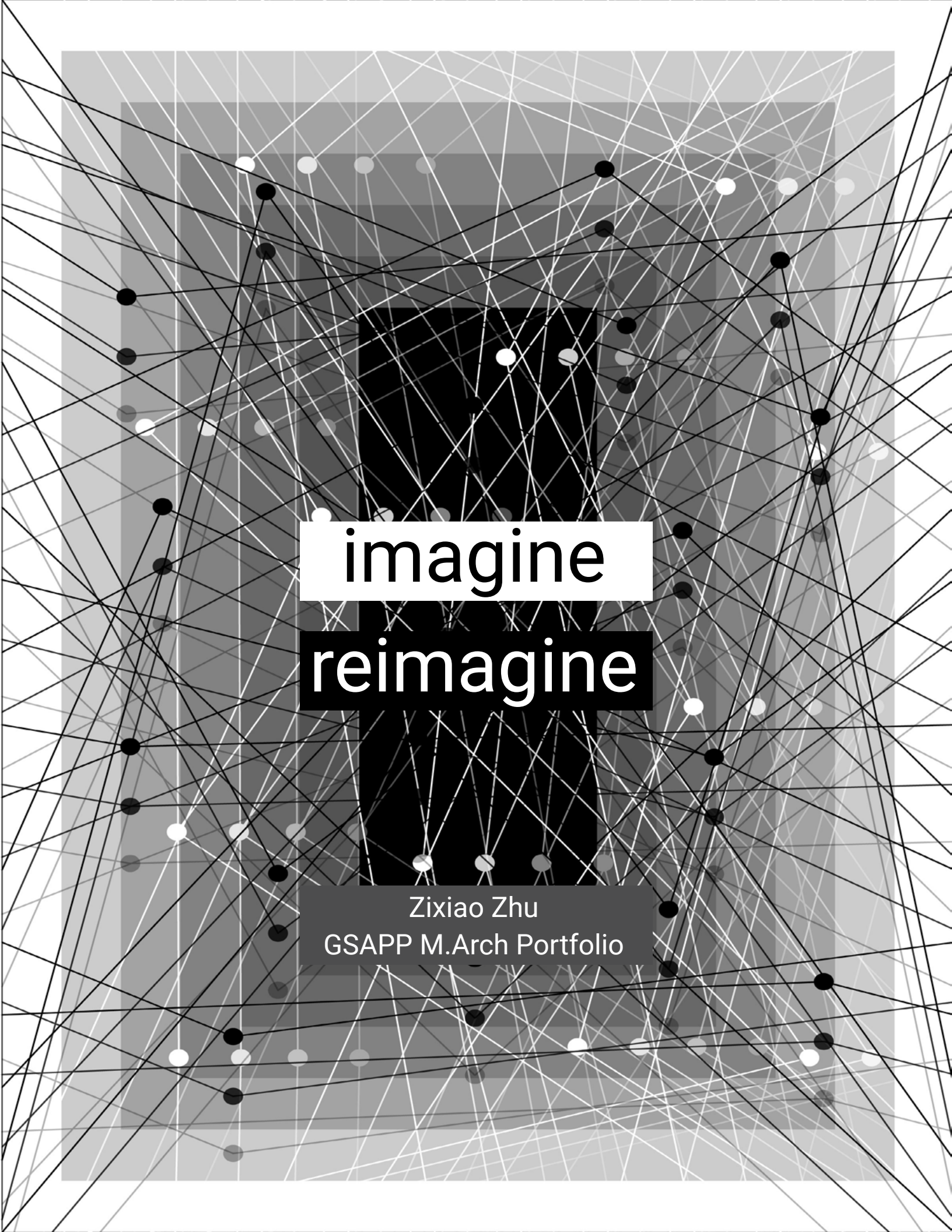


Zixiao Zhu
GSAPP M.Arch Portfolio

CONTENT OF IMAGINATION

CONTENT OF REIMAGINATION

To Imagine

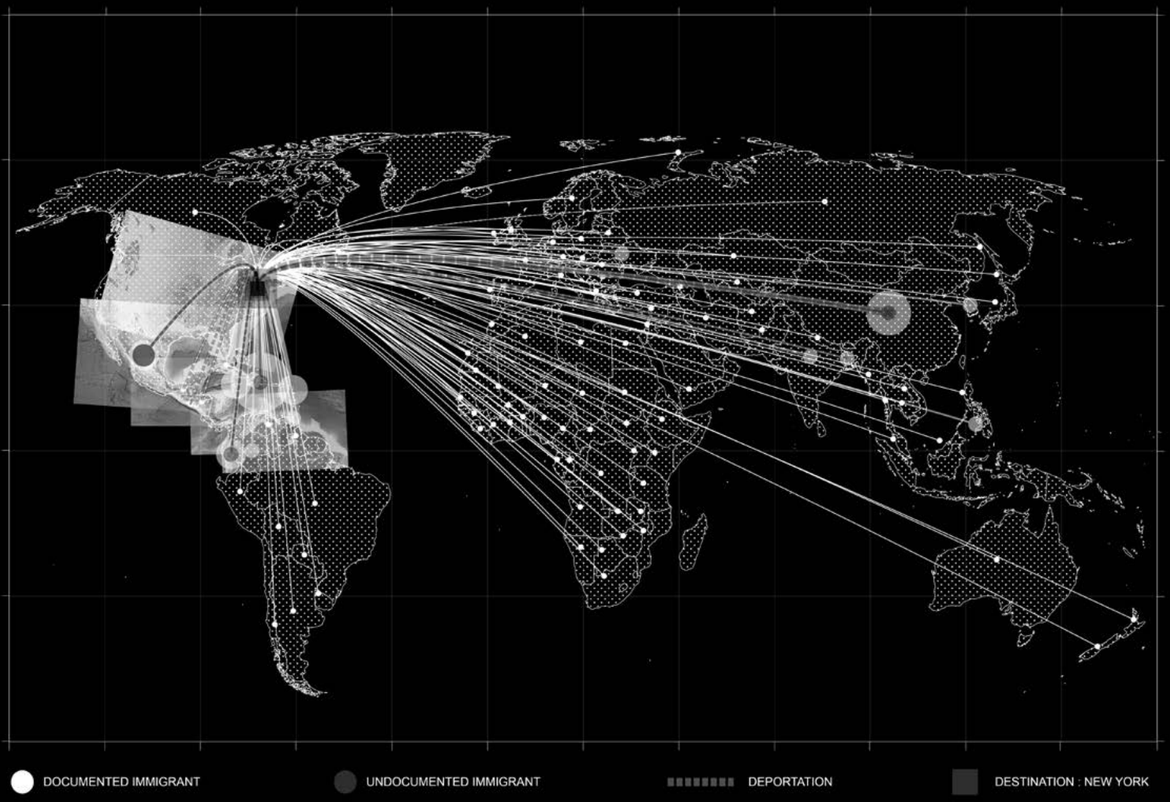
To imagine architecture is to envision new forms of social, political, technical, and civic relations that take into account the communal, cultural, and environmental impacts of design. This involves developing innovative and sustainable solutions that meet the needs of individuals and communities. In the “To Imagine” section, projects explore imaginative possibilities, from reimagining the nature of human mortality to envisioning centralized carbon removal. By utilizing cutting-edge technologies, materials, and policies, these projects actively contribute to the creation of a larger-scale world-building effort.

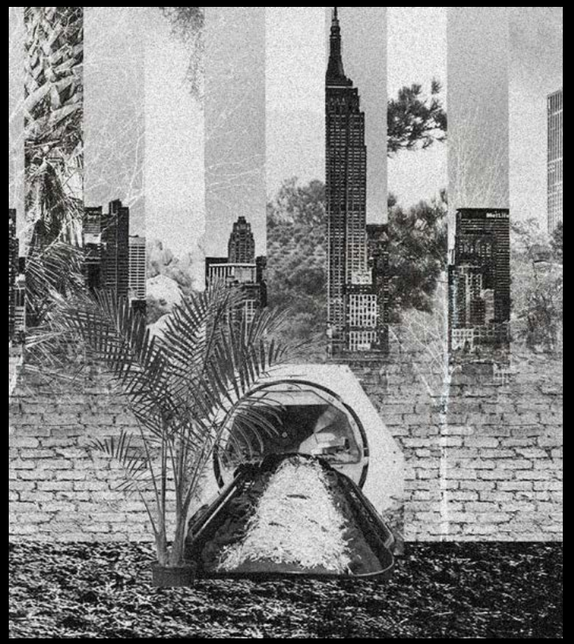
01
OVERPASS:
A CEMETERY OF THE DISTANT

GSAPP Adv Studio VI
Spring Semester 2023

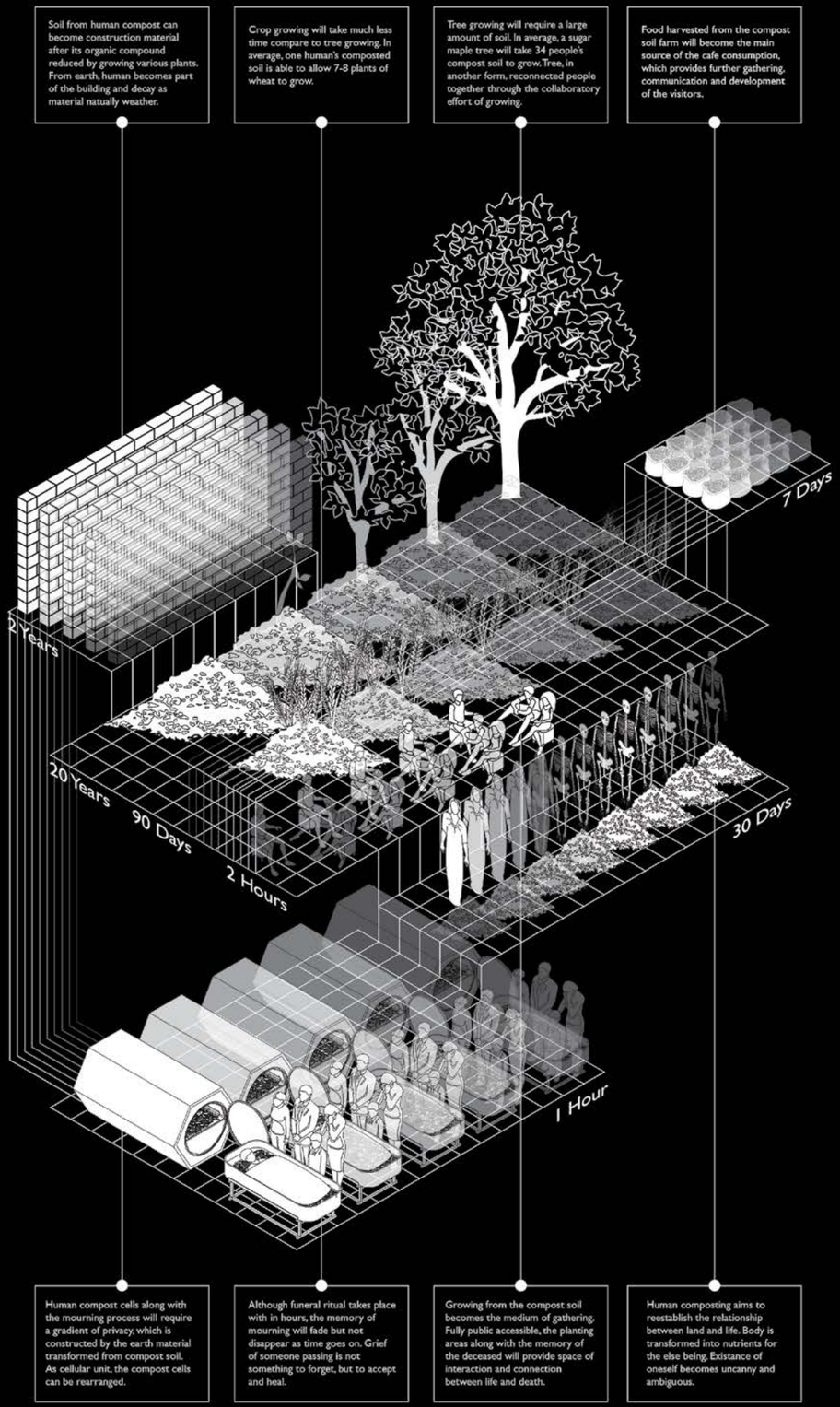
Team Project Partner: Wenjing Tu
Instructor : Karla Rothstein

With a profound history of global immigration, New York has yet to sufficiently recognize the extent of loss of identity, community and belonging among migrants. At the same time, with an augmenting shortage of spaces to commemorate the deceased, New York lacks sustainable, ethical and economic procedures for migrants and their relatives to settle their death. Addressing the sorrow and grief of death within a displaced environment and culture, the project provides an alternative form of belonging and reinstates lost kinship for the deceased migrant. The sustainable and transformative infrastructure of human composting transcends the significance of the soul to provide families a meaningful way of memorizing the dead by transitioning the human body into soil. Islands juxtaposed with “sacred” climatized green spaces and mourning passages utilize the soil to nurture other living species and accumulate through time, slowly modifying the occupiable architectural spaces.

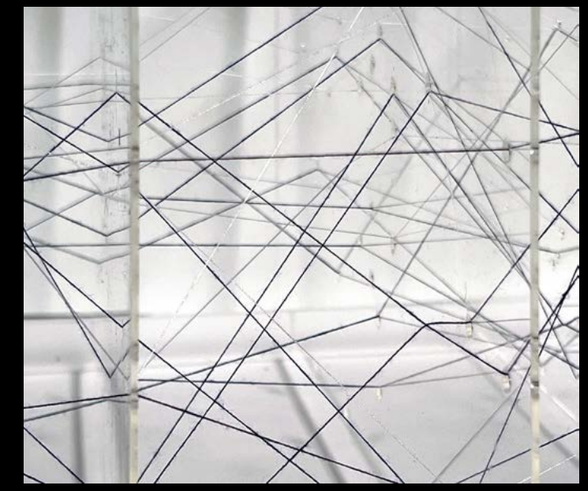


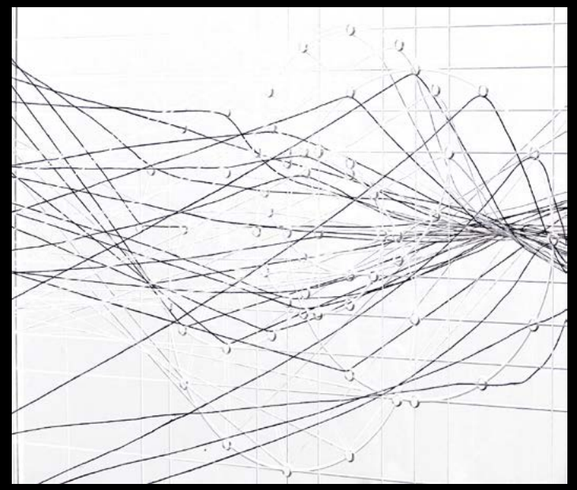


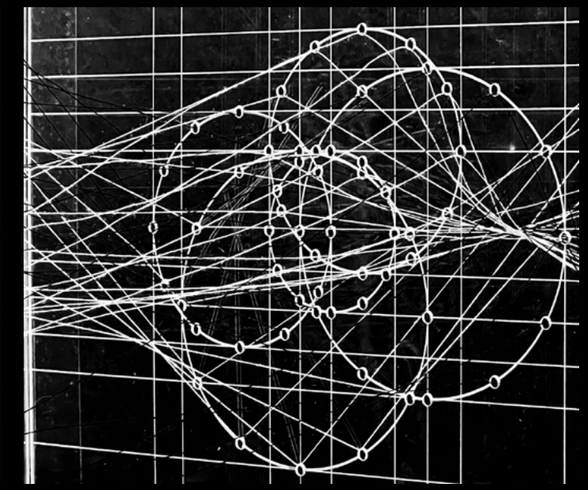
New York City has a significant demographic composition of immigrants, representing 37.2 percent of the population and 44.2 percent of the labor force. Major countries of origin include the Dominican Republic, China, and Mexico, with a recent wave of migration from countries like Venezuela. These migration patterns reflect a positive attitude towards the environmental, cultural, and identity transition that comes with relocating, as well as a sense of purpose. However, dying in New York is financially unfeasible, as the city's shortage of commemorative spaces presents an unsustainable, unethical, and costly challenge for migrants and their families seeking end-of-life settlement options. The project began by selecting a site along the New York side edge of Ellis Island, which has a deep historical significance in the migration history of the city. The map expresses the density of migrants in various parts of New York City and the locations of health departments where family members can obtain death certificates for their deceased loved ones. On December 30, 2022, New york passed the A382 bill legalizing human composing as an alternative option for burial. Different from cremation or embalming burial, the human composting process provides an alternative end of life by reintegrating the body back to earth.

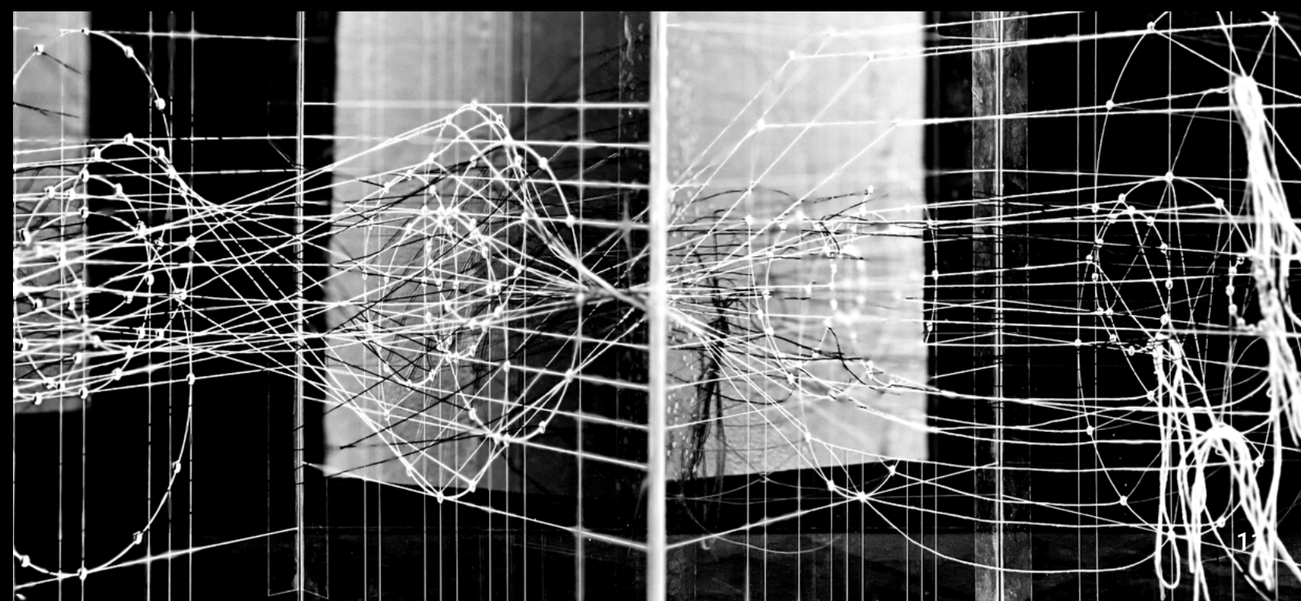


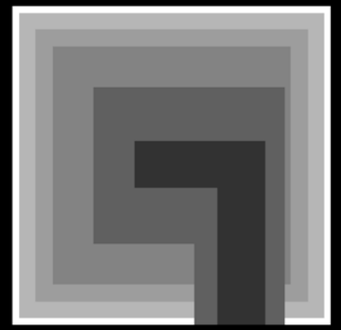
Various physical tactics were employed to explore the liminal nature of the coexistence of the nature of immigrants. Despite sharing the same spatial framework, the black and white strings have an ambiguous visible quality against different backgrounds. Their appearance and disappearance, which reflects the migrants' situational character, also calls attention to the impact of our spatial design. The continuous accumulation, integration and deterioration of soil from human composing would become the means of sculpting the space within this human compost facility. Meanwhile becoming the thread connecting the migrants and the land.

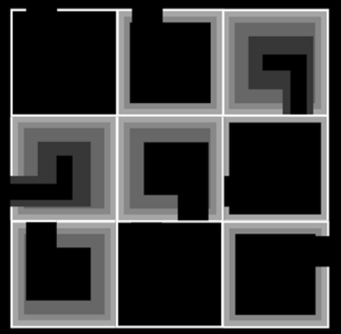


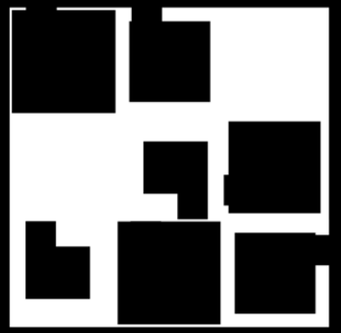


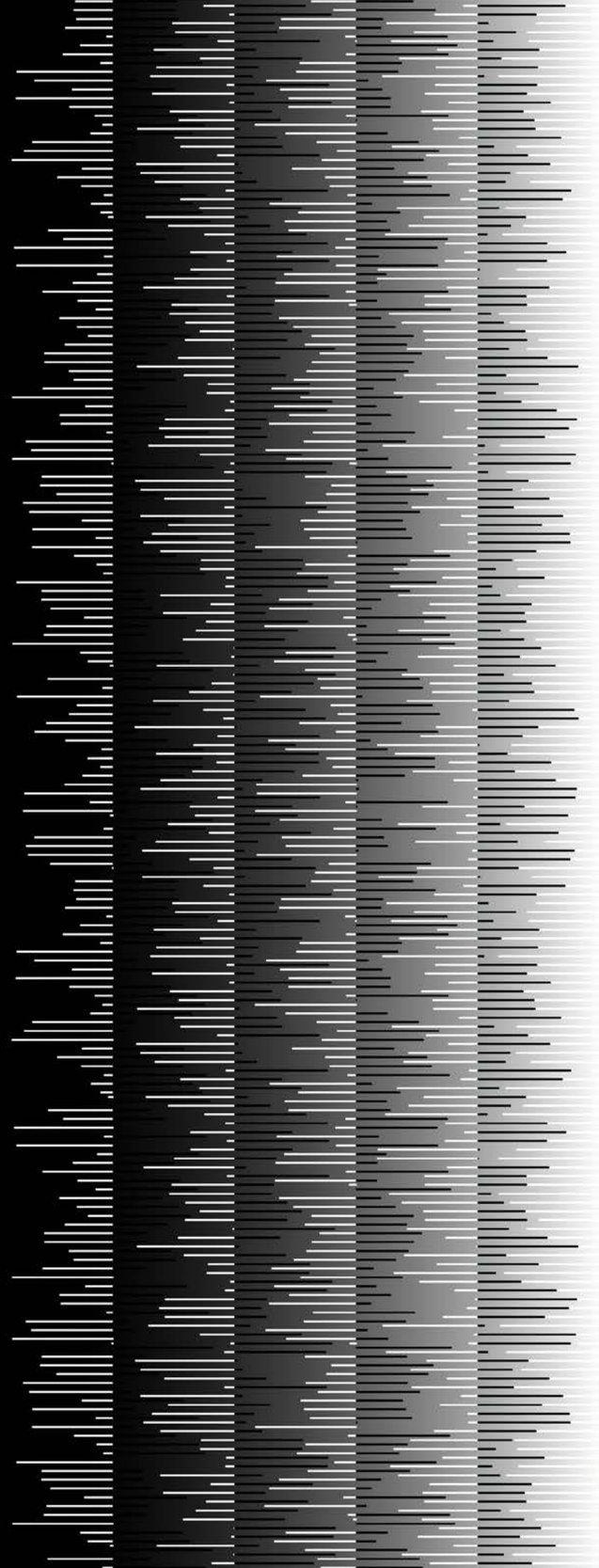








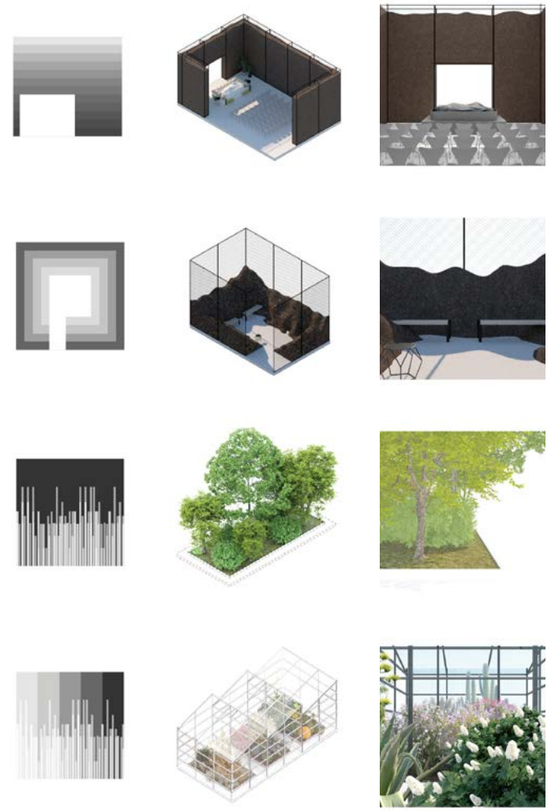


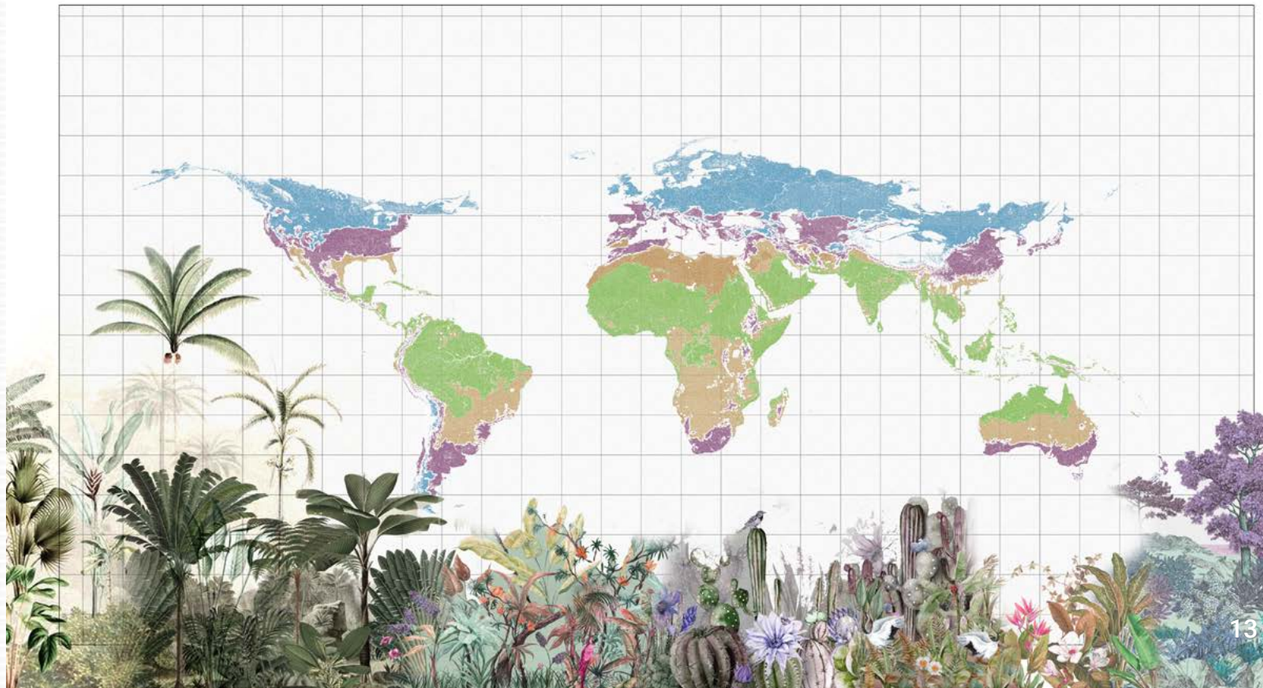


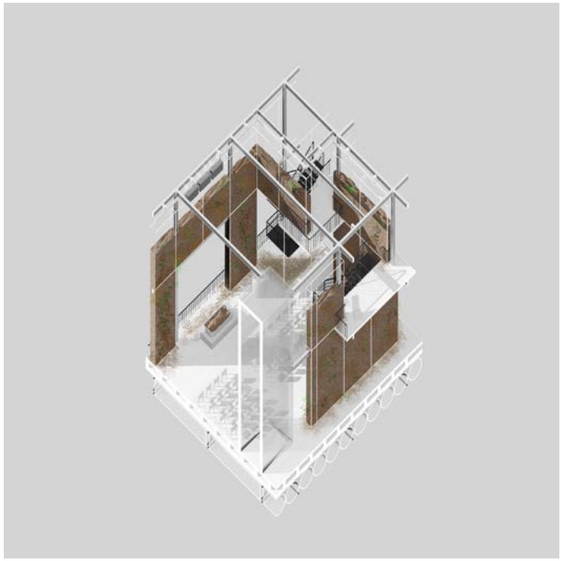
Soil and Land

The continuous accumulation, integration and deterioration of soil returns migrants of New York back to the land and beyond, reconnecting the migrated, the city, and distant relatives. Four spatial arrangements can be created, whereby a dual mesh system confines soil buildup to form walls that enclose ceremonial spaces. In contrast, a single mesh system permits horizontal and organic accumulation of soil, occupying spaces reserved for mourning.

Cultivated climate regimes correlate with the temperature and moisture of global ecological regions, providing immersive habitat for flora that are familiar and meaningful to migrants' homelands, while also connecting individuals across diverse geographies. The outdoor greenary spaces, taking advantage of the New York climate, becomes the link to domestic land and the destination of migration.

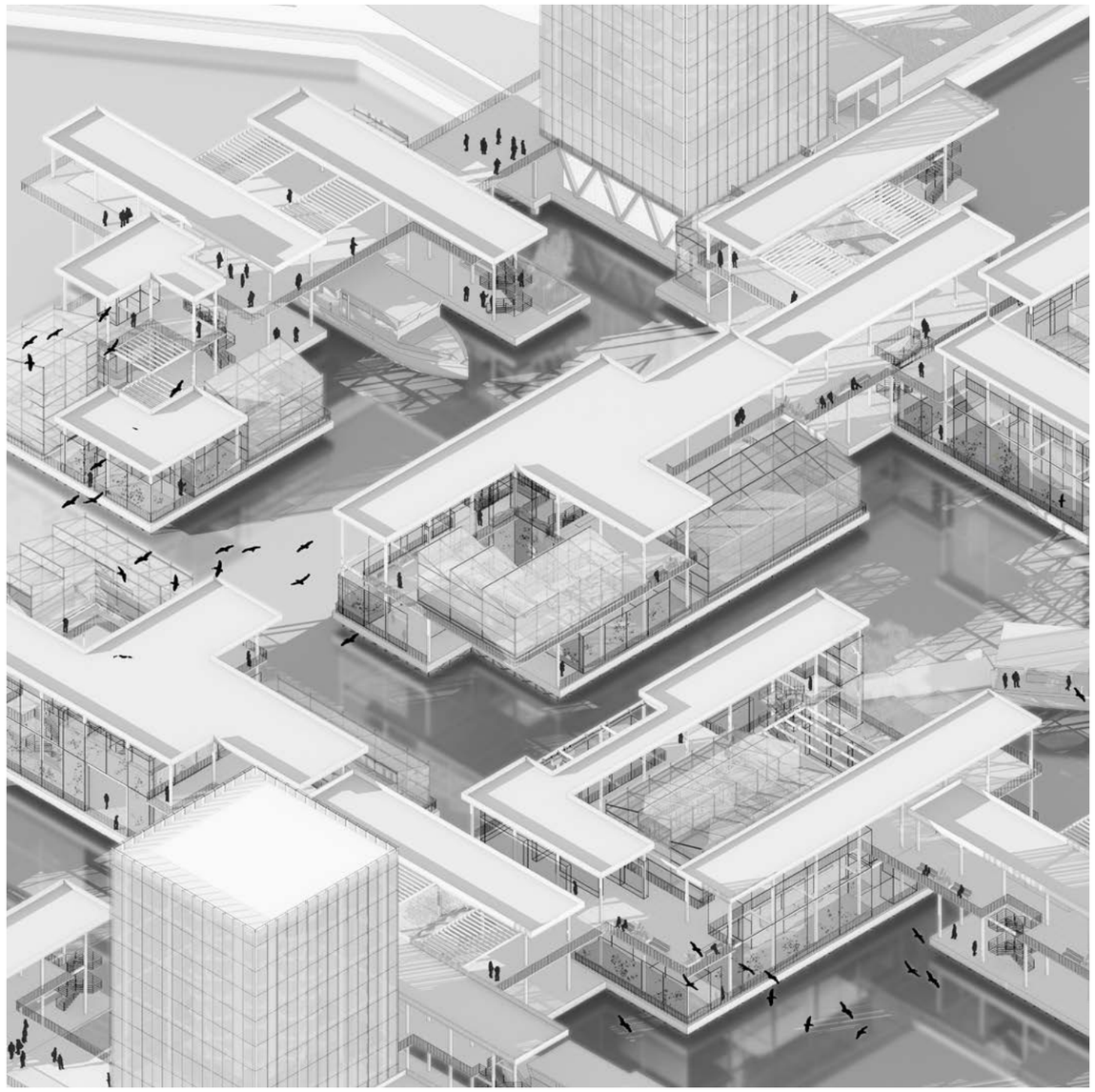






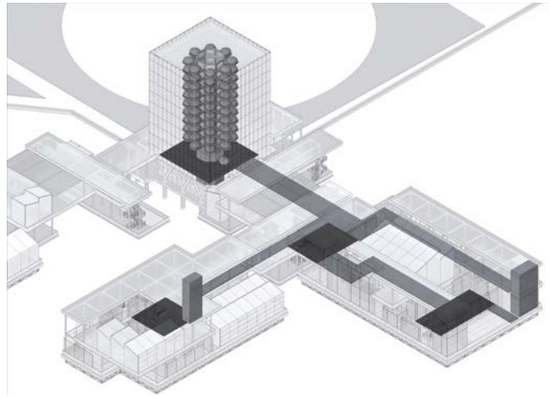
Modular Space

Based on qualitative ideas, a set of modular islands have been designed to facilitate gradual soil accumulation over an extended period. Each island is typically used for 16-20 years and serves as a base for funerary activities and self-reflection. These islands are interconnected, enabling people to move between them, promoting a sense of community and shared mourning. Soil are distributed by automate vessels that are attached in between structures. The vessels move slowly around the meshes and gradually layering soil. The network of soil accumulation provides the visitors and relatives a sense of connection, a connection between migrants and lands.



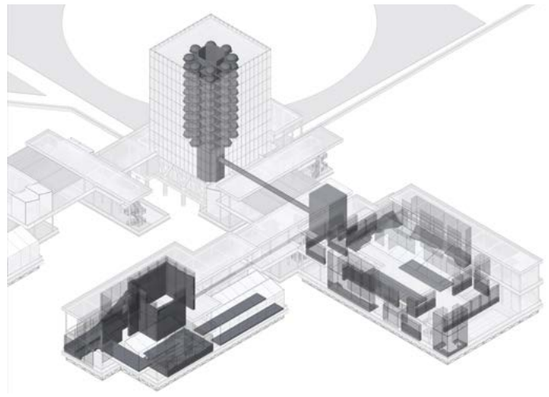
Cluster and Expansion

The main purpose of the tower will be to house human compost facilities and serve as the primary source of soil. It will also be connected to all the modules. To facilitate the docking of ferries, connection islands will act as bridges between the tower and the funeral islands. The ongoing construction of islands will expand the edge of Ellis Island, creating an infrastructure and landscape for mourning and healing. This design will also highlight and celebrate the diversity of culture, climate, and activities of New York residents. As Ellis Island being the first prototype design, the new clustering facility will expand gradually to locations along New York's shoreline according to the population and needs of the immigrant community.



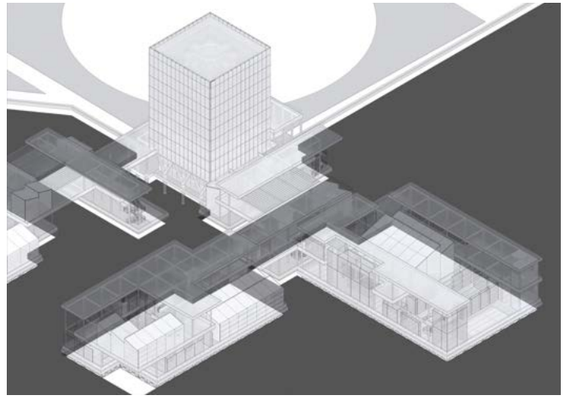
Funeral Route

The funeral route starts from the point people arrive on the transitional dock spaces. The body along with the relatives will head to the ceremonial space on the modular islands. After all, the body will go along the elevators and be sent to the compost tower through the second level.



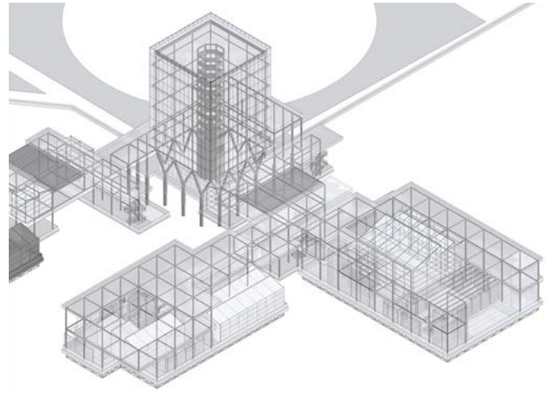
Soil Route

After total of 60 days (composting & settling), the soil is loaded to the empty vessels for distribution. The mechanical setup is linked from the tower to the transitional island and then to the funeral islands. The containers travel on tracks situated along the edge of the meshes to distribute soil, allowing for a more even layering effect.



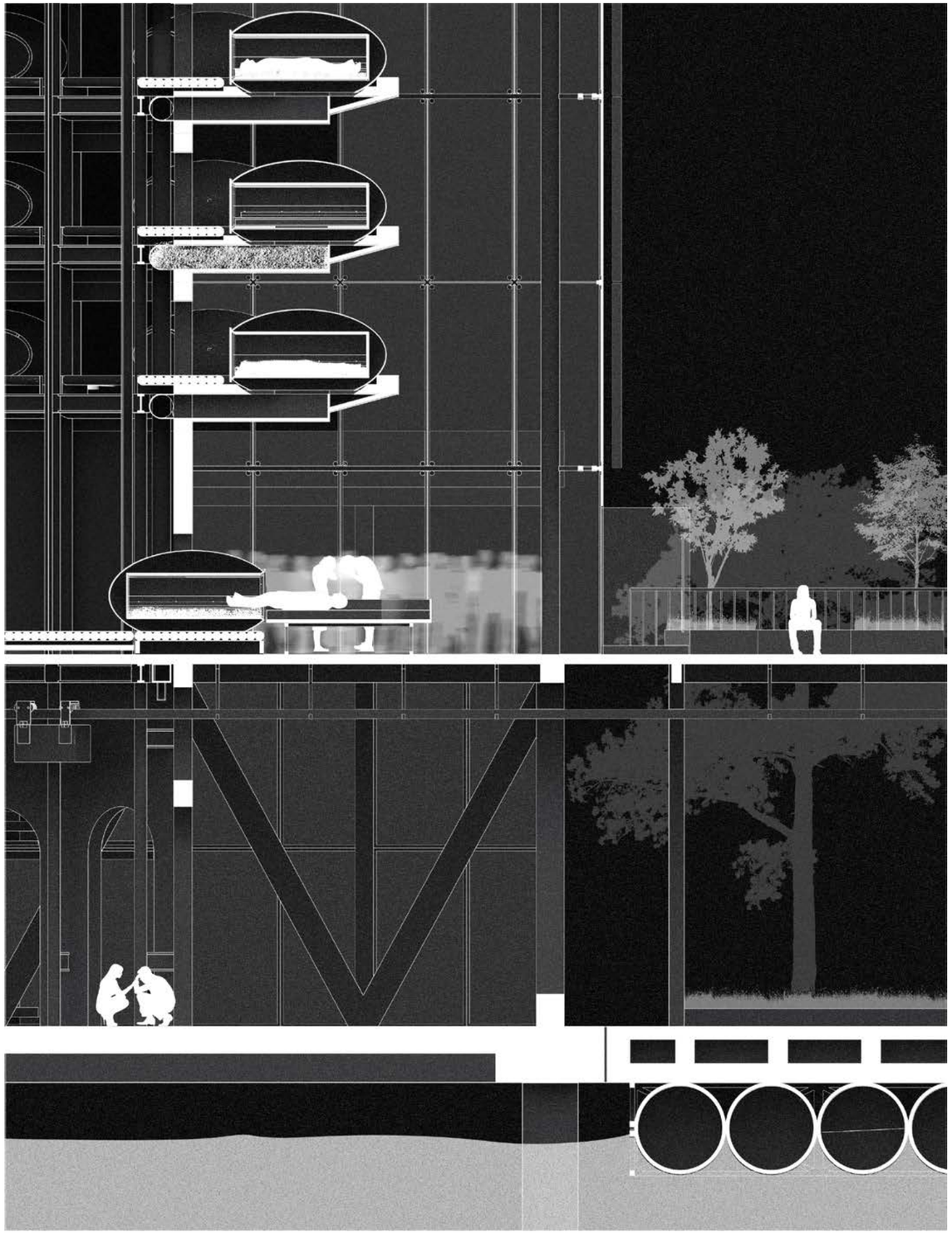
Water Route

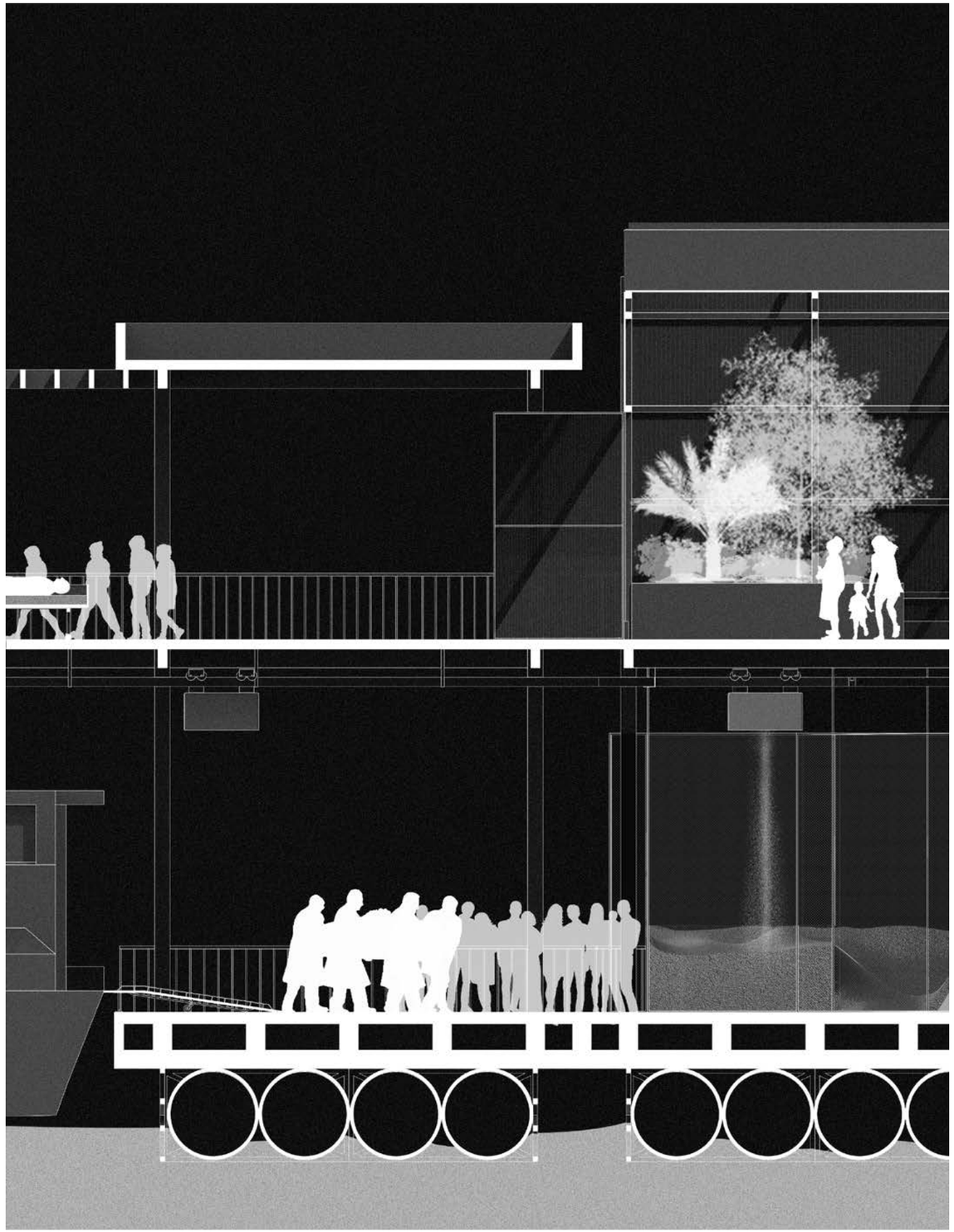
The walking route of in between the towers and island are siutated at upper levels, allowing a much more free route for the funeral ferries. At the same time, water becomes a symbolic connection media weaving the complexes together, but at the same time giving enough individuality to each island.



Structure

The towers will be deeply anchored into the riverbed as they need great dead load capacity. The first level of the tower is concrete V-columns, based on the study that will need to resist flooding. All modular islands will have a buoyant foundation with steel construction.





02
FROM CRADLE TO CRADLE TO GRAVE

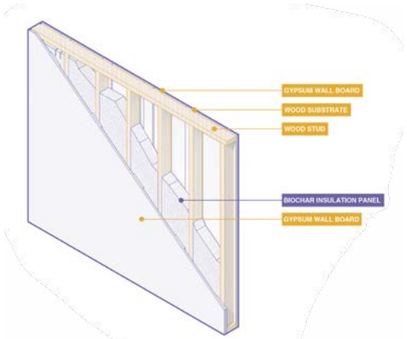
GSAPP Adv Studio V
Fall Semester 2022

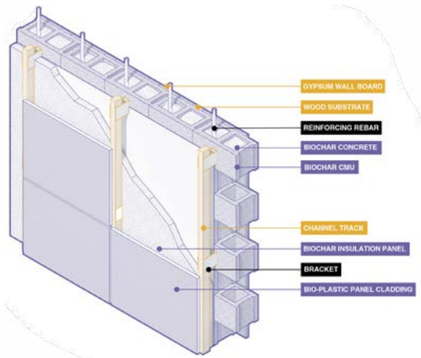
Team Project Partner: Cohaul Chen
Instructor : David Benjamin

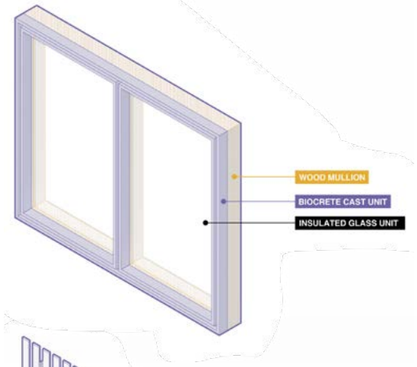
The demolition of stick frame houses has contributed a huge portion of the construction waste. Although wood is natural carbon tank material, most of the waste wood will be burned or landfilled due to the low recycling rate, which releases carbon back into the atmosphere. Resonated with the Buy Clean initiative, in 2025, “From Cradle to Cradle to Grave” responses to the policy, announced by the Alaska governor, to create Stick Frame Waste Treatment Facility in Anchorage. The facility not only transforms stick frame waste into biochar, a highly stable material that has a net carbon-negative production process but also serves as carbon storage. The proposal utilizes mass timber to promote low embodied carbon and reusable construction materials.

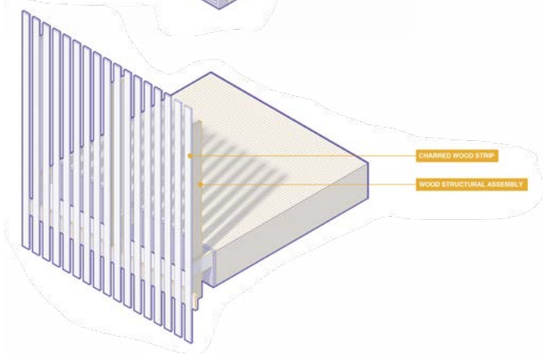
Buildings have a limited lifespan due to material decay, wear and tear, and external factors. Stick frame houses, despite using wood, a material that captures carbon, generate significant construction waste. This waste is often not properly disposed of, and instead ends up being burned or sent to a landfill, releasing carbon back into the atmosphere. To address this problem, urgent transition to construction technology with high reusability and a viable afterlife is necessary. By doing so, we can reduce the amount of construction waste generated and create new job opportunities in sustainable construction. This would have a positive impact on the environment and society for generations to come.

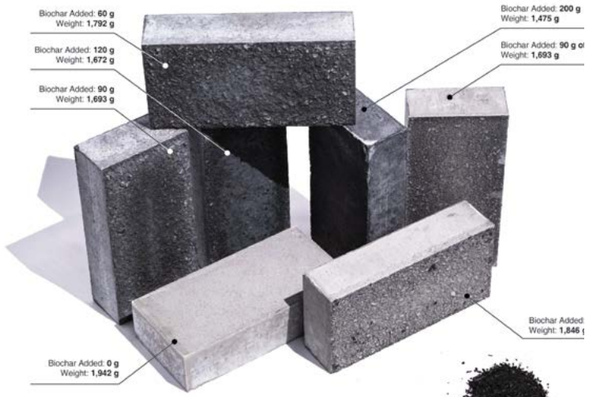
The governor of Alaska announced a new policy to create a Stick Frame Waste Treatment Facility, aligning with the Buy Clean initiative's goal of requiring the use of low carbon materials by 2025. Architects should be responsible not only for the construction documents but also for the deconstruction documents. This policy will promote using low embodied carbon construction materials and reusable construction materials for public architecture.

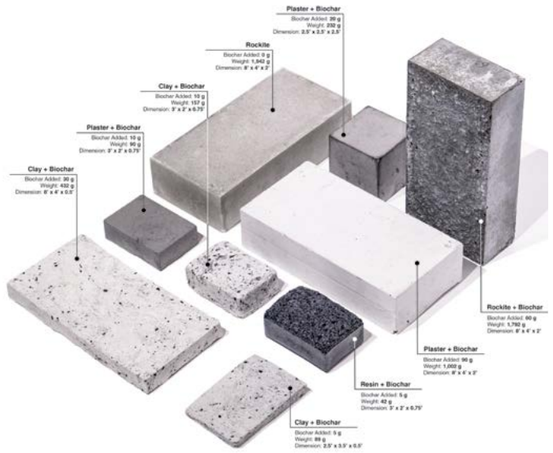




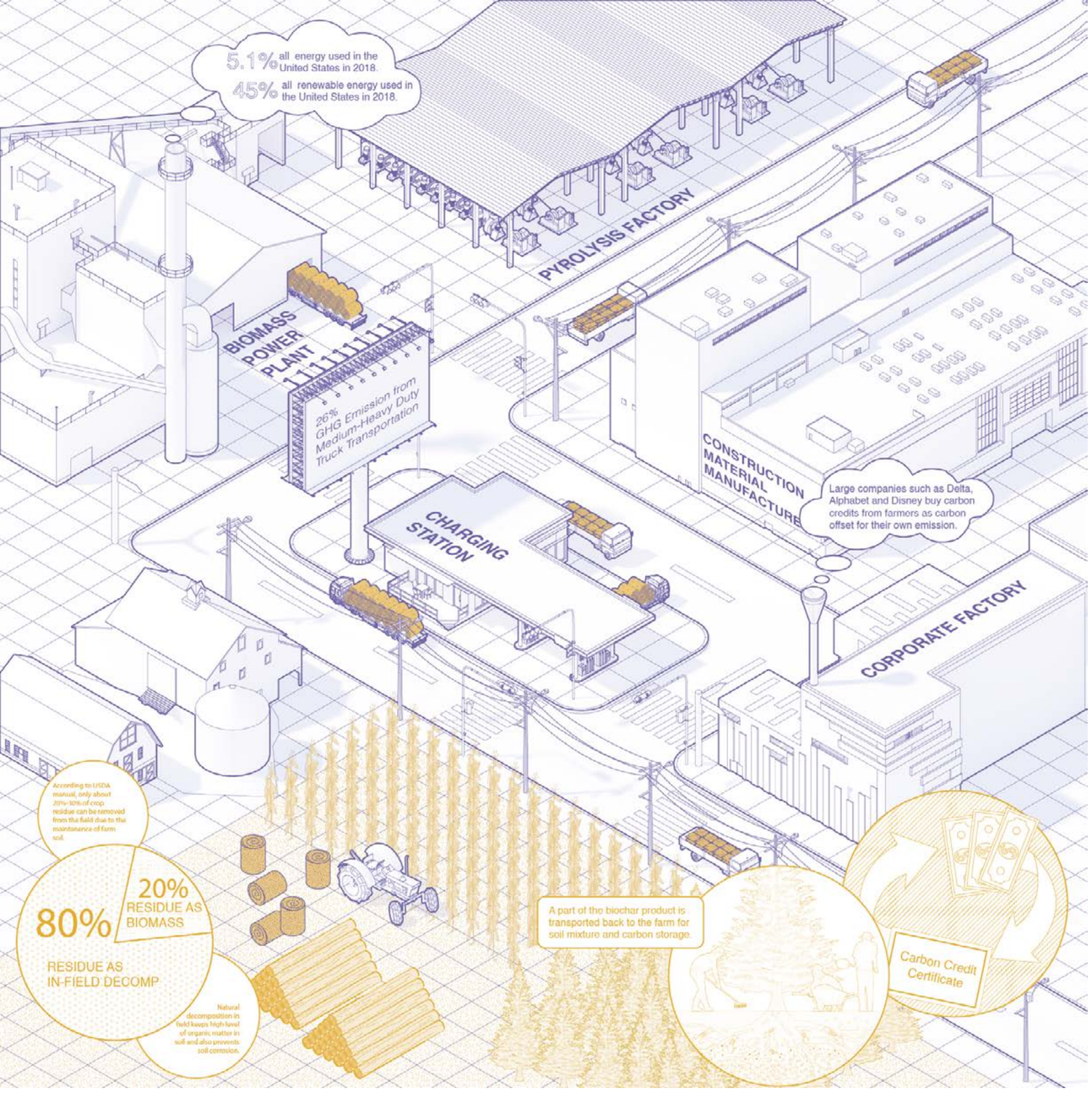






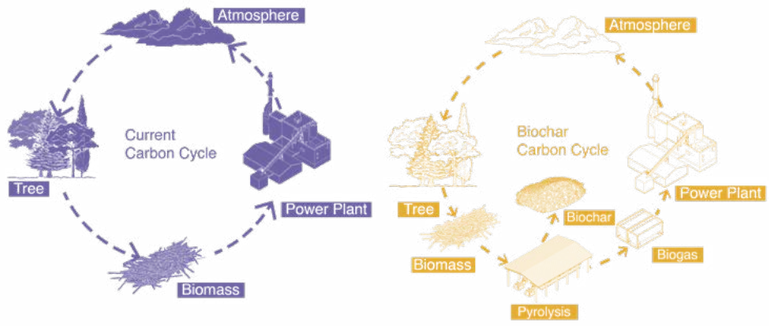


Biochar is a product of pyrolysis, a process of burning biomass such as wood and agricultural residues with no oxygen, which is able to transform more than 50 percent of the carbon storage in wood and agricultural residues into charcoal like stable substance. Besides adding back to agricultural field, biochar could be used as a raw material to fabricate architectural products such as insulation, CMU blocks, facade panels, etc. Replacing conventional building material with biochar product can further lower the embodied carbon from construction. A series of material experimentation was taken to explore the potential utility of biochar bricks within the project. Adding biochar into construction material allows the building becomes a carbon tank itself. Different proportion of biochar not just affects the weight of the block, but the color qualities.



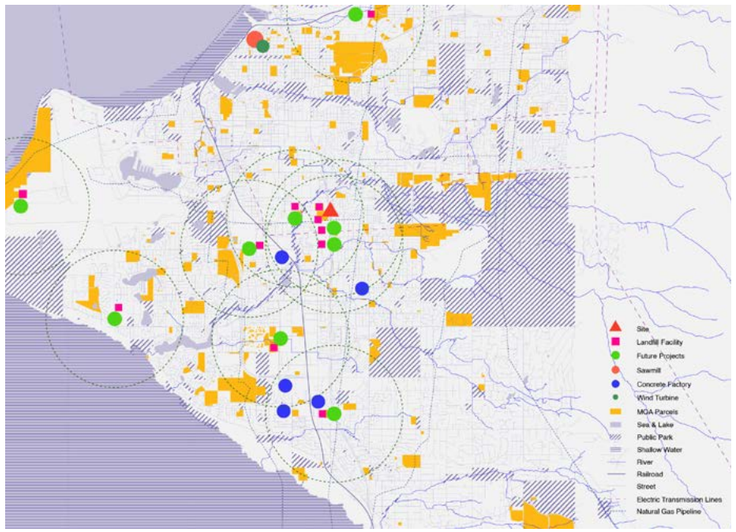
Biochar Industry

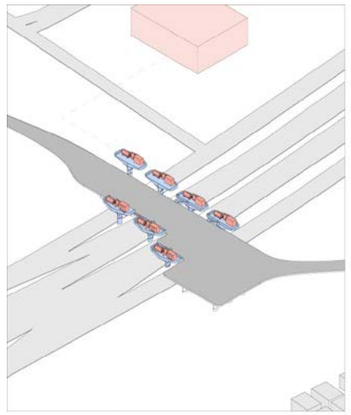
The production of biochar starts with biomass, such as agricultural and wood residue, which can be transformed into a charcoal-like substance called biochar through the process of pyrolysis. This method is able to sequester up to 50% of the carbon present in organic compounds within the biochar, which is highly stable. Additionally, syngas is produced during the process, providing a renewable energy source. Biochar is widely used in agriculture as a soil additive to reduce fertilizer usage. Because the production process has a negative carbon footprint, farms can sell carbon credits to larger corporations, including airlines.



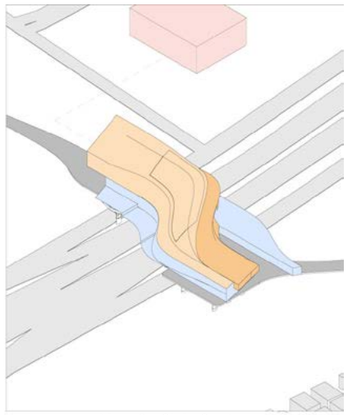
Wood Cycle

Introducing biochar into the wood industry offers an effective and sustainable approach for handling the transitional carbon from stick frame to mass timber construction. Using mass timber in construction enables higher reusability, as most members are connected by mechanical joints, and salvaged mass timber can be processed into wood boards for both interior and exterior installations. Biochar storage serves as the final resting place for wood construction materials.

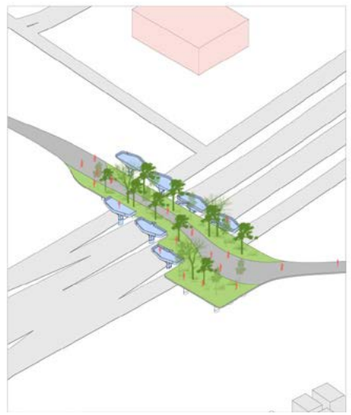




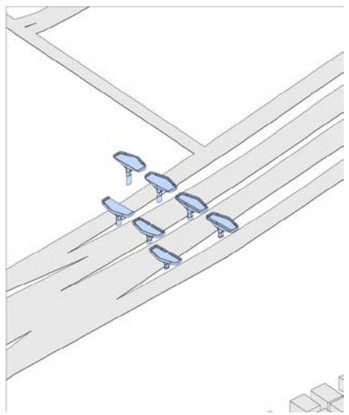
Year 0 - Bridge + Pyrolysis Columns



Year 0 - Civic Center

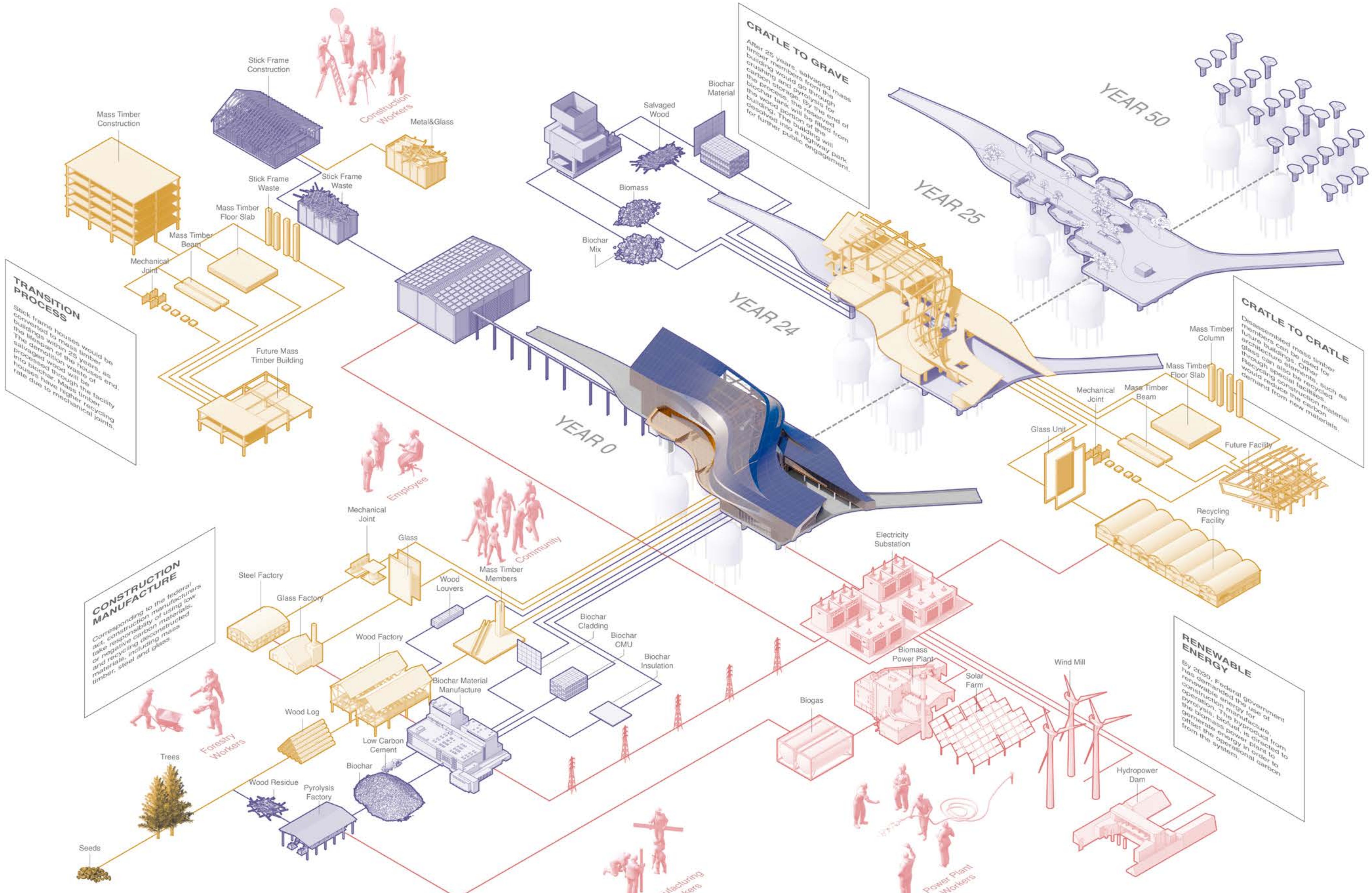


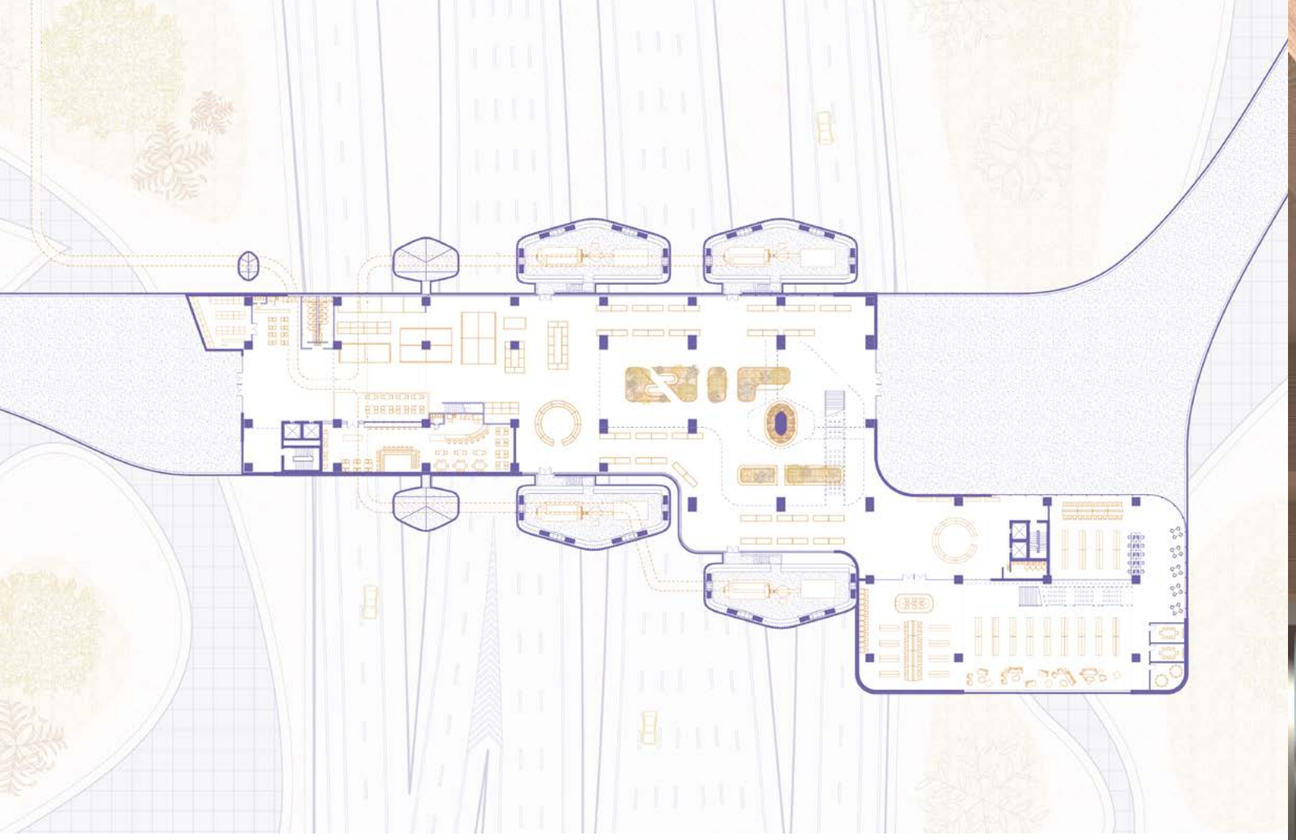
Year 25 - Public Park



Year 50 - Biochar Monument

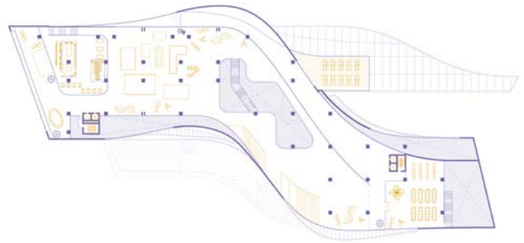
By analyzing the available resources in Anchorage, the site map reveals that the area has a significant number of logging yards and renewable power plants, including windmills and hydropower plants. This makes Anchorage an ideal location for a fully renewable future. The site is located across the Seward Highway, and the facility's primary responsibility is to convert stick frames to biochar from demolition sites within a one-mile radius. Over the next 25 years, all stick frame houses will be converted to mass timber construction. Simultaneously, the building will serve as a communal bridge, connecting neighborhoods and reducing the segregation caused by the highway. The building will also house various public programs and the Department of Energy office, creating a new civic typology that fosters community.


CRATLE TO GRAVE
After 25 years, salvaged mass timber members from the building would go through crushing and pyrolysis for carbon storage. By the end of the process, the reserved biochar tank will be filled from the wood portion of the building. The building will desolved into a highway park for further public engagement.
TRANSITION PROCESS
Stick frame houses would be converted to mass timber buildings within 25 years, as the lifespan of the houses end. The demolition waste of salvaged wood will be processed through the facility into biochar. Mass timber houses have higher recycling rate due to mechanical joints.
CRATLE TO CRATLE
Disassembled mass timber members can be used for future buildings. Other architecture elements, such as glass can also be recycled through special facilities. Recycling construction material would reduce the carbon demand from new materials.
CONSTRUCTION MANUFACTURE
Corresponding to the federal act, construction manufacturers take responsiblity of using low or negative carbon materials and recycling deconstructed materials, including mass timber, steel and glass.
RENEWABLE ENERGY
By 2030, Federal government has demanded the use of renewable energy for construction manufacture, operation. The byproduct from pyrolysis, biofuel, is directed to the biomass power plant to gemerate energy in order to offset the operational carbon from the system.
YEAR 0
YEAR 24
YEAR 25
YEAR 50
Stick Frame Construction
Construction Workers
Metal&Glass
Mass Timber Construction
Stick Frame Waste
Stick Frame Waste
Mass Timber Floor Slab
Mass Timber Beam
Mechanical Joint
Future Mass Timber Building
Salvaged Wood
Biochar Material
Biomass
Biochar Mix
Employee
Community
Mechanical Joint
Glass
Steel Factory
Glass Factory
Wood Louvers
Mass Timber Members
Biochar Cladding
Biochar CMU
Biochar Insulation
Wood Factory
Biochar Material Manufacture
Wood Log
Low Carbon Cement
Biochar
Trees
Forestry Workers
Wood Residue
Pyrolysis Factory
Seeds
Manufacturing Workers
Mass Timber Column
Mass Timber Floor Slab
Mechanical Joint
Mass Timber Beam
Glass Unit
Future Facility
Recycling Facility
Electricity Substation
Biomass Power Plant
Solar Farm
Biogas
Wind Mill
Hydropower Dam
Power Plant Workers



Bridge Level Plan

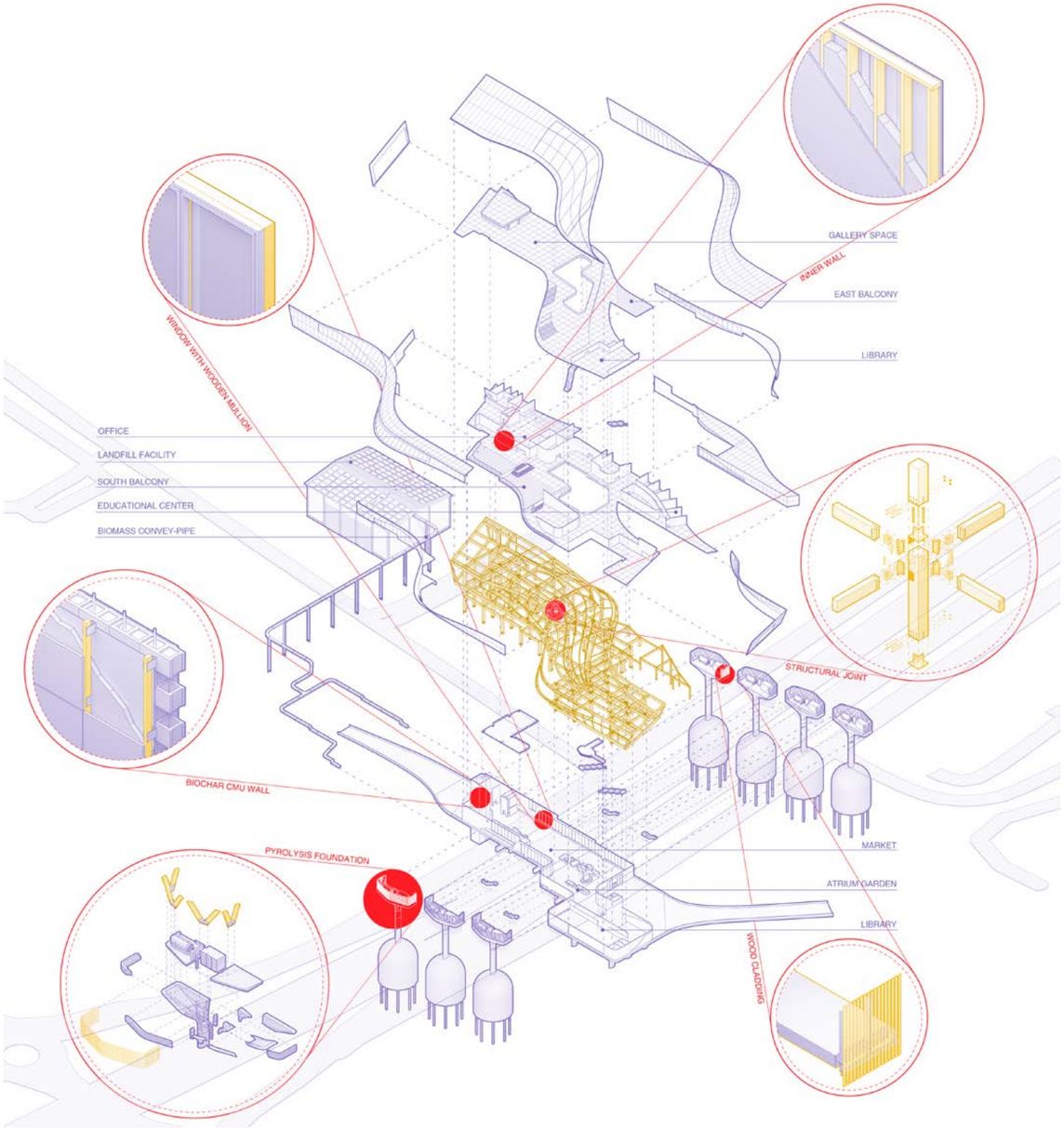
Second Level Plan



Third Level Plan

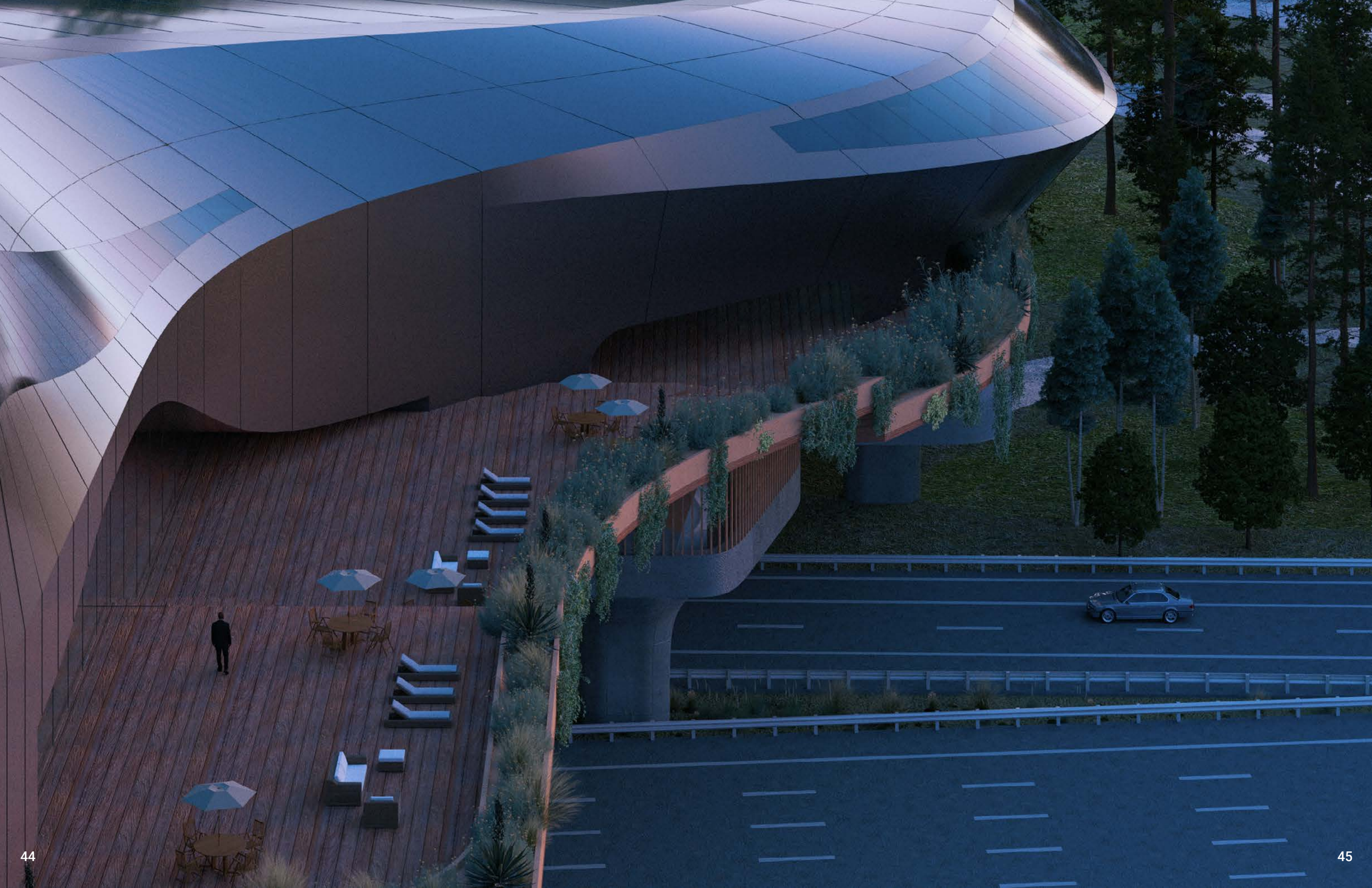
Civic Bridge

The facility will contain a enclosed street market space for the local gathering on the top of the highway. Besides the market are civic spaces such as library, education spaces and communal working spaces. The second level will contain a department of energy office, which further emphasizes local agency and taking care of the running of the pyrolysis machines. The third level will be the exhibition spaces from local artists and also environmental awarness groups. With the mixture of community, spaces and institutional spaces and urban infrastructure, the building aims to become hotspots of Anchorage.



Carbon Storage

The foundation column is constructed with precast biochar-crete, which can be quickly assembled on-site. A large carbon tank will be situated at the column's base to collect the biochar produced by the pyrolysis plant located on the column's top. Additionally, the CLT space frames will provide additional support for the building's upper portion. The section illustrates the time difference between the building's completion and 25 years later, after the mass timber portion has been deconstructed. Each CLT component will be connected using mechanical fasteners, bolts, and pins. This means that, after 25 years, every column or beam can be quickly disassembled and repurposed as construction materials for other projects.

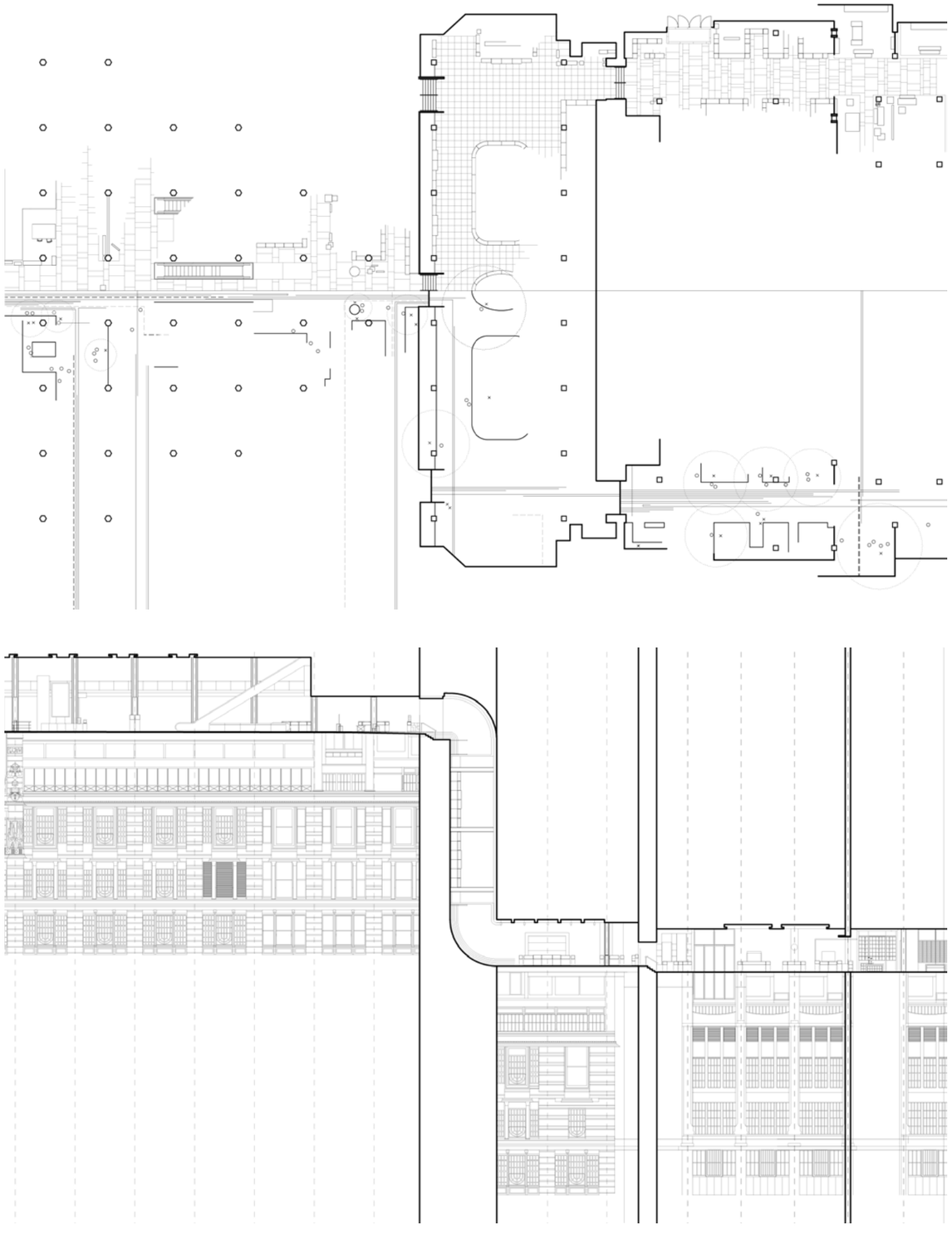


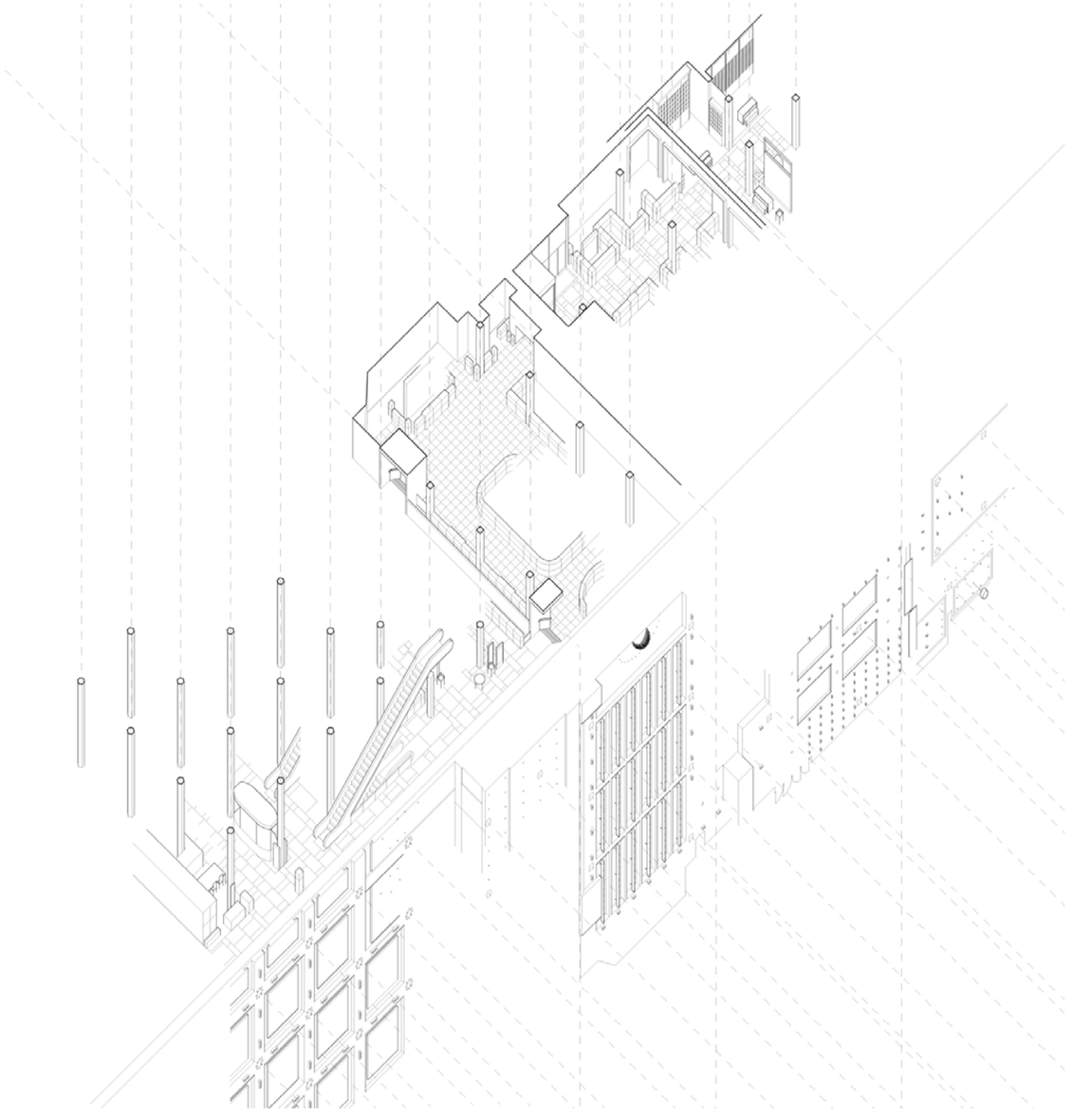
03
MANHATTAN UNSLEEP

GSAPP Core I
Fall Semester 2020

Individual Project
Instructor : Emmett Zeifman

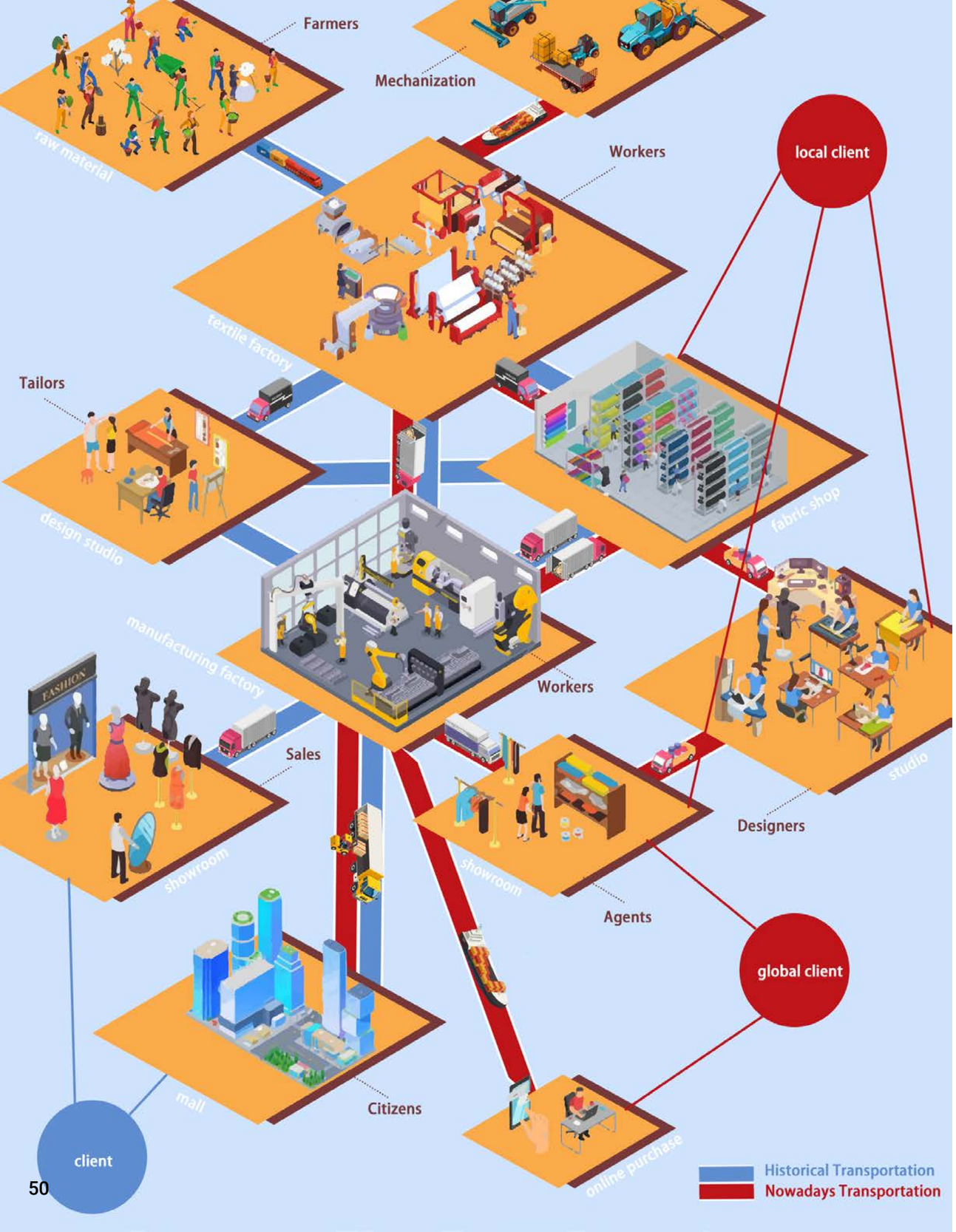
The Fashion District, also known as the Garment District, has been a hub for fashion labels and light apparel manufacturers for decades, benefiting from its special zoning status. However, with the rise of the service sector in the capitalist economy of the early 21st century and the increasing prevalence of autonomous and “lights-out” factories, the gentrification of the district’s manufacturing culture has become inevitable, despite attempts to prevent it through local zoning laws. Looking towards a future of full automation, the project takes a step further. With the labor force fully replaced by algorithms and lights-out factories, there is no longer pressure to find employment, as Universal Basic Income is provided by the government. The Fashion + Garment District thus becomes a space not only for professionals but for all people, as a place for recreation, spontaneous hobby, and a new norm of shopping.

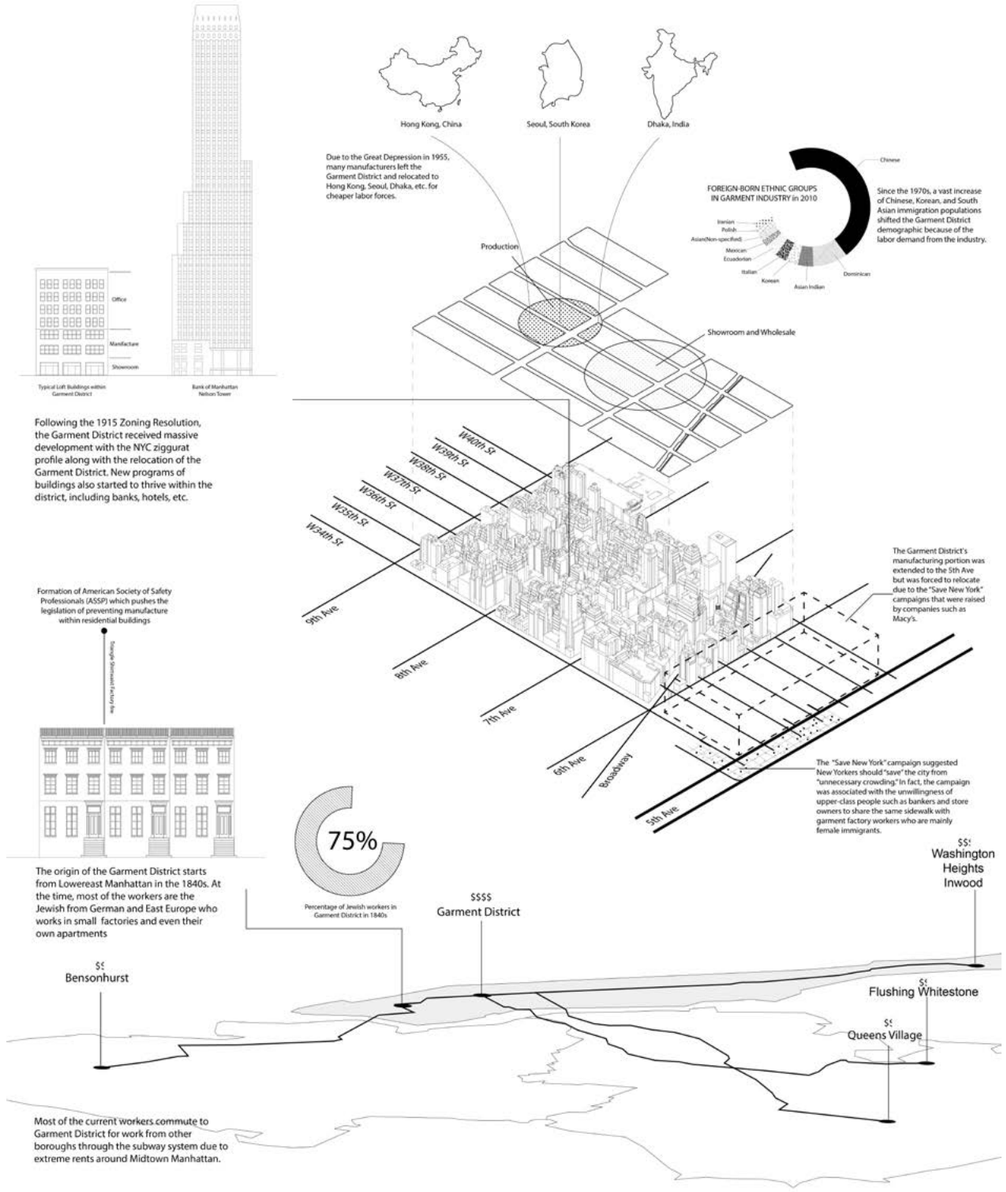




Experiential Documentation

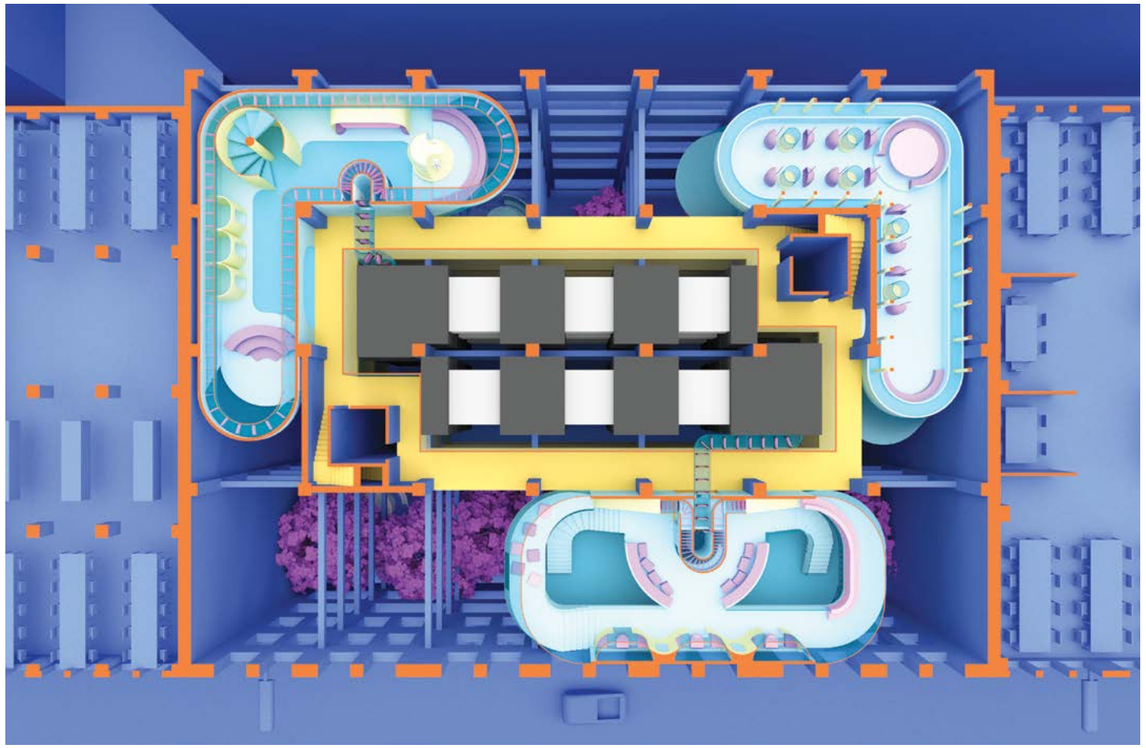
The aim of this series of documentation is to conduct an analysis of the architecture of Midtown Manhattan and explore its close association with consumer culture. The project employs video recordings of the everyday hustle and bustle at Macy's department store as a baseline for the investigation. The drawings derived from the recordings highlight the personal attention given to the surrounding counters, capturing the intricate details of the architecture and design that serve to entice and engage consumers. By delving into the relationship between architecture and consumer culture, the documentation seeks to deepen our understanding of the role that the built environment plays in shaping our consumption behaviors and desires.





Garment & Industry

Following multiple "Industrial Revolutions," it is highly probable that the majority of labor, both industrial and service-related, will be carried out by lights-out factories and algorithms. The proposed building draws upon the typology of loft buildings in the garment district, serving as a foundation for a social vision of a post-industrial future. In this future, people will not have to engage in labor solely for survival, but instead, they will have the opportunity to embrace labor as an enjoyable, self-automated activity.



Post-Industrial Autonomy

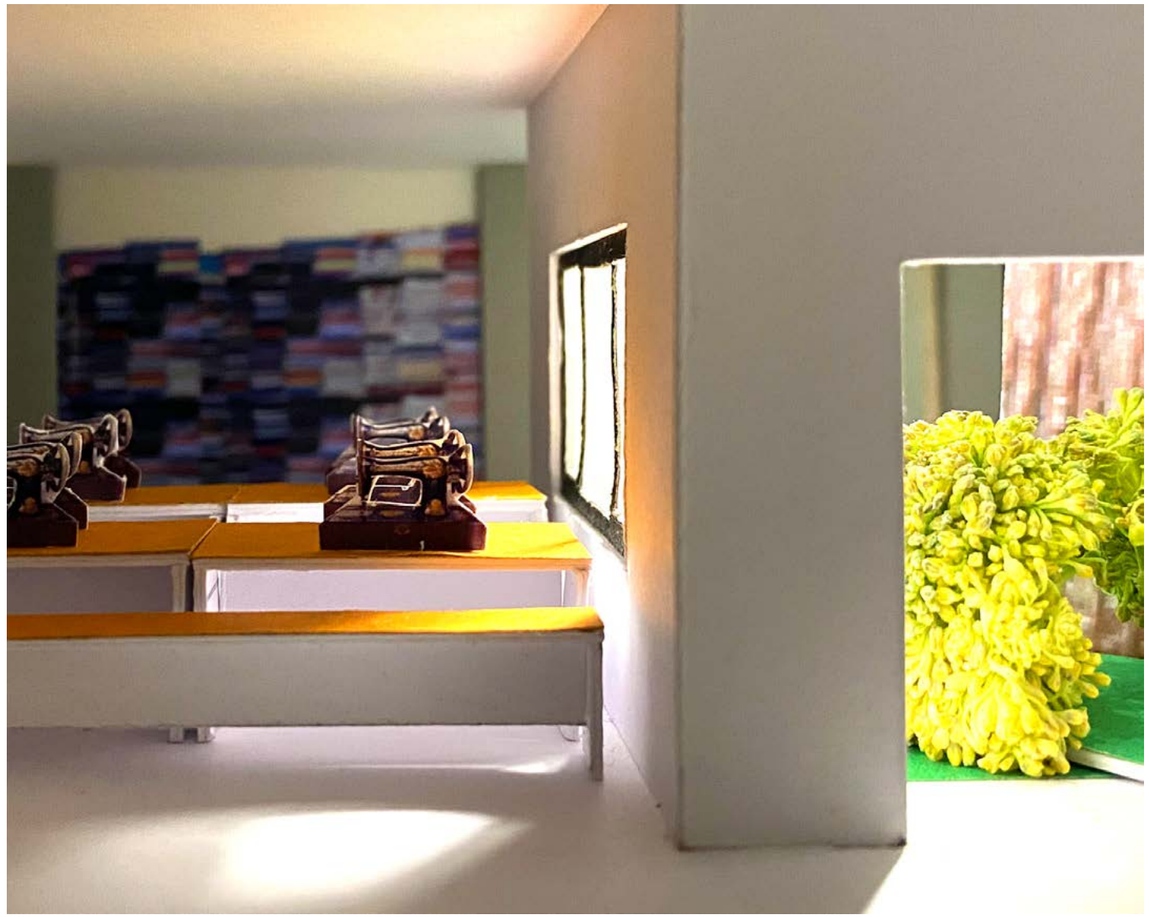
Humans have a tendency to gravitate towards the old as a stereotypical “style” of entertainment. Whether it is a lounge for creative shopping or a handcraft shop for relaxation and self-directed labor, the contemporary interests of the majority are often superficial and rooted in history. Despite the emergence of new trends and innovations, there is a persistent nostalgia for the past, which is evident in the current design and culture of many establishments. This longing for the old is indicative of a larger cultural phenomenon that highlights our collective desire to connect with our heritage and the traditions that have shaped us as a society.

Lightsout Factory

The proposed autonomous factory is an imagination based on 1920s factory high-rises, designed to meet the needs of the fashion industry. Located at the center of the building, the factory utilizes advanced technology for 24/7 garment production, freeing human labor forces from repetitive tasks. With robotic maintenance as the new norm, the factory operates smoothly and produces consistent high-quality garments. This technological advancement marks a significant milestone for the garment industry, highlighting the power of innovation and technology to revolutionize traditional manufacturing processes.

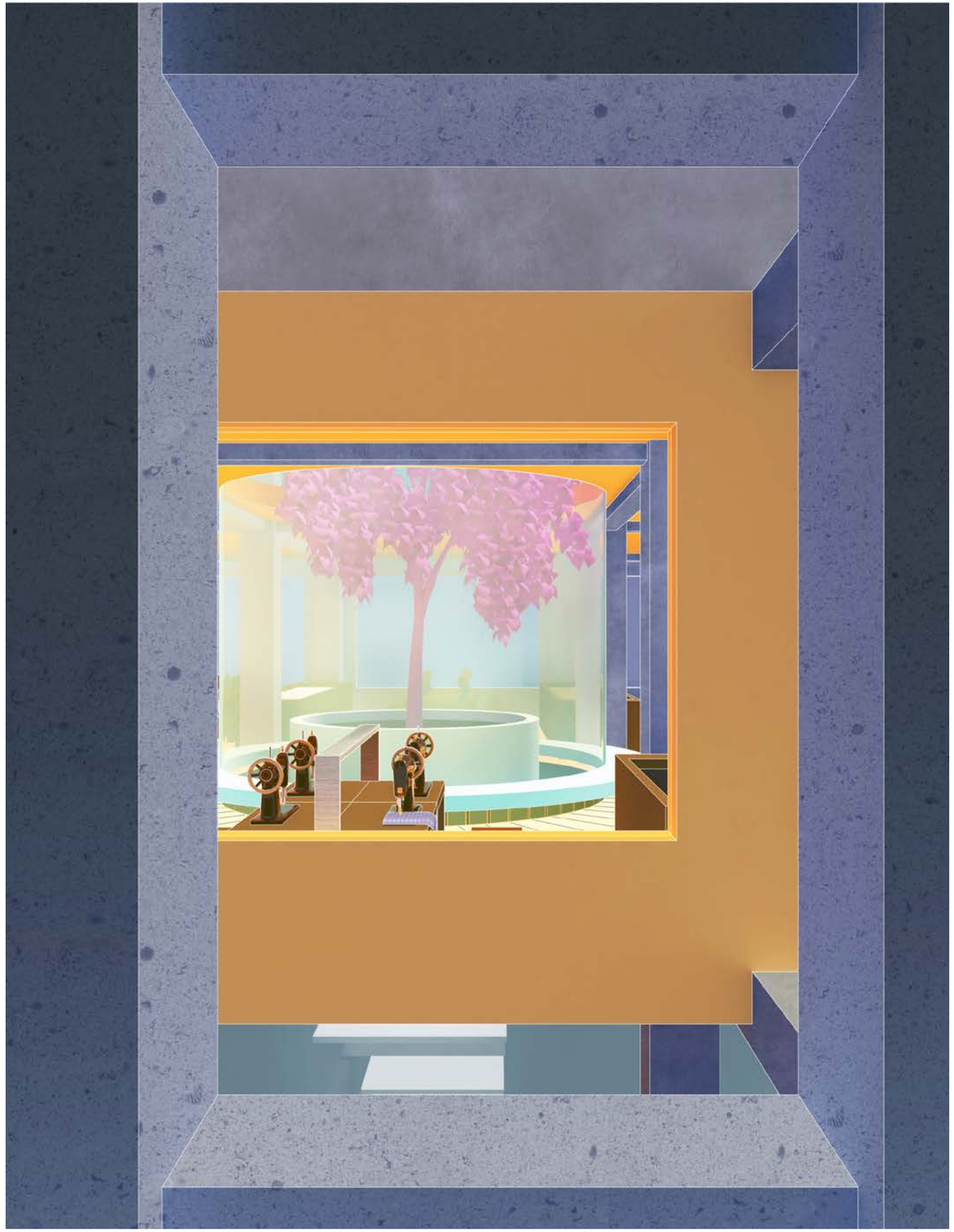
Creative Center

Surrounding the central factory are the Creative Centers, where fully customizable clothing can be ordered and produced on site. These centers empower citizens to lead fashion trends and facilitate self-branding, rather than relying solely on fashion brands to dictate style. Customization and design would become the currency and media of communication. Social status would no longer expressed through garment. Rather, talent, thinking and making are more emphasized at this imaginative era.



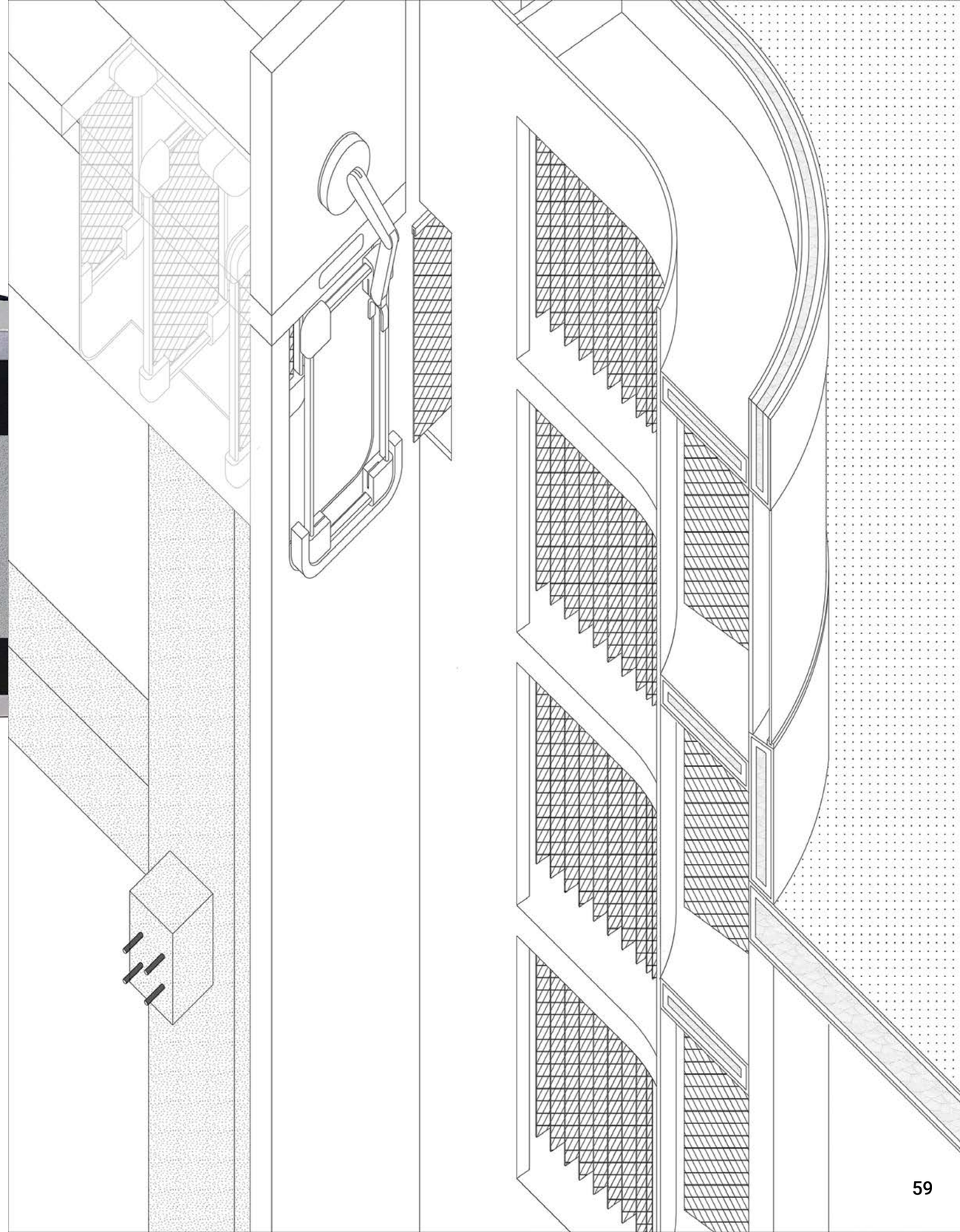
Craft Shop

Acknowledging the power and pleasure of self-labor and creation, the Craft Lounge provides a space for hand-made clothing. Although similar to an old manhattan loft factory layout, the space is considered a imaginative space for people to use their hands to make design come true. At the same time, the space becomes an exchanging space of ideas, life, art and beliefs. All programs are elevated in the shell of the high-rise building, eliminating the privitization of the retail ground floor and giving it back to the city.



Public Accessiblity

The loft high-rise building boasts an industrial aesthetic, with a bare reinforced concrete structure and exposed core. The design draws inspiration from heavy magnets, which provide easy construction and deconstruction qualities, making the building easy to modify and adapt to changing needs. The floor and wall composition are prefabricated and can be assembled on-site, creating a modular design that allows for flexibility and customization. This modular design also extends to the Creative Center cells, which are designed to be easily assembled and disassembled, providing a versatile and adaptable space for personal customization and self-expression.



04
PORTAL TO NOWHERE

GSAPP Ultrareal
Fall Semester 2022

Team Project Partner: Elena Yu | Claire Chen
Instructor : Phillip Crupi

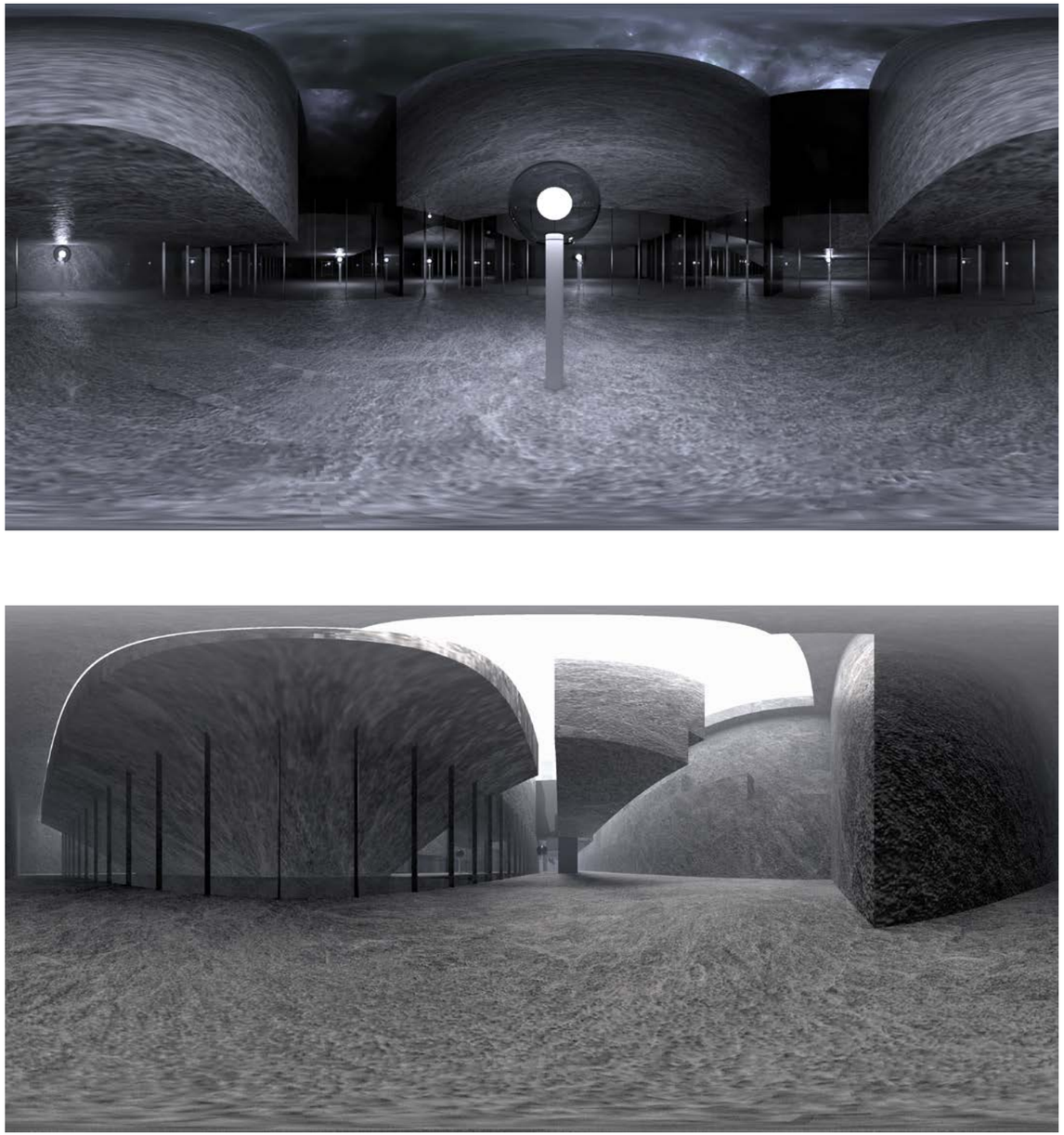
This project explores the concept of a fictional, yet possible space. The scene depicted is that of a post-apocalyptic planet, where a spaceship hovers over a lake, shooting a lightbeam into the sky, marking the connection to other possible survivors. The structure of the beacon is designed to be a portal to nowhere, with the alternating scale making people appear small and fragile. The scenes captured in the project depict the moments of this fictional narrative, showcasing the imagination and creativity of the designer. The project invites viewers to imagine a world beyond our current reality and to consider the possibilities that exist beyond our present circumstances. What is the power of architecture visual representation? Could monumentality be conducted through realism and surrealism?

05
ARCH DRAWING & REPRESENTATION

GSAPP ADR I & II
Fall Semester 2020
Spring Semester 2021

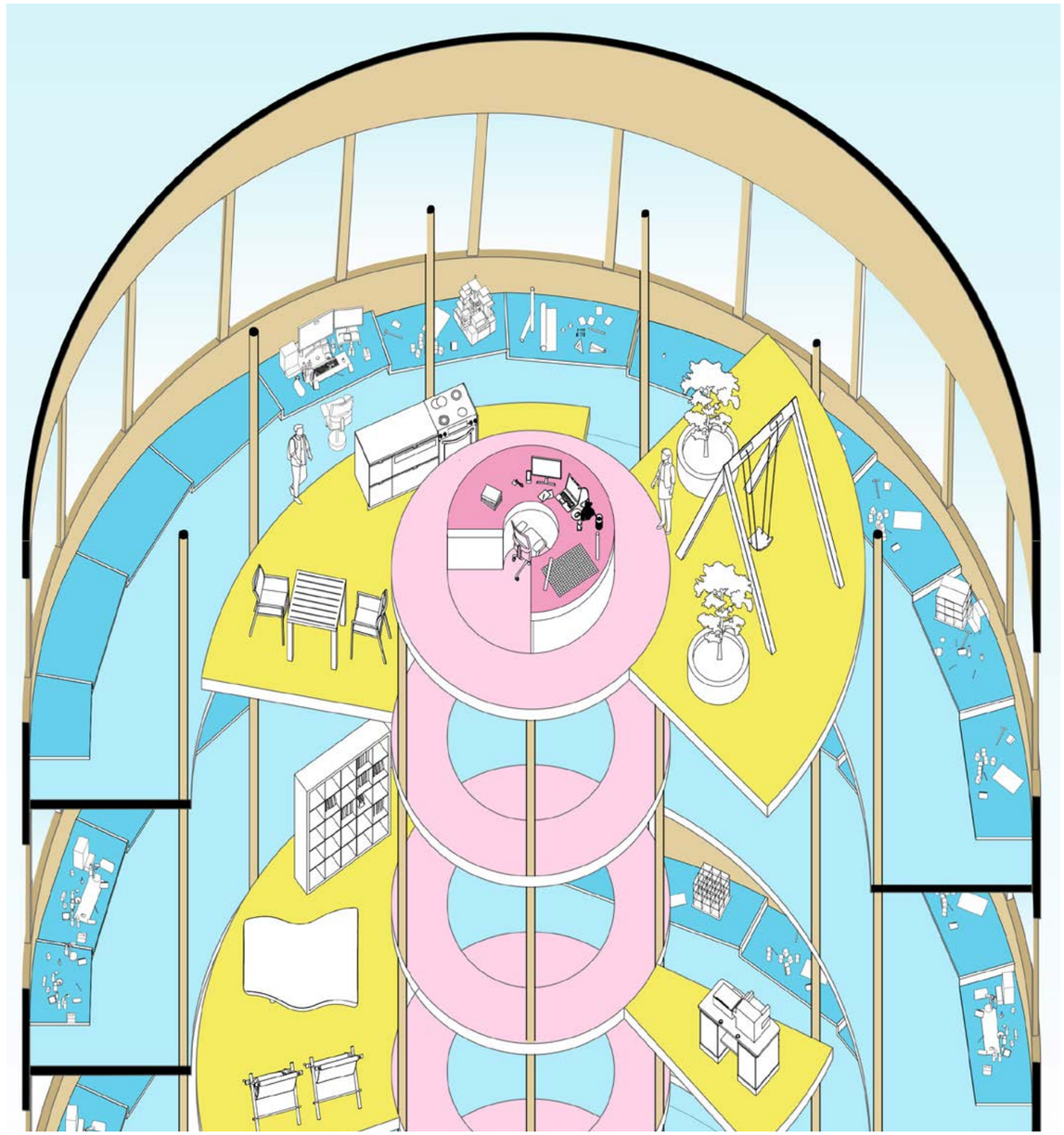
Instructor : Lexi Tsien

The Architecture Drawing & Representation (ADR) program emphasizes the use of digital representation methods to convey narrative in architecture. In the first course, ADR I, students focus on Bocconi University as a case study, utilizing various drawing and video techniques to explore and highlight the unique features of the design. The students use drawing to draw parallels between the building's rectilinear and architectural concrete exterior and the delicate, intricately detailed interior reminiscent of a jewelry box. ADR II encourages students to delve deeper into the themes of taxonomy, analogy, and data visualization, allowing for a more nuanced and complex exploration of architectural representation.



Compression & Reflection

Bocconi University's structural system is primarily supported by thick concrete rectangular columns, with many volumes cantilevering outward significantly. This levitation of masses creates a sense of compression for visitors. The programmatic spaces are enclosed by highly reflective glass, creating an optical illusion for visitors. The repetition of these gestures on both the interior and exterior of the building enhances this sense of confusion.



Space of Remote Working

The Tower of Work is a representation of the experiences of two architecture students, showcasing their daily struggles and living habits. At the perimeter of the tower, there is a spiraling desk that provides infinite modeling space, symbolizing the need for working surfaces during remote studios. The middle elevator desk is designed to have everything in reach, signifying the desire to work efficiently with minimal movement. The tower's design is inspired by the students' experiences and wishes, creating a functional and dynamic space that caters to their specific needs.

To Reimagine

To reimagine architecture, it is important to critically analyze existing infrastructural, urban, social, and technological developments. In addition to imagination, innovative progression and the application of existing tools, methods, and concepts of design are also crucial. Through reimagining architecture, architects and designers can create buildings and structures that contribute positively to the well-being of individuals and communities, promote cultural identity, and help address some of the most pressing challenges facing our world today. The “To Reimagine” section focuses on the reformation, recombination, and readaptation of existing education systems, low-income residency, curtain wall systems, and other areas.

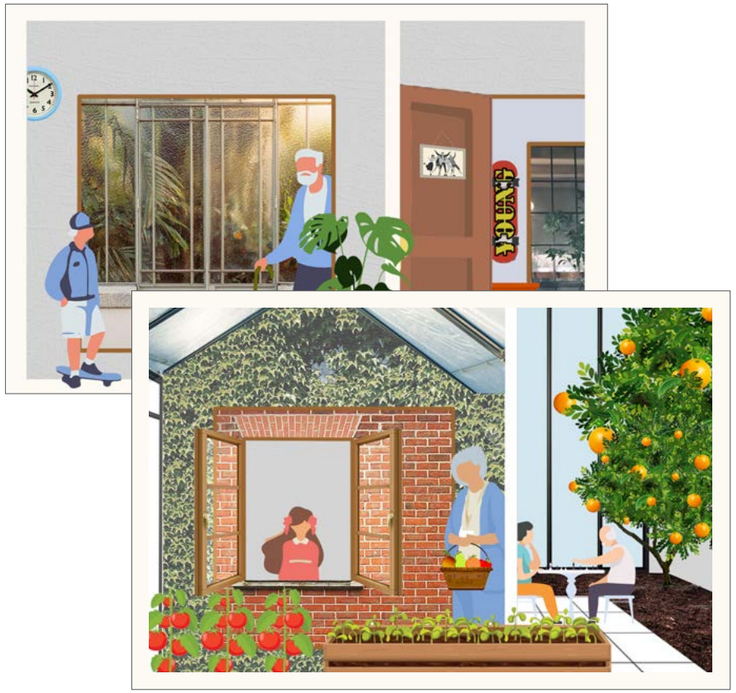
06
INTER-GROWING HOMES

GSAPP Core Studio III
Fall Semester 2021

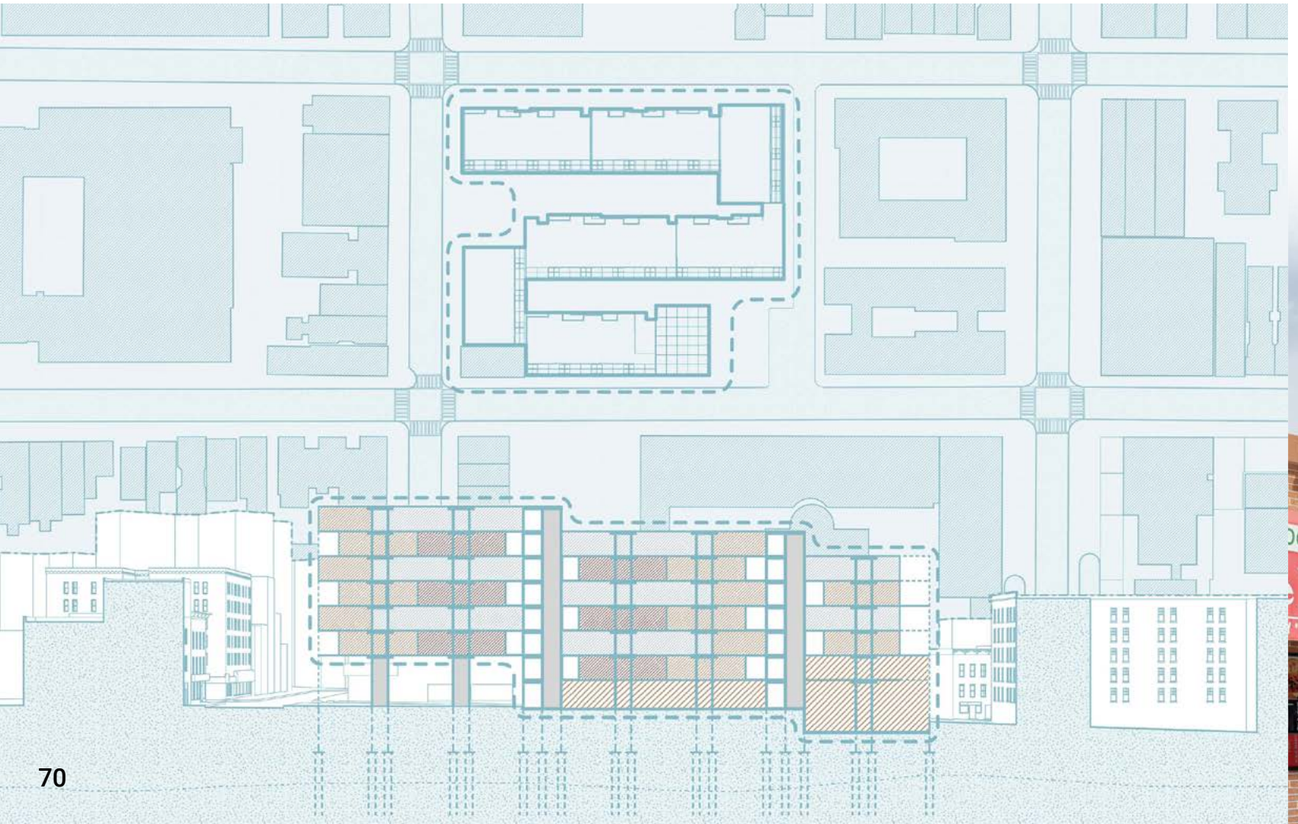
Team Project Partner: Ruisheng Yang
Instructor : Erica Goetz

The proposed 92-unit housing project is located within Melrose, Bronx, which has a unique demographic composition of 30% under-18 population and a majority of single households. The site also houses a major local senior home that suffers from its outdated design and will be replaced. The new building's architectural layout provides many scales of communal spaces that lace throughout the building: each apartment extends beyond its own walls into a meso-spatial zone which not only provides a thermal buffer to the exterior climate in either cold days or warm conditions but also creates a layered interior that extends as well as reconfigures inhabitants' living spaces depending on the season and time of day.

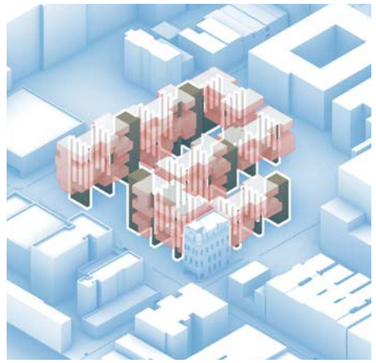
The Melrose neighborhood comprises primarily of single households, with 30% of the population being under 18 and around 10% being elderly. Despite the proximity of the two age groups, they coexist parallelly with limited interactions. The generation gap between the two age groups becomes more noticeable due to the scarcity of spaces and media that enable sharing experiences. Can we create housing that encourages direct interaction between the young and the old, bridging the end of life to the beginning and reintegrating the elderly back into society? This could also provide opportunities for the young to learn lifelong lessons from the elderly.



Concept Poster Card



Plugging Unit Clusters Into Winter Garden Ribbon

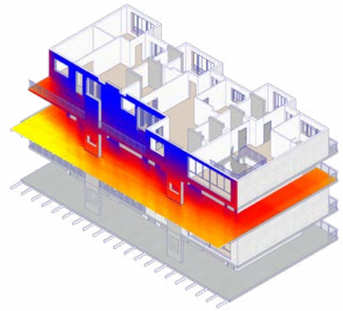


Arranging Service And Structural Bays

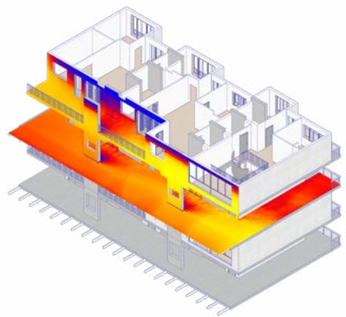
Engaging The Public

Solar Analysis & Massing

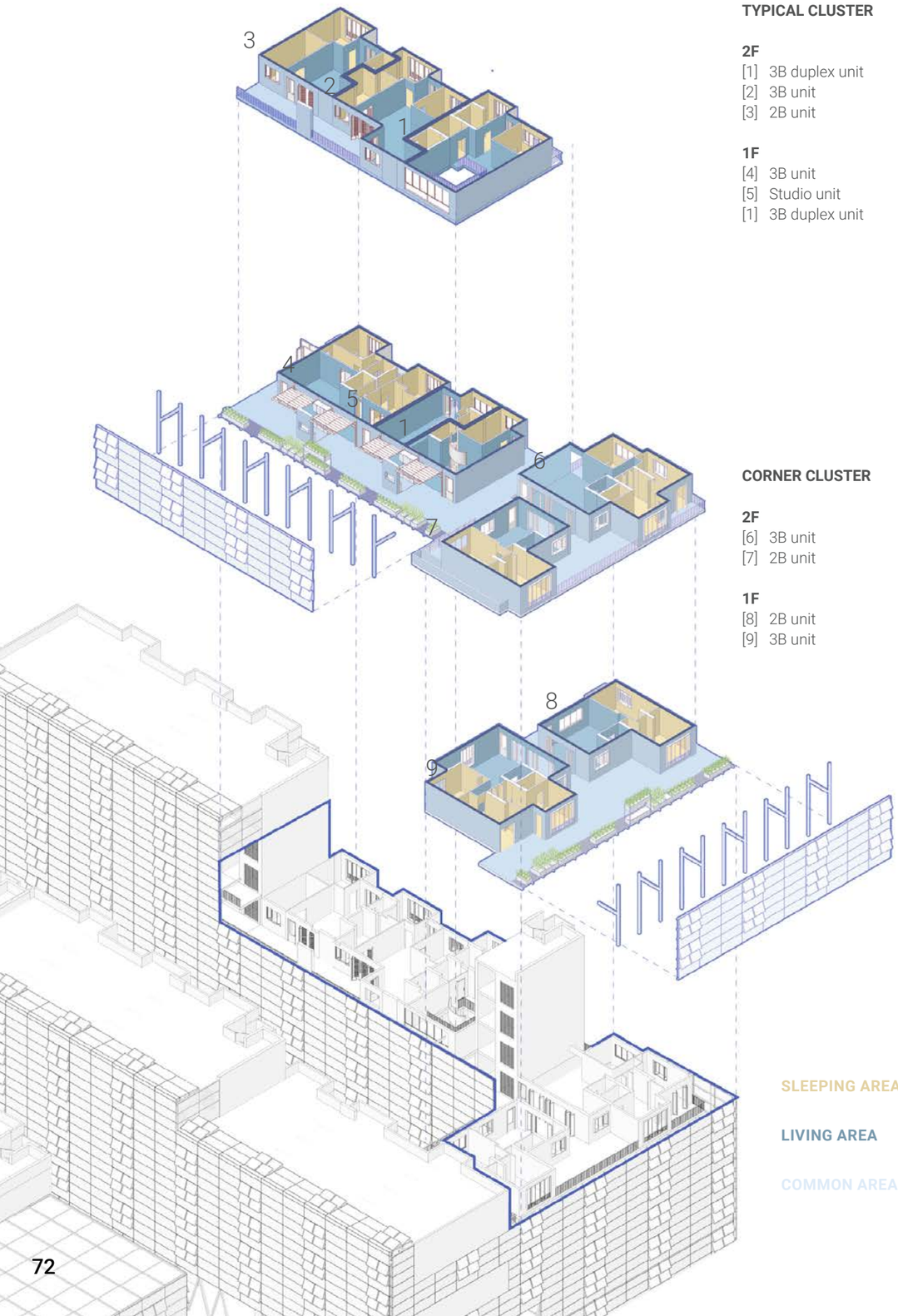
Apartments are typically clustered in groups of 6 and divided into two levels. The first floor of each cluster will prioritize senior tenant while the second level of each cluster will instead house young adults as well as families with kids. This arrangement structure allows seniors who usually have more spare time to take care of plants and vegetables growing within the common greenhouse corridor, while encourages young people and kids to interact with the elder as they wish to utilize the common areas. The shared kitchen is situated within the actual greenhouse, and in other instances, game tables, planting boxes or lounge furniture entice residents to socialize in this sunlit space.



Unit Summer Direct Solar Study



Unit Winter Direct Solar Study



TYPICAL CLUSTER

2F
[1] 3B duplex unit
[2] 3B unit
[3] 2B unit

1F
[4] 3B unit
[5] Studio unit
[1] 3B duplex unit

CORNER CLUSTER

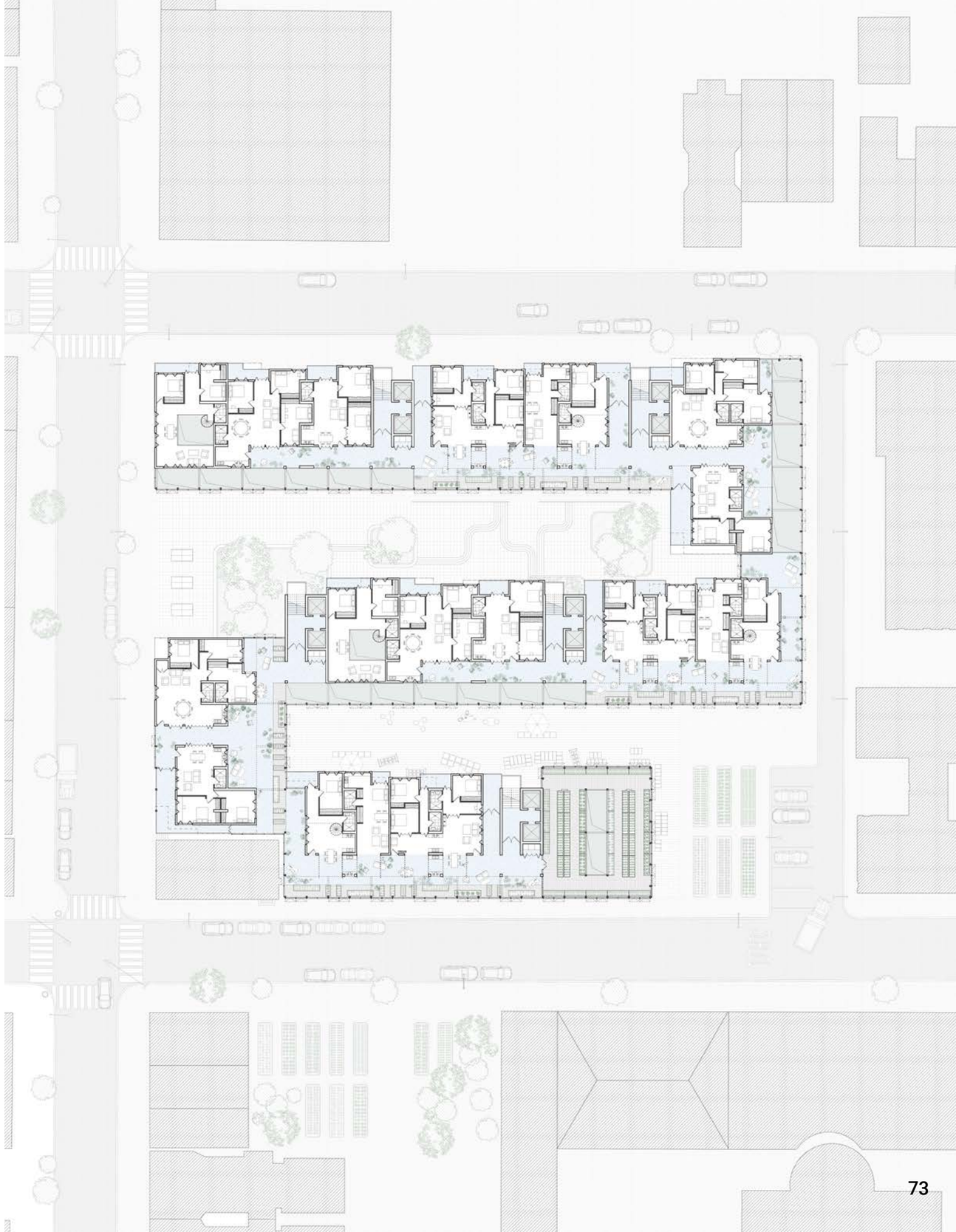
2F
[6] 3B unit
[7] 2B unit

1F
[8] 2B unit
[9] 3B unit

SLEEPING AREA

LIVING AREA

COMMON AREA



Greenhouse

The greenhouse offers a unique setting for building a sense of community through shared activities, utilizing the medium of growth. The cluster of living spaces features a communal kitchen and gardening area, all situated in the south-facing solar space. The first floor's insulated garage door enhances spatial fluidity, enabling a seamless connection between the senior living area and the gardening space, symbolically closing the loop of life. This design promotes interaction and a sense of belonging, encouraging residents to learn from each other and develop relationships based on shared experiences.

Civic Garden

The elevated residential portion not only creates a unique visual identity but also serves as a catalyst for community development. The ground level hosts a collective greenhouse that provides fresh produce in the Bronx's food desert while also creating job opportunities for the locals. The space also doubles as a marketing area and playgrounds for children, fostering social interaction and promoting healthy living. This multi-use design integrates sustainability, community engagement, and social welfare, redefining the traditional residential building typology.

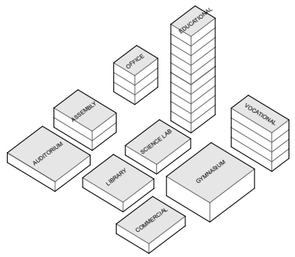
07
INTEGRATE DESIGN

GSAPP Architecture Technology IV
Fall Semester 2021

Team Project Partner: Hanyu Liu, Kaixi Tu, Dongxiao Yang Ruisheng Yang
Architectural Consultant: Akiko Kyei-Aboagye
Mechanical Consultant: Kenton Phillips
Structural Consultantl Justin Stolze
Lecturer: Berardo Matalucci

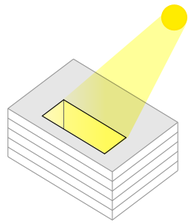
The integrated project that was developed from Schematic Design phase to Design Development phase in a group of five for GSAPP Architecture Tech course over a 12-week period. Having adequate experience with Revit, I take part in developing Revit and Rhino models, orthographic drawings, building envelop detail and design.
To create community engagement and a space for play, the new Public School 64 mass-timber building contains an elevated courtyard that connects to the adjacent street via public accessible stairs. At the same time, the central void provides a pleasant learning experience by bringing sufficient daylight natural ventilation into classrooms.

The building integrates two envelope strategies in contrast to establish the dynamic transition from the street to the courtyard. Facing the street is a mixture of louver curtain wall with brick rainscreen system. Facing the courtyard is a more colorful curtain wall system.



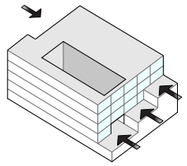
PROGRAM REQUIREMENTS

School requires diverse program types



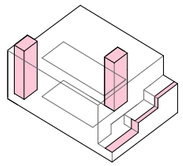
COURTYARD STRATEGY

An open courtyard welcomes sunlight and fresh air, all integrated in a sustainbility scheme.



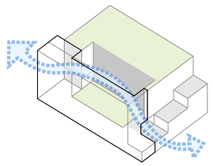
SETBACKS AND VENTILATIONS

The setbacks push the volumns inwards to create spaces for windows and grand entrance. These moves also accomodate mandatory mechanical and zoning requirements.



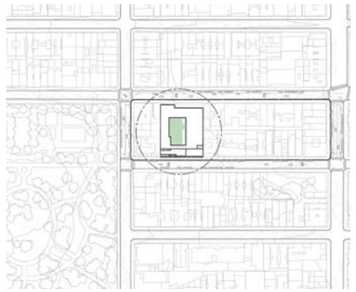
CIRCULATION TO PUBLIC SPACE

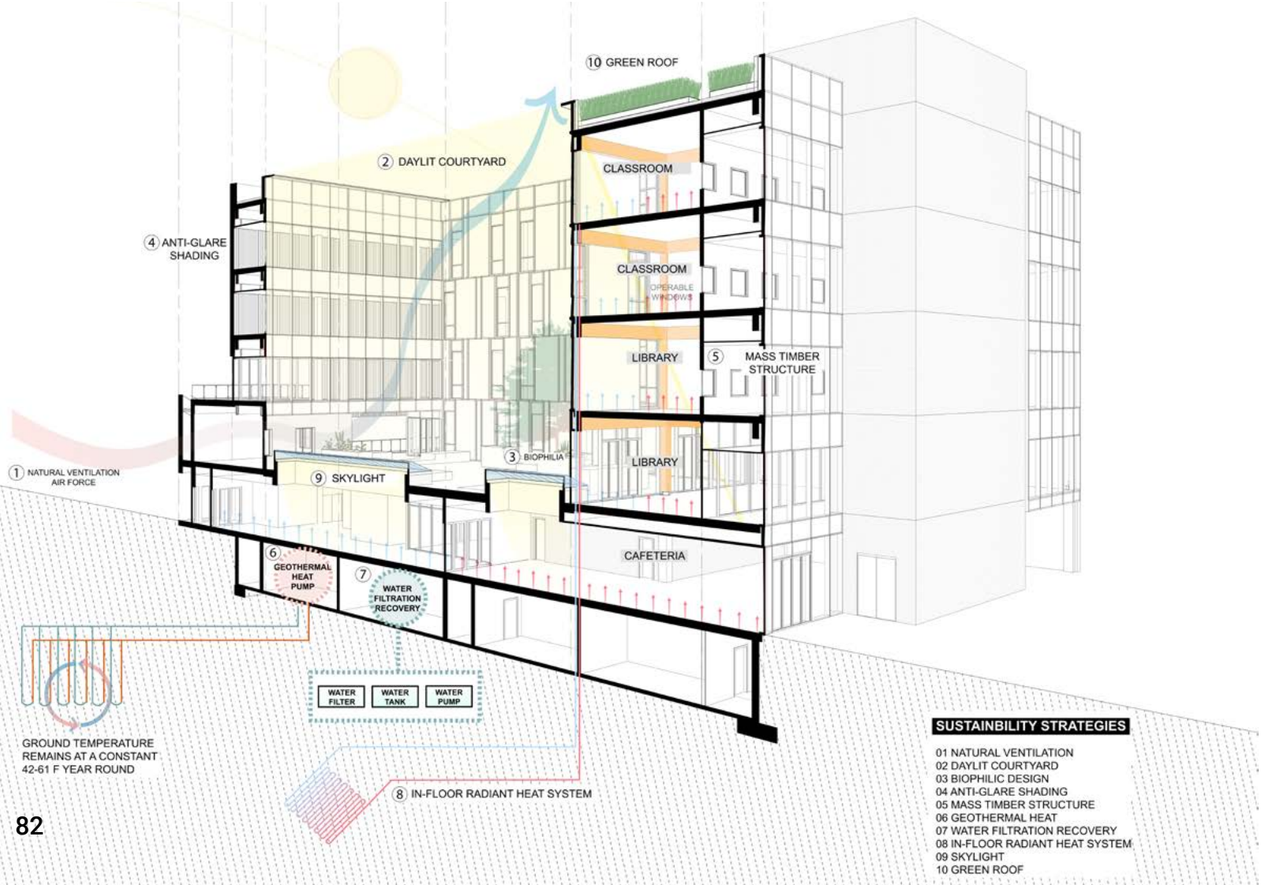
Use circulation as a mean to accomandate public engagement



INVITE

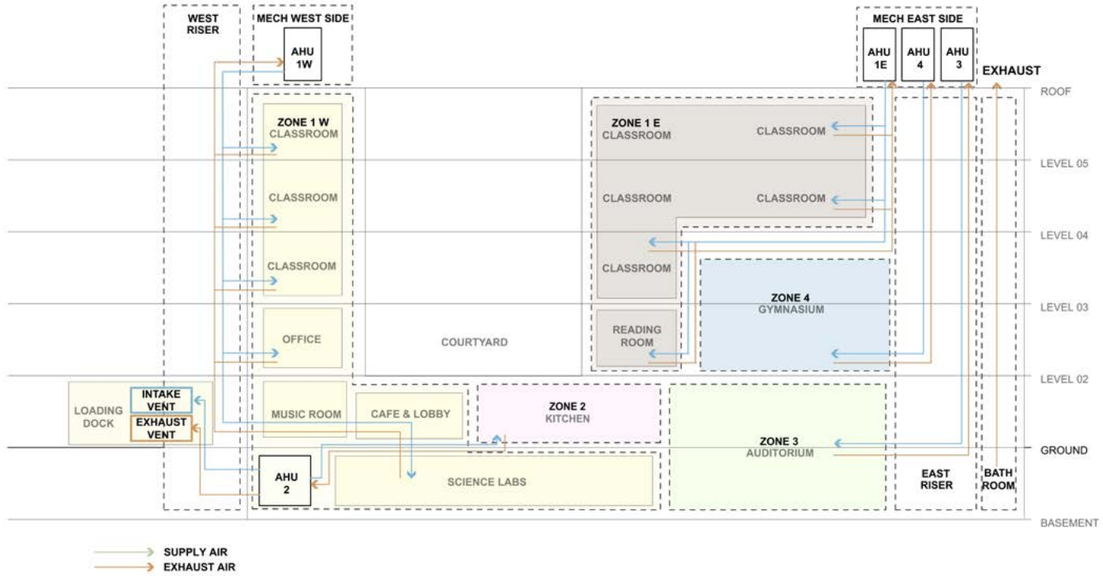
The open lobby and courtyard on the first level invite passage, social interactions, and natural elements.



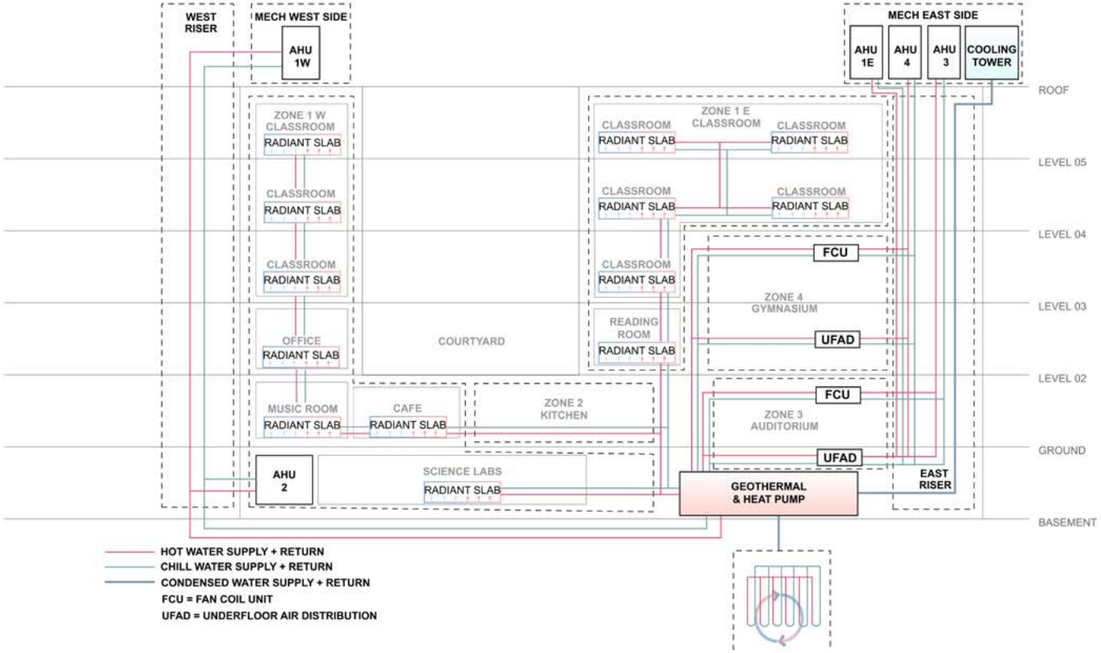


SUSTAINBILITY STRATEGIES

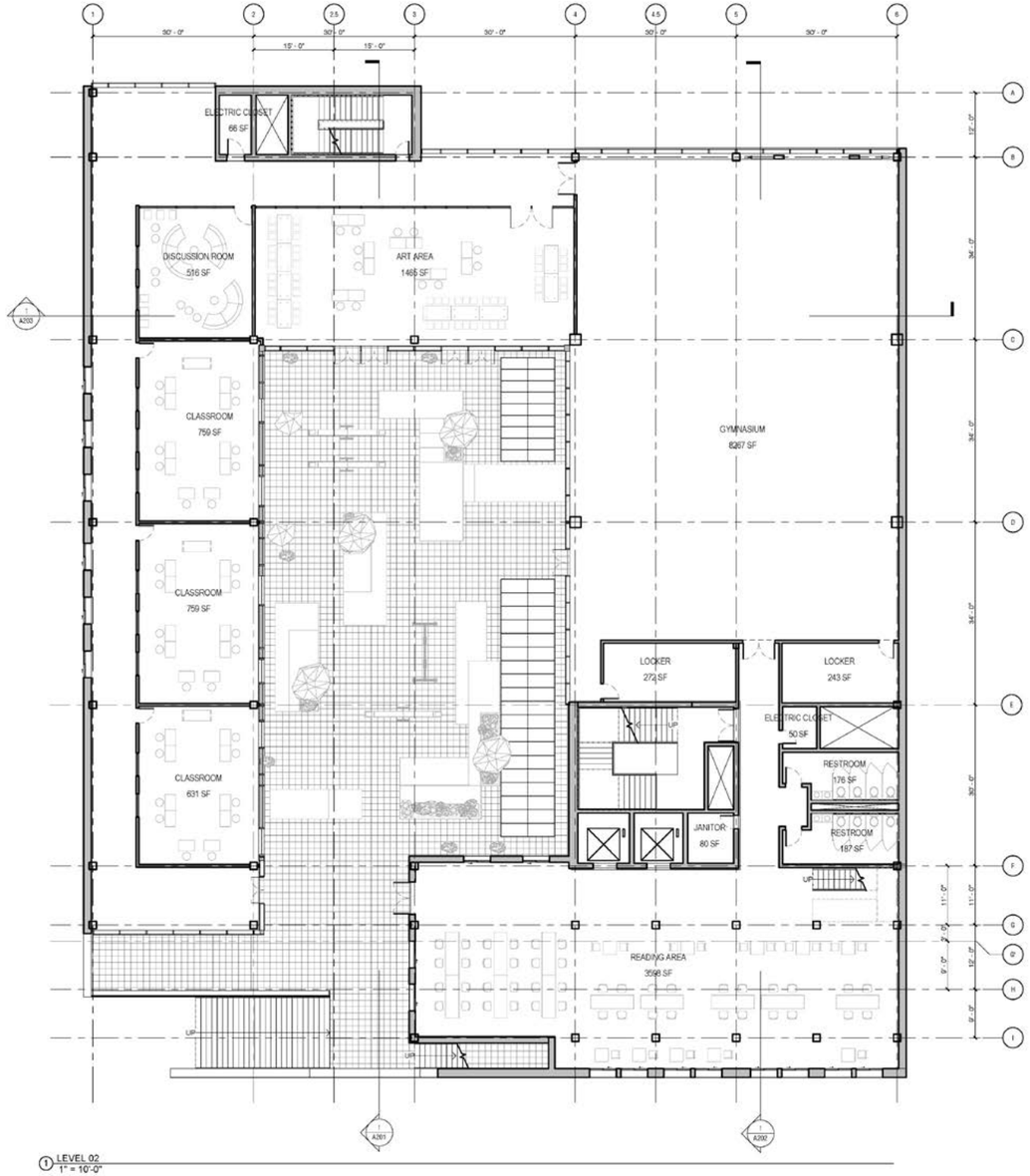
01 NATURAL VENTILATION
02 DAYLIT COURTYARD
03 BIOPHILIC DESIGN
04 ANTI-GLARE SHADING
05 MASS TIMBER STRUCTURE
06 GEOTHERMAL HEAT
07 WATER FILTRATION RECOVERY
08 IN-FLOOR RADIANT HEAT SYSTEM
09 SKYLIGHT
10 GREEN ROOF



HVAC System Diagram



Heating Diagram

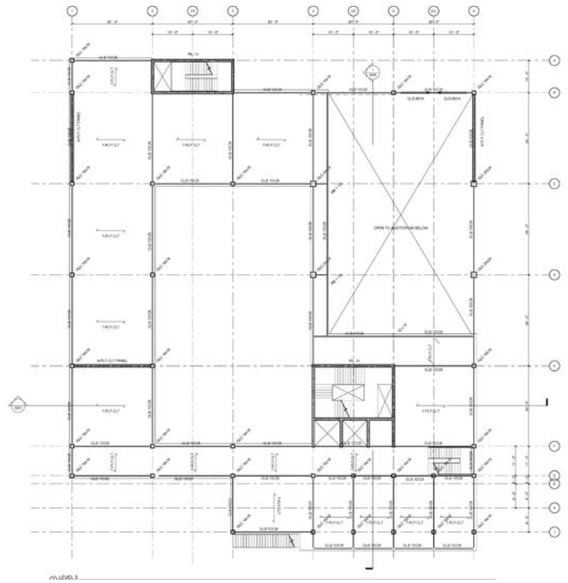


Garden Level Plan

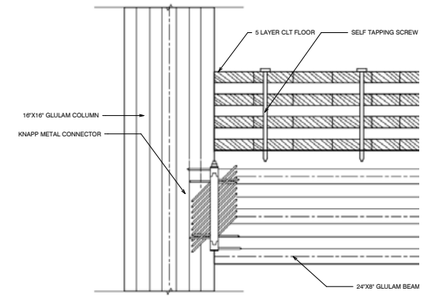
Public Accessiblity

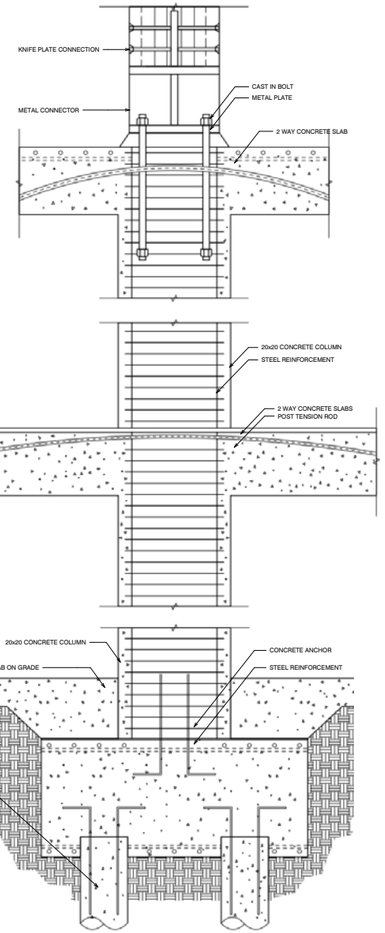
The school's second floor is directly connected to the street level, which transforms into a public garden creating a fluctuation of privacy and publicity, enabling students to learn in a dynamic and interactive environment. The garden, with its outdoor infrastructures, encourages students of various ages to engage with one another, promoting socialization and collaboration. Next to the garden is a public library, offering after-school access to the neighborhood. The design creates a symbiotic relationship between the school and its surrounding neighborhood, promoting community engagement and fostering a sense of shared responsibility.

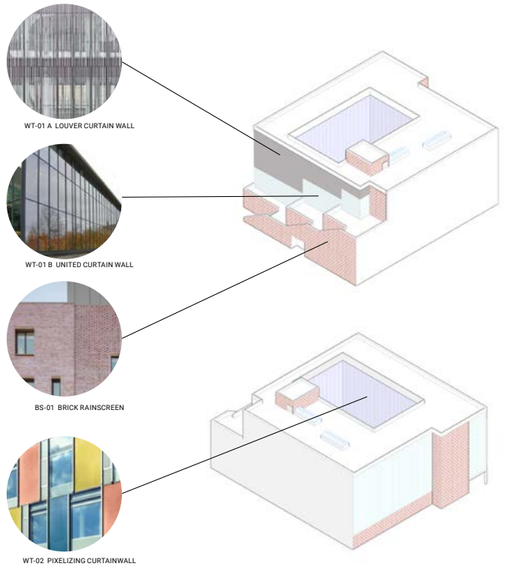
Ground Level RCP

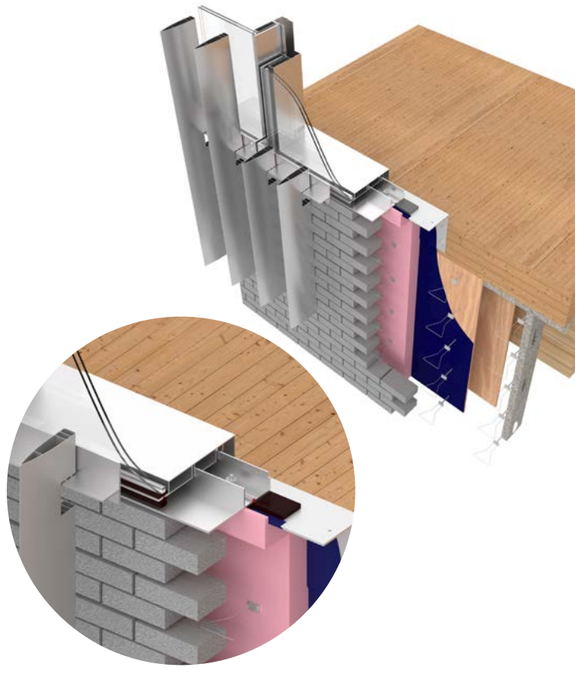


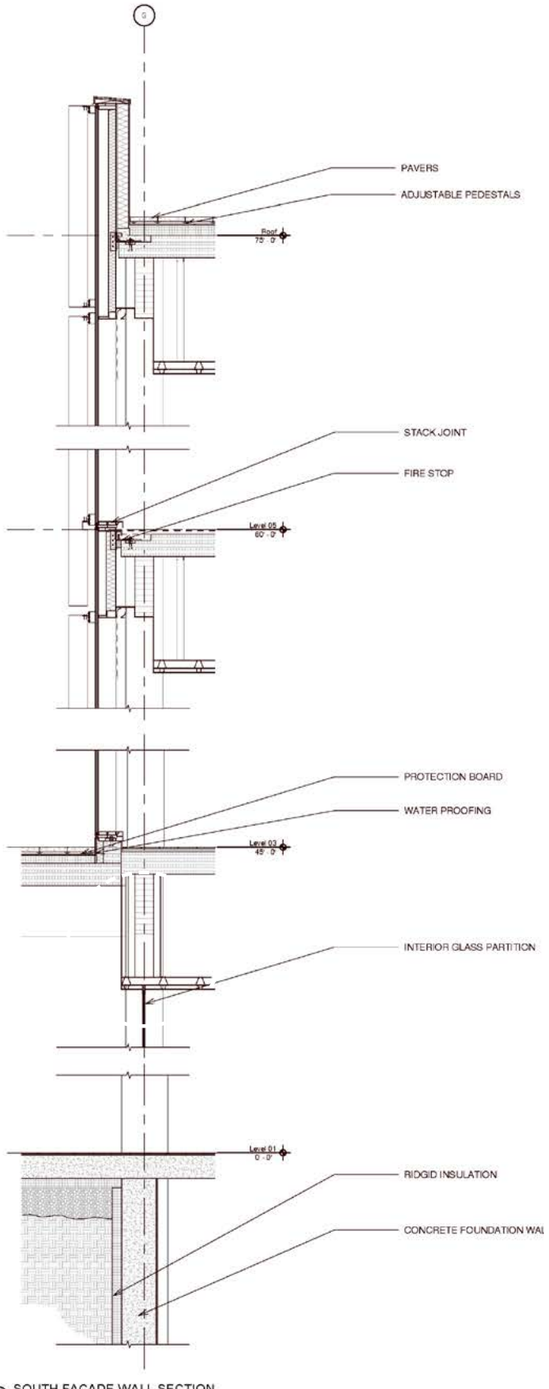
Garden Level Structure Plan



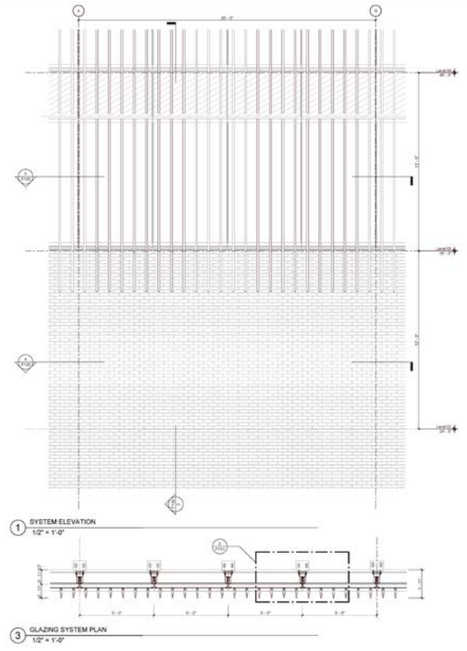






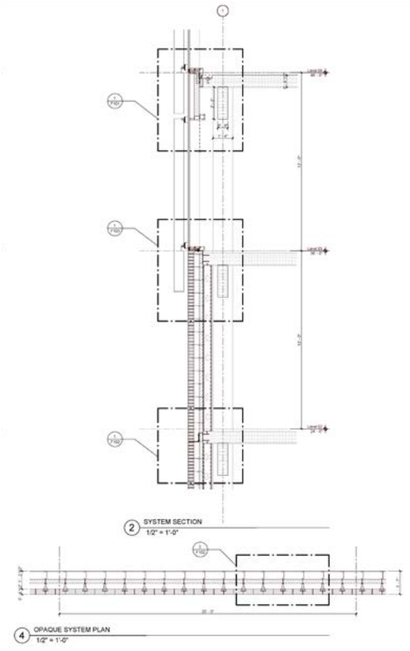


1 SOUTH FACADE WALL SECTION
3/8" = 1'-0"



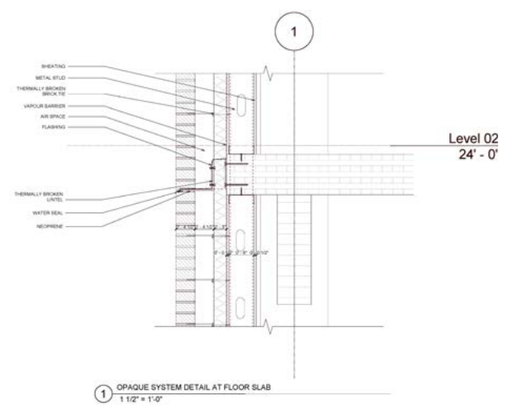
1 SYSTEM ELEVATION
1/2" = 1'-0"

3 GLAZING SYSTEM PLAN
1/2" = 1'-0"

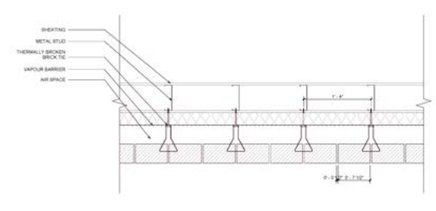


2 SYSTEM SECTION
1/2" = 1'-0"

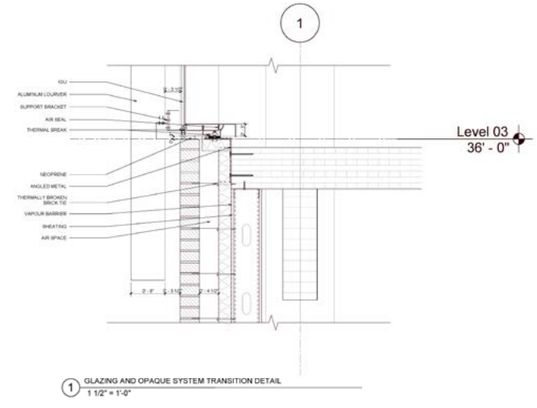
4 OPAQUE SYSTEM PLAN
1/2" = 1'-0"



1 OPAQUE SYSTEM DETAIL AT FLOOR SLAB
1 1/2" = 1'-0"



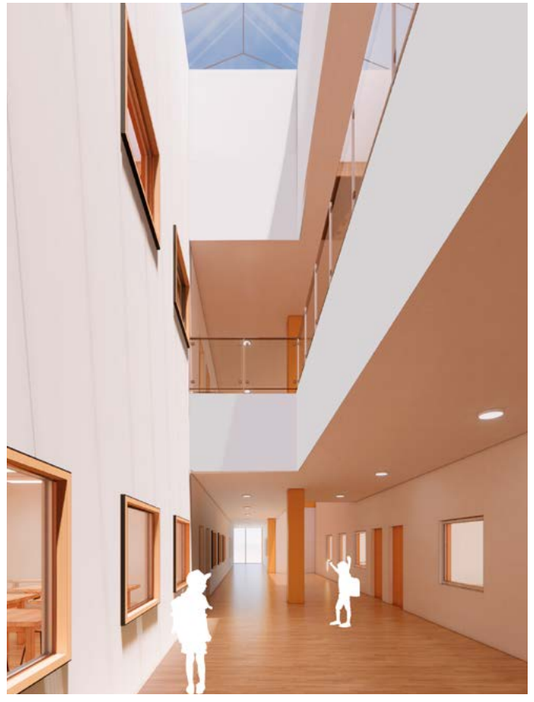
2 OPAQUE SYSTEM DETAIL PLAN
1 1/2" = 1'-0"

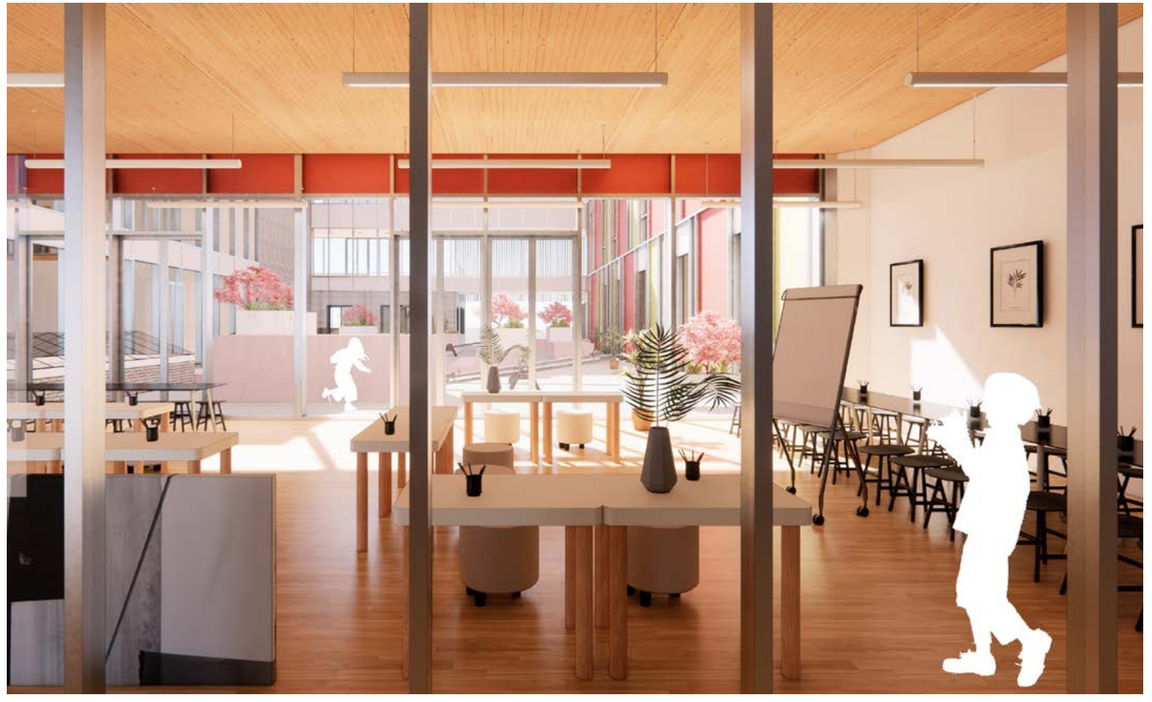


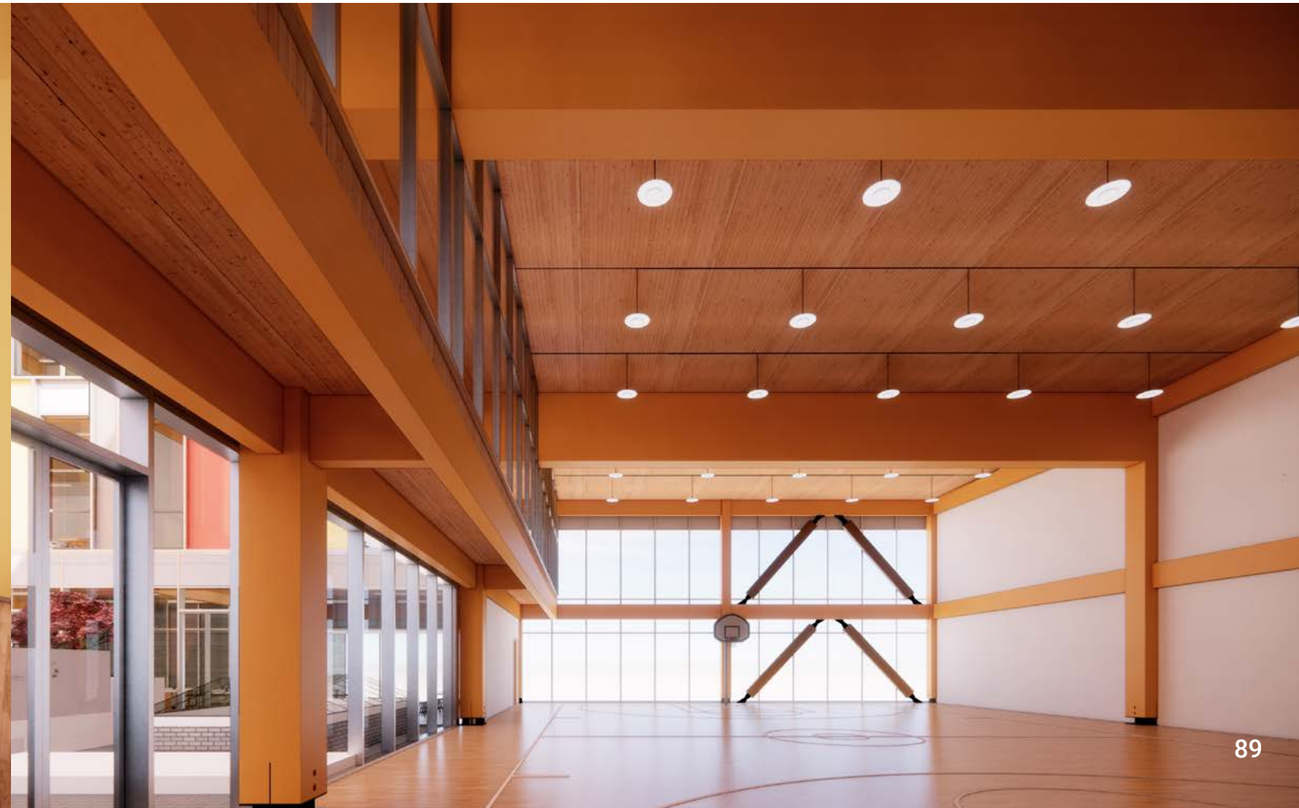
1 GLAZING AND OPAQUE SYSTEM TRANSITION DETAIL
1 1/2" = 1'-0"

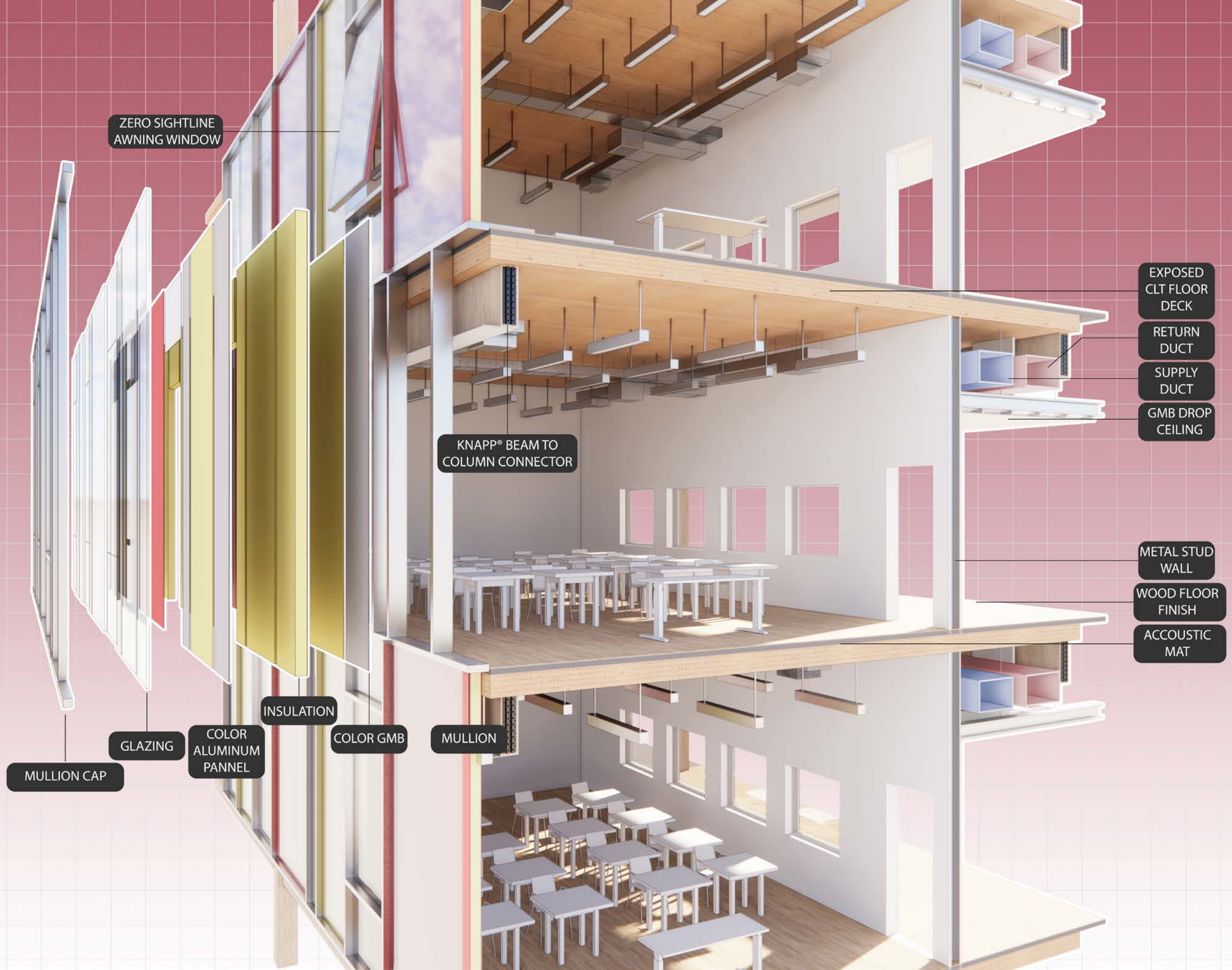
Facade System

The public program area on the ground level of the building will be constructed using a brick rainscreen system, providing durability and protection from the elements. In contrast, the upper levels, which house the classrooms, will have a higher window to wall ratio to allow for more natural light. Additionally, the south facade will feature a louver system designed to act as a solar shade, optimizing energy efficiency.







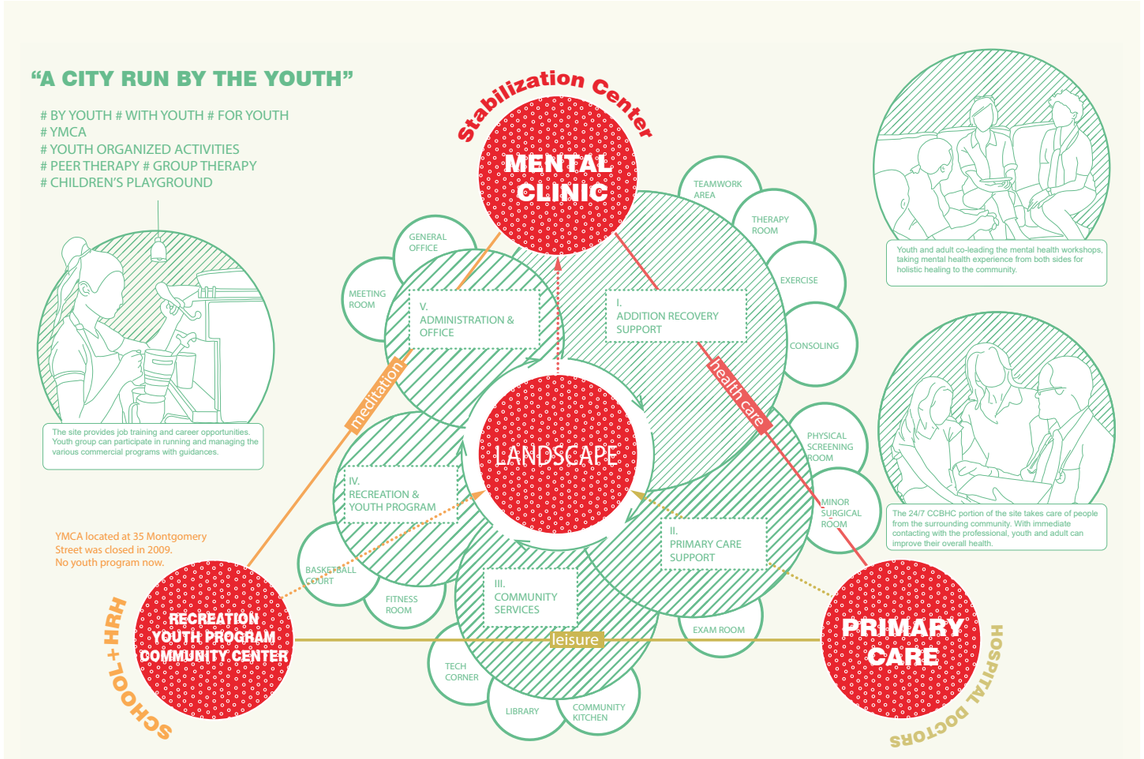

ZERO SIGHTLINE AWNING WINDOW
KNAPP® BEAM TO COLUMN CONNECTOR
EXPOSED CLT FLOOR DECK
RETURN DUCT
SUPPLY DUCT
GMB DROP CEILING
METAL STUD WALL
WOOD FLOOR FINISH
ACCOUSTIC MAT
MULLION CAP
GLAZING
COLOR ALUMINUM PANNEL
INSULATION
COLOR GMB
MULLION

08
YOUTH CITY

GSAPP Adv Studio IV
Spring Semester 2022

Team Project Partner: Yifei Yuan
Instructor : Bryony Roberts

Youth City looks into resolving the current shortage of youth services in Poughkeepsie due to the YMCA shut down in 2009. The youth group in Poughkeepsie has been mentally suffered from low income and drug culture. At the same time, the lack of youth support services and youth spaces harms the area severely, leaving the youth group disconnected with the society. The project aims to provide sufficient mental and physical help for the youth group in Poughkeepsie by integrating a CCBHC model mental and physical health facility and youth-friendly indoor and outdoor activity spaces providing safe and interactive spaces for the teenagers. In promoting beneficial activities and social value among the young people, the program the proposed program also integrates job training, and on-site career positions for the teenagers as a form of relief for their current financial issue. Thus, Mental health, youth programs, and primary care form tri-folding elements of the project, which are interlinked by a serious of public and private landscapes
.

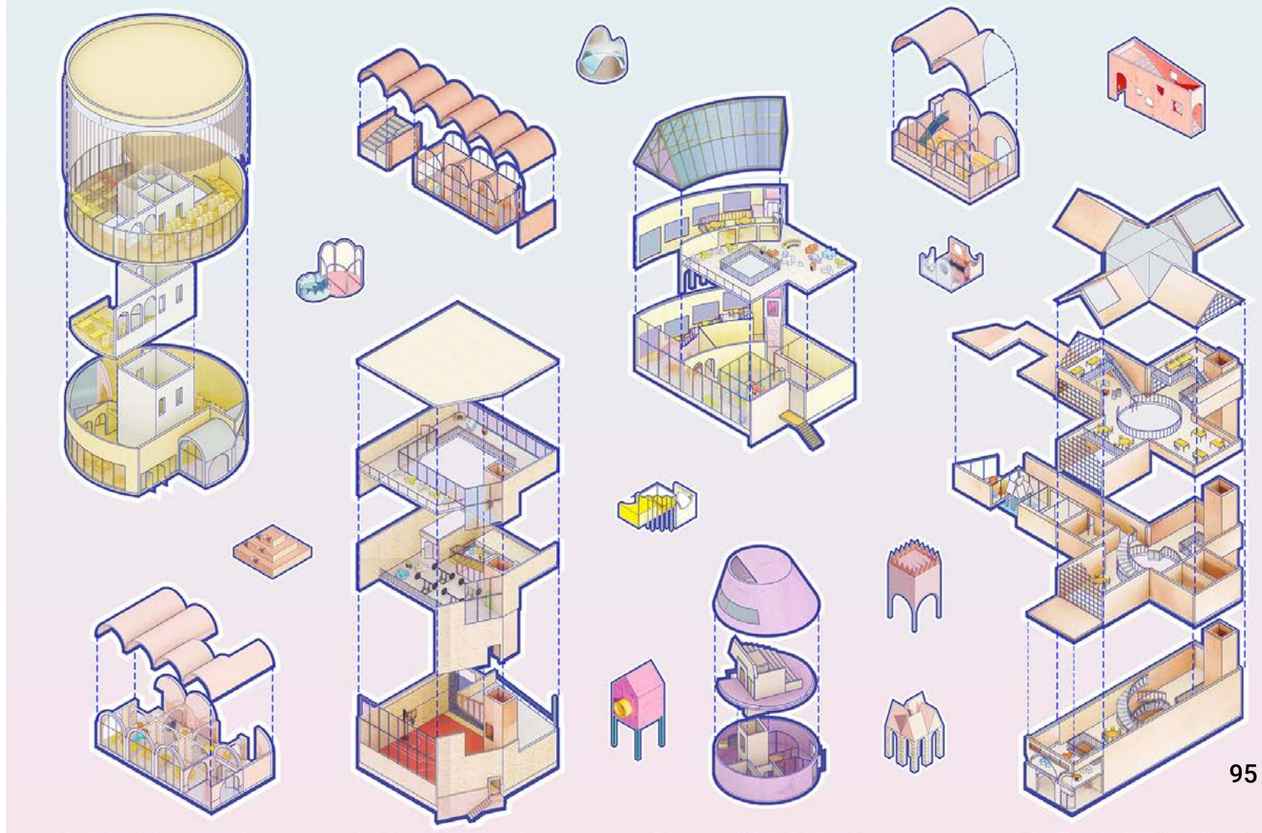


Model of Care

The community's mental health issues, particularly among youth, are being addressed through a new facility designed to radiate positive change to the rest of the community. The facility resembles a mini-cityscape and is focused on providing primary care and mental health services to the community, with a special emphasis on improving access for young people. In addition to offering procedural health care, the program also includes mental health workshops that encourage partnership and collaboration between adults and youth. The goal is to value and incorporate the experiences and opinions of both groups, recognizing that youth perspectives are not naive, but rather provide valuable insight for understanding and changing the community's mental health landscape.

Primary Shapes

The design of the mental health facility aims to break away from traditional typologies by incorporating a series of primary shapes that create a playful and engaging environment for teenagers. The shapes are arranged in a north-south orientation based on noise levels, with quieter spaces located towards the south. The programs are interconnected to create a private circulation system for visitors, while landscape elements weave through the buildings to form sinking gardens that provide quiet and reflective spaces for the youth. These gardens serve as a break from the programmatic spaces, and also allow for natural light and ventilation to permeate the building.



YOUTH

RECREATION

Contemplation Room

Fitness Room

Half Basketball Court

AUDITORIUM

Dining Room with Kitchen

Library

Cafeteria

Auditorium

Job Training

YOUTH COMMUNITY PROGRAM

Multipurpose Room

Study Room

Tech Corner

Workshop Space

Creativity Room

MENTAL HEALTH GATHERING

Family Consult Room

Consoling Room

Teamwork Area

Reception

Group Therapy Area

Occupational Therapy Room

PRIMARY CARE

Waiting Lounge

Family Legal Aid

Physical Screening Room

Minor Surgical Room

Clinic Room

Exam Room

ADMINISTRATION

Storage

Break Room

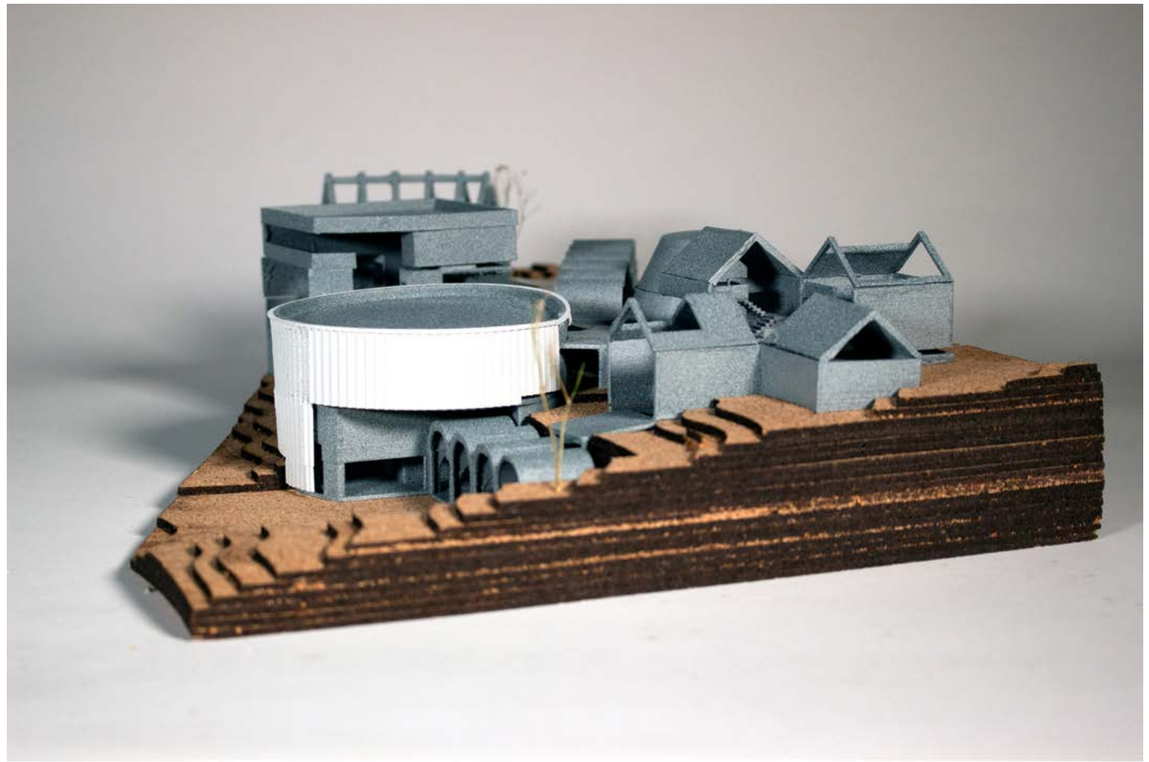
Conference Room

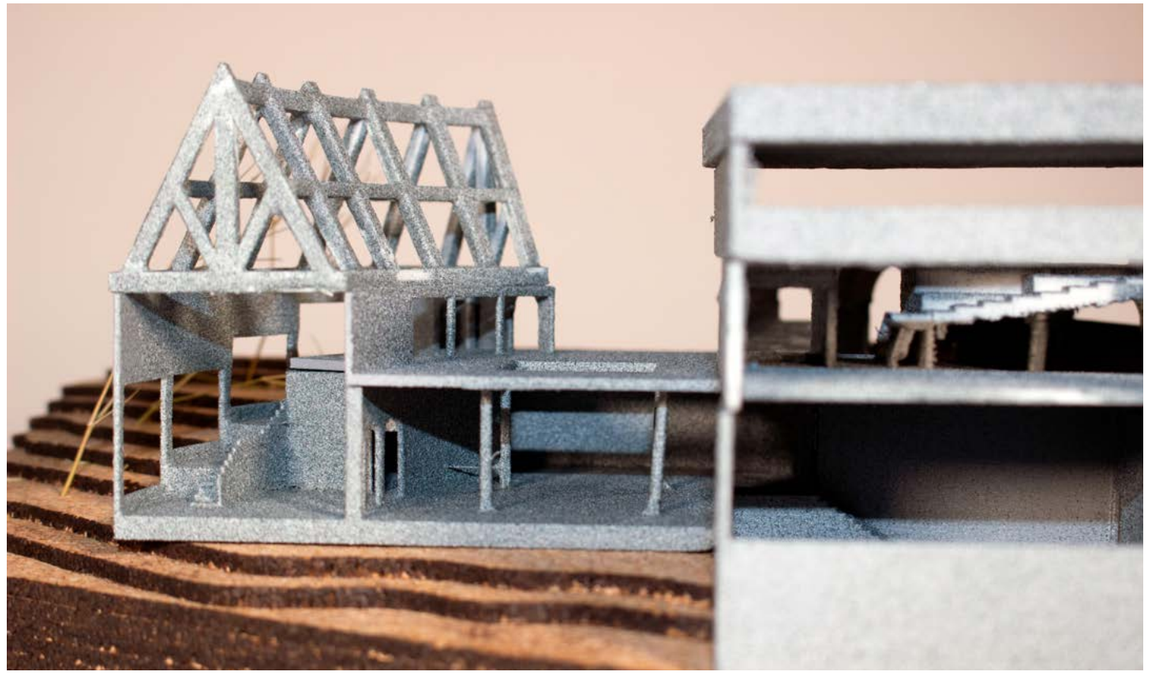
General Office

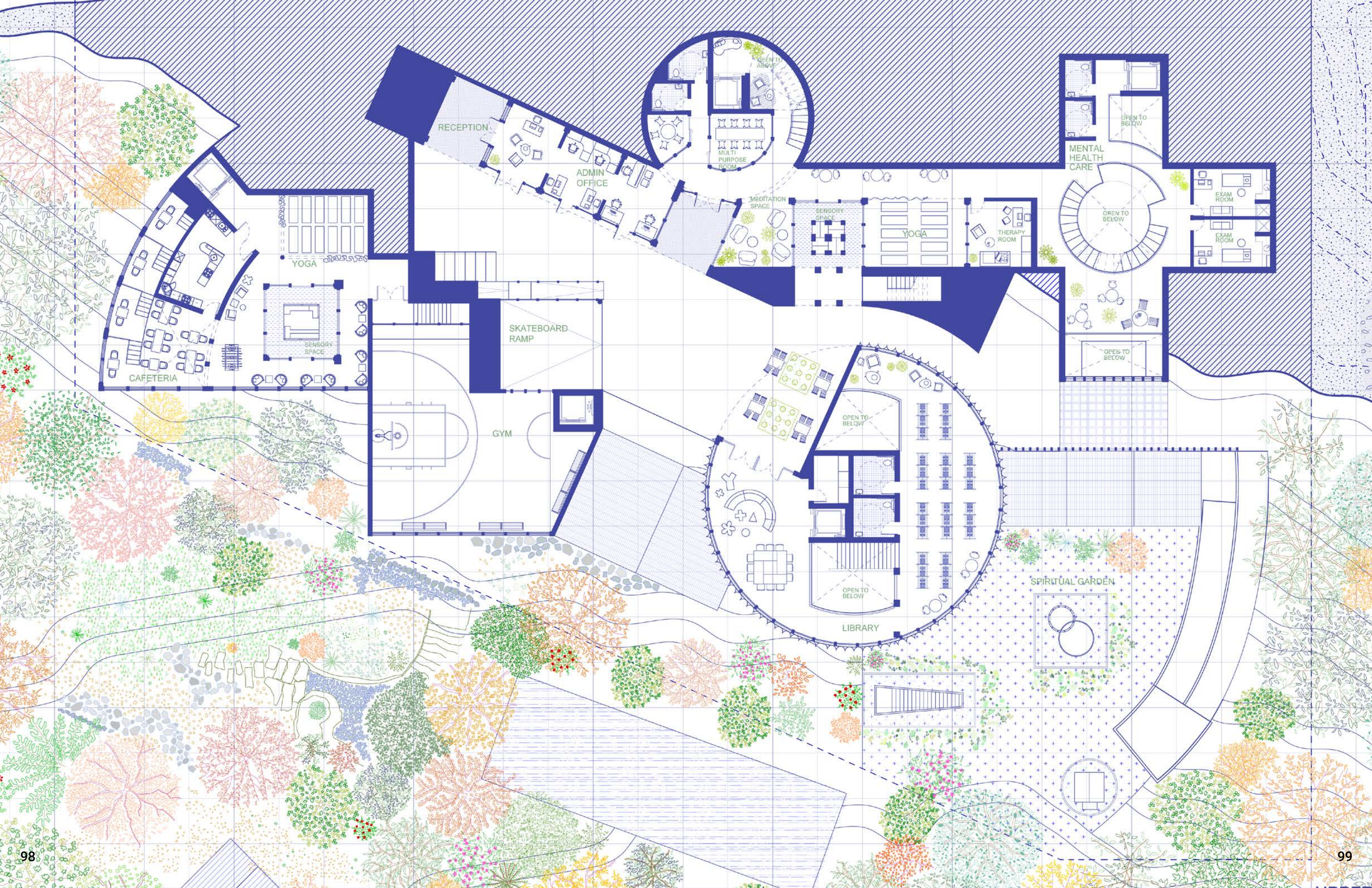
Training Room

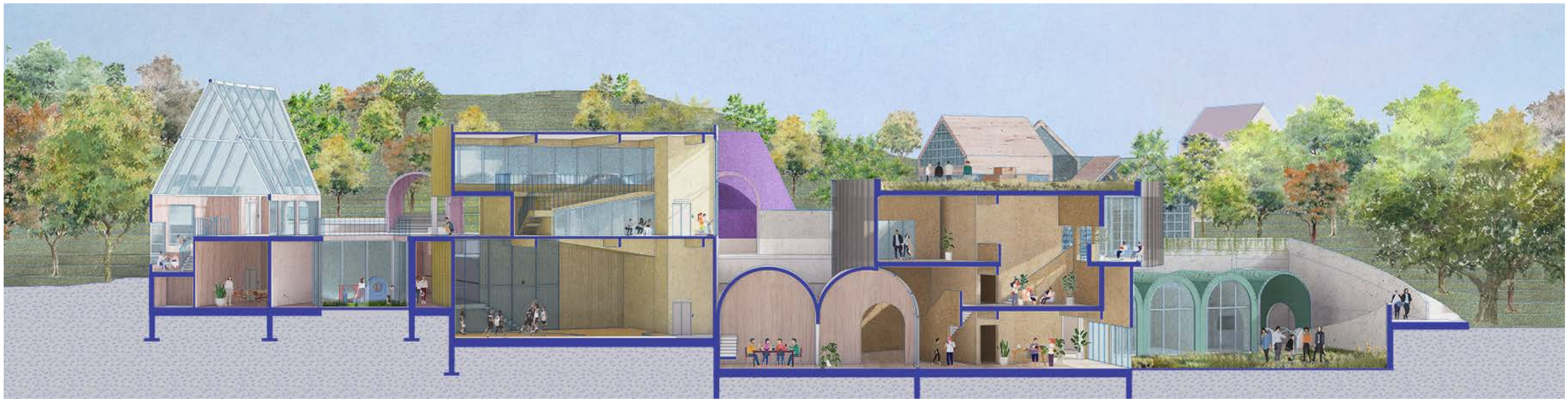
Admin Suite

ADULT






RECEPTION
ADMIN OFFICE
OPEN TO ABOVE
MULTI PURPOSE ROOM
MEDITATION SPACE
SENSORY SPACE
YOGA
THERAPY ROOM
MENTAL HEALTH CARE
OPEN TO BELOW
EXAM ROOM
EXAM ROOM
OPEN TO BELOW
OPEN TO BELOW
YOGA
SENSORY SPACE
CAFETERIA
SKATEBOARD RAMP
GYM
OPEN TO BELOW
OPEN TO BELOW
LIBRARY
SPIRITUAL GARDEN

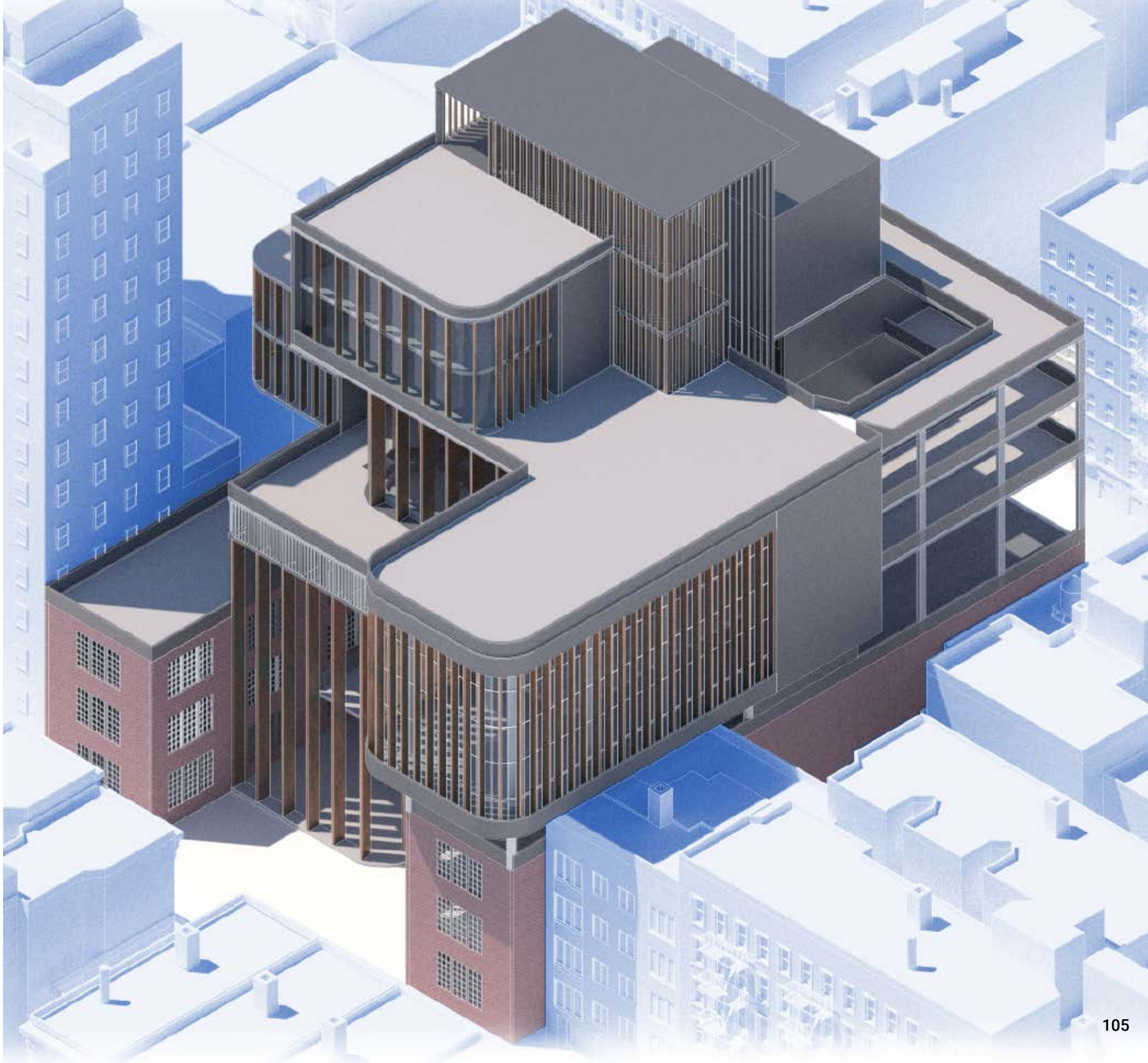


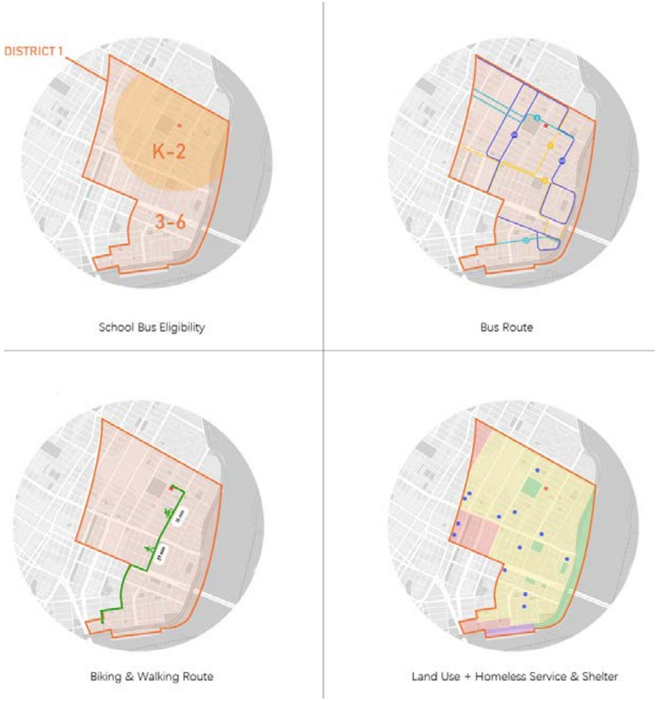
09
MOMENTUM LIBERATION

GSAPP Core II
Spring Semester 2021

Individual Project
Instructor: Amina Blacksher

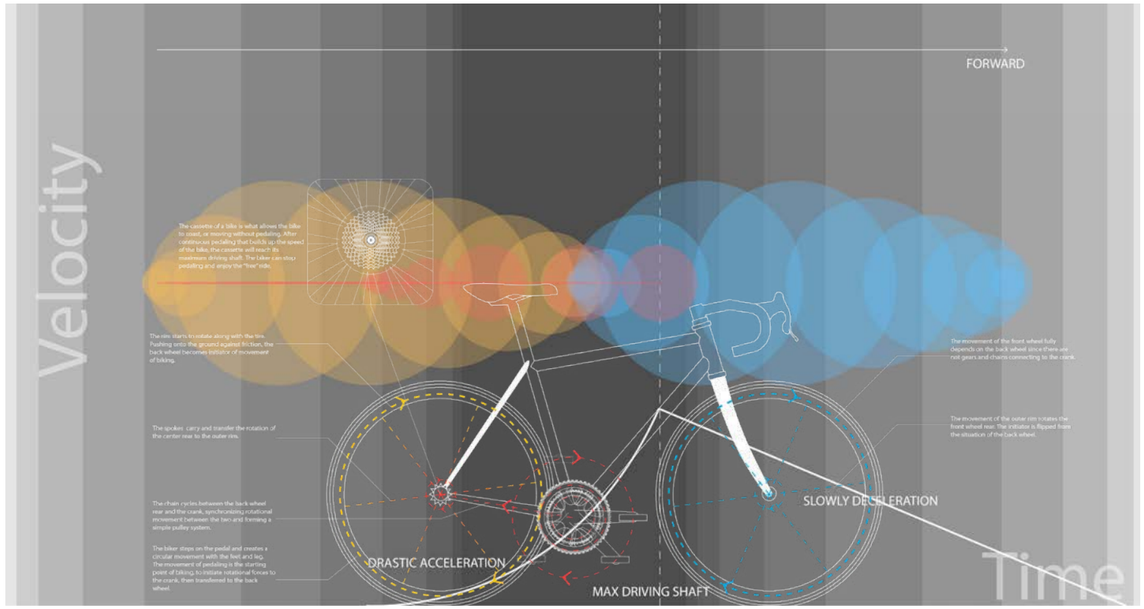
Momentum Liberation is a project that seeks to transform the education system in New York City by reimagining the use of P.S. 64 as a K-8 school. The existing classrooms will be repurposed for teacher-centered STEM subjects, while new student-centered cells will be created for other subjects such as art and media. Additionally, the school will feature dormitory spaces and public areas that encourage community engagement. The circulation spaces and external platforms will serve as playground areas for students, while also allowing for secure public accessibility to pedestrians and community members. Overall, the project aims to create a more dynamic and inclusive learning environment that benefits both students and the wider community.

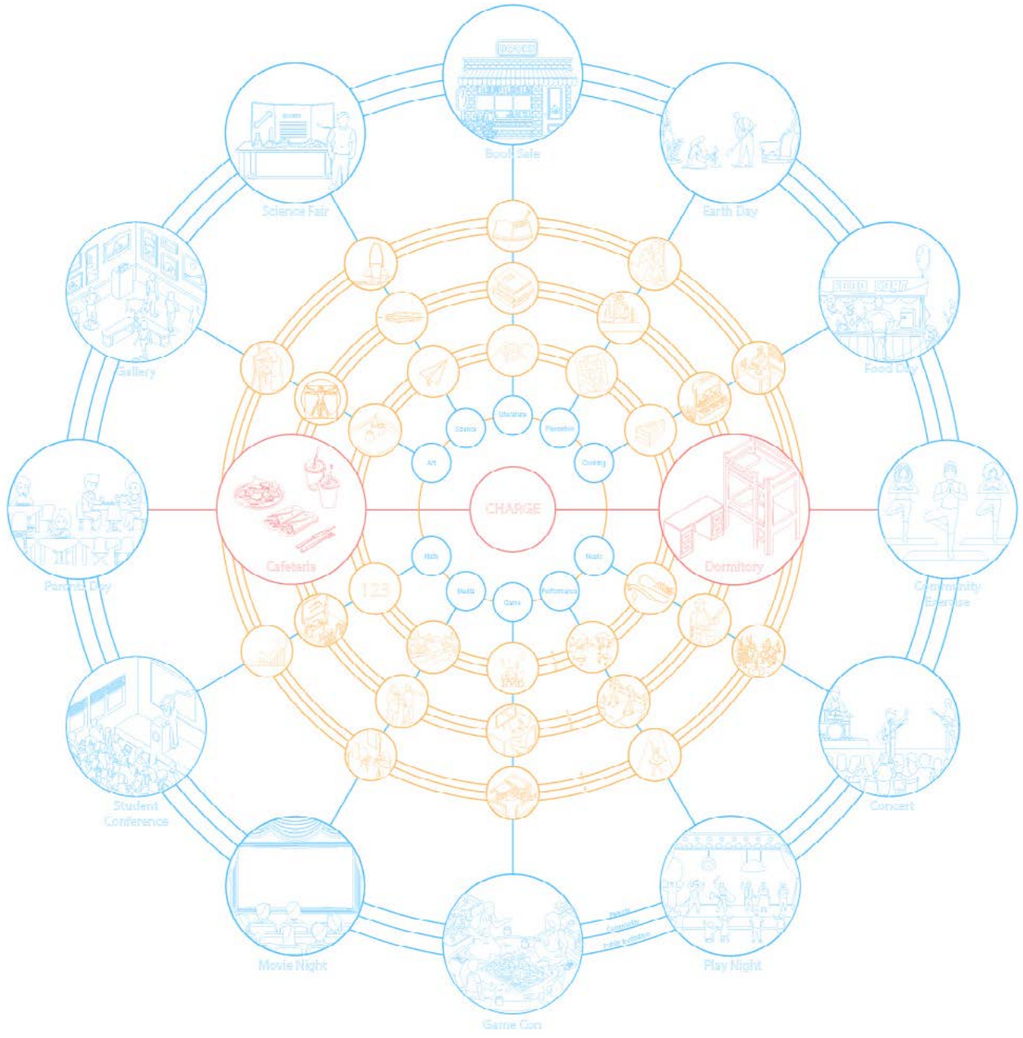




Kinetic Coasting

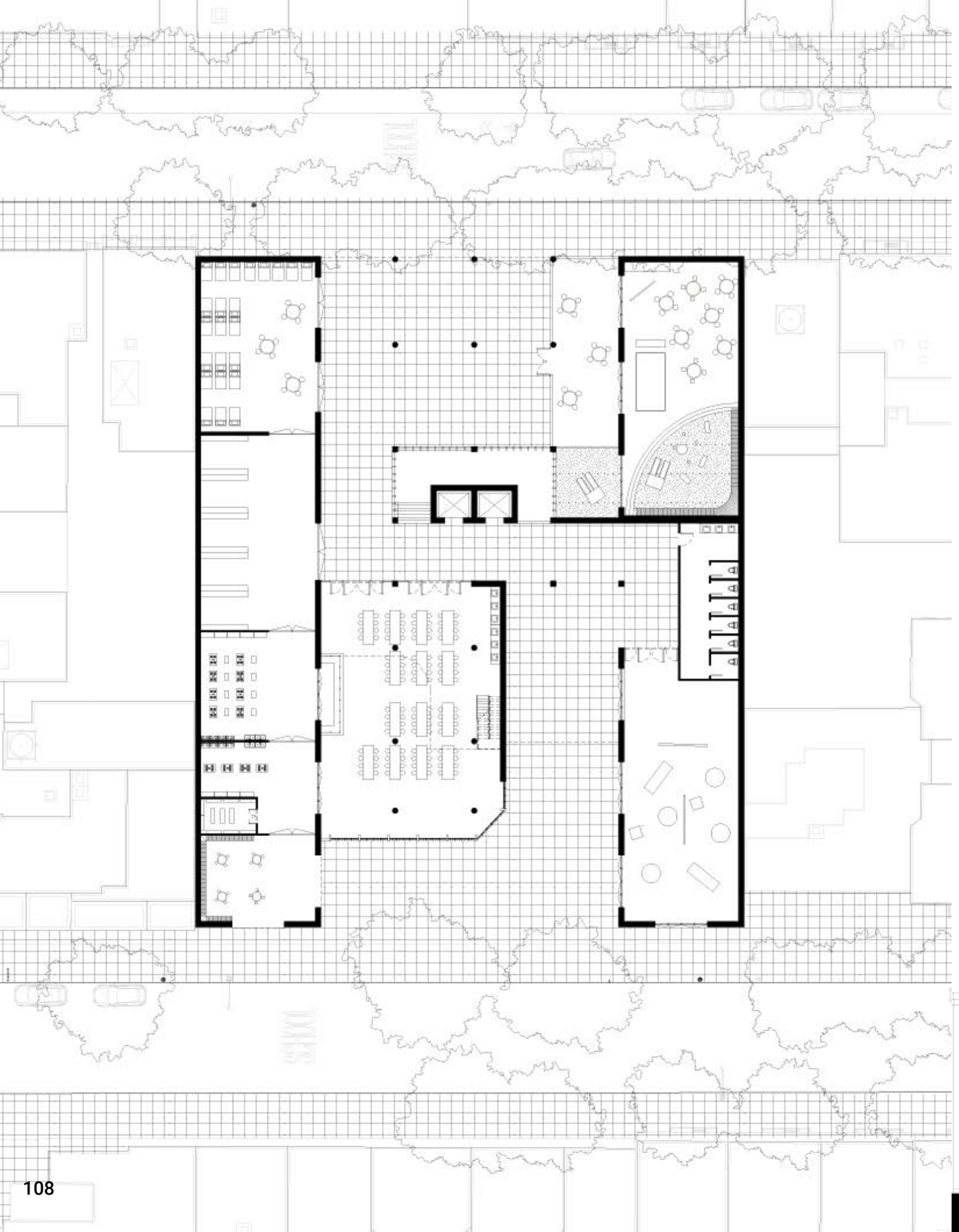
To challenge this static duality, Momentum Liberation proposes to create a more dynamic and accessible space by introducing public and semi-public spaces within the school. These spaces, such as the dormitory and the community center, provide opportunities for the school to interact with the community, creating a more fluid and flexible relationship. In addition, the design incorporates external platforms and circulation spaces that serve as playgrounds for students and gathering spaces for the community. By blurring the boundaries between private and public spaces, Momentum Liberation hopes to create a more inclusive and engaging environment that promotes learning and community interaction.

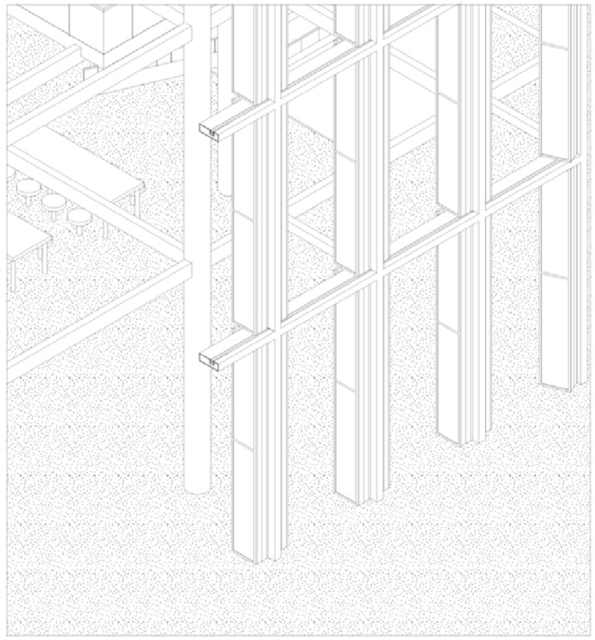


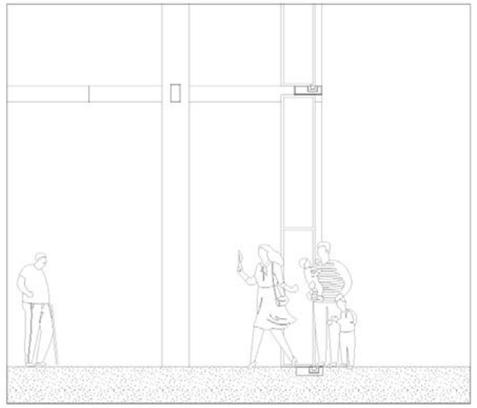


Two Mode of Operation

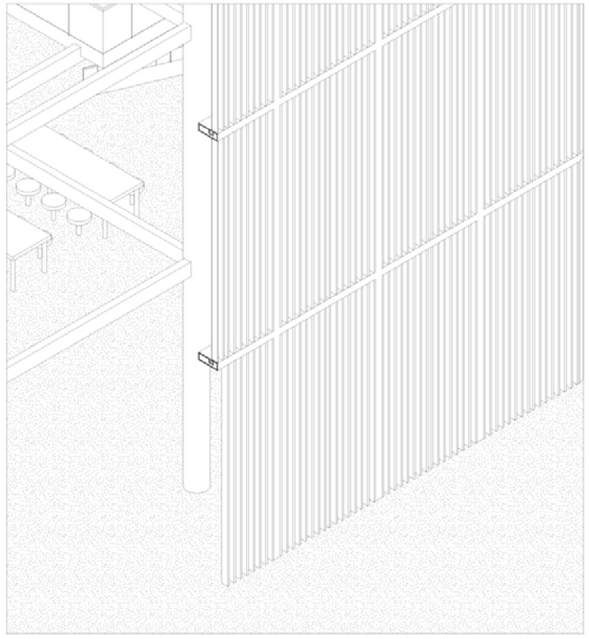
The school operates in two distinct modes: private and public. During private mode, which consists mainly of academic classes like math and literature, the building's design is focused on providing a sense of inward orientation and isolation to facilitate student focus. On the other hand, during public mode, the school's architecture becomes more outwardly focused, blurring the boundary between the school and the community. Learning takes place both inside and outside the school, and interaction between students and community members is encouraged.

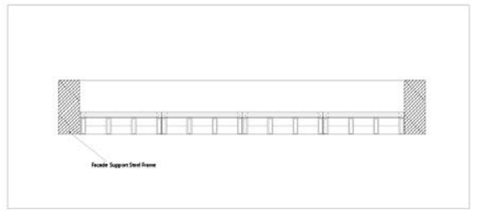


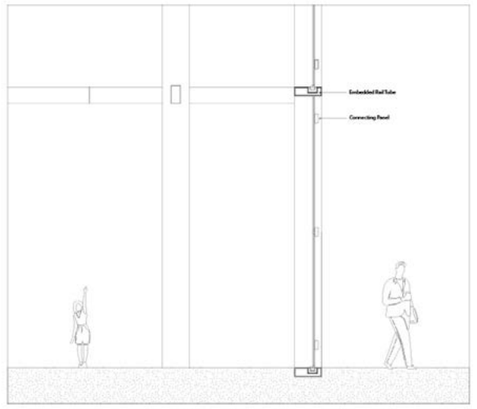




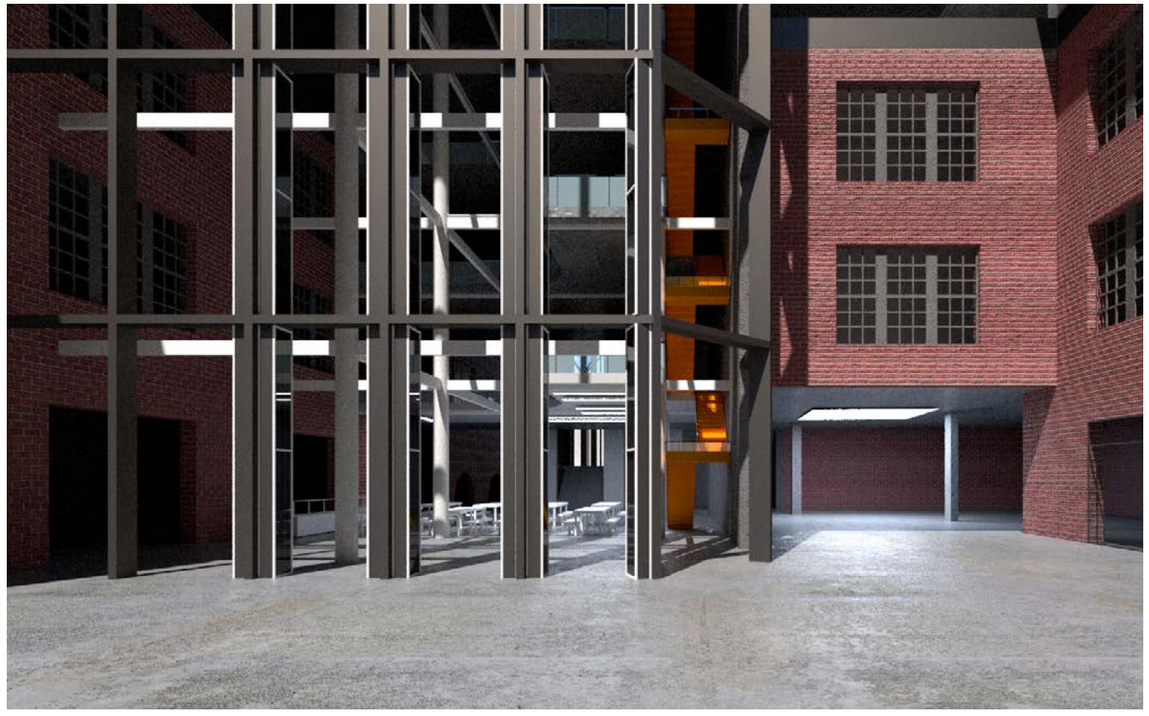
Public Mode

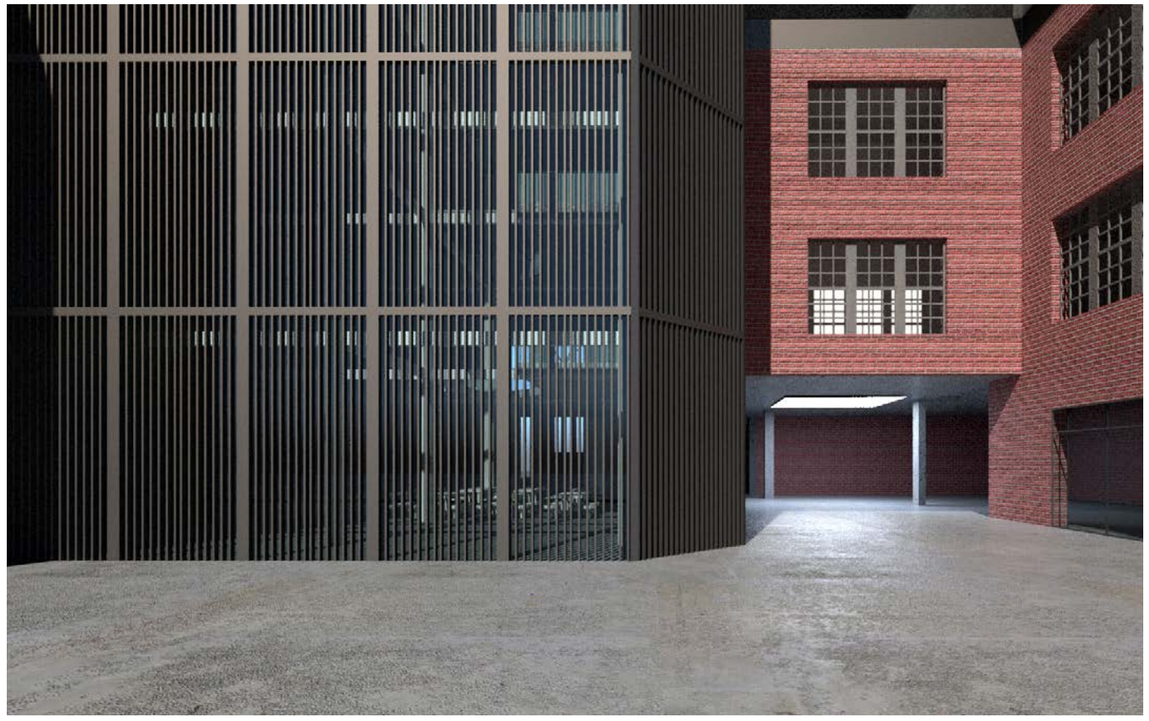






Private Mode





10
GRADIENT VANISH

GSAPP ADVANCED CURTAIN WALL
Fall Semester 2022

Individual Project
Instructor: Daniel Vos

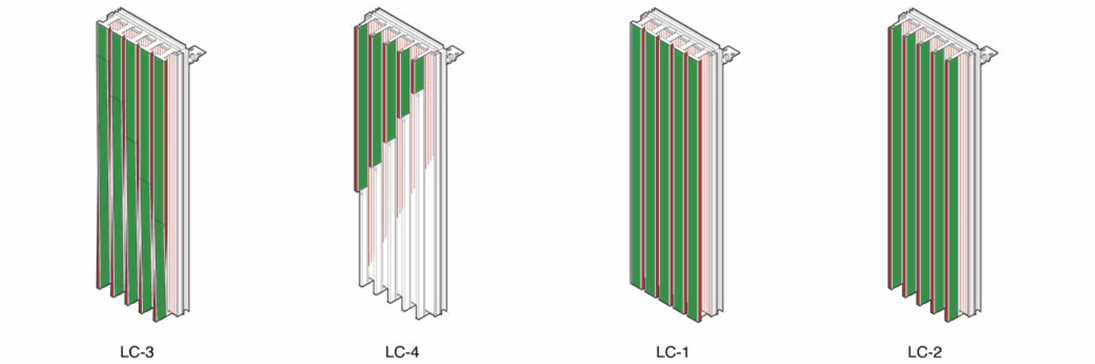
The curtain wall project is inspired by Gerhard Richter's ***Fuji,*** 1996. The goal is to translate the abstract modern painting into a curtain wall system that embodies the characteristics of the art work, which in project is the strong verticality and the corrosive nature of color. The composite fence system alternates the observable color from different angles. Combining color fences with fritting provides a finer resolution of the color gradient. As the metal members have the potential to weather, the facade itself also is a platform for natural color change from green to red rust.

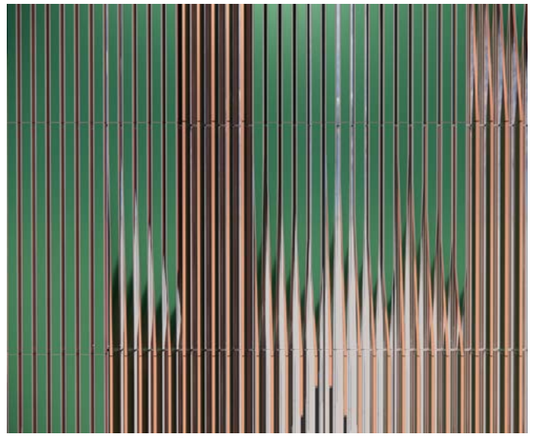
System consists of two insulating glass units four-sided structural silicone glazed onto unitized frames of thermally broken, custom profile extruded aluminum for acoustic control. One layer of Ipachrome(non-low-e reflective coating) is coated on the #2 surface of the outer insulated glass unit. Supporting aluminum panels are inserted and connected to horizontal mullions. Colored glass fritting applied on #1 surface of the outer insulated glass unit. Four types of prefabricated aluminum composite louver units are attached to the support panels through fasteners.

Gerhard Richter - “Fuji”, 1996

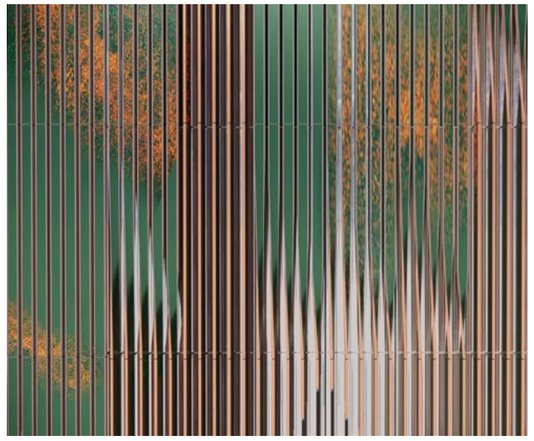
Erosion & Verticality

In painting the Fuji series, Gerhard Richter uses long heavy brushes stroking layers of oil paint freely on a canvas. The intertwining rhythmic movement of red and green creates ambiguity among viewers. The two colors corrodes one another, blurring any hard boundaries in between. The facade design is inspired by the strong verticality and the dynamic colors of the painting. Acknowledging the soft transition between solid and void, the facade would have various visibility, from opaque to transparent. At the same time, the facade emphasizes the vertical architecture language through colors.

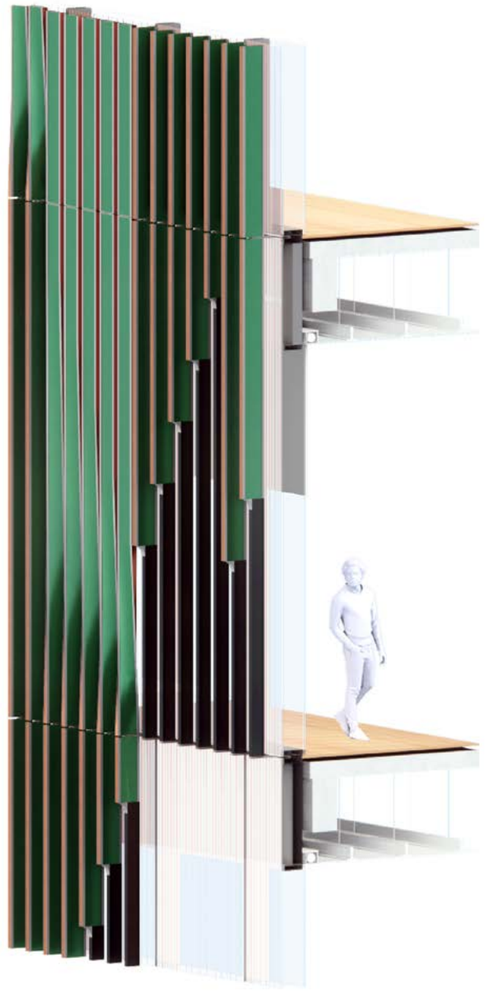


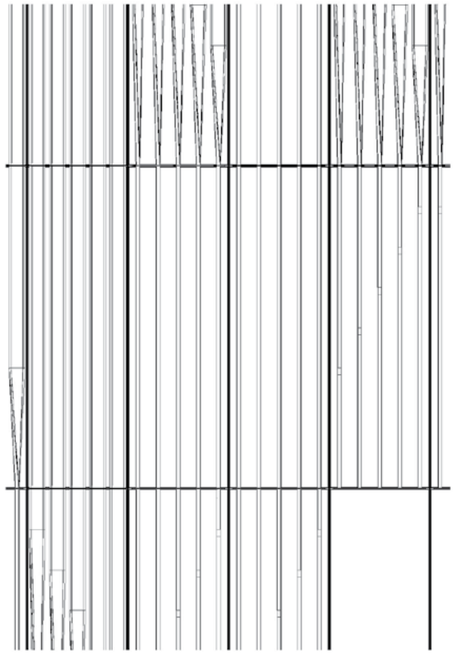


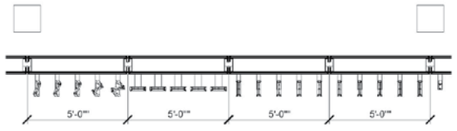
Before Weathering

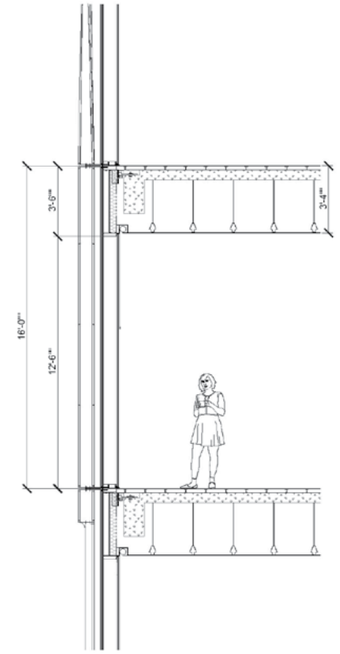


After Weathering









Facade System

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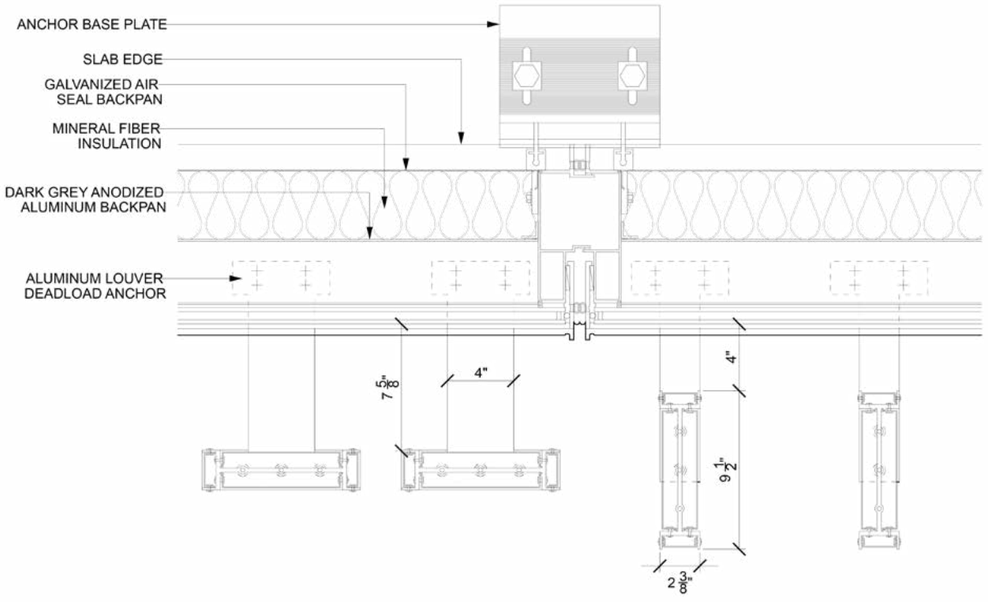
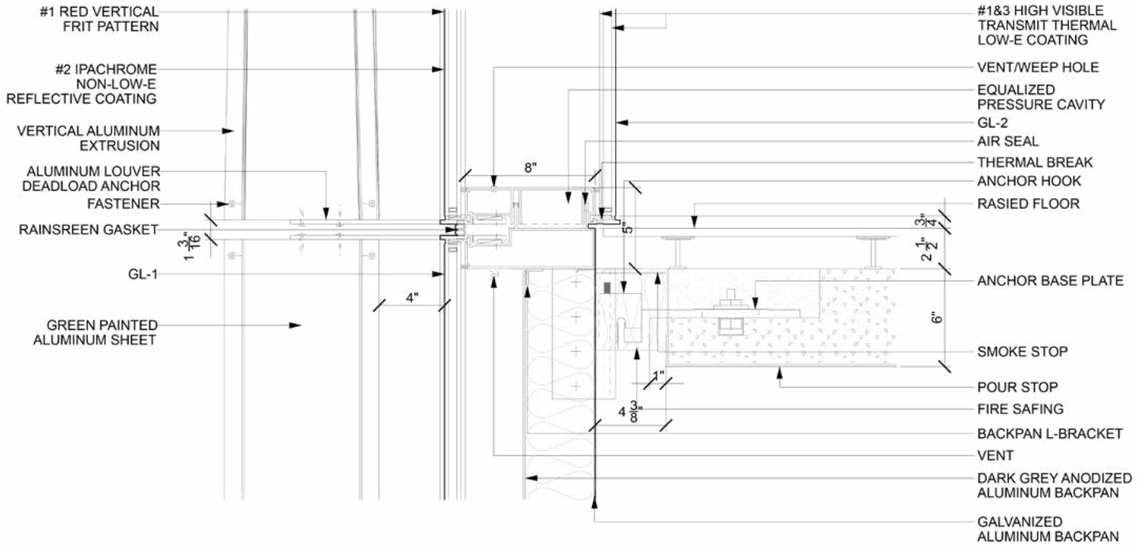
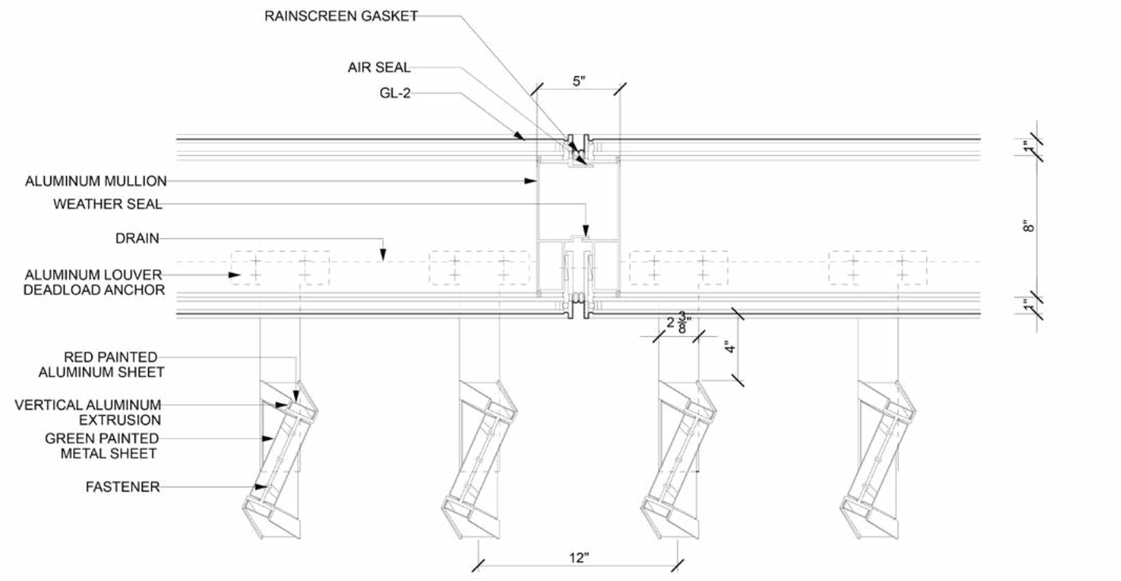
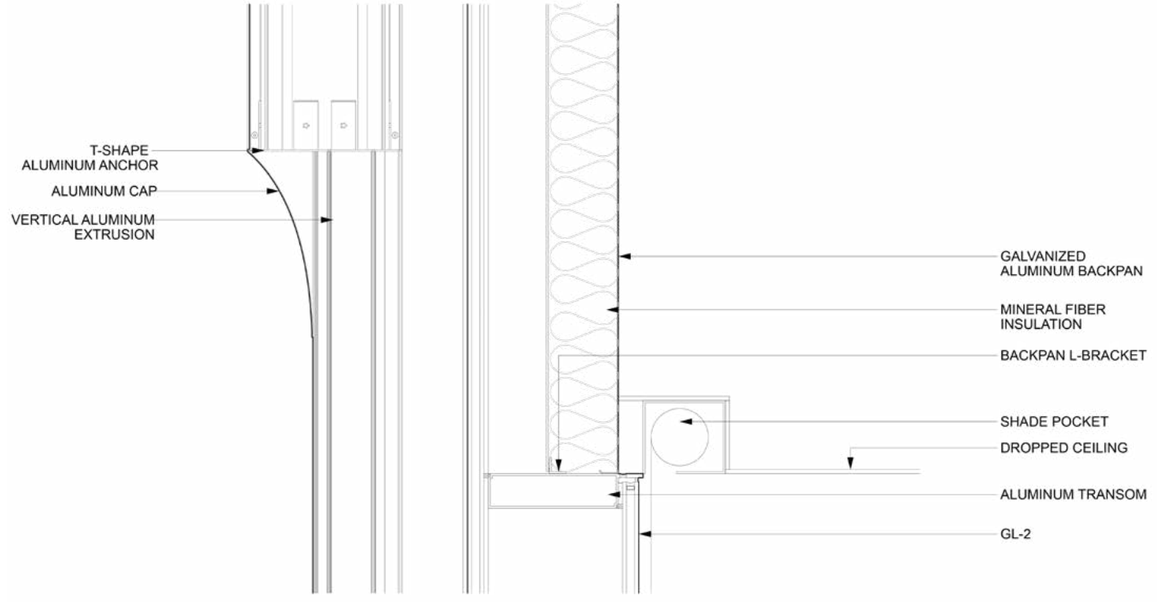

ANCHOR BASE PLATE
SLAB EDGE
GALVANIZED AIR SEAL BACKPAN
MINERAL FIBER INSULATION
DARK GREY ANODIZED ALUMINUM BACKPAN
ALUMINUM LOUVER DEADLOAD ANCHOR
7 5/8"
4"
4"
9 1/2"
2 3/8"


#1 RED VERTICAL FRIT PATTERN
#2 IPACHROME NON-LOW-E REFLECTIVE COATING
VERTICAL ALUMINUM EXTRUSION
ALUMINUM LOUVER DEADLOAD ANCHOR
FASTENER
RAINSREEN GASKET
1 3/16"
GL-1
GREEN PAINTED ALUMINUM SHEET
8"
4"
#1&3 HIGH VISIBLE TRANSMIT THERMAL LOW-E COATING
VENT/WEEP HOLE
EQUALIZED PRESSURE CAVITY
GL-2
AIR SEAL
THERMAL BREAK
ANCHOR HOOK
RASIED FLOOR
3/4"
2 1/2"
ANCHOR BASE PLATE
6"
SMOKE STOP
1"
POUR STOP
4 3/8"
FIRE SAFING
BACKPAN L-BRACKET
VENT
DARK GREY ANODIZED ALUMINUM BACKPAN
GALVANIZED ALUMINUM BACKPAN


RAINSCREEN GASKET
AIR SEAL
GL-2
5"
ALUMINUM MULLION
WEATHER SEAL
DRAIN
ALUMINUM LOUVER DEADLOAD ANCHOR
1"
8"
1"
2 3/8"
4"
RED PAINTED ALUMINUM SHEET
VERTICAL ALUMINUM EXTRUSION
GREEN PAINTED METAL SHEET
FASTENER
12"

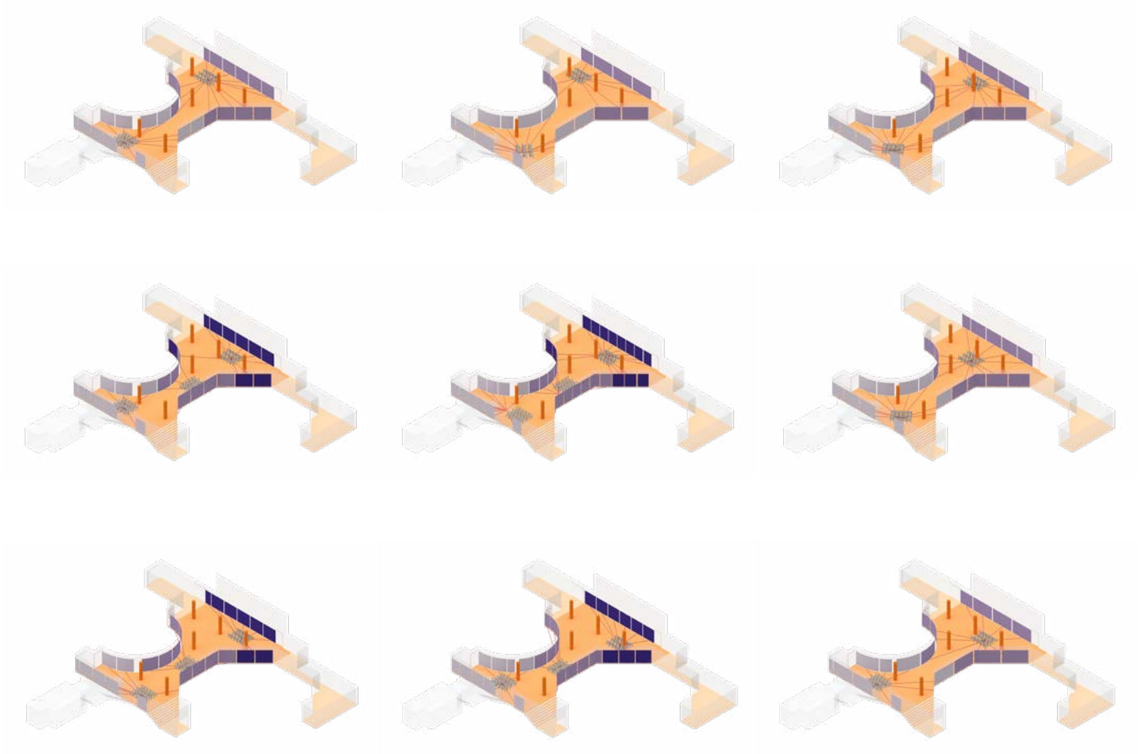

T-SHAPE ALUMINUM ANCHOR
ALUMINUM CAP
VERTICAL ALUMINUM EXTRUSION
GALVANIZED ALUMINUM BACKPAN
MINERAL FIBER INSULATION
BACKPAN L-BRACKET
SHADE POCKET
DROPPED CEILING
ALUMINUM TRANSOM
GL-2

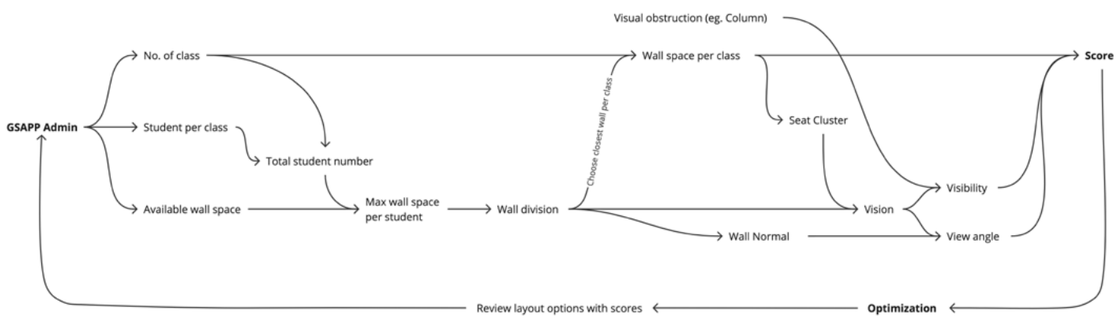
11
BASEMENT REARANGEMENT

GSAPP Generative Design I
Spring Semester 2023

Team Project Partner: Wenjing Tu, Cohaul Chen, Elena Yu, Walter Wang
Instructor: Danil Nagy

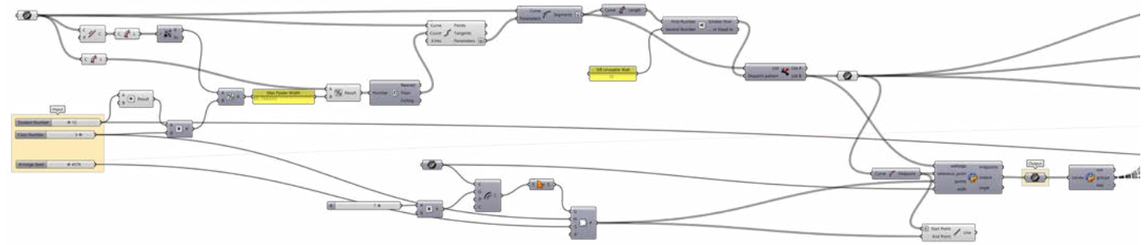
As the GSAPP architecture department has expanded, the available space for conducting studio reviews has become increasingly cramped. This lack of space has forced students and faculty members to share classrooms and other inadequate spaces, which can negatively impact the quality of reviews and limit the department's ability to foster collaboration and innovation. This is a pressing issue that needs to be addressed to ensure that the department can continue to provide a high-quality education for its students and maintain its reputation for excellence in the field of architecture. This project aims to highlight the underutilization of the Avery basement and propose potential solutions to optimize its use for studio review or exhibition. Therefore, the project uses generative design as a method to generate optimal layouts for reviews.

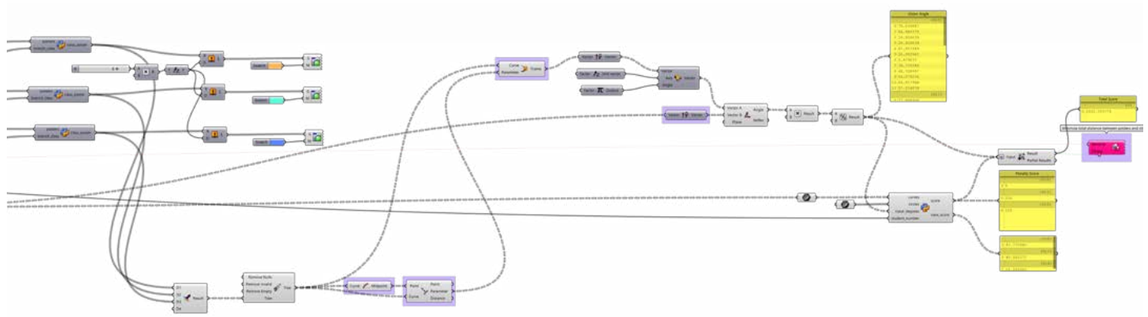


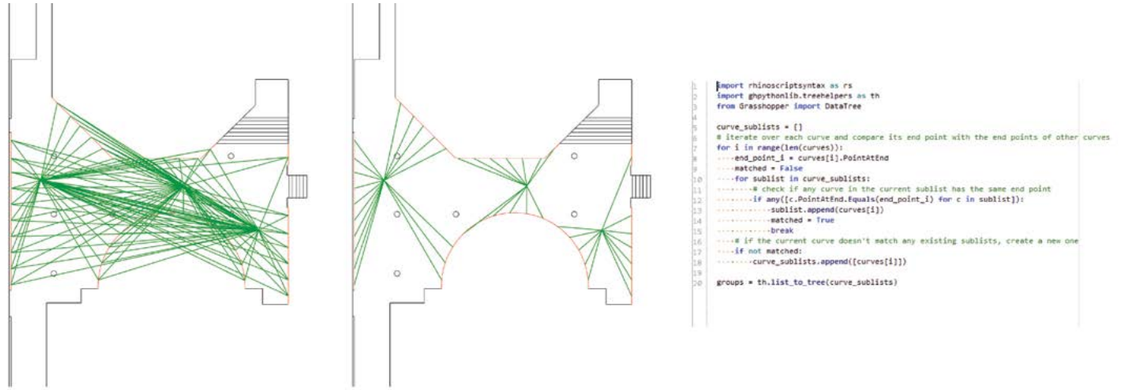


Review Space Configuration

The project user is the administration of GSAPP, who is responsible for managing the resources and facilities of the school. By applying an automated system, it would be easier for them to identify the most efficient and effective way to organize reviews and exhibitions for multiple studios. By input of class number and student number, the program is able to generate series of possible layouts according to the information provided. The concept is to optimize the wall layout and class cluster to achieve the best visual layout for reviewers.



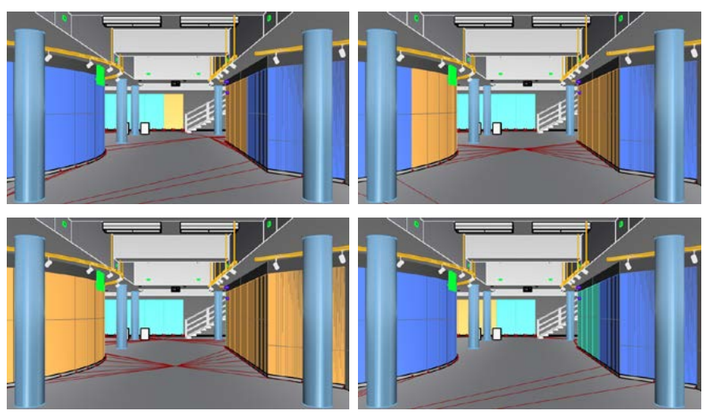




```
import rhinoscriptsyntax as rs
import ghpythonlib.treehelpers as th
from Grasshopper import DataTree

curve_sublists = []
# iterate over each curve and compare its end point with the end points of other curves
for i in range(len(curves)):
    end_point_i = curves[i].PointAtEnd
    matched = False
    for sublist in curve_sublists:
        # check if any curve in the current sublist has the same end point
        if any([c.PointAtEnd.EpsilonEquals(end_point_i, c in sublist]):
            sublist.append(curves[i])
            matched = True
            break
    # if the current curve doesn't match any existing sublists, create a new one
    if not matched:
        curve_sublists.append([curves[i]])

groups = th.list_to_tree(curve_sublists)
```

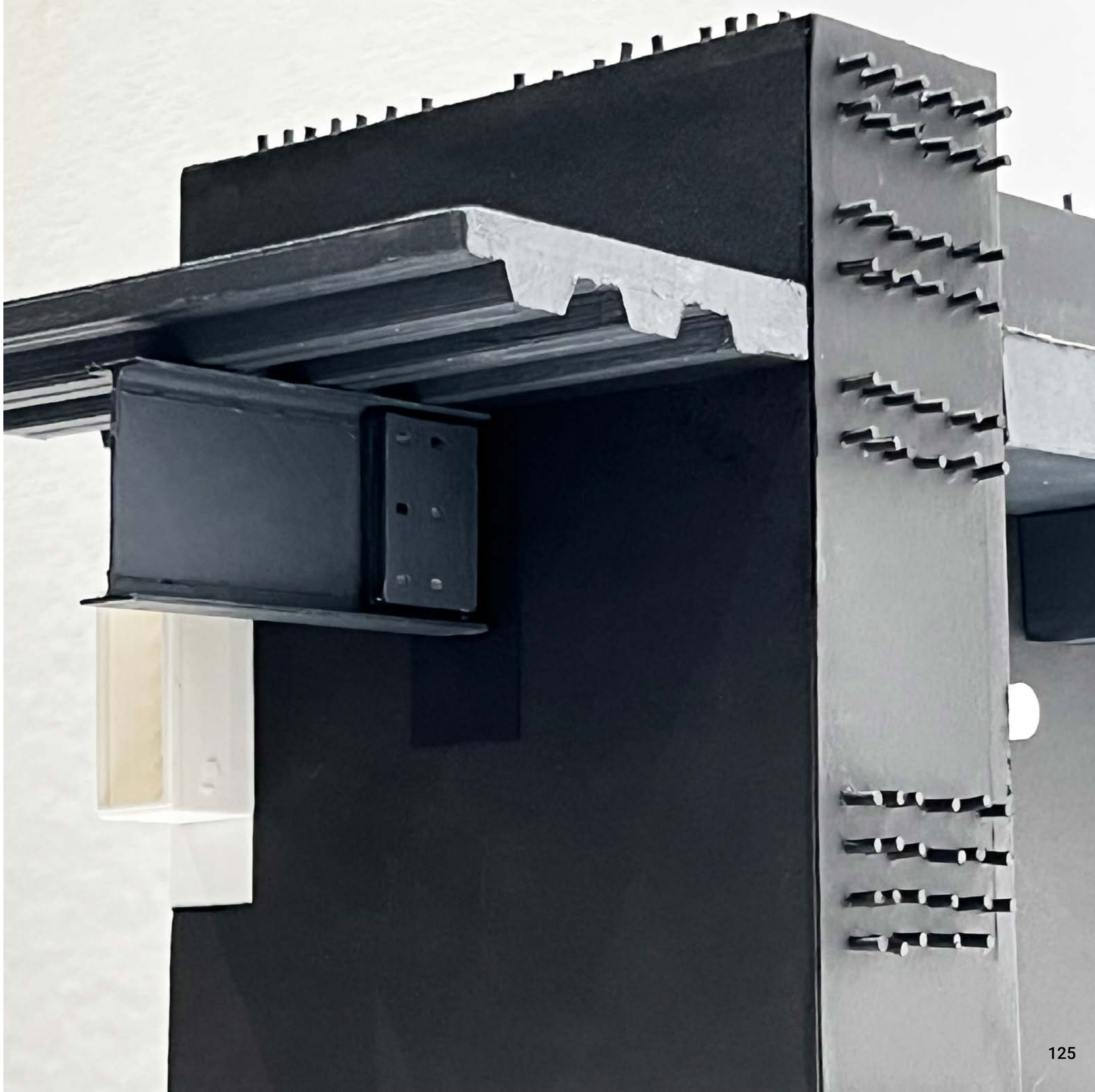


12
EGRESS ANATOMY

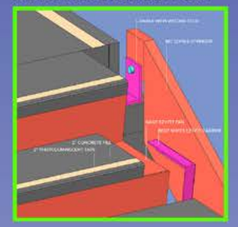
GSAPP Architecture Technology V
Spring Semester 2022

Team Project Partner: Daniel Chang, Alison Lam, Jacob Kackley
Instructor: Nicole Dosso

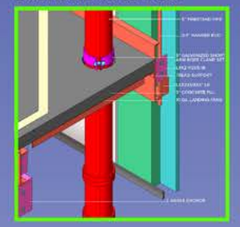
The project involves dissecting and analyzing a cross-section of an egress staircase to gain a deeper understanding of the building system. The selected building is a concrete core building, and the staircase is made of metal plates and filled with concrete. The project examines fire protection, structure, HVAC, sprinklers, elevator, and wall assembly through diagrams and models. The section model of the staircase uses varying shades of black and white to illustrate the construction sequence of the staircase, from the latest to the earliest stage.



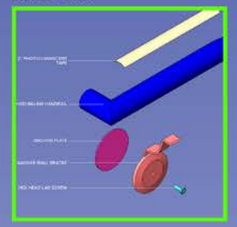
METAL PAN STAIR SUPPORT



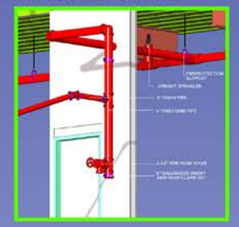
STAIR LANDING SUPPORT



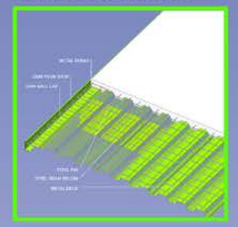
HANDRAIL



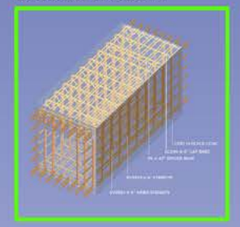
FIRE PROTECTION PIPES



METAL DECK FLOOR PLATE



CONCRETE LINK BEAM



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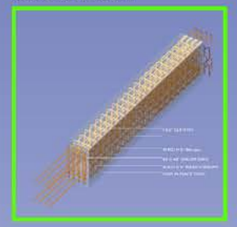
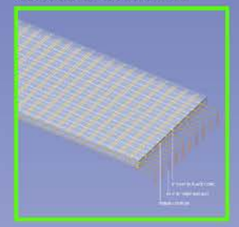
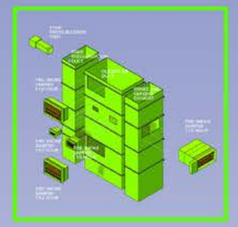


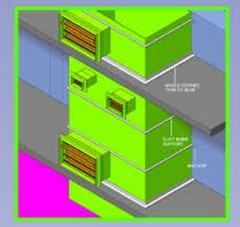
CONCRETE FLOOR PLATE



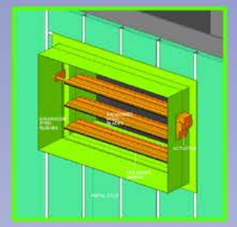
MECHANICAL SYSTEM



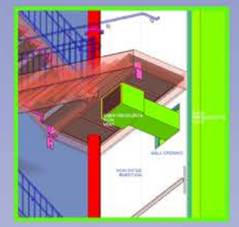
DUCT SUPPORT



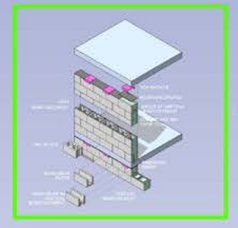
FIRE SMOKE DAMPER



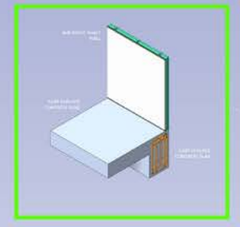
STAIR PRESSURIZATION



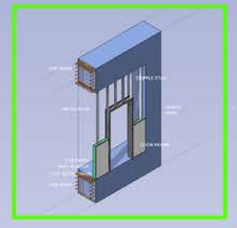
CMU BOND BEAM



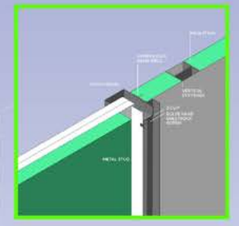
SHAFT WALL ALIGNMENT



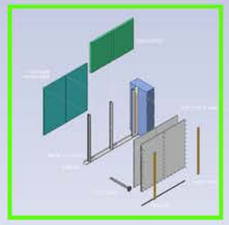
DOOR FRAME



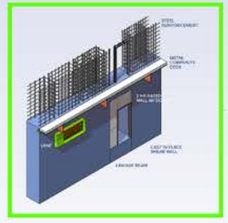
DOOR FRAME DETAIL SECTION

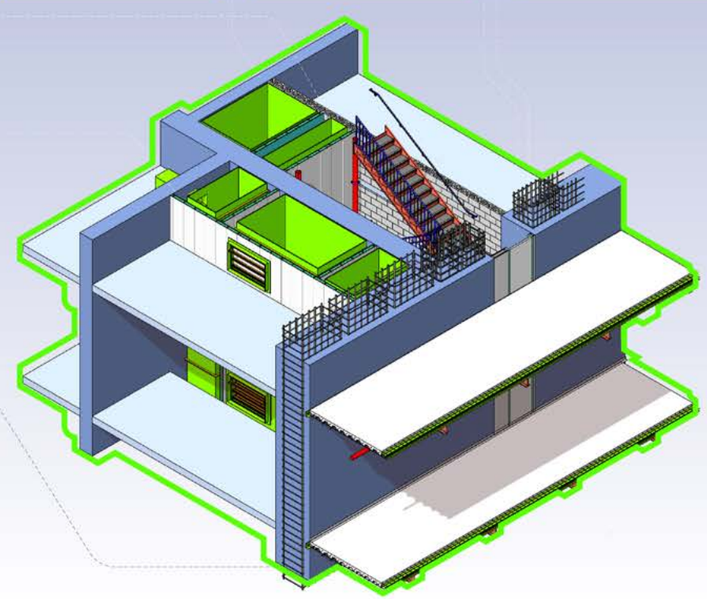


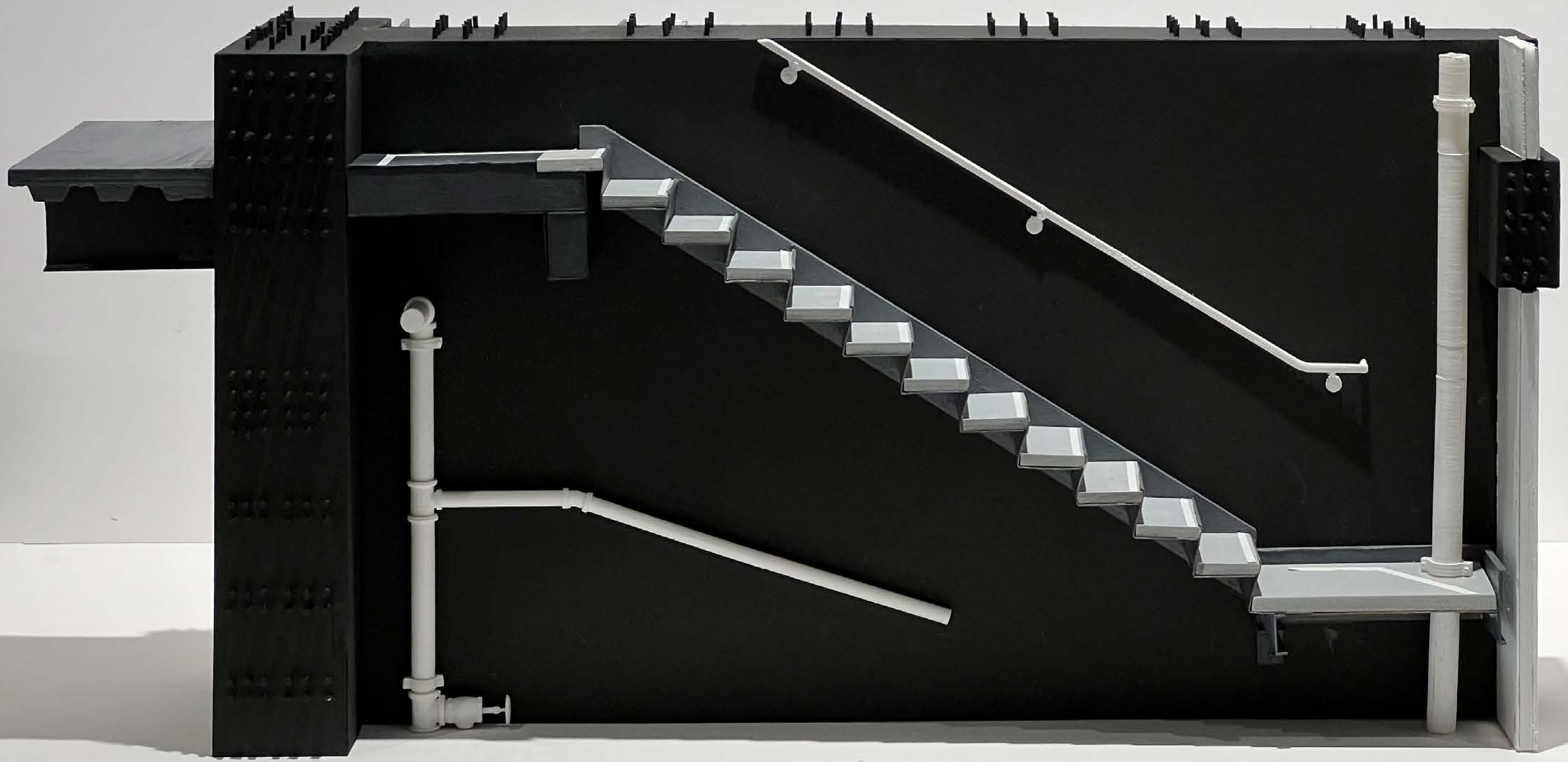
EXPLODED WALL MAKEUP



SHEAR WALL







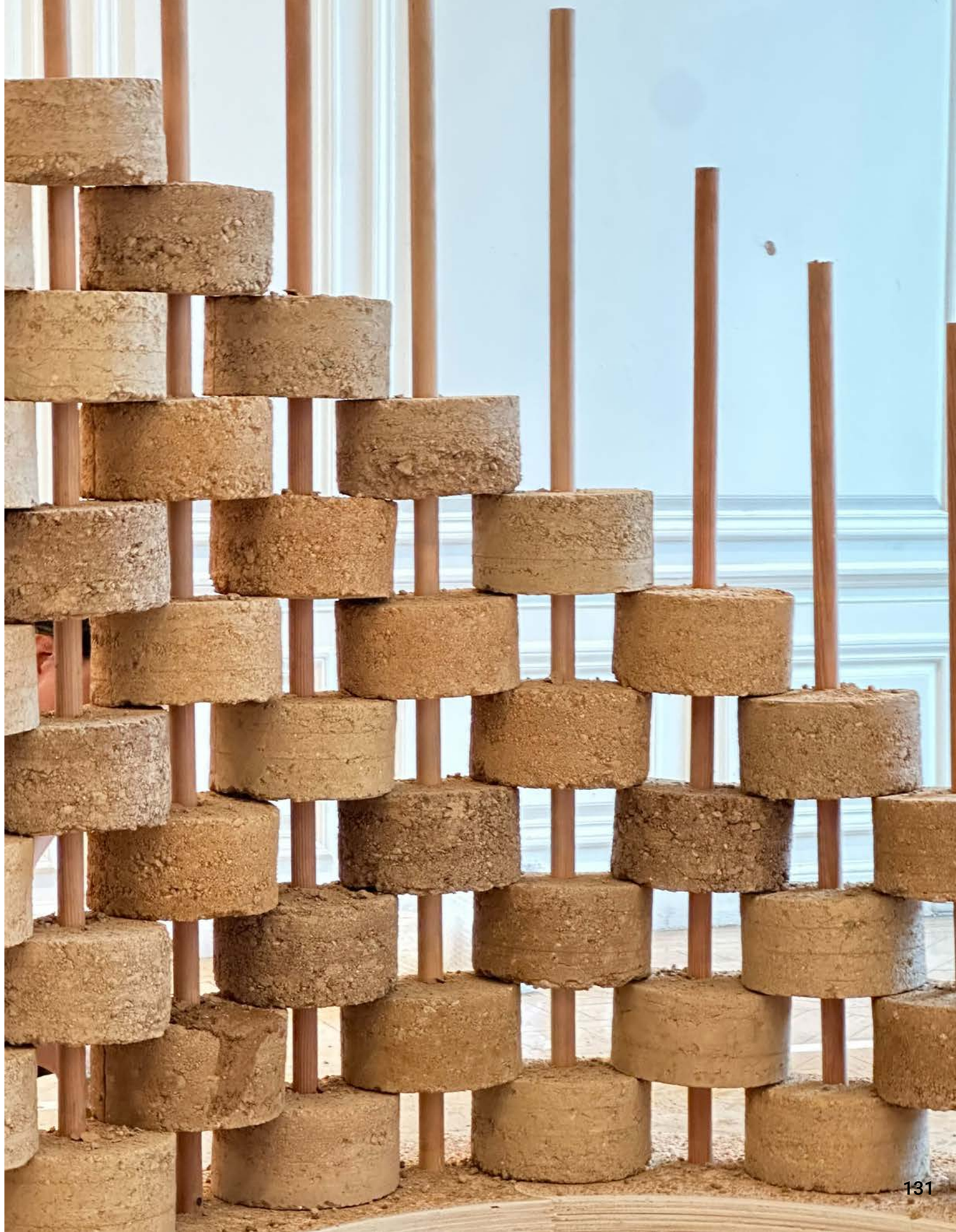
13
DYNAMIC SOLIDITY

GSAPP Making With Earth
Spring Semester 2023

Team Project Partner: Yuli Wang, Zhuofei Tang
Instructor: Lola Ben-Alon

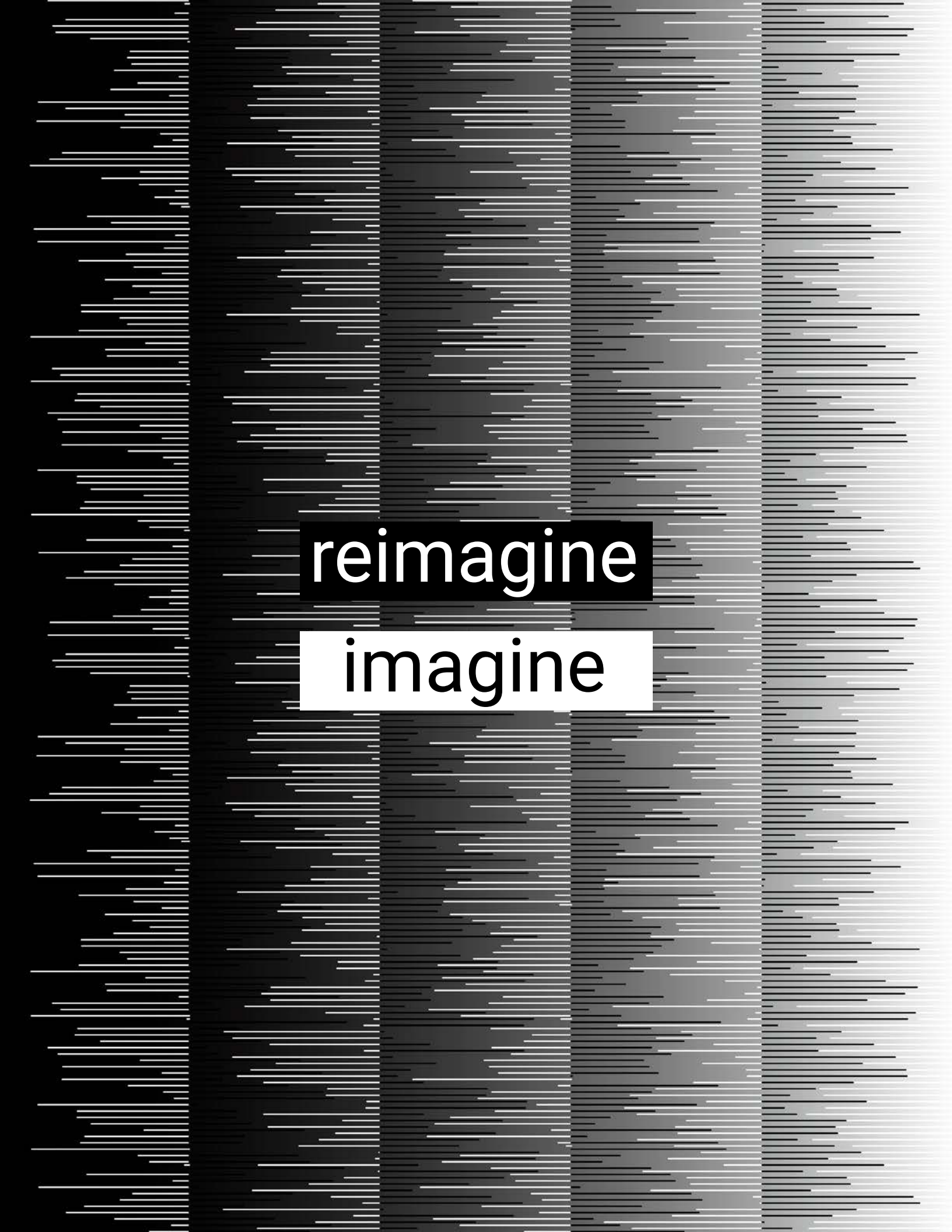
Earthen materials are low carbon, ubitiques, and low cost. Structures of raw earth, built without cement or synthetic stabilizers, have the potential to minimize embodied fuel and carbon emissions from chemical, industrial, and thermal processing. Earthen building processes — contemporary versions of ancient knowledge — to be promising components of climate-friendly design that require further exploration and demonstration.

Engaging with theories and hands-on experiences, students developed a range of earth-based mixtures and tested their fabrication mechanisms, including digital 3D printing, mechanical pressing, and manual craft. Students drew inspiration from traditional techniques such as adobe rammed earth, cob, clay plasters, and straw bale construction, to speculate the futures of earth materialities. The class studied the performance and environmental benefits of each speculative project, while making a sensitive choice of materials, technical details, and fabrication processes.



Review Space Configuration

Dynamic Solidity aims to create dynamically shaped architectural components using a technique called poured earth and drawing inspiration from traditional earthbag construction. The fabrication process revealed that using nonwoven permeable fabrics allowed for the earth-based mixture to dry through evaporation. The experimentation is conducted to investigate the material and aethetic qualities of different shapes of the casts and ingredients. Fabric casting gives enough freedom to the soil to form organicly, but is also constrained by strings tying all the bags together. Textures of the fabric, similar to wood casting concrete, leaves on the soil columns and veneers, giving a sense of softness.


reimagine
imagine