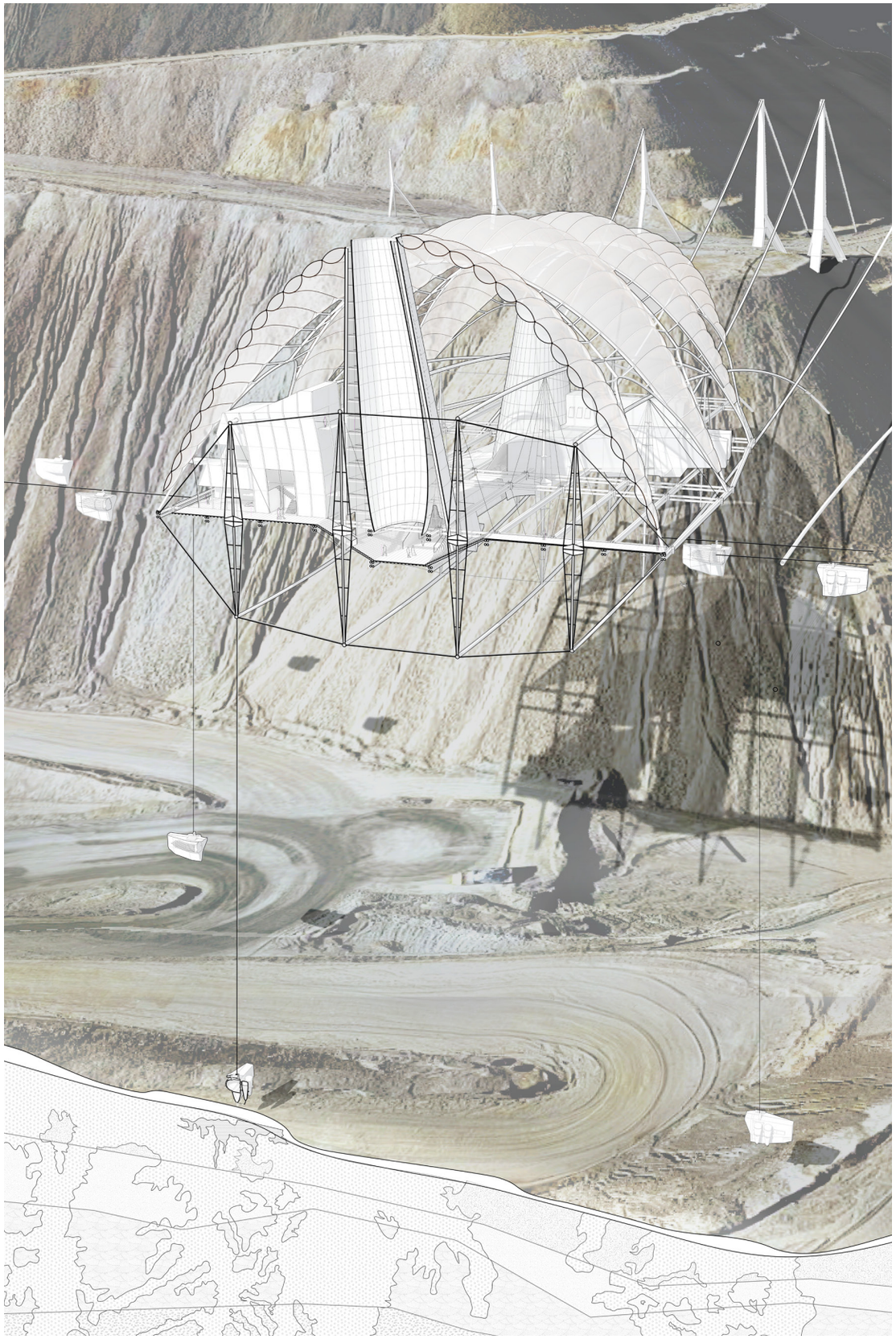
PORTFOLIO

ERIC BOURKE
CALIFORNIA POLYTECHNIC STATE
SCHOOL OF ARCHITECTURE



PROSPECT

a blueprint for a regenerative community

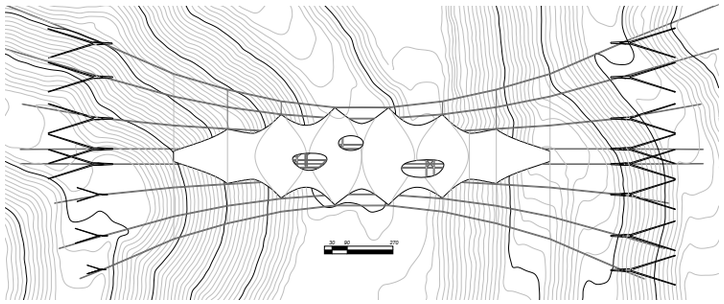
2022 B. Arch Thesis

In our current society, energy is consumed with the flip of a switch or the touch of a button without a second thought. This visual and cognitive disconnect between humankind and its resources can be traced back to periods of industrialization and westward expansion in the United States. Guided by manifest destiny, pioneers expanded the country into new and untouched landscapes, where they saw nature as an unruly force to be conquered.

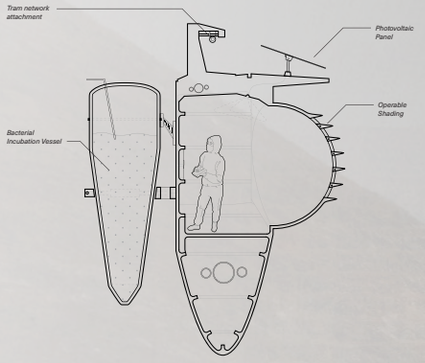
In the United States, there are over 140,000 abandoned hard rock mines on federal land alone. Current mining remediation practices seek to restore the land to its original state failing to recognize the embodied scar the Earth will forever bear.

This intervention in an Arizona copper mines acts as a suture, stitching together humanities past mistakes with a speculative future of the neo-pioneer, seeing humans as an ecological agent of design.

Researchers of new bio-remediation techniques act as a catalyst to foster ecological succession. As value is returned to the land, a new age of pioneers migrates to the former mine. The interior spaces of the building take on spiritual qualities causing researchers and pioneers to reflect on their relationship with the landscape.

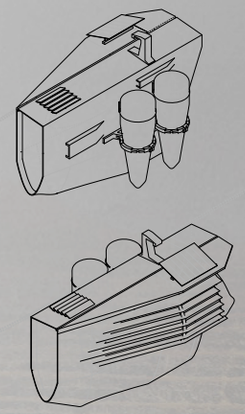


PROSPECT_1: soil remediation



Rovers are deployed via a tram network and implement bio remediation techniques the heal the soil.

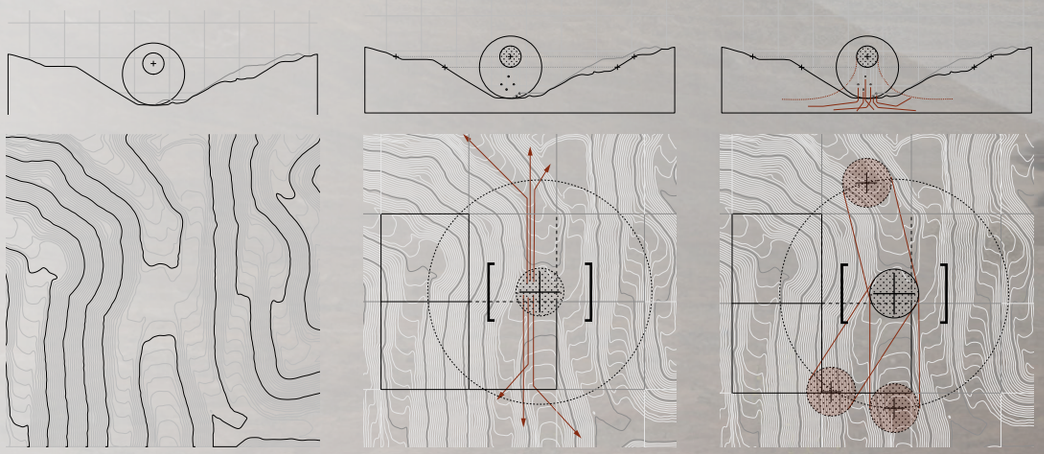
Bacteria needed for this process is cultured on site in a genetic engineering lab. The mine acts an experimental medium for new bio-remediation techniques.

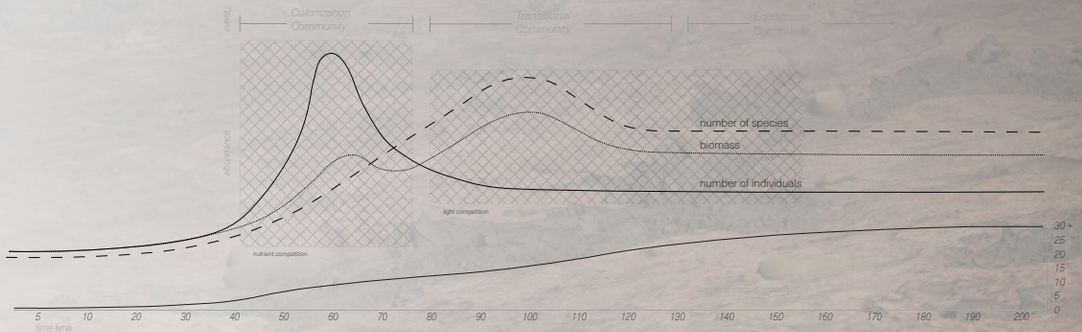


Year 0 : Isolated + Latent State

Year 1-10 *Deployment of microbial delivery network*

Year 10 - 50 *Growth of biomass and soil remediation*





Years 0 - 50 *Years 50 -100* *Years 100 - xxx*

Objective One : Remediation

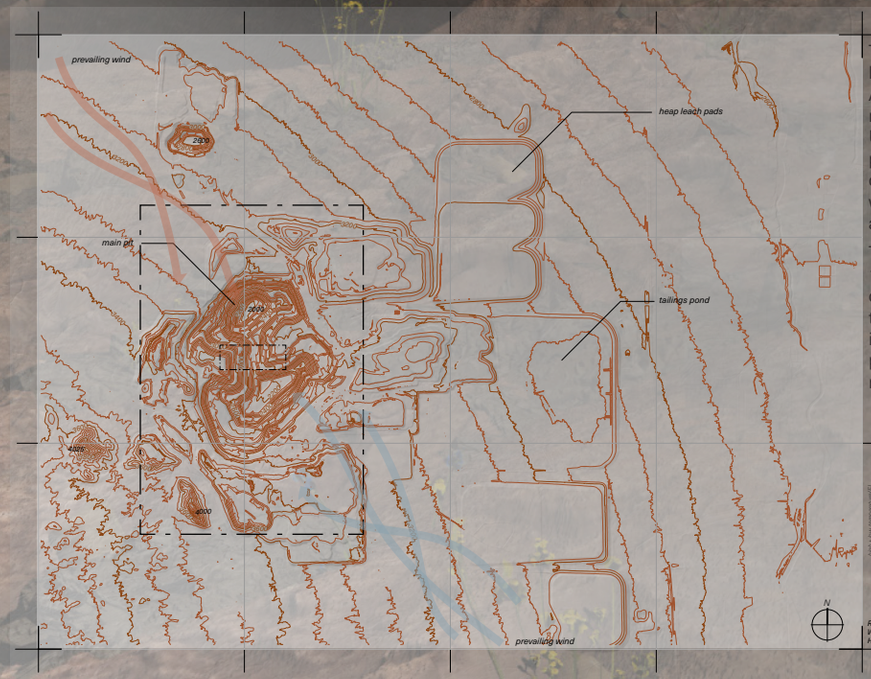
microbial inoculation returns value to the land through the creation of soil that can support life

Objective Two : Integration

initial site development acts as a catalyst, facilitating ecological interchange with the site. humans challenge traditional roles of consumerism within the food web and adopt a hybrid methodology of producer/consumer

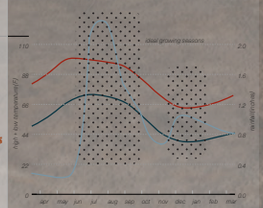
Objective Three : Creation

At the site of a monument to human exploitation of nature, inhabitants redefine this landscape as an arena for the research and development of biohybrid materials and processes. The tectonic framework of the project acts as



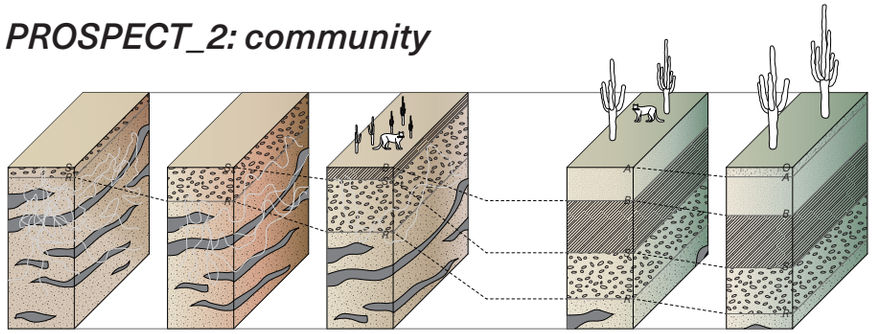
The Mission Mine Complex located south of Tucson Arizona is one of the largest mining operations in the United States. The mine produces 475,000 tons of concentrated copper a year, with a reserve life estimated at 2033.

The main pit is 2.5 by 1.5 miles, and 1,200 feet deep. Usually ranked the third largest copper mine in Arizona, the state that produces 65% of the nation's raw copper.



Rainfall per year : avg 11.8 in
Wettest months : July, August (2.4 in)
Hottest months : June, July

PROSPECT_2: community



Breaking Down of Parent Material

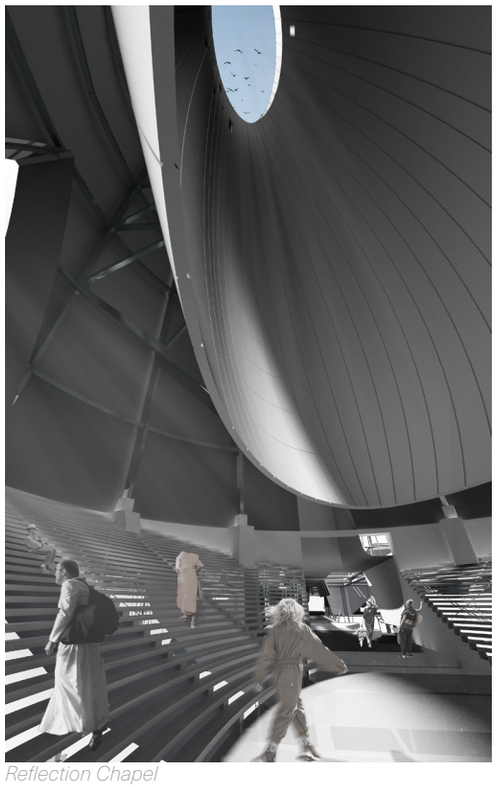
O Horizon: Organic Material

A Horizon: Top Soil

B Horizon: Subsoil

C Horizon: Weathered Bedrock

R Horizon: Bedrock

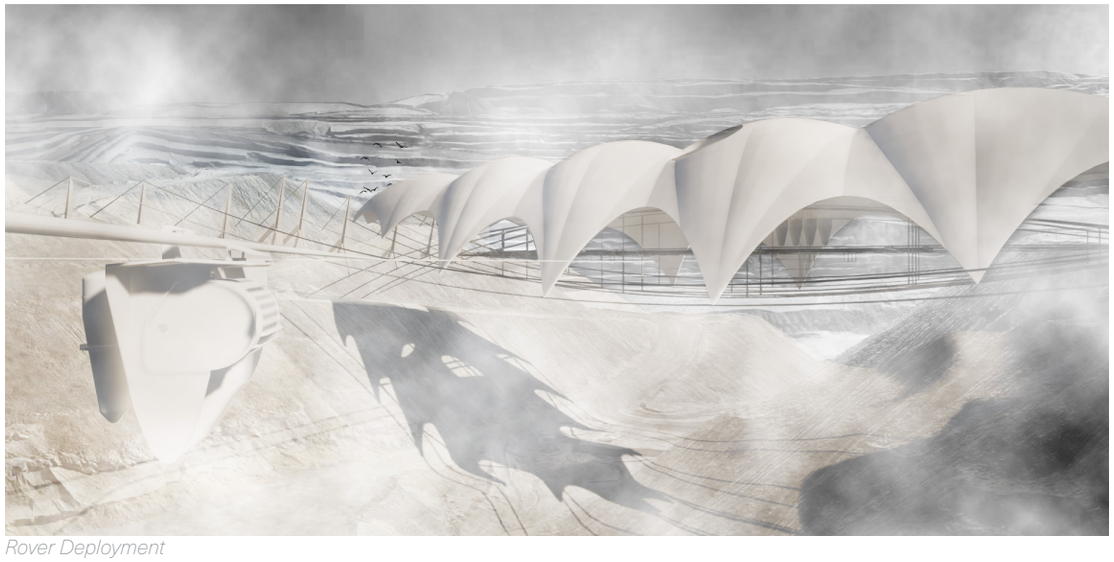


Reflection Chapel

PROGRAM:

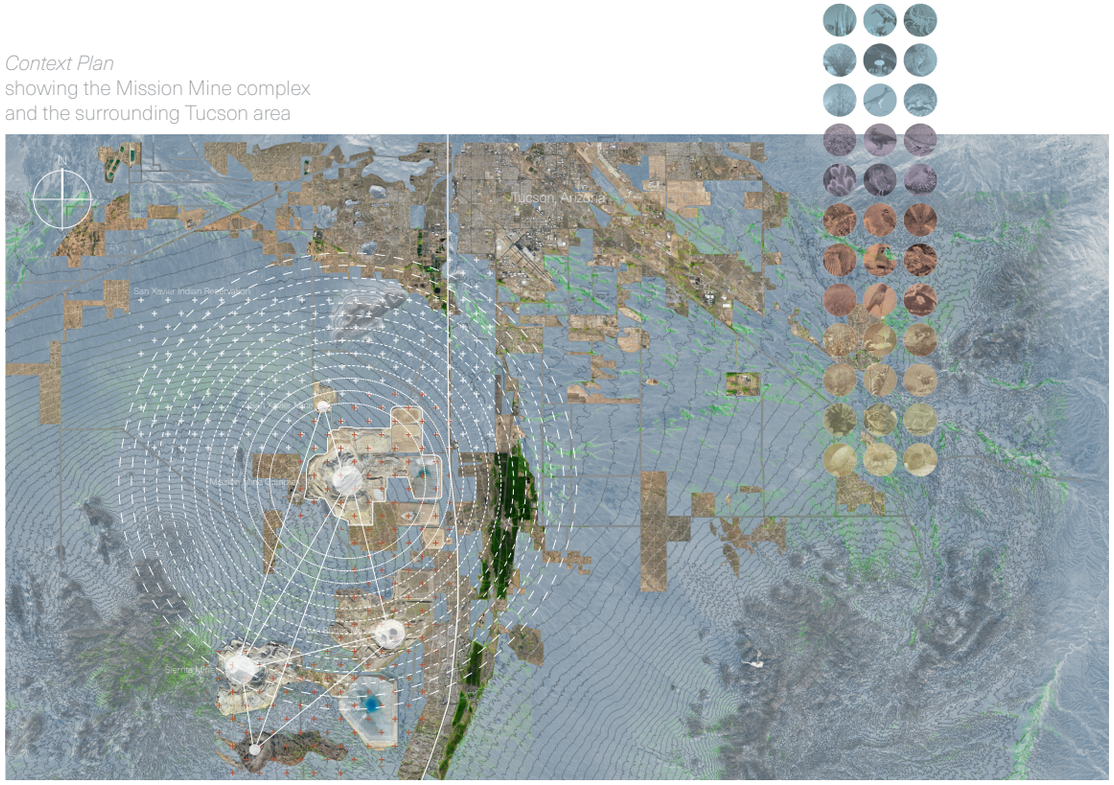
-Research Center for Bioremediation Techniques
-Seed Propogation and Nursery
-Living quarters
-Community Infrastructure for Residents
-Chapel of Ecology

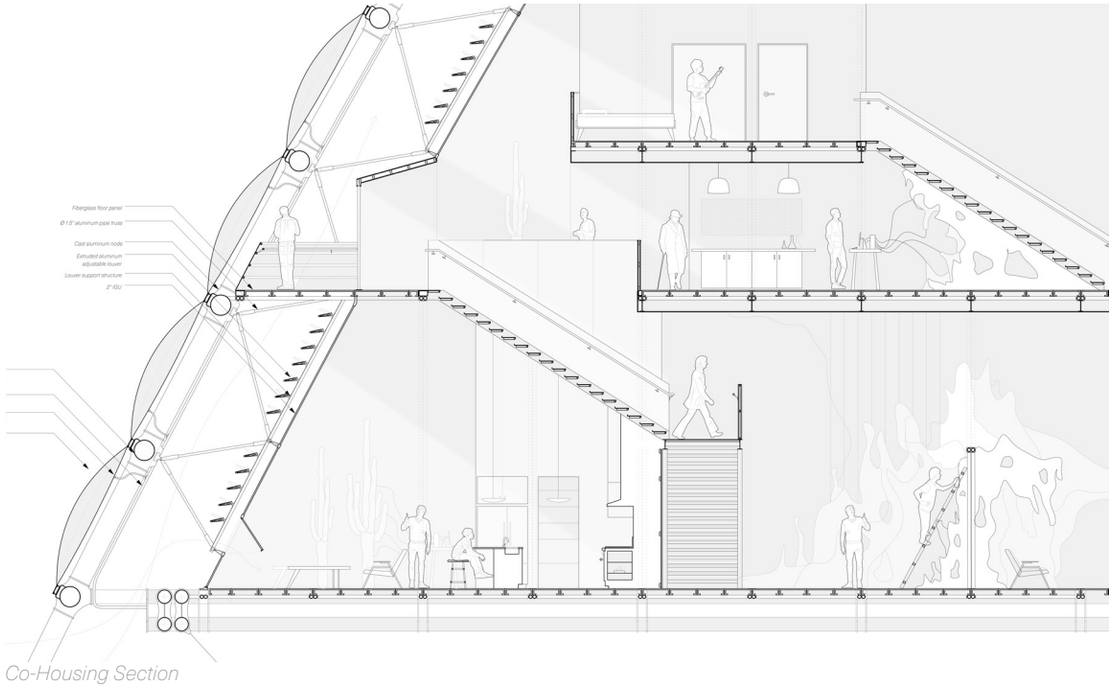
As remediation efforts become more successful, a new generation of pioneers begin to inhabit this new landscape formed in the wake of their ancestor's destruction. Researchers and homesteaders alike are caused to reflect on their past and present actions by being suspending within the scar.



Rover Deployment

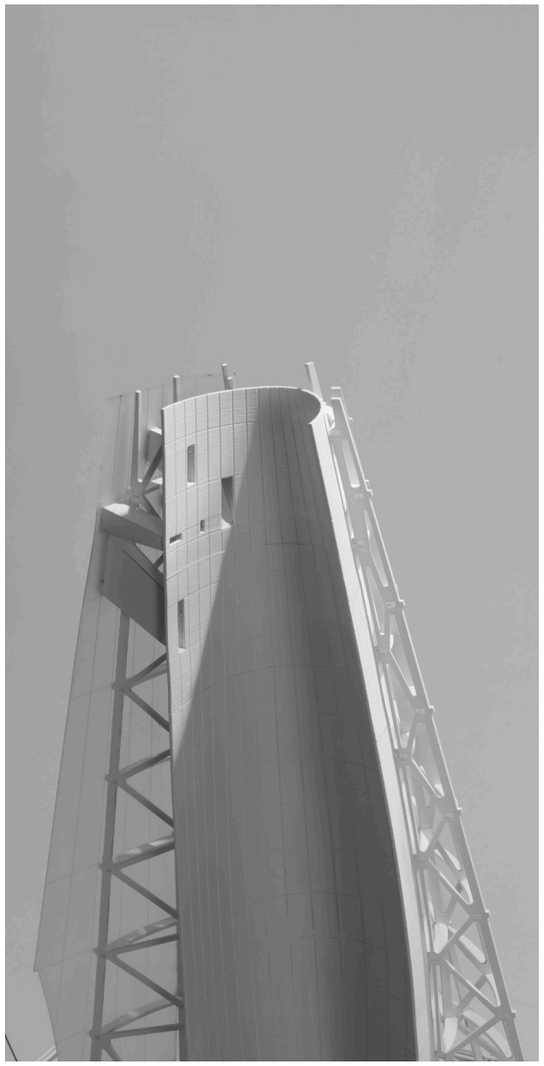
Context Plan
showing the Mission Mine complex and the surrounding Tucson area

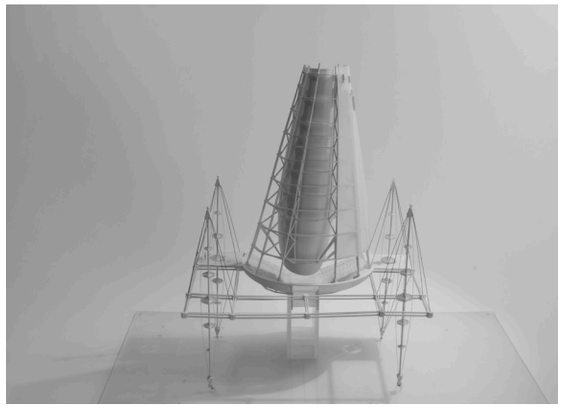


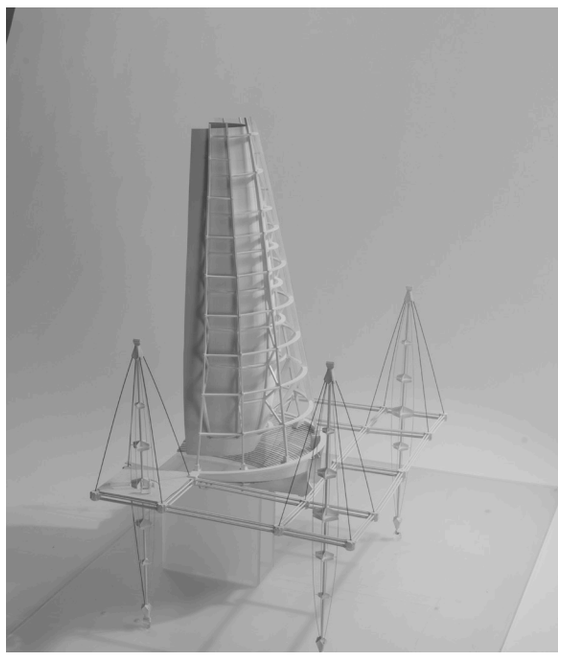


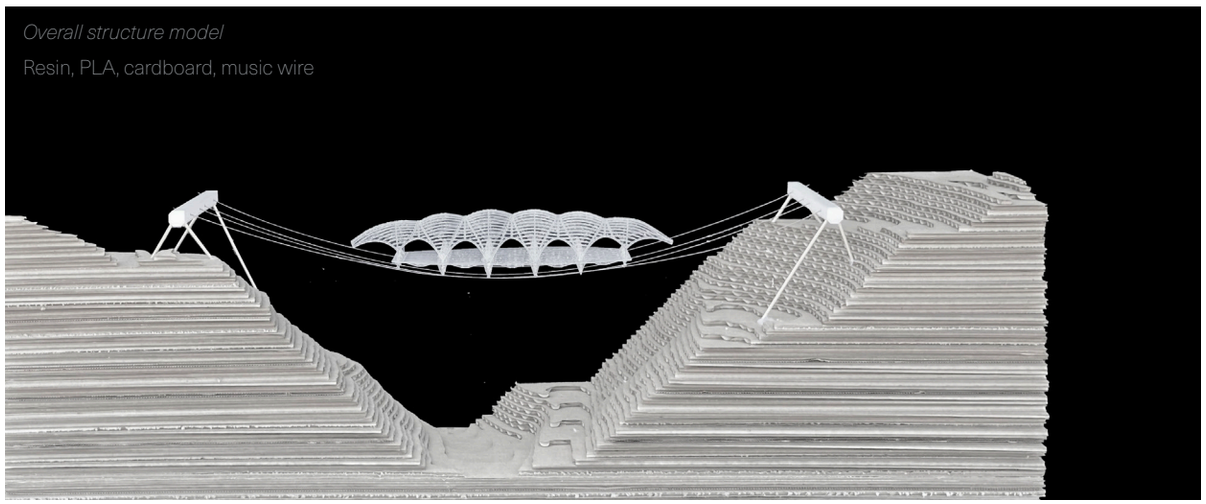
Co-Housing Section

PROSPECT: model photos



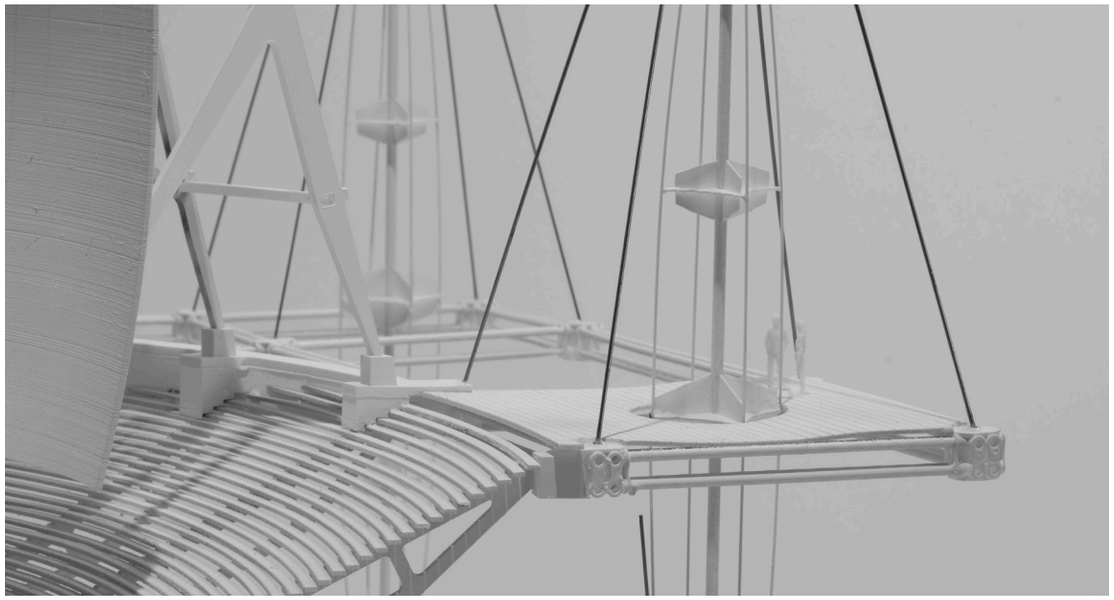






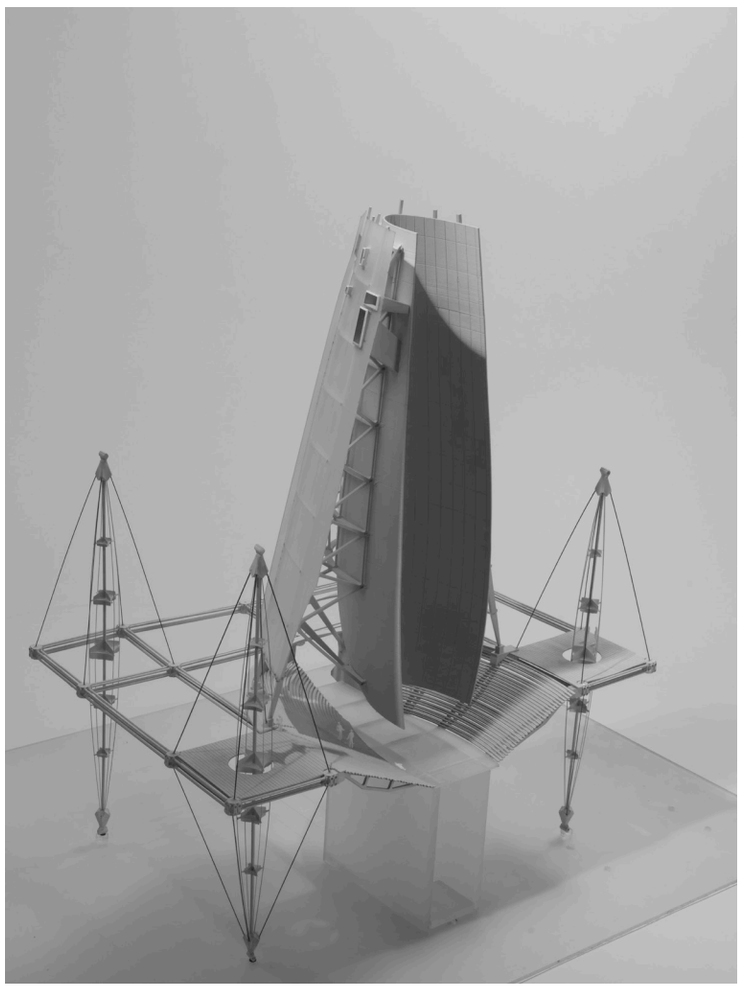
Overall structure model

Resin, PLA, cardboard, music wire



Chapel of Ecology chunk model

acrylic, resin, pla, basswood, music wire



pause.

In our current society, a large emphasis is placed on chasing the next best thing. This mentality causes anxiety and contributes to stress. This mid-century modern inspired lounge chair is comprised of oak and steel blending two opposing materials. The design seeks to evoke positive and calming memories of the past by allowing the user sit back, relax, and take a pause from their busy life.

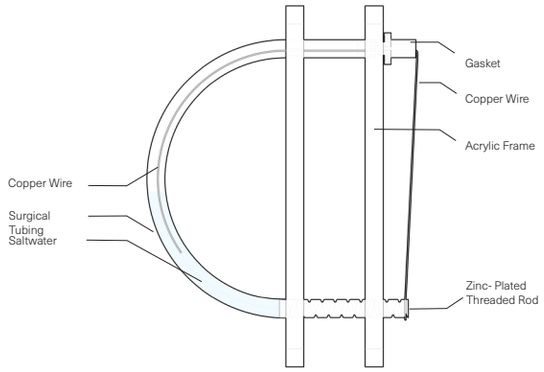
Walnut and steel coffee table.

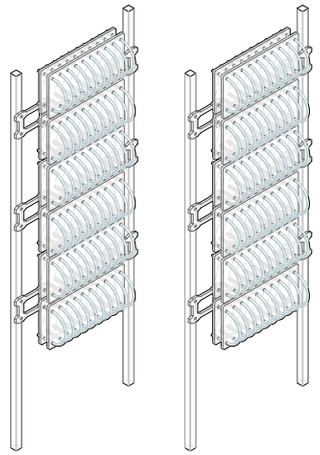
a compilation of lightweight steel elements support a live edge walnut slab. the crack in the wood is held together by a steel pipe inlayed into the table. this piece spices up your living room by engaging the eye with the unique shape and contrast of material.

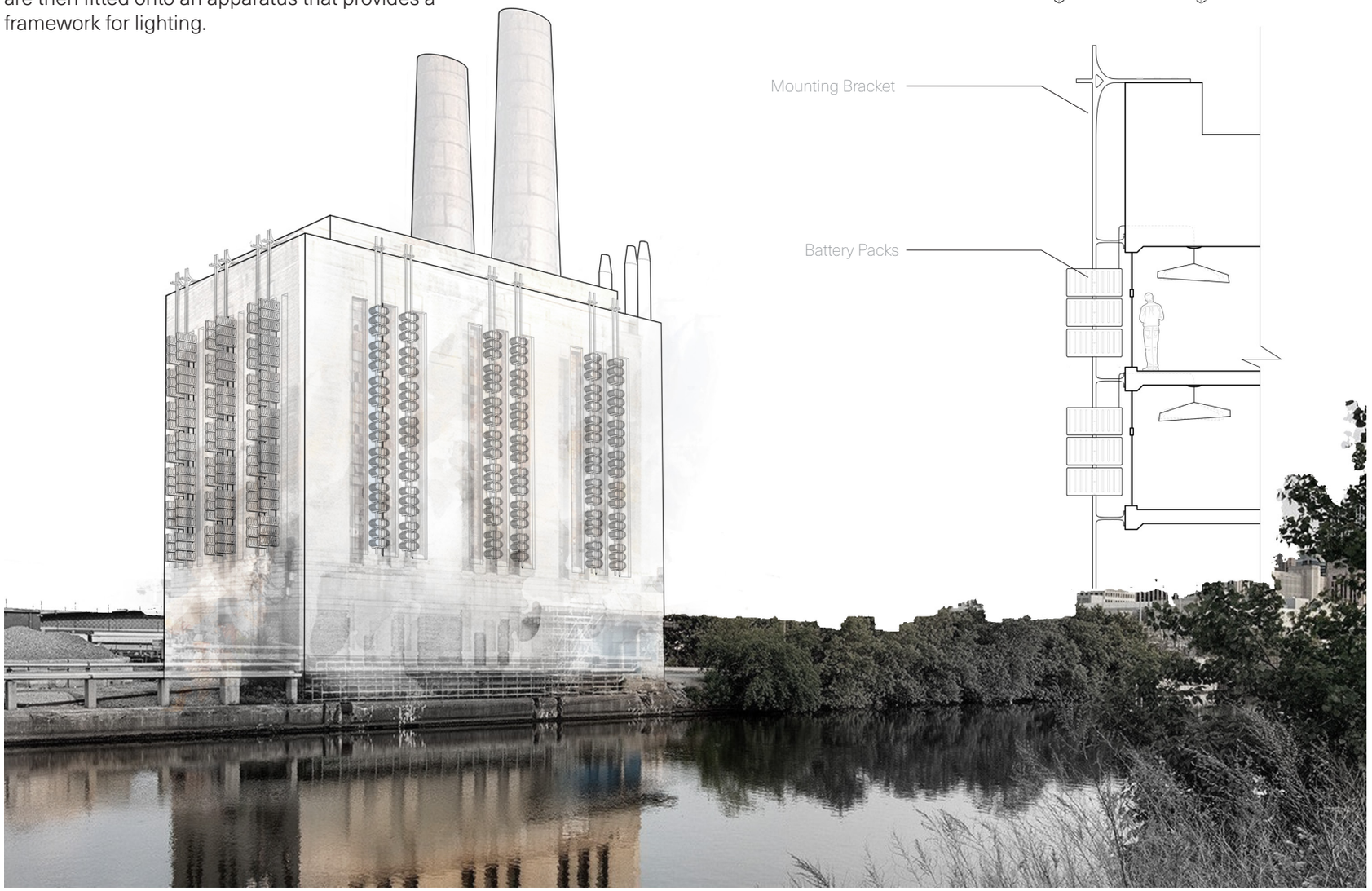
SALTWATER BATTERY

exploration of renewable energy

Using common materials, the saltwater battery can serve as a catalyst to inspire future generations to explore the possibilities of alternative energy sources. While the saltwater battery requires more cells to obtain similar voltage, this increased size calls attention to the amount of energy used in our society possibly causing the user to consider their actions.
As batteries are connected together, voltage increases and these units begin to become part of a system that provides sufficient DC power to illuminate LEDs. The drawing on the right shows a series of saltwater batteries comprised of sixty total cells. These batteries are then fitted onto an apparatus that provides a framework for lighting.







As more and more cells are aggregated, possibilities range from the scale of human body to the scale of a building. The example on the right explores the implementation of a unitized battery system on an abandoned factory building. The battery packs represent a shift to clean energy and the revitalization of a building that seeks reunite consumers with their energy source through the external display of power.

FOOD INTERCHANGE

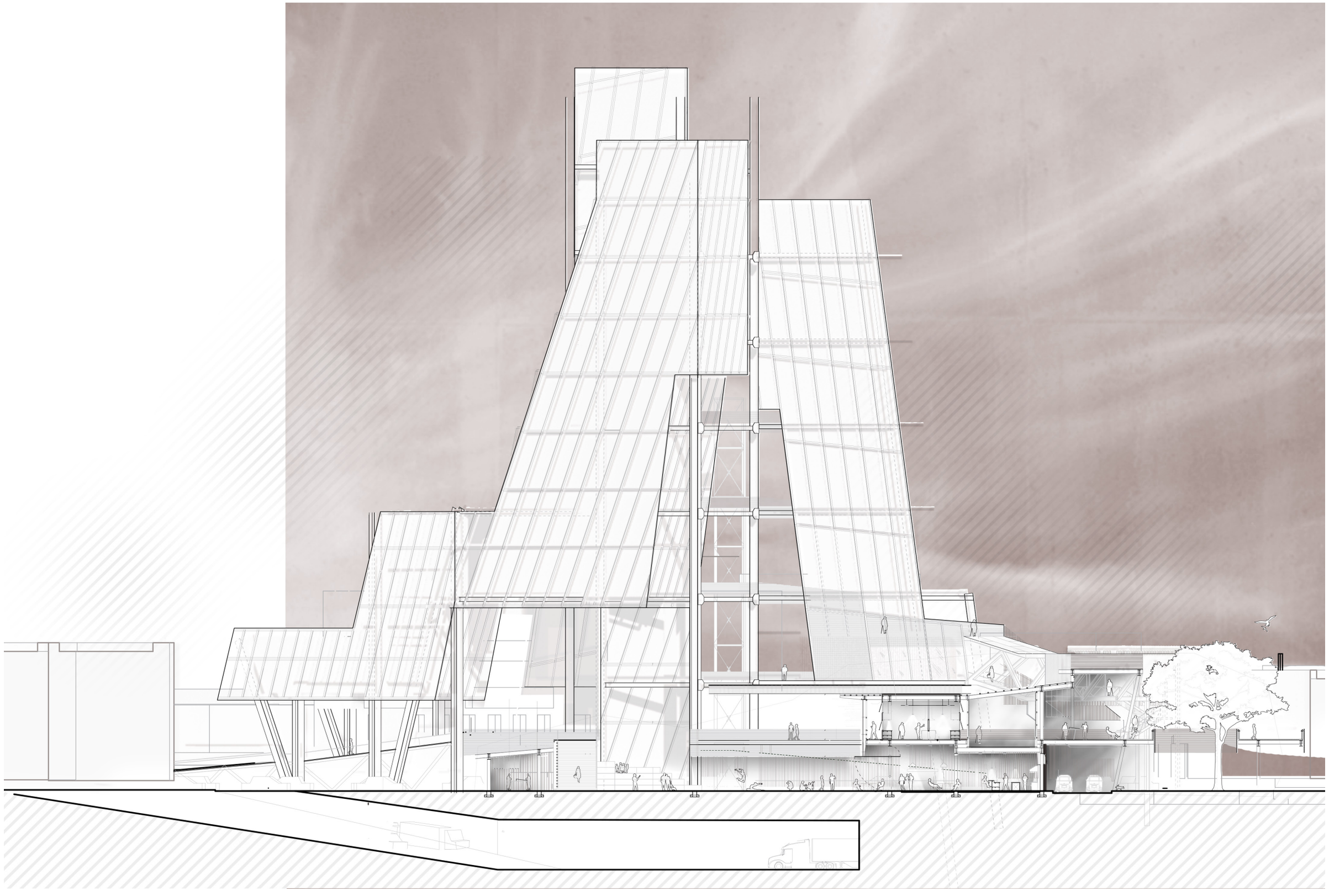
an urban food in Havana, Cuba

2020 winter/spring

The small socialist island nation of Cuba, long relied on its ally the Soviet Union for the imports of staple food products to feed its citizens and of oil to power its infrastructure. In turn, the Castro regime focused the nation's farming on exporting the cash crop of sugar cane. Upon the collapse of the Soviet Union in 1992, this relationship that Cuba had long relied on was upended overnight. This supply chain disruption forced Cubans to improvise and begin growing their own food. In the main city of Havana, civilians began to transform open or abandoned spaces into urban gardens that could provide for their families and neighbors. This urban farm movement has increasingly provided Cubans with food independence but has lacked any sort of formal or architectural guidance.

The "food interchange" aims to enhance the urban fabric of Havana by reclaiming a busy intersection. The existing freeway is rerouted underground and the remaining surface streets are diverted into a roundabout that circumnavigates the proposed park and food hub. The goal of the food hub is to draw upon the existing urban farming network in Cuba and create a space where the local community can: sell the products of their own urban farming, produce goods in the commercial kitchen, enjoy food sourced from the on-site vertical farm, learn about farming techniques and grow food in the community garden. This creates a alcove in the middle of the city that brings people and community together.

The massing of the project creates a central gathering space where visitors either ascend or descend via a ramped pathway in order to explore the site. The orientation and form of the vertical farm is idealized for greenhouse growing. The remaining mass on the project is clad in terracotta louvers that provide thermal and shading of the facade.



FOOD INTERCHANGE

conceptual diagrams

REPUBLIC OF CUBA

Caribbean sub-tropical climate with a rainy hot and humid weather in summer, and mild weather in winter. This climate produces highly fertile ground for farming, but inconsistent rainwater has historically plagued farmers.

Major exporter of sugar cane until the collapse of the Soviet Union in 1991 but production has declined since. Tobacco is second largest export crop.

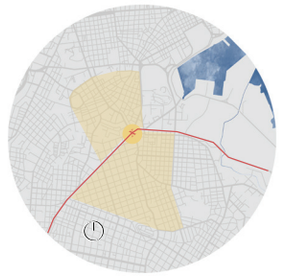
Currently, Cuba imports 60%-70% of its food at a cost of around $2 billion, mainly bulk cereals and grains such as rice, corn, soy and beans, as well as items such as powdered milk and chicken.

HAVANA, CUBA

Located on the Northern side of Cuba facing the Gulf of Mexico

Cuba's previous monocrop agriculture has caused increased reliance on foreign markets for food supply.

Solution: Create of series of nodes along Primer Anillo de La Havana that provide processing of food, distribution into the city, and access to seeds to encourage diversity in agriculture. The central hub will provide these same services in an urbancontext more catered to the urban farmer.



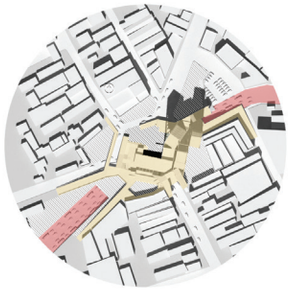
LA VIBORA

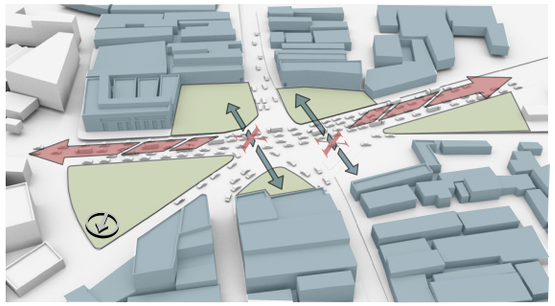
Located at the center of the primary residential district of the city

Neighborhood is currently divided by a 4-lane highway running through the middle of an area of pedeestrian circulation. The intersection contains six parks bordering the highway.

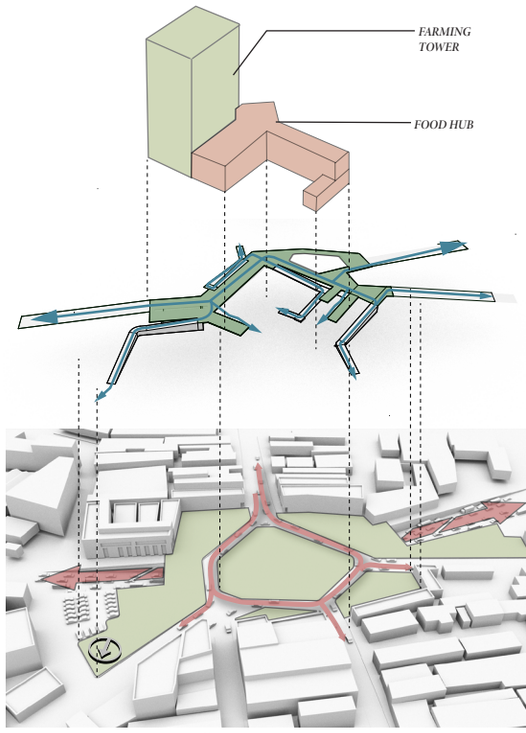
In order to reconnect the neighborhood, the highway is rerouted under ground and above ground vehicular circulation is facilitated through the implimentation of a roundabout.

Below ground, trucks from urban farms around the city and from farms on the outskirts of the city drop off goods to be stored underground until they are sold at the market.

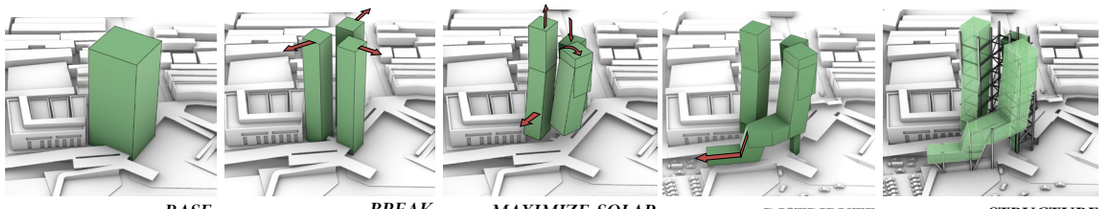




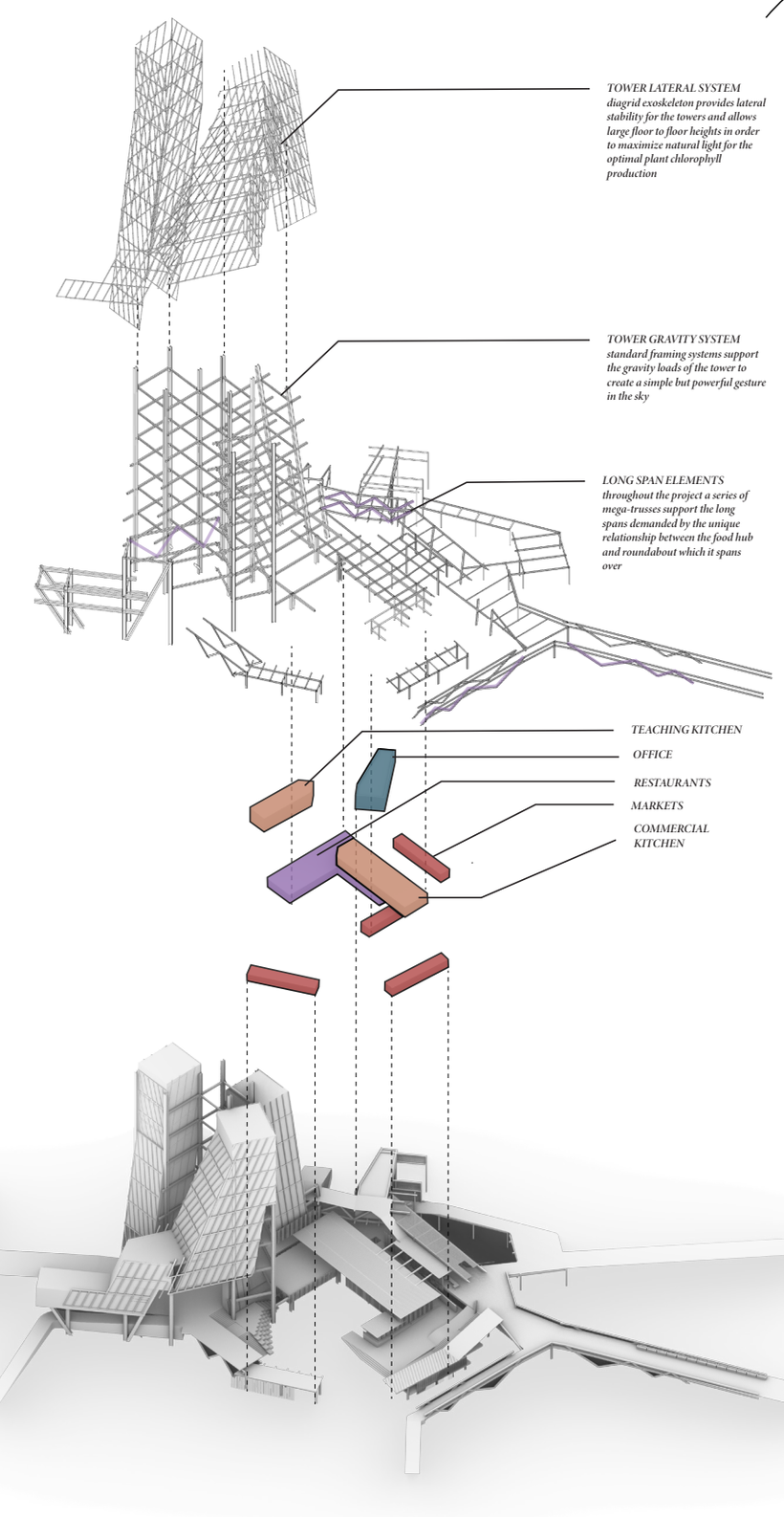
existing problem

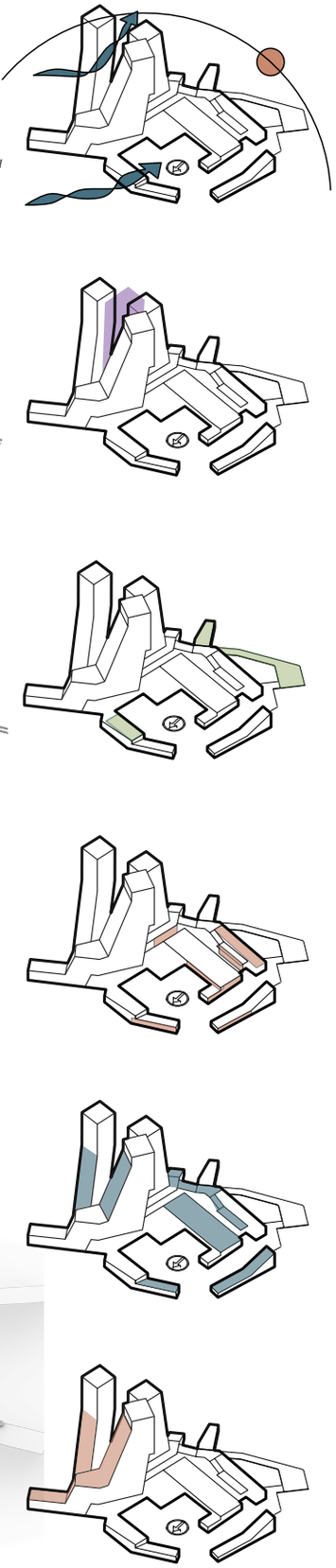


proposed vehicular traffic



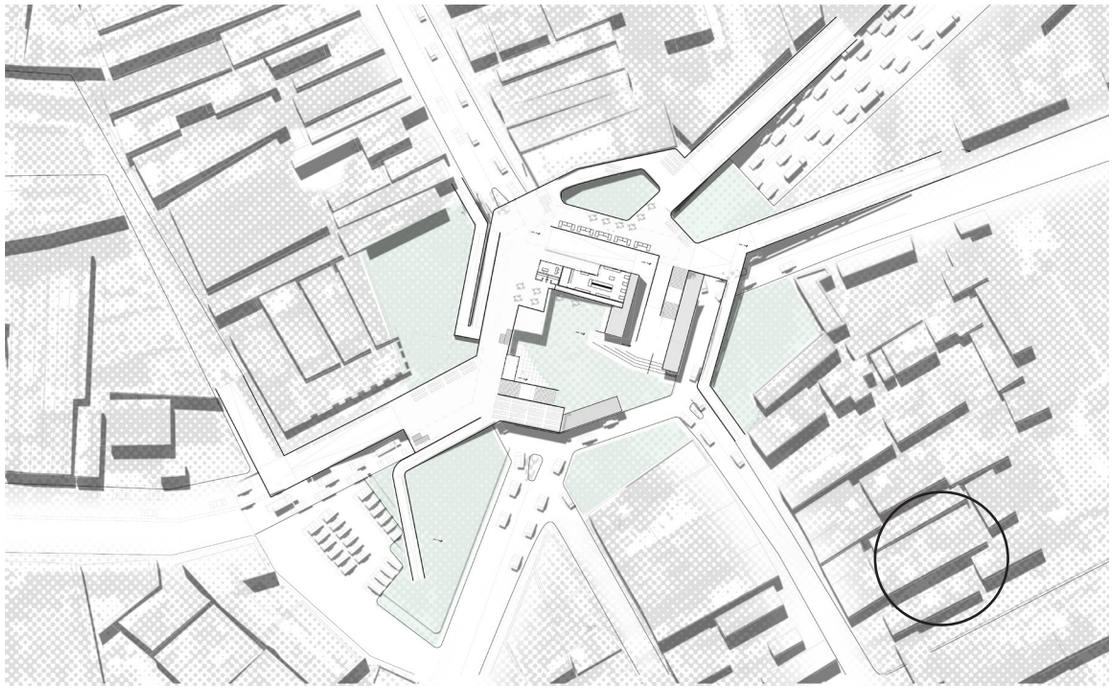
structure + sustainability

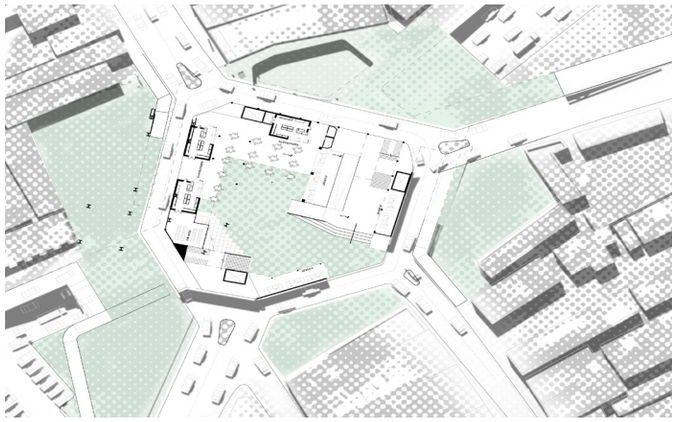




FOOD INTERCHANGE

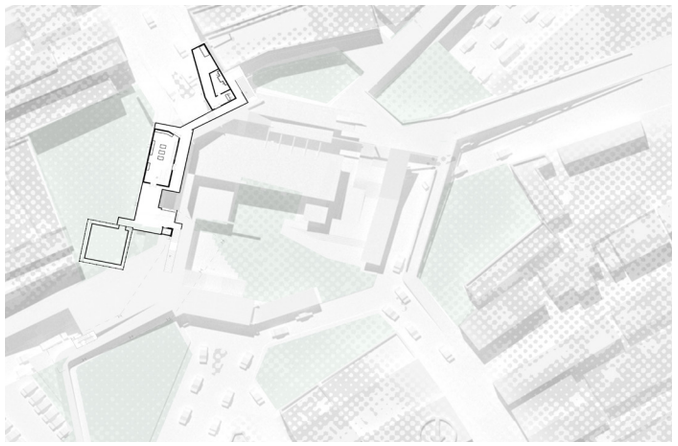
plans and sections





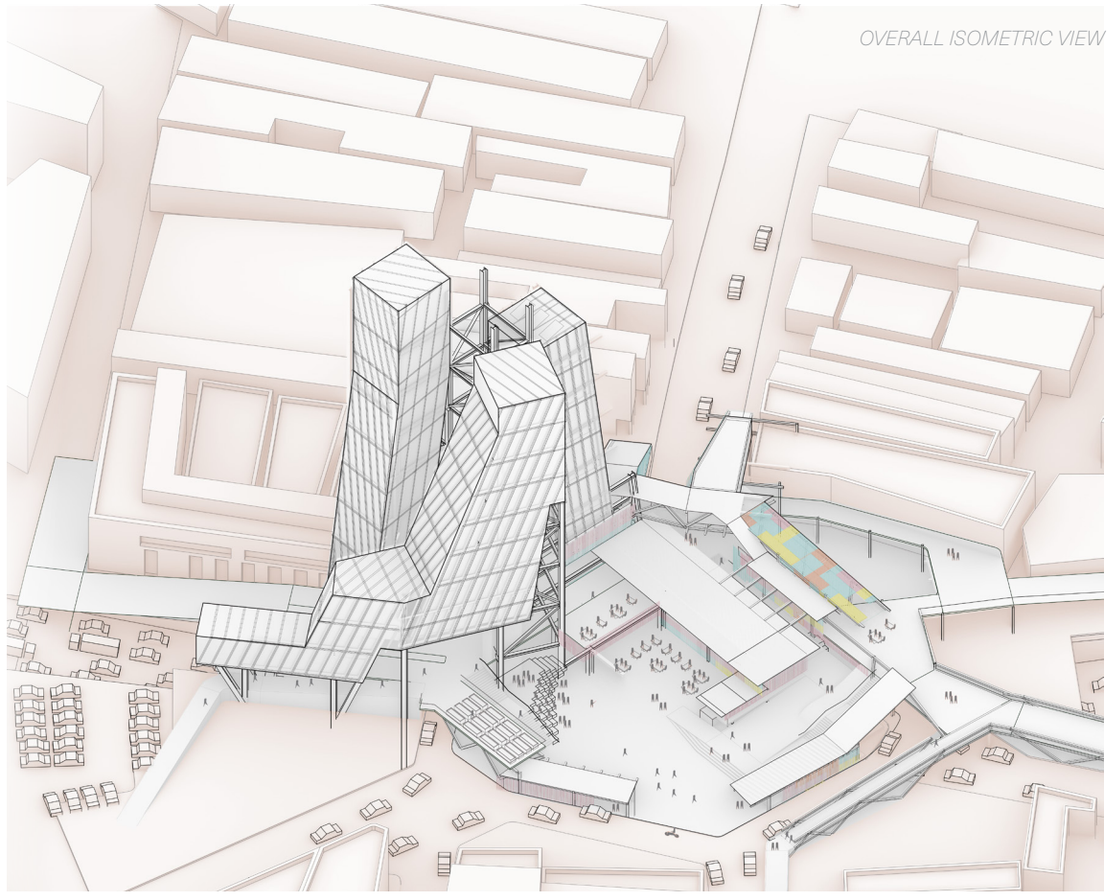
GROUND FLOOR

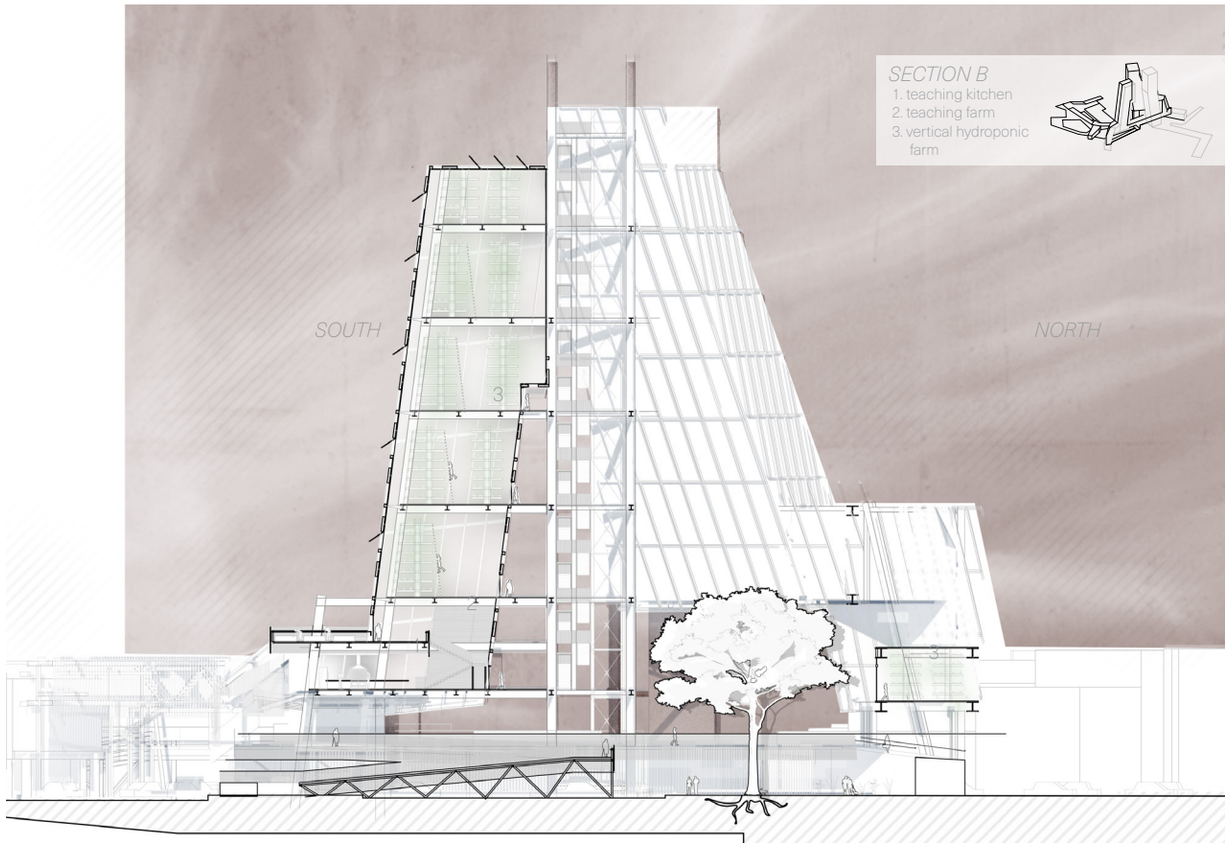
the food interchange
vertical green house farm
provides the food hub with fresh fruits and vegetables for the restuarants. this model of onsite food production works to eliminate the physical distance between consumers and their food. Excess food is transported to local restuarants or sold on site at one of the markets in order to further root the surrounding community to the project



THIRD FLOOR

OVERALL ISOMETRIC VIEW

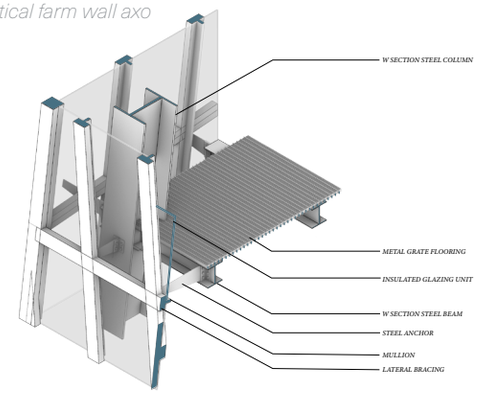




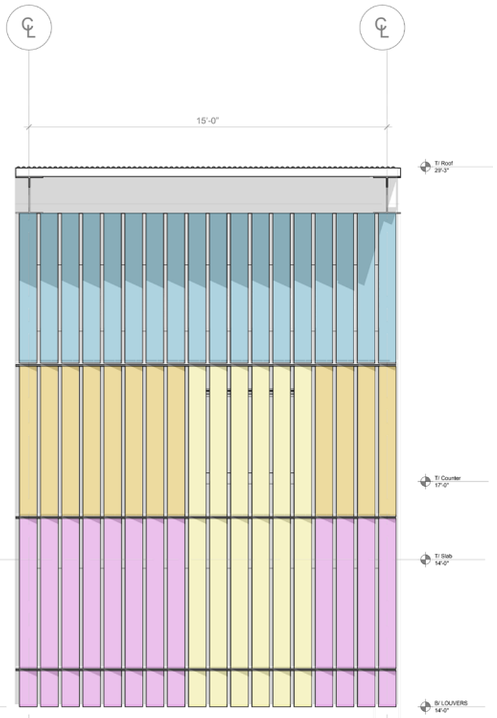
FOOD INTERCHANGE

details and renders

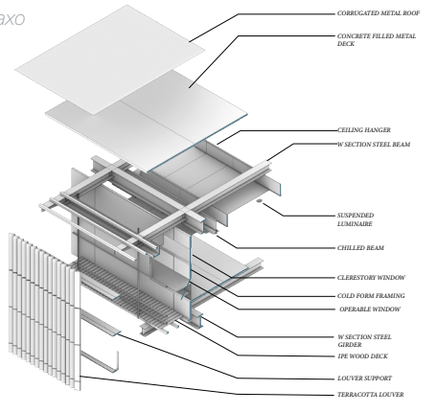
vertical farm wall axo

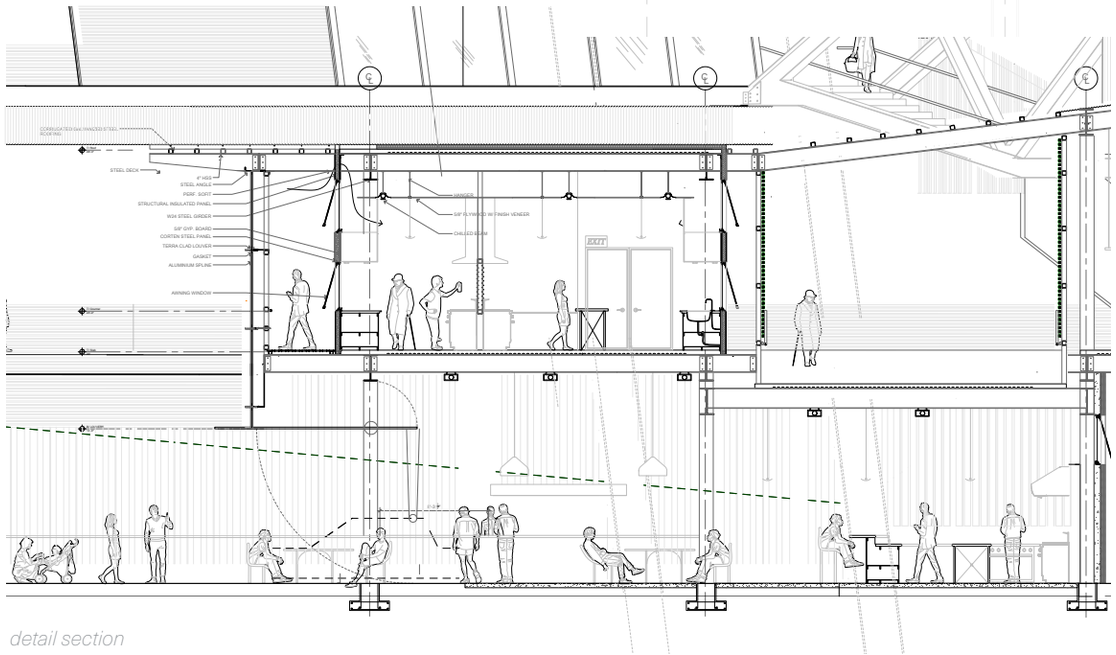


vertical terracotta louver facade

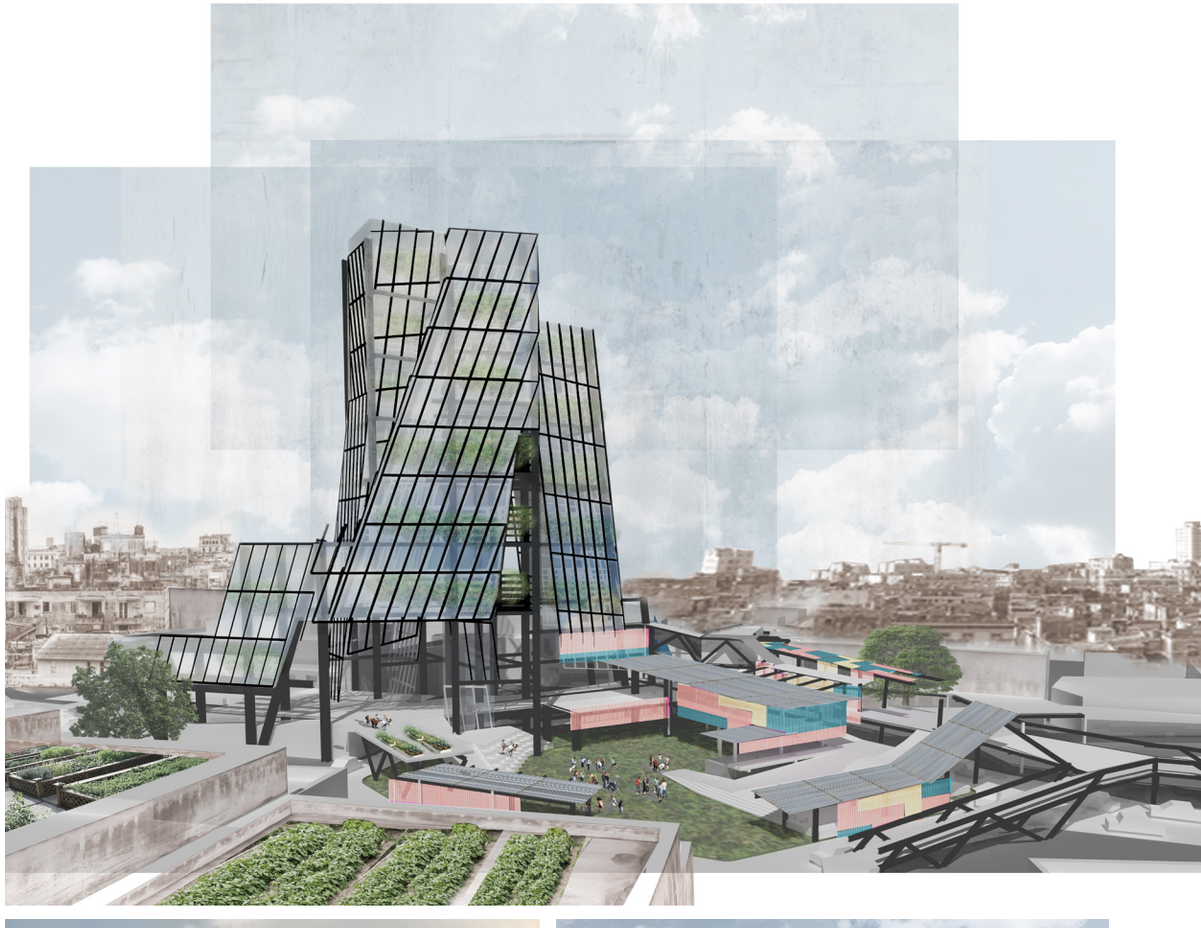


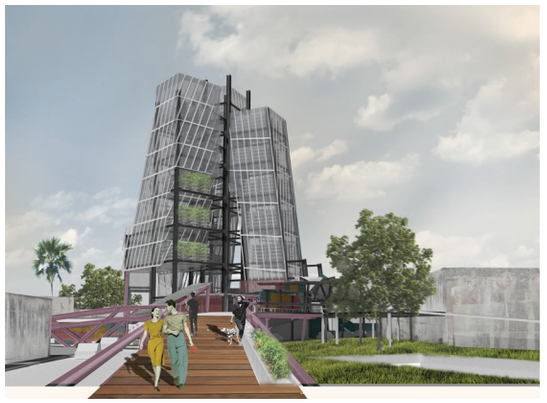
kitchen wall exploded axo

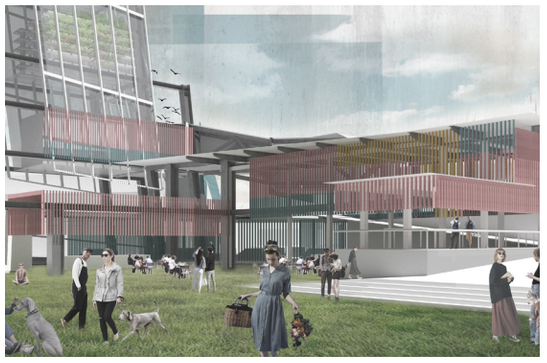


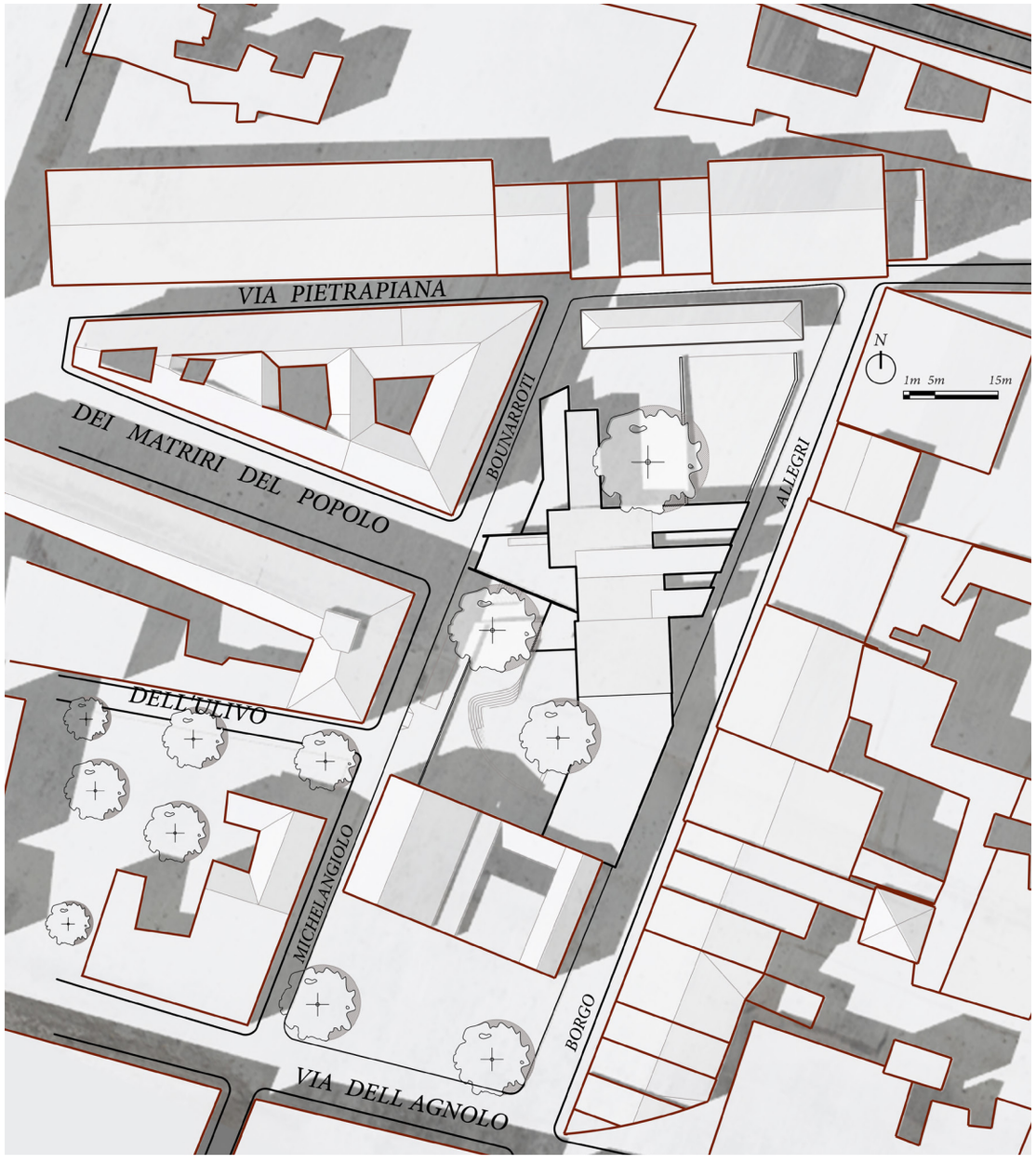


detail section









URBAN EXPRESSION

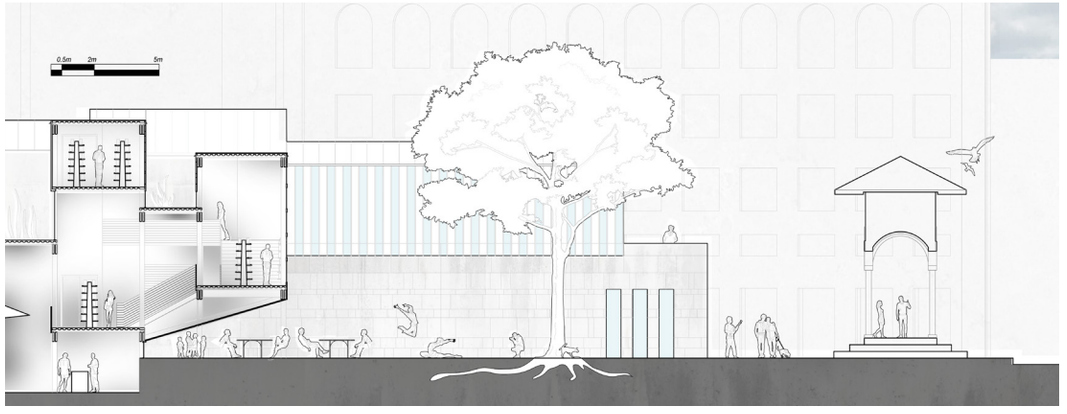
a public library and kindergarten
Piazza dei Ciompi, Florence

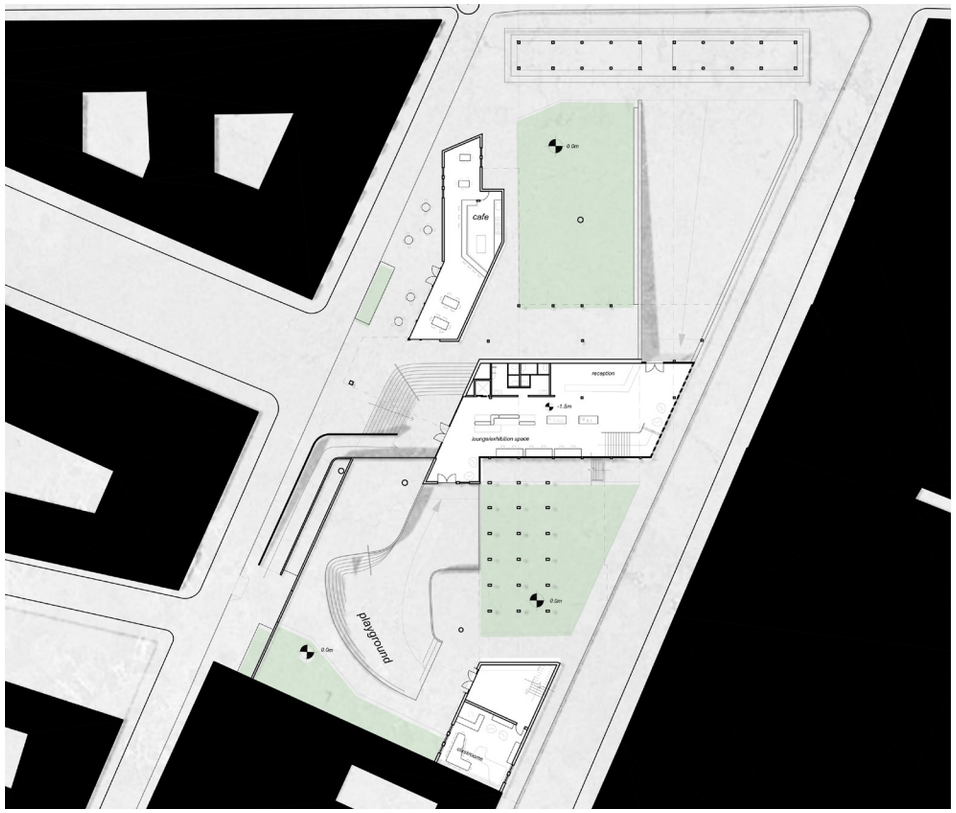
2021 spring

The urban fabric of a city and a playground are places of expression for adults and children alike. Although these spatial concepts operate at different scales, they can both be traversed in different levels and directions. Urban Expression seeks to mirror and expand upon the existing aspects of the city where each passageway through the site is its own experience incorporating the ideas of piazzas, loggias, porticos, urban terraces, and atriums. This not only integrates the building into the city but provides students with the valuable experience of learning to navigate the city and its various elements.

The architectural language was developed through an analysis of existing public space in area. The faceted nature of these negative voids in the city influences the creation of a positive approach to a public program.

Seeking to create a building that emulates the aspects and design of the city at a smaller scale, the public space on the site is fragmented but connected through various and interesting circulation paths. This creates differentiated aspects of the site causing each user to experience the building in unique ways.



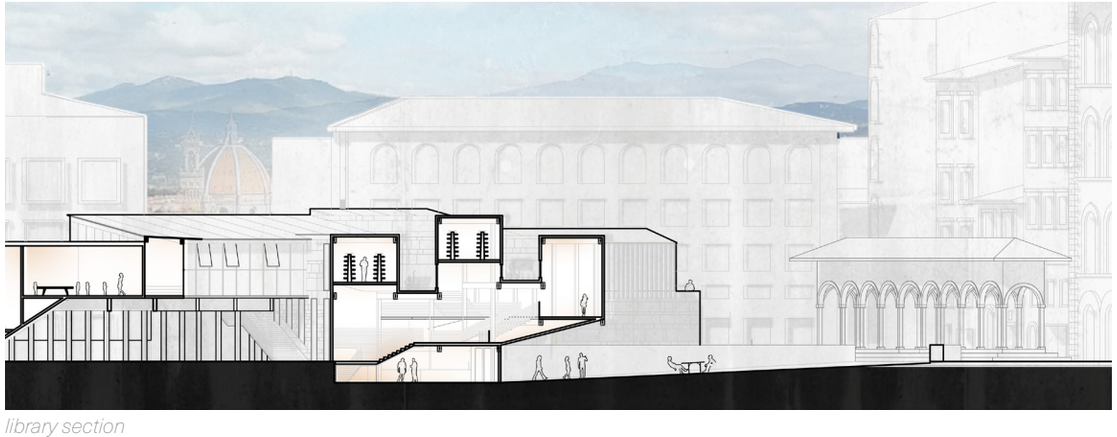


ground floor

2nd floor

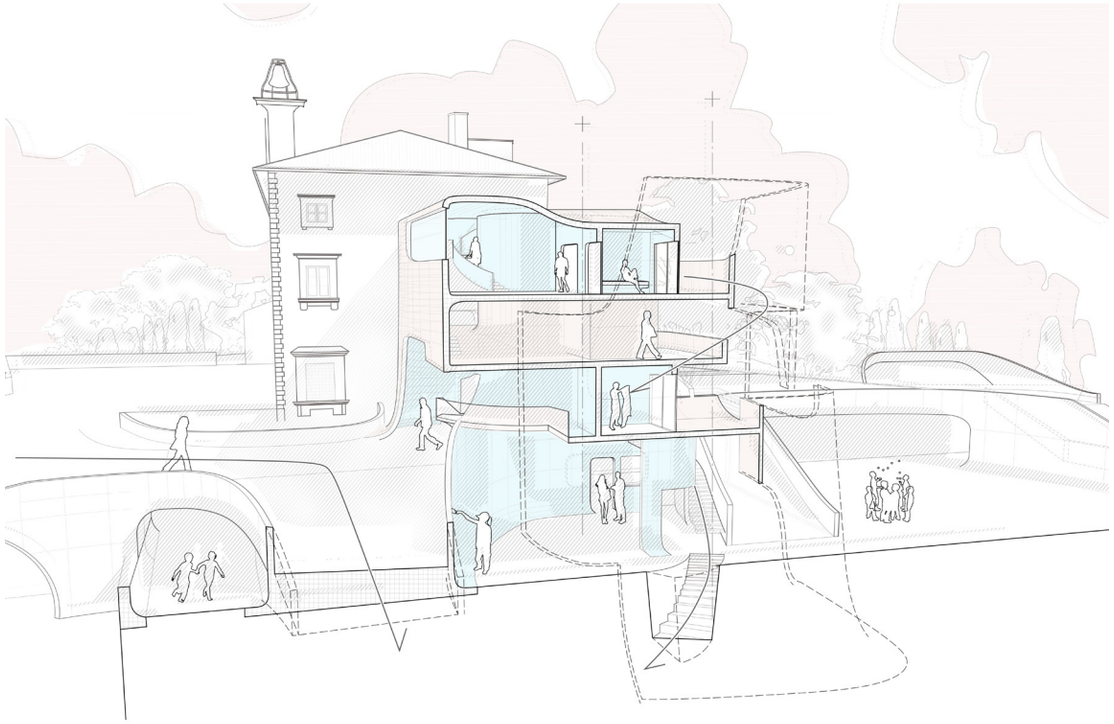
reading room

library interior

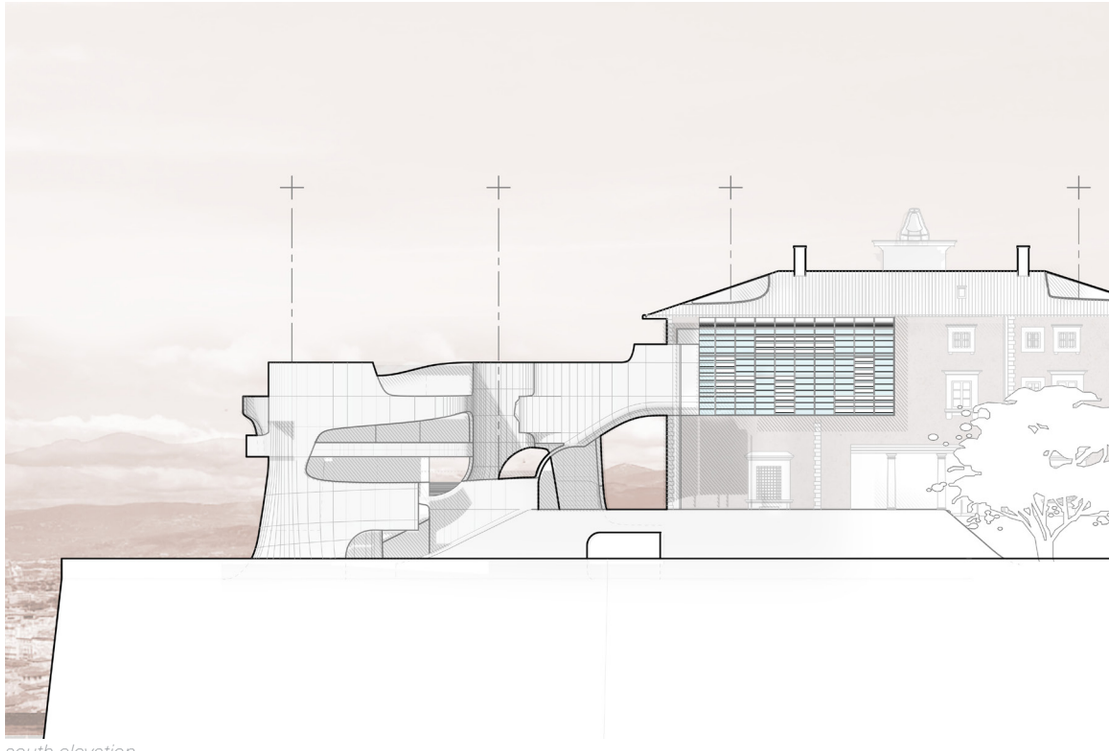


library section

The form of the central library space is designed to maximize natural daylight through clerestory windows and large north east facing glass. The east and west exposures are shaded by vertical wooden fins that create a rhythm in the facade as well as reduce solar gain.



section perspective



south elevation

COMMUNAL RECONFIGURATION

a student hotel in a historic monument
Forte Belvedere, Florence

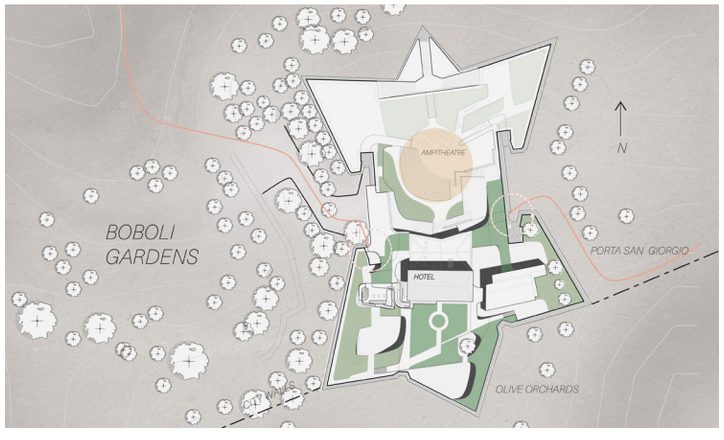
2020 fall

The Forte Belvedere was Commissioned in the 1530s by Giulio de' Medici to provide defenses from south of Florence and to also protect the ducal family and court from turmoil inside the city. The fort is easily accessed from the nearby Palazzo Pitti and the Boboli Gardens.

Today, Forte Belvedere is primarily used for art exhibitions and has hosted many notable sculptural artists. "Communal Reconfiguration" draws inspiration from these sculptural artifacts leaving traces of the past on the site.

Creating a student hotel in a historical city poses the question of what sense of citizenship the students can aspire to. With limited possessions and stake in the city, students must acquire a sense of ownership to better appreciate the way of life of a local.

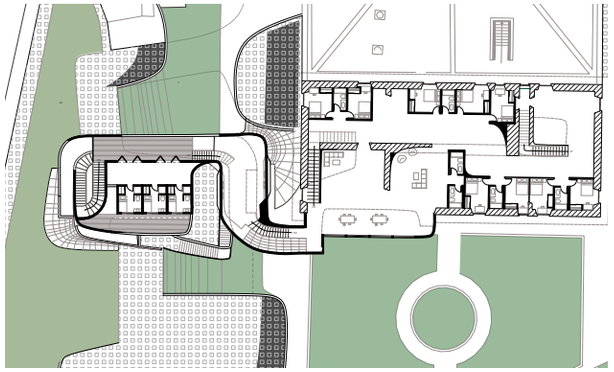
"Communal Reconfiguration" creates a student hotel that is focused on communal living and interaction between students. This model creates a greater sense of citizenship for students by giving them a place to call home and a community that supports them.



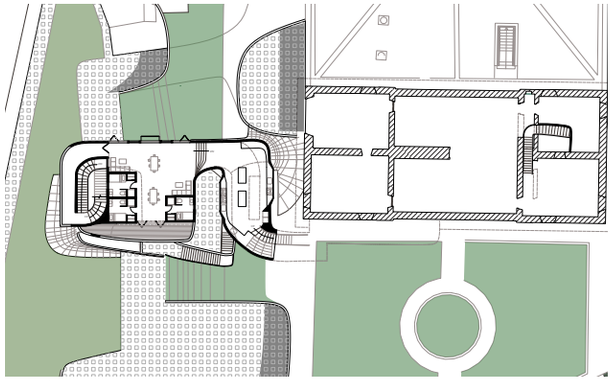
At the realm of the site, the landscape design remedies the existing stratification of the Forte by creating a fluid and dynamic network of circulation paths unifying various levels of the site.

COMMUNAL RECONFIGURATION

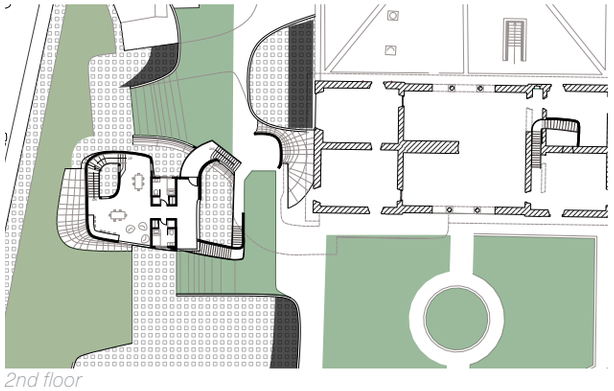
plans and views



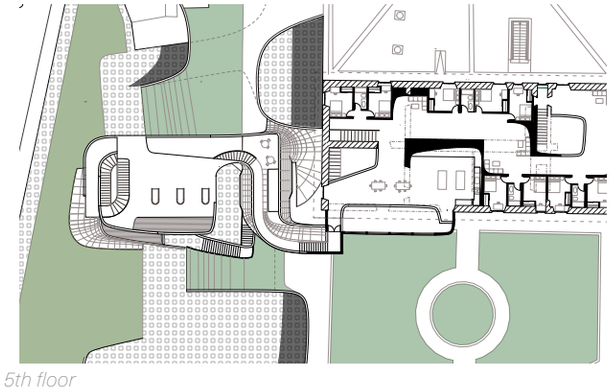
4th floor



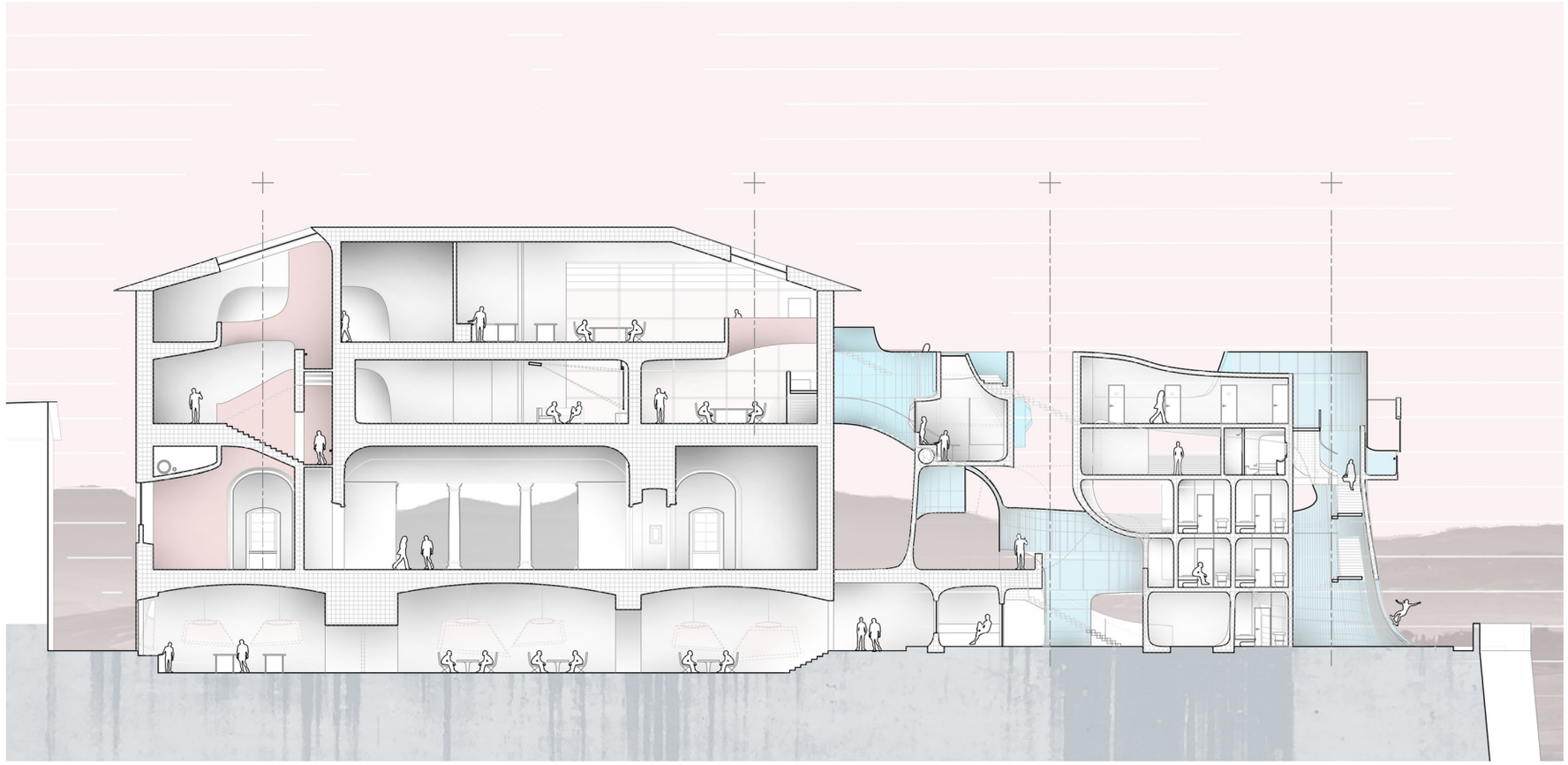
3rd floor



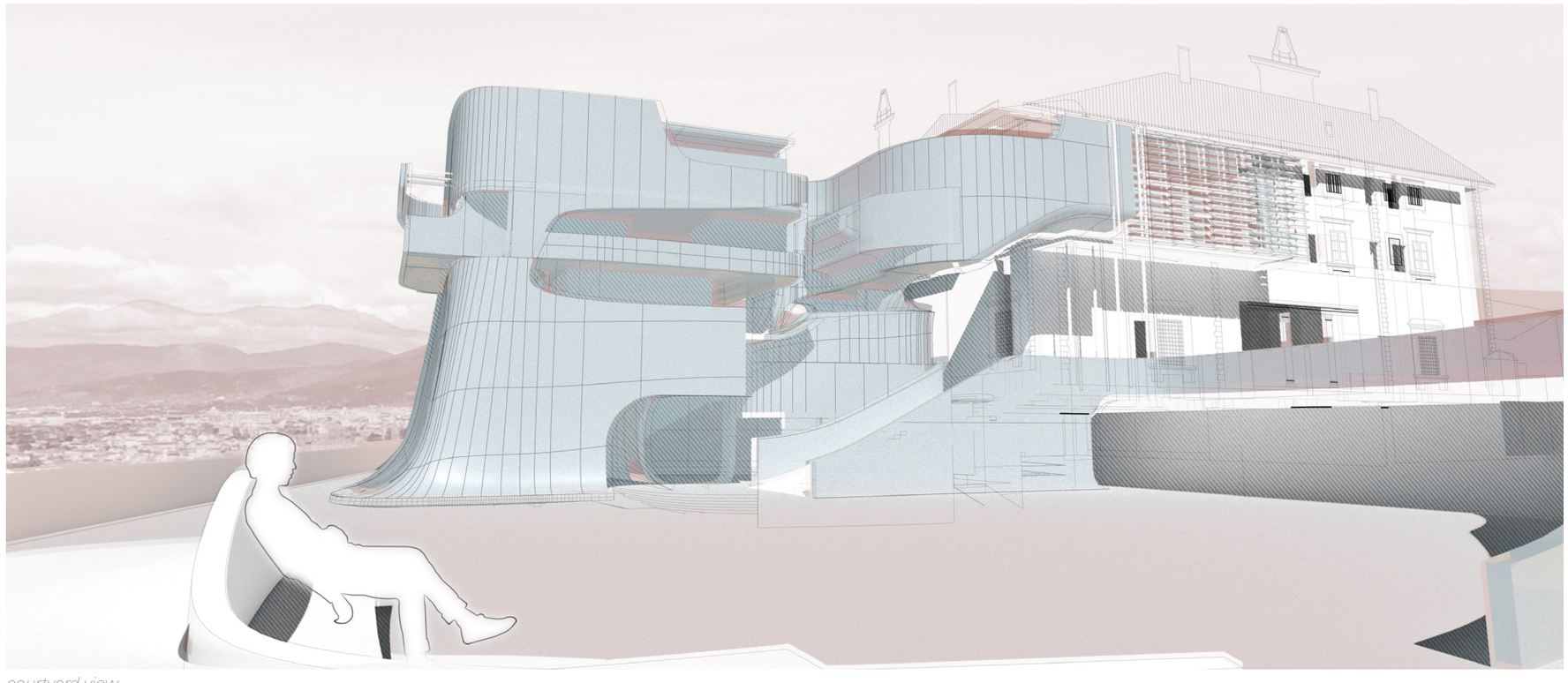
2nd floor



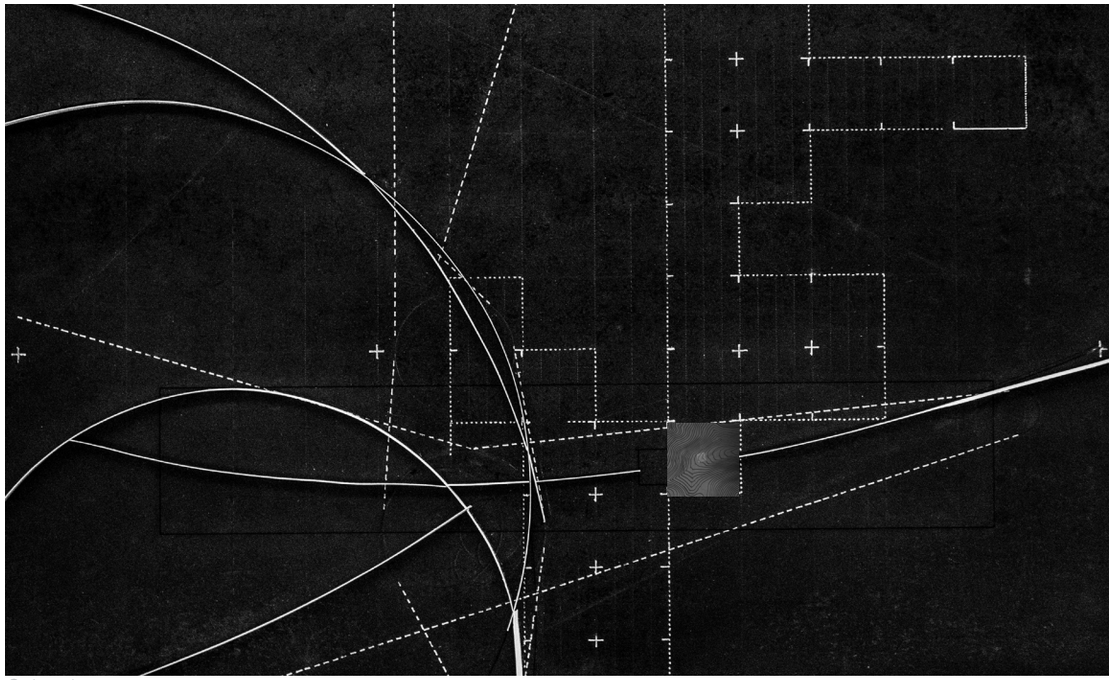
5th floor



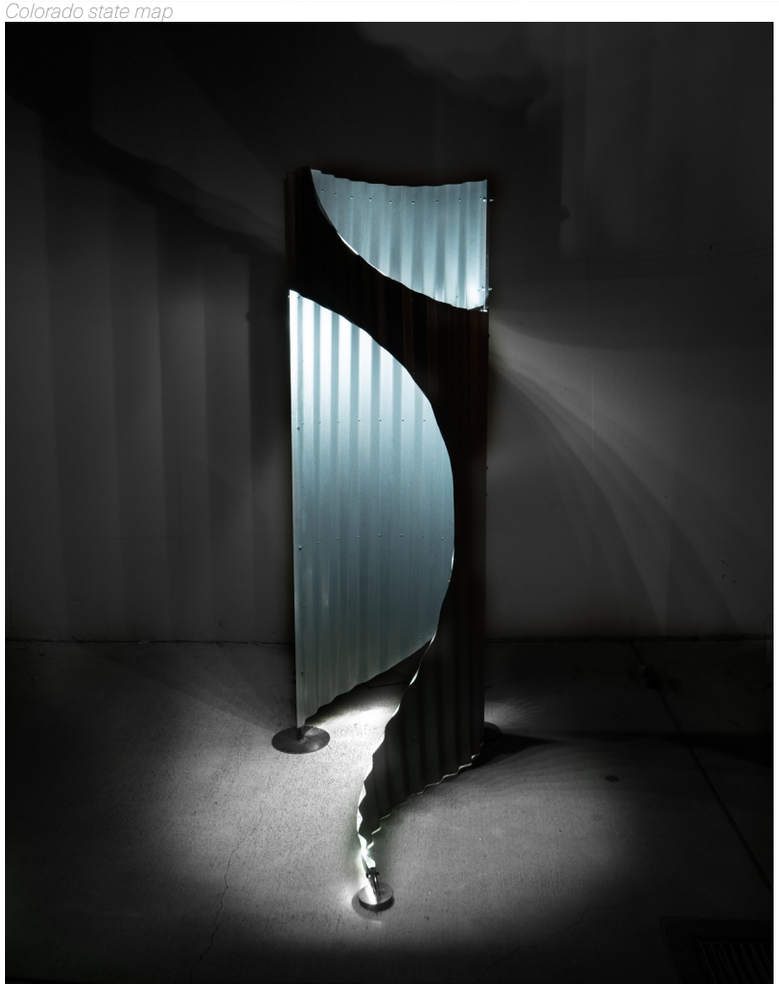
transverse section

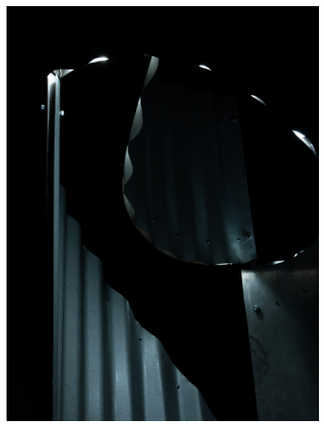


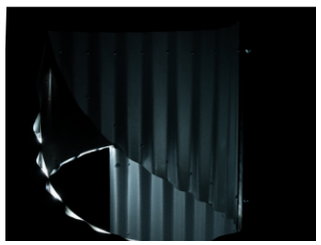
courtyard view



Colorado state map







1:60 scale beacon

OCULAR DISRUPTION

the world's first ski-in ski-out truck stop
Loveland Pass, Colorado

2019 fall

An extensive linear path traverses through the vast darkness and is suddenly disrupted by a beacon that signals the truck stop they have been waiting for.

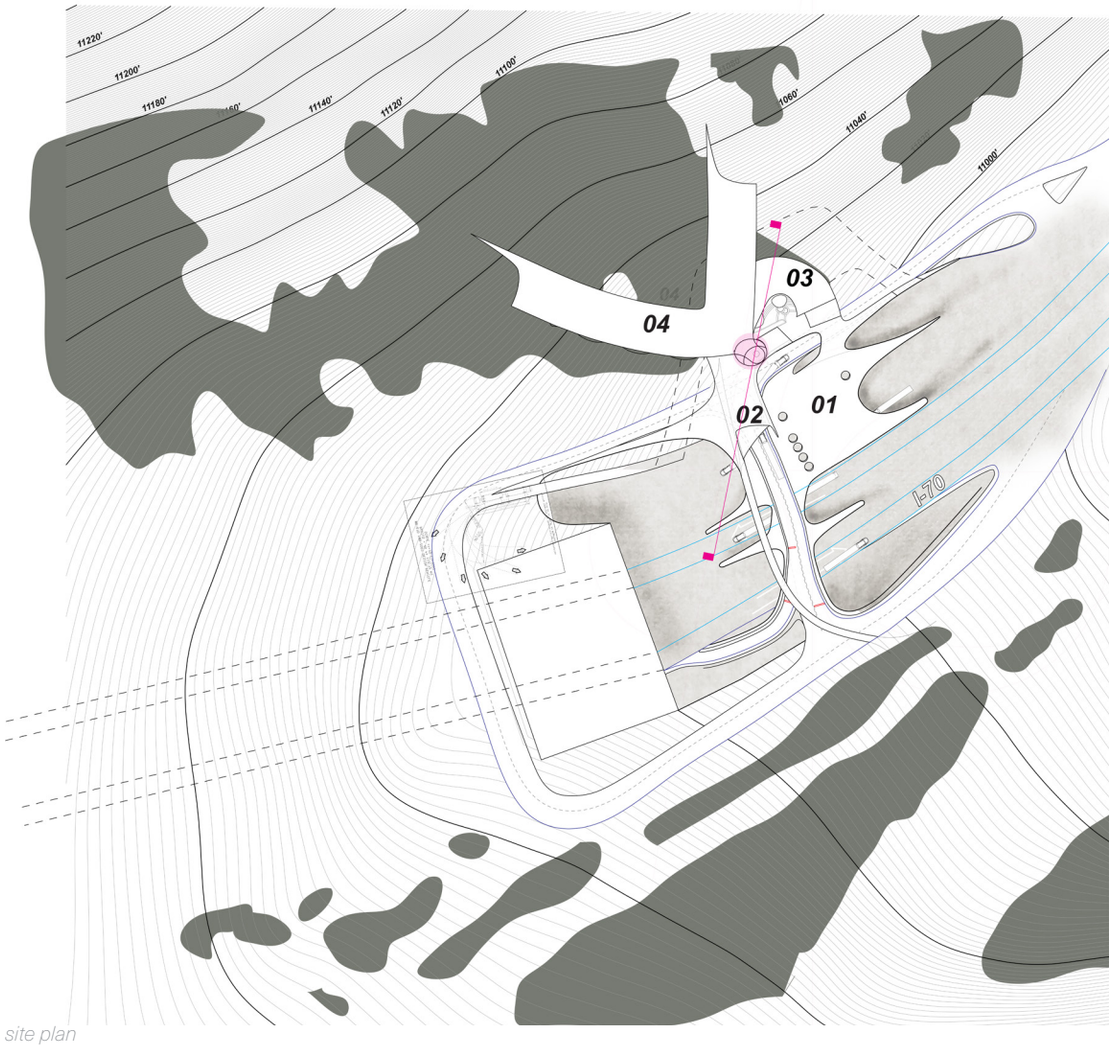
A map of Colorado (left) exploring the relationships between population centers, major roadways, and mountainous regions. These relationships informed the project's form and site selection. The site was chosen along I-70 at the continental divide where the freeway enters the Eisenhower Tunnel at the base of Loveland Ski Area. The truckstop responds to the elements of the tunnel, the mountainside and the ski area by bridging the highway to facilitate skier circulation, elevating the program off the ground to provide views of the mountains in front of and behind the project. The additional programs of a gym and a spa were added to promote a healthier lifestyle for truckers.

The first half of the quarter was spent designing and constructing a 1:50 scale beacon that would signal the entrance to the truck stop. The beacon of the truck stop was developed as response the linearity of a long haul trucker's journey through a disruption of curves through linear material to create an intriguing forced perspective. LEDs are positioned in the flutes of the corrugation to illuminate the beacon at night.

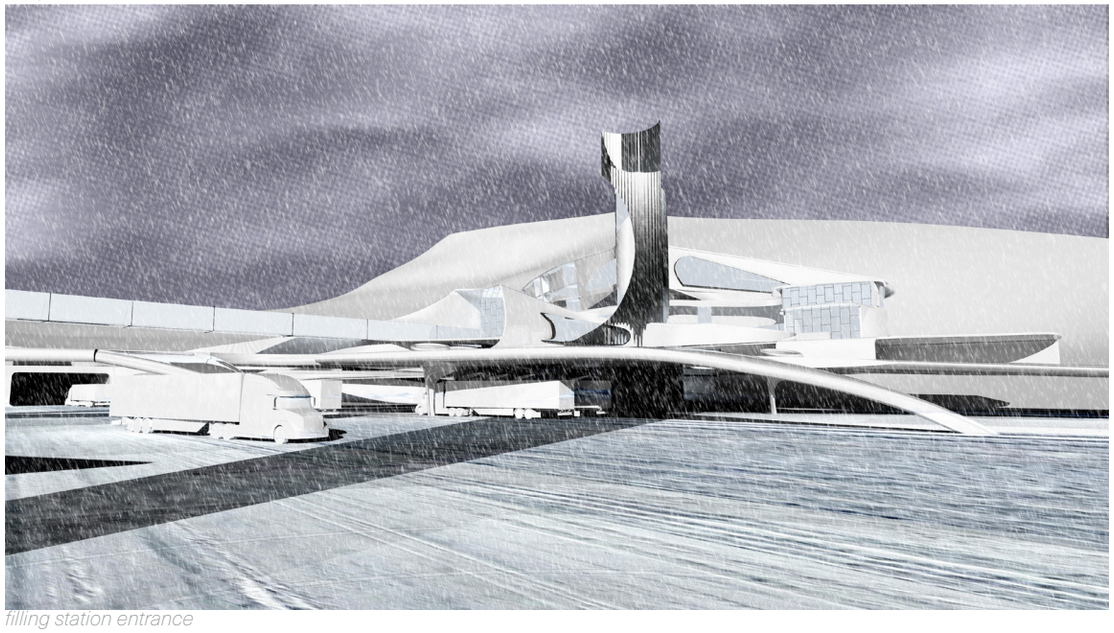
concept model

OCULAR DISRUPTION

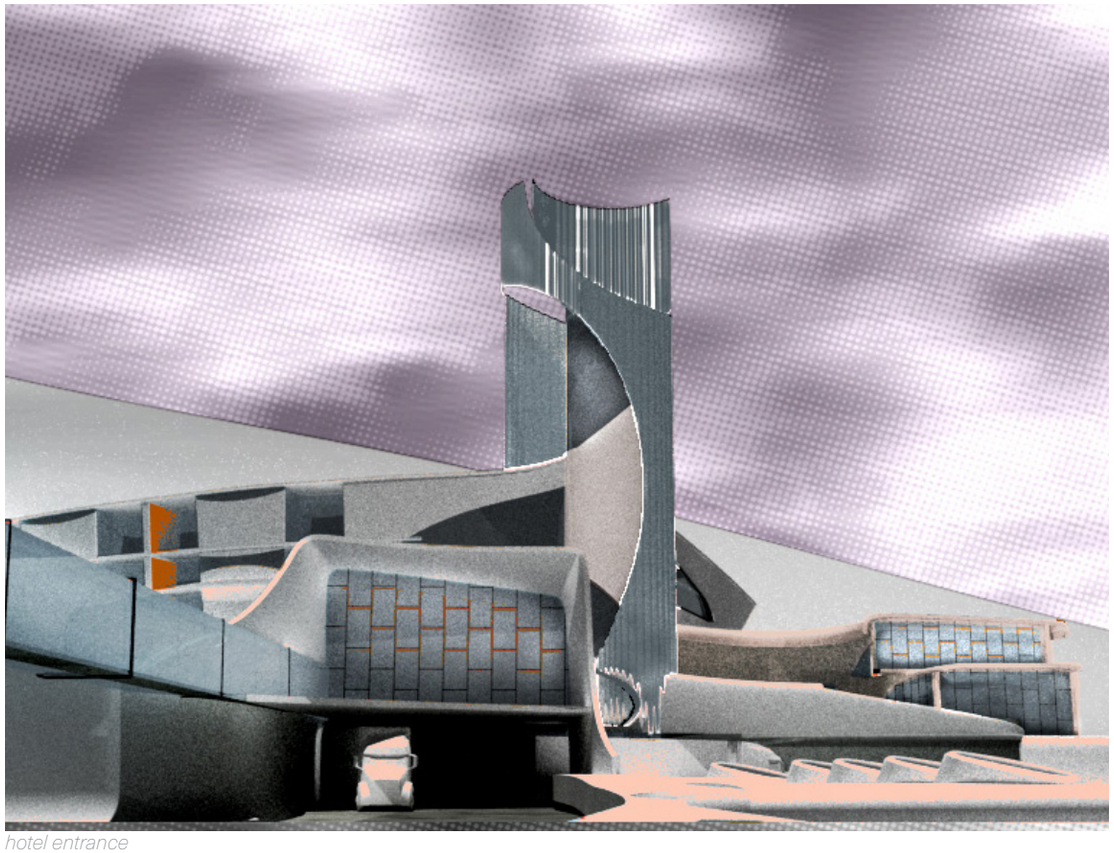
plans and views



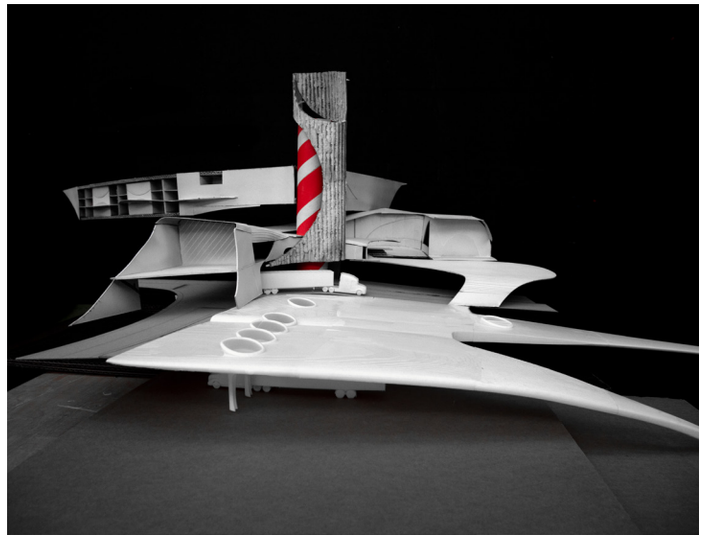
site plan



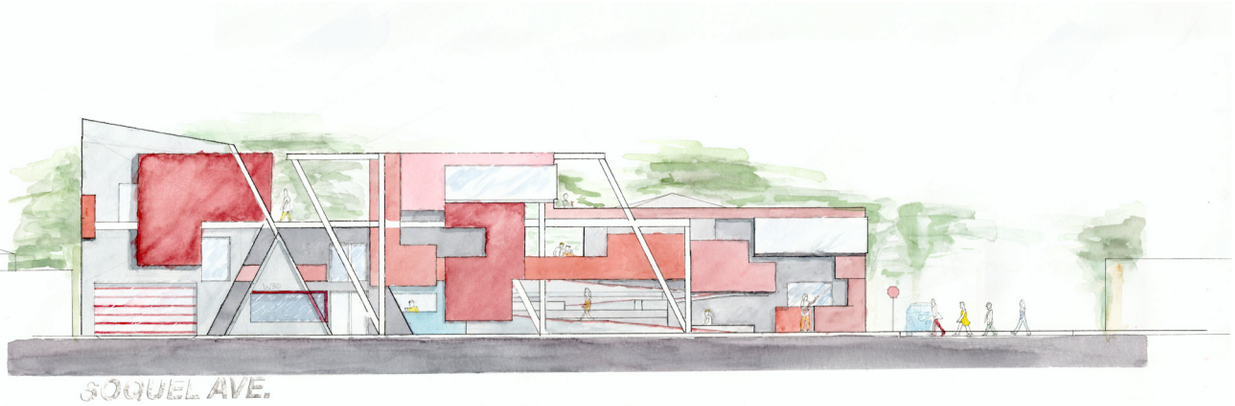
filling station entrance

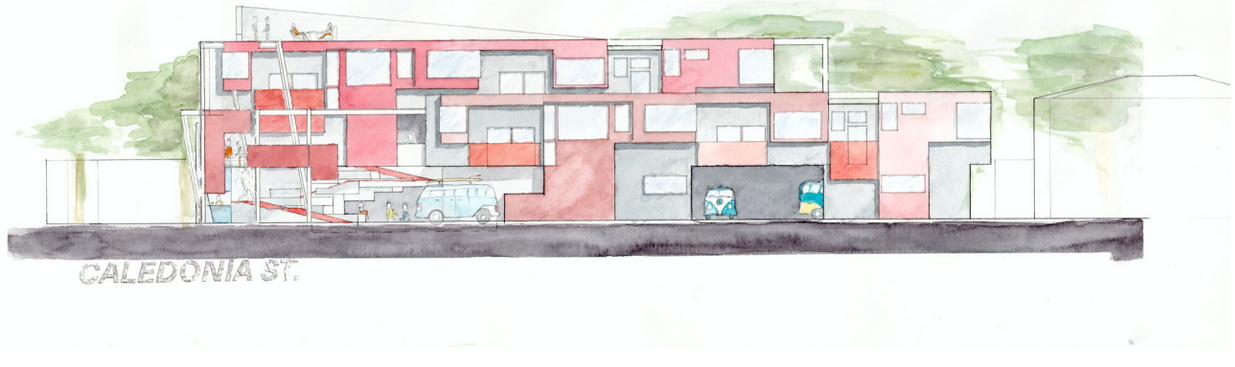


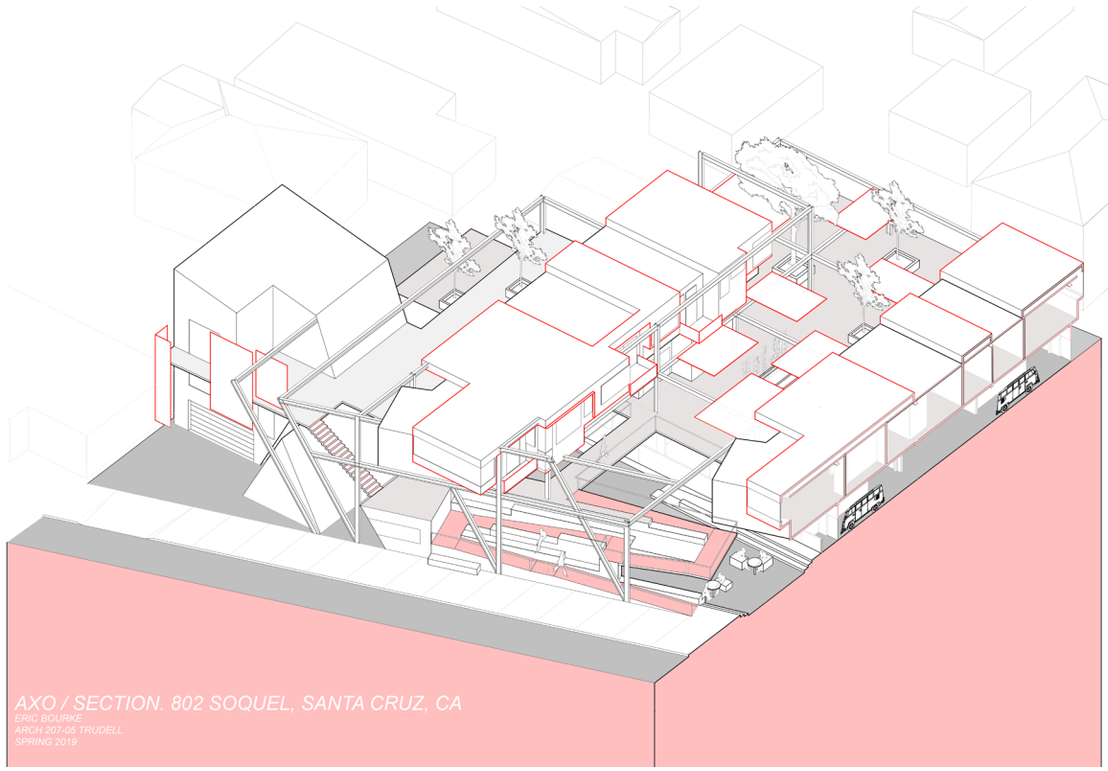
hotel entrance

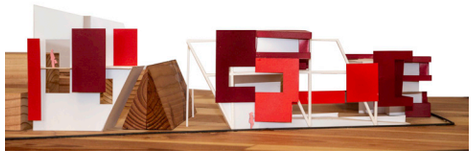


physical model









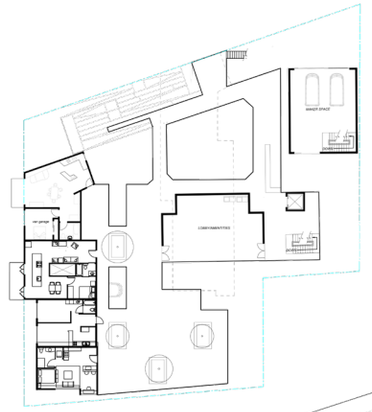
MULTI FAMILY HOUSING

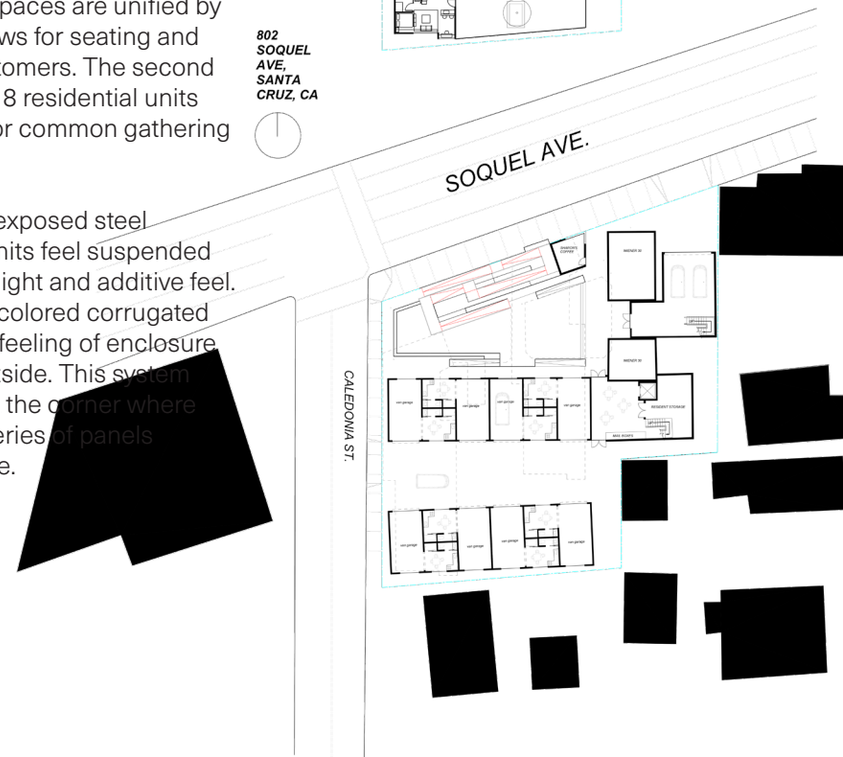
combating affordable housing crisis
Santa Cruz, California

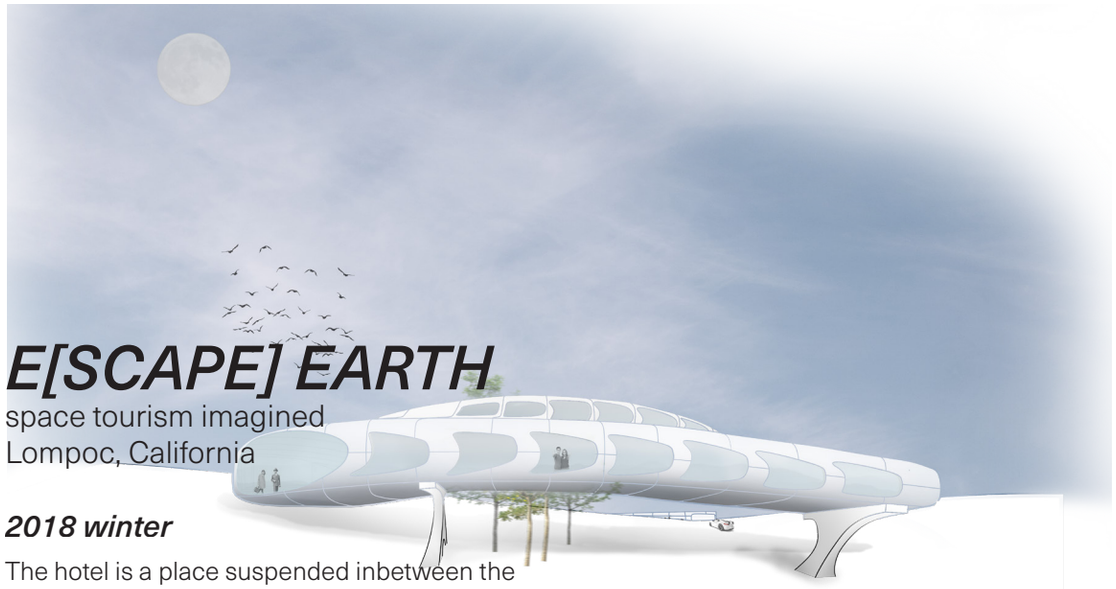
2019 spring

This project started with an investigation into the types of people that might inhabit the proposed 16 unit mixed use housing complex. After acquiring background knowledge, I developed a character to base the design of the units off of. My character's name is Analesia; a UC Santa Cruz grad student who, because of the lack of affordable housing, lives in her van. Based on this information, I designed a van garage unit that leaves the van as the primary sleeping quarters and provides storage as well as a small bathroom and kitchen. 8 of these units populate the ground floor along with a maker-space for residents to work on their vans, a coffee shop, and a renovated existing wiener schnitzel building that sells beer and hotdogs. These spaces are unified by a lowered public space that allows for seating and socializing of residents and customers. The second and third floors are occupied by 8 residential units each with a second floor outdoor common gathering area for the residents.

I designed the building with an exposed steel structure in order to make the units feel suspended and give the building an overall light and additive feel. I combined this with a series of colored corrugated metal facade panels to create a feeling of enclosure and comfort while still being outside. This system also creates a sense of arrival at the corner where the user transitions through a series of panels differentiating is shape and scale.





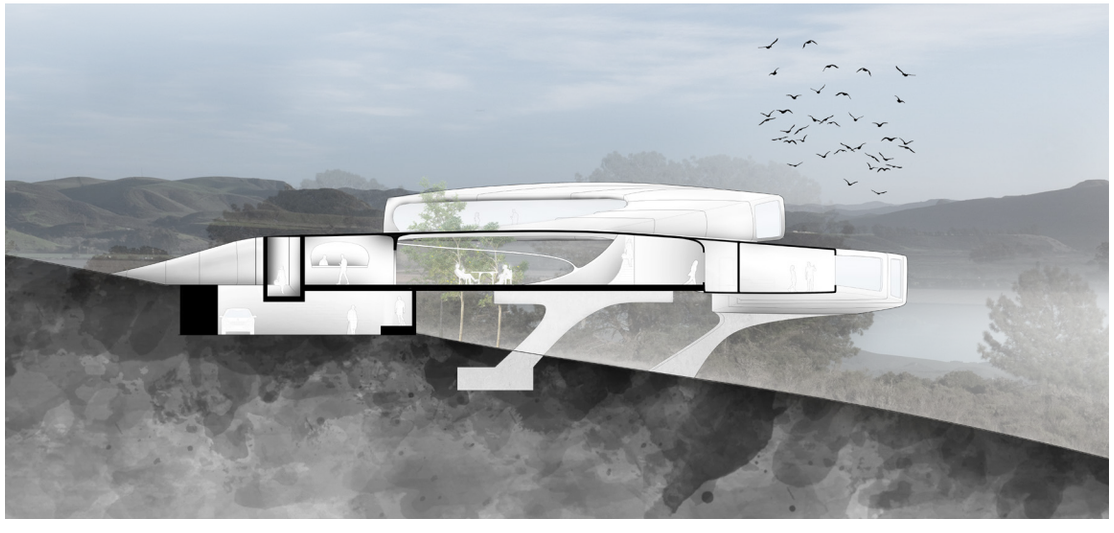


E[SCAPE] EARTH

space tourism imagined
Lompoc, California

2018 winter

The hotel is a place suspended inbetween the feeling of home and a destination that awaits. In the anthropocene era, humans are suspended between a desire to save the planet or to abandon Earth and ascend into space in search of other worlds. This uncomfortable stage of life creates conflict between connection to the ground and the anticipation of the ascending. Hotel E[SCAPE] creates an atmosphere of anticipation through a processional ground to building relationship caused by elevation change and the act of projecting the guest above the landscape. As the guest approaches the building they enter a tunnel that blends into the landscape. As they park their car, the illuminated interior of the overhead hotel causes a stark contrast with their dark earthen arrival. An outside social space above the trees in the middle of the 14 guestrooms, brings guests to the center of filtered and controlled lighting of the hotel.



E[SCAPE] is located in Lompoc, CA. This location is poised to become a tourist hotspot based on its ideal views of rocket launches from nearby Vandenberg Airforce Base. The proposed hotel creates a luxury destination centered around the connection to the sky and to the future