JEJ

adaptive architecture

My name is...

Jolene Emily Jussif. I was born and raised in New Hampshire and moved to San Francisco at age 17. I gained my 5 year Bachelor of Architecture degree at California College of the Arts, focusing on imaginative concepts and experimental fabrication. I gained some professional experience there, working at a community benefit district designing urban interventions in downtown; publishing a book on privately owned public open space; designing a mural; planning a street life plan at the San Francisco Planning Department; and at Gensler developing designs for an international competition.

I came to Columbia GSAPP for the M.S. Advanced Architecture Design program to investigate and invent new ways of experiencing space. I intended to design and invent new drawing types, examine theories, build upon my technical foundation in architecture, and to immerse myself in an experimental program that allows me to do so.

During my time at Columbia, I became interested in new types of adaptive architecture. Fire resilient, climate resilient, politically resilient, even socially resilient. Throughout my work, you will get a glimpse of how I see architecture as a way to reimagine architecture's relationship to the world. Whether it is research on biometric face printing replacing defensive walls, seasonally adaptive architecture or monolithic circulation protecting local inhabitants from wildfires - the projects intend to imagine what architecture can be like in the future.

CONTENTS

Adaptive Architecture

is how architecture needs to designed if we want to survive in a constantly changing world. Charles Darwin is attributed to the quote,"It is not the strongest, nor the most intelligent who survive. It is the most adaptable to change." Climate change, wildfires, oil shortages, uninhabitable climates, increased involuntary surveillance in public space, poorly planned neighborhoods needing change; these are the issues I grapple with in this portfolio. This is my research, response and ideation. Throughout my work, I pose the question, How can architecture adapt to the constantly changing paremeters of the world around us?

The Pheonix

Spring 2020: Advanced Studio VI: Water Studio
Instructor Mario Gooden
Individual Project

The name Pheonix, is after the Pheonix bird. It represents transformation, death, and rebirth in its fire. It gains new life by arising from it's own ashes. This proposal intends to transform through destruction and fires, while encouraging the rebirth of the community and local fynbos. This project is shifting from "fire-resistant" architecture to "fire-resilient" architecture. **The project intends to adapt circulation into a mechanism of protection.** The circulation holds the elevators, stairs, bathrooms and hallways and doubles as shelter during wildfires.

The site is located on the top of Cape Peninsula where wind alternates from East to West seasonally. The laboratory is situated halfway between the two bodies of water, False Bay and the South Atlantic, with a strong relationship to the wind and sky. The roofs are shaped to allow the terrain to continue over the tops of the building, some being accessible. The colliding roofs are parallel to the winds movement. The central space that separates between the groupings is where wind and animals can move through, also it is where the public would enter the building. The three exterior walls are entrances for the community to the evacuation spaces.
The striated roofs jet out from the main cores. The roof tops have a recessed inlet and soil for water collection. The main cores are stretched vertically and house all the circulation, mechanical rooms and plumbing. The cores are made from thick, local, stone, creating monolithic columns that sink below ground to connect to the underground and evacuation rooms.

The intent of the proposal is to create a building that is fire resilient. A building that can withstand the fynbos prescribed fires burning the tops of its roofs while being permeable enough to allow animals to traverse. A building

Night time view displays intersection of two forms.

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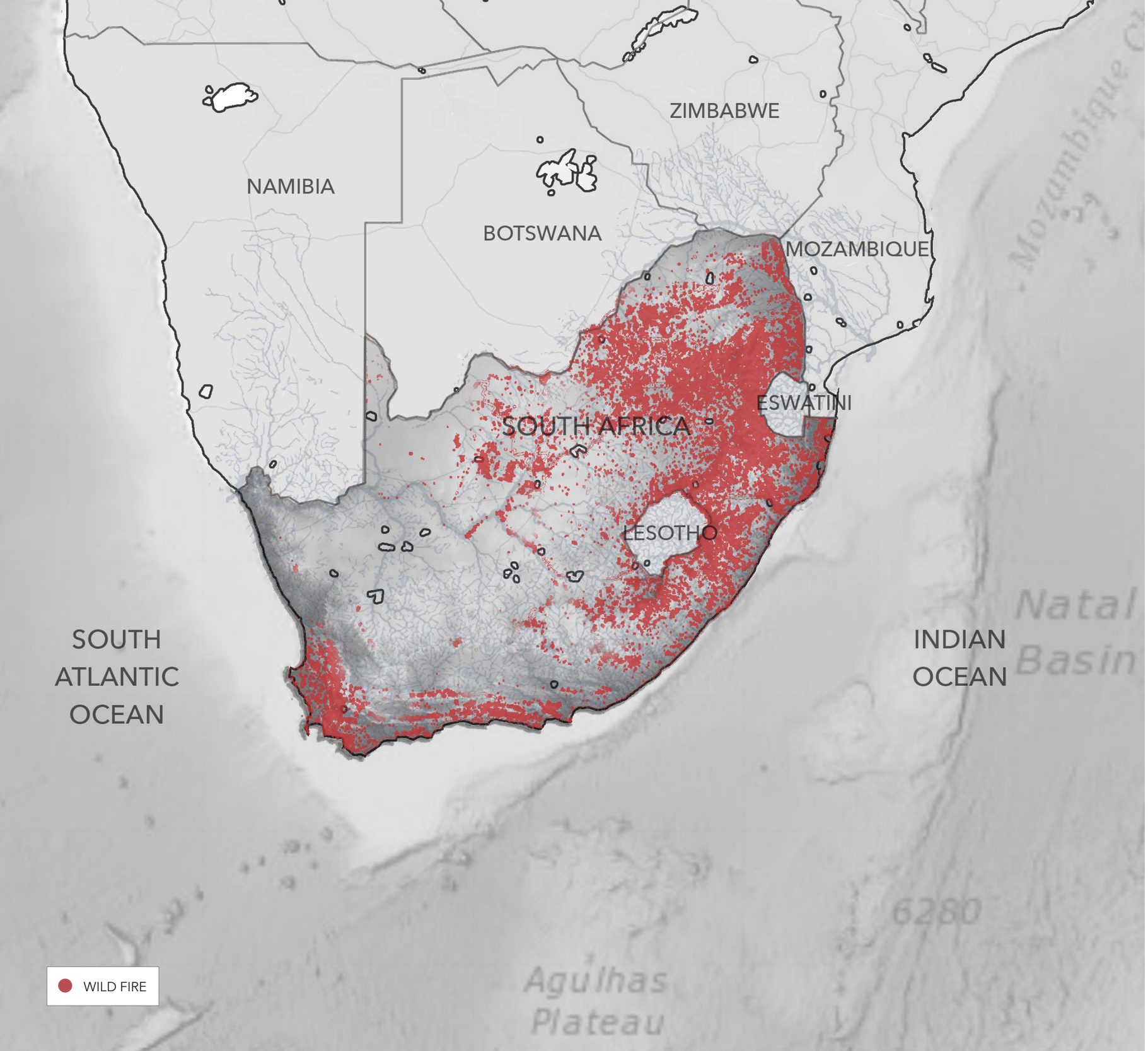
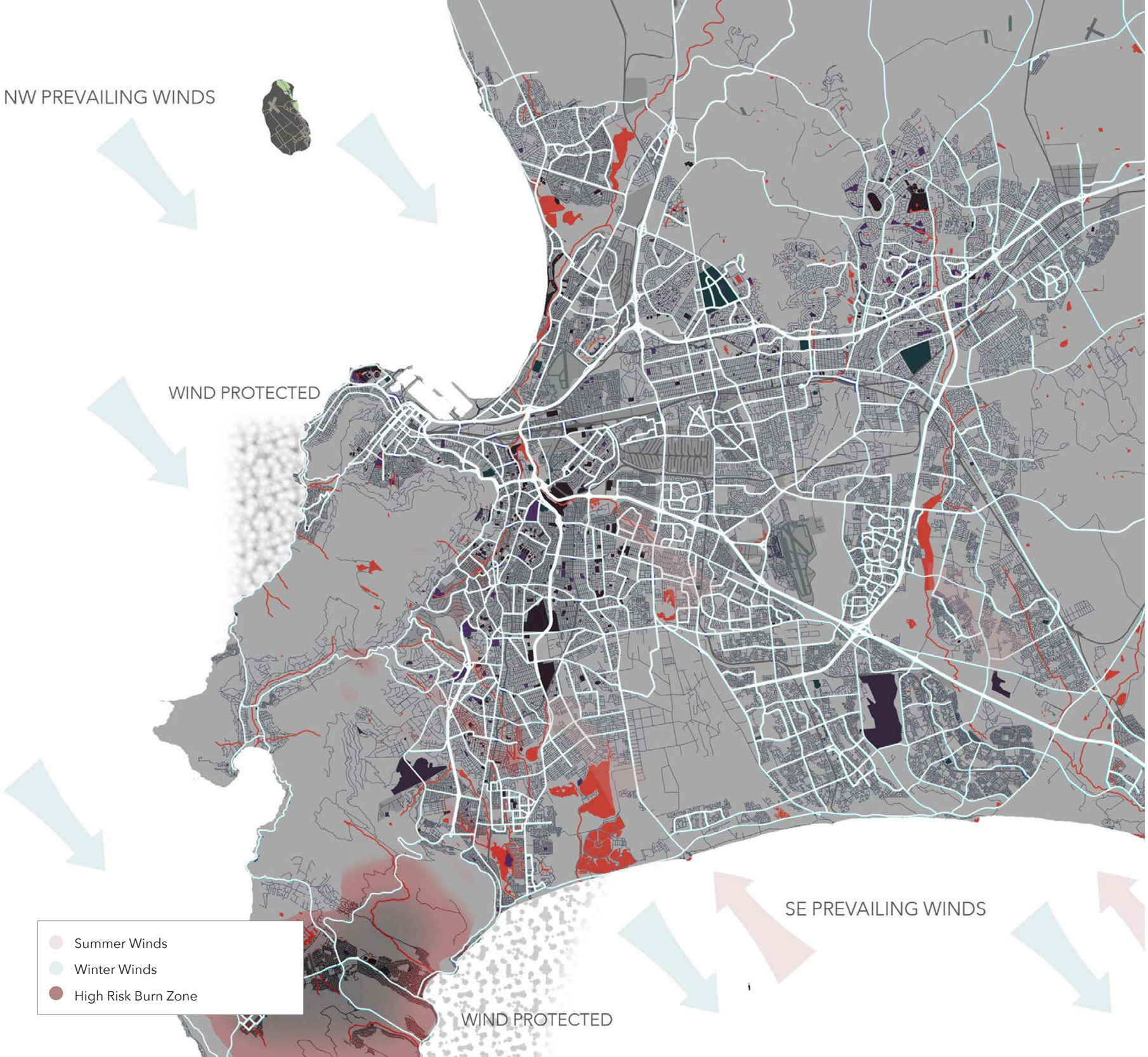


Site Analysis

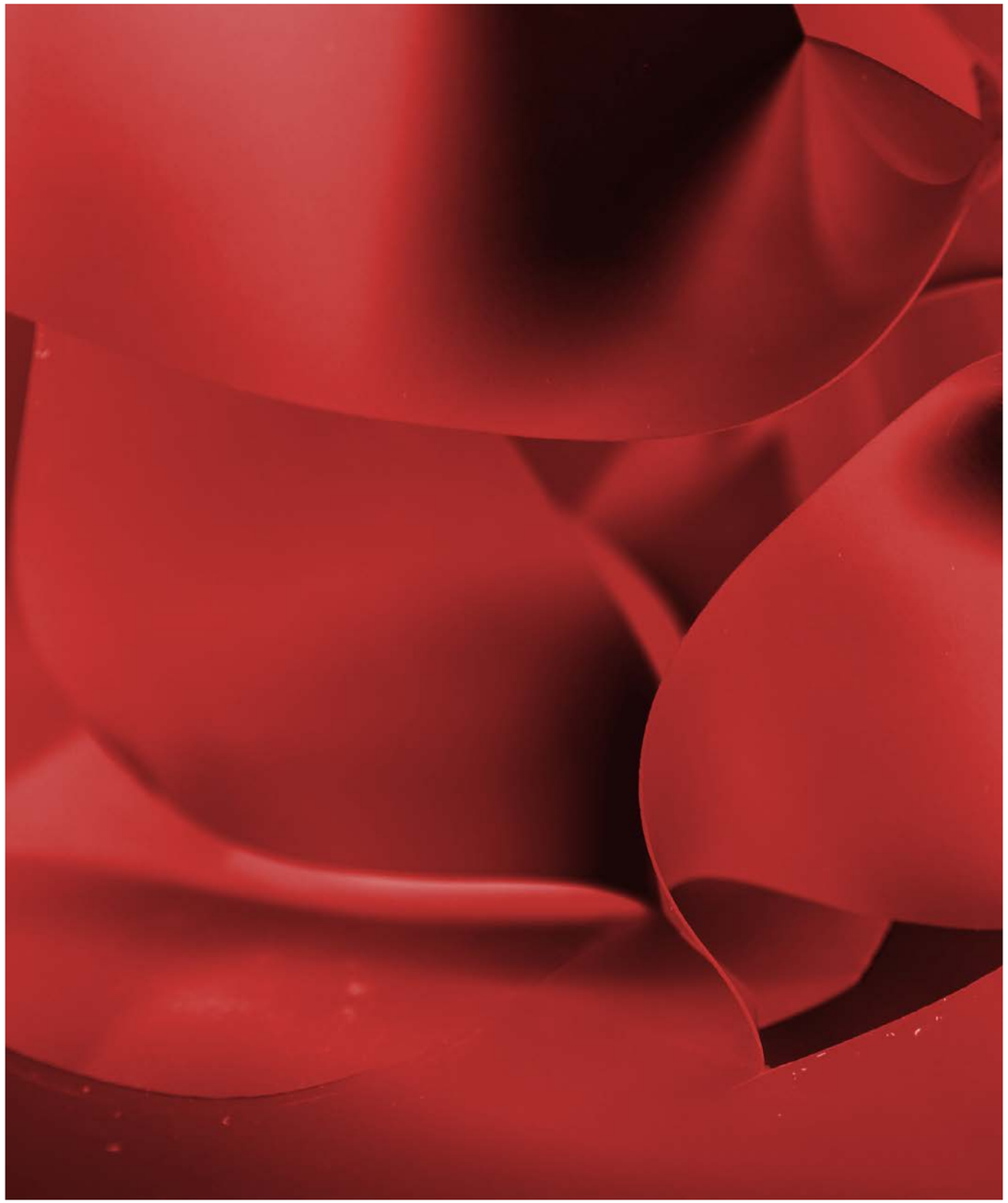
Cape Town, South Africa is uniquely situated in a region that experiences drought and receives around 19 inches of rainfall annually. The mapping reveals where wildfires occur in relation to the river networks. As we can see, wildfires occur around the coasts, where native fynbos predominately grows.



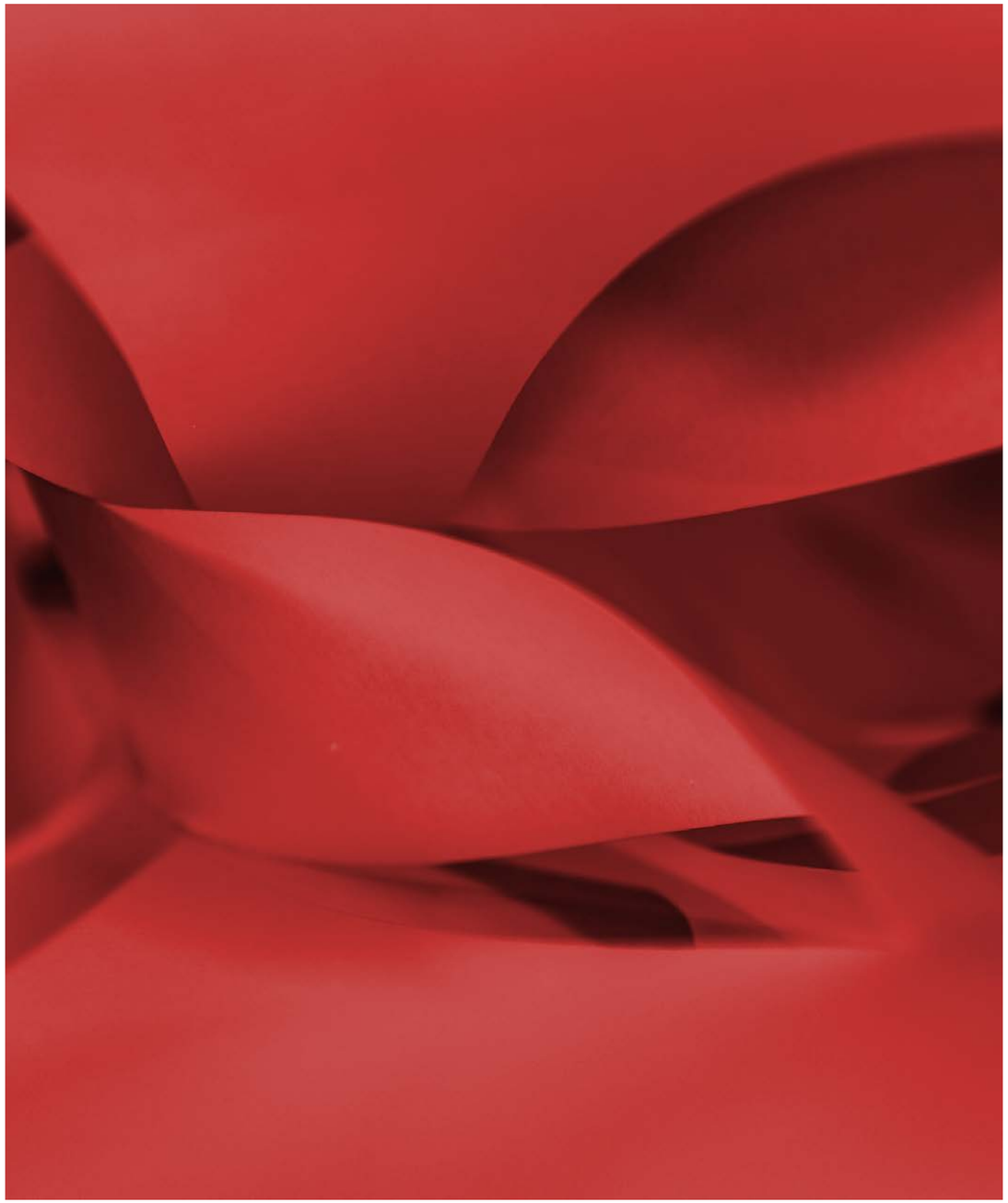
Site Analysis

The city of Capetown is mountainous and has a peninsula, called Cape Peninsula. The mountainous peninsula and Table Mountain create inhabitable zones within the city limits. These are the areas that are most impacted by wildfires. Fynbos grows here that is easily ignitable in a small fire, spreading fire to unreachable locations for fire fighters.

In this map, we see the seasonal wind trends. The terrains create wind protected zones along the beaches where luxury homes are built. Moreover, between seasons the wind switches direction from Northwest prevailing winds to Southeast prevailing winds.



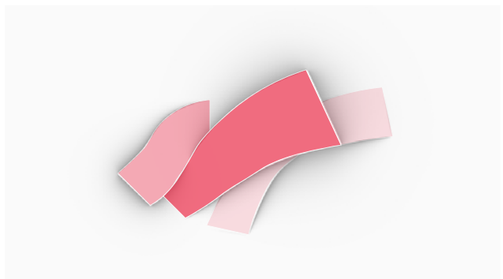
Paper Model Study 1: Diverge
Paper Model, Photography, Post-processing

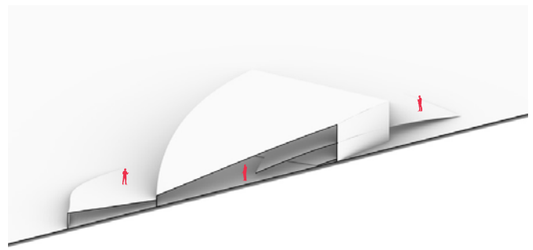


Paper Model Study 2: Maneuver

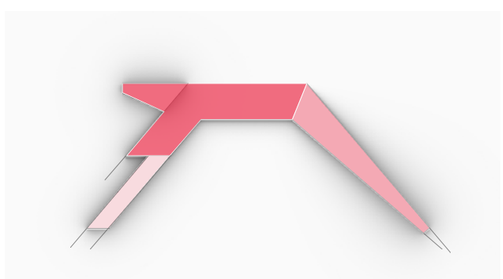
FORM ITERATIONS

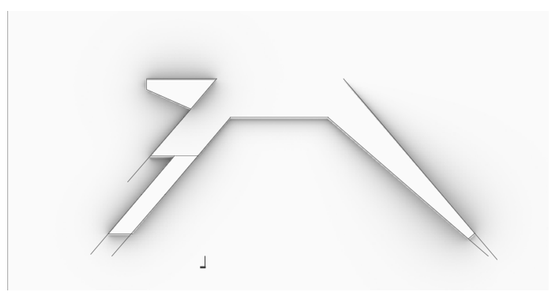
COLLIDE + FILTER

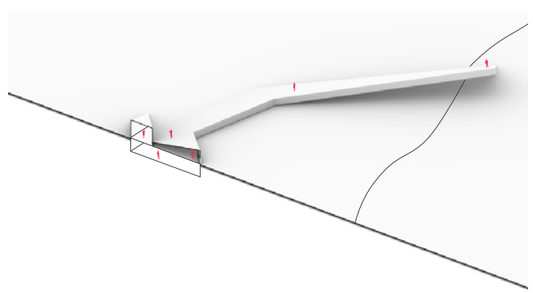




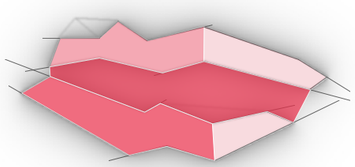
ENCOMPASS + REORIENT

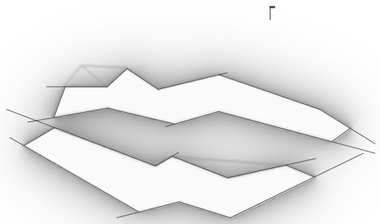


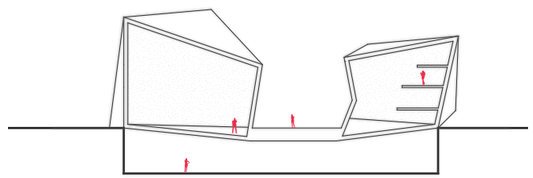




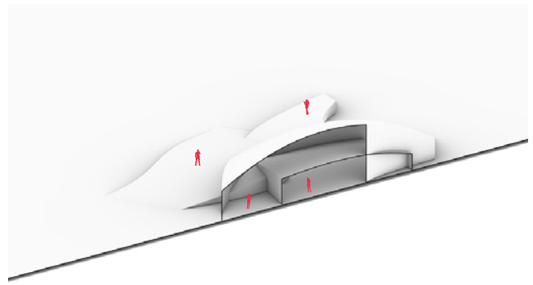
MANEUVER + DIVERT



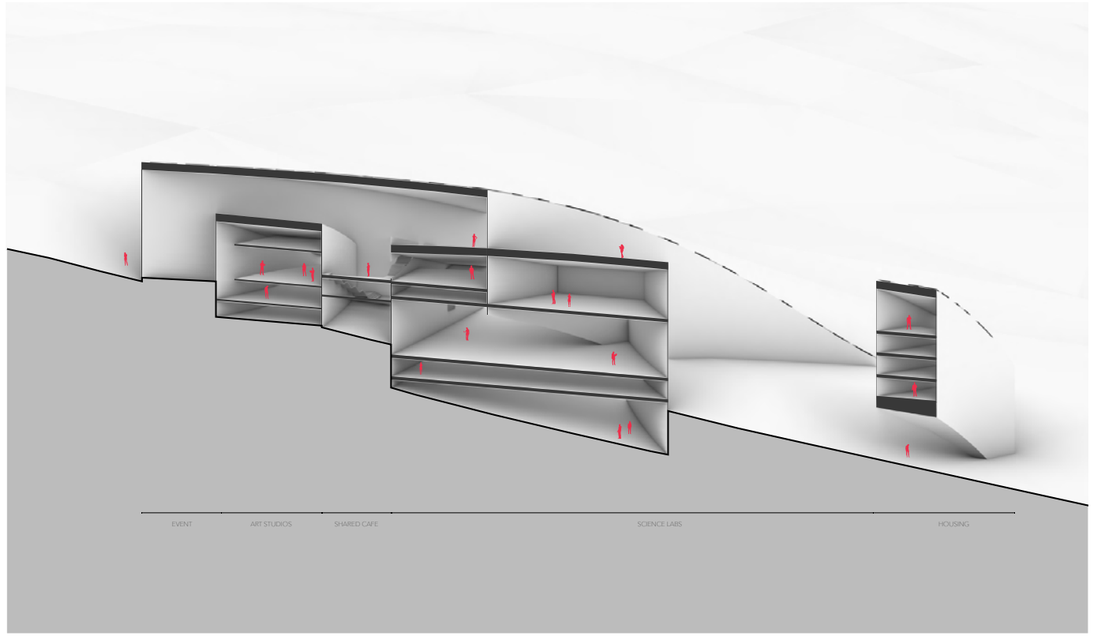


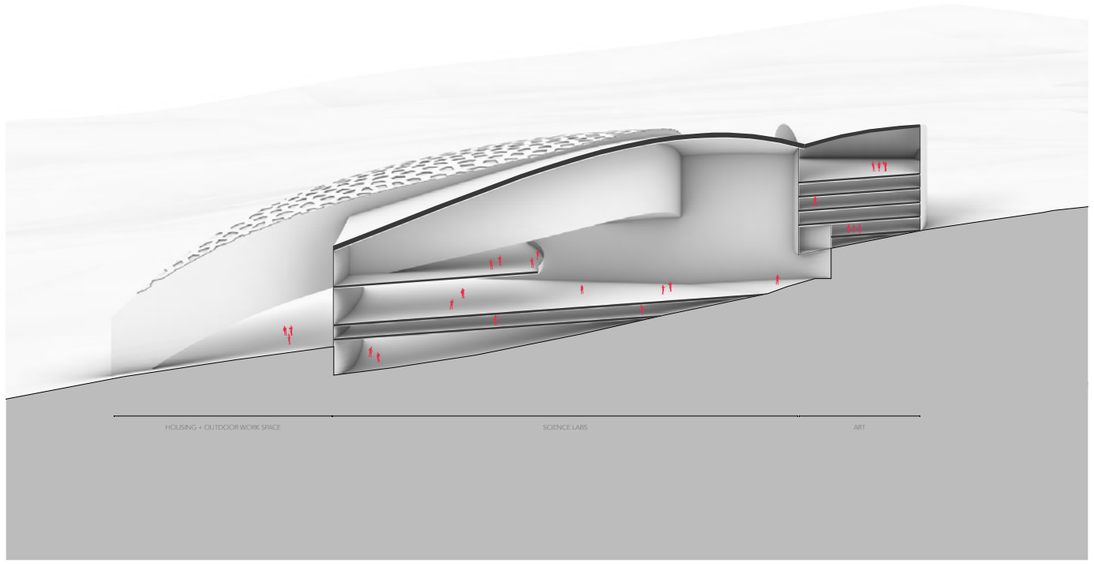


REPEL + COLLIDE

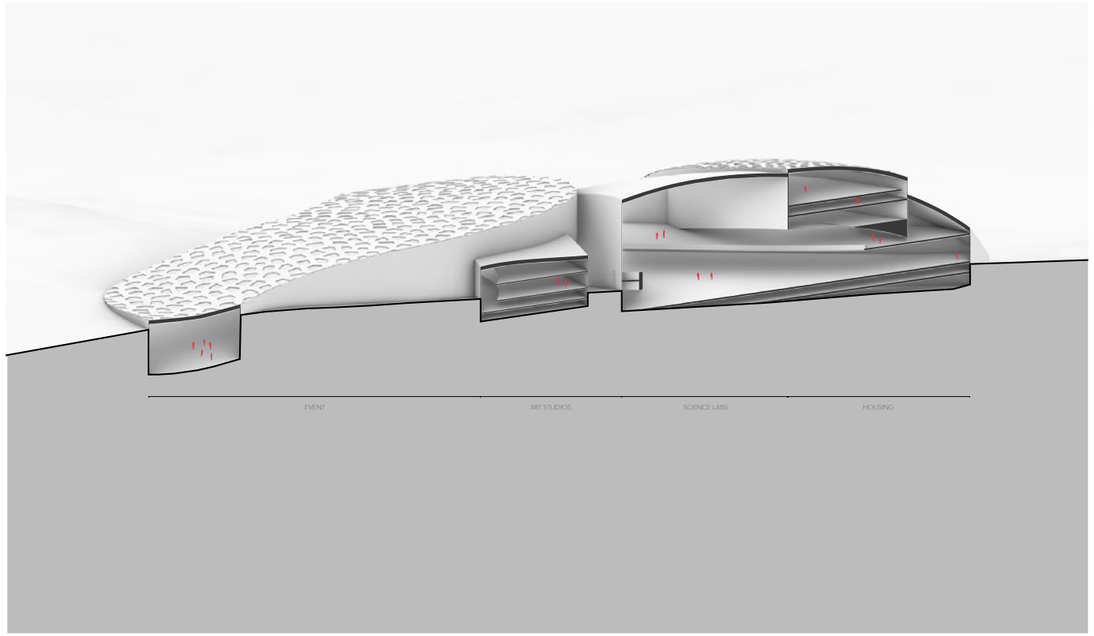


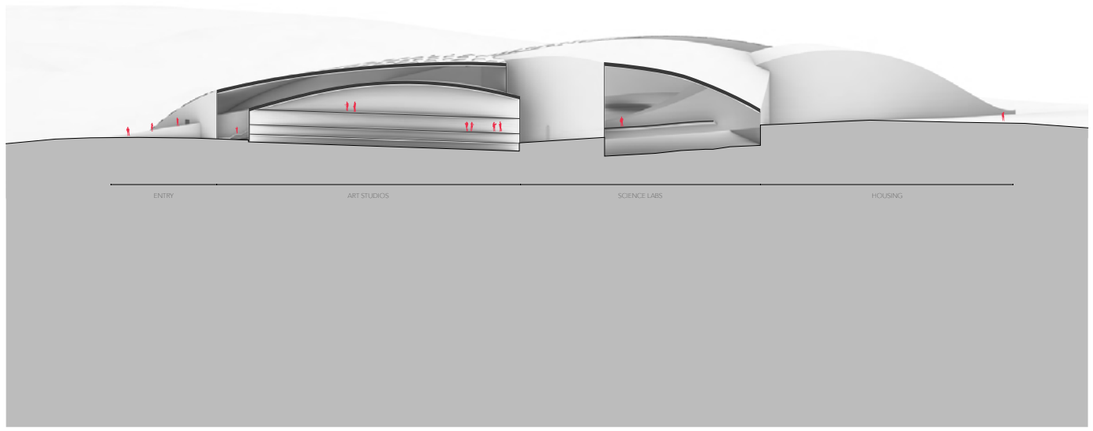
SCIENCE PERFORM ART





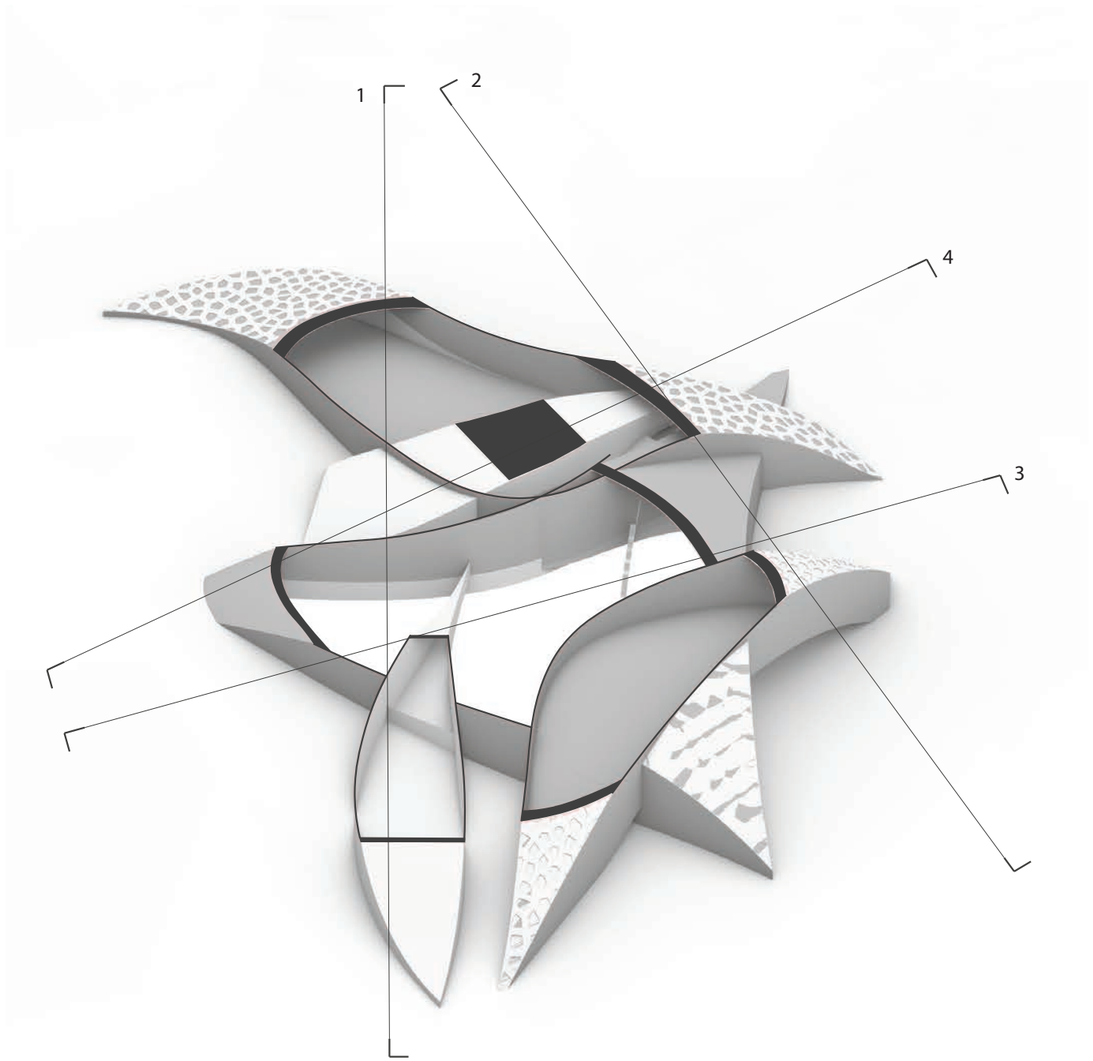
Midterm sections display nested programs.





Midterms sections display colliding programs.

Midterm Exterior Perspective



Midterm floorplan perspective

Final Site Plan and Section

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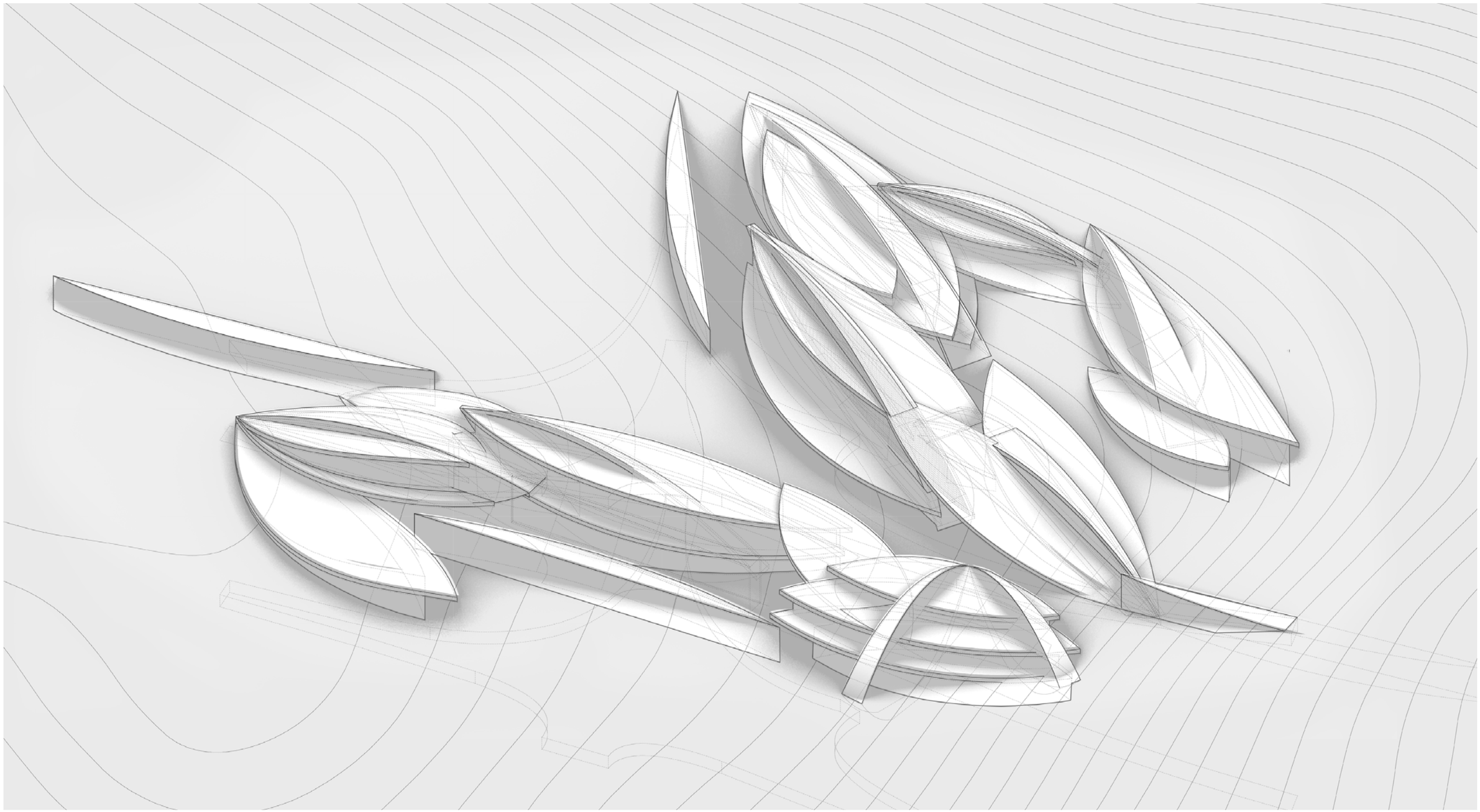

Perspective view displaying central space for humans and animals to traverse

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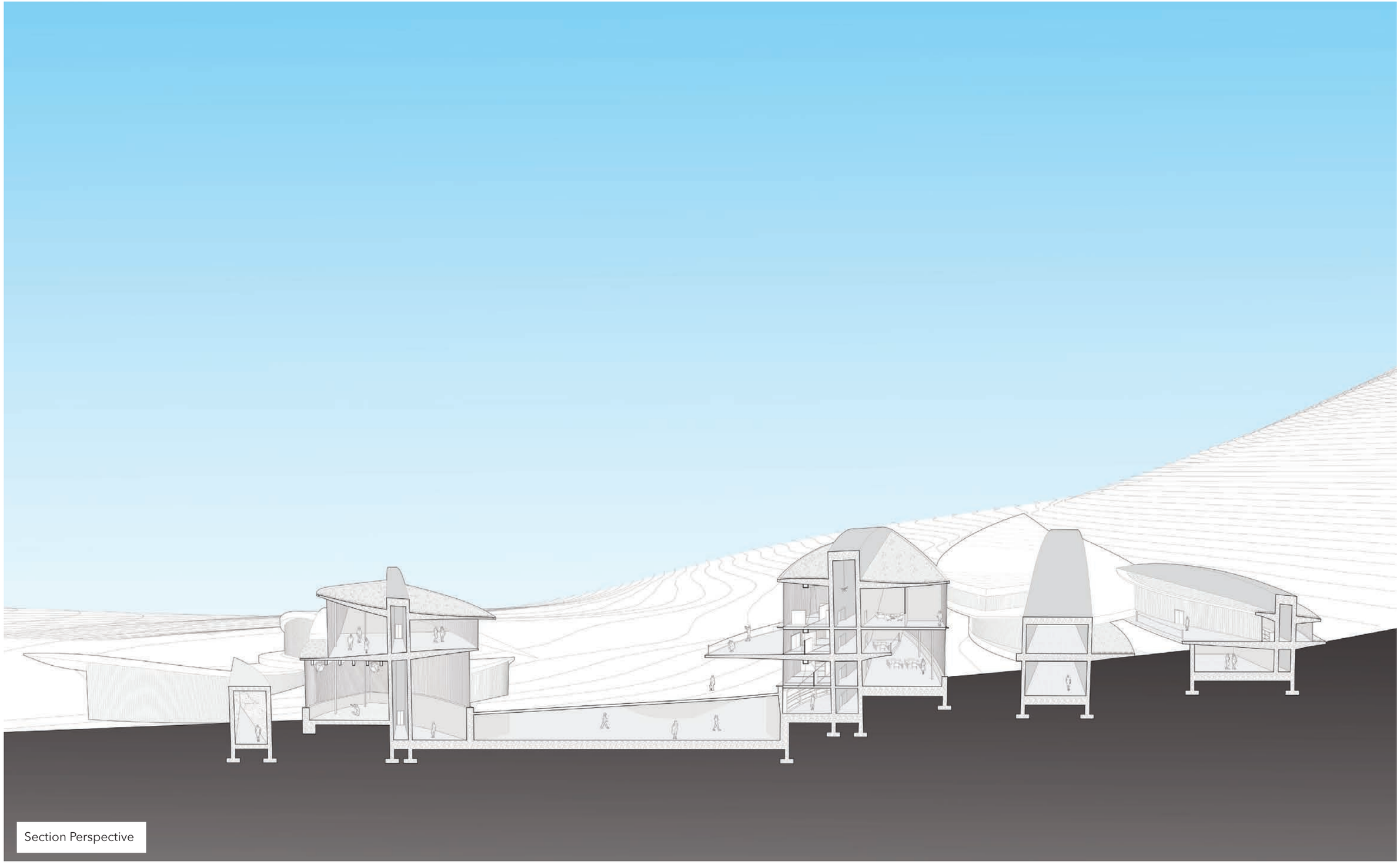

Section Perspective

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Section Perspective

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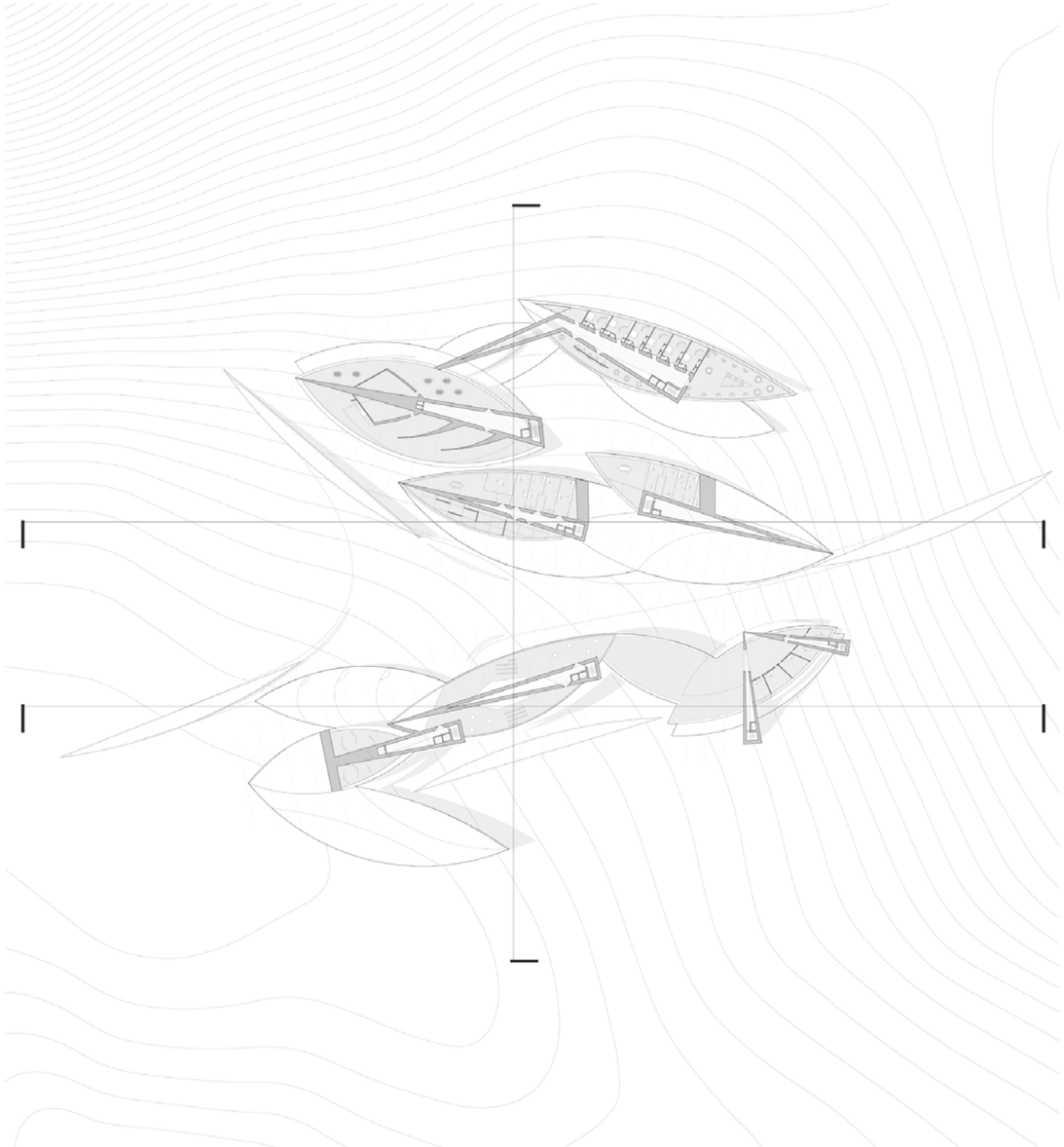
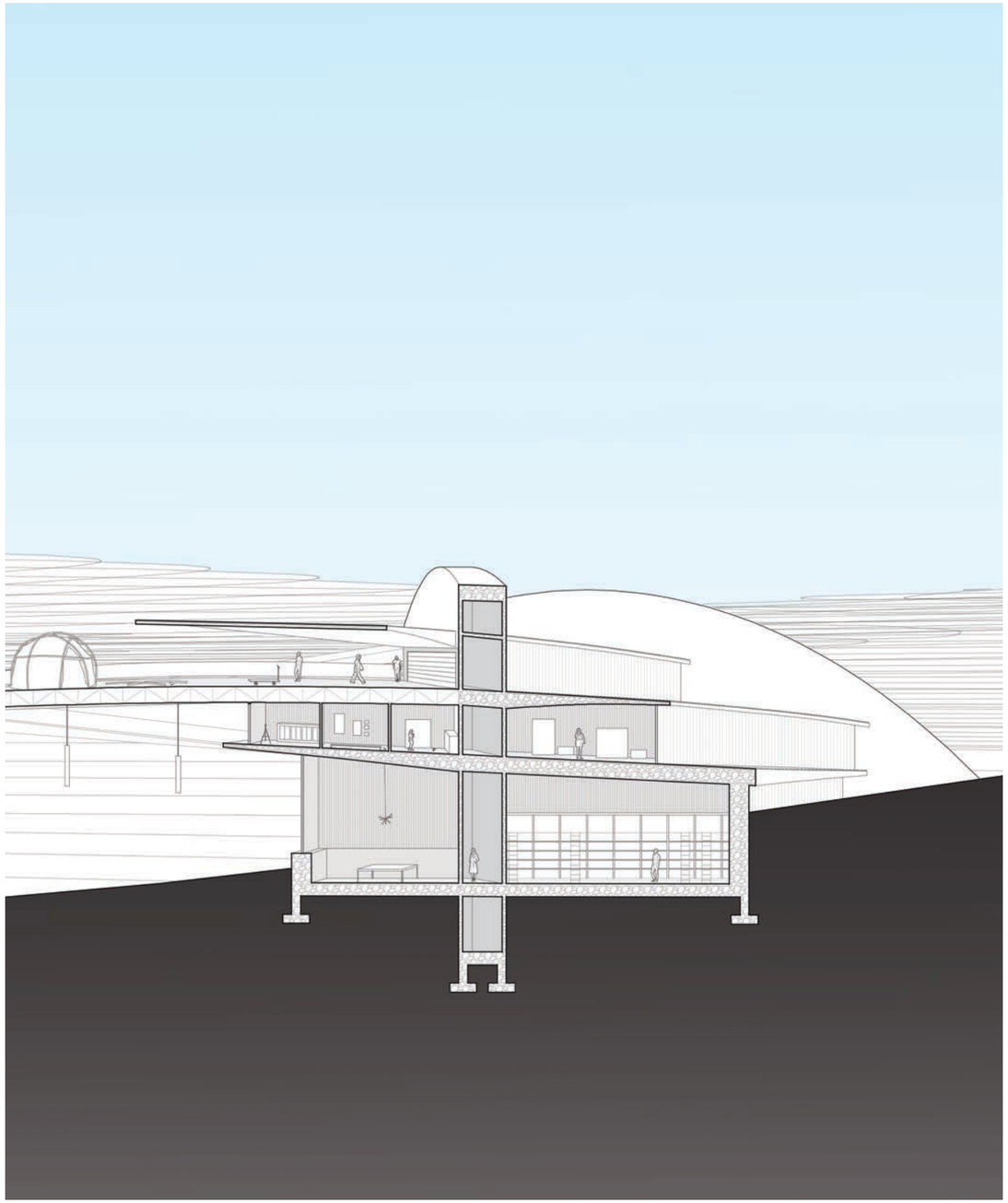
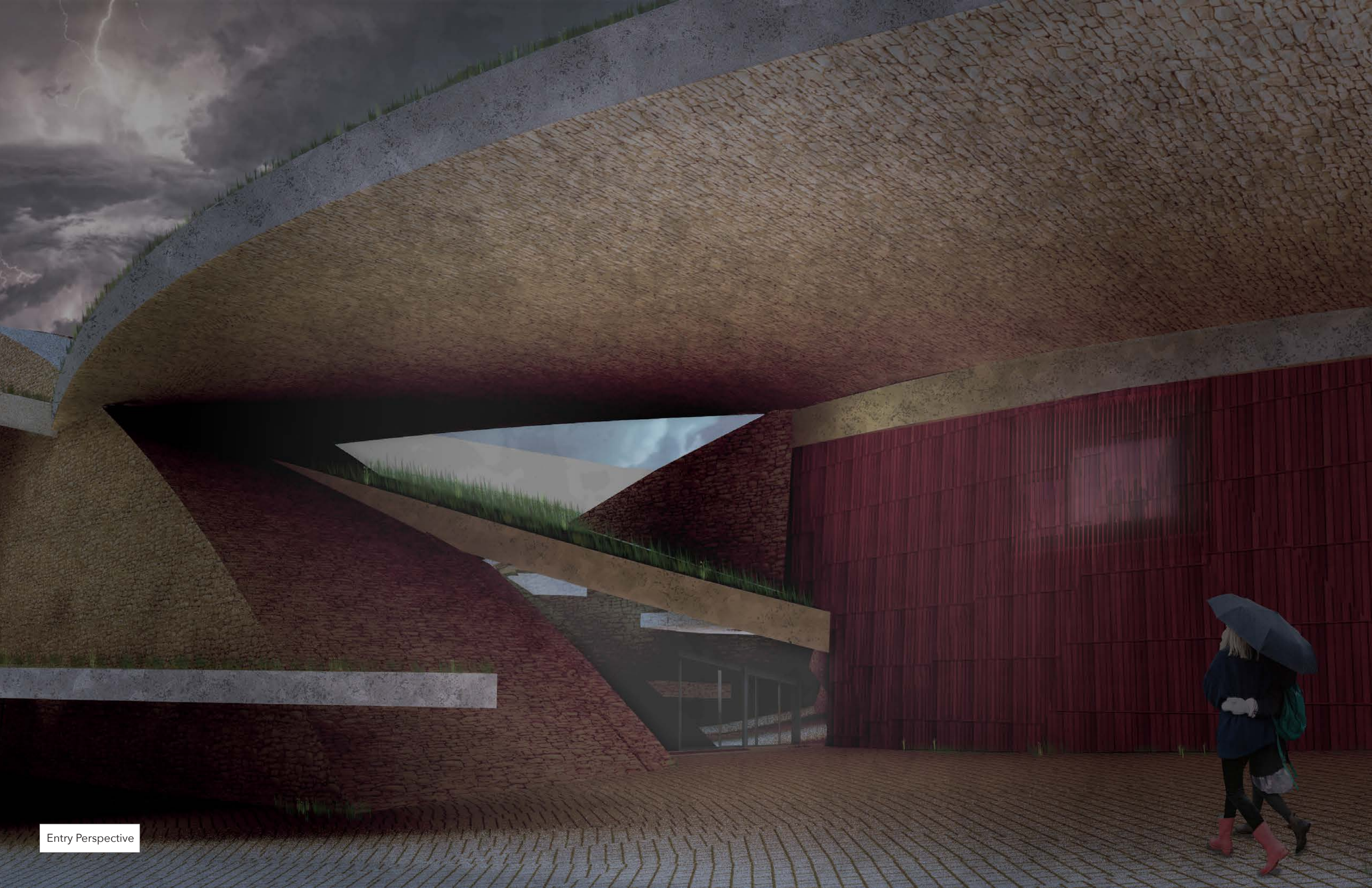


Site plan displays steep topography and jetting entrances to the building.



Zoomed section displaying large studio spaces.



Entry Perspective

Exterior Perspective

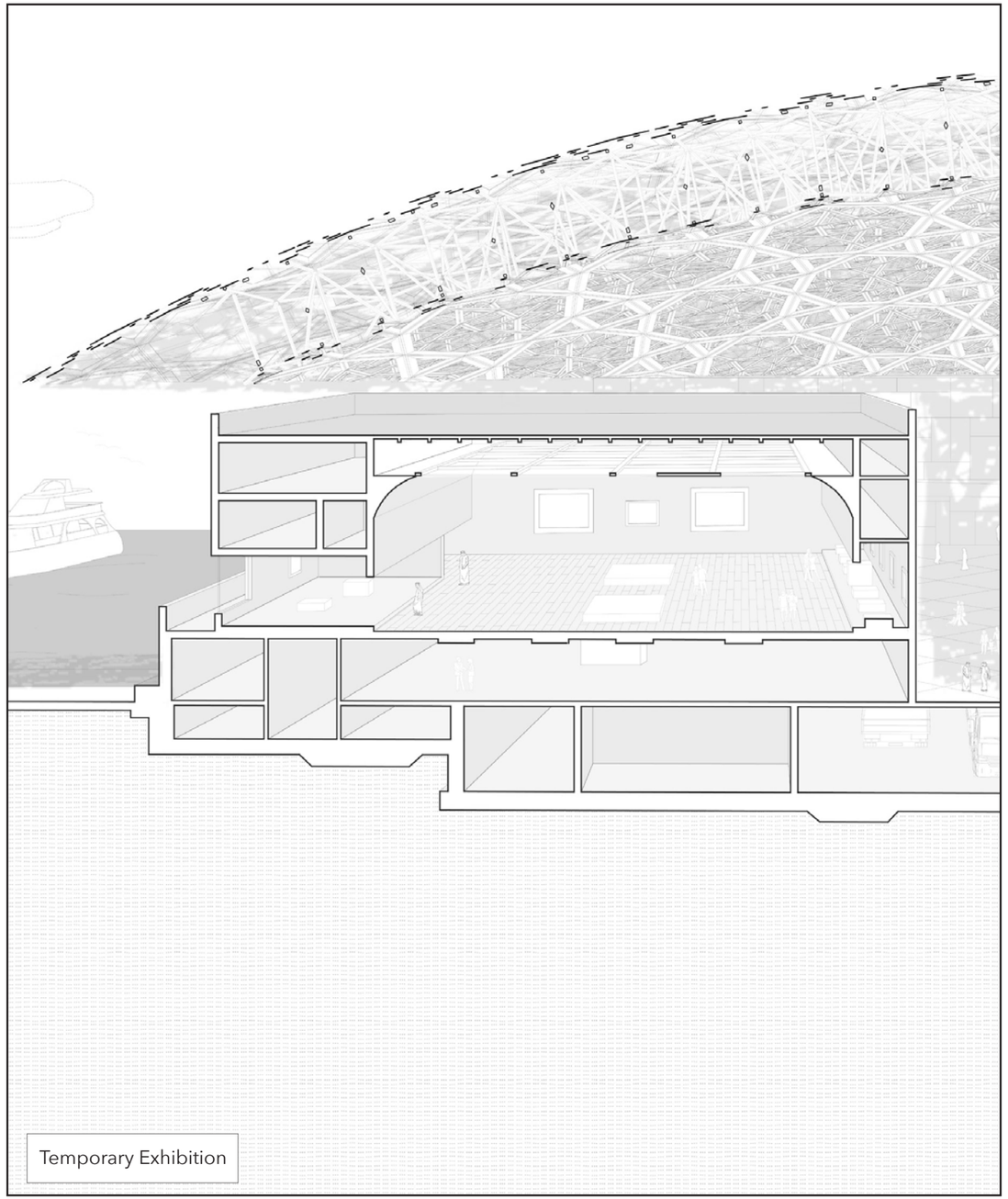
Research: Louvre Abu Dhabi

Spring 2020: Elective: Seminar of Section
Instructor Marc Tsurumaki
Individual Project

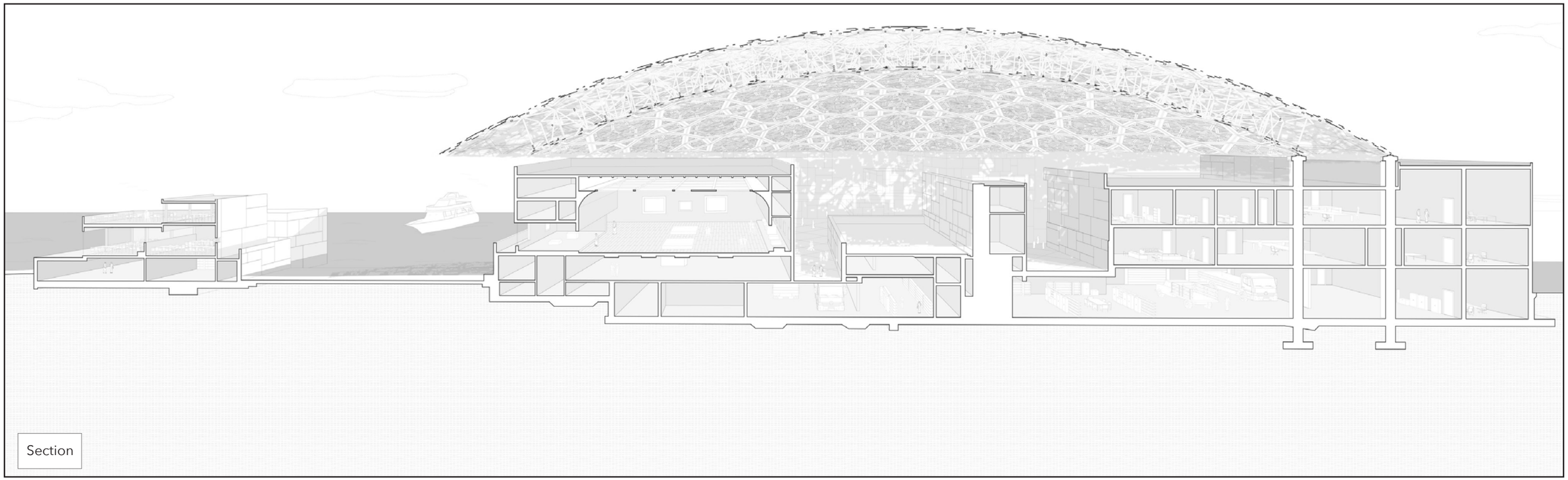
The Louvre Abu Dhabi is located in Abu Dhabi, United Arab Emirates. It was designed by Jean Nouvel and completed in 2017. The course was focused on The Manual of Section and we were asked to study one project. **This project's dome creates a micro-climate below, adapting a museum to a desert climate.**

I decided to study The Louvre Abu Dhabi because it is a contemporary museum with interesting sectional moments. I was interested in revealing the complexities of a seemingly floating dome. The dome shapes the space above the galleries, hiding it's structure withing the orthogonal buildings below. The dome is a multi-layered structure that allows light to filter through to the public spaces below. The overlays 8 layers with truss in between where sunlight creates speckles on the spaces below. The light effect also controls the climate, making the outdoor space enjoyable in an arid climate.

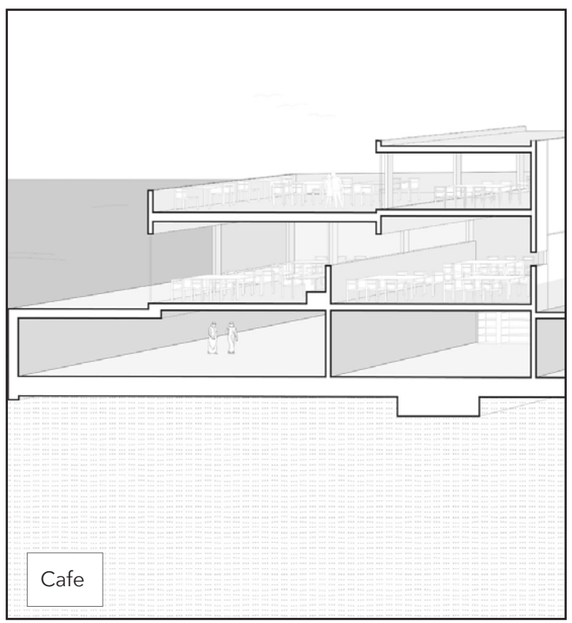
Upon visiting the museum, one will be unaware of many moves happening in the building. The museum itself is jetting into the water, and allowing water to infiltrate the architecture. The light weight dome has four major columns holding it up that are hidden within the museum walls. Lastly, the seemingly simple white-box galleries are actually connected below ground. The section intends



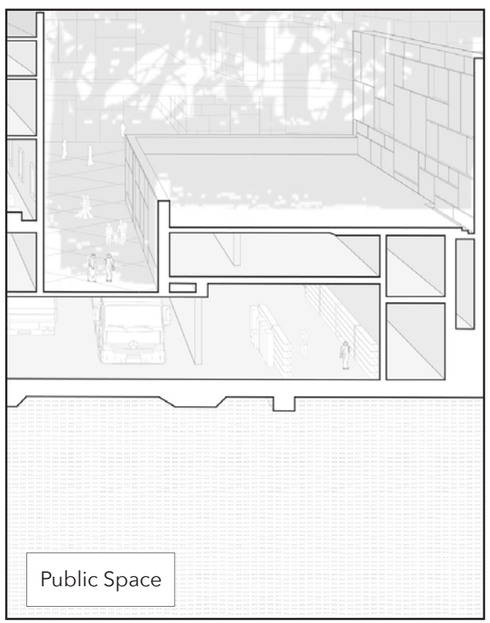
This is the temporary exhibition space that uses artificial light disguised as natural light. The dome above cantilevers over the water.



Section



Cafe



Public Space

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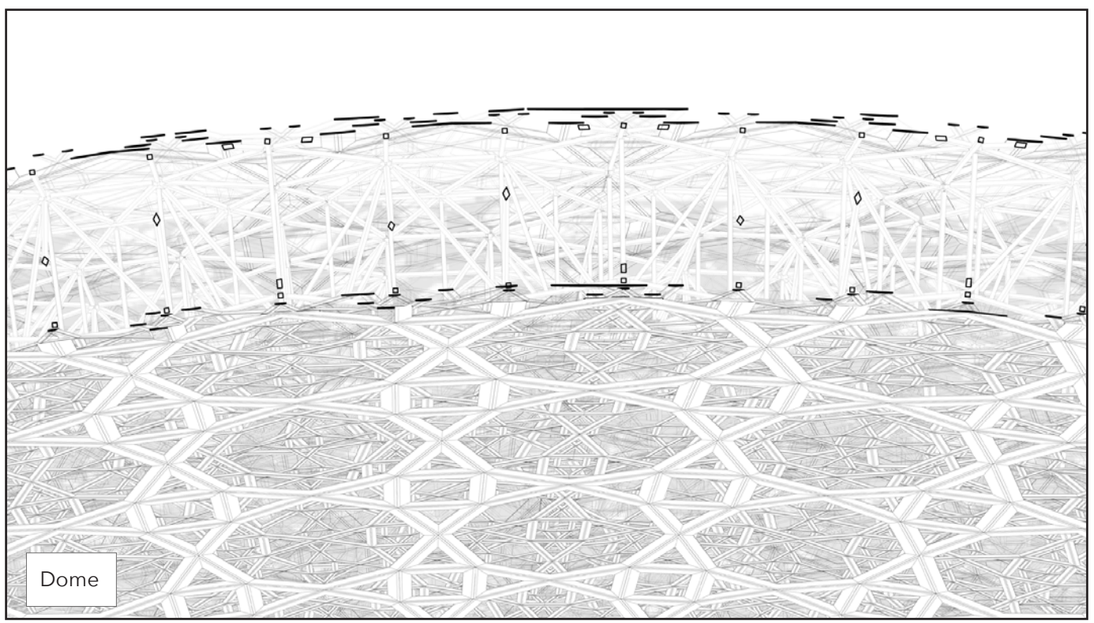

Dome

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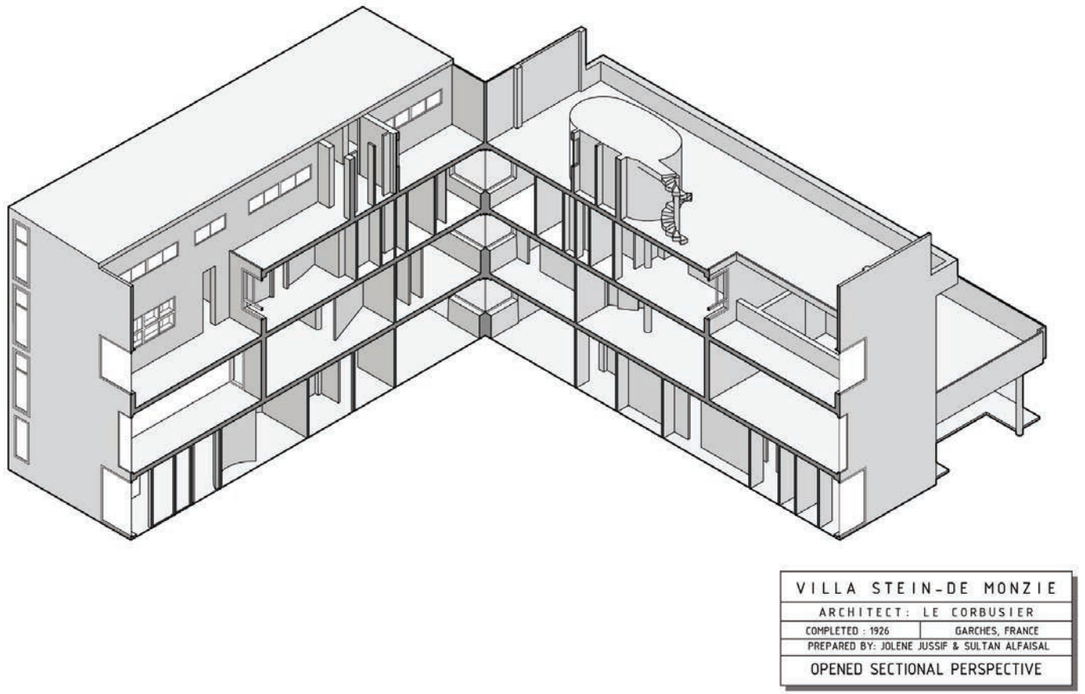
Research: Villa Stein-de Monzie

Spring 2020: Elective: Le Corbusier
Instructor Kenneth Frampton
Collaboration with Sultan Alfaisal

Villa Stein-de Monzie is a private home located in Garches, France. It was designed by Le Corbusier and built in 1926. The villa was commissioned by Gabrielle Colaco-Osorio de Monzie and Sarah Stein.

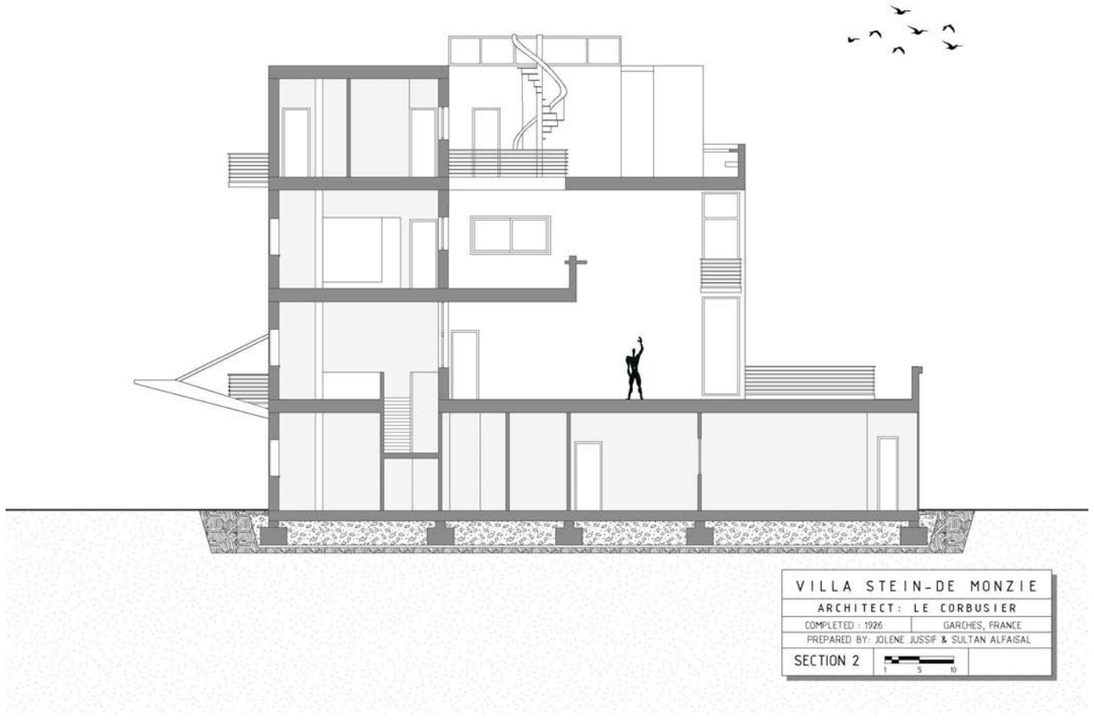
The drawings clearly exemplify Le Corbusier's 5 points of architecture; the pilotis, the free plan, the free facade, ribbon window and the roof garden. This building is a palace as a house. There are sections of the home for those who own, and sections for the staff. The plans display a clear distinction between the classes. The facade shows is elevated where the ground floor facade is recessed to give the effect of floating. The dom-ino structural styles allows for open floor plans and exposed structure in the living spaces.

These drawings looked at and attempt to rediscover the complexities of Villa Stein-de Monzie.



Sectional perspective displays the roof garden and terrace gardens that are burrowed within the architecture. The ribbon windows are shown here on the interior courtyard as well as the exterior.

This section displayed the conventional stacked section and carved out terrace. This section displays the ribbon windows that wrap the building.



This section displays the stepping form of the building and the detail of the handrails. The stepped facade of the building is the back and one would enter under the overhang.

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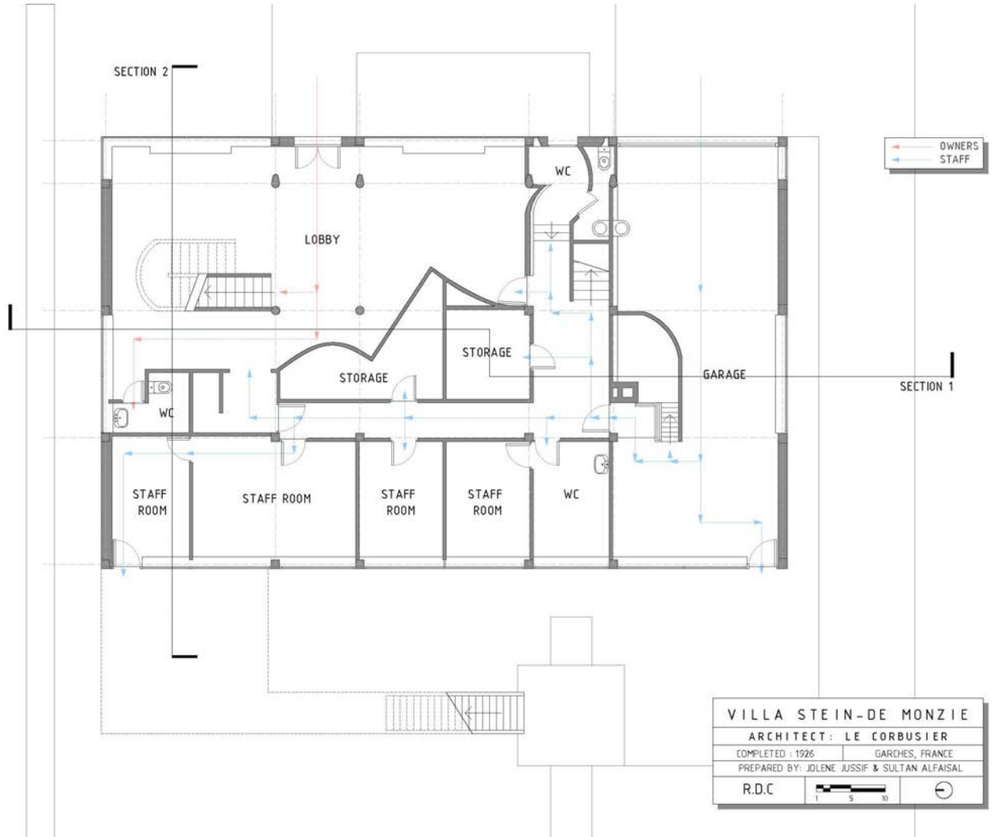

The ground floor of the building, or Rez-de-Chaussèe, is the staff's living quarters consisting of their bedrooms, bathrooms, storage, basement entry and garage. The owners enter here via a distinct entry to a grand lobby.

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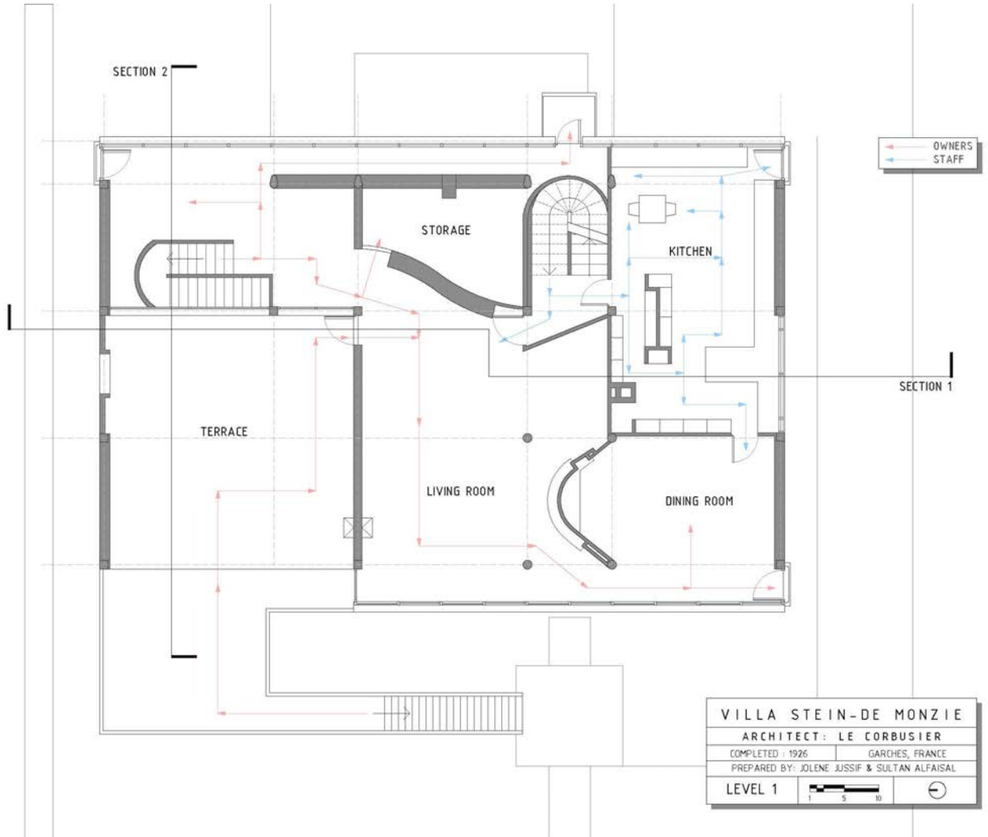
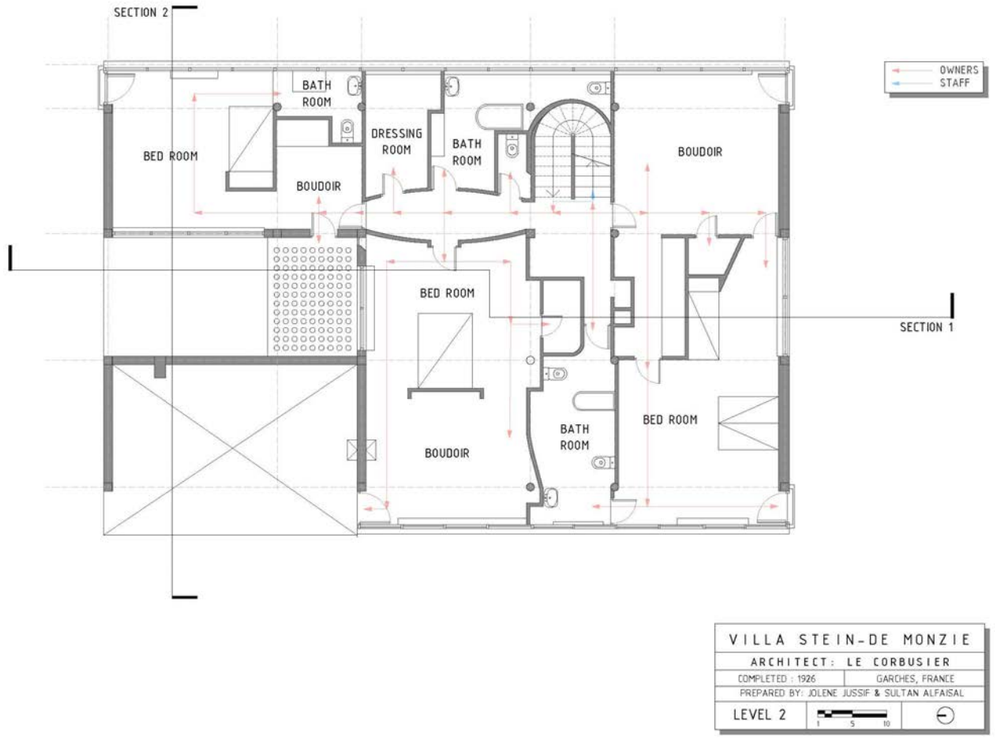
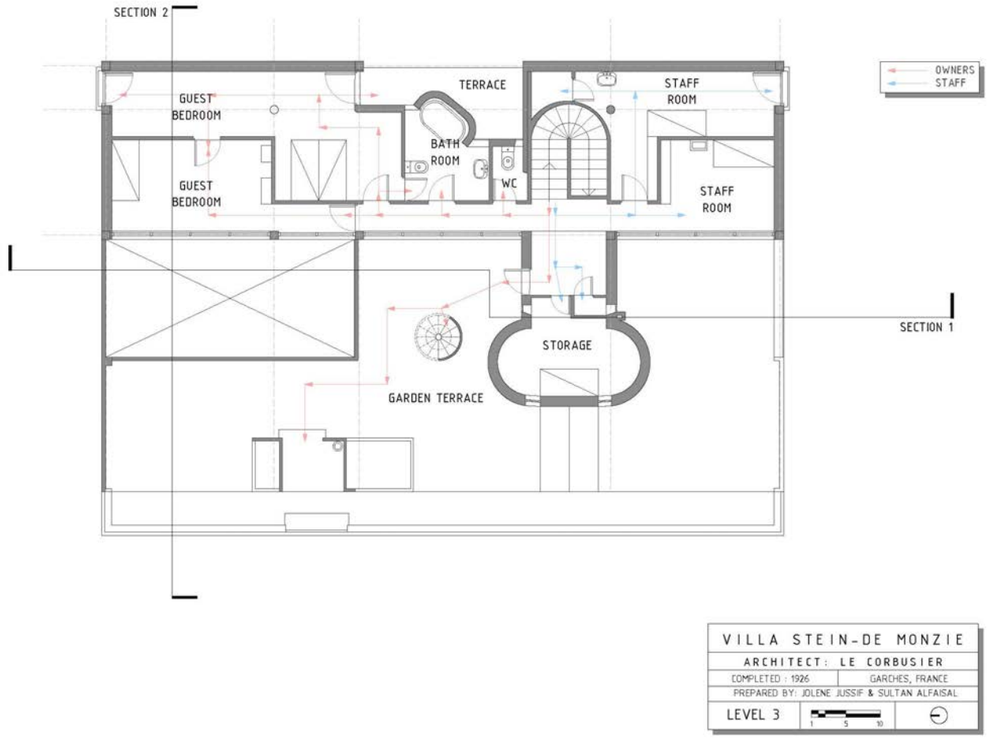


Level 1 is the owner's living quarters and can be entered directly from the ground by the terrace. This floor encompasses their living room, terrace, kitchen, and dining room. This plan displays the many configurations of a free plan.



Level 2 is the owner's sleeping quarters consisting of their bedrooms, boudoirs, and bathrooms. The grand hallway opens up to the large bedrooms.



Level 3 consists of guest bedrooms, staff rooms, bathrooms and terrace entries. We see in the plan the different employments of orthogonal and curvilinear geometries.

Being Watched

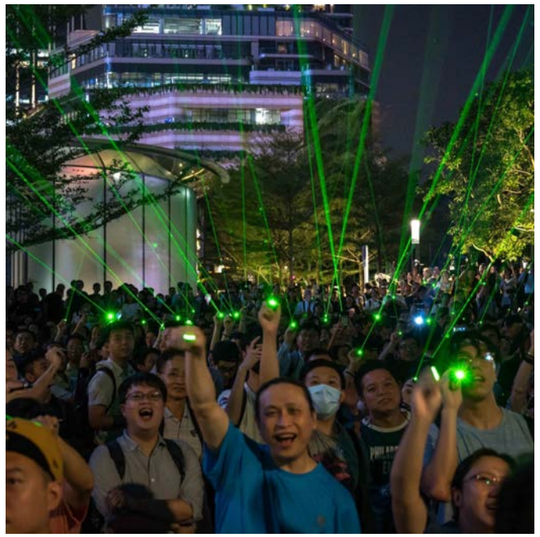
The Role of the Architect in the Panopticism of Facial Recognition
Avery Essay Submission
Individual Project

Physical and symbolic barriers of defense have transformed into cunning, seemingly transparent envelopes. Facial recognition through surveillance has erased the idea of anonymity, leading to a deceivingly translucent architectural movement. Our modern information culture has brought with it the global rise of misinformation and revolts. Defensive castle walls have transformed into current facial recognition software. In the discipline of architecture, we must question; how has this duality of technological advancement and ignorance manifested itself in architectural design?

Political movements have long been reflected in architecture and public space design. Ideologies of political movements are physically manifested through spatial forms, urban planning and architectural styles. Today, there is the perpetual threat of privacy violations and data breaches which have been linked to hacked elections and analytics used for predatory campaigning. The power of data is influencing how the masses perceive their leaders and is only starting to be realized. Political protests, nationalism and deceitful leaders are a global reality. We are existing in a new territory where technology is evolving faster than policy can regulate. This is reflected in an architectural movement consisting of complex technical systems, physical guards, glass clad materials and unregulated facial recognition software made available to police occupants. The line of defense against crime and protests is digital software embedded into architecture that monitor and control the unaware masses.

The architecture and public space of today have moved from being liberated spaces of gathering into malignant panopticons. In a watched world, architects feel free to clad spaces of value in thin, transparent glass. Why do modern-day architects take the liberty to envelope highly valued spaces in transparent cladding? In Discipline and Punish, by Michel Foucault, he touches on the power of surveillance to cause individuals to self-police, with the Panopticon by Jeremy Bentham acting as a physical apparatus of power to do so. Individuals under constant watch will become easier to control. The constant possibility of surveillance is a form of coercive discipline. It influences individuals to feel watched and therefore be more cognizant of their behavior and more principally, how their behavior is perceived by those surveilling. The growing presence of facial recognition software in public space, governmental buildings, airports, and train stations causes individuals to feel constantly watched, consequently erasing their anonymity and changing behavior. This form of self-policing has decreased the need for defensive architecture.

Facial recognition software is the key strategy to supervise individuals in public space. Recognition of a face happens in five steps: (1) detection of a face; (2) alignment to determine the head size and position; (3) normalization to scale and rotate the head; (4) translation of the face into a code; and (5) the system matches the face in a database. In step four, the software scans a face's eighty nodal points to generate a code called a faceprint. The faceprint code is stored and shared as data to compare it with millions of other faceprints. Facial recognition is a biometric software application that is applied to different spaces, "such as to identify problem gamblers in casinos, greet hotel guests, connect people on matchmaking websites, help take attendance in schools, and identify drinkers who are underage". The software can be applied to help protect buildings from crime. However, this defensive software often diminishes an



individual's anonymity in times of unrest and creates a panoptic environment in public spaces. Facial recognition software creates a protective blanket of security around buildings, reducing the need for defensive materiality.

Historically, valuable items or important people that needed protection were housed in architecture that exhibited protective behavior. Out of fear, many avoided criminal behavior because the architecture was built for defense. Castles, which exemplify defensive architecture methodology, have been used for protection of governments and monarchies in the United Kingdom for centuries. Dover Castle in the United Kingdom exhibits protective behavior with a thick, masonry outer curtain wall and moat around its perimeter. Crenel windows, battlements, arrow slits and corner towers were all used to watch those outside the castle walls. The castle protected England from many sieges in a time where power was exhibited through forms of public torture and execution ceremonies. Methods of discipline transformed over time into modern-day prisons where the punished are isolated from the public eye, thus causing less of a public spectacle. Dover Castle and a modern glass tower share the creation of an unequal gaze where an individual might feel at any moment, irrelevant of consent or notification, they are being observed by someone or something they cannot see. Human made structures have always been used to establish a vantage point over an enemy as a form of coercive discipline.

Foucault's idea of self-policing through surveillance has worked to near perfection until now. This is because we are in an information saturated society where nearly everyone has a camera and endless knowledge at arm's length. Most civilians have the capability to record and share information rather than this capability being limited to only those in a traditional position of power. Next to Trump Tower on Fifth Avenue in Manhattan, the adjacent streets are shut down, the air above has been declared a national defense airspace, and the doors are guarded by uniformed soldiers equipped with machine guns. These tactics have been employed to protect the vulnerable glass tower in a time where the President, and building owner, is undergoing impeachment proceedings, despite the tower being highly defensive against intruders in its basic form. For instance, higher floors are unreachable; those inside can see and not be seen because of high floors; the ground floor perimeter is small; and security guards can control every entrance and exit of the building. The paradigm of self-policing through observation begins to break down in times of political outrage establishing a need for additional measures to be taken.

When Donald Trump was elected President of the United States in 2016, many mid-century novels had a resurgence. These novels centered on dystopian worlds governed by surveillance. "George Orwell's classic book "1984," about a dystopian future where critical thought is suppressed under a totalitarian regime, has seen a surge in sales this month, rising to the top of the Amazon best-seller list in the United States and leading its publisher to have tens of thousands of new copies printed". The books that surged in sales all were concerned with surveillance and the fear of being watched by those in power. Consequently, this warned individuals to realize that smart technology was listening and surveilling in their private homes. There is general shared knowledge out there that shows individuals

are being surveilled in their homes, public buildings and public space, and facial recognition software and storing of faceprints takes away anonymity.

Glass-clad buildings are meant to evoke a feeling of openness and honesty; however, they oppress the public's right to privacy through hidden biometrics. Owners of buildings, interested in protecting their investments, have long employed cameras and security contractors to combat burglaries, vandalism or political riots. This can be problematic because the usefulness of the camera is only fully realized when paired with adequate surveillance. Like the panopticon, it does not matter who is observing or if there is anyone observing. Artificial intelligence is becoming mainstream enough to recognize faces inside buildings or on the street; all without consent. A crenel window in a castle, where a soldier identifies an enemy from a secure position, is comparable to facial recognition software where the system identifies faces in crowds from a safe distance with the power to detect. Governments recognize the power of surveillance and personal cameras. This recognition is exhibited through the typical policy to ban civilian cellphones in most governmental buildings.

Vice News has closely covered the implementation of facial recognition software in public spaces for many years. In an article from 2015, the surveillance company, Skakash, had been using a software called Churchix to recognize attendants at church. Churchgoers provide an image of their face and the camera tracks the individual upon entry. This data could be used to check who comes to church consistently but also to check if the individual is a sex offender or criminal. It is unclear whether Churchix was implemented to control attendants or protect them. In another article from January 2020, facial recognition was found in the University of San Francisco, Stanford University, and University of Southern California. In response to those findings, students formed an activist group with the intent to ban this software in schools nationwide due to privacy violations. Abhi Dewan, a George Washington student stated, "We don't know what the psychological effects of constant surveillance could be on students and professors. If being watched 24/7, it is very possible that this could significantly suppress diversity of opinion and academic discourse". This diversity suppression and moderation is the psychological intent of passive surveillance. Foucault writes, "Hence the major effect of the Panopticon: to induce the inmate into a state of conscious and permanent visibility that assures the automatic functioning of power". The impacts of constant surveillance are dangerous and immeasurable and public buildings should be gaining consent from occupants before collecting data. Panoptic surveillance systems can be found in airports, train stations, malls, retail stores

"Facial recognition software can be found in most governmental buildings today and is sometimes used in place of traditional defense practices."

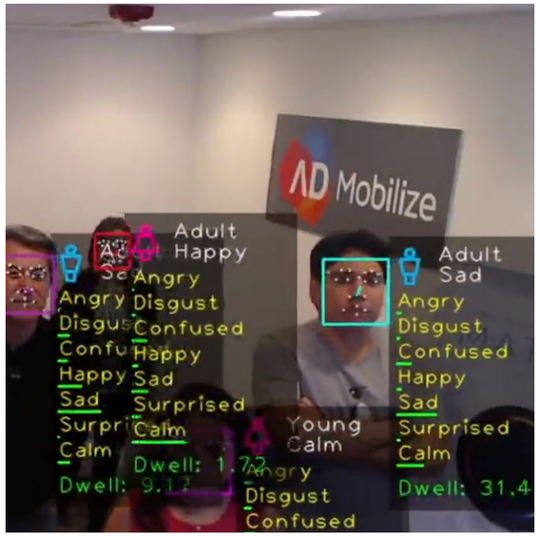
and marijuana dispensaries. The collection of data and faces in public buildings and campuses is legal and a perfect example of the evolutionary speed of technology surpassing the development of policy and legislature.

Buildings with facial recognition are our modern-day royal defense castles; unreachable, with anonymous occupants, high construction costs, and built for surveilling. In the next decade, there will be political, social and architectural debates on hidden facial recognition inside towers, public space, schools, transportation, and governmental buildings. The next generation of architects must decide if they want to build architecture that protects people or serves those in power while adapting to new regulations and legislature. The power of facial recognition is the power of control in a protest. Specifically, in the Hong Kong protests in 2019; protest leaders were targeted and caught on the street using technology to recognize their faces as a form of discipline and control. Consequently, the protesters began using lasers and masks to protect their privacy.

Facial recognition software can be found in most governmental buildings today and is sometimes used in place of traditional defense practices. The controversial transparent design for the United States Embassy in London is a blast-resistant glass building. Embassy designers are required to follow a strict code, including an outer 'curtain' wall and water moat, like those found in medieval castles. The United States began using the Standard Embassy Design (SED) in 2002 after bombings in Beirut, Kenya and Tanzania. These fortress-like buildings were criticized because of their generic, dull designs and in 2011 the United States began the Design Excellence program in response to the criticism. Since, they have commissioned popular architect firms such as Studio Gang, Morphosis, and Tod Williams and Billie Tsien to design new embassies abroad. These firms differ from previous architects chosen prior to the SED program, such as Walter Gropius and Marcel Breuer, who had focused on heavier materials for security. The stripping away of heavy materials reflects a culture where risk is low, and aesthetics come first. The outer curtain wall of the embassy is their first layer of defense and the new appealing embassy designs are concealed and forbidden to be photographed. Today, the fear of attack on a United States embassy is lower as individuals are watched by hierarchical powers such as cameras or facial recognition.

There are ways that architects can design buildings that protect the rights of occupants and those on the street. There are spatial strategies to do this like avoiding long wide hallways, screened walkways, scattered columns, over hanged canopies or generating reflections. To build a protective design, future architects must advocate for an ethical code to prevent unregulated surveillance without consent. What advantages and disadvantages of artificial intelligence will be argued in architecture circles as the technology develops? If glass towers or governmental buildings are apparatuses of power, how will architects wield that power in the future? Will there be a shift in how architects plan these glass fortresses in respect to an ethical or political code?

To build architecture with occupant's privacy in mind is to build autonomous architecture. It is an



ethical element of the design like the consideration of employing migrant workers in unsafe construction environment. Katsushi Goto writes, "The practice of architects and planners must be understood as one that is aware of both: autonomy in built-environment and collective consciousness towards current and future needs". Goto might think of facial recognition software as an aspect that must be considered in the design process and should be explained to individuals that enter a building. Immanuel Kant (1724 – 1804), a critical philosopher, describes autonomy as self-governance over one's own actions. Considering this, his opinion might be that even though facial recognition software is legal, it is up to the architect to govern whether it is ethical to fight against technology or build technology into the design. Kant would believe that the moral decision is up to the architect who integrates it into their building rather than the political institution that allows such technology to exist. Goto and Kant would both agree that either side, for or against artificial intelligence in architecture, must be considered ethically in the design process yet Goto might agree that designers should follow the law and not their own moral compass.

Foucault might think of facial recognition biometrics and artificial intelligence as the ultimate apparatus of power to control the masses. Unlike the Panopticon, the technology does not take a physical form and power becomes intangible. Gilles Deleuze writes about Foucault's idea of power, "…it is less a property than a strategy, and its effects cannot be attributed to an appropriation ' but to dispositions, manouevres, tactics, techniques, functionings'; 'it is exercise rather than possessed; it is not the "privilege" acquired or preserved, by the dominant class, but the overall effect of its strategic positions.'". Deleuze would argue that facial recognition software in public buildings and public space diffuses the power and takes it out of the hands of privileged parties. The power now belongs to those who surveil, track and build faceprint databases.

Barriers of defense in architecture have transformed in accordance with forms of surveillance. Castles had thick masonry walls with small slits to prevent intruders and glass-clad architecture today has technology to coerce the observed into fear. The hierarchical powers in both examples sought to gain power over masses using panoptic surveillance tactics. The United States Embassy in London is a glass building, a material that was unthinkable for an abroad governmental building in the past due to bombing threats. Glass, as a material, shows that we are in a culture where physical threats are no longer a problem due to facial recognition software diminishing an individual's anonymity.

The role of the architect regarding facial recognition software is to have an informed opinion. This is a seemingly simple role however it is crucial to the collective consciousness of our future needs. With Churchix software, the facial recognition is used to track who is coming to church, but also to prevent sex offenders and criminals from entering the church. To completely refuse to integrate the software into a church consequently allows for the potential entry of sex offenders and criminals to enter. Designers must have autonomy to make ethical, informed decisions. These decisions to fight the technology or make space for it cannot be solely dependent upon the law because technology is evolving faster than policy. The most important role the architect plays is the distributor of information so that individuals may consent to no longer being anonymous in or near the buildings the architect has designed.

"Barriers of defense in architecture have transformed in accordance with forms of surveillance."

References

1. Goodman, Amy. "'Democracy For Sale': Cambridge Analytica & Big Tech's History of Manipulating Elections." Democracy Now!, January 10, 2020. Online Interview.
2. Foucault, Michel. Discipline and Punish: The Birth of the Prison. New York: Vintage Books, 1977.
3. Bonsor, Kevin, and Ryan Johnson. "How Facial Recognition Systems Work." How Stuff Works, 2001. link
4. Hamann, Kristine, and Rachel Smith. "Facial Recognition Technology: Where Will It Take Us?" American Bar Association, 2019. link
5. Ettel, Peter, Anne-Marie Flambard Héricher, and Kieran Denis OConor. Château Et Frontière: Études De Castellologie Médiévale. Presses universitaires de Caen, 1998. link
6. Dunlap, David W., and J. David Goodman. "Trump Tower, a Site That Drew Tourists, Now Draws Heavy Security." The New York Times, November 10, 2016. link
7. Freytas-tamura, Kimiko De. "George Orwell's '1984' Is Suddenly a Best-Seller." The New York Times. The New York Times, January 25, 2017. link
8. Chen, Brian X. "Hi, Alexa. How Do I Stop You From Listening In On Me?" The New York Times. The New York Times, August 21, 2019. link
9. Upon researching several United States Embassies guidelines in Sweden, Mexico, Bahamas, and India, it was concluded that cellphones are typically banned from Embassies. In some instances, like England or Australia, phones were permitted but are required to be powered off.
10. Pearson, Jordan. "Churches Are Using Facial Recognition to Track Members, This Startup Says." Vice News, June 19, 2015. link
11. Jr, Edward Ongweso. "Students Are Campaigning to Ban Facial Recognition From College Campuses." Vice, January 14, 2020. link
12. Foucault, Michel. Discipline and Punish: The Birth of the Prison.
13. Mozur, Paul. "In Hong Kong Protests, Faces Become Weapons." The New York Times. The New York Times, July 26, 2019. link
14. McCartney, Scott. "Are You Ready for Facial Recognition at the Airport?" The Wall Street Journal. Dow Jones & Company, August 14, 2019. link
15. Johnson, Sara. "A Glimpse at the U.S. Embassy in London." architectmagazine.com, December 13, 2017. link
16. Hurley, Amanda Kolson. "Diplomatic Design: New US Embassies Make an Architectural Statement." CNN. Cable News Network, May 5, 2017. link
17. Foucault, Michel. Discipline and Punish: The Birth of the Prison.
18. Goto, Katsushi. Autonomy of Architecture, Architecture of Autonomy. Seoul World Architects Congress, 2017.
19. Christman, John. "Autonomy in Moral and Political Philosophy." Stanford Encyclopedia of Philosophy. Stanford University, January 9, 2015. link
20. Deleuze, Gilles. Foucault: A New Cartographer. Minnesota, 1986.
21. Johnson, Sara. "A Glimpse at the U.S. Embassy in London."

A School for Culinary Art Movements

Fall 2019: Advanced Studio V: "The New Type of..."
Instructor Bernard Tschumi
Collaboration with Xiaoxuan Li

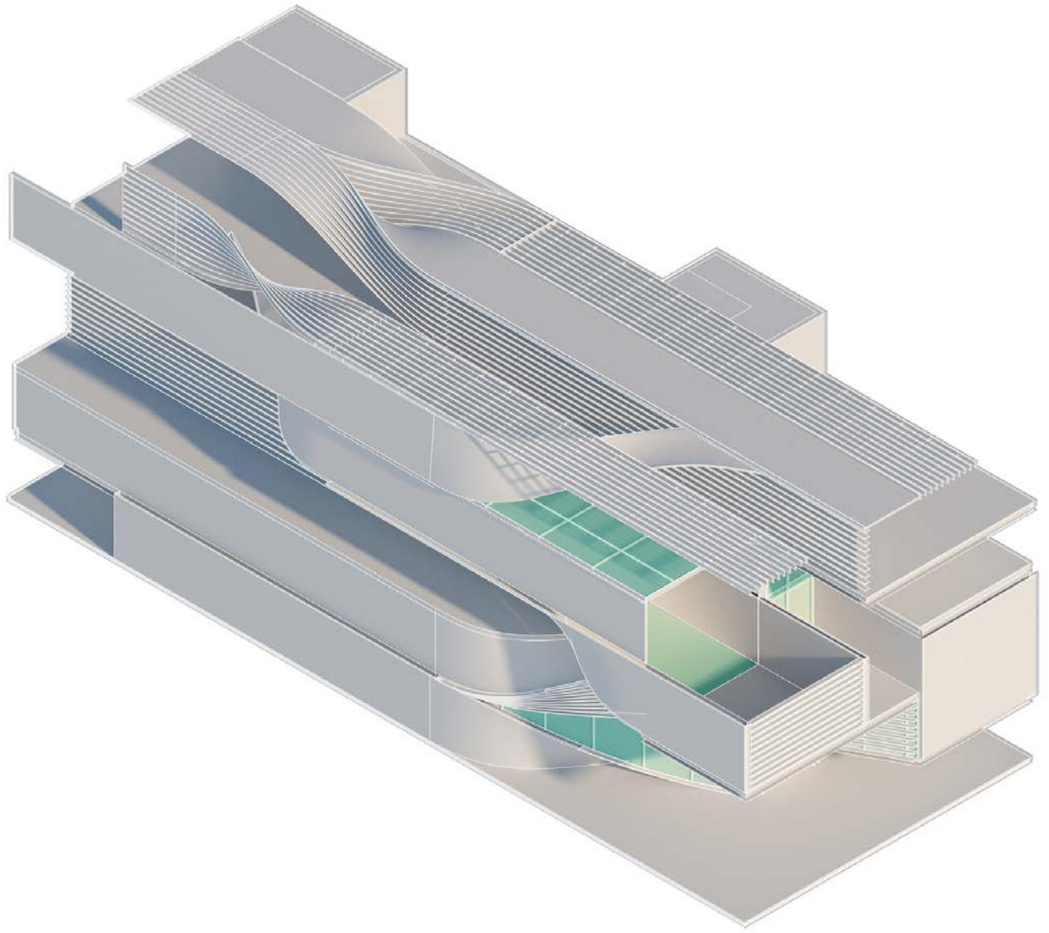
We looked at a typical New York City block where buildings will have heating, ventilation and cooling (HVAC) with no passive techniques to maintain comfortable temperatures. HVAC systems are some of the largest sources of carbon dioxide emissions. Therefore, we propose dynamic architecture that does not rely upon mechanical systems to heat, ventilate and cool it; has an algorithmically formed envelope to combat solar radiation and high solar heat gains; and is constantly shifting programs to maintain comfort.

The building is a vocational school for young adults to learn culinary art. We recognize the vulnerabilities in food production and responded with a program that grows, cooks, and composts its own food. This cycle is critical to learn the fundamentals of food security and farming in hopes of inspiring the next generation to end world hunger.

The building does not use any HVAC system to maintain temperatures, causing less anthropogenic effects on Earth. Instead, we employ a generative facade type that filters heat. Additionally, high heat producing programs, like kitchens, are situated next to lower heat producing programs, like classrooms, to distribute and take advantage of surplus heat. If the heat becomes too intense, the high heat producing programs are physically shifted to colder parts of the building. The building's program movements change seasonally to sustainably combat climate impacting comfort.

Architectural components are algorithmically formed to prevent solar radiation and heat gains. The components form widened stairs, cutting large openings in floor plates and encouraging air ventilation. A solar hot water tank component, located on the warmest corner, heats up to warm the interior. The components implant social interactions such as the grand staircases for gatherings or double height spaces for visual exchanges. The components are prefabricated for a lower carbon footprint and to transfer knowledge to vulnerable locations where the object can become symbolic of contemporary environmentalism. This self-sufficient, operationally zero-carbon architectural system can extend into the city with surplus solar panel power being fed back into the city grid to power public spaces.

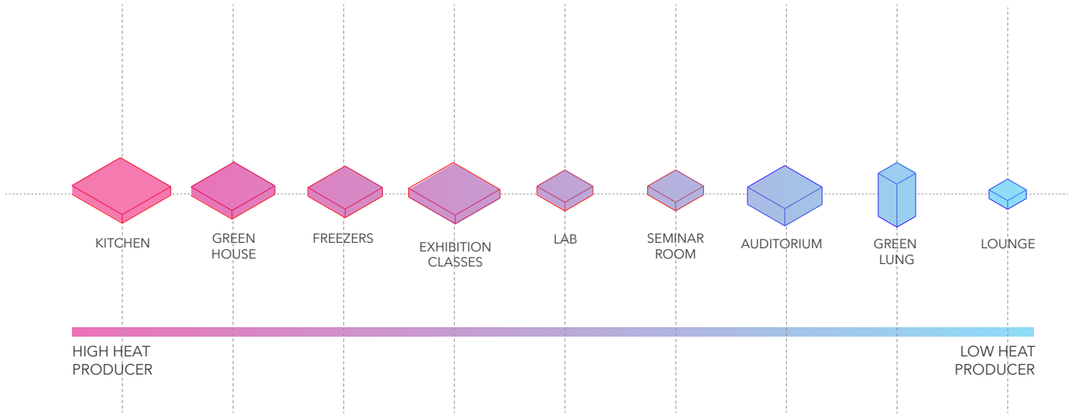
We must share sustainable techniques to both developed and vulnerable nations where all buildings adapt. This extension of the Paris Agreement is crucial to future sustainability of architectural design and the building industry. The new type intends to be carried through to large scale city planning and cross-border negotiations to build climate resilient architecture.

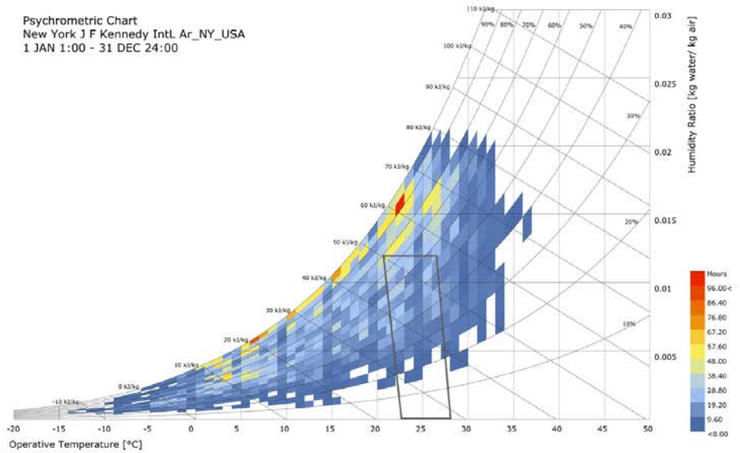


Formal undulations respond to environmental conditions and allow for yearly program movements.

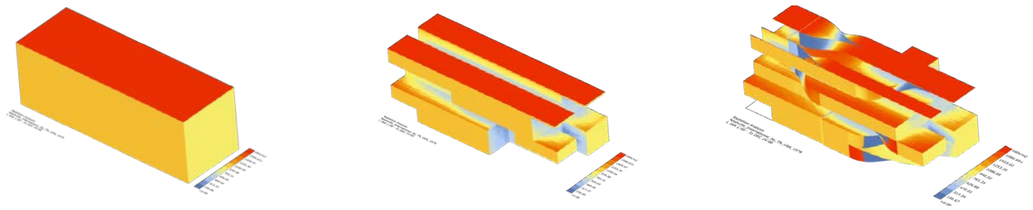
JOLENE EMILY JUSSIF

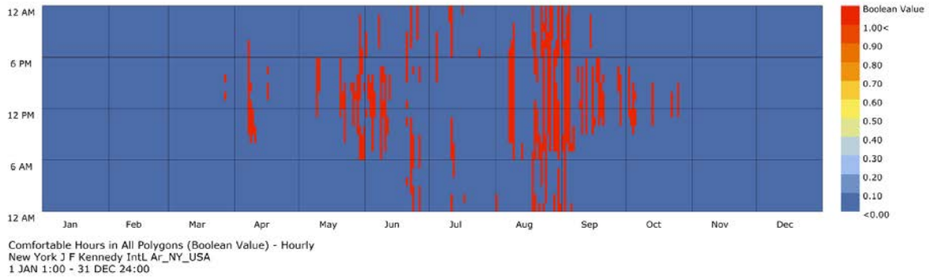
HOT TO COLD PROGRAMMING AND HEAT REDISTRIBUTION

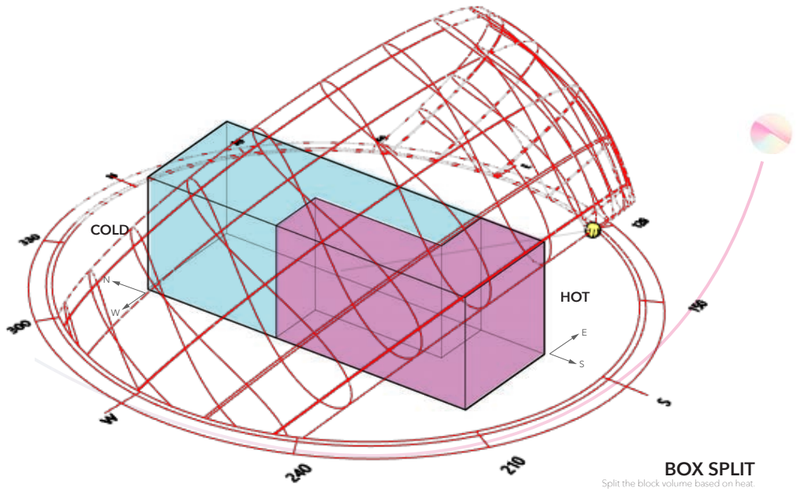




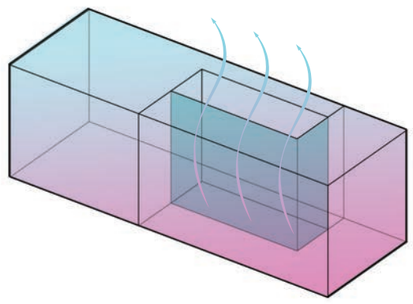
"HOT" "COLD"



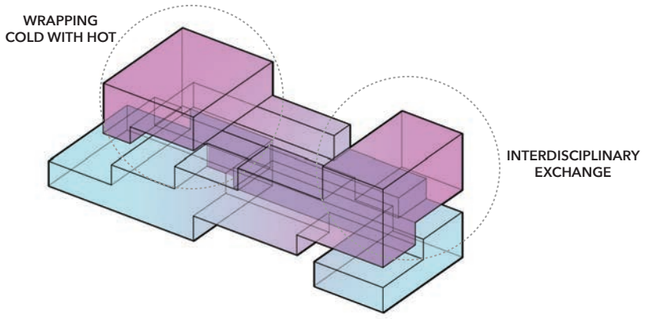




BOX SPLIT
Split the block volume based on heat.



CARVE
Carved the volume for light and air.



BEND
Bend the two volumes over each other.

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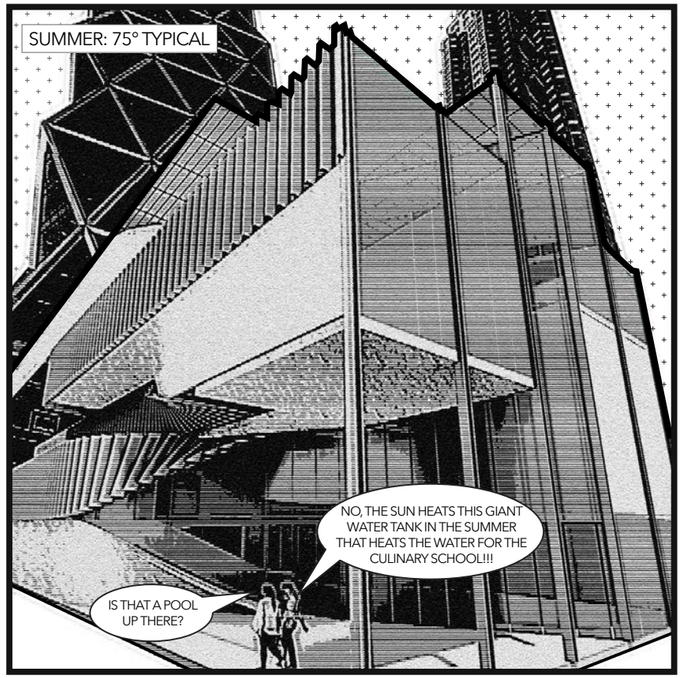

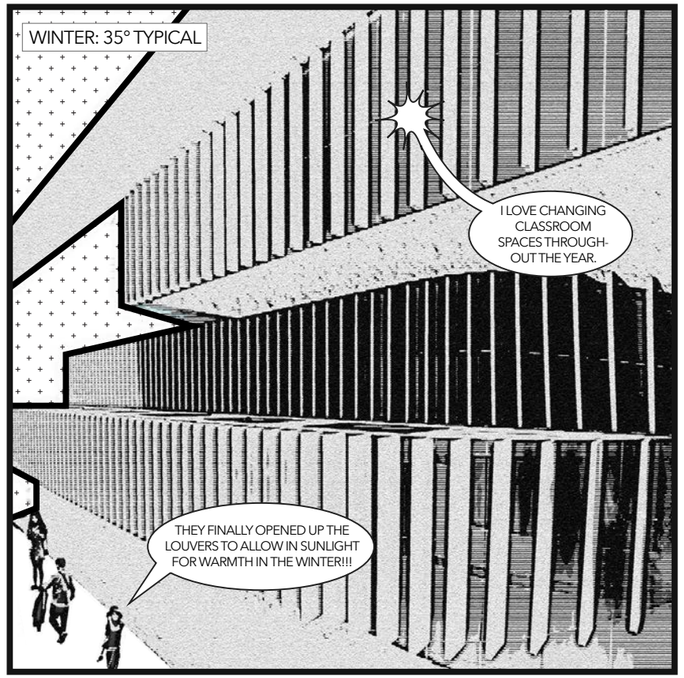

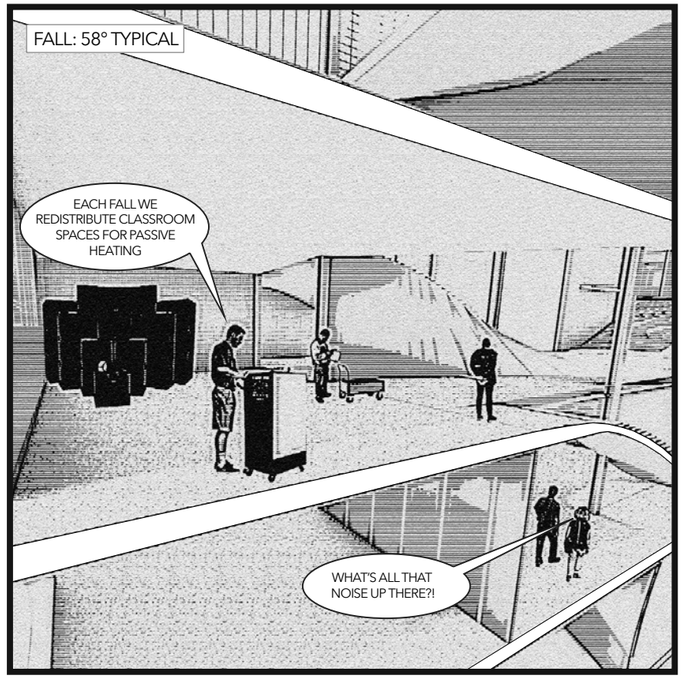

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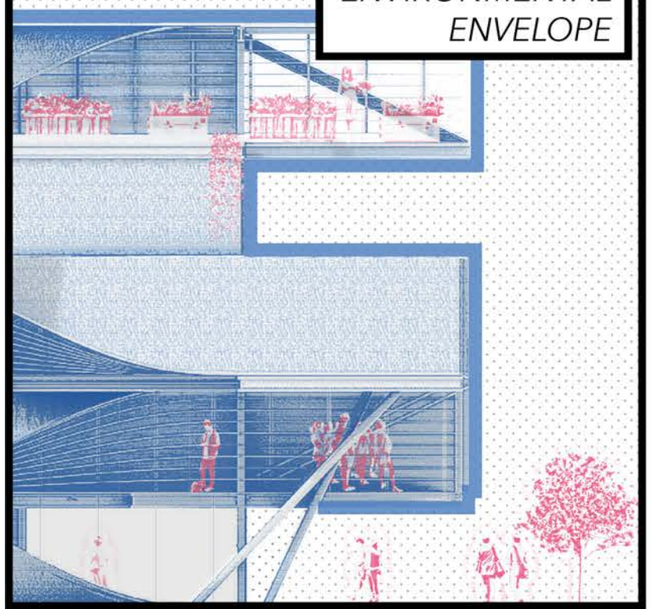
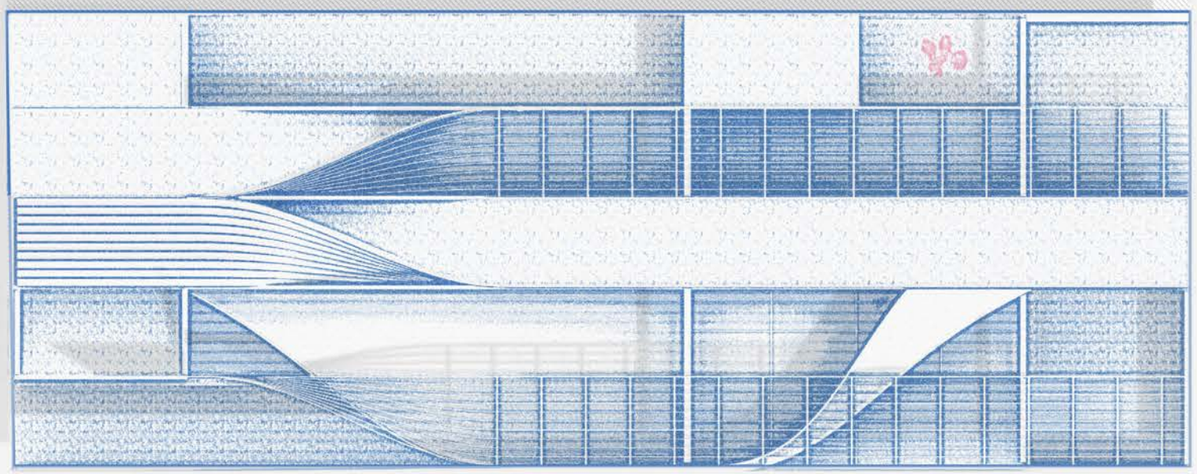
THE ENVIRONMENTAL ENVELOPE



A RARELY SEEN HELICOPTER ROOF VIEW...

FIVE STRUCTURAL BAYS FRAME THE LOUVERS AND CONTROL HEAT LOSS



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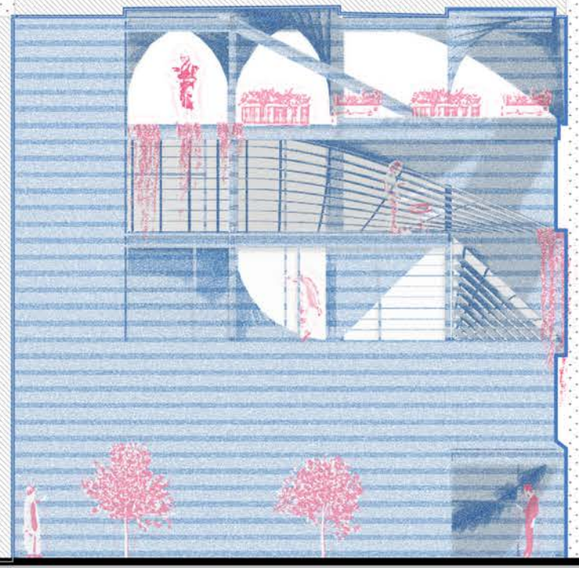
THE NORTH ELEVATION...

SEES THE LEAST SUN...

AND HOUSES HOT PROGRAMS.



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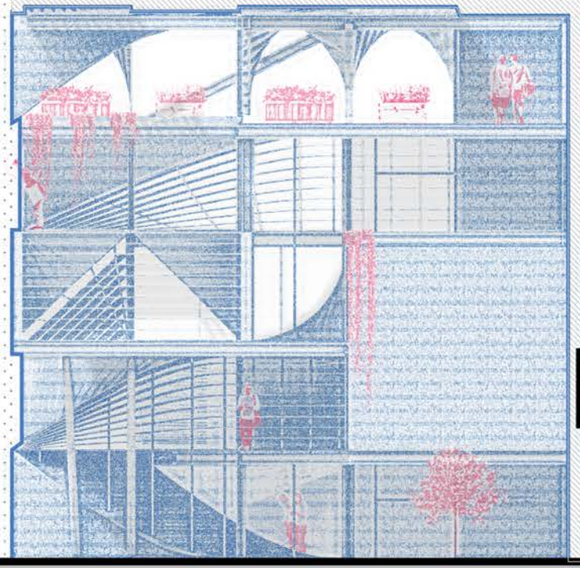
THE SOUTH ELEVATION...

HEATS THE HOT WATER TANK...

AND COLD PROGRAMS.



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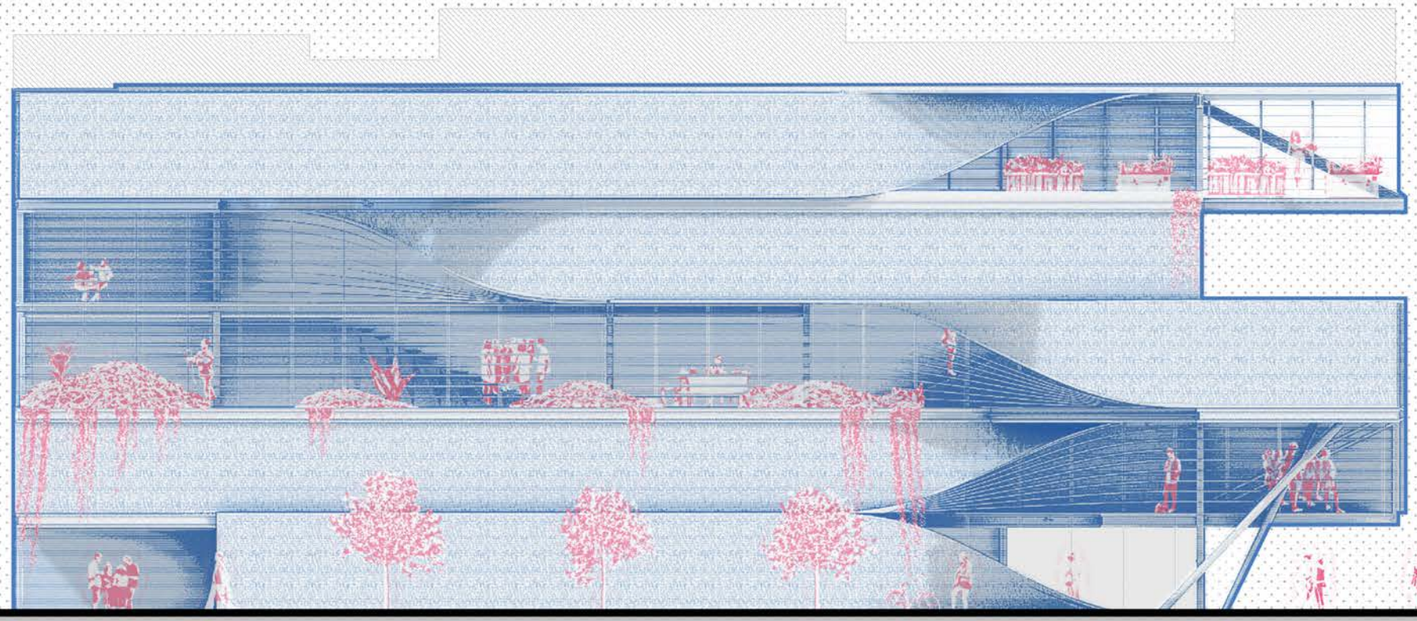
THE WEST ELEVATION...

THE HOTTEST AND SUNNIEST.



THE LONGEST FACE DECOMPOSES WASTE AND GENERATES SOLAR ENERGY.

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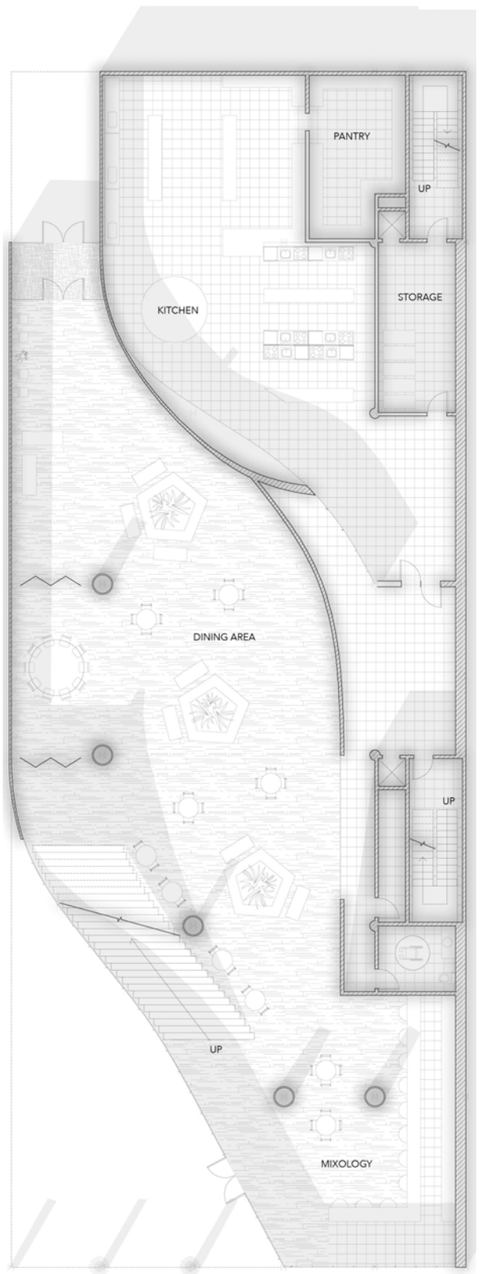

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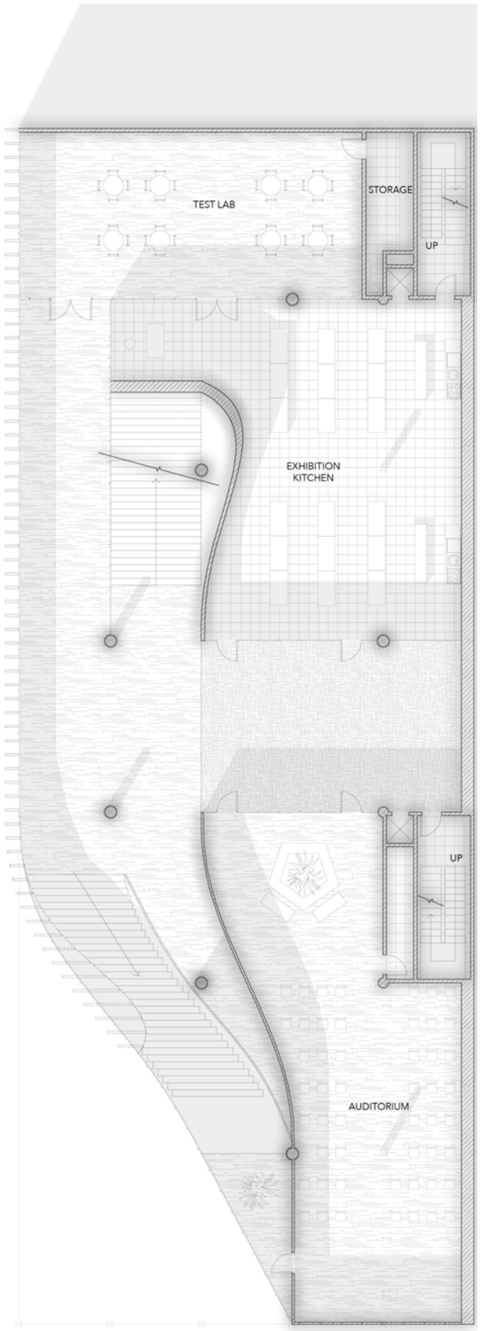

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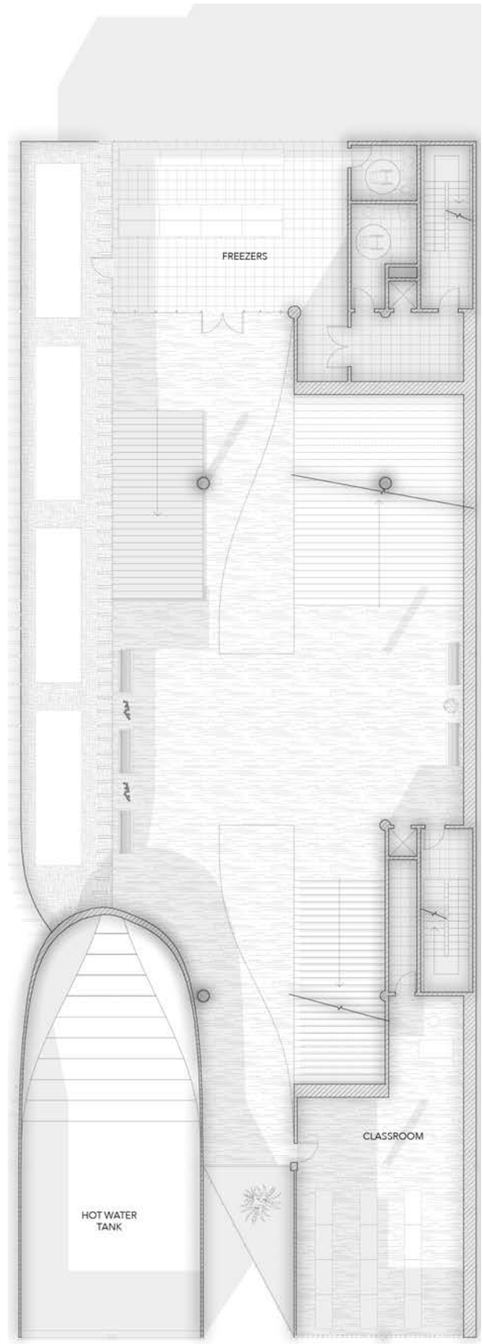

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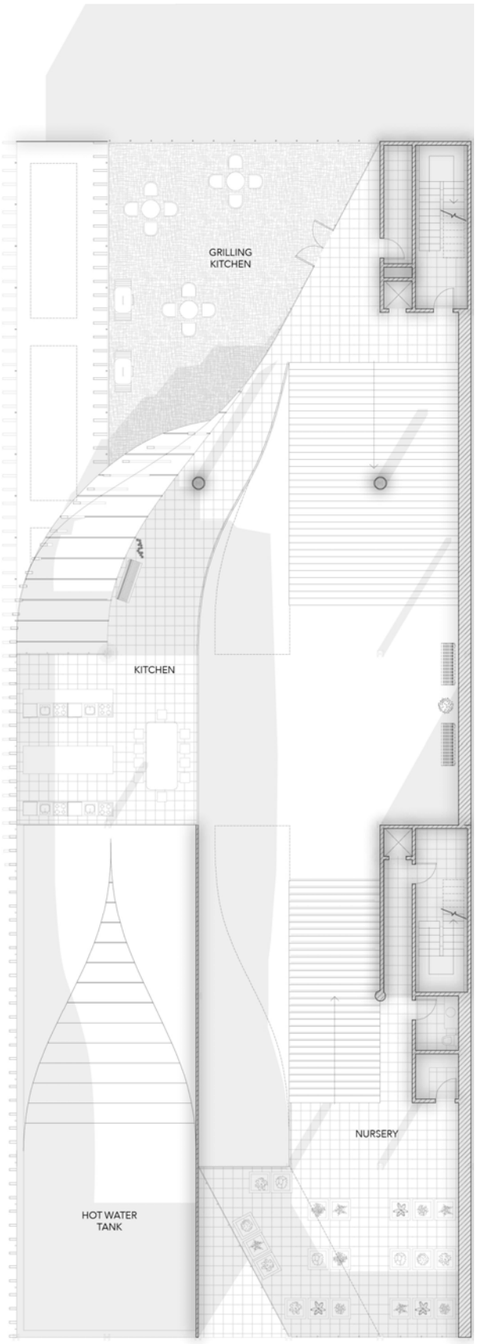

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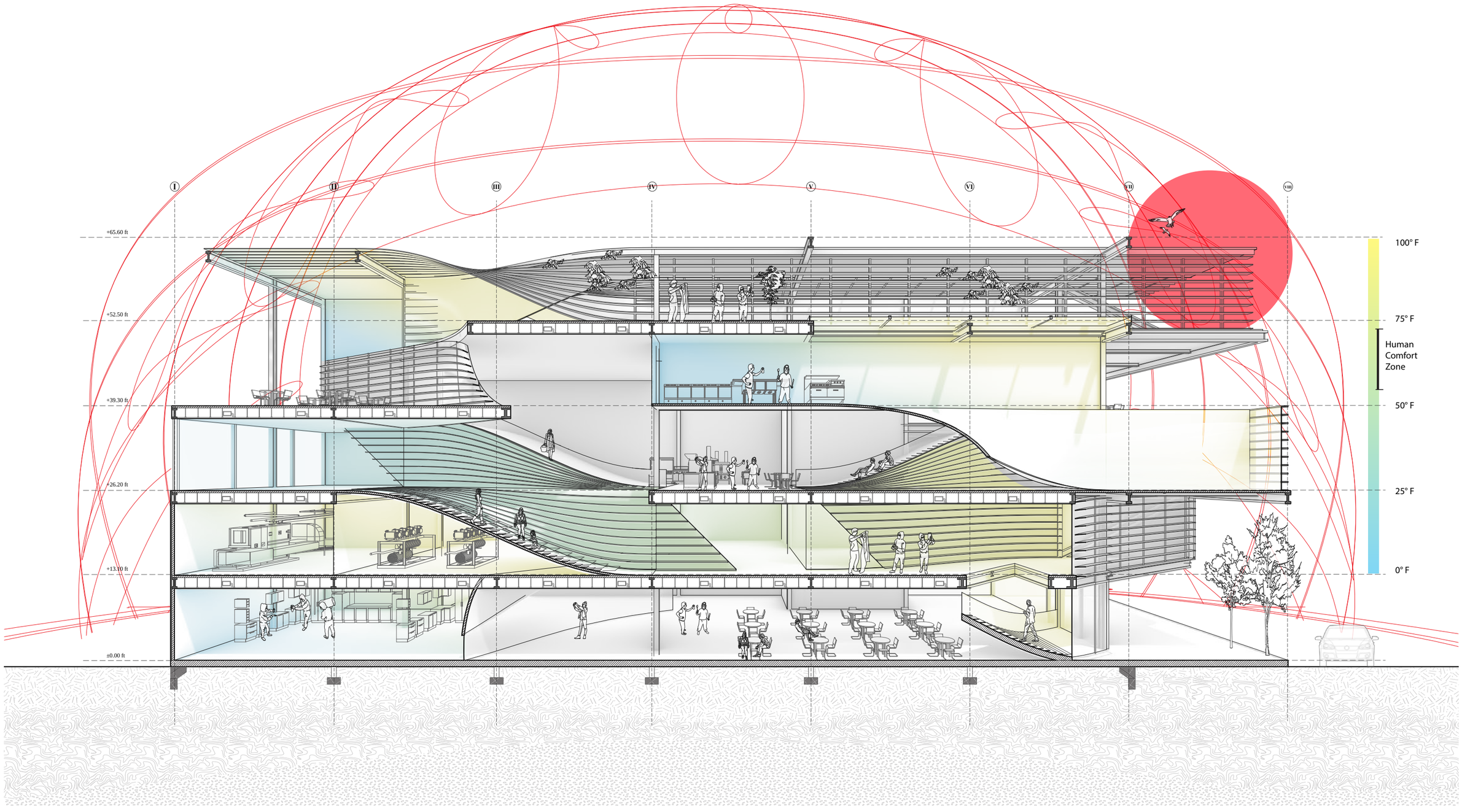

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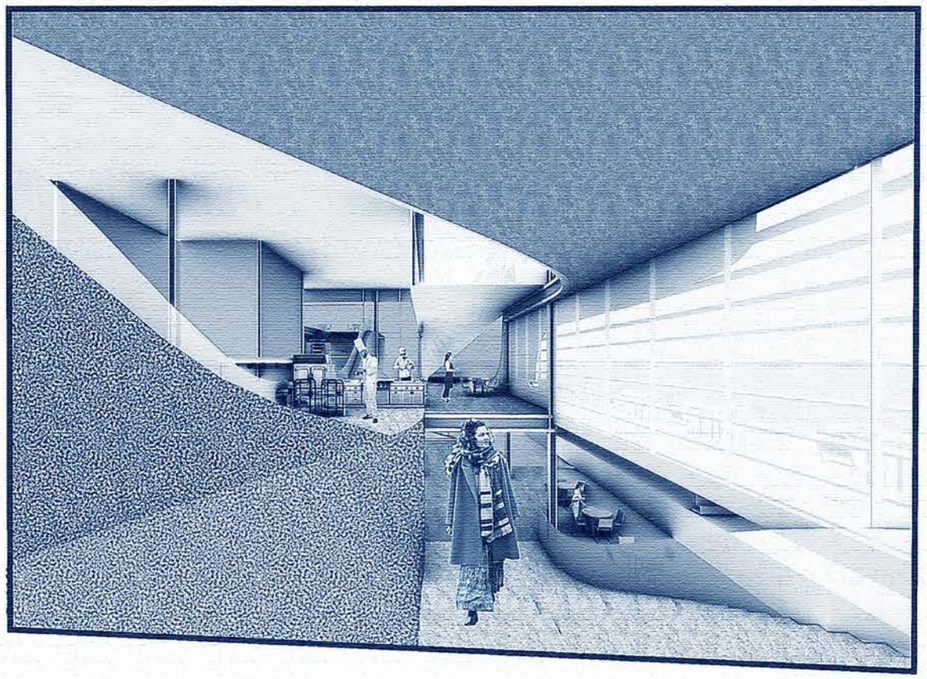
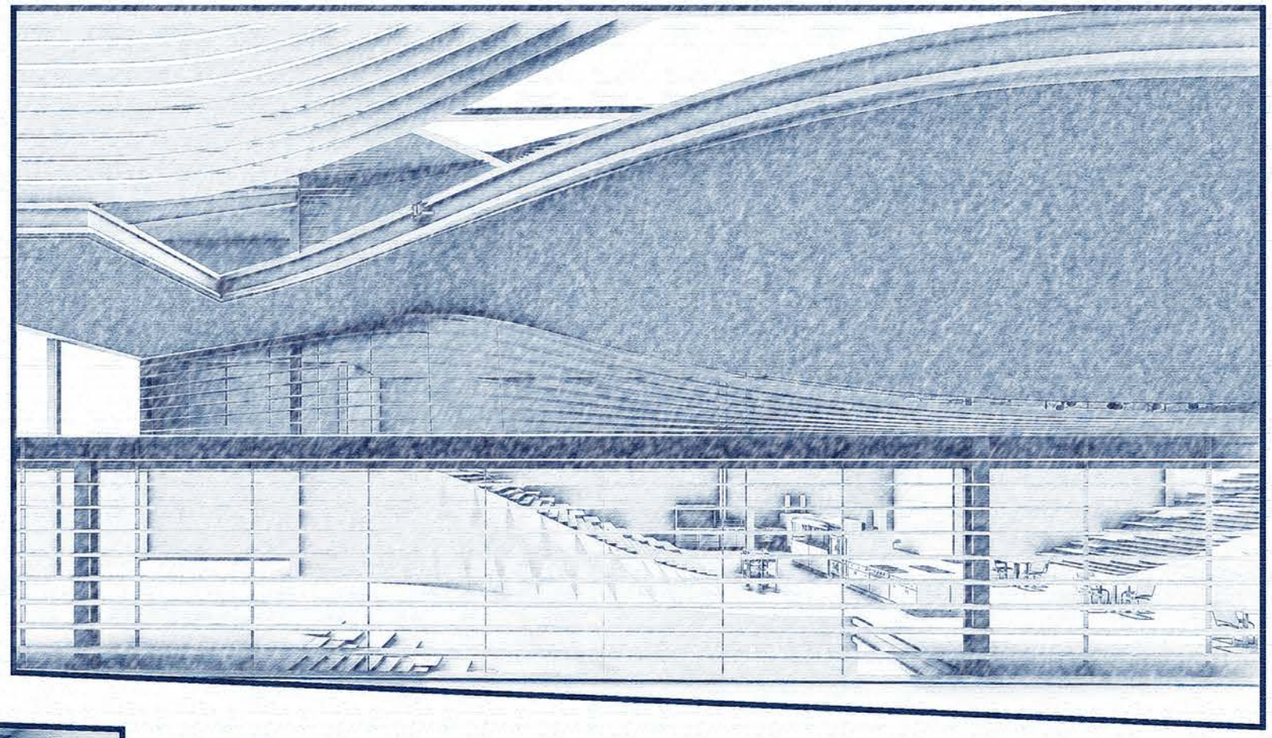
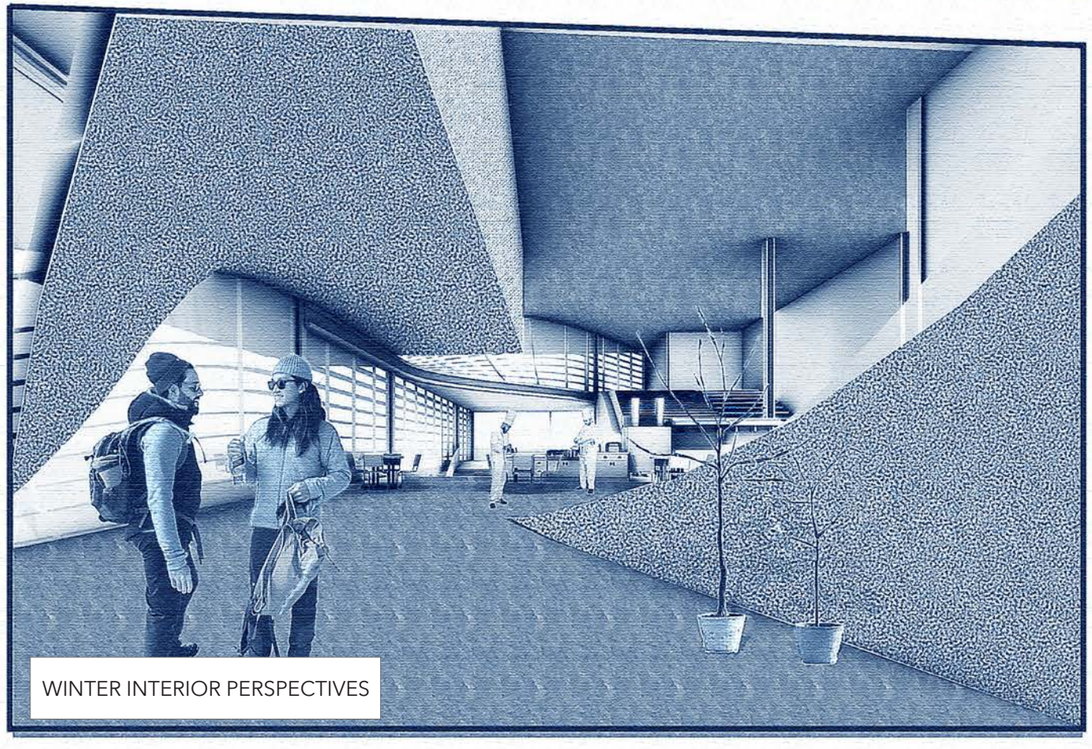
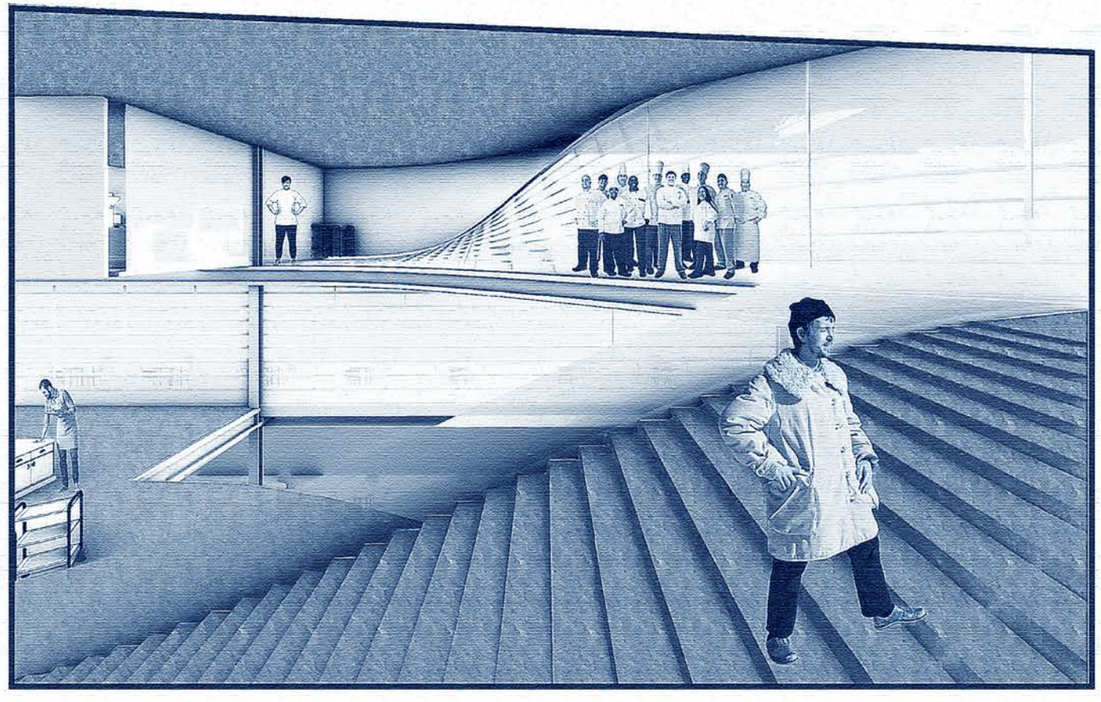






WINTER INTERIOR PERSPECTIVES



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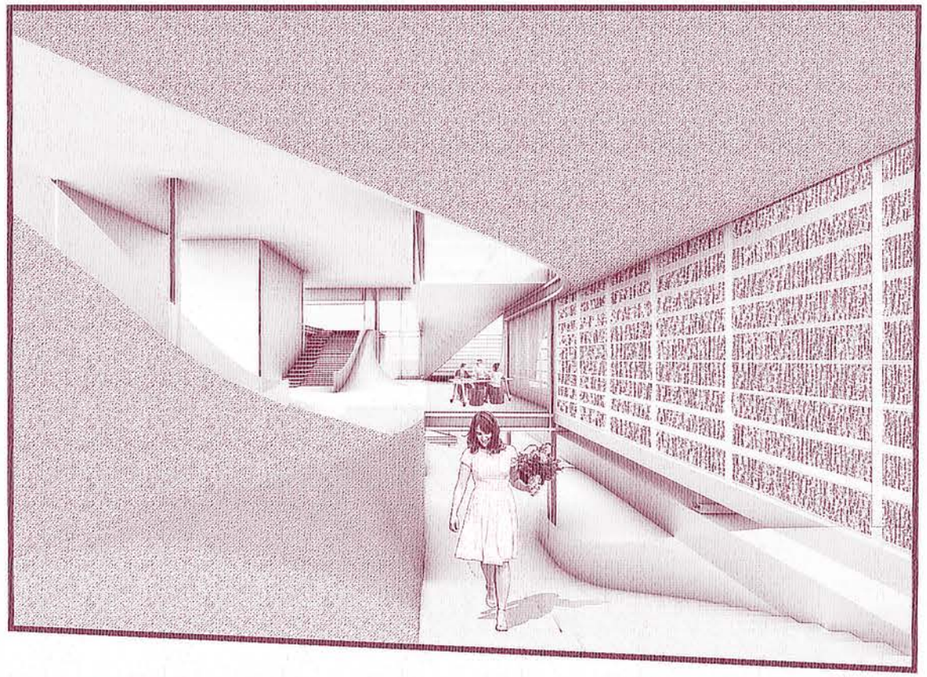
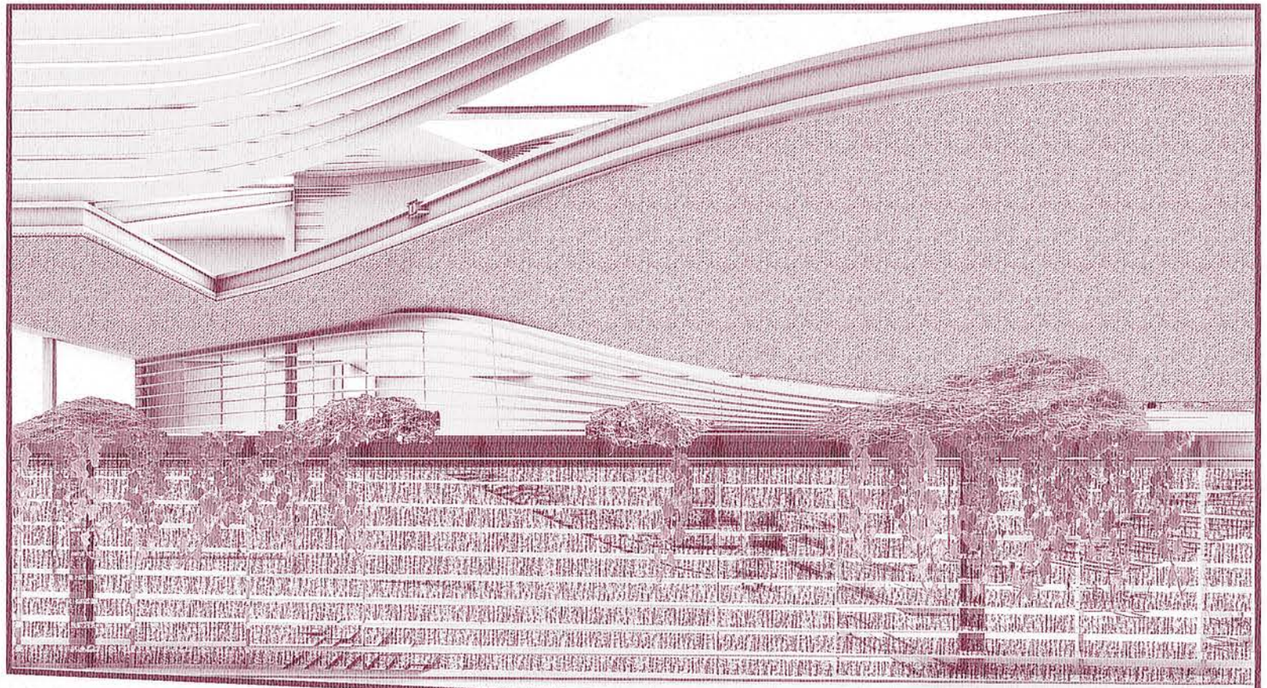
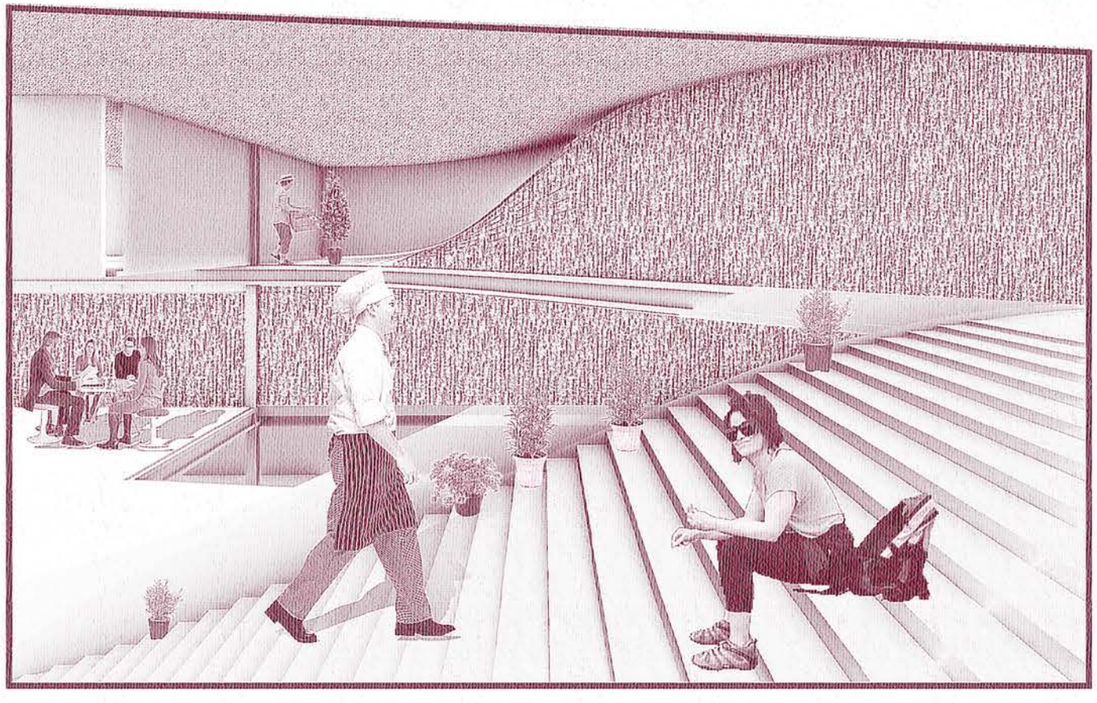




SUMMER INTERIOR PERSPECTIVES



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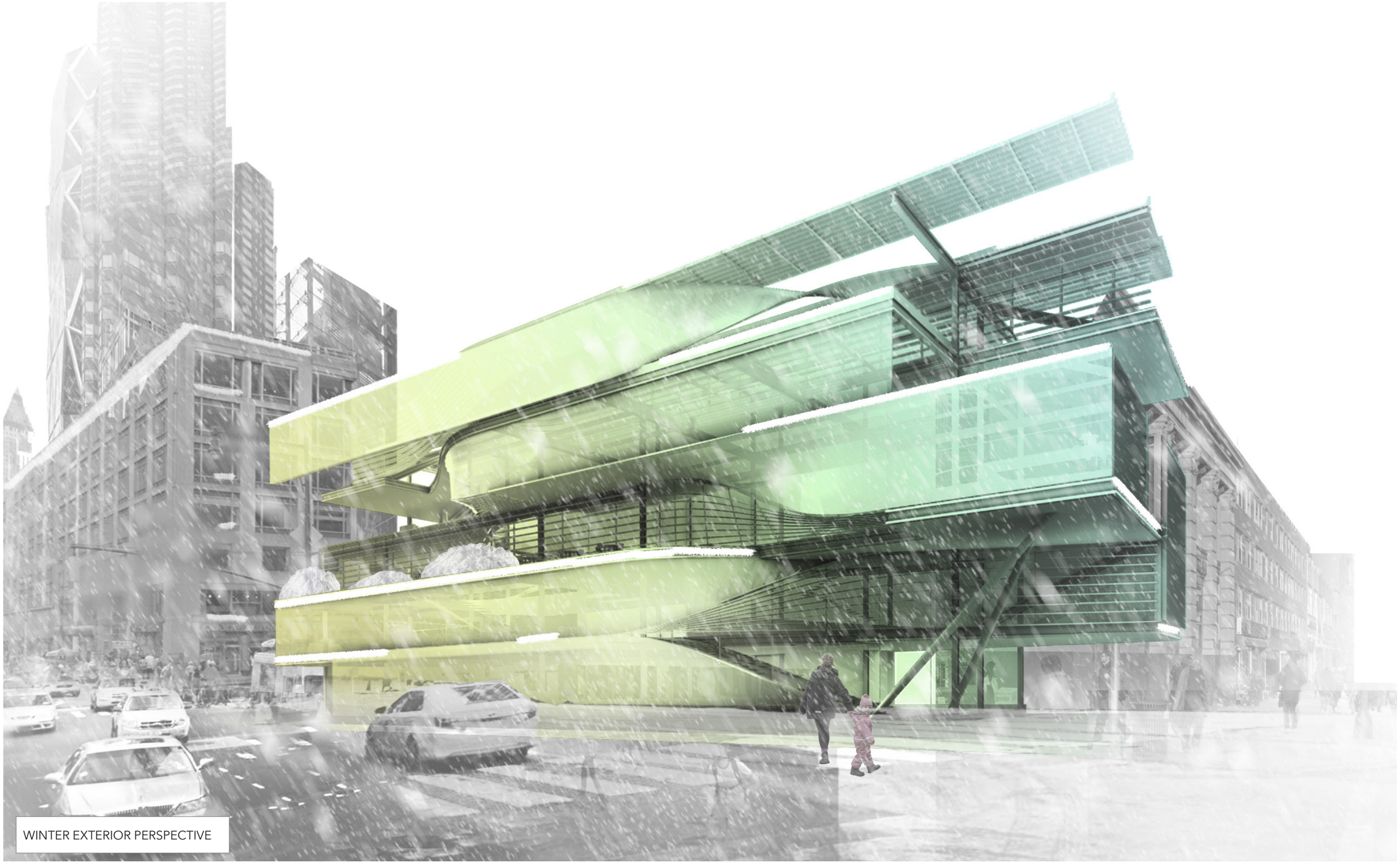

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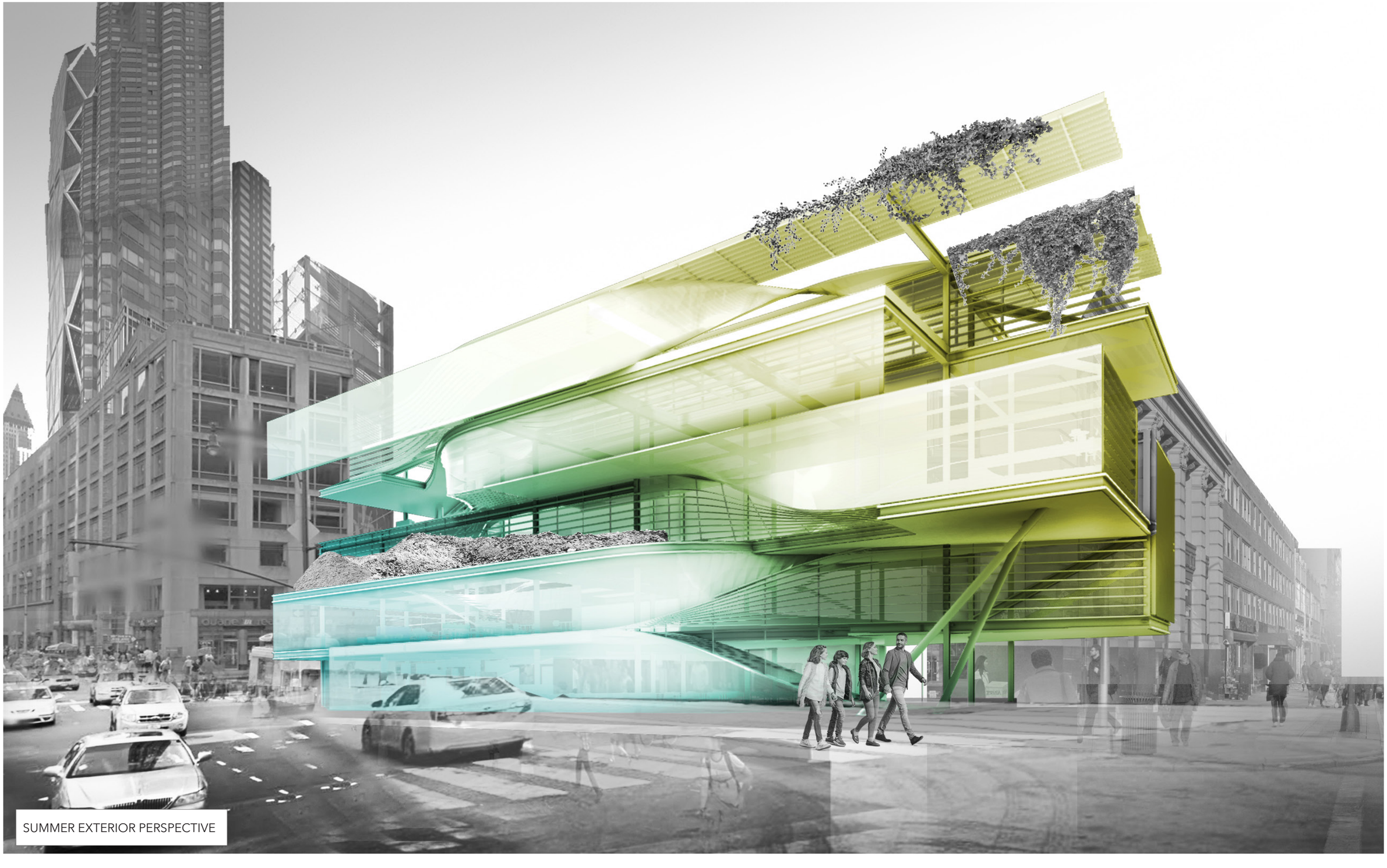


SUMMER EXTERIOR PERSPECTIVE

JOLENE EMILY JUSSIF

Osmopolis: City of the Future

Fall 2019: Theory of City Forms
Instructor Vishaan Chakrabarti
Collaboration with Adina Bauman, Ericka Mina Song, Zhou Wu

The City of the Future is the Periphery City. It is one that is outside of major metropolitan centers and currently too removed to benefit from metropolitan resources. Traditionally out of the limelight, these periphery cities can evolve to be completely self-sufficient, lessening the burden on larger metropolises to provide jobs and an economic base to commuters.

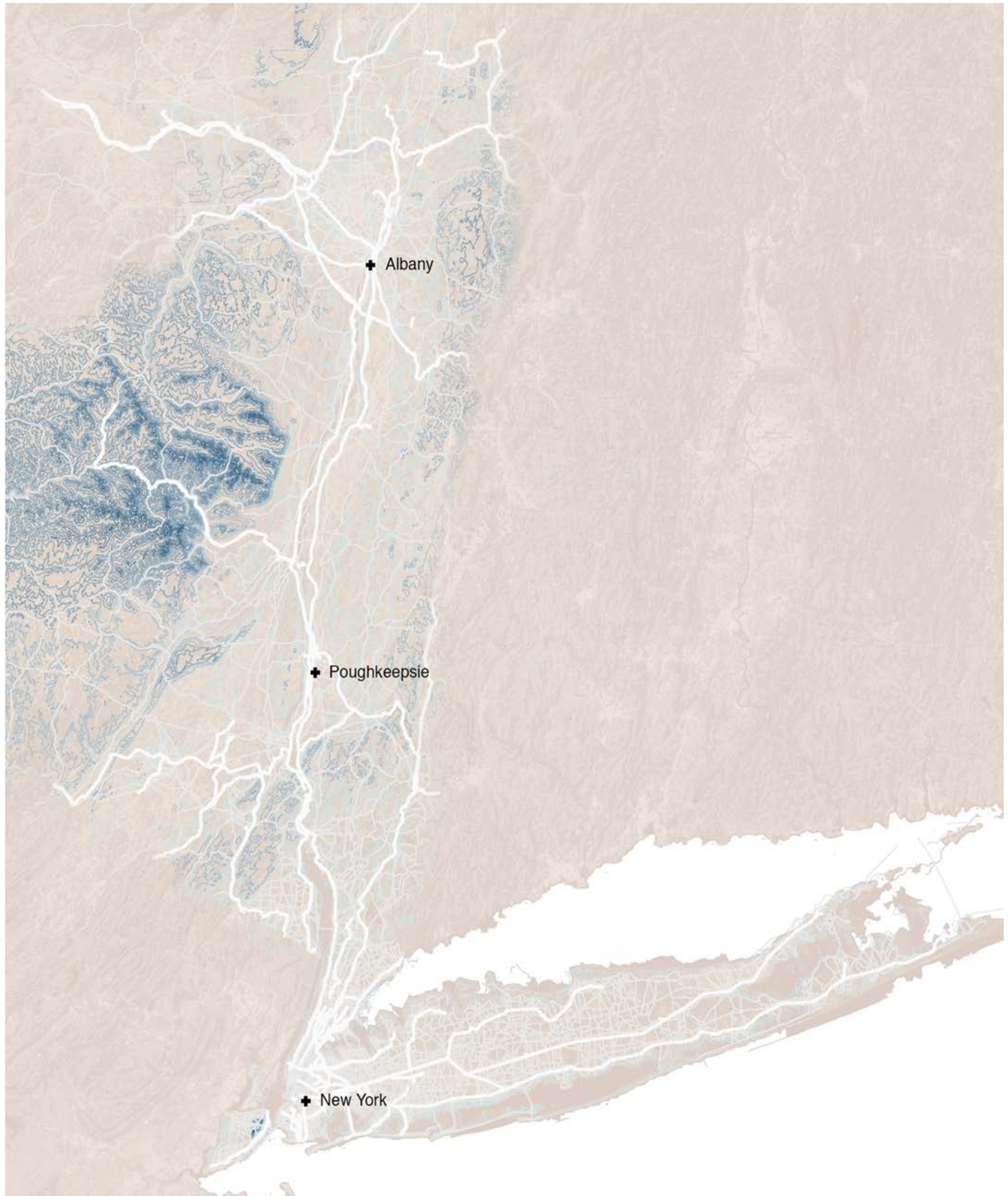
This mutually beneficial relationship becomes one of "osmosis" giving way to the Osmopolis: the city thriving and yet still supporting and enriching it's neighboring metropolis. Osmopolis can offer ways of living not necessarily tied to hyper dense urban centers. Cities such as Newark, NJ; Oakland,CA; Ad Diriyah, SA; Piraeus, Greece; and Poughkeepsie, NY are all indicative of this condition. These communities are prosperous and considered more densely populated than suburbs.

This project focuses on Poughkeepsie, NY as its test site. Inhabiting a grey zone between New York City and Albany, Poughkeepsie has the ideal geographic underpinnings to become the new Osmopolis. Currently, Poughkeepsie has a few different options for public transportation to New York. There is a rail commuter service to New York City where the city is the last stop along the Metro North Hudson Line. For longer trips, Amtrak also serves the city with a stop.

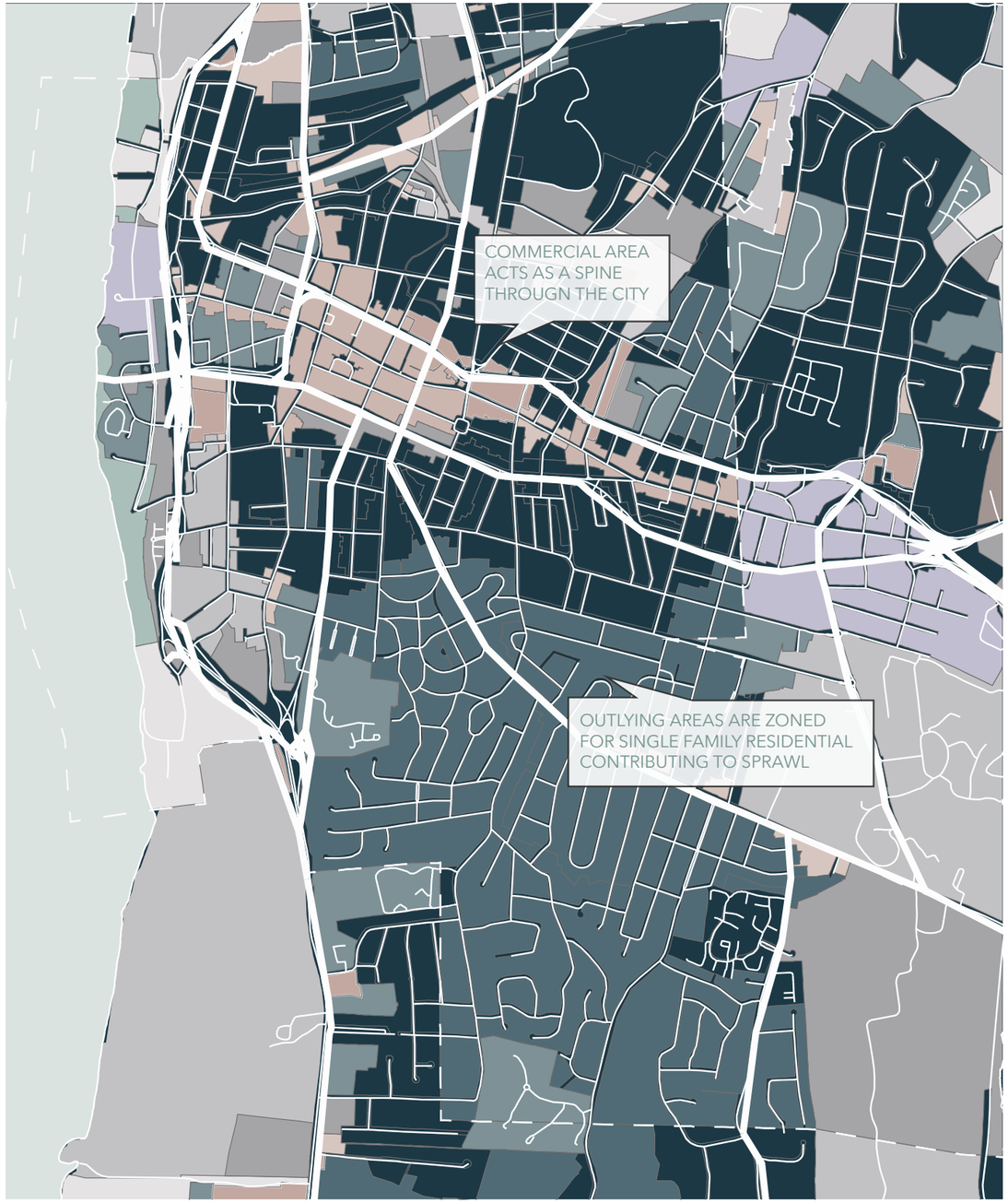
The City of the Future will not built up from a tabula rasa using the latest technology but rather, will be self-sustaining and cultivated from existing complex urban systems and relationships. The self sustaining city intends to respect the residents and allow the city to grow organically upwards, rather than sprawl outwards, while promoting economic growth and sustainability in new commercial centers.

The focus is on systems and methods governing modes of transit. Every city resident is provided with a minimum level of free daily transportation allowing them to commute within and out of the city. Micro-mobility and autonomous vehicle routes fill in gaps as the city grows and infrastructure catches up. Typical periphery cities have a central business district that occurs along a main street. Building heights and forms will take different shapes. This strategy seeks to diversify zoning to promote livability. Landfill as landscape works o ban usage of single-use products, promote anaerobic digestion for reuse of material into energy. Waste is compressed and compacted into an ever-growing landfilled park space encircling the city.

Poughkeepsie's plan will become more diverse with more smaller, city centers. Therefore, existing arterial road will become less congested.

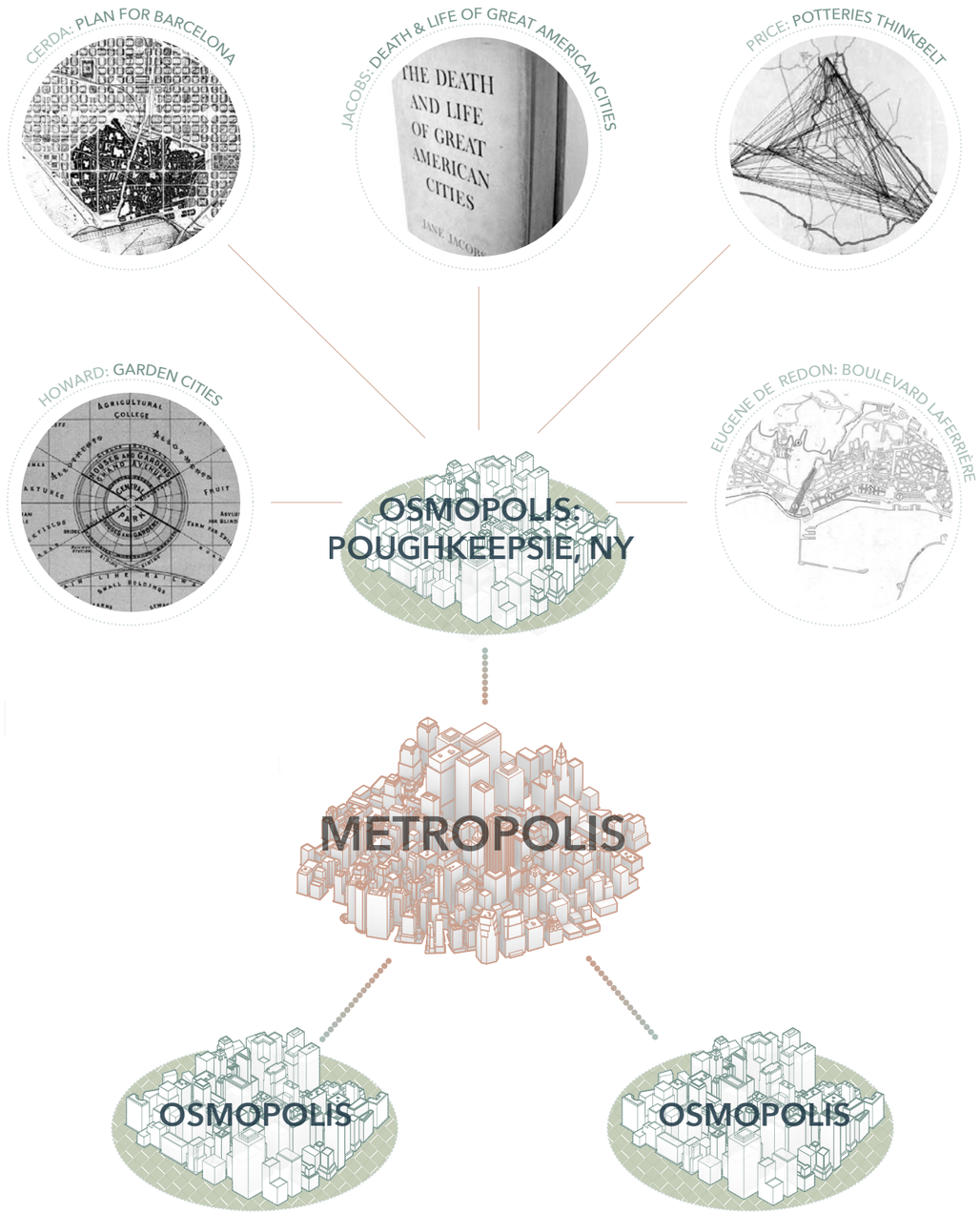


Poughkeepsie is the ideal periphery city to develop being situated equally between two metropolises.

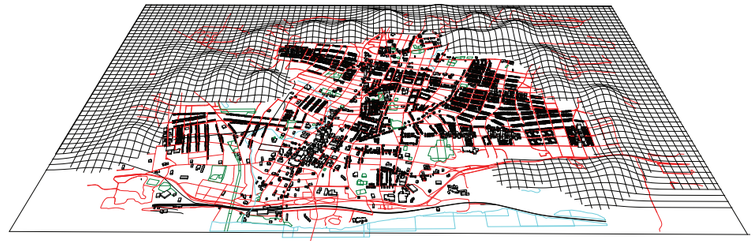


Currently, the city center is congested and the suburbs have sprawled, leading to a low density city.

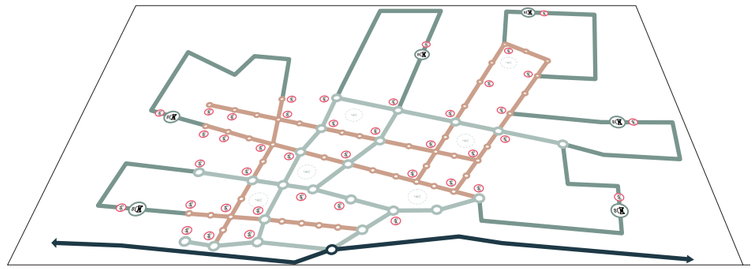
JOLENE EMILY JUSSIF



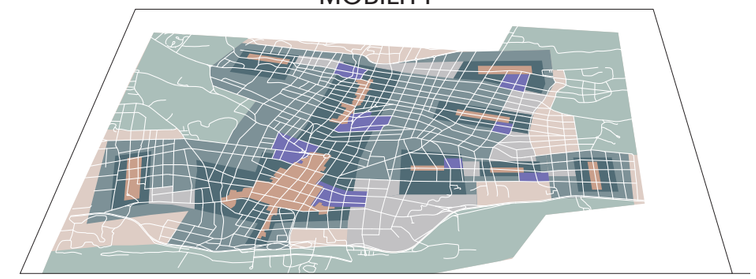
The theories behind the development of the city are concerned with greening post-industrial cities, giving residents agency over their neighborhoods, and planning major developments ahead, rather than sprawling.



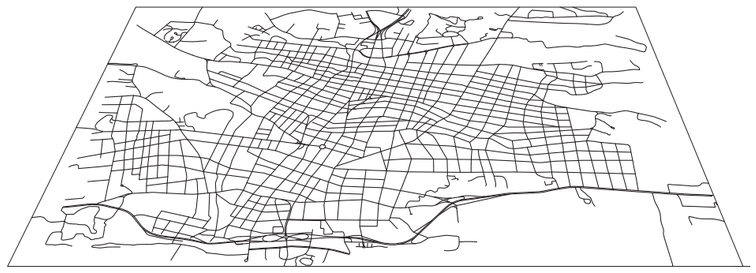
LANDFILL & ANTI-SPRAWL



UNIVERSAL BASIC MOBILITY



MICROGRID ZONING

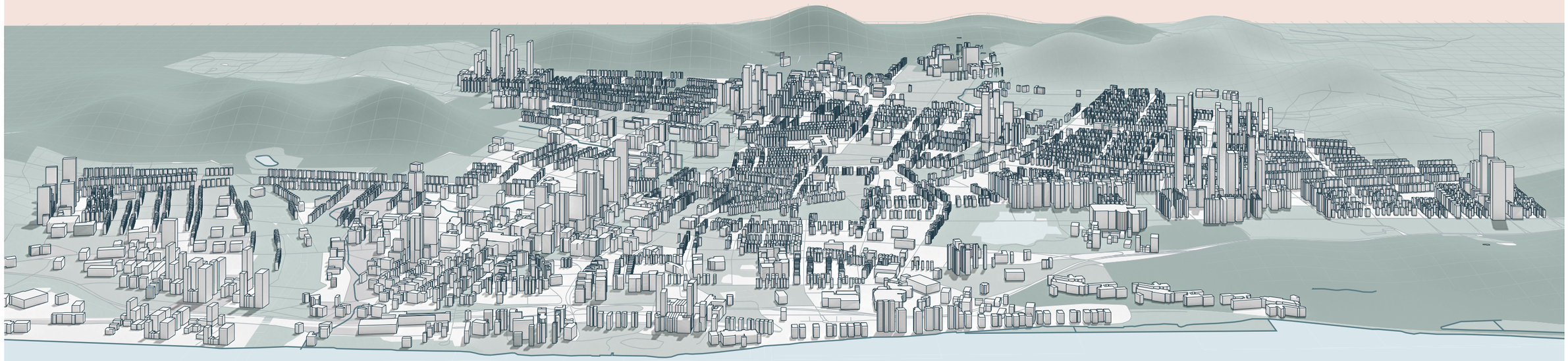


REGRID & CONNECTION

These are the four layers of infrastucture we suggested for Poughkeepsie.

LANDFILL AS LANDSCAPE

Waste is recycling environmentally and redistributed under the ground, forming a green belt around the city.



ZONING REDISTRIBUTION

Zoning is redistributed to create smaller micro-neighborhoods, promoting local industry.

FREE BASIC MOBILITY

Free basic mobility is given to everyone, regardless of income, to promote public transportation within the city.

JOLENE EMILY JUSSIF

Insulative Air and Indoor Cities

Fall 2019: Theory of City Forms
Instructor Vishaan Chakrabarti
Individual Project

Why does New York City experience brown outs in Summer? Typically, air conditioning is the culprit. People in offices, homes, stores and museums crank up their air conditioning and as a result, the power company imposes brown outs to restrict electrical power in particular areas. Today, most interior spaces across the world have some form of controlled air to regulate human comfort. A crucial point that needs to be added to week three in the Theories of City Form course is the notion of controlled environments expanding by use of air conditioning and the result being megastructures and globalization. The readings that should be added are Junkspace by Rem Koolhaas, Thermal Delight in Architecture by Lisa Heschong, and Air Conditioning: Claiming the Climate as a Dream of Civilization by Eva Horn.

During week three, Delirious New York by Rem Koolhaas was assigned where the discussion focused on new inventions that allowed cities to grow vertically and sprawl. The invention of the elevator and steel becoming a universal standard for buildings allowed towers to be built taller in cities. I argue that the invention of air conditioning has created expanded cities outwards and allowed them to form in locations that might not be there otherwise due to their climate. A lecture about air conditioning and its effects on cities should replace or become supplement to inventions that expanded architecture.

Thermal Delight in Architecture by Lisa Heschong should be assigned to learn about why humans enjoy being in controlled environments. The book focuses on the dangers of sealed buildings and environments that eventually led to "sick building syndrome". She argues for replacing forced air with vernacular techniques like passive heating and cooling. This text is essential to understanding why architects and city planners should think critically about the mechanical systems being replaced with passive techniques.

And lastly, Air Conditioning: Claiming the Climate as a Dream of Civilization by Eva Horn is essential to understanding the cultural connotations of controlled air. The essay describes global climates bringing society into the 'civilized' future by use of air conditioning. Horn investigates ancient theories of heat that were once accepted as true. This text could serve as a lively discussion point about the transference of knowledge throughout time.

The lecture should focus on two cities that take air conditioning to the extreme; Dubai, United Arab Emirates, and Tokyo, Japan. Dubai is located in a subtropical desert where the metropolis has sprawled, literally and culturally, due to its elaborate, controlled, artificial environments. Tokyo is located in a humid subtropical climate that has grown hotter over the past 100 years causing the city to interiorize massive transportation hub hybrids. Both of these cities have expanded and are aesthetically 'global' due to the power of air conditioning.

The city of Dubai is the epitome of a cultural boom due to air conditioning. The city has grown exponentially in a climate that is not suitable for dense, comfortable, human life. Nevertheless, the metropolis has sprawled by building zones such as Internet City, Media City, Medical city and Jebel Ali, the Industry City. The hot, humid climate demands shade year-round, therefore air conditioning has become the main source of providing comfort.

In Dubai, the main mode of transportation is via automobile. This is due to the climate, sprawl of the city, privatization of entrances, and the comfort that air conditioning provides. Air conditioning allows people to never be forced to face the humidity or heat when they travel. The automobile dominates the city form in Dubai where most streets are highways which decimates urban culture. Due to the expansion of the city, it is impossible for all residents and visitors to drive due to traffic waiting times. The Dubai Metro was built to take the same route as the large Sheik Zayed Highway. The route is elevated, overlooks the 12-18 lane highway, and provides air-conditioned stops and train cars to riders, perpetuating the culture of being in an artificial environment. The public transportation system and cars in Dubai create miniature climate pods where the riders are never forced to feel the outdoor climate.

Cultural institutions have attracted investors and tourists to Dubai and its neighbor, Abu Dhabi. The Louvre in Abu Dhabi is one of the first museums to spur growth in the cultural district planning. Upon arriving at the museum by car, the procession design intends to create a shaded canopy for visitors to circulate where it is successful in making people feel comfortable outside. However, it is necessary for art to be in a controlled environment. All the galleries for paintings and artifacts are indoors with only durable sculptures located outside. Priceless art is stored in regulated rooms where humidity and temperature are highly specific to preserve its quality. Would there be cultural institutions with priceless art in Abu Dhabi if air conditioning did not exist? Perhaps the cultural district would focus on another local form of art that would shape the city into a different form.

Elaborate types of programs exist in Dubai that only occur due to air conditioning on a large scale. For example, there is an indoor skiing center featuring real snow and real ski slopes. There is an Olympic sized ice-skating rink. Developers attempted an elaborate program to air condition an entire beach from underneath the ground at a high-end resort. These environmentally abusive programs pumping air conditioning negatively effects global emissions and raises global temperatures causing the need for even more air conditioning.

The Mall of Dubai is one of the world's largest shopping centers. The mall brings an entire city indoors, replacing the hot, humid outdoor experience. The mall sprawls and encapsulates shopping, restaurants, and a catalog of tourist attractions; all air conditioned. What might the city form look like if these programs were not encompassed by an umbrella of air conditioning? There may not be massive megastructures sprawling the downtown areas. Instead the city form could have shaded walkways and water elements to help cool the air.

The climate in Tokyo during summer months is extremely humid and can reach one hundred degrees Fahrenheit. This location might not be suitable for a city when there are many places in the world with mild temperatures. However, Tokyo became a megacity with a population of over ten million in 1962. The city

was being rebuilt and the government reorganized after the war surrender in 1945, therefore all the new modernized architecture was being built with residential air conditioning that became popular in the 1950's. I would argue that the only reason Tokyo became a megacity so fast is due to air conditioning maintaining interior comforts.

Unintended effects of air conditioning on a massive scale occur in Tokyo today. The urban heat island phenomena have been occurring in Tokyo due population increases and mechanical equipment necessary to serve them. The urban heat island phenomena are when an urban area becomes significantly warmer than less dense areas due to human activities. This has resulted in rising outdoor temperatures where Tokyo's annual mean temperature has risen over thirty-seven degrees Fahrenheit over the past one hundred years. This contributes to people not spending time outside, cooling measures being taken, and for larger scale interior artificial environments to expand and replace the hot city streets.

A large-scale example of the city form changing in Tokyo due to population increase and air conditioning is their advanced metro public transportation system. This system moves nearly seven million riders daily. Due to severe weather in Summers and rising temperatures, the metro stations have swelled. This creates mega stations that allow people to stay indoors in cold air-conditioned temperatures. For example, the Shinjuku station in Tokyo is the world's busiest train station with almost four million riders daily. This station connects riders to pharmacies, department stores, grocery stores, restaurants and many other necessary services. All these connections happen indoors and with air conditioning. The station is expansive, and the station website states, "Shinjuku can even bewilder Tokyoites who ride the rails everyday".

The stations in Tokyo create seemingly endless air-conditioned spaces. In week three, the reading Junkspace by Rem Koolhaas should be assigned. The repetitive station's circulation intentionally confuses people and cause them to be stuck in the air-conditioned world. The design of the megastructure connects department stores to the stations where riders are forced to walk through them, causing overstimulation and therefore becoming Junkspace. The stations become massive malls that slowly claim more land in metropolitan areas due to the connective tissue that is air conditioning. City streets are becoming indoors more often due to people wanting a cold, comfortable commute.

Historical precedents of cities still exist today where we can see traces of how climate-responsive cities were formed. For example, the souks in Dubai feature shaded streets, short architecture, colonnades, courtyards and closer together buildings to create natural comfortability. Instead of designing these new, unique cities and neighborhoods with logic, globalization becomes shared knowledge across the world that can is hastily applied to any climate. More often, city forms and architecture will look increasingly similar. The Mall of Dubai looks and performs like the mall in Hudson Yards despite being thousands of miles away with drastically different climates and cultures. Developers and designers are repeating techniques, such as air conditioning, in different cities creating mindless homogeneity. Innovation and vernacular city forms disappear when information can be distributed globally

through shared resources.

These artificial environments powered by air conditioning are now common and transcend national borders causing additional global heat gains wherever they may be built. A mall in Dubai could be transported to Singapore or Shanghai. The location is irrelevant because air conditioning and globalization allows buildings to be built relatively the same. This contributes to a global style that can be implanted anywhere in the world, forming cities by encapsulating them in private replacements like train stations or malls. The insulative environments can be endless and without style, becoming boring Junkspace. The result is megastructures like the Dubai Mall or Shinjuku Station that follow nearly indistinguishable global styles.

Recommended Readings

Heschong, Lisa. Thermal Delight in Architecture. Cambridge, Mass: MIT Press, 1979. Print.
Horn, Eva. Air Conditioning: Claiming the Climate as a Dream of Civilization. Baden, Switzerland: Lars Mueller Publishers. Online Essay.
Koolhaas, Rem. Junkspace. Italy: Quodlibet Publishers, 2006. Print.

Bibliography

"25 Top-Rated Tourist Attractions in Dubai: PlanetWare." PlanetWare.com, https://www.planetware.com/tourist-attractions-/dubai-uae-dub-dubai.htm
Bureau of Environment, Tokyo Metropolitan Government. "Urban Heat Island." Urban Heat Island, http://www.kankyo.metro.tokyo.jp/en/climate/heat_island.html
"Louvre Abu Dhabi – See Humanity in a New Light." Louvre Abu Dhabi – See Humanity in a New Light, https://www.louvreabudhabi.ae/.
"Shinjuku Station." Shinjuku Station, https://www.shinjukustation.com/shinjuku-station-map-finding-your-way/
"Tokyo's History, Geography, and population." History of Tokyo - Tokyo Metropolitan Government, http://www.metro.tokyo.jp/ENGLISH/ABOUT/HISTORY/history01.htm.

JOLENE EMILY JUSSIF

See / Sea

Fall 2019: Lines Not Splines
Instructor Christoph Kumpusch
Individual Project

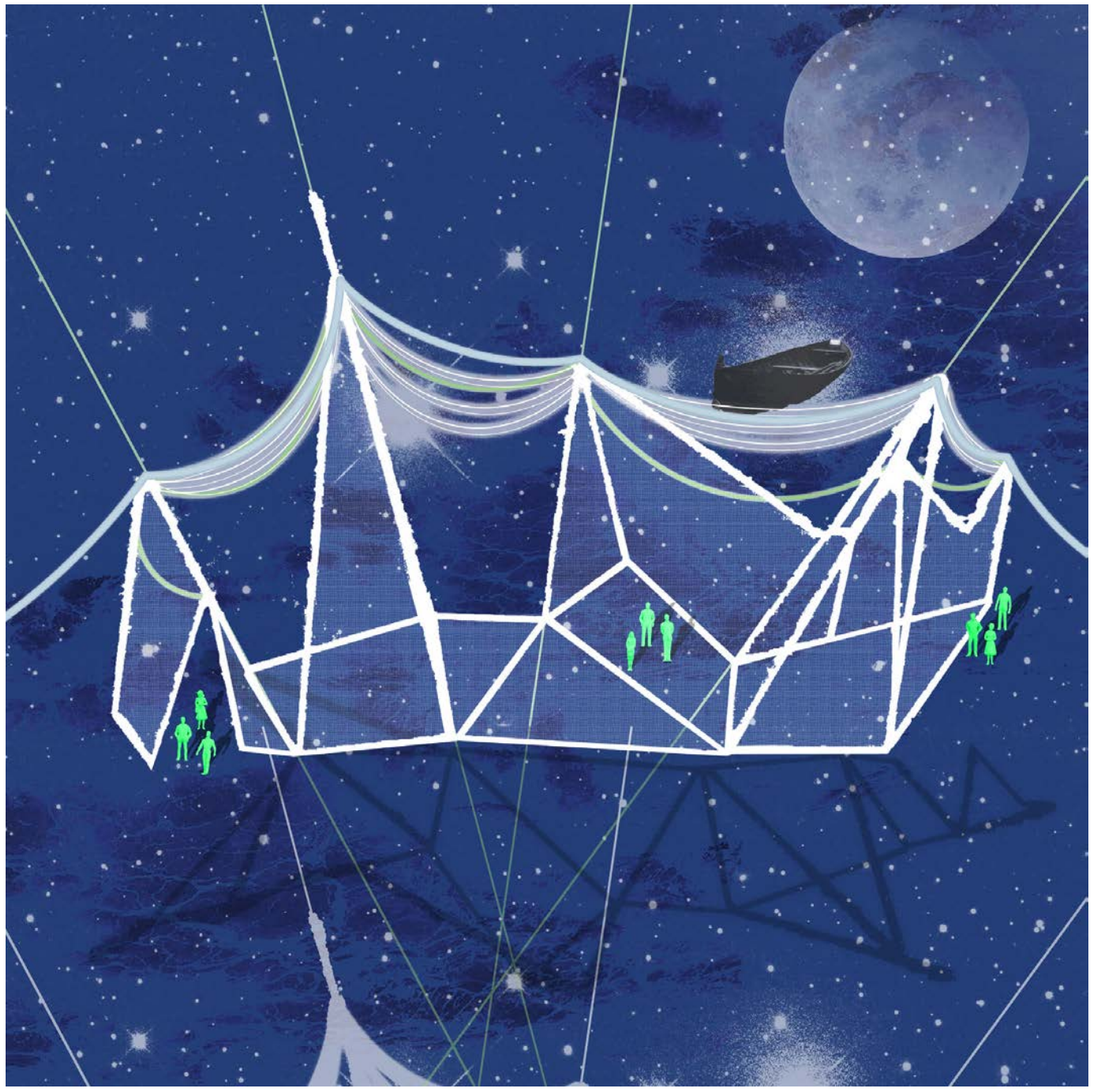
What can we see without seeing, but with reading? These might look like abstract ideas of what the author is intending to convey. A million different people could read a poem and produce a different visual of what was interpreted. It is the poets obligation to take on the troubles of the confined and ease them. It is the intent of the drawings to convey the essence of sea and isolation in one's own mind. Pablo Neruda's poem pictures the sea to an incarcerated mind. The sea touches on all of the six senses. Likewise, the drawing intends to touch on the viewers senses. The drawings from others are translated into models. The drawings had rough elements, curved elements and enclosed spaces. These forms started to represent water and organic forms. The straight sections became textured models, while the organic forms were modeled with string. The beauty is found in the subtlety of the textures that frame space. The reader and author become part of an exchange of information where the author provides the content and the reader can start to imagine. The reader can accept many different ideas and scramble them back into a vision. The drawings are my interpretive visions of the drawings and poem.

Pablo Neruda paints a picture of what the sea might feel like, sound like and look like. The essence of the sea is painted through textures, forms and ideas of what it might look like. The use of color expresses the sea. It expresses the melancholy of experiencing the ocean alone, in your own mind.

"To whoever is not listening to the sea
this Friday morning, to whoever is cooped up
in house or office, factory or woman
or street or mine or harsh prison cell;
to him I come, and, without speaking or
looking,
I arrive and open the door of his prison,
and a vibration starts up, vague and insistent,
a great fragment of thunder sets in motion
the rumble of the planet and the foam,
the raucous rivers of the ocean flood,
the star vibrates swiftly in its corona,
and the sea is beating, dying and continuing.

So, drawn on by my destiny,
I ceaselessly must listen to and keep
the sea's lamenting in my awareness,
I must feel the crash of the hard water
and gather it up in a perpetual cup
so that, wherever those in prison may be,
wherever they suffer the autumn's castigation,
I may be there with an errant wave,
I may move, passing through windows,
and hearing me, eyes will glance upward
saying 'How can I reach the sea?'
And I shall broadcast, saying nothing,
the starry echoes of the wave,
a breaking up of foam and quicksand,
a rustling of salt withdrawing,
the grey cry of the sea-birds on the coast.

So, through me, freedom and the sea
will make their answer to the shuttered
heart."



This collage intends to visualize the sand from the ocean and make it habitable for people.

The Dystopian Landscape

Summer 2019: Advanced Studio: Isolines: The Territorial Landscape
Instructor Marco Ferrari
Individual Project

When the world runs out of oil, wind energy will be commodified, stockpiled, and controlled by those in power. Wind will no longer be a free, renewable resource.

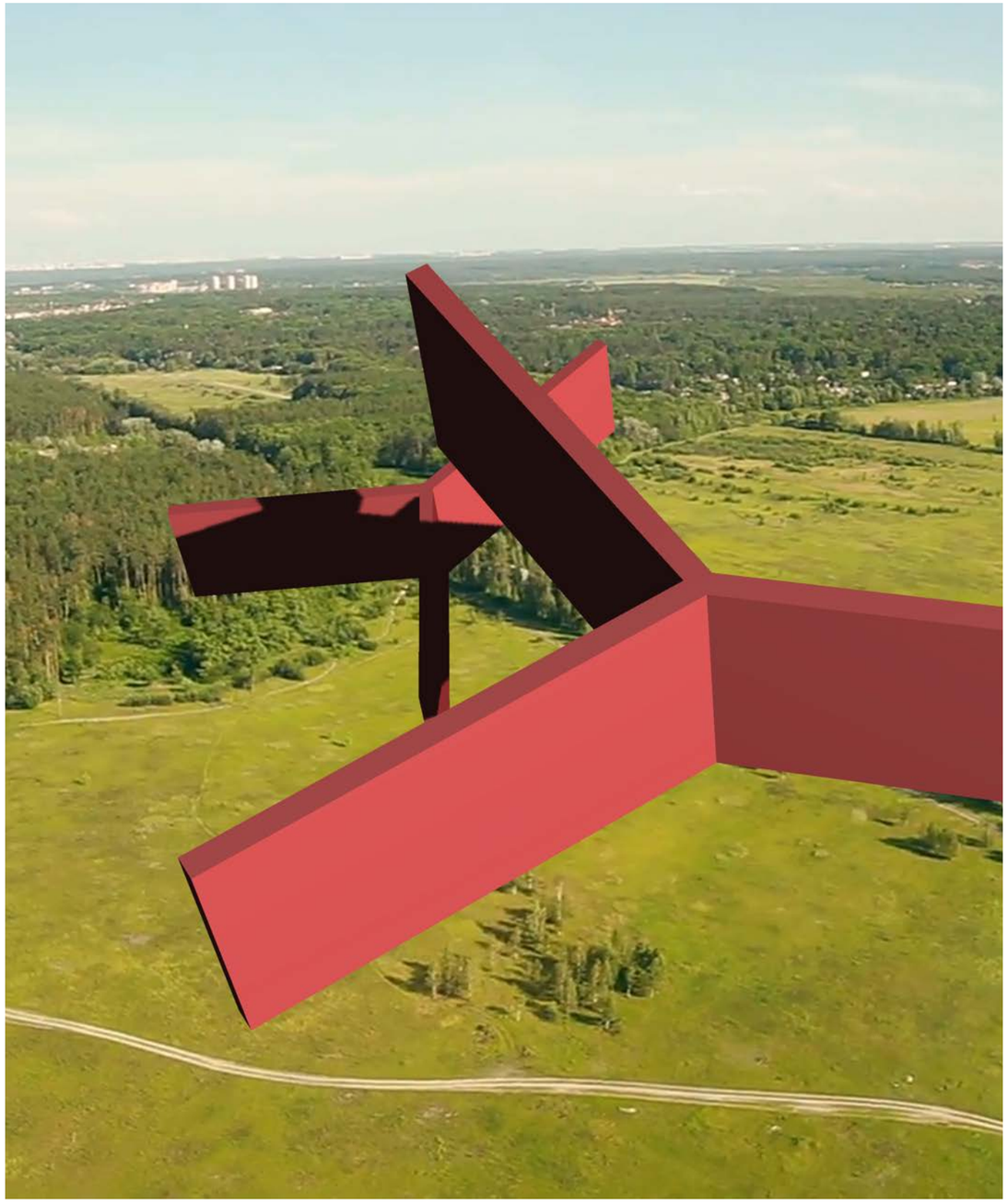
The 4 m/s isotach was chosen as the baseline for my research as it has been consistent throughout the 2018 and since 1950. This isoline bounds diverse geographical conditions such as the Appalachian Mountains, Mississippi River, wetlands in Florida, Atlantic Coastal Plain, The Great Plains, Chesapeake Bay, the Atlantic Coast and Gulf of Mexico Coast.

The 4 m/s isotach is a line connecting points at which wind power was measured with an anemometer. The data points are averaged together with North to South and East to West. These are then computer generated and reanalyzed by the National Oceanic and Atmospheric Administration (NOAA) and uploaded to a publicly accessible online database. Besides the data from the NOAA, I looked at wind farm locations, tornado paths, meat industry locations, sea level rise, hurricanes, global wind trends, invasive species, and wind speeds at different heights as a base for the map and section.

Beginning in the Florida Coast, I speculate that wind here will increase in the future because the land is warming up causing wind pressure differences from the water. Extreme wind conditions like hurricanes are occuring. These are caused when hot air, humid air, and cold air intersect. Hurricane Michael alone caused 25 billion dollars in damage. The isotach runs through tornado alley, an area where hot humid air and cold dry air intersect causing displacement and destruction.

It travels through the great plains, a region known for producing corn, soybeans, wheat, and other crops. The problem here is that wind has caused soil erosion to the top layers of soil, making farming difficult without the help of machinery. The last major issue along the isotach that I looked at is particle dispersion. We can see from the terrain that the Appalachian range borders the Atlantic coast, making it difficult for wind close to the ground to move around. This has resulted in particles including seeds, pollution, and smoke from coal mines and fracking being blocked. The USGS found high amounts of carcinogens, silica, chromium, sulfate, selenium, arsenic and magnesium in air making the region have the highest cancer rates in the United States. With all these problems and future speculations, I questioned - how can we make such a problematic, destructive, seemingly useless nuisance such as wind work for us?

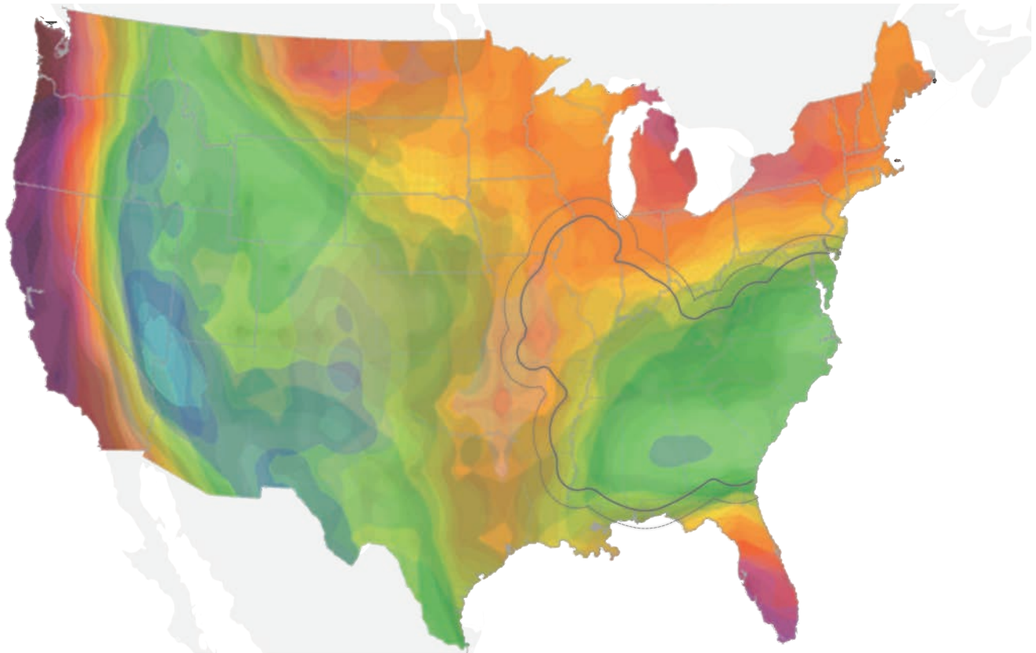
In the future, roughly 50-70 years according to British Petroleum, when the world runs out of oil, wind energy will be central to the energy economy. If those in power, public or private entities, address wind energy with the same capitalistic mentality as oil extraction, we can begin to imagine a dystopia where wind infrastructure sprawls across the country, wind is trapped and stored as a product, and the market is controlled where wind is no longer a free, renewable resource.



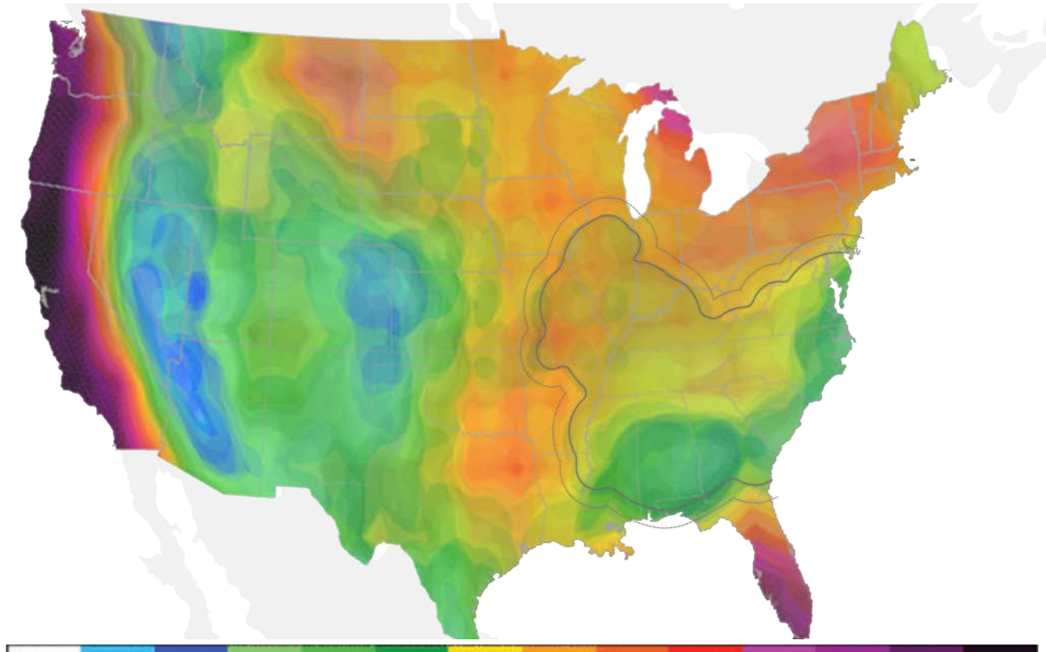
Wind Walls fall upon the pristine landscapes.

JOLENE EMILY JUSSIF

Average wind speeds (U + V) for each decade on October since 1950.

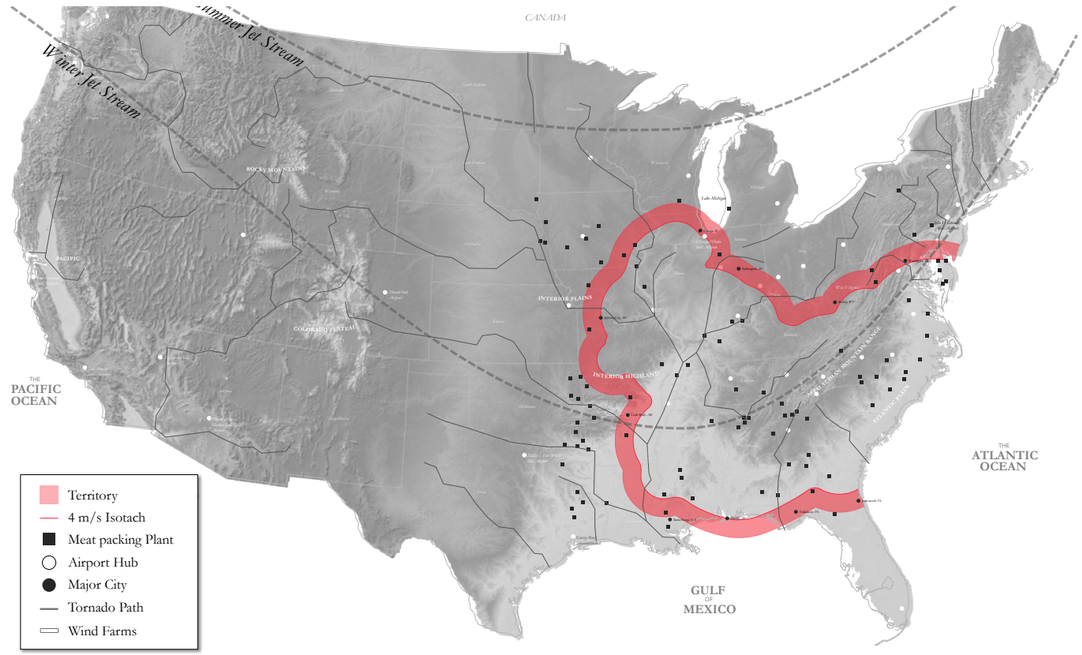


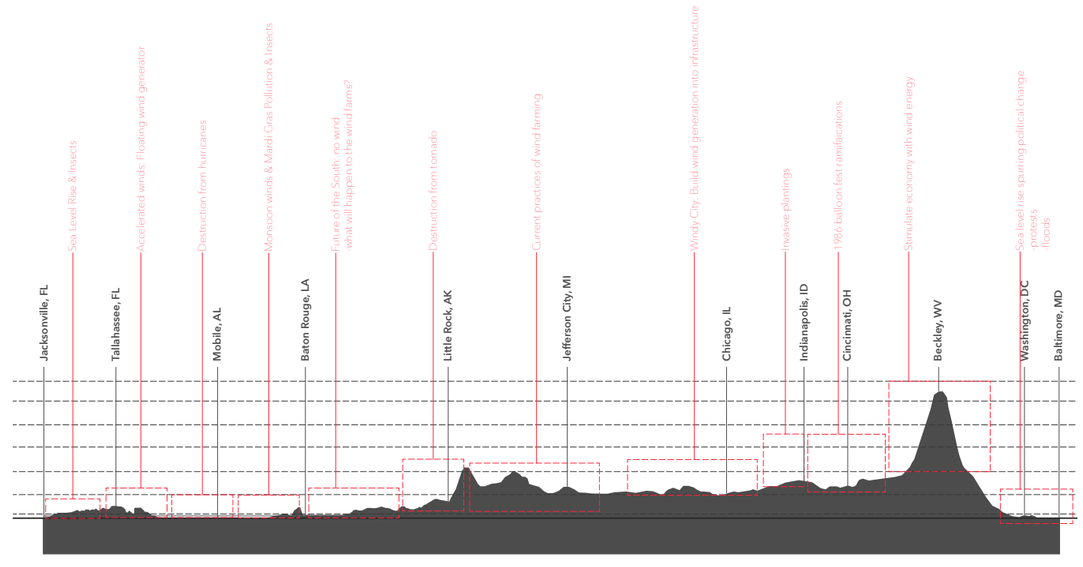
Average wind speeds (U + V) for each month in 2018.



0 *Calm Air* 1 *Light Air* 2 *Gentle Breeze* 3 *Branches Sway* 4 *Fresh Breeze* 5 *Strong Breeze* 6 *Fresh Gale* 7

Meters per Second (average U +V)





Above: 4 m/s wind line and 100 mile periphery zone selected as research topic due to consistent wind trends over the past 50 years.
Below: Section derived from wind line cut scaled to show topography details.

ISOTACH SECTION

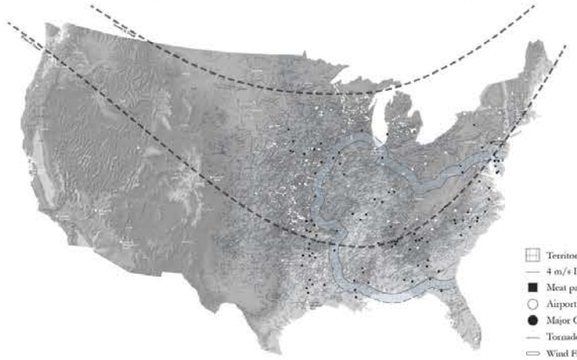
OF THE

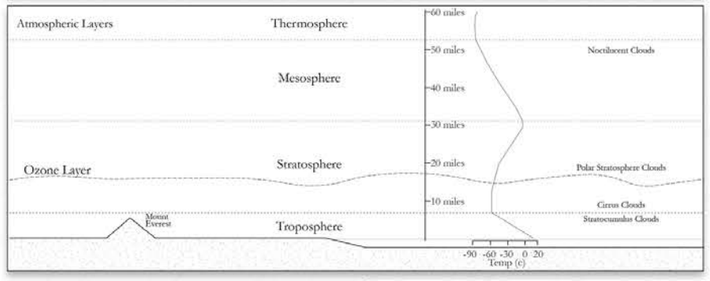
UNITED STATES OF AMERICA

COMPILED BY
JOLENE JUSSIF

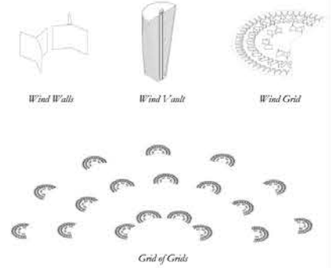
0 50 miles 100 miles

ISOTACH DATA RELEVANT TO
OCTOBER 2018

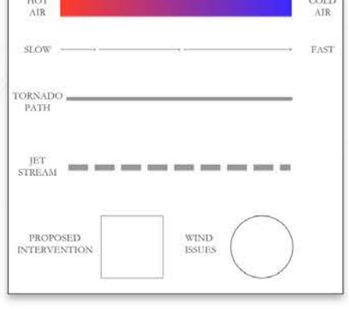




DESIGN DICTIONARY



LEGEND

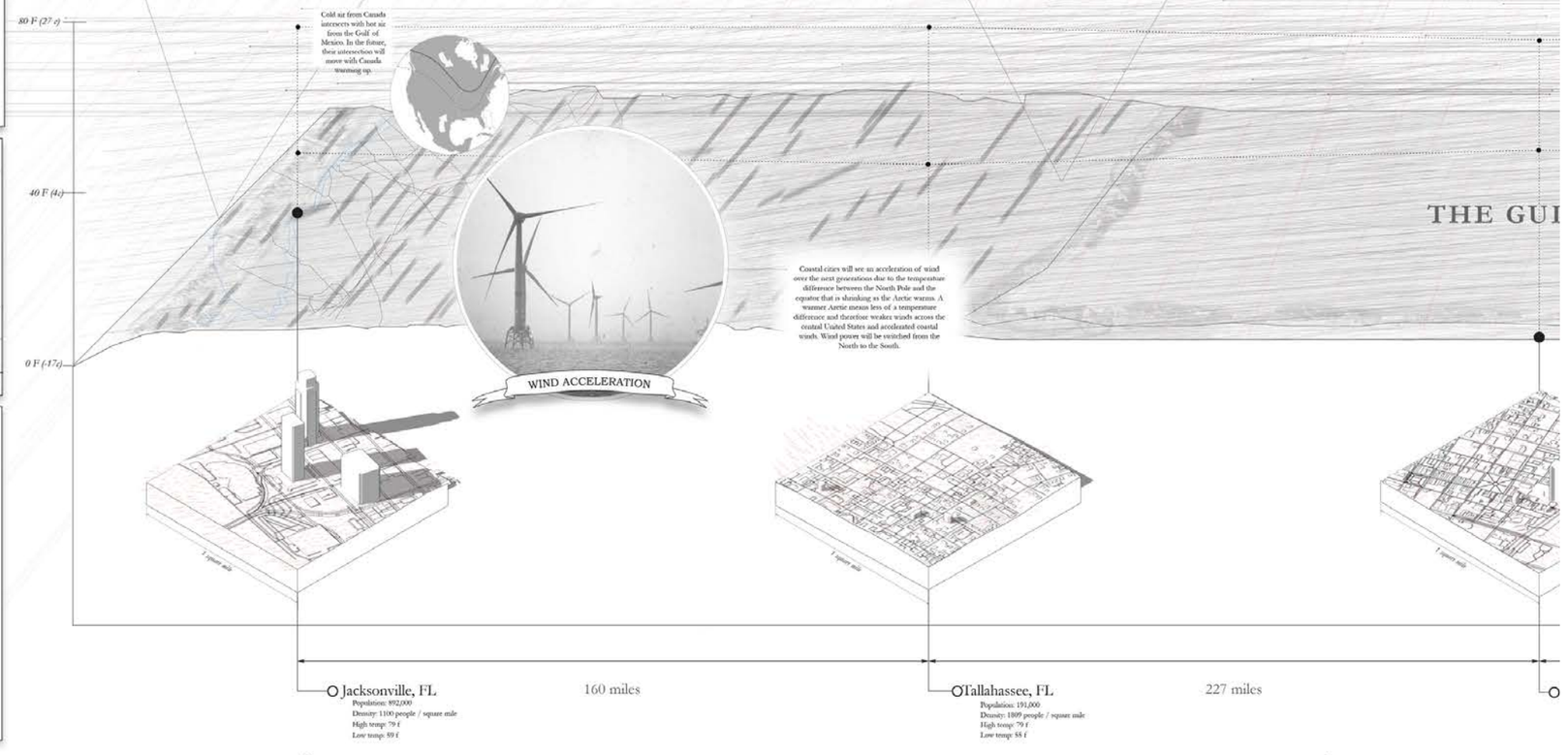


Coastal Wind Wall

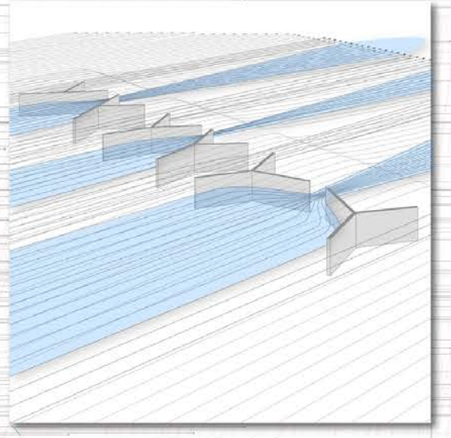
Wind Walls will spring up along the coasts to capture wind and produce energy. Wind along the coasts will accelerate and many will invest here. Ocean views will be a thing of the past and wind walls will become mediums for political revolution.

Coastal Wind Grid

How might Wind Walls occupy beachfront properties? These monoliths will take front row to the ocean where the most consistent winds come from. Beachgoers will adapt to sit around them.

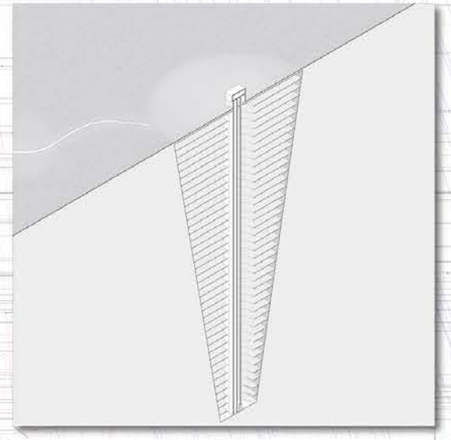


JOLENE EMILY JUSSIF



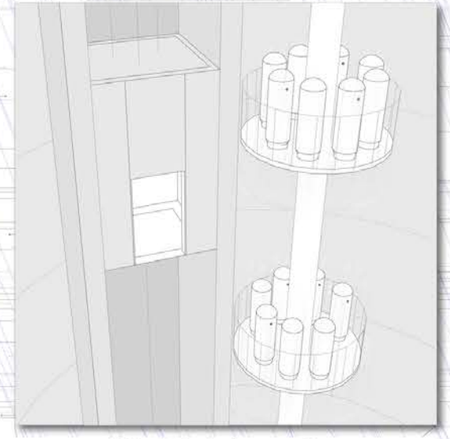
Wind Analysis

Wind Walls can be arranged at different angles to capture more wind or accelerate wind faster. The arrangement of the walls will speed up wind flows, becoming more productive. Wind Walls aim to capture all wind falling within 200 feet of the earth's surface.



Wind Vaults

Wind Vaults are underground, completely automated, secure, and highly explosive. The compressed wind is stored in standardized tubes to both commodify wind and for ease of transportation. What results from this storage process is similar to diamonds or grain, owners begin to control the market, able to set any price by stockpiling mass quantities of compressed wind.



Wind Vault Automation

Wind Vaults are highly automatized to make more money. Air is compressed above ground, and elevated below ground to be reserved. These spaces store the standardized compressed wind capsules.

Hot, moist air from the Gulf of Mexico encounters cold air and causes hurricanes here.

Hurricanes are caused when warm, moist air from the ocean surface begins to rise rapidly, where it encounters cooler air that causes the warm water vapor to coudcuse and to form storm clouds and drops of rain. Hurricanes cost billions in dmage each year. Hurricane Michael from 2018 cost $25 billion alone reaching wind speeds of 125 miles per hour, and causing 16 deaths

1. 1900: Great Galveston, 12k killed and 10k displaced
2. 2017: Hurricane Maria, 5k killed and 17k displaced
3. 1928: The Okeechobee Hurricane, 3,000 killed

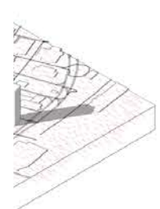
LF of MEXICO

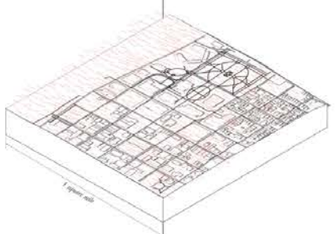
THE ATLANTIC PLAINS

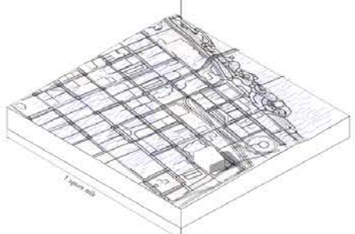
Hot air from Mexico, moist air from the Gulf of Mexico, and cold air from Canada cause tornadoes.

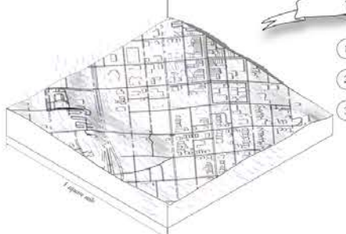
Tornado Alley loosely runs vertically through the center of the country. These regions are impacted because the air pressure imbalance from the dry, cold air in Canada, the hot, humid air from the Gulf of Mexico, and the hot, dry air from Mexico. This three-way intersection causes a pressure imbalance generating destructive tornadoes. The number of tornadoes fell to 1,124 in 2018 from 1,429 in 2017, according to the National Oceanic and Atmospheric Administration (NOAA). The speculative future of tornadoes may see a decrease in the Tornado Alley area because Canada will begin to warm due to global warming. The intersection will move.

1. 1925: Tri- State Tornado, 695 killed and 2,027 injured
2. 1840: Natchez Tornado, 317 killed and 109 injured
3. 1896: St. Louis Tornado, 255 killed and 1,000 injured









Mobile, AL
Population: 190,000
Density: 1264 people / square mile
High temp: 77 f
Low temp: 57 f

192 miles

Baton Rouge, LA
Population: 225,000
Density: 2972 people / square mile
High temp: 79 f
Low temp: 56 f

314 miles

Little Rock, AK
Population: 198,000
Density: 1576 people / square mile
High temp: 72 f
Low temp: 52.5 f

265 miles

Jefferson City, MI
Population: 43,000
Density: 1188 people / square mile
High temp:66. f
Low temp: 45 f

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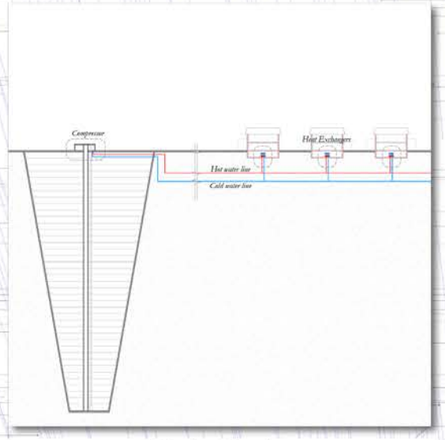


District Heating

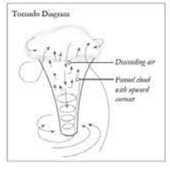
Heat is an unexpected bi-product of air compression. The machines that compress air produce ample heat. This heat can be capitalized by heating water to provide geothermal heat to towns or cities in close proximity.

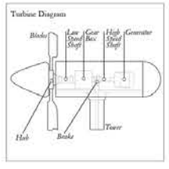
Grid of Grids

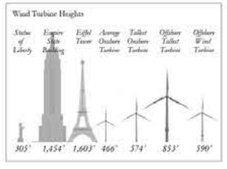
The Plains will be ground zero for Wind Walls domination of the 4 m/s isotach. There is wide open land and consistent wind. The Wind Walls will be organized in grids of grids to capture wind. Rather than the typical wind turbines, Wind Walls will be used to capitalize and economize the wind.

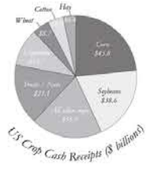
Scalability

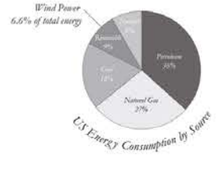
Wind Walls grid logic has the capability to scale up and take over land formerly used for farming. The scale can be as small as one set occupying a beach, or as large as a square crop.

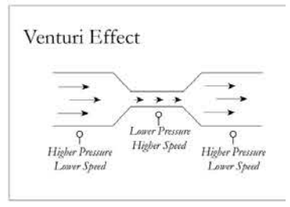


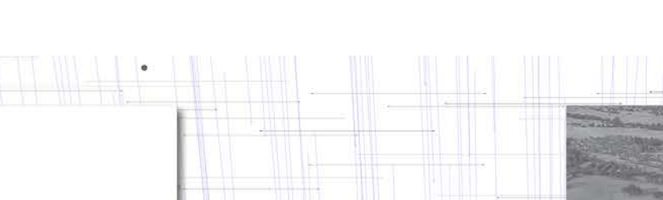












THE INTERIOR P

352 miles

166 miles

Chicago, IL
Population: 2,716,000
Density: 10,000 people / square mile
High temp: 59 f
Low temp: 43 f

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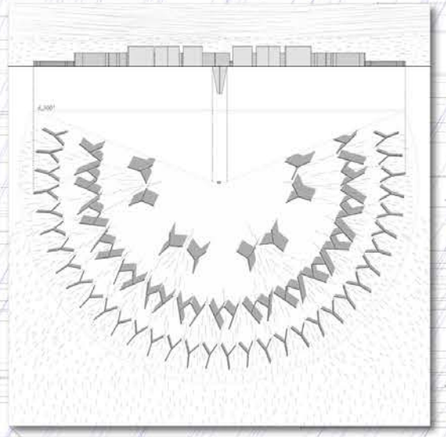
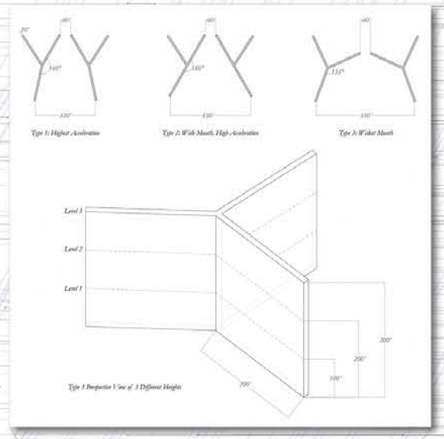


Grid Logic

The Wind Wall Grid has 3 rings concentrically distributed around a Wind Vault. The first outer ring is the shortest and skinniest opening to catch the low wind and accelerate it the most. The second ring is the second tallest and captures the higher wind and leftover wind from the first ring. The third inner most ring is the tallest with the widest opening to catch the highest winds, and all the leftover wind from the first two rings.



Details

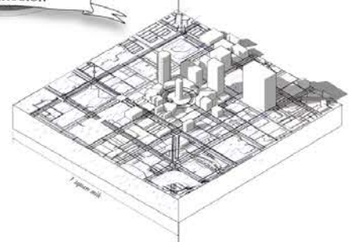
There are several different modules and typologies of Wind Walls. They can differ in height, opening size, and wall angle. The two walls are the funnels, and the third wall acts as structure to avoid falling over from fatigue, during high winds, or during natural disaster.

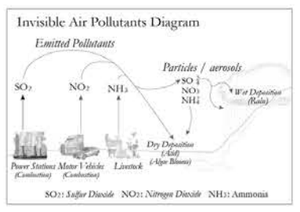
Wind Ruins

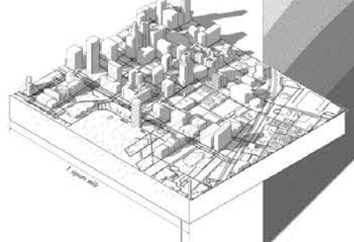
When wind moves due to global warming, Wind Walls are left behind. These monolithic infrastructures rot and ruin. Cities form around the grids haphazardly.

Wind is the main driver of particle dispersal. Particles including seed dispersal, pollenens, smoke, and others. The Appalachian Mountains block the wind from the Atlantic Coast and witnesses pollution from coal mines and fracking. The USGS found high amounts of carcinogens, silica, chromium, sulfate, selenium, arsenic and magnesium in air making the region the highest cancer rates in the United States. The image to the right is from the 1986 Balloon Fest in Ohio when balloons were released in the air polluting surrounding areas and lakes.

The Great Plains were settled by pioneers in the 1800's. The plains were divided up in 1785 by the U.S. Public Land Survey System separated by section lines that would become roads, field divisions, county lines and state lines. The main problem farmers faced here was the soil. The top soil would erode from the wind making seeds fly away, droughts would dry the land, and the sod was difficult to break through. Pioneers invented new technology to deal with soil erosion such as the steel tipped plows to turn over the soil and plant the seeds deeper. Today, farmers deal with soil erosion by planting trees, grass, contour farming for irrigation, and reducing over watering the crops.







Indianapolis, ID
Population: 872,000
Density: 2273 people / square mile
High temp: 62 f
Low temp: 44 f

300 miles

Beckley, WV
Population: 16,000
Density: 1,784 people / square mile
High temp: 60 f
Low temp: 38 f

265 miles

Washington, DC
Population: 702,000
Density: 10,528 people / square mile
High temp: 65 f
Low temp: 45 f

JOLENE EMILY JUSSIF

JOLENE EMILY JUSSIF

Research: World Trade Center

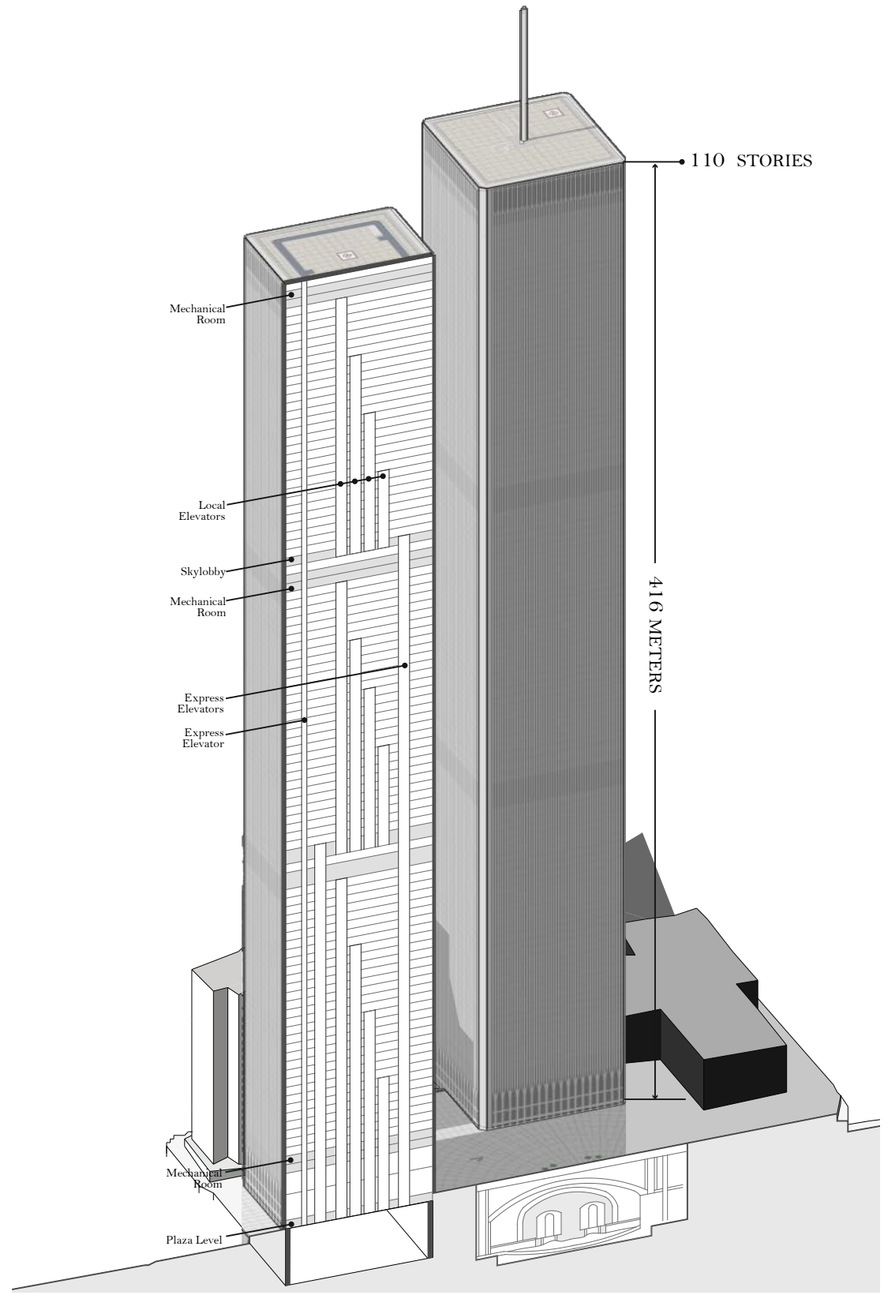
Summer 2019: Transscalarities
Instructor Andres Jaque & Robin Honggare
Collaboration with Shanti Gollapudi and Jose Luis Granda

The World Trade Center's Twin Towers planning and construction was the outcome of a series of favors including the Port Authority's acquisition of the bankrupt H&M railroad and the movement of land beyond the existing site in Lower Manhattan. These negotiations shaped New York's largest and tallest office buildings which would become an icon of Manhattan's skyline.

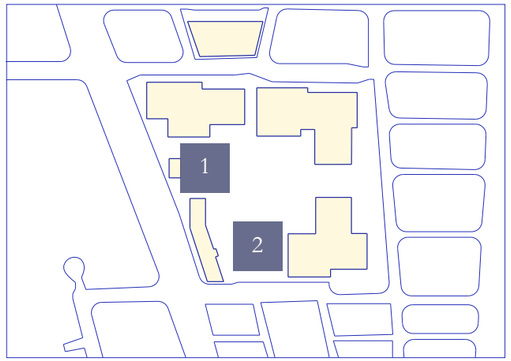
The design of the WTC was widely criticized on the premise that New York City did not need the scale of the proposal. It was perceived as a highly ambitious project that was driven by the Yamasaki's vision and not the public, a sentiment that was echoed in a New York Times article by an architectural critic, Ada Huxtable. 'Big but not so bold', she described in her piece mirroring the wishes of the public who wanted one tower of 200 floors. Yamasaki, driven by his desire to offer New York with the best views he could, decided that building two towers of 110 stories would be the best option to achieve a good relationship between the human scale and the towers, but ultimately the height and structure was to maximize rental space and floor area.

The Twin Towers design featured 10 million square feet of office space. Adjacent property managers and developers of office spaces responded to this by attempting to delay the construction as this amount of square footage was going to saturate the market and drive down rents. The City sided with property managers and developers and used this to negotiate financial advantages. The City used their only power over the project, street closures, to negotiate with the Port Authority. The Port Authority offered to create Battery Park City, with the infill from the World Trade Center's foundation, as well as a $16 million containership in South Brooklyn, and a $100 million passenger ship near Battery Park.

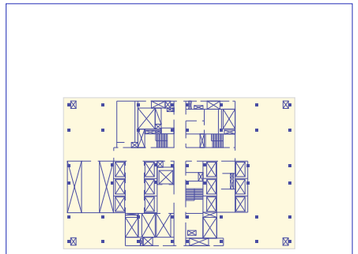
The World Trade Center's Twin Towers stood for roughly 28 years protruding from Manhattan's skyline. After the terrorist attacks on September 11th 2001, the towers and complex were destroyed and the debris was moved to Freshkills Landfill in New York. What stands on the site today is the National September 11th Memorial, the Oculus Transit Hub, and New York City's tallest tower, One World Trade.



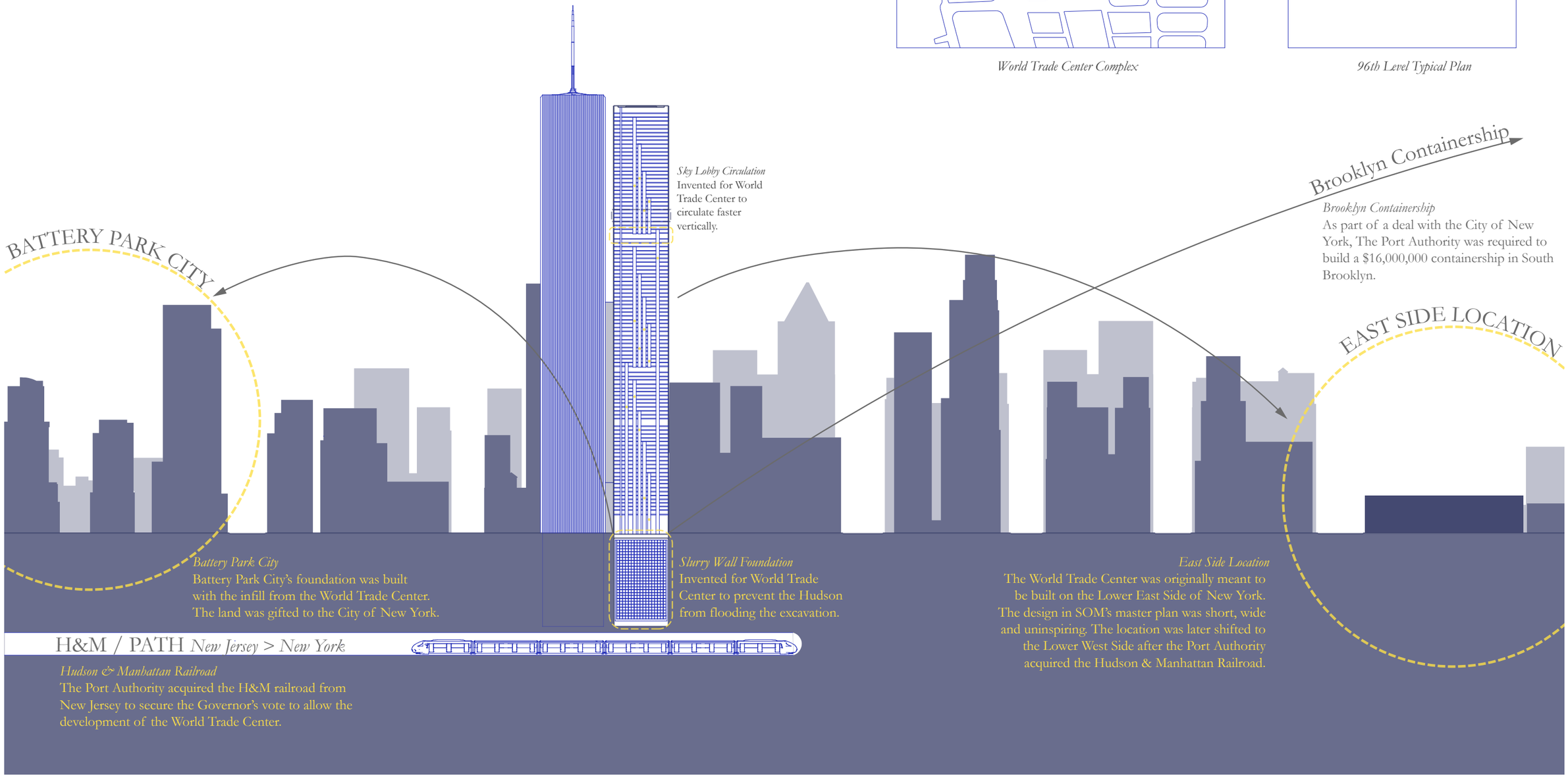
The World Trade Center's twin towers were 110 stories tall and the first to have sky lobbies and a slurry wall foundation.



World Trade Center Complex



96th Level Typical Plan



JOLENE EMILY JUSSIF

The Port Authority's Struggle for an Icon

Summer 2019: Contentious New York
Instructor Andres Jaque
Collaboration with Shanti Gollapudi and Jose Luis Granda

The World Trade Center's Twin Towers planning and construction was the outcome of a series of favors including the Port Authority's acquisition of the bankrupt H&M railroad and the movement of land beyond the existing site in Lower Manhattan. These negotiations shaped New York's largest and tallest office buildings which would become an icon of Manhattan's skyline.

While midtown Manhattan was rapidly developing with new buildings, Lower Manhattan was left behind due to its location and inaccessibility via transit. Brothers David Rockefeller and Nelson Rockefeller had an interest in Lower Manhattan's development. They formed the Downtown Lower Manhattan Association (DLMA) to guarantee development and protect vested interests in the neighborhood.1

DLMA's commissioned Skidmore, Owings, Merrill Architecture Firm (SOM) to redesign lower Manhattan as their first mission. SOM created a masterplan featuring renewed buildings, widened streets, and a return of the World Trade Center. The World Trade Center complex had been invented by the Port Authority over 10 years prior but had been shelved due to feasibility issues. Governor Nelson Rockefeller used his political power to sway the Port Authority to pursue this idea. The proposed site was located on the Lower East Side and was met with praise from the public.1 If the site had been located here, the Twin Towers would have been a short, wide, uninspiring building.

The Port Authority had to get the World Trade Center approved and accepted by New York, New Jersey and the public. The Port Authority is an interstate agency governed by both New Jersey and New York due their shared rivers, ports, tunnels and bridges. New Jersey Governor Meyner saw an opportunity to unload the bankrupt Hudson & Manhattan Railroad (H&M). An agreement could not be reached after 2 years between the Authority and New Jersey Governor Meyner.2 Finally, a new governor was elected in New Jersey and a special legislative package was passed that required the Port Authority to take over New Jersey's H&M railroad and office buildings located in the Lower West Side.2 This acquisition gave the Port Authority the land and approval for the World Trade Center complex and therefore moved the site from the Lower East to the Lower West side location. The consequences of the relocation were protests from residents and the disappearance of the Radio Row neighborhood. The protests unfortunately failed to stop the eminent domain process and locals relocated.

The Twin Towers design featured 10 million square feet of office space. Adjacent property managers and developers of office spaces responded to this by attempting to delay the construction as this amount of square footage was going to saturate the market and drive down rents. The City sided with property managers and developers and used this to negotiate financial advantages. The City used their only power over the project, street closures, to negotiate with the Port Authority. The Port Authority offered to create Battery Park City, with the infill from the World Trade Center's foundation, as well as a $16 million containership in South Brooklyn, and a $100 million passenger ship near Battery Park.

On top of the public backlash, the City also opposed this development because they were being shorthanded in terms of the tax package offered to them. The Port Authority is a public agency and was content with not paying any yerly taxes to the city for the development, however the City proposed a yearly payment in lieu of taxes because some tenants would be private companies. A New York Lawyer,

Robert Shapiro, helped to broker a deal where if 40% of the site was to be occupied by private tenants, the Port Authority would make an annual payment to the city which was equivalent to the taxes the private tenants would have to pay. This negotiation favored the city because the size of the payment would be subject to annual review, allowing them to raise the payment as needed. The remaining 60% of the site was to be leased to public agencies, including federal and state offices, who were exempt from paying taxes. In conclusion, the Port Authority would make a yearly payment equivalent to 40% of the actual tax amount to the City of New York. This deal allowed the project to begin it's construction phase.

The design of the WTC was widely criticized on the premise that New York City did not need the scale of the proposal. It was perceived as a highly ambitious project that was driven by the Yamasaki's vision and not the public, a sentiment that was echoed in a New York Times article by an architectural critic, Ada Huxtable. 'Big but not so bold', she described in her piece mirroring the wishes of the public who wanted one tower of 200 floors. Yamasaki, driven by his desire to offer New York with the best views he could, decided that building two towers of 110 stories would be the best option to achieve a good relationship between the human scale and the towers, but ultimately the height and structure was to maximize rental space and floor area.

The scale of the design required technological inventions. Yamasaki developed sky lobbies which were multiple lobby levels inspired by the subway system of New York. The sky lobby floor had communicated local elevator which went floor by floor and an express elevator which stopped only at the sky lobby levels. 'Slurry Walls' were another intervention in the construction of the World Trade Center that was revolutionary for its time. Their function was to keep the basement levels of the towers from being flooded by the Hudson River. If these walls collapsed, the entire New York subway system would flood. These technological advancements helped to sell this ambitious project to prospective tenants and critics.

The World Trade Center's Twin Towers stood for roughly 28 years protruding from Manhattan's skyline. After the terrorist attacks on September 11th 2001, the towers and complex were destroyed and the debris was moved to Freshkills Landfill in New York. What stands on the site today is the National September 11th Memorial, the Oculus Transit Hub, and New York City's tallest tower, One World Trade.

The drivers behind the World Trade Center faced public backlash and setbacks from both New York and New Jersey. The Port Authority aimed to create an icon for Manhattan that would maximize area, boost rental space prices, increase vertical circulation, and interconnect to the subway systems at the expense of public money and eminent domain of the existing neighborhood.

Bibliography
1. Gillespie, Angus Kress. Twin Towers: The Life of New York City's World Trade Center. (United Kingdom: British Library). 16-50
2. Goldberger, Paul. Up From Zero. (New York: Random House Trade Paperbacks), Page 20-24.

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GSAPP 2020