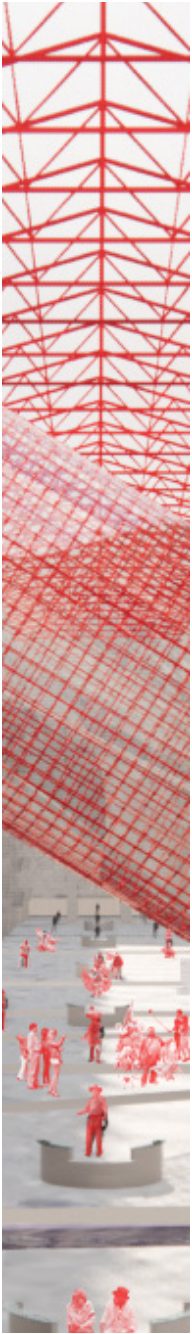


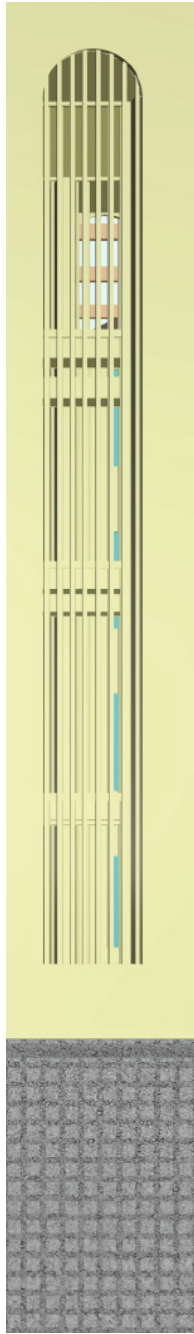
Graduate Architecture Portfolio

Rush Majumder

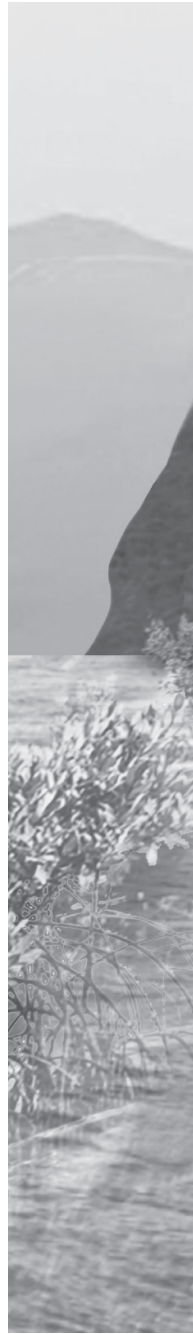
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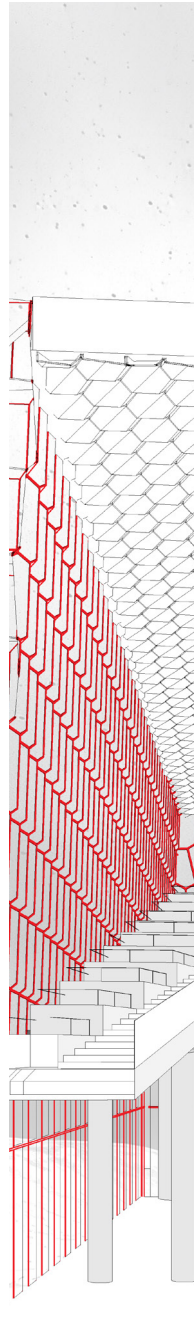
p. 4



p. 22



p. 32



p. 44



p. 48



p. 56

Light, Fish, People



Summer 2021

//Instructor(s): Laura Gonzalez Fierro

The Brooklyn Army Terminal, located in Sunset Park Brooklyn, has a rich history of manufacturing and now as an art space. However, it remains to feel segregated from the rest of the population of Sunset Park, particularly working Hispanics and Chinese. This project aims to bridge the gap, and introduce ways of life familiar to the population surrounding the site, as well as enriching the Brooklyn Army Terminal.























With the lack of light, light columns were introduced to allow rooms that are not facing the border of windows to get natural daylight. These light columns being injected into the site creates unique spaces, as a gathering place for people.

The site being on the Hudson River allowed for the introduction of canals. These canals would cut through the building into the previous parking lot, creating an aquaponic farm. The farm serves an aquaponic cycle to clean the water for vegetation and fish, which allows for people working there to grow their own produce and food.

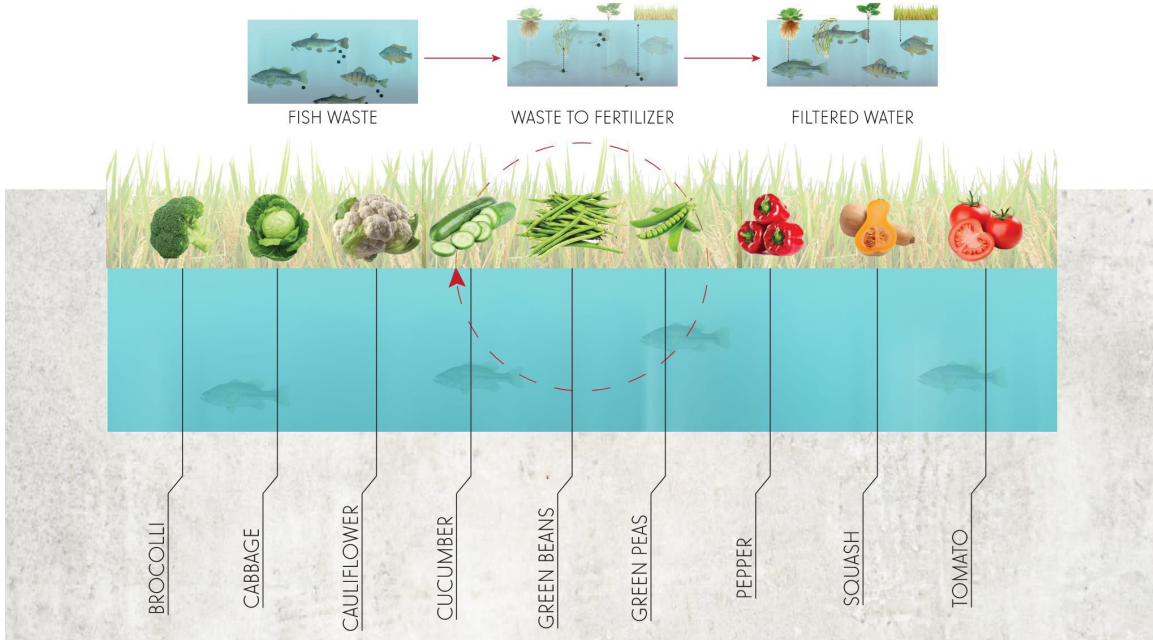




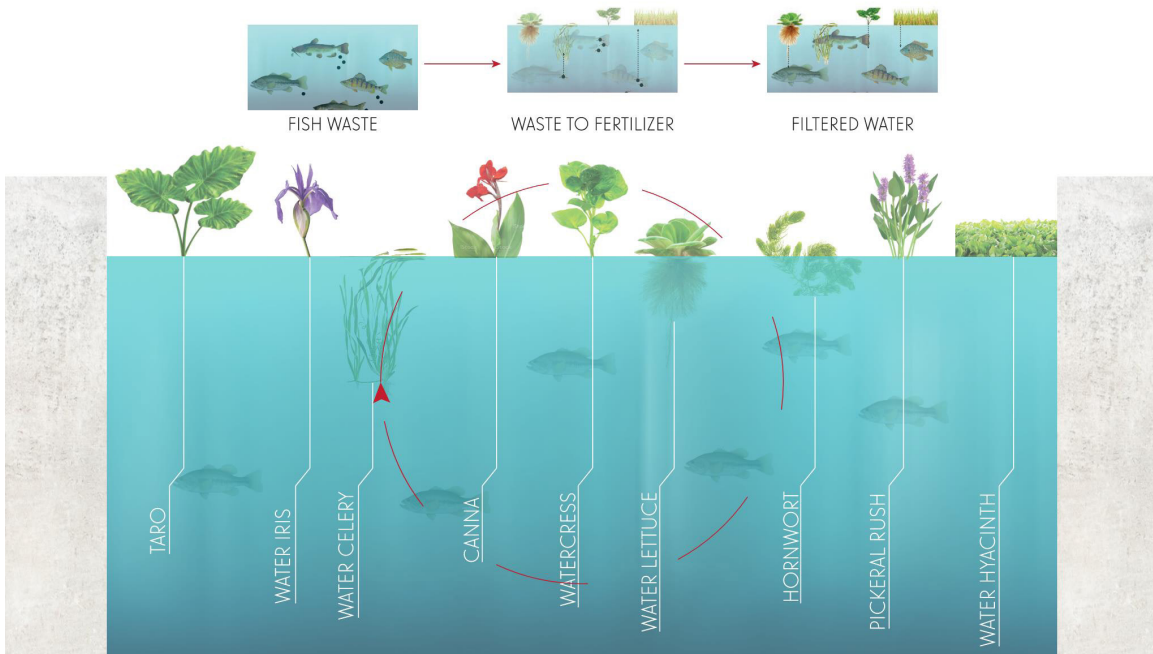


-  ACIPENSER OXYRINCHUS
-  ALEWIFE
-  AMERICAN EEL
-  AMERICAN SHAD
-  ATLANTIC NEEDLEFISH
-  ATLANTIC SILVERSIDE
-  BANDED KILLFISH
-  BLUEFISH
-  BROWN BULLFISH
-  CARP
-  CATFISH
-  GOLDFISH
-  HOGCHOKER
-  LARGE MOUTH BASS
-  MUMMICHOG
-  NORTHERN PIPEFISH
-  PUMPKINSEED
-  SMALL MOUTH BASS
-  SPOTTAIL SHINER
-  STRIPED BASS
-  TESSELATED DARTER
-  WHITE PERCH

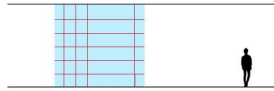
AQUAPONIC FARM CYCLE



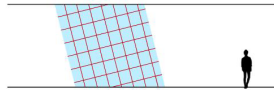
CLEANSING VEGETATION CYCLE



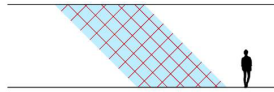
VERTICAL



ANGLED

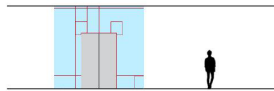


SLOPED

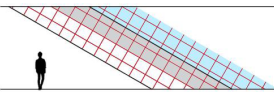


LIGHT COLUMNS

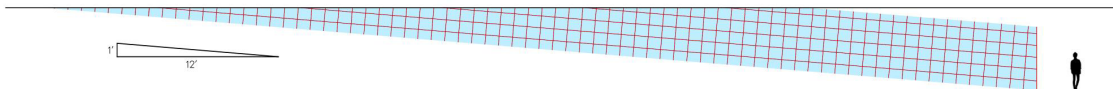
ELEVATOR



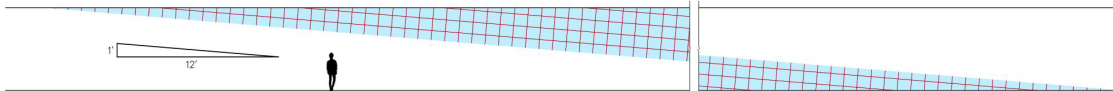
ESCALATOR



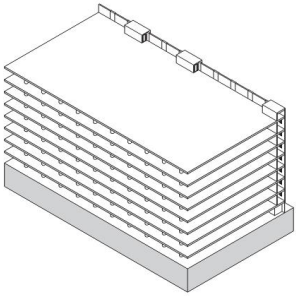
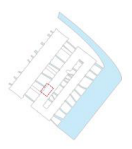
ADA RAMP



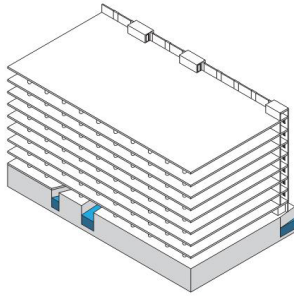
ADA RAMP



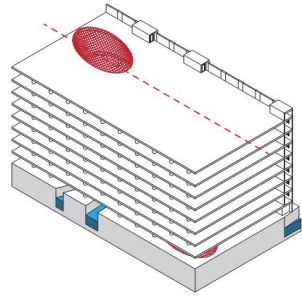
LOCAL COLUMNS



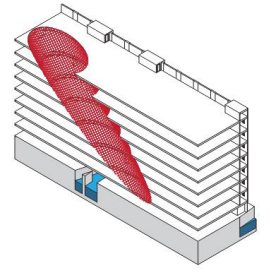
BUILDING



CANALS

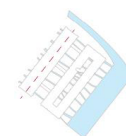


LIGHT COLUMN

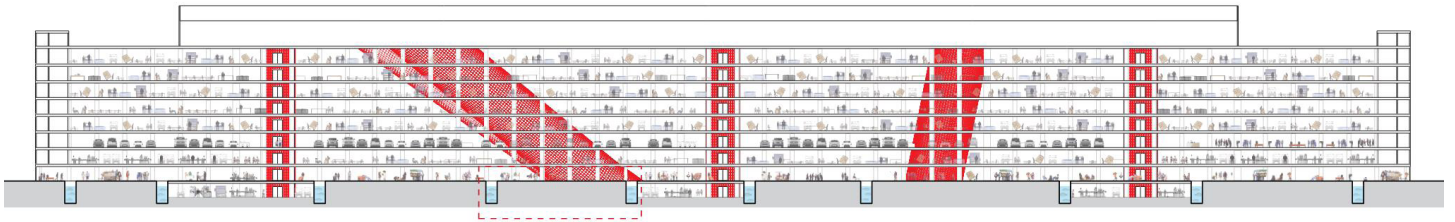


SECTION CUT

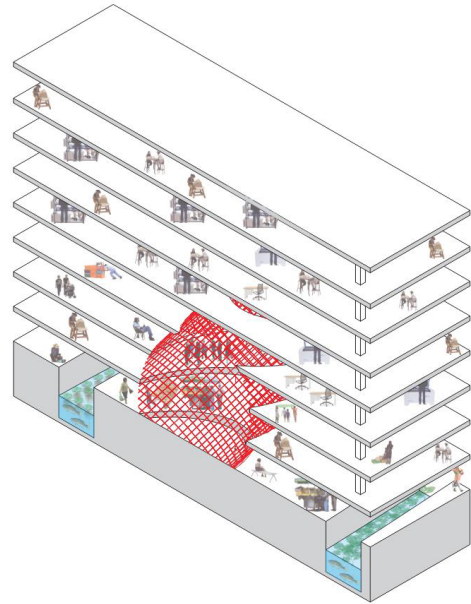
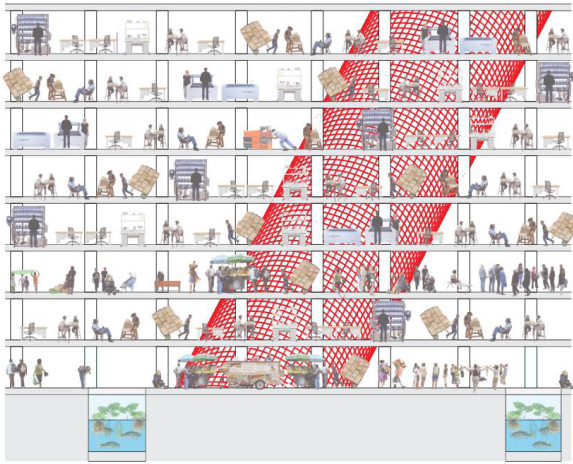
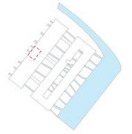
LIGHT COLUMN + CANALS



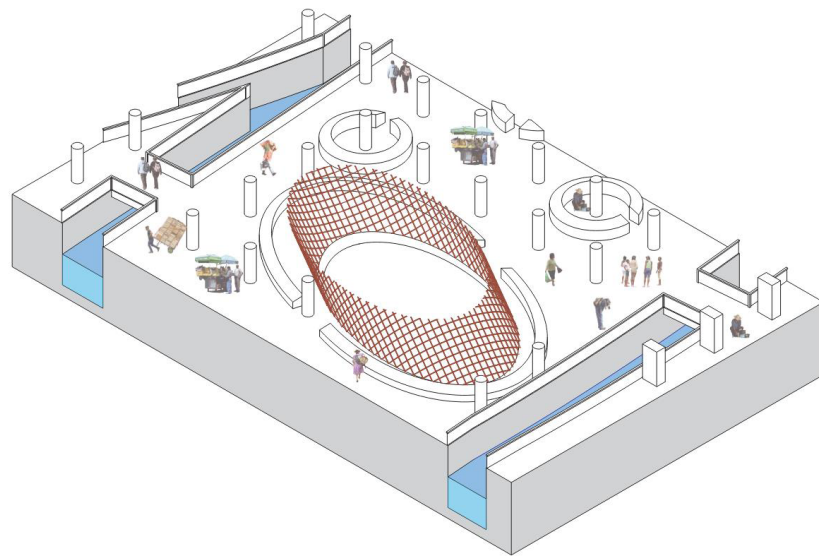
BUILDING A SECTION



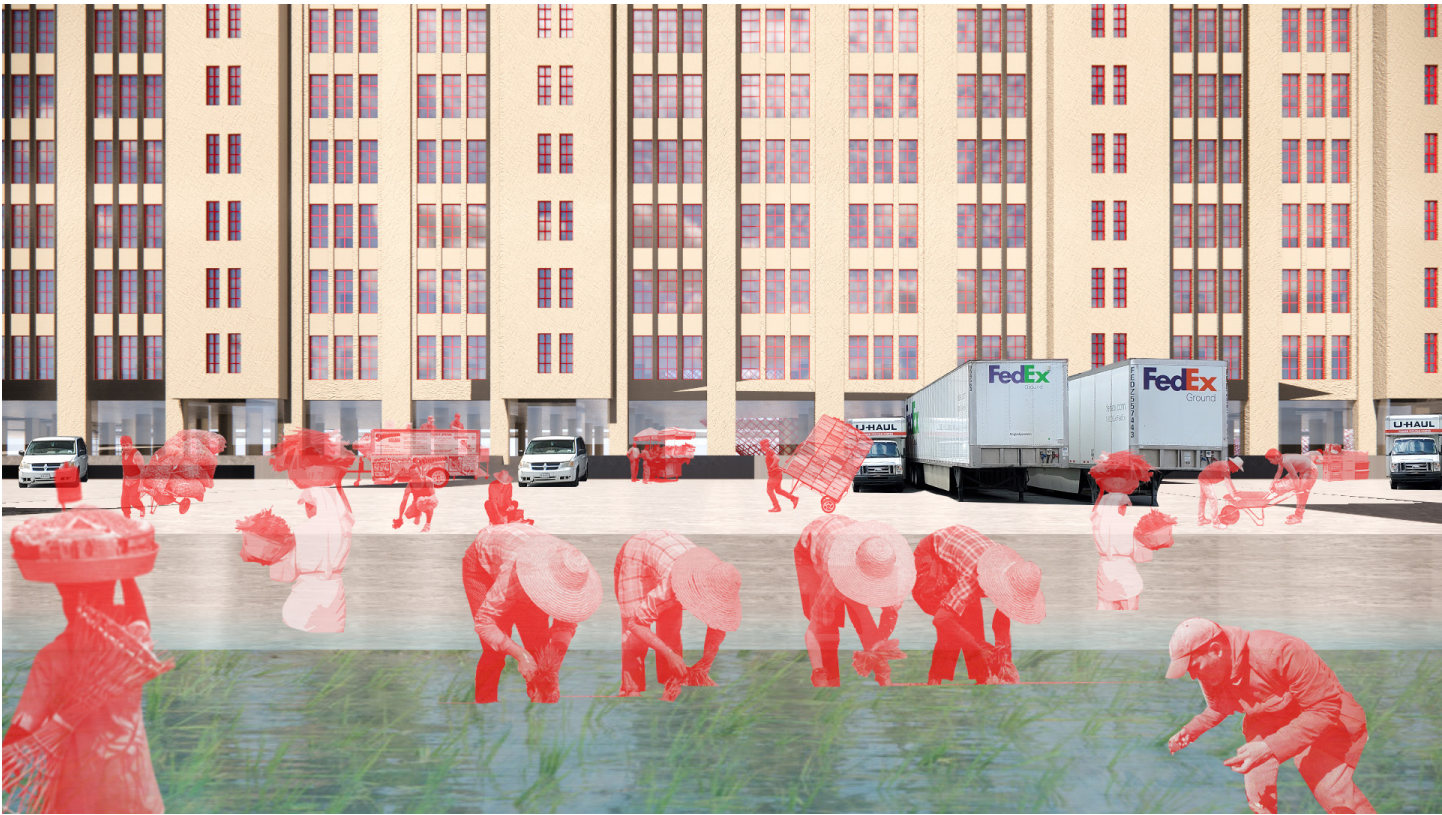
BUILDING B SECTION

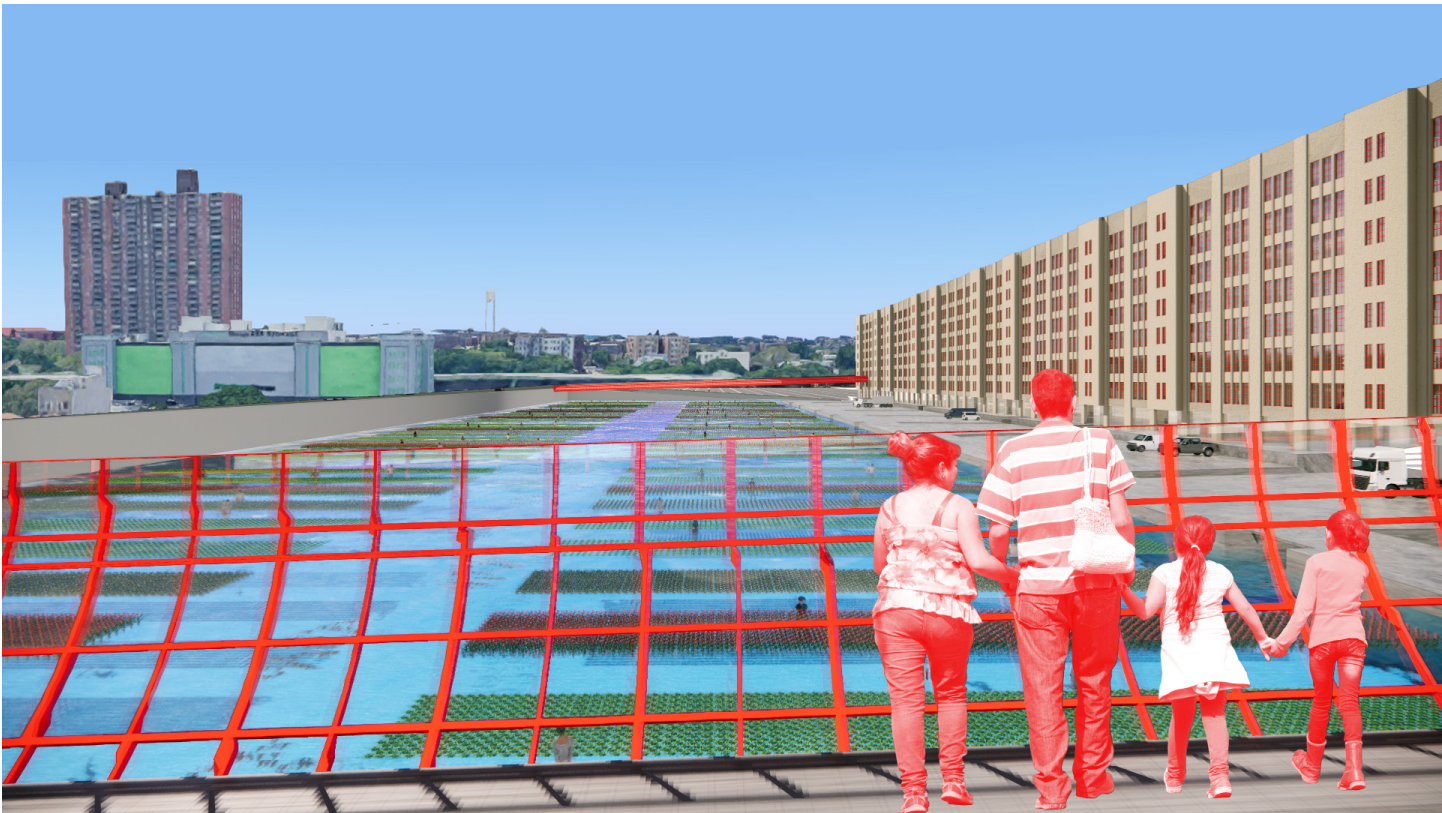


BUILDING A ZOOM IN

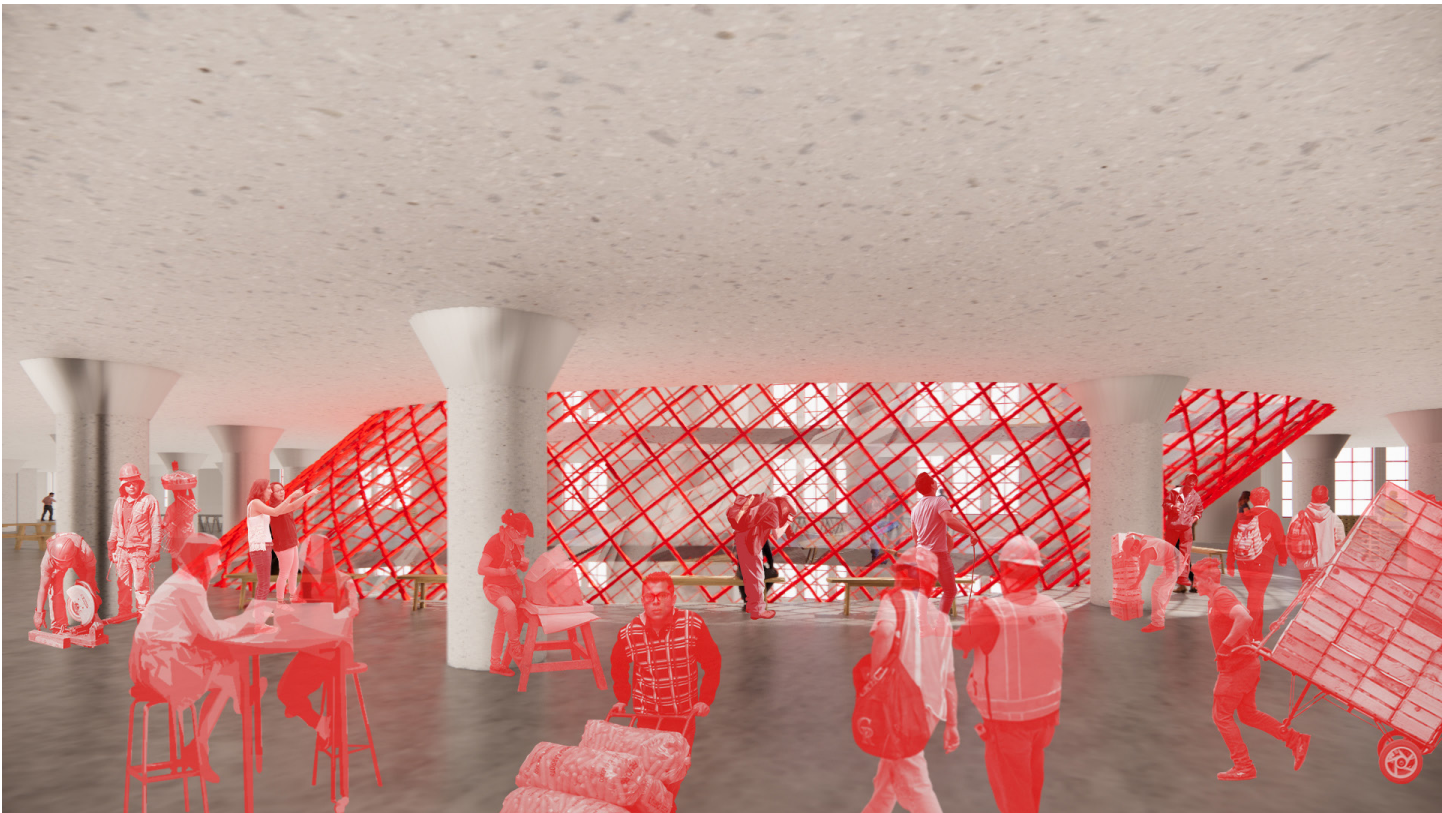


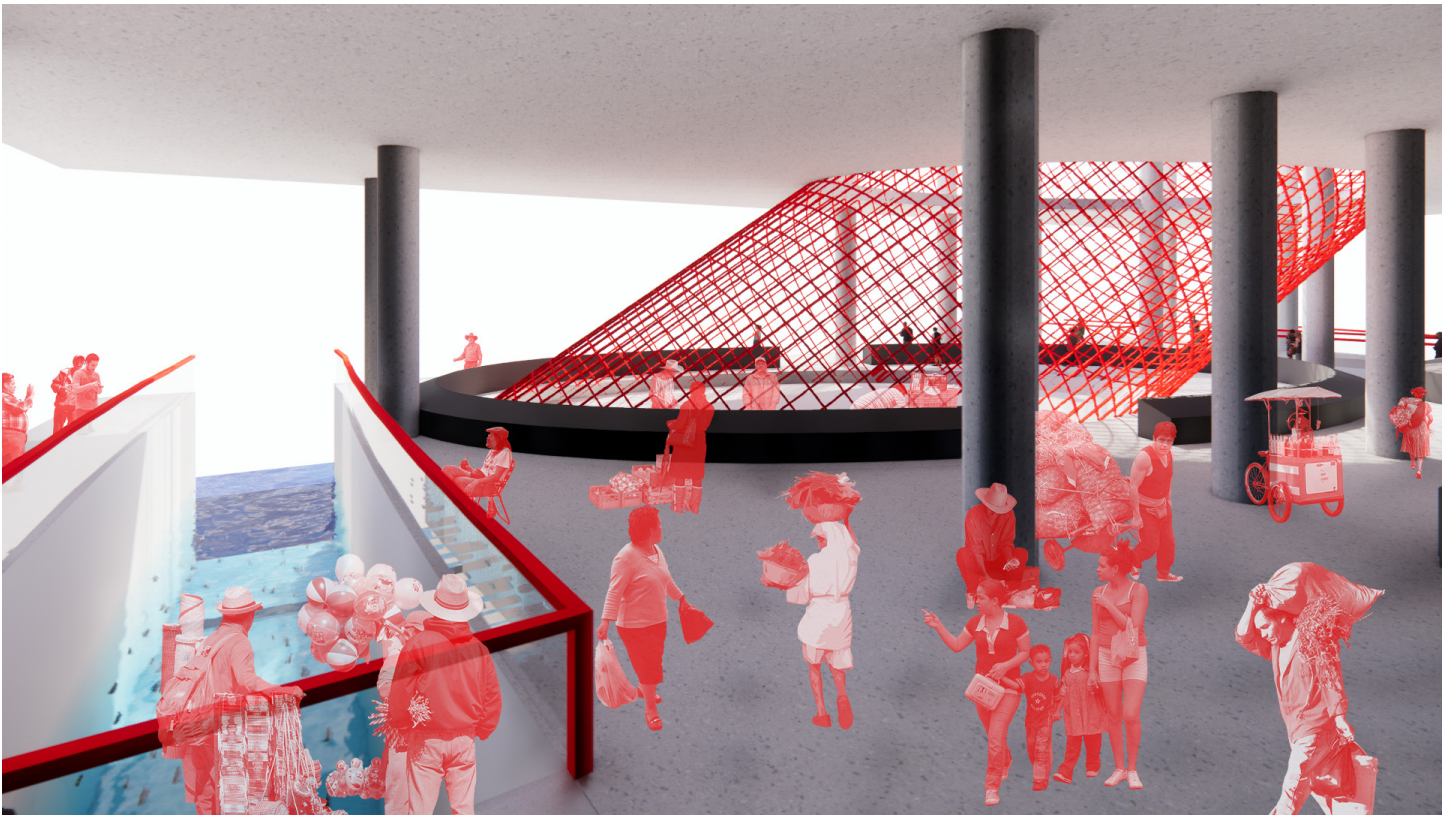
BUILDING B PUBLIC ZOOM IN

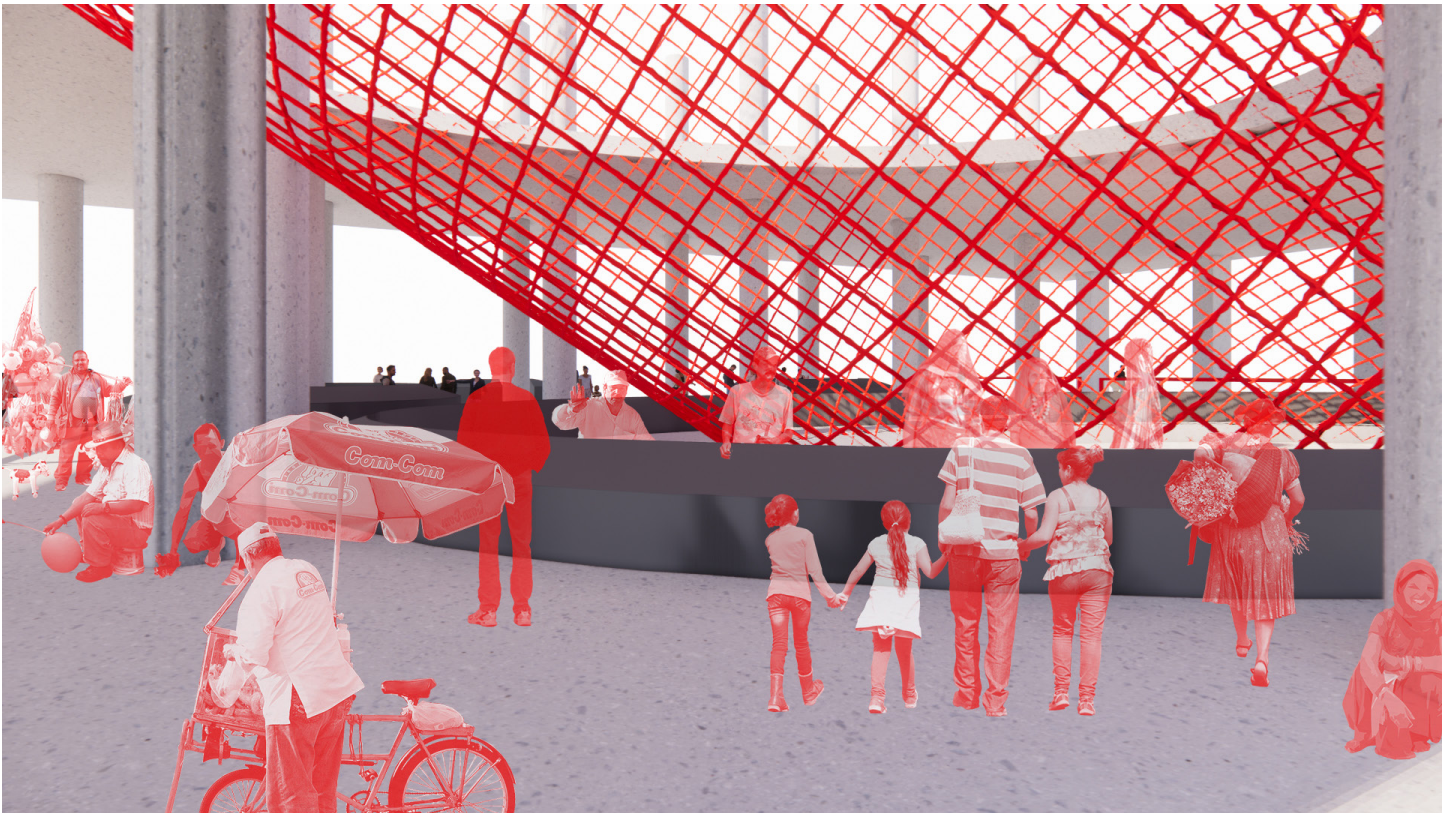




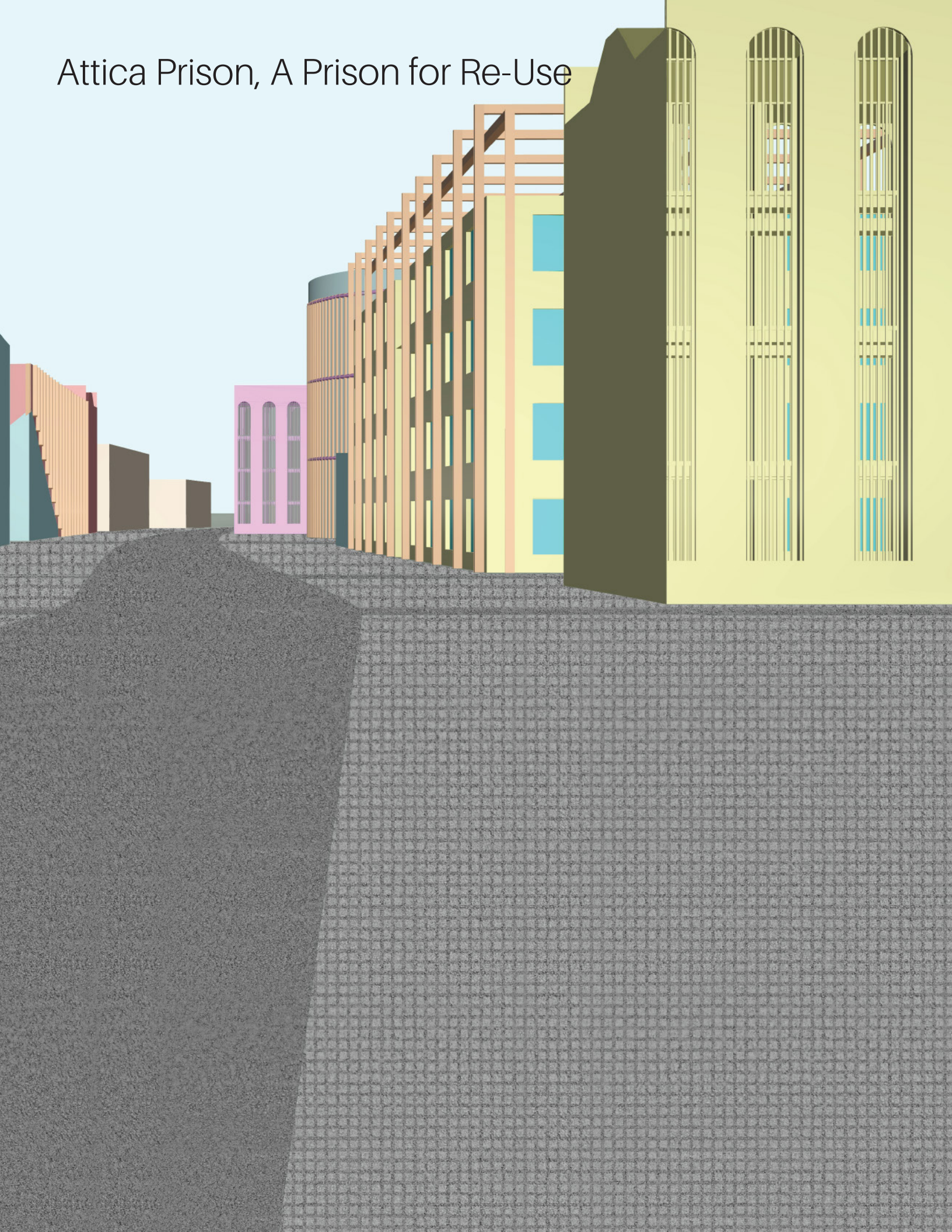








Attica Prison, A Prison for Re-Use



Spring 2023

//Instructor(s): Olga Aleksakova, Joel McCullough

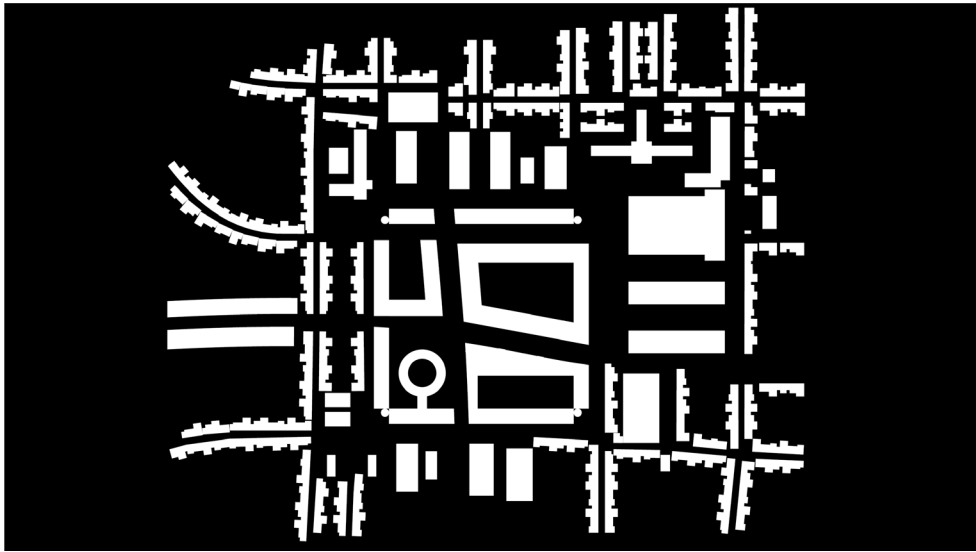
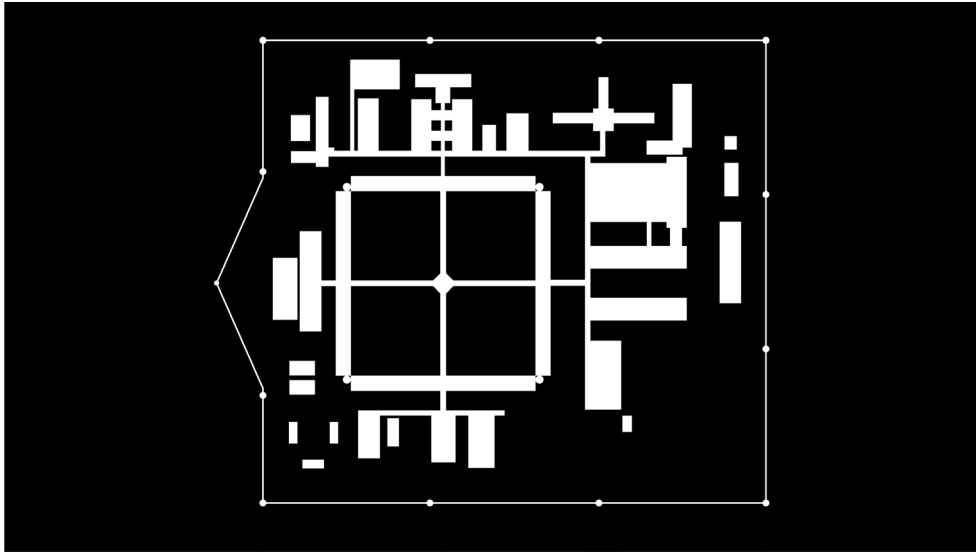
With declining incarceration rates and more progressive values being inputted in the judicial system, the decline of prison complexes is inevitable. In terms of re-use and re-adaptation, the prison typology can be made liveable. Attica Prison is surrounded by walls, with prisoners being circulated through the campus in lengthy, enclosed corridors. Many different buildings exist within, from mess halls, hospitals, and workshops as well as cell blocks.

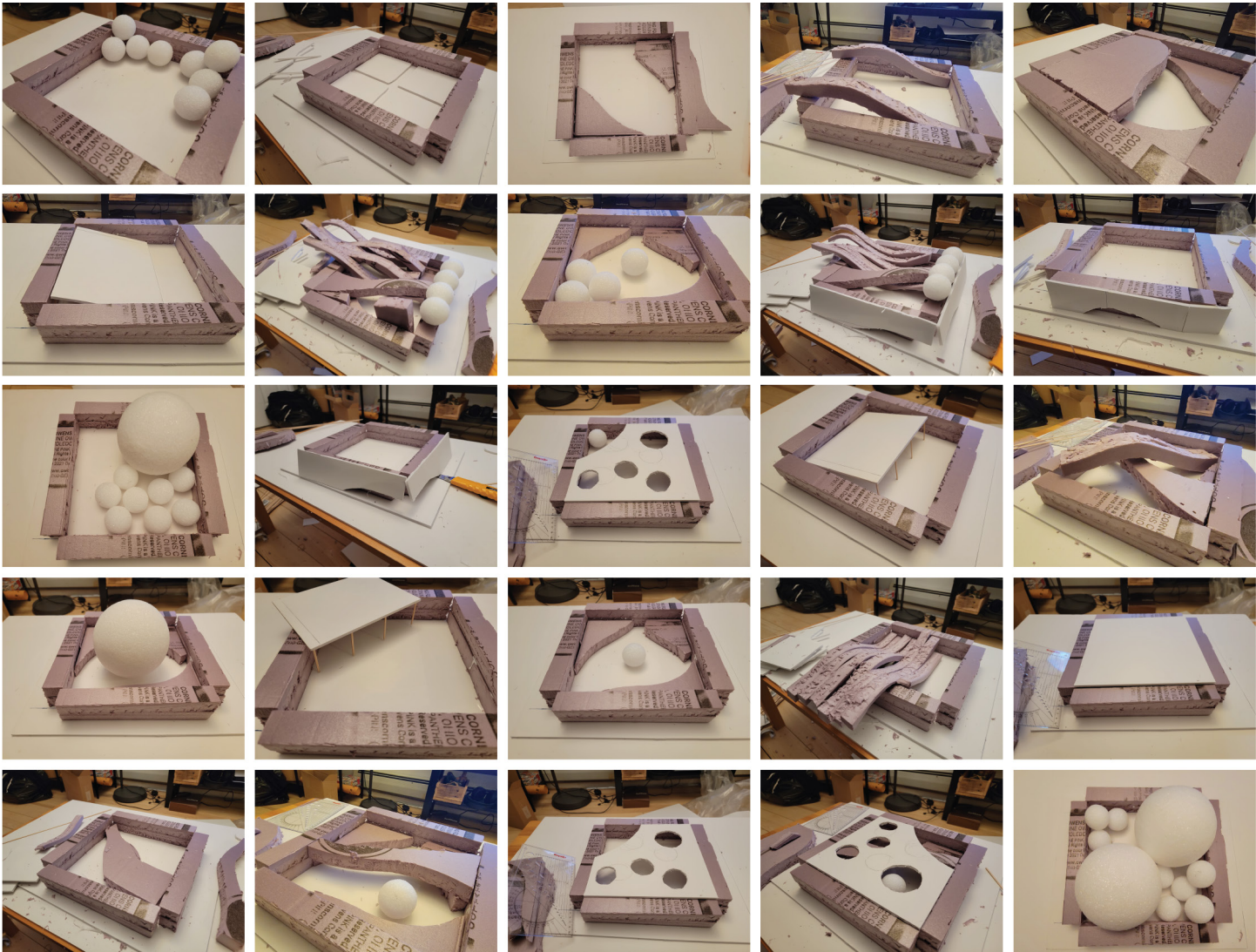
This project aims to convert Attica Prison into a Prison for re-use. This project tackled two challenges throughout the semester. First, the scale of this complex proved to be too large to think of this as a simple re-adaptation project. Taking into account the site, the relationship to the town of Attica, and the buildings existing there already, molding this project into a urban design project provided much more positive results.

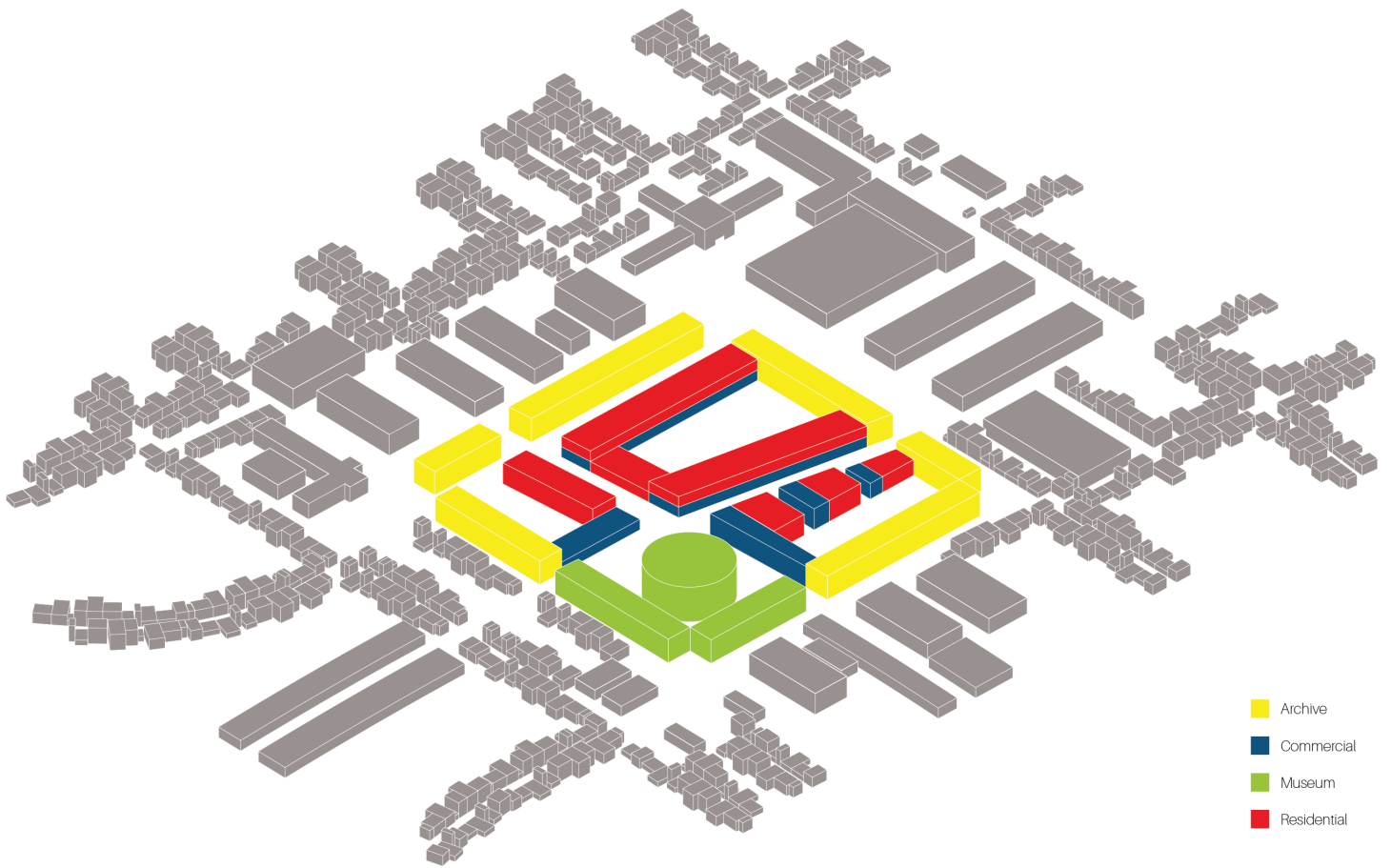
Second, people have an internal bias to living in a place with such a dreadful history. How can this typology then attract people to move here? Born from the urban design perspective, thinking about this typology as a new town square, and then a new town made it livelier. Taking inspiration from places such as Almere, Rotterdam, and Bruges, the project then asked the question of what would a rural city center look like?

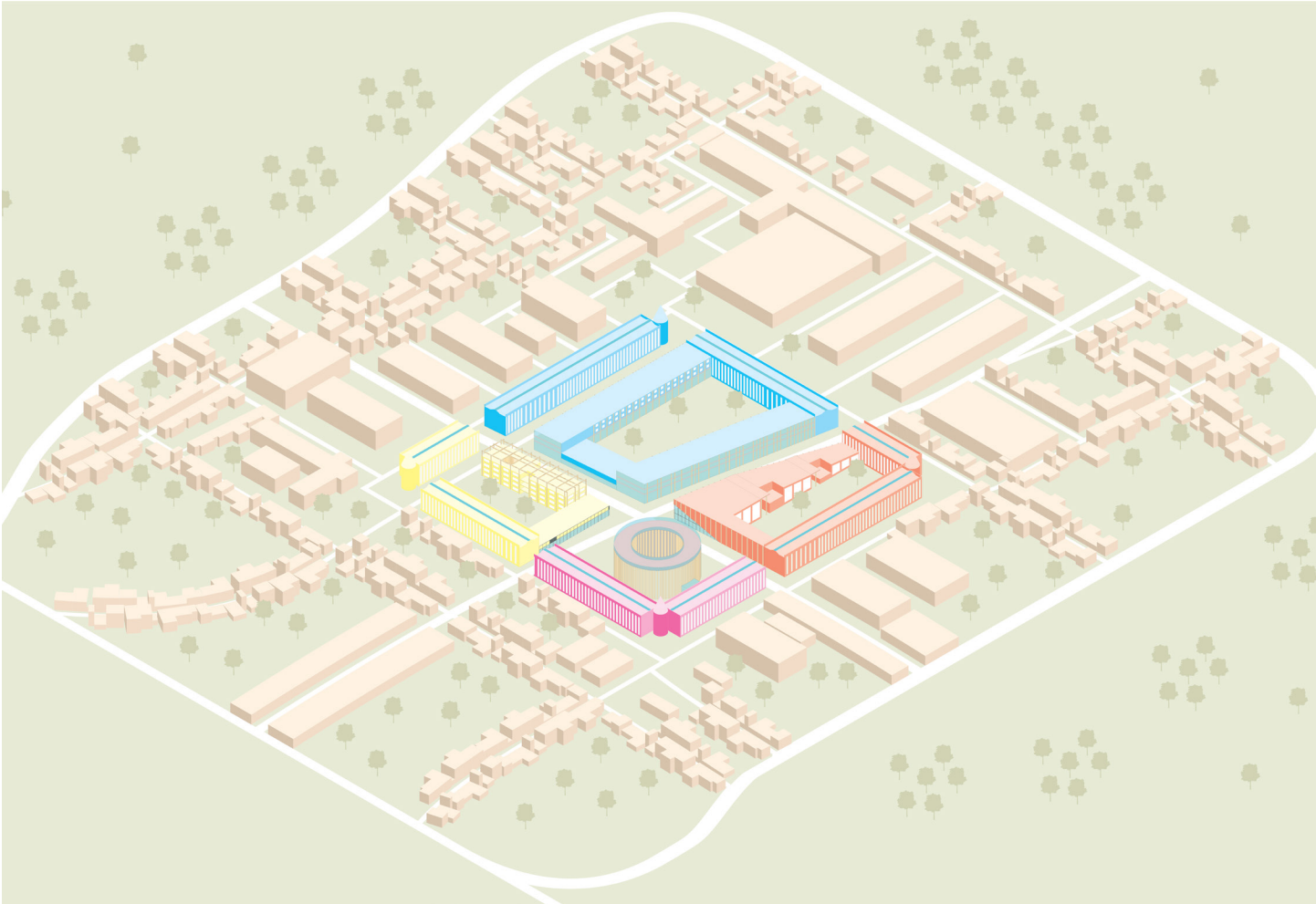


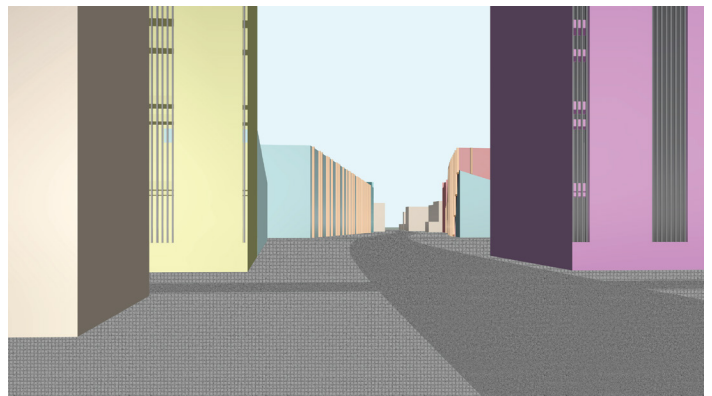
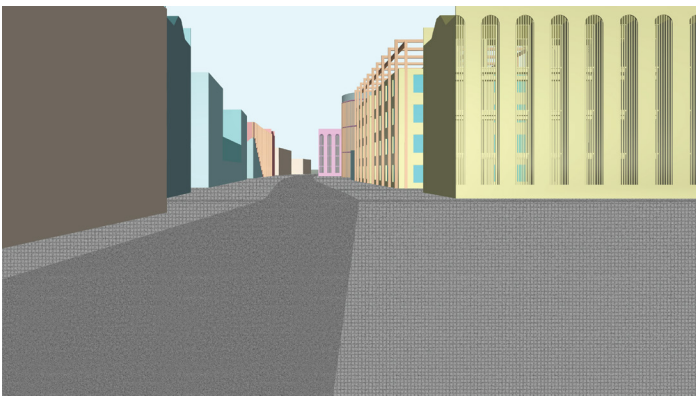
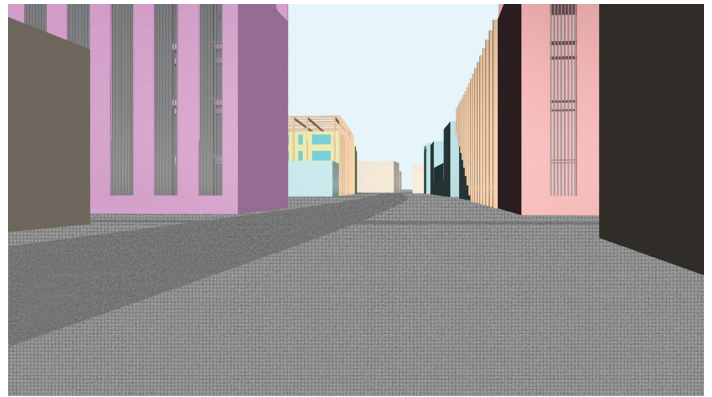
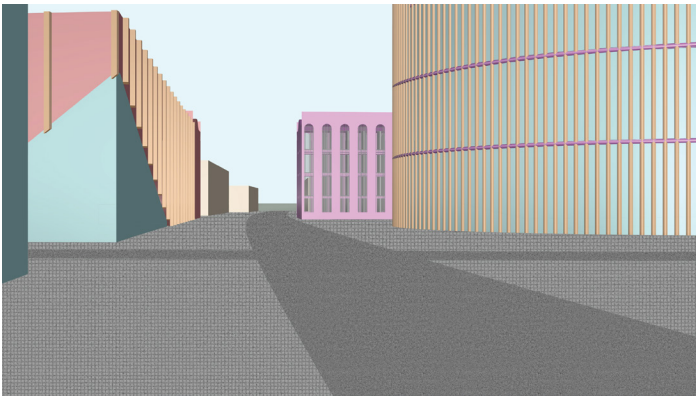
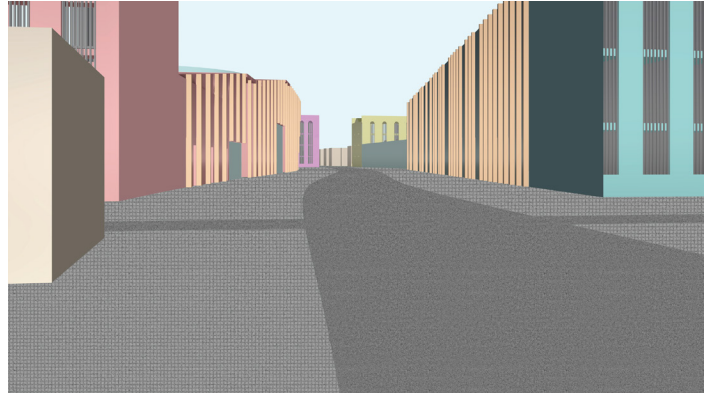
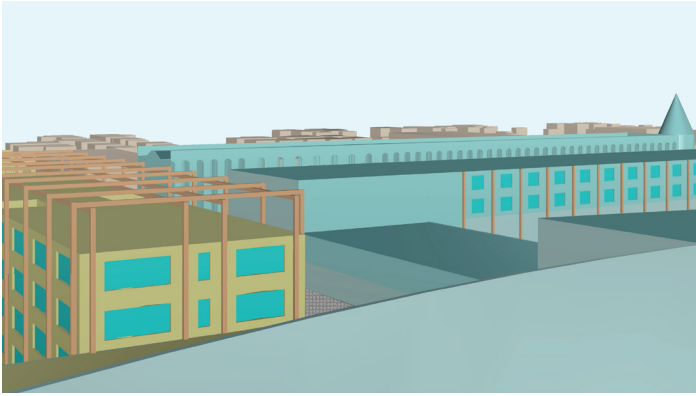














Hierarchies of Control



Fall 2022

//Instructor(s): Elise Hunchuck, Marco Ferrari

The Indus Watershed consists of 6 rivers and extends through Pakistan, India, and the Tibetan Plateau. The 6 rivers are the Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej. The goal for this project is a response to the devastating flooding in Pakistan in 2022, and to place the control of the watershed in the hands of the Pakistani people, rather than to globally tied infrastructure that populate the watershed. There are natural ways of water management that work with the watershed, instead of against it. Flooding, while dangerous, is needed for this watershed and Pakistan to grow.

Removal of dams on the watershed can be used to revitalize biodiversity and nature along the rivers. This removal takes place within a timeline, where Year 0 creates a buildup of sediment along the river, which has previously been accumulating behind the reservoir. In 2 weeks time, the sediment reaches the shores of the river and creates nutrition filled soil. In Year 1, the sediment falls back into the new movement of the river, which is now narrower and more abundant.

The expansion and retraction of the river post dam removal will serve as a riparian buffer, helping with over flooding. Beyond that would be a re-introduction of agriculture that traditionally grow in water in Pakistan would also begin to serve as a mitigation against over flooding. The final phase of this project is the moving of Mangrove Forests to the river's edge. Mangroves naturally serve as a barrier against flooding, and by growing them on river banks will replenish and create biodiversity.

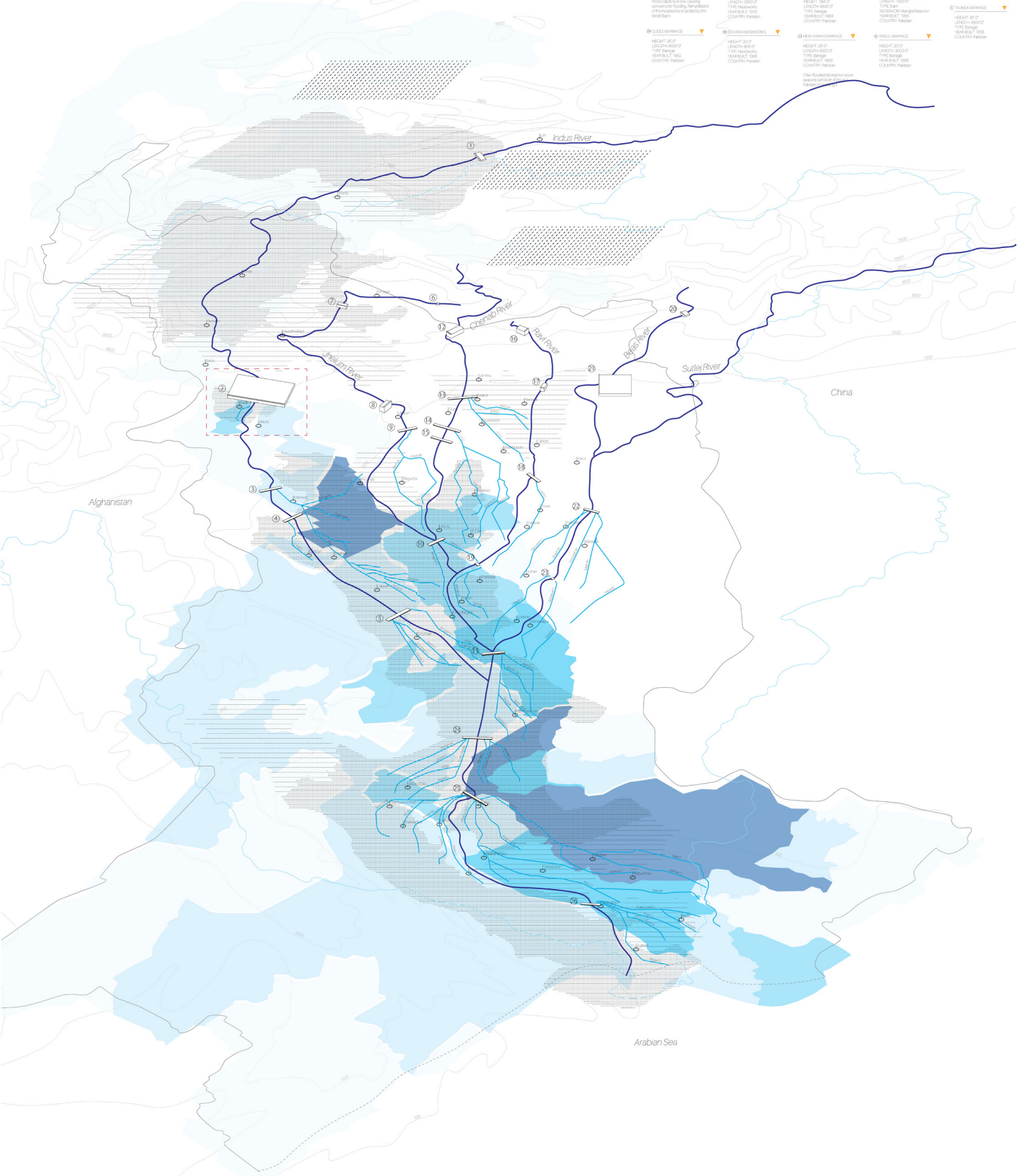
The Indus Water Treaty of 1960



Current Infrastructures in the Indus Watershed

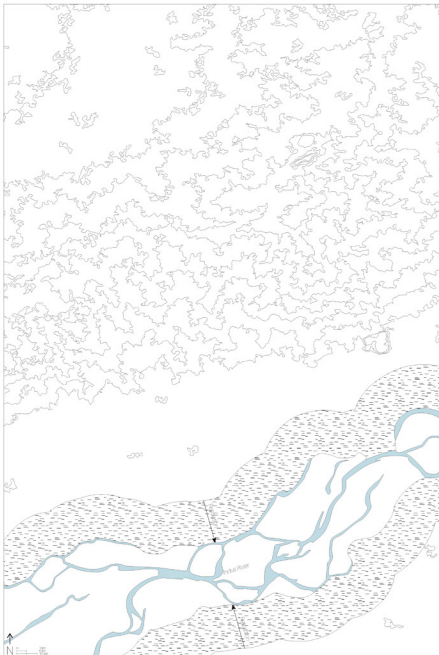
- Rangeheadworks
- Dam and Reservoir
- Canal
- Border
- Field
- Zone
- Watered
- Heavy Flood Hazard, 2017
- Medium Flood Hazard, 2017
- Medium Flood, 2020
- Medium Flood, 2022
- Light Flood, 2022
- High Hazard, 2022
- City
- Range
- Town

① JALM BARAJ HEIGHT: 200' / LENGTH: 5000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	② HINGO DAM HEIGHT: 180' / LENGTH: 1000' / TYPE: Dam / RESERVOIR: Panch Lake / YEAR BUILT: 1927 / COUNTRY: India	③ GHAGGAR BARAJ HEIGHT: 200' / LENGTH: 3000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan	④ THAKA BARAJ HEIGHT: 700' / LENGTH: 1000' / TYPE: Range / YEAR BUILT: 1939 / COUNTRY: Pakistan	⑤ SOUL DAM HEIGHT: 200' / LENGTH: 1000' / TYPE: Dam / RESERVOIR: Sagar Lake / YEAR BUILT: 1927 / COUNTRY: Jamshaid Pur, India	⑥ AGRI CAMP HEIGHT: 180' / LENGTH: 800' / TYPE: Camp / YEAR BUILT: 2014 / COUNTRY: India
⑦ KANG DAM HEIGHT: 400' / LENGTH: 3000' / TYPE: Range / YEAR BUILT: 1956 / COUNTRY: Pakistan	⑧ KANG DAM HEIGHT: 400' / LENGTH: 1000' / TYPE: Dam / RESERVOIR: Chawar Reservoir / YEAR BUILT: 1956 / COUNTRY: India	⑨ HULLOH HEADWORKS HEIGHT: 200' / LENGTH: 2000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	⑩ HULLOH HEADWORKS HEIGHT: 200' / LENGTH: 2000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	⑪ SARDAR DAM HEIGHT: 1100' / LENGTH: 4000' / TYPE: Dam / YEAR BUILT: 1967 / COUNTRY: Jamshaid Pur, India	⑫ DABOL DAM HEIGHT: 400' / LENGTH: 3000' / TYPE: Dam / RESERVOIR: Talsar Reservoir / YEAR BUILT: 1973 / COUNTRY: Pakistan
⑬ SULLIMAN HEADWORKS HEIGHT: 200' / LENGTH: 2000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan	⑭ SULT SAGAR DAM HEIGHT: 400' / LENGTH: 4000' / TYPE: Dam / RESERVOIR: Rana Raja Dam Lake / YEAR BUILT: 2002 / COUNTRY: India	⑮ EL ALAM HEADWORKS HEIGHT: 200' / LENGTH: 2000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan	⑯ EL ALAM HEADWORKS HEIGHT: 200' / LENGTH: 2000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan	⑰ SARDAR DAM HEIGHT: 1100' / LENGTH: 4000' / TYPE: Dam / YEAR BUILT: 1967 / COUNTRY: Jamshaid Pur, India	⑱ CHANAB BARAJ HEIGHT: 200' / LENGTH: 3000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan
⑲ EL ALAM HEADWORKS HEIGHT: 200' / LENGTH: 2000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan	⑳ BALKH HEADWORKS HEIGHT: 200' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉑ BALKH HEADWORKS HEIGHT: 200' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉒ SARKAL BARAJ HEIGHT: 180' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉓ MANGLA DAM HEIGHT: 400' / LENGTH: 1000' / TYPE: Dam / RESERVOIR: Mangla Reservoir / YEAR BUILT: 1960 / COUNTRY: Pakistan	㉔ TALEGA BARAJ HEIGHT: 200' / LENGTH: 3000' / TYPE: Range / YEAR BUILT: 1927 / COUNTRY: Pakistan
㉕ GLEDA BARAJ HEIGHT: 200' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉖ CHANAB HEADWORKS HEIGHT: 200' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉗ NEW HEADWORKS HEIGHT: 200' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉘ NEW HEADWORKS HEIGHT: 200' / LENGTH: 4000' / TYPE: Range / YEAR BUILT: 1922 / COUNTRY: Pakistan	㉙ SOUL BARAJ HEIGHT: 200' / LENGTH: 1000' / TYPE: Dam / RESERVOIR: Sagar Lake / YEAR BUILT: 1927 / COUNTRY: Jamshaid Pur, India	Other flood control infrastructure in the watershed



Timeline of the Tarbela Dam removal in Pakistan

- Dam
- River
- ▨ Paved and Motor-Gate
- Wetland



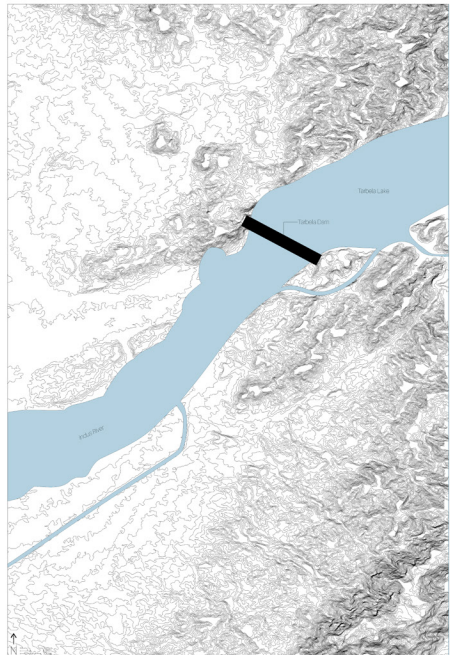
1 Year

Sediment settles along the river bed with a reduced stream allowing for the soil to be used in agriculture. The river still cuts through the newly created or on a more natural flow rather than being controlled by the dam.



1 - 2 Weeks After Removal

Once the dam is removed there is a brief expansion of the wetland to the excess water that was stored in the reservoir system. This can be slowly reduced however to allow for more managed flooding.

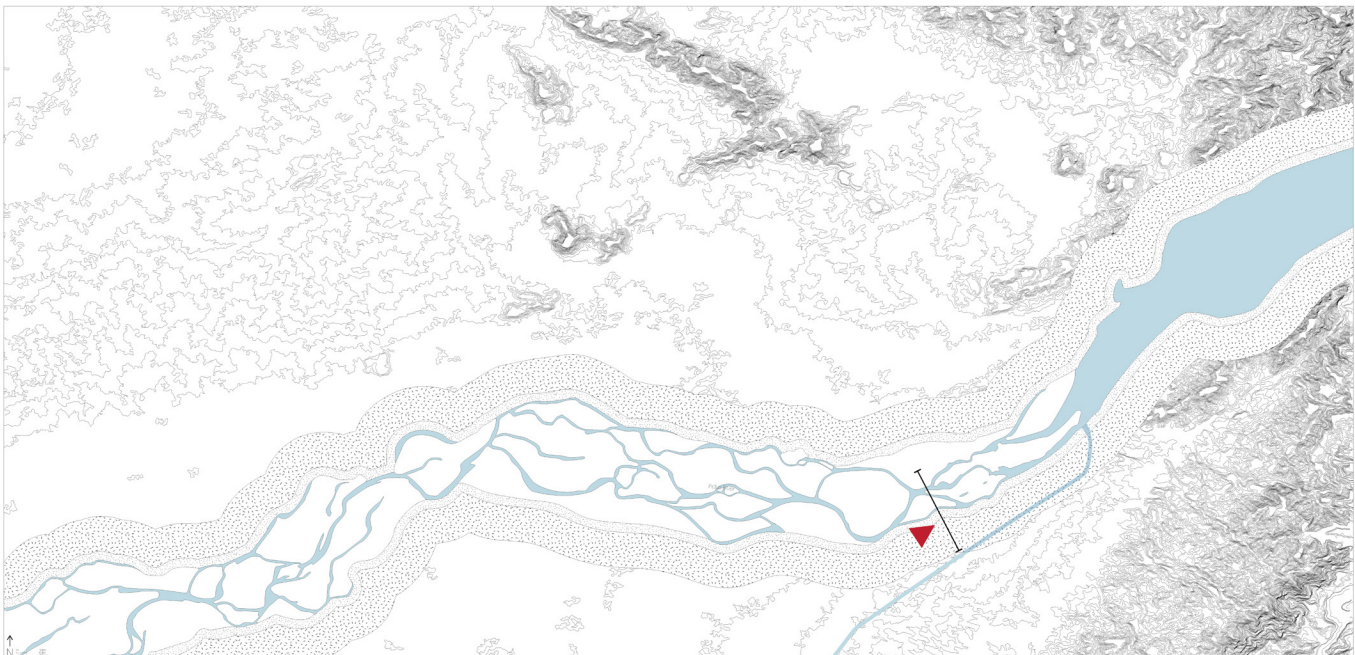


Current

Dams were built for flood control and energy production, control the natural river causing more damage than benefits. The benefits are not offset by more flood protection such as not changing or changing a river management. Flood people are not so because were reduced.

Timeline of the Tarbela Dam removal in Pakistan

-  River
-  Mangrove Zone
-  Agriculture Zone
-  Sediments

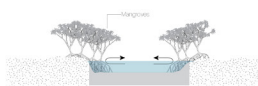


Site Selection

Tarbela Dam, Pakistan
 Coordinates: 34° 37' 17.41" N, 73° 47' 12.4" E
 450m above sea level

Mangrove Forests

Mangroves are natural defences of the coastline. They provide important habitat for birds and other wildlife. Mangroves also play a role in filtering pollutants and sediment from the water before it reaches the sea.



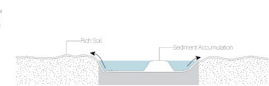
Agriculture

Over the years, the area around the dam has been converted to agricultural land. This has led to a loss of natural habitat and a decrease in biodiversity.



Sediments

Sediments are the result of erosion of soil, rocks, or other material that has been carried to the sea. This material is deposited in the sea, where it can be used for a variety of purposes.



Stagnant



The Indus River is still now, flows unnaturally due to infrastructure built along it. Focusing on the largest dam in Pakistan, the Tarbela Dam's reservoir holds back approximately 14.33 cubic km.



Flooded



Although flooding occurs naturally in Pakistan annually through monsoons and glacier melt, dam releases add on an extremely amount to the flooding and affects those downstream greatly.



Phase 1: Dam Deconstruction + Controlled Flooding



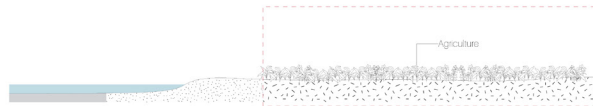
With the first phase of the project, once the dam is deconstructed through a notch and release method, the river expands due to the excess water previously being held back by the dam. However, the flooding is more controlled as the release of water during the deconstruction can be slowed down.



Phase 2: Agricultural Zones



With the areas surrounding the river now heavily sedimented, it becomes richer soil, allowing for more vegetation to grow. The second phase in the project would be extending agricultural zones, allowing the shallower floods to help move nutrients to and from these areas. Agriculture in this area consists of specific products, such as onions, sugarcane, or dates, all of which can grow on the water's surface.



Phase 3. Flood Buffers



The final phase consists of growing mangroves along the river to mitigate natural annual flooding. With the threat of dam releases now gone, the mangroves lined rivers now allow a more manageable amount of flooding to seep through, while creating a natural barrier against destructive flooding.



Future Flooding



With the buffers in place flooding is now mitigated, although not fully stopped due to the sea level rise. The excess water serves the agricultural zone beyond. This cycle of annual flooding allows the areas around the Indian river to be one of the richest.



HARPA Section Drawing



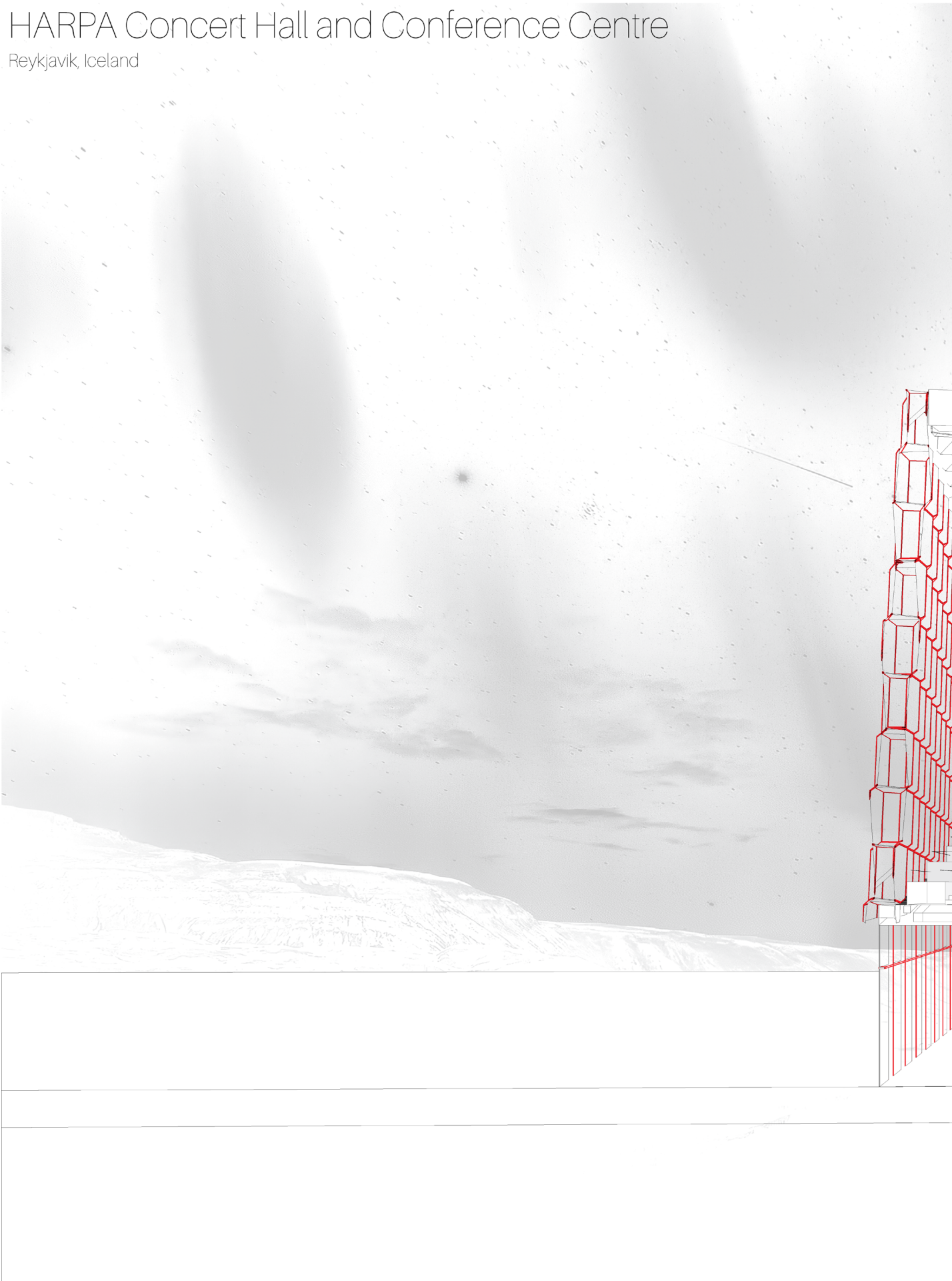
Spring 2023

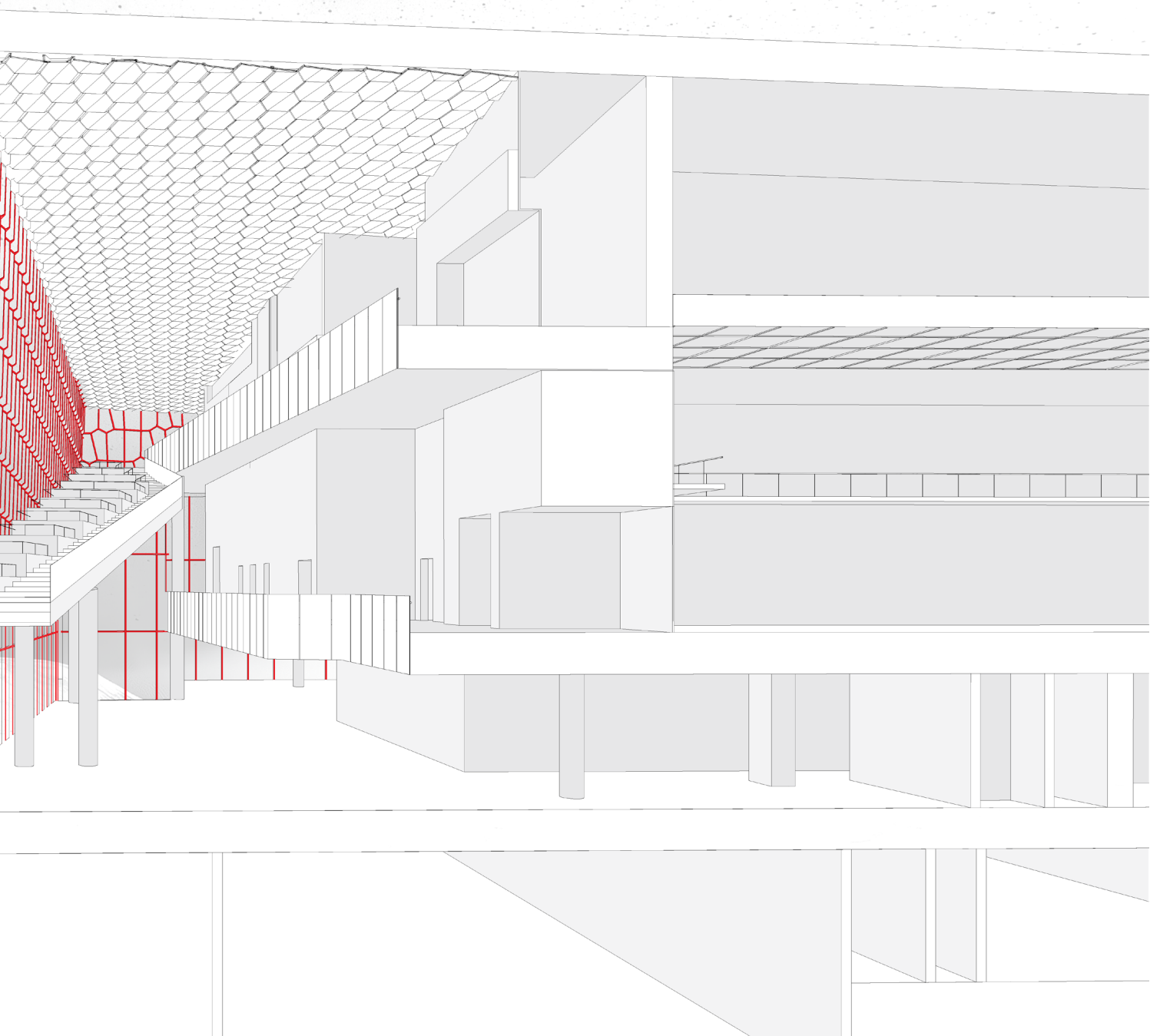
//Instructor(s): Marc Tsurumaki

The Seminar of Section elective asked us to develop a section of a building important to us, or one we were interested in. The HARPA Concert Hall is one such building. Built in 2011, and designed by Olafur Eliasson, the facade of this Hall was the most unique aspect of the building to me. While the use of a section shows the detailed interior of a building, I wanted to challenge myself to reverse the idea, that a section can show the beauty of an intricate and delicate facade system.

HARPA Concert Hall and Conference Centre

Reykjavik, Iceland





Studio City, Venice Style

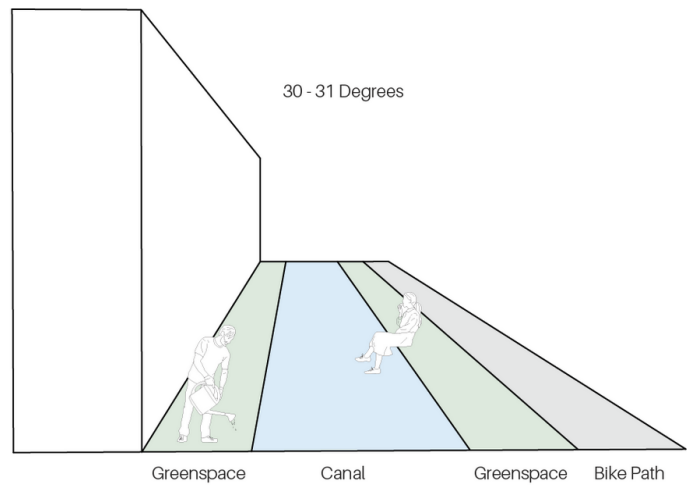
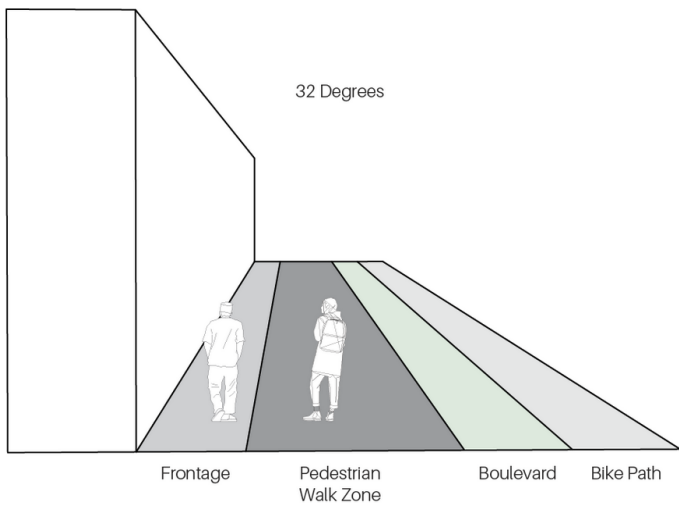


Spring 2023

//Instructor(s): Snoweria Zhang

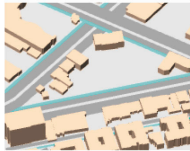
//Partner(s): Polina Stepanova

The X-Info Modeling elective focused on using Grasshopper as a tool for analysis. Throughout the class, we learned different components, and how to apply it to a project proposal. The team's project proposal was the introduction of canals and green lanes in Studio City, Los Angeles. Initially coming from research of canals lowering urban environment temperature by 1 to 2 degrees, the project then evolved into walkability metrics, sun-light analysis, and remaining area for commuters. While we do not want to create islands in Studio City, we wanted to find the perfect middle ground between all of these points.

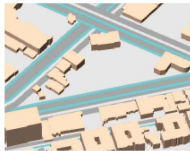


INPUTS

CANAL WIDTH



10%



25%



50%

what percentage of the street does canal take?

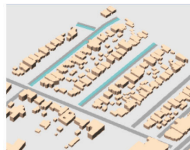
CANAL DENSITY LOCATION



center



near major street



scattered

where are the canals located?

CANAL PROMINENCE



5%



25%



50%



95%

what percentage of all the streets have canals?

AMOUNT OF TREES



25



75



300

how many trees are there?

TREE DENSITY LOCATION

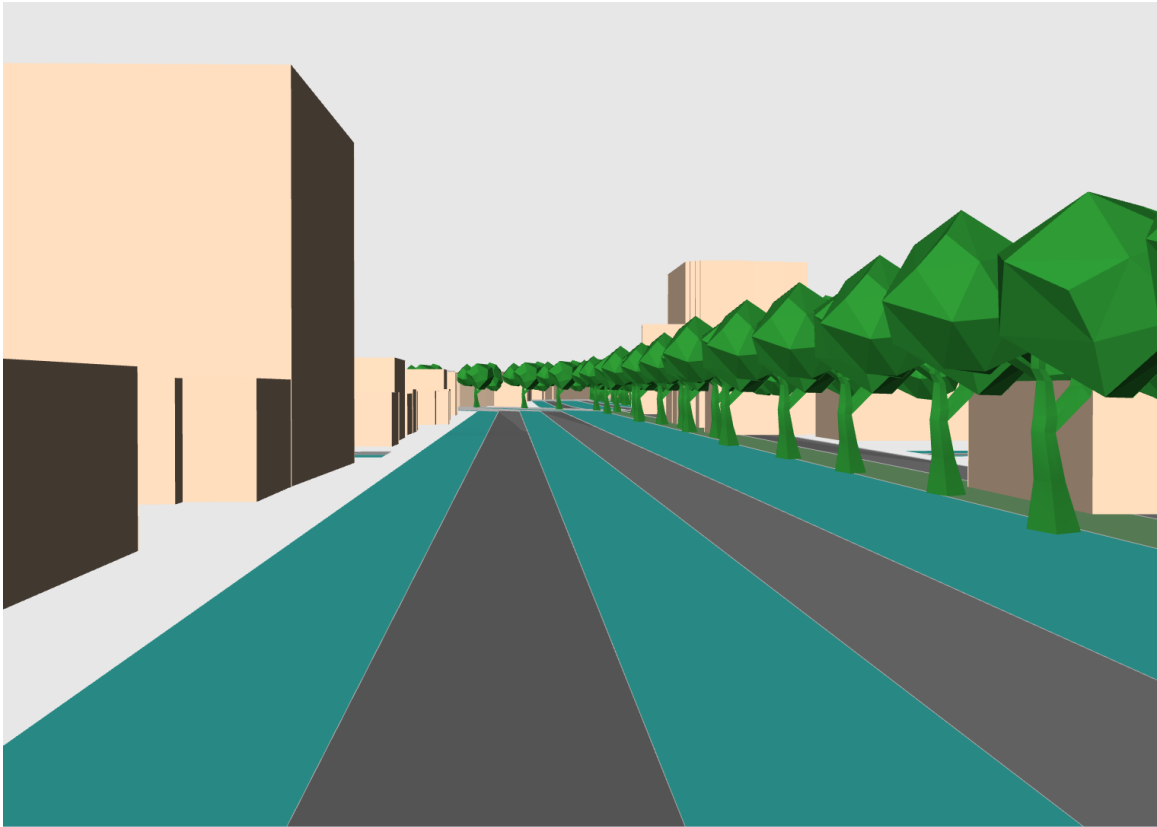


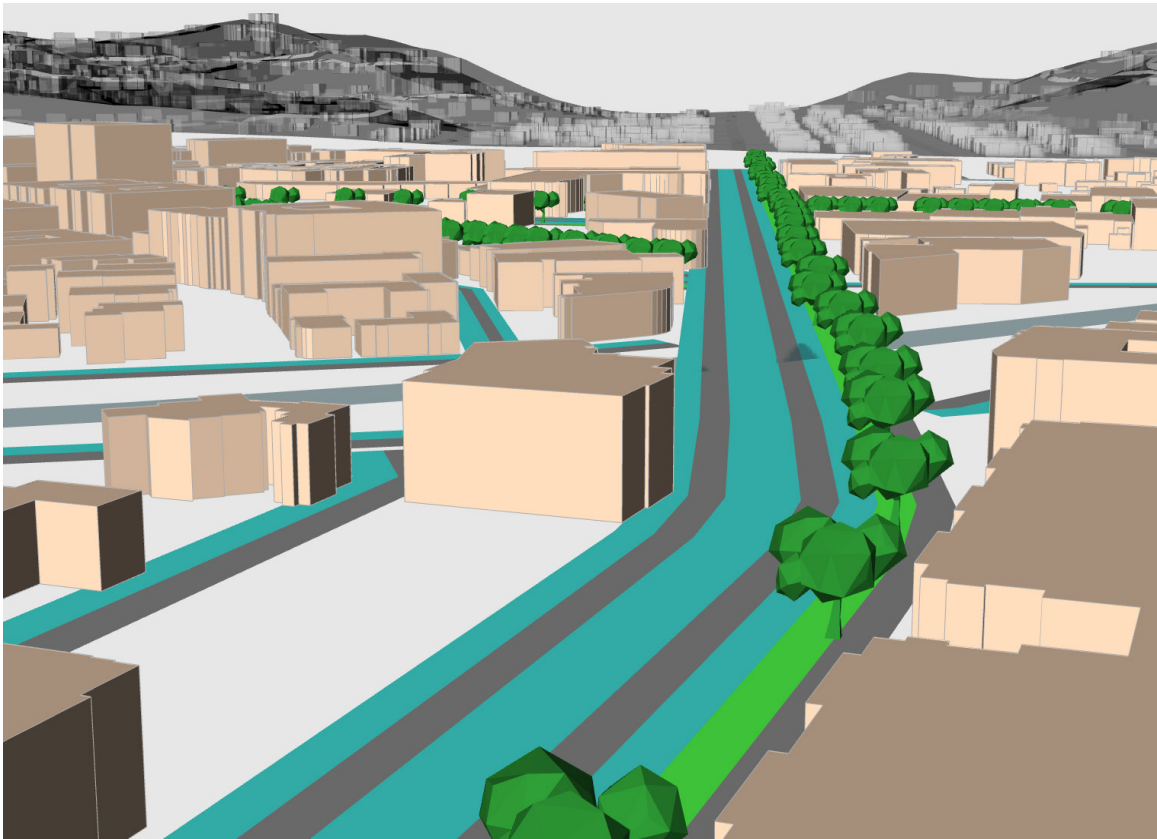
center

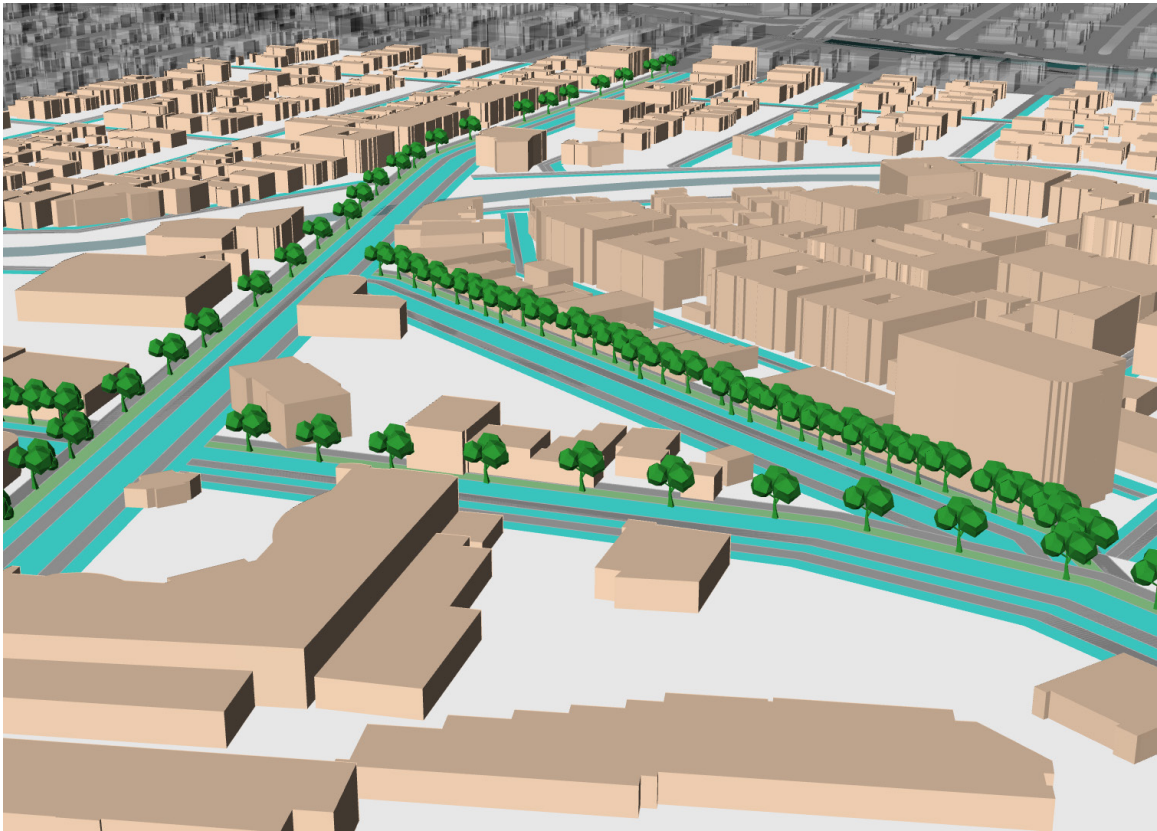


scattered

which streets have lanes for tree planting?









Mapping San Francisco's Retrofitted Buildings by Household Income



Fall 2022

//Instructor(s): Leah Meisterlin

//Teaching Assistant(s): Mario Giamperi

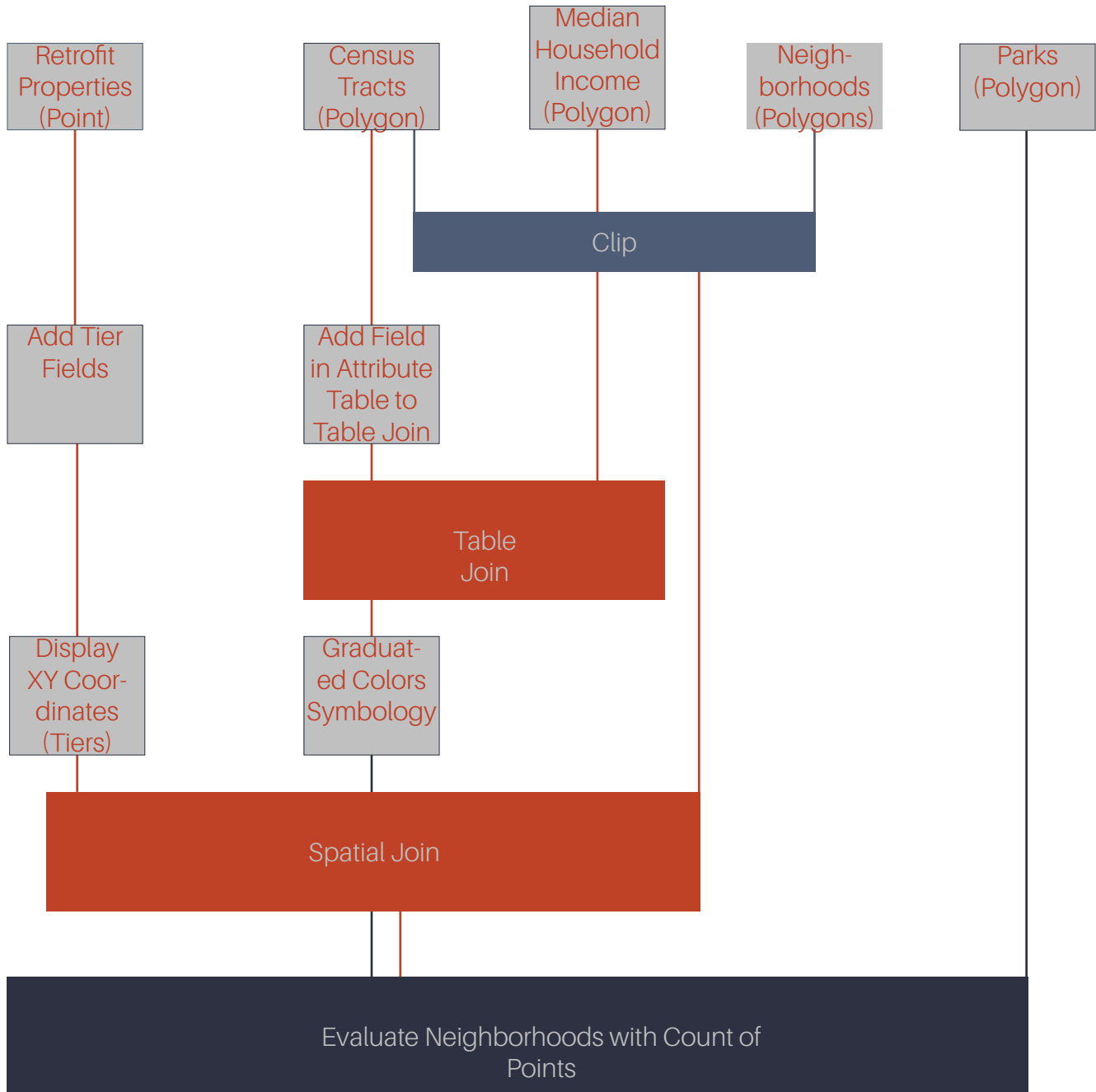
San Francisco lies on the San Andreas fault that runs through the west coast of the United States. Having faced earthquakes in 1906, and more recently in 1989, the city has had to rebuild itself and introduce new legislation to build and renovate safer buildings.

San Francisco is a melting pot of different people from different backgrounds. While the city prides itself on its diverseness, neighborhoods have long been the tell for a person's economic background. The difference between the Tenderloin and Pacific Heights, despite being less than 2 miles apart, cannot be more distant between income.

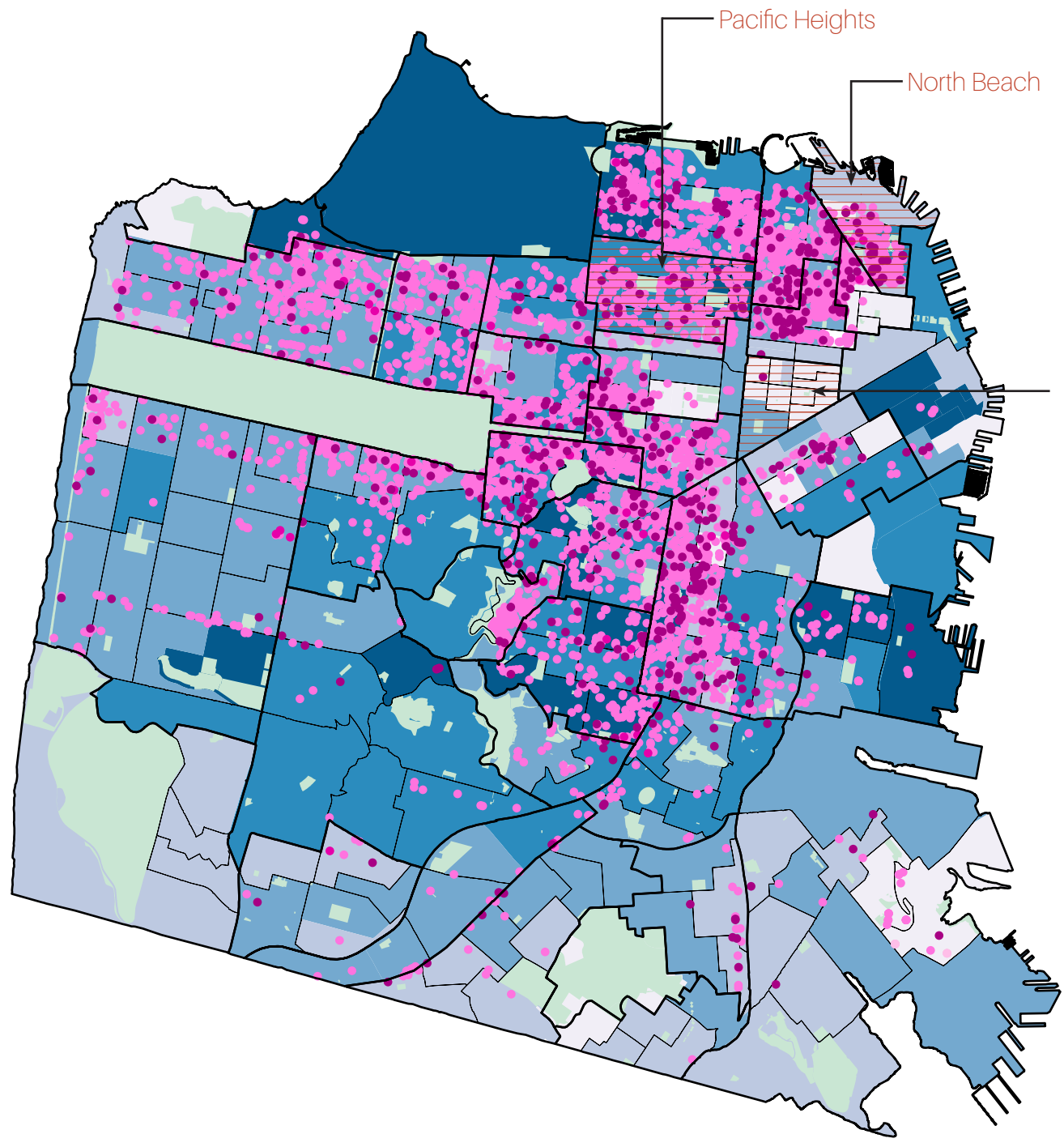
The Mandatory Seismic Retrofit Program of 2013 brought about laws requiring the retrofit of all wood framed soft story buildings in San Francisco.

This project aims to discover any correlation between the status of retrofitted buildings, and the neighborhoods they populate. For the purposes of this project, we will be analyzing three neighborhoods, the Tenderloin, Pacific Heights, and the North Beach.

_Methodology



- Census Tract Borders
 - Neighborhood Borders
 - Parks
 - ▨ Neighborhoods of Interest
- Median Household Income
 - \$0 - \$50,000
 - \$50,001 - \$100,000
 - \$100,001 - \$150,000
 - \$150,001 - \$200,000
 - \$200,001 - \$250,000
- Retrofit Status
 - Retrofit Non-Compliant
 - Retrofit Completed, No CFC Issued
 - Retrofit Completed, CFC Issued
 - New Construction



Projected Coordinate System: US National Atlas Equal Area
 Projection: Lambert Azimuthal Equal Area
 Geographic Coordinate System: Clarke 1866 Authalic Sphere



_Tenderloin

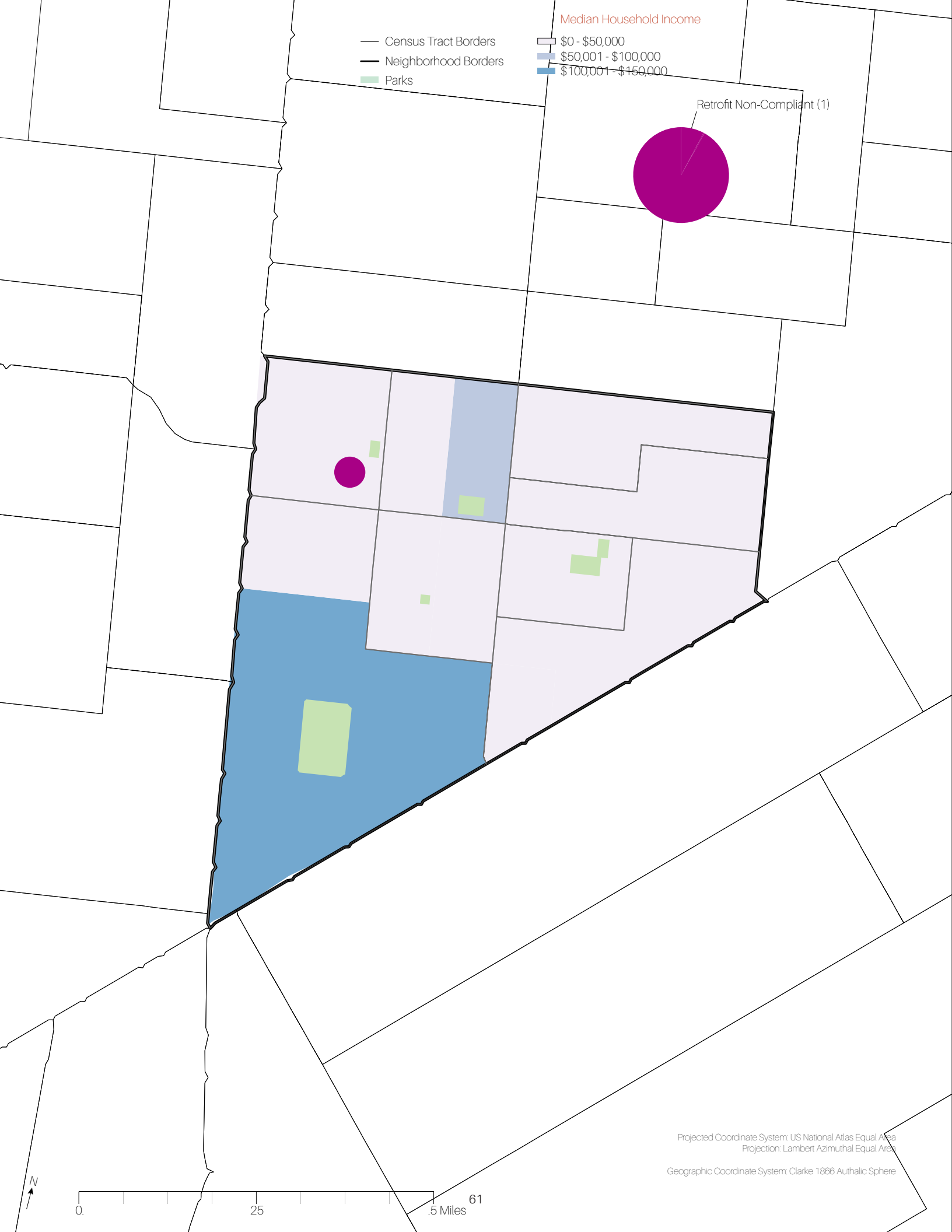
The focus on the Tenderloin neighborhood of San Francisco was made because it is a low income neighborhood in San Francisco with a large demographic of minorities. The hypothesis for this neighborhood was that the retrofitting process would be non-compliant.

However, according to the City and Country of San Francisco, there is only one soft story property, but it is still non-compliant.

— Census Tract Borders
— Neighborhood Borders
■ Parks

Median Household Income
□ \$0 - \$50,000
■ \$50,001 - \$100,000
■ \$100,001 - \$150,000

Retrofit Non-Compliant (1)



Projected Coordinate System: US National Atlas Equal Area
Projection: Lambert Azimuthal Equal Area
Geographic Coordinate System: Clarke 1866 Authalic Sphere

0 25 50 61
.5 Miles

_Embarcadero

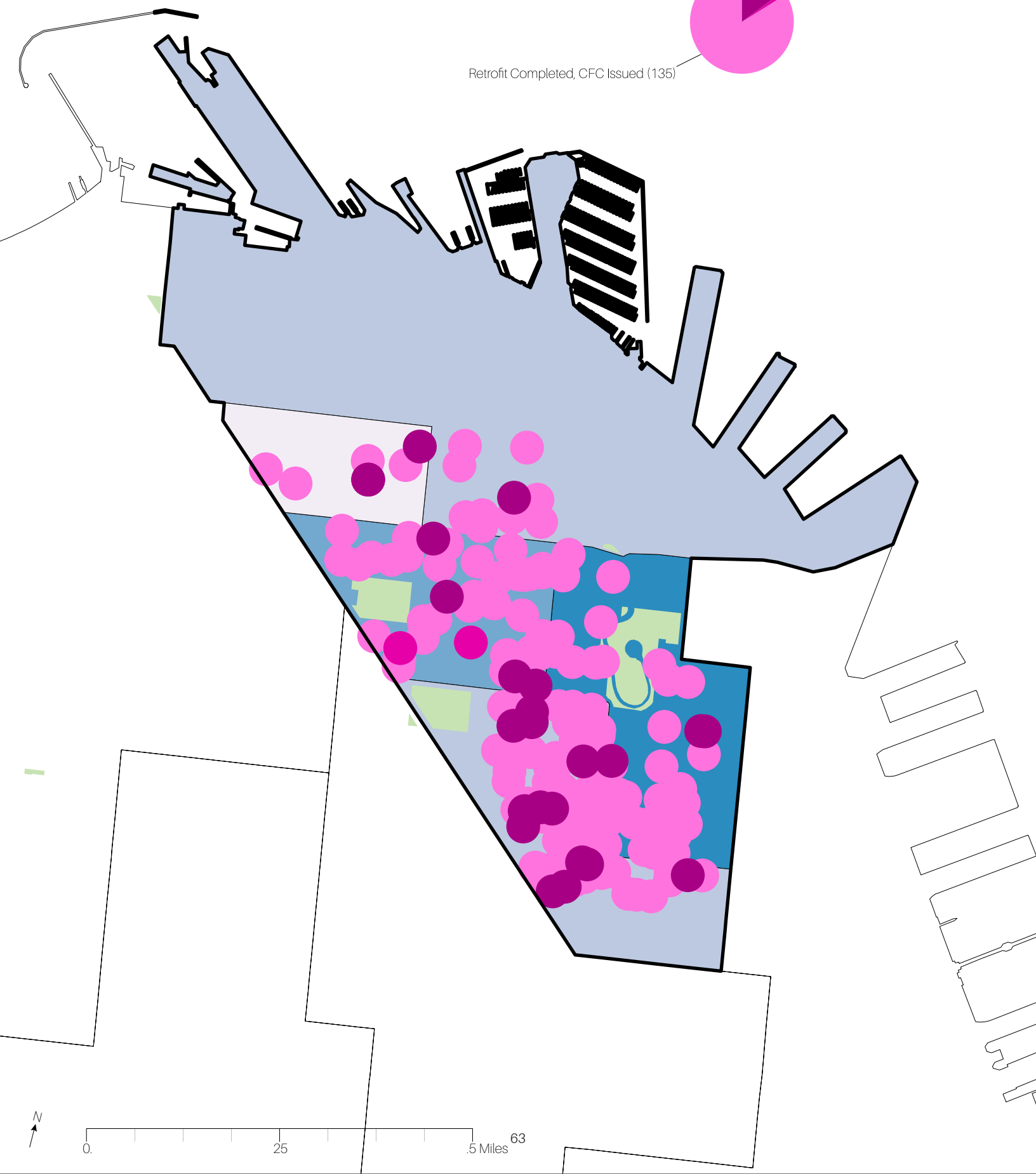
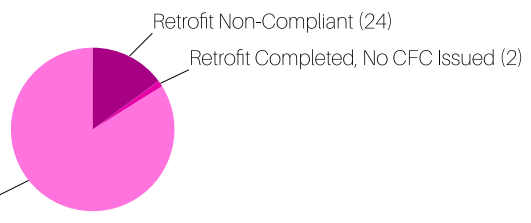
The Embarcadero was chosen as a mixture between low median household income, and high median household income. There is more variation in this neighborhood than the Tenderloin.

Less than a quarter of soft story properties in this neighborhood are non-compliant, but they mainly fall in the \$100,000 and less median household income census tract zones.

Overall, the retrofit completion of soft story properties in this area is high.

Median Household Income

- Census Tract Borders
- Neighborhood Borders
- Parks
- \$0 - \$50,000
- \$50,001 - \$100,000
- \$100,001 - \$150,000
- \$150,001 - \$200,000



_Pacific Heights

Pacific Heights was chosen as one of the neighborhoods because of its high level of median household income being above \$50,000. The hypothesis behind this decision was that the more well to do neighborhoods of San Francisco would have a bigger sense of urgency in retrofitting its soft story properties.

We can see a greater number of retrofit completions in this neighborhood, with minimum non-compliance properties.

There is also a surprising amount of non-compliant soft story properties within the over \$200,000 median household income zones.

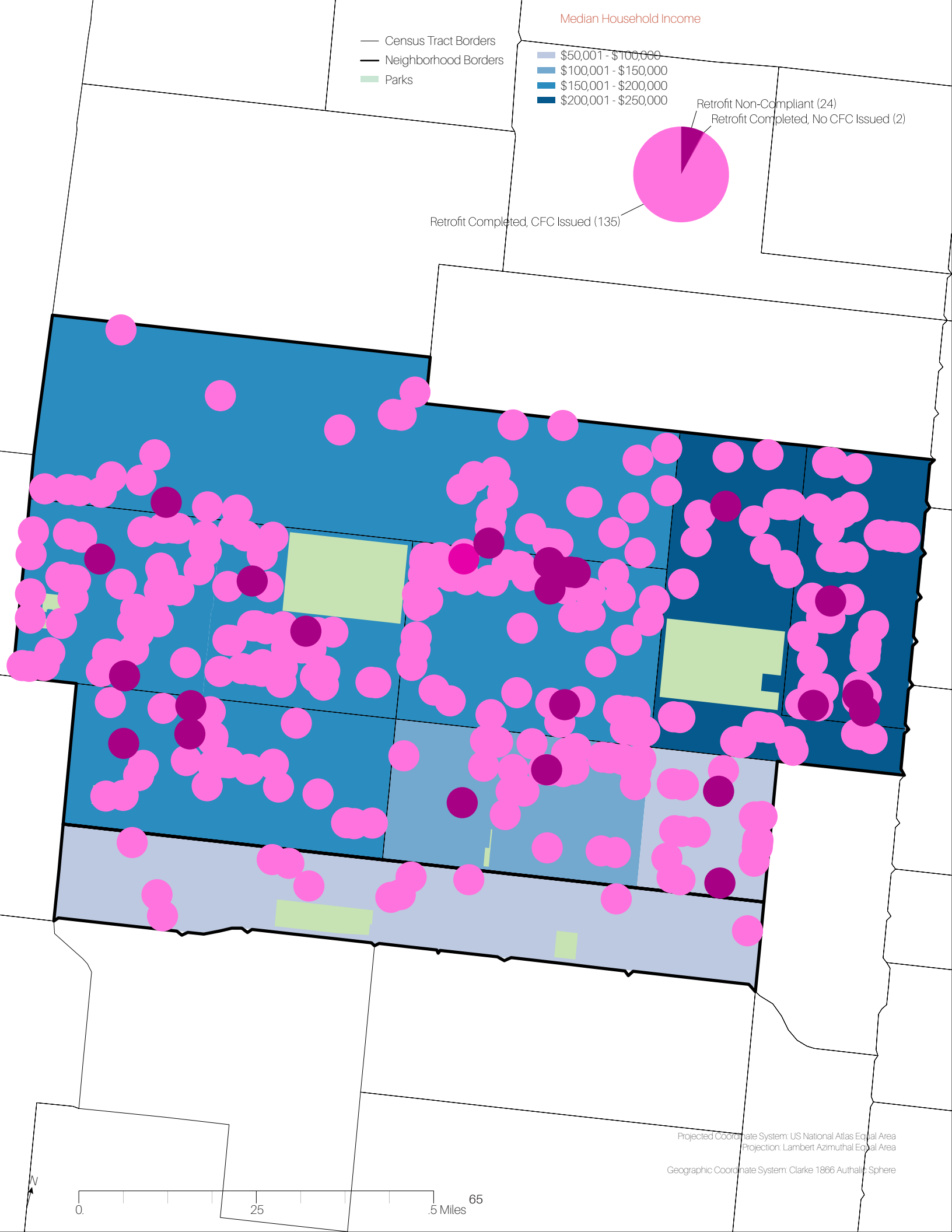
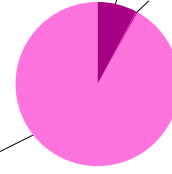
Median Household Income

- Census Tract Borders
- Neighborhood Borders
- Parks

- \$50,001 - \$100,000
- \$100,001 - \$150,000
- \$150,001 - \$200,000
- \$200,001 - \$250,000

Retrofit Non-Compliant (24)
Retrofit Completed, No CFC Issued (2)

Retrofit Completed, CFC Issued (135)



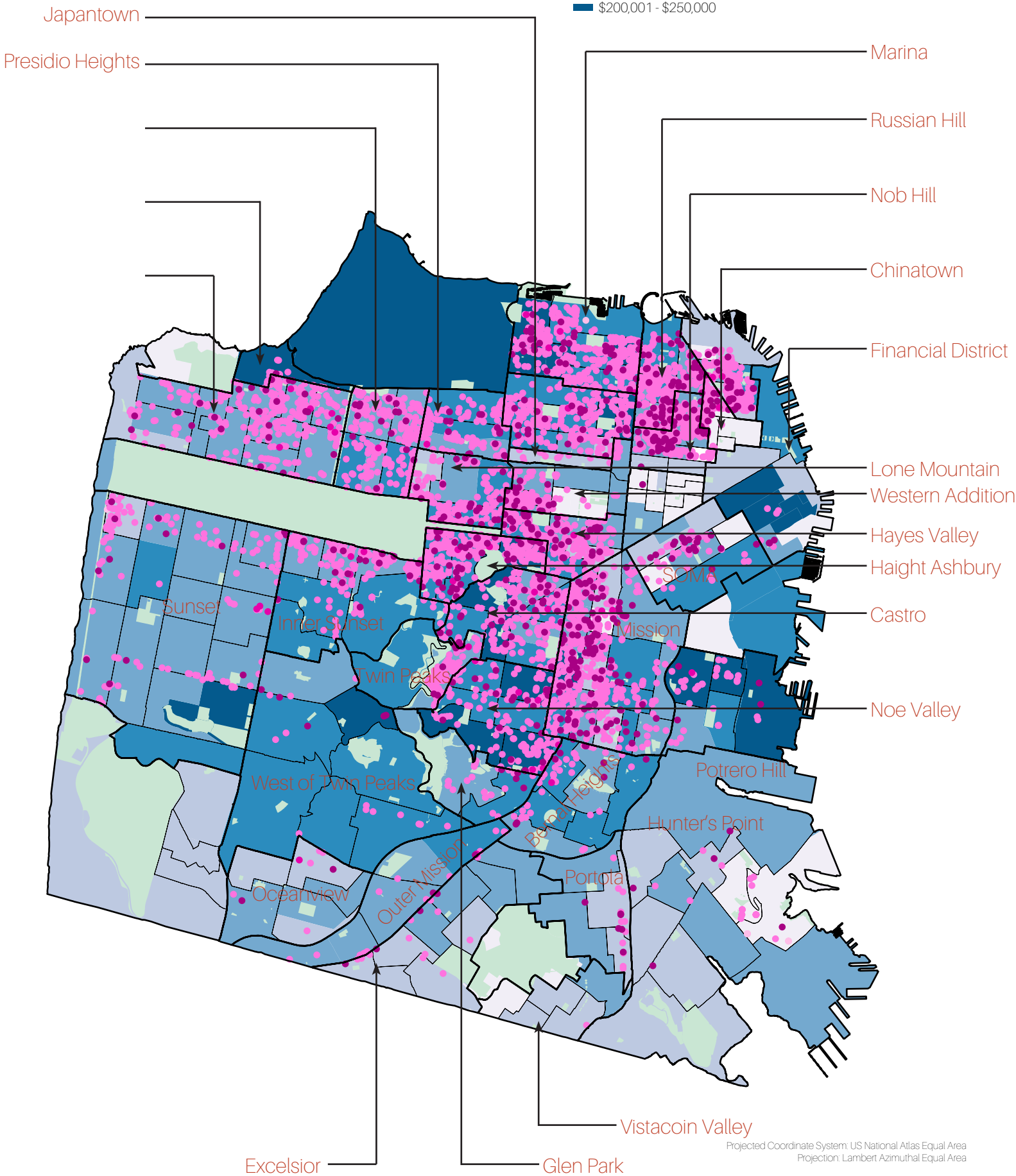
Median Household Income

Retrofit Status

- Census Tract Borders
- Neighborhood Borders
- Parks

- \$0 - \$50,000
- \$50,001 - \$100,000
- \$100,001 - \$150,000
- \$150,001 - \$200,000
- \$200,001 - \$250,000

- Retrofit Non-Compliant
- Retrofit Completed, No CFC Issued
- Retrofit Completed, CFC Issued
- New Construction



_Conclusion

The initial question was to see if there was a connection between lack of retrofitted soft story properties and low income neighborhoods in San Francisco. Based on the scope of this project, there is no correlation between the retrofitted properties and median household income.

However, this project has limitations as mentioned before. We are only looking at 3 neighborhoods of San Francisco, which were chosen on personal biases. They were not chosen on finding the most variations, but rather what is locally known as poor and rich neighborhoods.