



C A R M E N Y U

GSAPP MSAUD
GRADUATION PORTFOLIO '22

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RIO HONDO BI-NATIONAL PARK



02

REYNOLDSTOWN: RIGHT OF LIVING



03

RECLAIM THE AIR





01

RIO HONDO BI-NATIONAL PARK

An unbounded connection that extends the porous gradients of communal spirit and culture - allowing countries to cooperate as joint stewards of the Rio Hondo.

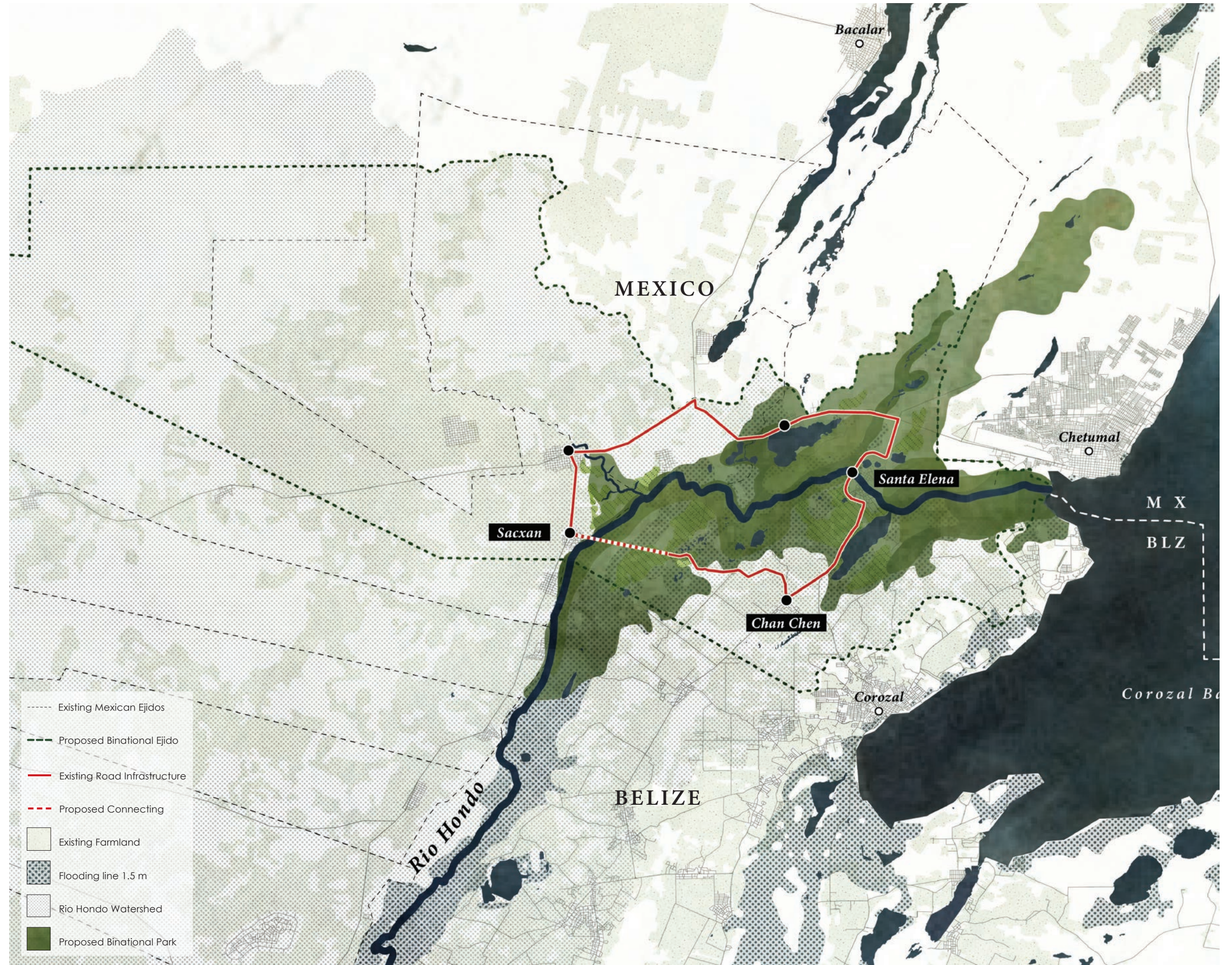
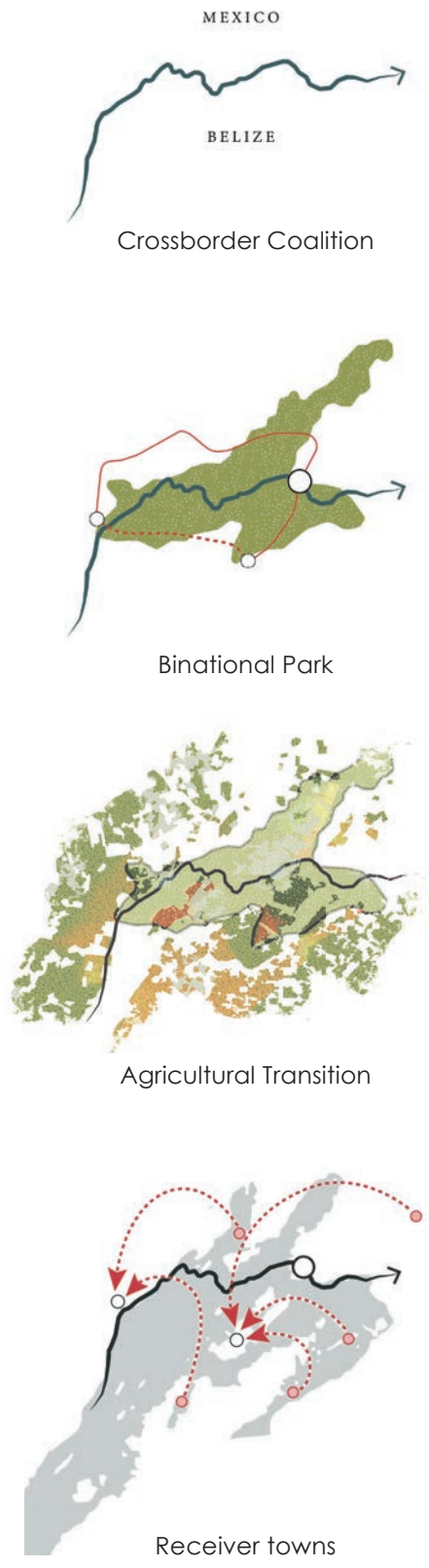
The Rio Hondo has been reduced from a porous watershed to a political boundary between Mexico and Belize. Agricultural expansion has increased deforestation as well as the pollution of the water table that is unique to this region. **Our proposal seeks to strengthen the collaboration between these two nations by drawing from the shared historic knowledge of the Yucatec Mayan communities.** The Rio Hondo Bi-National Park is the driver in envisioning a future of collective stewardship in the face of climate change.

UD Studio III '22: Water Urbanism Belize & Yucatan

TEAM: Carmen Yu, Daniela Deu, Kimberly Ramirez, Tanuja Dhanasekaran

FACULTY: Kate Orff, Thad Pawlowski, Geeta Mehta, Adriana Chavez, Lorena Bello Gomez, Tori Vuono

RIO HONDO BI-NATIONAL PARK



CULTURAL ROOTS

This region has a rich history and Mayan ancestry. A core element to this culture is the understanding that ecological and human needs are interconnected with various other systems weaving, informing, and influencing each other.

This stewardship has been disrupted, but this knowledge continues to exist within these communities. Our proposal hopes to tap into it and re-center the care of this landscape to the communities that have historically tended to it.

Key practices and concepts

CEIBA is a tropical tree native to Mexico, Central America and the Caribbean. It served as beacons for the Maya, representing the deep connection that they had to their surrounding landscape, and larger systems such as the sky, the land, and the soil.

MAYAN CALENDAR Tun (1 year), Katun (20 years), Bakatun (295 years)

YUCATEC MAYA are an indigenous Mayan community native to northern Belize and the Yucatan peninsula.

EJIDO is a piece of land farmed communally under a system supported by the Mexican state.

MILPA is an intercropping agricultural system used throughout Mesoamerica. This communal practice is central to a socio-cultural relationship between farmers, crops and land.

CENOTES are connected underground water systems unique to the Yucatan peninsula.





STRATEGIES

BINATIONAL PARK SANTA ELENA, BELIZE + MEXICO

The tax free zone at the **border crossing** between Sta. Elena and Subteniente Lopez is an existing financial binational cooperation model that we can build upon to establish a Binational park.

RISKS: Mangrove deforestation



AGRICULTURAL TRANSITION CHAN CHEN, BELIZE

Chan Chen is currently a major sugarcane monoculture village. Pesticide and fertilizer use seep into the underground watertable and pollute the Rio Hondo. We propose to reintroduce **milpa and agroforestry** which are less extractive and can diversify crops.

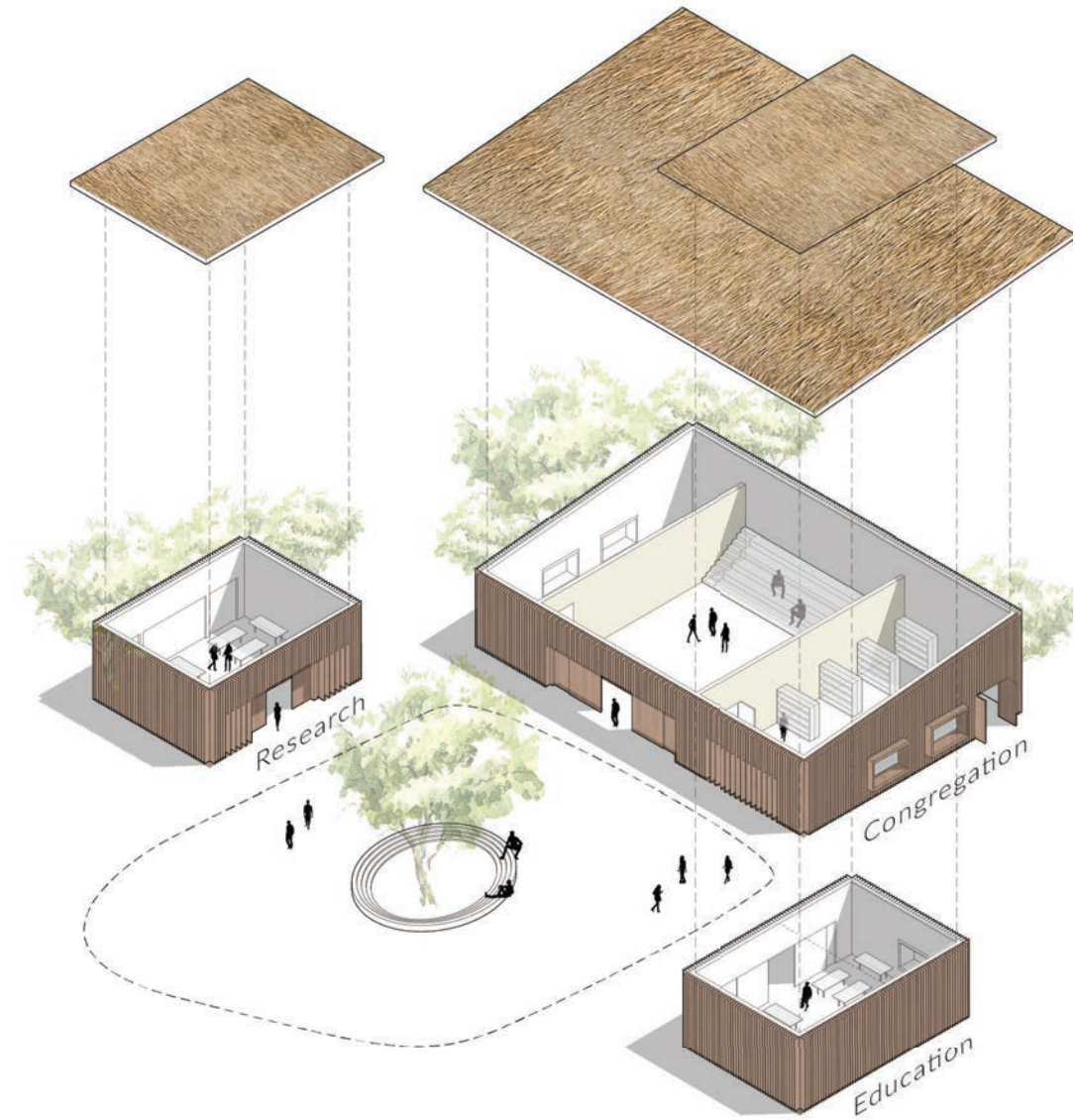
RISKS: Sugarcane monoculture



RECEIVER TOWNS SACXAN, MEXICO

Sacxan sits on higher ground along the fault line that runs through the Rio Hondo, making it an ideal site to transition into a **receiver town** in the event of future flooding due to sea level rise and storm surges.

RISKS: Flooding due to sea level rise



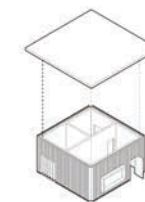
COALITION CENTER

Education

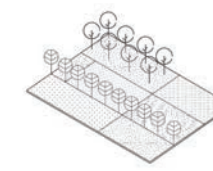
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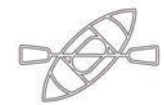
Community



Infrastructure

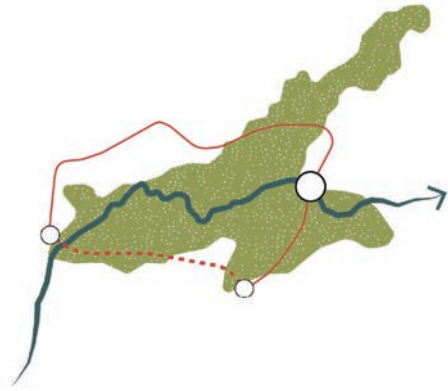


Agriculture



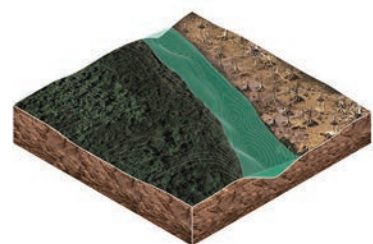
Tourism

RIO HONDO BI-NATIONAL PARK
 Santa Elena | Mexico + Belize

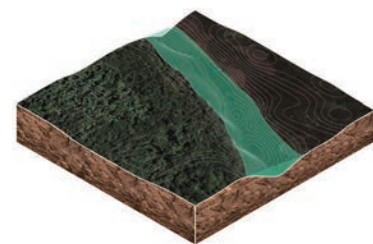


The proposal revolves round the creation of a binational park. We extend the concept of the Mexican **Ejido** into Belize to form a **Transnational Ejido** that collectively manages and take stewardship of the proposed Rio Hondo Bi-National park.

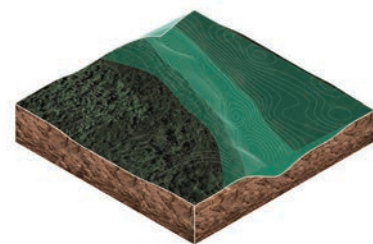
The shape of the park follows the watershed and projected flood line to buffer the river from agricultural run-off and development. Reforestation efforts will protect nearby resident from flood waters, and can help establish small scale regional eco-tourism therefore diversifying their economy.



Mangrove deforestation
today



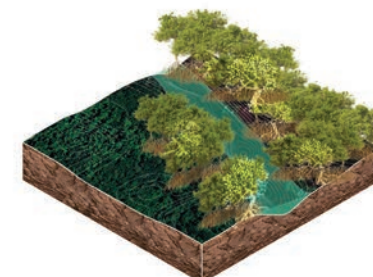
Swamp
today



Future flooding event
Bakatun 395 years



Reforestation
Tun 1 year



Mangrove forest
Katun 20 year



Eco-tourism
Katun 20 year

Mangrove reforestation



To give a an understanding of our intervention and its impact on the local community, we consider the life of Felix - an imaginary resident of Santa Elena who is a Marine Biologist in the Coalition Center.

He is an **active volunteer in the Youth Engagement program** that encourages children from Sacxan such as Jose to participate in the **mangrove reforestation** efforts along the rio hondo.

Over the course of time, he would further be involved in the **water quality management** that is digitally monitored to **track the levels of pesticide contamination in the river.**

At a larger timescale, we envision a flourishing marine life that houses a rich ecosystem consisting of **thriving mangrove nurseries, invites ecology such as manatees back to banks of the Rio Hondo,** as well as invites tourists to participate in **eco-tourism.**

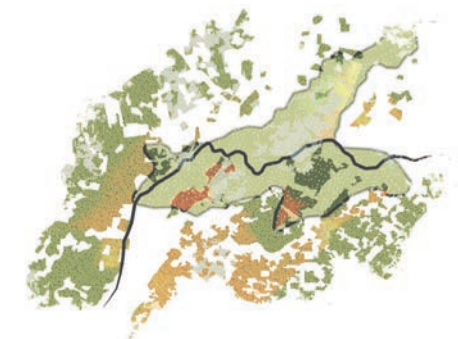
Water Quality testing



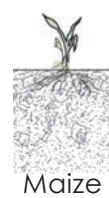
Eco-Tourism regional



AGRICULTURAL TRANSITION
Chan Chen | Belize



Through the knowledge shared in the **Coalition Centers**, we could incentivize a shift towards **Milpa**, a sustainable agricultural practice that traditionally uses maize, squash and beans due to their complimentary effects that support and balance each other. This shift could positively impact the water table as fertilizers would no longer seep into the system of cenotes present in this region. These changes would also affect the lives of **Chan Chen** villagers by diversifying their livelihoods and tap into the influx of tourism from the **Tren Maya**.



Maize



Maize



Maize + Beans



Maize + Beans



Maize + Beans + Squash



Harvest

Truck Rental *from Pedro*



6 AM 🌙

Milpa Farm *tend to crops*



12 PM 🌞

Workshop *education*



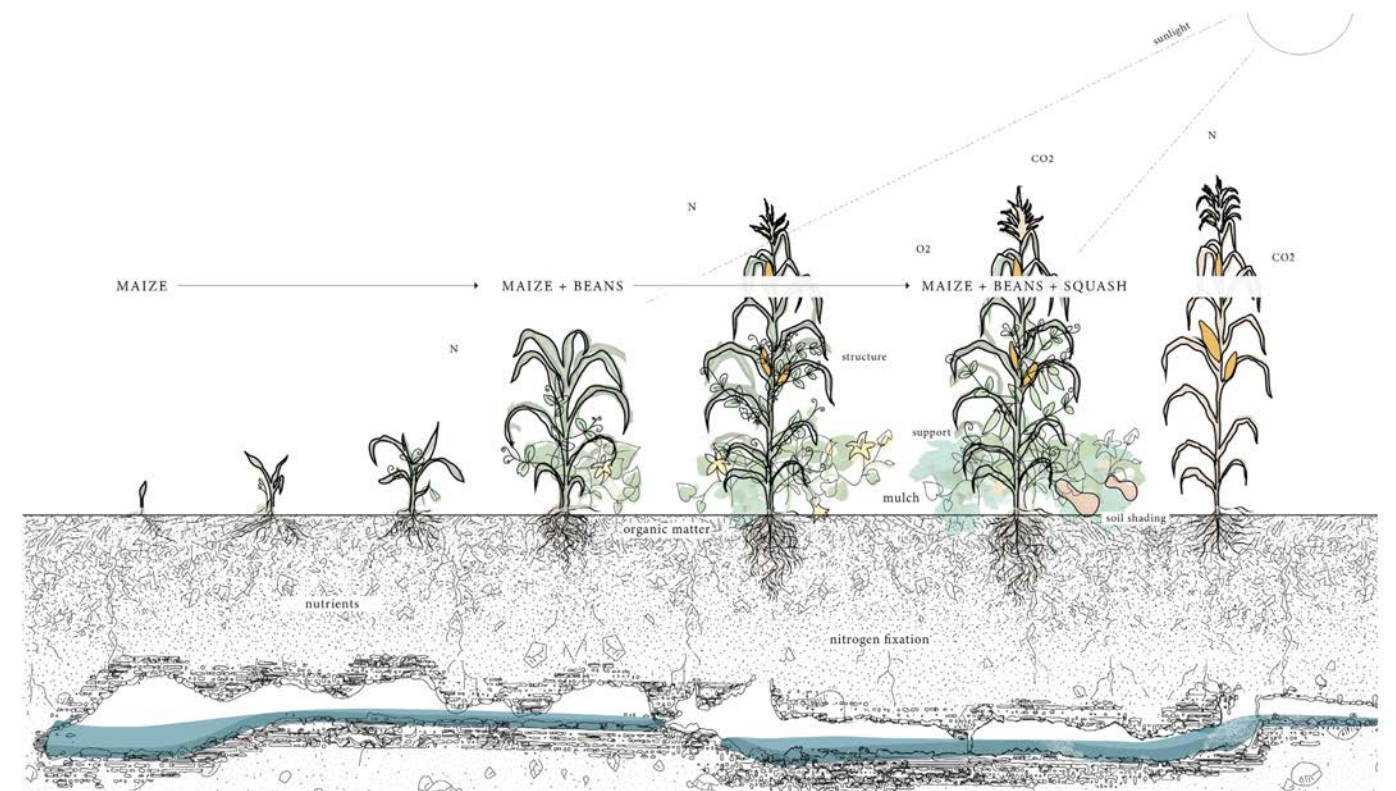
6 PM 🌙

In Chan Chen, we follow the character of a farmer named Margarita. Through the Belize Yucatec Maya Facebook group she could work to encourage a transition to more sustainable agricultural practices amongst fellow sugarcane farmers.

The **agricultural shift to milpa** would positively impact the watertable, as fertilizers would no longer seep into the system of cenotes present in this region. Following a day in the life of Margarita, she would be able to **rent a tractor from the coalition center** in the morning from Pedro, who is employed by the center to manage these services.

Margarita would use the virtual component of the coalition center to **sell some of her produce to a local hotel in Chetumal**, taking advantage of **tourism boom from Tren Maya**.

In the evening, the coalition center could host a professor from the University of Belize to give a **lecture on sustainable pest control strategies**.



RECEIVER TOWNS

Chan Chen | Belize

In 80 years, sea level rise will become a more threatening reality. The introduction of the Coalition Center would strengthen connections between villages along the Rio Hondo and prepare villages on higher elevations to receive an influx of people from coastal cities. Taking precedent from traditional Mayan housing clusters, existing blocks can densify around shared courtyards to receive these climate refugees.





02

REYNOLDSTOWN: RIGHT OF LIVING

Some of the major promises the Beltline has made was to provide 5,600 affordable housing units by 2030, but the project has only built 397 to date.

Within **Reynoldstown** (a historic neighborhood originally a collective of former slaves during the post civil war era), **the Beltline** (an ongoing project that aims to connect Atlanta's neighborhoods using a pedestrian walkway) **has made false promises, and continues with the cycle of capitalist development.** By redistributing allocated funds, offering housing that is attainable to low income families, and not increasing property value, ***we picture a world after property where neither income nor color determines where you live, nor does it define a boundary.***

UD Studio II '21: Atlanta After Property

TEAM: Achmad Maulana, Javier Ortiz, Carmen Yu, Curran Zhang

FACULTY: Emanuel Admassu, Lexi Tsien, Nina Cooke John, Chat Travieso, Nupur Roy

2005 | FORMATION

Based off of Ryan Gravel's thesis project, the Atlanta Beltline aims to redevelop the abandoned railroads throughout Atlanta to create a new green corridor looping the Atlanta metro region.

2005 | TAD (TAX ALLOCATION DISTRICT)

An increase of local property tax as the "funding source for the implementation of [The Beltline]". "All increment collected goes to fund the infrastructure of the project".

- INVEST ATLANTA

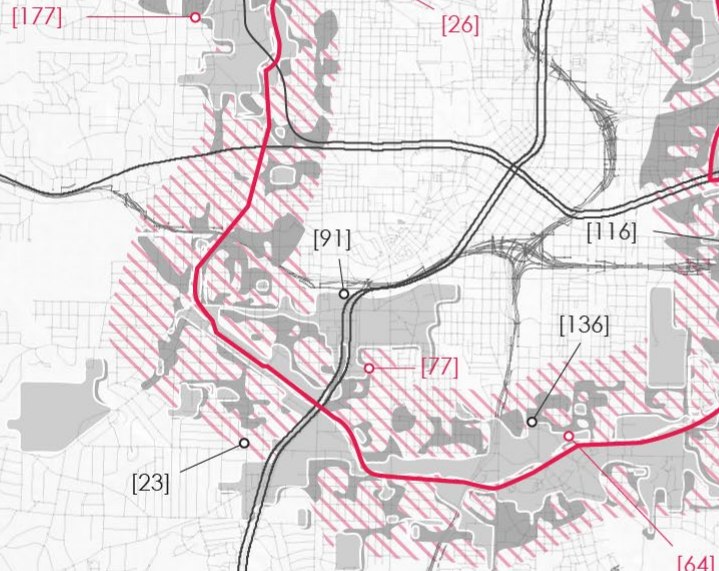
2021 | SSD (SPECIAL SERVICE DISTRICT)

"An SSD is a targeted tax district where commercial and multi-family property owners pay slightly more in property taxes to fund the completion of the Atlanta BeltLine Trail"

- ATLANTA BELTLINE

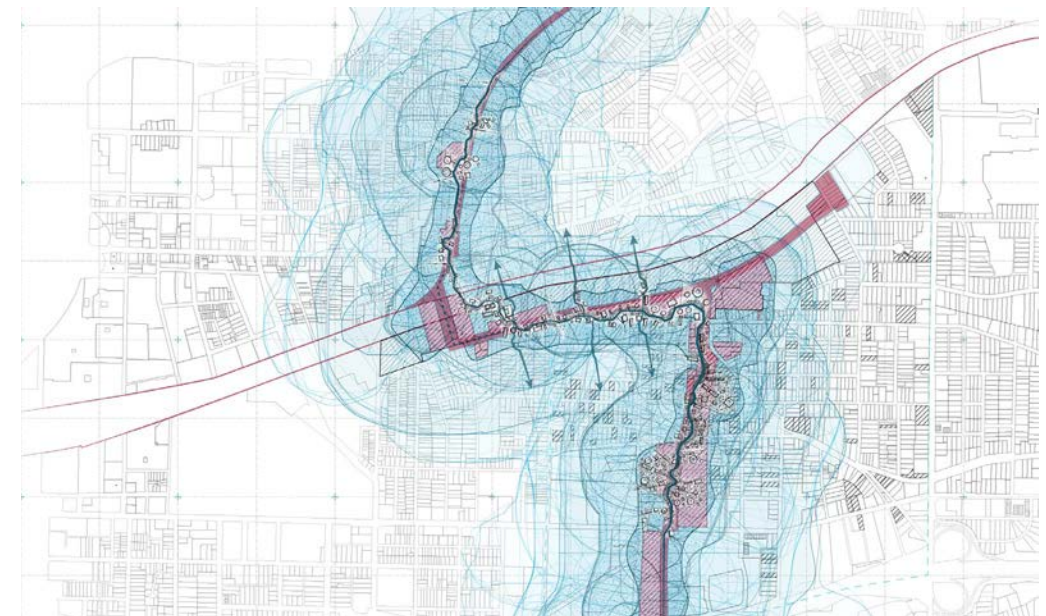
Key

- Beltline
- TAD
- Reynoldtowns
- 1/2 Mile Gentrification Impact
- Built Affordable Housing (397)
- Proposed Affordable Housing (726)
- MARTA Rail
- SSD



ATLANTA BELTLINE

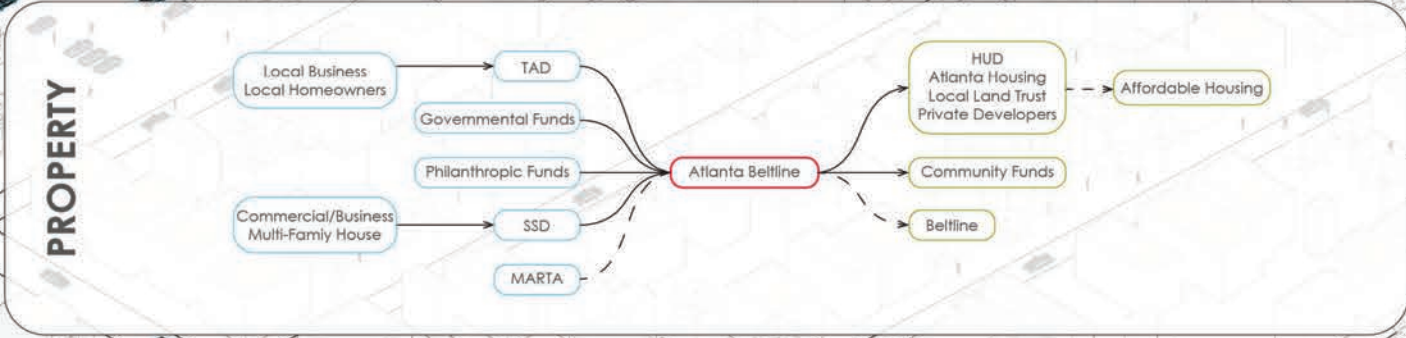
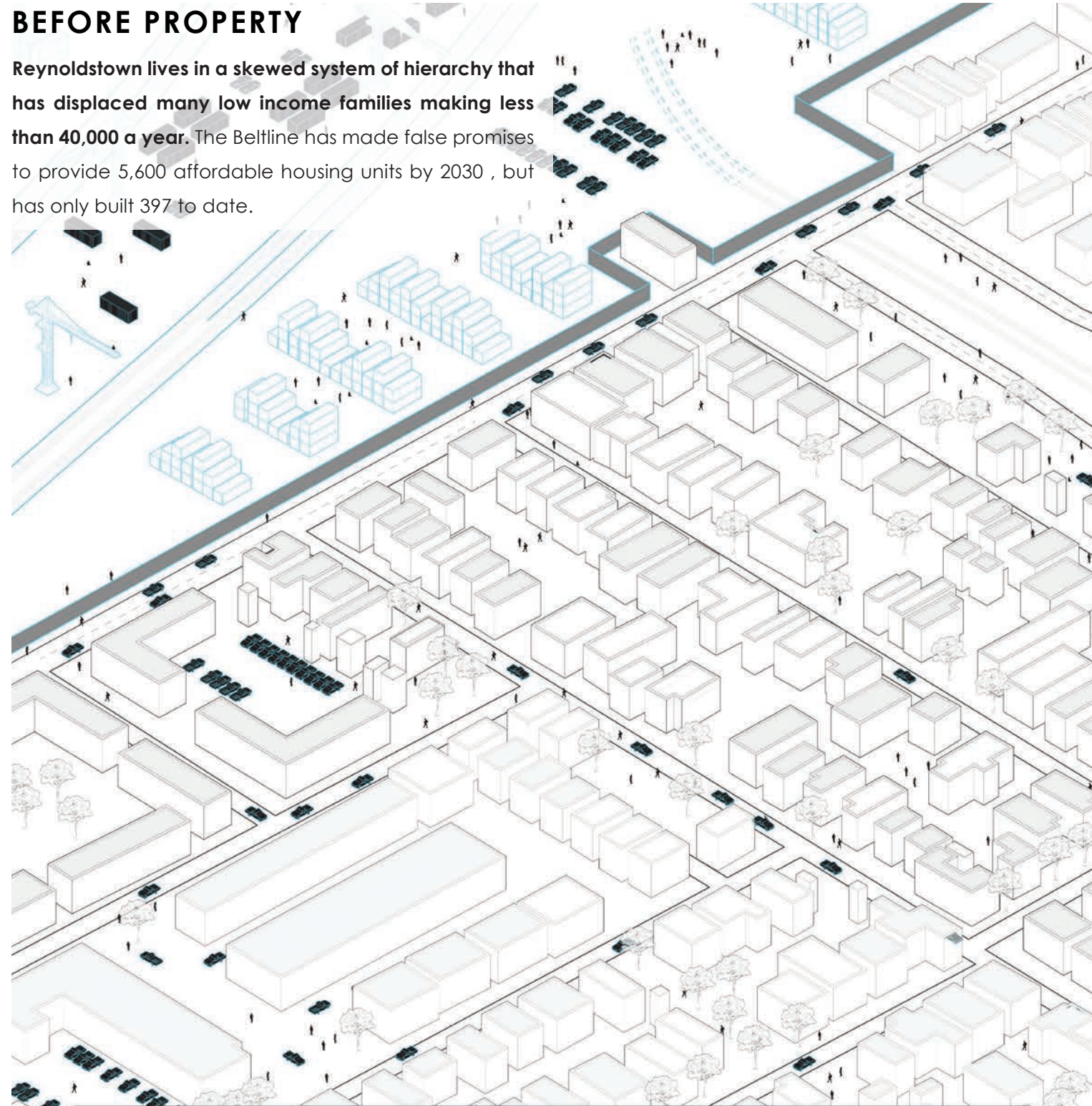
The Beltline is a **pedestrian walkway with limited access** in which this project has resulted in **broken promises/ increased property tax, and pushing out low income families from the neighborhood.** Some of the major promises the Beltline has made was to **provide 5,600 affordable housing units by 2030**, but the project has only built 397 to date.



Beltline expansion in Reynoldstown.

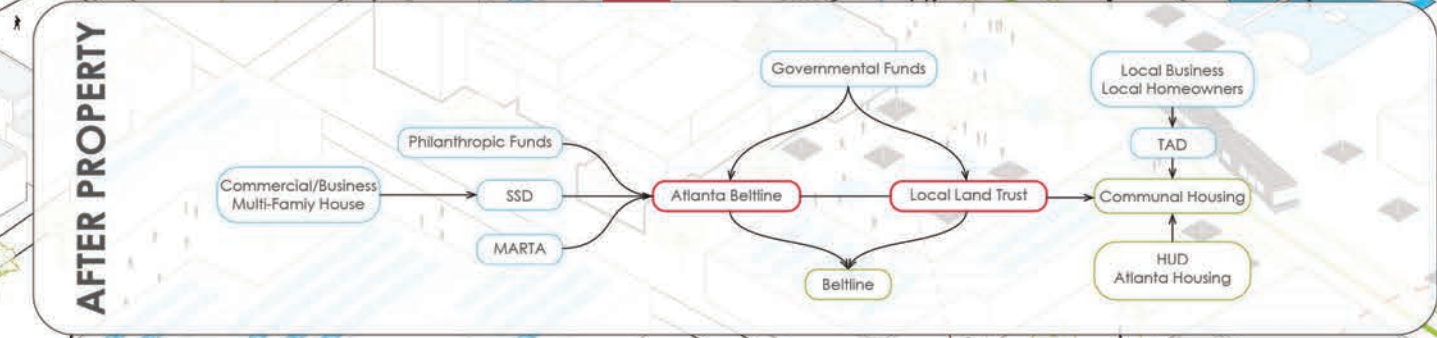
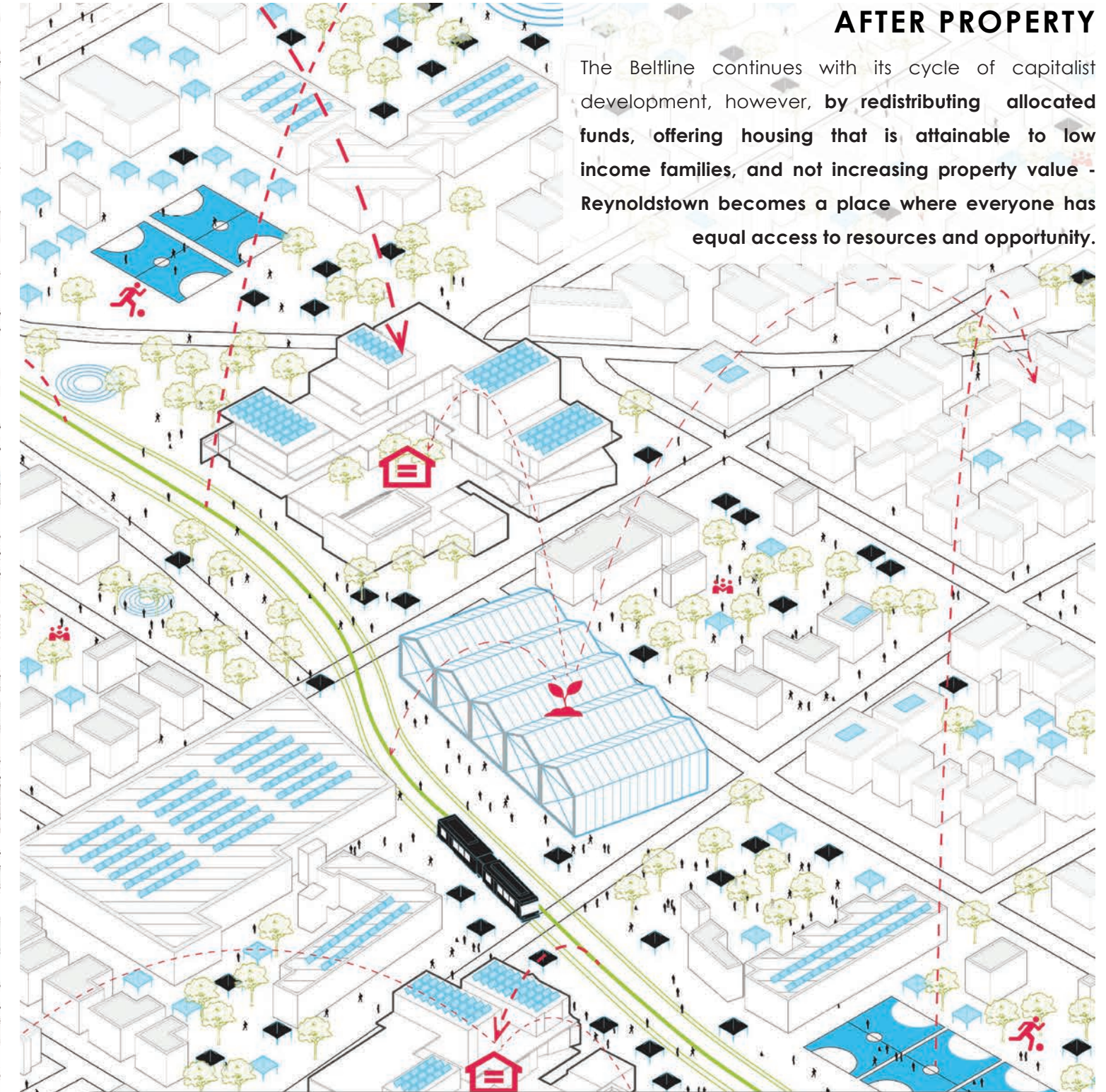
BEFORE PROPERTY

Reynoldstown lives in a skewed system of hierarchy that has displaced many low income families making less than 40,000 a year. The Beltline has made false promises to provide 5,600 affordable housing units by 2030, but has only built 397 to date.



AFTER PROPERTY

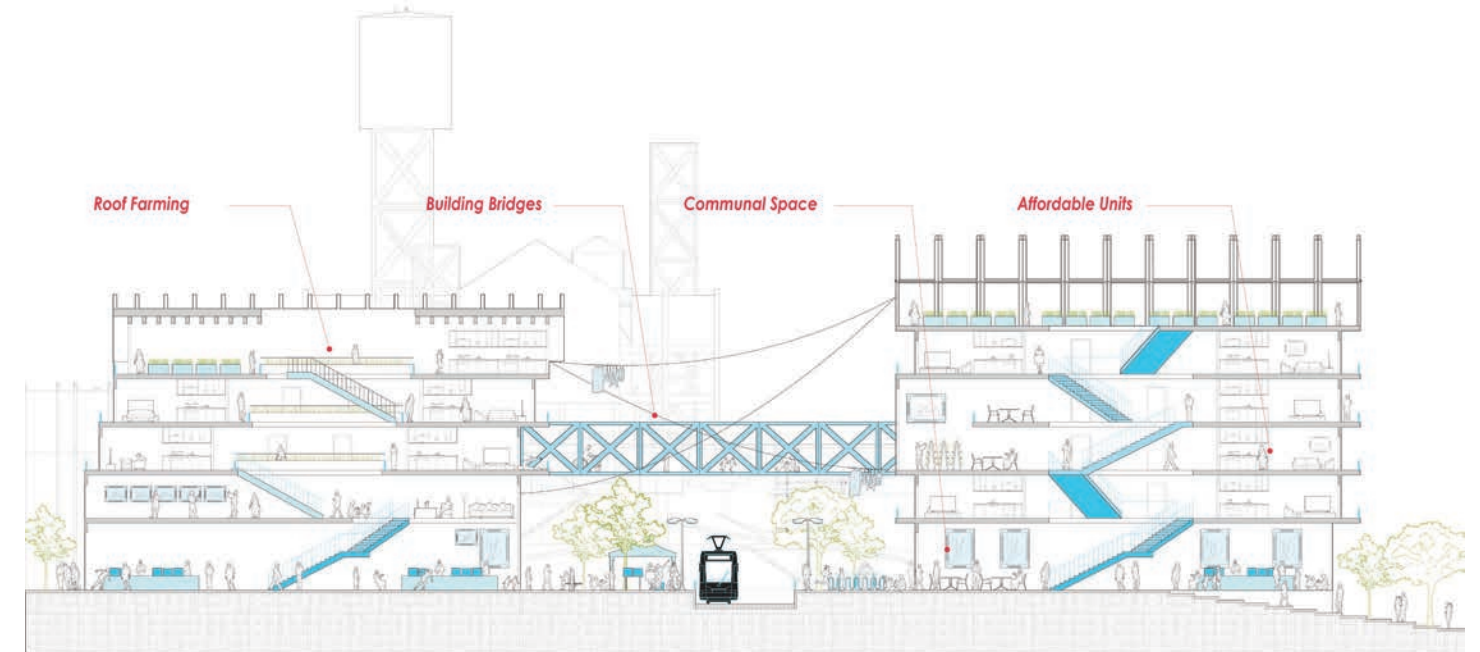
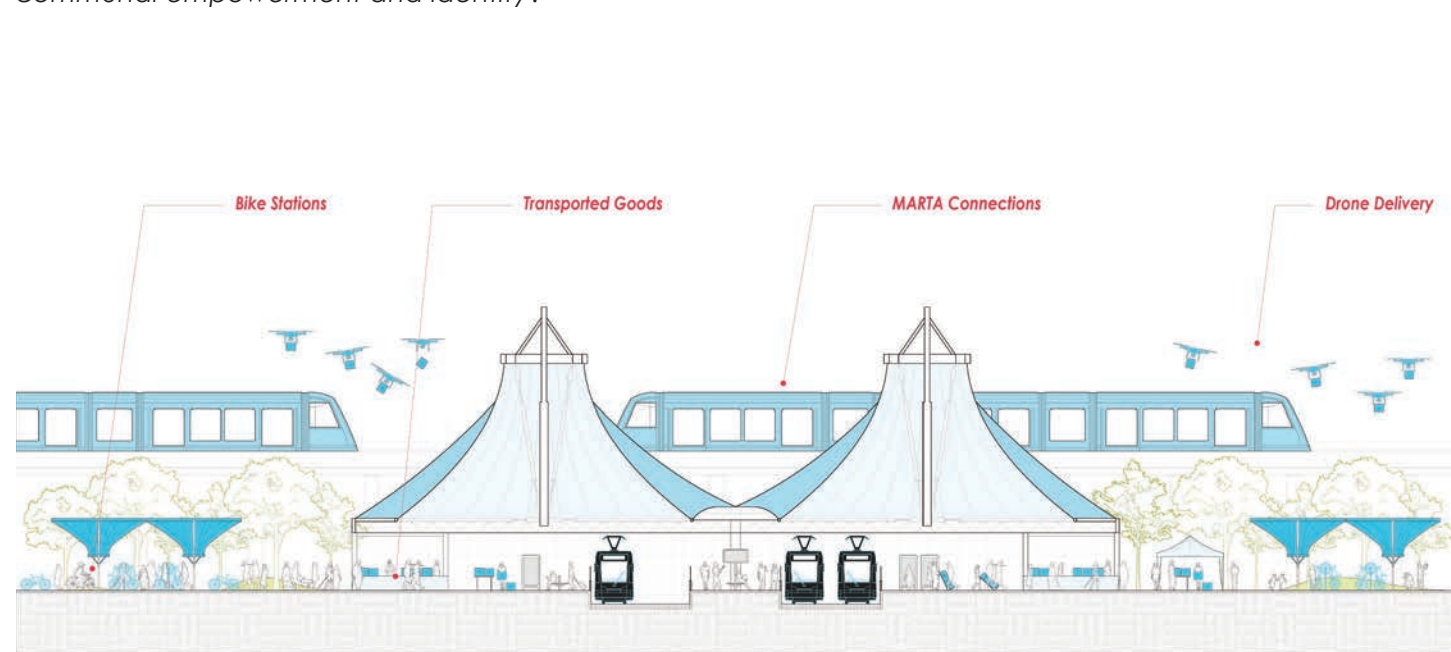
The Beltline continues with its cycle of capitalist development, however, by redistributing allocated funds, offering housing that is attainable to low income families, and not increasing property value - Reynoldstown becomes a place where everyone has equal access to resources and opportunity.



RIGHT OF TRANSIT / HOUSING

Our project is articulated through 2 steps: allocating various right of way interventions and removing physical boundaries within the residential community to create a shared commodity.

How can we use the Beltline in a way in which it would achieve communal empowerment and identity?



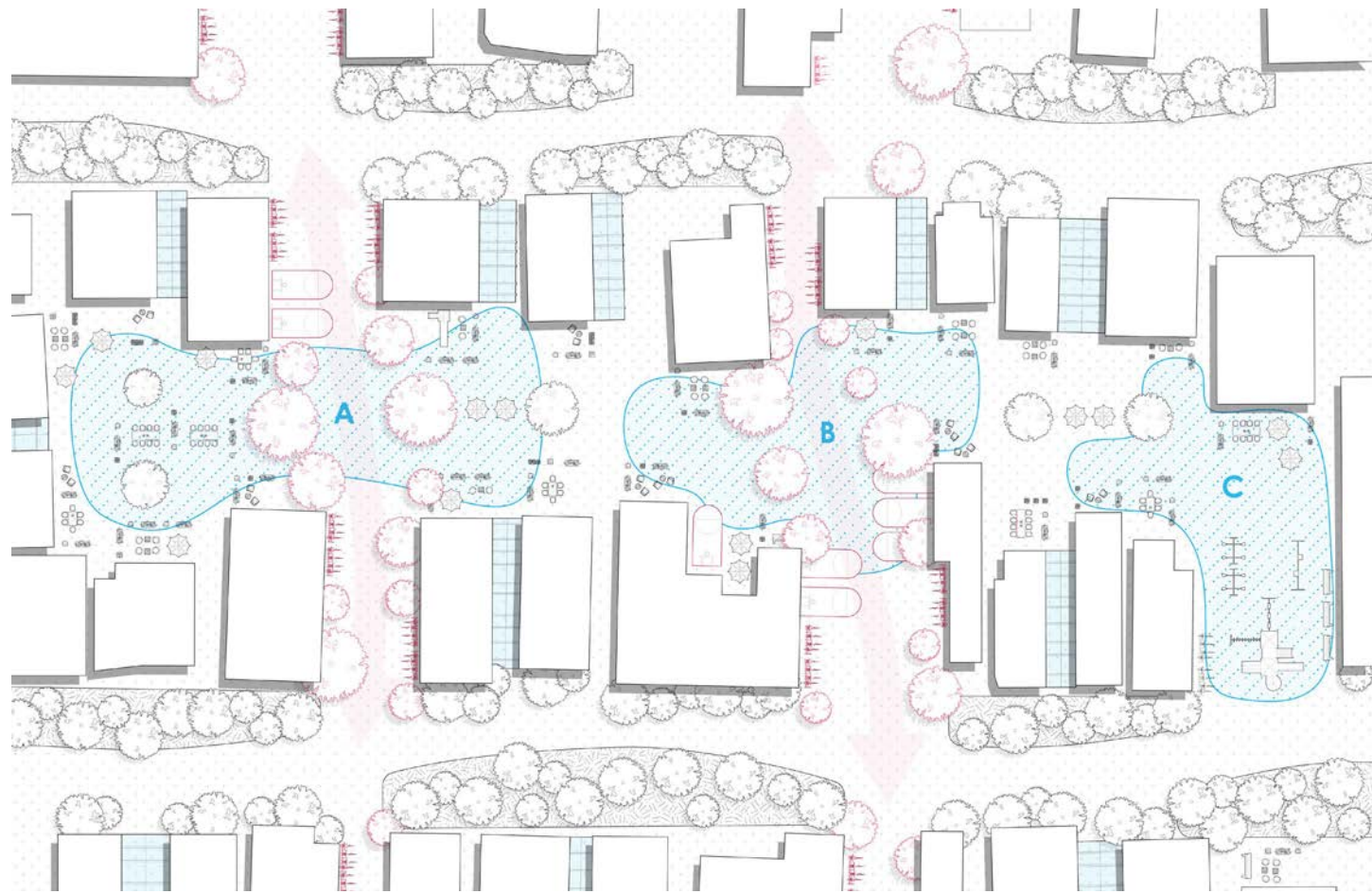
RIGHT OF TRANSIT

The right of transit intervention acts as a transportation hub for local residents to take advantage of resources provided allowing residents to reach a further network.

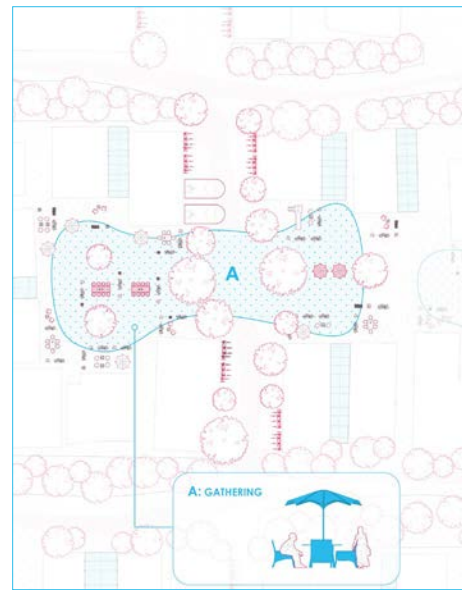
RIGHT OF HOUSING

The right of housing is an opportunity to tackle the lack of affordable housing within Reynoldstown and Atlanta as a whole. The broken promise from the Beltline is an opportunity for these interventions to provide multi-generation housing for locals that have long since been living within Reynoldstown.

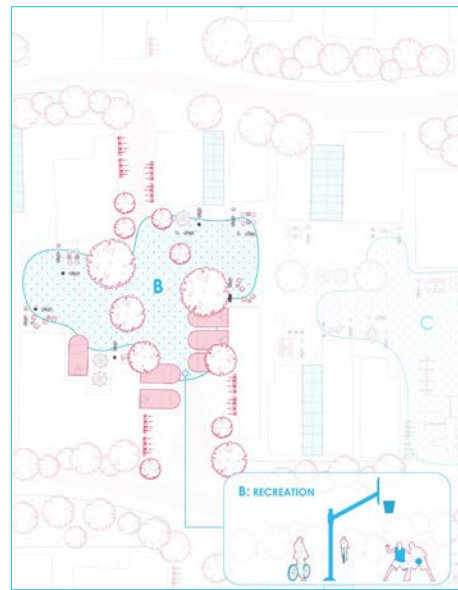




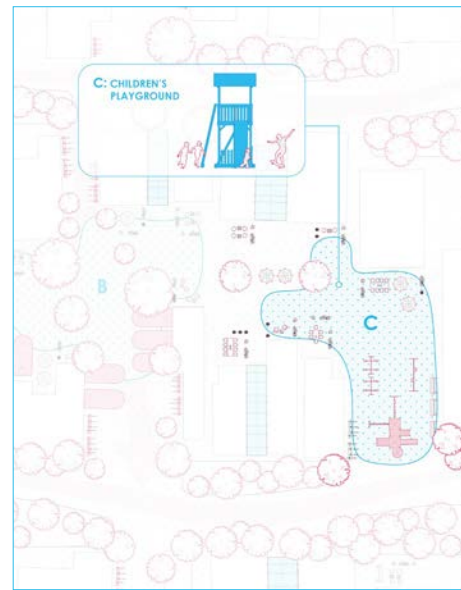
SHARED BACKYARD



GATHERING



RECREATION

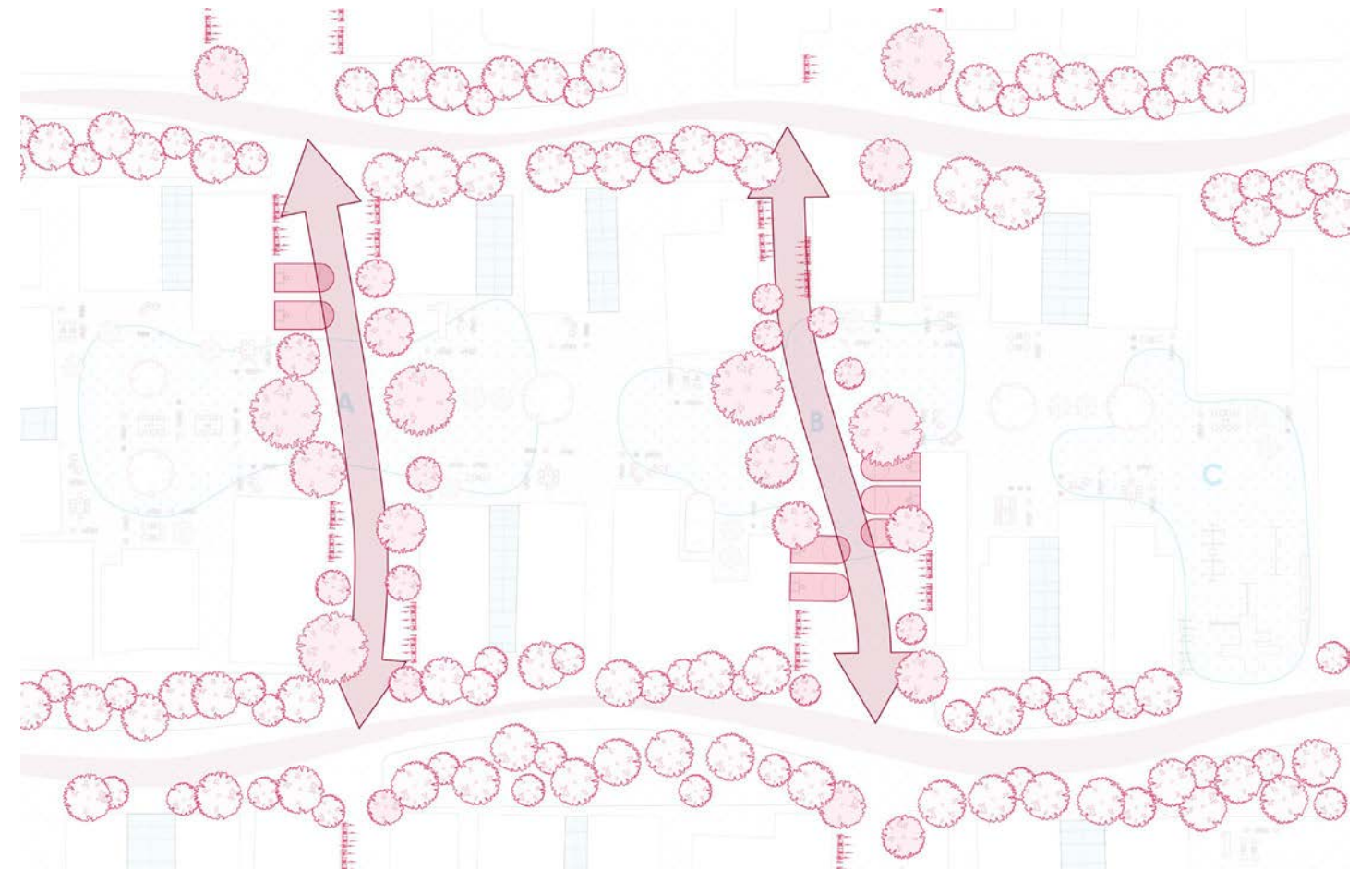


CHILDREN'S PLAYGROUND

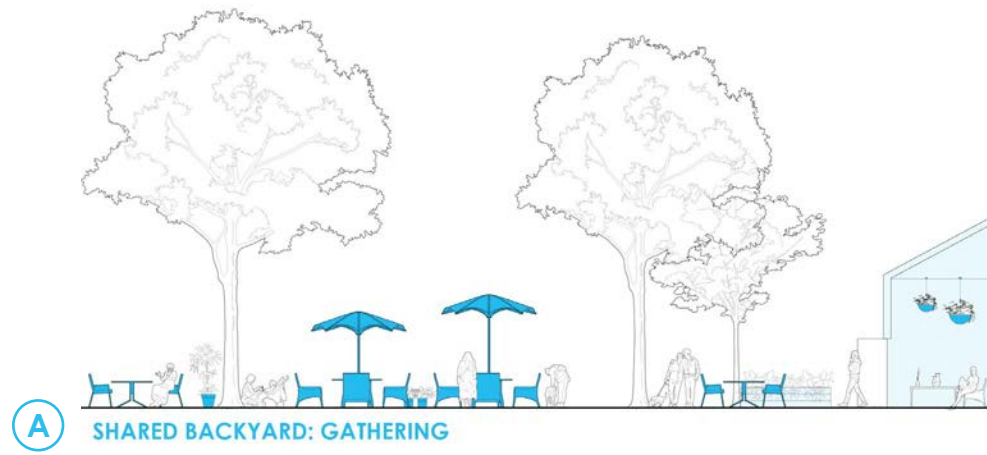
REMOVING PHYSICAL BOUNDARIES

This current typology of single family homes, **creates boundaries with fences, promoting isolation and giving no opportunity for community engagement.** By removing the physical boundaries, backyards become a shared commodity and households are able to define their space using elements such as plants and furniture rather than hard boundaries such as fences. **Backyard spaces become a community asset with each space providing a shared resource.**

The **green corridors** run through the shared yard spaces and are defined by a series of trees and shared community elements such as bike racks and recreation spaces which allows for alternate modes of transportations other than cars



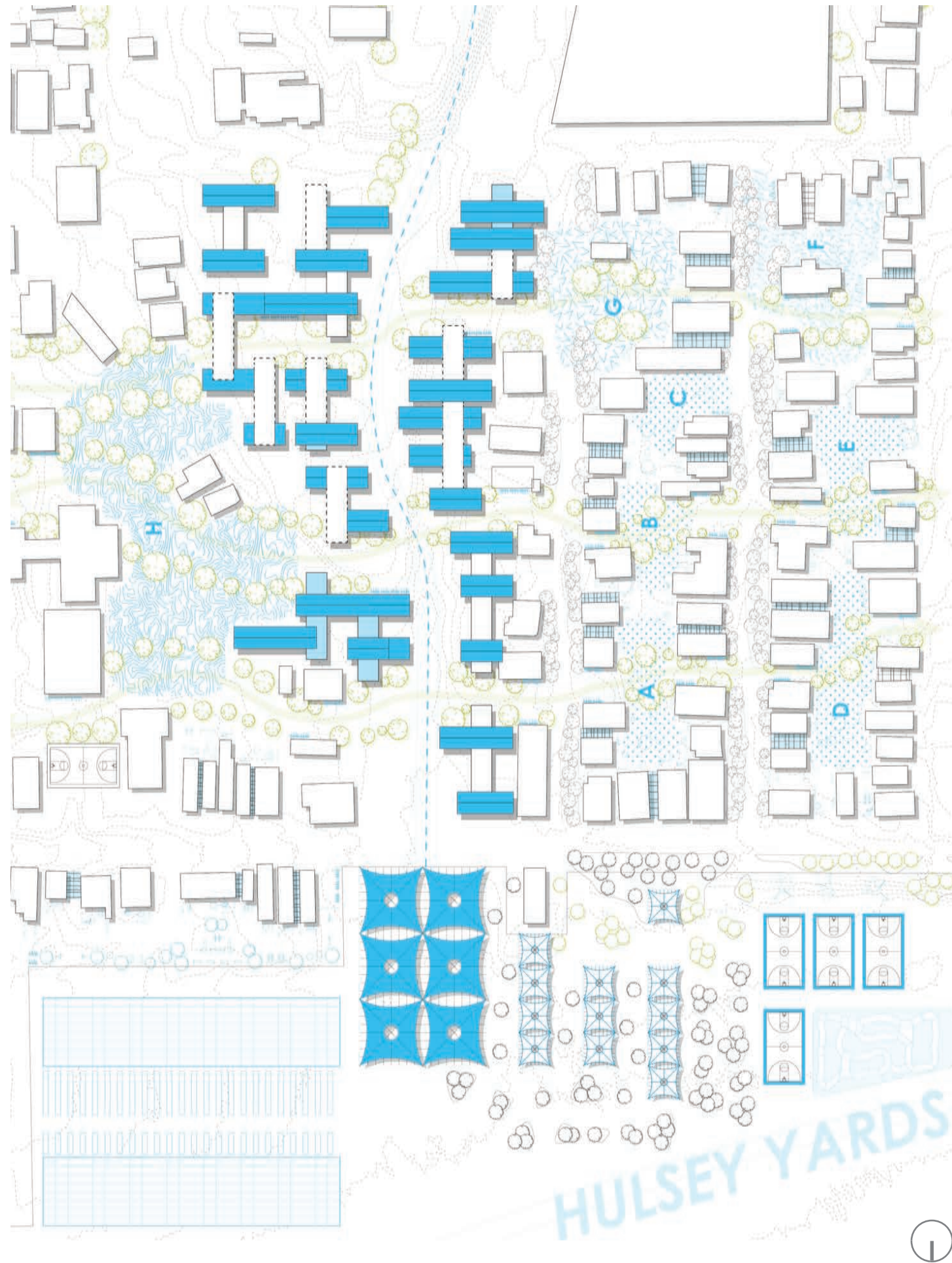
GREEN CORRIDOR



"Build for people to live in and not for people to visit. People will visit anyway"

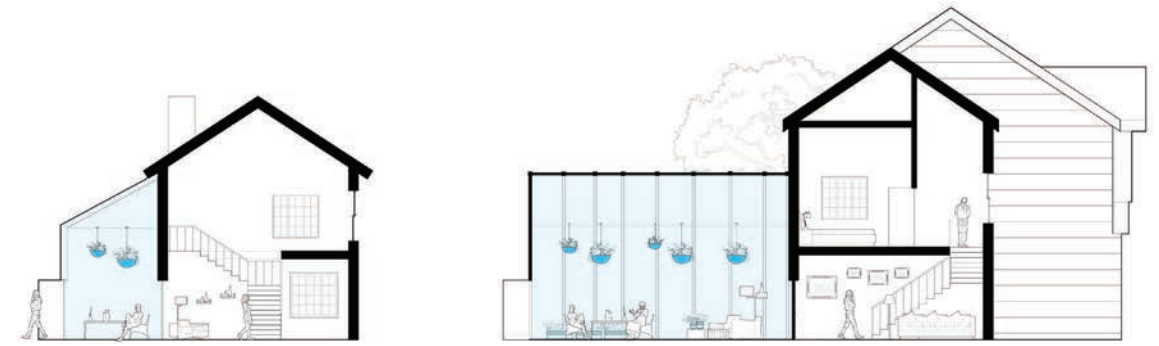


Backyard spaces with no fences and boundaries.



WINTERGARDENS

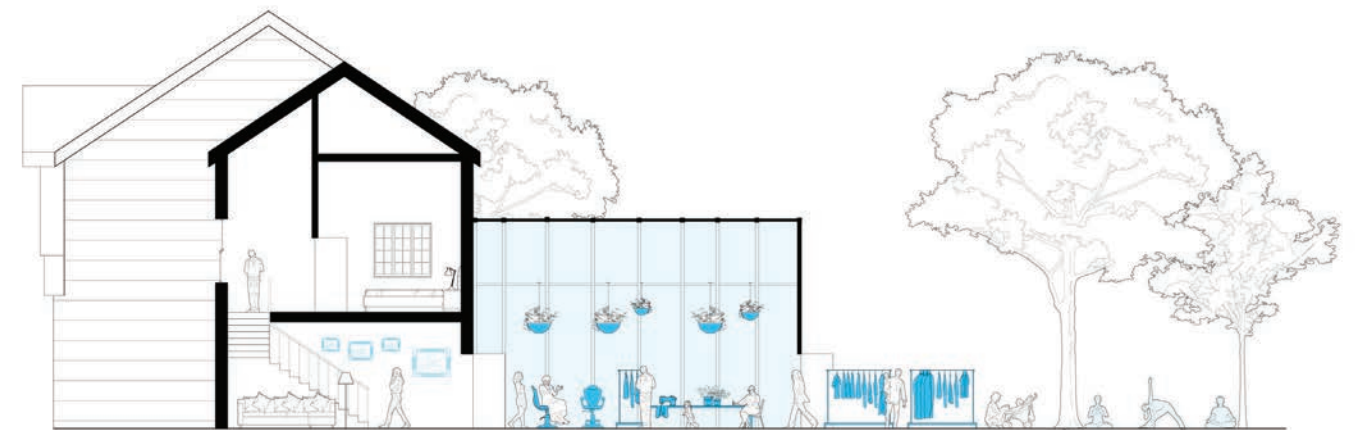
Highlighted in light blue and located between the existing homes, wintergardens provide an **opportunity of expansion as well as connecting existing homes or provide a space for community gatherings**. Lastly, the wintergarden can also be a **space for neighbors to provide home services or resources for the community based on their hobbies or existing skills** so the space can be transformed into a salon/ barber shop, space for clothing tailoring or selling home goods, etc.



EXPANSION



CONNECTION



HOME SERVICES



REYNOLDSTOWN AFTER PROPERTY

In our vision, the Beltline has been dissolved and reintegrated with its surrounding community.

Our world after property is where minority and low income families in Reynoldstown and in Atlanta are no longer facing displacement because of the Beltline. Together these strategies complement and support each other in creating new ideals of cohesive community that promote self sufficiency and new identity.





03

RECLAIM THE AIR

Air pollution caused by toxic factories, transportation, and foul odors leads to increased health risks and affects vulnerable communities.

The design proposal commits to designing a healthier environment and to promote a healthy Newark region. **Since air pollution does not follow boundaries**, each type of pollutant requires a different intervention at the point one interacts with the environment. **Design solutions based on capturing technology can also protect and educate the community.**

UD Studio I '21: City Edges: Sites, Systems, Spaces, Stories

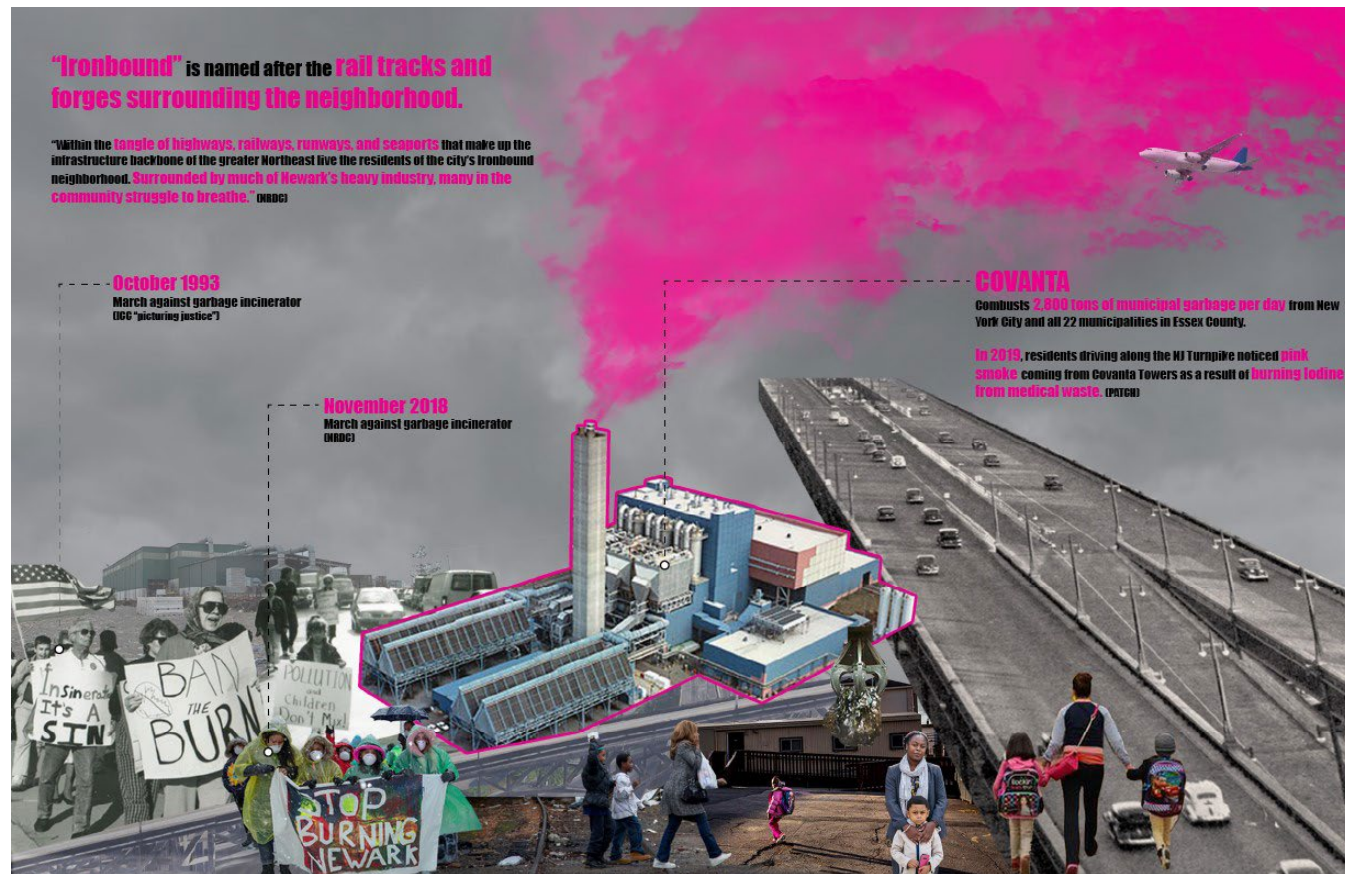
TEAM: Samuel Dye, Minsung Kim, Javier Ortiz, Carmen Yu

FACULTY: Nans Voron, Sagi Golan, Jae Shin, Galen Pardee, Austin Sakong, Sean Gallagher, Tami Banh, Candelaria Mas Pohmajevic

AIR POLLUTION AND EXISTING CONDITIONS

Air pollution has been an issue in Ironbound when Newark started becoming overtaken by industries.

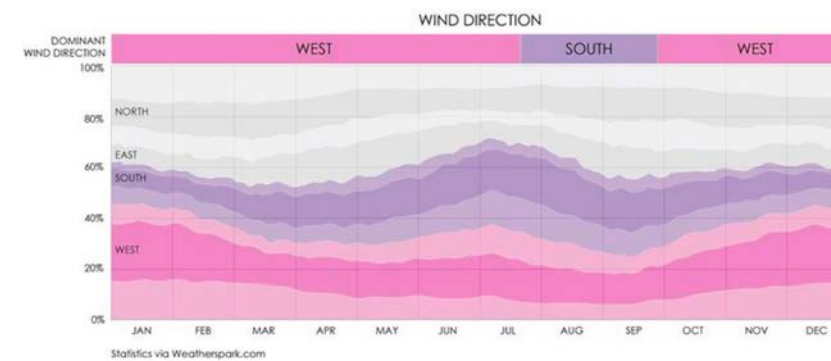
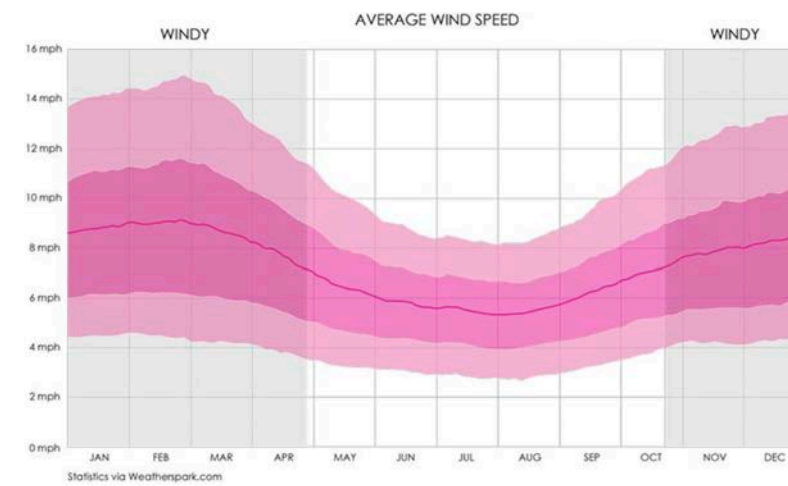
Since 1993, Ironbound has been protesting against the arrival of **Covanta**, a garbage incineration site that combusts **2,800 tons of garbage per day**. Today - the community continues to protest where in **2019 Covanta had an incident of releasing pink smoke that was seen by commuters from the NJ turnpike.**



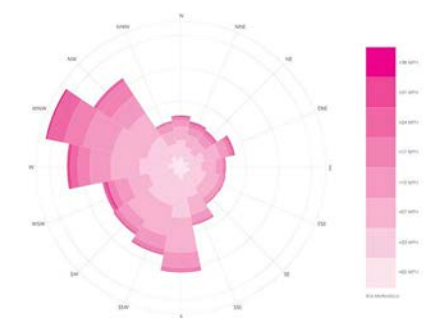
Air pollution during the summer months.



Air pollution during the winter months.



Dominant winds from the south and west carry pollutants from the highways and industries into not only Newark and the Ironbound community, but also surrounding areas such as Harrison and Jersey City.

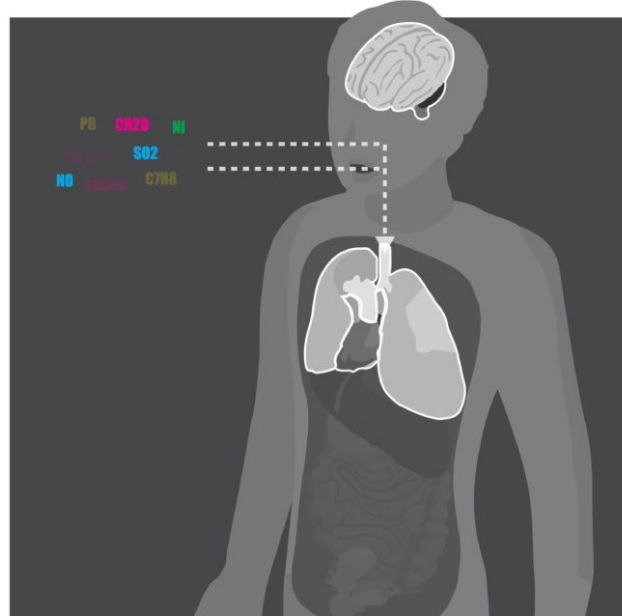


AIR POLLUTION AND HEALTH EFFECTS

NITROGEN OXIDE | NO
SULFUR DIOXIDE | SO2
FORMALDEHYDE | CH2O
PARTICULATE MATTER 2.5 | PM 2.5
METHANOL | CH3OH

LEAD | Pb
TOLUENE | C7H8

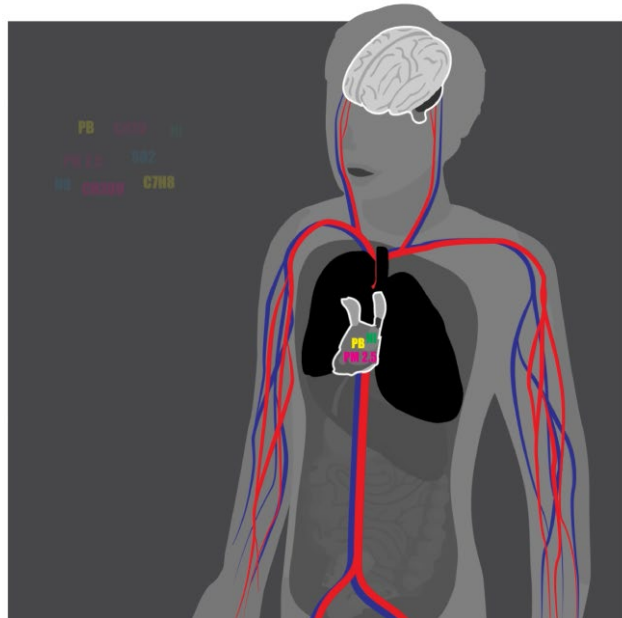
NICKLE | Ni



NITROGEN OXIDE | NO
SULFUR DIOXIDE | SO2
FORMALDEHYDE | CH2O
PARTICULATE MATTER 2.5 | PM 2.5
METHANOL | CH3OH

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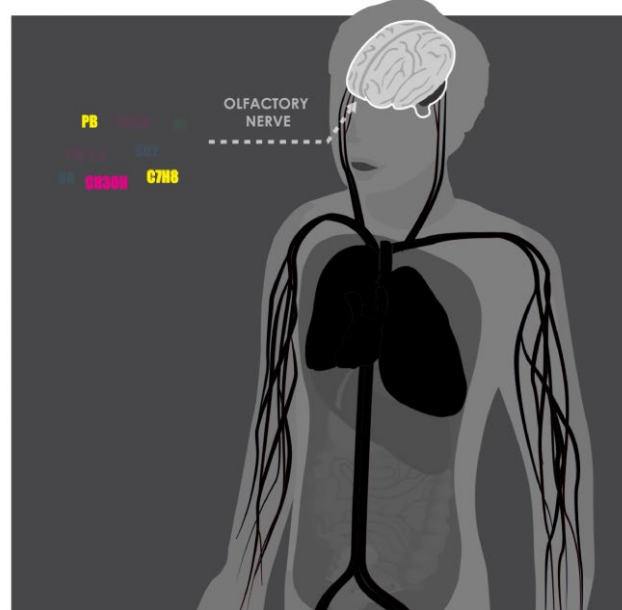
NICKLE | Ni



NITROGEN OXIDE | NO
SULFUR DIOXIDE | SO2
FORMALDEHYDE | CH2O
PARTICULATE MATTER 2.5 | PM 2.5
METHANOL | CH3OH

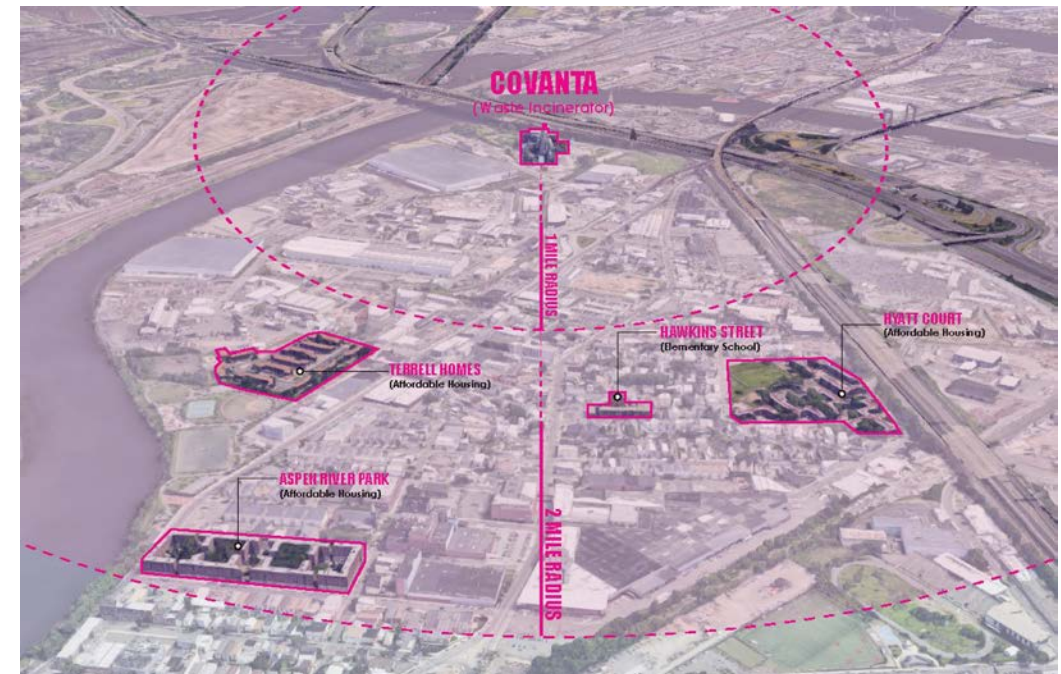
LEAD | Pb
TOLUENE | C7H8

NICKLE | Ni



AIR POLLUTION increases respiratory disease – cardiovascular disease – and impairs brain development.

Some of the chemicals emitted within Newark are chemicals and metals that are **breathed in through the nose and mouth to irritate the lungs** causing respiratory disease, **travel in the bloodstream** to cause cardiovascular disease and can be **inhaled passing through the olfactory nerve** to impair brain damage.



Covanta's location is within a 2 mile radius of three affordable housing complexes and an elementary school.

DESIGN TOOLKIT OF INTERVENTIONS USED



RESIDENTIAL INTERVENTION

The current site that we have chosen to intervene in is a **residential area located near East Ferry of Newark and is within the 2 mile radius of Covanta.**

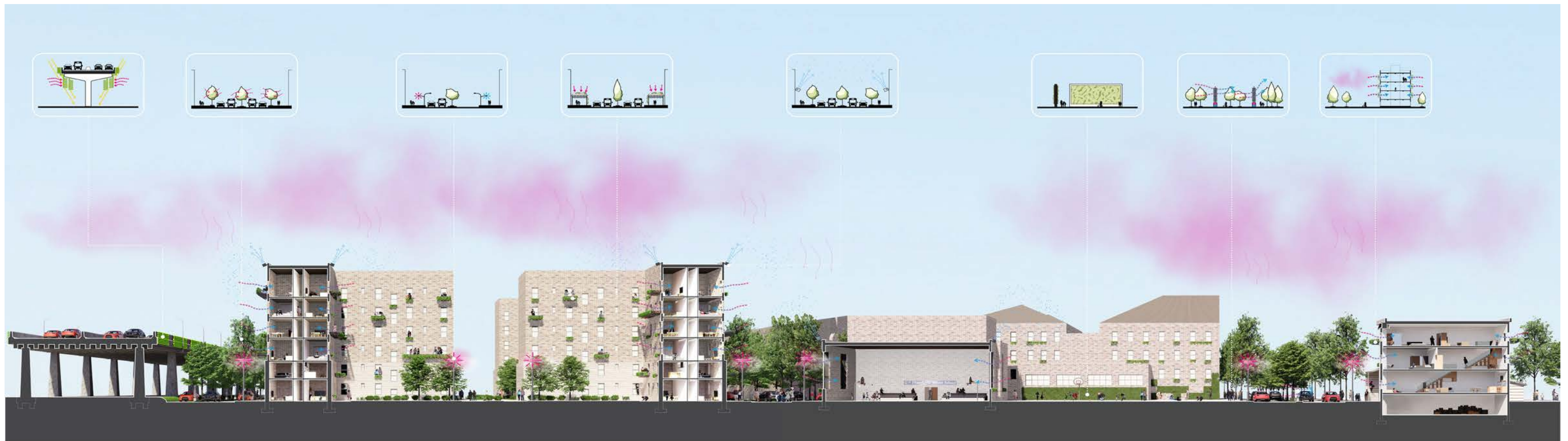
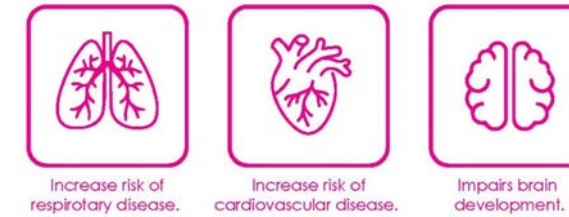
Addressing the **highway**, we utilize **algae farms** located at the side of the highway to **capture carbon emissions from passing cars.** We also use **air purifying towers** - hidden among high accumulating trees to **filter fossil fuels at street level.**

Continuing onto **affordable housing**, we've implemented **street lights integrated with an air quality alert system coupled with water mist cannons to absorb pollution particles while watering our modular green balconies.** Throughout the neighborhood we continue to utilize the **air quality alert street lights to educate residents along with the purifying towers to mitigate pollution that directly impact pedestrians.**

At the **school zone**, we've have chosen to apply a **moss wall where one 13'x10' panel absorbs the equivalent of 275 trees in CO2** and lastly for **residential homes** we've designed **filtering facades that purifies the air as it enters the home.**

"It's created a legacy of illness for **Kim Gaddy, a fourth generation Newarker** living in the city's South Ward.

She has asthma, as do all her children. Her parents had it, her brother did too, and her brother-in-law suffered a total asthma attack right here, at age 45." - (NJ Opinion)



FACILITIES AND CHEMICAL EMISSIONS

METALS

Lead: can adversely affect the **nervous system, kidney function, immune system, reproductive, developmental systems and the cardiovascular system.** Infants and young children are especially sensitive to lead exposures, which may **contribute to behavioral problems, learning deficits and lowered IQ.** (EPA)

Nickel: Nickel contact can cause a variety of side effects such as **allergy, cardiovascular and kidney diseases, lung fibrosis, lung and nasal cancer.** (National Library of Medicine)

Copper: Breathing high levels of copper can cause **irritation of your nose and throat.** Ingesting high levels of copper can cause **nausea, vomiting, and diarrhea.** Very-high doses of copper can cause **damage to your liver and kidneys, and can even cause death.** (CDC - ATSDR)

CHEMICALS

Carbon Monoxide: displaces oxygen in the blood and deprives the heart, brain and other vital organs of oxygen. Large amounts of CO can overcome you in minutes without warning — causing you to **lose consciousness and suffocate.** (OSHA)

Carbon Dioxide: Greenhouse gas contributing to **climate crisis.**

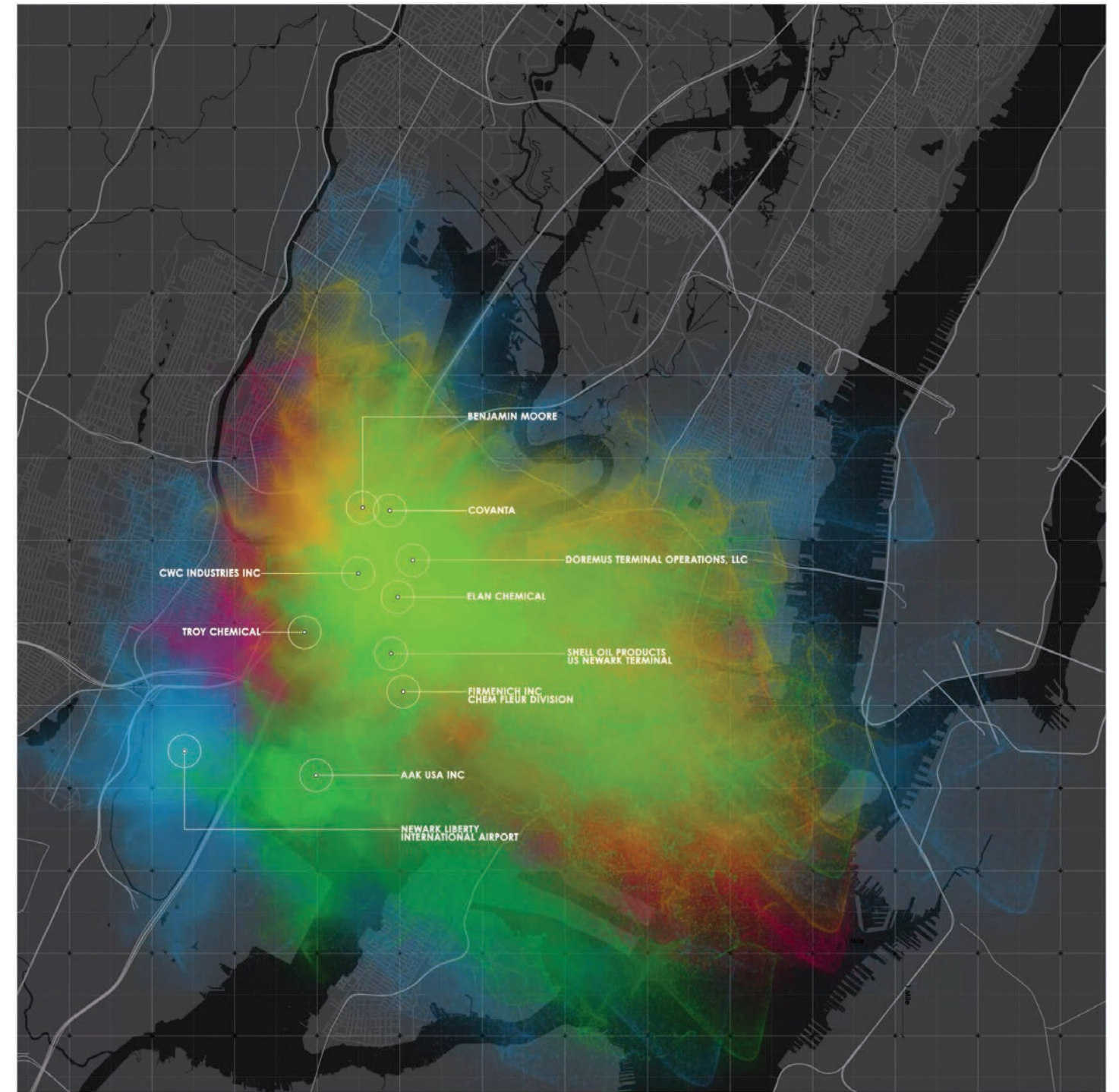
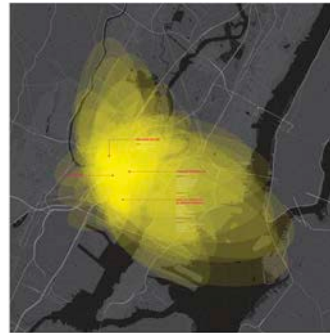
Sulfur Dioxide: can cause **irritation to the skin, eyes, nose, throat, and lungs.** High concentrations of SO₂ can cause inflammation and **irritation of the respiratory system as well as can affect lung function, worsen asthma attacks, and worsen existing heart disease in sensitive groups.** (NPS)

Nitrogen Oxides: can cause **damage to the human respiratory tract** and increase a person's vulnerability to **respiratory infections and asthma.** Long-term exposure to high levels of nitrogen dioxide can cause **chronic lung disease.** (EPA)

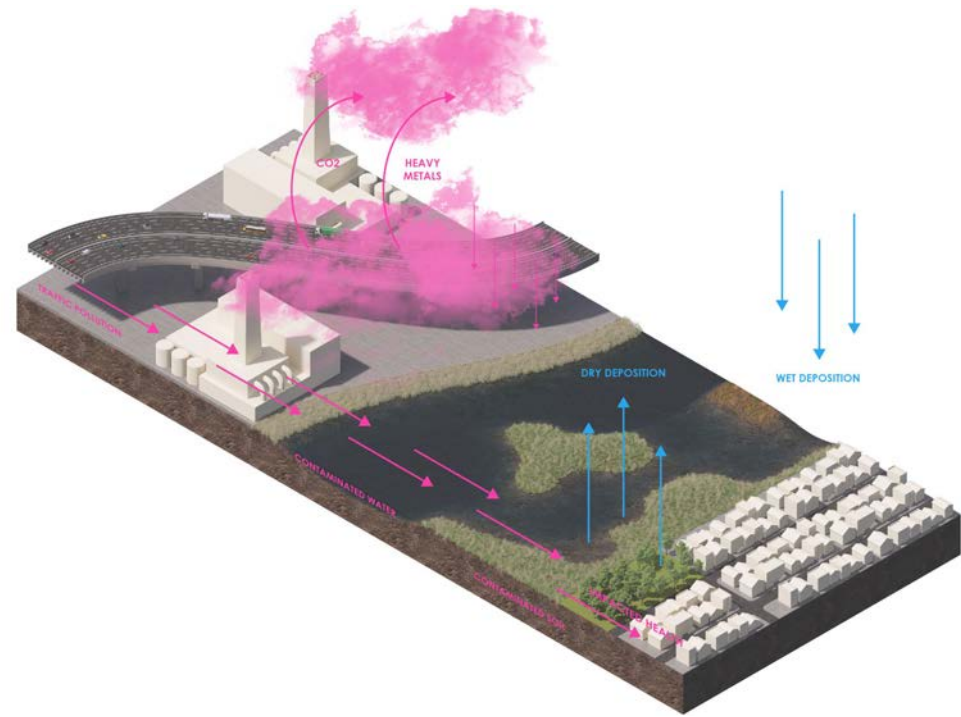
Methanol: if inhaled, may cause **destruction of the optic nerve, poisoning of the central nervous system, coma and possibly death.** (EPA)

Toluene: Exposure to Toluene may have an effect on your **nervous system (brain and nerves).** Nervous system effects can be temporary, such as **headaches, dizziness, or unconsciousness.** **Prolonged exposure can lead to brain impairment.** (CDC - ATSDR)

Formaldehyde: **irritant** for a person's eyes, nose, throat, and lungs. Can **trigger asthma attacks** even at low concentrations. **Prolonged exposure can lead to cancer.** (American Lung Association)



DESIGN INTERVENTION FOR GREATER NEWARK/NJ AREA



PM 10 (BIG AND HEAVY)

Smoke, dirt, and dust from factories, farming, and roads as well as mold, spores and pollen.

PM 2.5 (SMALL AND LIGHT)

Toxic organic compounds and heavy metals.

The next sites of intervention are located at the river front near **Lincoln Park at the mouth of the Passaic River.**

Large Mist towers are utilized to deploy mist in which the **water droplets attract and absorb air pollution** - sheltering pedestrians from the incoming pollution from the highway. **Floating plant beds** accompanied by mist towers are utilized where they **emits lights to notify and capture heavy metals in both the air and water.** **Ground cover plants** are also chosen along the river's edge to **prevent fallen pollutants from contaminating the water.**

