Living With Water

Union Beach, New Jersey

Advanced Landscape Architecture 550:431, Fall 2013, 5 Credits

Dr. Wolfram Hoefer & David Hanrahan

RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY

Living With Water
Union Beach

550:431 Advanced Landscape Architecture
Rutgers, The State University of New Jersey
Department of Landscape Architecture
Center for Urban Environmental Sustainability
Fall 2013

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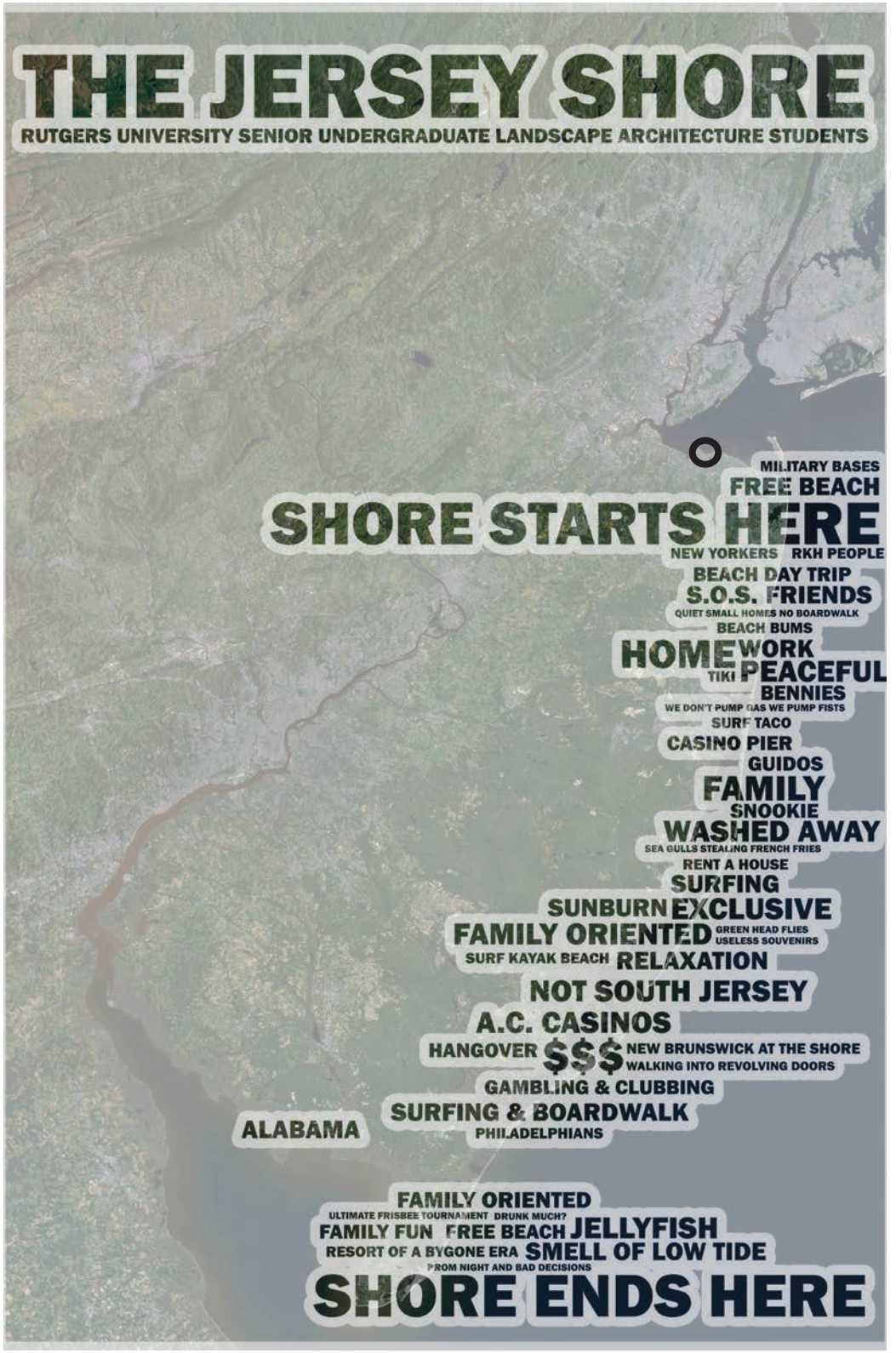
The Jersey Shore Perspective



As a class, we wrote phrases and words that we associated with the Jersey Shore on post its. Then, we placed them all along the coast in the places that they were derived from. This graphic shows a compilation of the those phrases and words in order to create a class perspective of how we interpret the Jersey Shore.

Union Beach

Union Beach is on Raritan Bay, nobody in our class considered is as part of the shore.

Living With Water

Wolfram Hoefer, David Hanrahan

The experience of Super Storm Sandy has thrown traditional experiences over board. The beauty of living with a bay view is now overshadowed by significant danger. The next storm will happen, but we do not know when and where. Getting ready for disaster is crucial; however, the quality of our daily live should not be compromised by always preparing for the worst.

This senior studio was intended to support the initiatives of the Borough of Union Beach to develop long term resilient solutions for the town. Our goal was to find a balance between the needs for protection from future storms, safe and affordable housing structures, appealing streetscapes, high quality open spaces, and wildlife habitat. The students considered the needs of local residents and businesses along with potentials for tourism.

Our first site visit made it brutally clear to us: Union Beach was very hard hit. Some homes were completely washed away; just the concrete path that was once leading to the door was left as a reminder. Back in class we had a lengthy conversation about our personal impressions and how we could channel our desire to help into creative energy that would bring forward creative solutions.

The class became very aware that looking at the challenges at hand; a lot of creative energy would be needed.

One example is the need for residents to lift up their homes in order to make them resilient for future storms. The new questions for landscape architecture students:

How does that impact the relationship of the interior and the exterior of residential and commercial buildings?

What could be a resilient streetscape?

Or do we start thinking in completely different directions....?

The class investigated into the general options how to address the threat of storm surges along with seal level rise today.

Seawall:
What does it mean for a small town on the bay when the bay view disappears behind a wall?

Local Retreat:
How can housing be reorganized in Union Beach on long term safe dry grounds while maintaining quality of life for the current residents?

Raised Homes:
What are the consequences for the spaces in between buildings, are that still livable open spaces?

Living On Water:
What does it mean when we accepts rising sea levels as an opportunity?

This report documents the path he student's took. Opening questions about the site and the issue gave guidance for inventory and analysis. The complexity of design challenges and opportunities was handled through a comprehensive design methodology, called the "Morphological Box". Through several iterations of test designs and explorations in physical models, student groups developed housing an open space concepts that were further developed in individual site designs.

Overall this report documents the student's work as it was produced for the classroom. It was not edited or publication; however, we hope that this report will be a valuable contribution to a resilient future for Union Beach and the ongoing discussion about perspectives for a resilient urbanized landscape in New Jersey.

We thank the Borough of Union Beach as well as the Baykeeper Organization for providing valuable information and for active participation in student discussions and reviews.

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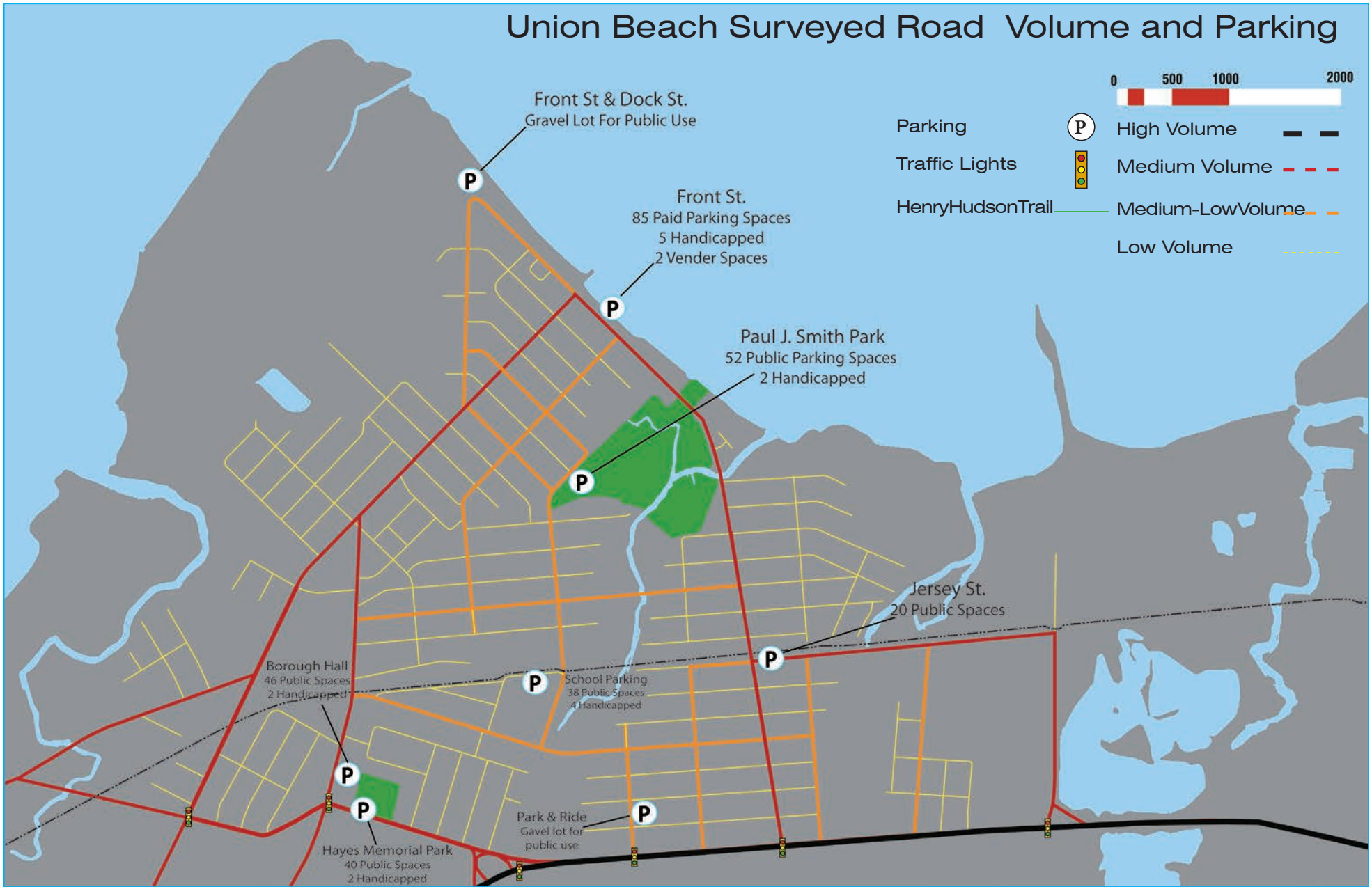
Inventory & Analysis

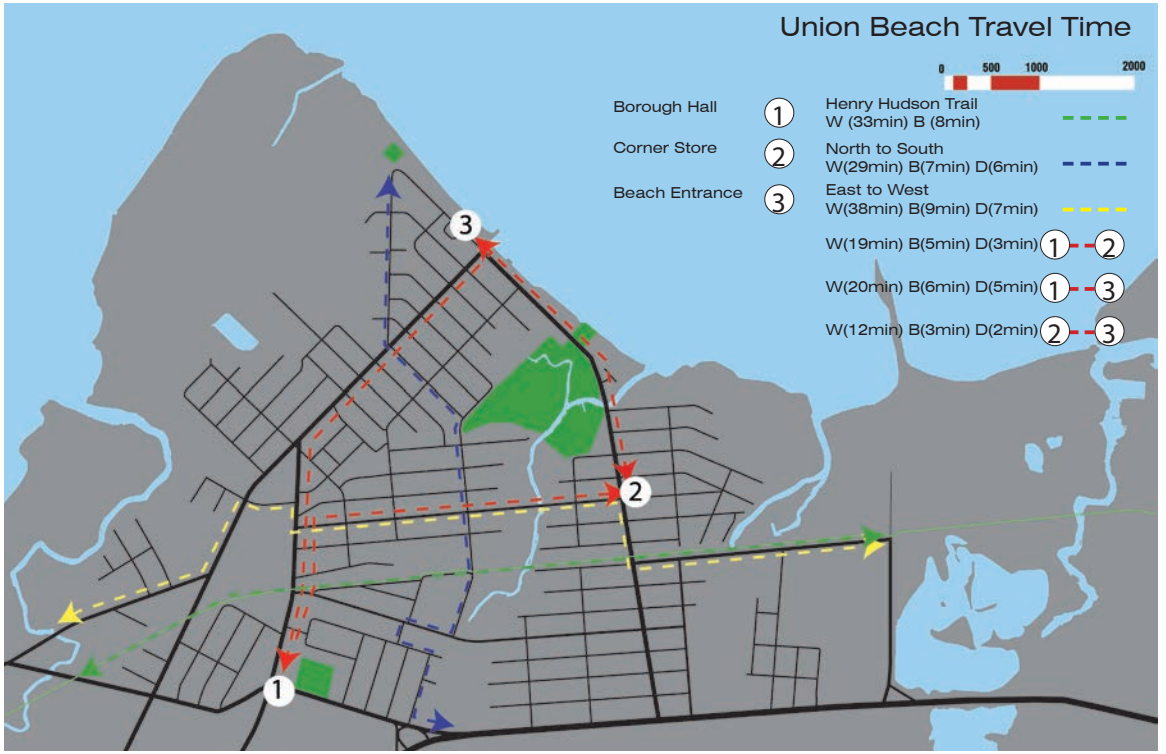
Chapter 1

Circulation of Union Beach

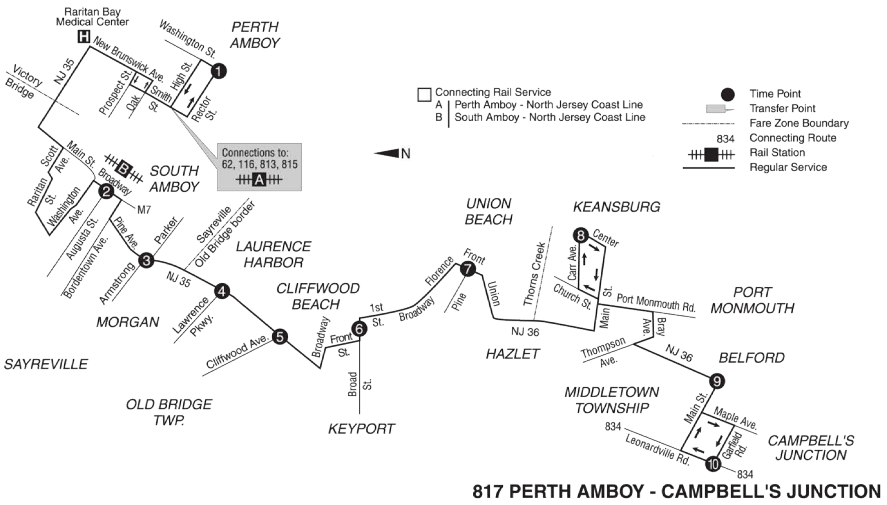
Union Beach, New Jersey
Joshua Mieloch, Sam Saydak, Brian Maher

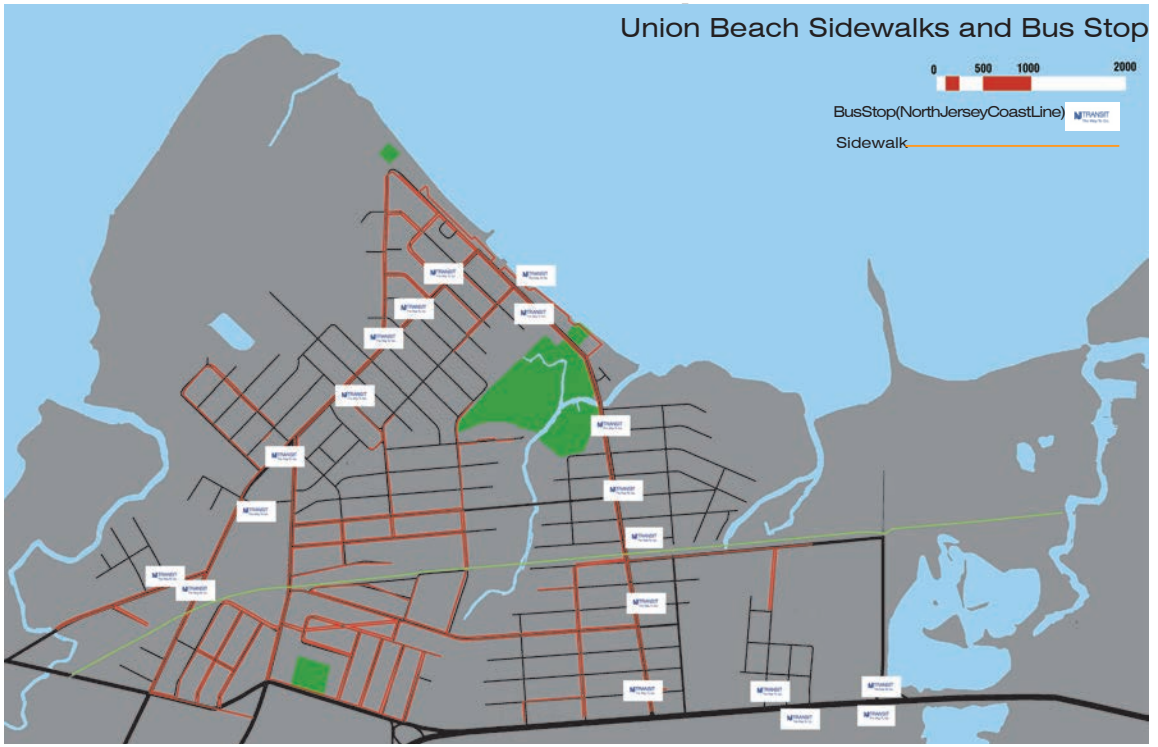


These Maps are created with the purpose of providing an understanding of the circulation in Union Beach. They display multiple aspects of Union Beach, starting with classification of all of the roads of Union Beach based on size. Next is a map showing which streets have sidewalks as well as bus stops and parking locations through out town. The final map displays travel time from certain points in town, such as the waterfront and major intersections. This gives an individual a good sense of how long it takes to get across town. There is also a diagram that displays the bus route that travels through Union Beach and where it connects to.



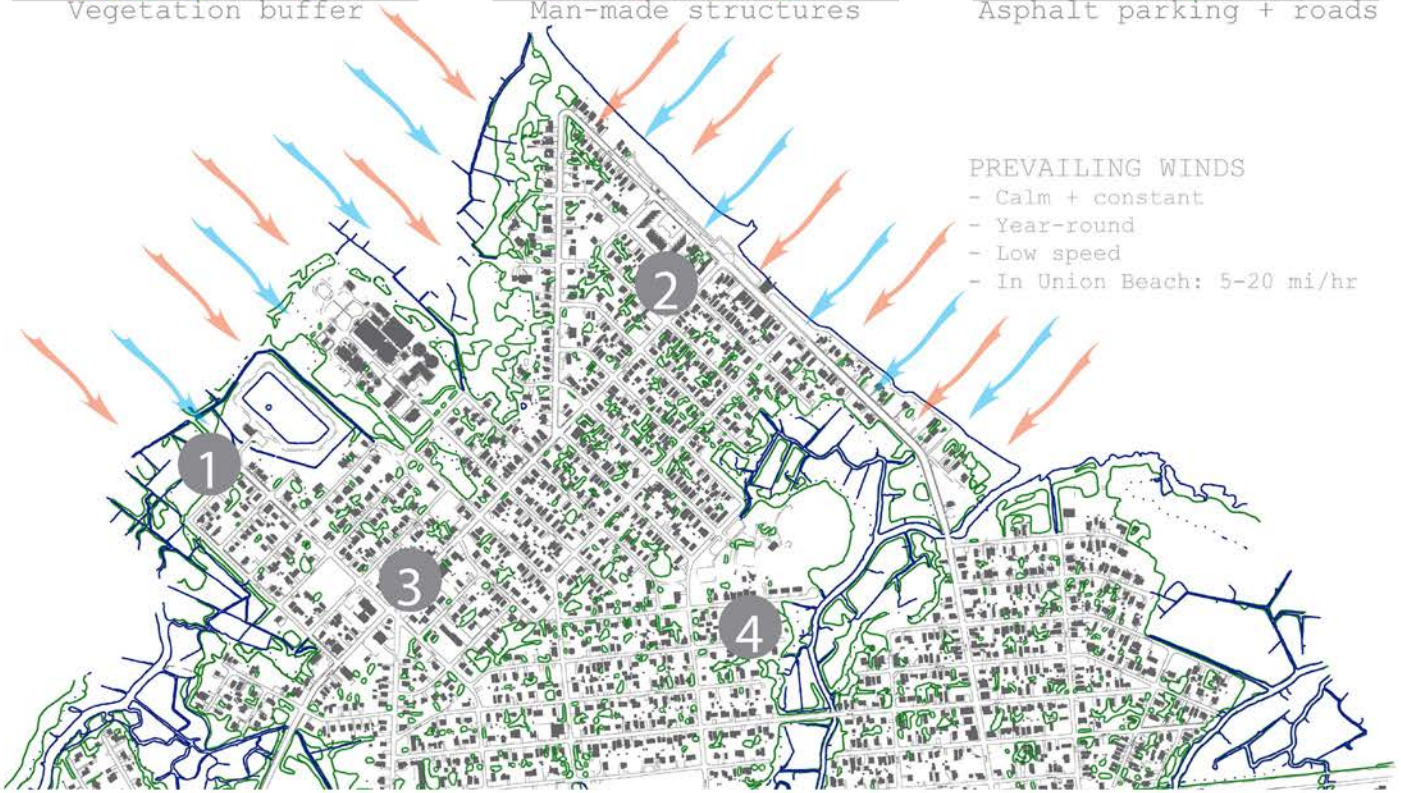
Bus Diagram





Climate

Union Beach, New Jersey
Rebecca Cook, Gwen Heerschap, Christopher Perez



PREVAILING WINDS
- Calm + constant
- Year-round
- Low speed
- In Union Beach: 5-20 mi/hr

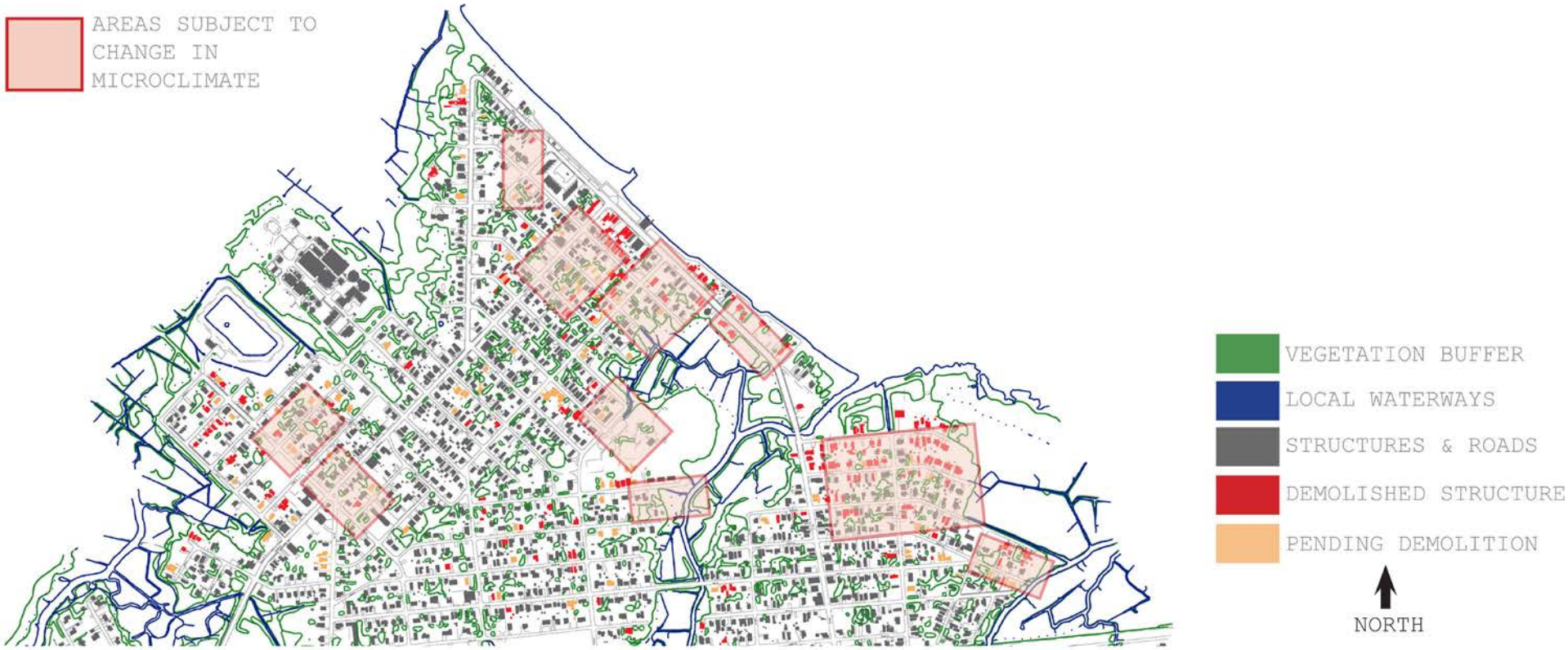
COASTAL WINDS
- Temperature stabilizing
- Seasonal
- Driven by sea temperature
- Mid to high speed

VEGETATION BUFFER
LOCAL WATERWAYS
STRUCTURES & ROADS
COASTAL WINDS

NORTH

(ARMY CORPS. OF ENGINEERS, 1997)

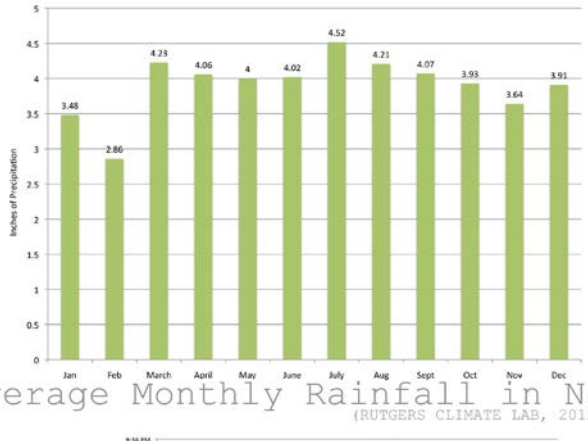
MICROCLIMATE ANALYSIS



New jersey has low prevailing wind rates relative to other areas in the continental United States. In coastal areas like union beach, sea breezes or coastal winds have a greater impact on local microclimate, including surface tempuratures, humidity, and the heat index. These winds are often absorbed by dunes, vegetation, and waterfront homes and businesses. Union beach has several natural windbreaks in the form of salt marsh wetlands. In the wake of hurricane sandy, union beach has lost its manmade windbreak. These areas with high percentages of demolished homes are likely subject to inhospitable winds. Homes and businesses behind the waterfront blocks are now on the front lines of coastal climate effects. Section A and B represent microclimate situations that may now occur at Union Beach. The microclimate in many ground level homes will be altered due to thier proximity to raised homes and vegetated buffers. The ground level home in section B will now experience wind, light, heat and water much differently than it would if the homes next to itt were built on the same level.

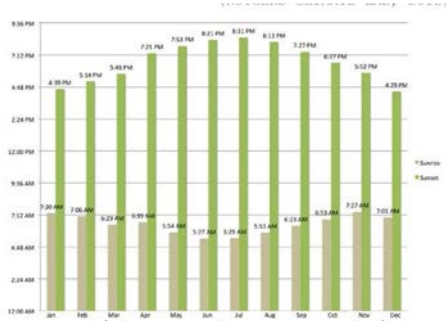
Section A: Not to scale

Section B: Not to scale



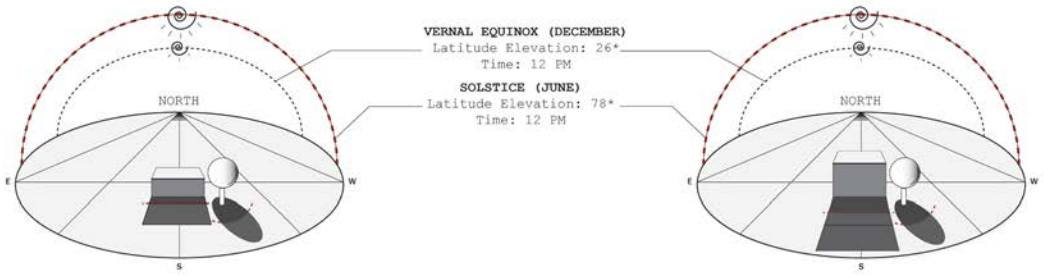
Average Monthly Rainfall in NJ

(RUTGERS CLIMATE LAB, 2012)



Monthly Sunrise + Sunset Times

(WESTERN REGIONAL CLIMATE CENTER, 2013)



SINGLE STORY HOME MODEL

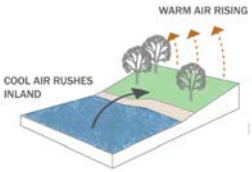
Double Story or Elevated Home Model

SOLAR PATH DIAGRAMS

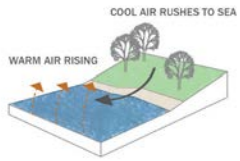
Shadow Analysis

(NOAA EARTH SYSTEMS LABORATORY)

Summer Diurnal Winds
(Sea Breeze)

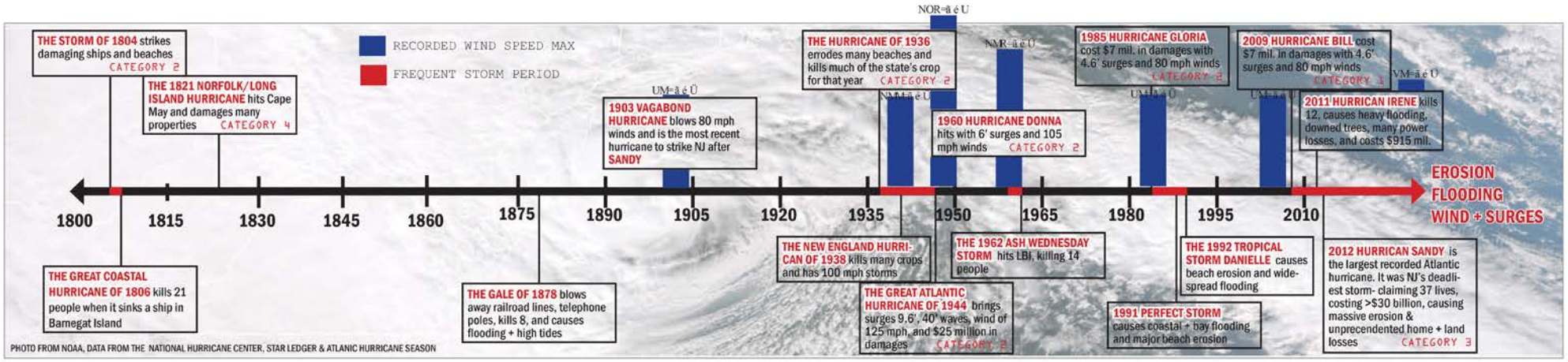


Winter Diurnal Winds
(Land Breeze)



Sea Breezes are characterized by cool temperatures and inland directional flow. High summer heat raises the surface temperature of land disproportionately fast compared to that of the ocean. This is due to water's high heat capacity, a physical property which minimizes temperature flucuations during seasonal temperature change. Land temperatures rise faster in comparison to water, and this is especially true of the dark colored, impervious surfaces of the land. Warm air over the land rises, increasing pressure over the water, thus forcing cooler air over the ocean and across the land. The cool air flow then has the opportunity to heat and cycle through the system again.

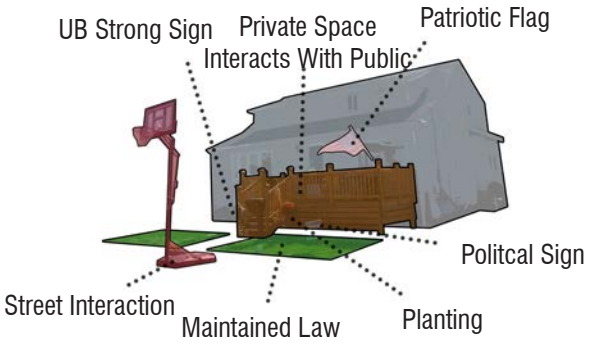
Land Breezes are characterized by warm temperatures and sea-bound directional flow. Cooling of the surface temperature on land disproportionately increases compared to that of the ocean at night and during the winter. This is due to water's high heat capacity, a physical property which minimizes temperature flucuations during seasonal temperature change. Ocean temperatures can become greater in comparison to the cooling of the land, at night or during the winter season. Warm air over the ocean rises, lowering pressure, and forcing cooler air off land and over the ocean. The cool air flow then has the opportunity to heat and cycle through the system again.



Community

Union Beach, New Jersey

Andrew Blackburn, Peter Ellis, Ryan Goodstein



Trails & Fishing Access
Beach Front
Memorial Pier
Jakeabobs Restaurant (Demolished)
Anchor Inn
American Legion (Demolished)
Firefighters / Jack Pinto Memorial Park
Scholer Park
Baseball Field & Backetball Court
Beachers Deli & Catering
Cervino's Restaurant
Pre School / Adult School
Grace Church
Union Hose Firehouse
Aders Tavern
Iglesia Nueva Church
Playing Fields
Library
Hope Tree
Public Works
Small Park
Little League Field
Discovery World
Union Beach Pizza
Jakeabobs Restaurant (Relocated)
Memorial School
Softball Field
Borough Hall
Hayes Memorial Park
Henry Hudson Trail
Holy Family Church
Route 36

Groups and Organizations Assisting Union Beach

Hope for Healing: offers mental health and counseling services

RobinHood: charity organziation of New York City that works with other non-profit organziations to provide food and supplies

Habitat for Humanity: creates affordable housing for those in need; currently building a home in Union Beach

Federal Emergency Management Agency (FEMA): aids in disaster preparedness, response, and recovery service; readjusting flood maps to alter flood insurance and requirements for homes in Union Beach

Salvation Army: nationwide charity organziation renting out the old fire house to serve as a headquarters for entire region

Union Beach Strong: created by residents in order to share recovery information and organize events using social media

Reaching all in Need Everyday (RAINE): volunteer organization operating out of bayshore area providing food, clothing and assistance

Gateway Church of Christ Disaster Response Center: located at Boro Hall in Union Beach; collects donations and distributes funds to those in need

Occupy Sandy: grassroots disaster relief network that emerged through social media to aid recovery for the region

The Sandy Ground Project: creating 26 parks to honor the victims of the Sandy Hook tragedy; created the Jack Pinto Park in Union Beach

Firefighters Mutual Benevolent: charity organization consisting of past and present members of local fire departments; helped build Jack Pinto Park

Kaboom!: non-profit, nationwide organziation that builds playgrounds, help organize and construct Scholer Park in Union Beach

United Healthcare: employees volunteered with Kaboom! in order to build Scholer Park

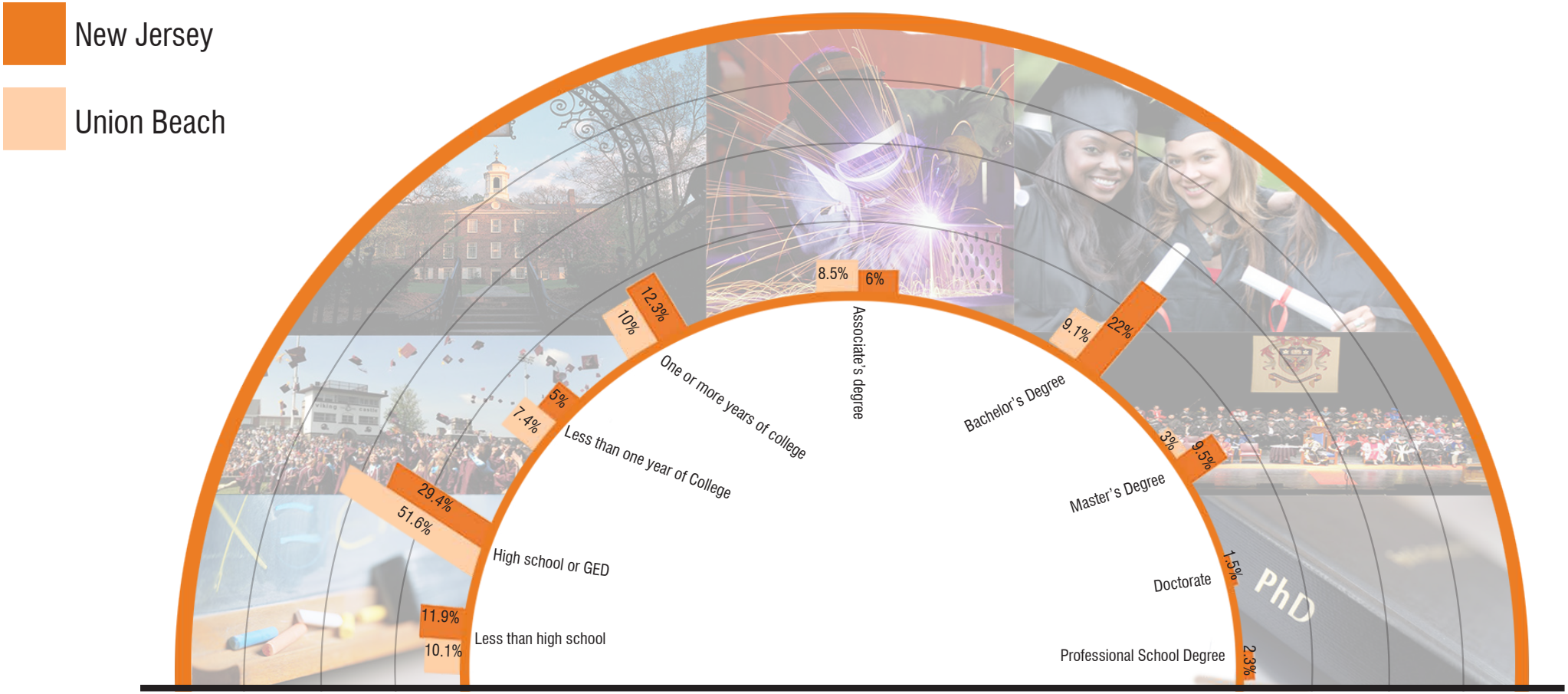
Organizations Web: Union Beach is a small, tight knit community where everyone seems to know each other. After the town was devastated by Hurricane Sandy, the residents banded together in order to restore and rehabilitate the town they loved. With the assistance from groups and organizations the community grew larger and stronger. Some groups, like Union Beach Strong, were created to connect the town through social media. Other groups, like the Salvation Army provided meals and donations for residents in need. All groups were connected to each other with one goal, to help Union Beach recover from Hurricane Sandy.

Demographics

Union Beach, New Jersey
Alexandra Duro, Jack Peters, Michael Ticker, Sara Yildrim

"Caught without insurance, many bayshore bungalow owners can't afford to rebuild or remain." ... "In the self-described blue-collar boro of Union Beach, the frustrated pronouncement, 'I'm still waiting for my money', punctuates so many conversations that it's almost a refrain among homeowners who -- for months after Sandy -- have yet to receive the insurance checks that will help them cover critical home repairs or elevations or both." - Tara Nurin (Freelance journalist)

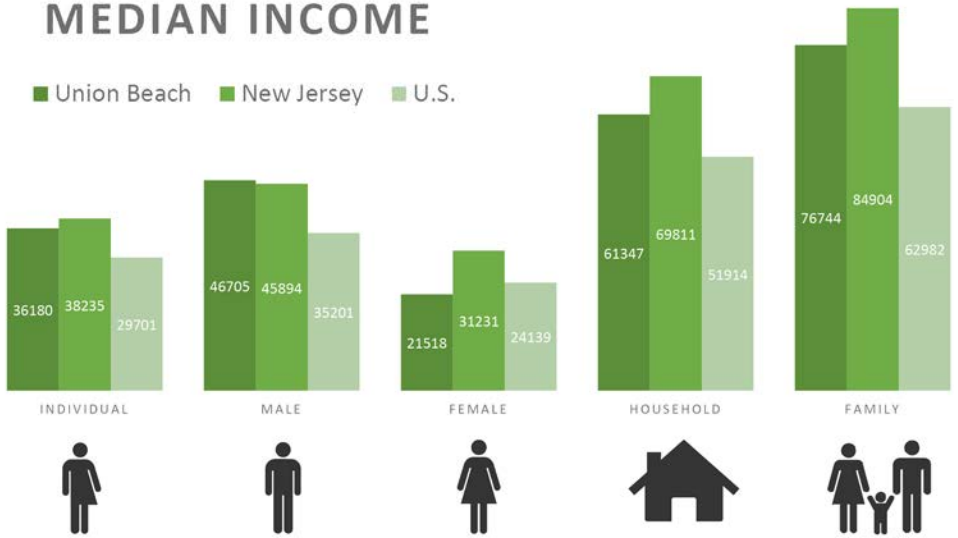
"...Union Beach, a scrappy, working-class town of 6,200 people tucked along the Bayshore of northern Monmouth County that has the will, but not the resources that more affluent towns can tap, to fully recover from the storm." ... "The storm struck a staggering blow to a linchpin of Union Beach's unique character: blue-collar home-ownership." - Shannon Mullen (Asbury Park, NJ press)



Source: http://www.usa.com/union-beach-nj.htm

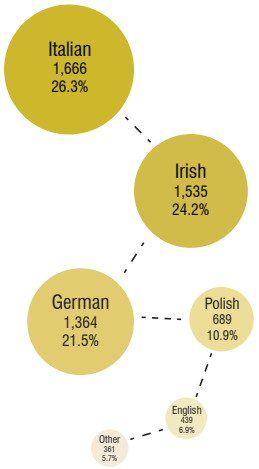
Graphic by: Mike Ticker

MEDIAN INCOME

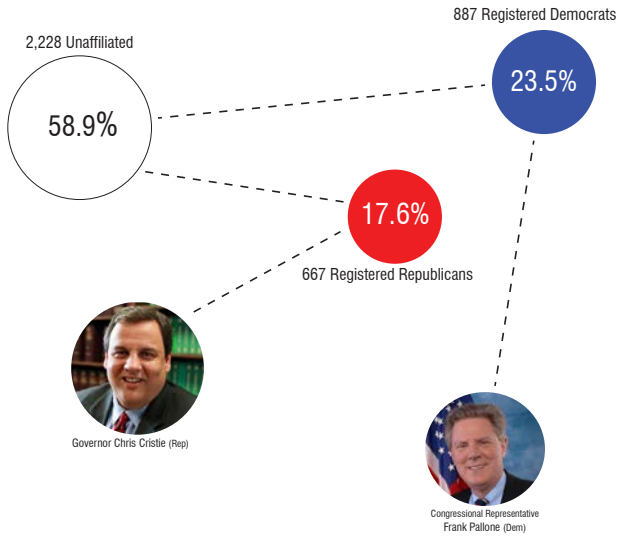


Source: United States Census Bureau 2010

Population by first ancestry

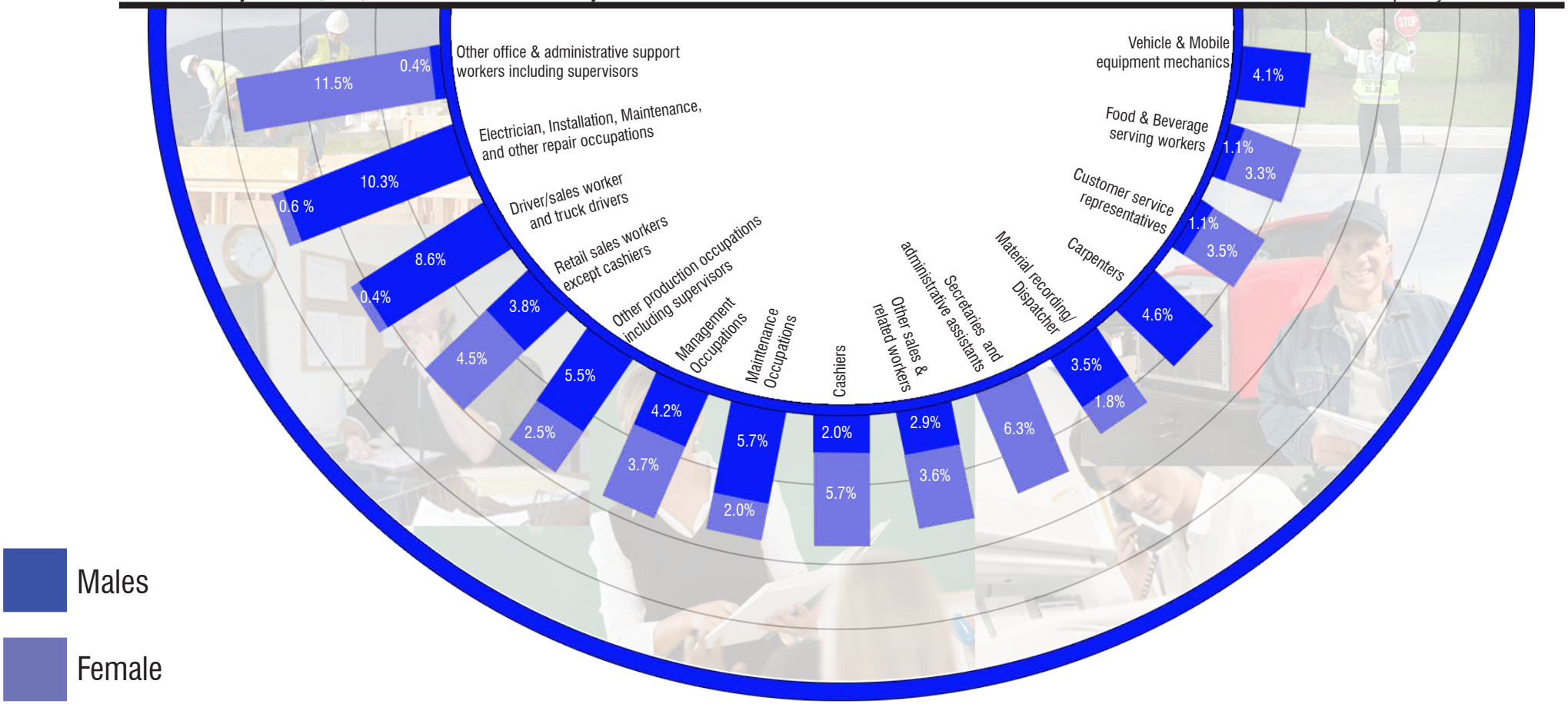


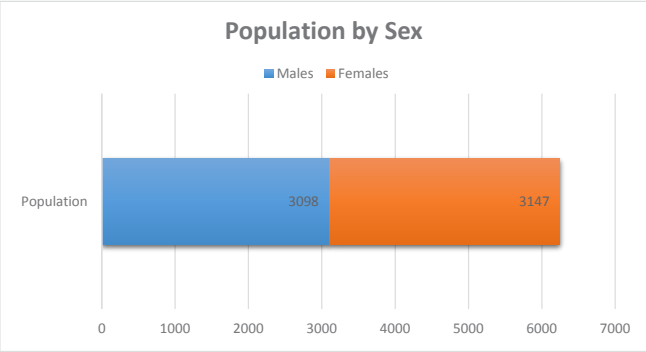
Political stance



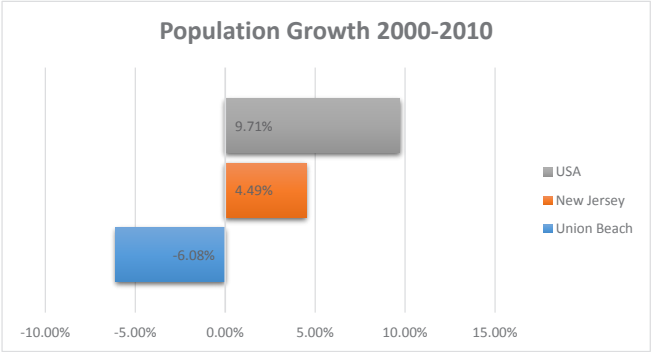
Source: www.city-data.com/work/work-Union-Beach-New-Jersey.html

Graphic by: Alexandra Duro

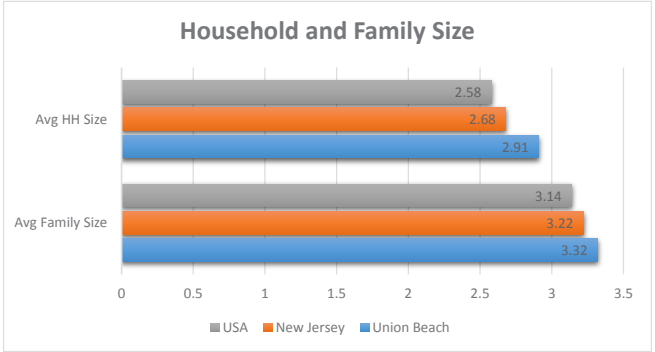




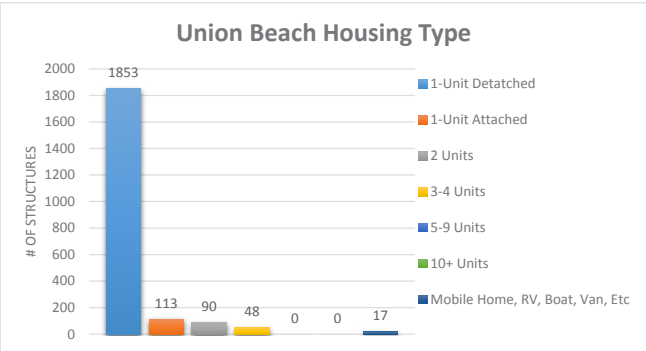
This graphic shows the total Union Beach population of 6245, broken down by the population of each sex.



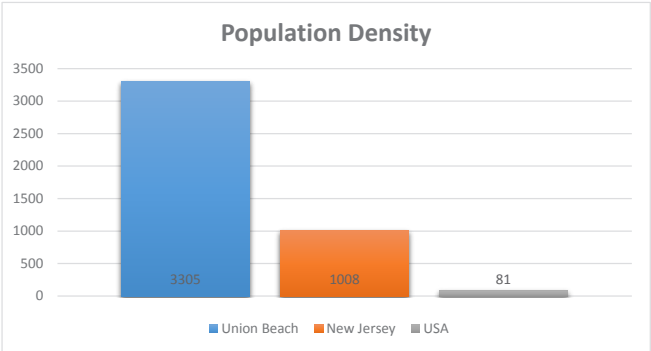
From 200-2010, the United States has experienced a population growth of nearly 10% and New Jersey increased by almost 5%. Union Beach, on the other hand, saw a decrease of over 6% of its population in the same decade.



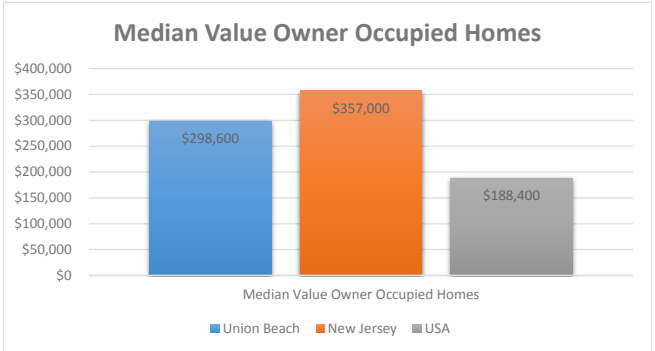
The average household in America is 2.5 people, and family size is 3.14 persons, with NJ's average household of 2.68 and family size averaging 3.22. Union Beach narrowly exceeds both national and state averages.



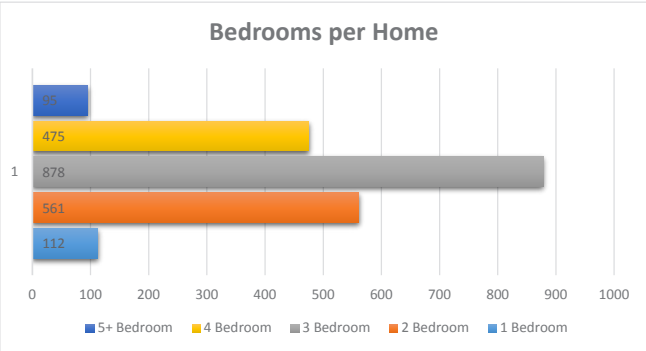
This graph shows the actual number of units listed by housing type. As you can see, it is overwhelmingly composed of single family homes, and is potentially lacking 5+ unit housing options.



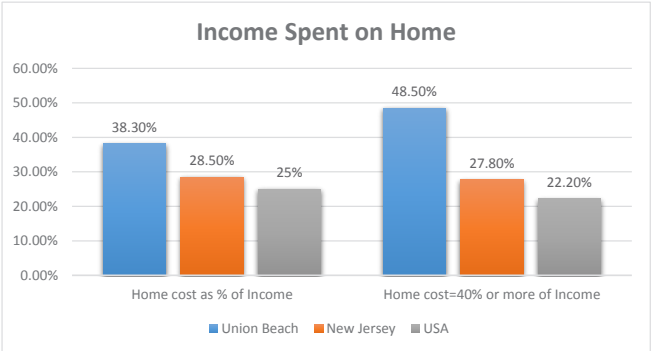
The borough of Union Beach is 3 times more densely populated than the average density of NJ and 40 times more densely populated than the national average.



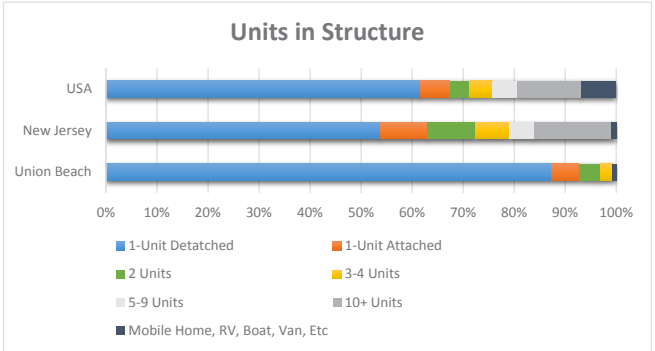
NJ has some of the most expensive real estate in the country, as shown in this chart comparing median value of owner occupied homes. While Union Beach homes rank lower in value than median state values, it still exceeds national averages by $100k.



Union Beach is primarily composed of single family-detached homes. This illustration shows the number of homes with the amount of bedrooms.



This graphic first shows the percent of homeowner's income which is spent on their homes in Union Beach, NJ, and the USA. The following 3 bars show the % of homeowners in each group that spend >40% of their income on their home.



Compared to NJ and national figures, Union Beach is an anomaly regarding housing. Even though it is 3x's more densely populated than NJ and 40x's more than US average, it has an alarmingly higher % of 1-unit detached homes and very little high density and retail options.

History

Union Beach, New Jersey
Michelle Hartmann, Deanna Lu, Chris Marshall

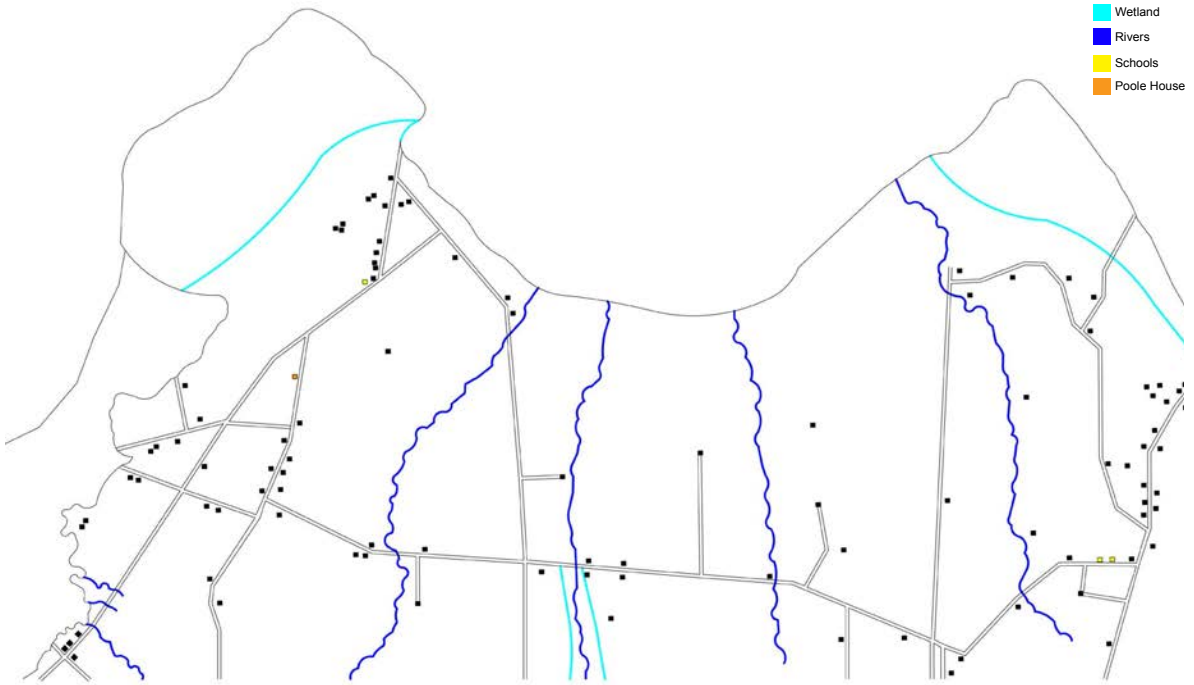
History plays an important role in
finding ones identity. By looking to the past, one can understand how and why a certain place came to be how it is today, how different actions shaped the current culture, and how the landscape morphed due to certain events. As a result, historical research becomes an integral part of understanding a place in relation to the people who reside in it.

Union Beach was originally a tract of land brought from the Lenni-Lenape Indians by William Hartshorne in 1676. It was known as the Conaskunk Territory up until the mid-1800s and was part of the Raritan up until May 18th, 1925. Ever since, Union Beach has experienced many events ranging from the Revolutionary War, to the arrival of the New Jersey Central Railroad, to Prohibition, to the Great Depression, and to the building of the Garden State Parkway.

Researching the history of Union Beach helped the class understand the culture and landscape of Union Beach prior to Hurricane Sandy. These four figure ground drawings provide a graphic representation of change over time and depicts the transformation of the landscape and the expansion of man.

Focusing on the strong blue collar town identity, the Housing and Open Space studio hopes to preserve the past
traditions and design for a more
resilient landscape.

1873

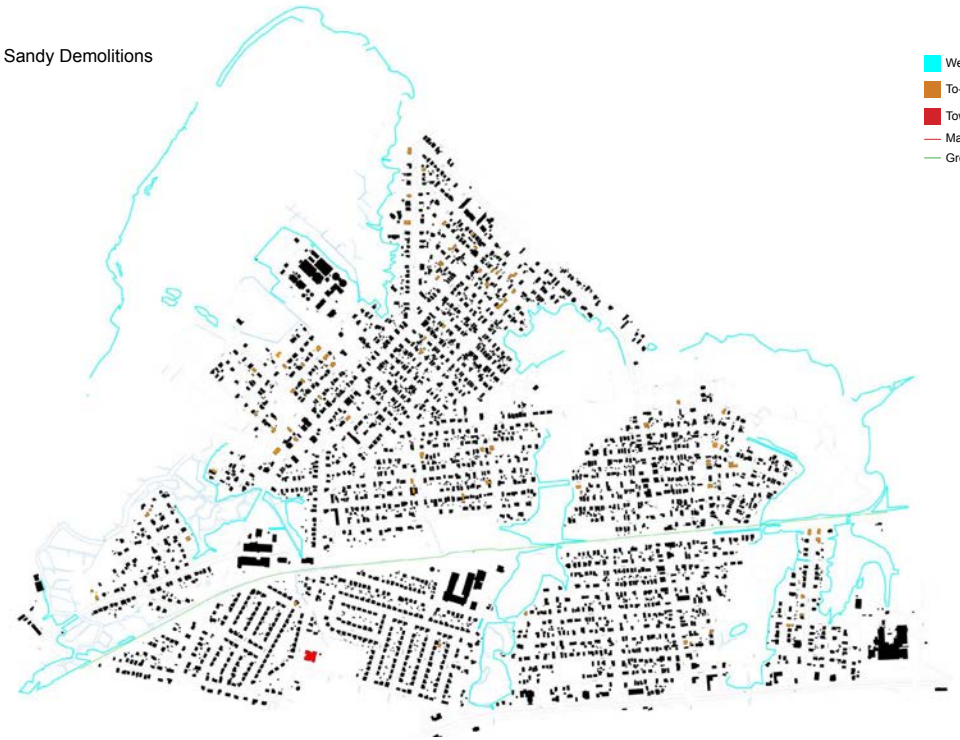


1944

2010

2013

Decrease Post Sandy Demolitions



PAST

LENNI LENAPE
Settle at New York Harbor

DISCOVERY of NYC
by Giovanni da Verazzano

DUTCH settle NYC
call it "New Amsterdam"

MANHATTEN is purchased
by General Peter Minuit

1700

1750

1776

1800

STAMP ACT
by British Parliament

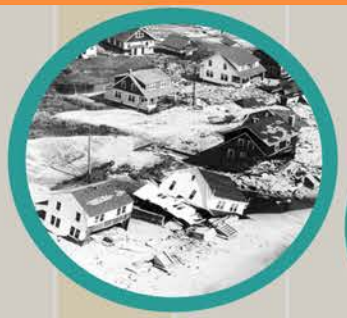
NYC becomes NATIONAL PORT CITY

REVOLUTIONARY WAR

GEORGE WASHIONTON CONQUERS THE BRITISH

LENNI LENAPE
Settle at Conaskunk
(former Union Beach)

Land purcased in 3 tracts
by English lawyer, Richard Harthorne



STORM OF 1804
GREAT COASTAL HURRICANE
LONG ISLAND HU
VAGABOND HUR.

Colonel Tye and loyalists
capture patriots

The Poole Family moves to Conas
Purchase a 100-acre farm

Lieutenant Poole became Colonel P
during the war of 1812

Florence
beg

UNION

1850

1900

WORLD WAR I

NYC STOCK MARKET CRASH

PROHIBITION
of alcohol in United States

1950

2000

BERLIN WALL
demolished

OUTERBRIDGE CROSSING OPENS

NATO
established

GARDEN STATE PARKWAY BUILT

9/11
attack

CENTRAL RAILROAD
of New Jersey

THE GREAT DEPRESSION
WORLD WAR II

IRAQ WAR

Major development & expansion
Lead to the sale and subdivision of all farms

HURRICANE DONNA

THE PERFECT STORM

HUR. IRENE

HURRICANE FLOYD

HUR. BILL

806
CANE

National Fireproofing Company
begins local mining for clay to produce bricks

NATCO stops mining clay abandoned clay pits
pit is left and abandoned

NATCO LAKE forms
becomes a wildlife site

UNION AVE. BRIDGE built

Local rumrunners participate in prohibition
over 1200 barrels of whiskey in Raritan Bay

Union Gardens (Poole Ave.) to Flat Creek
offered for sale

k

UNION BEACH BECOMES BOROUGH

FUTURE

PRINCESS COTTAGE is built
began as Lorraine Hote, 705 Front Street

Railroad Station is built in Union Beach
Purchased subdivisons increase

Stone Road becomes ROUTE 36

Water system installed
first for Union Beach

d Keyport Co. becomes incorporated
buy out major parts of the territory for development

Florence and Keyport Co.
builds a 2,200 ft. long pier on Dock street

NJ Central Traction Company
expands trolley servie to Keyport

PRINCESS COTTAGE
destroyed
becomes iconic "half house"

HURRICANE
SANDY

Monmouth House Hotel
errected by Florence & Keyport Co
338 Front Street

PUBLIC LIBRARY opens

THE GALE OF 1878

Poole Farm is SOLD
and becomes Union Subdivision

No. 50 is built on Florence Ave.
First schoolhouse (2 classrooms)

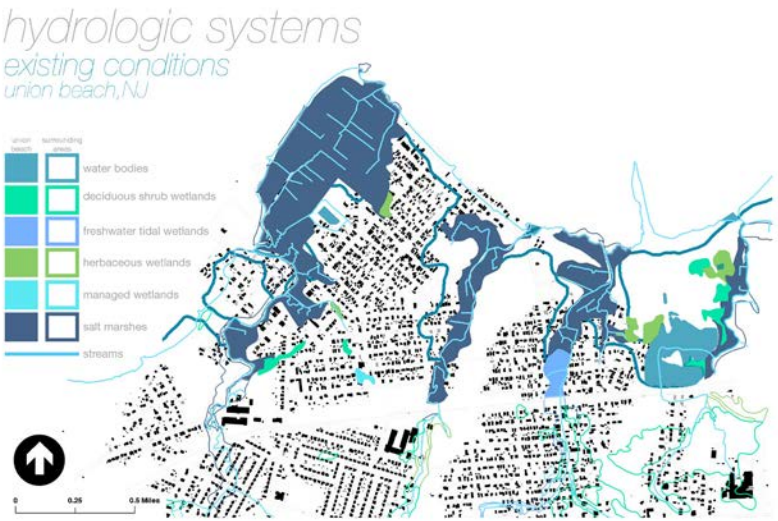
ECONOMIC STRUGGLE

BEACH

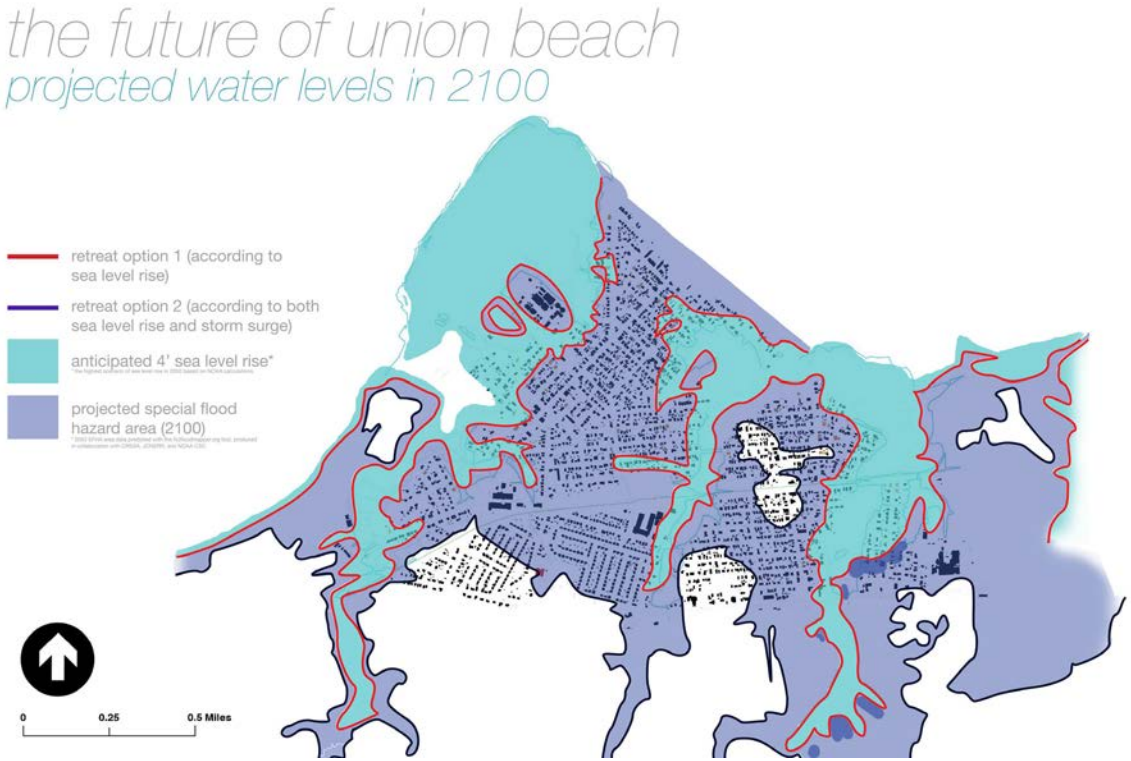
Hydrology of Union Beach, NJ

Union Beach, New Jersey

Jessie Woods, Alyssa Viani, Kim Richmond

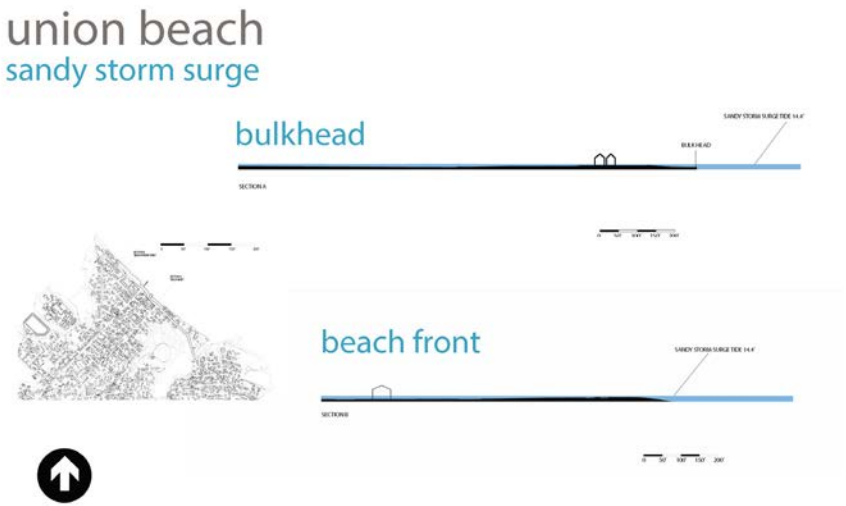


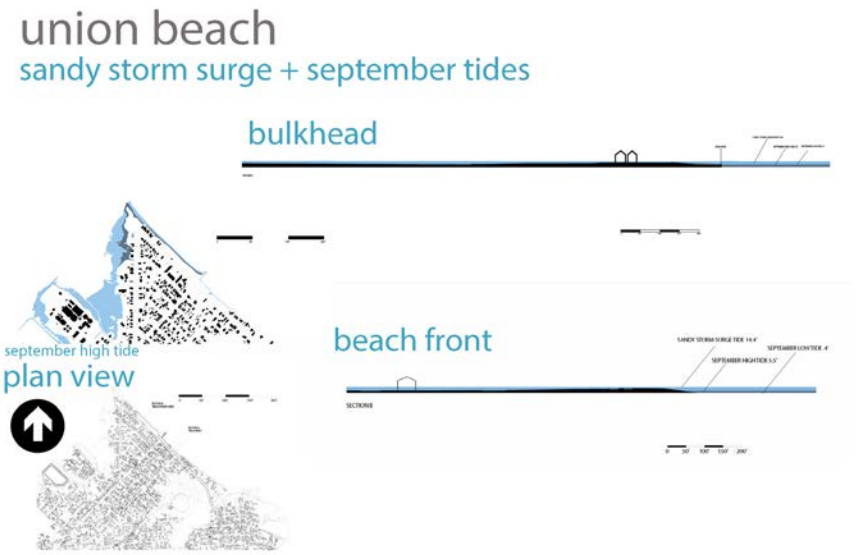
This map shows the existing hydrologically important areas such as salt marshes, wetlands, and streams that are important to consider when develohping the town so that they are not disturbed. It also begins to show areas where these systems can be expanded upon in order to maximize their ecosystem services such as storm surge absorption and wave attenuation.



When dealing with both storm surge and sea level rise threats, retreat is always an option. The map provided was created to set and show retreat lines that are used as a baseline for all designs. The 4' sea level rise in 2050 prediction is based off of the NOAA claculation for the highest high scenario for sea level rise, 6' in 2100. The 2050 special flood hazard area was predicted with the NJfloodmapper.org tool, which was produced in collaboration CRSSA, JCNERR, and NOAA CSC. We are aware that actual levels may be much lower, but these levels were chosen as design baseline because our studio is setting out to massively redesign large portions or even all of Union Beach, therefore we chose to use the highest predictions of sea level rise possible in order to be able to explore new and innovative solutions.

In order to be able to safely design for the future of Union Beach, it is important to understand the storms of the past. This series of maps illustrates the extent of the storm surges of the two most recent and damaging storms to hit Union Beach, Hurricane Irene in 2011 and Hurricane Sandy in 2012 as well as delineates the areas that were hit by both storms. These especially vulnerable areas that have been in the forefront of past storms are interesting for future design of the town because these are the areas that will most certainly be hit again.



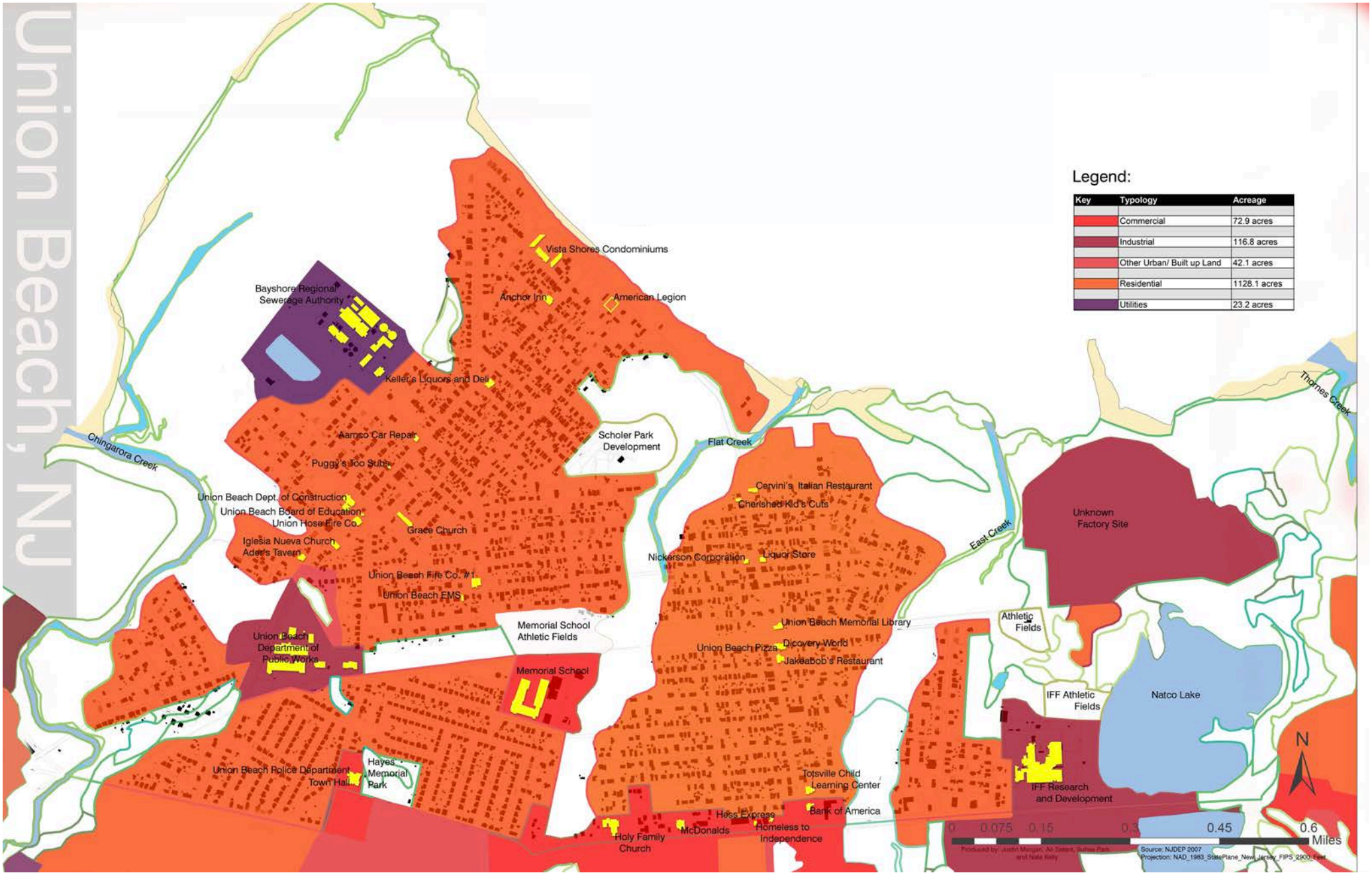


In order to develop an idea of what the town of Union Beach actually experienced because of Hurricane Sandy, the following sections were made to visualize the distance in which the storm surge actually traveled inland. Also, to give a general idea of what the normal high and low tides of September 2012, sections were made in order to show the difference between what those normal September tides were and the Sandy surge during that month.

Landuse/Landcover

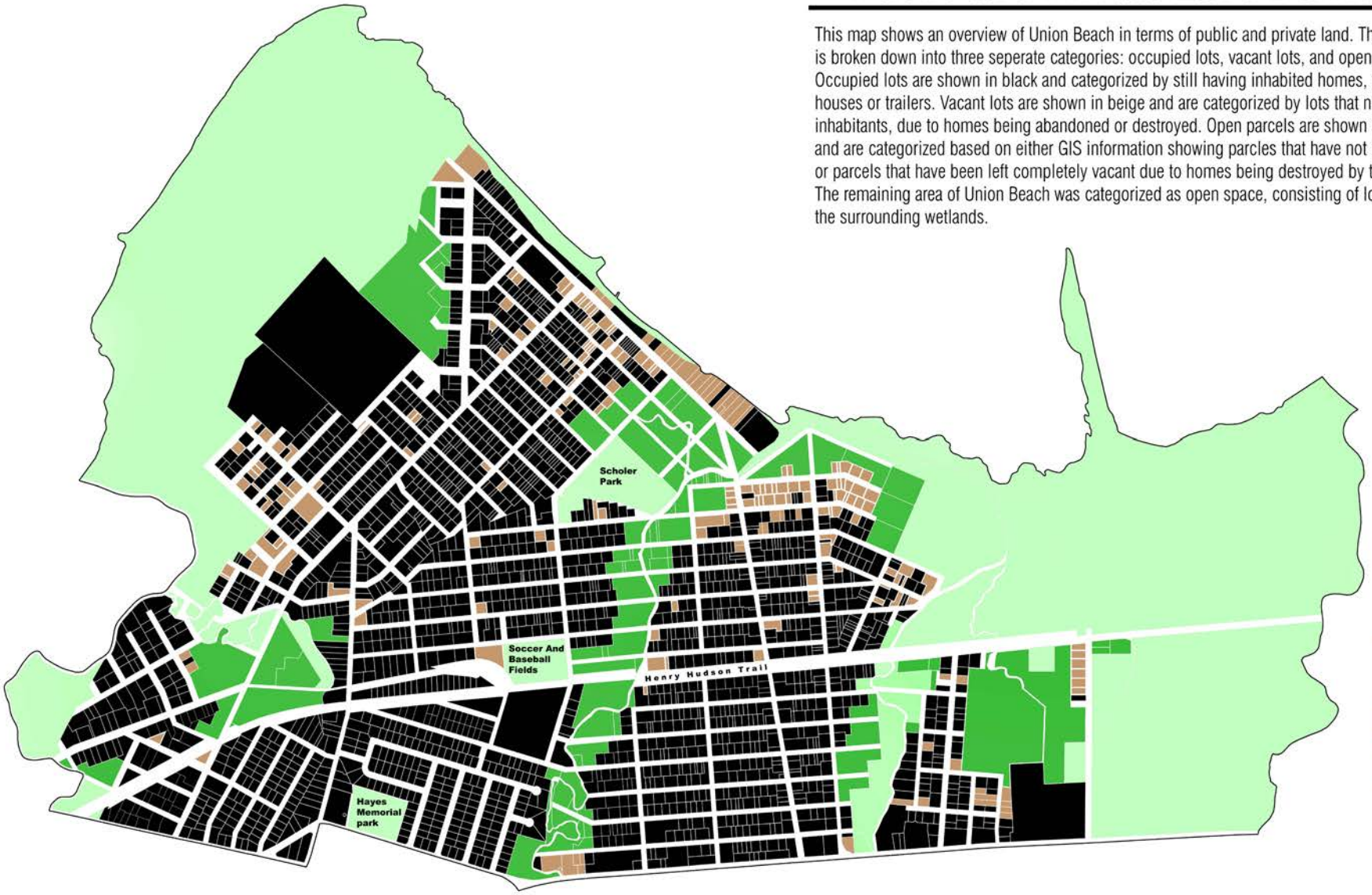
Union Beach, New Jersey

Justin Morgan, Ari Salant, Nate Kelly, Suhee Park



Public and Private Land Delineation

This map shows an overview of Union Beach in terms of public and private land. The Private land is broken down into three seperate categories: occupied lots, vacant lots, and open parcels. Occupied lots are shown in black and categorized by still having inhabited homes, whether they be houses or trailers. Vacant lots are shown in beige and are categorized by lots that no longer have inhabitants, due to homes being abandoned or destroyed. Open parcels are shown in dark green and are categorized based on either GIS information showing parcles that have not been built on, or parcels that have been left completely vacant due to homes being destroyed by the storm. The remaining area of Union Beach was categorized as open space, consisting of local parks and the surrounding wetlands.



Land Use	Acres
Residential	1128.1
Open Space	888

Occupied Lots

Vacant Lots

Open Parcels

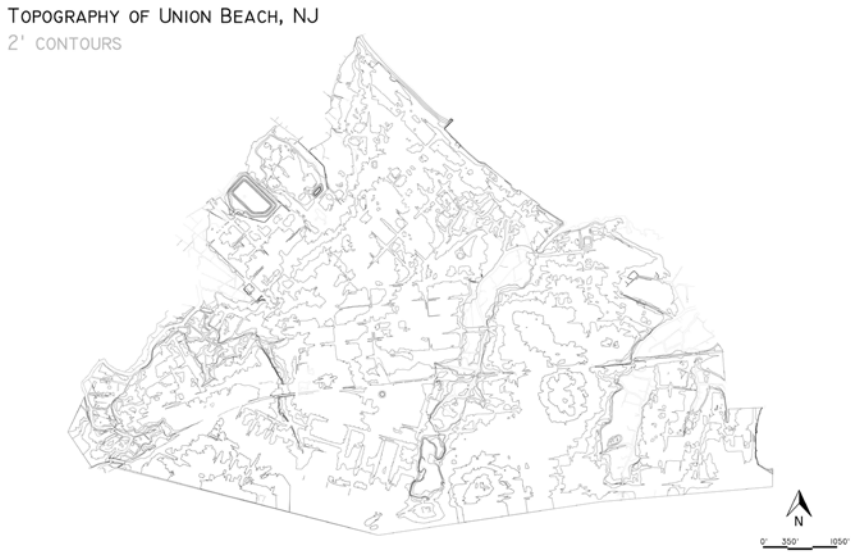
Open Space

Union Beach, NJ

Union Beach's Vegetative Land cover is predominately Saline Marshes with 343.4 acres of cover. They are focused around the 4 tributaries that flow through Union Beach. Flat Creek and East Creek dissect the town into 3 parts. The eastern edge of Union Beach is defined by Thornes Creek and moving west from there is marsh habitat transitioning into Brushland. The tributaries that flow into the Raritan Bay all have some buffering although the stream character does encroach on the town's residences in spots. Areas of housing where there was no substantial buffer did see heavier destruction of property from Hurricane Sandy than areas with larger vegetative buffers. An example being the western edge of town which is defined by a large saline marsh did not sustain severe storm surge damage compared to the houses closest to Flat Creek, where blocks of houses are still destroyed. Also there are 27.2 acres of Beaches while all beaches are public and free some areas are inaccessible due to wetland buffers or tides.

Topography & Soils

Union Beach, New Jersey
George Brnilovich III, Audrey Li, Nick Patiro



At first glance, the topography seemed very extensive. Looking into the layers, there were three areas of relative safety during the flood. The first and largest is the left half that is split by the marsh stream that runs slightly southwest to northeast. The second is split between that stream and the stream further right. The third was to the right of the second stream and above Natco Lake. There is a high point of 23.4' that is located slightly to the northwest of the sewage plant. The low point is 1.8' is located in the marsh area near the mouth of the stream located in the middle of the plan. After comparing the topography with the flood maps FEMA & NOAA, there was a correlation between the 12' contour and the level of safety. Many home on or above 12' in elevation were relatively safe, except for wind damage. The homes belowe 12' in elevation were very much damaged from the flood waters, the wave action, and the winds.

Soils

Union Beach consists of 3 main soil types as shown on the map above

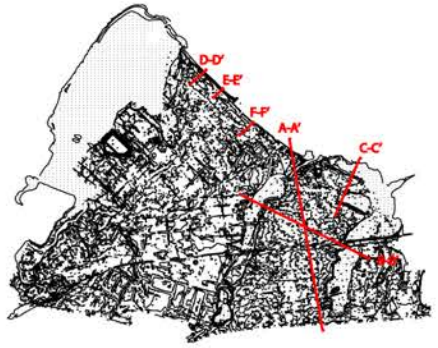
The AptAv complex consists of saline marshes with high amounts of decomposed organic matter. These soils are highly saturated as the water table sits at the surface. Due to this saturation, the only vegetation that is supported are wetland or water tolerant herbaceous plants. There is a high runoff potential and this land is not suitable for building above-ground or below-ground structures.

The UdauB complex is in a residential area typified by loam and loamy sand, mixed with urban fill (shown in orange) and covered with impervious surfaces like asphalt, concrete, roofs, and other hardscaping.There is high runoff potential. The water table sits fairly deep below the surface at over 80". Topographically, it is the most elevated part of town. A wider variety of vegetation will grow in this soil, but drought tolerant species are best due to the depth of the water table. The soil is suitable for building most types of elevated structures.

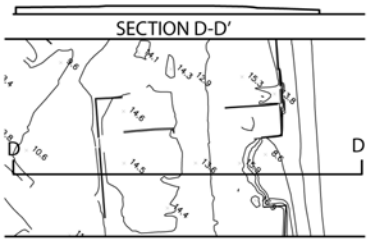
The KkhB Klej/Urban Land complex is bordered by marsh areas and is largely residential. it is also one of the most elevated parts of town. The soil is loamy sand/sand, a thin layer of slightly decomposed plant material, and urban fill, covered with many imperviopus surfaces. The water table sits at 12"-24" below the surface, so water is more readily available to plants with less risk of saturation. The runoff rate is more moderate compared to the previous two soil types.Most types of vegetation will grow with native/wild herbaceous plants having the most success. this

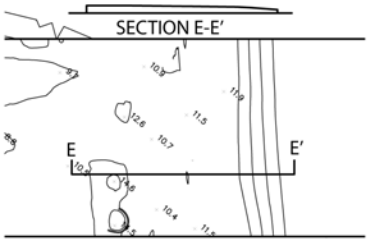
Sections

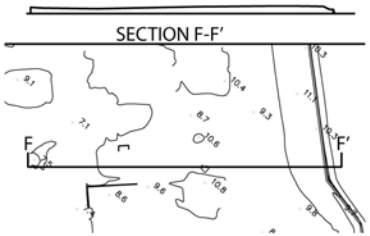
Sections are a great way to understand the topography of a site. By studying the existing topographic change and characteristics, these sections will provide an overview of what the natural landform as well as the artificial physical features of Union Beach look like. it is critical information that will help students from the Studio make design decisions. Sections are cut based upon student design groups' requests and each group's focus area. land typologies examined include beachfront, waterfront, wetlands, commercial development, and housing development.

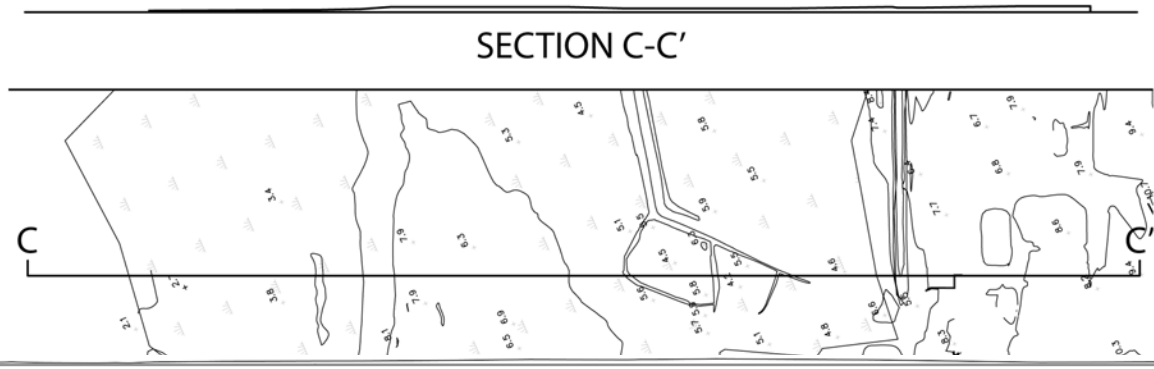


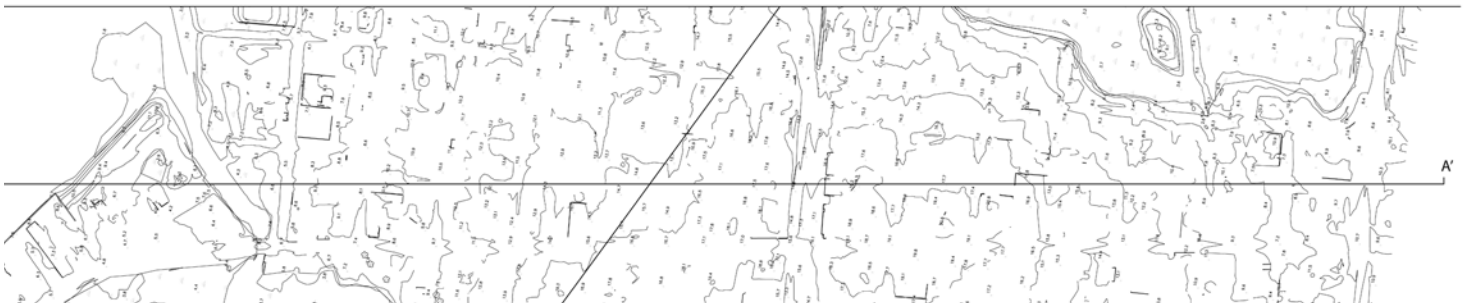
SECTION LOCATIONS DIAGRAM

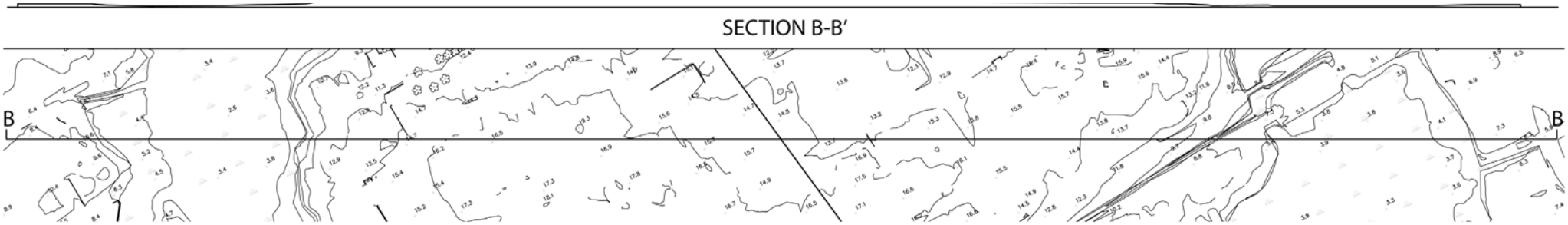










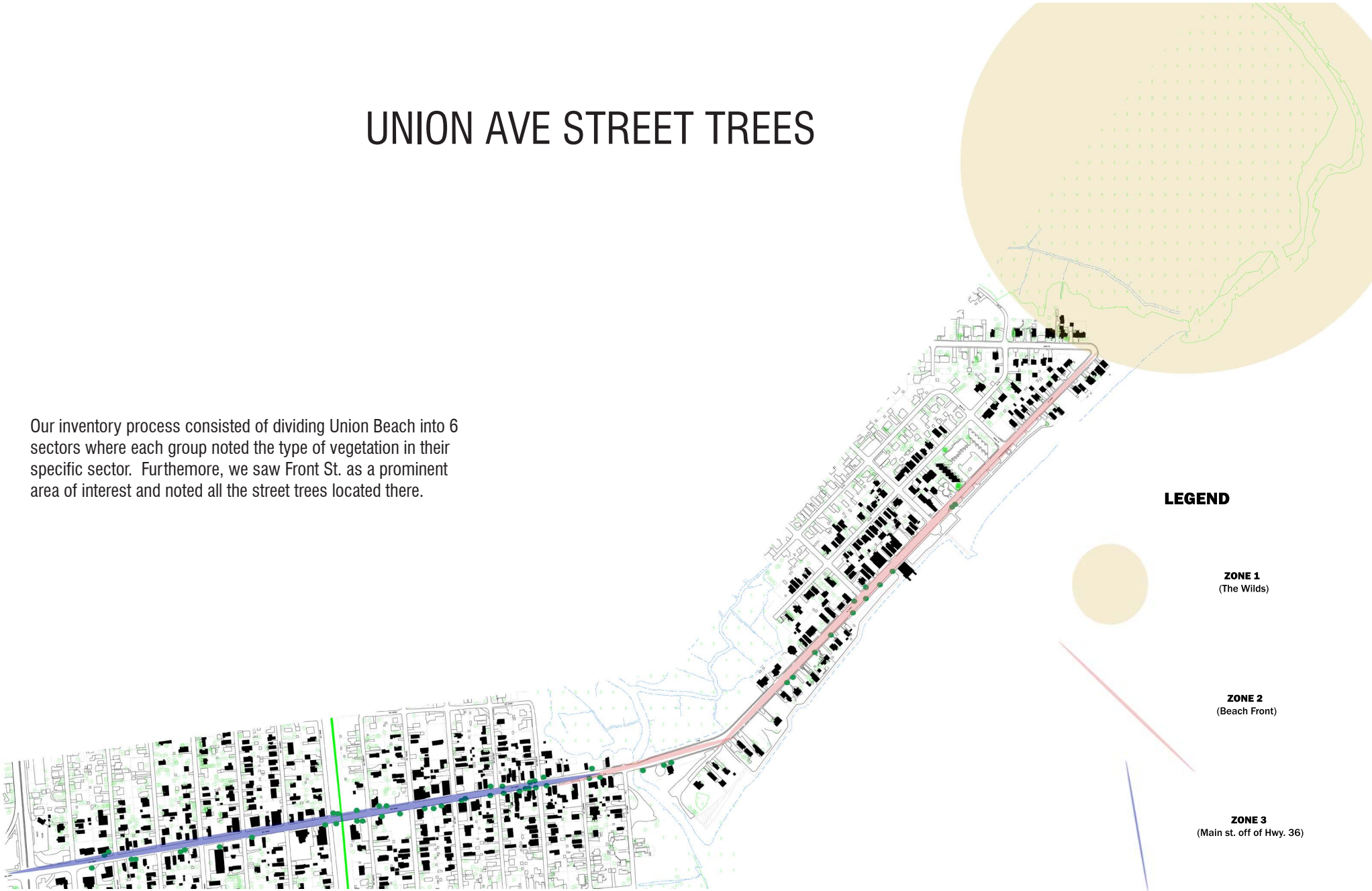


Vegetation

Union Beach, New Jersey
Benjamin Antwi, Marlon Davis, Areli Perez

UNION AVE STREET TREES

Our inventory process consisted of dividing Union Beach into 6 sectors where each group noted the type of vegetation in their specific sector. Furthemore, we saw Front St. as a prominent area of interest and noted all the street trees located there.



Union Beach

PROCESS

On September 17, 2013 The Advanced Landscape Architecture Studio, Living With Water, performed a survey on theexisting vegetation of the coastal town of Union Beach in Monmouth County New Jersey. The Vegetation Inventory group organized each team into 6 groups that would take a survey of existing vegetation in their designated areas. Union beach was organized into 6 sections corresponding to the 6 groups taking surveys of the town. Each groups task was to Identify each tree in there designated area, note tree condition and identify specific plant communities.

Sample Survey

Due to the short time the Advanced Landscape Architecture Studio class had to perform a complete inventory, indentifying every tree in union beach proved to be a daunting task. The Soulution was then to use each inventory sub group's inventory data and use the sample information to predict the overall vegetative composition of Union Beach.

Sample Size

Each Sample Size was based on a 1,700,000 square feet area determined by the vegetation group. The projection of the sample information is based on sample survey up to the total number of trees the Army Corp of Engineers vegetation inventory done in 1998. Based on the 1998 Army corp of Engineers survey there were Trees in Union Beach at the time of the survey.

Group 1

Group 2

Group 3

Group 4

Group 5

Group 6

Case Studies

Chapter 2

Oysters wildnewjersey.tv

Subway Car njdep-artificial reef program

Reef Balls reefball.org

Coastal Biomedical Reef International Journal of Tropical Biology vol58 Oct2010

Artificial Reefs

George Brnilovich III

An artificial reef is a submerged or partially submerged, man–made, underwater structure that is usually built to provide a habitat for marine plants and animals, as well as terrestrial life forms that benefit from marine species. They closely mimic a naturally occurring reef when well planned and constructed. Although originally built for protection or to attract fish for human consumption, artificial reefs are currently known to have the added benefits of reducing beach erosion, nourishing shoreline, stabilizing sediment, reducing marsh retreat and attenuating and refracting waves (See Table 1 for a list of pros and cons).

Artificial reef construction dates back thousands of years. Ancient Persians and Romans used them in warfare to keep enemy invaders in or out of harbors (8). The first documented uses for food consumption come from 17th century Japan, when bamboo cages, rocks, and rubble were used in aquaculture to attract fish & invertebrates (8). The earliest documented uses in the United States are from 1830's South Carolina, where American fisherman utilized fastened logs in the state's coastal waters, thus increasing fish yields (8).

Artificial reefs are applicable to any marine environment where there is lack of hard substrate that marine life can attach itself to. They can only be called artificial because they are intentionally placed in the environment while everything that follows is a natural process. In civil engineering terms, this is called hard engineering - a controlled disruption of natural resources using man-made structures. When ocean currents meet a vertical structure, plankton-rich upwelling occurs that attracts smaller predators that in turn attract larger predators. Other species are drawn to any structure that provides cover and shelter from open water. If enough light is present, structures become gardens for algae, tunicates, corals, sponges and other benthic marine organisms. In time, the attachments of these organisms become stronger, further strengthening the structure. The result is a living reef matrix that can be multiple layers thick that is strong enough to withstand northeast storms, tropical depressions and hurricanes (6).(See photo of Reef Life)

The structures are constructed out of myriad natural and artificial materials. Almost any material can be used provided it is durable, stable, and environmentally safe. Historically, natural materials including bamboo, wood, and rock were used, but currently a host of manufactured items are also employed including concrete, steel, demolition debris, boats and ships, tires, train and subway cars, army tanks, dredged rock, refrigerators, automobiles, and other large household appliances, and even oil drilling rigs (2). Before these recycled items are sunk into the ocean they are thoroughly cleaned of plastics, degradable materials, grease and any other potentially harmful components by standards set by the Environmental Protection Agency which works with numerous federal, state, county, and municipal government agencies to ensure safety (2). In the last decade, a process called electro mineral accretion (EMA) has been used to build artificial reefs. Mineral accretion involves applying low voltage current to a metallic structure to cause limestone to precipitate out of seawater and crystallize on the surface, on which coral and other marine organisms can attached and grow. The electrical current facilitates post-attachment growth. A coalition named the Global Coral Reef Alliance has developed a technique called the Biorock process using EMA for reef restoration, mariculture, and shoreline protection. Biorock is also called Seacrete or Seament. The process can continue without limit as long as the electrical current is flowing.

As of 2011, Biorock reef projects exist in over 20 countries around the Caribbean, in the Indian and Pacific Oceans, and Southeast Asia (cite). These projects have also been experimented locally within the New York area for sal marshes and oyster reefs (9). (See photo of oysters)

New Jersey has had an artificial reef program since 1984 managed by the Bureau of Marine Fisheries. The New Jersey network is the largest artificial reef network on the Atlantic coast, consisting of 15 locations covering a total of over 25 square miles (See slide for locations of AR network) (2). The reefs have been carefully placed along the 120-mile coast to ensure that each site is easily accessible via boat from 12 ocean inlets. Over 4000 patch reefs have been constructed within the 15 sites. A patch reef is a 0.5-5 acre area where a barge load of material has been deployed. Most of the New Jersey reef locations (13 of the 15) have material sunk at a depth of 48-94 feet. However, the Shark River reef depth is 119-134 feet, and the Deepwater reef depth is 90-125 feet (5). The goals of the artificial reef network is to create a hard substrate habitat that provides marine life with areas for spawning, nursery, refuge, and feeding, thus increasing abundance and diversity. These improved habitats will also create fishing and scuba diving areas for human recreation that will contribute local economic growth to these industries.

Between 1984 and 2004, DEP used 6.3 million cubic yards material for reef building. These construction materials consisted of rock, concrete demolition material, concrete castings, steel demolition material, undersea telecommunications cable, steel ships and barges, army tanks, tires, wooden ships, fiberglass boat hull molds, subway cars, and flatbed rail cars (2). Some materials that have been used in New Jersey & worldwide that are prohibited for use in the state as of 2005 are wooden vessels, ferro-cement vessels, fiberglass vessels or hull molds, railroad box cars, tires, automobile and truck bodies, airplanes, sea-land shipping containers, white goods like refrigerators and stoves, and subway cars (5).(See photo of subway car) However, it appears that the ban on subways cars was lifted shortly thereafter as 58 stainless steel subway cars were deployed on Cape Between 1984 and 2004, DEP used 6.3 million cubic yards material for reef building. These construction materials consisted of rock, concrete demolition material, concrete castings, steel demolition material, undersea telecommunications cable, steel ships and barges, army tanks, tires, wooden ships, fiberglass boat hull molds, subway cars, and flatbed rail cars (2). Some materials that have been used in New Jersey & worldwide that are prohibited for use in the state as of 2005 are wooden vessels, ferro-cement vessels, fiberglass vessels or hull molds, railroad box cars, tires, automobile and truck bodies, airplanes, sea-land shipping containers, white goods like refrigerators and stoves, and subway cars (5).(See photo of subway car) However, it appears that the ban on subways cars was lifted shortly thereafter as 58 stainless steel subway cars were deployed on Cape May Reef in 2008. This reversal may be attributed to revised cleaning techniques. Over 90% of the reef material is from shale, sandstone, and granite dredge rock. Information about the weight of materials is not fully documented, but some documented examples are 5000 tons of jetty rock at Sea Girt reef and 8000 tons of concrete rubble at Ocean city reef in 2006; 800 tons of concrete pier pedestals and 100 tons of concrete buoy sinkers at Axel Carlson reef in 2007; 18 tons of subway cars at Cape May reef in 2008; and a 9000 ton decommissioned destroyer at Del-Jersey reef in 2011 2).

The Atlantic Ocean along the coastline of New Jersey is suitable to reef development due to the shallow coastal plain along the nearly featureless ocean floor. The hard, sandy floor is good for supporting reef structure and the temperate waters are rich in nutrients, which support abundant growth of phytoplankton. The phytoplankton provides a strong base for the reef food web. The New York Bight is one of the most heavily fished areas in the U.S.; therefore any addition of fish habitat from reef development is beneficial to the local fishery industry.

With the heightened environmental awareness as a result of climate change, artificial reefs are now increasingly being utilized to reduce beach erosion, nourish shorelines, stabilize sediment, reduce marsh retreat, and attenuate and refract waves. The primary mechanism is via wave attenuation and refraction. Wave attenuation is a reduction of the peak flow due to dispersion of the wave over time. In other words, when larger waves are coming towards shore unimpeded their energy is stronger when they break at the shoreline. When waves hit a barrier, they break further away from shore and their energy is dissipated and absorbed back into the water. Wave refraction is a process by which a wave approaching the shore changes direction due to slowing of those parts of the wave that enter shallow water first, causing a sharp decrease in the angle at which the wave approaches until the wave is almost parallel to the coast. When waves break at an angle, a longshore current develops and sand transports down the coast. With the presence of an artificial reef, waves can travel across wider and shallower waters and refract, thus reducing harmful impacts at the shoreline.

In spite of New Jersey's long history with the artificial reef network, there is little data showing how any of the reefs in the network held up in response to Superstorm Sandy or other major storm events. Reef structures do not last forever due the destructive properties of the ocean, corrosion, sand blasting, storm surge, and scouring, just some of the forces at work in the marine environment. The calcium carbonate binder in cement is weakened in ocean water, but still can last for decades or more in an artificial reef. The Bureau of Marine Fisheries predicts an expected lifespan of at least 50 years and up to 100 years for various ships, vessels, and subway cars that have been deployed (2).

There is much more data available from Caribbean and other tropical countries on how artificial reefs fare when faced with strong weather. In the Dominican Republic in 1998, 450 Reef Balls were installed as a breakwater system. The 2 sizes of Reef Ball used were 6' wide x 3.8' high, weighing in at 3000-4500 pounds each, and 5.5' high x 4.3' wide, weighing in at 3500-4500 pounds each.(See photo of Reef Balls)

The units were installed close to the shoreline at depths of 5.25' to 6.56', so they were just below the mean water level. In the same year, the island suffered a direct hit from Hurricane Georges, a Category 3 hurricane, and then large waves from Hurricane Mitch, a Category 5 hurricane. No Reef Ball installations were displaced or damaged (6). Another Reef Ball project on Grand Cayman Island has withstood a direct hit from Category 5 Hurricane Ivan in 2004, and large waves from Category 5 Hurricane Wilma in 2005 (4). Another study using Biorock reefs and simple, half cylindrical structures made from welded and wired rebar was done in the Turks and Caicos Islands in 2006-2007 (7). (See photo of Oasis Cylindrical Reef). These very light structures sustained direct hits from Hurricane Hannah, immediately followed by Category 4 Hurricane Ike in 2008. Again, there was little damage to the structures.

However, large structures like ships, or subway cars that are placed in shallow waters can show some movement or break apart during storms, especially if they are not anchored to the sea floor. After Hurricane Andrew in 1992, coral reefs suffered severe damage from debris (6). The objects used in New Jersey's artificial reef network are sunk at deeper depths and do not appear to have had any major damage from storms. Recent attempts to contact a representative from the Bureau of Fisheries to find out how resilient the reefs were up against Superstorm Sandy have been unsuccessful. Generally, structures that stand the best chance of resisting strong storms and the resulting damage are either anchored, heavy and higher density, or light and more permeable to hydrodynamic forces.

In conclusion, artificial reefs seem like a viable alternative to more costly and laborious methods to address the threats of sea level rise, storm surges, and other coastal hazards threatening the Tri-state area and elsewhere due to climate change. They will not work to address all issues in all areas, but when weaved together with other types of interventions, they can be part of a coastal protection fabric that will ensure that resiliency is not just a post-Sandy buzzword, but a viable network of methods that will offer protection to vulnerable communities for many years to come.

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8.Retrieved November 1, 2013. http://en.wikipedia.org/wiki/Artificial_reef

9.Retrieved November 1, 2013. http://nynjbaykeeper.org/

Table 1

Human Impacts

Pros

Improved Fishing , Improved Water Quality, Low visual impact, Recreational, Educational

Cons

Government regulations, Permitting, Extensive Environmental Assessments, Material & Installation Costs, Active Monitoring, Conflicts between users

Environmental Impacts

Pros

Nourish beaches, Minimize erosion and marsh retreat, Increase biodiversity, Creates habitats, Effective for Coastal Marshes, Sheltered Bays

Cons

Does not work in sheltered bluffs, Animal poaching and overfishing, Leaching of chemicals, Displacement of species, Diseases due to population density of marine life

Storm & Climate Mitigation

Pros

Attenuate/Refract wave force, Protection from low storm surge, Effective in shallow waters

Cons

Does not protect from high storm surge, Does not protect from sea level rise, Not effective in deep waters


Photo 1: courtesy of Ehow.com, The Advantages of Coastline barriers


Photo 2: courtesy of Jane & Lance White Home Land Investments


Photo 3: courtesy of Skyscrapercity.com

Barrier Islands

BRIAN MAHER

Here in New Jersey as well as in various parts of the world, Barrier Islands exist for many reasons, some unknown, but to our knowledge, provide protection from wave action to coastlines as well as provide treasured habitats for fragile wildlife. How they protect from wave action as well as provide habitat consists of many factors and ingredients that must work together for a barrier island to be a successful protective buffer for coastlines and habitats that may exist on them. The identification of barrier islands vary due to context and location. In technical terms, barrier islands are natural forming islands that are usually long, narrow offshore deposits of sand and sediment that parallel the coastline with the front side of the island facing open ocean, gulf or expanse of water while the back side faces a shallow bay or lagoon across from a mainland. They are also subject to change due to ocean currents and storms and they may even take the form of a peninsula, connected to the mainland and serves the same purpose and features the same elements as a barrier island. If a barrier island was conceptualized for an implementation to provide protection against wave action, the common question may arise: "If barrier islands are naturally formed, how could they possibly be constructed"? The answer to this may be complex but we as humans have been altering land in endless ways when it comes to making artificial land in open waters, which will be illustrated later in detail with the help of a case study about a barrier peninsula recently constructed in The Netherlands called Maasvlakte 2. An article by Jessica Bridger on Rotterdam's Maasvlakte 2 in Landscape Architecture Magazine from its November 2013 edition describes the man-made peninsula that ensures the dominance of the Port of Rotterdam while redefining recreation and industry with higher seas in mind, ultimately protecting from major storm surge events.

The discovery of barrier islands lead many to questions especially how and why they formed? Stated in an article "How Barrier Islands Work" by Craig Freudenrich, Ph.D., a professional in biology from the University of West Virginia, states that "The formation of barrier islands is complex and not completely understood. The current theory is that barrier islands were formed about 18,000 years ago when the last ice age ended. As the glaciers melted and receded, the sea levels began to rise, and flooded areas behind the beach ridges at that time. The rising waters carried sediments from those beach ridges and deposited them along shallow areas just off the new coastlines. Waves and currents continued to bring in sediments that built up, forming barrier islands" (Freudenrich). It is also believed that in addition to this theory that rivers behind barrier islands washed sediments from the mainland that settled behind the islands and helped build them up. From this, we can now see where barrier islands occur in the world and the majority of barrier islands exist on the Atlantic seaboard, including the three-quarters of New Jersey's shoreline, and on the shores of the Gulf of Mexico. Along with the discovery of barrier islands came the investigation on why they may be important for our coastlines and exactly what they consist of that make them significant and relevant to our well-being as we began to heavily develop our coastal regions throughout the country. Habitats that enable barrier islands to work as they do (listed from ocean to the bay) include beach, dune, barrier-flat and salt marsh habitats. The beach habitat consists of the plants and animals that live in the intertidal zone that experiences high tide twice daily. These creatures include migrating, native, and endangered shorebirds, shellfish, and algae that inhabits pore space between gains of sand. The dune habitat is the area of naturally occurring high berms of sand that are built up by wind and water transport of sediment. Plants such as American Beach Grass, Sea Oats, and Bitter Pancum inhabit the dune providing stability to the dunes. Some barrier islands have a parallel series of dunes through the middle of the island instead of just one dune parallel to the beach. The barrier flat and salt marsh habitat is the area that comes after the dunes that features vegetation such as cordgrass and sawgrass and is usually flooded daily during high tides on the lagoon or bayside. Fauna in this zone consist of shellfish, shorebirds, and various species of fish that come and

go with the tides. Since barrier islands mainly occur in oceans and coastal regions, the first main ingredient most important for the formation and success of barrier islands is sand. Sand consists of the beaches that front most barrier islands as well as the dune systems that form on them. It is the dune system that provides most of the defense against wave action along with the vegetation that roots within a dune system. As for protecting the mainland, barrier islands absorb wave action from storms when sand from dunes and vegetation firmly rooted in the sand of the island acts as a drag on the wave's energy, leaving a diminished, less destructive wave to travel through the wetland or lagoon behind the barrier island to the mainland. Essentially, they provide a "Natural speed bump" for waves to crash on before they can do any damage to the mainland. During a major storm event with the approach of the storm surge, powerful high waves erode beach and eventually begin to scour at the primary dune system. Once the storm surge rises and meets the elevation of the top of the dunes, with the dunes acting as a dam or levee, the rising waters will eventually overtop them and breaching begins to occur. If the storm surge is high enough and lasts long enough and with the possible lack of vegetation present, it could eventually eliminate the dunes and deposit the sand from the dunes in the shallow lagoon or bay behind the barrier island. This event is called overwash. When overwash occurs, the action of the water rushing over the island from the ocean to the bay may literally flatten the island to a shallow sandbar and in some events, even cause new inlets to form through what was once a long narrow strip of land, dividing it into smaller segmented islands. When the storm surge finally recedes, a changed landscape appears. The severity of the damage to a barrier island may vary between human developed barrier island verses naturalized ones. With a denser vegetative area and naturalized dunes undisturbed by development, naturalized barrier islands show signs of change usually on the beach and to the primary dune system. We tend to want to develop on barrier islands because of their unique settings. With barrier islands located off the coast from a mainland usually connected by a long causeway or bridge, life on the island could feel like an escape from city life and the everyday grind; a place to just kick back, relax and feel like you are on the edge of the world; a place like no other. This may sound very tempting to develop but development on barrier islands has its consequences. When we develop barrier islands, we become choosy when selecting a location to build upon, disregarding the natural processes that originally occur on them. Building on the primary dune system closest to the beach to have the best view and pave streets perpendicular to the beach to create a suburb at the beach, the barrier island can no longer protect naturally anymore. If we build on barrier islands, we must expect that we will always be at risk for the kind of destruction and change that happens on them, but many people seem ignorant to this and remain firm on trying to "Hold the line" by beach replenishment of the most present shoreline that is always subject to change. It should be understood that as we continue to do this, we have summoned ourselves to living on nature's first line of defense against the power of the ocean. The question for many homeowners now is "Is my home elevated enough to survive storm surge"? In the event of a major storm, smaller manmade dunes will be eroded first and fast, water will overwash the dunes and water from the ocean will begin rushing down streets and other impervious surfaces like a fast flowing river with no protective buffers to slow it down. This deluge of fast flowing sea water and high waves smash into un-elevated homes closest to the beach, collapsing them into the ocean and lifts lower homes off their foundations floating them away, crashing into other homes and the process repeats itself as more and more homes are affected. Asphalt on streets may even be eroded away exposing utilities under the street. Homes usually elevated on wood pilings can survive the wave action as long as it occurs under the house and not high enough to lift them off the pilings.

Now, when it comes to the construction of a "Natural" barrier island to serve as a storm surge barrier and serve the purpose of open space as well, it is very possible. On the other hand, it's impossible to construct a barrier island to its "natural" state and expect nature to work our way with something that was never there in the first place. Therefore, if we do want to construct something similar to a barrier island, we must come close to mimicry of one that resembles them sharply and works with the natural processes that they encounter or find ways to refute these processes by implementing built structures in places where "we" want to take control. One real world example of a constructed barrier island was not an island itself but a peninsula called Maasvlakte 2, which would serve the same purpose as a barrier island; to protect the Port of Rotterdam in The Netherlands from the North Sea, while providing for recreation and wildlife. Construction of the Maasvlakte 2 occurred between 2008 and 2013 with a plan devised by the Dutch landscape architecture office of H+N+S, to create about 5000 acres of new open spaces. These new open spaces were designed to house new beaches for recreational use and new port space for port functions combined in a way like no other. In this design, when it came to creating new habitat for the area, "a 'nature' beach along the southern edge has limited public access and is meant as a refuge for seabirds and other coastal wildlife. The public beach stretches from a broad southwestern expanse up along a west-facing strip for sporting activities and bird watching" (Bridger 174). As for the storm protection aspect of the project, the beaches and dunes of Maasvlakte 2 also double as a soft seawall ringed by biking paths and roads. Also included is a hard seawall "with its cascading surface of cobbles and asphalt a reminder that this has all been engineered by humans" (Bridger 174). Coincidentally, the Maasvlakte 2 was constructed using the same companies and technologies that brought projects like Dubai's "The World" islands into existence (manmade islands off the coast of the city's waterfront shaped like a map of the world). Construction began with the use of sand-cannon boats and 240 million cubic meters of sand from a site off the coast to literally spray the peninsula into existence. Over the course of the peninsula, "a hard seawall, dunes and underwater morphological measures absorb the force of waves and distribute high water over large areas in a crisis situation" (Bridger 181). During construction of the Maasvlakte 2, ecological disturbance was a factor that was taken into consideration. The team was imperative on "engaging the nearby coastline and playing into the environmental offsets for the project. New ecological values and territory were established for shoreline defense, in exchange for disturbances to the ocean floor by sand dredging for Maasvlakte 2's raw materials. The project itself is sustainable in terms of climate change, beyond the bounds of new land, as part of the trade inherent to its creation" (Bridger 186). Overall from the results from this feat, we can easily say that the Dutch are the undisputed masters of land and water manipulation and any example regarding the reclamation of new land in open waters will most likely lead to success in winning against nature's fury. They haven't failed yet. "Along with much of the rest of the Netherlands, the beach at Maasvlakte 2 is one of these (un)natural landscapes, just as the decimated New Jersey coastline is, and in fact much of the world around us. Through this might be unremarkable in the Dutch context at a certain level, it is also a notable feat of courage" (Bridger 187).

Another supporting case that has not yet been constructed but considered was a design done by the West 8 Landscape Architecture Firm that stresses on the importance of the development of new barrier islands to provide protection from wave action from storms. Discussed in an article titled "How to Protect Cities from Sandy-Like Storms? It's All About Islands" by Alissa Walker, "ten architecture and planning teams revealed their solutions for rebuilding the city (New York) in a way that would promote resilience when the next hurricane comes along. One big takeaway? We need new islands" (Walker). The architecture and planning teams began selecting dozens of sites for the designers to re-imagine throughout the New York/New Jersey region. "While some of the ideas are policy-based, the most

powerful ideas include making dramatic changes to the coastline and ocean floor, restoring the natural balance that we've dredged away or demolished over the years. This includes the addition of artificial breakwaters, barrier islands and massive floating reefs."(Walker). Though the proposed islands and structures to protect the New York and New Jersey may seem extremely radical at first, it is the way we need to think in order to actually defeat such a large scale problem as difficult as storm surge when focusing on a regional scale that is home to millions of people. The vision of WXY/West 8 consists of "a series of new islands—sandbars, really—that would stretch from New Jersey to Rhode Island, providing "wave attenuation" that could help lower the height of storm surges and remove the need for more complicated improvements on the shore. This is part of a larger idea of creating a "tidal society," a city that's more attuned to the meaning of marine-related data, from wave heights to flooding risk" (Walker). The attempts made in The Netherlands in the construction of Maasvlakte 2 beach barrier could be a new implementation strategy or design template for Union Beach, New Jersey to cope with future storm surge and wave action similar to the events that occurred during Hurricane Sandy in 2012. If a barrier island or even barrier peninsula were to be developed in the waters offshore of Union Beach in Raritan Bay, the benefits could possibly be substantial. For the context and location of Union Beach, a barrier peninsula would most likely work best; extending like an arm off of the neighboring town of Keansburg's Beach and terminating parallel to the current shoreline creating a harbor behind the peninsula and an inlet allowing boat traffic to enter and exit. The barrier peninsula would work suitably if it were located between a quarter of a mile to a half a mile offshore providing enough buffering from wave action to dissipate before and after the barrier with the help of a dune system. The width of the peninsula would vary if built structures were to be used to define the shoreline or not; wider if no built structure was implemented to protect against erosion over a longer span and narrower if a structure is present. After the barrier peninsula is finished, new viable open space could either be used for the combination of habitat and human recreation on the new land, or one or the other. The barrier peninsula would generally work just by its presence, no matter how big or small in front of Union Beach (in this case bigger is better when considering sea level rise and climate change). It all depends on what is made up in its physical structure that contributes to its being as a first responder at the first line of defense against storm surge wave action. It just takes a matter of educated engineering inferences that would help determine the barrier islands maximum potential and determine its lifespan and sustainability. "What the Dutch call 'Adaptation by Design', acknowledging the calculated capitulation to changing environmental conditions, and a faith in design and engineering to accomplish this necessary aim" (Bridger 175), is what the Maasvlakte 2 was based off of, a faithful leap to what has now become a notable leap of courage that will serve as a template for storm surge protection for the future.

Dune Systems: An Exploration of Maintenance and Chesapeake Bay Dune Case Study

CHISTOPHER S. MARSHALL

Dune systems occur more often on oceanic coasts than bay coasts but dunes are still important to estuarine systems when it comes to flooding and winter storms. Dunes fluctuate in size and in elevation naturally and function as a mobile system. Dunes that occur naturally have survived through many different kinds of storms and storm surges without any kind of human influence. However there are many instances where man has stepped in to try and help with the dune reinforcement and reestablishment by implementing fences and scheduled plantings. A comparison of the Chesapeake Bay dune systems will hopefully help with understanding how a dune will work along a bayshore system and can hopefully be implemented into Union Beach as a future deflecting tool for storms and storm surges

Dune Maintenance

Dunes tend to get battered by winter storms which sometimes they will need help to get sediment back onto them as well as being replanted. A good practice to capture sediment for the dunes is to set up dune or sediment fences to capture any kind of sand that will be blown by the wind or carried by tidal movement. One of the practices to replace the sand sediment is to set up sand fences to trap sand as well as not removing any kind of wrack or beach litter from the dune.
Key Components of Dune Protection

There are 3 different approaches to dune protection which are physical, legal, and public education. The physical protection requires for maintenance and the repair of any kind of sand fencing which will have a tendency to break or be covered with sand as well as maintenance of dune vegetation. Legal protection involves the adoption and the enforcement of a beach and dune protection law or bill. This would give a borough the ability to regulate any kind of instances that would impact any kind of dune areas. Public education involves like it sounds; teaching the public on the benefits of dunes and if one destroys the dune because it wrecks their view. The educational aspect also intertwines with physical protection because with a community project people will see what their efforts really mean for the dune restoration and preservation.
Dune reestablishment

We are exposed to the idea that if the beach is re-graded and smoothened. But what happens is it inhibits the growth of the dune seaward. The benefits of of a naturally functioning dune is it increases the desirability of the back beach or foredune for any kind of nesting birds that will visit the site, can function as a seed sources for food for any kind of fauna that occupies the dune, and shows the dynamics of the natural mobile dune system and what lives in a dune environment.

Chesapeake Bay dune study

This was a study conducted by the Virginia Institute of Marine Sciences to study the existing dune systems around Chesapeake Bay. This included studying the morphology of the dune and how it changed over time and explained a significant instance of erosion through the study of the vegetation around the Chesapeake Bay dune system. Along with studying the morphological features of the dune the study looked at trying to find the difference from the primary dune and the secondary dune to see how far they extended landward and if there was a definitive difference between the primary and secondary dune. In the Chesapeake Bay as well as most places we see on the east coast, the dune systems are mobile which means these systems fluctuate in height through wind when sediment is sometimes carried to a different area of the dune as well as being exposed to winter storms. Winter storms tend to have a high wave action and take away part of the dune and displacing it to a local sand bar.

However lower wave energy can help bring sediment back to the dune systems which will reestablish the dune sediment over time. A term called wrack is also known as beach litter. This is not your typical scattered cups and tires from human waste but what this term refers to is any kind of drift wood from old trees and vegetation and or any kind of algae washing up onto the beach. When this wrack is left untouched it helps with trapping of the sediment and helps build up the beach and dune. The dune systems in the Chesapeake Bay are also vegetated and also help with the trapping of loose sand sediment from the wind as well.

The Chesapeake Bay dune systems have different site conditions also varying in lengths anywhere from a few hundred to a few thousand feet. Since the dunes are an ever changing system, they tend to be difficult to find out where the areas such as a primary and secondary dune start and also what is needed to keep these dunes maintained and if it needs any kind of maintenance from the local municipalities. These dune systems tend to occur in areas of stable sand such as tidal creeks, in front of older dunes, confined shorelines, also acting as wash over, as spits, and any kind of a man-made structure like groins or jetties.

In the Chesapeake Bay dune study there were about 365 potential dune sites which 259 sites were actually visited. In this site visit some 219 sites which spread around 39.6 miles had a defined primary dune system. In the 219 sites visited there were 165 sites that were constructed along a 20.3 mile span while 54 of the 219 sites also had a secondary dune system as well as a primary dune system that was at a length of 19.3 miles along the bay coast. In this study the average primary dune site was about 650 feet long compared to the primary and secondary dune sites which were 1,884 feet long. The size and location of a primary dune can be determined by the amount of sand that is available as well as the frequency of wind and waves moving through the site where existing vegetation can be able to trap sand sediment.

The Chesapeake Bay dune system also broke down the dune systems into 3 main categories to describe the dune geomorphology which were naturally constructed dunes, man-influenced dunes, and man-made dunes. The natural dune system consists of undisturbed areas which are not touched and is left to fluctuate in heights. This showed how the Chesapeake Bay dune systems are a mobile system. The term man-influenced involves putting in sand sediment fences and proposing new native dune plantings to help with the stabilization of dune sediment. Man-made or man manipulated dunes involve reconstructing the dunes and the planting (if any) of the dunes.

An example of a man-made dune from my own experience was taken this summer down in Monmouth Beach, New Jersey. We were repairing wash outs that occurred from a rain storm that took out a great amount of sediment. Our area which we worked on was the east side of the dune where the washout was 5 feet wide by 10 feet long by a little more than 5 feet deep. This equated to 30 yards of sand that was washed onto the local beach which calculated into 45 tons of sand (1.5 tons per yard). What was revealed under the sand was a former seawall about 12-16 inches thick with large 200 lb. jetty rocks placed at its foundation.

I believe the reason why this dune was washed out was because a time before we re-graded the dune 3 times for the home owners personal preference. After the grading of the dune was set the very top of the dune was planted with American Beach Grass (Ammophila breviligulata) and Rugosa Rose (Rosa rugosa). This planting took place 3 weeks before the washout happened. When we replaced the sediment and replanted the plantings we saw about 4 inch root growth of the plugs of the American Beach grass. I wish I could say the same about the rugosa rose they were still fairing pretty well. We were called in to fix this dune system with the hope of the dune planting to take root and to stabilize the dune itself. However the worry of the winter storms of New Jersey will be the real test to see if this dune will hold up or will be a major problem come spring.

To a dune site it depends on the dune morphology and the wind and wave exposure from nature as to how the dune will function. The position of the dunes crest or dune ridge is essential into understanding the morphology of the primary and secondary dunes. In the dune profile of Chesapeake Bay primary dunes are more easily defined than secondary dune systems. The back side of the primary dune indicates the start of the secondary dune system. The secondary dune system might end at the wood line rather than ending where there is a break the slope like how the primary dune is defined.

The dunes vegetation can indicate the dunes structural stability and the history of the dune. Primary bay dunes that are pretty stable have a plant community that consists of American beach grass, salt meadow hay and sea rocket. These species do well on the primary dune because the climate is hot, dry, and salty from the water spray. From a personal experience adds a thick root mass to the dune to keep the sediment from being displaced. However the dune systems that have a shrub community or any kind of herbaceous plant community that do not normally do well in extreme hot weather, salt spray, and long periods of drought are an indication of erosion or instability. Any kind of shrub colonies are common in dune fields that are closer to land creating a wind break from storm winds and even northeasterly winds.

The integration of a dune system in our design on front street would not work only because in a way it forms a sort of seawall. However adopting any kind of dune plantings and having a dune like park will work in our design because it will create a little bit of a vegetated buffer against any kind of storm surge. However if there were to be a dune system that was man-made in place of a sea wall I believe it will work because I have experienced firsthand the construction of a dune up against a seawall with vegetation on top. One of the cool things that I noticed down in the North Carolina beaches is they posted a sign that says if anyone is caught on top of or is walking on top of any kind of dune system will be fined anywhere from $500-$1000.

That way it creates a protection from the dunes getting trampled on. If a dune system is implemented into Union Beach, NJ at all it will be a model for more bay communities, like the Chesapeake Bay dune system, to use a dune system and see how affective a dune system is against storms and storm surges. It is a lot of management to keep up a dune in case part of the dune does get swept away due to hurricanes and high wave energy and winter storms.

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BEACH NOURISHMENT

ARELI PEREZ

Beach nourishment is the procedure of placing sand on to beaches that are experiencing erosion or experienced severely loss of sand sediment due to a storm surge. According to the "Shore Protection Assessment", "Beach nourishment projects are designed and engineered to work like natural beaches, allowing sand to shift in response to changing waves and water levels." (2004.)

Beach Nourishment in progress

Photo Credit: www.costalcare.org

This procedure is significant because beaches are slowly losing sand sediments due to erosion, human usage, and in some cases storm surges. "Beach erosion is a severe problem worldwide. According to Bird (1985) 70% of beaches in the world are retreating at a rate of 0.5-1.0 m a year." (Dong, Kuang, Liu, Pan, Yang & Zhang, 2011.) As a result of sediment loss, storm protection to upland structures, recreational usage, and habitat for many species are also being lost. With beach nourishment, erosion is controlled and storm protection, recreational usage, and habitat are no longer at risk of being destroyed.

Storm damage is reduced with beach nourishment because with added sediment to the beach, the beach is expanded making "a wide beach which is a very effective energy absorber. The effectiveness of wide beaches in reducing structural damage has been demonstrated through both field studies conducted after storms…" (Dean, 2005.) The case study Beach Nourishment for Hurricane Protection: North Carolina Project Performance in Hurricanes Dennis and Floyd demonstrates how with the aid of beach nourishment, storm damage is dramatically reduced. This study states that prior to the five hurricanes (Bertha, Fran, Bonnie, Dennis, and Floyd) that affected North Carolina from 1996-1999, other hurricanes had a negative impact on the coast of North Carolina. Fortunately for the North Carolina residents, "local governments were well practiced in storm preparation and recovery. For the first time, local governments had the luxury of documenting major structural damage to buildings." (Rogers.) In 1965 the U.S. Army Corps of Engineers built separate 2.6-mile beach nourishment projects for Wrightsville Beach and Carolina Beach. This plan focused primarily on protection for buildings rather than protection for recreational areas. The plan also called for maintenance to be done every two to four years. The maintenance involved adding sand to the lower beach width to reduce erosion and increase storm damage reduction. In conclusion to having tackled beach nourishment in a timely manner, Rogers states that:

> The beach nourishment projects in North Carolina designed for hurricane protection by the U. S. Army Corps of Engineers performed as expected in the flurry of recent hurricanes. The building survey following Hurricanes Floyd and Dennis found that no buildings were threatened by erosion inside the project dunes, while 968 buildings were threatened and destroyed outside the protection. Properly designed and maintained beach nourishment is clearly an effective tool for hurricane protection.

Beach nourishment is also important for recreational usage because beaches are one of the biggest forms of economy income for different parts of the world. Majority of vacation trips are taken to beaches like Cancun and the Bahamas because of the beautiful views and warm weather experienced there. If beach erosion were not controlled through beach nourishment, majority of beaches would be lost. The loss of beaches would cause tourism to decrease and the economy would lose a large part of its income. As stated in "Shore Protection Assessment":

> Local, regional, and national economies thrive on the prosperity of American beaches. Coastal watersheds generated a remarkable $6 trillion in 2003—more than half the nation's economy. The tourism industry is now the nation's largest employer and fastest growing economic sector. (2004.)

As a result, keeping the beaches alive and healthy is vital to the economy's structure. See Figure 6. A case study that shows successful beach nourishment for recreational usage involves the city of Sicily, Italy which is the largest island in the Mediterranean and tourism is its most important source of income. According to Stefania Lanza and Giovanni Randazzo, "Sicily has no official Integrated Coastal Zone Management (ICZM) policy and also lacks an overall plan for coastal protection." (2012.) As a result, the Bay of Giardini Naxos located in Sicily, was chosen to be nourished. This bay was chosen because it was experiencing massive loss of beach due to incorrect position of the port structure and the rapidly increasing coastal urbanization. Furthermore, the Bay of Giardini Naxos was one of the most important tourist attractions in Italy. Therefore, the Sicilian Regional Government submitted its own project on the issues that would be tackled when restoring the bay:

> The study on the erosive process of the bay had been undertaken to design a protection system that would restore the balance of the shoreline while allowing tourists to use the beach. The aim of the project was to improve the aspect of the shore, to moderate wave action within the protected area, and to limit the dispersion of sediments in the southern part of the bay. (Lanza & Randazzo, 2012.)

In conclusion to this study, the Bay of Giardini Naxos was successfully nourished where it receives both protection from the sea and allows tourists to use the bay, "the project conducted showed excellent-quality structure, and a submerged artificial barrier still in good working order and showing an excellent capacity to mitigate wave action." (Lanza & Randazzo, 2012.)

Finally, beach nourishment also helps with protecting the environment. Through erosion from constant human usage of the beach to wave action removing sand sediments, animals are constantly losing their homes. With beach nourishment, the beaches are expanded and species that use the beach do not have to migrate elsewhere to find a home. Sea turtles are greatly affected by eroded beaches. These turtles need a lot of space in order to nest their eggs and if the beaches were to disappear the turtles would also disappear. Robert G. Dean states that, "Many beaches have been nourished in the United States and the overall effect on turtles has been favorable." (2012.) Another way that beach nourishment helps the habitat is by protecting plants that are endangered in the dune areas and by protecting habitat behind the dunes or next to the beaches.

Prior to beginning a beach nourishment project, a decision has to be made whether the project is needed or not. Beach nourishment projects regularly arise "after a local government decides that it has valuable resources—dense development and other economic and environmental resources behind a beach—needing protection from hurricanes and coastal storms." ("Shore Protection Assessment, 2004.) More than likely, the town in which the beach nourishment is going to take place has already experienced prior flooding and damages from the coast and therefore feels the necessity of having the beach nourished for protection. Following the decision of wanting to have a beach nourished, the local government has to contact the federal government in order for the project request to be approved. The "Shore Protection Assessment" states:

> For projects with federal involvement, the beach receiving protection must be accessible to the public. Additionally…Congress requires that costs for beach nourishment and periodic nourishment be shared by the federal government and the local sponsor. Not all proposed projects will get built. Projects must go through rigorous evaluation process, including an environmental analysis, reviews by state and federal agencies, public hearings, and the Corps' internal review process. (2004.)

After the request for beach nourishment has been approved, the planning process begins. Coastal engineers use computer models that aid in making the beach nourishment design. They use the computer models to predict beach behavior and types of storms that could affect the area where the project is taking place. During this process, the engineers determine environmental issues and confirm that the project complies with federal, state and local laws.

Next, the question of "What types of features should be implemented into the beach nourishment design?" is challenged. Some features that are looked at are beach berms and sand dunes. Depending on predicted storm behavior for the project area, higher and wider beach berms could be implemented into the design to reduce wave energy. Sand dunes could also be applied into the beach nourishment design to prevent flooding and storm damage caused by storm surges. The "Shore Protection Assessment" states:

> New sand dunes may need to be constructed or existing dunes improved to reduce damage from inundation. By acting as a protective barrier, dunes help prevent flooding and storm damage caused by storm surge, wave run-up, and overtopping. Berm height and width, dune height, and offshore slope are critical elements of a beach nourishment design. (2004.)

Finally, the last and "…most important factor for beach nourishment projects is the grain size distribution of the source material as compared to the native beach material, also referred to as sediment compatibility." ("Beach Nourishment", 2007.) The type of sediment used to fill the project area is based on sand compatibility, removal and transportation, and cost. Finding the proper sediment is challenging due to the fact that the grain size, composition, color, and texture of the sediment should match to the native sand to ensure proper project functioning. To determine the grain size needed, a sediment and analysis plan has to be created. According to the article "Beach Nourishment" the plan should include the following:

> -Sampling locations
> -Sampling method
> -Number of samples to be collect
> -What method will be used to composite representative samples, and
> -How grain-size distribution will be determined (2007.)

The sediment samples are collected along survey profile lines, which should include all of the qualities found in project area. Qualities include dunes, mid-backshore, berm crest, mean high water, mid-tide, mean low water, and bar crest. "In general, beach/dune systems having a narrow range of grain sizes will require fewer samples to characterize them than will systems with a wide range of grain-sizes." ("Beach Nourishment", 2007.) Furthermore the article states:

> After all the locations along the profile-line are sampled, the individual samples should be combined…the samples collected at key locations along the profile-line must be dried before an equal-weight portion of each is measured out. . Then the equal portions are combined together to create a single sample for grain-size distribution analysis. ("Beach Nourishment" 2007.)

After sediment compatibility has been determined, the sediment can be dredged from underwater resources. Examples of underwater resources include harbors, navigation channels, or waterways from offshore deposits. The sediments can be pumped through pipelines onto the beach or be transported to the shore through barges before being pumped onto the project area. If dredging is not an option, the sediment can come from dry land sources and be transported by trucks to the project area.

Furthermore, the costs of beach nourishment projects vary depending on the size of the project area and the amount of sediment needed to fill the project area. "Ideally, the grain size of the source material should be the same size of larger than the native beach sand to minimize erosion. If a smaller diameter is used, the volume of material required will be much greater and consequently more costly." ("Beach Nourishment" 2007.)

Once the design of the beach nourishment has been established, construction can then begin to take place. During the construction, sand sediments are placed in a way that natural coastal processes can reshape the nourished beach into the desired configuration as intended by coastal engineers. According to the "Shore Protection Assessment":

> The dry beach may seem "overbuilt" during construction, since sand is often placed on the shore at fairly steep slopes. After construction, it is normal for the newly nourished beach to readjust and change substantially within the first few months. This sediment will continue to move offshore, so that larger waves are prevented from reaching the shore. This movement of sediment, while decreasing the width of the nourished beach somewhat, is not erosion; rather it indicates that the project is performing as designed.

When a storm surge strikes a replenished beach front, it is natural for the beaches and dunes to erode and change as they dissolve and absorb the wave energies during a storm. It is expected that large storms will move sediment from the nourished beach and move sand offshore. When this occurs, waves will break farther away from the shoreline, consequently weakening their strength before they reach the shoreline. "A wide, flat beach berm with a sufficient volume of sand keeps the erosive power of the waves from reaching and destroying the dunes and structures…" ("Shore Protection Assessment," 2004.) As a result, the nourished beach does help protect dunes and property from further erosion, decrease flooding, and limit how far ashore a storm surge will go. Without beach nourishment, storm surges would strike further onshore and without the necessary sand volume and healthy dunes to absorb wave energy, damages to the beach and structures behind the beach would have a negative impact. See Figure 4. The "Shore Protection Assessment" states that:

> An estimated $105 million in damage was prevented after Hurricane Isabel struck a nourished beach with a seawall at Virginia Beach in fall 2003. The project was designed to stop a 9 foot storm surge—and it did. The nourished beach minimized wave attack and overtopping of the seawall, the community's last line of defense. (2004.)

Though the process of beach nourishment demonstrates many positive qualities, it also has its disadvantages. Beach nourishment is designed to control beach erosion and unfortunately it is not a permanent solution to shoreline erosion. In reality, added sediment erodes faster than original sand sediment found at the project area. "Periodic re-nourishments, or 'top-ups', will be needed to maintain a scheme's effectiveness. This will require regular re-investment but can be viewed as a maintenance cost, such as those associated with hard engineered structures." (ClimateTechWiki.) As mentioned before, beach nourishment can benefit habitat life at the project area, however if the project is not designed properly, habitat life will be negatively affected. In some cases, the depositing of the sediment could actually bury living organisms that live on the project area. Additionally, if the added sediments do not match with the original sand sediment found at the project area, beach and ocean habitats would be disrupted. Finally, the price to conclude a beach nourishment project is really expensive. The website ClimateTechWiki states:

> Costs were shown to typically vary from US$3-15/m3 (at 2009 price levels) where dredge sites are available locally (Linham et al., 2010). The most important determinant of nourishment costs appears to be the transport distance for the beach material. Most of this data was collected in developed countries because this is where the vast bulk of nourishment occurs today. In developing countries, costs would, in general, be expected to be similar or possibly higher, due to their less developed coastal engineering industry.

Like stated previously, beach nourishment is not a permanent solution for beach erosion, therefore the project area will constantly be invested in to keep from disappearing.

STATE	COASTLINE MILES	RENOURISHMENT SPENDING (2012 ADJUSTED)	SPENDING PER MILE
1. New Jersey	**130**	**$1.116B**	**$8.6M**
2. Delaware	28	$216M	$7.7M
3. Maryland	31	$165M	$5.3M
4. New York	127	$567M	$4.5M
5. Virginia	112	$239M	$2.1M
6. North Carolina	301	$610M	$2.0M
7. South Carolina	187	$353M	$1.9M
8. Florida	1,350	$1.984B	$1.5M
9. Alabama	53	$71M	$1.3M
10. Mississippi	44	$56M	$1.3M

SOURCE: PROGRAM FOR THE STUDY OF DEVELOPED SHORELINES, WESTERN CAROLINA UNIVERSITY

In conclusion, beach nourishment is a great procedure to control beach erosion. Though this method is not a permanent solution, it is the most convenient one because beach nourishment aids in reducing storm surge impact by having the added sediments reduce wave force, it helps maintain recreational usage that benefit economies, and it helps species who inhabit the project areas by expanding beach fronts, thus expanding the homes of the inhibiters. While the price of this procedure may be very costly, I believe that it is best to invest in the protection of our structures and habitat rather than invest in the re-construction of devastated structures, habitat, and emotions.

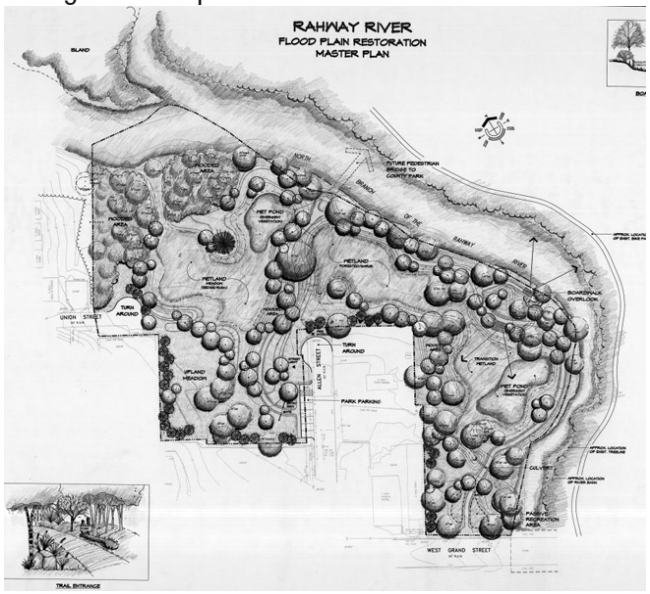
Photo Credit Peter Ellis

Parks in areas subject to flooding

PETER ELLIS

A flood plain is an area that is naturally subject to frequent flooding. This is because a flood plain is a lower area along a body of water that is meant to flood during storm events when the body of water breaches its normal bank. The issue with flooding comes into play because our society has settled along waterways. This is because at first, water was the only means of transportation so it was beneficial to be as close to the water as possible. This lead to communities being established along the banks of rivers and along the coastline. Today, due to increased development, more land is becoming covered in an impervious surface. An impervious surface does not allow water to penetrate it, causing any amount of storm water to run off of it. This leads to overwhelming amounts of storm water runoff entering the local waterways.

Now areas that were accustomed to a certain amount of storm water are being faced with far above average flood amounts. Areas that typically did not flood now are faced with flood waters. For instance “in September 2004, April 2005, and June 2006, the Delaware River experienced major flooding in a span of less than two years”, an event such as this has not occurred in the region since 1955 (NJAFM 4:10). In our changing environment, storms that were once considered 100 year storm events are happening in intervals much shorter than once every one hundred years. Also, rising sea levels are becoming to be a threat to communities such as Union Beach that established their way of life along the coast. Just as our environment changes, we need to adjust to the change and adapt to deal with it.



The idea of constructing a recreational area on a flood prone parcel of property will have more benefits then if the area was used for housing. By providing a park in the community, you are providing people with a gathering space, a place for activities, as well as a place dedicated for outdoor recreation. The areas can be designed with opportunities to educate the residents of the community about their local environment and the benefits that this recreational area has to their environment. I explored three case studies that I be-

lieve can each contribute to our re-design of Union Beach to help the community function around the risk of flooding. I chose three parks that were designed by water and are able to deal with above normal water amounts without significant damage. Each park is designed for a different context such as the Rahway River restoration dealing with flood waters from a local river, the Mill Creek site dealing with recreation in wetlands, and Island Beach State Park dealing with coastal elements while still remaining resilient. Each of these parks are located in the state of New Jersey and have elements that can be used to better the living conditions of the people of Union Beach and provide them with resilient recreation systems.

In the City of Rahway New Jersey, a floodplain restoration project recently took place to help the town cope with the frequent flooding of the Rahway River. Due to the high rate of urbanization of the Rahway River watershed, the Rahway Residents, businesses and property owners located along the Rahway River have "suffered extensive financial loss and personal hardship due to frequent and severe flooding" (Mayor`s Council 1). In particular, the homes in area of Union and Allen streets were in "constant state of disrepair from flood damage" (Kallin and Obropta 25:175). Aside from the homes constantly needing repair, emergency personnel were also putting their lives in harm's way in order to save the individuals who reside there. The current set up was no longer working and a change was needed.

By mid-September 1996, "The City of Rahway succeeded in securing Federal Emergency Management Agency (FEMA) and New Jersey Department of Environmental Protection (NJDEP) Green Acres funding to purchase and demolish the houses, with the ultimate goal of restoring the floodplain to its predevelopment condition" (Kallin and Obropta 25:175). The master plan for the flood plain restoration involved a reconstruction of the floodplain while attempting to restore it to the way it was prior to the homes being built there. The park would include much needed green space for the community, provide a habitat for animals and insects, and restore a wetland area (Figure 1). (Photo Credit Ecological Restoration)

The design of the park would not prevent the entire town from flooding, but by removing the homes from the area emergency personal no longer are risking their lives in this area of frequent flooding and the residents no longer are losing their homes and belongings every time a storm event occurs.

I visited the restoration site two months after hurricane sandy hit our area. The town itself did not see any major flooding but that is also due to the fact that sandy was not a major rain event; however, the intense winds did take a toll on the park. The pathway was still intact and I do feel that this is due to the design of it being on the top of a compacted berm of earth. This is a simple structure, but it is also very functional. It is used as a dike along the Rahway River in this case. The process of buying out homes in frequently damaged areas is also something to be considered in Union Beach. When we spoke to Local Union Beach residents, they told us that many parts of the town flood on an average rain event. By doing some sort of program like this we could increase useable green space and reduce the amount of damage caused by frequent storms.

The Mill Creek Enhancement site is located in Secaucus, New Jersey. As part of the meadowlands marsh and mill creek, the site was part of a wetland restoration project that included "the re-establishment of tidal flows, creation of open water impoundments, grading to create low, high and upland marsh areas, and native re-plantings to attract a diversity of aquatic life and birds" (NJMC). This is a two part park system that consists of a total of about 225 acres. Mill Creek Point Park is a public park built by the New Jersey Meadowlands Commission and managed by the Township of Secaucus (see figure 2).

The design of the park encourages its visitors to become involved and interact with the environment. There is a public accessible boat launch ramp that allows users to unload and launch their kayaks and small boats into mill creek. On the western edge of the park, there is a boardwalk that is elevated above the wetlands. This allows park users to walk through the wetland environment without disturbing the area (see figure 3). (Photo Credit Peter Ellis)

It is constructed of metal and recycled plastic floor boards. The structure is built to withstand water during a flood level event and would only require minor repairs and cleaning if some such event were to occur. The other portion of the site is the Mill Creek Marsh. This area is in the cedar marsh and at low tide the massive cedar stumps are still visible (see figure 4). (Photo Credit Peter Ellis) The Mill Creek Marsh Trail takes you all throughout the swamp and are simply raised berms with packed gravel walking trail. This gives users great access into the wetland so they can experience their local environment to their fullest. This area is a great habitat for local birds and animals making the Mill Creek area a great place for bird watchers, canoe users and people who just want to take a walk outdoors without traveling a great distance.

I visited both Mill Creek Point Park and Mill Creek Marsh four months after Hurricane Sandy struck New Jersey. Though the state as a whole was still in the process of recovering, both the park and marsh were in useable condition and did not appear to have been damaged at all. Upon further investigation I was told that the water level did submerge the area and some storm debris were still in the wetland. The elevated

walking path was completely functional and appeared to have no recent repairs. Also in the marsh, the elevated pathways on the top of the berm structure did not have any recent signs of repairs either. There was some debris left over from the flooding but the structural system of the area remained intact.

Island Beach State Park is a barrier island, located in Seaside Park New Jersey. It is ten miles in length and 3000 acres in size. Island Beach State Park contains "Miles of sand dunes and white sandy beaches that offer habitat to maritime plants and diverse wildlife that is almost the same as it was thousands of years ago" (NJDEP). This is a great example to see how a shoreline in our area can look and function. Island Beach provides users with the chance to interact with the water and a costal environment. Fishing is very popular on the island as well as kayaking, surfing, and recreational trail use. The ten mile strip of roadway running up the middle of the island makes for a great bicycle ride. There are elevated boardwalk trails that guide users throughout the dunes so visitors can see the different vegetation and animals that inhabit the area. The boardwalk keeps the users off of the dunes so they do not step on the vegetation causing it to die or step on the dune causing the structure to erode. The boardwalks are firmly anchored into the sand and use wooden planks for the surface. The simplicity of the structure allows it to remain relatively strong so it withstands most storm events and if it were to be damaged replacement would be easy. There are few structures in the park and the elements people come to use and enjoy are naturally available making the park more resilient. Hurricane Sandy did take a toll on the park, especially the sand dunes when hit with the storm surge (see figure 5), (Photo Credit Peter Ellis)but this is still a natural event that barrier islands are faced with and sand dunes are capable of natural reconstruction (see figure 6). (Photo Credit: National Geographic)

"A dune in the right place at the right time is a very powerful thing. More than just hills of sand, dunes can be a beach town's first line of defense against storms and erosion" from wave action (Miller). This is something that can be considered for Union Beach, the area along Front Street in particular. Even though sand dunes do not naturally occur on a bay, they could be constructed and incorporated into the redesign of the beach front. As seen in figure 5 and 6, the front portion of the dune has been damaged by the storm surge, but because of the established vegetation growing on the dune; it was able to hold its structure and will slowly start to reform.

Each park that was looked at above is meant to deal with flooding in some way. Each situation is different due to the different context of the parks. The Rahway River flood plain restoration and Mill Creek point were both designed recreational areas designed for two different contexts, one for a river and the other around a wetland. Island Beach state park is a barrier island that was kept in its natural form with the exception of the road running down the center, parking areas, and a few simple structures. Each park has a way of dealing with above average water levels in a different way, unique to them. Some of these techniques are man-made interventions, and others are naturally occurring in that particular region of the state. By looking at the existing parks in detail, we can see what works, find out why it works, and how that unique feature might be able to be incorporated into the re design of the town of Union Beach.

Union Beach is a costal bay community that has a large variety of different types of open space. This is not a problem, but a situation that should be taken advantage of. The town has the ability to provide residents and visitors with recreational system that can deliver a variety of spacial experiences in different environments. The town contains land features that each of the parks mentioned above are focused around. The collaboration of ideas from the parks provides Union Beach with the opportunity to incorporate unique features found in the parks into the redesign of the towns open space and create a better experience for the residents that can be constructed to be resilient. Any town can reserve an open space and call it a park, but not every town has the opportunity to provide its residents with an experience.

The wetland and marsh areas in Union Beach do not have to be seen just as land that cannot be built on. They can provide the town with the opportunity to create an experience that not every town in New Jersey can provide. "Wetlands have recreational, historical, scientific, and cultural values. More than half of all U.S. adults (98 million) hunt, fish, bird watch or photograph wildlife" and Union Beach has the ability to provide this to its residents (EPA). The East creek that runs through Union Beach has the potential to be a space that can provide such an experience. The Hennery Hudson trail is a currently existing green way that

currently crosses East creek. I feel that the pathway currently cuts through the wetland as if it were dividing the space in two (see figure 7) (Photo Credit Peter Ellis) because of the paved path and mowed edges. This could be an excellent opportunity for an elevated boardwalk!

The existing path only briefly brings users of the green way through the wetland, in a way in which one would assume that you were meant to be kept out of the area. An elevated boardwalk would be a low impact way of allowing users to go into the wetland area. This would give birdwatchers, photographers, as well as anyone looking to just enjoy this local space the chance to access this hidden gem. A boat launch area would also be very useful around the area of Brook Avenue and Front Street. This would give residents a chance to launch their kayaks into East creek and explore the wetland or go out into the bay. These two implementations are relatively simple and can be built to withstand flood waters. The benefits to the community will be well worth the cost to complete the project. Residents will be encouraged to see the beauty and value in the wetland ecosystem and realize that they are a very important part to their own environment and can even help to manage storm water.

The homes on the bay side of Front Street and Brook Avenue are directly in harm's way from any type of storm surge or wave action. This is an opportunity to implement a park similar to that of the Rahway River flood plain restoration project. All of the homes here were completely destroyed or sustained damage from Hurricane Sandy. Sandy was a so called "perfect storm" and was significantly more severe than the average storm New Jersey sees on a regular basis, but with the sea levels rising on top of the frequency of severe storms hitting our area, this would be a great safety precaution. Eliminating housing in these areas would open the opportunity to create a bayside park that could act as a buffer between the bay and the Union Beach community. This would not stop all water from entering the town like a sea wall would, but it can help lessen the damage from smaller storm events. After our site visit and speaking to local residents, we were informed that the town is subject to flooding even during a heavy rain storm. This is defiantly a cause for concern, almost like a warning sign that should not be overlooked.

The bay side park would be an opportunity to provide a buffer from immediate wave action during a storm event. This can be achieved by using a combination of elevated walkways on earthen berms and rain garden type structures. This could block smaller waves from flooding the edge of town and any water that breaches the berm could be caught in the rain garden structure. It could even be just a planted buffer instead of a rain garden. I believe this would provide an aesthetically pleasing view from vehicles driving down Front Street as well as people using the open space the buffer would create.

For my groups redesign of the Union Beach beach front we presented the idea of a raised structures along Front Street. We were challenged to look into different ways to soften the transition from the street level to the usable area of our structure. Using inspiration from Island Beach State Park, I think the creation of sand dunes will help our group accomplish this. Our design included of the closure of Front Street from the areas of Pine Street to Beach Street. This would allow us room to change the current landscape of the beach front and incorporate sand dunes. The dunes would allow us to accentually bring the landscape closer to the first useable floor of our structure, 20.5' above the current ground level. The building would still be elevated the same height but the addition of dunes would make it appear less drastic and essentially soften the harshness of the super structure like appearance. We would be able to use a variety of dune plantings to make the transition flow from the beach to the top of the dunes as well as incorporate a pathway system, possibly a ramp or a stair ramp combination, from the ground level at Front Street to the first floor of our structure.

The dune design would not be a massive dune, but more so a steady transition from the shore to our structure. The transition would still allow for a beach area. The beach area would basically be expanded in a way, having a transition from a useable beach, to a smaller dune area, to the higher fore dune area (front of our building) then start to slope off to the hind dune portion that would go back to the original grade by

the time the dunes would approach upon 2nd Street. Not only would this help with the design of our raised structure and pedestrian only space where Front Street once was, the dunes would help Union Beach by providing protection from storm surge.

The ideas discussed from the three case studies are implementations that I strongly believe have a chance to be successful in reviving Union Beach. Each park has something that we can take away from their individual design and incorporate it into the revamp of the green space to make it not only more functional, but more useable to residents and hopefully attract others to come as well. Once people become engaged in the open space opportunities the town has to offer, they will understand how the community will benefit from changes.

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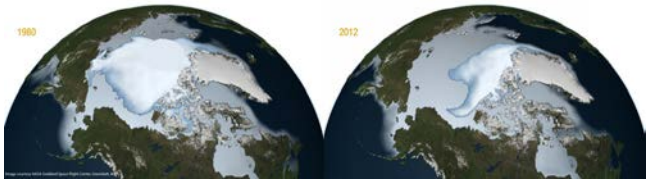
Aquatecture

SARA YILDIRIM

About 70 percent of the Earth's surface is water and oceans hold 96.5 percent of all Earth's water (Perlman). Our world is changing at an alarming rate with significant increases in hurricane activity, rising temperatures, and influx in CO2 emission which are concerns for many people around the world. Consequently, there are growing fears that global warming may not only cause more severe and unpredictable weather patterns, but will cause oceans to rise and destroy coastlines, buildings, homes, and communities not just in the United States, but worldwide (Green Peace). The 21st century is faced with major challenges of managing the dangers posed by climate change and the impacts of sea-level rise to coastal regions. Sea-level rise is a major impact of global climate warming and comes from expansion of ocean waters and the melting of glaciers and ice caps at exceeding rates. NASA studies reveal that the oldest and thickest Arctic sea ice is disappearing at an alarmingly fast rate shown in this satellite image spanning only two decades (Williams 1).



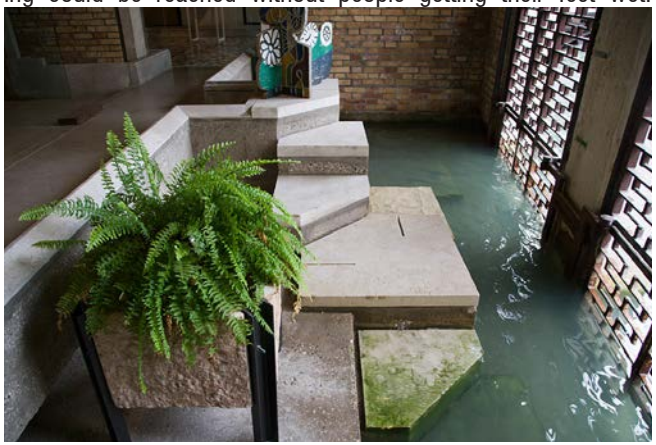
[Figure 1] NASA

Rising sea levels and increased rates of flooding cause substantial complications all over the world and major cities are projected to be effected by water in the near future. For this reason, designing with resilience and environmental consciousness is crucial, now more than ever before, in preventing and adapting to these drastic changes that threaten to sweep out the built and natural environment and our way of life. Adaptation is a biological trait in which organisms grow and develop in response to the environmental challenges they face. The human disposition to adapt is crucial in planning and survival of a changing climate. Aquatecture is an adaptive architectural typology that can be used to alleviate and control flooding and withstand sea-level rise. It uses architectural design and water to provide bold and dependable solutions to mitigate and reduce destructive water levels and continue inhabitation of cities, towns, and homes (Williams 1).

Most major cities and towns were founded around a source of water- rivers, streams, lakes, deltas, harbors. These settlement areas were determined based on the factors of accessible supply of drinking water, waterways for the transportation of goods, and sewage treatment and removal. The relationship between people and water was prominent in areas of Rome, Greece, India, areas of the Muslim world, and the Netherlands, and to a large extent still is. Water planning is one of the oldest driving forces in urban development with a profound social and cultural connection (Slessor 2). Despite this physical, social, and cultural affinity with water, it is a powerful force of nature that threatens the livelihood of many areas, especially when paired with the strength of wind and the impacts of human development. "The very act of building involves protecting against rain and snow to keep people and possessions dry" (Slessor 2) yet many of the effects of building also threaten many natural systems that work to prevent and alleviate events such as flooding and sea-level rise. With more than 70 percent of the world's population living on coastal plains, the human and socioeconomic effects of rising sea levels will be substantial. "A sea-level rise of just 20 centimeters will cause 740,000 people to lose their homes in Nigeria. A sea-level rise of just 40 centimeters in the Bay of Bengal would put 11 percent of the country's coastal land underwater, creating 7-10 million 'climate refugees' and 17 percent of Bangladesh could disappear with a three-foot rise in sea level, and approximately 140 million people could be impacted in China and Bangladesh" (IPCC). "By 2100, sea levels

could rise 13 inches in Los Angeles, 20 inches in Miami Beach, 22 inches in Boston, 38 inches in Galveston, and 55 inches in Grand Isle, Louisiana" (Gardiner). Life is defined with water therefore strategies for sustainable water planning, distribution, development, and management must ensure that present and future designs accommodate and harmonize with water as an element.

In the restoration of the Fondazione Querini-Stampalia, architect Carlo Scarpa "saw no point in devising defensive schemes for dealing with the city's periodic flooding. Instead he accepted flooding as a fact of life and installed stepping stones in the cellar, ensuring that every corner of the building could be reached without people getting their feet wet.



[Figure2] Carlo Scarpa: Fondazione Querini Stampalia in Venice

This practical solution changed the perception of water from a regularly occurring threat into an almost theatrical experience. Rather than being feared, water was accepted, welcomed, even as an inevitable, transforming force of nature" (Slessor 2). Scarpa's design approach is deeply sensitive to the changes of time... "A style that allows the existing context to pass beneath and behind the new work without being disturbed" (Thuroczy). This method is interesting and can be applied virtually everywhere as an architectural approach to the issue of living with water. Union Beach, New Jersey is one area that was devastated by Hurricane Sandy and now faces the challenge of persisting against both rising sea levels and reoccurring flooding. Following Scarpa's technique would allow the residents of the town to live with the water, rather than retreat and avoid it. By considering the existing architecture of the town and raising the homes and walkways, one can create a community that can continue to function even when the ground is flooded, a community that accepts water as an inevitable transforming force. Like Scarpa's sensitivity to changes of time, the design for Union Beach would be accomplished through a phasing plan implemented through time. The first focus would be on creating the infrastructure, like the raised homes and walks, which will allow residents to avoid any flood damage and still work as a community. The next phase would be challenged with dealing with the rising sea levels that prevent use of the ground level, including vehicular access. The problem of access can be solved with the implementation of an alternative transportation system that allows residents to comfortably travel to and from any area. The last phase is accepting the fact that a significant portion of the area will be underwater due to rising sea levels and will learn and adapt to live with the water. It is at this stage that soft infrastructure techniques, such as the ones suggested in the Rising Currents, which include wetland plantings and green roofs can help.

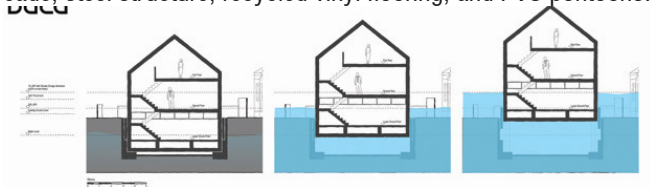
All around the world, individuals are recognizing the reality of global change and its effects on water and subsequently water's effects to billions of people and communities around the world and it is critical that defense strategies are prepared against any potential devastation (Williams 11). Aquatecture allows for flexibility of site and therefore can serve as a long-term solution and quality of life within current and projected flood prone areas around the world. The principle question asks: Where will people go when water levels rise? How can people continue to live in coastal cities in spite of the threats that water levels pose? What will happen to homes, to cities-to architecture? When water levels rise, people will choose to either retreat from their homes or stay at their homes.

In Union Beach, NJ individuals are choosing to remain in their community, where they feel a sense of place despite risk factors and threats to the livelihood of the town. This is why it is so important to advocate building and architectural techniques adaptive to the problems of water at hand. According to Erica Williams, the solution to implement aquatecture acts "to avoid the destruction of communities through adaptation and the implementation of new architectural typology of aquatecture, which considers water and architecture, and pertains to building types and adaptive re-use strategies that mitigate and manage flood related threats (Williams 12). She goes on to explain that in order to prevent destruction and retreat caused by sea level rise, the built environment within coastal regions needs to be redefined. Her thesis proposal looks into the implementation of aquatecture by redefining a coastal home, city, and community. Step 1 in her research addresses the coastal home: "Homes are a primary component in a coastal community. Without a safe and reliable place to live, people will become threatened and migrate to inland locations. To avoid this migration, it is important to redefine the current housing typology. As a first line of defense, a home that adapts with rising water will be the first step toward providing alternative, reliable, and adaptable living solutions" (Williams 12). Her proposal can directly relate to the homes of Union Beach, many of which got destructive damage during Hurricane Sandy. The people of Union Beach intend to stay in their homes and some have invested in rebuilding and raising. After having spent this investment in their homes, the intent to stay is apparent and that is why it is important for these residents to feel completely safe and at ease. The second step in Williams' research looks at redefining a coastal community, where she proposes a micro community of 40 homes that will be introduced to a water community design. "As the water rises, and the need increases, growth and adaptation of the community will follow. This small community of 40 homes will serve as an archetype for future communities in 'endangered areas' to adopt" (Williams 12). If a community is to be successful, it must draw residents into it as people are what make a community. The sense of community at Union Beach emerged when the hurricane hit and has continued to prevail in the aftermath. This is key in the continuation of Union Beach as a town that refuses retreat and remains to live with water. The third step in Williams' work redefines a coastal city, where "as time progresses, and water rises, high-rise residential towers, bridges, city infrastructure become affected or unusable because of flood waters. In this case, preexisting infrastructure is no longer suitable for its intended use. As a result, adaptive re-use strategies for the building envelopes and existing infrastructure will be integrated within the city core" (Williams 13). While Union Beach is not a city, this application can be used for the town in implementing resilient and sustainable architectural and landscape architectural techniques.

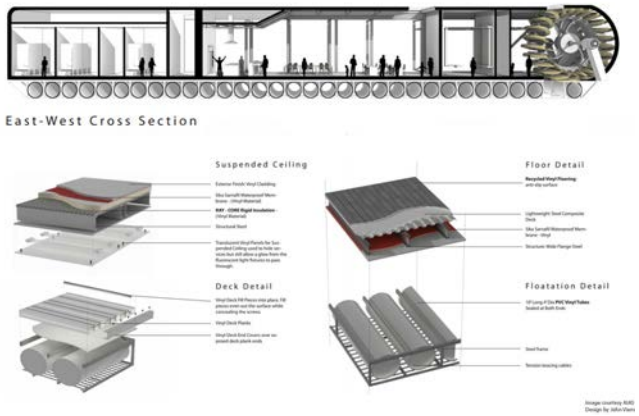
With a changing world comes a changing way of life. Various alternative and adaptive architecture is emerging with the waters, providing solutions to live with water. The amphibious house is one of these solutions that rests on the ground of a fixed foundation but whenever a flood occurs, the entire building rises up in its dock and floats, buoyed by the floodwater. Amphibious design is just one solution that can enable residents to live safely and to adapt to the challenges of climate change. Baca Architects Firm is in the process of building the United Kingdom's first amphibious house on the banks of the River Thames.

[Figure 3] baca architects: Amphibious Home
This home will replace existing bungalows on site and uses a riverside terrace garden that acts as a flood warning system and manages run off from the house after flood events.

An amphibious home is a floating home and is capable of withstanding flooding by rising, but the floating home by architect John Vierra not only floats but is also mobile. This building was proposed for the Bohemian Flats in Minneapolis, Minnesota where there is a long history of flooding. The material of the structure is very important in terms of its relationship with water, so Vierra has designed the entire building to rest on a PVC vinyl flotation system that allows the building to move with the nature of the site. Mobility is given through a pedal placed onto a rotating wheel and gives the building an additional function. The structure is reinforced with the flexible and elastic properties of vinyl, it is compact and efficient so as to minimize surface area. Other building components include the vinyl shell, paddle boat wheel, vinyl facade, steel structure, recycled vinyl flooring, and PVS pontoons.



[Figure 4] baca architects: Amphibious Home



[Figure 5] John Vierra: The Bohemian Flats Boathouse
This structure is especially interesting as it can provide users with not only a home, but also a communal area with additional program and function. This building can become a fishing house for the residents of a community, where it will be functional and resilient.

In Berlin, Germany, Förster Trabitzch Architects developed a series of floating homes. These homes contain a material of glass, steel, and wood to create transparency and reflectivity to connect the living space with the surrounding water. This strategy of a floating home is good when it comes to prevention of water damage, but the houses are susceptible to rocking and drifting which could potentially be uncomfortable and vulnerable to occupants.

Silodam, a project in the Netherlands, shows community living with water and consists of 157 apartments, business units, and public spaces. The apartments are various sizes and formed to create a connected neighborhood where residents can walk freely through the building and pass at different facades and rooftop spaces. This project develops a sense of community due to its function of mixed use providing a place for residents to live, acquire jobs, and enjoy public spaces. Silodam's location really showcases the transition from land to water living where there is tendency to flood and water levels to rise.

[Figure 6] Silodam- Dezeen
Strategies developed by Holland, a country whose top two-thirds of the country are at or below sea level and vulnerable to floods, have developed communities that protect against water, function with water, and sustain in the long run to ensure people a safe and reliable place to live.

Erica Williams proposes three strategies to aquatecture: mitigate, adapt, and sustain. In order to successfully live with water, there must be a reliable constructional defense against it. When sea levels rise and flooding instances become more frequent, adaptation is key for the development and continuation of communities, cities, and homes. Without adapting architecture to water, there is no reason to stay in an area with these risks. As mentioned before, Union Beach intends to stay at Union Beach and are currently working in restoring and bringing back the town. Finally, there is sustainability, which says that if the environment under water provides the necessities of life, then residents will be more likely to stay and not retreat. These homes, cities, and communities need to build resilience against natural disasters in order to provide continued living for people in coastal regions.

For these reasons, the development of aquatecture can be applied to homes and entire communities throughout coastline regions all round the world. It is a solution that will respond to specific site, climate, and cultural identity of the area and its inhabitants. For example, if aquatecture was to be implemented in Union Beach, New Jersey located in a temperate on the Atlantic coast will have the materiality and design for seasonal rainfall and grow plants appropriate for the temperature and salty conditions. Infrastructure will incorporate materials and construction techniques that interact and work with water in a way that allows residents to continue living in homes in a community that ensures safety and comfort. As Williams states in her conclusion, "it is crucial to understand that as the world changes, so should architecture."

Hyper engineered infrastructure like dikes, damns, and levees have yielded to inadequate short term solutions, which is why it is necessary for the consideration of aquatecture methods that provide new options to mitigate against sea level rise and provide opportunities for non-threatening co-habitation with water.

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FIGURE01


FIGURE02


FIGURE03


FIGURE04


FIGURE05

Architecture of the aftermath: Looking at Emerging Architecture Post Katrina

NATE KELLY

The premise of this research paper is for a student of landscape architecture to begin to understand how to derive architecture that suits the context of redevelopment in a landscape that has sustained environmental disaster and is prone to eminent reoccurrence of such. In order for one to implement the re-design of housing in any landscape it is imperative that the decisions made are informed decisions. In forming architectural solutions to redevelopment, there are observed three possible tacts of action. There is generally a status quo of architectural vernacular that can be simply replicated. There are architectural statements that can be made by blatantly challenging the architectural status quo of the area. Then there is the manipulation of existing and historic architectural vernacular of the area into an innovative and informed new architectural language. This paper will attempt to look at all three of these possible scenarios in the context of resolving an architectural course of action for the resilient architectural re-design of housing in Union Beach, NJ in the wake of Hurricane Sandy 2012. In order to further enhance the understanding of what to be done, it is imperative to view what has been done. In order to do so, the research of emerging architecture in the aftermath of Hurricane Katrina 2005 in New Orleans, LA is noted as an appropriate precedent to further inform architectural decisions in design.

Hurricane Katrina was one of the five deadliest hurricanes recorded in United States history. The storm and subsequent floods claimed 1,833 lives and caused 108 billion dollars in damage. The brunt of the storms force was taken by the coastal communities in the Gulf of Mexico, particularly the coastal communities of Mississippi and Louisiana. The metropolis of New Orleans seated in the coastal floodplain of the Gulf sustained exorbitant damage, and being the most at populous and at high risk, accounted for a vast majority of the devastation.

The City of New Orleans epitomizes the notion of living with water. The city is located in southeast Louisiana along the Mississippi river, bordered to the north by Lake Ponchartrain, to the east by Lake Borgne, and to the south by lakes Cataouatche and Salvador and numerous bayous and coastal marshlands. The asset as a location to settle historically makes sense in the consideration of trade and vicinity to the Mississippi River Delta. But as development and population density of the area grew through history the idea that this settlement was at a great environmental risk in terms of storms and flooding became relevant and engineering measures were taken in order to protect New Orleans. As mandated in the Flood Control Act of 1965 the United States Army Corps of Engineers was implemented to design and construct a levee system that would protect the city from impending storms and flooding.

The major cause of damage sustained by New Orleans was due to the severe storm surge that resulted in extensive flooding. The severity of this turn of events was emphasized by the failing of the preventative revetment infrastructure that was the New Orleans levee system. In what is referred to as the worst civil engineering disaster in the history of the United States, the storm surge of Hurricane Katrina breached almost every levee constructed in the New Orleans metro area . This subsequent flooding due to failed infrastructure created a bathtub effect to the city. Water flooded in damaging numerous infrastructure and residential land and remained in the low lying metropolis thereafter (see Figure 01). We observed similar effects by Hurricane Sandy along the coast of New Jersey. The high winds were of great concern and resulting damage, but it was the flooding due to storm surge that wreaked the greatest havoc on the Jersey shore and New York metro area.

Whether it be due to failure of engineered preventative infrastructure or total absence of such infrastructure, the issue of inhabiting these at risk locales with the new vision of disaster that likely ensues poses a new method of consideration in how to

rebuild. The future reconstruction of these areas has to provide a level of safety that ensures some stability with regard to future storms. Though not only does reconstruction become a question of safety, but a question of improvement. Given the necessity to reconstruct housing gives to the opportunity to implement new strategies and technologies with regard to creating more sustainable housing. Instead of the notion of retrofitting what you already have to accommodate global environmental changes, you have the idea now of a fresh start. So with this obvious opportunity, one major factor in making decisions of reconstructive design, is the decision to improve upon what was once there pre-disaster. To improve in terms of energy efficiency, waste reduction, and overall consumption in general. This is a given criteria, however the decision of how this improved housing is designed and communicated to the community for which it is being proposed becomes a question of architectural vernacular.

This question does not have one particular answer but is an imperative question to wrestle with as the designer of such housing. Does the architectural vernacular stem from the existing? Does it reference the past? Does it look to the future? How can it look to the future while simultaneously echoing the past? Can it juxtapose and integrate with the existing? It becomes a very complicated design issue that cannot be ignored in these circumstances. To ignore this question is not to say that an architectural vernacular cannot defy or challenge, which we all understand that it can. But rather in the instance of handling tight knit, devastated communities, the issue of loss and grievance and urgency become factors in seeking a solution. It goes without saying that emotion and urgency have the potential to cloud judgment when it comes to exploring solutions, nonetheless they cannot be overlooked as factors in justifying architectural decision making. In the attempt to begin to wrestle with the architectural question of redevelopment in Union Beach, NJ, it seems appropriate to look at what has emerged architecturally in New Orleans in the aftermath of similar events to seek clues as to how to begin to define reasoning for proposing an architectural tact.

For the purposes of staying concise, this paper will focus on the redevelopment of the Lower Ninth Ward neighborhood in New Orleans. The neighborhood sustained some of the most devastation in terms of flooding and home loss. It has been referred to as a crazy quilt of architectural styles post-katrina, and it serves as a varietal location of examples for architectural derivatives and vernaculars. In addition it is classified as a small working class community similar to that found in Union Beach.

In the wake of a natural disaster there are always two immediate inclinations of individuals. There is the defense tactic and there is the survival tactic. These were the two main concerns of rebuilding in the immediate aftermath of Hurricane Katrina. The survival tactic describes an architecture that emerges out of necessity. It is hap hazard temporary structure that fulfills the immediate need of shelter, but as economic uncertainty becomes reality in these situations, the reservation towards this type of architecture becomes prevalent (see Figure 02). The main concern in New Orleans was that these temporary shelters would become permanent and redevelopment would turn into a shanty town. This issue can be related to Union Beach in the form of the trailer. In Union Beach it is not uncommon to see trailers parked on demolished lots where people are temporarily residing on their land in their trailers or recreational vehicles. Though the recreational vehicle is not an architectural structure, it does contribute to the overall residential landscape there. The defensive tactic is the inclination to protect your remaining structure from future flooding by simply raising it to an elevation deemed safe (see Figure 03). The issue here is that you are taking an architectural vernacular that is designed to sit flush with the ground plane and hoisting it up thereby altering that architecture in a way that it was not designed. This move can be seen throughout Union Beach. Not only does this negatively affect the architecture of the individual structure, but has an effect on the overall architectural landscape of the neighborhood. The design of a raised community is one that would demand a conscious plan in order to work as a system of raised structures. Individual structures would have to re-designed to work architecturally as a structure that is designed to function at that elevation. This defensive tactic is where it becomes evident that reacting in a sense of urgency is a reckless way to go about the rebuilding post disaster.

We have derived criteria for re-building, and we have seen the flaw in rebuilding with a sense of urgency and disregard for the opportunity of the task at hand. To look now at an example of architecture that emerged from Hurricane Katrina that fulfill the criteria of the issue, we look at the work being done by the Make It Right Foundation in the Lower Ninth Ward of New Orleans.

The Make it Right Foundation is a non profit organization with the mission, “To build safe, Cradle to Cradle inspired homes, buildings, and communities for people in need.” The organization was founded in 2007 with the re-construction of several homes in the Lower Ninth Ward of New Orleans being their inaugural project. They broke ground on the first homes in June 2008 and completed the first six homes by August 2008. They are committed to building 150 homes in the Lower Ninth Ward and have completed 87 to date. Led by GRAFT architects they have utilized 21 world-renowned architects to design their homes.

Where the work of the Make It Right foundation succeeds is in addressing the issues discussed in this paper and providing sound solutions to these issues. The home designs are informed by architect William McDonough’s Cradle to Cradle design principles. Some characterizations of Cradle to Cradle designs are; materials are defined as biological and/or technical nutrients for safe use and reuse, products are designed for disassembly/recovery, use of renewable energy, maintains and enhances water quality, honors social fairness and human dignity, and improvement is continuous and aspirational. In this fashion Make It Right homes are addressing the opportunity for reconstruction to be a major re-design and improvement toward more environmentally sensitive, climate adapted homes. The Make It Right rebuilds address opportunity, account for safety in there raised structure, but also have implemented a sensible architectural vernacular that tastefully challenges the status quo while referencing the historic and existing vernacular of the region.

When looking at the designs of some of the Make It Right rebuilds it is apparent some of the architectural elements are iterations of existing vernacular. The bold colors and balconies which echo “the southern porch” are architectural notes upon first glance (see Figure 04). But upon deeper analysis it can be observed that many of the home designs were influenced by the southern shotgun house. The shotgun house is a historic architectural vernacular prevalent to the southern United States. It is characterized as a small rectangular home with two doors, one on the front and one in the back providing access. Historically it is theorized the houses influence came from the small shanty style homes found in Africa and Haiti and originated in New Orleans with these cultures found there. The architecture of shotgun homes was an architecture of necessity as it was the most popular form of architecture in the south following the Civil War and provided a modest dwelling for primarily poor and some middle class. The long layout of the structure allowed for exceptional airflow and narrow frontage allowed for many lots along a street which made this architecture particularly popular in historic, growing New Orleans. This historic architectural vernacular can be seen informing the designs of Make It Right rebuilds (see Figure 5). The compact design of the home is easily integrated into the Cradle to Cradle design theory that the organization strives to design by. It also will naturally speak to the community,

reminding them of their heritage but also challenging their eye. The Make It Right homes are an apt example of how thoughtful architectural decisions can be made in the wake of disaster.

Moving forward with design in Union Beach, NJ, it is imperative to look at precedents such as the Make It Right foundations work in the Lower Ninth Ward of New Orleans to begin to understand how to even confront the architectural question of what to do. To simply answer the question is not of possibility in this context, as with any design question there are infinite answers. The purpose of this research into the architecture of the aftermath in New Orleans, is to try and decipher necessary criteria to form a new architectural vernacular for a community. Natural disaster provides the opportunity to ponder the question of how to rebuild, but also leaves you with the fragility of the community left behind. It is in good taste both socially and architecturally to refer to historic architectural vernacular to begin to seek some solution to innovate upon.

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Ennead Architects

Ennead Architects

Building After Katrina Visions of the Gulf Coast

Rethinking High Density Housing Typologies in Flood prone Communities

MARLON DAVIS

Introduction

Rethinking High Density Housing Typologies after Flood disaster is essential for us to move forward in the future design of our cities. After hurricane Sandy, much of the east coast of North America was severely affected by the Super storm in October of 2012. Many people lost everything they had because the destructive force that the storm brought with it. Homes, business, and places people cared about were swept away by storm surges wind and other environmental factors that could have possibly been avoided if there was a conscious reconsideration of how we build our homes near flood prone areas. Union Beach, NJ located in the Raritan Bay, South of New York city was one of the hardest hit towns in NJ during this incredible storm. Many homes were destroyed or severely damaged by the strong winds, storm surge, and flooding. It has become evident that the rethinking of housing typologies in area's prone to flooding must change if people are to continue living by the water.

With the changing climate and sea level rise , it has become clear that housing typologies of shore communities and places susceptible to flooding must change. Moving to a more sustainable style of housing is the best way to adapt to the changing environment in a meaningful way without loosing the actual sense of place that people live. Anytime there is a disaster of this magnitude, It allows us to uncover the things in our built environment that may not be working to the benefit our lives. It is times like these where true change can happen because if people where not listening before the storm, they are definitely paying full attention now. In the book, Rebuilding After Katrina: Visions for the Gulf Coast, editor Betsy Roettger says, "Thinking about the the more invisible systems, designers can begin to question policies that shape what is allowed to be built. This upstream approach includes questioning zoning, density, ecology, potential for adding public spaces, transportation connections, and the ability to include surrounding communities in the design process"(Roettger). These invisible systems that Roettger suggest about hurricane Katrina have been uncovered again by hurricane Sandy. There is a problem with who, what, when, and where we build our homes, especially in shore communities. Matthew M. Wambua, the Commissioner of the NYC Housing Preservation and Development, writes, "Every now and then we get to seize an opportunity to make a difference - hurricane Sandy presented us with just such a chance. The devastating impact of the hurricane on low-lying communities such as those on the Rockaway peninsula emphasized the need for thoughtful and critical consideration of how we should approach the development of flood prone areas"(Wambua). If we are to continue living by the water we have to develop our towns and cities in a way that allows for the coexistence of man and water. Wambua is right when he says there has to be a consideration of how we approach development because the way the current housing situation is not working at the moment. This is why housing as we know it in shore communities needs a dramatic and intelligent makeover that makes the places we live and homes we build safer, more sustainable, and long lasting for future generations to come.

Climate Change and the Risk of Natural Disaster

With the idea that climate change becoming a more widely accepted concept over the last few years it has become more clear that we must begin to respect our environment and mother nature. With natural flood events happening all over the world it has become common knowledge that climate change is a real thing and not just an overhyped theory disregarded by politicians. With events such as the typhoon tragedy in the Philippines happening as I write this paper we must understand that we share some of the blame when it comes to the destruction of our built environment. "Rising sea-levels and a warming climate will continue to contribute to the vulnerability of waterfront developments. While some might advocate for relocating coast-

al communities further inland, financial constraints and existing cultural and economic ties often preclude extensive relocation... with an emphasis on resilient structures and infrastructure that will allow communities to safely coexist with the coastal environment and recover quickly from storm"(Wambua). Knowing that sea level rise is going to effect millions of people living on the coast, it is important that we react to the changes before they come. We have made ourselves vulnerable to the destructive power of the sea without really designing for safety. It is possible to have a harmonious relationship with water but we must first be able to respect it's awesome power. An alarming fact is that the increase in dangerous storms is predicted to rise in the coming years due to climate change. Robert Giegengack and Kennneth R. Foster say in their excerpt in Rebuilding Urban Places after Disaster: Lessons from Hurricane Katrina titled, Constraints on Reconstruction New Orleans, "the intensity (if not the frequency) of hurricanes has increased in recent years, in synchrony with the changes in the surface temperature of the sea in different parts of the world. Emanuel (2005) concluded that the destructiveness of hurricanes, as measured by the amount of power that they represent, has increased markedly since the 1990's in close association with the rise in sea temperature of the North Atlantic. His results suggest that future warming may lead to an upward trend in tropical cyclone potential- a substantial increase in hurricane related loss"(Giegengack, Foster 24). When you take into account the rise in populations in coastal cities it is important to note that damage due to flooding and other storm related impacts will increase ten fold. Many investigators on the topic of global warming and sea-level rise are unconvinced that these variables are a threat, but the problem of extreme weather patterns is staring them right in the face. As long as professionals, politicians, and other influential actors in the development of coastal cities neglect that climate change is going to continue putting our houses in danger there will be no change in the way we develop and more devastation in our future.

Why High Density

Planning future coastal cities that will be susceptible to sea level rise will have to be designed with density in mind. Designing higher density will allow for more infrastructure and flood mitigation systems that will help protect the city. The opportunity to use more land to absorb the storm surges and flooding will allow for a better relationship between housing and the water. While it is a common misconception that high density housing is often times dangerous, it could also be a pleasant living environment for all types of people. In an article titled, Designing for Density Doesn't have to be Ugly, or Scary, Alison Arieef talks about the success of Tassafaronga Village in Oakland California , a high density housing typology. In the article Arieef explains why living in higher density homes will help the environment in a number of ways. One thing that stands out in her analysis is when she says, "Manhattan, for example, has 70,595 people per square mile yet has the lowest carbon footprint of the United States. Conversely, Oklahoma City has 872 people per square mile and each of those individuals produce double the carbon of a New Yorker... As the number per square mile decreases, things like traffic, air pollution, and energy consumption decrease" (Arieef). Arieef's research suggest that higher density leads to a smaller carbon footprint which incredibly desirable today especially when talks of sustainability are in constant circulation. To move to a more sustainable way of living designing higher density homes is the way to go if moving toward a promising future is to occur. In order to make high density housing work and thrive as a housing typology is variation according to Arieef. Arieef says, "The key to density is a mix of housing types rather than an entire city of high rises"(Arieef) Keeping the community diverse with a incredible amount of options is how cities in danger of coastal flooding will adapt and adjust to climate change and other environmental factors.

Precedent Studies, Far ROC and Building After Katrina: Visions for the Gulf Coast

Building After Katrina: Visions for the Gulf Coast provided great insight on how housing typologies could be adapted to deal with the changing climates. The University of Virginia's School of Architecture Department made it their mission to address the needs of Hurricane Katrina and rethink the way in which we are building housing today. The department worked closely with residents in New Orleans to assist in recovery efforts from the storm that had devastated the region and raised awareness about the severity of storms that could reach land in the near future. The studio is a great resource for thinking of how housing in a flood prone area can be adapted to flood risk. According to Maurice Cox, an instructor at the University of Virginia School of Architecture, "Through all the frustration of political uncertainty one thing appears to be clear-that the New Orleans that emerges from the devastation of Hurricane Katrina will be smaller, more dense and built on higher ground"(Cox). The University of Virginia's decision to focus on high density housing is the result of keeping houses safe from flooding. The University hopes to create innovative solutions for the city by designing new architectural typologies that are related to the exiting vernacular in New Orleans. By rethinking how homes are built in the region, there could be an effective change in the way in which we design in flood prone cities.

The Studio Seeking Higher Ground was a 2nd and 3rd year architecture and landscape Architecture studio that attempted to address the needs of the New Orleans residents through

innovative design. Architectural record sponsored the "High Density on the High Ground" competition in partnership with Tulane University's school of Architecture.The program of the competition called for 140 units of housing with a component of mixed use space and parking on about an acre and a half of land. The projects were to be progressive and innovative without compromising the city's unique cultural identity which is not an easy task when considering New Orleans' rich history.

A project designed by students Justin Laskin and Kathleen Mark really exemplified what it means to design high density homes in flood prone areas without making the housing look undesirable to live in. The pair focused mainly on establishing a unique character and identity with the mix of industrial history and residential culture. The pair said, "By mixing use and density within a former industrial swath, this proposal responds to the scale of the neighborhood and the river, the ware house and the house, the body and it's place" (Laskin, Mark). The pair decided to lift the city block to minimize the effect of storm water on homes. If homes are out of the flood surges reach then flood damage risk is minimized. The design also calls for an elevated court in the middle of the design that serves as a communal space for residents living in the community. The designers go on to say, the elevated court becomes a new gathering space with a market, restaurant/ cafe seating, and park"(Laskin, Mark). (see figure 1 and 2 for details). Another successful element of the design is it's use of outdoor spaces that are above the central elevated court. Incorporating views and allowing in light help to create a smart sustainable living environment that anyone would be happy living in. Roof gardens are also an important feature of the design which are coupled with water capturing storage systems that use grey water for watering the plants.

Another project that the University of Virginia's Architecture program designed that addressed the issues surrounding new housing types in New Orleans was Global Green, Local Green : Live Work Play. The design was also a part of the High Density on the high Ground competition but the competition was modified as a separate sub topic focusing on New Life on the River's edge.

Small Means Great Ends White Arup Architects

Small Means Great Ends White Arup Architects

Building After Katrina Visions of the Gulf Coast

The project was done by Judith Kinnard FAIA, Kathleen Kambie, Kenneth Schwartz FAIA and Ben Blanchard. Judith Kinnard writes about the project that, “Rebuilding the Gulf requires a fundamental rethinking of the “ground”. Street level has become troubled territory”(Kinnard). Kinnard suggests that housing as we know it should be conscious of the fact that the street has become a risky place to dwell. Lifting homes may seem like an obvious option to reduce flood risk but it does not make sense aesthetically nor does it take into account how people will access their homes or pedestrian interaction with the residences. The projects strategy for housing responds to traditional New Orleans housing typologies while providing more densely developed homes. Housing units are linear with broad exposure’s to light and air . The key feature of the design is it’s sloping of the land up to a level above the risk of flooding. This ascending pathway that links the homes to the streets and side walks really blurs the line between public space, street, sidewalk, and private space (see figure 3 and 4). The housing also has a direct view to the Mississippi river which creates a meaningful connection between home and the sea.

The Far ROC design competition to develop best Practices for Sustainable Development in Waterfront areas addressed many questions about the future of housing on the coast. The competition required participants to rethink the shoreline residences of Rockaway Peninsula in New York City which was heavily damaged by Hurricane Sandy. The competition aimed to spur the competitive thinking and planning to guide development of Arverne East, an approximately 80-acre vacant site in the Atlantic Ocean. The goals set out by the NYC Department of Housing Preservation and Development were to create a new standard for sustainability and resiliency in the Post Sandy Era. In the overview of the competition guidelines the sponsors say, “In recent years, the relationship between the built and natural environment has been dramatically affected by climate change, severe storm events, and rising sea levels. The extensive damage to low lying waterfront zones caused by Hurricane Sandy in October 2012 reinforced the need for resilient infrastructure and redevelopment strategies for existing coastal communities.” Now more than ever are coastal communities exposed to the harsh reality of flooding and disaster. The Far ROC competition helps to solve the issue of housing and infrastructure in truly forward thinking ways to influence change in coastal regions.

One project that addresses the tough challenge of housing in flood risk areas is Small Means and Great Ends by White Architecture and Arup, together with Gensler. “Small Means and Great Ends” is a collaboration of White Architecture and Arup, with Gensler as the associate architect. White Architecture and Gensler’s vision is to, “to create an urban design for the community of Arverne East that through a series of small, affordable, and smart interventions creates a model which rises beyond resilient, to a level we call ”anti-fragile”. The term ”resiliency” implies a return of something that was damaged to its original form. The community must not settle for a return to the past but instead adapt and actively improve conditions both for this generation and for those to come, to become beyond resilient”. Instead of coming up with one package that dealt with housing in one way the project explores a number of different housing options that can be used by a variety of the inhabitants of the Rockaway’s. Because of their diverse list of housing typologies, this project came out victorious as the winner of the design competition (See Figure 5 and 6). The design strategies that the firms explored really challenge the idea that housing along the shore communities must be raised in order to combat flood risks.

F.R.E.D Fostering Resilient Ecological Development is a project that was submitted by Ennead Architects for the Far ROC resiliency competition. This project has housing typologies that are truly breathtaking. The projects idea was to use dunes to mitigate flooding and also use them as a platform where buildings good be elevated away from the ground were flood waters may go (see figure 7 and 8 for more detail). The projects main objectives were to be efficient through minimizing roads and infrastructure and maximizing open space, be adaptable by

adjusting to changing coastlines by accommodating the tides, maximizing ecological functions, and creating a close knit neighborhood feeling in the community. The approach the Architects took was centered around the development of dunes which will help protect the shore communities and create wildlife habitat, piers for getting from one elevated home to the next, and Housing Clusters to preserve enough open space and allow ecological areas to function efficiently. Ennead Architects really created a unique sense of place that is characterized by the unique housing typologies created by the structures in the design. This project really pushes the limit to how high density housing can be rethought in an exciting new way.

Conclusion

With natural disasters and other unpredictable storms devastating our shores it has become the task of designers to correct

the problems of the built world. Landscape Architects, Architect, Planners, and other professionals need to get away from the old way of designing coastal cities and adapt to the changing world. Marie Auguilino author of Beyond Shelter: Architecture and Human Dignity says it best in her book when she says, “Two Hundred Million People (that’s two thirds of the US population) have been affected by natural disasters and hazards in the last decade e we respect the waters we live by and develop housing strategies that are resilient and adaptable to living with water.

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Floating Homes

ANDREW BLACKBURN

Floating homes (sometimes referred to as a house barge) came about when people started to look for an alternative to houseboats. The primary differences between the two is that a floating home is typically designed to stay in place for extended periods of time, existing as a moored floating structure, whereas a houseboat is designed to be mobile under its own power, able to move at a moments notice. The official definition of a floating home tends to vary depending on location, but they tend to consist of the following:

- constructed on a float
- designed and built to be used as a residential dwelling
- stationary by being moored or anchored, and not meant for navigation
- without a means of self-propulsion
- powered by utilities connected to the shore
- permanently and continuously connected to a sewage system on shore.

From Inspecting Floating Homes - InterNACHI http://www.nachi.org/inspecting-floating-homes.htm#ixzz2kOW6Umlp

Floating homes, as described above, are designed to stay in place. They will rise and fall with the water level, and can move around slightly, though are usually designed to be moored into place for little movement. They can survive wind, storm surges, and harsh conditions, but they are not very good in areas of wave action. It is important to make sure there will be no waves in an area before attempting to establish a floating structure. Wave action from boats in the area should also be considered, as their wake can rock floating homes a bit. Many homeowners have megaphones to yell at rude boaters who are violating speed codes.

The specific construction of a floating home is pretty straight forward. The floating barge portion is usually made of a concrete base with a foam fill to make it float, reinforced with steel. The concrete is then sealed with a coat of polyurethane epoxy. Older float construction methods used plywood primarily, and these are no longer allowed for safety reasons. Newer construction methods should allow concrete barges to last for several hundreds of years.

The float usually takes up about 5 feet of space below the home, though only 3 feet of this float usually sits submerged. The additional 2 feet help to account for changes in weight on the structure. These help to keep the house from suddenly sinking if too much weight is applied, for example.

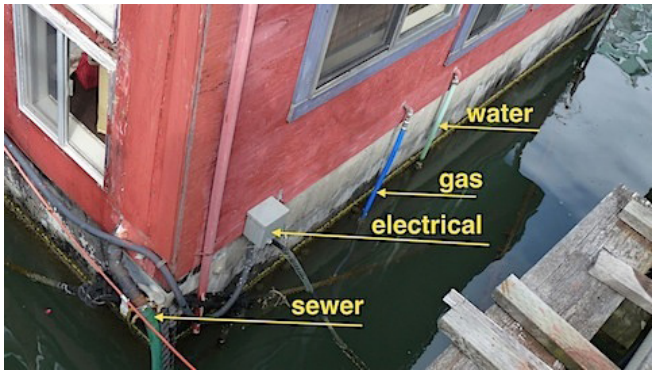
The general rule of thumb is that a floating home needs to be at least 20'x20' if it is a two story structure, whereas a three story structure should be at least 25'x25'. The largest floating structure (by one company) is 90,000 ft2, so the size of these structures has a lot of variety. You can also have two or more floats attached to create a larger platform to build on. Platforms are also not required to be perfectly rectangular, though most present designs tend to be rectangular. (*Floating Houses | Build Blog*)

In terms of the actual house part of the floating home, this can be constructed much like any normal home would be. Some additional things to be mindful of with this though, is that there are opportunities for design that would be specific to a floating home which would be unavailable to a typical home, such as including places for boats, accounting for water views, and finding ways to incorporate additional sources of light, such as sunlight reflected off the water surface.

Infrastructure

Floating homes can make use of the same types of infrastructure as any typical housing, such as power, sewage, electric, gas, and cable/internet, though a few changes are necessary. Flexible

connections to each of these are required, running from the floating home to the docks, where all of these utilities are hidden along the underside of the docks. The flexible connections allow for changes in the rise and fall of water level to influence the height of the floating homes without causing issues.



Sewage is a particularly interesting one. Unlike typical sewage, floating homes will have a system known as a Honeypot. These are containers which mechanically break down solid waste before it is pumped into the sewage lines. These honeypot systems tend to last several years before needing repairs or replacement, and its certainly not a pretty job. (*Floating Home FAQ | Marketing Goon*)

As for how your "lot" works, space on the water tends to be leased out by the local government. Some common leases are offered for every 20 years, but the term on them can be adjusted to suit the needs of the place the floating homes are being installed.

One way in which a floating home differs from a typical home is the lack of a yard. Many floating home owners will put lots of planters and spaces to grow plants on their property to compensate for this, and some even attempt floating gardens and green roofs. Other typical home furnishings, such as furniture and appliances are perfectly fine on floating homes as well.

Maintenance

Some unusual maintenance will need to be done to maintain a floating home. Honeypots need to be inspected often, as leaks in them cause huge fines. These will have to be maintained and repaired often. One other thing to look out for is cracks in the concrete of the float. Cracks are no issue by themselves, but if you see rust in a crack, it means that water has made it to the steel inner structures and are starting to rust them. In order to keep that from happening, at the first sign of rust on a crack, one should clean out the crack and re-seal it. (Inspecting Floating Homes - InterNACHI)


Inspecting Floating Homes - InterNACHI. By Nick Gromicko and Kenton Shepard http://www.nachi.org/inspecting-floating-homes.htm

Another unusual item of maintenance to keep track of is actually birds. Many birds will flock to shore side floating homes, so it is important to remember what might attract birds and what might make them choose to go somewhere else. There are some easy ways to design your exterior spaces to be less bird friendly.

One of the biggest things to keep track of for maintenance is the winter. One small inconvenience is that due to water lines being more exposed outside the floating home, they are more likely to freeze. Simply keeping the water in the house trickling will help avoid this. The bigger problem is snowfall. Too much snow can cause the floating home to sink slightly. This won't completely submerge the house, but might get water in where you wouldn't want it. This is easy to manage though by shoveling snow off your floating house and not letting it build up too much.

Community

One of the biggest draws about floating home communities is that they are very close with one another. Neighbors will all quickly come to know each other, and often look out for one another. They will often offer services to each other, like helping maintain the seals on the floats, or helping each other with gardening. They end up with very close communities of people who all are good friends with one another, and help each other out, like cooking meals for someone when they get sick.

Tying it all Back to Union Beach

Union Beach is a small town which has a strong sense of community. After Hurricane Sandy, a very large percentage of the homeowners who had evacuated for the storm had said they definitely planned to return to Union Beach. It is a town where there are families who have been there for generations, and everyone gets to know each other.

Floating Homes present a unique opportunity to Union Beach, as their sense of community and their adaptability to rising sea levels and future storm events will make them an ideal fit for Union Beach, seamlessly merging a newly established floating community with the already strong ties to the current community, nearly feeling as if they would be a perfectly natural addition to the town.

In conclusion, Union Beach needs to be prepared for the future, and floating homes look to be an excellent choice for a design criteria moving forward.

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Water Oriented Communities

Joshua Mieloch

Introduction: People are attracted to water. 10% of the world's population lives with 5km of water (Leblanc). Water is attractive, people from all over flock to live and play near the water, it is an economic life line for many, shore towns thrive on tourism at the beach, fishing communities depend on it, cities thrive through trade by being on the water. Society as we know it depends on it. Yet recently our relationship with water has begun to change. Increased floods and the threat of rising sea levels have changed how people have to live with water. It used to be something people fought off, and live next to, but now it has become something they have to live with and accept. The reality is trying to fight it to keep our toes dry is no longer sustainable for certain places. The mindset has to change to learn to live with water.

This paper aims to look at places around the world both old and new, that took on the challenge of accepting water in, instead of trying to keep it out. Through looking at these precedents the goal is to be able to get a better understanding of how people can and do live with water. Each place took a different approach and has their own pros and cons when it comes to it. But the idea is that by understanding these aspects as well as the history and context one can begin to understand how to design a community that can function well and adapt to whatever gets thrown at them. The communities examined in this paper are Venice, Italy, Venice, California, Kampong Ayer, Brunei, and the Floating Quarter Utrecht, Netherlands.

Venice, Italy: Venice, Italy is one of the oldest and most familiar water oriented communities in the world. It has become the benchmark to the point where other cities or towns like Giethoorn and Kampong Ayer are referred to as the Venice of the North, and Venice of the East, respectively. Venice was founded in 400 AD on a system of islands in Northeast Italy (History of Venice). Shielded from the Mediterranean from a system of barrier islands Venice developed as an important trade and fishing hub. Water was and still is the way of life in Venice, the economy as well as travel in the city is based around it. The city and canals were created through dredging. As the canals were dug out the soil was used to create the land that the building and city were constructed upon. Building foundations are located right next to the water. It is this juxtaposition along with the extraordinary architecture and history that has led Venice to be declared an Unesco World Heritage Site (Venice and Its Lagoon).

For the people of Venice, water is the way of life. It is composed of over 100 canals and over 400 bridges to make walking possible. Boats and walkways are the main modes of transportation throughout the city. People live right up against the water and have fully embraced a water oriented life.

While the beauty of Venice and its canals is undeniable, the truth is that the water that makes it such an unique place is also its biggest threat. Venice is very prone to flooding and to the rising sea levels predicted in the future. Even though residences are protected up on the second floor, when it floods the walkways become flooded and travel becomes difficult for the average person. Another issue with the water is the level of pollution in the canals. Venice does not have a modern sewer system, most of the sewage spills right into the canals, this makes floods much more unsafe since the contaminated water also creates a health risk for the people (Montalbano). In order to combat the flooding the town has begun a management plan called MOSE. MOSE is a movable flood gate that will help to stop extreme floods but will also allow normal tides to come in and out. It does this by using ballast to lower and raise itself at certain times. While an ingenious idea, it is a very expensive project, estimated around 5 billion dollars, and is quite a monumental task (How Italian Technology Is Trying to Save Venice). If successful its implementation will protect Venice from extreme water events.

Venice is one of the first examples people think of when it comes to living with water. It is a great example for how a city can function when surrounded by water, it has a booming tourist and trade based economy, and people are perfectly at home with the water. However it is not a stunning example of sustainability with water. With the combination of flooding often, extremely

expensive storm management techniques, and severe water pollution it does expose the negatives of living with the water. This does not mean future design should not look to Venice, Italy. The city has a community quality that one should think of as well it shows some main issues a designer needs to consider and address when approaching a water based community design.

Venice, California: As said before Venice, Italy's influence can be seen around the world, especially here in Venice, California. The canals of Venice, California were created by Albert Kinney, a tobacco magnate, who wanted to create a Venice of America. Open in 1905 the town was planned to have the canals and walkways to be the main transportation around the town while a railroad brought you to the town. He even brought Italian gondoliers too (Venice History). The town was a hit with residents but it was short lived. Soon after the automobile was developed the canals fell to disuse and in an effort to build a more car friendly town the majority of the canals were filled in for roads. Only six canals survived the filling. Over time the remaining canals became a shadow of there former selves, becoming polluted and disused. in the 1980s the remaining canals were dredged and then restored in 1992. After the renovations the canals were returned to their former glory and have become a very beautiful and desirable place to live.

The canals are now a beautiful asset to the community. The environment and community they create is quite astonishing and the landscape is a beautiful site. However their history provides an insight into some issues one should understand. The canals of Venice, California were not a necessary creation, they came to be from one's desire to replicate a beautiful historical city. The city was not under threat, or already covered with water. This could be a reason why with the invention of the car that they failed after a decade. The community did not require them to stay safe, manage water, or run their economy so therefore their fall is understandable. Also the trouble with the beauty of the canals now is the risk of gentrification. If a place is developed to that extent, the new desire to live there as well as the rising cost that goes with that could drive existing families out and the dynamics of the community can change. Finally as an example of living with water, this town's canals are aesthetic and recreational, they still have mainly land access and they do not provide any safety from flooding for the houses around it. As a design one must consider these benefits and issues when examining this town.

Kampong Ayer, Brunei: Kampong Ayer has been called the Venice of the East and boasts being the largest water village in the world. Located in the country of Brunei which is found in the islands South East Asia, it is a part of the country's capital city Bandar Seri Begawan on the Brunei River. Founded an estimated 1000 years ago Kampong Ayer is home to about 30,000 citizens of Brunei, that is an estimated 10% of the total population of the country(Nooten). Most water villages found in South East Asia are more likely to be found on the edge of a river or water body. Kampong Ayer is unique in this respect because it is built right on the water. The city developed from dense clusters of homes and buildings that created villages, these villages then connected to each other and soon overlapped and formed the town. Originally there were no major walkways, only small connections to each house, and it could be possible to travel from house to house without stepping foot outside. Connection has since improved and there are now more substantial walkways that connect the villages and homes together.

Houses in the city are all constructed from wood and are set atop wood pilings that are driven into the riverbed. Another aspect of the houses is that the family sizes are typically extended so the average home size is 350 square meters, or about 1200 square feet with about 6 bedrooms (Leblanc). Every house is organized with the front having walkway access and the rear having water access. Being that this settlement is above water, boats are the major form of transportation for everyone. Children are taken to school on boats, there are raised gas stations created for the boats and even emergency services operate using boats. Kampong Ayer has a long tradition of being a trade and fishing hub which can explain why the city has thrived and grown for so long on the river. 6.

Jones, Luuka. School Boat. Kids Returning from School. 2011. Photograph. Luuka Jones. 17 Oct. 2011. Web. 04 Nov.2013.

Siti Nadyatul Syafiqah B. Yahya. 2012. Photograph. Shutterspeech. 14 Apr. 2012. Web. 04 Nov. 2013.

However recently the town has had some issues that have halted its success. Although Brunei is in the top 10 for richest countries in the world, Kampong Ayer has not kept up well with modern conveniences. One would expect the water and storms to be the biggest threat to Kampong, however that is not necessarily the case. The houses are old and the utilities, particularly electricity, have become an issue. The electrical systems in combination with the water has created short circuits that have cause many fires in the city (Nooten). With the houses being made of wood and being densely pack the fires spread quickly and easily. This along with the debris that fills the river has led locals to begin to leave the once thriving town. Storms do have an effect on Kampong Ayer too, but not as much as the fires. The biggest issue with storms are the winds and the older homes do obtain some damage from the force of the winds (Repairs Underway As Kg Ayer Residents Recover).

The government of Brunei has realized that improve-

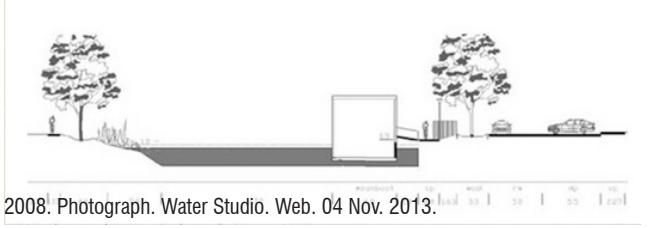
ments need to be made in order to ensure the survival of this historically significant city. They have begun to implement river clean ups and have begun to construct better built houses, as well as beginning to implement some sewage systems.

Kampong Ayer is an extremely interesting place. It displays how a city can function when solely accessed by water. While it does have some issues through a lack of modern improvements and safety concerns that go along with an old settlement, I believe this can be a beautiful example of how life on the water, not just next to it can work. Its issues also bring to light that when designing for rising sea levels and flooding, water is not the only thing to worry about. Designers also need to think about other issues like fire and wind when creating solutions to the rising tides. In the coming years with the modern improvements the country is aiming toward I think Kampong will become an excellent example for how a city can function when water is at their doorstep.

The Floating Quarter Utrecht, Netherlands: The Netherlands has a long history of dealing with water, with about 20 percent of the country being below sea level. In the past the country dealt with water by constructing an impressive systems of dykes, dams, and other management techniques to control the water levels and allow use of the lower lands. This system has worked incredibly well, even being considered one of the 7 wonders of the modern world by the American Society of Civil Engineers (Netherlands North Sea Protection Works). However the country has acknowledged how the system is not sustainable when facing rising sea levels. With this acknowledgement the Dutch have changed their policy from fighting the water to living with it. In that respect the government has agreed on a plan to add almost half a billion cubic meters of water storage in the next 30 years (Leblanc). This new policy has led to the creation of more water storage as well as a refocus on developing floating housing to help with the people live with this new policy. This new focus on floating housing has also led to a standard set of guidelines and regulations for floating homes in the country that was not present before.

2006. Photograph. *Float Base*. Web. 04 Nov. 2013.

One of the modern developments that is tackling these policy changes is the floating quarter of Utrecht. This development consists of 19 floating homes along a canal in the neighborhood of Terwijde. These houses are of a modern design, the living spaces of the house are divided with sleeping quarters on the lower floor and partially submerged and the upper floor containing the living quarters with open views over the canal and landscape. They also take advantage of the roof and floating decks attached to the house to create outdoor private space on the water, as well as using the water itself as a public recreation zone for the residents.This development is not fully water based however, the house connects to land and a road that runs parallel to the canal. In this sense the development is more of a hybrid between land and water.



2008. Photograph. Water Studio. Web. 04 Nov. 2013.

This modern development of water based living really displays the positives of this type of home. The hybrid nature provides a good starting point for people who are still weary to the idea of living on or fully with the water, while still providing the opportunity to better manage water and allow for a more radical water oriented community in the future. Since the home is floating already it is much more able to evolve to fit whatever the landscape and community becomes when the water levels rise. This could easily be suggested as part of a phasing plan to become the first step from a land based to water based community. It also displays how being on the water does not mean one would lose their outdoor space, with a well designed home, their outdoor space can actually become much more enjoyable.

Conclusion: By studying these examples of water oriented communities one can better understand how a place can function when water is allowed in. All of these examples, Venice, Italy, Venice, California, Kampong Ayer, Brunei, and the Floating Quarter Utrecht, Netherlands, have their positives and negatives. Venice, Italy has a beautiful setting and a strong economy based around the canals, but storm water management and pollution plague the great city. The canals of Venice, California have a wonderful residential setting and an incredible landscape quality, however gentrification and a lack of storm water management take away from its usefulness. Kampong Ayer is the only one that is constructed completely over water and does not have many issues with water, however the old material, density, and utilities put it at risk to fire. Finally the Floating Quarter of Utrecht, is the only floating development which gives it great flexibility for the future, its hybrid design provides a good starting point, and its creation of outdoor space is great. However it also can create issues if the ground level its attached too floods, or create gentrification from its higher end design. By looking at all of these one can understand

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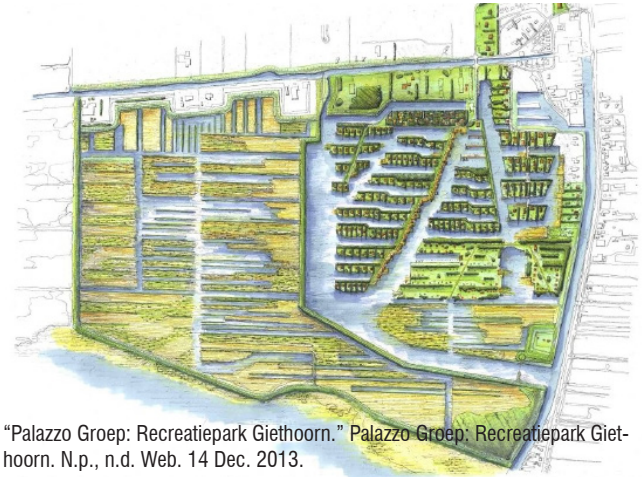

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Public And Private Space

KIM RICHMOND

Union beach was lacking an adequate amount of space whether private or public. Although it may be argued differently I did not sense strong of a community tie as was being described to me by some of the people from Union Beach? The neighborhoods where stereotypical of any town, which consisted of a front yard, back yard, and a public sidewalk. The public spaces that already existed or being proposed seemed to be inadequate to promote public interactions. It seems that there may be issues on how these parks are used especially at night. Some of the problems the community described was vandalizes and usage of drugs in there park spaces. The problems that I also encountered were the lack of access to green space from both the public and private perspectives. Union Beach's residence should be stimulated by the spaces around them to create more interaction within the community. A strong identification with a place should have a much stronger meaning than just home to an individual. Places have the ability to symbolize principles and ideals. In many instances, modern society tends to destroy the rich variety of places, replacing them with homogenized "efficient" settings that have no variety, surprise, or traces of their own history and development (Steele pg. 8). In Union Beach open space is viewed as a quick means to create a public space without understanding the needs of the surrounding community. Fritz also begins to say in his book The Sense of Place, "We need to create richer settings and use existing ones more effectively, and generally to improve their contributions to our lives (Fritz pg. 8.)"Micro world of experience "means coming to know a limited setting in great depth, and focusing on increasingly fine details and new relationships among them. (Fritz 114)." Union Beach needs to establish these relationships and details in a richer setting.

The topic of quality of life brings up the issue of what type of lifestyle these people enjoy and envision. Quality of life is defined as your personal satisfaction (or dissatisfaction) with the cultural or intellectual conditions under which you live (Wikipedia). Union Beach described their quality of life as "blue collar" and a close-knit community that supported one another. The people live in modest single-family homes and some have been there for generations. After Sandy it was clear that the quality of life within Union Beach did not meet the standards that would be substantial enough for major problems like sea level rise, storm surges, and super storms. Home owners must raise their homes for protection in the event of future super storms. There was not protection for the community either from the storm. However, the storm brought the community together in efforts of restoring the town to what it once was, but what will happen when the town is back to the way it was? Although the homeowners have the option of raising their homes this causes a major shift in the community. For those who don't raise homes how will this affect their private space? For one there space will become more open to there soon to be raise up neighbors. This combination of raised and ground level homes leaves a disconnection within the city. A normal neighborhood is all on one plan in this town. With raised homes accessing a neighbor's house or going to a friend's becomes more than just walking up their sidewalk. They now have to climb the stairs up to the raised house. However there is greater opportunity for spaces both public and private if Union Beach would not just rebuilt what once was, but build to be resilient for the future.

The environment is not only the physical and social feature, but it is also what a person or a community brings to it. The social climate of Union Beach needs to be redefined in order to adapt to the changes of homes being raised and inadequate amount of public space that contributes to the lives of the community members. Social climate as Steele states, " refers to the systems of rules, norms, values, expectations, and other factors that provide the guidelines, supports, and constraints for how people relate to each other in a given setting (pg. 70)." With the Sandy Storm Union Beach must look into way of utilizing space not only as a contribution to themselves, but also

to the longevity of the community. By looking at places as not just an aesthetic, but also as a critical part to the survival of the community can set the standard for all shore communities.

Neighborhoods are both social and physical features that any given area has common values, activities and approaches to problems and consist of some kind of physical boundaries that mark the end and the beginning to somewhere else. Union Beach in order to be a community that they have in their minds needs to create this boundary of their social life and the outside neighboring social interactions making them a strong unique community. One way of changing Union Beach is to change its organizational climate. Fritz says,

"Organizational climate has also been used to describe social contributions to a spirit of place.
Many organizations impart a distinct feel or atmosphere to those who work in them: warm or cold, tight or loose, exciting or dull, energized or lethargic, predictable, or unpredictable, and so on. Physical features help to create this climate, but a good portion of it is maintained by the ways that the social system impacts on people with its norms, rules, policies, expectations, and management style (Fritz 71)."

Union Beach is both predictable and may seem quite dull to the outsider. The spaces within Union Beach need to be more unique and at the same time a place the community can place themselves in as their own space. However some of the main characteristics of place occupation is that will make it more likely for a place and awareness to be generated the place must meet survival demands, task demands, opportunity structures and patterns of experience. In my perspective of survival demands a space must meet the needs of a person not only on the physical level but also on a mental level. Task demands generates survival from economic standpoint. Opportunity structure entitles the idea that an individual worker can seek out or explore new settings not norm to their normal routine. Patterns of experience are the result from spending a large amount of time in these places. The spaces in Union Beach after evaluating all of these do not create any of these opportunities. How do we begin to look at these spaces? Individually each must be defined both private, semi private and public space. With a greater understanding of these different spaces we can begin to understand what bests will service Union Beach for the present community and future ones to come.

A private space as a universal definition is the region surrounding a person, which they regard as psychologically theirs (Wikipedia). Most people value their personal space and feel discomfort, anger, or anxiety when their personal space is encroached. Private space could also mean personal space, which means you have the freedom to be by yourself at all times. The private space in Union Beach to me is still in adequate. The backyards of homes were the traditional private space however after the sandy crisis there is opportunity to redefine what a private space could mean in Union Beach. With the homes being raised backyards will no longer be a private space when you neighbor is looking down upon you. This creates a problem for the unraised home, because your neighbor may be able to look down on you like in the backyard setting where you go there for privacy. In that sense your privacy has been lost. Although raised homes would help to create rich new private and semi-private spaces. The new private space could be on the balconies or roofs creating gardens or different spaces that would accommodate the homeowner.

Opportunities for spaces under the homes exist as well as in the backyards if the owner creates a dense vegetative buffer or tall fences that would allow for privacy from their neighbors. In our design since all homes must be raised the new private space will become these second floor levels that create that disconnect or escape that we seek when we go to be alone. In Fritz's The Sense of Place the discussion about private space is brought up. He references E.T. Hall's The Hidden Dimension, which discusses the difference between an Englishman and an American's way of personal privacy. The American would go to his own room and closes himself in relying on the architecture to screen him from the outside world. The Englishman however having to share a room never had the practice of using space as an escape. For this a new set of barriers were erected that others were supposed to recognize. Even though our needs for privacy are all similar from this passage it is clear that we seek it in different ways. Some rely on architecture while others rely on social behavioral signals. Some social signals may be holding a newspaper or creating other barriers like focusing on your phone or computer screen. Privacy in this case may not mean you need to be hidden from your neighbor, but you give an indication that you do not want to be bothered. This brings up the idea that personal privacy is not only created physically, but also socially and psychologically.

These raised homes also allow for more semi private space for the residence of Union Beach. Semi private space is defined as available to a small number of people that provides some but not complete privacy. The backyards and front yards can be created as new semi private spaces that would allow closer relationships between neighbors that would fit their original description of the town. Low walls would act as small buffers or small shrubs that could give the homeowner some privacy, but allow them to be social if they so choose. The Venice Canal in California has rich semi private spaces that are buffered by small walls that allow access to the canal system and the public area.

A public space is a social space that is generally open and accessible to people. Roads, public squares, parks and beaches are typically considered public space (Wikipedia). Union Beach consists of a small beach area along with a greenway and small public park areas. A public space should be easily accessible. A public space should be implemented so that anyone from Union Beach could access it within ten minutes to my opinion. The existing spaces that we visited were
being placed up to show Union Beach moving forward from the storm however I don't think this is the proper response. To create a successful public space there should be some type of topophilia within the community. Topophilia is defined as a love of place. In Union Beach there seems to be a lack of a consist

"Dreaming of the Simple Life? Try the Village in the Netherlands with No Roads (but You'll Need a Boat)." Mail Online. N.p., n.d. Web. 14 Dec. 2013.

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love of the public space. In order to have a successful public space the community must take ownership of it. Creating ownership will bring down any types of crime that may go on as well as help maintain the integrity of the space.

My case studies explored the idea that a place can have multiple meanings and could also help in the rebuild of a resilient Union Beach. The first case study is Giethoorn Netherlands. Giethorrn was founded 1230 A.D. and still today is an iconic community. Giethoorn resides on the marshlands where peat was formed. When the settlers started to use the peat they began to dig the canals for transport purposes. Lakes in giethoorn are no deeper than three, or four feet. Giethoorn is also located at the edge of a national park called Weerribben-Wieden.

Giethoorn is home to less than 3000 people; most of them live on their own private islands. Around 180 bridges exist in town. Residences in town get from place to place by foot, punts, or by bicycle. Bicycles routes were recently added as a form of transportation for the people. Visitors trying to enter the community must park their cars and rent a punt or some type of transportation down the main canal. The passage through the canal creates a romantic atmosphere of wooden arched bridges along with the rustic charm of the old homes. The punts they use or "whisper boats" are motorized boats that do not disturb the peace and tranquility of the town life. The canals glide under the village's humpback bridges, past farms, their meadows, and enchanting old canal-side cottages with reed-thatched roofs and carefully tended gardens. The front or backyards of some of these homes are open to the canal and the view of their neighbors. Wooden bridges help connect the island of homes to one another creating a private space, but when accessed by canal the outdoor spaces of the home become semi private or if the homeowner so wishes they can become rich public space where the community can interact with one another. The canals also offer seasonal interest. When winter hits and the canals freeze over people ice skate through the town and outsiders can come rent skates and experience the beautiful rustic town caped with white snow. The canals offer as a public space where the town and outside visitors can interact. The canal is used for performances as well as other activities like concerts. The canal makes the public space in Giethoorn rich and diverse. Although the town does not have the use of vehicles it is considered a destination when going to the Netherlands.

My next case study resides in Venice Beach California. Venice Beach was model after Venice Italy. Founded by Abbot Kinney in 1905. Kinney dredged miles of canals to drain the marshes in the area into his newly designed residential area. People would come by train or gondolas to tour the town. Venice Beach lies 2 miles away from the nearest freeway, and the narrow streets that exist were not meant for the type of traffic that exists today. Although automobile access is by alleys in the rear of the neighborhoods while the streets in front are all pedestrian-only. Venice Beach is a huge advocate of public

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programming. The spaces are used for art crawls. Streets come alive with art music, food, and performances. Venice Beach is a successful case of utilizing the public realm. There are opportunities for interaction among residents. With the streets being used mainly pedestrians creating an abundance of public space while private space is limited to the home. Balconies become the private space in this scenario as well as fenced in spaces facing the canal. What is interesting about Venice Beach is how some homeowners choose to define their space. Some utilize it with low walls or vegetation that allow for semi private spatial feeling. These semi private spaces allow a homeowner to view the public but if they so wish keep to him or herself. Passerby can still interact with the homeowner, but as I previously discussed behavioral situations or physical allow the homeowner to create a mood that one could read. My last case study was Radburn New Jersey. Radburn was supposed to be a model community for the rest of the country that based off of the thirties up to sixties style of planning. Radburn was a community meant to minimize automobile accidents. The community was supposed to be a model of beauty and efficiency. Fees and taxes are collected to take care of the maintenance of communal operational

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facilities. Radburn was seen as a walking community that was the same style no matter where you went in town. An abundance of park spaces were implemented throughout the design. With a similar community appearance and ideals this created a stronger relationship within the town. Goals and maintenance are easier to address when everyone has the same standards and view of how they want to live. The streets, parks, front yards and such become this common public space within town that the residence can relate with. This creates a type of ownership and gives the spirit of place, as Fritz would describe where an individual has his or her own experiences. Since the town has the same physical appearance this creates a feeling of place wherever the person may walk. This gives the community a sense of security. In the public realm this is ideal for people to want to use these spaces.

In all three case studies each addresses the public and private space in a different way. However all three of them are effective in redefining the norm. Moving on with our design process what could this mean for Union Beach? What types of spaces will be created on the public and private level. What are the char-

acteristics of these spaces? How will they affect the lives of the residence in Union Beach? As we begin to reshape Union Beach the concept of public and private reaches the psychological and behavioral level of how people in Union beach interact with space and one another.

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Using the Priorites of PlaNYC to Ensure a Successful Future For Union Beach, NJ

Ryan Goodstein

Following the devastation of Hurricane Sandy, the town of Union Beach is faced with important decisions in order to ensure resilience for future storms. One option includes a retreat from storm surge prone areas to safer ground. By comparing the Special Flood Hazard Area maps created by the Federal Emergency Management Agency for 2050, to the current housing information of Union Beach, it is determined that only one-third of the homes in Union Beach are safe from serious storm surge events. Therefore, a retreat that stays within town limits means that two thirds of the housing would be new. It also means that this housing would have to be denser than the existing density of Union Beach.

In order to get a better idea on how the new housing and open space can be designed in Union Beach it is important to look at the planning priorities of other towns and cities. Within recent years, one of the most significant planning strategies is taking place in New York City. PlaNYC's main focus is to make a greener, greater, New York (The City of New York 01). It was first launched on April 22, 2007. It is a collaborative effort that involves 25 city agencies focused on the way the city will function by 2030 when its population will reach 30 million people. According to the plan, "Unplanned growth – development in places that don't make sense and that outstrips the capacity of public infrastructure – can burden our city and harm everyone's quality of life" (The City of New York 5). Although the density and character of Union Beach and New York City are comparably different, it is evident that planning for growth in any community is essential. Because the future of Union Beach is uncertain at this time, it is important to look at all scales in order to fully understand how to go about planning a community. Another reason why PlaNYC is relevant to Union Beach is because of close they are to one another. Staten Island is approximately five miles from Union Beach. The skyline of Manhattan can be seen from the beachfront. A plan for Union Beach can be seen as an extension of the plan for New York City. Because of their close proximity to one another, there are similar issues that both are facing. Some of these issues include proneness to hurricanes, sea level rise, affordable housing, transportation and open space conservation and preservation.

In April of 2011 the City of New York published a report of the progress and future of PlaNYC. In its first four years of implementation it has been able to protect over two hundred acres of parkland (The City of New York 03). Also, it has created or preserved 64,000 units of affordable housing. Utilizing the extension public transportation system of the city, 20 new transit oriented rezonings have taken place. Eighty seven percent of the new development within city limits are transit accessible. Also, the city launched its first bus rapid transit. One of the main goals of the plan is to make parks more accessible to New Yorkers. From 2007 to 2011, 250,000 more city residents are within a ten minute walk of a park. Half a million trees have been planted along New York City Streets. Politicians and planners have also put forth the effort to reserve and secure funds that will ensure sustainability for the city. $1.5 billion will be put towards green infrastructure in order to clean the waterways. Also, investments have been made in order to increase the quality and efficiency of drinking water systems. An emphasis on brownfield remediation is focused on decreasing the amount of time it takes clean such sites. One hundred energy efficient retrofits of existing buildings will help to reduce greenhouse gas emissions by thirty percent by 2017. As a result, Mayor Michael Bloomberg was appointed as the chair of the C40 Cities Climate Leadership Group. This group is a collaboration of the world's forty largest cities. They are united in an effort to reduce greenhouse gases.

Union Beach is a working class neighborhood that is bordered on all four sides. To the North, the Raritan Bay provides a beautiful waterfront view, but it serves little connection to the entire region. Along the southern edge of the town, Route 36 is a busy highway that connects to other communities. However, many never stop in Union Beach and if they do it is limited to locations along the highway itself. The East and West ends of the town are bordered by salt marshes and creeks. There are also two major salt marshes and creeks that run through the center of town. While the ecological beauty of the town enhances its character, it also sub divides the town spatially. These barriers and divisions increase the sense of community, but they inhibit the opportunity for long term economic growth. According to the plan "To thrive economically, we must create a setting where talented entrepreneurs and the businesses they grow want to be" (The City of New York 09). While creating a desirable community for global business leaders and entrepreneurs to center out of is hardly the function and purpose of the small tight knit community of Union Beach, there is relevance for the priorities of Union Beach. As the town develops it needs to be a place that invites outsiders to stimulate economic growth, while still striking a balance that makes it affordable for its residents to live in.

PlaNYC organizes its planning approach into ten main topics. These topics include housing and neighborhoods, parks and public space, brownfields, waterways, water supply, transportation, energy, air quality, solid waste, and climate change (The City of New York 03). Of these topics, the housing and neighborhoods is specifically relevant to the future of Union Beach. Although the context of New York City is different from Union Beach, we can use the priorities and strategies to determine planning and design for Union Beach

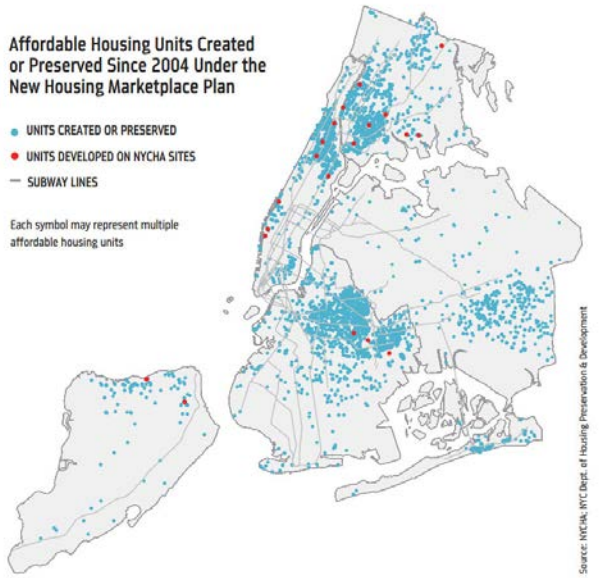
The most important topic regarding a connection of PlaNYC to the planning for the future of Union Beach is housing. In order to retreat from flood prone areas the density and configuration of neighborhoods will drastically change. Approximately 1,262 homes will need to be relocated in areas safe from storm surge. While it is impossible to recreate the exact same housing conditions that existed before Hurricane Sandy it is essential to replicate the character and integrity of the community and build from it. One concern when redeveloping communities is the idea of gentrification. According to an article from the Public Broadcasting Station, "Gentrification is a general term for the arrival of wealthier people in an existing urban district, a related increase in rents and property values, and changes in the district's character and culture" (Grant). This is an extreme concern for Union Beach. For example, if upscale development that did not match the character of Union Beach's residents was the future of the town, residents would not be able to afford housing and taxes. This means that they would eventually be forced to leave the town. The goal for Union Beach's retreat, relocation and resilience is that all in Union Beach would be supported and stay in the community that they have lived in for many years.

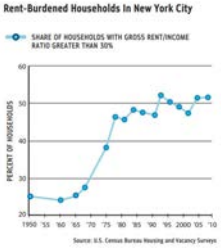
Gentrification is a very common issue in New York City as well. In Brooklyn, Harlem and other New York City communities, gentrification is being questioned. The idea of reduced crime, new investment in buildings and infrastructure, and increased economic activity is hard to argue against (Grant). However, this is all undermined when working class citizens lose their homes.

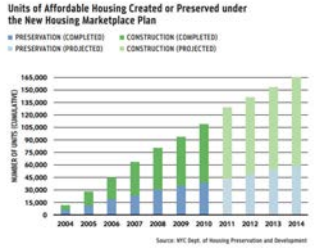
According to PlaNYC, there are three major priorities regarding the plan for housing and neighborhoods within New York City. These priorities include creating a capacity for new housing, financing and facilitating new housing, and encouraging new neighborhoods (The City of New York 21).

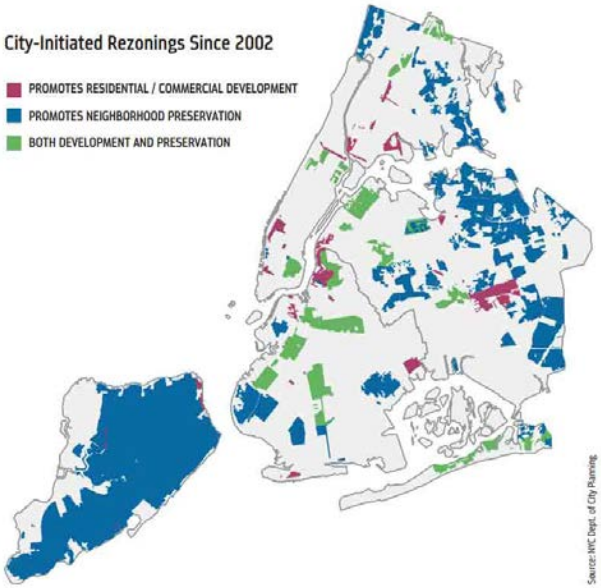
Creating a capacity for new housing involves rezoning for transit oriented communities, exploring additional areas for redevelopment and making sure housing models specifically fit the evolving population. These are all relevant and important topics regarding Union Beach. While the actual implementation of these goals may not fit Union Beach, the goals themselves can be easily translated. In order to ensure Union Beach functions as a community spatially and has obvious connection to the region, a zoning strategy will help facilitate its use. According to the plan, "By encouraging denser development in neighborhoods well served by transit while limiting growth in auto dependent areas, we can steer new development to areas where residential growth is sustainable" (The City of New York 23). Since Union Beach's density will increase in order to accommodate everyone safely, it will be important to make sure people have better connection to alternative forms of transportation. This may not be as large scale as subway trains, but it should promote less vehicular traffic.

Next, exploring additional areas for redevelopment will open the opportunity for new development. In Union Beach, there is limited land that is safe from flooding that is not already occupied by housing. However, while the houses themselves will not be safe from flooding, the land can serve new opportunity for new development that with limited effort to protect from storm surge.









SOURCE: SkyScraperCity.com

Lastly, enabling housing models to serve evolving populations can also be translated into use in Union Beach. According to PlaNYC, "Units could add housing options suited for elderly or single residents and smaller households in neighborhoods are otherwise hard to find" (The City of New York 24). Most of the houses in Union Beach are single family homes. However, there is also a large elderly community throughout Union Beach. Creating areas for senior living has two positives. First, it will unite the elderly community in housing that is more suitable for their needs and allow for the resources and care to be more accessible. Also, by combining living and eating space for multiple individuals, the density of the rest of the can be lower and closer to the density of the current Union Beach.

The next priority for housing and neighborhoods is financing and facilitating new housing. The initiatives include developing new neighborhoods on underutilized sites, creating new units in existing neighborhoods and developing new housing units on existing city properties. These are all strategies that can be used in Union Beach (The City of New York 24).

The first initiative is extremely relative to Union Beach because it involves the development of neighborhoods in places where they didn't previously exist. One area within Union Beach that is safe from storm surge is the brownfields site of the International Fragrances and Flavors facility. According to the United States Environmental Protection Agency, "The International Flavors & Fragrances (IFF) manufactured specialty organic flavors and fragrances at this site from 1951 until the plant closed in 1997. It is adjacent to the Raritan Bay. Operations were in a 41-acre fenced-in area within a 105-acre property owned by IFF" (EPA). While this site is somewhat contaminated its potential for redevelopment cannot be ignored. At a similar density as the current density of Union Beach, approximately 300 units could be relocated out of storm surge area and at this site. This is essential if Union Beach is to maintain a similar character based on density. On the Queen's waterfront, Hunter's Point South is a redevelopment project that is already underway. "When completed, this project will provide 5,000 new units of housing, 3,000 of which will be permanently reserved for low-, moderate-, and middle-income families" (The City of New York 25). While far less units will be needed for redevelopment at the International Fragrances and Flavors site, there are similarities relating to the income levels for families and its adjacency to the waterfront. At Hunter's Point, large amounts of open space is located along the waterfront. Large plazas are located in front of high density living to provide places for people to interact on a day to day bases. There is also, a great amount of green space located on top buildings which provide a somewhat more provide outdoor space.

The other incentives for financing and facilitating new housing includes creating new units in existing neighborhoods and developing new housing units on existing city properties (The City of New York 26). "When NYCHA began building tall towers surrounded by open space and parking lots beginning in the 1940s, the result often interrupted the continuity of neighborhoods and retail corridors, and too often left NYCHA developments as islands isolated form the broader community" (The City of New York 26). In Union Beach there much less opportunity for additional units within existing neighborhoods. However, the idea of subdividing lots can be explored as long as the continuity of the neighborhood is not affected. Another strategy New York is taking is to use city owned property to build housing. One example is a former school that will be converted into 90 affordable units. Most of the town owned properties in Union beach include parks and playing fields. If they can be relocated to other areas, creating housing is plausible. One other option would be to redevelop the area that is used for town services. This area is relatively safe from flooding.

The last topic regarding housing and neighborhoods deals with encouraging sustainable neighborhoods. Incentives include fostering the creation of greener, greater communities, increasing sustainability of city finance and public buildings, promoting walkable destinations for retail and other services, preserving and upgrading existing affordable housing and proactively protecting quality of neighborhoods (The City of New York 26). These incentives are somewhat more specific to New York City than previous incentives mentioned. This is due to the fact that New York City is made up of multiple neighborhoods, with a diverse collection of housing types. Focusing on local priorities can have a much larger impact. "This includes projects to manage storm water, improve energy efficiency, establish community composting resources, create public space, and enhance stewardship of parks" (The City of New York 27). Since most of Union Beach will be planned and designed with little existing context, we must consider how the new vision for the community will enhance local initiatives. Another priority in PlaNYC is to improve walkability. This is mostly to reduce the amount of greenhouse gas emissions. It is impossible to eliminate cars entirely in Union Beach because most people use their cars for work daily. However, because the location of homes, stores, and open space there is opportunity to limit vehicular transportation by providing safe and close connections throughout the community.

Although the character of Union Beach and New York City are extremely different the priorities and incentives of PlaNYC have great relevance to the future of Union Beach. We can look at why certain incentives have been created in order to prevent parallels in planning and design that have not been successful. Also, we can use these priorities to help dictate the future of the Union Beach to ensure a successful and resilient Union Beach.

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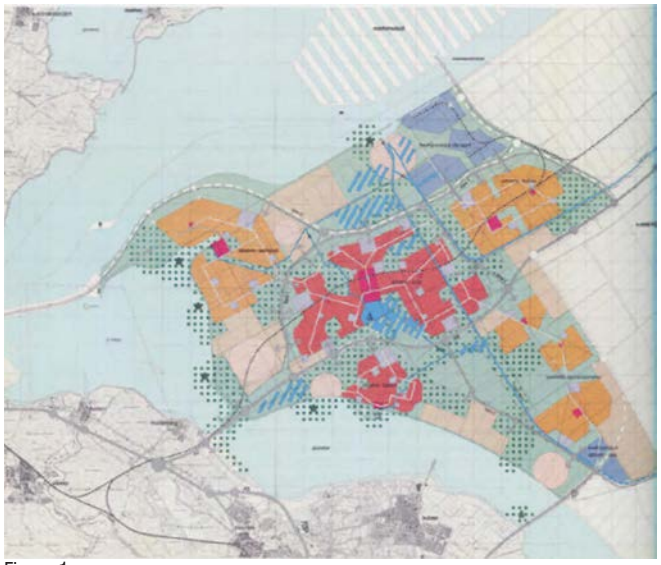

Figure 1

Figure 2

Photo Credit: MVRDV Architects

Almere 2.0: a bottom up planning approach

MICHAEL TICKER

Regional and local planning 'in its simplest terms, is an attempt to satisfy human and social aims by providing appropriate and well placed buildings and facilities (Heywood 52).' And though planning has different connotations in different professions—the businessman planning the future growth of his company or the professor planning out their semester's curriculum for example—the fundamentals of a plan should always coincide with its user's objectives and their visions. Take the businessman for example, he strategically lays out a schedule to increase the company's margins over the next quarter, but he is not alone in doing so. Alongside him he has co-workers as well as a board of directors in order to create a properly structured plan. But that cannot be everyone who makes up the company, so what about the workers? Phil Heywood, fellow and former President of the Queensland Division of the Planning Institute of Australia, writes that 'tenants and residents [associations] can claim, on several grounds, the right to be consulted about proposals for their localities. They have roots in the area, and know more acutely than councilmen or officials what is like to be on the receiving end of policy decisions…And if involved they may bring real knowledge and insight to bear on local problems (Heywood 57).' The Netherlands have an interesting proposal for an urban redevelopment in Almere, which aims to work as a flexible and organic planning framework 'which can be filled in by the people of the city (Bullivant 243).' Is it possible for the 'workers' of a community to have a say in the board room with the CEO when it comes to the creation of their life quality—or is this just a grassroots fantasy left behind in the 1960s?

Almere, located twenty two miles west of Amsterdam, The Netherlands, is the country's youngest city, breaking ground in 1961 with the construction of its first house. Built on reclaimed land, the city was developed as a means to provide a green spacious place to live for Amsterdam's overflow population. Planned from the top down and designed as a garden city equipped with green belts, the city has been developed in series' since its inception, 'without any variation in typological distinction in the neighborhoods (Bullivant 241)'. Thus, the 1970 master plan developed by Teun Koolhaas (Figure 1) has been revamped by MVRDV architects in compliance with the city's municipality for their Structure Vision 2030 proposal. Koolhaas' plan was developed as a multinuclear city with multiple city centers as can be seen described by the pink colored areas in figure 2. These city centers would be equipped with multiple districts and housing densities described by the red and yellow in the plan and the green color surrounding the developments are the proposed green belt areas of the city. The proposed redevelopment plan (Figure 2) calls for an increase in population from one hundred and ninety thousand to three hundred and fifty thousand people, which comes in the form of some sixty thousand proposed houses and one hundred thousand new workplaces—which would make Almere the fifth largest city in The Netherlands. In this plan you can see that there will be only one city center (the small red area) located in the middle of the plan, connected by infrastructure to Amsterdam. The future growth of Almere will come in the shape of four new zones or neighborhoods: Almere Island, Almere City Centre, Almere Pampus and Almere Oosterworld (left to right on Figure 2). The latter of the four is the one that caught my attention upon learning more about its planning process—or lack thereof. Oosterwold is proposed as an open-ended development in which residents can collaborate in person and on the internet to plan development and reach consensus—with government serving as a facilitator as opposed to an entity. The firm behind it all, MVRDV, says that they are confident that with 'only a handful of guiding principles, such as the proportions of total land use—59% urban agriculture, 18% construction, 13%

public green space, 8% roads, and 2% water (Davis)' the people themselves can 'make' the city as Figure 3 displays. Albeit a lofty goal, the idea does sound appealing.

The scheme 'invites organic growth and is innovative in the context of Dutch urban planning, giving the government a facilitative rather than a directive role (Bullivant 246).' Thus leaving the top down approach of the original Koolhaas master plan, this example of bottom up offers the individual a range of choices with which they can create their ideal living conditions (See Figure 4). Starting from the bottom and 'building up from specific solutions is both more logical and more sensitive to local conditions and preferences (Heywood 59),' and in this case can create an interesting and exciting urban context. Figure 4 gives a good look at the possibilities of what the Oosterwold residents can create with its illustration of different mixed use development. It is clear that the Oosterwold model for 'do it yourself' urbanism seems inviting on a communal and national level, and has possibility for potential not only in the Netherlands where 'planning can get too perfect and hence predictable (Davis)' but in other areas of the world as well. Time will tell if the model will uphold, but Oosterwold is a step towards a 're-envisioning of the neighborhood, as a shared platform for innovation and resilience that takes a commons based approach to economic development, production and consumption (Davis).'

Figure 3 - Photo Credit: MVRDV Architects

Upon my first trip to Union Beach, New Jersey for the community hearing at Borough Hall, I could feel the sense of pride and community of the town and knew that it was a place not afraid to stand up and voice their opinions. Sandy's devastation has left the town at a crossroads in terms of residents staying, residents leaving, residents rebuilding, residents not, residents attempting to sell, and residents waiting patiently on funds from FEMA that have still yet to come. More importantly, Sandy has left the town with a lack of identity—a sort of in between shore town before the storm—now without much of the facades that created the little beach feeling it once had. And although its residents may not be experts on flood and storm proofing technologies, they are most definitely experts on what day to day life consisted of prior to disruption. Thinking opportunistically, Sandy has given our studio and the residents of Union Beach the unique opportunity and ability not only to restore, but to enhance the quality of life that they had once known. And though it is not feasible within a semester's time to completely survey the town and gain particular insight into the values and objectives of its residents—'96% of whom want to eventually return to Union Beach (Mayor Smith Interview)'—there are other ways to include the town in the planning and envisioning of their new neighborhoods. One woman exclaimed at the hearing that the town was once a 'self-sustained...independent community before Sandy (Sakai: Interviews).' Led her to wonder where the community's voice had gone, just as another woman exclaimed that 'our voices are hoarse, [especially when] funnel cakes are put before families (Sakai: Interviews).'

These two quotes begin to embody the sense of disconnect that this shore town and others have been feeling towards national and local organizations since last October. As mentioned above, it would be nearly impossible to completely survey a town about specific values in one semester's time, but I believe if we are to implement new design methodologies and typologies within their space, to improve their quality of life, a good way to push these designs forward would be give the residents various options even within just one particular design approach. In doing so, residents might be more accepting of drastic changes to the facades and interiors of their homes or even different designations of land use form what they are in Union Beach's current state. This could then lead to exciting and unique new neighborhoods, ones that the Jersey Shore has yet to see, that the people feel they had at least a choice in creating, if not the final say. Spatially, there can be an infinite number of ways to go about creating an abstract form for a master plan but long as 'the physical form is true to the activities and values of the people it serves, then it will also be readily understood and memorized by them (Heywood 143).' Rebuilding will take careful and meticulous planning as well as community engagement to ensure the safety of its residents, as well as the restoration and enhancement of their quality of life—but this can all be made possible through proper planning and design.

Figure 4 - Photo Credit: MVRDV Architects

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Image Sourcing

Figure 1. Bullivant, Lucy. Masterplanning Futures

Figure 2. Bullivant, Lucy. Masterplanning Futures

Figure 3. MVRDV Architects, Firm Website

Sustainable Housing and Open Space on Brownfield Sites

GWEN HEERSCHAP

Sustainably built homes connected to green open space are paramount in any new development or redevelopment. Residents of a community need homes built to withstand our earth's changing climate and open space to maintain healthy bodies and minds; to uphold a community's quality of life. Brownfields, which are contaminated lands from former industrial and commercial uses, present opportunities to exercise sustainable design. Transforming these polluted and unutilized sites can stimulate a communities' economic growth by creating new housing, new retail and business spaces, green areas for social interaction and restoration of ecological habitats. Although frequently looked at as unattractive, many brownfield sites have deep historical connections to the community they are found within. This historical connection should be considered a positive constraint in the redevelopment process; the design should be sensitive to the residents' connection to the site and celebrate the sites history. The site for this studio course is Union Beach, New Jersey, a borough in Monmouth County that was heavily affected by hurricane Sandy. The class goal is to develop resilient and sustainable housing options which will have a seamless connection to green open spaces. Currently, there are three land parcels in Union Beach that are classified as a brownfield: Provina Gas Station, Fragrances Ingredients Plant and The International Flavor and Fragrance Site. (Figure 1). This research paper investigates two redevelopment brownfield site case studies, The Domino Sugar Refinery in Brooklyn, New York and the Greenville Workforce Housing Project in Greenville, South Carolina, to further explore how sustainable housing and open space could be carried out in Union Beach, New Jersey. (Compare source G, H, L, M)

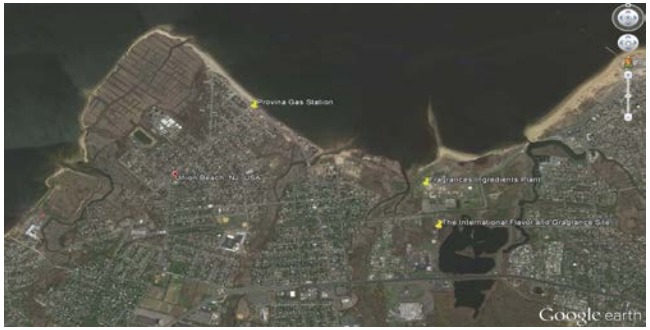

Figure 1

On the banks of the East River stands the colossal volumes of the former Domino Sugary Refinery. The refinery operated here for 148 years, providing jobs to generations of families living in the Williamsburg neighborhood. The closing of the sugar refinery in 2004 was anything but sweet. Thousands of people became unemployed forcing them to find other work in Brooklyn's neighborhoods or leave the area and move elsewhere.Weather people stayed or left, a connection to the Domino Sugar Refinery still exists, there is a need by the people to preserve the building and the memories associated with it. (Figure 2). Redevelopment of the 11.2 acre site is now in the hands of Two Trees Management Company, SHoP Architects and James Corner Field Operations. The goal is to create mixed housing which will offer people of middle and working classes a place to live, space for office and retail shops and open space. (Compare source F, L, Q).

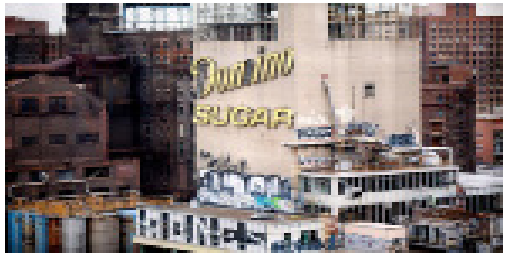

Figure 2 Photo by Brain Harkin for the New York Times

Redeveloping on the waterfront is a challenge. Two Trees wants to show users that they do not need to run from the water and to enforce this, the buildings are moved back from the water and all mechanical systems are to be placed above the flood zone. The five proposed towers are porous in their design allowing elements such air and light to flow through and also to not block the waterfront view of neighboring buildings. One of the five towers is two 60-story buildings that are connected by a skybridge while another one of the buildings is two 55-foot wide towers that are set apart 120-feet and joined at the top. The actual refinery building is planned to be gutted and revamped on the inside, the exterior will remain the same but will have an addition of glass and steel on the top. The historical landmark, The Domino Sugar Refinery sign will be hung from the top of the old refinery. (Figure 3). The redevelopment of the refinery will have an impact on the neighborhood of Williamsburg and this impact is yet to be determined a positive or negative. However, what is most likely to happen is an influx of wealthier families and an increase in property values. The design by Two Trees and SHoP Architects is nothing like the neighborhood of Williamsburg has ever seen which raises the question if the neighborhood is now undergoing gentrification. (Compare source A, D, L, O)

Figure 3

The development of housing is another sensitive area of the design and currently the plan calls for 2,300 residential units and 660 of them will be designated as affordable housing. To not create a segregation between the middle class and working class families, the affordable housing units will be sprinkled throughout the complex. Although this is their intended goal, about a third of the 660 units are concentrated in the first tower to be built, called the “Pomegranate”, which sits further from the water and lower than the rest of the proposed towers. (Figure 4, Site E) (Compare source B, D, N).

New office and retail spaces will boost the economic growth of this neighborhood. In March 2013, the plan called for 631,000 square feet of office and retail but the plan now adds an additional 500,000 square feet to the original number. Local businesses, small retail shops, are encouraged by the Two Trees Development Company but high end commercial spaces will be a large factor in the redevelopment.

Due to the buildings being pushed back from the water’s edge, a one-quarter mile park along the waterfront is called for in the design by James Corner Field Operations and SHoP Architects. (Figure 5 and 6). The park space is intended for passive and active use and incorporates programming such as a volleyball court, picnic areas, beer gardens, a kayak launch and a ferry landing. Salvaged pieces and materials from the Domino Sugar Refinery will be a main feature to the waterfront park in hope to celebrate the history and the sense of place. Using these salvaged materials allows the residents to continue to connect and preserve memories of the Domino Sugar Refinery while generating opportunities to form new memories. A large public plaza is also proposed to accommodate events such as fairs and performances. In total, open space is now 5.26 acres of the site and is intended to promote connectivity though the entire neighborhood.

(Compare source C, B, D, K)

Figure 5

Figure 6

The design for the refinery, with all its components, creates an interesting fate for the neighborhood. The result of bringing in more middle class residents into the flashy architecture will be creating gentrification in Williamsburg which was not there before. A similar situation is presented in the working class borough of Union Beach. Much of Union Beach needs to be redeveloped from the aftermath of hurricane Sandy but the approach in doing so must take into consideration that the residents living here are not accustomed to the style of design that is taking place at the Domino Sugar Refinery. Incorporating fancy retail spaces and large businesses may end up hurting taxpayers, forcing them to leave. The goal for the redevelopment design at Union Beach is to present the residents with sustainable housing and open space options that will enhance their quality of life, not damper it. Although economic development should be increased in Union Beach, total gentrification of the borough should be avoided. Designs should be sensitive to the fact that these are working class families whom may or may not be able to afford a high end market and yet still provide people with an experience unique to Union Beach.

Greenville, South Carolina is a town filled with a history of boom and bust economic cycles which brought on the development of residential and commercial areas that were supported by industrial growth. Development began around the late 1800s resulting in a city that has been home to textile mills, service and repair shops and other industrial businesses. During the 1950s-1960s residents and businesses of Greenville faced economic decline that persisted into the 2000s resulting in a concentration of brownfield properties in the western part of the city. This western area of the city is characterized by limited availability of affordable housing and many of the residents live at or below poverty level. (Compare source E, H, I)

The Greenville Workforce Housing Project is a pilot site selected by The U.S. Environmental Protection Agency (EPA) Brownfields Program. The EPA’s Brownfield Sustainability Pilots Program allows communities to safely clean up, assess and sustainably reuse underutilized brownfields. The site is located

on the corner of McLeod Street and Green Avenue intersection and is 1-acre in size. This intersection is looked at as an important node within the community and the hope in revitalizing this area is to stimulate more development and investment in the neighborhood, boosting the economy. (Compare source E)

The currently vacant brownfield was formally home to a BP service station and a Thriftway supermarket. (Figure 7). The BP service station began operating in 1964 and consisted of nine underground storage tanks for petroleum products, an above-ground storage tank, an office building with parking areas, a service garage, station and fuel oil dispenser island. Both the underground storage tanks and above-ground storage tank were taken out of service in 2002 and removed from the site in 2009. The Thriftway supermarket, which started in the 1960s, was contaminated with asbestos in the buildings ceiling tiles, floor tiles and exterior shingles. Based on the results of soil samples and groundwater samples collected from 18 monitoring wells located on the property, many contaminates were found. From the information provided by the City of Greenville, the selected remediation for any contaminants will be monitored natural attenuation, allowing naturally occurring processes to filter the toxic potential of any present contaminants. (Compare source J and P).

Figure 7

The concept design was drawn up by Tetra Tech EM Inc. and infuses green buildings, open space and sustainable design features to promote healthy living for the Greenville Workforce Housing Project. (Figure 8). To help serve the City's stormwater infrastructure, a dry pond is proposed and will take up 0.36 acre of the site leaving the remaining 0.64 acre for the rest of the development. Six detached, two level single family homes were drawn up in the design and cover approximately 1,000 square feet, including one assigned parking space. To achieve a sound connection to the proposed open space, each home will feature a porch which will provide opportunities for outdoor living and connections to the rest of the neighborhood. The open space and sustainable design elements are truly the elements bringing life into the concept. . Along with a native planted community park and plaza, two community gardens are incorporated. One garden will feature nine individual plots for growing flowers and the other one will feature three individual plots for vegetable production. Rain barrels, rain gardens and bioswales will all be incorporated into the design to help infiltrate water back into the ground and encourage residents to reduce their energy and water consumption. Infiltration trenches will be installed along the access roads and pervious pavement, such as interlocking concrete pavers and grass pavers, will be used on access roads, parking spaces and sidewalks. Curb and gutter cuts, vegetated curb extensions and planter boxes are additional features to enhance the development. (Compare source E and P).

Figure 8

The Greenville Workforce Housing Project was chosen as a case study for two reasons. First, it looks at a brownfield redevelopment on the site level which is much different than the redevelopment of the Domino Sugar Refinery. Secondly, the city of Greenville is populated with a working class community much like the residents of Union Beach. For the Workforce Housing Project much thought was given into creating sustainable features to enhance the quality of living for the people, taking the costs associated with owning a home into consideration. Understanding how the City of Greenville designed sustainable housing and open space for its residents, can assist the studio in making smart decisions for concepts of sustainable housing and open space in Union Beach.

In conclusion, the two case studies referenced above should lead as examples of redevelopment in Union Beach. Both the Domino Sugar Refinery and the Greenville Workforce Housing Project have attributes that can be implemented, or steered away from, at the Union Beach site.

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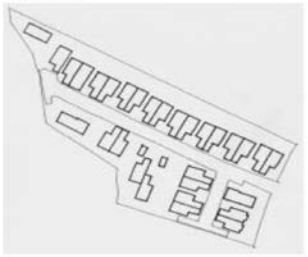
Figure 4



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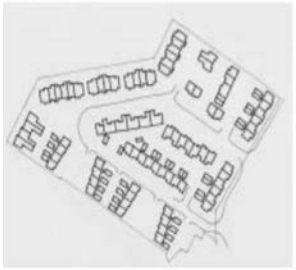

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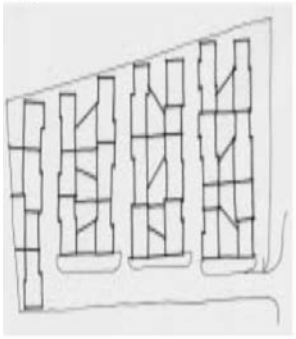

Figure 11

Housing Research Group of the School of Architecture and Landscape Architecture at Unitec

Best Practice in Medium Housing Density

BENJAMIN ANTWI

Housing density is the number of people within a space. Housing density has the ability to control how planners design water supplies, power grids and other services for communities. Planners can use housing to density strategize the placement of parks and recreation areas needed for physical activity and community events (Housing Density). Density in its raw form is a system of measurement that reference dwelling units to a given area of land. It is a factor that influences the perceptions of privacy. It is the measure of development potential and the form of the built environment (Figure 1). Medium density on the other hand is more than 150 m/unit and less than 350 m/unit. Medium density housing is used as a typology to determine best practice in design for an affordable and durable model (Figure 2). Medium density housing has been known as a form of housing with set characteristics, and offered as an optional residential form to low density suburban development (Figure 3). A study of New Zealand housing in the period between1960–1990 explains a small number of examples. There was the 1970 Pitarua Court development, in Wellington, by Peter Beavan, a special housing for the elderly, and student accommodation. There are also examples of medium density housing developments in the supply of affordable housing. These may be seen as starters in the genre, and provide evidence of New Zealand's capacity to experiment with different housing models, without supplying a clear variation identifiably of New Zealand in the medium density typology. Urban intensification use the concept of density as a readily approachable standard of a good quality urban environments; with low density signaling an unsustainable design approach. The interrelationship between housing density and urban design is evident in local town planning literature, including the City of Auckland District Scheme (Auckland City Council, 1968), which notes that:

"New concepts of residential design will be encouraged; new concepts of housing and comprehensive developments where a number of different types of residential buildings are located in a well planned relationship to one another and to the adjoining development." The same theory is expressed in another report produced as part of the Regional Master Plan by the Auckland Regional Authority (1967): "Higher density housing types should be located: within or near main commercial centres..."This idea makes perfect sense. Due to the high density, the large amount of people living there, shops are needed to accommodate for the density. In terms of union beach, creating a shopping center within high density area seems like the perfect design. Later, it is stated that, "Medium density housing types should be designed and built comprehensively and where at all possible permit separate legal title after development."

While reading the literature review of the Auckland Regional Council, I came across an interesting idea. It stated, "A further barrier to good design is that in many cases rules and proc-

edures developed for traditional low density housing are now being applied to medium density developments." Designers deal with tradeoffs all the time. In terms of Union Beach, the people of the town should be the most important when it comes to designing."...intensive developments involve a number of trade–offs. The developer wants density, the neighbor wants privacy, the resident wants a good view and aspect, while the community wants a good relationship to the street. It is not always possible to design a solution that overcomes all these trade–offs (Auckland Regional Council p21)." Designers hold the power to design for a solution that best fits the space. Judd identifies key design issues as follows: urban and neighborhood design; environmental fit; pedestrian access and way finding; vehicular access and parking; identity; privacy; security; dwelling layout; climate control and energy conservation; and marketability. Since 1990, housing design in North America has acknowledged the equivalent needs of containing extension, for economic and environmental reasons, and the challenge faced by US cities to achieve higher standards of urban design. Density has been at the core of the debate about city form since Stein, Mumford, and others, writing in the 1930s, and Jacobs began a critique of urban and suburban development and the following deterioration/ fall of the quality of urban life. Density by Design (Fader, 2000) is the second publication by the Urban Land Institute of America under this title. Fader identifies the issue of urban liveability as a main element in urban housing, seeking typologies that reverse the trend in the US of fortress like gated developments, and that reengage the street. The selected examples used in this study "highlight emerging quantitative standards for the basic building blocks of housing and community development: for example, lot sizes, setback standards, street and alley dimensions, and parking ratios. "In a discussion of layout design, Fader advocates rear access systems, against what are acknowledged to further costs, for the street-side advantage to parking and walkability. The study also deals with mixed housing, pointing to successful developments where "integrating varying market segments within small neighborhood units" is a traditional urban pattern that can continue to work in new schemes. In conclusion, medium density housing is characterized by complexity, and accuracy of location and context. From what I have gathered from the readings, density is at once a measurable ratio and a condition of quality in design relating to privacy, security, and identity.

Density is not a useful tool for determining quality in residential design because other factors in many combinations impact on the outcome. One of these combinations includes security and privacy. Density is a human view, usually of a sense of crowding, and therefore a highly flexible factor in housing design. Studies have established that density and privacy are interdependent and that achieving acceptable standards of privacy is a key issue in the design of socially successful higher density housing. In the literature Designed for Urban Living, "One important way of enabling control over privacy is to provide a clearly defined hierarchy of public, semiprivate, and private outdoor spaces which discourages intrusion by outsiders and provides necessary buffer space between dwellings and associated common access routes. The greater degree of control that can be given to residents as to how their private territory is defined and personalized, the greater the likelihood that privacy will be optimized (Judd 1993)."

Security plays a key role in housing. Security has been an issue associated with medium density housing since the term came into common use, but with little evidence to support the view that higher density housing generally, or medium density housing as a typology is either less safe or more prone to crime than other housing types. It is typologically characteristic that greater concentration of building, and proximity of public open space can create privacy and equally, by placement of windows and doors, construct a passive surveillance environment that discourages intruders. Judd said, ".. criminal behavior is related to broader social problems and their geographic distribution rather than housing type or density per se, medium density housing

.. concentrated in mid to inner–suburban areas or on public housing estates, which often have higher rates of burglary and personal crime."

In Adelphi Villas, East Tamaki, Manukau City, a housing design by the architect, Alan Rolston describes my first case study. It is a two-story housing in semi-detached units. It is labeled at 89 units per acre (Figure 4). In the design, the garage door dominates the area, property boundaries are indicated by concrete strips. Parking occupies all available space adjacent to the internal road, its appearance made more unattractive by an irregular arrangement, which conveys an impression of haphazard use, lacking ownership or organization (Figure 5). Overlooking remains a problem in spite of attempts in the planning of the site to protect privacy. The elevation to the distributor road to the north of the site presents a suburban identity. The second case study is located in Seymour Road, Sunnyvale, Waitakere City (Figure 6). The layout is more of a hybrid style, with the majority of units either detached or linked detached sharing only the wall between garages, and front access, dual aspect houses. The density is at 89 units per acre, a level at the lower end of the medium density range (Figure 7). The internal road is a public street in a compacted version of a traditional suburban layout. The development los es most of the benefits of suburban layout design without gain in any area. No public open space has been included. The scheme makes no concerns to recent good practice in higher density design, or to the potential of urban housing to contribute lively neighborhoods. A forward thinking landscaping idea, designed by Sinclair Knight Mentz, which would improve the quality of this development, has not been implemented yet but soon will be.

The third case study is located in Corban Village, Henderson, Waitakere City. The layout is based on two separate design principles: a front entry type using two and three story house types, and rear entry mostly with two story house types, and, due to neighboring public open space, no provision for inner communal areas (Figure 8). The plan includes an adopted road, which provides service access. All units have one secure car space, and the mass has a second space within view from the house. The whole development was packaged into about six developments, evidenced by architectural variety that removes any sense of uniformity or repetition (Figure 9). In this group the north south orientation raises the question of the inactive entrance on the south side where recessed front doors are not in use in all cases. Overall, the development shows the quality of a residential urban environment possible at this density without sacrificing access to and security of the car. The last case study that I focused on was in Melview, Ambrico Place, New Lynn, Waitakere City. The design achieves a high level of security and privacy (Figure 10). There is minimal overlooking between units, or into units from the public side and consequently little contribution to the sense of community in the neighborhood. At a density of 106 units per acre, however, the layout achieves a higher standard of privacy than most comparable schemes. The high standard of private open space achieved by the courtyard house type is severely affected by a later development on an attached site, illustrated in the photograph, underlining the need for organization of the whole site strategy from an early stage if higher density housing is to be successful (Figure 11).

By doing these case studies, I came to the conclusion that all medium density housing there is an element of compromise relating to house type, car access, external private space, the public domain, and construction costs. For this reason the case study comments and some of the discussion in this section certainly focus on areas in which the most significant compromises are identified, thereby constructing a critical model for the analysis. Most of the examples included in the study have some merits in at least one area. The sense of crowding in some of the case studies generates the perception that privacy

FIGURE 1

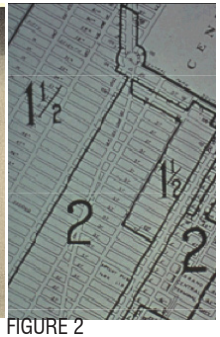

FIGURE 2

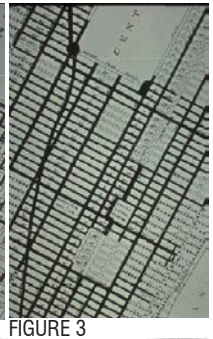

FIGURE 3

Environmental Consequences of Municipal Zoning in Union Beach, NJ

AUDREY LI

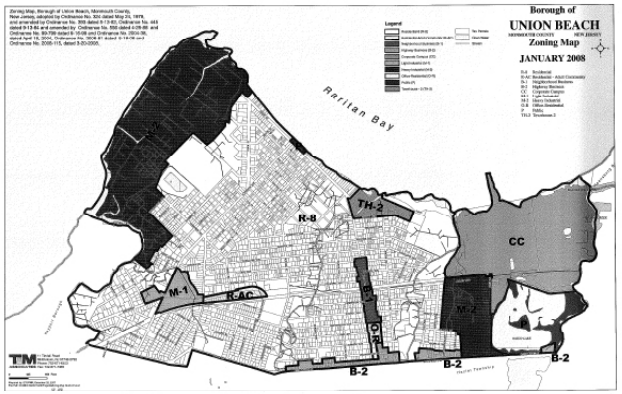

FIGURE 4

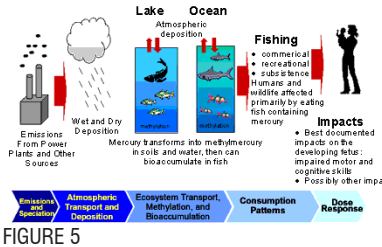

FIGURE 5

FIGURE 6

FIGURE 7

FIGURE 9

FIGURE 8

Photo Credit: See Work Cited

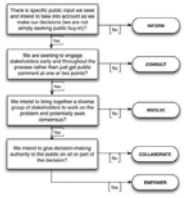

FIGURE 10

The History of Zoning

Zoning is a term that any city planner or policy maker would be familiar with. “Zoning Shapes the city”(NYC Zoning), it is a way the government controls the physical development of a land, and the requirements are in compliance with the general land use recommendations a land use plan would provide. Before zoning existed, most cities regulated land use through “nuisance laws”, meaning that anyone could take their neighbors to court if they didn’t like what they were using their property for and the ultimate decision making fell on the shoulders of a judge. This system did not work too well especially since the beginning of 20th century, new developments in cities were occurring heavily and rapidly. For example, in New York City, building heights were increasing along with the dissatisfactions of city dwellers who had their air and sunlight taken away. Early approaches of building height control were in effect to mediate the situation. In 1885, a law put a restriction on buildings to be one and a half times the street width. However, when the 42-story high-rise Equitable Building was built in 1915, it raised anger among the neighborhood members and they demanded justice from the government. As a result, in 1916, our country’s first “comprehensive zoning code” was passed. Since then, the city’s landscape started to transform. Architects began to manipulate design in order to comply with the new zoning regulations (Figure 1). Then it came the birth of districts divided based on the user activities such as residential, commercial, etc (Figure 2 & Figure 3).

The Zoning Resolution of 1916 became a model for other cities to adopt for their own planning purposes. Other early examples of city zoning are San Francisco’s effort in trying to zone out public laundry and Los Angeles’ effort of keeping industrial and commercial activities out of certain neighborhoods.

The Purpose of Zoning

In towns and cities of New Jersey, zoning laws regulate land use by designating zoned areas such as residential, commercial, or industrial and only certain land usages are authorized while other uses are off limits. “The idea is to avoid incompatible activities in proximity to one another and to enhance and preserve the livability of our community” (“Zoning”, Cherry Hill, NJ).

Existing Zoning in Union Beach, NJ

In the current zoning map of Union Beach, NJ (Figure 4), it is evident that the majority of the town is zoned for residential uses. The third largest distribution of zoning is the Corporate Campus zone. There is a small amount of land designated as business/commercial district, and as expected, there is also a small area of new development zoned as Townhouse. The most surprising zoning of Union Beach is the M1 and M2 zones, which occupies as the second largest zoned area in Union Beach. The northeast side of the town resides the largest M2 zone, which is categorized for Heavy Industrial. Coincidently, the land typology of the zone contains the general characteristics of a wetland. According to New Jersey Zoning Regulations, zoning code M-2, Heavy Industry Zone identifies a district that is authorized to permit intensive industrial operations. With the intensive industrial operations present on site on top of a wetland zone is extremely precarious to the environment and the ecology of Union Beach. Environmental consequences are bound to happen if the area gets developed according to the current zoning.

Environmental Impacts of Industrial Zones

Generally speaking, industrial districts “carry a higher environmental burden than do purely residential neighborhoods in terms of pollution impacts and risks” (Maantay, J, 573). Depending on what the industry of a specific site is, these negative environmental impacts are resulted from industrial activities and also from what is called “associated heavy truck traffic” (Maantay, J, 573). “For instance, just one solid waste transfer station may require 1000 truck trips per day to access its facility through a residential neighborhood, and some

neighborhoods may have twenty or more of these facilities" (Maantay, J, 573). This heavy truck traffic negatively affects the ecosystem by increasing air pollution from its gas emissions, increasing the noise level in the neighborhood, inducing earth vibration and traffic jams, and lastly, increasing the risk of pedestrian traffic. In the Environmental Impacts Diagram (Figure 5), it shows the relationship between the eco-processes and pollutants. Industrial processes also cause a significant amount of waste-related issues. Once again, gas emissions of toxic substances heavily pollute the air, causing a decrease in air quality (Figure 6). Soil contamination is also a byproduct of toxic emissions. Toxins also decrease the water quality by contaminating groundwater aquifers as well as reducing water levels and stream flow. Visual Blight is often a serious problem obliterated from the list of environmental consequence of an industrial zone. However, it is just as dangerous as water contamination (Figure 7) and can cause severe damages to plants, animals, as well as humans. Illegal dumping of hazardous materials can jeopardize the cleanliness and safety of nearby water bodies including the ocean, directly affecting the health of plants, animals, and humans.

Wetland Protection

In addition to what was previously stated he high environmental risk of a large M-2 zoned district being on top of a wetland has some serious environmental consequences. According to New Jersey Department of Environmental Protection, wetlands have a tremendous amount of ecological, social, as well as economical values. Early views of wetlands were often mistaken and they were thought to be wastelands instead of being recognized as areas with incredible ecological functions. Wetlands not only improve water quality by "filtering out chemicals, pollutants, and sediments that would otherwise clog and contaminate our waters", they also "soak up runoff from heavy rains and snow melts, providing natural flood control" ("Citizen's guide", SBMWA). During drought seasons, wetlands release waters stored from a flood into streams that need water replenishment. They provide a safe haven for numerous wildlife and plant species that are critical to keeping the ecosystem's balance (Figure 8). Moreover, wetlands bring an extraordinary recreational value to the landscape. "Many of these values were not widely appreciated until the 1970s and 1980s. By then, more than half of the nation's wetlands were destroyed" ("Freshwater", NJDEP). As a result, the protection of wetland areas in Union Beach becomes extremely important, as they are exceptionally valuable to the town's ecology and people. Besides the environmental damage from the potential industrial development in the M-2 zones, being on top of a wetland, the "Heavy Industrial" zoning jeopardizes the health and safety of the wetland, the wetland habitats, as well as citizens bordering the wetland. In order to control and regulate wetlands, the New Jersey Department of Environmental Protection has a set of laws to make sure the appropriate issuing of permits to restrict the usage of wetlands in New Jersey. Although inevitably, activities in the wetlands still occur and naturally still causing a substantial amount of disturbances. However, the NJDEP is making a lot of effort to minimize these disturbances by making the permit process more extensive and by reviewing the permit proposals more carefully. To further protect the wetlands, New Jersey tries the "No Net Loss" regulation, which requires "compensation when disturbing greater than 1 acre of wetlands, which is called Wetland Mitigation. Developers are required to provide 2 acres for each acre disturbed" ("Freshwater", NJDEP). Unfortunately, despite all the effort, New Jersey still loses about 150 acres of wetland every year due to development.

Coastal Pollution

Being a coastal town, it is by nature that Union Beach had environmental consequences of zoning directly related to coastal pollution. Having a M-2 zone bordering the Raritan Bay is an environmental liability because the emissions generated from industrial zones contaminate the ocean in the form of a gas, a solution, a substance absorbed on a particle or as a solid matrix. Types of coastal pollutants from an industrial site include toxic substances such as Arsenic, Copper, Lead, Mercury, Tin, Zinc, and Uranium. Waste products such as polychlorinated biphenyls, mixtures of up to 209 individual chlorinated compounds, also contribute to the pollution of coastal waters. PCBs are used as coolants and lubricants in electrical equipments such as transformers and capacitors. According to the U.S. Department of Health and Human Services, PCBs were prohibited from manufacturing due to the environmental buildup and the health-related issues. Forms of discharges from power plants, as well as noise pollution are also on the list of things that can cause coastal pollution. In the National Academy of Sciences Report, it was said "the ocean environment has always included an abundance of natural noises, such as the sounds generated by rain, waves, earthquakes, and sea creatures. However, a growing number of ships and oil rigs, as well as increased use of sonar by navies and researchers, is adding to the natural noise that already surrounds marine life. Although noise in the sea has increased steadily since the Industrial Revolution, there is little information on exactly how noisy it has become or how marine mammals in particular react to the noise. Nevertheless, recent episodes in which dolphins and whales have beached themselves while human-generated sounds were being deployed nearby have raised questions about the impact of ocean noise" (Stewart, TAMU). This questions not only the ecological and environmental side effects of industrial zoning, but also the ethics of harming the health of animals and humans.

Environmental Consequences of other types of zoning

In addition to the environmental impacts of the M-2 zones in Union Beach, other zoning decisions could as well be somewhat questionable. There is a relatively small amount of M-1 zones in Union Beach, meaning "Light Industrial". Although it does not have as many severe environmental consequences as the M-2 zones, the proximity of this zone to its surrounding R-8 residential neighborhoods is truly alarming. The negative effect of this zoning is similar to M-2, although with lesser in degree, it is recommended that it should be removed or relocated away from residential housing areas. The R-8 Residential District Zoning is "defined as high density residential areas where single-family and multi-family dwellings are commingled and certain open areas where similar residential development will be a viable land use. The uses permitted in this district are designed to stabilize and protect the essential characteristics of the area and to prohibit all activities of a commercial nature except certain home occupations controlled by specific limitation"(NYC Zoning). Due to the nature of the R-8 zones, the environmental consequences of residential zoning are majorly due to the large amount of impervious cover and the large amount of human water consumption and demand. Human waste can play a role in causing the environmental damage too (Figure 9).

Sandy and the future of zoning in Union Beach

After the disastrous attack by Sandy, many properties were destroyed, virtually transforming the existing zoning of parts of the town into abandoned or vacant land. This is essentially equivalent to the town becoming a different landscape, which has more contaminants and debris from the storm than the town had previously experienced. The town is more prone to intrusion of contaminants and stormwater runoff. For a more environmentally sound and sustainable future of Union Beach, it is imperative that designing of a rezoning plan takes place. With the goal of rebuilding the faith of people and bringing the community of Union Beach back together, involving the public into planning decisions becomes extremely necessary. Public participation is essential in any planning process, especially in zoning and rezoning. Enhancing public participation is one important also very effective way of reaching out to the community, the key stakeholders and receive feedback regarding the planning

process. In order for any zoning and rezoning to work the most effectively, one should not overlook the power of the public's opinions. In terms of environmental issues and justice, when the public is directly involved, the issues will be valued more and correspondingly the issues are more likely to be addressed. By encouraging public participation, the planners and decision makers can reduce the amount of public opposition (Figure 10). "Time passes, land uses change, and zoning policy accommodates, anticipates and guides those changes. In a certain sense, zoning is never final; it is renewed constantly in response to new ideas—and to new challenges" (NYC Zoning). We can't help what is some might perceive as flaws in the existing zoning in Union Beach, what we can do as future designers and planners is to try to solve these environmental issues through sustainable, innovative designs for rezoning Union Beach while making the town more resilient to flood events. In doing so, we are ensuring a better future for the town as well as for the global environment, further optimizing the quality of life of people in Union Beach as well as the entire human race.

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Photo credit: Unknown “Peticoat Lane 1890’s”

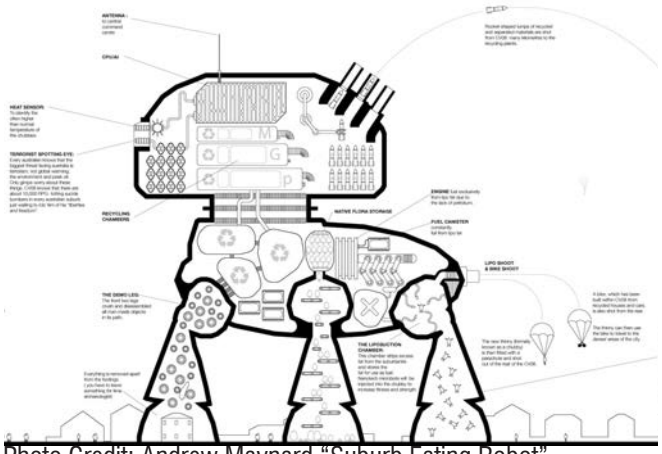
Photo Credit: Andrew Maynard “Suburb Eating Robot”


Photo Credit: EE&K Architects “The Gateway”

Transportation Villages: Investigation, Analysis, Application

JACK PETERS

Over the centuries, the civilizations have changed, the cities have evolved, but the basic framework has remained surprisingly similar. People living in high density areas create a cosmopolitan community that is highly adaptive, shares knowledge, and trades goods and services. These benefits to society are unparalleled in areas less dense. Unfortunately as population grows, so do the problems associated with them. Economic disparity is glaringly obvious in cities across the globe, the rich safe in their ivory towers, looking down on the poor struggling to survive in the crime ridden slums that typically border the downtown. These problems have been plaguing man for eons, and ways of dealing with it has been evolving along with the cities themselves.

Urban sprawl is a phenomenon as old as the phenomenon of urbanization. As cities grew, so did the drive to spread out, move away from the hustle and bustle of the high density downtown districts, and claim land in the lower density outskirts of the metropolis. This was an attempt, largely by the upper class, to keep a connection to the center of trade and commerce, while maintaining a distance from the crime and fast paced life that living in a city creates. Those that ventured outside the city limits developed the suburbs, a place where you could enjoy the tranquility and quiet of the countryside while still having access to the benefits of the network achieved by society in the city.

Decentralization of urban areas began as a privilege of the upper class, from the nobility of Rome traveling to vacation estates in the country, to businessmen of Industrial Europe looking for an escape from pollution and relentless whistles and hammering of the factories. For centuries it was a luxury that the vast majority could not afford, even traveling outside of your neighborhood was out of the question for most as transportation was very limited.

The introduction of mass transit lines, notably the Metropolitan Railway of London in the mid-19th century, completely reorganized the structure and function of how people lived and functioned in urban areas (Levinson, p55-77). In tandem with the development of factories at the borders of the city, transit lines created a new exciting idea and opportunity that has, in recent times, become a dreaded task, commuting. The middle class could now live, raise a family, and relax in the suburban neighborhoods that surrounded the congested downtown. As transportation evolved and infrastructure was developed, it could provide faster service for more people to further destinations, the effects continued to evolve the structure of the cities. The rich continued moving further away from the crowded city centers (see Figure 1), the poor remaining in the overcrowded streets of the downtown, and the space between filled in by a gradient of wealth.

The next major invention that shaped how cities operated was the automobile. The car forced city planners, especially in America, to reorganize circulation and commuting patterns. The development of highways provided users to have access to even greater distances than the train had offered. The personal freedom granted by the family owned automobile also had another effect on the population. The new road and highway infrastructure was popping up everywhere. No longer restricted to train tracks, they could drive almost anywhere. This new way of life, combined with a drastic population increase, caused a huge spike in suburbia formation. The popularity of cars on society provided many new opportunities, but over time, what was once a luxury became a necessity, and city planners that developed streets based on the auto had inadvertently created an automobile dependent society. What once provided freedom from congestion of city life, has become congestion on the road. Commuting is no longer an exciting way to escape the confines of the metropolis, but now a daily prison of loud horns, wasted hours, and stress for millions of people around the globe.

In our emerging “green conscious” society, the automobile has become demonized for its immense environmental impacts. Planners and environmental activists alike are working to find the next major leap in city planning,

many coming to an unexpected conclusion that if we are to move forward, we must put the gears in reverse. Rather than continuing the trend of creating new transport that allows the population to disperse over greater distances, we must revisit earlier systems of mass transit and re-centralize society. The next revolution will not be in creating a more convenient mode of transportation, but rather making existing transportation more efficient and convenient. In essence, planners are now deconstructing previous advances and reverse engineering methods which once allowed for urban sprawl. In the past transportation was developed which allowed for communities to grow outward, but with transportation oriented development (TOD) communities surrounding existing transportation are redesigned to effectively support a community that relies on public transit. (See figure 2)

Transit oriented development, as defined by the NJ Department of Transportation, is "a residential, commercial or mixed-use development project, made up of one or more buildings, that has been designed to take advantage of nearby transit and includes features that encourage walking, biking and transit ridership." TOD's are commonly implemented in areas that have a potential and willingness to grow that have existing transportation infrastructure such as train lines, light rails, or bus lines (McLinden, p67-68). Located in urban areas around the world, TOD's or Transit Villages, provide a community with multiple benefits. These transit villages create effects that address and counteract some of the problems with the status quo, road congestion is decreased, emissions are reduced, economic development, and contributes to more affordable housing options. There are other, less quantifying effects that increase the strength of the community. Transit villages are made up of mixed use buildings, in close proximity to mass transit and public spaces, promoting walking and cycling, as well as increased social interaction (Ain, p5).

While transit villages are located around the world, our home state of New Jersey is the leader among the United States in this type of development with 27 designated villages. This is due in part to its proximity to the two major metropolitan areas of New York City and Philadelphia, numerous transit lines that dissect the state, and the implementation of the New Jersey Department of Transportation Transit Village Initiative, a collaborative effort of 10 state agencies, spearheaded by NJ DOT and NJ Transit. The Initiative was created in 1999 in response to growing problems faced by NJ residents including increasing traffic congestion, loss of open space due to outward expansion, fragmentation of ecosystems, and decline of older towns (http://www.nj.gov/transportation/community/village/).

There are specific guidelines and requirements for a village to be designated as a transit village. I will use the requirements set by the Transit Village Initiative of NJ as a representation to further explain the process. Municipalities that wish to receive designation and funding must apply and meet the following criteria:

- Identify existing transportation: Including train, vehicular, pedestrian, bicycle
- Demonstrate municipal willingness to grow: Both in population and economically
- Adopt a Transit Oriented Development plan and zoning ordinance: Including transit supportive site and architectural design guidelines and appropriate parking
- Identify Specific TOD sites and projects: This must be done through ready to go documents which include affordable housing within the transit village area
- Identify bicycle and pedestrian route improvements
- Identify "place making" efforts near the transit station: including cultural, entertainment, community events and celebrations

(http://www.nj.gov/transportation/community/village/)

New Brunswick is one of the largest of the 27 transit villages in NJ. As it is local and familiar, it is a good case study for any students that wish to understand and further research how these designs operate. DEVCO, the New Brunswick Development Corporation, is a non profit real estate development company founded in the 1970's to assist in New Brunswick's revitalization efforts. Since its creation, DEVCO has been the engine behind much of New Brunswick's development. With many familiar projects in its portfolio, I will focus on one of its newest and most relevant projects (see Figure 3).

"The Gateway/The Vue" is a development which creates a connection between the existing train station with the Rutgers Campus and greater New Brunswick via a mixed-use building that provides store space, office space, parking, housing, and residential units. These uses encapsulate the goals of the Transit Village Initiative. This project alone created over 3000 jobs between the new commercial space and construction positions needed while being built. The gateway allows for pedestrian access directly to and from the southbound platform to Somerset St via a bridge. Proximity of 0.5 miles to a transit station is a primary requirement of TOD's. The Vue is a 23 story, mixed use building, housing 57,000 square feet of retail space which includes restaurants, shops, and a bookstore, over 650 parking spaces, and nearly 200 apartments in the upper 14 stories of the building. The residences make up the tallest building in New Brunswick, providing views of Rutgers Campus and the New Brunswick skyline (http://www.devco.org). This pedestrian friendly design reduces the need for auto travel as it is located not only near a train that offers express service to Manhattan and Philadelphia, but also is within walking distance to the largest campus in NJ and the New Brunswick commercial and cultural downtown area. As users walk to/from the train they pass by a Barnes and Noble, a new university bookstore. Commercial use that targets local needs is a core component of TOD.

In the California Bay area the Contra Costa Center is an National Planning Excellence Award for Implementation award winning Transit Village. Plans began in the 1970's when an environmental activist local government decided to revamp a 140 acre area surrounding the BART station. This station carried more passengers than any other Contra Costa station, largely due to a large parking area. In the early 1980's a regional bike trail was unveiled, but was not directly connected to the BART path, the local leaders recognized this as an opportunity to connect rail, bike, pedestrian, and car transit systems, forming a hub of transportation. This allowed residents to drive and local residents to walk or bike to the station where they could transfer to a train for longer trips. The plans were carried out via a series of contractual agreements between BART, the Contra Costa Redevelopment Agency to purchase land and develop new infrastructure. In the 1990's a development plan, which focused on mixed-use buildings, was adopted.

The plan was not well received by local business and community because they feared the new stores and entertainment complex would compete with existing venues. In 2001 the project leaders decided to hold a public charrette which consisted of over 500 people over a course of 6 days. The purpose of this was to get feedback from the local community and clear up some potential misunderstandings. This meeting proved to be very successful, and after $950 million in investment the village has over 500 residential units (16% affordable housing), 290,000 square feet of office and conference space, 35,000 square feet of retail and public amenities. Even at only 90% built, this village is a success story. Over a third of the village employees use transit, walk or bike to work, and single occupant vehicles dropped by over 30% (American Planning Associates, p29).

While transit villages prove to have many benefits, there are certainly some drawbacks as well. Planning a well integrated multi-modal transportation system, that incorporates housing, office space, store, restaurants and potential for growth takes time. These plans are often received with much

hesitation and even hostility. Practicing procedures such as the charrette in California can help ease resident and local business owner's concerns, while providing invaluable feedback for designers and planners. Due to the drawn out nature of design to implementation, the plans must be flexible and adaptable to changes during this time period. Proposals must look into the future, the next big thing will be here before you break ground. While some municipalities and organizations assist in funding, these plans often come with a hefty price tag. Raising support may be a challenge, so the best solution is to be prepared. Planners must go to town meetings, charrettes, and lenders with a full plan prepared, including rendered drawings, projections, surveys, etc (Slotterback, p144-161).

Taking into consideration the pros and cons of Transit Villages, I conclude that Union Beach is a good candidate for consideration as a TOD. With its proximity to existing NJ Transit rails, and a bus line that goes through the town, much of the infrastructure necessary already exists. The views provided by the location of Union Beach make this site appealing to potential new residents, and the bay surrounding the northern section of the town make water taxi or ferry travel an interesting potential additional means of transit for this coastal community. Route 36 and route 35 run along the southern edge of town create potential connections to other means of transportation and nearby towns. While I believe it is not necessary, the existing Henry Hudson Greenway or route 36 could be widened to provide space for a light rail to enhance Union Beach's connection to NJ Transit lines.

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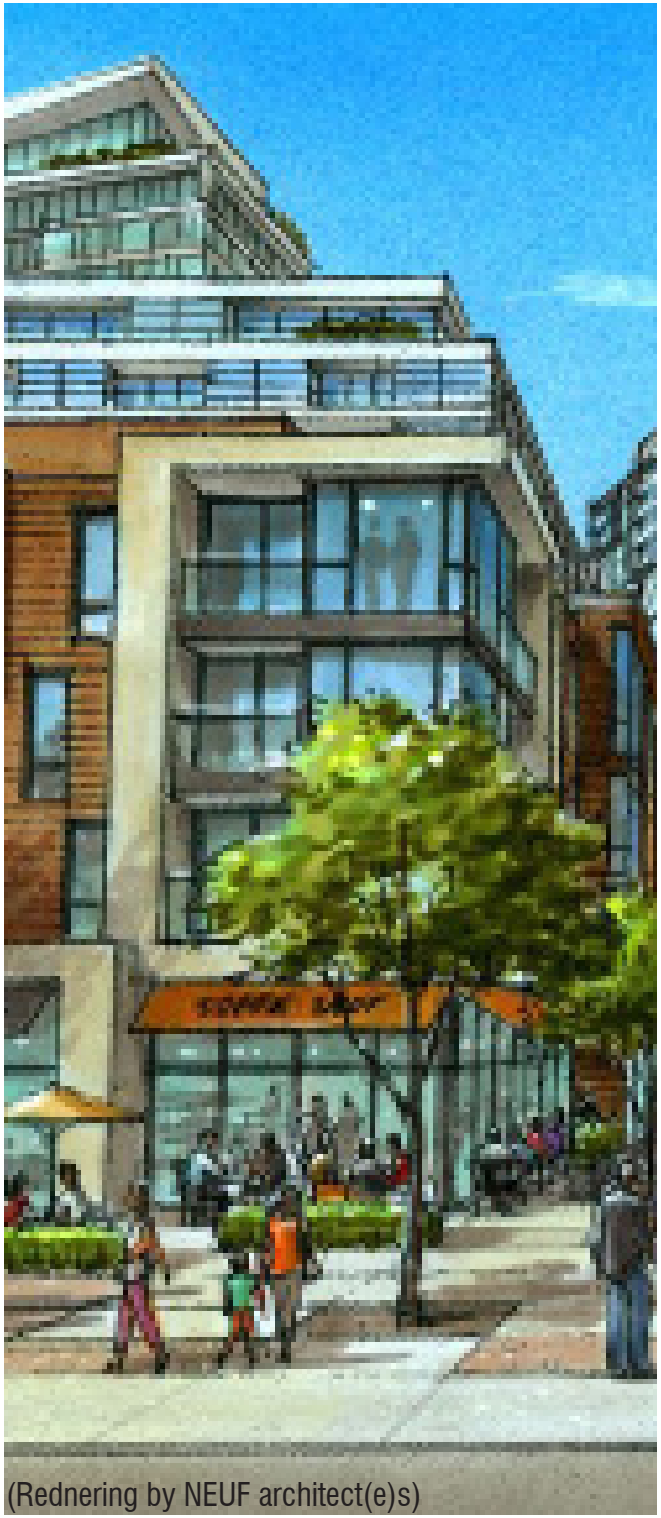

(Rednering by NEUF architect(e)s)

Resilient Downtown Design

REBECCA COOK

In one of the first discussions of our studio this semester students debated the question: what is “Main Street?” We wondered what made main streets successful, what there benefits were, and (most controversially) if Union Beach was an appropriatesetting for such an area. The main argument against developing a downtown district in Union Beach was that it would not do well in a “working class community” because along the Jersey Shore the most successful and easily recognized downtowns are found in characteristically well-off areas. Students insisted that main streets are best received by tourists and work to attract visitors to an already desirable place. The general consensus was that a downtown district in Union Beach would fail because the people of Union Beach would prefer to continue using shops along Route 36 as their main commerce area and would prefer to leave Union Ave. (the current “Main Street”) more or less the way it is. What these arguments failed to establish was an understanding of the main purpose of a downtown area and how, if designed appropriately, it could benefit a town of any social or economic status in a multitude of ways. Downtown design encompasses much more than just the t-shirt shops and ice cream parlors that many New Jersey-ians envision when they think of main streets of popular shore communities. Downtowns act as a symbol of community pride, history, economic health and partnership between private and public sector entities. The physical infrastructure of the downtown area is a public investment that gives back to the people by supplying jobs, revitalizing property values, incubating small and independent businesses which all works together to stimulate the local economy.

Equally as important, these areas can help to stimulate community. By concentrating activity in one area, downtown districts reduce sprawl, centrally locate local services, amenities and open space, supply a space where all members of the community can meet and program events, showcase the town’s unique history and character, and offer a space for local art and culture to flourish (National Trust for Historic Preservation).

In her book “The Death and Life of Great American Cities,” Jane Jacobs suggests how a city can create a successful downtown by stating: “The more successfully a city mingles everyday diversity of uses and users in its everyday streets, the more successfully, casually (and economically) its people thereby enliven and support well-located parks that can thus give back grace and delight to their neighborhoods instead of vacuity.” Her quote claims that a downtown adds value to the place its located- but how? As students and practitioners of landscape architecture we know that open space greatly enriches life. What we may not have known is the benefit of mixing uses on Main Street. Residents located on and near Main Street have higher property values and business located here fair better, even in times of recession, than ones located elsewhere. Businesses and residences can also work together to “soften the edge” of a strictly business district (like the hostile environment of Route 36 right up against the small town of Union Beach’s edge) by fading out into a more cohesive environment. Downtown districts benefit from the nearby residents acting as employees and a constant customer base (Buraydid 2013).

It is important that residential and business areas are thoughtfully integrated with each other to create a downtown that is economically and socially resilient. Downtown housing supports the economic and community activity that make the businesses and open spaces located there successful. The residents of these areas provide “a continuous day and night activity” that increases safety and promotes the feeling of a tight-knit community. Housing on Main Street also helps to infill empty areas where business or open space may have been previously unsuccessful. These homes are a link for community

As result of the conglomeration of businesses, homes, open and civic space into one area it is key that it acts as a "public street for public use." Since "Main Street" is the town's main area for people, the street should support these efforts as best as possible. To do so, designers must actively design for pedestrians travel in this area. Promoting walking instead of driving is a hard sell to make. The reason for this is the sprawling nature of the suburbs that separate land use types from one another and
connect people with places only by roads suitable for vehicular traffic. The absence of sidewalks and lack of condensed services forces residents to use cars for every need. This way of living has caused people to develop "environmental blinders." People develop a number of frequently visited destinations, such as work, the gym, the mall, and certain restaurants, and only use there car to reach them. This type of lifestyle suggests to drivers that pedestrians obstruct efficient travel. To influence people to change the way they feel above travel and to take a less vehicle-centric approach, they have to support pedestrians by becoming pedestrians themselves. Here is where design comes in. Walking routes must be created to be interesting and directed towards and through areas with highly concentrated, diverse services. These high concentration areas must also be within a reasonable distance from homes (which is about half of a mile). These routes must also make users feel safe. To do so car speed must be decreased, travel distance between homes and services must be reduced, bicycles must be supported, and public transit options must be provided forhandicapped residents (Moudon 1987).

Creating a resilient downtown is more than just created desirable space for people to enjoy and live. While that is a key aspect, we must also consider resiliency in terms of creating a place that will be able to withstand the future's undeniable environmental changes. Design must think ahead to a "post-carbon and climate responsive" community and decide what is most appropriate to bridge people from current times into that uncertain future. There are handfuls of urban planning principles that work to begin shaping the way designers should think about the future and creating places that will function then and now. The first important factor is to concentrate development in certain areas to minimize sprawl and the need for additional paved surfaces and roads. Areas with low-density development should be reevaluated in a way that promotes constant, varied use and accessibility to many different users. Neighborhoods must become denser and located closer to concentrated service areas. As discussed earlier in this essay, promoting walking and bicycle riding between high-density areas of development will help to reduce dependency on cars. Circulation in these communities will be altered- steering away from cul-de-sacs and highways and developing thoughtful corridors and transportation hubs. For those people who cannot walk or bicycle as a main method of travel and to get large groups of people further distances at once there must be a sustainable public form of transportation. This will be important in lowering a community's carbon footprint but also for moving forward into a future where fossil fuels to power personal automobiles may not be available (and if it is, may not be affordable to the general public). Interesting and beautiful design will help to attract people to a downtown district but ensuring constant well-being will keep them there. Resilient communities must plan for "life safety and critical infrastructure systems" that function during times of stresssuch as a flood or hurricane. These systems include drinking water, heating and electric, police, fire, and emergency medical services. This infrastructure system must be able to act when all aspects are performing normally but each one must also be able to stand alone. A secondary part of ensuring the constant well-being of a community is to consider the well-being of the environment. Preserving, managing and enhancing significant areas to promote the health of the wildlife, vegetation, biodiversity, wetlands, tree canopies, air, water, land and climate is very important. These factors must be considered in development. Both the environment and its residents benefit when produce and resources are sourced locally (within about 150 miles.)Locally sourced resources lower costs and energy usage for transportation while also stimulating the local economy. One of the most important aspects of designing a resilient downtown and community is gaining the support of its citizens. Designers and planners could implement hundreds of thoughtful changes but if the community didn't stand behind them and support them they would be useless. Changing the dynamics of a community requires fundamentally changing the lives of its inhabitants so in doing so its important to make sure the community is involved in making important planning decisions and that the choices made are something that would better the town's overall quality of life in many ways. "It is only through the sum total of individual choices, of individual actions, that change will come about." For this reason, residents and stakeholders are in integral part of planning and designing their community. When people feel that they were heard through out the decision making process, they will accommodate their way of living to support it, by walking to the food store instead of driving for instance
(ResilientCity 2013).

One urban design principle I investigated a bit more was the idea of placemaking. An important way to get people interested in mixed-use high-density areas is developing methods of place making there. Defining a community's identity and its natural sense of place will work to make its public spaces (parks, plazas, courtyards, streets, municipal buildings) more successful. Turning these typically mundane suburban places into desirable destinations will attract residents to them. Important resources to consider for place-making efforts are culturally and historically significant items to the community. But what is place making? A responder to a Project for Public Spaces survey said, "Place-making is a dynamic human function: it is an act of liberation, of staking claim, and of beautification; it is true human empowerment." Place-making is a combination of listening to the community's wants and needs and then creating a common vision for the space. Places effected by this type of design can be as small as a pocket park between two business buildings to as large as all of Union Beach's waterfront- what's so interesting about this type of thinking is that is a unification of different members of the communities points of view. Defining this will aid in creating valuable spaces that effect the entire town. William H. Whyte explains, "It is not just the number of people using [place-making spaces], but the larger number who pass by and enjoy them vicariously, or even the larger number who feel better about the city center for knowledge of them. For a city, such places are priceless, whatever the cost. They are built of a set of basics and they are right in front of our noses. If we will look." William H. Whyte. Place-makers have created a rule called "The Power of 10 (what William H. Whyte refers to as "The Multiplier Effect")." This rule states that a great downtown district should have 10 interesting, beautiful destinations- each with 10 places and 10 things to do within them. (Figure 1 on page 9 shows a diagram of this rule.) These basics include: developing spaces that are malleable and well managed and maintained and creating buildings that allow people to interact with each other and what's inside. An example of this type of interaction is to imagine removing street parking from the "Main Street" and add amenities and extend storefronts into the pedestrian corridor.

(Opportunity Detriot 2013)

To investigate how a city put this approach of place-making into action I used the city of Detroit's efforts as a case study. The first step in their redesign of public space was called "lighter, quicker, cheaper." This method was for low cost, low risk incremental implementation of public spaces to be experimentally integrated into the community. During this stage, the community is highly influential in where spaces are located and what their uses are. In addition, there were a number of public workshops and forums to have designers talk with stakeholders and residents to create a defined list of goals and needs to be met through downtown design. One finding of these efforts was that the improvement of different places on an individual level was just a small piece of a bigger whole and that "every storefront, every street corner, and every part of every park has to have its own identity and character." The place-making design process is not an overnight one. The relationship between uses, residents, building tenants, and organizations in a downtown district determine the types of "places" each will become for the public. Similar to Union Beach, Detroit's former downtown wasn't a commerce hub for the city. To promote local business, their redevelopment focused on supporting local business by supplying local artists, cooks, and entrepreneurs with a place to display and sell their work in a place with high foot traffic and at low cost to them. This method aims to redefine the downtown as a business area but one that is appropriate for the community it is a part of (Opportunity Detroit 2013).

Based on the research presented above on designing resilient downtowns, it is clear that Union Beach is a perfectly suitable candidate for such development. The tight-knit community that they are known for would only be fortified through this type of development and supply them with more space to let it thrive. Since Union Ave. is zoned currently zoned currently as mixed business, it would be a step in the right direction to develop an appropriate matrix that allow business, residences, civic buildings and open space to function together in a way that best supports the businesses located in that district. By designing this area with resilient urban design principles in mind, Union Beach could gain an asset for their town for many years to come.

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Photo Credit: Insurgent Public Space: Guerrilla Urbanism and the Remaking of Contemporary Cities.

Open Space as an Economic Asset

MICHELLE HARTMANN

INTRODUCTION

Through the struggle to articulate the algorithm for a good quality of life, we find ourselves at the dead end road of open space. Despite all of the literature written to prove the health benefits of being outdoors, the lack of quantifiable data leaves open space on the backburner of development, as we continuously search for an alternative solution. The Wilder Research Team puts it clearly in a study titled "The Economic Value of Open Space". They write, "those who advocate for more open space rather than less are often at a disadvantage making qualitative or abstract claims when compared to those who can demonstrate the monetary advantages of development". The quality of life benefits of open space are an innate understanding at the human scale, unique for each individual user. However, policy makers and community governments often attempt to standardize these experiences into quantifiable values that can be compared to other types of development, in the efforts of decision making.

Despite our valiant efforts to pose a positive argument for open space, the abstractions will never be accurately quantified against 'x' units per acre to be built for 'y' money. The truth is, instead of attempting to quantify the value of people satisfied or units built, we need to reinvent the current programs of open space to function as an economic asset and add that quantifiable value to the community.

THE PRESENCE OF OPEN SPACE: an affect on property value

Though unquantifiable from a supply and demand perspective, open space is unique in its ability to raise money by just plainly being in existence. Although not always tailored or perfectly manicured, studies have shown that the presence of open space in communities have many reasons for their positive affect on the overall property values in any given area. For example, in a study presented at Macalester College by Soren Anderson in June of 2000, he hypothesized that property value would increase in areas not only where the open space was not only visible but also accessible. It is the abstract essence or desires posed by individual users that make these properties more desirable and therefore in higher demand (Anderson 1).

As Anderson goes on to describe, there are two main categories of human desire for open space that trigger this increase in the surrounding property value. As he describes, "The multiple benefits of open space fall into two categories. The "passive use" benefits of open space include, for instance, the pleasure derived from knowing that open land is being conserved. The "active use" benefits include recreational use of the area, as well as scenic views, privacy, and the barrier to adjacent development provided by the area" (Anderson 1). Therefore, the opportunity for property increase is not just in the presence of parks for a scenic view, but also to be accessible for recreational purposes and conserved for ecological purposes.

Photo Credit: Shareable. Clean Tech Future Conference

So, how do we do it? From a recreational perspective, according to the American Trails Resource database, walkable

park system neighborhoods typically accrue high property value because of the private and "'public' benefits to the whole community, such as alleviating traffic congestion, reducing air pollution, flood control, wildlife habitat, improved water quality and facilitating healthy lifestyles…" (American Trails NP). People enjoy walking, but the key is to make it accessible and safe. By creating park networks that connect critical parts of the neighborhood (i.e. town centers with adjacent neighborhoods, etc.), users will find the spaces more accessible and highly valued.

In the urban context, there are many previously designed systems that are very successful in not only improving the quality of life for the people, but also the economic stature of the area. For example, Fredrick Law Olmsted's project The Emerald Necklace in Boston served as a sub-network connection, juxtaposing the streetscape. This design was intended to get the pedestrians away from the 'hustle and bustle' of the busy roads, while still allowing for them to get from place to place. Not only did this project better the overall health of Boston's residents, but also made the city more desirable for living. I think this application of small green gems along a necklace of greenways could be useful in any sub-urban/urban town that is currently privatized by the secluded single family home and inaccessible (Emerald Necklace Conservancy NP).

Although less "active" in their contribution to bettering the quality of life, the more passive benefits of conservation and ecological restoration are also helpful to the economic viability of small cities and towns. As previously mentioned by Soren Anderson, in his thesis research regarding increased property value, proximity to conserved lands increases property value due to the innate essence of peace, health, and calm living environments. There it is proven that proximity to wetland conservation areas or other ecological zones, although less slightly, allows for the same property value increase as those close to a recreational park. However, how is this be quantifiable in a way other than the abstract desires of peace and serenity? Community Land Trust agreements are an innovative way of making land worth something while still maintaining its ecological importance and abstract affects. In most cases, community groups and non-profits purchase the land for low cost and provide the community with a non-developable area. Although it may not be adding to the one track mind of development, it provides a alternative method for the payment of land used for conservation (Davis NP).

Conservational tactics such as these are an excellent way to account for the ecologically beneficial lands that are so often occupied regardless of environmental policy and law. To many political bodies it seems like open land to build these quantifiable units. However, the value of this land type runs deeper than the human monetary value. In addition, with the recent influx of non-profit organizations willing to help after Super Storm Sandy, partnerships with communities along the cost is inevitable. Using the resources of partnerships to aid in the growth and sustainable development of Union Beach's economic system will allow the town to afford some of the unaffordable desires of the human population.

THE POTENTIAL FOR OPEN SPACE: an opportunity as business

The use of open space as it relates to the abstract desires of the human experience is an indirect method of increasing economic revenue for a community. It does not provide direct kickback in revenue; it affects one thing that affects another. However, designing open space to function more like a traditional business would provide more direct economic results. This idea is present in communities today through programs such as farmer's markets and flea markets. However, those land areas are typically programed for those types of seasonal events, with permitting and regulating security as a package deal. However, the introduction of community design and involvement in these processes may be interesting to create a wider spectrum of opportunity for ephemeral businesses. Currently there are some impromptu business case studies available, however most don't function in the form of formal business with legal partnerships with the town and economic revenue for town's development. The idea is to distinguish a method of creating of business function legally in a way that benefits the economic sustainability of the host community.

The idea of impromptu business, like the previously described markets and street vendors, is not a new one. Community groups suffering to economically establish, typically create these, sometimes illegal, informal businesses to help make money and maintain life. In their case, it is a method of survival. In the book Insurgent Public Space: Guerrillla Urbanism and the Remaking of Contemporary Cities edited by Jeffery Hou, the authors expose the innovation of the common folk, as they reprogram traditional public space for their personal benefit. Despite the legality of it, what these groups are doing is creating space for them. Realistically, the community knows what they want much better than any designers eagle eye perspective ever would (Hou 2). However, despite the clear perfection of this method of programing public space, there are some issues (privatized public space, exclusion, etc.). However, if regulated in a way to be legal, it could provide so many more opportunities to communities. As noted in the book, The Shilin Night Market in Taipei holds an illegal market each night for the community to consume and the vendors to see. However, being that it is technically illegal they are forced to pack their bags and hide away each time a man in uniform is present (Hou 5). The question here is "Why?" Is the space not properly rented? Are the products illegal? In most cases, if the land ownership and management were controlled, there would be no reason to refuse economic advancement. If designers can begin to think in terms of ownership and management when designing, essentially, program-less places there may be more availability for the community to program these "insurgent spaces" we tend to create, and find the most successful.

A CASE STUDY: Tempelhof Freiheit in Berlin, Germany

Tempelhof Freiheit is a prime example of local innovation with the potential for economic revenue, although it to did not have that mission initially. From its pre-existence as an airport to its future of parkland, Tempelhof Freiheit has been in constant question as to the direction of its design. The current property has a deeply rooted history exposed through the cracks of the current landscape. Through design competition and other specialist panels, designers have endured countless discussions regarding the direction on the space. However, in the interim community groups have works to develop the space in a way similar to the case studies that appear in the book Insurgent Public Spaces. However, Tempelhof plays a unique role in the spatial development. Through more than just the physical landscape, the park system has developed a more unique method for regulating these "pioneer" developments (Tempelhof Freiheit NP). The "Pioneer Project" at Tempelhof allows for the integration of community design and administrative regulation. Their mission is to include "Projects should also fulfill the major sustainability criteria (economic, future oriented, entrepreneurial, resource efficient, ecological, based on partnerships, integrative, social) and fit into one or more of our six guiding themes "

Photo Credit: http://www.tempelhoferfreiheit.de

Programming the space at Templehof is an ongoing process. However, it was because of a lack of decision making that this ephemeral programing appeared in the park. Much like the illegal markets of Insurgent Public Spaces , these pioneer spaces originally emerged without the acceptance of the park administration. It was not until they saw their success that they attempted to design around it. Today, they have a variety of different programs, which include gardening initiative, art installations, recreational areas, and places open for innovation. As Tempelhof puts it, "We are looking for good ideas and enthusiasm" (Tempelhof Freiheit NP). The park administration is an advocate for this type of design and believes, the "Pioneers and interim users bring new life to Tempelhofer Freiheit. With their diverse projects, these trailblazers will be a part of all future developments" (Tempelhof Freiheit NP). So why not take advantage? There is no rule to say that everything must be designed by the ones with the degrees to do so.

DISCUSSION:

Union Beach is a coastal town located at the mouth of the Raritan Bay. About one year ago, Super Storm Sandy devastated the area. Due to an already instable economic system, the land devastation took a major toll in the overall function of the town. It left Union Beach in a sense of distress with the inability to afford the help they really needed. Our studio is attempting to address this issue. Although we cannot provide the cash flow they are in need of. We can help to provide potential innovative design solutions to both the physical and economic devastation. Through the scope of open space, we have identified the potential opportunities in both existing open space and business social space.

Our design goals discuss a way to use this open space opportunity to benefit the economics condition of Union Beach and aid in the establishment of a more resilient landscape. For our design project we have discussed a method for offering something different than what is offered on Route 36 (franchises, chains, etc). Union Beach, being home to the "mom and pop shop" and a close-knit community, should embrace that same innovative culture throughout the entire design of its commercial, mixed-use zone. This poses a great opportunity for some of the strategies applied in this research.

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Figure 1

Figure 2

Figure 3

Revitalization: Downtown Renewal in Small Communities

ALEXANDRA DURO

Anthropologist Anthony F.C. Wallace describes revitalization as a movement. He states that it is "a deliberate, organized, conscious effort by members of a society to construct a more satisfying culture" (Revitalization Movement Par. 1). Put into the context of Landscape Architecture and design, revitalization is defined as the renewal or redevelopment of a community with the purpose of making that community active and prominent. From anthropologists to experts in downtown redevelopment, real estate, finance, and strategic planning, both spectrums describe revitalization as a community effort. One of the most popular kinds of revitalization is the renewal or redevelopment of large and small city downtowns. "'Downtowns in large and small American cities are likely to share a number of common characteristics'. 'Regardless of city size, downtowns are likely to be situated very close to the historic beginnings of the city, often next to a body of water'" (Burayidi, Pg. 10). Small cities usually consist of a population under one hundred thousand individuals, but in some cases small cities have populations as low as twenty five thousand residents or less. Being that Union Beach (our project site) is a small city with a population of six thousand two hundred forty five individuals, my concentration will be directed towards the revitalization of small city downtown areas, which like Union Beach, is located to a body of water.

"Though every downtown is different that are still common revitalization lessons that can be applied anywhere" (Leinberger 2005). First one must note the features that set small city downtowns as a separate entity from large city downtowns. Small city downtowns are more of a human scale rather than a diminutive scale like downtown areas of large cities. The sky-scrapper infrastructure is not implemented in a small city downtown area. They also lack the large amounts of people on the sidewalks during prime hours of the day. In a small city downtown distances between destinations (within that downtown area) are easy to get to on foot. "Small city downtowns are not plagued with some of the problems that confront larger cities" (Burayidi, Pg. 11). For example, small city downtown areas do not have to deal with high amounts of vehicular traffic, as well as high levels of crime. Those problems relatively do not occur in smaller cities. Furthermore, large city downtown areas are usually dominated by a "corporate presence" both in terms of physical structures (hotels, office, buildings) and economic influence, which not common in small cities. Most small cities lack the large "signature" that are usually key components of larger city downtowns as well. The signature projects are usually identified as stadiums, indoor shopping centers, convention center, and/or mixed-use centers that act as development anchors. Retail structure in small cities differ in that they are dominated by local independents. Regional and national chains or franchises are not interested in placing one of their facilities in a small city downtown area due to the reduced market area. A lot of these small city downtown areas used to have department stores but due to economic reasons most have gone out of business and the idea of how to reuse vacant department stores continues to be a challenge in many small cities. (Burayidi, Pg. 11)

Another difference that sets small downtown areas as different entities from large downtown areas is that usually a large city is separate into portions also knows as districts (financial district, historic quarter, entertainment district, civic center area, etc.) due to geographic size of the city. Each of these districts function as separate entities in regards to function, character and feel. One has to also take into account that unlike a large cities, when dealing with a small city downtown area many small city downtowns are closely connected to other residential neighborhoods. The transition or distance between these small city downtowns are usually within an easy walking distance where downtown residents and consumers may reside. The infrastructure in these downtown areas are also more likely to contain or possess a higher percentage of historic buildings than in larger cities. New development is one of the most demanding needs for a large city, which leads to the demolition of older structures. This did not happen in small cities and it has in larger cities over the past few decades mostly for economic reasons. "These notable differences between downtowns of large and small cities dictate that a targeted set of principles be developed

for successful downtown development in small cities" (Burayidi, Pg. 12). Most of these principles were created years, if not decades ago, by professionals in the field that have seen the decline of small city downtown areas. Most decline of small downtown areas took decades to occur. Data shows that this decline began during the post-World War II decades as a result of the rising popularity of the private automobile, massive public expenditures into highways, and rapid suburbanization.

Editor Michael A. Burayidi lists eight principles on how to create a successful downtown development in small cities. His first principle is the importance of a strong private/public partnership within your small city. For example, "a strong organization of downtown interests which includes linkages with government agencies and other organizations, is one of the four tenants of the Main Street Approach; the other three tenants are design that enhances visual qualities and historic architecture, promotions and marketing, and economic restructuring and diversification" (Burayidi, Pg. 13). The Main Street Approach is an approach that has ranked as the most successful amongst other sixteen downtown development strategies. In other words the combining of both private and public partnerships have to be cohesive. Not only does the actual placement of this infrastructure matter but so does the architectural appearance.

The second principle is to develop a vision/ plan for the downtown area. "A vision of what the community would like to downtown to be functionally, physically, socially, economically" (Burayidi, Pg. 13). This step is a critical principal in the process of creating a successful revitalization in a small downtown city. In order to reach a consensus of the most desirable direction for a downtown area to proceed, the visioning process should include the community as a whole. This means that business owners, property owners, customers, workers, residents, government officials, institutional representatives should all be present to discuss and choose the vision/plan for the downtown area. It is advisable to extend the vision process to outside communities as well because there opinion and or interest may help make this a community-wide vision for downtown.

The third principle is that the downtown area should be multifunctional. Downtowns that are described the "healthiest" are those that have a wide range of interests for all the different people in the community and neighboring communities at varied times of the day and the week. Two of the most common functions in the downtown area are employment and shopping/ services. The other functions that also occur in downtown compliment these two functions as soon as this commercial orientation is put into its designated place might be, which goes back to the vision/plan for that specific downtown area. "In recent years, however, many downtowns have recognized the advantages of having more people actually live downtown, thereby providing a human presence throughout the week and a market for downtown businesses" (Burayidi, Pg. 15) It is because of this that we now have mixed-use buildings even in small downtown areas. The ground floor still remains that commercial space but the floors on top (depending on how high you can build) is for residential use. A successful downtown area is one that always has human presence.

The fourth principle is to take advantage of the downtown's heritage. The preservation of older buildings is highly important to the city's collective history, evolution, and memory. It is the old buildings that are the most significant feature for a historical successful downtown area. "'There are also strong economic arguments supporting the preservation over new construction'. 'It is more labor intensive, thus keeping more money within the community; it can attract tourism dollars into the city; it is often less costly and disruptive; and it takes advantage of already built infrastructure'" (Burayidi, Pg. 16). It is through the preservation of the downtown's heritage and restoration of its buildings that one can create a more satisfying culture.

The fifth principle is the link of the downtown area to the waterfront. As mentioned earlier a high percentage of small city downtowns are located on the water which without a doubt play a huge part in the community. "People are naturally attracted to water, and the presence of a body of water serves to heighten one's sense of place" (Burayidi, Pg. 16). A waterfront is now considered an amenity and it is an amenity that newly constructed commercials structures do not have. The survey the Burayidi conducted concluded that small cities with waterfronts were stated to be the second most attractive asset possessed by downtowns and waterfront development was the third most successful strategy.

The sixth principle is that the downtown area should be pedestrian-friendly. The most essential and important element of a downtown is its walkability. The downtown area will be successful if the prevalent environment is walkable. Individuals will often choose to walk if the pathways/sidewalks are comfortable, safe, captivating, and fun. If distances between destinations were designed to be pedestrian ways, it has to be clearly linked by a network of sidewalks and pathways. An example of this would be the core of a downtown with the riverfront or a nearby neighborhood.

The seventh principle is to establish a set of design guidelines. The design guidelines could also be called zoning codes. If a downtown area is being revitalized based on its history and given the importance of heritage, sense of place, and a pedestrian-friendly environment to a healthy downtown, the redevelopment of old structures and the construction of new buildings should be designed to integrate with the inherent character and fabric of the existing downtown. If the set of design guidelines are not put in place the fabric of buildings could cause damage to the visual and esthetics of the downtown area.

The last principle is to not overemphasize the importance of parking. A lot of city planner and designers stress the fact that parking has to be provided everywhere. "'In all but the most popular downtowns, spaces are available at any time of the day within one to two blocks of any destination'. 'Most of these spaces are not located directly in front of one's destination'. 'Therefore, the key usually is not to build more spaces but to more effectively manage the existing spaces and to better inform the public as to the whereabouts of available parking (e.g. directional signs, brochures, maps, newspaper advertisements)'" (Burayidi, Pg. 19). Basically you are encouraging users to walk to their destinations by not placing parking spaces or parking lots everywhere. Parking lots can cause a lot of damage to a downtown. The mainly interfere with pedestrian circulation and reduce downtown densities (where you could of put a build you now have a parking lot).

Moving on, I decided to visit the design approach of two shore communities in New Jersey, south of Union Beach. The shore communities are Long Branch (Pier Village) and Asbury Park. Both shore communities have a downtown as well as a waterfront, where they have recently revitalized if not yet still going through phasing of revitalization. I did research on each individual community in terms of its history and through research I also found what these shore communities used to be and what they are today. Asbury Park and Long Branch were also economically impact after post-World War II when highways were built and tourism started to move further south being that other locations were now accessible. People also started using cars more and the use of public transportation decreased. Long Branch was the beach "resort" township of the 18th century. It was also known as the "Hollywood" of the east in the 19th century. The waterfront had an enormous pier, perpendicular to the shore, which was the community's major asset (See Figure 1). It was in the 1950s that Long Branch lost a lot of tourists due to the opening of the Garden State

Highway. Decades later the more dilapidated parts of the resort town were condemned and redeveloped (See Figure 2). It was June 8, 1987 that a gas leak and strong winds burned down the entire pier. Master plans were made to rebuild but due to insurance issues the rebuilding on the waterfront was delayed over two decades. It was in 2001 when Long Branch was approved and funded for building that the remnants were torn down and the present Long Branch revitalization was built.

Long Branch today is what I would still call "Hollywood" of the east (See Figure 3). Long Branch had the downtown area or Main Street of Long Branch is connected at a perpendicular axis. The Main Street is Broadway (County Road 537) which consists of small individual shops and also includes a McDonalds. Long Branch also has a train station south of Broadway, which also has some commercial buildings in the surrounding area but then transitions back to residential land use. The waterfront is still the community's major asset. Developers built two massive mixed used buildings with commercial space at the bottom and residential space above (See Figure 4).

Figure 4

The pier out into the water was never rebuilt. The boardwalk was rebuilt running parallel along the beach at almost four miles long. Parking spaces were also added when the rebuilding of Long Branch started in 2001. In figure 5 is an aerial of present day Long Branch (Pier Village). I wanted to analyze the spatial arrangements of residential, commercial, and open space (Red = Mixed Use, Blue = Boardwalk, Yellow = Parking Lot, Green = Open Space, Orange = Transition between Downtown and Waterfront, Purple = Train Station, Dashed Red Line = Dominated Downtown Commercial Spaces).

My next case study was Asbury Park, which as mentioned above

Figure 5

is also a shore community. Again I did historical research on the town and Asbury Park was founded in 1871 by a New York City broom manufacturer James A. Bradley. Bradley bought five hundred acres for ninety thousand dollars, which would eventually become Asbury Park. In the 1920s the additions of the Paramount Theatre and the Convention Hall ushered in a new era of music and performing arts that still exists to this day (See Figure 6).

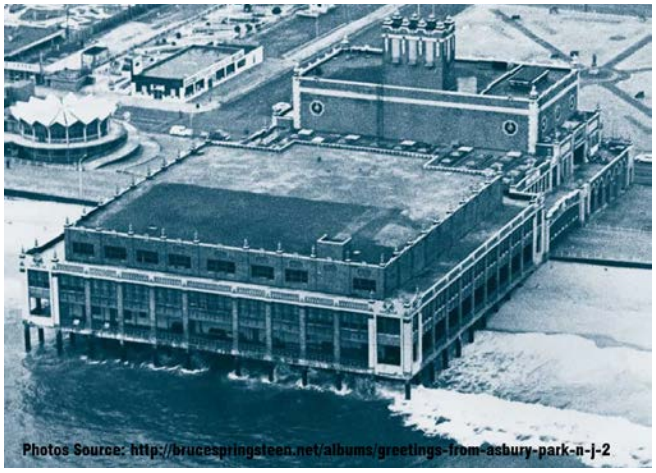

Figure 6

Over six hundred thousand people vacationed in Asbury Park annually (See Figure 7). Like Long Branch, due to the introduction of the Garden State Parkway and other amenities further south, tourists, businesses, and shoppers moved away from Asbury Park (See Figure 8). Asbury Park also had a

Figure 7

boardwalk parallel to the beach (Approximately half a mile long). In 1974 The Stony Pony opened its doors for first time, and even though the number of visitors coming to Asbury Park decreased, the unique entertainment culture still remained. It was in 2007 when a new chapter of Asbury Park's rich history began.

Figure 8

Present day Asbury Park has a population of 15,865 people in 1.6 sq. miles. The Main Street or downtown area on their existing street called Main Street. There train station is also located on their Main Street. If you look at Figure 8 you can see that the Main Street runs parallel to the waterfront of Asbury Park. In analyzing the aerial and looking at perpendicular streets to Main Street, Asbury Avenue and Cookman Avenue seems to be the most used streets to go to the waterfront. The Asbury Park renewal or restoration plan began in 2007 (as mentioned above). Infrastructure was restored for character and cultural fabric but to also make them accessible to the public (See Figure 9).

Figure 9

New businesses opened in buildings that once where owned by other owner, for example the Salt Water Beach Café opened in an existing cylindrical shaped building on the boardwalk (See Figure 10). See Figure 11 for an aerial of Asbury Park today (Red=Mixed-Use, Blue = Boardwalk, Yellow = Parking Lot, Green = Open Space, Orange = Transition between Downtown and Waterfront, Purple = Train Station, Dashed Red Line = Dominated Downtown Commercial Spaces).

Figure 10

After studying the eight principles that make a successful downtown revitalization and comparing those principles to both the Long Branch and Asbury Park case studies, it is plausible that Long Branch did not consider many of the principles mentioned in the beginning of the paper. If Long Branch in the past was considered to be the "Hollywood" of the east, the design implemented definitely looks "Hollywood". Long Branch did not have four story high buildings at its shore front blocking views from residences behind. I do not necessarily see Long Branch being revitalized based on its history or existing character/ fabric, but just constructed for means to increase economic value. From looking at the images and the aerial you can also conclude that because of surface parking spaces density was decreased. Lastly, if the mixed-use buildings were not built four stories high I would not see a disconnection between the downtown area and the waterfront, but the size of the buildings spatially want to create two separate entities or districts

Figure 11

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Biomimicry: Looking to Nature for Sustainable Solutions

ARI SALANT

http://mw2.google.com/mw-earth-vectordb/outreach/media/appvoices/photos/255114867_81cfc1ccc7.jpg

Fig. 1

http://www.calera.com/site/beneficial-reuse-of-co2/process.html

Fig. 2

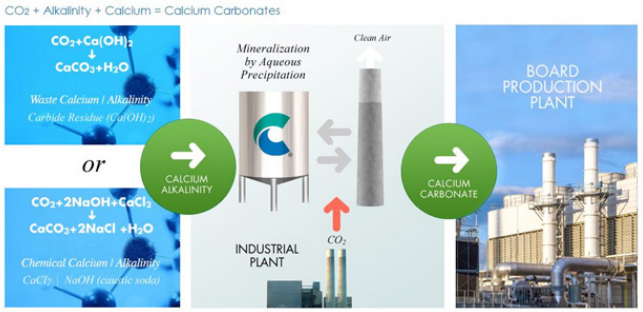

Fig. 3

Biomimicry, in its simplest terms, means to imitate life. So biomimicry can be the creation of a bioswale, constructed wetland, and a native perennial wheat field. But with today's technology, we are also able to see how nature is working on the nano scale, to see novel adaptations in organisms that were once invisible to the naked eye. We are now able to observe the skin of sharks to understand why they are resistant to bacterial growth, or the micro-topography of a leaf and understand what makes it repel particulates and water, and it was through the observation and study of these examples mentioned, by biologists and designers, that allowed for products to be developed that help manage and conserve water, and create surfaces in hospitals that help stop the spread of disease. have already been applied to design problems with products geared towards sustainability being the result. These creatures don't use caustic chemicals or detergents to survive in their habitats, or burn any amounts of fossil fuels for the creation of these materials, so it would only make sense to want to look closer at these species, and all species on earth, in order to identify their unique characteristics, adaptations, and behaviors and attempt to apply them to problems we are facing today due to the use of these chemicals and reliance on fossil fuels for energy.

Looking to nature for environmentally sustainable solutions in housing and open space is an emerging trend in the wake of the realization that drastic climate change is, more than likely, being caused by the excessive burning of fossil fuels to meet our energy demands. Even with stricter laws governing carbon output from coal plants, they are still the largest producers of CO2 in the United States, producing 44% of our electricity, while also being the dirtiest of the fossil fuels to burn. The mining, transportation, and storage of coal, levels mountains in the process, destroying the land, air and water. Burning coal causes smog, soot, acid rain, global warming, and toxic air emissions. Ash, sludge, toxic chemicals, and waste heat are by-products from the production of coal that end contaminating our land and waterways. (1)(Fig. 1)

There are many reasons why a designer would look to nature for inspiration while trying to come up with a solution to a problem, especially one concerning sustainability. Natures systems produce little to no waste, and designers have looked at some of the problems we are facing and have come up with some ways in which nature would take what we would traditionally consider waste, and instead, create something new out of it. An example of this would be in the cement industry. As stewards of the land, it is our responsibility to make sure the products we use in our designs are as 'green' as the spaces we are creating, and concrete is a highly used product in our industry. "Although the cement industry used only one-quarter of one percent of total U.S. energy, it is the most energy-intensive of all manufacturing industries, with a share of national energy use roughly 10 times its share of the nation's gross outputs of goods and services" (2a). In 1989 was responsible for 2.4% of the global CO2 emmisions(2), and has since doubled in the past 25 years and is now responsible for 5% of the global CO2 emissions(3). A cement manufacturing company by the name of Calera has taken inspiration from marine organisms and how they form their shells. "The heart of the Calera process is the formation of novel, metastable calcium and magnesium carbonate and bicarbonate minerals, similar to those found in the skeletons of marine animals and plants, by capturing carbon dioxide from flue gas and converting the gas to stable solid minerals…"(4) . The process of creating Calera Cement sequesters half a ton of CO2 in its creation, as opposed to the traditional one ton of CO2 emissions released for every one ton of cement produced. By utilizing both the high PH of water and the calcium found in industrial waste streams, Calera is able to process these chemicals capturing CO2 and converting it into a unique calcium carbonate cement(5)(fig. 2 & 3).

Designers all over the world are beginning to look

towards nature for solutions. Including how we may be able to eliminate our dependence on fossil fuels, or at least minimize our reliance on it. What many of these designers have come up with are unique ways in which individual buildings can harness their own energy, creating structures with multiple functions that act as more than just a shelter, but also as its own source of heating or even energy. Through varying means such as windmills implanted along grass hills, or replacing aluminum siding on houses with algae louvers, designers have begun to experiment with green walls, blurring the line between landscape and architecture. In Hamburg, Germany, a residential complex, being referred to as a Bio Intelligent Quotient (B.I.Q.) building, was constructed which has a façade of glass louvers housing algae farms(fig. 4). These algae farms, which can also be looked at as "transparent containers which create a controlled environment for photosynthesis", along with solar panels on the roof, are used to produce the energy for the building. "Algae are particularly well suited for this, as they produce up to five times as much biomass per hectare as terrestrial plants and contain many oils that can be used for energy(6)." The algae's diet consists of liquid nutrients and CO2, and each louver has pressurized air pumped into it, promoting algae growth and also to help aid in the prevention of rot. The only thing the algae has to do is be allowed to grow, and with these panels being placed on the outside of the building, these algae are being exposed to maximum sunlight resulting in photosyntheses. With a diet intended for fast growth and optimal sunlight exposure, the optimal habitat for algae has been achieved.

"The algae multiplies in regular cycles until it is able to be harvested", once the algae is harvested, it is separated from the rest of the algae as a dark green pulp. It is then taken to an external room, away from the housing complex itself, where the algae is allowed to ferment and produce biogas, this biogas is then burned as a fuel to heat and cool the building(7). Even more amazing is that these panels serve a multipurpose role, including creating the habitat for the algae to grow in, these panels also absorb excess light not utilized by the algae, which can be directly used for heating water and the building itself, or it can be stored in the ground "Using borehole heat exchangers – 80 metre-deep holes filled with brine. This remarkably sustainable energy concept is therefore capable of creating a cycle of solar thermal energy, geothermal energy, a condensing boiler, local heat, and the capture of biomass using the bio-reactor façade".

This type of architecture seems like the vision of the future for our homes and work places, but it is important to remember there are other ways in which cities use energy which is why it is important that we designate open space to the creation of energy. And designers have been coming up with solutions for a more sustainable form of energy when it comes to larger quantities needing to be distributed. A researcher from CalTech, John Dabiri, has looked towards schooling fish when it comes to creating energy on a larger scale, while keeping the efficiency of our open spaces high. A school of fish creates a large amount of turbulence in the water, which is essentially the same thing that happens with our wind turbines. The wind passes through the turbine creating a vortex behind it, which is a huge problem for traditional wind turbines which require as little turbulence as possible in order to be as efficient as possible. It was through studying the movement of schools of fish that John Dabiri was able create a more efficient wind turbine. "Schools of fish swimming in the ocean have to contend with vortices and disturbances caused by the other fish," Dabiri told Sierra Magazine. "Some species use less energy to move from point A to point B in groups than when they're by themselves, because they are able to use these vortices to enhance their swimming performance(fig. 4)." By studying this behavior, Dabiri was able to conceive of a wind turbine capable of utilizing these vortices by creating a vertical turbine, 30' tall, with blades that resemble fins as opposed to giant airplane propellers. By catching the "updraft" of the vortex, it allows the turbine to be more efficient than a single traditional turbine. Because of this unique design, wind farms would be able to pack hundreds of these types of turbines into a space traditionally reserved for one(8).

With design solutions like these coming out onto the market, it is becoming increasingly more possible that our over reliance on fossil fuels can start to be alleviated and we can start using more sustainable and efficient ways to power our daily lives. By eliminating CO2 emissions from our cement production, reducing and even eliminating altogether CO2 from our homes and work places and replacing it instead with free energy, and utilizing our open space designated for energy harvesting in increasingly more efficient ways, it is becoming decidedly more easy to understand why we are looking to nature for sustainable solutions.

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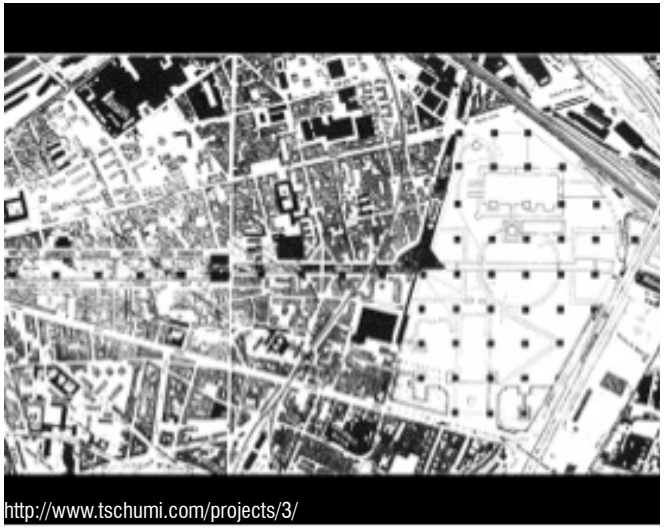

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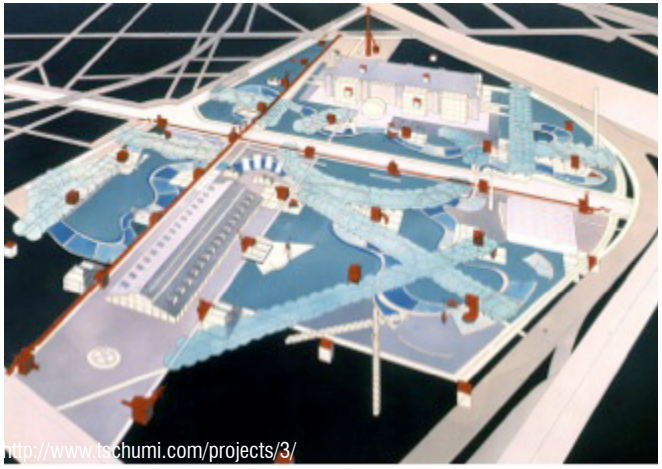

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Landscape Urbanism: What?

ALYSSA VIANI

We look to the future of design as this constant opportunity for new ideas, brilliant forms of articulating different experiential elements and incorporating the most fascinating concept for all designers the question, 'Why not?' Over the course of many years different styles of design have passed through the visual world of art, allowing our own population to be the guinea pigs of what our world can ultimately look like and function as. Throughout this paper you will be informed by some of the greatest designers and educators of our time that have serious inputs and opinions on the concept of Landscape Urbanism; you will read my personal outlook and the ways this design method is changing our world and I will also define this topic with three case studies that will clearly provide the evidence of this design method in our world today.

How do you define the landscape? How do you define infrastructure and architecture? What defines the context of urbanism in a city? Is there any type of conflation between all three of these clearly separate aspects of design? Is landscape urbanism the application of all of these design techniques combined into one concept? Who is the advocator of Landscape Urbanism? What makes up the 'urban surface'? How do you plan out a city? What defines a space? Is it openness? Accessibility? Public or private? Enclosed? Does infrastructure define how to plan out your spaces or does the landscape formulate the utilization of the spaces we inhabit? These are all questions that arise when trying to understand this concept of Landscape Urbanism.

There is no specific definition of this idea of Landscape Urbanism, which is why this is such a difficult topic to comprehend for the non-designer and even for the designer. There is much controversy from within the design world that makes this concept so difficult to pin point what actually makes this a design technique, what the boundaries are, and if this could possibly be the newest design method to plan out our urban cities. Through research, there is much discussion about the field of landscape architecture, architecture, urban design and planning and the so to speak, 'dumbing down' of the field of landscape architecture just in the sense that architects and designers feel that 'it's not too difficult to place a tree in a design'. James Corner writes, in The Landscape Urbanism Reader:

"Leading schools of landscape architecture have traditionally understood the scope of landscape as a model for urbanism, embracing large-scale organizational techniques alongside those of design, cultural expression, and ecological formation…. So it seems that certain elements within each of the design professions—architecture, landscape architecture, urban design, and planning – are moving toward a shared form of practice, for which the term landscape holds central significance, as described through the formulation landscape urbanism." (Corner, Terra Fluxus, p.23)

Corner discusses in his article Terra Fluxus, how the two terms 'landscape' and 'urbanism' are joined to be one practice but in retrospect the words are completely separate in meaning. As a population, people have the outlook that cities are planned out by their infrastructure and roads, but on the contrary, one of the greatest cities in the world, Manhattan, was planned based off the placement of Olmstead's Central Park. (Corner, Terra Fluxus, p. 24) People have this defined outlook on a city being driven by its buildings, high paced traffic, circulation and technological advancements that increase revenue; yet, with this topic of landscape urbanism, the process of the formation of a city is driven not by its buildings and roads, but by its landscape. There is such a distinct difference between architecture and landscape architecture in the sense of texture and structural differences. The cityscape drives this concrete idea that isn't necessarily moveable and yet somewhat unchanging with time, whereas landscape involves planting and nature and is more soft in a sense, with the ability to change with time. (I.e. successional plants, overgrowth, progressing with the landform, etc.)

In order to give a general understanding of the

concept, Charles Waldheim, otherwise known as the organizer of Landscape Urbanism defines it:

"Landscape Urbanism describes a disciplinary realignment currently underway in which landscape replaces architecture as the basic building block of contemporary urbanism. For many, across a range of disciplines, landscape has become both the lens through which the contemporary city is represented and the medium through which it is constructed." (Waldheim, Landscape As Urbanism, p. 11)

My general understanding of the concept is that developing vertical spaces is no longer the definitive character to a place. There is this idea that cities are determined by the spaces created by their infrastructure, but today that idea is failing terribly. Spaces are now being defined by the horizontal scape, the landscape. Why must buildings be the 'cookie cutters' of a city's planning strategy for open spaces? Why can't the landscape, the topology and form of the actual land be the guidelines for the development of a metropolis? Buildings cannot grow as plants do, they can only change and adapt based on reconstruction and standards. There is no shifting of a building that can lead to a good outcome. Unlike buildings, the landscape can form and adjust to change. Plants can be successional, developed green spaces can adapt to grade change and can form to their surroundings. Skyscrapers that have taken years to build and to sustain their structural strength cannot adjust to the factors of time by the drop of a dime; the landscape is timeless.

There is no excuse as to why a landscape cannot define spaces, when the whole concept behind a beautiful park or an English Garden is to experience and recognize spatial elements through nature and paths. It has been said that, "landscape has often traditionally been defined as the art of organizing horizontal surfaces", and I agree with the idea. (Allen, p. 124) There is a constant trend of the idea that the landscape is this horizontal surface that is defining space on its own and it can be the formula to create, develop circulation and spaces in large urban areas.

In the discussion of landscape urbanism and the process of formation of spaces, Stan Allen, an architect and theorist, states:

"By paying careful attention to these surface conditions, not only configuration but also materiality and performance – designers can activate space and produce urban effects without the weighty apparatus of traditional space making…Landscape is not only a formal model for urbanism today but… a model for process. Time is a fundamental variable in landscape work. Landscapes cannot be designed and controlled as a totality; they are instead scripted as scenarios projected into the future, allowed to grow and evolve over time." (Allen, p. 125)

Time is the main theoretical essence behind Landscape Urbanism. Time can work with or against design, and in the nature of this concept; Landscape Urbanism works and adjusts with time.

Moving through the theoretical recognition of the topic, Christopher Hight discusses the modes of operation of the landscape, otherwise referred to as the 'ethos' of the landscape. Hight develops this concept that if you combine architecture and urbanism with the contact of landscape the rejuvenation of all three fields will in fact occur. The ethos of landscape urbanisms is more so a concept that there is an assumption of norms and applications in order for a design to be termed, a "Landscape Urbanism" project. Hight states:

"Architecture traditionally operates through an ethics of stasis, truth, wholeness, and timelessness, urban planning operates via control, determinism, and hierarchy. In contrast, landscape design appears to offer an ethics of temporal, complexity and soft-control with a commensurable spatial and organizational repertoire…Landscape urbanism, if it is to be anything, must be understood as an attempt 'to constitute a kind of ethics [as] an aesthetics of existence'". (Hight, p. 24)

The trend of time and aesthetics of the landscape is consistent and valuable. Each of these prominent individuals have referred to the landscape in one way or another as a soft scape, aesthetically appealing, spatially adapting, or horizontally definitive of spaces. Landscape has shifted as the driving force of development today. But, there is much dispute with the concept of the English Garden, picturesque, value of the landscape.The argument has been developed for quite some time now that landscape was always utilized for aesthetics and the visual stimulation for the individuals accessing the spaces created; it was never a driving force for city planning or circulation for that matter. Circulation within the landscape spaces of course are taken into account of when creating picturesque gardens, but the idea that this garden developed a city has been unheard of for some.

Architecture has been looked at as the driving force for order within a city, not a beautiful picture of order. It is an understandable idea, and I grasp where the argument stems from; we are small individuals utilizing and inhabiting around these towering infrastructures that form and develop spaces for us to access. It is also completely evident that buildings have developed and created open spaces for future developments such as the idea of pocket parks. There is so much hardscape within cities today that it is even difficult to find spaces to scrounge up to create "green" areas. This idea of "green" space infuriates many, especially myself. Some planners have this idea instilled in their work ethic that if there is this many square feet of hardscape we must throw some form of green somewhere within that space just so it becomes more appealing. It is more so an outrage in the design world when there are individuals like that of Ian McHarg, who wrote the book Design With Nature. McHarg has been looked at and studied by many; he is a landscape architect and writer on regional planning using natural systems. McHarg takes his book through a different approach than many of the other architects that have been discussed previously in this paper, McHarg blatantly calls out in his introduction the understanding that the book was going to formulate an understanding of the "place of nature in man's world", and the book was going to develop, "a simple plan for man in nature". (McHarg, p. 1) McHarg takes the approach that nature is going to be constructed and developed by man, but it is not our world as individuals control it, as Nature is what has control and is constantly changing and adjusting to our planet's changes.

There's a lack for a better word in the idea that the imagination plays a large role in the concept of Landscape Urbanism. The idea of bringing back that ability to let your imagination take control of your experience and create these spatial recognitions within the spaces created for you as the user. There has been such a down play in the design world as time has passed today that doesn't allow the user to allow their imagination to take control of their experience and become creative with understanding and differentiating design aspects within a space. The utilization of the imagination is what allows an individual to create recognitions of emotions within a space that allows one to utilize those feelings when experiencing a space of similar context. James Corner states:

"In ideological terms, it posits that the city might be imagined, conceived and designed as if it is a landscape, and that landscape too may be reconsidered urbanistically…Landscape urbanisms suggests that models of landscape, ecology and geography offer alternative techniques for grappling with rampant urbanization around the world, and that landscape may no longer be simply a passive, scenic background but more the actual engine in shaping new forms of urban settlement."(Corner, Topos, p.26)

One of the greatest designs that predates the concept of Landscape Urbanism but speaks its vocabulary is the Parc de la Villete, in Paris, France. "Theoretically, Parc de la Villete possesses many traits of Landscape Urbanism, specifically in the metaphysical sense. These include layers, cosmology, and determinism, which justify the parka as a product of its context, and allow it to be molded over time to fulfill a function." ("Landscape Urbanism") The park was designed by Bernard


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in Paris, a 125 acre expanse previously occupied by the central slaughter houses and situated at the northeast corner of the city." ("Parc De La Villete") The background behind the park competition was to create an "urban park for the 21st century". ("Parc De La Villete")

The park consists of different programming ideas, proposes cultural and social aspects, recreational facilities, playgrounds, concerts, expos and workshops. La Villete was considered to be one of the largest building structures ever constructed that coincides with the landscape features. Tschumi didn't design the site as a park, but more so a new type of city within an actual city, that would develop no context to the old site, but develop a new site using a point-grid system. The post industrial site developed as a, "system of dispersed "points"—the red enameled steel follies that support different cultural and leisure activities—is superimposed on a system of lines that emphasizes movement through the park", which utilized the building infrastructure as the basis for these programs. ("Parc De La Villete")

Parc de la Villete was basically created as its own city within the city of Paris. The park demonstrates design aspects of the concept of Landscape Urbanism with the concept of layering different programs on top of each other, integrating the urban landscape that was previously overpowering the landscape and developing spaces through the landscape itself. According to James Corner, the "follies" aren't just seen as buildings, and more recently the landscape of the actual site has matured to an aesthetic appeal of overpowering nature over the infrastructure. (Corner, Terra Fluxus, p. 26)

Two other case studies that reflect the concept of Landscape Urbanism are competition entries for Fresh Kills Park deigned by James Corner and Downsview Park. Charles Waldheim speaks on the two designs:

"Downsview Park, located on the site of an underutilized military airbase in Toronto, and Fresh Kills, on the site of the world's largest landfill on Staten Island, New York, are representative of these trends and offer the most fully formed examples of landscape urbanism practices to date applied by the detritus of the industrial city."(Waldheim, Landscape As Urbanism, p.48)

Waldheim furthers his discussion on these two projects by stating that while both are extremely different projects, there is a conflation between the two, that being the emergent idea that designers will look at both of these parks and take notices that they are built environments, and both articulate well that the landscape is definitive medium through which the renovations of both post-industrial sites are established.

Fresh Kills Park consists of 2,200 acres of land, and will be the largest park developed in New York City. ("Freshkills Park") It is a post-industrial landscape that will be developed into five parks that involve ecological restoration and educational programming. Downsview Park works with the theme of landscape becoming the main tool to model a city. Corner and Allen worked with the idea of "adaptive emergence" where the landscape and the inhabitants of that landscape will circulate and develop the project in its own. Mau and Koolhaas/OMA developed the winning prize design, "Tree City". Tree City was a proposal that developed a design mechanism that focused its infrastructure based off of the planting of trees rather than the building of structure. OMA developed a successional design process in which the landscape is the "cookie cutter" in the design implementation and the spaces form based off that development. ("OMA- DOWNSVIEW-PARK")

In relation to these three case studies, brings us to the conclusion of this concept. Landscape Urbanism has taken a great toll on the concept of design for our future parks. We look to this idea of the landscape taking on topology and infrastructure and in essence defining spaces for the individual to access.


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“I’m Home”

Suhee Park-Jung

On the evening of October 29, 2012, Hurricane Sandy made landfall in southern New Jersey, with impacts felt across more than a dozen states; the storm battered the East Coast, particularly the densely-populated New York and New Jersey coasts, with heavy rain, strong winds, and record storm surges (fema.gov). Many businesses by the beach got affected and the tourism businesses are damaged and caused millions of dollars worth of damages in New Jersey alone. Many people have gotten injured and many people’s homes were damaged due to the hurricane. In Union Beach, many of the houses and the businesses got hit by the hurricane. Some places got demolished with the hurricane and some places are recovering from the damages. Despite the damages on their houses, many people would like to come to Union Beach and restart their lives there. So, why do people want to return to a place where they lost everything? If they have to start all over, why don’t they start at a place where it is much safer for them and their families to live and have to worry about flooding, hurricanes or storms less? Why does it have to be this place and why do they want to come back? This paper will discuss the psychology of why people get attached to their homes and why where you live means so much.

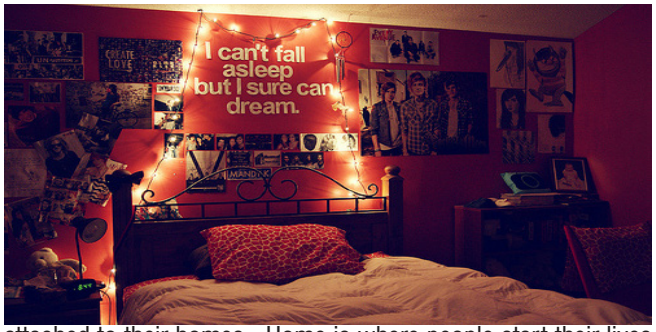
One of the reasons is because, simply, you pay for it and you take time and effort to make the house to be truly yours. Owning a house is not a easy thing. It takes a lot of time, money and responsibility. First, you have to make a commitment to do your homework to buy a house. House is a large investment and it is a path to long term wealth. Once you make a decision, you will need help from the professionals. You may want to hire a real estate agent, a lawyer and a place where you can borrow a mortgage loan. Then, you have to figure out how much you can put down and how much you can afford. When these things are all ready, then go shopping for a house! Spend enough time to look for a house that is going to be perfect for you and your family. Find your dream house because you are going to spend a lot of time there with family, friends and it is where you are going to have your personal space. The house have to meet the standards and the requirements for you to sign the contract and put the money down. Once you find a place and close the deal, you have that ownership and it is yours. You are paying for the house, you are responsible for it and it is your baby. You have to take care of the house and protect it by maybe getting an insurance and a maintenance plan. Another way to look at this is that since it takes so much time and money, people would rather want to come back to their old houses and neighborhoods to get help locally. It is a lot of work but it is definitely a quicker solution.

Many people rent their places because they might not be able to afford a house, they might travel a lot, they just think renting is easier or etc. In different cities, people have different mind-sets. For example, down in Somerset where I currently live, most people own the house because they live with their families, they have multiple cars so they need garages and they need space for their dogs and children to run around. In New Brunswick, you can buy a house but when someone buys a house, they are most likely landlords who will be renting out the rooms and most people living in New Brunswick rent rooms temporarily. So rather you are owning a house, or renting a house, you are still spending your time to find the place and paying for the place you call home.

In addition to spending time and a lot of money, people put efforts to take care of their homes. People fix, renovate and keep their houses safe and beautiful. By spending so much time, effort and money on taking care of their places, they make it theirs and they have a sense of pride with their homes.

Once you move in, you have to organize the place, decorate and make it into your own special space. We decorate our places with posters, pictures, christmas lights, your special collections, or stuffed animals. People paint walls, have gardens and take care of their lawns. We give our places, our spaces, the meaning, characteristics and essentially when you look at your house or someone’s house, the characteristics and personalities of the owner are. We give our places, our spaces, the meaning, characteristics and essentially when you look at your house or someone’s house, the characteristics and personalities of the owner are easily recognizable. In the article

called “The Psychology of Home,” Susan Clayton, an environmental psychologist, says that “for many people, their home is part of their self-definition, which is why we do things like decorate our houses and take care of our lawns. These large patches of vegetation serve little real purpose, but they are part of a public face people put on, displaying their home as an extension of themselves (theatlantic.com).” So, home is not just where you are, where you live and it is not just a structure; it is who you are.



attached to their homes. Home is where people start their lives and families. Babies born in the house, and spend their childhood in the house. It is where they first learned how to walk and had their birthday parties. It is where they invited their friends over and played and had their birthday parties every year. Home is where you have your thanksgiving dinner with your family and decorated your christmas trees every year. Julia Terruso is one of the writers for the philadelphia local news website and she shared her story of her family vacation house that was affected by the storm Sandy. Since 1921, generations of her family spent summer at their house which was two blocks from the ocean and one point she writes, “Growing up surrounded by the love of cousins, siblings, aunts and uncles, parents, grandparents, and great-grandparents . . . somehow that seeped into the foundation of that house all the way out through to the crazy shag rug-patterned linoleum floor and family-room carpet, it’s what makes the house feel like a family member itself (Philly.com).” The memories and the structure of the house play together to hold hold the memories and emotions.

Home is where you can walk around in the dark with your muscle memory. You can walk down the stairs and know when to stop without counting the stairs. You know where all the switches are and where you have the best views. You know the way your house smells, how it looks and how everything is arranged. You know every parts of the house and you are an expert in your home. Burger, professor of psychology at Santa Clara University, writes, “the loss of a home is more than monetary. Researchers find that most people develop a strong emotional attachment to their homes. As a result, suddenly losing your home can be especially traumatic. People whose homes are destroyed often compare the experience to losing a loved one (psychologytoday.com).”

concept to isolate. It seems to encompass a broad sphere of emotional experience, sensory perception, memory and feelings of nostalgia (sheltersa.wordpress.com). Home is where people feel safe and secured. Different people have different feelings and emotions for their homes but generally, they are safe at home. A magazine called “Simple Life,” asked their subscribers to describe their feelings and thoughts of their homes. The question was “What Does Home Mean to You?” and few of the responses are listed below:

•A warm bed that you can’t get out of in the morning, a tiny pink toothbrush in the bathroom, and the sound of my husband’s key in the door at the end of the day.

Dena Nilsen (Charlotte, North Carolina)

•The sensation of peace on a cozy, rainy Sunday; the feeling of relief when you pull into the driveway after a long trip; a quiet kiss on the head of a baby asleep in my lap; and the warmth of my husband’s arms. Home has been many places for me over the years, but its comforts are defined by simple, blissful moments like these.

Sarah Bernard (Somersworth, New Hampshire)

•Where I can be naked, both emotionally and physically.

Courie Helene Weiss (Marina Del Rey, California)

•Home isn’t a place; it’s a feeling.

Winter Skelton (Springfield, Missouri)

•A place that evokes a sigh of relief as I walk in the door.

Courtney Golden (Arlington, Virginia)

Sarah Bernard (Somersworth, New Hampshire)
•Where I can be naked, both emotionally and physically.
Courie Helene Weiss (Marina Del Rey, California)
•Home isn’t a place; it’s a feeling.
Winter Skelton (Springfield, Missouri)
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Winter Skelton (Springfield, Missouri)

•A place that evokes a sigh of relief as I walk in the door.

Courtney Golden (Arlington, Virginia)

Everyone had different answers for this question but everyone shows that home is where they feel the safest, where they are comfortable being who they are, where they can rest after a long day at work and where they can be happy with their family. Home is their comfort zone where they can relax and let go. Home provides the sense of relief, security and happiness.

My story of Home

When I first meet someone, most of the people I have met asked me where I was from. To me that is a difficult question because I have two answers and I do not know which answer they want. One of the answers could be, “I am from Korea” I was born and raised and graduated elementary school in Korea. With this answer they can figure out my ethnicity of me. Or the other answer is “I am from south jersey.” I went to middle school and high school in Cherry Hill and Marlton. But to me, my true home is my house in Korea. When I get homesick, I miss my house in Korea and not the ones in Cherry Hill or Marlton. Since I was 7, my family and I moved to a two bedroom apartment in a city called Kwang-Ju. We lived on the 11th floor and all my childhood memories revolve around my house and my neighborhood. My house is where I first learned how to use my chopsticks. It is where I got yelled at because I started writing with my left and apparently, when you write with your left hand , you are a devil. It is where I put my mom’s shoes and clothes on and had my first runway down the hall in front of my stuffed animals. We lived so high up that in our balcony, we

could see my elementary school on the right side, little forest on the left and on New Years, we could see the fireworks in our livingroom. There was a playground in front of our apartment and my friends and I were there every night and we always got in trouble for coming home late because we were too busy running around taking over the playground in the dark. I remember every single details of our neighborhood, my apartment and the layout of my house. I really know that our place in Korea is my true home when I dream at night. When I dream, all my friends and familiar faces are from America but my home appears to be the one in Korea. Even in my dream I feel alive and very safe when I am in my own childhood home. Clearly, I am still emotionally, mentally and physically attached to my home in Korea.

Conclusion

Union Beach is a family oriented community. Most of the people spend the most part of their lives in Union Beach. They grew up in the neighborhood, they raised their children, they have families and friends and it is a tight community. Everyone watches out for their neighbors and everyone is very friendly and open. It is a small community and everyone belongs there. Displaced residents who have lived in their community a long time are the most likely to return after a disaster; this is probably because, as with other relationships, it takes time to establish a sense of connection with a place (Burger).

In our studio, we have gathered the inventory information, we have talked to the residents in the community and now we are at the phase where we need to provide the designs and solutions for the resiliency and the future of Union Beach. For most people, home is more than the structure where they live (Burger). We are suggesting many ideas and many changes will be needed. We should not carelessly design the town and put more thoughts and considerations when we are working on our projects. We are changing what they are familiar with and we are basically changing their lives and memories.

bloomberg.com

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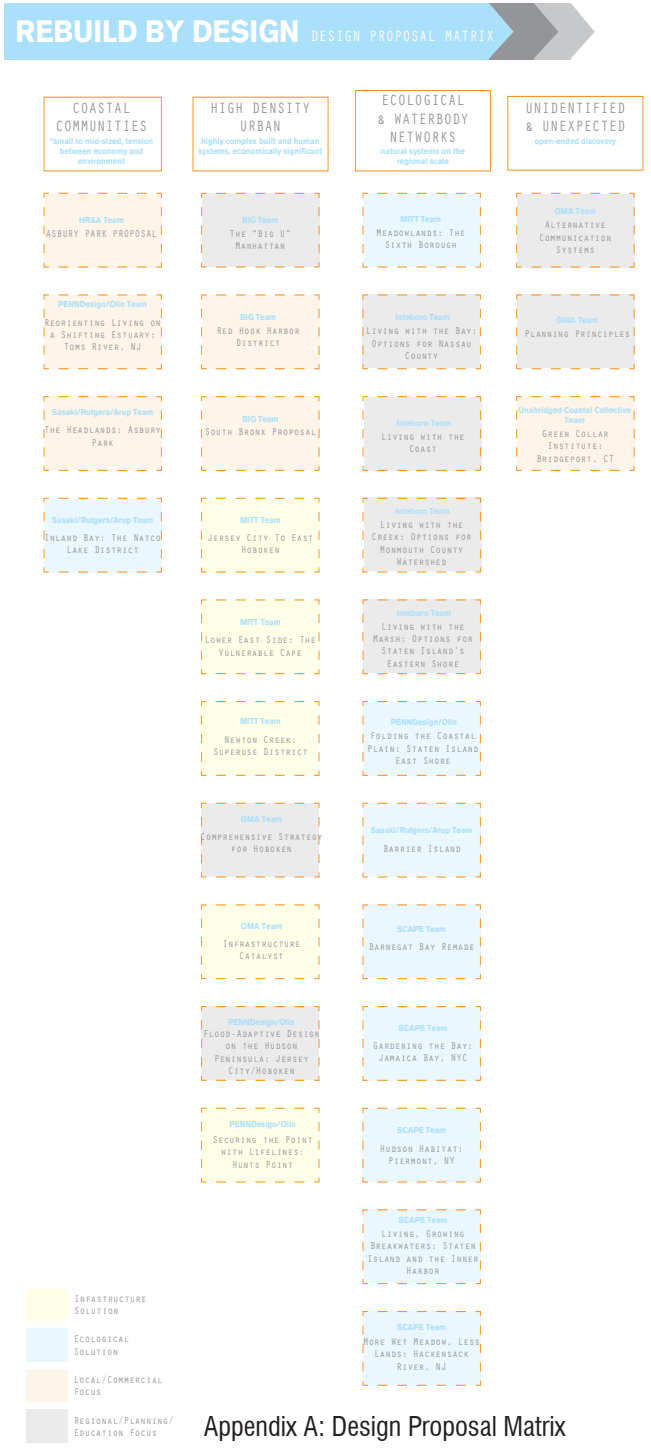


Appendix A: Design Proposal Matrix

Research By Design: An Analysis of the Rebuild By Design Competition

Jessie Woods

On the evening of October 29th, 2011, a record-breaking hurricane and post-tropical cyclone infamously known as "Superstorm Sandy" made landfall on the east coast. Destroying everything in its path, Sandy whipped down the coast and left devastated communities and lives in its wake- ranking itself as the second-costliest tropical cyclone on record (CNN NP). More than a year later, the Sandy affected region has made significant strides towards getting back on its feet, but many communities are still struggling.

The biggest post-Sandy challenge is not to recreate the existing, but to design an adaptive, resilient landscape that will mitigate this kind of damage in the face of future storms. In order to help achieve this goal, the Hurricane Sandy Rebuilding Task Force issued a call to action for thousands of expert professionals around the world to participate in "a multi-stage, regional design competition to promote resilience in the Sandy-affected region"- appropriately named Rebuild By Design (Rebuild By Design NP).

While the wrath of Sandy was felt in numerous countries and in twenty-four different states across our nation, Rebuild by Design is concentrating on the most severely damaged areas in the mid-Atlantic coastal region of Connecticut, Maryland, New Jersey, New York, and Rhode Island with particular attention to those that are susceptible to the same extent of damage in the future. Even though this narrowed down the geographic scope of the competition significantly, these five states are still extremely diverse and are compose of intricate systems. In order to tackle this challenge, four classifications were created: "coastal communities, high-density urban environments, ecological and waterbody networks, and a catch-all category of unidentified or unexpected focus" (Project Brief). Coastal communities are generally on the smaller, municipal scale and provide a unique challenge in that the environment and the economy are commonly at odds and require innovative, low-cost solutions that do not sacrifice the local identity. The high-density urban environment category encompasses areas that require a delicate balance between "built and human systems" that have economic reverberations that extend way beyond their boundaries (Project Brief). The ecological and waterbody networks typology encourages regional-scale systematic thoughts for improving the mutually dependent relationship correlation between human and ecological systems.

Resilience quickly became one of the most used terms when describing how to rebuild for the future. In the simplest form, resilience is "the physical property of a material that can return to its original shape or position after deformation that does not exceed its elastic limit" (Resiliency NP). But what does this mean in terms of design? Resilience has become a buzzword of sorts, like 'sustainable' and 'green', which gets thrown around in different contexts and meanings and as a result is sometimes lost in translation. When resiliency is the key theme a design aims to achieve, like in the Rebuild by Design competition, it is important to clearly define what the term means in this context. Rebuild by Design uses FEMA's National Disaster Recovery Framework's interpretation: "Resilience incorporates hazard mitigation and land use planning strategies; critical infrastructure; environmental and cultural resource protection; and sustainability practices to reconstruct the built environment an revitalize the economic, social, and natural environments" (FEMA NP). Resilient landscapes and communities accept the fact that natural disasters like Superstorm Sandy are no longer a rare occurrence and aim to adapt to this new reality by facilitating development and systems that allow a quick 'bounce-back' recovery. The top

5 vital characteristics for resilient systems were selected to set a baseline, standard definition for the competition:

1. Diversity: A wide range of resources allows for a wide range of responses to a stressor.
2. Redundancy: Resiliency is increased by making things 'double safe'- having a back-up for vital structures, elements, and processes.
3. Network Connectivity: A close network within "system nodes" facilitates the detection of change, but can also create larger adverse effects than normal if it fails.
4. Modularity: Individual parts of the whole can be self-sufficient if a stressor or disaster separates them from the overall network, and thus can remain function throughout a large event.
5. Adaptability: A key component of resiliency is the ability to learn from the past and adapt for the future.

In order to facilitate interdisciplinary communication and collaboration and produce and wide range of results, applicants were required to have worked in at least three of the eight designated fields of infrastructure engineering, landscape design, architecture, land-use planning, industrial design, community engagement, or communications design. The interest in Rebuild by Design's mission was widely received and reeled in approximately 140 team submissions from 15 different countries. While Hurricane Sandy made international news, it was very interesting to see in a quantifiable form the kind of worldwide attention and eagerness to help that was generated as a result of Rebuild by Design. The teams are as follows:

1. BIG Team
2. HR&A Advisors Inc. with Cooper Robertson and Partners
3. Inteboro Team
4. MIT+ZUS+URBANISTEN
5. OMA
6. PennDesign/OLIN
7. Sasaki/Rutgers/Arup
8. SCAPE/Landscape Architecture
9. Unabridged Coastal Collective
10. WXY/WEST 8

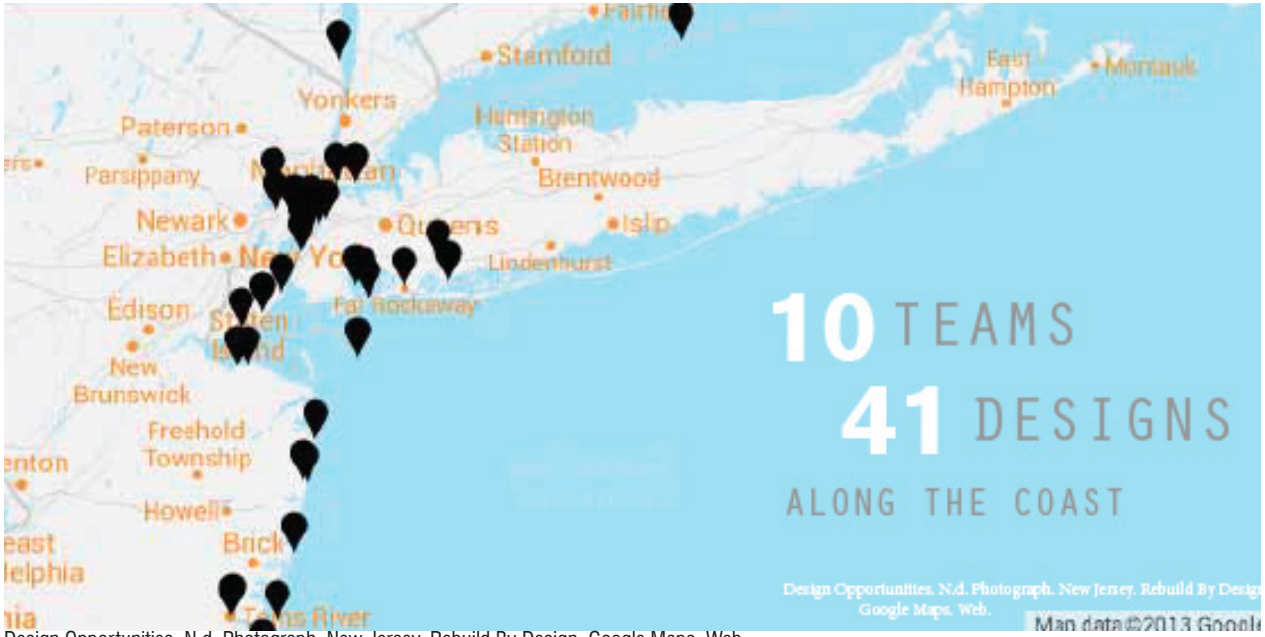
A more detailed description of each team composition and proposals are located in Appendix A and B.

On such a huge regional scale, what do you look into first? In the same systematic approach used to categorize the focus areas, the Hurricane Sandy Rebuilding Task Force created an inventory and analysis "starter toolkit". Similar to the inventory and analysis phase of our studio process, the starter toolkit exists as a baseline for the design teams to utilize the same basic standards of information from which to stem their designs. The inventory and analysis categories coincided almost exactly with ours: natural, environmental, cultural resources; economic and demographic trends; climate, flood risk/ vulnerability, and sea level rise hazards; housing and critical system infrastructure; land cover and topography; public health. Even at the large multi-firm level, it is still important for teams to utilize the same data so designs can be easily understood and comparisons can be made.

One of the stipulations of the second phase is the participation of the design teams in a series of public seminars, which I found to be one of the most interesting parts of the competition. It seems too often that the public involvement comes in at a design's terminal stages when they are presented with already developed, seemingly concrete plants to which they can analyze but cannot necessarily develop or change themselves. Rebuild by Design appears to be trying to emulate the concept of 'bottom-up' integrated planning through various public seminars and symposiums, but is it actually succeeding?

The answer to this question, thus far, is twofold. The open nature of the competition's publications and resource database is of great use to the public because the Hurricane Sandy Rebuilding Task Force concisely simplifies certain terms and concepts such as 'urban design' and 'managed retreat' into a universal language and lists definitions, key debates and questions, local context, proposed projects, and further reading for each. Frequently, information like this is not easily digestible, and sometimes deliberately so that any negatives or mistakes in the proposal are not detectable; we witnessed when the cumbersome and complicated Army Corps of Engineers' sea wall plan was lugged into studio. Rebuild by Design is not only giving the public the chance to educate themselves, but giving the chance to become well-versed enough in these topics to lessen the gap between the knowledge of expert professionals and the general public and be able to discuss designs on a more detailed level.

However, on a larger organizational level, the competition seemed to be slightly unaccommodating

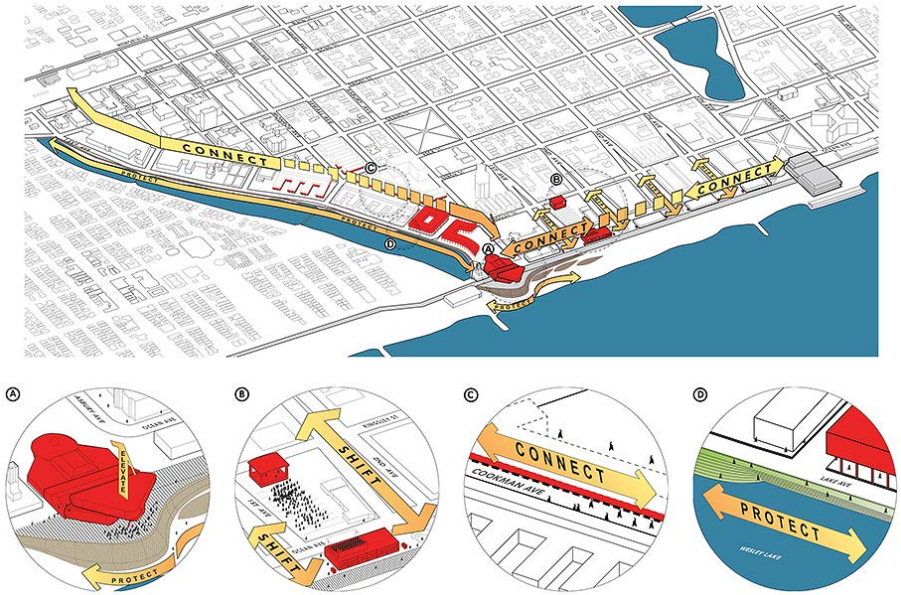


Design Opportunities. N.d. Photograph. New Jersey. Rebuild By Design. Google Maps. Web.

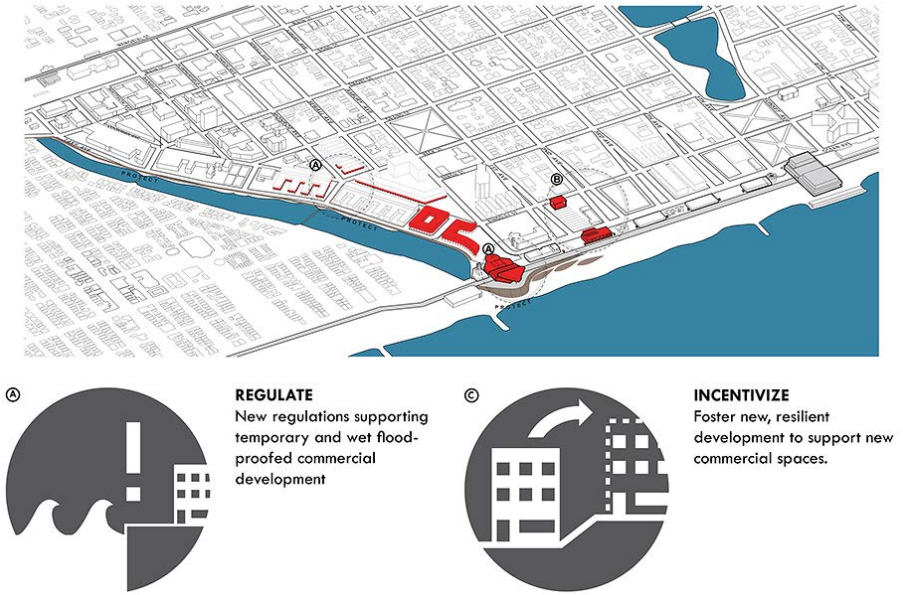
to smaller firms, individuals, and students not in select programs, which weeded out a lot of semi-qualified locals with a deep connection and understanding of certain areas. Additionally, the public receptions were introduced in the project brief to be a "facilitated, iterative community engagement processes with all levels of government" (Rebuild By Design Project Brief). When watching a live recording at one of the public receptions held at NJIT, 59 of 60 recorded minutes was the 10 design team representatives talking with a moderator and there is no recorded dialogue with the audience. The video concluded with encouraging words prompting guests to go online and leave their comments, which may end up not happening due to external factors. If there was a dialogue between the audience and the expert panel, I think it is equally as important to have this be as easily accessible as the other resources because now the questions, comments, and concerns of those who took the time to participate in this reception are not being heard. As a designer, especially in such personal scenarios like Hurricane Sandy, I think it is important to hear as many public opinions, questions, and concerns as possible and use them as catalysts for changes in the design as well as new ideas. I am interested to see how the teams move forth in the next phase of the competition in regards to public engagement and I plan to follow their processes to see how it is handled in the more in-depth phases of the competition.

In July of 2013, the initial proposals were tapered down into ten teams. In October 2013, each of the ten teams submitted three to five focus designs of 'key opportunities' they hope to further develop; this is the current stage of the competition. Although in the current stage they are at varying levels of detail, the key opportunity designs are valuable to look at as inspiration for our personal design process. Through the creation of a design proposal matrix (Appendix B), I quickly noticed that many of the submittals coincided with concepts and issues that my group was grappling with. The most related design opportunity was submitted by the HR&A Advisors, Inc. Team, whose mission statement is to "enhance commercial vibrancy and resiliency in the Sandy-affected region" (HR&A NP). HR&A plans to focus on Asbury Park, which is a similar challenge to Union Beach in that it has local, low sales and a seasonal economy. In order to generate an economic increase, revive, the community, and protect from the ever-changing climate, the team wants to maintain the current ground-level commercial spaces as floodable businesses and begin to elevate the new development. A connection from the boardwalk to an interior main street area mimics the project area and typology we have chosen for Union Beach along the Front Street and Union Avenue area. On a regulatory level, HR&A plans to redefine regulations to "support temporary and wet-proofed commercial development" (HR&A NP).

The overall process and structure of the competition was one of the most important things I took away from the competition. Because of the complexity of the problem posed by Rebuild by Design as well as the one posed for Union Beach, it is vital to break these ecological, economic, and social issues down into something that is digestible for a small scale design. In the next phase of studio design, we should strive to emulate this categorical and logical dissection of complex issues in Union Beach that will greatly facilitate the actual design. Rebuild by Design also drove home the fact that many, if not all, of the post-Sandy issues are facets of larger systems and networks and need to be treated as such to provide the highest level of resiliency.



Protective Solutions. N.d. Photograph. Asbury Park, NJ. Rebuild By Design. HR&A Advisors, Inc. Web. 7 Nov. 2013.



New Regulations. N.d. Photograph. Asbury Park, NJ. Rebuild By Design. HR&A Advisors, Inc. Web. 7 Nov. 2013.

Appendix B: Detailed Team List

Inteboro Team
Inteboro Partners with Apex; Bosch Slabbers; Center for Urban Pedagogy; David Rusk; Deltares; H+N+S Landscape Architects; IMG Rebel; NJIT Infrastructure Planning Program; Palmbout Urban Landscapes; Project Projects; and TU Delft.

MIT+ZUS+URBANISTEN
MIT+ZUS+URBANISTEN with Deltares; 75B; and Volker Infra Design.

OMA
Oma with Royal HaskoningDHV; Balmori Associates; and HR&A Advisors.

PennDesign/OLIN
Penn Design/OLIN with PennPraxis; HR&A Advisors; and eDesign Dynamics.

Sasaki/Rutgers/Arup
Sasaki Associates with Rutgers University and ARUP

SCAPE/Landscape Architecture
SCAPE/Landscape Architecture with Parsons Brinckerhoff; Dr. Phillip Orton/Stevens Institute of Technology; Ocean & Coastal Consultants; SeArc Ecological Consulting; LOT-EK, MTWTF;; The Harbor School; and Paul Greenberg.

Unabridged Coastal Collective
unabridged Architecture with Waggonner and Ball and the Mississippi State University Gulf Coast Community Design Studio.

WXY/WEST 8
Alan Blumberg, Davidson Laboratory, Stevens Institute; ARCADIS; Maxine Griffith; Kei Hayashi, BJH Advisors; Kate John Alder, Rutgers University; Yeju Choi, Nowhere Office; William Morrish, Parsons the New School for Design; Verisk Insurance Solutions; In dialogue with: Robert Young, Program for the Study of Developed Shorelines, Western Carolina University; Orrin Pilkey, Duke University; Mary Edna Fraser.

Boardwalk. N.d. Photograph. Asbury Park, NJ. Rebuild By Design. HR&A Advisors, Inc. Web. 7 Nov. 2013.

Cookman and Lake Avenue Corridor. N.d. Photograph. Asbury Park, NJ. Rebuild By Design. HR&A Advisors, Inc. Web. 7 Nov. 2013.

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Design

Chapter 3

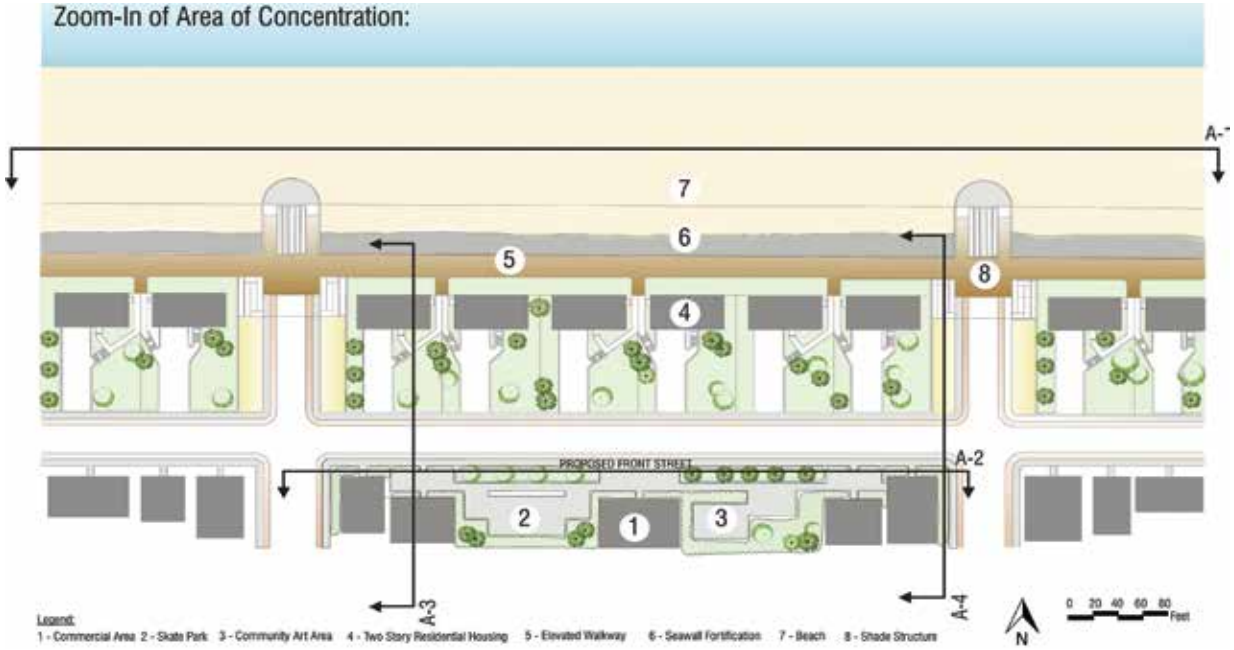
3.1 Seawall

The Living Sea Wall

Front Street, Union Beach, New Jersey

Alexandra Duro, Alyssa Viani, Gwen Heerschap, Brian Maher

Proposed Master Plan:



Concept Diagram:

A-2: Commercial Development & Open Space Section Elevation

A-1: Beach Front Section Elevation

Design Intent

With the rise in our planets sea level and continually changing climatic factors, Nature's unpredictable behavior poses a strong threat to land and residents of Union Beach, New Jersey. Action to protect this living landscape must be formed and the Living Wall, just may be, the guard to do so. The Living Wall will reduce the amount of flooding that Union Beach is vulnerable to while creating green, open space for healthy minds, bodies and ecosystems. To help ensure the resilience of the wall and town, a barrier island is proposed to be build off shore in the Raritan Bay. Not only will this barrier island break the action of future storm surge, it will create new habitats for New Jerseys treasured wildlife, add esthetic views and possibly, in the future, become a green space for humans to tread lightly upon. This new look at what a sea wall structure is, creates new places for residents' to gather and build community relationships and opens an opportunity for vegetation and habitat restoration.

Shade Structure

North View Perspective of Seawall Structure

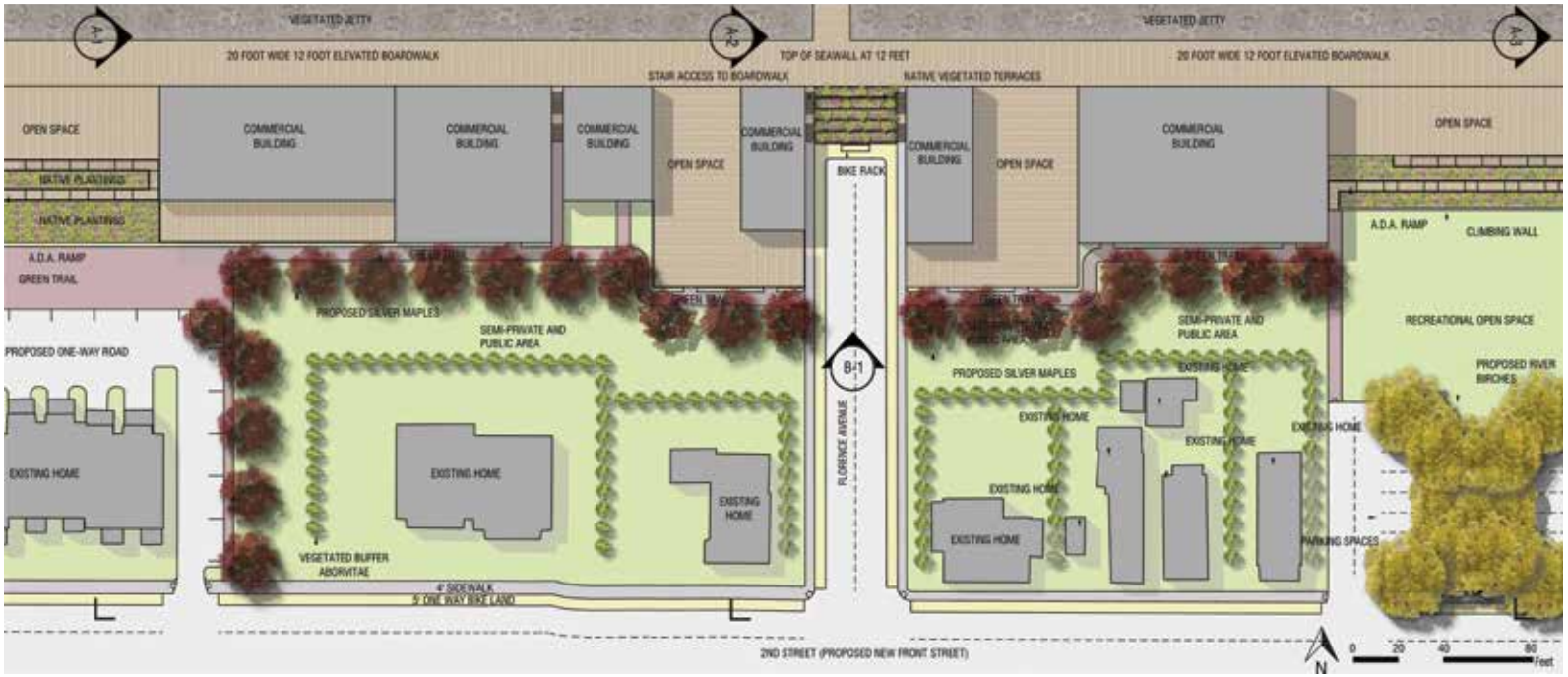
Outdoor Art Space

A-3: Commercial Development & Open Space Section

The Living Sea Wall

Front Street, Union Beach, New Jersey
Alexandra Duro

Proposed Master Plan:

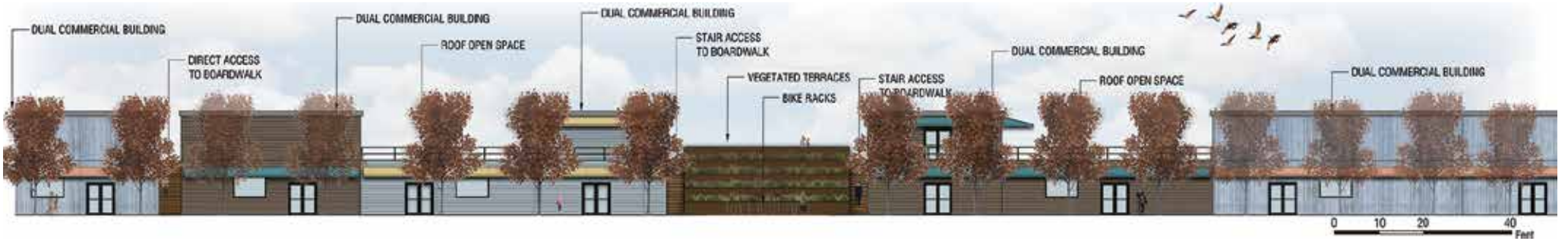


Design Intent:

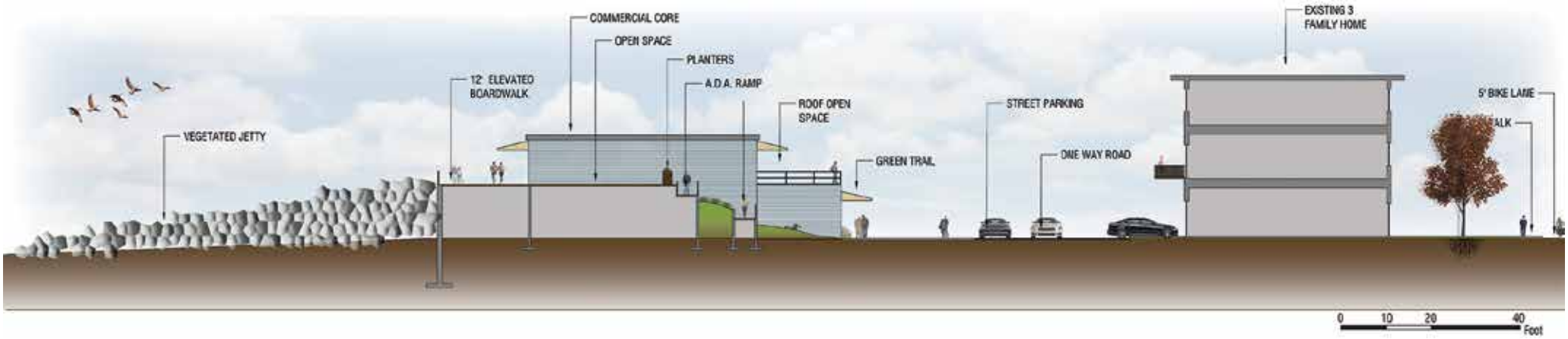
The project site is located on the waterfront of Union Beach (Front Street). A seawall was proposed to be placed half-way through the block with the intent of causing the least disturbance possible. The maximum height of the seawall is 12 Feet, which is where the 20 Foot boardwalk is located. Built into the back of the seawall are the commercial buildings and a series of open spaces. In order to place the commercial buildings, a set of methods were put in place that would integrate the existing homes as well as give them access to the green trail, the boardwalk, and views of the water (See diagram below). Vegetated buffers were put into place to give home owners privacy in their backyard. Silver Maple, which is a native tree to New Jersey, is used along the green trail. The facric and character of the commercial core are dressed to fit in with the existing traits of Union Beach.

Diagram Methods Used to Intergrate Exisitng Homes with the Proposed Commercial Seawall:

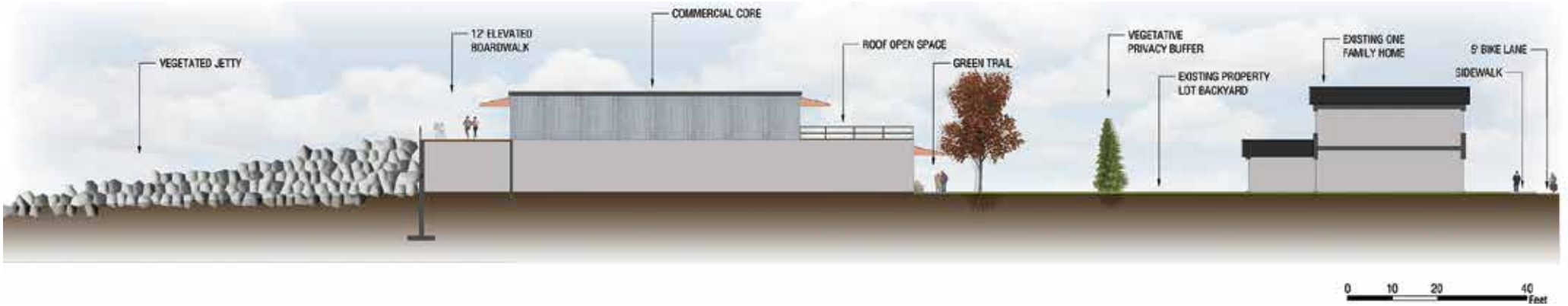
Elevation B-1: North Elevation of Green Trail Commercial Core:



Section A-1: East View of Proposed Restaurant and Existing Three Story Home:



Section A-2: East View Proposed Commercial Space and Existing One Story Home:

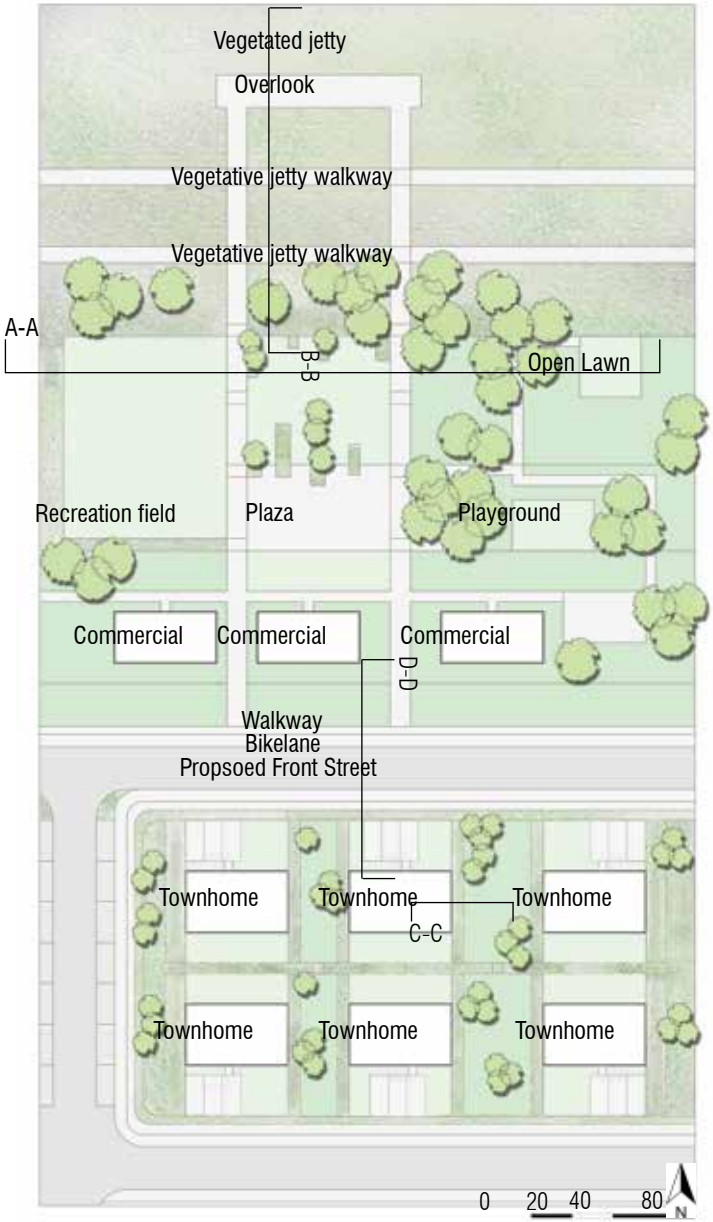


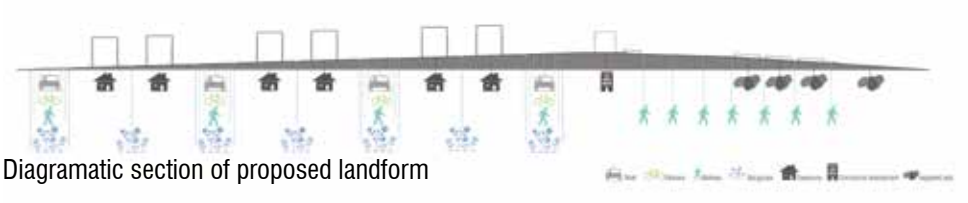
Section A-3: View of Commercial Space with the Recreational Area and the Climbing Wall:

The Living Sea Wall

Union Beach, New Jersey

Gwen Heerschap





Diagramatic section of proposed landform

Section A-A
Waterfront open space

0 10 20 40

Section B-B
Vegetated jetty walkway

0 10 20 40

Section C-C
Greenway between townhomes

0 10 20 40

Section D-D
Front Street

0 10 20 40

In the design of the Living Wall, revitalizing the resiliency of Union Beach was explored through the construction of a sea wall. The focus in this design is to build a structurally sound system that will protect against future storm surge and sea level while enabling residents to interact with the bay and experience its beautiful views and features. The visual and physical connection to the waterfront is maintained by gradually sloping the land, at an ADA percent, on all sides of the wall. This gradual slope allows the wall to be a living system that residences and businesses can be built upon and provides additional greenways and a large waterfront park. The diagramtic section shows the proposed landform and its realtionship to homes, businesses, circualtion patterns, rain gardens and the vegetated jetty waterfont park.

Perspective looking down vegetated jetty walkway

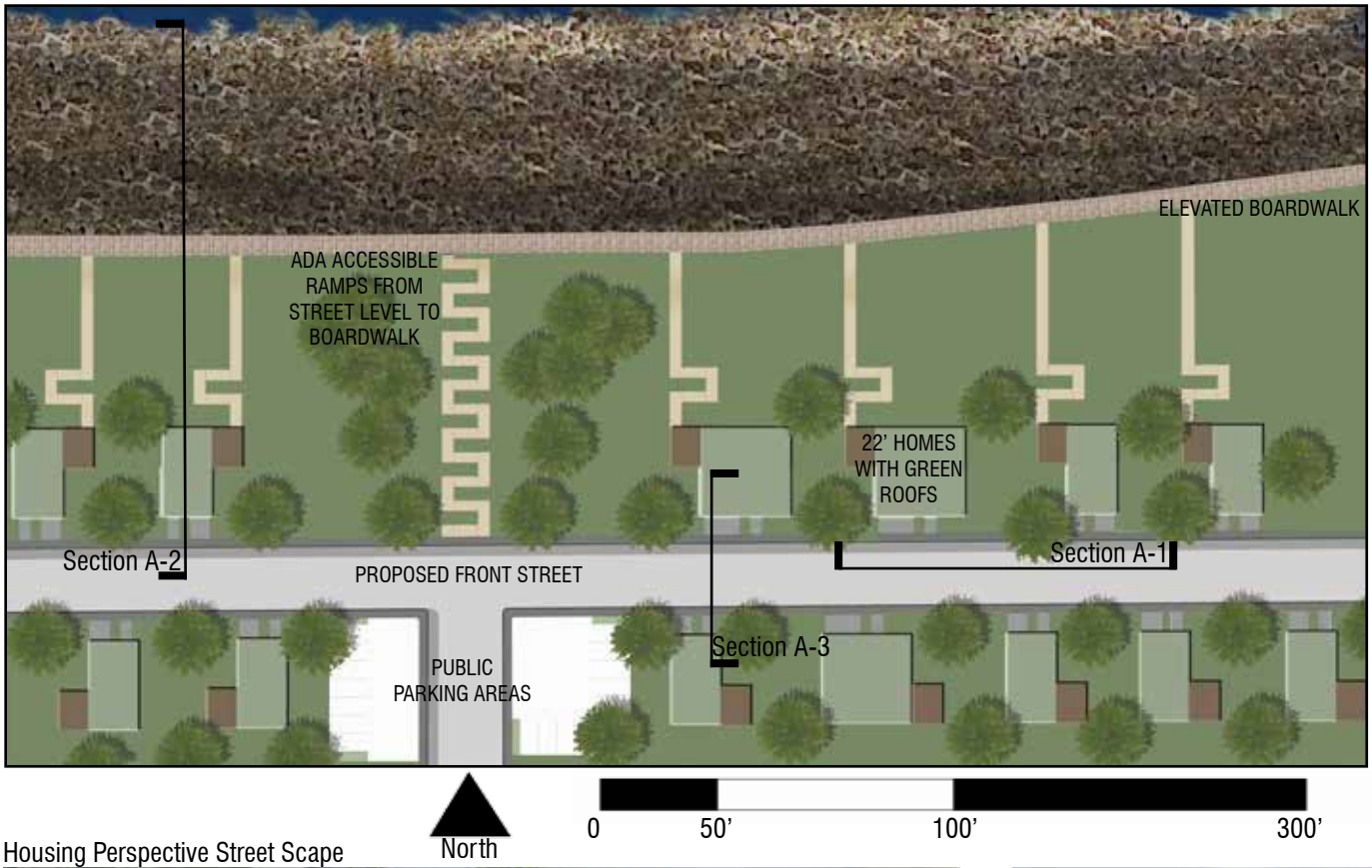
Perspective looking from vegetated walkway toward waterfront open space and commercial development

Perspective looking toward plaza and recreation field

The Living Sea Wall

Front Street, Union Beach, New Jersey

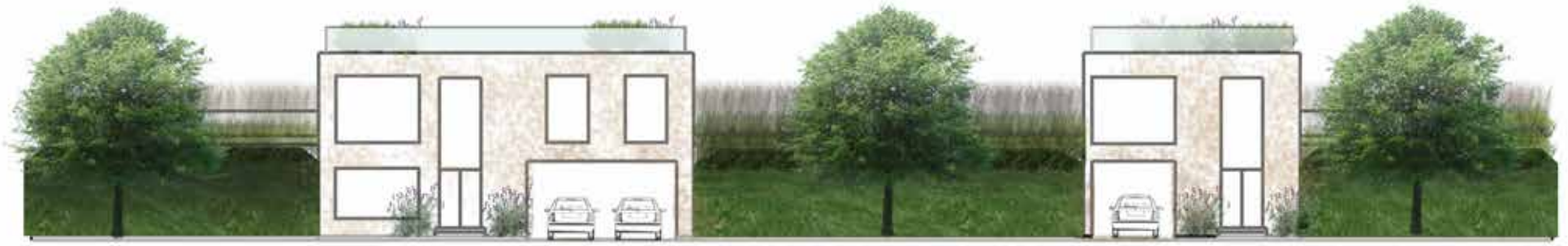
Alyssa Viani



It has come to our attention that sea level rise is an evident issue that is affecting us now and will continue to in the future. There is a concern amongst the shore community of Union Beach, about security and protection for the future; this is the driving force behind the design concept. This is not your ordinary "sea" wall you hear about. This 12' wall serves as a massive protection unit, yet serves as private living space built into the actual wall and public space by means of a usable boardwalk atop it. This structured, jetty rock, vegetative wall is designed for homeowners of Union Beach to utilize their town with a feeling of protection and security when in threat of future storms. In efforts to create a green community, usable spaces on each of the homes are designed as green roofs that are accessible. This is the proposed design of the "living" sea wall of Union Beach, NJ.

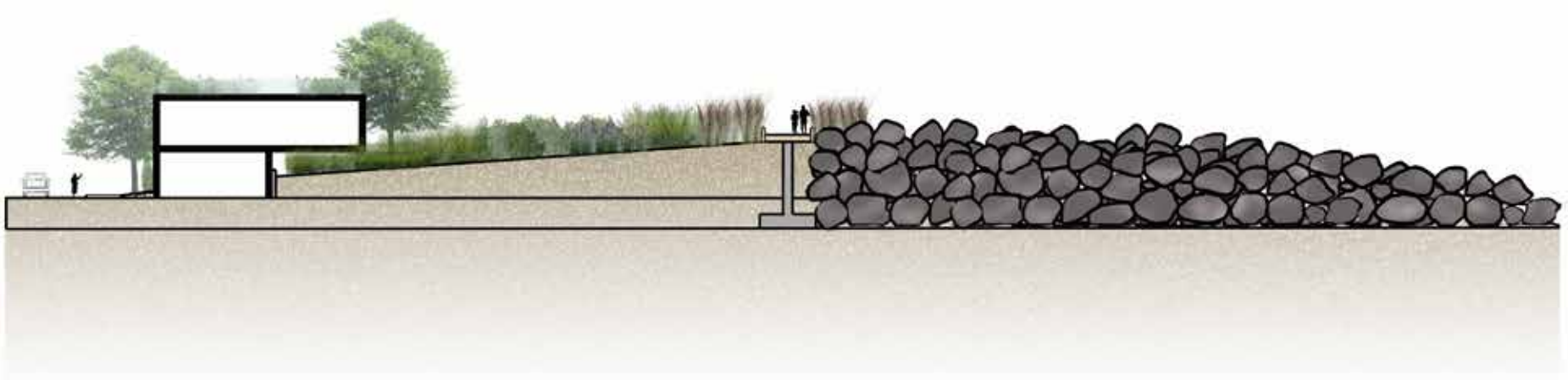
Housing Perspective Street Scape

Elevated Sea Wall Boardwalk Perspective



Section Elevation
Section A-1

0 5’ 20’ 50’



Beach Front & Housing
Section A-2

0 5’ 20’ 50’

Street View Housing
Section A-3

0 5’ 20’ 50’

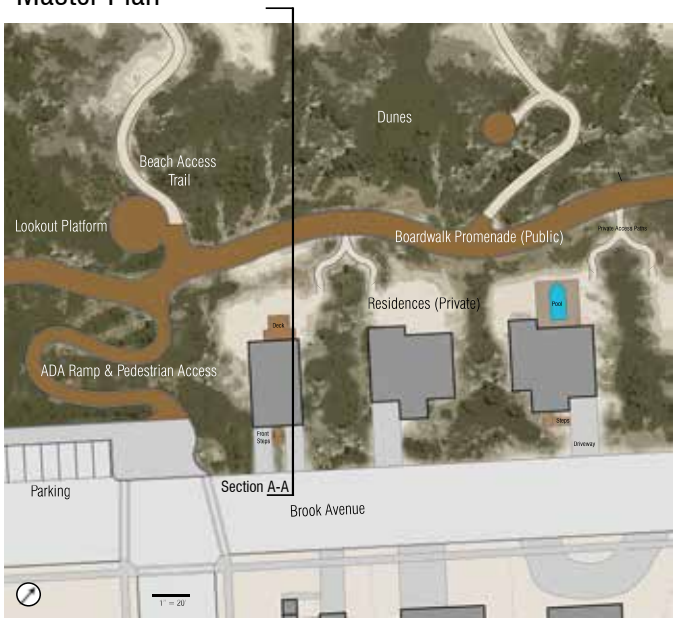
Each of the sections provided are to give a much better understanding to this “Living Sea Wall” design. After developing a 12’ sea wall that will be placed along the water-front where Front Street previously existed, providing a jetty rock beach front will allow for further protection from future storms. Each of the sections are provided to give a better understanding of what the feel of having a 12’ wall on the outskirts of the town would feel like on a personal level. Most sea walls develop a fortress idea that is extremely intimidating to the user and the eye. This vegetative, accessible sea wall gives Union Beach a different residential and public space look but keeps the consistent feeling of comfort and community is still evident with this redesign.

The Living Sea Wall

Brook Avenue, Union Beach, New Jersey

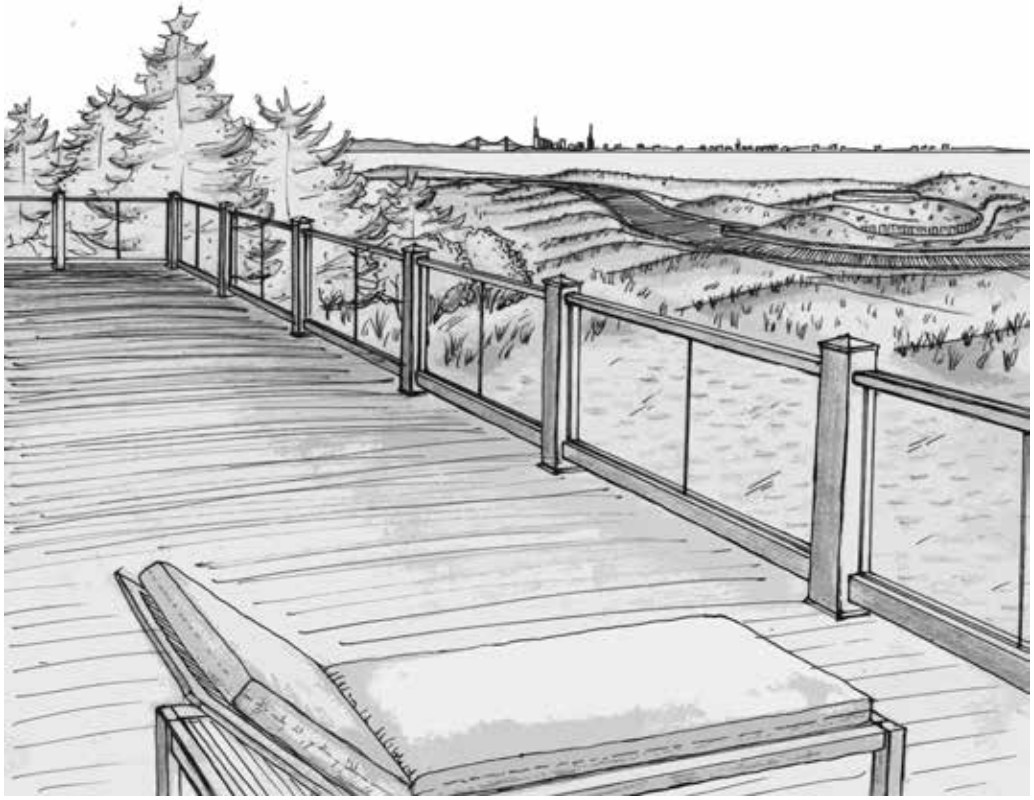
Brian Maher

Master Plan



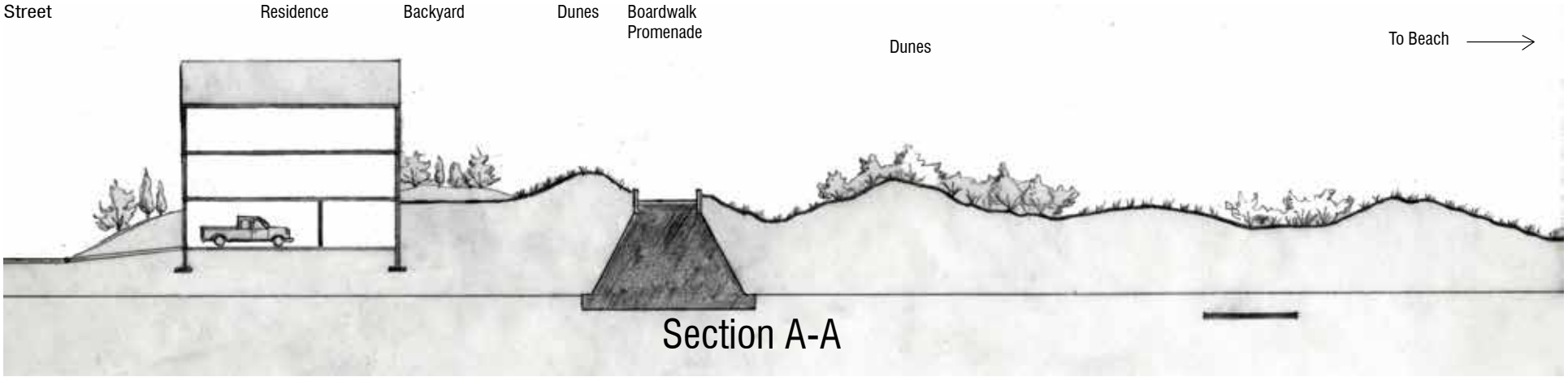
Circulation Diagram

The Brook Street site in Union Beach is a bayside dead-end block that was home to many of Union Beach. This block was completely devastated by Hurricane Sandy's powerful storm surge, leaving not one remaining home on the bay-facing side of the block and many others across the street in shambles or completely uncalled for. In this design, paralleling existing Brook Street, a soft seawall dune structure design was fused with a concrete hard seawall superstructure buried beneath the vegetated dune facade to protect from future storm surge and sea level rise while providing views of what looks like a natural landscape. Atop the hard seawall structure is a boardwalk promenade caps off the unsightly 20 foot high concrete superstructure with elegant concrete sitting walls that border each side of the boardwalk. Along the boardwalk are beach access paths with concealed lookout that expose you to breathtaking views of Raritan Bay and the New York City skyline and the Verrazano-Narrows Bridge.



Housing at the Brook Street site was replaced with large upscale, beach style homes built on top of the new implemented dune system and were derived from elevated homes in the Outer Banks of North Carolina; known for their resilience against hurricane storm surges. These homes have a below grade integrated garage accessed from current existing street level, with the first floor elevated above garage level. The first floor is level with the grade of the sandy backyard that reveals you into the new sublime landscape with million dollar views of the bay and the skyline. Beyond the backyard, private access trails lead you from the residences to the boardwalk promenade and to the beach.

Proposed Residences varying in size between 2000 and 4000 square feet are incorporated in the dune system with vegetation buffers providing privacy between homes.



Section A-A

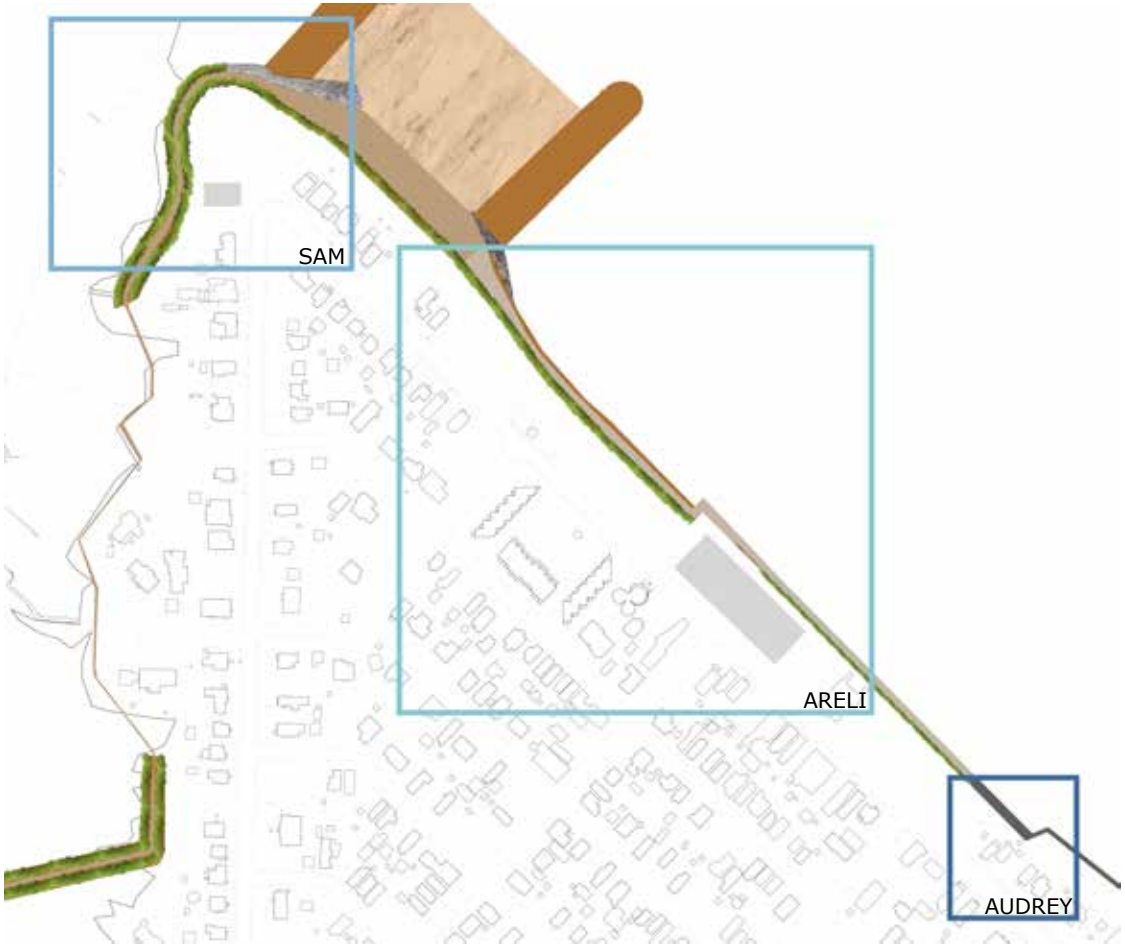
Left: Example of similar streetscape technique,
Figure Eight Island, North Carolina

Source: http://www.learnnc.org/lp/media/collections/cede/cedehcd18.jpg

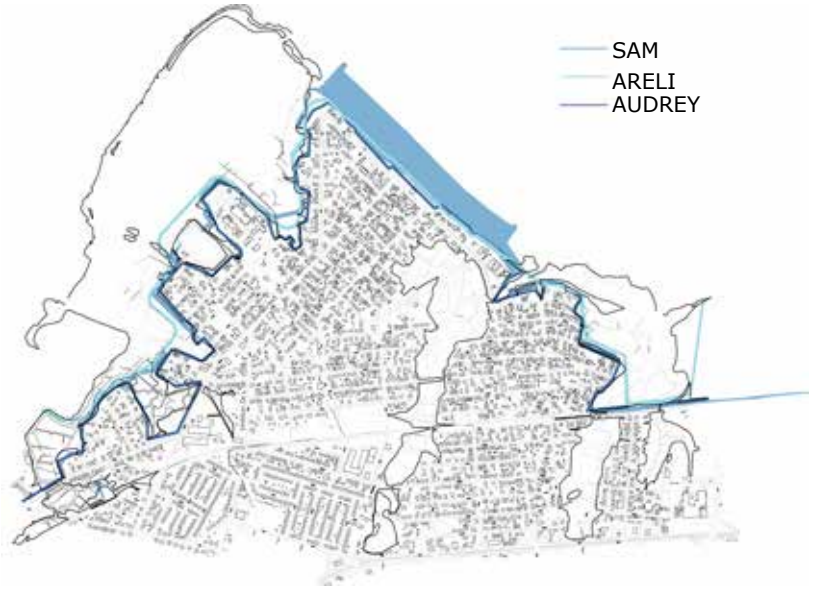
The Great Sea Wall of Union Beach

Beach Front Area

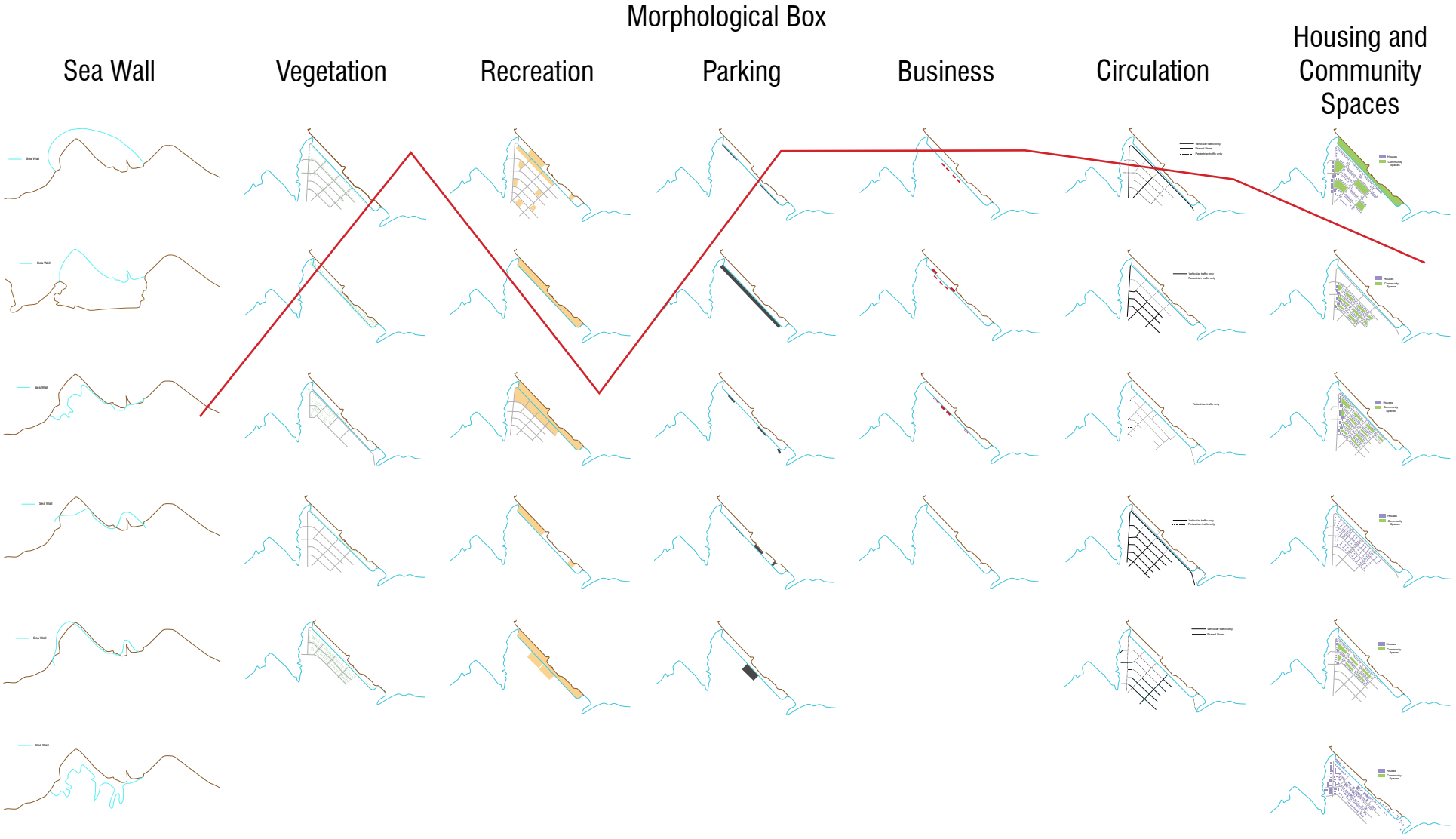
Audrey Li, Areli Perez, Sam Saydak



In October of 2012, Hurricane Sandy devastated the Northeast. One of the towns that were destroyed was Union Beach, New Jersey. In response to this the Army Corp of Engineers' plan for a sea wall resurfaced. This plan included dunes, floodwalls, terminal groins, and T-walls. The problem with this plan was that it was finished in 2003, years before Hurricane Sandy. Sandy was unlike any hurricane the town has seen before. In addition the plan did not include the most up to date information about sea level rise.



In addressing these problems and using the Army Corp of Engineers' plan as a starting point, three different designs were developed as a result of the Morphological Box. The inventory that was taken from the town served as guidelines for the sea wall designs. The inventory of focus was vegetation, recreation, parking, businesses, circulation, housing, and community spaces. Furthermore three areas with different typologies were examined. As a result each area has a different type of sea wall. In the Northern area dunes and levees are proposed. In the shore front you find a concrete structure surrounded by man-made landforms. Finally in the residential waterfront there is a partially private concrete structure is implemented.



Community Interaction With the Seawall

Front Street, Union Beach, New Jersey

Areli Perez

Design Intent

This design is intended to protect Union Beach without the need of residents having to relocate. Relocating to a new home is not only financially painful but also sad because of the loss of a good home full of memories. Most residents did not lose their homes after Hurricane Sandy, but if needed to relocate to be better protected, they would also lose their homes. The seawall prevents people from losing their home and at the same time still be protected from storm surges. Furthermore, the design invites people to use the Seawall through a variety of gathering spaces. It is meant to bring the community to the seawall and make it part of their every day lives.

The seawall is designed to be 20' high with a 10' width. The challenge faced was how to have the community accept a concrete wall keeping them away from the ocean and the ocean view. The solution was to create man made landforms on both sides of the seawall to access the beach front. On the town side, the landform created is vegetated to have a beautiful scenary of plants. Through the vegetated landforms, two large gathering spaces are found so that people can enjoy the landforms from within. The rocky landform on the beach front side of the wall was built without gathering spaces so that people are forced to reach their destination; the beach front. Though the vegetated landform is designed to be used, the design does not intend to take away attention from the town's biggest attraction, the ocean.

Section B-B

Seawall In Relationship To The Town Houses

A gathering space outside of the vegetated landform was also created to further invite the community to experience the landform from outside. This gathering space is for intended to be used for people who plan on utilizing the proposed business. Space for a business is proposed to better enhance the chances of attracting more people than before to the beach front. A new parking lot is also introduced to better accommodate both the residents from Union Beach and potential tourists.

Gathering Space 1.
Elevation: 8’

Gathering Space 2.
Elevation: 13’

Section A-A
Walkway To Top Of Seawall

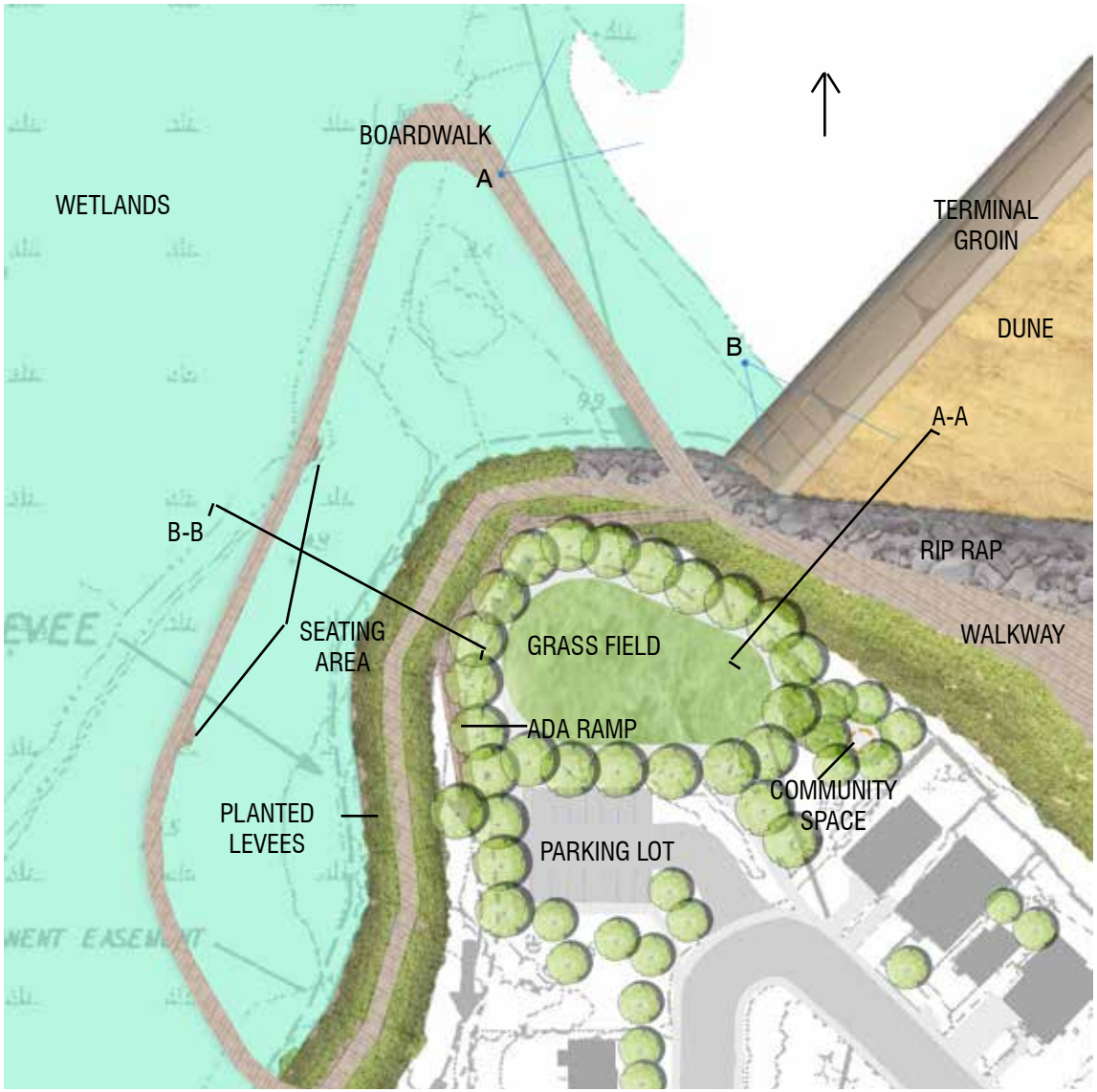
Flood Protection Diagram A: Hurricane Sandy Storm Surge
The Seawall Successfully Protects Union Beach From Storm Surges Like Hurricane Sandy

Flood Protection Diagram B: Projected Storm Surge In 2050 *Sea Level Rise: 4”
The Seawall Successfully Protects Union Beach From Storm Surges Bigger Than Hurricane Sandy

Army Corp Meets the Wetlands

Northern Point of the Bayside
Sam Saydak

Plan



Army Corp Overlay on Aerial

Design Intent

The Army Corp of Engineers' Plan for Union Beach is implemented in this design with some changes. The first change is the height of the levees and dune. The height was increased from 17 feet to 20 feet to accommodate sea level rise in the next 50 years. The second change is the addition of a boardwalk out into the wetlands and on top of the levees. This allows for people to use the floodwalls, levees, and dunes as connections to other areas of town. The boardwalk in the wetlands allows for people to walk out there without compacting the soil and fish without becoming wet. In the area that is surrounded by the Army Corp's structures, a field for playing and a community space can be found. People can arrive by walking on the boardwalk or by parking in the lot near the field.

Perspective A: Terminal Groins

Perspective B: Boadwalk in Wetlands

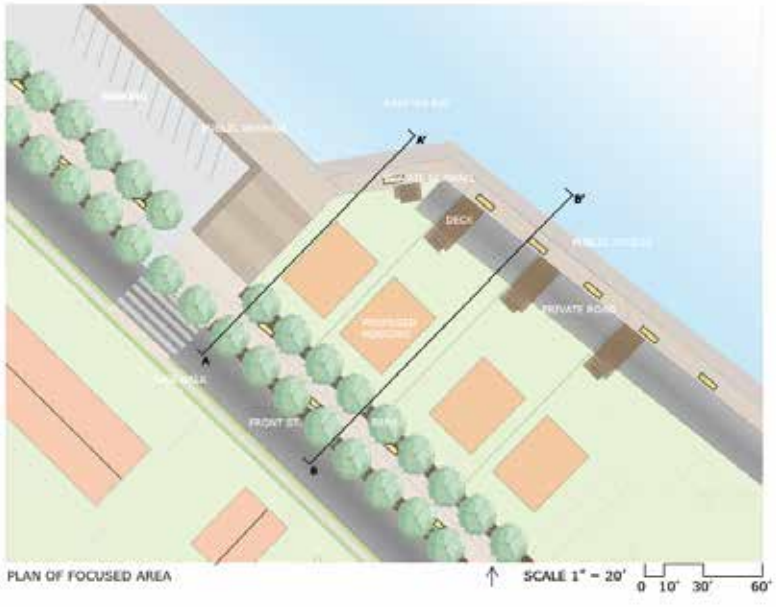
Model of Army Corps of Engineers' Plan

Section A-A Pathways and Dunes

Section B-B Wetlands and Levee

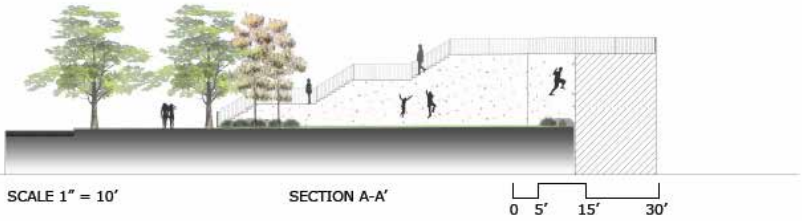
When Seawall Meets Residential Living

Beach Front
Audrey Li

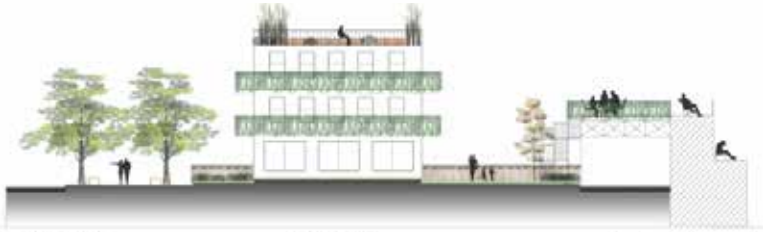


PLAN OF FOCUSED AREA SCALE 1" = 20' 0 10' 30' 60'

PERSPECTIVE OF STREET FRONT PARK



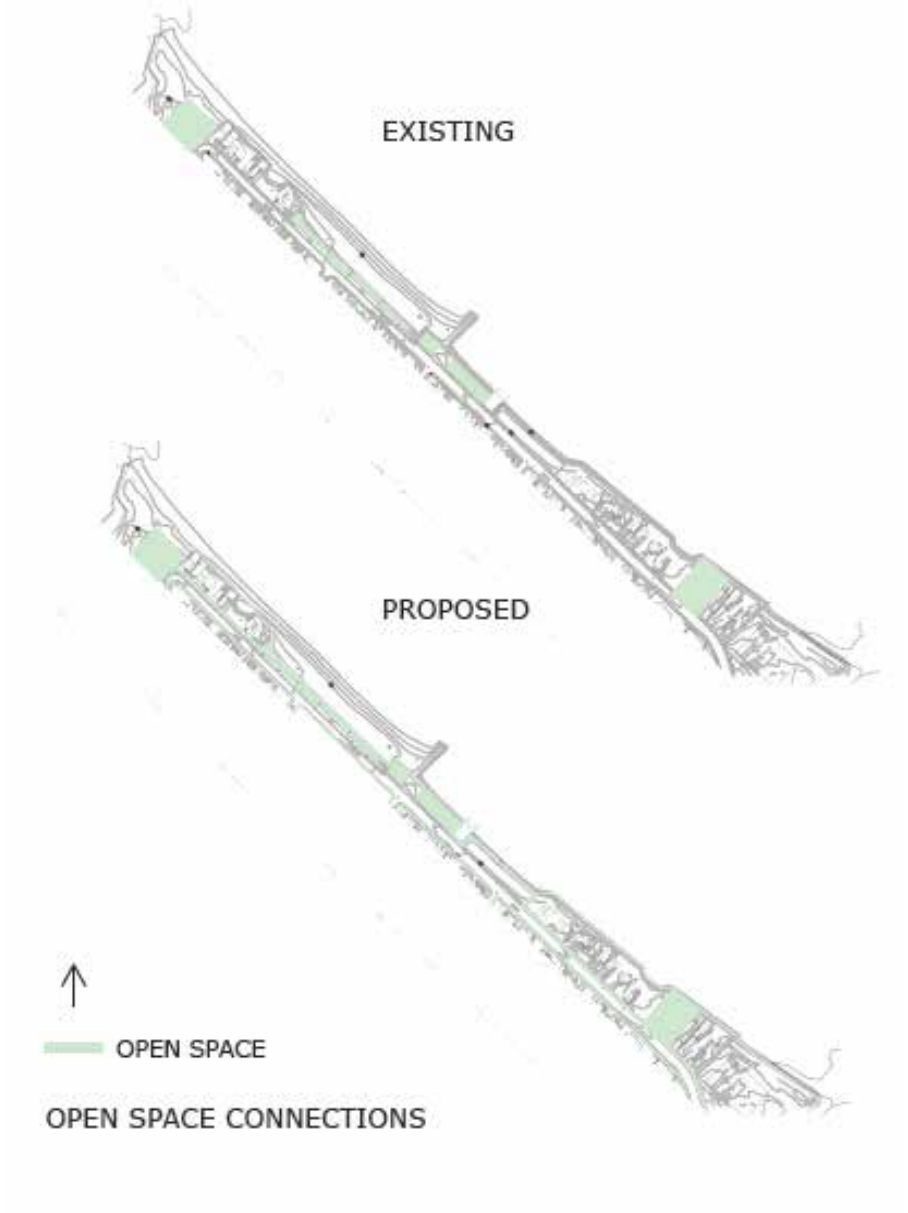
SCALE 1" = 10' SECTION A-A' 0 5' 15' 30'

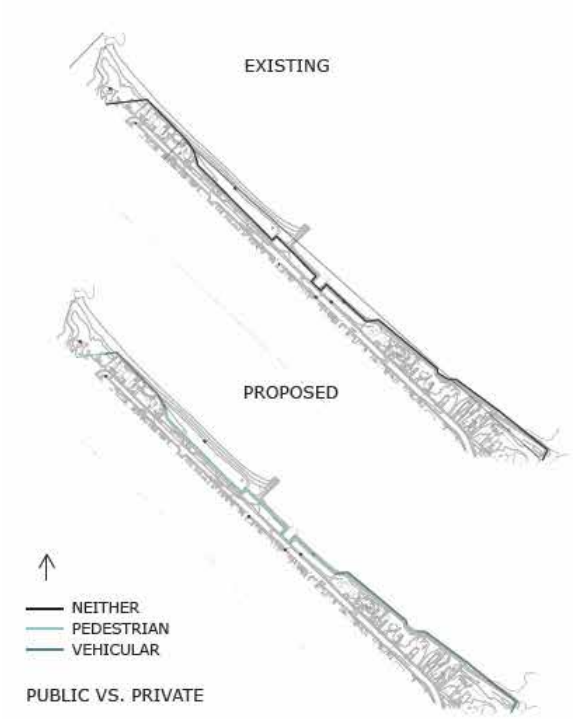


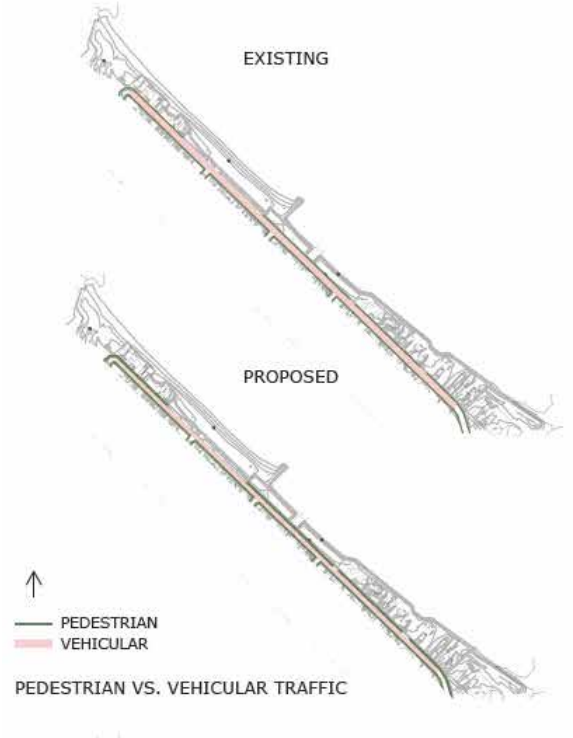
SCALE 1" = 10' SECTION B-B' 0 5' 15' 30'

Design Intent

Seawall makes the town of Union Beach more resilient, it keeps the people safe. My area examines the relationship between the seawall and private waterfront residents. However, challenges arise when trying to incorporate the seawall into people's lives: it is not exactly pleasant to have a 20 feet wall blocking your views and waterfront access. My intent is to give those residents back their waterfront access and views, while keeping the water front primarily public. In the process, my design will also enhance the open space programs of the Front St. area, as well as encouraging pedestrian circulation.







3.2 Retreat

Retreat For Recovery

Union Beach, Nj - Above 2050 Sea Level Rise

Marlon Davis, Jack Peters, Ari Salant, Michael Ticker

Site Locations of Proposed Designs

Above: The master plan for our Union Beach retreat design. Based on 2050 projections, the coastline changes dramatically and reduces the area of available open space and developable land. Each student focused their individual design on a specific area, and each area was developed to meet specific needs of a future community forced to relocate to higher ground. The dark blue section represents a low density area with views of the bay and NYC skyline, created by Michael Ticker. The light blue area is a mixed use, high density housing and transportation village created by Jack Peters, the green area is a mixed use, high density, native park setting, and the brown area is a community that offers housing of varying densities, created by Marlon Davis.

Design Intent

To find our direction when dealing with retreat, we first created problem statements and 5-7 alternative solutions (shown below). After analyzing each possible design, we used red yarn to tie together our best ideas and then overlayed them, which became our first masterplan. To understand housing density we determined that roughly 6000 people needed housing, and based on demographics, the average household of Union Beach was 3 people. We cut out foam blocks into a size that represented 5 units (15 people) and rearanged the blocks into many different ways to form various shapes of buildings and spaces in the voids, eventually leading to a final design (Figures 1-6). Each student developed our varying options in their projects.

Morphological Box

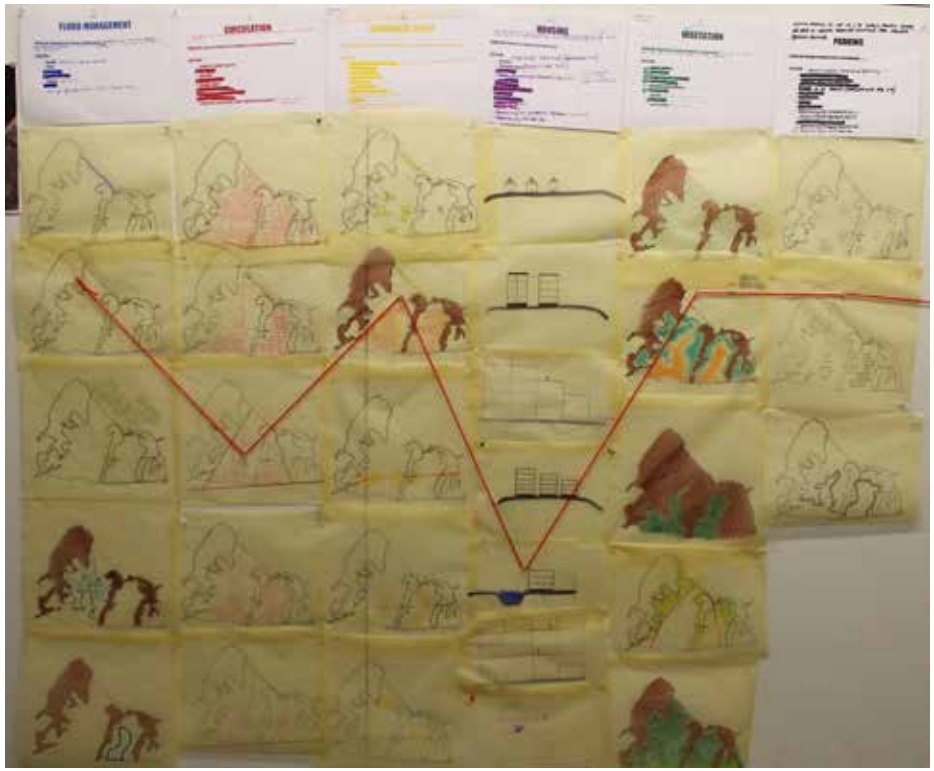


Figure 1

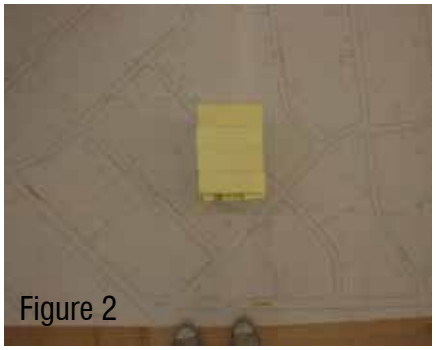


Figure 2

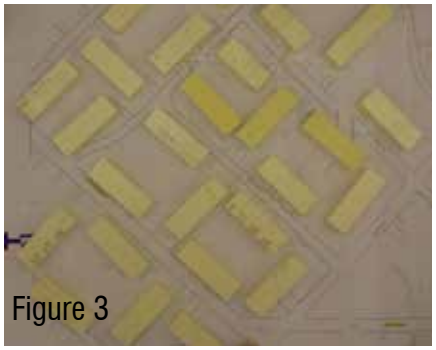


Figure 3

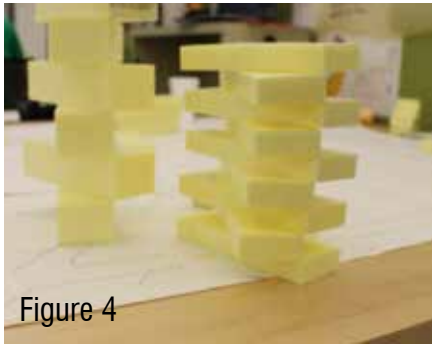


Figure 4

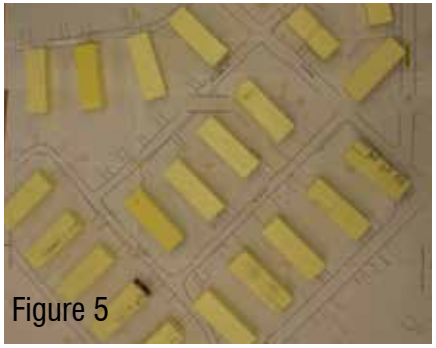
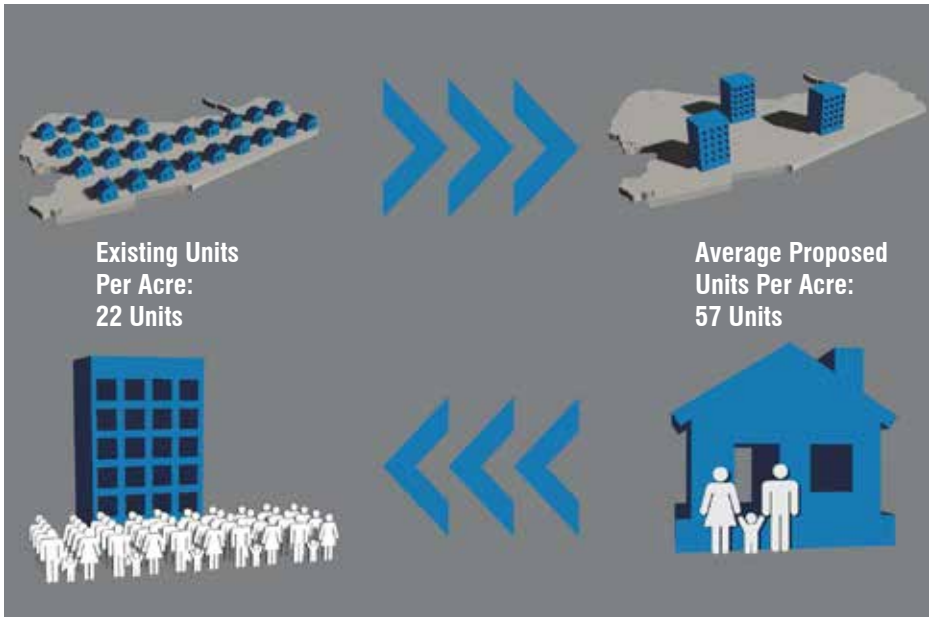


Figure 5

Figure 6

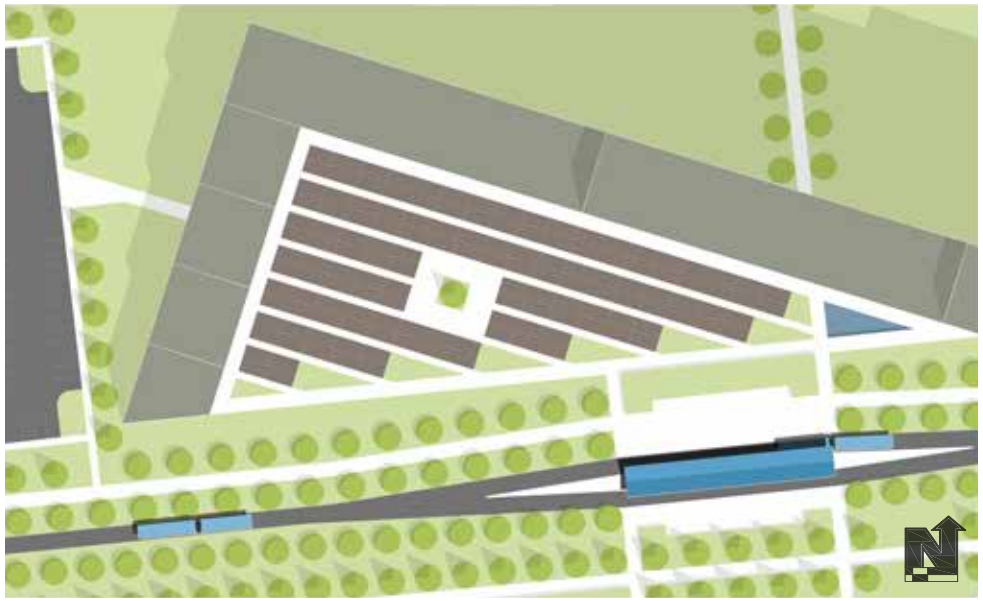
Below: Demographic information used and analyzed when determining existing and proposed housing densities

Below: Demographic information, from exisiting conditions to proposed densities based on final designs



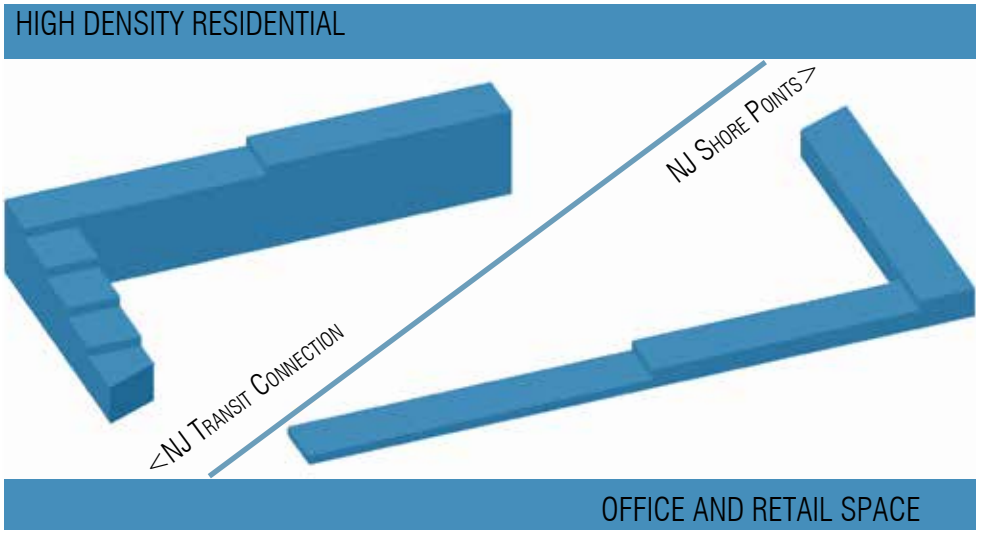
Union Beach Transportation Village

Existing Henry Hudson Greenway
Jack Peters



An Alternative For The Future

+ Create a mixed use (residential, office, commercial) area which is centered around a mass transit station
+ Reduce architectural footprint, allowing a growth of natural ecosystems which protect residents and property from storm damage and other natural disasters
+ Provide increased public park and open space in areas currently fragmented by single family, detached homes and an unnecessary large network of streets
+ Enhanced views of expanded wetland, Raritan Bay, and the NYC skyline from a midrise residential building
+ over 120,000 ft^2 of office and commercial space, providing job opportunity for residents
+ Increse pedestrian and bicycle activity which promotes interaction and communication among residents and employees
+ Condensed living means lower maintenance for residents (Parking lots are plowed instead of each resident having to shovel out their own driveway)



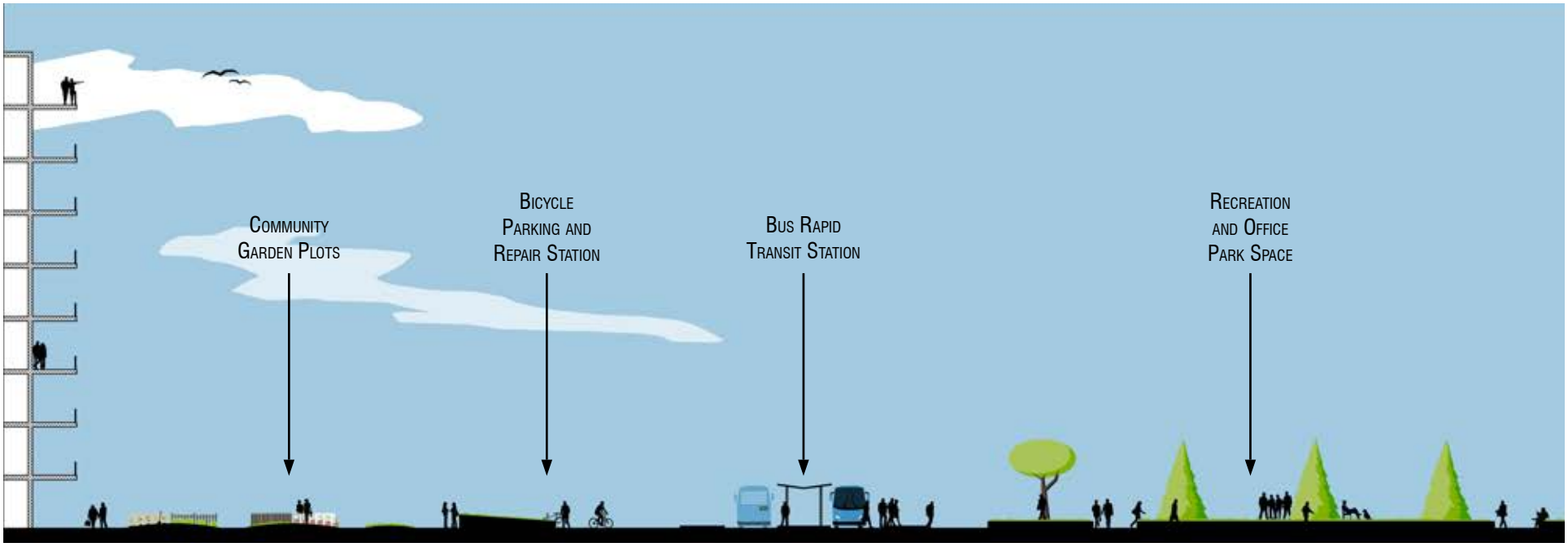
A Place for Hope

The Union Beach Hope Tree has become a nationwide icon of rememberance and perseverence of all communities devestated in the 2012 Superstorm Sandy event. This tree represents the resilience of the people, reclaiming their town. It is a way to remind each resident that no one is going through this alone. Each ornament represents someone that made the decision to stay "Jersey Strong" and to rebuild. What better place for a tree so important to so many than the center of the community garden, visible from each home and the new bus rapid transit station.

Transit oriented development, as defined by the NJ Department of Transportation, is “a residential, commercial or mixed-use development project, made up of one or more buildings, that has been designed to take advantage of nearby transit and includes features that encourage walking, biking and transit ridership.” TOD’s are commonly implemented in areas that have a potential and willingness to grow that have existing transportation infrastructure such as train lines, light rails, or bus lines (McLinden)

Union Beach is an optimal location for designation as a transit oriented community due to the town’s proximity to both New York City and various shore points in Monmouth County. The existing Henry Hudson Trail was once a rail line that connected the town to other major train and transportation lines. By repurposing the exisitng connections of the trail as a bus rapid transit line (BRT) these connections could be revisited and Union Beach would have an economic opportunity to expand and grow as a commercial community.

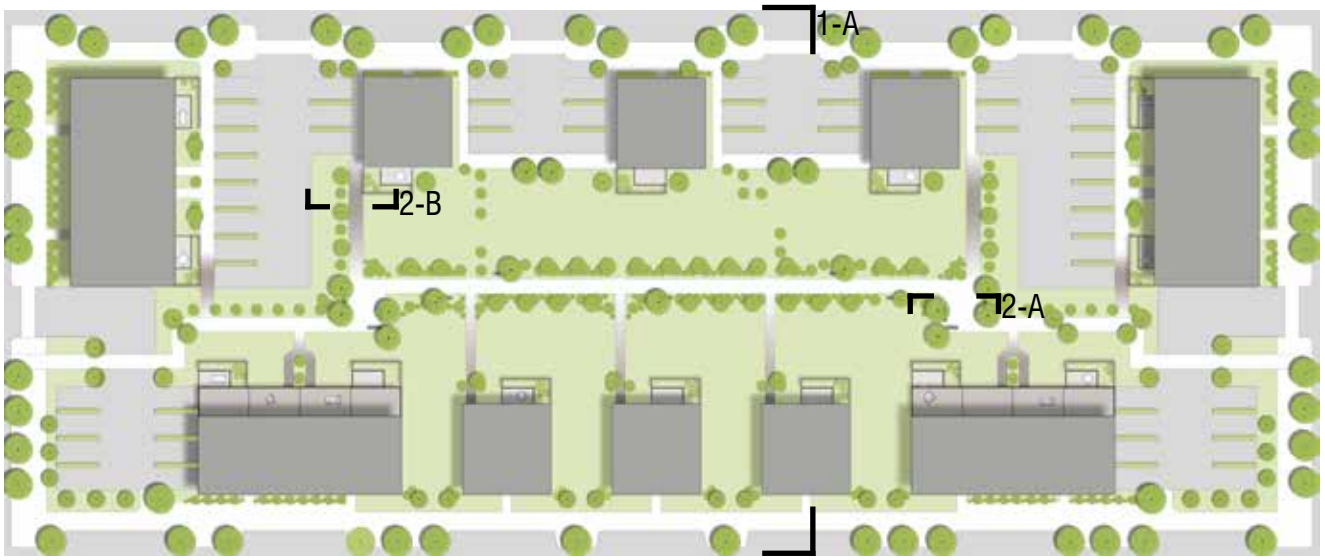
The pressing issue of imminent sea level rise and recent history of storm damage would also be addressed by creating a denser community, surrounded by expanded wetlands which assist in reducing damaging effects of wave attenuation and flooding. The community would also be safer as a new road, designated solely for express bus transportation, could double as an alternative escape route.



Bayside Lookouts

A Low Density Development

Michael Ticker



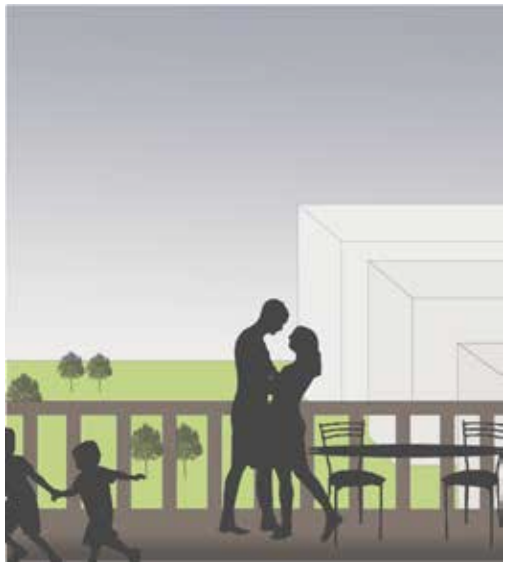
Design Intent

As a means of reacting to the extreme flooding that Union Beach, New Jersey has recently seen and will continue to experience, this housing scheme seeks to offer the best of Union Beach in a safe environment. The decision to place housing here was based on moving residents out of the FEMA 50-year flood zone and into areas of safety surrounded with salt marsh- both existing and proposed. With over four hundred units in the development ranging with spaces for the single homeowner all the way up to four person families, this development has much to offer current residents as well as newcomers interested in the area. The development provides private space for all units within the development in the forms of balconies and patios. As well as public space with opportunity for recreation and public activity along the green corridor and within the communal backyard areas.

Above: Plan view of developed block

Left: View of ground units patio space

Right: View of units balcony space



Density Calculations of Entire Development

1-Person Unit: 600 ft^2
-52 Units
3-Person Family Units: 1,425 ft^2
-141 Units
4-Person Family Units: 1,880 ft^2
-224 Units

Existing: 10 Units Per Acre - Proposed: 19 Units Per Acre

Single Apartment View to the Bay:

Section Cut 1-A

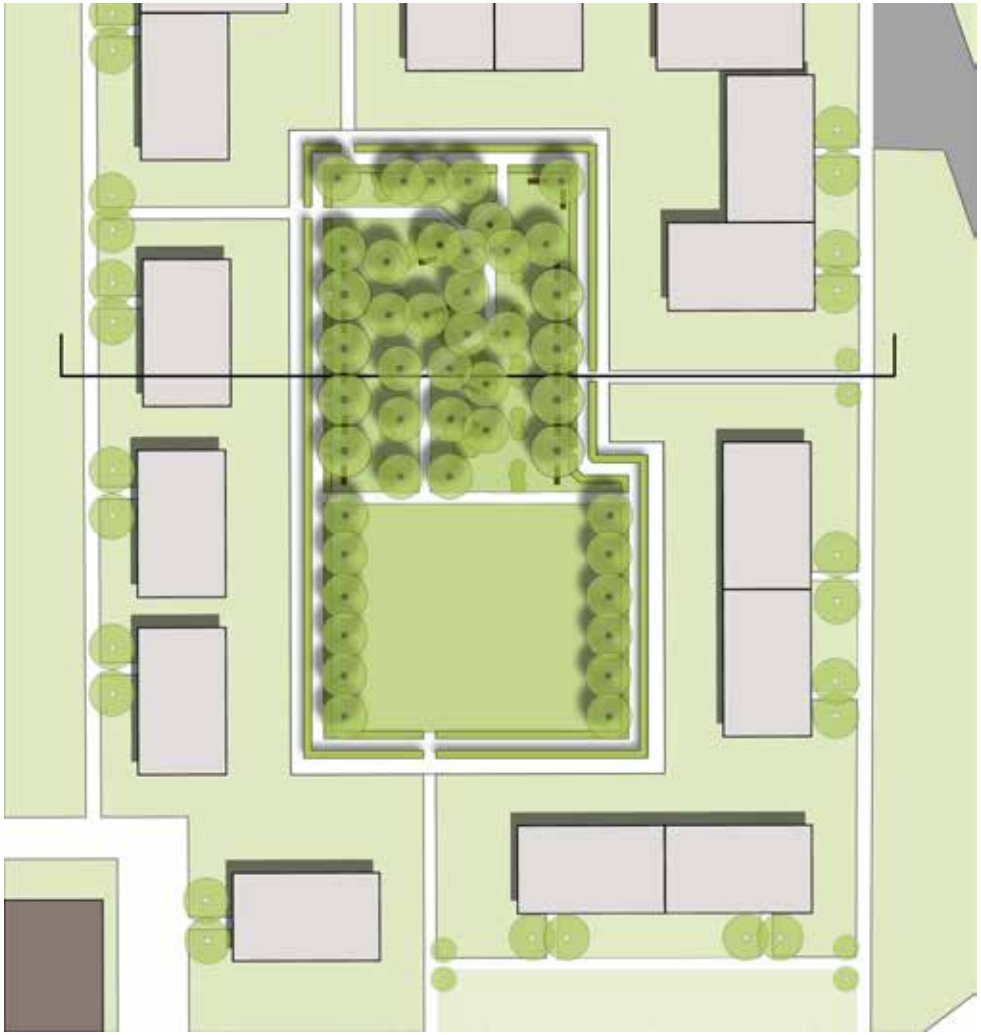
Section Cut 2-A

Section Cut 2-B

Highland Retreat

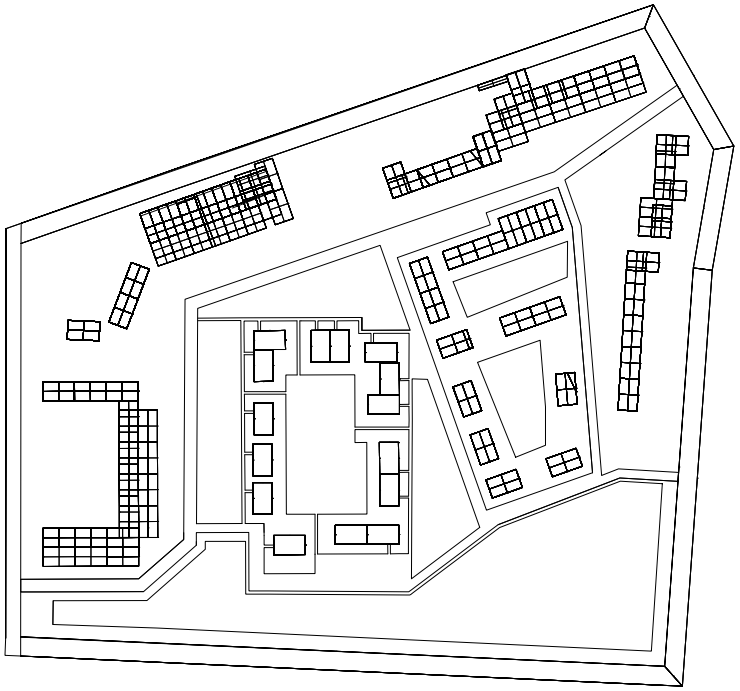
High point of Union Beach, Rt. 36

Ari Salant



Above:
This park grants residents the same amenities of a typical home owners yard. A large open lawn provides space for picnics and lounging outside, while the wooded area is a space for personal reflection and solitude.

Through the implementation of a city wide retreat of the residents of Union Beach into areas that will not be affected by projected 2050 sea level rise, there is a great opportunity for both the residents and the environment to greatly benefit. Higher density housing would allow for an amount of open space previously unavailable to the residents of Union Beach, creating a refuge in a park like setting that caters both to the residents and the local wildlife. In the remaining unpopulated lands, emergent wetlands will re-establish creating an ever changing landscape that the residents can enjoy throughout the years, while also creating addititional habitat for wildlife.



Below: A section showing the relationship of the high density housing and the parks that the open spaces create.

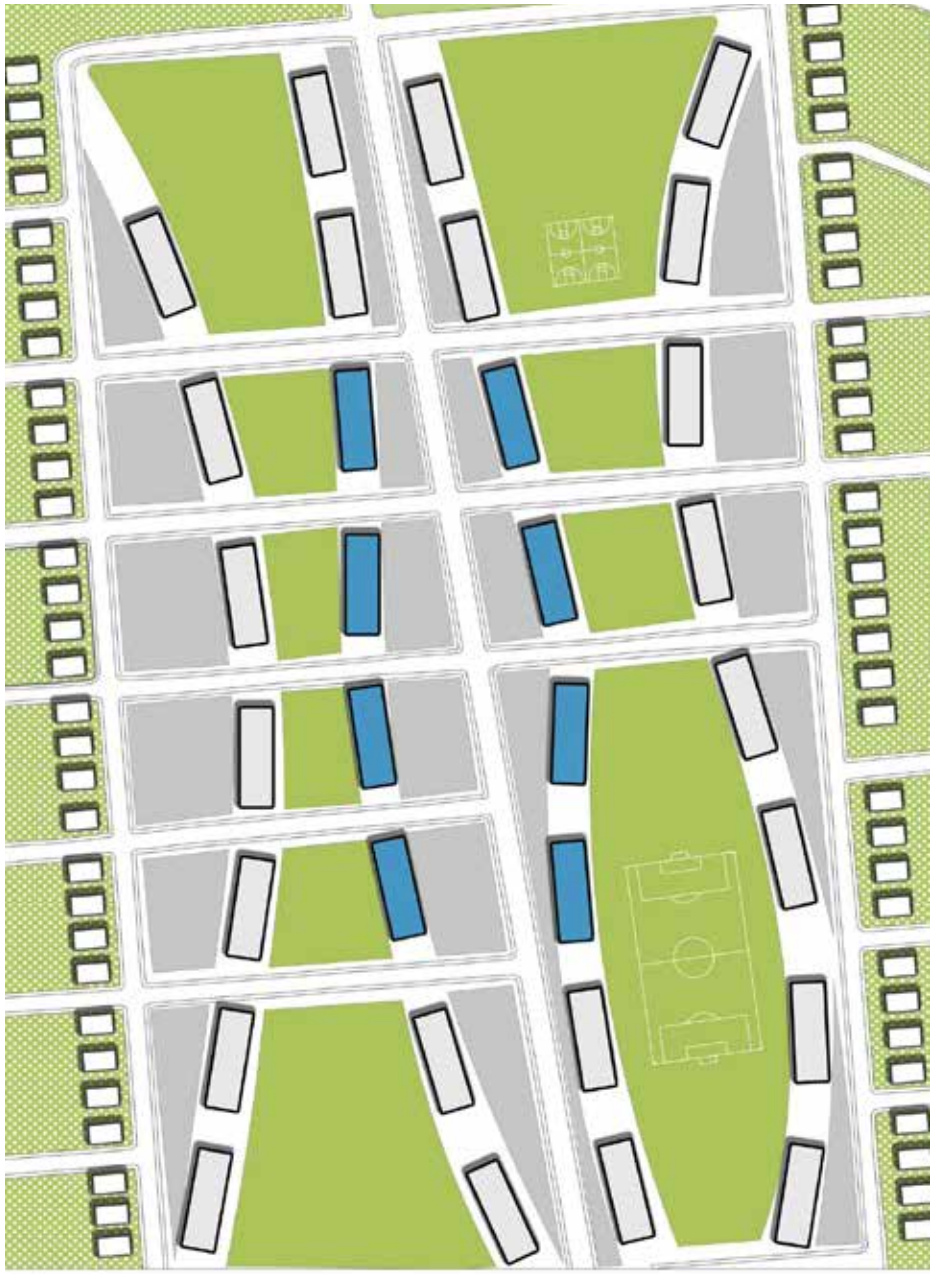
Above: A perspective showing the walk way into the park.

Wetland Retreats

Union Beach, New Jersey

Marlon Davis

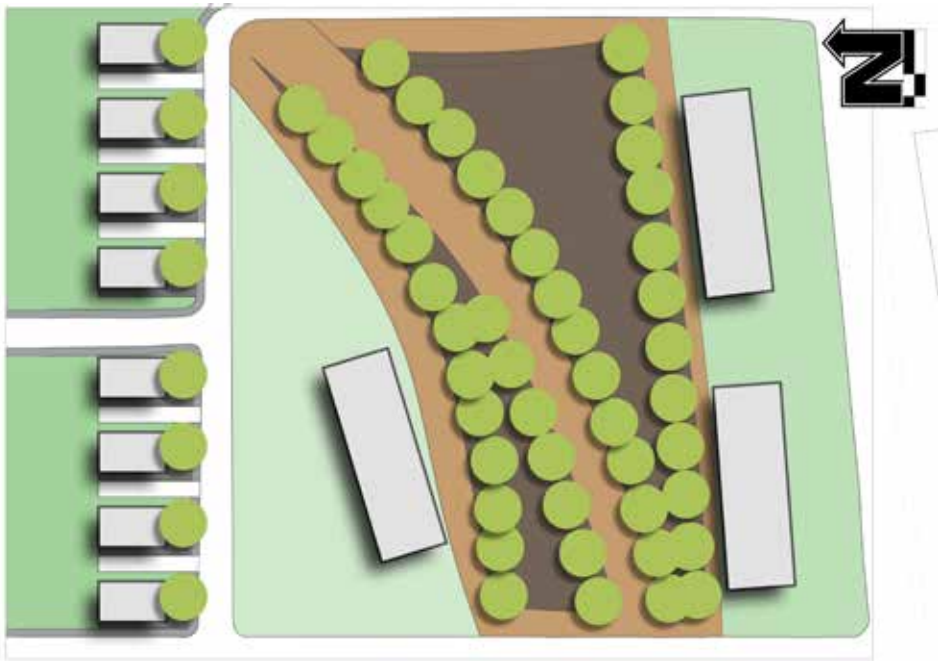
Master Plan



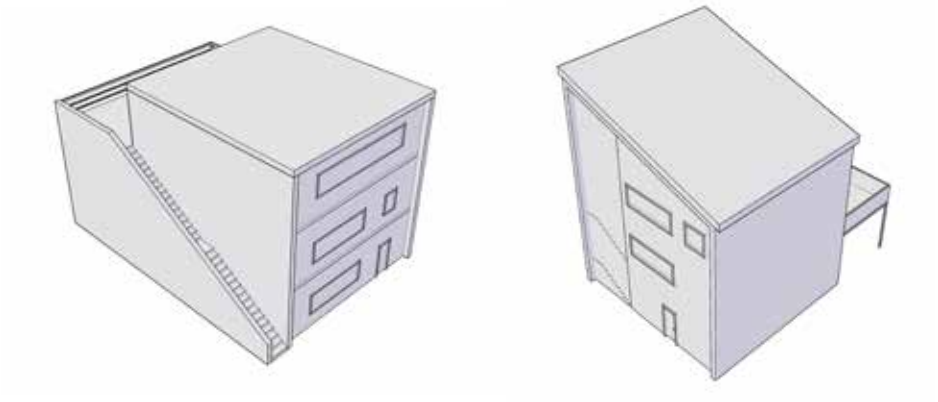
Design Intent

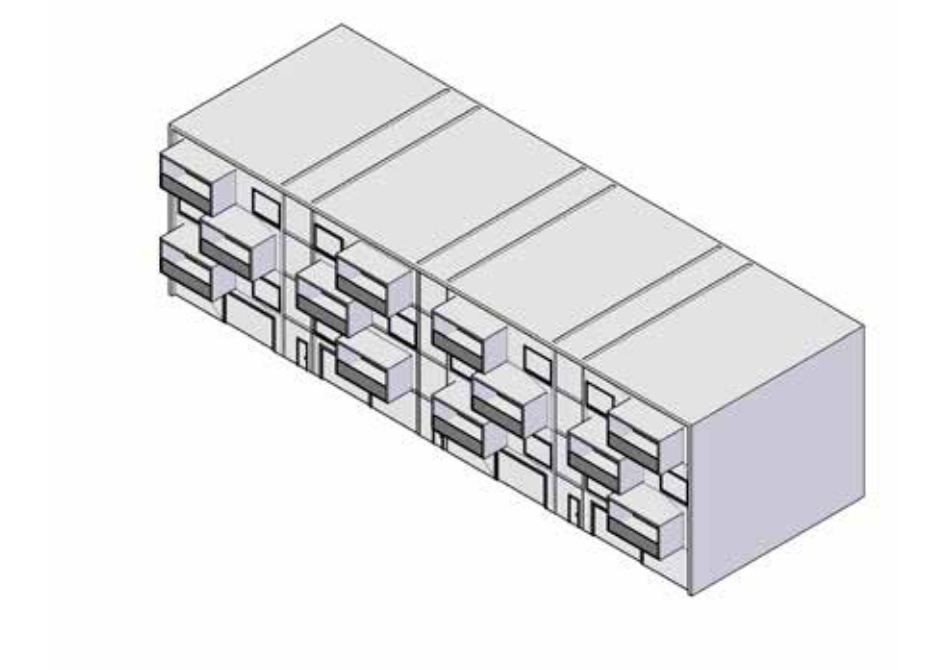
With Hurricane Sandy has caused us to rethink how we deal with housing in flood risk areas. We can no longer use the same methodology to plan our coastal towns. Wetland retreats attempts to relocate the people of Union Beach to areas that are out of the flood risk zone and out of the 4 foot sea level rise zone. Wetland Retreats is an attempt to create a liveable high density living environment that maintains the sense of community that Union Beach currently has. I choose this location for a few key reasons. The current location of my project area is flanked by two large wetland areas that act as a natural buffer to flood water and storm water surges. The wetlands also provide excellent views of salt marsh plants. Another reason why this was a key location for my design was the already existing main street, Union Ave. Wetland Retreats

Site Plan



Housing Typologies

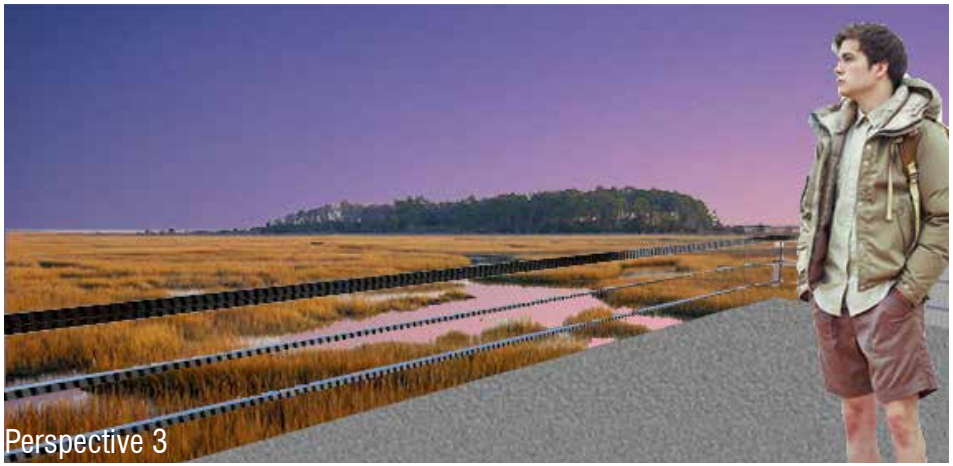




The housing typologies shown above give new options to the people of Union Beach. The dominant housing typologies that is most widely seen in Union Beach is not compatible with the existing landscape because of it's lack of efficient flood protection. The new options that are proposed in Wetland Retreats provide different residents with choices after the town is relocated.


Perspective 1


Perspective 2

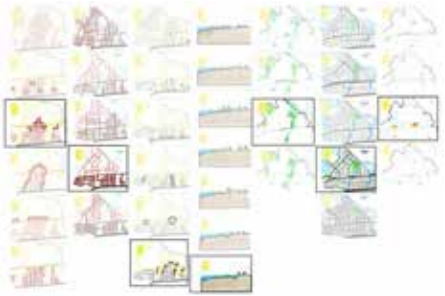

Perspective 3

Retreat and Relocation

of Union Beach, NJ

Ryan Goodstein, Nick Patiro, Benjamin Antwi

By choosing a strategy of retreat for the homes in Union Beach, it was apparent that the housing density would be altered. Our goal was to accomidate all of the homes within Union Beach at locations safe from storm surge while still maintaining the character of the town. By comparing storm surge and sea level rise information with the topography of Union Beach we determined that any home above 12' would be safe from flooding. Our overall stategy was to take fill from lower areas to increase that area, keep all existing homes considered safe from flooding, and redevelop the site of an old fragrance factory to accomidate for 600 new homes. We also, expanded the Henry Hudson Greenway within the town.

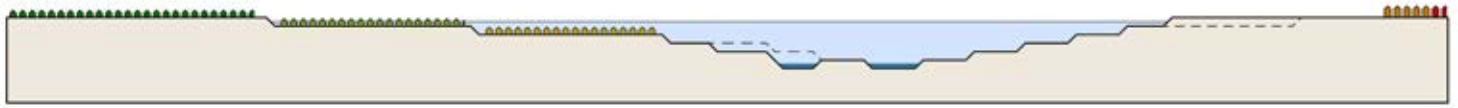


Morpho Box: using criterias for density, vehicular, economy, flood protection, open space, greenway connections and parking we selected the best scenarios in order to develop or initial concept

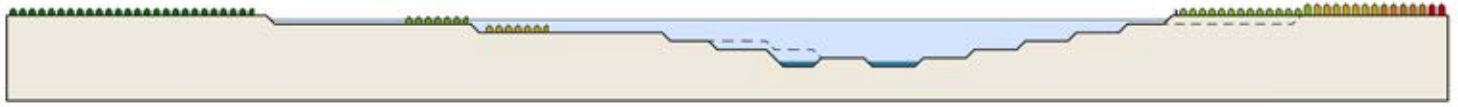
Relocation Strategy: Roughly two thirds of the homes within Union Beach are below 12'. This means only 642 homes would be safe from flooding. In the first phase we relocated all homes in the most danger to the fragrance factory site. Next, we expanded the salt marsh and placed created fill around the factory. Then, we moved half of the homes between 8' - 10' and half of the homes from 10' - 12' to the fragrance factory site. We then took the fill from where the homes on 8' - 10' were and placed it where the homes on 10' - 12' used to be. In the final phase, all remaining homes under 12' are rebuilt in safe areas.

Existing Topography — 642 Safe / 1262 Unsafe

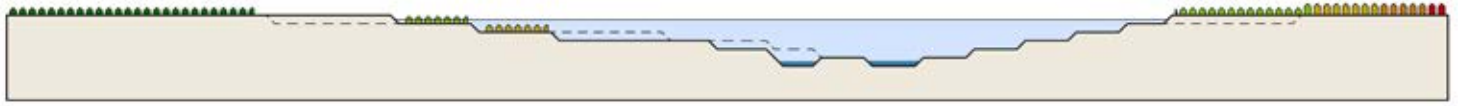
Phase 1 — 973 Safe / 931 Unsafe



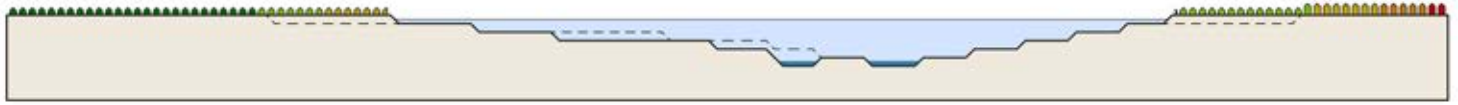
Phase 2 — Expanded Saltmarsh Fill Placed by Factory



Phase 3 — 1619 Safe / 285 Unsafe



Phase 4 — Fill from 8' - 10' Area Placed at 10' - 12' Area



Phase 5 — 1904 Safe / 0 Unsafe

Designing for Density

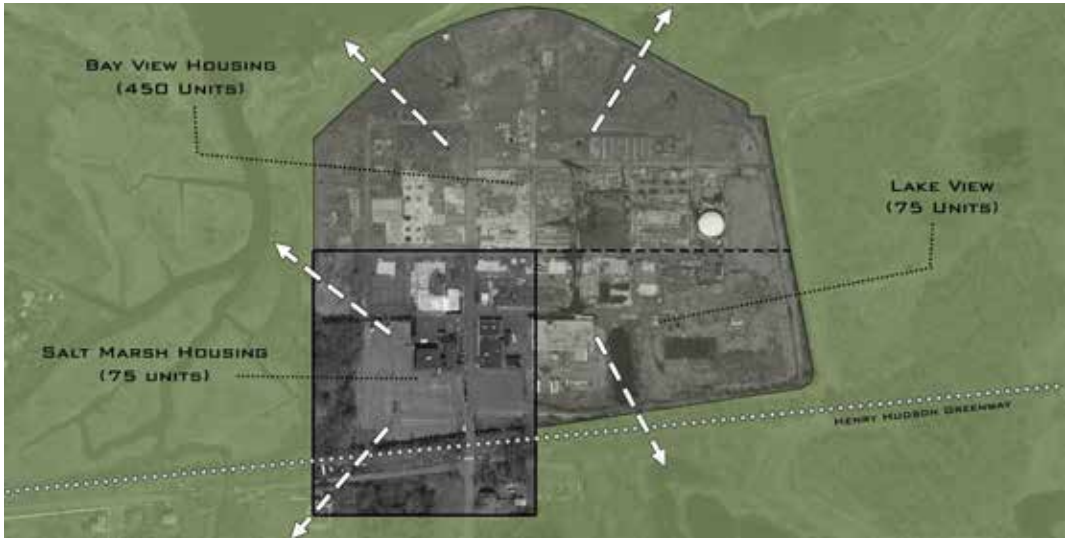
Brownfield Site: International Flavors and Fragrances Factory

Ryan Goodstein

Site Plan: the following plan accommodates 76 families (26 duplexes / 4 apartment buildings) and uses views of the marshes as axis for open space

Concept:

Because two-thirds of the homes in Union Beach are in significant danger of flooding it was necessary increase the housing density. However, one location within Union Beach that sits above the retreat line (12' elevation) was an old industrial site where the International Flavors and Fragrance Factory used to operate. In order to initialize our phasing strategy it was essential to relocate a significant amount of homes to the Fragrance Factory. By selecting different samples of density and placing them within the site we determined that roughly three hundred homes could be relocated at a density most similar to Union Beach. However, it was necessary to double that number in order to accommodate all of the residents within Union Beach. After a total number of homes were determined a breif analysis of the site was done. The northern half of the site faces the Raritan bay with views of New York City. In this area it made sense to create higher density living by maximizing views. The southeastern portion of the site has a close proximity to a lake. A smaller density would be located here with a central axis aligned with the lake. The southwestern portion of the site has two views saltmarshes. These views were used as axis for open space and circulation that connects tot he Henry Hudson Greenway.



Density Diagram: this graphic shows an aerial of the Fragrance Factory Plant. In this area we planned to locate 600 total homes. A higher density was placed on the north portion with views of the bay, while the south portion is a lower density with views of the salt marsh and lake

Housing Perspective:

In order to accommodate all of the residents and increase density, duplex style homes were created. While there are few duplex homes in Union Beach currently, combining two families in one building would work well if a retreat and relocation did take place. These buildings maximize the sides for driveway space and the front and back for porches. Each family has over 1700 square feet. Additionally, there is a 500 square foot porch for each family connecting to the greenway or to the streetscape.

Enlargement Plan:

This plan shows one axis of open space with views of the salt marsh with duplex style homes with large porches

Greenway Restoration

Old Fragrance Factory, Union Beach, New Jersey

Benjamin Antwi

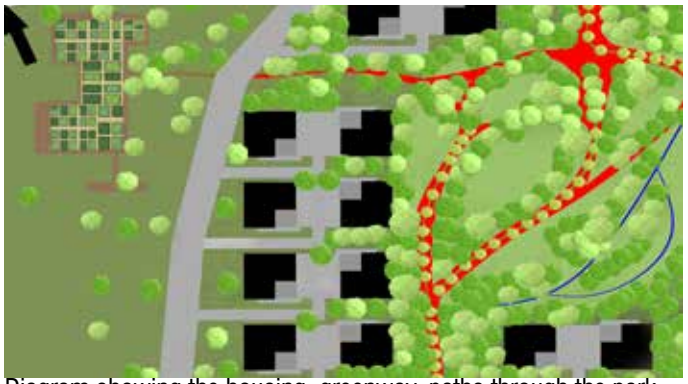


Diagram showing the housing, greenway, paths through the park, salt marsh, salt marsh deck, and car accessibility

Section Showing Salt Marsh Deck

Section Showing Housing

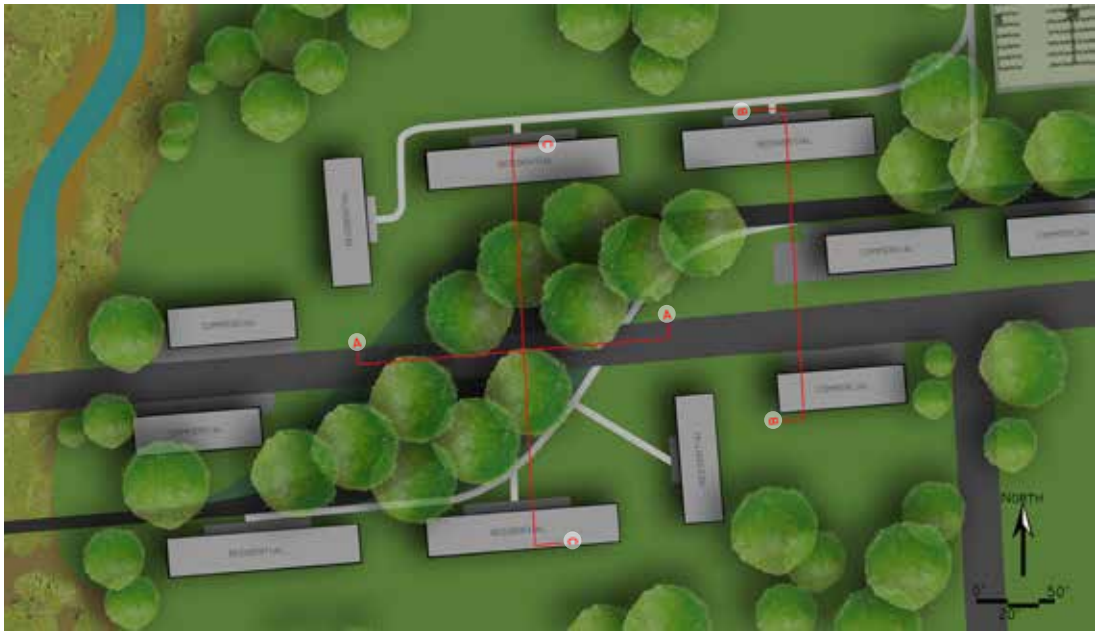
Union Beach has dominated the disaster known as Hurricane Sandy. Union Beach is a special area, which has extraordinary bay views. My design acts to intensify the beautiful views. These views includes the New York skyline, the salt marsh with its ecosystem, and the bay itself. In terms of housing opportuities, I developed a small community with two- family housing. the two-family housing is attached, with each house having a unique view. Each house includes a two-car garage. Each house is estimated to abput 15 dwellings/net acre. The scenario we had was no sea wall. Our main idea was to move towards the greenway. We saw it as a way to pay tribute to the Henry Hudson Trail and to promote green infrastructure. The greenway leads to a series of open space that includes a community gathering space, a park and a green lawn. A community rain garden is found as you cross the street, leaving the greenway. My intent for that was to create a dual habitiation between wildlife and the commuity. In the area is a deck path thats has hotspots, whihc one can stand and

Graphic showing the the salt marsh.

Graphic showing the greenway

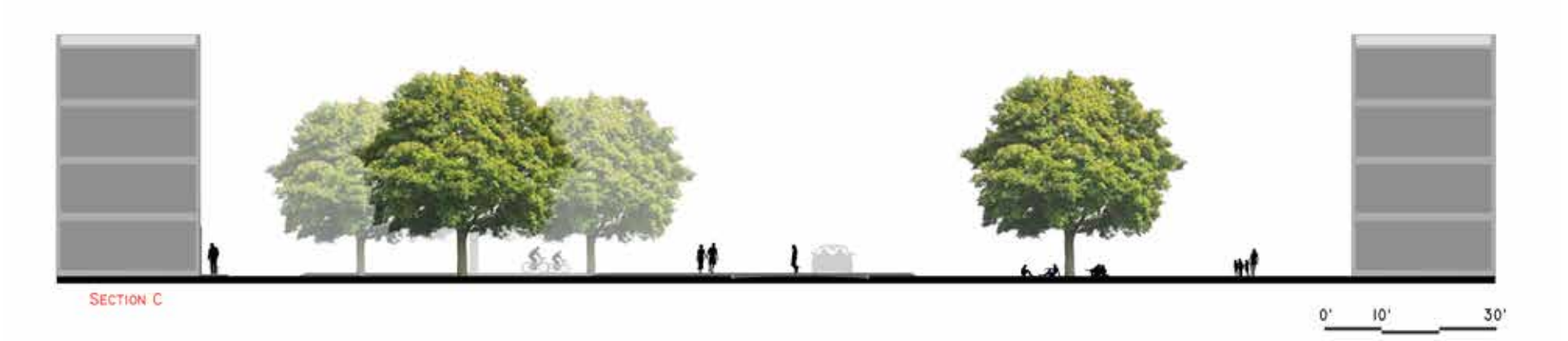
Expanding the Greenway

For Residence, Business, and Community
Nicholas Patiro



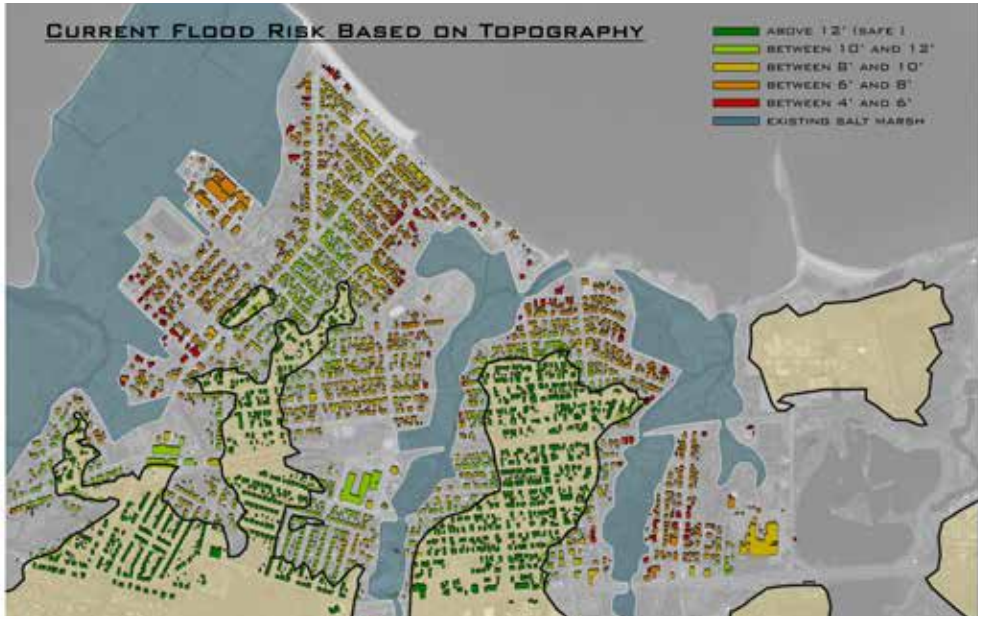
Plan

Context Plan



For Residence, Business, and Community

The use of the existing Henry Hudson Bike Trail to expand the social interaction that happens near the marsh edge. Businesses located along the greenway will benefit from local economic factors that come with the pedestrian circuit. The location of residents creates a quad space for the volumes of users coming to the newly expanded greenway.The promotion of pedestrian and biking circulation will result in more traffic on the greenway and create a community buzz in and around the space. Residents and customers of the are have accessible parking via a parking deck to accomodate plenty of parking for the various uses.

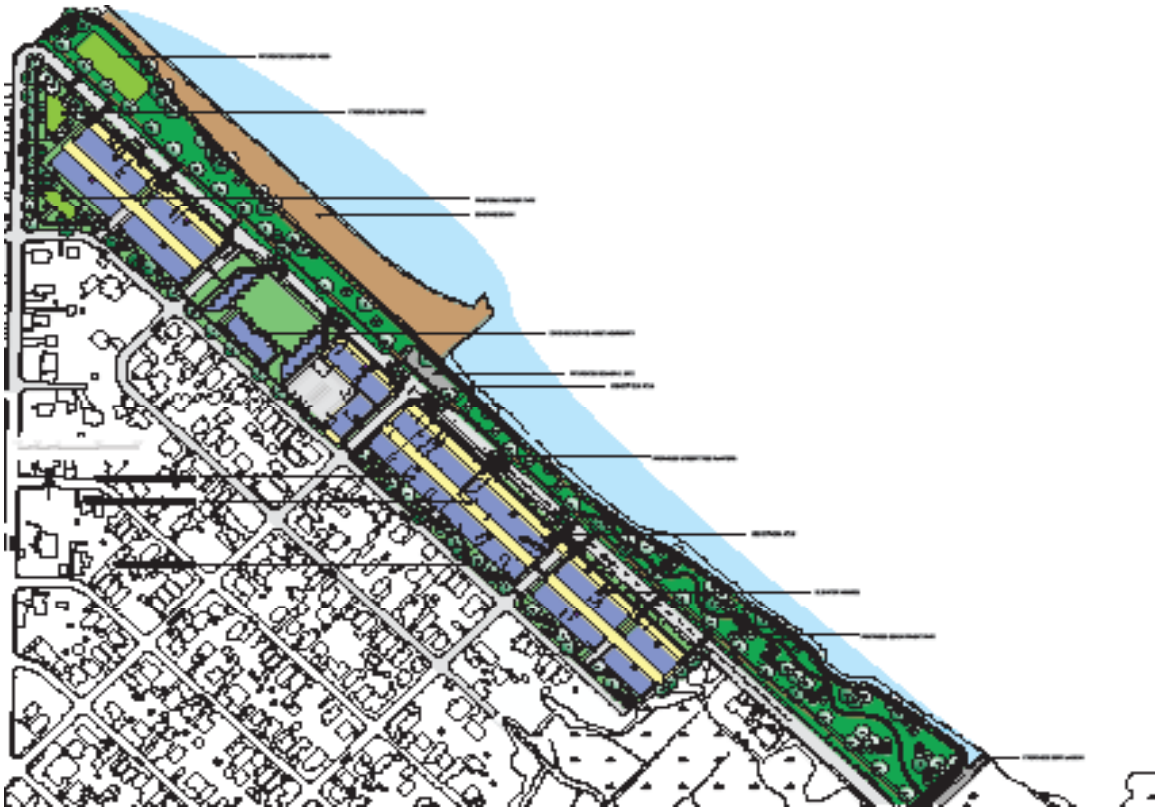


3.3 Raised Homes

Raised Homes Project

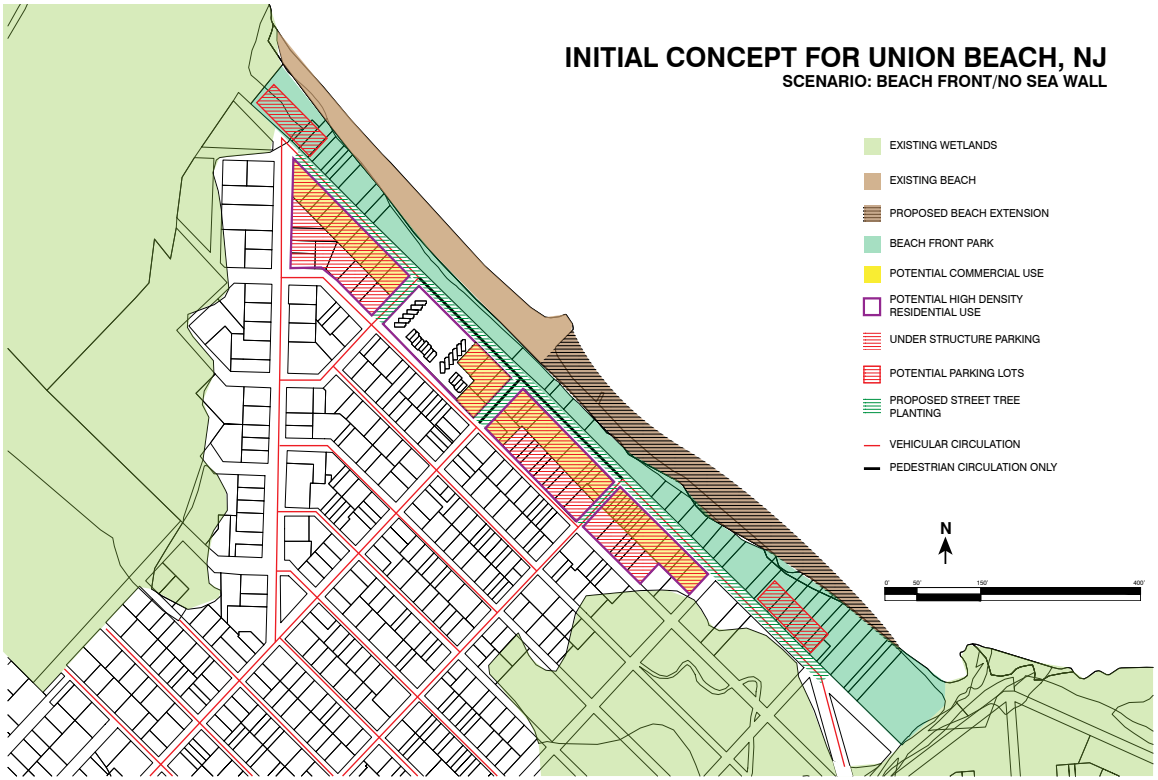
Front Street

Ellis, Kelly, Marshall



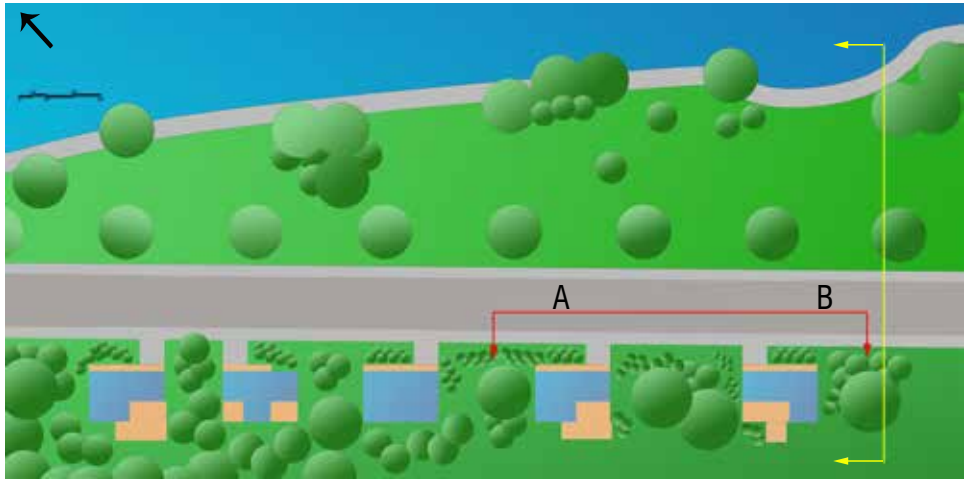
The Challenge

Upon completion of our initial concept design, we proposed increasing housing density along front st. And re-establishing it as a commercial hub for the town. The structures we proposed implemented a multi-story hierarchy that allowed for commercial use on the first floor and residential use on the second floor. The issue of proposing structure that would exhibit a potential resilience for future storms and climate change presented the challenge of adequatley raising homes to accomodate both the recorded 16'storm surge as well as an anticipated 4' rise in sea level in the next half century. Simply lofting the structure 20' into the air we observed an overwhelming spatial challenge that our three individual iteration attempt to address.


INITIAL CONCEPT FOR UNION BEACH, NJ
SCENARIO: BEACH FRONT/NO SEA WALL
EXISTING WETLANDS
EXISTING BEACH
PROPOSED BEACH EXTENSION
BEACH FRONT PARK
POTENTIAL COMMERCIAL USE
POTENTIAL HIGH DENSITY RESIDENTIAL USE
UNDER STRUCTURE PARKING
POTENTIAL PARKING LOTS
PROPOSED STREET TREE PLANTING
VEHICULAR CIRCULATION
PEDESTRIAN CIRCULATION ONLY
N
0'
50'
150'
400'

Living With Water: Elevated Homes

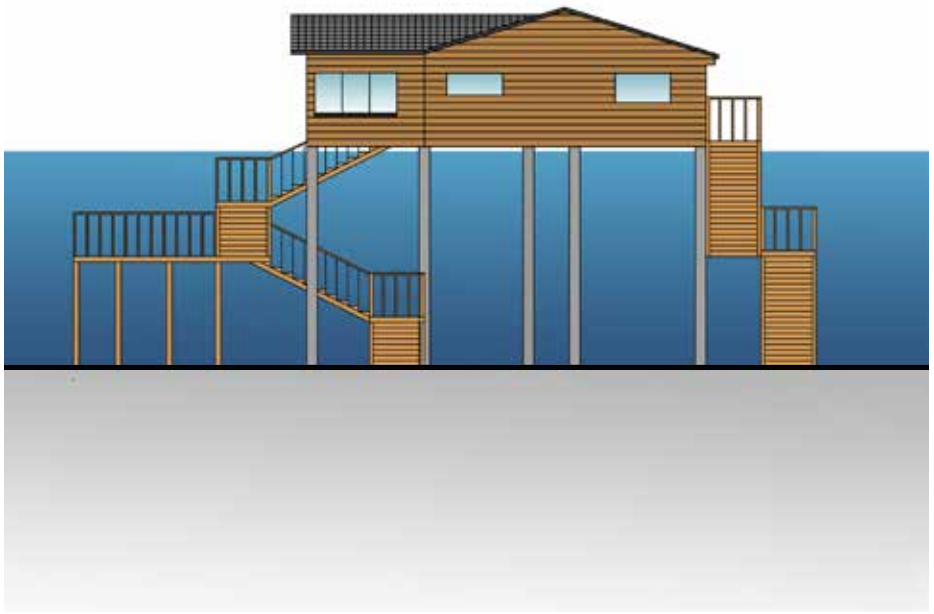
Front Street: Union Beach, New Jersey
Peter Ellis



Proposed Plants

Common name	
Willow oak	Inkberry
River birch	Groundsel bush
Sweet birch	Bay berry
Red maple	Lowbush blueberry
American holly	Seaside goldenrod
Eastern red cedar	Switchgrass
Colorado blue spruce	Indiangrass
Pitch pine	Salt-meadow grass
Kentucky coffee tree	Woody glasswort
Sweetbay magnolia	
Black gum	

Homes in my design are lifted 20’ above the normal hight. 16’ is for the storm surge and the other 4’ is from the expected sea level rise. Vegetation used is all salt water tollerent and should withstand flooding from the bay. The views from the front of the home allow you to see the bay clearly while the rear of the house gives you a great view of the wetlands.



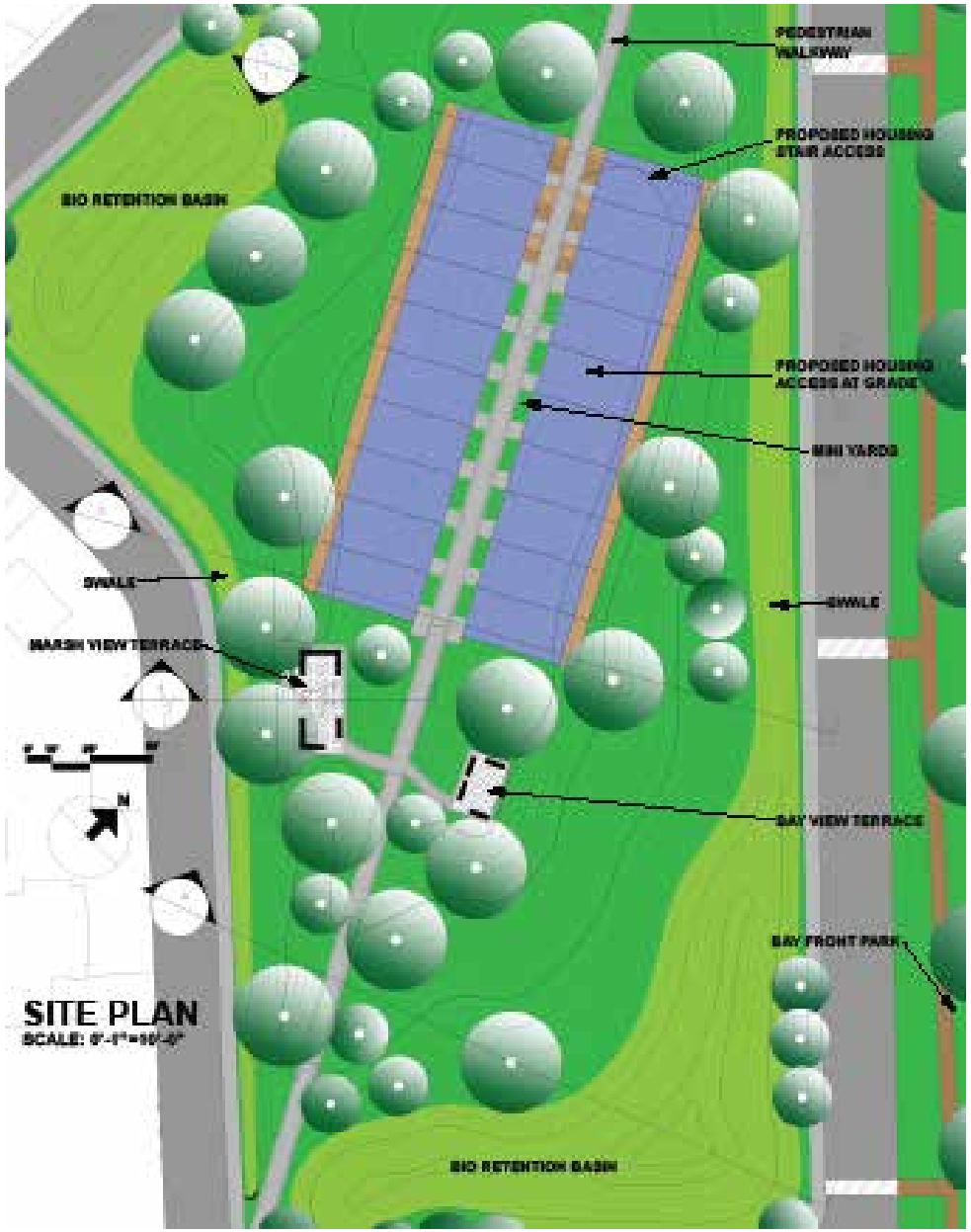
Section A

Section B

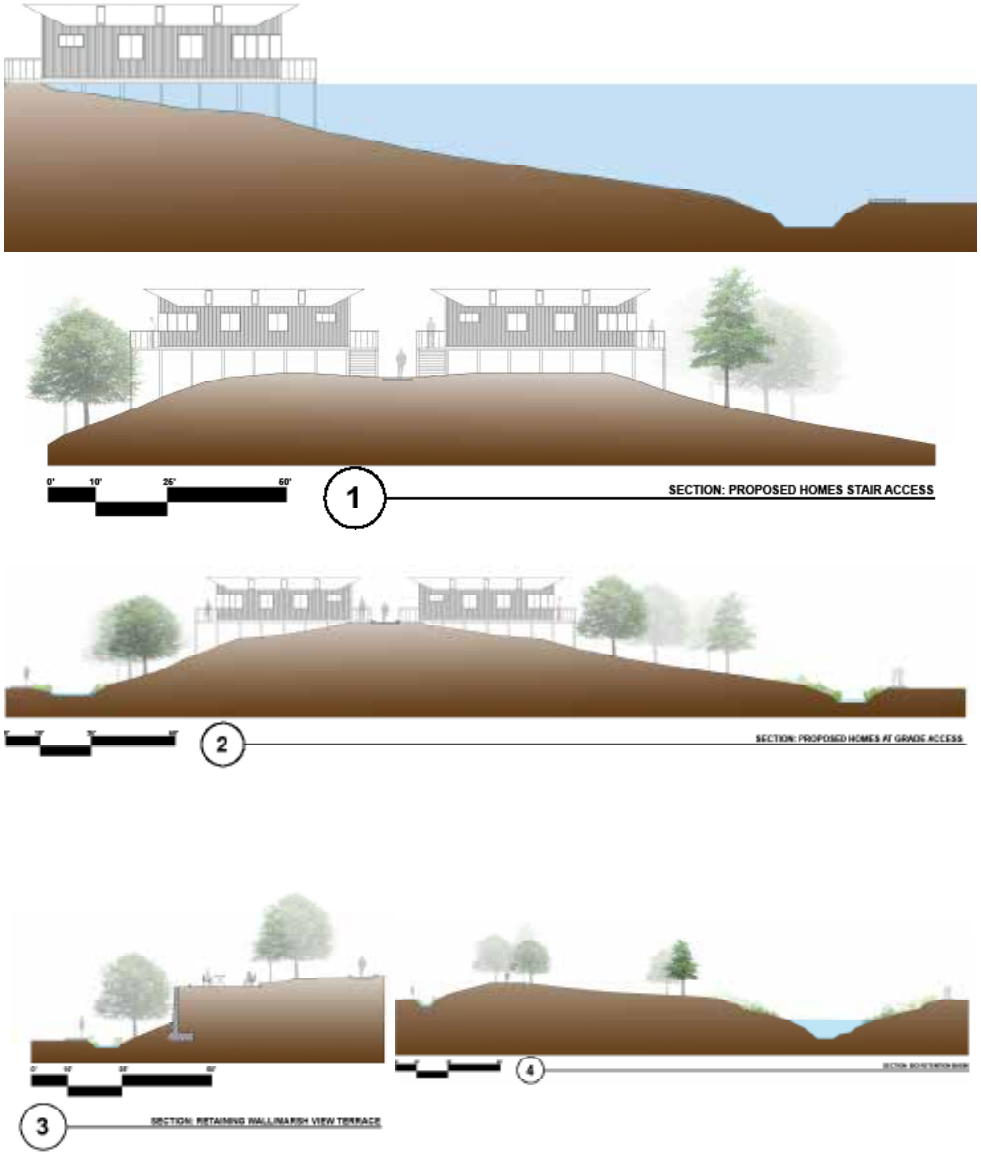
Raised Homes With Landform

Union Beach, NJ: Beach Front

Nate Kelly

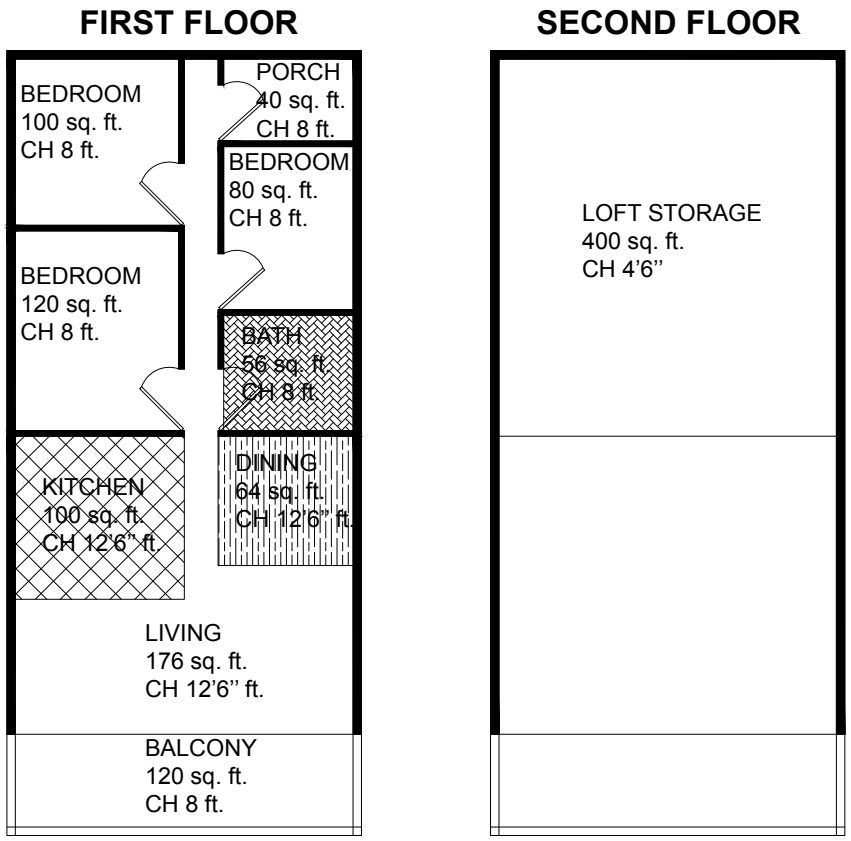


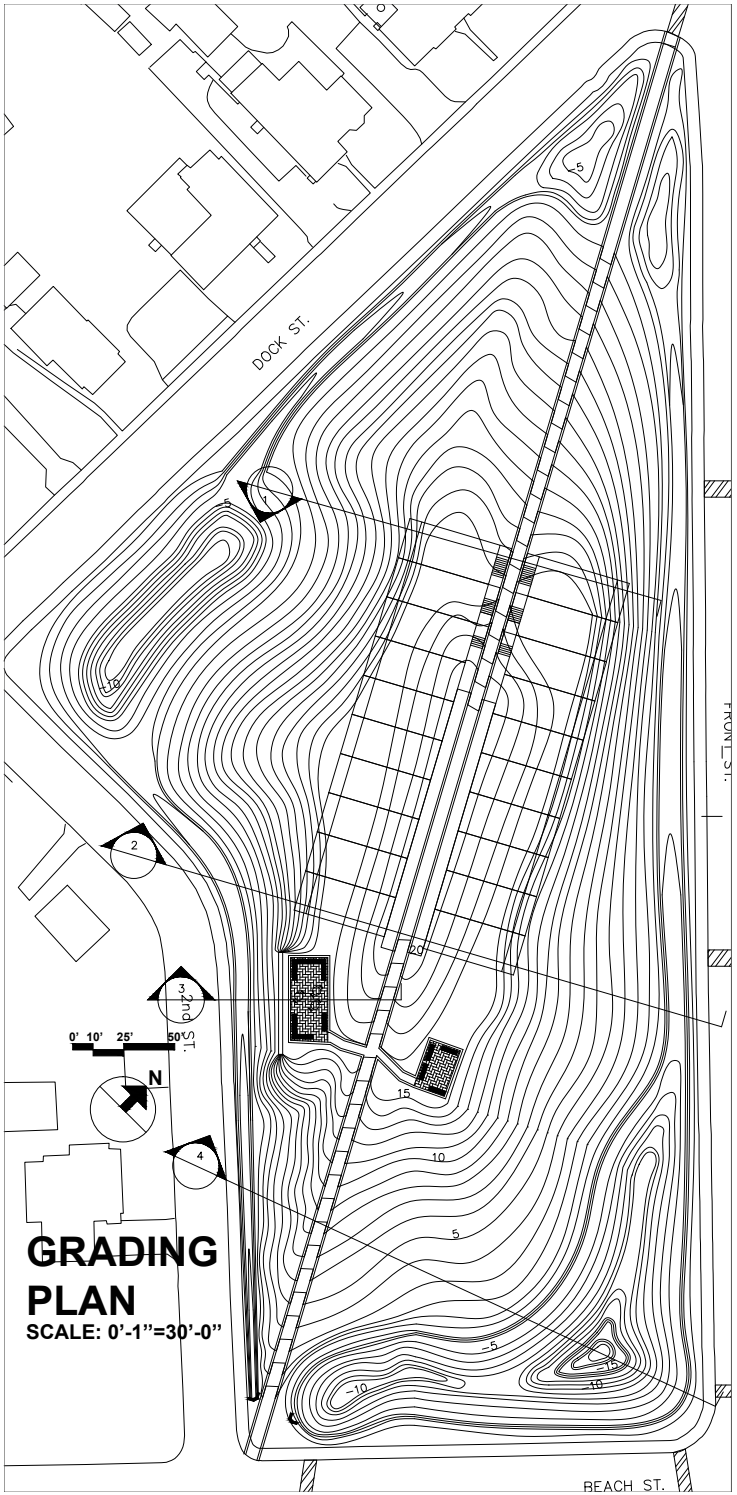
Conceptual Diagram: Flooding



To address the issue of ensuring a potentially resilient re-design of housing in Union Beach, the standard of raising homes as protection from storm surge and subsequent flooding. This conceptual design seeks to explore the possibility of using landform to raise homes, and to try and mitigate some of the spacial difficulties that ensue from projecting buildings 20' into the air. With resilience in mind the plan also seeks to explore the idea of smaller, efficent housing, that echos the historic concept of a beach front community composed of smaller closely related bungalows.

Living In 800 Sq. Ft.





Raised Homes and Dunescape

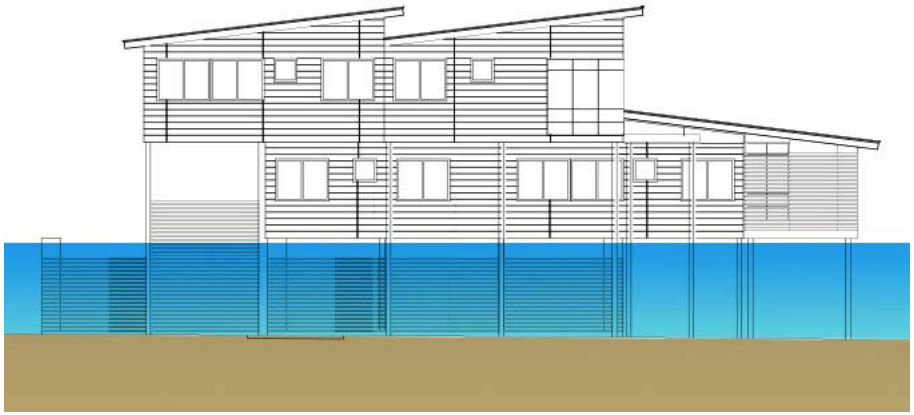
Between 2nd and Existing Front Street
Christopher S. Marshall

Sections

Master Plan

The design between Front Street and 2nd Street is a man-made dunescape with 3 different house heiarchies. Each unit is approximately 1000 square feet and can house a family of 3. The homes on this dunescape are lifted on pillars ten feet in the air which in some cases will have the dune plantings flow through these houses along with allowing enough space for residential parking.

The dunescape extends from 2nd Street past Front Street where part of the road is closed off and redirected behind Front Street on 2nd Street. The dunescape tries to replicate the New Jersey dunescape from the furthest away from the beach (dune woodland) up to the dune grassland.



The figure above shows a 3-dimensional rendition of how these planned homes would look in the landscape and how the landscape plantings will be able to flow through these houses to represent the dune as a natural system.

The figure to the left represents the newly raised homes in a flood event and where the water level would be if there was a storm surge such as the one from Hurricane Sandy along with taking into account the future sea level rise.

Raising the Paradigm

Strategic Masterplan for High Risk Coastal Habitation

Justin Morgan, Christopher Perez, Kim Richmond

Masterplan: Breaching The Suburban Grid

Union Beach, New Jersey has an intimate relationship with its waterways. The community lives unbelievably close to Raritan Bay and its tributaries. This experience is something to be desired and cherished; however due to sea level and climate change, the community is at a tipping point. In the wake of Superstorm Sandy it seems that future storms of similar magnitude are inevitable.

PROJECTED SEA-LEVEL RISE

NJ FLOODMAPPER/NOAA DATA

If the community wants to preserve their distinct character, water must be embraced as an asset rather than an adversary. Allowing the bay and its marshland to reclaim territory and replace impervious surfaces, human habitation and water become symbiotic. Letting tides flow in and out of existing and expanded water channels in combination with elevated housing is a compromise to permit the existence of Union Beach.

A proposed canal network in the footprint of the town's cross streets, traced by parks built for inundation and controlled by breakwaters will permit the water in a flood event to saturate these canals reducing the overall flood level. This combination of systems will allow the people of the town to retain their bayview and shelter their homes, while improving ecological services. Thus, accommodating the existing residents by addressing short term housing sensitivities and long term risk of inherent danger of coastal living.

Conceptual Diagrams

Hydrology Diagram

Circulation & Open Space Diagram

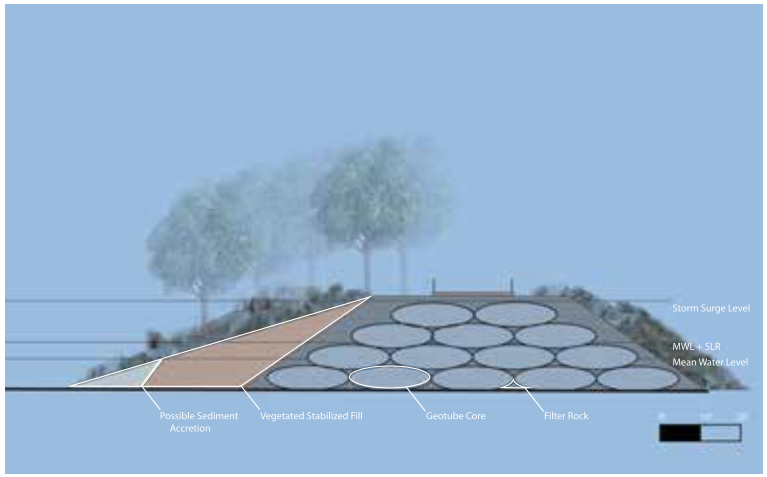
Brook Avenue Bayfront

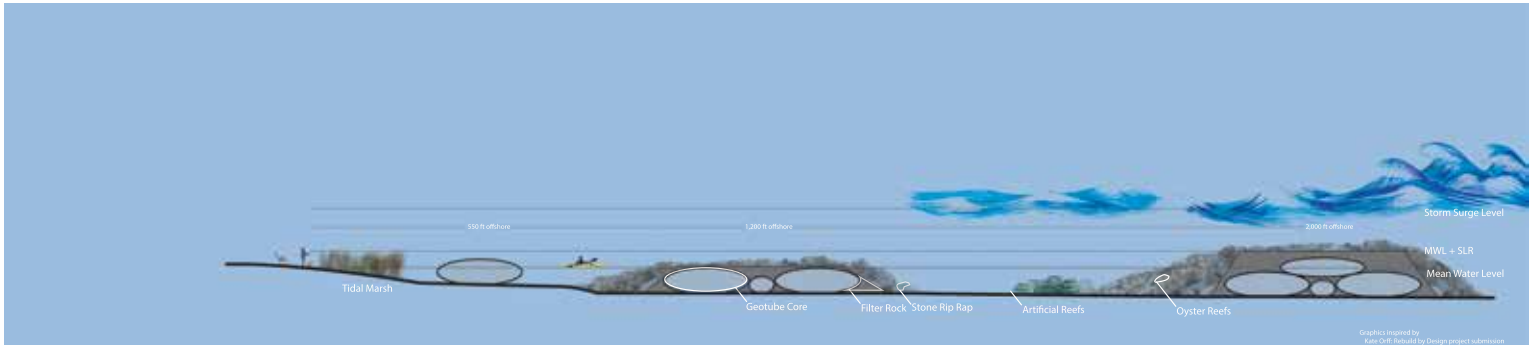
A New Outlook for Brook Avenue

Justin Morgan

Brook Avenue would become a greenway with trails through the marshland connecting to the Green Jetty and the Henry Hudson Greenway. The front yards of homes on Brook Avenue connect to the greenway and preserved coastal shrubland. Allowing residents on Brook Avenue space that is semi – public facilitating community congregation, such as block parties, fairs, markets, and everyday gathering. The newly preserved land can be used as a measure of success for the entire breakwater system as a whole. In time if the breakwaters serve to dissipate wave action the shrubland will not suffer disturbance and will mature into a coastal forest. Holistically the protection network increases ecological services, preserves the existing housing of Union Beach and overtime would evolve naturally accumulating shoreline as a headland for the town.

After Super storm Sandy, Brook Avenue in Union Beach suffered some of the worst damage from the storm. The offshore Breakwater system Proposed, would act to shelter the shoreline and marshland of Union Beach from future storm events. During a storm event the system would act as speed bumps for waves approaching Union Beach, causing the waves to crest before reaching the shoreline thus minimizing damage to the homes closest to the shoreline. The system would be submerged under normal high tide not obstructing the view of the Manhattan skyline. Under normal tidal conditions the water behind the Breakwaters will become calm and resemble an estuary. The calm waters allow for creation of ecological engineering projects such as artificial reefs and oyster reefs, further increasing the ecological value of Union Beach's marshland and waterways. A Green Jetty connecting to the shoreline of the IFF facility would be insurmountable by storm waves insuring that the Brook Avenue devastation would never happen again.





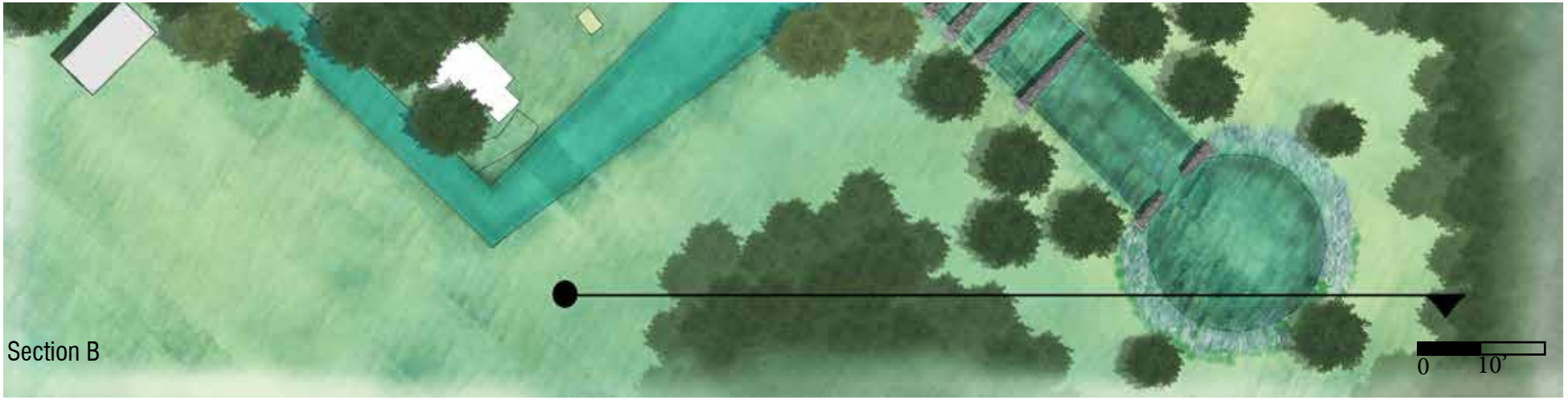
Open Space Planning

3rd Street, Union Beach

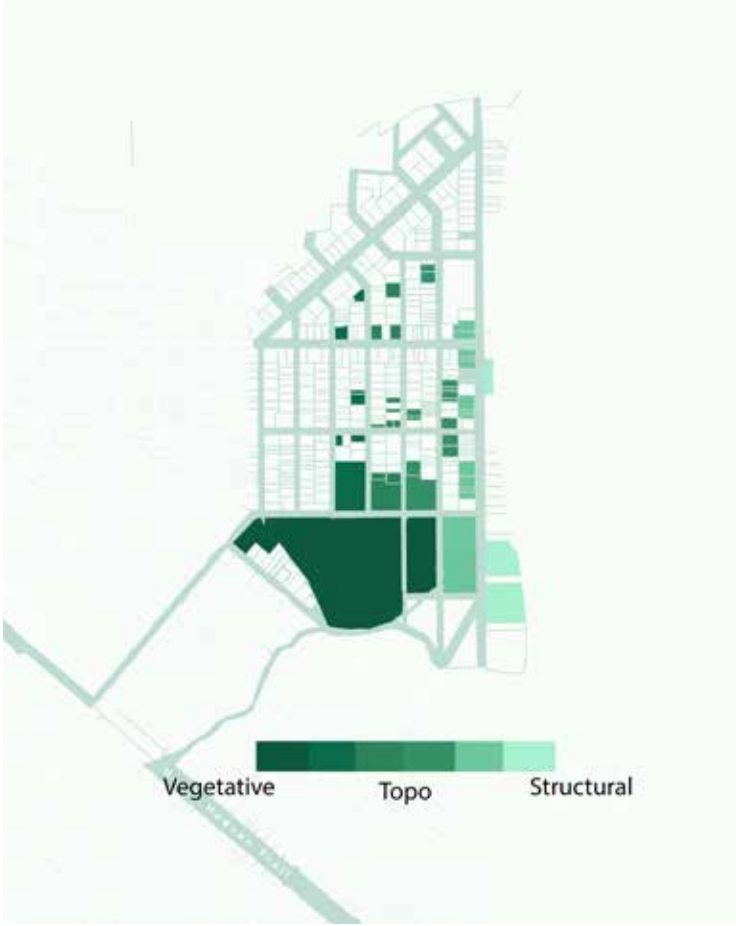
Kim Richmond

This studio explored the city of Union Beach and future design solutions for sea level rise. In our group design we explored canal systems that would replace the streets and create a new means of circulation. These canals would be able to easily access the waterfront to the roads outside of the canal systems. This design solution explores open space zoning in regards to the canals and how they would redefine what is open space in Union Beach. The different zones of open space address future storm surges and sea level rise. Parks in Union Beach will not only be recreational, but also provide a service to the community as protection. The ranges of solutions are from structural which will mostly occur along the shore line to a topography park that is set back two to three blocks. The last typology of park structure is vegetative which has the least chance of storm surge damage. In areas of inbetween there is freedom to design with two or more of these solutions. This would allow adversity of open space, but maintain a level of security for the community i9n the future.

Section A



Each rendering highlights the different visions for how to plan Union Beach's open space. The open space closest to the shore shall be structural. Types of open space two blocks back will be defined by topography. The farthest and safest parts of Union beach with the least need of protection will be designed as vegetative with the option of any of the other open space types. The diagram shows the zoning through color gradients and where there is overlap.

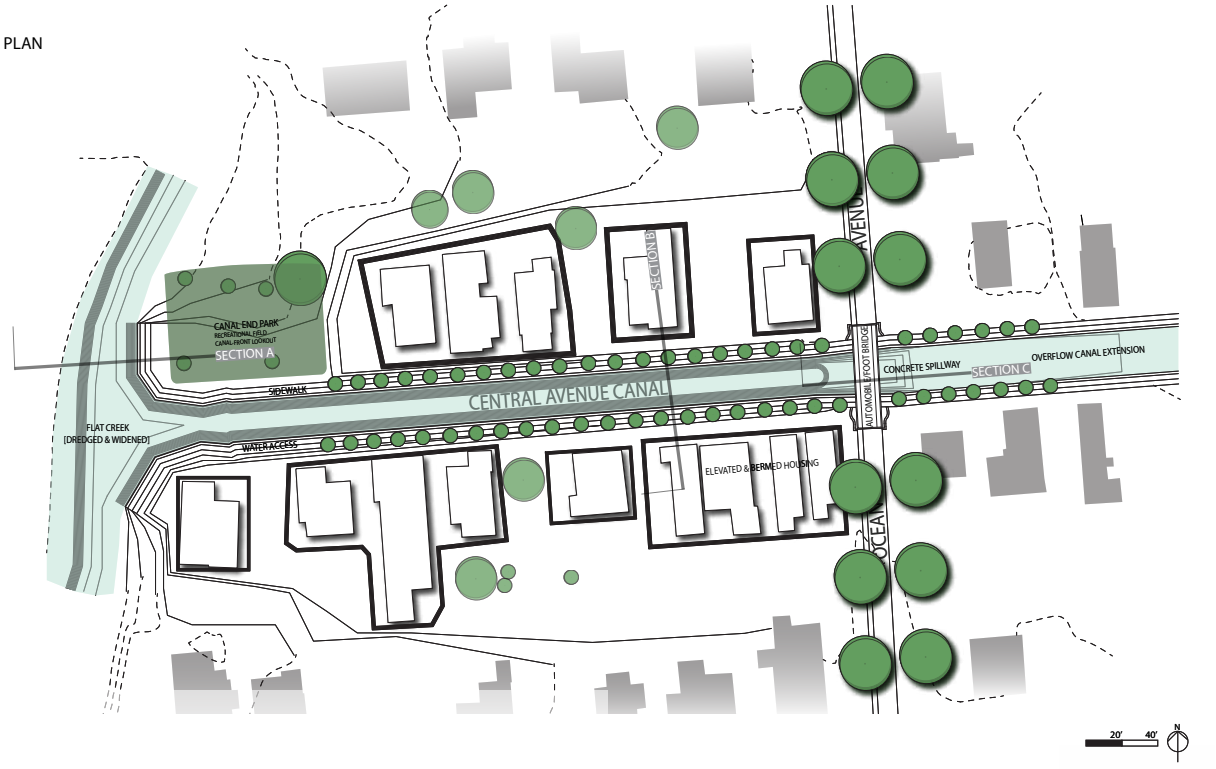


Water Inbound

A Contemporary Canal Oriented Community

Christopher Perez

SITE PLAN

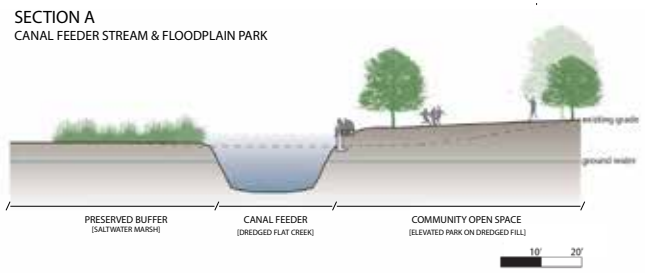


By converting cross streets [East-West] into canals in tandem with elevated single family housing, Union Beach will be a more secure and prepared coastal community. Canals will now rest in the footprint of residential streets and permit the use of watercraft for travel and recreation. The impacts of this are two-fold, as the canals provide for the storage of water and offer residents with an alternative transit system under the assumption of sea level rise.

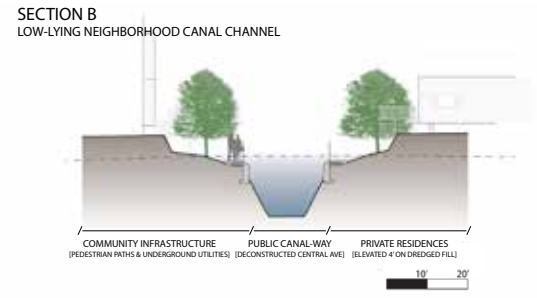
Simply raising existing homes stirs novel questions of aesthetic and functional urban quality. How do people reach their new door height, and how do they adjust to living at an exaggerated vertical elevation? How do people reach and access their outdoor space, both public and private? These questions will be answered by making a vertical adjustment to ground elevation, localized at each residents home. Completed using dredged fill from the deconstruction of the roads, earthen berms will effectively provide a comfortable step up to the elevated home height.

Neighborhoods are best defined by their public infrastructure. A key provision of this plan is the creation of flexible open space, located along the canal walks, stream bank parks, and within the shallow overflow channels. By expanding the recreation network for more spontaneous and adaptable opportunities, there will be growth in community interaction and social adoption.

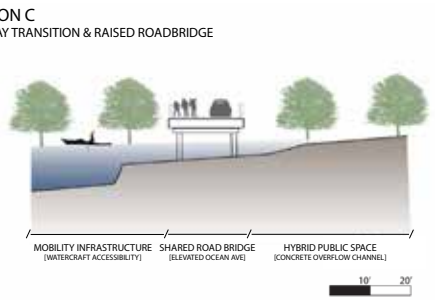
SECTION A
CANAL FEEDER STREAM & FLOODPLAIN PARK



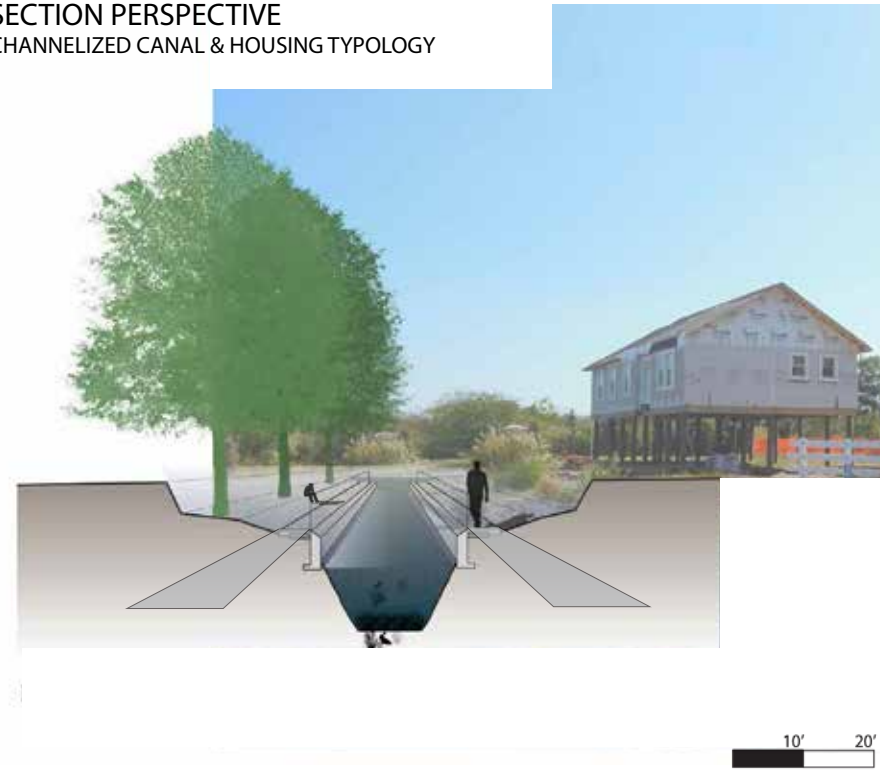
SECTION B
LOW-LYING NEIGHBORHOOD CANAL CHANNEL

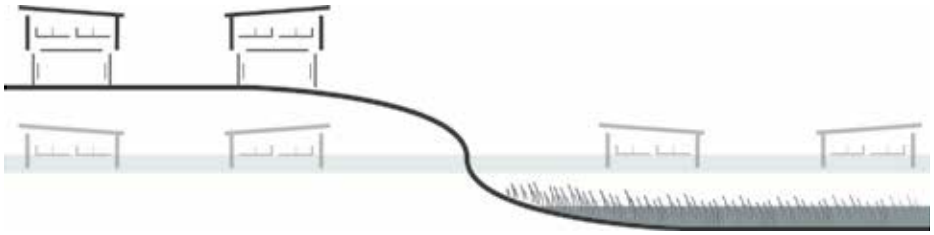


SECTION C
SPILLWAY TRANSITION & RAISED ROADBRIDGE



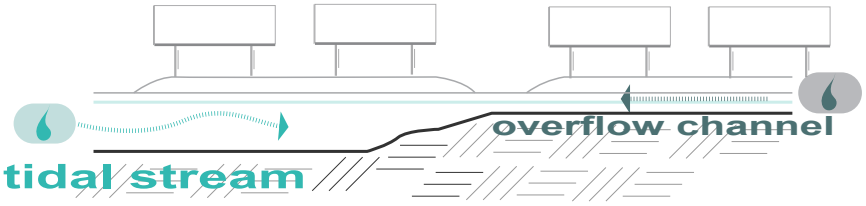
SECTION PERSPECTIVE
CHANNELIZED CANAL & HOUSING TYPOLOGY





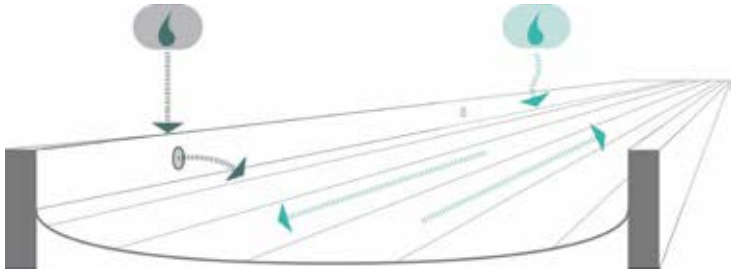
Home typology

Raising houses is an adequate solution for the immediate risks of flooding and sea level rise. Rethinking the way residents access and travel to/from their homes is the start of a paradigm shift in resilient community planning. Raised housing will be enhanced by earthen berms, reflecting an inverted shape of the canals.



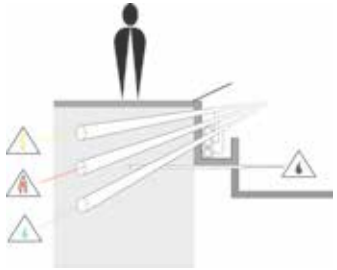
Transect hydrology

Waterflow in and out of the canals will be held constant by bay tides at the stream bed elevation. Over time, the water level will surpass the dredged stream depth and fill the overflow channel. During time of inundation, the overflow allows for water craft access and during dry periods, a community plaza.



Channel hydrology

Canal water sources are meandering saltwater wetland streams. To increase water capacity and ensure positive drainage, the streams are dredged and graded. Water depth is subject to tidal influence and can overflow into the channelized high point of the canal, located midway between the feeder streams.



Public utilities

During the road deconstruction, public utilities will be upgraded and relocated to the peripheral edges of the road-bed. The network of connecting pipes would be shared in a watertight container buried underneath the elevated concrete sidewalk. Stormwater collection in the canals would reduce load on the existing drainage network.

Safescapes

A Spectrum of Safety for Union Beach

Jessie Woods, Michelle Hartmann, Rebecca Cook

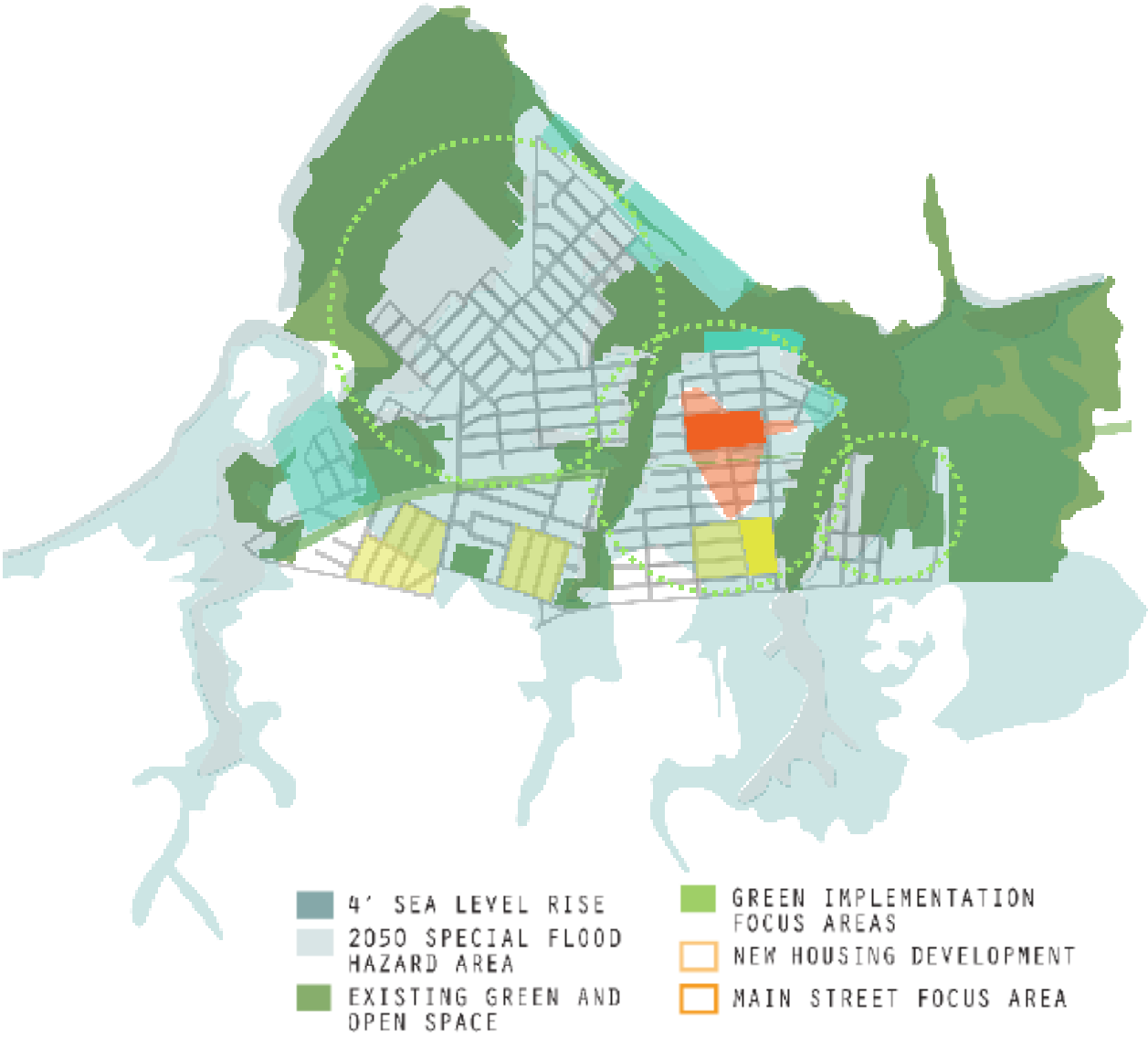
SCALE 1:100

Since the destruction of Hurrican Sandy, Union Beach has been forced to address how it can rebuild in a way that will prevent such damage in the face of another super-storm. The challenege of this coastal town is not to recreate the existing, but to redesign a more resilient landsacpe to withstand the shock of the physical and economic storms of the future. With drastic climate trends and rising sea levels, more and more coastal areas are vulnerable to the damages of storms like Hurriance Sandy, and on a more frequent basis. As a result, it is hard to maintain a feeling of safety in day to day life.

This plan employs a spectrum of 'Safescape' designs that utilize geographic, infrastructural, and ecological solutions in order to attain a more achieveable feeling of safety. Safescapes are designed with a realistic approach; understanding that completely shielding Union Beach from future storms is not possible, but mitigating the physical, social, and economic damage is.

Each of the different safescape typologies utilize vegetative buffers and open space to manage stormwater, mitigate storm flooding, promote biodiversity and habitat, and create recreational open space for citizens. The buffers take many shapes, including bioswales, rain gardens, vegetated topographic landforms, and artful retention areas. At the townwide scale, a variety of safescapes can be implemented to unify three the main areas of development within Union Beach.

Of the three predoiminantly residential development rings, a portion of the center ring encompasses the main street area; an area that happens to be a "safe zone" from both sea level rise and storm surge flooding. Our design aims to transform the currently designated main street into a successful hub for the community by creating a development with a strategic mix of building types. This area will serve as the crux of Union Beach, even in times of innundation, by balacing business, civic, housing, and open space uses that will best serve the community's needs. In the southern floodprone residential region, a new style of community housing and open space provides Union Beach residents with a successful yet storn adaptable style of living. In the nothern region diretly adjacent to the bay, a topographic landscape park overtakes previously developed lots destroyed during the storm, preserves, and repurposes the land to provide ecological benefits for the long term survival of the town. Together, the three safescape designs provide a spectrum of options for living with water in Union Beach.



Revitalization of Union Avenue

Downtown Development Between Columbia & Park Avenue

Rebecca Cook

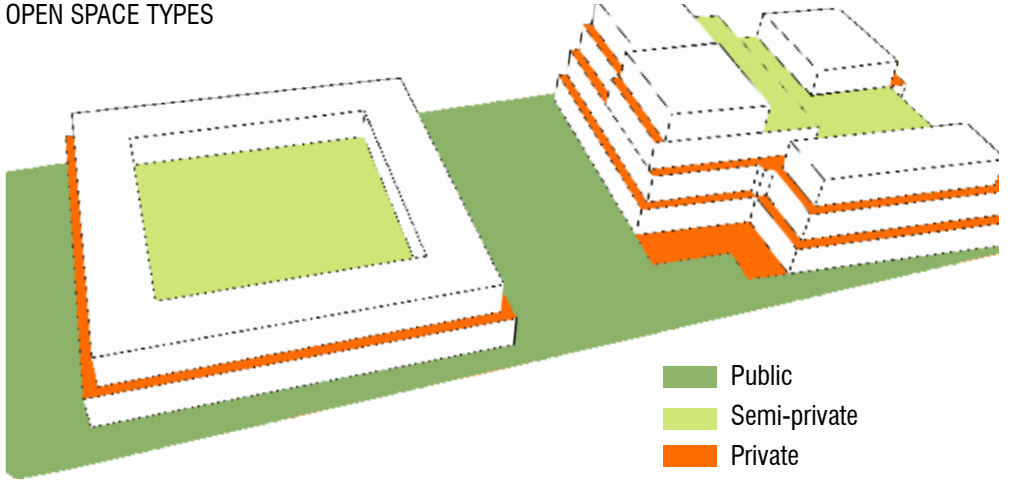
SCALE 1:20

THE PUBLIC'S "BACKYARD"

CROSSING UNION AVENUE

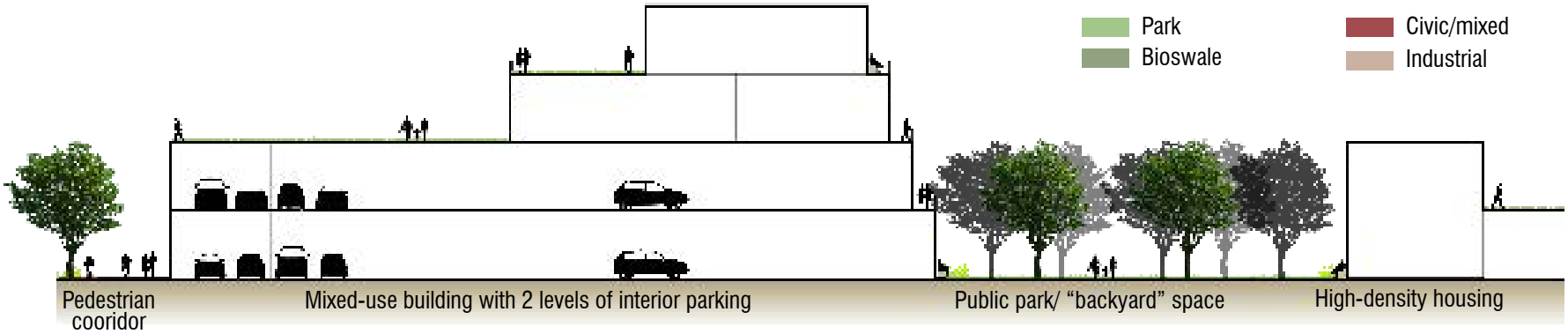
Redeveloping Union Avenue as the town's "main street" is a vital part of making it more resilient. The land in this zone is especially valuable because of its natural topography, it is predicted that it will not be negatively effected by future flooding and sea level rise. For this reason, the town needs to get the most value out of the land there by developing the perfect mix of land use types to best serve Union Beach's community. Increasing residential density and defining the avenue as the civic and commercial core of the community is key in promoting a healthy economy and community infrastructure system that can withstand physical and economic storms of the future. Developing the appropriate mix for the town will allow businesses to thrive and supply citizens with a community hub for programs and easy access to vital civic offices. Application of urban design principles such as pedestrian-friendly access, preservation of natural systems, and newly designed spaces with the intent to engage the community users and non-local visitors were main points throughout this portion of the town's redesign. Another important factors considered was how design can preserve Union Beach's aesthetic character in newly implemented setting. References to the preexisting plant material, street furnishings, signage and circulation will help to blend the new style to the old. In addition, the mixed land use will still have a focus on providing safe places for residents to live that still affords them the private outdoor space they maybe acclimated to along with larger, communal green space that will reinforce the idea of a new style of community living for UB.

OPEN SPACE TYPES



LAND USE

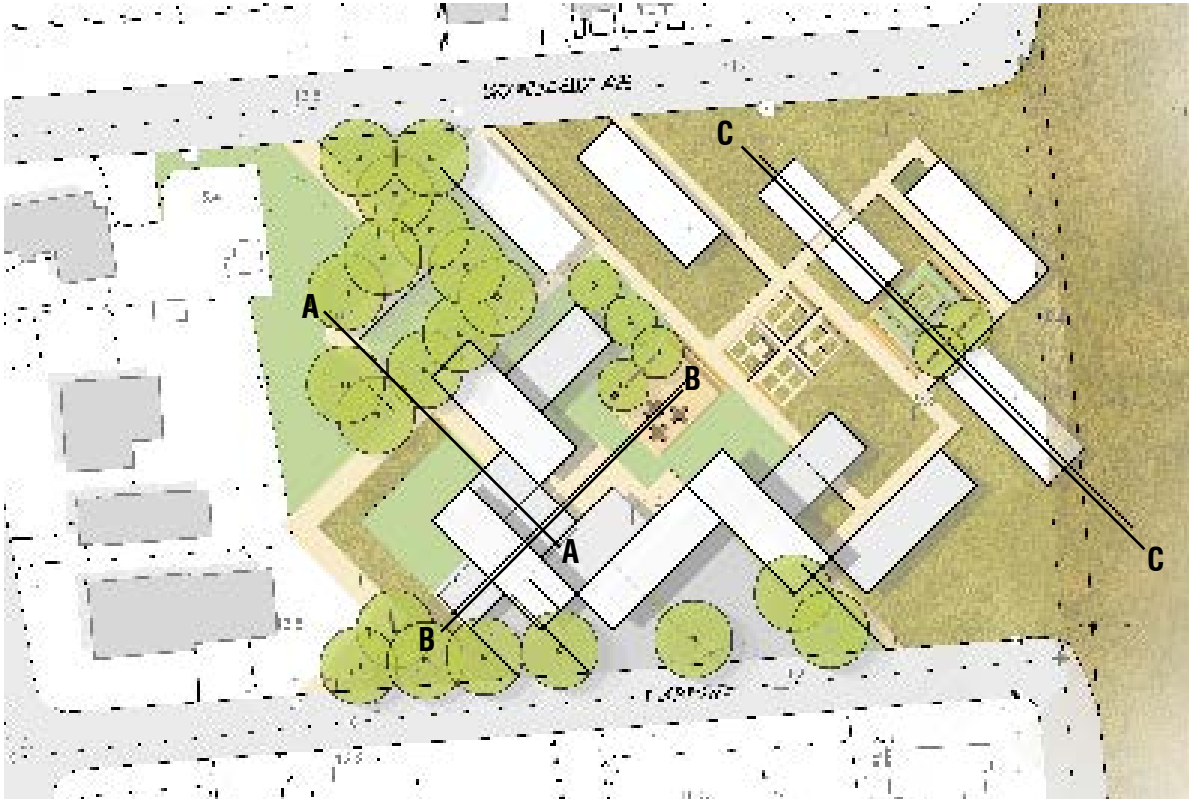
SECTION A-A:
Spatial relationship between mixed-used + high density housing buildings



SCALE 1:10

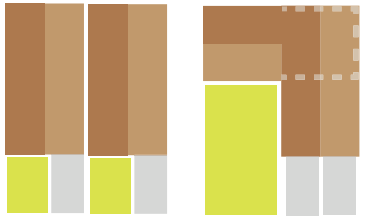
Safety in Numbers

Community Housing Development on Clark Avenue
Michelle Hartmann



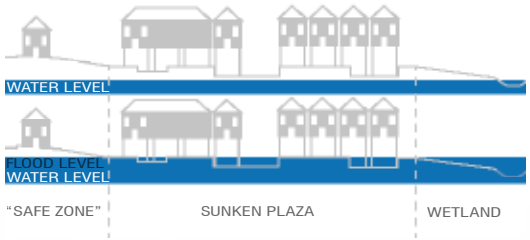
SHARING OPEN SPACE TO PROMOTE COMMUNITY

The goal of the design is to contribute to the idea of redefining safety as something more than just a barrier or sea wall. This community housing project aims to develop a sense of safety on a very localized neighborhood scale. "Safety in numbers" refers to the feeling of security when you are with a group of people. This medium density housing development is desgned to mimic that secure feeling through close proximity to other dwellings. However, because of the value of the single family home, community housing does not sacrifice the square footage of the average home. Instead, through a sequence of open spaces, the community is brought together outdoors in a series of sunken plazas and lawn areas.



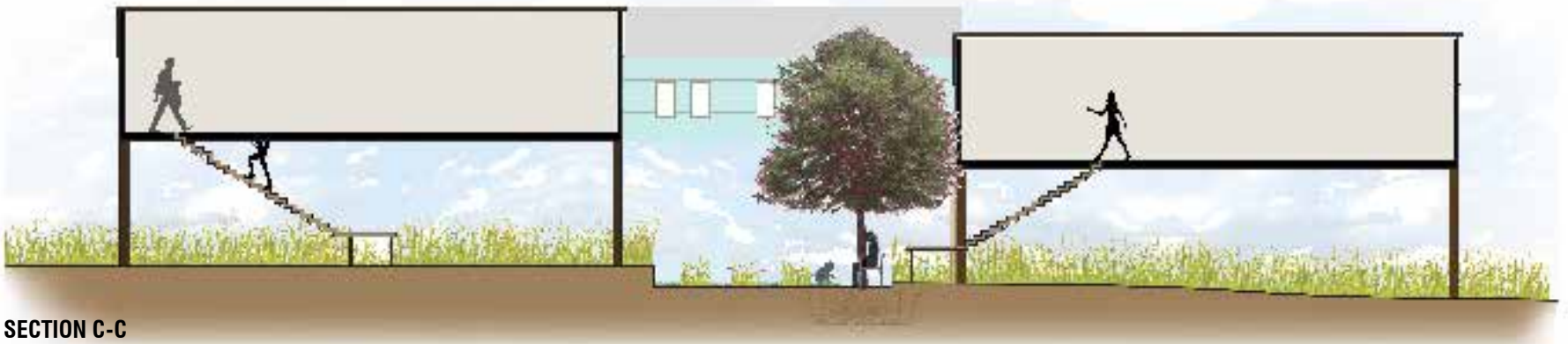
MANAGING STORMWATER IN RETENTION PLAZAS

The "sunken plaza" is designed as a semi-hardscape retention area for additional storm security. Because the ideal redevelopment areas are typically only suseptible to "backflooding" the ponds offer a desireable program when dry, and a view when flooded.



SECTION A-A

SECTION B-B



SECTION C-C

BEFORE

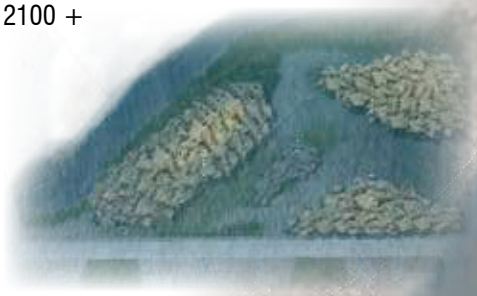
AFTER

Safescapes

The Brook Avenue Buffer
Jessie Woods

SEA LEVEL RISE
2050

2100 +



In the aftermath of Superstorm Sandy, some of the most devistating damage was seen in the blocks directly adjacent to the Raritan Bay. Homes were ripped up and away from the storm's surge and even if fortunate enough to hold on, the structural damage sustained required complete demolition and reconstruction anyway.

The Brook Avenue Buffer is a softscape solution that occupies currently vacant lots in this especially susceptible area of the town's coast and creates a multi-use, enduring landscape park that provides both social and ecological open space benefits to the residents of Union Beach. This design aims to reuse recycled materials produced by the reconstruction and revitalization of Union Avenue and adjacent neighborhoods in order to create undulating topography that helps to attenuate wave energy and mitigate storm surge as well as visually lessen the drastic difference in height between the ground plane and the new elevated living level of surrounding homes. The 'rubble' from the downtown main street redesign, including former building foundations, sidewalks, and paving, that will be constructed into a series of varying mounds over time as more and more material is produced. As sea level rises, the bay will begin to innundate the lower levels of the park and create isolated islands in which residents can discover and create a new variety of open space uses. Eventually, the mounds will be overtaken by rising water levels and evolve into 'rubble reefs'- a series of underwater structures that will ideally reduce wave velocity and potentially form new habitats and recreation.

PARKLAND PHASES
2025

INNUNDATED ISLANDS
2050

RUBBLE REEFS
2100+

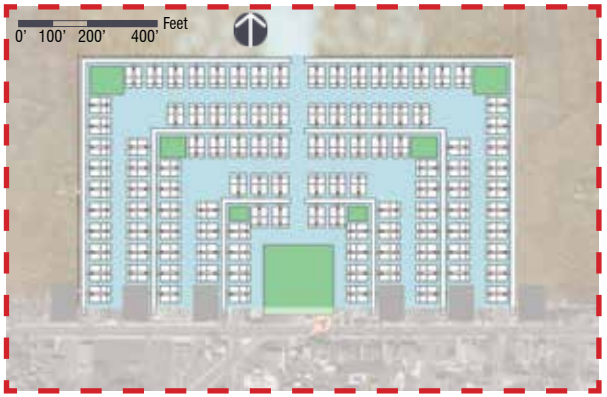
3.4 Living on Water

Rising to the Challenge

Union Beach, NJ
Deanna Lu, Joshua Mieloch, Sara Yildirim

Master Plan

In response to the increasing water levels and the devastation of Hurricane Sandy, three different housing plans were designed to increase the resiliency of Union Beach. Each design tackles a different solution in a unique setting. The morphological box graphically represents the existing conditions and important criteria taken into consideration in each design, specifically circulation, housing, open space, parking, storm protection, and vegetation. All designed to protect the immediate homeowners, these resilient strategies are implemented at the edge of Union Beach and create a protective barrier for the town as a whole.

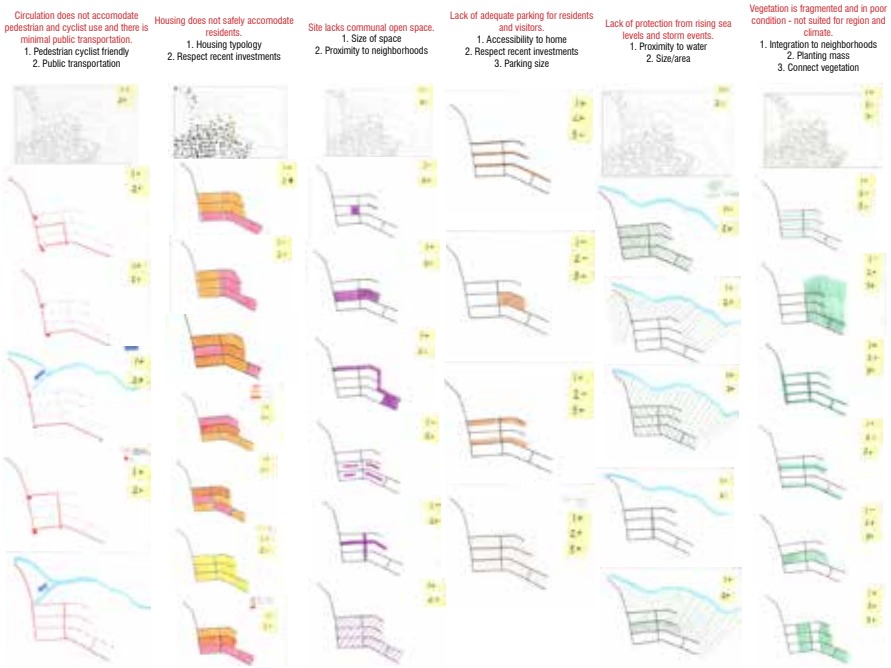


Living with Water Plan

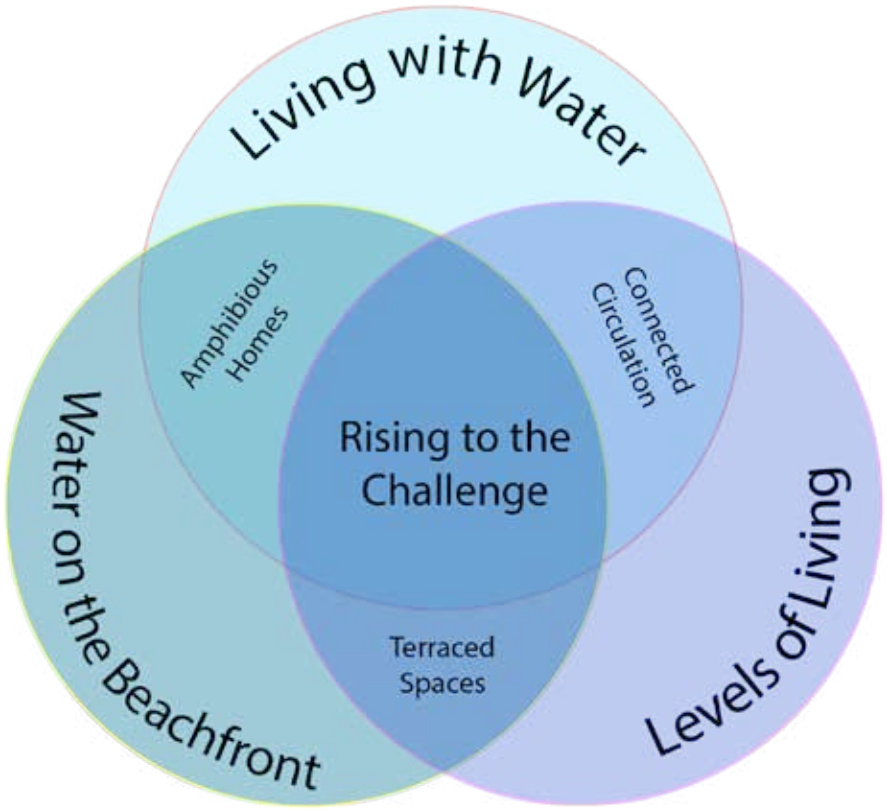
Water on the Beachfront Plan

Levels of Living Plan

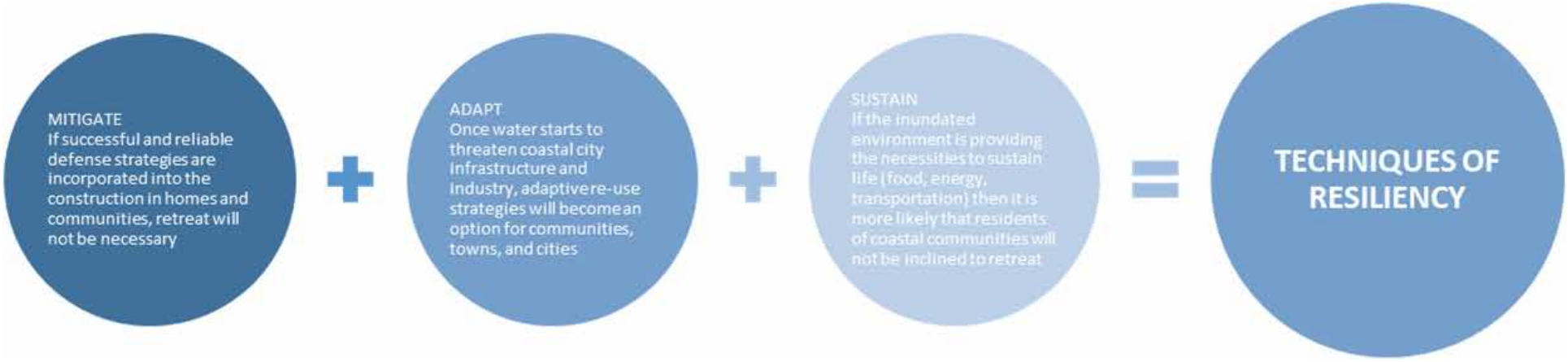
Though each site is independent from the other, all three plans have a common theme. By having a similar element in each site, these common factors generate a sense of familiarity between each individual area, creating a sense of comfort in unison with the collective theme of resiliency.



Morphological Box



Comparison Diagram



Water on the Beachfront

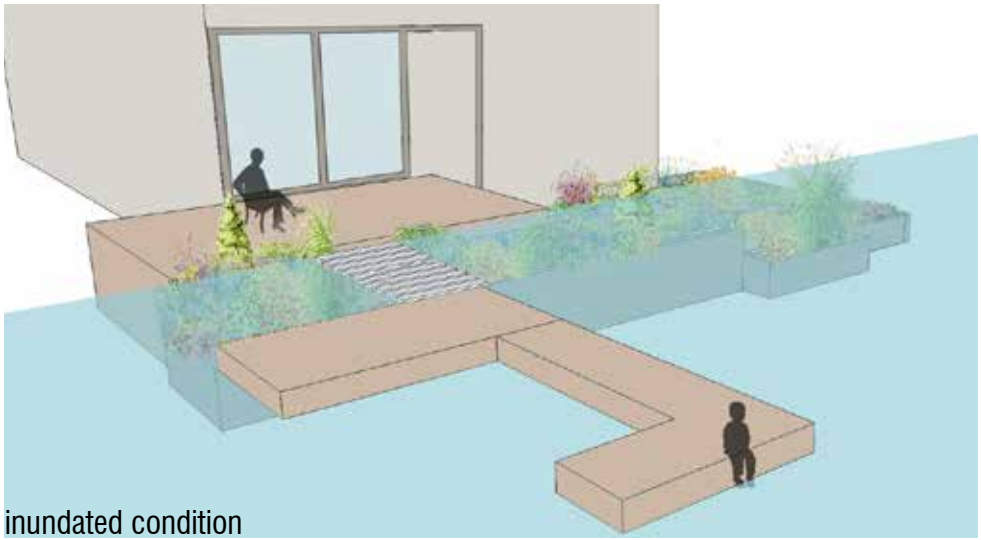
Existing Front Street

Sara Yildirim

plan

Union Beach is faced with both rising sea levels and reoccuring flooding. By designing to tackle these issues, residents of this town are able to continue living in their homes with the water. The amphibious home replaces the traditional house that often succumbs to flood devestation and provides comfort and safety for its residents. The home rises as water levels increase by means of permanment vertical posts secured into the ground that work with pontoons to raise and lower the house accordingly. A key component of this design is the implementation of terrace gardens that are designed to function as a flood warning system. These gardens are meant to accomodate water and also work to manage runoff from the house after events like flooding. When sea levels are at a permanent 4 feet, the residents of this area will be comfortable living with the water and may even learn to enjoy its presence within their gardens and living space. The design replaces the existing Front Street with coastal marshlands that mititage flooding and storm surge.

dry condition



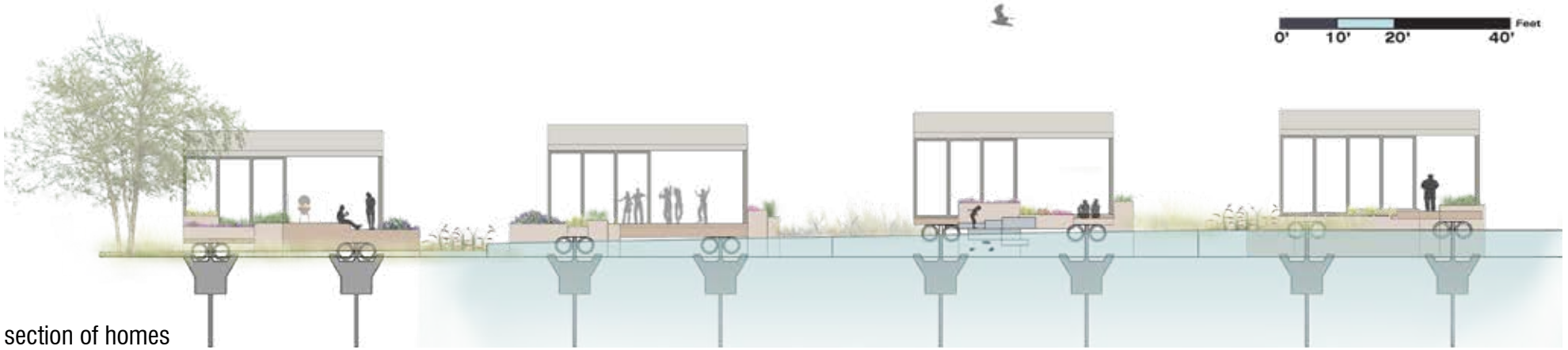
inundated condition

Each home has a its own private space where residents are free to design as they wish, with planters, plants, and gathering spaces. Connected to each home is a floating dock system that floats as water levels rise. This dock functions as a connection to the series of wooden walks out in the wetland park of where Front Street once stood. This way, residents have a connection to a large open space to use for recreation. The floating dock is also a means of transportation, a place to park a small boat. Once waters are at a permanent stance, the residents will still be able to live in their homes and travel to and from their houses.

In Union Beach, individuals are choosing to remain in their community, where they feel a sense of place despite risk factors and threats to the livelihood of the town. For this reason, it is important to advocate building and architectural techniques adaptive to the problems of water at hand. The development of architecture that can be applied to living with water is a solution that can respond to the

dock perspective

section of home and marshlands

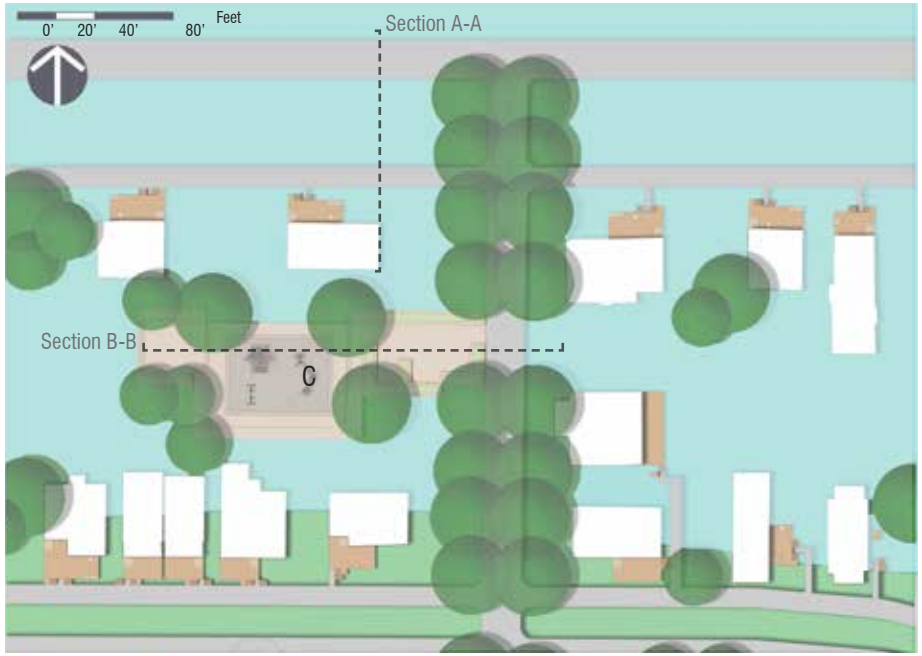


section of homes

Levels of Living

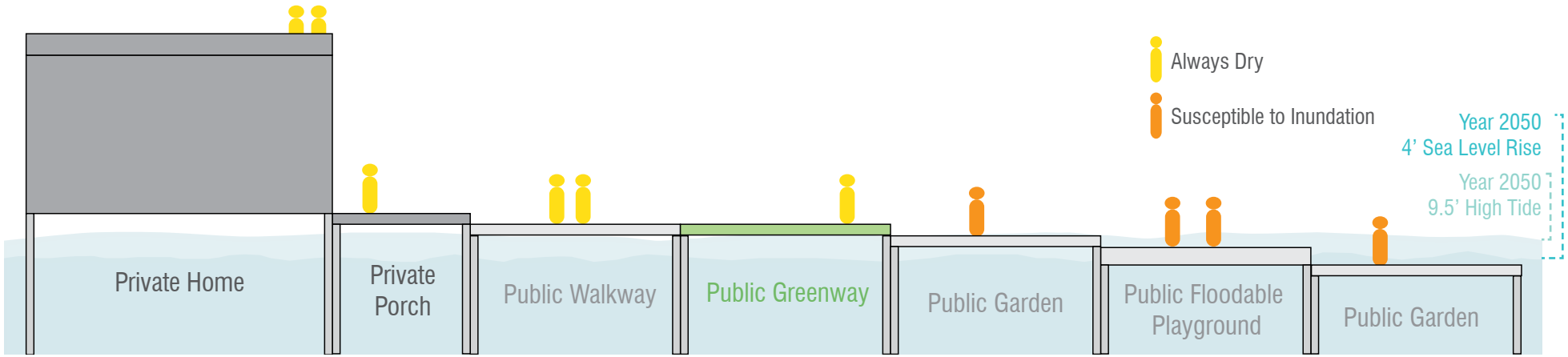
Elevated Housing between Brook Ave and Prospect Ave

Deanna Lu



This design aims to protect the citizens who live close to the water. In order to deal with the rising sea level, homes, open space, and circulation is elevated off the floor creating a new way of life above the ground. Because of the new marsh environment, cars will be relocated to a parking deck further inland, making this part of town pedestrian and cyclists only. The elevated public walkway provides a means of communication between neighbors during storm events and acts as one way streets for emergency vehicles.

The public walkways are connected to the greenway and leads to a boardwalk along the water. Elevated terraces branch off from the greenway, creating new open space for the citizens. These terraces gradually slope back down to the ground, allowing people to use the open space on the floor when it is still dry.

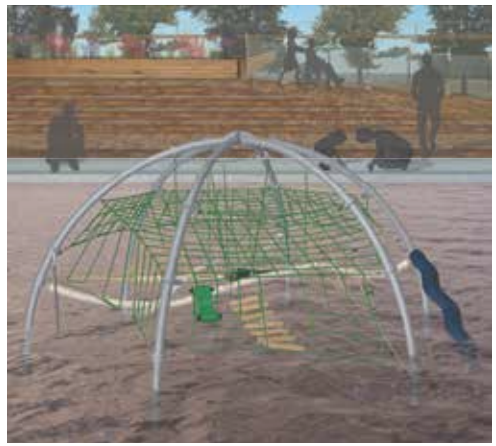


Levels of Living Diagram

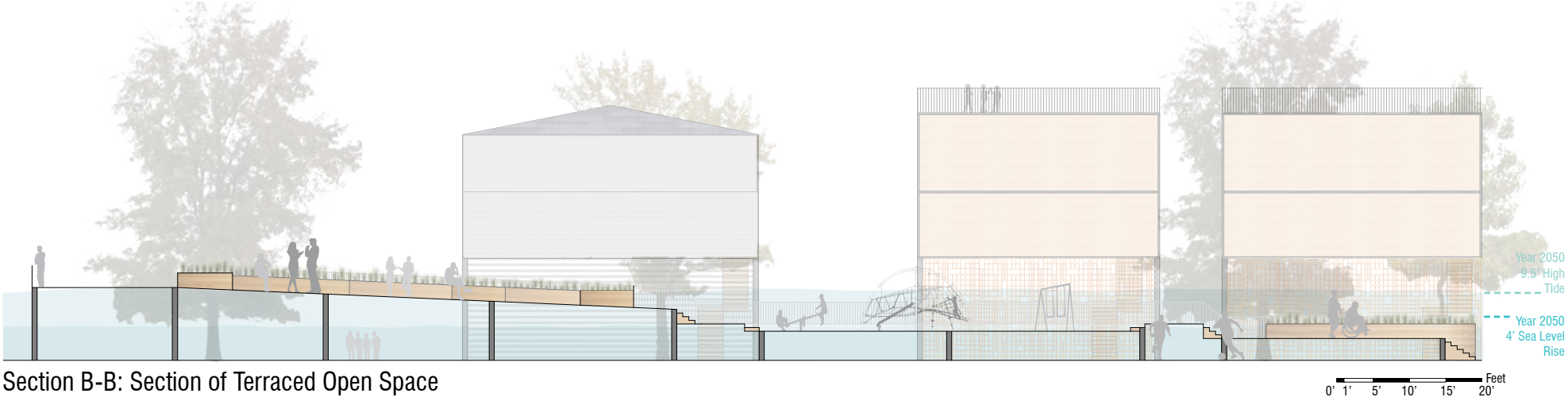
The public greenway and the public walkway serves as the main mode of circulation before, during, and after a storm. Raised high enough so it is not inundated during flood events and high tide, it becomes the main arteries of this newly elevated community. The new open space branching off the greenway creates different layers of recreation depending on the level of water. The floodable playground, which is elevated above the 4' sea level rise, is susceptible to inundation during high tide. As the water recedes, the floodable playground retains one foot of water in the center, creating an ephemeral water playground.

Section A-A: Section of House

Perspective C: Floodable Playground



Perspective C: Floodable Playground



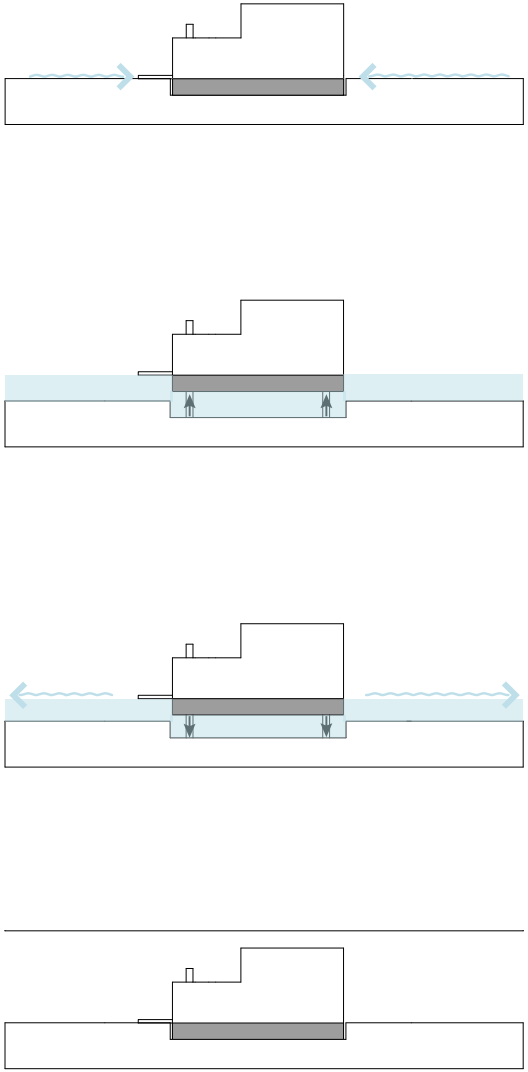
Section B-B: Section of Terraced Open Space

Living with Water

Community Development Between Bay Ave and 9th Street
Joshua Mieloch

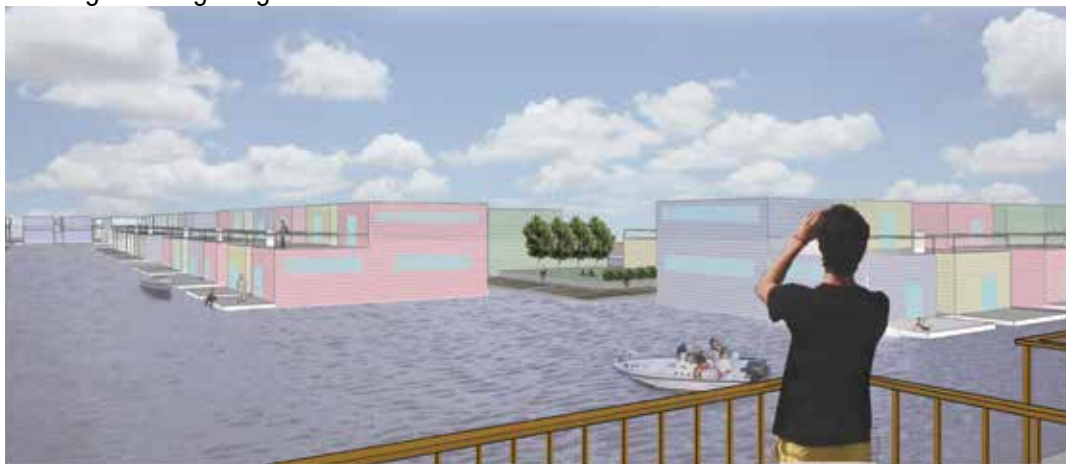
Plan

Floating Housing Diagram



This design is located on the West side of town adjacent to the marshlands. This site was chosen because it is in great danger of being flooded and overtaken by sea level rise, even though it is not right on the water. By 2100 the whole site will be underwater. Instead of fleeing the coming water this design focuses on living with it. The houses are designed with buoyant foundations and are meant to rise and fall with floods, tides, and sea level rise. Not only are the houses designed this way but so are the pedestrian walk ways leading to each house. This allows the community to function in these wet conditions. The community itself is designed with permanent sea level rise in mind, with future boat access accommodated as well. The goal of the project was to design a community that could live and function in wet conditions without having to raise up to protect themselves.

Floating Housing Diagram

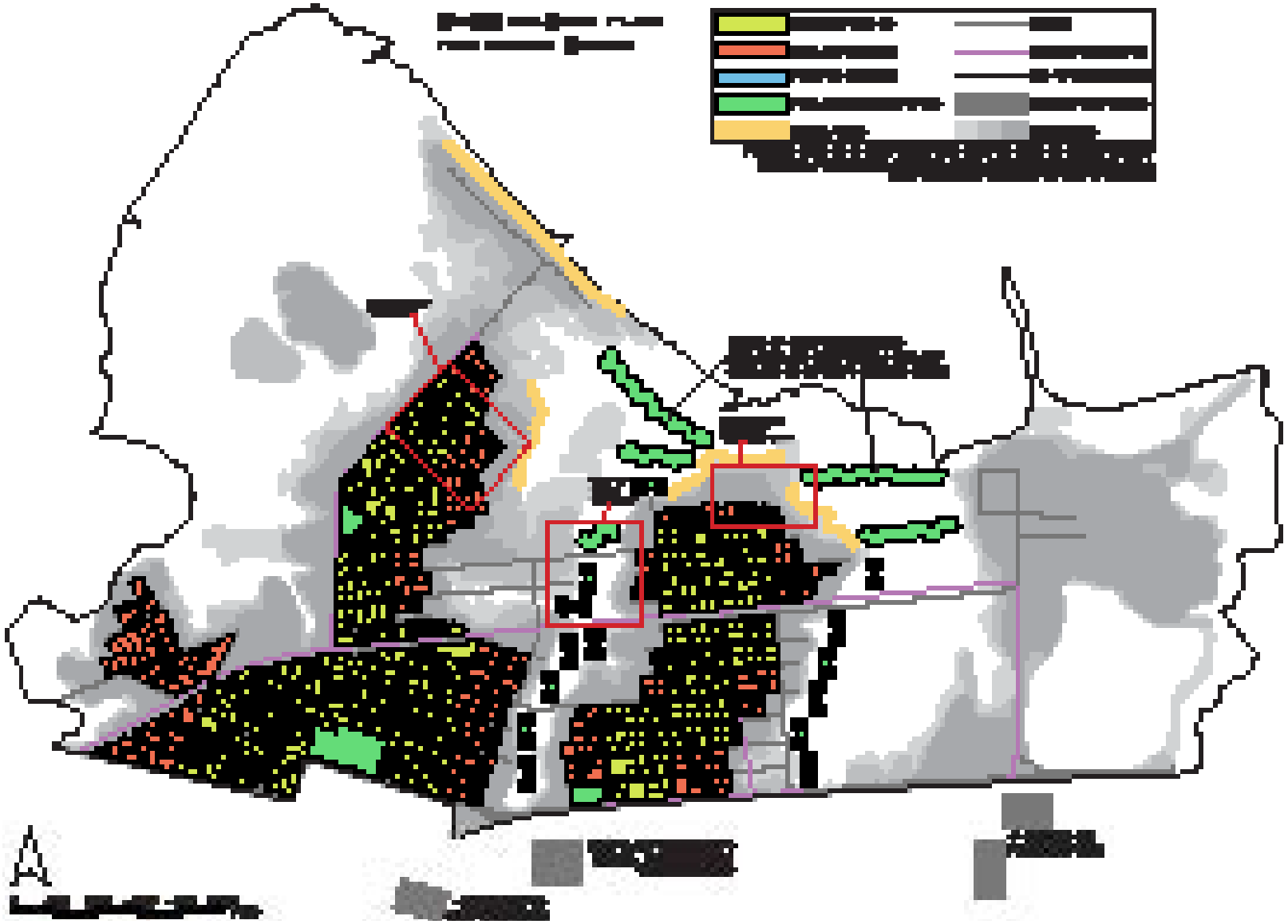


Floating Housing Diagram

Section E-E

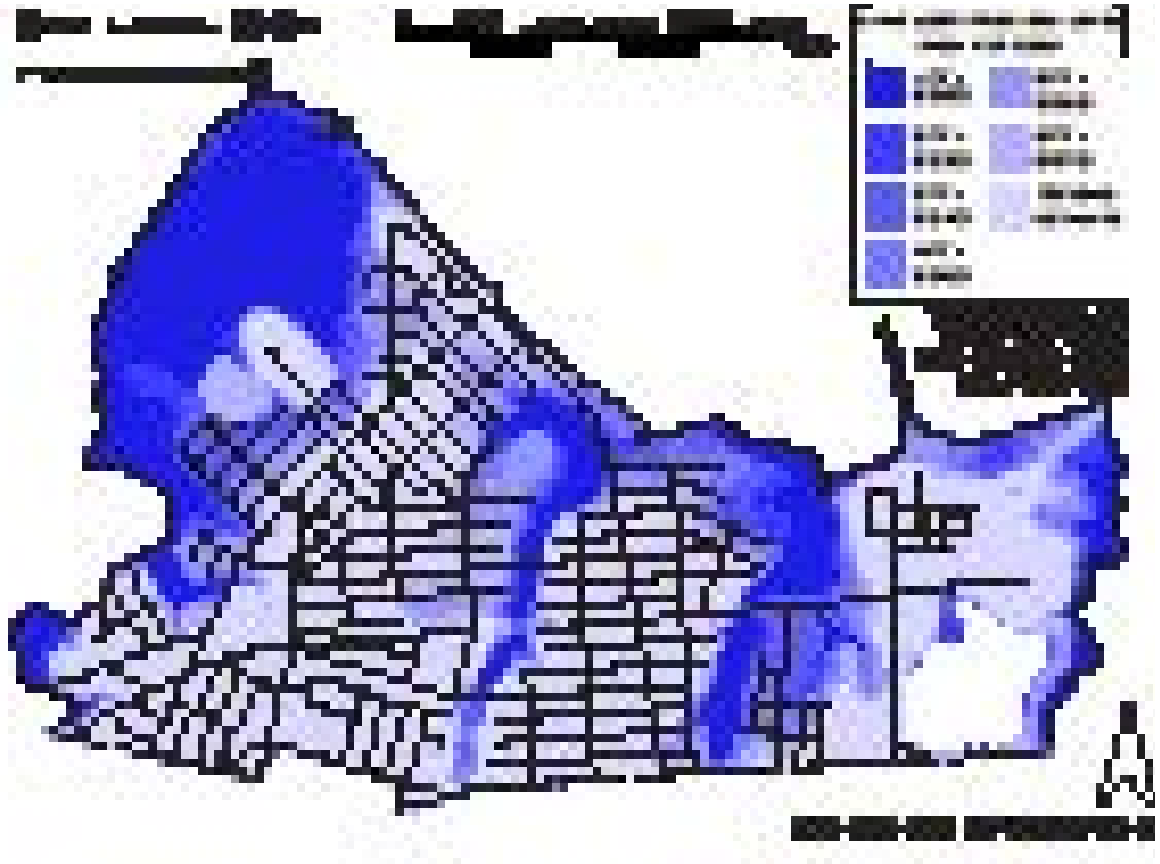
Union Beach On The Move

Union Beach, NJ
Andrew Blackburn, George Brnilovich III, Suhee Park-Jung



After looking at Union Beach and the risks it would face in the future, we decided that the best answer to a more resilient design for Union Beach would be to have a more movable infrastructure. As sea level rises and storms threaten the city, there would be two answers to have two solutions, an infrastructure of movable land based housing, and floating home communities. The floating homes would rise and fall with changes in tide and sea level. The movable homes would replace existing housing as more becomes threatened, and would move off site to a safer location in the event of a storm, and would move back after it had passed. Residents would be allowed to chose to move to a safer location, move to floating housing, or transition to movable housing in order to keep all residents as safe as possible.

In order to determine the areas which would be lost to sea level rise, we looked at NOAA predictions for Union Beach, based around what the worst case scenario would be. NOAA predictions are that 4 feet of sea level rise will occur by 2053, which can be seen on the diagram to the right. In order to cope with this large amount of Union Beach that would be lost by 2053, additional water based floating communities would be established. These floating communities would rise and fall with tides, and would survive sea level rise over time without any issues. The only additional concern for them is that they need to be safe from wave action, so having them on the bay-facing shore is unwise, but putting them on more inland shores would keep them safe. In addition to location, many floating treatment wetlands would be established. These wetlands help to clean the water in the area while cutting down wave action. Remaining land based houses which are in danger would be asked to move into floating homes, or movable prefab housing. These houses would be moved off the property in the event of a bad enough storm coming, and would be moved back onto their property after the storm has passed.



To the left, you can see the several design criteria that we used as the basis for what we felt Union Beach needed. We selected individual ideas and a group consensus, and used these criteria and our ratings to influence our designs, as well as our decision to design for multiple solutions for the town, rather than a single selection.

http://www.iidudu.com/awesome-premanufactured-homes-design-ideas/awesome-modular-homes-with-sliding-glass-door/

http://www.trendir.com/house-design/prefab/

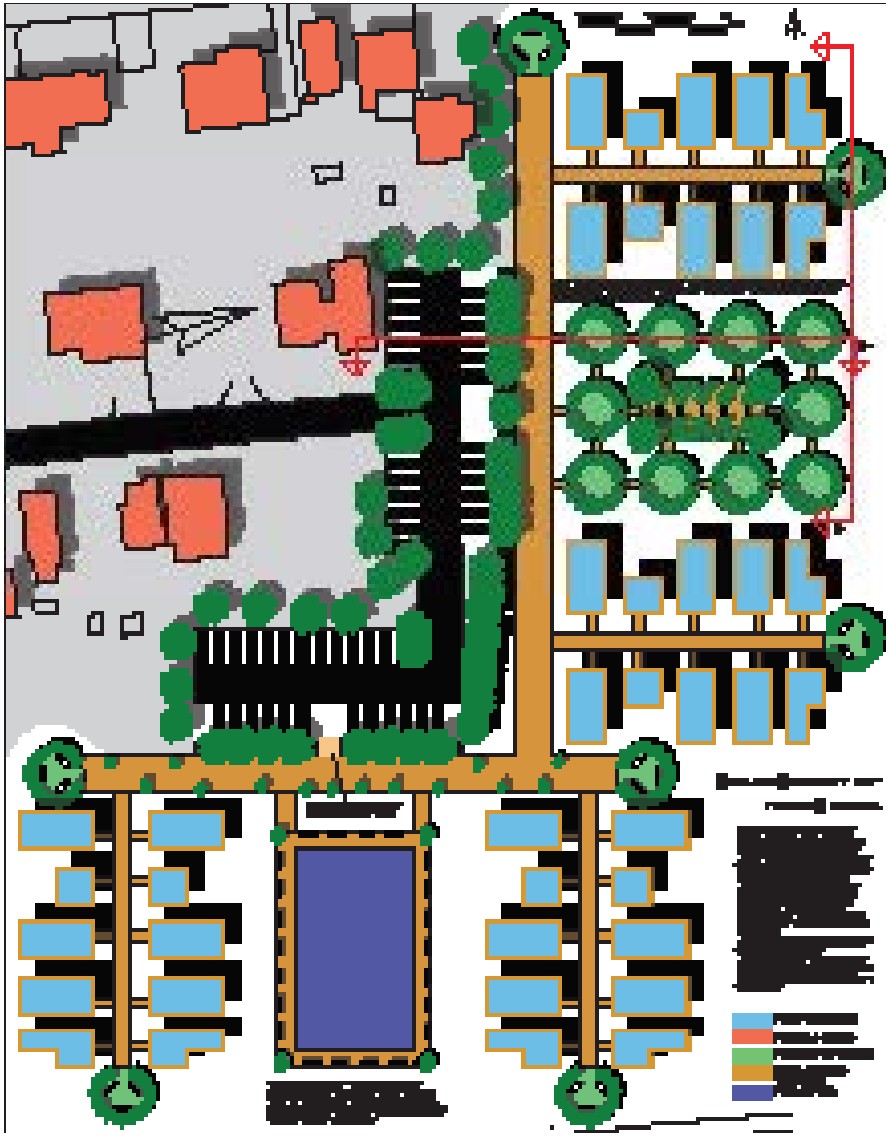
http://www.inspirationgreen.com/floating-homes.html

http://inhabitat.com/inhabitat-interview-waterstudios-koen-olthuis-on-float/

Union Beach On The Move

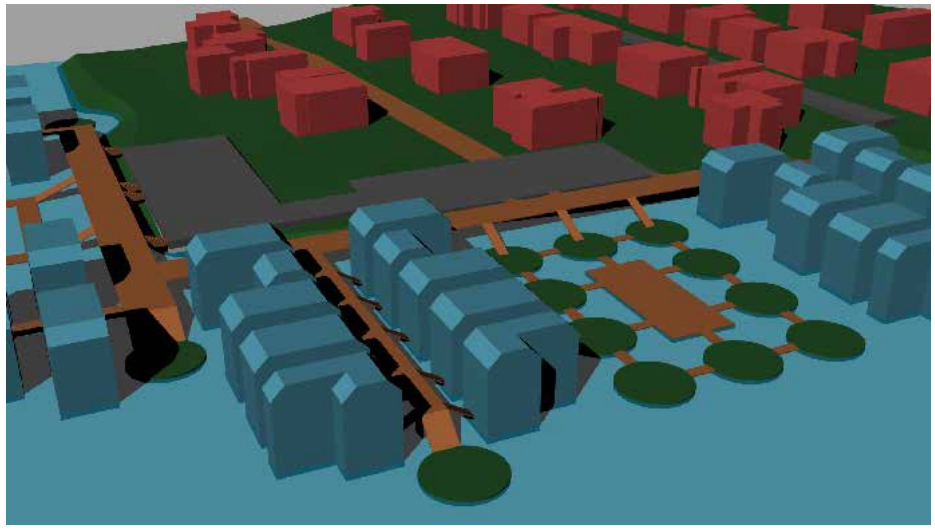
Located at the east end of Central Ave

Andrew Blackburn



Floating home communities can be designed to feel just like a typical housing community. They can offer much the same community interactions one might find, even having floating parks, and public spaces. Parking would need to be provided nearby, and there is even the possibility that as floating platforms are further developed, parking could be established on water nearer the homes, but currently needs to be on land or fixed elevated structures.

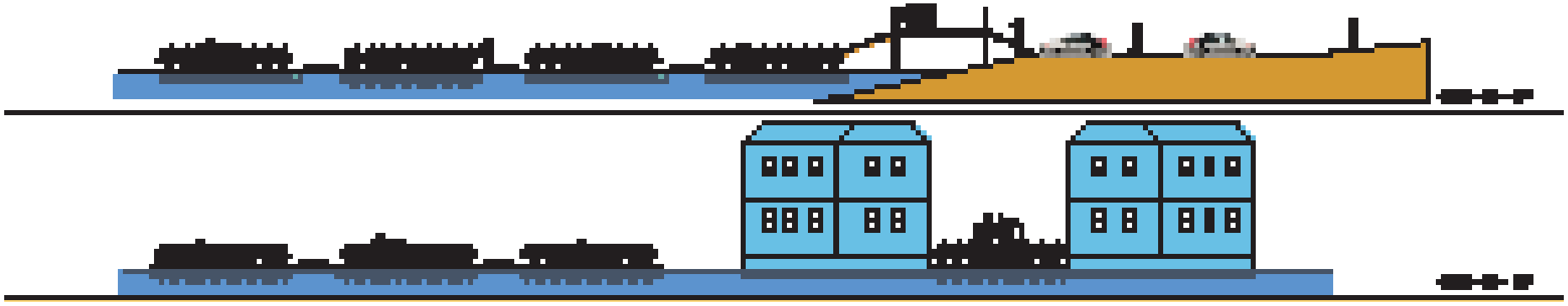
Floating homes provide a close knit sense of community which would encorporate into the current atmosphere of Union Beach very well. Nearby housing with communal spaces would foster lots of interaction with neighbors.



Floating Home Community Criteria:
- Every “block” of floating homes should be bordered on one side by a public space, either a park or pool.
- Every “block” should have houses of an approximately similar size. Floating homes can be as small as 20’x20’, and can be any size bigger than that.
- Floating Parks should be made up of a mixture of floating platforms for multiple uses (recreation and picnic spaces, for example), and several floating treatment wetlands interconnected to provide habitat and green space.
- Every “block” should include at least one floating treatment wetland with access to the neighbors.
- Floating treatment wetlands do not need to be connected to the community, but can be its own floating island, providing an interesting characteristic to the water.

In development currently, there are public pools which float on polluted waters. They filter out everything from the surrounding waters as they filter through the walls into the pool, creating clean, swimmable waters.

Floating treatment wetlands would be established to protect floating homes from wave action, while also helping to clean up the water qality of the area.

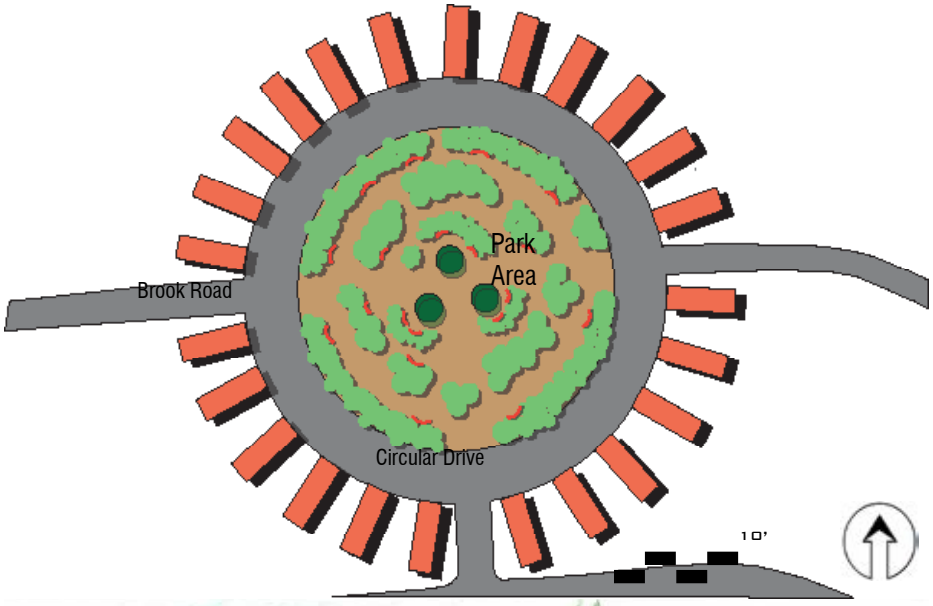


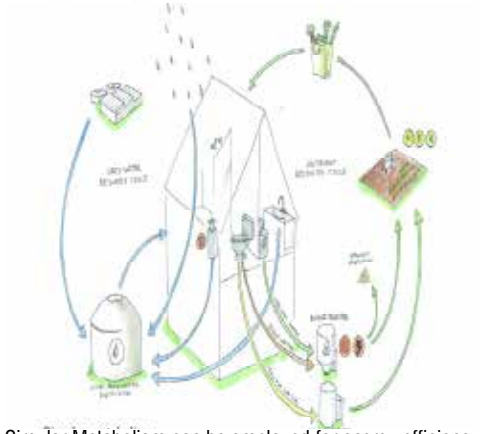
Union Beach On the Move

Economy and Portability of Tiny homes

George Brnilovich III

These two plans show where tiny homes could be implemented in the shorefront area of union Beach at Union road and Brook street, which are some of the first areas of town to be threatened by storm surges and rising seas. Brook road would be intersected by a large, open park space which residents could enjoy. This new development would benefit from its proximity to ocean views, beach access, and a nearby playground. the site is ideal to implement this type of housing because sea level rise projections indicate that most of this area will be underwater by 2053





Circular Metabolism can be employed for energy efficiency

Representative Floor Plan

Tiny Home design in Union Beach would be appealing for many different reasons:

The houses are truly small at 117-127 square feet, therby
fitting on a standard flatbed trailer base which requires no special permit to tow. The result is a home which can be relocated with a minimum of preparation or time.
Affordability is a huge incentive, with prefabricated houses available for $57,000 to $66,000. Plans are available for those who wish to do-it-yourself or hire a contractor.
The small size greatly reduces energy costs, thus reducing the carbon footprint. A solar energy unit can be attached for about $5000.
Simplicity of a small home is appealing to those who want to downsize, or have less home maintenance.
the uncovential living aspect is appealing to people who have an adventurous spirit or like the feeling of independance.
Financial freedom results from not having a mortgage, or using the savings to pay off debts. This would equally appealing
to homeowners that own their lot, or rent the land.
The ease of mobilty offers another layer of resilience in communities like Union Beach that may lose land from rising sea levels, storm damage, or other natural threats.

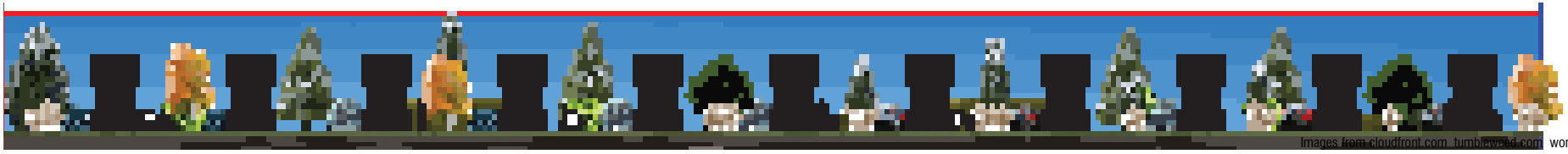
Linden Tiny Home

Mica Tiny Home

Elm Tiny Home

Cypress Tiny Home

Section/Elevation



Images from cloudfront.com tumbleweed.com wordpress.com

Movable Housing

on Pine Street to the Beach

Suhee Park- Jung

This site is located on Pine Street between the 8th and the 7th Street. This site is located on the edge of the town so it is one of the areas that will be flooded and go under water in 2053, when the sea level rises or when the natural disasters hit. This design contains movable homes for the site so when the town has to be evacuated people can easily move their houses to the assigned parking lot where they can stay safely.

Movable homes does not necessarily mean trailers!

There are many of the movable houses that are structured with simple and modern designs. They are small because those houses have to be carried away by trucks so the size is limited but those houses are designed to used all the spaces of the houses efficiently. Movable houses are cozy and beautiful with the simplicity styles and enhance outside views. The residents can have porches and outdoor room outside for outdoor activities.

Movable houses costs a lot less than owning a house because there is lower labor costs and less materials needed to build a house. Even once the residents start to live in the houses, there is less waste and less power needed for the house. Houses are economically and environmentally sustainable. There are so many ways for the residents to save money and they will have more money for their hobbies or vacations!

Markéta Cajthamlová

Christof Jantzen

Shipping Containers Design

Jared Levy
Gordon Stott

Adam Leu

The movable houses are placed along the street and in a way that it requires less turning radius. Then there is a community space in the middle of all the movable homes where people can hang out, have a picnic and enjoy outdoor activities. Common area also provides great views for the residents with plants and in addition, the residents can also get views from the ocean. Other people in town also have an access across the area. There is constructed wetland to restore and preserve the wetland vegetation. It will benefit the wildlife, create amazing views along the beach and it will also act as a buffer zone when it floods. Orange patterns indicate that there will be designed with concrete materials. Since the houses will drive over those corners, there should not be any plants or anything permanent. These are some of the design examples. (Bottom)

These movable houses are great because they are simple, beautiful and they serve efficient space. There will be private space for every residents and common space where they can have outdoor activities together, perhaps create a community
garden. Those houses have great views from the ocean and from the backyard.
It has an easy access to the beach and it is just a great place to live.