LITTLE FERRY

SENIOR HOUSING STUDIO
RUTGERS UNIVERSITY

DEPARTMENT OF
LANDSCAPE ARCHITECTURE
FALL 2014

CUES
Center for Urban Environmental Sustainability

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Impressum

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Rutgers, The State University of New
Jersey
Department of Landscape Architecture

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In collaboration with
Borough of Little Ferry
Rutgers Center of Urban
Environmental Sustainability

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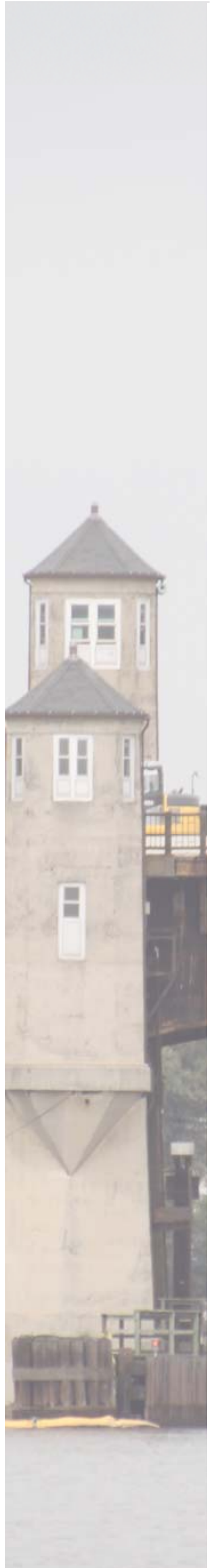
1 INTRODUCTION

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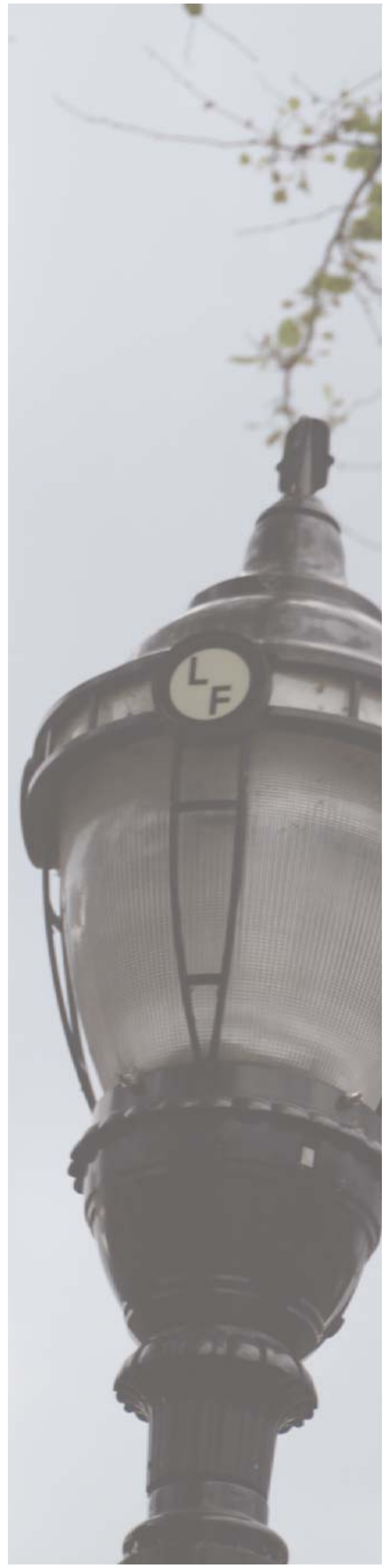
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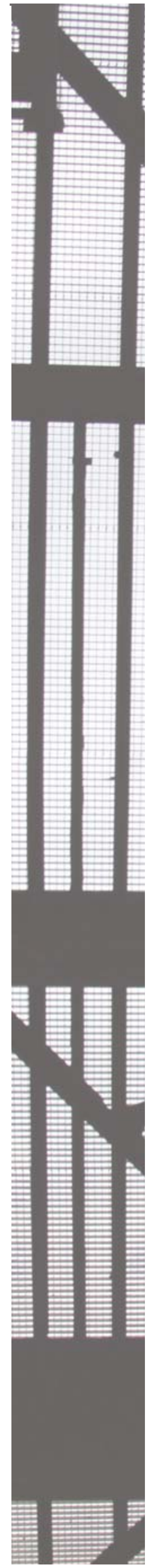


1 Introdcution

1.1 Every Long Journey Begins With a First Step

Wolfram Hoefer

Preparing for a resilient future is among the big challenges for the design professions. Landscape Architects, Architects, Urban Designers and Planners are working on visionary concepts to master that challenge. The Rebuild by Design competition, for example, has produced long term goals and planning parameters for a resilient future. But when does that future start? What happens in the meantime?

That is exactly the question for the Borough of Little Ferry, NJ. Located at the northern edge of the Meadowlands, it is more than 20 miles away from the bay, but is still severely threatened during storm events by waters coming up the Hackensack River. A long term flood protection vision which also considers sea level rise is included in the "New Meadowlands" project by the MIT Center for Advanced Urbanism.+ ZUS [Zones Urbaines Sensibles]+ URBANISTEN. This was one of the winning projects of the "Rebuild by Design" competition, initiated by the U.S. Federal Government. The proposed solution for the meadowlands is a levee system meadowband that functions as a connector between new settlement behind the berm and a water park landscape before it. Financing of this infrastructure shall be supported by an increase in development rights.

"The 'New Meadowlands' project articulates an integrated vision for protecting, connecting, and growing this critical asset for both New Jersey and the metropolitan area of New York. The Meadowlands project emerged from a larger regional analysis that mapped a maximal spectrum of risks and a comprehensive set of vulnerabilities, combining flood risk with social vulnerability, vital network vulnerability, pollution risk, etc." (Rebuild by Design 2014: The New Meadowlands. Unpublished report. P. 7).

This project is proposing a new levee that shall protect vulnerable communities and business areas. This dam shall also function as connecting infrastructure and shall be paid for by higher density residential and commercial buildings just behind the levee.

The leadership of Little Ferry considers the possibility of growth that would come along with the levee as a good opportunity for the town. People suffered from Sandy and they are further challenged by relatively high property taxes that are likely to increase if nothing happens. This will make it difficult for lower income people with fixed incomes (pensioners etc.) to stay in town because they may not be able to afford rising property taxes and increased flood insurance. To make matters worse, property values were very much hurt by Sandy and are only slowly coming back.

Protection by a levee is a shared long term goal. Financing that levee thought higher density development is also agreeable to the Borough. Although the Borough is s a little skeptical if the optimistic predictions for growth would actually come though, it is the intention of the town to create good conditions for economic growth.

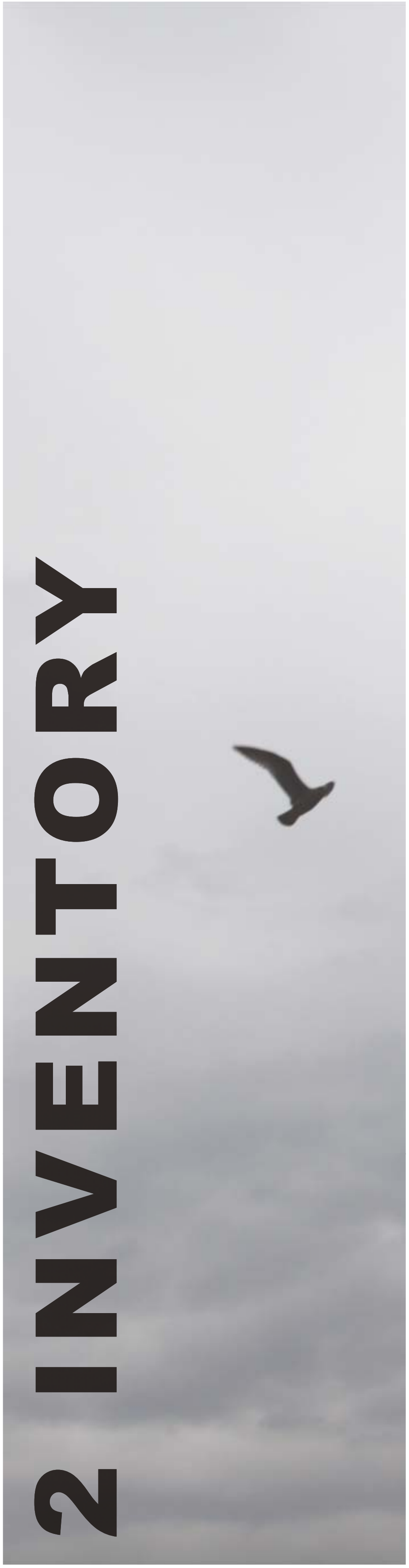
Higher density, more urban style development at the edge of town (using currently underutilized properties) along with multi storage commercial developments would be a possible revenue provider. In that respect the borough is on board with the Rebuild by Design proposal by ZUS > MIT CAU+ZUS+Urbanisten. The question for the Rutgers Landscape Architecture student was: What does the overall vision really mean on a site specific scale and how do we get there?

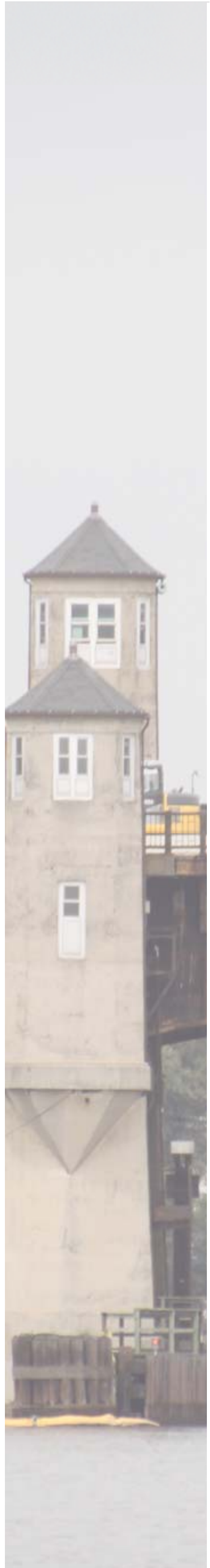
The focus of this semester-long studio was on creative interpretations of the urbanized Meadowlands landscape, addressing possible rebuilding and reorganization in the context of housing opportunities, smart streets, and green infrastructure. The students explored the cultural meaning and identity of the landscape considering existing uses, buildings and open spaces, while proposing new building masses that provide spatial framing for (sub)-urban public life. Housing and mixed use zones were considered as possible uses that support public open space activities. A main goal was to develop housing and mixed use concepts in accordance with ideas of sustainability, smart growth, appropriate tourism and, last but not least, resilience.
The second half of the studio developed open space concepts for residential zones and recreational areas at a site design scale. This brochure documents the acquired data of the inventory and analysis. Further it includes research papers addressing questions that occurred within the design process and that became of particular interest for individual students. That research and intellectual investigation helped the students to assess their progress throughout the design process and informed the final solutions.

We thank the Borough of Little Ferry for their kind support, the Meadowlands Commission for providing digital plan material and the MIT CAU+ZUS+Urbanisten design team for permission to use their data. The students have explored possible (and not yet possible) solutions through creative design. These ideas may support the public discussion along with the Borough's considerations on how to deal with the challenges and opportunities of the future on the banks of Hackensack River.

The only thing we know for sure: tomorrow will be different.

2 INVENTORY



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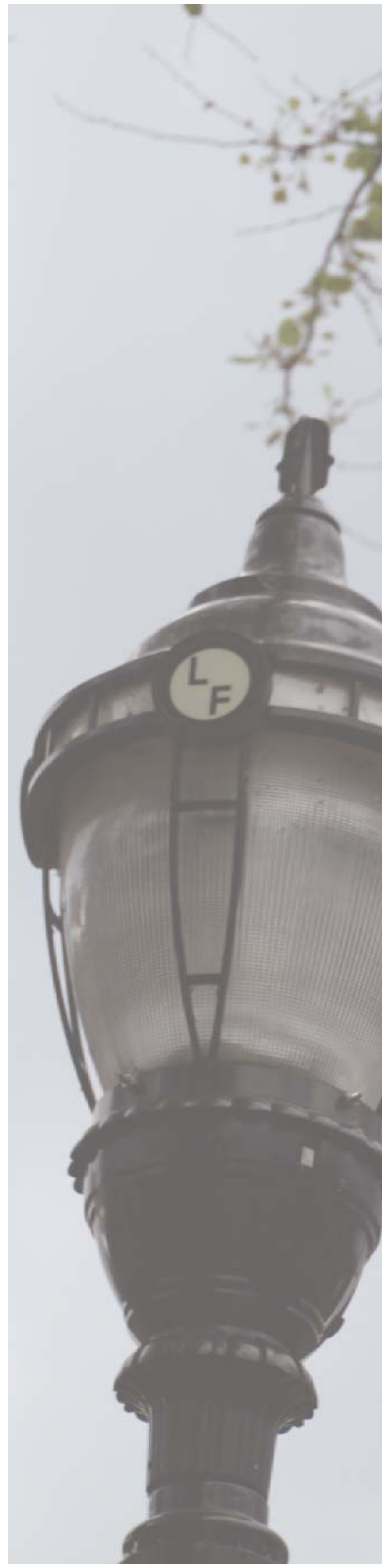
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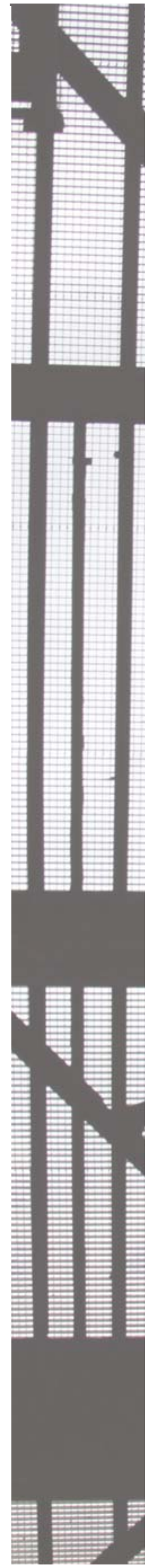


2 Inventory and Analysis

2.1 Site Context

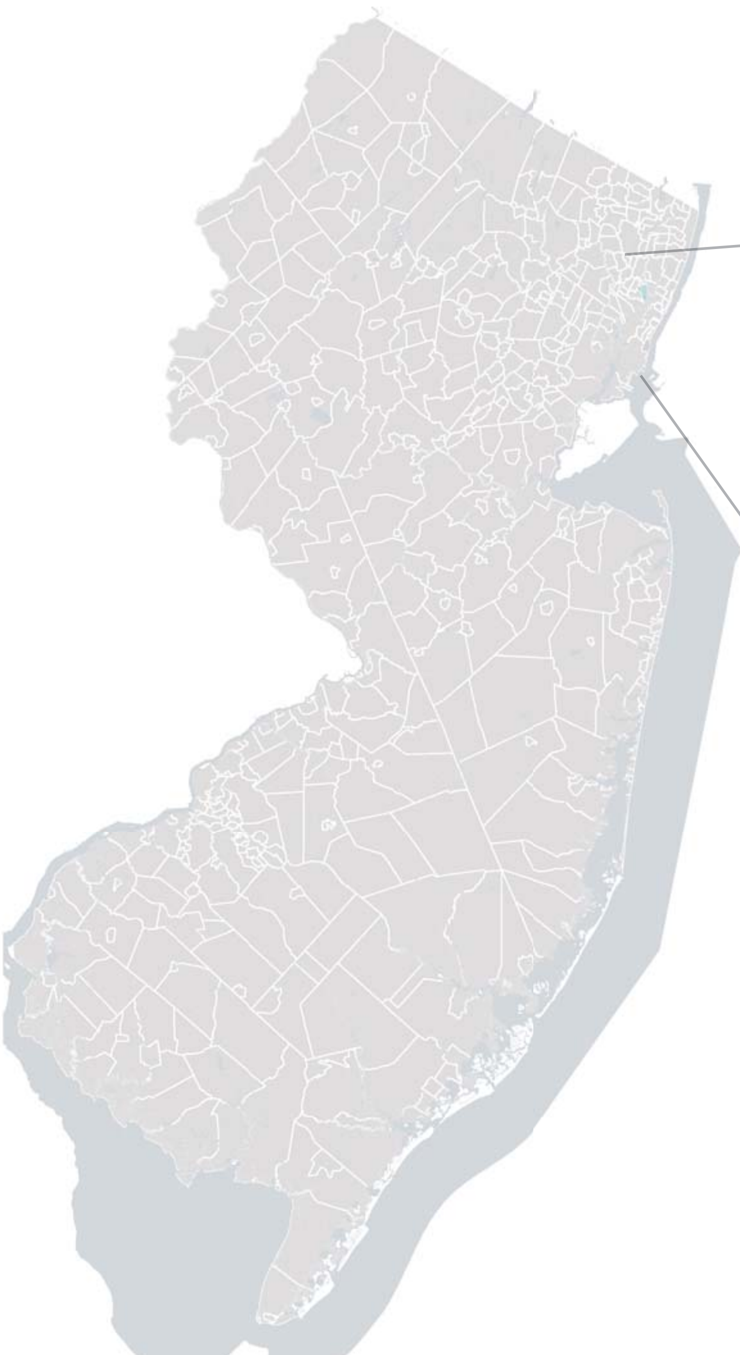


Figure 2.1.1 New Jersey

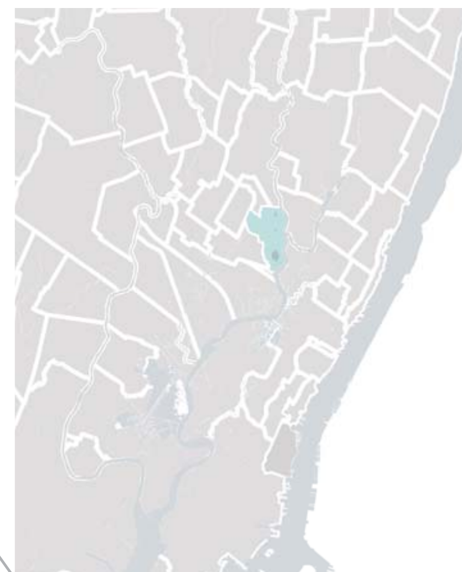


Figure 2.1.2 Little Ferry in Context

Little Ferry is located in Northern New Jersey in Bergen County on the banks of the Hackensack River. It is part of the New York Metropolitan area, and is considered a suburb of New York. Route 46 provides access to New York City, so many residents commute to work via car. Little Ferry contains part of the The Meadowlands region, so it has two different zoning codes for the borough.

Images source: NJDEP

2 Inventory and Analysis

2.2 Architecture / History

Eugene Fernandez - Sandra Grosso

Little Ferry is named after the rope drawn little ferry which was used to cross the Hackensack river from 1659 to 1828. It was first part of New Barbados until it became part of Lodi Township when the township formed in 1825. Little Ferry was finally incoporated in 1894.

The Bergen Pike bridge was errected in 1828 connecting Little Ferry across the river to Ridgefield Park via the Bergen Turnpike. After this construction the rope drawn little ferry was no longer in use. Another bridge was built in 1923 increasing access to the town, this was the rt 6 (now rt 46) bridge. Six years later the Bergen Pike Bridge was demolished.

At one point in history Little Ferry was home to the second largest brickyard in the country producing more than 2,200,00 bricks a year. The Mehrof brothers were very influential to the area and ran the brickyards in town. It was Mrs. Elizabeth Sutliff Dufler, a freed black slave, was the first to realize the value of the clay in the area and bough 10 acres along the river in 1847. She sold clay to potteries in Newark and Jersey City. It wasn't until 1872 that the first brickyard was opened. By 1904 eight brickyard were in operation and business was good. After WWI business began to decline and only four were remaining by 1923. Eventually the last brickyard burned down in 1956 and the only evidence of the historical brick industry is the existence of three lakes – Willow Lake, Indian Lake, and the lake at the lower end of Mehrof Road.

Little Ferry saw an influx of Czech population in the 1890s, which led to a building boom to meet this growing population, previous to that it was primarily German. The Czech established the first sokol "T.J. Sokol" on the corner of main street and garden street in 1897. The present structure was built in 1911 after a fire destroyed the first one. The sokol movement was a youth sports and gymnastic movement, viewed as a physical, moral, and intellectual training. This was around the same time that we started to see a regard for public health. Many Czech families opened small pearl button shops & employed people from the town, this saw success for about fifty years.

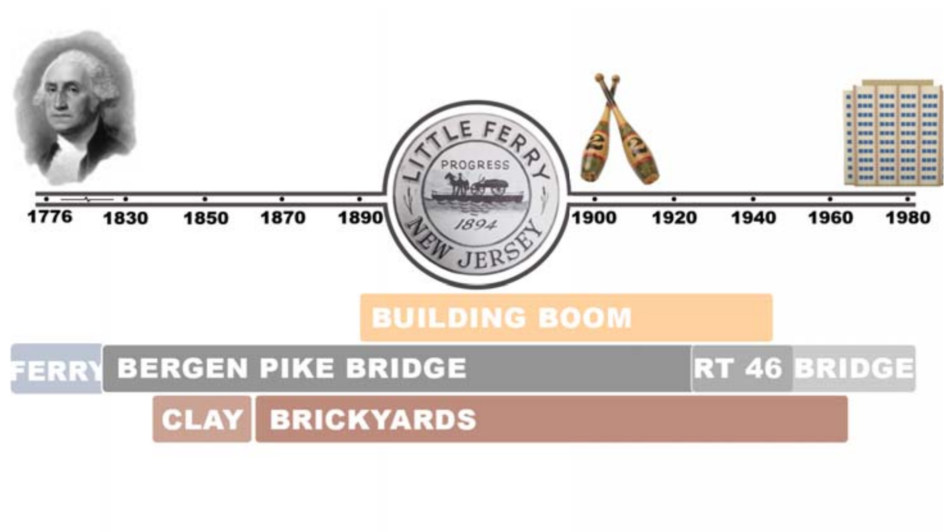


Figure 2.2.1

1925

1940

2012

Figure Ground Sanborn Maps

Figure 2.2.2

Figure 2.2.3

Figure 2.2.4

HACKENSACK RIVER

The Hackensack River formed as a result of glacier ice melt. A portion of the Wisconsin Glacier retreated and formed Glacial Lake Hackensack. Shortly after this formation humans settled along the lake, and animals such as wooly mammoths, giant sloths, and saber-toothed cats existed in this area. Over time bedrock rose to form what we now know as the Hackensack River watershed. The watershed is surrounded by geological features on all edge conditions; the High Tor Mountains in the north, the Palisades in the east, the Watchung foothills in the west, and the Newark Bay in the south.

By the 17th century Tamarack and Atlantic White Cedar established thick growth along the river, this was the same time the Lenape Indians were living off the land in this area. It was the early 1600s when Europeans first sailed up the river and colonists pushed the native americans out of a place they lived for thousands of years. With the establishment of a commercial boat trade came piracy, the fighting between the British and pirates resulted in the burning down of the forest.

By the late 1700s there was an immense amount of population growth, new infrastructure, and industry. This new infrastructure, including draw bridges and railroads, forfeited the “formerly impenetrable” marshlands. The river became a site for disposal including raw sewage, garbage dumpsites, and untreated waste. This led to the extreme contamination of the river including the establishment of waterborne diseases. It wasn’t until the 1970s that this began to shift, with the passing of the federal Clean Water Act in 1972. Regulations were set in place to improve the water quality of the Hackensack River.

However while the river was getting cleaner sprawl development was built on hundreds of acres of fill adding to the already urban development in the area. In 1970 the Hackensack Meadowlands Development Commission was formed by the state as a zoning authority for the Meadowlands. By the 80s conservation and environmental issues became hot button issues and has become an important conversation for the area since.

Figure 2.2.5

Figure 2.2.6

Sources:

Hackensack River Keeper

Little Ferry 1994-100th Anniversary (Rutgers Special Collections)

Figures:

2.2.1 Sandra Grosso
2.2.2 The Sanborn Map Company through Rutgers Library http://sanborn.umi.com
2.2.3 The Sanborn Map Company through Rutgers Library http://sanborn.umi.com
2.2.4 The Sanborn Map Company through Rutgers Library http://sanborn.umi.com
2.2.5 Sandra Grosso
2.2.6 Eugene Fernandez

2 Inventory and Analysis

2.4 Demographics

Ellen Gallagher

POPULATION:
10,806

HOUSEHOLDS:
4,239

AVERAGE FAMILY SIZE:
3.19

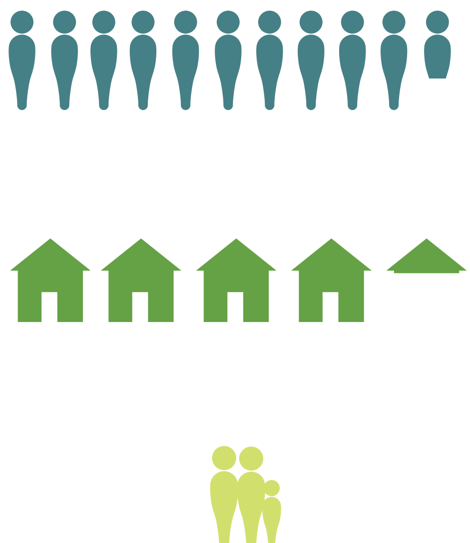


Figure 2.4.1.1 Source: CIty-Data

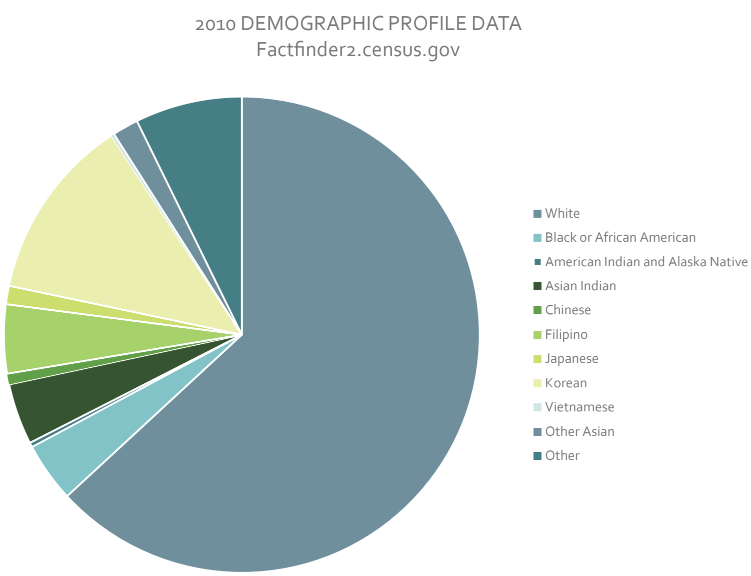


Figure 2.4.1.2

The site, fully enclosed within the borough of Little Ferry, is being sought after by town and regional planners as a place for residential and commercial development. Before any real development is planned, it is important to understand the current demographics of the town, and to really consider what kind of impacts development would have on these statistics. The 2010 census found that Little Ferry has a population of almost 11,000 people, making up a little over 4000 households, with an average family size of 3.19. This can be seen in Figure 2.4.1.1.

Northern New Jersey is a great example of a lot of different people with different ethnic backgrounds, and Little Ferry is no exception. While a majority of the town is white, there is a strong presence of Korean culture in Little Ferry. This can be seen in Figure 2.4.1.2.

Also, as seen in Figure 2.4.1.3, the residents of Little Ferry, with close access to other urban areas – especially New York City- hold many different kind of occupations. The most common occupations of residents are Educational services, health care and social assistance, and professional, scientific, and management. Also popular are retail trade and manufacturing occupations, showing a diverse population of workers.

In terms of home value and sale, City-Data's history shows that Little Ferry has not had a steady real estate market in the past few years. Interestingly, the chart shows the effects of Hurricane Irene and Hurricane Sandy, that there were major interruptions in the housing market. This Information is shown in Figure 2.4.1.4.

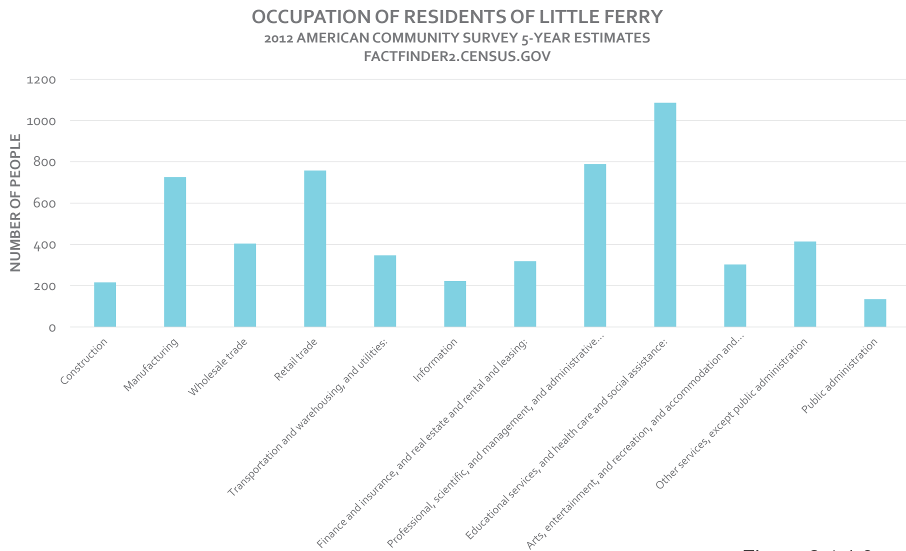


Figure 2.4.1.3

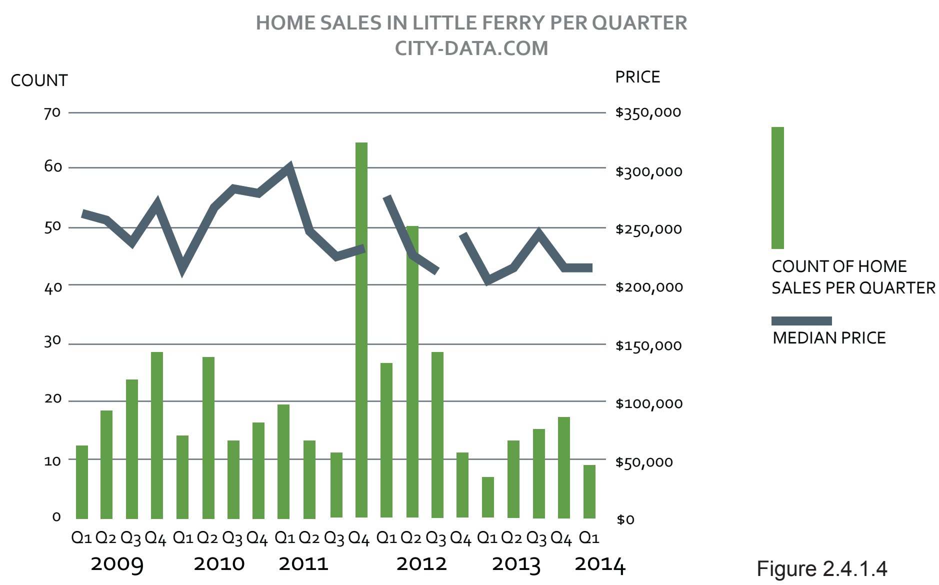


Figure 2.4.1.4

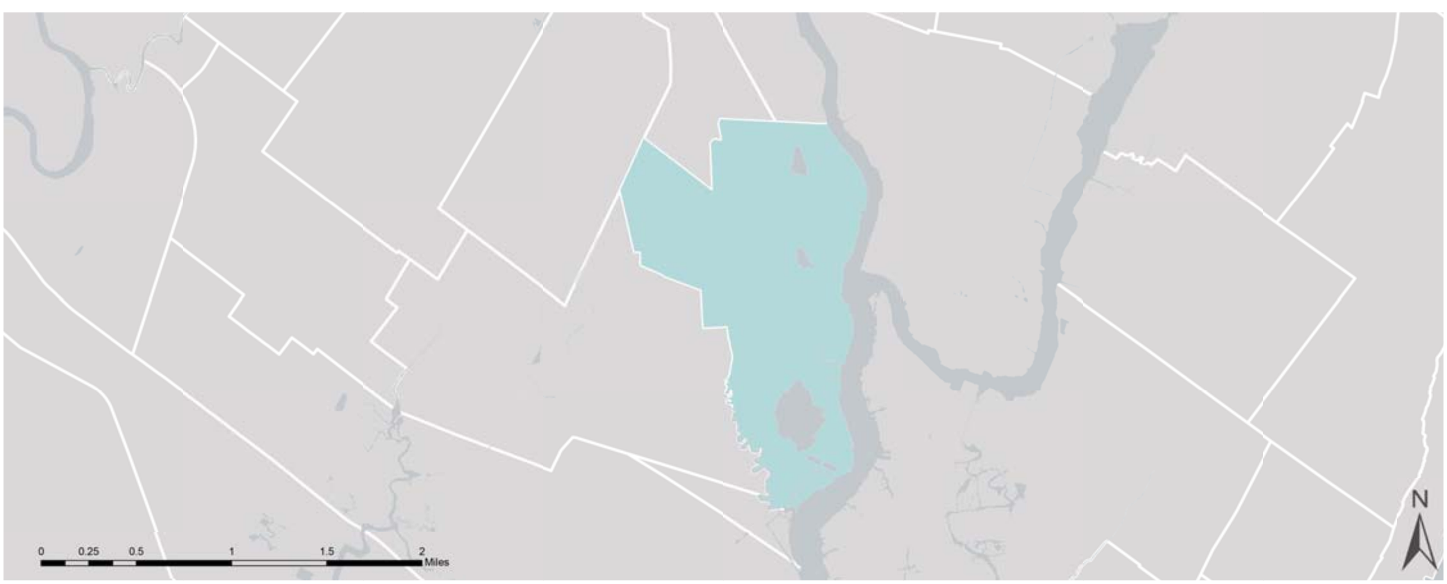


Figure 2.4.1.5 Source: NJ DEP

2 Inventory and Analysis

2.4.2 Little Ferry Demographic Analysis

Ellen Gallagher

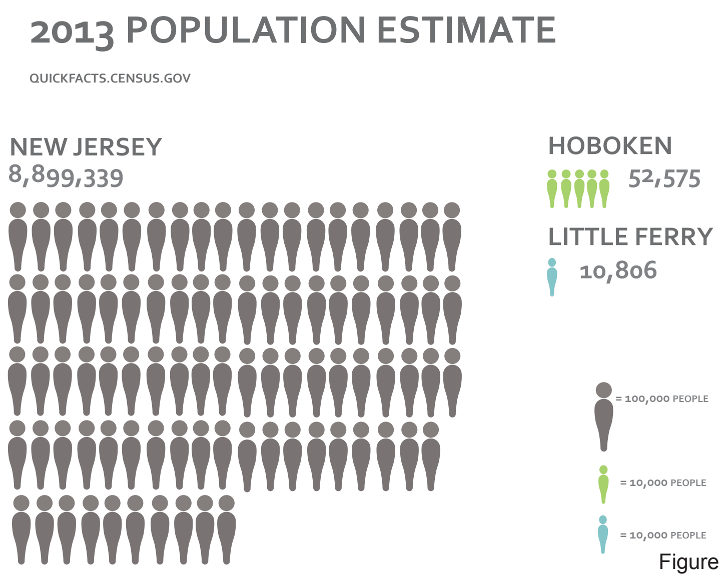


Figure 2.4.2.1

Figure 2.4.2.2

While it is vital to know who is in Little Ferry, demographics is only a useful tool if these statistics are put into perspective. Because many town and regional planners are looking to create a more dense, commuter oriented development in Little Ferry it is important to see what demographics look like in a town applying to those parameters. Hoboken has emerged in recent years as a very successful city in terms of transportation, nightlife, and economy. Also, comparing Little Ferry to New Jersey gives a perspective of how this small town fits in to the landscape of the state. Hoboken is about 5 times the size of Little Ferry in terms of population, but is actually .20 square miles smaller in land area. (Figure 2.4.2.1) (Figure 2.4.2.2)

When examining the ages of the residences, it is clear that Hoboken is a huge draw to young professionals. The age chart (Figure 2.4.2.3) shows a strong spike in the 20-39 year old categories, and a major difference in young children, and older residences. This shows that Little Ferry would have to become more geared towards young professionals who are not necessarily looking to raise a family. This would have an impact on schools and other municipal infrastructures within Little Ferry. Also, there would more likely need to be an increase in nightlife and attractions which cater to young professionals.

As seen in Figure 2.4.2.4, Hoboken seems to attract the young professional who is not necessarily looking to invest in real estate, and therefore not looking to make Hoboken a long term home. A design for Little Ferry should consider this ratio and what a more apartment dense streetscape would feel like- especially for current residents.

The average home sale prices show that the home values right now in Little Ferry are almost half of those in Hoboken. This is bolstered by the income data that shows that residents of Hoboken are largely wealthier than those in Little Ferry. However, 10% of Hoboken's population is below the poverty line, while only 5% of Little Ferry's residents are below the poverty line. (Figure 2.4.2.5) (Figure 2.4.2.6)

Looking at the ethnic backgrounds (Figure 2.4.2.8) of New Jersey, Little Ferry, and Hoboken, the most stand out feature is Little Ferry's strong presence of Korean residents. This culture could be potentially incorporated into a future design, helping to establish a sense of place.

Lastly, Hoboken has a very complex public transportation system for residents to commute to work with. The type of commute chart hints that Hoboken can afford to be so dense because less people rely on personal vehicle transportation. Therefore Little Ferry needs the transportation infrastructure before or as it densifies its housing. (Figure 2.4.2.7)

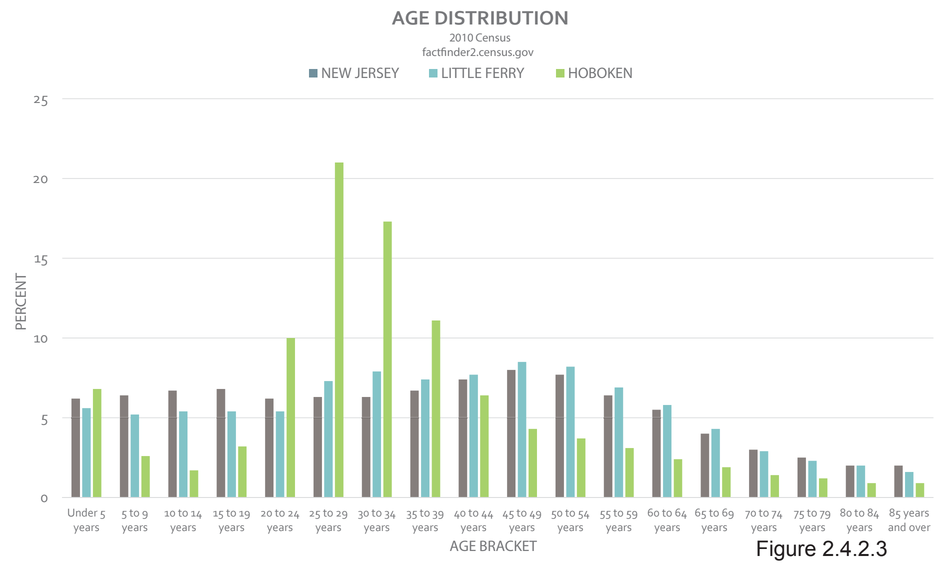


Figure 2.4.2.3

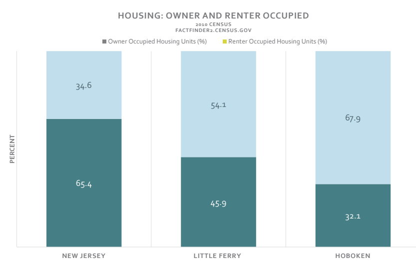


Figure 2.4.2.4

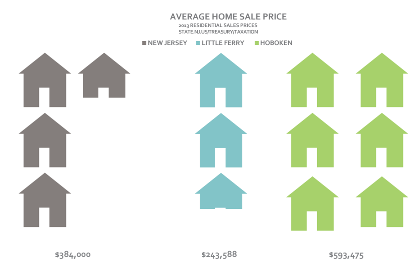
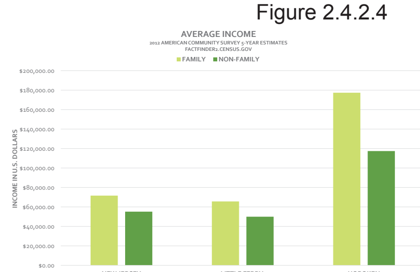


Figure 2.4.2.5



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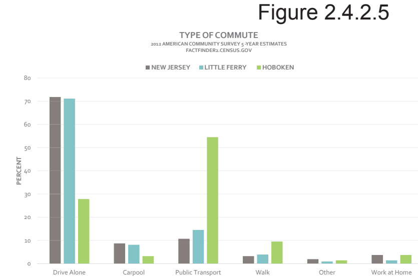

Figure 2.4.2.7

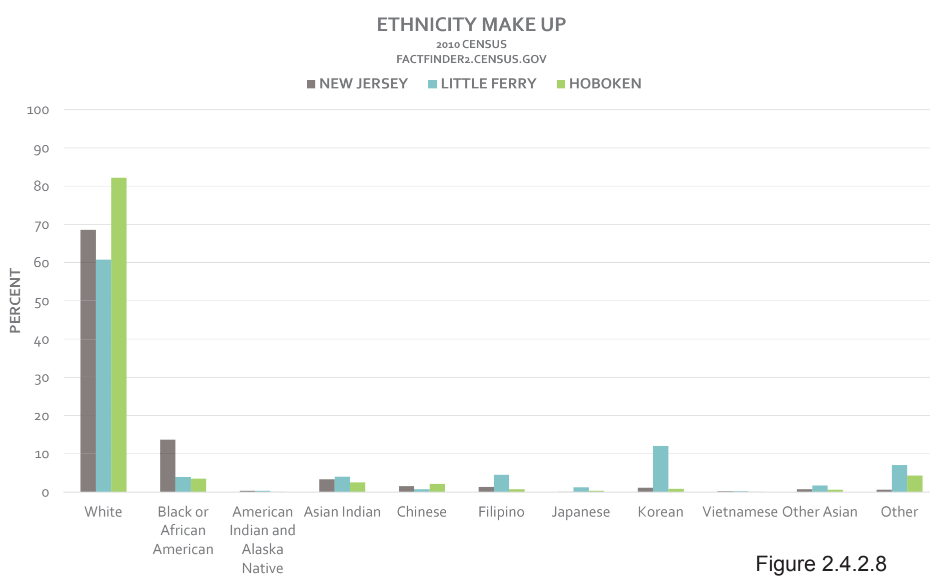

Figure 2.4.2.8

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2 Inventory and Analysis

2.4.3 Flood Risk and Demographics

John Jacobs

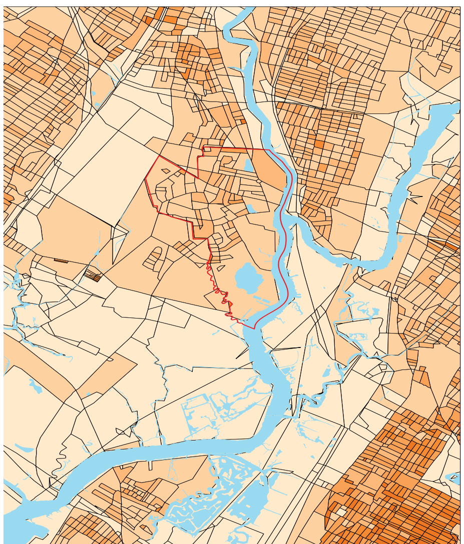


Figure 2.4.3.1

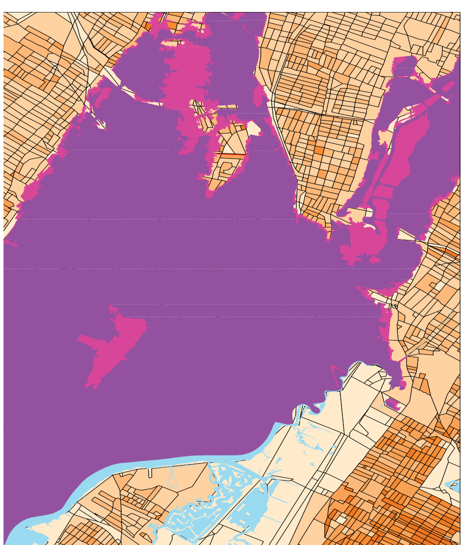


Figure 2.4.3.2

Studying the population density and its relation to severe storms and open space was crucial to understand the amount of people that are at risk of flooding. As seen in figure 2.4.3.1, darker shades of orange represent areas of higher density. Little Ferry, outlined in black, is most dense in the center and northern parts of the town. Execept for one area in the northern part of the town, the eastern coast along the Hackensack River is not very populated. Towns surrounding Little Ferry, especially in the south in areas such as Jersey City and Hoboken are much more dense.

Figure 2.4.3.2 the effects of major 100 and 500 year storms are shown. Areas in dark pink areas are most prone to flood damage from a 100 year storm. In the event of storm most of Little Ferry would be flooded. This map is particularly interesting because towns located south of Little Ferry would have very limited, if any innundation in the event of a storm. This is because of their higher topography in the region. Figure 2.4.3.3. the population density map is overlaid with the open space areas in the town. This shows that the town of Little Ferry is lacking open space in the most dense areas of town. Increased and improved open space can significantly improve property values and the quality of life for residents.

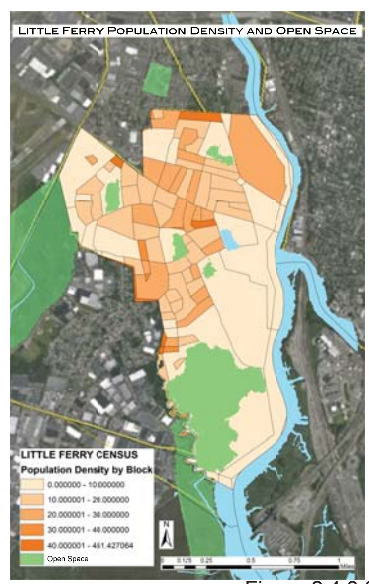


Figure 2.4.3.3

2 Inventory and Analysis

2.4.4 Housing Density

Peter Chang

Regional Housing Unit Density

Bergen County has a population of about 919,000 people scattered by an urban sprawl. The closer one is to the Hudson River, the denser the population and scattering of urban sprawl becomes. About 62.5% are categorized as White, 16.1% Hispanic or Latino, 14.4% as Asian, 5.2% as Black, and 1.4% as two or more races. The average household size in Bergen County compared to New Jersey is a 2:3 ratio.

Figure 2.4.4.1

Comparing Neighboring Municipalities and their Densities

Along the Hackensack River lies Ridgefield, right across Little Ferry. They have about 11,300 residents that are increasing at about 4% (since 2000). The estimated average household income makes about $61,065 compared to New Jersey's average, $69,667.

Little Ferry Housing Density

Little Ferry is a small town occupied by 44.9% White, 31% Asian, 21.1% Hispanic, 2% Black, and .5% mixed race. The average income is $64,464. About 26.6% of the residents of Little Ferry commute to work either to Ridgefield, Hoboken, Tereboro, New York, and more. Industrial buildings along the Hackensack River and inland residencies - mainly two story family dwellings and apartment complexes, occupy the project site.

Little Ferry was Impacted by the100yr Storm Hurricane Sandy leaving 1,036 total homes damaged/destroyed (see figure 2.4.3.5). The low lying typography of Little Ferry allows storm surges

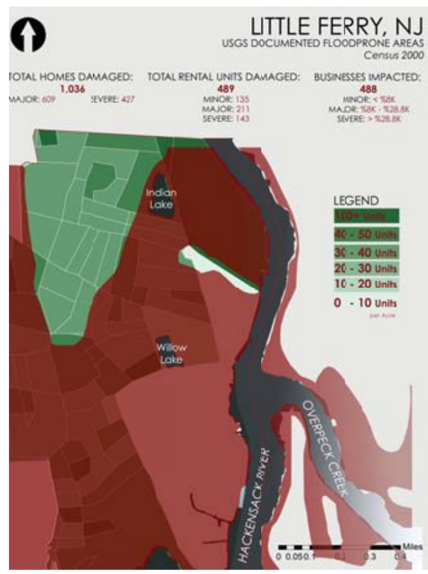


Figure 2.4.4.2

to enter through both Hackensack and Overpeck Creek eventually drowning Little Ferry with massive surge power. Rebuild by Design proposes a 15 foot sea wall, but what other methods can be utilized for Little Ferry.

Sources:
www.City-Data.com
DateAccessed: 09/23/14 1:37PM
www.NJSpotlight.com
DateAccessed: 09/24/14 1:45PM
Gis Arc Maps (Census 200)

2 Inventory and Analysis

2.5.1 Sea Level Rise

Scott Miller

This sea level rise map of Little Ferry demonstrates the projected increase in the sea level at one, two, three, and four feet and the corresponding areas that would lie beneath water. The map shows that Little Ferry will be severely inundated if no action takes place to defend against the inevitable rise of sea level and the intense flooding that comes with it. The parts most at risk of a sea level rise as little as one and two feet, is primarily the portion of southern Little Ferry that is a part of the Meadowlands. The projected sea level rise correlates directly with Little Ferry's topography. With a rising sea level the town will experience more frequent and longer lasting flooding.

SEA LEVEL RISE PROJECTIONS

- 1' RISE
- 2' RISE
- 3' RISE
- 4' RISE
- OUR SITE
- MEADOWLANDS

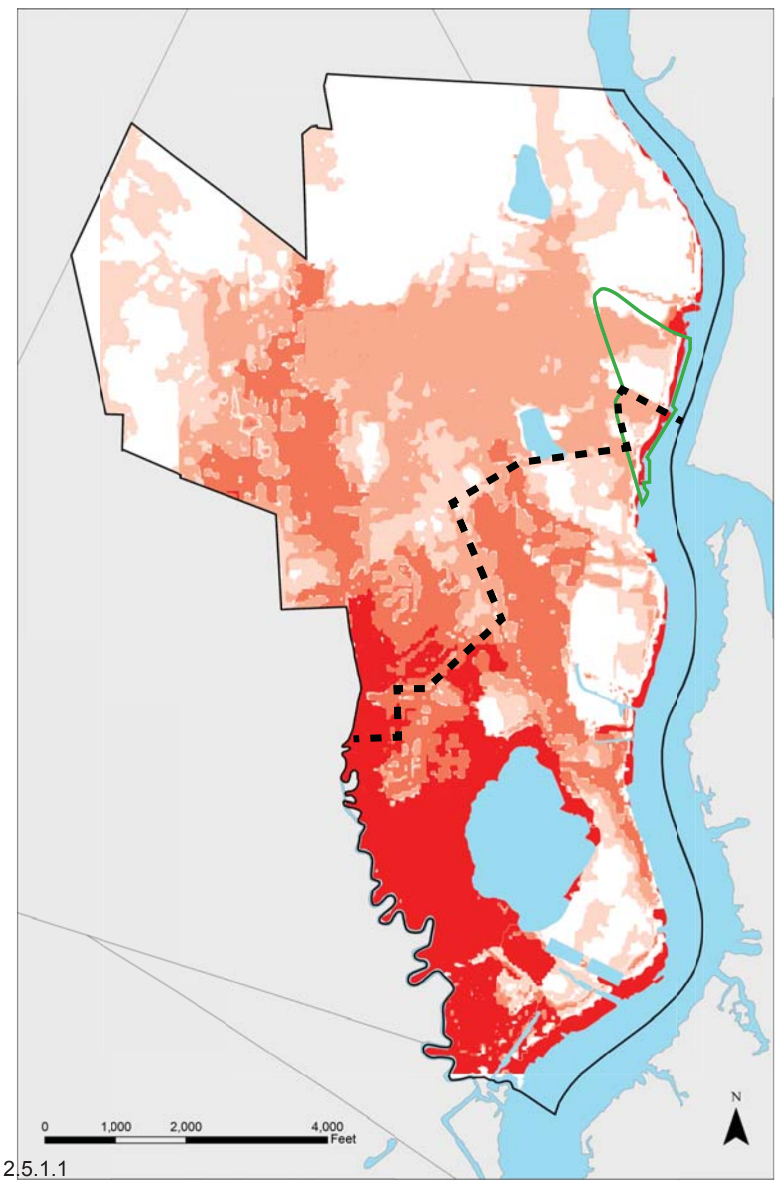
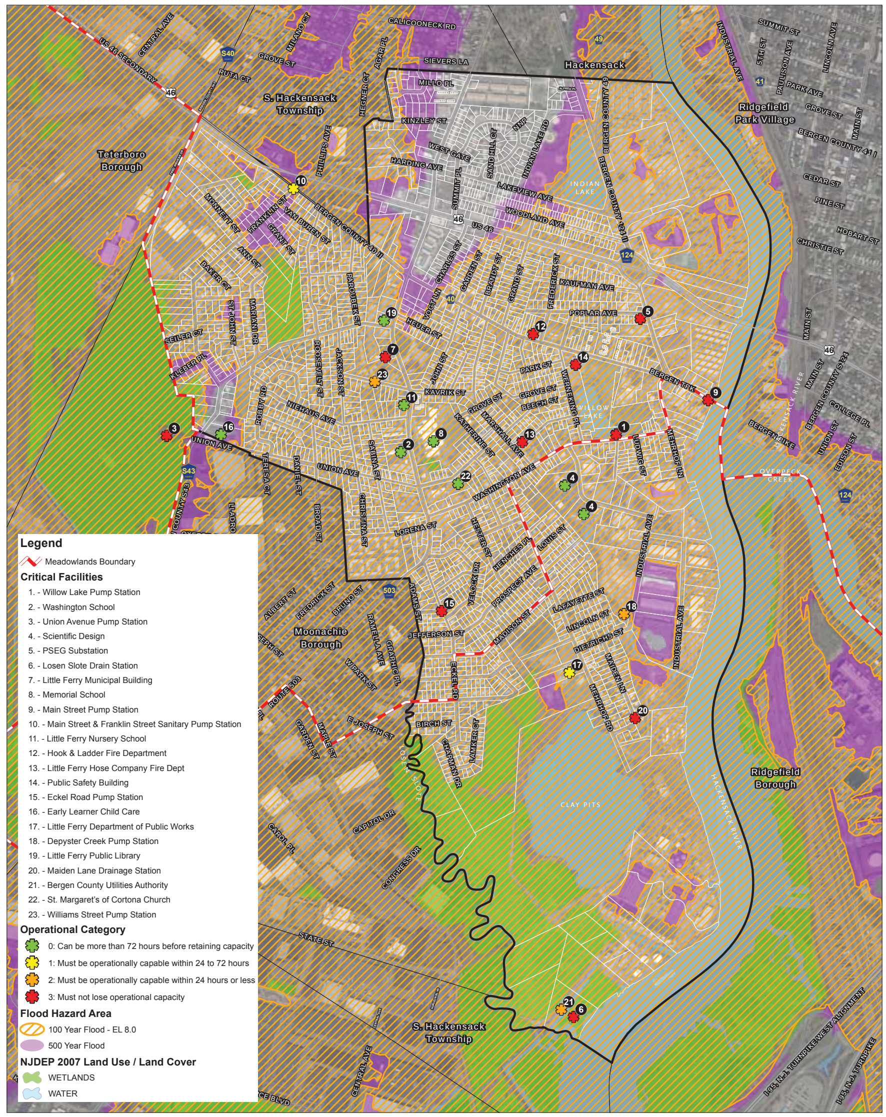


Figure 2.5.1.1

Critical Infrastructure

This map shows the critical infrastructure that us as a group has deemed the most important to protect in the instance of flooding. If our protection was to fail these locations are the first to repair and become operational. We chose the Pumping Stations, Facilities, and the EMS locations to be the most important. Without pumping stations there would be no way to get rid of the floodwater. Without the facilities you would lose the PSEG substation and without EMS the hook and ladder would not be able to respond to those in need. The Borough of Little Ferry has deemed necessary to be operational in the event of flooding. They have been split up into five categories, which include flood pump stations, Facilities, EMS, Municipal Buildings, and Schools. The infrastructure is shown as an overlay to the FEMA flood maps that show the 100-year and the 500-year floods. Almost all of the infrastructure lies within the flood zone on the map.



Parcel Source: NJGIN Tax Parcels for Atlantic County 2012
Aerial Source: 2012 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID Tiles
Published by NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS) 3/2013

0 175 350 700 1,050 1,400 Feet

Strategic Recovery Planning Report

Critical Facilities

Little Ferry Borough, Bergen County, NJ March 2014

Clarke Caton Hintz
Architecture
Planning
Landscape Architecture

Fig. 2.5.2

2 Inventory and Analysis

2.5.3 Hackensack Watershed Topography Analysis

Mark Lacey

When looked at in a regional context of the entire Hackensack Watershed, the meadowlands are a mostly flat, low-lying. Little Ferry lies in this flat area right along the Hackensack River. Surrounding this flat area are key geological features, such as the Watchung Mountains and the Palisades.

Using the EPA's website, I was able to locate on a map the superfund sites on the national priorities list located within the Hackensack, Hudson, and Pascack Watershed Management Area. By overlaying this data with the area's topography data and water flow diagrams, I analyzed how groundwater and runoff from these sites could potentially contaminate the Hackensack River. Most of these superfund sites are located within the Meadlowlands, and are very close to the shores of the Hackensack River. These allow potential for toxins such as mercury, chlorine, lead, and other industrial wastes to enter the River and eventually flow into the Atlantic Ocean.

Figure 2.5.3.1 Watershed Topography
Source: NJDEP data

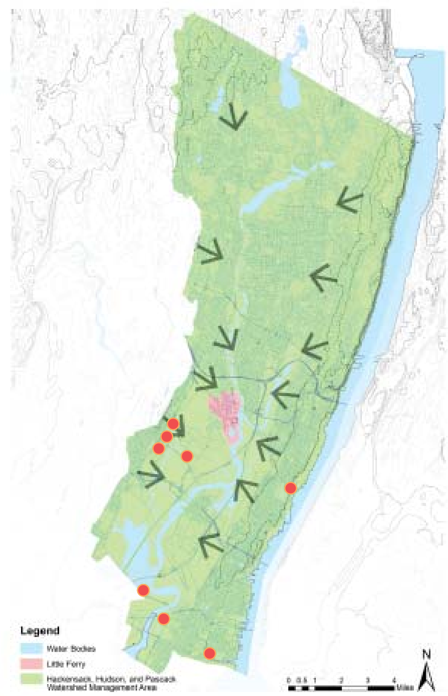


Figure 2.5.3.2 Pollution and Topography Analysis
Source: EPA website

2 Inventory and Analysis

2.6 Storm Water

Arturo Hernandez, Chelsea Beisswanger, Evan Sparkman

Tracking all storms ranging from sub-tropical storms to category five hurricanes, this diagram illustrates paths in the Western Atlantic Ocean basin from 1913 to 2013. The gradient of color (ranging from a pale slate blue to a vibrant red) indicates the intensity of each storm at different points along their paths. While the trajectory is fairly consistent, the areas of intensity are diverse. Little Ferry, New Jersey, roughly located in the center of the circle indicated on the diagram, is clearly vulnerable to storm activity in a range of concentrations. While most of the storms within the range indicate sub-tropical, tropical and category one activity, there is evidence of category two hurricanes affecting the area. Especially in an impervious, industrial and urban area such as Little Ferry, this kind of storm interaction speaks volumes in terms of storm water and storm water management. From this diagram it is clear that Little Ferry is in need of adaptable, effective and efficient storm water management systems. The data compiled is from the Historical Hurricane Tracks courtesy of the National Oceanic and Atmospheric Administration.
The interactive data can be found at: coast.noaa.gov/hurricanes.

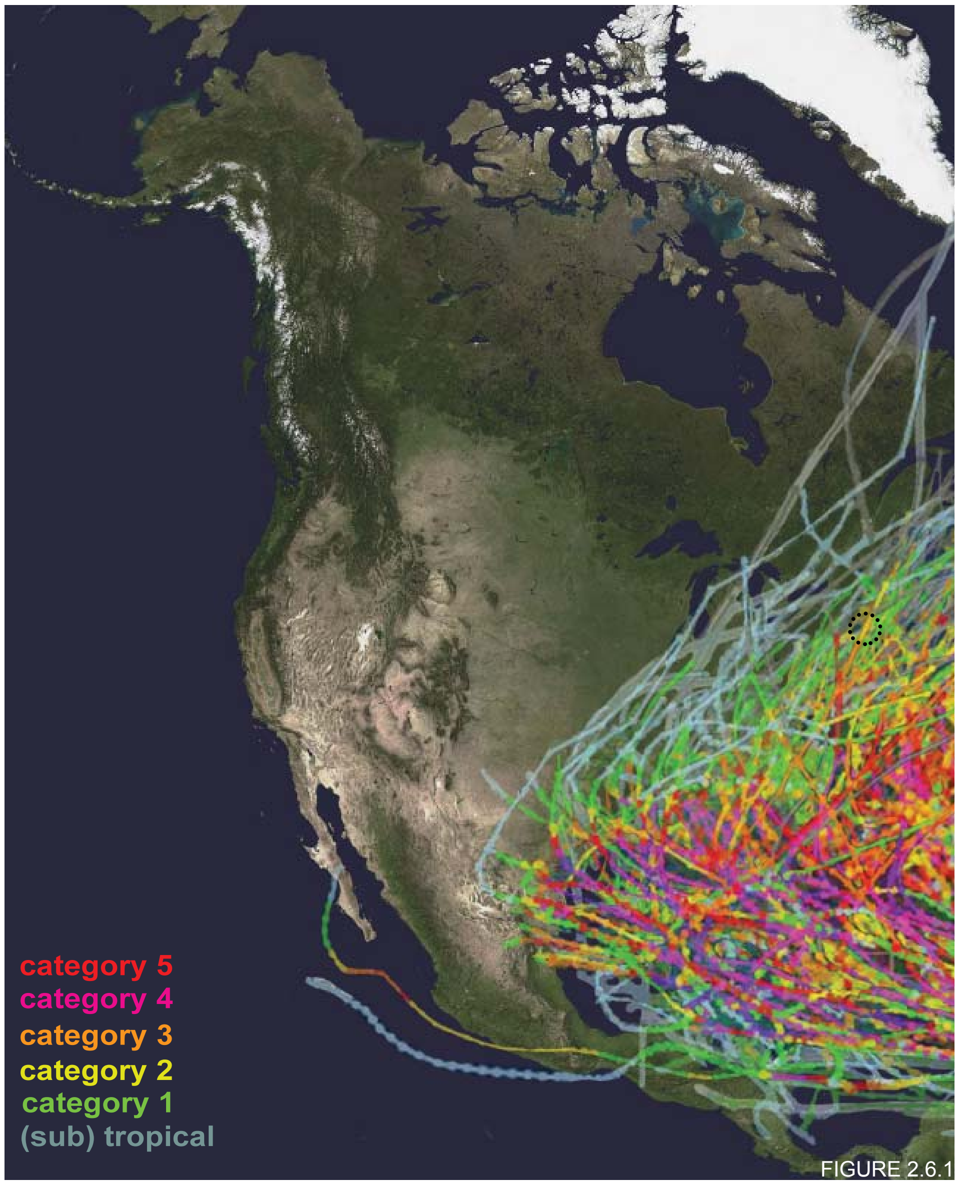


FIGURE 2.6.1

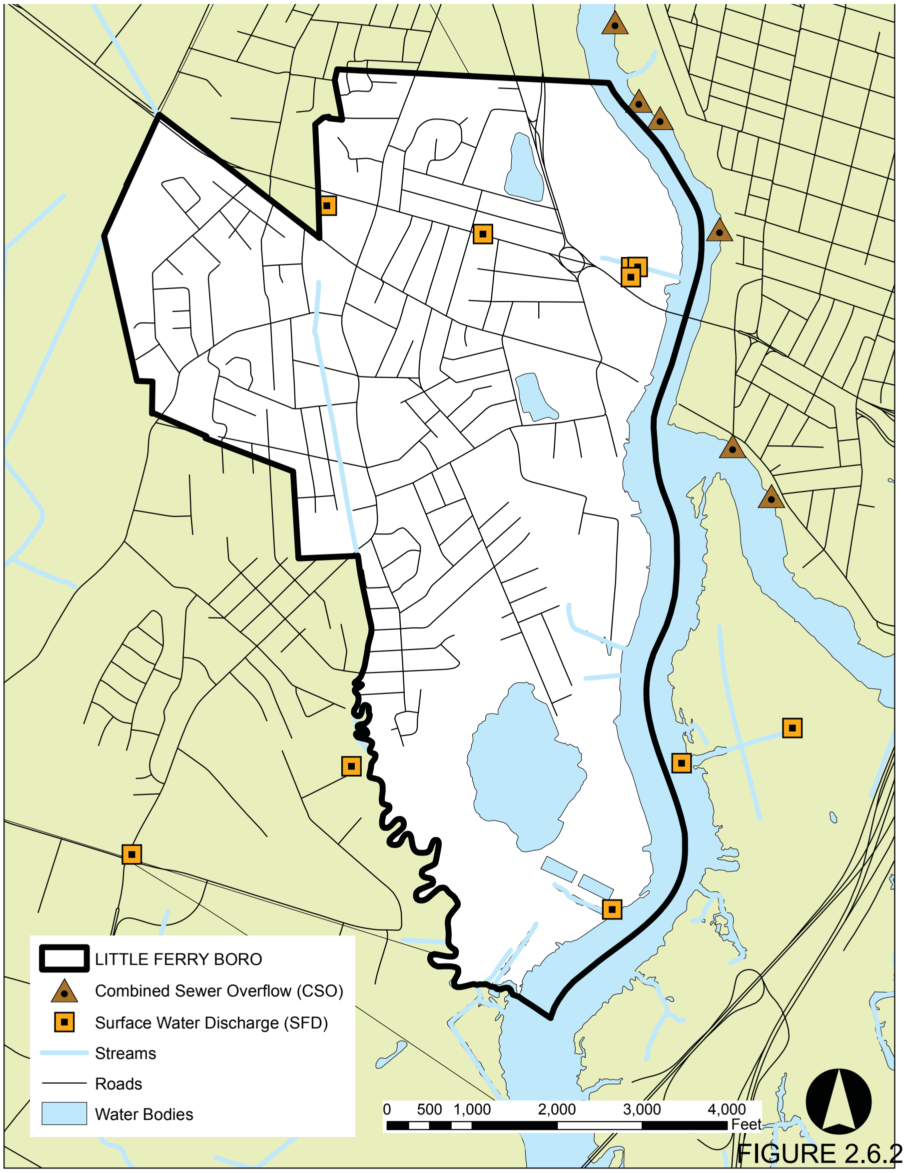


FIGURE 2.6.2

Looking at the change in landform over time is always important because it gives us a better understanding of how our site was developed over time. With development comes impervious surfaces which is what I chose to highlight in each map. It is clear that in 1930, the site was undeveloped and consisted of open green space. With the introduction of urban sprawl, more citizens from the surrounding cities started living in the outskirts. This is why we see such a dramatic increase immediately after the 1930s and 50s.

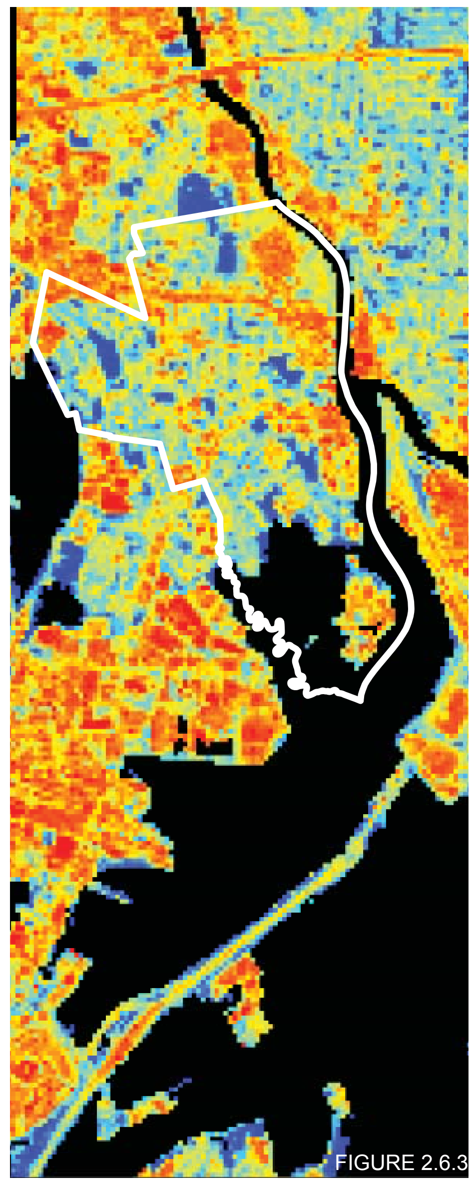
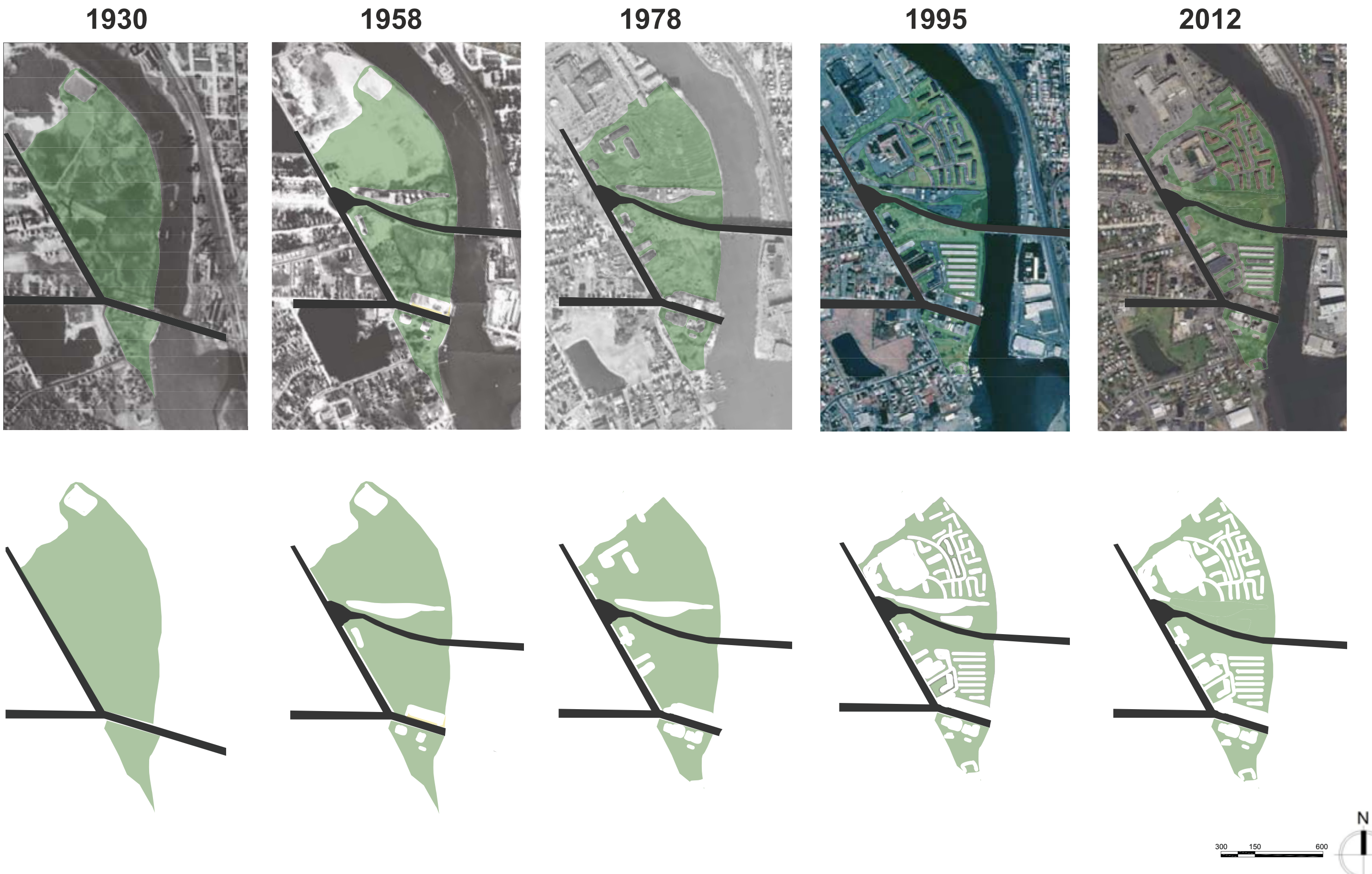


FIGURE 2.6.3

When understanding the drainage of the site, the impervious and pervious surfaces are crucial to note. This map is zoomed out to 2000 scale because it then provides greater context. At first glance, it almost appears as if the information provided is a thermal map. If you glance at the legend, you can see that the higher percentage, the more impervious the surface is. This is determined by the PIMP index. It is calculated by measuring the percentage of a catchment area which is made up of impervious surfaces such as roads, roofs and other paved surfaces. You can see that a lot of the areas alongside the Hackensack River contain a great deal of impervious surfaces, especially on our site. This is important because impervious surface increase the water runoff rate which can contribute to more flooding and contamination of the Hackensack River. Our group also included a map of the water flow within the area, if we compare these two maps you can see that a lot of the water flows through areas of high imperviousness. This will lead to even more contaminants in the water.

CHANGE IN IMPERVIOUS SURFACES

LITTLE FERRY, NJ



BEISSWANGER | HERNANDEZ-SANGREGORIO | S

FIGURE2.6.4

Looking at the change in landform over time is always important because it gives us a better understanding of how our site was developed over time. With development comes impervious surfaces which is what I chose to highlight in each map. It is clear that in 1930, the site was undeveloped and consisted of open green space. With the introduction of urban sprawl, more citizens from the surrounding cities started living in the outskirts. This is why we see such a dramatic increase immediately after the 1930s and 50s.

2 Inventory and Analysis

2.7.1 Green Space

Angela Johnsen

Mounting evidence suggests that parks and other green spaces are critical to achieving healthy communities in our increasingly built environment. Parks have been associated with better short- and long-term health benefits or residents and critical to optimum child development.[1 2 3] The American Planning Association (APA) reports that parks also provide significant economic benefits as they "enhance property values, increase municipal revenue, bring in homebuyers and workers, and attract retirees."[4] In fact, given the myriad positive environmental, aesthetic, recreational, and economic benefits that parks offer, the APA concludes that parks "are a good financial investment for a community."[5] For that reason, investigating existing conditions of local green space was crucial in determining the most appropriate land use for our site.

LAND RECREATION

Parks and open space within a 10-minute walk (approx. 3000 ft) were evaluated by five primary criteria: location, quality of maintenance, comfort/appeal, diversity of user groups/activities supported, accessibility by foot from our site, and overall proporation of parkland to size of population.

Location of Parkland

As Figure 2.7.1.1 indicates, approximately 7 recreational properties open to the public fall roughly within the 10-minute walk boundary (including those outside the borough, as pedestrians go to the most convenient and interesting locations regardless of political boundaries). These green spaces facilitate some variety of active recreational activities, such as baseball, as well as more passive ones, like dog walking (we observed many dog walkers).

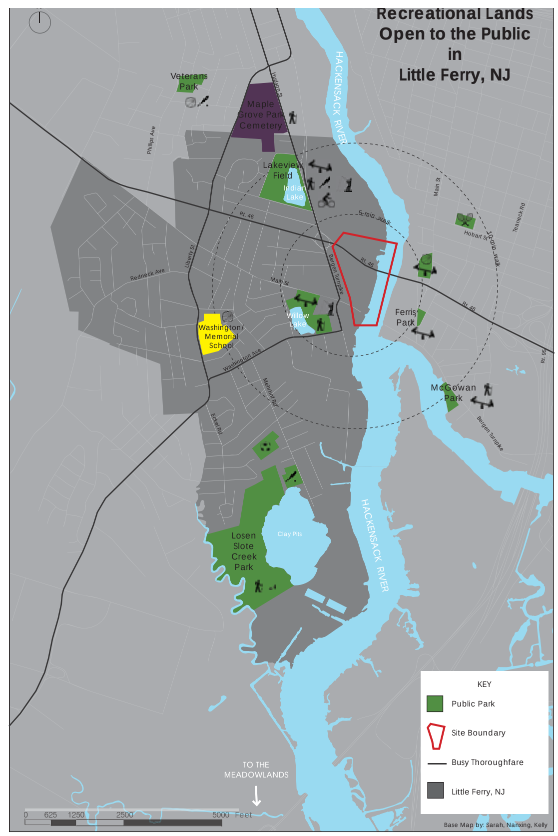


Fig. 2.7.1.1 Map of public green spaces within a 5- to 10-minute walk of our site. Busy streets indicate barriers to easy, safe pedestrian access. Recreational icons indicate activities supported by each location, although the impression of diversity can be misleading as most of the parks are uncomfortable and not interesting enough to draw many visitors. Parks would benefit from additional amenities such as comfortable seating, as well as from increased variation of interesting activities.

---

[1] Barrett, Meredith, Daphne Miller, and Howard Frumkin, "Parks and Health: Aligning Incentives to Create Innovations in Chronic Disease Prevention," *Prevention of Chronic Disease* (2014), http://www.cdc.gov/pcd/issues/2014/13_0407.htm (accessed November 2, 2014).

[2] Alcock, Ian et al, "Longtitudinal Effects on Mental Health of Moving to Greener or Less Green Urban Areas," *Environmental Science & Technology* 48 (2014): 1247-1255.

[3] American Planning Association, "How Cities Use Parks to Help Children Learn," https://www.planning.org/cityparks/briefing papers/helpchildrenlearn.htm (accessed November 5, 2014).

Fig. 2.7.1.2 WIllow Lake Park. Many of the parks in Little Ferry support very low diversity of activities, have no comfortable seating, and are not universally accessible, thus severely limiting their usership and benefit to the the community. Credit: Angela Johnsen.

Losen Slote Creek Park adds a nature preserve to the diversity of parks, too.

Maintenance

Level of maintenance varies across the board. Some parks feature neatly mowed lawns, dog waste disposal amenities, and new play equipment, while others exhibit signs of neglect such as grafitti and deteriorating softball fields.

Comfort/appeal/Diversity of Users

With the notable exception of the park at Indian Lake, most of the recreational spaces are fairly uncomfortable and visually unappealing. Several are primarily wide expanses of lawn with perhaps a ball field or playground, but little else to engage visitors.

Seating, particularly comfortable seating that facilitates sociable interactions, is scarce. The park around Willow Lake, for example, has a small playground in full sun with no seating for parents; in fact, it has no seating at all. The toe path does attract some dog walkers and an occasional jogger, but overall seems understandably underutilized (Fig. 2.7.1.2). The Indian Lake park (Fig. 2.7.1.3), on the other hand, has a wider variety of activities offered, a pleasant mix of microclimates, and seating deployed at regular intervals, contributing to higher use by residents. Given this, along with feed-back from a long-term resident about the lack of space for "families to hang-out," it seems that the town could perhaps use more, or at the very least, higher quality recreational space, especially considering that the town anticipates adding a substantial amount of additional housing to attract more affluent residents.

Accessibility

Busy traffic along congested roads (marked in bold on Fig. 2.7.1.1), unsafe crossings, some decayed sidewalks, and lack of continuous bike infrastructure inhibit safe, easy, pleasant travel to parks within Little Ferry for all members of the community, particularly around our site. Although the Meadowband concept in the RBD proposal aims to reduce this problem by providing public transit infrastructure on the berm and promoting pedestrianism and cycling, siting of new recreational spaces and careful transportation planning will need to keep the reality of busy traffic in mind. Individuals with mobility challenges must find it difficult to fully access green spaces as most of the parks are not ADA compliant (curbs without ramps, path surfaces not conducive to wheelchair/walker use, etc.).

Proportion of Green Space to Population

Although recomendations vary, the National Recreation Administration and various planning administrations suggest a minimum of 1 acre of space devoted to neighborhood parks per 1,000 residents.[6] Given the 2013 US Census estimate of approx. 10,800 population in Little Ferry,[7] the town does technically exceed the

[4] American Planning Association, "How Cities Use Parks for Economic Development," https://www.planning.org/cityparks/briefingpapers/economicdevelopment.htm (accessed November 5, 2014).

[5] American Planning Association, "How Citie Use Parks for Economic Development."

[6] Moeller, John. "Standards For Outdoor Recreational Areas." https://www.planning.org/pas/at60/report194.htm (accessed September 19, 2014).

[7] US Census Bureau. "Little Ferry (borough), New Jersey QuickFacts." http://quickfacts.census.gov/qfd/states/34/3440680.html (accessed September 22, 2014).

Fig. 2.7.1.3 The park at Indian Lake is much more appealing with access to water, a variety of passive and active activities, wildlife, and desirable amenities such as seating and trail markers. Credit: Angela Johnsen.

recommended amount of park land.

Functionally, however, Little Ferry does not have enough usable/desirable green space, as most park area is largely inaccessible to the mobility challenged, occurs in relatively isolated pockets, and is severely underutilized due to undesirable conditions.

Fig. 2.7.1.4 Most lakes are fenced, discouraging or prohibiting public use of these valuable recreational resources. Credit: Angela Johnsen.

WATER & REGIONAL RECREATION

Little Ferry's considerable water resources have tremendous potential for outdoor recreation hence their inclusion in this inventory. Apart from Indian Lake, which has a toe path around its perimeter, most other lakes are fenced off, allowing glimpses of the water but no active interaction with it (some residents apparently fish in them, though, perhaps surreptitiously) (Fig. 2.7.1.4). Private properties and development along the Hackensack River makes it fairly inaccessible to residents, too. Thus, installing a berm for flood protection may not obsure the view of the river considerably more than it is already for most residents.

Little Ferry's close proximity to the Hackensack River and Meadowlands makes participation in regional green space corridors very logical. The New Jersey Meadowlands Commission indicates that there are existing terrestrial trails that connect Little Ferry recreational areas within the Meadowlands (Fig.2.7.1.5), however these trails are functionally invisible to the average visitor as there is not clear signage or path material to indicate a trail. Poor access to the Hackensack River means that Little Ferry is also not easily connected to parks along the river.

ANALYSIS

The main challenges for parks revolve around underutilization, access, and linkage to other green spaces. Overuse of lawn makes the existing parks (with the exception of Losen Slote Creek Park) very poor quality wildlife habitat, too. To make best use of limited space and maintenance budget, future recreational space design should perhaps aim to multi-task (e.g. achieve ecosystem services + human recreation) rather than relying simply on the old recipe of open lawn and a ball field.

Existing parks should be rehabilitated to encourage more passive use by adding more convenient seating (e.g. next to children's play equipment so caretakers can rest and socialize more comfortably), making them ADA compliant. Adding more variation in topography (which is currently fairly flat) and diversity of plantings would add more visual complexity and interest throughout the year, as well as improve habitat for wildlife. Linking parks via greenways would make human access

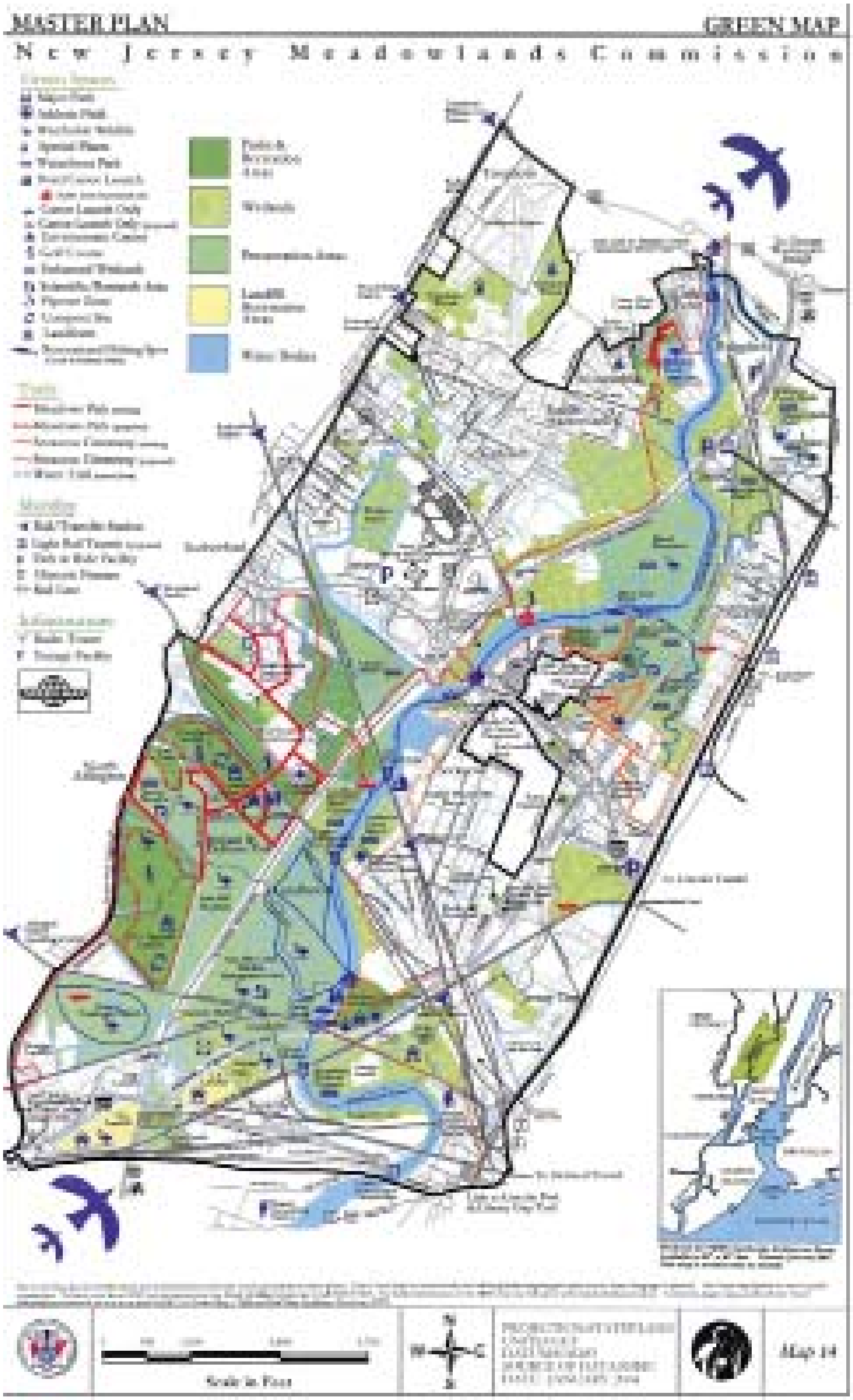


Fig. 2.7.1.5 Map of green space in the NJ Meadowlands. More robust connections to the Hackensack River could enhance regional open space linkages and transportation. A wetland park along the river in our site would add diversity to Little Ferry recreation. Credit: NJ Meadowlands Commission.

safer as well as make improve wildlife migration by reducing patchiness.

In regard to more active use, efforts should be made to establish what activities residents wish to participate in at parks. Are more picnic areas needed for families? Do certain ethnic groups in the community (e.g. the sizeable Korean population) feel that their recreational interests are facilitated in the parks?

Water is one of Little Ferry's most defining and valuable resources in terms of recreational potential. Lakes should be made as accessible to residents as possible. If physical access is out of the question for a particular health or security reason, visual access should be encouraged by making fencing/barriers part of attractive landscaping--no more institutional chain-link fences.

Access to the river should also be prioritized for easy enjoyment of the unique Hackensack River natural resources and connection to the Meadowlands. Boating could function not only as a recreational activity on its own, but also provide a means of transportation to open space in the Meadowlands and other parts of the region (reducing vehicular congestion on the already busy roads). If a berm is utilized for flood protection, space on the river side should be made into a wetland boardwalk park, which would help provide stormwater storage while introducing a novel type of park to Little Ferry's green space repertoire.

2 Inventory and Analysis

2.7.2 Contamination

Theresa Hyslop

The Meadowlands Region and the Hackensack River have a reputation for being highly polluted. While things have improved over the past few decades, there is still a lot of existing contamination in the area. This contamination needs to be taken into consideration for any redesign of our site.

Thanks to efforts from the Clean Water Act, the Riverkeeper, and other organizations, the pollution in the Hackensack River has been reduced in the past few decades. However, there is still a lot of contamination in the river that classifies the system as impaired waters. This limits the uses of the river and will restrict how people can interact with the river (i.e. no swimming in its current condition). The Hackensack River is broken up into several sub-regions, each with its own impairment report that lists the specific causes of impairment and the more general group cause. The waters on our site currently have impairments related to toxic organics, pesticides, PCBs, mercury, and turbidity. Information for the map is from the Environmental Protection Agency's Watershed Assessment Listed Waters for Reporting Year 2010.

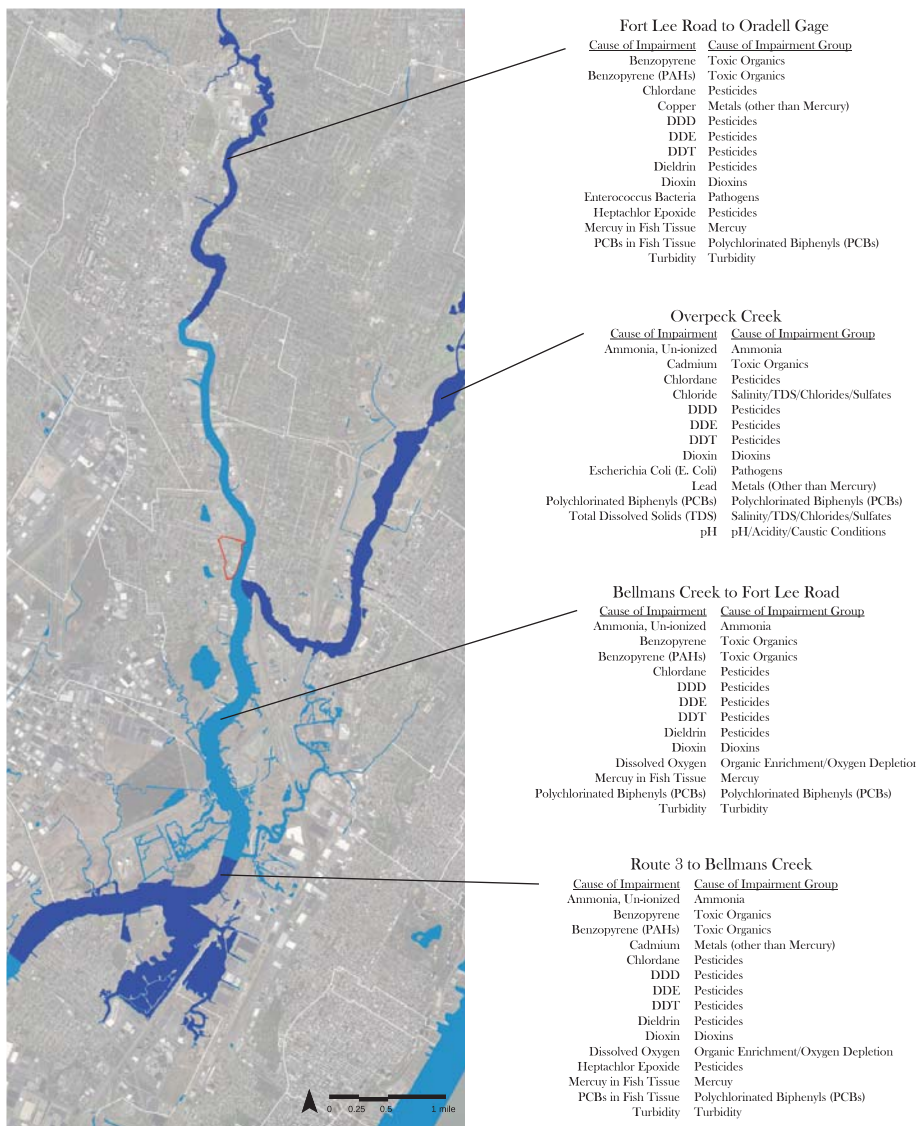
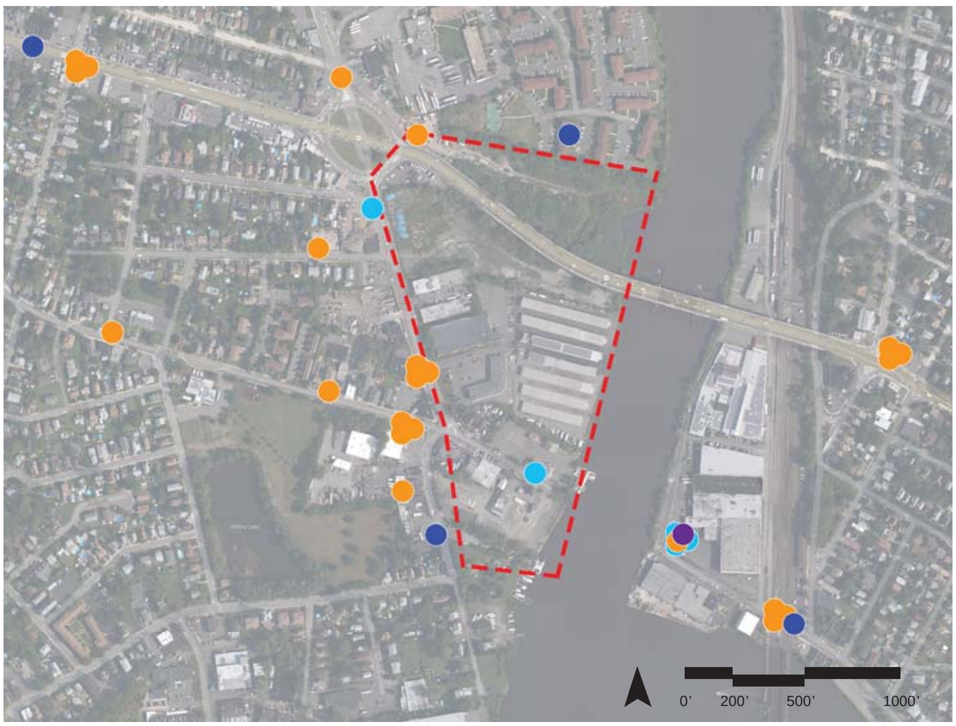


Figure 2.7.2.1. Hackensack River Contamination

1 Amerada Hess Little Ferry
2 Classic Marble and Tile
3 Tilcon Inc. Little Ferry Plant
4 Walker Poroswall Pipe Company

0 .05 .1 .2 mi

Figure 2.7.2.2. Local Known Contaminated Sites.



Water Dischargers Hazardous Waste Toxic Releases Air Emissions

- A-Self Storage
- Altona Blower & Sheet Metal Works Inc.
- Amerada Hess Corp
- Anderson Machine Works Corp
- Atlas Plastics Inc
- Balalas Service Station
- Brana Vincent P
- Capri the Dry Cleaner
- Consolidated Packaging Group Inc
- Control Data-Automated Wagering
- Crown Beverage Packaging Incorporated
- Ford Motor Co Mahwah Assembly Plant
- Globe Photo Engraving Corp
- Hoffman Block Company
- Latta Graphics Inc
- Legrand John
- Little Ferry Terminal
- Little Ferry Transmissions Inc
- Mayers AutoBody
- Metal Components Inc
- Mobil Oil Corp SS C20
- NY Susquehanna & Western Railway Ridgefield Park Fueling Facility
- Pano Dot Inc
- Ridgefield Park Citgo
- Shell Service Station #138404
- Tilcon NY NJ Inc Little Ferry Plant
- United Refrigeration Inc

Figure 2.7.2.3. Nearby EPA Registered Facilities.

The Known Contaminated Sites lists the NJ Department of Environmental Protection's Known Contaminated Sites list (last updated 6/16/2014). Three contaminated sites are within our site boundary and as such, will need to be addressed in some way for the final design. Each location has a different type and degree of contamination. Figure 2.7.2.2. shows these sites with their property boundaries. However, the contamination may not be limited to the sites' properties and may have spread to other areas.

The Nearby EPA Registered Facilities map locates facilities within approximately a half mile of our site that have to report to the EPA. While most of these sites are in compliance with the EPA, there may be some unreported contamination coming from these locations. It may also be possible to address some of the pollution from these facilities in the redesign of our site. The Registered Facilities were taken from the Environmental Protection Agency's EnviroMapper tool, which is based off of the EPA's Facilities Registration Service. There is more information about some of the facilities available online from the EPA, including permits and specific contaminations.

The last map analyzes the current contamination around our project location in terms of importance to our site. The darker red shows contamination issues that potentially have a high impact on the site. These must be considered for the final design. This includes the Known Contaminated Sites within our site as well as the Bellmans Creek to Fort Lee Road sub-region of the Hackensack

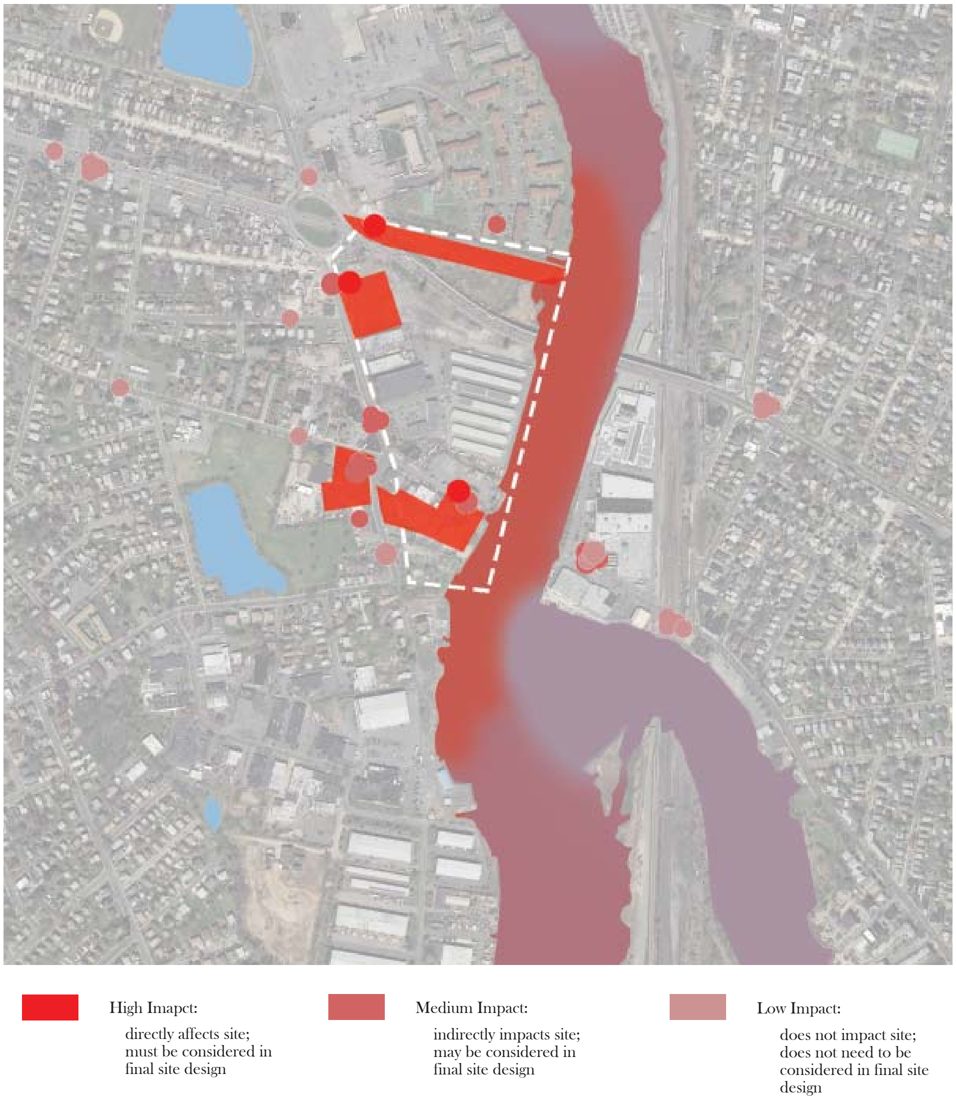


Figure 2.7.2.4. Impact of Contamination

River. These directly affect how people might use the site. For example, the contaminated waters of this sub-region of the Hackensack River limits the full use of the river by the community. The medium red shows medium impact: contamination issues that might also be considered in the final design. These do not impact the site directly, but have the potential to be addressed in some way on site. Lastly, the light red shows contamination issues that appear to have no impact to the site. These do not have to be considered in the final design.

Sources:

Environmental Protection Agency's Watershed Assessment Listed Waters for Reporting Year 2010
NJ Department of Environmental Protection's Known Contaminated Sites List (updated 6/16/14)
Environmental Protection Agency's EnviroMapper based off of the EPA's Facilities Registration Service

2 Inventory and Analysis

2.8 Circulation

Kelly Popek, Sarah Korapati, Nanxing Zheng

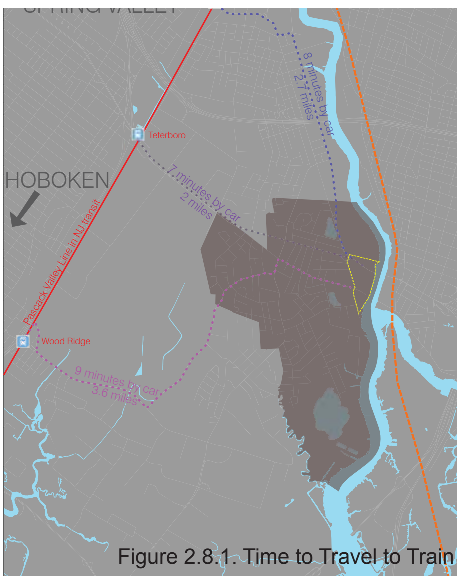


Figure 2.8.1. Time to Travel to Train

These three maps show the public transpotation near Little Ferry including bus, train, and plane. Despite the three modes of transportation, it is difficult to find a connection between the three. For example, there is no connection between the train station and the Teterboro Airport. The docks are demolished and are no longer functional leaving a town that is separated from their identity: Little Ferry. Fortunately, there would be a new rail line which could links Secaucus and Paterson.

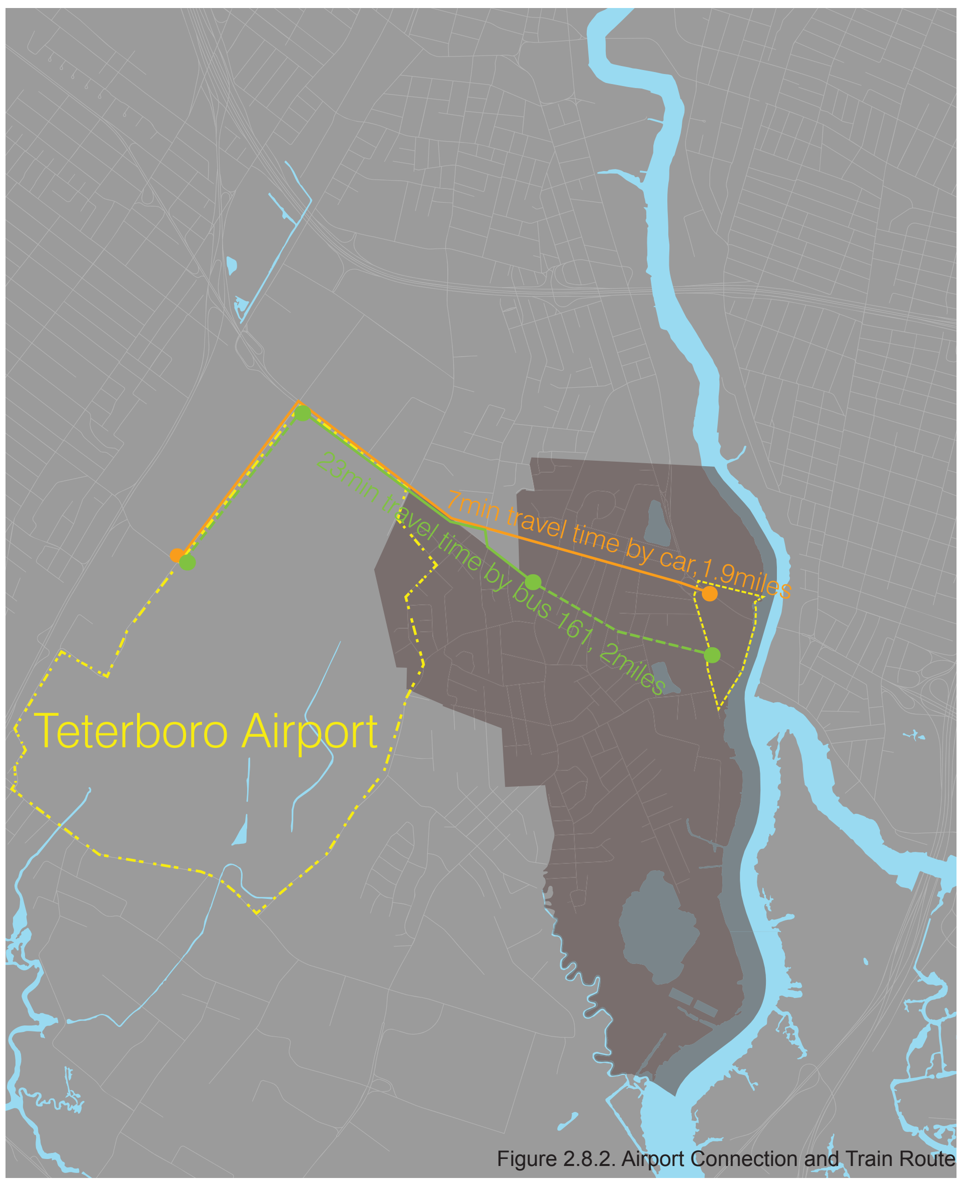


Figure 2.8.2. Airport Connection and Train Route

Figure 2.8.3. No Parking

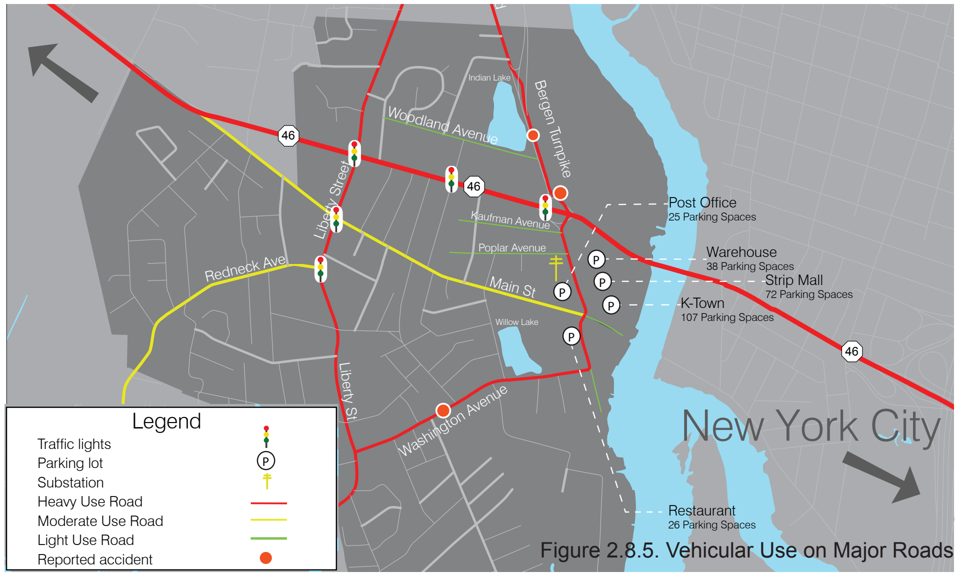


Figure 2.8.5. Vehicular Use on Major Roads

Figure 2.8.4. Dangerous House Position

There is currently very limited public parking in and around the site. Most of the existing parking is for businesses, such as the warehouses, strip mall, K-Town, restaurants, and post office. At present, there are 217 parking spaces within the site boundaries, which would potentially be lost if this site is redeveloped within the scope of the RBD proposal. Opposite the site along Bergen Turnpike there are 51 parking spaces total divided between the post office and an existing restaurant. The portion of the site north of Rt. 46 has even more limited access to public parking because of the existing Little Ferry roundabout traffic pattern. Areas to the west and south of the site mainly consist of single-family dwellings, with a couple of condominium complexes and some industrial business along Bergen Turnpike, none of which offer public parking. Residents park within their driveways—there is no on-street parking—while industrial businesses have parking on their own properties. Main Street has no on-street parking and consists mainly of single family dwellings. Some businesses exist towards the west end of Main Street with parking on their own properties. The apartment complex immediately to the north of the site has already converted an existing tennis court into parking spaces due to lack of adequate parking for tenants. Given these existing conditions, any site redevelopment proposal would require additional parking spaces, either inside the site or along the perimeter. State Highway Rt. 46, a major thoroughfare in the state connecting New York City and Pennsylvania, run through our site and is highly congested. Bergen Turnpike and Washington Ave are even more congested.

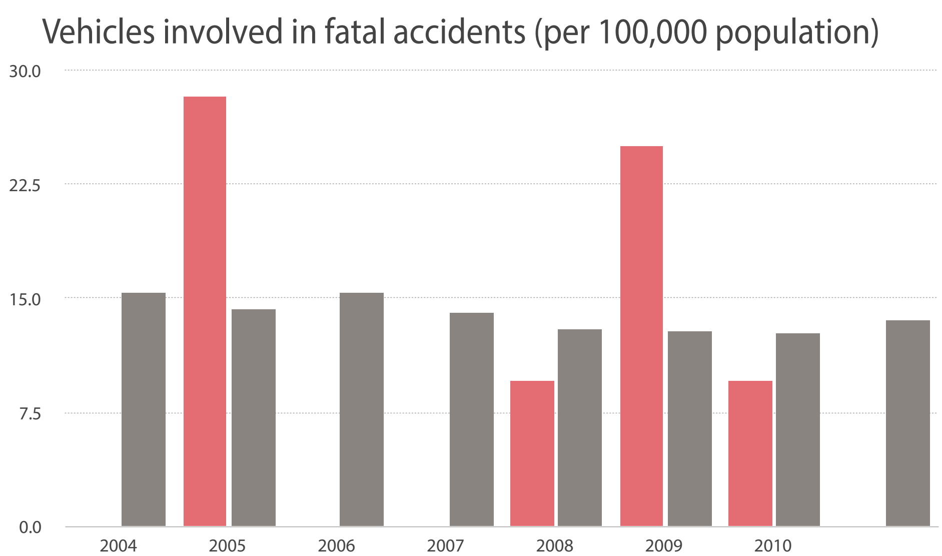


Figure 2.8.6. Vehicles involved in Fatal Accidents Table. Source: City-Data.com

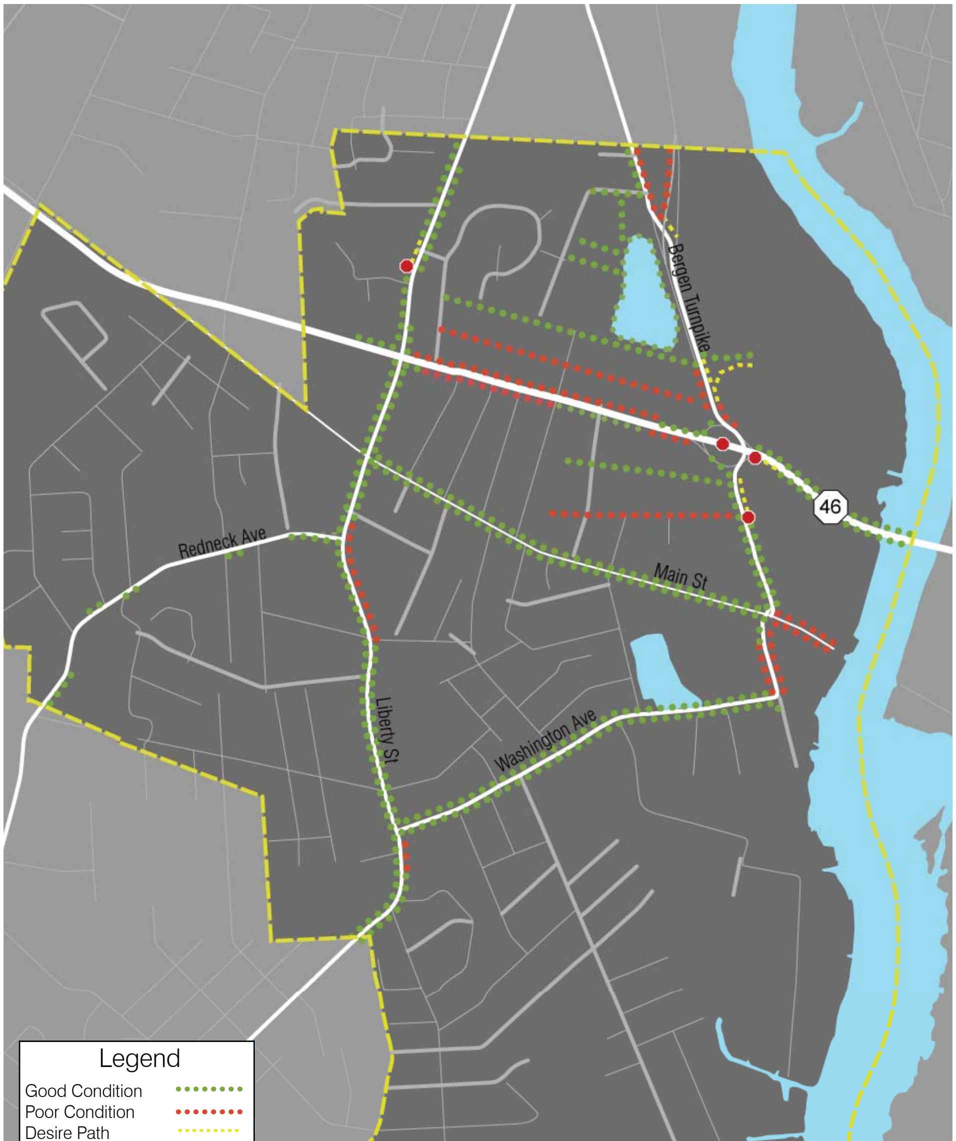


Figure 2.8.7. Condition of Pedestrian Sidewalks

Figure 2.8.8. Weedy Sidewalks

Figure 2.8.9. Suddenly Ending Sidewalks

Whether or not a side walk was in good condition was dependent upon three factors. The first criteria was that there are no obstructions on the path(ie. utility poles, weeds, etc.). The second standard was that the side walk was at least 4.5 feet wide. Lastly, the sidewalk must be maintained with no severe damage. Minor cracks were negligible but there should be no tripping hazard from fractures in the pavement. Overall, Little Ferry is not a very pedestrian friendly area along the main roads with he exception of neighborhood.

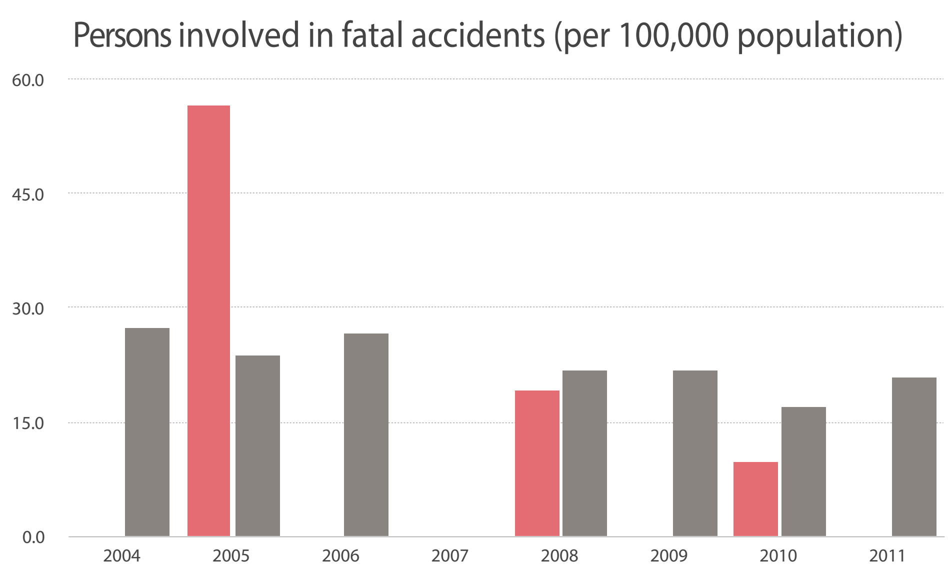


Figure 2.8.10. Persons involved in fatal accidents Table. Source: City-Data.com

2.9 Vegetation and Ecology

Teddy Aretakis, Grace Kinney, Danny Rodriguez

Vegetation

The vegetation inventory shows the spatial distribution of identified trees overlaid on a CAD drawing of the site as well as the urban context. Most trees are deciduous, while there also a few conifers throughout. Unfortunately many of the trees on the site were left unidentified because they are located on private property.

The vegetation analysis determines which trees are worth saving and which are candidates for removal if necessary for future design and development. The lower left hand map values the worth of trees based on size. Trees with a canopy spread over 50' are considered large and should be kept in place. Smaller trees are suitable for removal. The lower right hand map assigns value to trees based on their native or invasive status, with invasive species being suitable for removal. Using the overlay method, the two maps are combined to suggest which trees are most worth preservation.

Figure □□□□ Vegetation Inventory

Figure □□□□□ Large vs. Small Trees

Figure □□□□□ Native vs. Invasive

Figure □□□□4 Proposed Trees for Preservation

Figure □□□□5

Wildlife

The scale of the wildlife inventory map shows all of the municipalities in the Meadowlands. It is important to see at a regional perspective because many of the wildlife species find habitat in the landfills and wetlands in this environment, and they may not all be evident at a site wide scale. Birds, mammals, reptiles, amphibians, fish, and invertebrate all utilize these areas throughout each season of the year. According to Erik Kiviat and Kristi MacDonald in their research of Biodiversity Patterns and Conservation in the Hackensack Meadowlands, there have been over 260 species of birds, over 50 kinds of fish, 50 bees, and 420 plants. A number of these are considered threatened or endangered in New Jersey, including the mud turtle, northern harriers, cooper's hawk, and more. This information is vital to our design because there is a complex ecosystem within the Meadowlands and if this environment is altered, there may be adverse effects to wildlife and vegetation. Any kind of reconstruction could throw off the existing balance and increase invasive plants and animals, while further threatening already endangered species.

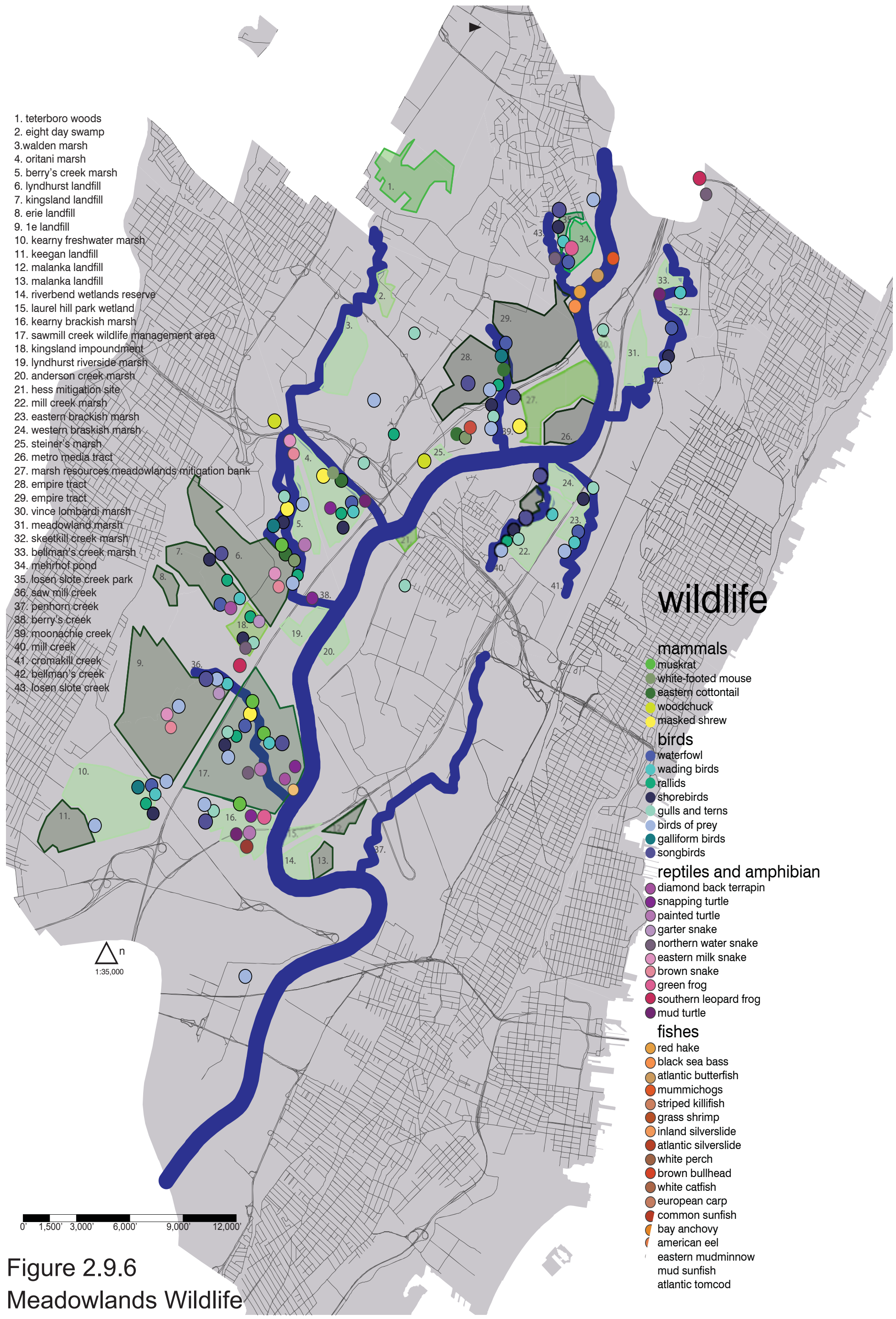


Figure 2.9.6
Meadowlands Wildlife

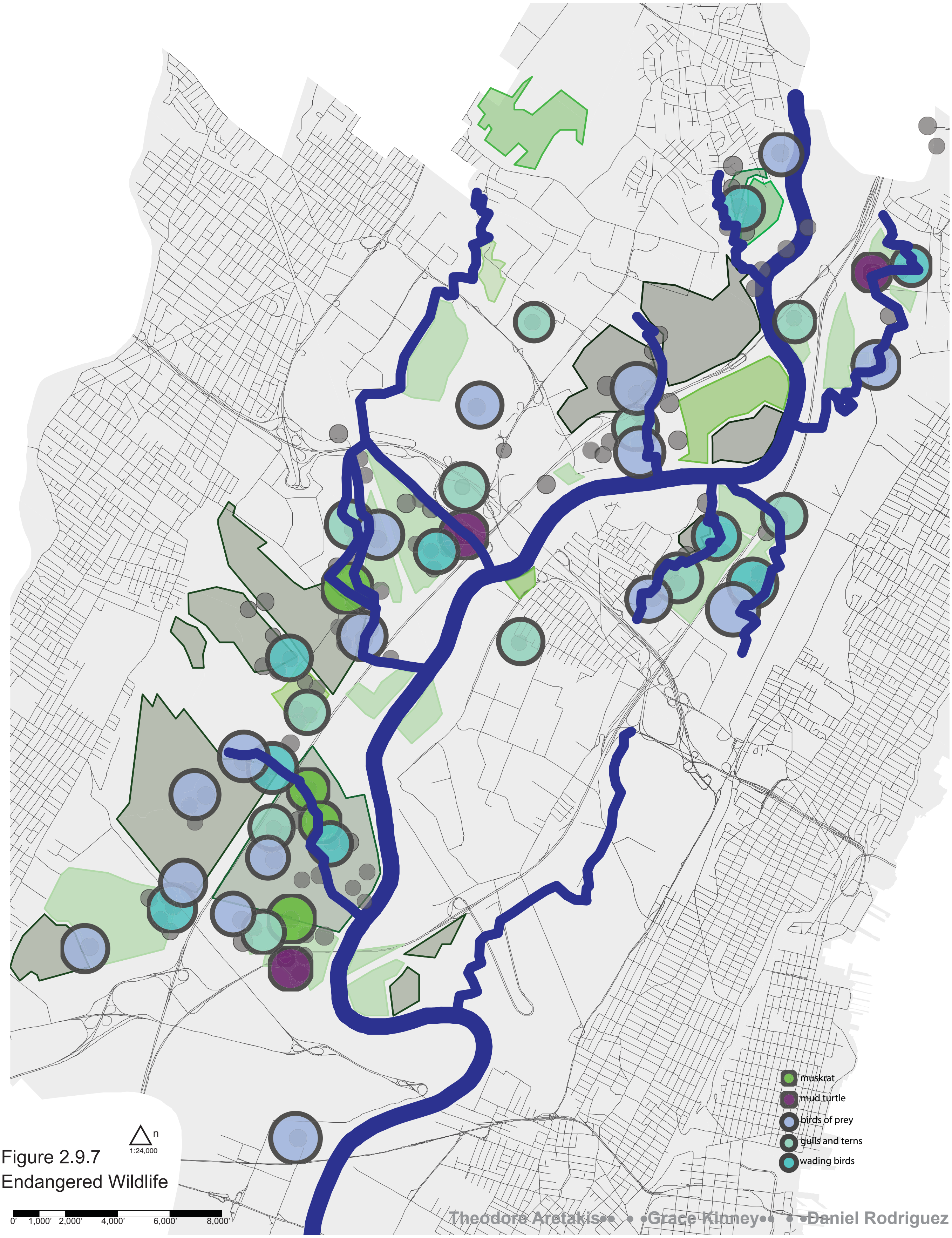


Figure 2.9.7
Endangered Wildlife

Soils

UDWB—Udorthents, wet substratum gray

The soil in these areas is classified as mainly having a wet substratum. Udorthents consists of well drained to excessively drained soils wind, waves, and rain has eroded these soils. This area was a title marsh that had been filled. The parent material is loamy spread deposits. It's made up of sand, rubbish and waste matter. It drains very well, and the water table is anywhere from 20 to 40 inches deep, this land is not good farmland.
UDWUB—Udorthents, wet substratum-Urban land complex red
This area is classified as having a slightly wet substratum but mostly urban fill. Is very simiar to the last area except there is more fill and less water. This area also has a parent material of sand and muck. It is moderately well drained. The water table is 20 to 40 inches down. Not prime farmland due to the poor quality soil.
UR—Urban land green
Urban land is material that has been manipulated and disturbed by man. Urban fill is used in the city environment for moderate plant growth. The chemical and biological properties are less favorable for rooting as opposed to the soil found in natural landscapes. Pavement, concrete, buildings, and other structures underlain by natural soil material cover this surface. There are low hills

Figure 2.9.8 Soil Types

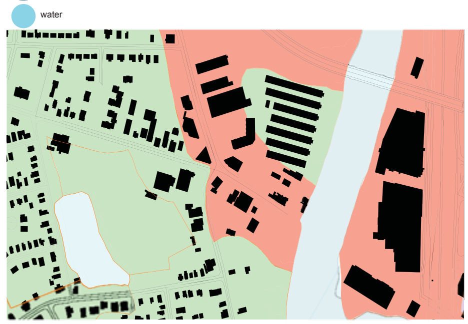


Figure 2.9.9 Soil Drainage

The drainage analysis is based off of information from an online web soil survey. Most of the site drains very well, meaning water won't sit on the side it will percolate into the ground. This makes our site a prime location for different plants, and groundwater recharge.
Wind
The town of Little ferry has a humid continental climate with minimal influence from the Atlantic Ocean. The climate of the site is influenced by warm prevailing winds from the southwest in summer and cold winds from

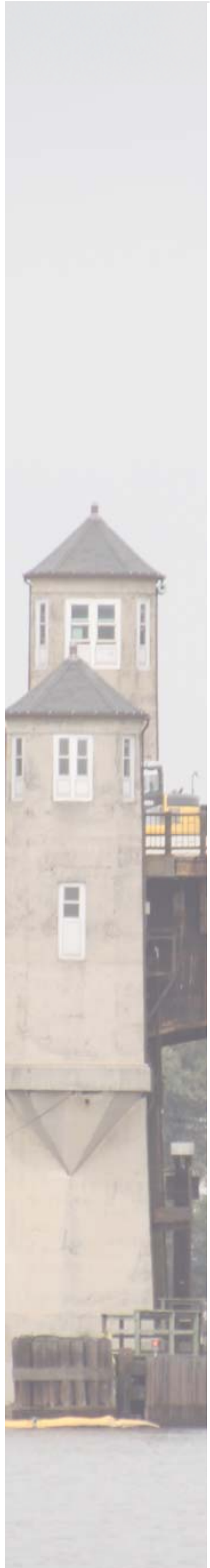
Figure 2.9.10 Wind Inventory

Figure 2.9.11 Wind Analysis

the northwest in winter. In the spring months, ocean breezes can keep temperatures along coastal regions cooler.

In the summer and spring we would like to encourage the cool breeze coming from the southwest, and in the winter we need to focus on mitigating the cold winds from the northwest. The buildings in the area do not have much effect on the wind in the area due to the fact that the tallest buildings are only three stories high.

3 RESEARCH TOPICS

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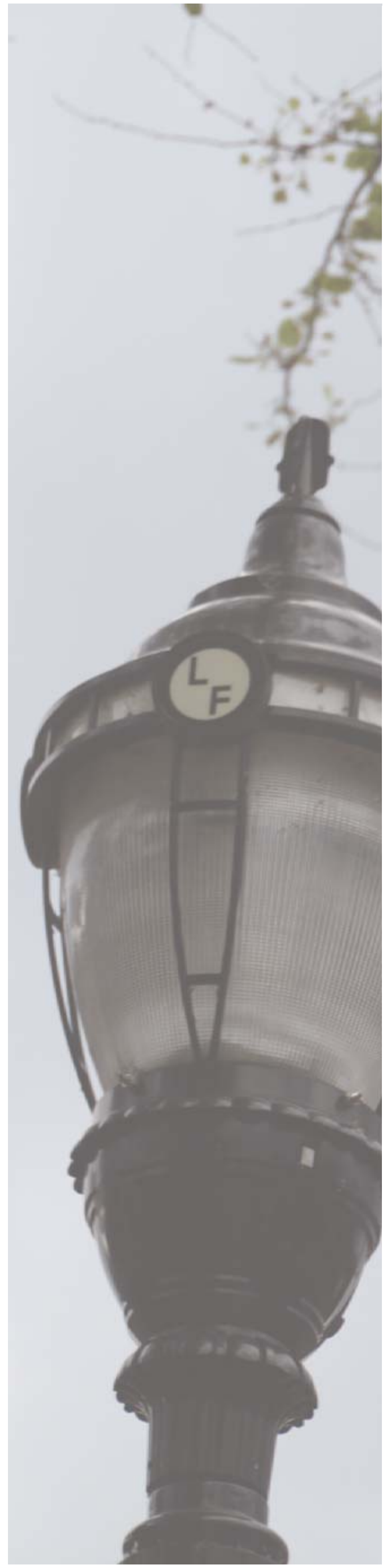
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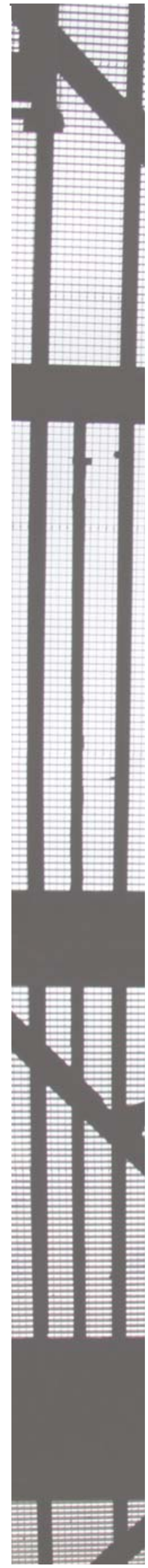


3 Research Topic

3.1 Levee and Berm Alternatives

Eugene Fernandez

With global warming, we are facing many different challenges. One of these challenges is rapid climate change and the effects of it such as sea level rise and the higher frequency of stronger storms. (Tam 2009) It is a global scale problem and it is no different than Little Ferry, NJ. The proposed flood protection barrier for Little Ferry was a levee or a berm, which is made of earthen fill made of engineered soil to protect the town, which would take a lot of space because of the slope required to hold up the structure and prevent erosion. I looked into other possible solutions that did not take up as much space on land.

Figure 3.1.1 - Berm / Levee

A hardened approach to a levee is a sea wall or flood wall, both of which are the linear protection of the coastline. Called coastal armoring, flood walls come engineered in many different forms depending on the

Figure 3.1.2 - Flood Wall

application. A flood wall is typically made of concrete wall or a bulkhead. With a hardened engineered structure, this would take up less space required to build as opposed to a softened structure of a levee. The advantages to armoring is that we have been doing it for a long time so it behaves predictably and can be used with other flood mitigation strategies. With new development strategies, structures such as housing can be built strategically with or close to flood walls. The disadvantages however, are that it is a short-term solution and both hardened and softened solutions are engineered to accommodate only a certain sized storm or rise in sea level. (Tam 2009) With storms getting stronger, the uncertainty of their strength like in New Orleans with Hurricane Katrina. Hurricane Katrina was an unusual storm that breeched and destroyed parts of a levee which was well maintained. Ironically, armoring the coast created more vulnerability to other areas upstream of the Hackensack River because of its inability to dissipate energy and detain the volume of the flood.

Another strategy that is highly engineered is a barrier. A barrier is a dam, flood gate or lock, sometimes used in a series like Delta Works in the Netherlands, (deltawerken 2004). Delta works is a system which consists of dams, sluices, locks, dykes, levees, and storm surge barriers which are all engineered to mitigate flood events. Since 1958, which was when the first Delta Work was operational, they have been making and adding on improvements to the system. It is such an enormous project that it is sometimes referred to as the 'eighth wonder of the world' (deltawerken 2004). Different barriers can be used to protect a large area of land, but is expensive to build. While expensive to build, some types of barriers can be used to harness the energy of the water to balance the cost. There are many different types of barriers, none ultimately better than the other, it all depends on the application. A dam, a check dam, flood gates, and a weir all act as a barrier that retains or holds water back. This is done to control the volume of water, and as well as reducing the velocity of the water. These types of barriers are usually fixed in place and manage the flow through a portal for the transfer of water, change in water levels, and navigation. While used as a series of different systems like the Delta Work system, depending on the area and topography, it can all be done in one fell swoop. An example of a place where this can be done is in San Francisco's Golden Gate Bridge, where there are plans of 'The Bay Arc'. The Bay Arc would consist of a giant net that would fold underwater, under the Golden Gate and be raised to protect the Bay from ocean storm surges. (Tam 2009) The advantages of a barrier are, like stated previously, if planned strategically could protect an area in one single application, and it also has the ability to protect everyone with no issues of what social and land-use issues would occur like in other flood protection strategies. The disadvantages of barrier

s are mainly that they are expensive to construct, the famous Three Gorges Dam in China has an expected cost of $25 billion, and the proposed Golden Gate barrier could cost up to 3 times

Figure 3.1.3 - Flood Gate

Figure 3.1.4 - Check Dam

more than the Three Gorges Dam. Another major with barriers is that they are ecologically damaging, the hydrology of the water will drastically change, meaning that the Hackensack River's salinity, sedimentation, wetlands, habitat, and wildlife would be affected. Barriers may also increase erosion to the coast, and lastly the barrier may not work because it is created for a certain size storm event. An example of this is

the Thames barrier in London which was operational since 1982, it is one of the largest movable flood barriers in the world, but has flaws. In 2003, it closed 14 times for maintenance, and is expected to only be useful for another 50 years due to sea level rise. (Tam 2009)

If the previous flood mitigation strategies were building up, this next strategy is to dig down. The next alternative is what is referred to as a diversion canal, floodway, or flood control channel. Basically functioning as an area where water can be diverted to temporary holding areas or detention areas during flood events. Essentially, they are a series of large channels that can be either an empty open-air channel like in the Los Angeles River or a controlled floodway such as the Red River Floodway in Winnepeg, a part of Western Canada. The controlled floodway of the Red River lets water in through control gates that let water in as


Figure 3.1.5 - Flood Control Channel

necessary. The success of a floodway greatly depends on the implementation of its design. A hard solution made of all concrete like the LA River will have a much different impact than a soft solution like the Red River. Much like all the flood mitigation strategies, there are adverse effects to the ecology and hydrology of the area. This is even more prevalent with a floodway because it requires more space than the other alternatives. The advantages of a floodway are that it can make river flooding virtually minimal or non-existent because the volume of water has a new place to go. A floodway also reduces natural erosion to the river by allowing the water to be diverted into the floodway. Other advantages to a floodway, which are not necessarily directly correlated to flood control, are that it can be made available for agriculture, and as well as it can be a source or navigation for water travel. On the other hand, the disadvantages vary. One is the loss of wetlands, and wetlands are an excellent habitat for many forms of wildlife, and also serve as the sponge and filter for fresh water. Another disadvantage is that floodways have a tendency to have straightened channels, which can increase soil erosion and also make the water travelling move more rapidly than normal which can lead to an increase of flooding downstream from the channel. In addition, there have been studies showing that river fish populations also decrease due to the channelization of a floodway. A study of the Chariton River in northern Missouri in 1971 found that a channelized section of the river contained only 13 species of fish, while the natural segment of the stream contained 21 species. So the biodiversity of the channelized areas are significantly less than a natural river. Lastly, a dredged channel's rate of recovery is extremely slow, with many streams around the world showing no significant recovery even 30 to 40 years after the date of construction. The disadvantages of a floodway seem substantial, with current improvements and technology in green infrastructure and ecology working collectively, it is possible to create a naturalized and effective soft floodway that would nullify the some of the previously stated disadvantages. (Trygg Danforth n.d.)

I shortly spoke about wetlands and soft structures, which is the next alternative. Living shorelines or wetlands are the most natural way of dealing with flood events. Not only do they serve as the sponge for the shoreline, they also filter sediments, absorb wave action, and slow the flow of high water. Different types of wetlands include marshes of salt and fresh water types, tidal basins, mud flats, rocky shores and beaches. The advantages of having wetlands are extensive and extremely beneficial for society. Wetlands filter pollutants out of water, aid in carbon sequestration,


Figure 3.1.6 - Wetland Restoration

provide flood control, provide habitat for fish and wildlife, and as well as provide recreational and fishing for people. Wetlands are a natural ecosystem that provides the most long-term flood control solution as opposed to the other engineered solutions to flooding. The disadvantages of wetlands are minimal, but they have to do with land use. The land used in wetlands will usually turn into a reserve, where there is not much of a tax revenue, but that is not necessarily as negative if it protects the town inland. And the other is mosquitos which can be controlled in a properly constructed wetland. (Trygg Danforth n.d.)

There are many alternatives to flooding as we have been dealing with it for centuries; some other alternatives which I will just briefly discuss are creating a Floating Development, which would consist of transforming all of Little Ferry to have floating structures and infrastructure. I believe this would not be ideal for Little Ferry as there is the waste water treatment facility which would be difficult, if not impossible to work-in with a floating development and as well as the many industrial buildings which could possible discharge pollution into the water during a flood event. Another strategy is an elevated development, which would mean elevating all the buildings and infrastructure high enough to avoid damage from flood events. Similar to floating homes, I believe it is no applicable to Little Ferry with its waste water treatment facility and its many industrial areas which could discharge pollutants into the water. In addition, it is not ideal for high-density development because the buildings are raised on stilts, as well as it's limitation due to sea level rise, it is only a short-

Figure 3.1.7- Floating Homes

Figure 3.1.8- Managed Retreat

term solution. Lastly, the last solution I will be discussing is a managed retreat. Since a managed retreat involves abandoning, or removing existing buildings and infrastructure to higher land it is difficult for places to implement. Advantages include, lowest cost of all the other strategies, and could possibly allow for that land be turned into a wetland to protect the inland and filter the water. The disadvantages include the extreme difficulty of implementation as it involves tremendous legal issues because not all property owners are willing to sell their homes. In addition, leaving all the existing buildings in place or demolishing them could lead to pollution, so a massive site cleanup would need to be done.

Overall, there is no clear cut solution to flooding. Meaning that every alternative should be explored, and as well as new technologies and solutions to flooding. Not only will considering at all alternatives help, but studying the all the existing conditions, being land-use, ecology, social issues, etc. This will lead to a more successful design, and eventually lead to a solution that is bigger than just Little Ferry.

Works Cited

-deltawerken. The Delta Works. 2004. http://www.deltawerken.com/Deltaworks/23.html (accessed 11 29, 2014).

-Stevens Institute of Technology. Stevens Davidson Laboratory Researchers Evaluate Flood Wall Invention to Protect Coastal Cities from Tidal Surges - See more at: http://www.stevens.edu/news/content/stevens-davidson-laboratory-researchers-evaluate-flood-wall-invention-protect-coastal-citi. 2004. http://www.stevens.edu/news/content/stevens-davidson-laboratory-researchers-evaluate-flood-wall-invention-protect-coastal-cities (accessed November 29, 2014).

-Tam, Laura. Strategies for Managing Sea Level Rise. 11 1, 2009. http://www.spur.org/publications/article/2009-11-01/sea-level-rise-and-future-bay-area (accessed 11 29, 2014).

-Trygg Danforth. Grey vs Green, The Benefits of Natural Flood Control in a Changing Climate. n.d. http://www.patrout.org/docs/stream-cleaning-and-channelization/grey-vs-green-article.pdf?sfvrsn=2 (accessed 11 29, 2014).

Figures & Contents / Web Resources

Figure 3.1.1 – Levee – Netherlands -http://ngm.nationalgeographic.com/2013/09/rising-seas/img/12-netherlands-windmills-and-dikes-670.jpg

Figure 3.1.2 – Flood Wall – Richmond,VA - http://farm7.staticflickr.com/6237/6341950719_9af7a7dd28_o.jpg

Figure 3.1.3 - Delta Works, Netherlands - http://i.imgur.com/uD4B6P6.jpg -

Figure 3.1.4 – Naruko Check Dam, Japan - http://upload.wikimedia.org/wikipedia/commons/f/f1/Naruko_Dam_check_dam.jpg

Figure 3.1.5 – Red River Floodway - Winnepeg, Canada - http://www.gov.mb.ca/asset_library/en/2011flood/images/04/04/03.jpg

Figure 3.1.6 – Lincoln Park Wetland Restoration – Jersey City, NJ - http://www.louisberger.com/sites/default/files/styles/project_slider/public/LBG-LincolnPark_aerial.jpg?itok=gZNmfPcC

Figure 3.1.7 – Floatable Homes – Amsterdam - http://www.bowcrest.com/dutch-barge-specialists/wp-content/gallery/ijburg-2/4-floating-homes-ijburg.jpg

Figure 3.1.8 – Managed Retreat - Photo: Reuters - http://cdn.thewire.com/img/upload/2012/10/29/fde5a7249523464de40dbe_623x416.jpg

3.2 Berm Materials and Typologies

Theresa Hyslop

Inspired by the MIT/ZUS Rebuild by Design proposal, many of the studio groups are proposing a large berm as part of their overall design for the Little Ferry site. The creation of a berm (levee) in Little Ferry provides a good solution for future flood protection, but there are still some questions that would need to be answered about the construction of the berm. Typical berm construction requires a lot of soil fill and can be expensive. Incorporating recycled materials and using novel construction techniques provide opportunities for making a more sustainable and less expensive berm.

One of the main components of the MIT/ZUS Rebuild By Design proposal, the New Meadowlands, is the creation of the Meadowband system. This system contains a flood protection berm that is integrated with the wetland system and will provide protection against future flooding. Secondarily, it is meant to serve as a new connection along the Hackensack River and the Meadowlands, with the possibility to include a rapid transit bus system, a road, and a pedestrian walkway on the top of the berm. Little Ferry is poised to have the northernmost part of the berm, as it is situated on the northern edge of the Meadowlands and the northern edge of the New Meadowlands proposal. In general, the berm is meant to emulate the third-generation Dutch dike system. However, when it comes to specific locations, the berm will have different characteristics depending on its location in response to sediment material availability and available space. The report also mentions that the berm's base will be built with a sand/soil core, clay cladding and grass or shrub cover. This means that a massive amount of fill will be required, which may not be very feasible nor very sustainable (MIT, 89). Good earth for fill may not be available nearby, and as such soil will have to be brought in from an outside source. This can be costly depending on the type of fill used.

The New Meadowland's berm follows well with the traditional berm or levee. A levee is formally defined by the US Army Corps of Engineers as "an embankment whose primary purpose is to furnish flood protection from seasonal high water and which is therefore subject to water loading for periods of only a few days or weeks

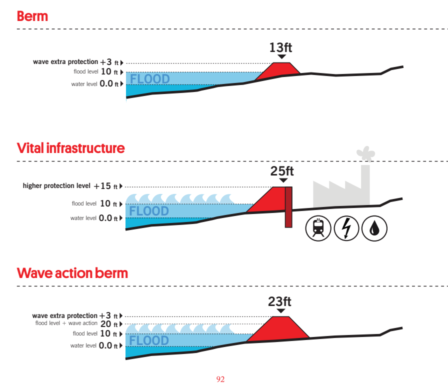
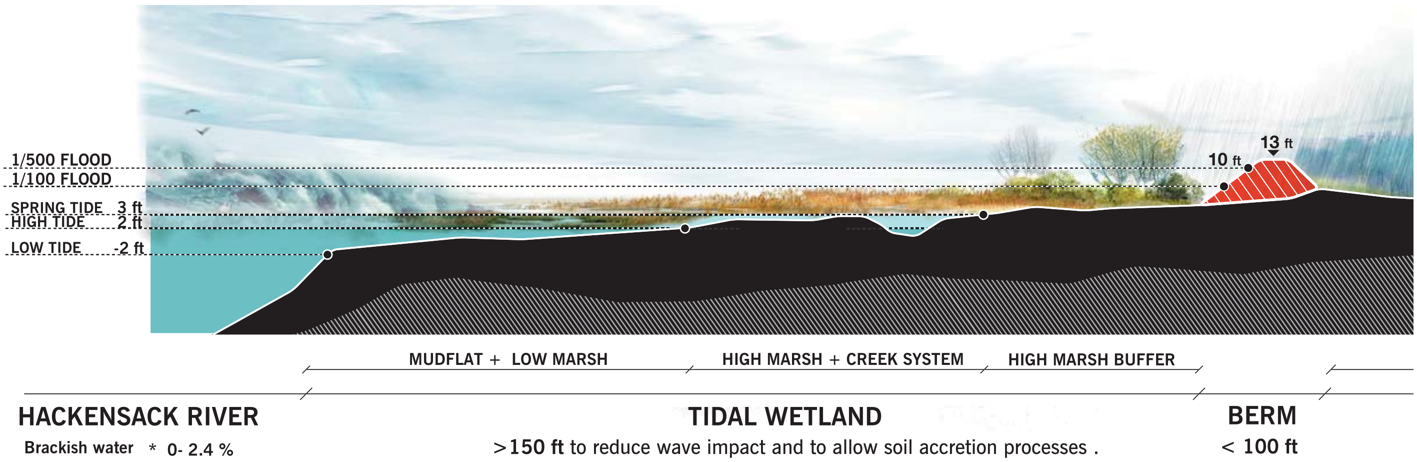


Figure 3.2.1. New Meadowlands berm typologies.

a year" (USACE, 11). In common terms, berm and levee are often used interchangeably, as they both refer to a raised embankment. Because the New Meadowlands report refers to their levee as a berm, the two terms will be used interchangeably throughout the rest of the report. Levees are typically made out of earth, or in other words, some type of soil. In their Design and Construction of Levees Manual, the US Army Corps of Engineers states that almost any soil is suitable for constructing levees. While very wet soils, fine-grained soils, and organic soils are usually



Sectional diagram with flood protection berm in red in the middle. Freshwater basins or contaminated chamber wetlands to the right.

Figure 3.2.2. Sectional diagram of New Meadowlands proposal berm.

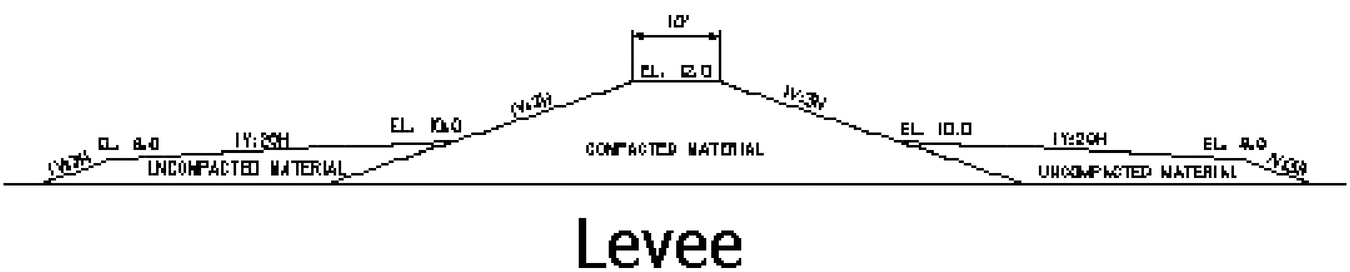


Figure 3.2.3. Sectional diagram of a typical levee.

not suitable, they may be considered for portions of levees in some situations (USACE, 32). The soil for constructing levees is usually obtained from shallow pits or from channels excavated adjacent to the levee. However, these produce fill material that is often heterogeneous and far from ideal (USACE, 11). Regardless of the soil used, it should be tested for its suitability before construction of the levee (USACE, 22). Based on the New Meadowlands report, it is likely that the Meadowberm will be constructed based on these traditional techniques. This means that a lot of earthen fill will be required, and in urban areas like Little Ferry, it may be difficult getting the large amount of fill. As a result, fill may have to be brought in from other areas which will increase the cost of the berm.

However, there are several alternatives to the traditional earthen levee which can help make the berm more feasible and sustainable. These include reusing concrete, reusing old tires, and using construction wastes. There are also opportunities to apply technologies used for Mechanically Stabilized Earthen Berms to the construction of flood protection berms. Each of these alternatives have different ranges of application, but all have some potential to be applied along the proposed Meadowlands berm system.

The first idea of reusing concrete comes from Louisiana, where there was a proposal to use the rubble of the old Interstate 10 Twin Span Bridge to build an artificial reef and reinforce existing levees (Charpentier). There are also opportunities to crush and sift concrete blocks to use for fill. This concrete fill can supplement or substitute earthen fill. Crushed concrete must meet certain American Society of Testing Materials (ASTM) standards or else it cannot be used. For example, materials must be consistently crushed to the proper dimensions and must not contain above a certain percentage of other material. Concrete can additionally be used to strengthen berms and levees. Slabs of concrete inserted into the body of the embankment helps to increase the stability and resistance of the structure. This allows the slope of the levee to be steeper, which reduces the amount of earthmoving required to build the levee (Vytlačilová, 74).

While it is an older project, California State University in Chico did an experiment with reusing old tires for levee repair and flood protection. Along part of a flood control levee on the Feather River, the group constructed a 1,400 foot long, 20 foot deep reinforcing wall of 2 inch rubber chips. The chips were made from 45,000 old waste tires and were mixed with soil, cement and bentonite for the wall. The mixture seals off leakage and helps anchor the levee (Levee). This project demonstrates opportunities for incorporating waste tires into future berm repairs and flood protection. It might also be possible to apply this to reinforcing levee and berm construction at the outset to make for a stronger berm.

California also demonstrates that it is possible to use construction and demolition waste and debris in levees and berms. The state has many standards concerning waste and disposal, but some materials are excluded when they are reused in other activities. For example, according to California's Minimum Standards for Solid Waste Handling and Disposal, "[t]he use of fully cured asphalt, uncontaminated concrete

Figure 3.2.4. Example of a MSE berm at Cherry Island Landfill.

(including steel reinforcing rods embedded in the concrete), crushed glass, brick, ceramics, clay and clay products, which may be mixed with rock and soil, in connection with road building, road repair, airport runway construction, bridge and roadway work, levee work, flood control work, and all associated activities by Federal, State and local government public works agencies and their contractors" are excluded activities from the standards (Chapter 3). While not every material listed could be used in the construction of levees, this exclusion reveals that many of these materials have been recycled and reused in the past and can continue to be used in the future. Furthermore, engineers in Czech Republic have been researching more ways to use recycled materials in the building industry. One paper examines the properties of fibre reinforced concrete, which incorporates recycled aggregates from construction and demolition wastes. It concludes that while more research needs to be done, some of the applications of the fibre reinforced concrete includes use in earthen structures, such as levees, dams or dikes (Vytlačilová, 74). These two sources reveal opportunities for demolition waste from our project site to be incorporated into the construction of a berm.

Moreover, one of the most promising applications for a better flood protection berm comes from Mechanically Stabilized Earthen Berms. MSE berms, as they are usually called, are berms that use geosynthetic or metallic reinforcing elements with soil and facing elements to create grade separations. They are commonly used for highways and to expand the volume of landfills. One company, Advanced Wall Technology, has recently patented a new type of MSE berm that has the potential to be very sustainable. It uses recycled fill materials for 99.7% of its construction, which eliminates the need to bring in a lot of new fill for the project (Our Approach). For example, Coal Combustion Products, such as fly ash, can be incorporated into the berm, as well as contaminated soil, dredge material, and crushed glass (Solutions). The MSE berms constructed with Advanced Wall Technology's patented system were shown to withstand a range of tough conditions. One berm in particular withstood a 5.8-6.0 earthquake and

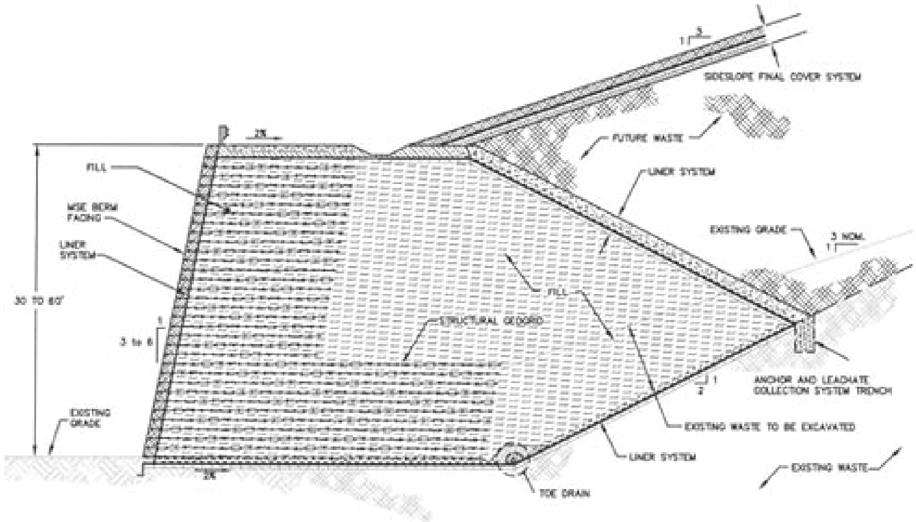


Figure 3.2.5. Sample sectional diagram of Advanced Wall Technology's patented MSE berm system.

Figure 3.2.6. Aerial photo of Cherry Island Landfill project under construction.

heavy winds and rain from Hurricane Irene with no impacts noted from either the earthquake or the hurricane on follow-up inspections (Our Approach). When it comes to our project site, there is a chance to apply this technology when constructing the flood protection berm. Based on the tough conditions similar berms have withstood in the past, a levee constructed with this applied technology should be able to withstand forces from flooding along the Hackensack River. There is also the great opportunity to use contaminated soils found on our project site in the creation of the berm.

A great example of an existing MSE berm project is the Cherry Island Landfill Vertical Expansion Project. The landfill is located in Wilmington, Delaware and won the American Academy of Environmental Engineers and Scientists' 2013 Honor Award for Design. For the project, Geosyntec prepared a final design that included an 8,000-ft long, 70-ft high MSE berm around the perimeter of the landfill that was built over extremely soft river-dredge material. The berm played two critical roles in the project: it both compressed and consolidated foundation soils while providing more disposal space for the landfill. The innovative prefabricated vertical drains (PVDs) installed beneath the berm dissipated pore pressures during berm construction, improving the foundation of the construction. This MSE berm is one of the highest and most massive reinforced structures ever constructed over soft soils in the United States—a very impressive feat that could have some applications to flood protection berms. Because the landfill and berm are expected to settle over time, an extensive geotechnical monitoring network is in place to monitor their stability. Additionally, numerous older monitoring systems were replaced with updated ones and incorporated into the overall design of the berm (Honor Award). Similar monitoring systems could be put in place along the berm in Little Ferry to check its resiliency over time and help discover any problems. The Cherry Island Landfill project not only opens opportunities for extending the capacity of existing disposal facilities over dredge disposal sites, but also for very cost effectively raising levees and dikes at critical locations prone to flooding. For Little Ferry, this technology can be used for constructing the berm, which would make it more resilient and able to incorporate contaminated soils into the construction of the berm.

Many opportunities exist for making the Little Ferry berm more feasible and more sustainable. Saving materials from building demolitions and reusing them for fill can cut down on the amount of needed earthen fill and reduce the cost of the berm. This also means that there is less waste to remove from the site and less waste that will go to landfills, making the project cheaper and more green. Monitoring systems can be put into the new berm to record data to be used for other projects and to prevent potential problems. The proposed berm in Little Ferry, and the berms proposed along the rest of the Hackensack River, have the potential to be so much more than simple earthen berms. New technologies and new engineering techniques are constantly being developed, and many things already exist that need to be applied in new ways. The proposed berm in Little Ferry has the opportunity to set new precedents for more sustainable and feasible berm construction.

Figure 3.2.7. View from top of MSE berm at Cherry Island Landfill.

1. "2013 Honor Award – Design: Cherry Island Landfill Vertical Expansion Project." 2014. American Academy of Environmental Engineers and Scientists. Accessed 28 November 2014. http://www.aaees.org/e3competition-winners-2013honor-design2.php
2. "Chapter 3. Minimum Standards for Solid Waste Handling and Disposal: Article 5.95. Construction and Demolition Waste and Inert Debris Disposal Regulatory Requirements." 2014. California Integrated Waste Management Board. Accessed 29 November 2014. http://www.calrecycle.ca.gov/Laws/regulations/title14/ch3a595a.htm
3. Charpentier, Colley. "Jindal endorses plans for using rubble of twin spans." NOLA. 10 June 2008. Accessed 28 November 2014. http://www.nola.com/news/index.ssf/2008/06/jindal_endorses_plans_for_usin.html
4. "Levee repairs underway with old tires." The Waste Watcher, Summer 1999. California Integrated Waste Management Board Archives. Accessed 29 November. http://www.calrecycle.ca.gov/archive/IWMBPR/Watcher/1999/Summer.htm#Levee
5. MIT CAU, ZUS, Urbanisten, Deltares, Volker Infradesign, and 75 B. The New Meadowlands. 2014 Draft Proposal. Commissioned by Rebuild by Design.
6. Our Approach. 2014. Advanced Wall Technologies. Accessed 29 November 2014. http://www.mseberms.com/?page_id=40
7. Solutions. 2014. Advanced Wall Technologies. Accessed 29 November 2014. http://www.mseberms.com/?page_id=463
8. U.S. Army Corps of Engineers. "Engineering and Design: Design and Construction of Levees." 30 April 2000.
9. V. Vytlačilová and J. Vodička. "Properties of fiber reinforced concrete using recycled aggregates" in Advances in Control, Chemical Engineering, Civil Engineering and Mechanical Engineering, p71-75. September 30, 2010.

3.2.1 and 2. MIT CAU, ZUS, Urbanisten, Deltares, Volker Infradesign, and 75 B. The New Meadowlands. 2014 Draft Proposal. Commissioned by Rebuild by Design.

3.2.3. U.S. Army Corps of Engineers. "Engineering and Design: Retaining and Floodwalls." 29 September 1989.

3.2.4. "2013 Honor Award – Design: Cherry Island Landfill Vertical Expansion Project." 2014. American Academy of Environmental Engineers and Scientists. Accessed 28 November 2014. http://www.aaees.org/e3competition-winners-2013honor-design2.php

3.2.5. Our Approach. 2014. Advanced Wall Technologies. Accessed 29 November 2014. http://www.mseberms.com/?page_id=40

3.2.6 and 7. "2013 Honor Award – Design: Cherry Island Landfill Vertical Expansion Project." 2014. American Academy of Environmental Engineers and Scientists. Accessed 28 November 2014. http://www.aaees.org/e3competition-winners-2013honor-design2.php

3 Research Topics

3.3 Planting on Top of a Berm

Evan Sparkman

Plants are a popular and aesthetically pleasing way to bring nature to a constructed environment. While trees are a gift of nature, we must be cautious of where we plant them. Planting on a levee is no exception and the primary purpose it serves is to protect the residents living behind it. It is understandable why trees and plants may want to be added to a berm but it is important to remember the true purpose this structure serves. This report will be discussing the different issues that can be caused by planting on a levee and the ways to work around it.

The first major issue of planting on a berm is that the roots of plants can accelerate seepage rates. While plants with shallower more fibrous root systems may not be a problem, trees with larger thicker roots can create gaps and openings in the berm. During a larger storm or flood event, this can cause water to slowly infiltrate the berm which can then jeopardize the structural integrity.

The second issue is a common problem that is dealt with in all different environments. When a tree is blown over, its roots are pulled out of the ground as well. This can cause excessive damage to the ground and

Figure 3.3.1: Berm Rendering with Planting

Figure 3.3.2: Berm Seepage From Tree Roots

can be quite costly to fix. If the tree is on the riverside of the levee, the combination of a flood with high velocity winds can dramatically increase the chance of a tree toppling over. This can be detrimental during a large storm as water will, again, be able to seep into the berm leading to erosion and possibly the eventual collapse of a portion of the berm.

A levee requires constant maintenance and monitoring in order for it to serve its primary purpose. This would require vehicular access to the levee so that workers can drive alongside to see if there is damage to any areas. Larger plants and trees can hinder site lines for these maintenance workers and an area that might be damaged can be hidden behind a tree. Clarity of the berm is crucial especially in preparation of a major storm event. Any damage or obstructions that are not seen or fixed by the workers can lead to many different issues. When a berm extends for miles, convenient maintenance is essential as a very thorough inspection of all areas of the berm is unrealistic, timely, and costly. Not only do trees block these site lines but during major operations, trees will create barricades for vehicular access. Temporary flood control structures are often placed on levees before storms to help further prevent water from flowing over it. Ease of access is important for these operations in order for them to be carried out expediently and efficiently.

While this is not one of the more major concerns but definitely should be taken into consideration, it must be noted that trees provide shelter of many different animals. The concern would not be towards the birds and different mammals that take shelter in the canopy but the animals

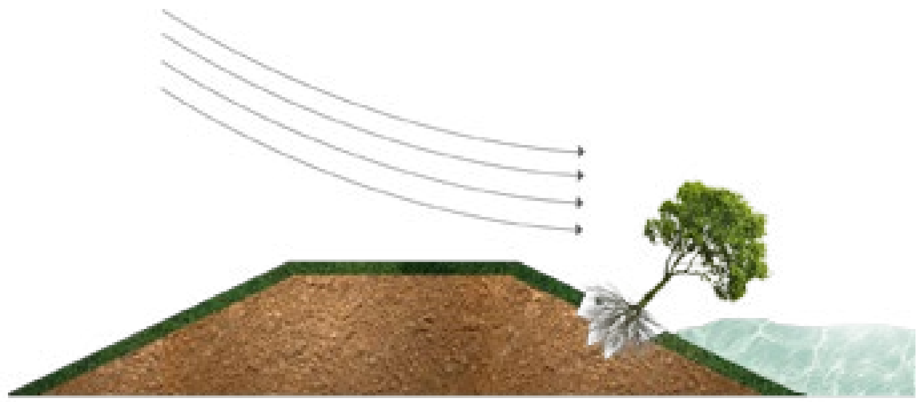


Figure 3.3.3: Berm Damage From Blow Over

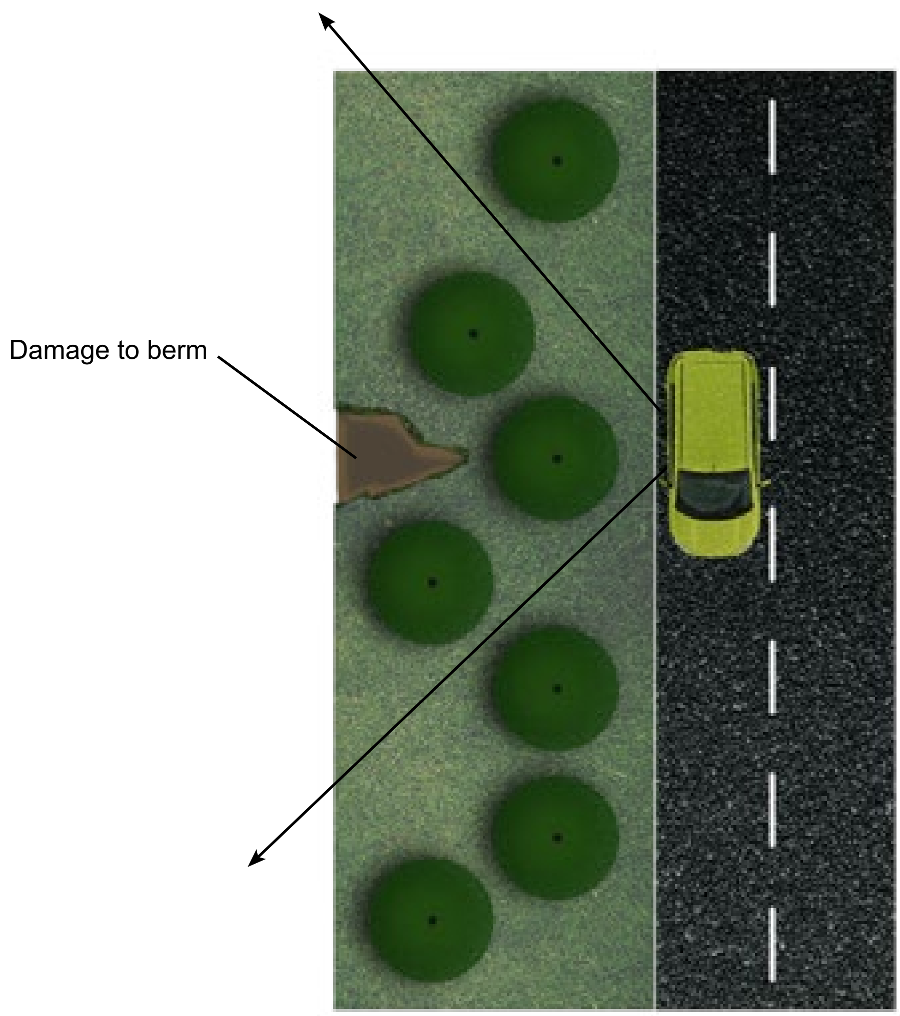


Figure 3.3.4: Hindered Site Lines

that burrow under the trees. Just like the tree roots, this can also lead to seepage issues and create even more openings for water to leak into. Not only do trees create shelter, but grasses do as well. This is a natural environment for many species as they can observe their surroundings better to protect themselves from any predators that may be approaching. Many of the animals will burrow down over three feet to properly shelter themselves

Now that the different conflicts have been addressed, it is important to review the different zoning ordinances that are set for levees. Having knowledge of these zoning requirements will not only best prepare us for what we can and can't do, but how we can work around it when designing. The vegetation free zone is the first regulation to understand. Depending on the size of the berm, this is the area that prohibits planting. This applies to all plants except for grasses which is used to stabilize the soil to prevent erosion. Grass roots do not penetrate the soil deep enough to induce any structural damage to the levee. The primary purpose of the vegetation free zone is to provide easy vehicular access to the berm in case any actions need to be taken. If trees are planted outside the vegetation free zone, their canopy cannot extend through the vegetation free zone and must be maintained and pruned. In addition to a vegetation free zone, there is also a vegetation management zone. If there are any trees outside of the vegetation free zone that can harm or affect any part of the levee, it is to be removed. For instance, if a tree is overshadowing an area of the levee and is inhibiting grass growth, this will have to be dealt with. Another case would be if the tree roots were damaged during construction thereby increasing the chance of the tree collapsing on top of the berm. This is why the root free zone was introduced. The greatest expected extend of plant roots should be noted before planting in the vegetation free zone as it could end up making its way under the berm. Root barriers could be used to prevent this; however, this should not slow the flow of groundwater as well as seepage flow.

Before analyzing and exploring the different solutions for planting on a levy, it is important to understand the different obstacles when landscaping planting is permitted. There are a number of different factors that determine this. The first is the type of construction material that is used to build the levee. Certain types of soils are more easily penetrated by tree roots which can lead to "piping" or more

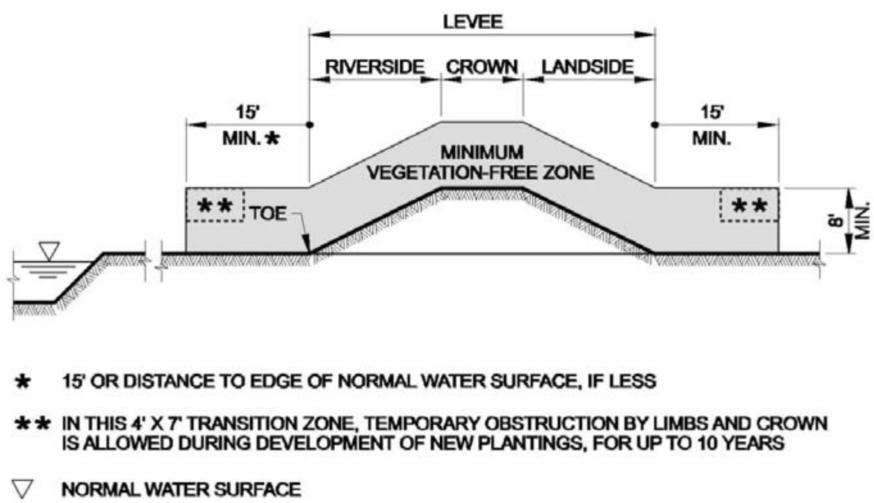


Figure 3.3.5: Vegetation Free Zone

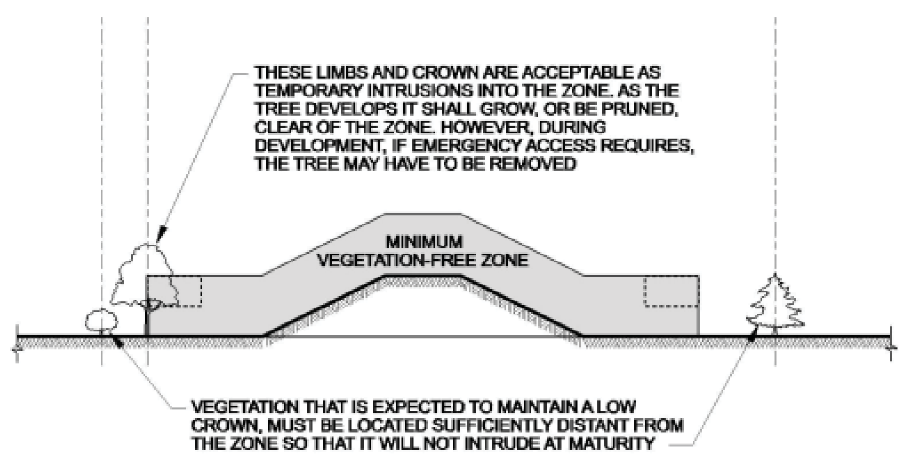


Figure 3.3.6: Vegetation Maintenance

openings in the soils. Some soils used may also not be suitable due to the lack of nutrients or contaminants found within it. Another consideration is the overall project alignment. The role of a landscape architect is to understand the limitations and opportunities that a particular project can have on a surrounding area. Understanding ways to use plants for aesthetic and open space values while still following the zoning regulations is a challenge that landscape architects face; however, if done properly can be greatly advantageous. Lastly, the environmental factors can have a large impact on determining where and if certain types of vegetation are permitted. Abiotic factors such as climate, groundwater depth, and soil drainage all need to be taken into consideration when choosing plants.

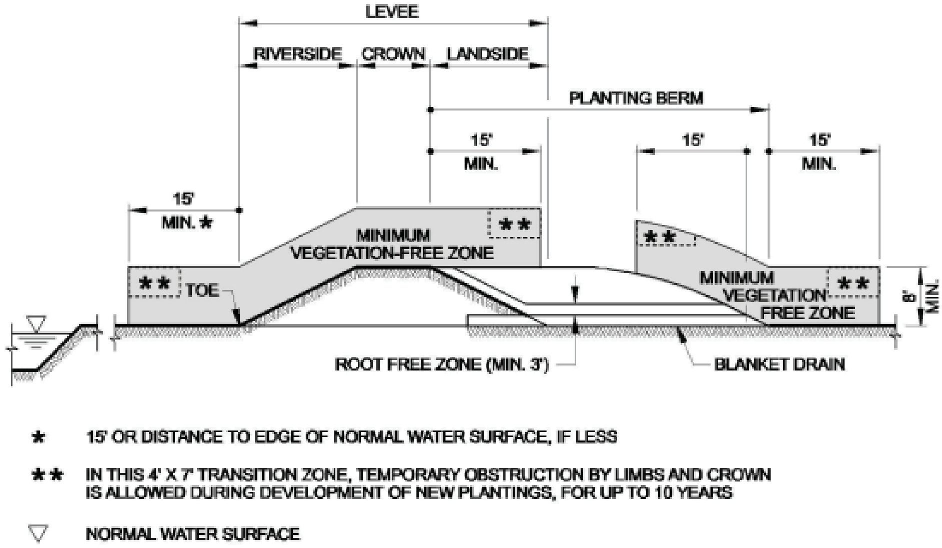


Figure 3.3.7: Additional Earth Fill

Figure 3.3.8: Planters

It seems that larger plants are difficult to implement with a berm. There are a few different solutions that are worth exploring. Creating planting berms is one of the solutions to all these different conflicts. Additional earth fill is added to the back portion of the levee which then allows for planting on a portion of the berm. The width of this portion is determined by the size of the levee as well as the amount of fill added. Certain areas along the berm will still needed to be open to allow for vehicular access in case of flood fighting operations.

Planters are a more popular and a slightly less costly option. This may limit the variety of plants that will be used. The material of the planters must also be taken into consideration as it is more favorable if they are portable. Planters that are too large may create barricades during flood fighting operations. The irrigation as well as the overall maintenance of these plants should also be taken into consideration. Plants that are selected for use in these planters should not exceed a height of approximately 20 ft.

While maintenance was mentioned in the previous paragraph, this is quite a serious consideration. If irrigation lines are to be added underneath the levy, double walled piping or leakage detection systems should be considered as any leak underneath the levy can cause serious damage. Irrigation water may impair visual inspection by causing maintenance workers to think that an area may be wet due to irrigation when in fact it may be due to seepage. In terms of the planting itself, the levy will need to weeded to prevent the spread of invasive species. Lower maintenance plants are ideal for these conditions.

Plants should be selected by an approved plant list by division and district landscape architects.

Perennial grasses are the only acceptable groundcover in the vegetation free zone. While the primary purpose of this groundcover is to prevent erosion, adding different species and varieties of ornamental grasses to add aesthetic value is a consideration. If the soils of these areas are not ideal for any type of vegetation, then other mean of erosion control should be implemented. Pavement, concrete mats, and other engineered surfaces are a few examples. If grass is chosen to reinforce the levee, the contractor is required to stay on the job until there is good grass growth. Some people tend to get too focused on the aesthetic value of grass and forget the primary purpose it serves.

When designing a project with a levee, it is always good to list your top priorities. While a major storm only occurs every now and then, one must remember that there is an opportunity cost when constructing a levee. Millions may be spent to construct it; however, it can end up saving money in the long run by preventing the immense amount of damage that can be caused by a severe storm or flood. It is completely understandable that one would want to improve the aesthetic value of such an immense structure but tampering with the sustainability of a levee can have irreversible consequences and these precautious must be followed.

Figure 3.3.9: Ornamental Grasses

Figure 3.3.10: Concrete Mat

Works Cited

In Text Citations

1. “GUIDELINES FOR LANDSCAPE PLANTING AND VEGETATION MANAGEMENT AT LEVEES, FLOOD-WALLS, EMBANKMENT DAMS, AND APPURTENANT STRUCTURES.” US ARMY CORPS OF ENGINEERS, 30 Apr. 2014. Web. <http://www.publications.usace.army.mil/Portals/76/Publications/EngineerTechnicalLetters/ETL_1110-2-583.pdf>.

2. “CONCERNS ABOUT VEGETATION ON LEVEES.” RIVE PARTNERS. N.p., 2014. Web. <http://www.riverpartners.org/resources/riparian-ecology/veg-levees/concerns-about-veg-on-levees/>.

3. “VEGETATION MANAGEMENT.” US ARMY CORPS OF ENGINEERS, 2014. Web. <http://lrl-apps.lrl.usace.army.mil/poi/article.asp?id=975&MyCategory=478>.

4. “The Science of Vegetation on Levees.” RIVE PARTNERS. N.p., 2014. Web. <http://www.riverpartners.org/resources/riparian-ecology/veg-levees/science-of-veg-on-levees/>.

Image Citation

3.3.1 Evan Sparkman - Berm Rendering With Planting (PNG)

3.3.2 Evan Sparkman - Berm Seepage From Tree Roots (PNG)

3.3.3 Evan Sparkman - Berm Damage From Blow Over (PNG)

3.3.4 Evan Sparkman - Hindered Sight Lines (PNG)

3.3.5 Army Corps of Engineers - Vegetation Free Zone (JPEG)

3.3.6 Army Corps of Engineers - Vegetation Maintenance (JPEG)

3.3.7 Army Corps of Engineers - Additional Earth Fill (JPEG)

3.3.8 Scenic Planting - Planters (JPEG)

3.3.9 Scenic Planting - Ornamental Grasses (JPEG)

3..3.10 Mat Engineering - Concrete Mat (JPEG)

3 Research Topic

3.4 Hillside Landscaping

Nanxing Zheng

Figure 3.4.1
Abstract pattern of terraced rice fields in Yuanyang County, Yunnan, China

Sloped area within a landscape presents gardeners with a special challenge that could include manipulating vegetation and structures on the steep ground and, at the same time, control erosion to reduce runoff. Since the topography varies from places to places, in order to maximum land values and create some unique environment, it is inevitable to use the sloped section to cultivate annual plant for food or ornamental purpose or to host perennials as ground covers and shrubs. Therefore, there is something we need to know about the hillside landscaping.

History of Taming A Slope

Terraced farming is earliest method of utilizing the slope sections. It is first developed by people who live in the mountain valley. This method use “steps”, which called “andenes” in Inca culture, which built into the side of mountain or hill. On each step, various plants would be planted. When it rains, instead of washing away all of the nutrient in the soil, the nutrient will be carried down to the next level. Additionally, these steps prevent a free flowing of avalanche of water that may carry the plants with it and destroy all of the crops on slope.
In some paddy cultivation in Yunnan Province, people even have fish cultivation in the paddy field. (Recent studies have shown that methane production can be significantly reduced while also boosting crop yield by draining the paddies to allow the soil to aerate thereby interrupting methane production).

Figure 3.4.2 Inca Terraces in Pisac, Peru. The terraces created thousands of years ago are still in use today.

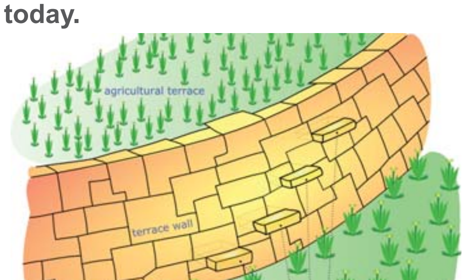


Figure 3.4.3 Diagram of Andenes


Figure 3.4.4 Terraced Garden.

Basic forms of hillside landscaping

Terraced garden

Terraced garden often requires engineers or professional landscape contractors to handle the retaining wall construction. Terracing involves using earth moving equipment to cut a lot of flat platform into the slope and construction of professionally-engineered retaining walls to support soils. Although it involves a series of professional construction works, when it complete, any plants can be installed, ranging from the small fruit trees to grape vines, only limit to your personal preference. If the owners are not up for terracing the entire place, they can still building a low retaining wall at the bottom, which tides it up with a crisp clean line and ensures that the soil above will stay put. The owners may also consider making it a part of seating area if it can be made at the bench height.

Since this method is only to stabilize the soil on the hillside, but also to have the flat space for people to walk on, steps should be integrated into the design. Usually, for a formal and symmetrical design, center the steps in the middle the terrace and tapering a larger entrance at the bottom. The materials of steps should be well-matched with the retaining wall.

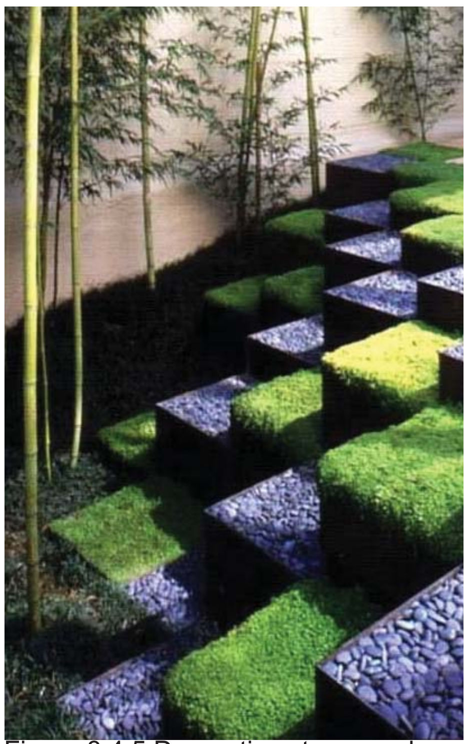


Figure 3.4.5 Decorative stone garden.

Rock garden

Rock garden is broadly defined by its material use of rock on the slope. Rocks are basic element in rock garden. It serves as decoration purposes and holding the soil in place. There is not fast and quick instruction of which kinds of rocks we should use. But it is would be nice to have lichens and mosses grows between the rocks, commonly referred as “field rock” in the landscape.
Slope areas often provide good drainage for plants. Thus, they are the perfect place for finicky plants like dwarf pine trees, rock roses, and salvias that cannot stand their feet wet. Commonly, small succulents, cacti or alpine species that would naturally tolerant dry, rocky areas, are the perfect match for rock garden. So, based on these growing characters of these drought tolerant plants, rock should be at the same scale of these diminutive plants. Making these plants can be viewed up closer rather than extensive mass-planting.


Figure 3.4.6 Rock Garden

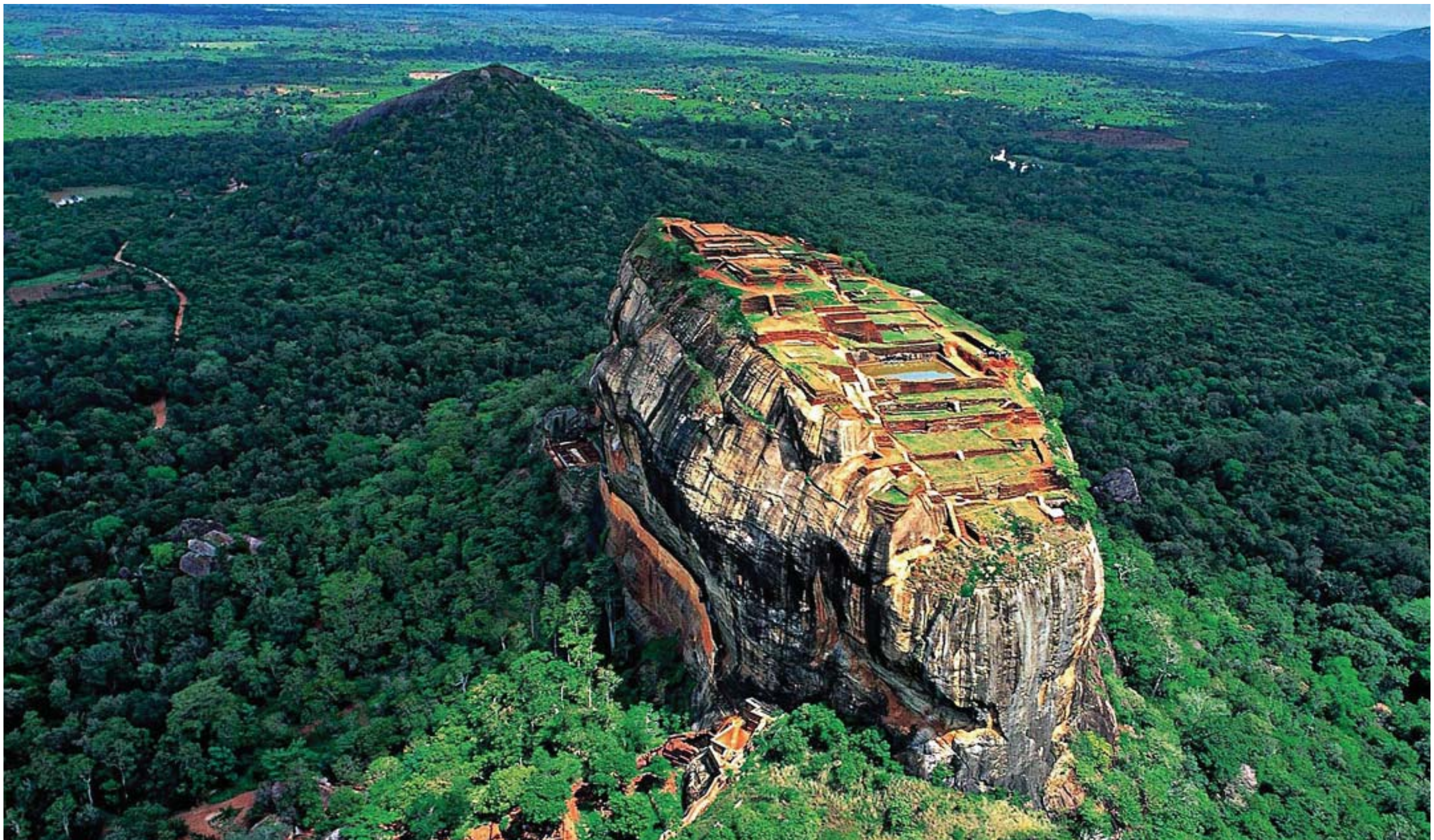


Figure 3.4.7 Special example of rock garden--Sigiriya: The Lion Rock of Sri Lanka

Groundcover

Plant spreading groundcovers are one way to beautify a hillside and stabilize the soil in hillside landscaping. In order to have the plants grow well, the key of creating a groundcover landscaping is to understand the conditions of the site (sun/shade, soil type, climate, etc) and choose species to match. These can be cascading grasses, mixtures of wild flower, or other low-growing low maintenance plants, such as ivy, vinca, creeping rose and flowering salvias.

Over a large area, one of the most economical ways is establish by seed. However, erosion mats, which are biodegradable blankets, are another method to hold the soil in place before plant been established. Neverthless, spreading groundcovers do not mean to have monotonous sea of single-species vegetation. It would be more dynamic to add some vertical elements as a focus point by centering drifts of one species to each tree.

Figure 3.4.8 Erosion Mat

Figure 3.4.9 Example of different groundcovers combined

Figure 3.4.10 Multi-layered hillside landscaping

Multi-layered hillside landscaping

Creating a full-fledged landscape on a slope involves a lot of work. This kind of landscape needs a forest-like planting with beautiful spreading canopies, flowering shrubs, bulbs and cascading groundcovers. Plants are selected to bloom sequentially all year around and a haven for butterflies, birds and other precious wildlife.

When we start to put these different elements into one piece of grotto-like slope, we need to think how we arrange these layers. Firstly, mix deciduous and evergreen trees in the rear two-thirds of the slope. Secondly, shrubbery should be placed randomly in group of three, five or seven in the order of height. Thirdly, fill the remaining space with groundcovers, bulbs and perennials, using the smallest and daintiest species up close. Finally, try to mulch heavily around the plants to hold the soil in place and keep weeds down. Drought-tolerant plants are preferred unless irrigation system installed. Otherwise, the primary maintenance is to grow the plantings a couple times a year to prune back excessive growth and keep the plants in their own niche where they would not infringe their neighbors' space.

Water feature

Water feature is perhaps the costliest and highest maintenance form of landscaping, but they are perfect for slope—gravity does beautiful things with water. You may harness the force and create a mesmerizing work of art with it. However, keep something in mind: water feature need maintenance a minimum of once a week; ongoing cost includes the running pump to power it; you may need professionals to fix it.

We may also consider the basic elements in our design of water feature. Do we want the effect of waterfall or a burbling stream; will the water empty into a sizable basin at the basin or will it be a pondless water feature; would you like a naturalized look with mossy boulders and lots of plants or an architectural showpiece with formal stonework and a symmetrical design. Also, we should keep in mind that different scales of water feature create different soundscape, a tall plunging waterfall may have a dramatics view to look at, but living with this kind of sound effect may be a noise to many people.
A wide range of aquatic plant for naturalistic water feature is selected within the water, floating plants like water lilies and water hyacinch, emergent species that stick out about the waterline such as papyrus and bulbush. Some wetland plants can occupies the margins, such as lobelia, Gunnera, etc.

Figure 3.4.11 Naturalistic waterfall

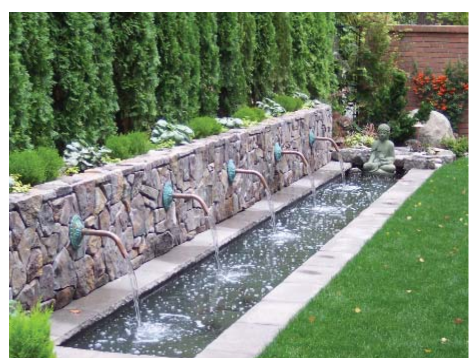


Figure 3.4.12 Water pond

Some things need to be considered for design and maintenance

The steepness of a slope

Before any designs on the slope sections, something should be taken into consideration, which is how steep for a slope should be considered as too steep to sustain the plant to grow. A slope ratio of 2:1 drops one foot in every two horizontal feet. This is considered limitation of support plants grow, and even then they often fail because water cannot saturate into the soil before it run off. A slope of 3:1 would be considered as more suitable for plants to grow well if we are properly planted with drought tolerant plants, and this is maximum slope for mowing lawn. A slope less than 3:1 is high recommended because a wide range of plant can survive there due to the better water conditions. Thus, a slope that is more than the ratio of 3:1 is more likely to be terraced due to the highly erosion rate and loss of nutrient.

Views on the slope

The reason people buy hillside homes is for the view, which may be panoramic or quite narrow. The home's value is based on this, so all landscaping must be subordinate to the view. Before we begin any project that may impact this part of the site, define your view corridor, which is how you see the view from the interior rooms of the house. Also be aware of your neighbor's view because what you do can compromise it now or in the future. Home in the forested hill often need to cut the trees to increase the view. But, the trees have vast roots that have held the soil in place for a long time, and when trees are cut down the roots die and the soil becomes vulnerable. So be aware of plants that you want to replace the tree that you cut down.

Erosion control

1. Work organic matter into the soil. Increasing the organic matter content improves the ability of the soil to retain water and the rate at which water is absorbed. Organic soil amendments could include manure, compost, sphagnum peat moss or grass clippings.
2. Select suitable plants. Grow perennials or suitable groundcovers whenever possible to act as soil anchors, slow the speed of water running down the slope and reduce the force of impact of raindrops on the soil surface.
3. Orient rows or plants on contours perpendicular to the slope and alternate plants in rows so that individual plants are staggered and prevent water from running in a line straight down the slope. When cultivating, leave small channels between rows to collect water and allow it to drain slowly into the soil.
4. Direct water off the slope with one or more French drains or perforated drain pipes located halfway down or at multiple levels on the slope. (Create a trench at least 6 inches deep and wide that runs perpendicular to the slope and leads to a ditch, rain garden or other suitable outlet. Place perforated pipe in the length of the trench and fill the trench with clean, coarse gravel. If the soil is particularly silty, consider lining the trench or wrapping the pipe and gravel in landscaping cloth or filter fabric to prevent clogging.)
5. Install terraces or a retaining wall if the slope is very steep.(Terraces break the slope up into multiple nearly flat steps. A terrace can be made out of earth, rocks, timber or other materials. Each "bench" should have a slight slope perpendicular to the hill's slope to direct water to one side or the

Soil Erosion Control Materials

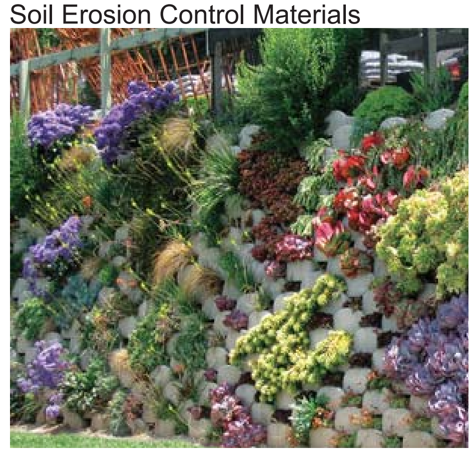


Figure 3.4.13 Plantable retaining wall

Figure 3.4.14 Drivable grass

Figure 3.4.15 Soil retention block

other.)
6. Spread mulch across the soil around plants. Mulches such as wood chips or shredded bark slow runoff while also conserving soil moisture, regulating soil temperature and contributing nutrients as they break down. But, noticing on a very steep slope, mulch may just wash off after severe rains.

Text citation

Barth, Brian. “Slope Landscaping Ideas.” LoveToKnow. N.p., n.d. Web. 02 Dec. 2014.

Gilmer, Maureen. “Hillside Landscaping Ideas.” Hillside Landscaping. N.p., n.d. Web. 02 Dec. 2014.

“Terraced Farms.” Terraced Farms. N.p., n.d. Web. 02 Dec. 2014.

Image citation

Figure 3.4.1
www.inspirationgreen.com/terraced-farms.html

Figure 3.4.2
www.inspirationgreen.com/terraced-farms.html

Figure 3.4.3
upload.wikimedia.org/wikipedia/commons/4/4a/Inca_terrace-en.png

Figure 3.4.4
www.gardendesignexposed.com/images/Vertical_Gardening_Dream_Paid_Terraced_Garden.jpg

Figure 3.4.5
www.pinterest.com/pin/379780181047710231/

Figure 3.4.6
cdn.decordraw.net/images/3.lushome.com/wp-content/uploads/2012/05/rock-garden-design-landscaping-ideas-3.jpg

Figure 3.4.7
http://sometimesinteresting.files.wordpress.com/2014/02/sigiriya-01.jpg

figure 3.4.8
http://plant-systems.com/de/content/articles/steep-slope-greening-with-helix-repens-83/

Figure 3.4.9
http://img.diynetwork.com/DIY/2012/03/02/RX-DK-LGC04002_ground-patchwork_s4x3_lg.jpg

Figure 3.4.10
http://www.pinterest.com/pin/280278776783410328/

Figure 3.4.11
http://blog.wetandforget.com/Portals/126400/images/water%20feature-resized-600.jpg

Figure 3.4.12
http://mostbeautifulgardens.com/wp-content/uploads/2013/07/5.jpg

Figure 3.4.13
http://st.houzz.com/simgs/6741c6660202c8e2_4-4215/contemporary-retainer-walls.jpg

Figure 3.4.14
http://www.soilretention.com/

Figure 3.4.15
http://www.soilretention.com/

3 Research Topics

3.5 Residential Open Space

Angela A. Johnsen

WHAT IS MULTI-UNIT RESIDENTIAL OUTDOOR OPEN SPACE?

For the purposes of this paper, multi-unit residential outdoor open space is outdoor spaces utilized by residents of apartment buildings, condominium complexes, and any other type of residential development that houses more than one family.

Residential open space can take a variety of forms (as discussed later) and ranges from private (maintains visual privacy and is used by only one family/unit) to semi-public (maintains very little visual privacy and is used by most members of the residential development). Whatever form it takes, outdoor open space should, from the very beginning, become a pivotal part of any new residential development plans in Little Ferry.

In an article on multifamily development open space for municipalities, Seattle planner Bob Bengford clearly identifies many of the key health, economic, aesthetic, social, environmental, and safety benefits of providing quality outdoor spaces to people living in multi-unit residential developments (Bengford). Similarly, New Jersey planner and professor Anton Nelessen has observed that communities (including those of low income) that make quality outdoor open space for residents a priority tend to have lower rates of crime and depression, and higher levels of civic pride, property maintenance, and sense of place (Nelessen). According to Nelessen, positive outdoor open spaces tend to “engender positive emotions and behavior,” and are critical to the psychological development of children, as well as the physiological needs of adults managing and working for prolonged periods in “negative built environment Nelessen” Quality outdoor open space is particularly vital in multi-unit residential developments as residents live in more confined quarters and at higher density than those in single family homes, but generally have no personal yard in which to play, garden, relax, entertain friends, etc.

So, how much and what kind of open space should a town require? This paper briefly introduces current thought about space requirements, examines the pros and cons of different types of residential open space, and draws some concluding recommendations for the Little Ferry context.

OPEN SPACE REQUIREMENTS

Minimum usable open space requirements vary within and across different states. For example, Staunton, Virginia, requires a certain square footage of usable open space per dwelling unit, and this amount varies depending on the height of the building (Staunton City Code). In contrast, New Jersey’s Secaucus Transit Village calculates minimum open space requirements as a percentage of the lot area (NJ Meadowlands Commission). Bengford advises towns to tailor requirements to the unique combination of “local market demographics…community characteristics and goals” to avoid requiring more or less open space than the community actually needs (Bengford). He notes that “excessive amounts and/or sizes” of open space can reduce the “viability of development” (Bengford). Similarly, urban researcher William Whyte’s studies on human behavior in urban public spaces clearly indicate that quality of open spaces plays a more critical role in determining level of use and enjoyment of them than size of the space does (Whyte, 10-15).

TYPES OF RESIDENTIAL OPEN SPACE

Residential open space general falls into one of 4 main categories: balcony, front/back yard, communal area, and (with increasing frequency) roof garden. Each of these types of spaces has its own unique characteristics, range of advantages, and challenges as described below.

Balconies

For centuries around the world, balconies have provided a measure of personal outdoor open space to residents of multi-story dwellings without access to their own yard (Encyclopaedia Britannica). Since balconies are generally only accessed by one apartment, they can be considered private open space, a potentially valuable amenity for people living in a multi-unit dwelling, where private outdoor space on the ground is limited or non-existent.

Fig. 3.5.1 Small balconies provide private outdoor space on an intimate scale. Vegetation in the distance can make balconies seem larger than they really are.

Fig. 3.5.2 Fully exposed balconies in the background lose their sense of privacy.

Size and context play a significant role in the character and success of balconies as residential open space, however. For example, smaller balconies can lend an intimate place to enjoy fresh air, entertain a friend, hang a birdfeeder, or grow plants. Balconies with a clear view of abundant vegetation nearby can seem larger than they truly are, as seen in Figure 3.5.1. More often in residential developments, however, balconies, such as those in the background of Fig. 3.5.2, are fully exposed to their surroundings, losing their sense of privacy. Another drawback to small balconies is the limited space available for entertaining guests; many balconies can only fit 1-3 people comfortably, so larger gatherings must occur elsewhere.

Larger balconies allow for more guests and can host a wider variety of activities, functioning as an outdoor room. The Swedish apartment balcony in Fig. 3.5.3a and 3.5.3b, for example, shows many excellent qualities of good balcony design. First, easy physical and visual access to the balcony from the apartment (Fig. 3.5.3a) makes it a flexible extension of the indoor living quarters; it could serves a plethora of roles from an outdoor playroom for children while parents prepare food in the kitchen to a handy place to grow herbs and veggies for meals. Second, large size makes barbecues, family gatherings, and other parties that include many guests possible. Third, a mix of solid walls and open views out make the space feel private without seeming isolated (Fig. 3.5.3b).

Front Yard/Back Yard

Apartments with front or back yards strike a balance between the advan-

Fig. 3.5.3a This sizable balcony has easy access to and from the apartment, serving as an outdoor room.

tages of apartment living and the lure of the suburban home's outdoor living space. Indeed, *Apartment Therapy* editor Carrie McBride's article, "Walk-Up World: Pros and Cons of Living on the First Floor," cites having a yard as one of the best amenities of first floor apartments as it serves a plethora of purposes from al fresco dining to a place to paint furniture (McBride).

Other apartment dwellers appreciate the value to having such a convenient outdoor space for children to run and play. Emma Sorensen's *Real Estate.com.au* article, "Apartment Living With Kids" points out many of the advantages of having a yard where "children can play unsupervised and do messy things" (Sorensen). Furthermore, as one mother that she interviewed mentioned, sending kids out to play in a personal yard is more convenient for busy parents than having to go to public outdoor spaces: no need to get all small children and babies in the family prepared to go out or pack food and other necessities (Sorensen).

Although these yards generally are more exposed than suburban yards and thus fall into the semi-private space category, they still have enormous value to residents lucky enough to possess them.

Front yards often take the form of small fenced areas or lawns created by building setbacks from the sidewalk (Fig. 3.5.4). To some degree, porches of apartment entrances can also act as personalized front yards (Fig. 3.5.5), although there is little room for children to run. Front yards and porches can help to soften an apartment building's connection to the street and smaller homes nearby, adding character and beauty to the built environment.

Multi-unit residential backyards generally do not look out onto a street and are sometimes larger than front yards, which can make them more desirable to residents, especially parents. As with front yards and porches, one challenge to these semi-private areas is how to achieve a sense of privacy where high fences are not allowed and neighbors can look right into the yard.

Communal Area

Many multi-unit developments rely primarily on open communal areas to satisfy residents' open space needs. The quality and use of these semi-public spaces varies tremendously. For example, the highly-manicured green at Milwaukee's Gaslight and Corcoran Lofts (Fig. 3.5.6) does provide room for children to run, greenery to soothe the senses, lawn for sunbathing, and even an art piece. The space lacks sufficient texture and level of complexity to keep residents' senses fully engaged for long, however. Children would soon become bored here and the overall sense is that this is a space for viewing, not for living life fully. In contrast, communal space at the Riversails condominium

Fig. 3.5.3b Solid walls provide privacy and sense of enclosure without sacrificing views to the surrounding world.

Fig. 3.5.4 Building setbacks create space for compact front yards for apartment residents. These yards help to soften the streetscape.

complex in Singapore (Fig. 3.5.7) has been designed to nurture residents (particularly youth), inspire creativity, engage the senses, and promote a range of fun activities.

One of the challenges of these semi-public communal spaces is how to balance privacy with sociability. Spaces that foster interactions between residents, allowing them to meet frequently, build friendships, and take on tasks together, are certainly desirable. Nevertheless, residents also need conveniently-located outdoor areas that allow for quiet reflection alone, private conversation with a trusted friend, etc.

<u>Roof Gardens</u>

With the resurgence of green roofs in America, roof gardens are increasingly included in the repertoire of residential open space (Barclay). Dotti Tulle, writing for *The Daily Mail*, describes the lure of roof gardens for residents craving spectacular views, "tranquil spots…to relax," and unique social opportunities to mix with other residents, as well as for savvy developers tapping in on a popular apartment selling point (Tulle). Far from the old image of green roofs as seas of drab succulents, today's residential roof gardens offer a wide range of activities from community barbeques to playing fetch with the dog (Fig. 3.5.8) to vegetable growing and beekeeping (Tulle; Satow). As with any semi-private space, residents appreciate flexible roof garden designs that provide opportunities to relax alone or enjoy a glass a wine with friends depending on their mood.

ISN'T GREAT OPEN SPACE TOO EXPENSIVE?

Cost plays a critical role in developers' decisions as to the amount and quality of open space offered in multi-unit residential open space. Michelle Ervin, reporting from the 2014 meeting of the Association of Condominium Managers of Ontario, paraphrases Allan King, president of landscape company Urban Garden, as saying that "the prevailing attitude toward landscapes among condo boards and managers… is that they're an expensive line-item in the budget that delivers few measurable benefits" (Ervin). According to Ervin, King believes that condo boards fail to recognize the full benefits of better landscapes, which, in spite of higher up front cost, reduce maintenance and hidden costs over time, increase resident enjoyment (and thus tenure), and attract young condo owners, who expect amenities like barbecue areas

Fig. 3.5.5 Porches can function to some extent like front yards, providing space for outdoor entertaining, growing plants, personal relaxation, and some play.

and play spaces for children (Ervin). According to Tulle's article, global real estate corporation Savills also sees the value of investing in quality multi-unit residential open space, as it is a key selling point for many buyers and tenants (Tulle).

WHAT DOES THIS MEAN FOR LITTLE FERRY?

The MIT-ZUS Rebuild By Design proposal calls for new multi-unit residential development along the proposed berm in Little Ferry, which raises a critical question regarding what types, amounts, and quality of residential open space the borough envisions for its residents in the future (MIT CAU, ZUS, Urbanisten, 159).

My investigation of multi-unit residential open space suggests that the strongest course of action is to find developers willing to consider the long-term social, environmental, and economic benefits of investing in quality outdoor spaces and embrace a layered strategy that incorporates all four types of residential open space. Doing so would: 1) attract prospective residents of the new developments who demand landscape amenities; 2) make outdoor activity more easy and enjoyable to achieve, which could improve public health and improve economic productivity; 3) help to blend new residences with the existing homes a harmonious streetscape; and 4) provide Little Ferry with the myriad ecosystem services that healthier landscapes support, saving resources in the long-run.

Fig. 3.5.6 This well-manicured green in Milwaukee has some visual appeal but lacks complexity and does not support a high variety of activities.

Fig. 3.5.7 This play area at a Singapore condominium development clearly promotes active enjoyment of life and engages all of the senses with a rich complexity of detail.

Fig. 3.5.8 Roof gardens aren’t just for sitting in a deck chair—they can support a wealth of activities from playing with the dog to urban farming to community dinner parties.

Sources

Barclay, Eliza. "Rooftop Farming is Getting Off the Ground." *NPR: The Salt*, September 25, 2013. http://www.npr.org/blogss/the salt/2013/09/24/225745012/why-aren-t-there-more-rooftop-farms (accessed November 30, 2014).

Bengford, Bob. "Providing for Usable Open Space for Multifamily Developments." *MRSC: In Focus*, January 2012. http://www.mrsc.org/focus/pladvisor/pla0112.aspx (accessed November 5, 2014).

Encyclopaedia Britannica. "Balcony." http://www.britannica.com/EBchecked/topic/49931/balcony (accessed November 30, 2014).

Ervin, Michelle. "Tips on Revitalizing Condo Landscapes." *CondoBusiness*, January 20, 2014. http://www.reminetwork.com/articles/tips-on-revitalizing-condo-landscapes/ (accessed October 30, 2014).

McBride, Carrie. "Walk-Up World: Pros and Cons of Living on the First Floor." *Apartment Therapy*, August 20, 2013. http://www.apartmenttherapy.com/walkup-world-pros-cons-of-living-on-the-first-floor-191884 (accessed November 30, 2014).

MIT CAU, ZUS, and Urbanisten. "The New Meadowlands." *Rebuild By Design proposal*, 2014.

Nelessen, Anton. "Visioning Open Spaces in New Development and Redevelopment." In *The Benefits of Open Space*, edited by Leonard Hamilton. Great Swamp Watershed Association, 1997. http://www.greatswamp.org/Education/nelessen.htm (accessed November 5, 2014).

New Jersey Meadowlands Commission. *Secaucus Transit Village Redevelopment Plan*. October 21, 2011. http://www.njmeadowlands.gov/doc_archive/NJMC%20Doc%20Archive/econgrow_docs/redelv_docs/STV%20redevelopment%20Plan%20final%2010-2011.pdf (accessed November 5, 2014).

Satow, Julie. "Worker Bees on a Rooftop, Ignoring Urban Pleasures." *The New York Times*, August 6, 2013, national edition. http://www.nytimes.com/2013/08/07/realestate/commercial/worker-bees-on-a-rooftop-ignoring-bryant-parks-pleasures.html?pagewanted=all&_r=0 (accessed November 30, 2014).

Staunton City Code. *R-4 High Density Residential District*. Chapter 18.35. June 11, 2014. http://www.code publishing.com/VA/staunton/html/Staunton18/Staunton1835.html (accessed November 5, 2014).

Sorensen, Emma. "Apartment Living With Kids." *Real Estate.com.au*, July 15, 2014. http://www.realestate.com.au/blog/apartment-living-reinventing-the-family-home (accessed November 30, 2014).

Tulle, Dotti. "The Sky's the Limit: A Roof Garden Will Make Your Neighbours Green With Envy—and Developers are Catching On." *The Daily Mail Online*, March 12, 2010. http://www.dailymail.co.uk/property/article-1257502/The-skys-limit-A-roof-garden-make-neighbours-green-envy--developers-catching-on.html (accessed November 30, 2014).

Table of Figures

Urban Plazas

Plazas and Parks in Urban Settings

John Jacobs

Since the emergence of urban formations approximately 6000 years ago, it has been evident that open spaces are essential for healthy communities. Ever growing cities have lead to concerns about the quality and quantity of open public spaces. As these concerns grew, countless studies have been done to try to understand the basics of what makes for a successful plaza design. These studies have been groundbreaking in designing unique spaces that not only offer many health benefits to its users but also provides economic benefits to state, local and federal governments. Cities across the United States including, Chicago, San Francisco and New York City have lead the way with innovative planning and zoning regulations that have lead to the success of their open spaces.

An urban plaza is defined as an area of open space used for social and communal gatherings. Urban plazas are often found at the heart of towns and cities and are the center for activities such as shopping, concerts and other events. Urban formations first appeared about 6000 years ago. The earliest urban open spaces were significantly smaller than those designed today and were commonly found at the cross roads of important trade routes. The first urban plazas served as a center for religious worship, trade and various markets. In other instances these areas served as places where military processions and parades could take place to show off the power of a ruler. As cities increasingly became more dense and diverse, the need and demand for accessible open space dramatically increased.

Open space in urban areas provides a wide range of benefits for the citizens of a community. In cities that are rapidly growing and expanding, any area of open space can offer relief from the everyday congestion and hustle-and-bustle mentality that is all too commonly found in these areas. Open spaces can have many significant psychological and health benefits that are often needed when living in high-density areas. A study done with hospital patients in Pennsylvania showed that those patients who were exposed to nature stayed in hospitals shorter then those not exposed.

Parks and other natural areas provide areas for recreation, habitat and aesthetic benefits to surrounding residents. An aspect of urban plazas and open space that is often overlooked is the economic benefits that they can provide to a town. When studying the economic benefits of these spaces, there are many variables that must be considered such as, travel expenditure and time costs, public amenities and surrounding property values. The benefits provided by these areas also increase the environmental quality in urban areas.

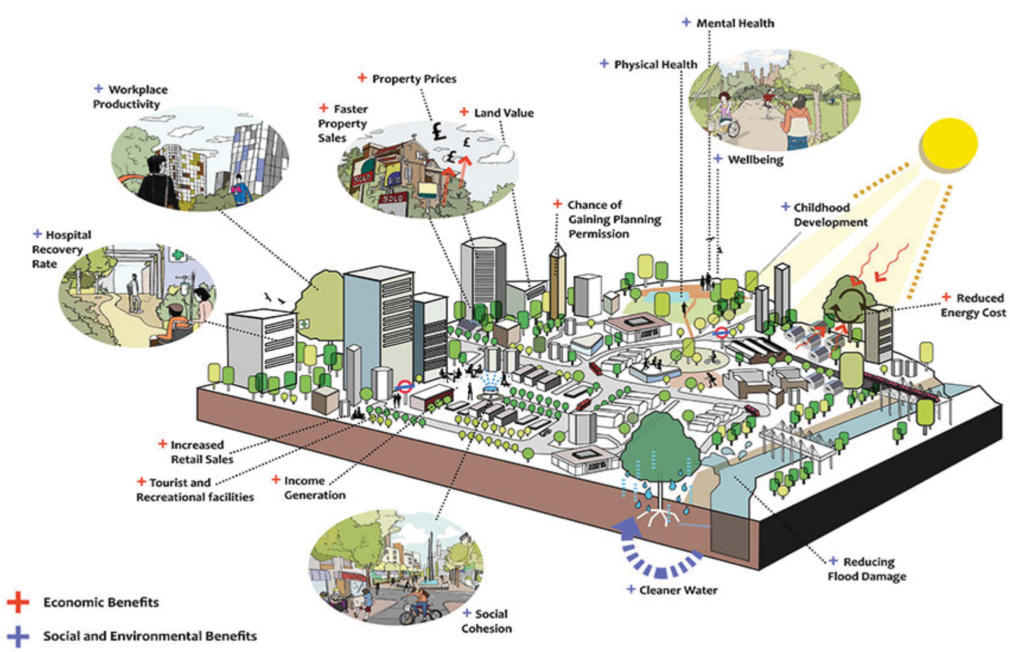


Figure 3.7.1

http://www.arup.com

Parks and plazas provide habitats for animals that would normally not exist due to the concrete jungles that we have created. In the early 1960's and 1970's in the United States, extensive studies on these areas took place, which quickly lead to their increased popularity.

As cities continue to grow so does a citizens concern for the quality of public spaces. Both Landscape Architects and Urban Planners have been called upon to create more were granted for providing/including open spaces. It was easily recognizable that the first plazas built during this stretch of time were very unsuccessful and undesirable by residents and visitors. The largest problems that designers and planners faced was a plazas limited use, unattractive entrances, and lack of connectivity. These problems challenged designers and local governments to be more innovative with their designs and zoning requirements and to promote better use of the space. New regulations were also put in place in cities such as Clevand, Chicago and New York City. In 1978 a study was completed by Joardar and Neill on 10 outdoor plazas in Vancouver. This study showed that the configuration of the buildings surrounding the plaza directly effected a users enjoyment and interaction with the site. One finding of this study showed that edges of the parks were more commonly used as sitting and areas as opposed to interior parts of the site. As studies like this

Figure 3.7.2

http://www.coloradomagazine.com

Figure 3.7.3

http://lda.ucdavis.edu/people/websites/francis/Urban%20Open%20Spaces-Francis.pdf

successful urban places and spaces. Since the emergence of designed open spaces in cities across the United States, there have been considerable advances in the meaning of urban plazas. These advances are in part to extensive research by designers and public officials. The 1960's and 1970's were a time of redevelopment in cities such as New York City, Chicago and San Francisco.

New commercial and corporate high-rise buildings were springing up in every part of the city. As an incentive to developers and designers, private funds and zoning bonuses

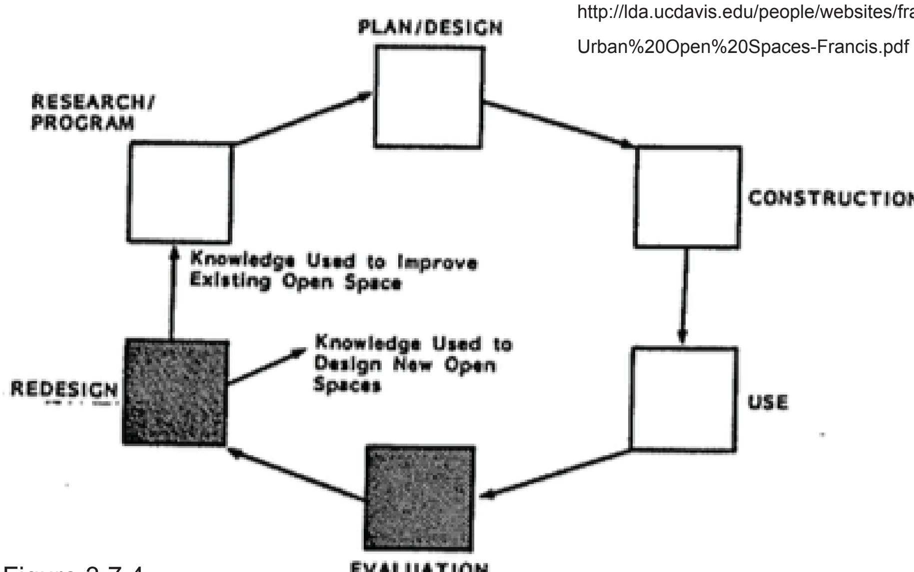


Figure 3.7.4

continued and designs began to advance, open space in urban settings began to address more of the wants and needs of the citizens and users of the space.

As the 1980s and 1990s approached cities such as Boston, New York City and San Francisco began to take steps to create additional open spaces that shared a connection with the people that used it. Studies in these areas showed that plaza type areas were used as a way for the neighborhood residents to come together and have a sense of place. Other residents saw that they used these spaces more often because they were better maintained, more visually appealing and were safer to visit. These parks better connected residents and communities to nature. These studies are also the basis for things to consider when designing an urban plaza.

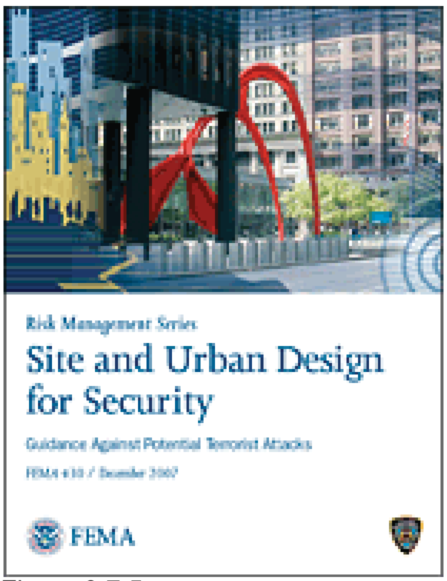


Figure 3.7.5

When designing urban plazas and open spaces today there are many aspects that must be taken into consideration for a design to be successful. Some of the most important things that must be considered include, safety and security, ecological and economic benefits, comfort, and user involvement. One of the most important components of an urban plaza is a users sense of safety and security. If a person does not feel safe inside of a park for any reason it creates a major barrier between the person/community and the space.

Figure 3.7.6 http://www.mappery.com/maps/Map-of-Bryant-Park.jpg

Safety is particularly important for women, children and the elderly. Plazas must be designed with proper lighting and design techniques as to not create “hiding spaces”. Often time’s plazas and other open spaces can be the center for dangerous drug deals and vandalism. Designs should be suited for use by diverse user groups. Plazas and open spaces that have roadways need to pay special attention to children’s safety. Road speeds near playgrounds should be kept to a minimum and access to the park should be at areas that children can safely navigate. Many guidelines have been set by both local, state and federal governments to help insure the safety for the users of these sites.

The attractiveness and comfort of a plaza is what attracts users. Designers should take measures to try to understand the relationship of buildings and shade, seating options and amenities when designing a plaza. Urban plazas should be designed to have adequate and comfortable seating, protection from the elements such as snow, wind and rain, and should also be oriented to have the maximum amount of sunlight. Efforts by the local and state planning boards can be taken to prevent the building of high-rise buildings near plazas that would cast shadows making the site undesirable by its users. Other amenities and design features that have proven to attract and please users of sites include water features, tree shading, chess tables, and colorful plantings. Attracting a wide variety and diverse group of users is what makes for a successful plaza design.

Diverse user groups makes plazas unique and brings communities together. Designers and planners should take into consideration that the site is going to be used by people from different socioeconomic groups, age groups, backgrounds etc. Each different user group will perceive the space differently and have many different uses for even just one part of the site. The visual quality, including the entrances and exits of the park are particularly important and will attract a wide variety of users.

Urban designer, Jan Gehl, has studied the user groups of people that use urban plazas for over 30 years. His studies have shown that there are five groups of people that use these spaces. These people include, the everyday users, visitors/customers, passerby, recreational, and event visitors. An everyday user would be considered a person who lives and works in the area and passes by or uses the site often. Any user who uses the site but must travel to use the site would be considered a visitor. Those people who may not use the site very often but pass through the area is considered to be a passerby. A recreational visitor is those people who visit the park because of it beauty and to use it for active recreation. Lastly those people who come to the park because of a programmed or special event are considered a visitor. By studying these different user groups and better understanding each, designers and planners can better design parks to match the needs of its users. Modern day examples of successfuly designed urban plazas can be seen in cities across the United States.

In cities across the United States there are a variety of urban plazas, each with their own unique characteristics and design details. Cities such as Chicago, San Francisco and New York City have been leading the way with successful urban plaza designs, and effective zoning and planning regulations. In Chicago the John Hancock Building Plaza uses grade changes, water features and shops as a way to attract users into its space. San Francisco has changed many of its zoning laws to limit the height of buildings near parks and plazas in an effort to maintain comfort in the open spaces. New York City has set forth groundbreaking open space standards to ensure residents can easily access open space areas and creatively use different amenities to draw users into its space. These examples are ones that should be carefully studied when designing new open spaces.

Figure 3.7.7

http://www.pps.org

Located along North Michigan Avenue, the John Hancock Building Plaza is a must stop place when shopping in downtown Chicago. With the upper part of the site being at grade with the North Michigan Avenue,


Figure 3.7.8


Figure 3.7.9

this plaza is able to take advantage of the large pedestrian flows that are commonly found. Surrounding both the upper and lower levels of the site, many shops and restaurants can be found. Seating walls and moveable seating are found in the interior parts of the site under large shade tress that have been added for increased comfort. As users make there way to the lower part of the site, a large water wall allows for user interaction and other aesthetic qualities.

The Portsmouth Square Project is considered to be one of San Francisco's first public open space sites. Located at the heart of Chinatown, this site has become neglected and no longer meets the needs of its users. This site is currently under renovation so that it can better serve the needs of its users. The buildings around this site are shorter in height

Figure 3.7.10 httpp://www.sf-planning.org

Figure 3.7.11 httpp://www.pps.org

due to new zoning regulations which allow for adequate amounts of sunlight into these open spaces. Aspects that were taken into consideration during the design process included connectivity, buffers, pedestrian access, and parking. With these considerations in mind, designers and planners have been able to create an enhanced public space that caters to its diverse user groups and is able to be programmed for many different types of events.

Figure 3.7.12 http://www.streetsblog.org/wp-content/uploads/2012/01/Fowler-SquareS

New York City has long been considered to be to have some of the most innovative guidelines for open space design. One major component of these guidelines is that open spaces must provide amenities to its users. This allows parks to bring in revenue for city and offer an incentive for people to use the space. The city of New York established the NYC Plaza Program, which ensures that all residents live within a ten-minute walk of an open space. This initiative has been put into effect to help with increased health concerns and the well being of New York City residents. Herald Square and Bryant Park are both excellent examples of open spaces located within one of the busiest cities in the world.

Herald Square in located in the heart of Manhattan and is formed by the intersections of Broadway and Sixth Avenue. Despite being parallel to major roadways, this space successfully utilizes the standards set forth by the city of New York to make it comfortable and useful space. Shade

Figure 3.7.13 http://www heraldsquare psychology.com/uploads/2/5/5/4/25545469/1868261.jpg

trees, different seating structures and a variety of different plants all make this a unique place to visit.

Bryant Park has long been a model for urban plazas. Despite having many problems with the original designs, recent renovations have made it a hot spot for visitors. Bryant Park offers a wide variety of shops, eateries and adequate amounts of "moveable" seating. Bryant Park is often viewed as a textbook design because of its great economic impact that the park has on the city of New York.

In conclusion, urban plazas have long been the heart of a community and the center of towns. As urban areas increasingly become more congested the demand of open spaces also increases. Design problems and lack of knowledge led to many problems with the first urban plazas. As research advanced and designers and planners took the wants and needs of the people into consideration, plazas and open spaces became more commonly used. The benefits that these areas provide to a community are often overlooked, however these benefits are crucial in urban settings. Urban plazas in cities such as Chicago, San Francisco and New York City have set the standard high and should be used as inspiration and as a guideline to design.

Works Cited

Zube, Ervin H., and Gary T. Moore, eds. Advances in Environment, Behavior, and Design. Vol. 1. New York City: Plenum, Print.

http://www.nyc.gov/html/dcp/html/pops/plaza_standards.shtml Date Accessed: November 30, 2014

http://www.sf-planning.org/index.aspx?page=3499 Date Accessed: November 30, 2014

http://www.pps.org/great_public_spaces/one?public_place_id=677 Date Accessed: November 30, 2014

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3.8 European Town Squares in the Historical Context

Kelly A. Popek

Currently, the town of Little Ferry has a very few public spaces that attract residents or visitors. Furthermore, Little Ferry lacks a distinct sense of place and a clear, engaging center. The commercial redevelopment suggested in the MIT-ZUS Rebuild By Design proposal provides a perfect opportunity for the town to rethink its open space strategy, particularly in commercial areas. To that end, this paper examines the town square, a popular type of open space often associated with commercial areas, within the European historical context: its traditional forms and functions, contemporary use, characteristics that make it successful as open space, and implications for Little Ferry.

Fig. 3.8.1 St. Mark's Square, Venice. Buildings surrounding squares provide a sense of physical enclose and vertical drama. Credit: Gabriele Bella.

History of Town Squares

Town squares have been used for centuries throughout the world—by Ancient Greeks and Romans up to the present (Hirst).

Many squares were once bustling marketplaces and thus were usually located in the heart of a town near the crossroads of important roads. Although commerce was historically the primary function of squares, they were also used for religious & political gathering, public discourse, and social interaction (Lennard). Being centrally located, town squares were usually surrounded by small shops such as bakeries, meat markets, cheese stores, and clothing stores, as well as the site of government buildings, museums and other public buildings (Jagganath).

They still play a prominent role in European urban centers, though their names vary across languages (Lennard). In German-speaking countries, for example, a town squares is referred to as a "platz," which also means "place." In French, "place" or "grand place" can refer to a square, while other countries often call a square a "market," because of the usage of the square as a market place. For instance, almost every town in Belgium and the southern part of the

Fig. 3.8.2 St. Mark's Square, Venice. Arcades provide visual enclosure before opening up to a view of the square, lending a powerful feeling of arrival. Credit: www.lifesessions.com

Netherlands has a "Grote Market" (for example "Grote Markt" in Brussels). The "Grote Markt" is often the place where the town hall is situated and therefore the centre of the town. In Italy, town squares are referred to as "piazzas" and were often associated with manifestations of wealth & power.

<u>Traditional Form of Squares</u>

Squares were usually surrounded by almost continuous wall of buildings, with small entrances and exits leading in and out, providing a sense of physical enclosure (Fig. 3.8.1) (Lennard). Most of the surrounding buildings have a mixed use of shops & houses, as well as important civic and religious buildings, emphasizing the square's significance as the most important place in the city. The placement of buildings around the perimeter transforms the square into a three dimensional composition; more imposing buildings, spires and campanile articulate the vertical axis, increasing dramatic effects (Lennard).

The shape of a square actually varies tremendously across Europe from fan shaped (Sienna, Italy) to trapezoidal (Piazza San Marco, Venice), oval (Verona, Italy) to square-doughnut shaped (Krakow, Poland) (Lennard).

In addition to physical enclosure, architect Dr. Suzanne Lennard observes that squares typically provided a distinct sense of visual enclosure, too (Lennard). Being "inside" the square, surrounded by continuous building walls, with the sky as a ceiling, nurtures the citizen's sense of belonging, and the space formed by the buildings feels like a well-proportioned room or a grand hall (Lennard). Entrances vary from open to very enclosed, such as walking beneath arcades; passing through a dark arch heightens the experience of crossing the threshold, and raises one's awareness of entering the public arena (Fig. 3.8.2) (Lennard).

Most town squares were hardscapes suitable for open markets, music concerts, political rallies, and other events that attract large numbers of crowds. At their center was often a fountain, well, monument, or statue.

Regional differences in architectural forms and materials, predominant architectural styles, characteristics and placement of focal buildings are uniquely combined to imbue each square with its individual personality, reflecting the town's unique history. In Krakow, Poland, for example, the main square is the principal urban space located at the center of the city (Fig. 3.8.3) (Fodors). It dates back to the 13th century, and is the

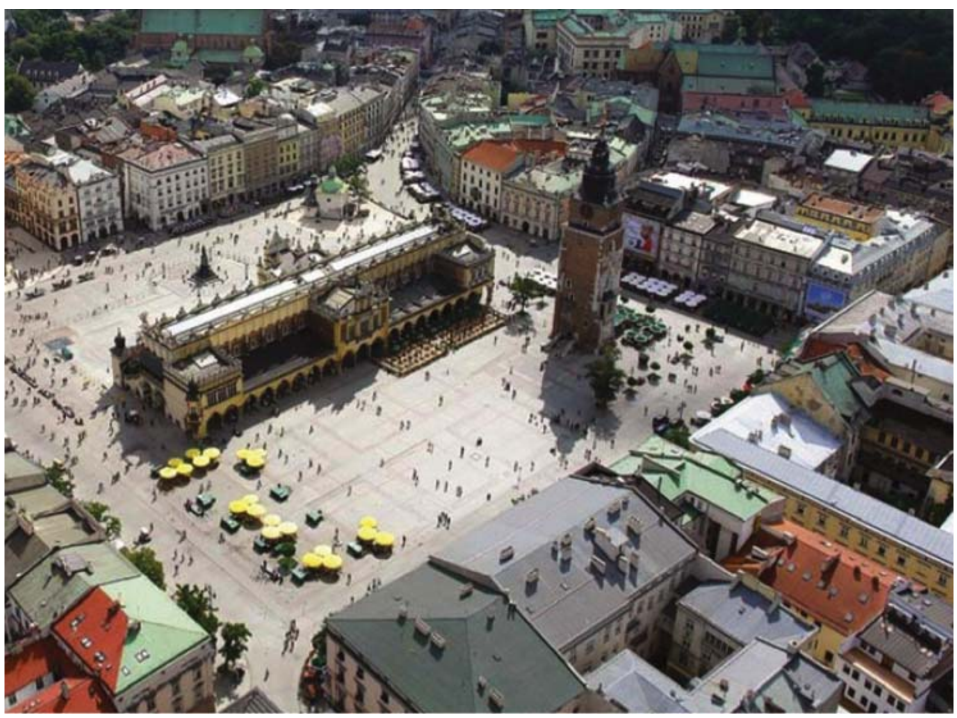


Fig. 3.8.3 Rynek Glowny Main Square, Krakow, Poland. Located in the city's center, the square was an important commercial hub. For that reason, Polish monarchs traditionally stopped ther during processions to receive homage. Credit: www.topolinoautoclubitalia.it

largest medieval town square in Europe (Fodors). The main square is a rectangular space surrounded by historic townhouses, palaces, churches and the center of the square is dominated by the cloth hall, which was originally designed in the 14th century as a center for cloth trade (Fodors). Polish kings used to have processions through the square after coronation, stopping to receive homage from important political leaders (Fodors). In December 2005, the Project for Public Spaces (PPS) Listed Krakow's Rynek Głowny Main Square as the the best public space in Europe due to its lively street life (Project for Public Spaces, "The World's Best Squares").

In contrast, in London, England, a "square" has a wider meaning. There are public town squares of the varying types with formal open spaces surrounded by houses with private gardens at the centre, sometimes known as garden squares. Most of these were built in the 18th and 19th centuries. In some cases, the gardens are now open to the public. Additionally, many public squares were created in towns and cities across Britain as part of urban redevelopment following World War II. Squares can also be quite small and resemble courtyards; this design is commonly found in London.

Contemporary Function

Many squares still thrive today with some changes to their form and function. Contemporary use generally revolves around social and cultural activity, rather than commerce (Fig. 3.8.4) (Jagganath). Nevertheless, most squares have small shops around the perimeter, periodic market days, and/or small street vendors, and a thriving square is considered to enhance local economic activity (Jagganath). In some cities, institutional buildings or banks dominate the main square. Maintaining the square as the center of economic and social life, however, requires a diversity of economic activity on the square. Town squares with very diverse shops and facilities, including restaurants and coffee houses exhibit much more vitality and daily life, drawing inhabitants of varied ages and backgrounds to the squares.

Fig. 3.8.4 Piazza in Torino, Italy. Many squares today revolve primarily around social and cultural activities than commerce. Credit: Angela A. Johnsen.

Many city inhabitants consider their main square as a representation of what is most characteristic of their city. The high degree of face-to-face interaction on the traditional main square ensures a strong community of people who know, or recognize one another, and who know each other's stories (Lennard). To function in this way, the square must be multifunctional and adaptable for different activities, providing reasons for people to gather, to work together, to coordinate efforts, to prepare for community events, and to celebrate together.

Elements of successful Plazas

In *The Social Life of Small Urban Spaces*, William Whyte notes that some important elements of elements of successful squares include: convenient seating, ample amounts of sun, availability of food, water elements, areas of shade trees, a view of life on the street, and elements that can bring strangers together in conversation, building a sense of mutuality (Whyte, 10-35).

Historically, town squares were the center of communities, and they traditionally helped shape the identity of entire cities. Most had a center element that was used to give the square a strong image. Any great square has a variety of smaller "places" within it to appeal to various people. These can include outdoor cafés, fountains, sculpture, or a band shell for outdoor performances.

In addition, the town square should feature amenities that make it comfortable for people to use (Whyte 24). A bench or waste receptacle in just the right location can make a big difference in how people choose to use a place. Lighting can strengthen a square's identity while highlighting specific activities, entrances, or pathways. Public art can be a great magnet for children of all ages to come together (Whyte, 32). Whether temporary or permanent, a good amenity will help establish a hospitable setting for positive social interaction.

The use of a town square changes during the course of the day, week,

Fig. 3.8.6 Beautiful sculptures and fountains draw visitors to the Piazza Navona every year. Credit: Michael A. Stecker.

Fig. 3.8.5 Piazza Navona, Rome, Italy follows the oblong form of the former Stadium of Domitian.
Credit: www.italian-architecture.info

and year. In respond to these natural fluctuations, flexibility needs to be built in. Instead of a permanent stage, a retractable or temporary stage could be used. Likewise, it is important to have on-site storage for movable chairs, tables, umbrellas, and games so they can be used at a moment's notice (Whyte, 12-20). A successful town square can't flourish with just one seasonal display, must change with the seasons to add interest. Skating rinks, outdoor cafés, markets, horticulture displays, art and sculpture help adapt our use of the space from one season to the next.

A successful town square needs to be easy to access, too. The best squares: are always easily accessible by foot; have narrow surrounding streets with well-marked crosswalks for easy crossing; have traffic lights are timed for pedestrians, not vehicles; have slow-moving traffic with transit stops located nearby. A town square surrounded by lanes of fast-moving traffic will discourage pedestrians use and thus be deprived of its most essential element: people.

Just as important as the edge of a square is the way that streets, sidewalks and ground floors of adjacent buildings lead into it. When walking becomes safer and more enjoyable, pedestrian traffic increases. Elements within the square are visible from a distance, and the ground floor activity of buildings entices pedestrians to move toward the square.

Landscape architects John Ormsbee Simonds and Barry Starke point out, however, that it is not just certain elements that make a square work, but the overarching thought in planning how those elements will work together in harmony and cohesion (Simonds and Starke, 135). They write that "in the building of the magnificent Piazza San Marco in Venice, the architect commissioned to design the cathedral, or the campanile, or the Doge's Palace, or the memorial columns at the water gate never conceived of his building or columns as design entities solely. Instead he instinctively considered his works as integral parts of the piazza…in terms of its impact on the entire piazza and vice versa….The secret of much of the charm and great beauty of European towns and cities lies in the conscious application of this planning axiom" (Simonds and Stark, 135).

Case Study 1:
Piazza Navona, Rome, Italy

Piazza Navona is a famous town square in Rome, Italy (Civil and Critcher). It is built on the site of the Stadium of Domitian, built in 1st century AD, and follows the form of the open space of the stadium (Fig.3.8.5). The Piazza embodies the city's unique identity, attracting visitors from around the world each year. With its ornate fountains, baroque palazzi and colorful cast of street artists, hawkers and tourists, Piazza Navona is Rome's most celebrated square and while the market traders have long since gone, the crowds continue to come to bask in its baroque beauty (Lonely Planet).

Famous for Bernini's baroque sculpture of the Fountain of the Four Rivers, Piazza Navona, teems with visitors who flock to the square for the Christmas market (Fig.3.8.6) (Lonely Planet). A huge vintage merry-go-round, a life-size Nativity scene, and colorful stalls selling a mixture of artisan crafts, tasty treats, and unique curiosities like handmade brooms to sweep out the old year bring a richness of visual and experiential interest to this ancient square (Civil and Critcher).

Project for Public Spaces points it out as an admirable example of a successful public square writing that "Piazza Navona….has all the qualities that a great square should have: major attractions, such as Bernini's great fountain; excellent programming (including one of the world's best Christmas markets); lively uses at the edges; and a design so flexible it is filled with people even at night and in the dead of winter" (Project for Public Spaces, "Piazza Navona").

Summer months attract the most people to the piazza. Fig.3.8.7 illustrates many elements that help make Piazza Navona successful: edges of piazza are interesting and alive with architectural detail; food is available in surrounding cafes; pedestrian enjoy the sun; changes in pavement material and pattern, as well as slight elevation change, helps to keep the expansive piazza at human scale rather than becoming an overwhelming sea of hardscaping. Activity at the center of the square in the form of art shows, vendors, fountains, etc. draws people in, as does greenery and colorful flowers along the edges. The piazza does have some apparent drawbacks, however. There a very few plants along the buildings and edges, and the lack of trees means that shade is scarce in the hottest part of the day.

Case Study 2:
Trafalgar Square, London, England

Trafalgar Square, located at the heart of London, is one of the city's most

Fig. 3.8.7 Piazza Navona includes many elements of successful public square design, such as seating, human-scale paving, and engaging activities.
Credit: Jenny Sadler

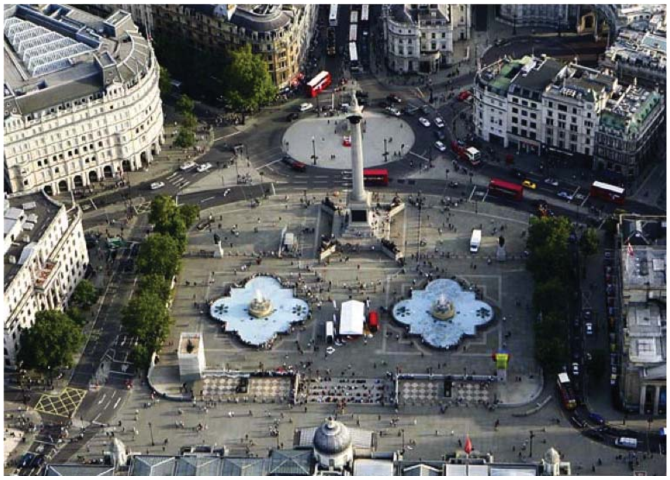


Fig. 3.8.8 Aerial view of Trafalgar Square, London, England. Credit: Webb Aviation.

Fig. 3.8.9 Terrace, new staircase, and view of paving pattern at Trafalgar Square. Credit: Foster + Partners.

vibrant public space and tourist attraction in central London, built around the area formerly known as Charing Cross (Greater London Authority). At its center is Nelson's Column, which is guarded by four lion statues at its base. There are a number of commemorative statues and sculptures in the square, while one plinth, left empty since it was built in 1840, "The Fourth Plinth", has been host to contemporary art since 1999 (Greater London Authority). It is a lively place often used for a wide range of special events and celebrations, filming and photography is also used for political demonstrations and community gatherings, such as the celebration of New Year's Eve (Greater London Authority).

Fig. 3.8.10 Fun sculptures, lookouts from elevated monuments, and access to water make Trafalgar Square a popular destination for all ages. Credit: Alan McFaden.

The square consists of a large central area with roadways on three sides and a terrace to the north, in front of the National Gallery (Fig.3.8.8) (Greater London Authority). Redevelopment of the Trafalgar Square was completed in 2003, making it more pedestrian-friendly by reducing the width of the roads, and closing the northern side to traffic, thus diverting the traffic around the other three sides of the square (Greater London Authority). Previously, pedestrian access between the square and the gallery was by two crossings at the northeast and northwest corners of the square (Greater London Authority). During redevelopment, however, a new, wide set of steps leading up to a terrace in front of the National Gallery was created by demolishing the central section of the northern retaining wall (Fig.3.8.9) (Greater London Authority). This area has improved circulation and become a popular place for visitors to sit. The construction also included adding important amenities such as a café, public restrooms, and two elevators for disabled access (Greater London Authority).

Some of the square's successful elements include: access to water in the fountains; a variety of informal seating options, such as the stairs; climbing and lookout points from the monument; lion sculptures, which enable fun interaction and photo opportunities; and interesting change in elevation. (Fig.3.8.10) Similar to Piazza Navona, changes in Trafalgar Square's pavement help to define spaces and keep it from being overwhelming (Fig.3.8.9). In addition, landmarks for make way-finding/orientation easy and serve as meeting points for friends.

All in all, Trafalgar Square is a place where people can come together to for artistic expression, awareness campaigns, civic gatherings & celebrations, and so much more (Fig.3.8.11). According to Project for Public Spaces, along with Piccadilly Circus, Covent Garden, and Leicester Square, Trafalgar Square contributes to London's unprecedented mass of public open spaces: "together, these four squares form the heart of central London. No other city has four public spaces of such high quality so close to each other. The result is the most dynamic core of any city in the world" (Project for Public Spaces, "The World's Best Squares").

Implications for Little Ferry, NJ

Given the success of many squares within busy commercial areas of Europe for centuries, Little Ferry should consider incorporating one into its master redevelopment plan as a unique social and economic hub. It would add a different dynamic than the parks that currently make up the majority of the town's open space. Care should be taken in selecting an appropriately bustling location near shopping and dining, and in blending harmoniously with surrounding areas. Furthermore, elements of Whyte's observations about how people attracted to certain public spaces can serve as basic programmatic and design guides (e.g. provide plenty of choice in seating), while brainstorming other events or elements that would celebrate the town's history. By doing so, planners could unveil a new and compelling social heart to the town of Little Ferry.

Fig. 3.8.11 Trafalgar Square temporarily turfed as part of a greening the city awareness program. Credit: Wikimedia.

WORKS CITED

Civil, Charlotte, and Paul Critcher. "In the Market For Great Christmas Gifts." *Express*, December 1, 2013. http://www.express.co.uk/travel/articles/446170/In-the-market-for-great-Christmas-gifts (accessed November 5, 2014).

Fodors. "Rynek Glowny Main Market Square." http://www.fodors.com/world/europe/poland/krakow/review-90834.html. Accessed November 5, 2014.

Greater London Authority. "Trafalgar Square." http://www.london.gov.uk/priorities/arts-culture/trafalgar-square (accessed November 5, 2014).

Jegannath, Thejas. "Why Are City Squares So Prominent?" *Urban Times*, January 21, 2013. https://urbantimes.co/2013/01/five-prominent-city-squares-around-world/ (accessed November 5, 2014).

Lennard, Suzanne H. Crowhurst. "Genius of the European Square." http://www.livablecities.org/articles/genius-european-square (accessed November 5, 2014).

Lonely Planet. "Piazza Navona." http://www.lonelyplanet.com/italy/rome/sights/squares-plazas/piazza-navona (accessed November 5, 2014).

Project for Public Spaces. "Piazza Navona." http://www.pps.org/great_public_spaces//one?public_place_id=911# (accessed November 4, 2014).

Project for Public Spaces. "The World's Best Squares." http://www.pps.org/reference/internationalsquares/ (accessed November 5, 2014).

Simonds, John Ormsbee and Barry W. Starke. Landscape Architecture, Fourth Edition. New York: McGraw-Hill, 2006.

William Whyte, *The Social Life of Small Urban Spaces* (New York, NY: Project for Public Spaces, 1980), 10, 14-15.

IMAGES

FIGURE 3.8.1
St. Mark's Square painting. Source: Gabriele Bella, The Last Day of the Carnival, St. Mark's Square, Venice. http://www.art-prints-on-demand.com/a/bella-gabriele/the-last-day-of-the-carni.html (accessed November 5, 2014).

FIGURE 3.8.2
St. Mark's Square arcade. Source: Lifesessions.com. http://marjan-vene-cija.blogspot.com/p/san-marco.html (accessed November 5, 2014).

FIGURE 3.8.3
Krakow Main Square. Source: http://www.topolinoautoclubitalia.it/images/k2/260/Piazza-Rynek-Glowny.jpg (accessed November 5, 2014).

FIGURE 3.8.4
Torino piazza. Source: Angela Johnsen. Rutgers University student.

FIGURE 3.8.5
Piazza Navona aerial. Source: http://www.italian-architecture.info/ROME/RO-013.htm (accessed November 5, 2014).

FIGURE 3.8.6
Piazza Navona sculptures. Source: Michael A Stecker. http://mstecker.com/pages/ro2011arpncen-P1000945a1.htm (accessed November 5, 2014).

FIGURE 3.8.7
Piazza Navona cafe. Source: Jenny Sadler. http://funcentrate.com/piazza-navona-cafe/ (accessed November 5, 2014).

FIGURE 3.8.8
Trafalgar Square aerial. Source: Webb Avaition. http://www.e-architect.co.uk/images/jpgs/london/trafalgar_square_wa261108.jpg (accessed November 5, 2014).

FIGURE 3.8.9
Trafalgar Square pavement. Source: Foster + Partners. http://www.fosterandpartners.com/projects/trafalgar-square-redevelopment/ (accessed November 5, 2014).

FIGURE 3.8.10
Trafalgar Square fountains. Source: Alan McFaden. http://www.britainfromabove.org.uk/image/epw021965 (accessed November 5, 2014).

FIGURE 3.8.11
Trafalgar Square green. Source: Wikimedia. http://upload.wikimedia.org/wikipedia/commons/a/ab/Trafalgar_Square_Grass_-_May_2007.jpg (accessed November 5, 2014).

3 Research Topic

3.9 Pedestrian Streets

Ellen Gallagher

“Cities shall exist for the care and culture of human beings, and shall not harm the pedestrian; the streets belong to the people, and shall not be usurped for the passage and storage of motor vehicles; and the sounds of human voices shall replace vehicular noise on city streets” (Pojani, 175). In 1974 two experts on pedestrian malls, Breines and Dean, wrote a Pedestrian Bill of Rights stating their idealized view of an American downtown, and yet for most of the country this is not what we think of when imagining our hometowns (Pojani, 175). Since the 1930’s, the United States has been notorious for its reliance on and pride in the automobile, and the development that it incurred. Our society has seen a boom of development in urban sprawl, and the trend has been to build bigger, farther and more extravagant. But is this smarter? In recent years, the age group known as the millennials (those born after 1980) have been changing this trend in incremental but largely significant ways (Maynard). Perhaps it is time that landscape architects start designing for these new trends in urban design specific to certain regions rather than applying prescribed formulas of ideologies that have been tested and in some cases failed over the last fifty or so years. In the past, pedestrian streets and malls were installed in cities all over the US, and a large majority of them failed. Does that mean that designers should give up on a downtown that thrives on pedestrian traffic? This paper first examines the causes of failed and successful pedestrian streets as outlined by Dorina Pojani, urban designer and planner from Berkeley California in her Master’s thesis in an article titled “American Downtown Pedestrian ‘Malls’: Rise, Fall, and Rebirth.” Coupling this information with a book written by Micheline Maynard, former Detroit Bureau Chief for the New York Times and Forbes.com contributor, *Curbing Cars: America’s Independence From the Auto Industry,* perhaps gives light to the development of a new kind of pedestrian street. As more and more millennials enter the workforce without the ownership of cars, the strain on public transit and transit development will become too great, unless designers and municipalities can work together to create downtowns that addresses this lifestyle, and support mass transit, community building and environmental concerns. In this post-Sandy time period of development, the New York Metropolitan Area has the immense opportunity to re-define how downtowns function for the pedestrian, bicycle, and mass transit users as well as automobile drivers on a daily basis.

During the 1960’s and into the 1980’s, over 200 American cities zoned their downtowns into pedestrian malls as part of the ‘center city revival movement’ (Pojani, 173). This movement first began in Northern Europe in the 1960’s and quickly spread across the entire continent (Pojani, 174). European cities already had well-functioning transit systems, high density cities and a cultural predisposition to walking (Pojani, 174). Moreover, European cities had mostly developed around a town center from medieval times, which were very narrow streets that could not allow vehicular traffic anyway (Pojani, 174). The pedestrian street seamlessly fit into the existing European infrastructure and lifestyle. Seeing Europe’s success, American city planners began designing pedestrian streets in hopes of revitalizing downtowns that had been forgotten with the introduction of the car and suburban malls (Pojani, 174). As Kevin Boyle, author of

Arc of Justice, explains, “What the automobile industry did was literally transform the way people interacted with each other, and the way they viewed space. There was no need to build upward, because you could build outwards” (Maynard). Many American cities expanded outwards, and city centers became more arbitrary and paradoxically almost scattered. Unlike European pedestrian streets that were made by simply closing off vehicular traffic, American pedestrian malls were often built from scratch, away from the original center of town (Pojani, 175). These areas, especially in the beginning, were strictly commercial, contained no residential uses, and often replicated suburban malls, just in open air (Pojani, 175). Initially, Designers literally followed the same criteria as a typical suburban shopping center, but as time passed, more and more pedestrian malls included transportation and open space (Pojani, 175). Some features found in American pedestrian malls are: brick paving, canopies, shade trees, exotic trees, play areas, skating rinks, fountains, ponds, sculptures, murals, and even stages for performances (Pojani, 175). Some of these elements can be seen in Figure 3.9.1, which was taken in February of 2011 on Church Street in Burlington, Vermont. At the outset, these amenities along with adequate shopping proved to be a success, with increased sales, slowing urban deterioration, and a new sense of place (Pojani, 175). Much of this renovation was subsidized by the United States government and bolstered with incentivized zoning laws, which allowed for additional construction elements in return for pedestrian enhancements (Pojani, 175).

Unfortunately, by the 1990’s many of the pedestrian malls that had proven themselves to be successful in the past, fell into steep decline and only 11 percent remain today (Judge). Many cities claimed that pedestrian streets actually contributed to the decline of the economy, but even after being restored to vehicular centers many still declined (Pojani, 176). Low population density served as one of the main reasons for failure, along with a formula of additional shopping elsewhere that was easier to access, and no ongoing management plans (Pojani, 176). In some cases, intentional design elements served as a deterrence for users (Pojani, 177). Statues and planting beds that lined streets were perceived as excellent hiding spaces from which an assailant could attack (Pojani, 177). Also, vacancy and decay such as vandalism, thrift stores, litter, discontinuous storefronts, and unpaved sidewalks show signs of neglect and can have a negative effect on a user (Pojani, 178). Ultimately, not maintaining the original design intent of the pedestrian streets led to downfall (Pojani, 178). While these failings are significant, it does not mean that pedestrian streets are a complete failure, maybe designers and planners can learn from these attempts.

Figure 3.9.1 Pedestrians in the Street

In 2014, Fresno California commissioned research on pedestrian streets as it began looking into revitalizing its Fulton Main Street from a pedestrian street into a complete streetscape (Judge). The report listed factors leading to successful pedestrian streets: population less than 100,000, must be attached to a university or other anchor, located within close proximity to a beach, between one and four blocks long, and be a major tourist destination city or town (Judge). Pojani cites that smaller cities have less complicated and less congested traffic patterns in the downtown areas, and often have popular university or tourist attractions nearby (Pojani, 178). However, these factors are not a fail-proof formula for a successful pedestrian street. It takes adequate programming, constant entertainment and management, and interesting stores and restaurants to keep people coming back (Pojani, 178). Successful pedestrian streets in the United States definitely share one common element: a population of people who are interested in being in a place, not just passing through, a true tribute to the identity of the town or city and its sense of place.

Church Street in Burlington,

Vermont is a north eastern example of a successful pedestrian street within a medium density location. While Burlington is the largest city within the Green Mountain State, it only has a little over 42,000 inhabitants ("Burlington, Vermont"). This population is bolstered by three major colleges, the University of Vermont, Champlain College, St. Michael's University, and many smaller community colleges. Burlington is situated on the eastern side of Lake Champlain, across from New York State and the Adirondack Mountains. On the other side of Burlington lies the Green Mountains, and the city boasts easy access to many major ski resorts in the winter and hiking trails in the fall "leaf-peeping" season. Its geographic location makes Burlington a year round tourist destination, and Church Street is located exactly in the heart of Burlington. Church Street is a North to South four-block stretch of pedestrian street that is anchored by City Hall at one end and a Church at the other. (Figure 3.9.5) Planning for Church Street began in 1969 by architect and Burlington Planning Commissioner, Bill Truex and Pat Robins, chair of the Street Commission in Burlington ("History"). In 1980, the two middle blocks were closed to traffic and the marketplace opened a little more than a year later in 1981 ("History"). Following the success after thirteen years, the top block (nearest the church) was added in 1994 ("History"). Again, the street proved to be a huge hit among tourists and residents alike and eleven years later the lower portion of Church Street in front of City Hall was added in 2005 ("History"). This transformation can be seen in Figures 3.9.2 and 3.9.3. Conceivably, this phased approach is a contributing factor to Church Street's success; phased introduction can help developments respond to noted trends

Figure 3.9.2 1960's Church Street

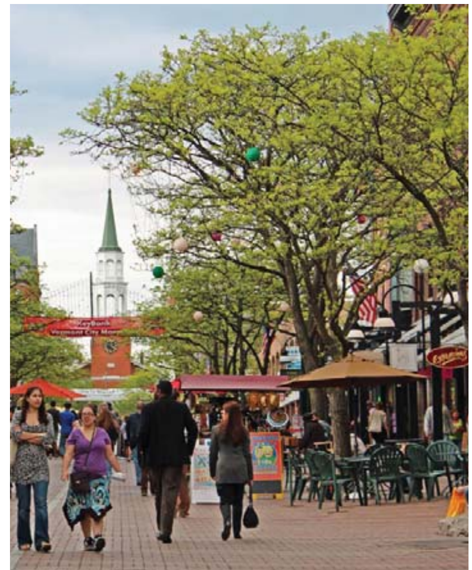
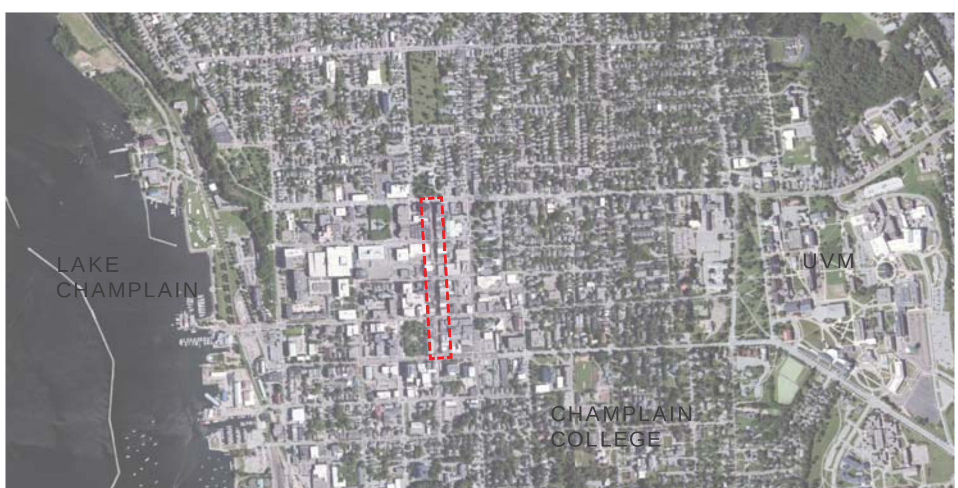


Figure 3.9.3 Church St Present Day

TYPICAL HOUSING
BURLINGTON, VERMONT

Figure 3.9.4 Typical Burlington Housing



not to scale

Figure 3.9.5 Church Street Context

Figure 3.9.6 1840's Pearl St.


Figure 3.9.7 Pearl St. Present Day

TYPICAL HOUSING
BOULDER, COLORADO

Figure 3.9.8 Boulder Typical Housing

not to scale

Figure 3.9.9 Pearl St Context

and uses, and maintain interest in the developing project. Church street is completely pedestrian, with cross streets allowing vehicular access over it, and parking provided in side street parking and a series of parking decks that offer two-hour free parking within a block of Church Street. The design is comprised of brick pavers with honey-locust trees and several statues and rocks that create interesting spaces. The housing around Church Street, although medium density, is not high rises or elaborate condominiums. Rather, there are larger Victorian homes that have been converted or built to accommodate the renter-student population. Church Street has remained a staple in Burlington for the past thirty three years, and continues to remain a major feature in the Identity of Burlington, Vermont. (Figure 3.9.4)

In the West, Pearl Street in Boulder, Colorado is designed quite differently than Church Street, showing the variety that pedestrian streets can offer. While their criteria are similar, Church Street and Pearl Street take different forms. Boulder is another unique city that attracts nature lovers who wish to ski in the Rocky Mountains. Additionally, the University of Colorado, Boulder is nearby. Boulder has a population of a little more than 100,000 people, and is a major tourist attraction ("Boulder, Colorado"). Pearl Street, similarly to Church Street, is four blocks long. (Figure 3.9.9) The original Pearl Street from 1844 can be seen in Figure 3.9.6. In the 1950's and 60's Boulder was a town plagued by the "convenient" effects of the automobile. "By the 1950s and 1960s, architectural preferences changed, and business owners covered many of the historic buildings with metal facades.Streetcars were long-gone, and shopping centers on the outskirts of town became more convenient for busy post-World War II housewives. The 1960s and much of the 1970s was a time of transition, as social and political upheaval rocked the country. In Boulder, an increase in crime coincided with a doubling of the population and the deterioration of downtown. To keep the commercial core viable, farsighted citizens began a series of planning groups" (Pettem). In 1974, a Core Area Revitilization Committee was formed, and despite controversies surrounding skepticism about parking and disruption of business, the Downtown Boulder Mall was opened to the public in 1977 (Pettem). The design is composed of brick pavers and a series of planters and areas that carve a meandering walking path into the street. Large trees in the center do not allow a straight viewpoint down either end of the street. These elements are visible in Figure 3.9.7. This type of design highlights implementation of variety can emphasize an area and create an identity for not only the town, but for the micro-envrionments and spaces within the street. The housing surrounding Pearl Street is a mixture between small single family homes and condominium living. (Figure 3.9.8) Together, these successful pedestrian streets show that a medium density housing typology can sustain a vibrant and healthy downtown that also contributes to the greater metropolitan area.

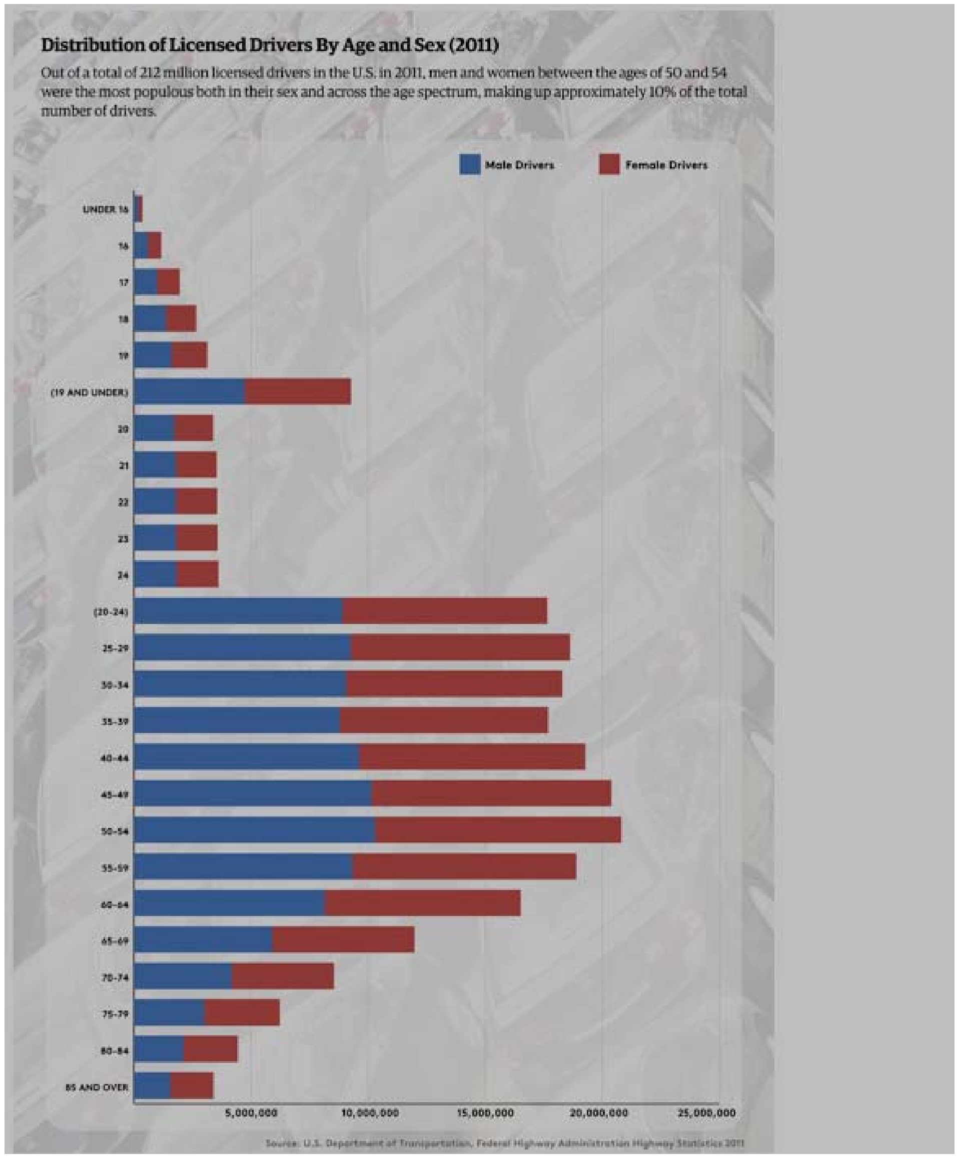


Figure 3.9.10 Liscensed Drivers by Age and Sex in 2011

Most people would believe that Americans are addicted to their cars and most developments have to be sensitive to vehicular needs, but what if that trend were changing? How would urban planners and designers accommodate a society switching gears, from auto to pedal, or even rail? Suddenly, Main Street has a new purpose, and new spaces are created. This trend is a very recent development, and is fueled by a generation that views a car as an anchor, not a tool of freedom (Maynard). "This notion of living car-light is gaining steam across the country, fueled by four changes: the economy, social practices, web innovations and environmental concerns. They are being accompanied by some new transportation resources that weren't available even five years ago, such as bike sharing, car sharing, and a wider availability of mass transit" (Maynard). The people who are aware of these new technologies and issues are known as millennials. This is the generation of the children of the baby boomers, and they grew up with their parents chauffeuring so often that driving was not seen as a freedom- it was ordinary (Maynard). A study done in 2014 by U.S. PIRG shows that the number of millennials driving dropped by a staggering 25% between 2001 and 2009 (Maynard). Maynard makes the claim that smartphones are the new car for the millennials, and this generation is not interested in driving because the world is at their fingertips. Figure 3.9.10 shows the apparent shift in ideology towards driving among the younger generation. Maynard also calls for a "massive rethinking of American culture," but maybe the re-evaluation is not as drastic as it sounds- the change is already happening, at a naturally evolving pace. This cultural paradigm shift is also not completely removing cars from the equation. We still have to design for automobiles within our cities, but the reliance is not as heavy as in the past. "Peak car doesn't mean that cars go away, but it does mean that the industry will no longer be on the kind of growth path it could once expect after past recessions… Given millennials' documented disinterest in automobiles, particularly in comparison with their parents and grandparents, and the reordering of the economy after the recession, a transformation is underway that's every bit as significant as the one that took place at the beginning of the previous century. If you need proof, just look at Detroit" (Maynard). Maynard points to the failure of the American auto industry as a tell-tale sign of where the US cultural inclinations are headed. If she is right, our cities must respond accordingly, catering to the new king- pedestrians and their needs. Why aren't millennials driving? "The number one reason cited in a survey of 600 youngsters by University of Michigan researchers Michael Sivak and Brandon Schoettle for not getting a license is that they simply don't have enough time" and 32% say that cars cost too much (Maynard). In this technological day and age, younger people would rather spend their hard earned money and dwindling free-time on experiences rather than a car. Car- free city dwellers do not have to worry about insurance and maintenance costs, or costly parking tickets and passes. In a recent article in the New Jersey Star Ledger (Sunday, November 23, 2014) entitled "What's driving the car-less commute trend across the U.S," Tim Henderson writes about the burden that many people in the work force feel that car-ownership brings, and how even though the percentages may be small year to year, a large change can be felt nation-wide. "The places with the most dramatic declines include the District of Columbia, where the rate declined 11 percent; the Bronx where it was down 9 percentage points to 28 percent; and in New Jersey's Hudson County, where it was down 8 percentage points to 47 percent" (Henderson, A13). Henderson also claims that many older people are looking for alternative forms of commute to maintain independence even after they can no longer drive (Henderson, A13). Furthermore, with the innovation of smartphones and other technologies, car ownership has taken a serious dive on a scale of importance for Millennials. "Zipcar, the car sharing company, which admittedly has taken a keen interest in the outcome, commissioned the study. It showed that nearly 40 percent of millennials believed that losing their phone would be a bigger hardship than losing their automobile" (Maynard). Perhaps it is time to stop designing for the car-centric individual, and start designing for a community of workers who want to share experiences with their friends (and the internet). "That's the future in which we find ourselves. As long as you can get somewhere, it no longer matters how you get there, whether you own a vehicle or a bicycle, use your own two feet or take a public transportation system. You can use whatever form of transportation you want, for as long as you want it, and just close the door behind you when you're done" (Maynard). This is a future of sharing needs, promoting a less wasteful lifestyle, and a more burden free life.

Human action and habits can change the course that our cities take, so can human imagination and innovation. In 1985, the blockbuster film *Back to the Future* made its way into theaters and was a cultural phenomenon. The film highlights the differences that time can have on society and how they use space- especially their downtowns, from 1955 to 1985. At the end of the film, a frantic "Doc" Brown tells Marty McFly that they have to go into the future to 2015 and delivers the iconic line "Roads? Where we're going we don't need roads." And while the real 2015 is nothing like the vision that Steven Spielberg had for the world, that kind of imaginative thinking is no less valuable in terms of planning for our "futuristic" cities. A new image of what freedom means in terms of transportation and lifestyle also opens up doors to a new definition of the American downtown. What if instead of designating an area as pedestrian only, a downtown was designed to be predominantly non-vehicular? Embracing foot, bike, and mass transportation traffic allows for an integrated and uniquely human commuting experience. Instead of stop-lights and traffic, the morning commute consists of stopping for coffee and hopping on a light rail, or biking to work. Combining the theory of a pedestrian street community and place making with a car-light future, the definition of the downtown road is left open. This liberty loosens the criteria of what a successful space could be. And perhaps we can use the new interaction and crowd input trends to make newer pedestrian streets more useful, enjoyable and successful for everyone. It is noteworthy that both the Burlington, Vermont and Boulder, Colorado projects began with very robust citizen, neighborhood input and oversight. Perhaps our greater reach of technologically aided input could assist designers in establishing ever increasingly beautiful, successful pedestrian streets which could further unify and support the communities that built them. Landscape architects now have the immense freedom to continue to develop and evolve conventions created within the last 100 years of American auto-centric history, and delineate more currently responsive terms of urban design where today's (and tomorrow's) people are back at the center of designs, at all stages- input, oversight, and usage after implementation.

Works Cited

"Boulder, Colorado." City-Data. Last modified 2013.Accessed November 5, 2014. http://www.city-data.com/city/Boulder-Colorado.html.

"Burlington, Vermont" City-Data. Last modified 2013. Accessed November 5, 2014. http://www.city-data.com/city/Burlington-Vermont.html.

Henderson, Tim. "What's Driving the Car-Less Commute Trend Across the U.S." Star Ledger [Woodbury] 23 Nov. 2014: A13. Print.

"History." Church Street Marketplace. Church Street Marketplace, n.d. Web. 1 Dec. 2014. <http://www.churchstmarketplace.com/about/history>.

Maynard, Micheline. Curbing Cars: America's Independence from the Auto Industry. Forbes Media, 2014. N. pag. Forbes Signature Series. Digital file.

Pettem, Silvia. "History of Pearl Street." Downtown Boulder. Downtown Boulder, 2014. Web. 1 Dec. 2014. <http://www.boulderdowntown.com/visit/history-of-pearl-street>.

Pojani, Dorina. "American Downtown Pedestrian 'Malls': Rise, Fall, and Rebirth." Territorio, no. 46 (2008): 173-80.

Judge, Cole. "The Failed Experiment of the American Pedestrian Mall." Urban Current. Last modified January 16, 2014. Accessed November 5, 2014. http://urbancurrent.org/2014/01/16/ the-failed-experiment-of-the-american-pedestrian-mall/.

Figures Cited

Figure 3.9.1

Gallagher, Ellen. "Snowy Church Street, Burlington, VT." 2011. JPEG.

Figure 3.9.2

Burlington, Vermont, 1960s. N.d. Daniel Strohl. JPEG file. http://blog.hemmings.com/index.php/2012/12/12/burlington-vermont-1960s/

Figure 3.9.3

"Burlington11." Catamount Tours of Vermont. Catamount Tours, n.d. Web. 1 Dec. 2014. <http://www.catamounttours.com/home/custom-designed-tours/>.

Figure 3.9.4

Gallagher, Ellen. "Typical Housing, Burlington, Vermont, Google Street View." 2014. JPEG.

Figure 3.9.5

Gallagher, Ellen. "Church Street Location, Burlington, Vermont, Bing Maps." 2014. PDF.

Figure 3.9.6

Boulder, Colo. 1844. 1844. JPEG file. http://pearlstreetboco.weebly.com/history.html

Figure 3.9.7

49949-444-PearlStreetMall. JPEG file. http://www.actionsportsinteractive.com/global/media/49949-444-PearlStreetMall.jpg

Figure 3.9.8

Gallagher, Ellen. "Typical Housing, Boulder, Colorado, Google Street View." 2014. JPEG.

Figure 3.9.9

Gallagher, Ellen. "Pearl Street Location, Boulder, Colorado, Bing Maps." 2014. PDF.

Figure 3.9.10

U.S. Department of Transportation, Federal Highway Administration Statistics 2011. "Distribution of Licensed Drivers by Age and Sex (2011)." Chart. Curbing Cars: America's Independence from the Auto Industry. By Micheline Maynard. Forbes Media, 2014. N. pag. Forbes Signature Series. Kindle file.

Research Topic

3.10 Lighting and Urban Streetscapes

Sarah Korapati

Natural lighting, or light from the sun, illuminate the streets and increases visibility. It can also greatly affect health, both mental and physical, of a person. A good rule of thumb for the minimum amount of lighting a building should get is 3 hours a day. There are three ways to alter the amount of light on streets as well as interior spaces of buildings including the street width, the directions of both buildings and streets, and the materiality of buildings and other street amenities.

Street width can greatly impact the amount of sun allowed to the floor of the street. Naturally, the wider the street, the more light is allowed. Streets can include sidewalks, bike lanes, swale ditches, outdoor seating for restaurants, etc. Time-savers Standards, figure 3.10.1, provides the variable and formula for allowing sunlight to hit the base of a building with the tallest building possible. Furthermore, Time-savers Standards provides an angle which provides the minimum spacing required to assure adequate light penetration. Little Ferry is located on the 40ºN latitude and so during the winter solstice, street width must be a little more than twice the height of the building and the spacing

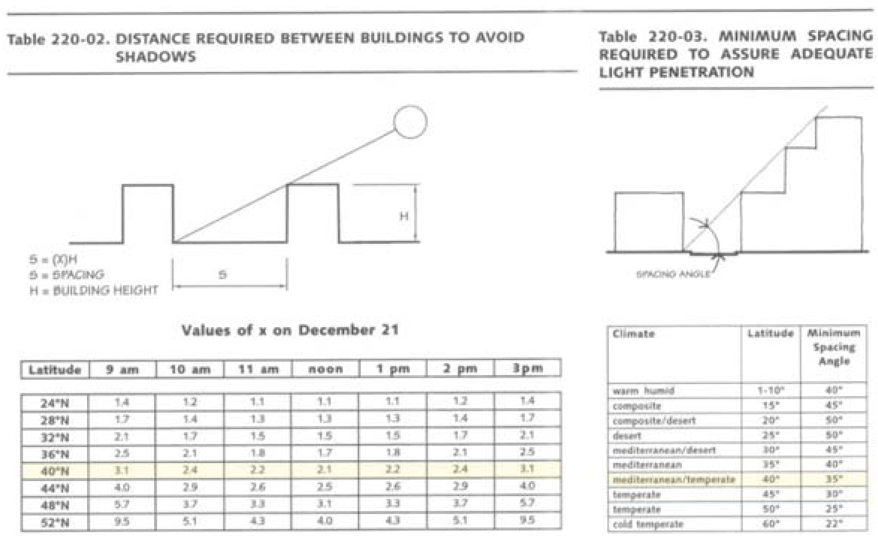


Table 220-02. DISTANCE REQUIRED BETWEEN BUILDINGS TO AVOID SHADOWS

Values of x on December 21

Latitude	9 am	10 am	11 am	noon	1 pm	2 pm	3pm
24°N	1.4	1.2	1.1	1.1	1.1	1.2	1.4
28°N	1.7	1.4	1.3	1.3	1.3	1.4	1.7
32°N	2.1	1.7	1.5	1.5	1.5	1.7	2.1
36°N	2.5	2.1	1.8	1.7	1.8	2.1	2.5
40°N	3.1	2.4	2.2	2.1	2.2	2.4	3.1
44°N	4.0	2.9	2.6	2.5	2.6	2.9	4.0
48°N	5.7	3.7	3.3	3.1	3.3	3.7	5.7
52°N	9.5	5.1	4.3	4.0	4.3	5.1	9.5

Table 220-03. MINIMUM SPACING REQUIRED TO ASSURE ADEQUATE LIGHT PENETRATION

Climate	Latitude	Minimum Spacing Angle
warm humid	1-10°	40°
composite	15°	45°
composite/desert	20°	50°
desert	25°	50°
mediterranean/desert	30°	45°
mediterranean	35°	40°
mediterranean/temperate	40°	35°
temperate	45°	30°
temperate	50°	25°
cold temperate	60°	22°

Figure 3.10.1: Time-Saver Standards

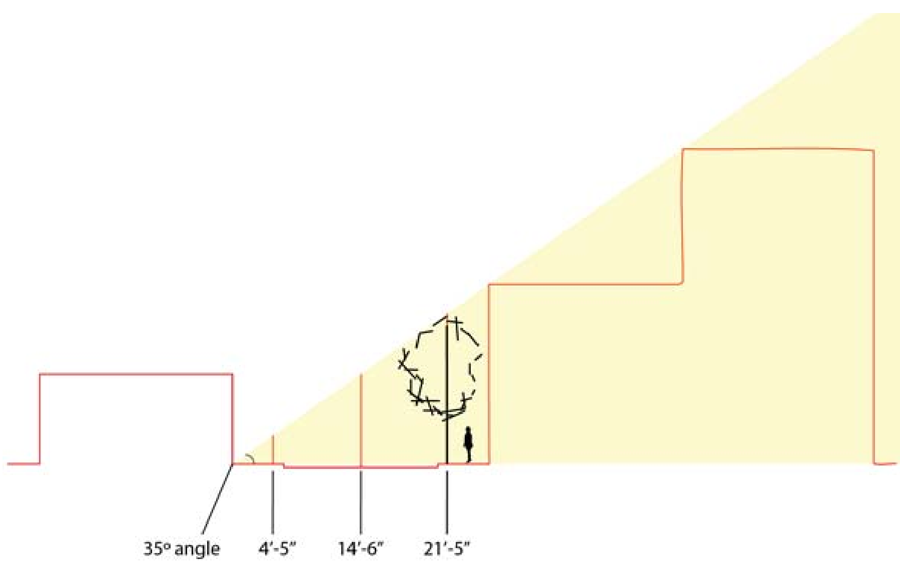


Figure 3.10.2: Section with angle of light

angle must be at a minimum 35º. In figure 3.10.2, at 35º the maximum height of a street tree would be 21 feet with a 20 foot wide road. The size of the tree would change depending upon the width of the streets. The lighting angle should be used to dictate the form of the buildings and height of the street trees.

Direction of buildings and streets can also alter the amount of light filtered onto streets. During the winter solstice in Little Ferry, the sun rises from the east and travels along the south to the west where it sets. In the models rendered on rhino (figure 3.10.3, 3.10.4, and 3.10.5), the shadows of buildings along main street are depicted between 8 am to 2pm. In the model, Classic Marble & Tile, Inc. is increased in height to show the affects of the shadow casted on buildings across the street. Under normal circumstances, the one story building hardly crosses the street. At two stories, it begins to shade main street. At five stories, it casts a massive shadow over main street and shades the bank across the street for the majority of the day. Therefore, designing on main street would require either a wider street width, different building typology or buildings less than five stories tall at the starting point of the building.

The material of buildings and streetscape amenities (ie. water features, sidewalks, etc.) can greatly alter the illumination of a streetscape. A glass building will reflect more light than a solid dark brick building. A water feature will reflect light to the underside of tree canopies. There are many different ways to explore and bend light in the landscape with the materials used within the streetscape.

Figure 3.10.3: Existing Building Shading

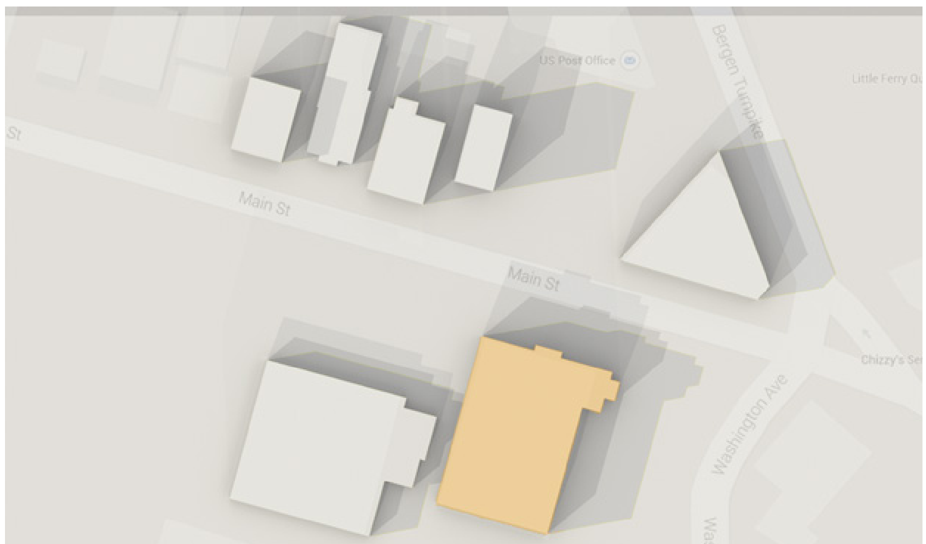


Figure 3.10.4: Two Story Building Shading


Figure 3.10.5: Five Story Building Shading

Artificial lighting includes any lighting that is not from direct or indirect sunlight. Night lighting is becoming increasingly important in areas of higher density to ensure safety of the public and residents. As such, it is necessary to have at the very least one light pole (both pedestrian and street) every thirty feet in a semi-urban context(Bathesda Landscape Plan, 8). Standard style light poles vary place to place but the distance is the standard across most city streetscapes (Pegler, 53) .

Aside from light poles, there are other aspects of lighting to take into consideration which illuminate streets at night. These features include architectural, landscape, identity, and retail lighting (Pegler, 53). Architectural lighting illuminates a building and provides accents to it. Figure 3.10.7 is the Eiffel tower illuminated to accent the architecture of the structure. Landscape lighting illuminates plant material (ie. uplighting for trees, Christmas lights, etc.). Figure 3.10.8 in London uses light to illuminate the betula trees via uplighting. Identity lighting can reinforce the identity of a place. Figure 3.10.9 is the Cook Douglas Campus

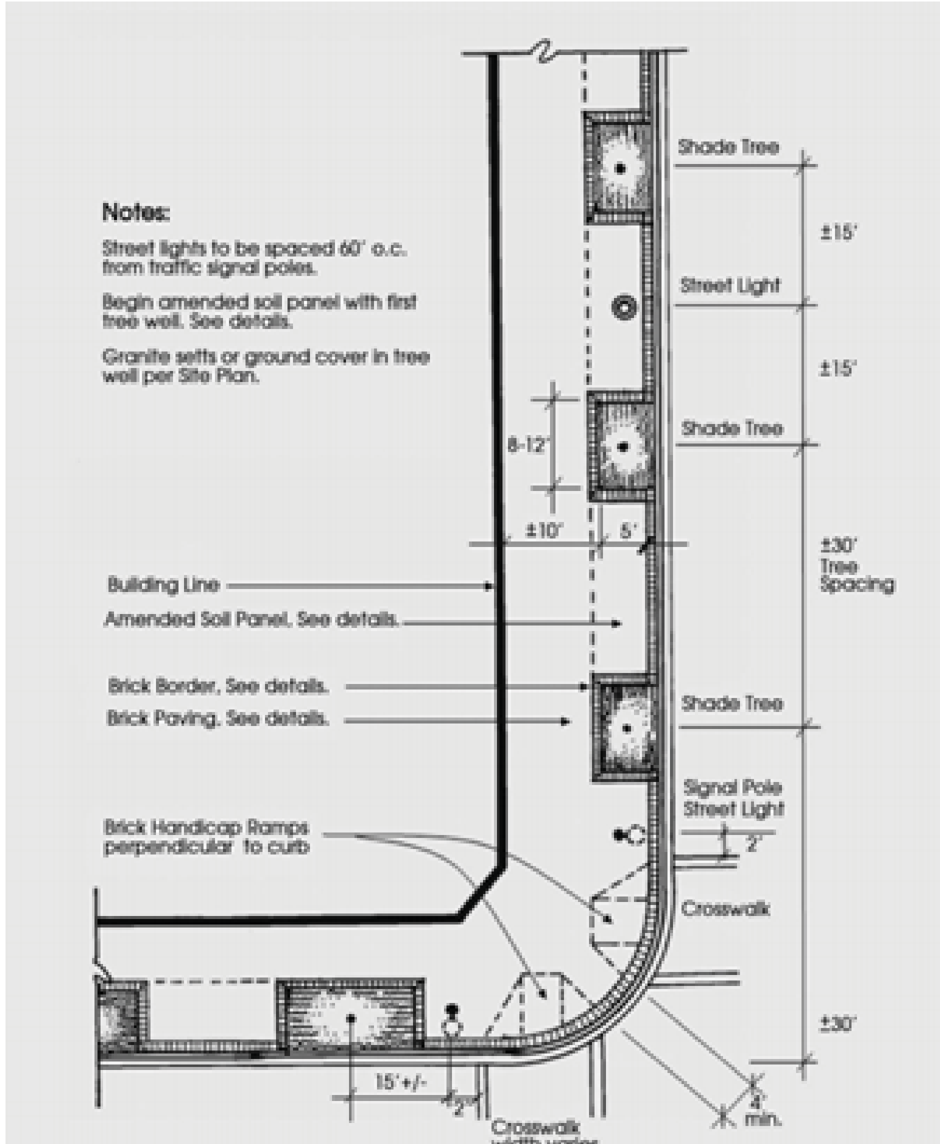


Figure 3.10.6: Bathesda Streetscape Plan


Figure 3.10.7: Architectural Lighting


Figure 3.10.8: Landscape Lighting

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

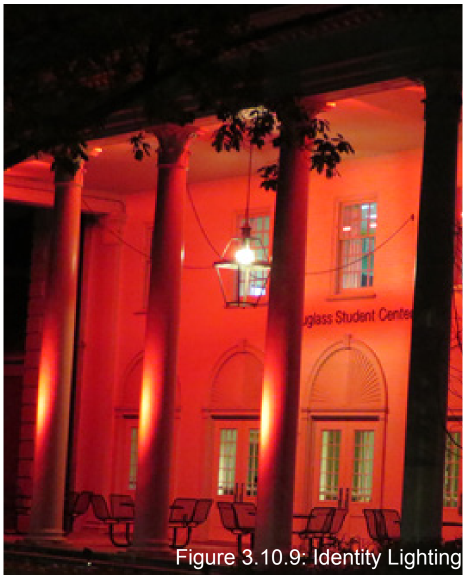


Figure 3.10.9: Identity Lighting

Center featuring a scarlet uplighting to reinforce the identity of Rutgers with its school color. Finally, the retails displays attract consumers and advertises the store. Figure 3.10.10 is a photograph of the 16 Handles on the Rutgers Livingston Campus as an example of retail lighting display. All should be taken into account when designing for the night time landscape.

The effect of night lighting on sky and wildlife are extremely important factors to take into consideration. The night sky between rural areas to urban areas gradually becomes brighter and harder to discern stars called the Bortle Effect (Bortle). To get an excellent night sky illuminated with stars, the best place to go would be the more rural areas while the urban cores tend to have a brightly lit sky and nearly no star in the sky (see figures 3.10.11 and 3.10.12). Most importantly, wildlife considerations must be taken into account. Migratory birds and animals which require complete darkness or are sensitive to light are unable to exist in areas which are well lit at night further decreasing the habitat available for birds and other wildlife (Bermudez). Therefore, when designing the night landscape, various forms of light pollution should be taken into account. The

Figure 3.10.10: Retail Lighting

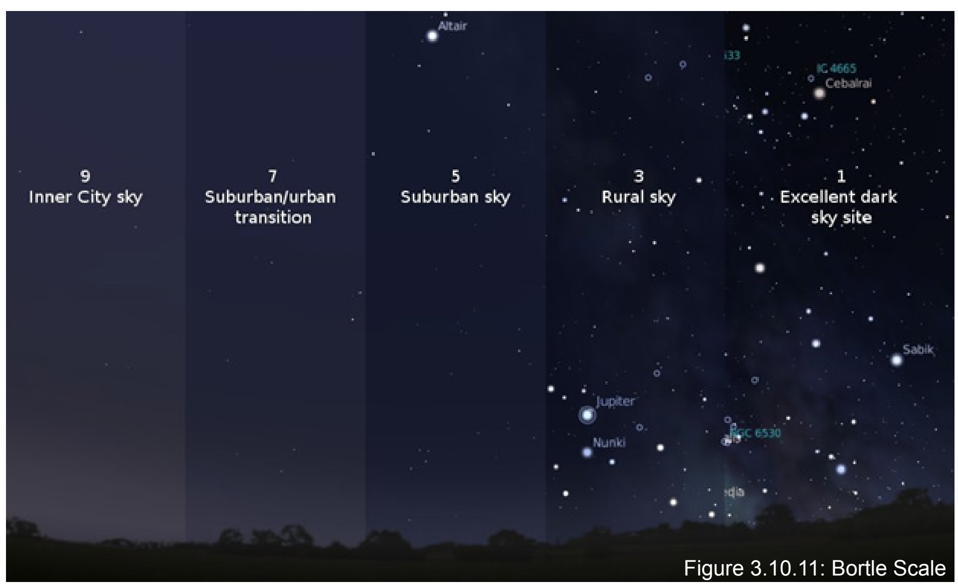


Figure 3.10.11: Bortle Scale

Figure 3.10.12: Extended Bortle Scale

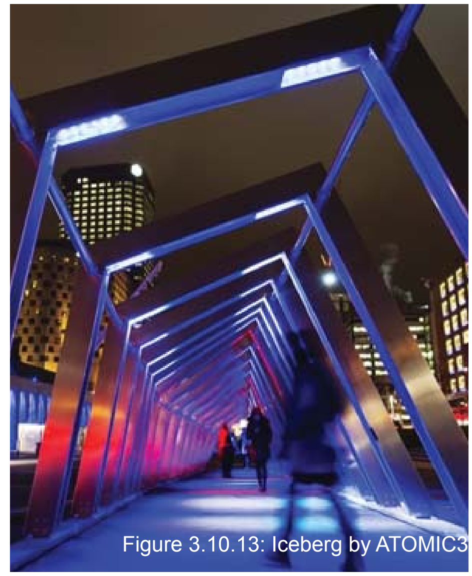


Figure 3.10.13: Iceberg by ATOMIC3

various forms of light pollution include light tresspass, glare, sky glow, and light clutter (Burmudez). Light tress-pass is when light goes beyond the property of a building and spills onto the property. The best example for this would be a street light shining onto the lawn of a property. Glare is when a source of light is greater than what the eye is accustomed to. Sky glow occurs in heavily urban areas where there is constant lighting into the night. Finally, light clutter is an excessive clumping of light which causes distractions.

Lighting can be used as a form of art as well, particularly as temporary and permanent structures.

Iceberg by ATOMIC3 reveals the use of light and color in the landscape. The night landscape opens a world of possibilities for using different colors in the landscape while at the same time serving a very important safety component. As seen in figure 3.10.13, the structure illuminates the pedestrian pathways with various colors and creates an interest in the passage way.

Field of Light by Bruce Munro is a series of temporary light structures which illuminate the night to create interest in the night landscape. Despite it being a temporary structure, it


Figure 3.10.14: Field of Light by Bruce Munro


Figure 3.10.15: BLOOM by Doris Kim Sung

has a profound impact on those who visits where each installation is at. In figure 3.10.14, Field of Light leads the eye towards the structure in the background.

Finally, Doris Kim Sung's Bloom is an example of the emerging technology in biomimicry and materials. The structure reacts to when the sun hits it, opening the cells when the sun hits it, to allow for ventilation underneath the structure, and closes when the sun is gone to allow for it to retain heat (FORMAKERS). Figure 3.10.15 is the installation of Sung's structure providing a shade structure for the surrounding building.

Lighting needs to be considered both in the night and day landscape. In the day time, it comes particularly in the form of natural sunlight to decrease the cost of lighting and take into consideration heating/cooling costs. In the night landscape it takes much more importance to illuminate landscapes for safety purposes but also can be a form of art. Both need to be taken into consideration when creating any space meant to be for people.

Works Cited

In-Text Citations

Bermudez, Mara. “Light Pollution: The Dark Side of Outdoor Lights,” November 21, 2013. http://www.delmarfans.com/educate/basics/lighting-pollution/.

Bethesda Streetscape Plan. Accessed November 5, 2014. http://www.montgomeryplanning.org/design/documents/BethesdaStreetscapeStandards.pdf.

“FORMAKERS - Bloom / Doris Kim Sung.” Accessed November 5, 2014. http://www.formakers.eu/project-679-doris-kim-sung-bloom.

Pegler, Martin. “Streetscape Design Guidelines: The Public Realm.” n.d. http://www.downtowngr.org/documents/downtown_streetscape_design_guidelines-public,private.pdf.

Time-Saver Standards for Landscape Architecture: Design and Construction Data. Second. McGraw-Hill Publishing Company, 1998. https://ia800905.us.archive.org/11/items/Time-Saver_Standards_for_Landscape_Architecture_Malestrom/Time-Saver_Standards_for_Landscape_Architecture_Malestrom.pdf.

Image Citations

Bermudez, Mara. “Light Pollution: The Dark Side of Outdoor Lights,” November 21, 2013. http://www.delmarfans.com/educate/basics/lighting-pollution/.

“Eiffel Tower Meaning | Bieber Travel Blog.” Accessed November 3, 2014. http://travelbieber.com/eiffel/eiffel-tower-meaning.html.

“FORMAKERS - Bloom / Doris Kim Sung.” Accessed November 5, 2014. http://www.formakers.eu/project-679-doris-kim-sung-bloom.

“Iceberg / ATOMIC3.” ArchDaily. Accessed November 5, 2014. http://www.archdaily.com/343771/iceberg-atomic3/.

“I Drool in My Sleep - The Bortle Dark Sky Scale, Generated by Stellarium.” Accessed November 6, 2014. http://idroolinmysleep.tumblr.com/post/5837982814.

“Light Pollution and Astronomy: How Dark Are Your Night Skies?” Sky & Telescope. Accessed December 1, 2014. http://www.skyandtelescope.com/astronomy-resources/light-pollution-and-astronomy-the-bortle-dark-sky-scale/.

“New York City & Times Square Night Tour.” Accessed November 6, 2014. http://thejetlife.com/2013/06/22/new-york-city-times-square-night-tour/.

Pickthall, Mark. Photograph of Bruce Munro’s Light Art Display. Accessed November 5, 2014. http://www.archdaily.com/250021/bruce-munro-announces-plans-for-solar-powered-field-of-light-at-uluru/brucemunro_2318/.

“Streetscape Guidelines for the City of Chicago Streetscape and Urban Design Program,” November 2003. http://www.cityofchicago.org/dam/city/depts/cdot/Streetscape_Design_Guidelines.pdf.

Time-Saver Standards for Landscape Architecture: Design and Construction Data. Second. McGraw-Hill Publishing Company, 1998. https://ia800905.us.archive.org/11/items/Time-Saver_Standards_for_Landscape_Architecture_Malestrom/Time-Saver_Standards_for_Landscape_Architecture_Malestrom.pdf.

Table of Figures

3 Research Topic

3.11 Outdoor Shopping

James Cocorles

The Agora

Some of the earliest open air markets where located in Greece and the largest was named the Agora. It was located at the foot of the Acropolis in Athens, Greece which is the heart of the city. The location is significant since it was easily accessible for the Athenian citizens who resided close to the market. The Agora which means “open place for assembly”, was the designated area for announcements, discussion of politics, open-air or tented marketplace. At that time it was not just about shopping for goods but it was a way of life for people. The agora was utilized for commerce, political, religious and military activity which was a way of bringing people together through the means of assembly to learn new information about politics and then also retrieve what goods are needed at the home. There was a variety of merchants that included confectioners, slave-traders, fishmongers, cloth merchants, shoe-makers, dress makers, and jewelry purveyors.

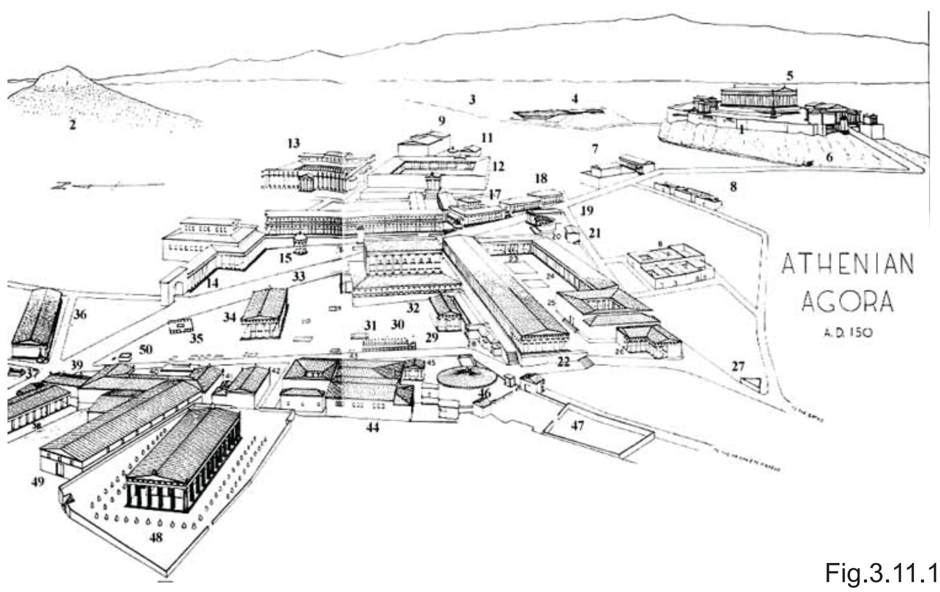


Fig.3.11.1

Fig.3.11.2

Fig.3.11.3

Once we entered into the 1900's, shopping really began to evolve with the introduction of the automobile. The car played a huge part in the sprawl across America which meant more shopping structures that were farther away from housing. These werent your typical main street shops in your town but single locations that were a distance to be traveled for those with a vehicle. Since you were driving your vehicle to the shops you needed a place to leave your car as well so parking was added. In 1907, a Baltimore neighborhood was the first to create a group of stores that were not part of a downtown and establish off-street parking. In 1922 the Country Club Plaza in Kansas City was the first group of stores only to be accessible by car was built. With off street parking it allows for more customers to visit the shops.

Markets grew to what we have become accustomed to today with the beginning of the modern shopping center. These shopping centers began to take on a completely different look with large retail stores and smaller ones mixed in. In California, grocery stores would serve as the anchor for a collection of smaller stores surrounding it.

"The sheer size of the department store required the use of new building materials, glass technology, new heating, cooling and lighting devices, and in-store people movement, which led to new store design, among other engineering and architectural innovations. The store layouts made shopping easier for consumers irrespective of their social or economic background. The department store also offered new customer services never before seen retail establishments such as restaurants, restrooms, reading and writing rooms, home delivery, wrapping services, health care services, art exhibitions, music appreciation, post office, travel services, funeral services, convenient store hours, new types of merchandise displays, and so forth. In other words, a onestop shopping experience with everything under one roof." (Tamilia, 5)

The introduction of the new stores brought together such a diverse shopping industry with many different products for all types of people to experience.

1940-1980

Fig.3.11.4

The layout of shopping centers began to change at this point in time. From the growth of diversity of the shops came a need to come up with an organizational system with how they are layed out in one space. In 1954 the Northland Center in Detroit, Michigan utilized the “cluster layout” which consisted of a single department store at the center and a collection of smaller retailers surrounding it. The main attention getter was this large department store that is a well known reputable store such a Sears at this time. These large retailers were the reason why shoppers came to these cluster layouts and as you travel within and begin to notice the other smaller stores with names you have never heard of before you feel compelled to stop in and take a look. With the growth of these layouts, new features were introduced that improved the overall shopping experience at the time. Some of the important features included surrounding parking lots and heating and air-conditioning. Large seas of asphalt parking lots surrounded the cluster layout which brought many consumers in but were never filled to capacity like it remains today. These extra spaces are used for holiday parking where the overflow of cars needs somewhere to park. We take heating and air condititioning for granted today as we have become so accustumed to it being in our daily lives whether it be your room or your car. At this time not many places had the ability to have these amenities and it was really a game changer and drew more attention to the stores.

The first enclosed mall was developed in Minneapolis in 1956. It was designed to keep the consumer out of harsh weather and the outside world. Having a fully enclosed shopping area instead of walking from store to store on an open pathway changed the way people shopped. Not many people would want to go running from store to store in order to not deal with outside elements. Having the ability to walk freely in a fully enclosed mall makes a difference since it will keep shoppers shopping for a longer period of time then an open layout would.

In 1976 the first festival marketplace was built in the United States. The Rouse Company created Faneuil Hall Marketplace in Boston, Massachusetts which centered around food and retail.

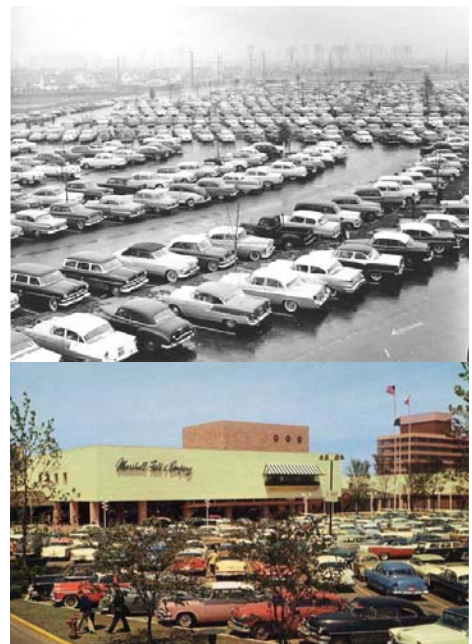


Fig.3.11.5 and Fig.3.11.6

1980-Present

Fig.3.11.7

Fig.3.11.8

"By the early 1980s indoor shopping centres were woven tightly into American culture. New cuisines (the term is perhaps too grand) emerged in them, thanks to chains like Cinnabon and Panda Express, which did not exist outside malls. They began to swell to the point of absurdity. Canada's West Edmonton Mall, which opened in 1982, has an ice-skating rink, a pool with sea-lions and an indoor bungee jump. The Mall of America, in Minnesota, has three rollercoasters and more than 500 shops arranged in "streets" designed to appeal to different age groups. Every morning it opens early to accommodate a group of "mall walkers" who trudge around its 0.57-mile perimeter for exercise." (Economist). Between 1980-1990 16,000 shopping centers were built. These shopping centers are always evolving to become bigger and better overtime. There is going to come a point in time when these designers are going to have to realize when bigger isn't always better.

The number of massive malls that measured over 800,000 square feet increased dramatically while factory outlet centers became more popular throughout the 1990's. Outlet malls are able to provide manufacturers to sell their products at discounted prices. Outlet malls make shopping a little bit easier on the consumer without having to deal with the negatives about going to much bigger shopping centers.

Just like the shopping centers growing larger and adding more amenaties the outlet malls grew in their own way. They became more people friendly with the addition of entertainment centers playing a large role in the 1990's which offered many different types of activities such as childrens play areas, live music, movie theaters, food courts, amusement parks, interactive demonstrations.

Today many stores have their own signature with lighting schemes, scents, displays, even flooring. These characteristics make a memorable experience for the consumer as they will take away a scent or remembering the oak wood floor. If the stores appearances all looked the same there would be no reason for a costumer to choose one store over another.

Interior and Exterior

Fig.3.11.9

Fig.3.11.10

The physical appearance both interior and exterior play a large role in getting a customer into the store. There are many tricks that designers use to make stores more appealing to people. It could be as simple as the clothing put in the window or the color paint that is on the building itself.

The physical exterior of a store influences customers to decide to get the courage to take the next step and enter. This exterior experience includes the storefront itself, entrances, display windows, physical characteristics of the building (scale and materials), surroundings (other buildings and landscape), and parking. The exterior of a store is the consumers first experience to engage them and bring them into the store. It is important for them to portray a positive impression. Large name stores do not need as much attention to draw people in unlike a small local business might since they already have built a reputation of their products. When consumers decide to shop at a smaller store they rely on the external cues such as a window display to draw them in.

The interior experience is after a costumer is influenced by the exterior of the store into entering it. The designers create an atmosphere within the store that grabs the attention of the consumer. The interior includes flooring, lighting, colors, scents, sounds, fixtures, merchandise, and cleanliness. The layout and design variables describe the allocation of floor space. They layout of the store is a big part of a stores sales. Similar to a super market you are confined to a path that brings you throughout the store so you pass by all of the goods. Each store has their own unique layout so that you have an opportunity to see the displays and then get to the product itself which is close by. There are point of purchase variables as well which include displays, signs, wall decorations, certifications, artwork, and prices of goods.

In 2000, Turley and Milliman conducted a review of stores interior atmospheres. Results suggested that these atmospheres have a substantial impact on the behavior of the shoppers. They also stressed the need for further research on the subject of the exterior atmospheres of stores to see the connection between the two.

Landscaping and The Conclusion

Fig.3.11.11

Landscaping generates positive emotional reactions and evaluations of urban settings. In an urban setting, the presence of vegetation positively influences the moods of and quality of life of people. It has be found that consumers reacted positively to the presence of trees at mini-malls. When stores were landscapes, consumers were more likely to patronize stores and were even willing to travel greater distances. In mall décor, different plants are used to manipulate the décor in terms of color which creates a substantial impact on a shoppers perception of the environment as well as the quality of products. Landscaping is particularly more important for restaurants and service retailers, attractive window displays are important for apparel and hardware retailers. Seasonal flowers add color and variety that architectural design just can not capture.

When it comes to the shopping atmoshpere it is all about how to draw a consumer in. We as Landscape Architects need to take the emphasis that designers place inside with displays and really focus that on the outdoor landscape. If we can make an environment that draws in consumers as well as gives them an environment to physically enjoy.

Works Cited

Images:

Fig. 3.11.1 http://www.mlahanas.de/Greeks/Maps/Agora1.jpg

Fig. 3.11.2 http://www.ancient.eu/uploads/images/display-2113.jpg

Fig. 3.11.3 http://www.gokingman.com/media/Centeral-Commercial-1920s_51631_53236-800x600.jpg

Fig. 3.11.4 http://reurbanist.com/wp-content/uploads/2013/05/Northland-Center-Detroit-564x317.jpg

Fig. 3.11.5 http://statemuseumpa.org/levittown/images/lg_jpegs/M54aP3.jpg

Fig. 3.11.6 http://photos1.blogger.com/blogger/5883/1181/1600/OLD%20ORCHARD%20SHOPPING%20CENTER%20CHICAGO%20ILLINOIS.0.jpg

Fig. 3.11.7 http://nreionline.com/site-files/nreionline.com/files/archive/blog.retailtrafficmag.com/retail_traffic_court/wp-content/uploads/2010/08/Cherry-Hill-Mall-After.jpg

Fig. 3.11.8 http://c3039282.cdn.cloudfiles.rackspacecloud.com/homepage/mallofamericabig.jpg

Fig. 3.11.9 http://designshoot.com/uploads/desember-08/cristian-store-interior-2.jpg

Fig. 3.11.10 http://startupmywebsite.com/cmssite/wp-content/uploads/2013/05/storefront11.jpg

Fig. 3.11.11 http://smithgill.com/media/images/project_images/775/great_city_streetscape.jpg

Documents:

Mower, Jennifer M., Minjeong Kim, and Michelle L. Childs. “Exterior Atmospherics and Consumer Behavior: Influence of Landscaping and Window Display.” Journal of Fashion Marketing and Management 16.4 (2012): 442-53. Web. 30 Oct. 2014.

Mark, Joshua J. “Agora.” Ancient History Encyclopedia. N.p., 2 Sept. 2009. Web. 03 Nov. 2014.

“OnlineMarketingDegree.net.” History of Shopping Center. N.p., n.d. Web. 05 Nov. 2014. <http://www.onlinemarketingdegree.net/resources/history-of-shopping-center/>.

Richard A. Feinberg and Jennifer Meoli (1991) ,”A Brief History of the Mall”, in NA - Advances in Consumer Research Volume 18, eds. Rebecca H. Holman and Michael R. Solomon, Provo, UT : Association for Consumer Research, Pages: 426-427. 3 Nov. 2014.

“Birth, Death and Shopping.” The Economist. The Economist Newspaper, 22 Dec. 2007. Web. 01 Dec. 2014. <http://www.economist.com/node/10278717>.

Tamilia, Robert D., PhD. “The Wonderful World of the Department Store in Historical Perspective: A Comprehensive International Bibliography, Partially Annotated.” Department of Marketing École Des Sciences De La Gestion University of Quebec at Montreal, July 2011. Web. 1 Dec. 2014. <http://faculty.quinnipiac.edu/charm/Docs/Department%20Store%20Bibliography.pdf>.

3 Research Topic

3.12 Urban Gateways

Jacob De Boer

Introduction

Urban gateways or gateways in general have been around since man has created structures and enclosures. Throughout the years they have evolved into something greater than a physical arch or gateway one would pass underneath. "Man-made enclosure, if only of the simplest kind, divides the environment into HERE and THERE. On this side of the arch, in Ludlow, we are in the present, uncomplicated and direct world, our world. The other side is different, having in some small way a life of its own" (Cullen, 1998, p. 183). What Cullen illustrates, brings a much deeper and cultural understanding of how a gateway can alter its surrounding area. Urban gateways, if successfully designed, create a unique image for the surrounding area, it creates a "here and there".

Gateways originated with the purpose of being a means of access or entry to a place (Figure 3.12.2). As civilizations began to fortify themselves they began constructing walls to keep their enemies at bay. Yet, they still required a means of access to and from the city, which resulted in the creation of gateways. Two main civilizations the Greek and Romans utilized gateways,

Figure 3.12.1

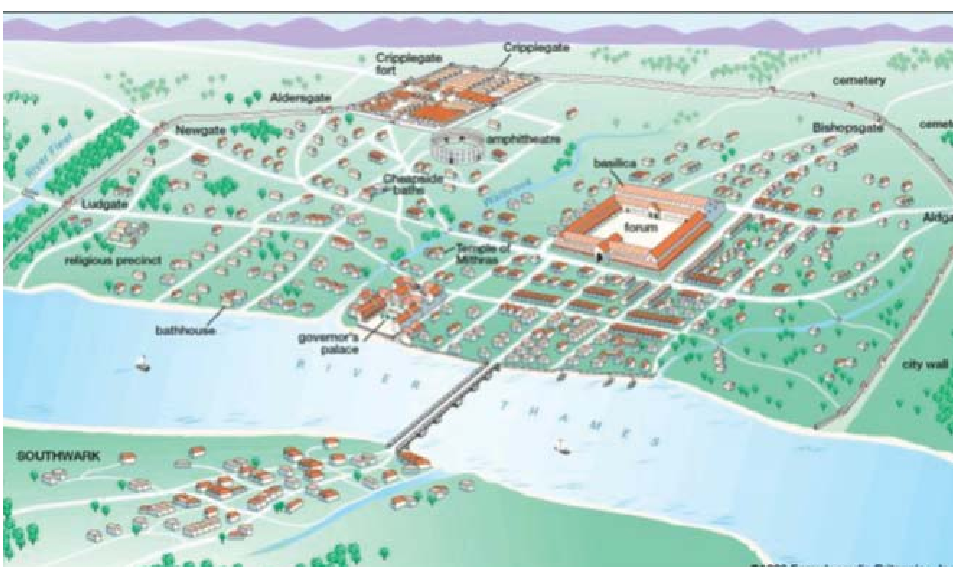


Figure 3.12.2

and each created a unique image for the surrounding area.

Urban Gateways in History

The gates of the old medieval town of Rhodes located in Greece are a great example of historical gateways and their impact on the landscape (Figure 3.12.1). Monumental in size, this gateway offers little access to and from the city. Yet, this is the intention of the design, attempting to limit the size of openings in the wall for defensive measures. Because of this limitation to the size of the opening and defensive features these gateways become intimidating. They represent the different between safety and death; within these massive walls this civilization feels safe. Looking in from the outside evokes a completely different feeling from looking out from within these walls.

Roman gates, held the same fundamental function of the urban gateway, serving as an exit and entry to a fortified city. They also symbolized the difference between safety, and death. Yet, they vary in their physical aesthetics, although serving the same function. “City gates differed in a number of significant ways from their Greek and Italic precursors. They pierced the city walls at right angles where ever possible” (qtd. in Gardner, 3). Although, Greek and Roman gateways create the same icon of safety for their civilizations, their characteristics differ vastly identifying their unique cultures.

Roman gates, held the same fundamental function of the urban gateway, serving as an exit and entry to a fortified city. They also symbolized the difference between safety, and death. Yet, they vary in their physical aesthetics, although serving the same function. “City gates differed in a number of significant ways from their Greek and Italic precursors. They pierced the city walls at right angles where ever possible” (qtd. in Gardner, 3). Although, Greek and Roman gateways create the same icon of safety for their civilizations, their characteristics differ vastly identifying their unique cultures.

Roman gateways (Figures 3.12.3-4), they consist of two large towers, with a bridge like crossing connecting both towers with an opening below. While Greek gateways (Figure 3.13.1), are composed of two wider cylindrical bunkers, and a few towers between them with an opening below. These differences in style express their religious, cultural, and aesthetic values of the time period, all while serving the

Figure 3.12.3


Figure 3.12.4

Figure 3.12.5

These differences in style express their religious, cultural, and aesthetic values of the time period, all while serving the same purpose.

While the ancient civilizations of Europe developed gateway as a means of exit and entry into a city, Asian cultures began developing their own gateways guided by different values. Japanese and Chinese cultures developed gateways within their garden designs, and each represent their culture's ideals and beliefs different. Japanese gardens incorporate the use of a Torii gate (Figure 3.12.5). These are traditional Japanese gates most commonly found at the entrance of or within a Shinto shrine. Rather than serving the primary function as a means of access of entry into a fortification. Torii gates symbolize the transition between what is sacred and the profane. Deeply rooted into their spiritual culture, the Japanese Torii gate has become an icon, serving a greater function than ancient Western gateways. They may also identify other sacred spots such as a mountain or rock.

Chinese culture integrated gateways into their gardens as a means of framing a particular view, calling them Moon gates (Figure 3.12.6). "[Moon gates] were often only a means of enhancing a view into the garden or to the scenery beyond, a beautifully placed circle framing some special outlook" (Cooper). These gates would be a viewport into a sacred or special area in a garden, sometime transitioning between each part of the garden. Similar to Torii gates in construction, yet instead of being symbolic themselves, Moon gates frame symbolic views.

Figure 3.12.6

Figure 3.12.7

Modern Urban Gateways

The United States Department of Transportation identifies an urban gateway as "a physical or geometric landmark that indicates a change in environment. They are frequently used to identify neighborhood and commercial areas within a larger urban setting." Their description of a gateway acknowledges symbolism, change, and iconography as the main requirement to be considered a gateway. Unlike the historical examples, modern urban gateways can be designed as more than just an arch or passageway. They can be iconic structures that signify a specific culture of a place, which coincides with Cullen's understanding of "here and there" (p. 183). But, there are many modern gateways that serve the same function as their predecessors.

Chinatown, San Francisco, California is a perfect example of a historical gateway in a modern setting (Figure 3.12.7). Here their gateway into Chinatown represents a transition


Figure 3.12.8


Figure 3.12.9

between two spaces. Unlike traditional Moon gates, Chinatown's gateway does not exist to frame a view. It was constructed and a physical separator between the town and Chinatown, similar to Japanese Torii gates. Although, Torii gates are meant to represent a difference between the sacred and the profane while Chinatown's gateway is not tied to religion, they are no more of a gateway than the other. While this was a gateway on a small scale, their scale can be infinite.

The Statue of Liberty, to this date is the most iconic and influential man-made gateway in the world (Figures 3.12.8-9). It is not an arch or entrance way in physical form, people do not pass beneath the Statue of Liberty like traditional gateways. Instead, it functions as a landmark which symbolizes freedom and is an icon for all citizen's and immigrants. In many cases, it symbolizes the different between here and there for immigrants, as soon as they sailed past this icon they transitioned into a new, free life. In terms of scale, this gateway is immense, encompassing the entire United States. Starting near New York City and ending in California. As an icon, indicating a change in environment, the Statue of Liberty succeeds on all levels and clearly illustrates how a gateway does not have to be a literal arch or gate.

On the contrary, the Gateway Arch, in St. Louis, Missouri (Figure 3.12.10) is one of the most popular and well known modern archways. It represents the city of St. Louis, yet you do not enter the city by driving beneath it. It becomes the icon for the city, and the western states as a whole. According to the Gateway Arch's official website it represents and celebrates western expansion. It serves a similar function as the Statue of Liberty, by representing a vast area and celebrating the unique culture of the United States. On the other hand, urban gateways, more according to the Department of Transportation's definition can identify changes in an area from an automotive perspective.

The broad definition of a gateway attests for their vast quantity of forms, culture and iconography. The Department of Transportation states

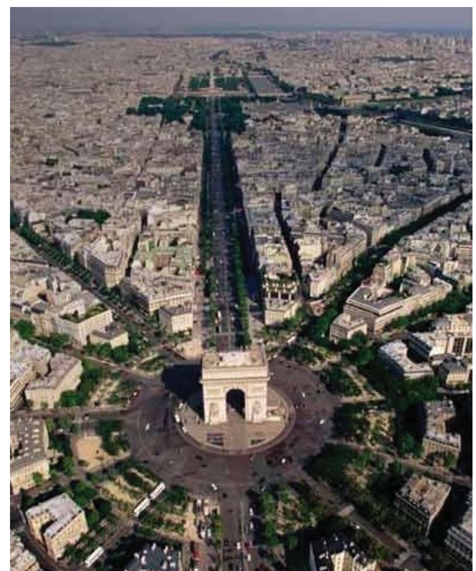


Figure 3.12.11


Figure 3.12.10

that "[Gateways] May be a combination of street narrowing, medians, signing, archways, roundabouts, or other identifiable features." While many of these requirements may not hold special significance, they do function properly by identifying a specific change in an area. These options can be used to control vehicular and pedestrian traffic, identify areas of interest and simply act as a means of transportation.

Traffic circles by themselves identify a unique confluence between three or more roadways, and according the Department of Transportation they function as gateways. Although, a standard traffic circle may identify a change in movement, there are old and new examples of traffic circles identifying a portion of a neighborhood. For example, L'Arc de Triomphe located in Paris (Figure 3.12.11) is a great example of a traffic circle that accomplishes such a feat. This traffic circle celebrates a unique situation in the Paris community, rather than being located at the entrance to an area, this icon signifies a central point. The traffic circle signifies the convergence of the town, and the archway identifies this area as being important, the center of Paris.

On the contrary, sometimes traffic circles may simply exist to indentify a unique change in traffic patterns with little symbolic representation. The Lujiazui traffic circle located in Shanghai Pudong (Figure 3.12.12), takes a unique approach on the difficulties associated with mixing vehicular and pedestrian traffic. Normally, traffic circles create a dangerous situation for pedestrians as there are no predetermined breaks in vehicular flow. This design lifts the pedestrian circulation, and creates a physical gateway for cars to pass beneath, and a safe way for pedestrians to cross. In terms of

Figure 3.12.12

Figure 3.12.13

Figure 3.12.14

functionality, and by the Department of Transportation standards this gateway is successful as it identifies a change in an area.

Park Entrances

Some of the most creative solutions and designs of urban gateways are created to symbolize the entrance into a park. Often symbolizing a transition between city life and nature, these gates function as entrance points to and from the park. They can be a combination of man made elements, or as simple as the placement as two great trees. While each may look drastically different, they all represent a transition between park and urban space.

Centennial Park located in Denver, Colorado (Figure 3.12.13) closely resembles the historical Toriii gates found in Japan. Although, the gate itself does not signify something sacred, depending on one's point of view, it still enforces the idea of "here and there". It provides clues as to the design aesthetics and style used to design the park, and serves as the main signifier for the park entrance. Even though this example resembles a typical looking gateway, there are plenty of examples that do not.

Since Prospect Park's Third Street entrance closed to non-essential automobile traffic in 2009, a dowdy metal police barricade has served as the formal entryway for pedestrians and cyclists. The proposed redesign of one of the gateways to Prospect Park (Figure 3.12.14) functions similarly to most park gateways, but introduces a few new ideas. New York architects Jordan Yamada and Peter Zaharatos proposal, Stone Garden, arrays a series of 12 movable granite stones outfitted with casters and set in parallel bronze tracks. It is unique because each boulder invites public interaction while creating an ever changing field of pedestrian and cyclist movement patterns. Functioning as a gateway, this unique approach highlights how urban gateways encompass a vast range of symbolic, cultural and aesthetic variations.


Figure 3.12.15

The landscape architecture firm Melk! Is very familiar with the creation of iconic gateways as important elements of design. Their redesign for Margaret T. Hance Park located in Phoenix, Arizona (Figure 3.12.15) aims to celebrate and identify this vast open space which flows underneath some of Phoenix's most used roadways. They designed a concept called "the cloud" which successfully creates a unique image for the park and the surrounding community.

Conclusion

Overall, urban gateways attempt to create a unique image for an area, creating a clear separation between "here and there". Throughout the course of human civilization gateways served as a means of access or entry into a place, and slowly evolved to encompass spiritual, cultural, and iconic significance. They have been used to evoke community's values and ideals, as well as representing their aesthetic preferences. Most importantly, urban gateways are not limited to a typical arch or gate construction, they are icons that tell a story about a particular place.

Table of Figures:

Works Cited:

COOPER, J. C. “Symbolism Of The Taoist Garden.” Studies In Comparative Religion 11.(1977): 224-234. Humanities Index Retrospective: 1907-1984 (H.W. Wilson). Web. 5 Nov. 2014

Gardner, Julian. “An Introduction to the Iconography of the Medieval Italian City Gate.” Dumbarton Oaks Papers 1987: 199. JSTOR Journals. Web. 5 Nov. 2014.

Ferguson, M, H Maoh, and P Kanaroglou. “Simulating Sustainable Urban Gateway Development Illustration From Hamilton, Ontario, Canada.” Transportation Research Record 2269 (2012): 135-144. Science Citation Index. Web. 5 Nov. 2014.

“Torii”. Encyclopædia Britannica. Encyclopædia Britannica Online. Encyclopædia Britannica Inc., 2014. Web. 05 Nov. 2014 <http://www.britannica.com/EBchecked/topic/599912/torii>.

3.13 Design Above and Below the Groundplane

Teddy Aretakis

Introduction

Utilities, as defined by the New Jersey Board of Public Utilities, are “critical services such as natural gas, electricity, water, telecommunications, and cable television” (BPU). It is important for landscape architects to understand the placement and function of underground utilities. Their work engages the ground plane, extending both above and below it. Landscape designs often require electricity, water supplies, and stormwater drainage. Buildings require these utilities as well as gas lines, sewer lines, cable lines, and telecommunications. Any plantings, soils, irrigation systems, and stormwater systems that landscape architects design must work cohesively with underground utilities; interference will lead to a failed design. Successful designs integrate buildings and the landscape and require dialogue about underground utilities between various professionals. For inclusion in greater design conversations, landscape architects need to be cognizant of many details, including the workings of underground utilities.

Stormwater Sewers

A major field of work for

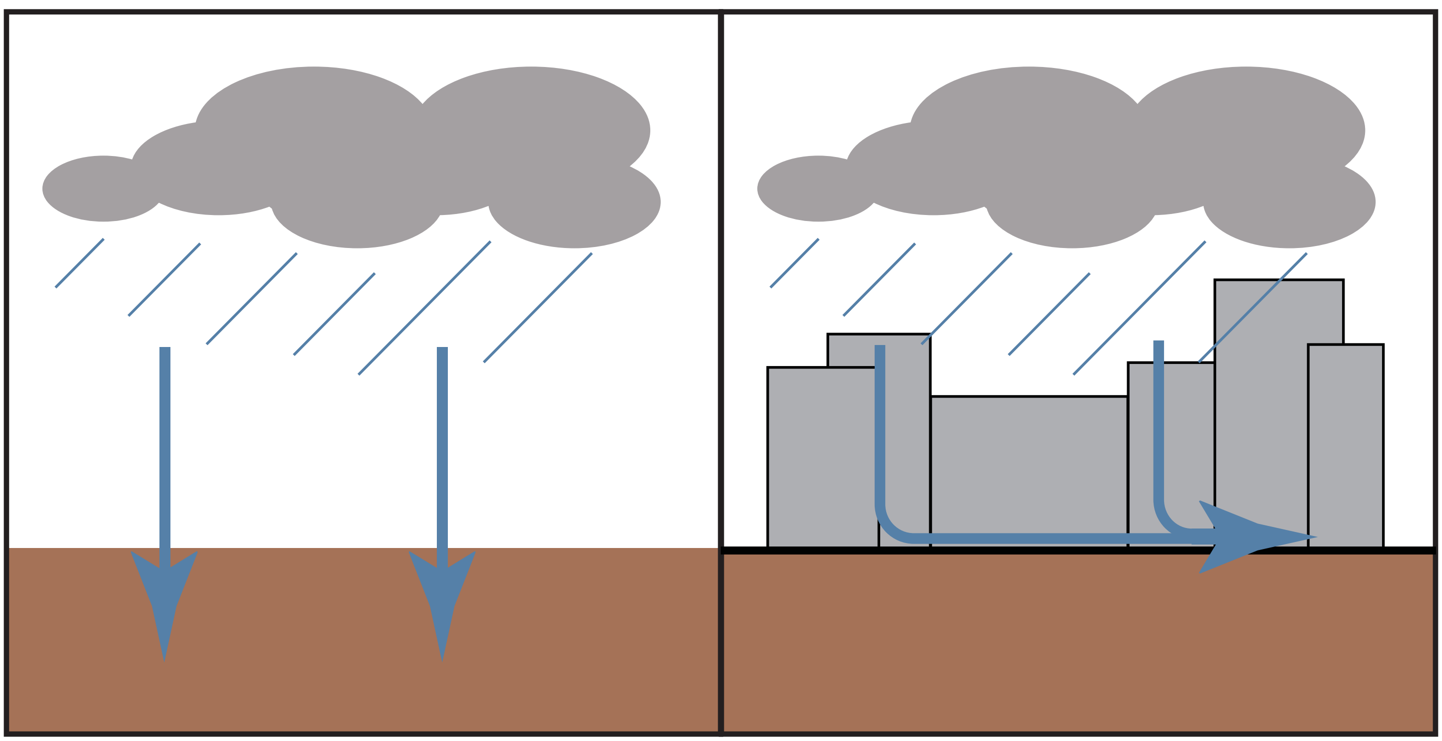


Figure 3.13.1


Figure 3.13.2

landscape architects is in the management of stormwater. In the undisturbed environment rainwater drains by percolating into the soil, but in highly disturbed urban environments, rainwater has very little undisturbed soil fit for percolation (see Figure 3.13.1). Most rainwater runs off pavement and is collected and fed into a pipe, which carries the water away from the runoff surface. One should note that it is a trend in landscape architecture to design systems that slow the movement of stormwater, but regardless of how much stormwater is slowed, it almost always ends up being fed into the stormwater sewer system.

Stormwater Sewers Layout and Materials

Sewer pipes are typically made of concrete. They should be straight whenever possible. When pipes need to turn, curves have a radius of no less than 30 m (Lynch and Hack 236-238). The degree of curvature is especially important for cleaning machinery. Sewer line cleaning machinery works by using high

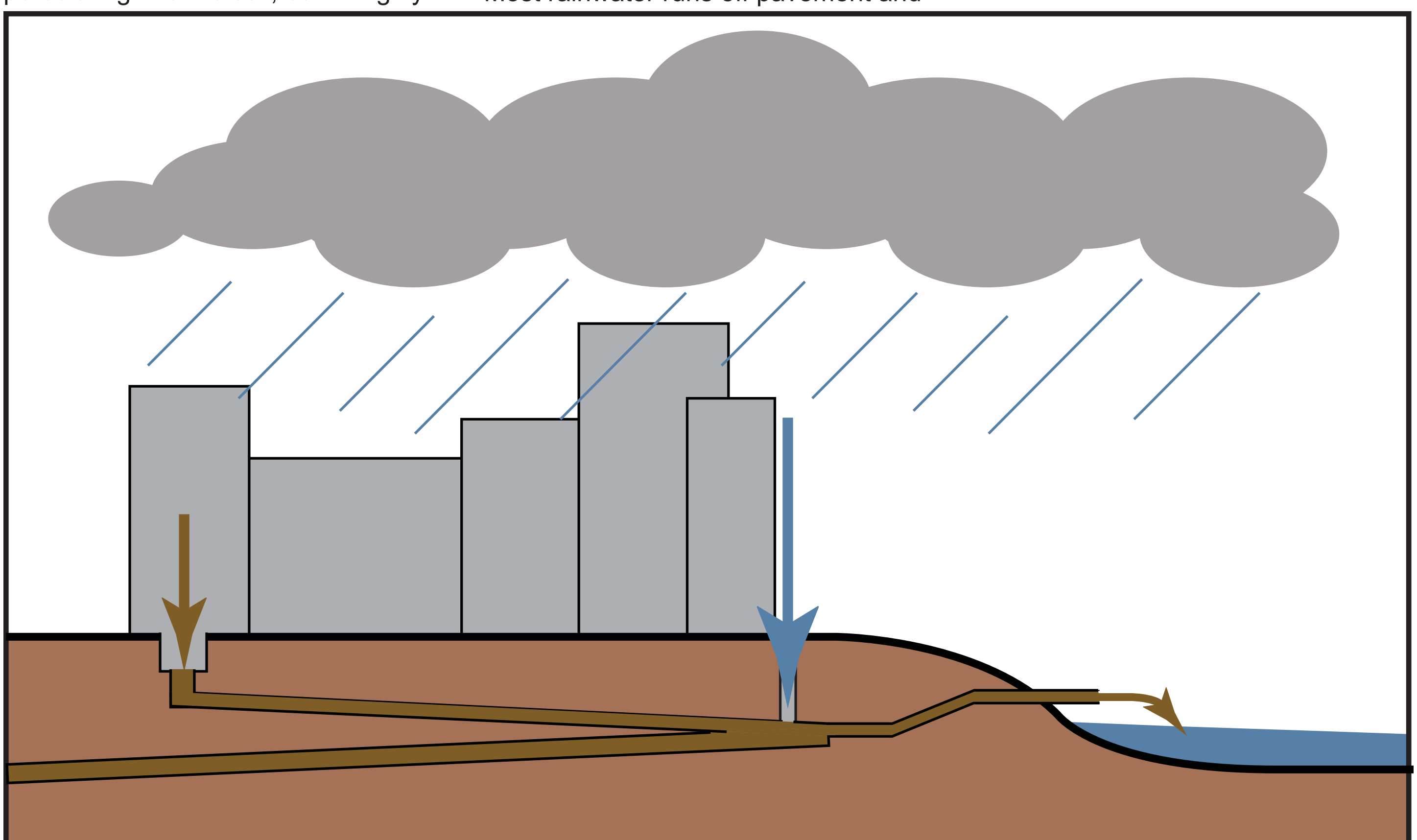


Figure 3.13.3

pressured water to clean the insides

of sewer lines, much like a power washer used to clean the façade of a house. Sharp curves make it difficult to feed machinery through pipes. Sewers carry water, which expands by 9% of its liquid state volume when it freezes, causing cracking and corrosion to whatever objects or materials surround it (Freeze-Thaw Resistance), so sewer lines must be situated below the frost line, which is about 3’ deep in central and northern New Jersey, 2.5’ in southern New Jersey (New Jersey Residential Codes 18). The maximum depth for sewer lines, as recommended by Lynch and Hack on page 236, is a depth of 20’. Laying a line any deeper than this will result in an unnecessarily expensive excavation. As a general rule of thumb, the minimum slope for sewer lines is 0.3%, but in reality the slope will vary based on pipe diameter and expected quantity of flow. To avoid clogging, sewer lines must be designed to that small sewer pipes will only lead to larger pipes. The reverse situation could cause clogging and would require more frequent maintenance. The minimum diameter for a street sewer is 12”.

Sanitary Sewers

Landscape architects should also be concerned with location of sanitary sewers. Sanitary sewers (Figure 3.13.2) are used for carry human waste water from sinks, toilets, showers, etc. Water is carried from homes, schools, and other buildings to a treatment plant. Dirty is sanitized and then released into a natural body of water. Older open sewer systems combined sanitary sewage and stormwater sewage and raw human sewage in one system. Heavy rain events overwhelm the system (Figure 3.13.3). To avoid backups of raw sewage, these systems compensate by discharging raw sewage into natural bodies of water. While these systems are typically separated in current designs, landscape architects have found many opportunities for work by finding ways to slow down water and clean contamination in these old open combined sewer systems. (McNally, Robert 21918). A system open to human access, such as the combined sewer system is a major public health concern (2004

Figure 3.13.5

Figure 3.13.4

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

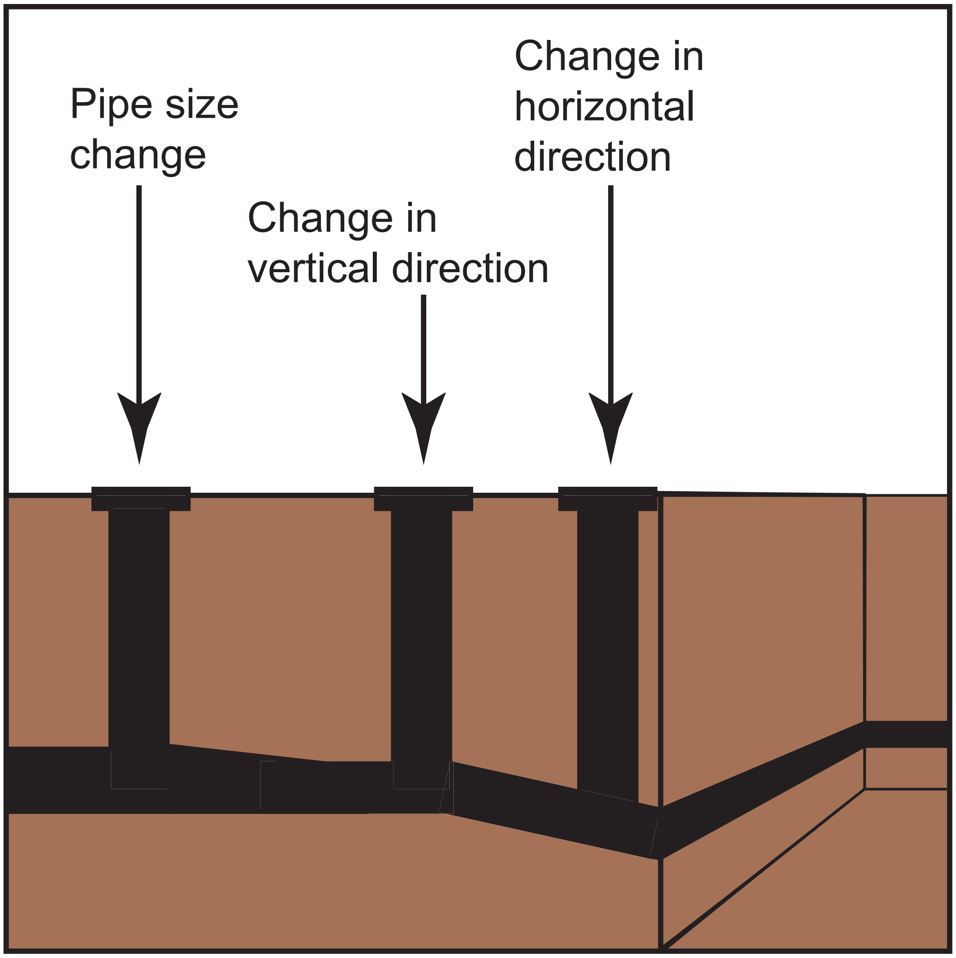


Figure 3.13.6

Report to Congress 6-1). To alleviate the excessive load in older systems, landscape architects use green infrastructure systems to slow down the movement of stormwater. These systems include green roofs, rain gardens (Figure 3.13.5), and so on (Green Infrastructure). Newer systems separate stormwater sewers from sanitary sewers to avoid pollution and disease.

Sanitary Sewers – Layout and Materials

Sanitary sewers have two main components: branch lines and street mains. Branch lines collect water from buildings and lead them to street mains. Street mains, like stormwater sewers, are made out of concrete and should curve at a radius no less than 3 m. The slope requirement is at least 0.3%, like that of stormwater sewers. Lines must be deep enough to collect water from buildings, so they are generally at least 2 m deep (Lynch and Hack 239-240).

Manholes

Manholes (Figure 3.13.4) provide access for people and cleaning machinery to sewer lines. They are located at the upper end of lines, at any changes in horizontal and vertical direction and at changes in pipe diameter (Figure 3). The only exception to this is when branch lines in sanitary sewers meet street mains, as this would cause an excessive number of manholes. Engineers and designers should generally minimize the number of manholes. They should be spaced between 100 m and 150 m apart (Lynch and Hack 234).

Drinking Water

The necessity for clean drinking water obvious, and a good designer will seek to minimize impact on access to it. Fortunately, water lines are more flexible than sewer lines and can bend and curve more easily. However, water lines break more often than sewer lines. To ensure easy access for repair, they are generally located in the center of the right-of-way. They should be located above sewer lines or on the opposite side of the right-of-way. Like sewer lines, water lines need to be situated below the frost line. Since the drinking water system is pressurized, lines can move up and down the vertical axis without affecting the movement of water, as long as pipes never move higher than source (Lynch and Hack 243-244).

Fire Hydrants

Fire hydrants use water lines as their source of water. They should be no closer than 25’ to a building, but close enough that a 100 m hose could reach all sides of a building (Lynch and Hack 244).

Power

Traditionally power lines for housing developments were connected to telephone poles and hung aboveground. When aboveground, power lines are more prone to breaks and tampering. New development involves the use of underground lines to avoid breaks and minimize maintenance. Underground power lines work by containing power lines of various voltages in a conduit tube. They are not damaged during storms. Underground power lines limit interference with tree branches and mutilation from haphazard pruning, but they limit the placement of tree pits. Generally, underground power lines have a life expectancy of 25 years, but may be replaced early with there is excessive power failure or outage frequency (Aretakis, Stephen).

Gas

Natural gas is used as a fuel source for heating and cooking. Pipes are small and the frost line is not a concern. The primary concern with gas lines is making sure location and maintenance for other utilities does not cause any interference (Lynch and Hack 247).

Conclusion

There are various underground utilities that landscape architects need to be aware of. While they will likely not understand the intricacies of the physics and mathematics behind underground utilities, landscape architects need a general understanding of their layout and function in order to engage engineers in conversation. Designs are only successful when designers and engineers can communicate and understand each other.

Works Cited

In-Text Citations

1) “About BPU.” Board of Public Utilities. Accessed November 30, 2014. http://www.state.nj.us/bpu/about/index.html.
Lynch, Kevin, and Gary Hack. Site Planning. 3rd ed. Cambridge, Mass.: MIT Press. 1984.

2) “Freeze-Thaw Resistance.” Freeze-Thaw Resistance. Accessed November 29, 2014. http://www.cement.org/for-concrete-books-learning/concrete-technology/durability/freeze-thaw-resistance.

3) “New Jersey Residential Codes Chapter 3: Building Planning and Construction” New Jersey Codes. Accessed November 29, 2014
http://www2.iccsafe.org/states/newjersey/NJ_Residential/Residential_Frameset.htm

4) McNally, Robert. Federal Register. Aprill 18, 2014. Accesse4d November 29, 2014
http://www.gpo.gov/fdsys/pkg/FR-2014-04-18/pdf/2014-08925.pdf

5) “2004 Report to Congress” United States Environmental Protection Agency. Accessed November 29, 2014
http://water.epa.gov/polwaste/npdes/cso/upload/csossoRTC2004_chapter06.pdf

6) “Green Infrastructure.” Home. October 27, 2014. Accessed November 29, 2014.
http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

7)Aretakis, Stephen. Principle Engineer and Contingency Planner, PSE&G. “Underground Powerlines” Interview by Teddy Aretakis. Personal interview. 9 Hidden Lake Drive, North Brunswick, NJ, 08902. Interviewed November 4, 2014.

Image Citations

3.13.1 – Aretakis, Theodore. “Infiltration and Runoff” 2014. PDF.

3.13.2 – United States Geological Survey. “Interior photo of a large sanitary sewer from an access manhole.” 1999. JPG.

3.13.3 – Aretakis, Theodore. “Combined Sewer Overflow.” 2014. PDF.

3.13.4 - Gallagher, Ellen. “Berlin Manhole.” 2013. JPG.

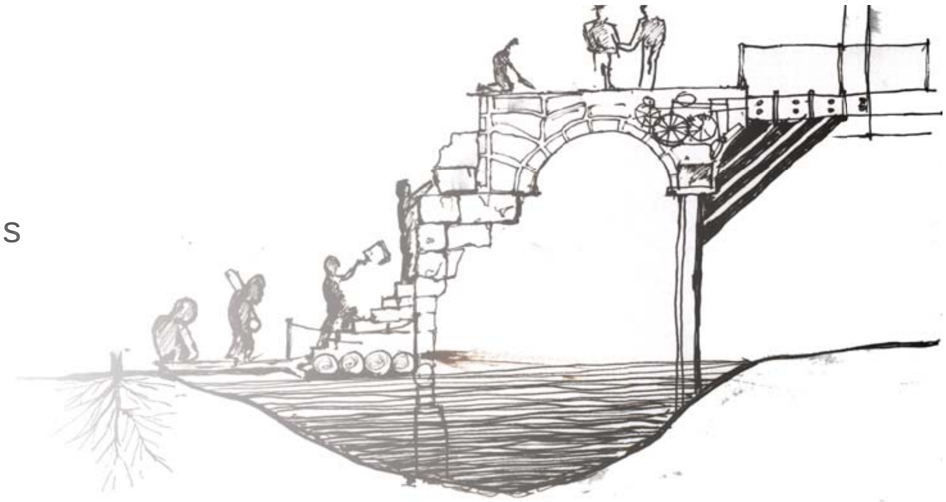
3.13.5 – Aretakis, Theodore. “Stormwater Rain Garden in Highland Park, NJ.” 2013. JPG.

3.13.6 – Aretakis, Theodore. “Situations Requiring Manhole Access.” 2014. PDF.

3. Research Topic

3.14 Evolution of Bridges

Peter D. Chang



Bridges are structures built to allow access to pedestrian, vehicular, and other means of transportation across water, steep typography, and major highways. Designing bridges primarily require structural and/or civil engineers, but can also be conceptualized by architects, landscape architects, and urban designers.

The concept of a bridge was first created in early primitive human communities. When a log was used as a plank to cross a river or stream, or forest tendrils intertwined to tie planks as a suspension bridge between two mountains, the structural connection between two obstacle created the term bridge. As economic and human growth continued, bridges required more length, ergo stronger architectural endurance. The evolution of bridges was initiated by the Roman Arch which has been a priceless principal still used today.

Ancient bridges like the Alcántara Bridge in Spain were initially constructed using brick and mortar. During construction, arches are often supported by a wooden frame and removed allowing both sides of the arch to press against the keystone and thereby supporting the arch.

Since the Roman Arch ages, engineers and architects have learned to use a variety of different materials (wood, stone, steel, iron, concrete, plastic, and combinations of all).

Now, as technological advances are constantly evolving, how and where can society see bridges as a living platform rather than just a stagnant connection? Using the current building methods and increasing the loads of both living and dead, can bridges be more than a connection, but also a habitat for humans, animals, and plants?

A strong controversy exists on whether building on oceans is sustainable, or even possible in some areas, but the truth of the matter is that populations will increase and land will be occupied.

For the purpose of this research paper, the topics that will be discussed will briefly touch upon the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG), Site Selection and Survey, Material and Technological advances, and the Future of Bridges.

Figure 3.14.1 Alcántara Bridge 104 - 106 Century A.D.
Tagus River at Alcantara, Spain

In 1990, George H.W. Bush and US Congress passed the Americans with Diasabilites Act to ensure citizens with mental and physical dissabilties with the same rights as non-disabled citizens. This includes equal employement, purchasing of goods and services, participating in state and local government programs, and to safely access buildings and landscapes.

The primary requirements for ADA accessible bridges involve spatial standards and user safety.

Spatial standards will be determined by users defined. Either it be for pedestrians, bicyclist, vehicular or even horseback riders, the spatial standards for single crossing path requires in a minimum of 4 feet.
One should also consider the space below the bridge for the crossing of canoeists, ships, railroads, or commercial traffic. In areas of cold climates, ice can create serious issues if not accounted for.

The main safety concerns on a bridge are falling on or off the structure. Therefore, in accordance with the expected users, a handrail should be designed to allow support against slope, high winds, and slipping.
In consideration of handicapped users, the design should include landings, rest areas, hand railings, and stable walking surfaces.

Landings should be present in the beginning and ending of the ramp. For bridges exceeding the maximum ADA slope of 1:12 or 8.33% require “a landing depth (min 5 feet) equal to the width of the largest ramp leading to it.” (Time Saver Standards 470-23) The landing should not be farther than 30 feet apart. If the slope is less than 1:12 or 8.33%, Intermediate landings may vary depending on the spatial and safety standards.
The texture and maintenance of surface material is extremely crucial to prevent slipping from water, ice, or structural malfunctions. Wood decking, for example, is acceptable if “the joints are less than 12m (1/2”) wide” (Time Saver Standard 470-23) allowing water to percolate. There are various methods to manipulate different materials (wood, steel, stone, plastics, and more) to create traction; stone and steel can be engraved or embezzeled, plastics can be molded, and wood can be jointed.

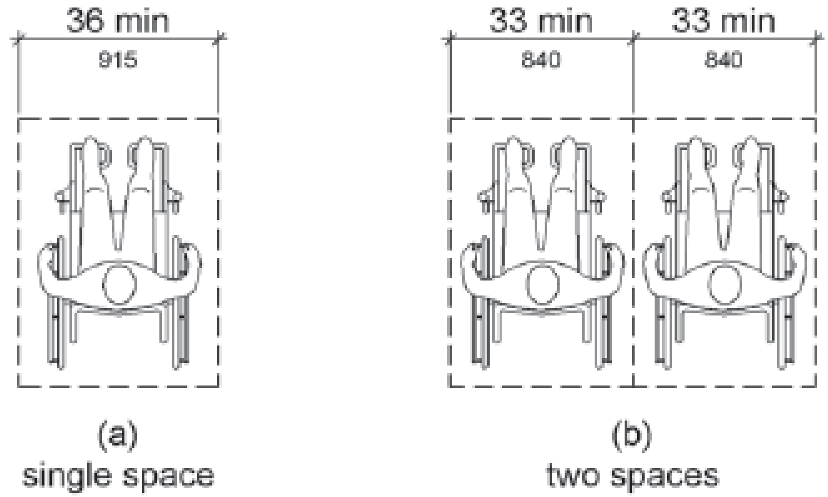


Figure 3.14.2 *ADA standard one way and two way*

The site selection must be surveyed before construction. There will be various scenerios determined by the location, climate, typography, soils, local materials, labor, and more that will effect the the bridge construction.
For example, in cold climates, thawing of frozen soil may hinder the foundation of the bridge. The circumstances will affect the bridge from bending or collapsing.These are some standards to ask before desiging the bridge.

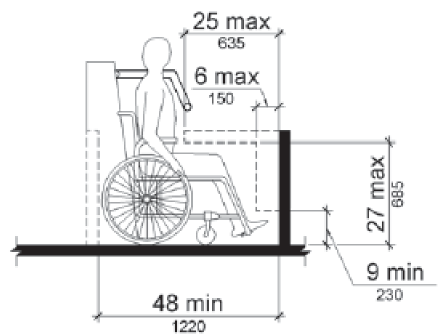


Figure 3.14.3 *ADA Standard Wheelchair Dimensions*

I) Which area requires least/ shortest span?
II) Which area has the best foundation conditions?
III) Which area has the closest line to the existing footpath?
IV) Which area has the fewest obstacles in the way?
V) Which area allows the most clearing from flooding?
VI) Which area is easiest to reach with equipment, labor and materials?
VII) Which areas have the fewest hazards? (Precipes, steep paths, exposure to strong winds)
VIII) User preference (ADA accessi bility, bycyclist, pedestrian, ve hicular)

(Time Saver Standards 470-3)

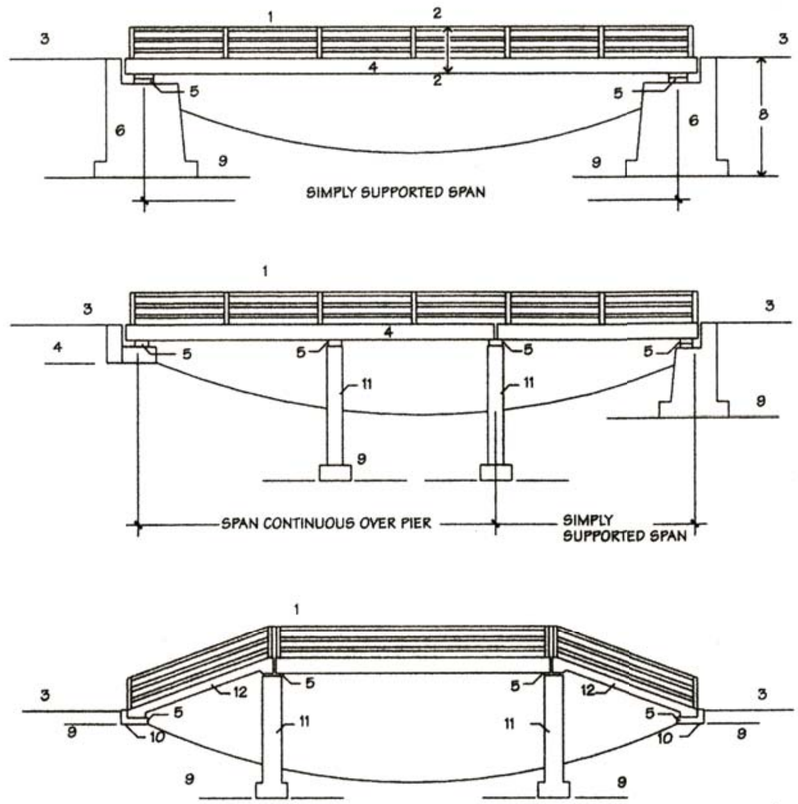


Figure 3.14.4 **Components of basic bridges** *(1) Handrail, (2) Superstructure, (3) approach path, (4) main beam, (5) bridge bearing, (6) abutment, (7) end dam, (8) substructure, (9) bearing strata, (10) end sear, (11) pier, (12) approach ramp*

The basic components of a bridge can be categorized by vertical, horizontal, and material attributes. Vertical components being the piers or abutments, horizontal features supported as beams or landings, and materials representing the facade and character of the bridge (see figure 3.1).

Because of material advancement of steel and iron, engineers have solved other methods of bridge building without the Roman Arch concept. In January 1933, San Fransisco's Golden Gate Bridge began its amitious construction. A suspension bridge made of steel beams and two massive abutments connecting over 8,981 feet of water was an unbelievable concept by engineer Joseph Strauss and Leon Moiseff. However, with innovative engineering and a new resource of steel, a 90 feet wide and 746 feet high bridge was built.

Bridge material has evolved. No longer using one continuous resource, but a combination of several, the primary concern is foundation. Considering the bearing capacity of live and dead, the bridge must meet the standard carrying capacity to withstand itself. When chosing materials, one must consider several obstacles: live load, dead load, wind, water, ice, flooding, and user. Live load is the living matter crossing/ on the bridge, while the dead load is stagnant matter. Wind will determine the direction that the bridge will be facing. Water, the main obstacle, will have a flunctuating rise and fall determined by the tide. In cold climates, this will affect freezing and thawing which is consequently dangerious for users.

In the past centuries, bridges have evolved dramatically through structural and technological advances. From just one trunk of a tree, to a stack of stones and mortar, to steel and concrete, and to recycled plastic and aluminum, bridges are now far more capable using different building methods than just a Roman Arch. Architects and engineers have developed unimaginable forms using our 21st century computing programs to mimic organic forms through parametrics and abstraction.

The next innovative designs will prove that bridges will soon be more than just a vehicular or pedestrian connection from one side to another, but a structural habitat binding towns and cities in lucrative ways.

The I-195 Pedestrian Bridge is under construction in Providence, Rhode Island. The bridge was designed by InForm Studio and Buro Happloid to provide pedestrians and bicyclist a stop to enjoy the outdoor waterfront with seating, a water level cafe, a garden, and sun deck. "With the grant of $2 million from DOT, the project will cost a total sum of $160 million dollars." (www.EcoFriend.com).

By using shipyard steel for a structural foundation and timber for a replaceable facade, this bridge is supported by concrete footings under water lifted by steel frames. Once the skeleton is built, the wood will be mounted onto the correct alignments. The steel and wood are from recycled shipyard materials. Although a sustainable source of material, the limited variations and sizes are difficult to work with.

From an birds eye, the I-195 Pedestrian Bridge takes the appearance of

a boat. Considering the crossing of water traffic, the bridge allows two large passages on the left wing of the cafe where customers and sailors can interact.
For the past century, bridges have been inanimate objects in our landscape. To explain, most structures in air or water are absent of living matter or any vegetation. Maybe some pots and crack weeds, but architects have realized that the roof of a home is no longer a flat surface over heads, but gardens where communities can gather. The amount of wastewater collected, purified, and detained helps the atmosphere in tremendous ways.

Furthermore, introducing a plant community on a bridge, as seen in figures 4.1 and 4.2, can create a completely different perspective of how the urban landscape evolves into the water.
A bridge will no longer be an animate object, yet a cleaning tool. The surrounding water is cleaned by grasses and shrubs collecting the contaminants and debris washed away from land. This can educate new urban communties on how green infrastructure can benifit water more than a stagnant solid instrastructure.

Figure 3.14.5 *Birds Eye View of I-195 Pedestrian Bridge*

The site location for this project is in Amsterdam, Holland where many urban developments have adjusted to casual flooding and prepared for sea level rise. Taking in second place for this design competition, Architect, Nicolas Montesano, and engineers Victor Vila and Boris Hoppek created a Water Plaza focused above and below water.
Reclaimed shipyard steel and wood allow the bending of the arch, while the circular tilt of the bridge allows a smooth parametric tech-no-savvy design. What are the amenities inside the bridge? Well, how about a smooth ride to a bicycle repair center, and then enjoying a nice glass of brew in the underground bar and cafe?
The Dutch have realized that land is scarce and a bridge can substitute some commercial activity to generate revenue.

The fact that this bridge is called Hermitage Water Plaza proclaims that this structure does not only connect lands, but also provides recreation and a unique landmark.
Although this Water Plaza will not be built, the concept expresses a contrary design strategy that takes the straight-away bridge to a circular dimension. This circular dimension easily allows ADA accessibility and cyclist pathways.

As material and structural advances develop, the design processes must also become more creative and sus-

Figure 3.14.6 *I-195 Pedestrian Bridge Water Cafe*

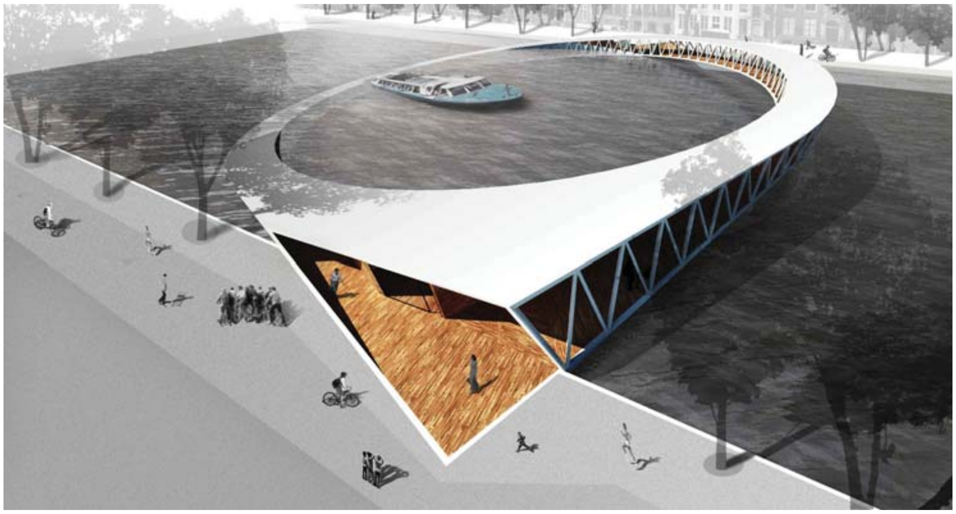


Figure 3.14.7 *Hermitage Water Plaza Birds Eye View*

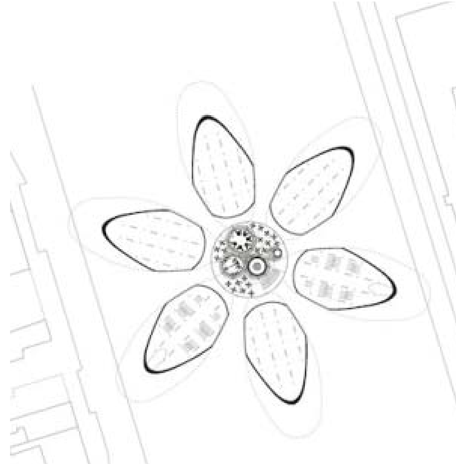


Figure 3.14.8 *Plan View*

tainable. The use of materials should form a sound landscape providing a habitat in water by implementing best management practices and resilience.

Another competetion held in Amsterdam, Holland that blooms the future of bridges as an organic module. A multi-use ampitheatre in the form of a Tulip links the Heritage Museum to its adjacent neighbors. MLBS Architects along with Michael Labory and Bertrand Schippan developed an ampitheatre for the Heritage Museum that also provides sun bathing and water sports. The petals act as multi-use platforms that can be mechanically shift vertically to allow passages for boats and conoeists (see figure 4.3).

Again, through technological advances in mechanics, these architects were able to create a bridge that has transformed into a living connection.

In conclusion, the concept of bridges have extended far beyond the oceans as enhancements to live on water are more prevalent. The sea levels have risen worldwide “0.14 Inches (3.5 millimeters) per year since the early 1990’s” (National Geographic) and populations area exponentially increasing. Land as we know today will eventually sink underwater. Having already a *Garbage Patch* of waste in the Pacific Ocean, the people must implement sustainable practices to prevent destruction of further habitats in water.
To bridge a life style on land to water, one must remember the consequenc

Figure 3.14.9 *Heritage Amitheatre*

Figure 3.14.10 *Hermitage Ampitheatre*

Figure 3.14.11 *Hermitage Water Plaza*

es planet earth has endured since human-kind. Learning from the mistakes of deforestation, pollution, coral reef destabilization, and depleting natural resources, water must be treated as a precious resource.

Sources

Web

I-195 Pedestrian Bridge Providence, Rhode Island http://www.EcoFriend.com. The Winning suststainable design from InForm Studio for Prividence Pedestrian Bridge. Admin, 1 Mar 2011. Web. Date Accessed 11.05.14 (17:30)

Hermitage Pedestrian Bridge Hermitage, Amsterdam Alison Furuto. Amsterdam Iconic Pe- destrian Bridge Competition. ArchDai- ly. 6 Aug. 2012. Web. Date Accessed 11.02.14 (12:30)

Versatile Tulip Pedestrian Bridge Hermitage, Amsterdam http://www.evolo.us/. Versatile Tulip Pedestrian Bridge In Amsterdam. Joe Cohan. 6 Aug. 2012. Web.
Date Accessed 11.01.14 (12:30)

Roman Arch History Houghton Mifflin Company. Writing about History: Problem and Solution. 1999. Text.

Images

Figure 1.1 Alcántara Bridge Photo Dantla. Bridge Alcantara. Wikipedia. 4 Feb. 2004. Date Accessed 11.01.14 (12:30)

Figure 2.1 - 2.2 Americans with Disabilities Act Title II Regulations

Figure 3.1 Basic Bridge Components Harris, W. Charles and Dines, Nicolas T. Time-Saver Standars for Landscape Architecture Second Ed. Columbia: McGraw-Hill Inc. 1998. Pring

Figures 4.1 - 4.1.2 I-195 Pedestrian Bridge Studio for Prividence Pedestrian Bridge. Admin, 1 Mar 2011. Web. Date Accessed 11.05.14 (17:30)

Figure 4.2 - 4.1.2 Hermitage Pedestrian Bridge Alison Furuto. Amsterdam Iconic Pe- destrian Bridge Competition. ArchDai- ly. 6 Aug. 2012. Web. Date Accessed 11.02.14 (12:30)

Figure 4.3.0 - 4.3.4 Tulip Hermitage Ampitheatre http://www.evolo.us/. Versatile Tulip Pedestrian Bridge In Amsterdam. Joe Cohan. 6 Aug. 2012. Web. Date Accessed 11.01.14 (12:30)

Text

Harris, W. Charles and Dines, Nicolas T. Time-Saver Standars for Landscape Architecture Second Ed. Columbia: McGraw-Hill Inc. 1998. Pring

Americans with Disabilities Act Title II Regulations

3 Research Topic

3.15 Green Roofing in an Urban Context

Chelsea Beisswanger

In an era where the extent of human impact on the environment is becoming increasingly disconcerting, the proper balance of economics and sustainable environmental solutions has gone from thought provoking to imperative. Green. The word itself has endless meaning. Extending beyond color, green encompasses an array of entities ranging from environmental to energetic. Capturing the essence of active, clean, wholesome and healthy lifestyles, the idea of green has evolved to be a topic in and of itself. Another color that has evolved into its own entity over time is grey. From factories and industry to high-rises and freeways, there is no denying the influence that the built environment has on our everyday lives, especially in highly urbanized areas. Built with little more than stone, asphalt and steel, these concrete jungles have become the daunting epicenters of our society. And with a majority of the global population calling these urban areas home, it is no surprise that the lack of green has become a growing concern. Especially in a society where environmental justice and ecologic concerns have quickly fought their way to the forefront of our attention, the marriage of green and grey in urban areas has become an increasingly popular issue demanding creative and innovative solutions.

Roofs. Capping off our beautiful skylines, cluttering aerial images; roofs in an urban context are little more than a rubber patchwork sealing sky-scrapers as they bake in the smoldering heat. Protecting buildings and their inhabitants from weather and extremities, these flat surfaces currently offer no other benefit to the urban environment or the people living within it. If nothing else, these smoldering rubber patches capture heat from the sun and contribute to the heat island effect, another increasing concern in urban systems. A radical and brow-raising solution to the social and environmental grid-lock of urban living is the idea of green roofing. “A green roof is a rooftop that is partially or completely covered with a growing medium and vegetation planted over a waterproofing membrane. It may also include additional layers such as a root barrier and drainage and irrigation systems. Green roofs are separated into several categories based on the depth of their growing media” (Center for Neighborhood Technology, 2010). Utilizing the plentiful and underutilized real estate that flat, urban rooftops offer in a way that not only reduces the harmful environmental impacts of city-life but trumps them with benefits ranging from social to economic and of course, environmental, green roofs are the creative and innovative solutions that effortlessly marry green and grey.

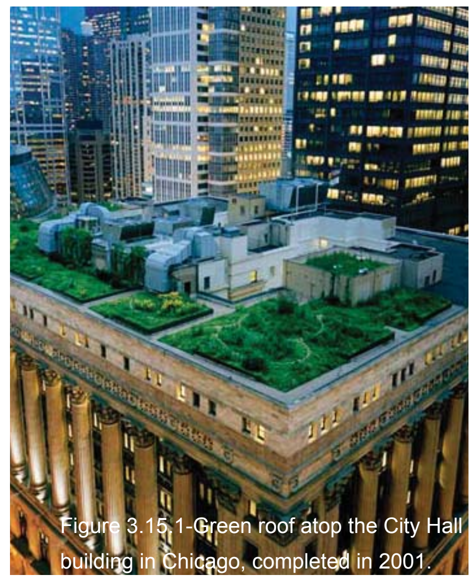


Figure 3.15.1-Green roof atop the City Hall building in Chicago, completed in 2001.

The most effective way to describe green roof systems is just that, effective. From reversing the environmental hazards that heat-absorbing rooftops allow, to offering a

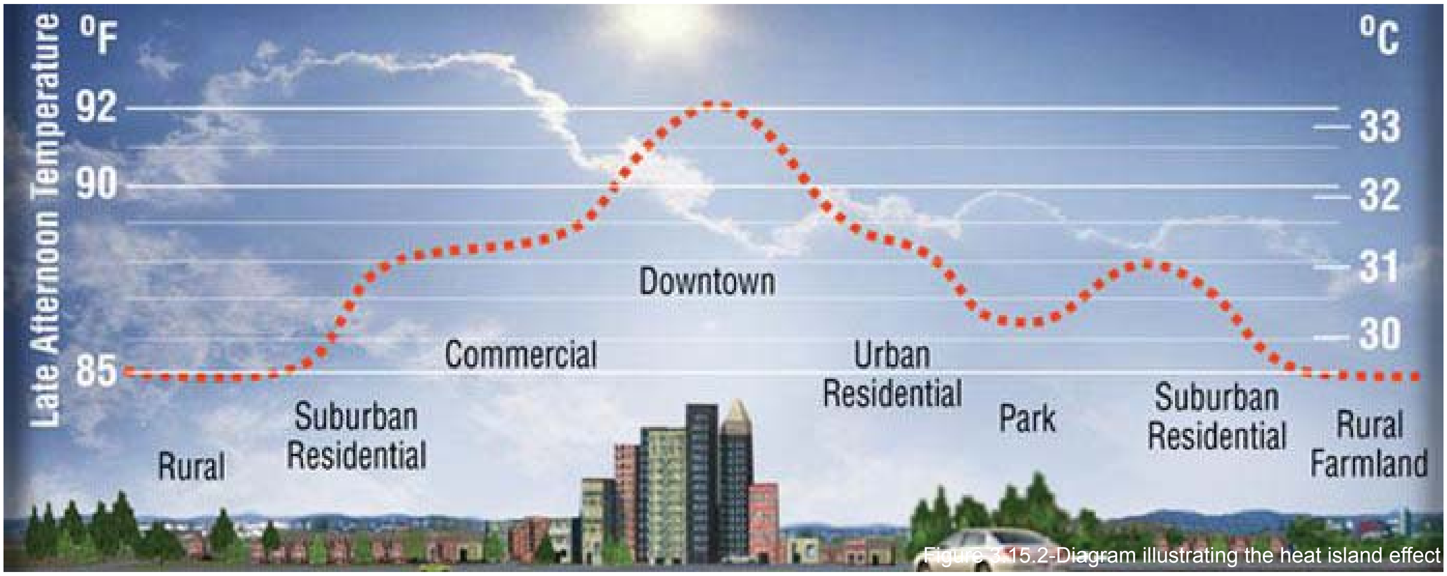


Figure 3.15.2-Diagram illustrating the heat island effect

wide array of environmental, ecologic, social and even economic benefits, green roofing is a simple yet impacting solution making cities sustainable in the fullest sense. These vegetated covers, be they well-rounded in terms of beneficial characteristics, are most appealing in terms of their environmental benefits. By definition, green roofs consist of "a vegetative layer grown on a rooftop. Green roofs provide shade and remove heat from the air through evapotranspiration, reducing temperatures of the roof surface and the surrounding air" (Environmental Protection Agency, 2013). As previously mentioned, cities are a growing target for the heat island effect. This phenomenon explains how urban areas exhibit higher temperatures in comparison with rural areas. Consisting of impervious surfaces, manmade structures and little vegetative matter, these concrete jungles not only absorb sunlight and heat but trap it, making cities a warmer microclimate in comparison to neighboring suburban areas (New York State Department of Environmental Conservation, 2014). "This elevated temperature leads to increased building cooling costs, particularly in warmer areas of the United States. Additionally, creation of impervious surfaces reduces the amount of land in urban areas available for biological communities to develop" (Carter and Butler, 2008). These environmental and biological consequences enforce the idea that heat island effect is a growing concern in dire need of a remedy.

The most effective way to lessen the negative impacts of the heat island effect is through the planting of large shade trees and other vegetative matter, something that has proven to be quite difficult within the confines of urban environments. Trees, with their large leaves and canopies, provide relief from the heat island effect in a few ways. For one, the presence of these large canopies is not only aesthetically pleasing but will provide shade to keep the harsh surfaces of buildings, streets and sidewalks cooler, limiting the amount of heat and sunlight that these surfaces would typically absorb. Trees also use evapotranspiration in both their leaves and root systems which "as the water evaporates it dissipates the heat in and around the tree which leads to cooler air in the area encompassing the tree" (New York State Department of Environmental Conservation, 2014). Bursting at the seams, cities allow very little in the way of open space, especially in regards to trees and plants. This lack of real-estate on the ground is a major reason why scientists, environmentalists and designers are looking up…to the plentiful rooftops hovering above. Another urban element hovering above is smog. Stifling the air, lessening its quality and putting city dwellers at greater risk for serious health concerns, smog is a potential result of having pollution and higher temperatures in urban areas (New York State Department of Environmental Conservation, 2014). This public health concern is the "result of pollutants in the air acted upon by the sun's light, this is known as a photochemical reaction. These pollutants are such things as: nitrogen oxide, hydrocarbons and other particulates in the air" (New York State Department of Environmental Conservation, 2014). This toxic combination leads to the presence of ozone in the air that we breathe, something that can lead to numerous health concerns. A few of the health concerns associated with the presence of ozone in the atmosphere include: irritation of the respiratory system such as coughing or chest pains, reduced lung function resulting in difficulty breathing and shallow breathing, aggravation of asthmatic symptoms, inflammation and damage to the lining of the lungs and aggravation to chronic lung diseases such as emphysema and bronchitis (Environmental Protection Agency, 1999). Just like the heat island effect, the suffocating presence of smog in urban areas is best remedied with the presence of trees and vegetative matter.


Figure 3.15.3-Green roof as a usable, urban green space

Especially in the wake of storms of similar caliber to Hurricane Irene and Super Storm Sandy, storm water management has been of increasing importance to the sustainability and resiliency of urban systems. Consisting of concrete and asphalt, it is no surprise that cities are one huge playground of impervious surfaces, leaving both infrastructure and residents vulnerable to storms and flooding events. “As cities are built, pervious land cover, such as forest and grasslands, is being replaced with impervious surfaces like roads, rooftops, and parking lots. Instead of infiltrating into the soil, precipitation flows over impervious surfaces transporting pollutants, such as oil, heavy metals, and fine particulates. This altered hydrology in an urban area can generate five times as much surface runoff as an equivalent area in a forested condition (U.S. Environmental Protection Agency 20030” (Carter and Butler, 2008). Even a simple rainfall can leave urban systems overwhelmed with storm water. Providing absorption, filtration, remediation and retention, urban green roof systems can not only lessen the amount of storm water that inundates urban areas but can offer improved water quality as well.

Aside from the environmental benefits, green roof systems also provide urban areas with ecologic benefits. Allowing green spaces in the urban context not only provides wildlife habitat but plays a role in conservation biology and the promotion of biodiversity within the confines of urban areas. Especially in a society where the urban population and consequent landscape continue to grow, it is important to find potential habitats in an effort to not severely damage current populations. The current presence of exotic plant species in urban areas indicates the ecologic shift in what an area can and can no longer sustain. With native urban habitats already well-diminished, “it may be impossible to protect or reestablish a viable ecosystem that looks and functions like the native system that the urban area replaced. If protection or restoration is not possible, one needs to think about the next-best option (Rosenzweig 2003)” (Dearborn and Kark, 2009). By providing platforms for vegetation to flourish, the opportunity to replenish native species within urban ecosystems is greatened. The presence of these vegetated areas will have a bigger impact on insect and pollinator species, as well as birds and other wildlife. This increase not only promotes biodiversity but allows for greater species richness in areas currently infamous for their inability to sustain a healthy wildlife habitat. While this enhancement means a great deal for these urban ecosystems, there is also a social benefit associated.

Offering green space amongst the grey chaos that composes the urban fabric, green roofs are an element of infrastructure with benefits that extend beyond environmental and economic. “Using green infrastructure for storm water management can improve the quality of life in urban neighborhoods. In addition to the ecological and economic values, the goods and services provided by urban vegetation and other green infrastructure practices carry sociocultural values—aspects that are important to humans because of social norms and cultural traditions” (Center for Neighborhood Technology, 2010). The social interactions and opportunities that green spaces facilitate add a whole other dimension to city life. A lifestyle often thought of to be isolation


Figure 3.15.4-People enjoying the Highline in New York City

amongst chaos and congestion is instantly transformed to vibrant, healthy and encouraging with the interjection of green roofs and gardens. The quality of life improvements that green roofs offer include, but certainly are not limited to: aesthetics, promotion of healthy, active lifestyles, reduced noise pollution and a sense of community.

Not only beautifying the built environment, aesthetics are a quality of life improvement that also carries an economic value. By increasing the aesthetic quality of a neighborhood, the property values are instantly increased as well. To put it simply, "people are willing to pay more to live in places with more greenery" (Center for Neighborhood Technology, 2010). Providing people with green spaces has also proven to benefit healthy and active living. Activities such as walking the dog, going for a run or even growing produce in a community garden are all healthy activities promoted with the institution of green spaces. Similarly to aesthetics, this promotion of recreation and healthy living also carries an economic value. It is important to look at "the avoided costs in connection to health benefits. An example of this would be studies that correlate lowered medical expenses with increased levels of routine physical activity. In a 2000 study, researchers found that when previously inactive adults regularly incorporated moderate physical activity into their routines, annual mean medical expenditures were reduced by $865 per individual (Pratt et al. 2000)" (Center for Neighborhood Technology, 2010), proving that the presence of green spaces benefit residents both on their waistlines and in their wallets. Noise pollution is another benefit of green roofing. Especially in areas where noise comes in all shapes and sizes, these vegetative covers offer residents a bit more relief from the daily hustle and bustle of city life, yet another property value increase. Perhaps the greatest benefit that green roofing offers is a sense of community. The spaces that green roofs create act as a catalyst for social interactions on a variety of levels, something hard to come by in an urban residential setting. This 'community cohesion' "improves the networks of formal and informal relationships among neighborhood residents that foster a nurturing and mutually supportive human environment (Sullivan, Kuo and Depooter, 2004)" (Center for Neighborhood Technology, 2010). From social to emotional, there is no denying the positive effect green spaces and the interaction that they provide have on an individual.

Another potential benefit offered by urban green roofing is the increasingly popular notion of urban agriculture. These rooftop spaces are the ideal platform for both community gardens and urban farms. The opportunity to grow, sell and consume food grown on the rooftop of a residential building is something both new and exciting for urbanites. "Urban agriculture can include a multitude of benefits to urban areas, including economic development, recreational and community building activities, educational opportunities for youth and increased habitat within the urban ecosystem" (Center for Neighborhood Technology, 2010). These community gardens, be they beneficial to the individual, also have the potential to benefit groups of children from an educational standpoint. Using urban farms and gardens as outdoor classrooms not only opens a child's mind to the innovation and creativity of using space in an urban setting but encourage an interaction with food production that does not exist otherwise. This interaction will encourage healthier eating habits, lifestyles and activities, something every inner-city child could benefit from. Just in terms of public education alone green roofs have a profound effect on communities. "Green infrastructure provides an opportunity to develop community awareness and understanding around the importance of sustainable water resource management. Likewise, green roofs increase community


Figure 3.15.5-Urban Agriculture in Chicago, Illinois

interest in green infrastructure through their aesthetic appeal, which provides a great opportunity for public education" (Center for Neighborhood Technology, 2010). From luxurious penthouse apartments to community gardens in under-privileged neighborhoods, green roofs give urban inhabitants an access to green space and interaction with nature that would not occur otherwise. Although it is hard to quantify the social benefits of green infrastructure, there is no denying the variety and opportunity that these spaces provide city dwellers.

Though the environmental, ecologic and social benefits are undeniably appealing, there is no negating the importance of the economic drivers behind green roofing. Like almost anything else, without monetary value, green roofs do not stand a chance in becoming common practice. Luckily, the value is not only present, but abundant. Perhaps the most prominent economic value that green roofs provide has to do with energy cost. "Additional insulation provided by the growing media of a green roof can reduce a building's energy consumption by providing superior insulation compared to conventional roofing materials while the presence of plants and growing media reduces the amount of solar radiation reaching the roof's surface, decreasing roof surface temperatures and heat influx during warm-weather months," (Center for Neighborhood Technology, 2010) meaning that green roofs can aid in the reduction of both heating and cooling costs for the buildings they cover. Similarly, the retention and filtration qualities that green roofs bring to urban environments lessen the costs of water treatment facilities and reduce the necessity of grey infrastructure. Reduced flooding and improved water quality also offer money-saving benefits to municipalities (Center for Neighborhood Technologies, 2010). While their post-construction benefits are plentiful, it is also imperative to take a glance at the installation and maintenance costs of green roof systems. Unlike reusable water bottles and canvas totes, green roofs are an impressive environmental progression with an equally impressive price tag. From engineering and designing the roof to plant material and soil to the actual construction of these sky-high gardens, green roofing cities involves a long process that requires millions of dollars in investing over the entirety of their lifecycle-money that bleeds from both the public and private sectors (Blackhurst, 2010). With installation comes material; from water-proofing membranes to river rocks, grasses, shrubbery, custom dirt blends and other elements specified by the site design, the aesthetics of green roofing along with the productivity and density of the unique vegetation required to fill them are another contribution to the project's final bill. With a future geared towards standardization, implementation and success, it is clear that current doubt in the financial commitment of green roofing will eventually be eradicated.

Encompassing an array of benefits ranging from environmental to ecologic, economic to social, there is no denying the potential impact green roofing systems could have on both the environment and today's society. From creating better, more beautiful and sustainable urban systems to transforming urban lifestyles, it is clear that green roofs are the modern infrastructure elements that provide the marriage between green and grey that our cities need.

Works Cited

In-Text Citations

Carter, Timothy, and Colleen Butler. “Ecological Impacts of Replacing Traditional Roofs with Green Roofs in Two Urban Areas.” Digital Commons at Loyola Marymount University and Loyola Law School. June 3, 2008. Accessed November 15, 2014. http://digitalcommons.lmu.edu/cgi/viewcontent.cgi?article=1020&context=cate.

Dearborn, Donald C., and Salit Kark. “Motivations for Conserving Urban Biodiversity.” Society for Conservation Biology. June 3, 2009. Accessed November 15, 2014. http://biodiversity-group.huji.ac.il/publication_files/publication_files/Dearborn-Kark Conservation Biology online early.pdf.

“Heat Island Effects Effects of Street Trees on Urban Heat Islands.” New York State Department of Environmental Control. January 1, 2014. Accessed November 15, 2014. http://www.dec.ny.gov/lands/30344.html.

Liu, Karen, and John Minor. “Performance Evaluation of an Extensive Green Roof.” National Research Council Canada. May 6, 2005. Accessed November 15, 2014. http://archive.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc48204/nrcc48204.pdf.

“Reducing Urban Heat Islands: Compendium of Strategies Green Roofs.” United States Environmental Protection Agency. November 22, 2013. Accessed November 15, 2014. http://www.epa.gov/heatisland/resources/pdf/GreenRoofsCompendium.pdf.

“Smog—Who Does It Hurt? What You Need to Know About Ozone and Your Health.” United States Environmental Protection Agency. July 1, 1999. Accessed November 15, 2014. http://www.epa.gov/airnow/health/smog.pdf.

“The Value of Green Infrastructure A Guide to Recognizing Its Economic, Environmental and Social Benefits.” Center for Neighborhood Technology. January 1, 2010. Accessed November 15, 2014. http://www.cnt.org/repository/gi-values-guide.pdf.

Image Citations

Image 3.15.1: Up On the Roof. May 2009. Vancouver. By Diane Cook and Len Jenshel. JPEG Courtesy of National Geographic. http://s.ngm.com/2009/05/green-roofs/img/roofs-615.jpg

Image 3.15.2: Sketch of an Urban Heat Island Profile, March 2014. By The Urban Heat Island Group. JPEG Courtesy of Open Stax CNX at Rice University. http://cnx.org/resources/47e79523cb248d-1348c22a5445b3e48a/graphics1.jpg

Image 3.15.3: June 5, 2010. Chicago. Unknown author. JPEG Courtesy of Inside Urban Green. http://static.squarespace.com/static/524710c1e4b05bf-d3a974be9/t/545d5f70e4b-08f1a46542d6a/1415405435564/WFYI.JPG?format=500w

Image 3.15.4: 2010, New York City. Unknown author. JPEG Courtesy of Zinco Greenroofs. http://www.zinco-greenroof.com/referenzen/images/referenzen_main_images/highline1.jpg

Image 3.15.5: 2010, Chicaco. Unknown author. JPEG Courtesy of the American Association of Landscape Architects. http://www.asla.org/2010awards/images/smallscale/377_03.jpg

3 Research Topic

3.16 Intensive Green Roof Systems

Mark Lacey

In urban areas, green spaces are often difficult to come by. In extremely built up areas, the lack of green space can contribute to problems such as overwhelming stormwater runoff, the urban heat island effect, increased health issues, and a lack of outdoor space for both human and wildlife use. In cities where open space on the ground is scarce, creating gardens on rooftops seems to be a logical solution to these problems.

Typically, there are two types of green roof systems: extensive and intensive. Extensive green roofs have an average soil depth of only 3 – 6 inches. This makes them lightweight, limits the options for plant species, and requires lower maintenance and irrigation. Intensive green roofs, on the other hand, can have a soil depth of anywhere from 6 – 24 or more inches. This amount of soil creates a much heavier load, and can weigh up to 150lbs per square foot. Intensive systems allow for a much wider variety of plantings, but can require high maintenance and irrigation. (“Green Roofs” 2014)

Both extensive and intensive green roofs serve similar purposes of collecting storm water to create less runoff, moderate the urban heat island effect, and improve air quality (“Green Roof Benefits” 2014). However, due to their increased capabilities for plant varieties and design, intensive green roofs can serve even greater purposes. Intensive green roofs can be designed to create spaces for human use, create valuable connections to wildlife habitat, and can be used to cover or hide structures from view for aesthetic purposes (“Green Roof Benefits” 2014).

Fig. 3.16.1

Human Spaces

In urban settings, parkland can often be scarce or expensive to live near. In these instances, green roofs on top of residential buildings can provide more social and healthier outdoor places for people to gather. Intensive green roofs can be used in these areas in various ways, such as for community gardens, commercial space, and recreational space. (“Green Roof Benefits” 2014)

One example of this human use of a green roof is the Gary Comer Youth Center in Chicago, Illinois (Figure 3.16.1). Located on the roof of the center’s second floor above the cafeteria and gymnasium, the 8,160 square foot green roof courtyard serves as a safe place for students and community members to get away from the city and interact with nature (Peck 2014). The garden serves as a community garden for community members of all ages, as well as an outdoor classroom for mathematics, horticulture, culinary, and business classes. The garden produces an average of 1000lbs of fruits and vegetables annually, and feed approximately 175 children at the center daily. All excess crops are either distributed to local restaurants or sold at local farm markets. ("Gary Comer Youth Center" 2012)

Another popular green roof geared towards human use is located on top of the Louisa in Portland, Oregon (Figure 3.16.2). The 8,071 square foot green roof is located on top of a 242 apartment residential high rise with first floor retail. The green space is planted with native, drought tolerant species to create visual interest and spaces for seating. This garden helps reduce storm water runoff and mitigates the urban heat island effect typically associated with large, bare roofs in cities. The garden has a typical soil depth of 1 – 2 feet and is maintained with a drip irrigation system for the hot summer months. (Peck 2014)

Fig. 3.16.2

Wildlife Habitat

Due to the lack of green and open spaces in most cities, wildlife habitat is usually massively disrupted in urban settings. Green roofs in cities can be designed to create new wildlife habitats and return some native species to their homes. Green roofs can act as intermediate stops for migrating species, or as new homes for species to survive on in areas that lack sufficient space for their habitat needs.

In 2011, Dustin Partridge, a doctoral candidate in biology at Fordham University, conducted a research project on the presence of migratory birds on green roofs in New York City. Each year, about 130 species of migratory birds pass through the city while traveling along the Atlantic Flyway. From April to August of 2011, Partridge compared the existence of birds on 20 roofs in New York City: 10 green roofs and 10 tar roofs adjacent to each of the green roofs. For the 5-month study period, Partridge visited each roof once a week for approximately 2 hours at a time and recorded the species of birds and insects he found on each roof. (Nuwer 2014)

During his research, Partridge observed 37 different bird species on the roofs that he studied. Of the 37 species, 26 of them were only present on the green roofs. Also, he noted that the diversity of insect species may be up to 6 times greater on the green roofs than on the tar roofs. These insect species serve as valuable foo sources for the migratory birds in the area. Partridge predicts that, were green roofs to continue popping up in cities such as New York, they could create a patchwork of migratory bird habitats, seriously increasing the biodiversity found in these cities. (Nuwer 2014)

Another example of the use of green roof systems for wildlife habitat was the construction of highway A50 in the Netherlands (Figures 3.16.3 and 3.16.4). When the highway was constructed in 1988, two overpasses, or "ecoducts," were built over the highway. These ecoducts were constructed at ground level, and the highway was built below grade, and placed along the migration paths of the red deer. The ecoducts were designed as open fields protected by trees and walls to block out noise and sight of the highway. Other than red deer, the ecoducts are used heavily by boar, badgers, hedgehogs, and badgers. (Bohemen 1998)

Hiding Structures

Many times, large buildings or structures can seem out of place

Fig. 3.16.3

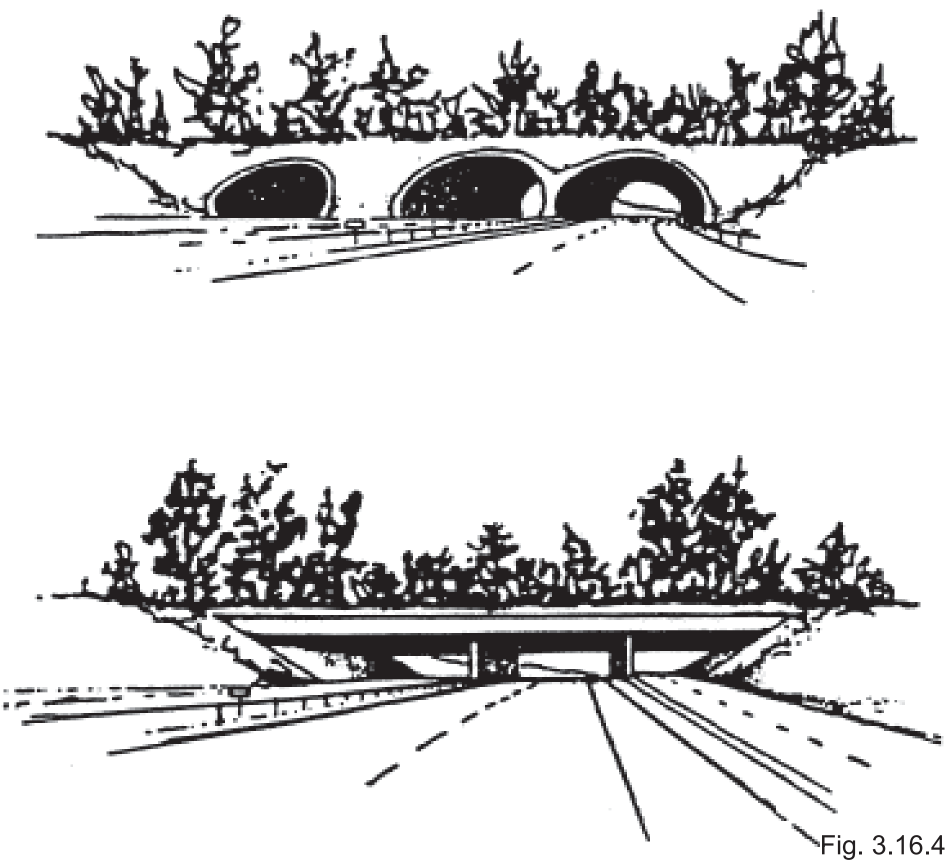


Fig. 3.16.4

or monolithic in context with their surroundings. Intensive green roof systems can be used to soften these structures or hide them from view on one or more sides. Sloping hills can also be used to cover some sides of a structure such as a large building or parking deck to create more aesthetically pleasing views.

In Philadelphia, Pennsylvania, the landscape architecture firm Olin designed a parking facility and sculpture garden at the Philadelphia Museum of Art. The sculpture garden was built on top of the 442 car parking deck. When exiting the museum, the sloping hills wrap around the parking deck, blocking the view of the massive structure (Figure 3.16.5). Only the entrance to the parking deck can be seen from the bottom of the hill (Figure 3.16.6). (“Philadelphia Museum of Art”)

Another green roof designed by Olin is in Salt Lake City, Utah on the assembly building for the Church of Jesus Christ of Latter Day Saints (Figure 3.16.7). The massive, ten acre building was constructed across the street from Temple Square. The green roof design submerges the building in a rising landscape, so that it does not overwhelm the neighboring areas. The terracing gardens along the sides of the building are meant to mimic the natural landscape of the Wasatch mountain range beyond. The roof of the building is integrated with fountains, and exterior stairs garden, and a 5 acre alpine meadow. (“Church of Jesus Christ” 2013)

Elements

Intensive green roof systems require many more components than just soil thrown on top of a building or structure. These systems consist of various layers that work together to


Fig. 3.16.5


Fig. 3.16.6


Fig. 3.16.7

ensure that the plants can survive and the structural integrity of the building or structure is maintained. Figure 3.16.8 shows how these layers are placed in a green roof, with each part playing a key role in the function and survival of the entire system.

The base layer of the system is, of course, the structural support. This would be the roof or top of the building or structure that the green roof system is constructed upon. Whether the structure is existing or proposed, a careful analysis of the structure must be done to ensure that the structure is able to withstand the weight of the green roof system. Intensive green roof systems, when saturated during a storm, can weigh up to 150lbs per square foot (“Green Roofs” 2014).

Above the structural support is the waterproof membrane. This layer is meant to protect the structure from damage due to moisture or water leaking through the green roof system. Typical materials used for a waterproofing membrane include PVC plastic, modified bituminous sheet roofing membranes, hot fluid-applied rubberized asphalts, and other waterproof materials. Other than just being waterproof, the materials selected for this layer must be resistant to punctures, resistant to chemicals such as fertilizers, and have a low water absorption rate. (Miller 2014)

Located above the waterproof membrane is the insulation layer. This layer protects the underlying structure from changes in temperature, preventing damage from freezing and thawing. Most commonly used for insulation is extruded polystyrene since this material does not absorb water and is located above the waterproofing layer (Miller 2014). Above the insulation layer is the drainage layer. This layer’s primary function is to retain water for future evapo-transpiration by the plants. The drainage layer can be made of various dimpled, polymeric materials that allow for water storage and movement. (Miller 2014)

The next layer is the filter fleece / root barrier. The root barrier, typically made from a high density polyethylene (HDPE), is meant to protect the underlying layers and structure from damage due to the roots

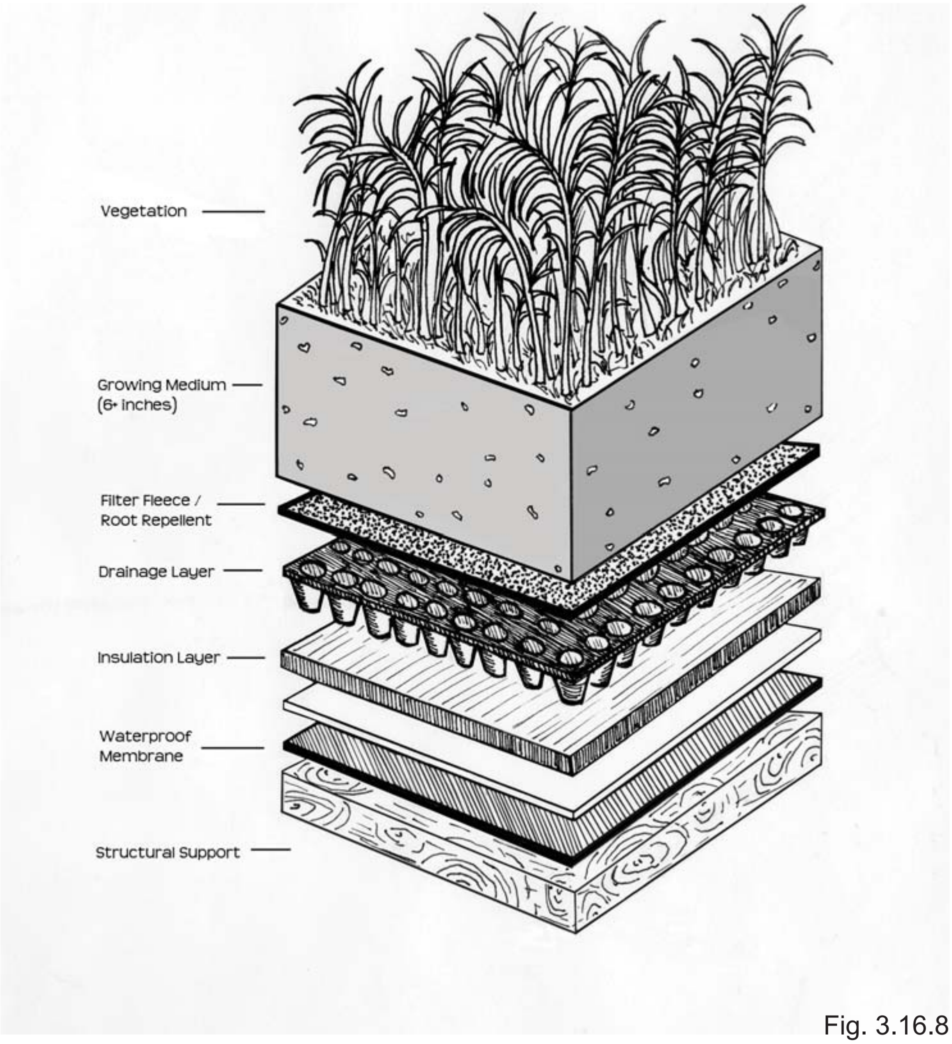


Fig. 3.16.8

of the plants on the green roof. This protective layer can be anywhere from 10 to 60 millimeters thick, depending on the plant species on the green roof. In some cases, the root barrier will be infused with a root-inhibiting compound, such a copper hydroxide. These chemicals, however, may possibly break down in the long run, reducing the barrier's effectiveness and possibly polluting the runoff from the green roof system. (Miller 2014)

The final layer of the system is the soil medium and plantings. In an intensive green roof system, the soil layer can be anywhere upwards of 6 inches, possibly up to 3 feet deep ("Green Roofs" 2014). The growing medium for a green roof cannot be a set standard, but must be engineered to the specific needs of the climate and plant types going into the system. In colder climates, the soil layer must be able to withstand freeze/thaw conditions. Also, the organic matter content should be based on climate and specific application needs. (Miller 2014)

Works Cited

Bohemen, H.D. Van. "Habitat Frag mentation, Infrastructure, and Ecological Engineering." Ecological Engineering 11.1-4 (1998): 199-207. Science Direct. Web. 05 Nov. 2014. <http://www.sci encedirect.com/science/article/pii/ S092585749800038X>.

"Church of Jesus Christ of Latter-Day Saints (LDS) Conference Center." Greenroofs.com. 2013. Web. 05 Nov. 2014. <http://www.greenroofs. com/projects/pview.php?id=46>.

"Gary Comer Youth Center: Rooftop Garden Featured on GreenRoofs. com." Gary Comer Youth Center, 2012. Web. 05 Nov. 2014. <http:// www.gcychome.org/index.php/roof top-garden-featured-on-greenroofs- com/>.

"Green Roof Benefits." Green Roofs for Healthy Cities, 2014. Web. 05 Nov. 2014. <http://www.greenroofs. org/index.php/about/greenroofben efits>.

"Green Roofs: Extensive vs. Inten sive." Plant Connection, Inc., 2014. Web. 05 Nov. 2014. <http://my plantconnection.com/green-roofs- vs.php>.

Miller, Charlie. "Extensive Vegetative Roofs." Whole Building Design Guide. 27 Oct. 2014. Web. 05 Nov. 2014. <http://www.wbdg.org/re sources/greenroofs.php>.

Nuwer, Rachel. "Wildlife Oases in New York's Concrete Jungle." National Wildlife Online, 27 Jan. 2014. Web. 05 Nov. 2014. <http:// www.nwf.org/news-and-mag azines/nationalwildlife/gardening/ archives/2014/new-york-green- roofs.aspx>.

Peck, Steven, and Damon Van Der Linde. "Up on the Roof... Green Roof, That Is!" LandscapeOnline. com, 2014. Web. 05 Nov. 2014. <http://www.landscapeonline.com/ research/article/15743>.

"Philadelphia Museum of Art Anne D'Harnoncourt Sculpture Garden & Parking Facility." Web log post. Archinect. Ed. Evan Geisler. Web. 05 Nov. 2014. <http://archinect. com/aosarchitects/project/philadel phia-museum-of-art-anne-d-har noncourt-sculpture-garden-park ing-facility>.

Images Cited

Fig. 3.16.1

"Downtown Community Gardens Group Exploring Green Roofs!" Greening Madison. Web. 05 Nov. 2014. <http://www.greening madison.com/green-roof-directory/ home/downtown-community-gar dens-group-1>.

Fig. 3.16.2

Peck, Steven, and Damon Van Der Linde. "Up on the Roof... Green Roof, That Is!" LandscapeOnline. com, 2014. Web. 05 Nov. 2014. <http://www.landscapeonline.com/ research/article/15743>.

Fig. 3.16.3

"Amazing Animal Bridges Around the World." Web log post. Twisted Sift er. 23 July 2012. Web. 05 Nov. 2014. <http://twistedsifter. com/2012/07/animal-bridges- around-the-world/>.

Fig. 3.16.4

Bohemen, H.D. Van. "Habitat Frag mentation, Infrastructure, and Ecological Engineering." Ecological Engineering 11.1-4 (1998): 199-207. Science Direct. Web. 05 Nov. 2014. <http://www.sci encedirect.com/science/article/pii/ S092585749800038X>.

Fig. 3.16.5

"Philadelphia Museum of Art Anne D'Harnoncourt Sculpture Garden & Parking Facility." Web log post. Archinect. Ed. Evan Geisler. Web. 05 Nov. 2014. <http://archinect. com/aosarchitects/project/philadel phia-museum-of-art-anne-d-har noncourt-sculpture-garden-park ing-facility>.

Fig. 3.16.6

"29 May 09: The End and the Be ginning." Phillyskyline.com. Web. 05 Nov. 2014. <http://phillyskyline. com/archive_0905b.htm>.

Fig. 3.16.7

"What Is a Green Roof?" Green Roof Research. Michigan State Universi ty, Web. 05 Nov. 2014. <http://www. hrt.msu.edu/greenroof/what-is- green-roof/index.html>.

Fig. 3.16.8

"Intensive vs Extensive Green Roofs: What's the Difference?" Green Roof Plan. N.p., 31 July 2010. Web. 05 Nov. 2014. <http://www. greenroofplan.com/intensive-vs-ex tensive-green-roofs/>.

Transit-Oriented Development

Bridging the Gap Between Sprawled Communities and the Urban Cores

Arturo Hernandez-Sangregorio

The mass production of automobiles in the early 1900's paved the way to new urbanizing trends. Literally. Development typologies that had a tendency to grow denser close to the cores of towns and cities shifted drastically and rapidly during this time period. The booming car industry, and the population's ease of access to purchasing automobiles, pushed the growth and expansion of communities to unforeseeable distances. This drastic growth of the metropolitan areas is known as 'urban sprawl'. Sprawling communities within large metropolitan areas remain dependent on the big cities for jobs and other resources, and people that live within these zones find themselves spending countless hours on painful daily commutes, as well as incredible amounts of money on the gasoline to fuel their vehicles. A way to deal with the issue of car dependency is to ease the access to faster means of public transportation. Transit-oriented developments (TODs) offer a great solution to many of the issues that impact sprawled communities within large metropolitan areas.

To define and to understand urban sprawl is essential to the understanding of the birth and implementation of Transit-oriented developments (TODs), and to their significance in today's growing society, since TOD's came about as part of a trouble-shooting tool in the process to remediate the damages brought about by sprawl itself.

In the book 'Urban Sprawl – A Comprehensive Reference Guide' edited by David C. Soule, sprawl is defined as:

[…] low density, auto-dependent land development taking place on the edges of urban centers, often "leapfrogging" away from current denser development nodes, to transform open, undeveloped land, into single-family residential subdivisions and campus-style commercial office parks and diffuse retail uses. (Soule 3)

Cornell University's Department of Development Sociology offers a similar definition to the term, however it also points out that sprawl is "often accompanied by a lack of development, redevelopment or reuse of land within the urban centers themselves." It also refers to sprawl as "the slow decentralization of human occupancy." Sprawled communities have the same needs as their denser counterparts such as homes, workplaces, and areas of recreation, however they require more land and space to fulfil these demands. (Cornell, The Definition of Sprawl.)

On a lecture called "The Promise of Suburbia" by Dr. Wolfram Hoefer, he references James Truslow Adams' famous quote from 'The American Dream':

[…] that dream of a land in which life should be better and richer and fuller for everyone, with opportunity for each according to ability or achievement.

The 'promise of suburbia' and everything suburbia stands for, are open invitations to the ideologies of urban sprawl. Dr. Hoefer explains that the American Dream is a sales pitch, and the ideas of suburbia are based on 'anti-urban' thoughts. The lecture further classifies the types of urban and suburban sprawls from the 'Borderlands' which are a mere 1-2 miles outside of the city, to the 'Rural Fringes' and beyond, which tend to be 80-100 miles outside of the city's core. (Hoefer).

These forms of sprawl in metropolitan areas, however far or close, rely heavily on the cities, since sprawl is by definition the relationship between communities that expand away from the central urban areas, the central urban areas themselves, and the distance between the two linked together by heavy automobile usage. The people who move far away from the urban cores and into the outskirts, seeking out the promise of a suburban good life as illustrated by Dr. Hoefer, or the American dream as defined by James Truslow Adams, are the ones burdened with the insufferable commutes.

Even though commuting is a normal behavior in today's society, a denser metropolitan area would be less impacted by long travel times. A collaborative analysis between GOOD and Atley G. Kasky and published on www.ceosforcities.org explains that even though Americans inevitably spend many hours stuck in traffic while commuting every year, some commutes are more congested than others. The study shows that the relationship between more traffic jams has nothing to do with more cars and fewer highways, but with sprawl. For example, the New York/Northern New Jersey/Long Island commuter will spend an average 163 hours a year in traffic, but 0 (zero) extra hours in traffic due to sprawl since the region is densely populated. Commuting in this area is just tedious because of traffic jams, but not because of traveled distances being extremely long. On the other hand, a commuter in the Oklahoma City area will spend an average of 154 hours a year in traffic (9 less hours than those in the New York metropolitan area), however those commuters will spend 98 extra hours traveling to their destinations due to sprawl and long distances to be travelled. (StreetsBlog NYC)

Alhough younger generations are moving out of the suburbs and back into the cities for numerous reasons, the Center for Transit-Oriented Development recognizes that this is happening partly because "traffic is so bad that commuting has become less and less appealing." In addition to seeking to escape long commutes, the changing demographics, reduction of household sizes, and a need for more housing and transportation choices are all catalysts for change, and are the driving factors pushing for transit-oriented developments. (Reconnecting America & Center for Transit-Oriented Development 3.)

The State of New jersey Department of Transportation offers the following definition for a TOD:

A transit-oriented development (TOD) 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. (NJDOT).

TODs are generally compact and within walking distance of major transportation hubs or train stations (about a half a mile). A supplementary definition to a TOD provided by Reconnecting America and the Center for Transit-Oriented Development list the goals of these types of developments as:

[…] creating walkable, sustainable communities for people of all ages and incomes and providing more transportation and housing choices (including townhomes, apartments, live-work spaces, and lofts). These neighborhoods provide for a lifestyle that's convenient, affordable and active, and create places where our children can play and our parents can grow old comfortably. (Reconnecting America & Center for Transit-Oriented Development 2).

Within the United States, it is important to look at New Jersey when it comes to TODs, since it is the leading state in the nation when it comes to these types of developments with a total of 26 existing cases. In New Jersey, Transit-Oriented developments are also known as Transit Villages, and each project is characterized by traditional building and site design, high quality pedestrian and biking environments, mixed transit-supportive uses, attention to place making and

Figure 3.17.1-Compact, traditional building and site design

the pedestrian realm, tallest buildings are located closest to the transit station, and transit-supportive parking. (NJDOT).

The characteristics of a TOD as defined by the New Jersey Department of Transportation include:

1. Compact, traditional building and site design:

For this category, buildings are in average three stories or higher, clustered together with wide setbacks and sidewalks, and their entrances are generally oriented towards transit stops. In the traditional building and site design model, there should not be blank walls where pedestrians walk, and at street level, the first floors of buildings should consist of at least 75 percent windows and doorways. Blocks should preferably be short in length, and in long blocks there should be cut-throughs. Parking lots and decks should be located to the back of buildings.

2. A high quality walking and biking environment:

High quality walking and biking environments in a TOD is mainly described as the ease of access (biking or walking) to the train stations and other transportation hubs connected by clear and unobstructed pathways. For pedestrian safety and comfort, sidewalks should be wide to accommodate many users simultaneously, crosswalks should be properly demarcated, and lighting and landscaping should be adequate to the location. Lastly, bicycle parking should be readily available. 3. A mix of transit-supportive uses


Figure 3.17.2- High quality walking and biking environment

Figure 3.17.3- Mix of transit supportive uses

Figure 3.17.4- Attention to placemaking and the pedestrian realm

3. A mix of transit-supportive uses

Transit-Oriented Developments should offer a wide array of uses with many other purposes other than strictly housing. TOD projects should be highly mix-used and include housing, as well as commercial uses ranging from offices and other services, to restaurants, coffee shops and more. These mixed uses should follow the traditional pattern, and consist of retail on the first floor of buildings, and residential on the upper levels. In TOD's, automobile-centric uses like gas stations, auto shops, and motels should be avoided.

4. Attention to place making and the pedestrian realm

Creating enjoyable and safe spaces for the public and pedestrians is also one of the characteristics of TODs. This category maintains train stations and transit hubs as the most important features of TODs. Parks and plazas should be within a short distance of transit hubs. There should be adequate signage, and landmarks to create an identity for the town, as well as providing orientation. Consideration to the public general comfort should be taken, therefore comfortable and safe places to sit should be provided near buildings entrances and other amenities.

5. Tallest buildings are located closest to transit station

In TOD's, the highest building density should be clustered directly around the train stations and transit hubs. The building density, both in height and size, should transition gradually reducing in dimensions the

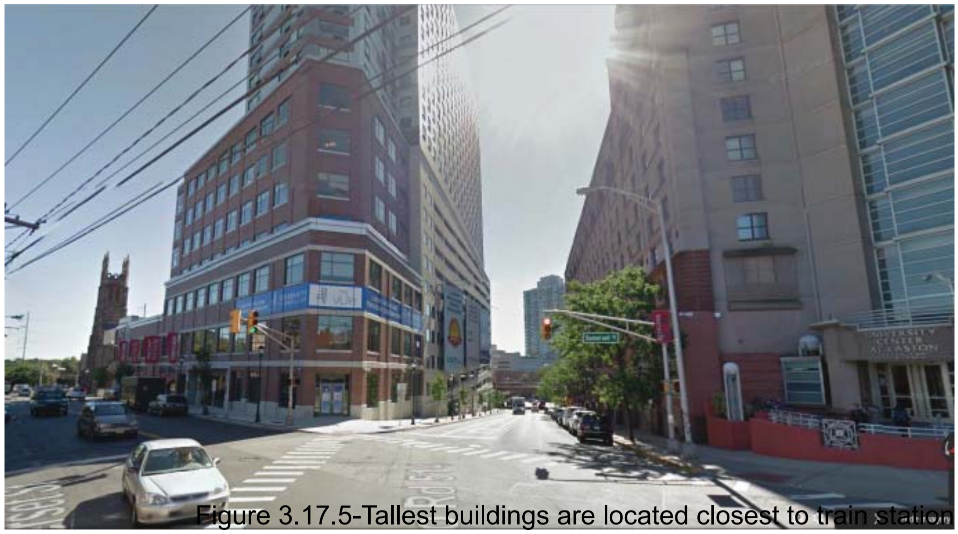


Figure 3.17.5-Tallest buildings are located closest to train station

Figure 3.17.6-Transit-supportive parking

farther they get from the transportation hubs.

6. Transit-supportive parking

The last characteristic of a TOD as defined by the New Jersey Department of Transportation, places parking lots and decks to the rear and sides of buildings. Parking space density lessens closer to transportation hubs. Lastly, parking decks should always be hidden, and not visible on the main floor of the building, since as established in a previous category, first floors should be used by retails and other commercial uses.

In conclusion, it is important to recognize that the urban development trends that were popularized by the advents of technology and the mass manufacturing of automobiles in the early 1900's had direct consequences in the lives of the people that inhabit large metropolitan areas. Urban sprawl, along with its promise of a better life and the American dream, resulted in communities that settled far away from the urban cores. However the inhabitants of such communities remain dependent on the urban cores for many reasons, mainly for work, which results in extremely long and painful daily commutes. Transit-Oriented Developments offer great solutions to many of the issues that impact these distant communities, and even though TOD projects are physically not any closer to the urban centers themselves, they enhance the quality of life of the towns by incorporating many amenities, and by ridding people from the burden of automobile dependency and the countless hours they would otherwise spend behind the wheel on their daily commute.

Works Cited

In-Text Citations

"Causes of Sprawl." Causes of Sprawl. Cornell University Department of Development Sociology, n.d. Web. 25 Nov. 2014.

"Defining and Managing Sprawl." . Soule, David C. Introduction. Urban Sprawl: A Comprehensive Reference Guide.

"WHY TRANSIT-ORIENTED DEVELOPMENT AND WHY NOW?" . Reconnecting America and the Center for Transit-Oriented Development. Web. 23 Nov. 2014. <http://www.ctod.org/pdfs/tod101.pdf>.

"Transit Oriented Development". State of New Jersey Department of Transportation. Web. 11.15.2014. < http://www.state.nj.us/transportation/community/village/tod.shtm>

"Want to Ease Commuter Pain? Highways and Sprawl Won't Help". Kazis, Noah. StreetsBlog NYC. Web. 11.15.2014 < http://www.streetsblog.org/2010/09/29/report-want-to-ease-commuter-pain-highways-and-sprawl-wont-help>

Image Citations

Image 3.17.1: http://archpaper.com/uploads/image/03-houston-texas-mixed-use-development-archpaper.jpg

Image 3.17.2: http://www.raisethehammer.org/static/presentations/images/complete_street_wide_sidewalk.jpg

Image 3.17.3: http://www.arnoldimaging.com/blog/wp-content/uploads/2007/12/zone-5.jpg

Image 3.17.4: http://www.arnoldimaging.com/blog/wp-content/uploads/2007/12/zone-5.jpg

Image 3.17.5: google maps / New Brunswick, NJ

Image 3.17.5: google maps / New Brunswick, NJ

Works Cited

In-Text Citations

Carter, Timothy, and Colleen Butler. "Ecological Impacts of Replacing Traditional Roofs with Green Roofs in Two Urban Areas." Digital Commons at Loyola Marymount University and Loyola Law School. June 3, 2008. Accessed November 15, 2014. http://digitalcommons.lmu.edu/cgi/viewcontent.cgi?article=1020&context=cate.

Dearborn, Donald C., and Salit Kark. "Motivations for Conserving Urban Biodiversity." Society for Conservation Biology. June 3, 2009. Accessed November 15, 2014. http://biodiversity-group.huji.ac.il/publication_files/publication_files/Dearborn-Kark Conservation Biology online early.pdf.

"Heat Island Effects Effects of Street Trees on Urban Heat Islands." New York State Department of Environmental Control. January 1, 2014. Accessed November 15, 2014. http://www.dec.ny.gov/lands/30344.html.

Liu, Karen, and John Minor. "Performance Evaluation of an Extensive Green Roof." National Research Council Canada. May 6, 2005. Accessed November 15, 2014. http://archive.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc48204/nrcc48204.pdf.

"Reducing Urban Heat Islands: Compendium of Strategies Green Roofs." United States Environmental Protection Agency. November 22, 2013. Accessed November 15, 2014. http://www.epa.gov/heatisland/resources/pdf/GreenRoofsCompendium.pdf.

"Smog—Who Does It Hurt? What You Need to Know About Ozone and Your Health." United States Environmental Protection Agency. July 1, 1999. Accessed November 15, 2014. http://www.epa.gov/airnow/health/smog.pdf.

"The Value of Green Infrastructure A Guide to Recognizing Its Economic, Environmental and Social Benefits." Center for Neighborhood Technology. January 1, 2010. Accessed November 15, 2014. http://www.cnt.org/repository/gi-values-guide.pdf.

Image Citations

Image 3.15.1: http://s.ngm.com/2009/05/green-roofs/img/roofs-615.jpg

Image 3.15.2: http://cnx.org/resources/47e79523cb248d-1348c22a5445b3e48a/graphics1.jpg

Image 3.15.3: http://static.squarespace.com/static/524710c1e4b05bfd3a974be9/t/545d5f70e4b08f1a46542d6a/1415405435564/WFYI.JPG?format=500w

Image 3.15.4: http://www.zinco-greenroof.com/referenzen/images/referenzen_main_images/highline1.jpg

Image 3.15.5: http://www.asla.org/2010awards/images/smallscale/377_03.jpg

3 Research Topic

3.18 Housing Density and Urban Form

Grace Kinney

Redesigning a site may often include adding residential units to an area for many reasons such as boosting the local economy, property taxes for the government, supplying a demand for a growing population, and many more. Housing density has a strong influence on urban form. The height, width, and facade of a development can shape how people perceive a city and how comfortable they feel in the space. People must be considered when designing these housing units, whether they will be the people living in the space, walking on the street next to the new housing, or living adjacent to the development. In this paper, I will investigate different variation of the word density, define criteria for what makes a good development for all different types of densities - low, medium, and high, and provide examples of successful residential density developments that could be utilized similarly for Little Ferry's redesign.

Densities can be measured in a couple different ways. There is the same formula, to calculate all types of densities, the land area variable is the only thing that changes. Typically, residential density equals number of dwelling units divided by the land area. It should be noted that the number of dwelling units can be found through the Floor Area Ratio.

The most specific measurement of density is site density, this includes the residential property only. Net density takes the residential component and the local roads into account. Gross density is even more broad, including the residential buildings, local roads and local non-residential land uses, such as schools and parks. For my purposes in this specific redesign project, only the three previously mentioned residential types will be utilized. However, you can also measure density on an urban scale, this would include residential uses, local roads and non-residential land uses as well as commercial and working/office spaces, transportation centers, and regional open space. There is also metropolitan density, measuring all land in certain administrative boundaries, this is often only used when comparing places on an international scale (Guidebook: New Designs for Growth).

Figure 3.18.2
Site Density

Figure 3.18.3
Net Density


Figure 3.18.1
Urban Density


Figure 3.18.4
Gross Density

The purpose of using site-specific density calculations are helping to determine how much developable area there is in a place and how that space will be split up by lot size. You would use net density for comparing the relationship of number of units in a housing development to the street scape. The gross density helps describe the experience of living or walking through the space and the attributes of the neighborhood. Urban density is useful in a larger scale, when considering regional zoning and services.

There are many aspects when designing for various residential densities. Low, medium, and high densities can all be successful as long as the appropriate considerations are applied depending on the location. What is considered low, medium, and high densities are respective to the city that is being studied. Low density in general terms, means anything from 0 to 15 units per acre using the net density calculations. The lot size in low density housing developments averages between 3,000 to 5,000 square feet in a suburban town. The building typology associated with lower densities includes single-family units, semi-detached units or duplexes, rowhouses, and secondary in-law units.

Medium density usually encompasses any residential density between 15 and 40 units per acre. Building typologies that are common in medium density developments include rowhomes, stacked walk-up town houses or flats. Higher densities can be considered any housing with 40 plus units per acre. This type of building units most often requires access through an elevator or corridor (Ellis, John G.).

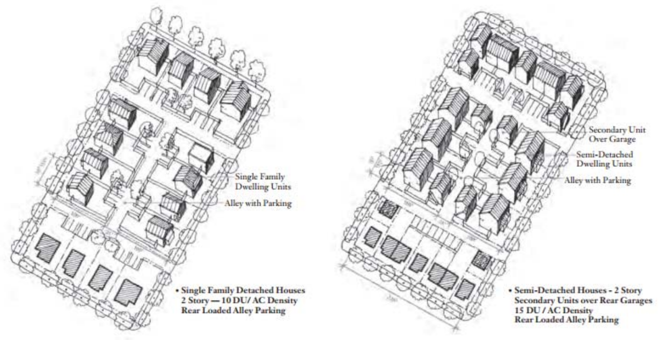


Figure 3.18.5 Low Density Diagram

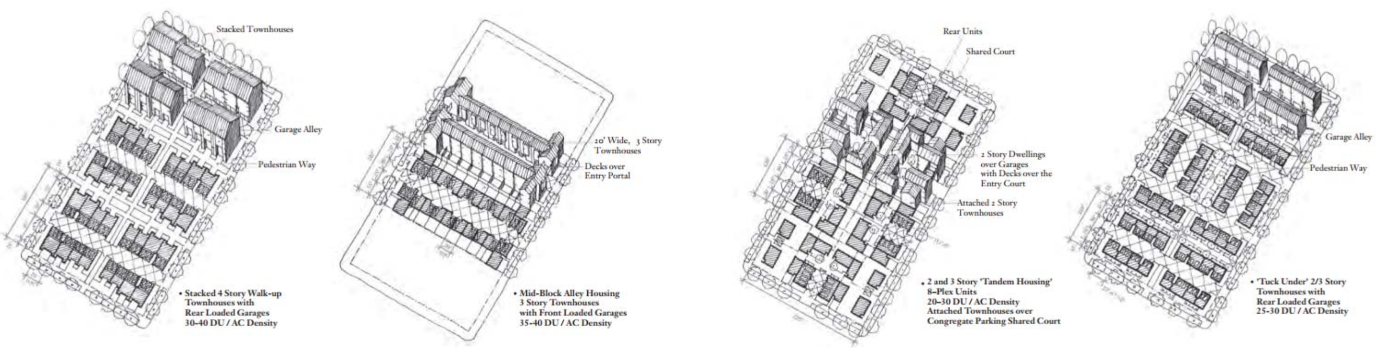


Figure 3.18.6 Medium Density Diagram

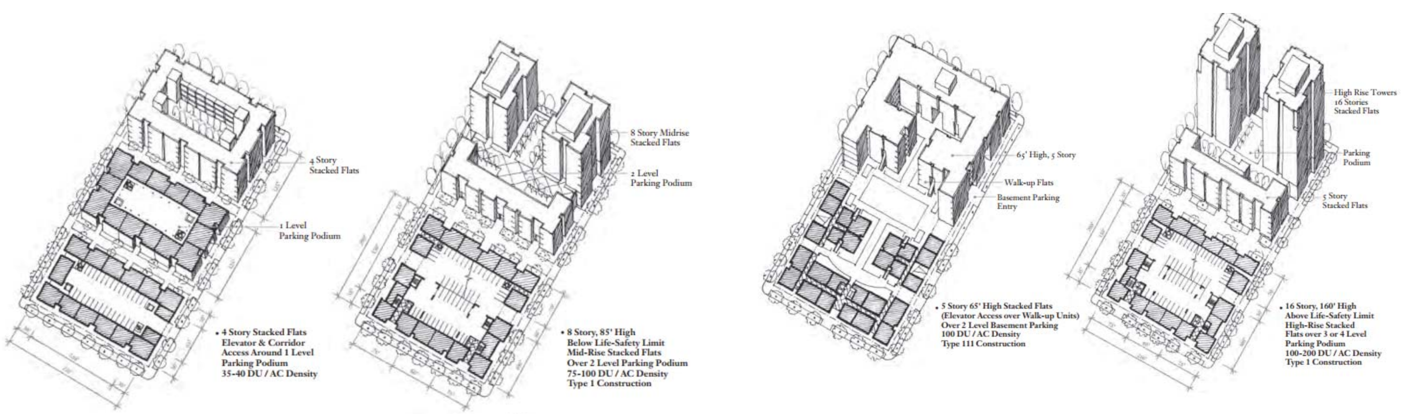


Figure 3.18.7 High Density Diagram

To be successful when designing different residential densities much of the criteria is the same. It is vital to make the most out of what space you have in the situation. Considerations should include environmental, social, and functional/economical features. When developing new housing units, many environmental factors come into play. One should consider proper stormwater management. To reduce runoff, pervious surfaces should be used when possible. If there is room adjacent to roads, bioswales can be implemented to clean pollution and sediment from rainwater. Also, to save rainwater, use water catchment methods near impervious surfaces to re-use grey water for appropriate purposes. Green infrastructure should be used when constructing new buildings. Stormwater reduction overlaps with infrastructure by the implementation of green roofs. Intensive and/or extensive green roofs can be used subject to construction methods. Solar panels can also placed onto residential roofs to utilize renewable energy resources. When building new units, locally sourced materials can help reduce the environmental impacts from construction. The design of a residential unit should promote walking, cycling, or public forms of transportation to reduce dependence on cars and fossil fuels and reduce air pollution.

Social interaction is another vital consideration for the success of a residential development. There must be a balance between private and public space in all kinds of densities. Directly outside the house, it is beneficial to have a semi-private space, like a porch or stoop in the front of the unit and a deck or balcony in the back. This helps the resident transition from their private living space to the public realm. It is also important in keeping “eyes on the street” referring to comfort and safety of a space through having neighbors looking out for one another. Social success depends on not only the people occupying the residential units but those who walk by or live adjacent to the development. The facades of the buildings affect the streetscape and how people choose to use it. If there are similar setbacks between housing units on both sides of the street, a passerby or neighbor will feel more at ease in the space. Open space is necessary for all levels of residential densities and should be a common place where citizens are welcome to interact with one another.

The functionality of a space may be the most important feature of prosperous and efficient neighborhood. No matter how high or low the density, each area should be thoughtfully planned for an intended use. The design should promote connections within and in between developments for both vehicles and pedestrians (http://www.newdesignsforgrowth.com/pages/guidebook/residential/lowdensityresidential/) Access to open space, businesses, grocery stores, and public transportation is necessary in every residential neighborhood. The development should react properly to the environmental threats and natural surroundings. Developers must consider the average intensity of storms and flooding so that the units can be built accordingly.


Figure 3.18.8 Orange Place Unit Facades


Figure 3.18.10 Pleasant View Street View


Figure 3.18.13 Dove Street Apartments


Figure 3.18.9 Orange Place Private Space


Figure 3.18.11 Pleasant View Facades

To help visualize different residential densities, examples will be shown with good and bad characteristics of each. Orange Place Cooperative Units in Escondido, California provide a successful example of low residential density development. The site-specific density of this development is calculated at 15 units per acre. A few reasons why Orange Place Cooperative may be prosperous is because a variety of one to four bedroom units exist for a broad range of residents. Each unit has a defined "outdoor room" which acts as their own private outdoor space, while also having common outdoor areas with contain courtyards, gardens, and place for children to play. It should also be noted that the organization of the buildings reinforces the streetscape, creating social engagement and safety in public spaces.
Refer to figures 3.18.8 and 3.18.9.


Figure 3.18.12

Pleasant View Gardens located in Baltimore, Maryland, is an example of poor low density residential development at 11 units per acre. While the low-rise row homes provide the neighborhood with "eyes on the street", the streetscape does not encourage community interactions. The individual units are not defined and the architecture is very monolithic. Refer to figures 3.18.10, 3.18.11 and 3.18.12


Figure 3.18.14 Dove Street Stoops

Dove Street in Albany New York provides a good example of medium density development. The site density is calculated at 32 units per acre. The apartments fit in with the local vernacular of the space, the design was inspired by rowhouses that were constructed in the late 1800's in the same area. It provides for its residents, a community garden space and a shared common space. The building facade emphasizes the street, by having stairs from the front door to the street, the development provides a semi-private space as a buffer between the private residence and the public space.
Refer to figures 3.18.13 and 3.18.14

Figure 3.18.15 Homan Square Street View

Figure 3.18.16 Homan Square from Above

Figure 3.18.17 Homan Sqare Units

Homan Square in Chicago, Illinois is another example of medium density residential units, providing 20 units per acre. However, this design is not as successful as the former because of its monolithic structure, the architecture of the buildings makes for dull and unwelcoming outdoor spaces, and does not support access to the street, as the aparments face a large empty lawn.

Refer to figures 3.18.15, 3.18.16, and 3.18.17

Figure 3.18.18 Langham Court Access

Figure 3.18.19 Langham Court Architecture

High density residential developments can still meet most criteria for successful design. Langham Court in Boston, Massachusetts provides a good example of this, with a density of 84 units per acre. The individual units are defined even though the architecture is similar, there is a small amount of space between the doorway and the street to provide access to the street and encourage the community to interact outdoors. The development also enhances the connection of the inner courtyard to the streetscape. The lower rise units provide a sense of safety in the area.

Refer to figure 3.18.18 and 3.18.19

Figure 3.18.20 Genesis Apartments Street View

Figure 3.18.21 Genesis Apartments from Above

Genesis Apartments is a higher rise building with a higher residential density, at 188 units per acre. The facade of the building is stark, although the size and height fit in with the surrounding buildings. The apartments do have a common courtyard but it is heavily shaded and there is no definition or individualism between apartments or outdoor spaces.

Refer to figure 3.18.20 and 3.18.21

The next example of successful residential development, that has similar characteristics to the town of Little Ferry, New Jersey, is the Artist's Housing in Mount Rainier, Maryland. The site-density of the apartments is 87 units per acre. There are a total of 12 units within the building at 600-650 sq. ft. per unit, as well as attached studio space. This was a rennovation project, gutting an existing building and adding infrastructure. The goals of this rennovation are creating daylit artist studios, building environmentally responsible dwellings, and fitting in with the local vernacular of the Mount Rainier Historic District.

This residence meets many of the previously mentioned environmental criteria. There is a green roof on top of the building, planted with sedum to reduce stormwater runoff and filter out pollutants. The whole building was carefully designed to let in the maximum amount of light, reducing energy costs. There are high effeciency heating pumps within the infrastructure also reducing energy. Outside the building there is a bioretention pond to collect and clean runoff.

Socially the Artist's Housing is successful due to the shared workspace within the building. This allows neighbors to interact, get to know each other, and look out for the safety of one another. The building facade creates an aesthetically appealing view from the sidewalk. The visual look of the residence as well as the fact that it is near to businesses and shopping areas encourage pedestrian or bicycle transporation as opposed to vehicular.

Functionally, the residence is also close to public transportation, there are multiple bus lines a half a block away. The apartments are within close proximity to Washington, D.C., within a growing community. Also, the residential profile of these housing units make 50% of the stae wide median or less, providing houses for younger residents and professionals that want to live just outside a metropolitan area. There is a balance between private and public space; the green roof and the shared studios provide residents with a semi-private space that is necessary in any residential development.

Overall I think this building makes the best use of its space. Common areas, semi-private spaces within and outside the building, proximity to public transportation, and other ammenitites make the residence successful and its residents' happy. The size and architecture of the building fit inot the local vernacular of Mount Rainier. Many of the qualities of Mount Rainier hold the same charateristics as Little Ferry, and could provide a successful example for new medium density construction in live/work spaces adjacent to the Little Ferry's revitalized Main Street (Design Advisor: HIP's Artist Housing).

Southside Park Co-Housing in Sacramento, California provides an alternative method for new residential properities. This development is located in an urban setting, and is trying to balance the positive aspects of both suburban and urban life. The site-density is 20 units per acre, with a total of 25 units in the whole development. Southside Park consists of one to four bedroom units, ranging from 640 to 1,420 sq. ft. The co-housing model was imported from methods in Denmark, it requires its prospective residents to become involved with the design of their homes and once the units are built, residents are expected to participate in community activities.

Environmental benefits to the Southside Park Co-Housing units include its proximity to public parks in Sacramento. It also has it's own community courtyard, providing residents with green space right outside their homes. Because this development is in an urban setting, residents do not rely on vehicles for transportation; it is easy for them to walk to commercial and recreational spaces.

A driving force in creating co-housing is the social aspect of the development. The community that co-housing creates is often compared to an extended family, the residents look out for each other's safety and benefit from the security of being in a group. One of the main goals of the Southside Park Co-Housing was to get to know the neighbors and revive the neighborhood association.

Economically, the residents benefit from sharing gardening tools and hardware, using community-owned dishwashers and laundry machines. The development as a whole helps create a stable environment because it is made up of occupants with mixed incomes. The functionality of space is desirable, there are semi-private spaces like the front porch that exist on every unit, and the rear of the buildings face a community courtyard, adding to the semi-private shared space.

This development can influence the redesign of Little Ferry in that it encourages social interactions of its residents. This is key in creating successful towns and cities. The setback that each unit has from the street is similar to the single family homes in Little Ferry. Densifying the opposite side of a street with these single family homes in a model like Southside Park would be appropriate for this space. It would allow the increase of residential density for the downtown district, but the size of the buildings would not to overwhelm the existing one and two story houses (Design Advisor: Southside Park CoHousing).

In conclusion, densities can be viewed in a variety of ways, not only can you calculate residential density from a site-specific scale to a metropolitan scale, but you can visualize density in different ways. Low-density does not necessarily mean large mansions in rural settings and high-density does not always translate to tall skyscrapers. It is vital to study the relation of the proposed development to the existing area, you want the new development to fit in and enhance the space on environmental, social, economic, and functional levels. In the redesign of Little Ferry, medium-density housing developments will help transition between the pedestrian friendly downtown and transportation hub and the existing residents in single-family homes.

Works Cited

Resources

"Design Advisor." HIP's Artists' Housing. N.p., n.d. Web. 30 Nov. 2014.

"Design Advisor." Southside Park Co-Housing. N.p., n.d. Web. 30 Nov. 2014.

"Doyle Street Cohousing in Emeryville, California." New Village Journal: Cohousing Communities: A Model for Reinvigorating Urban Neighborhoods. N.p., n.d. Web. 30 Nov. 2014.

"Explaning Residential Density" Places .Web. 30 Nov. 2014.

"GuideBook :: Critical Design Practices :: Introduction." New Designs for Growth. N.p., n.d. Web. 30 Nov. 2014.

"Search for a Place." Landcom : Landcom : Residential, Commercial and Industrial Properties. N.p., n.d. Web. 30 Nov. 2014.

Table of Figures

3 Research Topics

3.19 Parks and People

Daniel Rodriguez

Figure 3.19.1

When it comes to the size of an urban park one of the main contributing factor is the population of the area in which the park will be located. Standards have been set to ensure people will be able to have the most comfortable experience when visiting an urban park. In order for people to have the most enjoyable experience when visiting their neighborhood park. People should be provided with a place that gives them enough room to feel comfortable yet connected to other park goers. Many parks have thrived when abiding by the standards set by organizations that do research to develop numbers that work. A goal for every park is that it should be to attract as many visitors as possible. Parks are extremely beneficial in many ways. Parks are good for the economy, real estate, environment, and the areas aesthetics just to name a few. Having parks is pivotal to the growth and prosper of an urban area. Creating a successful park that is actively in use is even more vital.

A little background information on proportions between parks and population is that 80 percent of Americans live in metropolitan areas, and this number is up 48 percent from the year 1940. In many cities that have a lot of park, a large portion of the residents lack access to them. In New York City, nearly half of the city's community board districts have less than 1.5 acres of parkland per 1,000 residents Access to Parks Increases public health in many ways. Having a park motivates people to exercise, and studies show that nature and greenery can actually make people healthier and happier.

Territoriality

Territoriality is known as an area that a group or a person “defends”. It is related to nonverbal communication and how that is used to transmit ownership or occupancy to others around them sharing the same space. A territory is a space that somebody does not want breached by an outsider. The basic characteristics of a territory is ownership without actually owning the place someone calls their own. Territoriality is because a person has a space that pleases their psychological or aesthetic needs.

In an urban park territoriality is very important. People will come and go much more frequently if they know they can have a space they can call their own. When it comes to an urban area there aren’t many options for a person to enjoy green space outdoors. A large amount of people in urban areas reside in apartments and do not have a backyard that they can call their own. A person that lives in a single family home usually owns land and can do what they want with that land.

If a person does not feel comfortable in their neighborhood park, They may not continue to live in that area. A basic diagram on proxemics made by Eward t. Hall, a famous anthropologist shows the breakdown of personal space and territory. Shown in Figure 3.19.2 this diagram is broken down into four different segments. Intimate space, personal space, social space, and public space. This shows peoples comfort zones. Infringement of a territory can be broken down into a few different types, Psychologists believe that these range from complete invasion (when full control of a place is taken away from the owner) to moderate violation (a temporary overtaking of a territory in order to cause annoyance but not gain ownership) to mere contamination (when a territory is in some way harmed or fouled. In an urban park there is a need for the size of the park to be considered to prevent violent interactions between people.

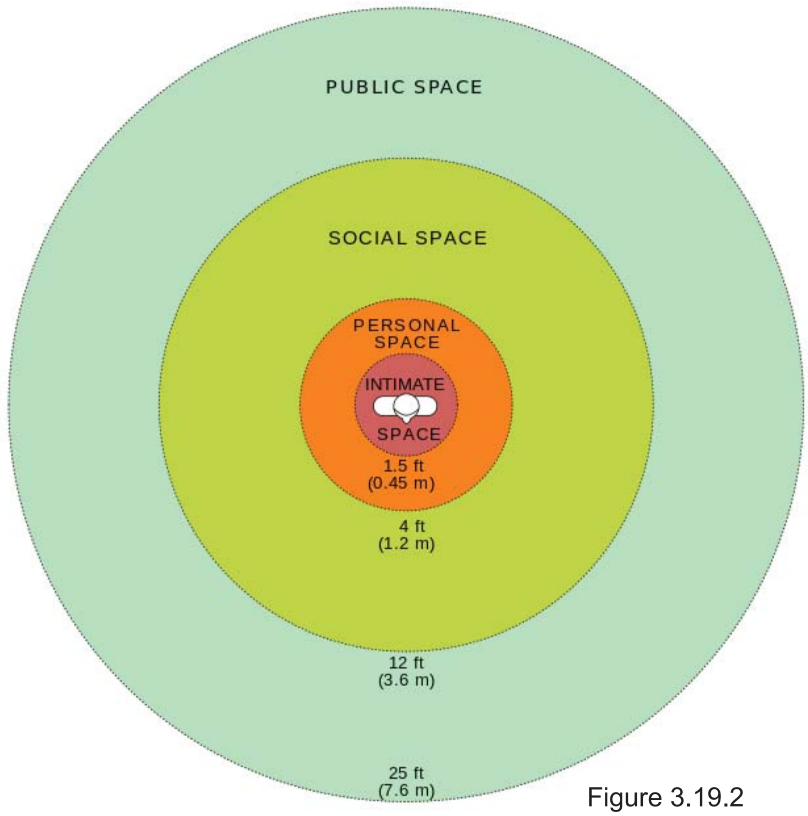


Figure 3.19.2

Privacy

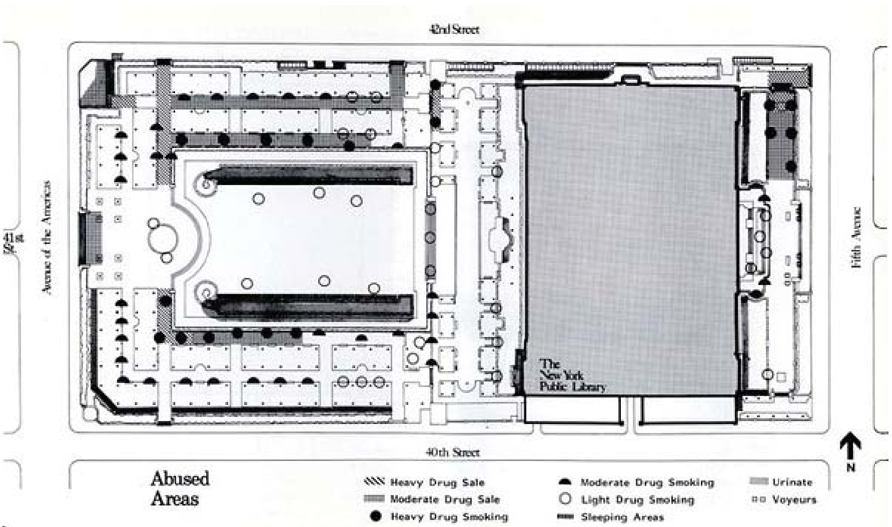


Figure 3.19.3

Park-goers strive to get to the appropriate level of privacy for the activity in which they are engaged. Privacy has to do with the ability of an individual or a group to control their visual, auditory, and olfactory interactions without outside people interfering.

Privacy is Dependant on the standing patterns of behavior, and the cultural context of the area. Also on a the personal aspirations of the individual visiting the park. There are many ways to produce the type of privacy people desire in a park. The use of walls, screens, symbolic and real territorial demarcates and distances are all mechanisms for attaining the amount of privacy a person wants.

No-one wants to feel uncomfortable in their own park. Crime is the single greatest factor that can negatively impact the publics enjoyment and use of urban parks. This limits the access to recreational programs that take place in a park. In many cities parks are not always considered a safe place. For instance, Parks are difficult to run and nearly impossible to keep locked up even with locked gates. Install an alarm systems to an entire park could be very complicated, and most smaller parks do not have their own police force but instead the authorities are only contacted when they are called upon, which is usually after criminal activity has already taken place. A park that is too big for the amount of people that it is suppose to support can be a haven for undesirable people and actions, especially in an urban setting where crime is more prevalent.. Figure 3.19.3 is a crime map of Bryant park made in the year 1979 it shows all of the different types of crime created by all of the dead zones. The standards set by organizations can help to decimate the amount of crime created by too much privacy.

Figure 3.19.4

Over-crowdedness

Figure 3.19.5

Another aspect of territoriality that contributes to the topic of park size is over-crowdedness. Being in a crowded park can get stressful because it can limit a persons impedance and personal experience. Feeling overcrowded in a park has been proven to diminish a persons desire to communicate with others. When a person visits the park in their city they should have enough personal space to control what they want to control around them. Park goers want to be able to comfortably do what they are at the park to do, and too many people can make that difficult. In some parks the such as one in Figure 3.19.5 shows a park in a crowded condition you can see the lack of communication between people.

0vercrouding in parks has been know to be directly linked to adverse behavior. The reason for this is social overload. One sociologist Russell Murray has said that the punishable behavior, as said by a study which asked parents questions on their children, worse behavior is usually from children in crowded conditions. Density on the other hand does not seem to be related to the same types of behavior. What is important to take from this is that the size of an urban park and the negative effects of having a park that is too small. The capacity a park can hold should be able to sustain the behavior structures within the park. Many people struggle with being in crowded places it is called Agoraphobia and it is an anxiety disorder where people feel danger when in certain environments that are too crowded.

Figure 3.19.6

The National Recreation and Park Association (NRPA) is a national, non-profit service organization that has been around for the past 40 years, These people are dedicated to advancing parks, recreation and environmental efforts that enhance the quality of life for all people. Their vision is for everyone to have easy access to park and recreation opportunities in sustainable communities. The organization is broken down into ten branches which include the Armed Forces Recreation Society, American Park and Recreation Society, Citizen Branch, National Aquatic Branch, National Society for Park Resources, National Therapeutic Recreation Society of Park and Recreation Educators, Student Branch, Commercial Recreation and Tourism Section, and Leisure and Aging Section. A combination of the work done by these branches helps them achieve their goals. The branch I would like to focus on is the American park and recreation society, and Society of Park and Recreation Educators. This is the commission for accreditation of park and recreation agencies or CARPA. CARPA creates standards and establishes benchmarks to help bring parks to a higher level of excellence. Some standards set by them are as followed.

Neighborhood parks 1 to 2 acres per 1000 people 5 to 15 desired size acres

Community parks 5 to 8 acres per 1000 people desired size 25+ Acres

Regional parks 5 to 10 acres per 1000 people desired size 200+ Acres

If parks were made correctly with these park standards they should be able to eliminate the problems I talked about in previous pages including too much privacy, fear, over crowding.

Below in Figure 3.19.7 is a map made by a website called http://static.persquaremile.com this map shows all of the major cities in America and compares them by highlight the amount of parkland per person per square mile. Albuquerque New Mexico clearly has the most in the country. They have almost 3000 square feet per person that lives there. The creator of this website Tim De Chant stated "Parks are somewhat under appreciated commodities, I think. You don't notice how much you use them until they're gone. That was my experience when I moved to Berkeley, California, an environmentally progressive city that oddly lacks a large, centrally located park. As a result, the smaller parks were very manicured and much too small—and crowded—to ever feel like you were getting away from the hordes." This map shows the areas in the country that need improvement there are many cities such as New York that have an extremely large amount of park land but it is still not sufficiently supporting the population. More pocket parks need to be created to fulfill the needs of smaller neighborhoods where access to parks is much harder. Every person in new York should be able to walk to a park.

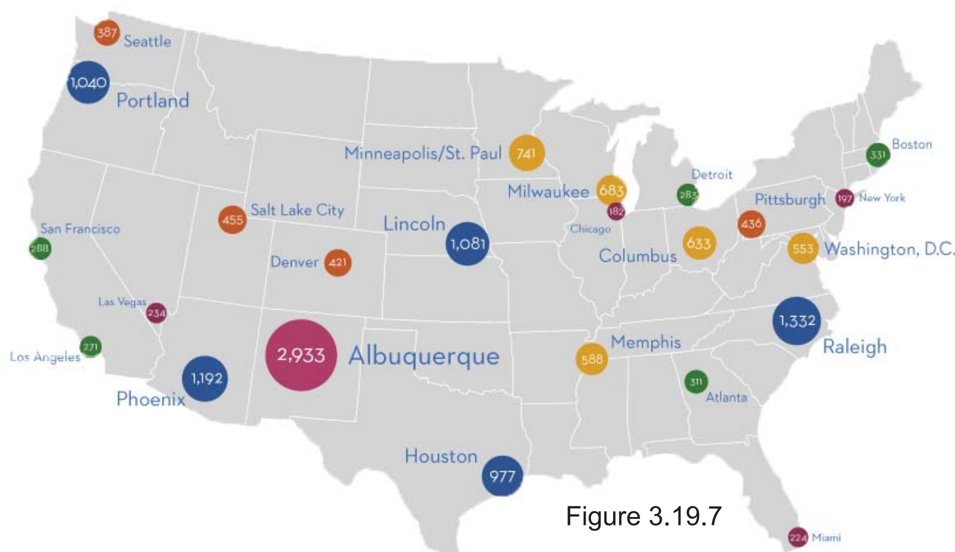


Figure 3.19.7

Work cited

Lang, Jon. The Role of the Behavioral Sciences in Environmental Design. N.p.: n.p., 1987. Print.

Hobbs, Frank, and Nicole Stoops. Demographic Trends in the 20th Century. N.p.: n.p., 2002. Print.

Walls, Margaret. “Parks and Recreation in the United States.” Backgrounder Local Park Systems (2009): n. pag. Print.

“2014 City Park Facts.” https://www.tpl.org/2014-city-park-facts. N.p., n.d. Web. 12 Dec. 2014. <https://www.tpl.org/2014-city-park-facts>.

http://static.persquaremile.com/. N.p., 2011. Web. 12 Dec. 2014. <http://persquaremile.com/>.

“Open Space and Enviornmental Resource Protection Plan.” http://www.lowermerion.org/archive/osp/osp_intro.html. N.p., n.d. Web. 12 Dec. 2014. <http://www.lowermerion.org/archive/osp/osp_intro.html>.

National recreation and park association. “A Public Health Perspective.” Parks & Recreation in Underserved Areas: n. pag. Print.

www.psychologytoday.com. Sussex Publishers, LLC, 15 Feb. 2013. Web. 12 Dec. 2014. <http://www.psychologytoday.com/blog/ienvironment/201302/environmental-territoriality-and-me>.

Hall, Edward T. “Diagram.” http://commons.wikimedia.org/wiki/File:Personal_Space.svg. N.p., n.d. Web. 12 Dec. 2014.

Bryant Park Crime Map (1979). N.d. Illustration.

Table of Figures:

3 Research Topic

3.20 Development of Residental Properties to Parks, & Open Spaces in Suburbia

Thomas Wyllner

The design of our communities has changed over the past one hundred years, largely in part to technology, with the invention of steel and reinforced concrete we were able to build taller buildings and have a denser population in our cities. What really changed how we live is the invention of the automobile. The automobile allowed us to live outside the cities, but at that time there was not many communities outside these cites so we created a new way of living called Suburbia. Many of these suburban neighborhoods designs didn't not take into consideration living with open space and parks, it was design more with a developer mentality of how to subdivided a piece of land into the maximum number of properties. They designed with a conventional approach as opposed to a clustering approach designing with open space and utilizing all its benefits as seen in towns like Radburn New Jersey and Green Belt Maryland.

A large part of what shapes a residential neighborhood is the subdivision of the land. "Residential subdivisions typically consist of low-density, single-family residential development, characterized by a lack of connectivity. In this context, connectivity refers to the presence of easily navigated transportation networks within and between neighborhoods" (McDonell, Monroe, Tomlinson). These subdivisions are frequently seen in majority of suburban neighborhoods that are filled with "wide roads, few sidewalks, and frequent cul-de-sacs, (which reduce connectivity, increase distance to destinations, and contribute to heavier traffic along collector roads)" (McDonell, Monroe, Tomlinson). Conventional subdivision development lacks shared greenspace, walkability, and connectivity within and between neighborhoods. Developers and residents are exploring new ways of living that provide social, economic, and environmental benefits" (McDonell, Monroe, Tomlinson).

There is an "increasingly popular alternative to today's typical subdivisions is the conservation subdivision. Conservation subdivisions employ smart growth principles, creating dense clusters of homes and leaving undeveloped greenspace for agriculture, conservation, and community use" (McDonell, Monroe, Tomlinson). "Homes are built on smaller lots than in a conventional subdivision and are situated to provide the greatest view of the preserved open space" (McDonell, Monroe, Tomlinson). "As urban populations grow and more people choose to be close to nature, development inevitably creeps beyond city limits and into rural lands. This new development occurs on a landscape that provides goods and services for our communities, from recreation and beauty, to food and fiber, and to clean air and wildlife habitat: the rural-urban interface. How new neighborhoods in suburban and interface areas are designed can influence residents' quality of life, transportation options, and the health of natural resources in these communities. A growing trend features progressive and neo-traditional subdivision designs that are creating attractive, walkable neighborhoods that encourage social interaction and help conserve natural areas" (McDonell, Monroe, Tomlinson).

These alternative approaches to development, whether it be called conservation design or clustering, they all have standard similar features. The conservation of rain water and reducing of run off are a big feature. They reduce the amount of the lawn devoted to each individual property so reduce runoff and design with the intention maximizing the spread stormwater over pervious surfaces. Along the roadways they use open channels compared to the traditional curb and gutter system. This allows runoff of rainwater to infiltrate back into the ground rather than be collected and carried through the sewers possible overloading the sewers in heavy rainfall events. Although this conservation or clustering design may seem like a new way of development it actually is not. The idea is influence by “the garden city movement is a method of urban planning that was initiated in 1898 by Sir Ebenezer Howard in the United Kingdom. Garden cities were intended to be planned, self-contained communities surrounded by “greenbelts”, containing proportionate areas of residences, industry and agriculture” (Matthews). The communities, Geenbelt, Maryland and Roosevelt, New Jersey for example, were built as a result of President Roosevelt’s New Deal act in the 1930’s by the National Industrial Recovery Act under the division of the Subsistence Homesteads where high influenced by garden city movement and by a unique small town in New Jersey. The town of Radburn New Jersey is arguably the first and best example of this conservation design in America.

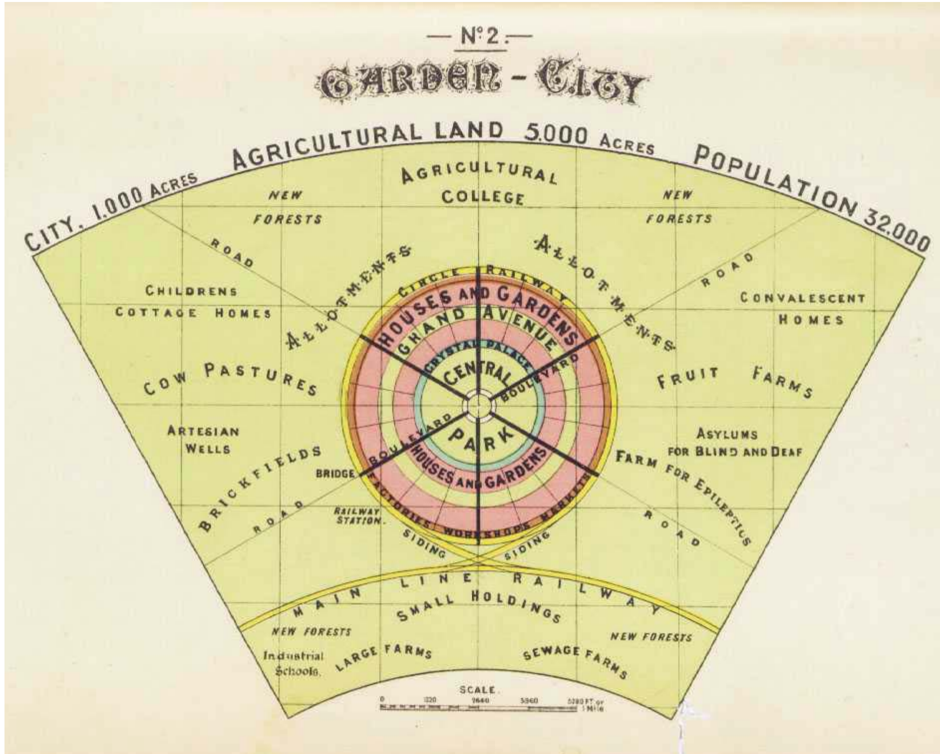


Figure 3.20.2 Letchworth Garden City planned by Richard Barry Parker, Media Architecture

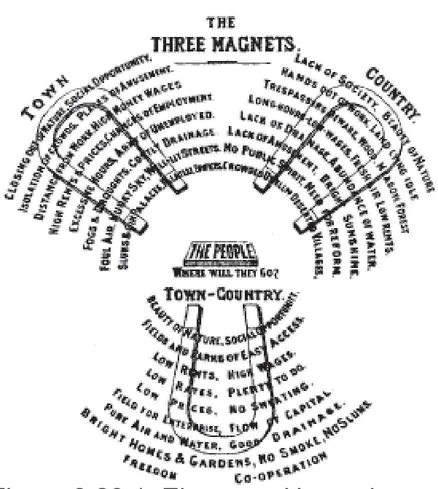


Figure 3.20.1 Ebenezer Howards Garden City, Cornell Library

Radburn was created in 1929 and was considered the “Town for the Motor Age”. “The primary innovation of Radburn was the separation of pedestrian and vehicular traffic. This was accomplished by doing away with the traditional grid-iron street pattern and replacing it with an innovation called the superblock. The superblock is a large block of land surrounded by main roads. The houses are grouped around small cul-de-sacs, each of which has an access road coming from the main roads. The remaining land inside the superblock is park area, the backbone of the neighborhood. The living and sleeping sections of the houses face toward the garden and park areas, while the service rooms face the access road” (Gatti). “The walks that surround the cul-de-sacs on the garden side of the houses divide the cu-de-sacs from each other and from the central park area. These paths cross the park when necessary. Finally, to further maintain the separation of pedestrian and vehicular traffic, a pedestrian underpass and an overpass, linking the superblocks, were provided. The system was so


Figure 3.20.3 Radburn NJ, Design for Health


Figure 3.20.4 Radburn NJ, Design for Health


Figure 3.20.5 Radburn NJ, Design for Health

devised that a pedestrian could start at any given point and proceed on foot to school, stores or church without crossing a street used by automobiles" (Gatti). This design was created by its planners, Clarence Stein and Henry Wright and also Marjorie Sewell Cautley who was a landscape architect. Its main architect Henry Wright had design principle that he called the "Six Planks for a Housing Platform". "These ideas formed the basic philosophy that he followed in designing Radburn. His planks were: Plan simply, but comprehensively. Don't stop at the individual property line. Adjust paving, sidewalks, sewers and the like to the particular needs of the property dealt with - not to a conventional pattern. Arrange buildings and grounds so as to give sunlight, air and a tolerable outlook to even the smallest and cheapest house. Provide ample sites in the right places for community use: i.e., playgrounds, school gardens, schools, theatres, churches, public buildings and stores. Put factories and other industrial buildings where they can be used without wasteful transportation of goods or people. Cars must be parked and stored, deliveries made, waste collected - plan for such services with a minimum of danger, noise and confusion. Bring private and public land into relationship and plan buildings and groups of buildings with relation to each other. Develop collectively such services as will add to the comfort of the individual, at lower cost than is possible under individual operation. Arrange for the occupancy of houses on a fair basis of cost and service, including the cost of what needs to be done in organizing, building and maintaining the community" (Gatti). "In the field of planning and architecture, Radburn has been called by Anthony Bailey, "the most significant notion in

20th Century urban development". Lewis Mumford considered it "the first major advance in city planning since Venice". Radburn is unique because it was envisioned as a town for better living, and it was the first example of city planning which recognized the importance of the automobile in modern life without permitting it to dominate the environment. It was the first time in the United States that a housing development was attempted on such a large scale, proceeding from a definite architectural plan resulting in a complete town" (Gatti). Since the building of Radburn others have used it as a model when building new communities. Radburn, planned as a "Town for the Motor Age" is truly a "Town for Tomorrow" (Gatti). However tomorrow is already here and these types of towns seem few and between. The lack of these communities could be in part by the result of the massive housing boom of the 1950's. After the end of World War Two is when we really started to see the vast expansion of the suburban sprawl. We needed to build comminutes quickly which was largely left up to the developer, so there was not a well thought out master plan when building these towns.


Figure 3.20.6 Typical Suburban Sprawl, Rethinking Bergen County


Figure 3.20.7 Map of Radburn, Notice the green space/clusters. Google maps

It can be difficult to develop conservation towns in today's world because of the fiscal value of land and our, peoples, ethics and value of land and open space. We view our private land different than our public land, it effects where people choose to live and especially the homes people choose to buy. In the study The Trade-off between Private Lots and Public Open Space in Subdivisions at the Urban–Rural Fringe by Elizabeth Kopits, Virginia McConnell, and Margaret Walls at Resources for the Future found interesting conclusion in their study. "Our results suggest why we may not see many clustered subdivisions on the urban–rural fringe without government regulations requiring such clustering. Households appear to strongly value their own private lots. While we do find in our analysis that households also value having more open space in their subdivisions or having a lot that is adjacent to subdivision open space, they do not value these amenities nearly as much as a larger private lot. Thus, reducing private acreage to provide more public subdivision open space tends to lead to overall reductions in house prices" (Kopits, McConnell, Walls.13). The research also looks into public opinion which is rudiment in how we design. The question was ask "whether households would be willing to trade off the size of their own lot for open space in the subdivision. Our findings suggest that there is some small willingness to trade off lot size for more subdivision open space" (Kopits, McConnell, Walls.13). With many people not willing to trade their private space for more public space while still wanting their townships to preserve public land it can become difficult. Especially when local governments are viewing Clustering subdivision development as "a way to reduce the development footprint and preserve open space in fringe communities" (Kopits, McConnell, Walls.13). "Communities are often confronted with the difficult decision of land use development. Often the assumption is that developing the land for residential homes offers more revenue to the community then developing parks and open spaces" (Crompton). "The conventional wisdom among many decision-makers and taxpayers is that development is the "highest and best use" of vacant land for increasing municipal revenues. The belief is that development increases the tax base and thereby lowers each individual's property tax payments. Hence, larger property tax revenues are likely to accrue to communities if land was built-out with homes, rather than being used as parks or open space" (Crompton). This can also affect the market values of the properties especially when the suburban sprawl was in full force. "Between the 1930s and 1970s the proximate principle virtually disappeared from mainstream discussions of parks and open space." "The proximate principle states that the market value of properties located proximate to a park or open space (POS) are frequently higher than comparable properties located elsewhere" (Crompton). However Kopits found lower property values in towns with the clustering design especially in homes that were not adjacent to the open space. This could be part of the reason why we see less towns with a conservation design. The preservation of open space can be a less expensive than developing it and places public opinion, it can greatly impact your tax base and property values by which way it is chosen to be designed.

With the change of new innovations and how we our value our land, our landscape and communities will continue to change. As public opinion begins to shift even more into valuing preservation of public open space, we should look back to these conservation designed towns seeing how we can take some of the ideas and adjust them for the current situation at hand.

Works Cited

In-Text Citations

Crompton, John L. “The Impact Of Parks And Open Space On Property Values.”Http://www.cprs.org/membersonly/Winter07_PropertyValues.htm. Department of Recreation, Park and Tourism Sciences Texas A&M University, 2007. Web. 1 Dec. 2014. <http://www.cprs.org/membersonly/Winter07_PropertyValues.htm>.

Gatti, Ronald F. “Radburn The Town For The Motor Age.” Radburn. The Radburn Association. Web. 1 Dec. 2014. <http://www.radburn.org/geninfo/history.html>.

Kopits, Elizabeth. McConnell, Virginia. Walls, Margaret. “The Trade-off between Private Lots and Public Open Space in Subdivisions at the Urban-Rural Fringe.” Resources for the Future, 1 July 2007. Web. 1 Dec. 2014. <http://www.rff.org/rff/Documents/RFF-DP-07-33.pdf>.

Matthews, Chris. “The Garden City Movement Genealogy Project.” Geni_family_tree. Geni, 1 Jan. 2014. Web. 1 Dec. 2014. <http://www.geni.com/projects/The-Garden-City-Movement/15255>.

McDonell, Lauren. Monroe, Martha C. Tomlinson, Jay. “Land Use in the Rural-Urban Interface: Subdivision Design1.” EDIS New Publications RSS. 2013. Web. 1 Dec. 2014. <http://edis.ifas.ufl.edu/fr275>.

Swann, Chris. “The Practice of Watershed Protection - The Benefits of Better Site Design in Residential Subdivisions.” Storm Water Center. Center for Watershed Protection, Ellicott City, MD, 1 Jan. 2000. Web. 1 Dec. 2014. <http://www.stormwatercenter.net/Library/Practice/46.pdf>.

Image Citations

3 Research Topic

3.21 Urban Agriculture

Scott Miller

Urban Agriculture is the growing of fruits, herbs, and vegetables and raising animals in cities, a process that is accompanied by many other complementary activities such as processing and distributing food, collecting and reusing food waste and rainwater, and educating, organizing, and employing local residents (fiveboroughfarm). As one can tell from the definition, there are several components in urban agriculture. The first and most often associated is the production of fruits, vegetables and other produce. This is a main component but only the surface of what urban agriculture is really about. The next part of raising animals in cities is only starting to become more and more popular recently. The processing and distribution of food is another key element as well as the collection of rain water and the education of residents and children. All of these elements compose the topic of urban agriculture and all of which will be covered throughout the paper.

With 80% of the population living in metropolitan areas, getting access to food is not always an easy task (US census). A metropolitan area includes a city with at least a population of 50,000 people and the adjacent counties which have some relation with the city, such as transportation or work. With such a large majority of the population in these areas a false sense of food security is present. All these people assume that there is an infinite amount of food in the supermarket but the process in which it gets there is not always guaranteed. On average, food travels between 1500-2500 miles before it reaches the store and all that traveling significantly reduces the nutritional value of the food. It also leads to environmental damage from the frequency and distance that large trucks are moving. This primarily affects fruits and vegetables where the nutrients are of the most importance. This is why urban agriculture is growing much more popular today where people in the metropolitan areas are wanting easily accessible and affordable fresh food.

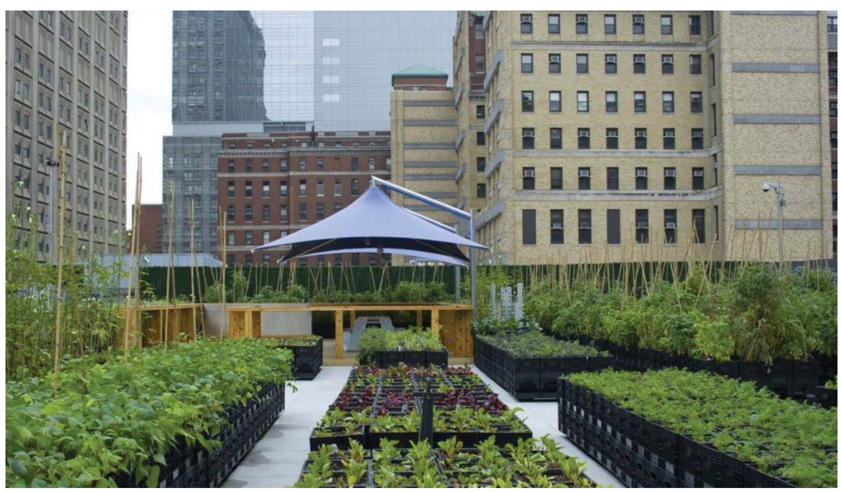


Figure 3.21.1
Food Republic

Types of Urban Agriculture

There are two distinct types of urban agriculture, community gardening and urban farming. Community gardening is at a much smaller scale and is typically found in vacant lots or public spaces. Community gardening allows families to acquire a piece of land to grow their fresh produce. This land is valuable especially in urbanized areas where land is extremely limited. These community gardens are also more individualized in terms of people having their own specific plots and can grow an attachment to what they are producing. By having a plot that belongs to only one person or family, it allows the person to tend to the produce and watch it grow each and every day, building a strong bond with the food in which they are creating. Community gardening also touches on a community scale where each person may have their own specific plot in which they maintain but there are several people that come to the garden for their plots. This is a way of bringing the community together over a common interest. This has the ability of building character in a neighborhood. The last thing that separates community gardening is the fact that people typically refrain from selling the produce that they are growing. The food is typically for themselves and their family as the plots are not large enough to make any real profit.

Figure 3.21.2
Inhabitat

The second type of urban agriculture is an urban farm and the major distinction between the two is that this spans across a much larger area. The primary goal of this is to grow as much fresh produce as possible for the community. Another key component of urban farming is its location near the urbanized area. These will primarily occur on the outskirts of the city but close enough that the transportation of the produce is not detrimental to the nutritional value of the foods. The closeness to the city also guarantees that the food will reach the local food stores and eventually the table of its consumers. However, finding enough space in an urbanized area is the difficult part. Most people agree that all the benefits from urban farming are tremendous but very few people are willing to sacrifice land for this to take place. Other uses for a space such as development can generate a much greater revenue and is typically the route taken. Urban farming does generate some kind of revenue from the distribution of the crops being grown but it is minimal compared to development. This is not a main goal of this type of urban agriculture, however, the production and consumption of fresh and affordable food is of utmost importance.

Figure 3.21.3
Inhabitat

The two typologies share many commonalities when it comes to the main focus of getting healthy foods to urban areas where it is lacking. They are distinct in their own ways and provide alternative benefits they may not be true for the other. Community building and growing a strong sense of attachment to their food is a big part of community gardening whereas providing a vast amount of fresh produce for a large group of people can only be achieved through urban farming. The two are rich in positive benefits and have little downside associated with them.

Figure 3.21.4
Grafton Farmers Market

When urban agriculture reaches the food distribution step in the process it is referring to urban farms where crops were mass produced. The first type of distribution is one most people are familiar with, farmers' markets. Farmers markets are pretty common where urban farms are present because it allows the residents of the urbanized area to go and pick their own food, knowing that it is extremely fresh and difficult to find anywhere else in the area. Farmers' markets ensure that the food is going directly from the farm in which it was grown to the table of the consumer. Many times at this type of distribution, the farmer or farmers will be present at the sale in case people have any general questions about the produce in which they are about to purchase. The questions may vary from which crop has been growing the best, which crops will be ready for purchase next, and the type of techniques that were used in the production of the food. Farmers' markets are also a way for the urban farm to make an immediate income and can use the money gained in order to continue the process of the food harvesting.

The next type of food distribution is growing popularity with the entire urban agriculture movement and that is the farm-to-school programs. Such programs are geared towards ensuring healthy foods to societies most vulnerable age group. This is important as in many urban areas where families struggle with accessibility to these foods and are unable to provide for their children. Programs like this are growing in importance in such areas as obesity continues to be a growing problem in our country. In many urbanized areas, families are sacrificing these nutritional foods for those that are less healthy but are easily accessible as well as affordable. No one can blame these families as they have little options and fresh produce is not provided. This is what makes a program like this so important as it guarantees children access to such foods necessary to grow up being a healthy.

The last program that also focuses on areas that particularly struggle with food security are specific food security initiatives. This takes the farm-to-school program to the next level and wants to further guarantee nutritional food options to all members of a community that extends past the children. These types of initiatives really focus on targeting the communities that struggle with their accessibility to such foods and directly provide them with foods that were grown just outside the area. Initiatives like this are not in existence to generate revenue but are primarily focused on ensuring a healthier community.

All of these distribution options are distinctly different with varying benefits for a particular audience. Farmers' markets are intended to provide all members of a community with fresh produce whereas the farm-to-school programs are really focused on the children. The food security initiatives are targeting the communities that struggle with accessing healthy foods and are typically located in areas of poverty. All distribution options are however, united in the goal of creating a healthier community through locally grown food.

Benefits

The benefits of urban agriculture are range though a wide variety of social, economic and community. The first benefit is the food security. The food is no longer traveling 1,500-2,500 miles to get into the city, however, it is grown locally. The complex food network is taken out of the equation and the guarantee of healthy foods in your neighborhood is strengthened. The large majority of people living in these metropolitan areas are much more likely to feel comfortable knowing that accessibility to fresh produce is not a concern.

Environmental restoration in urbanized areas is also a major benefit to urban agriculture. By creating both community gardens and urban farms, soil and air quality are directly influenced. Areas that would have been impervious surfaces and contribute to storm water runoff are now soils which absorb most of the storm water on site. The soil not only allows water to perculate but it also cleans and filters the water. The environment also benefits with the introduction of biodiversity to the urban setting. It is introducing a variety of plant species that would not normally be found in this type of environment. This also attracts new insects and birds into this distinct environment.

The next benefit associated with community gardening is the development of the surrounding community. After taking and agriculture in the landscape colloquium this was the one thing that stuck out to me. Every garden we went to visit had a unique identity that was due to the people that owned plots there. Each gardener had its own special relationship with the food they were growing as well as the other gardeners at that location. The people shared stories about their past, about the techniques they had learned to grow food and about the various experiences they have had with other members of the garden. Whether it was good experiences or bad, each person was there for a common interest which forced them together regardless of their relationship to one another. This is something unique in society today as there are very few things that require so much time and care. The gardens were a place one could always go where people were present and excited to share. The community not only came together in a single place but by doing so built a stronger relationship with one another in the neighborhood. Doing so usually lead to a spreading of knowledge on successful gardening techniques and how to tend to each plant from a variety of backgrounds and upbringings. This allowed one to know a member of the community at a deeper level than simply passing by on a street.

Economic benefits are primarily associated with urban farms where the selling of produce is an intricate part of the farming process. The selling of produce allows the farmers to make a slight profit, however, most of the money gets returned to the process as crops will need to be harvested once again in the following season. The economic benefits here may not be tremendous but they are definitely a crucial part in the urban agriculture process. Without the money generated through farmers' markets there would be no harvest for the following season as funds would be insufficient. This would be a huge break in the agriculture movement and would be a major setback in providing the community access to an important product.

Figure 3.21.5
Worcester Street Community Garden

Figure 3.21.6
San Francisco Recreation & Parks

Providing a place for recreation and exercise in an urban environment can be difficult as land is often unavailable for such uses. However, community gardens allow for that to take place. Going everyday to a place that requires manual labor and attention in order to create successful produce only further benefits ones health. Many people also enjoy watching and creating food from nothing and consider community garden a great place for them to get some recreation. Introducing children to such gardens also provides a safe place for them to explore and play.

Lastly, whether it is an urban farm or a community garden, people in an urban environment are often searching for a place to escape this fast paced lifestyle. What better place to do so than in a garden type setting. These places can reduce the noise of inner cities as well as provide aesthetically pleasing scenery to escape from the constant development. Many people need this more than they know in such environments and the personal benefits from escaping to a place of comfort and relaxation are endless. Such gardens, no matter the location or size, are often necessary to gain piece of mind and allow one to gather their thoughts.

All of these benefits are directly associated with urban agriculture spaces, not only with the fruits and vegetables being produced. These benefits are individualized as well as community oriented, health related in the consumption of food and the work to create such food and provide spaces that anyone can gain from. Very few drawbacks are associated with urban agriculture and the benefits are seemingly endless which only supports the further positive movement.

Figure 3.21.7
Inhabitat

Urban Form and Agriculture

Urban form and urban agriculture are related through the types of agricultural techniques and the amount of space available. The chart to the right (Figure 2.21.8) is a diagram from The Urban Agriculture Network in which each part of the metropolitan area is separated into various zones. The center of the diagram is designated as the core of the metropolitan area. This area is typically associated with the highest density of people and extremely limited open space. The area is filled with larger buildings, several stories high, with skinny alleys in between. Branching out from the core is the corridor zone. This area is still dense, however, it is less than the core. This area typically shows many of the same building typologies as the core but provide long strips of open space. These strips of open space are usually along main roads or railways. The wedge zone is beginning to push further away from the core and is described as areas that are not suitable for development. These areas are typically flood prone, wetlands, or steep slopes where development is not possible. This zone begins to show larger open areas that are not in competition with developers. The last zone on the outskirts of the area is called the periphery. The periphery is the rural-urban fringe where the transition to a rural area is prevalent. This zone is important in providing more expansive open space as well as being in a close proximity to the core.

Each of the zones are unique in their own way and each provide there own challenges for gardeners. The core is an area where space is extremely limited so community gardeners are limited in options while urban farms are not possible. Gardeners have begun to develop on rooftops of buildings where not only are they getting access to fresh food, but they are also providing several environmental benefits associated with green roofs. Temporary lots and public parks are also sought as spaces for community gardens but are often dismissed as inappropriate functions for the space.

The corridor is home to several elongated garden options. Again, with space being limited, options to create a garden are limited. In addition to the techniques used in

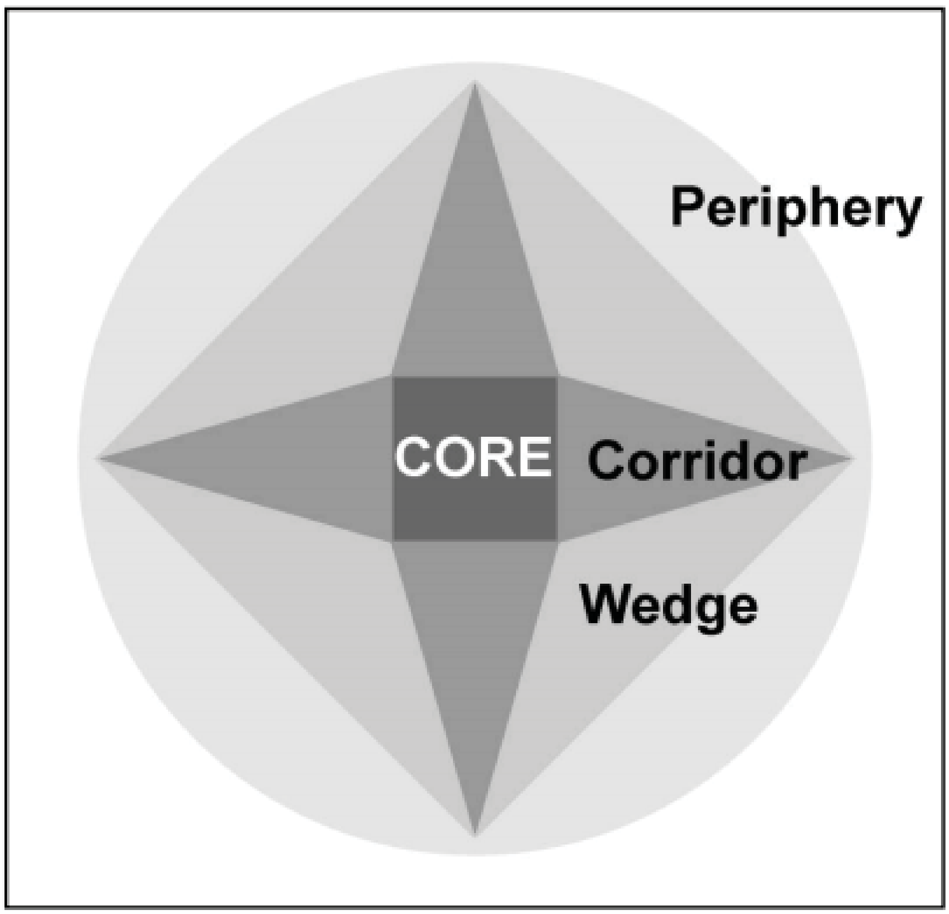


Figure 3.21.8
The Urban Agriculture Network

the core zone, community gardeners have added plots along main streets and railways. Although this may not be as secluded of a location, it is still a viable option and adds aesthetic value to the street experience. This zone is also where you begin to notice smaller intensity crops as longer crop production is possible. Small livestock are also introduced in this type of area as density is not as high as the core.

The wedge zone is where the idea of urban farming begins to be a possibility. The areas that are undeveloped due to water are generally ideal locations for crop production. Areas that are affected by severe slopes are also capable of providing certain crops with nutrients. It is also common to see terrace plantings created with these slopes as that has been a proven technique for success over history. Some larger scaled community garden are certainly possible in areas such as this where there is no competition with developers. Smaller urban farms are also possible in the wedge zone and can produce enough crops to supply distribution programs. High intensity crops are introduced to the metropolitan area and rows of orchards are possible for fruit trees.

Periphery zone can accommodate all types of urban agriculture. Land is not really an issue as it is further away from the core. Small to medium sized farms are common here where there is enough land to sustain. The benefits of this zone are that a large amount of crop are being produced with a minimal transportation cost and little damage done to the fresh produce.

This diagram describes directly how urban form and agriculture are related focusing primarily on the availability of open space in each zone. The density of each area is a major factor in the typology of urban agriculture, the crops you are able to produce and the experience you get from being in the garden. The greater the density the more creative people need to be in order to grow food. The high density also puts a limit to the number of crops you can grow as the space only permits so much. However, the limited space allowed for the garden only increases its personal value as people will rely on it for various benefits mentioned before.

Figure 3.21.9
City Farmer News

With a reduction in the density of as you move away from the core, the restrictions become much less to worry about. With this, the meaning of open space is not as valued. With an abundance of space around, one is not desperately seeking to find sanctuary from the constant built environment. The open space in these less dense areas are still an important space for those residents in the denser locations as they rely on these outside areas for food and other necessities.

Open space is also the factor that distinguishes these metropolitan zones. Open space and density are also related with one another and generally regulate urban agriculture entirely. It is this relationship in which gardeners try to balance as they struggle to find the appropriate resolution to the space in which they are restrained to.

Implementation

It is difficult for urban agriculture to grow as the implementation process does not cater everyone. Urban agriculture can be implemented through policy based approach, which makes it difficult for farmers who have very little political power. The most common way to designate a space for urban agriculture is through the use of zoning. Currently, the land used by most community gardeners is either public or vacant land. Both sites do not specifically permit urban agriculture as a use for the space, therefore they can be replaced at any time by the city if they find better use and can generate a revenue. This leads to several community gardens today being only temporary. In order to create urban agriculture as a permanent use of a space, planners need to recognize it as the intended use in the zoning code. This gives the community garden legitimacy and cannot be relocated.

The next way of implementation is through a cities Comprehensive Plan for the future. This notifies the residents that the city plans on moving towards a more agriculture friendly route and they are focusing on providing fresh food. An example of this is in Berkeley, California where they state in their Comprehensive Plan that, “additional space is desired for community gardens”. By stating this, it gives priority to community gardening wherever open space may occur. So if a developer wanted to build affordable housing in a vacant lot and the residents pushed for community gardening, the land would be designated for gardening despite the possible revenue from the housing. This shows that the city cares more about the health and well-being of its residents rather than being focused on the money aspect.

The last method of implementation is through state and local legislation. This is how gardeners can receive land grants from the city in order to legally purchase a space that they then deem as a location for agriculture. Local legislation also has the power to specify the uses of land similar to planners.

All these methods of implementation are not possible for most people wanting to begin community garden as they are often left for planners and local government. People do have the power to elect those specific people into power and they can make strong arguments for their installation. However difficult it may be, the benefits are undeniable and this urban agriculture movement is growing considerably over the past decade.

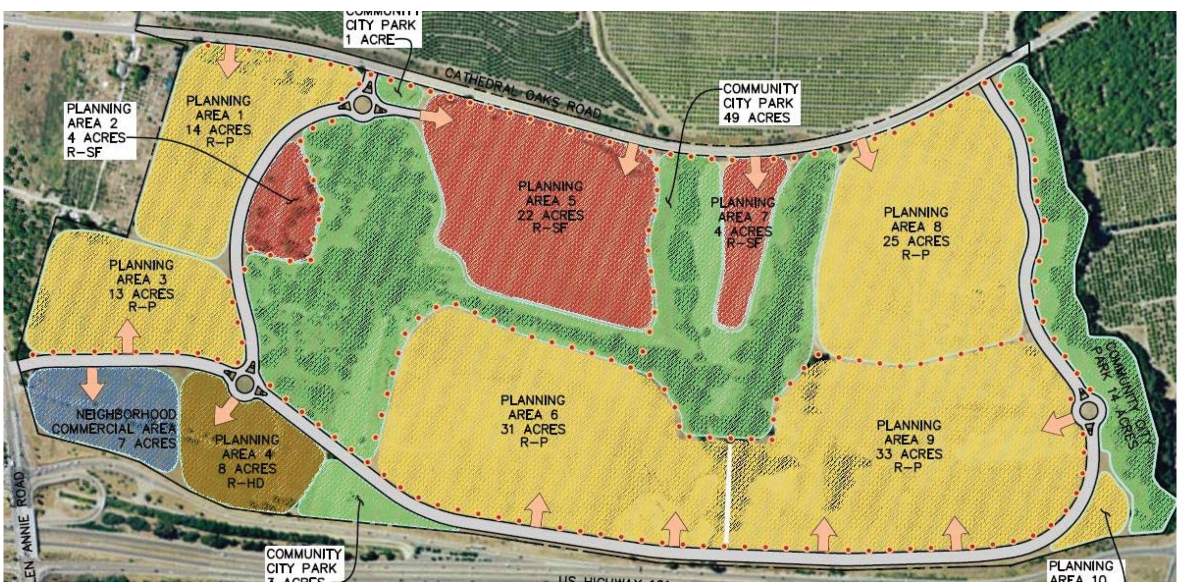


Figure 3.21.10
Food Republic

Works Cited

Levenston, Michael. “Urban Rooftop Agriculture.” Accessed November 4, 2014. http://www.cityfarmer.info/2011/11/04/report-urban-rooftop-agriculture/

Michaels, Trish. “Are Backyard Chickens Legal.” Accessed November 4, 2014. http://sustainablenorthflorida.org/are-backyard-chickens-legal

Urban Agriculture. Accessed November 5, 2014. http://urpl.wisc.edu/ecoplan/content/lit_urbanag.pdf

Ward, Lesley. “How to Start an Urban Beehive.” Accessed November 5, 2014. http://www.urbanfarmonline.com/urban-livestock/bee-keeping/start-beehive.aspx

Table of Figures

Figure 3.21.1
West, Eleanor. “Urban Agriculture is on the Move.” Accessed November 4, 2014. http://www.foodrepublic.com/2011/10/18/urban-agriculture-move

Figure 3.21.2
Barth, Brian. “NYC’s Design Trust for Public Space Launches Urban Agriculture Data Collection Portal.” Accessed November 5, 2014. http://inhabitat.com/nycs-design-trust-for-public-space-launches-urban-agriculture-data-collection-portal/

Figure 3.21.3
Barth, Brian. “NYC’s Design Trust for Public Space Launches Urban Agriculture Data Collection Portal.” Accessed November 5, 2014. http://inhabitat.com/nycs-design-trust-for-public-space-launches-urban-agriculture-data-collection-portal/

Figure 3.21.4
Michaels, Trish. “Are Backyard Chickens Legal.” Accessed November 4, 2014. http://sustainablenorthflorida.org/are-backyard-chickens-legal

Figure 3.21.5
Worcestor Street Community Garden. Accessed November 4, 2014. http://worcesterstreetgarden.org/blog/

Figure 3.21.6
Community Garden Program. Accessed November 5, 2014. http://sfrecpark.org/park-improvements/urban-agriculture-program-citywide/community-gardens-program/

Figure 3.21.7
Barth, Brian. “NYC’s Design Trust for Public Space Launches Urban Agriculture Data Collection Portal.” Accessed November 5, 2014. http://inhabitat.com/nycs-design-trust-for-public-space-launches-urban-agriculture-data-collection-portal/

Figure 3.21.8
Urban Agriculture. Accessed November 5, 2014. http://urpl.wisc.edu/ecoplan/content/lit_urbanag.pdf

Figure 3.21.9
Levenston, Michael. “Urban Rooftop Agriculture.” Accessed November 4, 2014. http://www.cityfarmer.info/2011/11/04/report-urban-rooftop-agriculture/

Figure 3.21.10
West, Eleanor. “Urban Agriculture is on the Move.” Accessed November 4, 2014. http://www.foodrepublic.com/2011/10/18/urban-agriculture-move

3 Research Topic

3.22 Floating Structures as a response to Urbanization

Sandra Grosso

Climate change and urbanization are putting immense pressure on our urban landscapes and infrastructure. The possibilities for increasing urban density are becoming more limited as we continue to run out of space. Koan Olthius and David Keuning, the founding principles of Waterstudio.NL, are proposing that we make use of the water. Waterstudio is the first architecture firm in the world exclusively dedicated to living on water. Together the partners have published the book FLOAT!. Their book proposes urban development on floating foundations because building on water they say would allow for flexibility which increases the ability to plan for future change on an ongoing basis.

The search for space in which to accommodate people and their belongings is an age old problem. The main solutions in the past have been to build up and to dig down. The invention of the first lift with a safety device in 1854 by Elisha Otis allowed the skyscraper to emerge. This new technology allowed for a large increase in the number of stories with the ability to be able to ascend them quickly. "In this way a relatively modest invention radically changed the appearance of the big city for all time." (Olthuis and Keuning 79) Since then the principle of the skyscraper has remained the same and we are continually reaching new feats with just how high into the air we can build. "Continuing to build up will result in extremely vertical cities; stacking does certainly increase density but not necessarily the quality of life." (Olthuis and Keuning) Thinking about the space under the city with new technology that has allowed us to build underground has also opened up new possibilities. Many cities have their transportation systems underground, saving a lot of surface area which could be put to other uses. Some cities have built all types of buildings underground. These structures have been found to be advantageous with regard not only to space but also to climate. Montreal, Canada has been nicknamed the "double decker city". It has the largest underground complex in the world. Montreal has a series of tunnels with 120 entrances that connect the city's subway system with commercial, residential and business spaces both above and below ground. (John Zacharias) In the cold Montreal winter more than 500,000 people use this space every day as a shelter from the cold above. (Olthuis and Keuning 85)

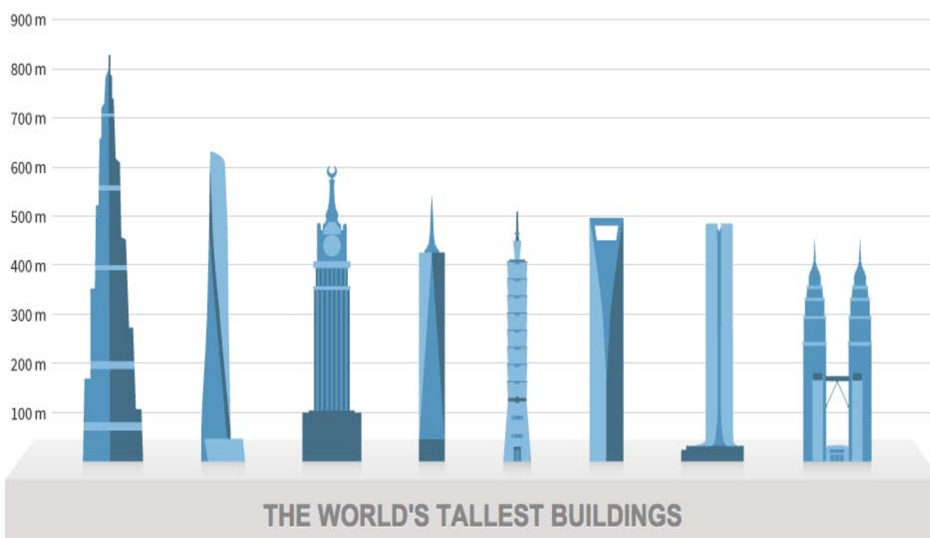


Figure 3.22.1

As planners turned underground to help solve the density problems in cities, they have discovered the unplanned benefit of improved connectivity. The Houston Tunnel System is a network of air conditioned tunnels that connect 95 downtown city blocks. 150,000 people use it every day especially in the summer as a relief from heat or when it is raining. It is also a "travel destination in its own right" with its underground system of houses, shops and restaurants. (Houston Downtown Management District) Today cities are looking into building underground as a serious alternative as a response to lack of space. "High-rise buildings and the underground are normal components of every large city these days. They are an integral part of the concept most people now have of urban space. But a few centuries ago they were just ideas, which turned the image of the city that had existed until then upside down. " (Olthuis and Keuning 88) The authors remind us that building up and digging down in the extreme ways that we do today were not even imaginable a century ago. In the same way, the authors believe that building on water, will also become a widely accepted idea as another solution to density.

Density in cities has greatly increased in the last two hundred years, mainly as a result of the development of high-rise buildings. "For the first time in history more people worldwide live in towns and cities than those who live in the country." By 2050 it is expected that 70% of the world's population will live in urbanized areas. (Olthuis and Keuning 21) This makes the livability of our cities even more important as they will be home to most of the worlds population. Most cities were founded on water, the same element that once allowed them to prosper is now threatening their existence. 90% of the worlds 100 largest cities in the world are located on water, whether it be on rivers, canals, harbors, bays, or the sea. (Olthuis and Keuning 25) The water is a spatial element to these cities and Olthuis and Keuning are saying we should use this valuable open space to build for the future.

Olthius challenges planners to view the building of cities in a different way. Rather than reacting to what is needed in the short term, he suggests that we begin to build places that are more flexible and able to adapt to the unforeseen needs and developments of the future. He points out that cities are dynamic places, yet we build a structure for today that is difficult to adapt to tomorrow. He hopes to spread the idea of creating flexible infrastructures and building on water he believes will make that possible. (Olthuis and Keuning)

Our need for space will always be changing due to social change, political and economic issues and technological advances. As World War II ended, there was an increase in the number of households but families were becoming smaller. Many suburban communities with small cookie cutter houses flourished. Today we are experiencing another shift in the family as offspring stay within the family household for a much longer period of time than in the past. We also see the average life expectancy rising. Baby boomers are entering their retirement years and aging in place is becoming more desirable. Life expectancy is increasing and people want mobility. These social changes mean changes in the type of housing and services people need and want. Rather than large suburban houses, many people are now seeking other options such as apartments that cater to older adults, multi-generational homes, and homes that can adapt to changing needs as people age. (Olthuis and Keuning 26-27)

Spatial planning is determined by more than just social change however. Spatial layout can be dictated by political, military and government issues as well. Since elected officials must run for office frequently, their goal is to please those voters. When making decisions about how to spend money on development, and what types of development will be approved, a short term view is adopted. Yet, large scale urban planning requires looking forward to the coming decades. It means considering not only what we want and need now, but how we can plan for future generations. The military defense of countries and cities can also impact the way communities are planned. Paris is an example of this. Promenades and straight boulevards replaced small winding roads in order to enable increased visibility on the part of military, and increased control by the government in the event of opposition or riots. (Olthuis and Keuning 28-30)

The rate at which change happens is much faster now due to increased population numbers, increased global communication and mobility, and an increase in technological possibilities. This means that metropolises that are flexible will be more economical and necessary in the future. In order to be flexible, a different way of thinking has to be adopted. The idea that a building is attached to one location for as long as that building stands is an idea that must change. The emergence of Zipcar and Citi bikes are both examples of flexible transportation and support a similar principle. The possibility of relocation for a building means that different owners in different locations can use a site for different purposes over the course of time. Building on water may be the best way to make that idea a reality. One example that the principles of Waterstudio give is Olympic buildings, which often fall into disuse after the worldwide event is over. They point out what a shame this is because the amount of energy that goes into planning is immense and the architecture is usually impressive. They imagine that if these buildings were floating structures they could be moved to different locations that will require that specific use, such as a stadium or a building that houses Olympic swimming pools, and not allow the building to become obsolete. (Olthuis and Keuning)

Figure 3.22.2
Olthius and Keuning forsee floatable structures being able to be transported thousands of miles inbetween cities.

Waterstudio works to change the general publics perceptions on floating buildings in the hopes of it gaining momentum and becoming a reality. They stress that it is actually not that different to build or live on water than it is to on land, the only difference lies within the foundation. The fact that there are few large scale floating projects for reference makes it hard to be generally accepted by a wide range of people. They envision that the first step towards floating cities is “trading places.”

“Now that building on water no longer has technical and financial restrictions trading places is the first logical step towards full fledged use of water ground for urban developments.” (Olthuis and Keuning 62) Spaces such as parks, green areas, sports grounds, and golf courses have low economic value to cities and often fall under pressure to be built upon. These areas have a low load and would require a simple floating foundation making them a great place to start introducing this idea to cities and their users. This would free up a lot of land that could then be built upon with more profitable functions while maintaining green space within a city. In addition this shift would once again spatially reunite a cities mainland to the water. Often times this relationship is severed by infrastructure such as roadways or rail liens and this would restore that relationship. (Olthuis and Keuning) NYC is a prime example of this the island is enclosed by highways on either side acting as a barrier between Manhattan and the water.

After floating structures are built and become larger in scale they envision additions of large floating districts that can be attached to the existing city pattern or grid. (Olthuis and Keuning)

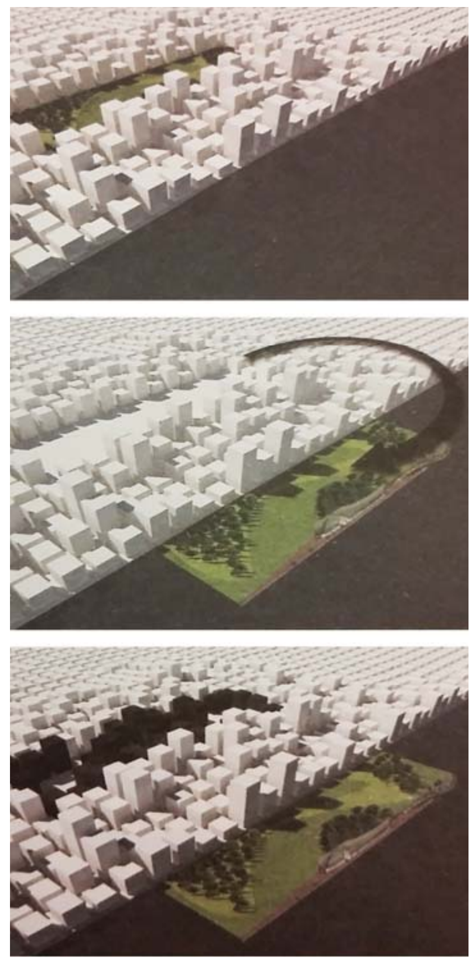


Figure 3.22.3
Proposal to move park space to the water and build in its former footprint.

“Expanding urban fabric over the water is not new.” (Olthuis and Keuning 64) In planning history filling in water to create artificial land has been the standard way to meet the growing demands for space. Manhattan has been reclaiming land from its waterfront for expansion throughout its existence. The idea of expanding over the water may not be new but this specific application is. Floating structures are a new, innovative, and perhaps better way to meet this continued demand. Olthius Koen and David Keuning have big dreams for the future of urbanization, from fighting against water to living with water. It is new ways of thinking and breaking existing perceptions that allow for advance.

Figure 3.22.4
Three step expansion design for Tokyo Bay by Waterstudio.

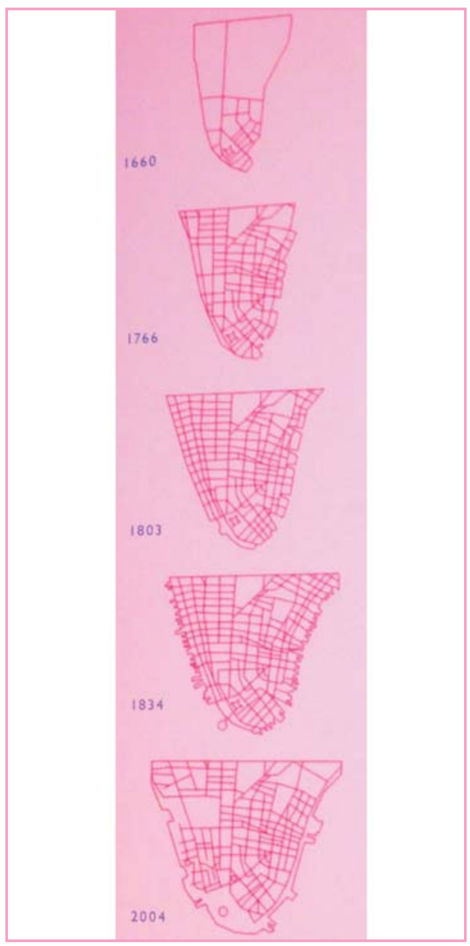


Figure 3.22.5
Evolution of lower Manhattan from 1660 to 2010.

REFERENCES

Houston Downtown Management District. Downtown Houston. n.d. 2014 15-November. <http://www.downtownhouston.org/district/downtown-tunnels/>.

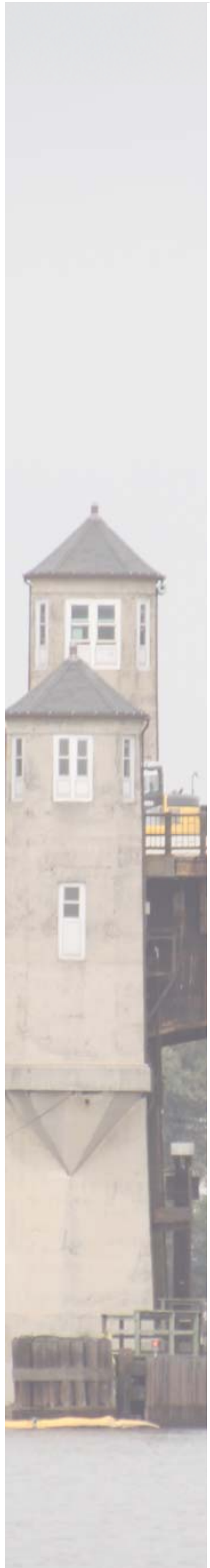
John Zacharias,PhD. “Montreal’s Underground Labyrinth.” 2003. EFUC. 2014 15-November. <http://www.efuc.org/old/suderburg03/papers/5-Zacharias.pdf>.

Olthuis, Koen and David Keuning. FLOAT! Building on Water to Combat Urban Congestion and Climate Change. Amsterdam: Frame Publisher, 2010.

IMAGE CITATIONS

3.22.1. http://www.urbanews.fr
3.22.2 FLOAT! p.68
3.22.3. FLOAT! p.55
3.22.4. FLOAT! p.62
3.22.5. FLOAT! p.64

4 DESIGN




CABLE
CROSSING
DON'T ANCHOR


NATIONAL BANK
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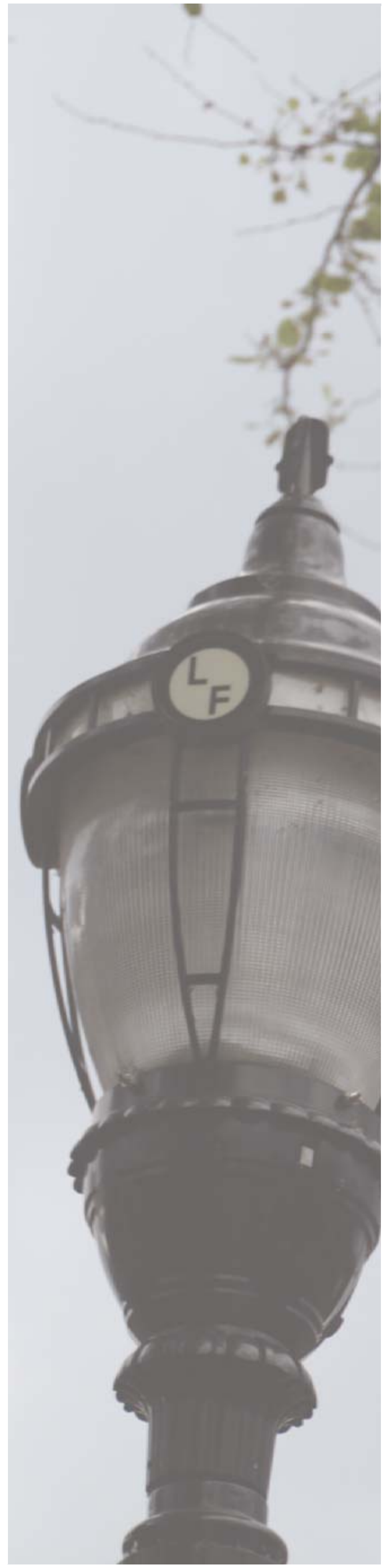
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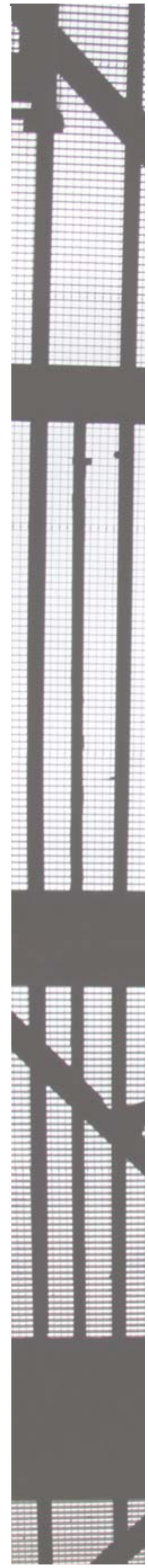


4.1 Small Steps to Resiliency

4.1.1 Morphological Box

Ellen Gallagher
Arturo Hernandez
Grace Kinney

The redesign for the area of Little Ferry that borders the Hackensack River creates a unique opportunity to reevaluate the foundation of the town on environmental, economic, and social levels. This design incorporates a phased approach that will function throughout the planning process and into implementation. Through this design our main goal is to reach a compromise between the environmental, economical, and social aspects of Little Ferry in the safest manner possible. Largely this would be dictated by the location of the berm to create a balance between new development, existing infrastructure, and flood protection. Goals we wish to achieve environmentally include flood protection through creation of a berm or various other methods. This would create habitat to enhance biodiversity and help with remediation of soil and water pollution. Additionally, creating an environment where people can reconnect to nature through a floodable park. Moreover, the design should incorporate storm water management that works in conjunction with the proposed levee system to alleviate existing sewage and water overflow issues. In economic terms, it is important to manipulate an equilibrium between new residential and commercial development and the existing economic community of Little Ferry. We wish to attract new residents and tourists to bring revenue to Little Ferry thus reducing the load of high property taxes on current residents. This brings a challenge of marrying various socioeconomic classes. Therefore, our primary concern is creating a safe and stable environment that will allow for socioeconomic growth which enhances the current identity of Little Ferry. Ultimately the issues we need to solve are Urban Form, Trees and Plants, Hydrology, Open Space, Circulation and Land Use.

Figure 4.1.1.1 working morphological box

Figure 4.1.1.2 final morphological box

Urban Form

The buildings and open space on the site do not express a social, cultural, or functioning economic system. An ideal urban form should seamlessly integrate the built and unbuilt environment. Additionally, this should be expressed by the vernacular of the region.

1. Views out
2. Social Space (indoor and outdoor)
3. Open Space

Trees & Plantings

Little Ferry's streetscapes and parks lack a significant ad meaningful presence both in aesthetics and function. Plantings should support a system of aesthetic and environmental values, establishing a sense of place.

1. Views
2. Shapes Open Space
2. Non-Invasive
3. Cohesive Plan
4. Provides Habitats

Open Space

The quality of the open space on site does not support meaningful user interactions. In fact, the open space on site is largely paved and uninviting. Even the adjacent park, although spacious in size, does not encourage neither programmer nor un-programmed activity. Collectively there should be a balanced amount and quality of open space to serve users.

1. Views
2. Programmed & Unprogrammed
3. Supports Community Interactions

Circulation

The town of Little Ferry lacks fluid connections in terms of pedestrian, bicycle, vehicular, and public transit throughout the town and beyond its boundaries. A functioning circulation system should have these elements working together to create efficient and safe travel.

1. Views
2. Pedestrian Friendly
3. Public Transportation
4. Bike Friendly
5. Easy Access to Waterfront

Hydrology

The geographic location and topography of Little Ferry makes the town prone to flooding from the river, as well as susceptible to storm water issues. Ideally, a well-functioning system should be able to integrate flood-protection mechanisms, as well as an improved storm water structure to improve the hydrologic conditions of the town.

1. Protects town against river flooding
2. Keeps storm-water out of sewer systems
3. Uses green infrastructure to ease flooding

Land Use

Little Ferry's current Land Use is mainly industrial and commercial properties along the Hackensack River's waterfront, with the exception of small areas planned for residential uses. This arrangement is uninviting for residents since some of the industries along the river have privatized the land, and the residents have spotty access to the waterfront.

1. Commercial/Industrial that promotes access to waterfront
2. Adds open space
3. Considers existing residents

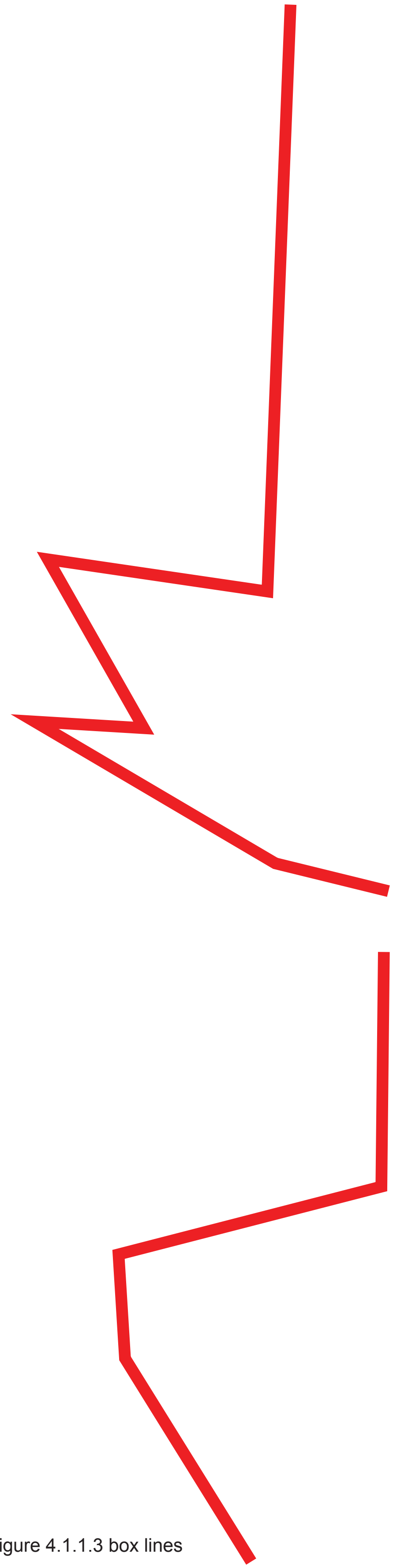


Figure 4.1.1.3 box lines

4.1 Small Steps to Resiliency

4.1.2 Midterm Project

The intent of this design proposal is to find a balance between the environmental, social, and economic aspects of the borough of Little Ferry.

The criteria involved in this redesign considers urban form, open spaces, overall circulation, hydrology, plantings, and land use.

A design that seamlessly incorporates these elements will strengthen and invigorate the town, turning Little Ferry into a desired destination within the New Jersey Meadowlands.

Following issue identification, the design process moved into reconsidering Little Ferry's existing zoning. The newly proposed zoning strategy revitalizes Main Street creating an important commercial core, enhances the open space areas drastically, provides larger zones for higher residential density, as well as locations for mixed-uses.

Figure 4.1.1.4 Zoning Map

Figure 4.1.1.5 Zoning Map

low density residential

medium density residential

downtown commercial district

municipal

flood protection

open space

water bodies

Figure 4.1.1.6 Concept Plan

The concept for this design creates a fully functional transit oriented development that revolves around the environmental, social, and economic aspects of the town.

The space is both shaped and reorganized by a protective berm, which allows for access between development and open space, not a barrier.

A light rail system would be implemented throughout the meadowlands region, bringing people right through Main Street in Little Ferry and over the Hackensack RIver.

A commercial downtown, in juxtaposition to large open spaces along the river encourages residents and visitors to enjoy all that Little Ferry has to offer.

New medium density residences will attract commuting professionals who can take advantage of the recreational marsh and parkland in addition to the light rail, or pedestrian and bike friendly bridge to a new train station.

Figure 4.1.1.7 Section A: The Plaza

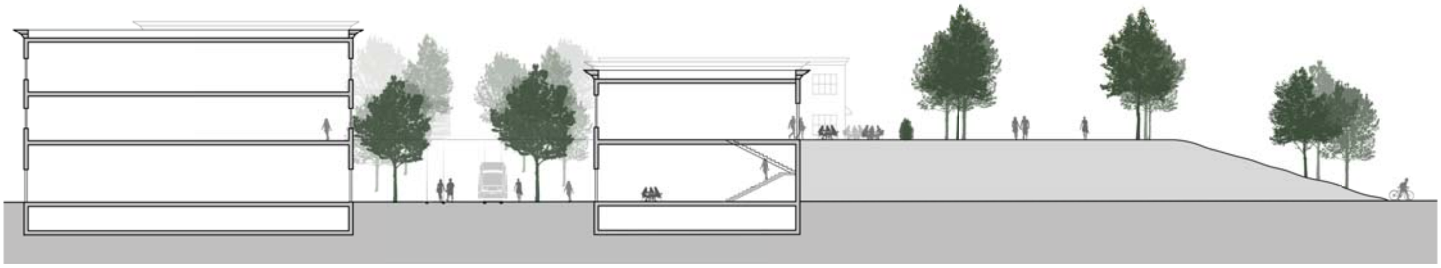


Figure 4.1.1.8 Section B: Downtown

Figure 4.1.1.9 Section C: Downtown

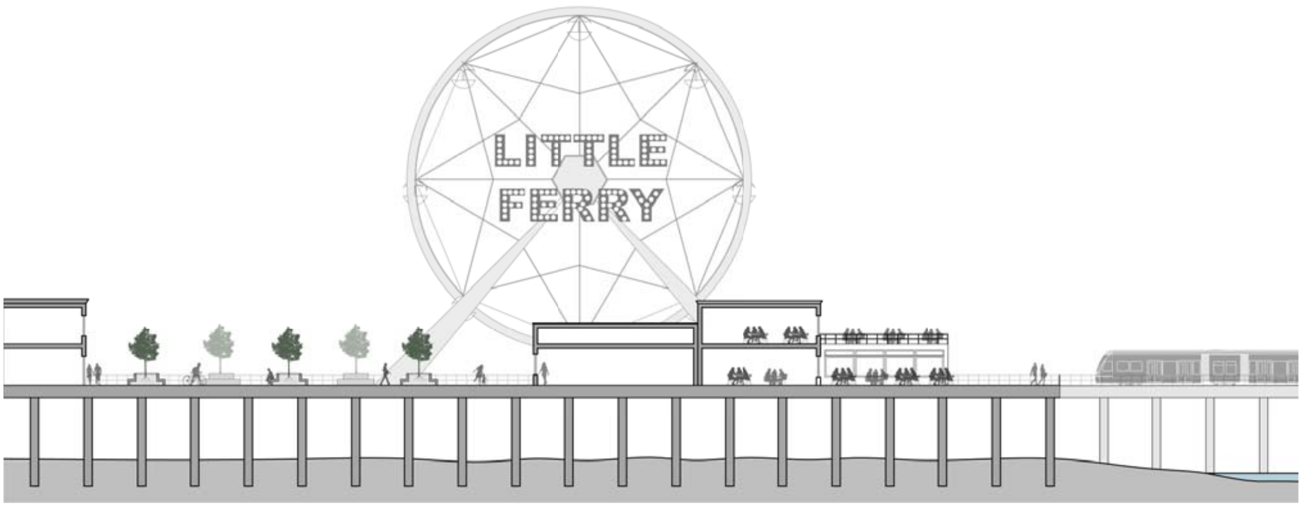


Figure 4.1.1.10 Section D: The Pier

Section A: The Plaza
The Plaza is the core of the downtown district and is anchored by a new townhall. A grand staircase leads to a plaza overlooking the park, and a light rail station provides easy access to the area.

Section B: Downtown
The Downtown Streetscape is marked by an allee of trees along a pedestrian road. Small shops and restaurants line the street, and some have a rear entrance along the park to create interest.

Section C: Downtown
This section shows how a slight incline would be added to the existing streetscape, allowing pedestrians and the light rail to scale the flood protection structure.

Section D: The Pier
The Pier is an extension of the downtown area, and contains shops and restaurants, as well as a large plaza. A ferris wheel makes Little Ferry visible, and a drawbridge provides access to a new train station.

Figure 4.1.1.11 Washington Street

Figure 4.1.1.12 View from Rt. 46 Bridge

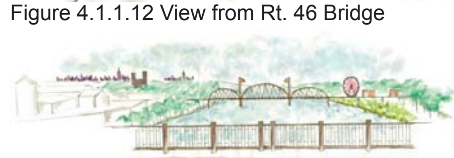


Figure 4.1.1.13 Main Street

4.1.3 Final Urban Design

Figure 4.1.1.16 Concept Plan

Figure 4.1.1.15 Meadowlands Light Rail Transit

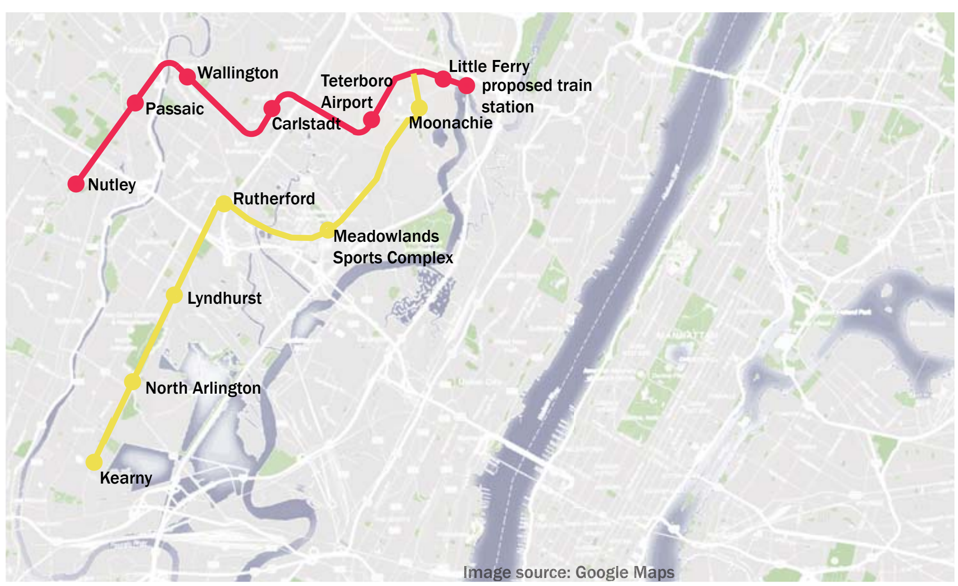


Figure 4.1.1.14 The Numbers

11.5 units per acre net density

2.5 units per acre gross density

66 private parking spaces

370 parking spaces in garage

4.1.3 Final Urban Design

4.1.3.1 Walkable

Ellen Gallagher

Main street in Little Ferry is re-envisioned as the center spine of the town, providing structure and identity to this small town. The vehicular access is restricted as the road gradually rises to meet the berm. This absence of vehicles creates a unique and exciting pedestrian oriented streetscape. Shops, restaurants, businesses and apartments line the road. The architectural style pays homage to the history of Little Ferry's clay industry, while still harboring an inviting environment. The anchor of the new downtown is the new Little Ferry Town Hall and Municipal Building. Next to the town hall is a unique civic plaza, which is designed to be inviting both in the day time and at night. The directionality of the different paving materials are in reference to the major draws of the area: Main Street, Town Hall, the residential neighborhoods, Willow Lake, and Willow Park. Lights, benches, and planters emerge from the paving pattern generates interest. The plaza serves as a gateway to the neighboring park and encourages users to walk towards Willow Lake. Park users can also access the stores from the park, which creates a seamless experience from park-scape to streetscape. Parking is located in a convenient parking deck, but the convenient light rail stop is the real draw to the new Downtown Little Ferry. Here, residents and visitors alike can enjoy all that Little Ferry has to offer.

Figure 4.1.1.17 Plan

Figure 4.1.1.18 Section A-A'

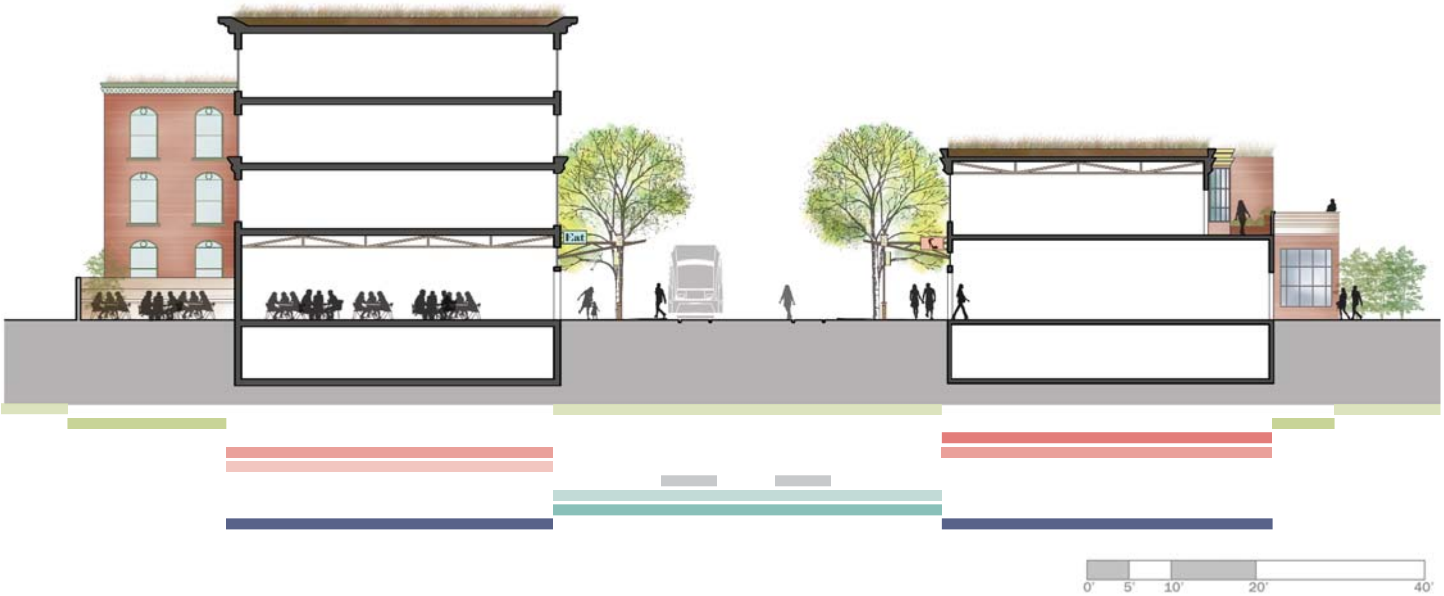
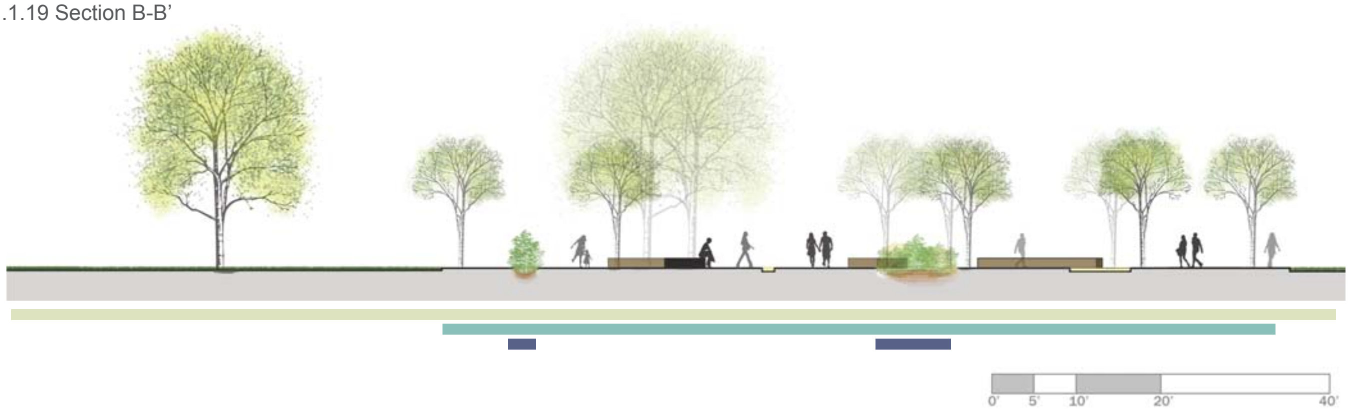


Figure 4.1.1.19 Section B-B'



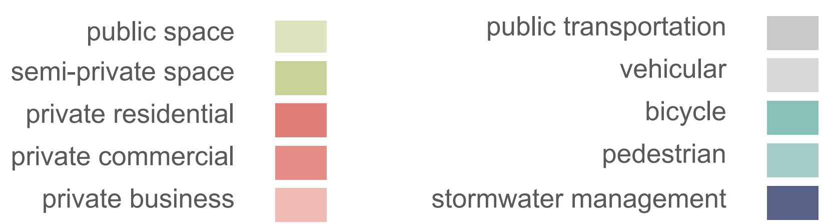


Figure 4.1.1.20 Space and Use

Figure 4.1.1.21 Civic Plaza: Enlargement Plan

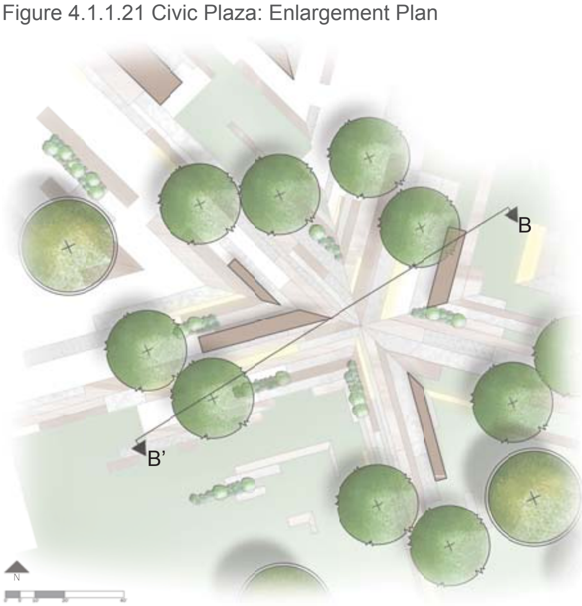
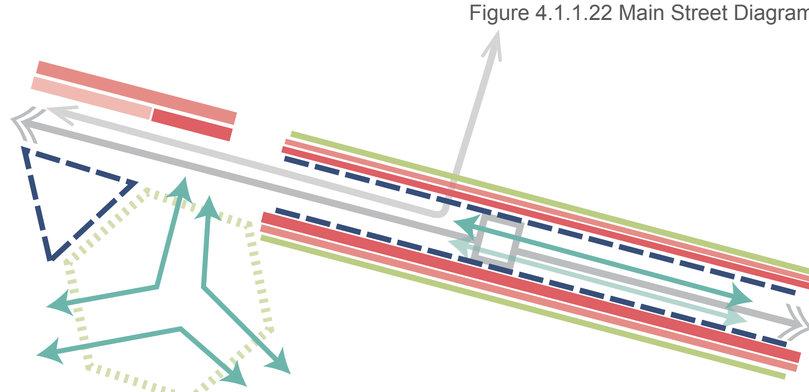


Figure 4.1.1.22 Main Street Diagram



4.1.3 Final Urban Design

4.1.3.2 Densify

Grace Kinney

Connecting Little Ferry's residents to the rennovated downtown is a fundamental goal of the new residential development between the Main Street and Poplar Avenue. Building facades with porches and balconies combined with consistant street treee plantings help to shape the street creating a safe and welcoming environment for residents and visitors alike. New infrastructure addresses stormwater management through greenroofs, bioswales, and a large urban farm above the parking garage, that presents local eateries with fresh food. Overall the new residences allow for Little Ferry to densify their downtown district and provide properties close to the Hackensack river, open parkland, and a lightrail stop to the surrounding cities, while keeping the character of Little Ferry alive.

4.1.1.23 Plan

public space
semi-private space
private residential
private commercial
private business

public transportation
vehicular
bicycle
pedestrian
stormwater management

Figure 4.1.1.20 Space and Use

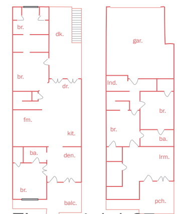


Figure 4.1.1.27

row house
27 total structures
1 unit per structure
4 bedrooms per unit
108 bedrooms total
architecture source: regent homes

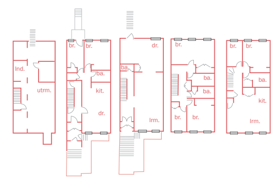


Figure 4.1.1.28

town house
16 total structures
2 unit per structure
7 bedrooms per unit
112 bedrooms total
architecture source:
kichi architectual design

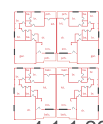


Figure 4.1.1.29

fourplex
3 total structures
4 unit per structure
12 bedrooms per unit
36 bedrooms total
architecture source:
monster house plans

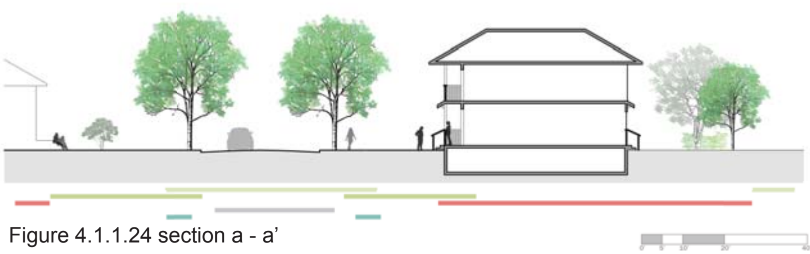


Figure 4.1.1.24 section a - a'

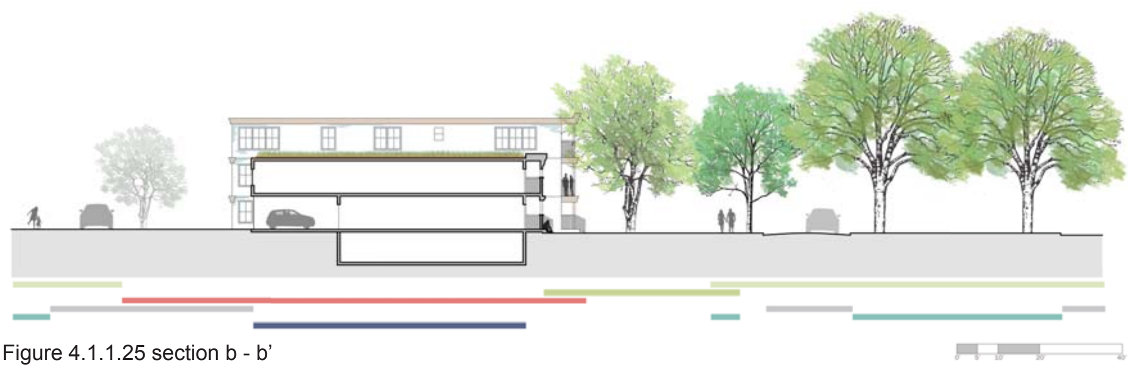


Figure 4.1.1.25 section b - b'

46 new buildings
71 total new units
Figure 4.1.1.30

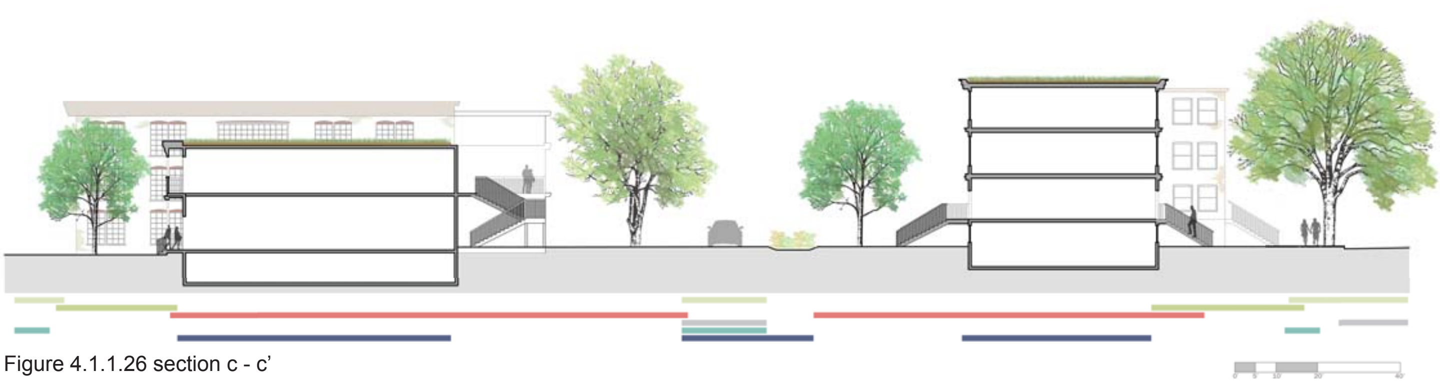


Figure 4.1.1.26 section c - c'

4.1.3 Final Urban Design

4.1.3.3 Connect

Arturo Hernandez-Sangregorio

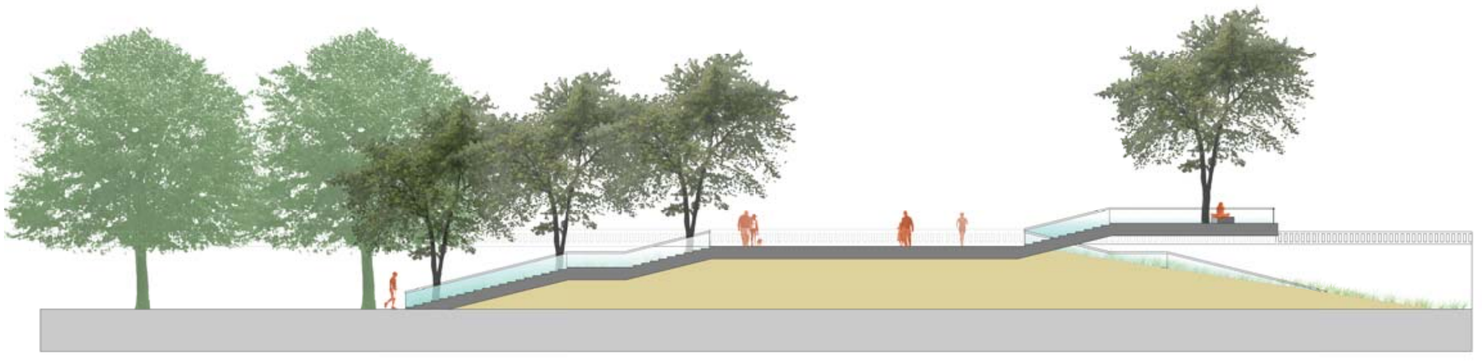


Figure 4.1.1.31 section a - a' : the overlook

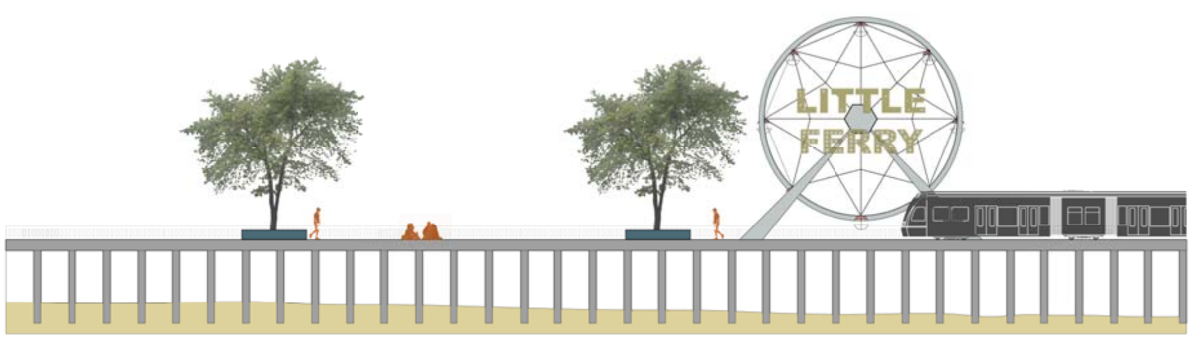


Figure 4.1.1.32 section b - b' : the pier

Little Ferry's need for extensive protection along the hackensack riverfront calls for the implementation of strategies to protect the town from future flood events. A 15 foot berm would meet the height requirement to protect Little Ferry against such issues, however it would also intensify the disconnection between the town's inhabitants and the water's edge. The purpose of this design is to use the berm as a connection rather than a divisor by maximizing open space on and along it. The berm will then fulfil not only the flood protection requirement, but also the ideology of reconnecting the people back to the waterfront.

1. active recreation field
2. overlook ramp
3. floodable marshland
4. elevated pier
5. boat launch / deck
6. amphitheater

Figure 4.1.1.33 Plan

4.2 Living on the Edge

4.2.1 Morphological Box

Theresa Hyslop, Mark Lacey, and Nanxing Zheng

After the inventory and analysis phase of our project was complete, the class moved on to test designs, which began with the use of an important and imformative tool, the morphological box is a set of ideas that are organized intocategories that were determined after analyzing the major issues found in Little Ferry. Our group developed the following categories: Open space,transportation, vegetation, ecology, urban form, flood protection, circulation and access, zoning, as our focus areas for the intitial stages of design.each category has a problem statement, and contains 5-6 varying solutions including the status quo as one of them. For example, one of the flood protection method is to retreat to a higher elevation area rather than stay with the berm, which is a drastic change compared to other options that is to stay within the berm. Although we would choose this option based on our criteria at first, this option is being abandon eventually after comprising with the other problems.

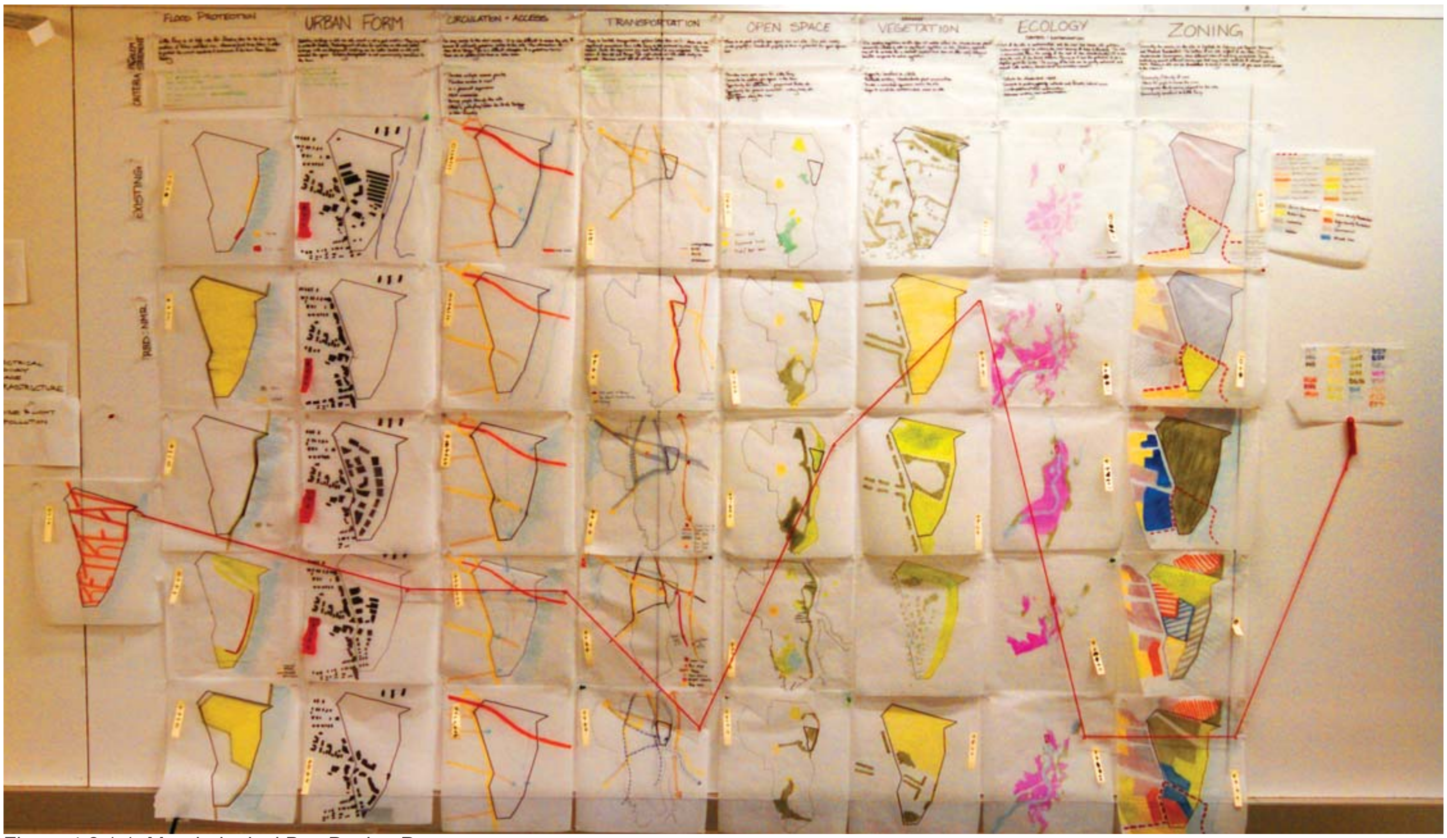


Figure 4.2.1.1. Morphological Box Design Process

The problem statement and criteria for each category are:
Flooding protection
Problem: Little Ferry is at high risk for flooding due to its low-lying condition and future sea level rise. Measures need to be taken in order to protect the current residents and businesses of the town from future flooding.
Criteria:
-can withstand 500 year storm, sea level rise and wave action
-can not damage nature habitat
-be more economical
-less maintainace

Urban form
Problem: exsiting buildings on site are old, vacant or not in good condition. They may not be suitable for flooding. Redevelopment will allow for new users on site and better buildings. With new development building can be better located on site and enhance the space. Exsiting development is not economically beneficial to the town.
Criteria:
-support a variety of users
-well organized or arranged
-frames open or urban space
-balance developed and open space

Circulation and access
Problem: no easy access to the river exsits. It is also difficult to access the site because of unfriendly pedestrian routes to the site. The intersection of Main street and Bergan Turnpike is a difficult intersection and a pedetrian barrier. There are no exsiting bike lanes or bike racks.
Criteria:
-provides multiple access points
-provides access to the Hackensack river
-ADA accessible
-Brings people through the site
-connects to the other side of Rt. 46 is bike-frinendly
Transportation
Problem: there is limited transortation options(other than car)--there are no significant connection from Little Ferry to the surrounding areas via mass transit. Route 46 experience very bad traffic is very congested. The intersection of Main street and Bargan Tpk right outside our site could vastly be inmporved. Marinas exsiting but do not seem to be used.
Criteria:
-interconnection with different public transportaiton
-support commuting
-connection to local or reginal attraction
-support sustainability

Open space
Problem: there is no good quality open space near our site. Our site mostly private property or abandoned property so there is potential for open space uses.
Criteria
-provides more open space for Little Ferry
-connects to exsiting open space inth town
-opportunity for recreation--programmed fields, etc.
-opportunity for passive recreation fields--walking trails, etc.
-open space along the river.

Ecology
Problem:part of the site is contaminated, and the river has issues with pollution. Contamination might be entering the river because of tides and flooding. The site is disconnected from the ecology of the of the rest of the Meadowlands. It is also along the route of the Great Atlantic Flyway so it has the potential to be a stepover point for birds. The ecology of the site can be greatly enhanced and connect with existing Meadowland conservation areas.
Criteria:
-reflects the Meadowland habitat
-connects to exsiting wetlands and natural areas.
-connects to Little Ferry
-feasible implementation

Vegetation
Problem: the exsiting vegetation on site does not reflect the Meadowland plant community. There is no significant vegetation on site. Existng vegetation may not suitable for a resilient location and does not offer many ecological benefits compared to native vegetation.
Criteria:
-support and beneficial to wildlife
-reflects exsiting Meadowlands plant communities.
-provides a connection experience across the site
-helps to remediate contaminated areas on site

Zoning
Problem: currently the zoning on the site is limited to Highway and Regional Business and Planned Residential. The bottom of our site is part of the New Jesery Meadowlands Commission, whose different rules will need to be considered. The site is bordered by several different zoning uses that may create conflicts of interest between users. Zoning on site can be diversified to bring in users that will give user more access to the river.
Criteria:
-diversity or variety of users
-allows for people to access the river
-corresponds to zoning adjacent to the site
-economically beneficial to Little Ferry

Each design option in the morphological box was evaluated as being good, neutral, or bad at satisfying each criteria for its category. The best options were evaluated and connected best one with red string.

4.2 Living on the Edge

4.2.2 Midterm Designs

Theresa Hyslop, Mark Lacey, and Nanxing Zheng

Figure 4.2.2.1. Midterm Site Plan

As our group researched, the Rebuild By Design team MIT/Zus proposed a large Meadowband system along the Hackensack River to help protect against future flooding and sea level rise. This system would also connect the communities along the berm with each other and the river. We sought to find a compromise between the MIT/ZUS proposal, the interests of the Hackensack Riverkeeper, and the interests of Little Ferry.

Our midterm design proposal took this idea of a connected berm system as it could apply to Little Ferry. Through the gradual change of elevations and the use of two green-roofed parking decks, we sought to integrate the community into the berm while providing room for both development and natural areas.

Figure 4.2.2.2. Midterm Section A-A’

Figure 4.2.2.3. Midterm Section B-B’

Figure 4.2.2.3. View from the berm to the Hackensack River

Figure 4.2.2.3. View into the covered ground level parking

4.2 Living on the Edge

4.2.3 Final Group Design

Theresa Hyslop, Mark Lacey, and Nanxing Zheng

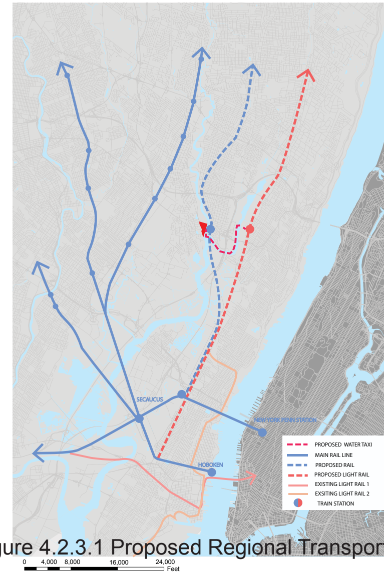


Figure 4.2.3.1 Proposed Regional Transportation

Our final design improved upon our midterm design of integrating the berm with the Little Ferry community. Through several weeks of design exploration, we adjusted the scale and orientation of our development and added townhomes on the southern end of our site. We sought to have our changes better reflect the existing community, while offering opportunities for improvement. Each group member focused on a different proposed development along the berm to explore in greater detail.

The three proposed communities along the berm offer three different typologies for development along a berm. The first is a mixed use building with a private residential garden. The second development is also mixed use, but encloses a public plaza. The third explores individual townhomes built next to the berm. Through the gradual change of elevations and the use of two green-roofed parking decks, the designs all sought to integrate the community into the berm while providing room for both development and natural areas.

North of our three sites, we pushed the berm further inland to allow for wetland restoration and provide more open space for the community. The pedestrian walkway serves as a grand link between Little Ferry, the berm, and the wetlands. It also contains several planters to collect and filter stormwater from the proposed developments.

PROPOSED ZONING

Figure 4.2.3.2. Proposed Zoning

REGIONAL CONNECTIONS

Little Ferry is currenlty a car-dependent borough and experiences heavy traffic along the Route 46 bridge. Providing more connections to mass transit at a regional scale will provide opportunities for Little Ferry to lessen its use of cars and traffic along the bridge. Two different train lines have been proposed. The Pascrell proposal plans to transform an existing industrial rail along the Hackensack River into a passenger rail. There are also plans to extend the Hudson-Bergen Light Rail northward to Tenafly. Both proposals will provide needed connections from Bergen County to New York City.

In order to better connect the residents of Little Ferry to the new proposed stations, our group is proposing a water taxi along the Hackensack River and Overpeck Creek. The water taxi can also connect other communities along the waterways and help connect more people to the river. There is also an opportunity for a train station to be built directly across the river from Little Ferry as part of the Pascrell Line. This station would have a large impact on the new proposed community and could help revitalize Little Ferry.

Figure 4.2.3.3. Final Site Plan

4.2.3 Living on the Edge

4.2.3.1 Luminary - A New Community Along the Little Ferry

Theresa Hyslop

Figure 4.2.3.1.1 Site Plan

Luminary is a new proposed development along the Little Ferry berm. At the heart of the development is a private residential garden. The garden is an intensive green roof system built on top of the ground level parking (see 3.16 for more information on intensive green roofs).

Both the garden and the building provide opportunites for a variety of uses by a variety of people, from private to public, for individuals and families. The boardwalk on the berm, or "bermwalk" links the development with the other developments along the berm and provides a connection to the Hackensack River. It also provides space for businesses along the berm to put out seating for customers, as well as space for other seating looking out to the wetlands. The bermwalk is open to pedestrians and bicyclists.

A key feature of the garden design are two light elements - the light bubble and the light pipe. These elements serve the dual purpose to bring light into the covered parking under the courtyard, and act as a unique light feature for the garden. Seating is located around many of the light elements so that residents can use their garden at any time of the day.

At the center of the courtyard garden is a playground for the children living in the building. Many play elements have a vertical theme that plays off of the light pipes throughout the rest of the garden. All of the garden's features are located according to an arc motif which can be admired from the upper apartments.

The courtyard garden offers a variety of spaces for residents. A few larger gathering areas can serve as spaces for parties, barbeques and other get togethers. Residents looking for a quieter spot can enjoy several small private areas throughout the garden. As an alternative to the courtyard garden, there are two green roofs that could be rooftop gardens.

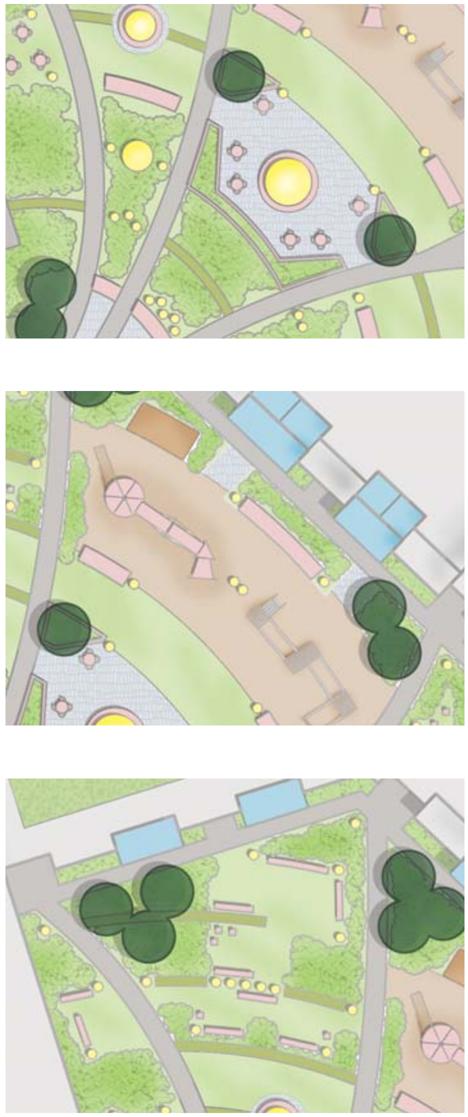


Figure 4.2.3.1.2 Plan Enlargements

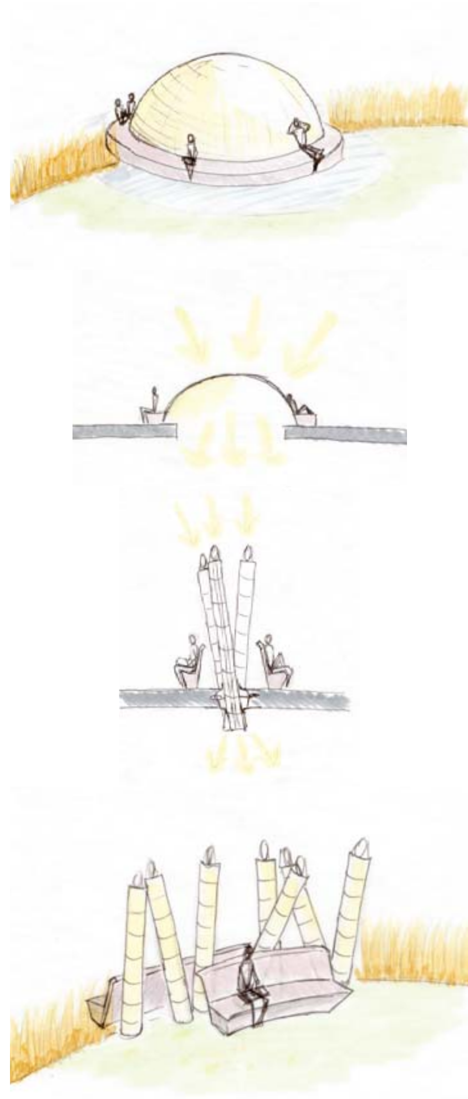


Figure 4.2.3.1.3 Light Features

Figure 4.2.3.1.4 Section A-A' : Multi-use with private garden

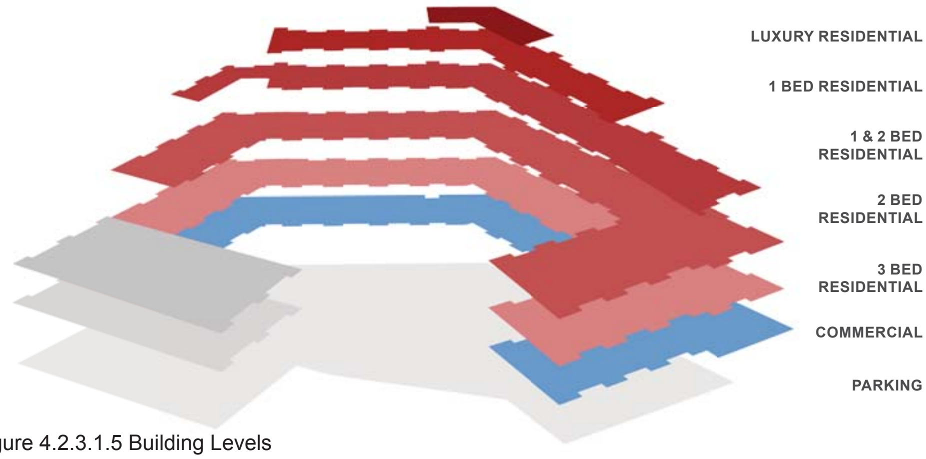


Figure 4.2.3.1.5 Building Levels

Number of Units: 119 Units

29 Three Bed Residential
39 Two Bed Residential
44 One Bed Residential
7 Luxury Residential

Commercial and Retail Space: 58,000 sq. ft.

Parking: 403 Spaces

232 spaces on ground floor parking
171 spaces in 3 story residential parking deck

The majority of the building is residential units, which vary in size from luxury one bed apartments to three bedroom apartments. The second level of commercial and retail is critical in strengthening the connection between Little Ferry and the proposed berm; it is meant to draw people to the berm to shop and eat, much like a boardwalk down at the Jersey Shore.

The covered ground level parking deck provides parking for visitors and commercial/retail customers. Residents of the building can park in the attached three story parking deck. Visitors can access the shops through several staircases that connect the first floor parking with the upper levels. Residents can also use these staircases to acces their apartments from the berm. (Swipe access would be needed to get to the upper residential levels.)

This community along the berm has the potential to become a very special place that can be home to both families and individuals. Their proximity to the berm is a great asset that provides opportunities for recreation, connectivity and community. By making the most out of mixed-use, Little Ferry can help to bring people to the berm and help establish a greater connection between the town and the river.

TABLE OF FIGURES

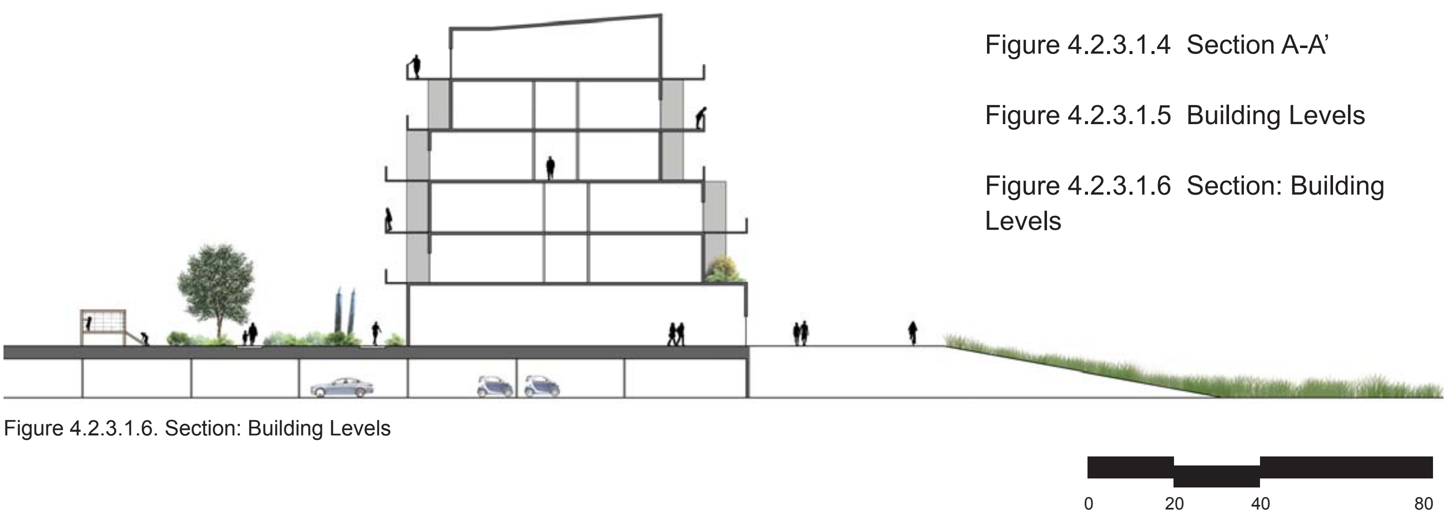


Figure 4.2.3.1.6. Section: Building Levels

4.2.3 Living on the Edge

4.2.3.2 Urban Courtyard Development

Mark Lacey

Figure 4.2.3.2.1 Site Plan

This mixed-use development is similar to the previous development, but is conceptually a much more public space. The building includes a first floor parking area, which has a sloping green roof that acts as an urban plaza for the second floor retail of the building.

The plaza is accesible from many different angles. Two sky bridges, which connect the 3 floor, resident only parking garage to the 3rd floor and above apartment complex, create gateways to the plaza from Willow Lake Park and the propose pedestrian walkway sloping up to the berm. The plaza also opens up to the neighboring townhome community.

The plaza contains various geomorphicly shaped planters with differring plant types (see Figure 4.2.3.2.3) to create different spaces for seating, walking, and gathering. The plaza also allows direct access to and from each retail entrance from any point in the plaza.

Above the second floor retail, the building contains 72 apartment units of varying sizes and floor levels (see Figure 4.2.3.2.2). The building also has green roof terraces on a section of the 3rd and 4th floors as a space strictly for residents of the apartments.

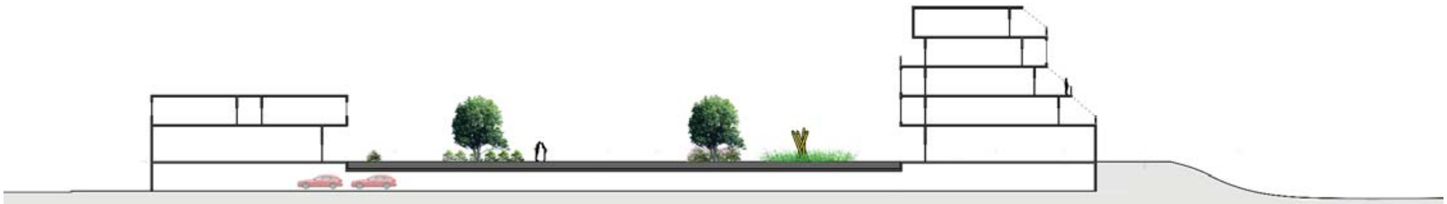


Figure 4.2.3.2.2 Section B-B'

PLANTING PALETTE

Figure 4.2.3.2.2 shows a section through the courtyard and encompassing building. On the left side, the building has 1st floor parking, seciond floor retail, and 3rd floor, 3 bedroom apartments. The building segment on the right also has 1st floor parking, 2nd floor retail, and 3 bedroom apartments on the 3rd floor.

The 4th floor contains 2 bedroom apartments. The 5th and 6th floors are combined within 10 2 bedroom, luxury apartment units. These units overlook the neighboring medowland park and the New York City skyline in the distance.

The planting design for the urban courtyard is used to create various spaces and pathways throughout the plaza. The trees and large shrubs are used as borders to create boudaries for gathering spaces. In the center of the courtyard is a large open plaza bounded by plantings of shrubs and trees. These create comfortable nooks for seating and gathering.

The tall grasses are used in areas where a pathway is meant to diverge in various directions. The ground cover is used to create differing pavement patterns while keeping pathways and main axes open.

Figure 4.2.3.2.3 Planting Palette

DESIGN INSPIRATION

Bailey Plaza at Cornell Univesity in Ithaca, New York

Designed by: Michael Van Valkenburgh Associates

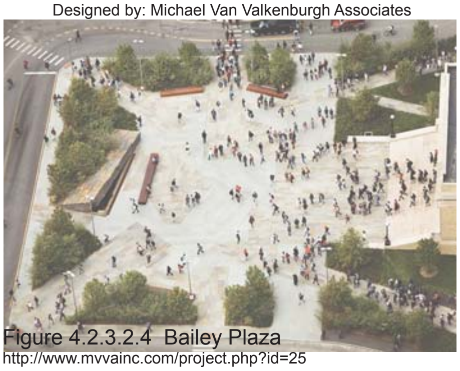


Figure 4.2.3.2.4 Bailey Plaza
http://www.mvvainc.com/project.php?id=25

Figure 4.2.3.2.5 Bailey Plaza
http://www.mvvainc.com/project.php?id=25

Funenpark in Amsterdam

Designed by: LANDLAB

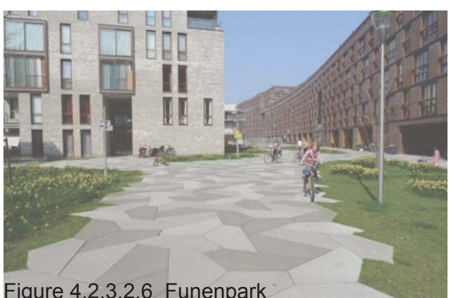


Figure 4.2.3.2.6 Funenpark
http://www.planetizen.com/node/64241

My design was influenced by designs of other urban plazas or courtyards that I have seen online. One that significantly stood out to me was Bailey Plaza at Cornell Univeristy in Ithaca, New York.

Design by Michael Van Valkenburgh associates, this plazes utilizes geomorphic shaped planters to frame a central plaza and various pathways into and through the plaza.

The planters are packed densely with high growing shrubs and trees, screening out views of the busy streets while the pathways keep the plaza open. Long benches placed along the planters create comfortable seating nooks for people passing through the plaza.

Another design that stood out to me was Funenpark in Amsterdam. This park, designed by the firm LANDLAB, creates a courtyard for residents of an apartment complex with a large path and interesting paving pattern.

I was inspired by their use of large width paths, allowing multiple users and bicycles to access the courtyard at one time.

The paving pattern of the paths also creates interest, and can help draw people into the courtyard. Although the paths are wide, the paving pattern is very detailed and creates shapes that bound the planters in the space

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Figure 4.2.3.2.7 Section A’-A”

4.2.3 Living on the Edge

4.2.3.3 Sloped-A Residential Design Integrating With Berm

Nanxing Zheng

Figure 4.2.3.3.1 Site plan

This is a new proposed development along the Little Ferry berm. At the heart of the development is a bus stop. The bus stop is designed to link the two groups of residential with the other Metropolitan areas, the left side of townhouses located on the flat plane, the right side of townhouses sitted on the gental slope linked to the top of the berm.
The “7” shaped road is the main pedestrain road for the residents who lives on the slope. This road can be functioned as both pedestrain road and vehicular road since it only serves for the local residents. This design provides another opportunity for our overall site design. Beside the single house and high-rise building, we offer another option for the people who want to have their private garden but did not want to buy the expensive single house.

Figure 4.2.3.3.2 enlargement

A key feature of the design are the terraced lawn that links bus stop to the residential sitting area and "7" shaped road. This road would be paved with the stones and different groundcovers and gradually sloped to the lawn on the both side creating a clean and peaceful feel of residential open space. The lawn would be graded as I proposed on this enlargement plan for better drainage to the rain garden at the bottom. The rain garden would be one of methods to collect the runoff on the slope. The "7" shaped road would be paved as the drivable grass because of light traffic and reducing vehicular speed to the pedestrian speed, as well as efficiently reducing the runoff rate on the slope.


Figure 4.2.3.3.3 Terraced lawn


Figure 4.2.3.3.4 The pavement on the terraced lawn


Figure 4.2.3.3.5 Rain garden


Figure 4.2.3.3.6 Drivable grass

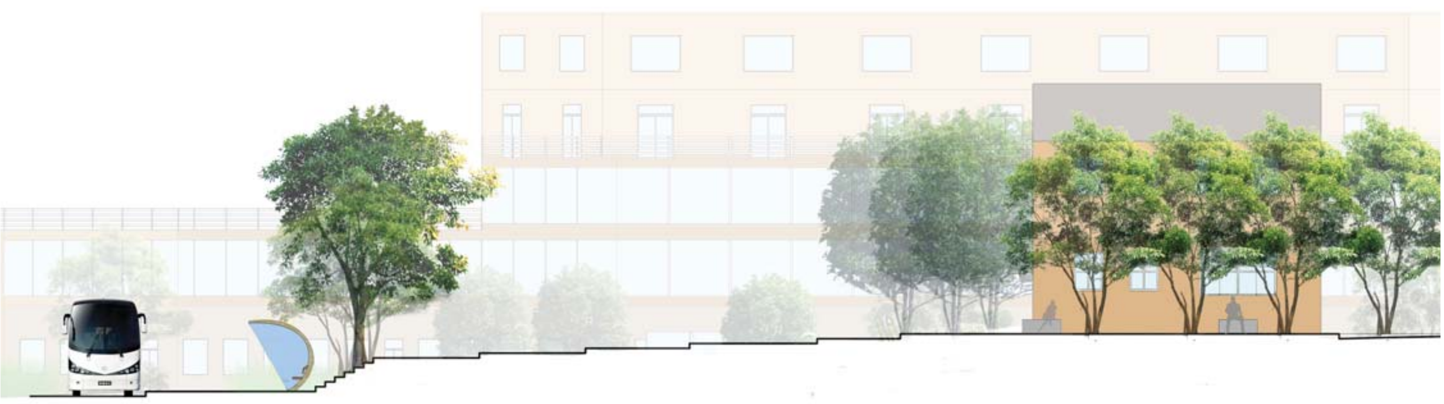
Figure 4.2.3.3.7 section B-B', scale 1"=40'

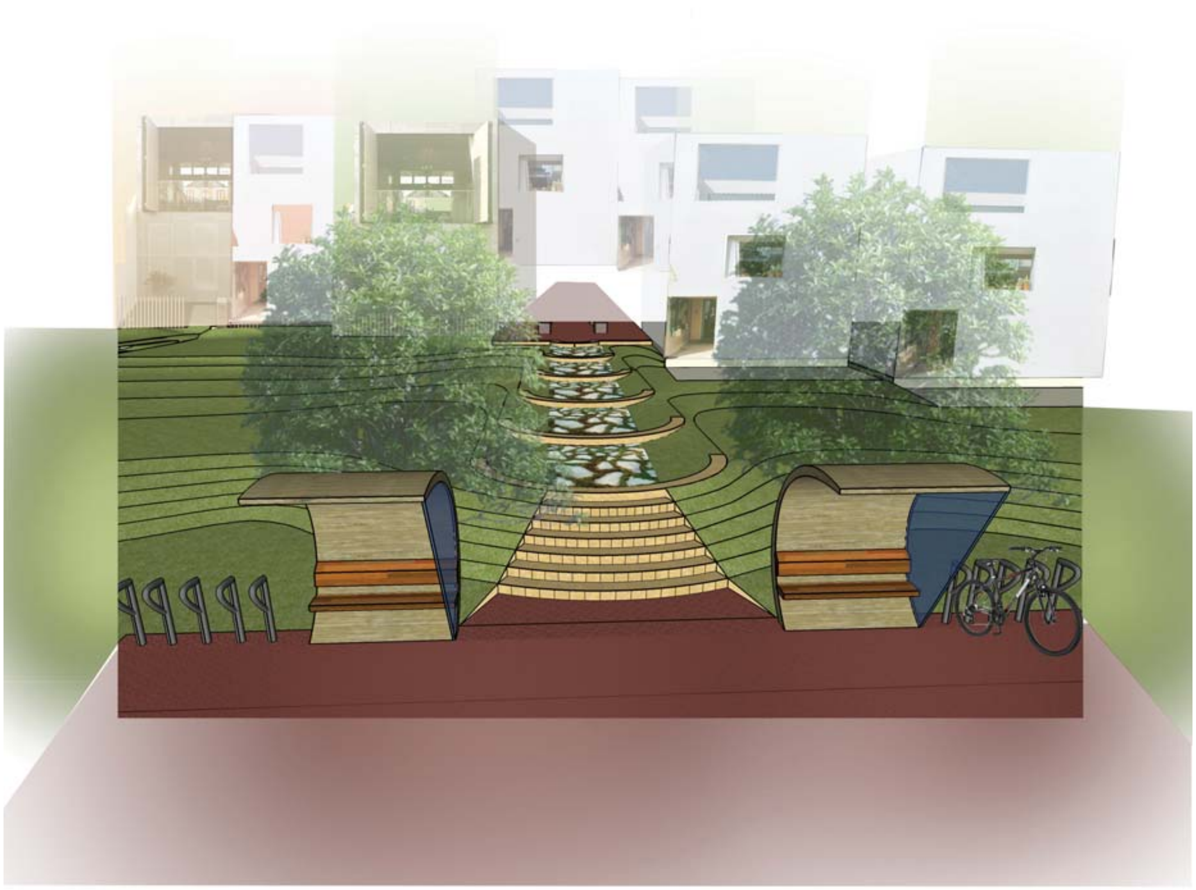

Figure 4.2.3.3.8 Entrance and busstop with sitting structure and bike rack

Figure 4.2.3.3.9 Section A"-A"' ,scale:1/64"= 1'-0"

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4.3 Group 3

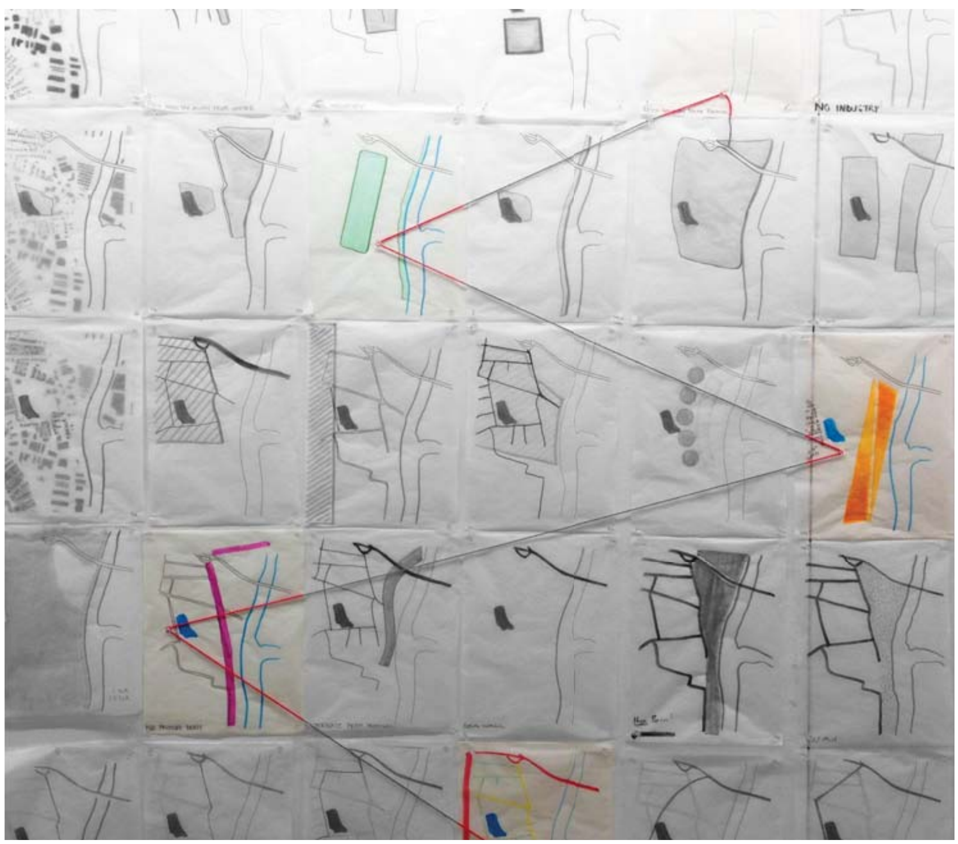
4.3.1 Morphological Box

James Cocorles, Sandra Grosso, Thomas Wyllner

Our design process began with the development of a morphological box. This allowed us to begin to analyze our site and choose five issues we thought were critcal to address in our design proposal for Little Ferry. For each issue we created a problem statement along with criteria that would allow us to evaluate the solutions we came up with in a tangible way. Our five main categories which needed to be explored were Industry and Commerce, Open Space, Housing, Water Management, and Circulation and Access. Developing our criteria for each topic allowed us to develop our opinions, value system, and stance on how we would like to approach each of this topics.

Next, diagrams were created within each topic explaining the “status quo” or the existing conditions in Little Ferry. These status quo diagrams showed where their current industry, open space, and housing was, how they were dealing with water managment, and the current state of their circulation and access and the quality of each. This would allow us to see if the status quo was acceptable or if it needed to be altered within our design. In addition to the status quo we came up with five different design alternatives for each category. Creating these diagrams allowed us to work very loosely on trace and keep our minds very open to change during this part of the design phase.

We then cross referenced the diagrams to the criteria that we had developed and chose the one that best met the criteria and the needs of the town. These were then overlayed to make up our first comprehensive preliminary design for our site. It was this initial overlay that we then went back and reworked constantly make sure each category worked well individually as well as together hollistically.

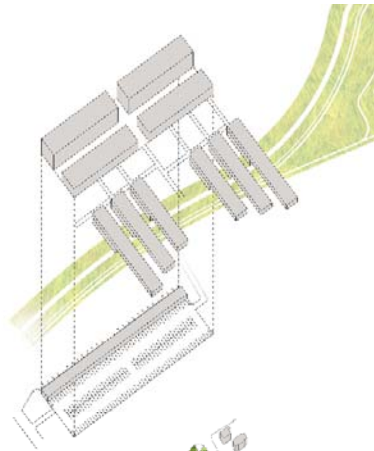


4.3 Group 3

4.3.2 Group Midterm Designs

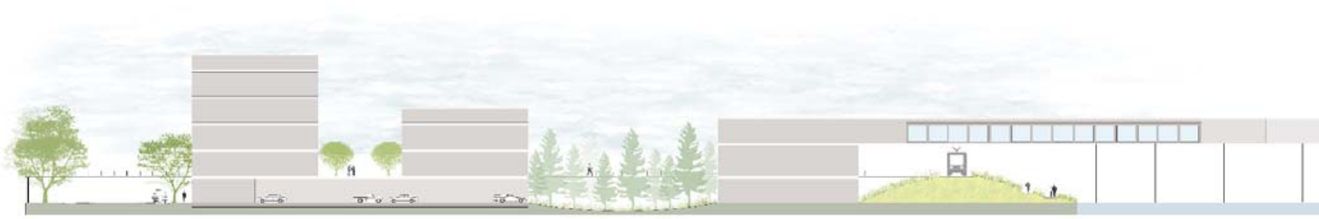
James Cocorles, Sandra Grosso, Thomas Wyllner

From the humble beginnings of our morphological box to the time of the midterm review this was the master plan we produced. Our main priority for the design proposal was to keep the existing structural integrity of the town creating as little disturbance as possible. A levee system with a flood protection berm sits at the waters edge protecting the infrastructure behind it from future flooding. Behind the berm is a consolidated mixed use and residential area. The redesign of the park acts as recreational open space. This allows for a transition area from the existing single story residential housing to the proposed higher density development. With the removal of the existing industry, in order to implement the berm, we propose a multi story warehouse to allow this industry to remain within the town. As shown on the plan to the left the industry was located closes to the Route 46 bridge since this is the least desirable place for housing and also keeps trucking off of the interior roadways. A freshwater swale planted with historic White Atlas Cedars acts as the primary storm water management behind the berm. This White Atlas Cedar planting will act as a separation between the industry and new development as well as serve as an ecological benefit. Our proposed mixed use development will have a ground floor open for new commerce and 212 residential units above, 108 of which will be park side. This creates a density of 50 units/acre in this area, much higher than Little Ferry's existing density. 400 parking spaces were added to accommodate these additions. We decided to have some buildings spanning the berm and cantilevering over the water. We realized the proportions of these buildings were not correct and this is something that was reworked for our final urban design. Our goal with this was to build over the berm to prevent it from acting as a barrier. The flood protection berm is to be 15' high at a 1:3 slope ratio. These dimensions reflect a 1 in 500 year flood event. We proposed a walking and biking path along the edge of the berm to still allow people to recreate along the waters edge.



The exploded axonometric figure to the left shows the vertical organization of the space and the relationship of the parking area to the mixed use and residential plaza. The parking will sit at ground level to be accessed from the existing network of roads allowing it to be tucked underneath the plaza which will sit flush with the berm and act as the ground floor for these buildings.

The axonometric figure to the left shows the existing single story detached housing that surrounds the park space. This expanded park space acts as a transition between the existing residential infrastructure and the proposed multiple story condensed mixed use area. It acts as an amenity to both parties and will help to increase property values.



A EAST WEST SECTION

B NORTH SOUTH SECTION ELEVATION

4.3 Group 3

4.3.3 Final Urban Design

James Cocorles, Sandra Grosso, Thomas Wyllner

After our midterm review we received feedback and each chose an area to improve upon. We each explored these areas and topics with greater detail working at a much smaller scale. Individually we came up with site specific designs and pieced them together to create a final urban design for Little Ferry.

The first half of the semester we worked comprehensively as a team throughout the entire design process. From the midterm review on we were able to work mostly as individuals while still periodically coming together as a team for peer review and to make sure the individual portions still lent themselves to our final urban design. This allowed each of us individually to explore areas of interest and add our own influences to the proposal.

From left to right:

1. The Common Ground

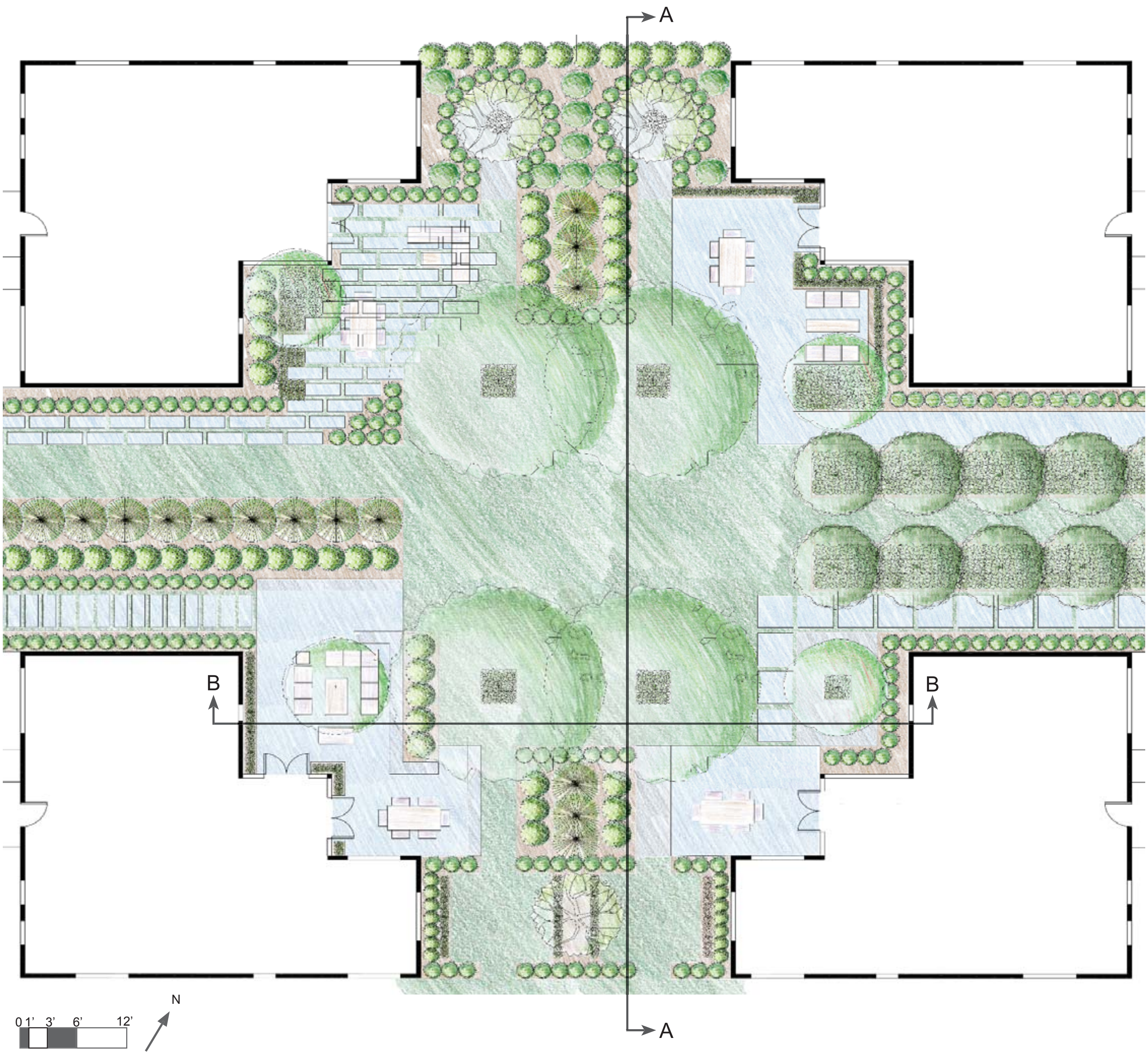
2. Shoppes at Bridgeview

3. Beauty & the Berm

4.3.3 Final Urban design

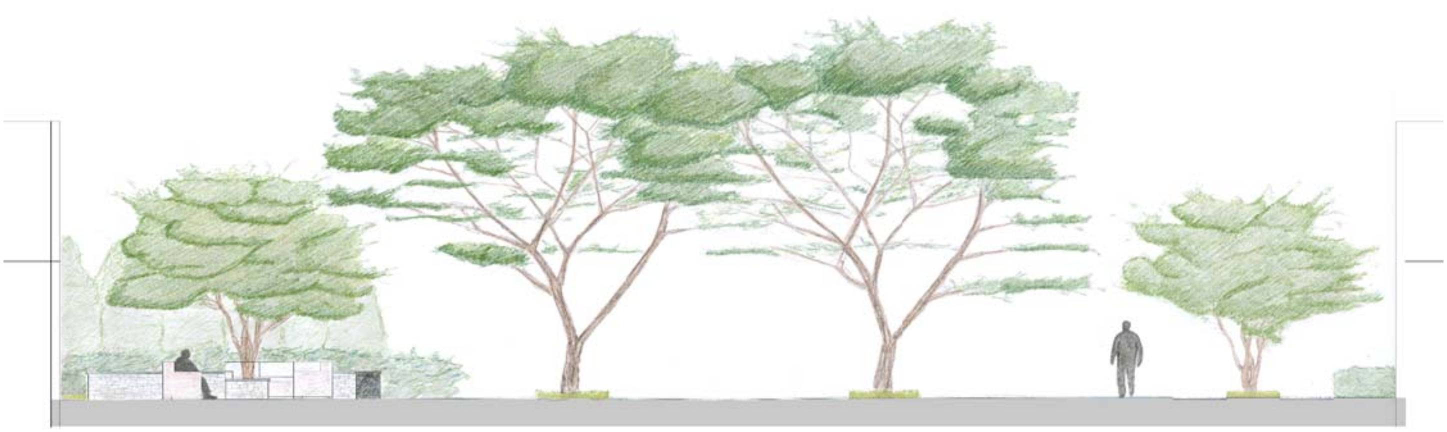
4.3.3.1 The Common Ground

Thomas Wyllner


A
A
B
B
N
0 1' 3' 6' 12'

The Common Ground: Four private residences arranged to share a private space. The rear of the homes all face one another forming a communal area. The rectilinear design is supported by the form and architecture of the homes. Each home has a private patio space ranging from 250 to 450 square feet providing different users ample room for recreation, dining, and entertaining. In addition to the patio space there is also a private nook located in each yard ranging from 75 to 100 square feet. These nooks provide a more secluded intimate setting and are spaced further from the shared interior area. The communal space is roughly 2,000 square feet, this allows for the patio area to spill into the yard. A large difference in the design of the interior space compared to the patio space is that the interior is not programed. It allows the different users to use it the way they deem necessary. One of the unique features, found in section B, is a planter that also serves as a coffee table. A small tree provided shade from the sun and forms a canopy or 'ceiling' for this 'outdoor room' making it feel much more secluded from the neighboring yards.

Section A 0 4' 8' 16'



Section B 0 1' 3' 8'

4.3.3 Final Urban design

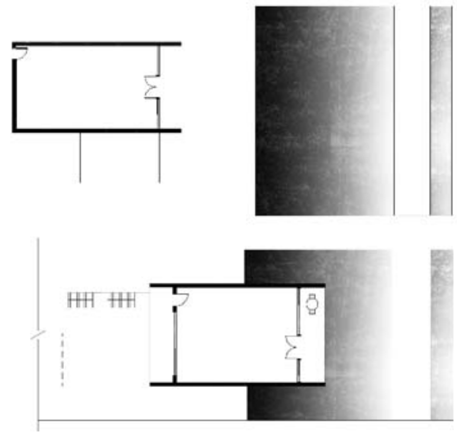
4.3.3.2 Beauty and the Berm

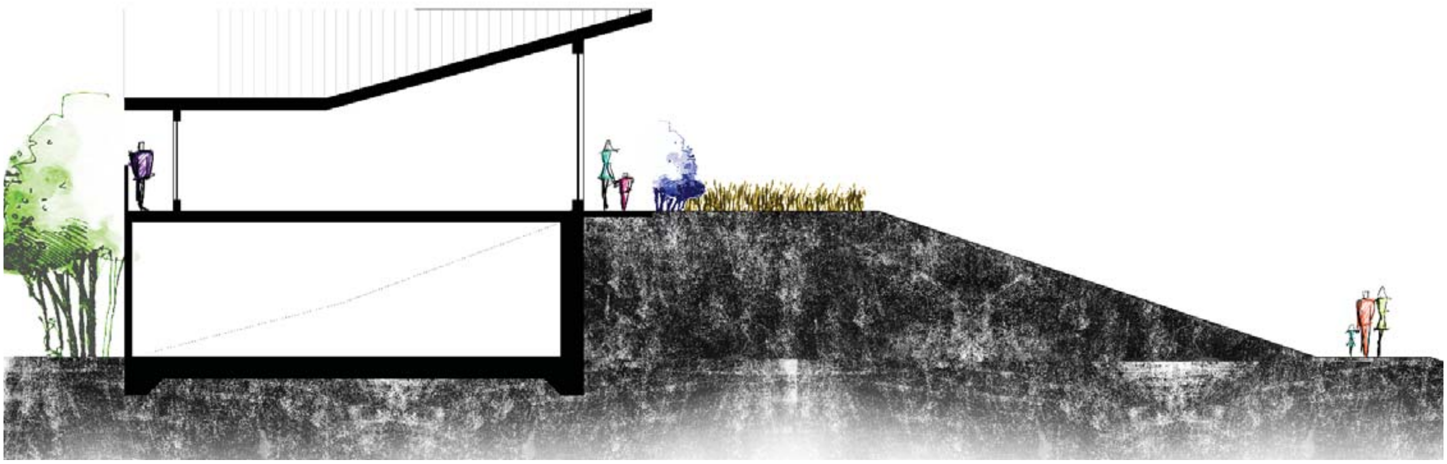
Sandra Grosso

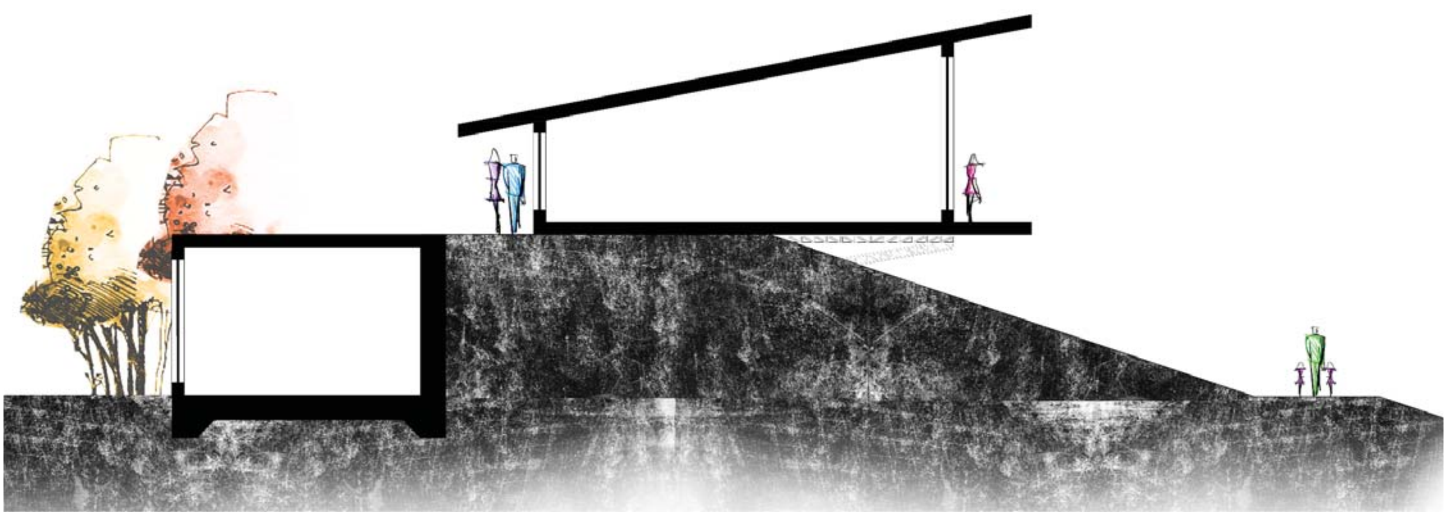
Beauty and the Berm addresses the reality of a 15' high flood protection berm separating Little Ferry from the river. This defense against the rising waters is essential to Little Ferry's future existence but will change the dynamic of the inland. As designers we have to be sensitive to how adding large infrastructure such as this flood protection berm will make the people who have to live in the space feel. My main question when exploring this area was how to relate what is behind the berm to the berm. Building "into" and "over" the berm allows this green infrastructure to become a street scape, softening its appearance, and preventing it from acting as a barrier between the city and the water.

I explored two housing typologies in relation to the berm. The first will be set into the topography with the finished floor elevation meeting flush with the top of the berm. The second floor will extend above the berm and these homes will have patios and green space on the top of the berm. The second building typology will be cantilevered over the berm reaching out towards the water. The garage will be set into the berm and allow access up to these homes. A balcony will further extend past the home over the berm creating a unique experience. The cantilevered homes will have side yards on the top of the berm, in addition to the green space that will span from the garage to the road on the street level. Spatially the two building typologies will be staggered to allow for the most amount of privacy and space between the cantilevered buildings.

The positioning of these homes allows one proximity to the waters edge as well as a view of the Manhattan skyline. These are both big factors in determining property value. It is hopeful that these buildings will be desirable living spaces and bring a new face to the residential form of Little Ferry.



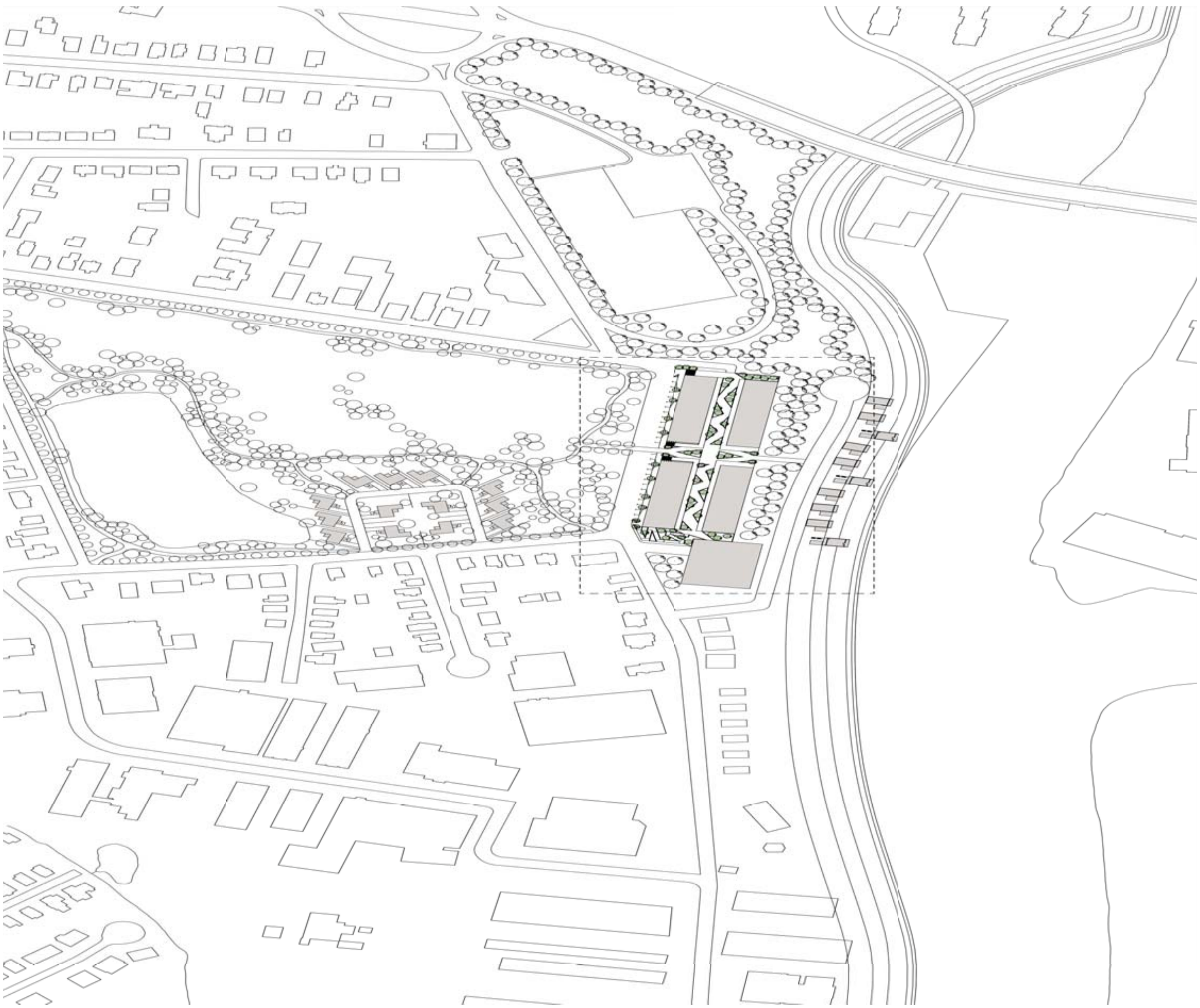


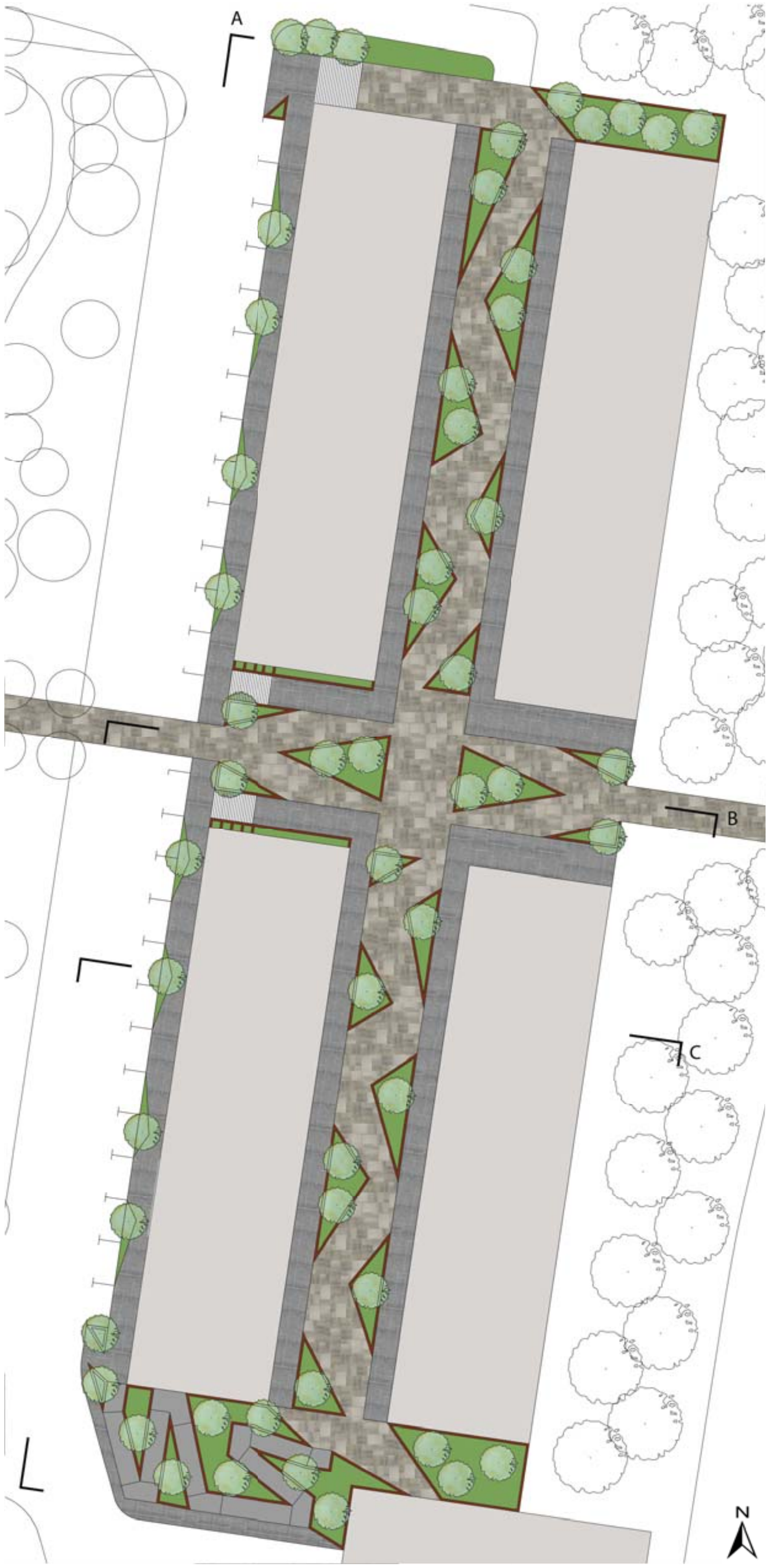


4.3.3 Final Urban design

4.3.3.3 The Shoppes at Bridgeview

James Cocorles

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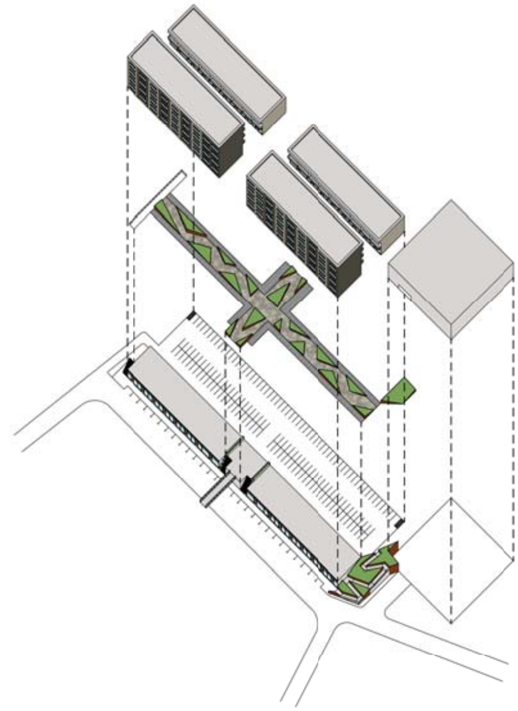

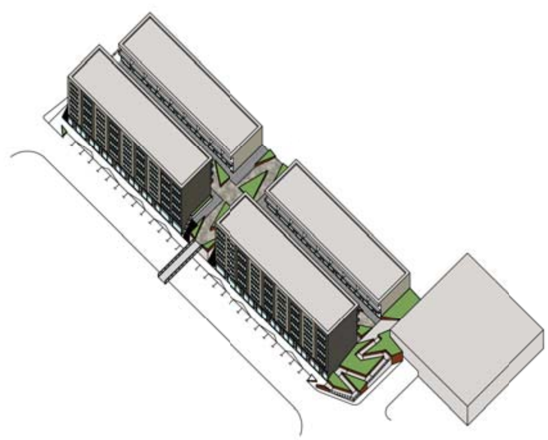

Shoppes At Bridgeview: Little Ferry's existing structure is composed of mostly residential and industrial spaces. The location of the Shoppes At Bridgeview will be on the site of existing industrial infrastructure that over looks the Route 46 bridge. This plaza space will bring more business to the town of Little Ferry with the addition of forty eight commercial spaces available within the quad buildings. With the addition of commercial spaces there will be sixty four single family apartments to increase the density of Little Ferry. Parking for residence will be provided beneath the structures in a parking garage that is at ground level. For those who choose to visit the retail stores, parking will be provided on the street as well as a parking deck located to the right of the quad space.

Section C

Section B

Section A

4.4. Group 4 – Theodore Aretakis, Chelsea Beisswanger, and Sarah Korapati

4.4.1. Morphological Box

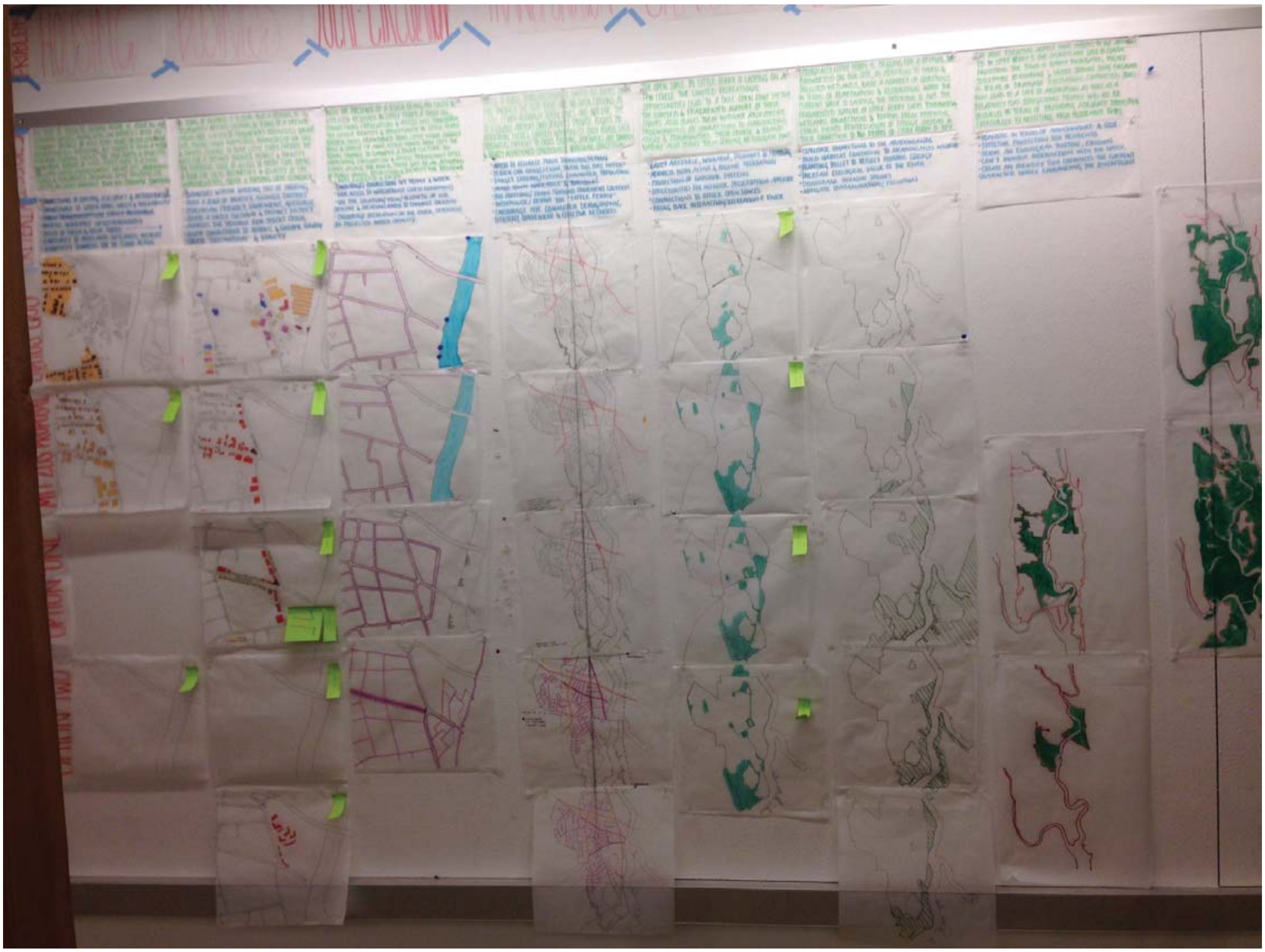

Figure 4.4.1.1. Aretakis Beisswanger Korapati Morphological Box Initial

Figure 4.4.1.2. Aretakis Beisswanger Korapati Morphological Box Final

The morphological box was an instrument in understanding the important aspects of what our designs should be centered around. The seven aspects which our designs centered around upon were housing, business, local circulation, transportation, open space(human based experience), ecology(wildlife based experience), and coastal protection. The biggest jump which differentiates our design from most others is that our berm proposal will ensure the safety of Little Ferry regardless of whether or not other portions of the berm is created. A long stretch of berm that crosses political boundaries is hard to manage. If a storm should come before the completion of the berm or another part of the area does not want to create a berm, Little Ferry will be certainly safer with an individual berm shielding it. After much deliberation, we decided that it would be best that half of the proposed area should have housing, the business core should be reoriented to main street. Furthermore, the roads should be made more pedestrian and bike friendly while a bridge connecting Little Ferry to the future proposed Train Station going to New York should be created. The open space should be better programed while there should be an increased awareness of thee ecology of the area. Finally, the coastal protection should ensure that Little Ferry will be safe regardless of what its neighbors do.

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4.4. Group 4 – Theodore Aretakis, Chelsea Beisswanger, and Sarah Korapati

4.4.2. Group Midterm Designs

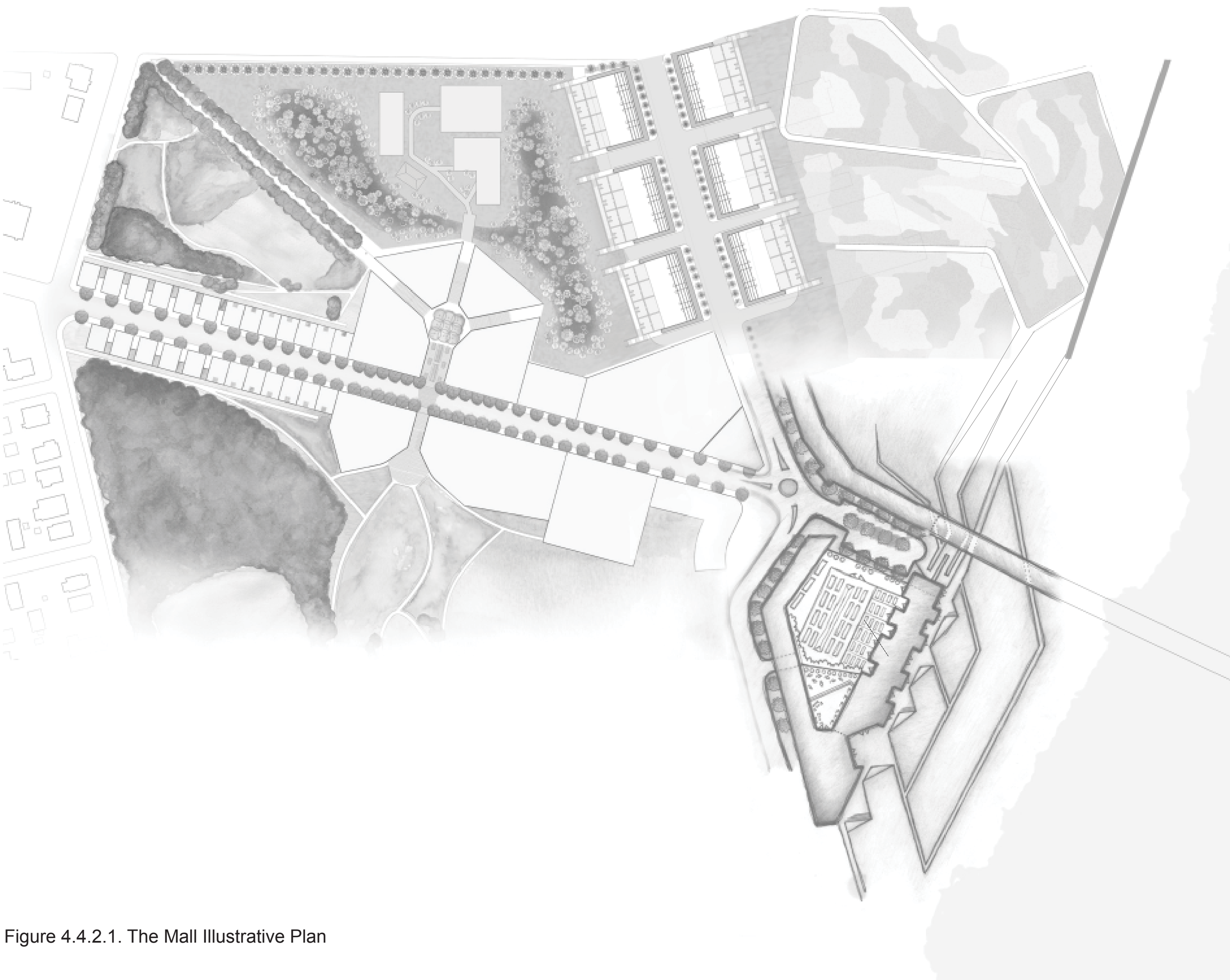

Figure 4.4.2.1. The Mall Illustrative Plan

Little Ferry is located just east of Manhattan along the Hackensack River. The town, be it small, has an enormous amount of potential in terms of both location and transportation, both of which it currently is unfit to benefit from. Just a few miles outside of the city and nestled in between Route 46 and the Teterboro airport, Little Ferry is clearly oppressed by traffic congestion. Additionally, the Hackensack River is an enormous asset that the town has been unsuccessful in embracing. Inversely, the river poses many threats to the citizens of Little Ferry in terms of stormwater management and flooding events.

The quality and availability of opportunities to engage and interact with the river are far and few in between. What does exist, be it residential homes or public pathways, is unkempt and dilapidated in the wake of 2012's Super Storm Sandy. The inevitable doom of future storm events along with rising sea levels makes Little Ferry an ideal candidate for a landscape intervention. With a flat, low-lying topography and a built environment fringing far too close to the Hackensack River, Little Ferry is in dire need of a creative solution that not only protects the town from flooding but is also able to add culture and identitiy to the area.

The evolution of suburbia in Little Ferry is especially evident in the fragmentation of green spaces throghout the town. These green patches have left the area with little ecological value especially in terms of wildlife. The integration of green and grey in Little Ferry is both essential and challenging in nature.

The current profile of Little Ferry has led ecology, transportation, identity, circulation and density to be key factors in our redesign. Making the town connected, in terms of ecology, wildlife and people will add richness on multiple dimensions. With flood protection leading our design, a proposed berm, sea wall and terraced unit anchors the new Little Ferry, a town of culture, protection and above all else, vitality.

Figure 4.4.2.2 Transportation Diagram

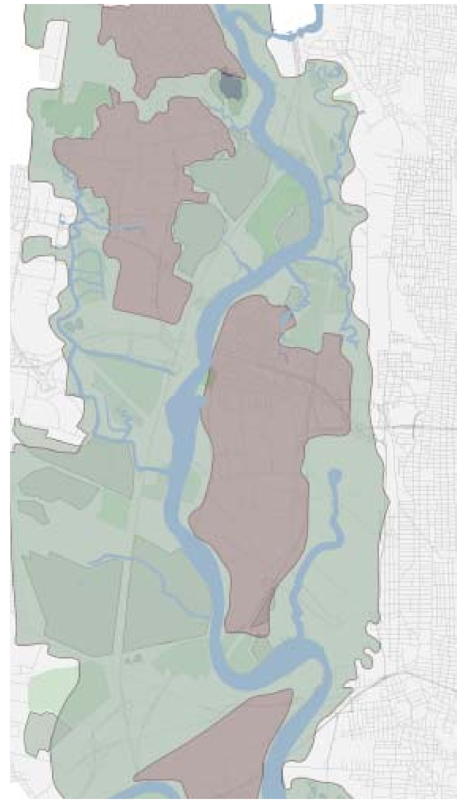
Figure 4.4.2.3 Berm Protection Islands

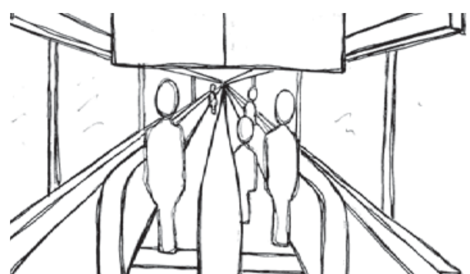
Figure 4.4.2.4 Slide Walk Rendering

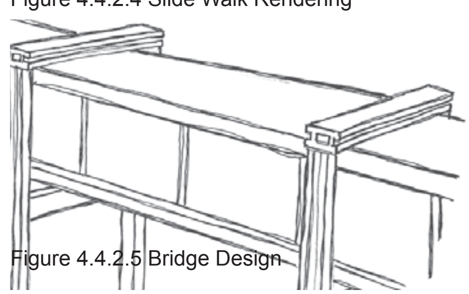
Figure 4.4.2.5 Bridge Design

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4 Designs

4.4.3.1 The Mall

Sarah Korapati

Figure 4.4.3.1.1: Illustrative Main Street Mall Plan

Figure 4.4.3.1.2: Main Street Architectural Style Elevation

In responce to the increase in population, the diminishing economic status due to hurricanes, and lack of central destinations within Little Ferry, I propose for a mall to be built onto main street. The experience of entering the newly developed area should be a smooth transition from the natural colonial style housing within Little Ferry to post-modern and finally contemporary modern style architecture. The despite the discrepency of chronological order in the architectural styles, the purpose of the mix is to create a pealing of ornamentation from the old style and open the possibility of the new changing world of architecture style in the world. The density and architecture of the entrance from main street transitions from colonial single family homes to post-modern town houses to finally modern apartments to create a smear of transition rather than alienating the existing community. Overall, the new development is 10 units per acre in comparison to the existing 4.5 units per acre in Little Ferry.

To further invite the community of Little Ferry to the newly develped area, the greenspace buffering the development is open to the public for community use. To create a wholesome greenspace rather than fragmented areas, the homes are pushed to the edge of the sidewalks and no home on main street has a backyard nor a front yard. In relation to the lost private open space, each home has a minimum of an 8’x8’ balcony space which can be used for a maximum of a comfortable 6 person party. Furthermore the north west corner and south west corners of the greenspace are open with no development to encourage the existing community to take part in the different spaces created in the area. Entering from the north west corner of the development, the first thing to come across is the outdoor food garden particularly featuring the native blueberry. It would be a garden that would be planted once and then let free to propser naturally. Local residents may maintain the garden if they would desire to but the idea of the garden is that it is low maintenance and mostly native plantings. Traveling south east, the area transitions to an open lawn with scattered trees to create a scenic pastoral landscape. This would be the place to host larger outdoor parties for the other residents and where people would do a barbeque or do lesser recreational activities. To the west of the pastoral lot is a bird habitat forested area which is meant to mostly be left untouched by residents. Nevertheless, it is a wonderful opportunity for residents to take part of the woodlot to escape from the built environment. In the south end park, the open space is much less programmed. A larger percentage of the area is woodlot which is to be maintained and planted


Figure 4.4.3.1.3: Avian Plaza through Ampitheatre Section

for bird habitat around the lake. The woodlot should, for the most part, be left undisturbed by humans as to not disturb any wildlife within the area. To the east of the woodlot would be the triad meadows which would be a series of natural meadows to cater to more bird species and to increase the aesthetic value of the above apartment complexes. Finally, to the south of the triad meadows is a dog friendly park.

The mall at main street rests at its center and branches out to the existing community. The center of the northern area includes an avian bosque. Honeylocust trees would be planted in a 9x9 grid and loose seating would be available underneath the canopy similar to cater to any visitor. The pavement pattern would be a complementary checker board pattern with the different native birds within and which pass through Little Ferry. Each direction would point to different habitat of where each bird would be found; wetland, migratory, and woodland birds. Whenever a bird would pass through, the tile would light up to make the connection between the wildlife of the area and the community within Little Ferry with the purpose of inviting the ecotourism aspect of the meadowlands to the interior of Little Ferry.

All in all, the design strives to both increase density within Little Ferry while encouraging a further education of the ecological aspects of the space.

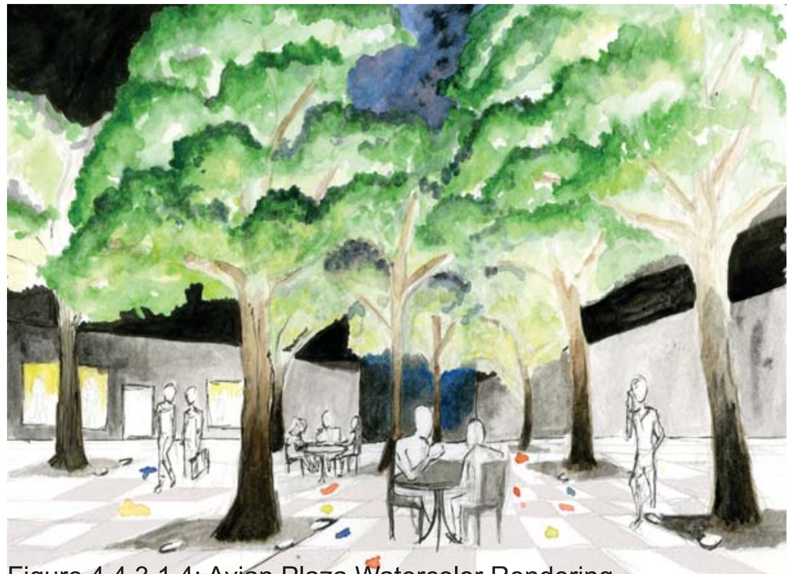
Figure 4.4.3.1.4: Avian Plaza Watercolor Rendering


Figure 4.4.3.1.5: Fractal Geometry inspired Ceiling Structure of Mall

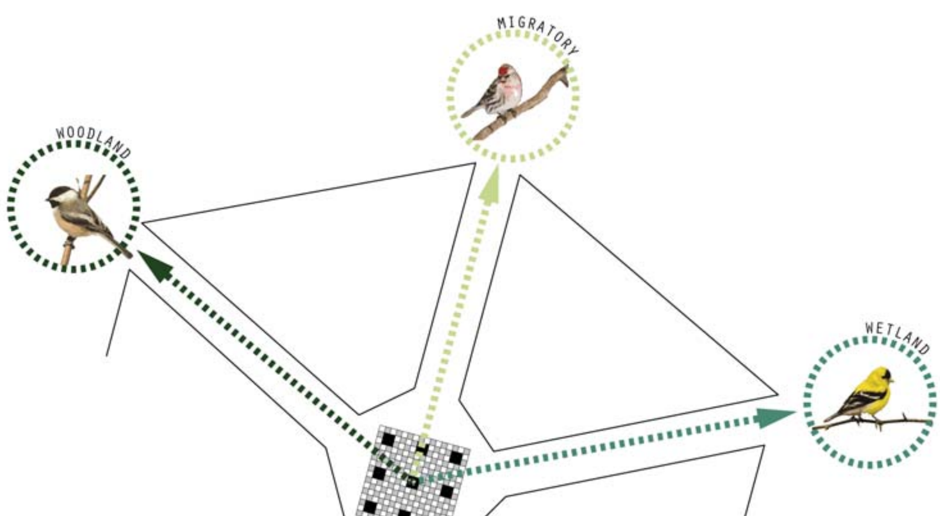

Figure 4.4.3.1.6: Tile Pattern of Avian Plaza

Figure 4.4.3.1.6: American Gold Finch Tile Design

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4.4.3.2 Modular Housing and Stormwater Meadow

Teddy Aretakis

Figure 4.4.3.2.1: Illustrative Plan of Housing, Meadow, and Play Space

The primary intention of design is to create housing with both private and semi-public outdoor spaces. My design is inspired by Little Ferry's history of harvesting clay and brick production.The other major aspect of my design is a meadow that collects and cleans stormwater and also provides habitat for the monarch butterfly as well as other pollinators.

The terraced housing units are designed in a modular manner (Figure 4.4.3.2.4). Units are stacked on each other like bricks. Each rising level slides away from the street, giving each unit a private balcony. Balconies are 8 feet long and allow for outdoor dining and socialization. They also provide oppurtinities for placemaking and personalization through the use of potted plants, flags, and other decorations. Doing so transforms these repeated modular housing units into individual user-designed living spaces. The building masses form space into a canyon shape that is reminiscent of the clay pits from which bricks originate. Each backyard space is shared so that three units share a two levelled terrace. These spaces can be used for parties and barbeques, as well as for casually socializing with friends and

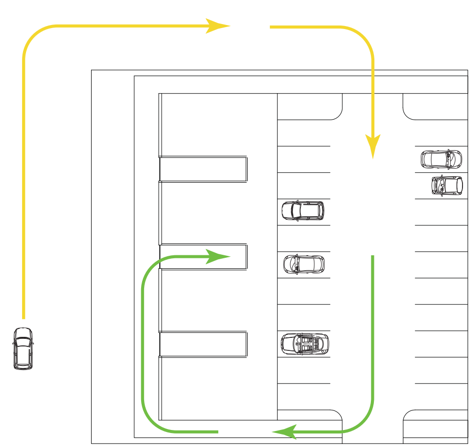

Figure 4.4.3.2.2: Parking Access Diagram

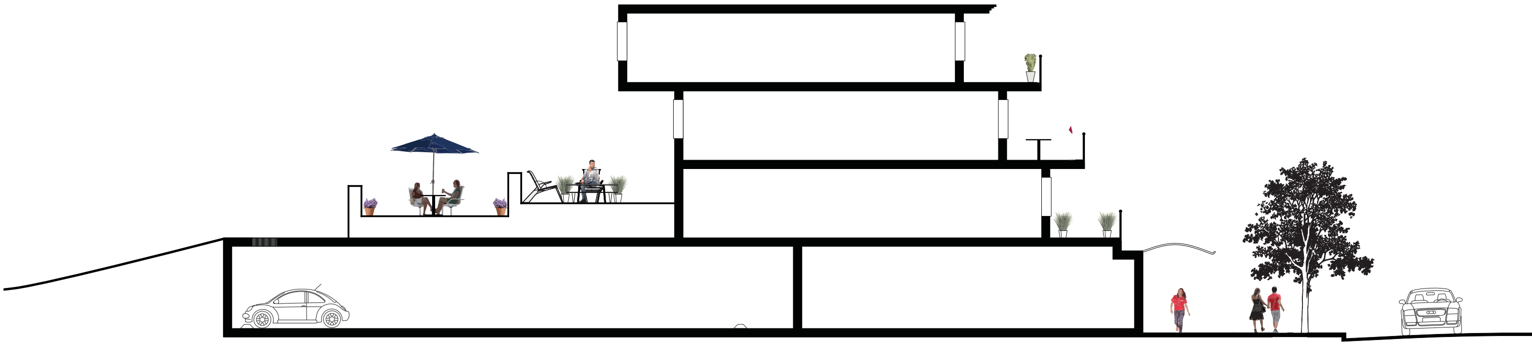

Figure 4.4.3.2.4: Terraced Housing Section

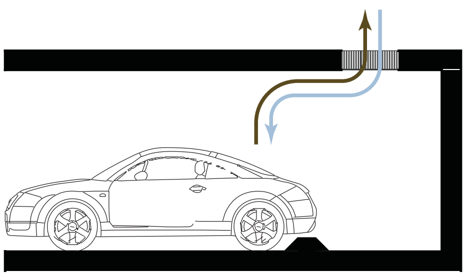

Figure 4.4.3.2.3: Ventilation Diagram

neighbors.

Parking is tucked behind the building, below the backyard terrace. There are two parking spaces per unit. The land adjacent to the terrace slopes up, making it seem as the the parking is stored underground. To enter the parking area will drive to a road inbetween to building blocks and turn right to enter the garage. This is illustrated in figure 4.4.3.2.2. Vents are used to encourage air flow, illustrated in figure 4.4.3.2.3. When one leaves the parking garage, they walk out of the area under an overhang that will protect them from precipitation. The person enters the building by entering a keycode that allows access to a private stairwell, shared by all of the housing units. One simply walks up the stairs to access their unit. Access to the backyard terrace is given by a set of stairs adjacent to the parking garage. Pedestrian access is illustrated in figure 4.4.3.2.5

The second major aspect of my design for Little Ferry is a meadow. The first function of the meadow is to collect and clean stormwater from the site and beyond. This will alleviate pressure on the stormwater sewer system.

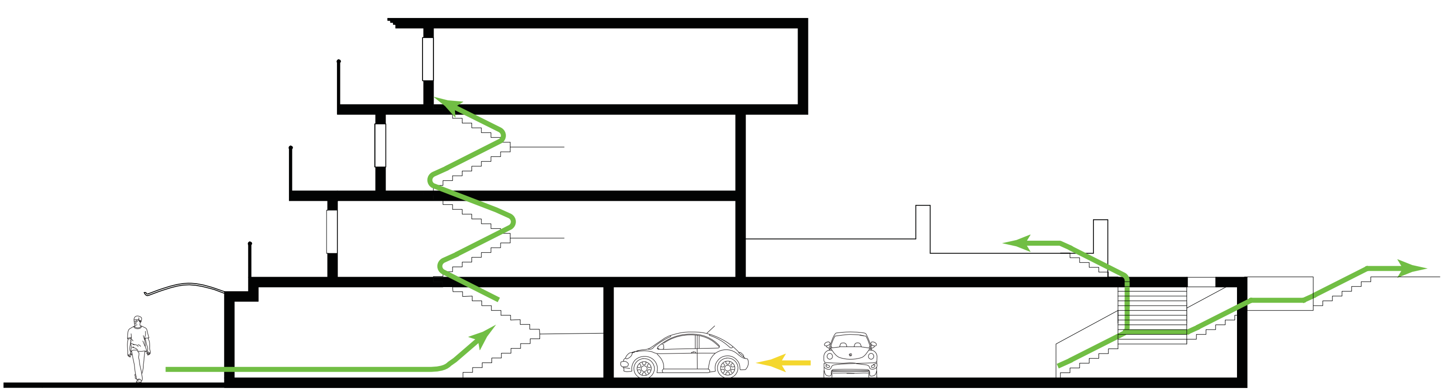

Figure 4.4.3.2.5: Human Access Diagram

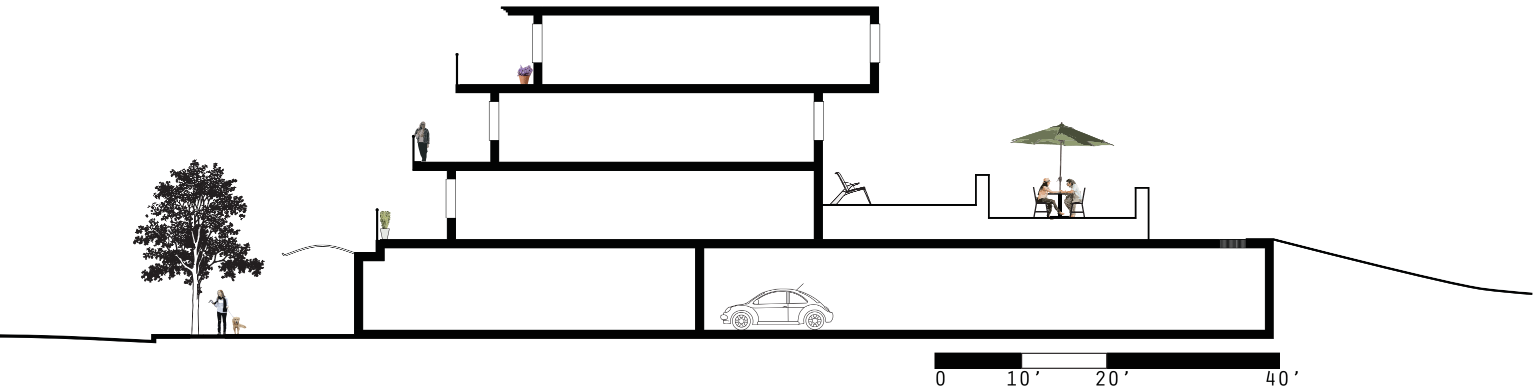

Figure 4.4.3.2.4: Terraced Housing Section

Plants are chosen with consideration to pollinators. All of the plants are bee friendly and swamp milkweed was chosen specifially to provide habitat for the monarch butterfly. Plants were also chosen based on bloom time, with the intent that flowers will be in bloom contantly starting in April and ending in September. The plants are organized in large swaths. Over time these shapes will evolve and plantings will drift into each other.

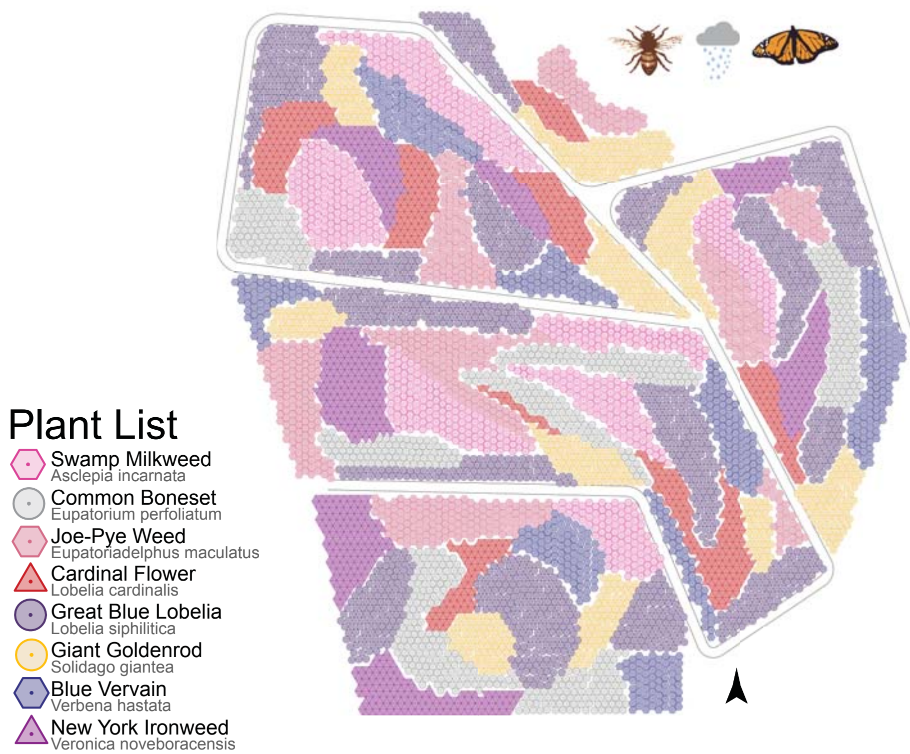

Figure 4.4.3.2.6: Planting Plan

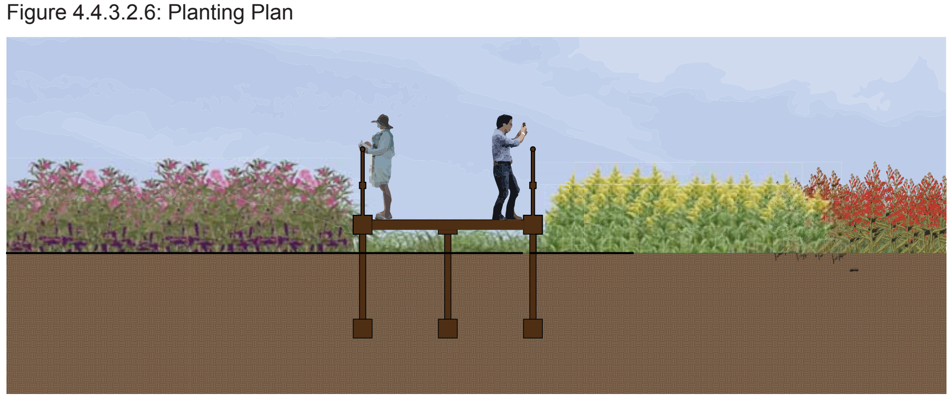

Figure 4.4.3.2.7: Meadow Section

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4.4 Group Four

4.4.3.3 Individual Design

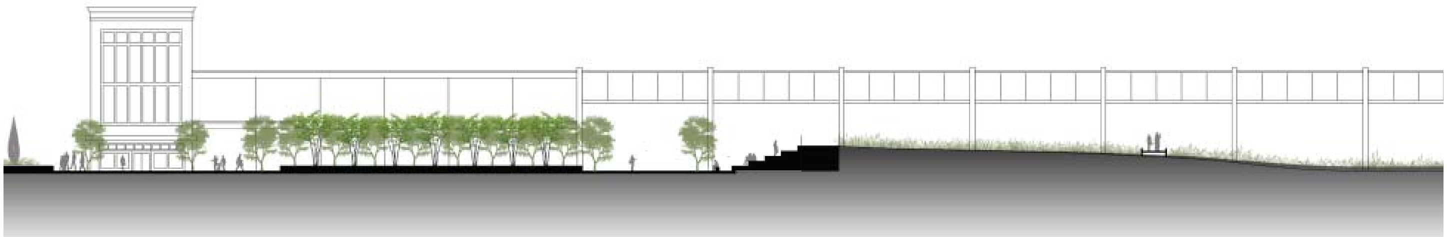
Chelsea Beisswanger

With the intention of creating an identity for Little Ferry, my redesign was focused at the dead end of Main Street where the town meets the Hackensack River. With an interesting history in the early brick industries of New Jersey, my design aims to bring that element back into the town in an effort to pay tribute to the industrial past of this Northern New Jersey town. From crosswalks and facades to the preservation of the Little Ferry Bank, this design truly embraces and celebrates the town's forgotten identity.

Utilizing the intersection where the old Little Ferry Bank currently resides as the ideal entrance into the new downtwon, many different design interventions were used to bring transform this space from congested and confusing to captivating, inviting and refreshing. Re-aligning the roads and adding a mini roundabout in the intersection not only soothes traffic issues but instantly makes Main Street more pedestrian friendly. Planting this roundabout with tall grasses not only softens the asphalt dominated intersection but alludes to the vegetation lurking just around the bend in the restored wetland that the design proposes. The center of the roundabout is anchored with the presence of a corten steel sculpture. Another tribute to the town's industrial history, this sculpture acts as a gateway into the town, marking the entrance into downtown Little Ferry.

Leading the design is the combination of flood protection elements used along the water's edge. From a sizable restored wetland to a berm, terrace and seawall unit, this design strives to protect and serve the people of Little Ferry without inhibiting their access to the waterfront. From sculpturaal terraces surrounding the Monarch Butterfly weigh-station and walkways to the Highline-inspired seating unit boldly occupying the current dead-end of Main Street, these elements not only serve their purpose as flood protection but enhance the identity of the town and encourage residents and visitors of Little Ferry to embrace the Hackensack River and all it has to offer ecologically. With a boardwalk along the top of the seawall and a network of outlooks and pathways reaching into the wetland, this system truly embraces both the river and the iconic views of New York City.

The buildings in my proposal also offer an array of benefits to the town.



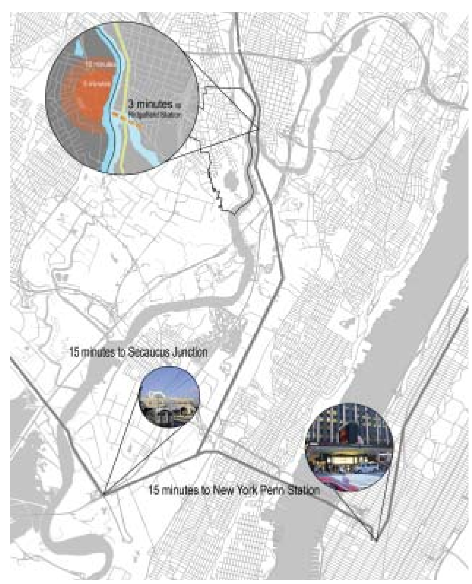
The V-shaped building along the seawall boardwalk offers an array of different elements tailored to the needs of the residents, visitors, diners and employees that inhabit it. With half of the building bringing office space to Little Ferry, it was essential not to forget the needs of the "9-5'ers." For this user group a courtyard was initiated. Claiming the same iconic shape of the Little Ferry Bank that drives the angular character of the design, the courtyard also uses a living green wall to make a relaxing retreat for lunch breaks, meetings and phone calls. The courtyard occupies a small portion of the green roof resting between the walls of the "V." This one-story high green roof covers the necessary eyesore of a parking deck.

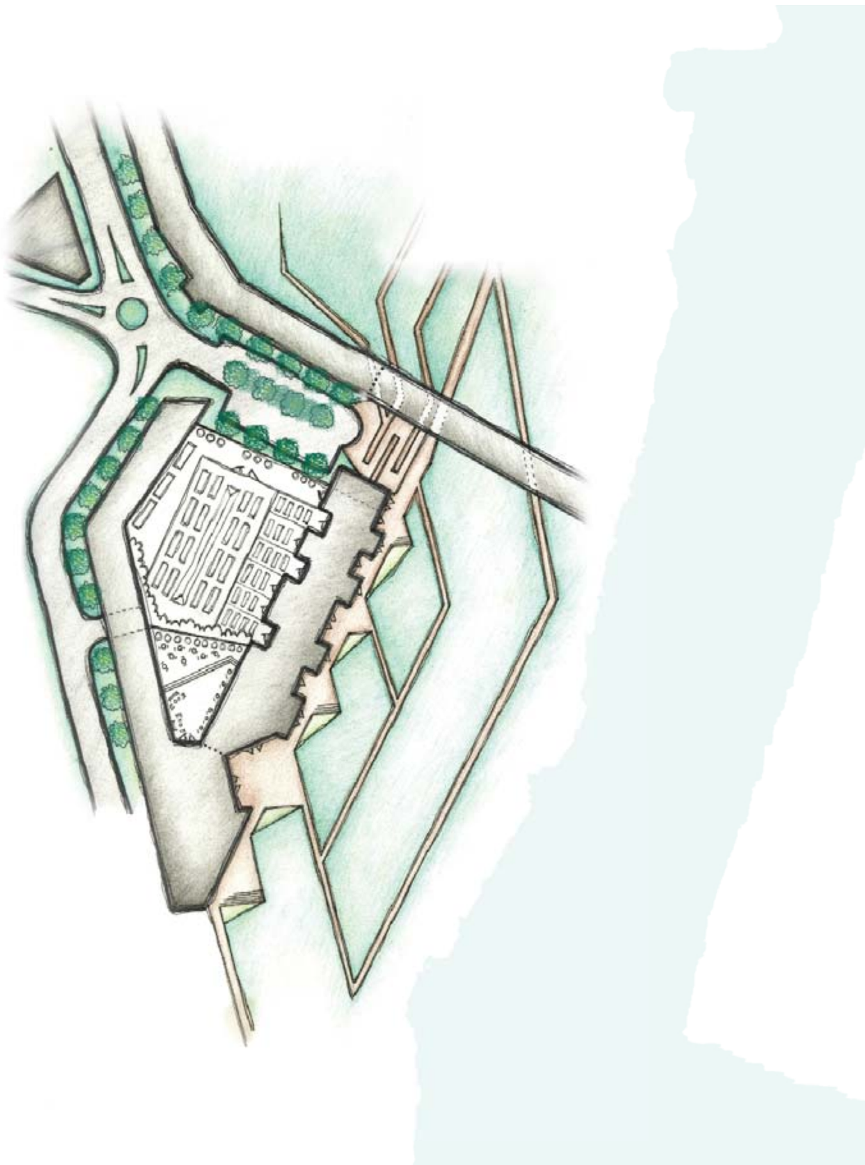
The majority of the green roof is dedicated to the growing trend of urban agriculture. From plots dedicated to a farm-to-talbe experience at the restaurants gracing the boardwalk to raised planters to be used by the residents of the building, the gardening element of Little Ferry is brought to life in this new urban green space.

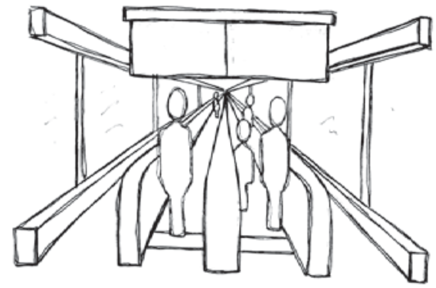
Across the street is a building dedicated to increasing the convenience of living, commuting and visiting Little Ferry. Anchoring the intersection with a Barnes and Noble, "The Station at Little Ferry" truly is the heart of the town. With commercial space speaking to the consumers occupying the mall on Main Street, The Station is a multi-functioning unit dedicated to enhancing the current and proposed lifestyles of Little Ferry. The building houses not only a Barnes and Noble but numerous quick eateries and cafes along with coffee shops, a post office, ATM's, newspaper stands and lounges. Focused on bringing consumers and visitors in, The Station mainly caters to users of the rail line across the river in Ridgefield Park.

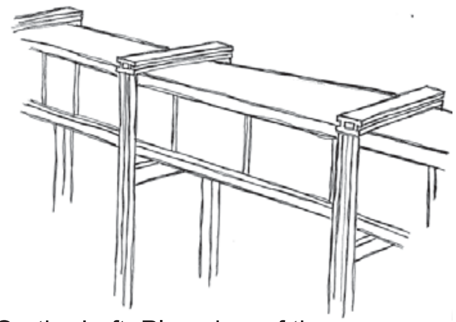
With the proposal of a new station in Ridgefield to coincide with the already proposed reinstating of a rail line in the area, The Station at Little Ferry will be the ideal connection between Ridgefield, Little Ferry and Manhattan, perfect for tourists and commuters alike. With a massive pedestrian bridge containing a pedestrian "slide walk" like those seen in airport terminals, The Station at Little Ferry encourages a commuter population by offering time-saving ways to get in and out of New York City without having to deal with the area's vehicular traffic. Between the roundabout and the pedestrian bridge encouraging train usage, congestion in Little Ferry should be greatly lessened.

From culture and history to cuisine and commuting, the Little Ferry redesign is one that will not only enhance the identity and history of the area but that will seemingly blend the lifestyles of current and future populations. With convenience and resources this proposal offers, Little Ferry will be a destination for both commuters and consumers bringing vitality and life back into this little town.









On the Left: Plan view of the new Little Ferry. Note the restored wetland pathway network and urban green roof system.

Above: conceptual renderings of the pedestrian bridge & “slidwalk” connecting The Station at Little Ferry to the proposed Ridgefield Park station across the Hackensack River.

Above: This section shows the relationship between the offices, apartments and parking garages and the urban green roof system. The courtyard for the employees of the office building is distinguishable at the far right of the section while the raised planting beds can be seen at the remainder of the roof. The Highline-inspired seating unit connecting the street with the sea wall can be seen at the center of the section cut and just to the left of that is a portion of The Station at Little Ferry and the vegetated berm terraces that set the backdrop for the Monarch Butterfly weigh station.

4.5 Little Ferry Redefined

4.5.1 Morphological Box

Angela Johnsen, Kelly Popek, Evan Sparkman

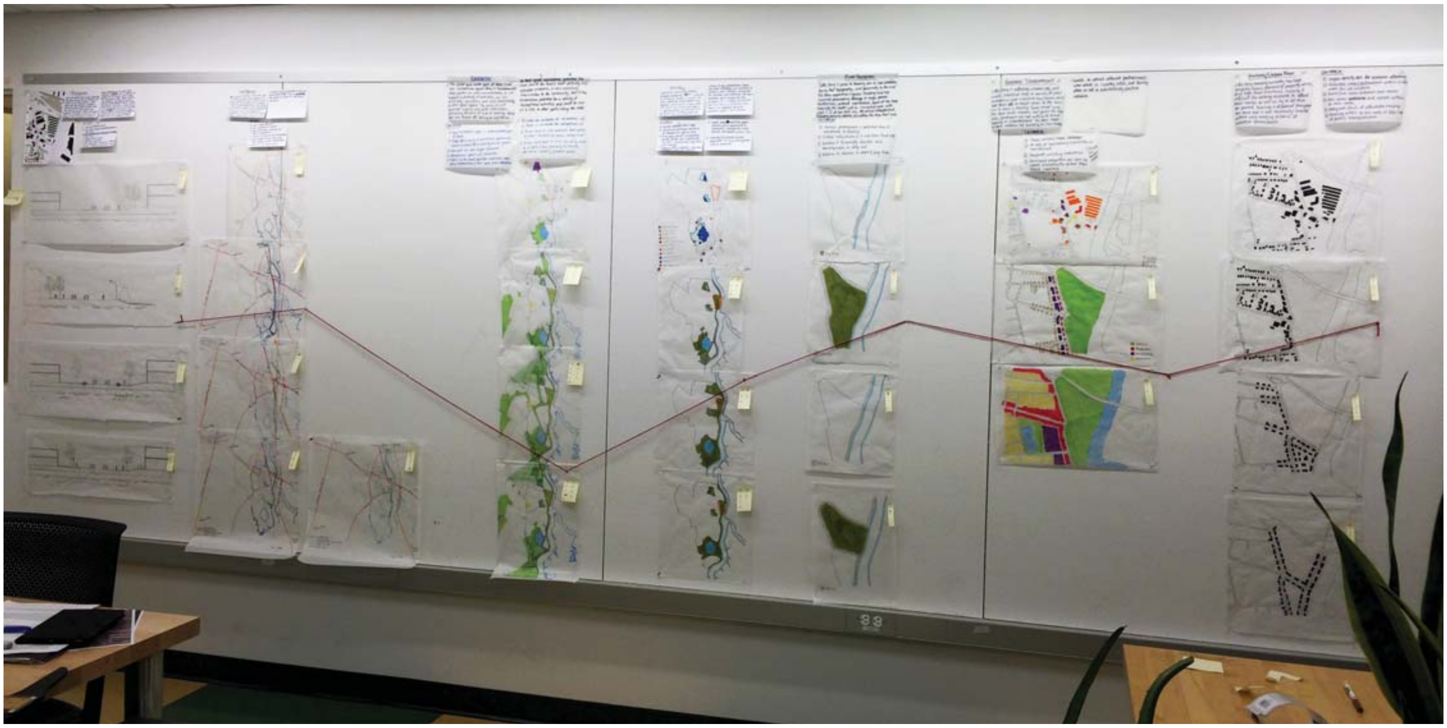


Fig. 4.5.1.1 Group 5's morphological box. The box consists of potential solutions for seven relevant issues Little Ferry faces, with a red line identifying alternatives that best satisfy criteria the group established for each issue.

ANTOMY OF THE BOX

Group 5 used a morphological box (Fig. 4.5.1.1) to explore seven issues that we considered relevant to site design in Little Ferry following our first site visit: streetscape, transportation, ecology, recreation/open space, economic development, zoning, and urban form. For each issue, we developed a statement identifying problems related to that issue in the Little Ferry context and articulated criteria by which each proposed solution to the problems would be evaluated (Fig. 4.5.1.2).

The name of the issue, along with its problem statement and list of criteria made up the morphological box's seven columns. The rows were composed of (from top to bottom): current conditions, conditions according to the MIT/ZUS Rebuild By Design proposal, and then additional solutions brainstormed by the group.

PROCESS

After identifying 3-5 alternative solutions (Fig. 4.5.1.3), we evaluated each solution judging whether it met each element of our previously established criteria well, moderately, or poorly (Fig. 4.5.1.4). We then tagged the proposal from each category that best satisfied our criteria with red yarn. We used these winning proposals as layers which we sythesized to produce a composite

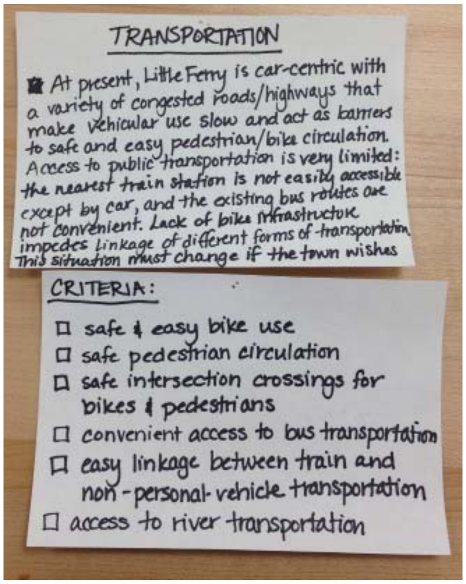


Fig. 4.5.1.2 Example of the tranportation problem statement and criteria.

proposal. The final step was to identify discrepancies and accord between the layers, and then restart the process to determine the best way to find a compromise between conflicting layers.

In this way, we could quickly assess many different options for feasabilitiy and become aware of the relationships between different courses of action.

THE RESULT

Not surprisingly, the main conflicts that emerged during this iterative process centered chiefly between ideal open space solutions (which were generally fairly similar to ideal ecology solutions) and ideal economic development solutions.

We eventually settled upon a compromise by proposing a wetland park on the river side of a flood protection berm and incorporated high density mixed commercial and residential development on the other side of the berm. People could access parts of the wetland park via boardwalk for recreation, while parts of the park would be set aside as quiet habitat for wildlife. The new commercial and residential development would enhance Little Ferry's tax ratables and draw extra value from the views of the river and park amenity.

The midterm design (Chapter 4.5.2) grew directly out of this iterative process, further developing elements of the most successful solutions according to our criteria into a cohesive plan.

Fig. 4.5.1.3 Example of an initial urban form solution.

Fig. 4.5.1.4 Example of an evaluated green space solution. Plus signs on the yellow sticky note indicate how well the solution meets the criteria checklist.

4.5 Little Ferry Redefined

4.5.2 Group Midterm Designs

Angela Johnsen, Kelly Popek, Evan Sparkman

OVERVIEW

Our midterm board (Fig. 4.5.2.1) represented the culmination of our work with the morphological box, presenting a conceptual residesign of our site area in Little Ferry.

Our design centered around five primary themes:

- Flood Protection
- Transportation
- Streetscape
- Ecology
- Recreation

<u>Flood Protection</u>

Flood protection played a central role in our design proposal. Given Little Ferry's vulnerability to catastrophic flooding, residents bear the weight of rising flood insurance without much opportunity to sell their homes in order to relocate. Similarly, the area is ripe for redevelopment to stimulate the local economy, but developers understandably consider the town an undesireable location for heavy investment.

Our group focused on the MIT/ZUS Rebuild By Design's proposed use of a berm to protect Little Ferry and other endangered towns in the Meadowlands region, exploring different ways in which the berm could be implemented and the impact it would have on the form and function of Little Ferry.

<u>Transportation</u>

Our criteria for the design included improvement of Little Ferry's car-centric, congested transportation system to protect town citizens, make Little Ferry a more desirable location for new residents in the proposed high-density housing, and improve the local environment.

Fig. 4.5.2.1 Group 5's midterm board.

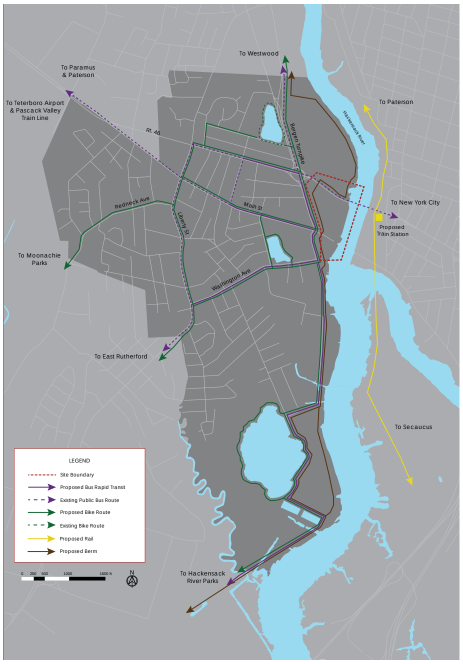


Fig. 4.5.2.2 Transportation diagram.

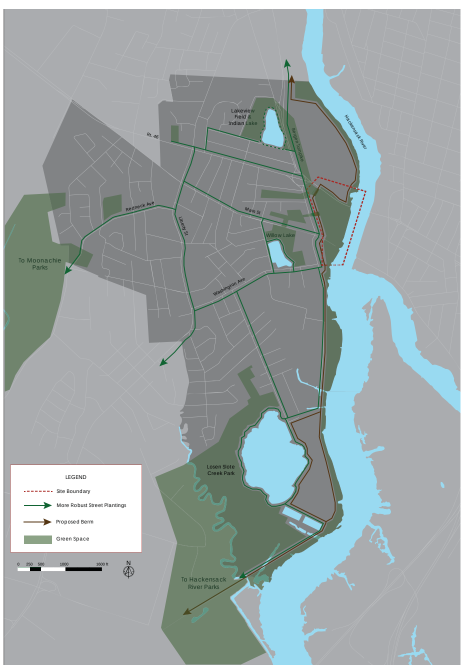


Fig. 4.5.2.3 Open space diagram.

Streetscape

The design sought to make primary streets more vibrant, striking a balance between the town's desire to retain a "small town feel" while attracting new residents and businesses.

Ecology

Each of our group members considered it imperative to restore higher quality ecological function (as habitat, etc.) to the riverfront, which is currently developed with small commercial and industrial enterprises, as well how to reconnect open spaces and create green corridors. Also, we sought to address the town's impervious footprint and reliance on grey infrastructure, both of which limit rainwater infiltration, to enhance natural systems and reduce the burden placed on the existing water pumping network.

Recreation

Finally, the design needed to enhance Little Ferry's existing, underutilized parks and introduce more diversity of recreational experiences. This included capitalizing on Little Ferry's close proximity to the river and a variety of lakes, most of which are currently inaccessible for recreational purposes.

THE DESIGN

Transportation

As Fig. 4.5.2.2 indicates, the design calls for a robust bus rapid transit and bike lane network to offer safe and effective alternatives to personal vehicles. Since the design proposes a high-density transit village on the current H-Mart site and high-density mixed use along the berm, existing train tracks on the east side of the Hackensack River should be rehabilitated for communter use with a new train station on the Ridgefield Park side of the Route 46 Bridge.

Open Space

The open space diagram (Fig. 4.5.2.3) illustrates how new development would be balanced with increased green space between buildings such that green corridors begin to emerge, linking open space. Adding bioswales and tree planters along appropriate streets would add to streetscape appeal and comfort while collecting stormwater on the town side of the berm and providing habitat for wildlife. To make room for these streetscape enhancements, new buildings would allow parking on the first few floors behind commercial businesses (see Fig. 4.5.2.5), reducing the need for onstreet parking.

Site Plan

Our site design strikes a balance between increasing open space and land devoted to economic development. The proposed site plan (Fig. 4.5.2.4) suggests that the berm pull away the edge of the river to create a wetland park and boardwalk, which would create more storm surge holding capacity and enhance the ecological funtion of the site, while providing a recreational amenity that boosts surrounding property values and attracts residents to proposed development. Unlike the MIT/ZUS proposal, our design would restrict the top of the berm to non-vehicular traffic, serving as a promenade for pedestrians and cyclists.

Main Street and Bergen Turnpike would become energetic economic corridors with new buildings facilitating commercial use on the bottom floor and residential units on upper floors.

Just below Route 46 to the east of Bergen Turnpike, a 13-story mixed commercial and residential building would serve as an iconic landmark for Little Ferry with unsurpassed views of the river. The adjacent public plaza would serve as a dynamic social space for residents to mix, shop, and dine, as well as a gateway to the pedestrian promenade on the berm.

Enhancements to Willow Lake Park would give it new life, becoming a vibrant recreational space in the new heart of the town and serving as a pleasing buffer between existing and new development.

Roofs of new buildings would include roof gardens for recreational use and community food production while reducing energy use of buildings and providing stormwater management benefits.

Fig. 4.5.2.4 Group 5's proposed midterm site plan.

Section

The section view of Bergen Turnpike (Fig. 4.5.2.5) shows the relationship between street and the berm, which we envision as a lively pedestrian promenade. Floors that open onto the berm would provide commercial opportunities for users to enjoy cafes and fun shops. A boardwalk leading off of the berm would provide controlled access to the wetland park, water activities such as kayaking, and water transport to other Meadowlands parks.

Figures 4.5.2.6 and 4.5.2.7 detail the berm and streetscape, respectively.

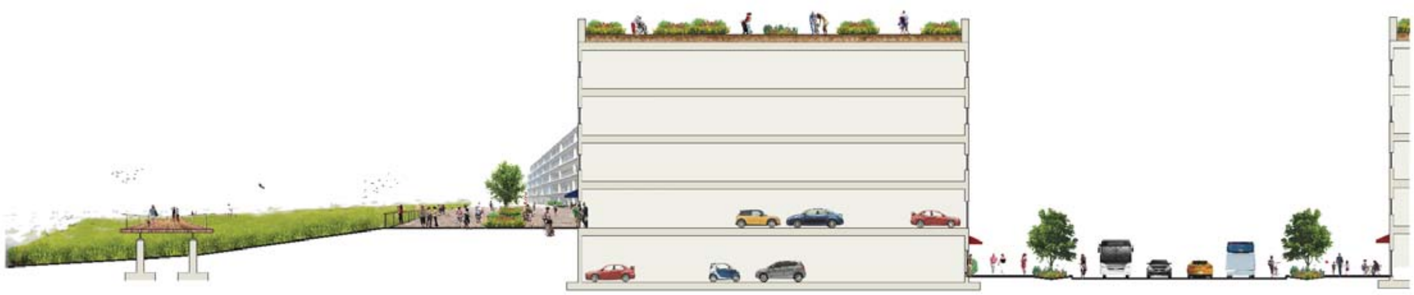


Fig. 4.5.2.5 Section of Bergen Turnpike illustrating the wetland park, pedestrian promenade on berm, parking concept, green roofs, and streetscape improvements.

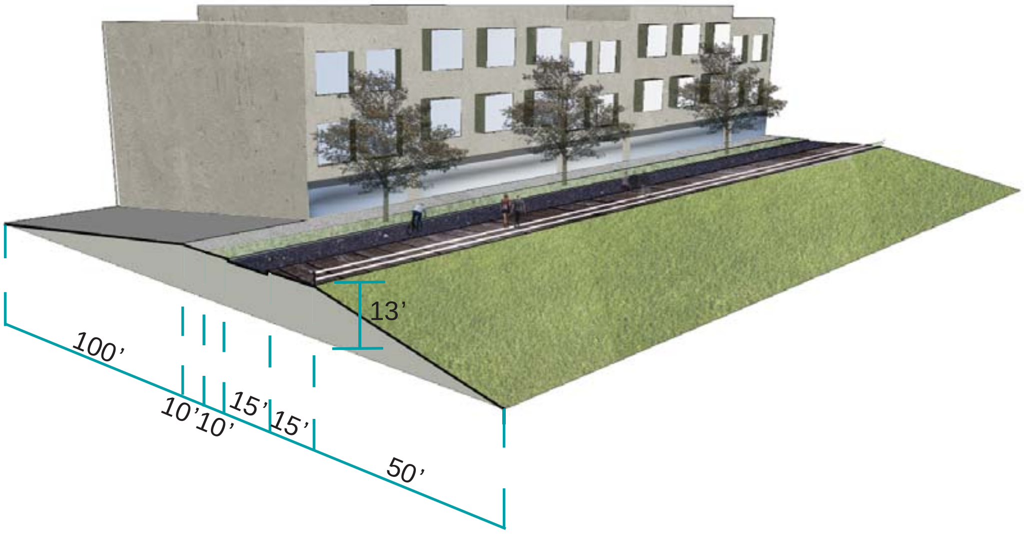


Fig. 4.5.2.6 Detail of berm and pedestrian promenade.

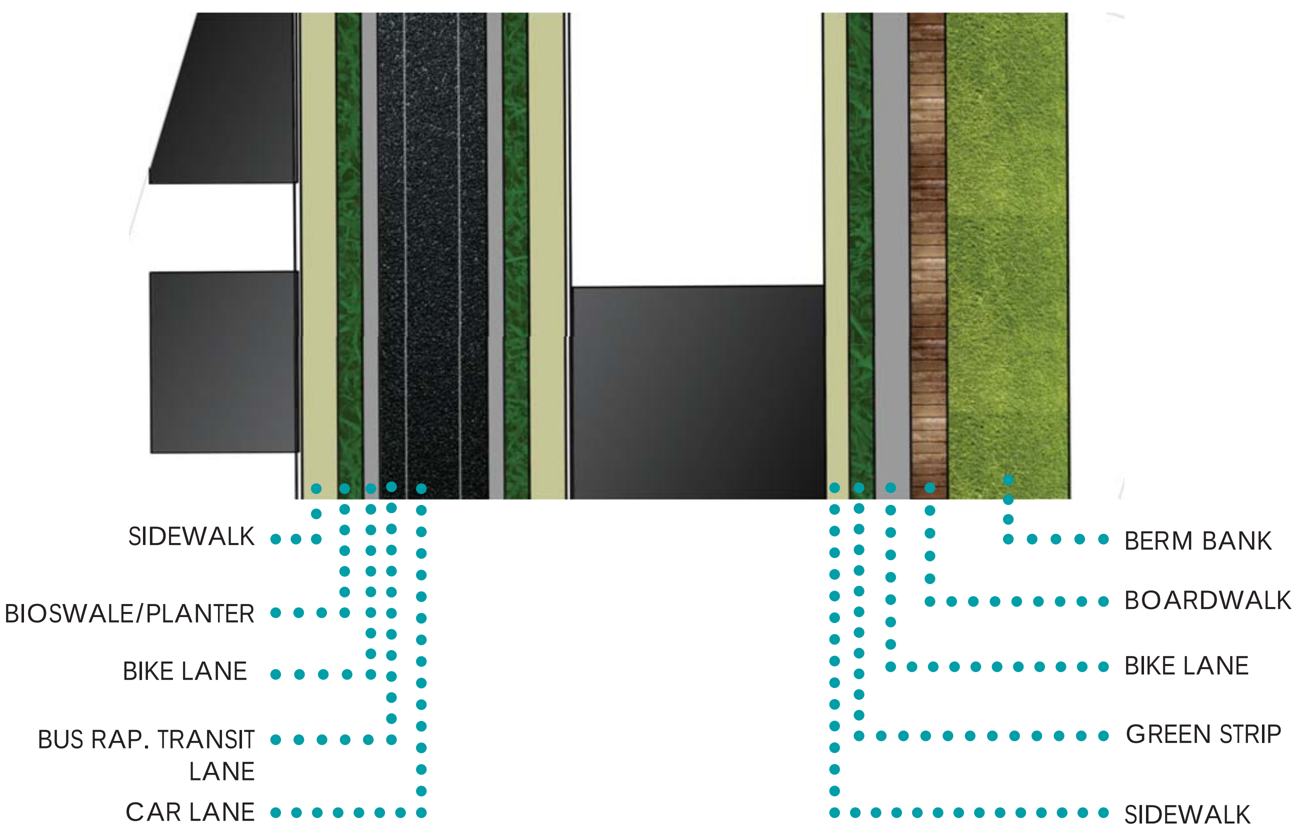


Fig. 4.5.2.7 Detail of Bergen Turnpike streetscape.

4.5.3 Final Urban Design

Angela Johnsen, Kelly Popek, Evan Sparkman

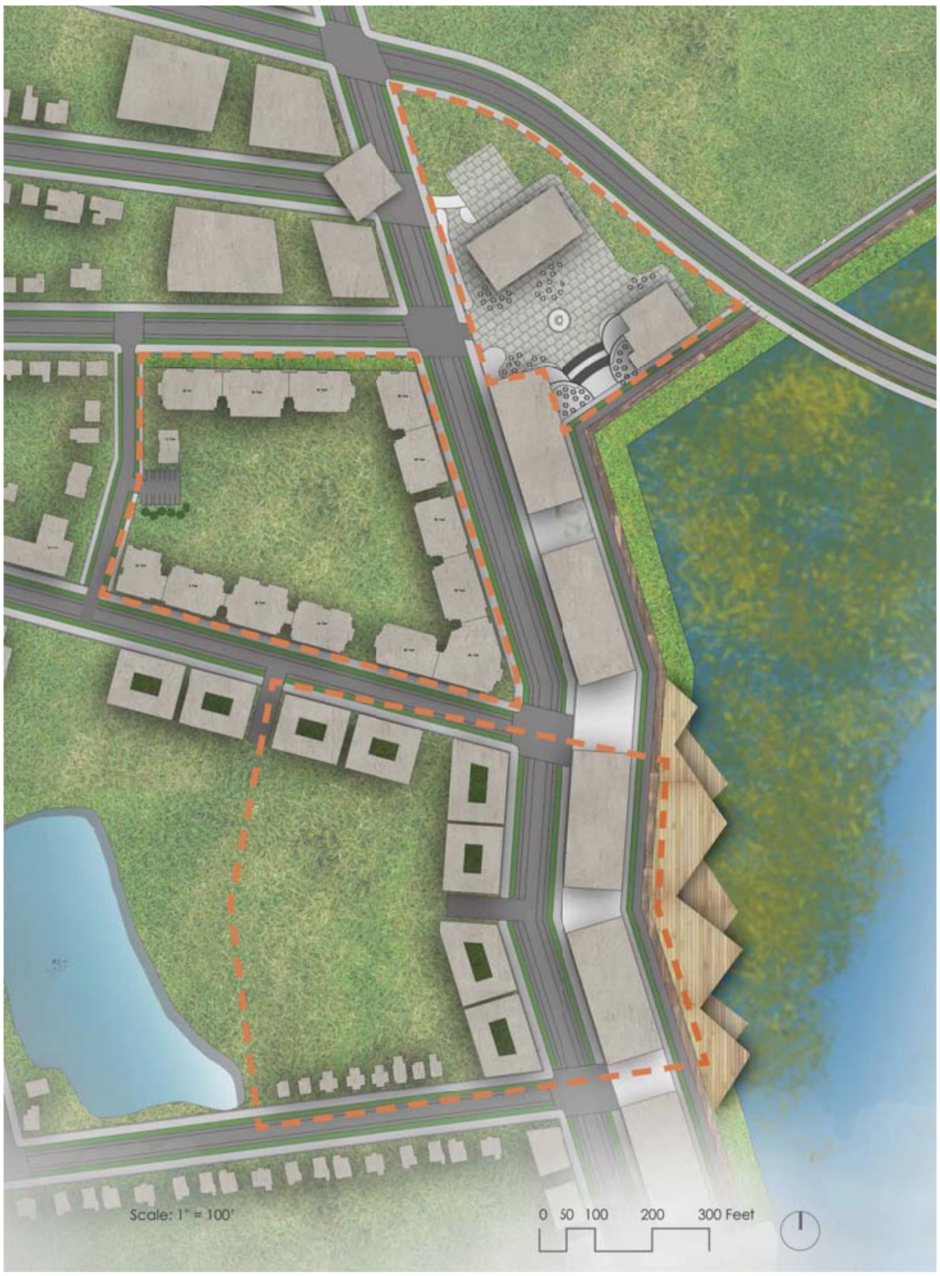


Fig. 4.5.3.1 Group 5 Final Site Plan

The group final designs built off of our conseptual site plan from the midterm without significant alterations (e.g. we continued designing with the berm in the same location). Each group member did, however, select a specific portion of the site plan to develop further individually, exploring the challenges and opportunities within that particular context.

The site plan (Fig. 4.5.3.2) identifies the three areas furthered developed. They are, from north to south: a vibrant public plaza (Chapter 4.5.3.1), a discovery landscape in a multi-unit mixed commercial and residential development (Chapter 4.5.3.1), and a mixed use development against the berm with a wetland boardwalk (Chapter 4.5.3.3).

4.5 Little Ferry Redefined

4.5.3.1 New Life For Apartment Landscapes

Angela Johnsen

PROJECT OVERVIEW

Proposals for new residential development inevitably lead to the question of what form and function open space in those developments will take. This portion of the final design focuses specifically on the outoor space for the mixed commercial and residential development between Poplar Ave and Main Street (Fig. 4.5.3.1.1).

PROJECT INSPIRATION

This project draws inspiration from the excitement of sailing on the Hackensack River during our first visit to Little Ferry. I was enchanted by the wetland bird life, so free and busy interacting with the built environment around them (Fig. 4.5.3.1.1), and I eagerly anticipated whatever lay before us around each new bend of the river and opening in the tall wetland grasses. This site design brings opportunities for more wonder, excitement, and water-side discovery to the typically-dull l andscape of proposed multi-unit residential developments in Little Ferry.

Fig. 4.5.3.1.1 Location of site outlined in orange.

Fig. 4.5.3.1.2 Excitement of life along the Hackensack River inspired the design.

PROJECT CRITERIA

The site design was guided by three main criteria:

1) Every resident must have access to quality private, semi-private, and semi-public outdoor open space.

2) The landscape must have a diversity of spaces and complexity of detail that promotes continues interest in exploring it.

3. The landscape should celebrate water, as the Hackensack River has and continues to define the town.

OPEN SPACE STRATEGY

The plan utilizes a multi-prong approach to open space in order to ensure that each resident has ample private, semi-private, and semi-public outdoor space (Fig. 4.5.3.1.3).

Each apartment has access to either a private yard or large private balcony that functions as a private outdoor room (Fig. 4.5.3.1.4). Roof gardens and small outdoor spaces offer emi-private areas for relaxation or small group socialization. Larger communal spaces allow residents to enjoy the landscape together and facilitate special community programming (e.g. movies on the lawn).

DESIGN CONCEPT

The site was split evenly into four quadrants, with each quadrant assigned a different theme inspired by our experiences on the Hackensack River (Fig. 4.5.3.1.5).

For example, spaces in the northwest portion of the site were themed around nestling and being comfortably at home like ducks we observed nestling on the riverbank. Two key elements of this quadrant are private yards and more small-group fire pits.

Spaces in the northeast quadrant generally promote quiet reflection (e.g. pavilions overlooking water pools) or new perspectives of the site (piers rising out of the tall meadow that act as lookout posts for children).

The southwest quadrant houses communal lounges that connect residents with each other, as well as streams, groves, and sculpture play area that encourage resident to connect deeply with nature.

Finally, play areas and a community garden with an outdoor kitchen and dining patio nurture residents physical, emotionally, and socially.

OPEN SPACE STRATEGY

YARD OR LARGE
BALCONY (Private)

+

ROOF GARDENS &
SMALL OUTDOOR SPACES
(Semi-Private)

+

COMMUNAL SPACES
(Semi-public)

Fig. 4.5.3.1.3 A muli-prong open space strategy for the site ensures that residents have adequate private, semi-private and semi-public outdoor space in a high-density development.

Fig. 4.5.3.1.4 Large enclosed balconies with views of the landscape act as private multi-purpose outdoor rooms for residents on upper floors. Credit: www.dailyinteriordesignblog.com

NESTLING	REFLECTING
CONNECTING	NURTURING

Fig. 4.5.3.1.5 Diagram of site area themes.

TOPOGRAPHY STRATEGY

To increase diversity of experiences, topography on the site varies to form a series of low rolling hills and valleys (Fig. 4.5.3.1.6). Thus, individuals on one side of a planted hill can enjoy quiet moments alone while only a short ways away small groups can socialize. Variation of topography was also essential to the network of stormwater streams and water pools, which provide aesthetic appeal and endless exploratory opportunities for residents old and young while storing, treating, and inflltrating stormwater onsite.

SUN/SHADE MODEL

Given the increase in building heights on the site, a sun/shade model (Fig. 4.5.3.1.7) was essential for determining appropriate placement of plantings, programming, and gathering spaces. The model indicates shadows cast in December, a low-light month, at 3pm when most children are home from school and likely to play outdoors. The plan compensates for shade by providing different types of outdoor areas (play, adult socialization, quiet reflection, etc.) both near the buildings (for convenience) and in sunnier locations in the center of the site.

Fig. 4.5.3.1.6 Section illustrating topography undulations for a diversity of engaging spaces and stormwater sequestration.

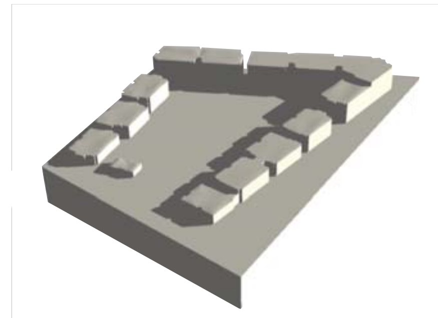


Fig. 4.5.3.1.7 Sun/shade model.

SITE PLAN KEY

1. Private front yards
2. Pocket park
3. Lookout piers
4. Three pavilions
5. Fire pits in gathering area
6. Proposed day care
7. Rivulet sculpture play area
8. Sunny lawn
9. Community garden with outdoor kitchen and pergola dining space
10. Playground
11. Outdoor lounging area
12. Emergency access courtyard
13. New on-street parking

Fig. 4.5.3.1.8 Site plan. Scale: 1” = 50’.

SITE STATISTICS

Total Acreage: ~ 6 acres
Units per Acre: 26.6 units/acre

# of 1-bedroom Units: 16
# of 2-bedroom Units: 85
# of 3-bedroom Units: 59

Area of Commercial: 88,200 ft^2
Parking Spaces: 164

SITE PLAN

As illustrated in Fig. 4.5.3.1.8, stormwater is harnessed throughout the site as a valuable amenity for the enjoyment of residents by featuring it as small streams and pools of water in which to explore and find peaceful reflection. A network of paths encourages movement throughout the site to a wide variety of environments to find private or social fulfillment. Building heights are indicated by Roman numerals on the plan.

In the northwest quadrant, buildings are residential only, thus apartments on the ground level enjoy private front yards. A yard on the Corner of Poplar Ave and Petersilge Drive can be used by residents on upper floors, as can the fire pits and general green spaces. A new daycare center with play yard enables working parents to conveniently drop off and pick up children close to home. Petersilge Drive is extended to Main Street as a one way conduit with on-street parking for residents in 2-story buildings. Half of the daycare parking lot serves residents in lower buildings as well.

The northeast quadrant, features quiet courtyards, pavilions overlooking water, and a tall meadow in which residents can stroll and imagine. A play area within the meadow allows children to climb on wooden piers, emerging from the tall grass and simulating water birds perching on posts in the Raritan River. To provide a celebrated vista of the public plaza across Bergen Turnpike, the corner of Poplar Avenue and Bergen Turnpike has the same setback as the residences along Poplar Ave, creating a pocket park.

In the southeastern quadrant, a community garden, outdoor kitchen, and outdoor dining patio under a pergola allow residents to enjoy the fruits of their labours together. This portion of the site also includes a dedicated children's playground and communal seating areas.

Fig. 4.5.3.1.9 Perspective of Rivulet play sculpture.

Finally, the southwesten quadrant has communal outdoor lounges and small lawns and landscaped areas around the building in which small children can play. For older children looking to explore farther from home, the Rivulet Sculpture area (Fig. 4.5.3.1.9) offers endless possibilities. Here children interact with playful sculptures inspired by a local artist's impressions of water. The sinuous forms offer opportunities for a diversity of activities from climbing to sliding. Children can crawl underneath them, too, discovering "secret" messages to decipher, absorbing illustrated wetland ecology stories, and hiding away to enjoy quiet moments.

A sunny lawn in the center of the site encourages running, picnics, and all kinds of fun. Breaks in buildings create courtyards that act as gateways to site interior from the street as well

4.5 Little Ferry Redefined

4.5.3.2 Piazza at the Landing

Kelly Popek

PROJECT OVERVIEW

The project area indicated in Fig. 4.5.3.2.1 posed a challenge because it was bounded by Route 46 to the north and east, Bergen Turnpike to the west, and the proposed berm to the south. However, the location does make it an ideal place for a memorable landmark.

The design creates a vibrant public plaza surrounded by an iconic skyscraper and mixed commercial and residential buildings. This area becomes an lively gateway between the promenade on the berm and pedestrian activity on Bergen Turnpike.

Fig. 4.5.3.2.1 Location of site outlined in orange.

Fig. 4.5.3.2.2 Plaza site plan.

SITE PLAN

At the center of the site, an iconic 23-story skyscraper rises from the plaza, offering residents exquisite views of the Hackensack River (Fig. 4.5.3.2.2. The entire ground floor houses commercial units, while luxury residential apartments compose the upper floors (Fig. 4.5.3.2.3).

At the base of the skyscraper, a permeable paver plaza with lush plantings, a fountain, and outdoor seating entice pedestrians to linger and socialize.

To the south, two mixed commercial and residential buildings ground the design. The 6-story southwestern building has commercial units and parking on the bottom two floors (as illustrated in Fig. 4.5.2.5), with residential units above.

The 11-story southeastern building has commercial and residential units on the first two floors, with only residential units above. All three buildings on the site have green roofs for recreational purposes, stormwater management, and energy reduction.

Between the two southern buildings, a gracious stairway from the plaza opens onto the pedestrian promenade on the berm, enticing pedestrians from Bergen Turnpike up to the promenade and enabling convenient access down from the berm to northern parts of town.

A new parking deck to the north of skyscraper provides parking for all new tenants plus approximately 200 additional spaces (based on 1 car per unit given improvements to mass transit, cycling, and pedestrian transportation). The section view of the plaza in Fig. 4.5.3.2.4 illustrates the relationship between these spaces.

Lushly planted bioswales on the north and eastern sides of the site screen out highway traffic, provide aesthetic enjoyment, and manage stormwater.

SITE STATISTICS

Site Area: ~5 acres
Total Res. Units per Acre: 60.6

Skyscraper (23 floors)
Total # Commercial Units: 20 (2000 ft^2 each)
Total # Residential Units: 154 (1472 ft^2 each)
Units per Floor: 7
Total # Residents: 462 (3 res./unit)

Southeast Building (11 floors)
Total # Commercial Units: 12
Total # Residential Units: 77
Total # Residents: 231 (3 res./unit)

Southwest Building (6 floors)
Total # Commercial Units: 12
Total # Residential Units: 72
Total # Residents: 216 (3 res./unit)

Parking Deck (6 floors)
Parking Spaces: 510

Fig. 4.5.3.2.3 Plaza site statistics.

Fig. 4.5.3.2.4 Section NE cutting through plaza (looking north towards Route 46). Original Scale: 1/16” = 1’-0”

4.5 Little Ferry Redefined

4.5.3.3 Boardwalk Empire

Evan Sparkman

Fig. 4.5.3.3.1 Site Plan, Original Scale 1”=50’

Redesigning a portion of this town was a bit of a challenge. As we already know, the town of Little Ferry faces numerous issues and it is our job as landscape architects to create unique urban design proposals while still shaping meaningful spaces. The portion I focused on was the lower waterfront area of the town. Through site visits, I noticed that the Hackensack River was not part of the identity of the town. There are no connections or walkways that allow the residents to experience or view the historic river. This was an important issue that I wanted to resolve with my design. The first portion I redeveloped were the buildings themselves(Fig. 4.5.3.3.5 & Fig. 4.5.3.3.6). I wanted to create a mixed use complex with a fair amount of open space for the residents to enjoy. I did this by adding green roofs, balconies, courtyards, and some additional space behind the complex. As for the buildings that run along the berm, there will not be as much open space; however, a portion of the residents will have ample views of the wetlands that extend beyond it. They will also be within close proximity of a park and boardwalk if extra space is needed. This brings me to the next portion of my design which is the boardwalk (Fig. 4.5.3.3.7). I used a geometric design approach as I felt it was appropriate to match our streetscape. Connections with nature is an important aspect of landscape architecture and I accomplished this by having this large tiered boardwalk that would extend over the wetlands. This allows pedestrians to travel down to the lower tier and observe the meadow band that extends for miles. Lastly, I designed the smaller “pocket spaces” that sit between the buildings along the berm (Fig. 4.5.3.3.2 & Fig. 4.5.3.3.3). These would be major connection points to access that top of the berm. Rather than them being spaces strictly for accessing the berm, I incorporated some fun elements to draw people into the space. The lighted seating will make this an attractive well lit space during the night and the tall surrounding buildings will provide ample shade for hotter sunny days.

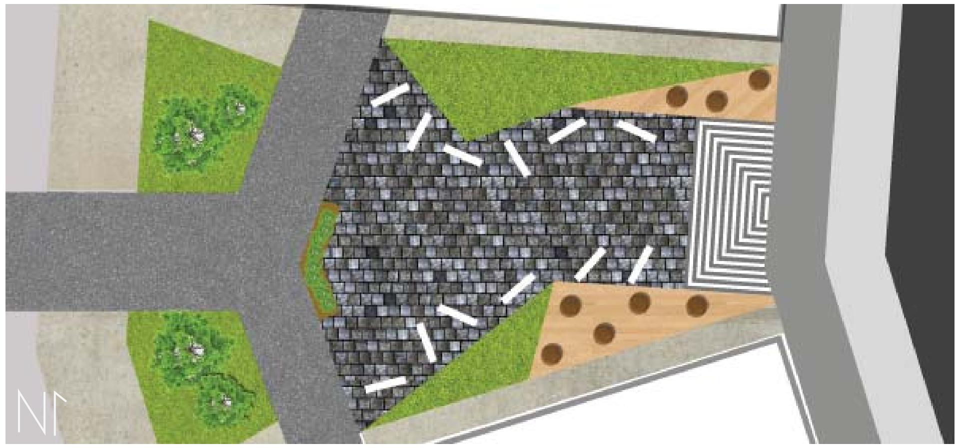


Fig. 4.5.3.3.2 Plan for Pocket Park, Original Scale 1”=20’


Fig. 4.5.3.3.3 Late Night Perspective

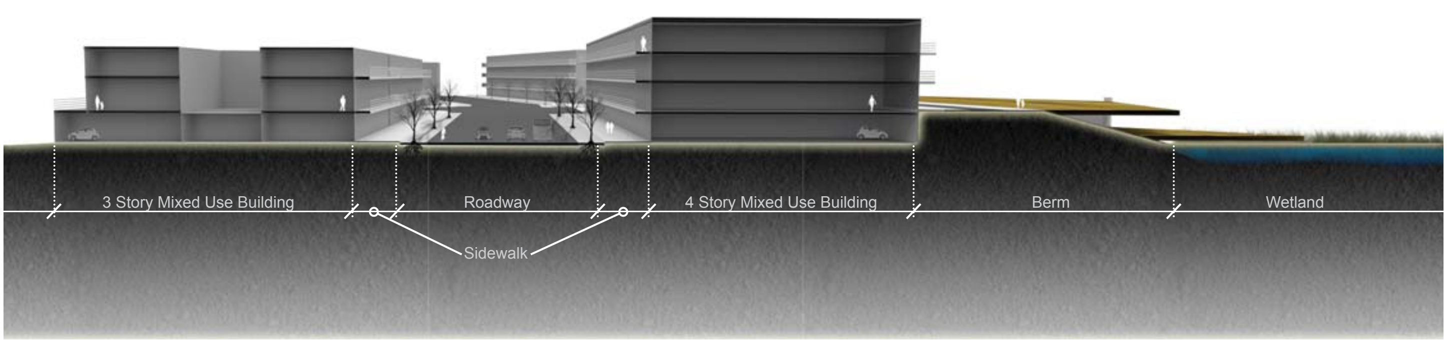


Fig. 4.5.3.3.4 Section Cut Through Center of Plan, Original Scale 1/16”=1’

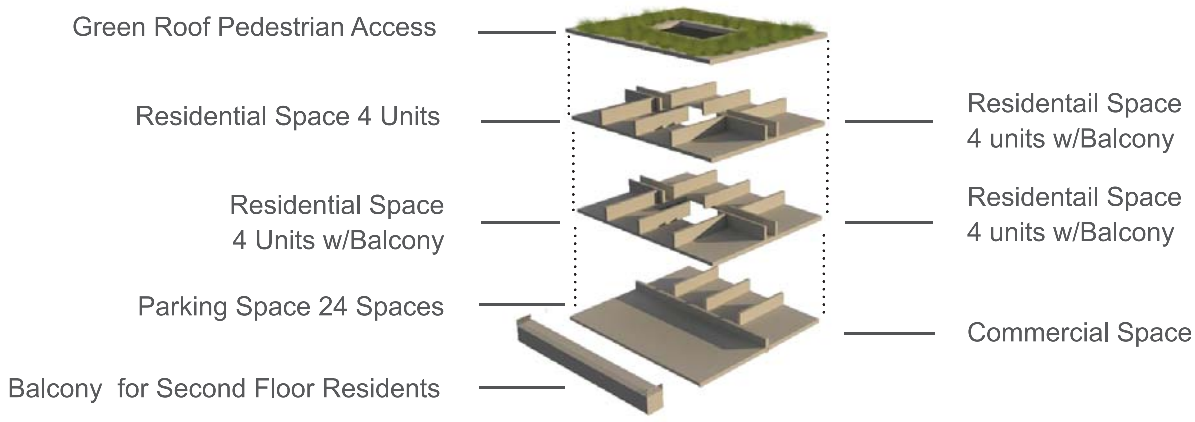


Fig. 4.5.3.3.5 Three Story Building Exploded Axon

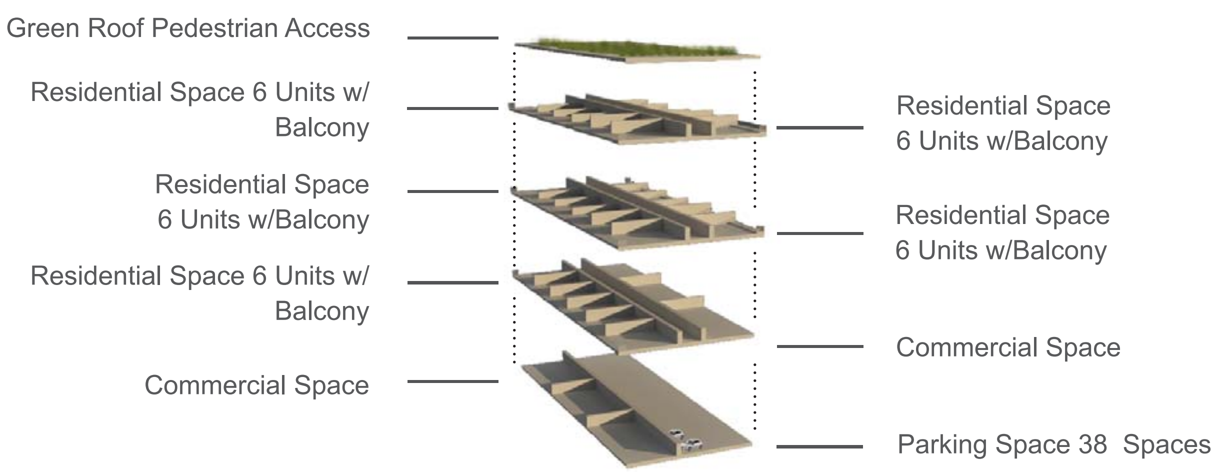


Fig. 4.5.3.3.6 Four Story Building Exploded Axon

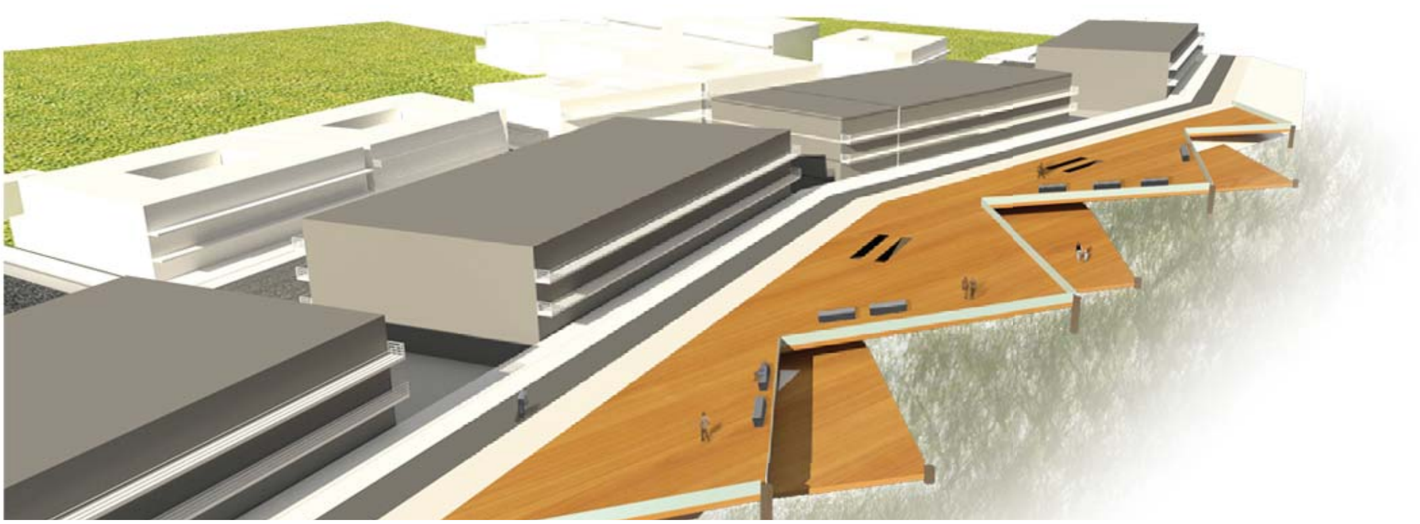


Fig. 4.5.3.3.7 Boardwalk Rendering

Table of Figures

4 Designs

4.6 Group 6 - HYDRA

Peter Chang, Eugene Fernandez, and Michael Young

4.6.1 Morphological Box

GOAL STATEMENT

Our primary goal for Little Ferry, New Jersey is to create a resilient waterfront identity through **S. E. A**. Our evaluation and criteria were focused on Flooding from Low-lying geography, Pollution, Vehicular and Pedestrian Circulation, Urban Form, and the 100yr Sea Level Rise.

STORMWATER MANAGEMENT

Located in an area prone to flooding, Little Ferry has to look into managing its stormwater efficiently. Tidal flooding and flooding caused by impervious surfaces and the current built environment. Implementing green infrastructure using Best Management Practices will ensure to reduce impacts of future storms.

ECOLOGY

Bring located within a densely developed region, the opportunity for ecological restoration needs to be explored within the context of the New Meadowlands Plan. Enhancing the current wildlife habitat, while not sacrificing protection for the people is one goal. The placement of the levee along either, the existing infrastructure or the Hackensack itself, to be implemented in a manner that optimizes possible ecosystem services. These may include: phytoremediation, freshwater filter feeders, or wetland remediation for flood capacity and runoff capture.

ARCHITECTURE

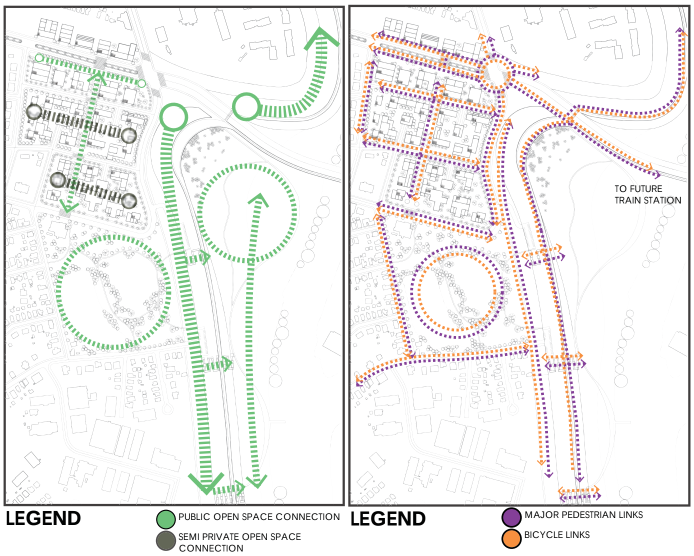
Little Ferry is occupied by a mixed use of industrial, residential, and commercial buildings similar to Teterboro and South Hackensack. The intent to form an architectural identity for Little Ferry begins with rezoning and re-fabrication. The rezoning of commercial, residential, and landscape structures will reduce the impact of flooding from natural disasters and typical rain events (<1 inch). The re-fabrication of materials for these structures must also decrease the amount of debris in case of harsh winds and storms.

MORPHOLOGICAL BOX

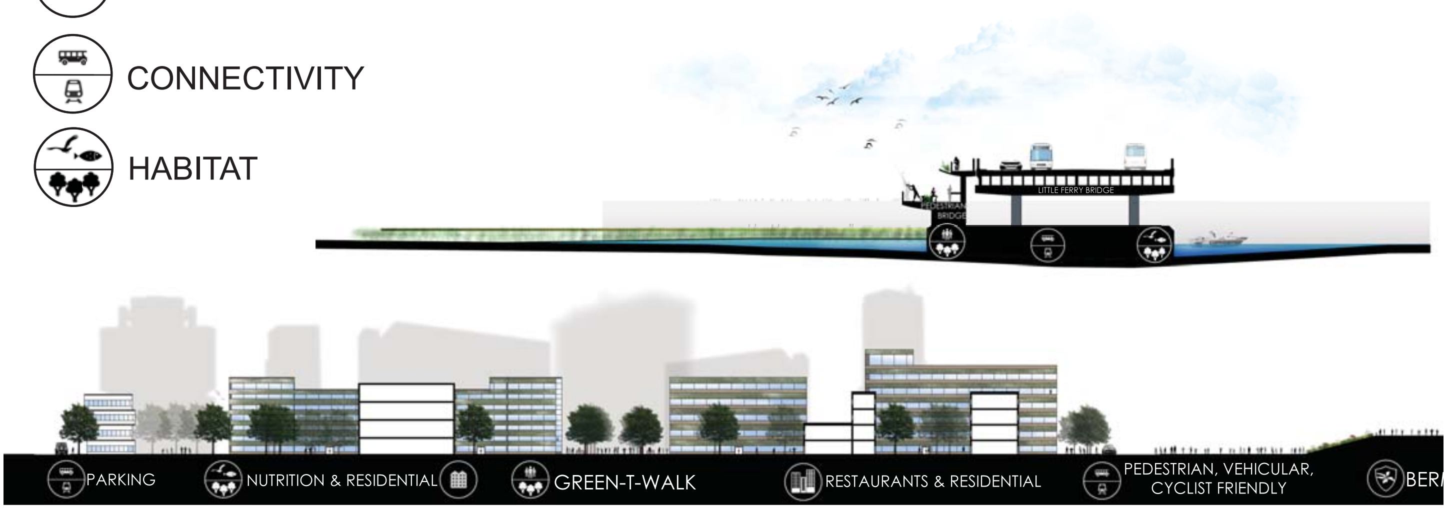
Our teams morphological box design criterea was to look at open space, urban sprawl, flooding, contamination and pollution, and the circulation.

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

4.6.2 Group Midterm Design



DESIGN PROPOSAL



AVERAGE BERGEN COUNTY UNITS PER ACRE

6.0 units per acre

EXISTING UNITS PER ACRE IN LITTLE FERRY

4.5 units per acre

PROPOSED UNITS PER ACRE

79 units per acre

PARKING SPACES PER UNIT

2 spaces per unit

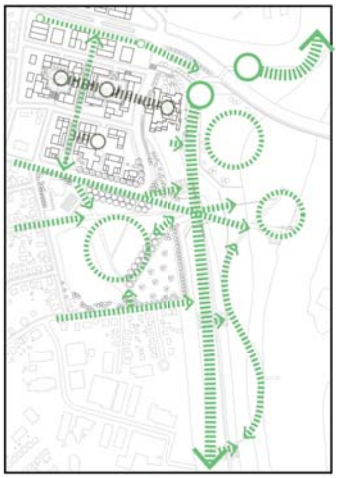
OPEN SPACES PER UNIT

800 sq. ft. per unit

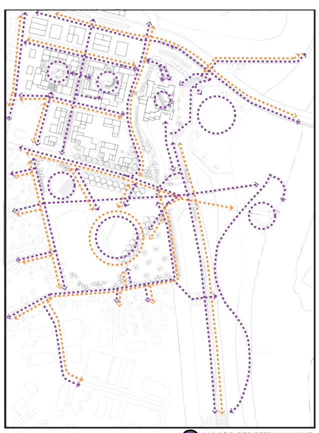
PEOPLE PER ACRE

220 people per acre

4.6.3 Final Urban Design



PUBLIC OPEN SPACE CONNECTION
SEMI PRIVATE OPEN SPACE CONNECTION



MAJOR PEDESTRIAN LINKS
BICYCLE LINKS

DESIGN PROPOSAL

HOUSING DENSITY

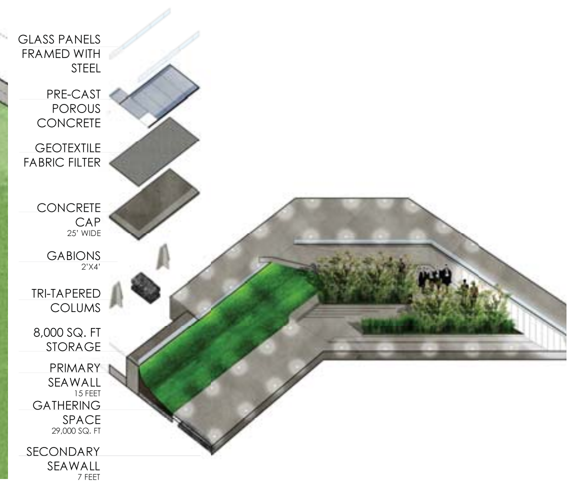
EXISTING: 4.5 units per acre

PROPOSED: 51 units per acre

PARKING SPACES PER UNIT: 1.8

EXISTING LITTLE FERRY RESIDENCE

4.6.3.1 Peter Chang - Berm Promenade

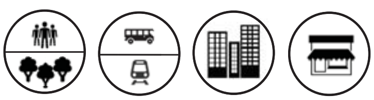


BERM PROMENADE

4.6.3.2 Michael Young - The Courtyards

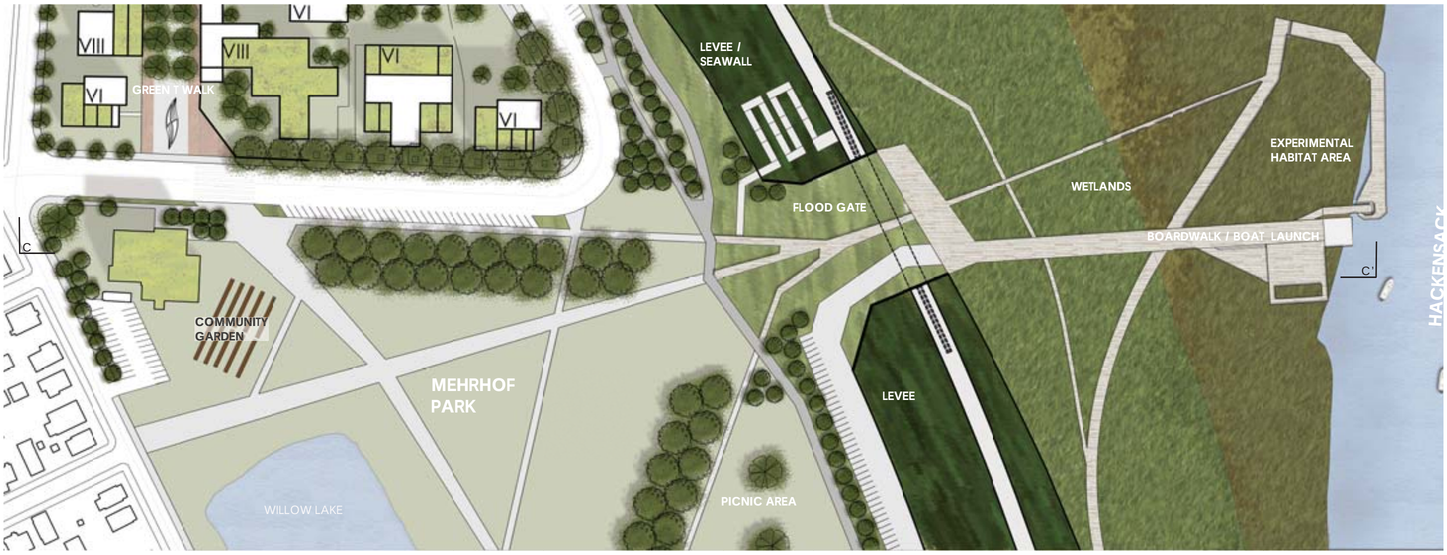
Plant List

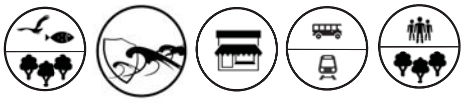
Courtyard 1
Betula nigra - River Birch
Cersis canadensis - Redbud
Prunus laurcerasus - Cherry Laurel
Calamagrostis ‘Karl Foerester’ - Reed Grass
Symphyotrichum novea-angliae - New York Aster
Rubekia fulgida - Black Eyed Susan
Geranium x Rozanne - Cranebill



Plant List
Courtyard 2
Hepticodium miconiodes - Seven Sons
Magnolia grandifolra - Southern Magnolia
Ilex verticillata - Winterberry Holly
Prunus laurcerasus -Cherry Laurel
Calamagrostis ‘Karl Foerester’ - Reed Grass
Echinacea purpurea - Cone Flower
Eryngium planum - Rattlesnake Master
Rubekia subtomentosa - Black Eyed Susan
Geranium x Rosanne - Cranesbill

4.6.3.3 Eugene Fernandez - Mehrhof Park





4.7 Urban Island Retreat

4.7.1 Morphological Box

Jacob DeBoer, John Jacobs,
Scott Miller, Danny Rodriguez

Figure 4.7.1.1. Morphological Box

Circulation

Route 46 is a major artery providing access to NYC for the town of Little Ferry, because of this traffic is an issue on the local and regional scale. Public transportation access is re-stricted and/or nonexistent, forcing residents to commute via car, further increasing the congestion in the area. As of now, there is barely any access to the riverfront. The town of Little Ferry is not pedestrian friendly and bike paths are nonexistent.

Berm / Flood Protection

A sizeable structure on the magnitude of the proposed berm will generate an enormous impact on the town's identity, and further decrease access to the water. The location of the berm is contoversial in terms of increasing development verse increasing pen space. The berm can be constructed a multitude of different ways, where some solutions may work while others may not. The construction of such a berm will have an impact on the local eceology, and has the opportunity to determine the future ecology.

Urban Form

Currently, the site is occupied by an assortment of abandonded buidlings, contaminated sites and a storage facility. The development on the site does not make a substaintial contribution to the local economy, and cuts off access to the riverfront.

Ecology

Due to the past uses of the site the local ecology has suffered to such an extent that it is almost nonexistent, compared to it's native ecology

Recreation / Open Space

This site is over-developed and provides no open space or recreational assets. The town as a whole has areas of open space, yet there are not enough to meet the standards.

Culture / Identity

The town has a deep histoy connected with the river, and the brickyards that used to inhabit the riverbank. The town also has a central bank, one of the oldest buildings in town. Currently, the town seems to have lost its identity and the connections to their past.

4.7 Urban Island Retreat

4.7.2 Midterm Presentation

Jake DeBoer, John Jacobs,
Scott Miller, Danny Rodriguez

Figure 4.7.2.1

Figure 4.7.2.2

Figure 4.7.2.3

The decision to reject the New Meadowlands design is based upon an analysis of water movement up river from the proposed berm. As sea level rises, areas that would normally flood are protected from the surge by the berm. Yet, all that water will be displaced; most likely traveling upstream and flooding northern municipalities along the Hackensack River. We also took the reduction of the berm height based upon the amount of marshland before the berm, creating a buffer. These calculations are based upon the Bay Institute's analysis of marsh length compared to berm height. A 1000 foot marsh decreases the height of the Berm by 6 and a half feet. This reduction preserves views of the River and NYC from within the town looking out.

Our design maximizes open space and ecological habitat while increasing density and ratables for the borough of Little Ferry. We propose to create a new downtown area for Little Ferry, by redeveloping the areas bounded by Liberty street and Washington Avenue. These streets are serviced by a new public transportation system that operates within Little Ferry and to the Wood Ridge train station. The new downtown is signified by three sky bridges, one on the north end of liberty street, a second towards the south, and the third along Washington Avenue. A crossing in the berm allows residents access to the Hackensack River for recreational activities such as fishing and bird watching. Along the top of the berm is a park system which offers jogging paths, beautiful scenery, and plenty of open space to relax and enjoy the view of New York City. This new development increases the density in our site area from 8.3 units per acre to approximatly 30 units per acre.

4.7 Urban Island Retreat

4.7.3 Final Group Design

Jacob DeBoer, John Jacobs, Scott Miller, Danny Rodriguez

Urban Island Retreat goals are protection from flooding, preservation of open space and marshland, and to provide connections to the land. By shrinking the urban footprint and increasing density along the Hackensack river, we begin to reclaim the natural ecology surrounding the river. Urban Island Retreat is providing beautiful scenery, opportunities for bird watching, recreation and exploration, and restoring the river to its former beauty. The protection of these newly developed cities is achievable via the construction of a series of berms, which serve as a secondary defense from the impending waters. These berms represent the edge condition between the natural and man-made, and are critical in connecting these two vastly different habitats. The additional marshland gained via the compression of our cities acts as the primary defense mechanism against future flooding, essentially "soaking up" the river as it rises. It is extremely important to provide access to these restored wet-lands, and integrate them into peoples everyday life. By connecting our citizens to the land we develop sustainable and

Figure 4.7.2.2 - Public Transportation

Figure 4.7.2.1 - Community garden, creating a connection between people and the land.

Figure 4.7.2.3 - Regional Base Map, Illustrating how the "islands" can be repeated along the Hackensack River.

resilient communities. Through the use of urban agriculture, community gardening, and sustainable urban practices, these cities will become self-reliant.

Protection

Sea Level Rise and frequent severe storms are increasing the need for protection from water. Rebuild By Design proposed a berm along the Hackensack River, stretching through several municipalities. Our Group feels that it would be difficult to get municipalities to unanimously agree. Our island concept can be applied by individual municipalities while maintaining the idea of a berm. Creating these individual islands will push development further away from the river's edge and replace it with marshland. The addition of the marshland will also significantly reduce the height of the berm and allow for views out into the horizon.

Preservation

The creation and preservation of Marshland acts as the primary flood protection. Preserving this space also protects the existing wildlife of the Meadowlands while introducing several species which could not survive here previously. The Meadowlands was once rich with wildlife and plant diversity but the constant development has been extremely detrimental. An increase in wildlife will encourage people to also use this preserved environment for recreation such as bird watching and jogging outside of the island. The preservation of this marshland has several ecological and social benefits while further protecting the island from flooding.

Connection

The relationship between people and nature will further grow

Figure 4.7.2.4 - Flooding, one of the major problems Little Ferry is facing.

Figure 4.7.2.5 - Preservation, restoring the Hackensack River to its natural state.

an appreciation for the land we live on. Creating a relationship between people is also an important aspect to ovur concept. Through community gardens and urban farms, people will be brought together over the growing of food. An improved public transportation system can allow for a smooth connection with people outside of the island and work. Introducing several urban open spaces throughout the island further influence relationships between people. Creating these strong connections will lead to a healthy and successful community for years to come.

Figure 4.7.2.6 - Connection, connecting the residents of Little Ferry to the marshes and the land.

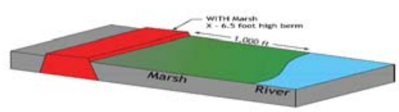


Figure 4.7.2.7 - Berm height with marsh

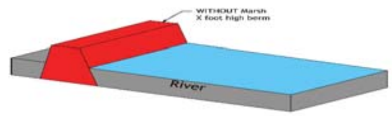


Figure 4.7.2.8 - Berm height without marsh

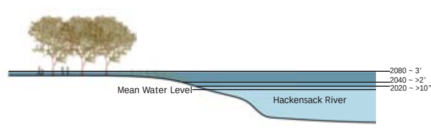


Figure 4.7.2.9 - Sealevel rise

Figure 4.7.2.10 - Regional site location

Figure 4.7.2.11 - Town site location

Figure 4.7.2.12 - Site location

The decision to reject the New Meadowlands design is based upon an analysis of water movement up river from the proposed berm. As sea level rises, areas that would normally flood are protected from the surge by the berm. Yet, all that water will be displaced; most likely traveling upstream and flooding northern municipalities along the Hackensack River. We also took the reduction of the berm height based upon the amount of marshland before the berm, creating a buffer. These calculations are based upon the Bay Institute's analysis of marsh length compared to berm height. A 1000 foot marsh decreases the height of the Berm by 6 and a half feet. This reduction preserves views of the River and NYC from within the town looking out. Our design maximizes open space and ecological habitat while increasing density and ratables for the borough of Little Ferry. We propose to create a new downtown area for Little Ferry, by redeveloping the areas bounded by Liberty street and Washington Avenue. These streets are serviced by a new public transportation system that operates within Little Ferry and to the Wood Ridge train station. The new downtown is signified by three sky bridges, one on the north end of liberty street, a second towards the south, and the third along Washington Avenue. To the East of Washington avenue is a new park, focused around the former clay pit now refereed to as Willow Lake. A crossing in the berm allows residents access to the Hackensack River for recreational activities such as fishing and bird watching. Along the top of the berm is a park system which offers jogging paths, beautiful scenery, and plenty of open space to relax and enjoy the view of New York City. This new development increases the density in our site area from 8.3 units per acre to approximately 30 units per acre.

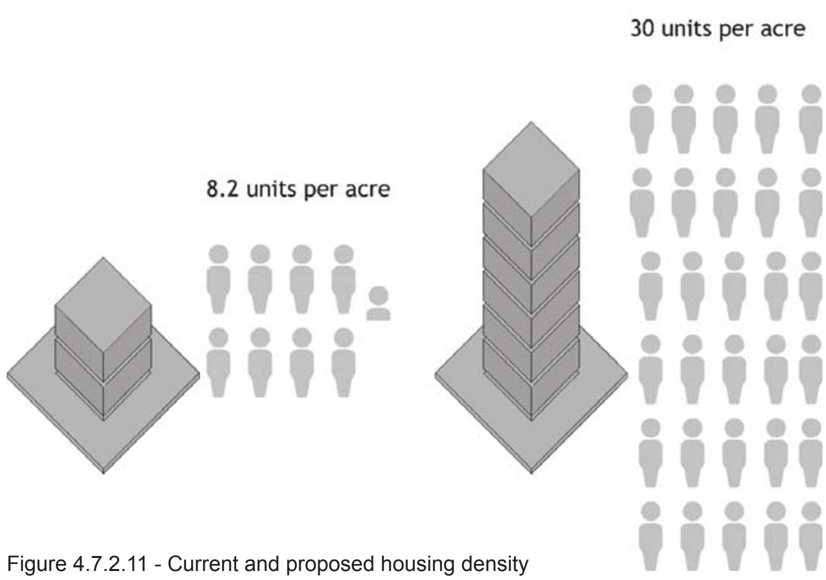


Figure 4.7.2.11 - Current and proposed housing density

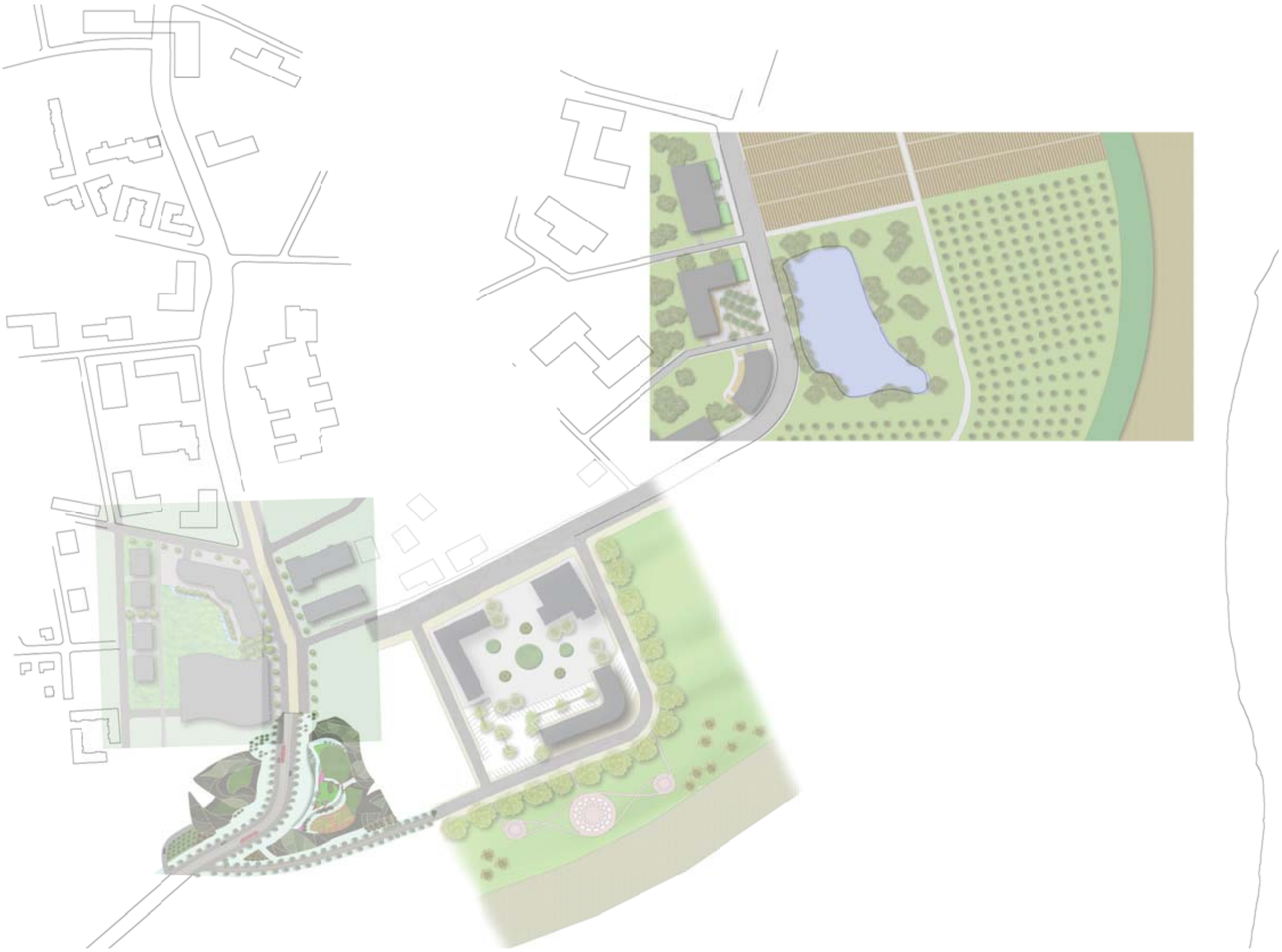
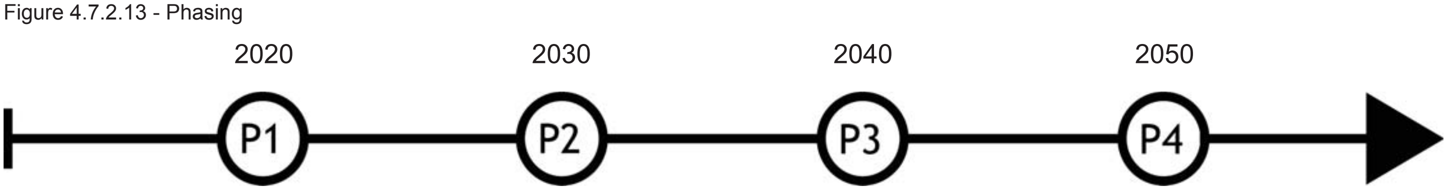


Figure 4.7.2.12 - Site plan

Figure 4.7.2.13 - Phasing



2020:

- Little Ferry Berm Constructed.
- Bike lanes throughout little ferry implemented.
- Town zoning updated to allow for redesign.

2030:

- Urban Design and Agriculture installed
- Little Ferry Community Garden installed
- Little Ferry streetcar installed
- Begin relocation of people throughout the town

2040:

- Urban Reforestation Design built
- Liberty Street Plaza installed
- 75% of people relocated

2050:

- Wetlands are restored to historic locations
- 100% of people relocated
- All designs and changes are installed/implemented

4.7 Urban Island Retreat

4.7.3.1 Urban Design and Agriculture

Scott Miller

This site design is composed of three main components- urban agriculture, building typology and linear open space. A vast amount of land dedicated solely to extensive crop production is protected from flooding just behind the berm and adjacent to a major roadway. This will provide the residents of Little Ferry with fresh and affordable produce while growing a self sufficient identity. The buildings across the farmland are designated as mixed-use with commercial and parking on the first floor and the remaining floors as residential. Various buildings will have residential floors offset from the sidewalk to lessen the effects of a large structure along a main pedestrian corridor. By doing so, private open space will be available above the single story commercial for residents of the building. Linear elements will be used to create space outside these buildings. By using linear elements, pathways are easily created allowing for successful circulation throughout the site. These elements distinguish space while maintaining clear views towards the city.

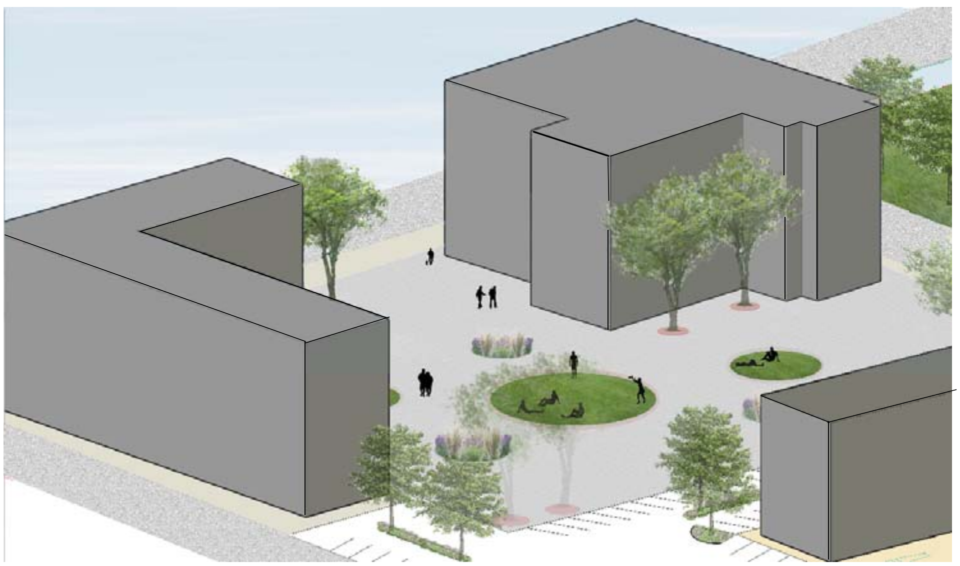
Section A - A'

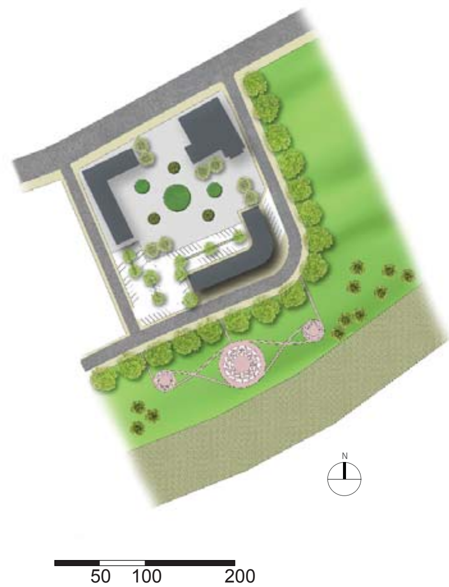
Section B - B'

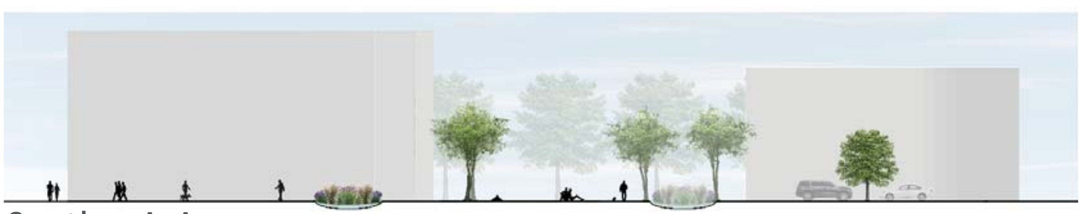
4.7 Urban Island Retreat

4.7.3.2 Little Ferry Community Gardens

Daniel Rodriguez







Section A-A
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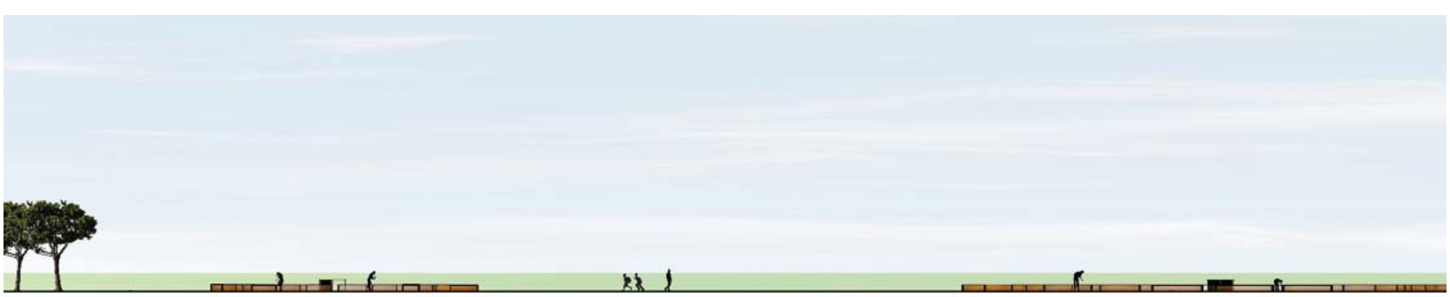

Section B-B
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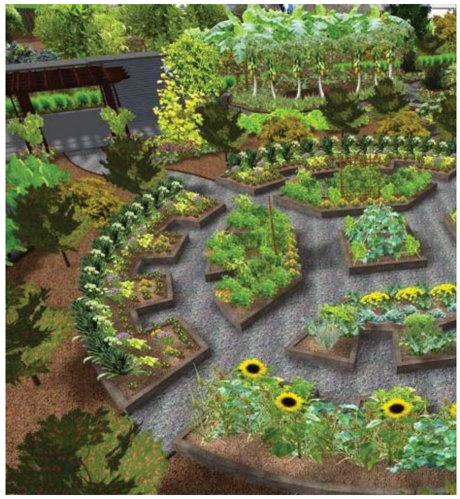
http://thejerseycitylife.com/wp-content/up-loads/2013/10/



http://betterfarm.blogspot.com/2012/10/manda-la-garden-design.html

http://mybuilder-uploads.s3.amazonaws.com/2_thumb/1866574_11b61830fe.jpg

This site design is focused around the use of circles to create different spaces, and making residents of the city feel like they have their own backyards. The courtyard in between the city block on Washington Ave has a bluestone paving pattern broken up by circles containing lawns, rain gardens, and trees. These lawns give people the opportunity to socialize with others, when they normally would not. On the largest circle of lawn people can socialize in large groups, and on the two smaller patches they can get some private lawn space with maybe one or two people. The rain gardens are spread out evenly to capture storm-water from the pavement that dominates the site. On the other side of the road there is a series of large community garden and two smaller community gardens with connecting paths and a view over the berm. The community gardens is another chance for people to socialize as well as create healthy lifestyles. Anyone that lives in a single family home can have their own garden, but when living in a city it is rare to get that kind of open space to grow your own vegetables. Parking on my site is another uncommon feature, Having a parking lot where residents can park instead of a parking garage makes the residents apartments more accessible and gives residents the feeling of having a personal driveway to park in.

4.7 Urban Island Retreat

4.7.3.3 Urban Reforestation

Jacob DeBoer

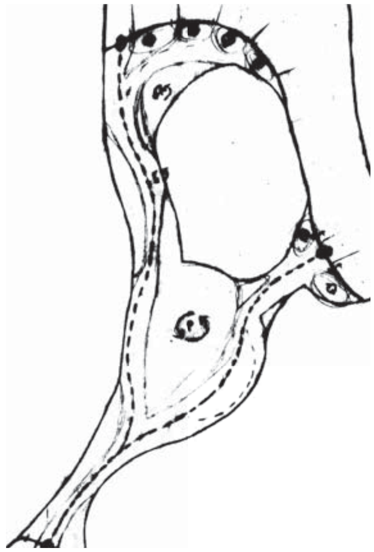


Figure 4.7.2.3.3 - Circulation diagram

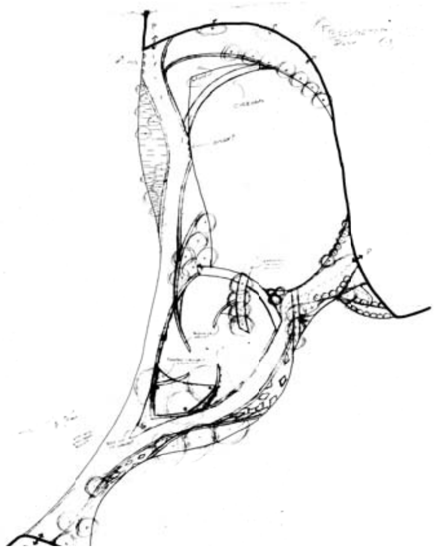


Figure 4.7.2.3.4 - Conceptual plan

Figure 4.7.2.3.2 - Site Plan

Urban Reforestation establishes a new standard concerning green infrastructure and sustainable living. By minimizing the urban footprint via the integration of nature into our buildings, Urban Reforestation boasts environmental friendliness, and various public health benefits. Not only is this new development incredibly beautiful, it also offers protection from impending floods via the berm and marsh, and an incredible public transportation system. Urban Reforestation provides 305 sustainable units, accompanied by 45,000 ft^2 of retail space, 305 parking spaces and creates a gateway into the new downtown of Little Ferry.

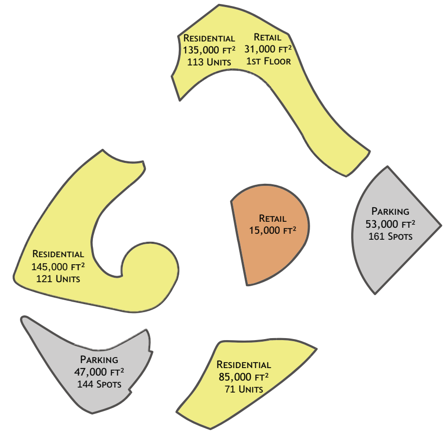


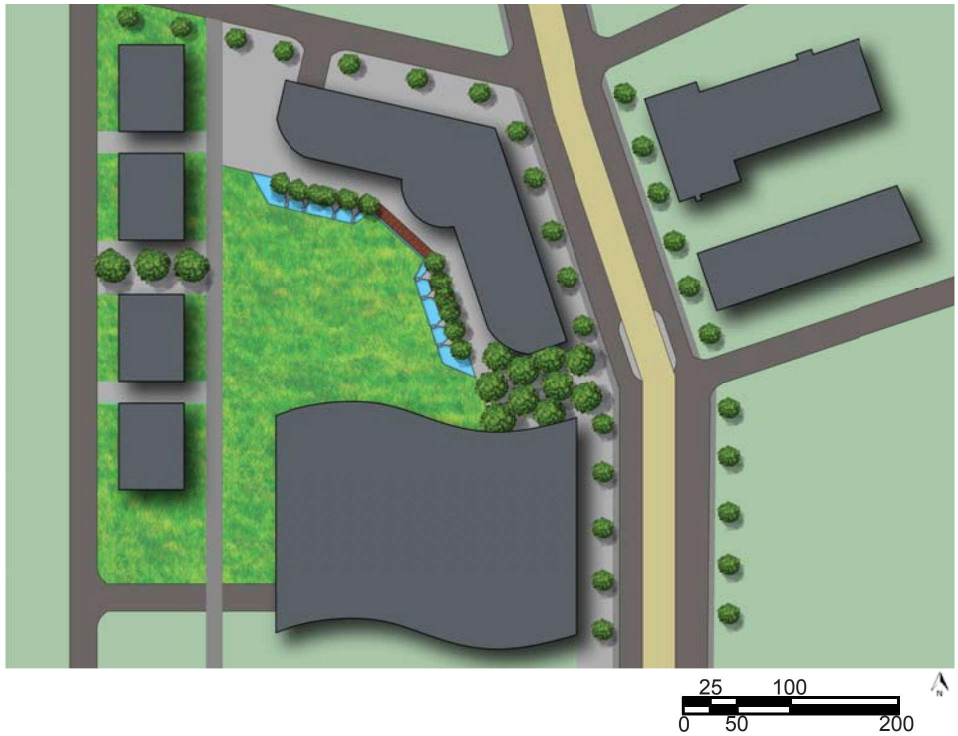
Figure 4.7.2.3.1 - Building Programing

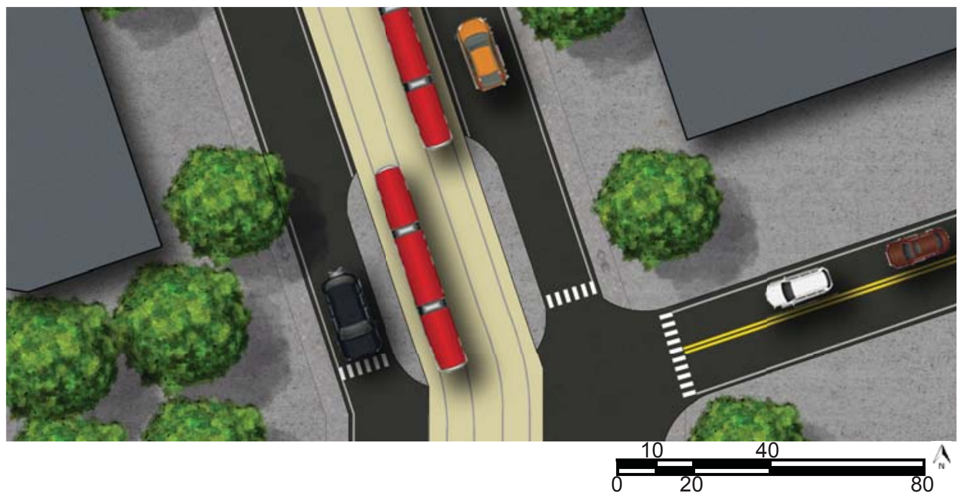

Figure 4.7.2.3.5 - Section

4.7 Urban Island Retreat

4.7.3.4 Liberty Street Plaza

John Jacobs





Located at a major stop of the Little Ferry streetcar, this plaza has both public and private spaces and nodes. The buildings around the site, 2-family townhomes to the west and mixed use residential to the north and south, will generate revenue and give residents new shoppiwng and living opportunities. The buildings to the north and south well offer parking for all residents and visitors. A unique water feature gives users an opportunity to interact with the site, helps with storm-water management and symbolically represents the Hackensack River. The streetcar, which will run along Liberty Street and other main streets throughout the town will allow Little Ferry residents and visitors to easily get around town and will give them access to a main train line.