New Orleans

Community Rebuilding
&
Hazard Mitigation

Louisiana State University
School of Landscape Architecture
&
Office of Sea Grant
2005

LSU School of Landscape Architecture
302 College of Design Building • Louisiana State University • Baton Rouge, LA 70803

LA 5001 Studio • Fall 2005

Community Rebuilding and Hazard Mitigation:

Strategies for Rebuilding a Safer New Orleans Louisiana in the Aftermath of Hurricanes Katrina and Rita

Support from LSU Office of Sea Grant

Contacts: Bruce G. Sharky (email bshark2@lsu.edu)
Kevin Risk (email jrisk1@lsu.edu)

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Faculty and Principal Investigators:
Bruce G. Sharky
J. Kevin Risk

Guest Reviewers and Lecturers:
Dr. Shaul Amir- UC Berkeley/Technion, Israel
Michael Liffmann – LSU Office of Sea Grant
Craig Colter, Department of Geography & Anthropology
Keith Scarmuzza, Landscape Architect, New Orleans
Patricia Skinner – LSU Ag Center
Marc Levitan, Director, LSU Hurricane Center
Chuck Wilson, Executive Director – LSU Office of Sea Grant
Roy Kron and Lisa Schiavinato – LSU Office of Sea Grant
Michelle Spielman – University Public Affairs

Students

Ogea, Chad
Pfister, Perry
Tellez, Claudia
Cannon, Catherine
Lemoine, Justin
Lindabury, Justin
Vo, Tien
Ekblad, Michael
Boutte, Daniel
Spiller, Daniel
Ellis, Dawson
Herrod, Elizabeth
Smith, Scott
Robinson, Tanner
Trisler, Patrick
Thornton, Matthew
Hebert, Shaun
Guidry, Heather
Bellone, Laura
Hursey, Andrew
Jennings, Edward
Thibodaux, Steven
Landers, Damon
Szczepanski, Brett
Boudreaux, Mark

Support from LSU Office of Sea Grant

Introduction:
The following is written to provide the reader with an overview of the semester long activities of students enrolled in LA 5001: Urban Design Studio at Louisiana State University.

Hurricane Katrina made landfall in late August 2005, followed two weeks later by Hurricane Rita. Flood and wind damage occurred along most of the Gulf of Mexico coast extending from Alabama to Texas. In some cases, entire communities were lost as well as miles of barrier islands and coastal marshlands. The two hurricanes together mark the most devastating scale of destruction from a natural disaster in recorded history in the United States. It was estimated that approximately 80 percent of the city of New Orleans experienced varying degrees of flooding. There were areas of the city that did not flood significantly such as the central business district, the French Quarter, parts of Uptown and other neighborhoods located on or near the natural Mississippi River levee system. Neighborhoods located on the Metairie and Gentilly ridges generally experienced little storm-related damage. The now accepted reasons for extensive flooding that did occur was the result of various failures of the structural systems constructed to protect the city from tropical storm damage. These failures included breaches and over topping of floodwalls and levees, and several canal wall failures (attributed to design or material installation failures. The economic impact to the region range from $100 to $200 billion in physical losses of property with still yet to be accounted losses to businesses and other economic activities. Government agencies and various environmental, social, and economic scientists are still appraising the scale of loss of lives, economic productivity, and property as well as the impact on coastal marshlands and other natural systems.

Over the next ten days after Hurricane Katrina made landfall, Louisiana State University was closed and classes were cancelled. During this time the two faculty assigned to teach the senior-level urban design studio organized the redirection of the studio. Considering that many students in the course and their families were directly affected by the hurricanes the faculty decided to shift the focus the design studio course to New Orleans. The goal for the semester's work would be to research and develop appropriate strategies for rebuilding New Orleans with an emphasis on developing non-structural and land use strategies.

The following pages contain a summary of work accomplished by the students in LA 5001 during the fall semester. The summary consists of the background research regarding the history of New Orleans a summary of the strategies implemented in other communities in response to natural hazards. The students sought precedence on subjects that included temporary housing, flood plain and flood control management, alternate approaches to waste and debris removal, transportation systems, water quality management, coastal wetland protection, and other subjects. Finally, each student selected an area or neighborhood in the New Orleans area to focus on in greater depth and specificity (in terms of pertinent recovery and mitigation issues). Our readers present the recommendations made by each student for consideration.

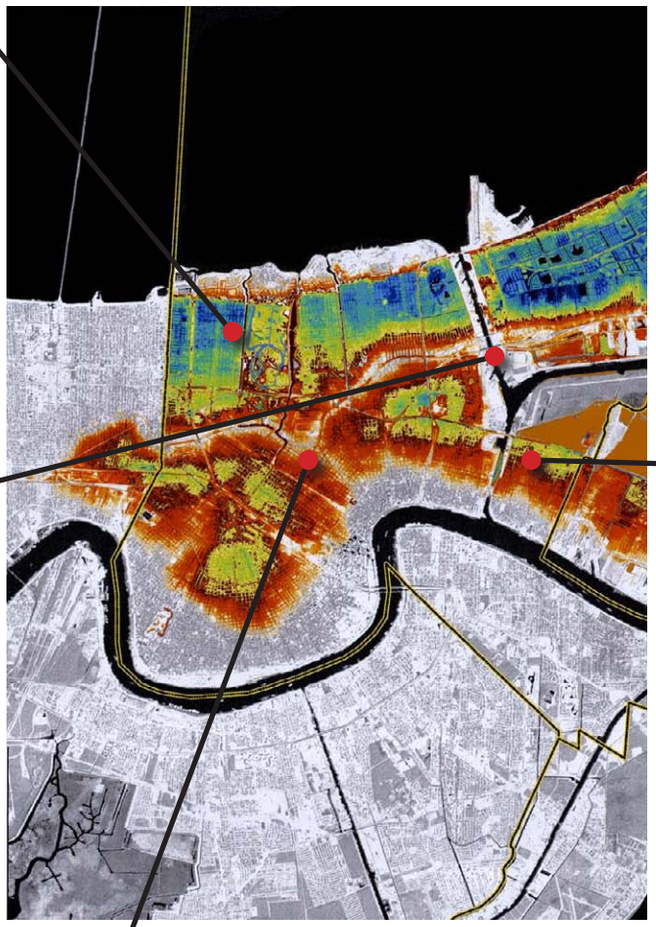
With this effort, the students hope to make a contribution to their neighbors and the state. They have not only learned a great deal this semester about coastal processes, the dynamics of natural tropical storms, and issues related to rebuilding after hurricane disasters but have also developed a sense of what their contribution as future landscape architecture professionals might make to the communities they live and work in the future. This has been one of the most important and rewarding learning experiences for the students and their faculty.

Baton Rouge, Louisiana
December 2005

Strategies

1. Non-structural
2. Land Planning
3. Wholistic approach rather than individuals
4. Systematic rather than piece meal
5. Reconstructed wetlands
6. Land Building
7. Super levees
8. Raised housing
9. Greenspace used as flood retention

2,3,4,9



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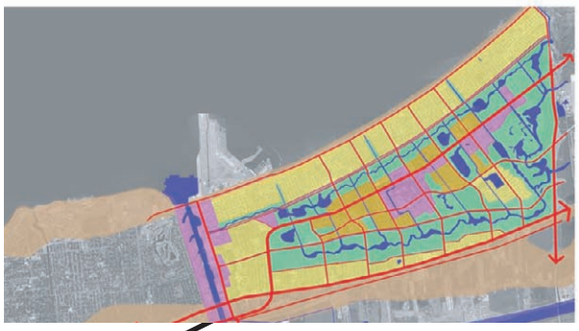
1,2,3,4,9



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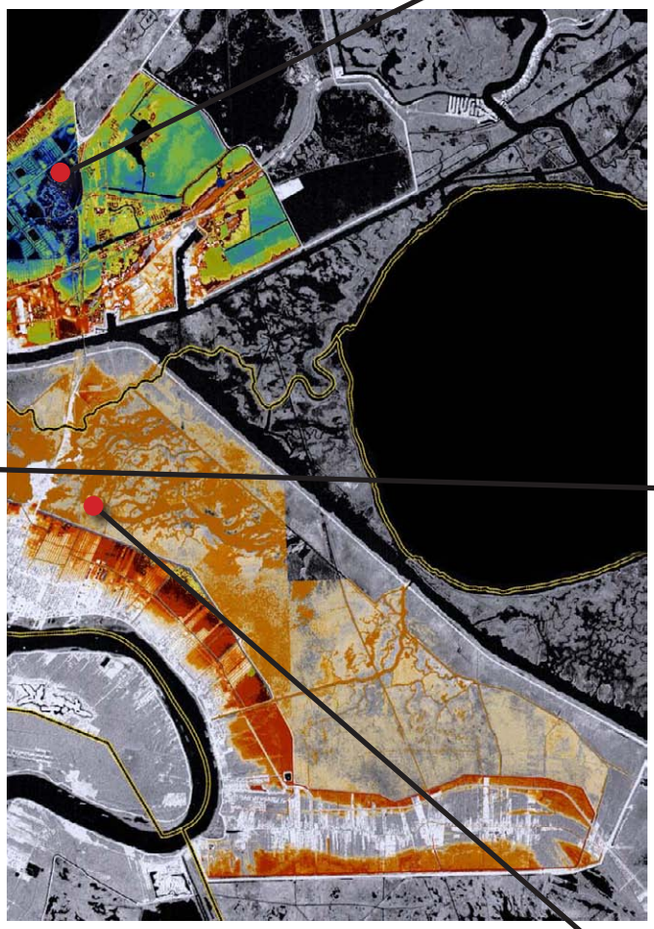

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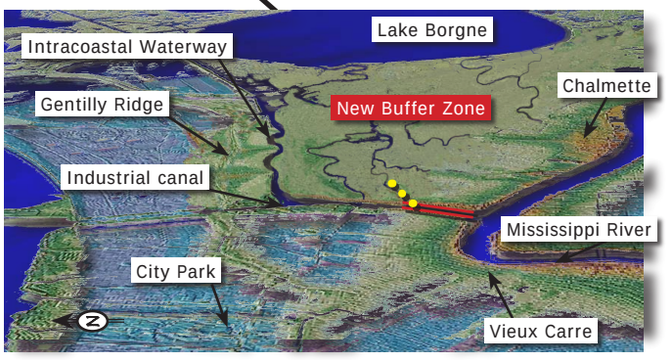


3,4,5,6

The Frenchman Bienville was charged with finding the optimum location for locating a new city that would afford strategic military advantages in protecting access into the vast Louisiana territory. Of equal importance the location had to be adequate in facilitating maritime commerce by providing safe and convenient transport of goods to and from Europe by way of the Gulf of Mexico to the vast Louisiana interior via Lake Pontchartrain and the Mississippi River. The natives had been living in the rich coastal marshes and intricate web of wetlands that a future city of New Orleans would be situated. They advised Bienville where to locate and build his new capital city of Louisiana. Their advice was to build on the high ground. Ground made higher than anything within the nearby surroundings by the annual deposit of the silt-laden Mississippi River. This meandering high ground was a natural levee, built up over eons of annual flooding and deposition of silt and debris. Bienville located in what is now called the French Quarter on the natural levee. As the town prospered and grew, successive new development continued to follow the natural levee or high ground, approximately representing the 20 percent of New Orleans that sustained minor or no flooding during Hurricane Katrina. As The Crescent City continued to grow and prosper urbanization gradually creeped into the lower lying wetlands and marshes which were also the lower lying terrain that often experienced seasonal flooding during heavy rains and the periodic hurricanes that annually buffet the Gulf Coast.

Over the years as Louisiana changed hands, ultimately purchased in 1803 by the US government, New Orleans grew, urbanization replaced the valuable wetlands, and the annual hurricane season came to dominate and influence daily life. **Figure 2** delineates urbanization along the Mississippi River natural levee high ground with low-lying cypress swamps between the Metairie and Gentilly ridges and Lake Pontchartrain. The certainty of a hurricane with the strength of a category 3 or 4 was anticipated. Although never hit—as far as during recorded history—by a category 5 hurricane, the event was always seen as the inevitable event. Even under this cloud of the certain one-day demise of New Orleans, the city attained a population of 1.3 million towards the end of the 20th century. During the time, beginning with French rule, structural solutions to the annual storm flooding were designed and implemented. There are three basic components that make up the defense against storms in New Orleans and all up and down the Mississippi River. The first was the construction of mostly earthen levees. The height and location of the levees were generally established after each major storm. The levee system that contains the Mississippi River proved adequate for Katrina with little flooding attributable from the Mississippi River. The second and third structural components put in place to handle flooding and storm surges, particularly in the low-lying areas built up between the Mississippi River and Lake Ponchatrain consisted of a system of canals later supplemented with pumps to hoist the waters from old wetland bottomlands up over a series of other natural levees into Lake Ponchatrain or other opportunities for outfall of flood waters. It was the failure of the canals and pump systems that led to the flooding of nearly 80 percent of New Orleans in the disastrous events that begun with Hurricane Katrina.

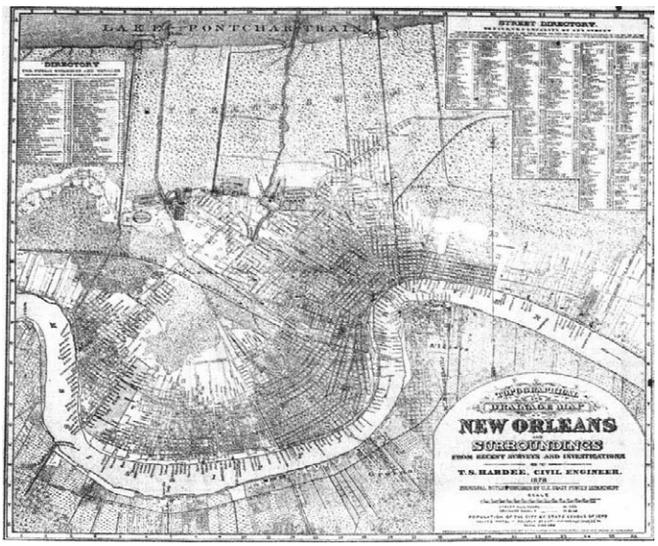
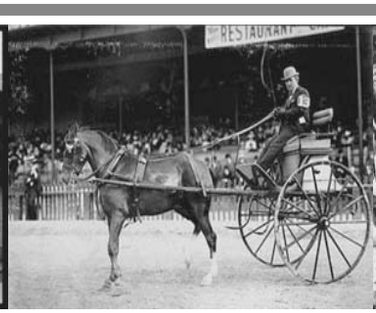


Figure 2: New Orleans 1879???? Source: Times Picayune



Hurricane Season 2005
Hurricanes Katrina & Rita

AUGUST

- Thursday 25: Katrina becomes a Category 1 hurricane in the Atlantic Ocean slowly moving across southern Florida, generating heavy flooding and with several fatalities.

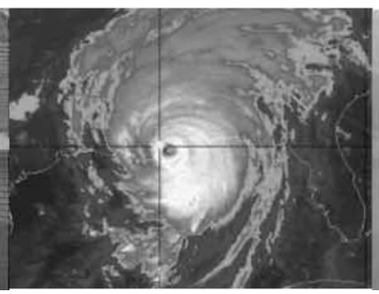
- Friday 26: Katrina strengthens to a Category 2 hurricane as it moves into the Gulf of Mexico.

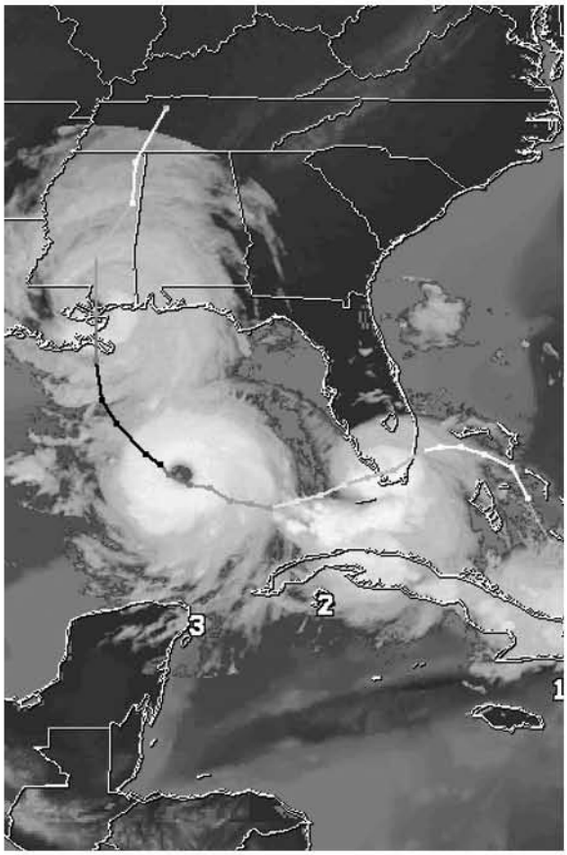
- Saturday 27: A state of emergency is declared in Louisiana as Katrina intensifies into a Category 3 storm with winds of 125 miles per hour. It heads directly for New Orleans, much of which sits six feet below sea level. Evacuations begin but many remain due to lack of places to go or wanting to ride out the storm.

- Sunday 28: Katrina becomes a Category 5 hurricane, with winds reaching 180 miles per hour. New Orleans Mayor Ray Nagin orders the 485,000 residents of his city to evacuate; 1.4 million live in the greater metropolitan area. Thousands flee to the Superdome sports stadium. Thousands more are gridlocked on the interstates and highways of Louisiana, Mississippi, Alabama, Florida, and Texas. Fears that the levees will not hold are on many forecasters minds.

- Monday29: Slightly weakened, Katrina smashes into Louisiana at 5:00 AM with winds 150 miles per hour. Under heavy rain, New Orleans begins to flood as water pumps fail. Water begins flowing

- Tuesday 30: The rain ceases as Katrina dissipates inland. Only a handful of deaths are reported in Louisiana; 54 people are reported killed in Mississippi. The death toll continues to rise, help is still not in immediate site. A levee protecting New Orleans from Lake Ponchartrain fails, leaving 80 percent of the city under water. All power and fresh water supplies are cut off for tens of thousands of mostly poor people trapped in the city. Looting erupts, there is chaos in the streets and occasional gunshots are heard which delayed some of the rescue efforts. A levee protecting New Orleans from Lake Ponchartrain fails, leaving 80 percent of the city under water. All power and fresh water supplies are cut off for tens of thousands of mostly poor people trapped in the city. Looting erupts, there is chaos in the streets and occasional gunshots are heard which delayed some of the rescue efforts.





Wednesday- 31: About 300,000 people in Louisiana are stranded by the floods, including 20,000 plus in the Superdome which is a very unstable and unlivable environment. Flood levels stabilize in New Orleans, and Washington releases strategic oil stocks to hold down oil prices. President George W. Bush surveys the area from his jet and calls it "one of the worst natural disasters in our nation's history." Five thousand National Guardsmen are deployed. The New Orleans Convention center has several thousands of people waiting for assistance. Many more people die and are left on the side as the survivors anxiously await help.

SEPTEMBER

Thursday- 1: New Orleans mayor Nagin issues a "desperate SOS" for help. Three hundred soldiers are sent to keep order with "shoot to kill" orders. There is still little order throughout the city. After an initial refusal, Washington accepts offers of aid from all over the world. Still there is a shortage of all resources and supplies. The people at the convention center continue to wait, some assistance finally arrives.
Friday- 2: Louisiana Senator David Vitter estimates the number of deaths in New Orleans could reach 10,000. There are still thousands stranded on rooftops. There is severe damage as far east as Mobile, Alabama. Engineers say it could take up to 80 days to drain New Orleans. Attempts to plug the levee are in effect. Thousands are still waiting for rescue in New Orleans. Buses move evacuees to the Astrodome in Houston. Bush signs a 10.5 billion dollar bill to continue the government relief efforts.
Saturday- 3: Bush announces that 7,000 soldiers and 10,000 national guardsmen are being sent to stricken region. The death toll in Mississippi reaches 134; the Louisiana toll remains unknown.
Sunday- 4: The first official estimate puts Louisiana deaths at 59; the total toll reaches 218, yet thousands more are to believed to be dead.

Refugees in the Superdome begin evacuation to Texas, where about 230,000 will be moved. The US accepts an offer of aid from the United Nations. A Mississippi clinic is closed after one case of dysentery is detected.
Monday-5: Bush returns to the disaster scene. The principle damaged levee of New Orleans is patched. Evacuees return to their homes to see what remains. About 10,000 survivors remain inside New Orleans as health officials begin combing the city for victims; Disease hazards in the water continue to grow.

Tuesday 6: Finally water is beginning to be pumped out of the city. Nagin forces evacuations of those still left in the city due to sever health issues and lack of supplies.
For many weeks to follow there will be massive clean-up efforts. The lives of everyone affected by this disaster will be changed forever. Hundreds of thousands homes were lost leaving many homeless and jobless. Job relocations will force families to move and start a new life in a new city for months if not permanently.

New Orleans

preparations

Businesses and homes are boarded up as people seek shelter and the city is evacuated.

landfall

Hurricane Katrina hits as a category 4, with powerful winds and storm surge. Those who stay behind ride out the storm and await the damage.

New Orleans

aftermath

After a series of levee breaches, 80% of the city becomes submerged, leaving people stranded on rooftops and prompting emergency evacuations.

aftermath

After so many days of water, people seeking food and shelter begin to emerge from the devastated city.

New Orleans

aftermath

Evacuations draw to a close as search and rescue continue and the city begins to dry out.

aftermath

Evidence of the destruction left in the wake of Hurricane Katrina.

New Orleans

aftermath

Hurricane Katrina left neighborhoods in ruins, streets littered, and a thick layer of mud over much of the city.

aftermath

People coming home find mass devastation where neighborhoods once stood.

Precedents

urban waterways and green infrastructure

Because New Orleans has experienced repeated problems with flooding since its founding, alternative methods of flood control were studied to understand how natural and structural methods could operate together to protect the city. The use of green infrastructure such as parks and open spaces to accommodate floodwaters proved to be highly relevant to New Orleans.

Frederick Law Olmsted's **Emerald Necklace** in Boston might be the world's most famous urban water treatment wetland, designed to be so beautiful that few people know it's an artificially constructed system. In particular, the **Back Bay Fens** segment was designed to solve serious drainage problems in the tidal swamp, filled with sewage and subject to frequent flooding. Olmsted built tidal gates and planted wetlands vegetation to create a temporary stormwater storage basin. The Fens proved that designers could use inspired engineering to integrate the functions of nature and people harmoniously.

Amsterdamse Bos Park in the Netherlands addressed the issue of how to accommodate a growing population on a limited land area, much of which is below sea level. The 2,310 acre park consists entirely of reclaimed land that was drained and re-worked to provide systems of on-site drainage. Like New Orleans, land below sea-level was used for development, but in the case of the Netherlands, it was wisely engineered to utilize parkland for floodwater management.

The millennium parklands of the Sydney Olympic Village utilized reconstructed wetlands to filter existing pollutants out of the site. Remediation and renewal of the site took 9 years, and after its completion the parklands served as an educational amenity to the residents of Sydney, demonstrating how specific remediation practices could transform an environmentally hazardous landfill into a beautiful recreational space. This project posed a potential solution to New Orleans' problems with contaminated floodwaters and the lack of wetlands to receive regular floodwater.

Buffalo Bayou and Guadalupe Riverfront Park demonstrated both structural and non-structural methods of floodcontrol. Both cities had flooding problems where natural water bodies flowed through a dense urban environment, so innovative techniques were employed to adapt to the specific conditions of each site. Bypass culverts, stepped terraces, and detention basins were used where land was densely developed, whereas floodplains and secondary river channels were utilized when space was available. This combination of flood control methods could easily be applied in New Orleans to provide additional measures of safety.

transportation

Transportation was a life-threatening issue in the days before Hurricane Katrina. The main method of evacuation was personal automobile, and because many of the city's poorest residents did not own cars, they were forced to seek shelter in the Superdome or risk riding out the storm in their homes. Alternative methods of transportation were studied in the hopes of implementing new methods of evacuation in New Orleans.

RAIL

Japan operates the world's most efficient and convenient rail service. This tightly scheduled, safe, quick and punctual rail service is provided by Japan Railways Group, who owns about 70% of Japan's railway network. A variety of trains are available depending on the distance traveled. "Bullet trains"can run at 300 kilometers per hour and operate on the broad scale, whereas "rapid trains" and "local trains" make more stops and operate on the local scale.

WATER TRANSIT

Boston does a great job of incorporating the harbor into their mass transit system. With extensive development along the waterfront, such as Logan International Airport, The World Trade Center and Rowe's Wharf, it is essential to provide access by way of the water. Ferries, commuter boats, and water taxis provide service throughout the day and night. Because New Orleans has extensive development along both the Mississippi River and Lake Ponchartrain, water transit could provide service to a wide range of users.r

ADDITIONAL OPTIONS

Portland, Oregon has a variety of mass transit options. It relies not only on vehicular circulation but also other services such as light rail, busses, park and ride, and street cars. The Max Light Rail system connects different communities around Portland, giving commuters a choice in transportation styles. The street cars and vintage trolleys operate on a smaller scale, and were designed to fit the traffic patterns of the neighborhoods through which they travel. Portland also has an extensive grid of bike trails, and all city busses have areas for bicycles.

New Orleans

alternative housing

Housing within New Orleans needs to embrace local styles and cultures, but new forms have emerged that rely on creative use of recycled materials, and environmentaly apporpriate designs.

Rural Studio,
Auburn

An architectural studio held by Sam Mockbee at Auburn University, provides affordable housing that relies on recycled construction materials, like stacked hay barrels, licence plates, used tires, carpet tiles, and salvaged wood. Well crafted and custom designed, houses reflect personality and functions of the inhabitant as well as the environmental design factors.

WPA,
California

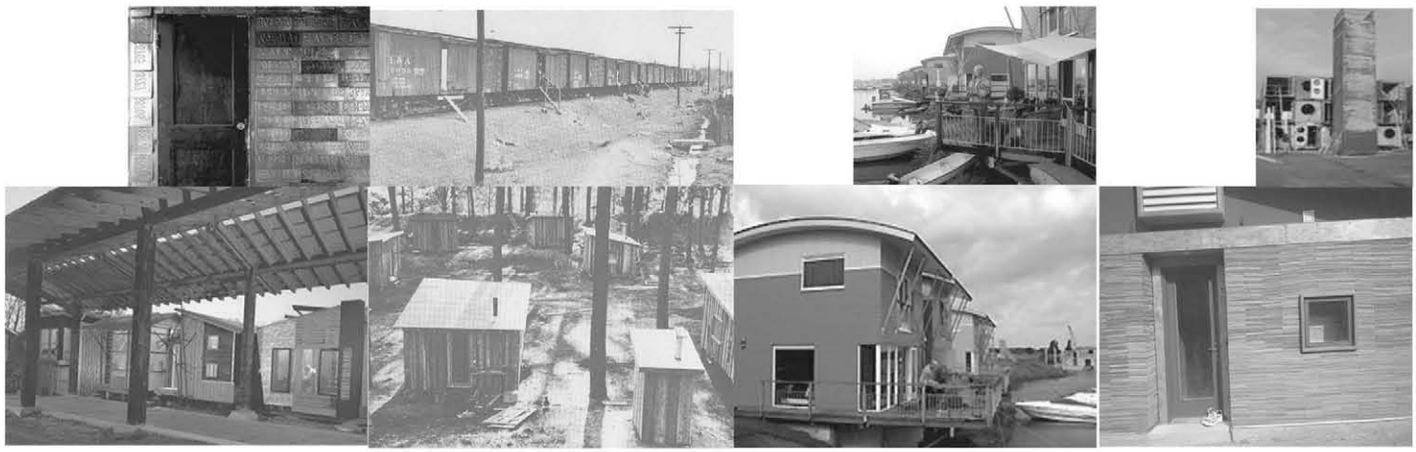
During the Great Depression in the 1930's, Roosevelt created the WPA to respond to spreading poverty. Garrett Eckbo designed fluid landscapes connecting row houses for migrant farm workers that fostered a sense of community. Housing options ranged from clustered cabins, railcar units, and early forms of mobile homes that made use of any available material.

floating houses,
Netherlands

Floating houses are a natural response to repeated flood waters in the Netherlands. Combined with wetlands reserved for floodplains and engineered structural solutions, cities are adapting to new lifestyles that embrace waterscapes rather than fight them.

container houses,
London

Container communities are a growing market in other countries. Quick to construct and transport, easy to stack and organize, container units are a low cost alternative to mobile homes that lack personality. Creative use of regional materials that are often all recycled and self sustaining.



Galveston,
Texas

Galveston suffered great structural losses in 1900, but responed by elevating homes and raising grade with fill pumped from the Gulf. Timber debris was sorted and reused to create smaller low-cost housing.

Sydney,
Australlia

Originally an industrial dump, Sydney's Olympic Park was was redeveloped into a sustainsble village for the 2000 Olympic games. Using created wetlands, nature preserves, and mangrove swamps to remediate the brown field.

Venice,
Italy

On the coast of the Adriatic Sea, Venice is home to a complex canal system that serves as modes of transportation and flood control. With many historic structures, these canals are lasting cultural landmarks that mitagate flood water rather than avoid them.

Yohohama,
Japan

Along the Tsurumi River, super levees support the homes of millions of people. Multi-purpose golf course detention basins, sewage filter gates, and the Yokohama international stadium that adapts to handle flood water, are examples of structural approaches to living on the water's edge.

international port cities

la 5001

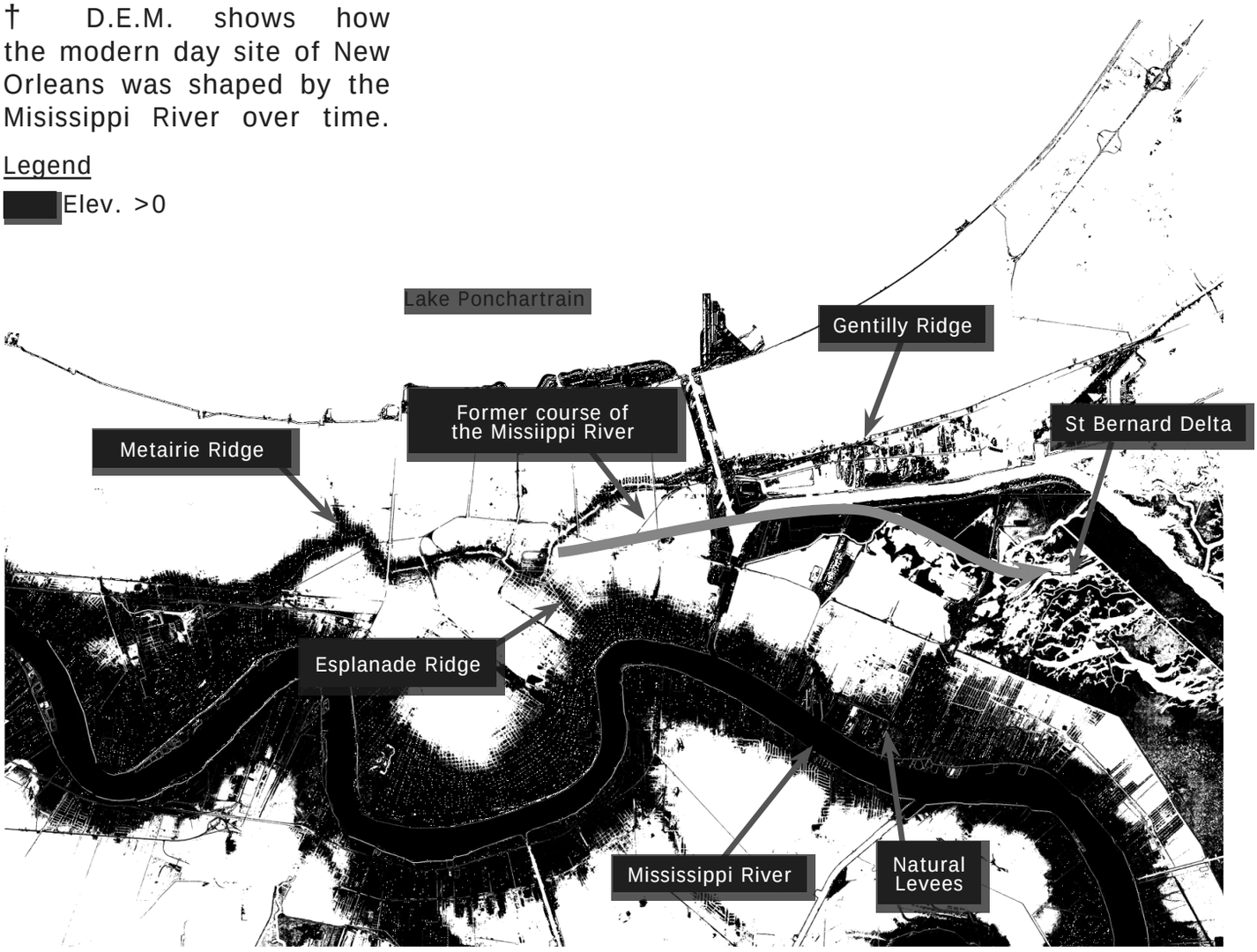
Projects

Digital Elevation Map

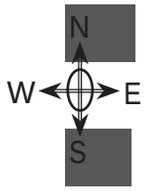
† D.E.M. shows how the modern day site of New Orleans was shaped by the Misisippi River over time.

Legend

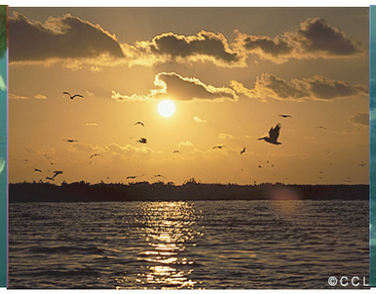
Elev. >0



Since the beginning of time, the Mississippi River has shaped the land on which modern day New Orleans exists. Through the annual flood cycle of the Mississippi River it has topped its natural levees and created new land by the natural process of siltation and deposition. Historically the natural levees built by the river were the higher ground and provided a place to build.



The digital elevation map above shows the present course of the river and reveals a former course that the river took to create the St. Bernard Delta 1,000 years ago.


Human intervention & natural systems

analysis

Human intervention with the natural systems of New Orleans over the past 150 years has left a lasting impression on the landscape. When the natural systems of 1863 are compared with those of 2005, the change in the natural systems due to human intervention is exposed.

† Natural levees created by the Mississippi River allow for development due to a higher elevation

† Drainage pattern of 1863 shows a continuous flow along an abandoned Mississippi River bed.

With the expansion of New Orleans to the East, changes in the natural systems have occurred over time. Man-made structures that where meant to protect the city from hurricane induced surges, have turned out to intensify the surge.

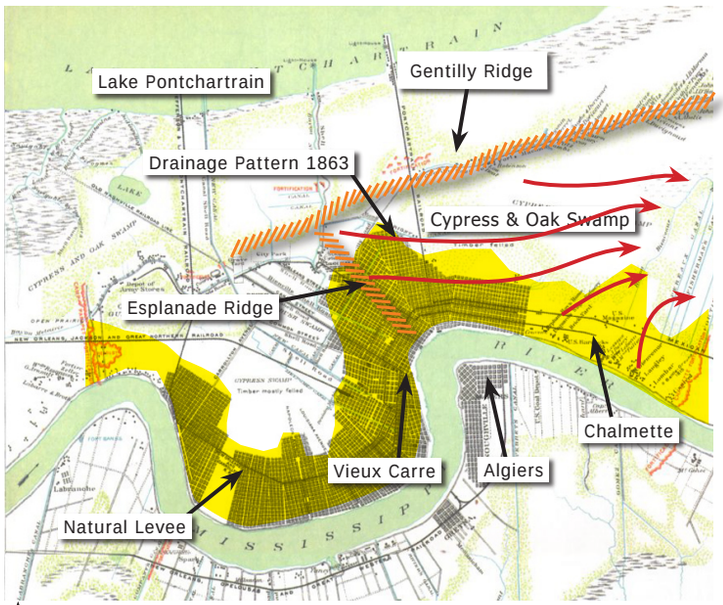
† Artificial levees constucted from (1722-2005). The natural drainage patterns are altered.

† Industrial Canal and Locks finished (1923) cut across Gentilly Ridge and trapped the water from Esplanade Ridge to the canal.

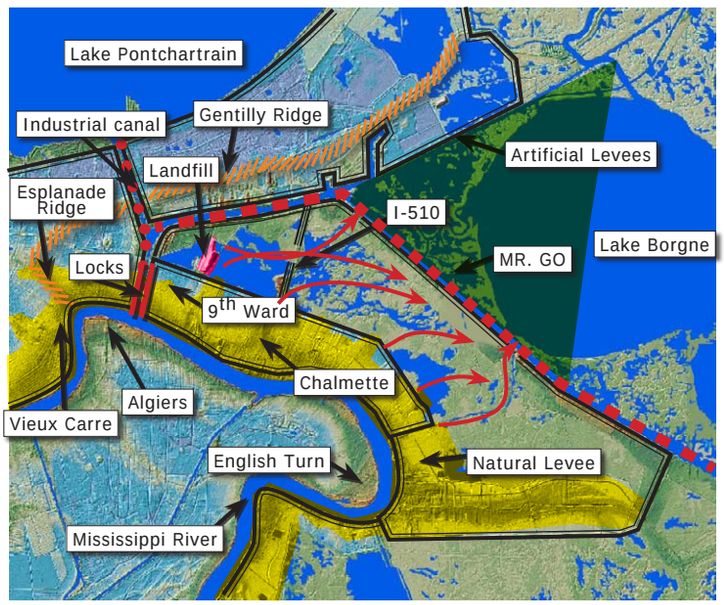
† Mississippi River Gulf Outlet, MR. GO completed (1968) was controversial from the beginning. The canal cut through 75 miles of marshes connecting the Industrial Canal to the Gulf of Mexico. Approximately 8,000 acres destroyed. Salt water Intrusion increased, further damaging the marshes that provide the levees a buffer from storm surge.

† I-510 and landfills have further impeded the drainage pattern.

† Highlighted in green, the end result of human intervention has created a funnel for storm surge to build pressure within the Industial Canal. Therefore, more pressure is put on the levee system.



1863 Approaches Map



2005 Elevation Map

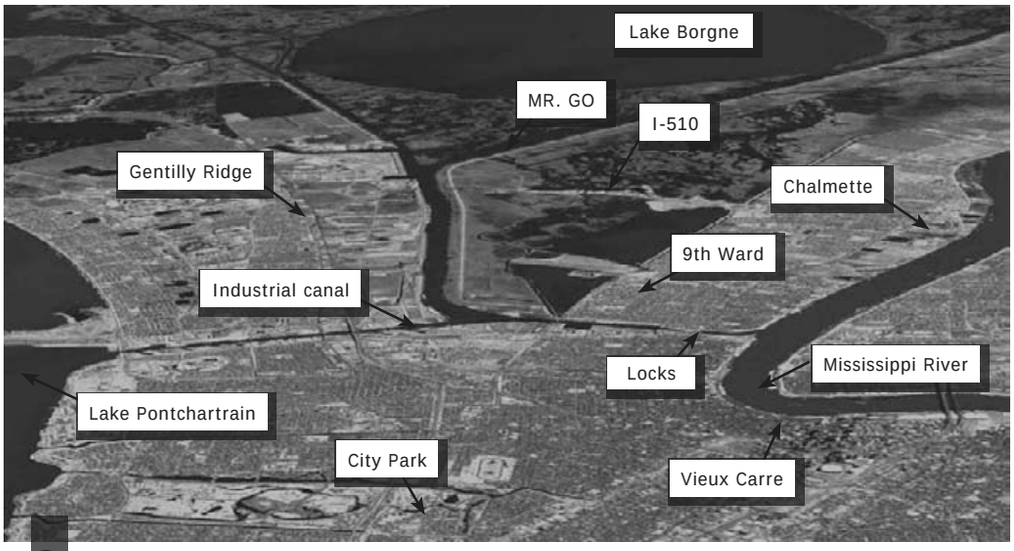
chad ogea

Throughout the history of New Orleans the city has tried to keep the Mississippi River in check. With the recent events of Hurricane Katrina, the face of New Orleans has been dramatically changed forever. Emotions, opinions, & politics in the recovery of New Orleans are wide ranging.

As a society it is of great importance that we understand the coastal marshes that buffer New Orleans and it's levee system from storm surges are disappearing at a rapid rate. Without this buffer zone the levee system takes the full brunt of the surges and they become the last line of defense. During the recovery process we have an opportunity to use the Mississippi River and it's ability to create land to provide New Orleans with protection from storm surges induced by Hurricanes.

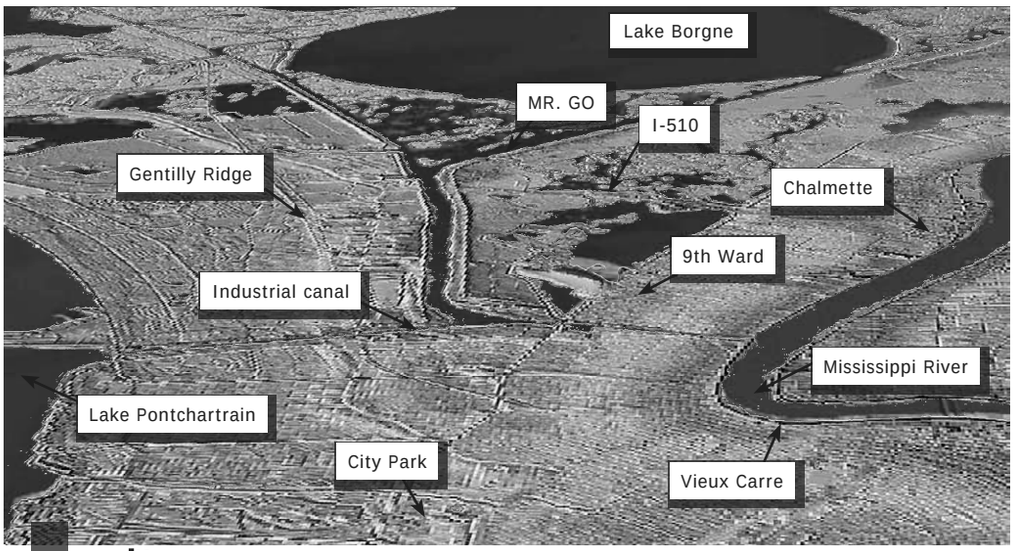
The Proposal for this area of New Orleans will be phased in over a 30-40 year period. Once completed New Orleans will not only have a buffer to protect the city from storm surges, but a precious natural resource will be saved.

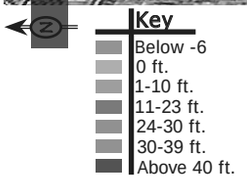
View Looking East



Louisiana Oil Spills Map

View Looking East



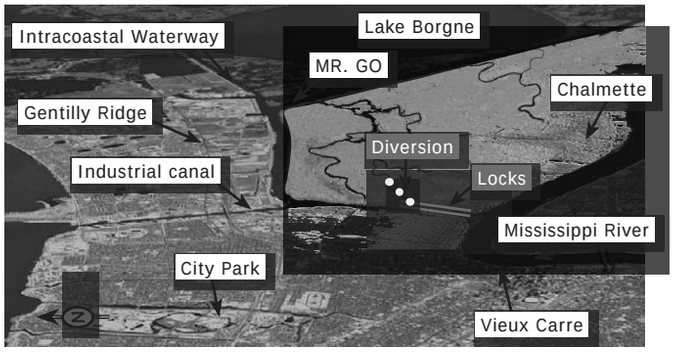


2005 Elevation Map

Phase I

† Locks of the Industrial Canal would be enlarged to allow deep draft vessels to access the Mississippi River instead of using MR. GO.

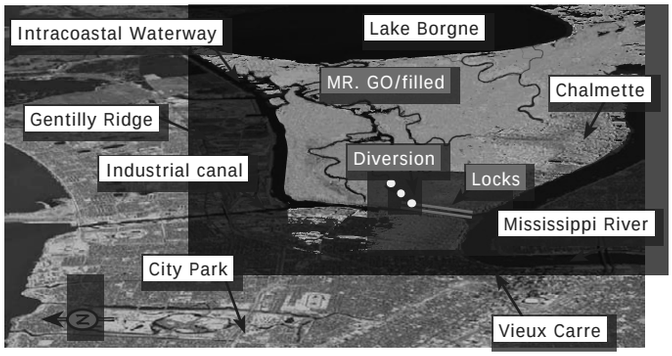
† Integrated into the locks would be a freshwater diversion that would deliver nutrients and new sediment to the marshland east of the Industrial Canal.



Phase II

† While new land is created by the freshwater diversion MR. GO would be filled in and returned to marshland.

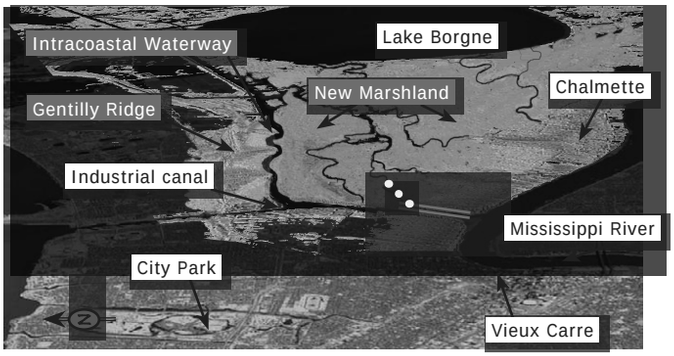
† The Levee system would begin to be reconfigured based on were the silt is built up by the freshwater diversion



Phase III

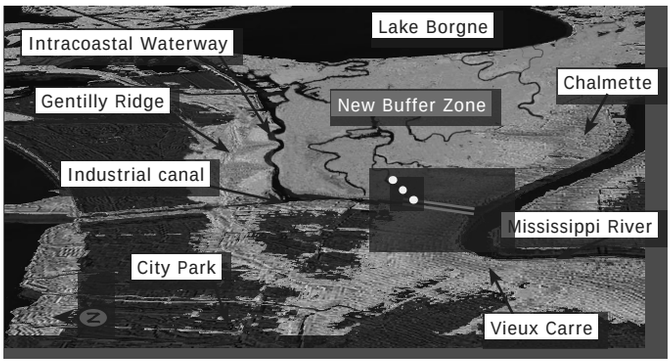
† Reconstruct Gentilly Ridge and Intracoastal Waterway to accommodate smaller ships.

† Create a curved edge that will allow more surface area to accommodate high water levels.

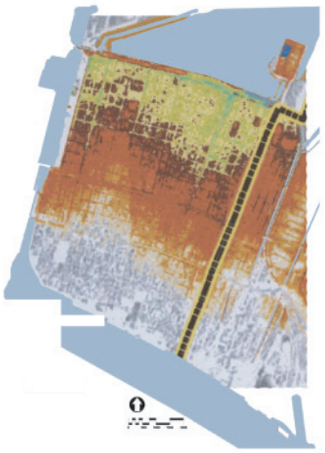


Completion

† By accommodating the Mississippi River with a freshwater diversion, we can use the river's ability to build land. Not only will this save a precious natural resource, but it will help protect New Orleans from storm surges.

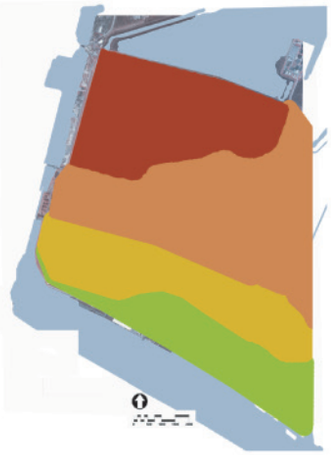


The Lower Ninth Ward:
A strategy for rebuilding

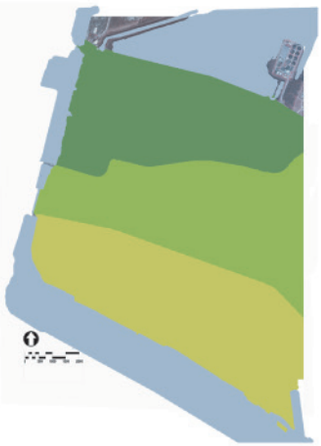


Hurricane Katrina Flood Depth

Elevation



Damage Levels post-Katrina



Land Use pre-Hurricane Katrina

16 - Schools

64 - Churches

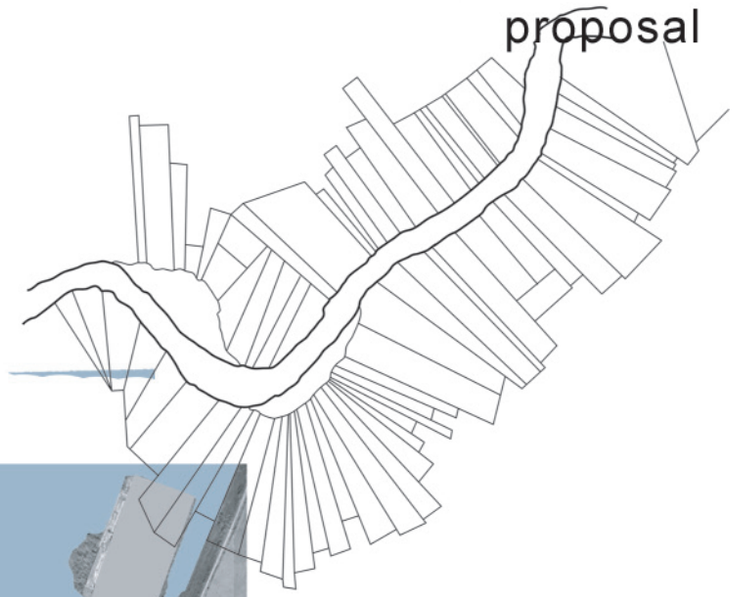
Development Zones

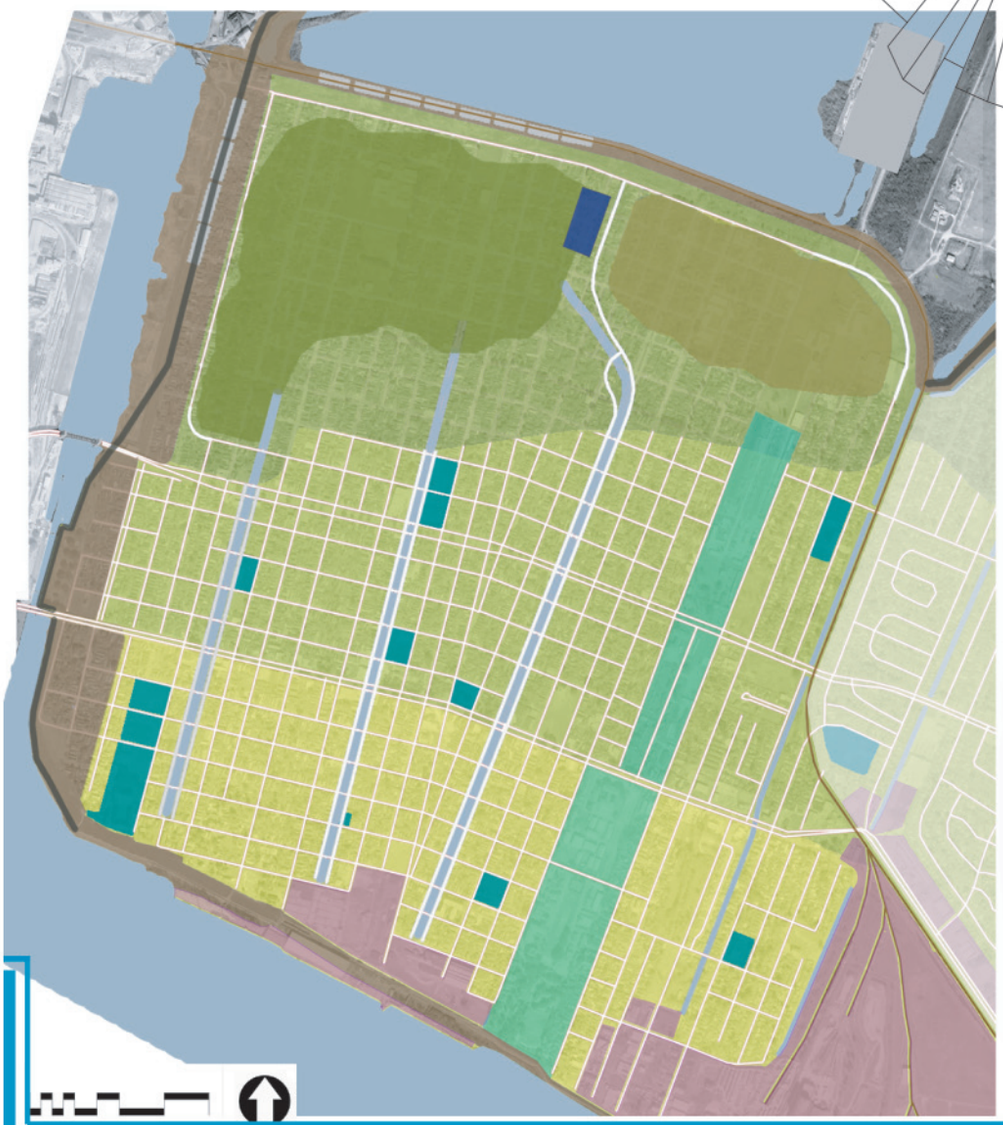
three No Structures can be rebuilt.
Site of constructed wetlands, research facility, and public green spaces.

two Rebuilding to occur within 2-5 years.
All homes must have a finish floor elevation at least 2' above 100 year flood line.

one Rebuilding to occur immediately.
Properties closer to river have fewer restrictions.

proposal





- Wetland Research Facility
- Existing Schools
- Existing Industry
- Jackson Barracks
- Zone 1
- Zone 2
- Zone 3
- Sewer treatment wetlands
- Stormwater treatment wetlands
- Stormwater drainage boulevards

Justin Lemoine

The Lower Ninth Ward:
A strategy for rebuilding

Zone 3: back to nature, remediation

Boardwalk through the wetlands, looking at elevated housing in the distance

Rail line runs on top of levee. Wier separates natural wetlands from constructed wetlands

Zone 2: transition, new living

Examples of Elevated housing and alternative uses for the first floor.

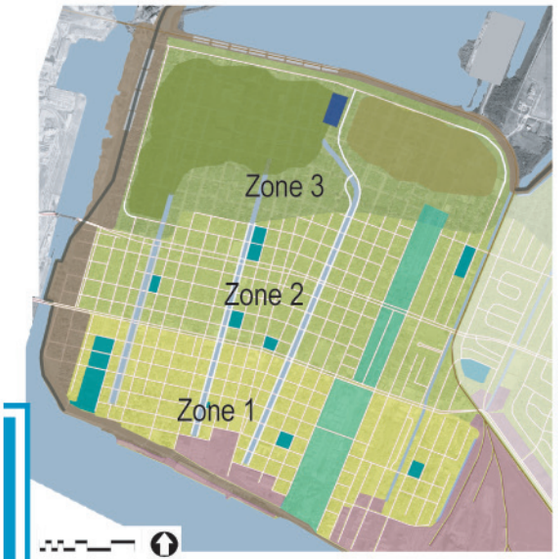
Drainage canal meets wetlands

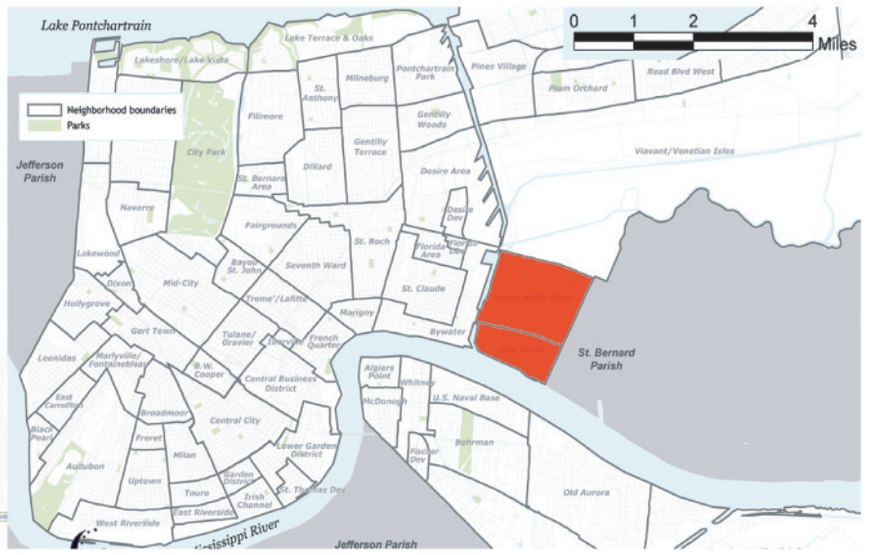
In wetlands, looking at elevated housing

Zone 1: rebuilding, renewing

Boulevard converted to drainage canal also serves as a green space to connect to wetlands

Location





Justin Lemoine

project brief

Hurricane Katrina ripped through the central gulf coast on August 29 2005, leaving a trail of death and destruction and a legacy as the costliest hurricane to ever hit the U.S. The city of New Orleans, LA bore the brunt of Katrina's wrath. A levee system designed to handle only a category 3 storm succumbed to Katrina's winds and waves, sending massive flooding throughout 80% of the city. As the city begins to pick up the pieces and rebuild a better future, it has become obvious that a new method of handling floodwater is desperately needed. Our task was to study the factors that make New Orleans unique and develop a system of rebuilding recommendations that not only restores the city to its former glory but also provides a safer future.

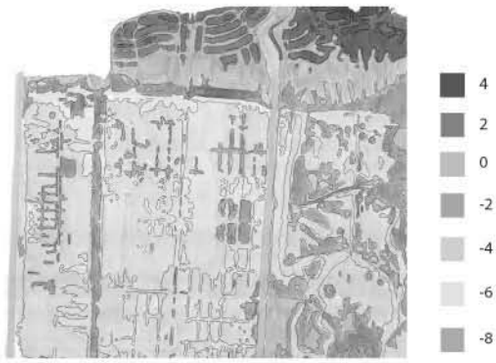
location

infrastructure

The area consists mostly of single family residences with a small number of retail establishments scattered throughout the neighborhoods. Several schools and churches serve the families nearby. I-610 serves as the primary artery for commuting to work in the city. Besides City Park there are only a few disconnected parks, located mainly within the lakefront area.

elevation

Much of the site is below sea level; it relies on a system of drains to collect rainwater and pumps to push the water up into canals and out into the lake. Because it is one of the lowest spots in the city it frequently has problems with flooding during times of heavy rainfall.



socio-economic conditions

The site is bounded by Lake Ponchartrain to the north, I-610 to the south, the 17th st. canal to the west, and Bayou St.John to the east. It includes Lakeview and West End neighborhoods as well as City Park.

- retail
- parks
- churches
- schools
- major roads

depth of flooding

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- >10

Because of its low elevation, this area received some of the greatest depths of floodwater during the hurricane. West End and Lakeview neighborhoods commonly showed water lines 10' deep and greater. However, the areas north of Robert E Lee Blvd. sustained less floodwater due to their above sea level elevations. Most of the floodwater was due to a breach in the 17th st. canal adjacent to West End.

	Lakeview	West End
average income	$63,984	$69,909
total occupied units	4524	2755
renters	30.5%	39.3%
home owners	69.5%	60.7%
house built		
1949 or earlier	41.8%	10.2%
1950-1959	34.4%	22.3%
1960-1969	13%	27%
1970-1979	4.8%	22.7%
length of residence 17+ years	41%	38%
poverty	4.9%	9.1%

Elizabeth Herrod

New Orleans Redevelopment

Issues

First goals were defined based on previous shortcomings of the area and the opportunity to rebuild a better community.

Several field trips to different parts of the city were conducted to determine the extent of destruction, the condition of surviving elements of infrastructure and what progress was occurring.

Studying how other cities have handled flooding problems proved to be very helpful. Alternative methods of flood control were discussed in relation to New Orleans' unique geography.

Based upon the previous research conclusions were drawn about how many people would return to the area and what parameters would guide the design solutions.

desired impacts

SOCIAL

- better distribution of greenspace throughout a previously-dense neighborhood
- connectivity between different areas through walking/riding trails

extent of destruction

precedent studies

Guadalupe Riverfront Park utilized both structural and non-structural methods of flood control. Structural methods were used where adjacent land was already developed and space was tight. Bypass culverts,planted terraces, and retaining walls were used here. Where land was available the floodplain was increased, a secondary river channel was created, and pedestrian trails were incorporated to give the area a parklike setting. These methods could easily be applied to New Orleans' existing flood control system.

assumptions and guidelines

ENVIRONMENTAL

- return part of area to its previous state (wetlands)
- increase wildlife habitat in urban area
- accommodate flooding
- increase land through deposition of sediment through regular flooding

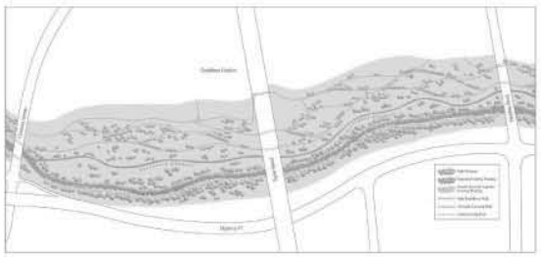
CULTURAL

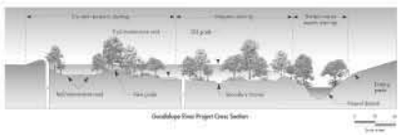
- capture the essence of New Orleans
- source of pride and inspiration for the 'new' city

severe damage
-houses knocked off foundations, torn apart
-some total structural failure
-cars, boats tossed around, crushed
-trees uprooted
-buildings may be demolished

moderate damage
-extensive flooding damage but structures still intact
-1 story houses flooded up to roofs
- mold in addition to flooding damage
- vegetation dead
-some buildings may be demolished, others gutted

minimal damage
- less flooding damage
- houses intact and salvageable





1. large percentage of home ownership. 2/3 will return/rebuild, 1/3 will not. Use 1/3 of land for flood accomodation system (23,550,000 sq. ft.)

2. city park has naturally higher ground. use part for rebuilding houses, replace lost open space in floodmeadow park. (13,860,000 sq.ft.)

3. develop secondary stream channels for Orleans and 17th St. canals to provide access to floodmeadow. should be natural, meandering, not channelized.

4. Bayou St. John, city park lagoon system linked for access to floodmeadow.

5. no drastic changes to levee system. secondary system of flood control is natural method in addition to existing structural method.

6. buildings in zones:

A. elevation 0+. fixed/built first. no special building requirements.
B. elevation -3 to 0. fixed/built second. buildings required to be raised.
C. elevation -8 to -3. no building allowed. area used for flood accomodation.

Elizabeth Herrod

design elements

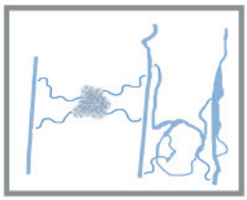
The proposed redevelopment of lakeview and west end is centered around a natural floodmeadow park. This area could serve recreational uses during dry times, while also collecting excess water during times of heavy rain. This system works with the existing levees, providing an additional element of safety. Buildings adjacent to the flood park are also advised to be raised for further protection. Pedestrian trails connect the floodmeadow with other existing parks and the lakefront. Giving residents the opportunity to ride an elevated boardwalk or ground trails ensures that they experience the floodpark in different ways. Car circulation is limited to one north/south crossing through the park, protecting the peaceful quality of the natural setting. By utilizing both natural and structural methods of flood control, residents of New Orleans will have a new model of development that protects and enhances the unique character of the city.

building zones

- floodplain elevation -8 no building
- stilt zone elevation -3 houses raised
- regular zone elevation > -3 no requirements

flood system

- swamp
- existing water bodies
- proposed channels
- outfall point

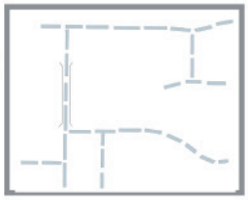


pedestrian circulation

- raised boardwalk
- ground trail

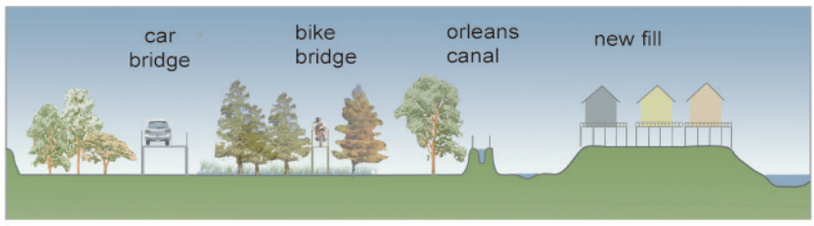
vehicular circulation

- elevated roadway
- road on grade



north-south

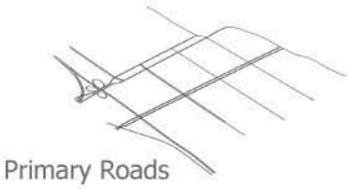
east-west



scale 1"=1000'

Elizabeth Herrod

Transit Oriented Development

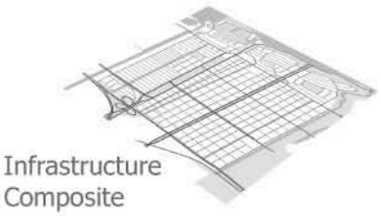


Primary Roads

Secondary Roads

Waterways

Green Space



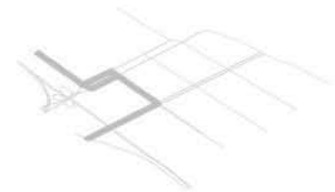
Infrastructure Composite

Institutional and Commercial

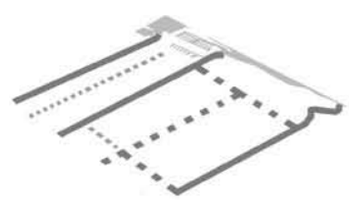
Residential

Land Uses Composite

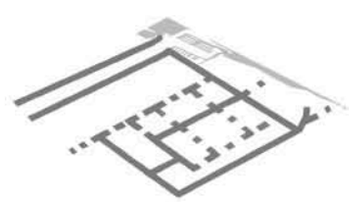
Existing Bus Routes



Primary Connectors



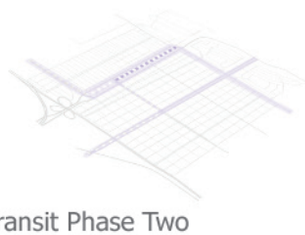
1903 Drainage



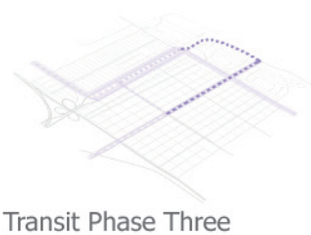
1992 Drainage

Land Uses

Transit Phase One

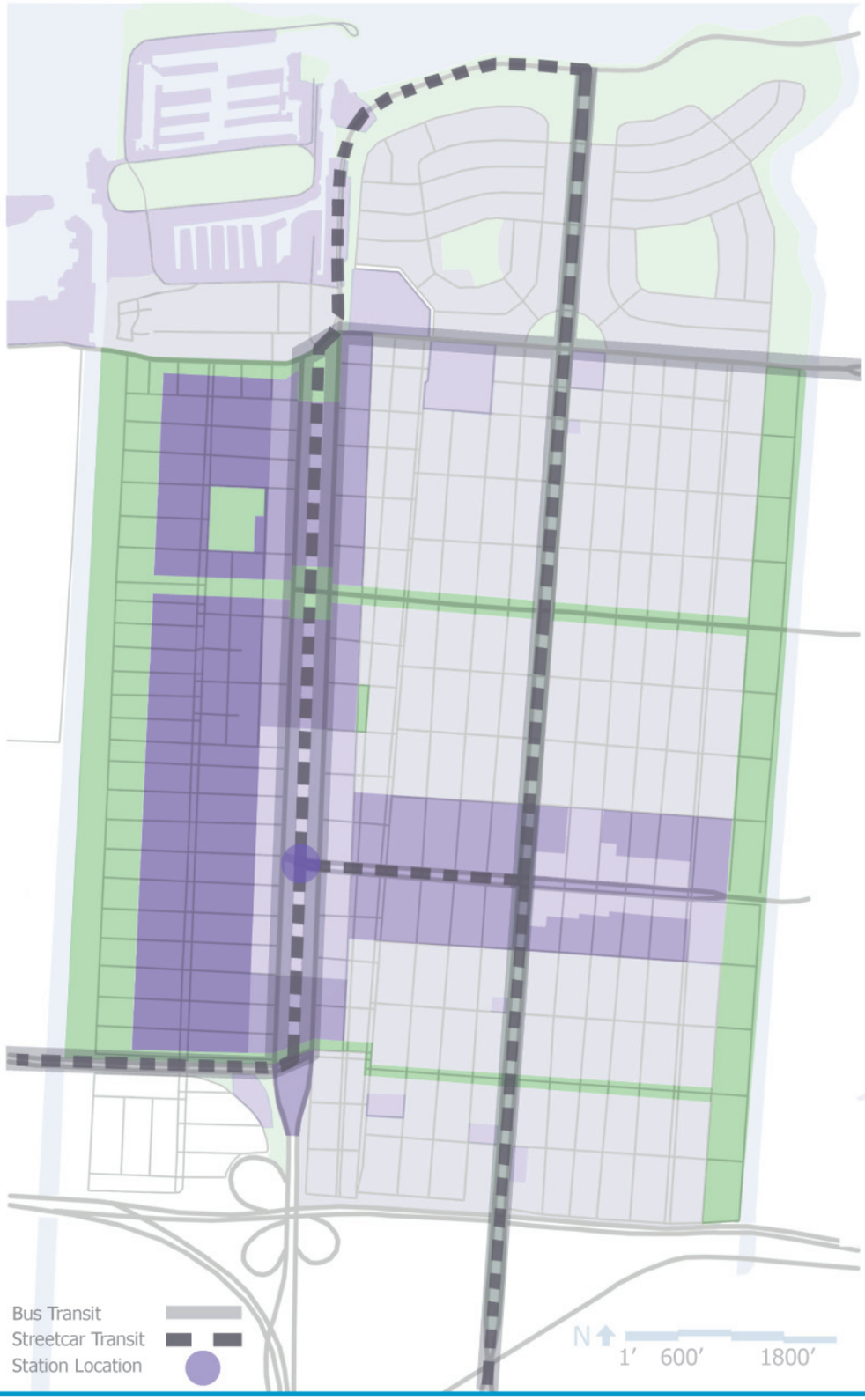


Transit Phase Two

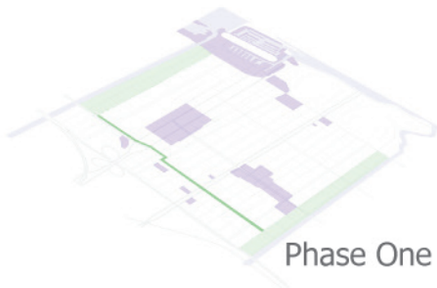


Transit Phase Three

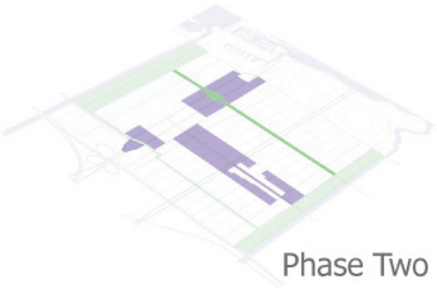
Strategic Plan



All Phases



Phase One



Phase Two

Phase Three

Green Corridor
Existing Residential
Phase One
Phase Two
Phase Three

Justin Lindabury

Transit Oriented Development

All Phases

-Throughout all the phases green corridors adjacent to the canals serve as a buffer zone. Recreational activities and bike trails are utilized in the green belts by residents in the area while connecting with surrounding neighborhoods.

Phase Two

-Phase two utilizes West End Blvd. and Pontchartrain Blvd. creating a transit oriented mixed-use corridor. Along the proposed corridor a streetcar extension and multiple pocket parks provide efficient connections to the area.

Phase One

-The station is the hub for the redevelopment of the Lakeview area in New Orleans. Phase one focuses on reconstruction and redevelopment of existing infrastructure. The station provides access for workers and residents to commute from surrounding areas. While re-establishing existing transit, new street-car connections provide efficient alternatives to the area.

Phase Three

-The final phase provides high density residential adjacent to the corridor. A streetcar extension along Lake Pontchartrain connects back to the Canal Street line providing connections with downtown and surrounding neighborhoods such as Metairie.

Representation

Canal Street

Section A-A$_1$

Harrison Avenue

Section B-B$_1$

Filmore Avenue

Section C-C$_1$

All Phases
-Reconstruct existing highlighted residential areas
-Establish green belts along canal edges serving as buffer zones

Phase One
-Re-establish existing institutional and mixed-use development
-Establish station location and immediate transit oriented commercial zone
-Establish green corridor connection perpendicular to green belts

Phase Two
-Extend transit oriented commercial zone
-Establish green corridor connection perpendicular to green belts

Phase Three
-Establish high density residential along green belt adjacent to the 17th Street Canal
-Create green corridor connection from high density residential to commercial zone area

Justin Lindabury

New Orleans Redevelopment

context

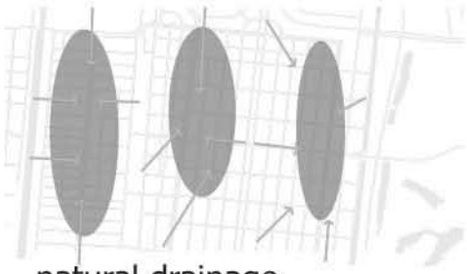
Flood Protection Greenway System

Louisiana

New Orleans

Lakeview and Westend

analysis



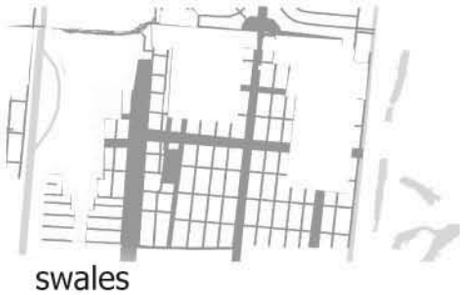
natural drainage

elevation

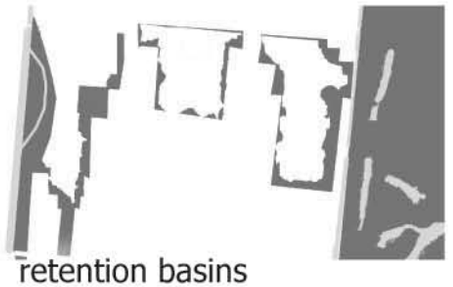
existing land use

The chosen area consists of extremely low elevations, down to eight feet below sea level. The site is made up of three areas, each separated by a major roadway. Each area has a low point where it is very dangerous to live in. The first map shows how the water in the area goes to that low point, and creates an area that is vulnerable to flooding. The second map shows the topography of the area, with red being the lowest points. The map reemphasizes the statement of the first map. Map number three, shows the existing land use of the area. Most of the area is residential, with commercial on the north and south sides of the map. With the analysis from the above maps, a land development map was made creating an area for nodevelopment, one for low development, and another for regular to high development.

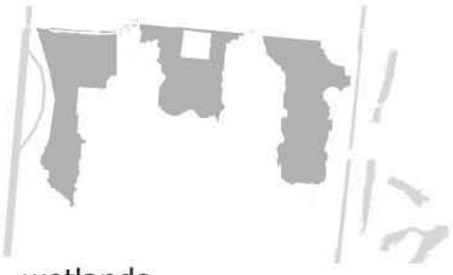
system



swales



retention basins



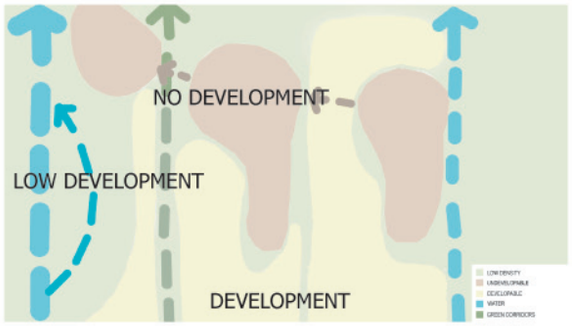
wetlands

A system of green infrastructure may be a solution for the neighborhoods problem. The system would consist of three stages. Stage one would be bio-swales alongside of the roadways, and throughout the neighborhoods, leading stormwater through to stage two, while also allowing the water to drain into the soils. Stage two is a series of retention basins surrounding the lowest areas of the neighborhoods. These basins would act as parks and open space, while flooding is not present. Stormwater would percolate in these basins and the remaining water would drain into the wetland areas which are stage three. The wetlands would be the lowest areas of the neighborhood, and would be designed as recreational wetlands, to allow for biking, camping, canoeing, and walking. Boardwalks would connect the neighborhoods with the wetlands and the commercial centers on the other side. Overall the green system would allow for a longer period of stormwater drainage, to allow the water to filter into the soils and replenish the water table, instead of pumping after every hard rainfall, which takes water out of the soils.

Claudia Tellez

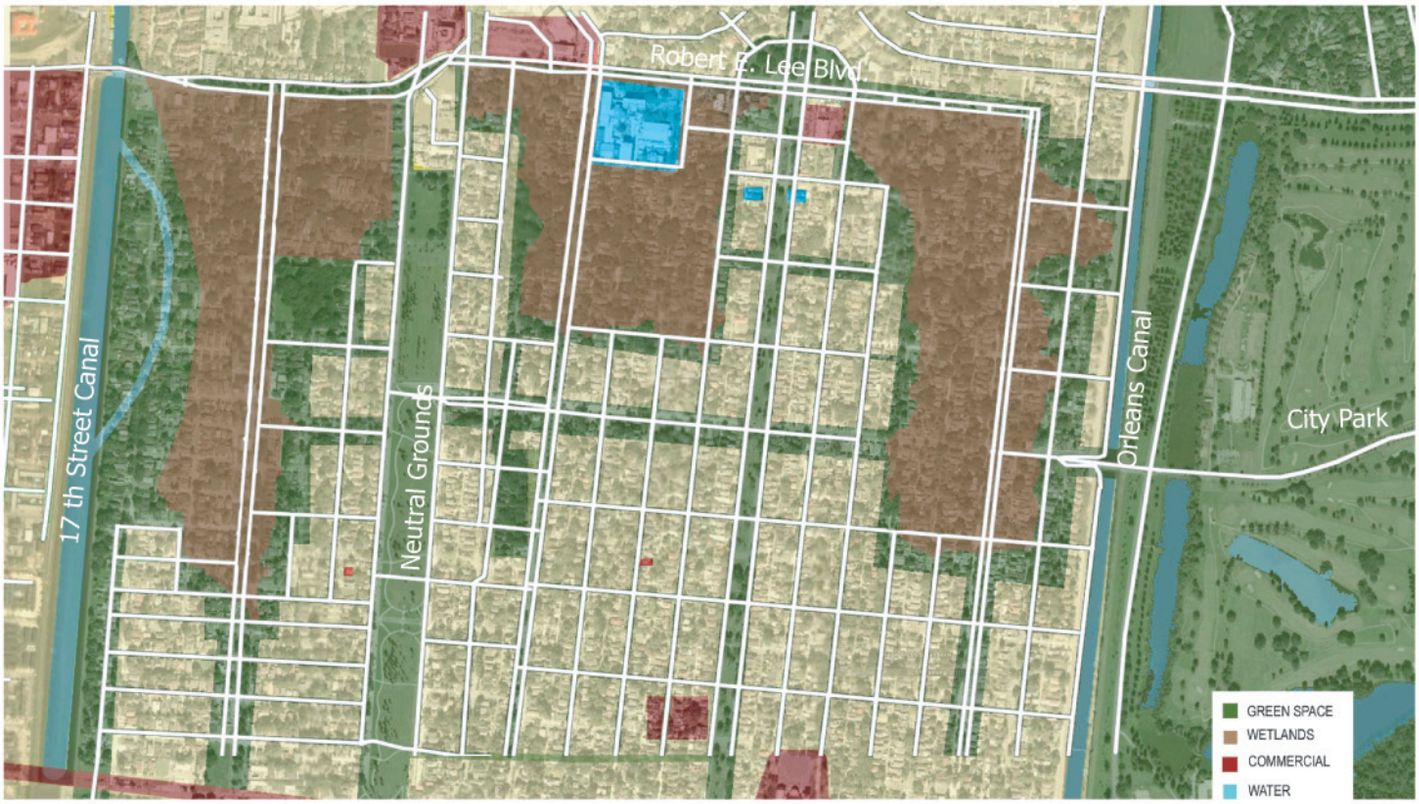
New Orleans Redevelopment proposal

Flood Protection Greenway System

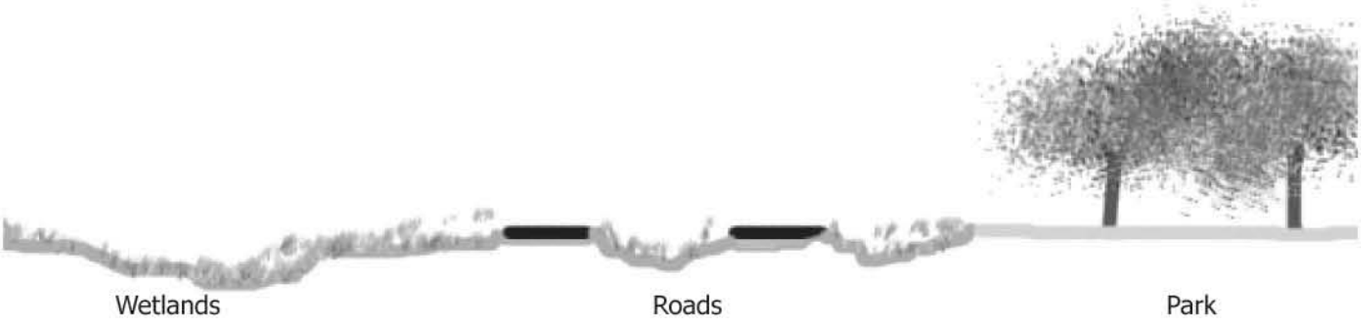


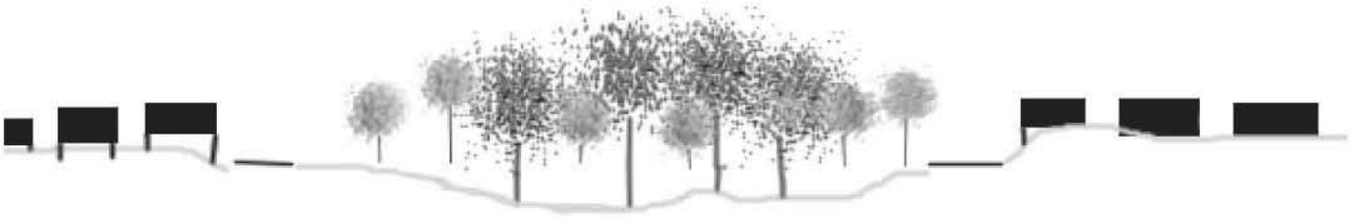
The three areas of land development, would each have its own restrictions. The area with no development would be restricted for reconstructed recreational wetland areas, with boardwalks connecting it to the resdential and commercial areas. The low development would permit few residents to rebuild at higher elevations. The regular to high develoment would be for raised existing and new development.

The proposed conseptual plan allows for 60 percent of the residents to redevelop their homes. By following the future FEMA regulations, the homes may be raised to a safe level and the lower area of the homes may be used as recreational spaces. This will also allow for more permiable areas.

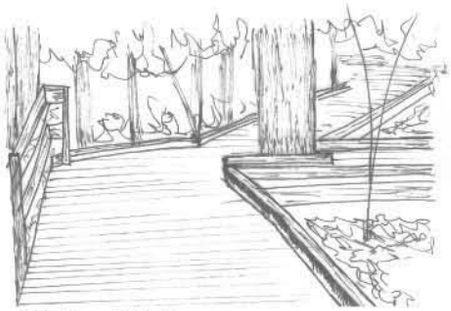


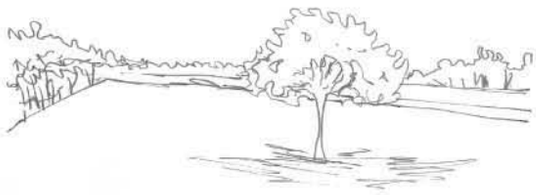
17 th Street Canal | Bypass | Greenspace | Residential | Wetlands | Orleans Canal | City park






Raised Houses


Wetland Walkways


Open Spaces

The System


Existing New Orleans Neighborhood


Proposed Raised homes and green drainage system

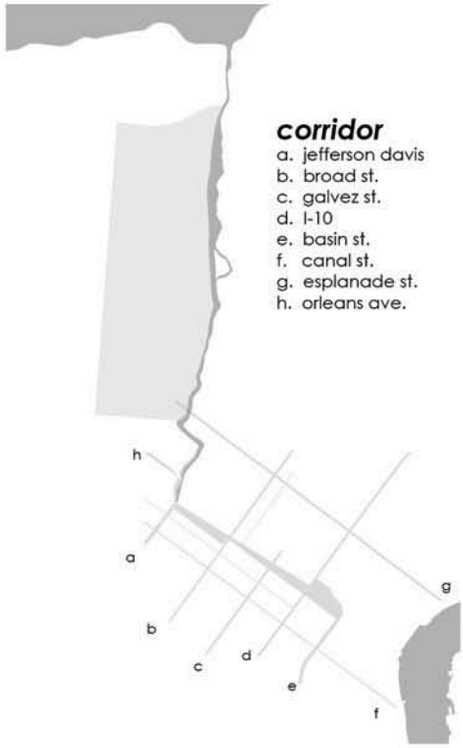

Normal rainfall


During Flood

Claudia Tellez

New Orleans

exploded analysis

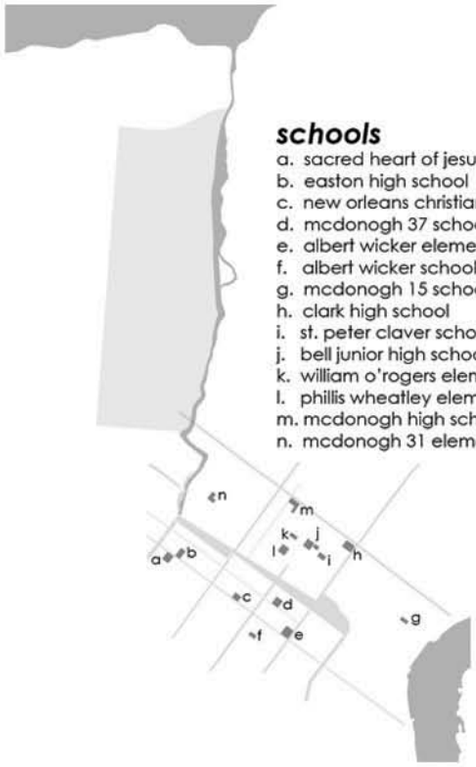


corridor

a. jefferson davis
b. broad st.
c. galvez st.
d. I-10
e. basin st.
f. canal st.
g. esplanade st.
h. orleans ave.

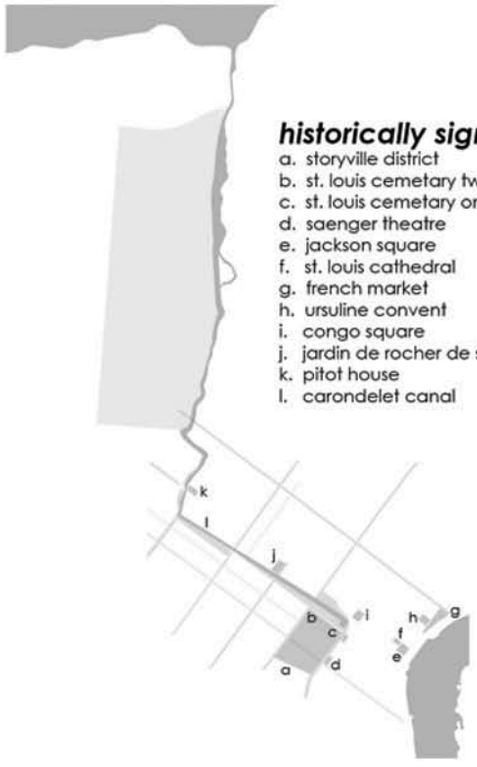
parks

a. duncan plaza
b. lafayette square
c. woldenberg park
d. jackson square
e. cabrini playground
f. washington square
g. louis armstrong park
h. kennedy place park
i. easton park



schools

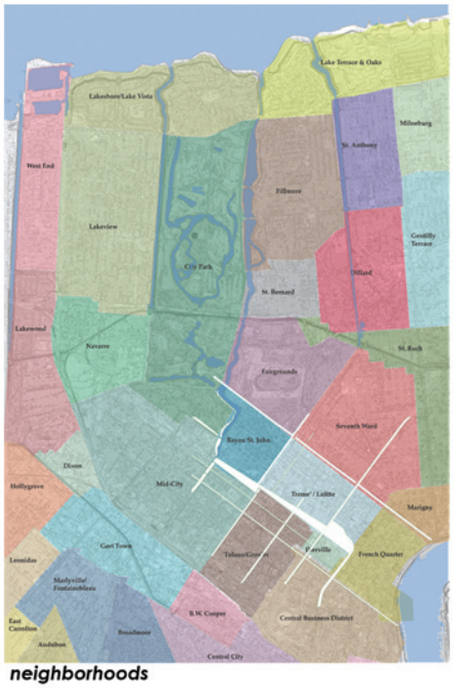
a. sacred heart of jesus high school
b. easton high school
c. new orleans christian academy
d. mcdonogh 37 school
e. albert wicker elementary
f. albert wicker school
g. mcdonogh 15 school
h. clark high school
i. st. peter claver school
j. bell junior high school
k. william o'rogers elementary
l. phillis wheatley elementary
m. mcdonogh high school
n. mcdonogh 31 elementary



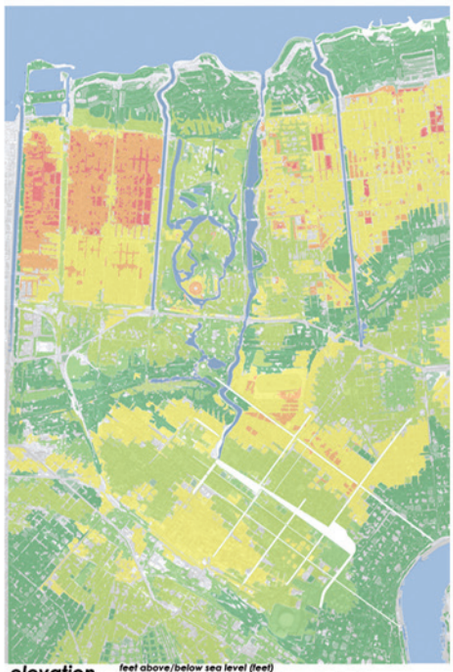
historically significant

a. storyville district
b. st. louis cemetary two
c. st. louis cemetary one
d. saenger theatre
e. jackson square
f. st. louis cathedral
g. french market
h. ursuline convent
i. congo square
j. jardin de rocher de st. helene
k. pitot house
l. carondelet canal

site analysis



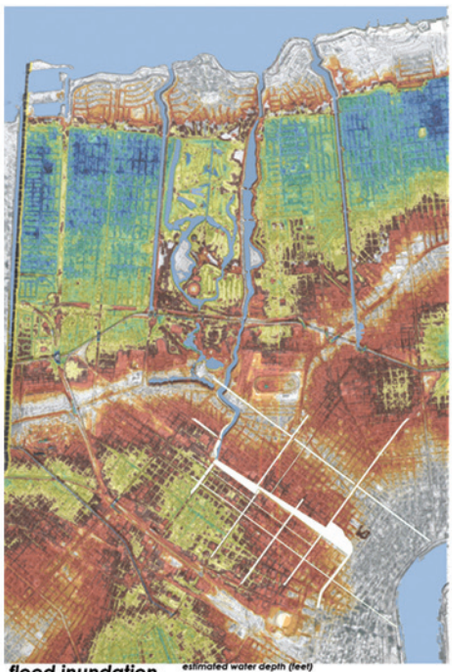
neighborhoods



elevation

feet above/below sea level (feet)

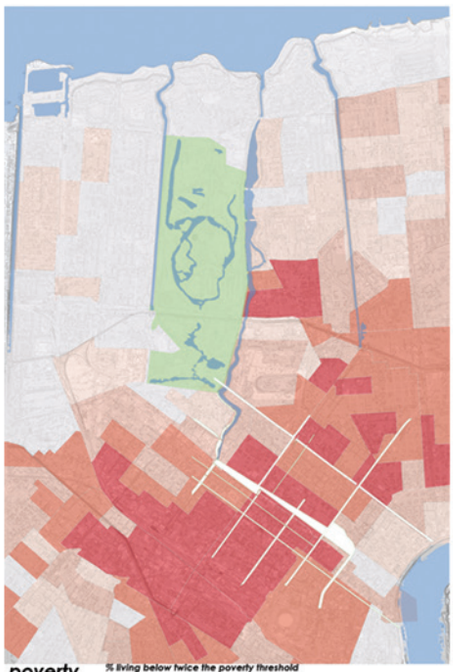
- 0+ feet
- 0 - -2
- -2 - -4
- -4 - -6
- -6 - -8
- -8 +



flood inundation

estimated water depth (feet)

- 0
- 0.1 -1
- 1.1 - 2
- 2.1 - 3
- 3.1 - 4
- 4.1 - 5
- 5.1 - 6
- 6.1 - 7
- 7.1 - 8
- 8.1 - 9
- 9+



poverty

% living below twice the poverty threshold

- 0 - 21%
- 22 - 38%
- 39 - 55%
- 56 - 73%
- 74 - 100%

Tanner Robinson

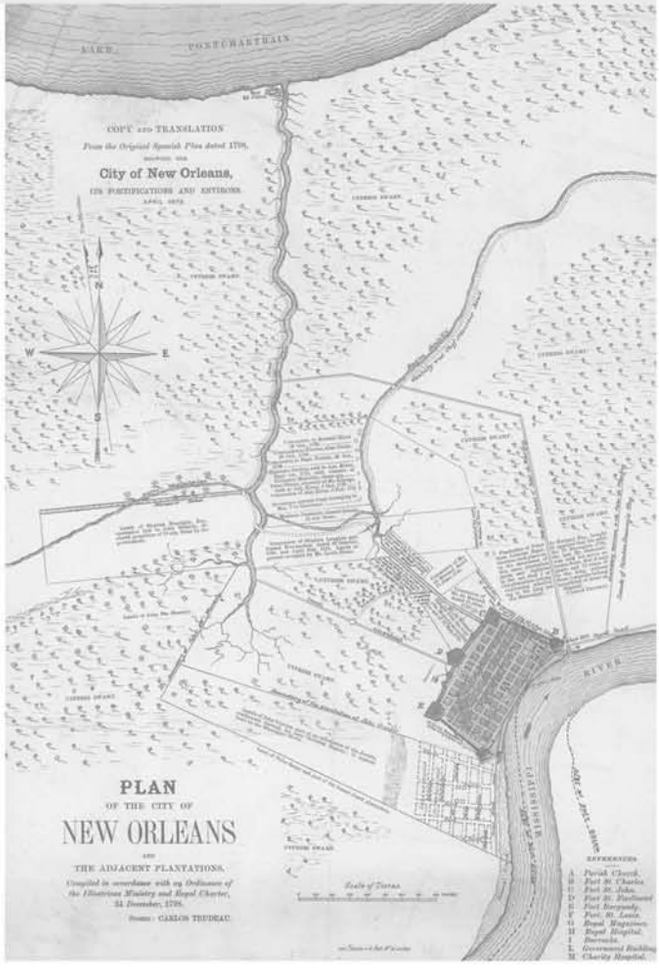
New Orleans

historical maps

birdseye view of new orleans
1885
shows carondelet canal in the distance and the evolution of development on both sides of the canal.
(maps collection, library of congress)

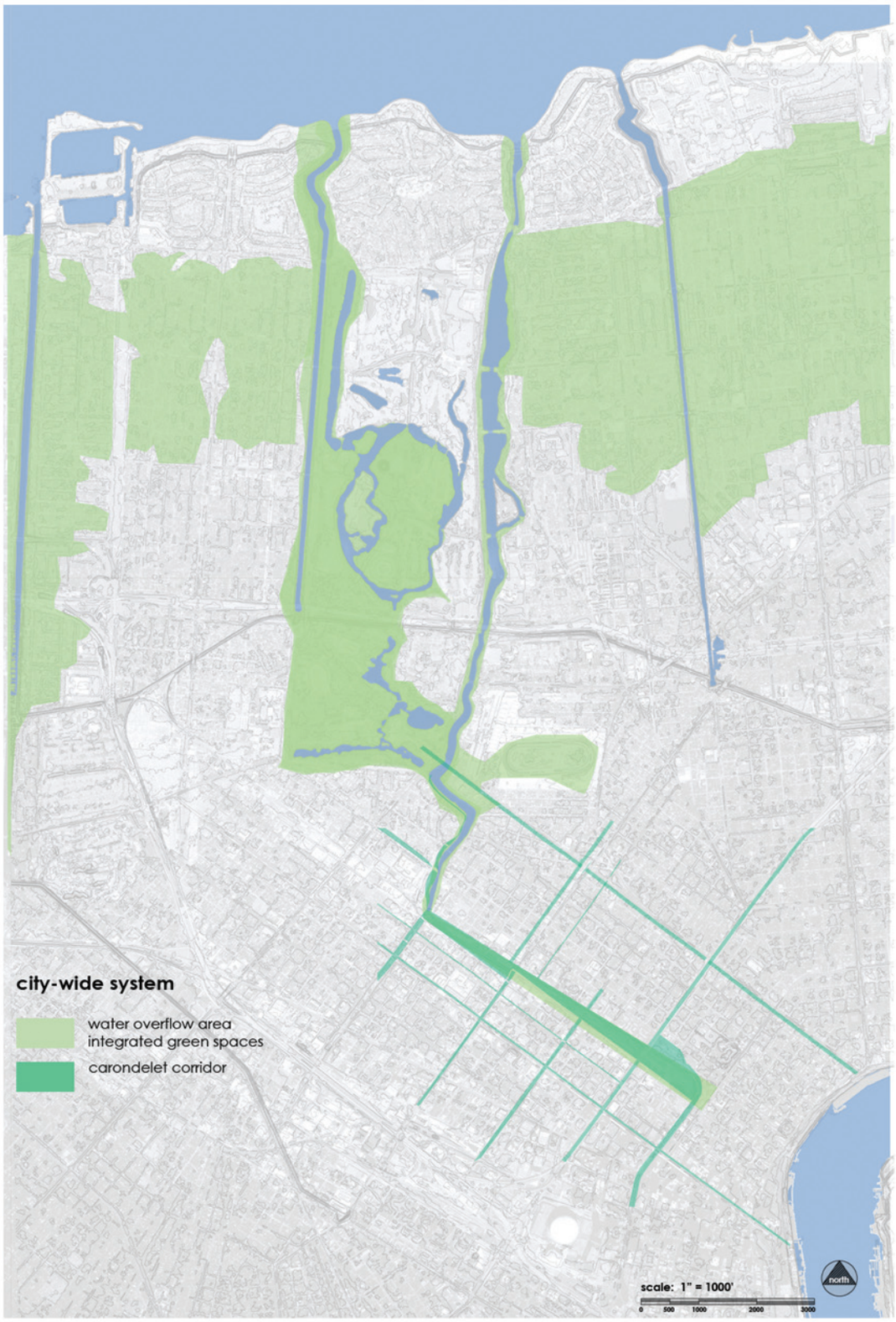
birdseye view of new orleans
1851
shows carondelet canal in the distance connecting the rear of the old city with bayou st. john and then to lake pontchartrain.
(maps collection, library of congress)

original spanish plan
1798
distinctly shows bayou metairie & bayou gentilly and the scale of the once prominent swamps. note the carondelet canal extending from bayou st. john to the french quarter.
(map collection, library of congress)



plan of the city & suburbs of new orleans
1815
shows the carondelet canal and early development of the surrounding areas. the old turning basin of the carondelet canal is clearly shown adjacent to congo square.
(maps collection, library of congress)

overall system



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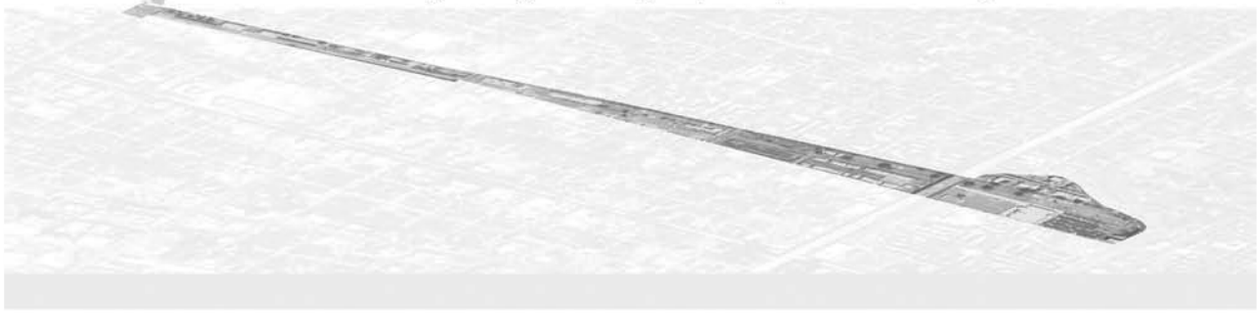
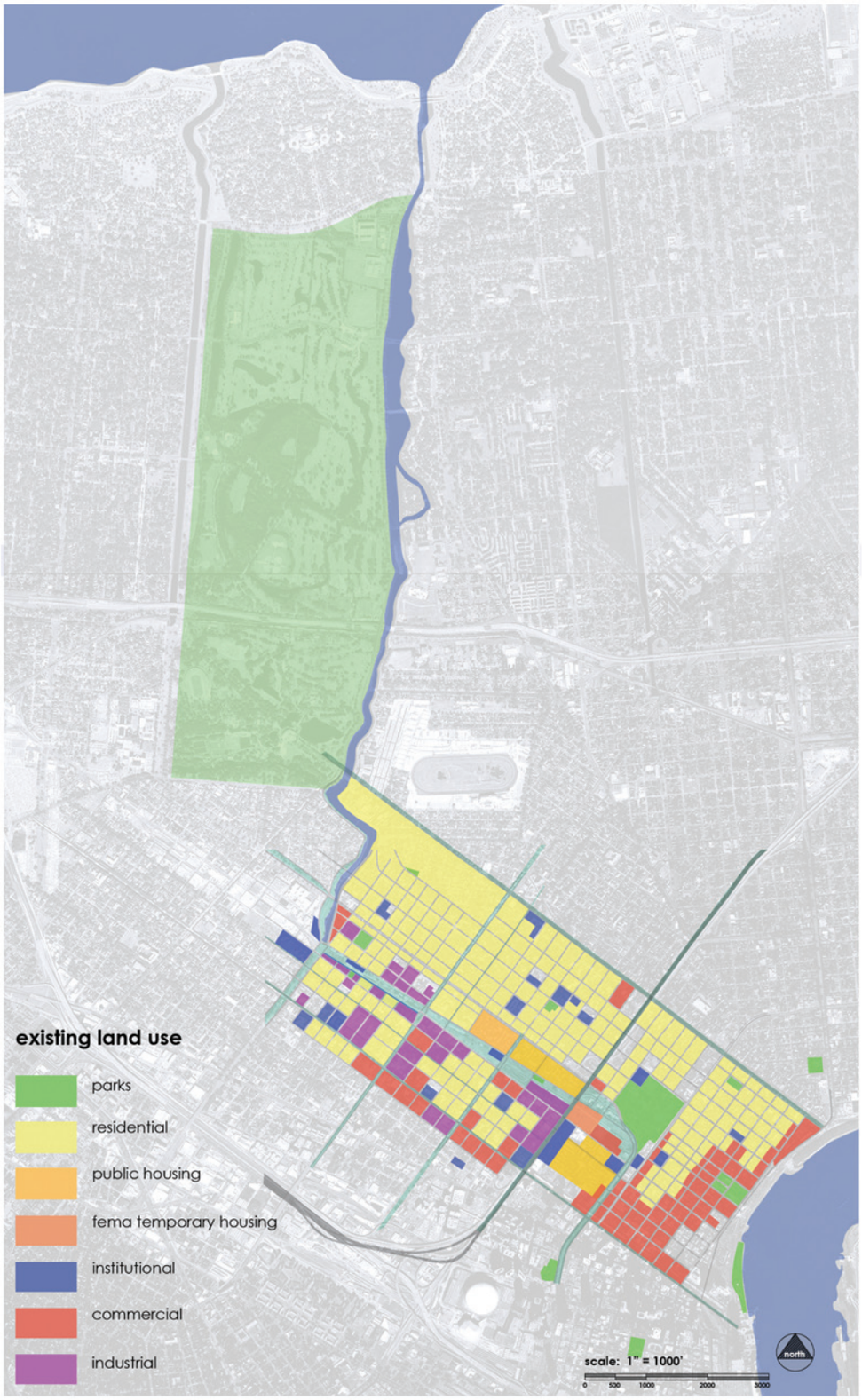
carondelet canal corridor: integrating time & place

the carondelet canal was filled in during 1927-38, but its mark on the city in 1940 was just as clear as it is today, forming an open swath of concrete and grass through otherwise densely populated neighborhoods. the canal that gave basin street and canal street their widths, names, and character helped connect new orleans to the outside world for well over a century, and still forms an imprint upon the geography of the modern city. this project attempts to reintroduce a once vital connection through the city, as a new system of green space and boulevards, to integrate neighborhoods, parks, schools, and facets of history.



existing site conditions

existing land use



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New Orleans

master plan and photo simulations

bayou st. john

bayou st. john:
bayou st. john's termination of the intersection of jefferson davis and tellife st. provides an opportunity to establish a connection from the proposed carondelet corridor to city park.

carondelet corridor:
the existing swath of grass and concrete where the carondelet canal once flowed, provides numerous opportunities to take advantage of this valuable, yet almost deserted piece of history. a corridor of green space and connecting streets would provide a connection from the old city to city park and spark needed economical growth in this area of new orleans.

schematic master plan

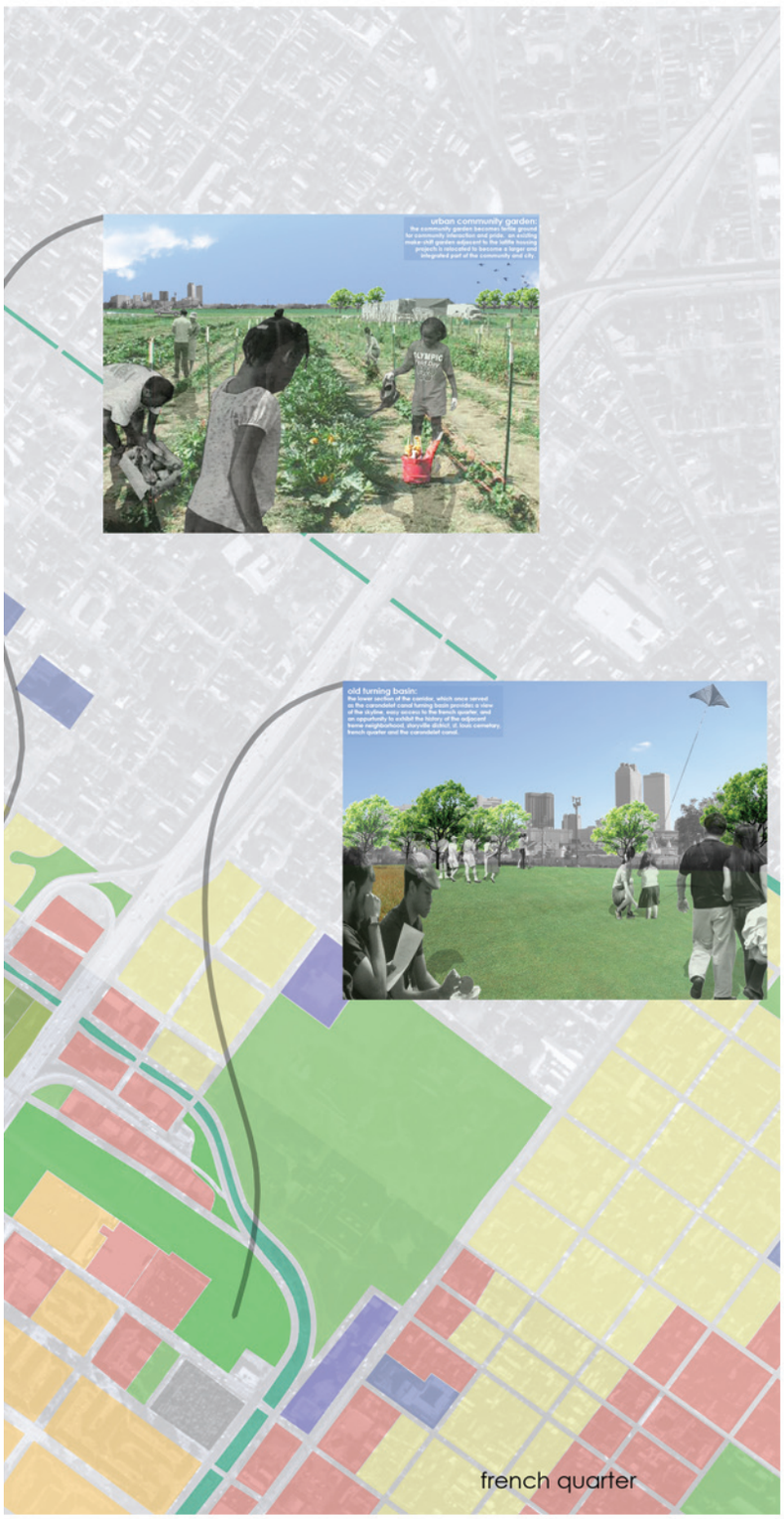
- parks
- carondelet corridor
- connecting streets
- residential
- medium density/mixed use
- institutional
- commercial
- industrial
- st. louis cemetary

scale: 1" = 300'

0 100 200 300 600 900

north

interstate 10:
the interstate currently serves as a barrier. bisecting the communities in this area. the carondelet corridor would visually break this barrier and encourage pedestrian circulation under the overpass allowing a strong connection from the french quarter to bayou st. john.


urban community garden:
the community garden becomes fertile ground for community interaction and pride. an existing make-shift garden adjacent to the lafitte housing projects is relocated to become a larger and integrated part of the community and city.
old turning basin:
the lower section of the canidor, which once served as the carondelet canal turning basin provides a view of the skyline, easy access to the french quarter, and an opportunity to exhibit the history of the adjacent treme neighborhood, storyville district, st. louis cemetery, french quarter and the carondelet canal.
french quarter

New Orleans

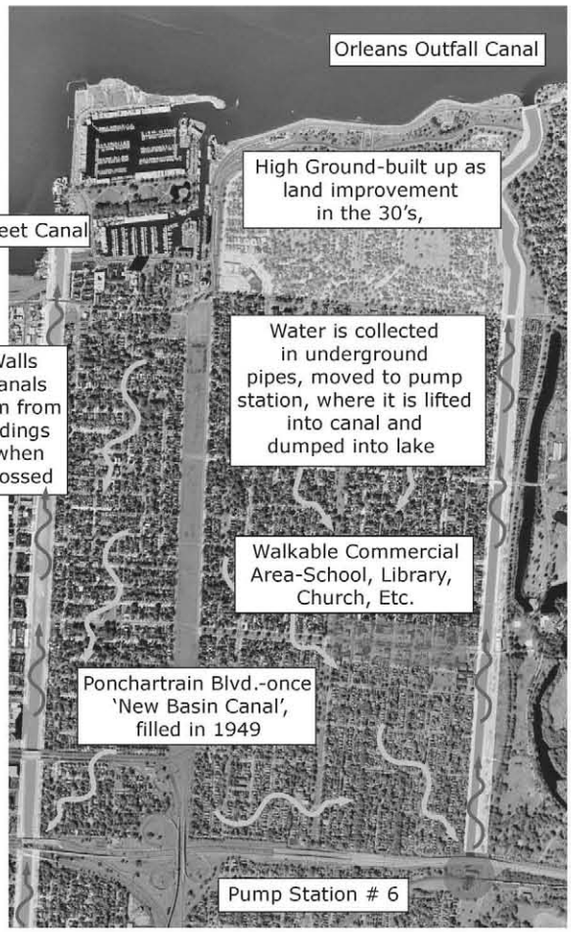
SITE LOCATION

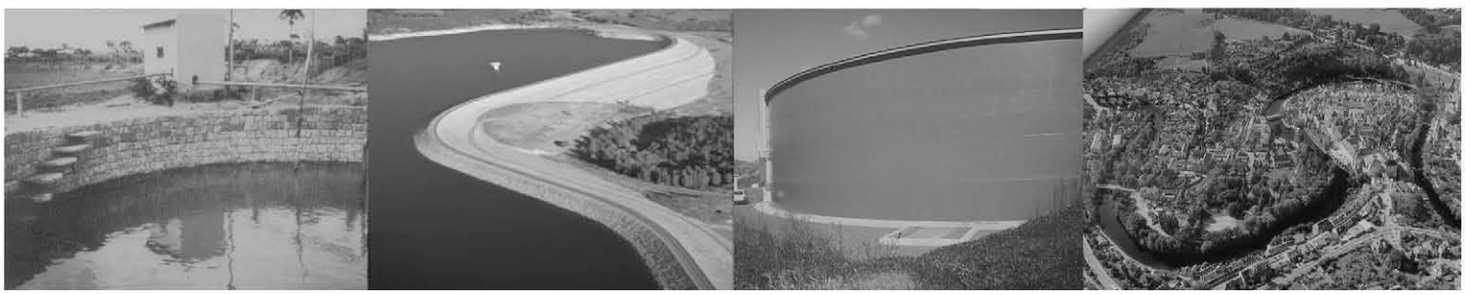
Shows extent of flooding immediateley prior to Hurricane Katrina

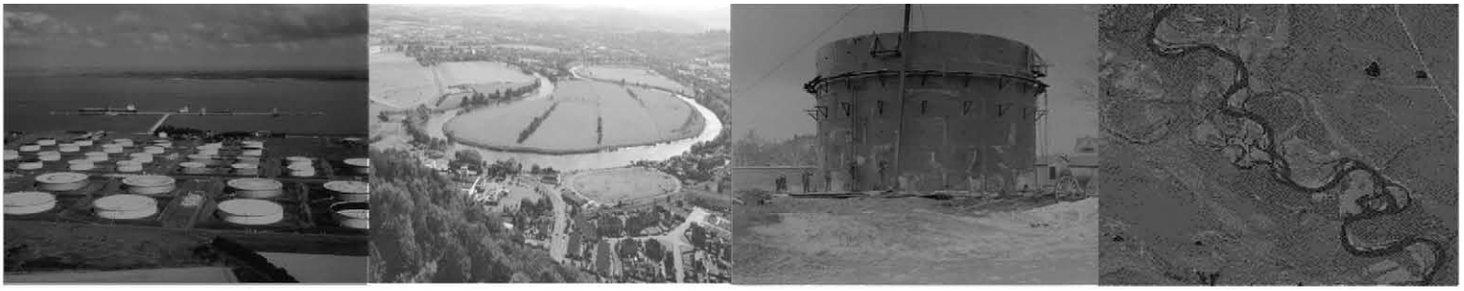
ELEVATION MAP

LAND USE

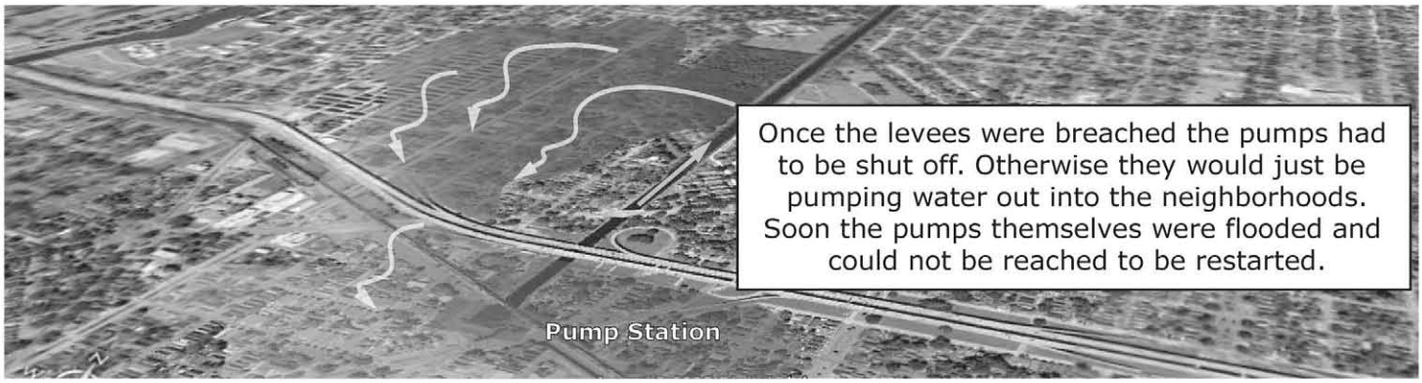
SITE ANALYSIS







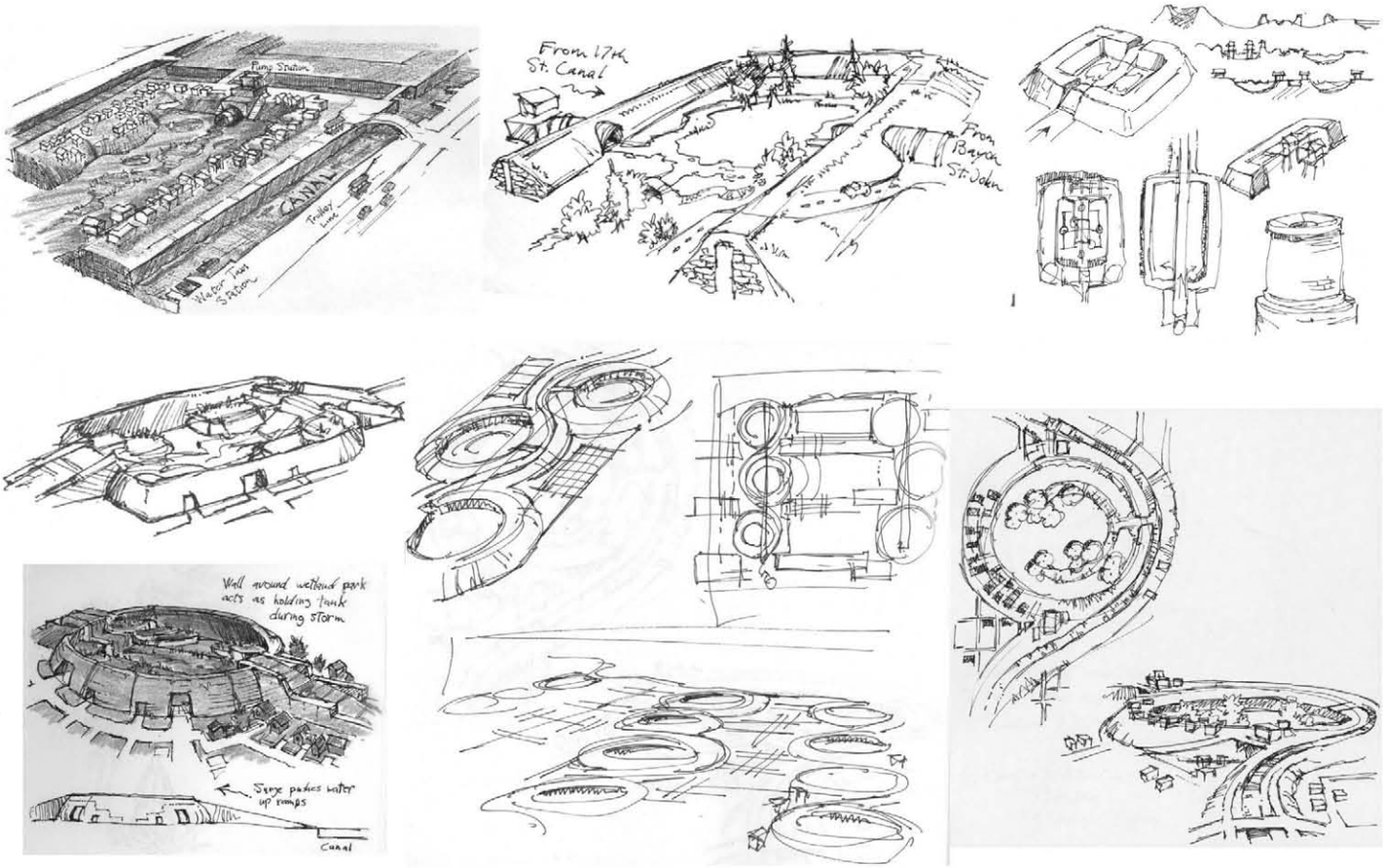
PUMP FAILURE



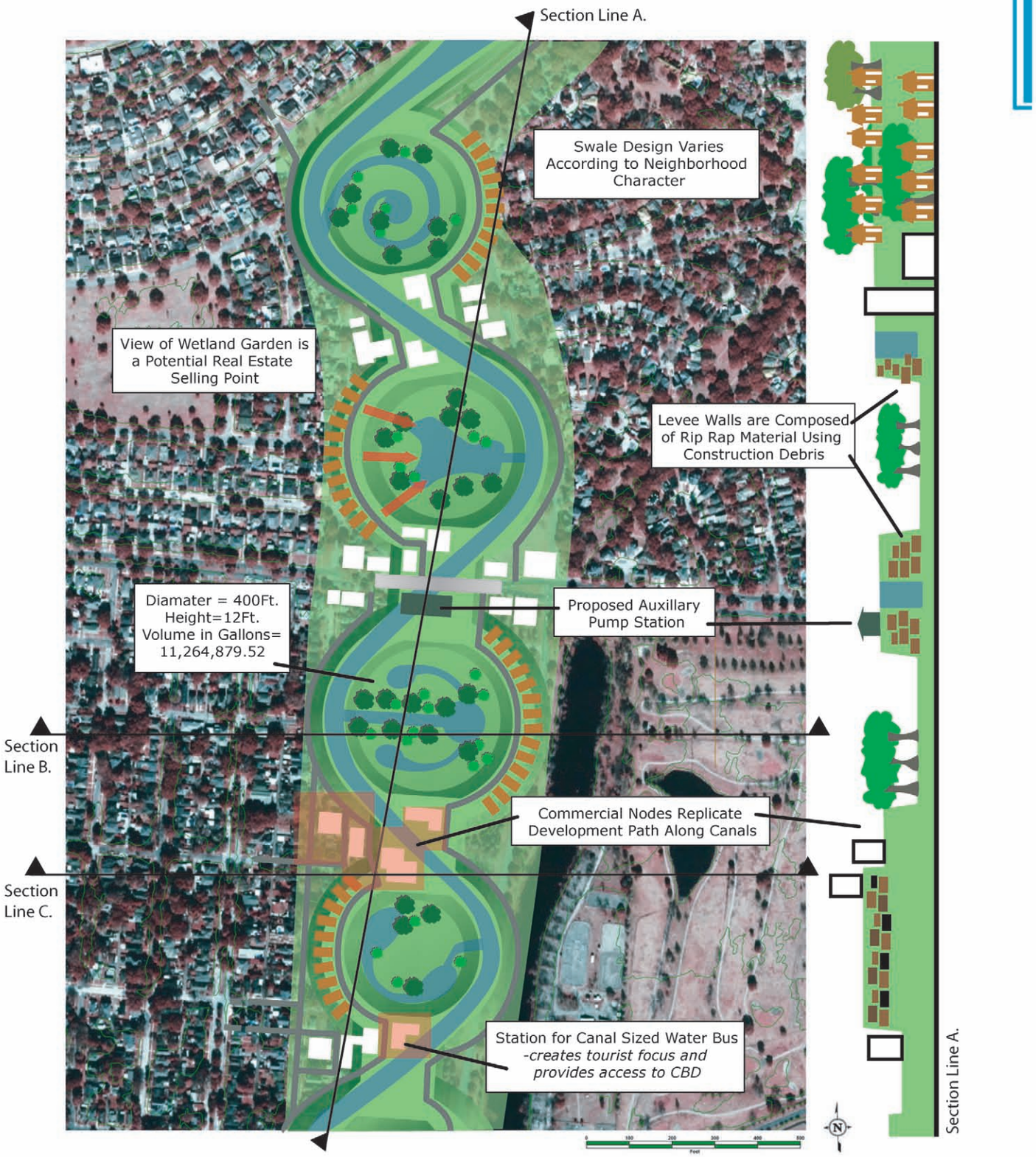
Once the levees were breached the pumps had to be shut off. Otherwise they would just be pumping water out into the neighborhoods. Soon the pumps themselves were flooded and could not be reached to be restarted.

PROCESS DRAWINGS

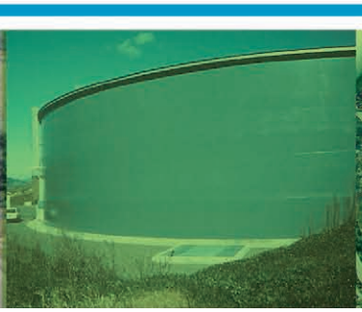
These eventually led to a system of containment reservoirs. The priciple idea is that since New Orleans is so low it must hold its storm water above the ground. These could range in size from ring levees to plaza size cisterns. These would all have the dedicated function of storing stormwater, but they would also function to cleanse the water as it enters the ground rather than dump it all into the lake.



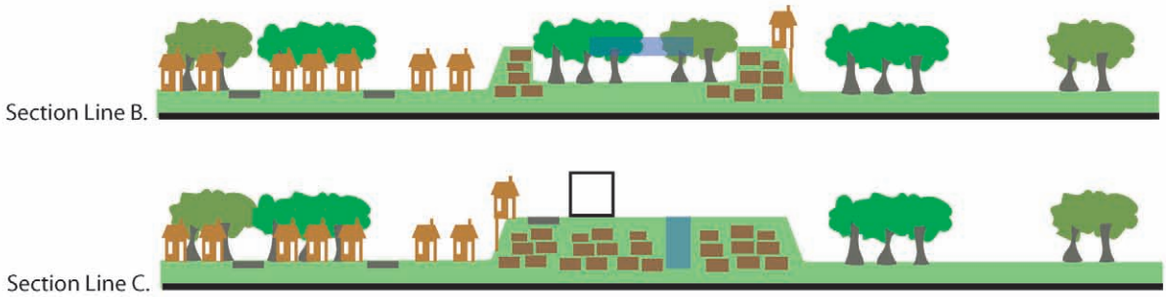
New Orleans


Section Line A.
Swale Design Varies According to Neighborhood Character
View of Wetland Garden is a Potential Real Estate Selling Point
Levee Walls are Composed of Rip Rap Material Using Construction Debris
Diamater = 400Ft.
Height=12Ft.
Volume in Gallons=
11,264,879.52
Proposed Auxillary Pump Station
Section Line B.
Commercial Nodes Replicate Development Path Along Canals
Section Line C.
Station for Canal Sized Water Bus
-creates tourist focus and provides access to CBD
Section Line A.

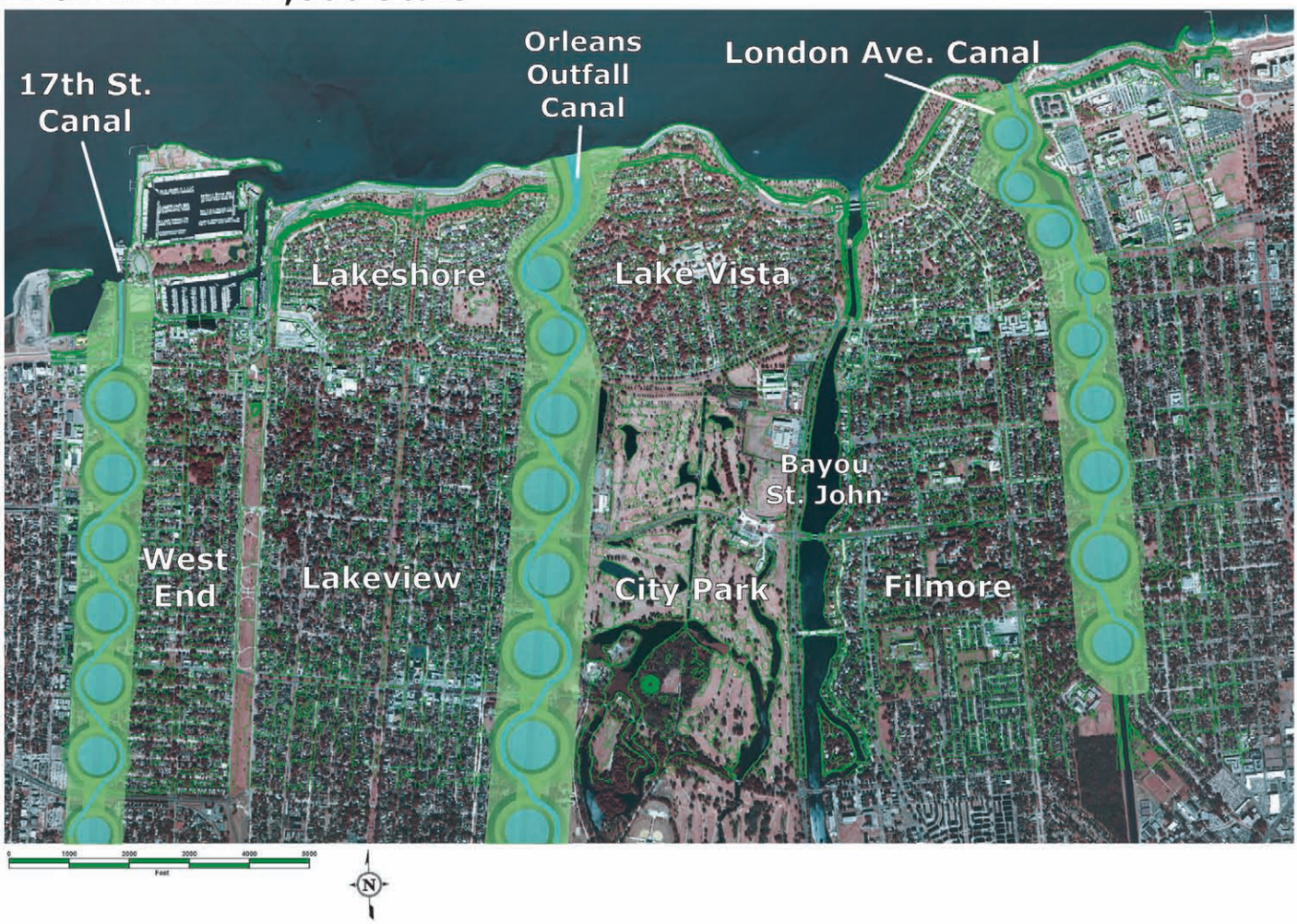





SECTIONS



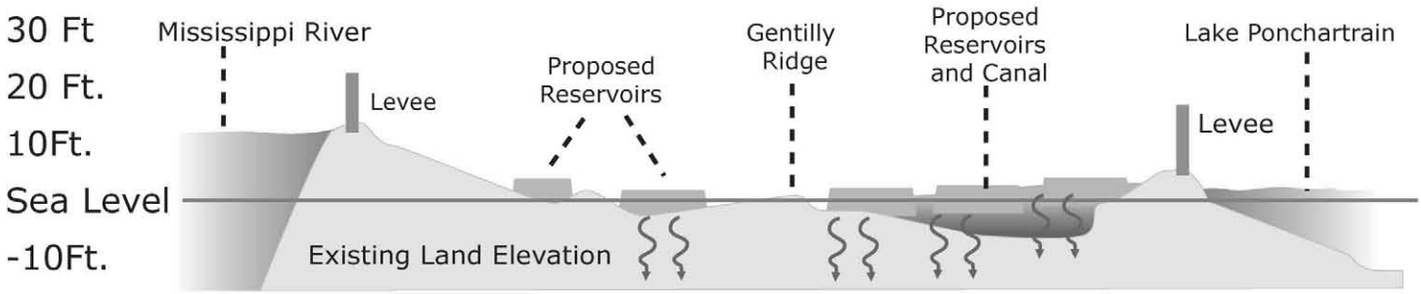
MASTER PLAN-1,000 Scale



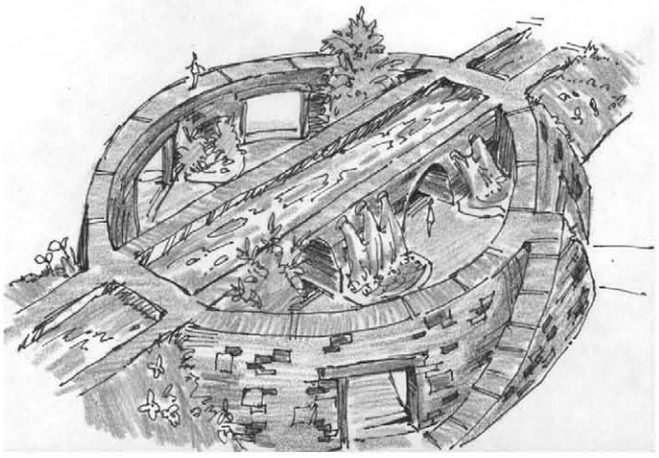
Patrick Trisler

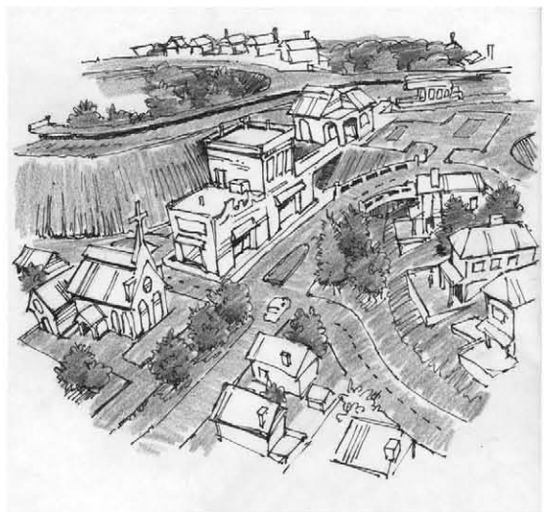
New Orleans

TRANSECT



CHARACTER SKETCHES





New Orleans

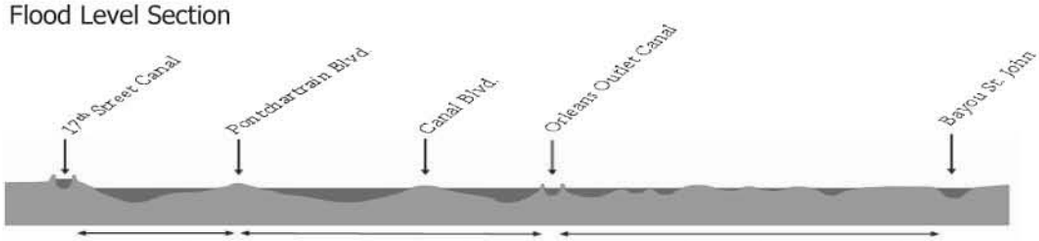
analysis

Redesigning City Park/Lakeview/West End

Goals - to try and eliminate the flooding of development in the City Park/Lakeview/West End area of New Orleans. Also create a park system that will help control floodwaters and be an interconnected part of the community.

Location Aerial

Flood Level Section



West End - 95% of which is -6 feet or below and all residential.

Lakeview - 75% of area is -6 feet or below and the land use is about 95% residential.

City Park - has about 10% of land area that is -6 feet or below, which are lakes, and yet has no residential development.

Land Use Map

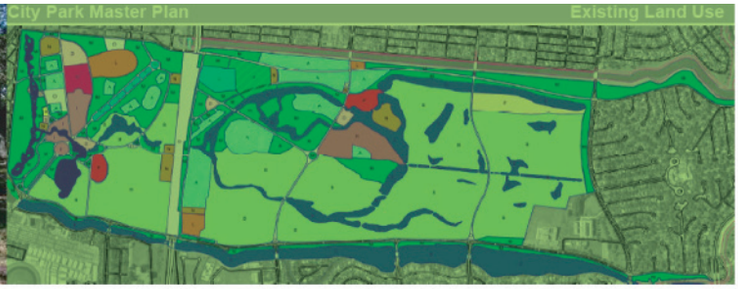
- 0 +
- 0 to -2
- -2 to -4
- -4 to -6
- -6 to -8
- -8 +

Elevation Map

- Primary Roads
- Secondary Roads
- Institution
- Mixed Use
- Residential
- Green Space

Land Use/Elevation Overlay

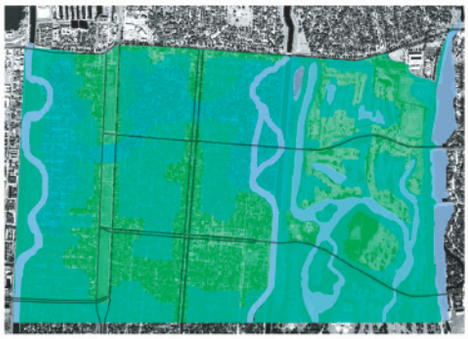
- overlay showing how the residential development is located in the lowest area and the green space is located on the highest land.

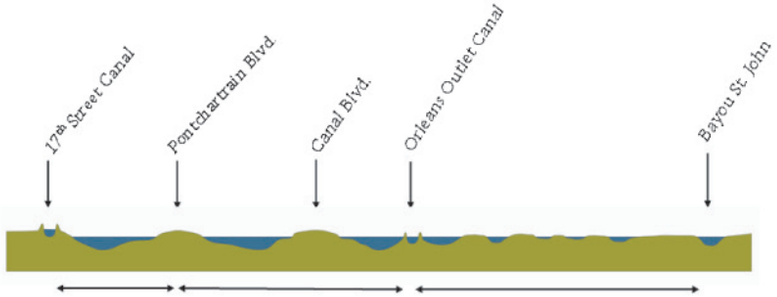


proposal
land use/master plan

Proposal - in order to achieve the goals I have set, I am proposing to relocate the development that exists in the lowest elevated areas of Lakeview and West End to the higher ground that exists in City Park. Now, the lowest land can be used as a detention basin and the intermediate land as Park Space.

Land Development Plan





- cut in the lowest area and fill along the existing major roads that are already high b/c of the neutral grounds.

- regrade parts to allow for better development and drainage.

Roads

Detention Basin

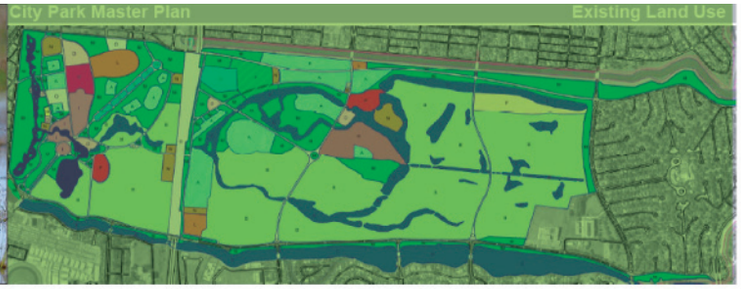
Development

Green Space

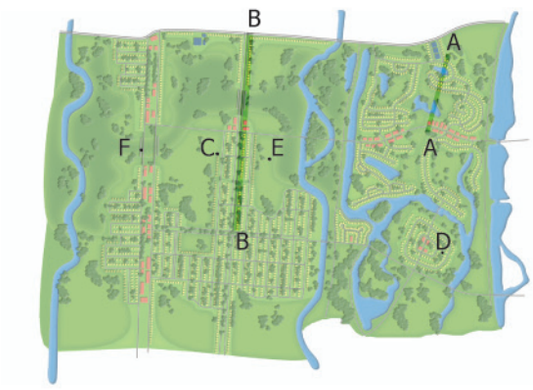
Proposed Master Plan

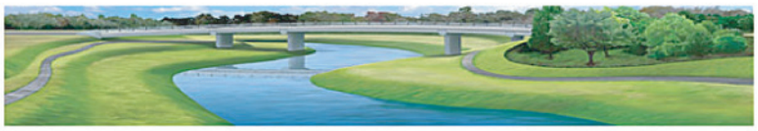
Redesigning City Park/Lakeview/West End

Brett Szczepanski

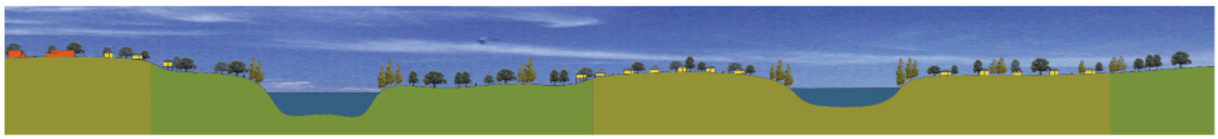


proposal sections/sketches

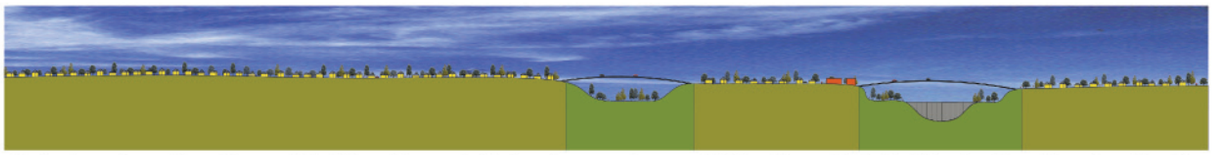




- potentially what the detention basin could look like year round and could overflow its banks if needed to help control the flood waters.



A. **City Park Section -** Section through the north end of city park, showing the relationship between the proposed residential development and the existing green space. The development in the park must be elevated to the height 1′ above one hundred years flood level.

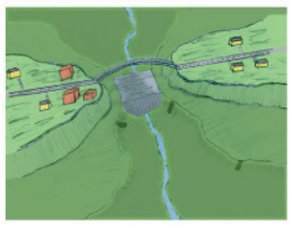


B. **Lakeview Section -** Section through Lakeview, cut parallel to Canal Blvd., illustrating the depth of the green space and how the road would continue over, via bridges.

C. Sketch of elevated home in green space, 1′ above one hundred year flood level.

D. Sketch of residential trailway in the rear of the homes, to allow better access to the green space.

E. Sketch of the park trail system which would connect the relocated development with the existing.



F. Sketch of 1 of the 2 weirs that will be located in the detention basin to help control flood waters.

Redesigning City Park/Lakeview/West End

Brett Szczepanski

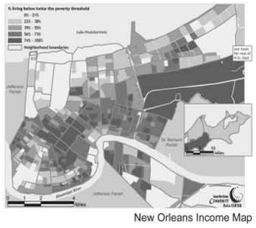
New Orleans

Redevelopment of the Historic St. Claude Neighborhood

Site Selection-Process

New Orleans Elevation Map


New Orleans Growth Map


New Orleans Income Map


% Hispanic
Census Block Group
Orleans Parish


% African American
Census Block Group
Orleans Parish


% White
Census Block Group
Orleans Parish


% Asian
Census Block Group
Orleans Parish


FEMA Flood Map
After Hurricane Katrina

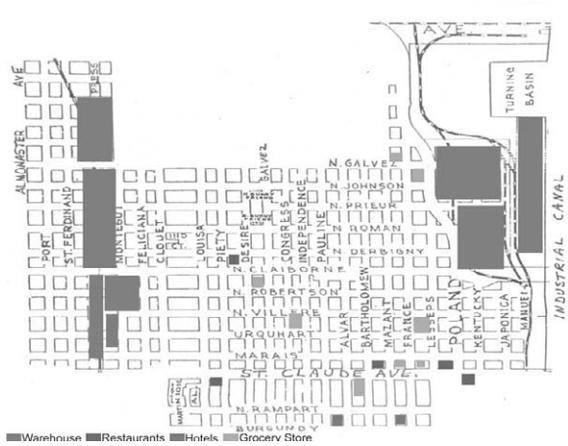
Site Selection

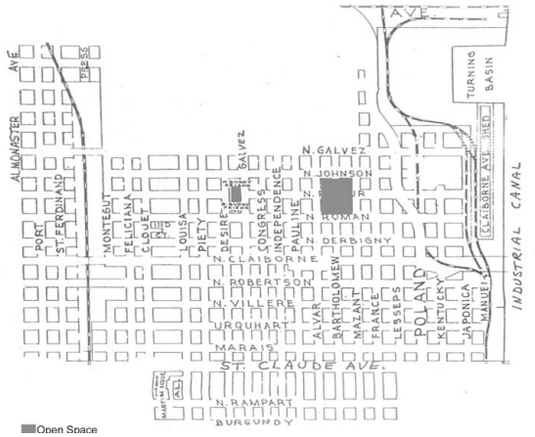
In the beginning, the development of New Orleans was centered around the highest points of elevation. Neighborhoods were very dense and housed people of different ethnic backgrounds. The Growth Map shows people moving away from the higher elevation areas over a 300 year period. The Neighborhood Poverty Map shows, that based on the FEMA Flood Map, flooding occured in the upper middle class to poverty income neighborhoods. The Census Block maps show, that according to the Growth Map, as growth occured different ethnic groups seperated into smaller neighborhoods. The smaller neighborhoods are located at the lowest points of elevation throughout the city. Accourding to the FEMA Flood Map following Hurricane Katrina and the New Orleans Neighborhood Poverty Map, residents of all ethnic backgrounds and income levels were affected by Hurricane Katrina.

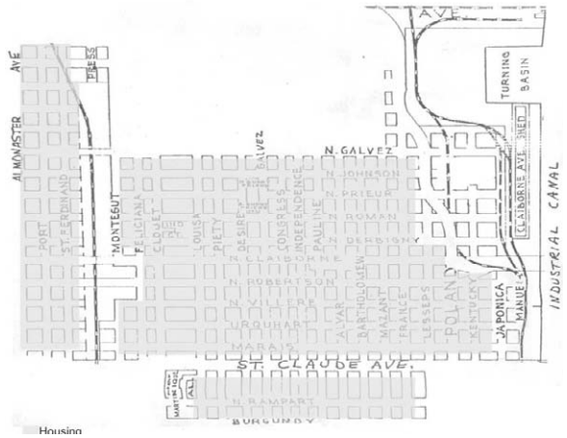
Historic St. Claude Neighborhood
Orleans Parish
9th Ward

analysis

Before Hurricane Katrina







After Hurricane Katrina


Commercial


Open Space


Residential

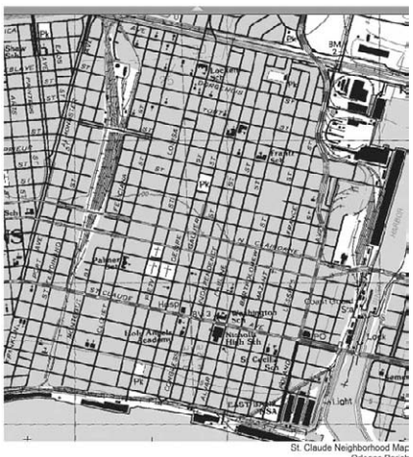

Institutional

The Historic St. Claude Neighborhood is located west of the Industrial Canal in the Nineth Ward of New Orleans. The neighborhood is a dense, urban neighborhood that contains smaller neighborhoods within its boundaries. These smaller neighborhoods are defined by the infustructure that the residents interact with each day. The St. Caude neighborhood is a good place to rebuild after Hurricane Katrina, because the area received more wind damage than flood water damage. This area is very diverse and great place to showcase the unique characteristics of New Orleans.

Heather Guidry

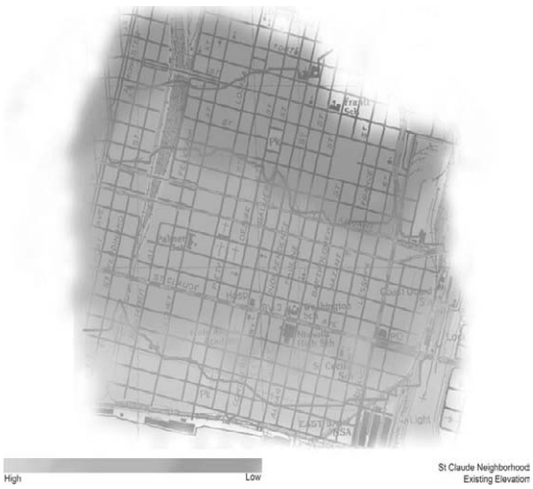
New Orleans

proposal

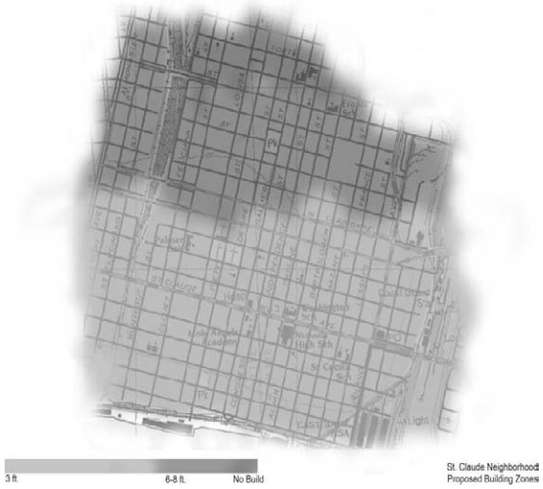


St. Claude Neighborhood Map
Orleans Parish

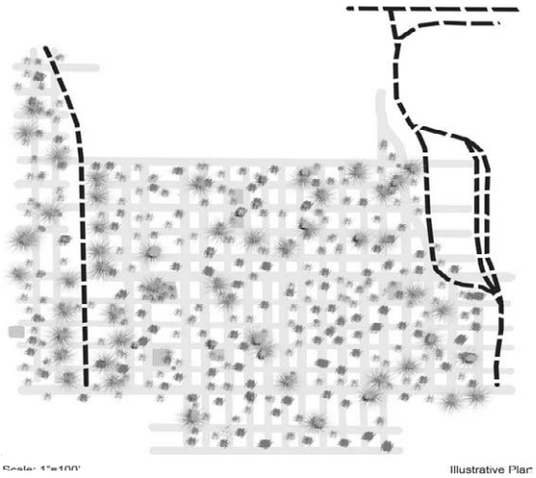
St. Claude Neighborhood
Existing Roads



St Claude Neighborhood
Existing Elevation



St. Claude Neighborhood
Proposed Building Zones



Illustrative Plan

Residential Section

Open Space

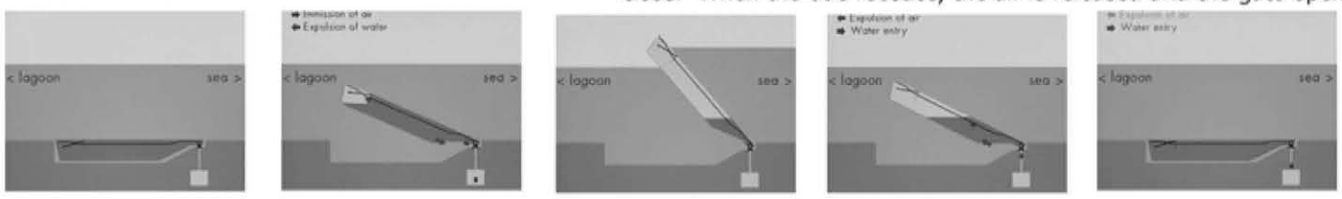
Scale 1”= 100’

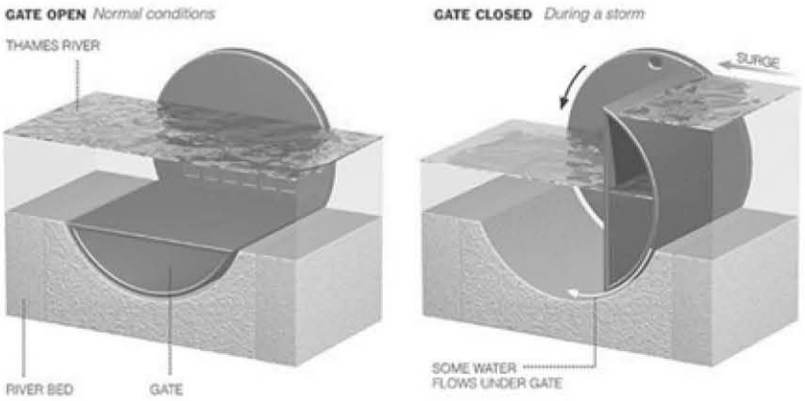
Heather Guidry

The image to the left marks where flood protection gates will be located. These gates are between barrier islands that protect Venice, Italy.

A photo simulation of the gates is to the right. The gates are filled with air so that they can "float" up when the tide reaches a dangerous height.

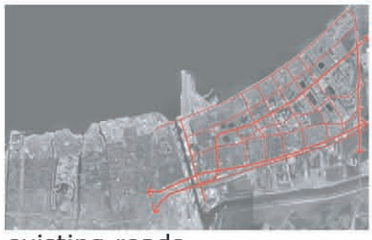
The diagrams below illustrate how the gates in Venice operate. When the tide is at a maximum height, air is pumped into the gates so that they close. When the tide recedes, the air is released and the gate opens.





London uses the gate system above the protect itself from flooding. These gates are used in the Thames River and create a wall to hold back water. The wall is 60 feet tall.

New Orleans East Redevelopment Analysis

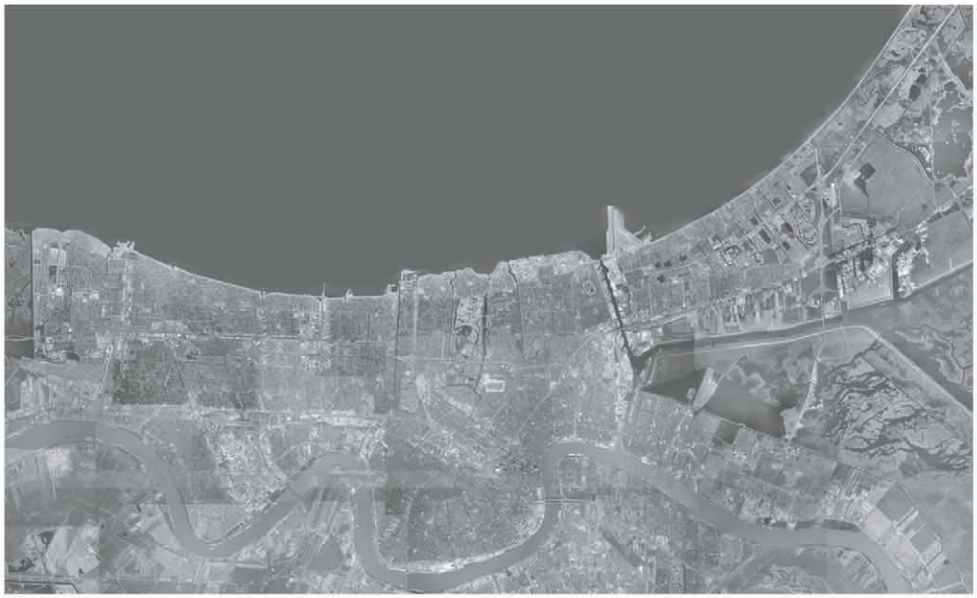

existing roads

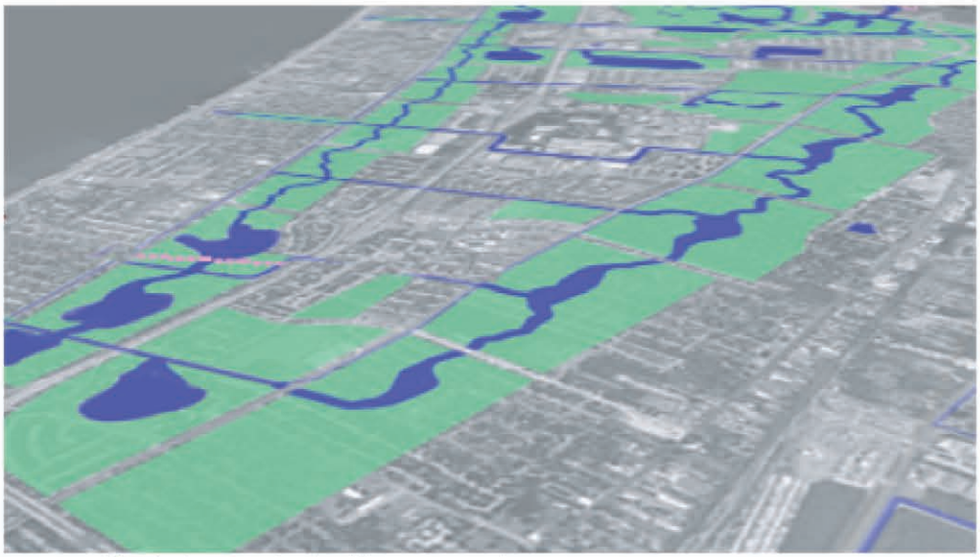

existing hydrology


existing industry


existing park space

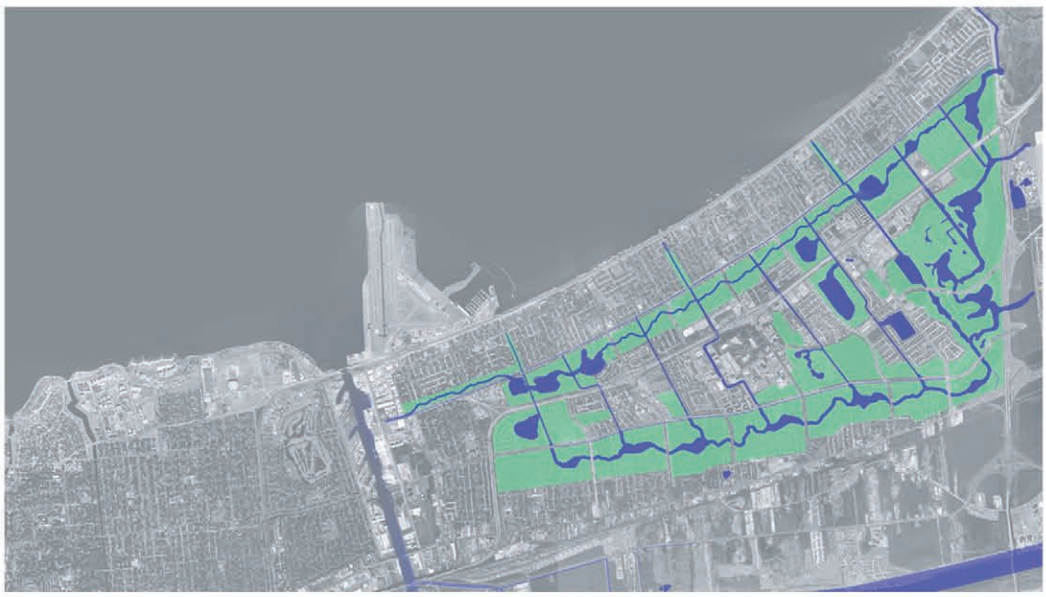

existing high ground


New Orleans East recieved some of the most extensive flooding after Hurricane Katrina. After carerful analysis of the area many open area's were located were floodwater retention zones could be developed to ease future flooding. These retention zones encircle an existing commercial core, and medical facility which is currently being renovated.

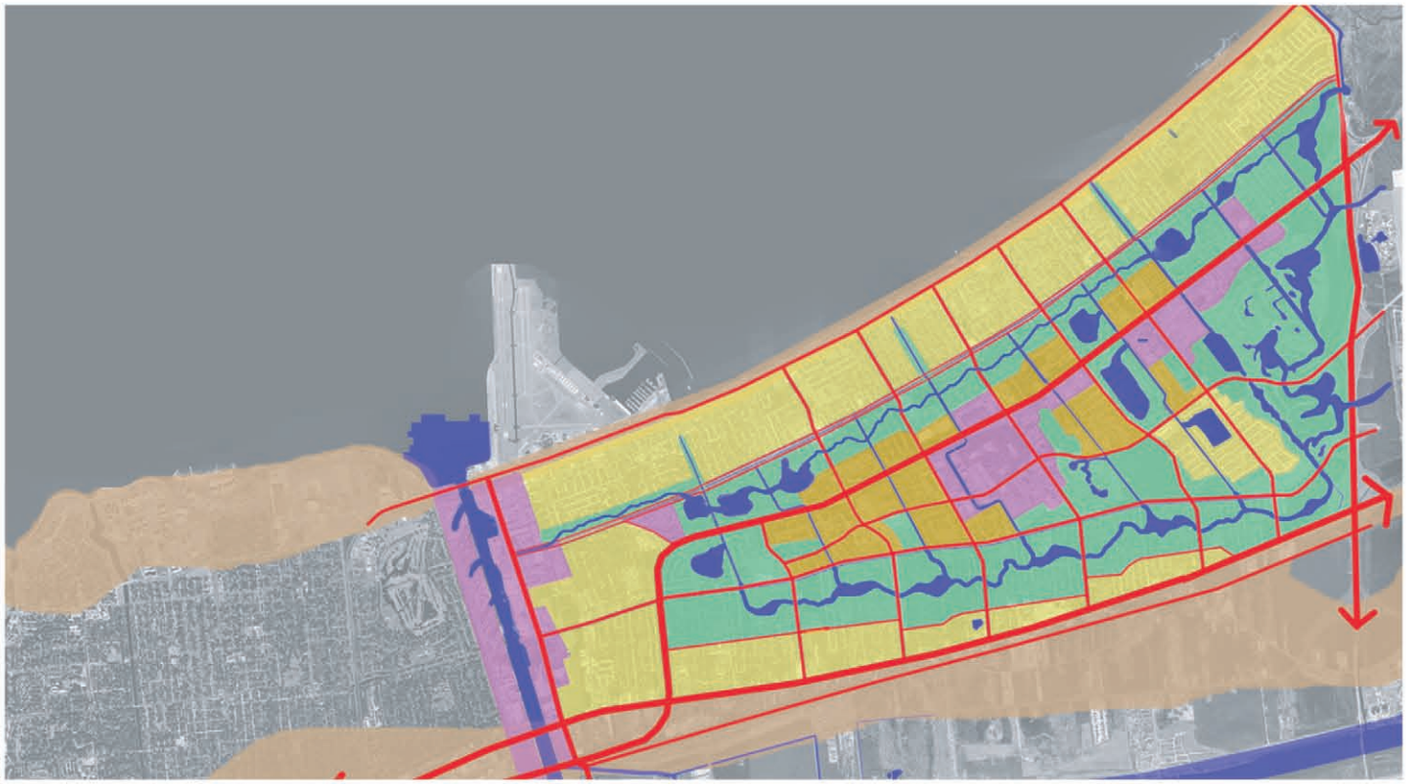

proposed hydrology and retention zone system

proposal

The proposal for the re-development of this site calls for the interlinking of all existing canals and retention area's, as well as relief outlits into the marshland to the east.



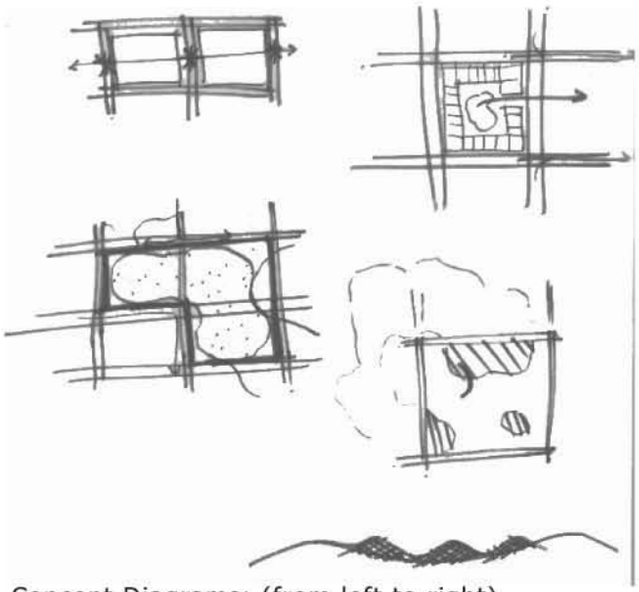
proposed retention system



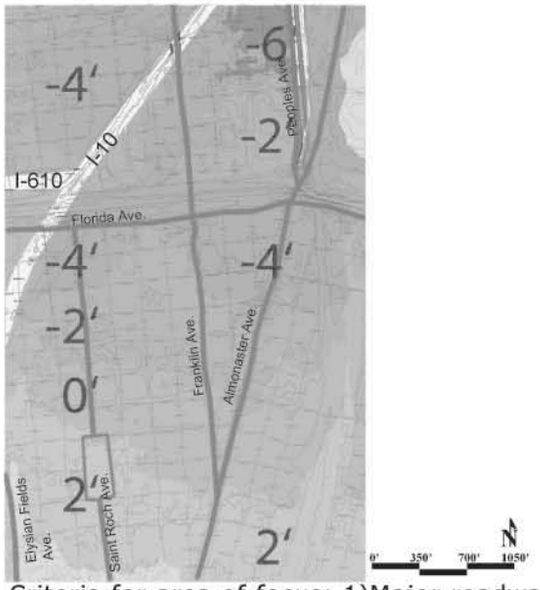
proposed land use plan

Andy Hursey

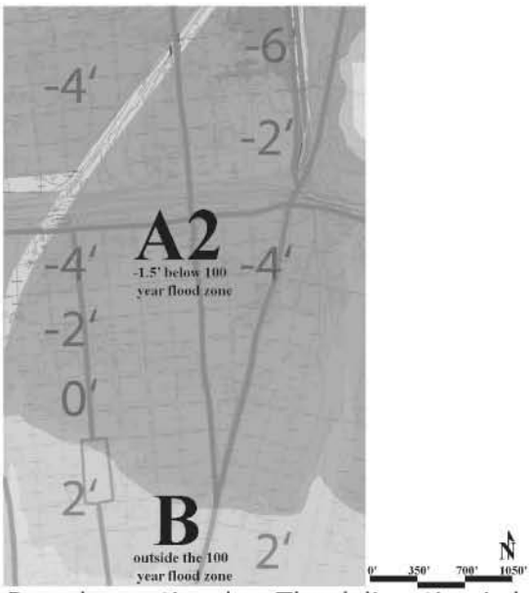
Flood Resilient Neighborhoods



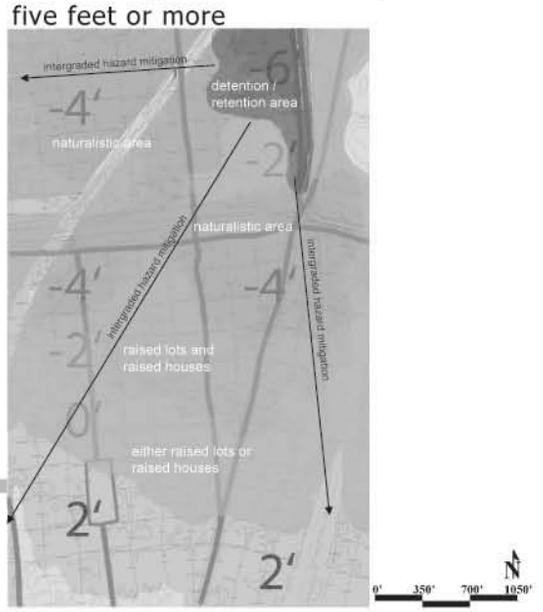
Concept Diagrams: (from left to right) Escaping Inundation- Holding Areas- The Organic Grid- Adaptive Landscapes- Ice Tray



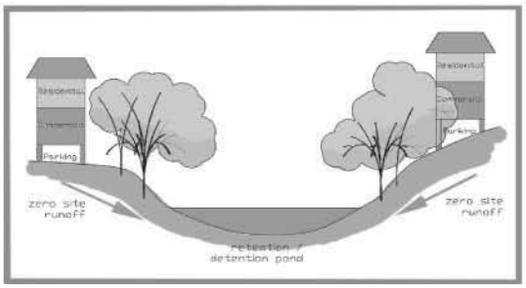
Criteria for area of focus: 1)Major roadways 2)Transition areas between livable and non-livable zones 3)Transitions between parcels with raised houses and/or raised lots 4)Areas with flooding of five feet or more

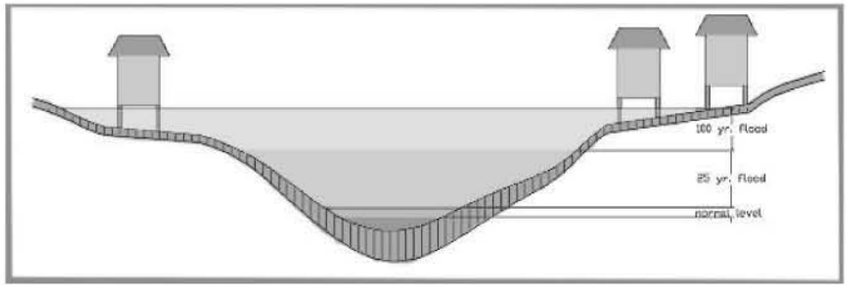


Boundary rationale: The delineation is based upon drainage systems and pumping stations but do not factor in topping of the levees or failure of the levee system



The area of focus was severely inundated by flood waters. The maximum flood average reached a depth of about 6.5′ feet. For this reason, areas to be reoccupied should have a base level of 7′ feet above ground





proposal

area of focus

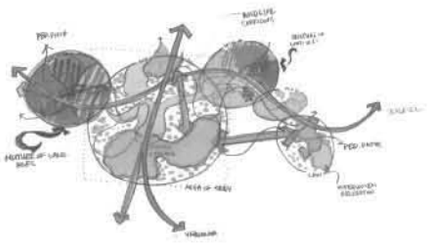
regional context

local context

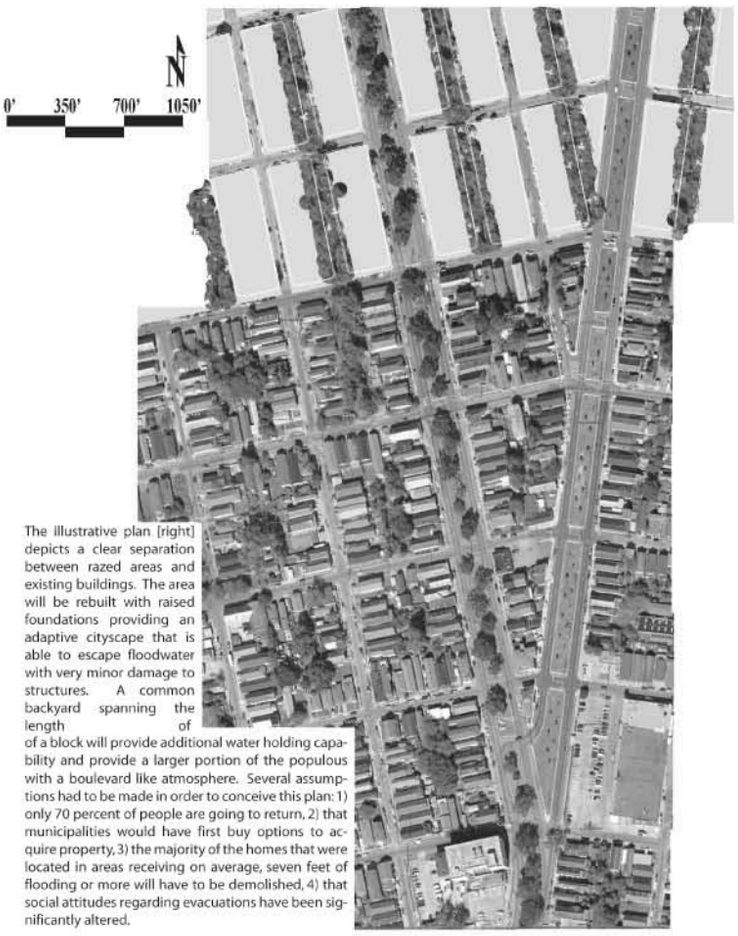
The site is located on a transition between two zones and allows for the exploration of multiple boulevards.

diagramatic coordination

The diagram [right] is a plan-section hybrid depicting land uses and movement corridors through the city of New Orleans. The arrangement of the pieces is such that they show the relative elevational relationship to each other while simultaneously providing an overview of land use patterns. The diagram also shows the relationship between connecting junctures allowing for a fluid spatial sequence throughout the diagram.



illustrative plan



The illustrative plan [right] depicts a clear separation between razed areas and existing buildings. The area will be rebuilt with raised foundations providing an adaptive cityscape that is able to escape floodwater with very minor damage to structures. A common backyard spanning the length of of a block will provide additional water holding capability and provide a larger portion of the populous with a boulevard like atmosphere. Several assumptions had to be made in order to conceive this plan: 1) only 70 percent of people are going to return, 2) that municipalities would have first buy options to acquire property, 3) the majority of the homes that were located in areas receiving on average, seven feet of flooding or more will have to be demolished, 4) that social attitudes regarding evacuations have been significantly altered.

New Orleans

analysis

THE AREA OF INTREST IS THE LOWER NINTH WARD. THIS IS AN AREA NORTH OF THE MISSISSIPPI RIVER, EAST OF THE INDUSTRIAL CANAL AND BELOW THE OUTFALL CANAL. THIS AREA WAS SEVERLY DAMAGED BY HURRICANE KATRINA. ALMOST ALL OF THE HOUSES WERE COMPLETLY DEMOLISHED.

WHY THE 9TH WARD?

THE LOWER 9TH WARD WAS DAMAGED SEVERLY, MAINLY BY THE TWO BREECHS ON THE INDUSTRIAL CANAL. THE FLOOD WATERS ROSE UP TO 10 FT DESTROYING MOST HOUSES AND LEAVING ALMOST 90% OF THE HOUSES UNDER WATER.

REBUILDING IN THE AREAS OF LOW LYING ELEVATION IS OF GREAT CONCERN. THESE LOW LYING AREAS ARE EASILY FLOODED, NOT ONLY BY NATURAL DISASTERS BUT BY HEAVY RAINS AS WELL.

ARIAL OF LOWER 9TH WARD UNDER FLOOD WATER

THE AREA OF THE LOWER NINTH WARD HAS GREAT POTENTIAL OF BECOMING A CONSTRUCTED WETLANDS OCCASIONAL FLOODINGS COULD OCCUR THROUGH RELEASE OF WATER FROM THE OVERFLOW CANAL INTO THE NINTH WARD. THESE OCCASIONAL FLOODINGS WILL BUILD LAND THROUGH SEDIMENT. IN ADDITION THESE WETLANDS WILL MIDIGATE THE POLLUTION FROM THE NEARBY INDUSTRY ALONG THE INDUSTRIAL CANAL AS WELL AS CREATE AREAS OF RETENTION FOR FLOODWATER.

RETENTION BASIN:

THIS AREA WILL HOUSE WATER FROM THE OUTFALL CANAL AND RUNOFF FROM SURROUNDING AREAS.

WETLANDS:

THE WETLANDS WILL RETAIN SURFACE WATER AND BEGIN TO REBUILD LAND.

SETBACK:

THIS AREA WILL CREATE A BUFFER BETWEEN DEVELOPMENT AND WETLANDS. THE SETBACK WILL ALSO CREATE GREEN SPACE CORRIDORS TO CARRY RUNOFF TO WETLANDS.

SWALES:

THE SWALES WILL COLLECT RUNOFF FROM DEVELOPMENT AND CARRY IT TO THE WETLANDS. THE SWALES WILL ALSO FORM A CONNECTION BETWEEN THE MISSISSIPPI RIVER AND THE WETLANDS.

10 - 25 YEAR DEVELOPMENT:

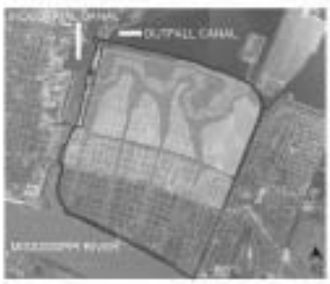
THIS AREA WILL BE LOW DENSITY ANDWILL BE COMPLETELY BULLDOZED. THIS AREA WILL BE FLOODED TO BUILD THE LAND UP. WHEN LAND IS DEVELOPED, THE DEVELOPMENT WILL HAVE TO BE A MINIMUM ELEVATION FROM THE GROUND. THIS AREA WILL RECIEVE NO FLOOD

5 - 10 YEAR DEVELOPMENT:

THIS AREA WILL BE LOW TO MEDIUM DENSITY AND WILL BE COMPLETELY BULLDOZED. THIS AREA WILL GET SOME PARTIAL FLOODING BUT WILL CONSIST MAINLY OF FILL. DEVELOPMENT IN THIS AREA WILL HAVE A MINIMUN ELEVTION REQUIREMENT. THIS AREA WILL RECIEVE NO FLOOD

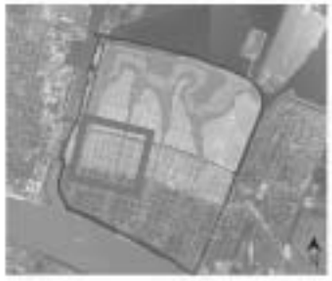
2 -5 YEAR DEVELOPMENT:

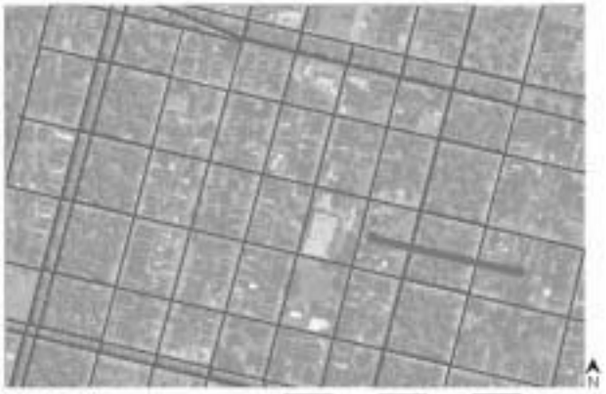
THIS AREA WILL BE MEDIUM DENSITY AND WILL BE BULLDOZED. THIS AREA WILL RECIEVE NO FLOODING AND WILL HAVE LITTLE FILL. THE DEVELOPMENT WILL HAVE A MINIMUN ELEVATION REQUIREMENT AND WILL BE ELLIGABLE FOR FLOOD INSURANCE.



0 - 5 YEAR DEVELOPMENT:

THIS AREA WILL BE HIGH DENSITY AND WILL BE REMODELED AS NEEDED. THE DEVELOPEMENT WILL HAVE A MINIMUN ELEVATION REQUIREMENT AND WILL BE ELIGABLE FOR FLOOD INSURANCE.





SCALE 1" = 250'

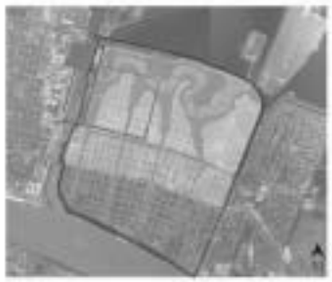
0 250 500 750 1000 1250 1500

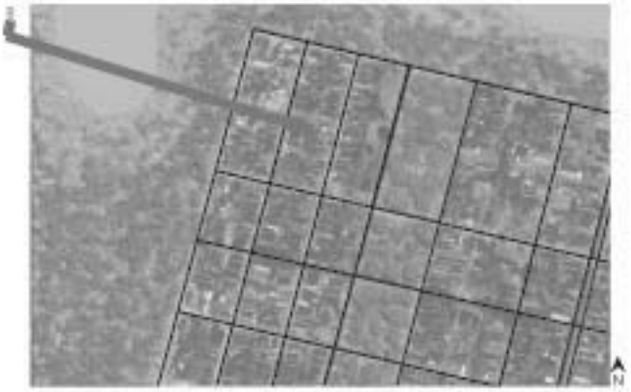
SCALE 1" = 100'

0 100 200 300 400 500 600

SCALE 1" = 125'

0 125 300 450 600 750 900





SCALE 1" = 250'

0 250 500 750 1000 1250 1500

PEDESTRIAN PATHWAY THROUGH WETLANDS AND DETENTION BASIN

Context Map

Louisiana state map showing relationship of New Orleans to other major cities. New Orleans is 60 miles east of Baton Rouge, the capital of Louisiana.

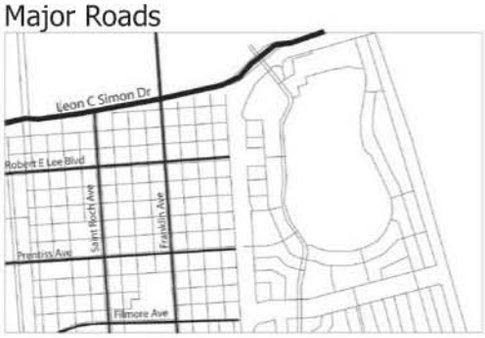
New Orleans Map

The area of interest of development is north-east of downtown New Orleans. This site is south of UNO and inbetween the London Street and Industrial Canals.

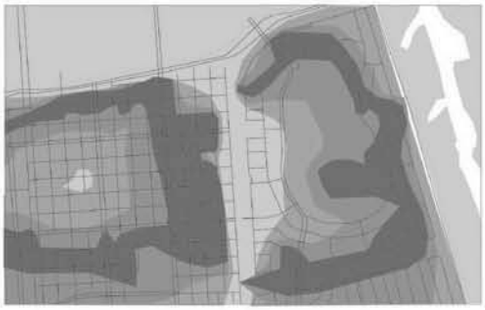
Waterways

These areas which contain water passages would be connected to lakes sites to form detention ponds in order to mitigate waste water or runoff.

Major Roads



Elevation



10-20ft
5-10ft
2-5ft
0-2ft
-4-0ft

The elevation of the Gentilly area is primarily lower than sea level due to the lack of soil recharge and water pumping to keep from flooding. The elevatios of the land will determine in the areas of concern and how the phases will relate to the design and construction.

Landmarks

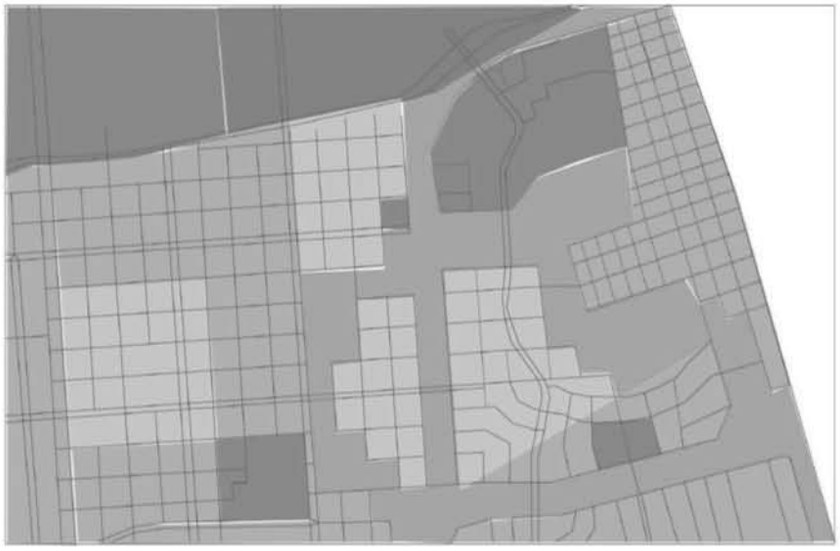
-The area south of UNO and Lakeshore Park are prone to flooding

-There are landmarks such as recreational areas, schools, and stadiums that should be brought into consideration for rebuilding and restoring

-Major roadways are cited for community (residential, student, and visitor) use

-Waterways such as canals and lakes should be recognized for possible solutions to better local areas

proposal



UNO
Save/Rebuild
Phase I
Phase II
Phase III

MasterPlan

Constructing a bayou with surrounding pathways would be the first phase after saving or rebuilding important landmarks. Phase II consist of using the higher elevation for primary housing. Phase III will also be permanent housing, but will have different codes. All houses will have to be raised on stilts to compensate for flooding.

Precedent

Flooding was the main factor for the city of Houston to propose and build or expand the existing Buffalo Bayou. Urban design and development was to improve the existing infrastructure as well as adding and upgrading mixed use along the bayou. Flood management is based on a three-pronged approach; direct flow of flood water, creating bypass channels, eliminating crossings and reconstructing bridges when necesssary.

Bayou/Stream
Open Space/Recreation
Constructed Wetland/Recreation
Proposed Housing
Wetland Research Station
Existing Building/Housing

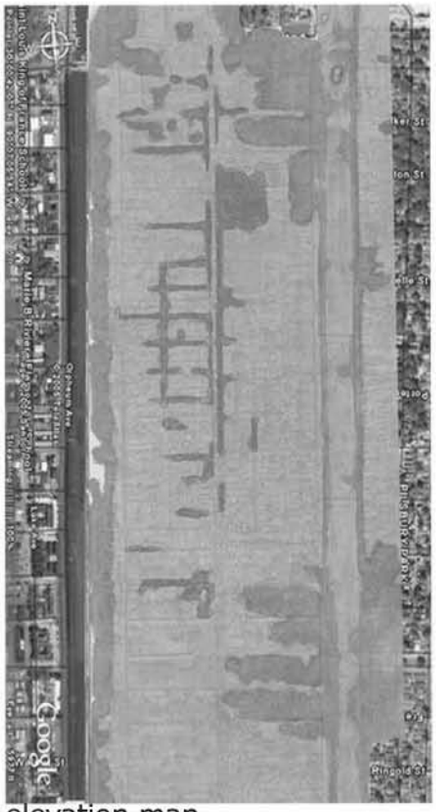
Scale 1"= 100'

Mark Boudreaux

regional map: new orleans, louisiana
site: lakeview, metarie

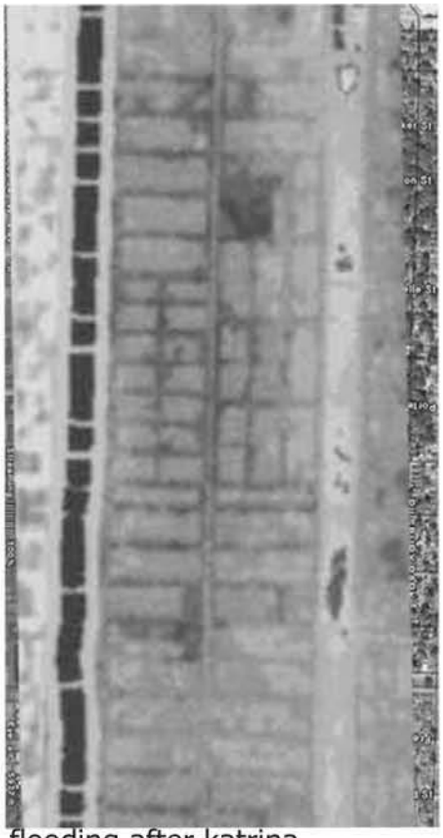
existing infrastructure

this area was completely flooded after hurricane katrina. i wanted to create a non-structural flood control system within the area to alleviate flood water and allow residents to move back into the community. this design proposal will hopefully serve as a precedent model for the parts of the region that are adjacent to the levees and canals.



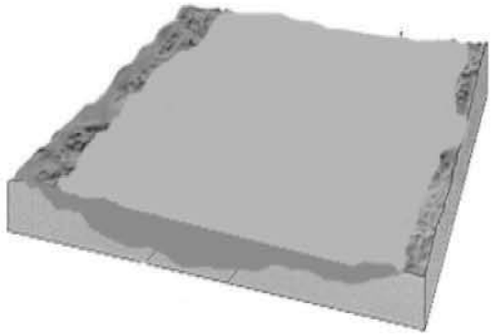
elevation map

-8 +
-8--6
-6--4
-4--2



flooding after katrina

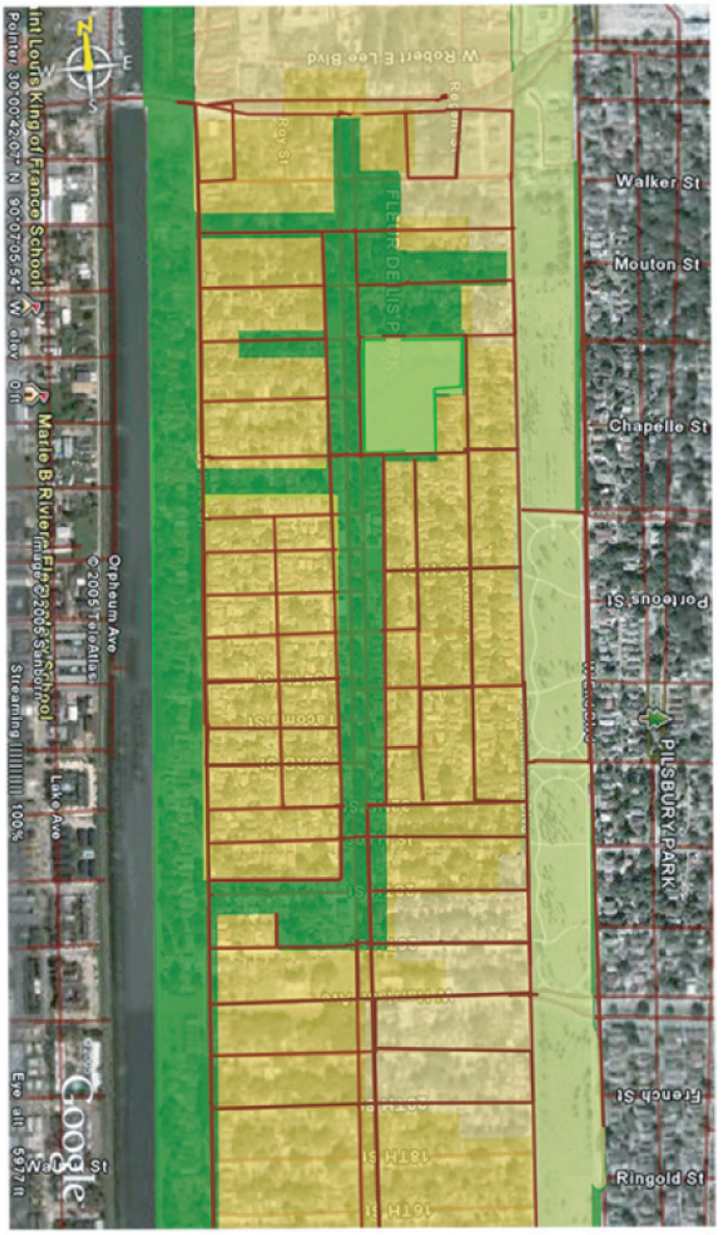
2.1-3
3.1-4
4.1-5
5.1-6
6.1-7
7.1-8
8.1-9
10+



Laura Bellone

precedent: the neighboring canal has a greenspace buffer on either side of the canal before the building of commercial or residential areas begin.

greenspace next to the levee with a berm creating a non-structural flood control system

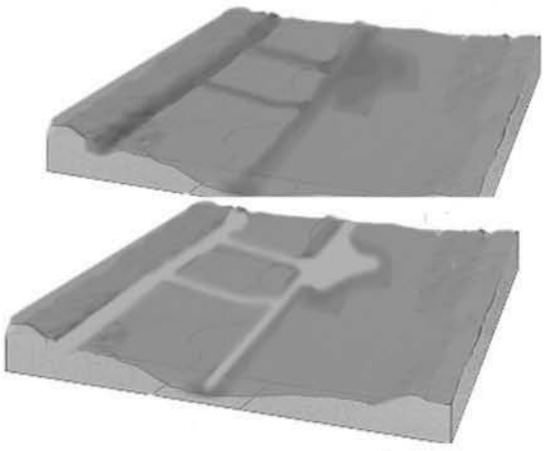


master plan

green represents parks/ flood contro
light green existing park and greenspacel
yellow represents zone1 of residential
light yellow represents zone 2 of residential

option 1 excavate area adjacent to the levee and fill lower elevation residential areas. this excavated area will be park space and serve as a buffer in times of flooding. the park will is a designated detention area.

option 2 create a berm on the residential side of the park to slow the flow of water in times of flooding. the lowest elevations will be turned into park/ greenspace within the residential areas.



zoning: the majority of the site is zoned for major flooding. in order to move back into the area residents must meet the requirements set by the state and fema. houses will be raised ten feet in the darker shaded zone and lighter zone will be six feet high.

Laura Bellone

New Orleans

site data

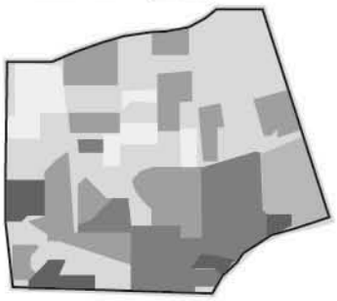
Gentilly, Louisiana

Why Gentilly?

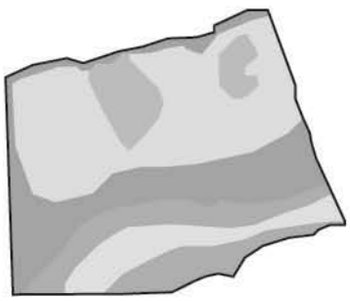
The area of Gentilly was greatly effected by Katrina and below are reasons why this area was studied and redesigned

- area of middle to lower class residents who lost nearly everything they own
- entire area received flooding, most places severe flooding
- lacks park system, use this as an opportunity to develop one
- residents need second barrier against another potential breach
- infrastructure needs organization and improvement
- communities need to be reconnected to surrounding communities
- fill in the gaps created be deserting residents
- give future residents reason to move/build in gentilly

An arial view of the Gentilly area shows how dense the population is there and the lack of a public park system



This is a poverty map, the darker areas are areas of more people that live beyond the poverty threshold. Large areas of gentilly lived in the poverty threshold and need financial assistance for the future



This is a flood water depth map. The light blue colors were areas with little or no water. The orange areas were the areas with the deepest waters, and the green and yellow were those in between

Overlay Maps
No Scale

Filling in the Gaps

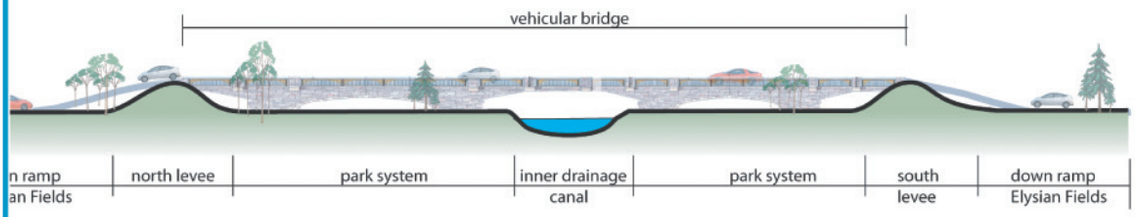
Diagram showing people that get displaced by the construction will be paid to fill in the gaps of the surrounding neighborhoods

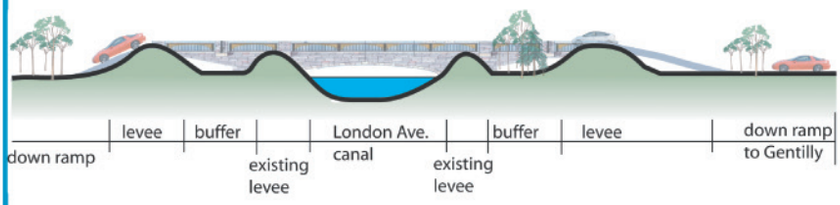
Pre-construction

Post-construction with people moved into vacant lots

Illustrative Plan

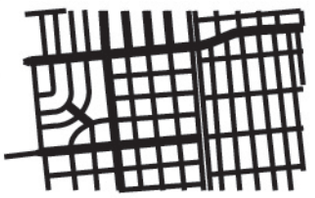
The illustrative plan shown on the right shows the park systems proposed in the Gentilly area. The double system of levees serves as extra protection from future storms as well as a recreational coridor. A small pumping station and research center can serve as additional resources to the area





The above sections show how the double levee system would operate in this area. A bridge would span across and allow pedestrian traffic to flow freely under them

The diagram to the rigth outlines the way roads were taken out but main circulation was not disrupted and the main throughways are still connected

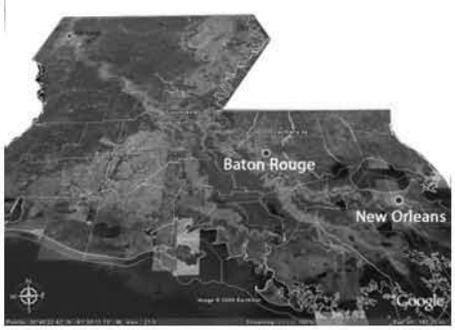


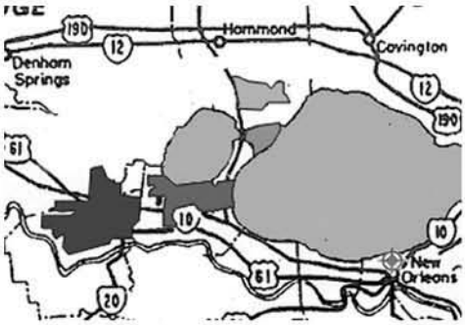
Shaun Hebert
LA 5001

New Orleans

analysis

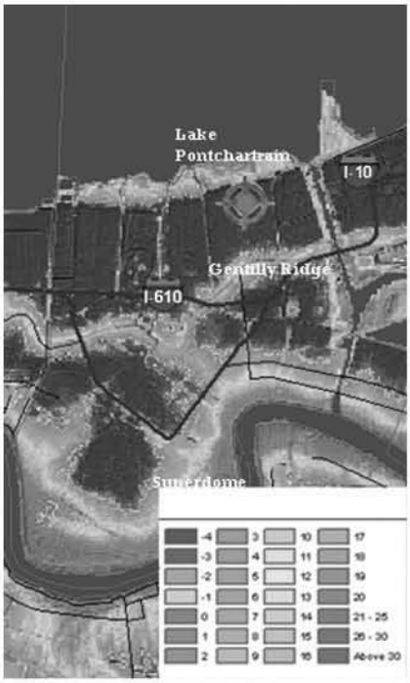
Site Location

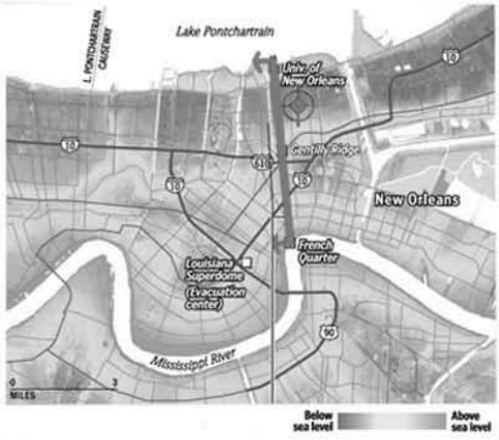


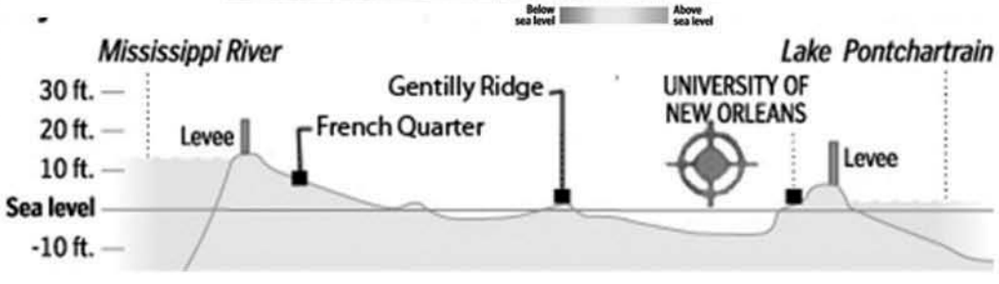


•My site in New Orleans is located South of the University of New Orleans, west of London St. Canal, east of Industrial Canal and north of Gentilly Ridge.

Existing elevations with site section







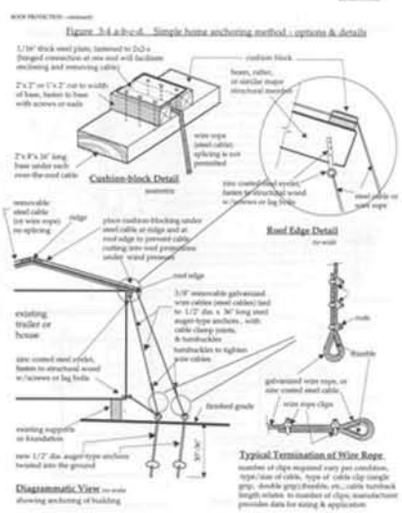
Precedent

Concrete residential structure

Only home among a row of houses that survived Hurricane Hugo, NC.

- **14" piles**
- **Bottom of support beam at 15'**
- **Pilings 22 plus feet**

Hurricane proof Roof



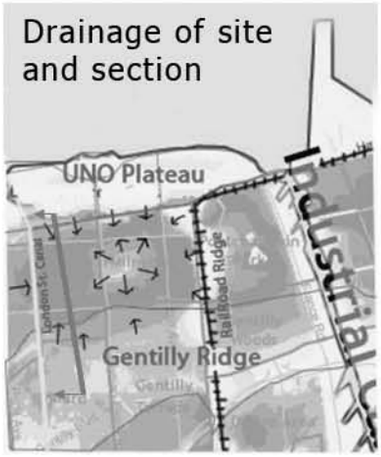
Pile supported wooden frame structure

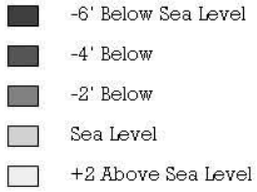
- **Class B piles with ¾" steel bracings**
- **Hurricane clips**

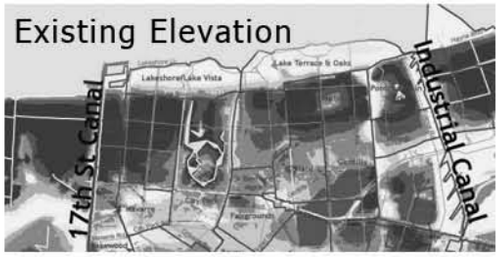
Redevelopment

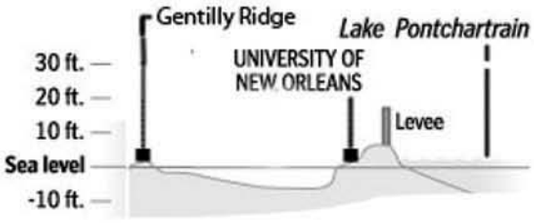
- All Structures must be risen at least 10-15 feet above ground level
- Residential must have higher density housing along the higher ground. Creating a stronger more uniformed structure.
- Housing in lowest areas must be risen to correct heights with correctly installed hurricane clips and foundations must be connected properly to prevent floating.

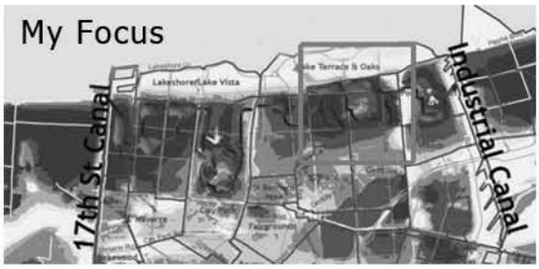
New Orleans











Existing Elevation with proposed bayou system

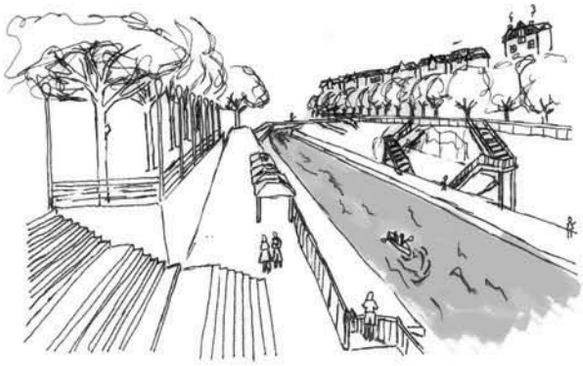
Main road structure

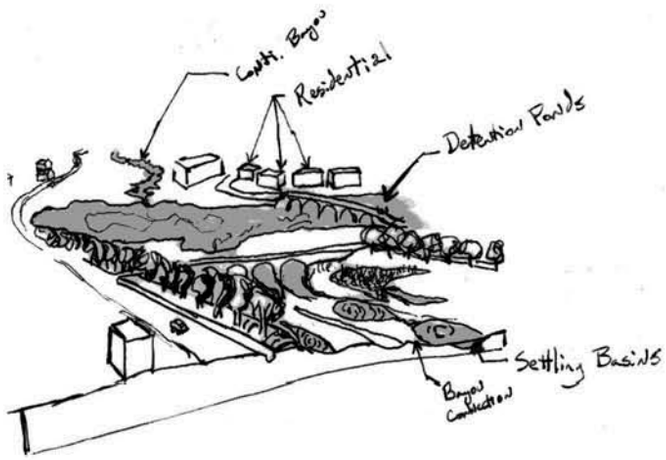
site analysis

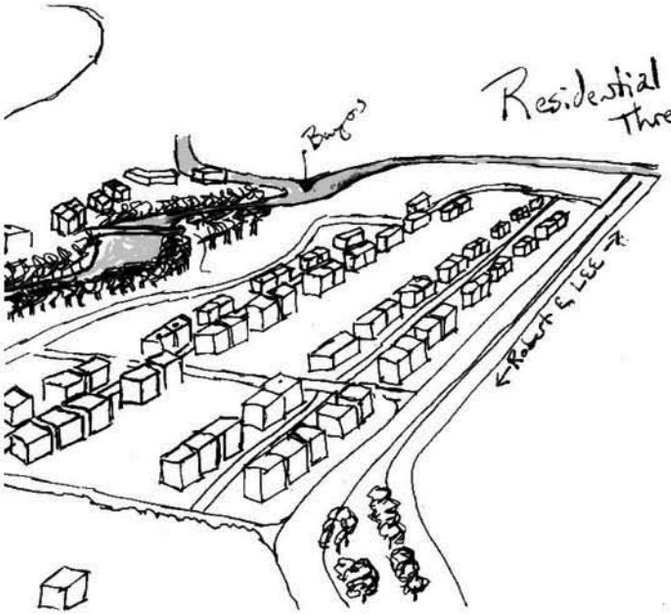
Main Canals

N

This project creates a place that manages the impact of flooding protecting its people and assets from random acts of nature.







Each individual pocket or each low lying section of New Orleans should be self sufficient in relation to its drainage issues.

By collecting and slowing the drainae allowing for ground water penetration while slowing surface water to create less impact on the pumps at one time.

RE-DEVELOPING NEW ORLEANS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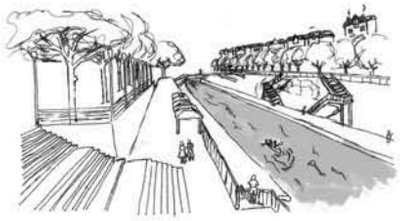
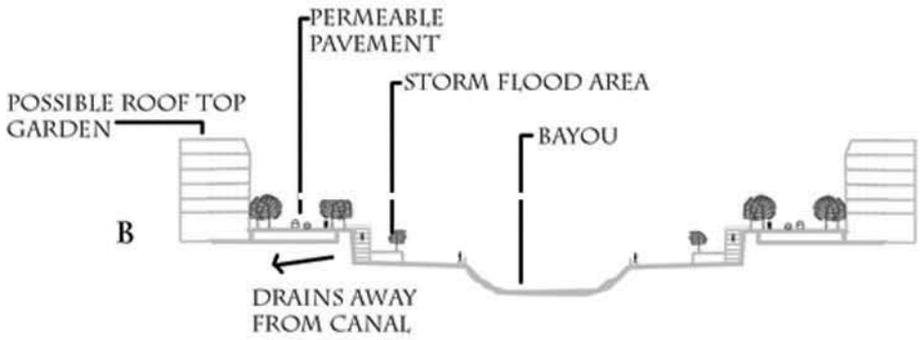
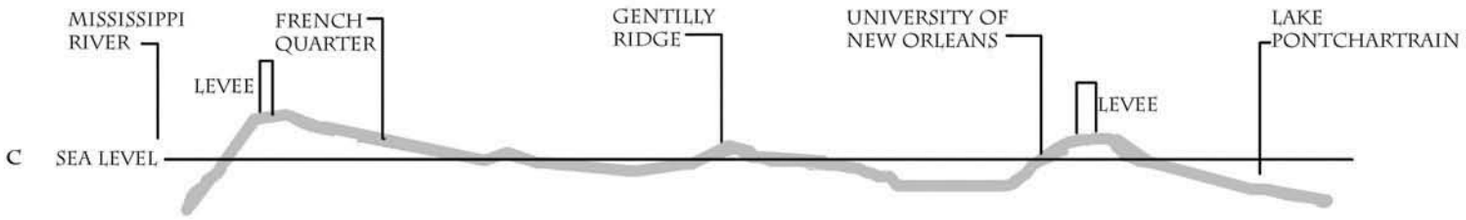
UNO ARENA
RAILROAD RIDGE
INDUSTRIAL CANAL
WETLAND CLEANSING AREA
WETLAND
GENTILLY RIDGE
0
500
1000
1500
2000
2500
Feet

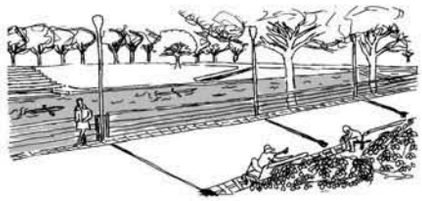
New Orleans

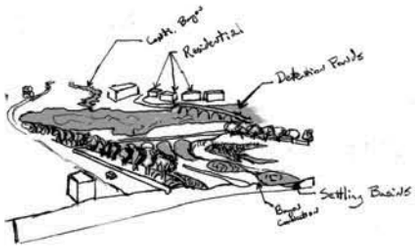
Sections

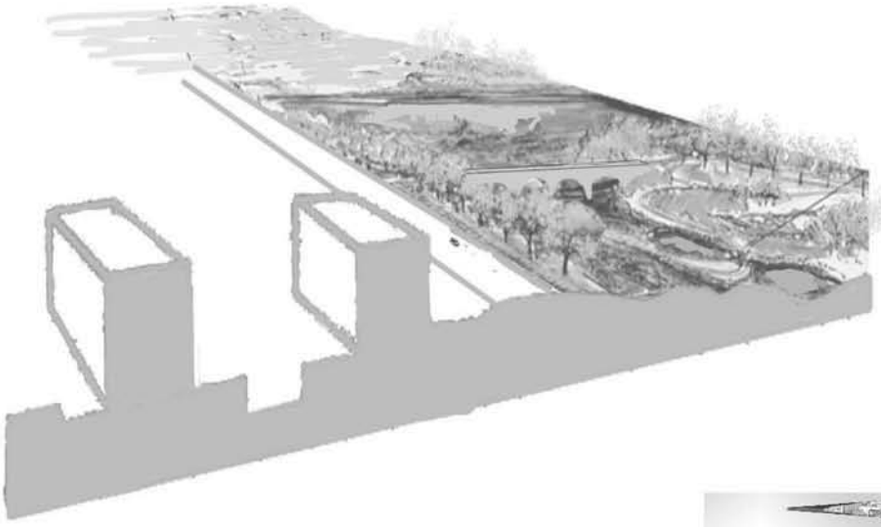












This tilt up focuses on improving drainage quality through the creation of winding paths and wetland habitats. While also moderating the time required for storm water to reach the canals as a flood control measure, addressing water overflow at the source slowing it and cleansing it before it reaches Lake Pontchartrain.

Industrial Canal New Orleans

position

An integration of temporary housing coummunities and storm debris reuse, our project proposes infrastructure that facilitates flooding and provides connections from communities to open space along the Industrial Canal.

program:

connections to, mississippi river, lake pontchartrain, rail, interstate

above sea level

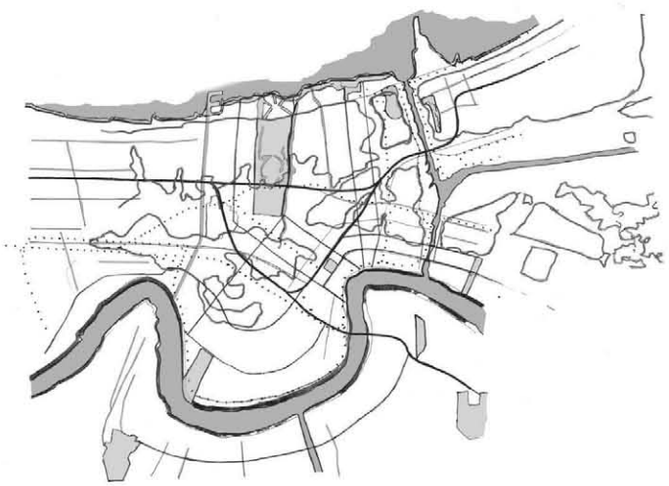
site of abandoned industries

connected open spaces

adjacent communities destroyed or below sea level

within orleans parish

near an area that ship or recieve storm debris



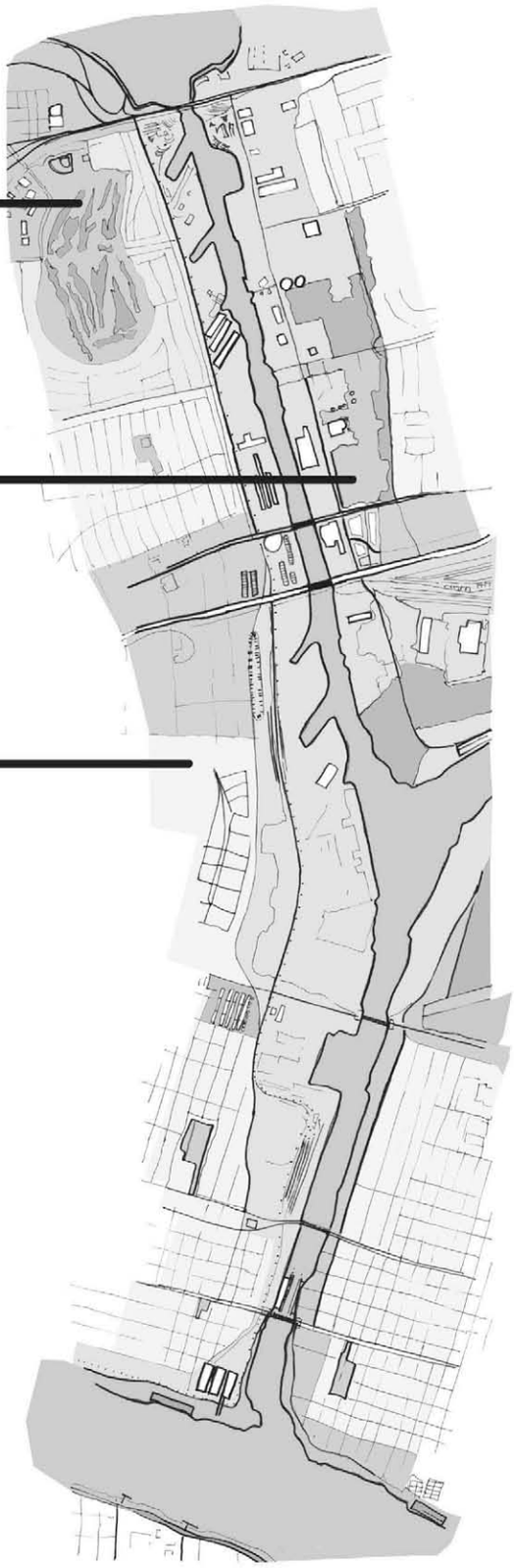
regional map of new orleans

site selection along nothern end of the industrial canal fit the choosen program

golf course open space
frames ponchartrain park:
a middle class african american
community

Luzianne / Proctor and Gamble coffee and tea
connect to a large open space
that could eaislybe integrated
into a pedestrian community.

port of New Orleans
dense industrial wharfs and
active shipping make connections
difficult.



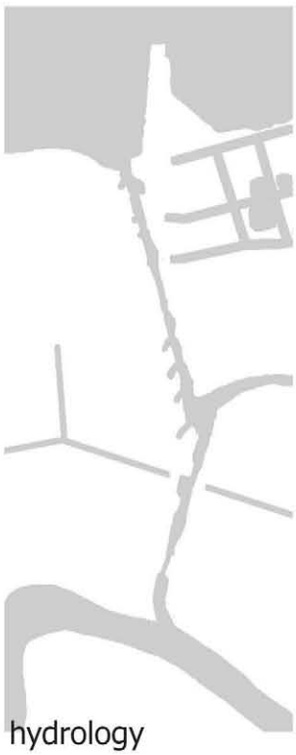
existing landuse

land use along the canal varys,
while some areas are still
active, other areas have been
abandoned or are open spaces
that lend to reuse.

Dan Spiller Daniel Boutte

elevation

soils



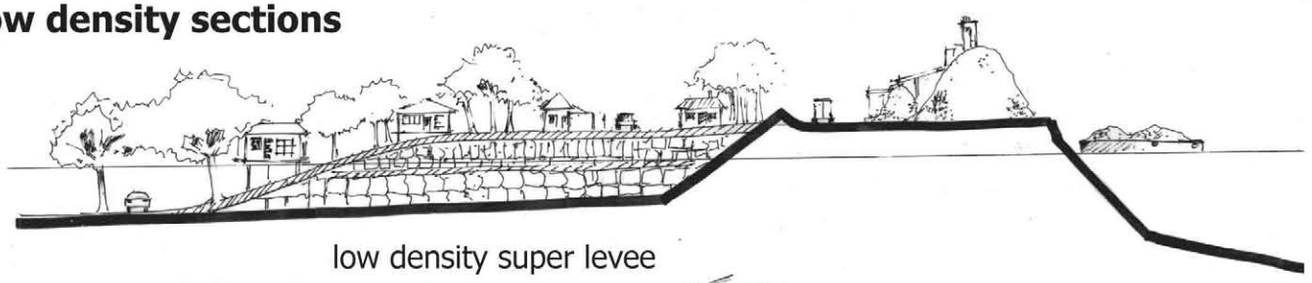
hydrology

community

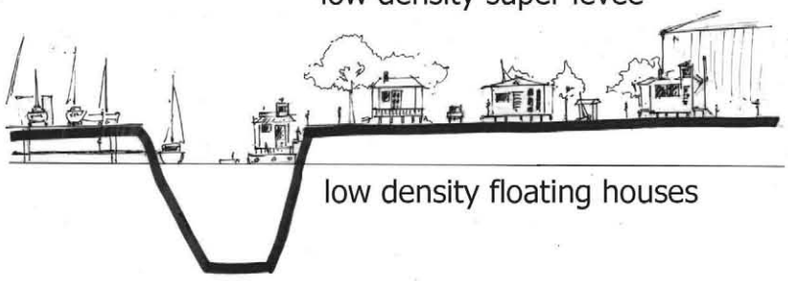
transportation

The canal has caused a rift between communities, transportation (vehicular and pedestrian), hydrology, and soils

low density sections



low density super levee



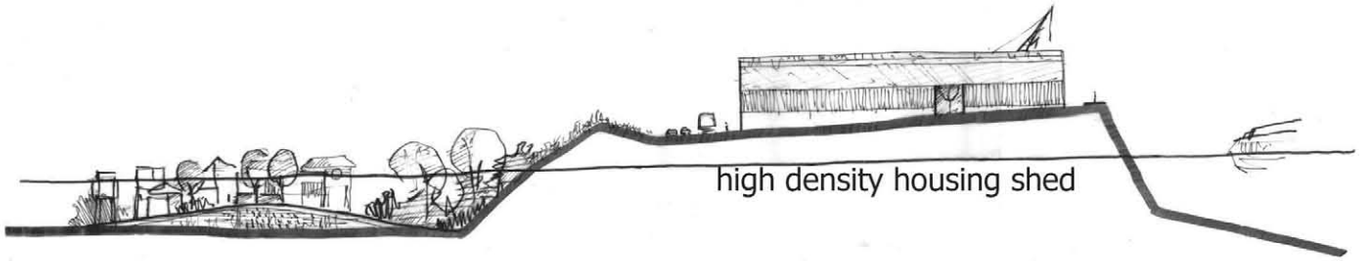
low density floating houses

low density:

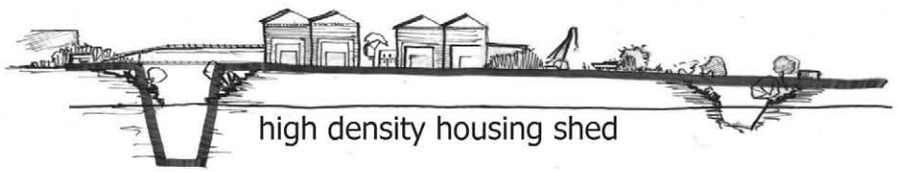
- super levee made of structural fill- consists of crushed cars and white goods
- floating homes on inlets embrace new orleans connection to the water and rise with floods
- stilled homes in lower elevations reflect vernacular southern louisiana architecture.

high density:

- abandoned industrial sheds serve as temporary housing structures
- pedestrian focused, existing rail, water taxi and proposed paths provide alternate tranportation
- secondary levees of structural fill create temporary detention for flooding.



high density housing shed



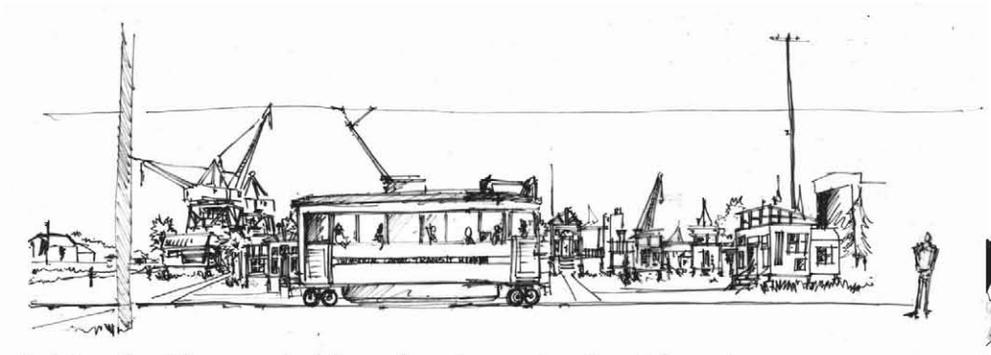
high density housing shed

high density sections

sections

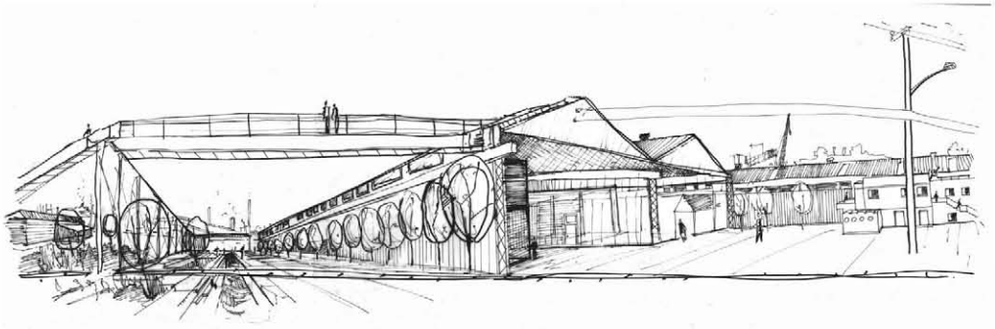
Dan Spiller Daniel Boutte

low density sketches

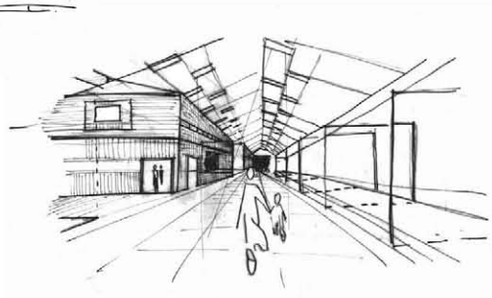


light rail with recycled low density water front housing

stilted housing



detention channel with pedestrian bridge connecting temporary housing sheds to canal open spaces

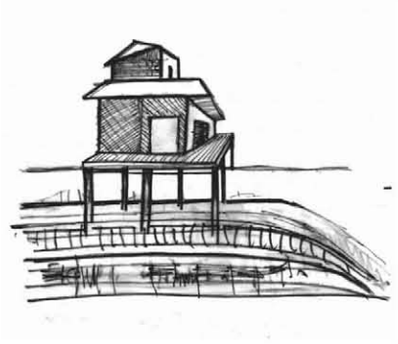


view through shed

high density sketches

diagrams

pedestrian pull



debris reuse

above grade
shingles, slate roof pannels, wood above water level, brick, CMU's, concrete and metals

below grade
compacted cars, white-goods, clay fill, non- organics

view through clearing along pedestrian path to bridge

project statement
housing communities provide an image of return to living and a cultural response to environmental issues facing redevelopment.

conclusion

Rebuilding New Orleans

analysis

Dawson Ellis

Area of Concern:

-The area is south of Lake Pontratrain, north Gentilly Ridge, east of the 17th Street Canal, west of Interstate 510.

-This area received some of the deepest water, with major destruction from flood ing from Hurricane Katrina.

Should this area be rebuilt ?

-The elevation ranges from 3 - 12 feet below sea level.

-The levee's will be rebuilt to category 3 and not category 5

-New Orleans is sinking at a average rate of 3 feet per century.

-Residents will most likely not return to this area

-If people will move back , there will be the fear of levee breaches happening again.

-Rebuilding levee's to category 5 will take a estimated 20-30 years.

-The city is changed, the population will not be the same for years to come.

-Is it economically feasible to rebuild this area to just let it be flooded again if New Orleans suffers a hit from another hurricane.

-New Orleans is hit by a hurricane every 3 years, and has a near direct hit every 10 years.

-This land is very vulnerable unless USACE does any upgrades on the levees.

Depths of Flooding:

-Drastic measures must be put into place to provide a save environment of living for people in this area.

- **>10'**
- **8.1-10**
- **6.1-8**
- **5.1-6**
- **4.1-5**
- **3.1-4**
- **2.1-3**

National Flood Insurance Program

For all new and substantially improved build ings in A Zones:

-All new construction and substantial improvements of residential buildings must have the lowest floor (including basement) elevated to or above the BFE.

-All new construction and substantial im provements of non-residential buildings must either have the lowest floor (including basement) elevated to or above the BFE or dry-floodproofed to the BFE. Dry floodproofing means that the building must be designed and constructed to be watertight, substantially impermeable to floodwaters.

-Buildings can be elevated to or above the BFE using fill, or they can be elevated on ex tended foundation walls or other enclo sure walls, on piles, or on columns.

FEMA's role is to provide technical assistance and to monitor communities for compliance with the minimum NFIP criteria. If communities do not adequately enforce their floodplain management regulations, they can be placed on probation and potentially suspended from the Program following probation.

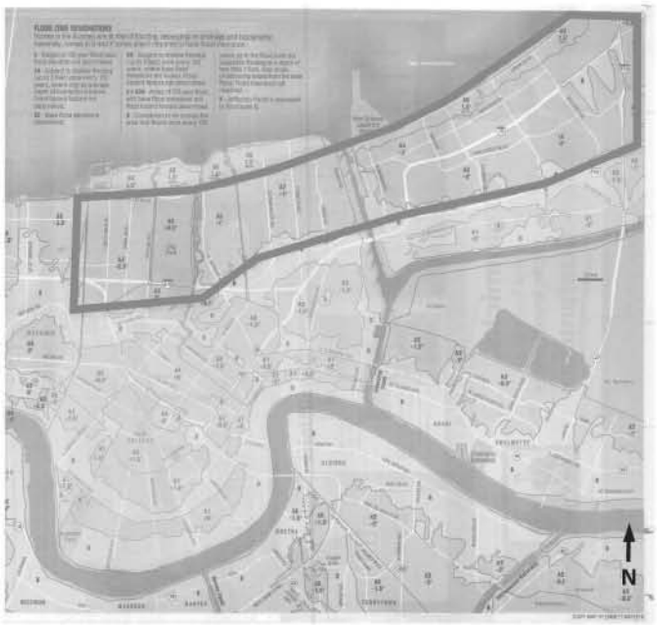
Following major flood disasters, FEMA staff work closely with communities in providing technical assistance on the NFIP floodplain management requirements, particularly the substantial damage requirement, and on developing a reconstruction strategy for property impacted by floods to determine appropriate mitigation measures, such as **elevation, acquisition, or relocation of flood-damaged structures.**

Insurance BFE map

-Area returned to natural process of flooding and re-flooding.
-Area within 100 year flood.

-Area that should be allowed to rebuild

This insurance map shows the different Base Flood Elevations for the different areas. New Base elevation maps that take into account Katrina's flooding aren't expected for at least another 2 years.



Dawson Ellis

Rebuilding New Orleans

analysis

Dawson Ellis

House with major structural damage, potential candidate for demolition

House believed to have partial structural damage, permits required before work can be done.

House OK, owners may make any repairs without special approval.

In response to flood hazards, FEMA's primary emphasis is on non-structural hazard mitigation measures. **Nonstructural measures include the acquisition and demolition, relocation, elevation, or flood proofing of flood-damaged or flood-prone properties.**

Considering that no green is within red lines, then no rebuilding should occur in this area. A different plan for rebuilding New Orleans should be considered.

This area calls for a more drastic plan considering all the challenging issues involved in this area.

What should happen in this area:

-In 1878, the town settled on the high ground and did not settle in the low wet areas.

-Since this area suffered major destruction, is sinking at a alarming rate, is not protected from future storms, will not be protected for the nest 20 years until levee improvements are established, then the land should be returned to its natural wet state.

-This area can be flooded as many times a year, **possibly** via the Industrial Canal with the muddy waters of the Missis sippi river to rebuild the land.

-After 20 years of sediment deposits, this area can act as a super levee, and allow a safer development area for New Or leans.

The flood in this area left silt everywhere, which shows the natural build up of land after flooding.

Process of flooding:

-Water from the Mississippi can enter these three sites and deposit its silt.

-City park will be left alone except for a canal to get flood waters towards the 17th street canal area.

-After flood waters have deposited there silt, the clean water will exit into Lake Pontchartrain.

-The silt left behind can be bulldozed to the red lines to help add height to the levee's for the next flood from the In dustrial Canal.

- After years of Flooding, the elevation of the land will rise. This new land will be a super levee for the city.

Dawson Ellis

Rebuilding New Orleans

proposal

Dawson Ellis

17th Street Canal Levee Breach

Lake View and West End Area:

-Flooding of this area can provide land for future use

-Minor levee buildup will have to be constructed to allow for flooding to begin along HWY 610, to begin initial flooding. Cost should be minimal to begin this flooding process.

-As sediment starts to build up, this can be used to raise the levees near the red lines.

-New development can be built once elevation is safe.

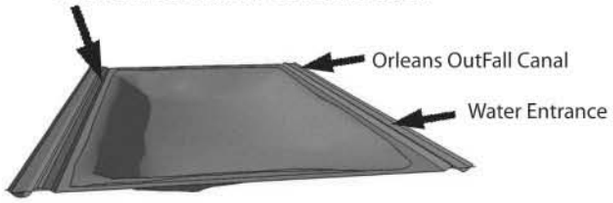
-New technology can be used to help keep silt in this area. Such as silt fabric, silt traps, and also dredging of lake Pon tchartrain to add to the silt buildup.

Crevasse splay:
Crevasse splay at Bry ants Creek MO cross ing floodplain of upper Mississippi River

Flooding Process:

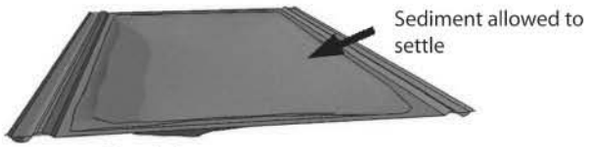
-Silt water from the Mississippi River is allowed to enter the site to flood at certain depth.

17th Street Canal Levee Breach



Empty Basin

-Silt water will remain in site to allow the sediment to settle and begin the land building process. This will be repeated as many times a year as possible



Flooded

-The sediment will be left behind, which can be used for building new levee's around this area so that flooding can continue.

Drained with Sediment Load

Elevation Map

-8′ and below
-6′
-4′
-2′
Sea Level and Above

Land Use Map

Single Family
Multi Family
Commercial
Parks
Church
Schools

% Of Slab Foundations

90%
70%
50%
30%
10%

Subdivision Development Timeline

1880 City Park Starts Const.
1912 Navarre
1926 Lakeview
1927 City Park Addition
1930 Lakewood
1930 Lakeshore
1938 Lakevista
1949 Canal filled
1960 West End




proposal

This project is designed to help New Orleans with the flood problem during a hurricane. The idea is when the water in the 17th street and Orleans Outfall canals get too high they overflow into a drainage basin. This prevents the pressure of the water breaking the levees and collects water that would overtop levees. The water would first drain into a basin between the two canals in Lakeview. Analysis shown on the left were done to chose the best area for retaining water. The area chosen was the best area for a drainage basin because it:

- -Is the lowest land in the area at -8 below sea level
- -Effects the least amount of people with only single family housing and no schools or churches
- -Has the most slab foundations so will cost the most to elevate
- -Was the last area developed so has the least historic value

If the flood is severe and the basin is filled, the water will then drain into the 2nd drainage basin in northern City Park. The natural leve from the bayou on the east and the high areas in the south side give the outer perimiter of the park a 10' higher elevation than the center and west side of City Park. This gives City Park an enormous amout of potential for retaining water.

Levee Drainage Retention Area

Water Retention Areas

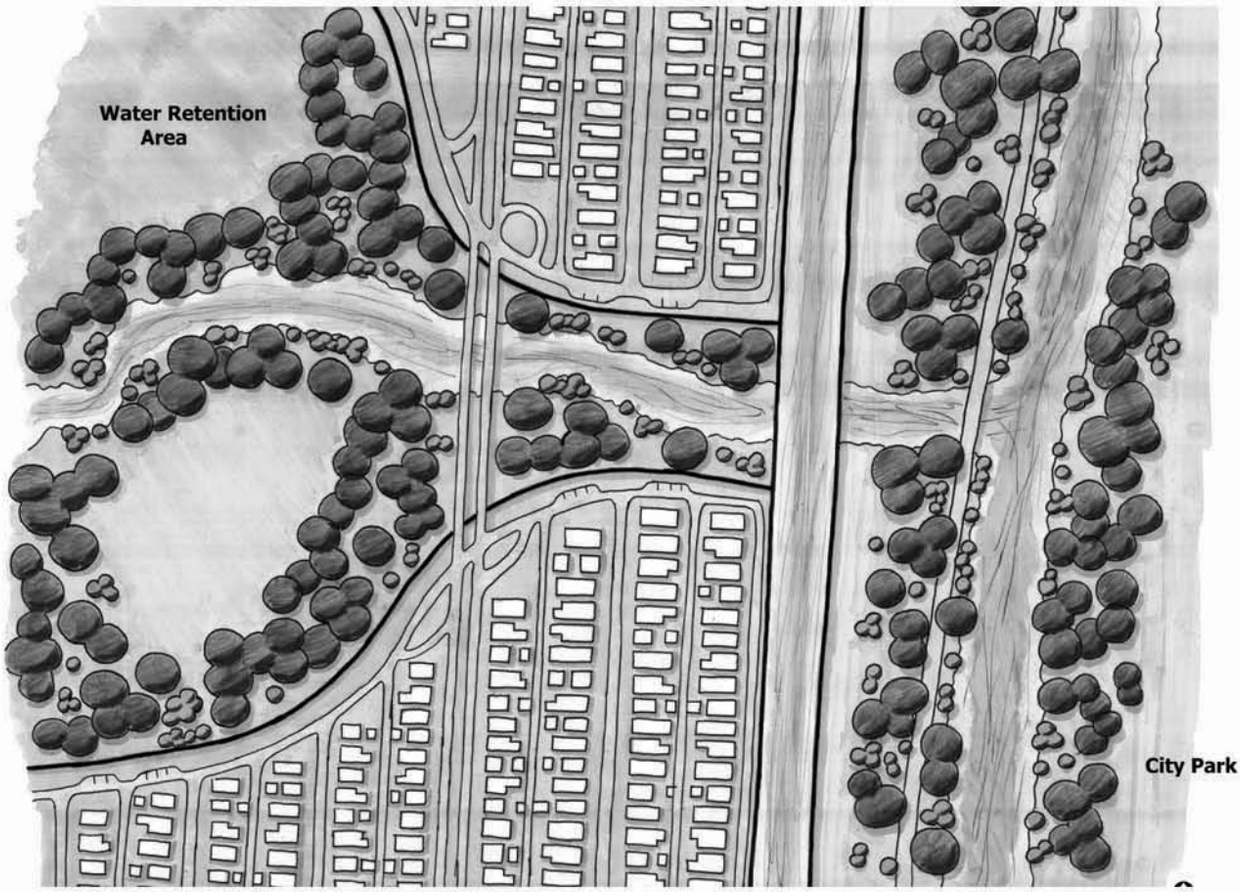
Water Retention Walls

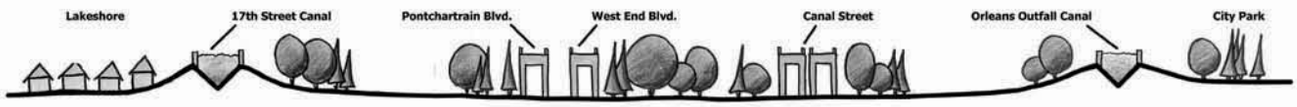
Roads

Interstate

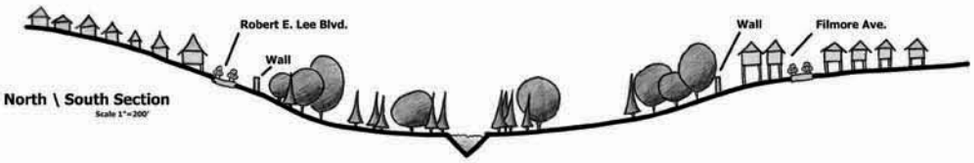
Section Lines

Damon Landers



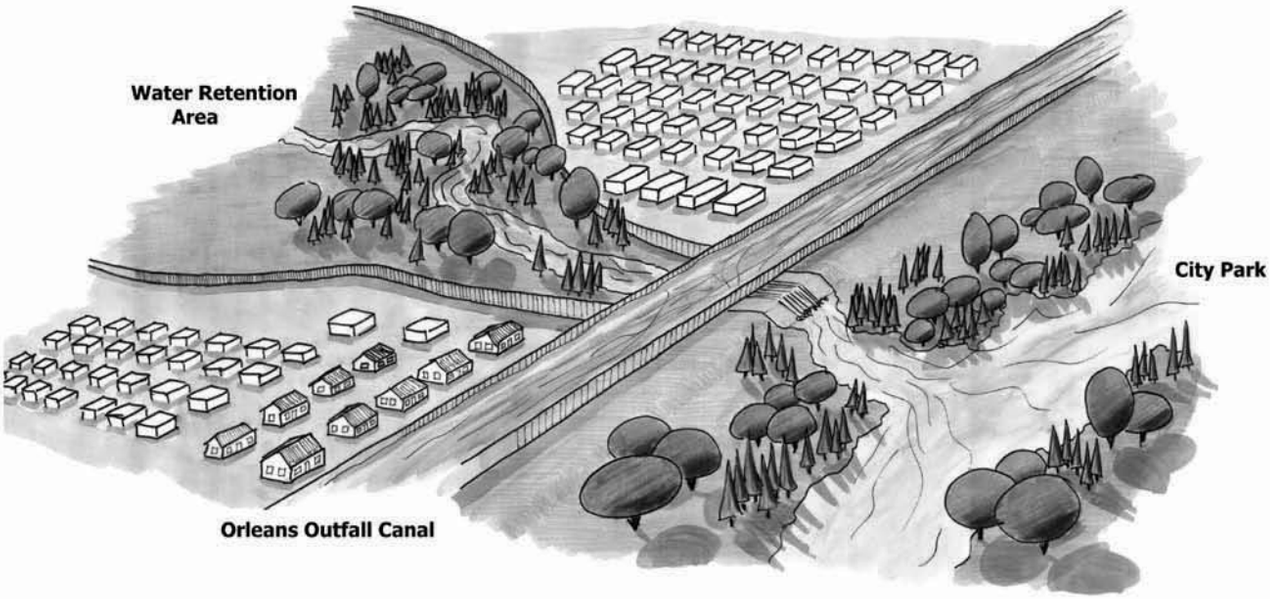


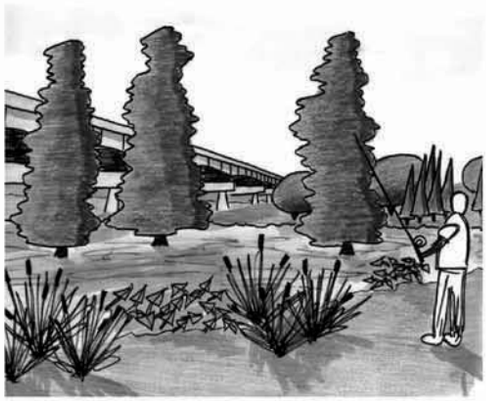
East \ West Section
Not To Scale

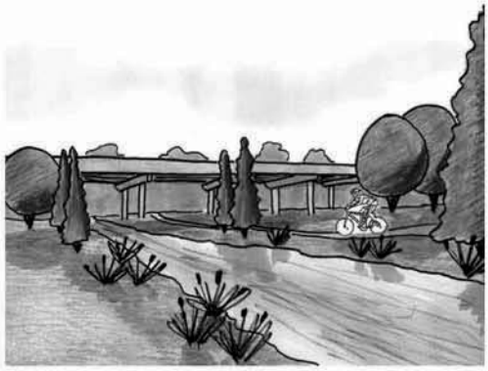


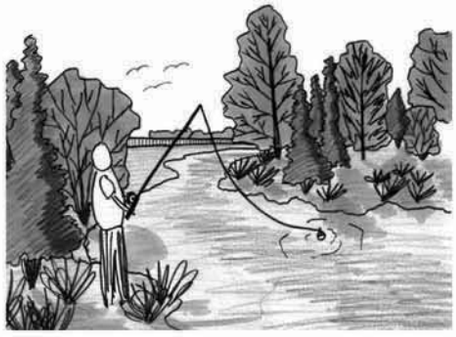
North \ South Section
Scale 1"=200'

proposal





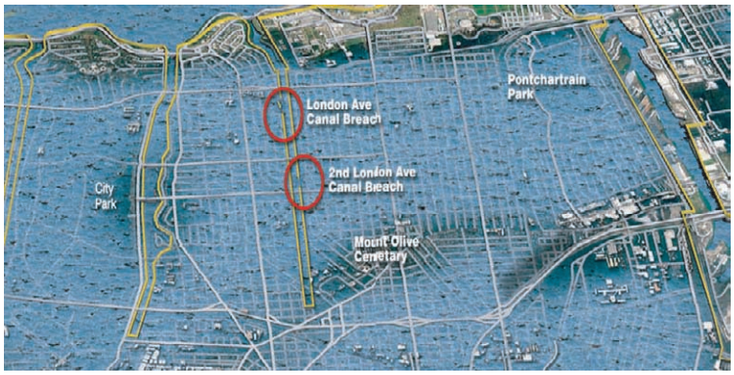




Damon Landers

New Orleans

analysis



After hurricane Katrina

The breach of London Ave Canal, 2nd London Ave Canal cause flooding of houses and business. All the homes are flooded 8-12 ft. of water. Today all home in the area are uninhabitable to live in since the flood.

The site is located between City Park and Joseph M Bartholomew Golf CC. Bayou St. John and London Aavenue Outfall Canal cut through the site.

Pockets of green spaces are located throughout the site. These green spaces are located in parks, schools, private properties and along boulevards. These green spaces can be use as wetlands, retention ponds and recreational areas.

The idea is to creat a wetland system that connect City park and golf course. These systems reduce flooding and surface runoff, store storm water and mitigate. These system of wetland improve flood and also bring back the natural wetland that New Orleans is built on.

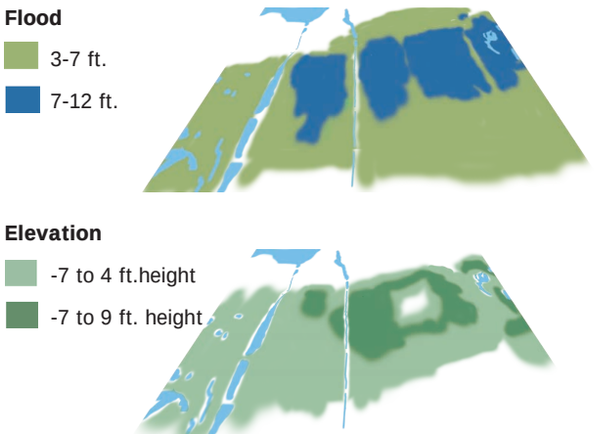
baseball fields

golf course

boulevard

parks

The use of flood and elevation maps is to determine the wetland, low and high density area in the site. The over laying of flood and elevation map, the areas that have the worst flooding and areas with lowest elevation is going to be wetlands. All the other areas are going to be mix us of developments and green spaces.



To prevent future flood, block the flow of water in London Ave Canal to Lake Pontartrain would reduce the amount of water coming into the city.

Retention ponds located throughout the site would help to retain storm water. Each retention ponds would be connected each other allowing for overflow from one to the other. The pump systems locate in the main retention ponds going to pump into Lake Pontartrain to prevent over flow.

proposal of wetland

The role of wetland is to:

- •Store storm water
- •Mitigation
- •Reduce surface runoff
- •Recreation use
- •educational
- •Attract wildlife

The dark green represent wetlands. These wetland hold and mitigate storm water. The light green represent low density area containing green spaces and development. Homes built in these area is to be 6 feet above ground. The style of home is going to be parking below and living above.

Tien Vo

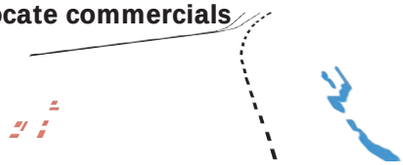
New Orleans

analysis

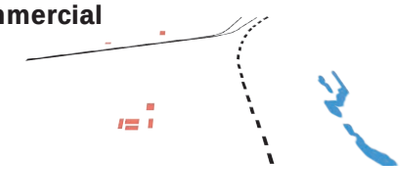
The site is located below UNO and left of Josephm M Bartholomen Golf CC.

After Katrina, these area flooded 6-12ft of water. Many residents and business did not come back to these area.

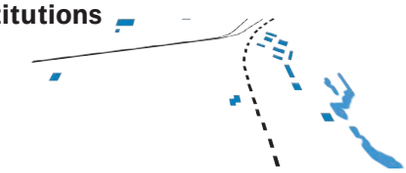
relocate commercials



commercial



institutions

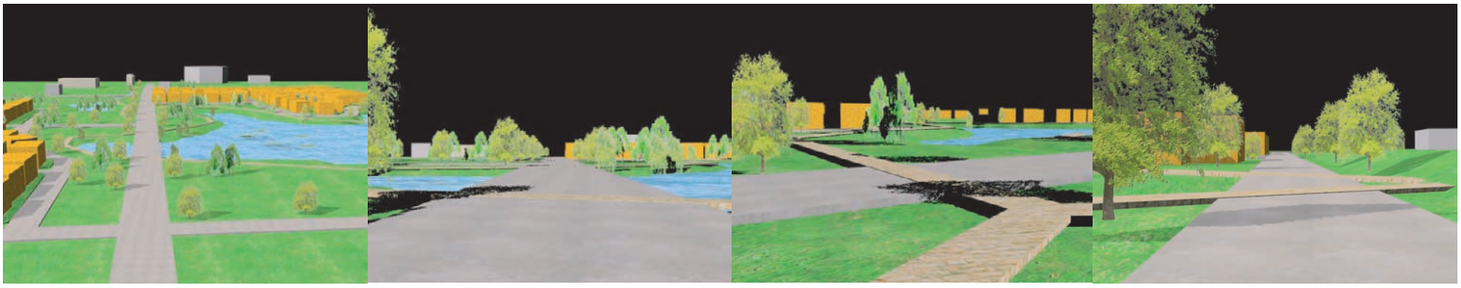


existing green spaces

UNO, SU, residents and golf course are connected by a sysem of wetland. The purpose of the wetland is to store and provide educational for the schools and residents in these area. Trails are located throughout the site provide access from UNO, SU and residents.

150'

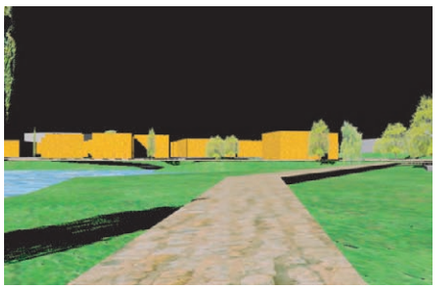
commercials
retention ponds
institutions
wetlands



Commercial locate along the intersection of Lafaye St. should be remove to Franklin Ave to accommodate the wetlands. At Frankin Ave there are land for bussiness to be relocated.

A public schools located on People Ave is not to be remove. The school can have access to the wetland and use the wetland for educational purpose.

This section show the relationship of the golf course, school, residents and wetland.

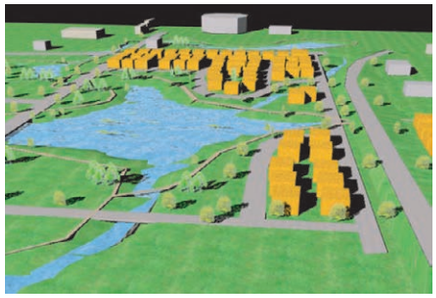


trails along the lake conect Lafaye St. and Poeple Ave.

The section show the relation of UNO, residents and retention ponds.

view along Lafaye St.

3D model show the layout of the wetlands, retentions ponds, roads, houses and trails in the site.



Tien Vo