Supplemental CSO Team – Session 6

PVSC Service Area
North Bergen MUA Service Area (Woodcliff Treatment Plant)
Long Term Control Plan

January 9, 2018

CLEAN WATERWAYS
Healthy Neighborhoods

Agenda

- Introduction and Recap
- Passaic Valley Regional Planning & Design Studio

  presented by: Dr. Wolfram Hoefer and David Smith

  Rutgers University, Department of Landscape Architecture
- PVSC and Rutgers Green Infrastructure Municipal Outreach and Technical Assistance Program

  presented by: Rosana Da Silva

  Program Associate, Rutgers Cooperative Extension Water Resources Program
- Questions
- Adjourn

CLEAN WATERWAYS
Healthy Neighborhoods

Introduction and Recap

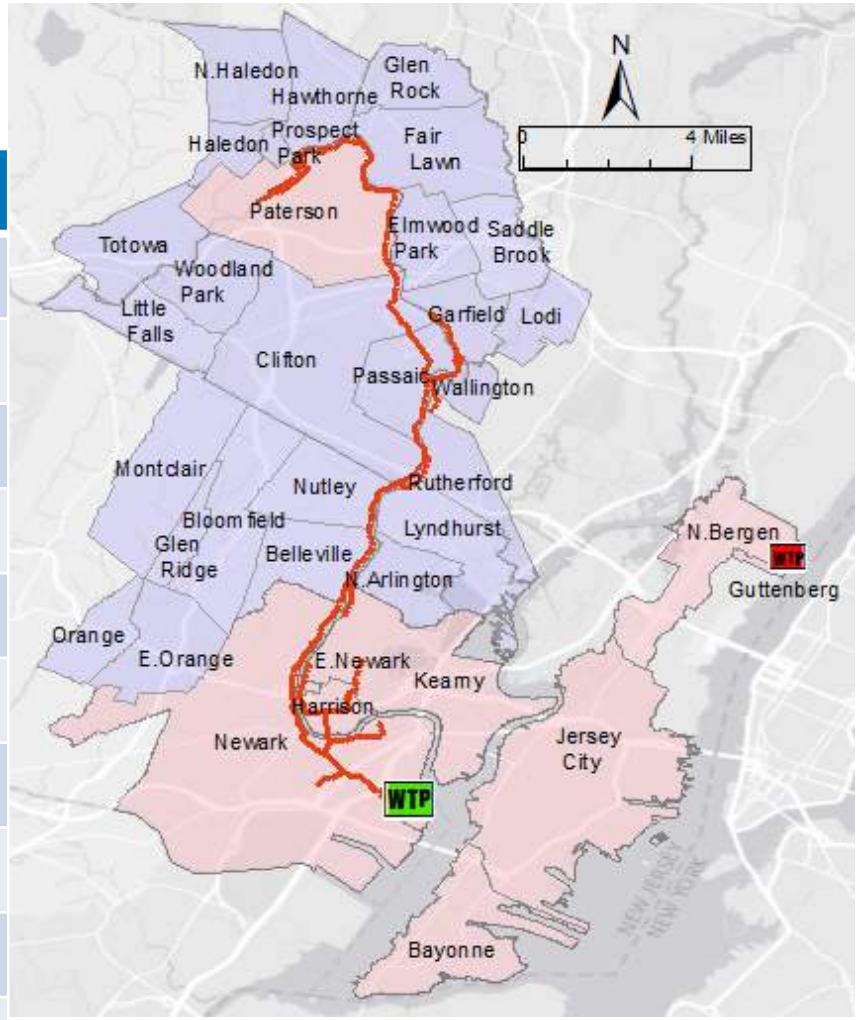
CLEAN WATERWAYS
Healthy Neighborhoods

Supplemental CSO Team Members

Member	Organization		Member	Organization
Matt Dorans	Bayonne Chamber of Commerce		Sandra Meola	Paterson Smart
David P. Donnelly	Jersey City Redevelopment Agency		Ruben Gomez	City of Paterson Economic Development
Nicole Miller	Newark DIG		Sheri Ferreira	Greater Paterson Chamber of Commerce
Drew Curtis	Ironbound Community Corporation		Betty Jane Boros	New Jersey Business & Industrial Association
Robin Dougherty	Newark Greater Conservancy/Newark Business Partnership		Debbie Mans	NY/NJ Baykeeper
Jorge Santos	Newark Community Economic Development Corporation		Meiyin Wu, Ph.D	Montclair State University - Passaic River Institute
Christopher Pianese	Township of North Bergen		Christopher C. Obropta, Ph.D	Rutgers University - Cooperative Extension Water Resources
Janet Castro	Hudson Regional Health Commission Town of North Bergen		Captain Bill Sheehan	Hackensack Riverkeeper
Thomas Stampe	North Bergen "Sustainable Jersey" group		Harvey Morginstin	Passaic River Boat Club & Passaic River Superfund CAG
Nancy Kontos	Bunker Hill Special Improvement District		Laurie Howard	Passaic River Coalition
Alison Cucco	Jersey City Environmental Commission		Ben Delisle	Passaic River Rowing Association

Permittees

Permittee	Municipality	WWTP	CSOs
Bayonne MUA	Bayonne	PVSC	30
Borough of East Newark	East Newark		1
Town of Harrison	Harrison		7
Jersey City MUA	Jersey City		21
Town of Kearny	Kearny		5
City of Newark	Newark		18
North Bergen MUA	North Bergen		7
City of Paterson	Paterson		23
PVSC	-		0
Town of Guttenberg	Guttenberg	Woodcliff	1
North Bergen MUA*	North Bergen		1
	Total		114



CLEAN WATERWAYS
Healthy Neighborhoods

** North Bergen MUA conveys flows to both PVSC and Woodcliff WWTPs*

59-Month Program Schedule and Milestones

Permit Effective Date
July 1st, 2015

January 1, 2016
- ✓ Coordinates of pumps, regulators, and outfalls
- ✓ System Characterization Work Plan
- ✓ Baseline Compliance Monitoring Program Work Plan

July 1, 2016
- ✓ Map of Combined and Separate Sewer Areas

Permit Due Date

July 1, 2018
- System Characterization Report
- Public Participation Process Report
- Compliance Monitoring Program Report
- Consideration of Sensitive Areas Plan

July 1, 2019
- Development and Evaluation of Alternatives Report

June 1, 2020
- Selection and Implementation of Alternatives Report in the Final LTCP

Overview of Current Activities

- CSO Monthly Discharge Monitoring Reporting (DMRs)
- Updating Hydrologic and Hydraulic Collection System Models
  - Models being turned over to permittees
- Performing Water Quality Monitoring and Model Development
- Analyzing Financial Capability
- Developing Public Outreach Materials
- Performing Infiltration and Inflow Analysis
- Proceeding on Two Green Infrastructure Pilot Projects

CLEAN WATERWAYS
Healthy Neighborhoods

Passaic Valley
Regional Planning & Design Studio

Fall 2017 Junior Studio Class

25 Students, 14 Weeks

Learning Goals:

- analyze ecological and other landscape processes
- craft designs that facilitate or enable desired ecological and social scenarios at multiple scales.
- understand and apply policies and planning recommendations communicate their designs and design principles.

Partner:

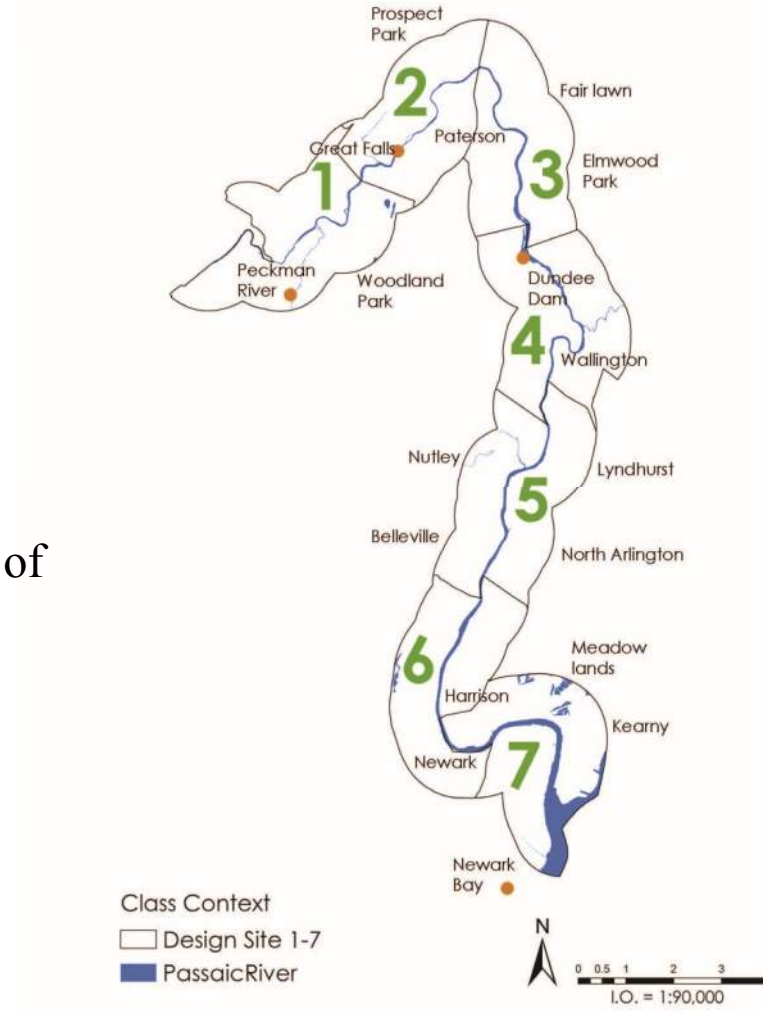
Passaic Valley Sewerage Commission

Project:

Passaic Valley Open Space System addressing flooding, reduction of storm water run-off, water pollution, and creating safe and easy access to the river.

Steps:

- Regional inventory
- Case Studies
- Master Planning (7 groups)
- Site Interventions (individual)



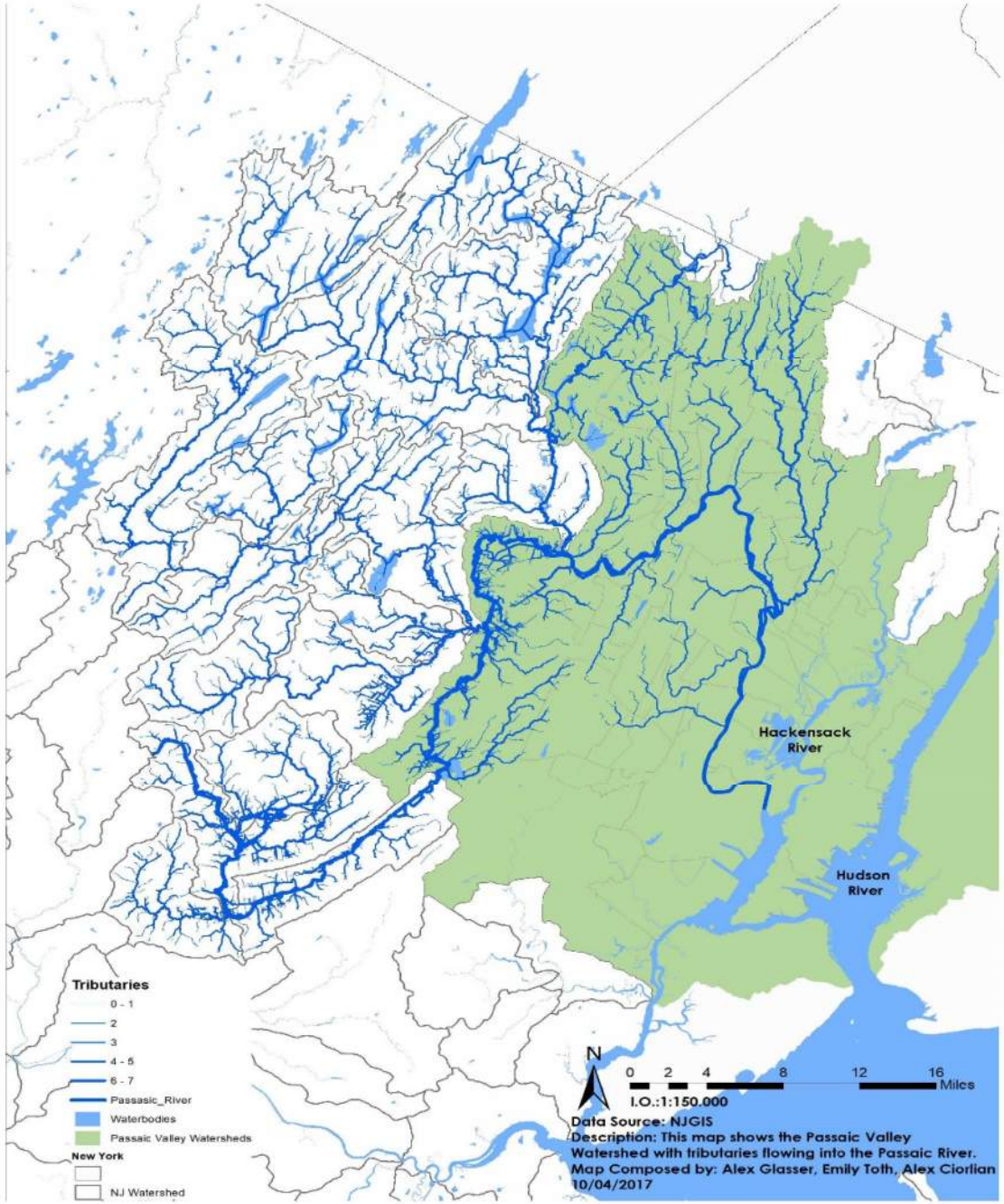
Inventory

2.1 Hydrology

By: Alex Corlian, Alex Glasser, Emily Toth

- The Passaic River (80 miles) has its source south of the Cushetunk Mountains,
- flows north and around the Watchung Mountain Range,
- drops 77ft at the Great Falls in Patterson,
- elevation gradually lowers as the river flows through Patterson, Newark,
- and then empties out into the Newark bay.

- Important factor for early European settlements and industrial development in northern New Jersey.
- However, the Passaic River is also a “victim” of heavy use and pollution.



2.2 Floodzones

By: Emily Otterbine, Wes Masco

Weather Events and Precipitation Amounts near the Passaic River
Group 8 - Climate

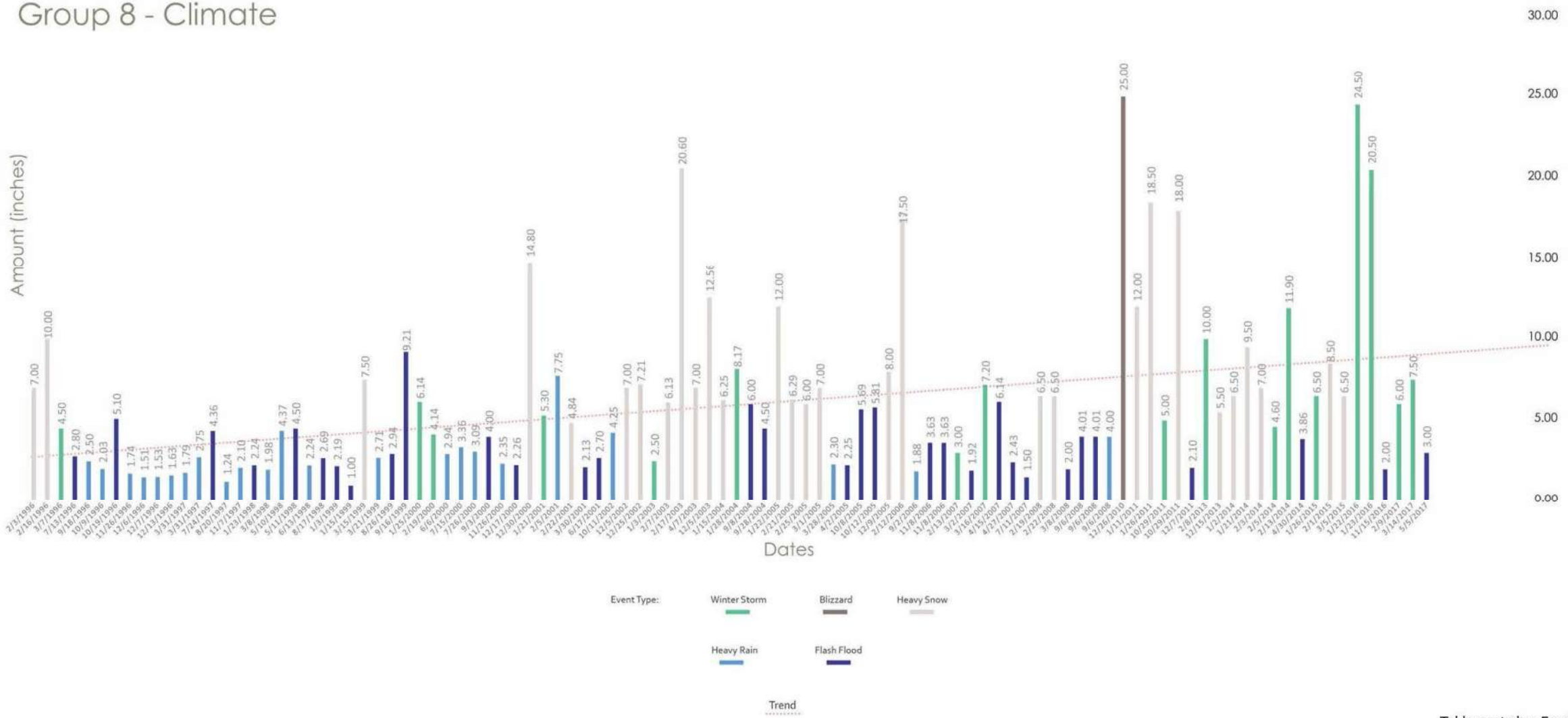
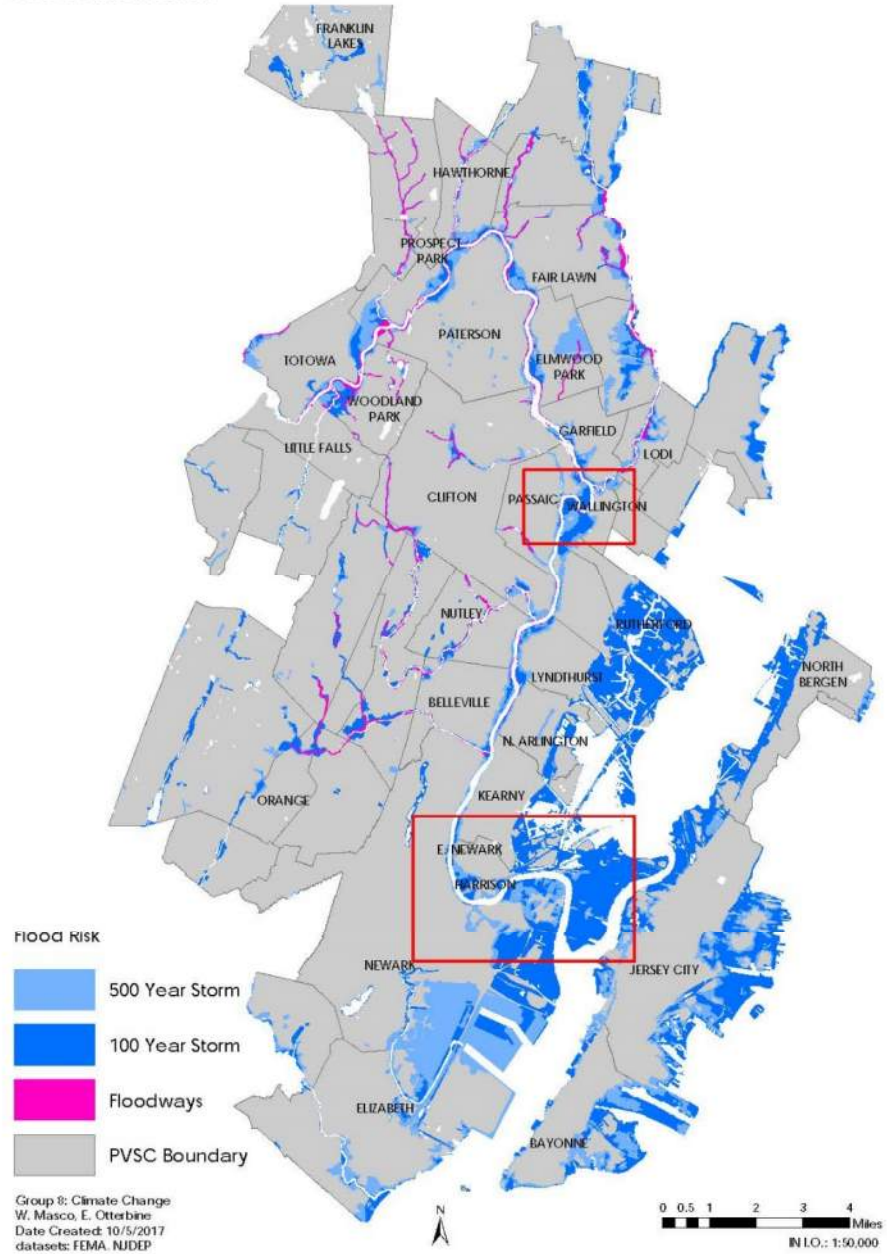


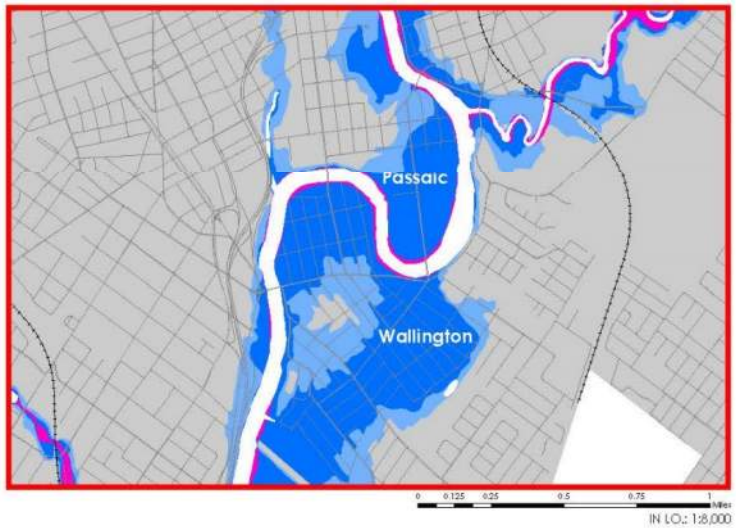
Table created on Excel 2016

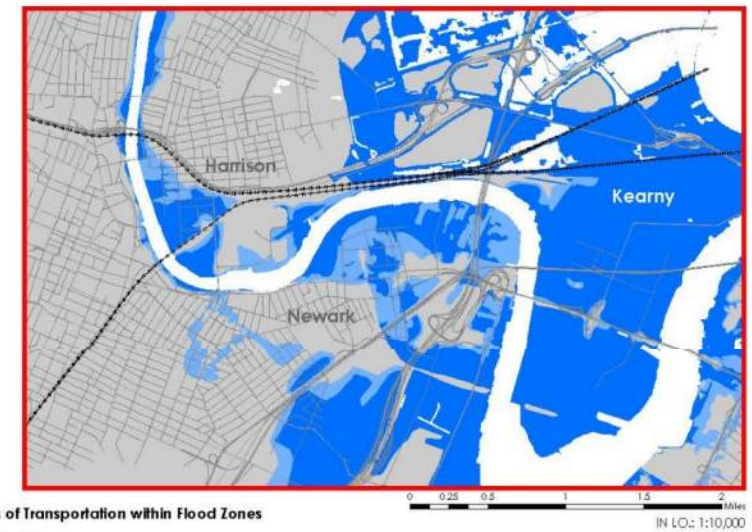
Flood Zones within
PVSC Jurisdiction



Group 8: Climate Change
W. Masco, E. Otterbine
Date Created: 10/5/2017
datasets: FEMA, NJDEP

Flood Zones within
PVSC Jurisdiction





Types of Transportation within Flood Zones

Rail Lines
Minor Roadways
Major Roadways

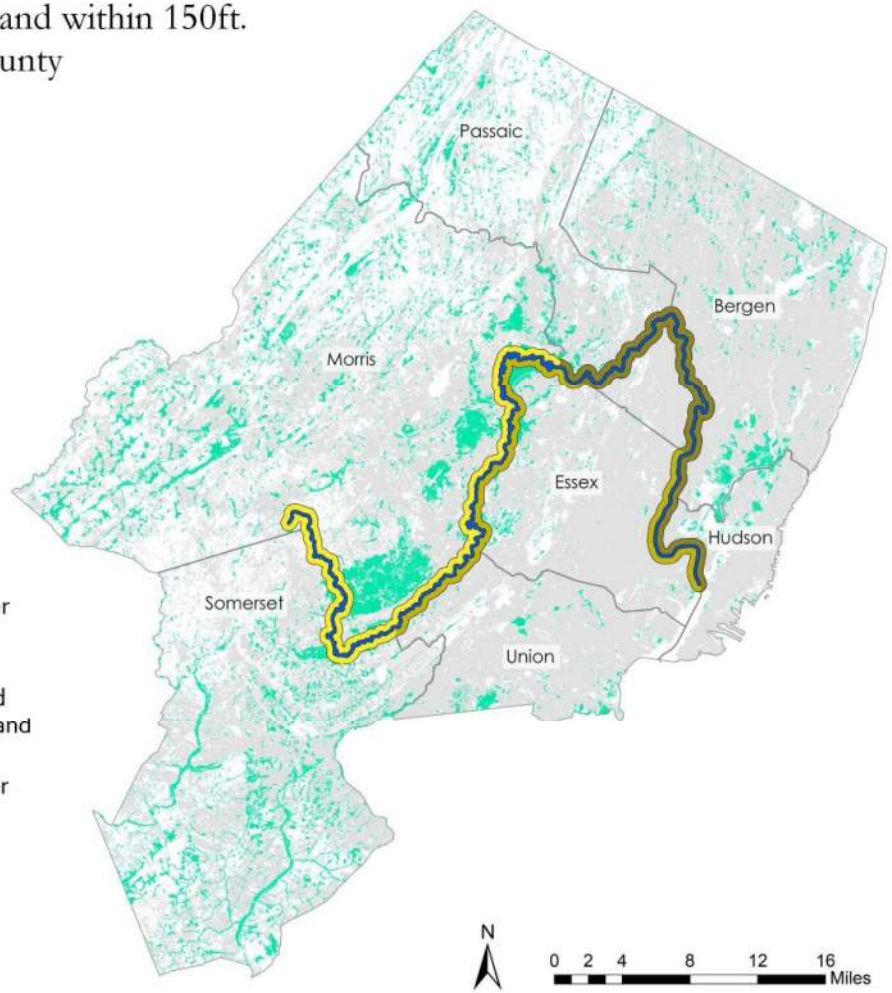
Group 8: Climate Change
W. Masco, E. Otterbine
datasets: FEMA, NJDEP

N

2.3 Open Space and Ecology

By: Anna Erickson, Grace Li, Giselle Pena

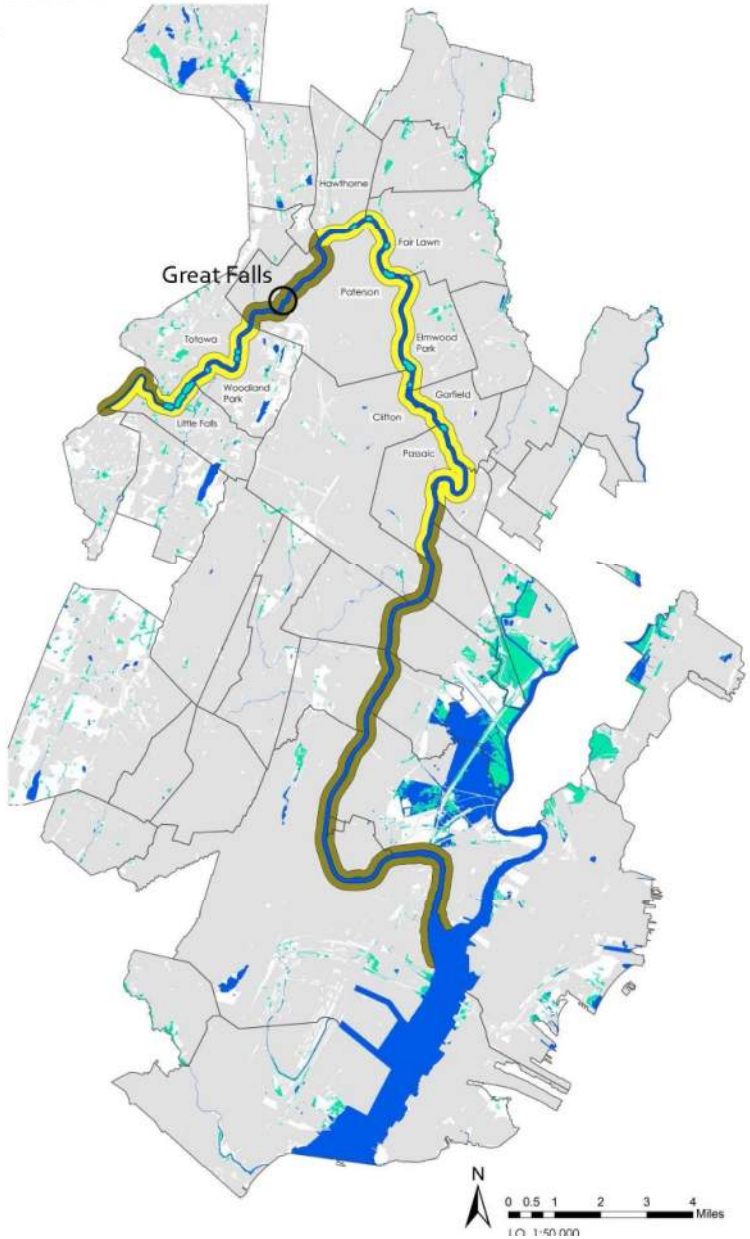
Percentage of Wetland within 150ft.
Buffer Zone by County



Land Type

- >40% of Land in Buffer Zone is Wetland
- 20% < x < 40% of Land in Buffer Zone is Wetland
- <20% of Land in Buffer Zone is Wetland
- Impervious Surface
- Wetland
- Passaic River

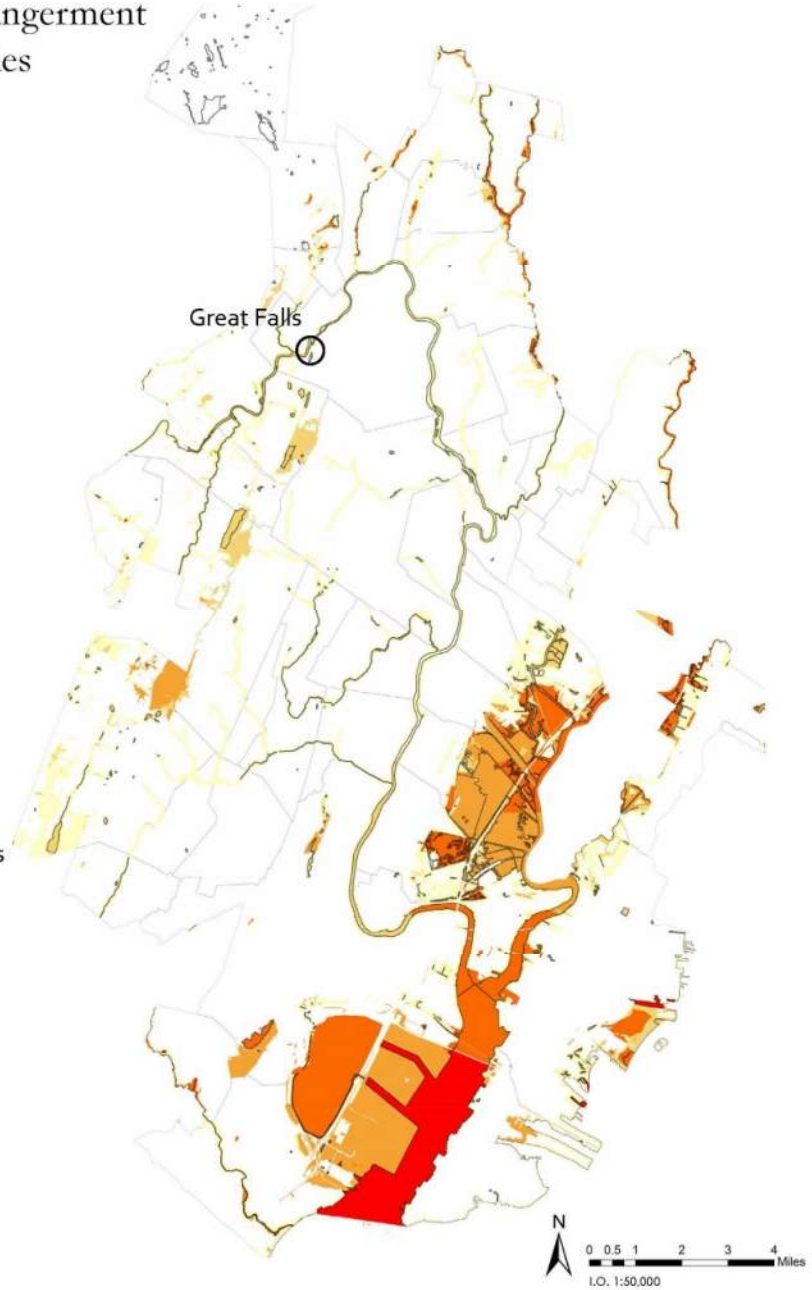
Percentage of Wetland within 150ft.
Buffer Zone by Municipality



Land Type

- Municipality Contains Wetland Within 150ft. Buffer
- Does Not Contain Wetland Within 150 ft. Buffer
- Water
- Wetland
- Impervious Surface

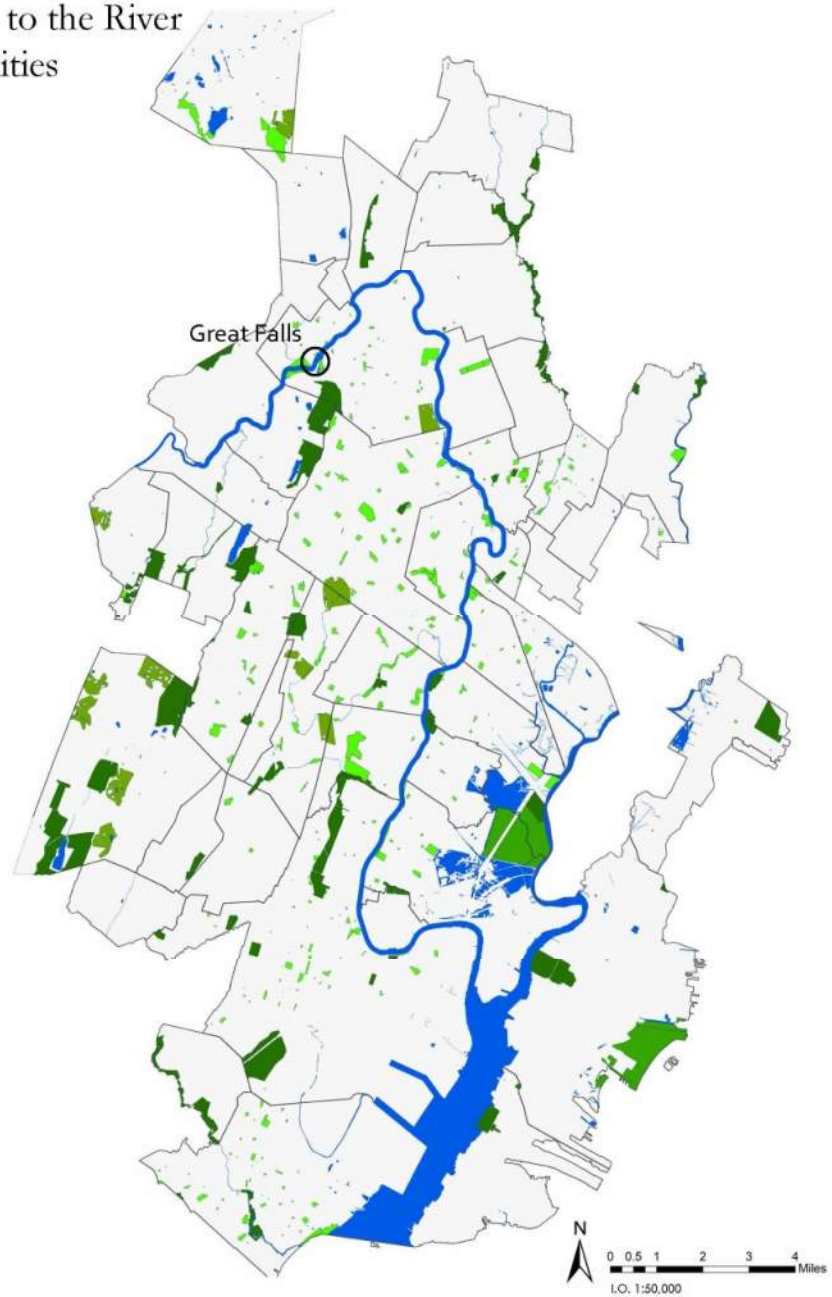
Wildlife and Species Endangerment Within PVSC Municipalities



Species Rankings

- Rank 1
  Habitat Specific Requirements
- Rank 2
  Special Concern
- Rank 3
  State Threatened
- Rank 4
  State Endangered
- Rank 5
  Federally Listed

Open Space and Access to the River Within PVSC Municipalities



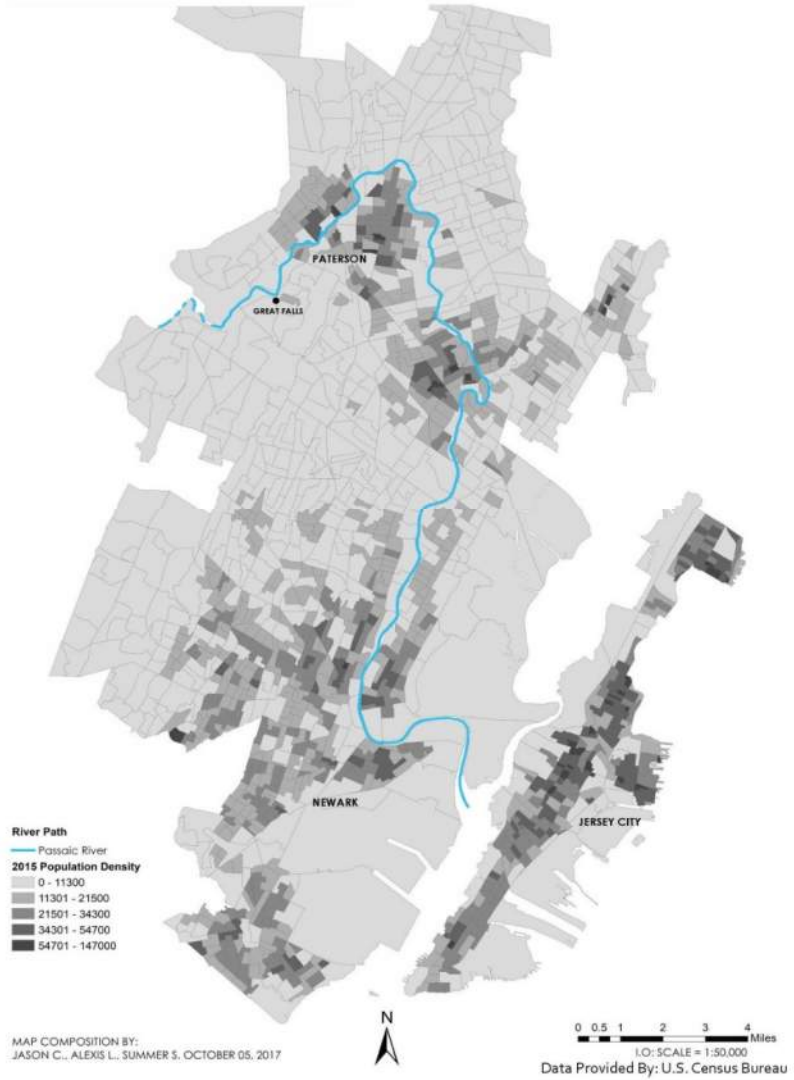
Types of Open Space

- Water
- Local Parks and Recreation Space
- County Parks
- State Parks
- Golf Courses

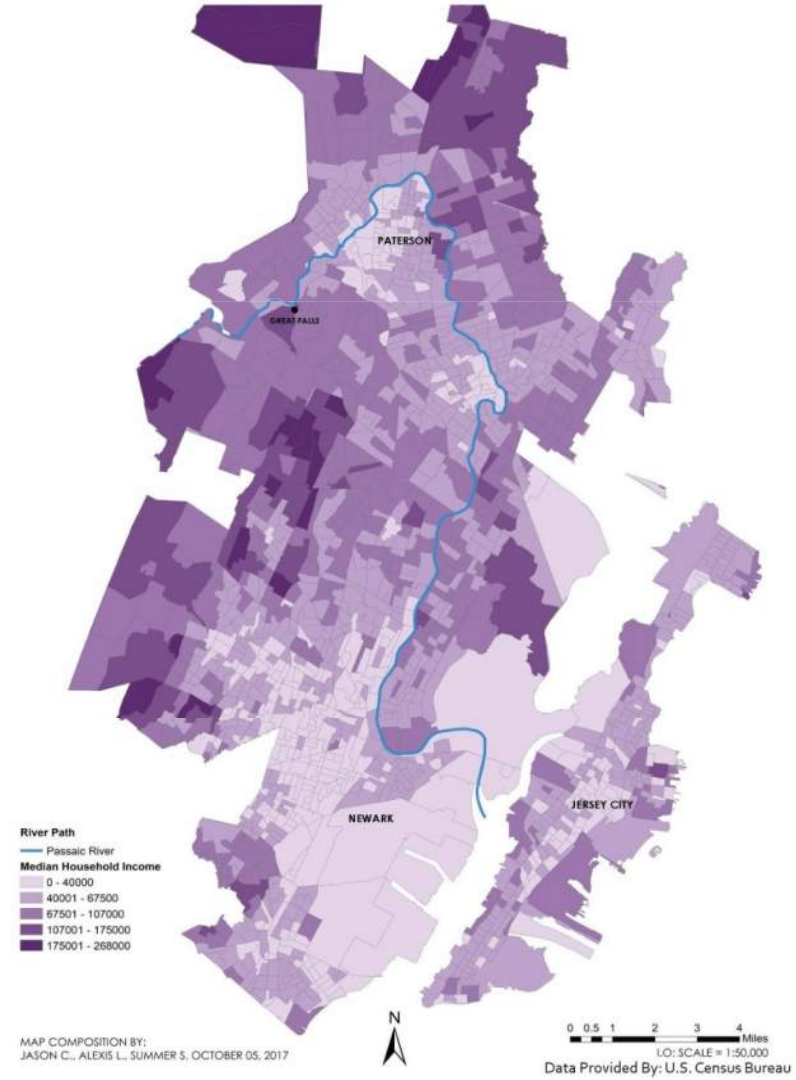
2.4 DEMOGRAPHICS

By: Jason Cincotta, Alexis LO, Summer Sprofera.

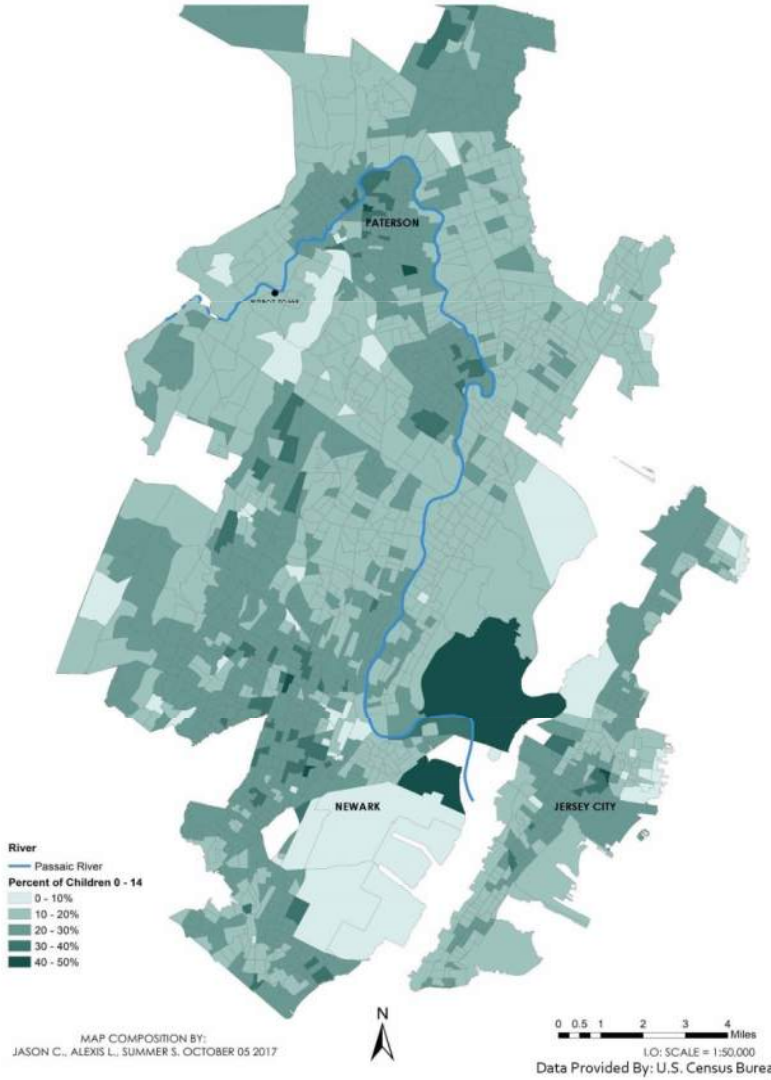
2015 Population Density



Median Household Income



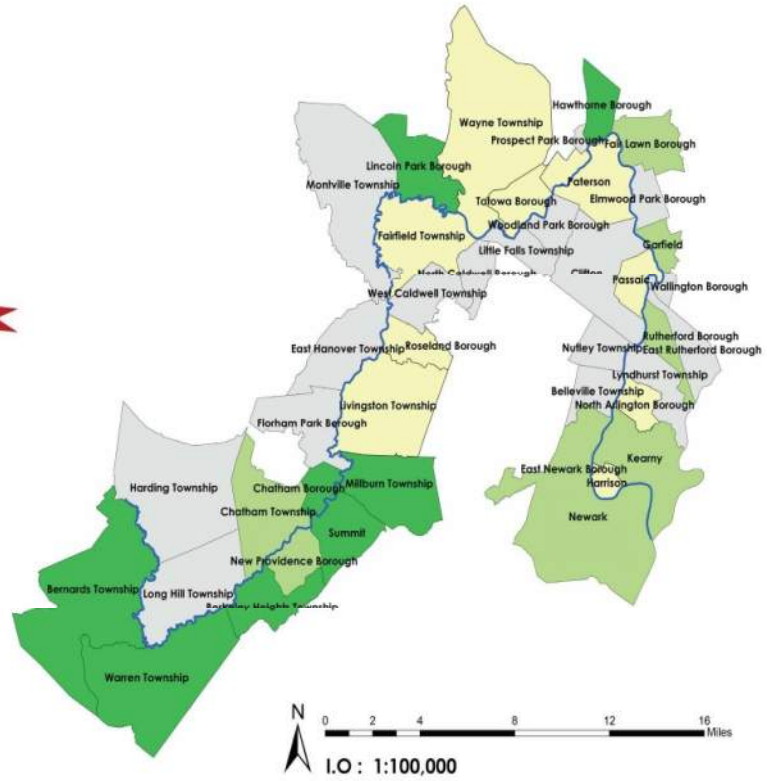
Percent of Children Ages 0-14



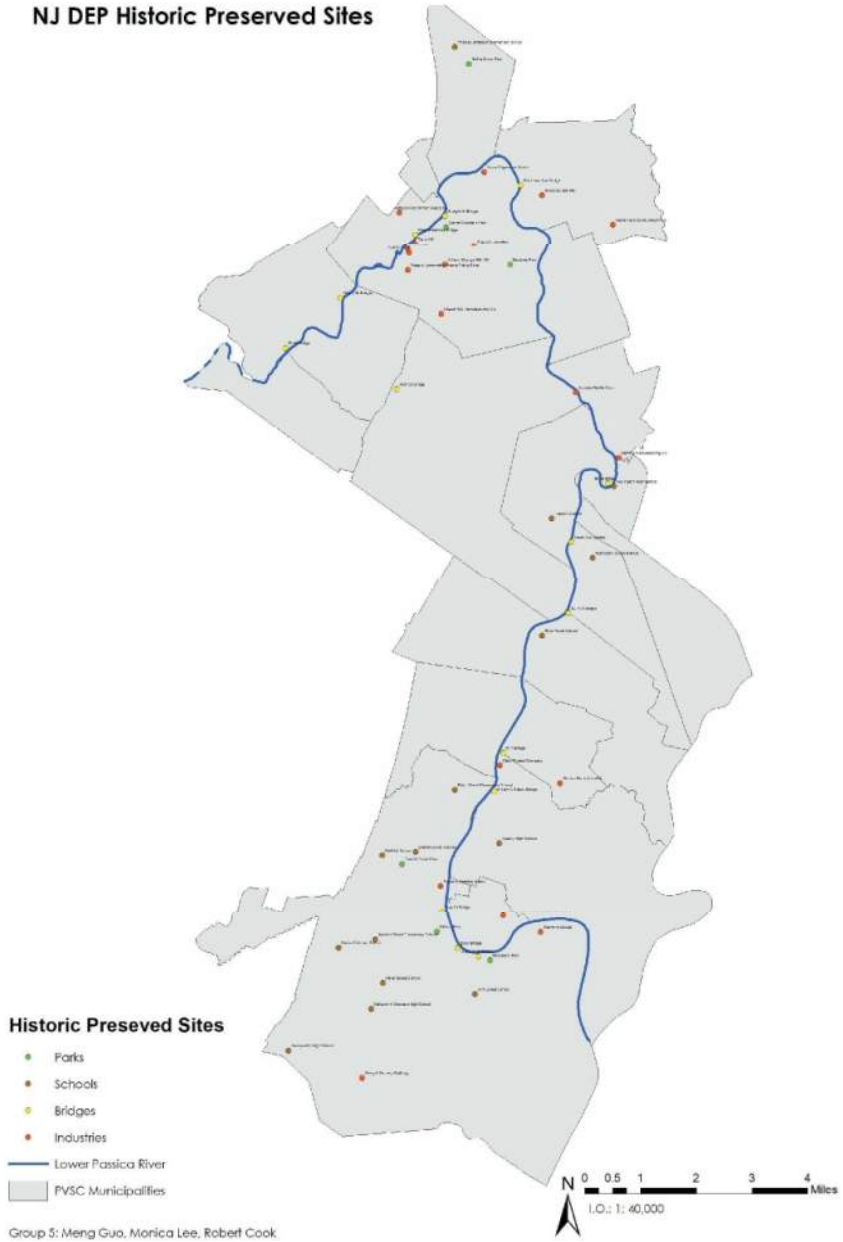
2.5 Government

By: Meng Guo, Monica Lee, Robert Cook

Municipalities Registered and Ranked By Sustainable Jersey



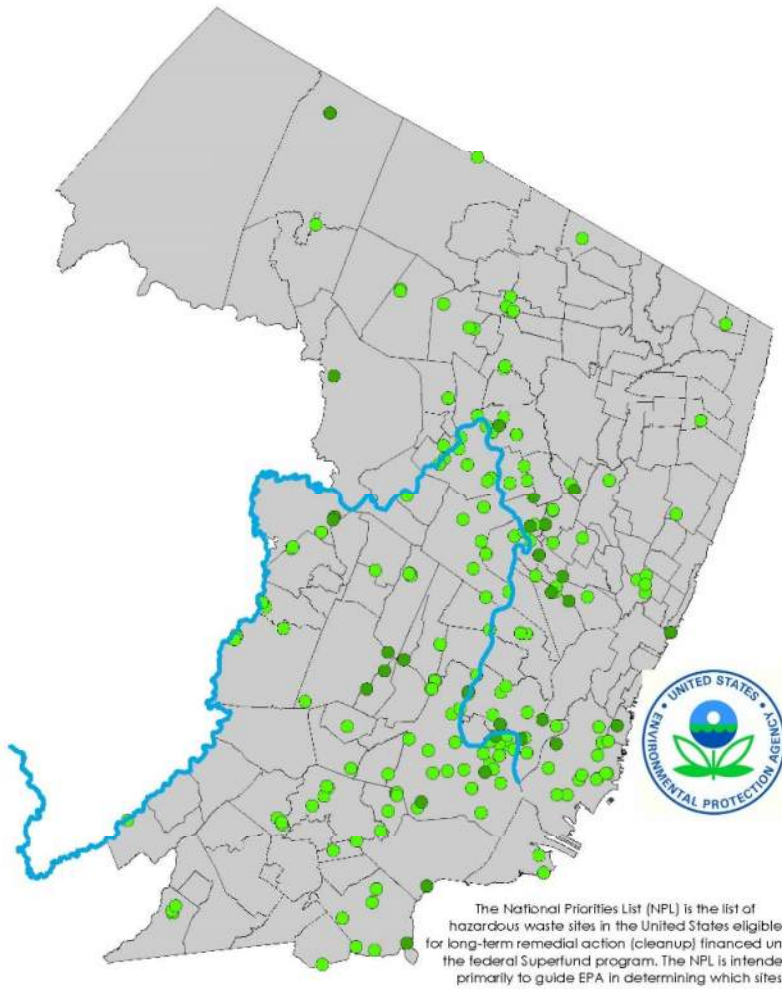
NJ DEP Historic Preserved Sites



Group 5: Meng Guo, Monica Lee, Robert Cook

Superfund Sites Registered By The EPA

Group 5 - Government



The National Priorities List (NPL) is the list of hazardous waste sites in the United States eligible for long-term remedial action (cleanup) financed under the federal Superfund program. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation.

Superfund Sites:

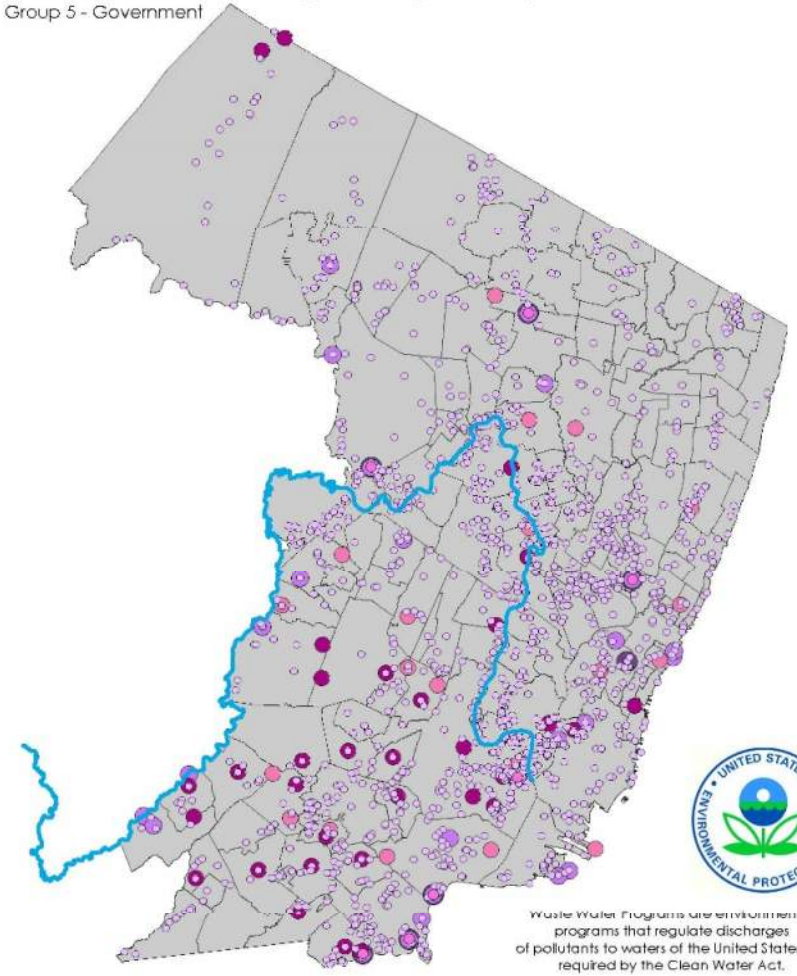
- Passaic River
- Superfund NPL
- Superfund Site (Non NPL)
- PVSC Municipalities

N 0 1.25 2.5 5 7.5 10 Miles

IO: 1:100,000

Polluted Waste Water Programs Registered By The EPA

Group 5 - Government



Waste Water Programs are environmental programs that regulate discharges of pollutants to waters of the United States, as required by the Clean Water Act.

The Clean Water Act established the basic structure for regulating pollutant discharges into the waters of the United States. Gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry.

Waste Water Programs:

- Passaic River
- Biosolids
- NPDES Non- Major Discharge Sites
- NPDES Unpermitted Sites
- NPDES Permit Sites
- NPDES Major Discharge Sites
- NPDES Pretreatment Program Sites
- PVSC Municipalities

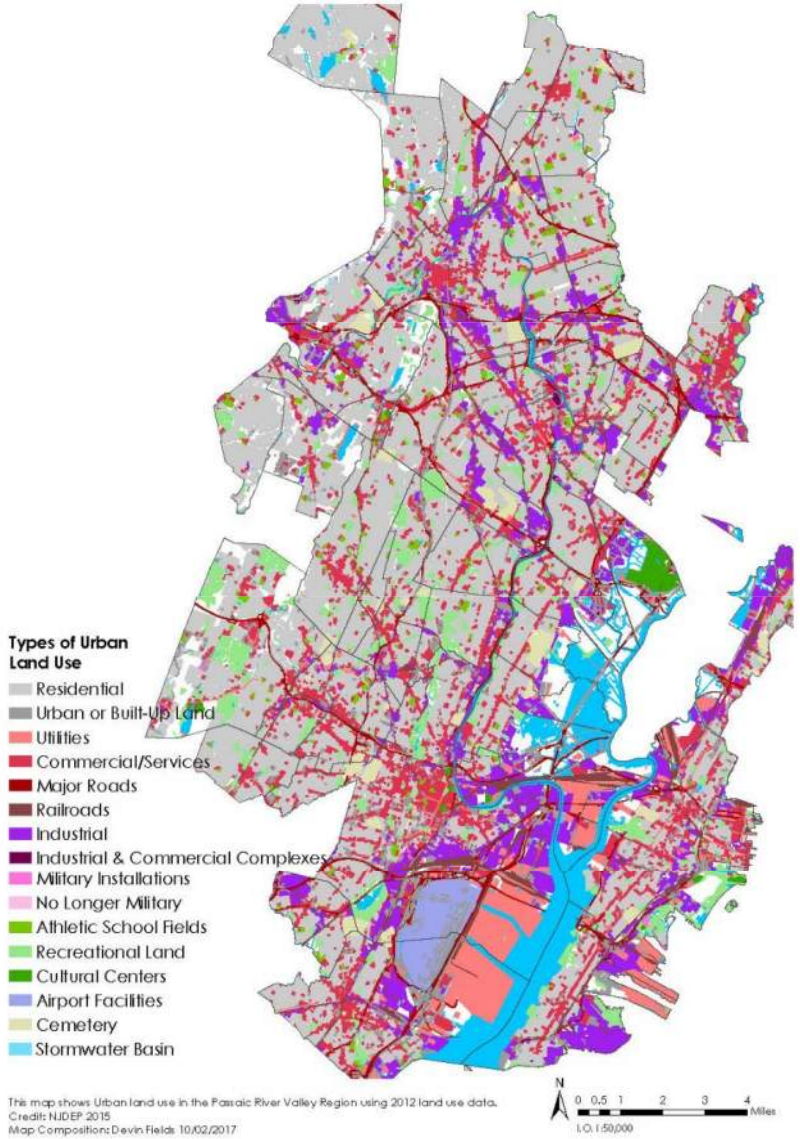
N 0 1.25 2.5 5 7.5 10 Miles

IO: 1:100,000

2.6 Development

By: Adam Fricke, Devin Fields, Diosmiry Rodriguez

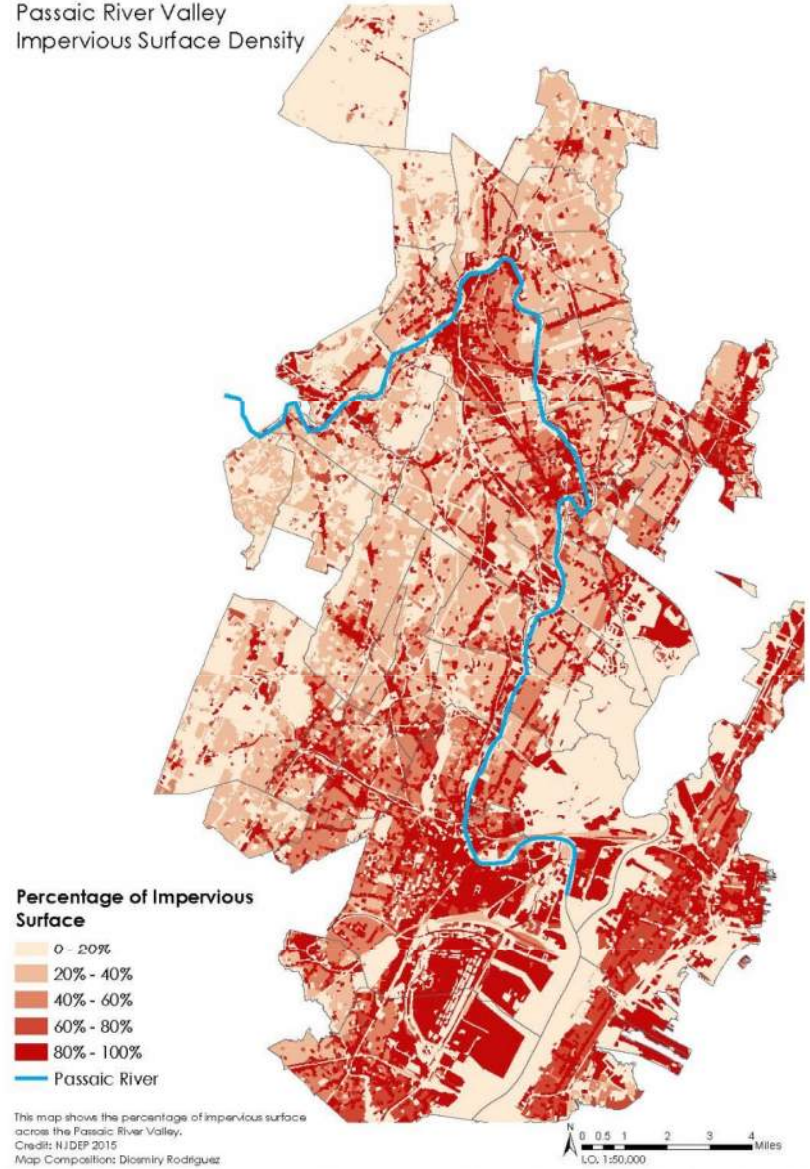
Passaic River Valley Urban Land Use



This map shows Urban land use in the Passaic River Valley Region using 2012 land use data.
Credit: NJDEP 2015
Map Composition: Devin Fields 10/02/2017

Data Provided By:
NJ Department of Environmental Protection
2015

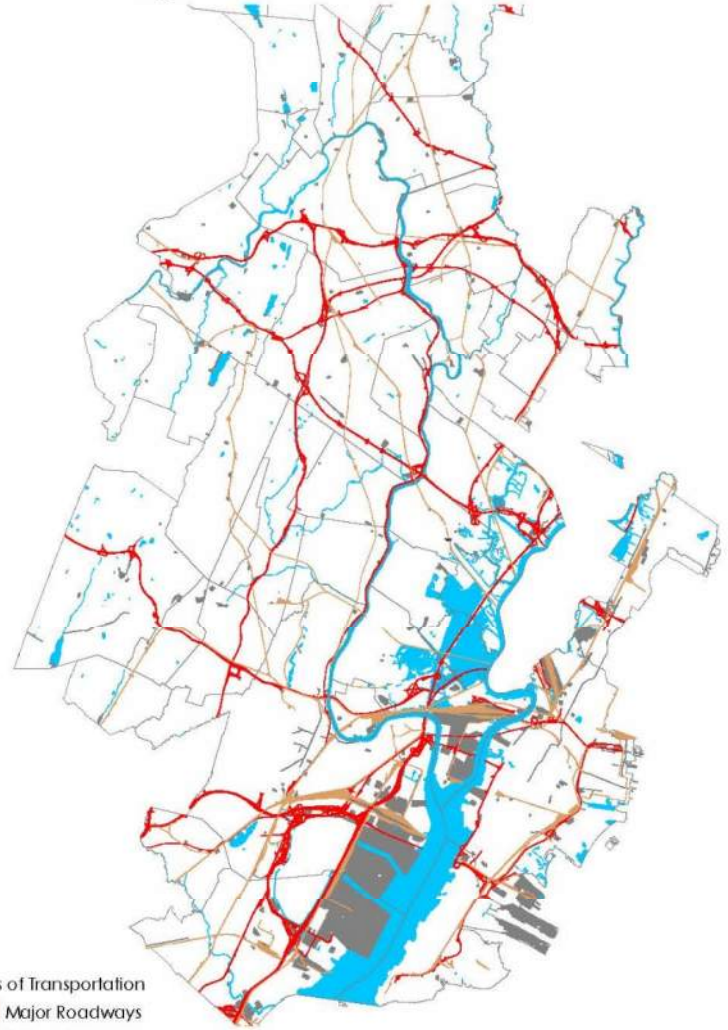
Passaic River Valley
Impervious Surface Density



This map shows the percentage of impervious surface across the Passaic River Valley.
Credit: NJDEP 2015
Map Composition: Diosmiry Rodriguez

Data Provided By: NJ Department of Environmental Protection 2015, Esri National Atlas of the U.S. 2017, U.S. Geological Survey 2017

Types of Transportation
In Passaic River Region



Types of Transportation
- Major Roadways
- Railroads
- Transportation/Communication/Utilities

This map shows the municipalities and types of transportation in the Passaic River Region of focus.

Produced By: Adam Fricke 9/26/2017

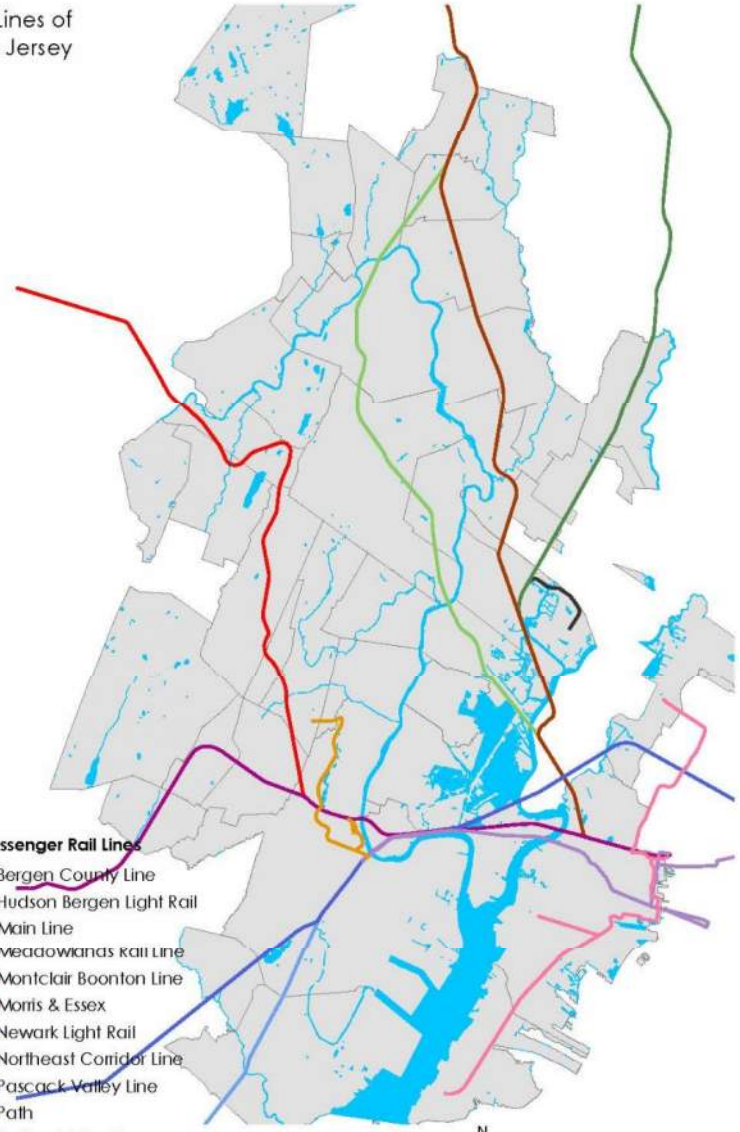
N

0 0.5 1 2 3 4 Miles

O.I. 50,000

Data Provided By: NJ Department of Environmental Protection 2015

Rail Lines of
New Jersey



NJ Passenger Rail Lines
- Bergen County Line
- Hudson Bergen Light Rail
- Main Line
- Meadowlands Rail Line
- Montclair Boonton Line
- Morris & Essex
- Newark Light Rail
- Northeast Corridor Line
- Pascack Valley Line
- Path
- Raritan Valley Line

This map shows the major rail lines used by the public in New Jersey.

Produced By: Adam Fricke 9/26/2017

N

0 0.5 1 2 3 4 Miles

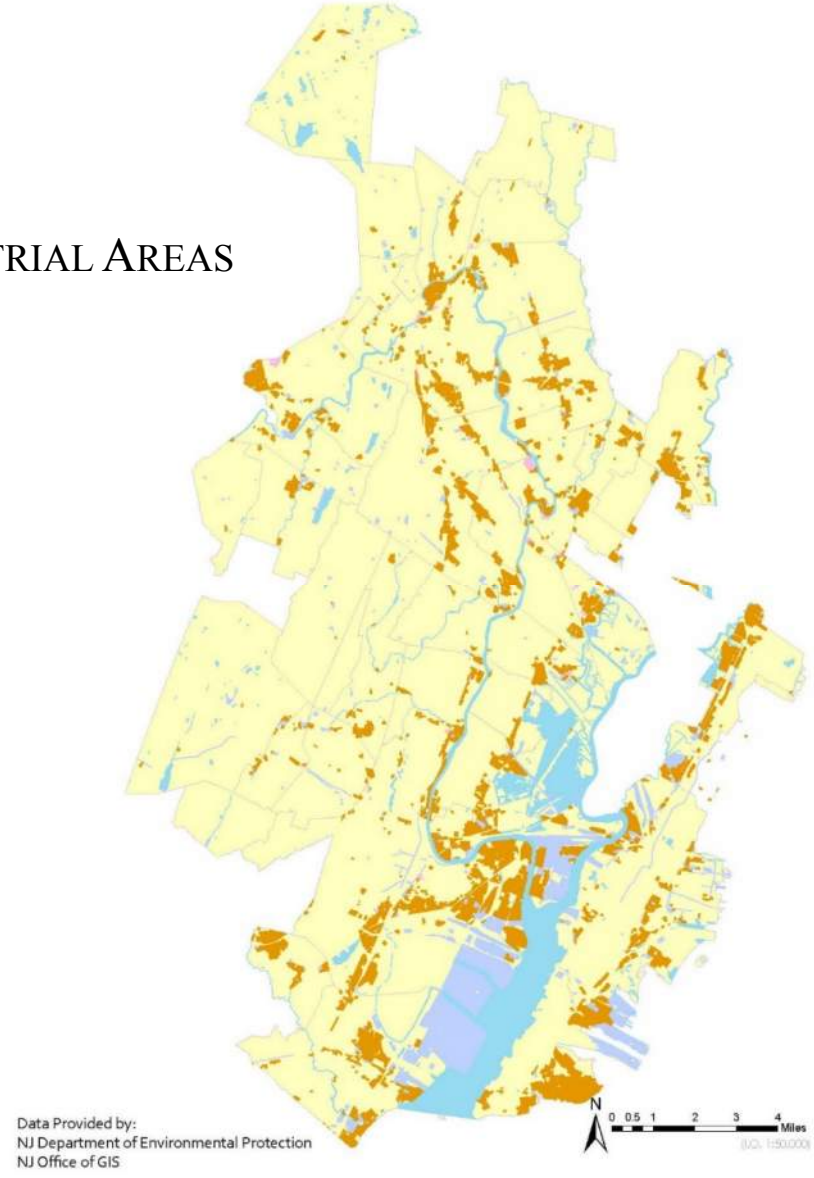
O.I. 50,000

Data Provided By: NJ Office of GIS 2017, NJ Transit - GIS-Transportation 2017

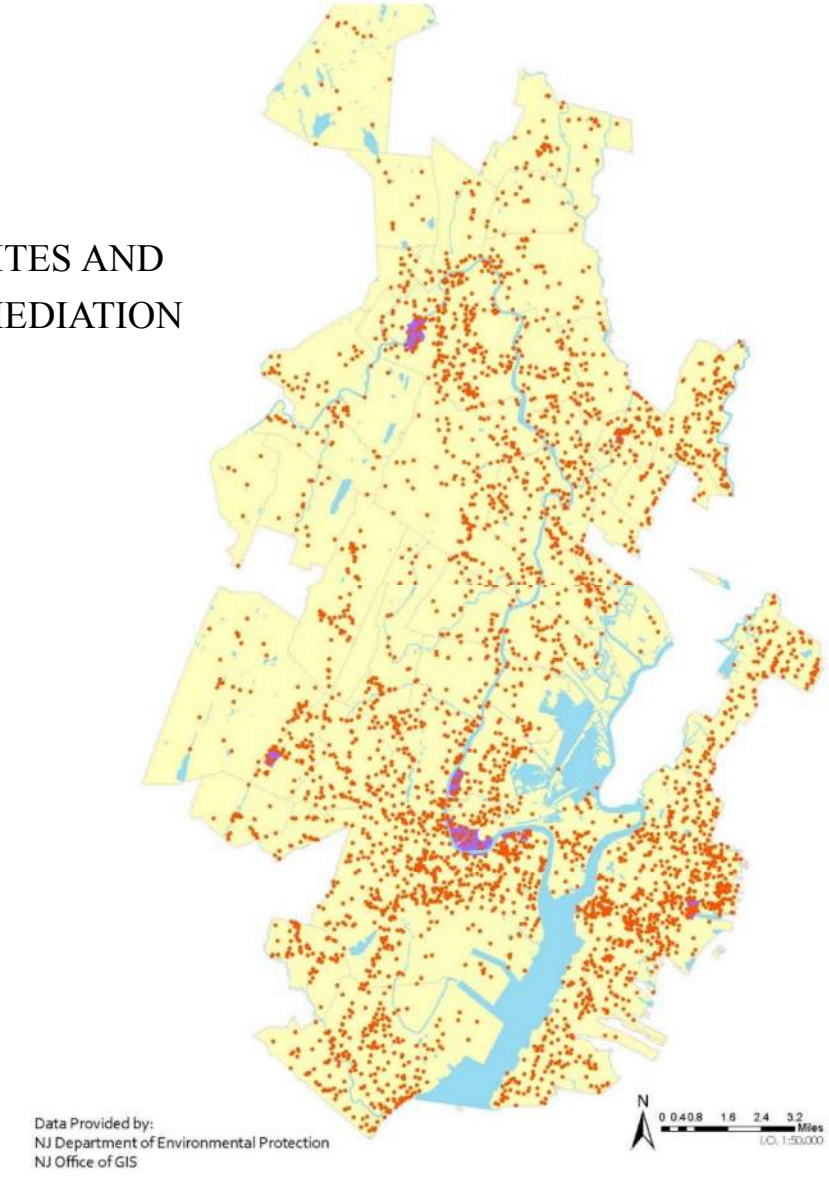
2.4 Industrial

By: Tina Mao, Nanik Song, Wenjia Yan

Industrial Areas



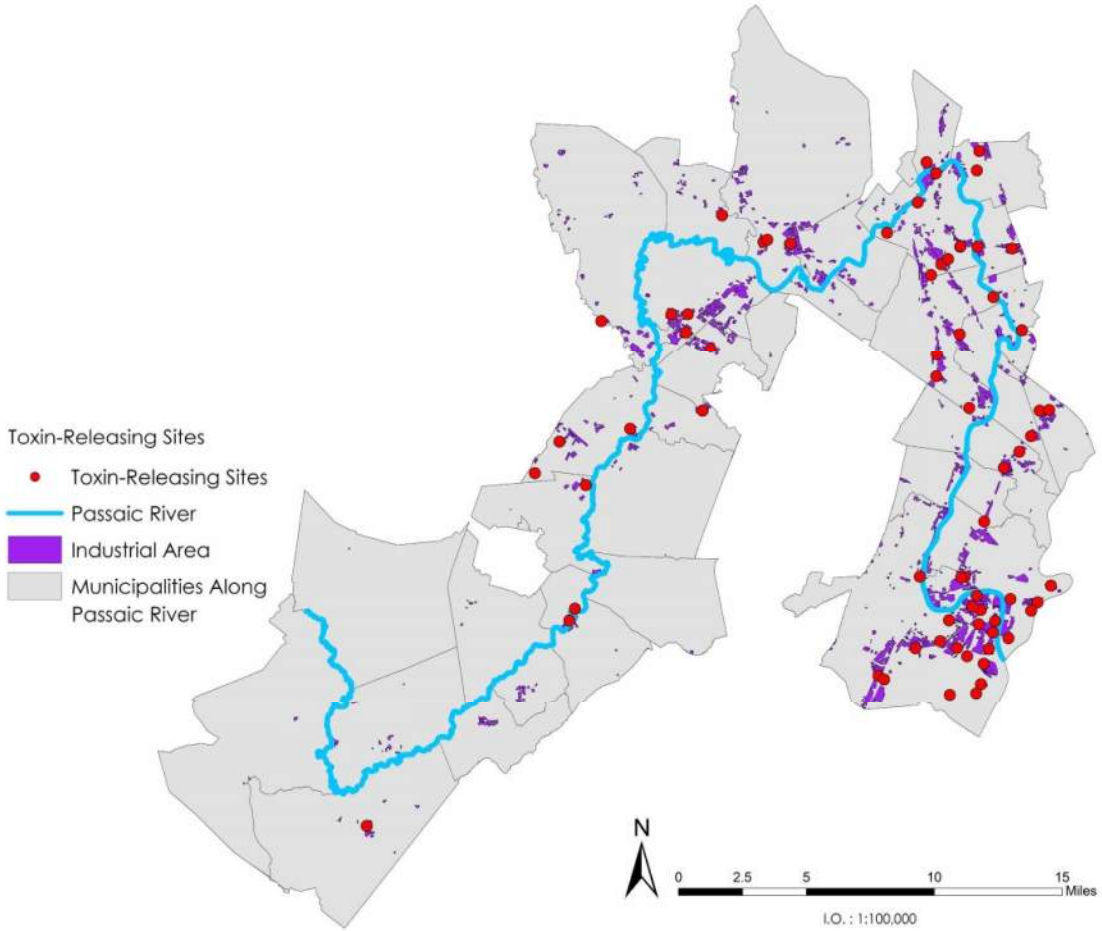
Contaminated Sites and Brownfield Remediation



2.8 Pollution

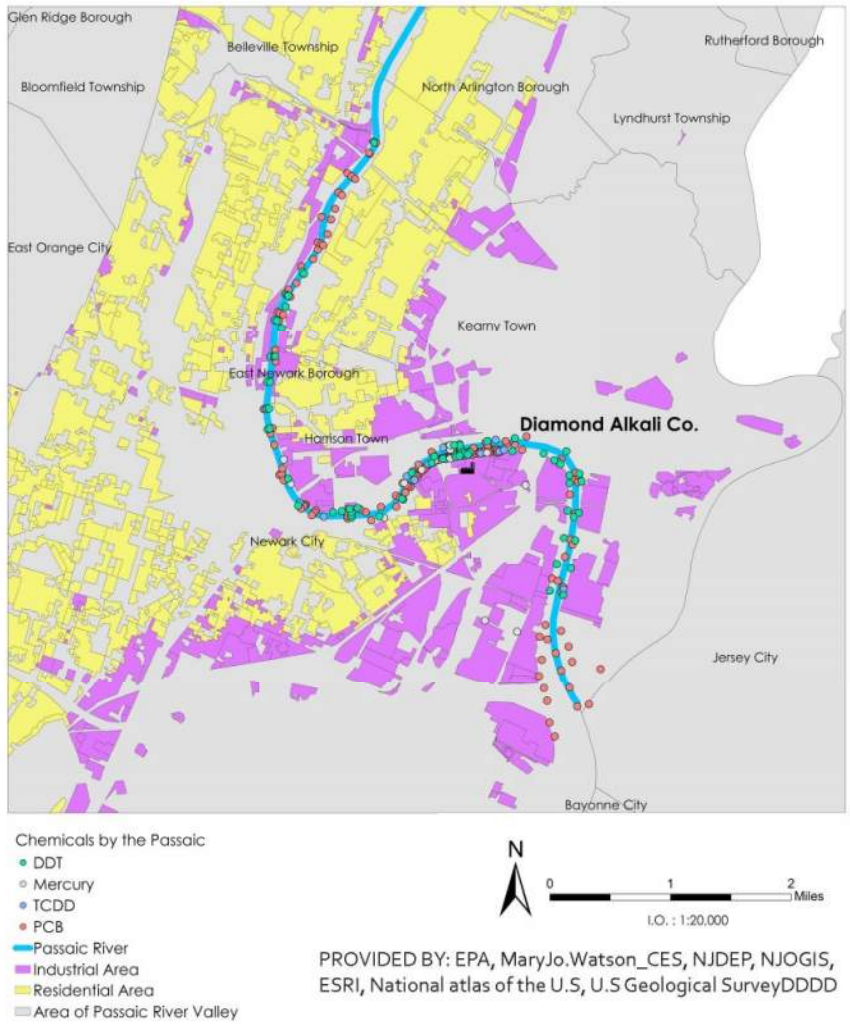
By: Shicheng Ma, Wooseok (Jacob) Choi

Industrial Area and Toxic Releasing Sites Along Passaic River



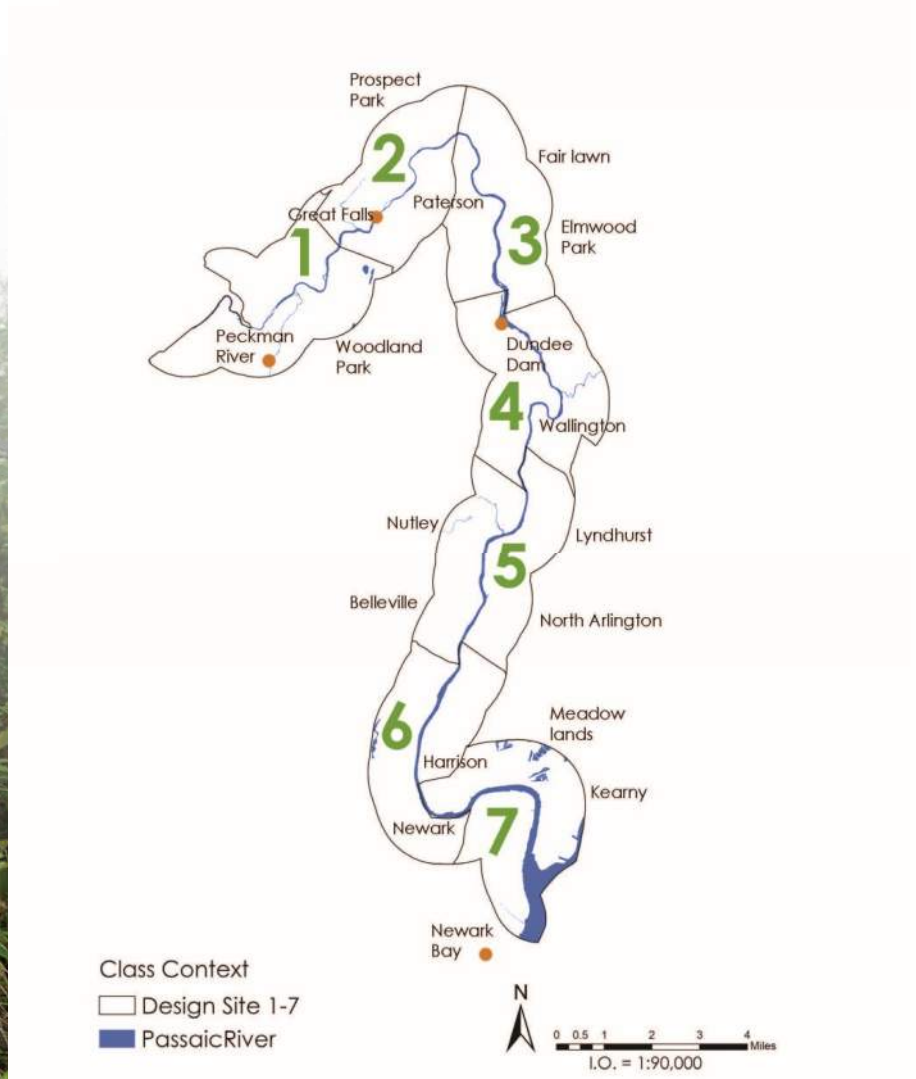
PROVIDED BY: EPA, ESRI, National atlas of the U.S, U.S Geological Survey, NJOGIS

Existing Toxic Chemicals in Downstream of Passaic River and Industiral Area



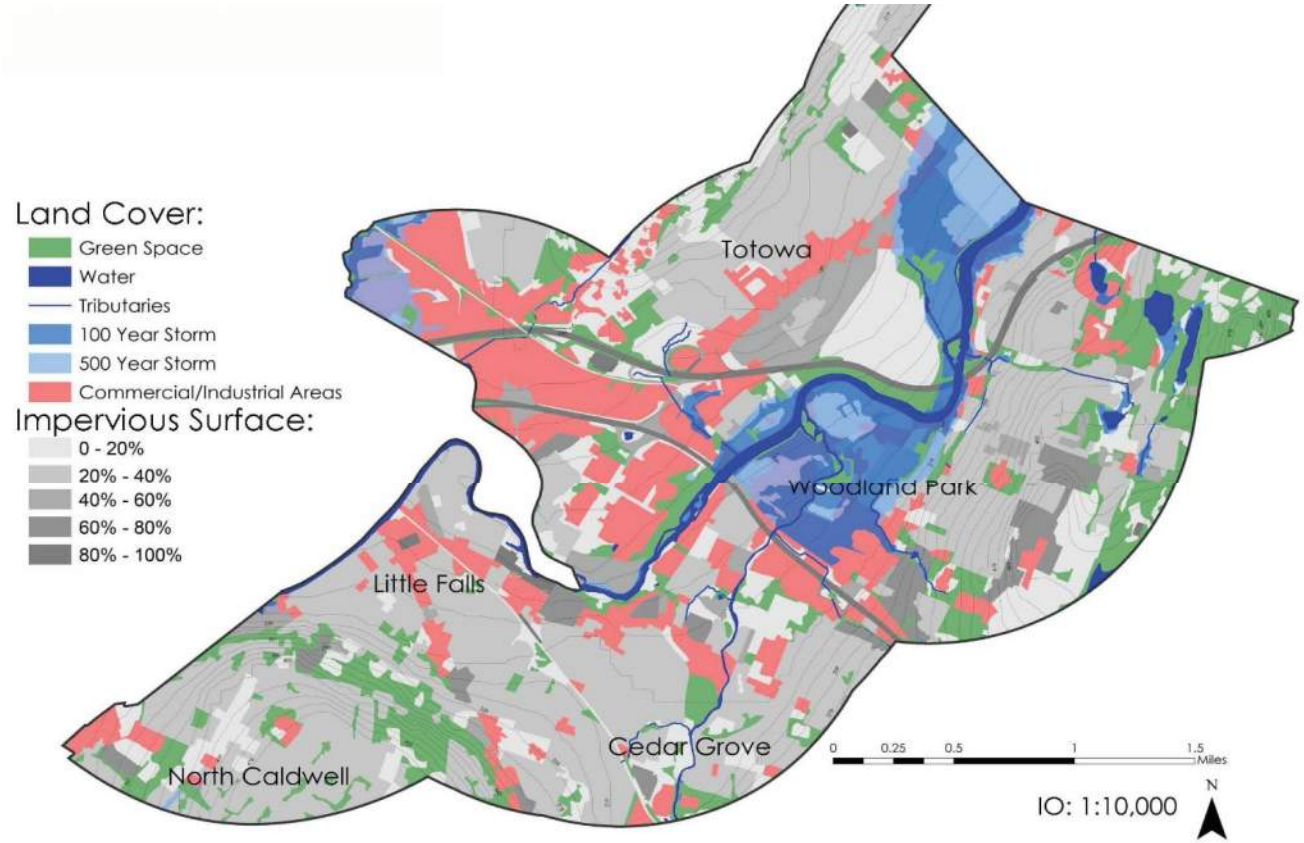
PROVIDED BY: EPA, MaryJo.Watson_CES, NJDEP, NJOGIS, ESRI, National atlas of the U.S, U.S Geological SurveyDDDD

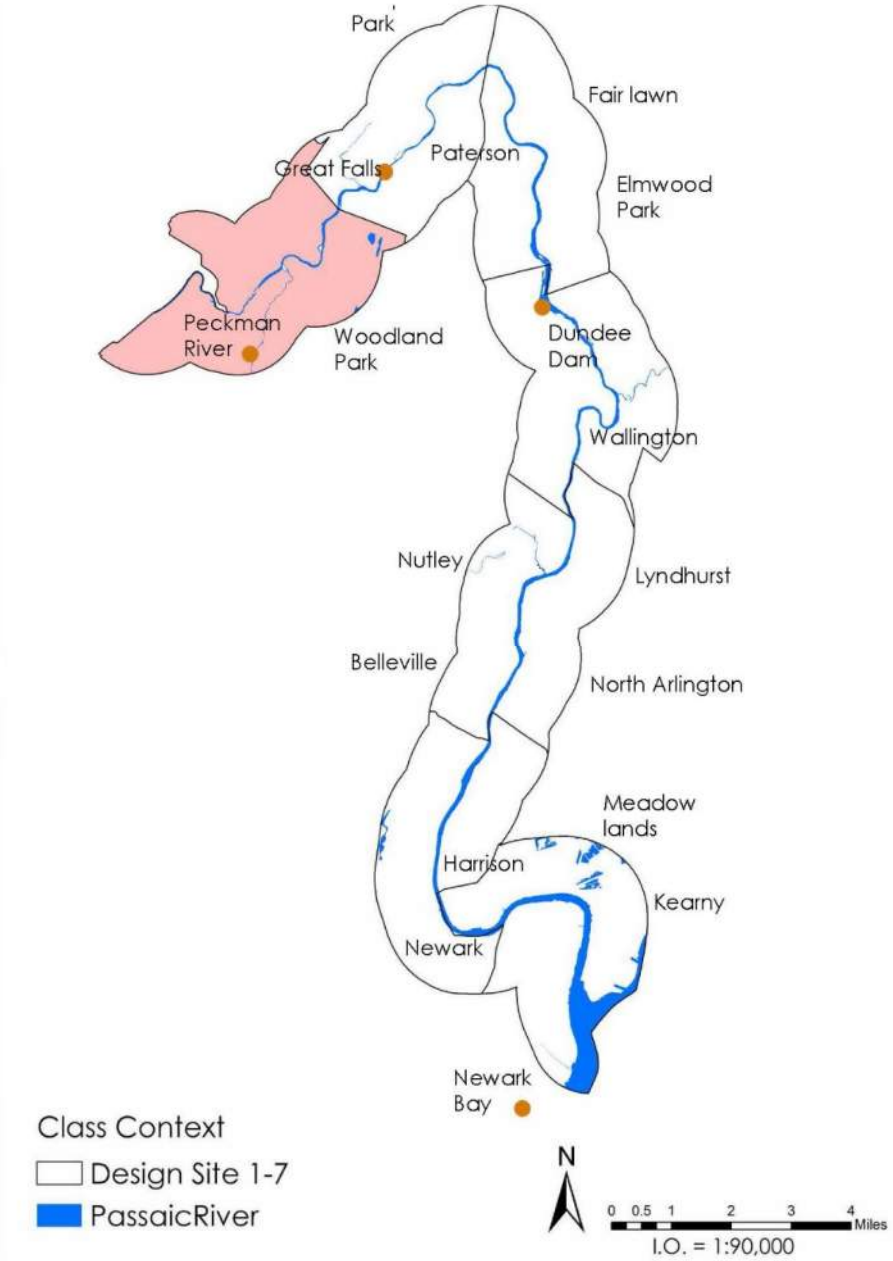
Intervention Sites



TATOWA, WOODLAND PARK

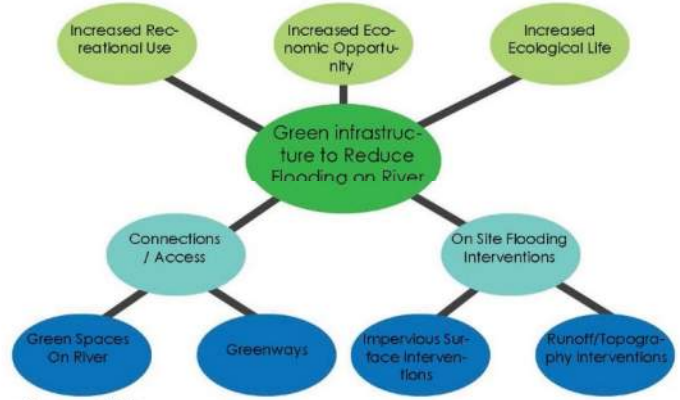
GROUP 1: EMILY MC GALE, SUMMER SPROFERA, MONICA LEE)





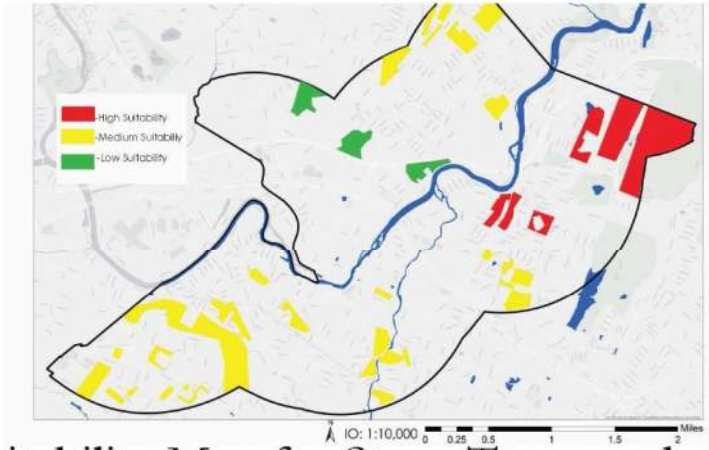
Suitability Maps and Problem Solution Trees

Problem Tree

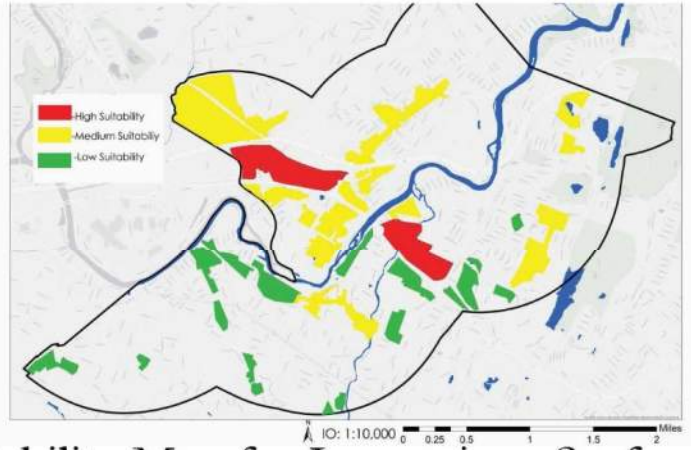


Solution Tree

Suitability Map for Green Streets

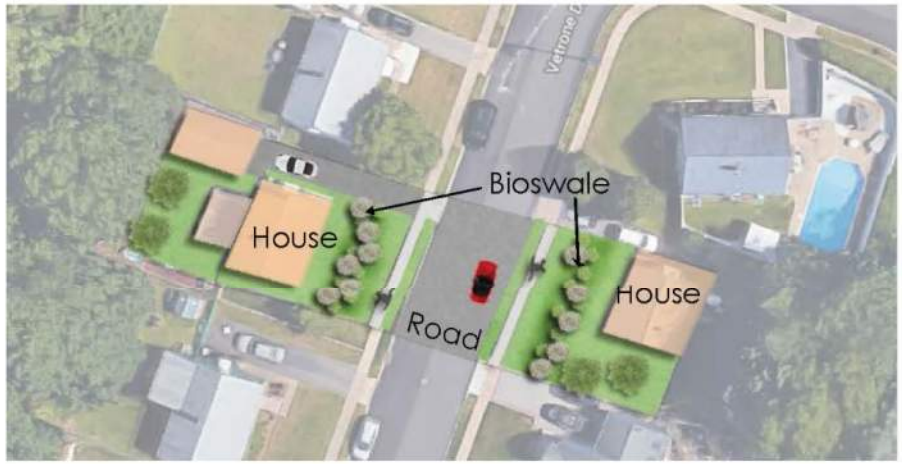


Suitability Map for Steep Topography

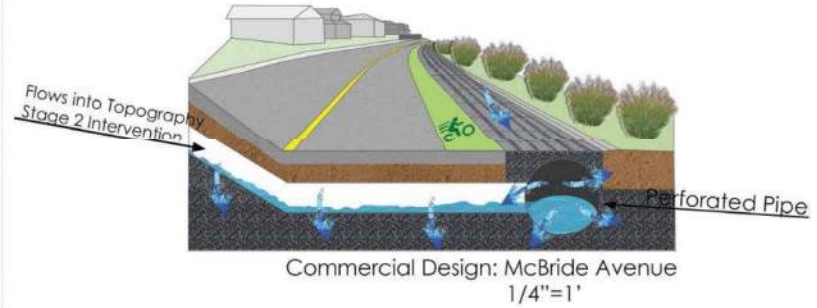


Suitability Map for Impervious Surface

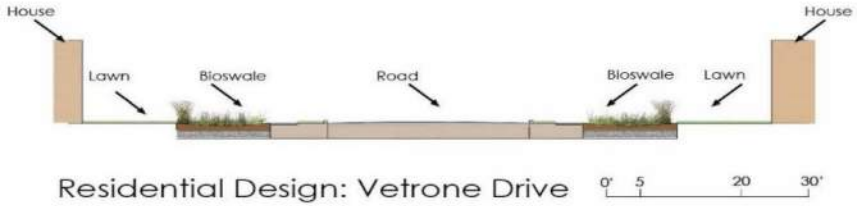
GREEN STREETS: SUMMER SPROFERA



Plan of Residential Street



Commercial



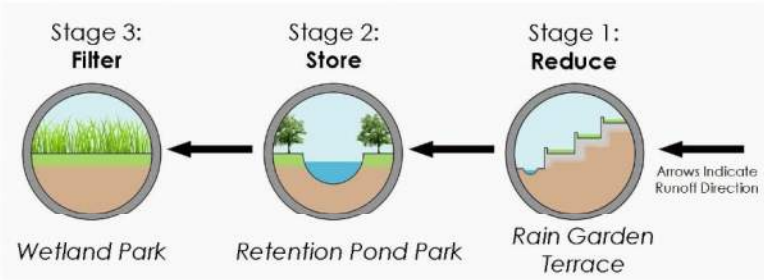
Residential Street

Highway Street

Steep Topography Runoff Intervention

Monica Lee

Concept



Stage 1: First stage reduces the amount of runoff at the beginning of the source thus impacting the amount flowing down the slope and eventually reaching the Passaic River

Stage 2: Second stage collects and stores runoff from a wide range to futher reduce the amount reaching into the Passaic River

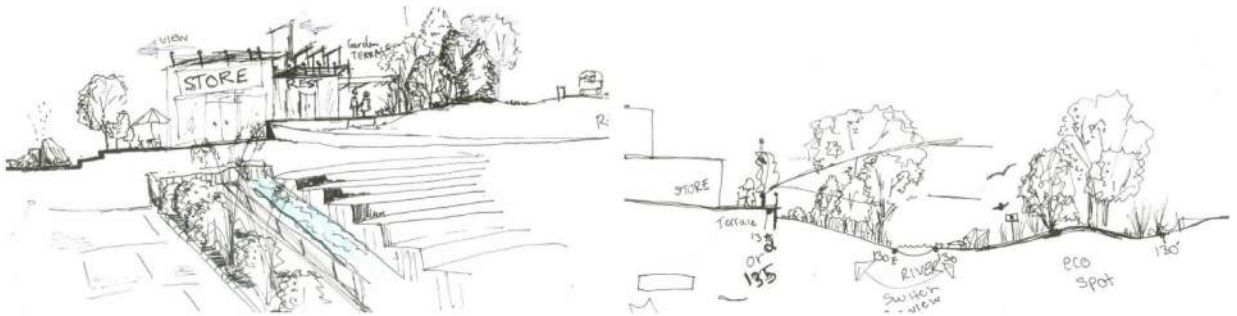
Stage 3: Third stage collects the remaining runoff and filters it by a combination of wetlands and rain gardens to screen the runoff and make it cleaner before reaching the Passaic River

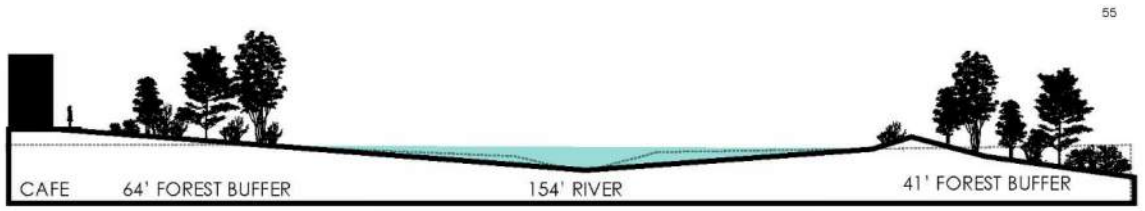
Master Plan

Existing Topography

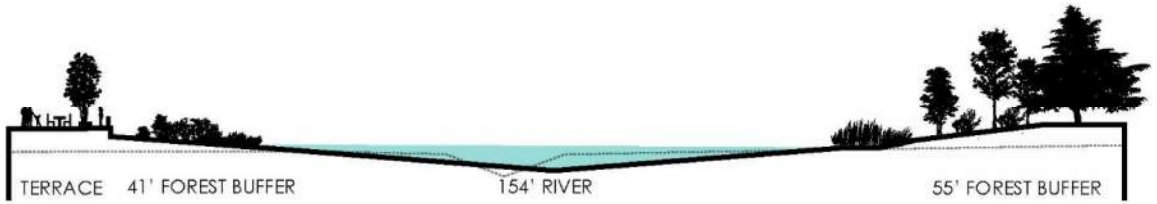
Proposed Topography

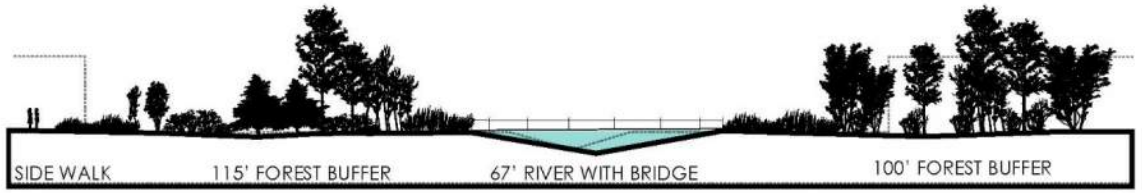
TRANSFORMING A SHOPPING MALL
EMILY MCGALE





1a 1b





3a 3b

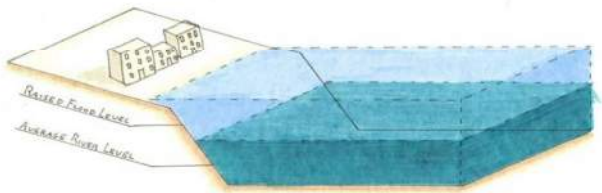
300' SECTIONS

Paterson

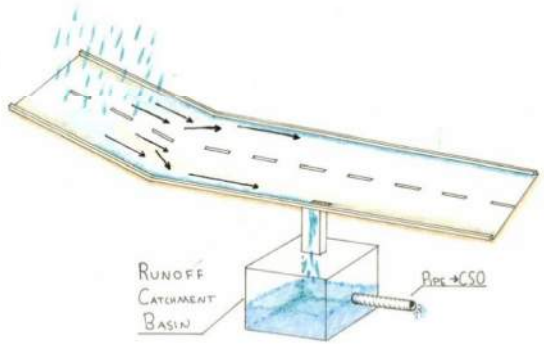
Group 2: Devin Fields, Wes Masco,
Eamon Epstein, Jason Cincotta

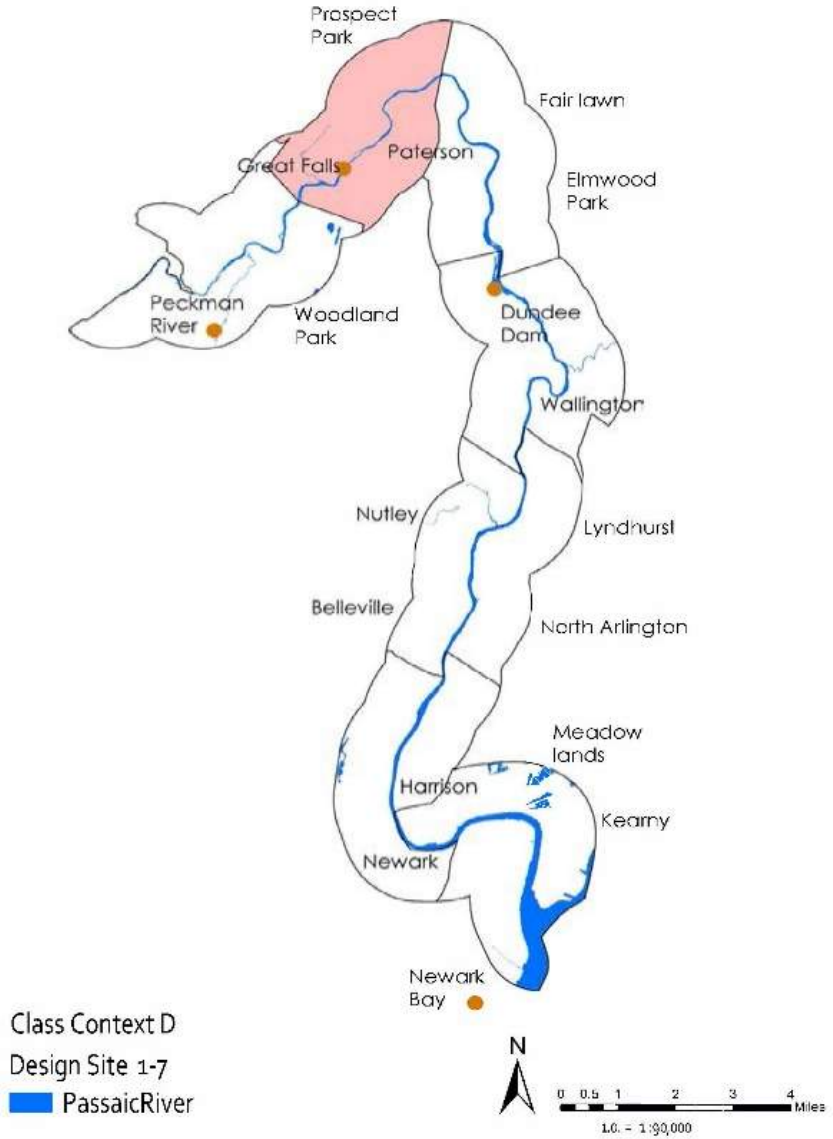
Main Site Problems

Flooding



Runoff

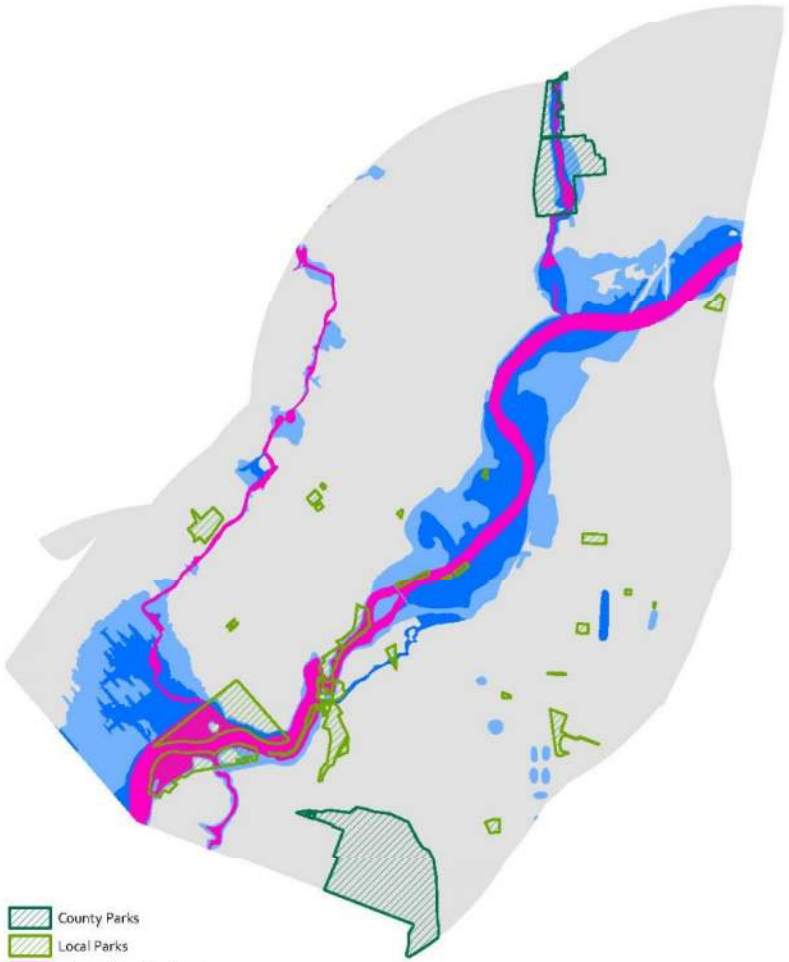




Intervention Suitability Analysis

Open Space In Flood Zones

Used to develop park location suitability

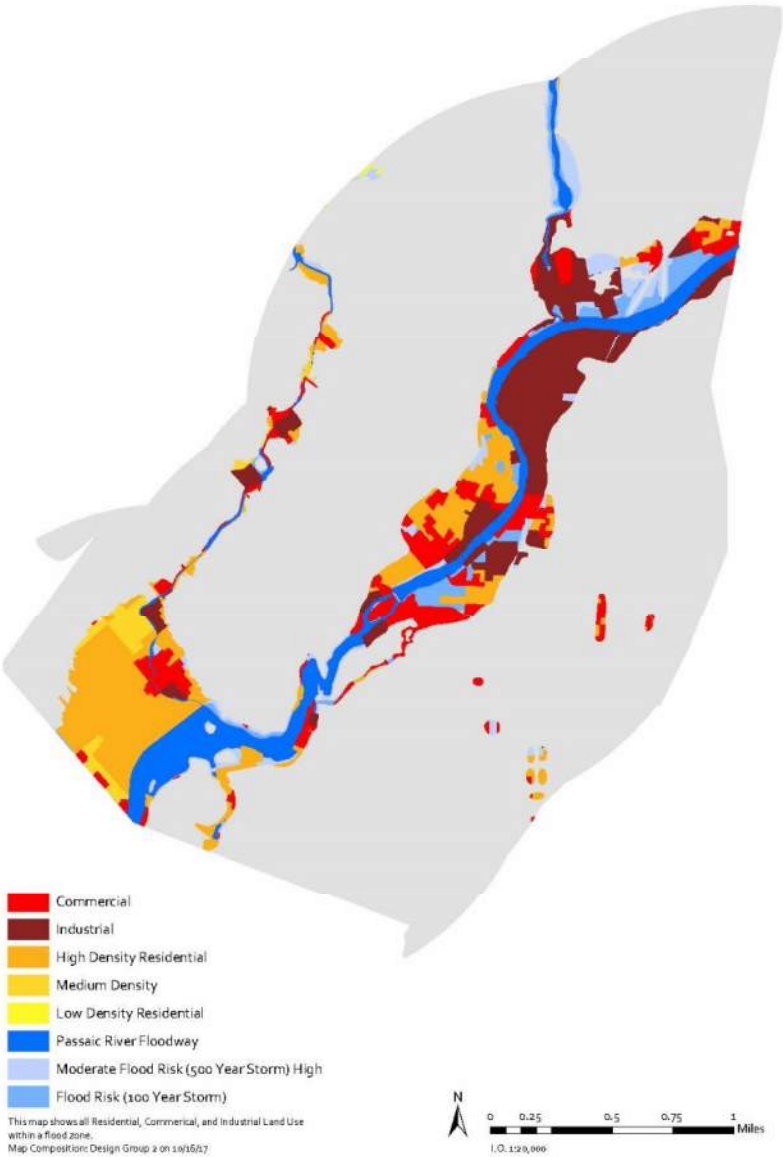


This map shows open space (local and county parks) and the flooz zones within our site.
Map Composition: Design Group 2 on 10/16/17

N 0 0.25 0.5 0.75 1 Miles
I.O. 1:20,000

Highly Developed Land In A Flood Zone

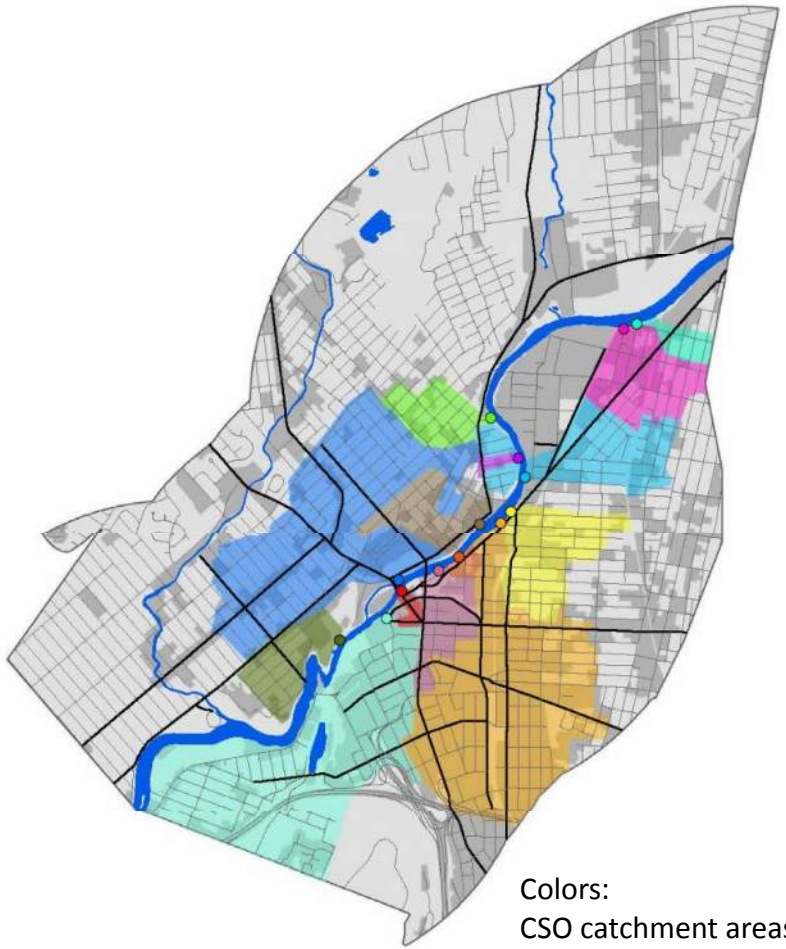
Used to develop park location suitability



This map shows all Residential, Commerical, and Industrial Land Use within a flood zone.
Map Composition: Design Group 2 on 10/16/17

N 0 0.25 0.5 0.75 1 Miles
I.O. 1:20,000

Green Streets Suitability Analysis

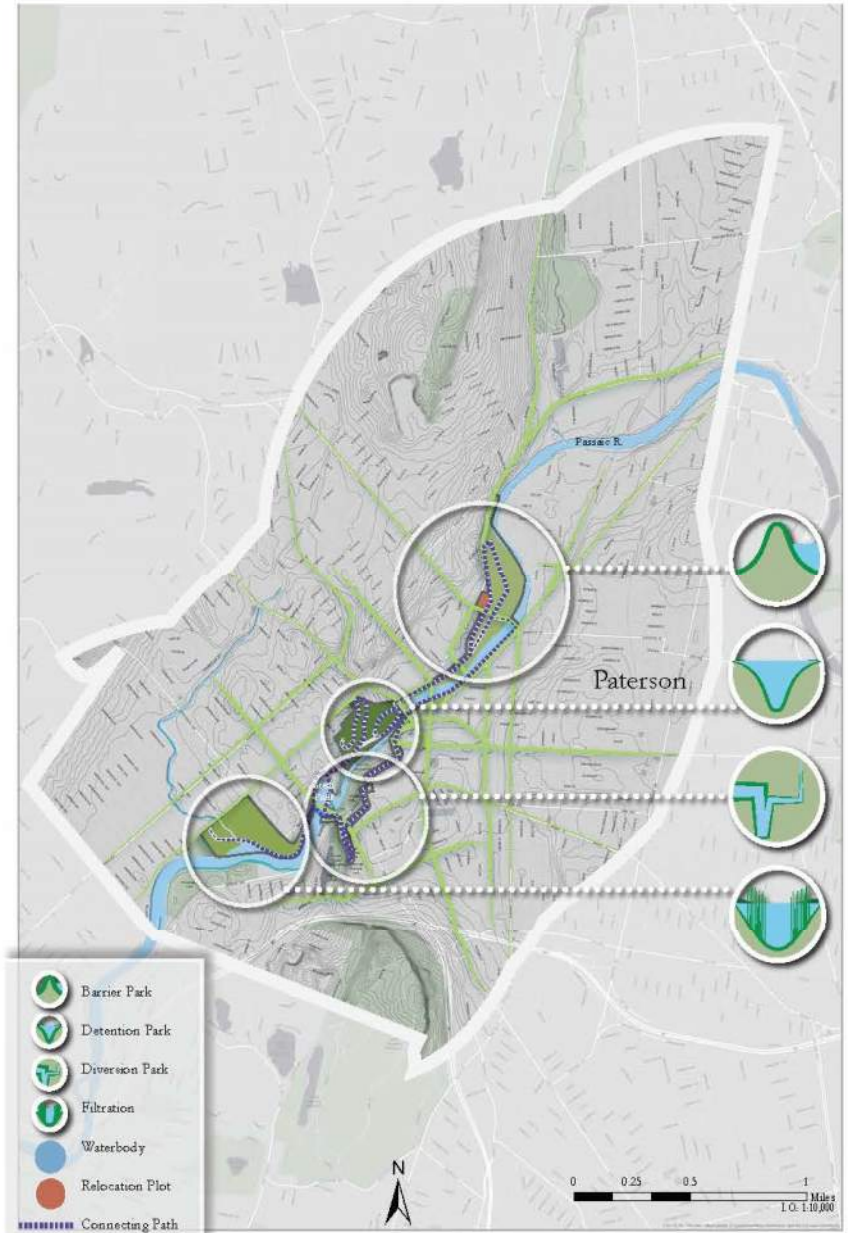


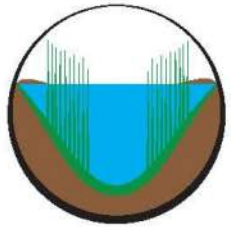
Colors:
CSO catchment areas

Map design by: Design Group 2 on 11/15/17

N 0 0.25 0.5 0.75 1 Miles
I.O. 1:20,000

MASTER PLAN



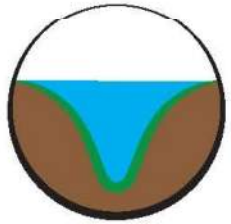


Wetland Park

Located at existing West Side Park and JFK High School sites, this design brings a fresh face to the park while implementing flood mitigation and water filtration techniques. It serves as an innovative park opportunity as well as a space for educational opportunities and recreation possibilities.

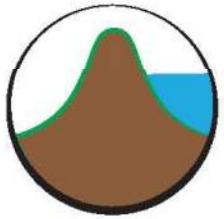
Diversion Park

This intervention utilizes the exisiting S.U.M. Raceway system that runs through Paterson New Jersey. There currently is no water running through these canals. This intervention would divert water into these raceways once again. A linear subsurface gravel wetland as well as dense wetland plantings will be implemented throughout these canals to aid in removing pollutants from the water. Stormwater runoff can also collect within these canals to ease combined sewer systems. People can enjoy the adjacent walking path as they walk through a district of rich industrial history.



Detention Park

An existing concrete island is converted into a detention basin. Detention basins divert and temporarily store river water to slow peak flow rate downstream. Outside of peak flow rate, detention basins can be used for recreation space.



Barrier Park

A system of green spaces, existing and proposed, located on both side of the Passaic River. These green spaces are raised 20 feet from the existing elevation and slope down to existing towards the river. These green space "barriers" block flood waters from the river during moderate to high storms.

Our implementation of park systems will connect the fragemented green spaces of Paterson while remediating the polluted watersof the Passaic and protecting flood prone areas against rising storm waters. As well as capture stormwater runoff to lessen flow of stormwater into the antiquated Combined Sewer Systems in the surrounding areas.

GREEN STREETS

These **Green infrastructure** techniques can be implemented along roads to **catch stormwater and prevent runoff from entering antiquated Combined Sewer Systems.**

Small Streets: 36 to 50 feet wide

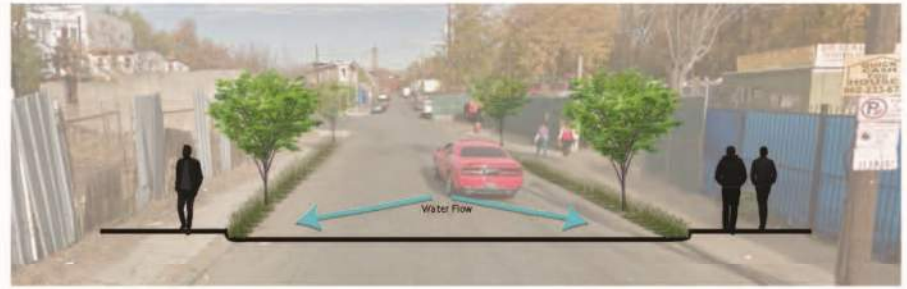
Wait Street: 36'
Goffle Road: 40'
E Main Street: 44'
Murray Avenue: 45'
Presidential Boulevard: 46'
Totawa Avenue: 47'
Main Street: 49'
Straight Street: 49'
Preakness Avenue: 50'
Paterson Street: 50'

Medium Streets: 51 to 65 feet wide

River Street: 55'
Belmont Avenue: 55'
Temple Street: 57'
Market Street: 56'
Wagaraw Road: 59'
W. Broadway: 60'
Grand Street: 64'

Large Streets: 66 to 80 feet wide

Union Avenue: 70'
Broadwy: 71'
Memorial Drive: 79'



A section perspective of Presidential Boulevard in Paterson New Jersey.
These 2 foot wide "**Green Gutters**" can be implemented on more narrow streets to maximize the storm water retention within a small area

A section perspective of Market Street in Paterson New Jersey.
These 6 foot wide "**Roadside Bioswales**" can be implemented on **medium to large streets to hold and retain stormwater runoff and** lessen the amount of rainwater that ends up in Combined Sewer Systems

Memorial Drive is a 79 foot wide four-lane road. A long stretch of 15 foot yellow line dividers serve as optimal location for a **bio-swale divider to collect and clean run-off. Areas where** turning lanes exist could have metal grates to continue the water storage swale.

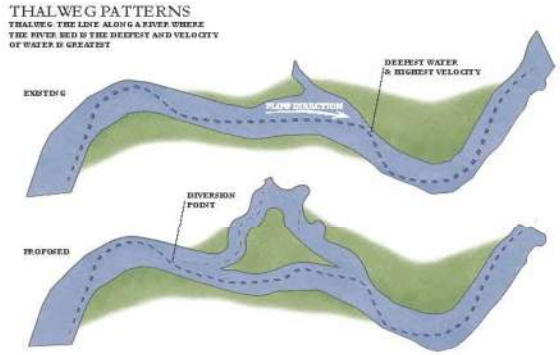
SITE A

WETLAND PARK

GOALS	PROPOSAL
MITIGATE FLOOD WATER	SPONGE ISLAND AND BANKS
RUNOFF STORAGE	GREEN ROOF CONNECTED TO WATER RETENTION SYSTEM
FILTER RIVER	RIVER DIVERSION

Figure one shows the site plan of this site. It sits within the existing West Side Park and JFK High School boundaries. Listed above are the main goals and plans for the site. The sole purpose of this design is to serve as a sponge - both filtering some of the diverted Passaic River as well as water coming from a nearby stream, as well as storage for run-off and flood water. Other additional benefits include public educational opportunities and continued recreational possibilities.

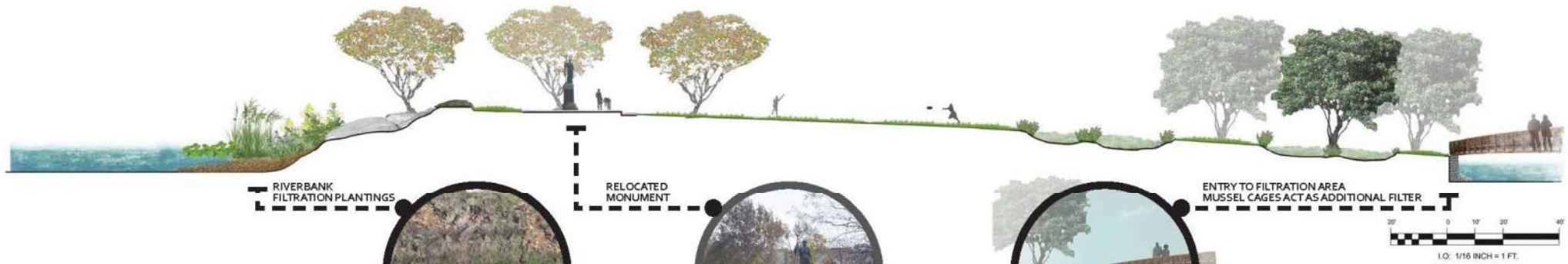
1 PLAN VIEW



Shown above is a diagram of the Passaic River thalweg patterns running through my site. It shows the existing versus proposed, and was strategically analyzed to allow for one-third of the rivers water to separate from the main body at the diversion point.

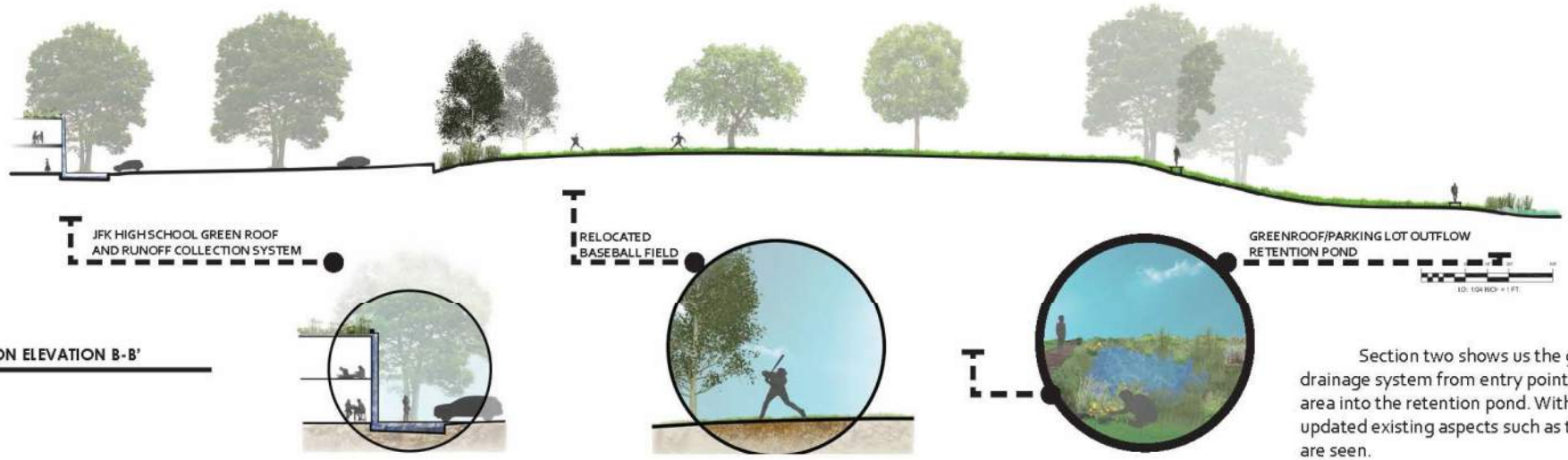
Below is the general planting palette for this site, categorized into four parts, each designated for a specific function within the site. The most important plants involved are the marshland and emergent plants, for the aid to filtration and storage on the site.

PLANT PALETTE



2 SECTION ELEVATION A-A'

This section and accompanying views are pieces of the built island. Within this cut from the diversion side to the outlet side, the filtration, storage and vegetation infrastructure are shown in relation to each other.



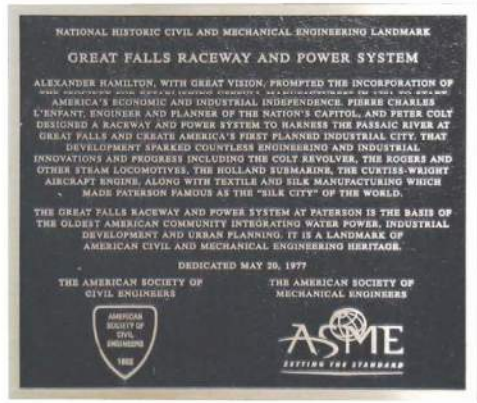
3 SECTION ELEVATION B-B'

Section two shows us the green roof drainage system from entry point, and the outflow area into the retention pond. Within each side, updated existing aspects such as the baseball field are seen.

SITE B

DIVERSION PARK

The proposed revival of Paterson's Raceway System will see an improved entrance to the park as users are greeted by the sound of water flowing throw Paterson's great canal system once again. This renewed flow of water diverted from the Passaic River will be complimented by an innovative linear wetland system throughout the canals to help filter out unwanted pollutants. The adjacent racewalk offers a scenic trail stretching the full expanse of the racway network while paying homage to the rich industrial history of the area.



Plant Palette

Salix Sepulcralis
Weeping Willow

Phragmites Australis
Common Reed

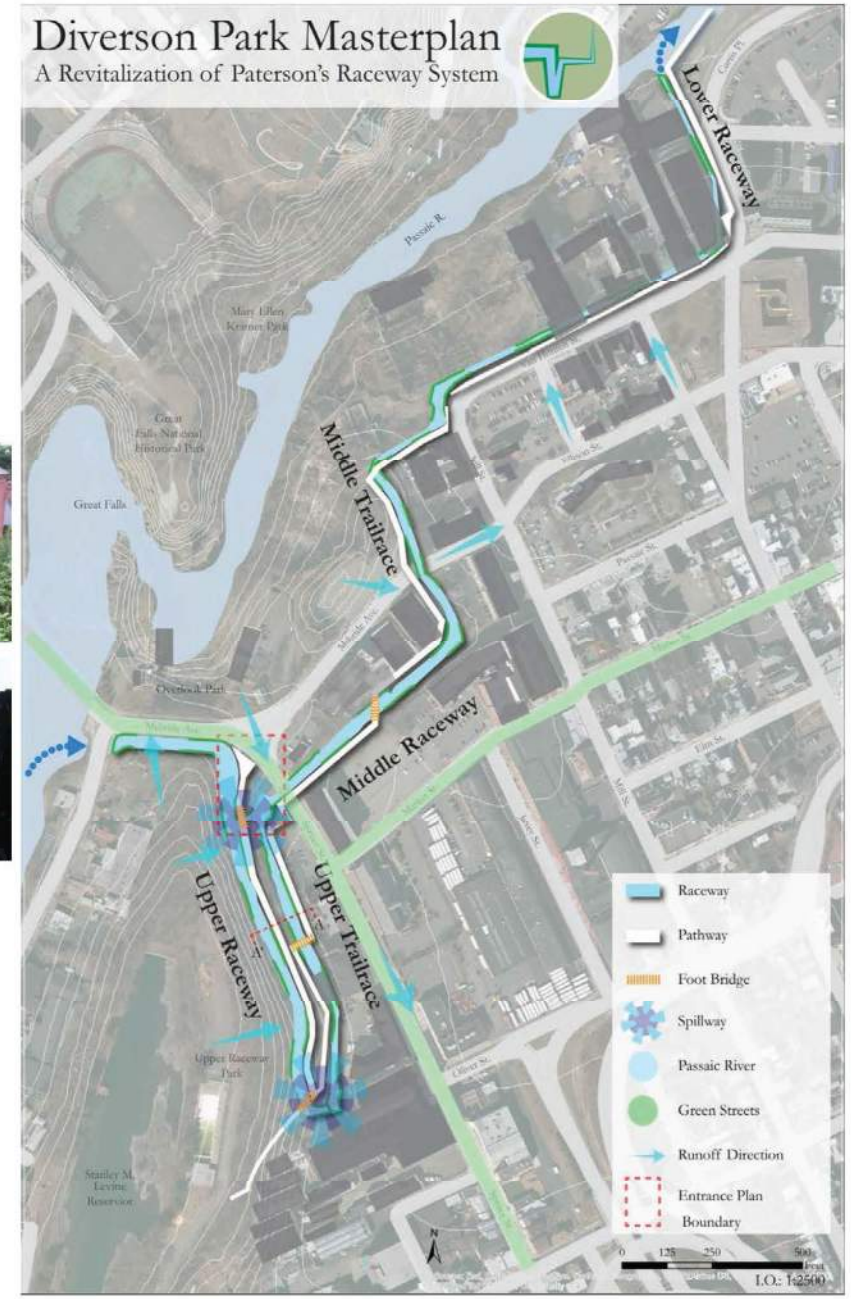
Cyperaceae
Sedge

Cornus Florida
Flowering Dogwood

Typha
Cattail

Saururus Cernuus
Lizard Tail

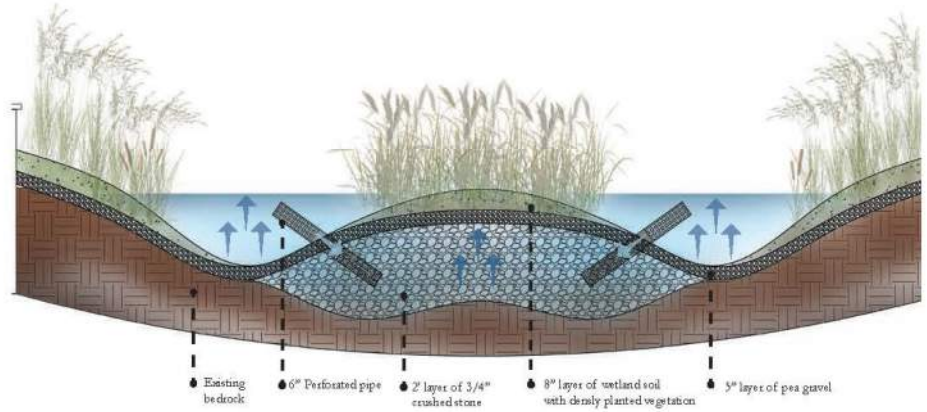
Existing Condition



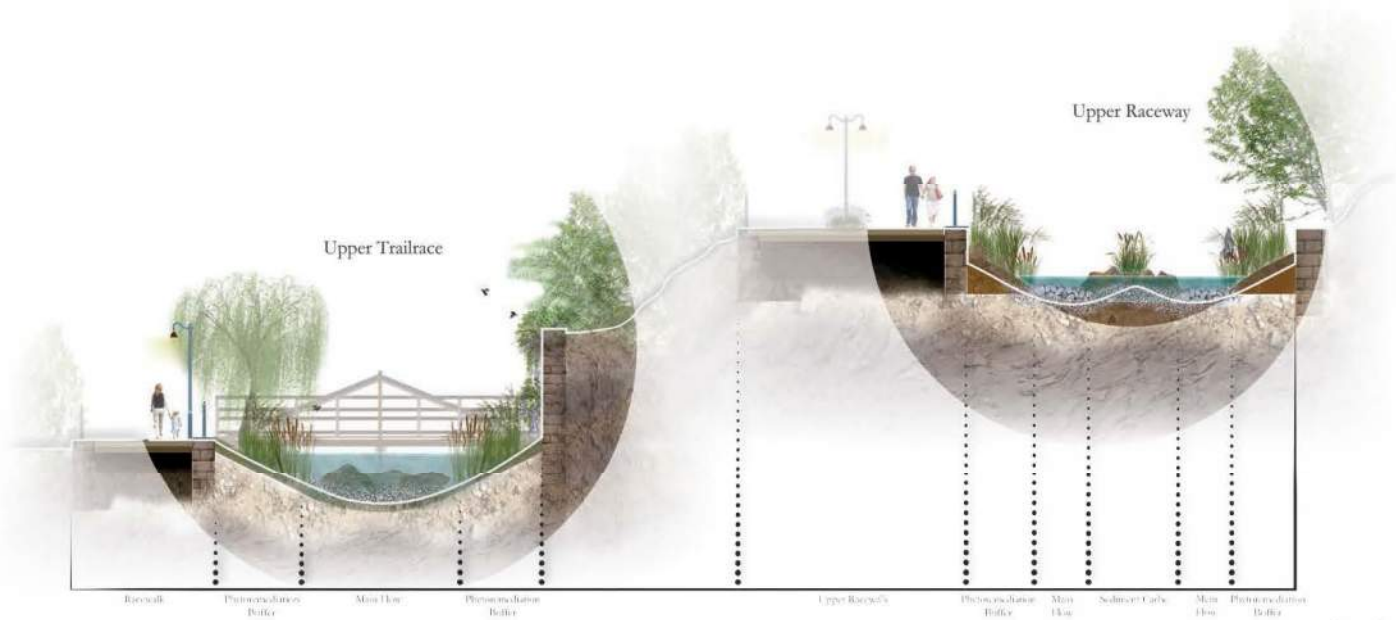
Diversion Park Entrance

Subsurface Gravel Wetland Detail

(Within Raceway)



These Vegetated Subsurface Gravel Wetlands will be implemented within parts of the Raceways to aid in cleansing the water that is diverted from the Passaic. The water will enter the raceway where portions of it will then encounter these constructed landforms which remove up to 80% of total suspended solids. Water will percolate and flow through these gravel basins that will naturally line with a biofilm of algae and microbes over time. This biofilm will adhere to and intercept suspended solids in the water. The vegetation within the raceway will have a similar pollutant absorbing effect. Plant species such as cattails, Fragmites, Sedge, and ragweed will help to regulate the pollutants in the water as well. The power to control flow into the raceways will allow for easy maintenance.



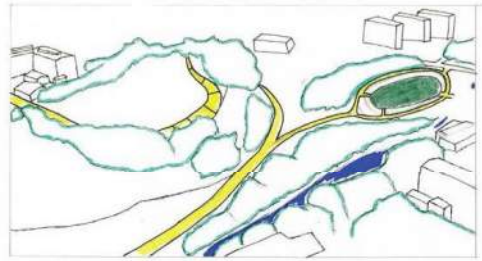
SITE C

DETENTION PARK

The plan view of the intervention highlights both the specific outlines of the areas to be developed, as well as the proximity of the two locations relative to one another.

Aerial View

Perspective Sketch

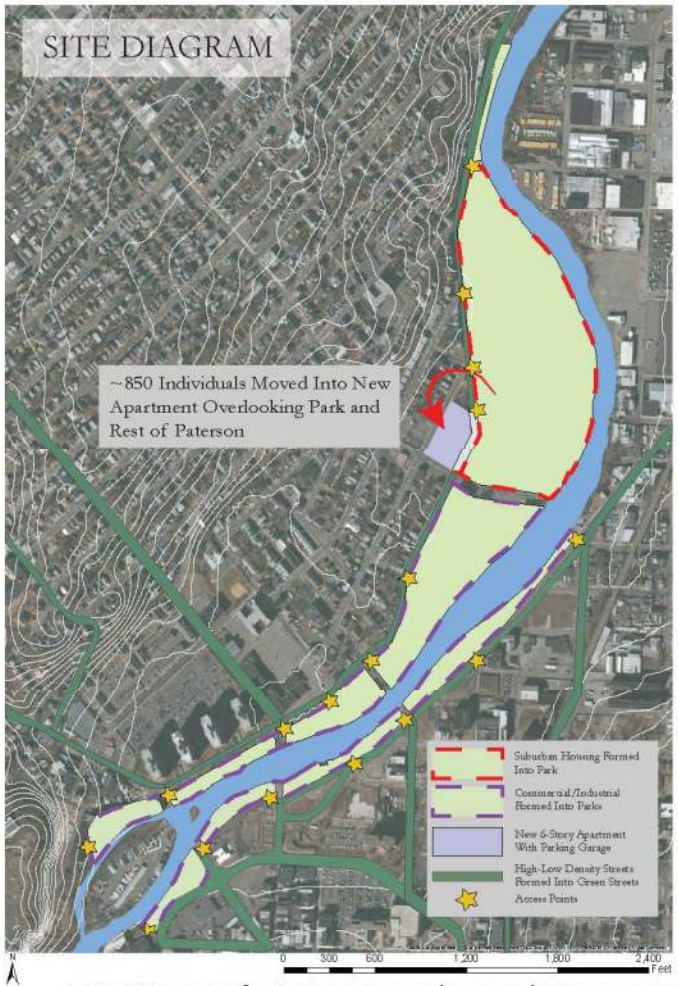


Detention Park converts a concrete island stuck in a fork of the Passaic River into a multifunctional flood mitigation and recreation asset. River flow is diverted into the park, while maintaining the original branched path flowing around the new park. During flood events, the peak discharge of the Passaic River will be partially channeled through the intake pipe at the beginning of the park, and will be slowed through the various levels of the basin until it is slowly re-released into the main body of the river. In between flooding events, the park serves as a large open space recreation area. The bottom level of the detention basin consists of an open grass field, which residents have the liberty to use for any activity they choose. The path leading up to the park continues around its outermost, highest elevated edge, alowing for a recreational route both during and between flood events.

Overlook Park sits atop a cliff previously home to a failed residential development, with close proximity to Detention Park. The same multi-use path leading to Detention Park also follows the curve of the cliff and leads pedestrian traffic through a wooded trail up to Overlook Park. As the dense forest clears visitors to the park are greeted by both a large lawn area sloping up to the cliff edge, as well as an observation walk along the edge. The observation walk provides a scenic view of the city of Paterson and provides a better persepective of the Detention Park as a whole.

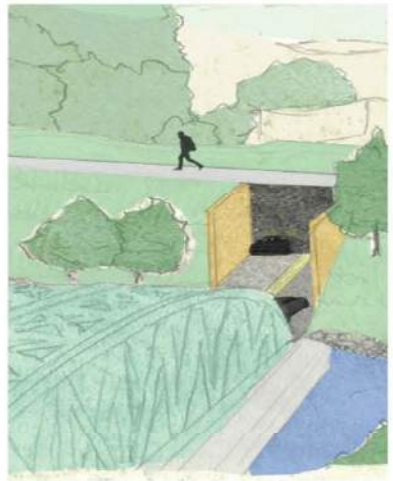
SITE D

BARRIER PARK



A Site Diagram of existing space and propsed interventions for the Barrier Park green space system. It delinates which areas are housing and commercial/industrial, where those residents will be moved, and the new green spaces and access points

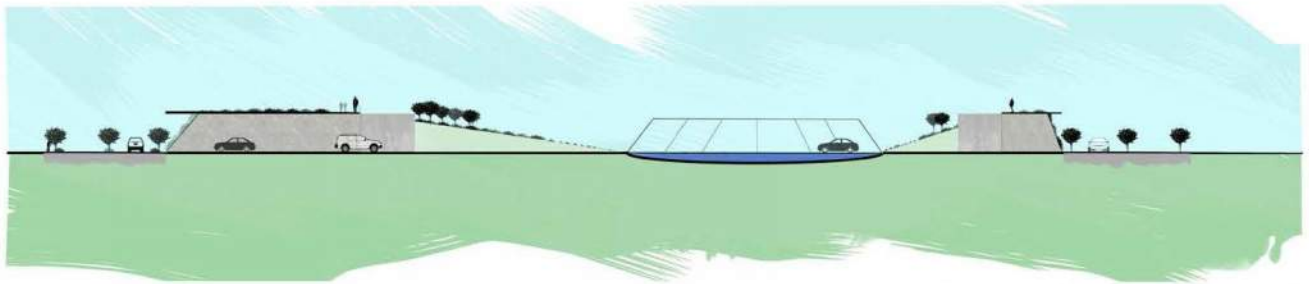
The Barrier Park green space system is a series of small to large green spaces that act as barriers to block rising flood water from the Passaic River. The design consists of differing elevations, peaking at 20 feet above existing grade. It also consists of pathways at multiple elevations, dense soft border plantings, ada accesible ramp coming from the proposed residential apartments, and rip rap lining the edge of the green space to help prevent soil erosion. Around the parks are green street to slow down the storm water runoff.



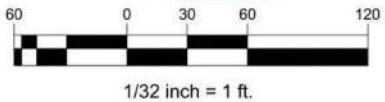
A perspective drawing of the interaction between the existing bridge, and the flood wall tunnel.

Section A-A'

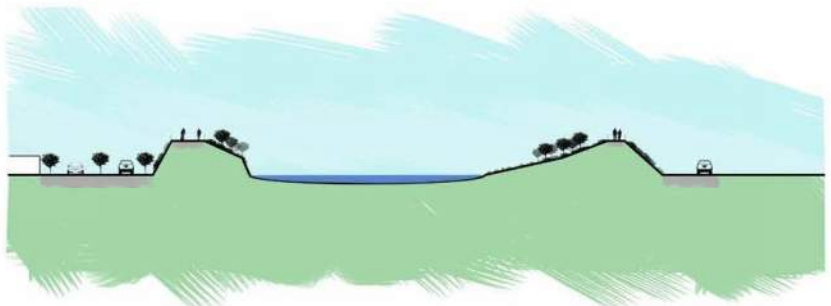
Section A-A' is a long section that cuts through the proposed residential apartments, the tunnel with terrace above, and the gradual slope that lowers itself into the Passaic River. This section of Barrier Park has two walkways, one 20 feet above existing grade and another 10 feet above. The lower path is expected to flood during intense storms.



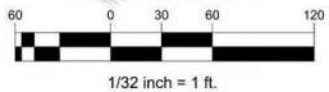
Section B-B'



Section B-B' is a section cut through a green street, flood wall tunnel, over an existing bridge, and over to the other flood wall tunnel on the other side of the Passaic River. This section shows how the roads were not raised or altered, but the green spaces were built around the existing roads. Also, the flood wall doors are there to be closed during intense storms.



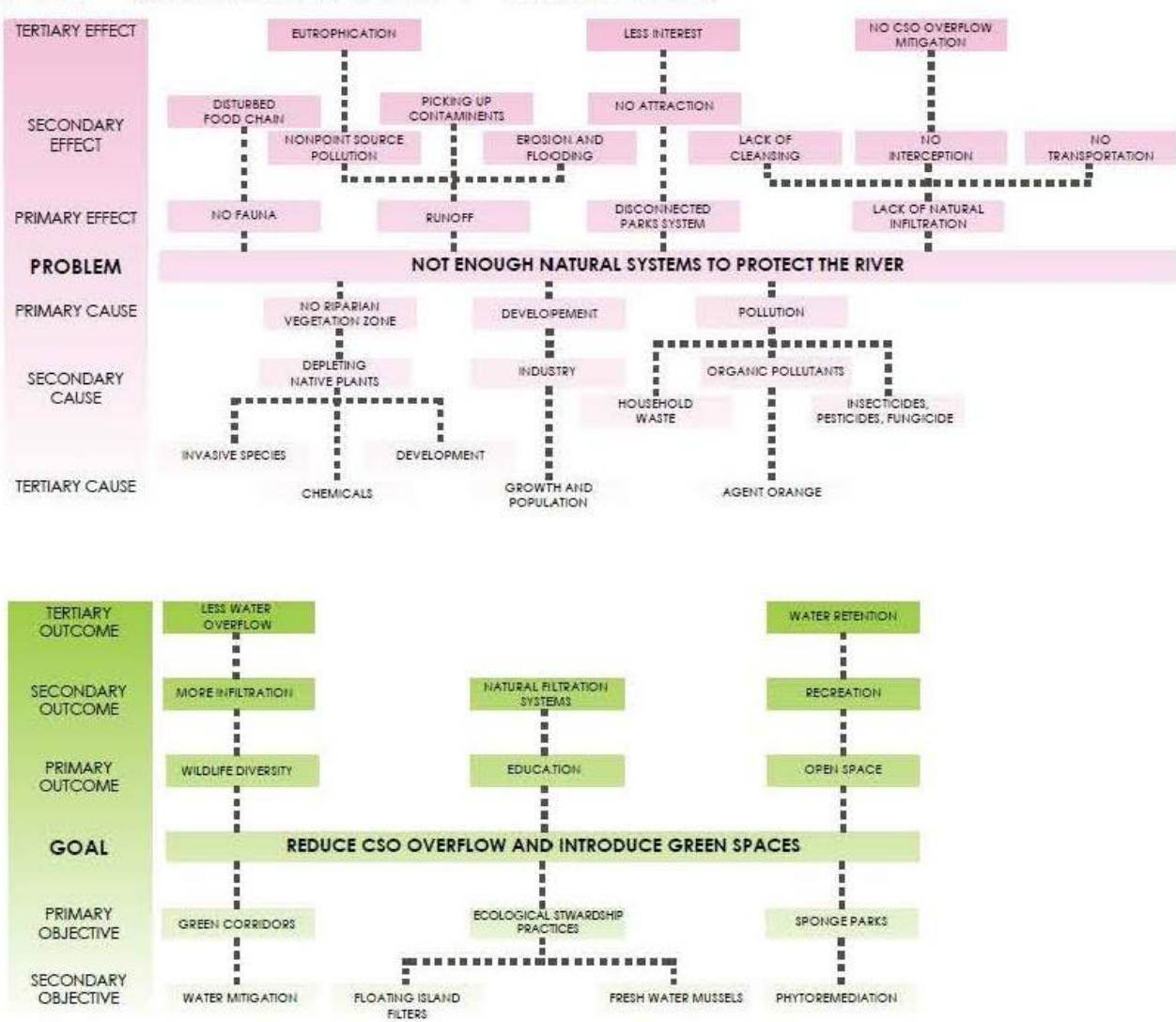
Section C-C'

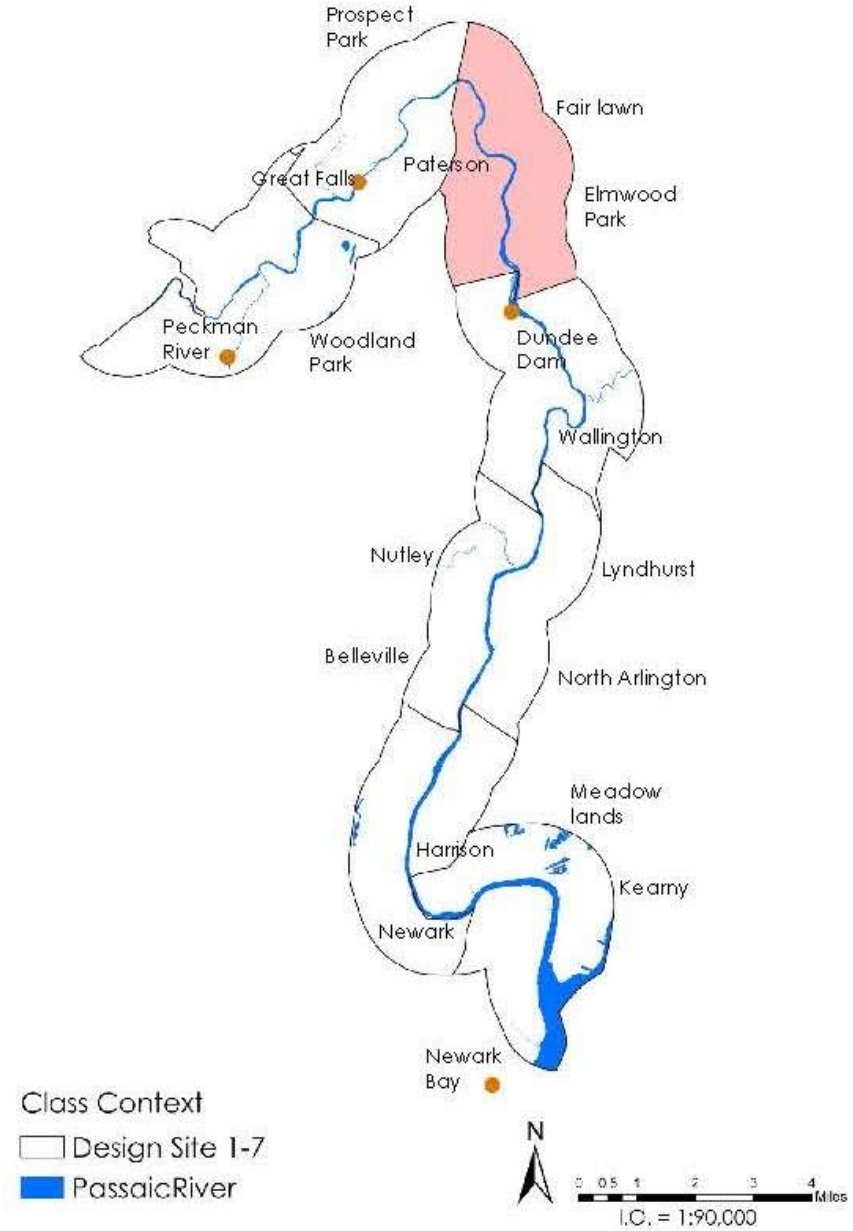


Section C-C' is a section cut through the more narrow section of the Barrier Park green space system. The cut runs through a green street, a green space, the river, and mirrors the other side. This section contrasts Section A-A' as the slope in this section is much steeper. Also, there is one walkway located at the highest elevation on both sides of the river.

Elmwood Park, Fair Lawn, Paterson

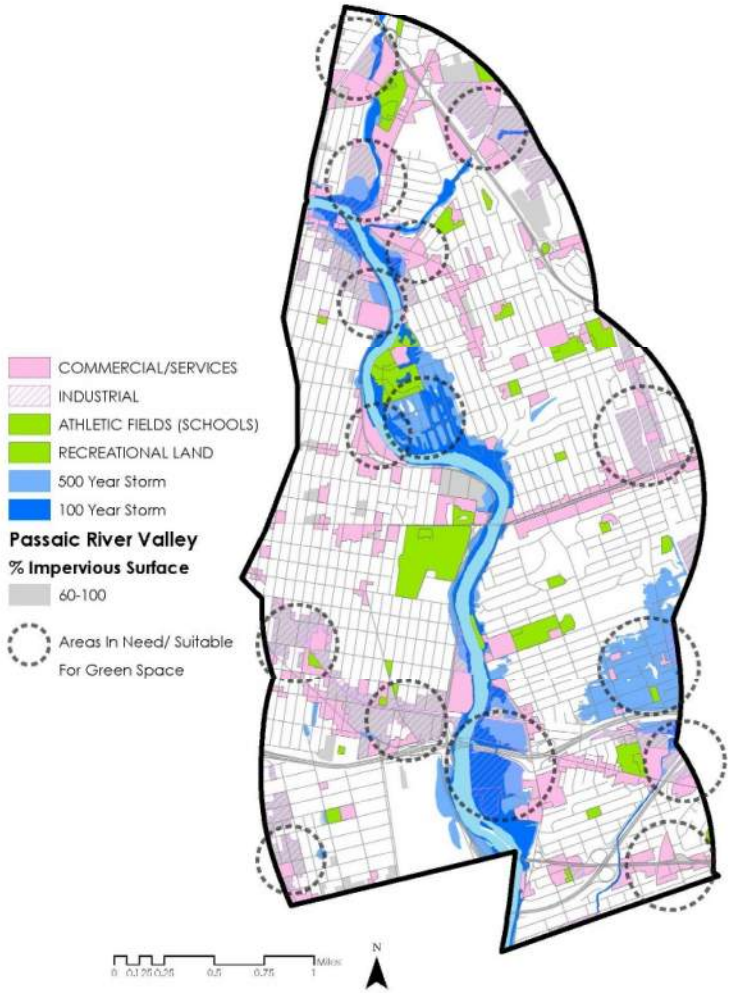
Group 3: Emily Otterbine, Alexis Lo, Giselle Peña, Emily Toth



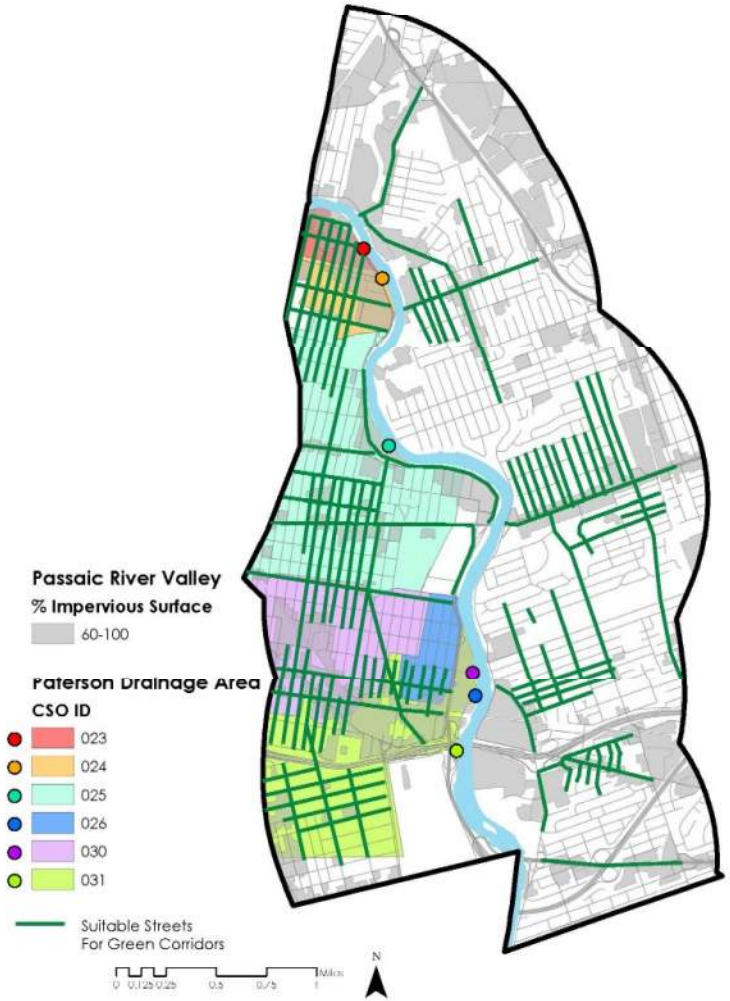


Suitability Maps

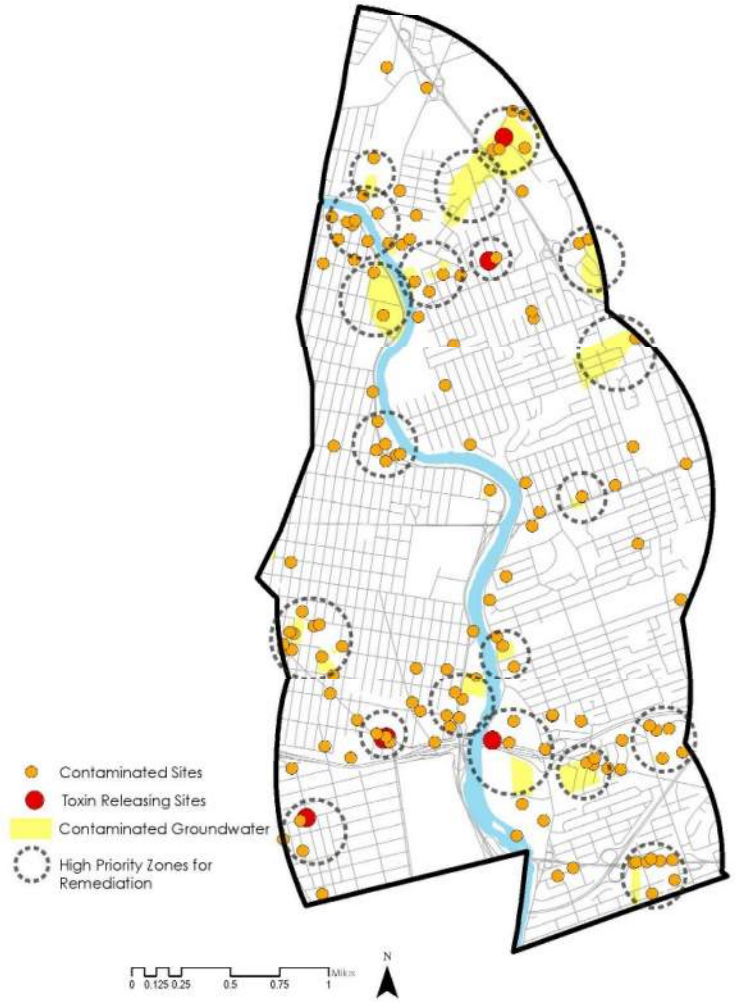
Need/Opportunity For Green Space



Green Corridor



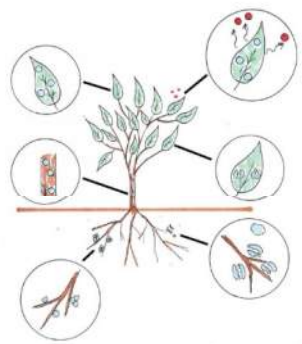
Remediation Zone



Remediation Strategies

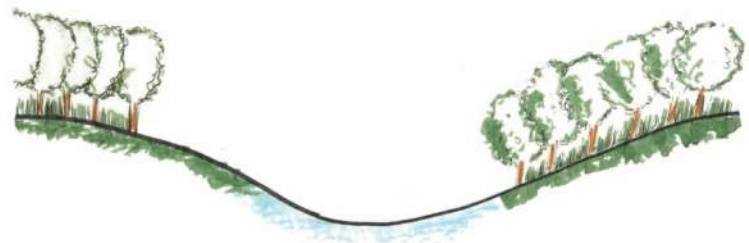
The proposed remediation strategies will help reduce CSO overflow, flood zones and pollution both in the soil and water. These strategies are all environmentally friendly and offer an aesthetic alternative to the typical grey infrastructure environment.

Phytoremediation



Phytoremediation is the technique of using specific plants to remove or break-down contaminants in the soil and groundwater. Phytoremediation can be broken into four subprocesses: Phytoextraction, Phytodegradation, Phytostabilization, and Phytovolatilization. Simplistic definitions are as followed. Phytoextraction is the process of plants removing and storing contaminants from the soil or water. Phytodegradation is the process of plants breaking down contaminants in the soil or water. Phytostabilization is the process of plants reducing the mobility of heavy metals in soil. Phytovolatilization is the process of plants uptaking and transpiring contaminants through leaves.

Constructed Riparian Zones



A riparian zone is a buffer area between a water body and inland. This area normally includes a variety of lush plants and trees due to water and nutrient availability. Although these water bodies already have a green space buffer, they are negatively impacted by development in that area. This development is almost always residential and or highway use. Restoring this elevated buffer near a body of water is essential because it helps filter water and soil, trap sediment and slow down water runoff. This can potentially reduce the challenges earlier presented. Riparian zones also provide corridors for wildlife to live and travel and the opportunity for educational practices.

Floating Island Filters

Floating Island Filters are made up of floating recycled material that holds adaptive and native vegetation. The vegetation sits above the material, while the roots extend down and filter the water. These filters are held near the shore to catch pollutants and debris.

Mussel Filtration

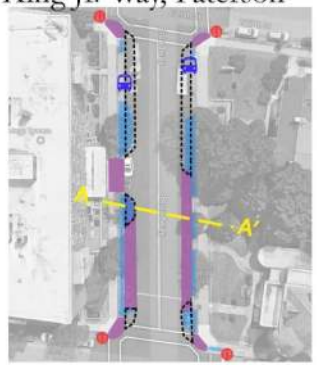
Mussels can be used as water filtration aids. The specific mussel that will be used is the freshwater pearl mussel (*Margaritifer margaritifera*). This species of mussel is native to North America and New England. Filter feeders such as these act to clarify water. The mussel has siphons, which are organs that organic particles enter through and clean water is pushed out.

Model 1:

Dr. Martin Luther King Jr. Way, Paterson

Applications:

- Curb Extensions
  - Pinch Points
  - Bus Bulbs
  - Gateways
- Bio-retention
- Porous Pavement
- Existing drains
- Bus stops



Implementation of pinch points and bump-outs where storm water could drain via stormwater inlet into a bio-retention cell that would both mitigate the amount of run off headed for the CSO systems while also providing a small amount of filter treatment to the water.

Installation of porous pavers in parking lanes and sections of sidewalk that may be susceptable to nearby impervious runoff or pooling water.

Retention cells adjacent to parking lanes will be covered by grates where they will be without plantings but layered with appropriate aggregates to encourage inflitration into the native soil.

Model 1 & 2 Intersecion:

Berdan Avenue & River Road, Elmwood Park

A moderately busy four-way intersection with commercial businesses, bus stops, and nearby residential neighborhoods presents many opportunities for parking bump-outs, corner curb extensions, and porous pavers.

River Road may be implemented with subtle curb extensions in its turn-only lanes while thru-traffic lanes may be slightly narrowed near the intersection to allow more space for curb extension that will taper off when met with a parking lane or another turn-only lane down the block. Bus stops will be widened into bus bulbs with pervious surfaces accompanied by basins.

Pedestrian crosswalks will also be paved with brightly colored permeable materials, and finally, existing grass sidewalk buffers will be transformed into bio-retention cells.

Model 3:

Broadway, Elmwood Park - Fair Lawn

Intervention is limited on these roads due to high speeds and heavy traffic leaving only room for subtle curb extensions with minimal plantings as to not obstruct emergency and breakdown lanes.

Grate-covered swales may be placed within narrow road areas such as rumble strips where grates may be corrugated to reproduce the sound effect of the strips, or near/beneath Jersey Barries where water is not efficiently drained.

Medians will become bio-retention basins where any of the nearby grated swales could drain from the road.

Parking lane pinch point with bio-retention gardens within

Porous pavement alongside a grated retention cell

Bus bulbs fitted with porous pavers accompanied by bio-retention gardens

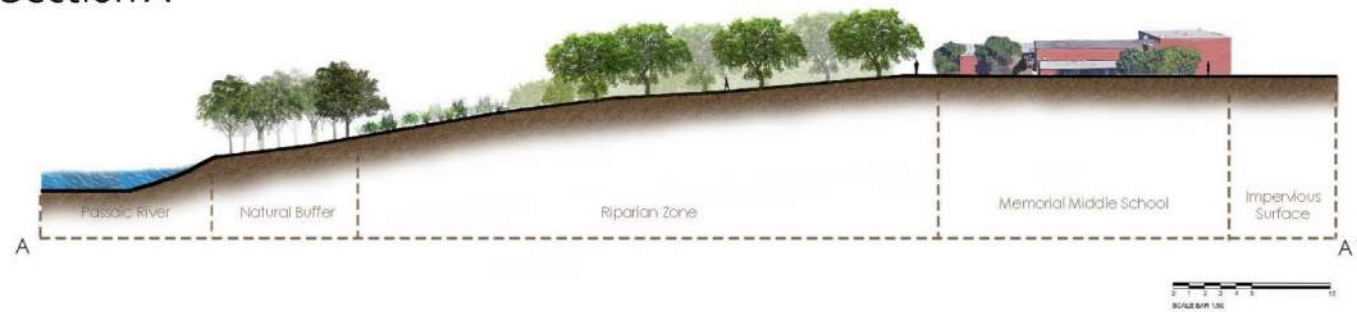
Bus bulbs fitted with porous pavers and grated swales

Planted median

Porous pavement in between a grated retention cell and rumble strip swale

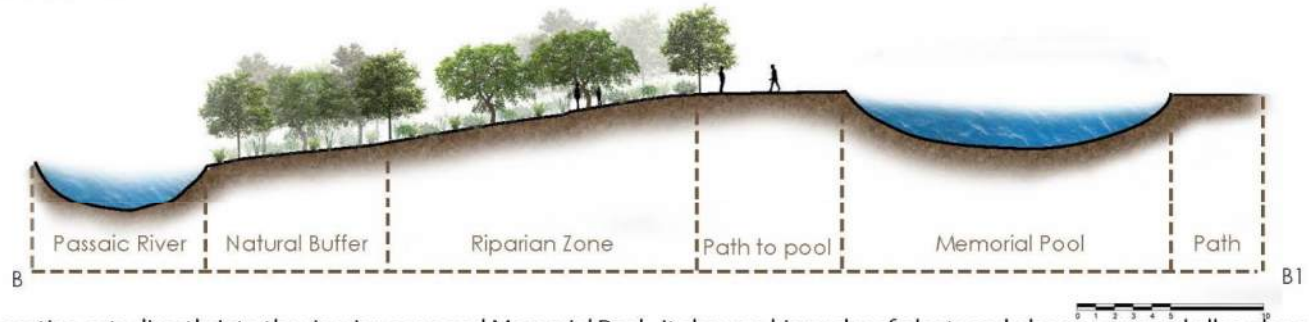
Riparian Zone Plan

Section A



This section depicts the Passaic River and its natural buffer which is about 50 ft. wide. The proposed Riparian zone is about 175ft. long and provides a variety of trees and shrubs and herbaceous plants that will help slow down water run off into the river. Keeping the existing natural buffer near the river will help to stabilize the soil and offer filtration through its roots. The riparian zone also extends all the way to the Memorial Middle School which can provide educational opportunities and a possible field trip for students

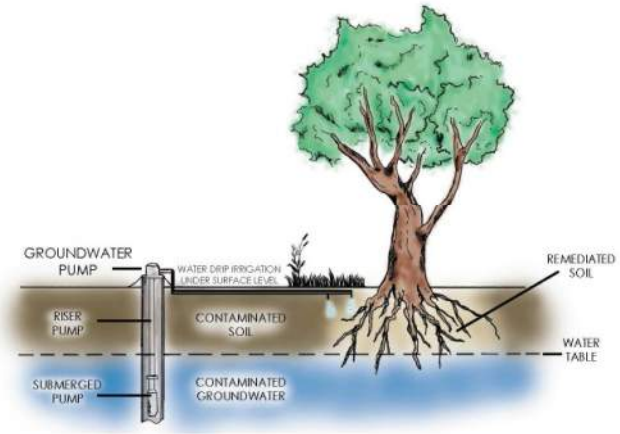
Section B



This section cuts directly into the riparian zone and Memorial Pool. It shows a hierarchy of plants and also an arranged allee along the path that would connect the riparian zone to the following Flood Plain park. Because the existing site is flat, the riparian zone would have to be regraded in order to redirect water back into the river and into the Flood Plain park.

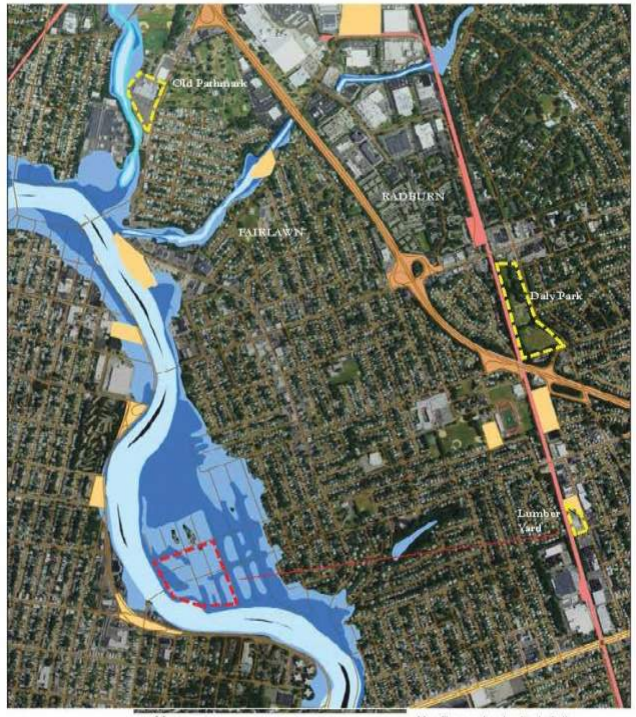
Bio-Reference Lab Plan

Bio-Reference Lab Diagram

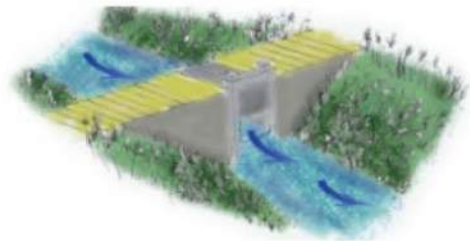


Bio-Reference Lab Section

This site will still be functional for the current users of the building. The groundwater contamination is located beneath the entire parking lot and building. To collect and "filter" stormwater throughout the site without removing the existing structures, a groundwater pump system has been created to fit this specific site. This system could theoretically be applied to multiple sites as long as the parameters fit within this site's context. The pump would move contaminated water upwards to a set of irrigation lines that would bring the water directly to the roots of the plants within the phytoremediation zone. These irrigation lines will be below the surface level so it will not be a direct threat to the surrounding people.



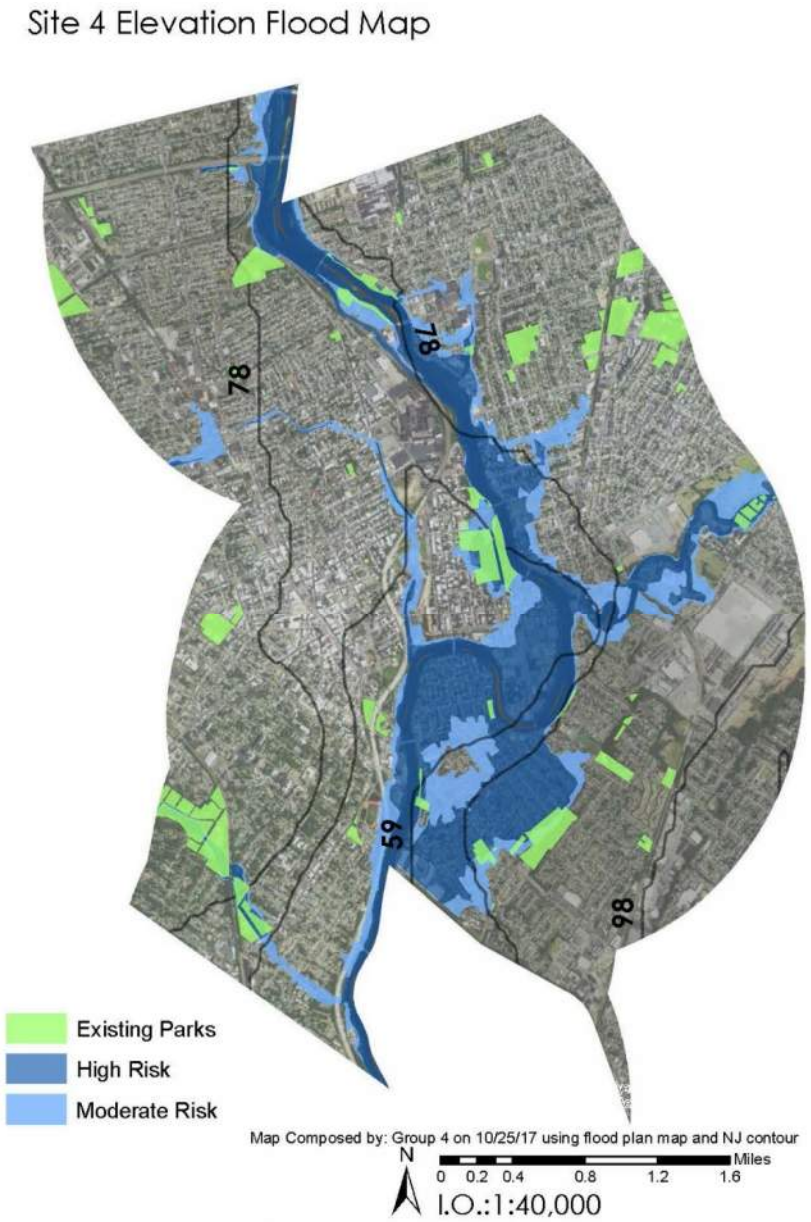
Flood Basins are a depth of 4' from the trails. The stream bed is a depth of 1'. The basins include wetland meadow plants that can survive flooding as well as tolerate drought conditions.

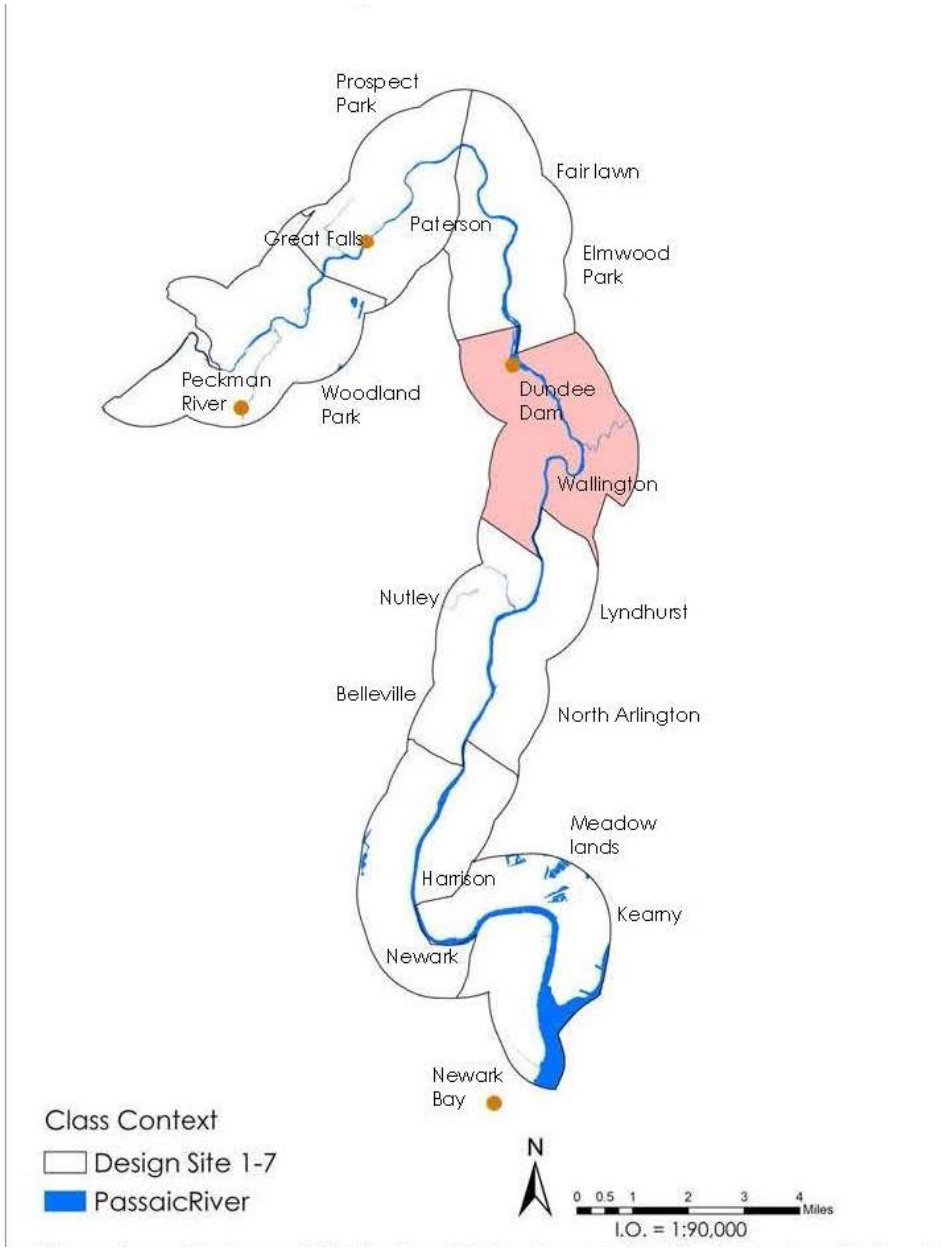


Sluice gate: Control the flow and speed of water through the flood basins.

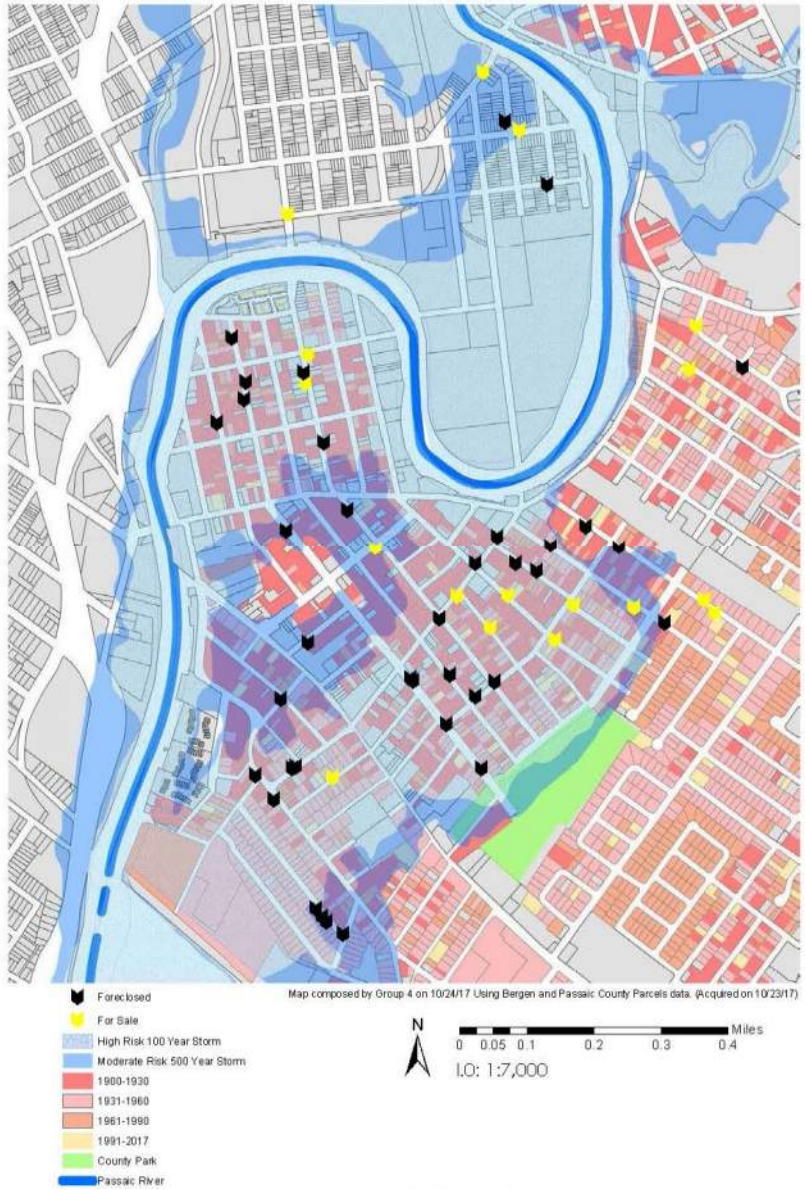
PASSAIC, WALLINGTON

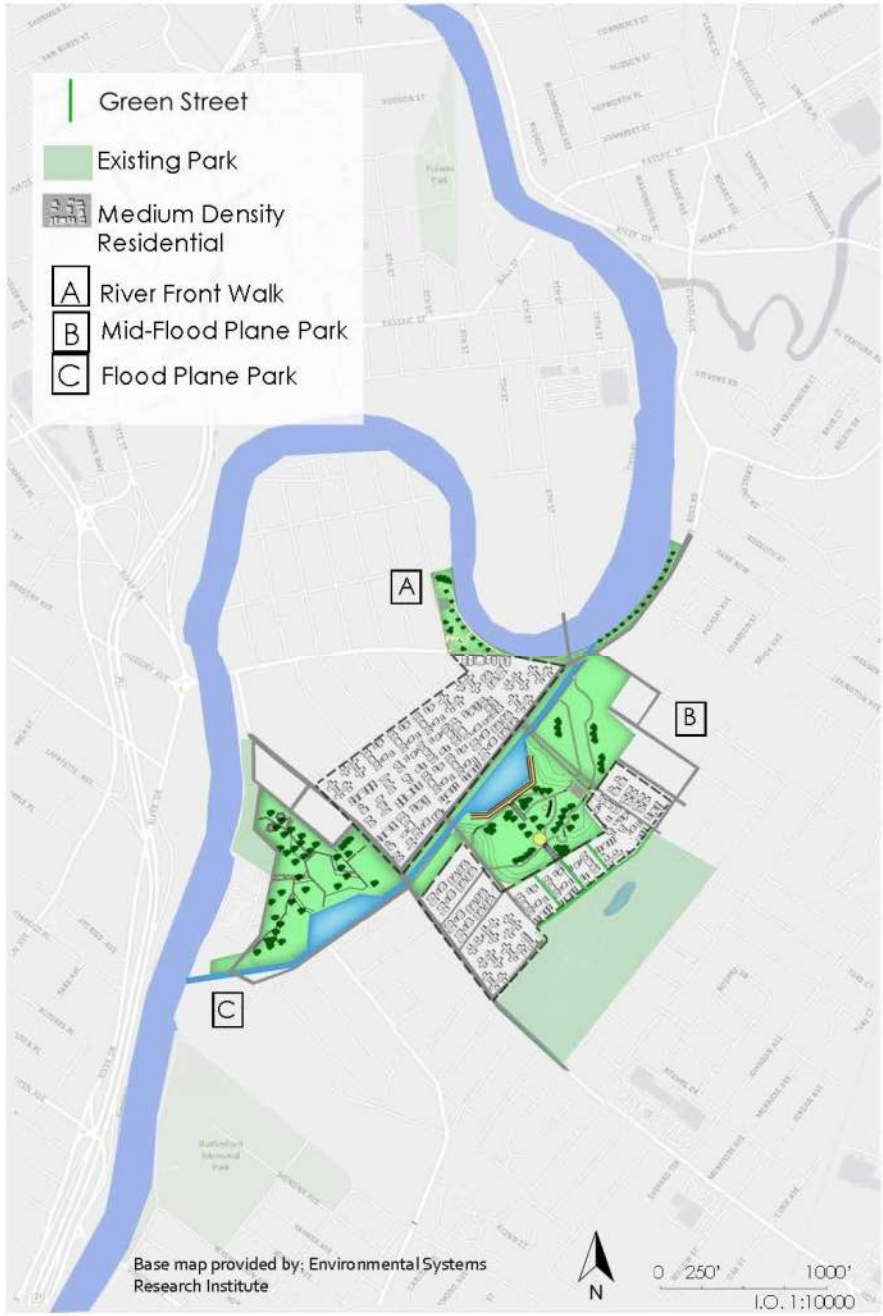
GROUP 4: WENJIA (ANNA) YAN, ROBERT COOK, ALEXANDER GLASSER





Residences For Sale and Forclosed in Wallington Area In Flood Zones





Site A: Wallington Riverront Walk

Site A is situated along the bank of the Passaic River. On the Master plan, there are currently two small existing parks. One located on the upper right side of the map and one on the upper left side of the map. The design intent of this intervention is to connect the two parks, create community involvement and mitigate flooding.

With the use of a riverfront walk, the two existing parks will become one. The walk will be adjacent to the Passaic River, which will create beautiful sightlines to the water's edge. To connect to the community, the design provides social programing with the use of a small pocket park. This pocket park, consists of multiple gathering spaces for community events as well as a small playground for neighborhood kids to play in.

Due to Wallington being on the curve of the river, erosion and flooding is a huge issue. A boulder bulkhead will help prevent the erosion of the banks, and create a barrier to help prevent flooding. At the mouth of the canal, there is a pedestrian foot bridge that is also a weir. This helps control the fluctuation of water able to go into the canal.

Site Intervention A.

Base map provided by: Environmental Systems Research Institute

1. Pedestrians are able to walk under 8th St. Bridge and have an uninterupted riverfront walk from one side of the park to the other.

2. The pedestrian bridge over the canal showcases the weir that controls the flow of water from the Passaic River into the canal.

3. Riverfront walk with views of the Passaic River.

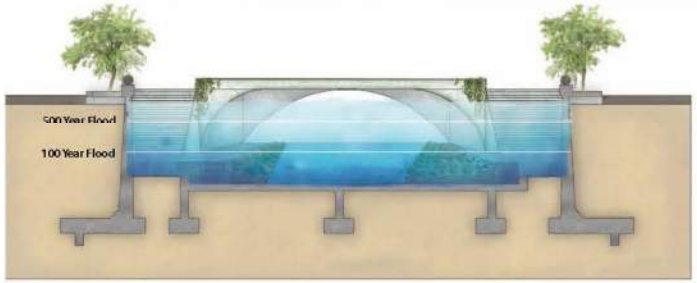
Site B: Wallington Mid Flood Plain Park

The intervention of site B is located along Locust Ave and continues until Paterson Ave. Samuel Nelkins park, is a county park nearby.

Currently this site is entirely residential housing. These homes are in moderate to high risk flood zones. In removing these residences, the area will become the flood plain park. This area will contain the floodwaters with its bowl shaped topography, and slowly release the water during a flooding event.

The park will boast a spillway and a decking area that allows visitors to enjoy the artificially created wetland habitat area that will be naturally resilient to flooding. All other vegetation and plants will be resilient to flooding, as well as the furnishings and materials used. Low maintenance furnishings and plants are key in a flood plain park due to the possibility of constant inundation and months with ought attention.

The canal-spillway-floodplain combination will be able to lessen the blows of flood events and prevent damage to residential housing by removing it from the picture.



(Above) Section of canal during 500 year flood event. (Right) Perspective looking down canal from Paterson Ave.

Site C: Wallington Lower Flood Plain Park

The purpose of the Lower Flood Plain Park design is to contain excess overspill water from the canals currently in place to protect residential areas during floods.

This concept is based on removing the buildings within the affected area and replacing the current paths with new ones that preserve the tree pattern already in place. This space will then be differentiated into big spaces for large amounts of people, and small spaces for more privacy based on the tree density of the area.

The park that is already in existence will be connected so that the paths align with each other, but the original park will remain open, while the new space will be an enclosed space to relax in. In order to keep harmony with the population, there will be a playground installed for children to play in. There will also be a skateboarding park for older teens to hang out in located further away from the more populated areas so that the sounds will not disturb the residents. For greater convenience for the people, the welcoming park is located next to the parking lot in the eastern area of the park, so that more people may have access to it. This area will allow for activities such as festivals while also providing space for mobile stalls.

A. Private Gathering Space
B. Kids Playground
C. Welcoming Plaza
D. Parking Lot
E. Open Space Plaza
F. Spillover
G. Skatepark
H. Existing Trees

Stormwater Management

A. GREEN ROOF

B. CISTERN
To retain stormwater and be used in the building.

C. PERMEABLE PAVEMENT

D. ROADSIDE RAIN GARDENS

E. PIPE REPLACEMENT
Provide greater capacity to store and convey stormwater.

F. POROUS ASPHALT

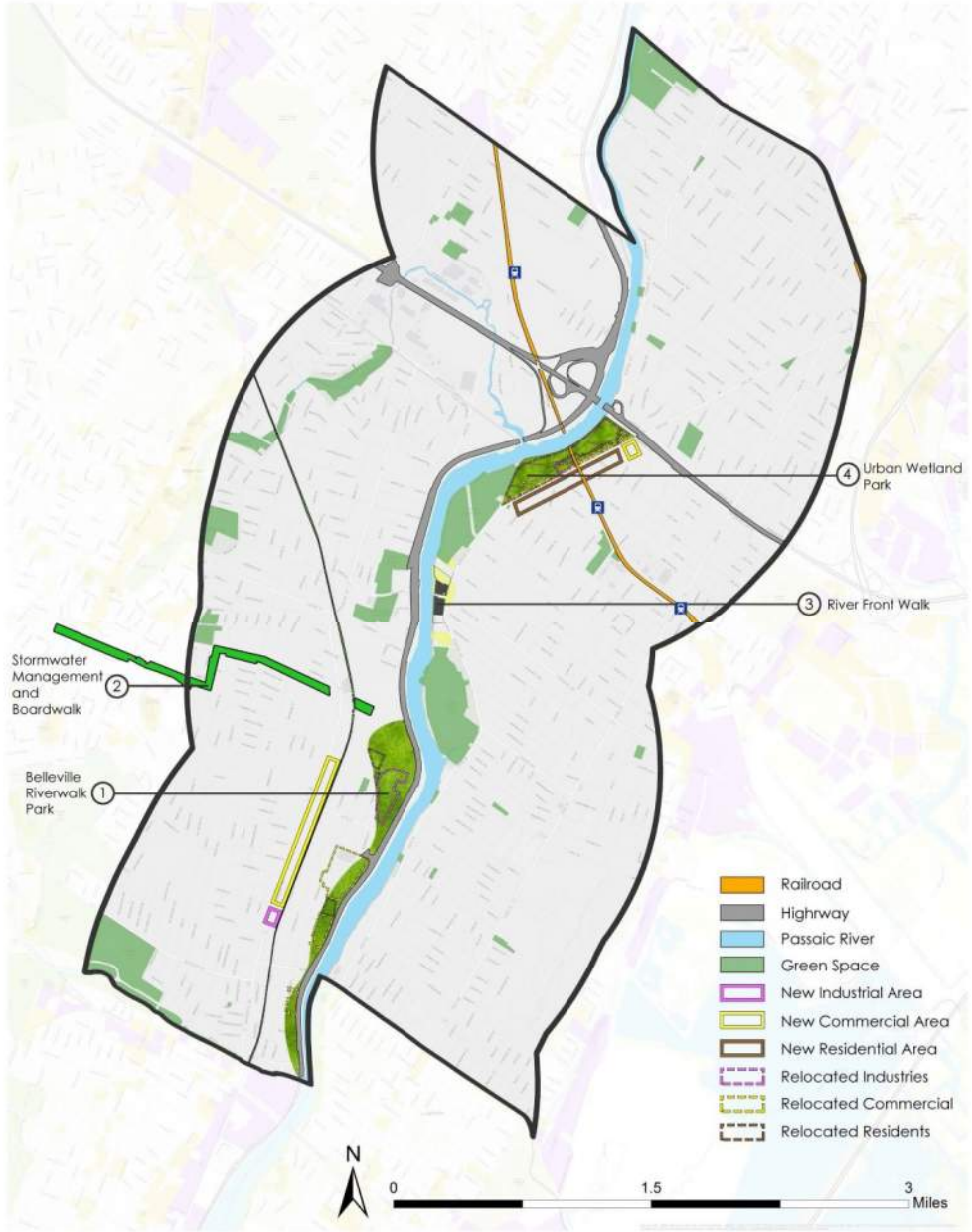
G. SIDEWALK TREES

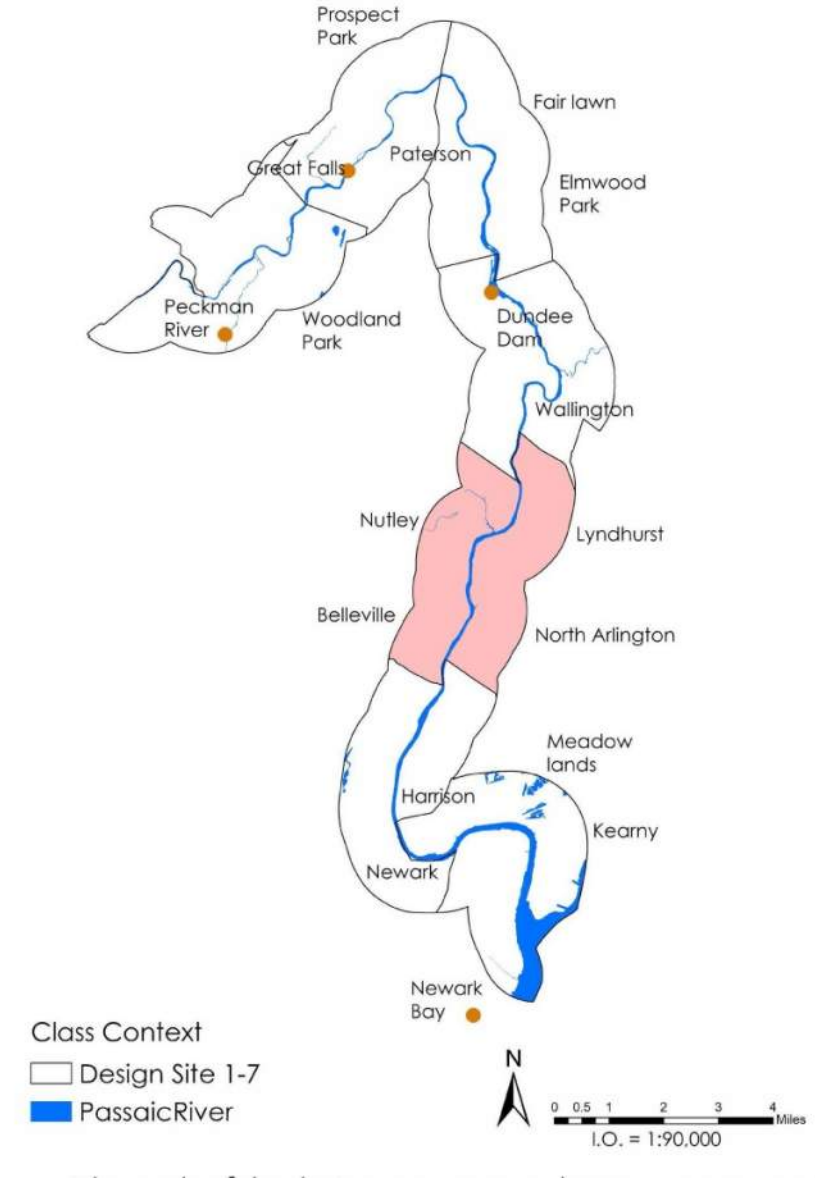
The storm water management system is a design intervention for connecting the Mid Flood Plain Park to an existing park. It reduces storm water runoff through the application of permeable pavement allows water to pass through and be absorbed by the ground beneath it, and the porous asphalt connected to a pipe replacement enables a greater capacity to store and convey storm water. The roadside rain gardens and sidewalk trees assist in reducing excess runoff. The buildings have the additional systems to redirect water from green roofs to be stored for later reuse in cisterns.

Open Space Plaza With Flower Planting Bed

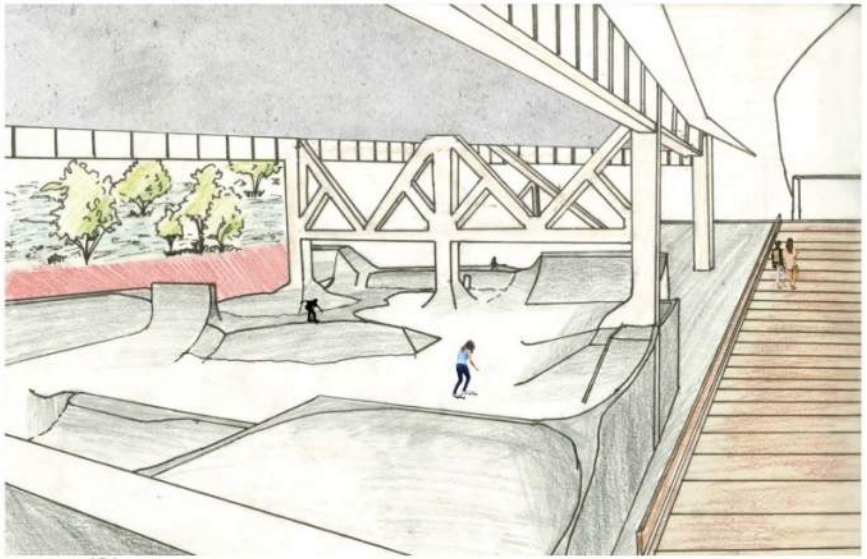
BELLEVILLE, NUTLEY, LYNDHURST

GROUP 5: SHICHENG MA, MENG GUO, TINA MAO, GRACE LI






Green Allee
Green Allee
Green Allee
Belleville Riverwalk Park
Elevated Highway & Skatepark
Passaic River
A
A'



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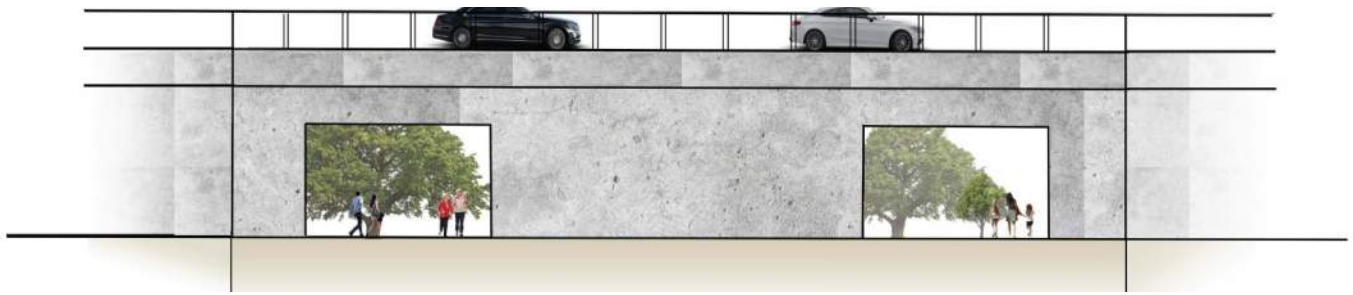



Parking Lots
Green Allee
Riverfront Boardwalk
Skateboard Park
Elevated Highway
N
0
0.25
0.5
Miles

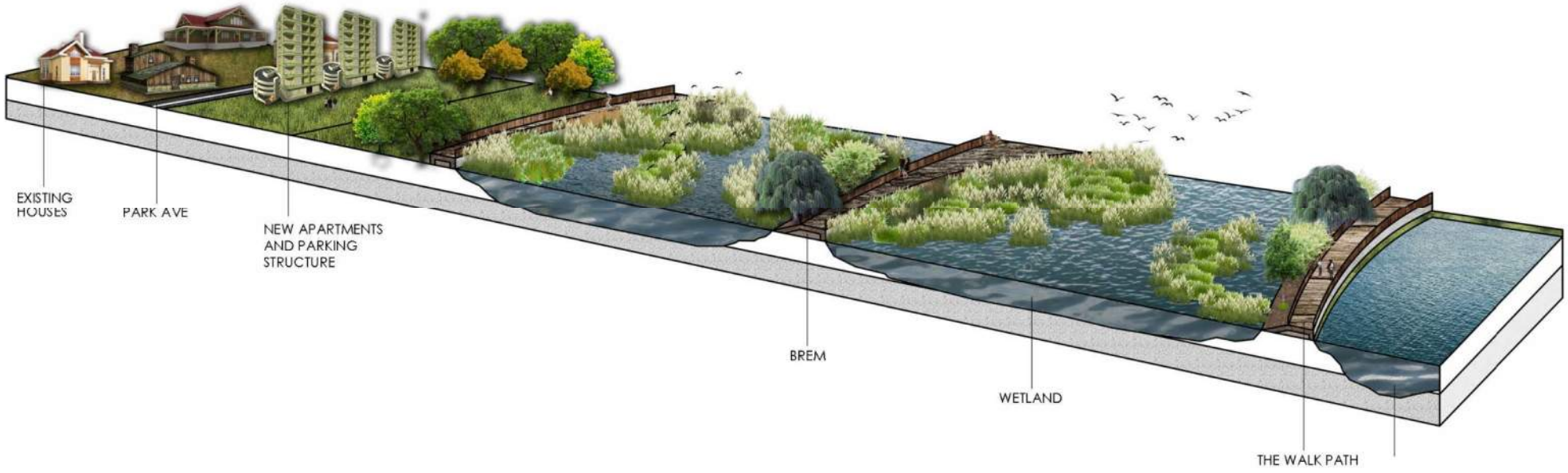

A'
A
B
B'
C'
D
D'
C
N
0
0.25
0.5
Miles
1

Figure 1

Figu

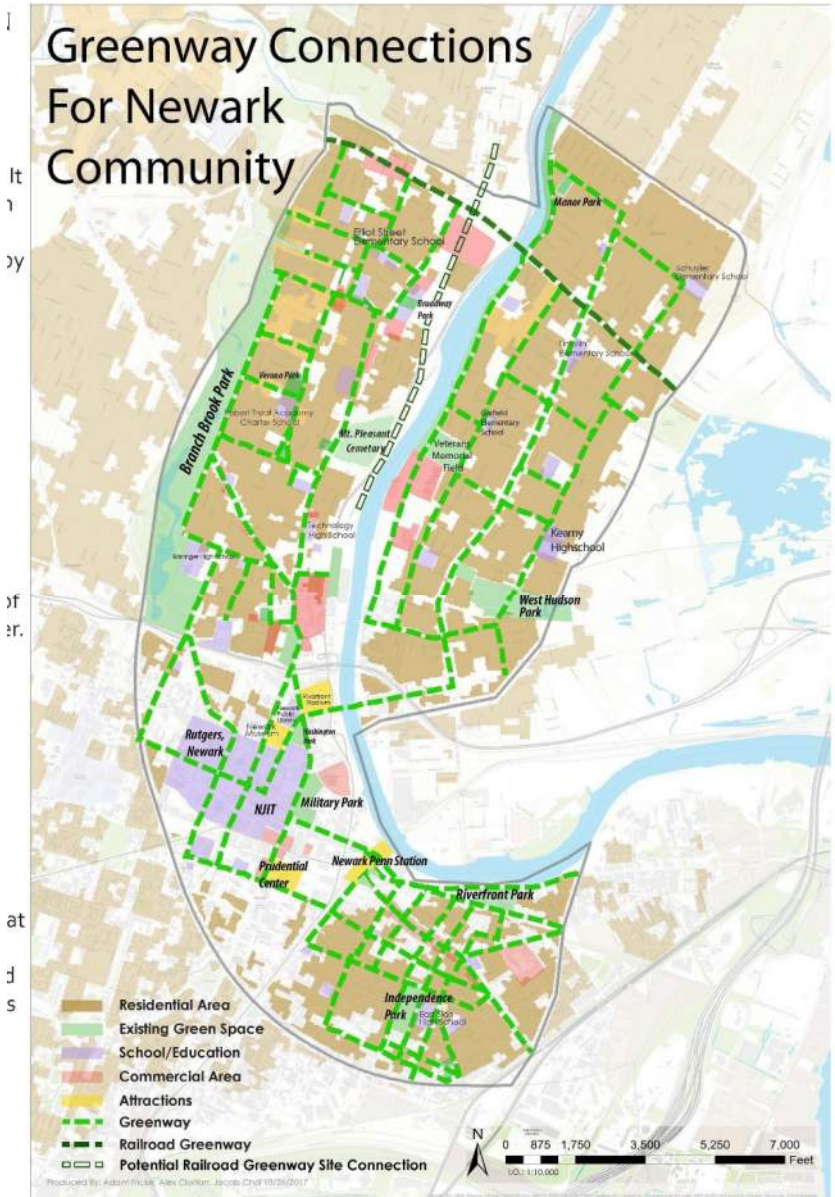
Figu

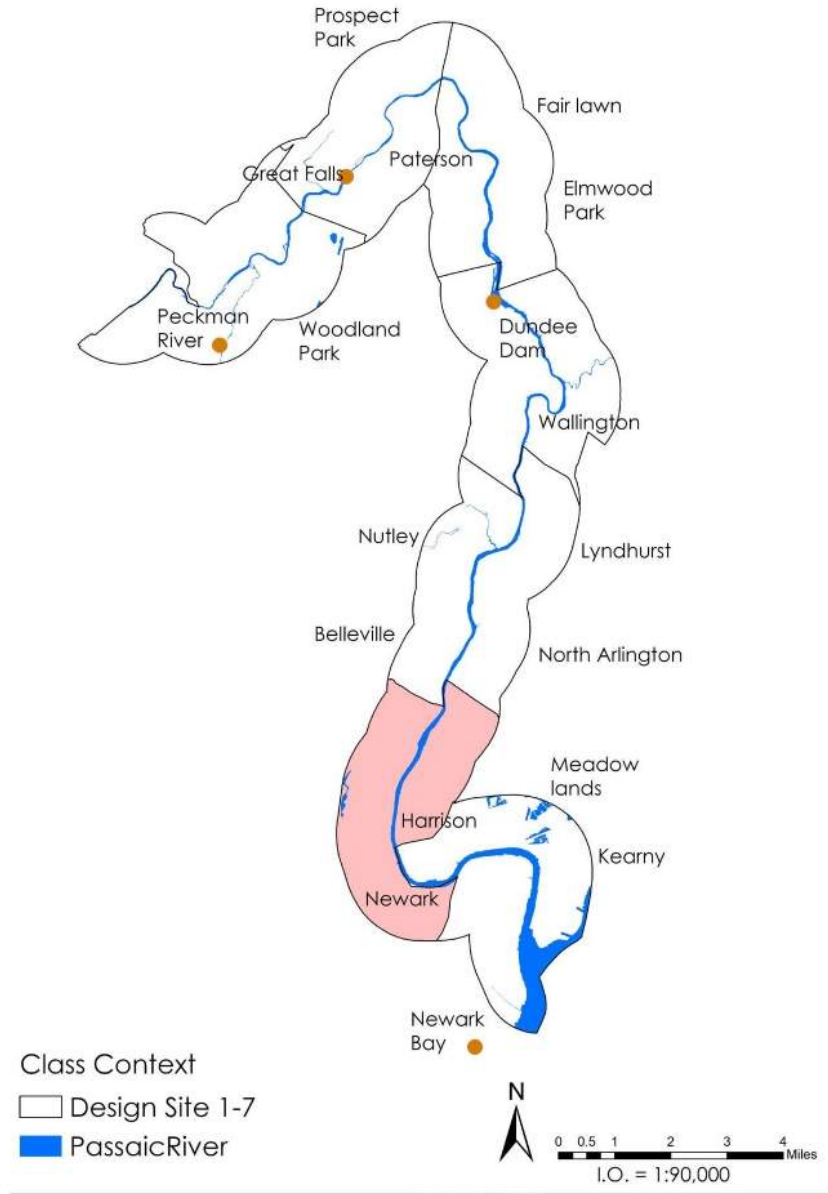
According to the Master



NEWARK

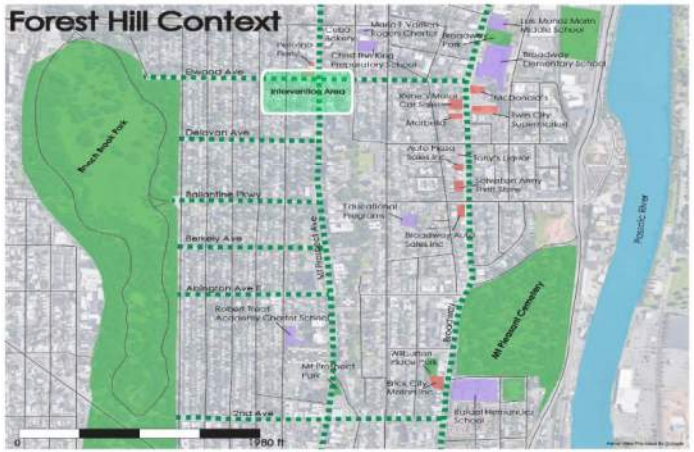
GROUP 6: WOSSEOK (JACOB) CHOI, ALEXANDER CIORILIAN, ADAM FRICKE



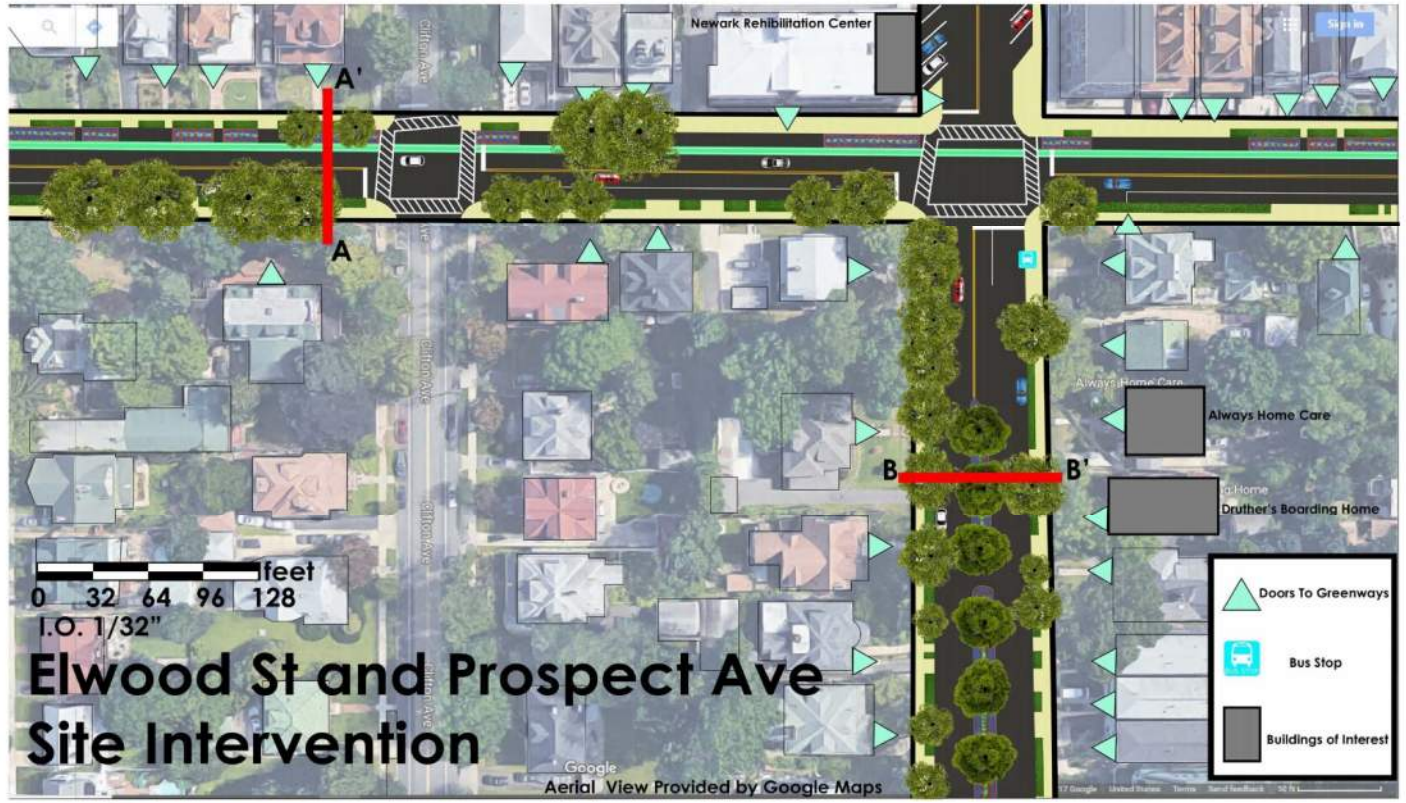


Forest Hill, Newark Intervention

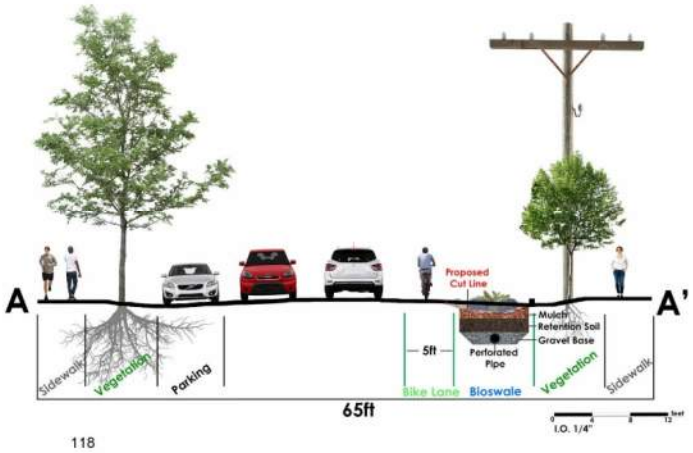
Adam Fricke



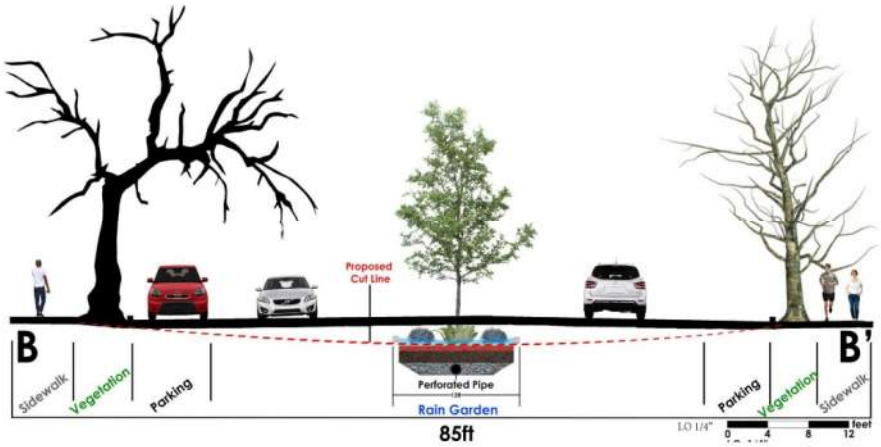
Context map of the Forest Hill area containing: potential greenways, existing green space, commericial areas, and community education areas.



Plan view of Elwood Ave and Prospect Ave intersection intervention.



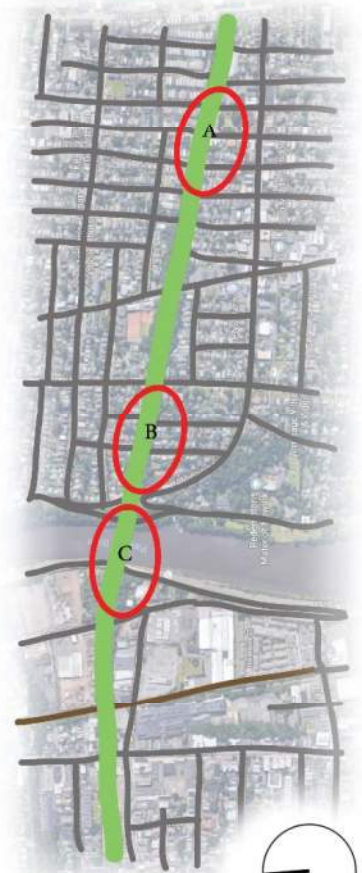
From each end of the sidewalk Elwood Avenue is 65 feet in width. The streets parallel to it also have widths of about 65 feet. Keeping this in mind, the design intervention for implementin bioswales and a bike lane can be incorporated for more than one raod that lead to Branch Brook Park.



Mount Prospect Ave is an 85 foot long main road that runs vertically through the Forest Hill area. It intersects many of the roads that have potential for becoming greenways. For this area, the painted meridian strip can be used as a place for raingardens to accumulate runoff water.

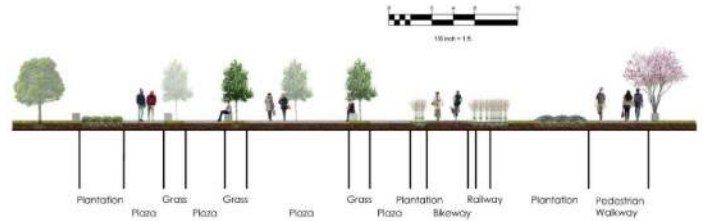
Passaic Railroad Walkway

Along the Passaic River, through Kearny to Forest Hill regions across the bridge, there is an abandoned railroad that is currently covered with trees and forests. The bridge is completely closed, the forest is prohibitted for close neighbors to enter, and some parts of the open space only remain as dearth.
By renovating this abandoned railroad into railroad walkways and bikeways, people could get across the river, connecting the Branch Brook Park and Kearny residential area, or even further to Newark city.

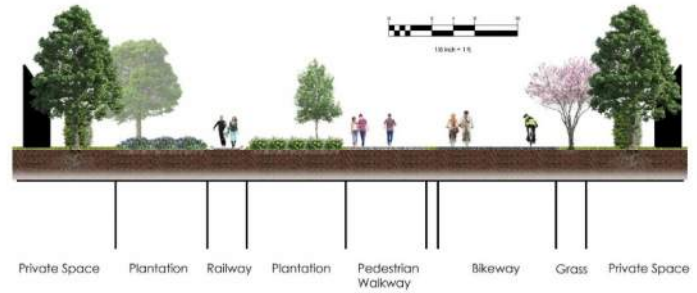


Passaic Railway

A. Garafola Plaza Plan



A. Garafola Plaza Section A-A'



B. Passaic Railway Section B-B'

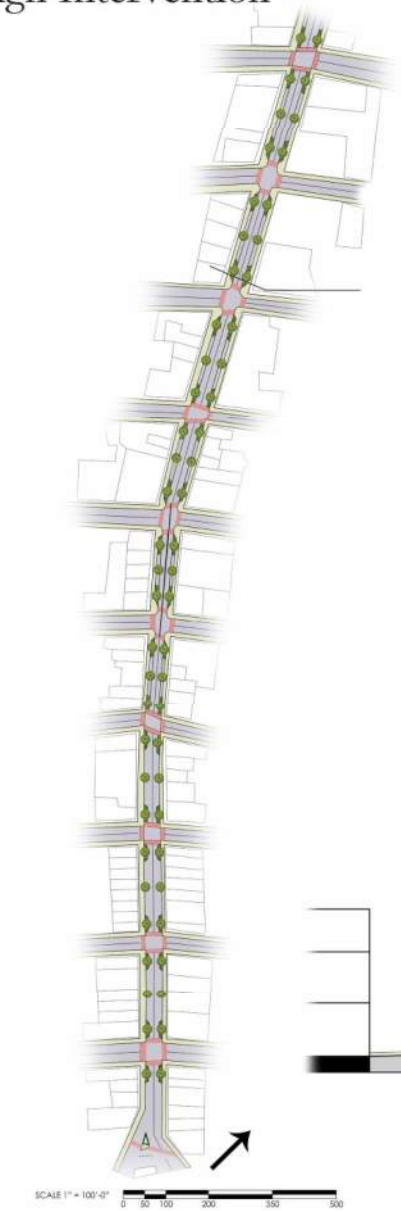
B. Passaic Railway Plan

Wooseok (Jacob) Choi

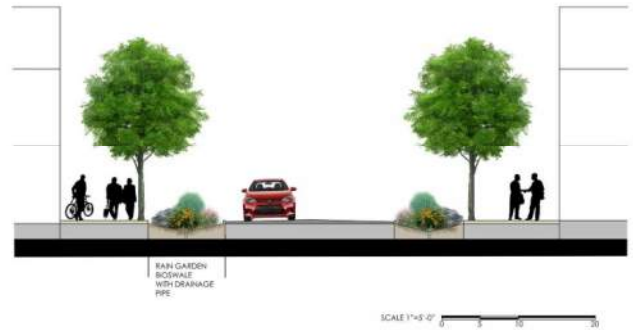
Ferry Street

Site Design Intervention

Alex Ciorlian

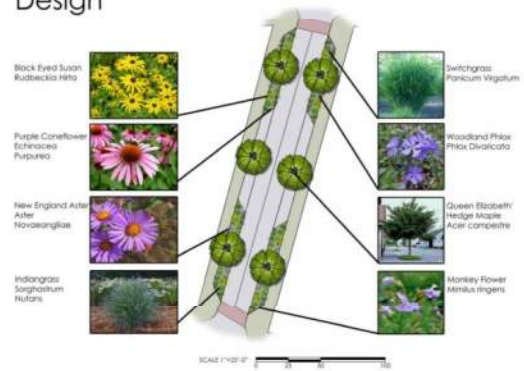


Ferry Street 65 Foot Distance
Between Building Property
Site Intervention
Context Map



Street Section

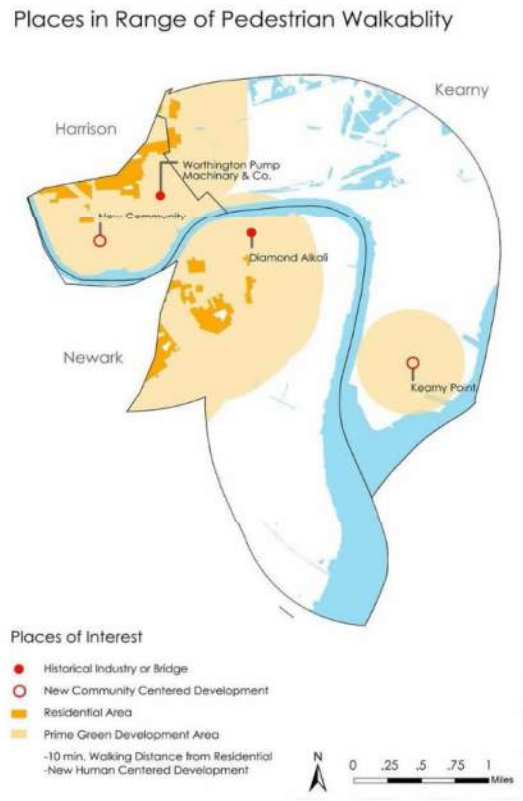
Planting
Design

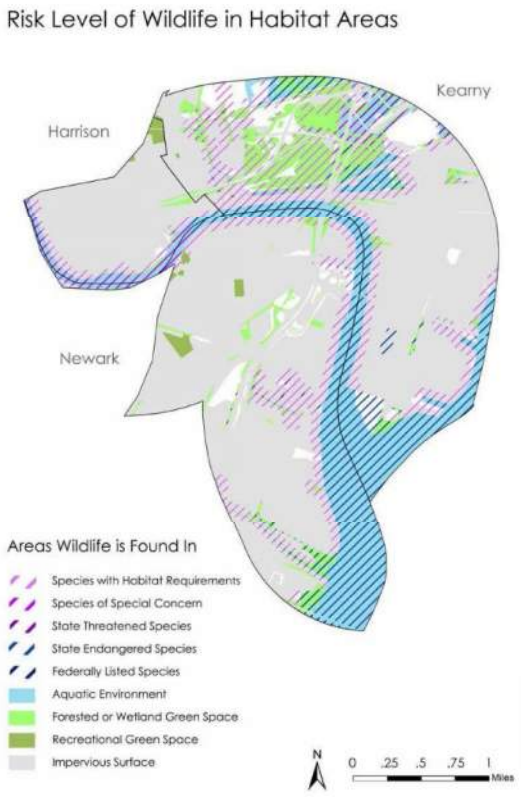


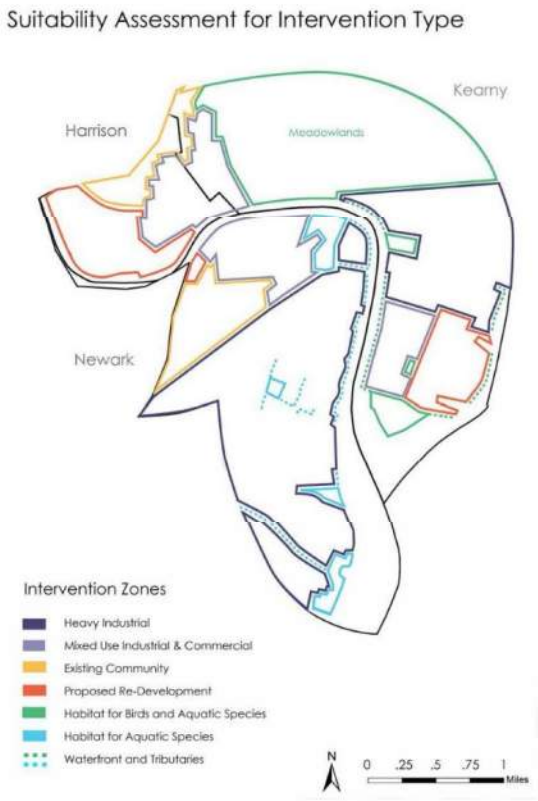
Street Section

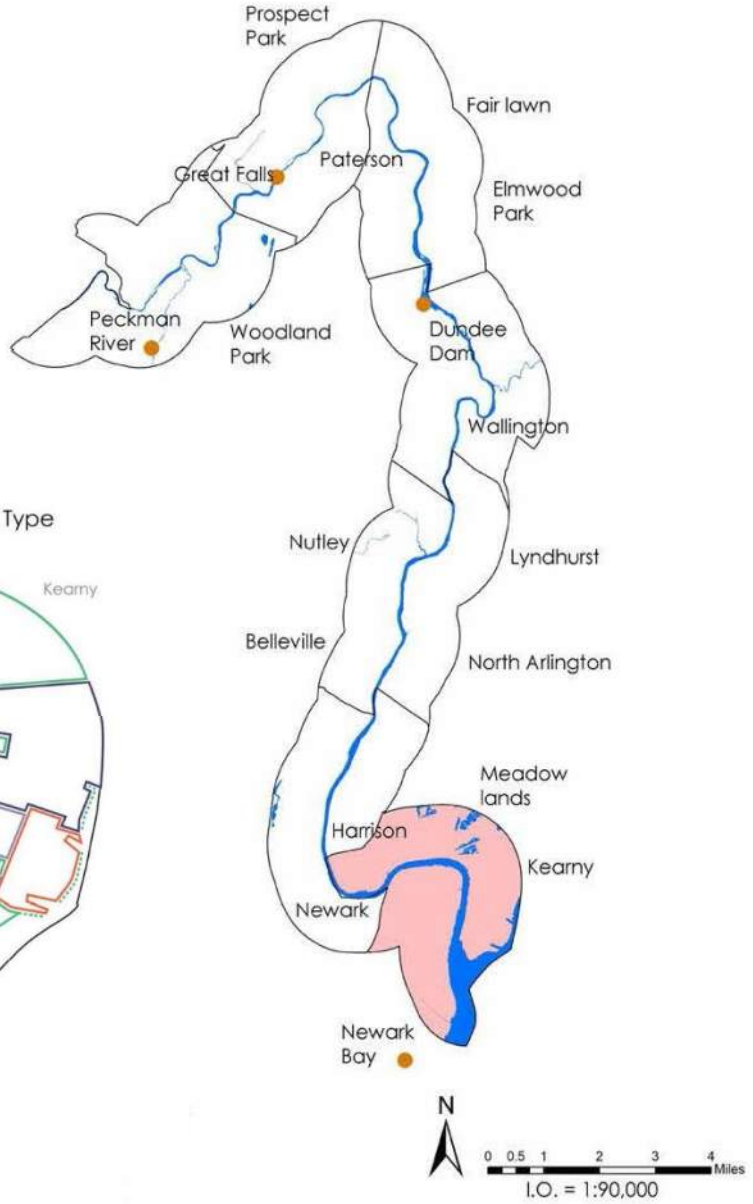
Newark, Kearny, Harrison

Group 7: Diosmiry Rodriguez, Anna Erickson, Nanik Song









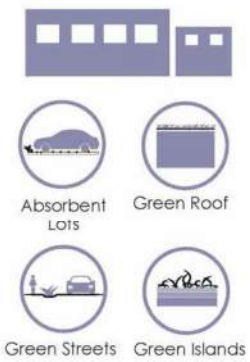
Site 7 Master Plan

Reconnecting People to the River; An Urban Approach

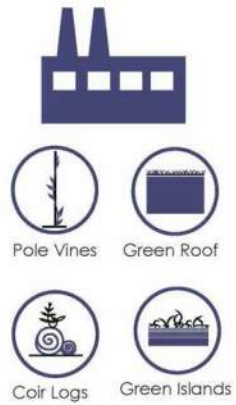
New Development

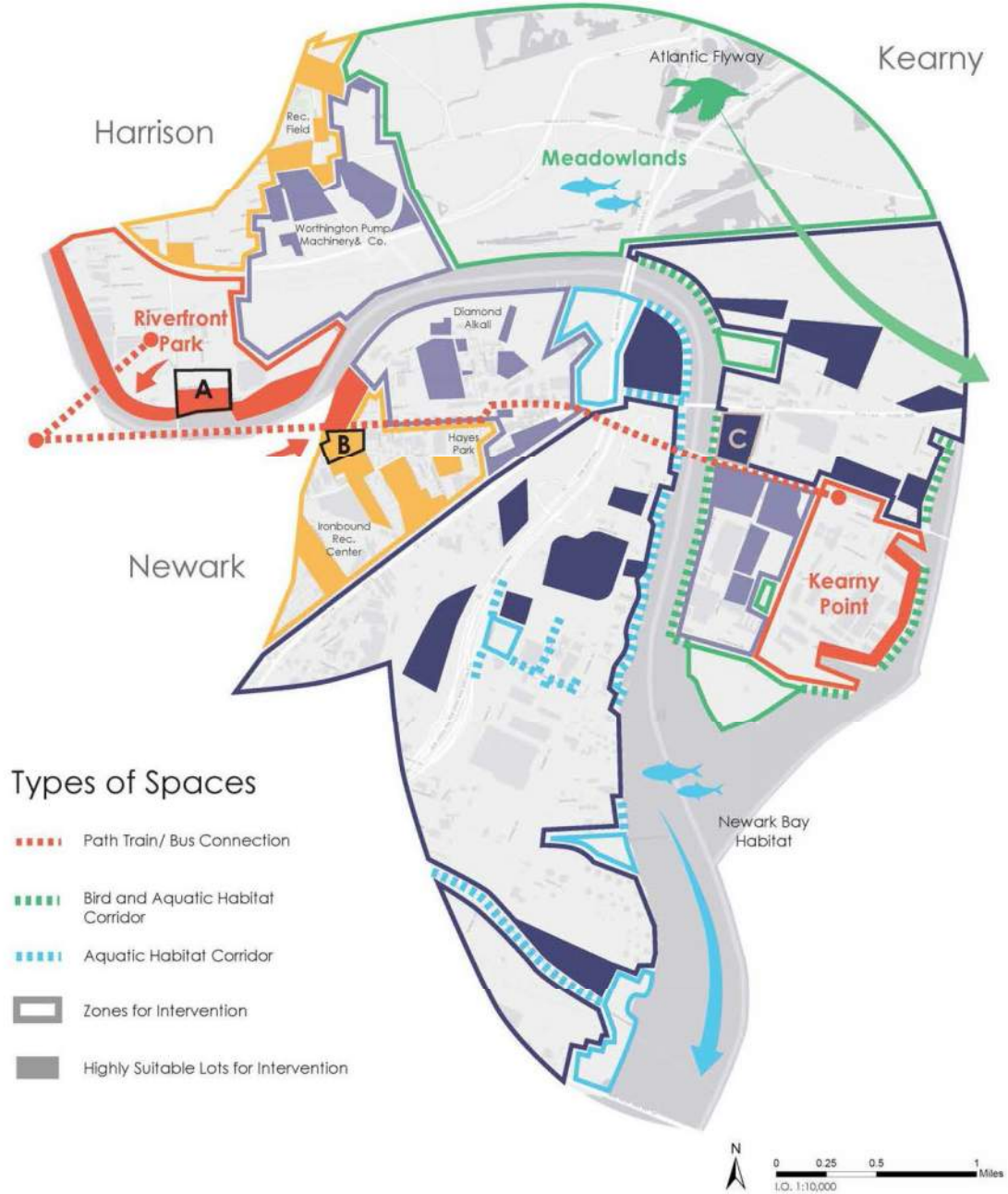
Residential Community

Mixed Use/ Industrial&Commercial

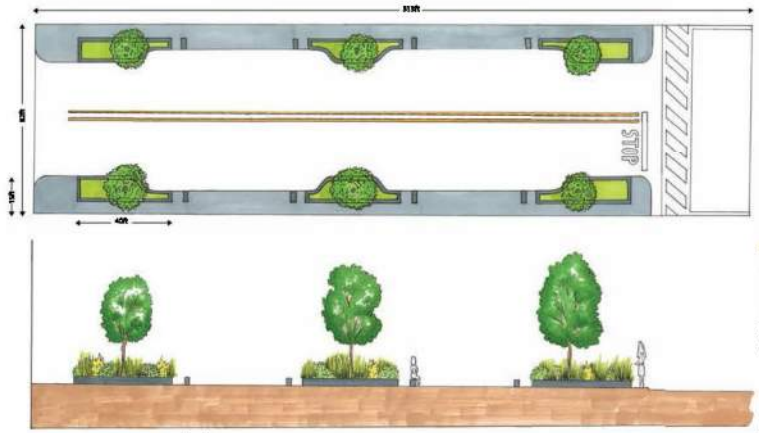


Industrial



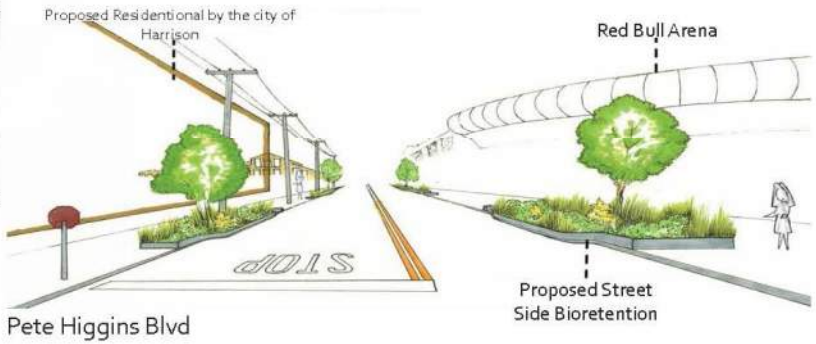


Plan View and Section Cut



Pete Higgins Blvd

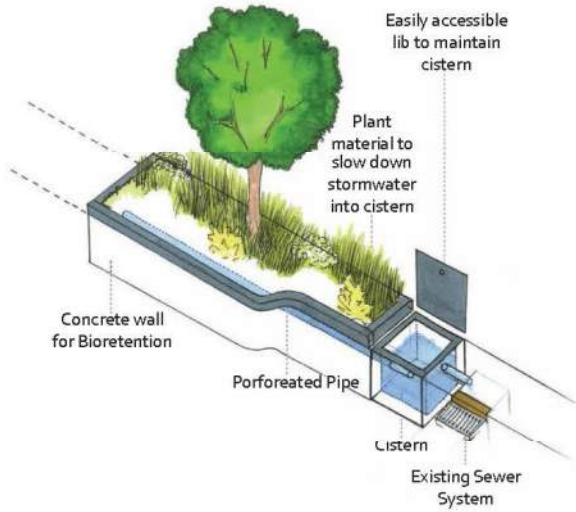
Proposed Main Green Street



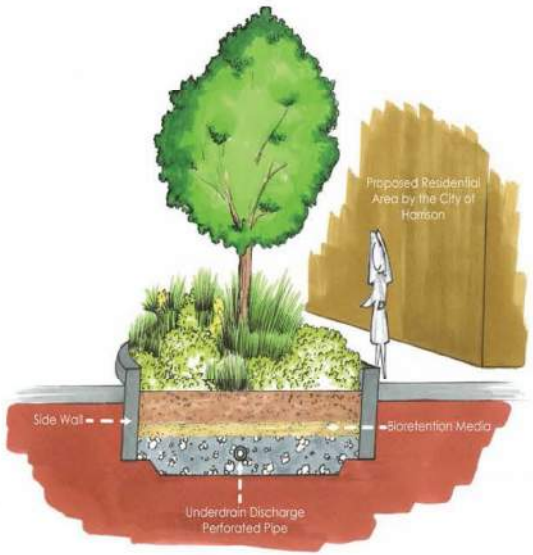
Pete Higgins Blvd

The above diagram provides a clear view of spacing and layout of the proposed bioretentions. The planting adds aesthetic value that establishes a unique sense of place (especially when featuring plants native to the area). It encourages environmental stewardship and community pride. It also provides a host of additional environmental benefits such as habitat for micro-wildlife and native plant varieties, improving air quality, reducing energy use, mitigating and reducing storm water runoff.

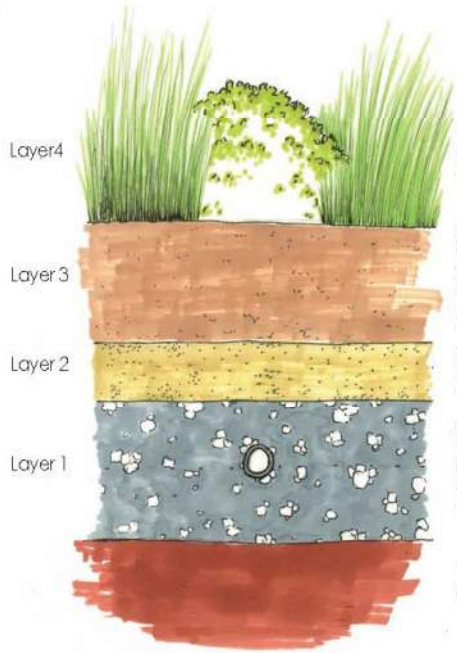
Axonometric Cistern Detail



Bioretention Sectional Diagram



Bioretention Layers Diagram



Plants
Slows and filters stormwater the creates evapotranspiration

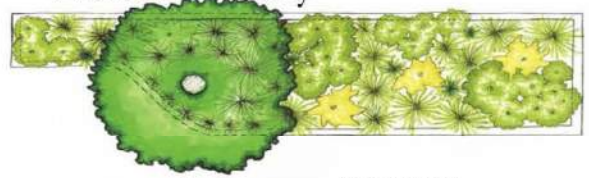
Soil
the soil must have an infiltration rate sufficient enough to draw down any pooled water within 3-4 hours after a storm event. This requires that the soil infiltration rate exceed 1.5 inches/hour. 50-60% sand, 20-30% top soil and 20-30% leaf compost allows high infultration capacity

Sand
Also reduces velocity of runoff, filters particulates and spreads flow ocer the lenght of bioretention

Gravel
The gravel blanket consisting of two layers around the underdrain discharge perforated pipe helps keep the free of possible soil transport. This layer also provides additional storage of storm water

Existing Soil
Soil that is already on site

Plant Inventory



	Little Bluestem (Schizachyrium Scoparium)	Height: 2.00 to 4.00 feet Spread: 1.50 to 2.00 feet Bloom Time: August-February Blood Description: Purplish Bronze Tolerate: Deer, Drought, Erosion, Dry Soil, Shallow-Rocky Soils, Wet Soils, Air Pollution and Salt Water
	Dallas Blue Switch Grass (Panicum Virgatum)	Height: 4.00 to 6.00 feet Spread: 2.00 to 3.00 feet Bloom Time: September-February Blood Description: Purple Tinge Tolerate: Drought, Erosion, Dry Soil, Wet Soils, Air Pollution and Salt Water
	Golden Fleece (Solidago Sphacelata)	Height: 1.00 to 1.50 feet Spread: 1.00 to 1.50 feet Bloom Time: August to September Blood Description: Yellow Tolerate: Deer, Drought, Erosion, Clay Soil, Dry Soil, and Shallow-Rocky Soil
	Blue Star Amsonia (Amsonia Hubrectii)	Height: 2.00 to 3.00 feet Spread: 2.00 to 3.00 feet Bloom Time: April-May Blood Description: Powdery Blue Tolerate: Deer, Wet Soil, and Salt Water
	River Birch (Betula Nigra)	Height: 40.00 to 70.00 feet Spread: 40.00 to 70.00 feet Bloom Time: April-May Blood Description: Brown (Male) Tolerate: Deer, Wet Soil, Low Salt Water, Clay Soil, Air Pollution, and Drought

Site B

Residential Intervention

By: Anna Erickson

Goals:

1. Connect people to parks and the waterfront.

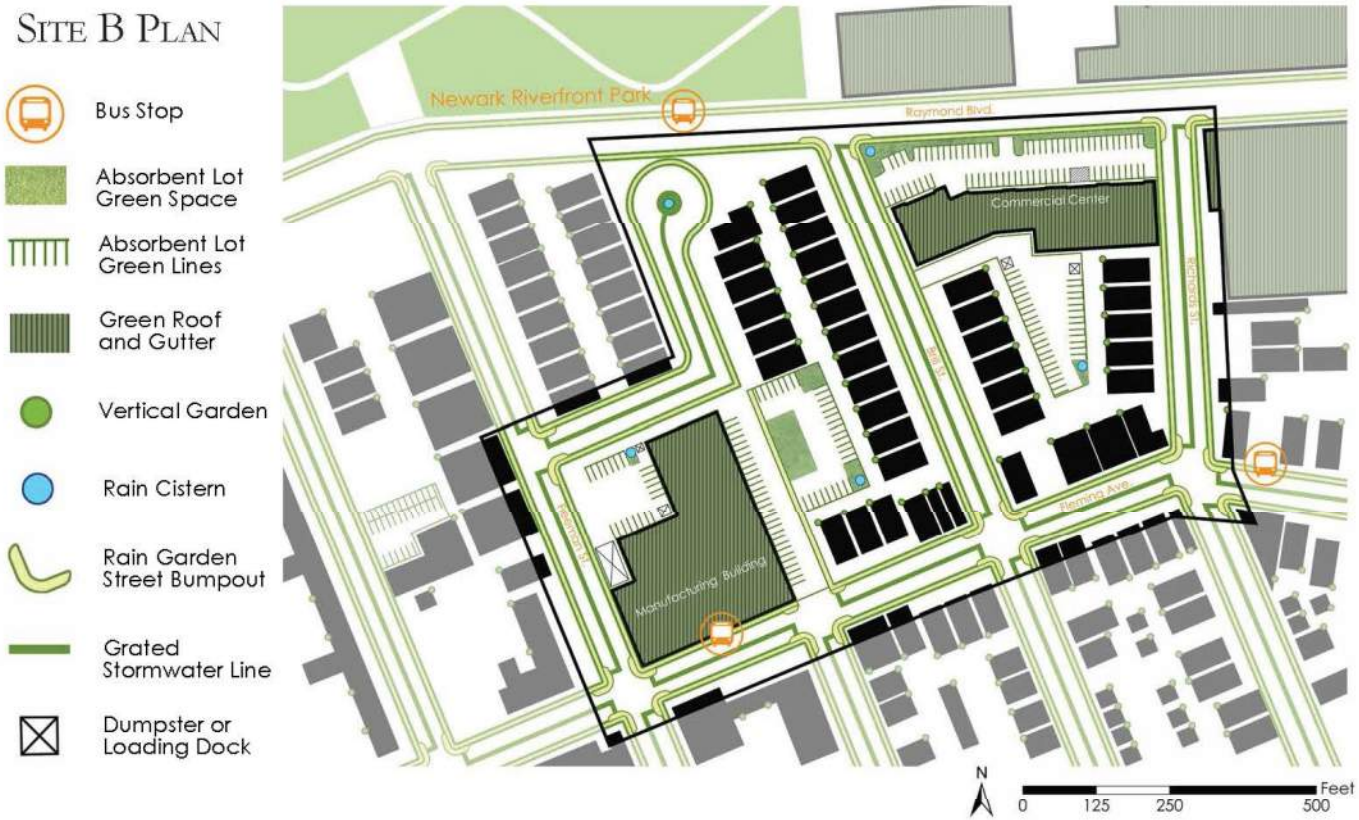
2. Incorporate urban wildlife within the city.

3. Reduce CSO overflow.

The residential interventions in Site 7 are categorized by the need to create a pedestrian friendly environment in an area of the city that borders on industrial territory. This part of Newark in Site B is also being faced with the interesting dynamic of being a community built on old infrastructure that is in the midst of seeing new change. The conglomeration of more recently developed parks and housing units in combination of with long standing manufacturing and industrial facilities leaves the area lacking a complete feel.

To remedy this, green streets featuring grated storm water lines that slow and divert run-off into rain garden bumpouts create a cohesive green network that makes pedestrian crossing safer while controlling storm water. With an abundance of parking lots, this area of town has an extremely high degree of impervious surface, but this can be mitigated with the concept of absorbent lots. By turning all potential unused space into areas that can slow rainwater, peak run-off rates can be reduced. Rainwater disconnection incentives should be offered to make homeowners and business owners excited and aware of storm water management in their community. By making use of green roofs, gutter gardens, rain cisterns, and rain gardens, property owners can be offered tax rebates for their part in making the community a more sustainable place. To increase awareness among the next generation, vertical gardens can be purchased as premade units to attach to a fence or a downspout, or they can be made out of recyclable water bottles. Community outreach events led by schools, churches, or the parks system can use the opportunity to bring families together and spread a message about storm water in the community.

Site B Plan



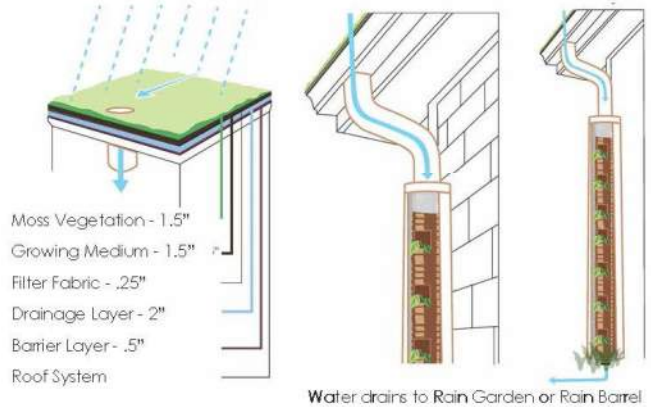
Fleming Ave. Street Sections

A to A'

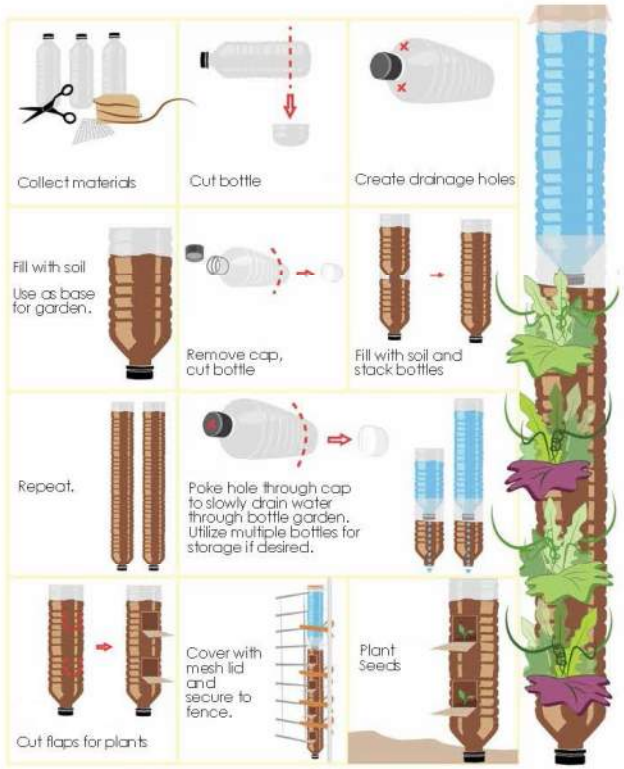
B to B' - Intersection

Grated stormwater lines slope down to intersection and carry water into stormwater bumpout.

Green Roof and Gutter Garden



Vertical Community or Home Garden



Fleming Ave. Street view

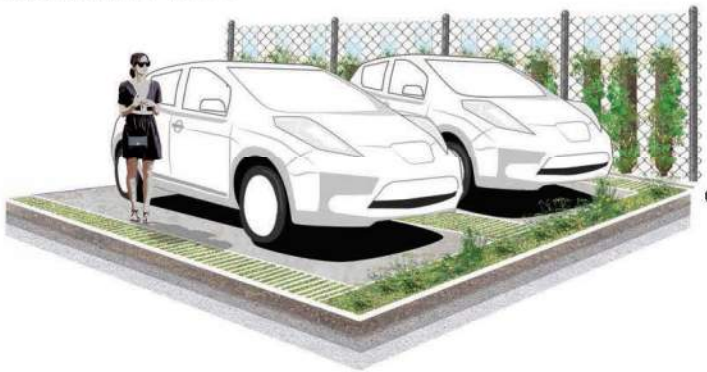
Grated green lines support low growing vegetation that can survive in compacted soil along roadways such as Carpetweed and Purslane. These stormwater diversion strips take the place of traditional painted road markings where high speed traffic is low. Colored grates maintain the symbology of the lines while allowing them to be driven over without compressing root structures. Collected water drains into a rain garden at the end of every intersection.

Gutter Gardens on Building Side

A lightweight moss greenroof drains excess water into a prefabricated vertical garden made of metal or plastic. Ratio of water storage space to vegetated garden space can vary as desired.

Water from vertical gardens drains into a bed of stones that flows into a rain cistern. A pump mechanism can irrigate vertical gardens during periods of drought.

Absorbent Lot



Absorbent lots feature grated green lines bounding either side and the front of each parking space. Concrete reinforcements at the edge of each line create a boundary between the stormwater infiltration strip and the asphalt parking space. Grates cover the two side lines for walkability while taller species such as sweet clover and birdsfoot trefoil dominate the front planting.

Site C

Industrial Intervention

By Nanik Song

Goals:

1. Increase Transpiration Rates within Industrial Areas
2. Promote Polyculture and Urban Plants
3. Provide Food and Shelter/Habitat for Wildlife
4. Stabilize Banks via Assisted Succession
5. Reduce Erosion and Decrease Sediment Contamination
6. Serve Ecological Functions

Interventions:

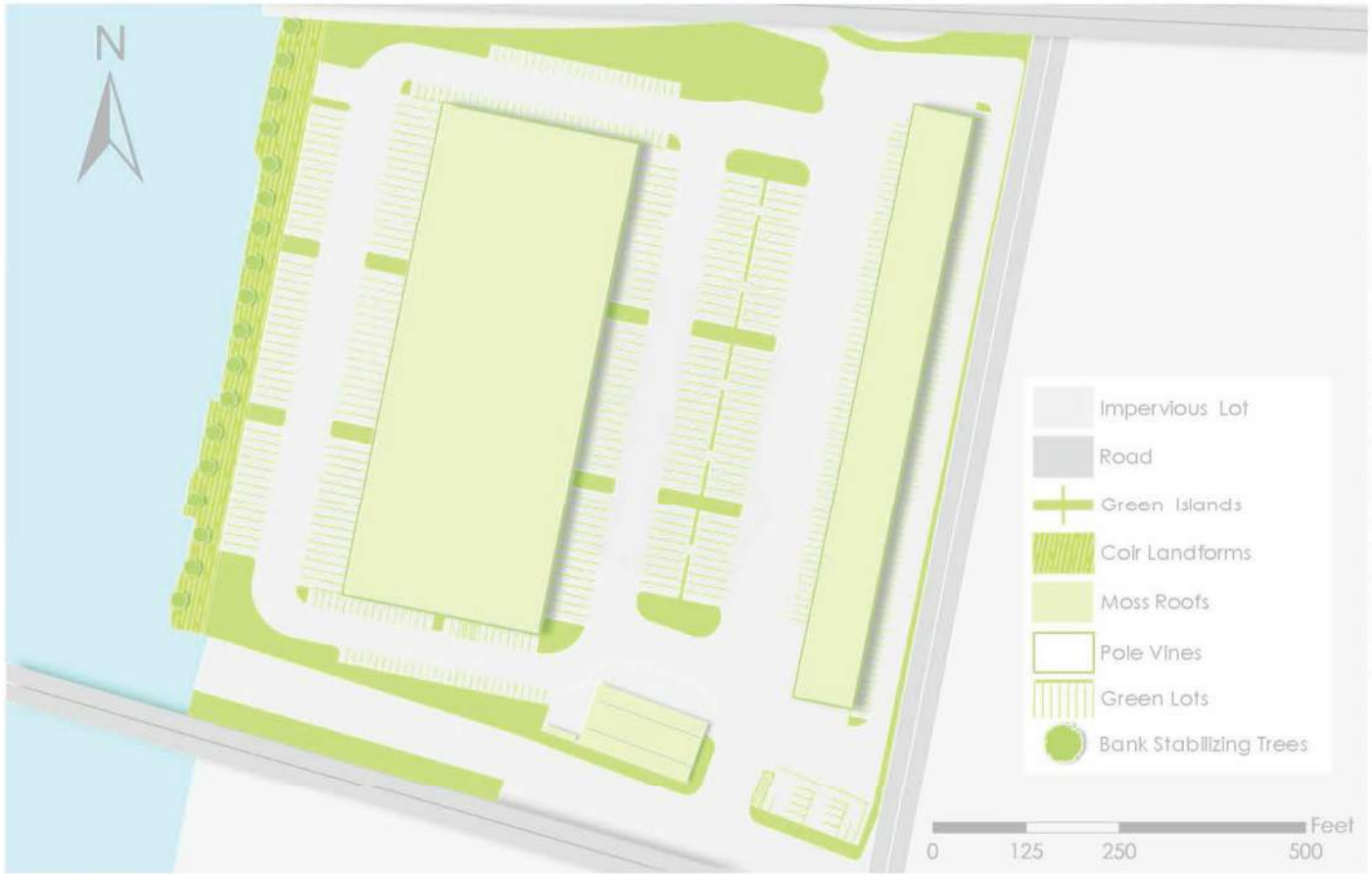
1. Parking Lots → Absorbant/Green Lots
2. Roofs → Lightweight Moss Roof
3. Building Facades → Vine Poles
4. Parking Lot Medians → Green Islands
5. Riverside → Coir Landforms

Site C can be simply summarized as a large parking lot. With a large building in the center, an immense amount of impervious space, and very little greenery (which is primarily characterized by grass), it serves as a pretty good example of what to expect in (light) industrial areas.

Site C has become an example of ecological design in industrial areas by taking advantage of what opportunities there are in the area.

While one may not be able to reclaim parking spots, there is the possibility to take advantage of small spaces, such as the painted lines between each parking spot, transforming them into lanes that hold water and increase transpiration rates, or by creating vertical structures that can increase surface area, thus productivity and opportunities, and running plants along the length, inviting resources for the wildlife in the area.

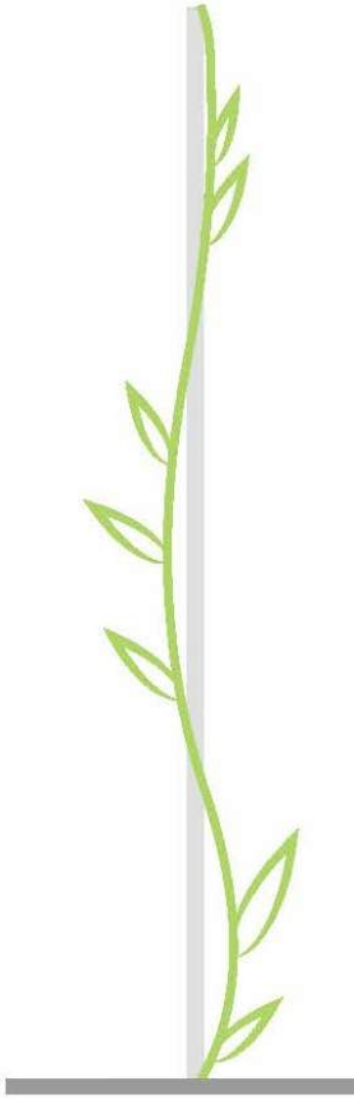
By rethinking space, we create opportunity. By rethinking design, we transform space.



Planted Coir Landform and Green Islands

Vine Poles and Green Islands

Vine Poles



RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY

Green Infrastructure Municipal Outreach and Technical Assistance Program

A Partnership between Passaic Valley Sewerage Commission & Rutgers Cooperative Extension Water Resources Program

Rosana Da Silva

(848) 932-6714

rdasilva@envsci.rutgers.edu

January 9, 2018

PASSAIC VALLEY SEWERAGE COMMISSION
EST. 1902

"Protecting Public Health and the Environment"

PROGRAM OBJECTIVES 2013-2017

- Community-based Technical Assistance
- Outreach and Education
- Green Infrastructure Demonstration Projects
- Municipal Green Infrastructure Assessments

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"

Planning & Technical Assistance Summary

- Completed **39** municipal green infrastructure feasibility studies
- Met with municipal officials in **25** municipalities across the service area
  - **CSO:** Bayonne, East Newark, Harrison, Jersey City, Newark, North Bergen, Paterson, and Union City
  - **MS4:** Bloomfield, Clifton, East Orange, Elmwood Park, Fair Lawn, Garfield, Glen Rock, Hawthorne, Little Falls, Montclair, North Arlington, Rutherford, Saddle Brook, Totowa, Wallington, West Orange, and Woodland Park
- Secured MOAs with 13 municipalities:
  - Bayonne, East Newark, East Orange, Garfield, Harrison, Jersey City, Little Falls, Montclair, Newark, North Bergen, Paterson, Saddle Brook, and West Orange

RUTGERS

PVSC Service Area

Communities with Green Infrastructure Feasibility Studies

Outreach and Education

- Delivered five training programs to 179 participants:
  - Green Infrastructure Training Program, January 2013 and June 2017
  - Stormwater Management in Your Schoolyard Teacher In-Service, June 2015
  - Complying with New Jersey Stormwater Regulations, May 2016 and September 2017
- Engaged county representatives in Bergen, Essex, Hudson, and Passaic Counties
- Continue to host and update the program website: *water.rutgers.edu/PVSC/PVSC.html*

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"

COMPLETED: Demonstration Projects

Elysian Fields Community Garden, Paterson – BEFORE

Elysian Fields Community Garden, Paterson – AFTER

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"

COMPLETED: Demonstration Projects

Greater Newark Conservancy – BEFORE

Greater Newark Conservancy – AFTER

"Protecting Public Health and the Environment"

COMPLETED: Demonstration Projects

Horace Mann School, Bayonne – BEFORE

Horace Mann School, Bayonne – AFTER

COMPLETED: Demonstration Projects

Lincoln Middle School, Kearny – BEFORE

Lincoln Middle School, Kearny – AFTER

COMPLETED: Demonstration Projects

Watsessing Elementary School, Bloomfield – BEFORE

Watsessing Elementary School, Bloomfield – AFTER

COMPLETED: Demonstration Projects

Hawkins Street Elementary School, Newark – BEFORE

Hawkins Street Elementary School, Newark – AFTER

PROPOSED: Demonstration Projects

Langston Hughes Elementary School, East Orange

CURRENT CONDITION

CONCEPT DESIGN

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"

PROPOSED: Demonstration Projects

Abraham Lincoln School, Garfield

CURRENT CONDITION

CONCEPT DESIGN

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"

YEAR 5 PROGRAM OBJECTIVES

- Green Infrastructure Demonstration Projects
- Outreach and Education
- Green Infrastructure Database
- Municipal Action Team Support

"Protecting Public Health and the Environment"

CASE STUDY: Harrison Pubic Library

Harrison TIDE (Transforming Infrastructure and Defending our Environment) identified three potential projects in the community.

RCE Water Resources Program complete site assessments and TIDE voted on the Public Library due to:

- Feasibility
- Visibility
- Public Engagement Opportunities

Harrison Lions Club showcased project during National Night Out to engage local residents on the future project.

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"

GREEN INFRASTRUCTURE RECOMMENDATIONS

Harrison Public Library

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 10' 20'

HARRISON PUBLIC LIBRARY

Subwatershed: Lower Passaic River

Site Area: 23,969 sq. ft.

Address: 415 Harrison Avenue, Harrison, NJ 07029

Block and Lot: Block 127, Lot 11

The site is a public library building located in a public park and municipal complex. Downspouts at the northwest and northeast front corners could be disconnected into rain gardens in surrounding lawn areas. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
86	20,626	1.0	10.4	94.7	0.016	0.57

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.038	6	2,790	0.10	360	$1,800


TIDE

CASE STUDY: Dr. Michael Conti School 5

Public School 5 contacted RCE Water Resources Program regarding a study for green infrastructure for their school.

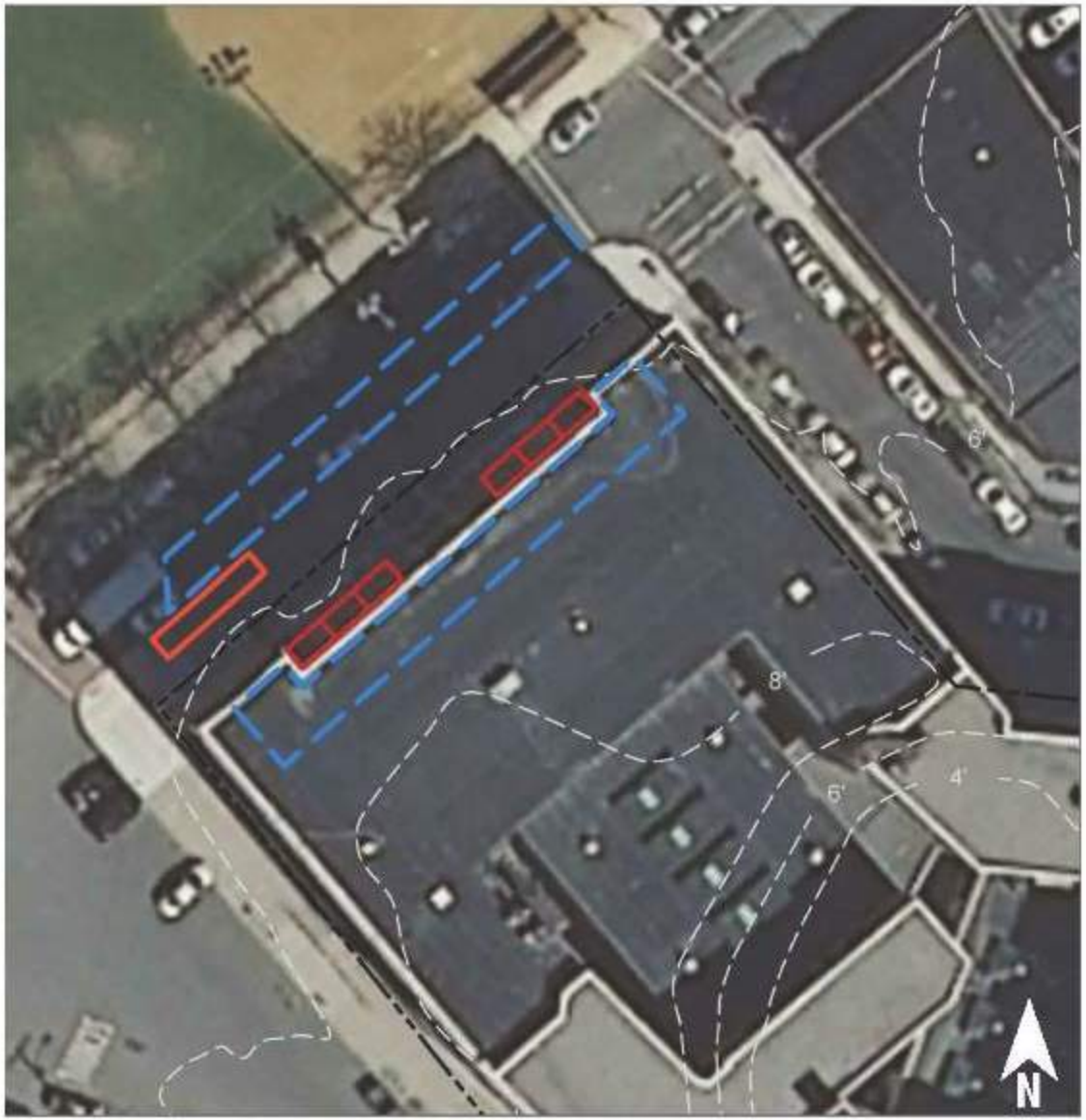
Jersey City START (Stormwater Treatment and Resiliency Team) explored ways to support a project at the school.

RCE Water Resources Program worked with Jersey City MUA on a design to address known flooding:

- Feasibility
- Visibility
- Public Engagement Opportunities

Parents and students of the school were engaged and supported improvements to the school to address flooding.

PASSAIC VALLEY SEWERAGE COMMISSION
"Protecting Public Health and the Environment"



planter boxes

stormwater planters

drainage area

property line

2012 Aerial: NJOIT, OGIS

0' 20' 40'

DR. MICHAEL CONTI SCHOOL NO. 5

182 Morseles Street
Jersey City, NJ 07302, Ward E



Public School No. 5 has internally-fed drainage that can be diverted into demonstration planter boxes. Stormwater runoff from the street can be managed in stormwater planters.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	From the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
90.0	43,537	2.1	22.0	199.9	0.034	1.19

Recommended Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Planter boxes	0.034	5	n/a	n/a	72	$72,000
Stormwater planters	0.039	7	2,865	0.11	210	$21,000


DR. MICHAEL CONTI
SCHOOL


STOP
STOP


DR. MICHAEL CONTI
SCHOOL
MONTANA


DR. MICHAEL CONTI
SCHOOL


ENVIRONMENTAL INFRASTRUCTURE PROJECT

RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY

QUESTIONS?

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January 9, 2018

"Protecting Public Health and the Environment"

Questions and Final Discussion

CLEAN WATERWAYS
Healthy Neighborhoods