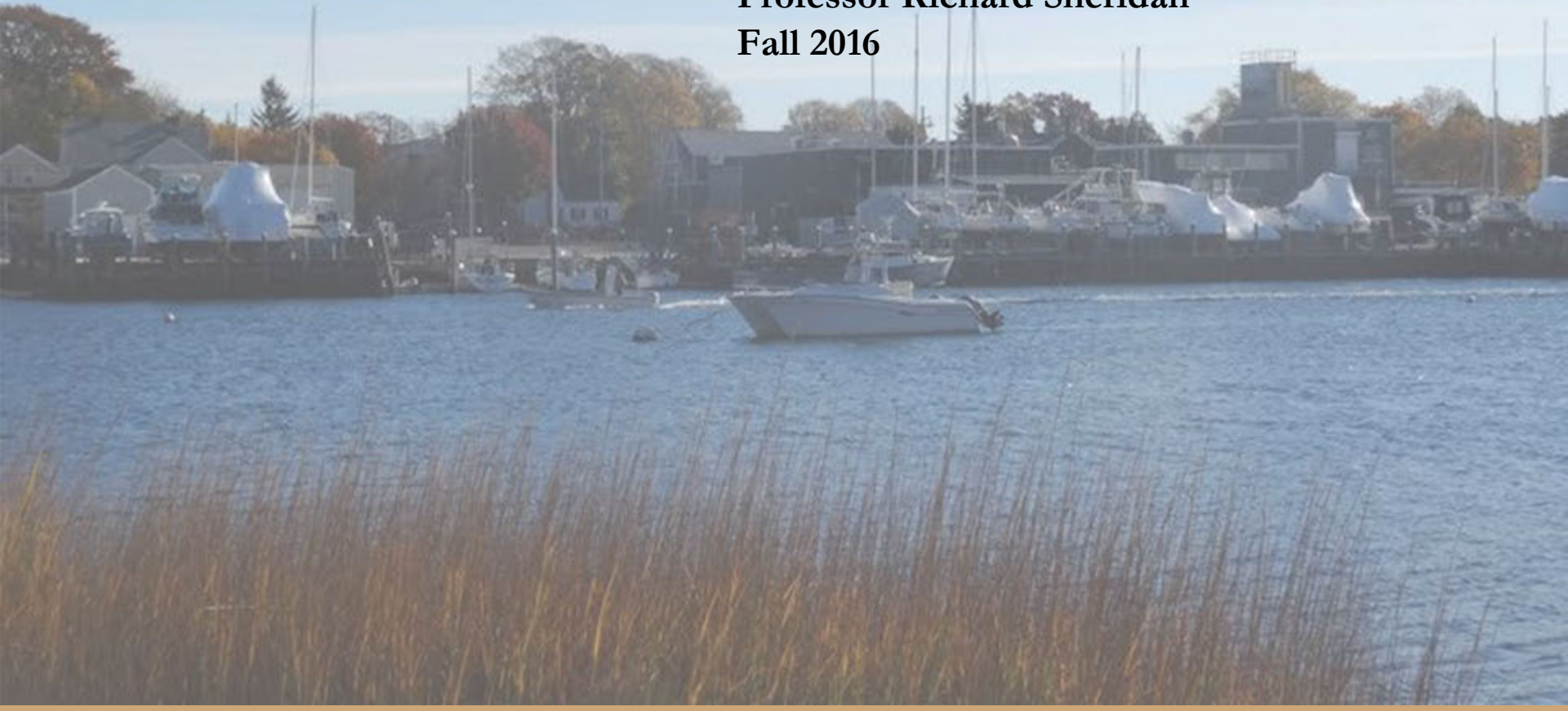


# Warren RI Site Analysis

URI Landscape Architecture Junior Class

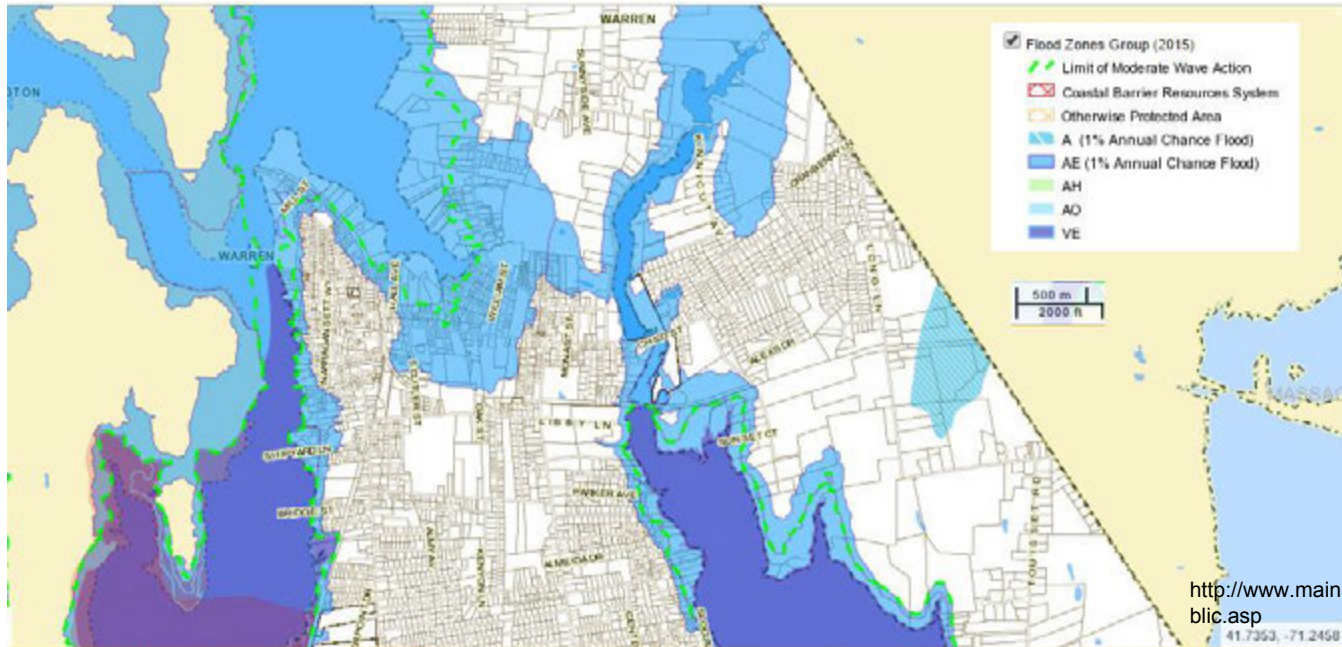
Professor Richard Sheridan

Fall 2016



# Mission Statement

As the climate changes, designs should be prepared in order to adapt and evolve with sea level rise and storm surge.



# Class Objectives

As a class, our objectives are to:

- Plan for sea level rise by planting vegetation to act as a coastal barrier, and aid filtration.
- Reduce and relocate surface runoff
- Relocate infrastructure susceptible to sea level rise
- Relocate historical buildings
- Provide informational signage about preserving history
- Preserve and restore coastal marshes

# Points of Interest Analysis

MARSHLAND



EAST BAY BIKE PATH & WARREN AVENUE BRIDGE



WATER STREET

WHARF TAVERN



BURRS HILL PARK & WARREN TOWN BEACH



*Historic photo of Burrs Hill Park. Date unknown*



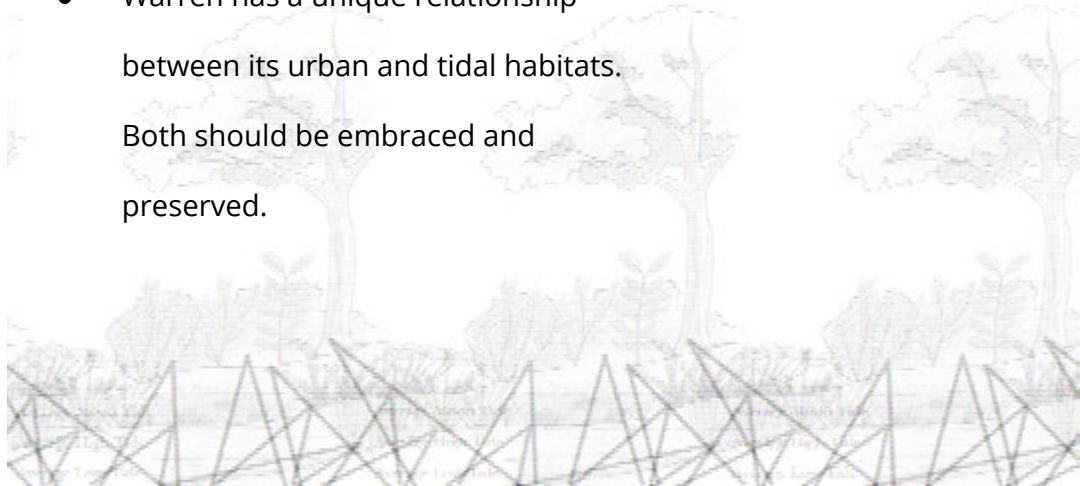


# Habitat Analysis

- Analyzing the way the ecosystem functions is critical in order to preserve the natural environment of Warren.
- This better understanding allows the designer to be ecologically sensitive and sustainable.
- Estuaries are vital nursery grounds for a number of economically and environmentally important aquatic species. These areas are heavily impacted by non-point pollution, and should be protected.



- Warren has a unique relationship between its urban and tidal habitats. Both should be embraced and preserved.



#### 1769-1820 - Slave Trade

- James DeWolf, whom virtually built the economy of Bristol, was the leading slave trader in the history of the US
- Over 50 yrs & 3 generations, the DeWolf family brought 12,000 enslaved Africans across the Middle Passage



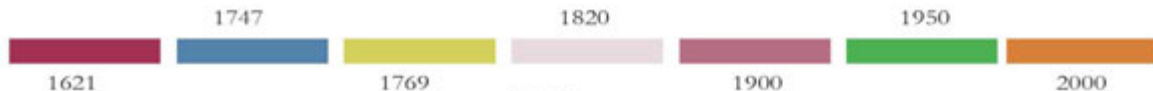
#### 1745- Warren was incorporated

- The town was named "Warren" after British naval hero Admiral Sir Peter Warren after a victory at Lousburg



#### 1954 - Hurricane Carol

- Category 3 hurricane with gusts of wind upwards of about 130 mph
- 60 fatalities & caused \$3.7 billion dollars of damage.



#### 1675-1678 - King Phillips War

- Relations became strained between the Indians and the settlers
- War named for the main leader of the Native American side, Metacomet, who had adopted the English name "King Philip" in honor of the previously-friendly relations between his father and the original Mayflower Pilgrims.

#### 1764 - Brown University

- Founded as the College in the English Colony of RI & Providence Plantations



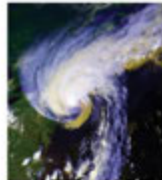
#### 1840-1860

- Warren lead RI in ship construction
- Well known as a whaling port, ship building was carried on to a considerable extent and still thriving today



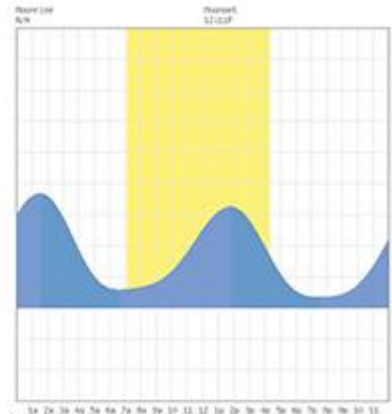
#### 1938 - The Great New England Hurricane

- Storm surges of 10 to 12 feet engulfed parts of the coast
- The most notable surge was found in Narragansett Bay and Buzzards Bay.

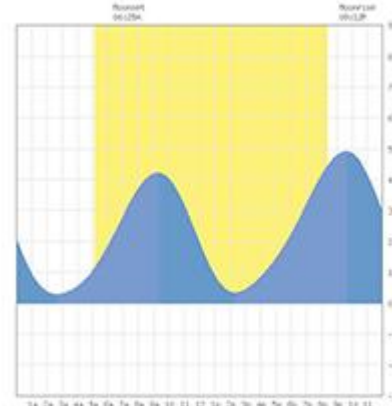


# Weather Analysis

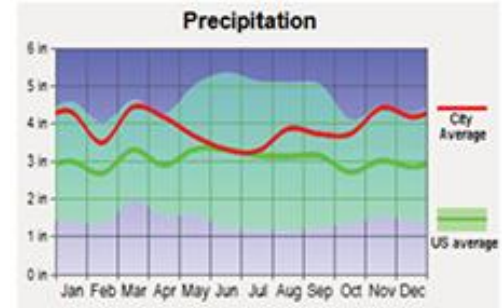
- With the rise in sea level it's important for us to look at annual precipitation to locate when rain and snow could lead to flooding
- Tidal change charts show us when the water level will be at its highest



Winter solstice tide chart



Summer solstice tide chart



- Warren's beach on July 3, 2016 approximately 22 minutes after high tide

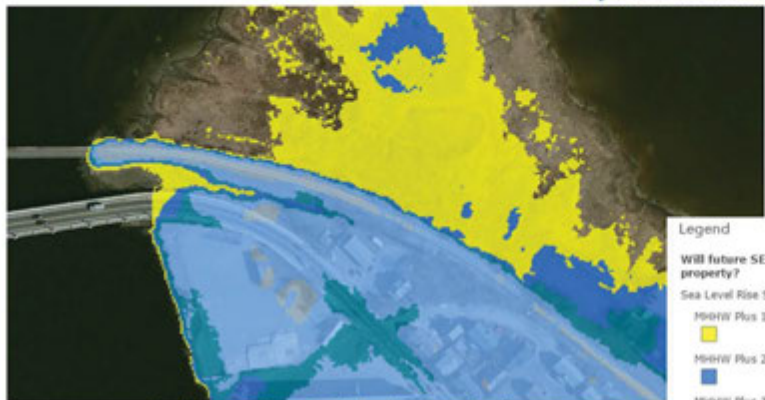
# SEA LEVEL RISE ANALYSIS

WARREN, RI 02885

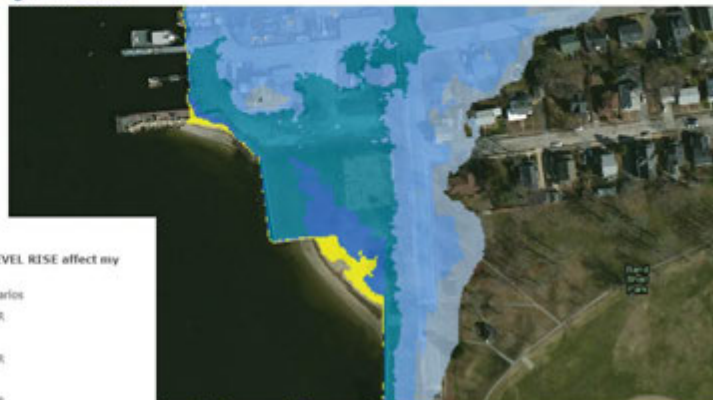


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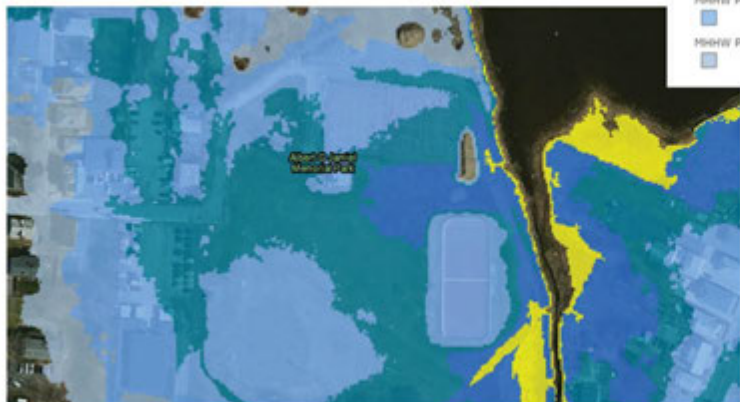
<http://www.beachsamp.org/stormtools/>



Palmer River Bridge/ Marsh Area



Warren Town Beach



Jamiel Park



Historic Waterfront District

Legend

Will future SEA LEVEL RISE affect my property?

Sea Level Rise Scenarios

- MOHW Plus 1' SLR
- MOHW Plus 2' SLR
- MOHW Plus 3' SLR
- MOHW Plus 5' SLR
- MOHW Plus 7' SLR



# LAND USE ANALYSIS

WARREN, RI 02885

UNIVERSITY OF RHODE ISLAND LANDSCAPE ARCHITECTURE DEPARTMENT

LAR 343

PREPARED FOR PROFESSOR RICHARD SHERIDAN

PREPARED BY

JONATHAN DANIELS, JULIAN SALVUCCI,

WILLIAM DEPINA-GOMES & ZACK FREGULETETTI

## Main Land Uses in Warren, Rhode Island

**Residence** - The population density determines what type of dwelling unit can be accommodated. Areas of low density anticipate single family houses while areas of high density are able to support multiple family house in a small space.

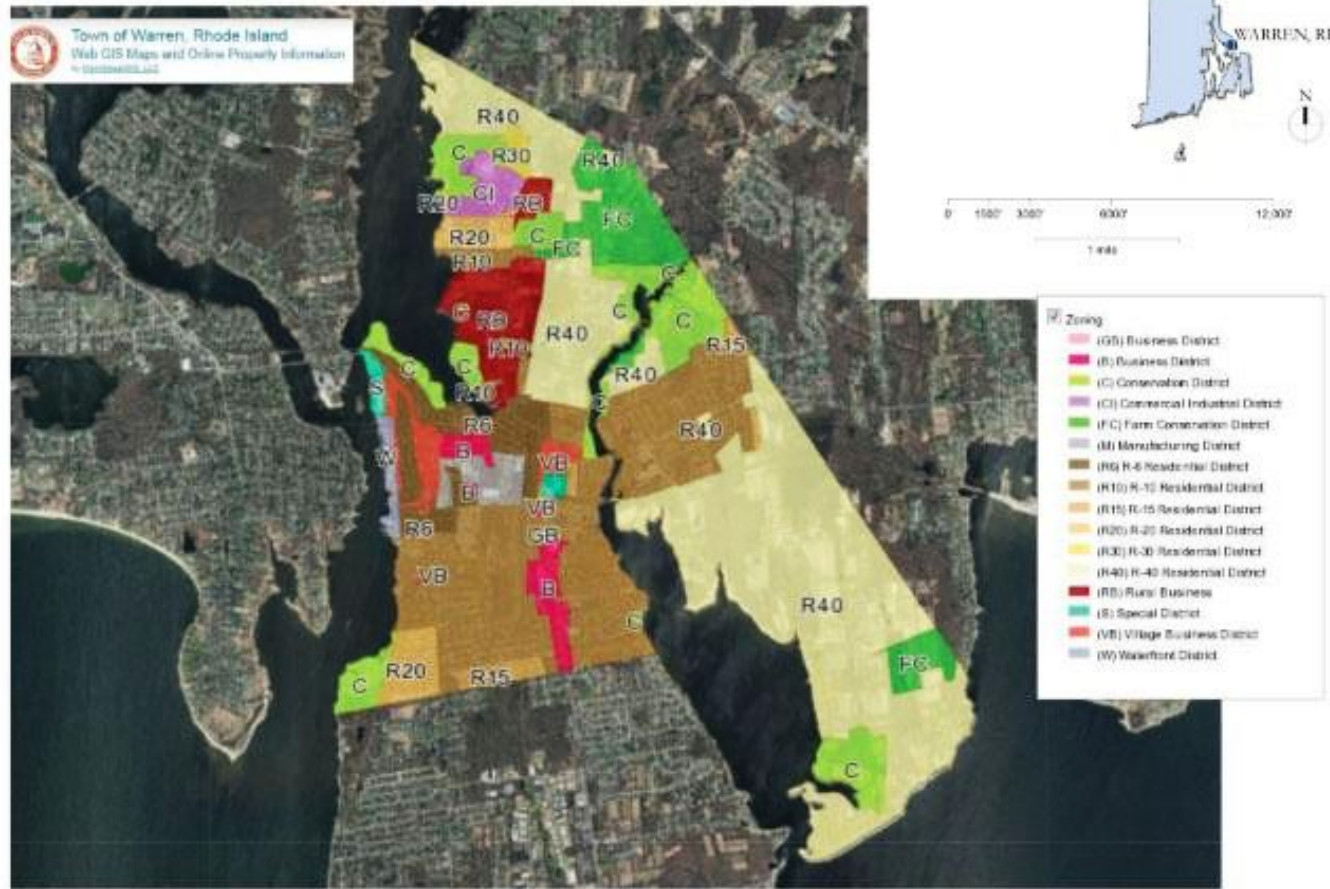
**Business** - Areas allocated to present and future use in business, general retail and offices.

**Waterfront Commercial** - Environmental uses for this type of area are normal waterfront commercial and manufacturing uses such as boat building, boat repair, marinas fishing piers, fish processing and marine supplies sales.

**Manufacturing** - Includes areas devoted to manufacturing specific goods. Rhode Island typically produces electronics, plastics, metal products and pharmaceuticals.

**Recreation and Conservation** - Land allocated to future public and private recreation facilities and areas deemed to be worthy of conservation.

**Public Utilities** - Land projected to be used in connection with supply, sewage, electric power, telephons and gas.



# CIRCULATION AND UTILITY ANALYSIS

UNIVERSITY OF RHODE ISLAND LANDSCAPE ARCHITECTURE DEPARTMENT  
LAR 343  
PREPARED FOR PROFESSOR RICHARD SHERIDAN

WARREN, RI 02885

## Circulation:

East Bay Bike Path starting from northwest splitting southwest towards Burs Hill Park and heading east towards Warren Recreation Park.

RIPTA transportation route from Providence to Newport is bus #60. North and southbound running through Warren, RI on Main Street (Route 114). RIPTA bus routes and schedules found on [ripta.com](http://ripta.com)

Long before bridges were established in the town of Warren, ferries was another way of transportation. One of the earliest ferries recorded connected the Tiverton shore with Apudnick Island in 1640, only a few years after the initial settlement of Rhode Island. No exact date of when Warren's first ferry was established but it is where the Barrington-Warren Bridge now stands, connected New Meadow Neck with Brook's Pasture. William Ingraham, the first ferryman employed by the town in 1678. In 1794, permission was granted to Duncan Kelley to erect a bridge at the ferry location. It was known as Toogood's Ferry in 1720 and then Kelley's Ferry 1736-1743.

A few years later, another ferry was established, probably about 1700, from the foot of Washington Street to Warren. Carr's Ferry was in operation for 12 years until 1722. In 1738, Robert Miller petitioned to run the ferry and it was known as Captain Miller's Ferry until at least 1756.

The last reference to the "lower" ferry is in 1798. Which foot travelers continued to be ferried over "within the memory of people now living" Bicknell stated in writing in 1898.

The Providence, Warren & Bristol Railroad was the fourth established in Rhode Island. The fourth day of July, 1855, was celebrated in Warren by the first railroad train in its history chugging into town. On September 21, 1938 the railroad said good-bye to all passengers, unexpectedly but perforce.

Resources: Warren 250th Anniversary Commemorative Book 1998C published by Masters Services, Springfield, Massachusetts

## Utilities:

Sewer lines, water lines and drainage are shown on GIS map. Map found online at [www.mainstreetmaps.com](http://www.mainstreetmaps.com)



JONATHAN DANIELS, JULIAN SALVUCCI,  
WILLIAM DEPINA-GOMES & ZACK FREGULETTI



# Warren RI Concept Designs





# Preservation of the Marsh

- Our salt marshes in RI are nursery grounds and habitats for hundreds of species of fish, shellfish, birds, and mammals
- 75% of commercial fish species depend on estuaries for habitats and spawning areas
- In RI, our marshes are valuable because RI has \$75 million commercial fishing and a recreational fishery valued at \$150 million
- Marshes serve as natural pollution treatment systems by filtering out pollutants before it reaches coastal waters
- Provide buffer during storms and flooding
- Around 58% of Narragansett Bay's marshes are impacted by polluted runoff
- Around 30% have inadequate or nonexistent buffer zones





# COASTAL RESILIENCE OF THE WARREN WATERFRONT

WARREN, RI 02885

## The Marsh

•The existing marshland in the northern part of Warren needs to be protected as it acts as an important filtration mechanism of pollutants exiting Warren into the ocean.

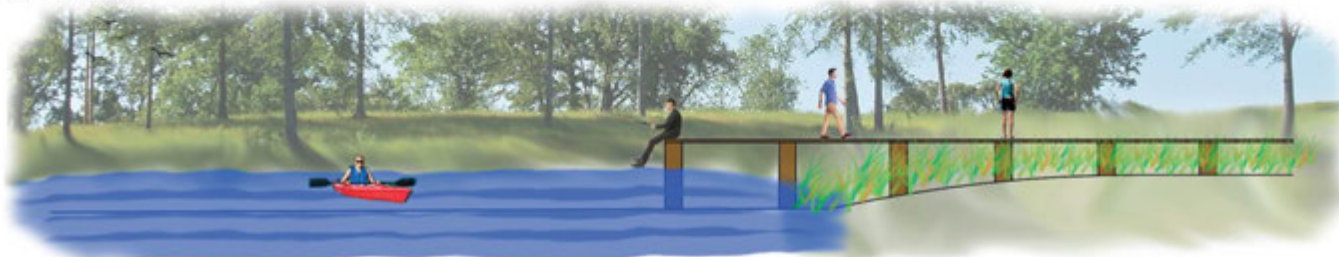
•I would like to place a boardwalk through the Marshland. This boardwalk would provide tourists and the people of Warren with fishing, nature walks, educational value, and wonderful sights, sounds, and smells.

•On the outlets of the boardwalk which extend just past the edge of the marsh will be used for fishing. Biodegradable canvas shade structures will be implemented in these areas.

•In the center of the marsh an educational exhibit including signage and interactive elements about the importance of marshes and the wildlife they inhabit will be implemented.

•Bird houses made from natural/recycled materials will be implemented to attract various kinds of birds including, osprey and the Northern Flicker.

## Marsh Cross Section



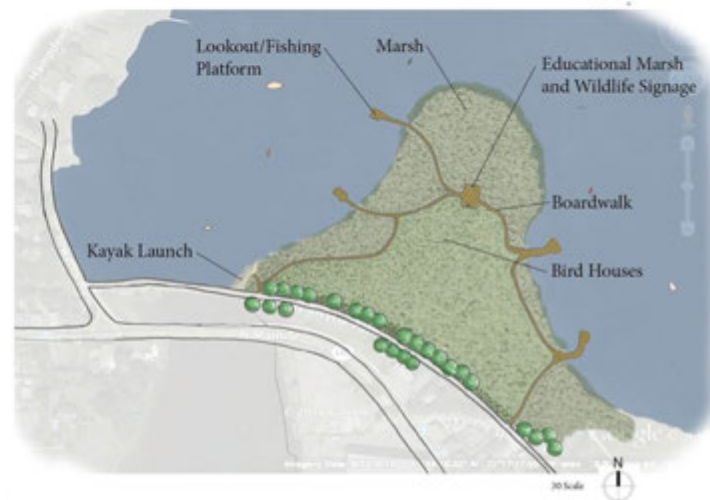
Map of Warren



Archetypes



Concept Plan



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PREPARED FOR PROFESSOR RICHARD SHERIDAN  
BY MAX WHITCOMB



# MARSH RESILIENCE

WARREN, RI 02885

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 PREPARED BY SEAN COFFEY  
 LAR 343



**PROGRAM**  
 RHODE ISLAND HAS A GOOD REPUTATION FOR ITS SALT MARSHES. SALT MARSHES AID MANY DIFFERENT SPECIES OF FISH AND MAMMALS AND PROVIDE THEM WITH A FUNCTIONAL ECOSYSTEM. SALT MARSHES ARE ALSO EXCELLENT BUFFER ZONES THAT HELP WITH WATER FILTRATION AND PROTECT TOWNS FROM HIGH WATER LEVELS. PRESERVATION OF THE MARSH AND ADDING TO THE EXISTING BUFFER CAN HELP PROTECT WARREN'S MARSH LAND AND EXTEND WARREN'S COMMUNITY FRIENDLY CULTURE TO THE NORTHWEST BORDER OF THE TOWN.

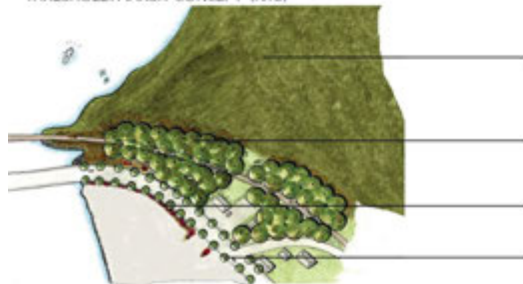
- Planting List:**
- || Black Tupelo (*Nyssa sylvatica variolocal*)
  - || Pin Oak (*Quercus palustris*)
  - || Swamp White Oak (*Quercus bicolor*)
  - || Arrowwood (*Viburnum dentatum*)
  - || Creeping Juniper (*Juniperus horizontalis*)
  - || Sea Lavender (*Limonium peretzii*)
  - || Smooth Cordgrass (*Spartina alterniflora*)
  - || Salt Hay Grass (*Spartina patens*)

- || Daylily (*Helmercallis* [Isome Double Classic])
- || Hyssop (*Agastache* [Blue Fortune])
- || Black Eyed Susan (*Rudbeckia hirta*)
- || Salvia (*Salvia* [greggii Texas Wedding])
- || Goat's Beard (*Achillea* [guthrieana])
- || Hydrangea (*Hydrangea paniculata*)
- || Foxglove (*Digitalis lineata*)
- || Yarrow (*Achillea* [Apricot Delight])

## EXISTING CONDITIONS



## THRESHOLD/MARSH CONCEPT (NTS)



A BOARDWALK WITH AN OUTLOOK WILL PROVIDE ESSENTIAL VIEWS OF THE MARSH AND THE SURROUNDING LANDSCAPE. IT ALSO GIVES PEOPLE ON THE BIKE PATH A PLACE TO REST.

INCREASING VEGETATION SURROUNDING THE EAST BAY BIKE PATH IS NECESSARY TO HELP FILTRATION AND INFILTRATION OF

ACCESS BETWEEN THE BIKE PATH AND MAIN STREET WILL RAISE VISITORS AND PROVIDE A SMOOTHER TRANSITION TO DOWNTOWN

ADDING LOW MAINTENANCE PERENNIAL FLOWERS CAN IMPROVE WARREN'S GATEWAY AND PROVIDE ATTRACTIVE SPACES IN FRONT OF INDUSTRIAL SITES.

A SMALL PARKING AREA WITH PERMEABLE PAVING WILL PROVIDE TOURISTS WITH A PLACE TO EXPLORE WARREN'S MARSHLAND

PLACING BANNERS ALONG THE STREET LAMPS CAN INFORM DRIVERS WHEN THEY ENTER WARREN AND ALSO ADVERTISE BUSINESSES AND UPCOMING EVENTS

PRESERVE EXISTING SALT MARSH TO PROVIDE HABITAT FOR WILDLIFE IN THE AREA.

IMPLEMENT A VEGETATIVE BUFFER TO COLLECT AND FILTER RUNOFF WATER.

LOW MAINTENANCE PERENNIAL FLOWER GARDENS

PLANTING TREES ALONG THE SIDEWALK WILL PROVIDE SAFETY TO PEDESTRIANS

## UPDATED PLAN VIEW OF GATEWAY (NTS)



## PHOTOSHOP RENDERING OF GATEWAY INTO WARREN



# COASTAL RESILIENCE OF THE WARREN WATERFRONT



WARREN, RI 02885

## East Bay Bike Path:



- Add vegetation such as *Spartina patens* to existing wetland area between bike path and vehicular bridge
- Addition will help slow the flow of sea level rise while aiding in erosion control



Before After

- Proposed extensions to the existing bike path
- One connecting bicyclists to the proposed river walk on the Tourister Mill development & another connecting bicyclists to Burr's Hill Park and Warren Town Beach

- Revegetate several areas along the bike path to aid in groundwater recharge while creating a more biodiverse habitat for wildlife



NTS

Section view of bike path crossing to town beach overlook

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BY ALEXANDRA LOMBARD

## Proposed bike path extension into Burr's Hill Park



- Extend the Warren Town Beach by knocking down old concrete sea wall and installing a marsh area
- Add a raised boardwalk from the entrance of the beach over the marsh to create a lookout of the waterfront while also providing educational signage on marsh wildlife and habitat for visitors
- Add permeable paving to existing parking lot and extend 25' to provide an area for food trucks
- Add vegetation to several areas throughout the park and beach to provide a coastal buffer zone between the park and the beach



# COASTAL RESILIENCE OF THE WARREN WATERFRONT



WARREN, RI 02885

## PROGRAM

-Being the gateway into Warren, this is a very important part of the town. This area should set the precedent for what the visitor will think of the town and leave a memorable impression

-Create a landscape that is harmony with the surrounding waterways

-Provide a natural buffer between the sensitive marsh and urban environments

-Maintain the hydrologic and ecological integrity of the marsh to provide wildlife habitat, aesthetics, visual screening, erosion control, and enhanced infiltration of stormwater

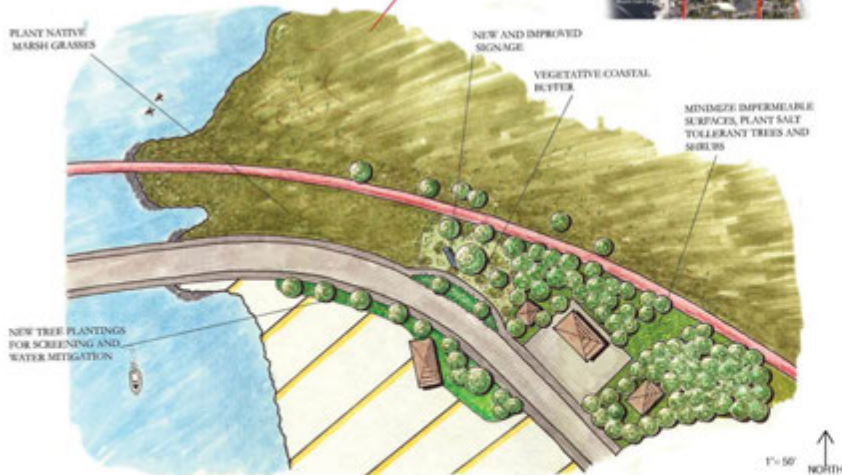


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BY DAVID WALENCEWICZ

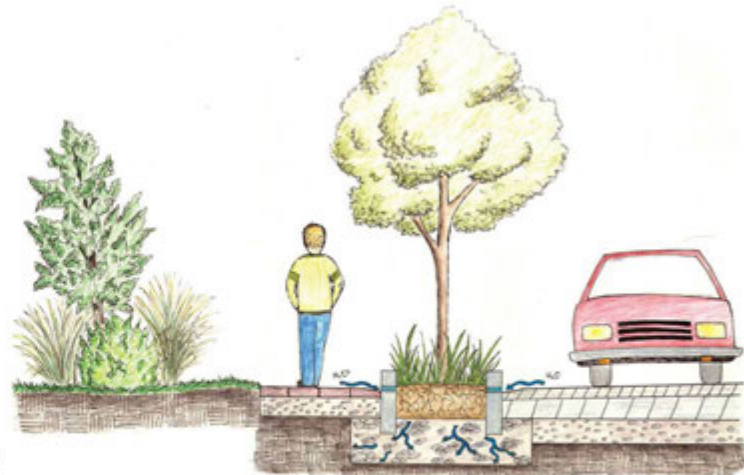
## PLANT LIST

The plants implemented in this plan will have the following qualities: Native to the New England region, salt tolerant, low maintenance, and aesthetic appeal throughout the season.

- Grass Species:
- Switchgrass (*Panicum amarum*)
  - Indiangrass (*Sorghastrum nutans*)
  - Saltmarsh hay (*Spartina Patens*)
- Shrub Species:
- Highbush blueberry (*Vaccinium corymbosum*)
  - Sweet pepperbush (*Clethra alnifolia*)
  - Shadbush (*Amelanchier canadensis*)
  - Arrowwood (*Viburnum dentatum*)
- Tree Species:
- Sassafras (*Sassafras albidum*)
  - Black oak (*Quercus velutina*)
  - Gray dogwood (*Cornus sacronosa*)
  - Red cedar (*Juniperus virginiana*)
  - Tupelo (*Nyssa sylvatica*)



PLAN VIEW OF MARSH AND TOWN GATEWAY



CROSS SECTION OF VEGETATED CURB BUMP-OUT BUFFER



# PROPOSED WATERFRONT DESIGN

- Warrens waterfront includes historic buildings, restaurants and shops
- We will use are designs to preserve the waterfront against sea level rise and flooding
- Continue to attract people to the waterfront by including walkways, lighting and green spaces



# COASTAL RESILIENCE OF THE WARREN WATERFRONT



WARREN, RI 02885

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 BY JONATHAN DANIELS

Seating areas on dock for views of waterfront, which are surrounded by potted trees to provide shade

Coastal buffer of granite rip-rap along the water edge to help mitigate sea level rise, while also providing stabilization for plant life

Increase marsh vegetation to help with green infrastructure, contain flooding waters, and increase



Installed eco-swales that will consist of salt-tolerant plants to help with percolation of water during storms and flooding, remove any contaminants of pollution from the water, and will be an environmentally friendly alternative to curbs

Installed street lights with LED flood bulbs surrounding parking lot to provide for lighting that will increase safety in the area even during flooding

Parking lot that is covered in a porous asphalt to help with water percolation. Parking lot will have no difference in the amount of open spaces for vehicles



Present day view of The Wharf Tavern's Parking Lot



The Wharf Tavern parking lot with installed eco-swales containing vegetation, and permeable pavement



Eco-swale will consist of salt-tolerant plants such as Purple Loosestrife, Buffalo Grass, Flat-Top Golden Rod, and Swamp White Oak

Different vegetation along coast will be Red-Shouldered Aster, Blue Lobelia, and Salvia

# COASTAL RESILIENCE OF THE WARREN WATERFRONT



WARREN, RI 02885

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PREPARED FOR PROFESSOR RICHARD SHERIDAN  
BY: APRIL BARKER



SEASHELL WALK MIX OF VEGETATION TRAFORD RESTURANT PERVIOUS PAVERS GRASS PAVERS

- REPLACE PARKING LOTS AND DRIVEWAYS WITH PERVIOUS PAVERS
- GRASS PAVERS CAN BE MADE OUT 100% RECECYLED PLASTIC. GRSSASS THAT COULD BE USED FESTUCA OVINA OR DISTICHLIS SPICATA
- WATER WILL FILTER INTO A STORAGE BASIN AND THEN SLOWLY DISCHARGE INTO THE SOIL. THE FILTRATION WILL HELP WATER BECOME LESS POLLUTED.
- WITH WATER BEING ALLOWED TO FILLTER THROUGH THERE WILL BE LESS FLOODING OF PARKING LOT AND DAMAGE FROM THE PRESSURE OF WATER RUN OFF
- REDUCES HEAT ISLAND AFFECT BY EVAPROTANSPIRATION FROM GRASS AND BY IMPROVING THE QUALITY OF TREES.
- EASIER FOR PLANTS TO GROW WITH GRASS PAVERS. ALLOWING YOU TO PLANT MORE TREES ENHANCING THE SHADE IN THE SUMMER.



VIEW OF PARKING LOT LOOKING TOWARDS WATER STREET



WEST FARM MALL IN WEST HARTFORD, CONNETTICUT. THEY MADE AN EXPANSION TO THERE PARKING AND DECIDED TO USE GRASS AND GRAVEL PAVERS TO AVOID HAVING TO MAKE A DETENTION BASIN. THEY USED GRASS AND GRAVEL PAVER 2 FROM INVISIBLE STRUCTURES INC., BOTH THESE PAVERS HAVE A COMPRESSIVE PSI OF 15,940.

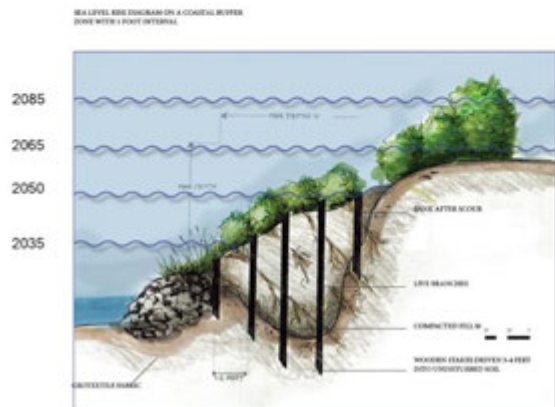


PESTRIAN WALK IN FRONT OF WATER LOOKING TOWARDS WATER STREET CAFE.



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 SVANA RUN HERMANNSDOTTIR



**Coastal buffer:** Land area adjacent to a shoreline feature that is vegetated with native plants and which provides a natural transition zone between the coast and adjacent upland development

**Benefits of a coastal buffer:**

- Water Quality
- Flood Control
- Protection of scenic and Aesthetic Quality
- Erosion Control
- Restores wildlife habitat



**FACTS ABOUT SEA LEVEL RISE**

- 50% of Americans live in coastal countries where water and energy infrastructure are increasingly vulnerable to higher sea levels.
- By the end of the century, annual damages from flooding in the U.S are projected to increase by 30%
- Research suggest that wave height can be reduced by 50% within the first 16 feet of marsh and 95% after crossing 100 feet of marsh.
- Over the past 200 years, Rhode Island has lost over 50% of its salt marshes to manmade alterations, resulting in a loss of approximately 4,000 acres statewide. Today many of the remaining coastal wetlands have been impacted by higher tides due to sea level rise.



25 YEAR FLOOD





# Historic Water Street

-focus on Hydrology and green infrastructure





# WATER STREET

## COASTAL RESILIENCE OF THE WARREN WATERFRONT



WARREN, RI 02885



### Goals:

- Increase the green infrastructure
- Implement changes to better manage storm water
- creation of "Pocket Parks"

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 PREPARED FOR PROFESSOR RICHARD SHERIDAN  
 BY BECKY REO

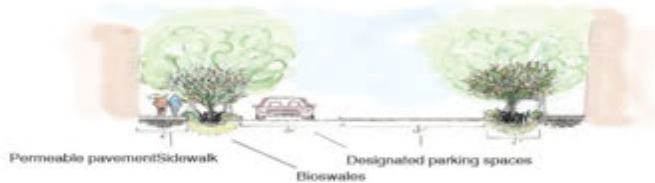
### Pocket Parks:

- small outdoor space to gather, relax and enjoy the outdoors
- they also provide permeable spaces for water to infiltrate and a habitat for birds and small animals



WARREN, RI

Recommended change to traffic pattern for Water st., One way traveling North to South from Main st. to State st.



Cross Section Drawing of One way traffic on Water Street



Existing park at the corner of Baker and Water st.



Suggested park site, corner of State and Water St.



Spaulding Rehabilitation Center, Boston MA

**Bioswales and Permeable Pavement** are types of water systems that mimic natural approaches to the filtration of storm water. This diversion allows rainwater to soak into the earth slowly rather than into the storm water/sewer systems.



Proposed pocket park area at the corner of Baker and Water street



# Jamiel's Park

Design for;

- Street Infrastructure Change
- Community Involvement
- Storm Surge Protection
- Coastal Remediation



---

Picture courtesy of Steve's Boat Rentals

# Jamiel's Park- NICK DANNER

- Amount of rainfall that happened in a square acre home lot in a 3" rain event. 81,462 gallons of water, or 10,891 cubic feet of water.
- In a 1" rain event; 26,970 gallons// 3606 cubic feet.
- Jamiel park was built on top of an old land-fill; remediative plants that are also natives, and add more marshland.
- I would also like to extend my project to work on market street so that it may act as a barrier to protect the other residential neighborhoods.
- The park size is 461,683.7 square feet, 10.6 acres, .02 miles, 4.3 hectares.
- Total rainfall in 3" event = 1,042,714 gallons // 139,400 cubic feet
- Depending on what type of snow falls, it can weigh 5-15 pounds per cubic foot!

# COASTAL RESILIENCE OF THE WARREN WATERFRONT

WARREN, RI 02885

**BRIEF:**

- Combat the issues of retreating marshlands, inland runoff, sea level rise, and flooding.
- Create a urban space for a multitude of activities that builds off existing features.
- Propose elements in residential areas to focus of recharge, recycling, and reuse of the water that enters their properties.
- Focus towards the residents and their wants and needs in regards to public activities and protection of their homes.

Concept 1: Jamiel's Park, Market street and Wood street Access.



Concept 2: Proposed 1 acre property.



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 PREPARED FOR PROFESSOR RICHARD SHERIDAN  
 BY: NICK DANNER



- Incentive program to residents for change by 2020.
- Program includes properties, roofs, and pavements.
- The total amount of water that will fall on this site in a 3" rain event 10,891 cubic feet or 81,462 gallons of water.
- Large trees that can absorb and respire about 100 gallons of water a day into the atmosphere.

Concept 3: Replacing the current sewage treatment plant with a park



- Design a new type of scenic shore line park.
- Reuse existing infrastructure.
- Turn a dangerous area into a non-hazardous area capable of withstanding seasonal weather risks.
- Connect this area to the bike path and Water Street to have a close and intertwined neighborhood.
- Fertile soil from sewage treatment plant will provide an excellent medium to plant salt tolerate trees that will hold the shore line in place.



Jamiel's Park Goals

- Increase activity opportunities.
- Build designated parking.
- Build a circulating pathway for pedestrians and cyclists.
- Protect the shore line and add activities around this area.





# Proposed Sewage Treatment Plant Design

- Warren's sewage treatment plant is located at a very low elevation of the waterfront
- Due to the impact of sea level rise in 10, 20, 30, and 40 year storms, actions need to be taken to keep the plant operable

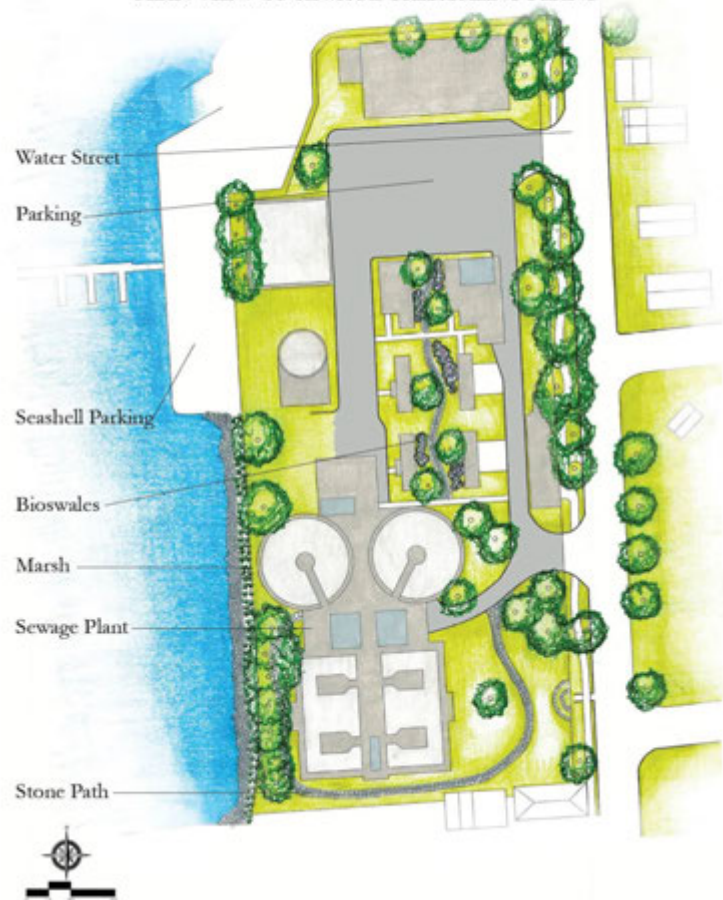


# COASTAL RESILIENCE OF THE WARREN WATERFRONT



WARREN, RI 02885

## PLAN VIEW OF SEWAGE TREATMENT PLANT



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LAR 343 DESIGN STUDIO FALL 2016  
PREPARED FOR PROFESSOR RICHARD SHERIDAN  
BY WILLIAM DEPINA-GOMES



Warren's Sewage Treatment Plant located on Water Street. The plant is at sea level and due to the impact of sea level rise in 10, 20, 30 and 40 year storms, the plant will need to be relocated to a higher level. This area should be open to the public since there is a lot of open green space. Incorporating more wildflowers, ferns, shrubs and small trees will help stand against sea level rise and stormwater runoff.



### RAIN GARDEN/BIOSWALES

View from inside the sewage treatment plant of the open grass area. This here could be an area to place green infrastructure. Gardens and bioswales not only capture stormwater runoff it provides shade and habitat along the coast.



### WATERFRONT PATH

View of the waterfront from the sewage treatment plant. With the addition of marshland plants with the existing coastal rocks will slow the effect of sea level rise. Converting the plant to a public park will bring in more pedestrian movement and provide access and views of the bay.

# COASTAL RESILIENCE OF THE WARREN WATERFRONT

WARREN, RI 02885

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BY ERIN NORRISON



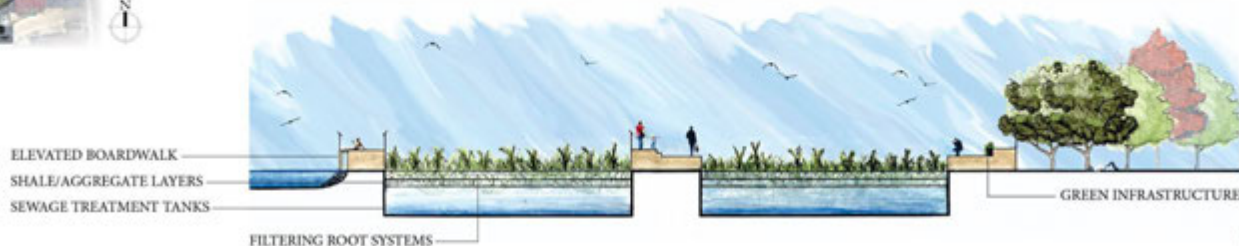
**THE LIVING MACHINE**  
BY JOHN TODD  
*Proposed for the sewage treatment plant of Warren, RI*

- New design will use native plant species to naturally filter waste products.
- New tanks will be constructed to filter water as well as hold it.
- Textile fabric is layered inside the tank with plantings covering it

Successful examples of the living machine include:

- Phipps Conservatory and Botanical Gardens in Pennsylvania
- Esalen Institute in Big Sur, California

PERSPECTIVE BELOW SHOWS ONE OF THE TWO TANKS AT THE WASTEWATER TREATMENT PLANT. A RAMP ALLOWS PEDESTRIANS TO WALK DOWN TO THE LOWER LEVEL OF THE TERRACED MANMADE MARSH.





# Burr's Hill Park

Design For:

Increased Recreational  
Use

Account for Sea Level  
Rise

Improve Aesthetically



# COASTAL RESILIENCE OF THE WARREN WATERFRONT

WARREN, RI 02885

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 BY JENNIFER FU

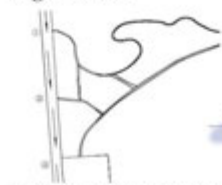


- OUR GOALS**
- Help with sea level rise
  - Catch and clean run off
  - Increase the accessibility for people

This is the prediction of future flooding in Warren

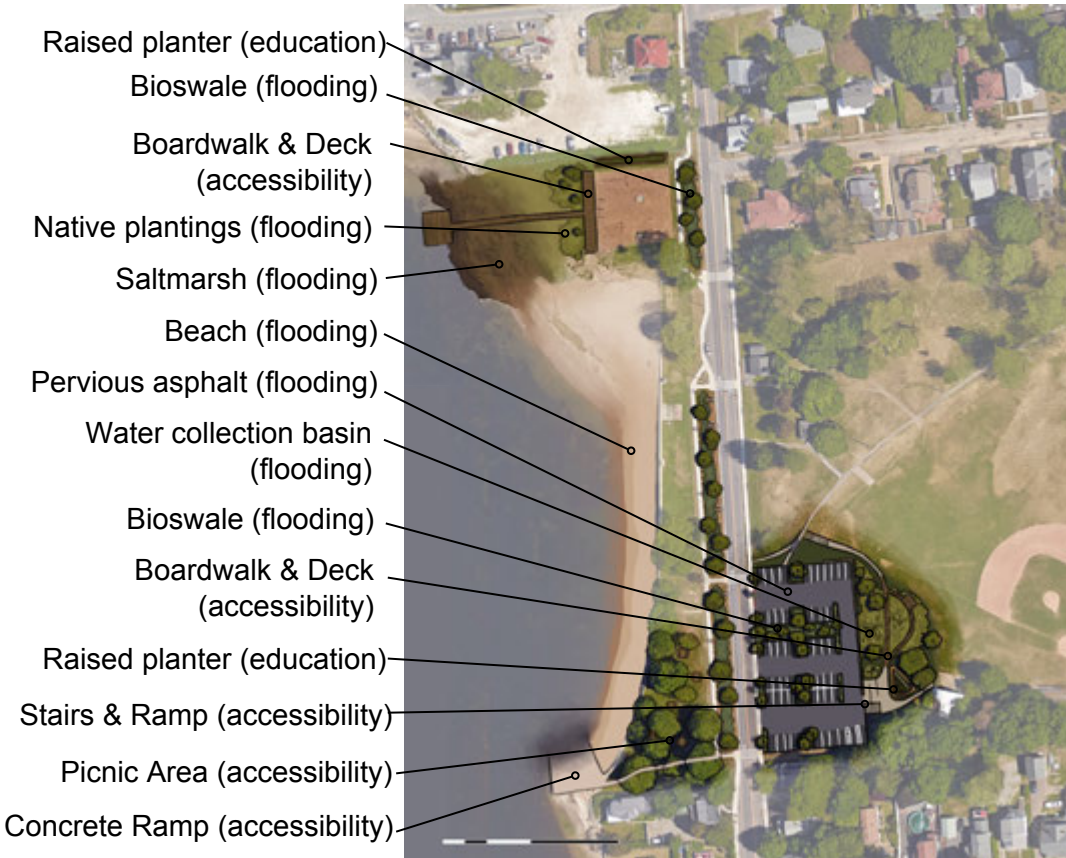


- Effects:**
- Larger beach and retaining wall to welcome more sea water
  - Change part of Water Street to one-way
  - More facilities
  - More trees in the north to prevent residential area
  - Bioswales
  - Rerouted pathways make the visits more interesting
  - Lights added





# Revitalizing Burr's Hill Park



Cross-section of a bioswale



## Goals:

- Improve public accessibility
- Prepare coastline for storm surge and sea-level rise
- Educate public about Warren's natural landscape



Perspective view of water collection basin



# COASTAL RESILIENCE OF BURRS HILL PARK



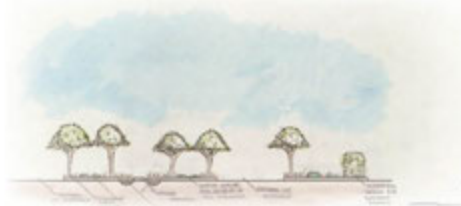
WARREN, RI 02885



## BURRS HILL PARK:

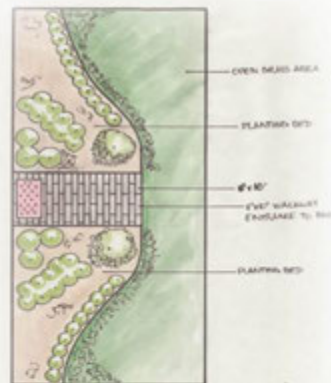
- repave current parking lot with porous pavement and include more handicapped parking spaces
- create an island in the middle of the new parking lot with raised sidewalk and bioswales to help with drainage
- excavate so bioswales run under Water Street to existing bio-retention basins
- update bio retention basins
- update concert stage
- new entrance to park with garden beds and walkway
- create viewing platforms at location of stairs along retaining wall at the waterfront
- stone dust pathways leading from sidewalk to viewing platforms
- update and install new benches along waterfront

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 BY ROBBIE PAULSEN



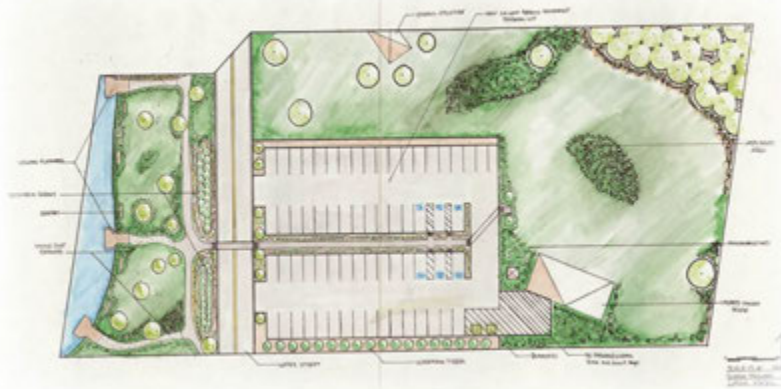
Above: Section view of parking lot entrance with raised walkway and bioswales.

Below: Section view of proposed viewing platform at waterfront



1  
 NORTH  
 SCALE: 1/8" = 1'-0"  
 DATE: 10/16/16

Above: plan view drawing of proposed redesign of entrance to Burrs Hill park.



# Burr's Hill Park Proposed Design



WARREN, RI 02885

## What are the Problems With the Area

- Minimalistic beach, not heavily used
  - Beach area is lacking visual appeal
  - Small in size
- Waterfront could use a focal point to draw people towards it
  - Has moderate seating for pedestrians
- Adequate walking trails for pedestrians
  - Could be improved/expanded to form one continuous walking path
  - Pavement material needs to be reconsidered
- Needs restroom facilities
  - Important for any public recreation area
- Playground need to be updated
  - Old and worn down
- Road separated both sides of the park
  - Creates a hazard zone for any pedestrian trying to cross the street

## How Would this Design Benefit Burr's Hill Park

- Previous pavements
  - On parking lots and walking trails
  - Increases infiltration and reduce runoff
- Parking lot's new location
  - Keeps moving vehicles away from the park
- Restrooms
  - Provides a set relief station
- Walking trail
  - Gives pedestrians a path to walk or run on
- Outdoor fitness area
  - Adds another attraction to the park
- Removing the road
  - Provides a sense of unity to the park, no hazard of crossing the street

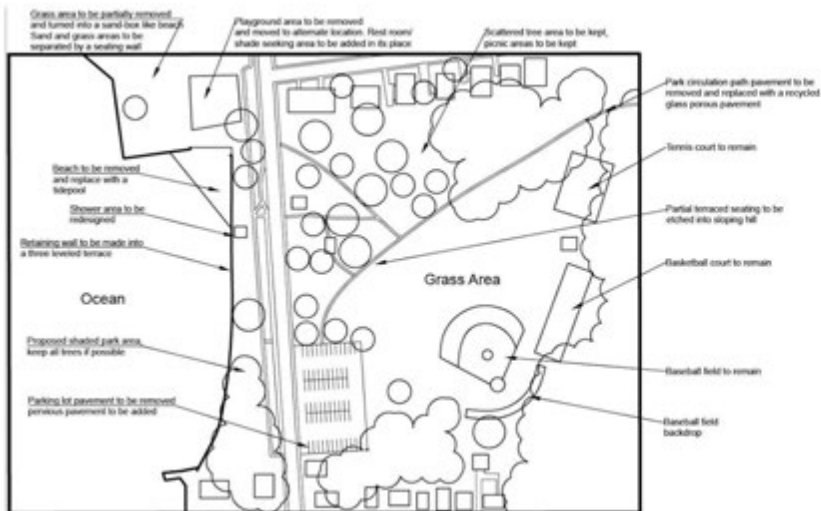
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 PREPARED FOR PROFESSOR RICHARD SHERIDAN  
 BY: Julian Salvucci



Beach-side Walk Made from a Tumbled Glass Aggregate



Outdoor Fitness Area



WARREN, RI 02885

## Purpose

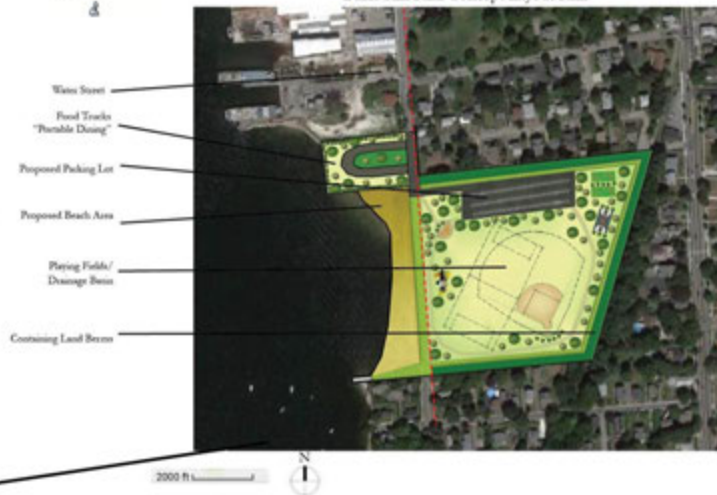
The town beach and Burrs Hill Park serves as one of Warren's centers of recreation. While it does serve its current purpose, the coastal resilience and tourist appeal is in need of improvement. Outlined below is a plan to turn the area into a more usable and appealing beach area and a coastal resilience improvement plan.

## Concept Proposal Plan - Burrs Hill Park/Beach, Warren RI

- End Water Street at Burrs Hill Park
- Construct land berms surrounding Burrs Hill Park to retain flood water in the park basin. This will allow the park to become an emergency storm water flood basin.
- Construct Bioswales of native beach grasses to serve as current filtration and encourage landward marsh migration as sea level rises.
- Relocate and expand the parking lot to the North end of the park at the base of the proposed land berms. Construct out of porous pavements. Will service Blount Boat Adventures, Burrs Hill Park, Water Street, and the new proposed beach area, etc.
- Remove the sea wall in order to revitalize and expand the beach in front of Burrs Hill Park to create
  - o A more complete "Beach Town" (Increase tourism and town profit)
  - o A path for water to enter Burrs Hill Park, which will serve as a situational water basin for flooding.



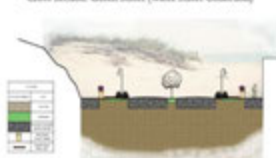
Burrs Hill Park Concept Layout Plan



Case Section: Eco Porous Parking Lot



Case Section: Green Street (Water Street Conversion)



Case Section: Town Beach/Burrs Hill Park



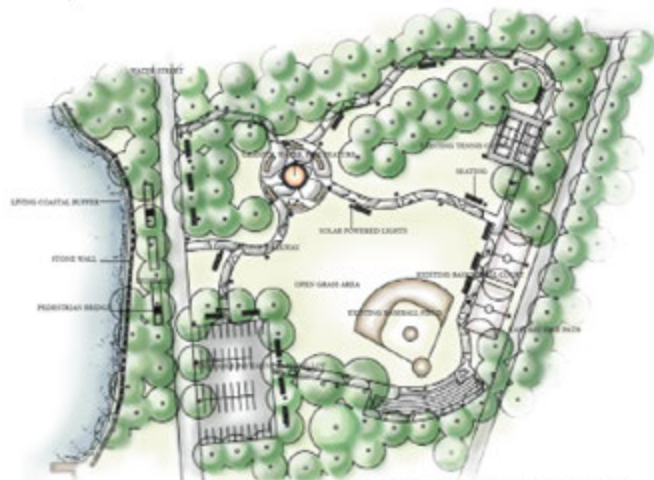


# COASTAL RESILIENCE OF THE WARREN WATERFRONT

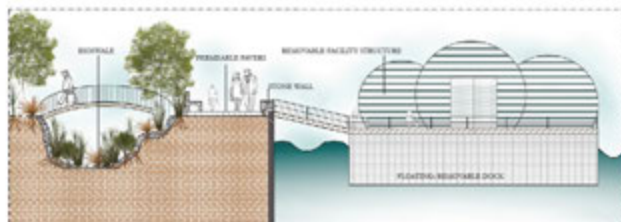


DESIGN CONCEPTS  
WARREN, RI 02885

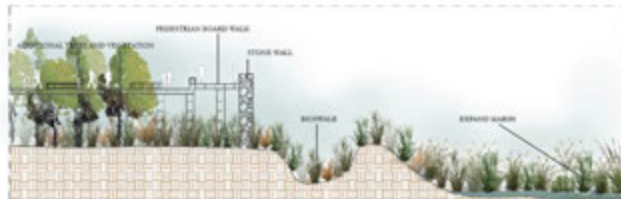
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PREPARED FOR PROFESSOR RICHARD SHERIDAN  
BY ALEXIS FARRIS



1. BURRS HILL PARK LAYOUT, NTS



2. HISTORIC WATERFRONT DISTRICT, NTS



3. GRINNELL POINT, NTS



1. BURRS HILL PARK SECTION, NTS

## OBJECTIVES :

- Keep as many existing trees possible for water infiltration use
- Discuss with public about susceptible storm damage buildings relocation away from water
- Additional seating and solar powered lighting to provide safety and increase use of space
- Added vegetation and biowalls to help with runoff
- Movable facilities in case of storm
- Added permeable pavements
- Expand marsh to help reduce runoff
- More recreational spaces to add character to the site
- Make area more safe and accessible for the public
- Improve boating and pedestrian circulation
- Protect historical structures or buildings



WARREN TOWN MAP

# Planning Excellence

Economic revitalization is driven by food systems in local neighborhoods.

The population of Warren RI is working to preserve heritage, improve community connectivity, and neighborhood performance art

Home to one of the oldest working waterfronts, has community support for public access,





THANK YOU

MAIN STREET WEST FROM TOWN HALL, WARREN, R. I.