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Newport Aquarium Oceanic Research and Discovery Center: to Further Our Knowledge of the Ocean

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Oceanic Research and Discovery Center:

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To further our Knowledge of the Ocean

Title:

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Oceanic Research and Discovery Center

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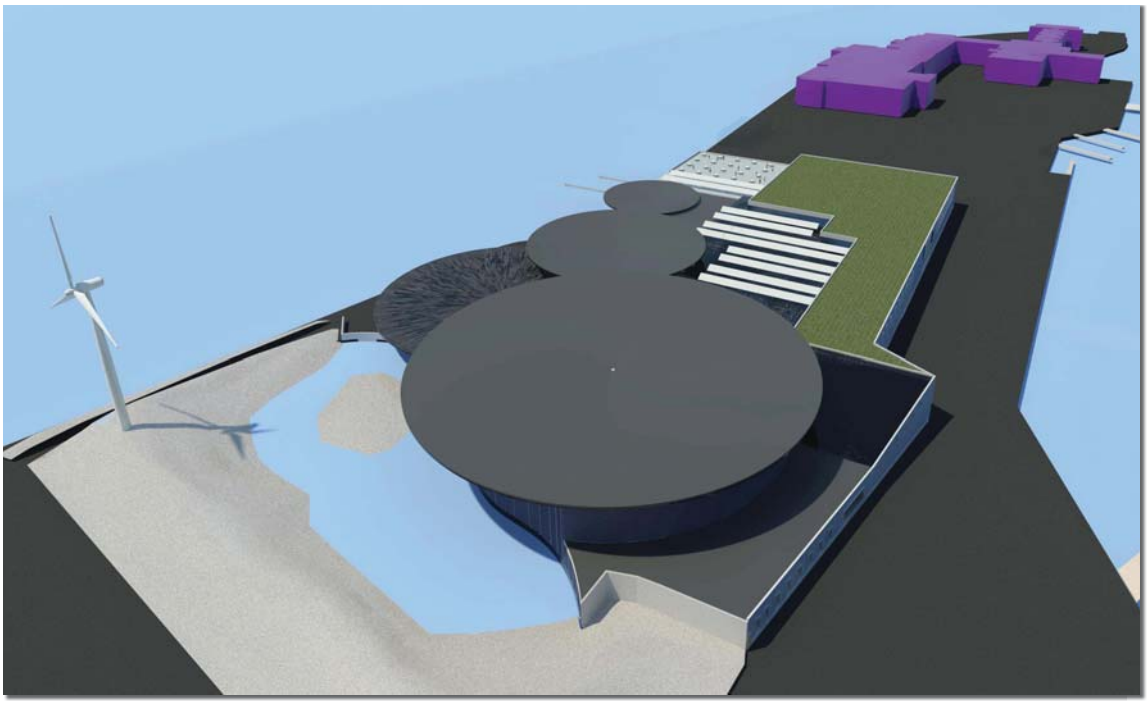
Overall building Rendering from above



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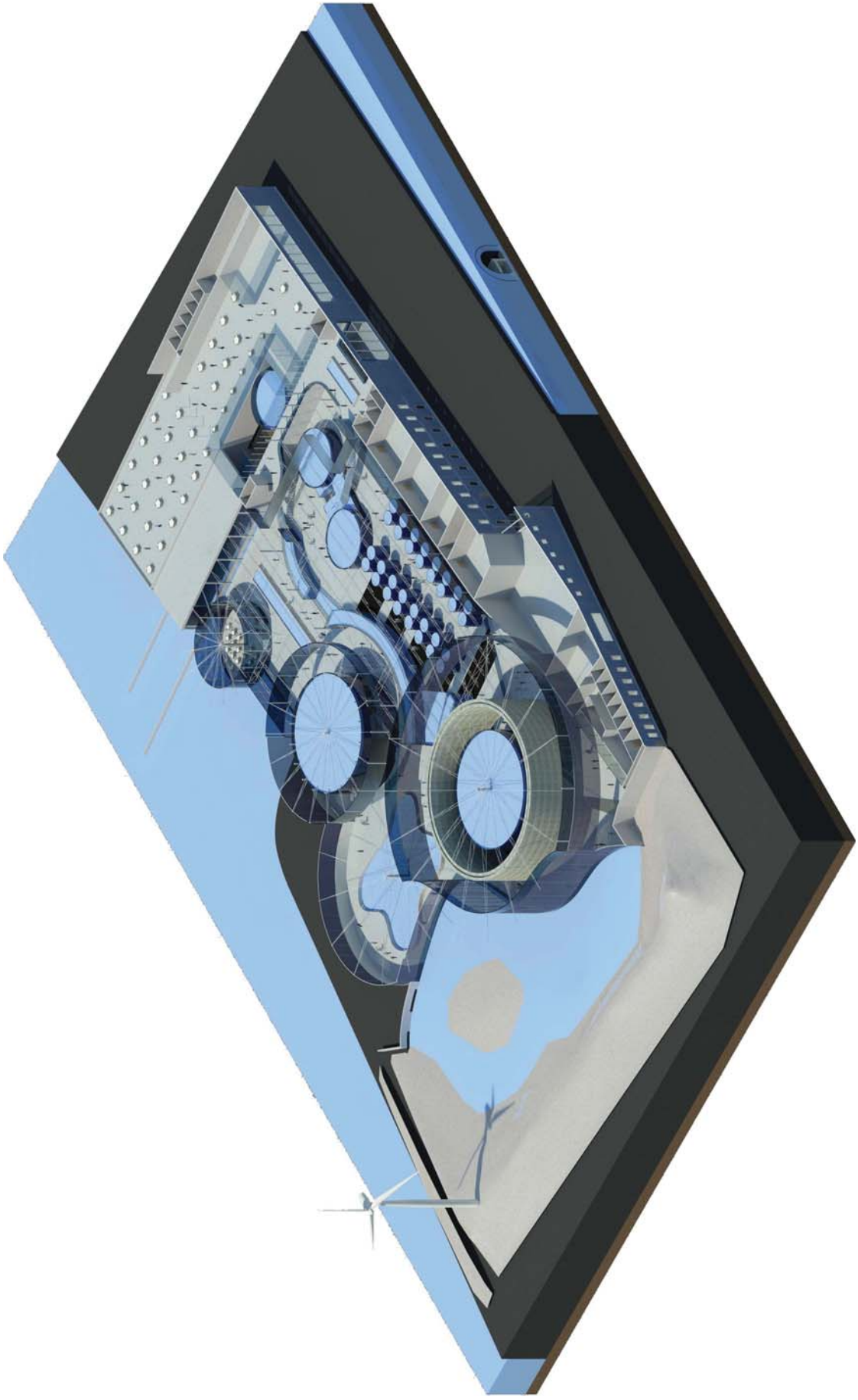
Building with Structure Exposed Showing Tanks



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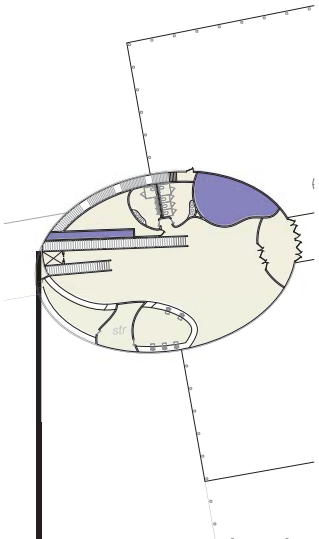
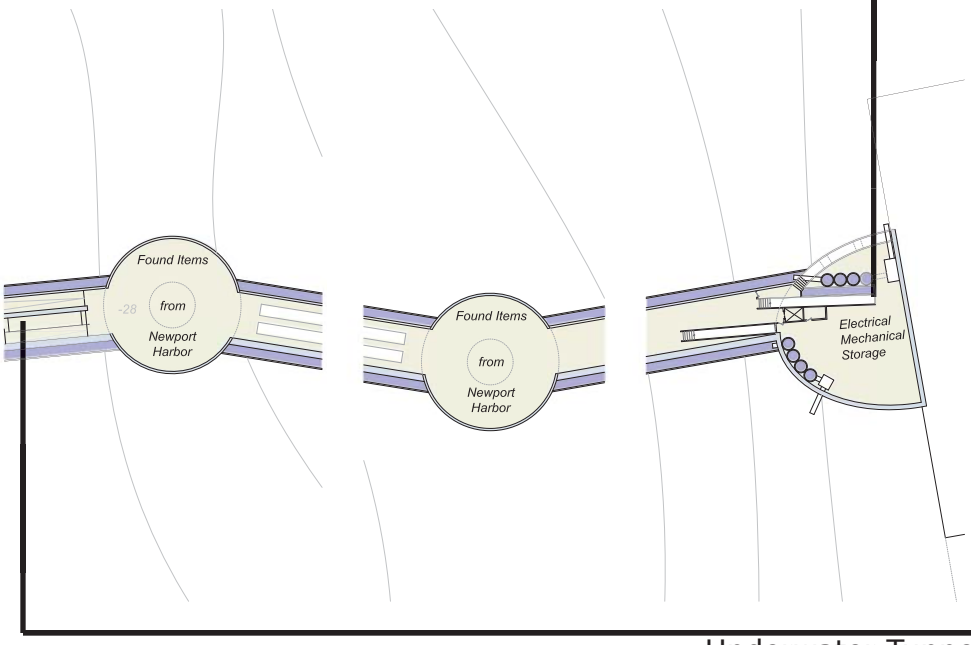
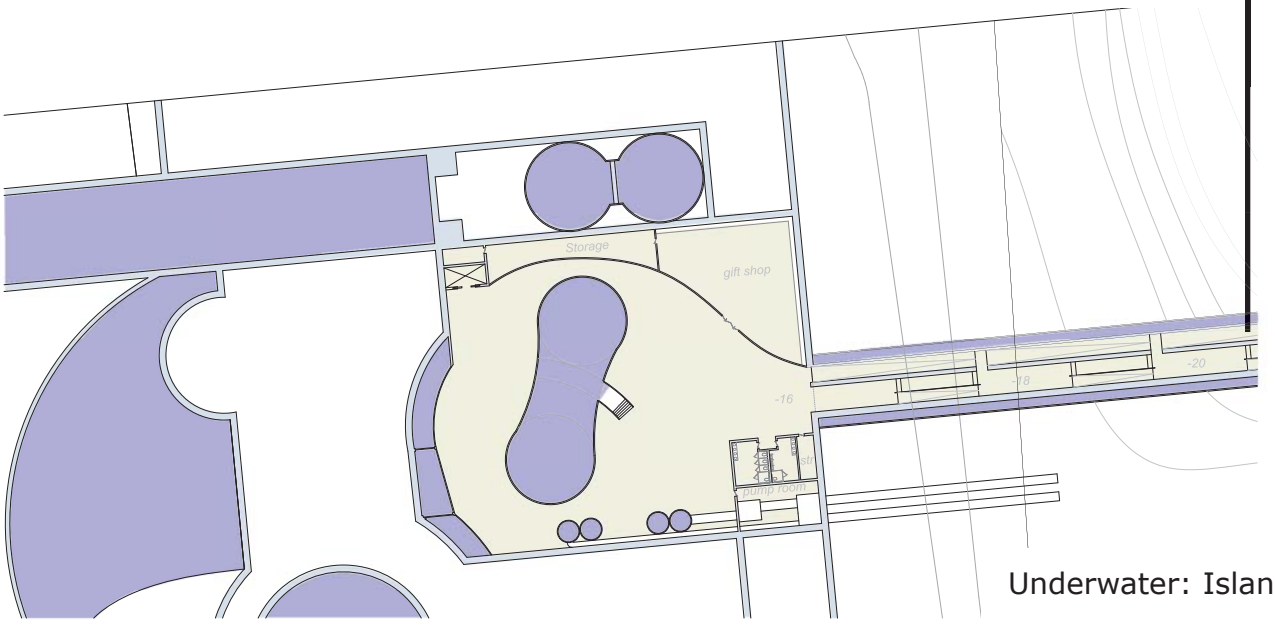


Mainland



Underwater Tunnel



Underwater: Island

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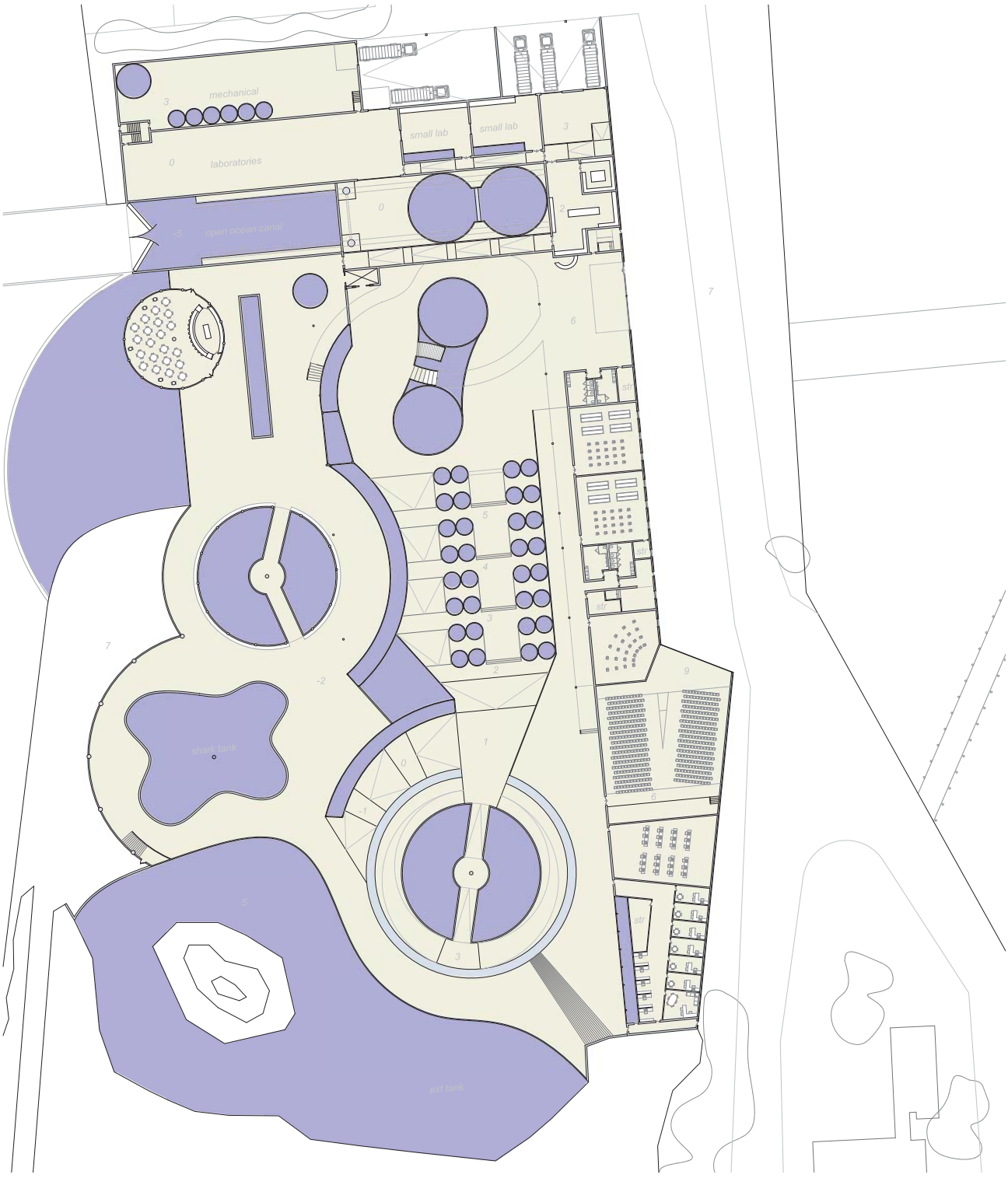
Floor Plans: Ground Floor



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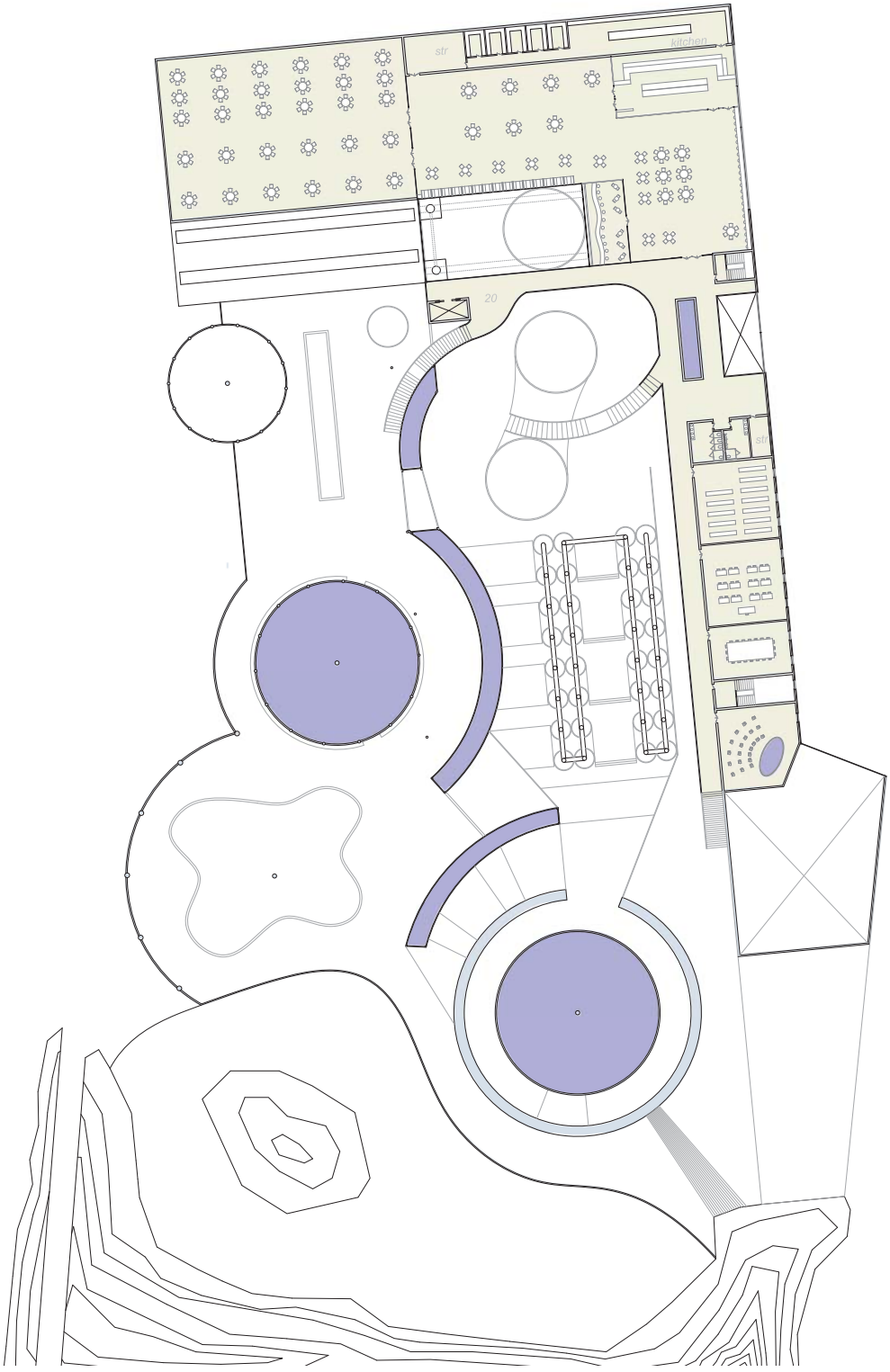
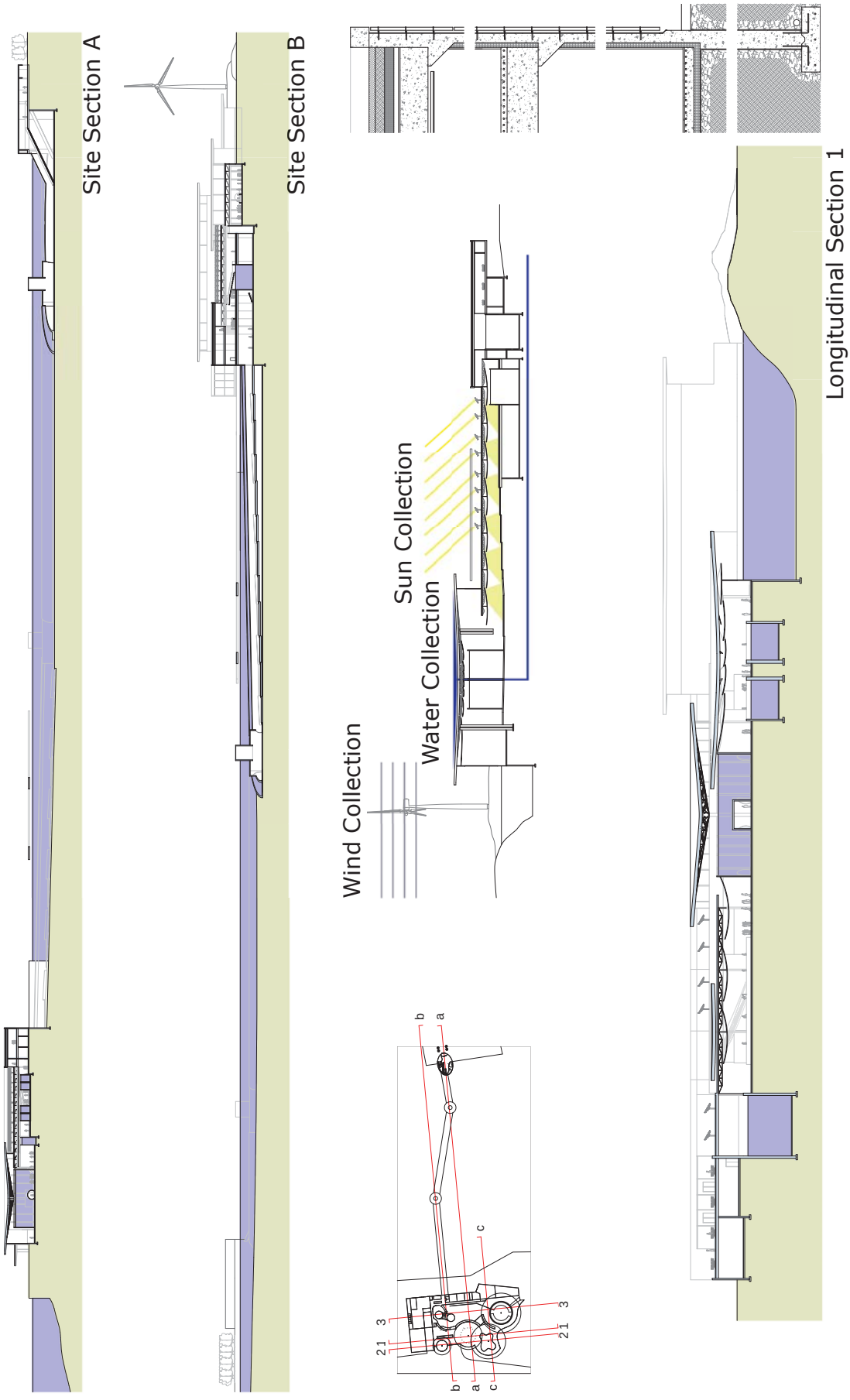
Floor Plans: Second Floor



Final Design Work Sections



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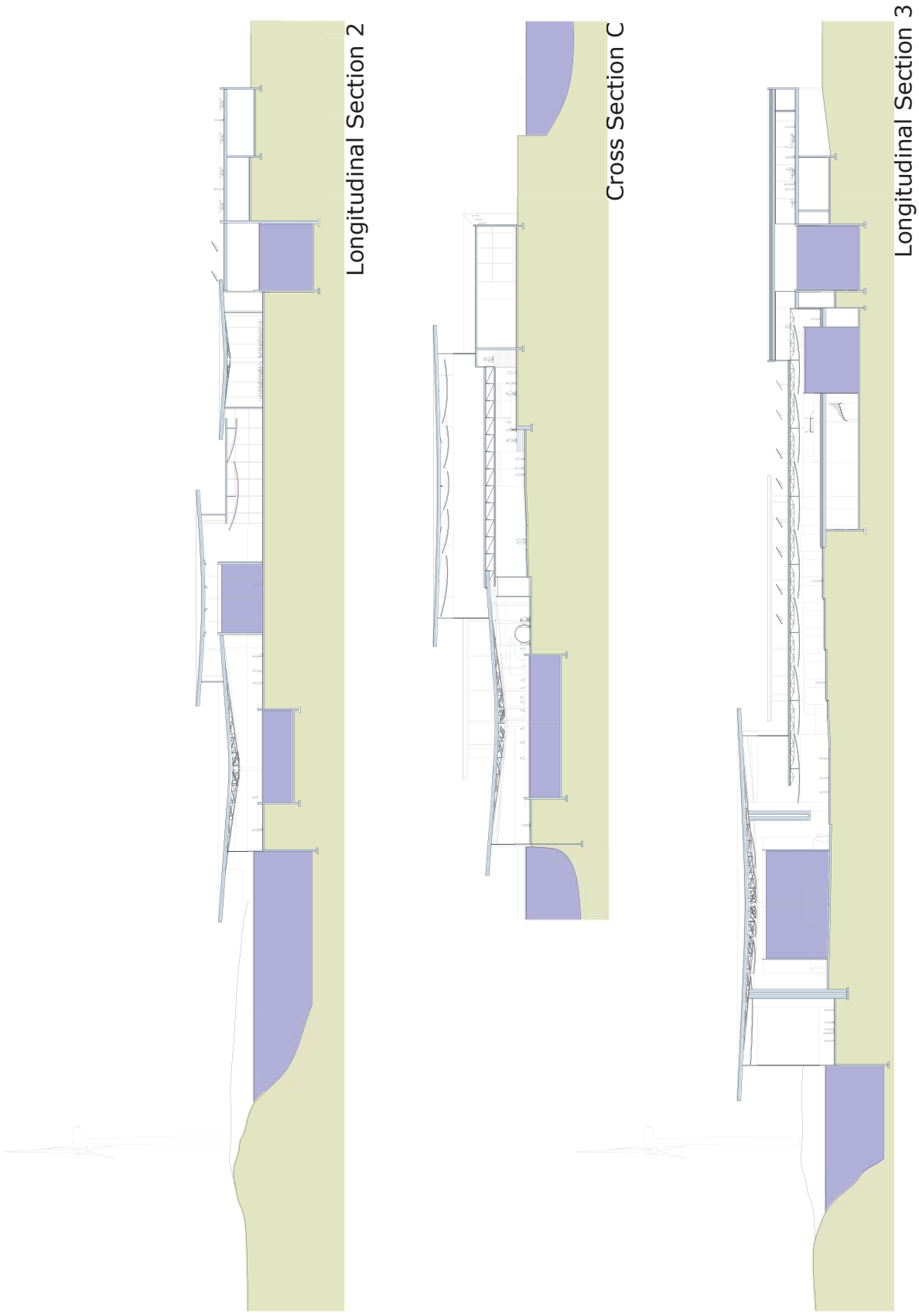
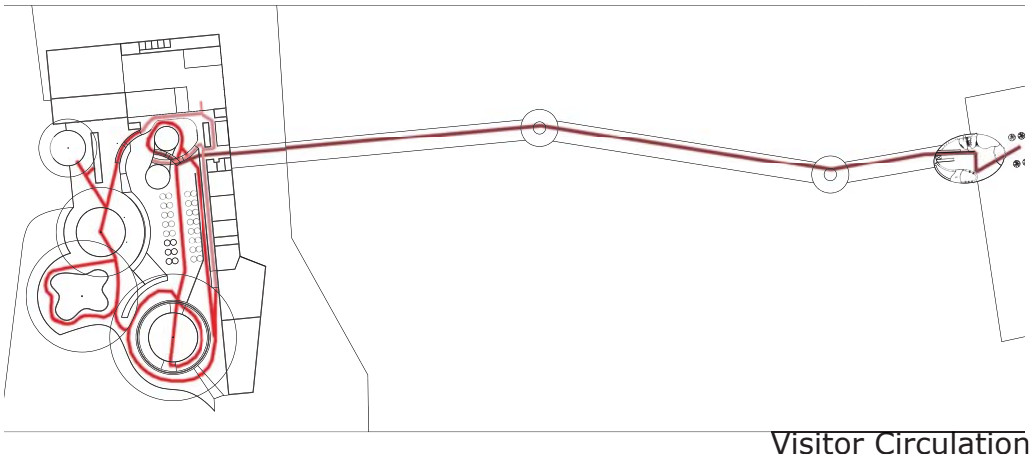
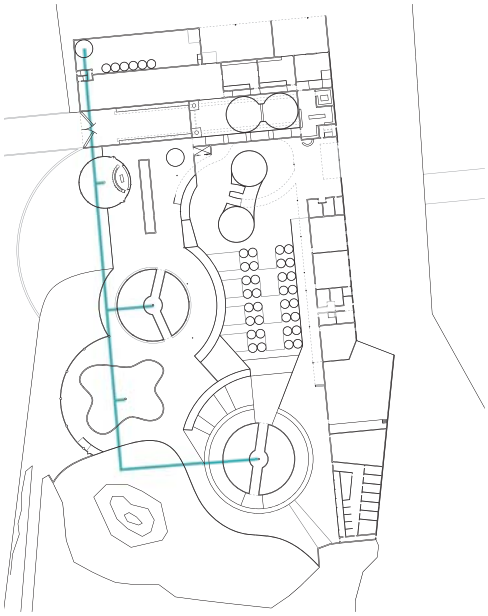
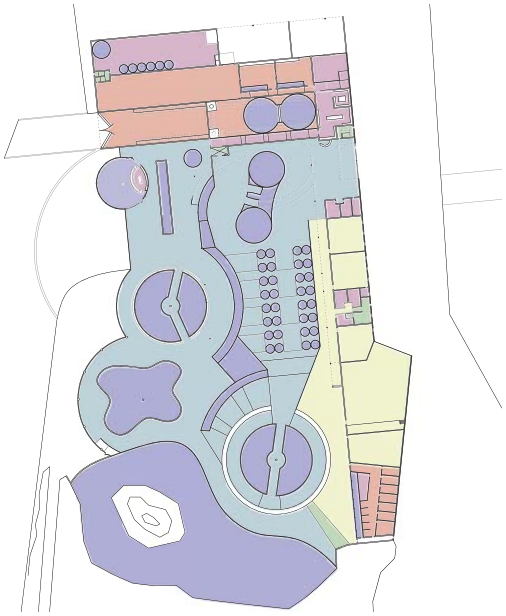




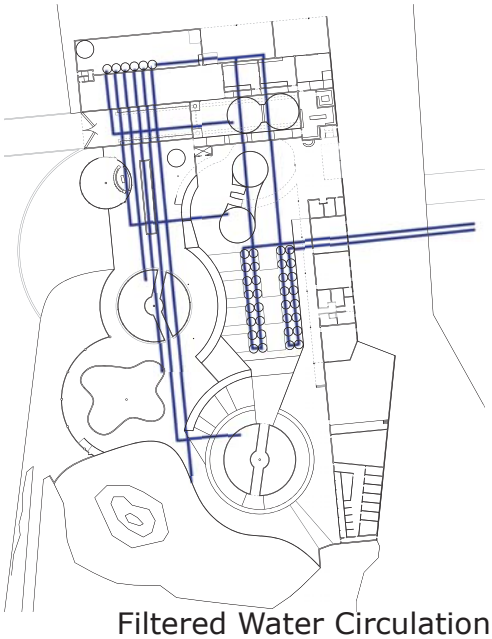
Visitor Circulation



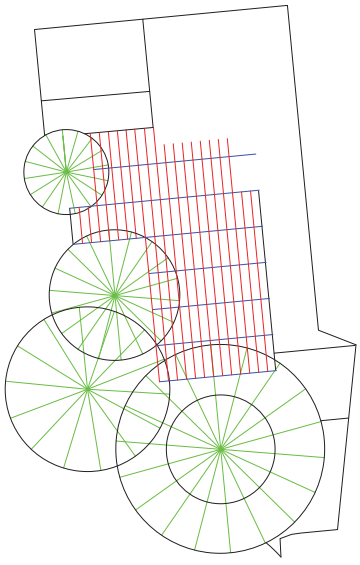
Rain Water Collection



Program



Filtered Water Circulation



Structure

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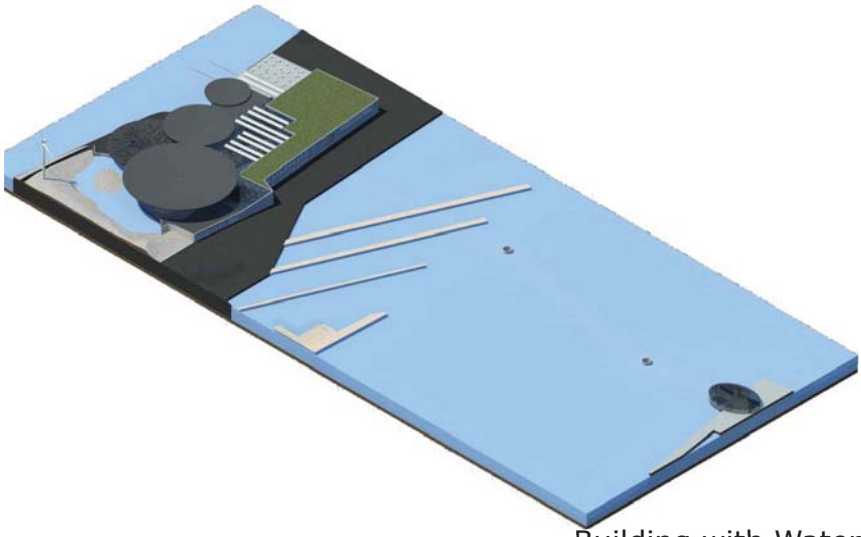
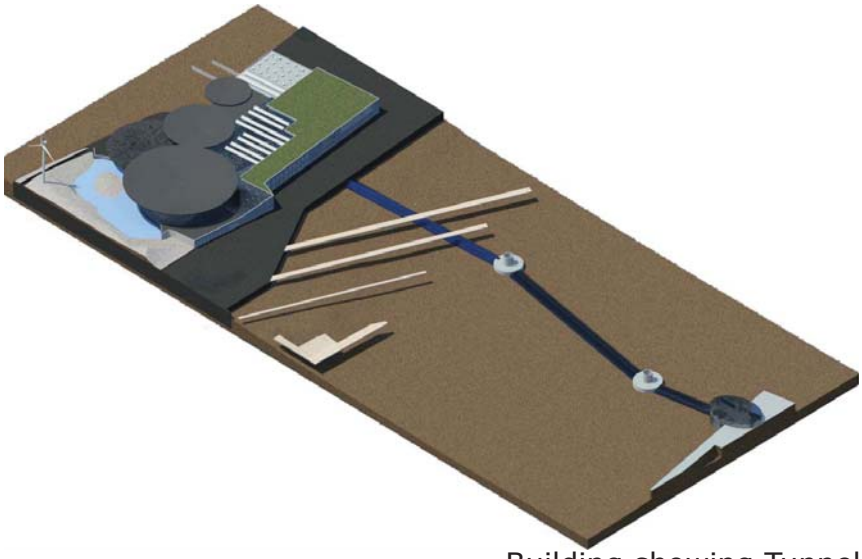
Exposure Diagrams



Building with Water



Building showing Tunnel

Roof Removed

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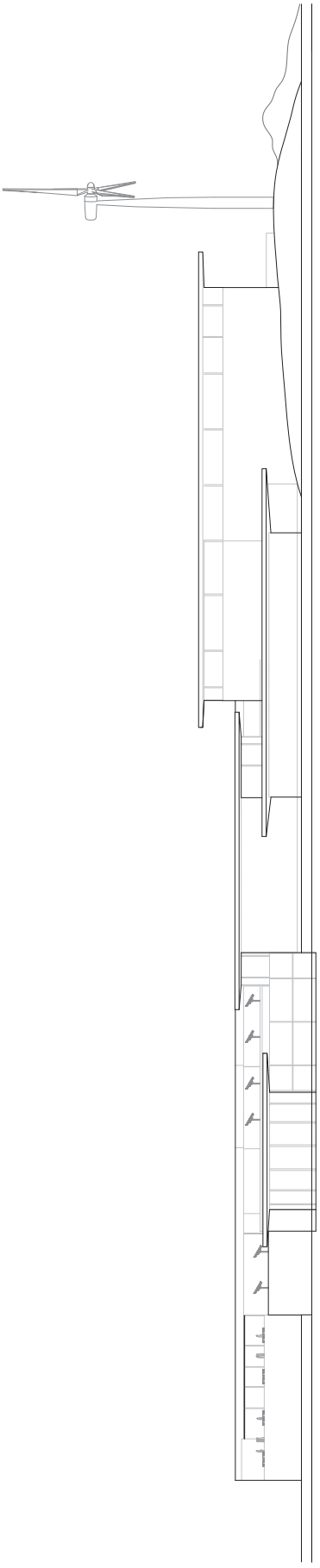
Waterside Elevation: West



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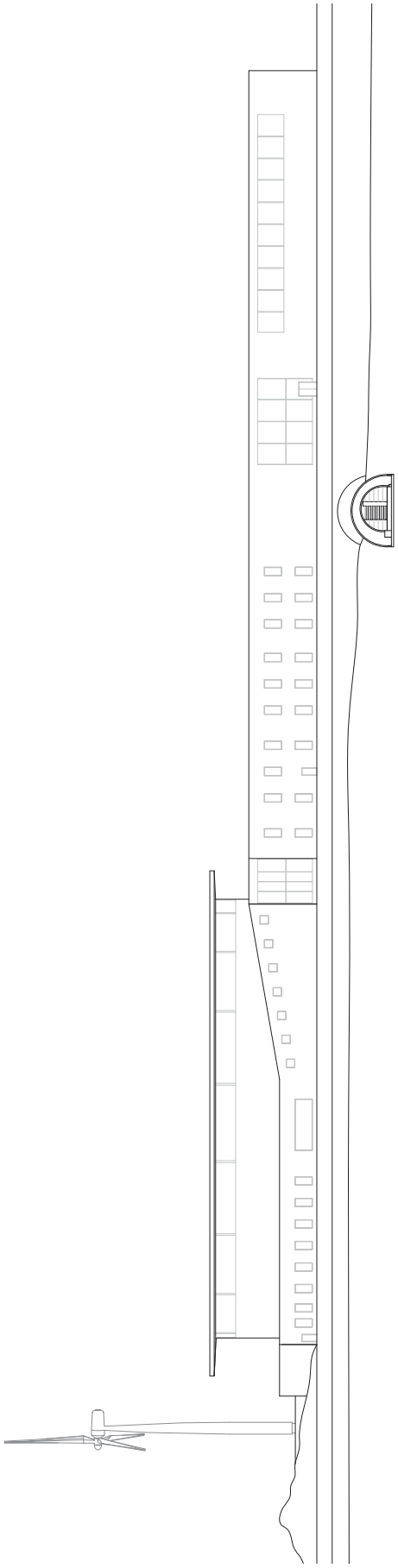
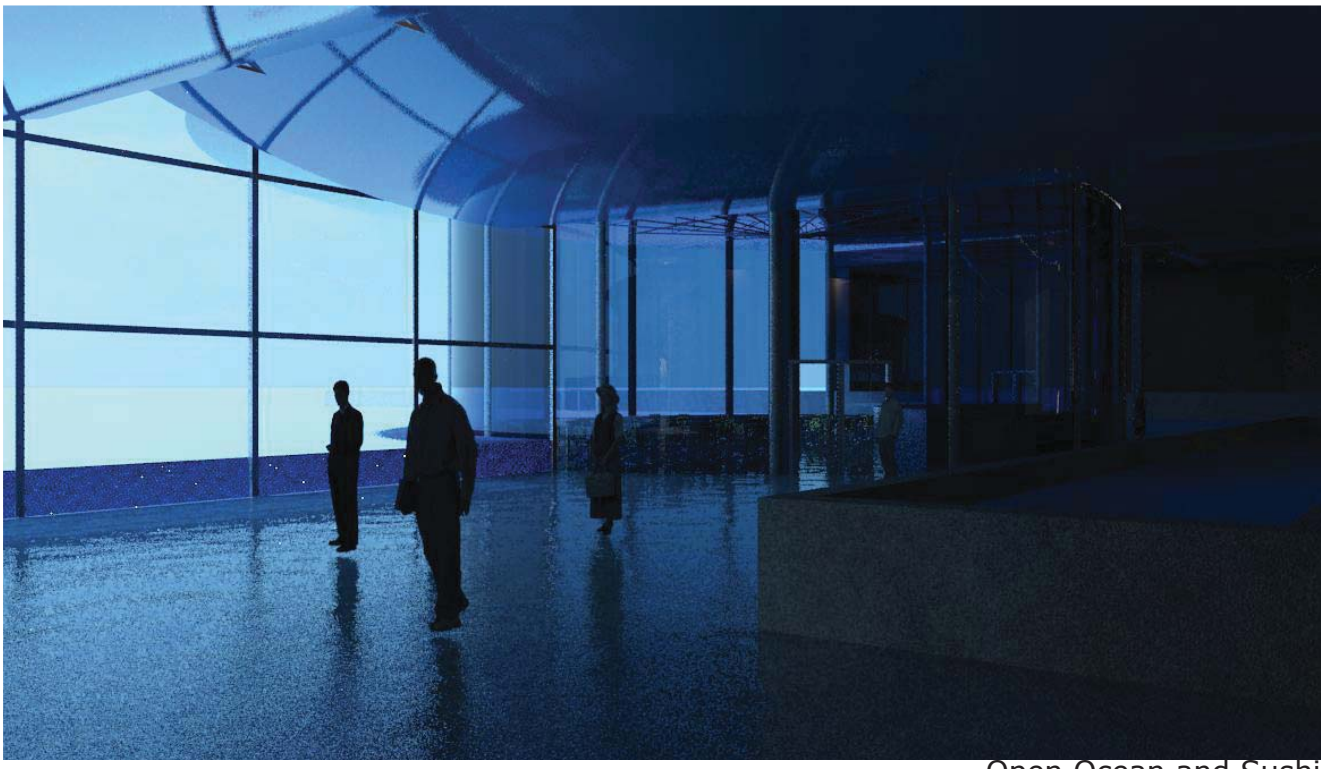
Mainland Elevation: East

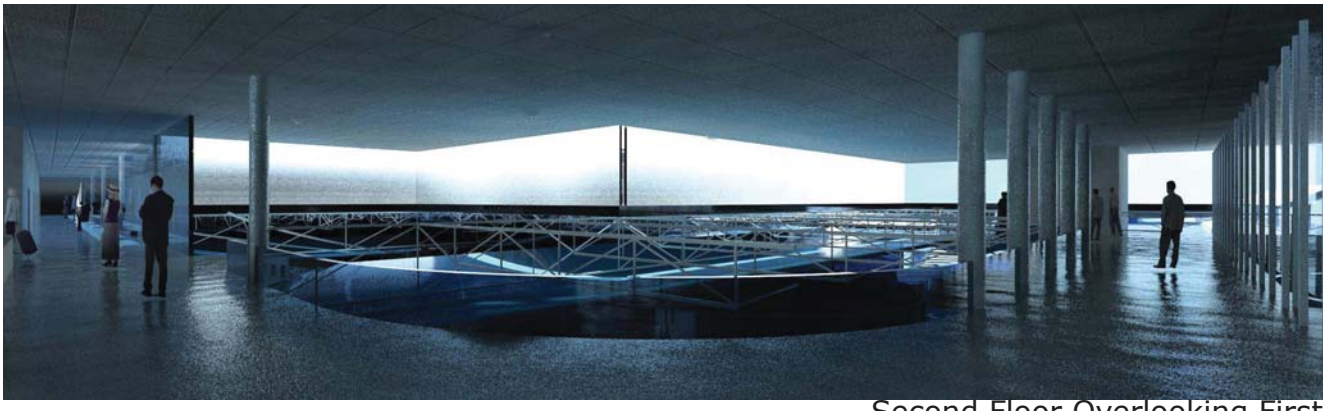


Final Design Work Building Renderings



Open Ocean and Sushi

From Sushi to Middle Tank



Second Floor Overlooking First

Final Design Work

Building Renderings

Entrance Tank

Filter Passage

Exterior Cafe

Introduction:

Aquaria are an important part of today's society. They give the public a chance learn and see parts of the largest part of this planet, the ocean. The depths of the ocean are an unknown place even to the most adventurous people. The ocean is feared by many people because of exaggerated movies and aquaphobia. There are many myths surrounding oceans that steer people away, when the ocean has the possibilities of supporting sustainable programs that would allow this planet to "breathe" cleaner and heal.

Design with the child in mind is very important. Children should be given the opportunity to learn early and find a love for the ocean and develop the desire to explore it. This building will have learning areas throughout the aquarium along with classrooms for hands on learning, which should enable these goals to be met.

It will be important for this building must connect to the ocean itself. This will allow people to see into the real ocean along with the controlled tanks. Bringing people outside of the building into the designed landscapes will allow them to experience open ocean tanks where fish can come an go as they please.

The low levels of light that are required in Aquaria give the possibility of directing and orienting people through light. Key areas and passage ways will be highlighted directing the visitor with the path they should follow.

Project statement:

This project is to design an Aquarium building both for the public and for researchers. There will be connections to the ocean visibly for the public and physically by docks and piers for the researchers. The building needs to tie into the landscape visually and will be using as many sustainable techniques as possible to support the building. A building that teaches how to save and preserve this planet should help the cause by creating its own power.

- Sustainability -

- Learning -

- 360 viewing of “tanks” -

- Ability to use light as a guide -

Sustainability

Sustainability defined by the US environmental Protection Agency is "meeting the needs of the present without compromising the ability of future generations to meet their own needs" - http://www.epa.gov/Sustainability/

Sustainability today is a very important and necessary mind set to have. Building should be designed with sustainable methods, materials and technologies from the beginning of the design.

The American Institute of Architecture states that:
"The AIA recognizes a growing body of evidence that demonstrates current planning, design, construction, and real estate practices contribute to patterns of resource consumption that seriously jeopardize the future of the Earth's population. Architects need to accept responsibility for their role in creating the built environment and, consequently, believe we must alter our profession's actions and encourage our clients and the entire design and construction industry to join with us to change the course of the planet's future."

The AIA knows that sustainable methods and technologies are expensive and clients usually tend to value engineer them out first because it takes a long time to pay off. But prices are coming down and technologies are easier to adapt into buildings. Architects are very crucial in this field because they are required to inform their clients about what is sustainable and what is not.

Sustainability can be as easy as to use local materials. The embedded energy in materials that come from far away use more energy to transport which burns fossil fuels and pollutes the environment. The location of this site will give the ability to bring materials by water, and use the sand from the bottom of the ocean to mix with the cement.

Multiple sustainable technologies should be utilized and combined to create the "greenest" building possible. Aquaria are very a very high demand for energy because of the life support systems needed to sustain life for the fish. The water from the ocean will be pumped into the building, cleaned, used and sent back into the bay cleaner then when it came in. Transparent photovoltaics will be used on the southern facing glass capturing energy without taking away view of the harbor. Solar hot water heaters will provide the heat for the HVAC system to warm the air for the customers. Geothermal heat pumps will bring warm water to help raise the temperature for the HVAC.

As new technologies are created and perfected they will be researched and will have the possibility of being integrated into the project.

Learning

The Smithsonian states that "The oceans cover 71 percent of the Earth's surface and contain 97 percent of the Earth's water."
-http://seawifs.gsfc.nasa.gov/OCEAN_PLANET/HTML/education_oceanographic_facts.html
This is an enormous amount of the planet that we do not inhabit. Many people have no interest in ever going to see the ocean let alone go into its depths.

Children have unlimited amounts of curiosity and this Aquarium will attempt to fill some of it with information about the sea. There will be touch tanks situated throughout the aquarium which will give children of all ages the chance to reach in a touch a fish. They will watch how it swims very up close and have someone talk to them about it while they are doing it. Along with this there will be places for demonstrations on how fish eat and what they eat.

The classrooms will have day, evening and night classes where people can come and learn from a variety of subject to do with the ocean. Stations will be set up to allow people see how sea water is made and filtered, giving them the chance to try the process their selves.

Learning platforms and docks will bring children out of the building to collect samples and go on trips into the ocean. The docks will have close proximity to the classrooms so they will be able to bring their findings back to the classroom to experiment or talk about.

The rooms will have large open floor plans to allow places for the children to sleep overnight and be in the aquarium alone with just their teachers. This will allow them to feel that the aquarium is their place allowing them to feel more connected with their aquatic friends.

Learning not only refers to children but also the researchers who will study and test the ocean for unlimited possibilities. They will have the tools to test better methods of cleaning and filtering the sea water, learn new ways to deal with carbon dioxide by growing phytoplankton to convert it to oxygen, and other sustainable and beneficial experiments for the ocean. The research facility will be closely linked to the classrooms to allow the children to learn from the people investigating the experiments not just from a text book.

360 viewing of “tanks”

Aquaria give people the chance to be under the water with out getting wet, with no fear of the shark swimming above your head. Tunnels through tanks let the visitor be submerged and surrounded by water on all sides. Technologies in glass and acrylics allow three hundred and sixty degrees of viewing possibilities. A tunnel through the middle of a tank with a glass floor, roof and walls would be an amazing experience for anyone. Fish swimming above, below and right next to you would give the feeling of “swimming with the fish” but in a safe way with no fear of death.

Large walls of glass will allow visitors to get even deeper in the water and make them want to sit back and watch the fish swim and interact just like they would a movie at home. An area such as this would have seating to allow interaction between people to spark conversations.

Ability to use light as a guide

Lighting is a strong guiding device that if used properly can intrigue people and cause them to move towards it. Aquaria have great opportunity to have vastly different levels of light within the building. The fish require very dim lighting to replicate their underwater environment but people require much more light then this. This difference in lighting conditions is a difficult task for the architect to overcome. This difference gives the ability to have certain areas of the building to be brighter to draw the visitors to locations designed by the architect.

There are many techniques that can be used when lighting is concerned.

Spotlighting can point out a passageway that the visitor should move towards.
A very bright area in a dark room will point out the next step in the tour of the aquarium. This technique can be easily done with one Leeko, a stationary, focus adjustable light, with different color gels or diffusion to soften the beam. These are very versatile lights that are easily controlled and used.

LED (Light Emitting Diode) lighting along the floor will entice people follow it like the white line along the side of the a road. Small detail lights like this emit an entice amount of light very close to the source but do not light the room. The room will stay dark but the designed path will shine.

Backlighting certain walls or panels will make them glow and intrigue the visitor.
Backlighting can be done with many different types of lights usually with fresnel type lights because of their warm glow with gels to change their colors.

Glowing neon will form a visual guide along a wall. The tubes can be bent in interesting shapes or around walls. They come in one specific color that has to be chosen when purchasing.

Black lights will excite children as they watch their clothes glow.

Moving Head lights can give amazing shows or give a feeling of being underwater with moving gobo’s (pieces of metal in front of the light to change the shape of the beam). These lights can easily change colors and positions with relatively simple controls.

Association of Zoos and Aquariums:

The Association of Zoos and Aquariums (AZA; previously American Zoo and Aquarium Association, and originally American Association of Zoological Parks and Aquariums (AAZPA)) is a nonprofit organization dedicated to the advancement of zoos and aquariums in the areas of conservation, education, science, and recreation. The vision statement of the organization is:

- The AZA uses its institution accreditation, animal care initiatives, education & conservation programs, collaborative research and political lobbying in order to achieve this goal.
- The AZA serves as an accrediting body for zoos and aquariums and ensures that accredited facilities meet higher standards of animal care than are required by law. There are over 200 AZA accredited institutions. Member institutions are evaluated every five years in order to ensure AZA standards are met and to maintain AZA accreditation.
- The Association also facilitates Species Survival Plans, which are plans for the captive management of genetically diverse populations of various endangered species.

The AZA was founded in 1924 and started as the American Association of Zoological Parks and Aquariums. The organization was formed to provide a professional forum for zoo officials to discuss their animals. In 1971, the AAZPA gained independent status and began to work towards animal conservation.

Program: Ratios

•2:3 Viewing area to "tank" space
- o more water for fish / actual area to watch them
  - -Deeper, more realistic view
- o Viewing angles at all levels
  - -Below, above and on all sides.
    - +Bridges and tunnels will support this

•3:4 Mechanical rooms to Water Filtration areas
- o systems "create" salt water
  - -Visible creation of sea water
    - +Salt water pumped and filtered to use

•1:2 Classrooms to Labs
- o Researchers study and prove facts about the ocean
  - Viewing areas to the Labs to allow people to watch processes
- o Children taught about findings in Classrooms

•1:1:3 Gift Shop to café exterior/interior eating area
- o The gift shop and café should be equal in size
  - - a large area will be left for bagged lunches
    - + Opportunity to bring their personal food - saves money and will make the guests stay longer

•Entrances and Central "meeting" places
- o Should be very large for a large group to meet

•Directors and administration offices
- o Out of the public eye but giving them a view of what is happening in the museum

•Ticket booths/credit card kiosks
- o Ability to bring in large amounts of people with little to no wait time

•Docks
- o Access to boat tours for guests and boats for researchers

•Restrooms
- o Should be easily seen but out of direct paths

Program:

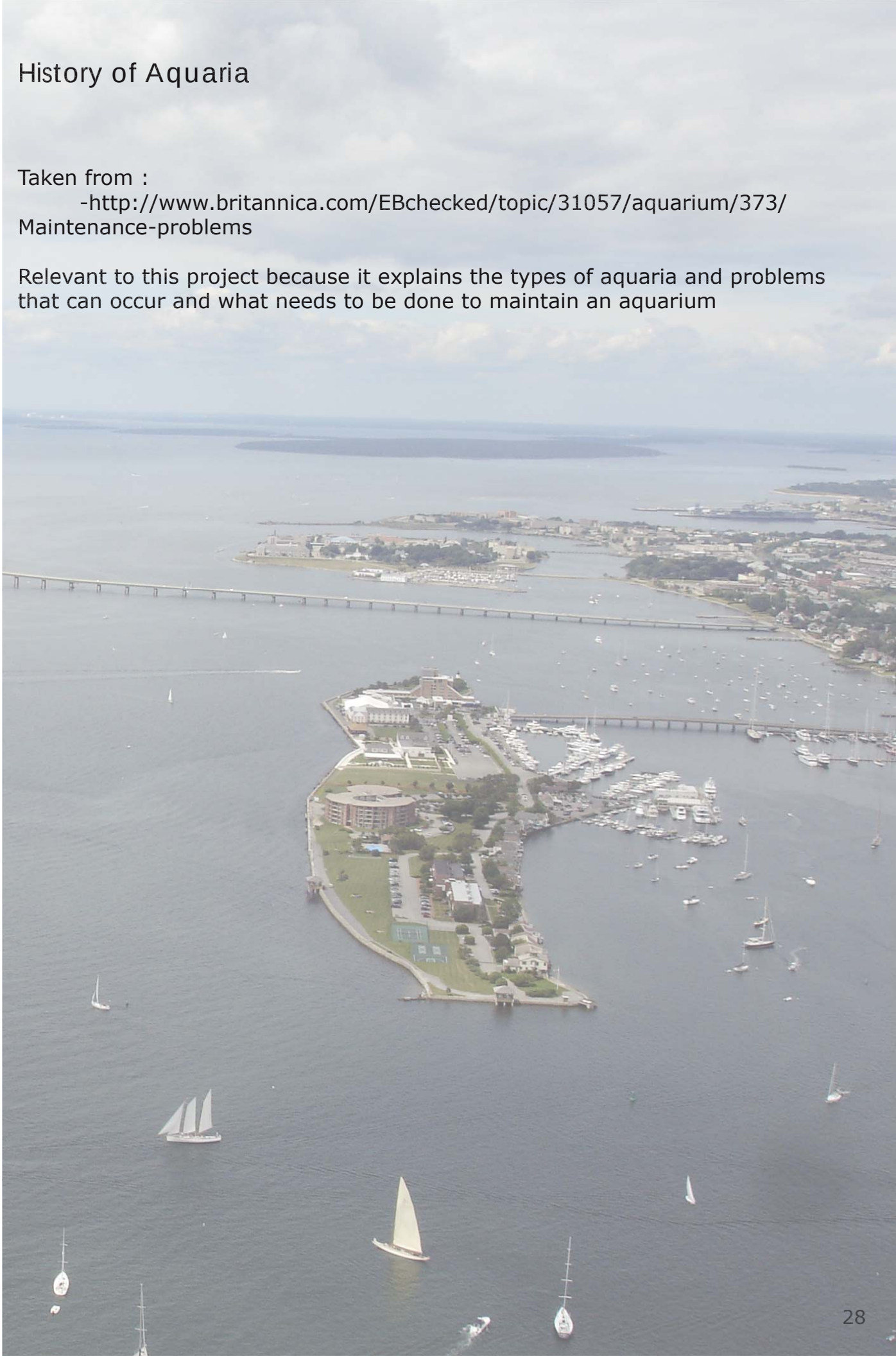
Aquarium		
	Galleries	5,000
	Tanks	20,000
	Mechanical	15,000
Lobby		
	Lobby Space	3,000
	Ticketing	500
Food Services		
	Cafe	2,000
	Kitchen	2,000
	Green Restaurant	3,000
Gift Shop		
	Shop	4,000
	Storage	1,200
Administration		
	Offices	3,000
	Storage	500
Animal Care		
	Rehabilitation Center	3,000
	Holding Tanks	2,000
Mechanical		
	Life Support Systems	15,000
	HVAC	5,000
	Filtration	3,000
Circulation/Support/Core		
	Restrooms	2,000
	Corridors	10,000
	Vertical Circulation	5,000
Classrooms and Labs		
	Classrooms	5,400
	Laboratories	10,000
Total		119,600

History of Aquaria

Taken from :

-http://www.britannica.com/EBchecked/topic/31057/aquarium/373/Maintenance-problems

Relevant to this project because it explains the types of aquaria and problems that can occur and what needs to be done to maintain an aquarium



Aquariums: Historical background

The earliest known aquarists were the Sumerians, who kept fishes in artificial ponds at least 4,500 years ago; records of fish keeping also date from ancient Egypt and Assyria. The Chinese, who raised carp for food as early as 1000 bc, were probably the first to breed fish with any degree of success. Their selective breeding of ornamental goldfish was later introduced to Japan, where the breeding of ornamental carp was perfected. The ancient Romans, who kept fish for food and entertainment, were the first known marine aquarists; they constructed ponds that were supplied with fresh seawater from the ocean. Although goldfish were successfully kept in glass vessels in England during the middle 1700s, aquarium keeping did not become well established until the relationship between oxygen, animals, and plants became known a century later.

By 1850 the keeping of fishes, amphibians, and reptiles had become useful in the study of nature. It was in the works of Philip Gosse, a British naturalist, which the term aquarium first appeared. His work aroused increased public interest in aquatic life. The first display aquarium was opened to the public in 1853 at Regent's Park in London. It was followed by aquariums in Berlin, Naples, and Paris. P.T. Barnum, the circus entrepreneur, recognized the commercial possibilities of living aquatic animals and, in 1856, opened the first display aquarium at the American Museum in New York City as a private enterprise. By 1928 there were 45 public or commercial aquariums throughout the world, but growth then slowed and few new large aquariums appeared until after World War II.

Many of the world's principal cities now have public aquariums as well as commercial ones. Another category encompasses those aquariums that serve chiefly as research institutions. Among the best known of the latter are those at Naples; the Oceanographic Museum of Monaco; Plymouth Marine Laboratory, Eng.; and Scripps Institution of Oceanography, La Jolla, Calif. Still another category includes temporary aquariums that have served as exhibits at world's fairs and expositions.

In 1938 the first oceanarium, or large marine aquarium, Marine land, opened near St. Augustine, Fla., as a private enterprise; it featured a giant community fish tank and trained dolphins. The Seaquarium, Miami, is similar. The emphasis in this type of aquarium is on very large tanks, up to 1,000,000 gallons each, in which a great variety of fishes is placed with no attempt to separate them. In the formal aquarium (e.g., the Shedd Aquarium, Chicago), the kinds and types of fishes are separated in most of the exhibits.

Aquariums: Design and architecture

The first containers specifically designed for aquatic specimens were the strictly functional open-air tanks used by the Romans to preserve and fatten fish for market. It was not until the 18th century that the importation of goldfish into France from the Orient for aesthetic enjoyment created the demand for small aquariums; ceramic bowls, occasionally fitted with transparent sections, were produced. In the large public aquariums built in many European cities between 1850 and 1880, efforts were made to create the illusion that the spectator was entering into the underwater world. More recently, the trend has been to emphasize the natural beauty of the specimens and to make a sharp distinction between the water and the viewing space.

Regardless of size—whether a small jar with a capacity of less than one gallon or a huge tank with a capacity of more than 1,000,000 gallons—aquariums must be constructed with care; many substances, especially plastics and adhesives, nontoxic to humans, are toxic to water-breathing animals.

Glass is probably the safest basic material, although polyethylene, polypropylene, acrylic plastics (Plexiglas), and fluorocarbon plastics are normally nontoxic. Fiberglass has been widely used and is nontoxic if properly prepared. Adhesives for sealing include epoxy resins, polyvinyl chloride, silicone rubber (except for certain colored preparations), and neoprene. Metals are not usually used, especially in seawater, which is highly corrosive. Stainless steel, however, has a low toxicity, and is often used, especially in freshwater systems.

A small aquarium can be constructed entirely of glass and without supporting frames by using silicone rubber as an adhesive. Fiberglass is probably the most practical supporting material for all but the largest tanks since it is lightweight, strong, does not deteriorate, and is easily fabricated into any shape. Wood, though widely used, is subject to rot and boring organisms and thus must be protected. Reinforced concrete, including special mixes for seawater, is the principal supporting material used in the construction of large aquariums.

Aquariums: Design and architecture

In modern aquariums tanks of a variety of sizes and shapes are often grouped together in order to avoid the "boxes of fish" look that characterizes some of the older, formal aquariums. Dry dioramas at the rear of the tank create the illusion of distance; the tank habitat can be a natural one or one in which fiberglass has been impregnated or painted to duplicate almost any environment. Modern aquariums attempt to illustrate the natural environment of the specimens displayed.

Polished plate glass, fully tempered polished plate glass, and Plexiglas are the most commonly used glazing materials. Polished plate glass is usually used only in small aquariums because it breaks into large pieces when it fails. One generally accepted practice is to glaze large tanks with two or three layers of tempered glass so that if breakage occurs it is confined to one layer. Although Plexiglas is easily scratched, it can be re-polished.

Nonmetallic or plastic-lined pumps are better than metal ones in terms of toxicity, but stainless steel is often satisfactory. Airlift pumps (such as those used in home aquarium subsand filters) move large volumes of water when the lift pipes are of sufficient diameter.

Generally, the most effective illumination is by incandescent lamps placed above the front glass. Fluorescent lights provide even illumination but may over illuminate the tank walls; colored lights accentuate natural colors; and mercury-vapor lamps encourage maximum growth of marine plants.

The introduction of some form of aquatic plant life is of practical value in an aquarium, although the presence of plants can cause complications. Aquatic plants consume dissolved oxygen and give off carbon dioxide; under the influence of bright light, plants also consume carbon dioxide and give off oxygen while engaged in photosynthesis. In turn, the waste products of the fishes form fertilizer or food for the plants and are consumed by them. This operates very well so long as light of a certain intensity falls on the plants—the animals thus give off what the plants can use and vice versa. Aquariums in which the plants and animals are believed to balance each other in the respiratory process are generally referred to as balanced aquariums.

Aquariums: Maintenance problems

The design of a large aquarium must take into account the requirements of the specimens, especially since exhibits at modern aquariums include all types of aquatic organisms: mammals, birds, reptiles, amphibians, and invertebrates as well as fishes. Among the many factors that must be considered are traffic flow patterns of visitors, reflections off glass, acoustics, and tank-maintenance problems such as water clarity, dissolved wastes, temperature, tank decor, disease treatment, and nutrition.

The primary requirement for maintaining aquatic organisms is water quality. The water supply must be free of pollutants, including sewage and industrial wastes, and it should be in gaseous equilibrium with the atmosphere to ensure adequate oxygen and to avoid super saturation with nitrogen. In re-circulating systems, water treatment must not only ensure clarity of the water but also purification of metabolic wastes. The source of fresh water is usually water supplies from which chlorine and other additives have been removed, either by carbon filtration or by the addition of a chemical. Marine organisms can be maintained in either natural or artificial seawater; the latter has the advantage of being initially free from disease-causing organisms and pollutants but may not be as suitable for some organisms.

There are three basic types of water systems: open, closed, and semi-closed. In open systems the water flows through the aquarium once and is discarded. This provides water quality comparable to that of the natural environment and there is no buildup of toxic metabolic wastes; however, temperature control and pumping are usually costly, and filtration often is necessary.

Aquariums: Maintenance problems

Water is continuously re-circulated in closed systems and is only renewed periodically. Metabolic wastes must be treated since they are not continuously flushed from the system. An important problem is that ammonia must be rapidly removed or transformed because it is harmful even at very low concentrations. In the aquarium the bacteria that convert ammonia to nitrite reside primarily in the filter material, and a slow sand filter with a large surface area is usually provided to ensure their abundance. Plant growth in the aquarium, especially in marine systems, is not usually sufficient to utilize the entire nitrate produced by bacteria from nitrite. Although some aquariums have operated many years with a minimum of water renewal, it is normally necessary to replace from 1 to 10 percent of the water per month to maintain a low level of nitrates. The use of charcoal in both fresh water and seawater systems helps to slow the accumulation of nitrogenous wastes. Metabolic wastes also cause an increase in the acidity of the water. Carbonate compounds are commonly used to maintain an optimal level of acidity, particularly when water renewal is infrequent.

Semi-closed systems are essentially the same as closed except that there is a constant connection to the water supply, and the problem of dissolved wastes is controlled by the regular addition of new water; this system is less costly than the open one with regard to temperature control and pumping.

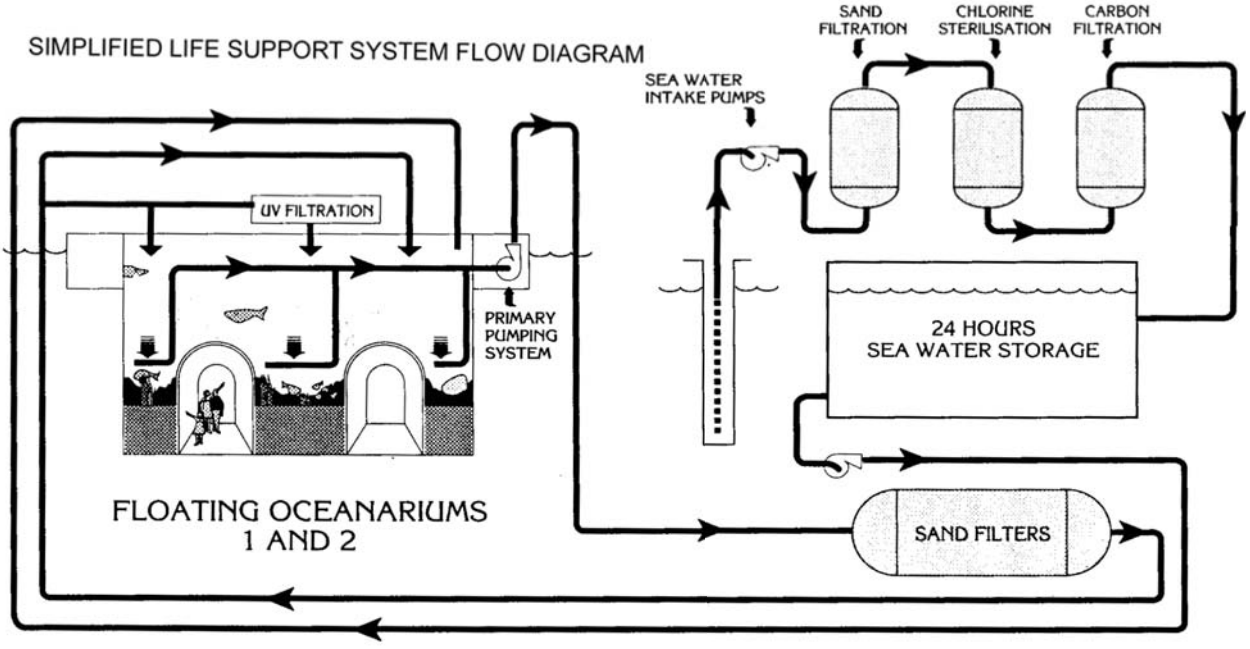
Filters vary from simple flow-through systems to completely automated re-circulating systems, with special provisions for monitoring and controlling the physical and chemical characteristics of the water.

The turnover rate or rate of water replacement, of individual aquariums is important and should be no more than two hours. In addition, aeration by means of air stones (diffusers) should be provided to guard against asphyxia in the event of an unexpected water-supply failure.

Aquariums: Maintenance problems

Fishes and invertebrates can also be maintained without filtration or aeration in aquariums that are "balanced" with plants; however, the balance between plants and animals is very difficult to attain on a large scale or even in a normally stocked aquarium, especially a seawater aquarium.

Freshwater pools for mammals and birds present special problems. They generally require a higher filtration rate and greater filter capacity because they accumulate large amounts of fecal wastes. Air-breathing animals, however, are not highly sensitive to water quality; thus, chemical treatments, such as chlorination, which would kill fishes, can be used to control bacteria and to improve water clarity. Seawater formulas are simpler; for example, a 2 percent sodium chloride solution will satisfactorily maintain whales and dolphins. Seals and sea lions have been kept in fresh water, but this may increase their eye problems because of the osmotic effect of the fresh water on the eye tissues.



Site: Goat Island

History

•Early History - goats grazed on the island and gave it its name
pirates were hung and buried on the island
•1673 - Newport purchased Goat Island
•1703 - Earthen fort built
Named "Fort Anne" after the reigning Queen Anne
•1738 - Stone fort built
Renamed "Fort George" after King George II
•1775 - Fort was renamed
Fort Liberty by the revolutionary forces
•1776-1779 - British army occupied Newport
Renamed the fort Fort George
•1784 - Repaired
Renamed Fort Washington after George Washington
•1794 - Newport sold goat island to the federal government
$1,500, to maintain a military fort to defend Newport Harbor
Fort named Fort Wolcott
•1824 - First Newport Harbor Lighthouse constructed
North end of the island
•1835 - Garrison was transferred to Florida
•1851 - Original lighthouse moved to Prudence Island
Current Newport Harbor Light was constructed
•1869 - Naval Torpedo Station was founded
On the site of the former Army fort
•1950 - Torpedo station was closed
•1960 - Goat Island sold to a private developer and the Hyatt Hotel
Belle Mer, and the Goat Island South Condominiums were later
Only one former navy building
Converted into the Marina Bar & Grille

Site: Goat Island

Light House

•Newport had been an important center of sea borne commerce since the early 1700s
•First lighthouse on Goat Island at the entrance to Newport Harbor was not completed until 1823
•Activated on New Year's Day of 1824, the stone tower was twenty feet tall with a multi-lamp and reflector combination showing a fixed white light
•A nearby keeper's dwelling had six rooms
•The lantern room gave keepers little room to move, being only five feet high and four feet wide
•The room was damp and ventilation poor, causing the condensation on the lantern glass to often freeze during the winter months
•The Newport Harbor Lighthouse was completely renovated by the Coast Guard in 1989
•Listed in the National Register of Historic Places
•2000 - Coast Guard leased the lighthouse to the American Lighthouse Foundation (ALF) - known as the Friends of Newport Harbor Light
established to raise funds for restoration of the tower
•2005 - Beacon showed a fixed green light - visibility of eleven miles
•The grounds are open to the public, although the actual lighthouse is not.

Site: Images

Views from across the bay speak a lot to this site. The two ends of the island are populated with large building where the middle seems to be left empty. This is the site location for this project. Visitors will be able to see the building much before coming to the entrance making it a new landmark for the city making it a part of an island that has such a rich history.

View of a island from a community beach

View of a group of cottages

View of the last historic building

View of the Hyatt from the North

Photomontage from the parking lot

Site: Image

The site is currently the white three story buildings in the background. This location is far enough from the Hyatt that the two building will not feel close to each other and this same is true for the condo's. Both sides of the site have a green space before the next building on the island.

View from balcony of Hyatt to site

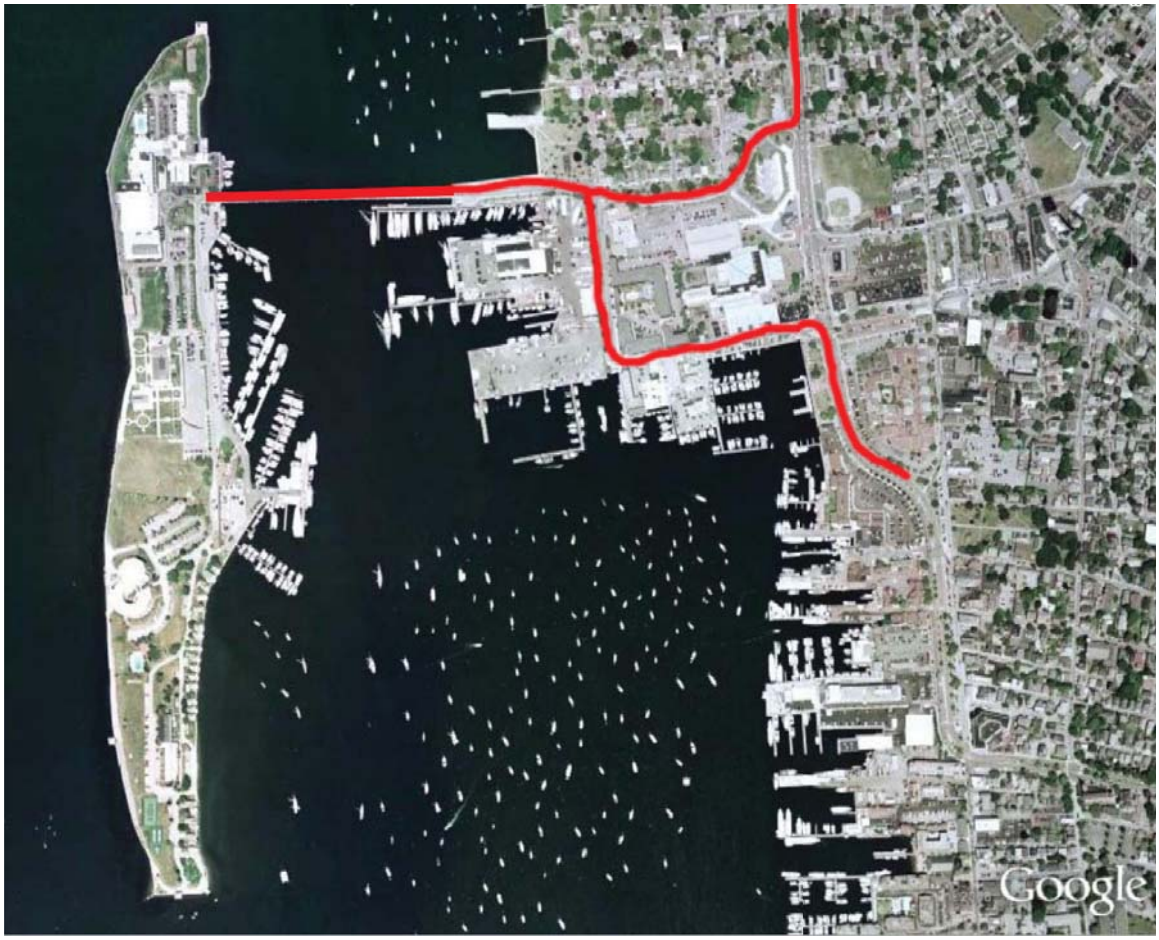
View from across the bay at site

Site: Diagram

Access

Access to the site currently is via a single causeway
There are two roads that enter the island
- past the bus station
- around the yacht club and past the docks

There is a possibility of creating a entrance via boat
- with a parking lot on the main shore

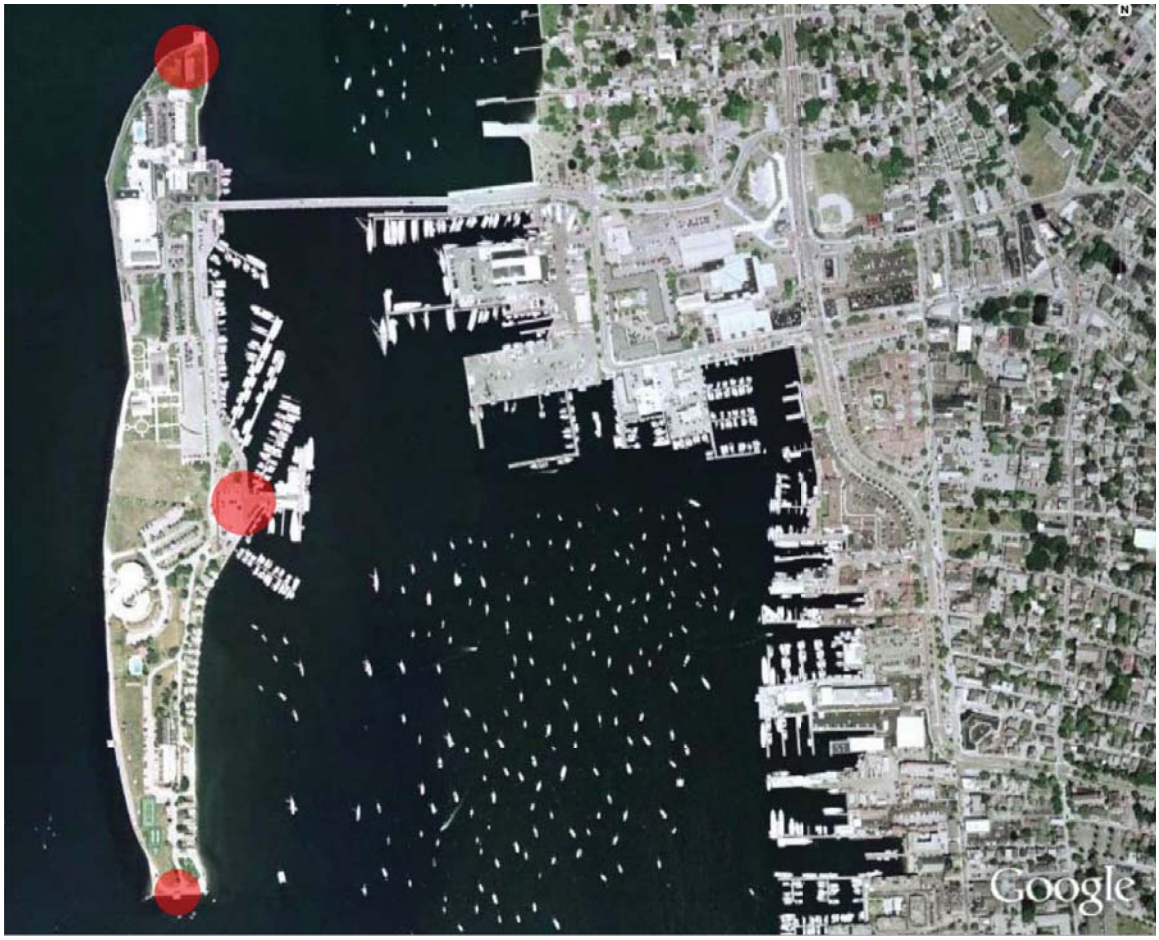


Site: Diagram

Historic Sites

Three historic sites remain on the island

- Goat Island Lighthouse
- Marina Bar and Grill (former Naval building)
- wooden structure previously a lighthouse



Site: Diagram

Structures Occupying Site

The Hyatt
Coast Guard
Yacht Club and support buildings
Belle Mer Restaurant
Condominium buildings
Cottages

Site: Fully Rendered Site Plan

Site: Selection

The location of this project will be between the Hyatt and the Southern Goat Island Condominiums. This site is currently owned by Bel Mer which is a venue for Weddings and other Parties, it will be assumed to be bought and demolished for this project. This location will be ideal for this project for its closeness to the water and large size will give space for a low semi low lying structure and outdoor exhibits.
Site size: 240,000 square feet

Site: Parking

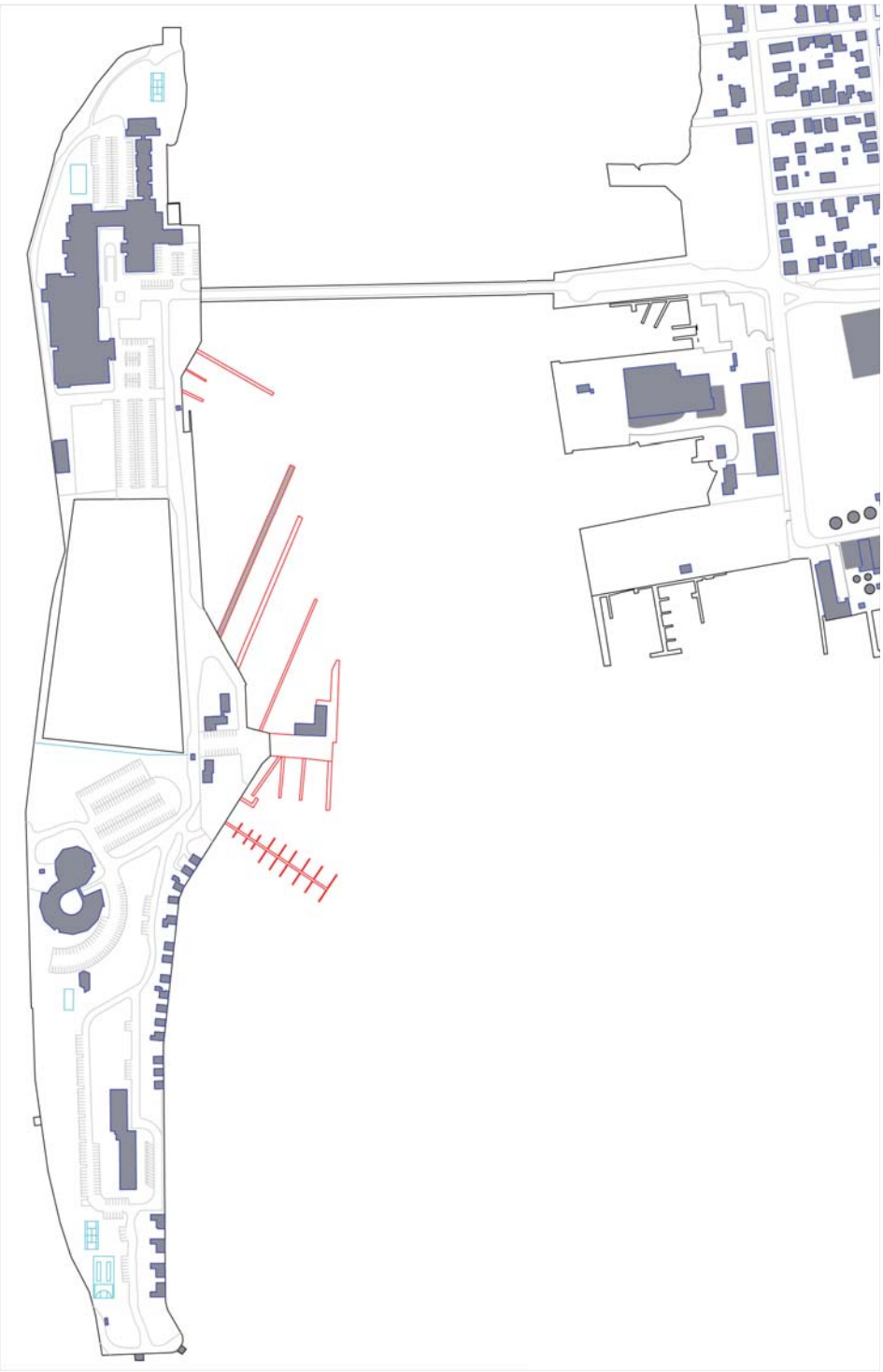
Because of the small causeway and limited parking on the Island a site on the mainland of Newport has been selected to allow for parking and the entrance to the Aquarium. This site currently is storage for bait and traps for fishing boats that leave from Newport. This storage could be handled from another location giving this visible, open parking space for the Museum.

Site: Access to the Aquarium

Access will be handled in two ways. One way being a straight shot underwater tunnel to the Island. This will give visitors a chance to see the underwater world of Newport's Harbor and bring them directly into the Aquarium. The second means of access will be a boat that leaves from the dock and brings people around the island showing Newport harbor from above allowing visitors to see both sides of Newport's harbor on their way to the Aquarium.

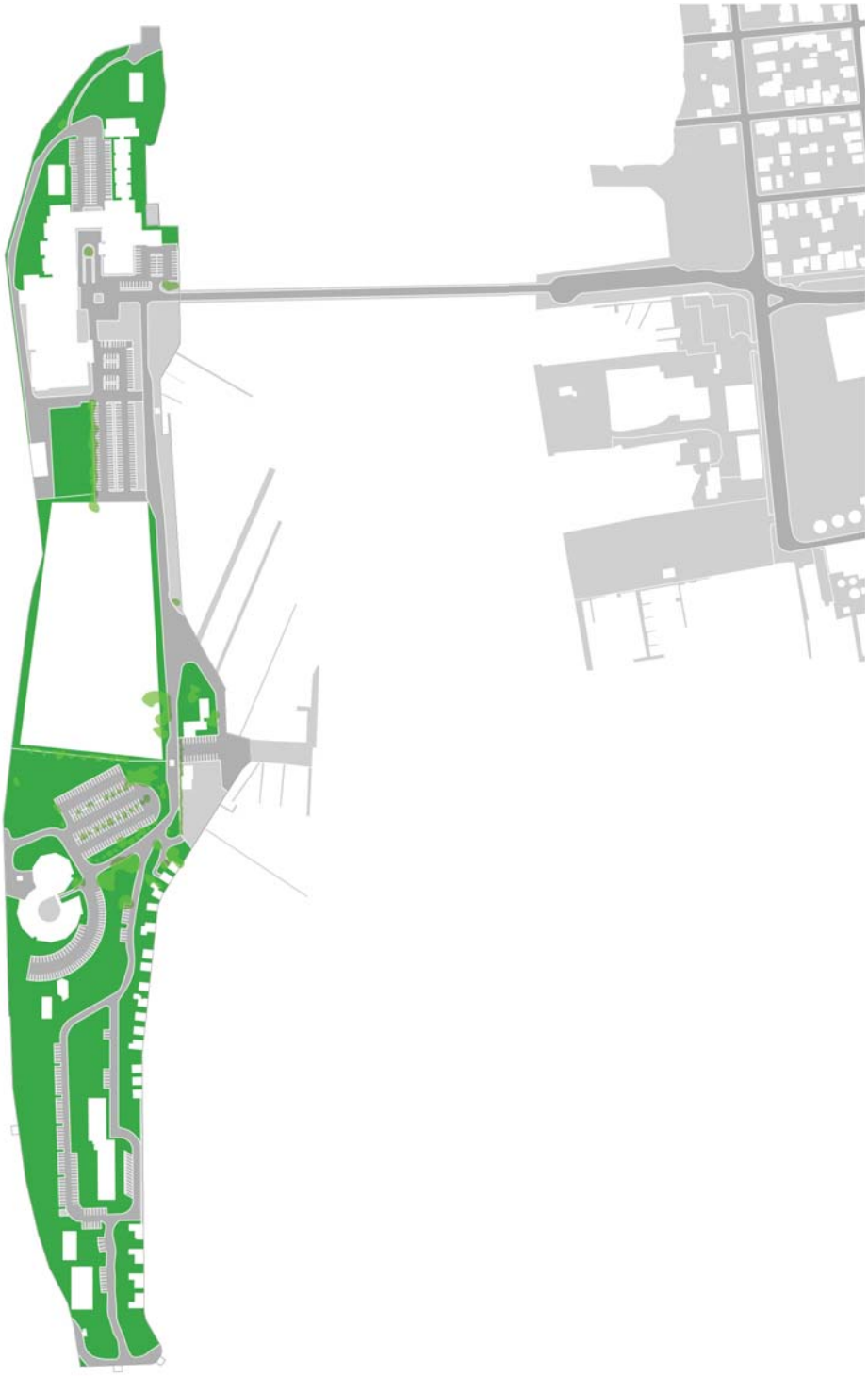
Site: Figure Ground

The Island is sparse in regard to the amount of buildings on the Island compared to the denseness of Newport City. It is very important that this new structure does not take away this differing feeling from Newport's mainland.



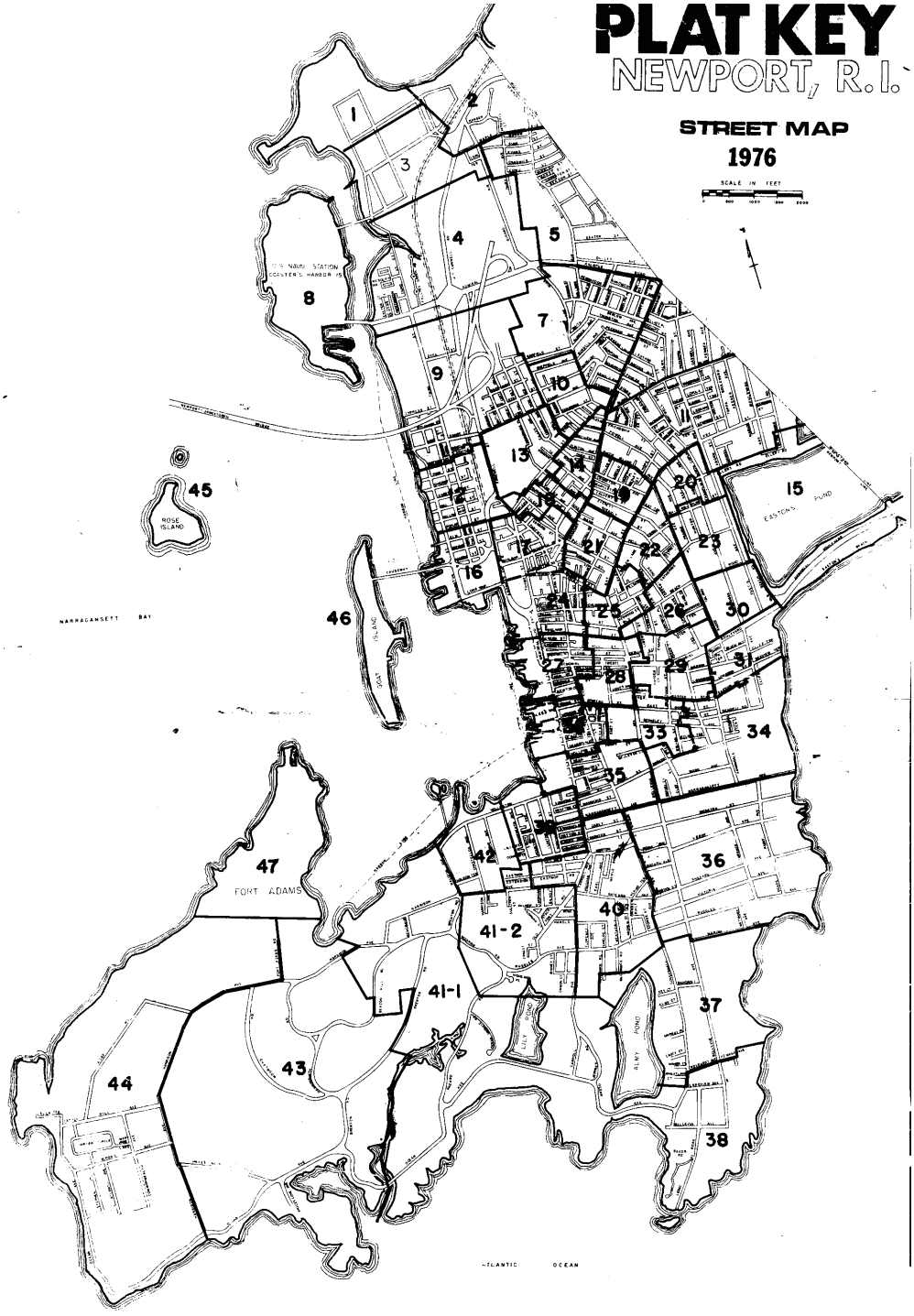
Site: Green Areas vs Hardscape

Like the differing feeling of density of Goat Island versus Newport's Mainland Goat Island has much more green than it has hardscape. This ratio must be preserved. There is no real reason to add anymore hardscape to the island because the parking will be on the mainland. Permeable materials will be implemented for outdoor areas on the site, where hard surfaces are necessary.



Site: Data

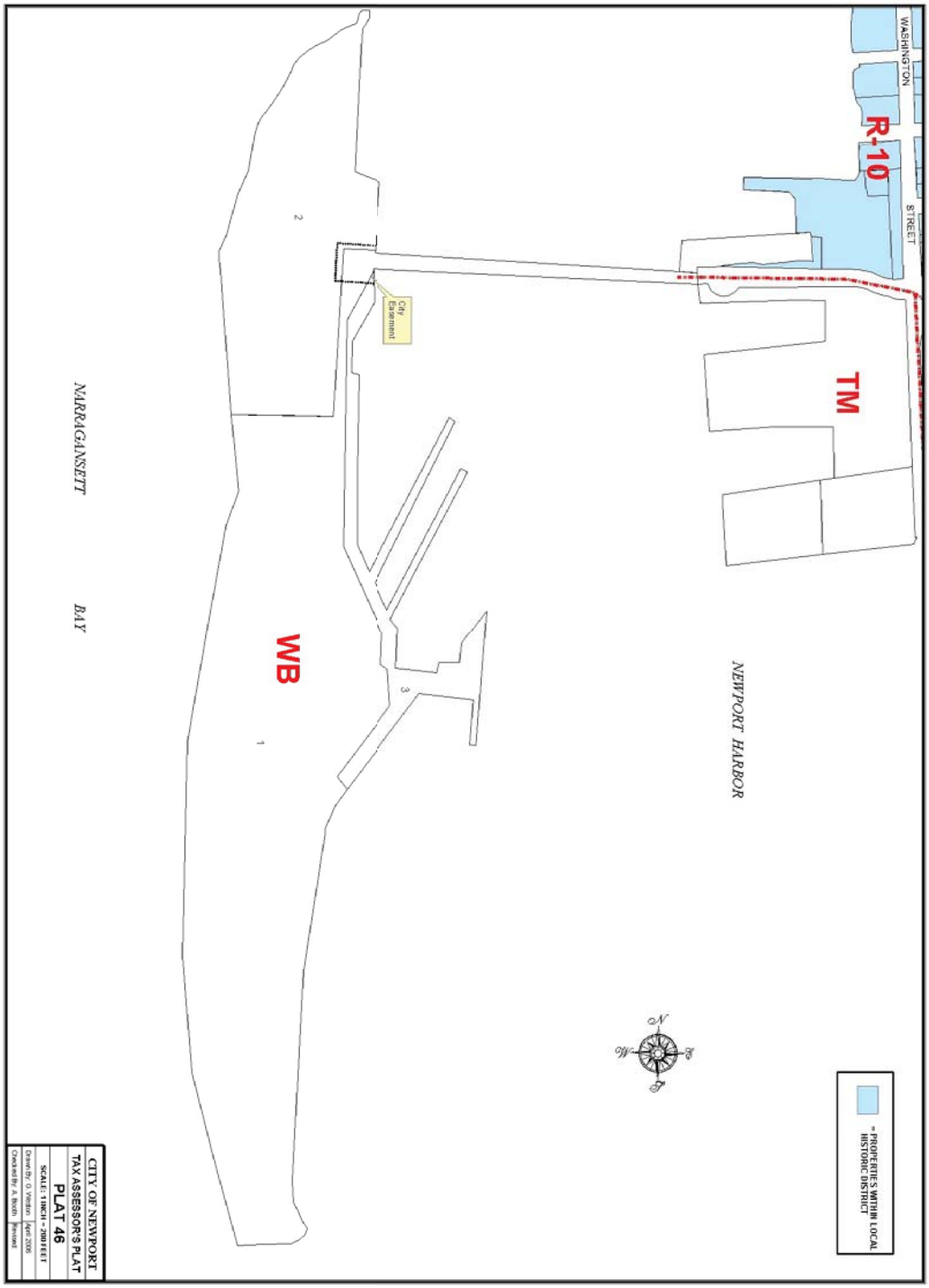
Plat Key



Site: Data

Plat Key

There are technically only two sites on the Island,
- One for the Hyatt
- One for the Condos



Site: Data

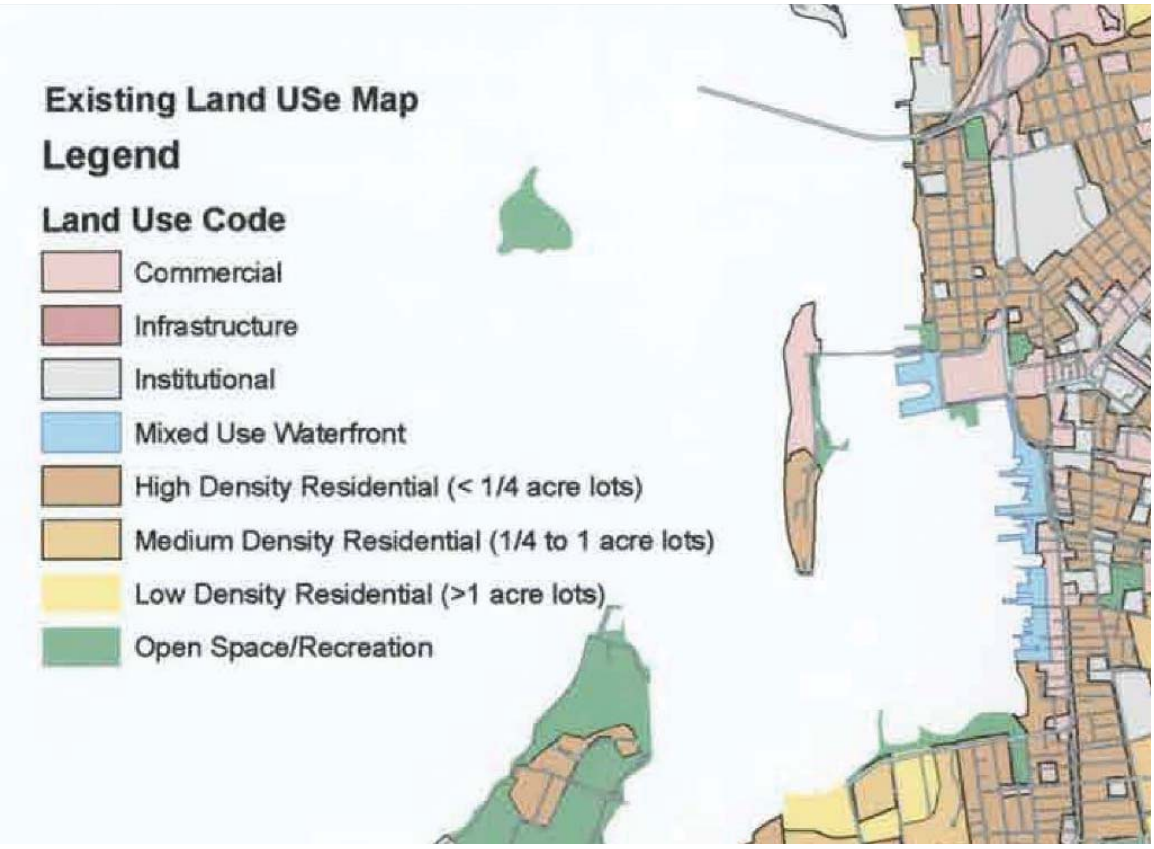
Site Contours

The highest point on the Island is only just over 10 feet above sea level
The site for this building will be above 10 feet over sea level but not much more

Site:

Land Use

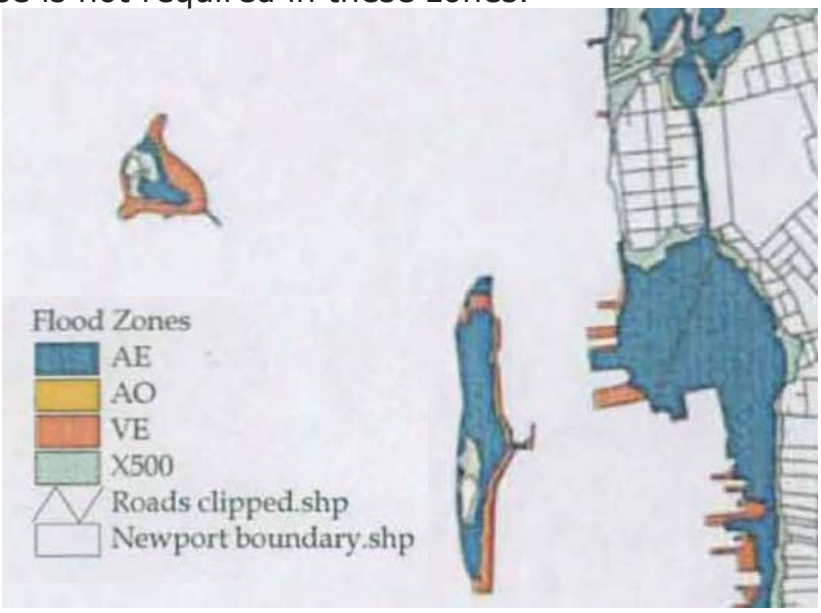
The Northern Portion of the site it coded for Commercial use
Commercial:
The future commercial land use is generally located in areas with adequate transportation, primary automobile, and where there is adequate lot size to accommodate medium to large commercial establishments. Specific uses within the commercial area would include retail, shopping centers, offices, research facilities, technology centers, guest facilities, restaurants, and other similar uses. The area in the North End contains the largest portion of future commercial area. The established zoning in the North End (Commercial/Industrial) also allows industrial uses, however industrial uses are not proposed or likely to occur given the nature of the community and its economy.



Site:

Flood Zones

Zone AE and A1-A30
Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis. In most instances, Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AO
Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from the detailed hydraulic analyses are shown within this zone. In addition, alluvial fan flood hazards are shown as Zone AO on the Flood Insurance Rate Map. Mandatory flood insurance purchase requirements apply.
Zone VE
Zone VE is the flood insurance rate zone that corresponds to areas within the 1-percent annual chance coastal floodplain that have additional hazards associated with storm waves. Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zones B, C, and X
Zones B, C, and X are the flood insurance rate zones that correspond to areas outside the 1-percent annual chance floodplain, areas of 1-percent annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1-percent annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1-percent annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.



Site:

Snow Loads

Ground Snow Load: 30 psf
Min Flat Roof Snow Load: 30 psf
Basic Wind Speed: 110 mph
Frost Depth: 3’ 4”

TABLE 1608.1

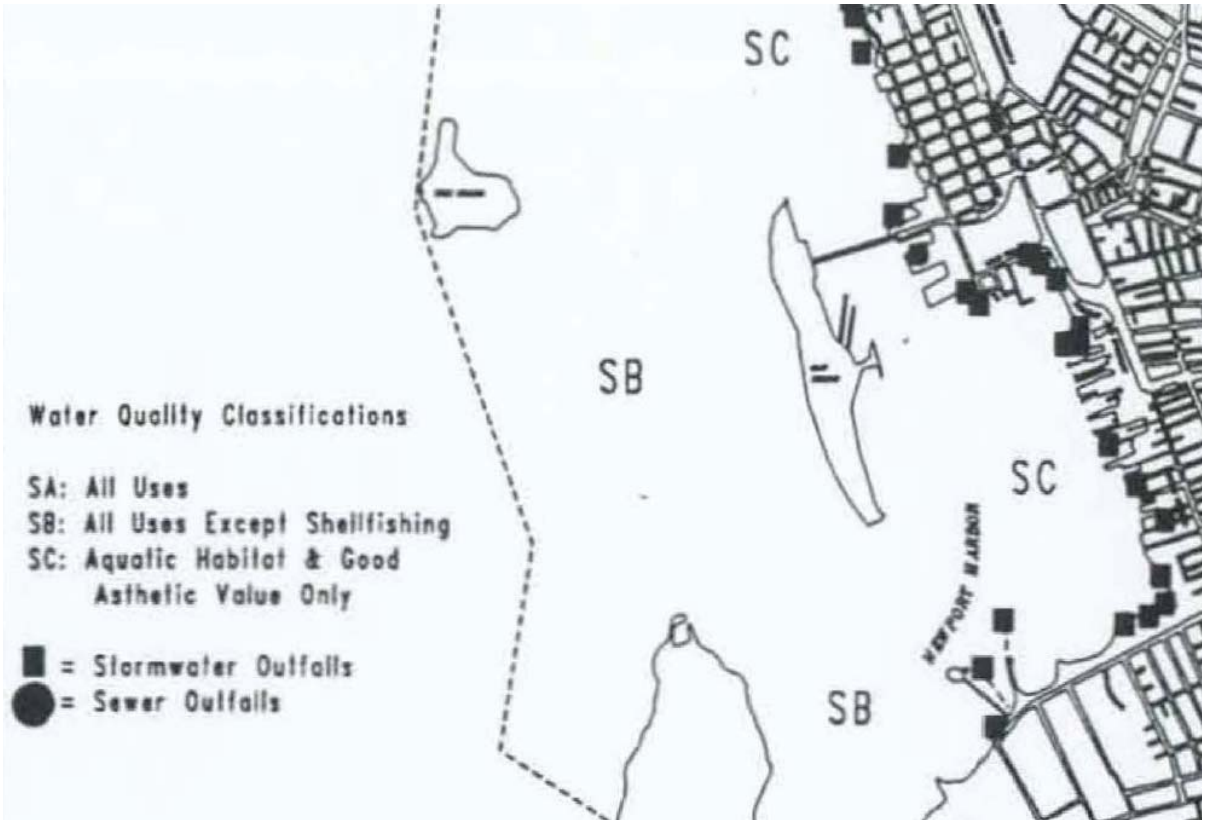
Municipality	Ground Snow Load Pg(psf)	Minimum Flat Roof Snow Load Pf(psf)	Basic Wind Speed V (mph)	Seismic Coefficients		Frost Depth
				Ss	S1	
Barrington	30	30	110	0.231	0.060	3’-4”
Bristol	30	30	110	0.227	0.059	3’-4”
Burrillville	35	30	100	0.232	0.063	4’-6”
Central Falls	30	30	100	0.236	0.062	4’-0”
Charlestown	30	30	110/120*	0.208	0.056	3’-4”
Coventry	30	30	100	0.227	0.060	4’-0”
Cranston (west of 295)	30	30	100	0.231	0.061	4’-0”
Cranston (east of 295)	30	30	100	0.232	0.060	3’-4”
Cumberland	35	30	100	0.237	0.062	4’-6”
East Greenwich	30	30	110	0.226	0.059	3’-4”
East Providence	30	30	100	0.235	0.061	3’-4”
Exeter	30	30	110	0.221	0.059	4’-0”
Foster	35	30	100	0.229	0.061	4’-6”
Glocester	35	30	100	0.230	0.063	4’-6”
Hopkinton	30	30	110	0.217	0.058	4’-0”
Jamestown	30	30	110	0.215	0.057	3’-4”
Johnston	30	30	100	0.232	0.061	4’-0”
Lincoln	35	30	100	0.235	0.062	4’-6”
Little Compton	30	30	110	0.211	0.056	3’-4”
Middletown	30	30	110	0.213	0.056	3’-4”
Narragansett	30	30	110/120*	0.206	0.056	3’-4”
New Shoreham	25	25	120	0.182	0.052	2’-6”
Newport	30	30	110	0.211	0.056	3’-4”
North Kingstown	30	30	110	0.222	0.058	3’-4”
North Providence	30	30	100	0.234	0.061	4’-0”
North Smithfield	35	30	100	0.234	0.063	4’-6”
Pawtucket	30	30	100	0.236	0.061	4’-0”
Portsmouth	30	30	110	0.220	0.057	3’-4”
Providence	30	30	100	0.234	0.061	3’-4”
Richmond	30	30	110	0.217	0.058	4’-0”
Scituate	30	30	100	0.231	0.061	4’-0”’
Smithfield	35	30	100	0.233	0.062	4’-6”
South Kingstown	30	30	110/120*	0.213	0.057	3’-4”
Tiverton	30	30	110	0.221	0.057	3’-4”
Warren	30	30	110	0.230	0.059	3’-4”
Warwick	30	30	100	0.229	0.060	3’-4”
West Greenwich	30	30	100	0.225	0.059	4’-0”
West Warwick	30	30	100	0.228	0.060	4’-0”
Westerly	30	30	110/120*	0.209	0.057	3’-4”
Woonsocket	30	30	100	0.236	0.063	4’-6”

*Line of Demarcation between 110 mph and 120 mph zones generally is Route 1A at Watch Hill in Westerly; East to Route 1 through Westerly, Charlestown, and South Kingstown; thence Northerly along Route 1 through Narragansett, to Easterly on South Ferry Road. See figures 1609 and 1609A.

Site:

Water Classifications

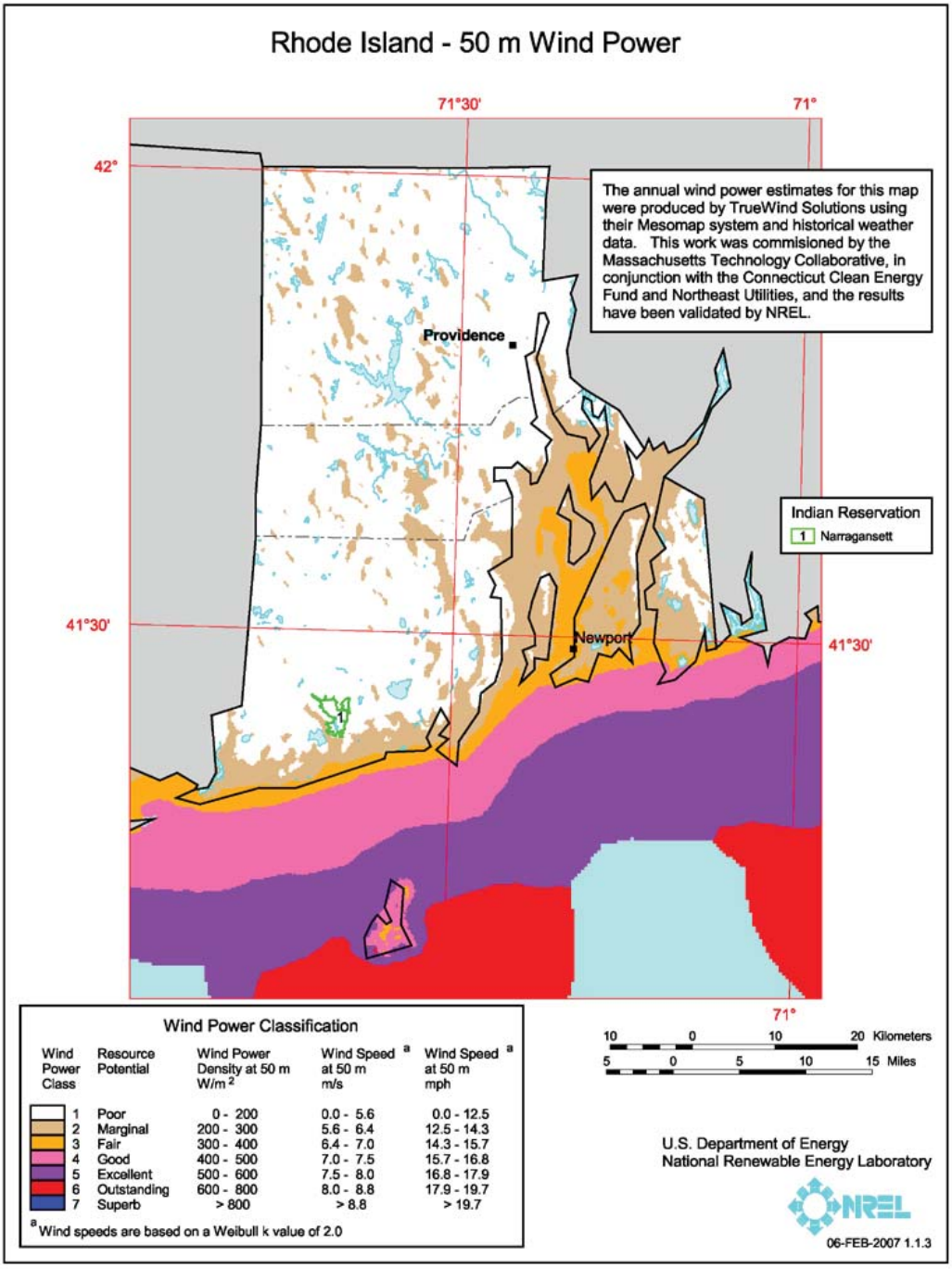
The water quality around the site would serve both purposes of the Project. The Western side of the site would be perfect for experimentations and other work from the research laboratories
The Eastern and Northern side of the site would be ideal for the public to view the water because of the Aquatic Habitat
The tunnel connecting the mainland entrance/parking would show visitors real life views of the Newport sea bed. The passage from mainland to Goat Island would spark interests and show a part of Newport that only a few have experienced.



Site: Data

Wind Zones

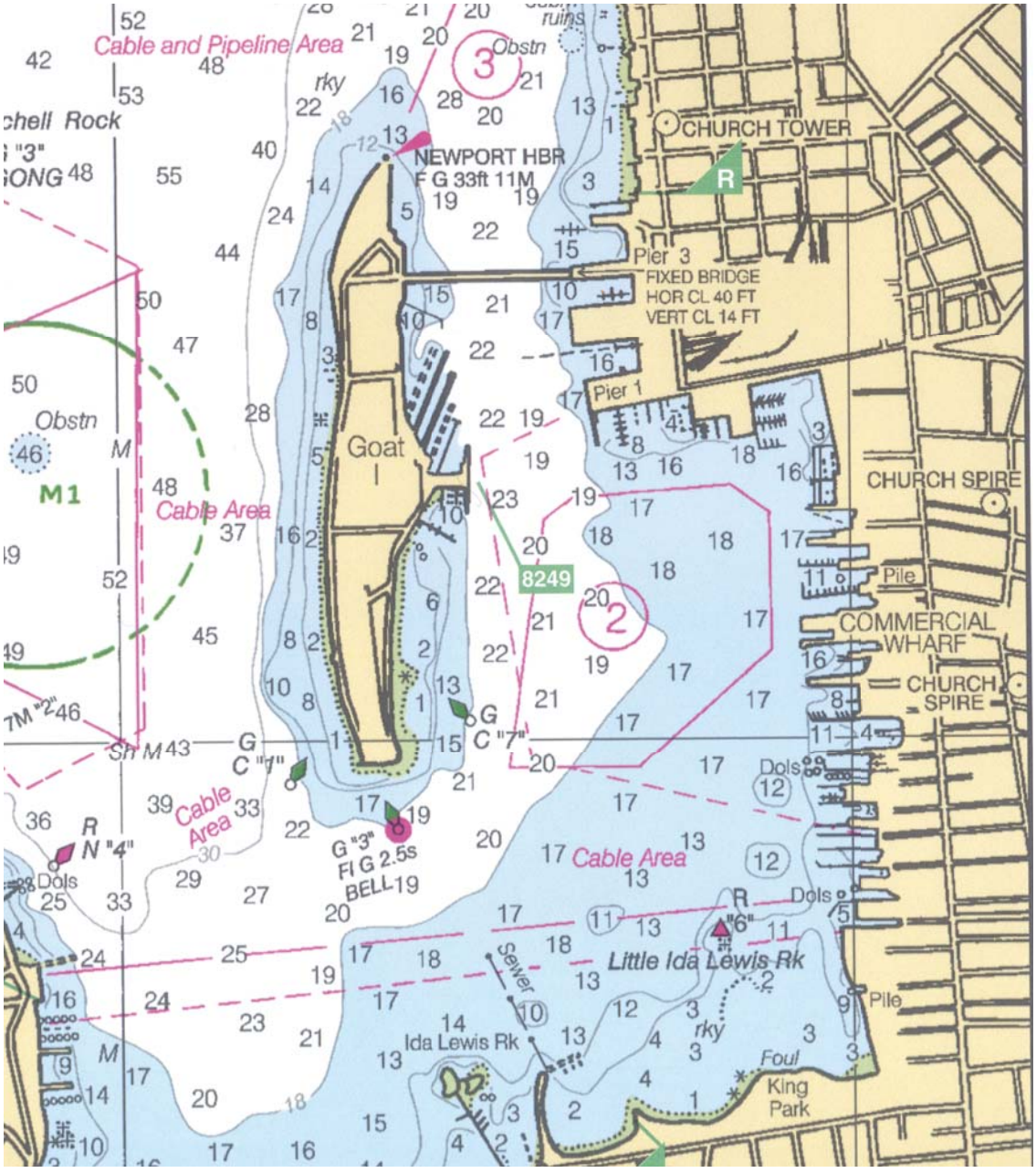
Map shows the wind speed in and around Newport.
The Ability to use wind turbines on site is possible because of the location in a wind zone.



Site: Data

Water Depths

The water is deep enough to support a tunnel along the ocean floor from the main land to the island. A tunnel would give the ability for the visitors to see the underwater life of Newport harbor.



Site: Data

Sea Level Rise

The height of the ocean has been rising and is projected to continue to rise in the future.
It is the architecturally responsible thing to do to raise the building off of grade to protect it from the rising sea level.

modeling becomes more developed.

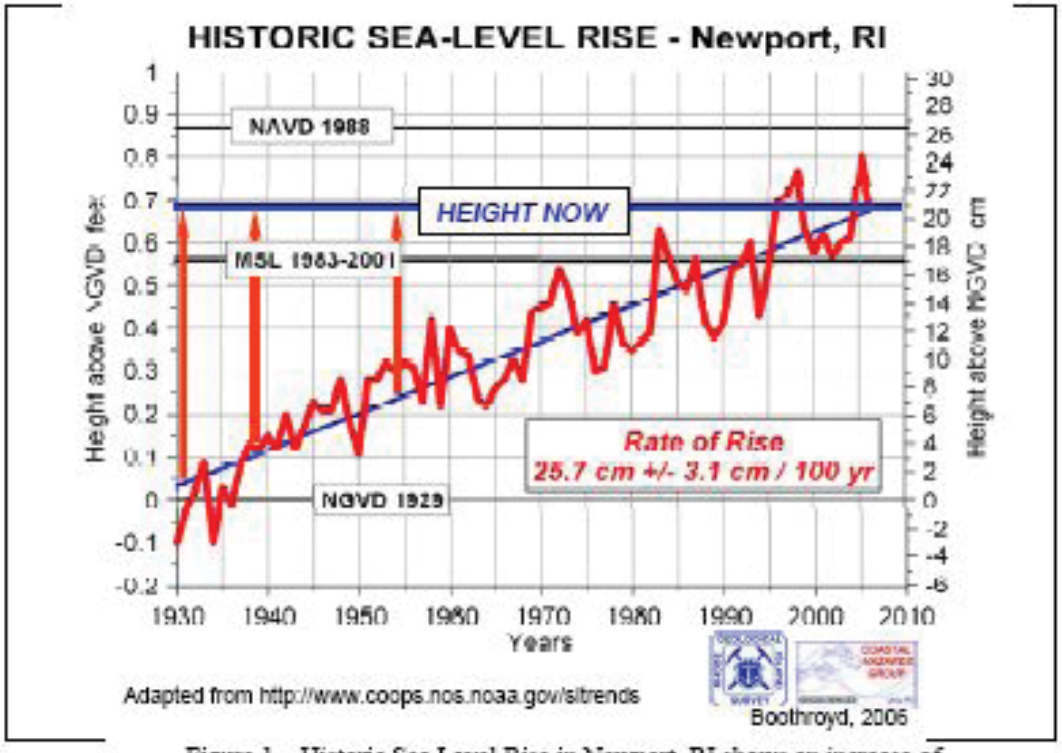
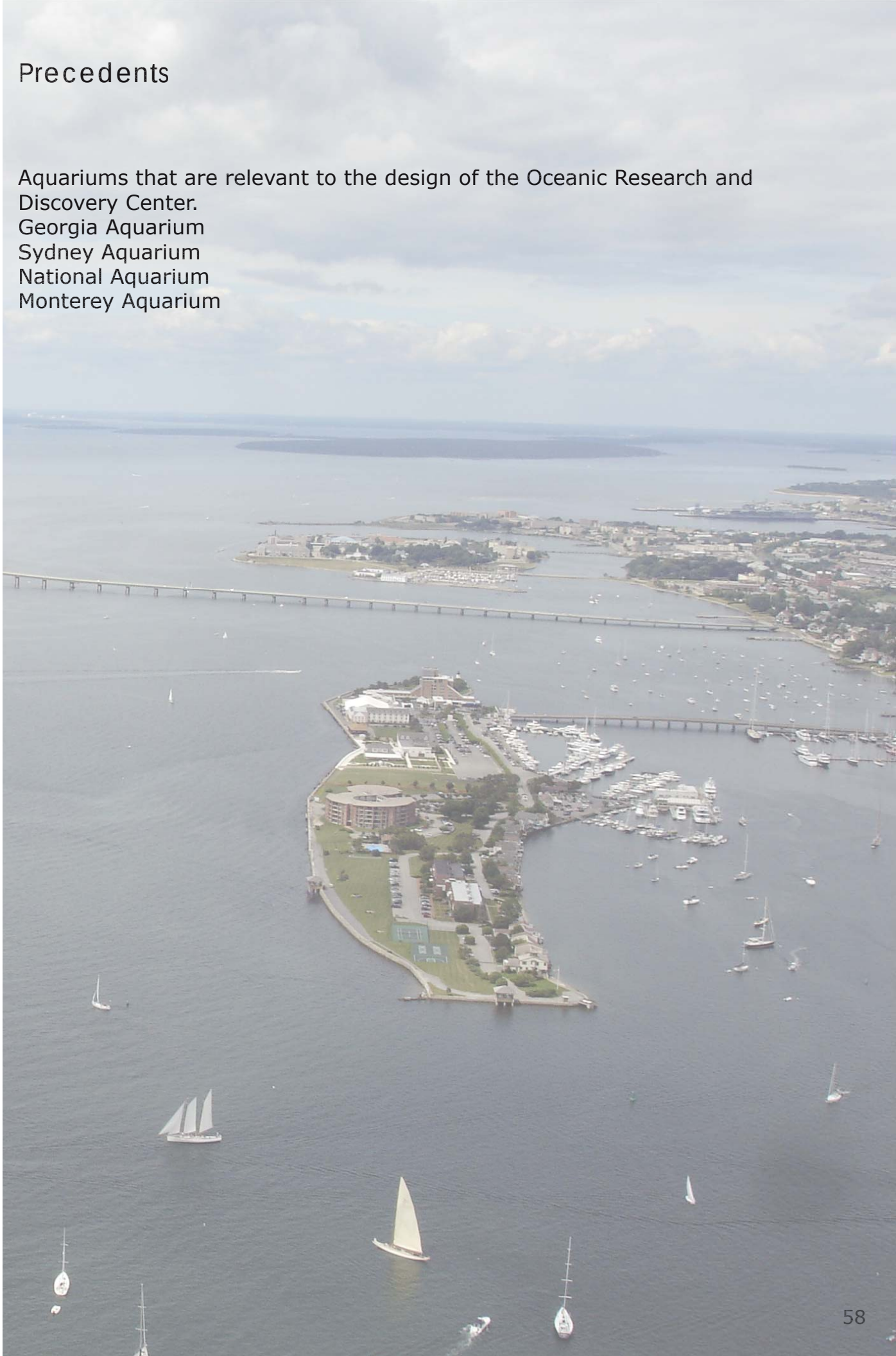


Figure 1 – Historic Sea Level Rise in Newport, RI shows an increase of approximately 0.64 feet between 1930 and 2006

Precedents

Aquariums that are relevant to the design of the Oceanic Research and Discovery Center.
Georgia Aquarium
Sydney Aquarium
National Aquarium
Monterey Aquarium



Precedents: Georgia Aquarium

Atlanta is a land-locked city, where its inhabitants have no chance to see the ocean or the animals that live in it. The architect wanted to give the visitor a chance to be "immersed" in water. This is the worlds largest aquarium that brings fish from all parts of the world to this landlocked place. This precedent is being used because of its shear size and ability to create such a large life support system for its animals.

Architect:
tvsdesign

Client:
• Marcus Foundation

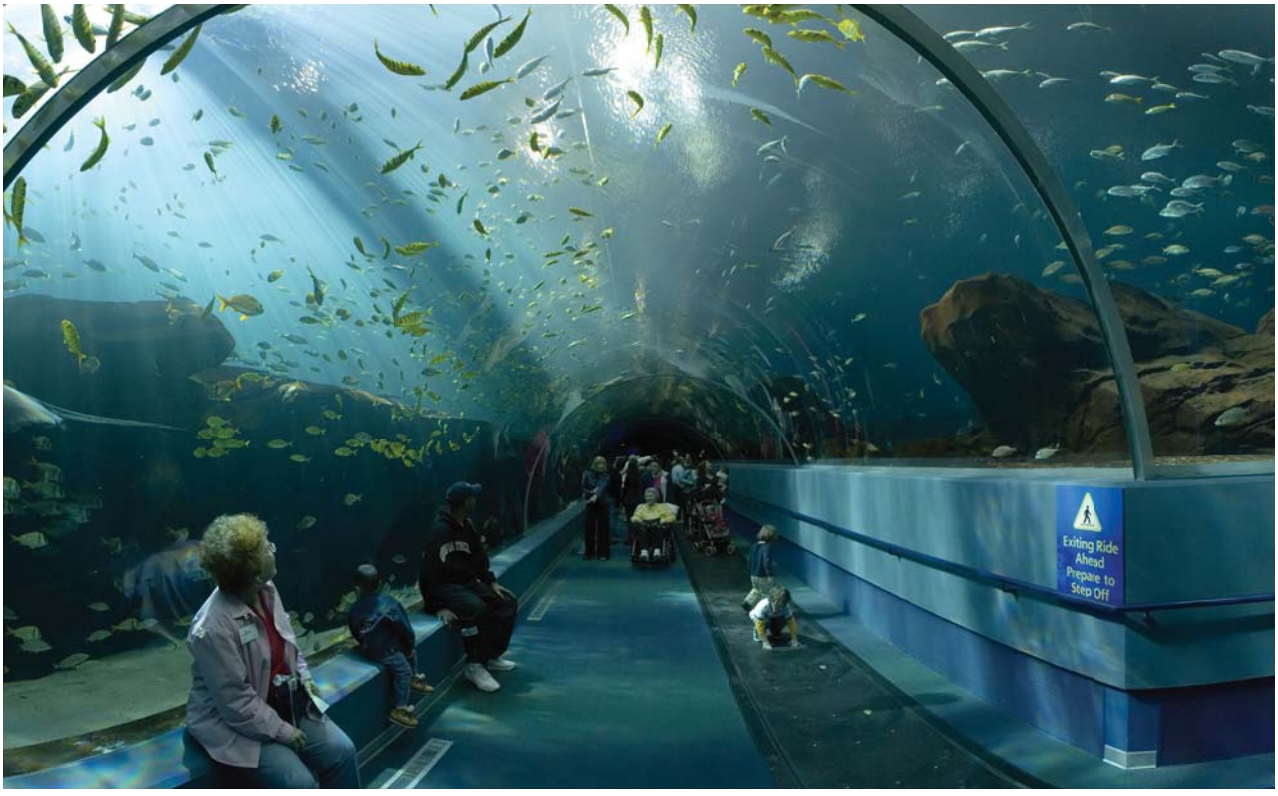
Project area:
• 550,000 sf

Additional data:
• Largest tank holds 6.2 million gallons
• Total aquarium holds 8 million gallons
• 60 total exhibits
• 500-plus different species
• 16,400 sf / 1,600-seat ballroom
• Water re-circulates every 85 minutes
• Aquarium uses less water than a typical office building.

Precedents: Georgia Aquarium

Submersion in water

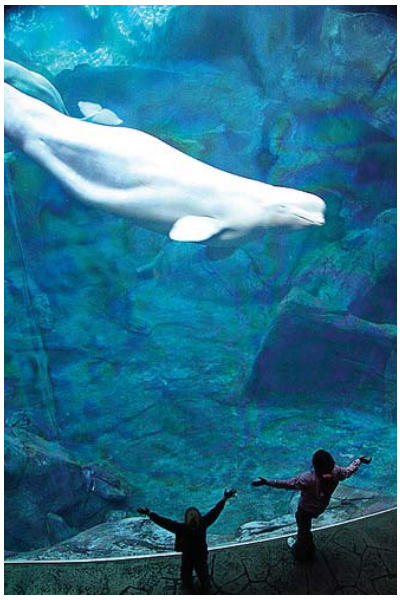
This Aquarium gives the visitor a chance to go below the water. To give the viewer a chance to see how the fish act together from their eye level. This precedent is land locked giving it no access to the actual ocean. In the Oceanic Research and Discovery Center the viewer will be submersed in the actual ocean as well as under tanks. The large tunnels and seating areas are perfect examples of a fantastic place to view the underwater world.

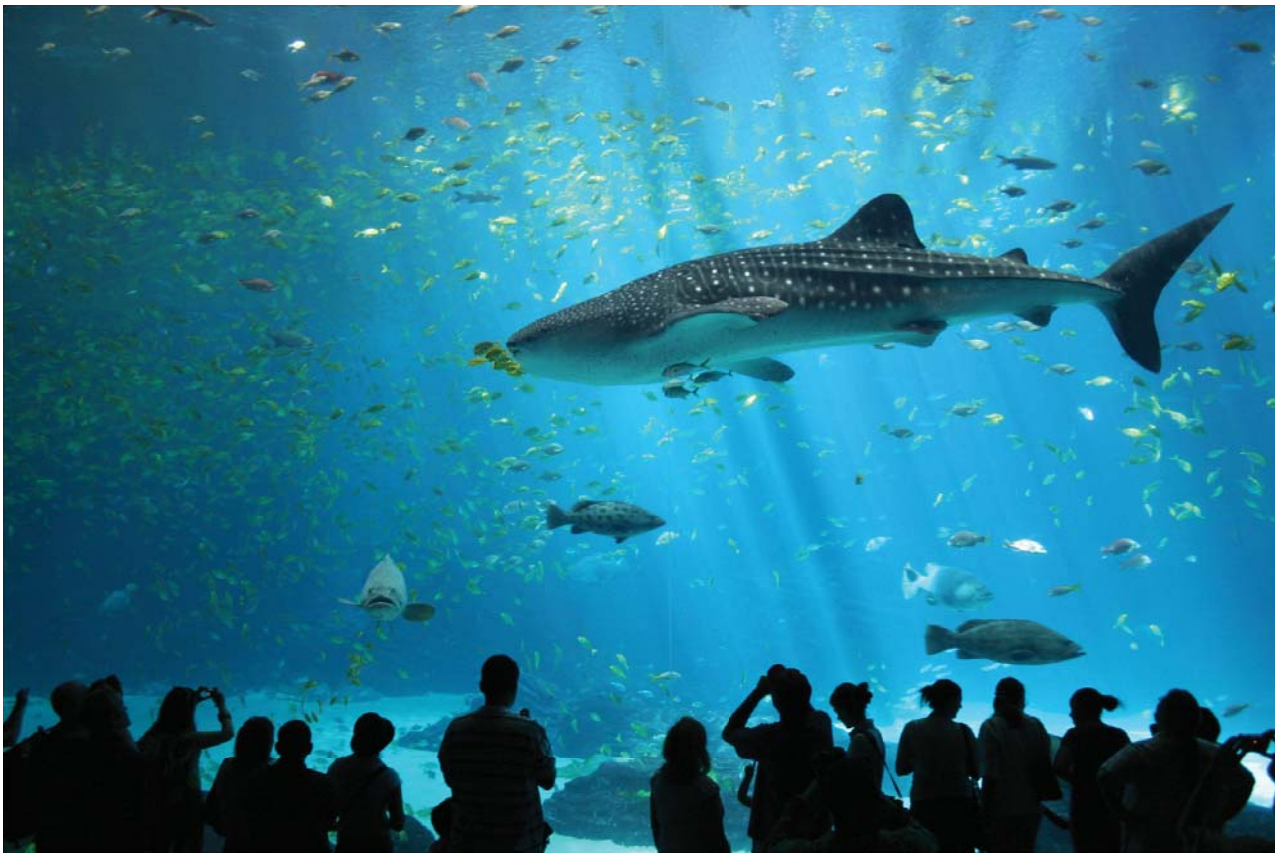


Precedents: Georgia Aquarium

Ocean Theaters

The Georgia Aquarium uses fantastically large pieces of glass turning the underwater world into a larger then life show for the visitor to watch. People are confronted with a view so deep they could sit for hours to watch every movement all of the thousands of fish make

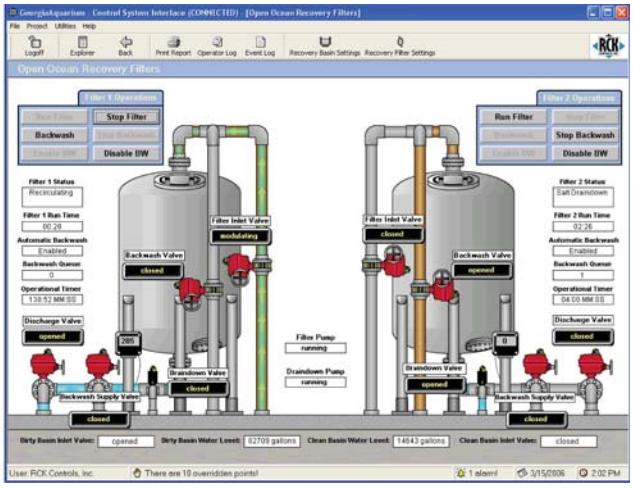


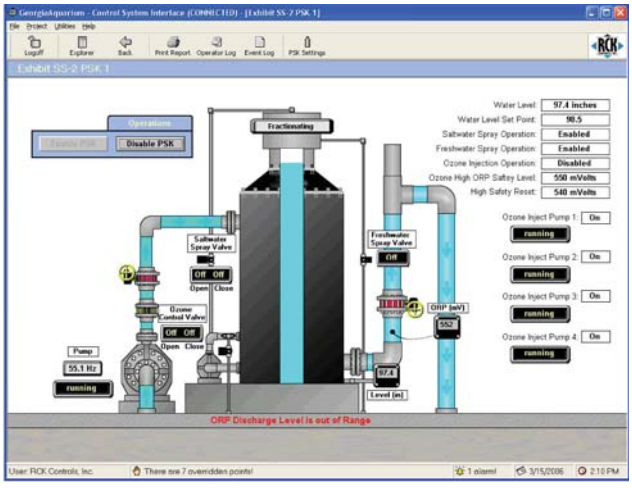


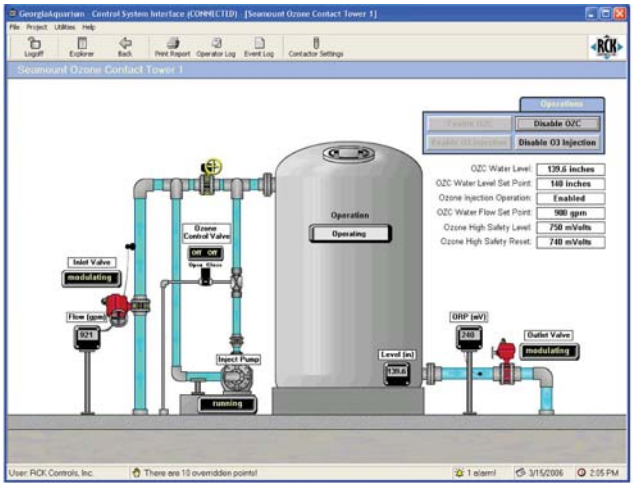
Precedents: Georgia Aquarium

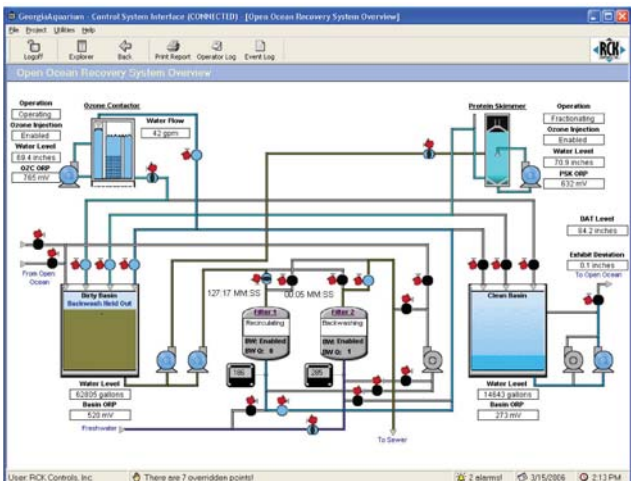
RCK Controls and Opto 22 hardware are the key components of the integrated control systems within the Georgia Aquarium. Ten RCK processors and more than 3100 Opto 22 mistic and SNAP I/O points (583 analog, 2,523 digital) control all of the aquarium's fish-related water processes. Or as John Hale, RCK Controls Project Manager puts it, "Anything affecting any of the fish habitats is run by RCK controllers communicating to Opto I/O." A few stories below the aquarium are the corridors, control rooms, service and storage areas, offices, and open areas that house the critical systems and equipment that keep the aquarium operating and the fish thriving. These life support systems (LSS) include huge mixing tanks—each with a capacity of more than 65,000 gallons—that create the salt water for the aquarium's exhibits, as well as the reclamation tanks that store and re-circulate the water every ninety minutes.

-http://www.opto22.com/documents/1637_Case_Study_Georgia_Aquarium.pdf









Precedents: Georgia Aquarium

RCK Controls designed and installed most of the Georgia Aquarium's LSS systems including the Open Ocean Recovery System, which collects, filters, cleans and returns the reclaimed water. To accomplish this, a total of 10 RCK custom controllers work with the Opto 22 I/O to monitor and regulate all processes. For example, sand filter flow rates are monitored to maintain a constant design flow rate. As filter vessel's sand media becomes more and more clogged, variable frequency drives (VFDs) speed is controlled. "The recovery system we designed required us to connect and monitor a number of I/O points," says Hale. "Valve positioning, analog reclamation water levels and flow meter readings all help determine when a sand filter can be automatically back washed. When a VFD's speed is 'maxed out' and filter performance has declined, it means the filter is ready for back washing and the process is initiated." "There are 56 filters just for the main tank," adds Joe Poniatowski, the Georgia Aquarium's Life Support Systems (LSS) Manager. "Monitoring and maintaining those alone would be a full-time job. Automating this process frees LSS from this responsibility." "All fish water backwashes to a common reclamation system," says Poniatowski. "We process and reuse almost all of this water, resulting in a close to zero percent salt water discharge. That's something that's pretty much unmatched by most other aquariums." For the Georgia Aquarium to transport process and reuse its water requires a host of water treatment equipment, hundreds of pumps, and over 61 miles of piping. Water is carried from the salt water mixing tanks to the exhibits and then back to the reclamation tanks. Along the way, the water is treated through the use of carbon filters (which strip out chlorine and fluoride) and protein skimmers, large tanks used to collect the water and remove any dissolved organic compounds (DOC) through a process called fractionation. Fractionation occurs when massive amounts of tiny air bubbles are injected into the water by a high pressure water pump and air valve. The rising air bubbles act as a lift, allowing DOC particles to attach to the bubbles and hitch a ride to the top of the protein skimmer, where they are captured in a collection cup and rinsed away via a jet spray.

-http://www.opto22.com/documents/1637_Case_Study_Georgia_Aquarium.pdf

Precedents: Georgia Aquarium

The Georgia Aquarium has 59 of these protein skimmers and each is equipped with its own on-board I/O. A mix of analog and digital connections to injector pumps, spray down valves, and pH and ORP (oxygen reduction potential) sensors and other components on this equipment, effectively enable each of the individual protein skimming processes plus a lot more. "Some of the species here are very sensitive to water temperature, salinity, pH balance, turbidity, etc.," says Poniatowski. "So we need to have very precise control over all of our protein skimmers and other water treatment systems. The RCK control engine provides just that."The aquarium's LSS control room serves as a center of operations where Poniatowski and his staff can view all of the aquarium's 62 I/O panels (and thus any and all of the aquarium's critical life support systems) from their computers. At the Georgia Aquarium, hardware from RCK Controls and Opto 22 controls and monitors all of the exhibits' critical life support system equipment and components including:

- Flow monitors (GF Signet)
- Heat exchangers
- Ozone equipment (WEDECO)
- Injector pumps
- Sand Filters (Neptune Benson)
- Filter pumps (USFilter, a Siemens company)
- Drain down pumps
- Protein skimmers (RK2 Systems)
- Salt water mixing tanks (Neptune Benson)
- Salt water reclamation tanks
- Discharge, inlet & backwash valves (ASAHI & Bray)

-http://www.opto22.com/documents/1637_Case_Study_Georgia_Aquarium.pdf

Precedents: Georgia Aquarium

"What makes this possible is our use of standard Ethernet-enabled components in the design of the control system," says Hale. "The RCK controllers communicate over the aquarium's dedicated and secure Ethernet network, allowing full monitoring capabilities from any connected PC or laptop." In such cases, a graphical user interface, designed by RCK Controls, gives a straightforward presentation of all of the processes taking place with the protein skimmers, mixing tanks, pumps and other equipment. Wireless connectivity enables mobile LSS staff carrying handheld units to receive alarm data instantly should any of these aquarium systems need servicing.

-http://www.opto22.com/documents/1637_Case_Study_Georgia_Aquarium.pdf

Precedents: Sydney Aquarium

Sydney Aquarium focuses on fish and other marine life from Australia. The viewer is brought down under the water in underwater passage ways with moving walkways to allow the customer experience being underwater without having to walk and just watch.

Architect:
Peter Reed

Client:
Sydney Attractions Group

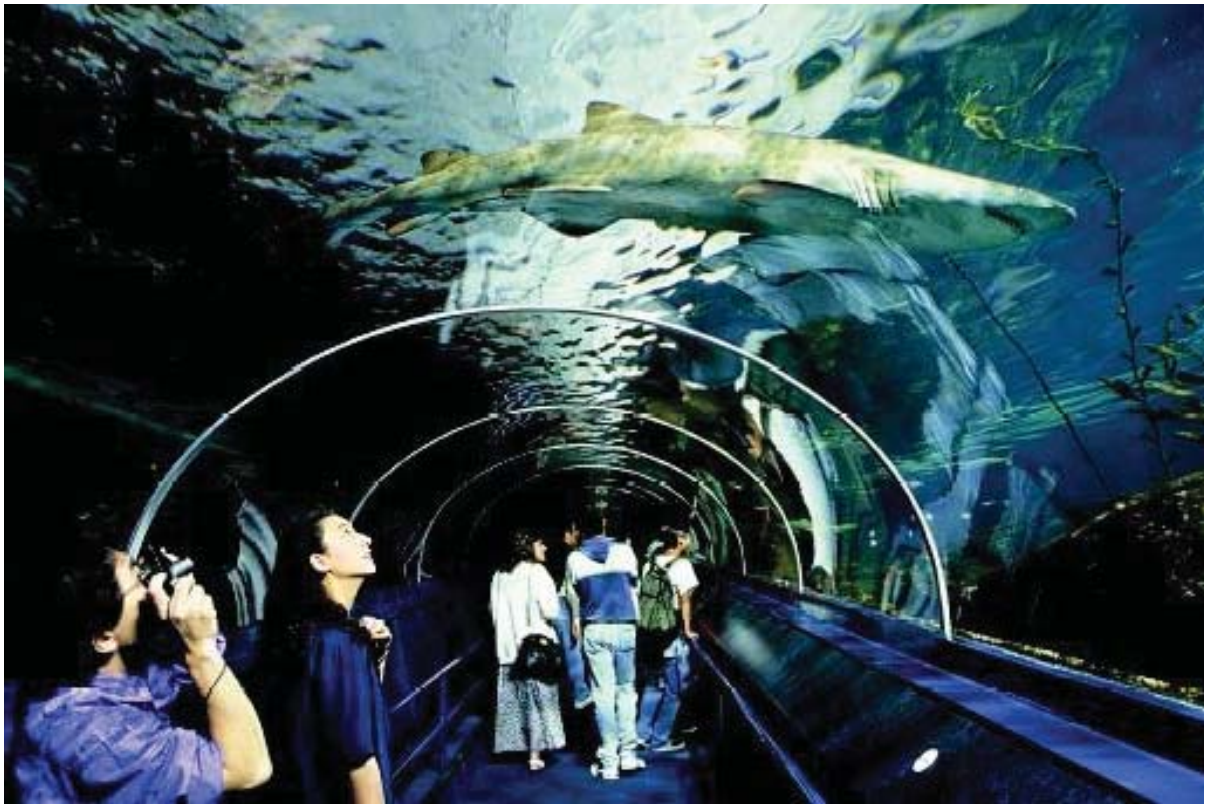
Project Size:
650 species comprising more than 6,000 individual fish

Other Information:
• Underwater, see-through, acrylic glass tunnels where sharks swim above visitors
• Recreation of a Great Barrier Reef coral environment
• Glass bottomed boat or Shark Explorer began operating. Giving guests a tour of the great barrier reef tank.

Precedents: Sydney Aquarium

Submersion in Water

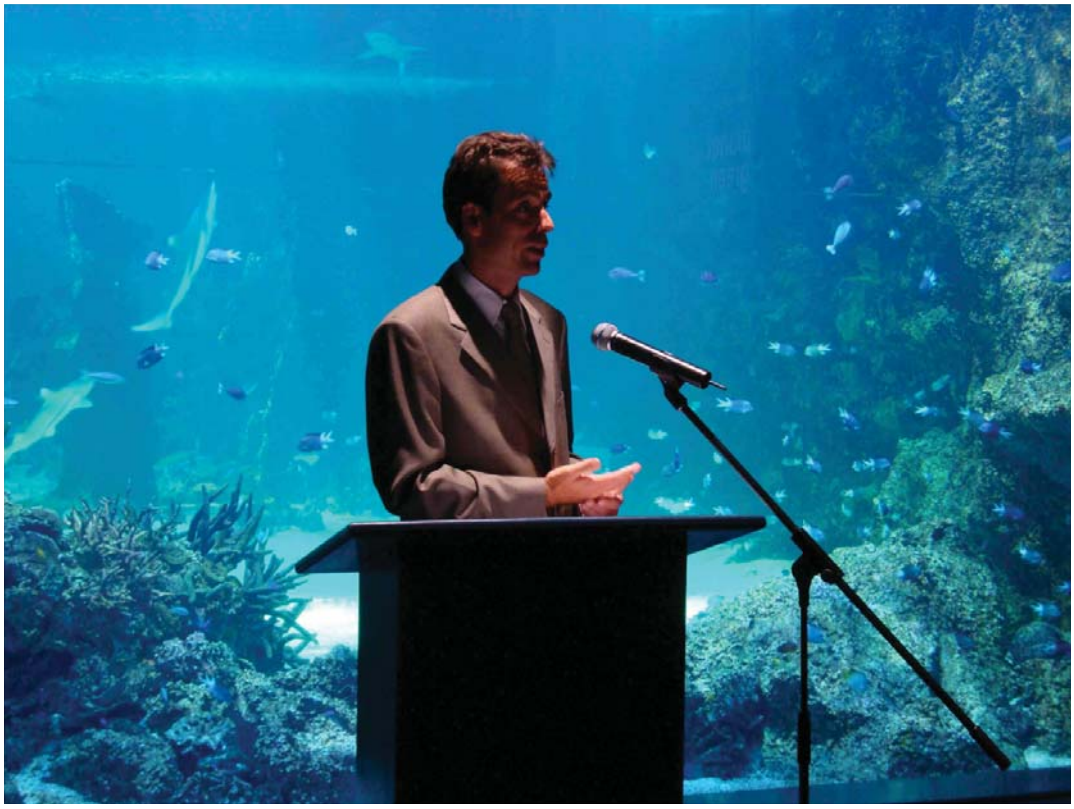
The Sydney Aquarium has created tunnels in the shark tank to let the visitors view the sharks. It is a safe way for people to view sharks, how they move and interact. The moving walking way allows people to move through the space while standing still, looking up and around at the marine life.



Precedents: Sydney Aquarium

Walls of Water

The tanks should be seen as much as possible. They should be a background for anything that happens in the building. If there is going to be a lecture, or a class why not put it in front of a wall of water.



Precedents: Sydney Aquarium

Sources of Aquatic Life

All the animals displayed at the Sydney Aquarium are native to Australian waters, although some may also be found elsewhere in the world. There are a variety of sources for the aquatic life used in the displays. The Aquarium owns a purpose-built vessel for collecting specimens. Many of the aquarium's animals have been collected from Sydney Harbor or from the open ocean outside the Sydney Heads. Different species require different collecting methods to ensure the safe and humane handling of the animals.
Fishermen may often donate an unusual creature that they have caught, for example, an eel with a color mutation. Other animals may have been found distressed like yellow-bellied sea snakes frequently found washed up on Sydney beaches or injured like the fairy penguins whose wings are often maimed by boat propellers in Sydney Harbor. Sydney Aquarium provides a sanctuary for injured animals and many, like marine turtles, have been successfully rehabilitated and returned to the wild.
The saltwater crocodile is leased from a Northern Australian Wildlife Park and the seals are surplus animals from Taronga Zoo and Sea World. Some animals, such as certain species from the Murray-Darling River and the Great Barrier Reef are purchased from authorized contract suppliers. These suppliers have restrictions placed on their collecting so that it is environmentally sustainable. Permits for the collection of aquatic animals must be obtained from the NSW Department of Fisheries. It is not possible to collect protected animals, such as the Grey Nurse shark. Any additional Grey Nurse sharks needed in the future must be collected from waters where collecting is allowed, such as South Africa.
The Aquarium also has a breeding program and some of the animals which have been successfully bred are sea horses, stingrays, penguins, Port Jackson sharks and Wobbegongs.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium: Water

Naturally water is an absolutely vital element to the Aquarium. Some animals live in fresh water, others in saltwater.
The water in all Sydney Aquarium's exhibit tanks is treated and filtered to make sure it provides optimum living conditions for the inhabitants. The main saltwater supply comes from Darling Harbor but is carefully filtered and conditioned before it is reticulated into the oceanariums and marine tanks.
The freshwater supply for the Aquarium comes from Sydney's main drinking water supply. The water is very pure but must be All the animals displayed at the Sydney Aquarium are native to Australian waters, although some may also be found elsewhere in the world. There are a variety of sources for the aquatic life used in the displays. The Aquarium owns a purpose-built vessel for collecting specimens. Many of the aquarium's animals have been collected from Sydney Harbor or from the open ocean outside the Sydney Heads. Different species require different collecting methods to ensure the safe and humane handling of the animals.
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There are 3 filtering schemes in the Sydney Aquarium. Each of the 50 tanks in the exhibit hall is supported by individual filter systems. The Open Ocean Oceanarium which houses the sharks and stingrays is supported by a "semi-closed" life support system built specially for the Sydney Aquarium. The Great Barrier Reef Oceanarium has its own filtration system for the approx. 1.6 million liters. It is filtered by 4x28 liter per second water pumps as well as a large air pump which carries out up to two thirds of the filtration in this exhibit. 1.5 million liters of water in the Open Ocean floating oceanarium are filtered every 1.5 hours to provide maximum clarity and purity of water assuring the health of the animals. Approximately 15% of fresh treated sea water is introduced every day to prevent toxic buildup in the Aquarium's water.
The Seal Sanctuary opened in 2003. This exhibit, the largest naturally lit exhibit in the Aquarium is at the cutting edge of Aquarium design and technology. Unlike other marine mammal exhibits in other aquariums worldwide and indeed, unlike the seal sanctuary at Sydney Aquarium which this one replaced, this exhibit is a totally natural open system which relies on natural sunlight and filtered seawater from the harbor to develop a balanced, continually evolving environment. No artificial water sterilization is utilized.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium

Special care

☐ Health care: To treat diseases and certain conditions in animals, antibiotics and medical preparations are used.

☐ Temperature control: Certain species, such as the animals from the Great Barrier Reef, the sharks in the Open Ocean exhibit and the exhibits from the Rivers of the Far North need to have their tanks heated while others can get by without special temperature control. The Antarctic ice-fish, the marbled rock cod requires a constant temperature of between 0° and 7°C.

☐ Food: The Sydney Aquarium curatorial staff prepares a wide range of foods for the animals every day. Whole fish are fed to the sharks and saltwater crocodiles. Animals in the Sydney Harbor Oceanarium prefer chopped fish. Large freshwater fish such as the Murray Cod love yabbies and freshwater shrimp as well as fish. Other items on the menu include dried fish flakes, Tubifex, brine shrimp (fresh and frozen), water fleas, earthworms, flies, cockroaches (bred on site), crickets and chopped spinach.

☐ Space: All aquatic animals need a space to live. In general large animals must have more space than smaller ones but other factors such as territorialism must be taken into account especially when placing different species together. Display tanks range from about 150 liters to 1.5 million liters, all specially designed to provide the right environment for different species. Many of the curatorial staff specialize in various species or particular aquatic habitats so that all the animals are in expert care.

☐ Animal husbandry: Newborn animals are placed in separate tanks for specialized care. New acquisitions are placed in quarantine facilities, so that their health can be monitored to ensure that they are not carrying any diseases that may infect animals on display. Although the seals do not perform shows, training is involved so that the keepers can do regular health checks without distress to either party.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium

Environmental Impacts

The Aquarium has a strong environmental commitment and has examined all ways it can recycle products and limit waste. A special committee (CRAP - Committee for Recycling Aquarium Products) regularly meets and coordinates all recycling activities. All office paper and cardboard boxes are recycled. Curatorial staff utilize used plastic bags for the weighing out of food for the animals. The restaurant has the policy of using environmentally friendly products wherever possible, for example, CFC-free foam cups. For the waste that cannot be recycled, dump bins are located behind the Aquarium and are emptied regularly. The Aquarium has little impact on the harbor. Water is taken from the harbor, but is returned in a more purified state.

Through its breeding program the Aquarium is often able to release back into the wild a number of animals and thus bolster natural stocks of threatened animals such as sea horses in Sydney Harbor. Other animals released to suitable habitat areas are juvenile Port Jackson sharks and Wobbegong sharks.

Buildings impact on the environment in two ways. The first is related to the actual materials used to construct the building. Each material during the process of its manufacture will affect the environment in both the energy it consumes and the waste products it creates. The second is how the completed building acts as an energy consuming machine. The Aquarium attempts to limit energy consumption in a number of ways. For example, there are timers on lights and at 10pm(closing time) all lights go off. In the Platypus exhibit, the lights are phased in (to simulate dawn) and phased out (to simulate dusk). This not only saves power but allows the animal to experience as natural an environment as possible. The start-up of plant machinery such as pumps and air-conditioning units is done in sequence to flatten out power surges and refrigerated tanks and reservoirs are insulated to avoid heat loss or gain, as are air-conditioning ducts. Natural sunlight is utilized wherever possible.

By monitoring energy consumption and incorporating flexibility into the building design, the Aquarium is able to respond wherever practical to new technological advances that improve the environmental performance of the building.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium

Impacts on the Human Environment

The volume of tourist traffic in the surrounding area does not pose problems for the Aquarium. In fact, tourists are naturally encouraged. There is bus parking for coaches, there is a ferry wharf at the end of the pier, there is a monorail station close by, and trains are also handy. There is plenty of space outside the aquarium for the free flow of tourists and many areas for them to congregate, eat and enjoy the surroundings. The flow of tourists around the site has been enhanced by the opening of the Cockle Bay Wharf and the King Street Wharf complexes, both of which attract visitors to the site and are easily accessed via a scenic walkway between the two.

The Aquarium provides a leisure and educational venue for the human environment, both local and international and its impact is measured in a number of ways. Sydney resident response to the Aquarium is monitored through Venue Monitor. This is a biannual telephone survey of the leisure time activities of 400 randomly selected Sydney adults. It measures recency of participation in a range of activities within Sydney and outside Sydney. It also measures recency of visiting specific Sydney leisure and tourism venues, detailed information about recent visits and intentions to visit in the future. The survey is conducted jointly by the Environmetrics Centre for Visitor Studies and News poll. It is an important planning tool for marketers of leisure and tourism products to the Sydney market. Trends can be monitored. For the Aquarium, it provides reasonably reliable data on the effectiveness of its domestic advertising campaigns.

Visitors are encouraged with the opportunity to win great prizes to complete Customer Opinion surveys as they exit the Aquarium. This allows Aquarium management to ascertain visitor response to the different exhibits and the level of visitor satisfaction.

Many graphics are designed to educate the public. For example there is an information board on dangerous marine animals. Environmental messages in the Aquarium are designed to reinforce the urgent need for the public to be more aware of our precious aquatic environments and to preserve them for future generations. Specifically there is an exhibit on “The Ocean’s Deadliest Predator” – the plastic bag and its detrimental effect on aquatic life; also a shark conservation display “Man Eating Shark” which focuses on the detrimental effects man’s exploitation and fear of sharks have had on worldwide shark populations.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium

Linkages and Flows within the Aquarium

The Aquarium employs about 80 full-time staff and between 40-80 casuals depending on seasonal demand. In terms of staff members to visitors, the Aquarium has a low level of labor intensity. Workers are obtained locally through advertisements in metropolitan newspapers, through word of mouth or through direct application to the Aquarium.
The management of the Aquarium is divided into three major areas:

1. Marketing and Sales Department which includes Front Desk, Gift Shop, café and Sales and Marketing department. Together these areas employ about 50 full-time staff and a variable number of casuals depending on the seasonal variation in the number of visitors.

2. Administration department employs 8 full-time staff.

3. Operations Department consists of about 20 full-time curatorial staff as well as cleaning, maintenance and security staff, and casual Touch pool staff.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium

Visitors

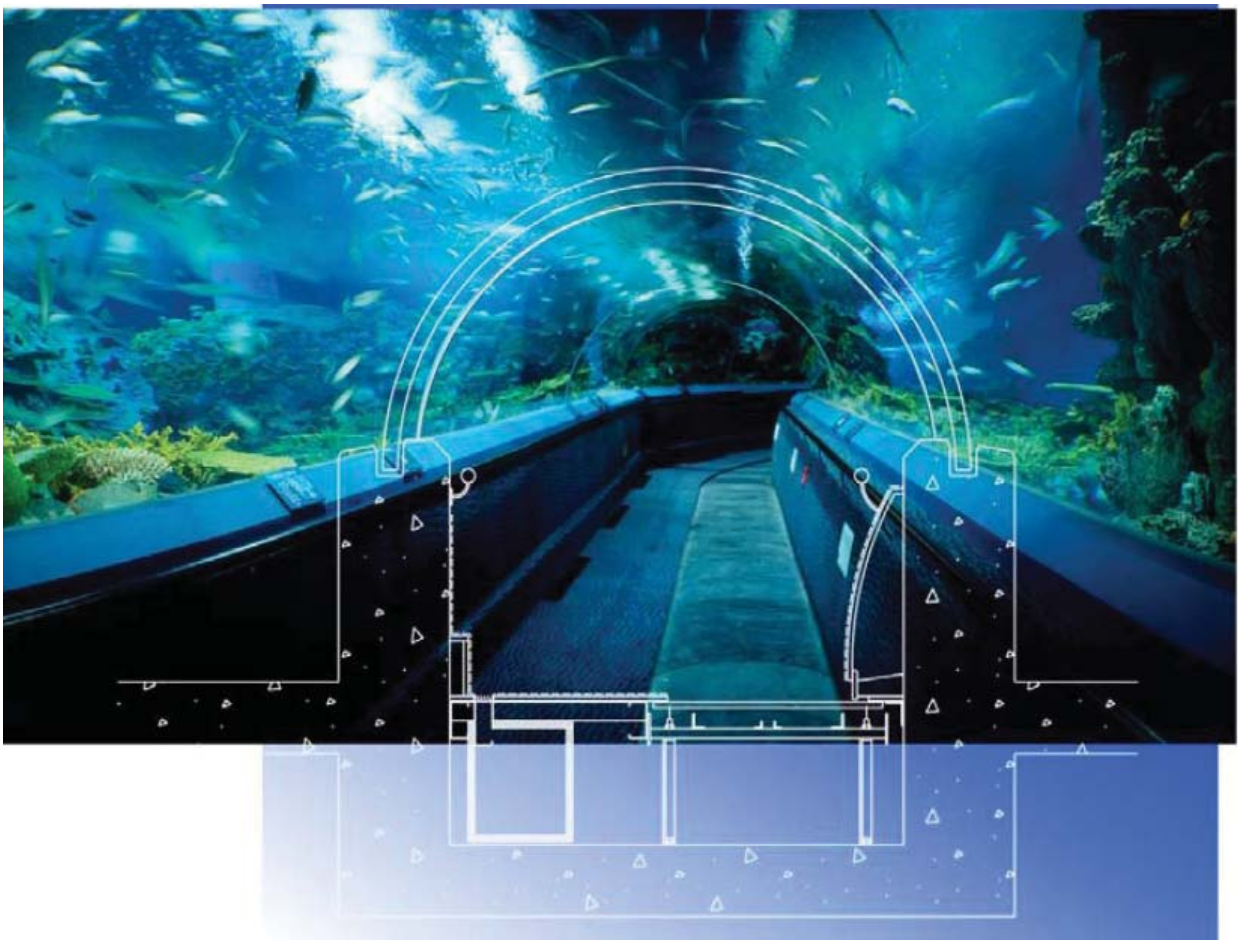
The Sydney Aquarium draws visitation from three key market segments - Sydneysiders, domestic tourists (intrastate and interstate) and international tourists.
At a minimum, flexibility should be designed into the areas below:
1. Exhibition design
The exhibits must be able to change to respond to a new idea or an important social or educational theme. The slab that supports the water-filled tanks must be able to sustain a variety of different weights and tank positions. The walls that enclose the exhibit should be lightweight and easy to demolish.
2. Modular Construction
The "building envelop" needs to be able to respond to change and this is achieved by using a modular system to create the external walls. The building is constructed out of a regular steel framed grid. On to this grid are fixed 900mm wide panels to create the external wall. The external panels are identical dimensions whether they are solid panels or window panels. This means panels can be substituted for each other during any extension work without too much disruption.
3. Cable Routes
Cables provide the electricity and communication - audio and visual systems, telephone and computer - routes throughout the building. The Aquarium needs to be able to easily access these routes to add new pathways or redirect pathways to a new installation.
4. Filtration
The filtration systems to the individual tanks need to be able to be changed as either the exhibit nature changes or new advances in technology provide a better solution to the filtration method. By clearly separating the "visitor" areas from "service" areas in the building design, flexibility is built in and change is possible without major disruption.
5. Lighting
Lighting is a common element in exhibit buildings that needs to quickly respond to any advances in technology so that the exhibits are always presented to their optimum capability.

-http://www.sydneyaquarium.com.au/Downloads/CLA/Yr7-12/SAQ_YR7-12_seniorgeo.pdf

Precedents: Sydney Aquarium

Underwater Tunnel

Aquatic Environmental systems designs the tunnels like the one of Sydney aquarium with Acrylic that are specially transported to the site and built in sections to create the tunnel



Underwater tunnel design

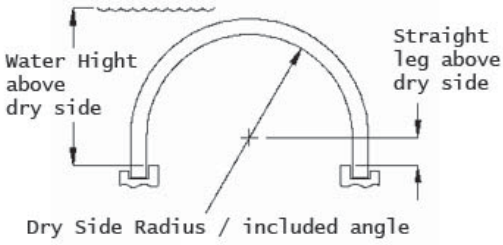
Cylindrical Aquarium Tunnel

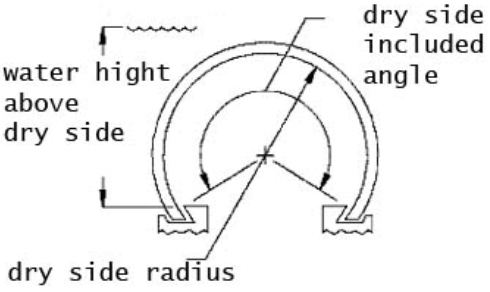
Tunnels are typically cylindrical in design. The most common tunnel has a constant radius and spans 180°. These tunnels can be faceted to make turns within the tank. The ideal tunnel has the viewer at some point completely surrounded by water so that in whatever direction they look, they only see water. A tunnel design can and many times does span beyond 180° to provide the viewer with a panoramic view of the tank interior. This type of design requires some unique coordination regarding the installation.

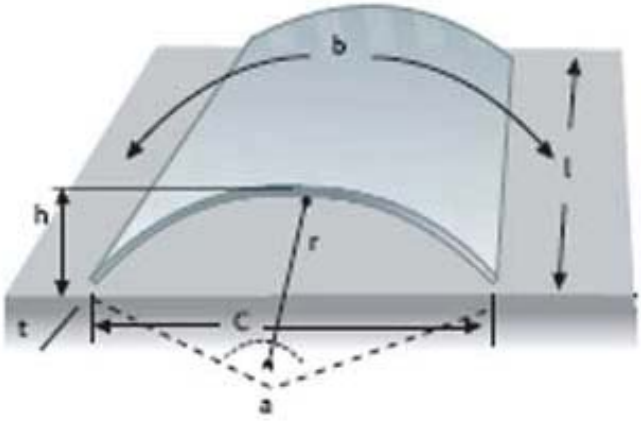
Optimized Aquarium Tunnel

There is an option other than the cylindrical design when designing tunnels. Since the water pressure at the top of the tunnel is less than the water pressure at the bottom, the acrylic window designer can take advantage of the differential and provide an optimized tunnel profile that is more elliptical in shape. When the width of the tunnel gets wide and the shape is cylindrical, the top of the tunnel starts getting quite high. If the top of the tunnel is too far above the heads of the people in the tunnel, then the feeling of being underwater starts to be lost. Optimizing the tunnel brings the top of the tunnel closer to the people in the tunnel, returning that intimate underwater feel. Properly designed, the optimized tunnel shape can lower the stress and movement of the acrylic tunnel; thus, the design thickness can be reduced, providing a cost savings as well better aesthetics. The optimized design works best for tunnel profiles that are very wide where the water is not too high above the top of the acrylic. Optimized tunnel sections are specific to the width and depth of the tunnel.
The optimized tunnel can be worked into numerous aquatic environments and its design naturally varies on width and depth. However this type of design works best in a wide aquarium space and just below the surface of the water.

-http://www.thorburn.co.nz/documents/aes.pdf







Precedents: National Aquarium

Located in a similar site to Goat island. Exhibits come from all over the globe including; life in diverse aquatic habitats, including fishes of a Caribbean coral reef, sharks in the open sea, and birds, amphibians, reptiles, and mammals of an Amazon rainforest.
Precedent Ideas are :guiding people with the use of light
:Recreating a far away place

Architect:
Cambridge Seven Associates

Client:
City of Baltimore

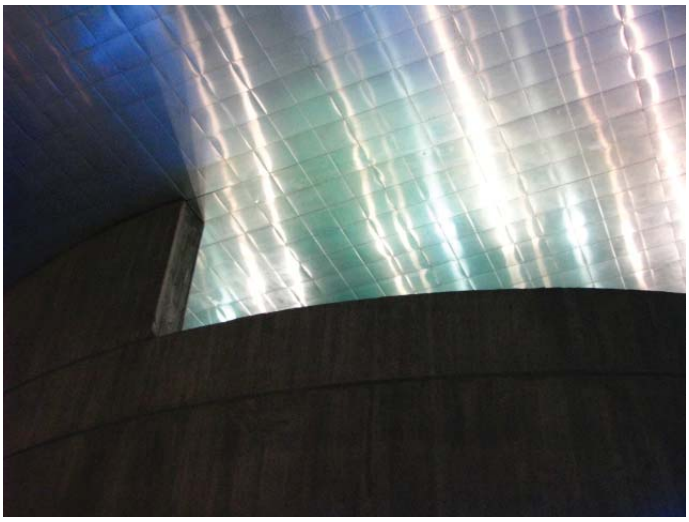
Project Size:
16,500 specimens of 660 different species

Other Information:
- Rooftop rainforest
- Multiple-story shark tank

Precedents: National Aquarium

Light as a Guide

Lighting is a very important part of any building. A building that is too bright feels uncomfortable to be inside, a building that is too dark makes you miss things. Light clues guide people. The right amount of lighting can move people around the building showing them where they should go and what they should see.



Precedents: National Aquarium

Recreating a Far-Away Place

The ability to create an environment from a place that most viewers will never get to visit is a great opportunity for an aquarium. The ability to transport someone to another place, to experience what it feels like to be there is a must for this project.

Precedents: Monterey Bay Aquarium

Monterey Bay Aquarium is the most technologically advanced aquarium in the world. The site is very like the Goat Island site because of its closeness to the ocean. This aquarium focuses on the local habitat of Monterey bay, there is an open bay tank that houses many open-ocean sharks and schooling fishes. The entire facility spans between land and water, engaging the environment it examines. There are terraces that span the water giving a very lively space for viewers to experience the birds on the rocks, the fish swim in the sea and the tide come in and out

Architect:
EHDD Architecture

Client:
City of Monterey Bay

Project Size:
230,000 sqft

Precedents: Monterey Bay Aquarium

Embracing the Local

The location of the Aquarium is an ideal place to have open ocean viewing. Showing people what is happening in the area they live in, or are visiting helps them understand what is happening in the real ocean not just people controlled tanks.
Large walls of glass give a views in to the open ocean tank allowing visitors to see the tank from under the water and the terraces allow the view from above.

Precedents: Mystic Aquarium

This aquarium is designed to teach. It is connected to an institute for exploration where the visitor is taught about the ocean in the past and the present. The building stands like a beacon drawing people into the aquarium. There are outside paths that lead the viewer to different parts of the aquarium to allow them to see the natural habitats of the Mystic area. The paths end at outdoor exhibits with glass railings to allow views into the tanks to allow the animals to be seen while swimming.

Architect:
Cesar Pelli and Associates

Client:
Kelvin Smith

Project Size:
70 exhibits with over 12,000 fishes, invertebrates, and marine mammals, representing 425 species from around the world.

Precedents: Mystic Aquarium

Exterior Exhibits

Bringing people out side of the building into a designed landscape with tanks gives the project a totally different feel and makes it unique. Visitors to this aquarium see the building from the exterior as a piece of sculpture while in a nature park.

Newport Facts: Comprehensive Land Use Plan

Excerpts to follow from the Newport Zoning code :
http://www.cityofnewport.com/departments/planning-zoning/maps-plans/home.cfm

Information relevant to project as facts selected from the official document. Information stating Newport's codes, want to manage tourism, policy, and environmental facts.

"Foster the city's Maritime Industry"
This aquarium will embrace Newport's history by displaying important aspects of it, as well as adding to it with the Research Center.

"Managing Tourism"
An aquarium would bring people and business to the city of Newport throughout the year keeping the city alive. The Learning center will teach giving an educational aspect to this touristic place.

"Environment"
Basic facts about the Climate and Land.

"Development"
The want to not over develop the city keeping the historical feel, while bringing new jobs and visitors to the city.

"Influx of People"
Explains how Newport deals with the visitors, how parking works and will have to work in the future.

"Codes"
Explain what can and cannot be built on this site.

Newport: Foster the City's Maritime Industry

Newport's maritime industry and harbor provide an important link with the City's past as well as an important component of the local and State economic base. Additionally, it provides indirect support to the City's retailing, services, and tourism economic activities. It has been noted that the economics of the waterfront make it difficult to establish and maintain marine industry. However, the presence of maritime industries adds to the essence of Newport. Aside from the fishing industry, other maritime industries such as sail lofts, yacht repair, metal fabrication, chandleries, and carpentry still exist in limited numbers along the waterfront and elsewhere in the City. The high-technology marine field also maintains a small but important presence in Newport. These and related businesses should be preserved, enhanced, and expanded. The establishment of spin-off industries is also important. Recommended actions include:

- Encourage the expansion of recreational marine activities such as sport fishing, sailing schools, and sailing events.
- Work with fishing and marine industry representatives to develop a plan to address the current and long range needs of Newport's marine industry.
- Encourage the creation of a maritime research/high-technology research/ development facility.
- Expand the dock at the Newport Harbor Center to facilitate its use as a marine center providing short-term dock facilities and services to recreational boaters and a building for marine non-profit organizations, as well as water-taxi linkages with other harbor locations.
- Encourage and support DEM's plans to expand yachting facilities at Fort Adams.
- Formulate a waterfront special area plan to direct future land uses in this area.

Manage Tourism

The health of the Newport economy is closely tied to its tourism industry. Newport's beaches, mansions, historic neighborhoods, spectacular scenery, and other qualities, continue to support taken the form of notorious party houses, traffic congestion, and parking shortages with serious questions regarding the impact of this on the quality of life for Newport's residents. Newport must manage tourism effectively so that the community's character and quality of life do not unalterably change. Tourism activities should foster and enhance the same qualities that make Newport a special place to live. The following actions are recommended:

• Encourage cooperative programs and events that provide an introduction to a variety of cultural and historic resources.
• Actively encourage heritage tourism by developing a more coordinated promotional/marketing strategy between the City, NCCVB, and the Newport County Chamber of Commerce.
• Encourage the expansion of year-round programming at the Newport's cultural attractions.
• Focus on Newport's natural and historic assets in economic development marketing programs.
• Consider a media campaign to showcase Newport's reputation as a vibrant, historic waterfront city where people want to live and emphasize the qualities that make it special to live.
• Encourage the continuation of current off-season and shoulder season convention marketing efforts of the NCCVB. Encourage "Family Oriented" Tourism Activities
• Consider tourist activities aimed at maximizing benefits to people of all ages as well as to reorient Newport's public image away from alcohol consumption.
• Encourage museums and/or attractions that focus on educational or interactive exhibits suited for children as well as adults.
• Develop stronger bonds between the tourist industry and local residents, to foster increased appreciation for Newport as a destination, e.g. tourism marketing and public relations efforts should also target local residents.
Reduce the Negative Impacts of Tourism
• Formalize the process of planning for special events to facilitate management and coordination of licensing, advertising, traffic management, and public safety efforts.
• Target resources for street cleaning and litter removal.
• Focus marketing on cultural and heritage programs.
• Strengthen enforcement of noise and parking ordinances.
• Strengthen ordinances and land development review procedures to address the traffic and parking impacts of new development.

Manage Tourism: Expand Heritage and Cultural Tourism Continued

• Implement innovative traffic management techniques especially for summer season. Support Managed Growth in Health and Educational Facilities Two major institutional facilities are located within the City -- Salve Regina University and Newport Hospital. These institutions are major employers in the City and offer a wide range of job opportunities. Purchases made by these organizations and their staff, students, and visitors bring significant economic benefits to local vendors. Lastly, their mission is to provide public services and activities that enhance the quality of life for City residents, the Island, and beyond.
• Establish closer working relationships between the City, Newport Hospital, and Salve Regina
University to ensure that these institutions are able to remain and grow in Newport, while at the same time remaining sensitive to the needs and concerns of the neighborhoods in which they are located.
• Enhance and publicize programs that establish internships for students in the local community.
• Enlist participation of Hospital and University representatives in future strategic economic planning for the City. Recognize the Importance of the U.S. Navy and High-Technology Industry Aquidneck Island relies heavily on the Naval Station Newport and associated defense-related and high-technology industries for its continued economic well-being. The U.S. Department of the Navy's recent expansion of NUWC, has been a significant boost to the local economy. Continued growth in these types of industries provide well-paying, long term employment opportunities. The future of both the U.S. Navy and private defense contractors is largely reliant upon national policies, where past experience has shown do not remain consistent from decade to decade. By fostering a close relationship with the Navy, Newport will monitor and respond effectively to the Navy's needs, while simultaneously sharing local concerns or issues.
• Enhance/strengthen communication and community relations with the Naval Station Newport.
• Encourage technology development, economic development, and human resources development activities where defense and high-tech industries are concerned

Manage Tourism: Maximize Newport's Educational Resources

Every step should be taken to ensure that Newport's residents are able to achieve their maximum economic potential. Older residents may also take advantage of educational opportunities to improve their competitiveness in the job market. Inadequate resources are geared toward keeping students in school. In 1997-1998 the Department of Education reports that 8,074 Rhode Island twelfth graders graduated, but 4.7 percent of 9th through 12th graders dropped out of high school. Additionally, most company training goes to managers and professionals, not front-line workers. Major efforts should go into ensuring that all youth, including high-school dropouts, receive the assistance necessary to earn minimum educational skills that translate into employment readiness. A comprehensive system of technical and professional certificates and associates degrees can be created to make the majority of Newport's students and adult workers ready for employment. States should have a system of employment and training boards, reflecting local business and community leadership, to organize and oversee the new school-to-work transitions and programs and coordinate the existing training system to meet employer needs. As the City takes steps to expand its economic base, it is also important to remember that a high quality school system is central to a community's ability to attract business interests.

- Recognize and publicize programs at State and local colleges to establish local internships with local businesses.
- Encourage cooperative education at the high-school level.
- Strengthen and expand technical education programs offered at Rogers High School and Newport County Vocational Technical School.
- Develop curriculum packages in local secondary and post-secondary schools that reflect the demands and needs of the local economy

Newport: Environment

SOILS

The soils in Newport are generally derived from unconsolidated glacial till and consist of particles of varying sizes. When small particles fill in tightly around large particles, the soil packs very tightly and becomes impervious to water. Layers of tightly packed soil are called hardpan or fragipan. According to the Soil Conservation Service, about 90 percent of the soils on Aquidneck Island can be expected to contain hardpan approximately 20 to 30 inches below the surface. Hardpan affects percolation, drainage, runoff, and erosion and can cause septic system failures which result in polluted runoff that will eventually get either into the Bay or into the island's freshwater resources.

CLIMATE

Newport enjoys the temperate climate of the southern New England region, which is heavily influenced by the Gulf Stream and is characterized by four seasons. The City's proximity to the ocean minimizes extreme temperatures which, according to recent National Ocean and Atmospheric Administration (NOAA) information, average approximately 70 degrees in summer and about 30 degrees in winter. The prevailing winds during the summer are from the southwest and from the northwest during the winter. Newport's comfortable summer climate has always been a prime attraction, particularly for Southerners seeking to escape sweltering cities where 100 degree temperatures and 90 percent humidity are not uncommon. Historically, winters in Newport were much colder, characterized by ice floes on the Bay which occurred as recently as 1975. In the last twenty-five years, however, winters have been generally mild with little snow accumulation. Rain often turns to ice during the night and does not thaw until late in the morning, making driving hazardous and requiring road salt and/or sanding operations.

TOPOGRAPHY

Topographically identified as seaboard lowlands or coastal plains, Newport's low-lying hills slope gently towards the water. The topography, plus the diversity of land uses and accumulated development over the past 200 years, contributes significantly to the unique scenic character of Newport which is appreciated both from land-to-water and water-to-land perspectives. From a land perspective, most parts of the City have a coveted water view. Conversely, most parts of the City are also visible from the water. Contributing to the exciting and unique visual patchwork that is Newport, natural and landscaped open spaces are contrasted against single, landmark-type buildings and more densely developed areas.

Newport: Rainfall/Storms/Droughts

Annual rainfall is distributed evenly throughout the year and is reported between 41 and 44 inches. A lush growing season occurs between April and September. Each year, mostly during the summer months, an average of 21 thunderstorms occurs. Although the six-month period from June 1 to November is considered to be the hurricane season, most occur in August, September and October, on the average of every ten years. The infamous hurricanes of 1938 and 1954 hit Rhode Island directly and caused major damage to Newport due to high winds and severe flooding. Most recently, Newport was hit by Hurricane Gloria in 1985 and Hurricane Bob in August 1991. On the average of every five years, the area experiences gale force winds, heavy rain and flooding -- the side effects of hurricanes or coastal storms that are not of tropical origin. Today's hurricane tracking and early warning systems give people a head start on protecting their property, but structures on low-lying land in flood hazard zones and boats in the water are still at the greatest risk. Coastal storms are less easy to predict and can actually cause more damage. A single gale in October of 1984, for instance, resulted in over five million dollars worth of damage to boats moored and docked in the harbor. Figure 5.2 identifies flood-prone areas.

Newport: Physical Beauty

The scenic open spaces along Ocean Drive, waves crashing against rocky cliffs, quiet coastal ponds, freshwater wetlands and salt marshes full of birds and fish, long stretches of clean white beaches, offshore islands and one of the safest deep-water harbors on the Eastern seaboard are some of the extraordinary natural assets which for centuries have drawn people from around the world to Newport to live, work, study and play. The beauty and accessibility of these wonderful assets which are appreciated so much by visitors also contribute significantly to the quality of life of Newport's residents. Yet, protecting these resources from over-development, overuse, and pollution has sometimes been difficult. With the opening of new highways and bridges, few parts of the state will be out of commuting range for people living on Aquidneck Island. It is anticipated that Newport's unique and attractive small-city ambiance will continue to attract visitors, as well as people who want to live here, whether year-round or only during the summer. Drawing visitors with its glamorous reputation inextricably identified with the nation's wealthiest people, the Newport of today is actually considered to be a working-class city and is home to approximately 26,475 permanent residents in 2000. As the City stretches to accommodate the increased transient summer population, the quality of the visitor's experience is threatened by crowding, the environment is burdened, demand for City services and facilities reaches peak proportions, and the quality of life of the permanent residents suffers unfairly. Many environmental evaluation and pollution control studies have been conducted by state and local agencies and citizens' groups, which provide valuable information about Newport's extensive natural resource base. As a result of these studies, large coastal areas of exquisite natural beauty with recreational and ecological value (such as Newport Harbor, Fort Adams, Rose Island, Brenton Point, Cliff Walk, and Easton's Beach) have long been accepted as being worthy of protection. How these areas are managed, therefore, will continue to be of great concern to the public. Of growing concern is the accumulated effect of the destruction of many smaller habitats whose value is not immediately obvious on a commercial scale. One example is freshwater wetlands that do not contain commercially valuable fish or shellfish and are not used for drinking water.

Newport: Environment and Ecosystem

Newport's physical, non-living environment and its climate naturally select for vegetation and wildlife that can be supported in the area. As is the case in other island communities, the variety of mammal species is particularly restricted here. Yet, because of the diverse vegetation found in and around the open fields, woodlands and wetlands, a broad spectrum of migratory birds are supported. These birds, in return, deposit seeds, further diversifying the vegetation, which helps prevent erosion and also recycles itself to build up and fertilize the soil, which supports the vegetation, which attracts the birds. The complex, interdependent relationships between soil, vegetation and wildlife is called an ecosystem, vividly described as a "web." The Newport environment consists of a multitude of land and water based ecosystems, wherein each element performs multiple roles in supporting both its immediate and other habitat communities, affecting living environments throughout Narragansett Bay and beyond. Figure 5.3 depicts Critical Habitat Areas on the island. An ecological gold mine, Narragansett Bay is an "estuary" where salt water from the ocean and fresh water drained from the land mix to create one of the earth's most diverse and abundant habitats. The global ecological importance of such estuaries is ranked along with tropical rain forests, fresh water wetlands, and coral reefs. The seriousness of the destruction of these habitats is confirmed by the rate and the alarming number of species that are currently being eradicated each year. On Aquidneck Island, rain falls into one of two watersheds, affecting either our drinking water or the Bay as it flows according to the natural contours of the land. Aquidneck Island is the largest and most densely developed of all the islands in Narragansett Bay. How we use our land, therefore, has a significant impact on the quality and quantity of both our fresh and salt water resources and, consequently, on the vast number of far reaching land and water based ecosystems which are related through the complex environmental web.

Environmental Regulation

Almost as complex as our local ecosystem is the web of federal, State, and local agencies that oversee, regulate, and enforce a multitude of laws and programs affecting land and water use. The key regulatory bodies affecting Aquidneck Island are delineated in Table 5.1. The coordination of these bodies and programs is normally achieved through permit processes, which can take years. Even though the process starts and ends at the City level, the City has little to do with the enforcement of State and federal standards. For example, the State Department of Environmental Management (OEM) has jurisdiction over everything from parks to ISDS permits to recycling. Despite OEM's vast information network, it is understandably limited in its enforcement capabilities. Some serious, chronic problems in the Ocean Drive area are failing septic systems/cesspools resulting in direct discharges into the Bay. It is hoped that Newport can become recognized as a model environmentally-aware "Green City," encouraging economic development based on the premise that protecting the environment is good business. If the City's zoning laws and ordinances were changed to incorporate State and federal environmental standards, then review and approval of new projects by a local Conservation Commission (or even an environmentalist on the planning staff) could drastically reduce the total time it takes to get a project permitted. The assumption here is that once comprehensive environmental standards are in place on the local level (incorporating State and federal standards that are prioritized to specifically protect Newport's unique environment), it would increase the likelihood of passing projects that are beneficial to the City. Thus, it is expected that rather than creating just another hoop for a developer to jump through, an early comprehensive environmental review process at the local level could significantly reduce overall permitting time. In addition, violations could also be handled speedily if brought by the Conservation Commission before the City's municipal court.

Land Resources

According to the 1988 President's Commission on American Outdoors, "natural beauty" was the most important attribute affecting the choice of outdoor destinations in recreation, travel, and tourism. Selecting for the "Green Tourist," a destination resort like Newport would do well, therefore, to maintain as much open space and natural scenic beauty as possible.

Newport: Sewage/Storm water Treatment

Newport's new secondary sewage treatment facilities began operations in May 1991. The new Combined Sewer Overflow (CSO) facility at Washington Street came on-line in August 1991, just before Hurricane Bob hit the area. The re-engineered CSO facility at Wellington Avenue is 90 percent operational as of September 1991. In 2000, Earth Tech Corporation entered into contract with the City to maintain the sewage treatment system. Therefore all of the distribution, management and monitoring of the system has now been privatized. Given the biological sensitivity of the secondary sewage treatment facility and the capacity of the CSO facilities, it will be necessary for the City to encourage maximum cooperation from citizens and businesses to ensure the long-term survival of these facilities. The introduction of grease, oil, and other toxins into the treatment system, either through the City's sewer lines or storm drains, is of particular concern, as is the volume of sewage and rainwater being routed to the treatment plants. Figure 5.9 depicts the sewerage and storm water out falls as well as the State water quality classifications.

Newport: Saltwater Resources

The coastline plays a key ecological role in providing habitat for vegetation and wildlife, which flourish in the unique environment where land meets the sea and where Narragansett Bay meets the Atlantic Ocean. Like freshwater wetland areas, the diversity of plant and animal life depends on the size of the area. Table 5.2 provides an inventory of the City's saltwater resources. The birds most often associated with Newport and the seashore are herring gulls -- permanent, year-round residents of the area. In addition, approximately 35 varieties of migratory waterfowl stopover in Newport for the summer, including ducks, Canada geese, cormorants, oyster catchers, mute swans, mergansers, black-backed and laughing gulls, terns, egrets, ibis, and a few ospreys, which are making a comeback after near annihilation from DDT in the late 1940s. The widespread appreciation of migratory birds was powerfully demonstrated in 1976, when the appearance of a single Siberian Smew on Easton's Pond attracted birdwatchers from around the world. Under the surface of the water exists another complex ecological web, which is primarily stimulated by changes in the seasons. Inlets, coves, and tidal pools along the City's undeveloped coast, particularly in the Ocean Drive area and including the large salt marsh at Cherry Neck Creek, serve as both nurseries and supermarkets in this fascinating underwater world. Full of microscopic organisms, Newport's waters are a hearty soup for hungry plankton feeders. Here, each level of life is a level in the food chain, for there is a larger organism that must eat it to survive. Natures own system of checks and balances works well, except when there is outside interference. Since the mouth of the Bay is only about 150 miles from the Gulf Stream, unusual tropical fish can sometimes be found in Narragansett Bay, including small barracuda and sea horses. Tautog (or blackfish) stays in the Bay year-round, while winter flounder trade places with summer flounder, ensuring a constant supply for fishermen. Lobsters and quahogs are also considered to be constants in Bay waters, and oysters, which were fished out in the 1940s, seem to be making a comeback along with Bay scallops. Figure 5.10 shows the principal areas for Aquidneck Island shellfish beds.
Whether large or microscopic, it appears that all saltwater creatures have some ecological, commercial, and/or recreational value. The waters in which they live have been used over the years by humans chiefly for commercial purposes -- first for fishing, then for shipping and trade, boat building and manufacturing, and transportation. Newport's waters were also used by the military for torpedo testing, among other activities, and have provided a convenient sewer for domestic and industrial wastes. Newport has had difficulty in complying with federal and State clean water standards, as our sewage and storm water treatment facilities have been improved only very recently. Figure 5.9 shows the number and location of storm water and sewer out falls into Newport Harbor and Narragansett Bay along with DEM's Water Quality Designations. These necessary discharges preclude the use of Newport Harbor as shell fishing grounds. Newport's saltwater resources will continue to be appreciated by large numbers of people as a floating playground for popular recreational activities such as swimming, boating, sport fishing, nature study, photography, and painting. How recreational demands are balanced against traditional commercial and economic demands will continue to be of concern to the State and to the City. Figure 5.11 shows the RICRMC water type classification scheme for Newport. By maintaining an open dialogue between conflicting user groups and through continued educational programs aimed at all levels, it is expected that more and more people will accept conscientious, cooperative roles in the future management of valuable saltwater resources in Newport and throughout the State, preventing overuse, misuse, neglect, and pollution.

Newport: Harbor

Nowhere else in the City are competing (and sometimes conflicting) needs and uses concentrated more than in the Harbor area. In addition, the importance of the Harbor is further recognized and emphasized by the number of federal, State, and local regulatory authorities that have overlapping jurisdiction. In order to "identify issues, goals, and priorities for better coordination and management in Newport Harbor," federal, State, and local officials and the public met over a nine-month period in 1984 to create a Special Area Management Plan (SAMPlan) for Newport Harbor. According to the general findings of the SAMPlan, the purpose of the document was to ensure "the continued ability of Newport Harbor to sustain its unique blend of recreational, water-oriented, and commercial uses," recognizing that this effort would "require increasing coordination between local and state planning and regulatory agencies" (SAMPlan, p.79). The SAMPlan was designed to integrate water area management practices, land use, and public access issues in a comprehensive manner. A number of the broader concerns faced by Newport and other waterfront municipalities throughout the State include the following:

A. The growth and alteration of the waterfront, which has led to the displacement of fishing and commercial vessels from traditional berthing areas and moorings, in favor of recreational vessels and residential and "transient guest" uses.

B. The probability of shutting out access to many middle-income people because of increasing mooring costs and limited boat launching ramp and parking facilities.

C. Density of moorings and impacts to water quality from overboard sewage discharges, leaks of gasoline, and the leaching of toxic bottom paints.

D. Conflicts over the priority of mooring assignments satisfy the demands of residents, nonresidents, and commercial users.

E. Provision and/or protection of support facilities, such as public access, service facilities, dinghy docks, showers, rest rooms, and parking for boaters' cars and trailers.

The Newport Harbor Management Plan (HMP) has been drafted during the past three years and will be presented to the Council by the end of 2002. The HMP is a comprehensive and detailed plan that addresses the above concerns and presents solutions to many of these issues. The City's priority is to improve the use of the Harbor and the accessibility to information and resources the Harbor Master has to offer. With the adoption of the HMP, the City will create a system to manage and maintain the quality and character of its most valuable resource. The State CRMC encourages municipalities to establish a Harbor Management Fund that would receive all income from mooring fees and other uses of local tidal waters to offset expenses directly related to use of harbor resources. Besides covering obvious harbor expenses (salaries of harbor master, assistants, and office staff; boat maintenance; etc.), a Harbor Management Fund could be a reliable source of money to improve and maintain those additional ancillary public facilities and services that would be defined as harbor-related by the new Newport Harbor area management plan.

Newport: Air Quality

Newport's air quality is enhanced by prevailing off-shore winds. Summer breezes typically are from the south. Storms moving up the coast usually cause easterly winds, since the storms tend to rotate clockwise. Only the strong north winter winds pass over large expanses of land before they pass over Aquidneck Island. Although the general air quality has never been a major health concern, it is not without faults. Unfortunately, there are traces of elements from chemical related industries located in New York and New Jersey. The path of the air from the south is periodically confirmed in the spring by the finding of marked balloons released as children's science projects. Because of our location and the direction of the winds, acid rain (sulfur dioxide from coal burning), nitrogen oxides, and carbon dioxides do not seem to be a concern. Air pollution meteorology information is typically provided to the public by the television and radio media and is limited to ozone and pollen levels.
One of the most noticeable detriments to Newport's air quality is exhaust fumes from standing automobiles, trucks, and buses that are left running for long periods of time or that are stuck in traffic. Vehicle operators should be encouraged to turn their engines off while standing or loading. Unless transportation policies on federal, State, and local levels are focused away from highways (which encourage the use of automobiles) and instead on a broad spectrum of public transportation services, the traffic congestion and resulting degraded air in Newport will continue to be noticeable, especially during the summer when traffic counts are high.
Air quality problems can be reported via two paths. Reports of air quality problems can be made during nominal working hours to Newport's Zoning Enforcement Office, which then initiates an investigation. If the police are called, they will initiate the investigation under the code of nuisances. The City ordinances address air quality as it applies to visible particulate (dust, dirt, fly ash, and smoke) and odiferous elements, excluding manure and other fertilizers, apply. There is no apparent provision to legally pursue abatement of the smell from the preparation of restaurant foods. City ordinances do not formally delineate the responsibility for the immediate response to determine an unknown material's toxicity. A spill resulting from a transportation accident is an example of the origin of an unknown material. Further, there is no existing local ordinance by which the City could demand the elimination of residential wood and coal burning in a high pollution air quality emergency situation.
Air quality is not addressed as an outside and inside issue. The existing Newport ordinance infers that it excludes indoor air pollution concerns. The recent wave of "no smoking" policies established by local companies and businesses in an effort to improve inside air quality is to be applauded.
Related to air quality is the issue of electric radiation fields associated with high-tension wires. Besides being a visual eyesore, poles and wires are easily downed by wind, ice, and snow storms. A systematic program for putting all lines underground throughout the City would be desirable from many perspectives.

Newport: Noise Pollution

Newport is not an industrial city and, therefore, does not generate the sounds of manufacturing. However, because of the limited land resources, businesses do closely border residential areas, especially in "mixed use" areas. Mixed use areas are zoned areas where retail stores and residences coexist. Certain business activities do generate, at times, excessive sounds that overflow into residential homes. The major complaints in mixed-use areas stem from loud noises associated with bars and restaurants that play music and/or attract loud customers. Because of the mixed-use zoning and compact nature of the City, residents are also subjected to the sounds of vehicular traffic. City Ordinance Chapter 8.12 thoroughly defines noise and describes the means to measure it as well as the acceptable sound limits and associated time of day (as applicable). All zones have established sound limits for specific times during the day. The Zoning Ordinance also references "noise" as a performance standard. The Police Department and Zoning Division are responsible for enforcing noise abatement.

Newport: Space and Facilities

Real estate speculation, an expanding tourist economy, and subsequent increased property values, as well as stricter enforcement of fire and building safety codes, have contributed to a shortage of affordable and physically adequate facilities for the creative and performing arts. Humanities agencies also need permanent locations to carry out long-range plans for expanding programs and events. Even with the current decline in the real estate market, many properties are still outside of the financial reach of individual artists and small cultural organizations. More attention needs to be given to this issue to ensure that adequate and reasonably priced spaces are available for use by individuals and organizations. Over the past year, The Rhode Island Shakespeare Theater (TRIST) Board representatives surveyed other arts and cultural groups in the City regarding their performance space needs. The survey indicated that there would be constant demand by these groups for a facility with two arenas: (1) a theater or "black box", seating 110 people and equipped with an adequate audiovisual system for slides, films, and lectures, in addition to arts performance; and (2) a broader stage suitable for dance, with acoustics appropriate for musical performance and with seating for 200-250 people. The survey responses again indicated that such a dual facility would attract a "saturated, year round use." Cooperative unions and public/private partnerships with access to facilities and funding should be encouraged to provide some relief from the current shortage of adequate facilities. For example, Newport Historical Society and St. George's School have provided temporary homes for TRIST. Salve Regina University was the recent setting for the Newport Historical Society's winter lecture series, and Preservation Society properties have long been the central sites for the Newport Music Festival concerts. The City, too, could contribute to this process by exploring the sale, lease, or rental of vacant public buildings for use as artists' studios or as performance arts space. The Annory, John Clarke School, the Rotunda, and, eventually, Thompson Junior High School are other properties that should be examined for possible conversions.

Newport: Visitors

The transportation system often becomes overwhelmed during the summer months when substantial additional vehicular demand is placed upon Newport's circulation system. Recent estimates place the level of visitor traffic at over three million visitors annually, the majority of which arrive in private automobiles. Much of the traffic in downtown Newport during the summer months is generated by motorists trying to get to the mansions, Ocean Drive, and the beaches. The current sign age system, particularly for traffic coming off the Newport Bridge, now directs all Newport-bound traffic through the downtown area. The traffic and parking study of 2001 makes some recommendation to address the routing of southbound traffic. This seasonal surge in traffic places extraordinary pressures upon the limited system as visitors and residents compete for limited space, both on the road as well as in terms of parking. The demands on the circulation system during the summer months far exceed the system's capacity. Three traffic management sub-systems comprise the circulation system: the local street network, sign age, and the location and availability of on-street parking. Tourist traffic concerns are exacerbated when any of these systems is inadequate or fails to perform as expected. Newport must be willing to enact creative strategies that may be only seasonal in nature. Congestion and lack of parking are the main concerns relating to tourism. Much of Newport's economy, however, is tourist based, so it would be counterproductive to enact strategies that limit tourist visits to the community. However, strategies can be designed to reduce the demand and need for visitor automobile traffic in and around Newport, e.g. encouraging alternative transport. Newport must take a creative and supportive role to strategies aimed at reducing visitor traffic in the downtown area and increase use of alternate transportation systems. However, the City's primary responsibilities are to its citizens. The NCCVB should take direct responsibility for coordinating the various tourist operators, including the Preservation Society. This group must be responsible for developing and funding, if necessary, some alternate transportation modes, such as shuttle buses, between the various tourist attractions. All alternate transportation should be linked with the Gateway Center to provide a central transportation clearinghouse for visitors.

Newport: Water Transportation

Water transportation is an integral part of any seaside community. Newport has a rich nautical history. The City by the Sea is perhaps most famous for its history in hosting the America's Cup races.

It is estimated that approximately 1800 private boats are moored or docked in Newport during the boating season. For those who do not own a boat, private services include harbor tours, boat rentals and charters and launch services. Launch services are regulated by the PUC. In addition, Old Port Marine is now operating a harbor taxi service.

In 1999 RIPTA introduced the Providence-Newport water ferry service. The service has been scheduled to run as a pilot program. The success of this route and the revenue generated will determine if more ferries will be funded for the route. Two persistent criticisms of the ferry service have been the infrequency of stops inadequate to promote commuter service, and the relatively late hour in which service initiates. With RIDOT funds the Perotti Park Marine Terminal now serves as the Harbor Master's Offices and the point of embarkation for the RIPTA ferry service. The City has secured funding to begin the development of a Harbor Shuttle program. Additional funding is being sought to fully develop a workable system.

Newport: Parking

Few public policy debates generate as much controversy as parking. The problems of parking are complex and the solutions elusive. Similar to the issue of vehicular congestion, parking problems reach a peak during the summer months. In order to reach a workable solution, a balance must be found among demand, costs, and minimizing the negative impacts of providing sufficient parking.

The most recent parking and circulation study of 2001 has made numerous recommendations to address circulation issues. However, some study recommendations require politically difficult decisions while others may be impractical and still other recommendations may be applied on a trial basis. An important relationship exists between a community's parking program, the transportation network, and the use of alternative transportation systems. Newport's parking program must be viewed comprehensively in order to meet the needs of residents, visitors, and businesses. Parking decisions made without concern as to repercussions upon other areas of the community will result in exacerbating the problems.

Parking is one of the most severe areas of conflict in urban areas, particularly as people encroach into residential neighborhoods seeking free, long-term parking spaces. The conflict derives of a common aversion to paid parking. However, the conflict may be minimized through increased enforcement as a disincentive and provision of easily accessible off-street parking areas as an incentive. The intensity of vehicular activity in Newport during peak periods, in conjunction with the tight grid-type street network, requires a carefully coordinated and implemented parking program. Conflicts arising from visitor and business parking requirements need to be minimized. Residents are defined herein as those people whose cars are registered in Newport, with the assumption that those who pay property taxes on their vehicles in Newport should have priority for on-street parking.

Newport: Development

Commercial development has significantly increased parking demands and traffic congestion. Development has taken place on land that had been previously used for parking. Parking requirements have been varied or eased, but there has been no replacement of the lost spaces. Continued development will place additional burdens on parking and traffic systems. Efforts to mitigate the negative effects of future development should be considered in the development review process of any project. All new development projects should be required to submit traffic and parking impact study. The scale of the project should be such that the projected traffic and parking demands generated by the proposal should not exceed allowable capacity. Alternatively, Newport could require that a developer pay an impact fee for road improvements or the development of parking facilities. Newport is a dense city, with little available space for new development projects. The demand for new roadways in the community is expected to grow with increasing numbers of visitors. There are few areas in Newport where new, or expanded, roads could be constructed without substantially altering the social fabric of that area.

There are strategically located parcels now used for parking that may be favored sites for future development, and that new building can contribute to the economic health of the City. The City should recognize that parking lots may not be a desirable land use in the city, but their elimination requires that alternatives be identified before the transition takes place. Also of concern is the in fill development on undersized lots in Newport and the additional development that is allowed by right in the R-IO zones. These areas are already among the most densely developed in the City. Additional development as allowed under the existing zoning ordinance will result in intensifying parking problems in these already congested neighborhoods. The level of permitted development in these areas needs to be reevaluated. Zoning regulations act as a safety net by ensuring that development provides an acceptable level of parking. However, parking regulations can prevent approval of projects with economic merit. Newport needs to work creatively to provide alternative solutions to parking for some developments.

Newport: Codes

Commercial:
The future commercial land use is generally located in areas with adequate transportation, primary automobile, and where there is adequate lot size to accommodate medium to large commercial establishments. Specific uses within the commercial area would include retail, shopping centers, offices, research facilities, technology centers, guest facilities, restaurants, and other similar uses. The area in the North End contains the largest portion of future commercial area. The established zoning in the North End (Commercial/Industrial) also allows industrial uses, however industrial uses are not proposed or likely to occur given the nature of the community and its economy.

Institutional:
The future institutional land use consists of uses such as schools, universities and colleges, governmental functions (local, state, and federal), hospitals, cemeteries, and non-profit community organizations. Institutional land uses in the future will continue to be located throughout Newport.

Mixed Use Waterfront:
The future mixed-use waterfront land use parallels the western side of Thames Street. This is also the eastern side of Newport Harbor. Mixed-uses currently exist there and they are promoted for the future. Uses including housing, retail, offices, restaurants, boat building and repair, fish and seafood receiving, handling, and shipping are all promoted in a mixed environment in this area with small lot sizes. Often housing and/or offices are on second or third floors with more intensive uses, such as retail or restaurants, located on the street level.

Commercial
Minimum lot size 10,000
Minimum width 100’
Maximum percent land use 50%
Front set back 25’
Rear Setback 20’
Side set back 20’
Max height 60’

Mixed Use Waterfront
Minimum lot size 10,000
Minimum width 80’
Maximum percent land use 40%
Front set back 0’
Rear Setback 5’
Side set back 5’
Max height 45’ above mean sea level

ALL NEW Encourage compatibility of new Enlarge Newport's Historic
DEVELOPMENT OR construction or redevelopment District area.

REDEVELOPMENT with the existing scale and MAINTAIN character of surrounding Create Zoning Design standards. COMPLIMENTARY SCALE, properties. S-T,A,R BUILDING MATERIALS, AND DIMENSIONAL PATTERS OF NEWPORT'S HISTORIC CHARACTER

PROTECT THE QUALITY OF THE WATER IN THE HARBOR

Continue to provide harbor side pump-out facilities for boat wastes. Provide convenient facilities for boats to unload trash, garbage, and recyclables. Maintain Newport Harbor municipal trash drop-off points on docks or barges with trash containers that boats can easily access. Maintain Newport Harbor. Clean City Coordinator and Trash Contractor. Acquire a water-borne refuse sweeper for cleaning the Harbor.

ENCOURAGE NON-PROFIT ORGANIZATIONS TO ADOPT, ENHANCE, AND
OPERATE CITY-OWNED WHARVES AND OTHER WATERFRONT PROPERTIES
FOR THE BENEFIT OF THE CITIZENS OF NEWPORT

Create a program to encourage interested civic non-profit organizations to "adopt" public waterfront areas and utilize them in accordance with the goals and policies of the Comprehensive Land Use Plan. Work through Waterfront Commission. Establish rules and regulations govern non-profit group management, operation, and improvements to City waterfront property for the benefit of the citizens of Newport.

EXPAND THE CITY'S ROLE TO INITIATE, PROMOTE, AND FACILITATE
EVENTS AND ACTIVITIES THAT CAPITALIZE UPON NEWPORT'S ASSETS AND
HERITAGE

Actively encourage ongoing coordination of heritage tourism as needed.

Developing a more coordinated promotional/marketing strategy between the City, Newport County Convention and Visitors Bureau, the Newport County Chamber of Commerce, and the Newport Cultural Commission. Encourage the expansion of year-round program at the City's cultural attractions. Continue to focus on NCCVB, NCCC, City, Newport's natural and others historic assets, economic development marketing programs. Encourage tourist city and NCCVB activities aimed at maximizing benefits to people of all ages as well as to reorient tourism's public image away from bars and night life. Encourage new Zoning museums and/or L-A,R attractions that focus on educational or interactive exhibits suited for young people as well as adults.

PLACE A HIGH PRIORITY ON BRINGING VISITORS TO NEWPORT IN THE OFF
SEASON

Continue off-season and "shoulder" season convention marketing efforts by the NCCVB.

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