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**Master of
Architecture**
in Architecture

Approved:

Jaen Holt, Chairman

Susan Piedmont-Palladino

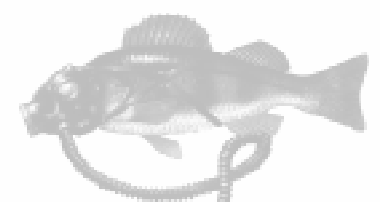
Joseph Wheeler

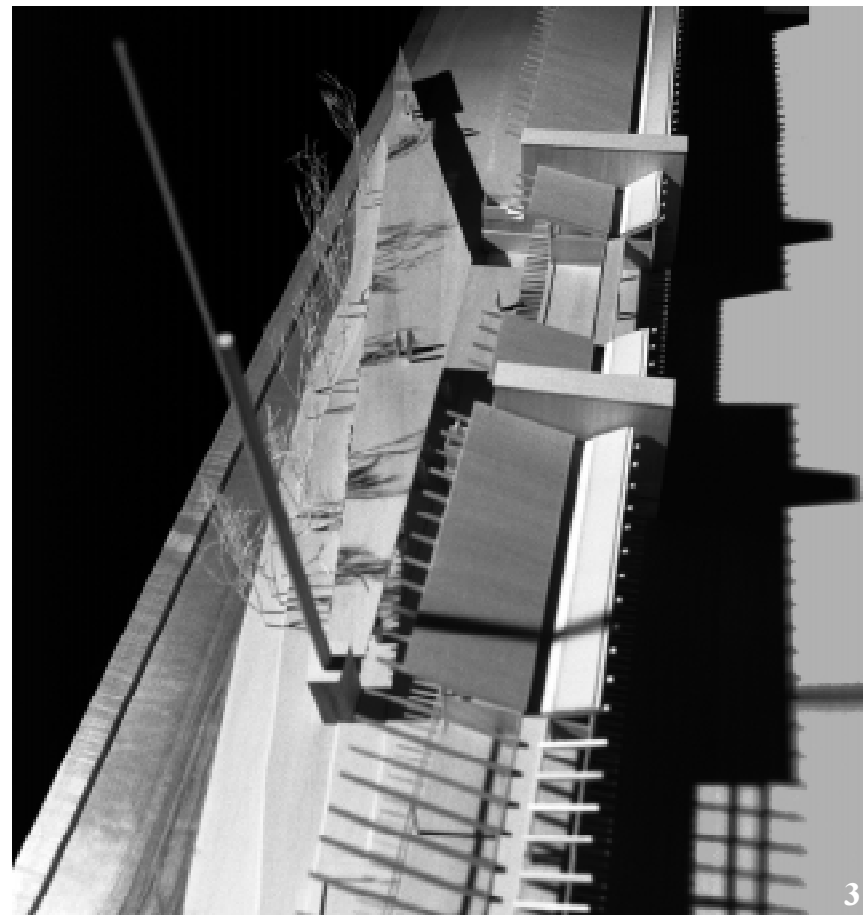
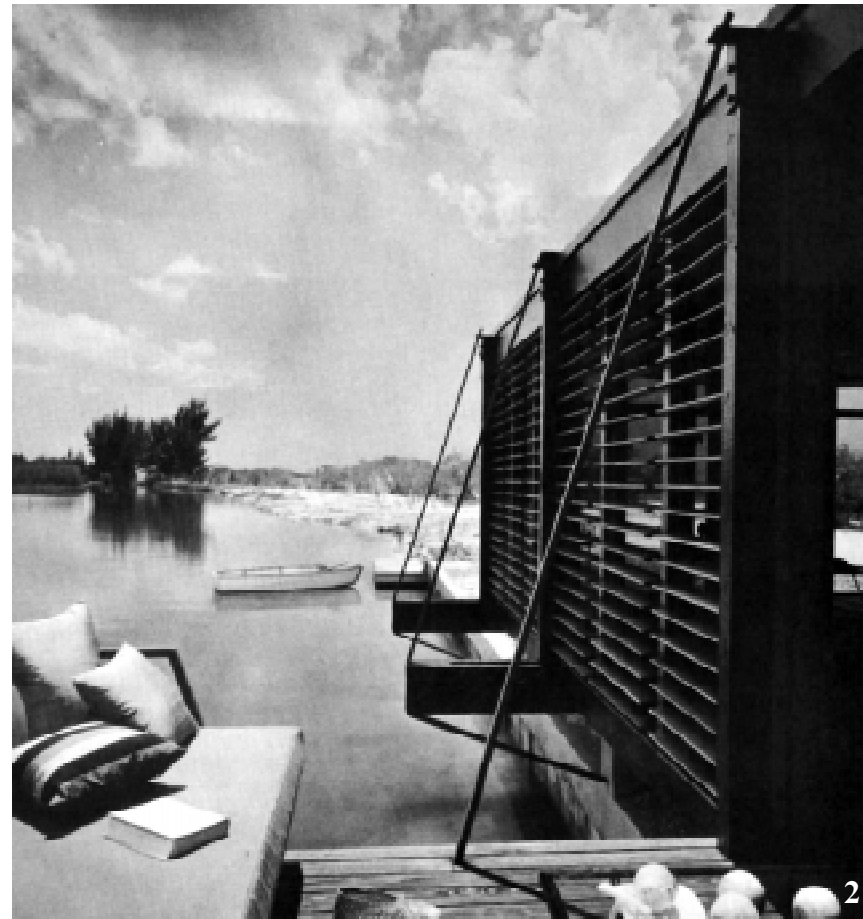
Dr. Maurice Lynch

February 1997
Alexandria, Virginia

Designing for the Waterfront
An Estuarine Research Reserve on Jones Point

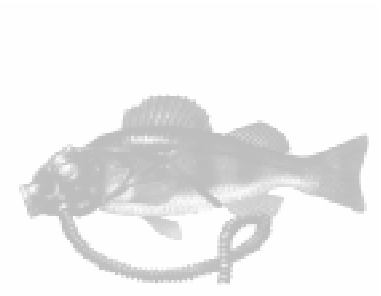
by Kevin M. Smith





Abstract

Due to our love of the waterfront, almost half of the United States population now lives in coastal areas, including shores of estuaries. Unfortunately, this increasing concentration of people upsets the balance of ecosystems. My thesis project, *Designing for the Waterfront- An Estuarine Research Reserve on Jones Point* is about setting an example, setting a precedent for building on the waterfront. I have attempted to design an environmentally responsive and sensitive research center that will not only monitor and study the Potomac estuary, but will also serve as an example of how one should build on the estuary.



Acknowledgements

Jaan Holt, for giving me the opportunity to make this thesis project a dream come true. You have given me a new appreciation for architecture; **Joseph Wheeler**, for being my mentor and friend to the end; **Susan Piedmont-Palladino**, for keeping me focused on what was important and for not giving up on me; **Dr. Maurice Lynch**, for volunteering your time and keeping me in touch with estuarine-related issues; **Gregory Hunt**, for giving me the inspiration to pursue this project; **Ron Kagawa**, for your site and fly-fishing expertise; **Eric Jenkins**, for your support and insight in the waning hours; **Maryellen Dore** and **Gary Lytton**, for sharing your knowledge of the estuary with me; **David Benninghoff**, for being the best roommate and friend there is; **R. David Chambers**, for your help with the computer renderings; **Richard Lucente** and **Rick Jones**, for your voluntary help with my thesis model; **Yuri Nizhnikovich**, for your plotting help and for being a great companion during the endless hours in the model lab; and **Michael Burton**, for all your help on my book and the main entry deck; **Tim Mount**, for your black slate desk crits and photography help; **Mark Little** and **Michael Licht**, for setting a good example to follow; **John W. Calvin**, for giving me the opportunity to grow and pursue my dream of becoming an architect; **the Marold family**, for treating me like family from the moment I met you; **Bob & Patti Webster**, for giving me an early introduction to architecture and love for the environment. Thank you all.

Kevin

This book is dedicated to my mother and father, my three sisters (Kathleen, Maryellen, and Shawna), my grandfather, and to the memory of my grandmother, who have always given me the support, encouragement, and love that has helped me overcome all obstacles. I also dedicate this book to my wife, Christina. Your seven years of patience, understanding, and undying love gave me the courage and strength that kept me going through the most difficult of times. I love you ...

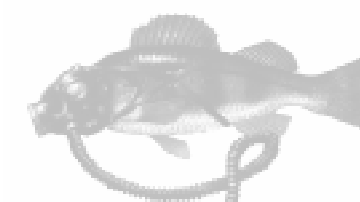
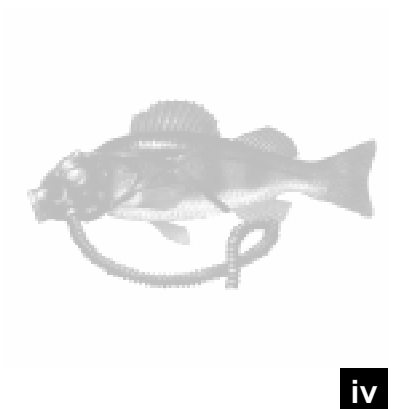


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New Beginnings

As I sit upon the steps of the Jones Point lighthouse, I look back to my beginnings. Just as the Fairfax Stone serves as the source for the entire Potomac River, my communion with the Alexandria waterfront can be looked at as my beginning- my source of inspiration. During my four years of study here at WAAC (Washington-Alexandria Architecture Consortium), I have spent countless hours along the Potomac River and its tributaries. Whether jogging around Jones Point, fly fishing in the Shenandoah River, reading in Founder's Park, or just roaming up and down South Union Street from the Torpedo Factory to the Ford Plant, I constantly find myself searching for new ways to enjoy or explore the water's edge. There are a multitude of images and events that evoke such feelings and emotions; that critical moment where the land merges with the water, or the ever-changing topography of the shoreline; the rhythmic repetition of the piles that dot the various marinas and coves, or the sense of linearity that they create; the serenity of standing off of the Potomac River and watching the sun come up to start the day; sitting on these steps of the lighthouse looking out across the farthest reaches of the Potomac where it eventually runs out into the Chesapeake Bay; the pure joy of discovery, such as the time when I stumbled upon the original boundary marker for the District of Columbia entombed in the breaker wall of the lighthouse; paddling a canoe amongst the piles of Ford Marina and around the perimeter of Jones Point. These are just a few experiences that helped give birth to my thesis project: *Designing for the Water's Edge- An Estuarine Research Reserve on Jones Point*.

Intentions...

Why design an estuarine research reserve? Why design it on Jones Point? These are questions that need to be answered in order to shed light on how I became involved in this project. Under the guidance of my original thesis committee chairman, Gregory Hunt, I was told to venture beyond the limits of the waterfront that I had familiarized myself with during my undergraduate studies. This led me to Jones Point- a site that is home to the Jones Point Lighthouse, one of the earliest lighthouses built on land in the United States, and the origin point for the District of Columbia's ten-square-mile grid. Trying very hard to get past the intriguing character of the site and the lighthouse that resided upon it, I looked beyond Jones Point out into

the Potomac River. From a distance, the Potomac looks like a very soothing body of water in contrast to the hard edges of the city in the background. A closer look paints a more disturbing picture- a murky, polluted river marked by dead fish and aquatic vegetation, trash, and signs prohibiting fishing and swimming. This experience gave me the idea to design a research center dedicated to helping clean up the Potomac River. This was a start, although I needed to be a bit more specific.



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The Potomac River

Potomac, Patowomike, Patowomek, or in any of its historically spelled forms is the Algonkin word for "something brought" or more freely "place to which tribute is brought", singularly appropriate for the present day location of our national capital. When explored by Captain John Smith in 1608 the river abounded in fish, the surrounding lands with game and the crude agriculture of the indigenous Indian tribes had little impact on the environment. The upper estuary was developed rapidly as a

shipping center from colonial times. Alexandria was then a bustling seaport, with ocean-going ships docked as far upstream as Bladensburg on the Anacostia and Georgetown on the Potomac River. The area was intimately involved in the history of the nation, the westward expansion, the Civil War, and the subsequent reconstruction and development of a strong national government in Washington D.C.

Geography

The historic source of the Potomac River is the Fairfax Stone at the headwaters of the North Branch in the rugged, forested Allegheny Mountains of the Appalachian chain at the Maryland-West Virginia border. The river flows first northeasterly, then southeasterly through several geophysical provinces some 400 miles to the Chesapeake Bay. Upon reading Ian McHarg's *Design With Nature*, I discovered that from source to ocean, the Potomac transects six physiographic regions from the

Allegheny Plateau to the Ridge & Valley Province, thence the Great Valley, Blue Ridge and Piedmont, and, finally, to its estuary in the Coastal Plain.

Water Quality

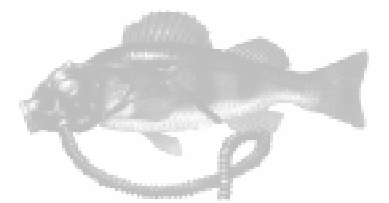
It was recorded that President Adams swam in the Potomac in the late 1790's, but by the 1860's the canals leading to the river often emitted such objectionable sewage odors that President Lincoln was forced to leave the White House at night. Following the generally accepted practice of that time, the first sewers constructed in 1870 carried sanitary wastes to the river. With the rapid population growth in Washington following the Civil War, river conditions became so bad that under President Harrison, a system was devised to convey all sewage into the Potomac downstream from the city. By 1920 the need for sewage treatment was recognized, but it was not until 1938 that a plant providing primary or settling type sewage treatment only was completed. While the efficiency of treatment by conventional methods has since been increased, more and more people are looking to build closer to the water. Water quality in the area will continue to deteriorate unless use, occupancy, and other restrictive measures are taken. Such measures may bring about ways of building environmentally sensitive, responsive, and "greener" architecture on the waterfront. Pollution in the upper river basin, while significant, is largely local and has only a minor role in polluting the estuary.

The Estuary

What is an estuary? Most definitions of the word estuary do not reflect the uniqueness of these bodies of water as habitats for living things. By definition, an estuary is where the mouth of a river meets the arm of the sea. Shallow basins within estuaries are warmed by the sun, and organic and mineral sediments in the waters are constantly mixed by ocean tides and currents. The results are fertile arms of the sea that provide food for an immense number of plants and animals either directly or indirectly through a complex food chain. This definition gave me an understanding of what an estuary was, but didn't really give me any clues about approaching the design problem. I needed to look at past examples of estuarine research centers, if there were any at all. With the help of the Internet, I was able to conduct an extensive search for these specific centers. What I uncovered was an incredible source of digital information- the National Estuarine Research Reserve System.

NERRS

The Coastal Zone Management Act of 1972 authorized the establishment of "estuarine sanctuaries" to serve as field laboratories for the conduct of research and education related to enhancing coastal management. In 1985, Congress amended the CMZA, changing the name of the program to the National Estuarine Research Reserve System and increasing the research dimension of the program. Over the past two decades, approximately one new reserve has been designated per year. As of October 1, 1994, 22 reserves have been designated, placing nearly 425,000 acres of estuarine waters, wetlands, and uplands into active management and stewardship. In 1991, the NERR welcomed four Virginia sites into its fold. In the York River Basin, the sites of the Chesapeake Bay National Estuarine Research Reserve System in Virginia are the beginning of a system that will extend to the James, Rappahannock and Potomac rivers and the Eastern Shore. I was fortunate to have had the opportunity to visit three sites: Rookery Bay NERR (Florida), Chesapeake Bay NERR (Maryland), and the Chesapeake Bay NERR (Virginia).





Regional History

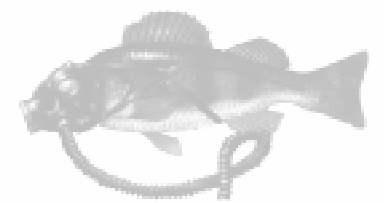
Jones Point Park, part of the National Park System, is a federally-owned tract of land located in the southeastern corner of the City of Alexandria. It is surrounded on three sides by the Potomac River. The park's location relative to Old Town and the river and the great variety of historic resources identifiable within its boundaries help establish its unique character. The park retains much of its natural charm with quiet wooded areas, open space, and a shoreline with a view of waterfront activities. The park is an important element in maintaining an overall natural shoreline in our nation's capital.

Historic Features

Jones Point Park is one of the most significant areas along the Alexandria Waterfront for historic resources. Its significance derives from the great variety of historic activities that occurred on Jones Point from which material remains appear above ground, or may be below ground. The special character of Jones Point Park is based upon its geographical location at the confluence of the Potomac River and Hunting Creek, its physical configuration of a boot-shape promontory jutting into the Potomac and its distance from the historic City of Alexandria.

Margaret Brent Memorial (1600-1671)

Margaret Brent, known as an enterprising champion of women's rights, has been called "the first feminist in Colonial America." On September 6, 1654, she received the first legal grant for a 700-acre tract of land which included the original 60-acre site of Alexandria. In 1979, the Mount Vernon Chapter of the Daughters of the American Revolution erected a memorial stone in her honor commemorating the first legal boundary designated in the area.





Regional History (cont.)

Federal City Boundary Marker (1791)

The Federal City Boundary Marker designated the southern terminus of the District of Columbia. From 1791 to 1846, Alexandria was known as Alexandria, D.C. and was included as part of the Federal City. This was the first marker stone to be put in place during the survey of 1791. George Washington authorized 39 other square marker stones to be placed around the 40 mile perimeter of the District of Columbia (one at every mile). The South Cornerstone, located in the seawall adjacent to the Lighthouse, is constantly threatened by erosion from the river.

Jones Point Lighthouse (1855)

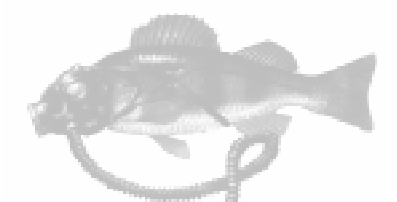
The Jones Point Lighthouse is the oldest inland waterway lighthouse in the United States. This nineteenth century lighthouse is a one and one-half story frame structure located on the southern shore of the Potomac River. It stands as an important historic monument because it protected shipping to and from the ports of Alexandria, Georgetown, and Washington for 70 years from 1856 to 1926.

Virginia Shipbuilding Corporation Shipyard (ca, 1912-1921)

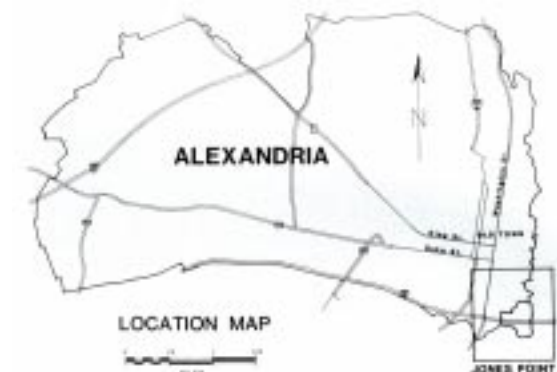
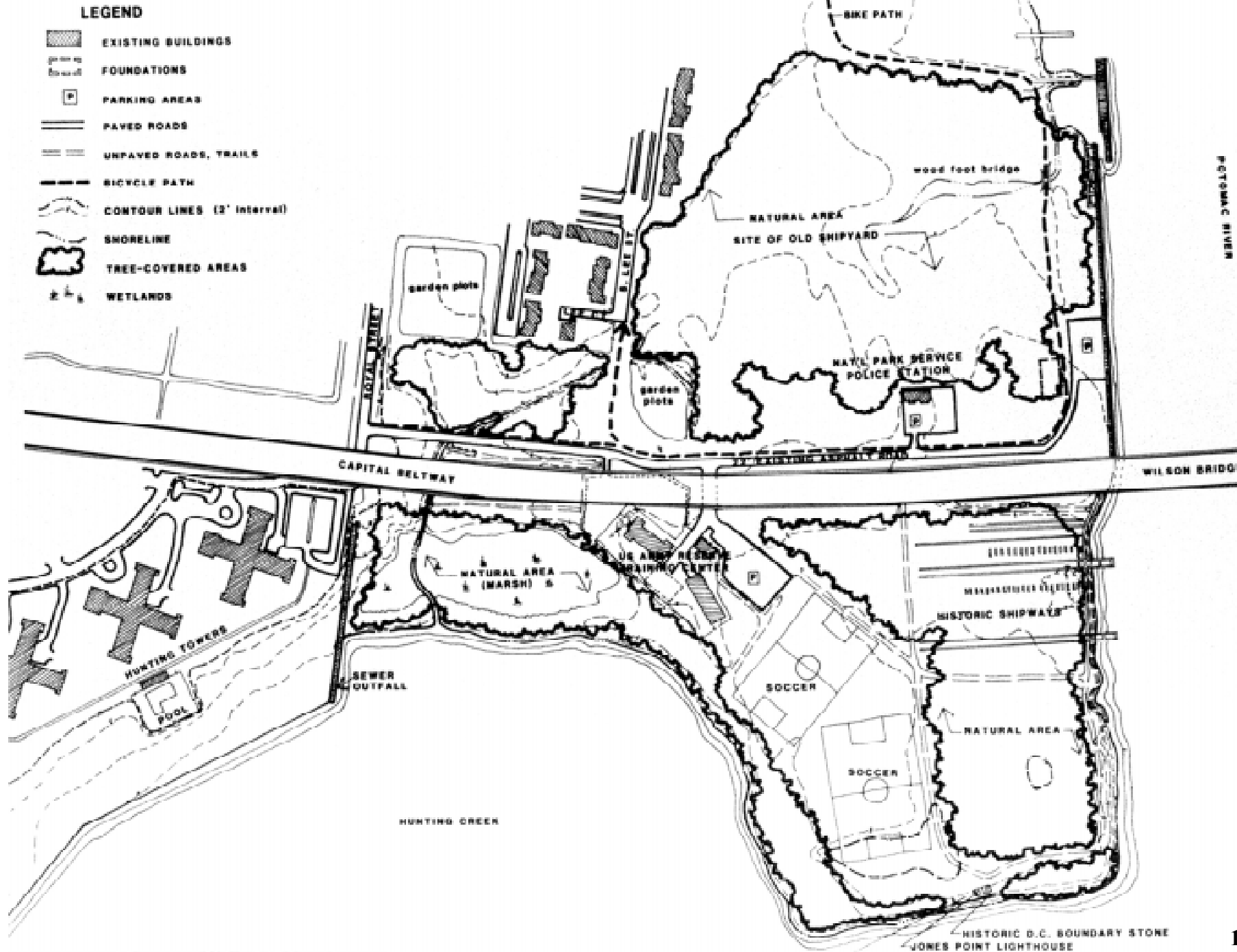
The Virginia Shipbuilding Corporation of New York City obtained a government contract for construction of 12 metal-hulled warships for World War I. A large shipyard with 4 slips or ways was built in Alexandria between the Franklin Street pier and the Jones Point Lighthouse. The shipyard was torn down shortly after the war, but the remains are still visible.

Light Tower (1926)

A 60-foot steel light tower was constructed on Jones Point in 1926. The light on the light tower was twice as high as the light on the Lighthouse and could be seen from a distance of thirteen miles. The light tower was torn down in the 1930's, however the concrete foundation is still visible.



JONES POINT EXISTING CONDITIONS



Topography

Jones Point Park is located in the 100 year flood plain. Most of the site is low-lying and almost flat. The lowest elevation on the site is in the area just north of the Woodrow Wilson Bridge. Elevation varies from 2.6 to 11.5 feet above sea level. Average elevation is six feet.

Shoreline

Approximately fifty percent of the shoreline at Jones Point has been stabilized with bulkhead or riprap. Bulkhead has been used adjacent to the Jones Point Lighthouse and in the area north of the Woodrow Wilson Bridge. Riprap has been used immediately south of the bridge and south of the Lighthouse. Much of the bulkhead is in disrepair. The remainder of the shoreline is in its natural state.

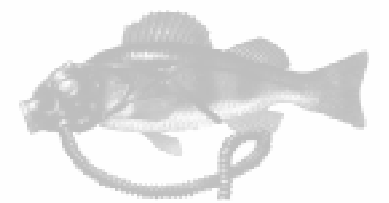
Air Quality

Vehicular traffic on the Woodrow Wilson Bridge which carries Interstate 95 over part of Jones Point Park, is the most significant source of air pollution in the immediate area. Major pollutants associated with gasoline powered vehicles are carbon monoxide, nitrogen oxide, and hydrocarbons. The impact of these pollutants on the park is greatly reduced by the elevation of the bridge over the park. A second source of air pollution in the park is generated by air traffic enroute to and from the Washington National Airport. The impact of this pollution on the park is negligible.

Water Quality

Growth in the mid-Basin region of the Potomac River during the twentieth century placed great burdens on the river for water supply and waste disposal. Dramatic improvements in the Potomac River water quality have occurred over the past decade. Scientific evidence shows us that eighty to ninety percent of the pollution from wastewater treatment has been removed from the river. The real proof, however, lies in the wide range of fish species that have returned to the river

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Site Analysis (cont.)

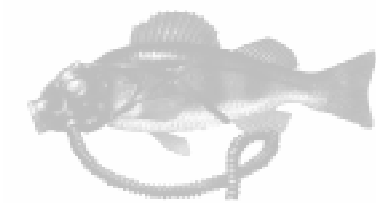
signifying improved water quality. A recent water quality survey of the Potomac in the Washington Metropolitan Area put the water quality in the fair to good range. However, the survey showed that the water quality in the Hunting Creek area around Jones Point to be in the poor range.

Wildlife and Fish

The park supports a variety of wildlife including domesticated species turned feral. Small mammals considered abundant are short-tailed shrew, eastern chipmunk, grey squirrel, white-footed mouse, and several species of rat. Larger animals include beaver, raccoon and opossum. Birds sighted in the area include morning dove, mocking bird, cardinal, goldfinch, bluejay, starling, crow, warbler, sparrow, gulls, terns, ducks, and several species of egrets and herons. Many kinds of migrating birds stop here. Reptiles found in the area include turtles and nonpoisonous snakes. Common freshwater fish found in this area of the Potomac River are carp, eel, pumpkinseed, and several species of catfish. In the spring, there are spawning runs of shad and perch.

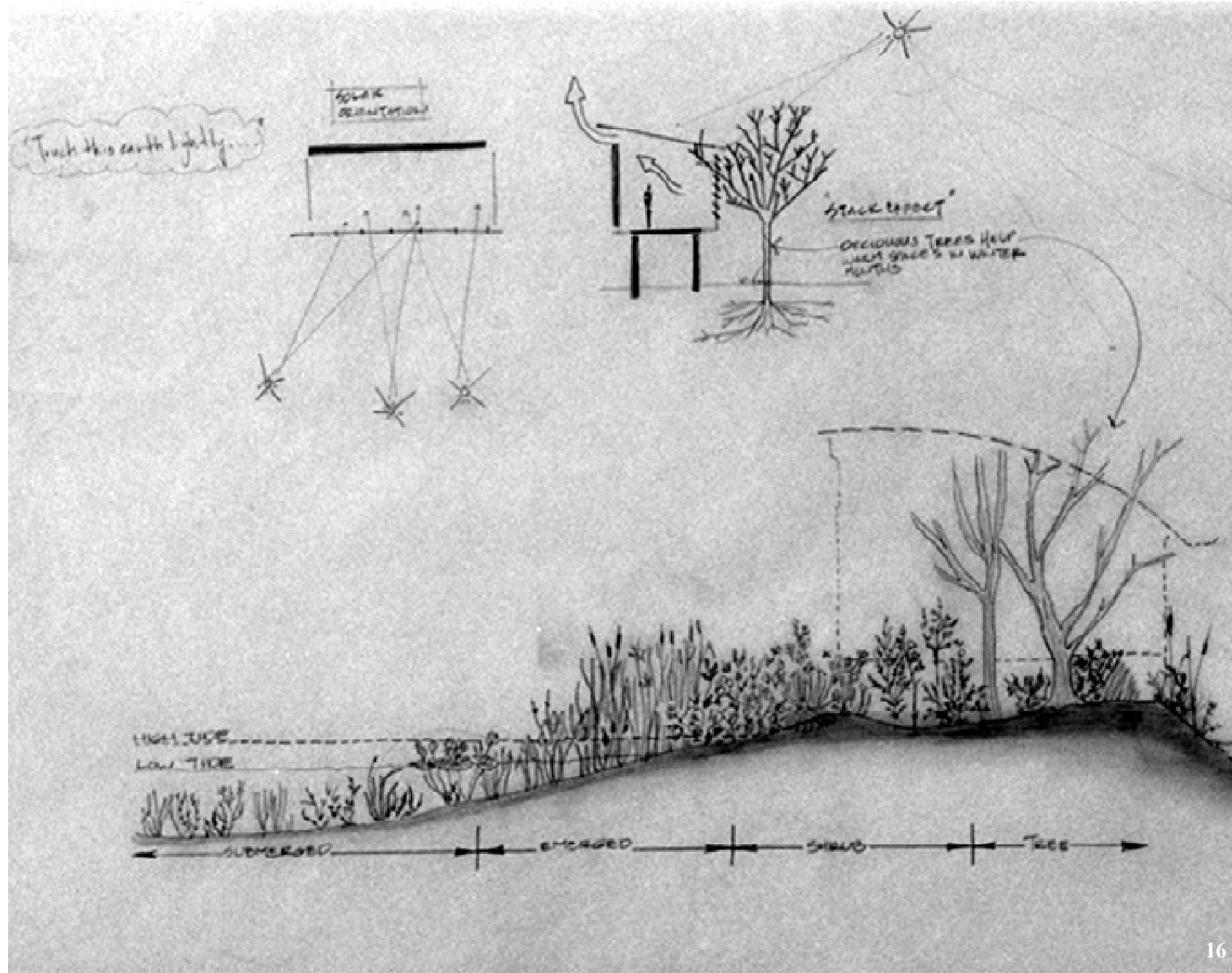
Vegetation

An inland shallow marsh, surrounded by a wooded area, is located in the north-central portion of the park. The marsh area is dominated by bulrushes, emergent grasses, reeds and rushes. A fringe marsh area borders Hunting Creek. It is dominated by narrow leaf cattail, reed, sedge, pickerel weed, and spatterdock. The marsh is a vital feeding habitat for many kinds of birds. A wooded area is located north of the Jones Point Lighthouse. Shrubs, vines, and herbaceous plants constitute the woodland understory. Dominant species include poison ivy, Virginia creeper, honey suckle, sumac, elderberry and blackberry. Dominant tree growth includes silver maple, black willow, American sycamore, red mulberry and tulip poplar.

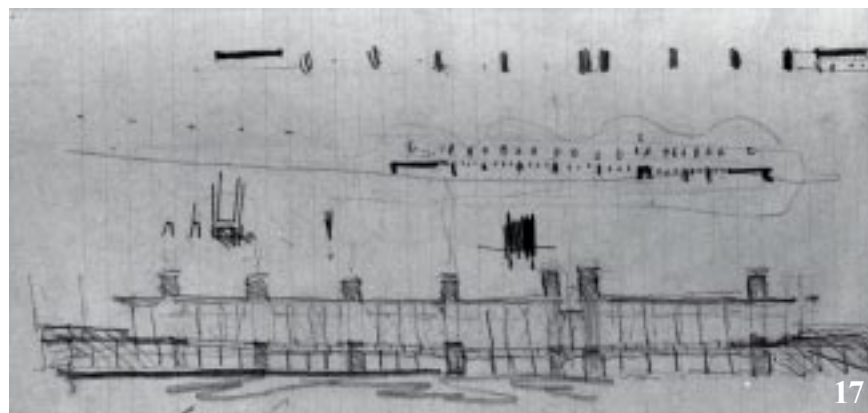


Conceptual Intent

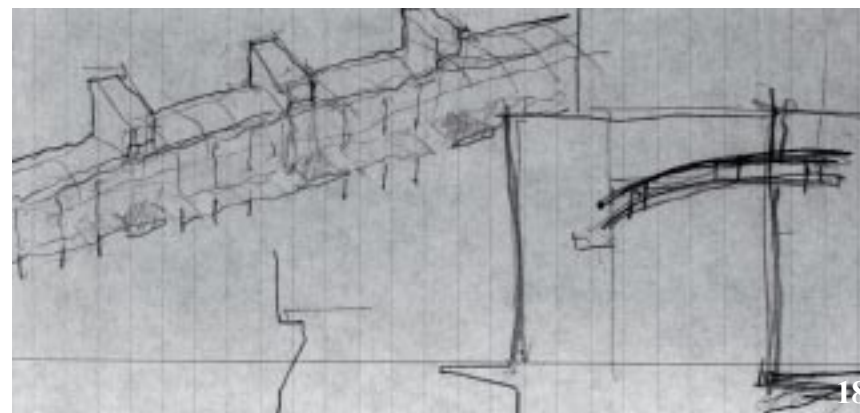
What role does the building play? The estuarine research reserve center on Jones Point is about setting an example, a precedent, for building on the waterfront. It is both a conceptual and a physical process of treating water and treating nature. It is about designing an environmentally responsive and sensitive building for the Potomac estuary. It is designed to play a part in heightening public awareness of estuarine-related problems and will help set an example of how to build on the water's edge. The architectural parti was quite simple- a linear axis that runs the entire length of the project. This line primarily serves as a dividing element between the serving and served areas in each of the component spaces. It also is the main circulation spine which collects pedestrians, service lines, and water. This line is terminated on both ends; the eastern end by a water storage silo and on the western end by a canoe launch. A public entry deck, the result of the elliptical carriage trail and the Jones Point lighthouse, bisects the meeting room/lecture hall and the visitor's center- the one moment where the rhythm and repetition is broken. Water is the central focus from beginning to end: from its origins in the water storage silo to its terminating point at the end of the canoe launch. This is the moment where cleansed water is given back to the estuary. Seeing water spilling into the Potomac off the end of the aqueduct, hearing it move over you as you walk along the interior corridor, feeling it splash into your hands as you stand on the end of the canoe launch, smelling the clean, filtered water in contrast to the silty, dirty Potomac water before your eyes. I wanted architecture to awaken the senses...to evoke the feelings and emotions I have experienced along the Alexandria waterfront.



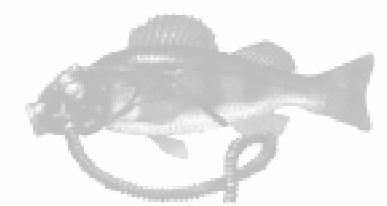
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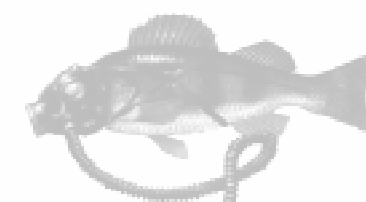
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Program

The estuarine research reserve facility on Jones Point has four main components: a visitor's center, a meeting room/lecture hall, administrative offices, and research laboratories. Each of these four areas contains a collector wall, which serves as a threshold between the entry and the areas in which the rooms reside. A water storage silo is located on the eastern end of the research reserve and helps mark the beginnings of the project both from land and from water. An angular wedge-like public entry deck juts out onto the shoreline and serves as a gathering place for people coming from the carriage trail or the Jones Point lighthouse. This public observation deck provides open, expansive views of the Potomac estuary and is looked upon as the gateway into the building. The most public of spaces are located directly off of this entry deck, with the visitor's center on the eastern side and the meeting room/lecture hall on the western side. Two smaller entry decks can be found along the linear building. The first secondary entry deck falls in between the western entrance of the meeting room and the eastern entrance of the administrative offices. The second of these two decks falls in between the western entrance of the administrative offices and the eastern entrance of the research laboratories. In addition to these secondary entry decks, there are two decks that fall on the end of the building: the deck on the extreme eastern end located off of the visitor's center and the deck on the extreme western end located off of the research laboratories. The last of the components is the canoe launch, which rides out into the cove and marks the ending of the project. This canoe launch is intended for private use by the researchers, but can also be used for canoe trips by students visiting the research reserve.



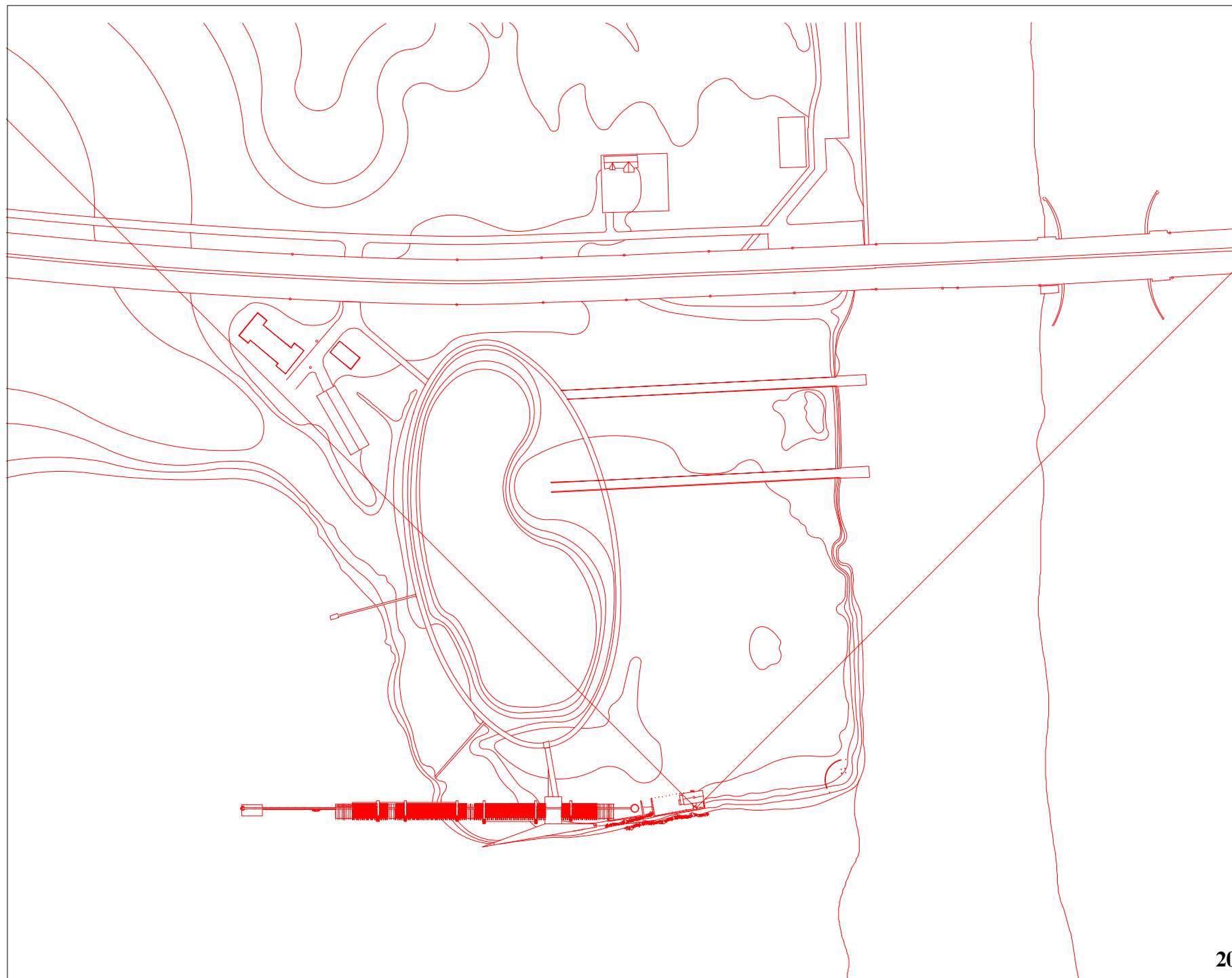
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Site Plan

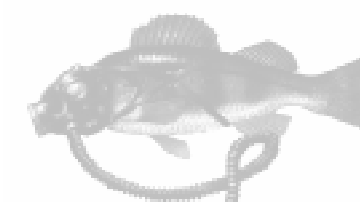
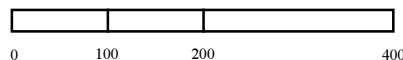
Architecture should remain in tune with the environment to ensure that the inhabitant is a part of the events around him
Glenn Murcutt

Existing conditions and features gave me clues as to how I would treat Jones Point Park. The open soccer field in the middle of the park and the existing tree line suggested that I create and sculpt an elliptical carriage trail on axis with the City of Alexandria and the Jones Point lighthouse. This trail would be made from a permeable material, preferably shells or gravel, and used by both motor vehicles and pedestrians. It would be a boundary between the maintained realm of the field and the rough, unkempt edge of the tree-lined shore. Public parking occurs underneath the Woodrow Wilson Bridge, while private parking spaces are made available to researchers and handicapped visitors closer to the building entrance. Walking or driving along this elliptical approach allows for the visitor to get a glimpse of the park and most importantly- the estuary, before reaching the public entrance. Sightlines and framed views/vistas were determinants in placing the ellipse and where new trees were to be planted/trimmed back. A typical scenario for experiencing the site on foot would include: (1) walking up to the ellipse and getting a first glimpse of the lighthouse in the distance, (2) the experience of walking out on the dock into the estuary, (3) being led into the entry path and ramping slightly up to the building onto the open public entry deck - the gateway of the project. Each area of historical significance was taken into account, such as trimming the existing trees back on the eastern end of the site to help frame views of the fishing piers and reinforce the remains of the concrete piers left over by the Virginia Shipbuilding Corporation. The lighthouse is to be left in its original condition, but can be accessed from the carriage trail.



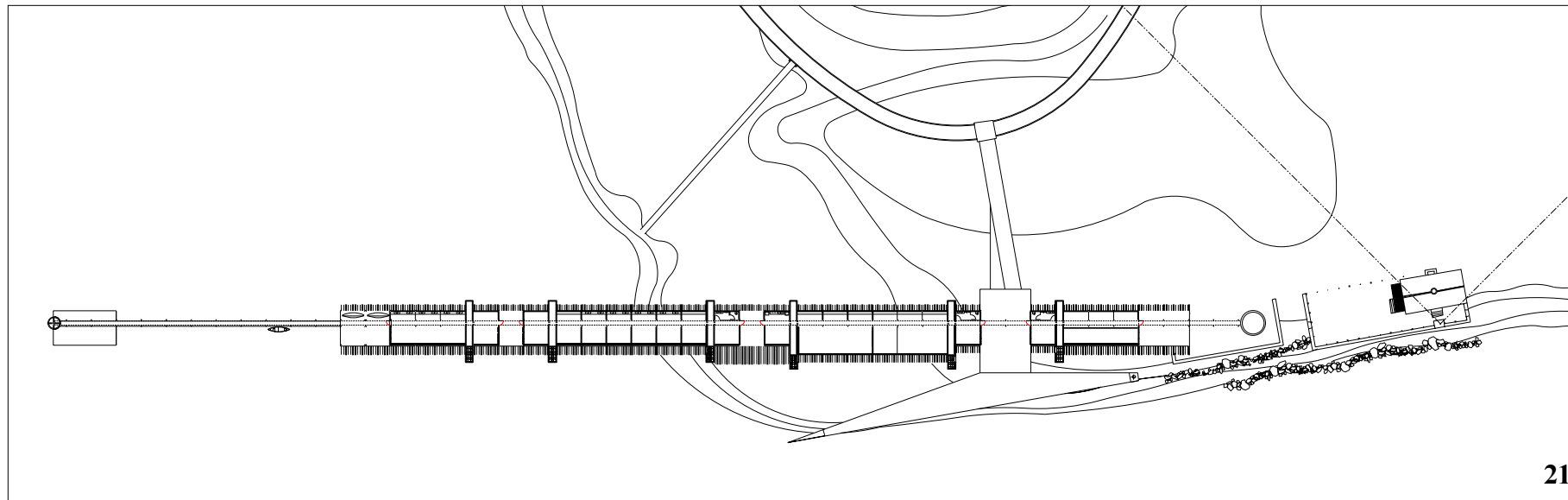
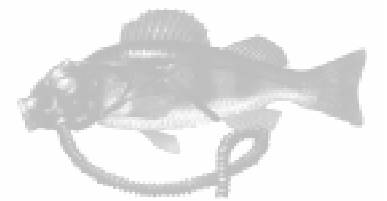
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Site Plan



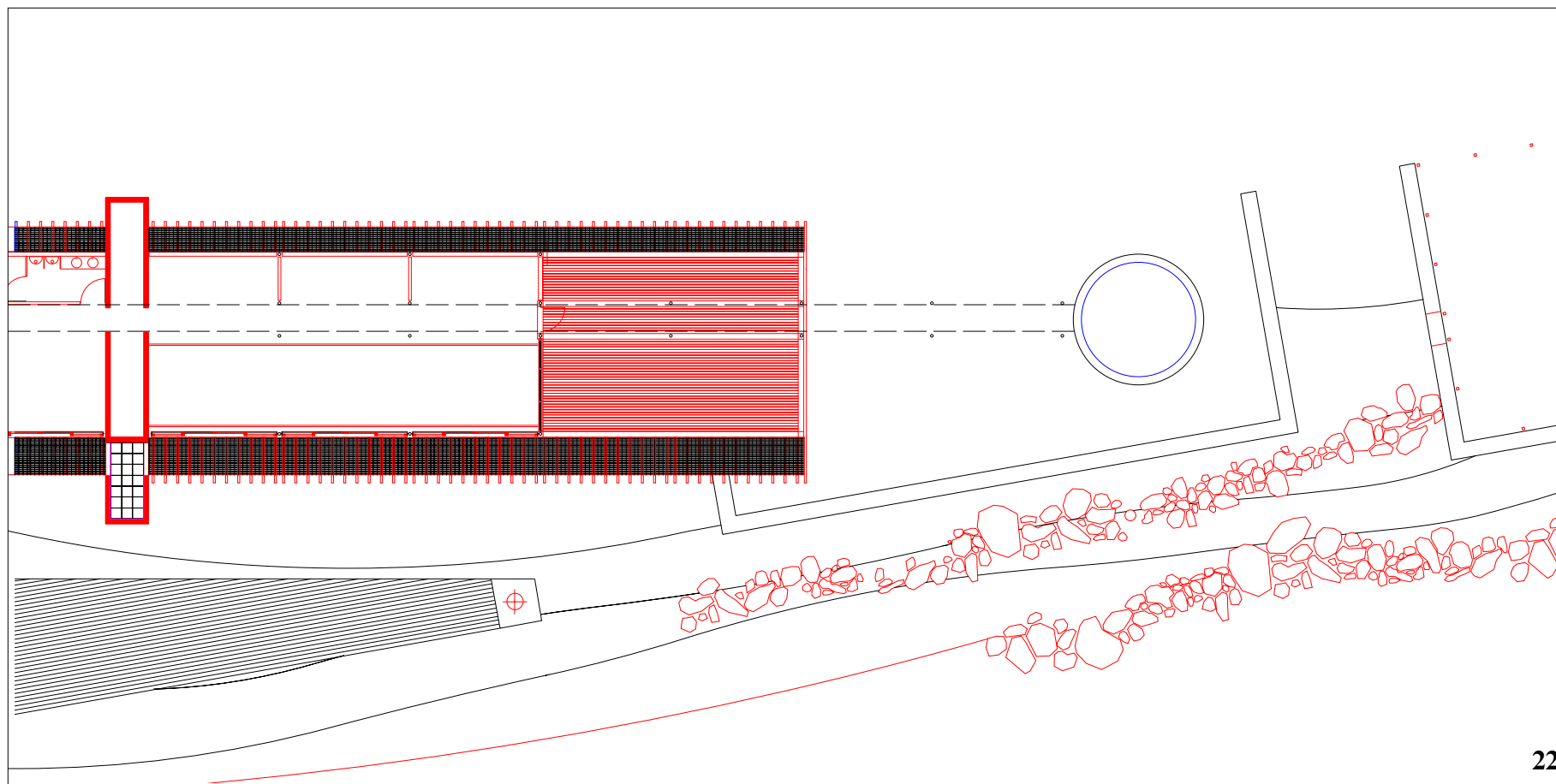
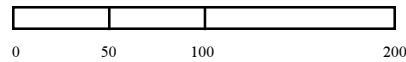
Floor Plan

The floor plan for the estuarine research reserve center on Jones Point sets up a dialogue for movement. It begins on land with the most public of spaces and ends in the water with the most private. This transition from public to private is further reinforced by the collector walls, which help divide the different zones along the length of the project. From the moment a visitor enters the research reserve and walks along the interior corridor, they are able to hear the soothing sound of water rushing overhead. This linear movement pertains to pedestrians, services, and water. In each of the component spaces, the interior corridor serves as a divider between the service spaces and the served spaces. This clarity in plan is carried through in section and elevation. The exterior circulation deck runs along the entire length of the southern side of the building and passes through small balconies provided by the collector walls. The moment of walking on a wooden deck to walking on a concrete surface occurs to reinforce the notion or idea of passing from one zone to another. The collector walls also serve as control points within the project, securing the public areas from the private areas when needed. The series of entry decks, or verandas, were influenced by the experience of sitting out on the steps of the Jones Point lighthouse and looking out across the Potomac. The repetition within the floor plan needed a area where there was some sort of hierarchy- a space in the building that could accommodate more people. It was decided that the meeting room/lecture hall had to extend in plan on the southern side. This achieves hierarchy in plan, section, elevation, and preserves the datum set up by the aqueduct along the entire length of the project. The repetitious nature of the plan also needed some variety within each of the component spaces. Interior partitions can be moved back and forth along tracks in each component space to provide the option of having the entire space for large events, or a variety of smaller spaces for classrooms or offices.



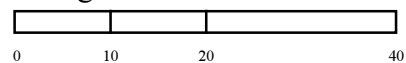
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Floor Plan



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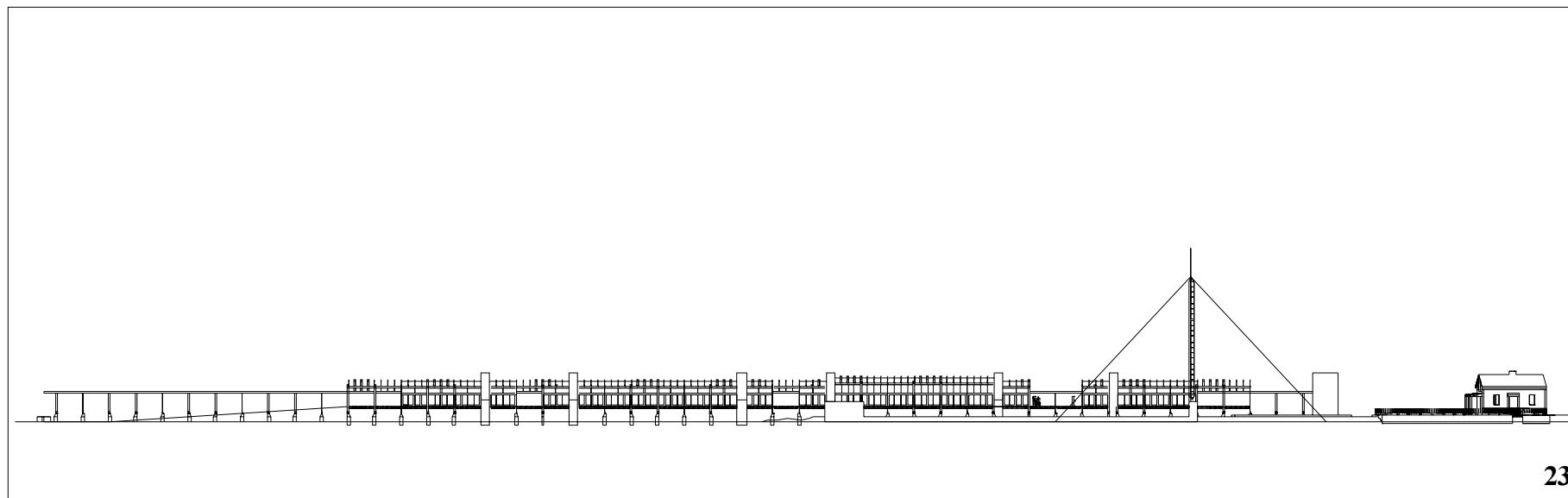
Enlarged Floor Plan



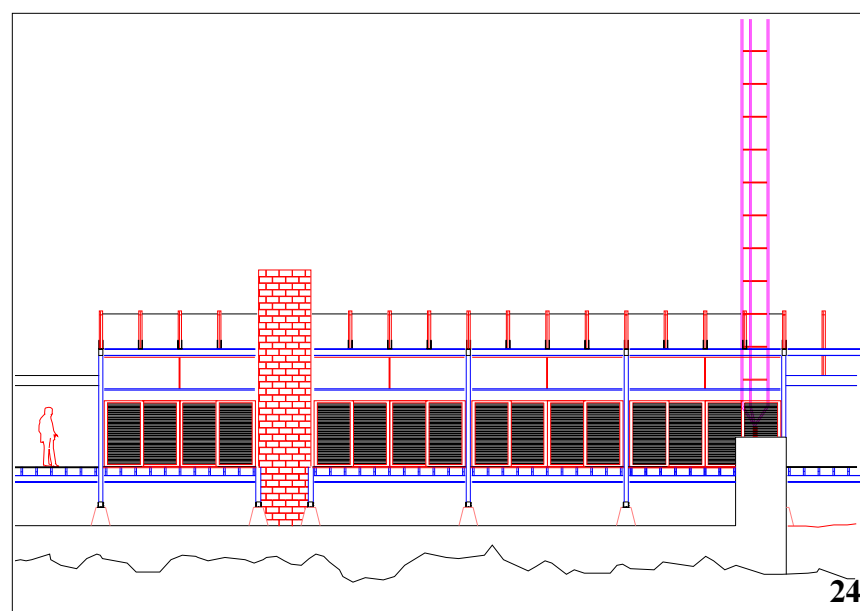
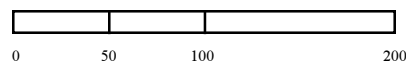
Elevations

Throughout the life of this project, one main idea that I held onto was to create a linear building- a long, slender pier that rode along the water's edge. This linearity is expressed with the introduction of the aqueduct. Not only does it represent movement from land to water, it sets up a datum. This continual datum splits the realm of the roof and the realm of the inhabitable spaces below. It was important to build at an elevation that would be safe, due to the fact that Jones Point Park is prone to serious flooding. The finished floor elevation throughout is 10'-0". It was desirable to keep the building at a residential scale in order to preserve the character of the Jones Point lighthouse. A rhythm has been established from beginning to end.

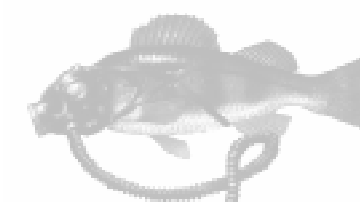
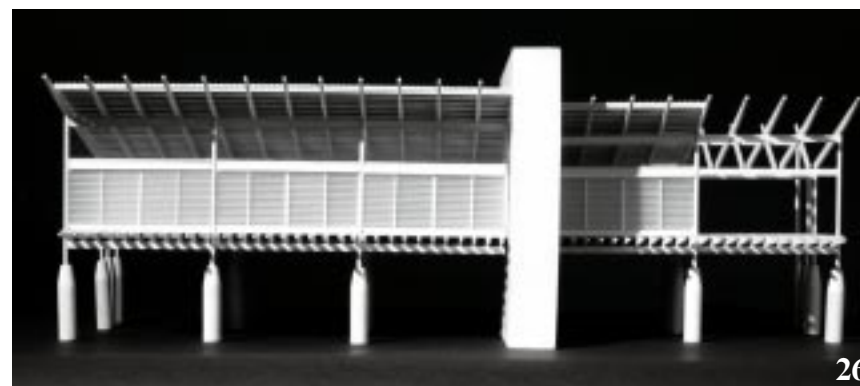
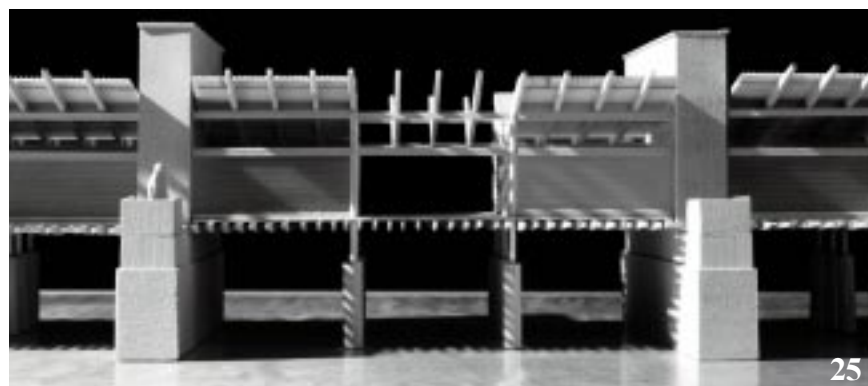
I have always viewed the research reserve center as a building that is composed in the same manner as a piece of music. Each element plays a part in creating the final composition. The introduction can be looked upon as the water storage silo, a moment where the architectural and conceptual process originates. From this point on, an intricate series of repetitive high notes occur within the component spaces, contrasted by the lows created by the collector walls. The entry decks, or verandas are breaks in the repetition, with the main public entry deck a long pause in comparison to the smaller pauses of the secondary entry decks. Finally, the conclusion is reached with the canoe launch- the final element of the building that marks the end of the project- the conclusion to the process. I have made an attempt to carry my ideas through from beginning to end in the same manner that the Potomac River flows from its origin at the Fairfax Stone to its destination at the mouth of the Chesapeake Bay.



South Elevation

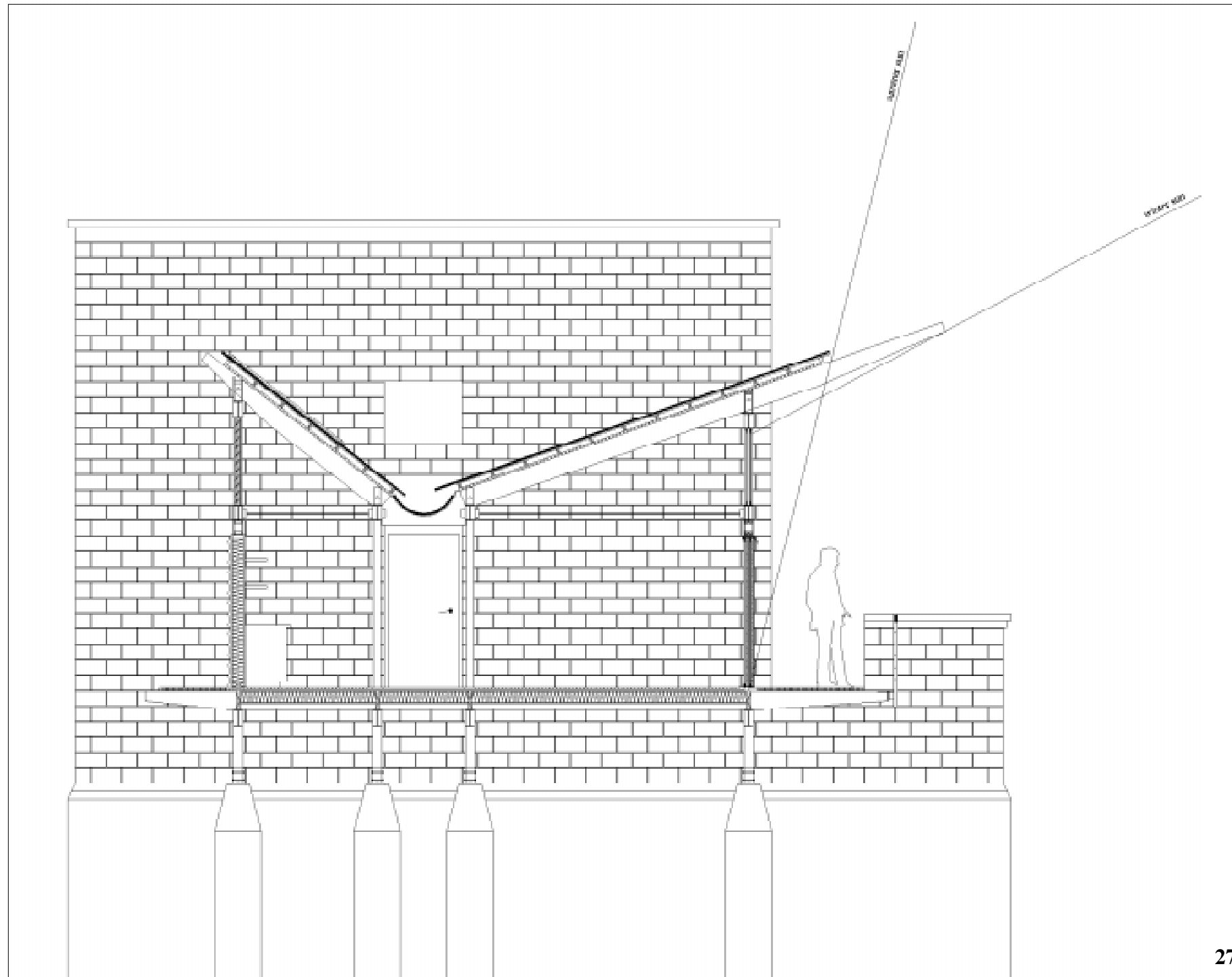


Enlarged Elevation



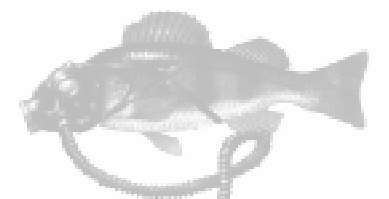
Cross Section

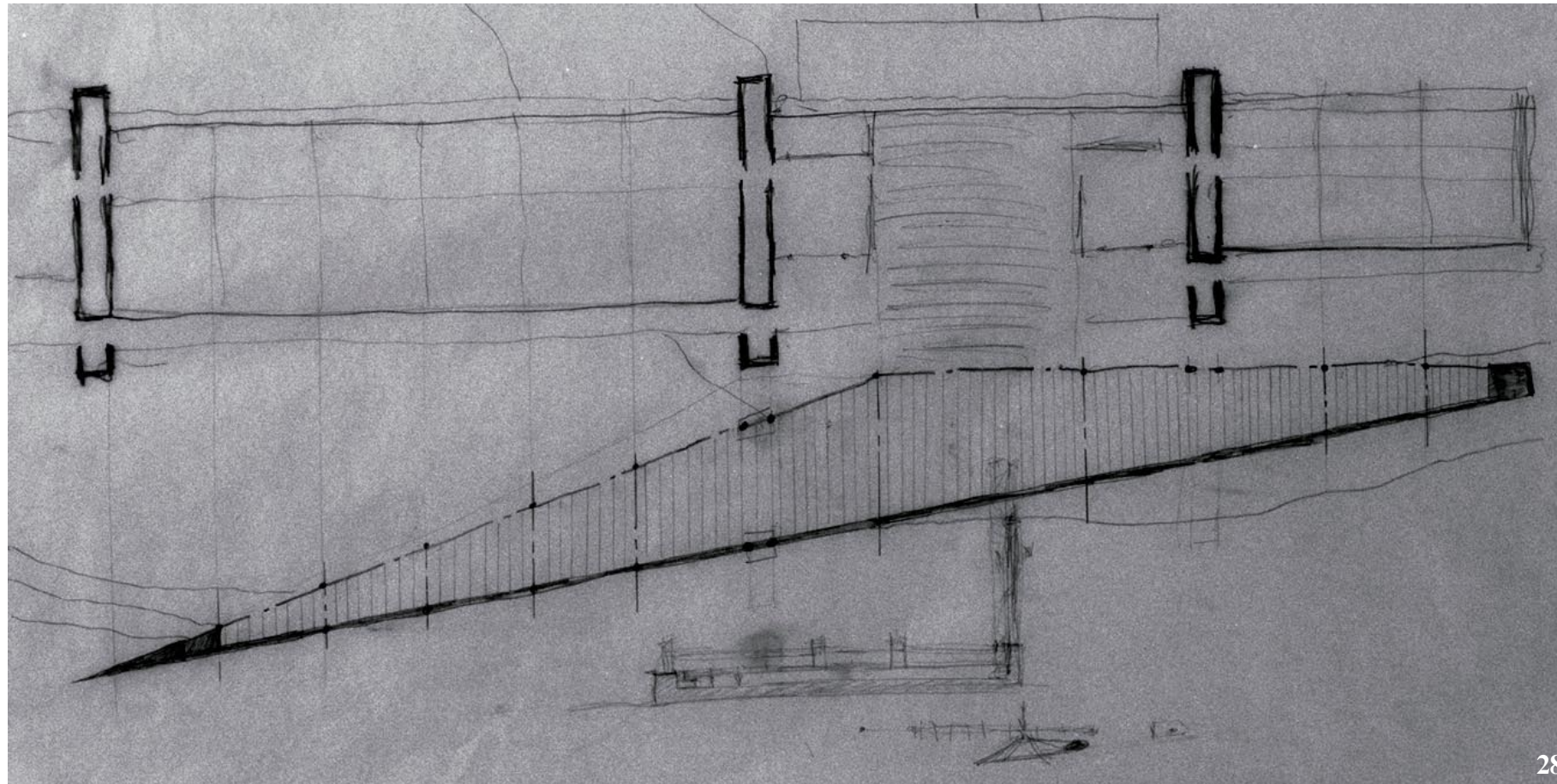
The choice of materials was governed by sensitivity to the environment and ability to be recycled. I chose to use a bolted galvanized steel frame that can be readily disassembled if necessary. To help prevent corrosion, all holes in the frame are drilled prior to being galvanized. The advantages to using the frame include faster assembly, a relatively lightweight structure, and the ability to disassemble the frame and have it recycled if necessary. Wood was chosen primarily as a finish material- a warm material that will make up the ceiling and the floor. Prefabricated aluminum sliding door assemblies will be used along the length of the southern facade. They will have louvers inside the double glazing to give inhabitants the ability to control the amount of daylighting that enters the interior spaces. Jalousie windows will be located within the clerestory section of the northern facade to allow hot air to be vented from the building. The floor and roof beams are made of structural timber and are tapered on the ends to help lighten the loads. The roof beam is a product of the floor beam (it is the floor beam cut into two pieces) to help simplify the construction process and to keep it as economical as possible. Corrugated aluminum was chosen as the roofing material because of its ability to collect and channel water down to the central aqueduct and its noncorrosive properties. Cast-in-place concrete will be used for the piles and the water table of the collector walls. Concrete masonry units were chosen to build the collector walls to avoid bulky formwork and its ability to be constructed and handled by a small team of workers. Rounded verticals were chosen for the columns and piles, in contrast to the rigid, horizontal beams used for the roof and flooring. A proportional system of 4'-0" was used throughout, which helped promote the use of uncut units and further simplify the construction process.



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Cross Section





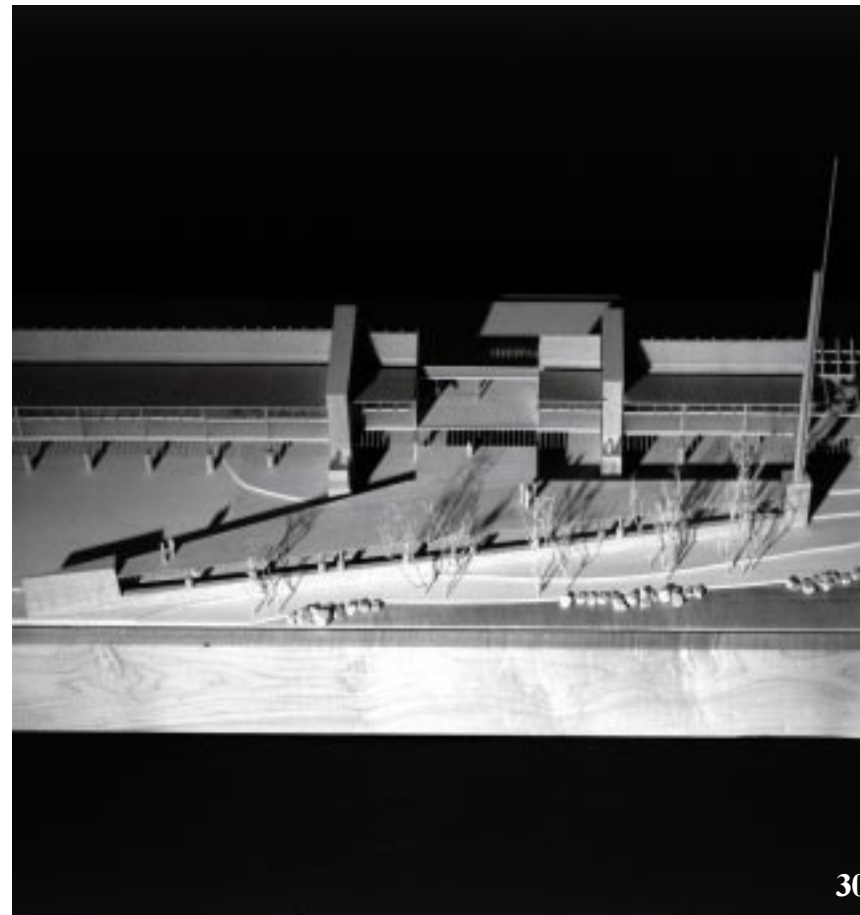
28

Entry Deck

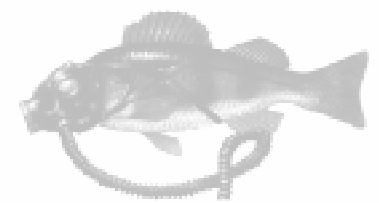
I consider the deck to be a landscape of floor, hovering above the natural landscape. The main public entry deck is part of a holistic idea about monitoring research and providing a place to heighten awareness not just of the bad things that are happening on the river, but also to reinforce its sheer scale and beauty. This main entry deck is the one unique feature within the project that breaks the repetition and linearity, and punctuates the idea of the “veranda” or porch. It picks up on the regulating lines of the breakwater of the Jones Point lighthouse. Although the geometry of the deck seems arbitrary, it stems from the rotated City of Alexandria grid and the Jones Point lighthouse. The deck collects pedestrians from the ellipse and the lighthouse and fans outward, reaching out to the water’s edge in the form of a knife-like concrete wedge. This is a moment where a visitor may sit and get a glimpse of the building riding out into the estuary. The constant flow of water spilling off the end of the aqueduct is beautifully juxtaposed by the ever-changing shoreline. The other end of the entry deck provides a place for the telecommunications tower, a 140-foot steel space-frame structure that will link the research reserve center to the other NERR sites around the nation. It also serves as a mechanism for collecting weather and satellite information for the researchers using the facilities. Just as the breakwater protects the Jones Point lighthouse, this deck has a breaker wall to act as a buffer for protection against erosion. It is large enough to comfortably accommodate people using both the visitor’s center, the meeting room/lecture hall, and any additional people who may be visiting from the park or the lighthouse. It is the place that encourages people to interact with one another. It is a place where an outdoor classroom could be set up during a nice day. It is a place that you could visit at night to experience the Potomac under the moonlight.



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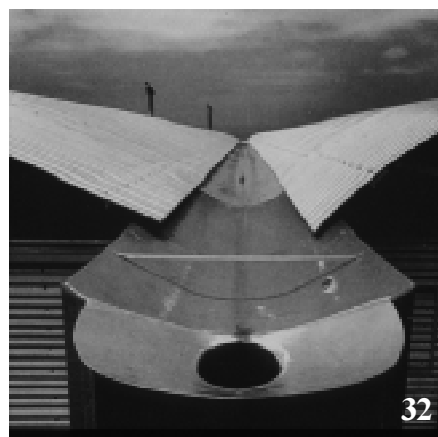
12

Glenn Murcutt

One of the most influential architects that I came across when working on my thesis project was Glenn Murcutt. He certainly became a guiding force for this project. I basically adopted his design vocabulary and redefined it for my site, program, and building design. The linear plan, angular roofs, lifting my building off of the ground onto piers, and passive design strategies can all be traced back to Murcutt. The estuarine research reserve on Jones Point was to be self-sustainable in every way possible. Whether harvesting rainwater, harnessing energy from the sun, or capturing breezes off of the Potomac, my project followed the examples of Glenn Murcutt's works. In his book, he sometimes speaks of the chess game of design. The metaphor is clear: in architecture, the object, rules and pieces are prescribed; each new game presupposes a fresh strategy applied in a sequence of logical decisions. Murcutt's buildings follow a long, rectangular plan, long and lean, rarely inflected. The appendages of his building's exterior mark the beginning of the journey- reinforce the impression of the finished building's apparent detachment from its site. This journey is always punctuated by an intermediate area between outside and inside. Murcutt clearly delineates "serving" and "served" areas, which he organizes in a variety of ways. With the serving-served partition set into parallel bands, Murcutt often devises the two long facades, which generally face north and south in opposing manners. Finally, Murcutt brings together all the functions within a common envelope, readable as such from both inside and outside; its long, continuous profile is obtained from a typical cross section as if by extrusion. This was the typology that served as a catalyst for my thesis project.



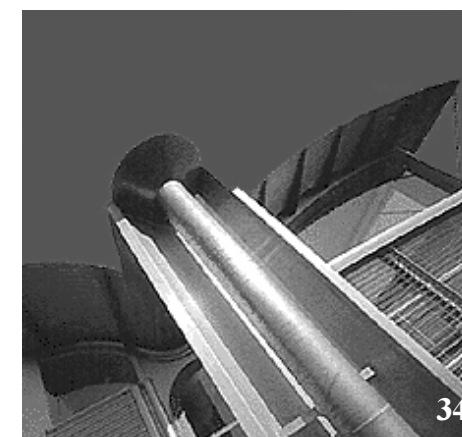
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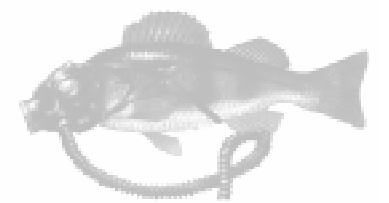
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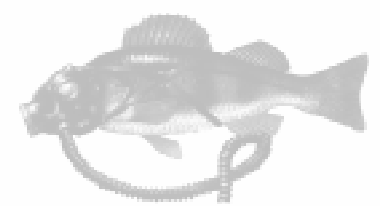
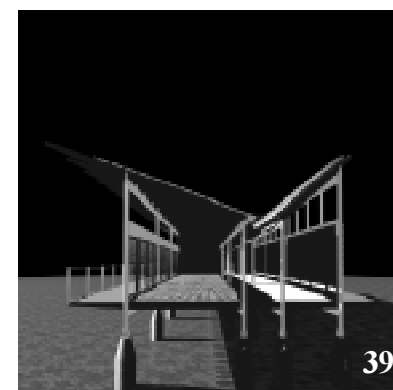
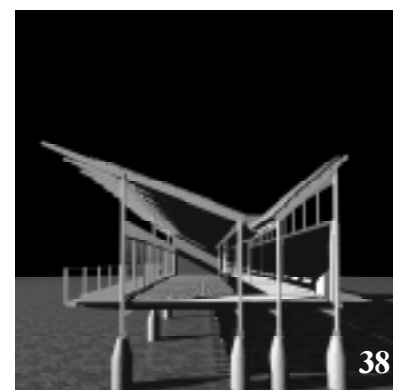
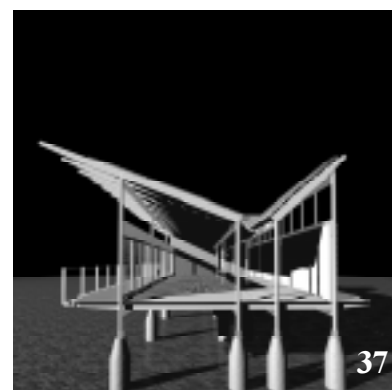
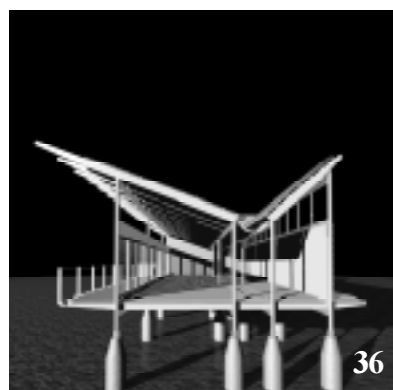
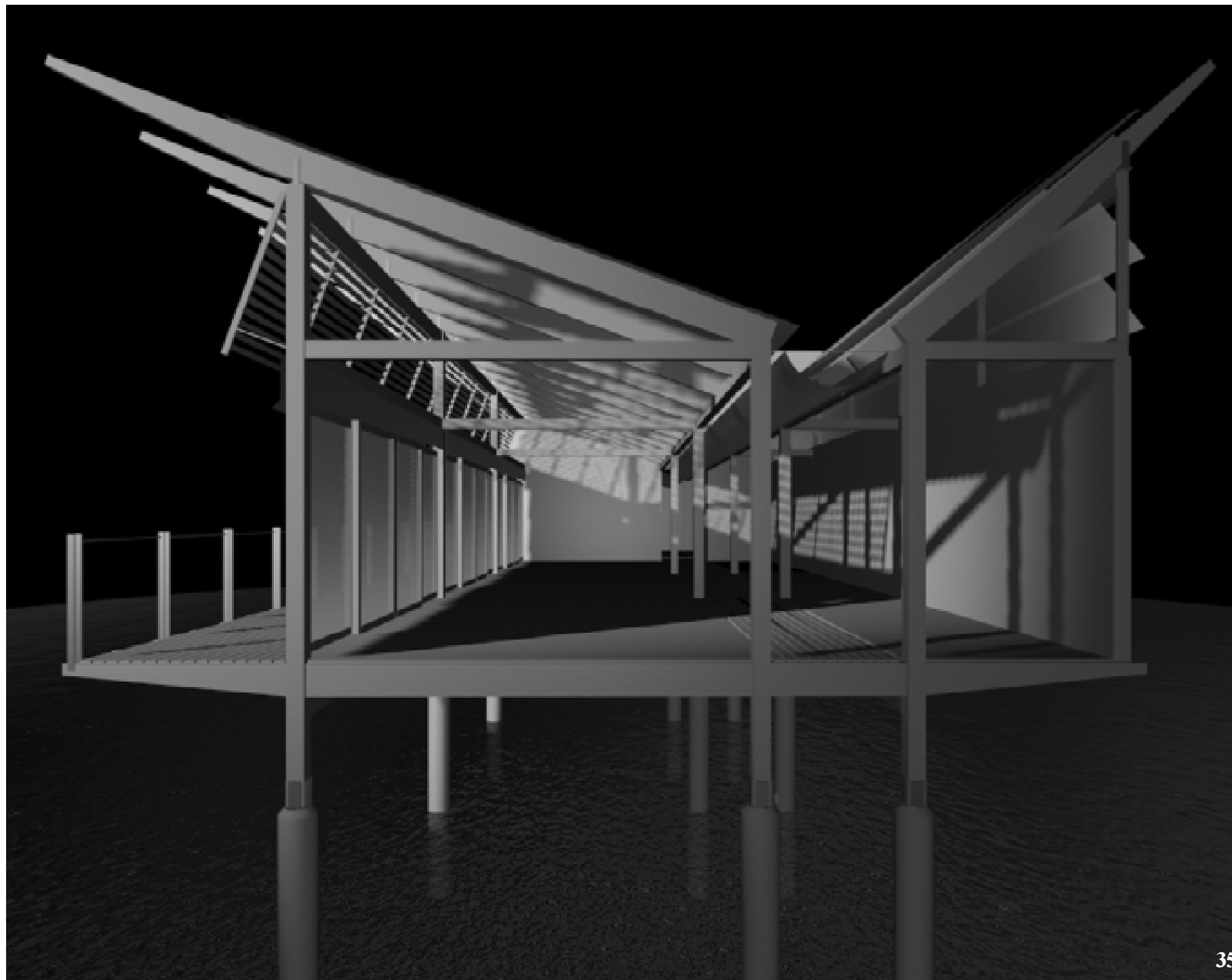
13

The Sun

Solar design principles were taken into account from the beginning of this project until the end. By siting the estuarine research reserve center on the southern tip of Jones Point, I could take advantage of unobstructed sunlight for passive winter heating and natural daylighting. By orienting the building on a east-west axis, all of the served spaces could open up to the captivating views across the Potomac and be south-facing. All of the service spaces, spaces which do not require as much lighting and views, could be situated on the north side. This basic orientation laid the foundation for the entire project. The butterfly, V-shaped roof was set up to capture the sun's energy on the northern side with the help of an array of photovoltaics. The angles of the roof were determined by calculation. The northern side tilted at 40°, so the photovoltaics would be perpendicular to the sun and get maximum performance. The southern side was tilted at 20°, so the roof could adequately overhang the south-facing glazing and help shade the facade from glare during the harsh summer months, while still admitting sunlight during the cold winter months. The narrow width of the building was influenced by the need to adequately provide daylighting to rooms inside. A hookup to the electrical grid is necessary for periods when the sun is not out, but also provides the opportunity to sell power back to the grid when sunlight is plentiful.

The Wind

By lifting the entire building off of the ground on concrete piles, I was able to bring cool air off of the water and into the interiors of the research reserve facility. This not only passively cools the spaces in the summer months, but also helps exhaust stale indoor air. Maximum natural ventilation is achieved by placing the building in the water's edge.





The Water

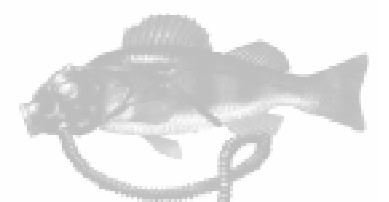
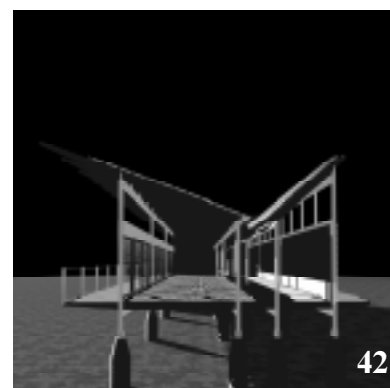
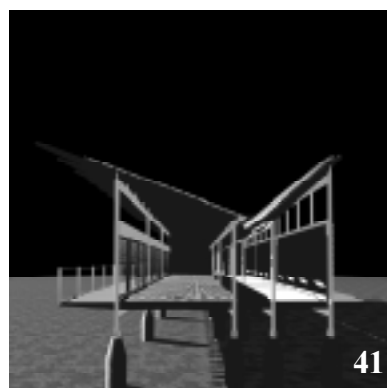
A primary focus of the estuarine research reserve center is collecting, cleaning, recycling, and studying water. Greywater from the service spaces is pumped into the collector walls. The collector walls contain cisterns in which the water can be filtered and used over again. Blackwater from the toilets can be used for irrigation purposes outside of the building. Harvested rainwater from the roofs is collected in the aqueduct and run through a series of filters that reside in the collector walls to ensure that the water is scrubbed of impurities before being dumped into the estuary. The research laboratories can sample and study this water when necessary.

“Touch The Estuary Lightly”

Minimal excavation was desired when placing my building on the water’s edge. This field of piles that dot the estuary help reduce the damage done to the substrate.

The Aborigines in Western Australia have a saying, “to touch-this-earth-lightly”, which admonishes man to avoid disturbing nature any more than is absolutely necessary. It conveys a sense in which the landscape is seen to possess a sacred character. It says, walk on tip-toe, be gentle with Mother Earth.

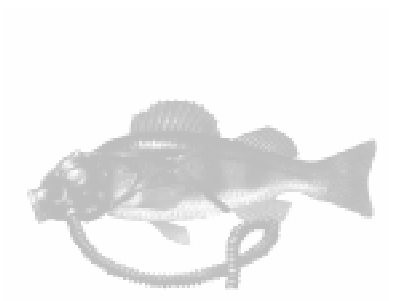
Glenn Murcutt



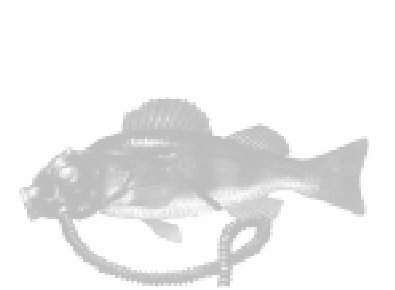


Conclusion

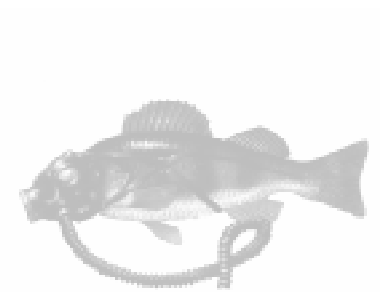
I have attempted to design an environmentally responsive and sensitive research facility that will not only monitor and study the Potomac estuary, but will also serve as an example of how one should build on the estuary. In this attempt to create a building that can become one with the site, I look back to my primary architectural influence, Glenn Murcutt. He likes to cite the example of a brick thrown into a river that comes to a standstill once it has reached its *exact place* in the flow of currents and fresh turbulence created by its own presence. I've always envisioned my thesis project as another landmark; another story to be told about Jones Point. Just as the lighthouse, the gantries, the old light tower abutments, and the Ford Factory leave clues behind about their existence, so will the estuarine research reserve center on Jones Point.



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- 4** *Alexandria Waterfront (Ford Marina)*
- 5** *Thesis Model (overall elevation)*
- 6** *Jones Point Lighthouse (view of south-facing steps)*
- 7** *Jones Point Lighthouse (vintage photograph)*
- 8** *Jones Point (remains of the shipyard)*
- 9** *Jones Point (boundary marker for the D.C. grid)*
- 10** *Jones Point (remains of light tower)*
- 11** *Map of Jones Point (existing conditions)*
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- 17** *Early conceptual sketches (parti)*
- 18** *Early conceptual sketches (parti)*
- 19** *Thesis model (section)*
- 20** *Site plan (1:200)*
- 21** *Floor Plan (1:100)*
- 22** *Enlarged floor plan (1:20)*
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- 41** *Solar rendering (summer 1:30 p.m.)*
- 42** *Solar rendering (summer 3:00 p.m.)*
- 43** *Solar rendering (summer 4:30 p.m.)*
- 44** *Solar rendering (summer 6:00 p.m.)*
- 45** *Mallow's Bay (infrared aerial photograph)*
- 46** *Alexandria Waterfront ("Alexandria")*
- Cover image from Zodiac (Neal Stephenson); logo*





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Vita

EDUCATION

1988-90

Broward Community College, Davie, FL
A.A. in Architecture

1990-93

Florida A&M University, Tallahassee, FL
B.S. in Architecture
Summa Cum Laude

1993-97

Virginia Polytechnic Institute & State
University, Washington-Alexandria
Architecture Consortium, Alexandria, VA
Master in Architecture

PROFESSIONAL EXPERIENCE

1986-93

Berry & Calvin, Inc.
Design Technician

Summer 1996

Roy D. Smith & Associates
Intern Architect

1997-present

Spillis Candela & Partners, Inc.
Intern Architect

HONORS & AWARDS

Dean's List (1991-1994)
Honorable Distinction, 1993 WAAC
Concrete Competition
Tau Sigma Delta Honor Society for
Architecture and the Allied Arts

