ABSTRACT

Title of Thesis: Riverpark: Adaptive Reuse of South Capitol Street Bridge

Kameron Reza Aroom, Master of Landscape Architecture, 2011

Thesis directed by: Mr. Jack Sullivan, FASLA, Associate Professor

Department of Plant Sciences and Landscape Architecture

This thesis proposes the adaptive reuse of the Frederick Douglass Memorial Bridge, located in Washington, D.C. into an urban park dedicated to the pedestrian experience. Also named the South Capitol Street Bridge, the bridge currently serves as the vital connection between the north and south quadrants of the District of Columbia. With plans to replace the existing bridge, and by utilizing the existing infrastructure, Riverpark will serve as the green link enhancing the pedestrian and cycling experiences between the Capitol Riverfront and Poplar Point across the Anacostia River in southeast Washington.

Riverpark: Adaptive Reuse of South Capitol Street Bridge

by

Kameron Reza Aroom

Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Master of Landscape Architecture
2011

Advisory Committee:

Associate Professor Jack Sullivan, FASLA. Committee Chair
Assistant Professor Victoria Chanse, Ph.D.
Adjunct Assistant Professor Caren Yglesias, Ph.D., AIA.

ACKNOWLEDGEMENTS

I would like to thank those who helped with this project to bring it from an idea to a developed concept. I want to thank Jack Sullivan, Victoria Chanse, Caren Yglesias for their dedicated contributions as committee members and the support from Arlie Ison in the thesis process.

TABLE OF CONTENTS

LIST OF FIGURES

Introduction

Cities are the stages for exciting opportunities to connect and promote healthy living environments for people. With over half of the world's population now residing in large cities, landscape architects hold the leading role in designing creative ways of providing accessible open space for people. Many problems associated with a lack of connection to open space in the city are the result of not providing viable means to encourage access. The social and economic value of access to the riverfront has generated a new appreciation for a pedestrian urban lifestyle. Traditional planning practices often turned the city's back towards the river with industrial development. Now planners are identifying transportation corridors in many urban areas where highways and industry have severed connections to the riverfront, which contain vital links that are viable opportunities to promote access.

Washington, DC's growing support for transportation alternatives to the automobile such as Metrorail, streetcars, and bicycles, will eventually present leftover infrastructures available for reuse. Vehicular and rail bridges that are in line for destruction present the opportunity to create valuable pedestrian links in the city. Creating pedestrian friendly urban environments will require improving networks through the city to support a variety of users not dependent on vehicular transportation. This thesis illustrates how landscape architecture can be used as a tool to transform a deteriorating infrastructure into an innovative urban park setting that connects and enhances the pedestrian and cycling experience within the District of Columbia.

Alternative Transportation

Increased automobile use in cities in the early 1960's resulted in an inhibited urban experience for the pedestrian in many areas of the city. Many countries throughout the world have in the past twenty years begun to adapt their traffic planning strategies to promote and acknowledge the importance of bicycle and pedestrian movement in the city. This shift has made cities more comfortable for residents to enjoy while reducing the nature and causes of traffic accidents (Gehl, 2010). The shared street has been a proven model in Europe where mixing different types of traffic on the same street offers safer and more efficient methods of traveling through the city for many people. The successes of all shared street concepts prioritize pedestrian movement above other traffic. By bringing a pedestrian presence to the street, active spaces develop where people begin to have daily movement routines in their city life.

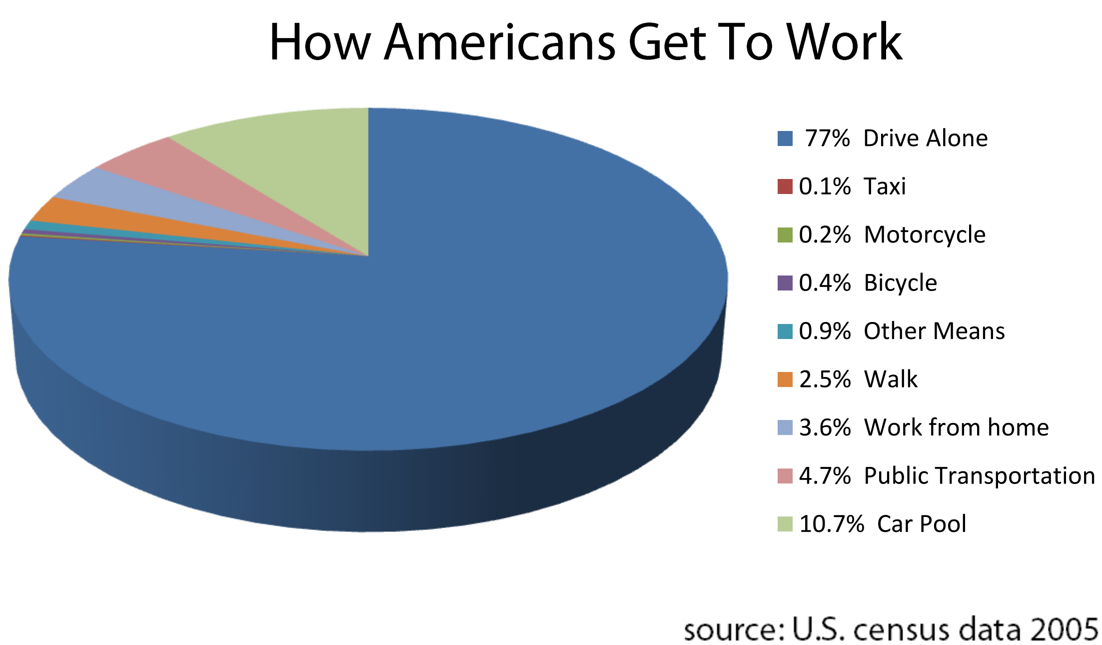

Figure 1: How Americans Get to Work [Aroom]

With 21st century planning, alternatives to vehicular transportation are welcomed for a variety of reasons. The time spent in commuting expenses grows each year with costs attributed to fuel, maintenance, and insurance. Vehicular emissions are still the leading contributing source of pollution in major metropolitan areas according to the Environmental Protection Agency with 77% of commuters driving alone (U.S. Census Bureau, 2005). Often the reasons for these high levels of emissions are attributed to idling in traffic, while mass transit often offers a more efficient means of connecting commuters to different areas in the city.

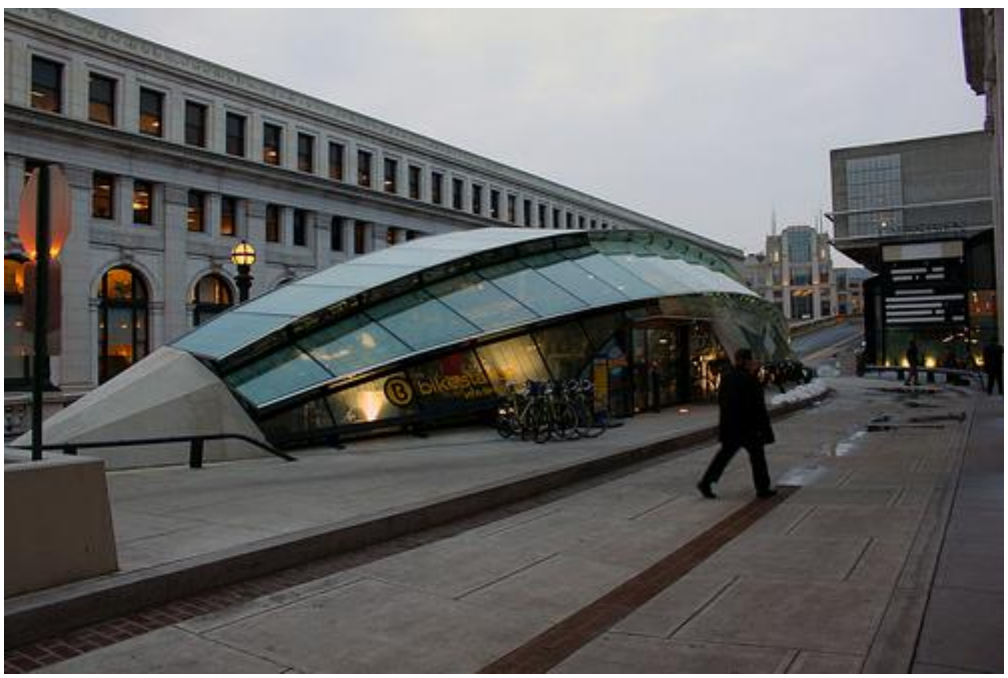

Figure 2: Union Bikestation, Washington DC 2010.

Bicycles have been instrumental in new urbanism's foundation in creating pedestrian friendly communities. Just as planning for vehicle access and safety for the pedestrian have been important, integrating bicycle planning into the urban landscape requires specific guidelines that can be used by cities to protect the cyclist and the pedestrian on an active street setting. To alleviate many of the congestion and pollution problems that are attributed to vehicles, alternatives such as rapid bus, light rail, and metro rail used in conjunction with bicycles can reshape how cities function and shift to become more environmentally conscious.

Washington, DC has demonstrated a commitment to alternative transportation with a growing network of transit centers that promote alternative transportation. Bikestation, located at Union Station, is a secure bicycle sharing facility that allows commuters to take public transportation to a transit facility where they can use bicycles to get to work, shops, and entertainment throughout Washington (Bikestation, 2003). Cities now share a general interest in creating improvements to encourage bicyclists and pedestrian mobility in their daily commute. To facilitate this mobility, cities need to reduce the number of surface vehicles and allow more effective and efficient ones to remain (Jacobs, 1992). Planning efforts also need to structure goals to improve routes across the city.

In the early half of the 20th century, a strong concentration toward highway connectivity was made with the increased use of the automobile in cities. America had well and truly entered the automobile age with about one car per family. The automobile encouraged suburban development at great distances bringing new densities to the city center. Adopting this technology into the urban realm came with consequence in the form of transportation infrastructure, now disrupting a substantial portion of the city fabric with an interurban highway system. This shift also spurred public works projects and urban artifacts that transformed the American landscape significantly in the years to come (Tatom, 2009). Transitioning away from the use of highway corridors that occupy a large percent of the urban realm (15%), many spaces and structures will offer places for new life in the modern city.

Figure 3: "Washington Plans Streetcars to Fill in the Gaps." [Freemark, Yonah]©

Entering the 21st century, cities are now faced with the task of rethinking and reworking the transportation networks that are present in the urban environment. A challenge to urban design is to accept the necessity of infrastructure and the importance of it in the experience of the contemporary metropolis (Corner, 1999). Transportation conduits are vital for a functioning city in many ways. Just as access predicated placement of cities next to navigable waters for trade; highway infrastructure, railways, and street networks serve the same purposes today. Designs must make cities attractive and networks more fluid to accommodate the growth and demands that follow metropolitan expansion. Sustainable approaches to redevelopment and new construction must encourage alternatives to the automobile by promoting mass transit.

Washington, DC has made major strides in expanding its Metrorail subway through the use of a growing metro bus network and future streetcar system. In efforts to make Washington better connected, planners have been faced with the physical separation of the southeast quadrant of the city between Federal City and Historic Anacostia. This noticeable disconnect in Washington was unavoidable because of the Anacostia River. 21^{st} century planning efforts initiated by the Anacostia Waterfront Initiative have worked to improve access to the new and existing destinations while linking adjacent communities in southeast Washington by evaluating the connections across the river. This thesis studies the existing connections and future potential for improvements along the routes for pedestrians and bicyclists across the Anacostia River.

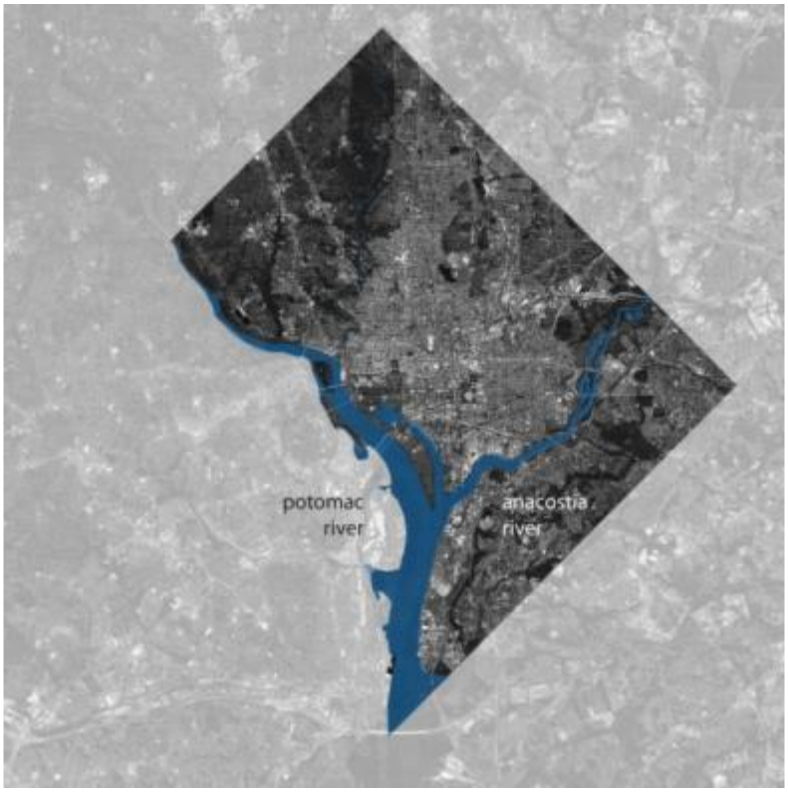

Figure 4: Washington DC River Context Plan [Aroom]

Riverfront Development

In the year 2000, the Anacostia Waterfront Initiative was started with a goal to reclaim, restore, and rejuvenate the Anacostia River. The Initiative worked to develop a framework plan to outline strategies to engage the waterfront while promoting urban revitalization. Public open space serves a vital design role by providing a relief from the density found in the built form of a city. Pierre Charles L'Enfant planned Washington, DC as a series of public spaces linked by avenues. Through extending L'Enfant's legacy, Washington, DC now has a generous number of varied public open spaces that relate the built urban context to its surrounding natural setting (Bednar, 2006). This system of open spaces is an invaluable resource for present and future residents and visitors to use, and is the core to the legacy plan of the nation's capital. Extending L’Enfant’s legacy, the 21st century plan proposes the extension of federal offices along South Capitol Street to physically express the balance of constitutional powers with the Capitol. The AWI Framework Plan identifies South Capitol Street as a grand gateway. Recent development has accelerated on either side of Capitol Street on the northern edge of the Anacostia River and now is referred to as the Capitol Riverfront.

One of the major plans of the Anacostia Waterfront initiative is to replace the existing Frederick Douglas Memorial Bridge with a new bridge that will align with South Capitol Street and have a lower elevation to establish improved street

Figure 5 : Anacostia Waterfront Initiative Framework Plan 2001

connections across the Anacostia River (Gateway, 2003). Many studies have considered different designs for this new bridge which can accommodate higher traffic volumes, and improved bicycle and pedestrian access. The new memorial bridge is planned for a site south of the current South Capitol Street Bridge's location. The new bridge will intersect with a traffic oval on the northern side of the Capitol Riverfront, and a circle rotary on the south side adjacent to Poplar Point.

Figure 6 : South Capitol Street Bridge Improvement Study Illustrative 2009.

On the other side of the river and the setting for many recent planning concepts, Poplar Point is located in the undeveloped open space of Anacostia Park with huge potential stemming from development at the Capitol Riverfront. The National Capitol Planning commission has worked with the Anacostia Waterfront Initiative (AWI) framework plan and a group of various design firms to provide scenarios for urban development of Poplar Point. Planning approaches all work towards the extension of green corridors, primarily with South Capitol Street, creating a celebrated gateway into downtown Washington.

Figure 7: Existing Bridge Panorama [Aroom]

The current South Capitol Street Bridge (Frederick Douglass Memorial Bridge) traffics over 55,000 vehicles a day. In 2007, a 27 million dollar construction project reconditioned the bridge and adjusted the northern on-ramp to meet the grade at the intersection of South Capitol Street and Potomac Avenue. This decision was made in order to ensure that the bridge would handle daily traffic loads for a period of 20 years or until construction starts on the future South Capitol Street Bridge. While the Frederick Douglass Memorial Bridge has served and will serve many daily commuters, this thesis presents the question of what will happen to the bridge when the new one is finished.

Figure 8 : Pennsylvania Station 1962 [Robinson, Cervin]

Preservation

The preservation of historic structures is a reoccurring topic facing urban development. In the 1960's, Pennsylvania Station in New York City became an iconic example of a significant work of architecture. Its destruction and the subsequent outcry from the preservation community resulted in the enactment of the Landmarks Preservation Law of 1965. Historic Preservation is now a recognized planning practice which seeks to preserve, conserve, and protect from alteration and destruction historically significant buildings, landscapes, and artifacts. The destruction of Pennsylvania Station initiated a discourse on what was considered a valuable civic resource in the urban landscape. One of the tasks of historic preservation has become the recognition and documentation of existing structures and landscapes that are deemed to be significant community assets and important contributions to our cultural heritage. Assessing the importance of dated structures is heavily weighed on considering its significance determined in part though the architectural details and methods of construction. Rapid development in the 1950's and 60's infrastructure will present new challenges for preservationists as the number of structures marked for destruction increases.

The metropolitan landscape is encouraging design is encouraged to engage existing infrastructure rather than merely recreating it. Designers have the opportunity to re-conceive infrastructure and create lasting accessible public spaces out of this neglected realm (Tatom, 2009). As infrastructure begins to age and deteriorate, the question arises asking if adopting ecological design into adaptive reuse will result in a more sustainable urban fabric. Understanding how metropolitan areas have developed, new programs for urban design are shifting from formally solving problems with engineered solutions, to identifying methods of improving the public life with city infrastructure. Designers can enhance this public realm by incorporating the social and pedestrian experience into the frameworks of the urban landscape. A critical inquiry can take place in all areas where potential adaptive reuse can occur to make best use of structures that would otherwise be identified as deteriorating leftovers of the urban fabric.

This is an interesting moment in city design, a shifting visible character of modern geography. The urban landscape in many ways has become more of a human habitat evident through our imprint of the built environment. This can be best viewed as layers across nature: which is already filled with many complex networks of ecology. Cities are facing a variety of challenges, with infrastructure supporting growth and more urgently, environmental issues supporting the city. As we move forward towards greener cities for people in many ways we need to peel back layers of existing urban fabric and find new ways to adapt infrastructure to unify landscapes rather than divide it. There already exist a few precedent examples of how adaptive reuse and the preservation of transportation infrastructure can result in new territories for pedestrian use.

Precedents

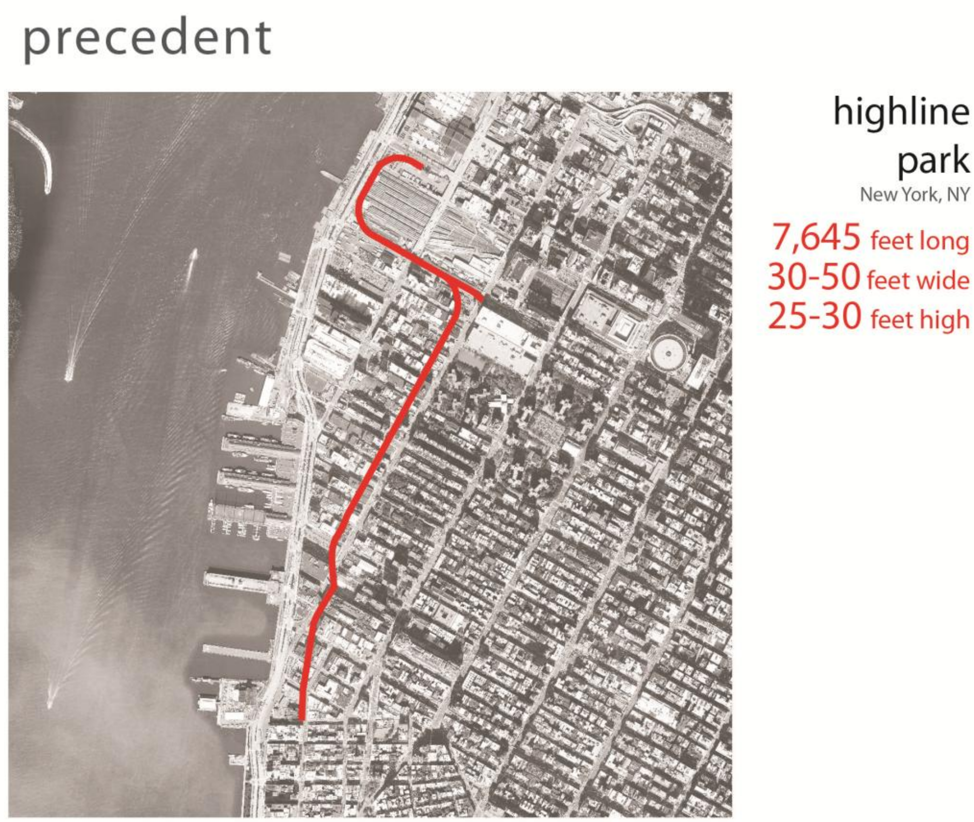

Figure 9: Highline Park Precedent Study [Aroom]

Highline Park

Located in New York City, the Highline Park is a project of adaptive reuse of an abandoned railway line in southwest Manhattan. The project demonstrates a successful implementation of ecological urbanism and adaptive reuse of industrial infrastructure. One of the most notable experiences that can take place on the Highline is that it includes a new vantage point of the city from an elevated level. Dedicated for pedestrian use, the elevated park incorporates native plantings in a linear park that intersects the city grid in three sections. Not only has the project prevented the destruction of the elevated railway, it has also created a valuable amenity for the surrounding neighborhoods as a public park in New York City.

Figure 10: The High Line [Roberts, Lucas] 2010.

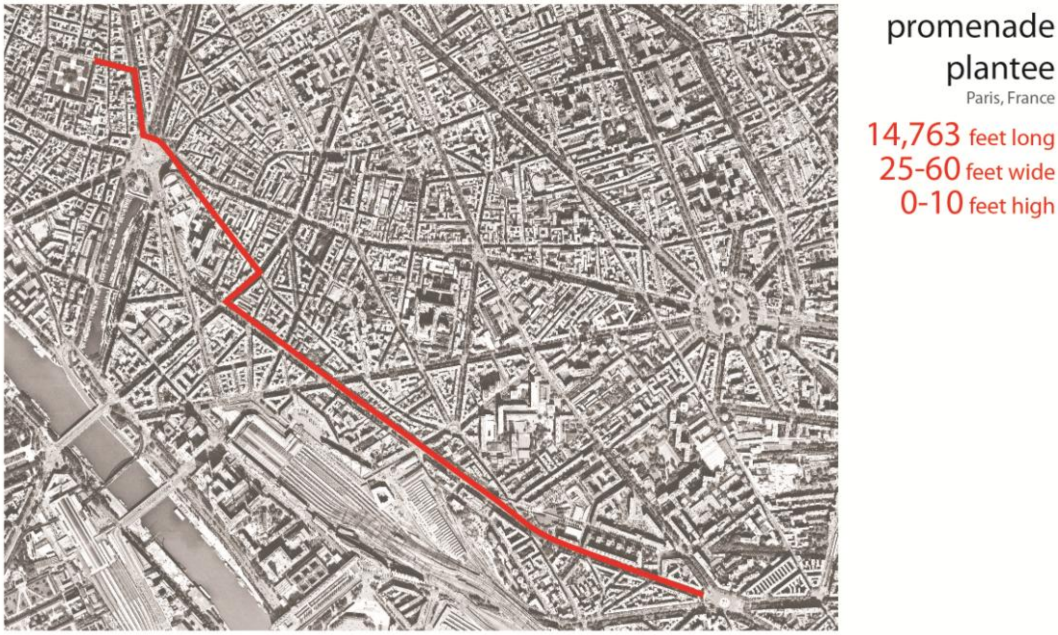

Figure 11:Promenade Plantee Precedent Study [Aroom]

Promenade Plantee

Now serving as a thoroughfare for pedestrians, the Promenade Plantee is the adaptive reuse of a railway in Paris, France. The Promenade is an effective solution to a remnant infrastructure which now provides a linear park retreat through the city. The railroad track was constructed in 1859 and was used by freight trains connecting the station at Place de la Bastille to the station in Saint-Maur in southeast Paris until its discontinued use in 1969. The park was designed in the early 1990’s by the landscape architect Jacques Vergely and architect Philippe Mathieux. The bicycle and pedestrian trail is a component of thr a viaduct revitalizaion in the city known as the Viaduct des Arts project.

Figure 12: Promeade Plantee [Leimang, Shelly]

Site Context

The District of Columbia is well known for its L'Enfant design with four quadrants: Northwest, Northeast, Southwest, and Southeast respectively centered on the Capitol. These quadrants can easily be distinguished by the Districts' formal street alignment. The White House and Capitol are situated at prominent points of high topography. In the new city plan for Washington, L'Enfant chose the high elevation of Jenkins Hill as the site for the Capitol and a public plaza (Ellicott moved the building to the center), to reiterate its symbolic importance to the nation (Bednar, 2006). On axis with the Capitol building are North and South Capitol Streets, which are the primary dividers of the eastern and western sides of DC.

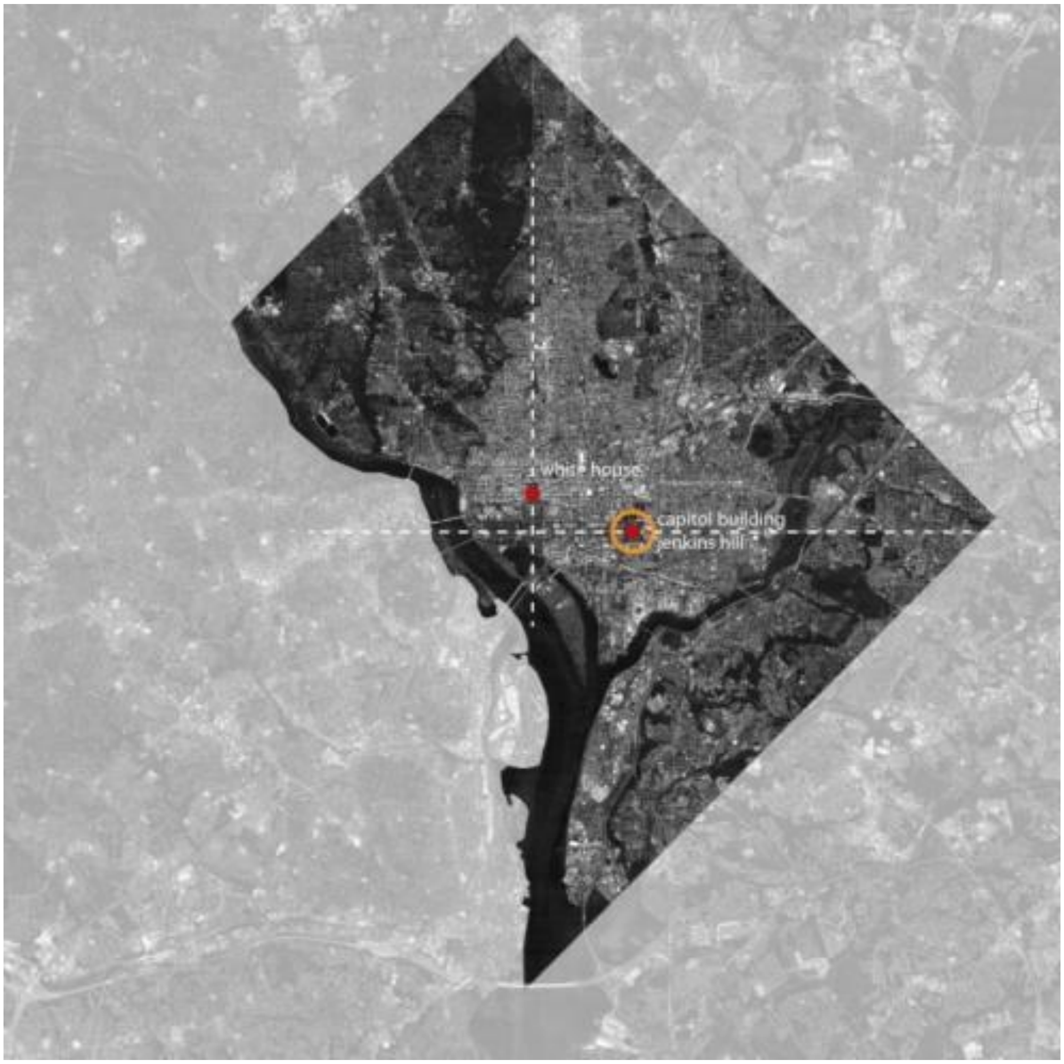

Figure 13: District of Columbia Axial Framework [Aroom]

Situated at the confluence of the Potomac and Anacostia Rivers, proximity to the waterfront provided the city with a means of navigable access for trading resources. L'Enfant identified "25 good springs of excellent water" and locations for five public fountains. Throughout its history, Washington has faced many challenges involving water: in clearing and developing land over and against it, and in crossing it. While the Potomac and Anacostia Rivers have provided many amenities for the city to function, urban development has been responsible for many environmental issues along the edge conditions of these rivers.

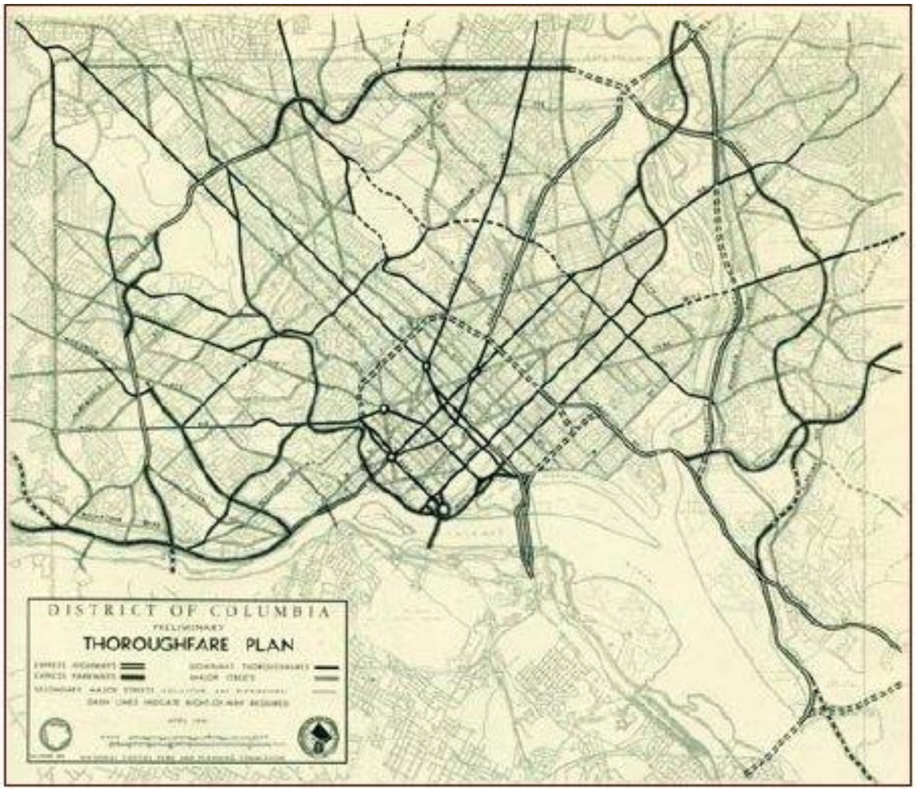

Figure 14: District of Columbia Preliminary Thoroughfare Plan

In the 1950's, Washington faced rapid decentralization of employment in Washington. New dependence on the automobile and a new emphasis on vehicular connections took place. The District built an inner loop elevated highway system that is still being added to today (see Figure 14). The South Capitol Street Bridge was constructed in 1950 to serve as the primary viaduct for commuters into the Capitol and to aid in connecting the southeast quadrant of the District of Columbia. Here recent construction and design implementation is occurring focusing on the connection between the north and south edges of the Anacostia River along South Capitol Street at Poplar Point and Buzzards Point.

Figure 15: Highway Infrastructure Diagram [Aroom]

Undeveloped open space that exists in the southeast quadrant is strikingly different at the Anacostia River's edge. While the urban fabric on the north side of the Anacostia has direct waterfront access, an elevated highway, Southeast Freeway Interstate-395, severs valuable open space from the residents inhibiting urban public life (see Figure 15). Not only does this physical divide cutoff historic Anacostia from the waterfront, the experience of crossing the Anacostia River is weighted towards the vehicle. While elevated highways can allow for free movement below, the experience is often visually obtrusive, and the environment does not encourage pedestrian activity.

Poplar Point development plans to maintain 70 acres of parkland in a 110-acre land use study. Capitol Riverfront development along with the transformation of St. Elizabeth's campus, located south of Poplar Point, to house a additional working population of 5,000 for the Department of Homeland Security, constitutes a large number of new residents to the area. The future development surrounding the South Capitol Street Bridge emphasizes the importance of providing an alternative means of transportation across the river and increased access to open space.

Thesis Proposal

This thesis proposes a secondary movement system, dedicated to the pedestrian and bicyclist experience that creates a celebrated gateway across the Anacostia River. These new links to the river would draw pedestrians and bicyclists through an urban experience that integrates the riverfront with the Monumental Core through a variety of vantage points and referential landmarks. This link will increase the amount of programmed open space on both sides of the river, bringing increased outdoor activity for residents along the river. More frequent citizen contact with the Anacostia River could also encourage environmental awareness that would lead to community involvement and more engagement in the process of improving the river's ecological health.

Figure 16: Concept Collage [Aroom]

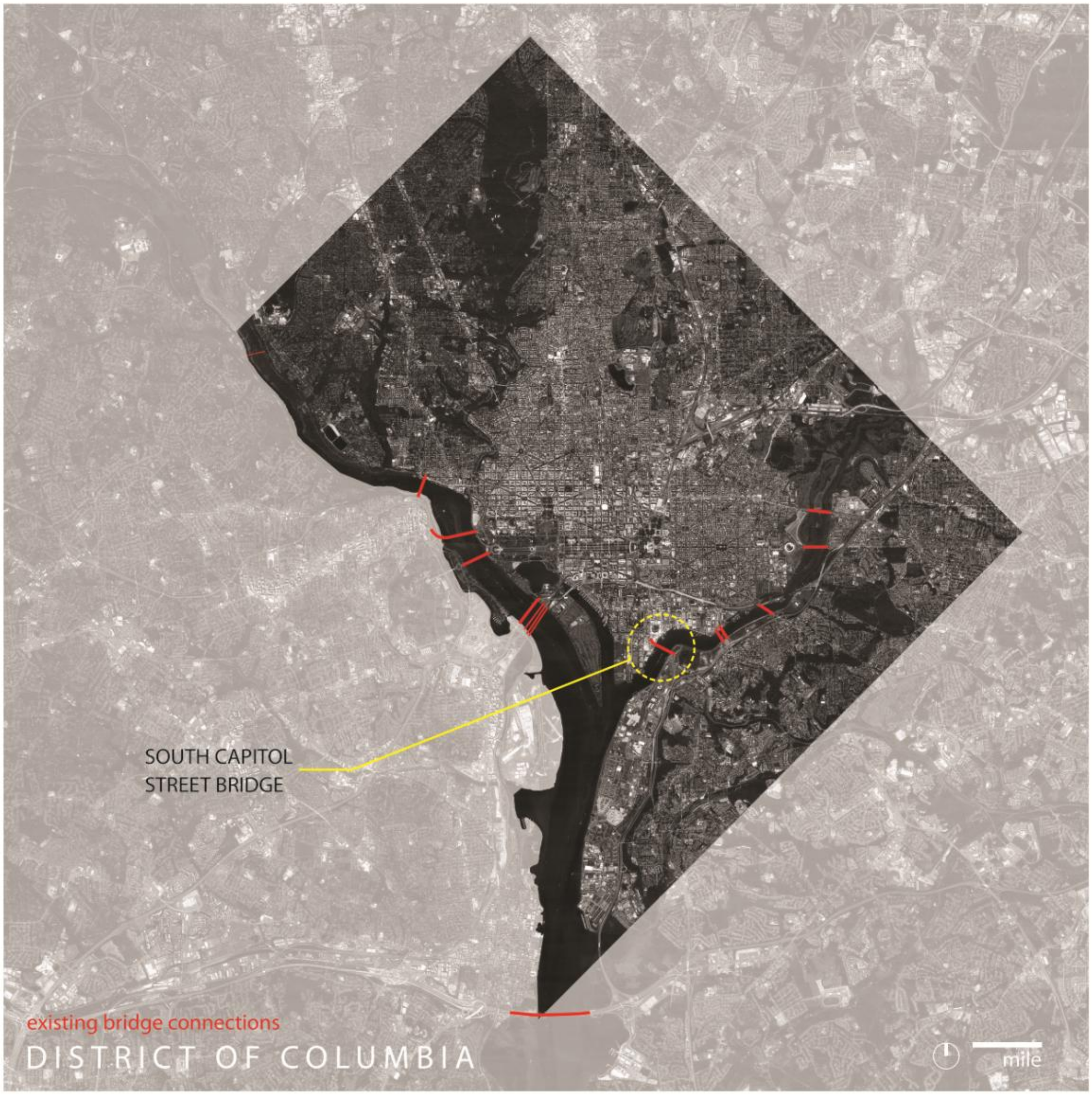

Figure 17: Existing Bridge Connections: District of Columbia Context [Aroom]

Opportunities and Constraints

The Bridge

Most people crossing the South Capitol Street Bridge by vehicle do not see the scale of the physical structure. The design is composed of nine impressive masonry piers (see Figure 20), averaging over 65 feet in width and over 40 feet in height supporting a steel superstructure. The piers are made up of granite blocks that visually and physically provide a sense of stability and mass to the bridge. To a person standing on foot, the piers have a monumental quality that is not present in concrete support structures that are found in typical bridge and overpass construction practices.

Figure 18: Masonry Support Piers [Aroom]

While the pier’s stone materials show signs of weathering, they remain structurally sound even with an age of 60 years and daily use. The monumental qualities of these piers offer great opportunities as access points for visitors encouraging recreation along the river. The large scale of the piers provide opportunities to cross between the archways (see Figure 19). Viewing through the piers supports a perceptible experience of the water's dynamic relationship with the bridge.

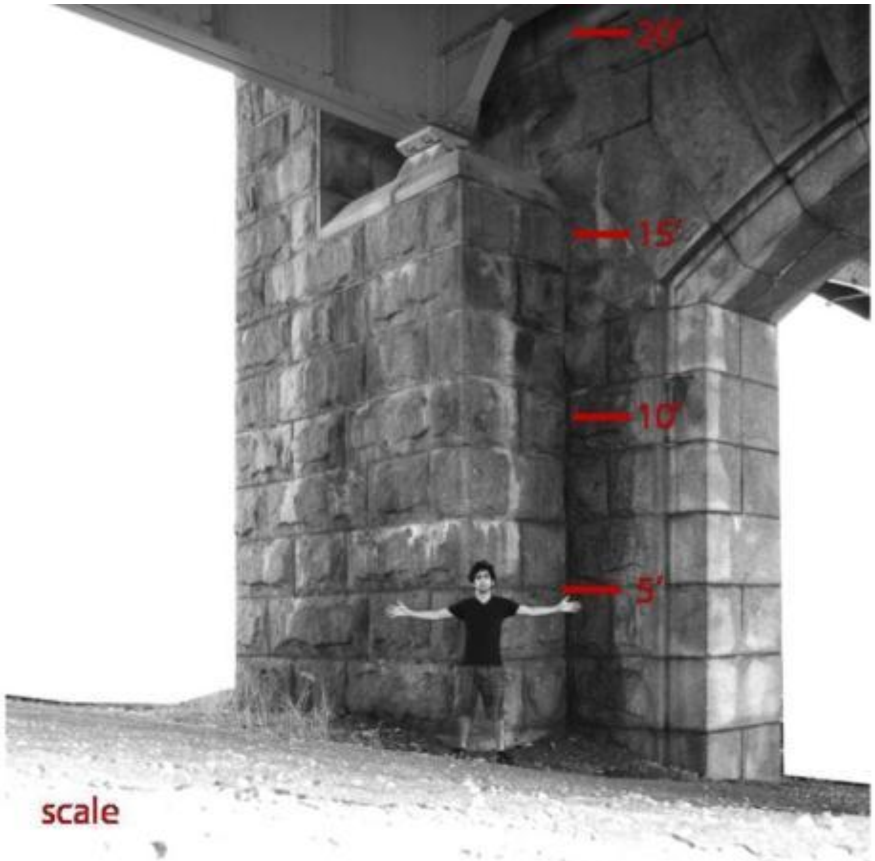

Figure 19: Masonry Pier Scale Study [Aroom]

The steel superstructure is a beam and girder system with primary girders (10'+ in height) along the entire length of the bridge. Perpendicular structural beams (6' in height) support the span above. The steel superstructure supports modular concrete slabs, (6-8" thick) fabricated with steel railings to initially provide four lanes of automobile traffic. Pedestrian movement is limited to two 4' foot wide sidewalks on either side of the bridge platform, protected from the vehicular lanes by a concrete divider.

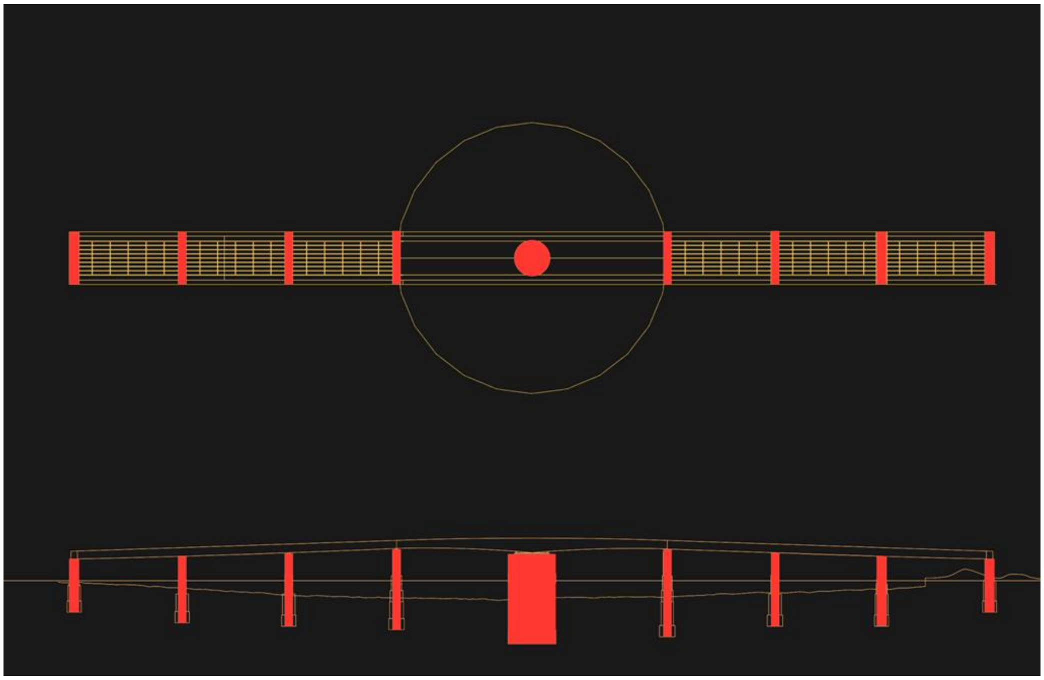

Figure 20: Beam and Girder Plan [Aroom]

Figure 21: Beam and Girder [Aroom]

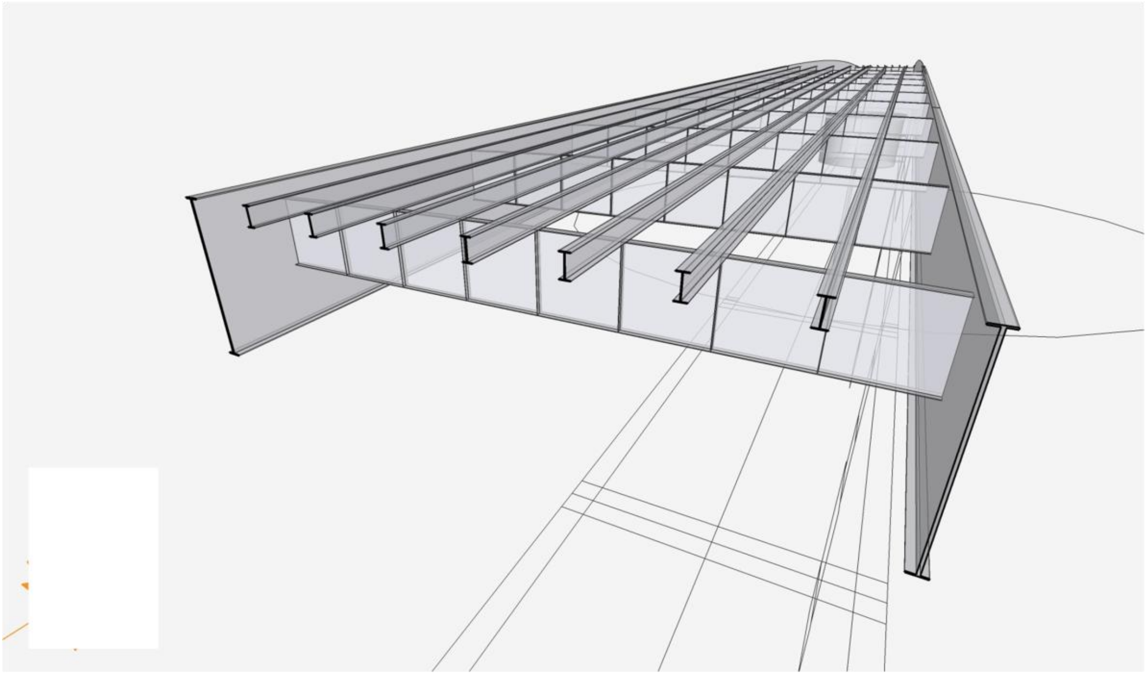

Figure 22: Bridge Steel Structure Section Study [Aroom]

In 1976, the bridge was widened to accommodate six lanes of automobile traffic and two small sidewalks providing limited pedestrian access (see Figure 23). Bridge reconditioning has repaired surface corrosion and today the steel structural members are in good overall condition with no visible rust. The bridge is coated in a muted teal finish found on most bridges dated from the era of its construction which protects the steel from corrosion. With bridges often over-engineered to accommodate 150% of their capacity, these structures can offer many types of reuse potential, specifically the weight of green roof technology. By introducing programs that support alternative transit the daily load on the bridge is dramatically reduced, resulting in a longer lifespan for the structure without incurring additional long-term maintenance requirements.

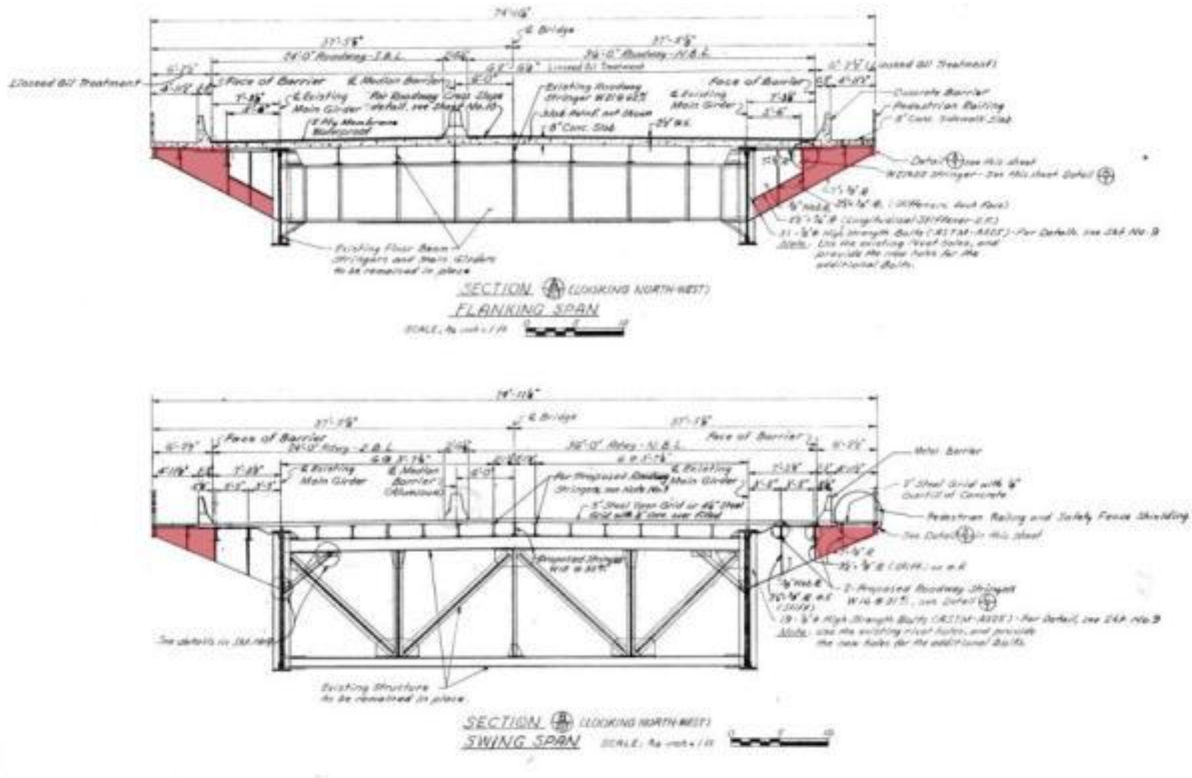

Figure 23: 1976 Bridge Widening Construction Drawings

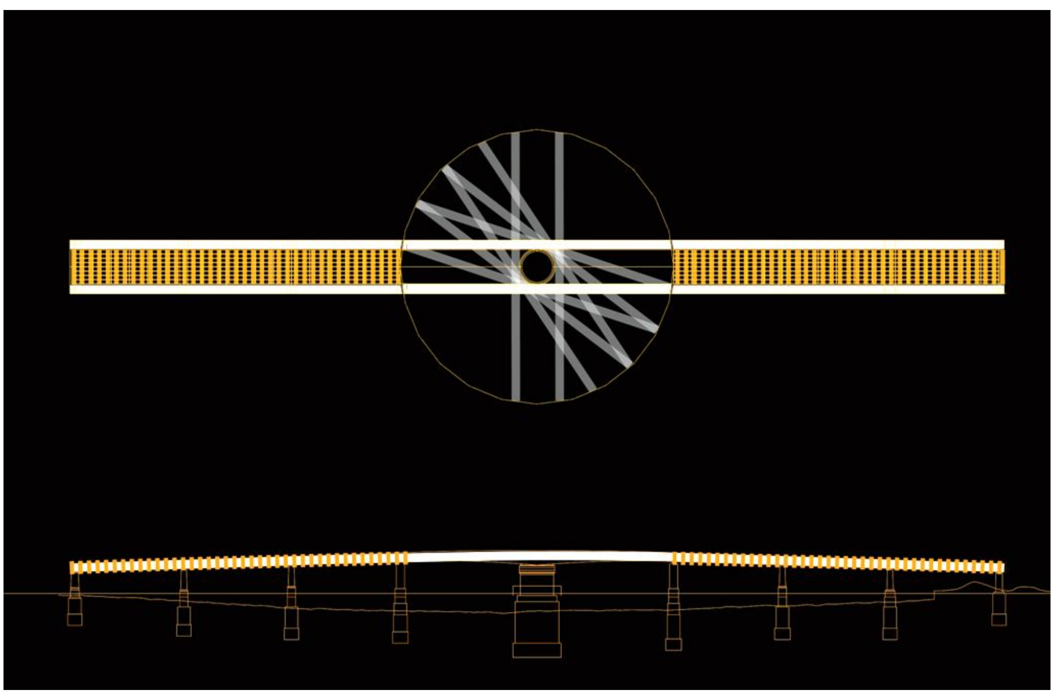

Figure 24: 1976 Bridge Turnstyle Plan [Aroom]

What makes the South Capitol Street Bridge unique is its central turnstyle, which rotates 180 degrees and spans an impressive 386 feet to allow larger boats to pass up the river (see Figure 24). One of the current complaints of the South Capitol Street Bridge is its elevation that requires long onramps to accommodate the speed and volumes of vehicular traffic. The new bridge would absorb this vehicular demand eliminating the need for these on ramps. Additionally, the bridge footprint would be dramatically reduced improving the physical connection itself across the water. Potential connections exist for the pedestrians and bicyclists requiring shorter and smaller ramps to access the bridge. By removing the automobile from the bridge's duties, the bridge provides an opportunity to build a park.

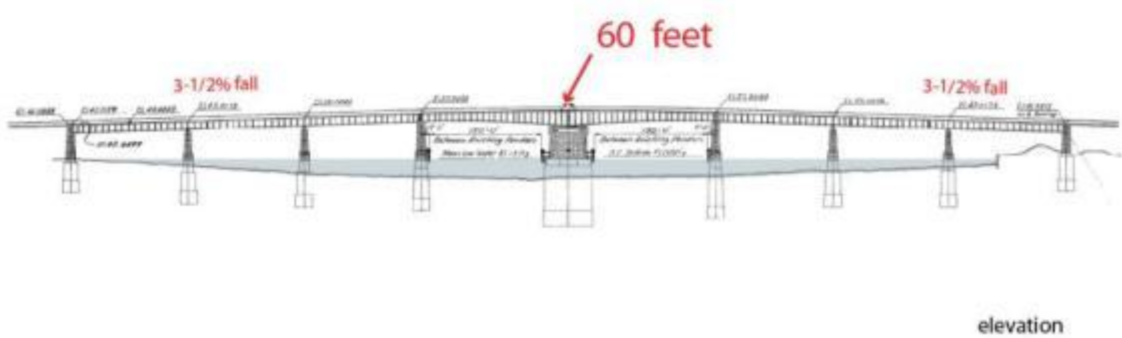

Figure 25: South Capitol Street Bridge Existing Section Elevation

Standing at center of the bridge, 60 feet above sea level you begin to experience a new vantage point of the surrounding city. The topographic relationship of the Washington Monument and the Capitol that lies on axis with South Capitol Street is visible on a map showing elevation at 60 foot color intervals (see Figure 22 below). By enabling a freer pedestrian experience, visitors will have new way to see the city. While the potential of reusing the existing bridge as an elevated park is possible, issues of accessibility presents a major challenge in bringing pedestrians to the elevated surface level of the bridge.

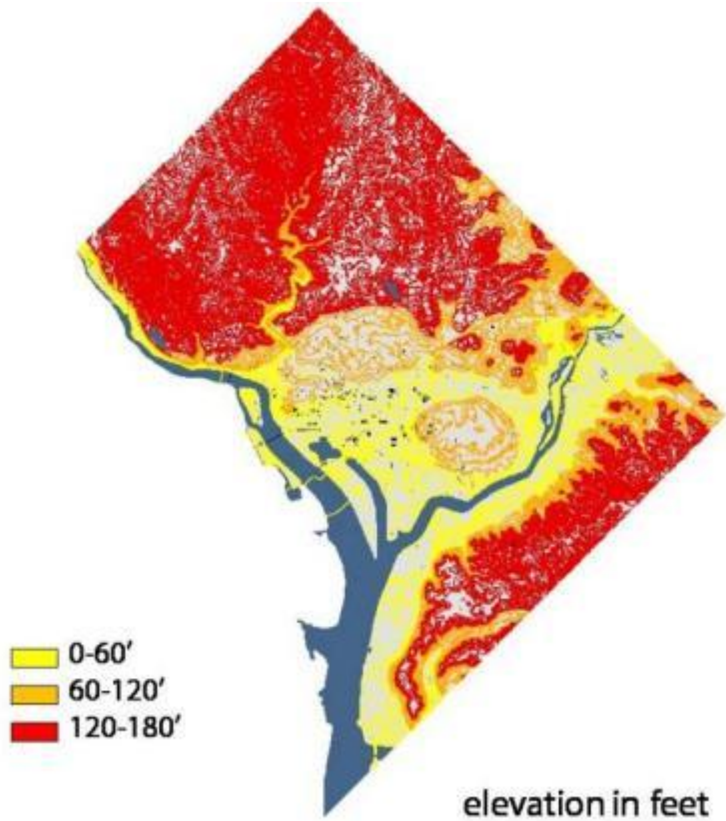

Figure 26: District of Columbia Topographic Study [Aroom]

Figure 27: Existing Habitat [Aroom]

Environment

The site is also used by many animal species; in many cases their habitats are leftover spaces adjacent to the river. Visible effects are evident along the edges of the Anacostia River. This is a constraint on development. With any proposal, environmental sensitivity is as important as is allocating space for new habitats to develop. The habitat areas surrounding the site can be improved by adding plant species found in the Anacostia Watershed. In addition, river's water quality will be improved with plants used to clean and filter the stormwater run-off from urban sites. Places along the river's edge offer visitor's opportunities for recreation, observation, and education. Encouraging a connection with the water will engender a new appreciation and respect for its role in a healthy city.

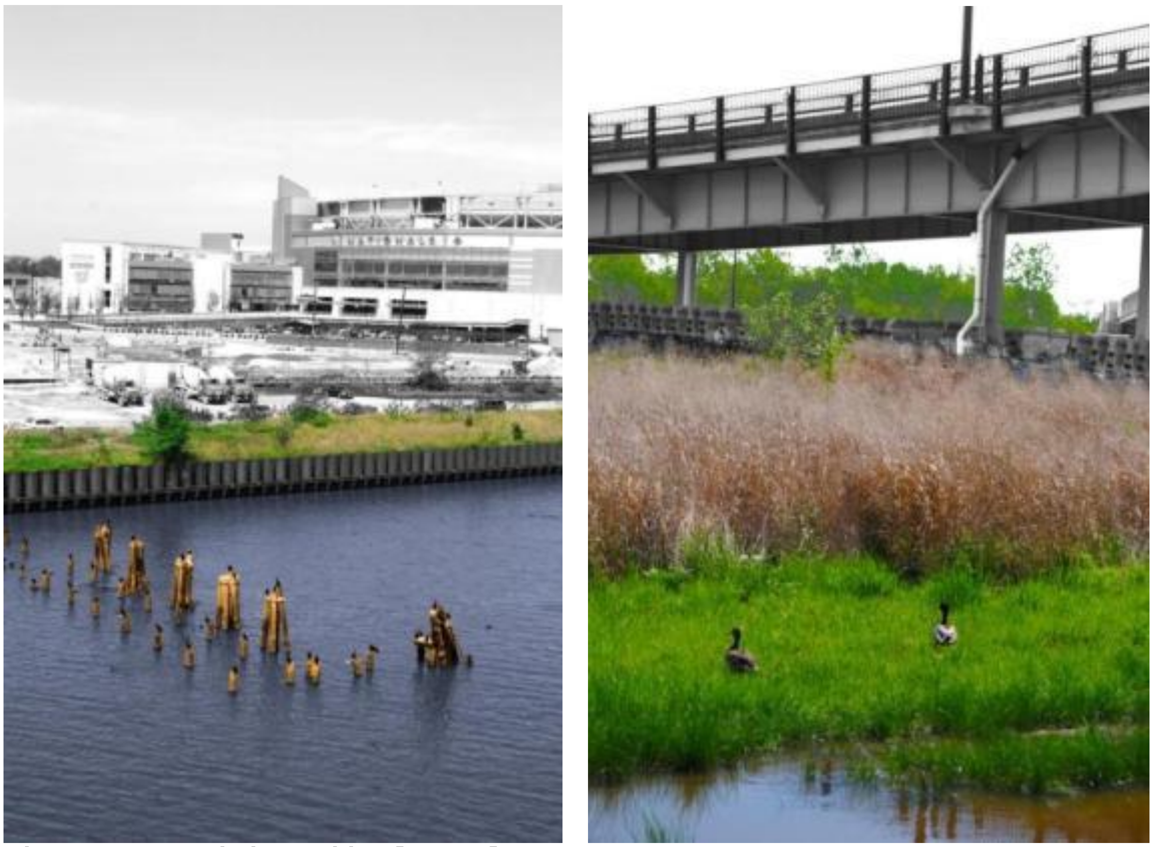

Figure 28, 29: Existing Habitat [Aroom]

Program

Figure 30: Design Principles [Aroom]

Design Principles

- Preservation of historic details and revealing these details to the visitor.
- Promote a diversity of plant life, using plant species that can not only grow on the bridge, but also within the Anacostia watershed
- Dedicate pedestrian and bicycle paths to encourage a wide variety of users, separating pathways not only creates flexible space, but also an active one

- Provide for a variety of uses, including recreation, exercise, picnics, or the daily commute
- Engage the Anacostia River with a park that retains not only views towards the river, but also provides different levels of interaction and engagement along the edge
- Connect the urban fabric keeping the park linked to the greater planning framework of Washington. DC

Special Issues

- Accessibility: Pedestrians on the northern end may use an elevator and on the south side the design retains one of the existing on-ramps as an access point.
- River traffic accessibility: In order for the turnstyle to remain functional, the overall design must allow for the central spans to rotate. A series of security gates currently keep vehicles and pedestrians away from the edges while the bridge is open. Incorporating these safety measures is important if the proposed program will allow for the bridge to open.
- Structural and mechanical implications: Where interventions are made to the bridge secondary structure, the primary structure must remain intact. Design elements should be located at optimum areas to minimize additional construction costs in modifying the bridge structure.

Design Approach

For centuries, bridges have aided in traversing challenging landscapes across edge conditions. These connectors often serve as effective catalysts for development. Washington can be compared to Paris as a city of bridges, where bridges are vital for the city to function. To highlight the connection in different ways, it is important to understand the definition of a bridge in design vocabulary.

Figure 31: Study Model infrastructure green space overlay [Aroom]

According to Merriam Webster's Dictionary, a bridge is defined as:

a: a structure carrying a pathway or roadway over a depression or obstacle

b : a time, place, or means of connection or transition

Both definitions have an important meaning for a bridge's performance. A bridge is identified as a means to overcome an obstacle, in the South Capitol Street's case, this is water. Water has always and will always be the strongest litmus test of our planet's eco system, and the environmental quality of cities. Throughout the design process, this project works to define the notion of movement along a river. A river in many ways connects just as a bridge does, and that is the design core of RIVERPARK.

River valleys connect complex systems of habitats. The primary design factors defining the experience of moving through the park were inspired by movement along a river valley.

- Vision: What do people see and how does this affect the experience

  landscape is a way of seeing – Dianne Harris (Hariss, 2007.)

- Predictability: The precision and sequencing of spaces, how are spaces framed through the use of plantings and materials to create and control views through nature

- Topography: Just as a river valley has places of exposure and changing elevation, the design offers a range of enhanced paths and spaces with distinct character.

  extrusion of vantage, visual experience, and tactile experience – M. Ponty (Ponty, 1965)

- Vegetation: What plants will grow, and how can they provide habitat and seasonal interest to the site with minimal maintenance requirements.

  emergent landscapes through controlled boundaries – James Corner (Corner, 1999.)

FRAMEWORK

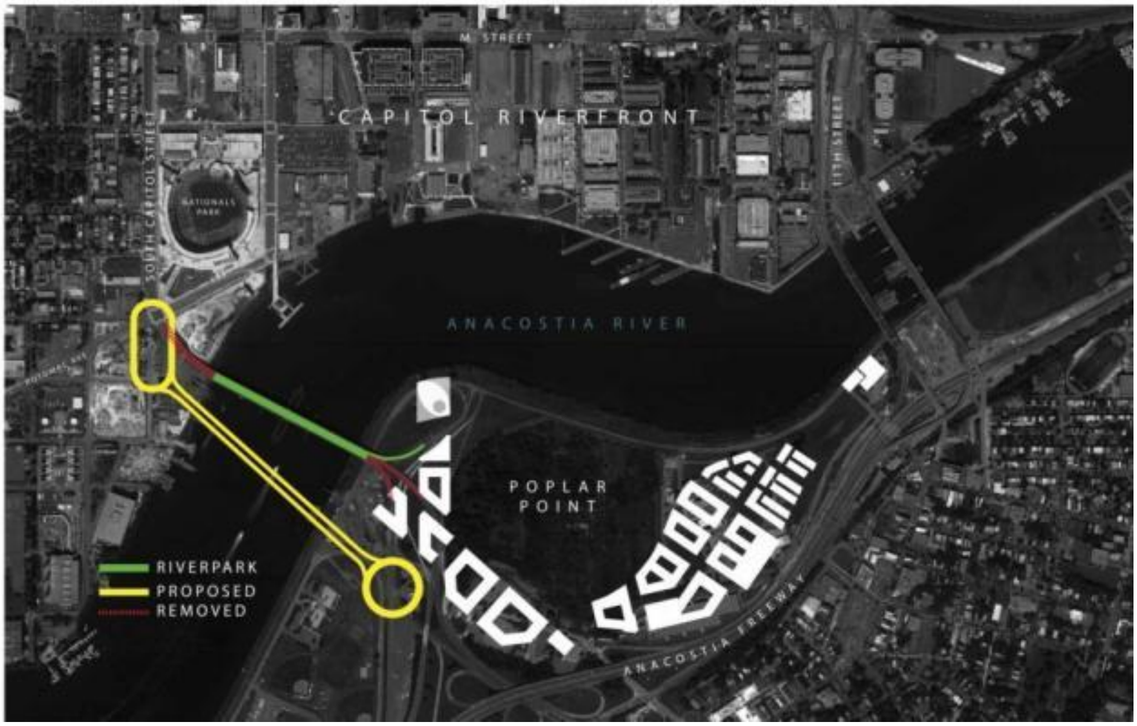

Figure 32: Framework plan [Aroom]

Framework

Riverpark has several pathways that enable visitors to experience prospects while moving through the park. These pathways are intended to reference movement along a river valley. Visitors on foot can selectively choose their path either along the center of the bridge or along the edges of the park with views of the Anacostia. A dedicated cycleway gives bicyclists a unique way of crossing the river. As an uninterrupted sequence, the cycleway not only serves as a thoroughfare for commuters, but also has recreational opportunities as well. The park has four distinct green roof planting characters, Bosque, Native Meadow, Flowering Meadow, and the Lawn Terrace. Each area has a design meant to reinforce views and respond to the environment over the river.

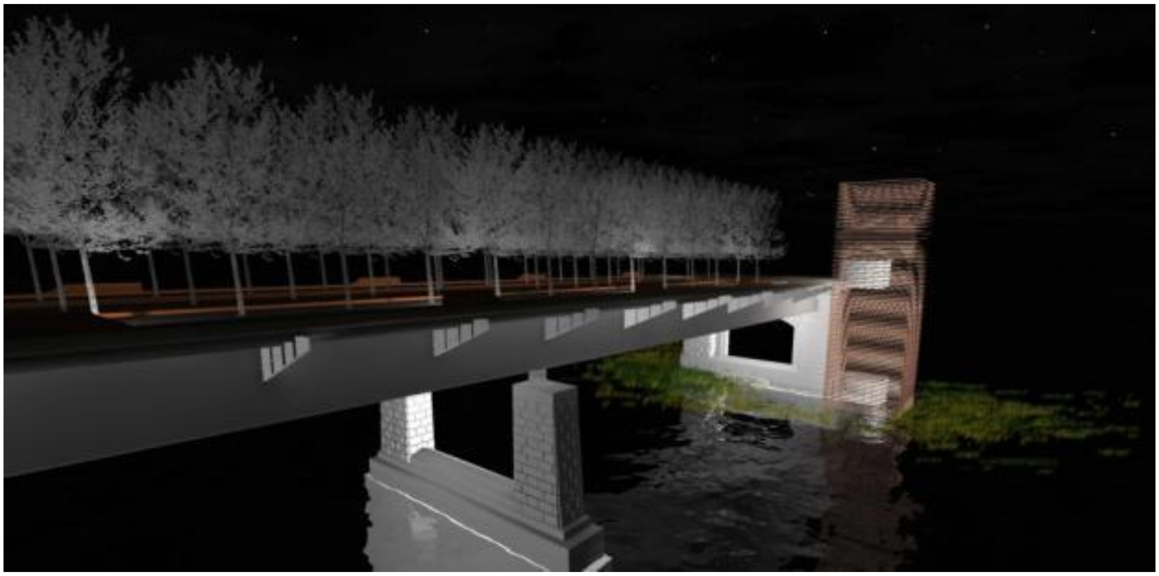

Figure 33: Concept Perspective of Riverpark [Aroom]

Lighting

Depending on the time of day, there are varieties of experiences that occur both above and below the bridge. In order for the new Riverpark Bridge to become a vital pedestrian and cycling link for the city, it must be a fully accessible during all times of the day and night. One of the challenges of the design was to activate and to highlight the bridge at night for the benefit of the users and as an addition to the urban night views along the riverfront.

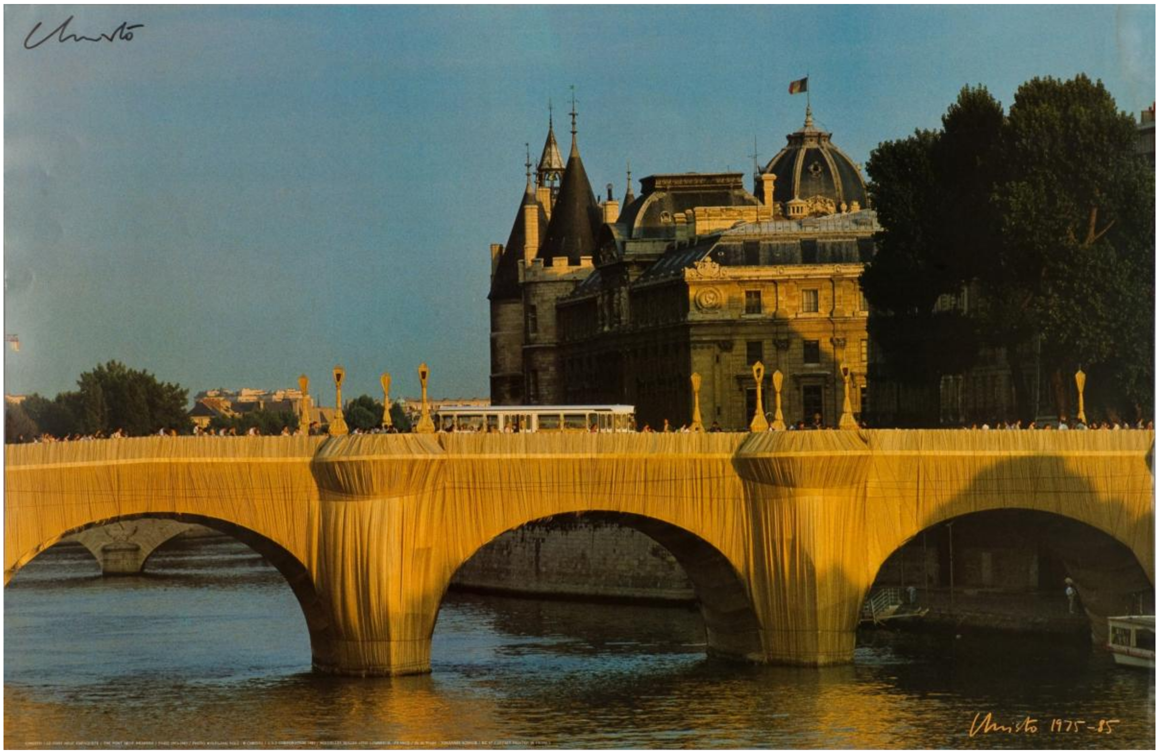

Figure 34: The Pont Neuf Wrapped, Paris, 1975-85 [Wolfgang Votz.: Christo 1985-2005]

The work of environmental artists Christo and the late Jeanne-Claude aims to change the perception of familiar landscapes through simple interventions. Pont Neuf is an iconic bridge in Paris, France. In 1985, they concealed the recognizable bridge with lightweight fabric and cable. Drawing inspiration from this work, Riverpark lends the idea of wrapping the bridge in light in order to change the perception of it at night.

Using light as a medium, Riverpark is connected visually to the ground plane by illuminated columns supporting elevators to the upper level. Determined by the time of day and position of the translucent illuminated elevator cars, dynamic patterns of light are cast against the copper structure and reflected on the river at night. The cladding is expected to eventually oxidize and take on a green patina with age allowing it to blend with the surrounding vegetation.

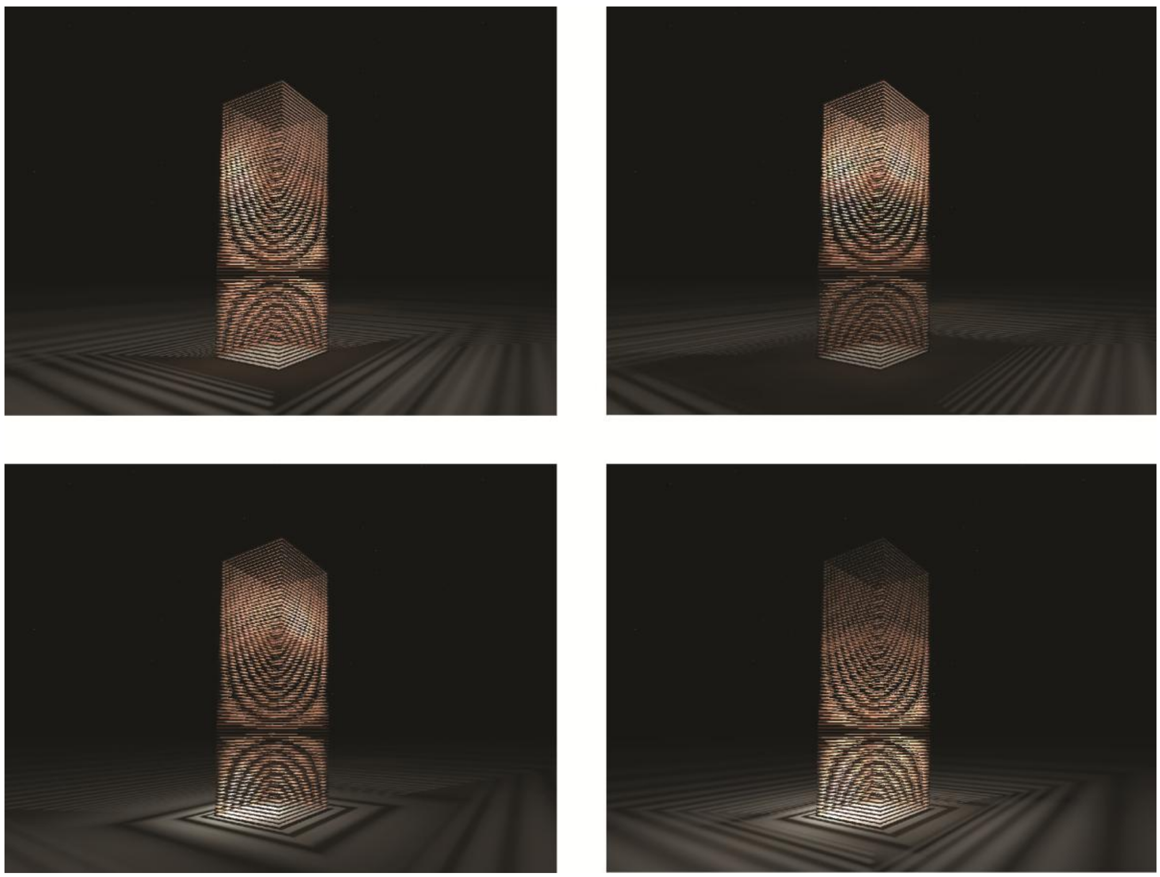

Figure 35: Elevator Digital Lighting Study Model [Aroom]

Figure 36: Riverpark Structure Lighting Study [Aroom]

Figure 37: Suspended Cycleway Lighting Study [Aroom]

Cycleway

Through the use of a suspension system, the Riverwalk's cycleway introduces a new experience of the Anacostia River. A continuous 16 foot wide path offers the flexibility to allow for large numbers of bicycles to cross in either direction. The cycleway path is designed to accommodate smaller maintenance vehicles that will be required to maintain the park. Reinforcing the notion of movement along a river, the path has places of elevation change to add a rhythm to the journey. The cycle path cuts below the surface level of the bridge to allow cyclists to see the underside structure of the bridge. Visitors descending the northern end pass between masonry piers of the bridge seeing the craftsmanship, detail, and scale of the stone structures that support the steel girders above. Incorporating the theme of light, recessed within the cycleway is a light band that divides the directional path and illuminates the bridge with a soft glow during low light conditions.

Figure 38: Riverpark Cycleway Elevation [Aroom]

Figure 39: Concept Perspective of Riverpark Bosque [Aroom]

Bosque

Visitors ascend to the park level and arrive to a bosque of birch trees. The formal design does not try to mimic a natural forest; instead it works to blend in with the engineered infrastructure by being located above the steel beams that support the concrete planters. The trees are strategically placed on the ends of the bridge to take advantage of the existing structural support, and to establish a visual hierarchy connecting the architectural scale of the bridge to the ground plane below. Cor-ten steel edging is used for thin clean lines between path and planting material while supporting seating that extrude from the pathway surface.

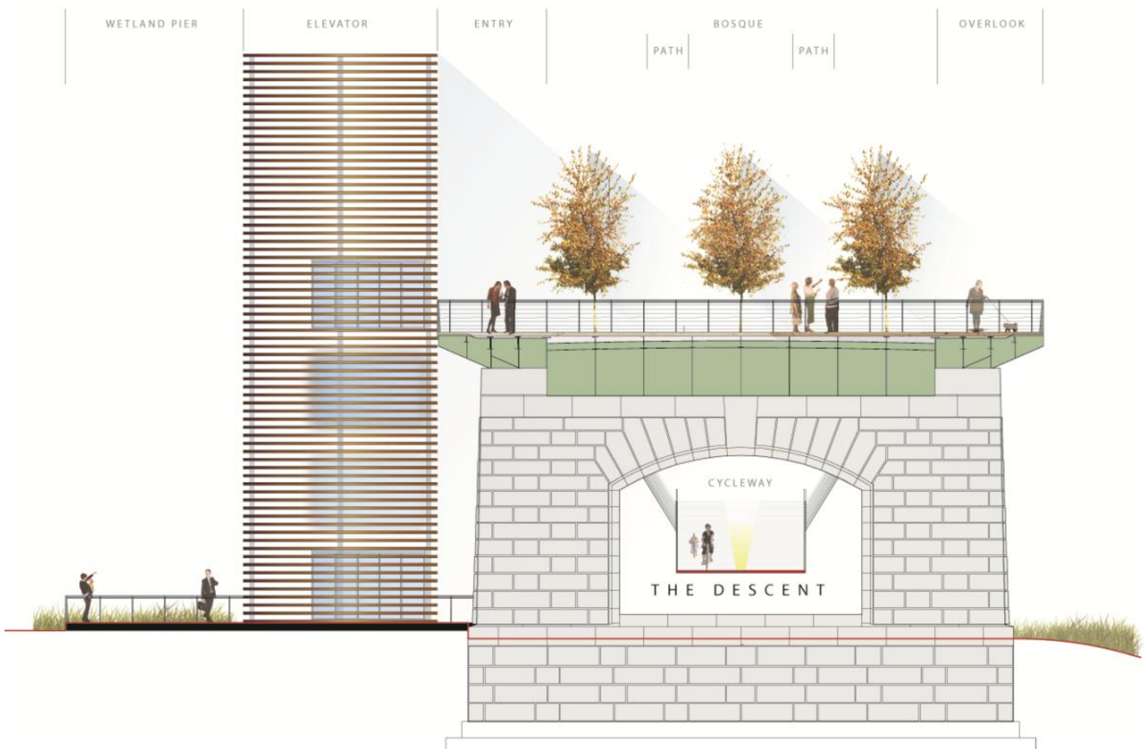

Figure 40: Riverpark Entry Section [Aroom]

The root depth of the tree plantings will require larger soil containers than in other portions of the park. Trees will need to be tolerant of different microclimates at the elevated position of the bridge. Locations of the trees will need to correspond to the system of horizontal steel beams that support the concrete platform above. Connecting the concrete tree planters will aid in irrigation and drainage in the event of heavy rainfall. Gravel pathways that line either side of the Bosque will offer distant views of the Anacostia Riverfront. Visitors who desire to feel more secure while crossing the bridge can choose to walk on the interior pathways, separated from the parks edge with the protection formed by the formal allee of trees. Below the rows of deciduous trees are varying plant materials that bring added seasonal interest to the bosque. Moving through the formal allee, visitors are directed to an area planted like native meadows found along the river's edge.

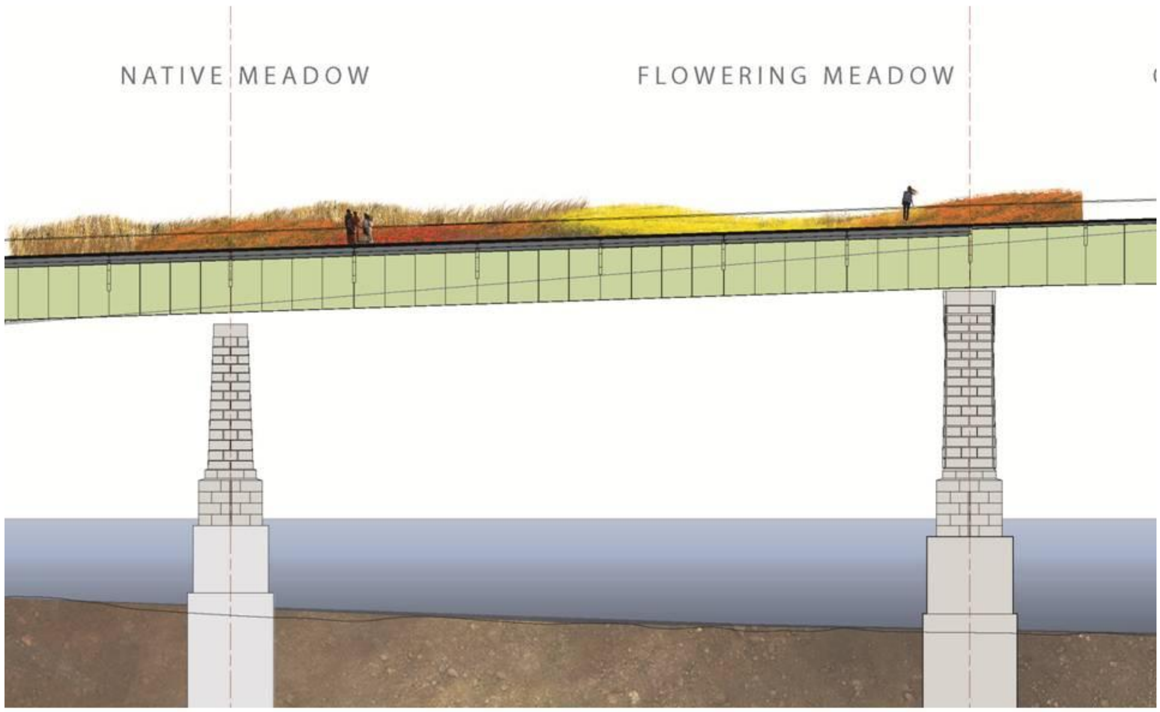

Figure 41: Riverpark Elevation of Native Meadows [Aroom]

Meadows

Tall grasses channel views and respond to wind patterns symbolic of changing currents in a river. The use of native grasses allow for a planting structure that has higher height potential with minimal root depth required to thrive. With an average root depth of 8", selected native grasses, such as Adropogon, are also more resilient to drought conditions and can be irrigated with water taken directly from the Anacostia River. Through the use of structural soil, subtle changes in topography are intended to resemble rolling prairies along a river.

Figure 42: Meadow Planting Examples [Aroom]

Beyond the tall grasses are flowering meadows which provide seasonal interest and color. Lower in height, these planting areas are intended for visitors to explore and to observe changes as the landscape continuously evolves through the seasons. Flower groupings planted to correspond with blooming patterns will ensure a dynamic color palette across the meadow during the year.

Figure 43: Riverpark Canyon Concept Perspective [Aroom]

Canyon

Along the southern end of the Riverpark cycleway, bicyclists ramp below the surface level of the bridge through a steel canyon symbolic of the erosive power of a river. The canyon walls are fabricated with layers of Corten steel which will oxidize to a brilliant ferrous orange color mimicking rock formations in the Southwestern United States. The panels are also used as structural walls to prevent pedestrians and plant material from falling into the canyon descent and to support the cycleway recessed below the surface level of the bridge. A crossover walkway provides the physical separation of pedestrian traffic overhead offering elevated observation points over the cycleway while enabling uninterrupted movement through the park. Native grasses grow to mature height just above the edge of the steel panels providing a visual reference for cyclists moving along the pathway.

Figure 44: Canyon Section Elevation [Aroom]

Turnstyle

At the center of Riverpark is the turnstyle. In order to allow for the center of the bridge to rotate, additional weight was minimized by providing an open lawn. The turnstyle lounge is a small structure that separates the bike path from the green, and is furnished with movable seating and a refreshment station. By creating this amenity for visitors, more use the space. Below the central turnstyle, the existing wood pier over-structure has been reused to hold aquatic vegetation held in floating planter boxes. Riverpark draws water from the Anacostia River in the center and irrigates the green bridge with the gentle slope in either direction. Through the process of pumping water from the river and cleansing it in the elevated landscape, the park effectively acts as a filter. Educational signs are placed throughout the park to identify plants and their function in the Anacostia Watershed.

Figure 45: Turnstyle Section Elevation [Aroom]

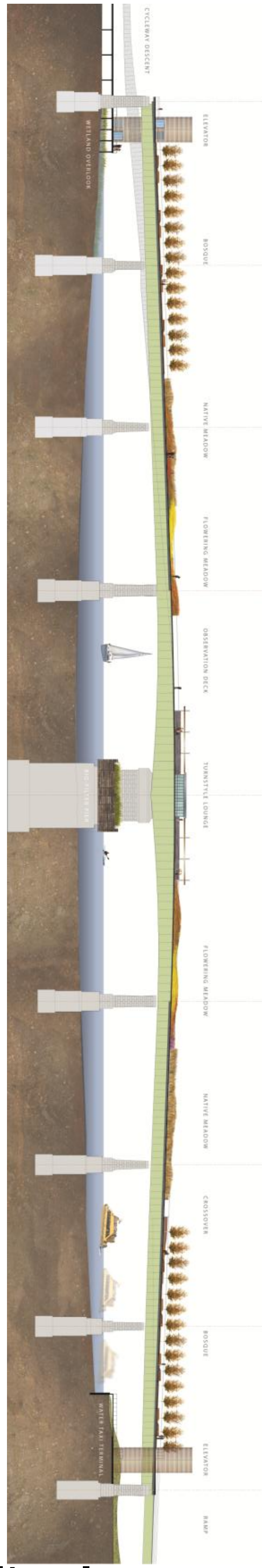

Figure 46: Riverpark Elevation [Aroom]

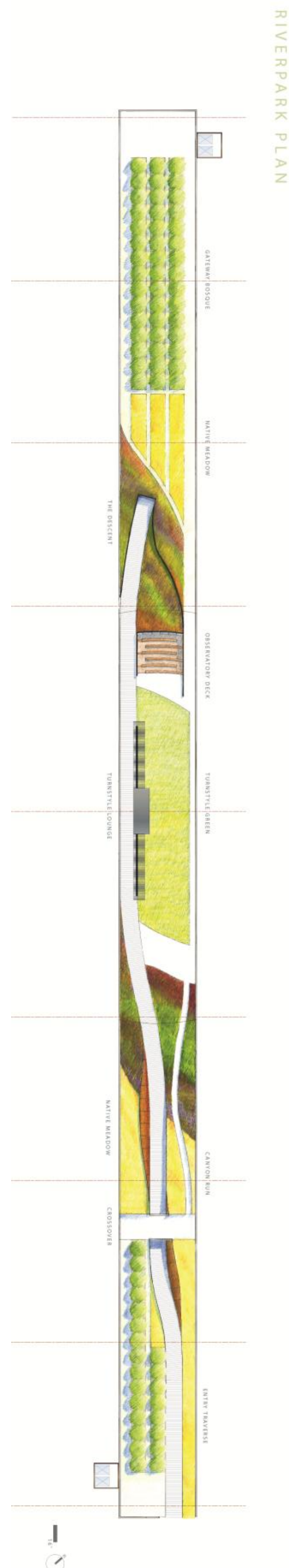

Figure 47: Riverpark Plan
[Aroom]

Conclusions

Summary of lessons learned in the design process and final proposition

Transportation infrastructure has developed pragmatic approaches to accommodate vehicular traffic across the landscape. Grounded in the urban setting, Riverpark's design reinforces greater connections along both sides of the Anacostia. Working with an existing bridge, in order to develop an implementable design, the structure required a thorough analysis of its detailed components. Preserving details designated with historic significance required restraint altering the existing structure. Because urban space is accessible to the public, safety is a large concern of the program. Some debate has occurred regarding dedicated pathways for pedestrian and the bicyclist. Determining separate program paths for these user groups was done for safety considerations. Further investigations could determine if this is necessary based on demand and time of day throughout the park. The over arching goal achieved was to provide varying methods of connecting users across the Anacostia through a dynamic landscape experience.

Reflections on development of the proposition since the public review

Public spaces are most successful when they are freely accessible. Reliance on an elevator as the primary means to transfer pedestrians from the ground plane to the upper bridge level of Riverpark was controversial. While pedestrians in this design have the use of the cycleway descent ramp to the upper surface, or an elevator even though this causes a momentary disconnect of a continuous pedestrian experience. The design of the elevator is part of the overall program and is part of the movement experience. Providing filtered views of the river while elevating or descending instills a sense of rhythm and connection. This not only is experienced inside the illuminated elevator cars, it is also present to the viewer outside the illuminated elevator column. Materials are intentionally chosen to blend with the surroundings and not to compete with the bridge surroundings.

Further investigation is required to explore the notion of using the bridge infrastructure as a filter. While the idea of pumping water from the central pier through a vegetated filter was conceptual in this design, the premise that water could be cleansed through the park can be realized. Just as native grasses line the Chesapeake Bay and are critical to water cleansing functions, they also provide habitat for many wildlife species. Suggesting a cyclic process that was not dependent on external water supplies was the motivating factor of plant choice in this design. Riverpark connects visually and ecologically, building stronger connections between both sides of the city and creates a more functional landscape. This thesis actively engages the realm of infrastructure and demonstrates how design adaptation can support ecological urbanism.

References

Bednar, Michael J. L'Enfant's Legacy: Public Open Spaces in Washington, D.C. Baltimore [Md.: Johns Hopkins UP, 2006. Print.

"Bikestation Washington, D.C. Signals Growing Interest in Alternative Transportation." *Journal of Transportation* (2003). Web. <http://s3.amazonaws.com/ameravant-bikestation-com-production/files/43/original.pdf>.

Corner, James. Recovering Landscape: Essays in Contemporary Landscape Architecture. New York: Princeton Architectural, 1999. Print.

Designing the High Line: Gansevoort Street to 30th Street. New York: Friends of the High Line, 2008. Print.

Fisher, Irving D. Frederick Law Olmsted and the City Planning Movement in the United States. Ann Arbor, MI: UMI Research, 1986. Print.

Gehl, Jan. Cities for People. Washington, DC: Island, 2010. Print.

Harris, Dianne. Sites Unseen: Landscape and Vision. Pittsburgh, Pa: University of Pittsburgh, 2007. Print.

Jacobs, Jane. *The Death and Life of Great American Cities*. New York: Vintage, 1992. Print.

Kelbaugh, Doug, and Kit Krankel. McCullough. Writing Urbanism: a Design Reader. London: Routledge, 2008. Print.

Litton, R. Burton., and Robert J. Tetlow. Water and Landscape: an Aesthetic Overview of the Role of Water in the Landscape. Port Washington, NY: Water Information Center, 1974. Print.

Lynch, Kevin. The Image of the City. Cambridge [Mass.: Technology, 1960. Print.

Manfredi, Michael A., and Marion Weiss. Weiss/Manfredi: Surface/subsurface. New York: Princeton Architectural, 2008. Print.

The Nation's Capital: Policies Plan for the Year 2000. [Washington, D.C], 1961. Print.

"Newsroom: American Community Survey (ACS): Most of Us Still Drive to Work — Alone." *Census Bureau Home Page*. Web. 14 May 2011. <http://www.census.gov/newsroom/releases/archives/american_community_survey_acs/cb07-cn06.html>.

Ponty, Maurice M. "The Primacy Of Perception." Philosophical Books 6.2 (1965): 20-22. Print.

The Proposed Comprehensive Plan for the National Capital. Washington: Commission, 1967. Print.

The South Capitol Gateway and Corridor Improvement Study. Washington, DC, 2003. Print.

Tatom, Jacqueline, and Jennifer Stauber. Making the Metropolitan Landscape: Standing Firm on Middle Ground. New York, NY: Routledge, 2009. Print.