The Agency of Earth on the Site of the Design

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ABSTRACT

Earth as a fundamental aspect of the existing conditions of a site has/can/should have agency in design, both historically and today. The aim of this study is to describe the agency of earth in design as a common premise between the disciplines of architecture and landscape architecture. The thesis question is “how can the earth on site have agency on the design?”

Thinking of the physical earth, specifically the topography, as one of the basic structures of the existing conditions, the earth should be taken as the most important condition that both architecture and landscape architecture use and share; both disciplines have to deal with context; they both have to deal with surroundings, and then work within systems that exist around them. As landscape architecture has been incredibly important to civilization throughout history, this project looks at different ways that earth has agency in design through important periods of history, from Greeks to contemporary design. While there are many examples in which designers have worked with the existing topography, there are other cases across cultures where people have drastically altered topography. Thinking about those designs, there are many possible answers to this thesis question from using existing hills to making mountains.

This thesis explores the creation of an artificial mound, as a monument to indigenous people, in order to revive the missed parts of the earth and empower the ground. The thesis rethinks the whole ground, protecting the earth by turning excavated soil into an important earthwork. The design is not only about creating an earthwork for people, it also transforms invisible earth into a visible structure. Based on the practices of Native American mound builders, the earthwork stands for the values of diversity and equality in the US, creating a gathering space for all people made of the native earth/soil.

The Agency of Earth on the Site of the Design

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GENERAL AUDIENCE ABSTRACT

Earth as one of the existing materials of a site constantly affects the process of the design. This study focuses on describing and improving the use and understanding this material shared by the disciplines of architecture and landscape architecture.

As landscape architecture has been incredibly important to civilization throughout history, this project looks at different ways that earth has affected design through important periods of history, from Greeks to modern design. Considering many examples in which designers have worked with the current land, there are other cases across cultures where people have changed earth. Thinking about different designs, there are many possible answers to this thesis question from using existing hills to making mountains.

This design is an artificial mound as a monument to indigenous people and it is about reviving the missed parts of the earth in order to empower the ground, rethinking the whole earth and protecting it, turning it into an important earthwork that is not only about something for people but also making it into something which in invisible situations it cannot be. Based on the tradition of Native American mound builders, part of this thesis is to affirm the value of diversity and equality in the US, through creating a gathering space for all people that pays special attention to indigenous culture.

DEDICATION

To my parents and sister,

for their never ending love and unconditional support.

To my Shayan,

for his patience, kindness, and his continuous support and encouragement.

To my chair committee,

for his endless guidance and motivation what I could never have done on my own.

To my committee members,

for their believe in this thesis and guiding me throughout the MLA program

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I. INTRODUCTION

This study emphasizes the concept of earthwork which is one of the most important premises of landscape architecture and architecture and has a strong voice in great designs. “The idea that the earth is an objectifiable resource is under widespread and increasing criticism; it can form the design and be formative.” (Leatherbarrow 1999)
The relationship between the two fields also requires reconsideration since conflicts between proponents of difference and sameness have enlivened discourse for decades. Landscape architecture has been incredibly important to civilization throughout the history, but no one was calling it landscape architecture historically, it was just a way of life. It was also the same for the architecture as a profession. Leatherbarrow suggests in his book, Topographical Stories, that the overlap between landscape and architecture is topography, which is a premise that two fields share. Regarding the issue of the agency of earth in design, in many projects the ground is figured by design, whereas it can be found in other contexts that there is a particular topography which has an underlying deep structure. For example, if we look to the Greeks, it is found that they took advantage of their lands to site buildings in the landscape. The temple would usually rest on either a spur or an outcrop of the containing hills or mountains, from which it had been quarried and with which it still seemed to be in harmony. This thesis will examine different ways that earth has agency in design through the important periods of history in order to determine a best design move to empower the earth, rethinking the whole ground and taking that it basically needs a particular protection.

THE RELATIONSHIP BETWEEN LANDSCAPE AND ARCHITECTURE

“Not really the same, nor entirely different, architecture and landscape architecture are quite simply similar to each other.” (Leatherbarrow 2004, p1) Leatherbarrow writes about this relationship throughout history. Based on his research he points out that some traditional critics made comments about the history of the two professions, architecture and landscape architecture, being like a parent and a child. This is surprising for me to take them in that way. It seems more obvious that they are twins, who are simultaneously the same and different. They sometimes share certain premises and yet have their own identities. Then if we ask who the mother of the twins is, the answer is the earth.

Figure 1. Collage representing the relationship between Architecture and Landscape Architecture

Now that we consider the earth as the one who gave the architecture and landscape architecture birth, then it has something fundamental which is behind both of them, topography. “Landscape provides a framework for architectural thought because it is inescapably ambient, or, as I have come to call it, topographical”, Leatherbarrow says. While it is important to consider the geometry and shape of the buildings and the landscape, other formal considerations are more interesting as they are noticed in connection with cultural meanings they hold, even invisibly. “The topographical structure of many urban places is all but invisible, having undergone centuries of change as part of the process of urbanization. Being aware of the topographic past and its history of alteration provides a much broader temporal background to make effective and imaginative decisions in the present.”(Dripps 2005, p.69)

Given the technology that we now have, the earth is getting more invisible in contemporary designs than the past ones in which it is more present. It seems that people were less likely to cover the earth up and erase it and move it, because it was so difficult to do that in terms of its costs and challenges, and more importantly, they respected it for what it was, not just what they could make of it.

Figure 2. Michael Heizer, Double Negative

Figure 3. Robert Morris, Land reclamation as sculpture

THE AGENCY OF EARTH THROUGHOUT HISTORY

- *THE ANCIENT GREEKS DESIGNS*

The aim of explaining the relationship between the experience of nature by Greeks and the formation of Greek identity and culture is to point out the interactions of Greeks with nature in particular, which was shaped most basically by the way they existed –dwelled on earth, which, in turn, shaped the way they built upon it.

As shown by Waterhouse, the earthy aspect of Greek architecture and city planning was apparent in their effort to legitimize the "rude" act of construction by articulating and dissolving the boundaries between what is 'natural' and what is 'man-made'. (Waterhouse 1994, 100-104)

Pregill argues that rather than attempting to site theaters on terrain that was topographically inappropriate, especially on land that was susceptible to flooding, the Greeks selected sites along hillsides, taking advantage of the prevailing slope and the elevation above seasonal flooding. Hillside siting also allowed the Greeks to sculpt the structure out of the land and to form acoustically functional space. Epidauros, sited on the eastern edge of the Argolid region, flourished as an important hilltop settlement from the first millennium acting as a bit of terracing to make a place for people to enjoy seeing poets, athletes and dancers.

Figure 4. General view, Sparta

Figure 5. The Theater of Epidauros sited into a hillside with spectacular views to the surrounding landscape.

- THE NATIONAL MALL AT WASHINGTON D.C.

As we move forward in history, designers are more intend onto moving hills and change the topography much more. An example here is the National Mall, where the earth both reveals itself in design and was dramatically altered at the same time; in fact it indicates two ways of working with topography. In this regard, L'Enfant considered the hills on which to site buildings and a large relatively level space for the mall firstly. The Capitol and the Washington Monument were built on existing hills. Then later in the 1920s, another idea was examined when an entirely new hill was built for the Lincoln Memorial in the old path of the Potomac river. Hence, the earth can have agency when designers make hills where they did not exist or where designers work with existing hills.

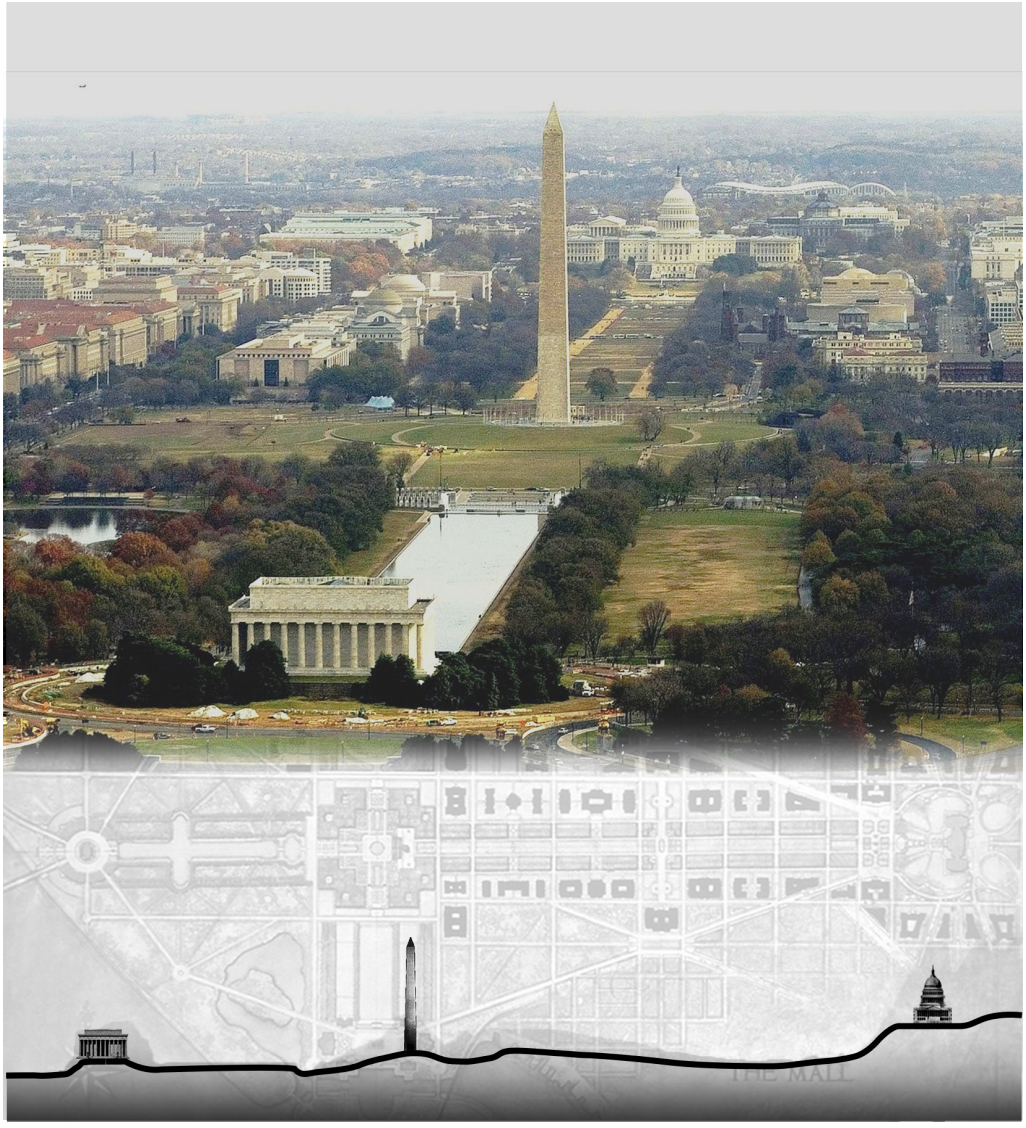


Figure 6. The National Mall in Washington D.C, South view, and the longitudinal section drawn by Raena Rahimi Bafrani.

- CONTEMPORARY DESIGNS

After looking at how earth has had agency on design in important periods of history, particularly the Greeks and 18th century America, now this study leads us to the current period: contemporary designs. In fact, there are different ways that earth has agency in design, both historically and now. Accordingly, a transition from respecting the existing topography in designs to completely moving and shifting it can be found. Currently we are in a period of history where it is still costly to move a lot of earth, but more possible. In this respect, the hills (Governors Island in New York) exemplifies this idea. The four Hills embody all that makes Governors Island unique: art, play, nature, relaxation, and view. (West 8)

Figure 7. Liberty view, from the top of Slide Hill (from Archdaily website)

زمین-

Thinking about those examples mentioned in this research so far led me to get more familiar with different terms related to earth since it reveals a variety of figures through the different cultures; earth, ground, terrain, land and topography. As a native Farsi speaker, there is only one word referring to all these terms: زمین , ZAMIN

Understanding the meaning of each term was difficult for me which made me look at the relationship between them and to find out how they are each distinct and how they each would contribute to my design. After exploring a number of studies, I realized how each term is related to the earth itself. Topography is a surface and the surface is how we know anything and that is what we interact with, but the earth is an entity or totality.

Figure 8. Collage showing the variety of terms related to the concept of earthwork

II. THE PROJECT

PROBLEM SETTING: HARMED EARTH

Based on the studies on the agency of the earth and investigating the physics of the earth, it led me to the question of what types of problems I could set to approach the goal of this thesis. I found out that there are some tools which are actual design moves that landscape architects have or can make in order to empower the earth. Therefore, this whole thesis is based around something that has to do with an inherent value to the particular ground. What are those inherent values? Forgotten areas of the city? Where sea is coming up higher? Topographic situation in the city? Based on these thoughts, I decided to look at missing parts of the earth or the invisible situations of the city and revive those missed parts as the practical aspect of the landscape problem related to thesis project. Based on my knowledge, the problem is something that needs to be fixed or changed. Hence, I tried to find a place that I see as problematic in terms of earth which has been harmed in some way or the ground has been treated.

CASE STUDY: WASHINGTON DC CLEAN RIVER PROJECTS

According to those observations, I realized that there is an important question in front of me, what people are doing with the earth that is the problem? My understanding of this question is that there are several ways that people treat earth which may cause the problem. Here is the question: what are those treatments? One of the answers that I found is making and building tunnels in the Potomac River for wastewater.

Basically, there are two tunnels: the Potomac River tunnel and the Anacostia River tunnel, which divides into different tunnels like northeast, first and blue plains channel. But the point is that all of the DC CSOs (combined sewer overflows) fall into the Potomac River which is the reason they came up with the idea of tunneling. The green infrastructure marked in figure 10 are in the Rock creek and Potomac drainage, places areas targeted for sewer separation.

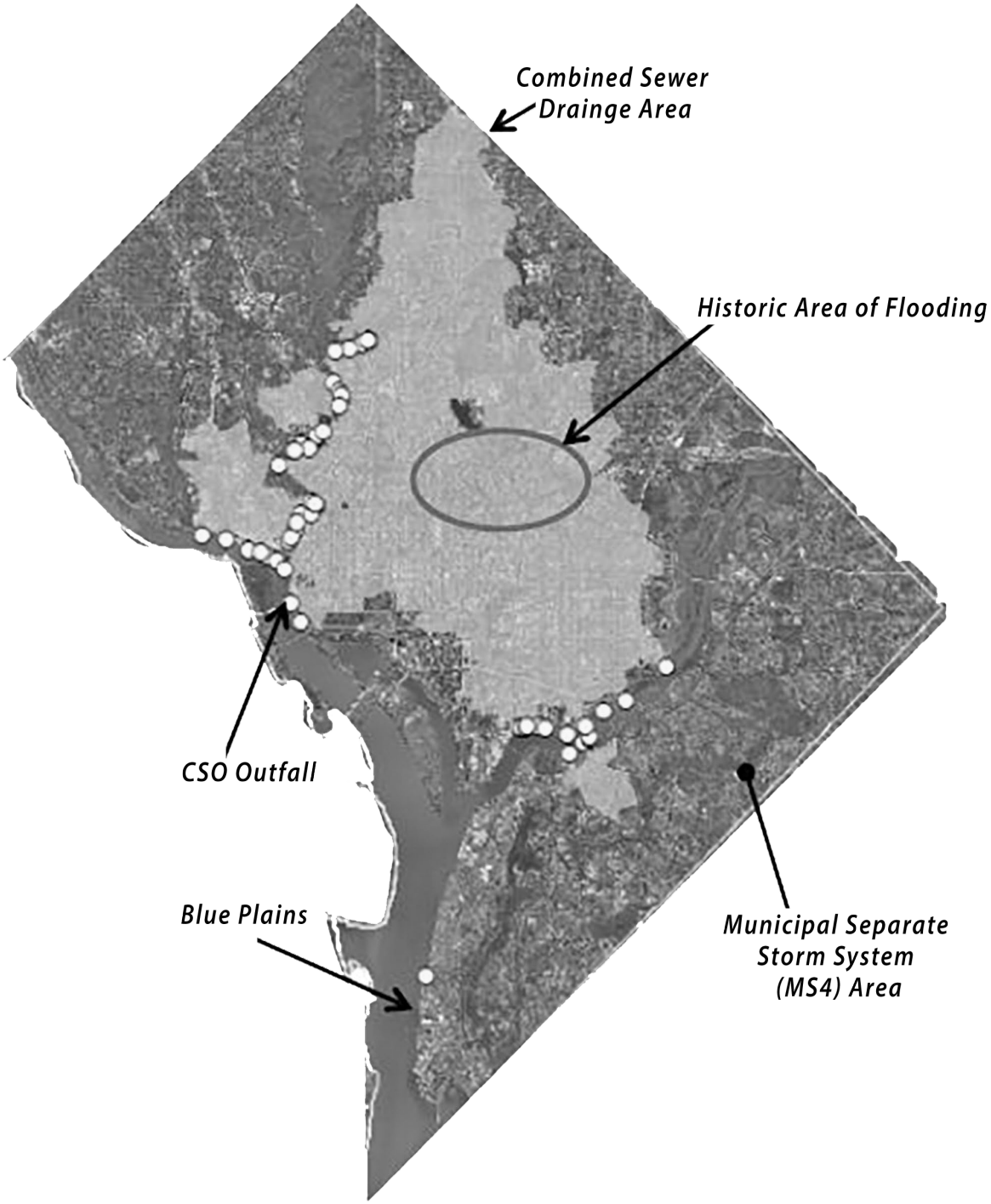


Figure 9. DC Clean Water Projects, Magnitude of the Challenge: CSO Control

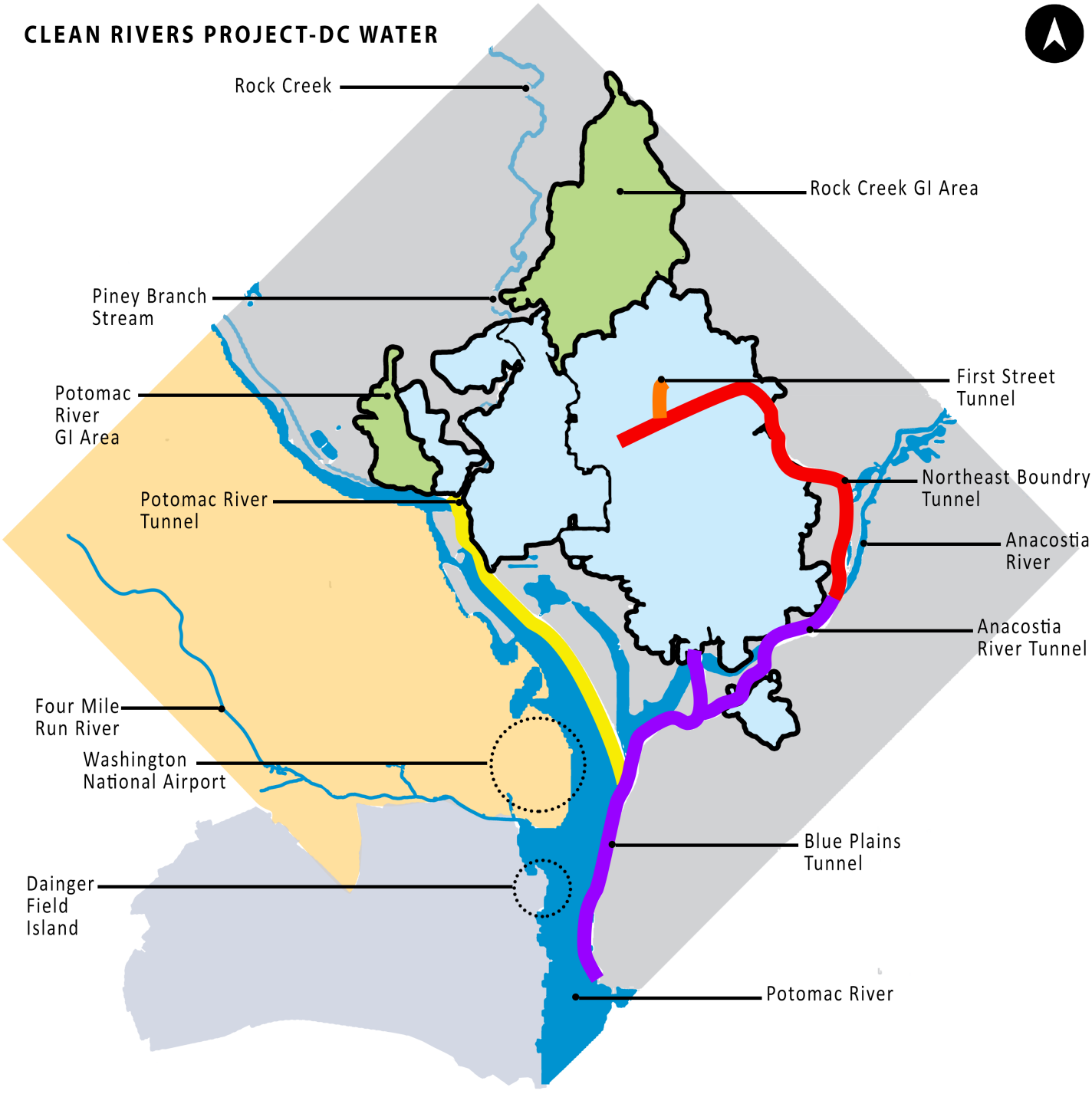


Figure 10. Clean Rivers Project - DC Water

POTOMAC RIVER TUNNEL

The main focus in this research is on the Potomac River Tunnel which is still in the process of design. This project includes 18ft Diameter Tunnel, 6 Shafts, 1.2 miles of Hard Rock Ground Tunnel, 3 miles of Soft Ground Tunnel, and the Project Status is On-line 2030. On this map you can see the tunnel itself which goes 4.2 miles from the rock creek to the Anacostia River, the shaft locations, you can also find that some part of this tunnel is underground and other parts of it are under the river.

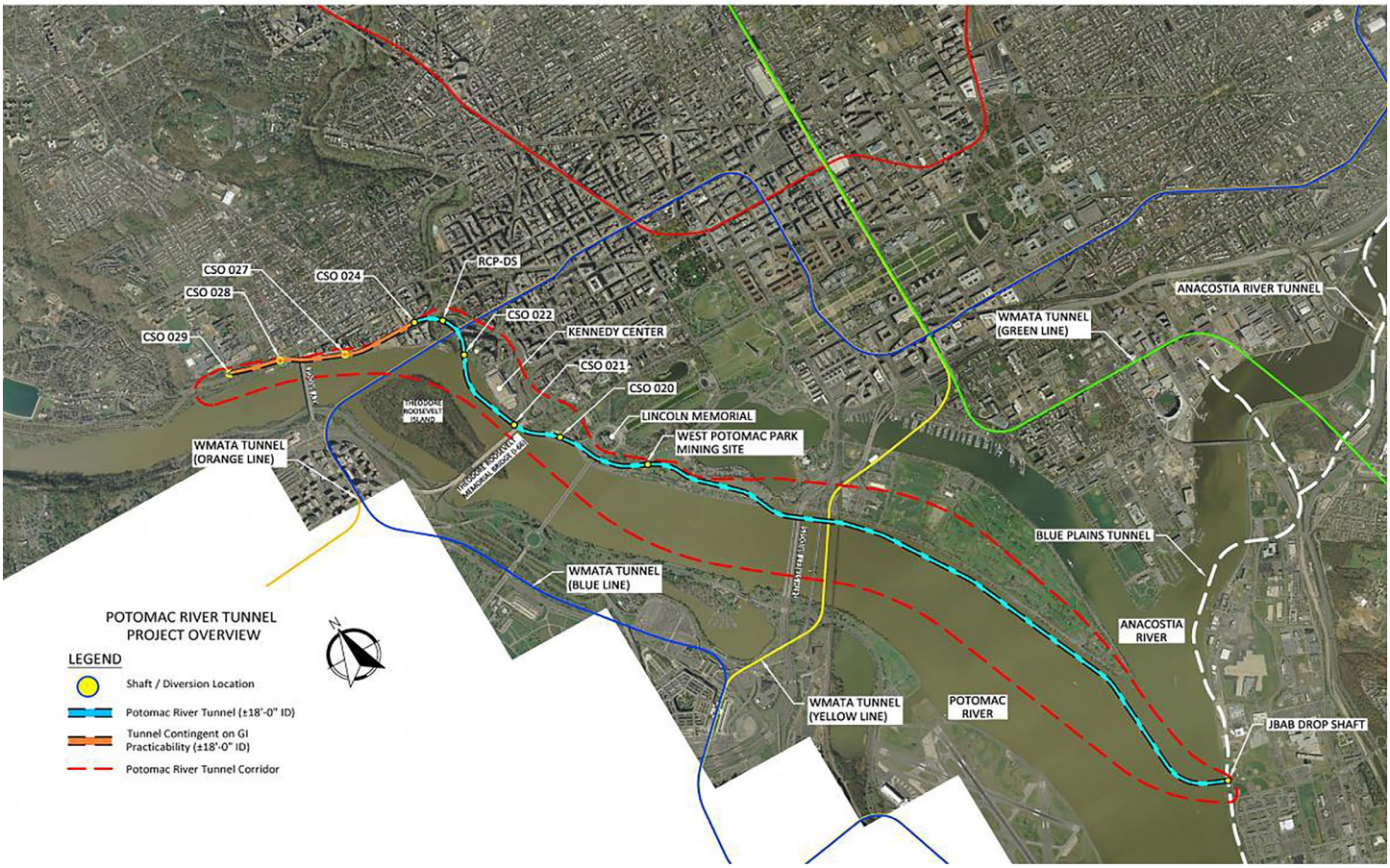


Figure 11. Potomac River Tunnel Project

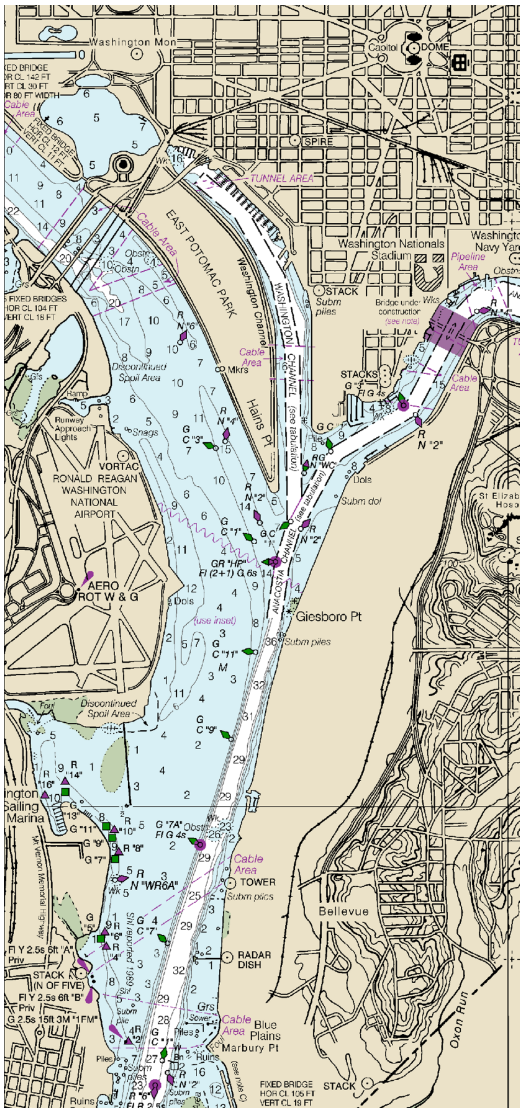
Through the figure below the details of how these types of tunneling may proceed can be seen. Since the Potomac tunnel project is still being designed, the construction details of the Anacostia are used as a reference to provide a better view of how this process is under construction. After excavating the clay from the tunnel, a whole bunch of wet soil will remain that will have to be shipped out of the job site.

Figure 12. The Tunneling Process, Deep Below the Washington DC

Now the question is, where is all this material going? There is not a specific answer to this question. Based on the Anacostia River tunneling project, they ship most of the soil to the Chesapeake Bay to make islands and landfills to make wetlands with dredge. Obviously, this solution has several problems and the most important one is the shipping costs. It would take so many truckloads of waste to ship the materials. Also, it takes 2 to 3 years to dewater the clay soil. For these reasons, I came up with an idea of taking the soils coming out of the tunnel and finding an appropriate receiving site as close as possible to the source and creating mountains out of the clay.

THE GEOLOGICAL CONTEXT-POTOMAC FORMATION

The tunnel project area is located at the western edge of the Atlantic Coastal Plain Physiographic Province, with the Piedmont Physiographic Province lying to the west, separated by the Fall Line. Starting at the Fall Line and thickening eastward, a wedge of Coastal Plain sedimentary deposits overlie older Piedmont residual soils and crystalline bedrock. In total there will be around 10milion cubic feet of soil, mixed soft and hard, coming out of the tunnel. Although the soil is wet, after it dries out, it can go up to 40-50% in slope. (from Northeast Boundary Tunnel: Applied lessons learned from the Anacostia River Tunnel Project)



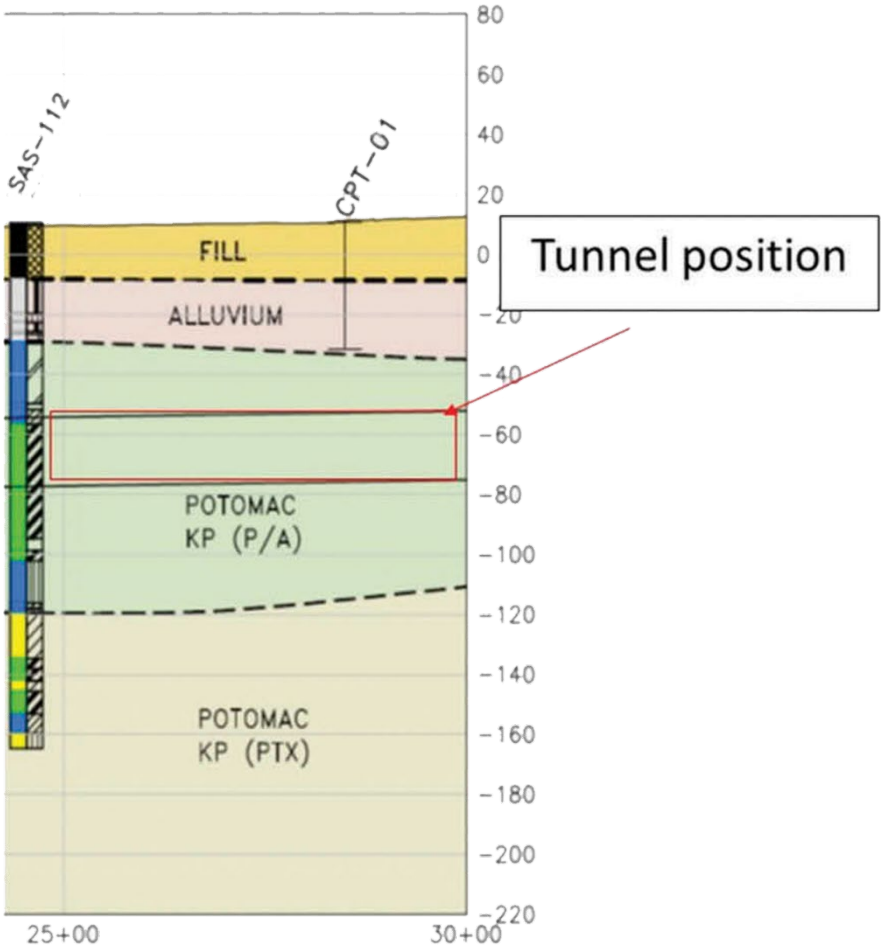


Figure 13. Typical stratigraphy along Potomac River System

IDEA: THE ARTIFICIAL MOUNTAINS

Mountains. This word is a definition of an earth form to me. The representation and formation of mountains is an important aspect of landscape design. At the beginning of history there was earth, the mountains also have been there. Maybe the landscape even has started to be formed by mountains. The main issue of my thesis is the relationship between the architecture and landscape architecture; I have to mention here that architects occupied both the horizontal and vertical surface, if landscape architects were to make a vertical occupation as well, what would it be? A mountain, for sure. This is where I can conclude that mountains can empower the earth as an object; the earth is kind of a designer itself. In this slide you see the examples of the natural mounts which vary in meanings in different cultures. In Greek mythology for example, they were known as a places to get closer to the gods. In general, mountains symbolize constancy, permanence and power.

Figure 14. Mount Damavand, Iran

To create a mount, I looked at the topic of artificial mountains. More recently, designers have made waves with outlandish plans to build artificial mountains on the same scale as real mountains as well as smaller mounds and hills. Furthermore, artificial mountains play a significant role in the environment, from providing escape from rising waters to boosting tourism with exceptional views. Right now, the world is studded with artificial mountains. These are the result of manufacturing processes, piled construction and mining waste, or in some cases they are built deliberately to add an impressive new feature to the horizon. The majority of artificial mountains are formed of sand, soil, and byproducts from the production of cement and steel. The examples shown in this slide range from 1250 BC (Chogha Zanbil, best-preserved ziggurats in Iran) to the creation of contemporary artificial hills such as The Hill project on Governors Island in New York and Northala Fields in Greater London, England.

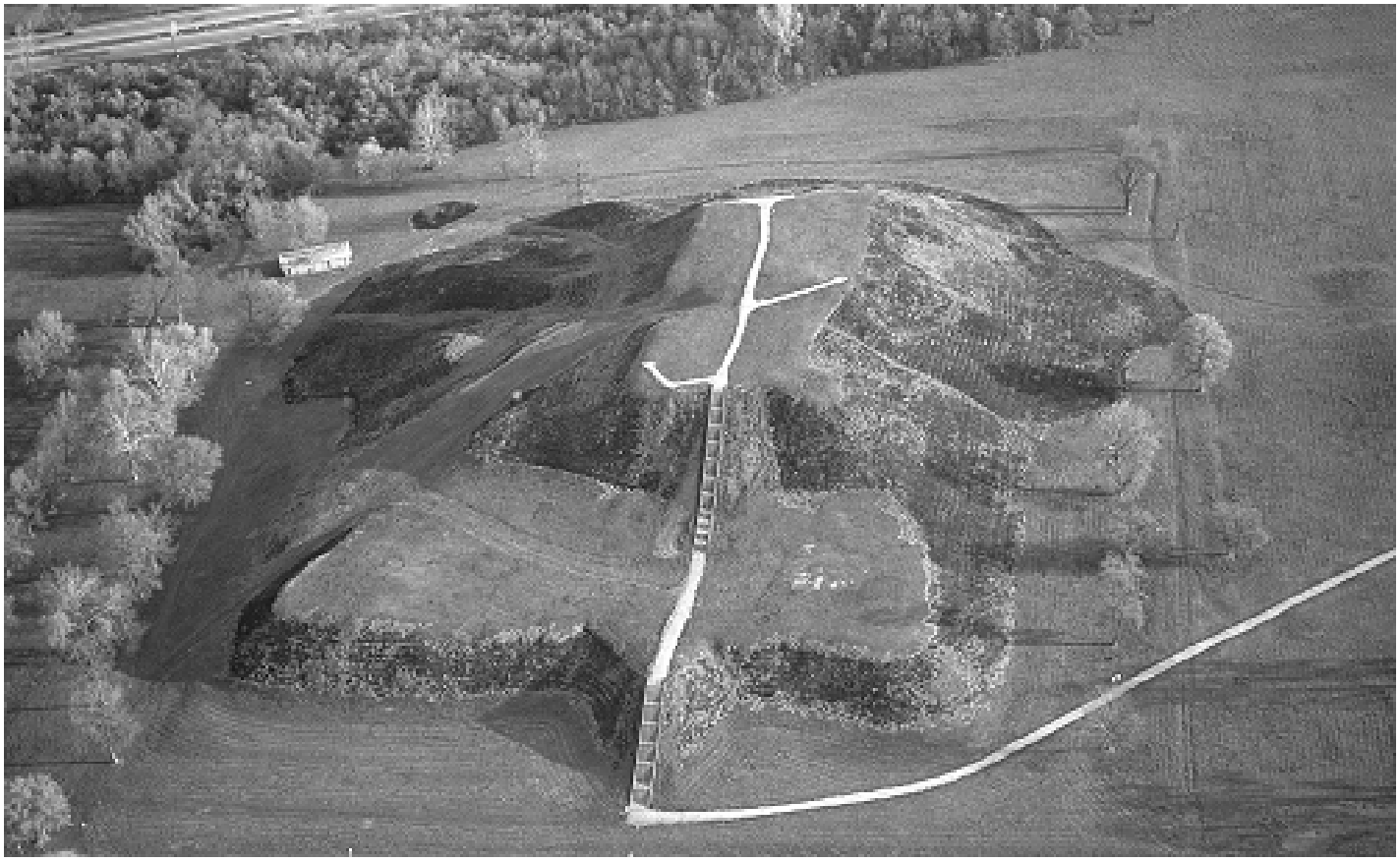


Figure 15. Cahokia Mounds, Collinsville, IL

PRECEDENT

- NORTHALA FIELDS

While providing an amazing new facility for the neighborhood and nearby cities, Northala Fields, (located in England) acts as a proof of a financially robust model and an ecologically sound design for the forming of a major new green public space. The most significant feature of the design is the construction of a new monumental landform on site, utilizing substantial volumes of imported construction rubble from a pool of London-wide development projects such as Heathrow Terminal 5, White City and Wembley Stadium. (Marko&Placemakers)

Figure 16. Looking toward the hills, Northala Fields Park

Many landfill sites for the London-based construction are some distance from the city, but by using the Northala site, companies were not only able to contribute their processed fill to a location destined to become a green site, but they were also able to cut down on their delivery costs, time and miles travelled, resulting in less carbon emission.

The following masterplan shows the majority features on the Northala Fields site, such as Urban Fishery, Model Boating Lake, Reed Bed, Borehole water source, Swale, Playground, Lookout, Meadows, wetlands, Woodland, Amphitheatre, Primary Path, Parking Areas.

Figure 17. Imagery Google,Northala Fields Park Masterplan

SLOPE ANALYSIS

The slope analysis and elevation of the hills were important to me, because this project is one of the closest one to my thoughts. These drawn sections provide more details. The highest hill is 80ft tall and the lowest 40ft, and the maximum slope that can be found within these mounts is 37.5% which belongs to the biggest mount.

Figure 18. The Four Hills at Northala Fields

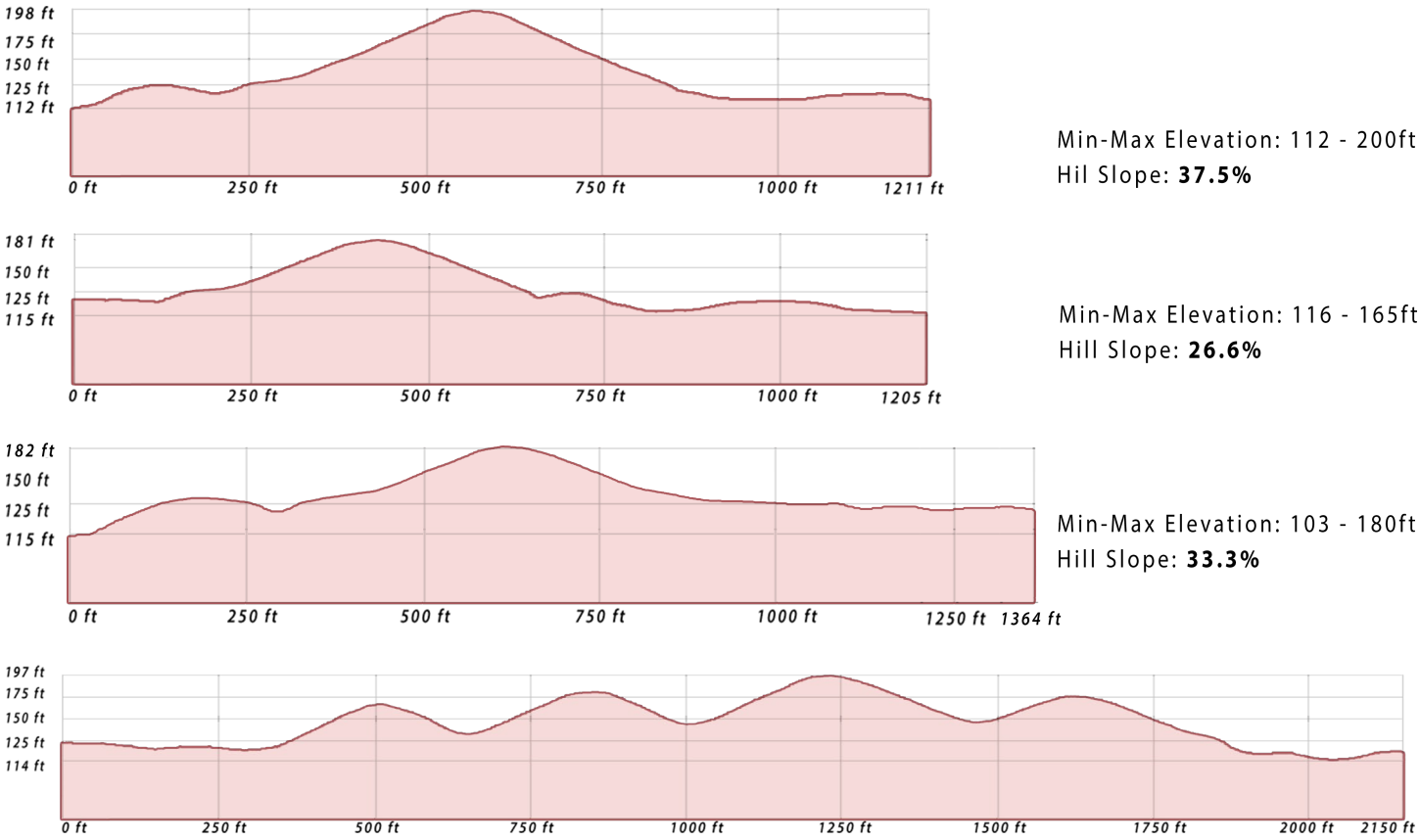


Figure 19. The Hills Elevation Profile at Northala Fields

CONSTRUCTION DETAILS

In total around 60,000 lorry loads of spoil and concrete, around 100,000M3, were dumped on the site. Soils making up the mounds are created from spoil from construction sites. The largest mound features a spiral path leads to the peak. The concrete from the rubble was crushed and used in gabions - walls surrounded by steel cages, which provide a spiral path up the tallest hill. Over one mile of gabion baskets were built on the hills. (London gardens trust)

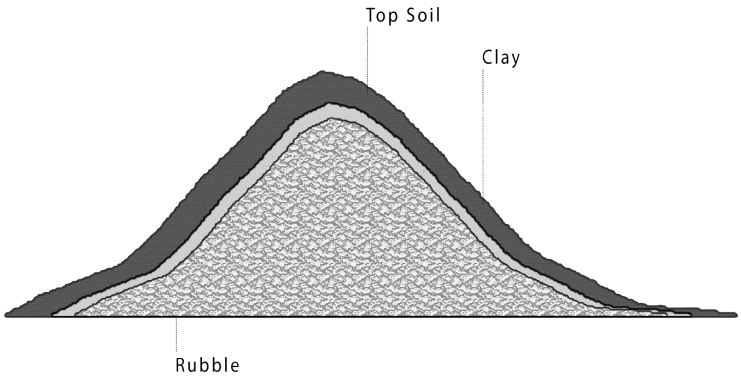


Figure 20. The Construction of the Mounds, Northala Fields Park

NATIVE AMERICAN MOUND BUILDERS

According to the idea of designing mountains which is based on a social agenda, I started to think about a movement to it, as an act of creating a better social environment through transformation of the land. The Native American earthen mounds of Mississippi began 2100years ago and continued to be built sporadically for another 1800 years. Some mounds of The Middle Woodland period were built to bury important members of local tribal groups. (Cahokia: North American Mounds)
The Mississippian period saw a resurgence of mound builders; they are mostly rectangular, flat-topped earthen platforms upon which temples or residences of chiefs were erected. Mississippian period mound sites mark centers of social and political authority. (NPS)

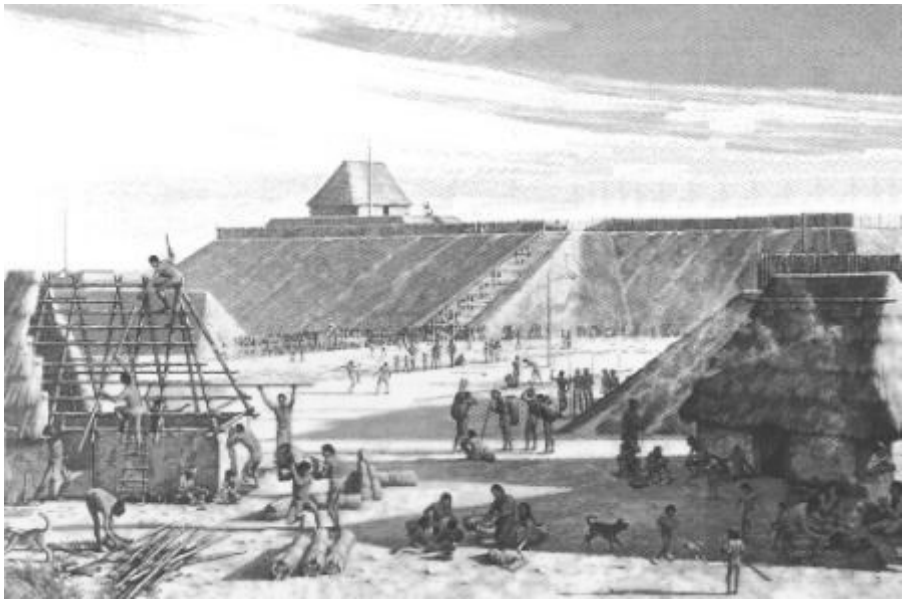


Figure 21. The Native American Mound Builders

Exploring these data, I found some interesting structures called Shell Middens which are developed along the coast and have to do with the edges where water meets the city. Therefore they are good for protection from hurricanes and floods.

They slow the water that is rushing up to the island. The shell rings were built on high land at that time. People believed that rings reveal insights into the social rankings of individuals and groups within the society; they held communal events involving large scale feasting there. The idea of considering mounds is to create a new structure that acknowledges that history and provides a special kind of gathering place. In the mid review I was talking about

justice and social justice. The thesis draws attention to the people that are from here that everybody has ignored for 2.5 centuries.

Figure 22. Shell Middens

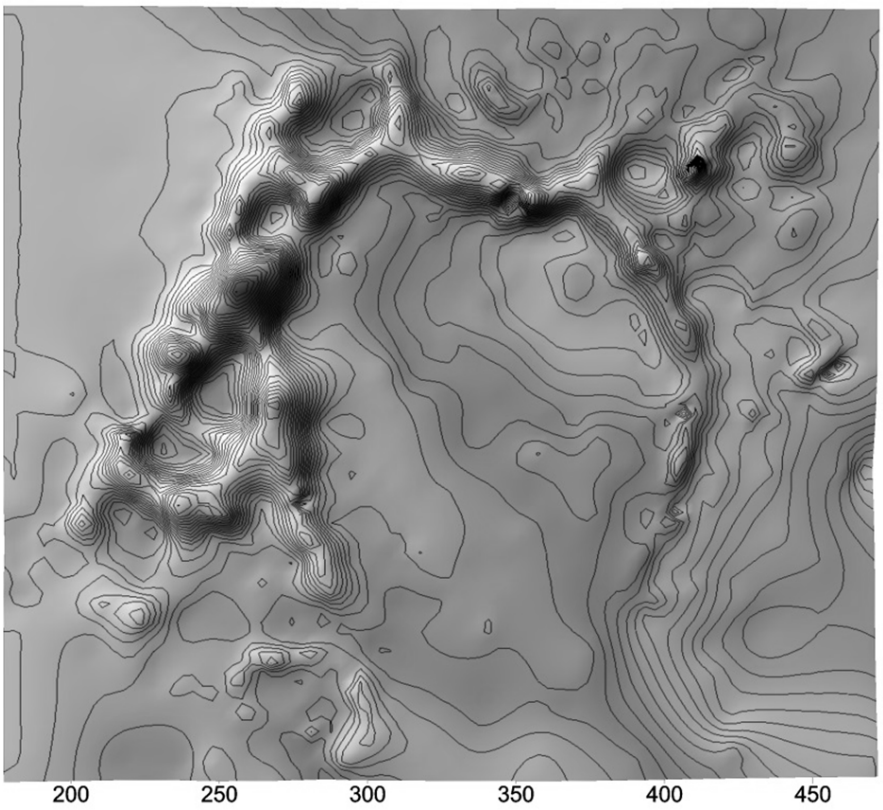


Figure 23. Archaic Shell Rings

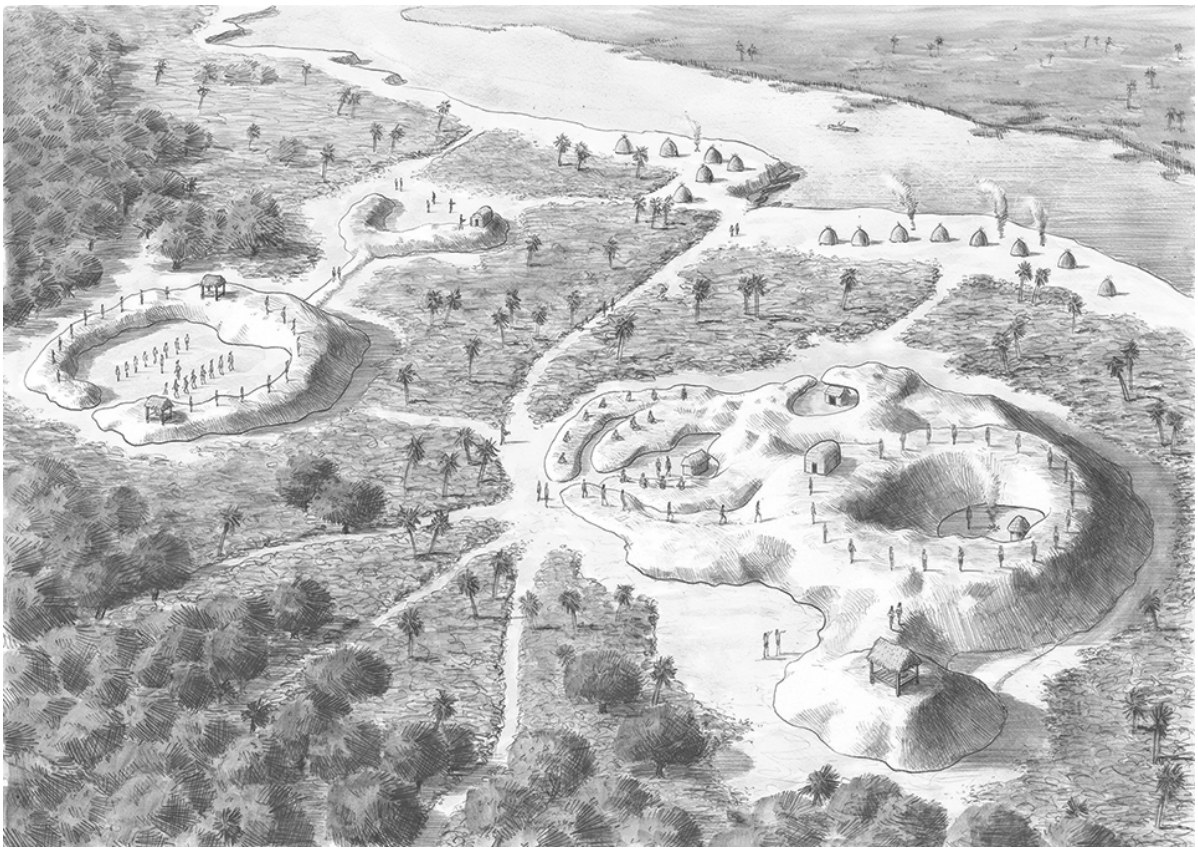


Figure 24. Fig Island Shell Rings

III. THE DESIGN

SITE SELECTION

After exploring all the research about the soil coming off the tunnel and creating mounds out of it, I began looking for a site considering the following criteria

- Part of the forgotten area of the city
- Where the sea is coming up higher
- Large field as a receiving ground with the capacity of holding lots of soil
- Having a unique identity that is grounded in the City's history
- Close to the Shafts of the Potomac River Tunnel
- Land that is in need of some sort of repair OR WILL need some kind of reimagining because of sea level rise
- Land with the opportunity to be a lifelong project (large land)

Based on this investigation, I found the Hains Point, Anacostia Park, Jones Point, Dangerfield Island and Four Mile Run as the most vulnerable which could benefit from having more EARTH.

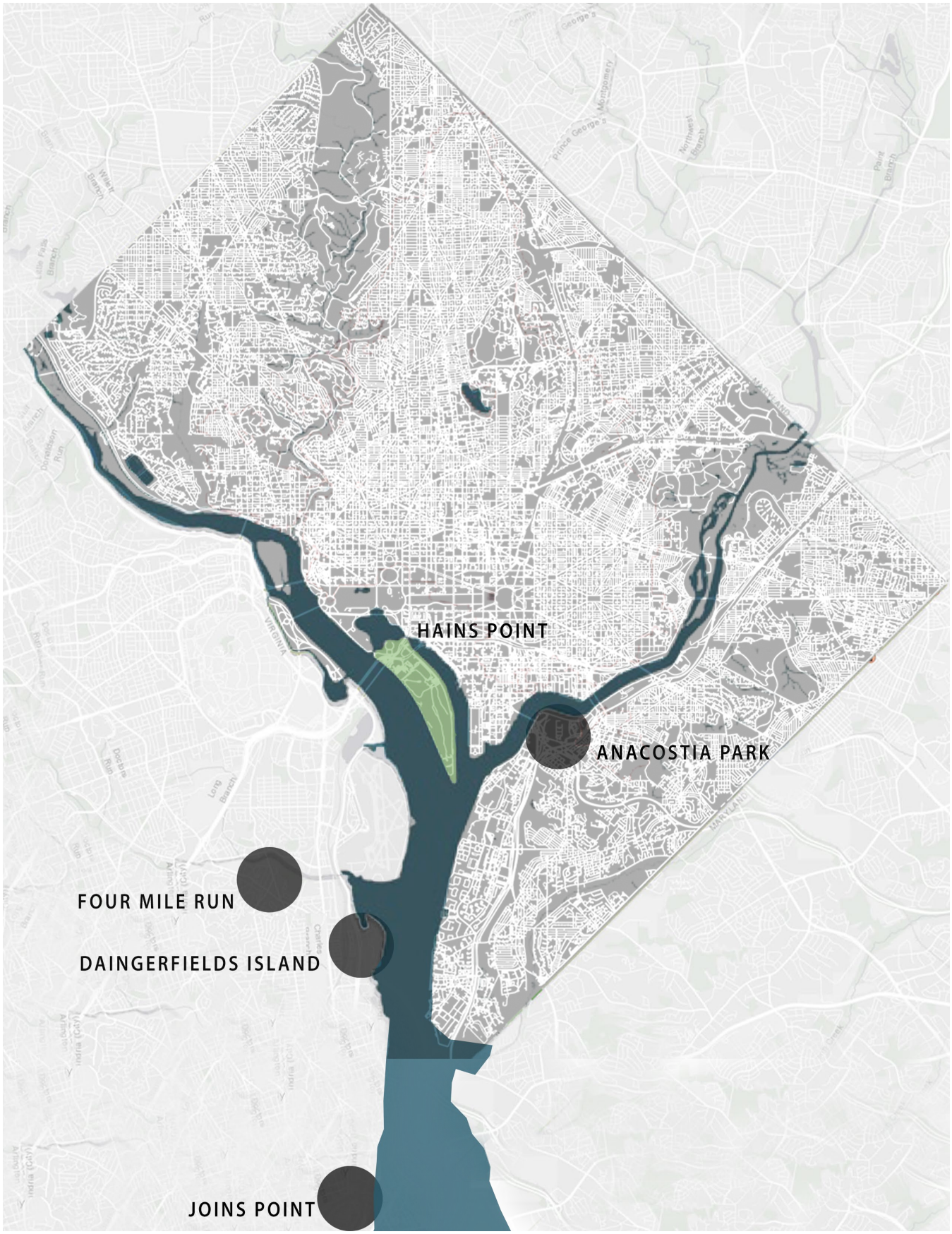


Figure 25. Site Selection, map of Washington DC Metro Area

HAINS POINT

Figure 26. East Potomac Park, Hains Point

EXISTING LAND USE

Located in Washington D.C, the land is large enough (400 acres) and it is right above the Potomac tunnel. According to the idea of Native American mound builders, part of my project is to reform the value diversity and equality of the US, through creating a gathering space for people, so even if the mall gets flooded, this place can act as a gathering place instead of building the mall up. Therefore it can be concluded that this land is going to be a sibling or twin to the national mall in terms of its monumental architecture concept. Also, it is close to the Tidal Basin, which the mounds can protect from the major flooding along with the city.

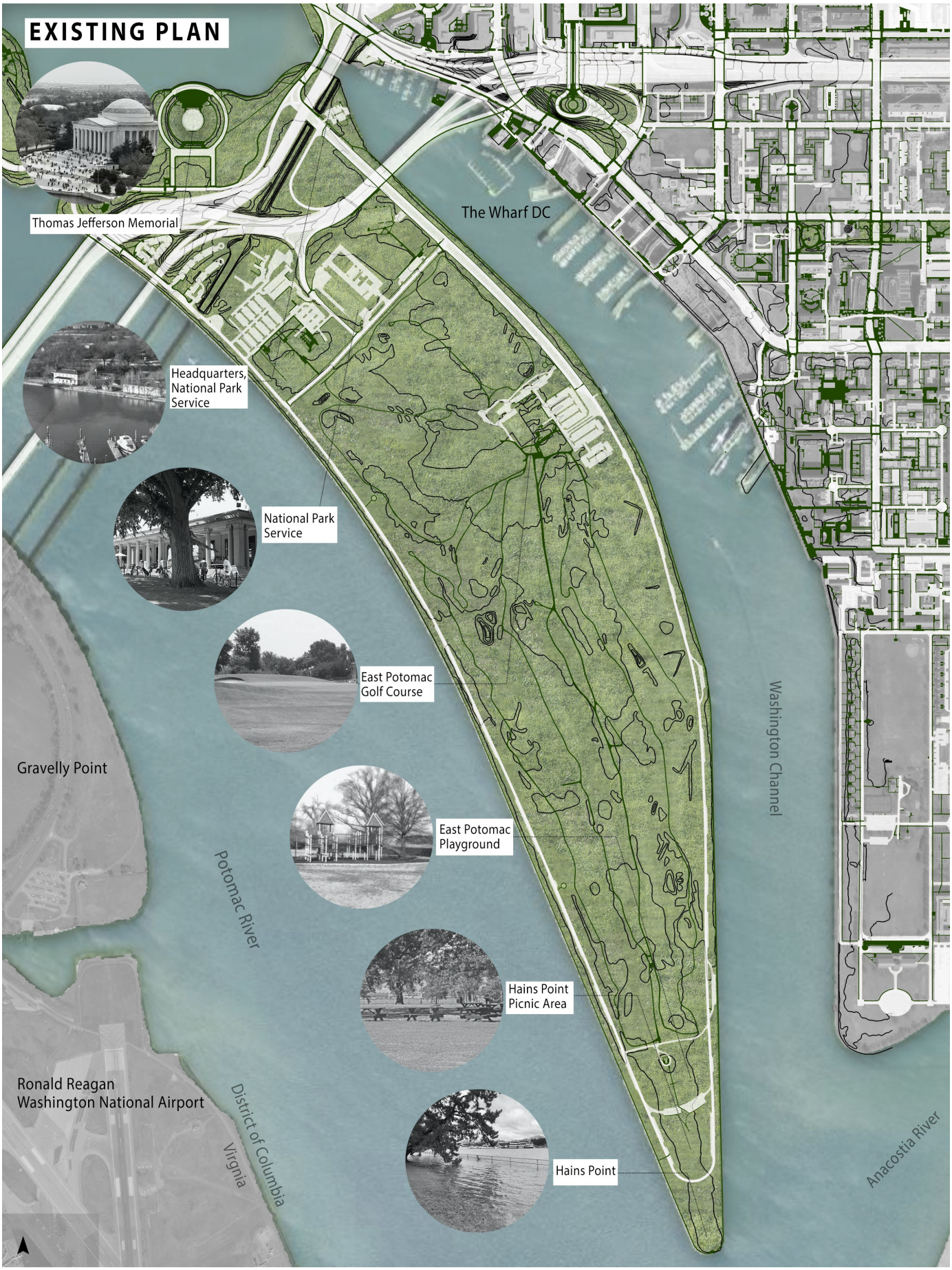


Figure 27. East Potomac Park Existing Landuse Plan

SEA LEVEL RISE

The island can anticipate a rise of 2 to 5feet within the 100 year. It can be understood that in different periods of time this island is going to disappear, meaning this earth needs to be empowered.

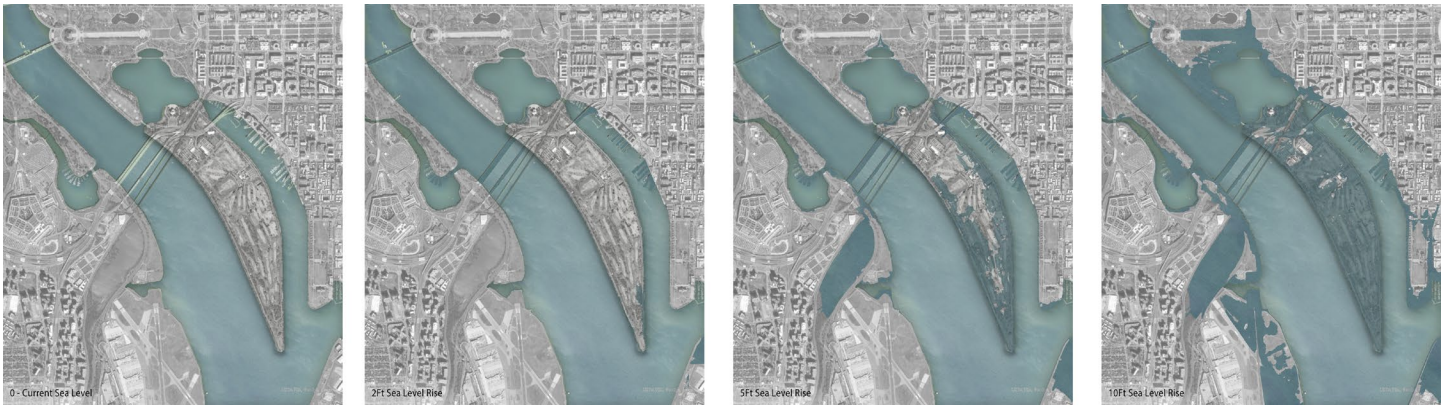


Figure 28. Sea Level Rise

Hains point has historically faced serious flooding in all seasons. While storm surges can cause flooding as high as 12 feet, the island is also the most vulnerable area for storm surge. As hydrology has become an important factor in my design process, this map is a guide to find out more about the water movement. The west edge of the site is the side that the river will hit hard, and the east will stay stronger. While big storm waves are coming to the land, a new path with the potential of designing a marsh needs to be considered.

In addition, the existing topography and the slope analysis have been studied to evaluate the stability of earth which illustrate how flat the whole area is. These areas, as shown by storm surge and sea level rise data, are especially prone to flooding.

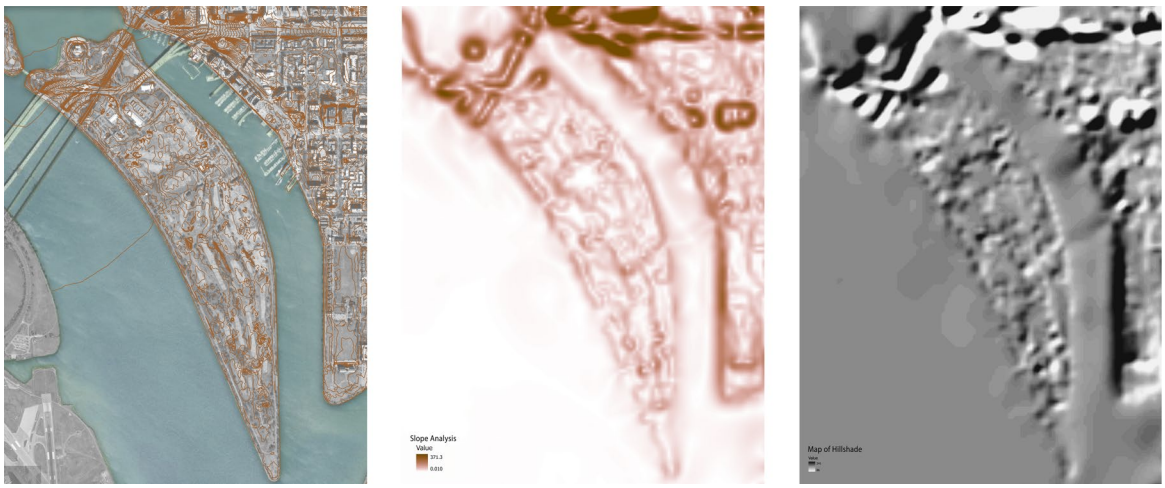


Figure 29. Topography and Slope Analysis

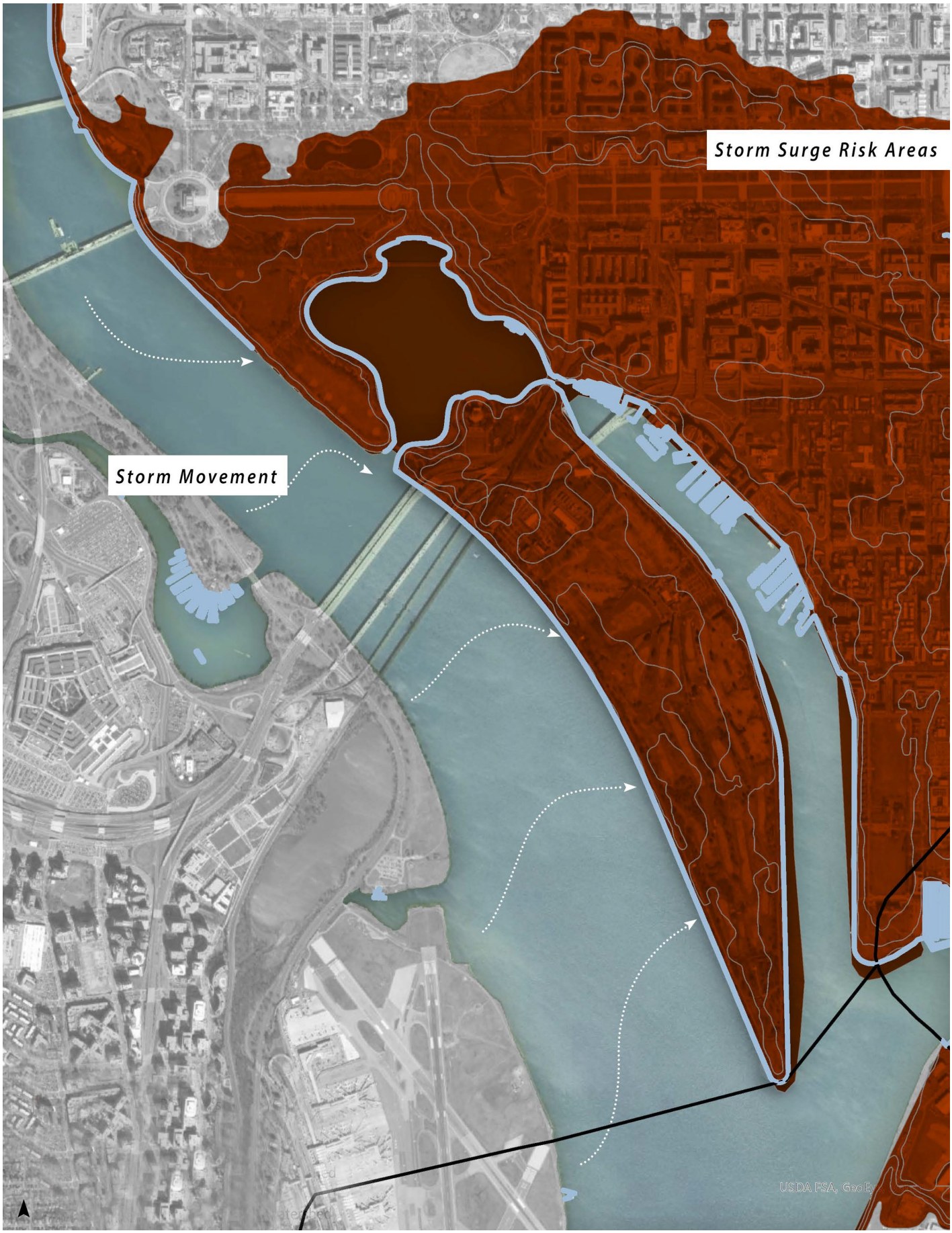


Figure 30. Map of Storm Surge Risk Area

THE DESIGN PROCESS

Based on my original thesis idea, the following are the main goals of this project:

1. Sustain East Potomac Park (Keep) as sea and river rise

2. Create new land to honor the high value that indigenous people have for land

3. Integrate landscape and architecture through use of earth, recognizing its foundational importance to design and empowering the earth

Next, to implement my mound design, I considered structures for it; in this way there will be a monumental structure and a daily life structure which consists of places for people to come and spend time during the day. Hains Point currently is a point but only in plan and horizontally; my design makes it more topographic and vertical especially at the end. In fact, the whole site becomes two mounds. Afterwards, based on what I gain from the tunnel which is a lot of wet sand and silt, I have to let them dry out for a long time. Therefore considering an area on Hains Point that is only for drying soil is necessary, which will be named a dewatering station.

This station first needs to be above the flood for the next 10 year or so, it is to be filled with soil, then the first layer added to the area will be transferred to the mound next to it, then another layer of soil will be added to the station for the next round. Although this process will take a number of years to be done, the advantage of it is that people would be able to see it.

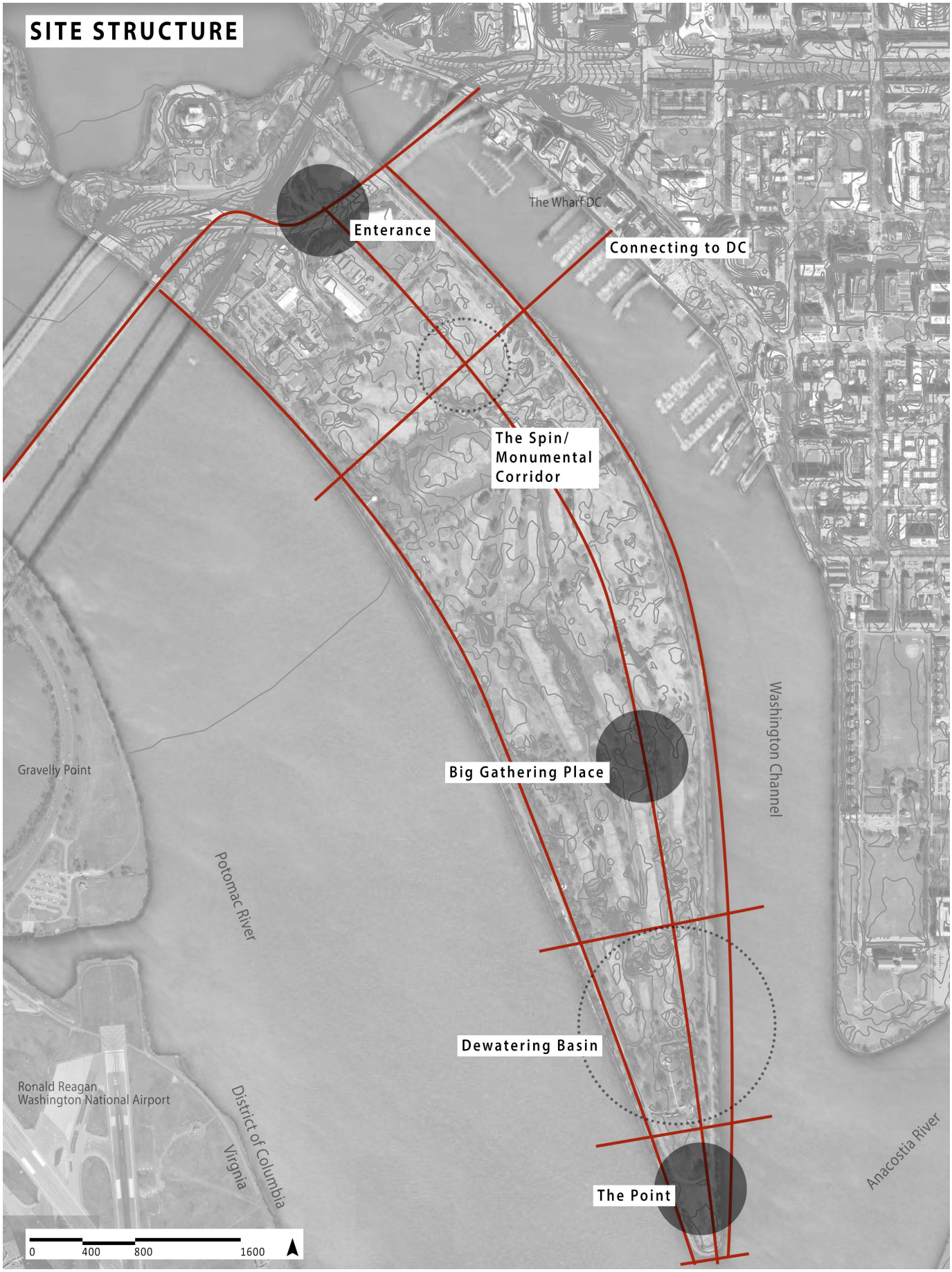


Figure 31. Map of Proposed Site Structure

THE STRATEGY OF BUILDING THE MOUNDS

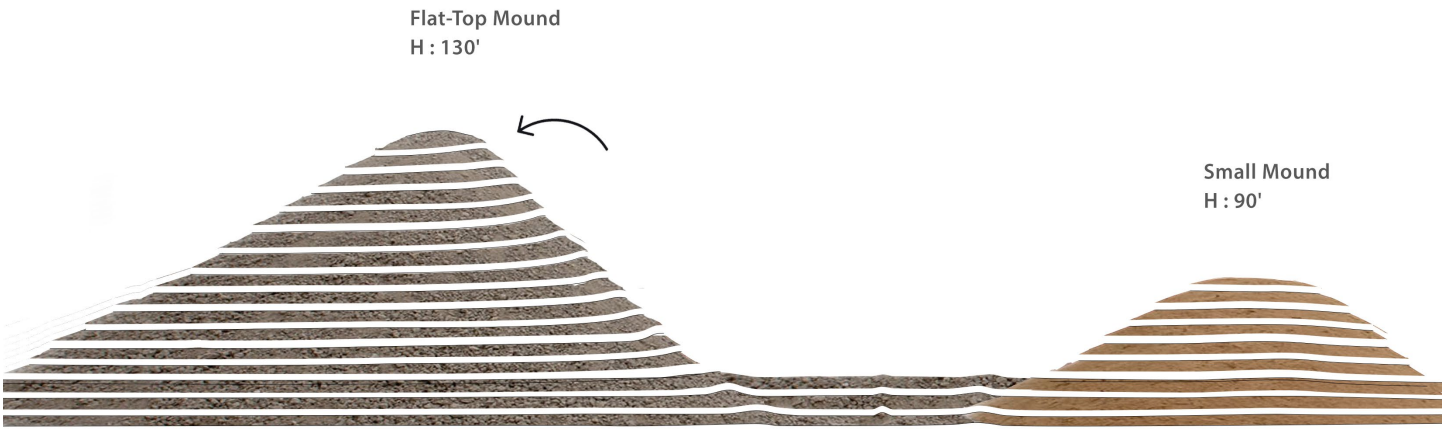
The Current Level of The Site

Raising the Land by 3ft

Filling the Land with Soil

Transferring the Soil to the Mounds

Completing the Process



Completing the Process

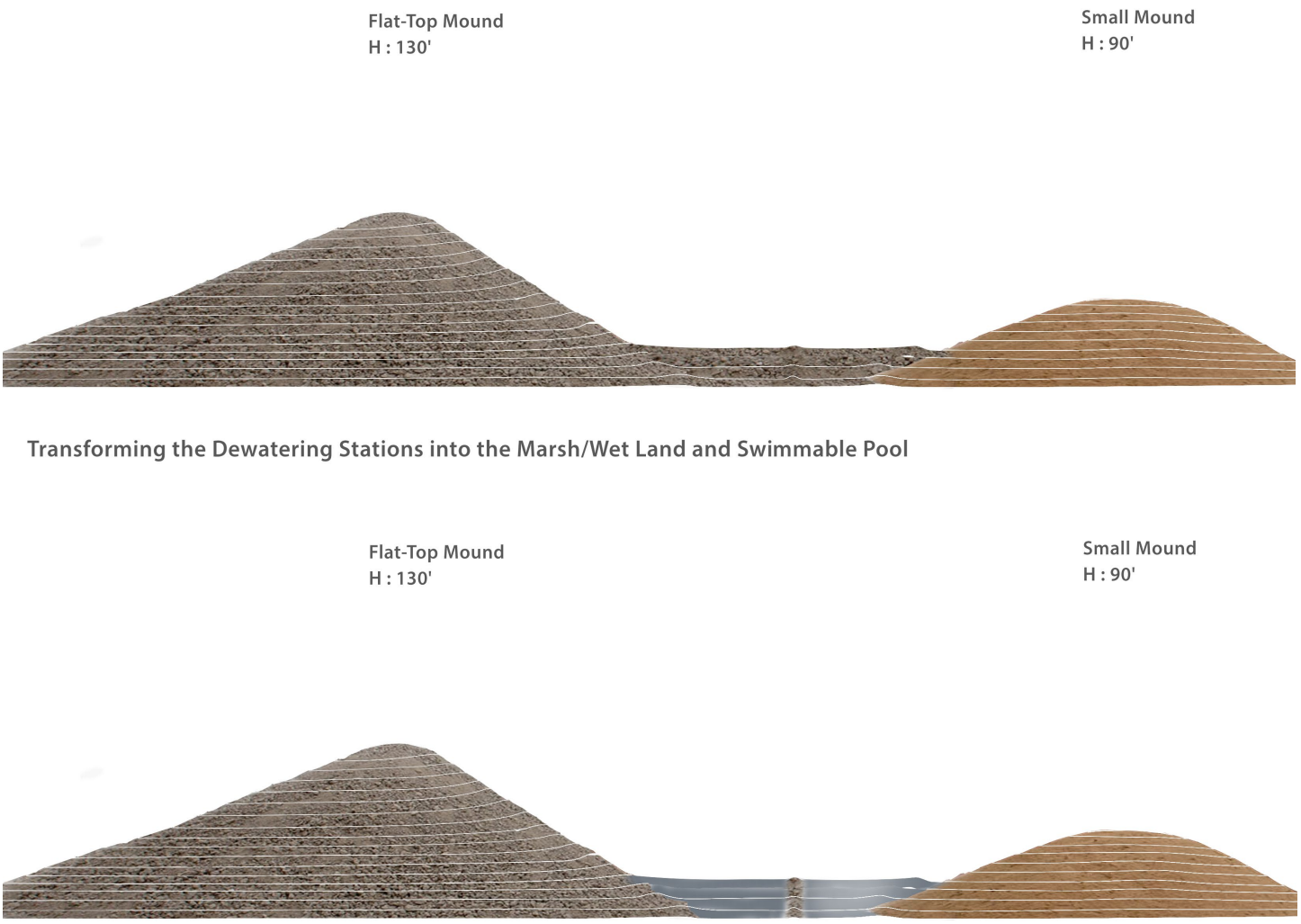


Figure 32. The Strategy of Building the Mounds

Once finished as a dewatering station, it will be made into two pools: the bigger one with more remaining sediments to be a wetland, the smaller one with clearer water will become a swimmable pond. To make this idea happen, a ring around the dewatering station needs to be created, which is inspired by the shell rings of indigenous people.

THE PROPOSED LANDFORM

The map below shows 3ft contour lines. The intent is to make the contours more regular than natural so that people feel that it is a man-made structure. In terms of draining water, there is a lot of water that comes off of the main swale. Then, it is going down to the other area, and that place is where the water is going to be processed before it goes back into the Potomac. The steepest part of the site is over the Washington Channel side, and the more habitable part is located on the southwest side.

THE SPINE

The overall design is a long gradual incline where people climbing the mound would not notice that they are getting to the top. The path to the top is a gently curved promenade: *The Spine*. This main climbing path to the mound is an important cultural path where I have monuments and certain sculptures set into scallop-shaped spaces along the promenade.

CIRCULATION PLAN

The circulation plan includes a one way riverside drive along the Potomac, parking along road, walking paths and trails within the fields and forest, and a gondola to the wharf is proposed. The way that the driveway works is that visitors enter the site, take the driveway and get to an amphitheater. They can park along the road and either go for a climb or search other areas. However, there is always the possibility, for example if any dignified figures, or police or even ambulances need to get up to the top of the mound that they are able to drive the spine. So for the daily routine this path is the only place people can take to get to this point of the site, and the spine is mostly closed for transportation.

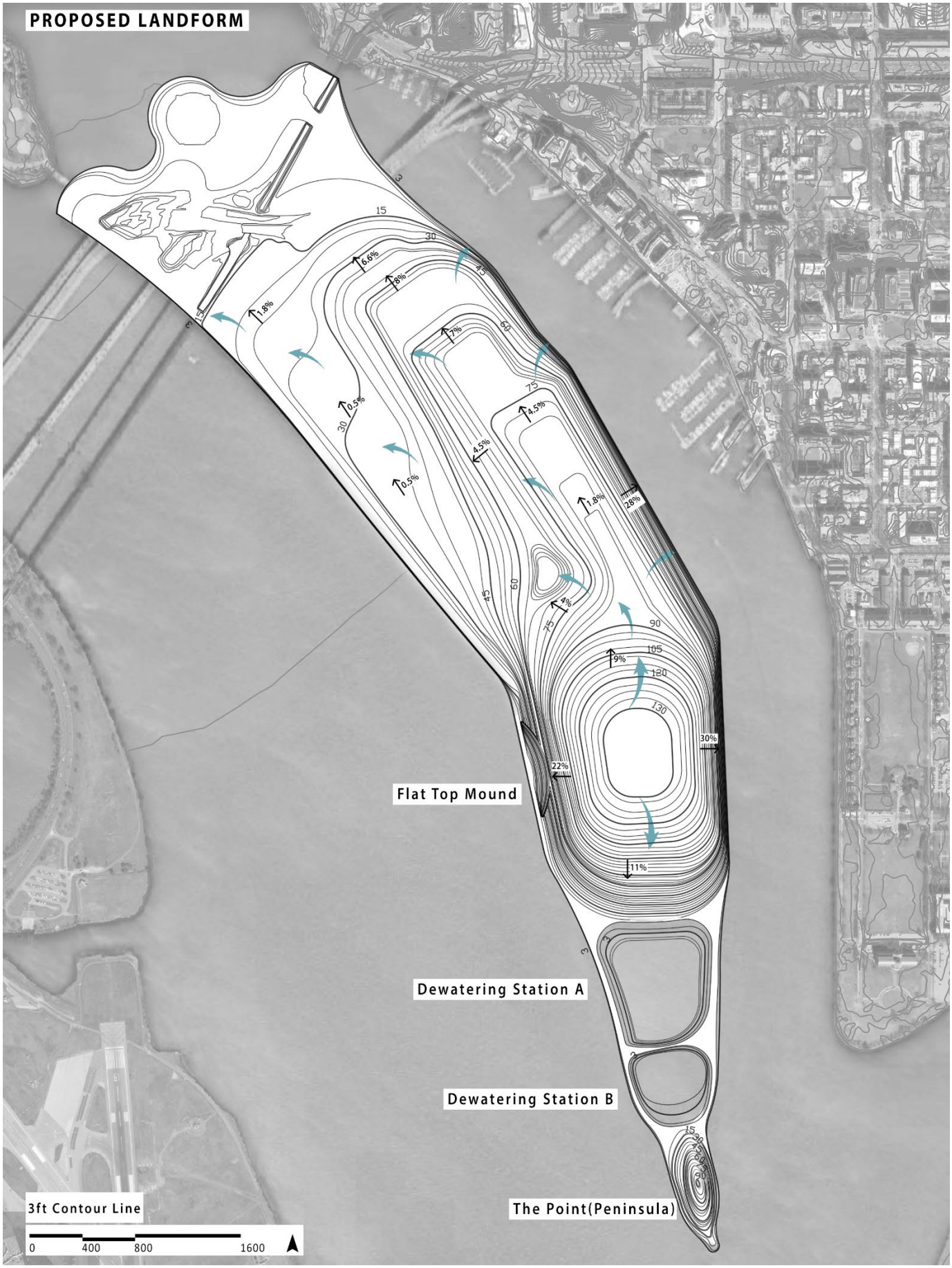


Figure 33. Map of Proposed Topography

Figure 34. Map of Proposed Spine

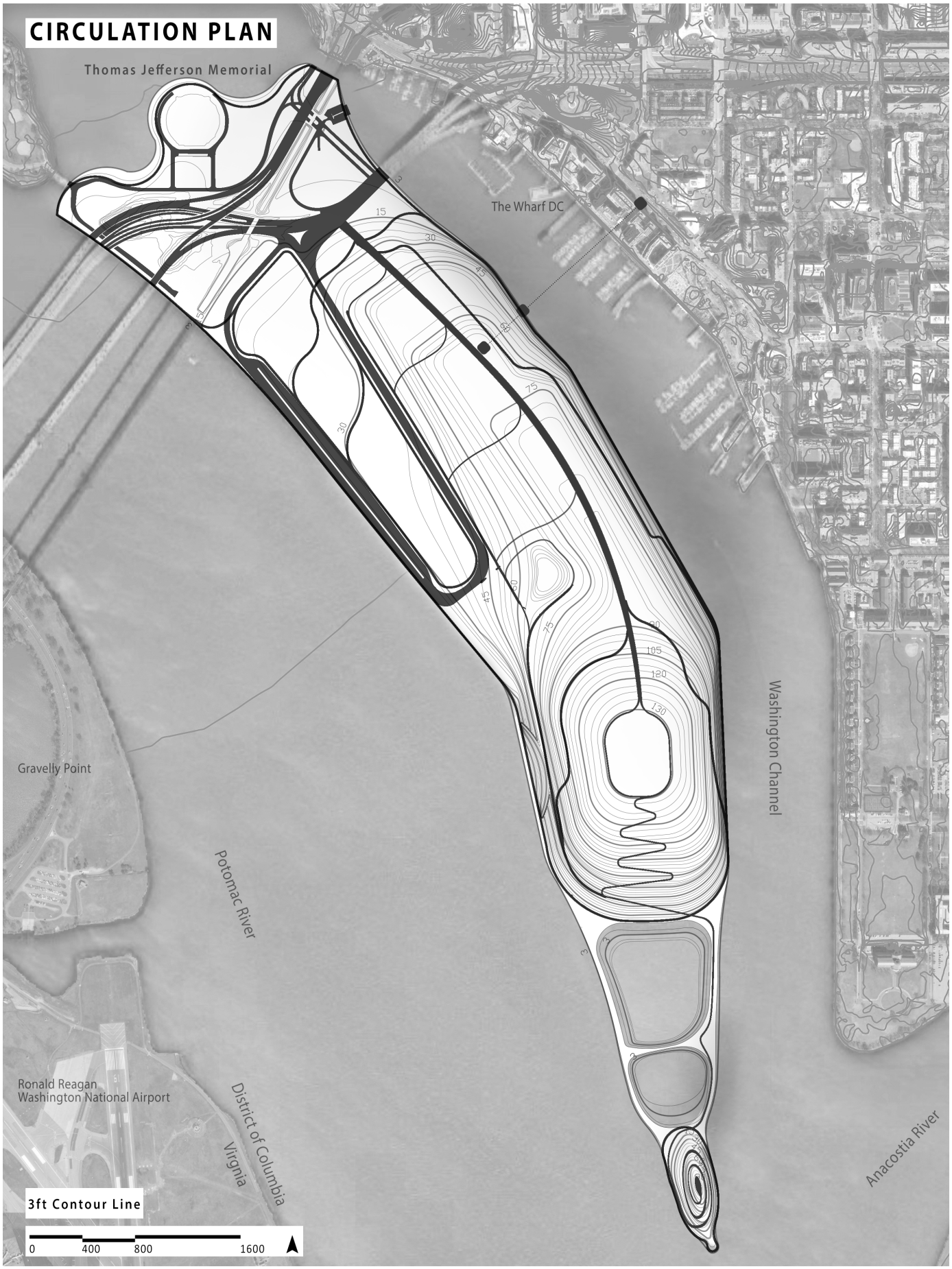


Figure 35. Map of Proposed Circulation

PROPOSED MASTERPALAN

Based on the structural analysis, I started to see three different zones in my design, past, present and future. From the entrance to the beginning of the mound, the chronology part represents the past. The flat top which will be always active and connected to the land, represents the present. And looking out across the water is the future part. As people go through the past they wander; the present becomes clear on the flat top, but still the visitor is in the trees. In the future everything emerges out at the end: water, sky and green land.

In the following masterplan it can be seen that people enter into the trees at the entrance and then can take this car free corridor to get to the big mound.

As they walk on this spine they are going in and out of the trees, into the lights, out of the light in these spots. Also, I considered the west side mostly open with grassy spaces, and the east side mostly forested, so in that case when people walk on the path, they see open space on one side and forest on the other. As they get toward the end, they start to enter the trees. Then they get on the top of the big mound, a mowed flat top opens up as a big gathering space for different events and ceremonies. Then there are the dewatering stations, and the smaller mound covered with meadow grass land.

In addition, I considered some activities like sport fields and an amphitheater lies embedded into the slopes.

After All, I refined the overlays of vegetation based on topography: meadows on the hillside areas, lawn and mowed grass on more flat spots.

THE VIEW FROM THE WEST

The next drawing is the west elevation showing the overall structure of the mound playing as a functional mound.

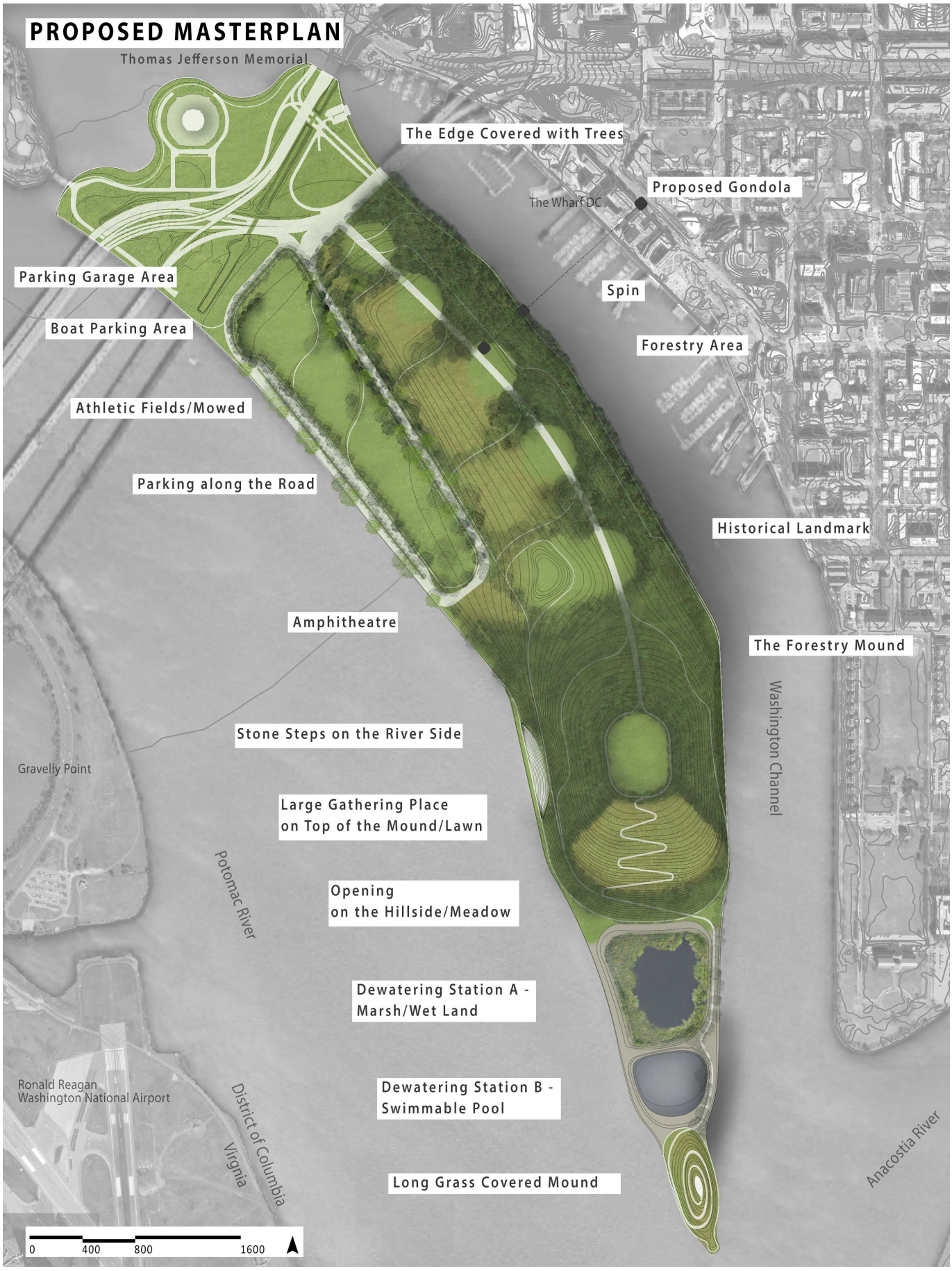


Figure 36. Map of Proposed Masterplan

The Overall Landform

For the rest of the study, I will present more details of the design through zoomed in plans and sections and perspective views.

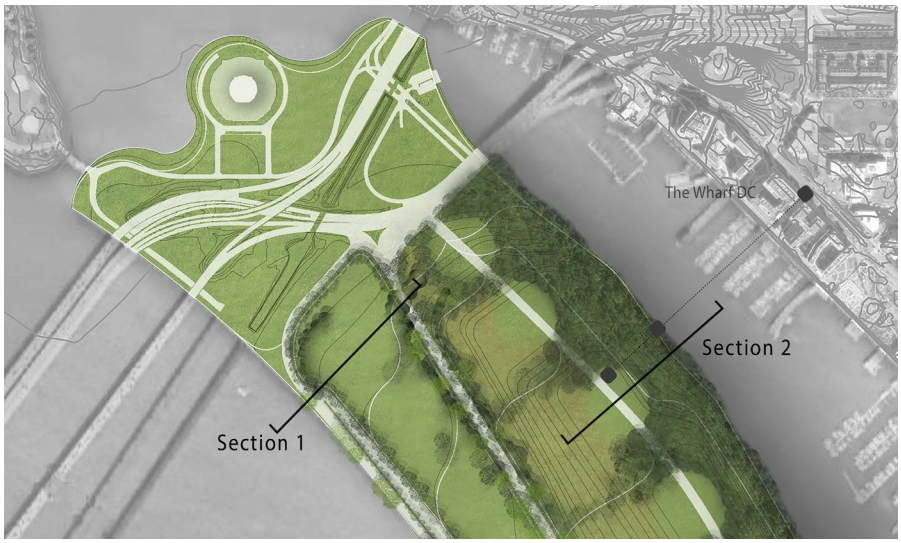


Figure 37. Detail Plan, the Entrance

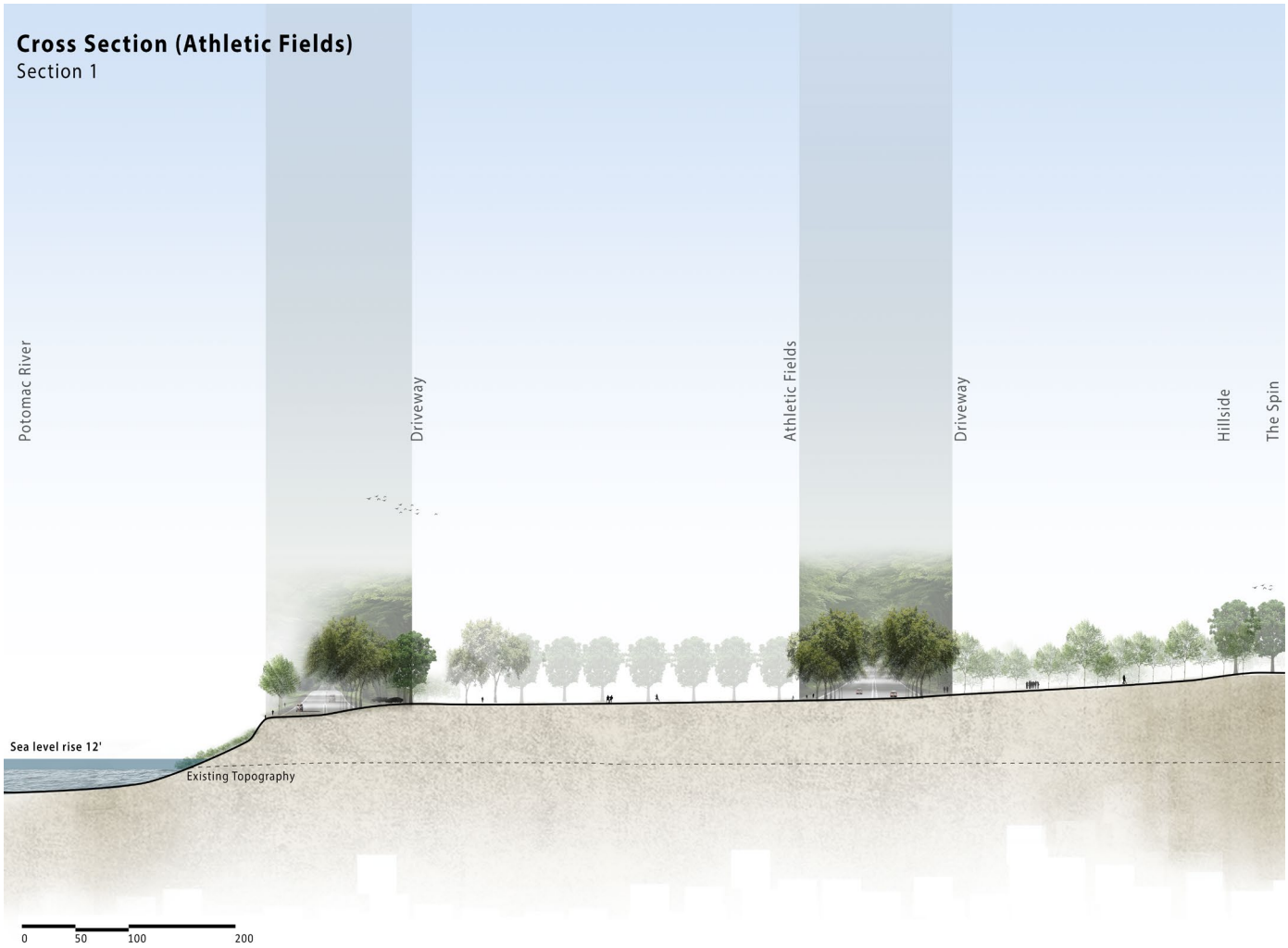


Figure 38. Cross Section, Athletic Fields

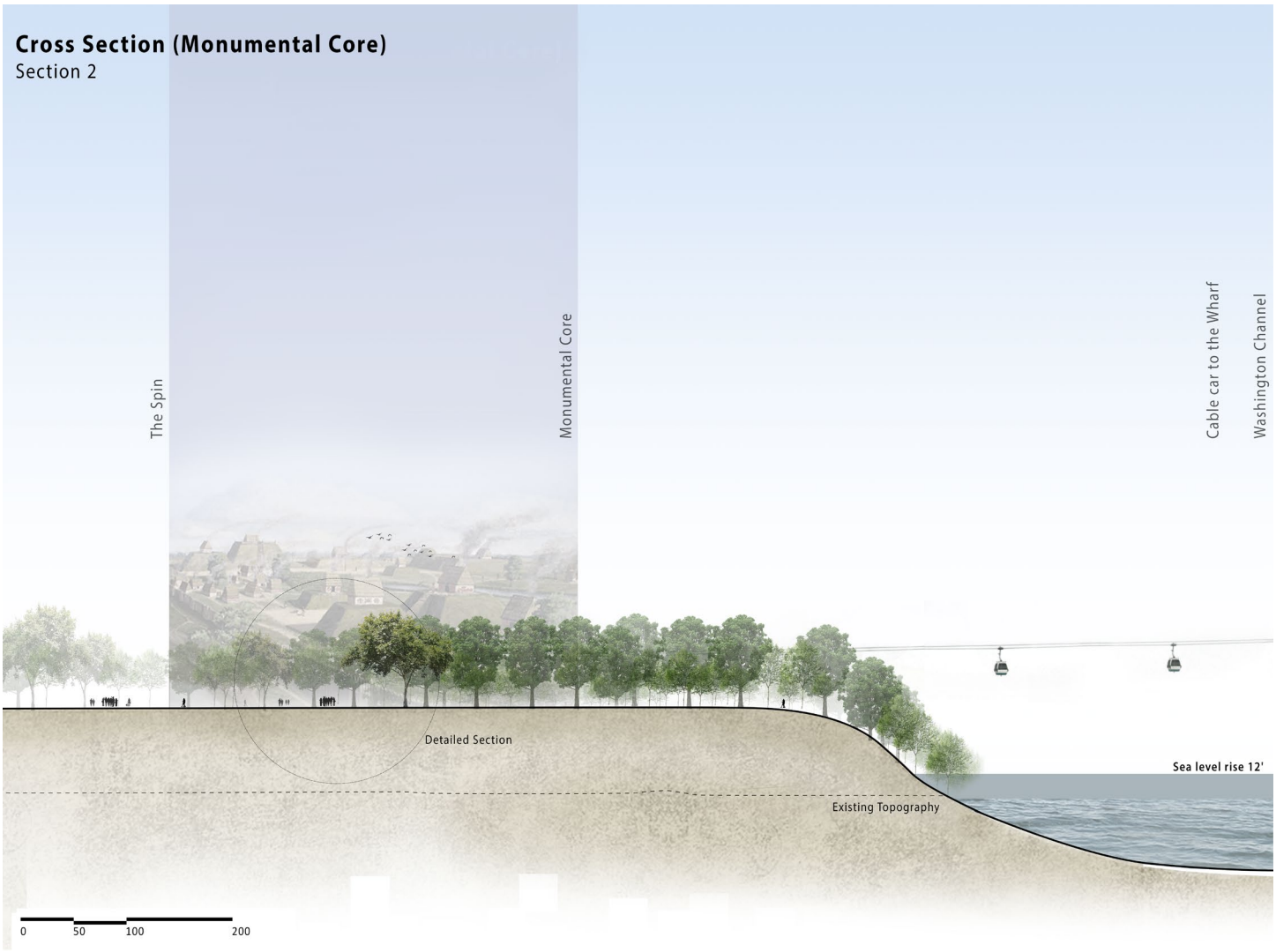


Figure 39. Cross Section, Monumental Core. The east edge, from Washington Channel to the forestry edge connecting through gondola, to the monumental scallops and the spine.

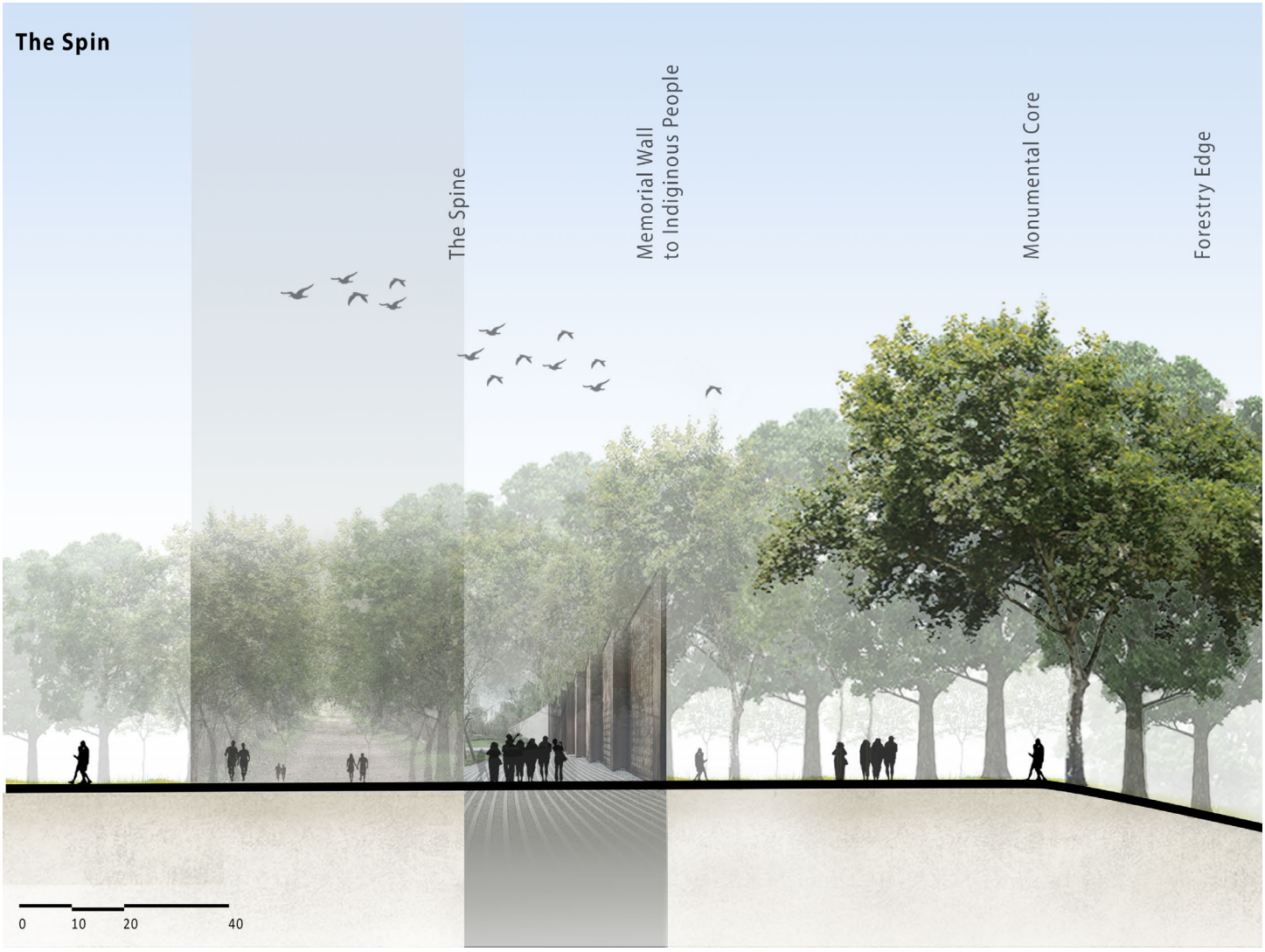


Figure 40. Detailed Section, The Spine. After a steep slope at the edge, the land becomes flat on the Spine, where people can walk and meet the memorials to indigenous people.

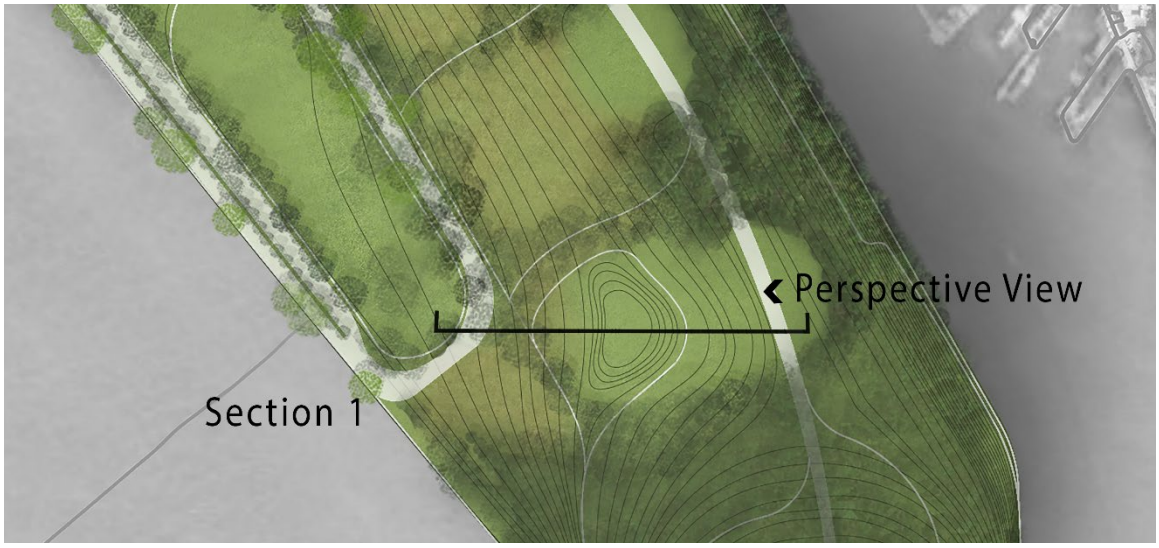


Figure 41. Detailed Plan, the Amphitheatre

Figure 42. Cross Section, The amphitheater as big green steps into the earth, this place acts more as a storytelling spac

Figure 43. Perspective View from the Spine down to the Amphitheatre

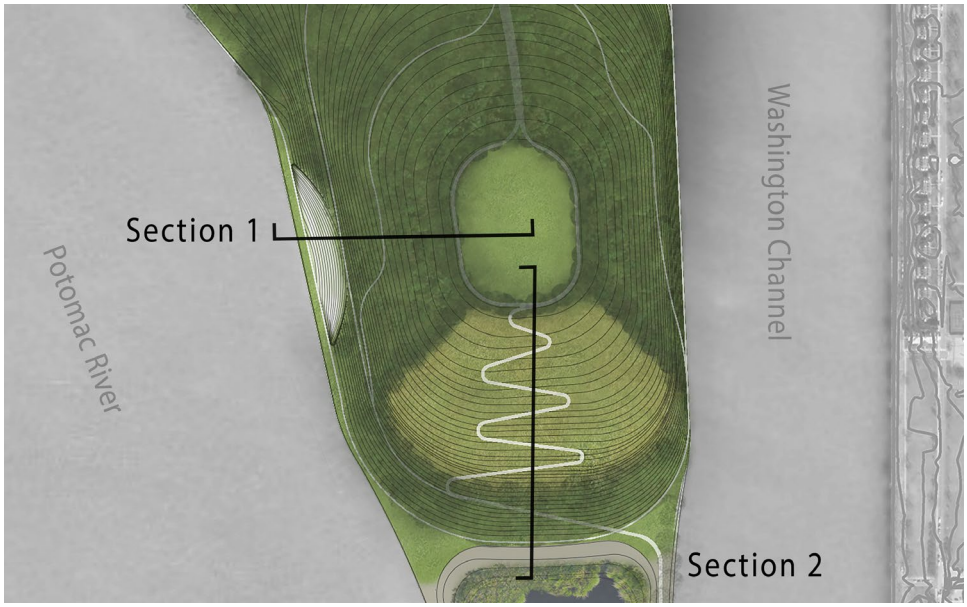


Figure 44. Detailed Plan, Flat Top Mound

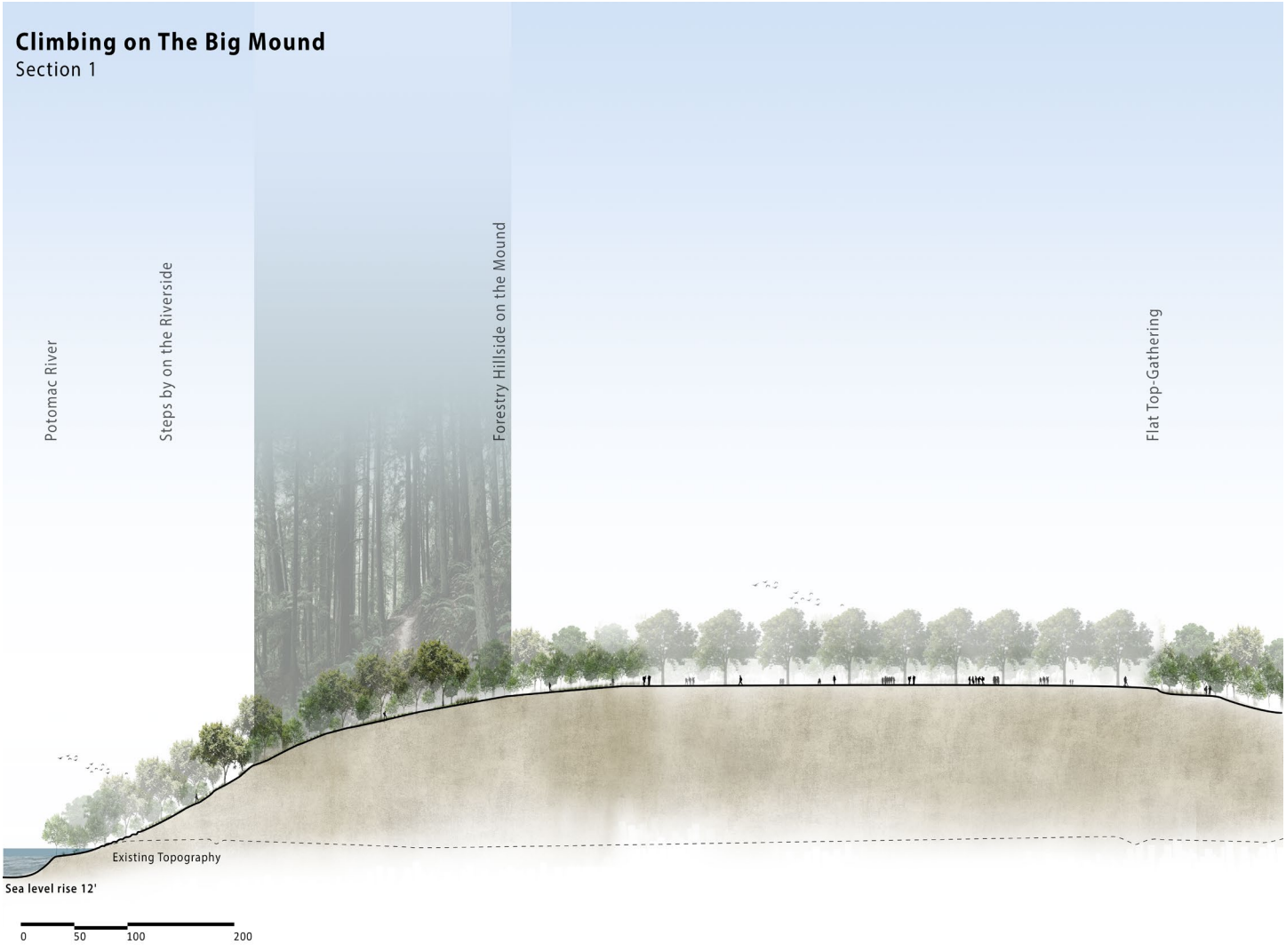


Figure 45. Cross Section, Climbing on the Big Mound from the Potomac River to the flat top

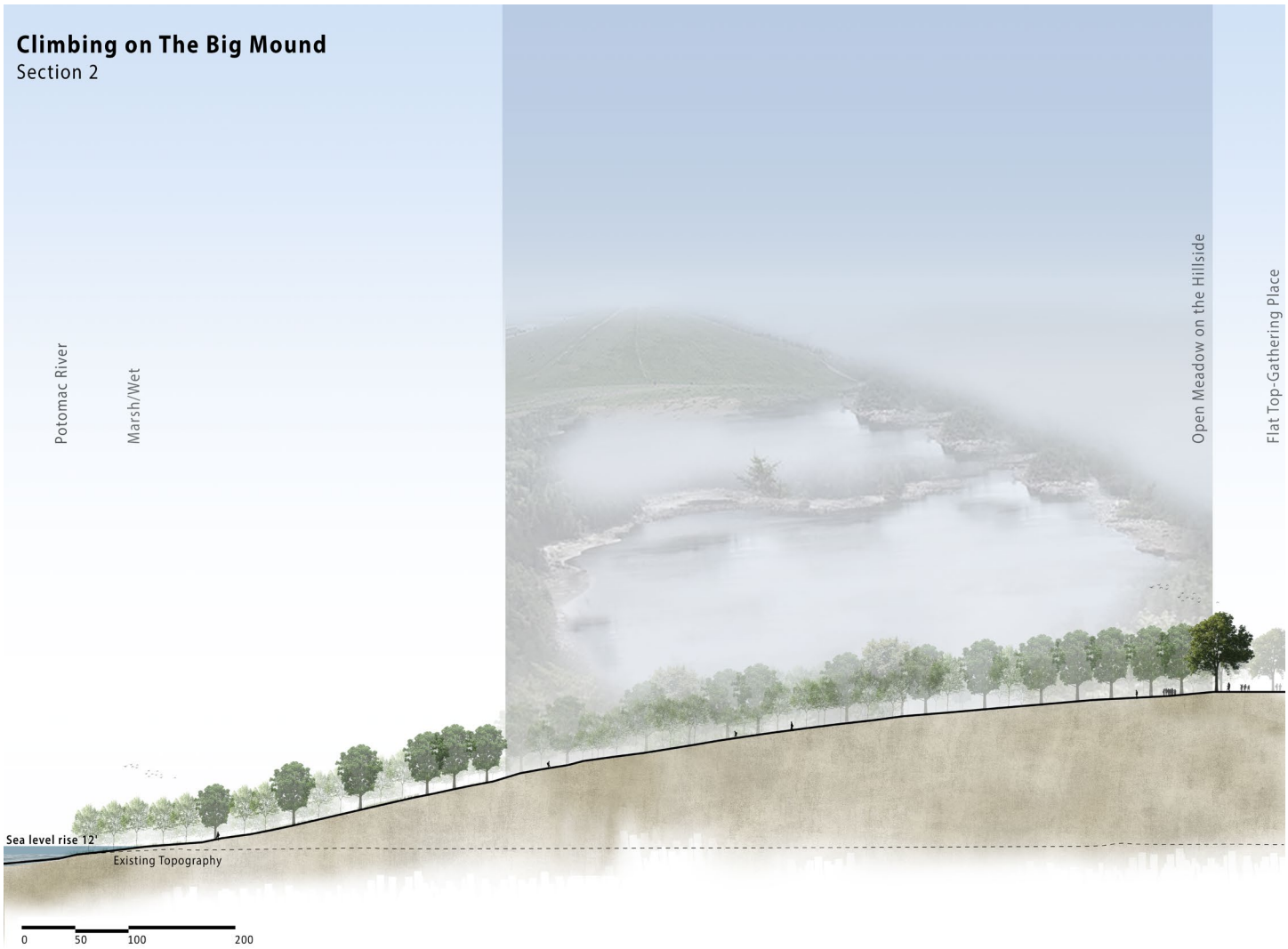


Figure 46. Cross Section, Climbing On the Big Mound. From the dewatering station (Marsh Land), to the flat top people standing on this opening part of the mound can get the view of the Potomac and basins, since the trees at the bottom are shorter.

Figure 47. Perspective View from the Flat Top Gathering Place

Figure 48. Elevation View from the River to the Steps

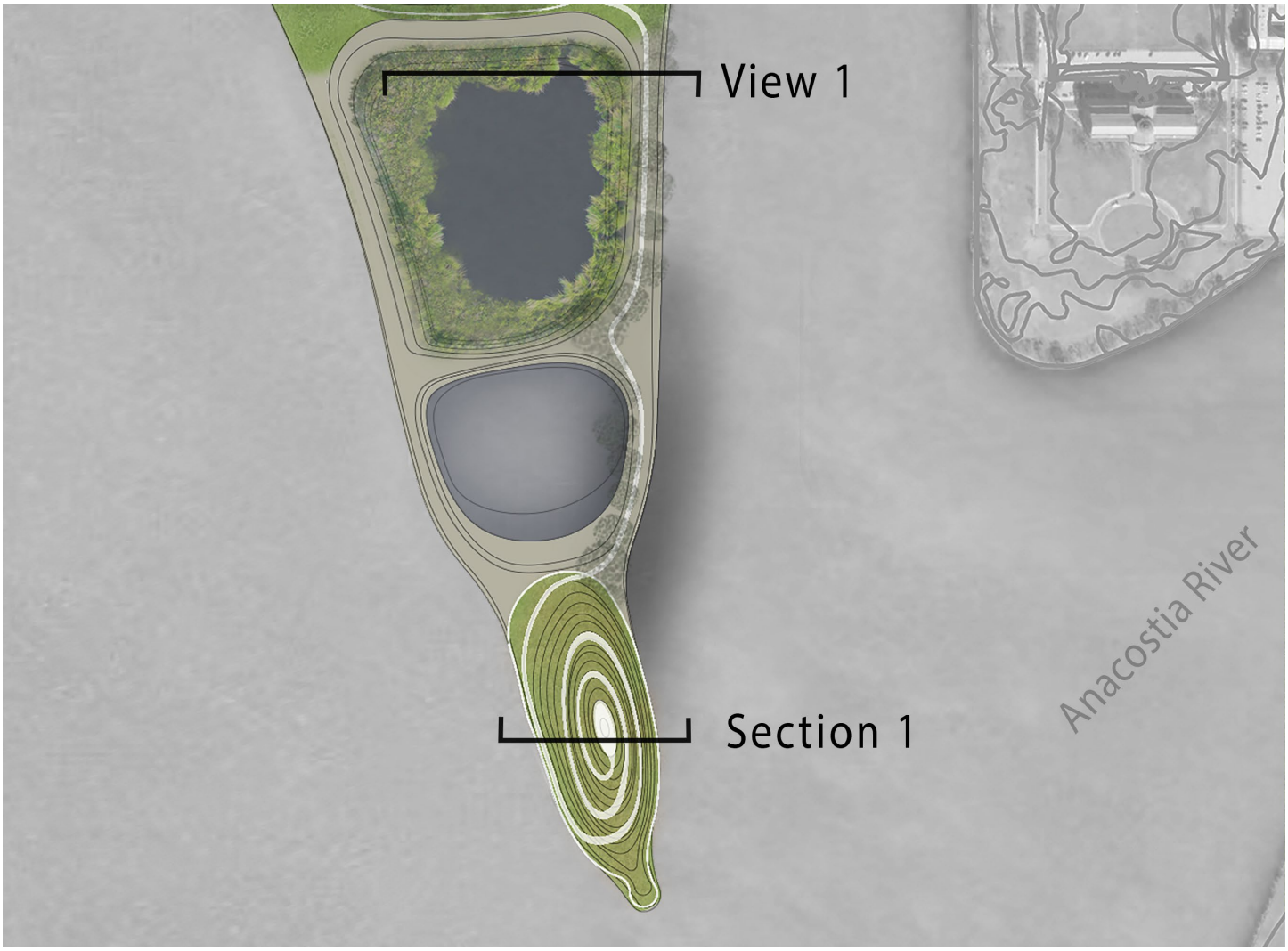


Figure 49. Detailed Plan, Hains Point and Basins

Figure 50. Perspective View from the Marsh Land to the Point

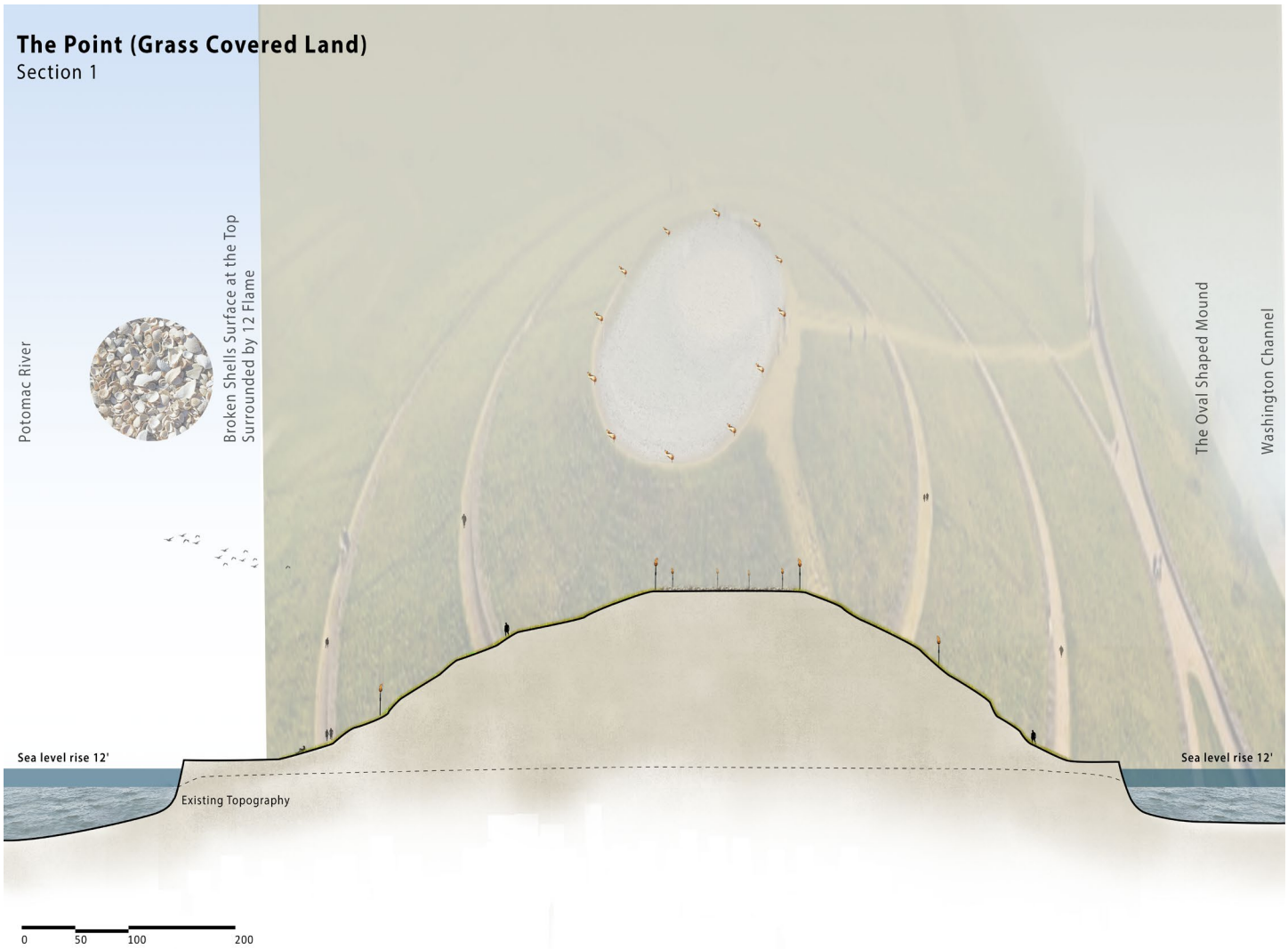


Figure 51. Cross Section, the Small Oval Mound. considering a goal for this mound to motivate people getting up there, first the surface at the top fills with the broken shells, inspired by shell middens of the mound builders, surrounded by 12 flames as 12 moons of the year dedicated to them since they very much liked the moon, so this earth mound is bearing some lights up the top.

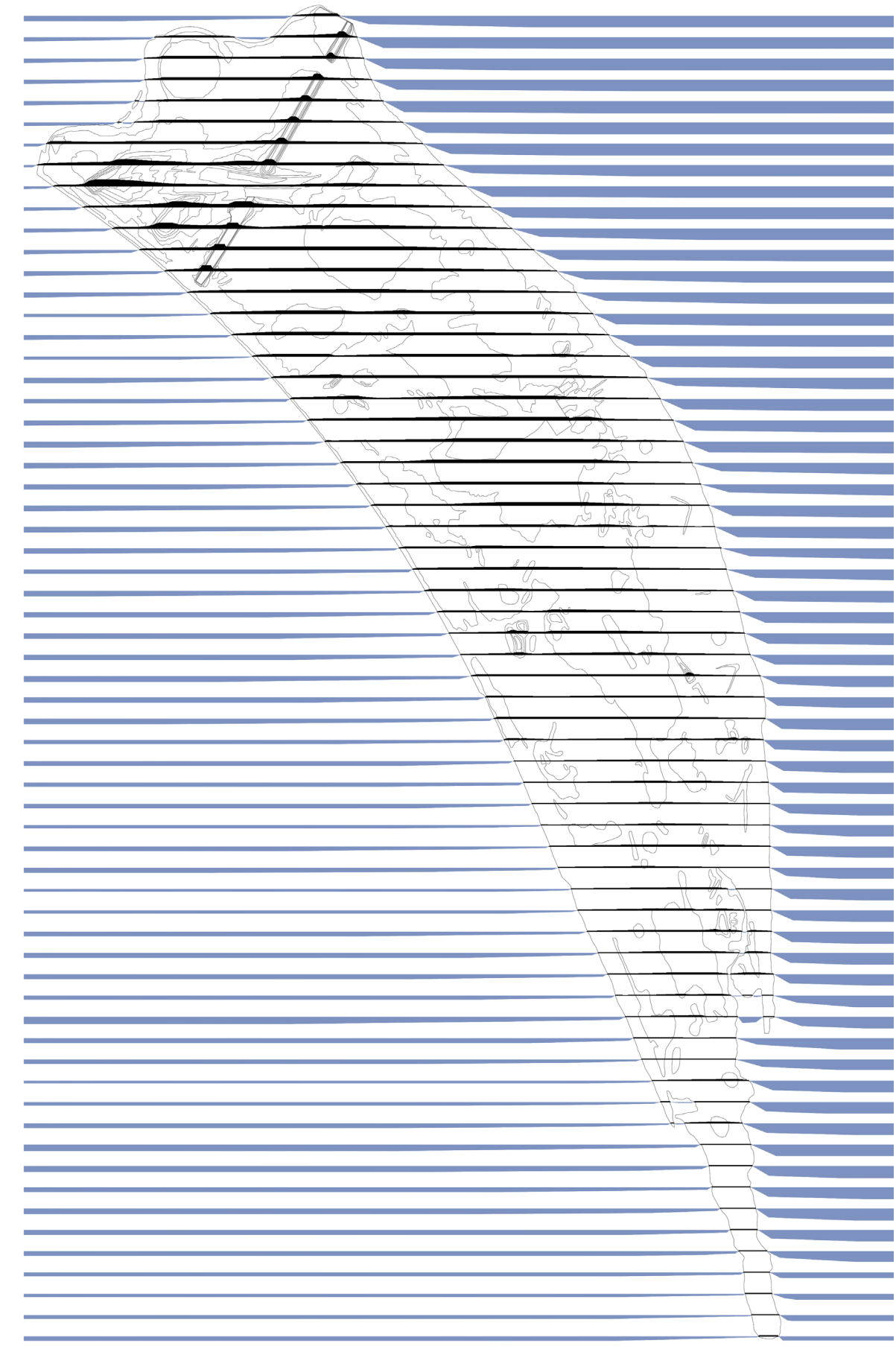


Figure 52. The Current Earth of the East Potomac Park

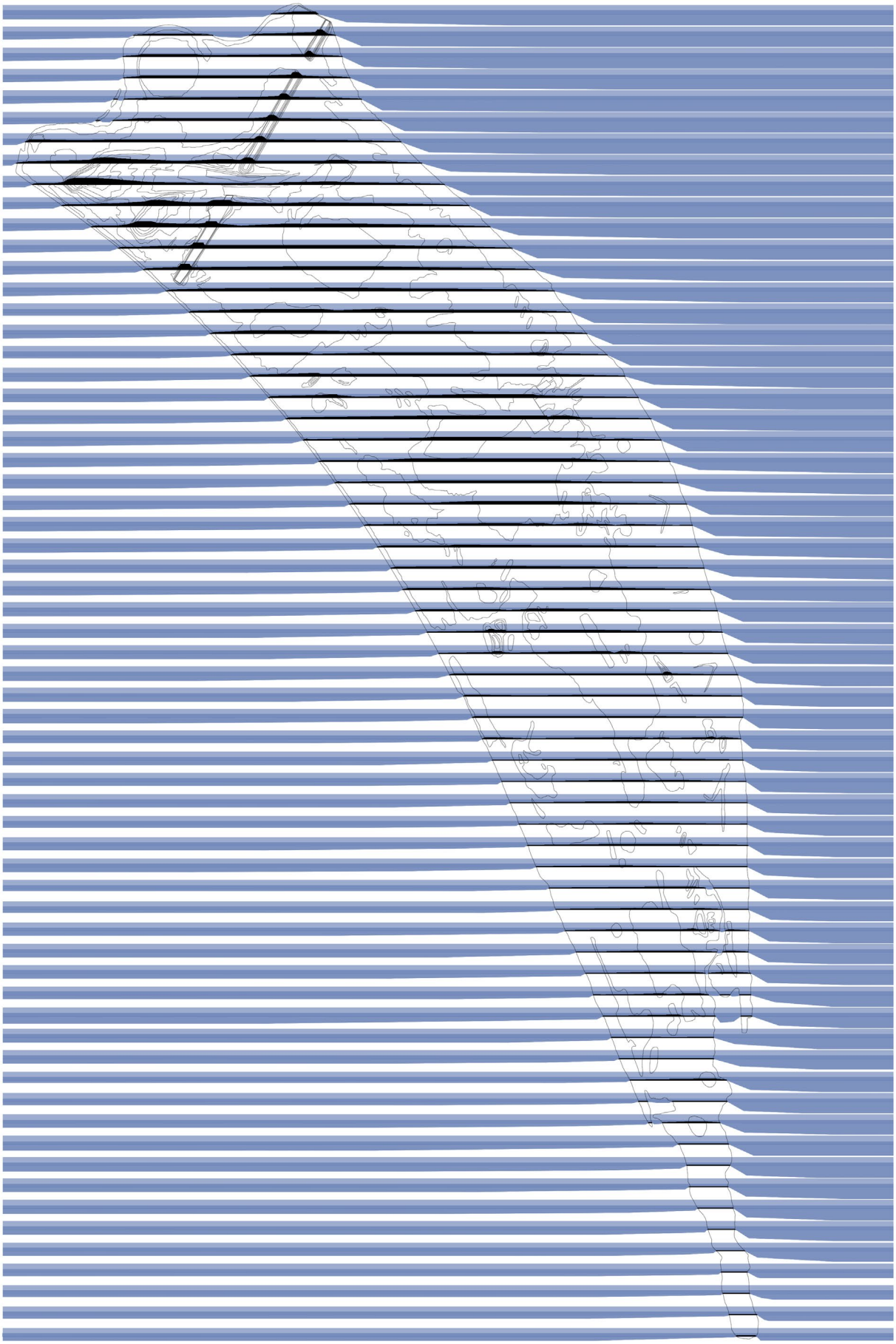


Figure 53. The East Potomac Park Getting Flooded After 200 Years

Figure 54. The Proposed Landform, New Earth

Figure 55. The Proposed Landform. After 200 Years, strong enough to not get hurt from future flooding

IIII. Conclusion

Looking back in history, it is interesting how the ancient Sumerians, Akkadians, Elamites and Babylonians built ziggurats on the plains of Mesopotamia through the structures of a mix between topography and building. While there are many who designers have worked with the existing topography, especially where changing it would be very expensive, there are other cases across cultures of people who have drastically altered topography, mostly at great cost. Thinking about those examples mentioned in this thesis led us to answer the question of what the various ways that earth can have agency in design are. Many possible answers became clear: according to the ancient Greeks who respected the earth as it was, the establishment of the sanctuaries and the architecture of their temples has convincingly revealed that coming to terms with sacred nature was an inherent feature of their essential being - the way they dwelled on earth which was eventually manifested in the way they built upon earth. Whereas, Native American Mound Builders, who, during a 5,000-year period, constructed various styles of earthen mounds for religious, ceremonial, burial, and elite residential purposes, developed an array of beliefs and unique cultures over thousands of years. They built mounds as expressions of their cultures. Accordingly, looking at the Prospect Park in Brooklyn in 19th century, siting in the terminal moraine, the edge of the last glacier, provides us a sense of the earth having agency in design where three distinct zones of the park which line up with the zones, directly responded to the earth conditions. There are many possible answers from using existing hills to making mountains. This thesis explains a variety of ideas for how earth has agency in design through a variety of examples that also link architecture and landscape architecture, and creates an important earthwork with the idea of making the hills and mountains in design as a different way of having the agency of earth in design that is not only about doing something for people but also making it to be something which in invisible situations it cannot be.

To conclude, earth as a fundamental aspect of the existing conditions of a site has/can/should have agency in design, both historically and now. This agency has been revealed in a variety of ways through different cultures and histories, from Native American Mound Builders, to Greeks to 18th century, to 19th century and contemporary designs; and from using the existing condition of the earth to making it entirely new forms with it.

Photo Credits:

Figure 2, p.3: Double negative earthwork by Michael Heizier, (2020, March). Retrieved from http://doublenegative.tarasen.net/double-negative

Figure 3, p.3: Land reclamation as sculpture project by Robert Morris, (2020, March). Retrieved from "Earthworks and beyond: contemporary art in the landscape", Beardsley, John, [fig.88, p.91]

Figure 4, p.4: General view, Sparta, (2020, May). Retrieved from "The Earth, the Temple and the Gods: Greek Sacred Architecture", Scully, Vincent, [New York: Frederick A. Praeger Inc. Publishers, 1969, fig. 45]

Figure 4, p.4: The Theater of Epidauros sited into a hillside with spectacular views to the surrounding landscape. (2020, April). Retrieved from a dissertation "An analytical approach to the concept of 'Topography' in architecture" by Cem Muyan

Figure 7, p.6: Liberty moment, Governors Island, (May 2020). Retrieved from https://www.archdaily.com/791454/the-hills-by-west-8-set-to-open-on-governors-island?ad_source=search&ad_medium=search_result_all

Figure 9, p.9: DC clean water projects, magnitude of the challenge: CSO control, (October 2020). Retrieved from https://www.dcwater.com/cleanrivers

Figure 10, p.10: DC clean water projects, magnitude of the challenge: CSO control, (October 2020). Retrieved from https://www.dcwater.com/cleanrivers

Figure 11, p.11: Potomac River tunnel project overview, (October 2020). Retrieved from https://www.dcwater.com/projects/potomac-river-tunnel-project

Figure 12, p.12: The tunneling process, (October 2020). Retrieved from https://www.dcwater.com/projects/anacostia-river-tunnel-project

Figure 13, p.13: Typical stratigraphy along the Potomac River system, (September 2020). Retrieved from a paper "Northeast Boundary Tunnel: Applied lessons learned from the Anacostia River Tunnel Project, Washington, USA", by M. Pescara & N. Della Valle

Figure 14, p.14: Mount Damavand, Iran, (October 2020). Retrieved from https://en.wikipedia.org/wiki/Mountain

Figure 15, p.15: Cahokia mounds, (December 2020). Retrieved from https://en.wikipedia.org/wiki/Cahokia

Figure 16, p16: Looking toward the hills, Northala fields park, (November 2020). Retrieved from http://markoandplacemakers.com/projects/northala-fields-park-london-uk

Figure 17, p.17: Imagery Google, Northala fields park masterplan, (November 2020). Retrieved from http://markoandplacemakers.com/projects/northala-fields-park-london-uk

Figure 18, p.17: The four hills at Northala fields, (November 2020). Retrieved from A report for the National Infrastructure Commission: "The Value of Design in Infrastructure Delivery", p.24

Figure 20, p.19: The construction of the mounds, Northala fields, (November 2020). Retrieved from "The magazine of the American Society of the Landscape Architects", Northala Fields Forever [05.2009], p.101

Figure 21, p.20: The Native American mound builders, (December 2020). Retrieved from https://en.wikipedia.org/wiki/Mound_Builders

Figure 22, p.21: Shell middens, (December 2020). Retrieved from https://www.ncptt.nps.gov/blog/its-not-just-garbage-identifying-ceremony-and-cosmology-in-shell-middens/

Figure 23, p.21: Archaic shell rings, (December 2020). Retrieved from https://www.ncptt.nps.gov/blog/its-not-just-garbage-identifying-ceremony-and-cosmology-in-shell-middens/

Figure 24, p.22: Fig island shell rings, (December 2020). Retrieved from https://www.nps.gov/articles/experimental-archaeology-were-archaic-shell-rings-prehistoric-water-tanks.htm

Figure 26, p.25: East Potomac Park, Hains Point. , (December 2020). Retrieved from https://en.wikipedia.org/wiki/Hains_Point

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