

# **WATER VOYAGE FROM QUABBIN TO BOSTON**

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A thesis submitted in partial fulfillment of the requirements for the Master of Landscape Architecture Degree in the Department of Landscape Architecture of the Rhode Island School of Design, Providence, Rhode Island.

By  
Date

**Approved by Masters Examination Committee:**

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## Overview

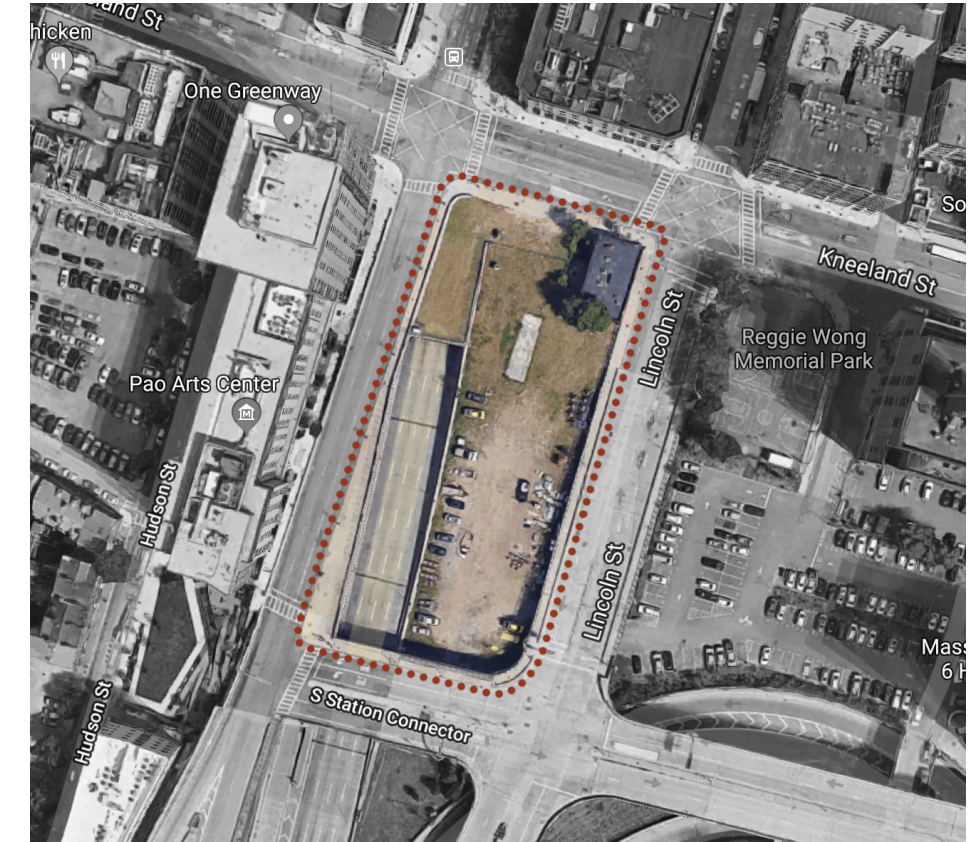
This thesis focus on investigating on revealing the powerful Quabbin to Boston water system. In Boston, whenever we turn on our tap, our shower head, there is water coming out. Being driven by the curiosity of want to know the source of the water, the research eventually get to know the Quabbin Reservoir. Being fascinated by the giant body of water which provides water for people of the big Boston, in phase one the research begins with finding the hidden story of the displaced people who lost their land because of Quabbin reservoir. However, the way of the researching cannot show the sublimity of quabbin, so in phase 2 the researcher then continues investigating the components of the whole system during which she found that the hidden part of the system----the giant size of the infrastructures of this system are really impressive and make her feel very sublilme, so she decides to show the sublime feeling of the infrastructure via design. She also does a form study based on the way water flows under the force of gravity. Finally in phase three, the researcher starts to work on identifying the issues of the site, by applying the framework on the site, she is able to come up with some strategies. Also, by extracting the size elements of the pipes and layouting them on the site, combining with the structure she got from the water flow form study, she is able to come up with a design which works mainly on the landform for revealing the system and provide space for people to use.

## Site

As part of the Quabbin- Boston water system, the high pump station at the north-eastern corner of the site is the reason for choosing the site,which also makes it suitable for revealing the water system.

This tight site locates in downtown boston, being surrounded by highrises---- most of them function as commercial building-----and right next to cinatown, users of the site will mostly be the people work there and residents in Chinatown.

Has sidewalks at four sides, the site is quite pedestrian-friendly. People access the site through four cornesr of it. But the elevated highway at south of the site cuts one of the main source of peopole who came here. The design on the site will focus on the main problem and the revealing process.



Aerial Photo of the site

# Phase 1 Investigation

Identify the experiences need to be created

## Abstract

This body of research explores the definition of sublime and the being displaced history of four towns which are under Quabbin Reservoir now. The aim is to understand the memory of these town, how people felt when being displaced and what kind of experience need to being created on the site. By overlaying the old town map with the existing one, information like how people used the space, where were the big public building and infrastructures located can be found. Photos of site on the Internet is also helpful for figuring out the spacial sequence on site. Precedents study works as examples of how to create experience via multimedia.



Old Dana Town Center

## Introduction

This phase of research starts from looking at Quabbin Reservoir and its history. To build the reservoir, 4 towns' people were displaced and land had been inundated. According to this author's definition of sublime——Except being aroused by the limitness of mass or space, sublime is also an appreciation aroused by some kind of experience which could be both current ones and post ones generated by current ones and thesis question—— How to create a series of experience via landscape to recall the memory of sacrifice to let people understand and appreciate it, finding the past memory, feeling of people being displaced and spatial sequence on the site is very necessary. Through reading many historic documents, the author concluded 3 different types of emotions people had in the past. The overlay of old and existing town mapping is very help to identify how people used the town space and where did important common buildings and infrastructures located. The spatial qualities and be concluded from the site photos which have different possibilities to be transformed into different feeling space offering different spatial experience.

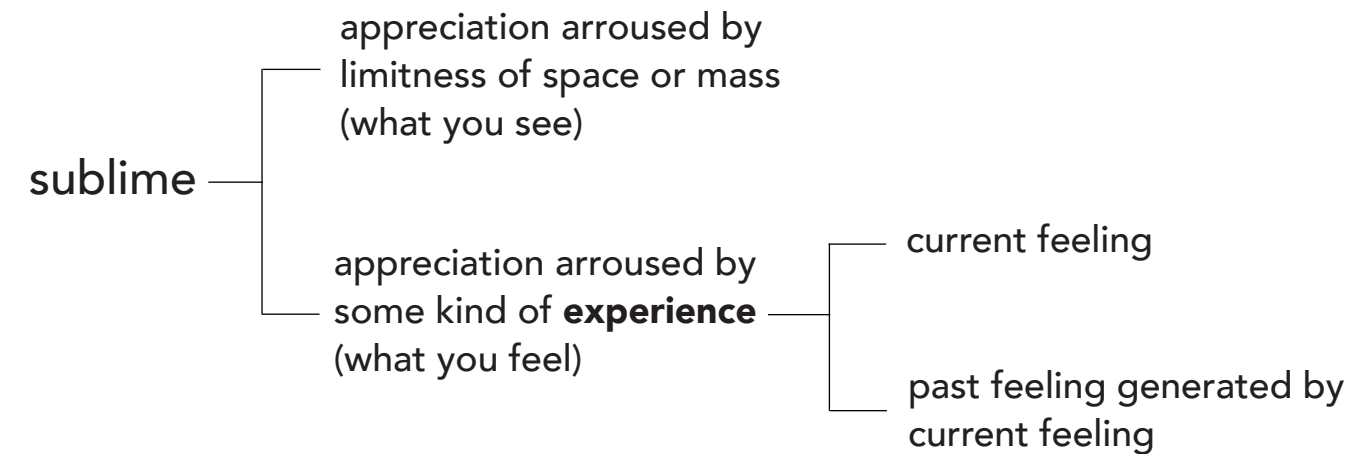
## Methods

1. Literature review
2. overlay mapping of old and existing
3. precedents study
4. model representations as concept
5. GIS mapping

## Phase 1.1 Definition

### Definition of Sublime:

Except being aroused by the limitness of mass or space, sublime is also an appreciation aroused by some kind of experience which could be both current ones and post ones generated by current ones.



### Thesis Question:

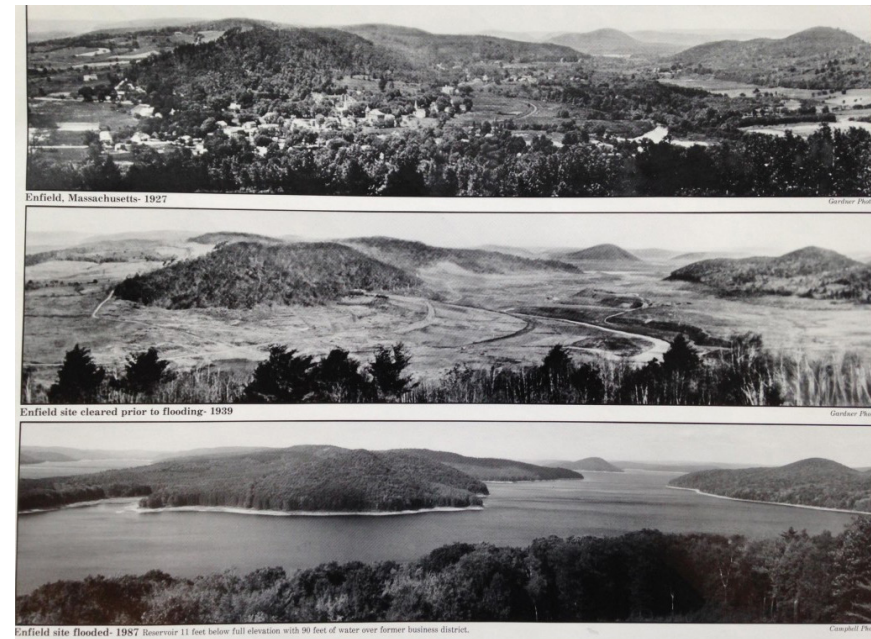
By asking the question: How to create a series of experience to recall the memory of sacrifice to let people understand and appreciate it, this work intends to create series of experience (both visually and mentally) for both first-time visitors and people who were displaced to revisit. The appreciation they get towards this landscape is the author's definition of sublime.

# Phase 1.2 Site Analysis



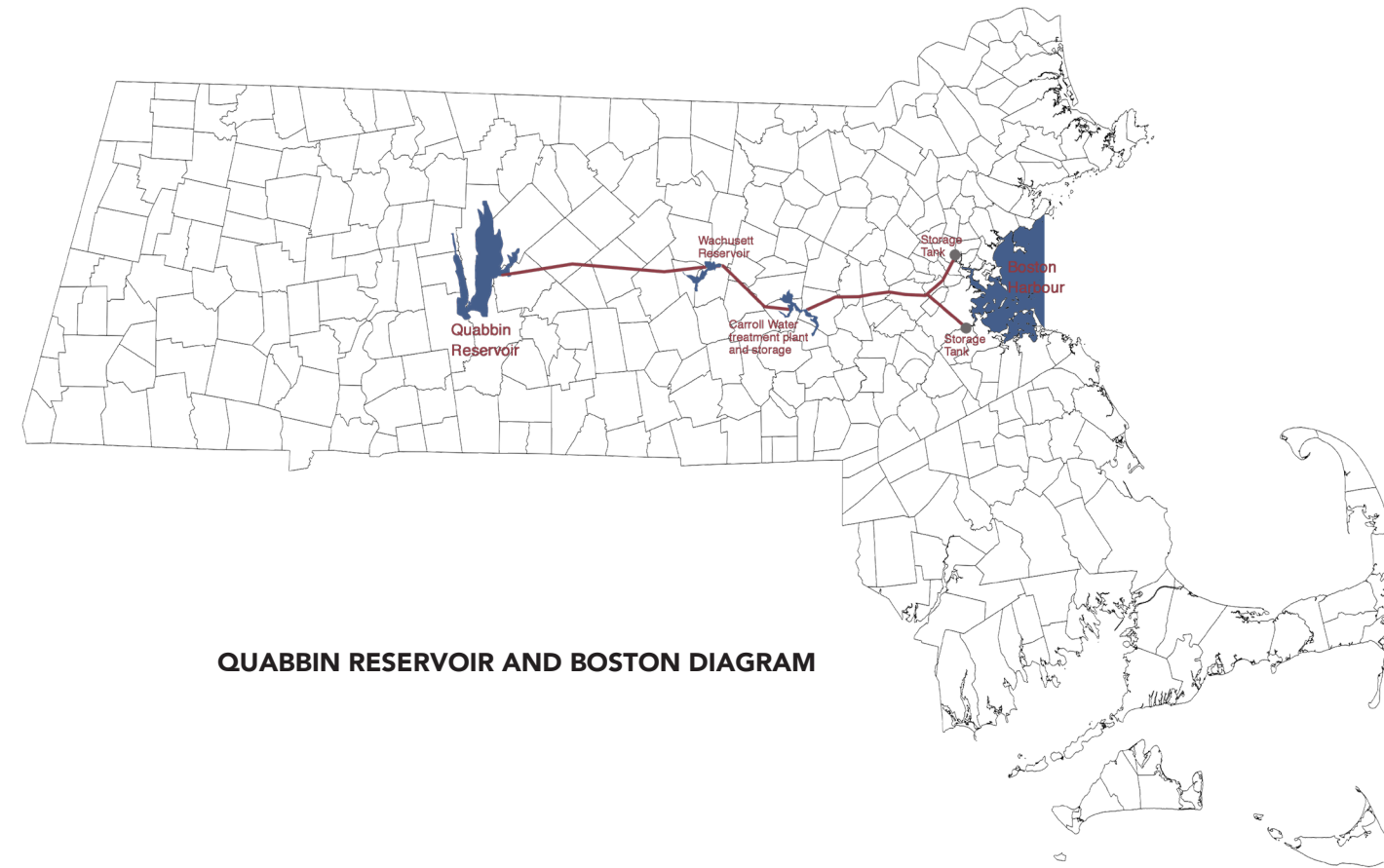
## SITE SLECTION

site is located in the old Dana town common, near Quabbin reservoir.



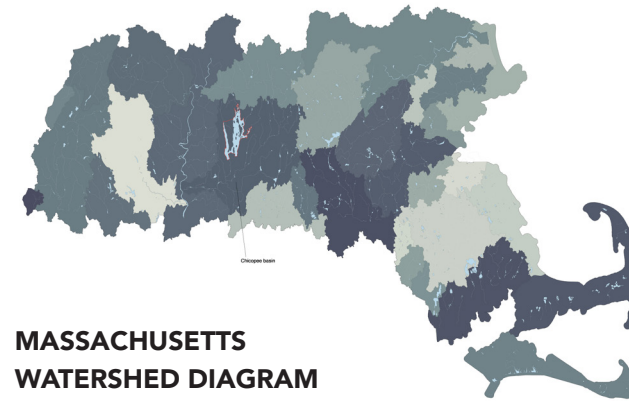
## BEFORE AND AFTER PHOTO OF QUABBIN

before and after of Quabbin Reservoir

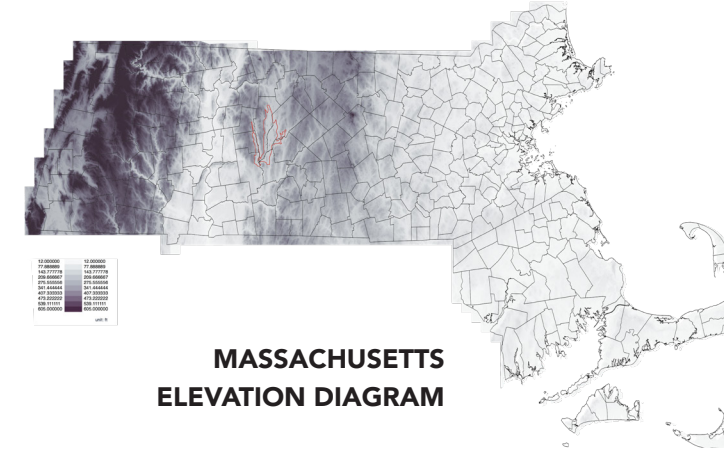


## QUABBIN RESERVOIR AND BOSTON DIAGRAM

Historically, the building of Quabbin Reservoir was because the increasing demanding for fresh water of boston people. It's not hard to see that the scale of Quabbin Reservoir is very big and the distance it travels to offer the drinkable fresh water to boston is also huge.



## MASSACHUSETTS WATERSHED DIAGRAM

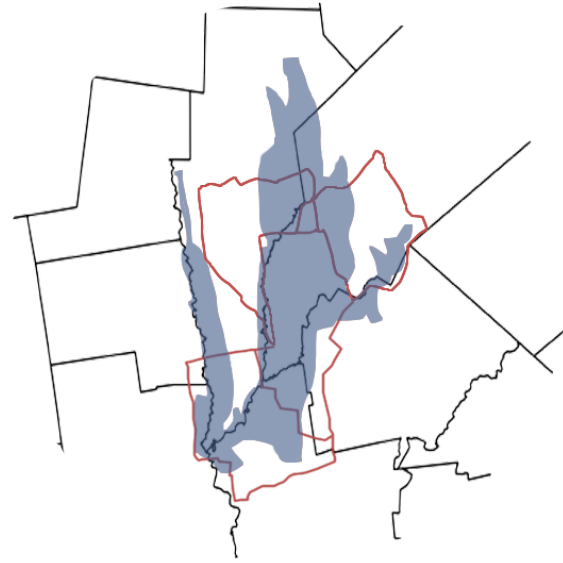


## MASSACHUSETTS ELEVATION DIAGRAM

Quabbin Reservoir locates in the chicopee basin watershed, this area's fresh water are one of the best among the whole Massachusetts. The elevation diagram also shows the relatively low elevation compared with its surroundings. These two reasons make it the best choice for being the source of fresh water.



**OVERLAY OF FOUR TOWN AND QUABBIN RESERVOIR**



Red lines are the boundaries of lost four towns. Almost the whole Greenwich town are underwater now. Areas that are above water have a lot of remanents of buildings and infrastructures. But above water area of Precott becomes the Precott peninsular which is only accessible on once a year. The area of Dana town, has the biggest remanents which is accessible to people.

**What happened before and after being inundated**

Before being inundated: (---1938)	majority of people made livings with agriculture and industry.	34 cemeteries in four towns
After being inundated: (---1938)	farmland and mills were flatten and were underwater	13 of the cemeteries were moved to Quabbin cemetary park, 21 of them were underwater.

**Three kinds of emotions people got**

people are excited to settle elsewhere and start new life

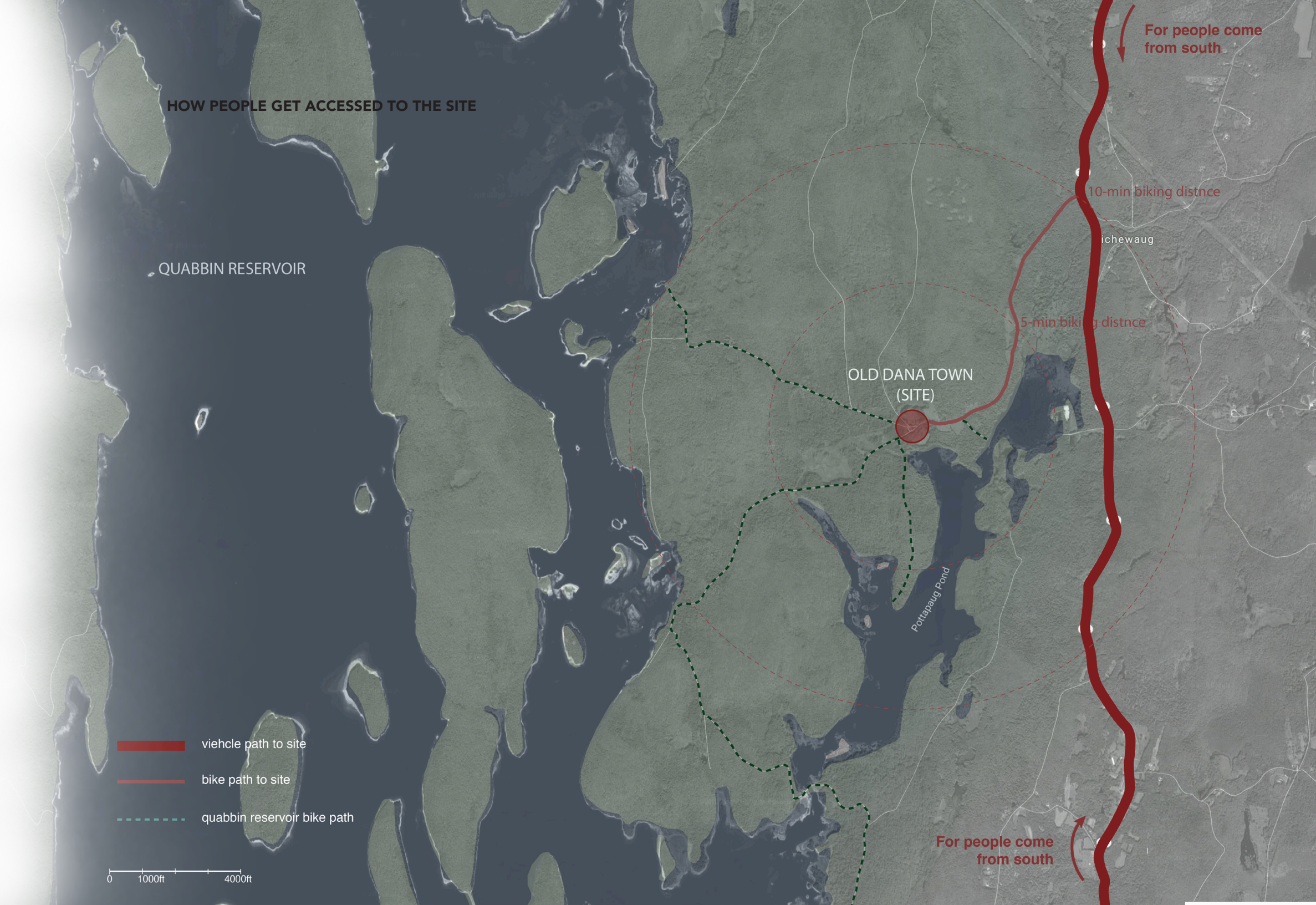
people were bitter but relatively calmed because they got ways for supporting themselves and family

**Different ways displaced people being treated**

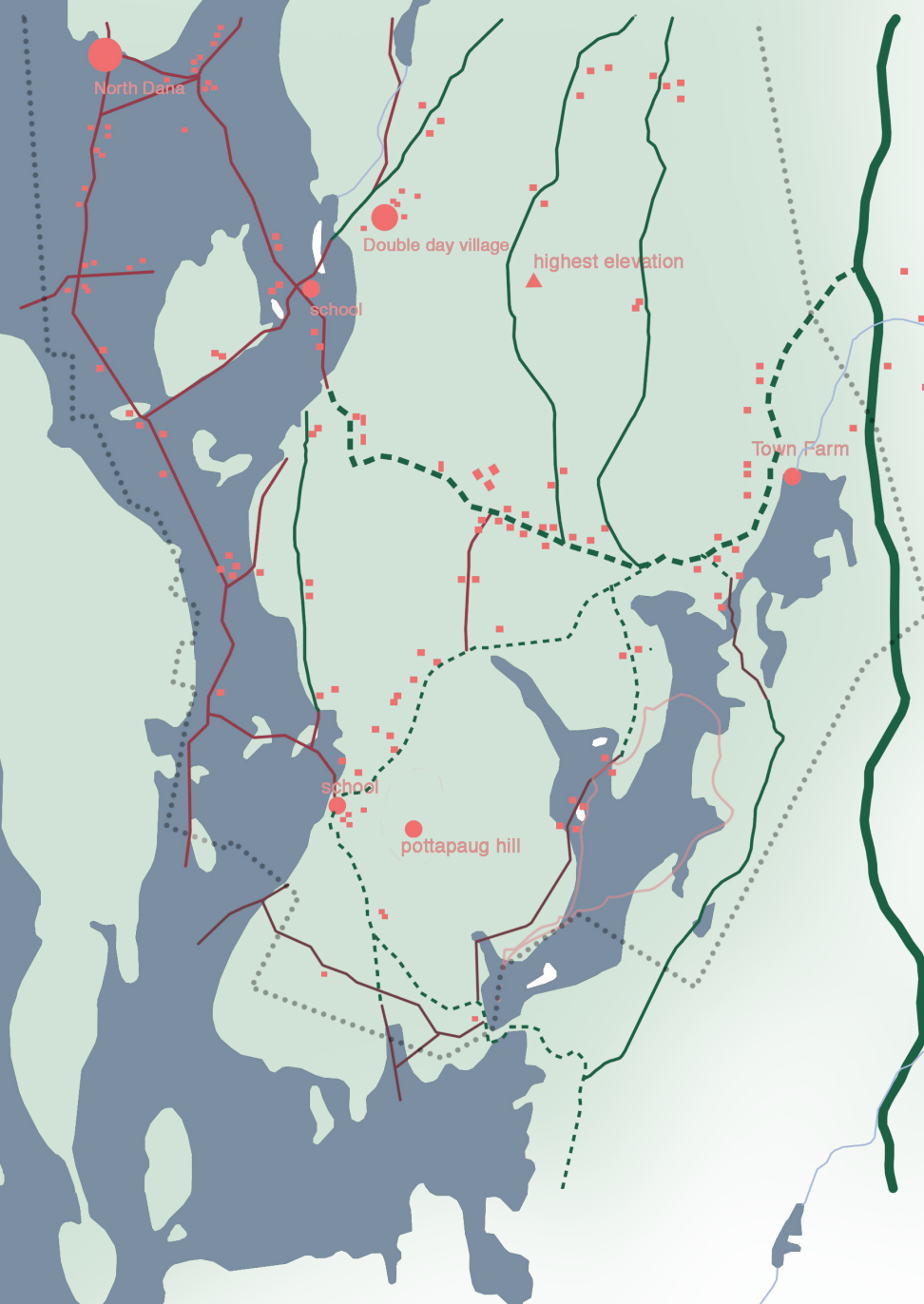
didn't been resigned new land but got lots of governmental allowance	didn't been resigned new land and much allowance either but got job because of this construction	get little allowance, didnt get a job , didn't been resigned new land either
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people were in great grief, fear and lost: losing their farmland and factories they had been working on for entire life; lost current connection and not sure about the future; had to share resource with host populations; without training for urban life

**HOW PEOPLE GET ACCESSED TO THE SITE**



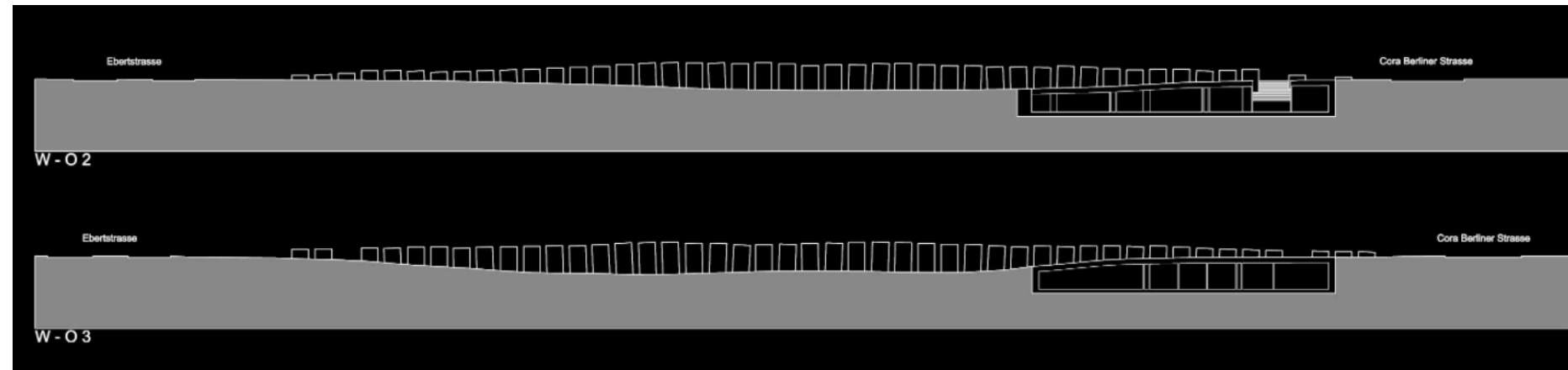
OVERLAY OF OLD AND EXISTING DANA TOWN MAP



## Phase 1.3 Case Study



911 national memorial



Memorial to the murdered Jew in Europe



remorete memory



nuclear sculpture

## Findings + Conclusions

Guided by the thesis question: How to create a series of experience via landscape to recall the memory of sacrifice to let people understand and appreciate it, the overlay of existing and old town map, emotional diagram and space characters showed by photos offer supports for the preliminary overall concept for site. The emotion diagram shows three different feelings for displaced people which are exciting; bitter but calm; and fear and lost. Two layers of map shows which road people used the most often in the past where are the public space and facility located. So the feeling and experience author wants to created can get from emotional diagram. Some remnants of public space and road to these space are also selected for creating different experience. Four types of space are identified through site photos. First, the long, quiet and dark path is the way to the old dana town common from the viechle path. Because of the quietness and darkness, makes it a suitable space to create a kind of fear and lost experience. The next space is the bright old dana town common where people used to get together here. It has the potential to be transformed into a meditation space to feel the calmness. If keep going, one will see another dark and narrow path, which is a good space for showing grief. Finally, a highest land of that space give people a nice view of the reservoir to appreciate the sacrifice.

However, at last the author figured out that the sublimeness she is trying to show is about the reservoir, so it seems that too much attention of the emotional space is not a strong way to achieve the goal. So the next step will focus on revising the definition of sublime and making clear what things I am going to show the sublimeness and how to do this.

## Assessment

General speaking this phase's research is not that successful. The main reason is that the author didn't find what object is the most sublime. However, the site related context research is very helpful. It shows the massive scale and long distance it travels all the way to Boston, which shows the sublimeness of the giant human-made water system. The research of the emotion of displaced people and putting different experience into different space to create varies feeling space is not a strong way to arouse people's appreciation towards the reservoir. Second, the audience is not clear, whether it is the first time visitor or the people who has been displaced before. This is a crucial point to help clarify the research question. For the following phase, the thesis question need to be revised and more ways to arouse the sublimeness of quabbin needs to be done.

# **Phase 2 Investigation**

**Reavel the Quabbin-Boton Water System**

## Abstract

In this phase, the researcher refines her thesis question to How to create a place for people to experience( to see, feel, hear) Quabbin-Boston water supply system and for people to use at the same time?; and her definition of sublime to A threshold between some appreciation aroused by huge things we could see and more veneration aroused by revealing unknown part of things.. Instead of researching the story of displaced people and towns, the researcher looks deep into the Quabbin- Boston water system, trying to find ways to reveal this giant sublime system. At the same time some site analysis set a frameworks for this revealing.

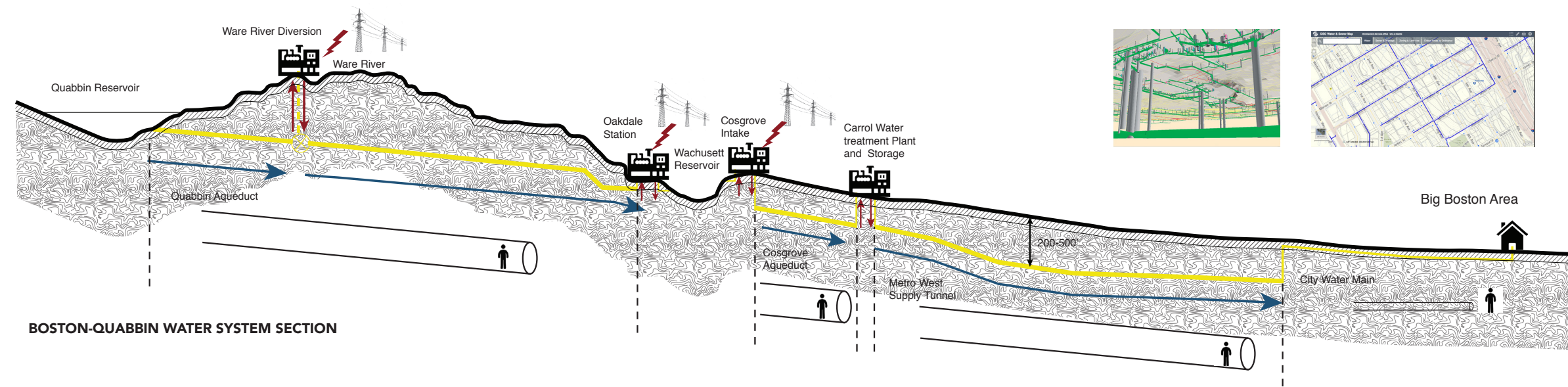
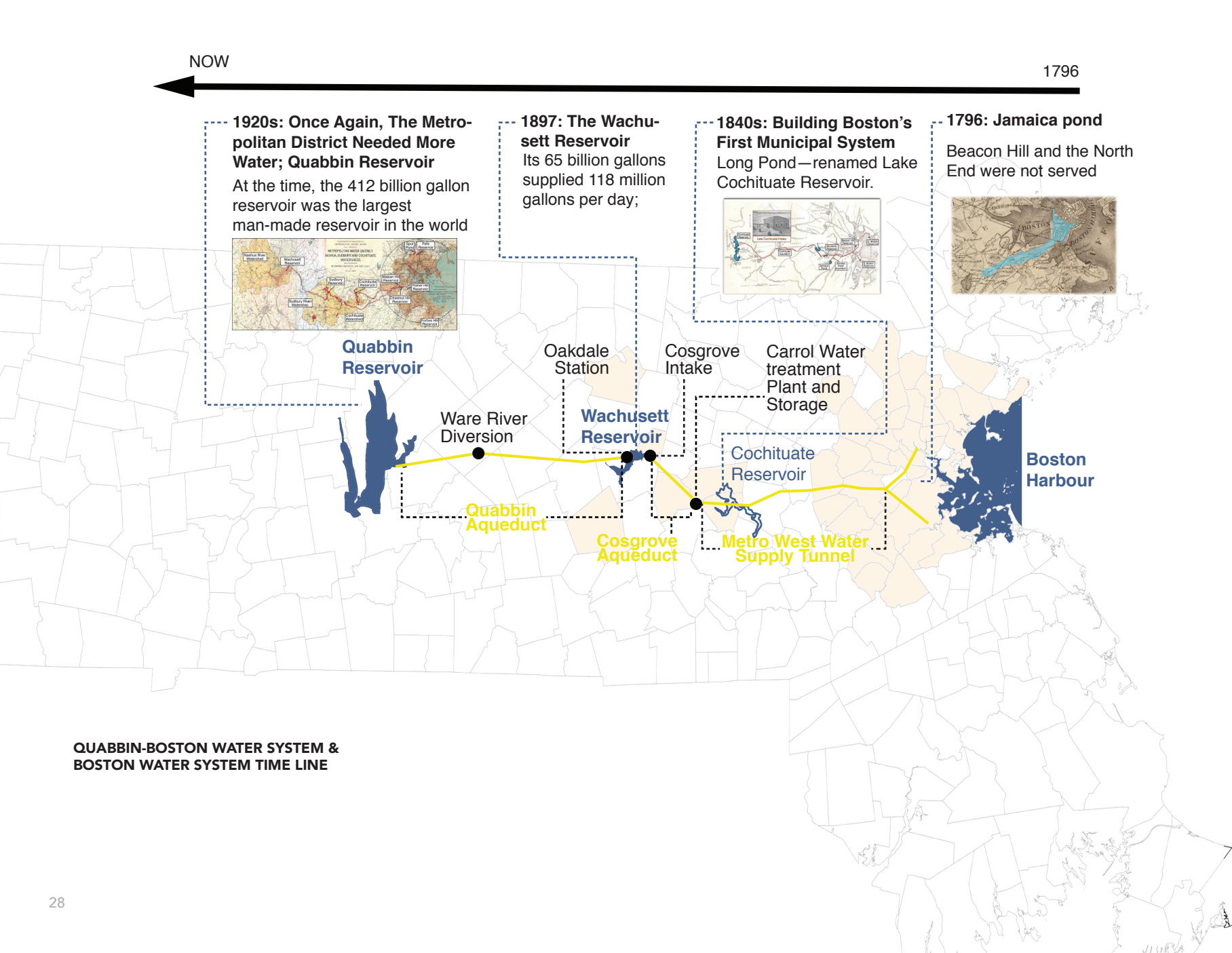


## Introduction

Driven by the refined thesis question: How to create a place for people to experience( to see, feel, hear) Quabbin-Boston water supply system and for people to use at the same time, the researcher first do a literature review on the component elements in this system: reservoirs, tunnels, aqueducts, pipes and hydropower stations. She then represent this system both in plan and section. The plan is about a narrative description of the system, the section is intended to show the forces that drive the whole process. Based on the analysis from section, the researcher extracts a form which is an abstraction of the whole system. To add some other possible layers on this form, the researcher does a form study of water moving driven by gravity, hoping to abstract more form from it. The other part of this phase is the site study. The researcher uses the GIS mapping to show the zoning information; location relationship of site with some main districts of Boston; and access information. She also uses sectional analysis to show the spacial quality of the site, including noise and light analysis.

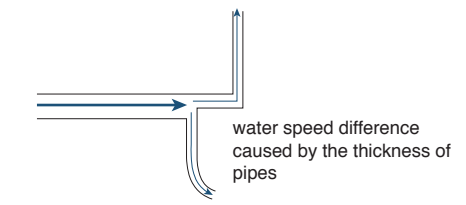
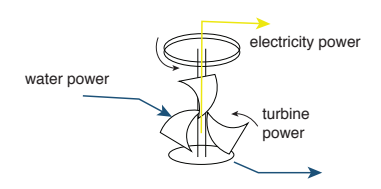
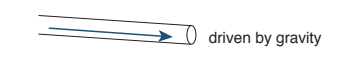
## Methods

- 1.Literature review: information about how water get transformed from
- 2.Quabbin to Boston.
- 3.Drawing diagrams: show the whole water system both in plan and section
- 4.Water flow test: tracing how water flow
- 5.Model making: represents how water flow
- 6.Mapping: show location information of site
- 7.Sectional noise diagrams: show the sound change of site
- 8.Sectional light analysis diagrams: show the light change of site

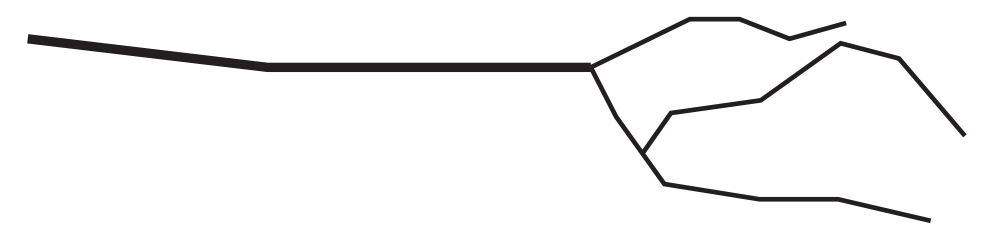


**SUBLIMENESS POINTS**

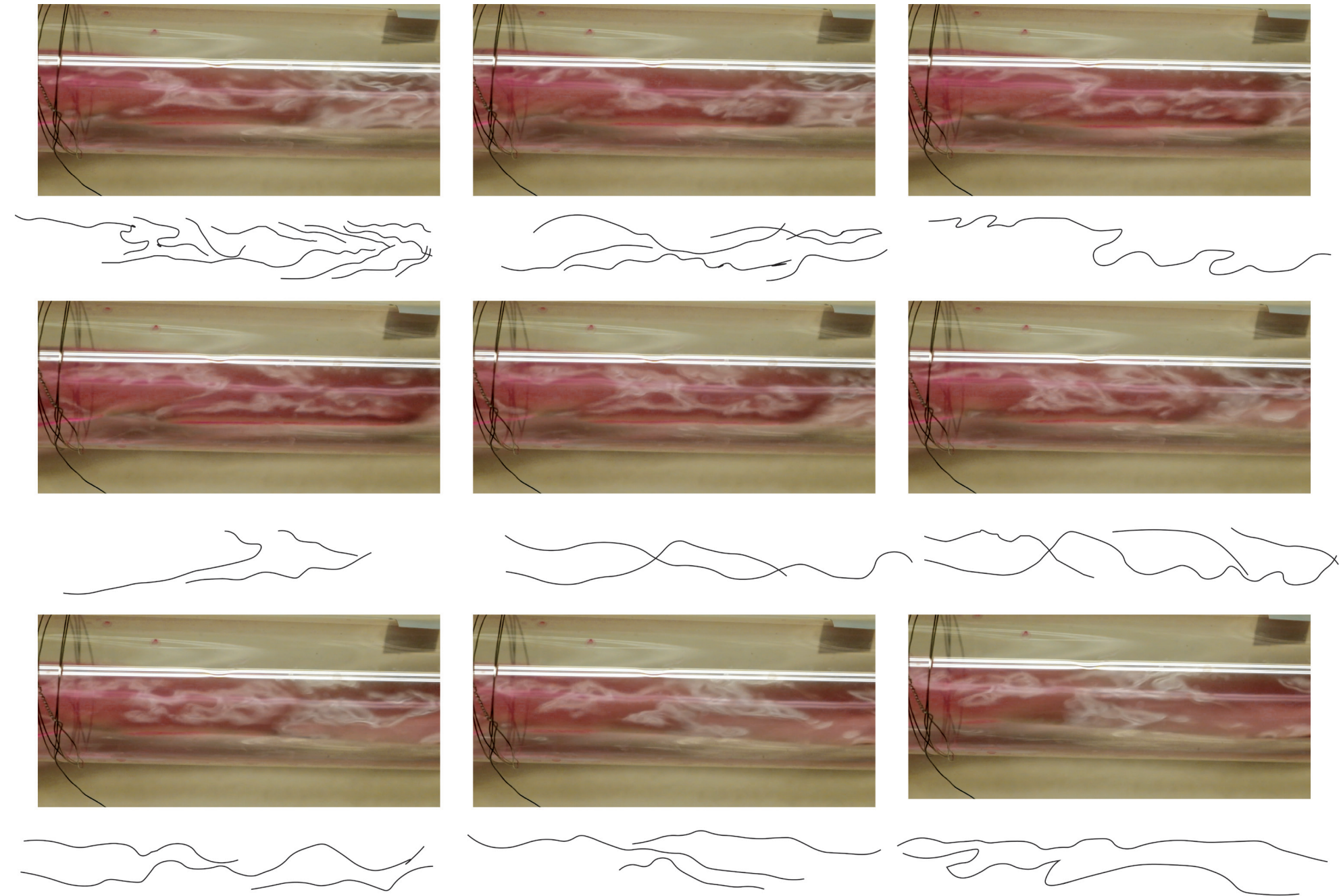
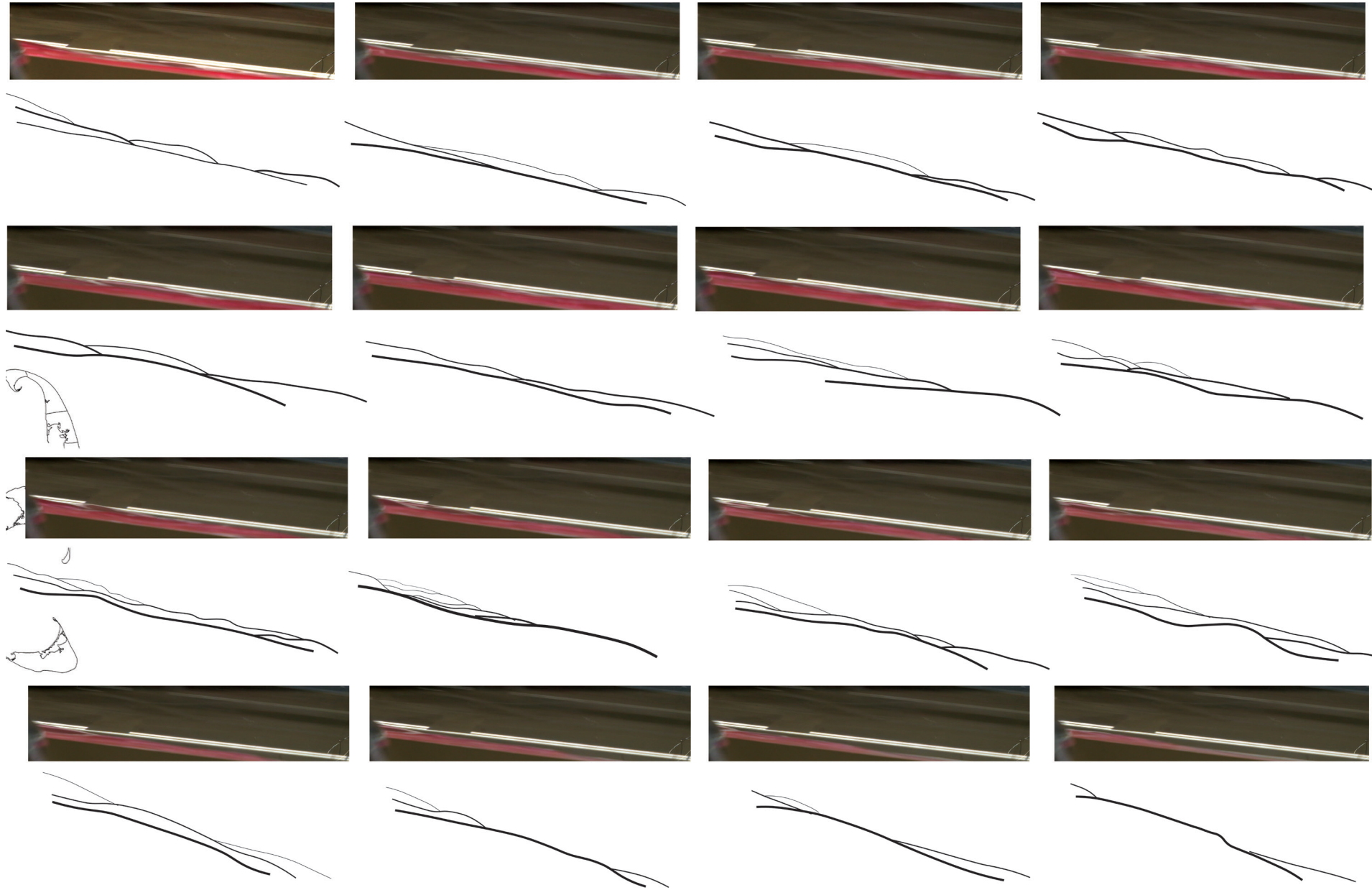
1. Gravity takes water all the way from west to east.
2. Hydropower each station generates.
3. Dense water pipes system.



**FORM ABSTRACTION**



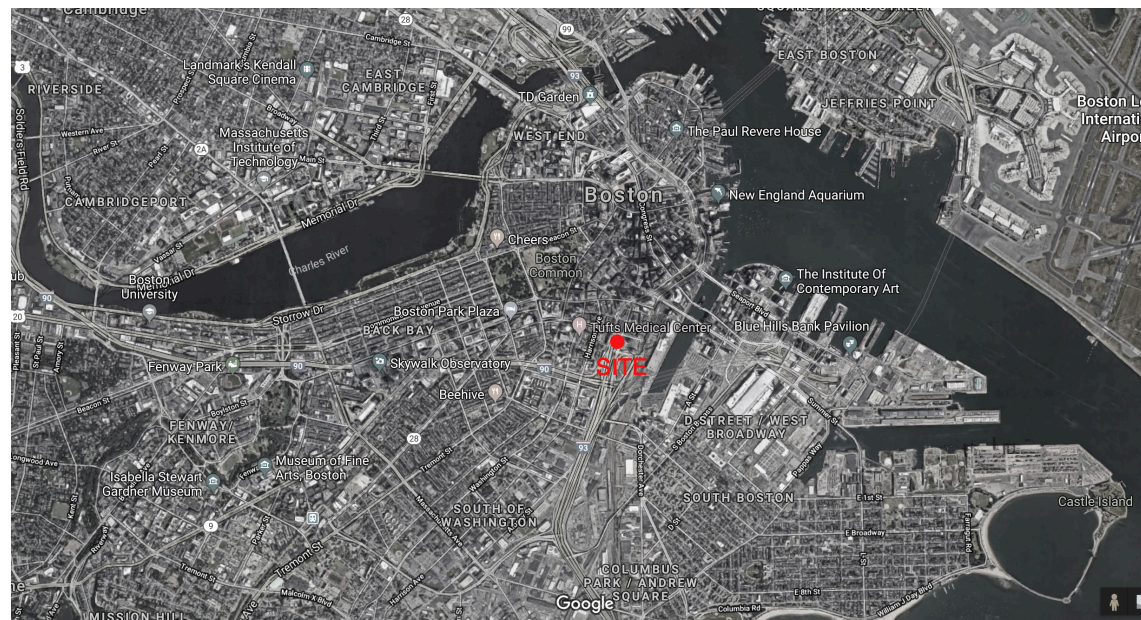
WATER MOVEMENT STUDY







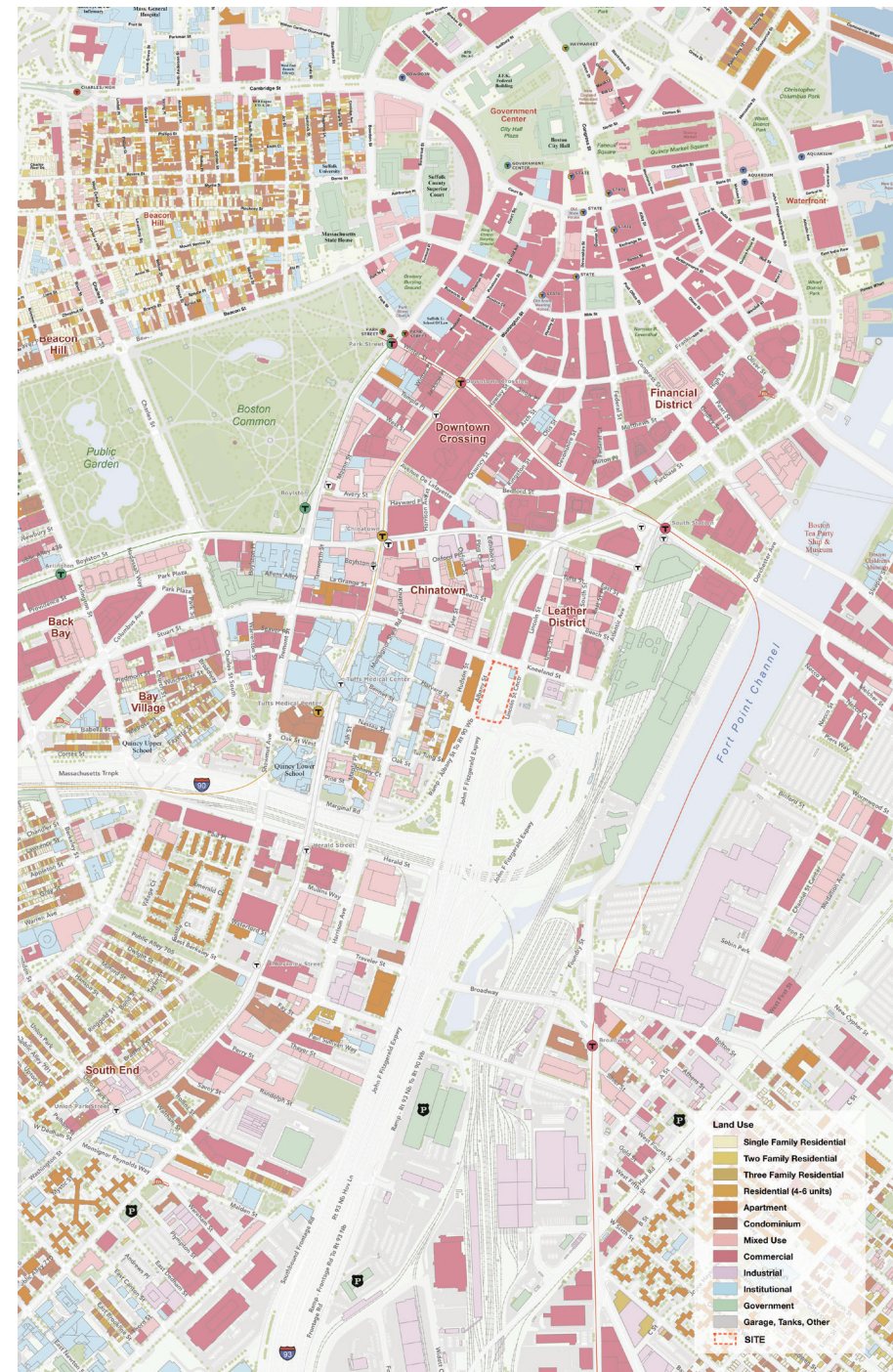
WATER FLOW MODEL



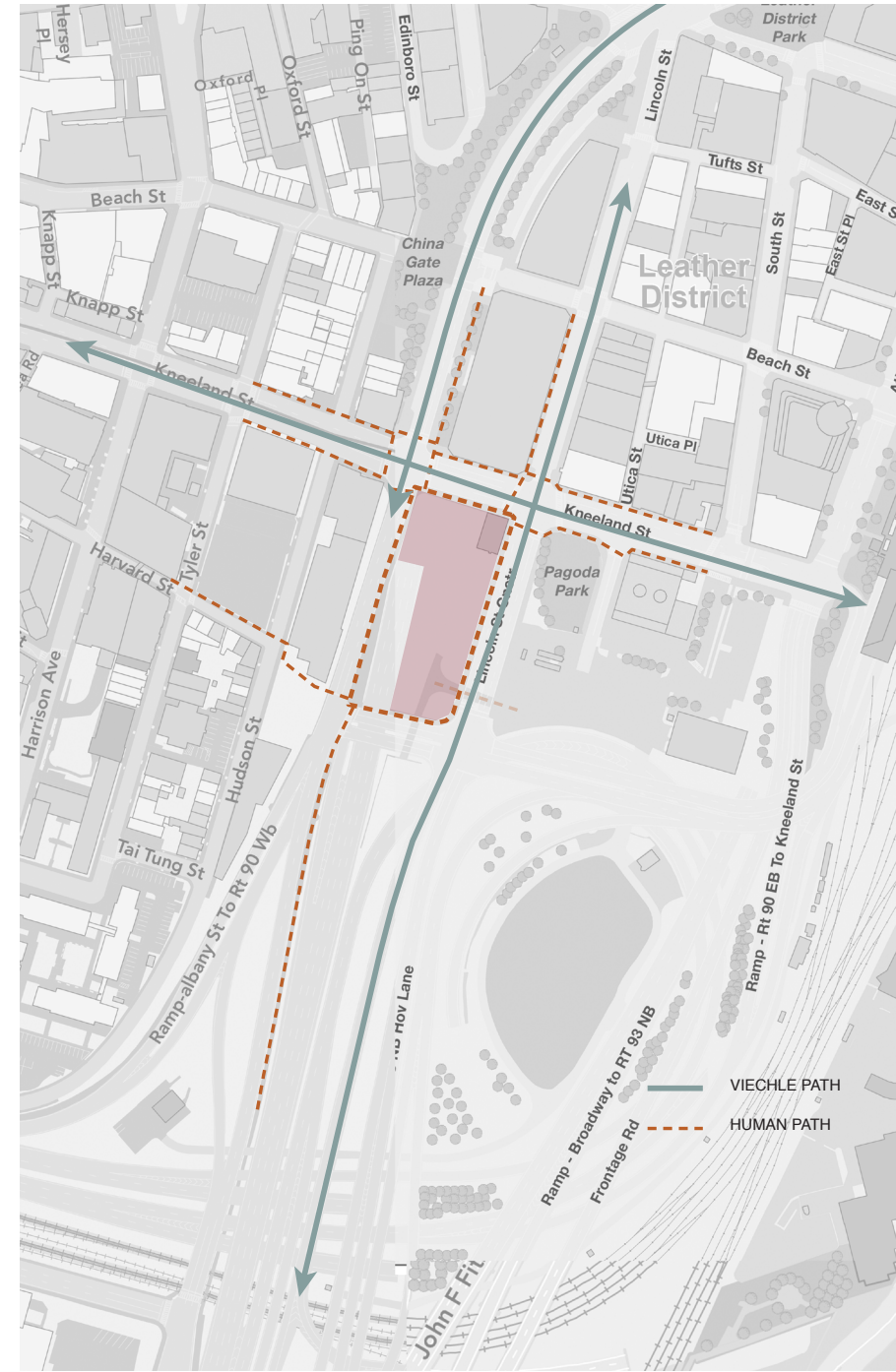
LOCATION OF SITE



SITE LOCATION ANALYSIS



ZONING ANALYSIS



ACCESS ANALYSIS

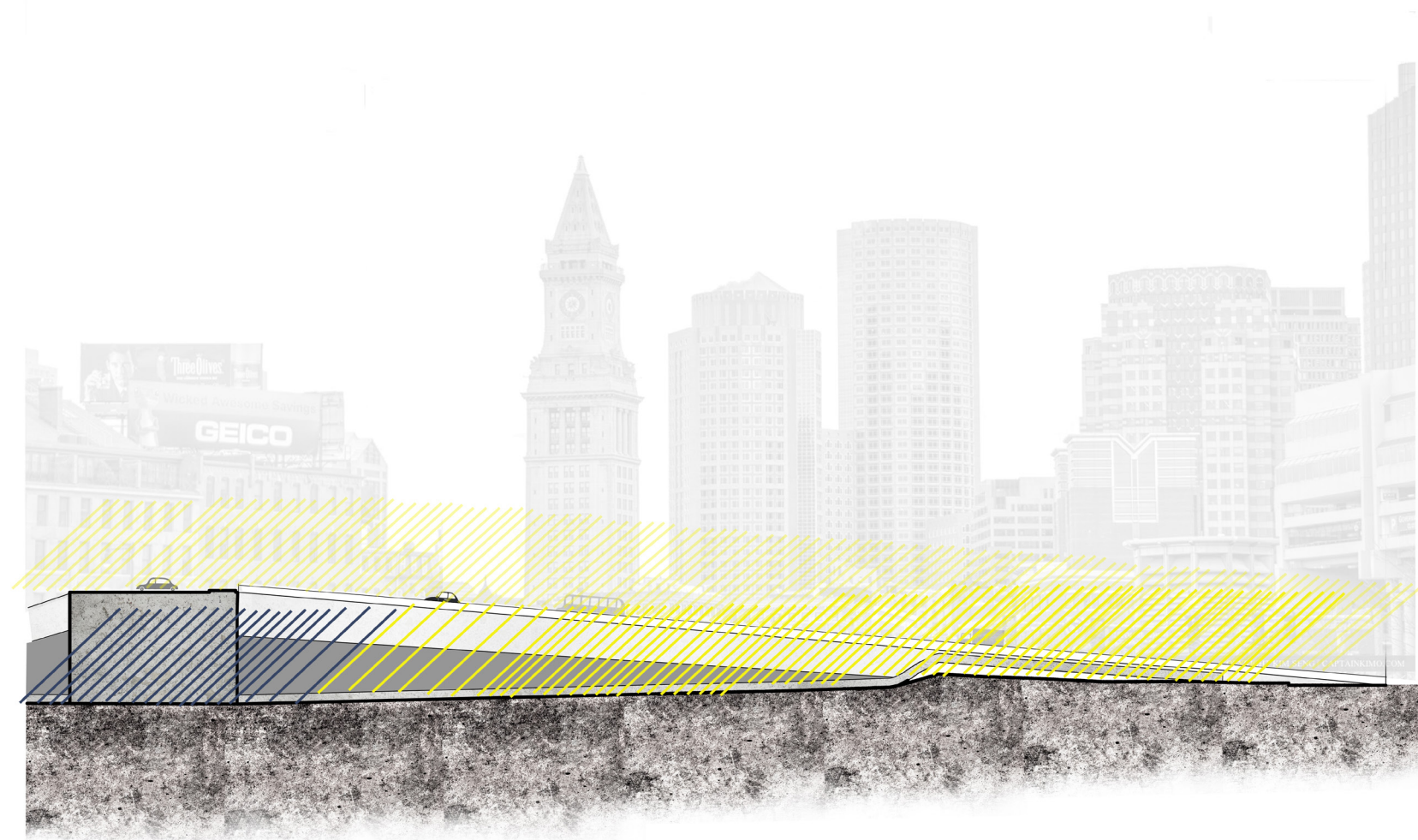
SITE PHOTOS



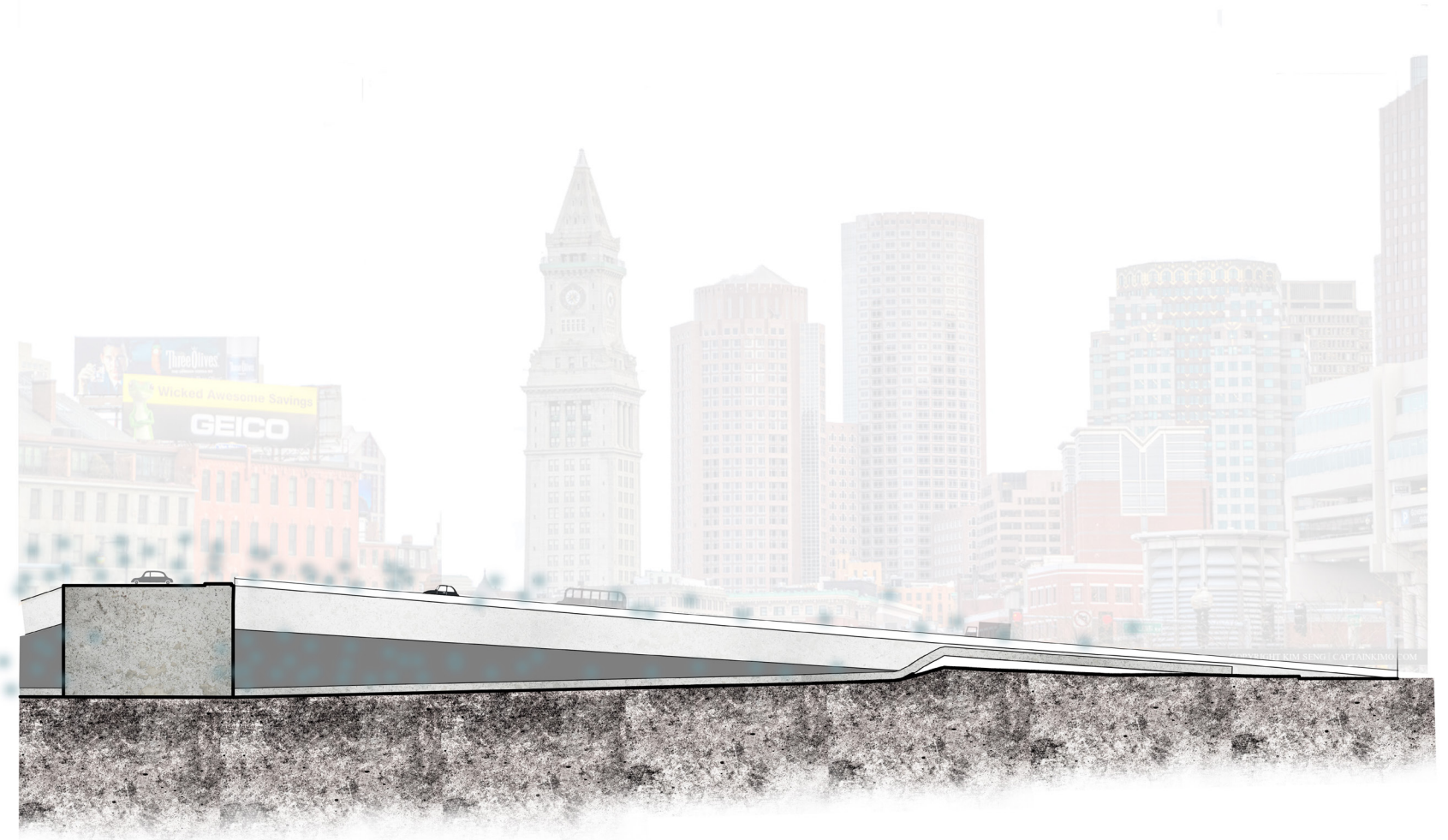
high pressure water pump station



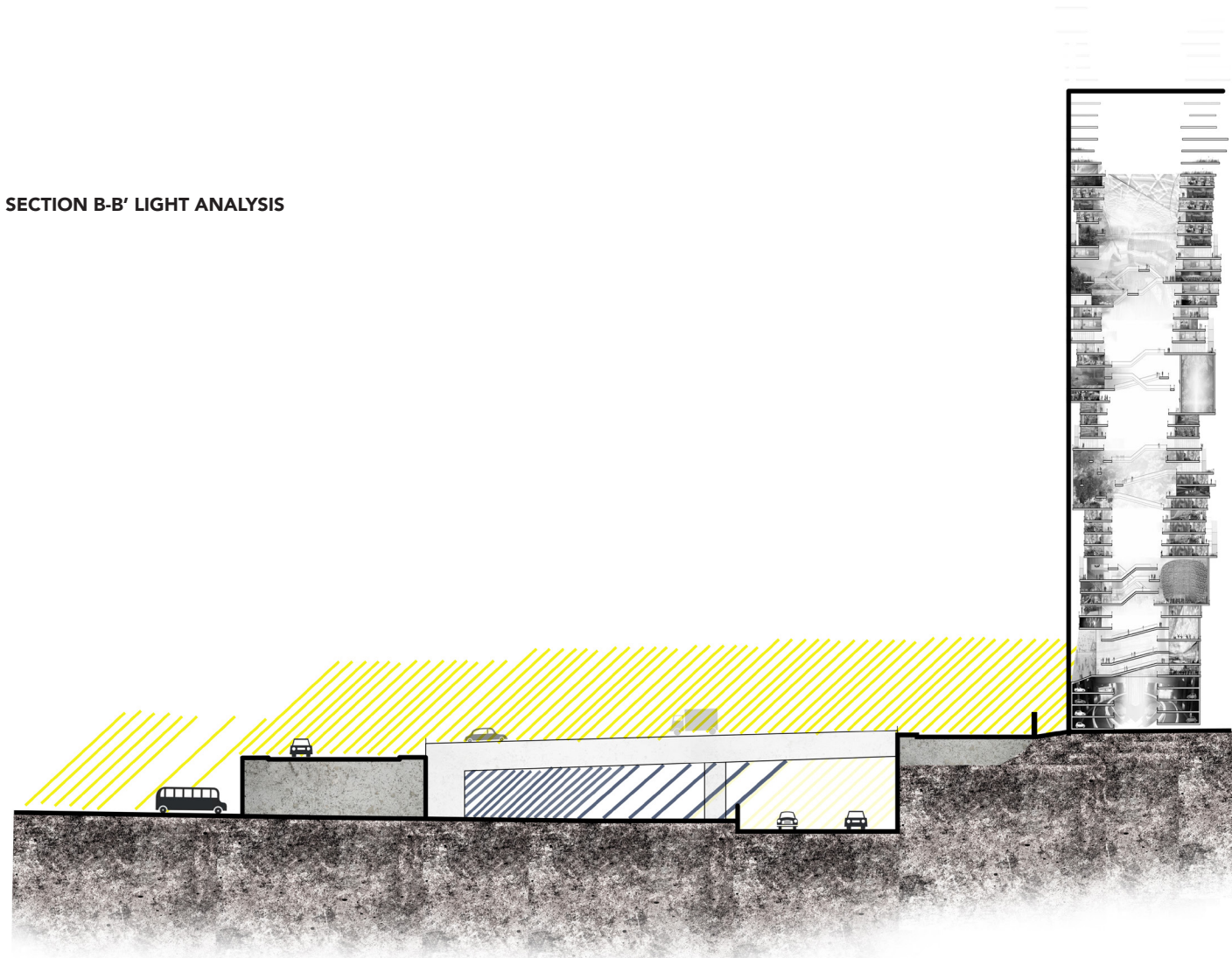
SECTION A-A' LIGHT ANALYSIS



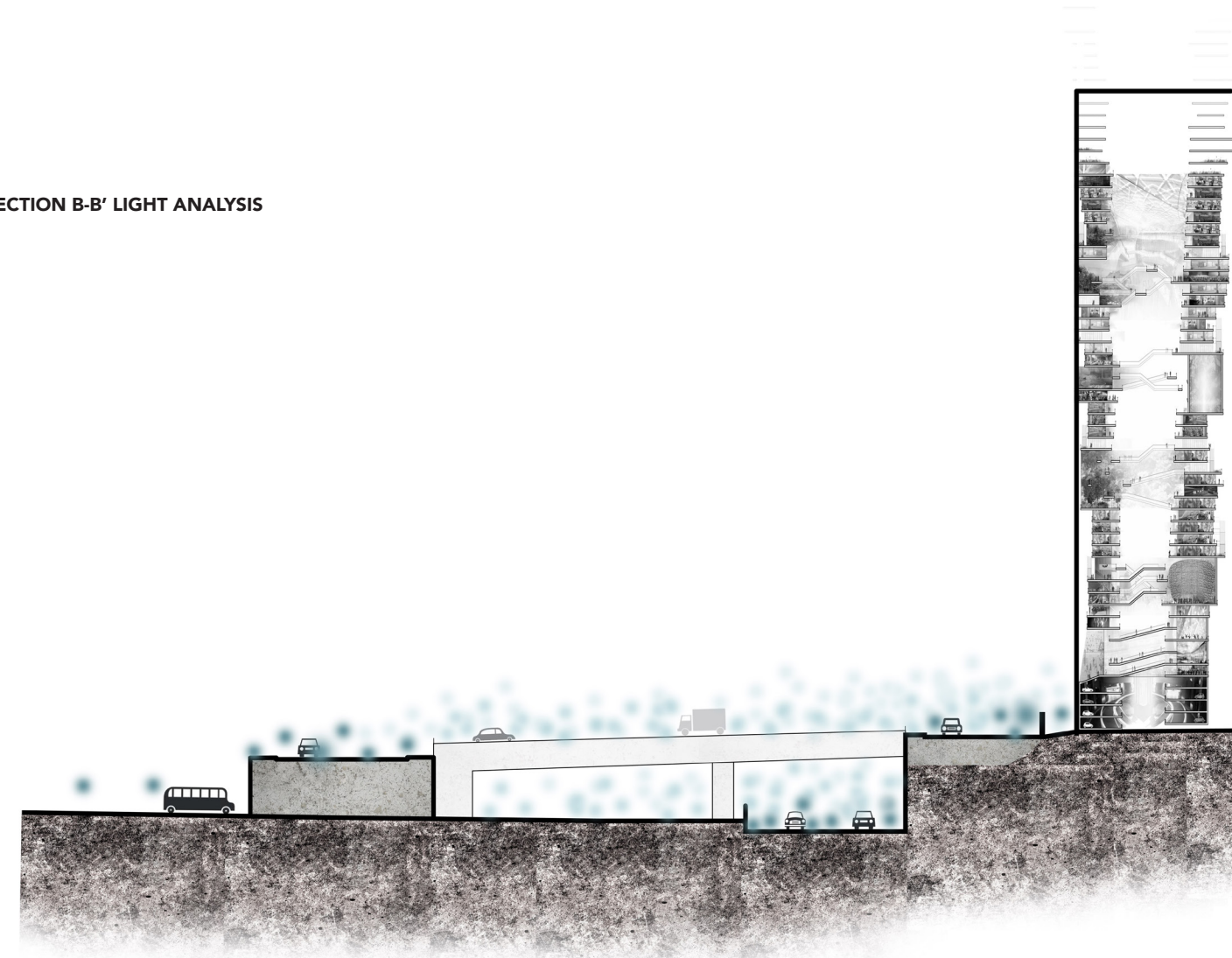
SECTION A-A' NOISE ANALYSIS



SECTION B-B' LIGHT ANALYSIS



SECTION B-B' LIGHT ANALYSIS



## Findings + Conclusions

By researching on the Quabbin- Boston water system, the researcher could know that the system consists of two main reservoir: Quabbin and Wachusett; three big deep rock tunnels: Quabbin Aqueduct, Cosgrove Aqueduct and Metro West Tunnel; several hydropower plant stations; and city water pipes. The sublimeness of the system is shown in four aspects: 1. gravity carries water all the way from west to east; 2. hydropower stations generate huge amount of electricity; 3. the dense underground water-supply system pipe lines. The whole system can be abstracted into a form or structure shown in the form abstraction diagram. To add more possibilities or to look detail into the structure, the researcher did an observation on water flow by the gravity. She made a slow-motion video then abstract several stops' pictures. By tracing section photos of water flow under micro lens, it is not difficult to see that: water moves like wave when seeing from section; moving water creates V and X shape patterns when seeing from plan. This is represented in the model. The site locates in downtown Boston which is adjacent to lots of districts like China town, leather district, south end and south Boston. There is a high pressure water pump station on the site which supply waters for whole boston hydrants when there is not enough water pressure. Surrounded by freeways on three sides, the site has a character of space gradient from open to enclosure, light to dark. It is also very noise on the site.

## Assessment

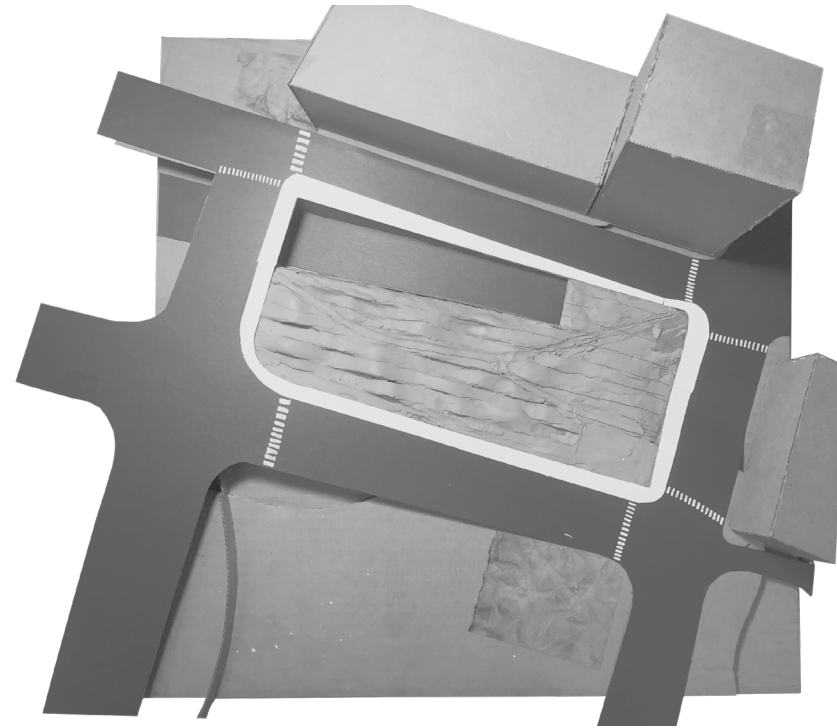
The through research about the water system is successful, but some datas need to be represented by diagrams to visualize the sublimeness of the system graphically. The site analysis are also clear which show the character of site correctly. The way the researcher chooses to reveal the system, however, is still not strong enough to show the sublimeness of the system. The next step is to find out the sublime points that really excites the researcher and find ways to reveal them.

# **Phase 3 Investigation**

**Weaving Landform Revealing The System**

## Abstract

In this phase, the researcher is trying to come up with a design using the research outcome in previous two phases. By zooming the designing elements down to two points: pipe size and water flowing form under the force of gravity, the researcher is able to transfer the definition of sublime into a design. By doing a more comprehensive site analysis, the researcher is able to identify the problem of the site, connect the site to the bigger system and come up with a strategy for this site. Using clay to test and doing experiment with the going up and down waving landform to create different public and private space is also one of the most important methods she used in this phase. Finally, she could achieve an outcome of the design that dealing with waving landform to reveal the system and provide space for people at the same time.



Sketch model shows the context of the site

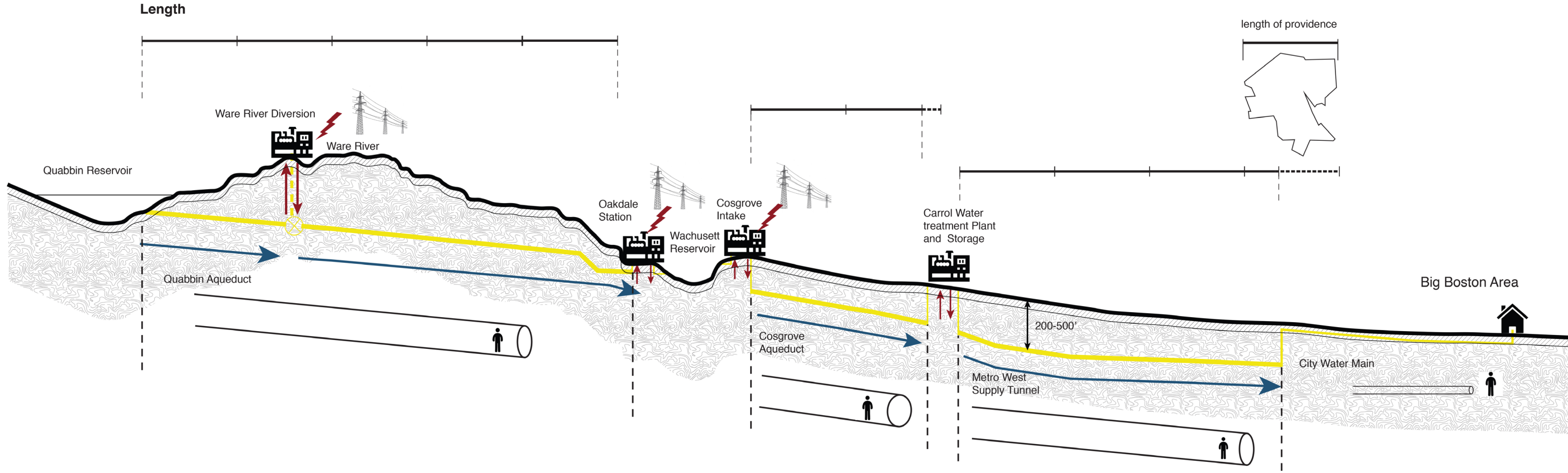
## Introduction

In site analysis, the researcher analyses the site in different scales. In a bigger city scale, the context analysis is trying to understand the relationship of the site with other district and the green way system. Zoom in to a more detailed scale, the access and surrounding condition and height analysis of the site shows the condition and problem of the site. Sketching is really a helpful way of making sure one's design strengthens one's concept. By making clay model, it is helpful to experiment with ideas play with the waving space(up and down, public and intimate spaces) and see the space in a 3-dimensional way. Sections are really helpful in testing the dimension of those different spaces.

## Methods

1. Site analysis using diagrams.
2. Drawing sketches to represent concept.
3. Clay model making to test and experiment ideas.
4. Drawing sections to test ideas.

QUABBIN-BOSTON WATER SYSTEM SECTION



**Capacity**  
600 million gallon/day

**Size**  
11' diameter, 12.75' height

☰ : whole Boston people water usage/day

**Capacity**  
600 million gallon/day

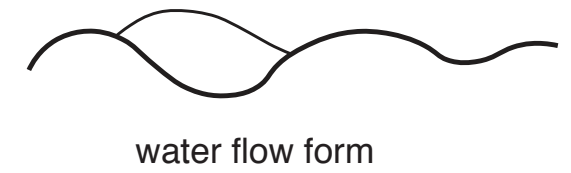
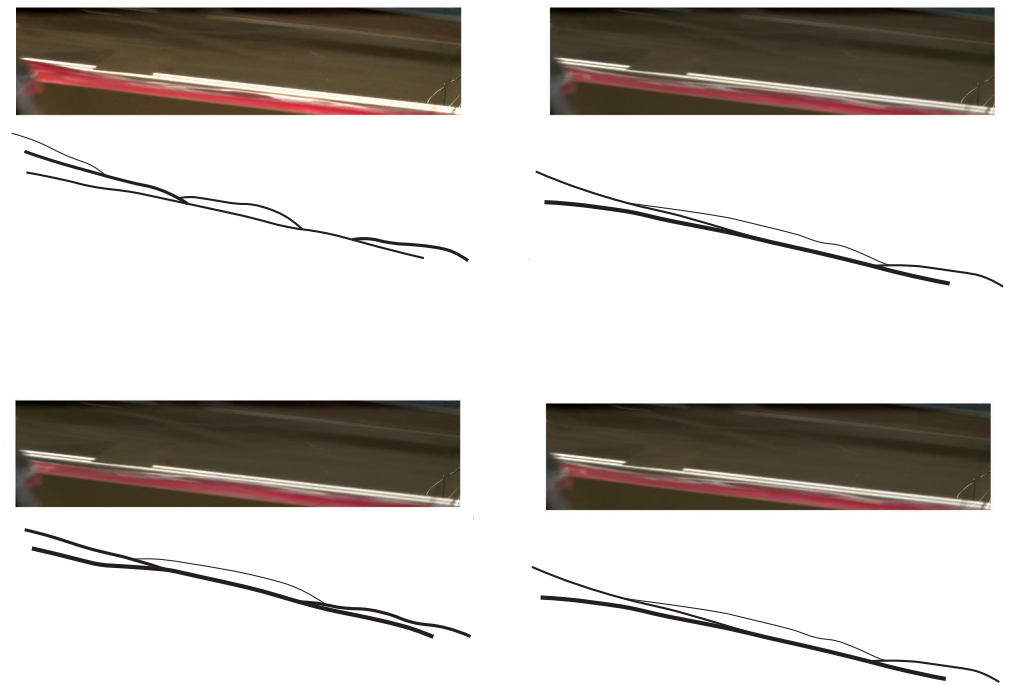
**Size**  
11' diameter, 11' height

**Capacity**  
600 million gallon/day

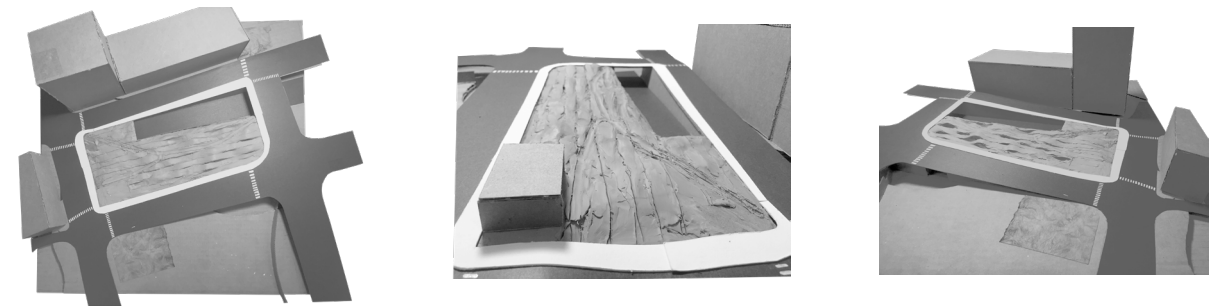
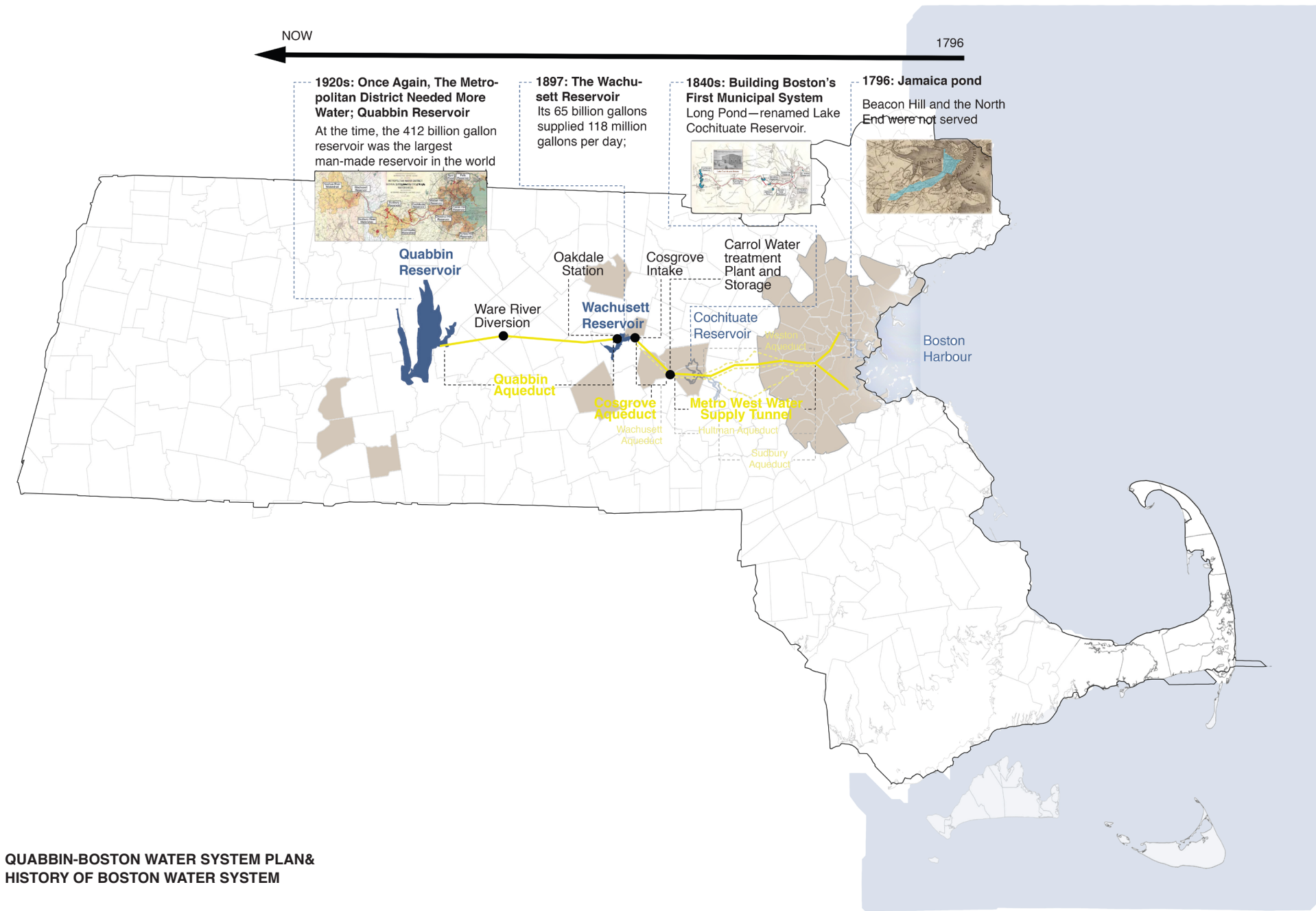
**Size**  
14' diameter, 14' height

☰ : whole Boston people water usage/day

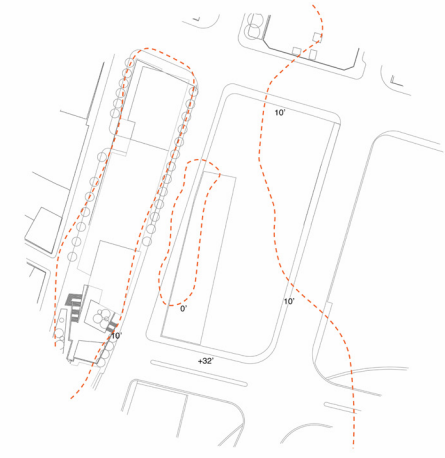
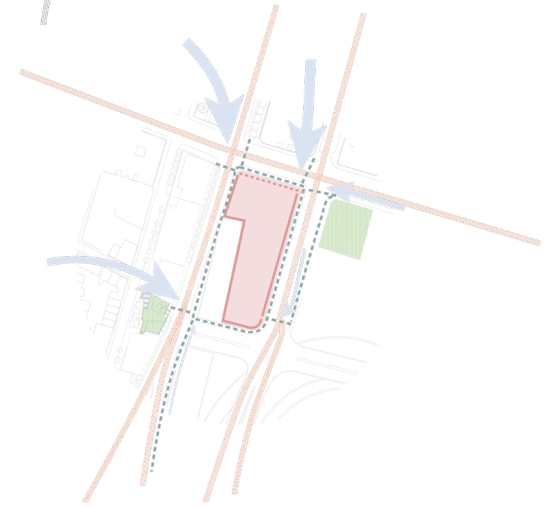
WATER FLOW STUDY







**SITE PHOTO AND CONTEXT PHOTO SHOW SITE CONDITION**

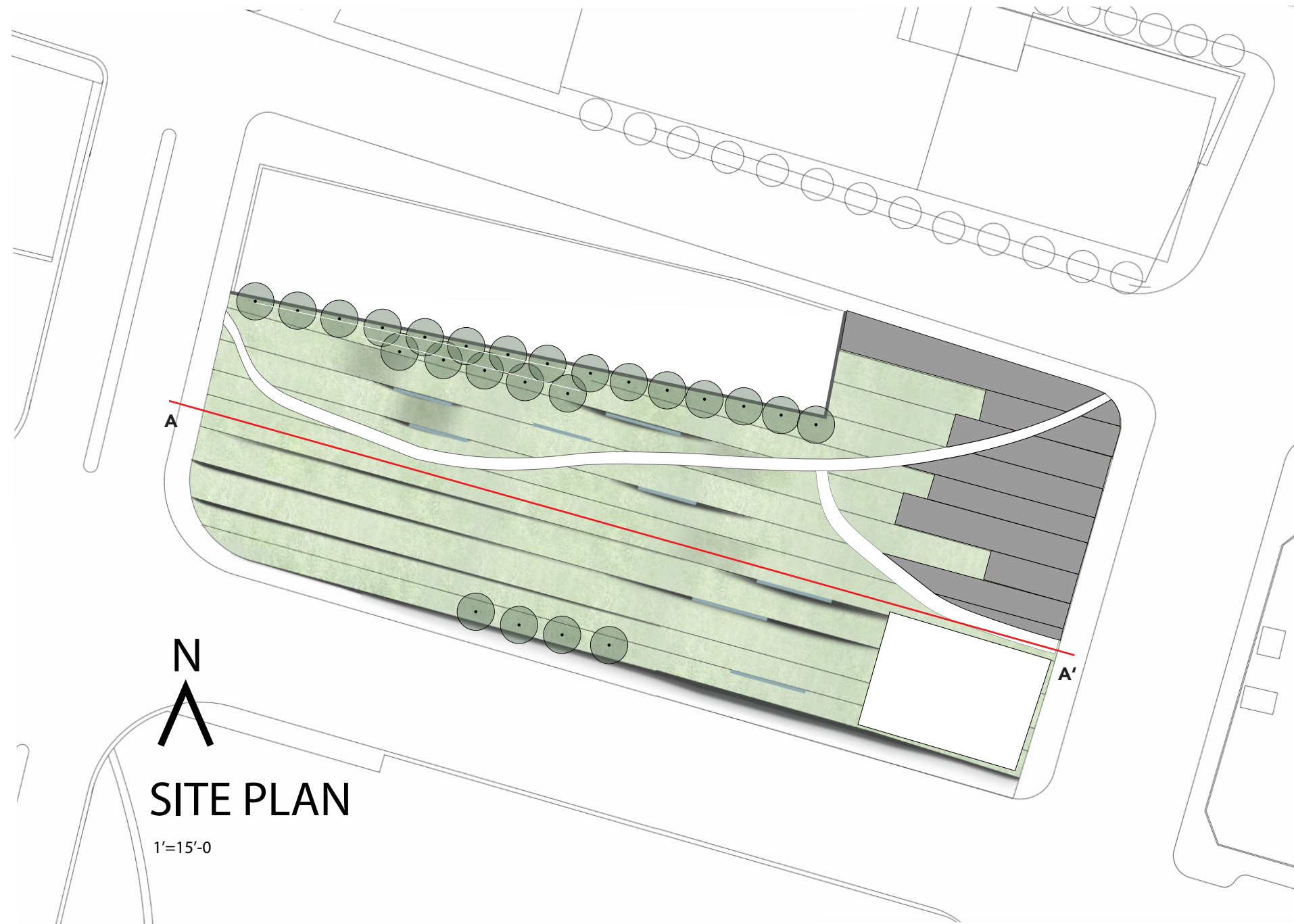
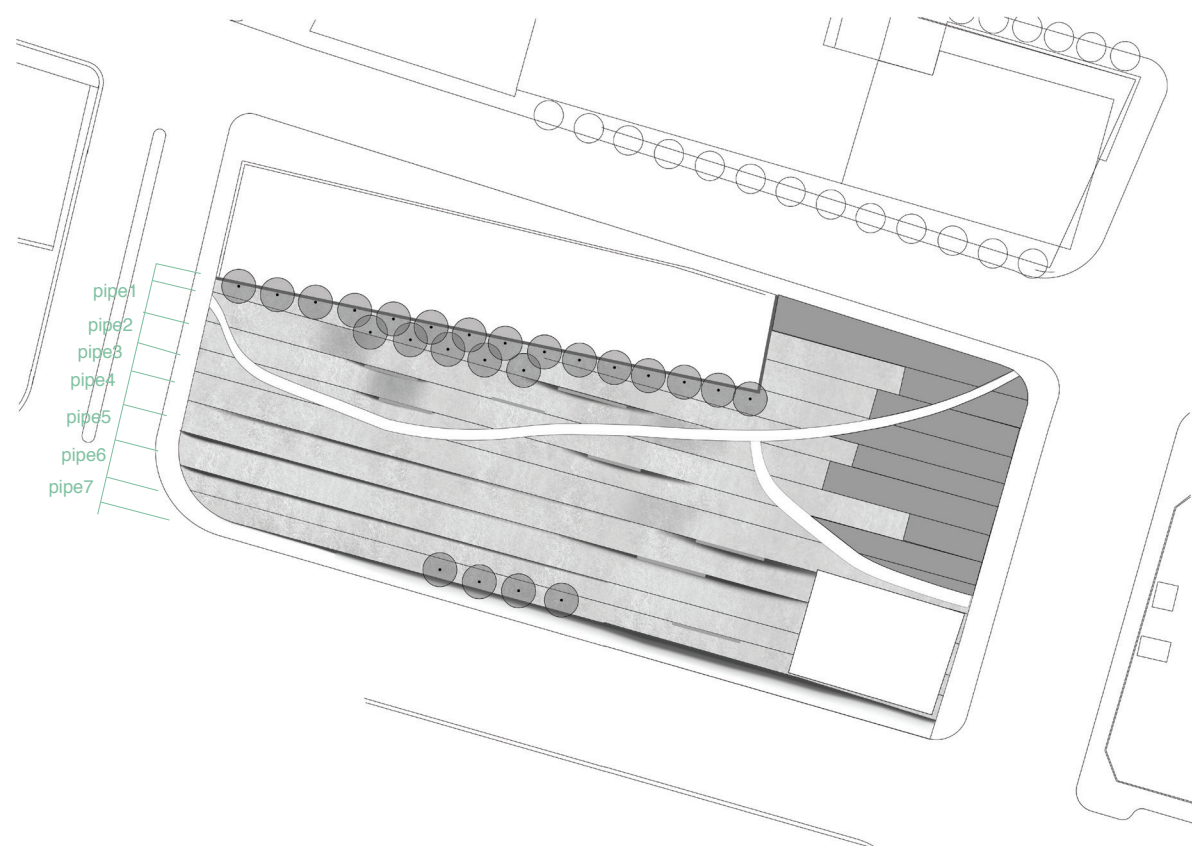


pipe size

water flow study

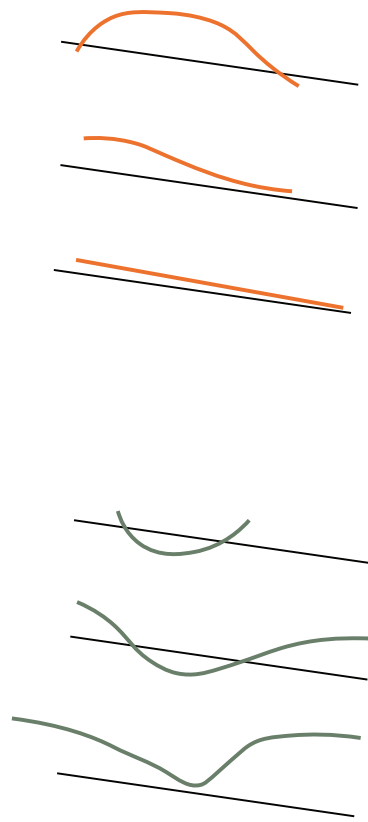


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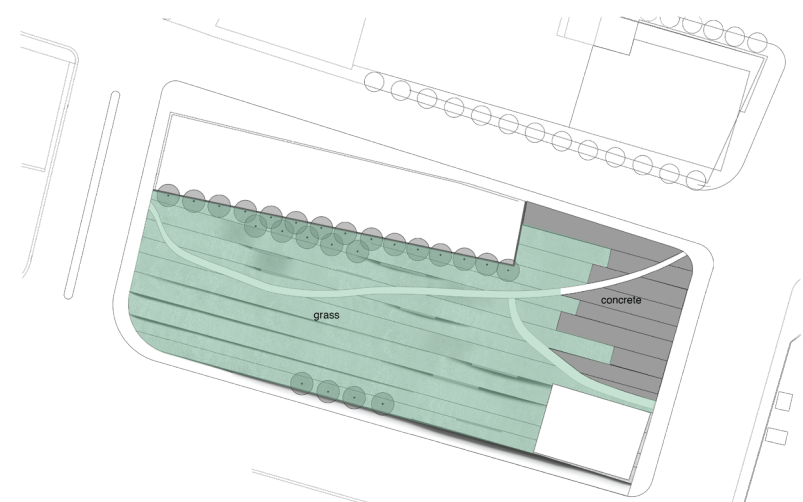
SITE PLAN

1"=15'-0"

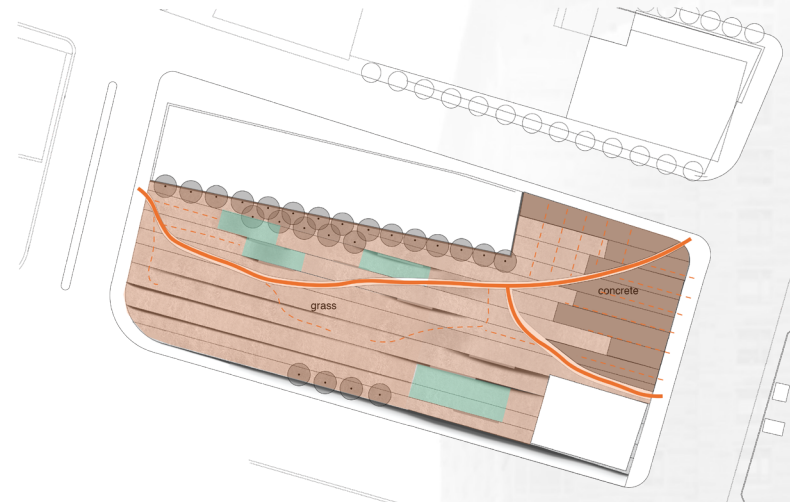


Public space

Intimate space



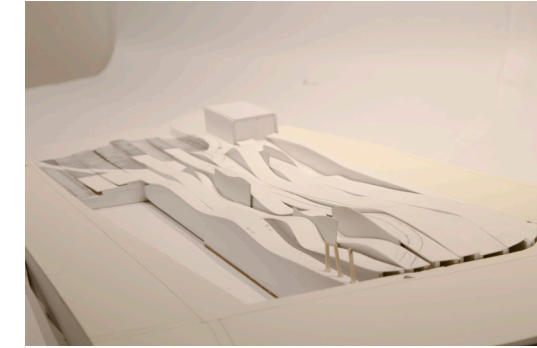
SOFT&HARD PAVER ANALYSIS



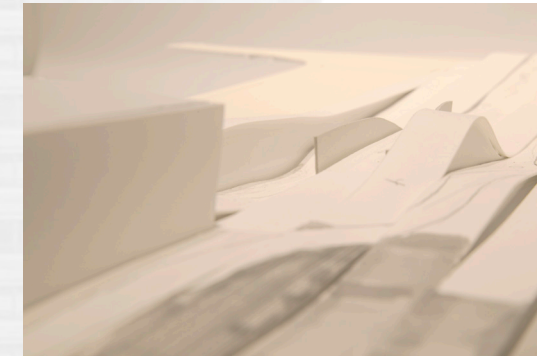
HOW PEOPLE MOVE THROUGH SITE ANALYSIS



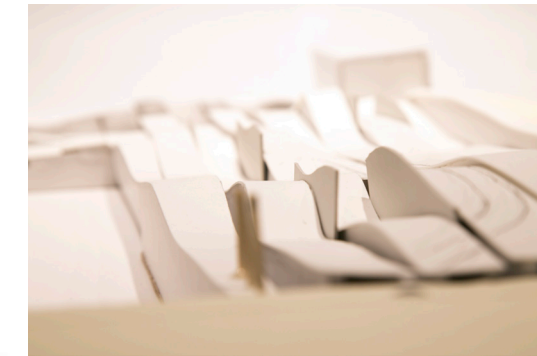
VIEW 1



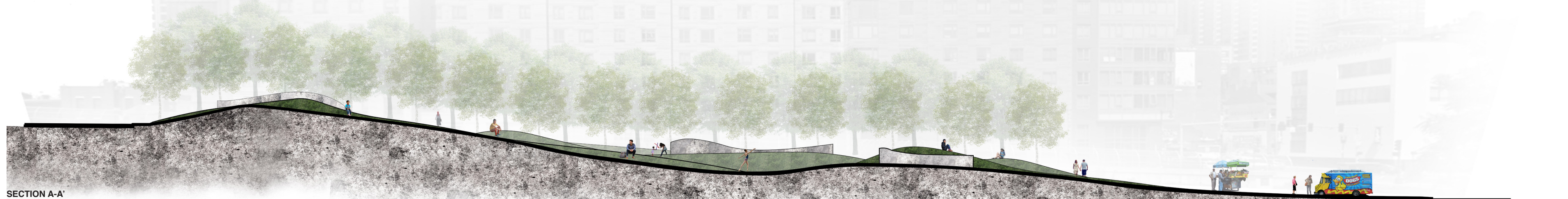
VIEW 2



VIEW 3



VIEW 3



SECTION A-A'

## Findings + Conclusions

The site situated in a commercial area and next to China town so the users can be identified which are mostly the people work there and from chinatown. It is also at the end of the greenway system so program can follow the whole system. Elevating the site to connect one of the most important source of visitors from the south east corner is the strategy of the site. Apply several pipes and actual site on the site and adding the waving form form water into the pipes to mimic the environment of pipes for people to feel.

In terms of the methods, the model making is really helpful with thinking and experimenting. It makes it easier to do designs in a three dimensional way. Sections are also very helpful in test scale and size of space. Sometimes, models are helpful in manipulating different sequences of space on the site but cannot testing the scale.

## Assessment

This phase of research has a better consistency with phase two. Both the site analysis and the form study of water flow are used in phase three. And the outcome is a simple and concise design, the applying of the pipes with actual sizes on the site strongly communicates the idea of pipes and the size. The waving form abstracted from the water flow form study also help create multiple spaces for people. But they are not quite consistent with the researcher's definition of sublime and her thesis statement. The waving design language cannot successfully communicate the sublime feeling of pipes.

# Overall Assessment

## Final Conclusions

By doing a thesis alone, the researcher is able to experience a whole process of do research and using design to represent her findings during the research process, which she has never done before. During this process, she has to make a lot of decisions alone and keep critical thinking on all her decisions. She has to always think that is it the only way of doing it? If not is there other ways to approach it? What the different outcomes of those different ways? Is it relate back to the original definition of sublime and statement? etc.

In terms of the research topic, by doing a research on the Quabbin to Boston water system, she gets to know more about the system. What are the component of the system? What are the driven forces during this process? She also gets to know a thing through a lot of similar research from other students doing thesis: city systems always have some hidden but giant infrastructures, living in a 21st century, people are so used to everything we have including electricity, water, energy, waste, pollution etc, but they seldom consider where are those things come from let alone making reflection on the impact of these infrastructures. This kinds of thesis give us a good opportunity to think about those questions and social issues and maybe service as some kinds of educational tools to arouse people's intention on them.

Also, the topic of the thesis-----sublime, offers the researcher a good opportunity to look deep into the word. As an English-as-second-language learner, the first way the research get the meaning of the word is from the translation dictionary. However, in the context of Chinese, there is no counterpart of sublime, so she

starts to turn to some readings and the origins of the word. For example in landscape history class and the early period landscape drawings, the sublime is more related to some kinds of natural forces. In Beth Meyer's reading, however, sublime is more about a contrast and co-existing of past and now, human and technology forces. The origin of the word shows sublime is also a kind of threshold. All these ways help the research understand sublime better and frame her own definition of sublime.

Last but not the least, in design, sometime it is very true that 'less is more'. It seems that a lot of designing beginners always want to put as many elements as possible in their design to achieve a rich and diverse outcome for their design. The outcome, however, will not be diverse but will be in a chaos, because too many elements contradict with each other, weaken the design concept. The right way is to keep one simple elements but adding more layers in different details, so that the design can be concise in concept but rich in detail.

## Final Assessment

If looking just into the research of the water system and the design outcome, the final design is an acceptable one. However, one can never evaluate a design without knowing the concept of it. So the whole process of this thesis does not have a big consistency. The final outcome does not fit with the thesis statement-----revealing the water system and mimic the environment of pipes. Users of the site cannot feel the sublimity the researcher trying to convey. The main reasons are: 1. At the very first beginning, the research is not able to convey her sublime feeling into neither drawing nor words clearly. Let alone doing the analysis of the elements that makes her feel sublimity. The outcome is she could not define her version of sublime neither clearly nor actually. 2. Reason one lead to the confusion of critiques, including her instructors, classmates. They could not give her the clear or right feedback she wants. 3. Two reasons above result in the research contents in phase two and three detach from what she wants to do at the beginning.

Because of missing the direction, she is also changing and trying to find what she really wants to show----- the definition of her version of sublime and also the research contents. That is also the reason she is not able to decide what she wants to show in her design.

So, for her final design, the clay study model enables her to explore more possibilities of the waving form. There are still other forms that can be done using this idea, she needs to explore these more.,

Going back to the very beginning. It seems that her version of feeling is aroused by the water drop installation in Teshima Museum, but she did not develop this idea deeper. So if she could do it again, she would have analysis what elements give her the sublime feeling then apply these elements into her own design. She is going to do it this summer. Also feeling and emotion analysis are very abstract which she had never done. She would like to using her understanding and experience got from the final reveal to find the answer of it.

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