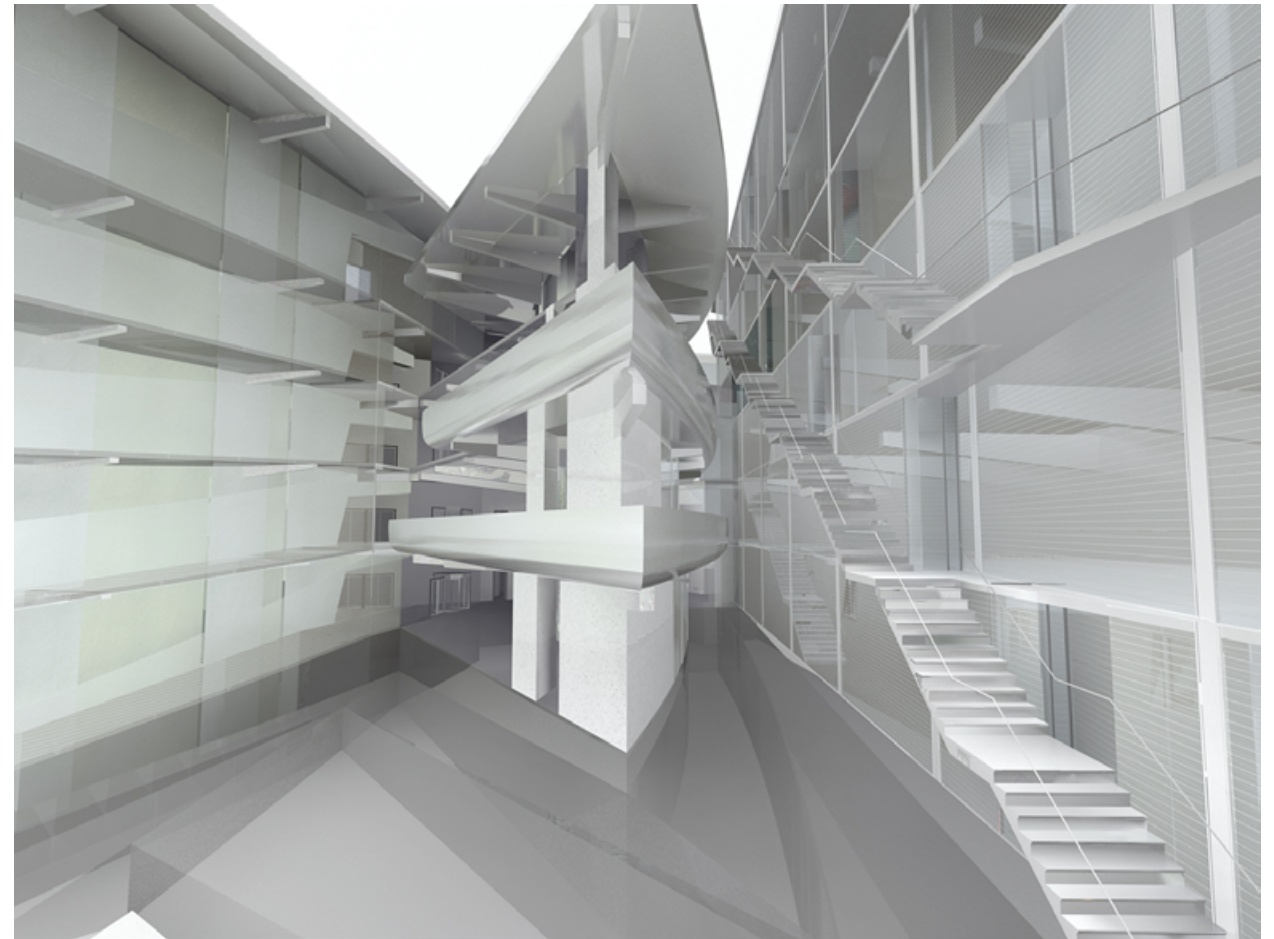


# SAMURAI SWORD MUSEUM IN KYOTO

THE BEAUTY OF THE  
SWORD, BRIGHTEN UP THE  
DARK ROOM - NINGNING

# **SAMURAI SWORD MUSEUM IN KYOTO**



SEPTEMBER 2011 - SEPTEMBER 2012

WASHINGTON - ALEXANDRIA ARCHITECTURE CENTER  
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

## SAMURAI SWORD MUSEUM

Thesis Submitted to the faculty to the

**VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY**

In partial fulfillment of the requirement for the degree of

**MASTER OF ARCHITECTURE IN ARCHITECTURE**

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**James. W. Ritter**

**Kashuo Bennett**

**Paul Emmons**

**Ningning Shang**

September 12th. 2012

Alexandria, Virginia

# SAMURAI SWORD MUSEUM IN KYOTO

## ABSTRACT

I HAVE LIVED IN KYOTO FOR 6 MONTHS. DURING THE 6 MONTHS, I WAS INTRIGUED BY THE BUSHIDO SPIRIT IN KYOTO, THE CORE OF BUSHIDO IS THE SOCIAL STRATIFICATION AND HONOR UNTO DEATH. I WOULD LIKE TO USE THE ARCHITECTURE LANGUAGE TO DEMONSTRATE THE SAMURAI CULTURE. EARTH, WATER, FIRE, AND AIR ARE THE ELEMENTS THAT I WANT TO CONSIDER.

WHEN THE SWORD CUT INTO THE WATER, THE WATER STOPPED FOR A WHILE, AND THEN IT CONTINUED FLOWING, SO I MADE A “Z” SHAPE CUT INTO THE EARTH. I HOPE THERE IS ONLY A LITTLE LIGHT IN THE BOTTOM OF THE MUSEUM. WHEN THE GLIMMER FALLS ON THE SWORD, THE BEAUTY OF THE SWORD WILL BRIGHTEN UP THE DARK ROOM.

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# SAMURAI SWORD CULTURE

## KYOTO

I love Kyoto, Japan. It is one of the most livable cities in the world. It is located in a valley, part of the Kyoto Basin. It is surrounded by mountains from three sides, where the leaves turn red in late October. Kyoto intrigued me with its long history and glorious culture. For most of its history, Kyoto was the imperial capital of Japan. The origins of the city can be traced back as far as the 6th century. Most of the buildings in Kyoto are only two or three floors high, which gives it an ancient feeling. There is an Architecture-Nature connection in the urban fabric of Kyoto. Shinto, the indigenous religion of Japan, teaches that everything contains a spiritual essence, and that this innate supernatural force is above the actions of humans. I chose the samurai sword as the inspiration for my thesis. I believe that the spiritual essence of the Samurai Sword is Bushido (Chivalry). Bushido is predicated on the Samurai moral code stressing frugality, loyalty, martial art mastery and honor unto death.

BUSHIDO IS THE SOUL OF JAPAN.

# BOSHIDO

Bushidō, literally “the way of the warrior”, is a Japanese word for the way of the samurai life. Bushidō is deeply embedded in modern Japan.

The Bushidō code is typified by seven virtues:

**RECTITUDE COURAGE BENEVOLENCE RESPECT HONESTY HONOR LOYALTY**

As far as I know, the core of Bushido is the SOCIAL STRATIFICATION and HONOR UNTO DEATH.

Hierarchy is natural in Japanese society. Originally the emperor and nobility employed the Samurai warriors. In time, they amassed enough manpower, resources and political backing in the form of alliances with one another to establish the first samurai-dominated government. So the concept is that samurai needs to unite and fight to become stronger and obtain a higher social status.

DO NOT FEAR DEATH. This was the most important part of being a samurai. Bushidō is really the “Way of Dying” or living as though one was already dead. This means that the Samurai lives as if he were dead, and acts as though life is only a dream and death is the awakening. A samurai must be willing to die at any moment in order to be true to his lord.

When I designed the samurai sword museum, I introduced these two concepts into the building. The load- bearing walls and the retaining walls need to unite to fight against the transverse thrust of the earth. Also, the shape of the sword is not a straight line but a curve. Life and death, just like bright and dark, will meet at the two sides of the curve.

Light always appear at the end of dark, at the end of the museum, after the endless fighting and dark, I will see the light.



# SAMURAI SWORD

When a Japanese sword is made, a special process of hardening the sword creates a wavy line. The line, called the hamon, is the delineation between hard edge-steel and the softer steel on the back of the blade.

Shown here are some examples of hamon.

## GRAIN PATTERNS (Hada)

Grain pattern within the steel is called hada in Japanese. When Japanese swords are made, both today and historically, steel of varying hardness is combined and folded. The manner of how the smith folds the steel, in relation to how he elongates it to create the blade, produces a unique grain pattern within the steel. Some blades have only one kind of grain but frequently a blade contains a mixture of more than one type of grain structure.

## STRAIGHT GRAIN (Masame)

Masame grain looks like long parallel wood grain that runs the length of the blade parallel with the cutting edge.

## WOOD-EYE GRAIN (Mokume)

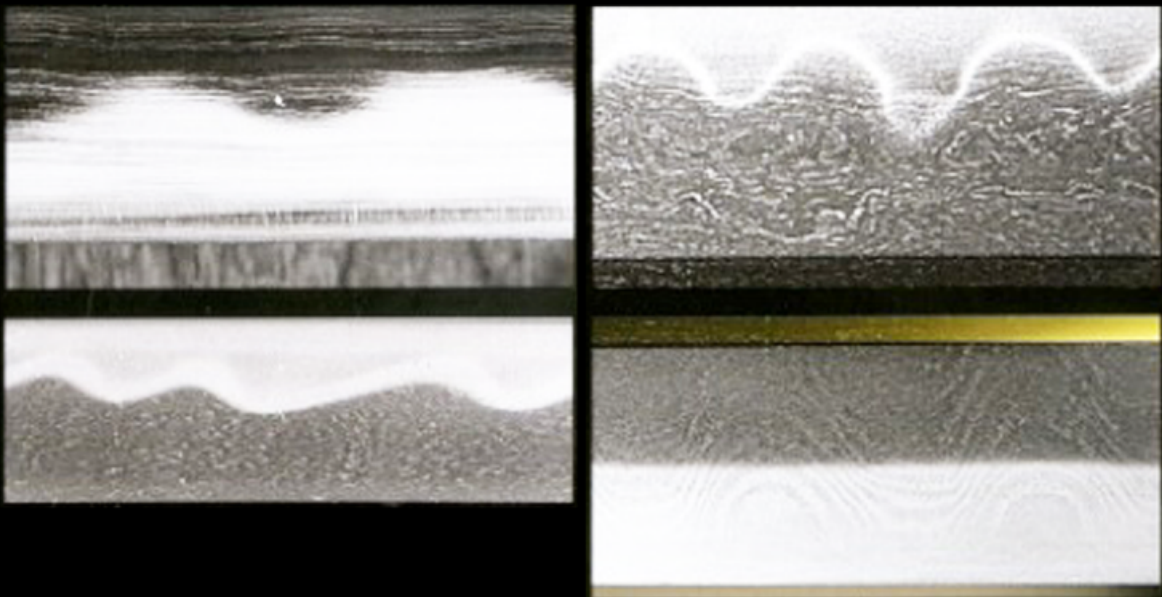
Blades with mokume hada feature irregular concentric circles and swirls connecting them. Moku means wood or tree; while me means eyes. Mokume hada looks like several saplings grew together. and now their combined growth rings are tightly connected by complimentary swirls.

## PLANK-EYE GRAIN (Itame)

When cutting a log into planks, a mix of wavy parallel and concentric circles will be seen. Itame hada means, plank-eye, and looks like the combination of masame and mokume hada: It has both parallel lines and some concentric circles.

## UNDULATING WAVE GRAIN (Ayasugi)

Ayasugi hada is an extremely wavy masame hada. The waves are generally homogeneous and equidistant. Primarily the Gassan School of sword making produces this grain structure; therefore it is sometimes referred to as Gassan hada. It is noteworthy that this grain is produced by filing away portions of the billet just before elongating it into a blade; not by elongation of the grain alone.



# MAKING OF SAMURAI SWORD

The techniques of forging which were developed by the Japanese sword smiths are unique and can bear comparison with those in any other part of the world. From earliest times the functional attributes sought in a Japanese blade have been unbreakability, rigidity and cutting power. The more purely aesthetic qualities sought by modern collectors might seem to be at variance with these severely practical requirements but in fact it is in its fulfillment of demanding technical norms that the essential beauty of a Japanese sword lies. It is obvious that unbreakability depends on the iron being soft while stiffness depends on its being hard, as does cutting power. However if the iron is hard it will snap easily and if it soft it will not cut so well. The combination of these contradictory qualities is the greatest achievement of Japanese forging and tempering techniques, whose three most important characteristics are as follows:

1 Hard outer skin is formed by folding over and hammering out the same piece of metal many times. This process aids the elimination of such impurities as phosphates and sulphates and also produces many layers (sometimes as many as one million) of metal of differing structure.

2 A softer inner core is formed by a different process of folding, using steel of lower carbon content, and the hard outer skin is wrapped around it.

3 A hamon is formed by covering the entire blade in a clay containing charcoal ash which is scraped away, in some places partially and in others completely, from the edge of the blade in the desired outline prior to heating. The varying thickness of the clay results in varying rates of cooling when the blade is quenched and these varying rates of cooling produce different crystalline compounds of iron and carbon; in particular the rapid cooling of the edge produces a hard martensitic crystalline structure while the slower cooling of the rest of the blade produces a softer pearlitic structure.

These three techniques are the most characteristic and distinctive parts of the process; also important are the shaping of the blade, the preparation of a well- formed tang, and the chiseling of the smith's signature.

A blade of Katana made by Muramasa in 16th century, in Tokyo National Museum. The signature is "Sei-shū Kuwana jū Muramasa" . [http://zh.wikipedia.org/wiki/File:Katana\\_Muramasa.JPG](http://zh.wikipedia.org/wiki/File:Katana_Muramasa.JPG)



## MAKING OF SAMURAI SWORD

Japanese Shinto Faith “ everything, be it mountain, animal, or tree has a kami [spirit] : the story of creation accounts for this belief. ”

Shinto religious ceremonies, such as : prayer, cleansing rituals, and offerings to ancestors and deities, before undertaking their craft.

The soul of the blade is believed to enter the sword at the moment the hamon is created. At this moment, the cleansing forces of fire meet the purifying properties of water and the sword's soul is born. The sword emerges from the water changed. With the spirit, the sword now appears curved and complete.

If the sword smith fails to purify himself or his smithy, then evil kami can enter both the sword itself as well as the smithy. This could result in the production of cursed, or evil blades, meant only for killing. If, on the other hand, the sword smith is righteous and purifies himself and his smithy, he may produce blades that live up to their highest potential.



# INSPIRATION AND PROCESS

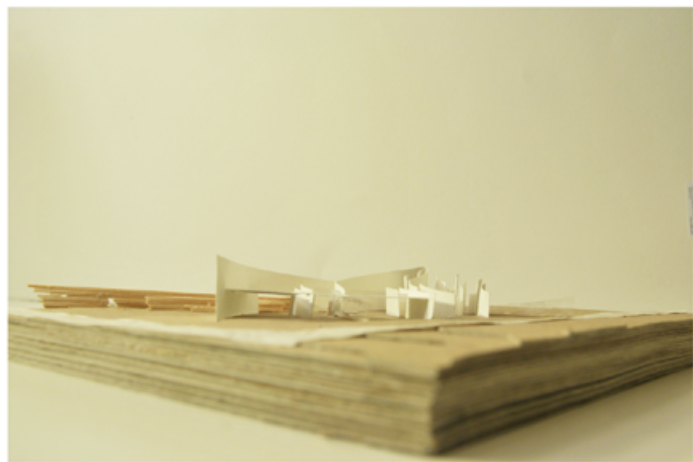
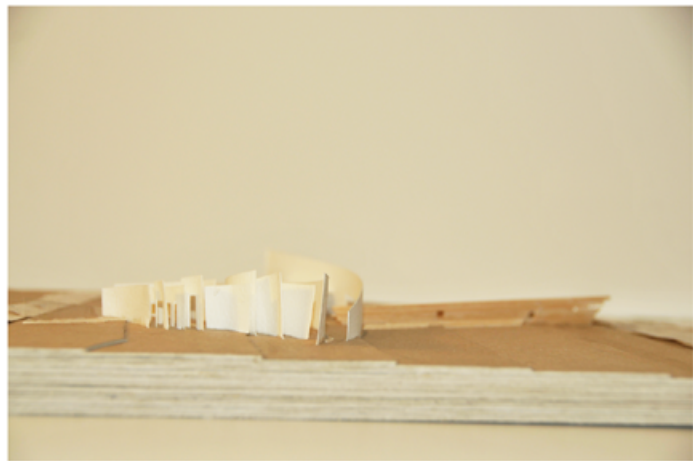
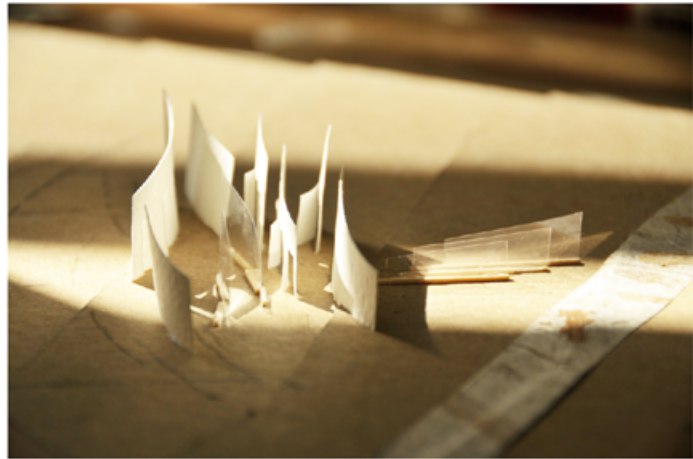
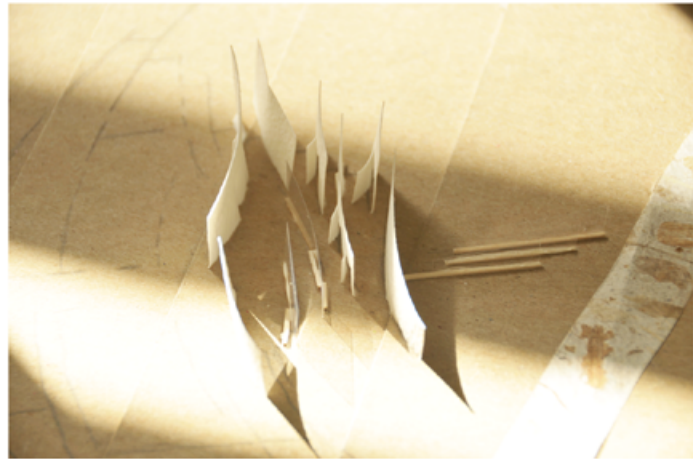
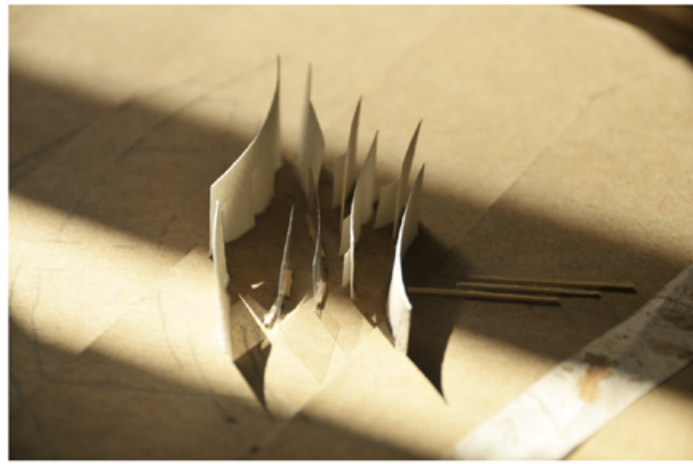
SITE ANALYSIS

SITE

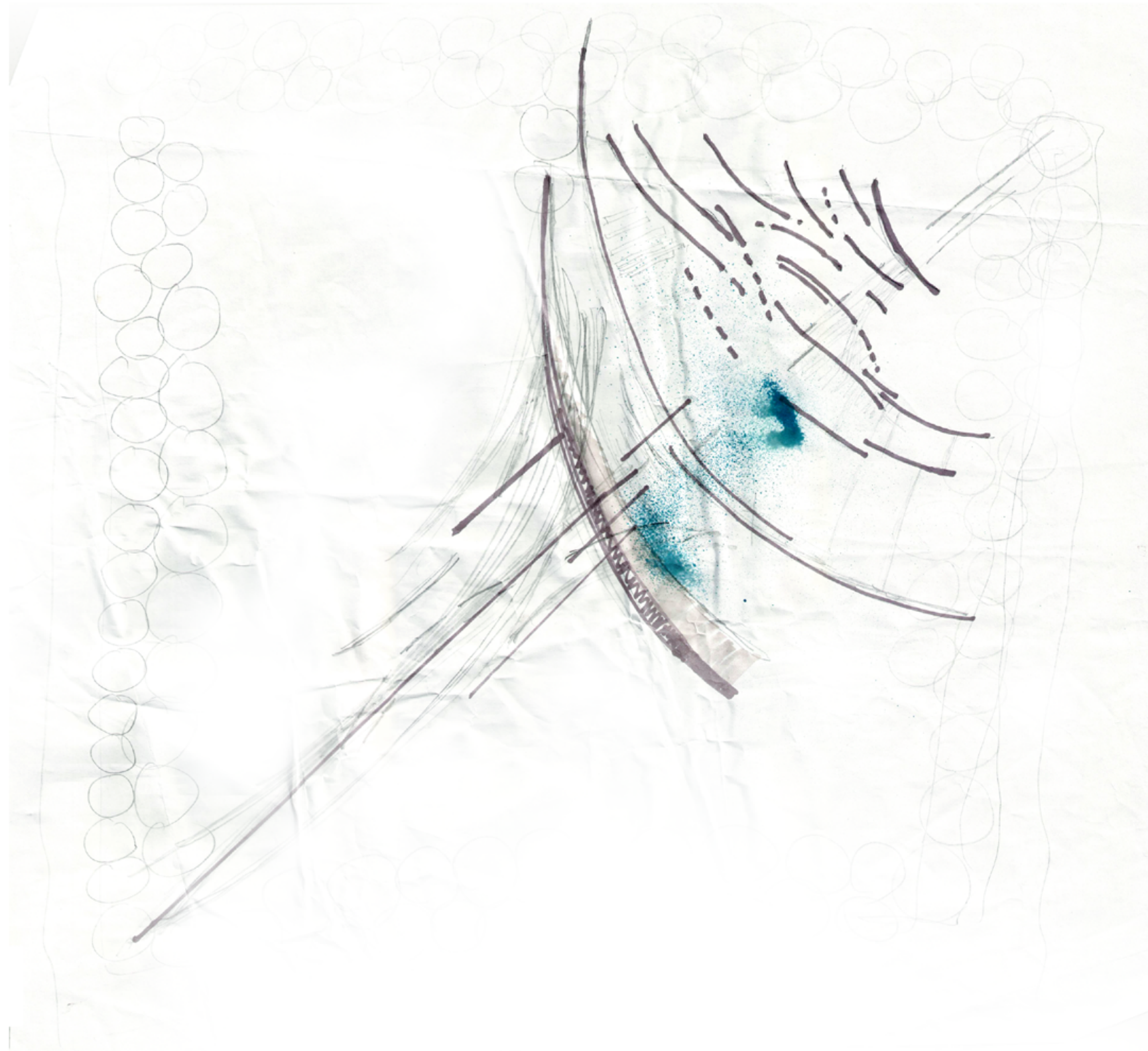
# SITE 電子規約データ

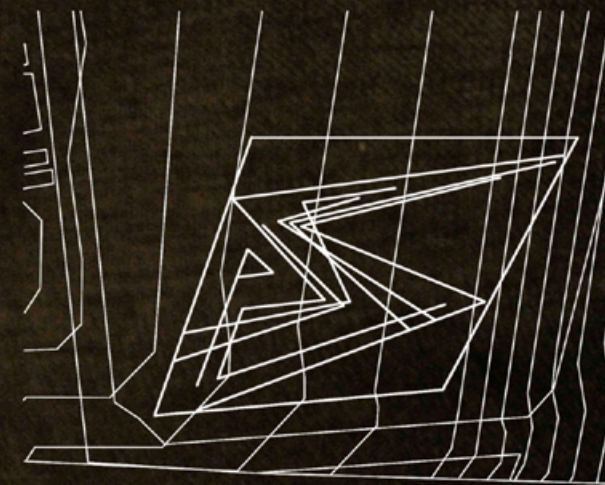
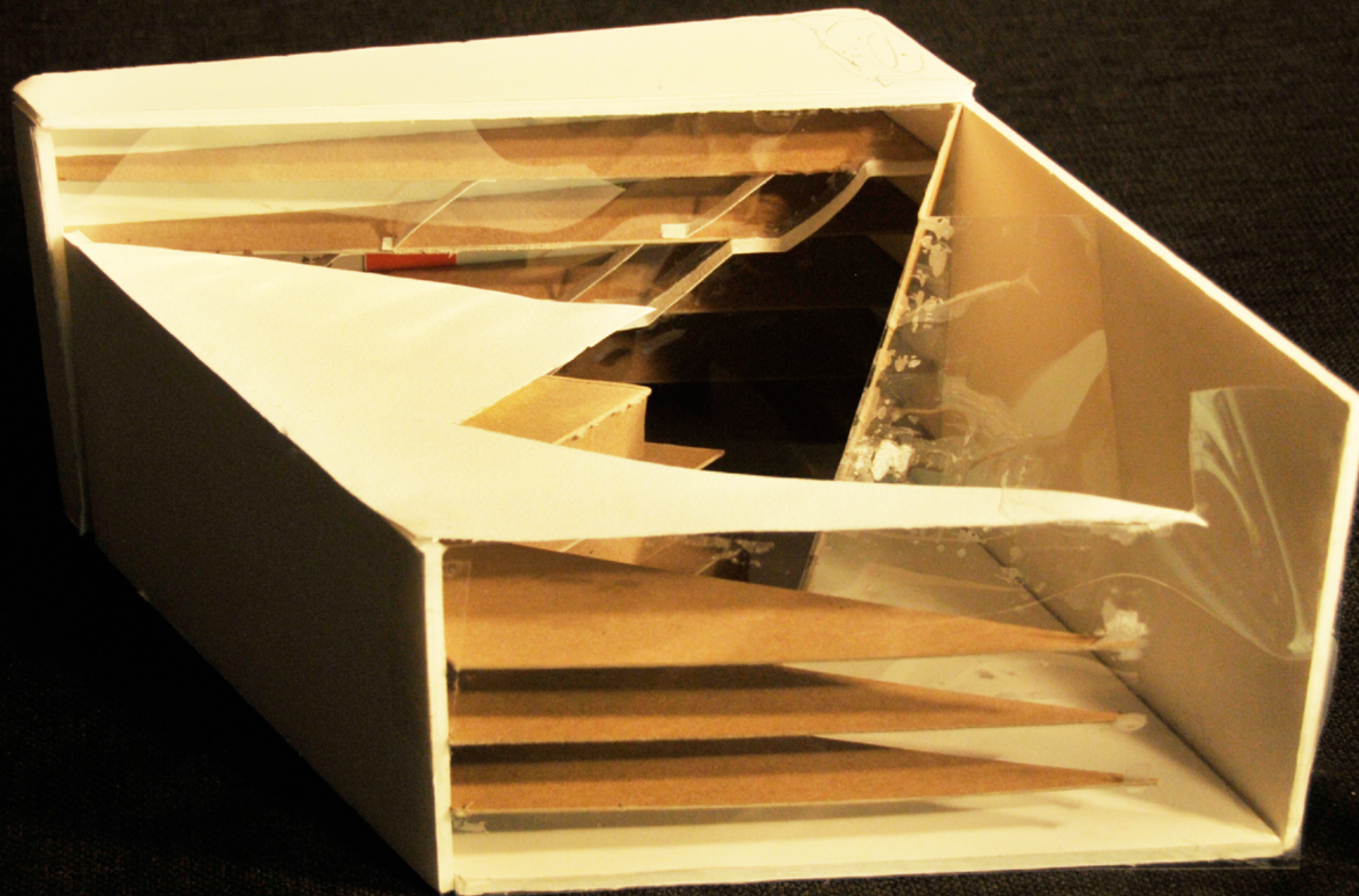
The site is located on a small hill, in the southeast of Kyoto, near the Kyoto University and Ohbaku Park. It is located conveniently near Ohbaku Station, and there are lots of parking spaces nearby.

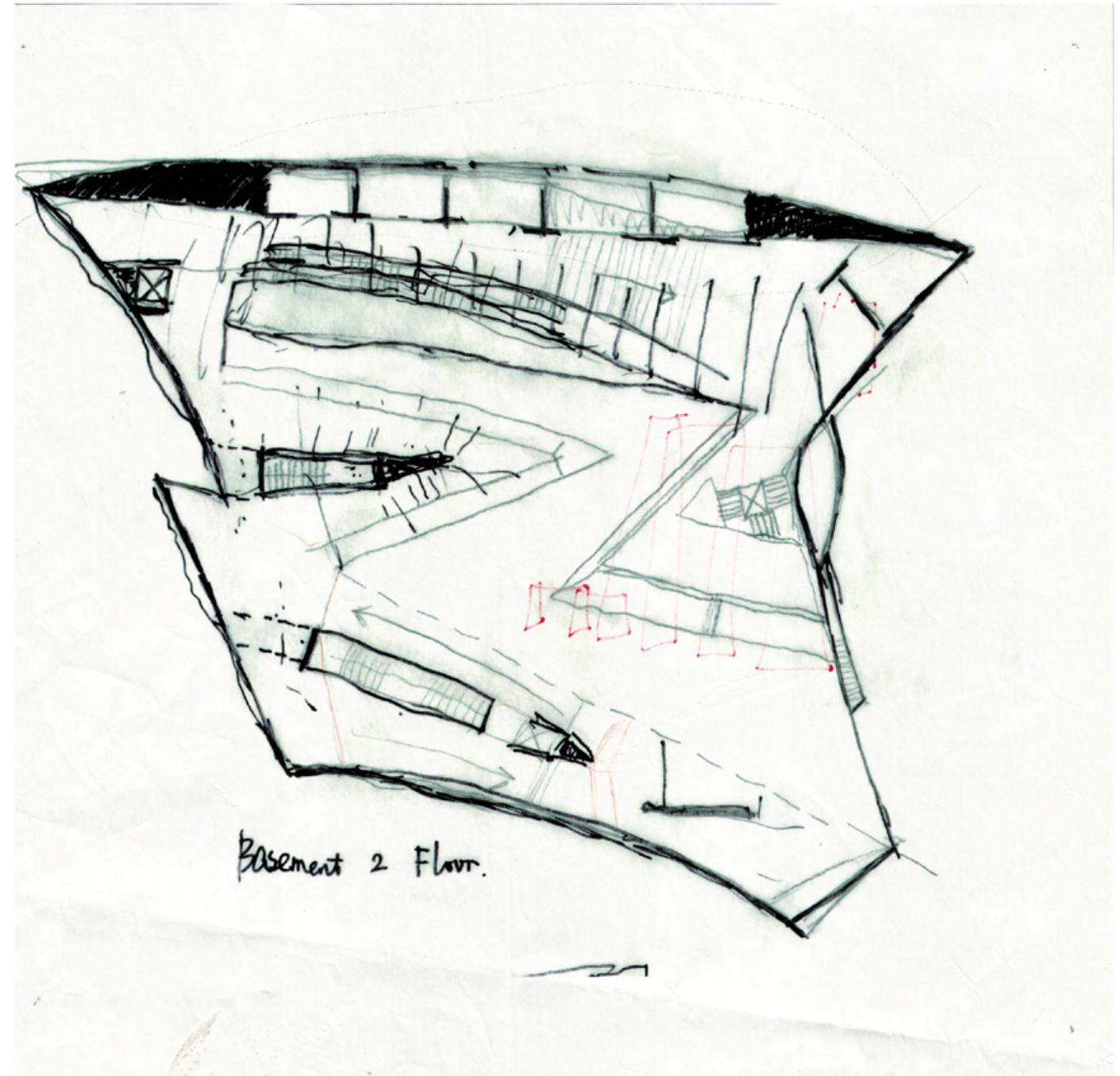
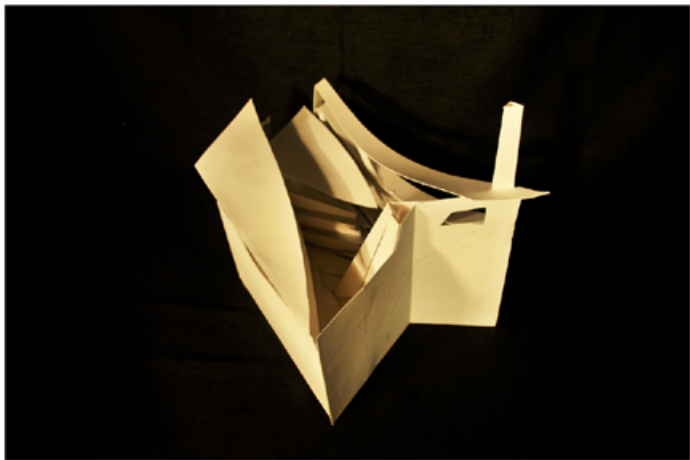
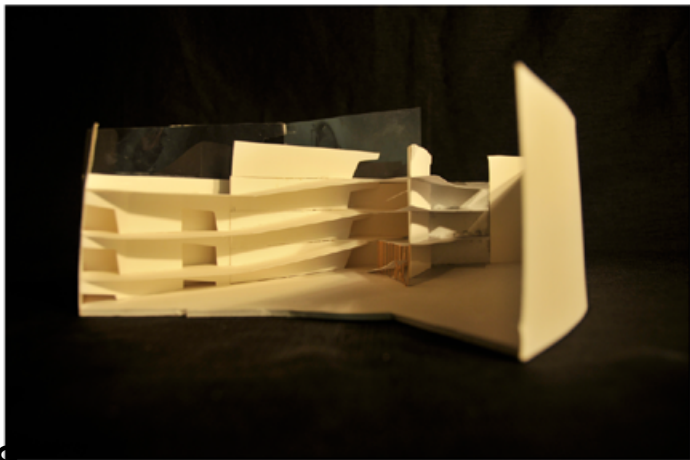
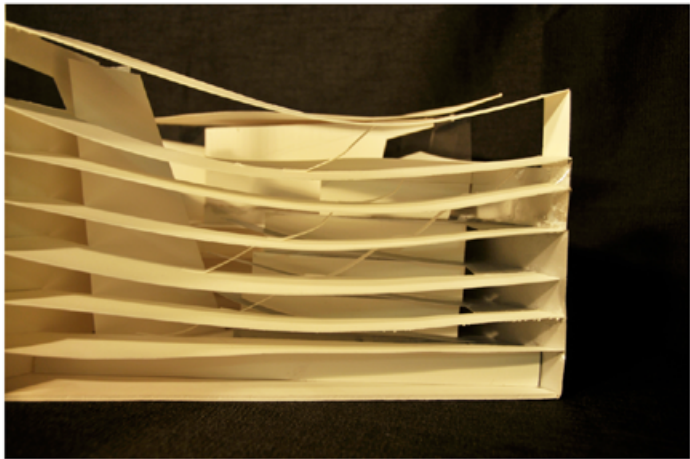
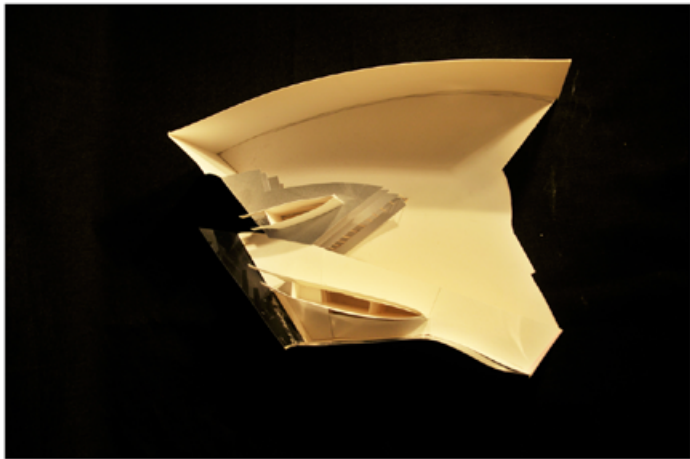
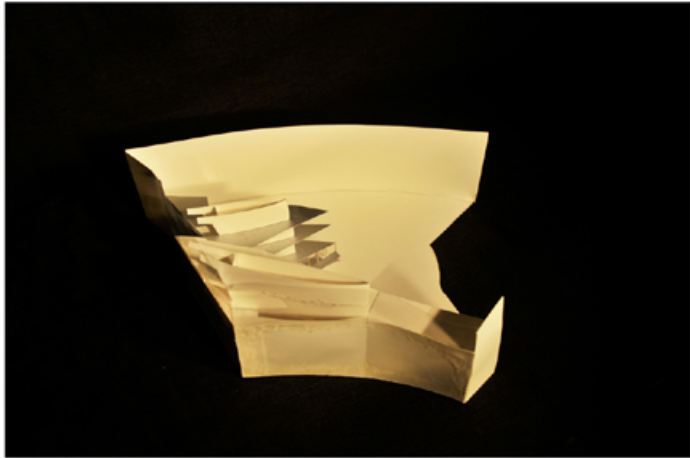
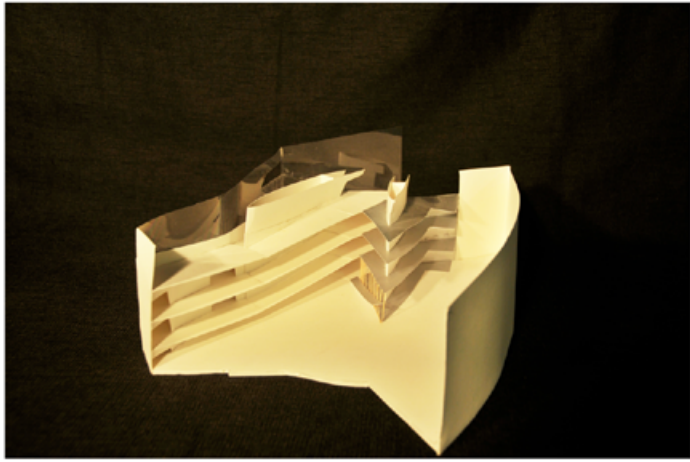


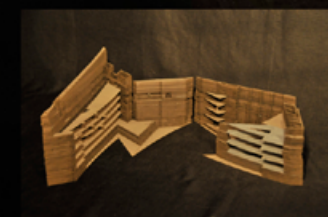


## ANALYSIS MODELS



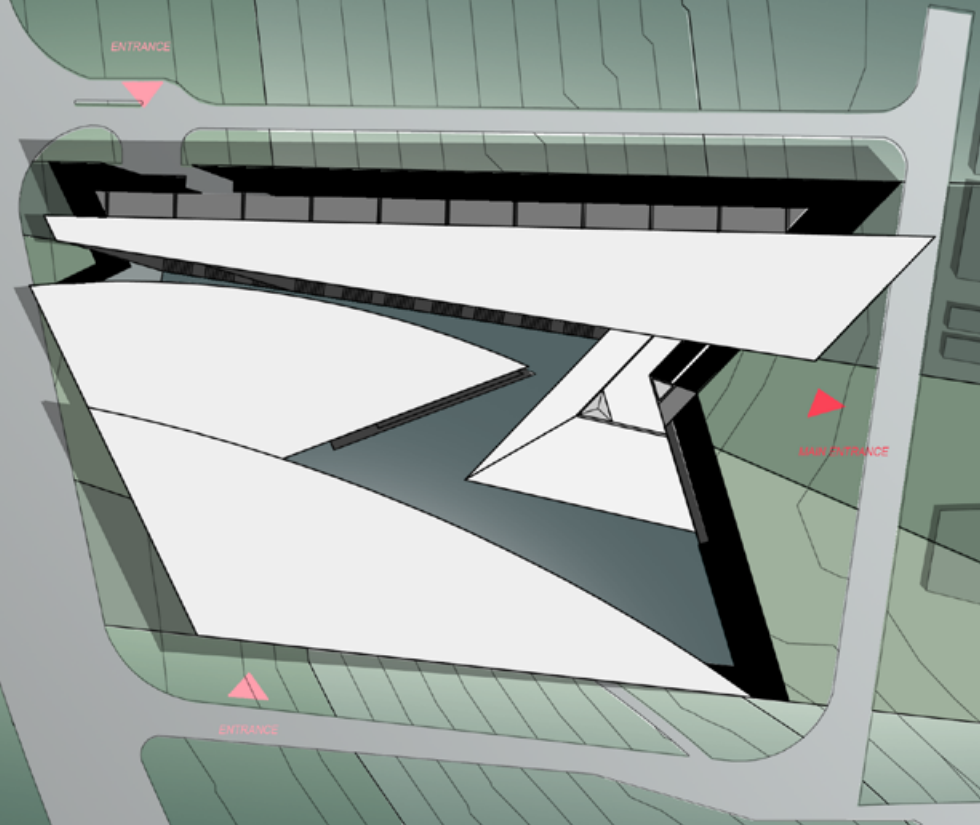




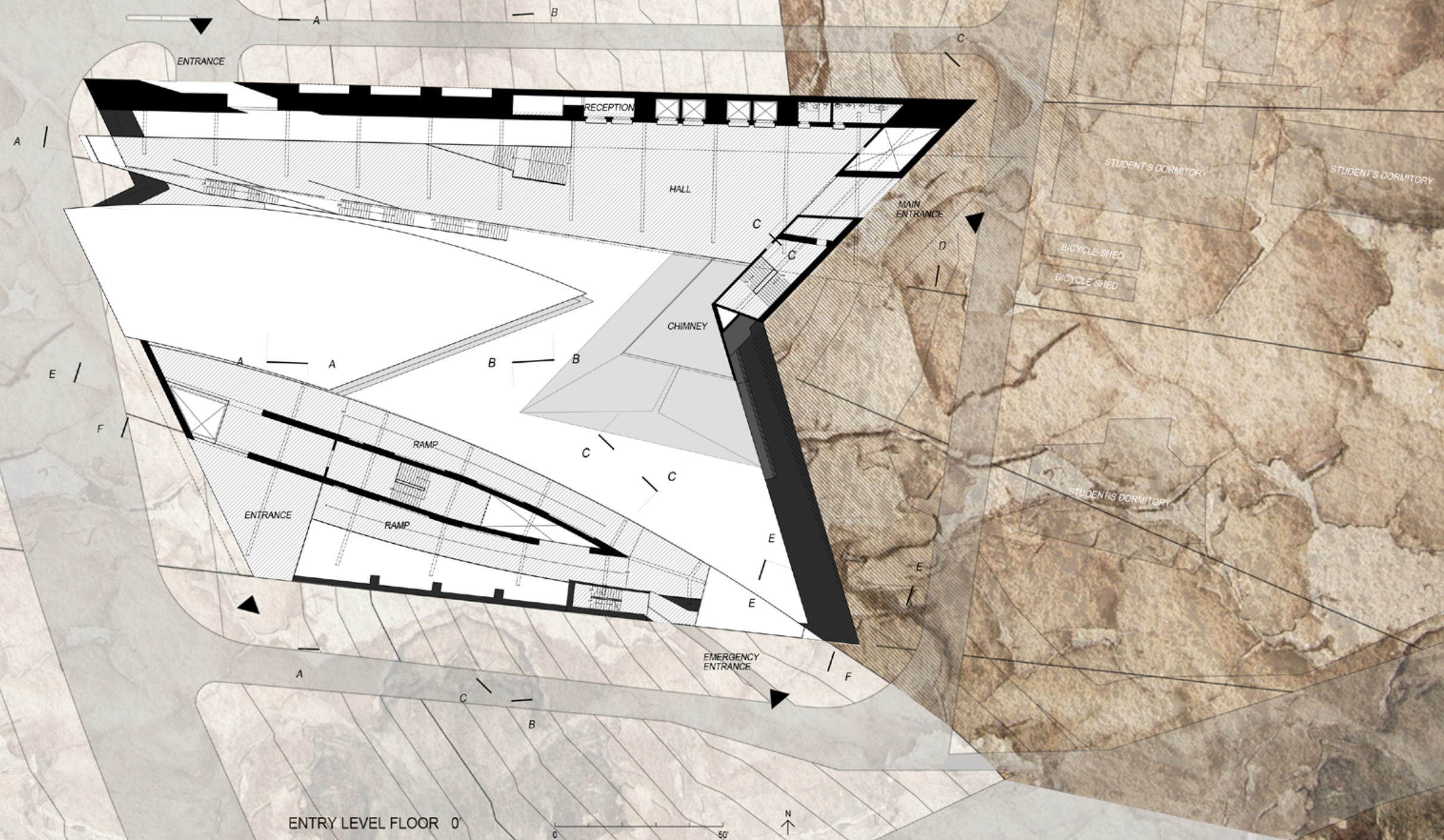


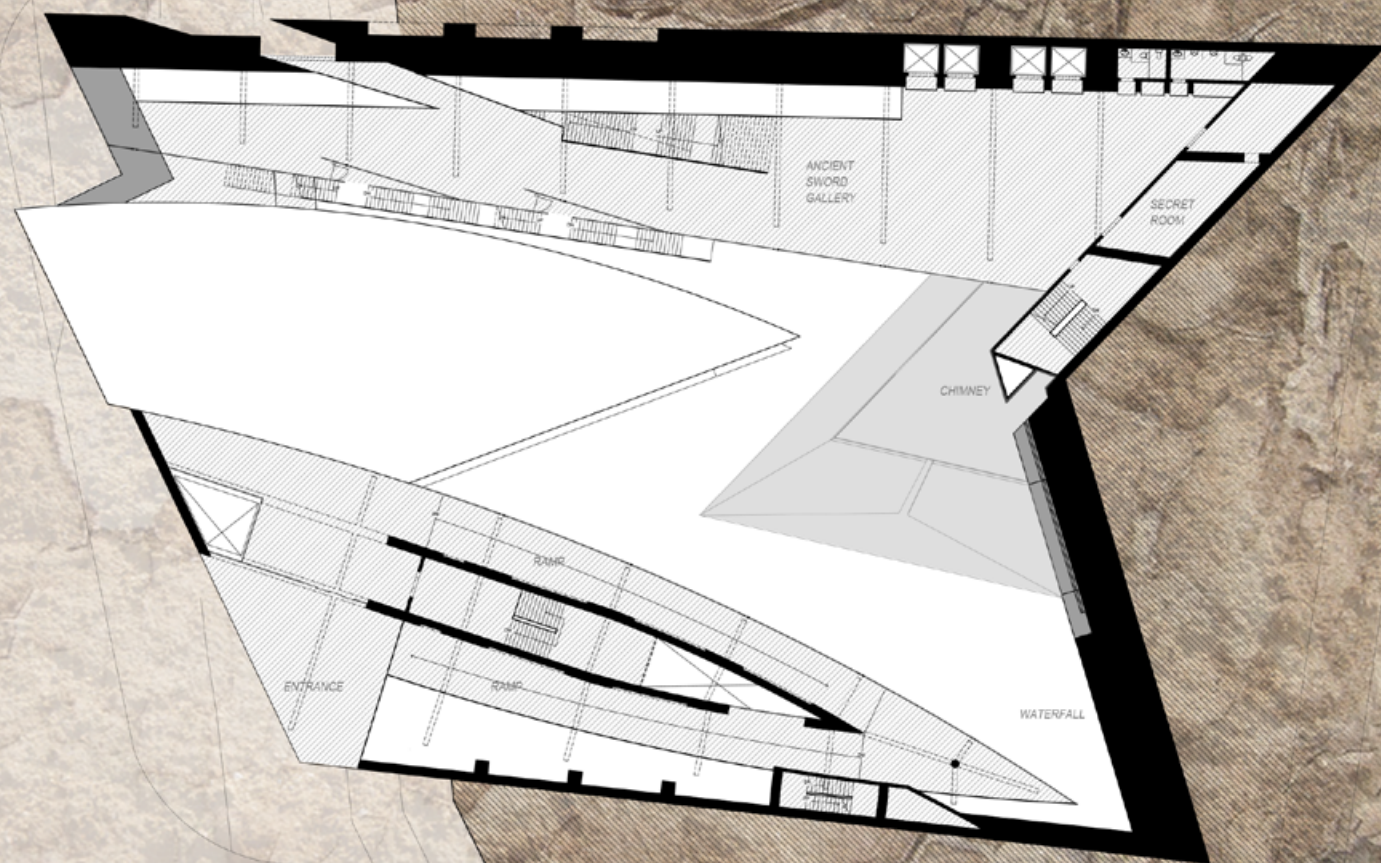
# SAMURAI SWORD MUSEUM

SITE PLAN

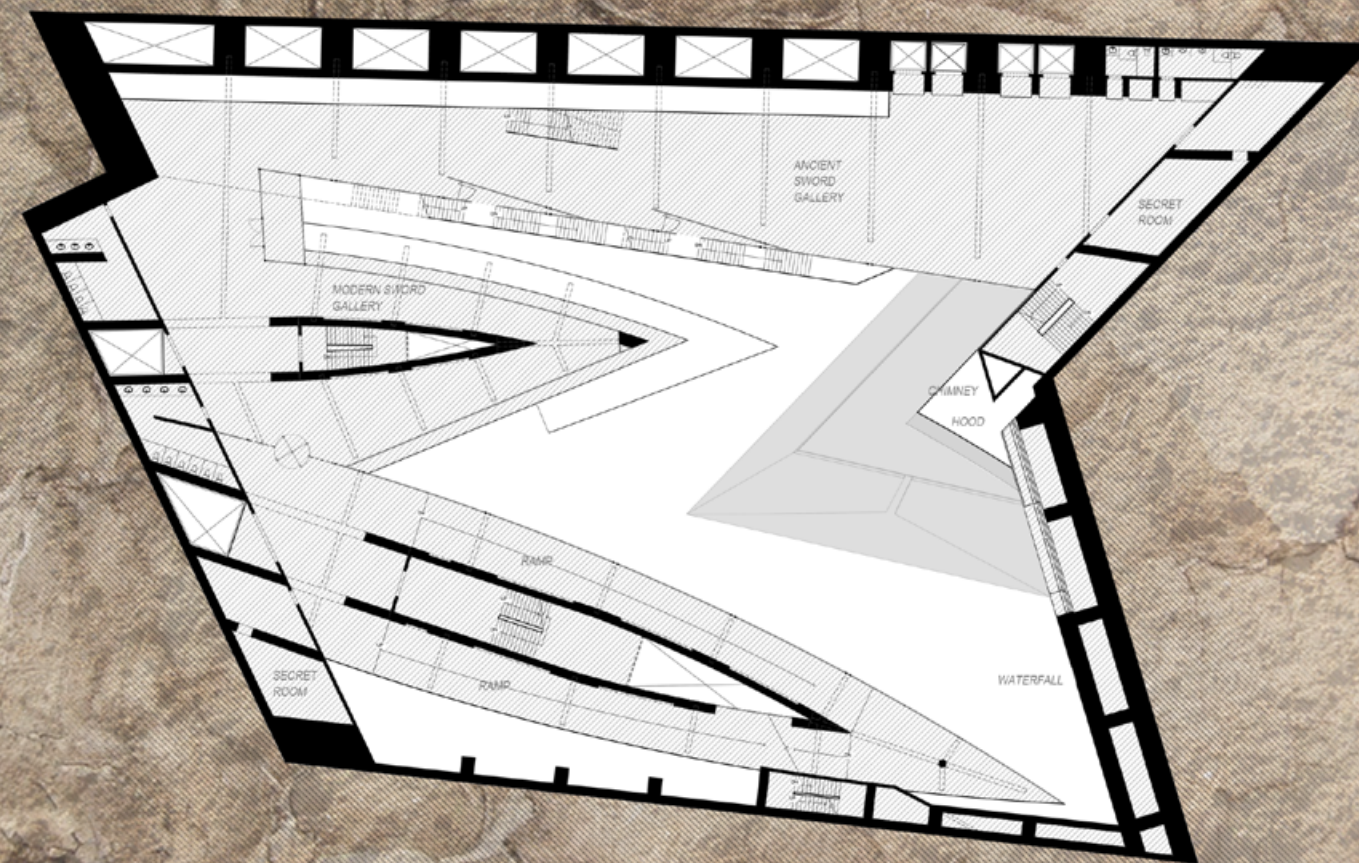


# PLANS

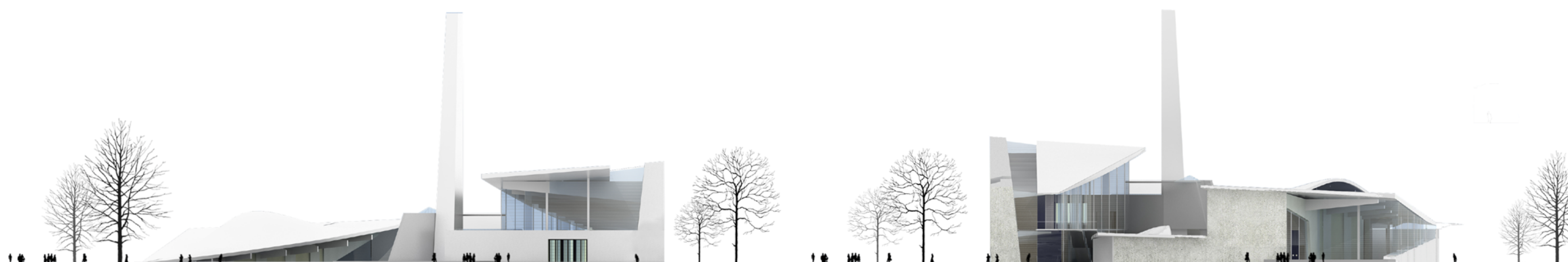


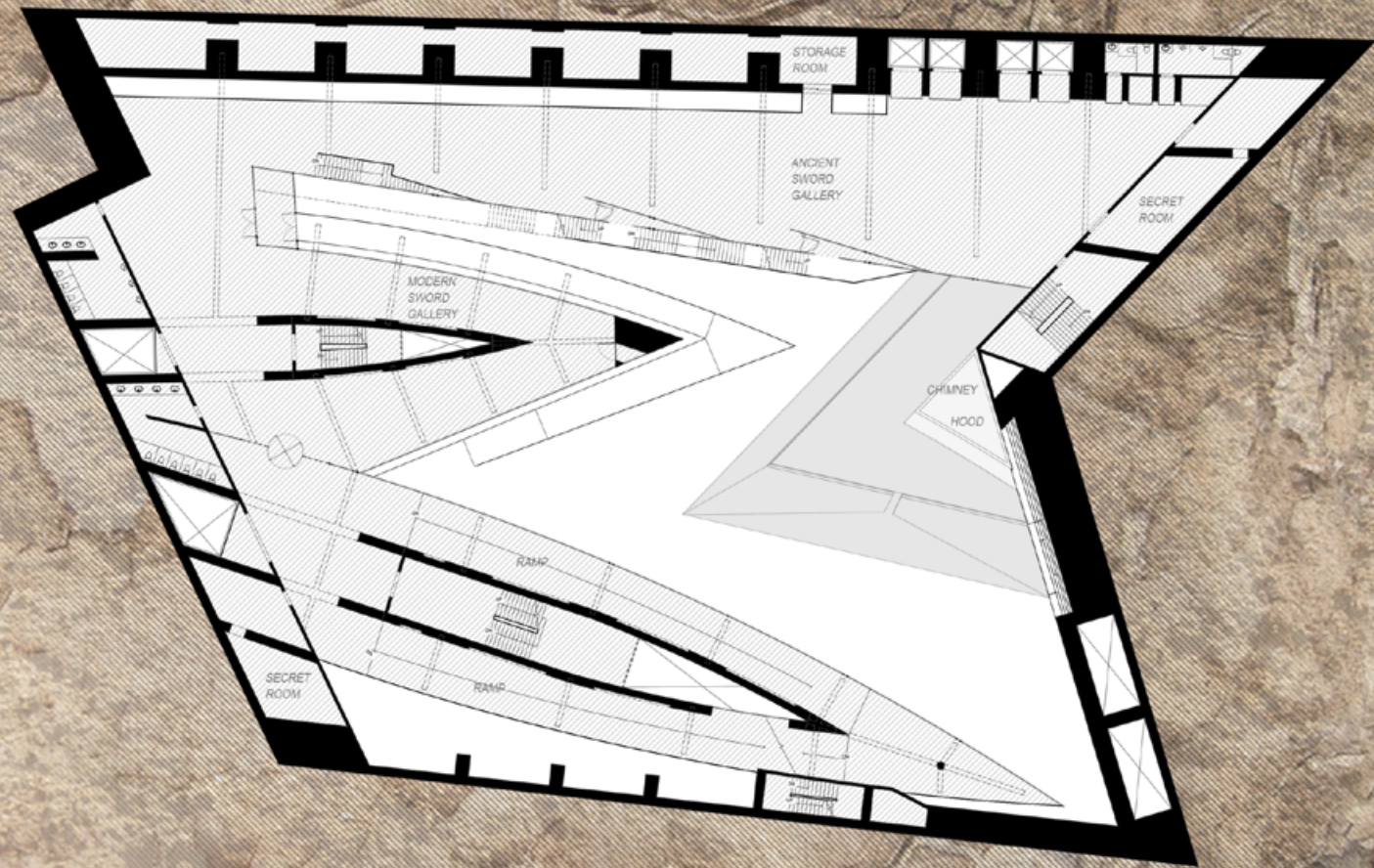


MINUS ONE FLOOR 147'

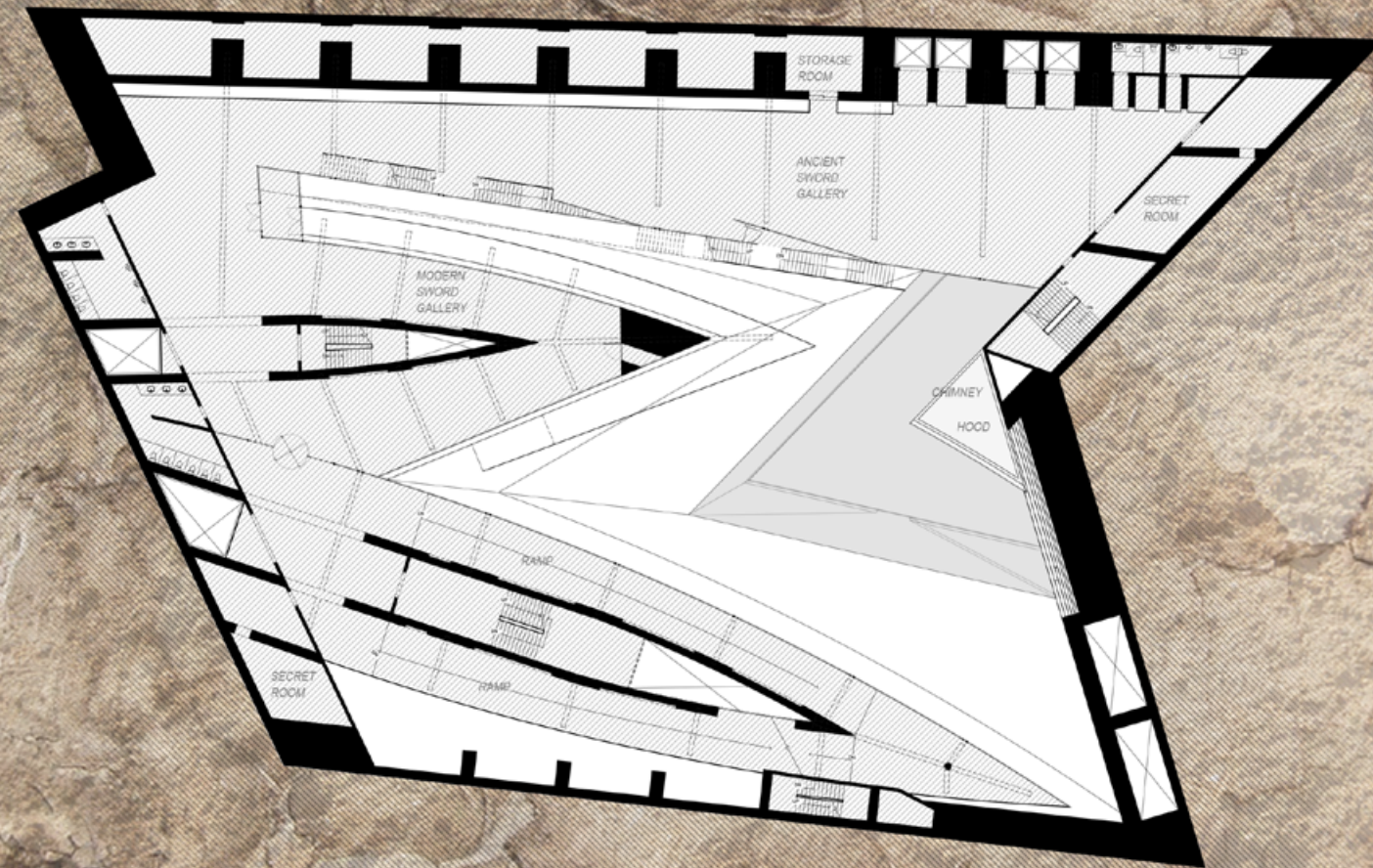


MINUS TWO FLOOR 133'

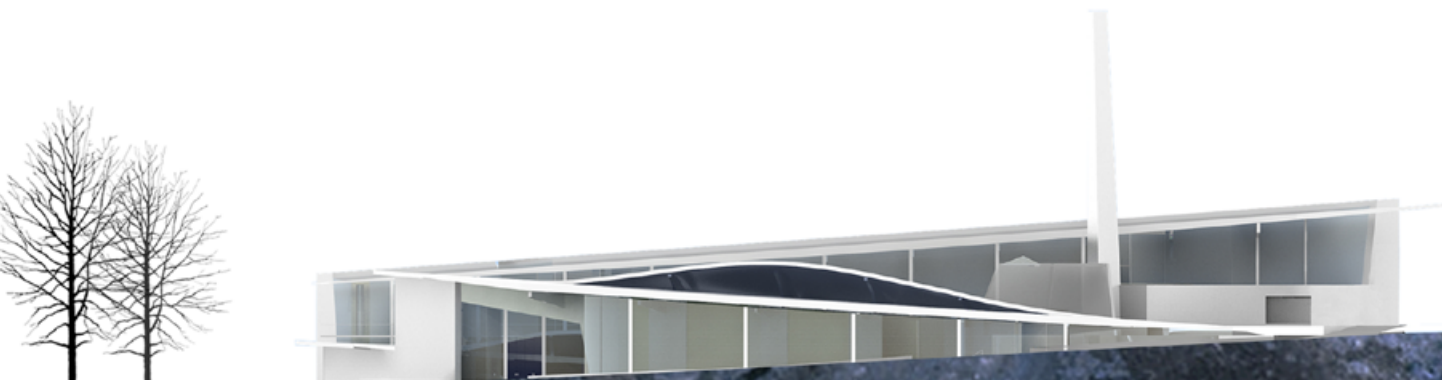




MINUS THREE FLOOR 119'



MINUS FOUR FLOOR 105'

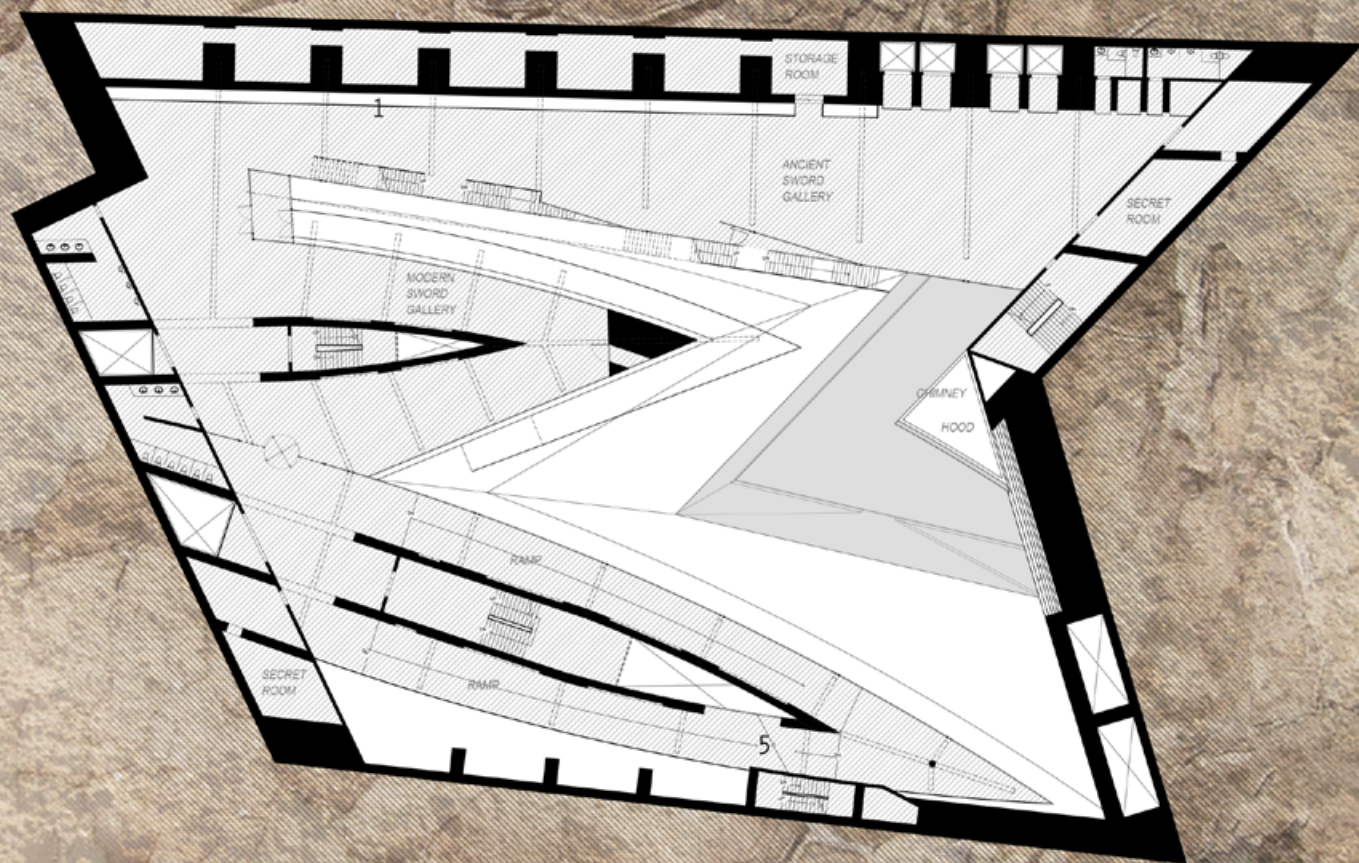


SOUTH ELEVATION

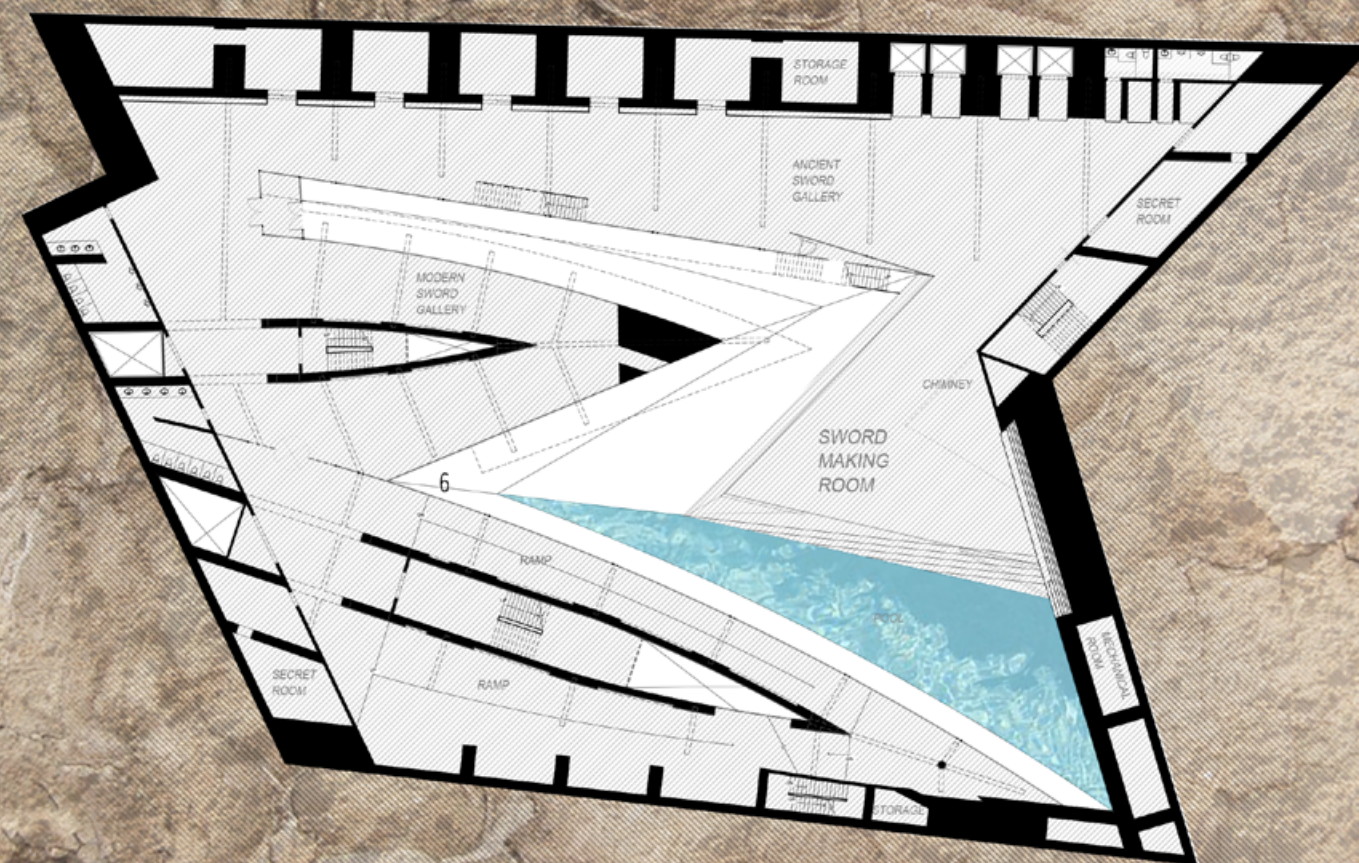


NORTH ELEVATION





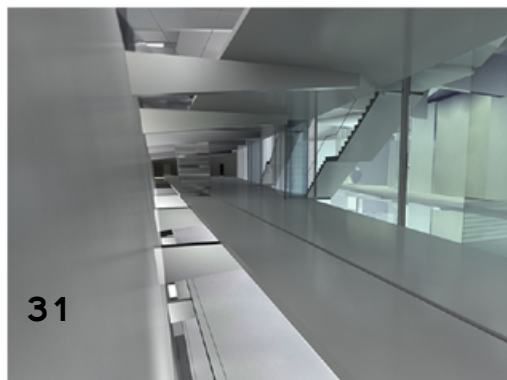
MINUS FIVE FLOOR 91'



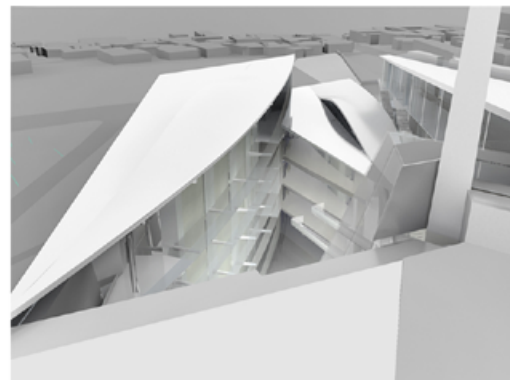
MINUS SIX FLOOR 77'



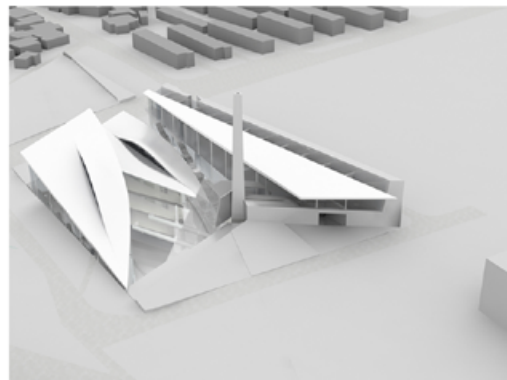
PERSPECTIVE 1



PERSPECTIVE 2



PERSPECTIVE 3



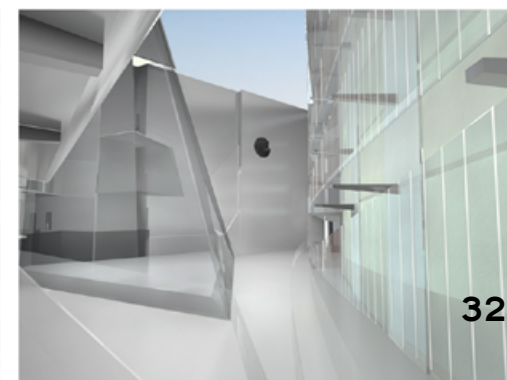
PERSPECTIVE 4



PERSPECTIVE 5



PERSPECTIVE 6

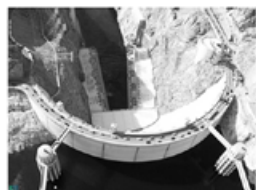




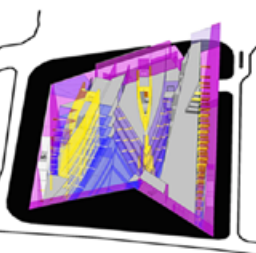
## ANALYSIS DRAWINGS



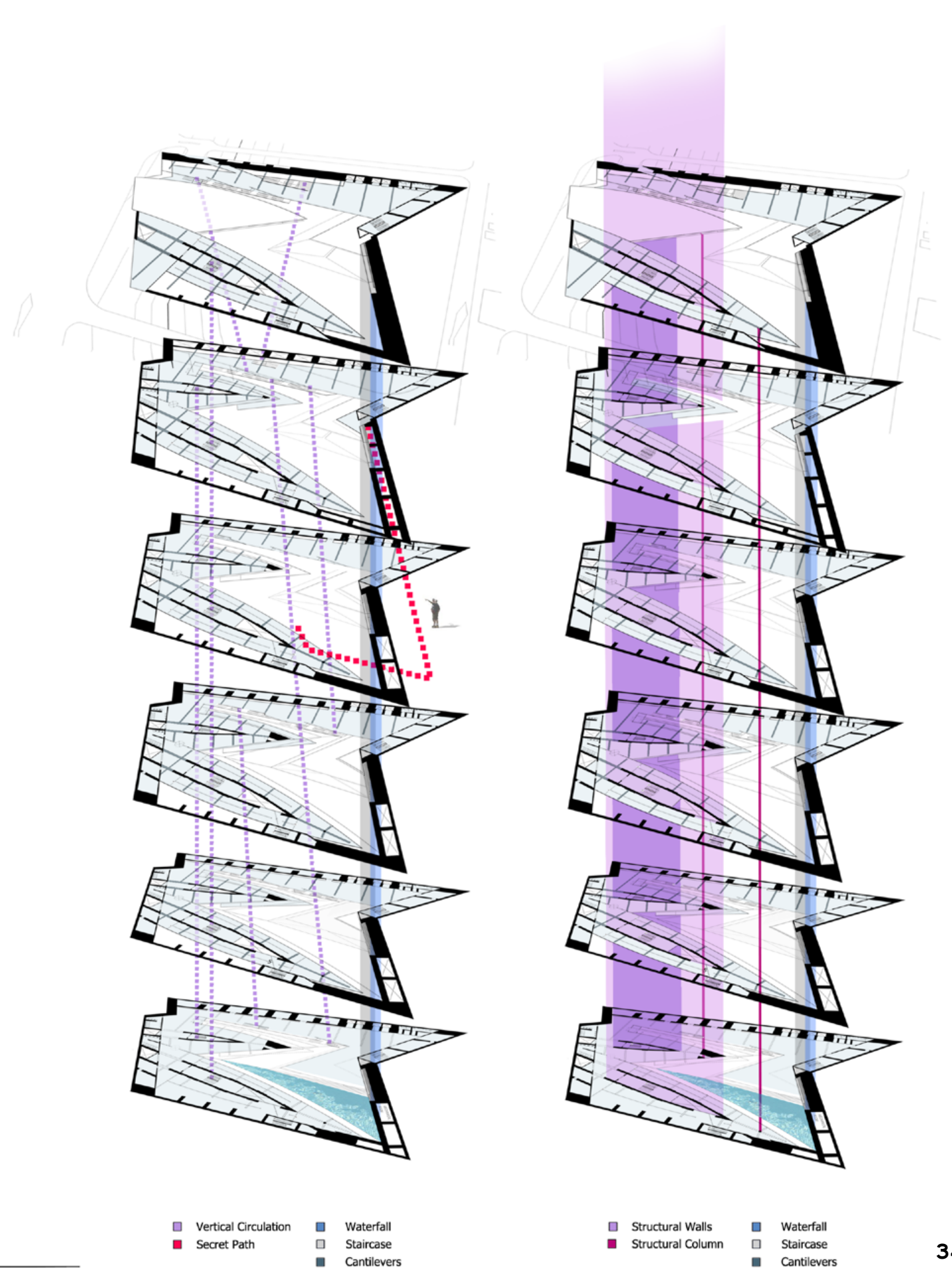
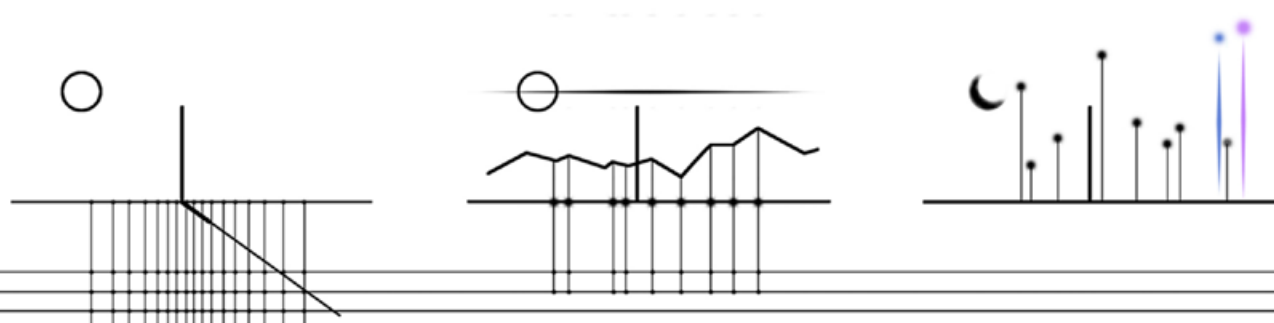
The "Z" Shape of the museum does not have roof, so when it rains, the water gather at the pool which located at the minus 5 floor. There is a pipe at the minus 5 floor, connecting the architecture and a garden nearby. The altitude of the garden is a little lower than minus 5 floor, so the rainwater is discharged.



I was inspired by the stepped well in India, and designed the stair near the waterfall. The visitors cannot use the stair, because it is located in the pool, and it is too narrow to walk onto. The Samurai fight for the King all their life, and when they die, their souls go to the heaven by the staircase.

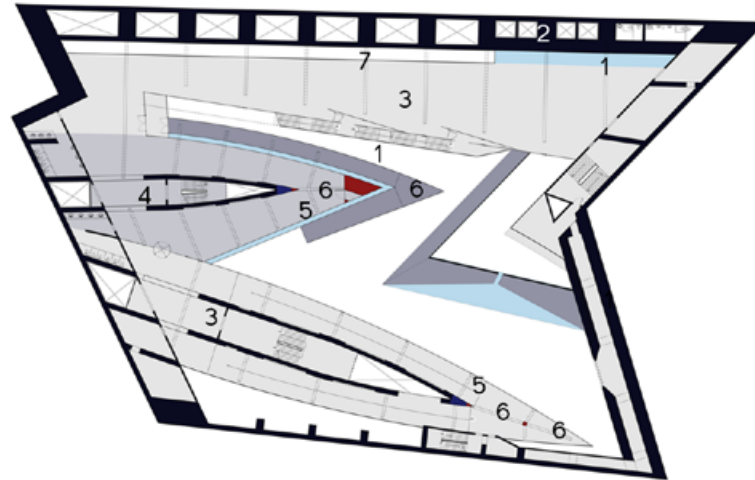


I was also inspired by the dam. Just like the samurai is fighting with other samurai, the retaining wall is fighting with the pressure of the earth, and it needs helpers -- the structural walls. The cantilevers grow on the retaining walls and structural walls, and they hold the floors and the roofs. I use parametric design in Revit to design the cantilevers, so they maintain the same shape, but they have different sizes. The sunlight travels through the cantilevers, and enter the gallery. The swords reflect the sunlight, and brighten up the dark room.



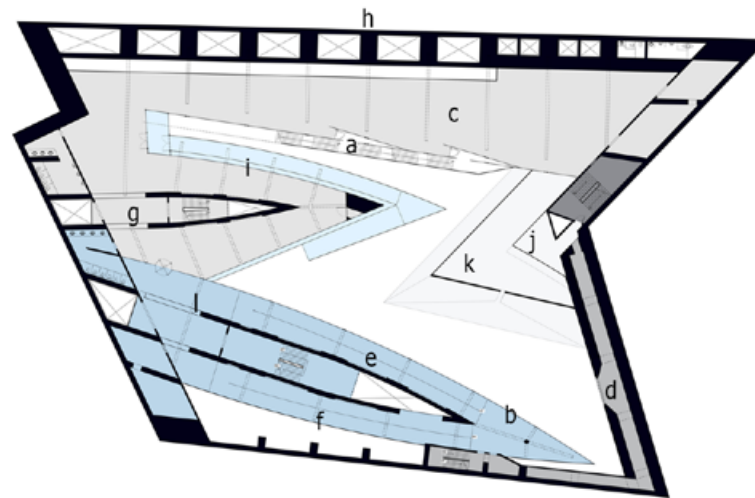
- Vertical Circulation
- Secret Path
- Waterfall
- Staircase
- Cantilevers

- Structural Walls
- Structural Column
- Waterfall
- Staircase
- Cantilevers

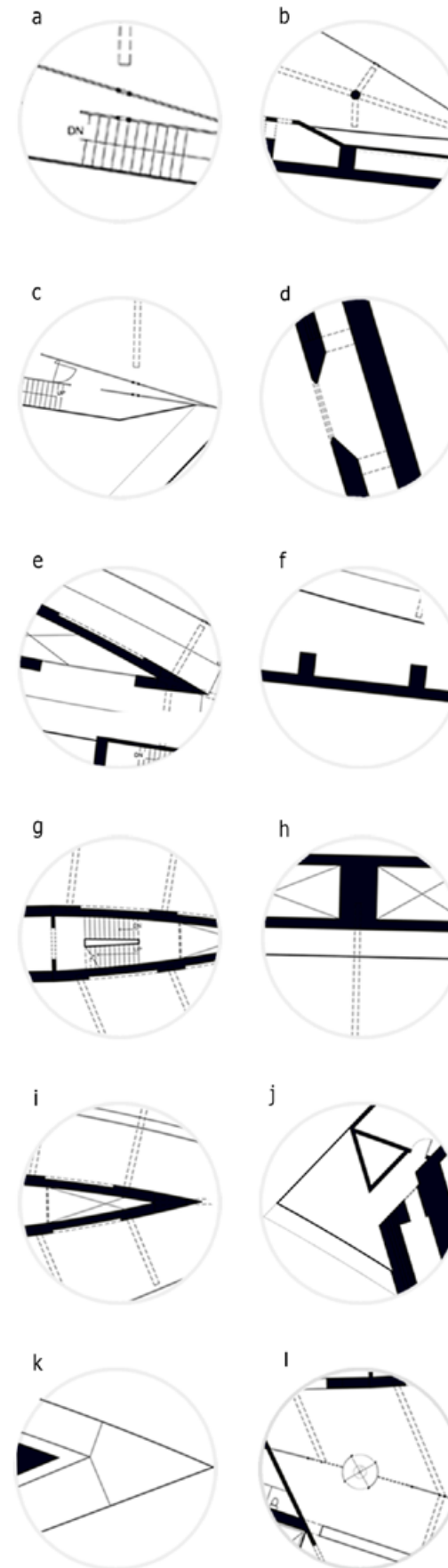


The rotation doors, pivot doors, and sliding doors separate the interior and exterior.  
So the air conditioner can control the temperature

Exterior Space Interior Space



- a The location of the double munlin corresponds the location of the cantilever.
- b The steel column is not a load bearing structure, but also a hint of the secret path.
- c The structural walls above the secret path connect the two pieces of retaining walls.
- d When you walk through the secret path, suddenly there is a window behind the waterfall, bringing you a bright view.
- e There is a mixture of circulation, structure and exhibition space here. When you walk on a certain place of the ramp, you can see the exhibition inside.
- f The serrated wall corresponds the mechanical laws, and the design can save concrete.
- g The structural walls can also be used as exhibition space.
- h The space in the hollowed retaining wall is for storage.
- i The gap between exhibition space and balcony is made of glass, and you will see the beams when you look down.
- j When you go through the secret path, finally you will step on the top of the hood, feel the heat, and then enter the stairs.
- k The width of the balcony changes wider at the turning point, because people tend to stay here longer.
- l There is a rotation door between the two closed spaces, separate the interior and exterior.



1 BALCONY WINDOWS  
AND PASSAGE

2 RETAINING AND  
STRUCTURAL WALL

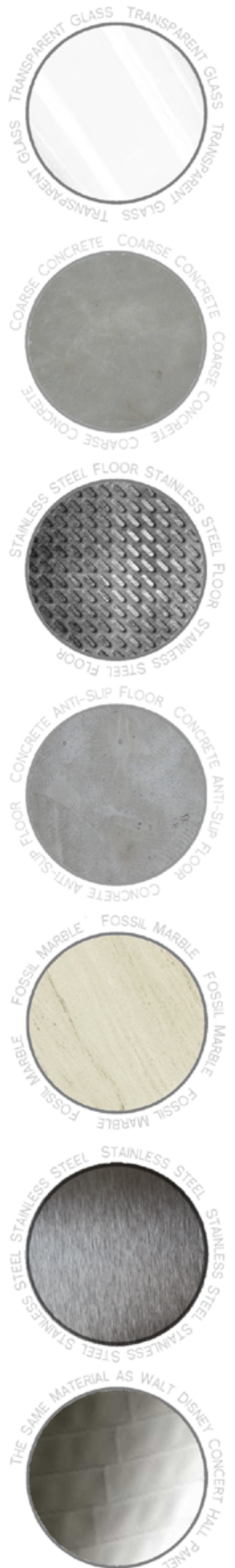
3 FLOOR FOR MODERN  
SWORD GALLERY AND BALCONY

4 FLOOR FOR ANCIENT  
SWORD GALLERY

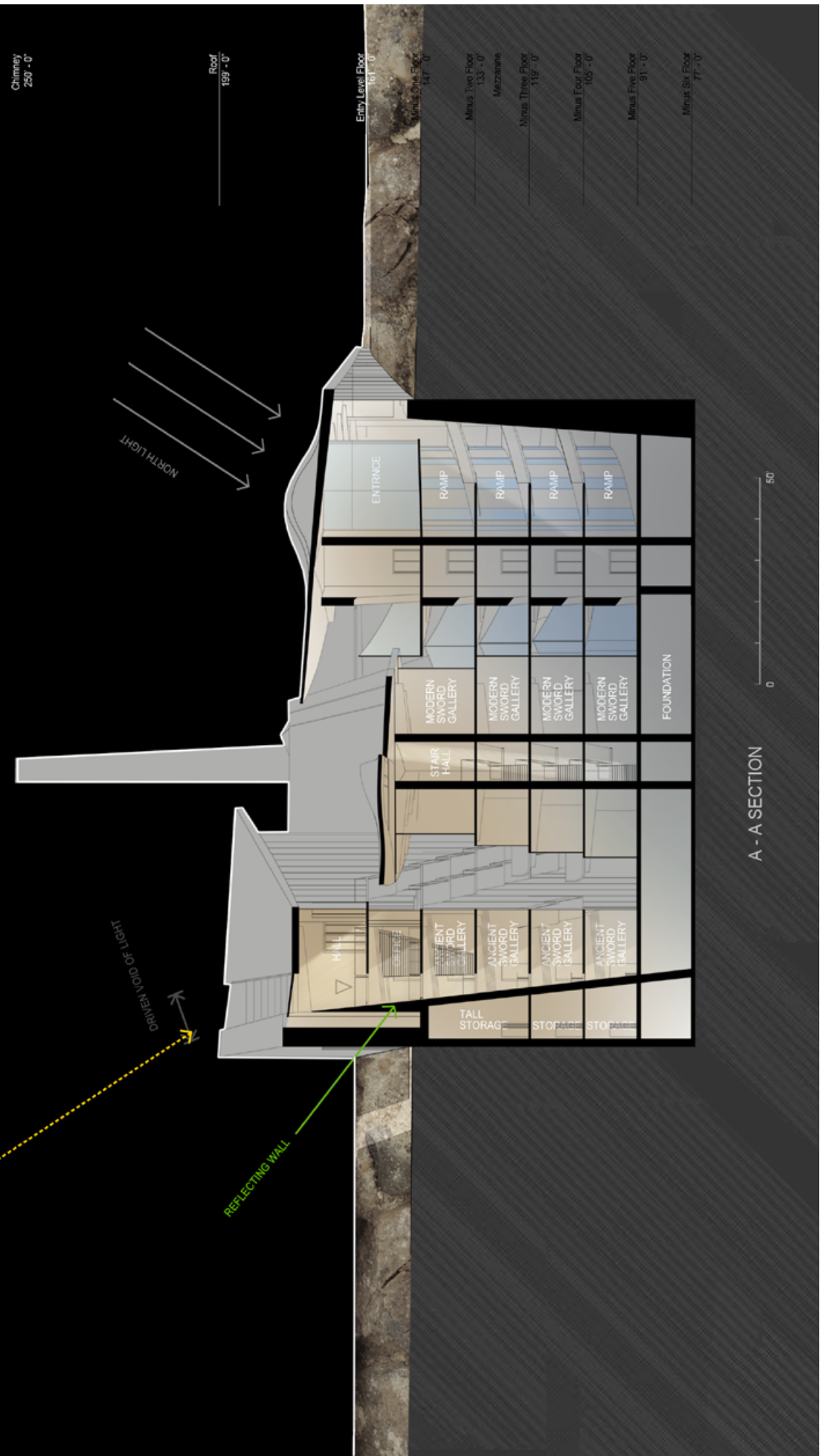
5 STRUCTURAL COLUMN AND  
PART OF STRUCTURAL WALL

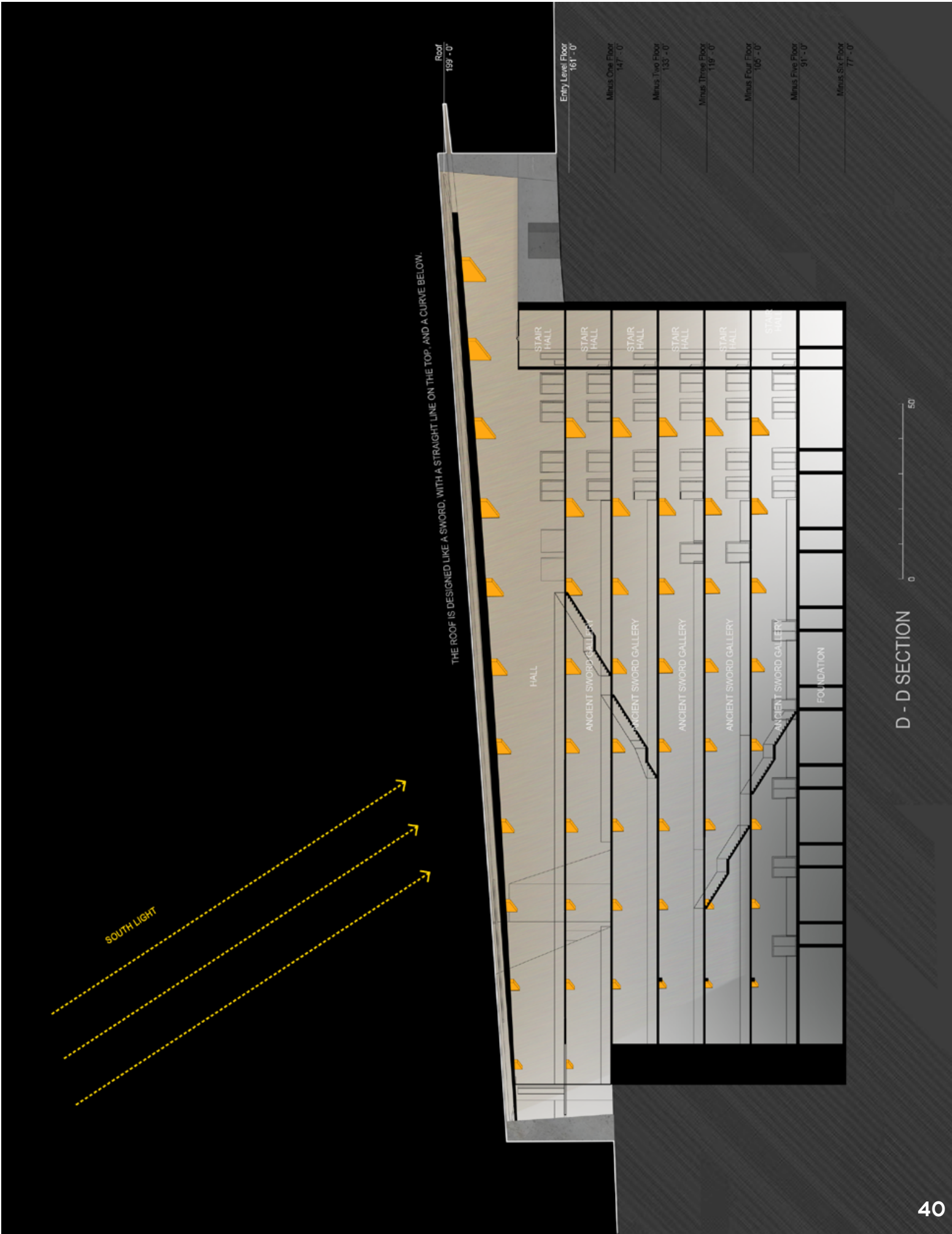
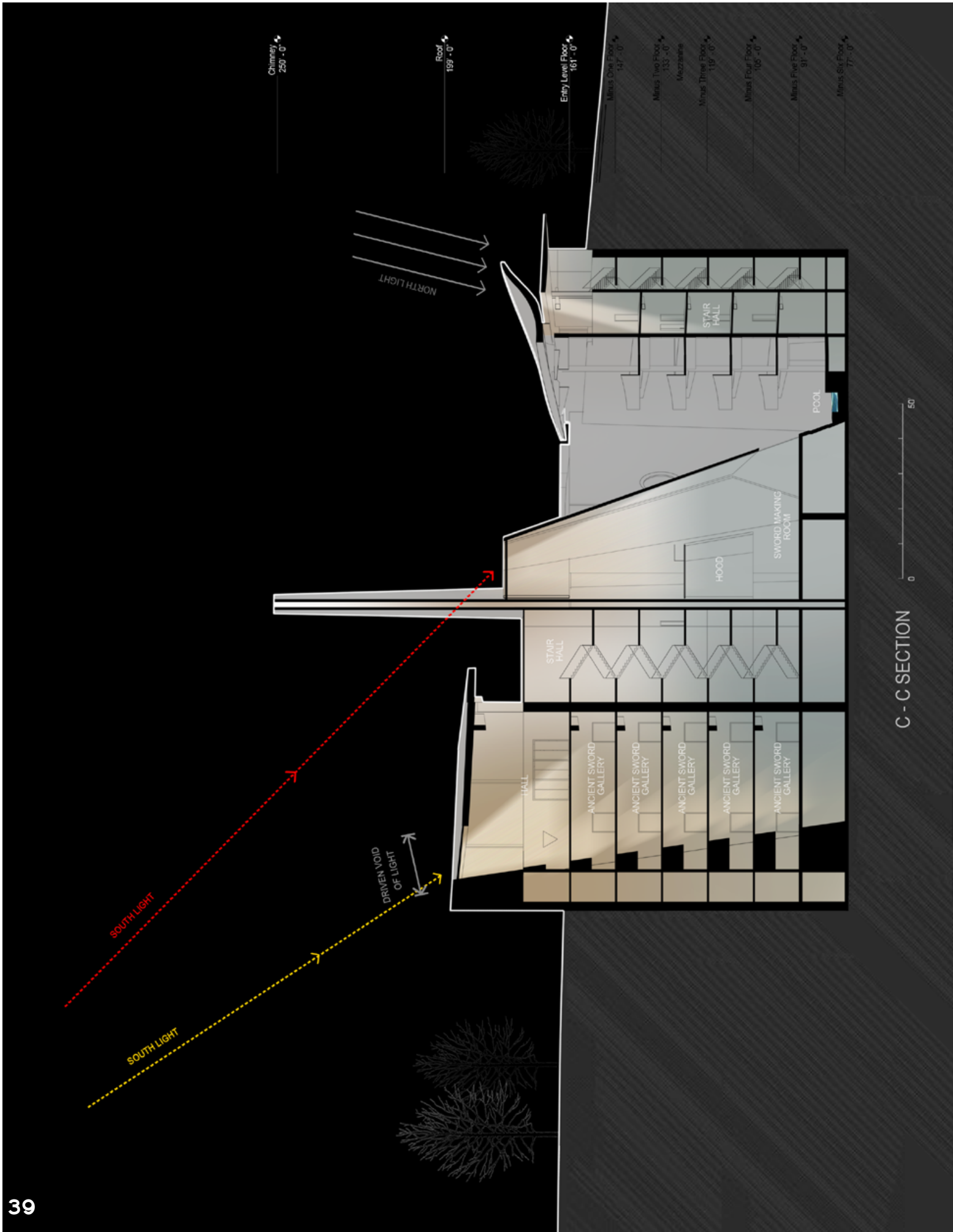
6 TIP OF THE STRUCTURAL COLUMN  
AND STRUCTURAL WALLS

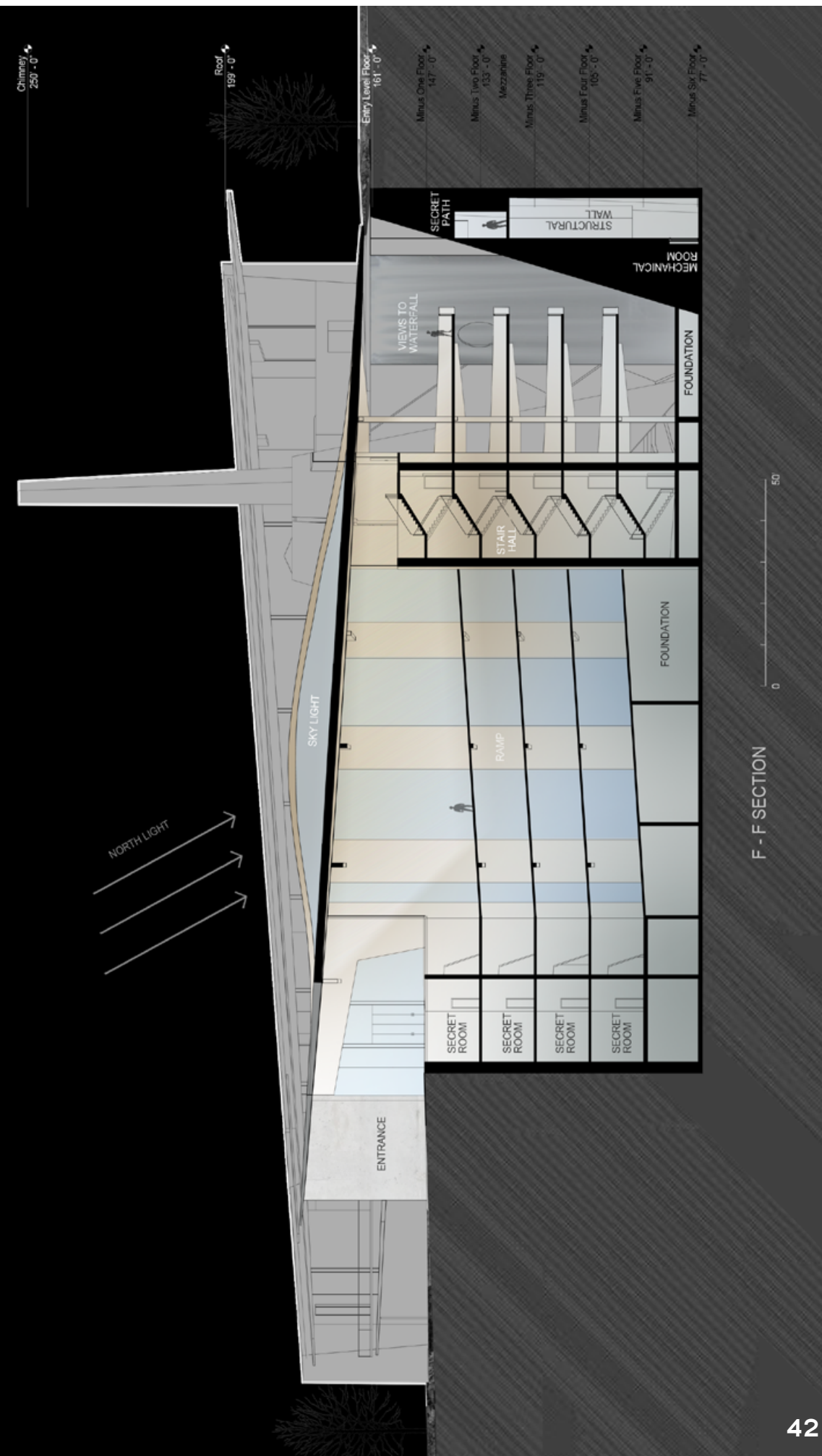
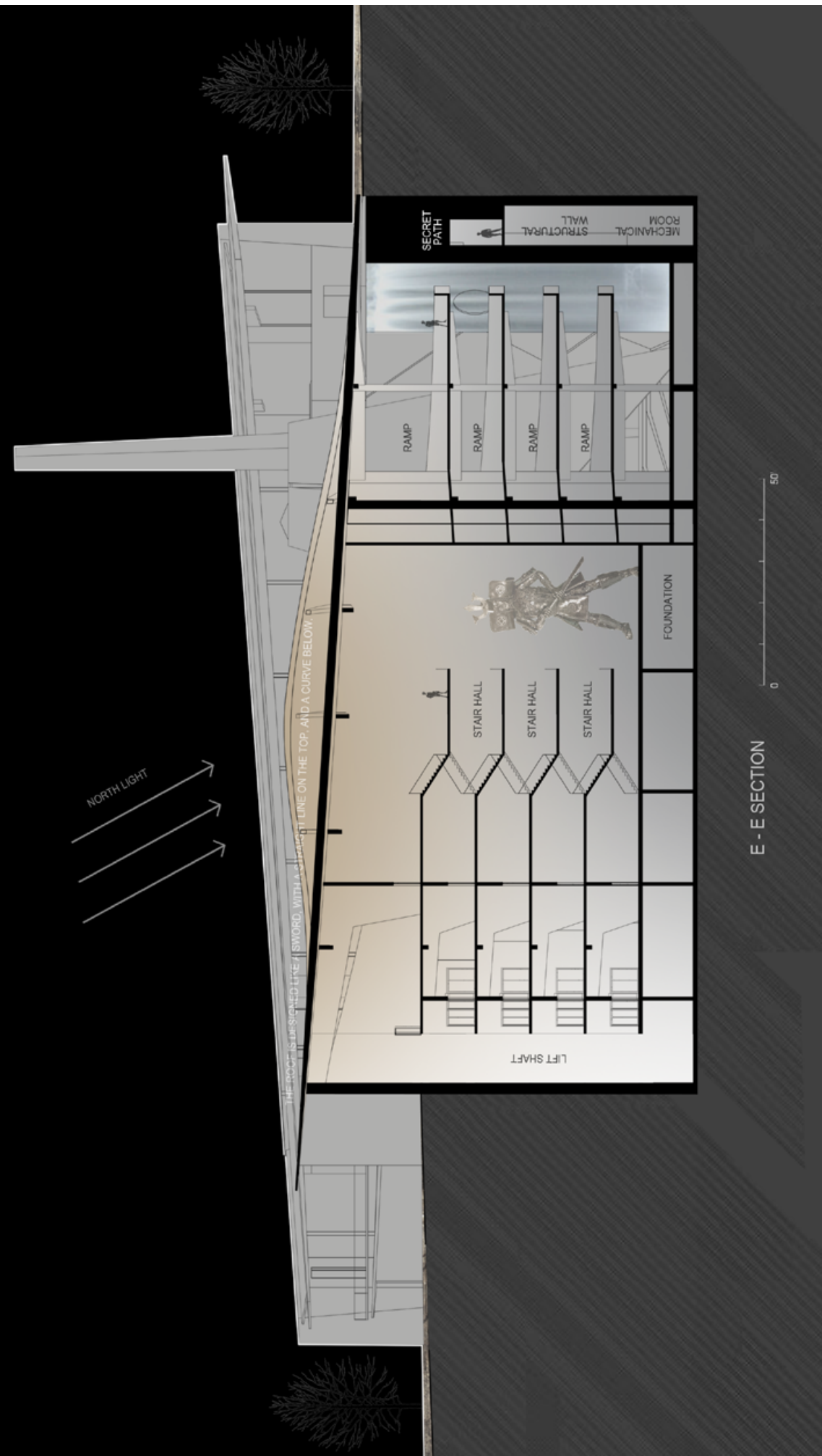
7 SHINING REFLECTING WALL



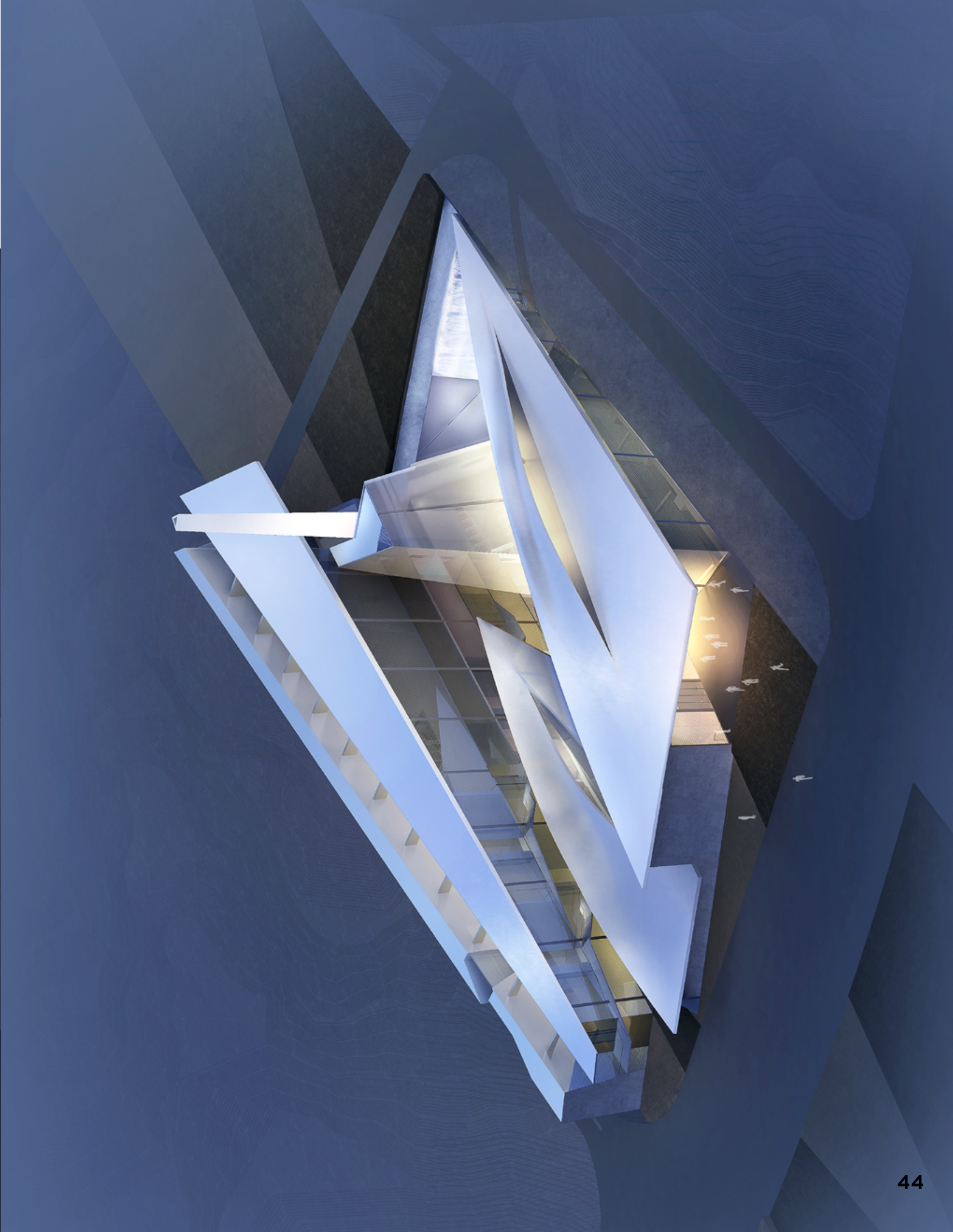
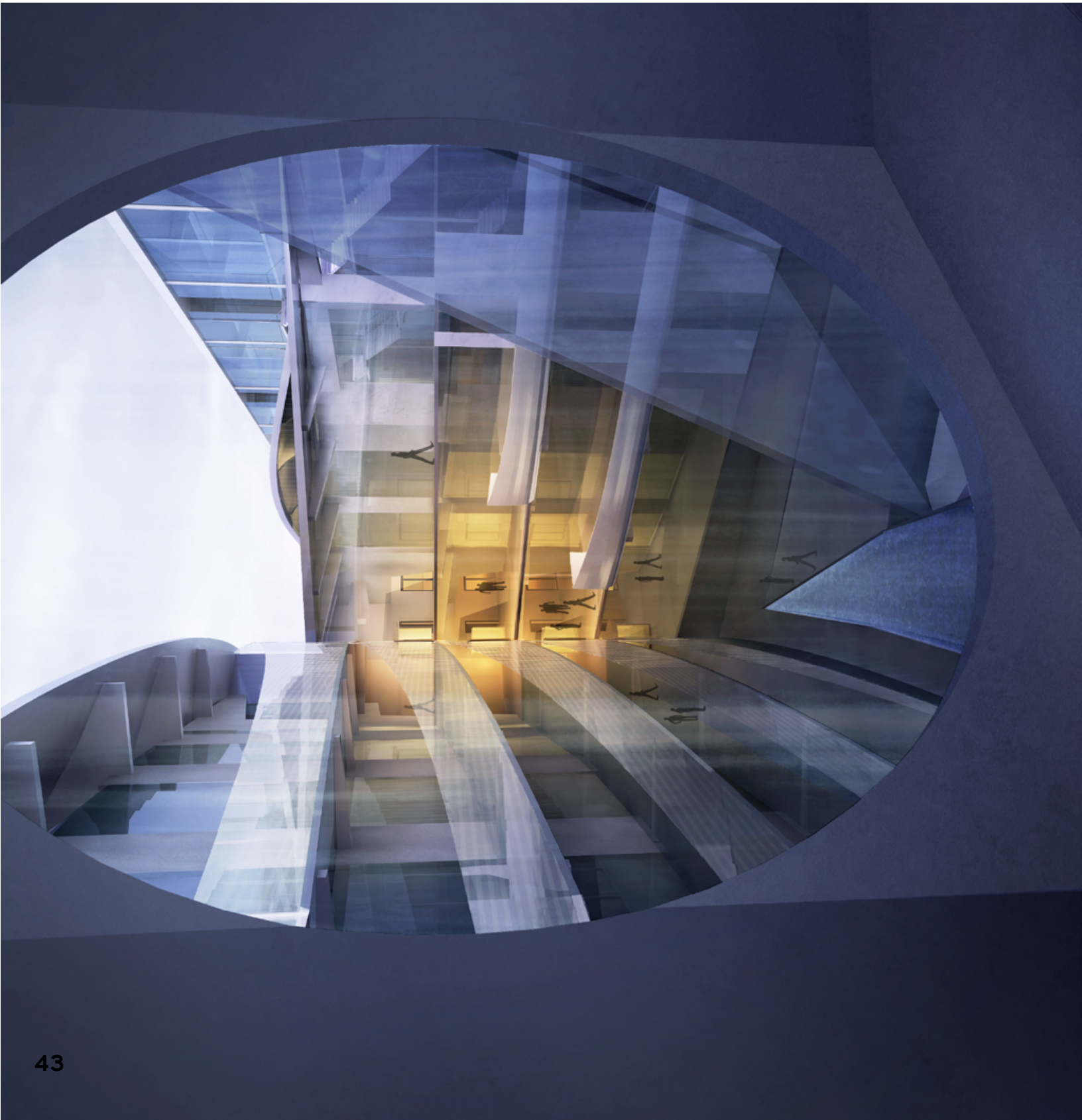
SECTIONS







PERSPECTIVES



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Web. <<http://en.wikipedia.org/wiki/Bushido>>

Web. <<http://www.wikihow.com/Be-a-Samurai>>

Web. <<http://www.flickr.com/photos/magiceye/7886647192/>>

Web. <[http://www.likecool.com/The\\_Hoover\\_Dam\\_Bypass\\_Bridge--Projects--Gear.html](http://www.likecool.com/The_Hoover_Dam_Bypass_Bridge--Projects--Gear.html)>

From Left to Right: Jaan Holt Ningning Shang Kashuo Benette James W Ritter Manoj Dalaya Paul Emmons Photo by Zhaoyang Kong Used with Permission

# ACKNOWLEDGEMENTS

My family, for giving me so much love.

My roommates, Wei Cao and Zhaoyang Kong,

My committee, Jaan Holt, Kashuo Benette, James W. Ritter and Paul Emmons,

Manoj Dalaya and KGD Architecture,

Henry Hollander and all my friends in WAAC,

Thank you so much for offering me so many good advices, and helping me grow up.



