A Choreography of Water, Light, and Space Interplay

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of
Masters of Architecture in Architecture

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12/16/2024
Blacksburg, VA
Keywords: Water, Light, and Space

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Abstract

This thesis explores the interplay of water, light, and space in a choreography of architectural sequences. Through the design of a spa, it explores how these elements can evoke sensory and emotional responses, shaping human perception and interaction within spatial environments. The project unfolds as a choreography where water in its various states and qualities interacts with light and architectural space, creating an immersive sensory journey. This journey makes the world present through a deliberate gathering of water and light, shaping the architectural space. This choreography carefully modulates centrifugal (outward-directed) and centripetal (inward-directed) experiences, crafting a dynamic interplay between the individual and the surrounding space.

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General Audience Abstract

This project explores how water and light can transform our experience of architectural spaces. Using the design of a spa as a case study, the work investigates how different forms of water—such as still pools, flowing streams, and mist—combine with natural and artificial light to create spaces that engage the senses. By carefully shaping how water and light interact, the design creates spaces that feel open and expansive at times or intimate and reflective at others. The study uses architectural models, simulations, and light experiments to design spaces that invite visitors to feel more connected to their surroundings and themselves. It considers how these experiences can evoke emotions, enhance relaxation, and foster a deeper awareness of the environment.

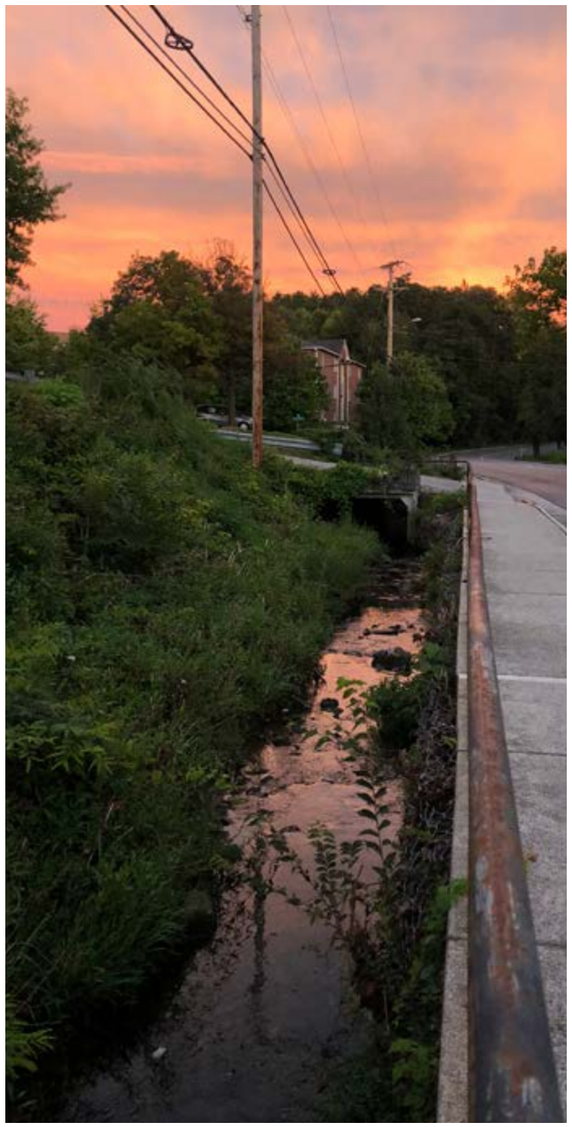


"The purpose of architecture is hence to make the world visible, it does this as a thing and the world that it brings into presence consists of what it gathers."

Christian Norberg-Schultz

Hormoz, Iran





Blacksburg, Virginia

Claytor Lake, Virginia





Vancouver, Canada

Thesis

How can the *choreography* of different states and qualities of **water** interact with **light** and **spatial elements** to evoke embodied experiences of the visitor?

Choreography

"The composition and arrangement of dances."

Merriam Webster Dictionary

Water in History

Water has been essential in history and cultures as a life-giving force, a symbol of power, and a medium for spiritual and artistic expression. Beyond its biological necessity, water has shaped civilizations, fostering agriculture, urban planning, and cultural development.
In Mesopotamia, water represented **creation**, with rivers like the Tigris and Euphrates nurturing the world's first cities. The Egyptians viewed the Nile as a source of **renewal**, its cyclical flooding ensuring agricultural prosperity and inspiring religious rituals. In Hinduism, rivers such as the Ganges symbolize **purification**, offering spiritual cleansing and connection to the divine, while in Buddhism, water embodies **clarity**, reflecting the flow of life and inner peace. Judaism associates water with **sanctity**, integral to rituals of cleansing, and in Christianity, it symbolizes **rebirth**, central to baptism and spiritual renewal. Islam values water as a source of purity, vital for ablution before prayer.
In Greco-Roman culture, water was a sign of **power**, evident in aqueducts and grand baths that showcased engineering and social sophistication. Indigenous cultures honor water as a source of **life**, tying it to creation myths and environmental stewardship. In Chinese Taoism, water reflects **balance and harmony** with nature, while in Japanese Shintoism, it represents harmony and is used for purification rituals.
Islamic architecture employs water to evoke **paradise**, such as in the Alhambra's serene pools, while the Aztecs revered water for its role in **fertility**, essential for agriculture, and the Maya viewed water as a **portal** to the spiritual world through sacred cenotes.
Across cultures, water has not only sustained physical life but also embodied transformation, power, and connection to the sacred, cementing its importance in human history and cultural identity.

Water

- Mesopotamian - **Creation**
- Egyptian - **Renewal**
- Hinduism - **Purificatio**
- Roman - **Power**
- Judaism - **Sanctity**
- Buddhism - **Clarity**
- Islam - **Purity**
- Christianity - **Rebirth**
- Indigenous **Life**
- Chinese - **Balance**
- Japanese - **Harmony**

Water in Architecture History



Fountain of Peirene
Corinth

Baths of Caracala
Aegidius Sadeler II



Ganjali Khan Hammam
Iran



Trevi Fountain
Rome



Fallingwater
Frank Lloyd Wright

Ancient Civilization
4000–2000 BCE

Irrigation systems for agriculture, sacred pools were used for rituals

Egypt: Incorporated water into temple complexes like **Karnak**, with sacred lakes for rituals.

Mesopotamia: Introduced water as a source of life and power through **canals** and sacred **ziggurats**.

Classical Era
8000 BCE - 500 CE

Greece: Utilized fountains for utility and aesthetics

Rome: Revolutionized water architecture with **aqueducts public Baths** combined utility with grandeur, was included monumental fountains symbolizing power and abundance

Medieval period
5th - 15th Century

Europe: Monasteries used cloisters with **wells** and **fountains** for spiritual and practical uses

Islamic World: **Courtyards** with reflective pools, symbolizing paradise and for cooling effects **Qanats** (Underground channels for water supply in arid regions), **Hammam** for cleanliness

Renaissance and Baroque
15th–18th Century

Italy and France: Fountains and cascades showcasing art and hydraulic engineering

Water as an expression of power, featuring elaborate **fountains** and lakes.

Industrial Revolution
18th–19th Century

Urban water management advanced with sewage systems and **ornamental public fountains** emphasizing civic pride

Modern and Contemporary Architecture
20th - 21st Century

Incorporates water in urban and indoor spaces as a **sensory design element** with the form of installations and architecture

Art

Water has been both a medium and subject in art history, embodying themes of life, purity, power, and transformation. Artists have long captured its symbolic and physical properties, from Hokusai's "The Great Wave", which portrays the might of nature, to Monet's "Water Lilies", exploring light, reflection, and tranquility. In religious art, water symbolizes purification, as seen in baptismal scenes, or divine judgment, such as depictions of floods. As a medium, contemporary art installations have redefined how water is used, blending technology, interaction, and environmental themes. Works like Olafur Eliasson's "The Weather Project" envelop viewers in atmospheric mist and light, while Random International's "Rain Room" allows visitors to walk through controlled rain, emphasizing humanity's complex relationship with natural forces. These modern creations highlight water's timeless duality as a force of beauty and reflection, while also addressing pressing themes of sustainability and the fragility of ecosystems.

"The Great Wave off Kanagawa" by Katsushika Hokusai



"Installation with Water" by Olafur Eliasson





"Water Lilies" by Claude Monet



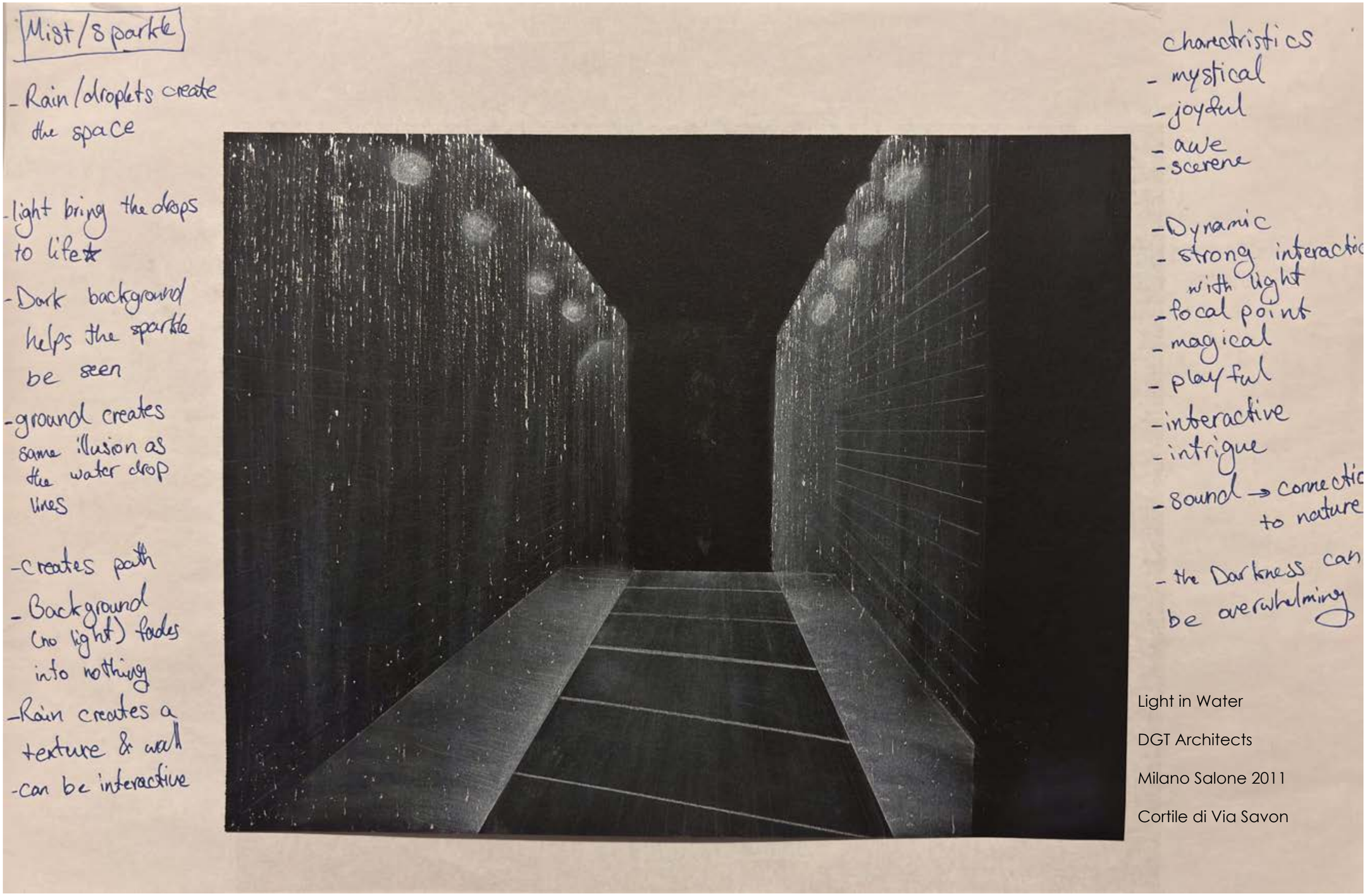
"Rain Room" by Random International



Research

To better understand the three core elements (water, light, and space) several research methods were utilized. Initially, selected architectural and art installations that evoke specific atmospheres were sketched to better understand the details. The qualities contributing to these atmospheres were analyzed.
Following this, the thesis colloquium provided an opportunity to examine the emotional responses of others to various water-related projects. These projects were further explored to understand the factors that triggered such reactions.
In the next phase, four distinct states or qualities of water were chosen for deeper investigation. This involved studying water characteristics and conducting experiments.
Through these learnings, I began designing a sequence that engages the sensory stimulation of these elements. The project, expressed through sketches, renderings, postproduction, and models, illustrates the complex interaction of water, light, and space.

Light in Water



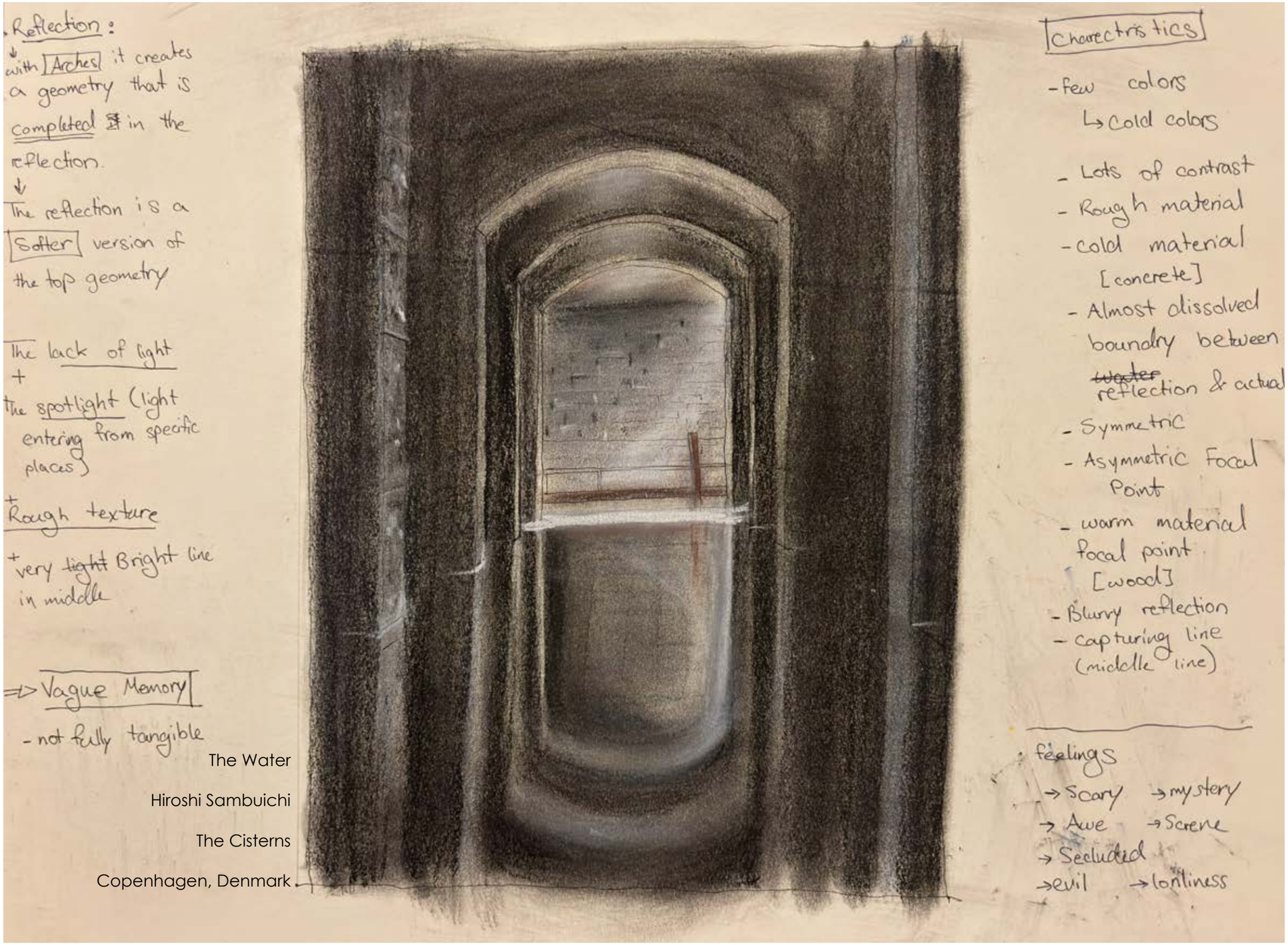
Light in Water

DGT Architects

Milano Salone 2011

Cortile di Via Savon

The Water



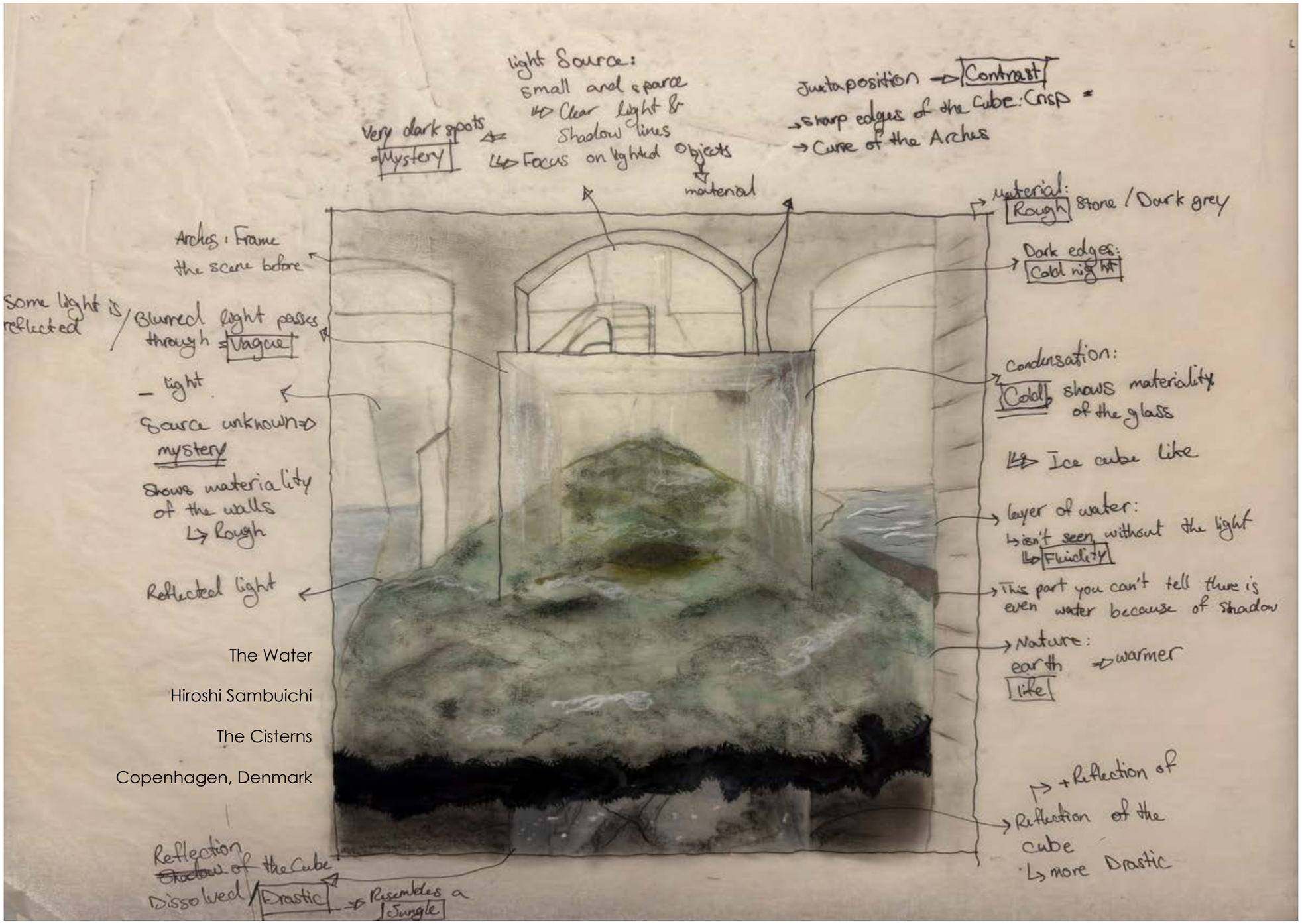
The Water

Hiroshi Sambuichi

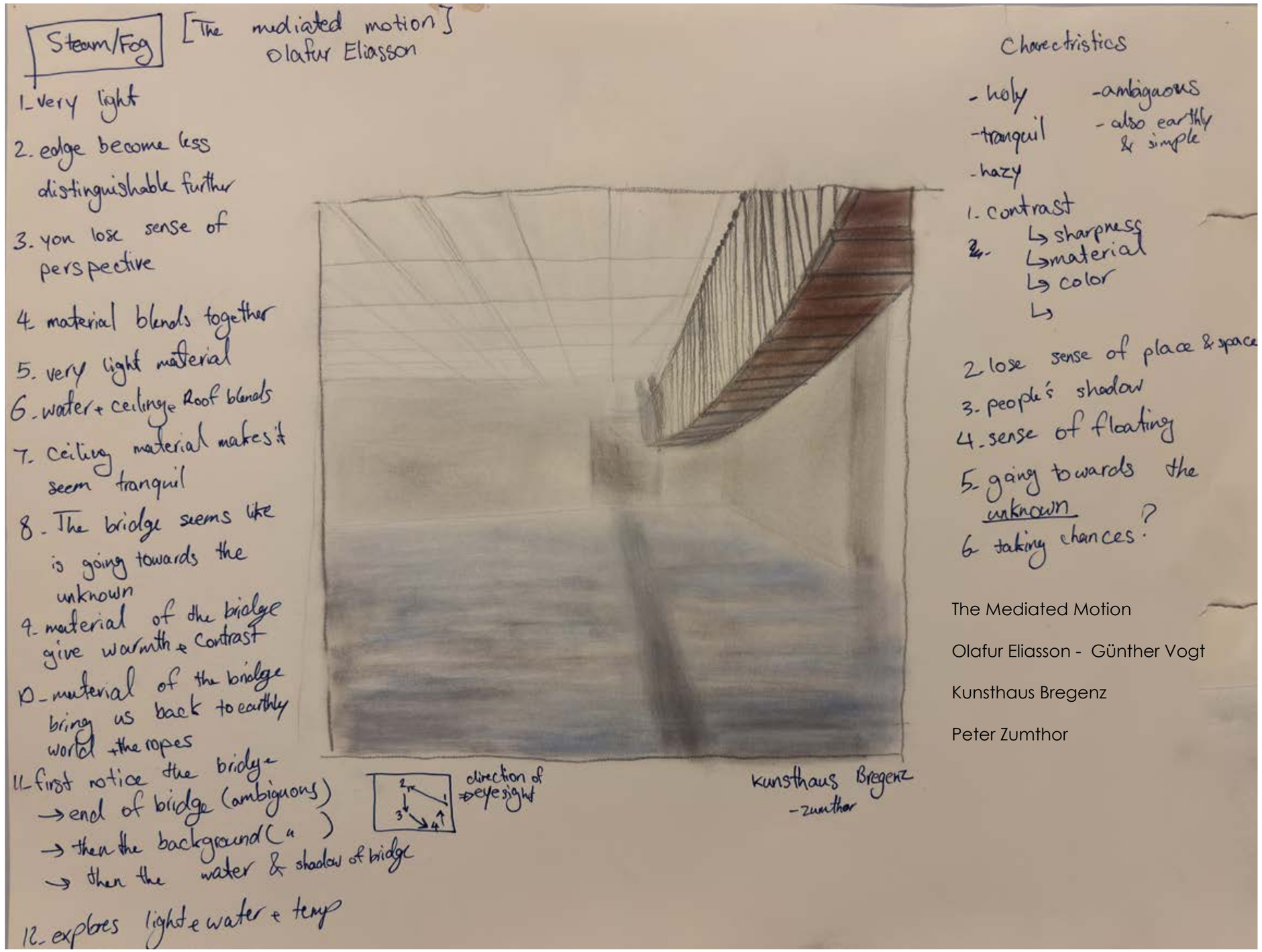
The Cisterns

Copenhagen, Denmark

The Water


light Source:
small and sparce
Clear light &
Shadow lines
Focus on lighted objects
material
Very dark spots
=Mystery
Juxtaposition → Contrast
→ sharp edges of the cube: Crisp
→ Curve of the Arches
Material:
Rough stone / Dark grey
Arches : Frame
the scene before
Dark edges:
Cold night
some light is reflected
Blurred light passes through
=Vague
light
Source unknown=>
mystery
Shows materiality
of the walls
Rough
Condensation:
Cold shows materiality
of the glass
Ice cube like
layer of water:
isn't seen without the light
Fluidity
Reflected light
This part you can't tell there is
even water because of Shadow
Nature:
earth
warmer
life
The Water
Hiroshi Sambuichi
The Cisterns
Copenhagen, Denmark
+Reflection of
Reflection of the
cube
more Drastic
Reflection
of the Cube
Dissolved
Drastic
Resembles a
Jungle

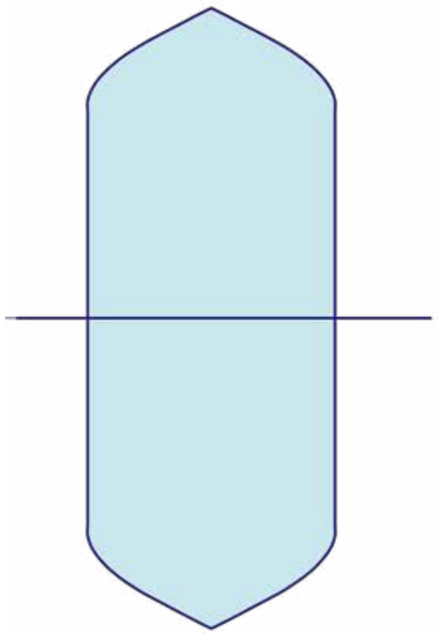
The Mediated Motion



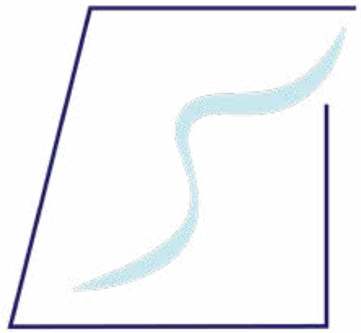
Water Medium

Four distinct qualities or states of water were selected as the medium for design.

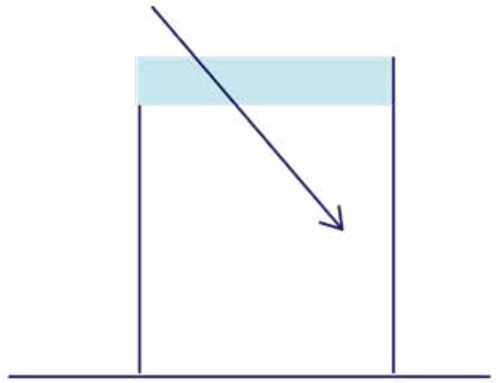
Reflection



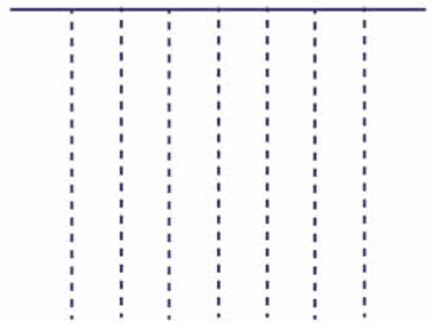
Fog



Caustics



Mist



Site

Stonebridge Dr

Whistler

Canada

Altitude: 2770’

The site was chosen to further celebrate water, as it is located in an area known for its frequent rain and dense fog.



Topography





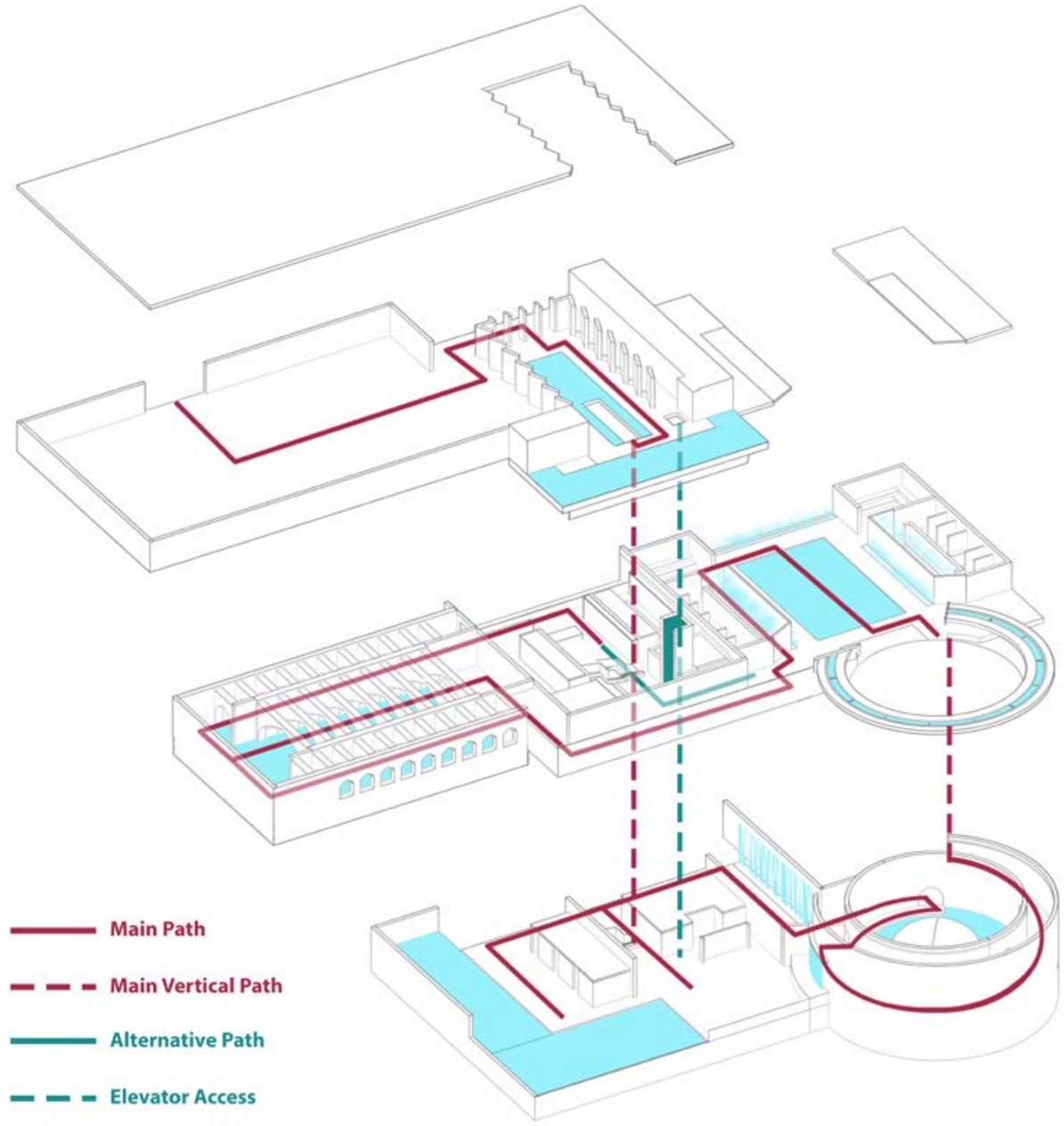
Alta Lake

Location


site
NESTERS
BLACKCOMB
ALTA LAKE
WHISTLER CREEK
TAMARISK
SPROATT

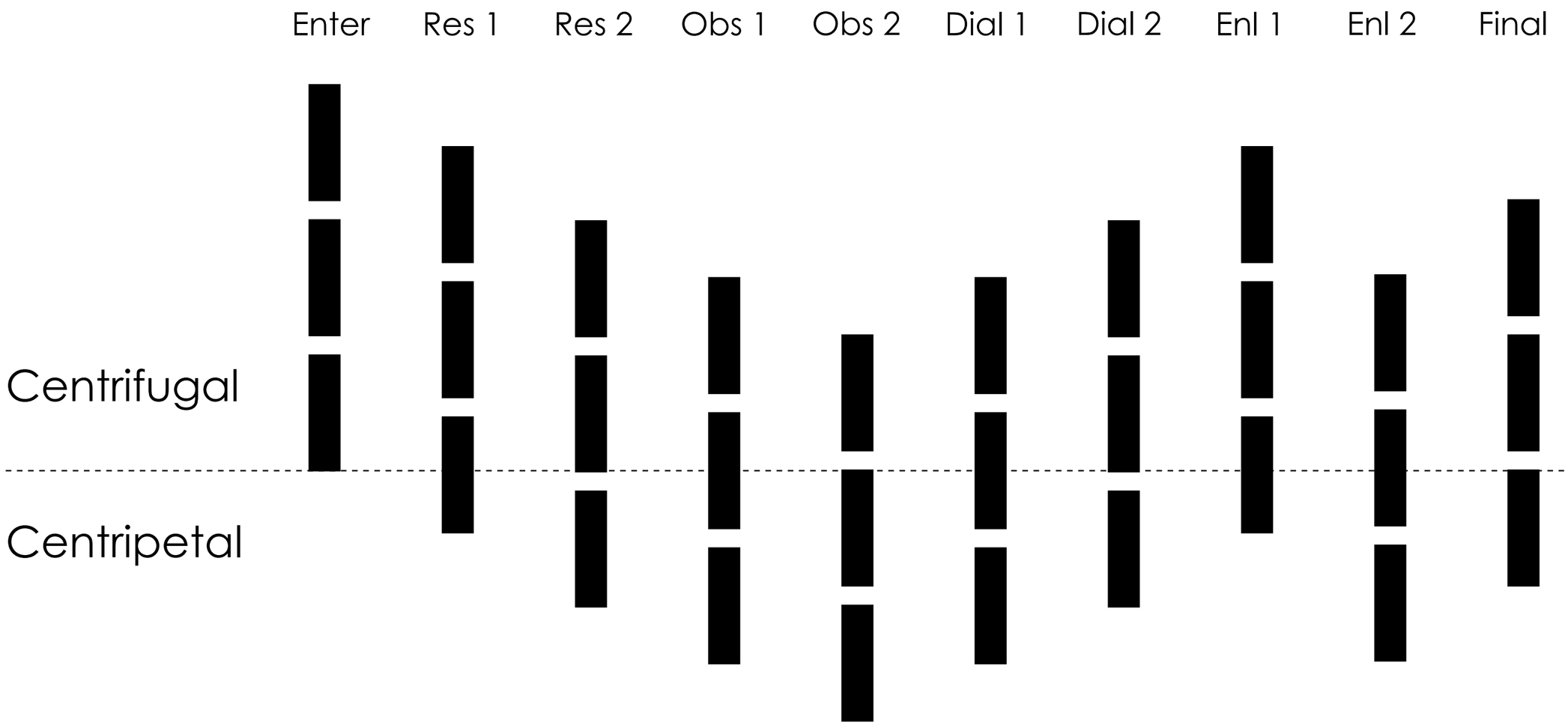
Composition

Choreography plays a key role in this design, guiding visitors through a carefully curated journey; however, alternative paths are thoughtfully integrated, offering flexibility and inviting exploration.
The journey begins with a gradual transition from the outside to the inside, setting the stage for the main sequences of the four chosen water mediums. Each phase unfolds with a gentle introduction to the medium, engaging a variety of senses. **Visually** through light and form, **aurally** through sounds of water and movement, and **tactilely** through textures and surfaces. **Thermoception** is stimulated by shifts in temperature from mist and steam, while **proprioception** and the **vestibular** sense are activated as visitors navigate transitions, feel subtle changes in air pressure, and move through varying spatial configurations. These sensory experiences build toward the grand utilization of each medium, offering a fully immersive journey.



Choreography

This journey is a dynamic interplay of centrifugal and centripetal experiences, unfolding as a choreography that modulates both self-awareness and awareness of the surrounding environment.

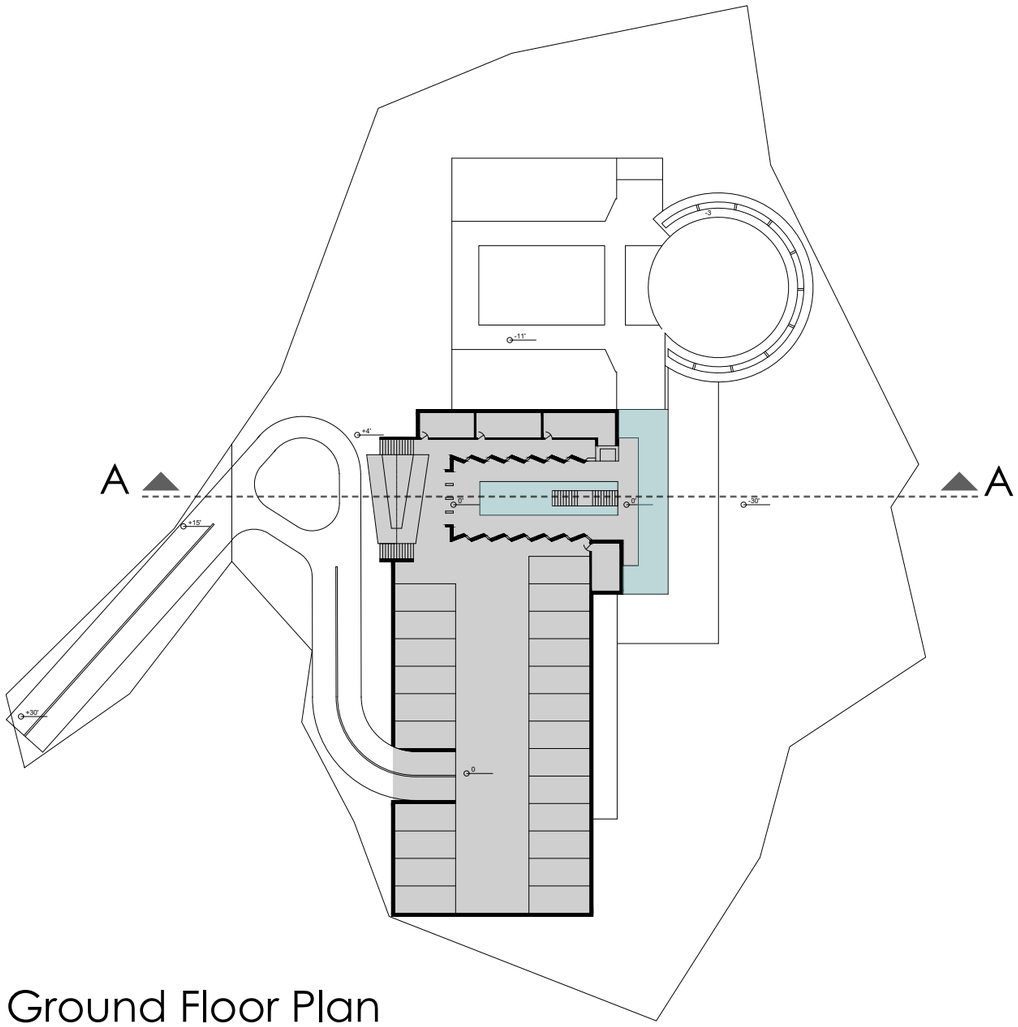


Entrance

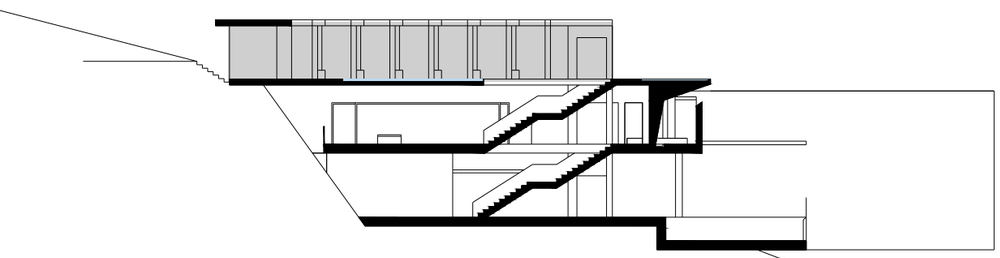
The journey begins with a celebration of the surrounding environment, where water mirrors the natural landscape. It then transitions into the intermediary space, where the connection to nature continues through a raw, untouched mountain wall, creating a seamless flow from the external world to the internal space.



Entrance Phase

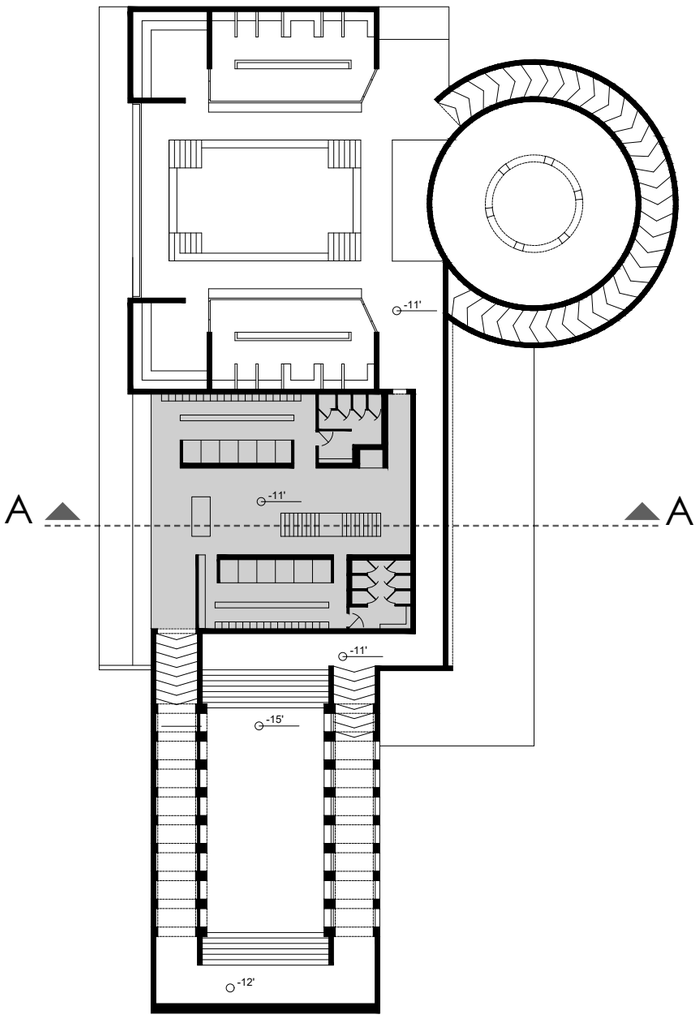


Ground Floor Plan



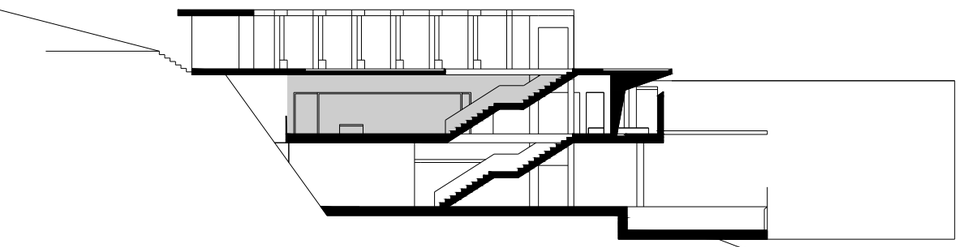
Section A-A



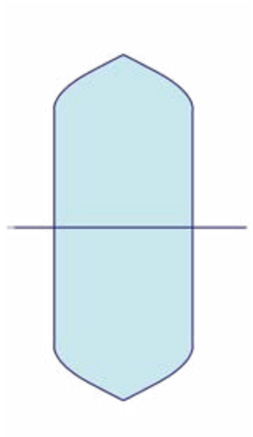


-1 Floor Plan





Section A-A



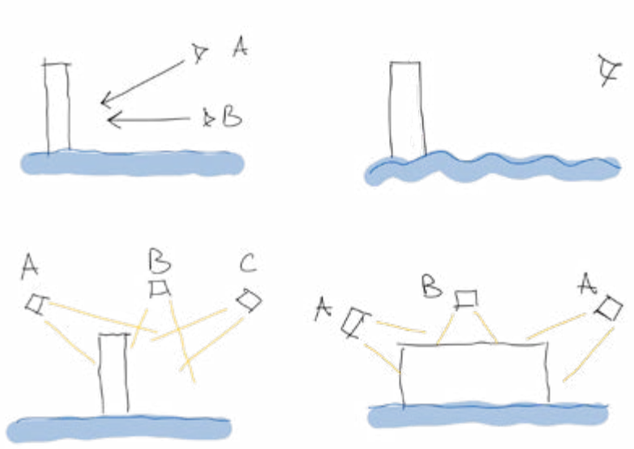
Resonance

This phase uses water reflections as a resonating medium, subtly echoing the surrounding environment while softening its perception.



Lighting condition

Diffused light on the geometry with dark underwater material make a seamless connection with the reflection.





Diffused light on geometry



Light on water



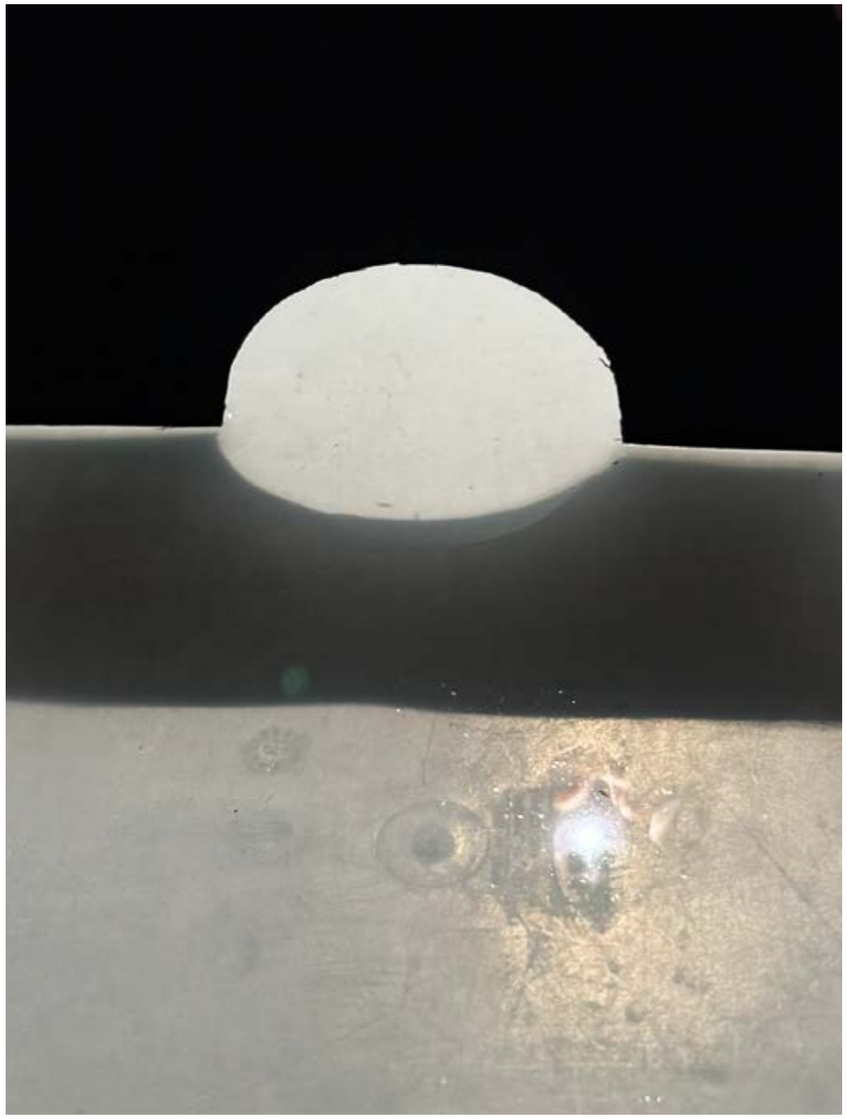
Direct light on geometry

Angles

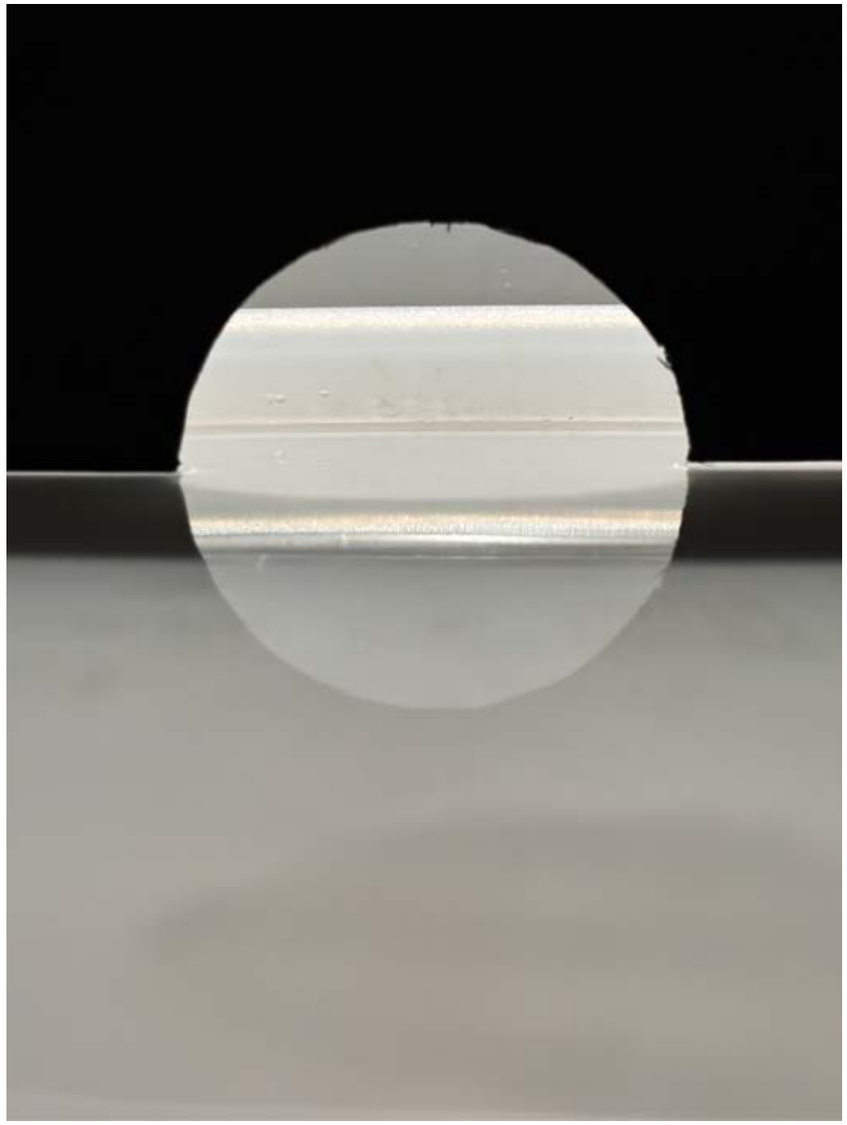
The incident angle of water surface and wall openings can be played with to make various geometries with their reflection.

Best Conditions

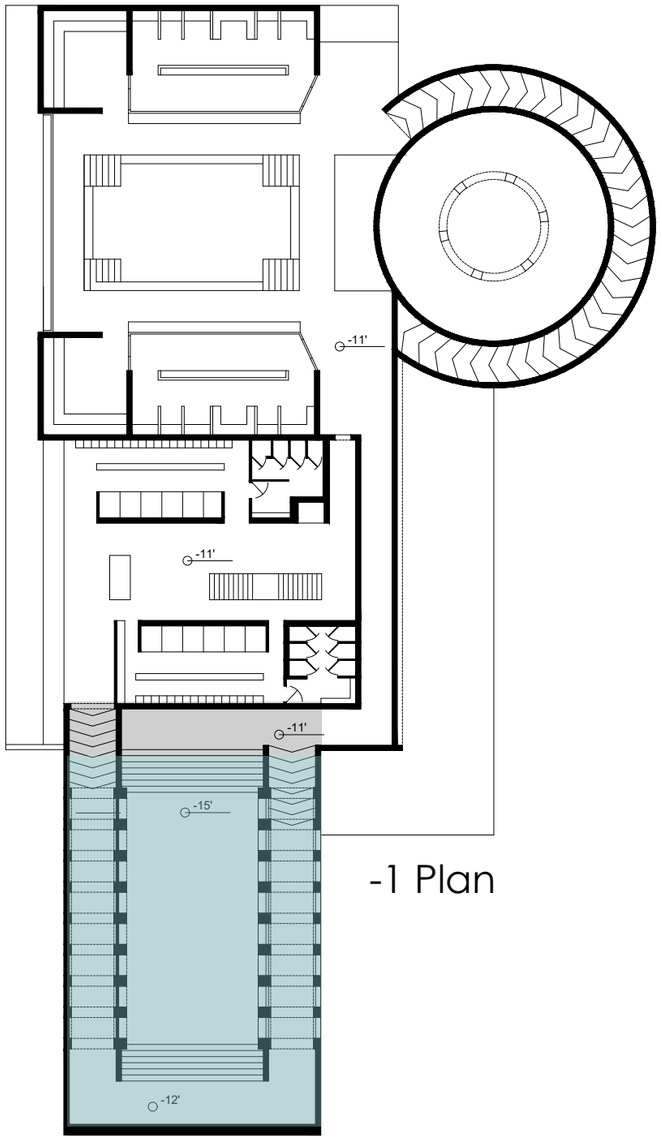
Low view angle
Dark material below water
Complex geometry
Diffused light on geometry



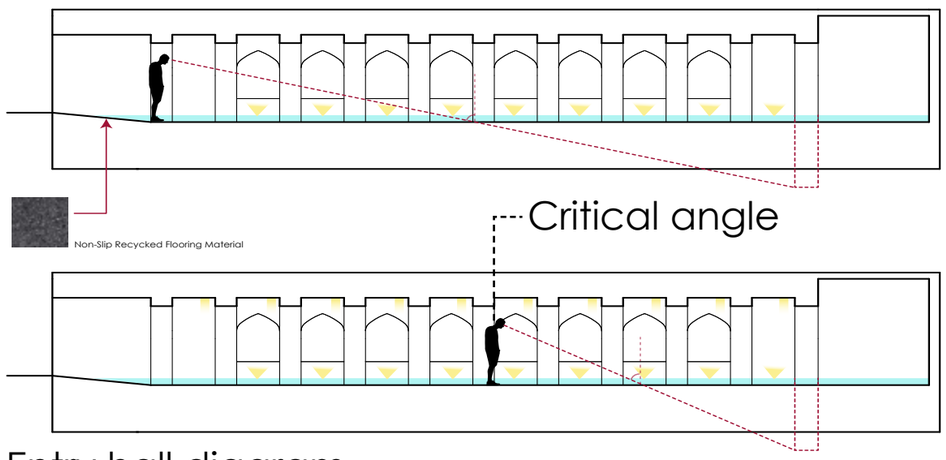
Angled geometry



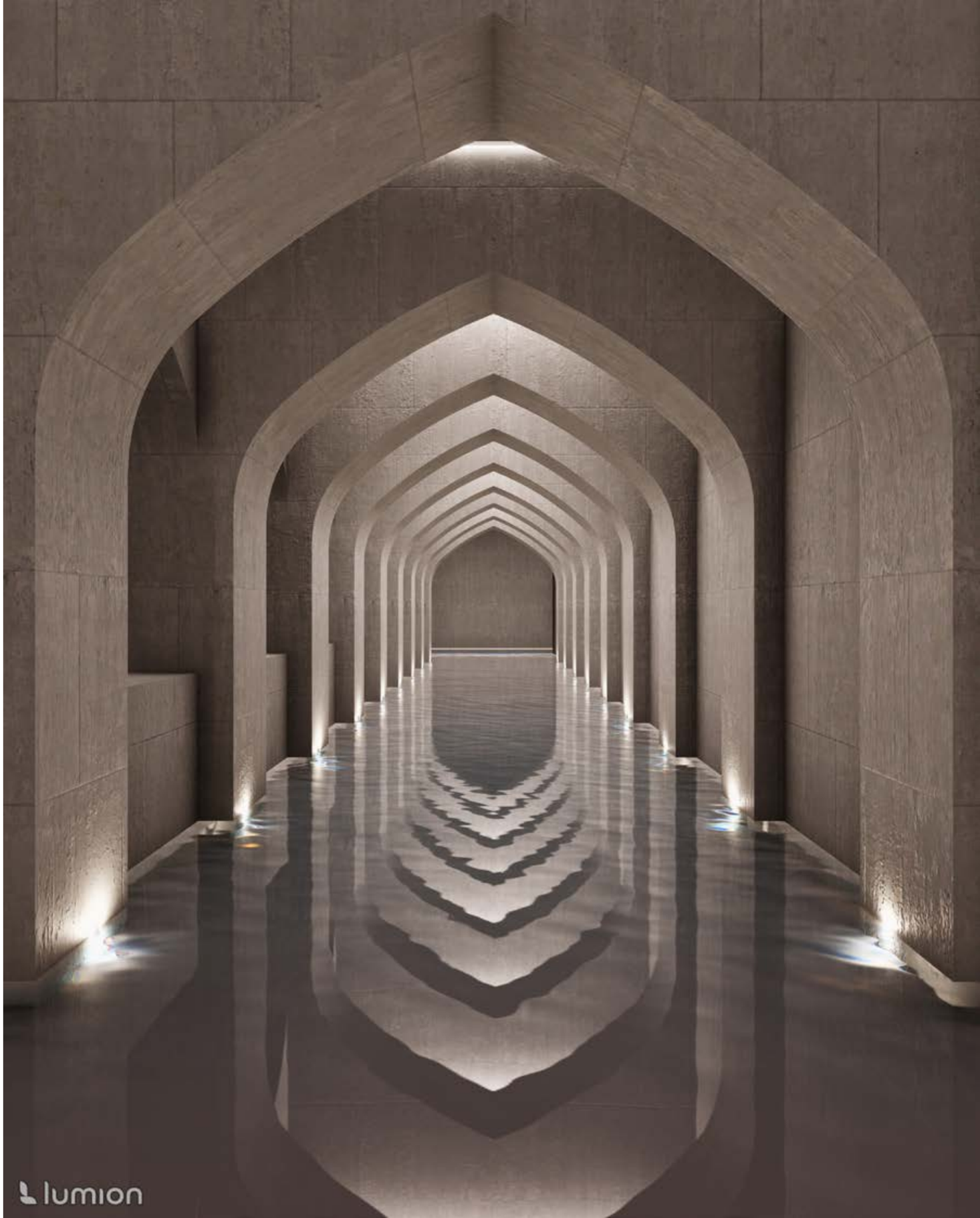
Perpendicular geometry

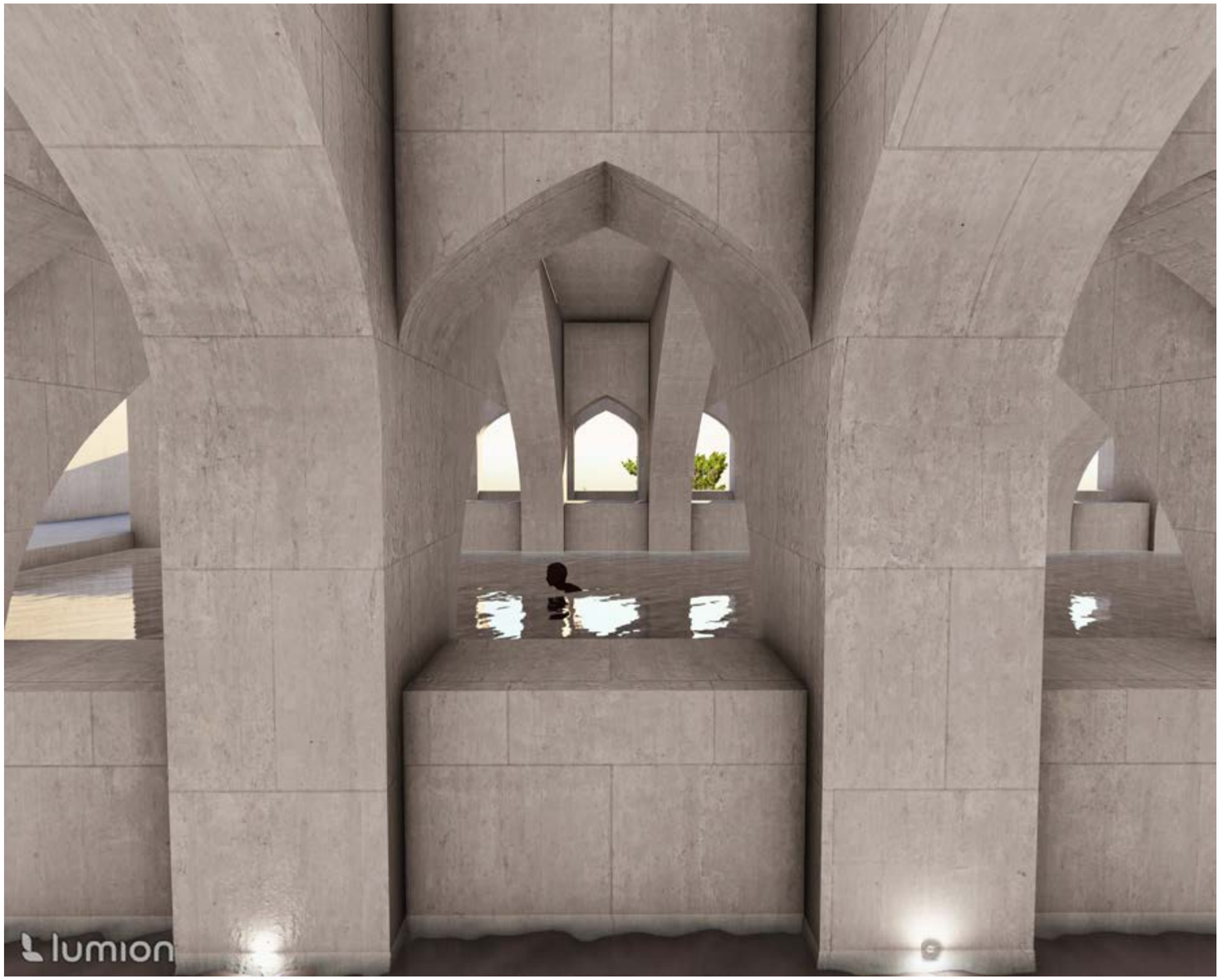


-1 Plan

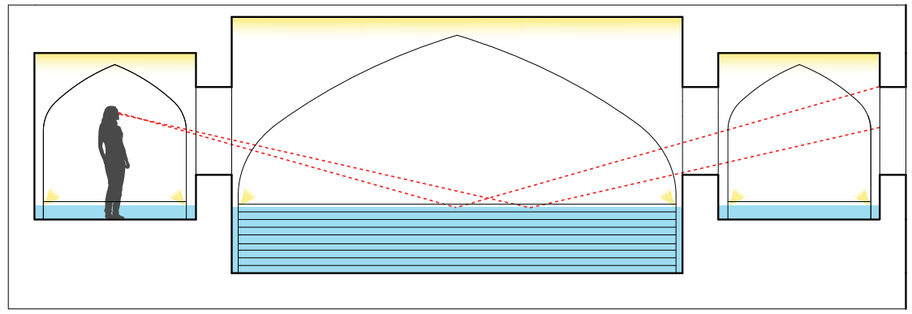


Entry hall diagram





Hall window view



Hall window diagram



Sketch Experiment



Obscurity

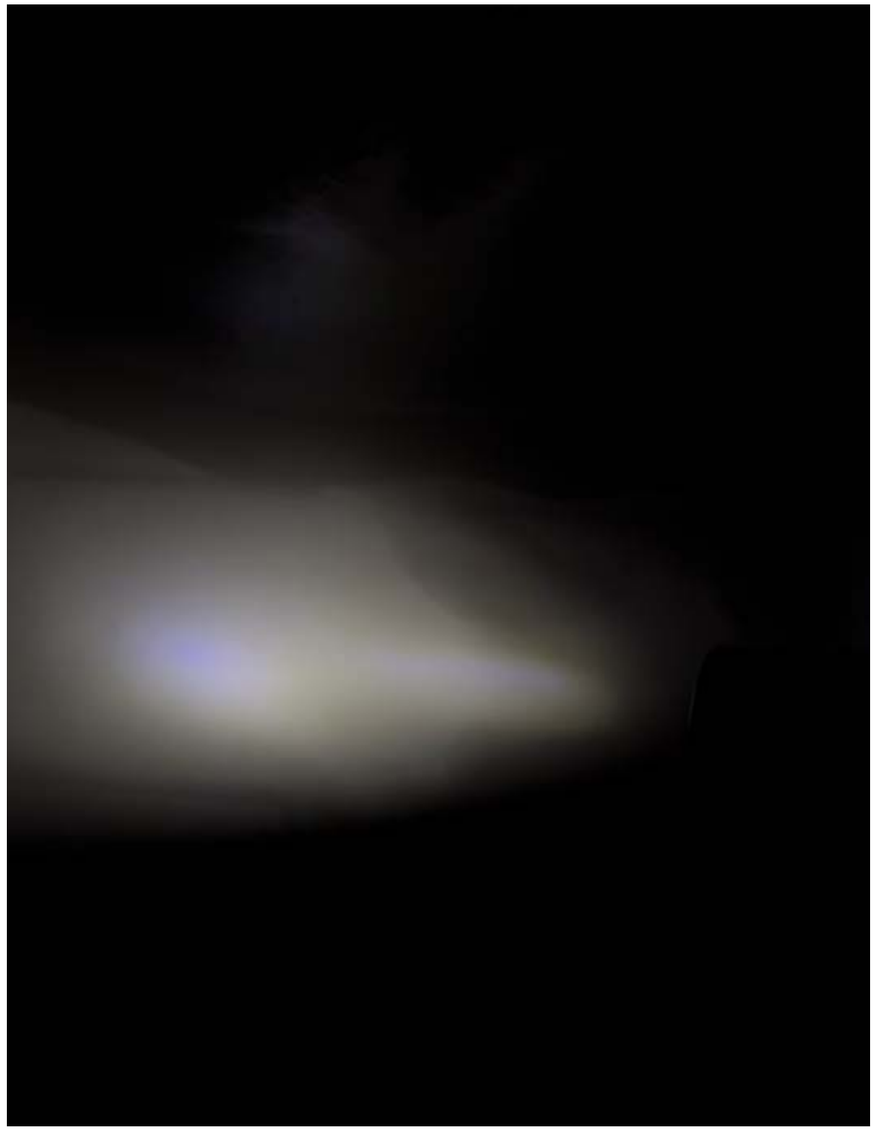
This phase utilizes fog and steam to visually obscure the surroundings, intensifying your other senses and fostering a deeper awareness of yourself.

Density

Thicker fog disperses the light more however thin fog makes the path of light visible.



Thick Fog



Thin Fog

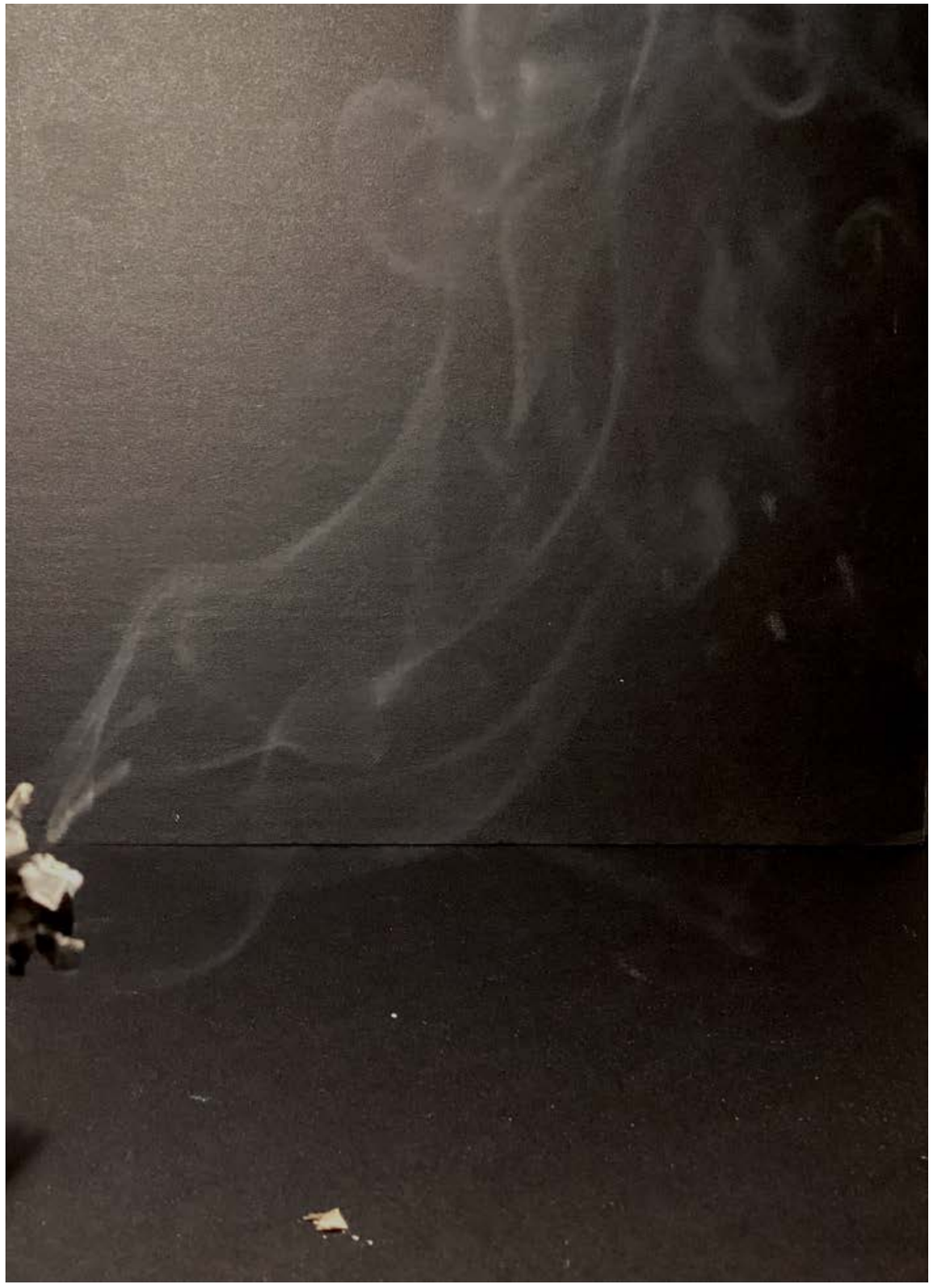
Qualities

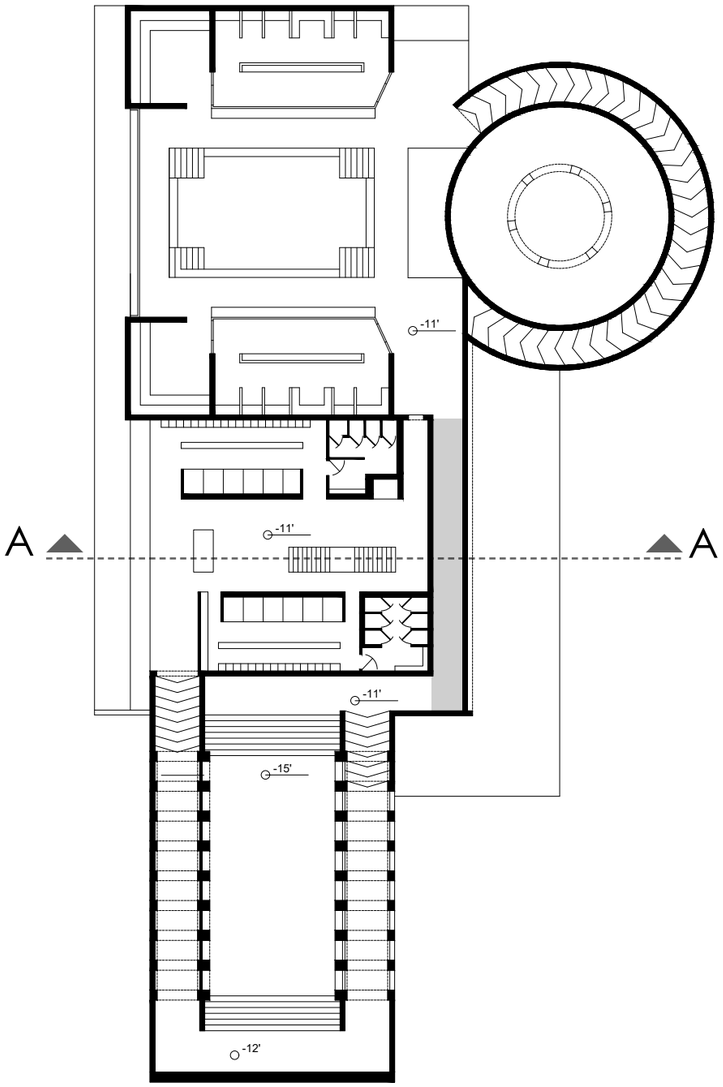
Balanced air movement creates beautiful fog path
Denser fog blurs our vision and the beyond

Softened edges

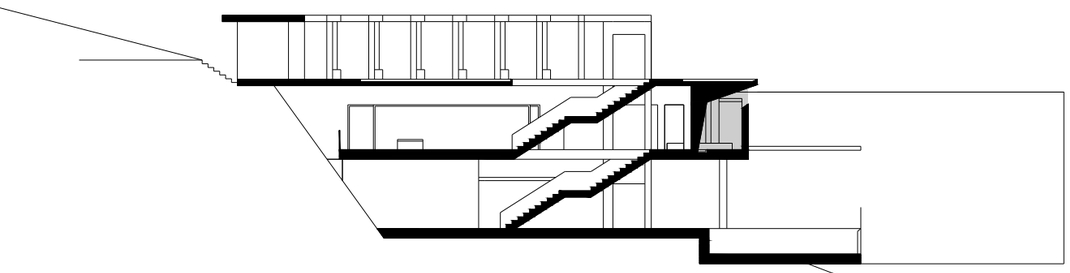


Movement





-1 Floor Plan



Section A-A

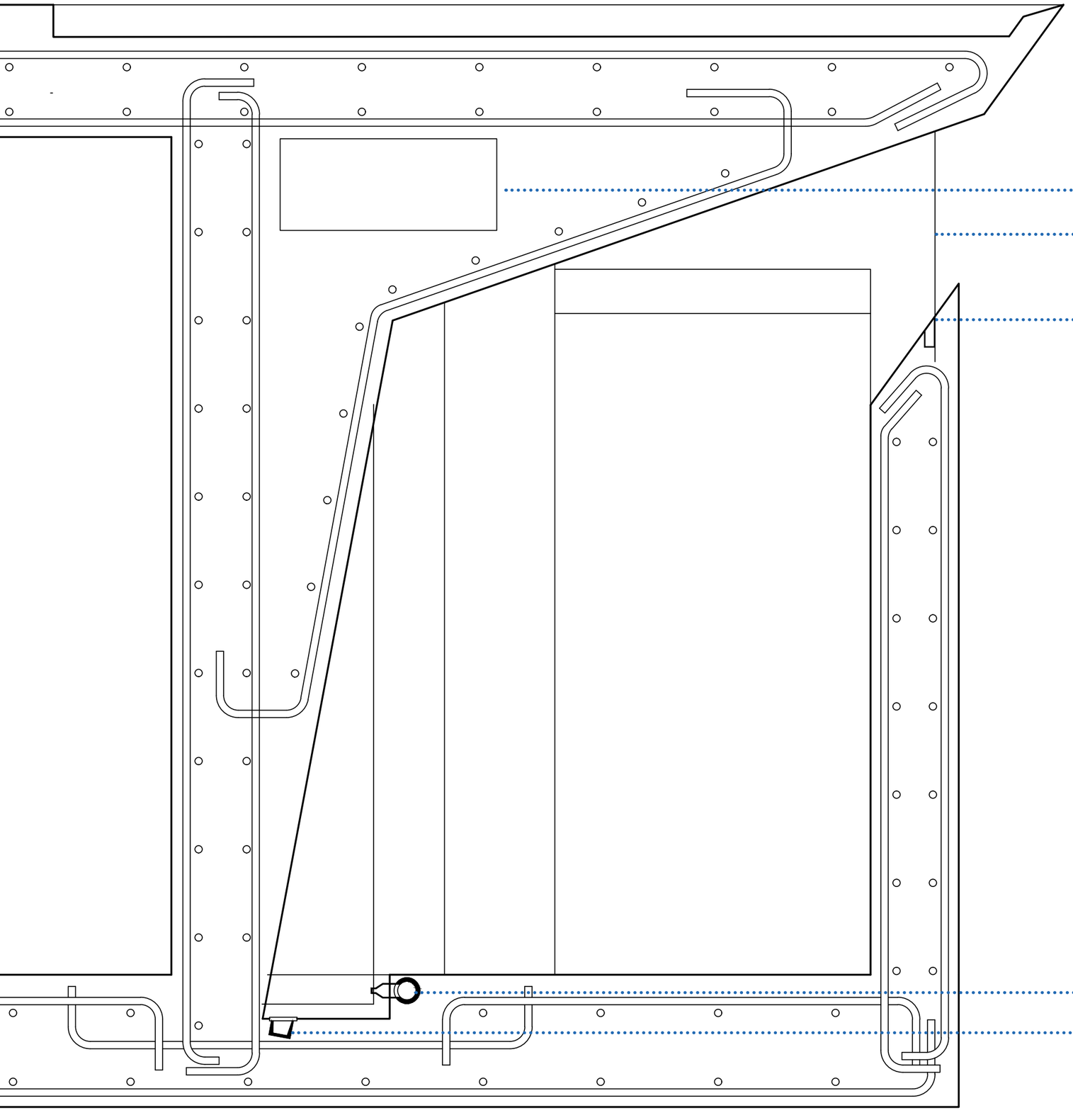


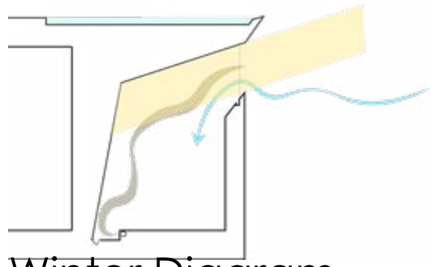
Transition hall view



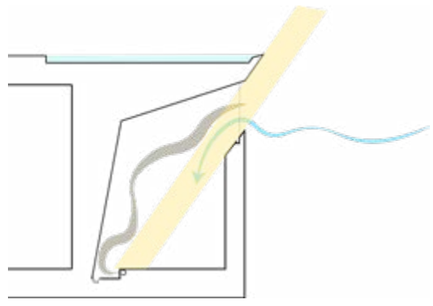
Sketch experiment

Construction Section

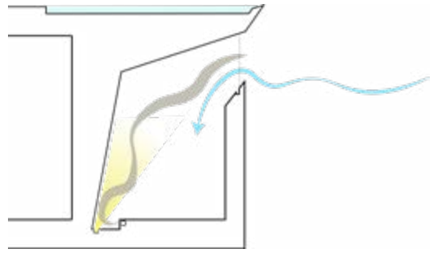




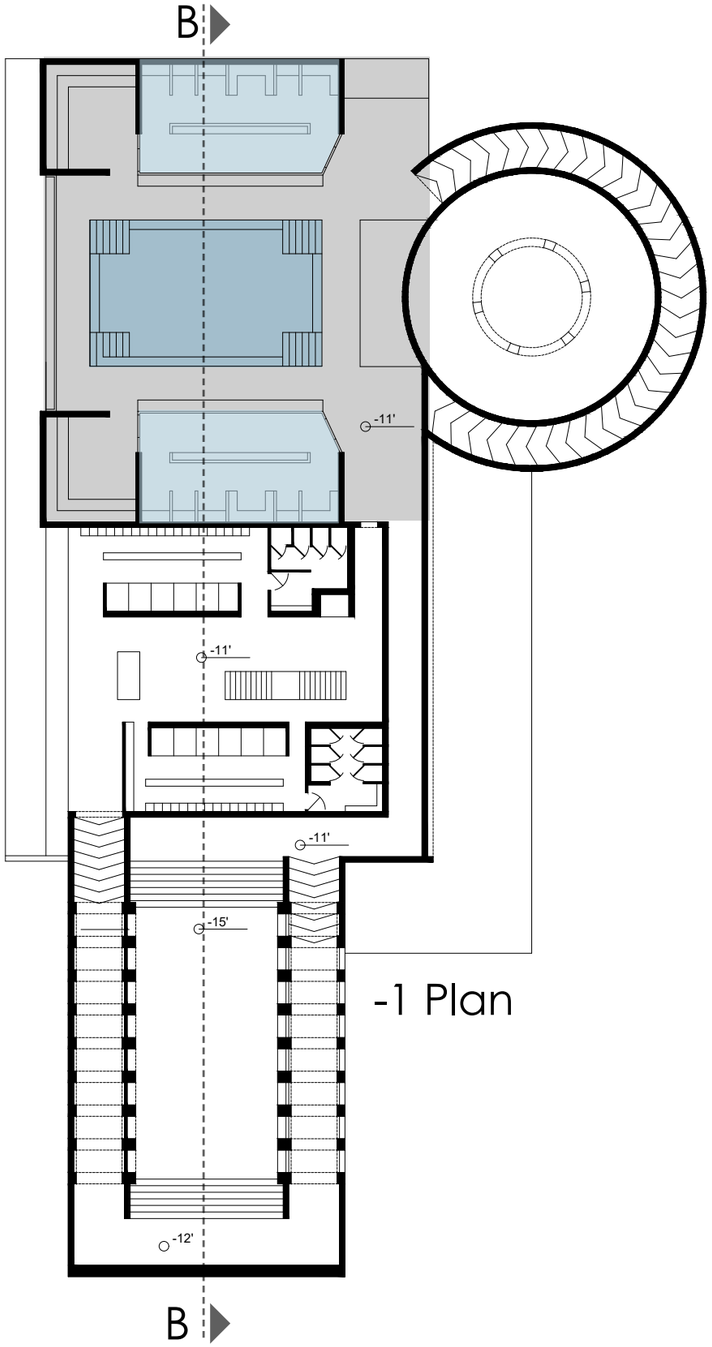
Winter Diagram



Summer Diagram



Night Diagram



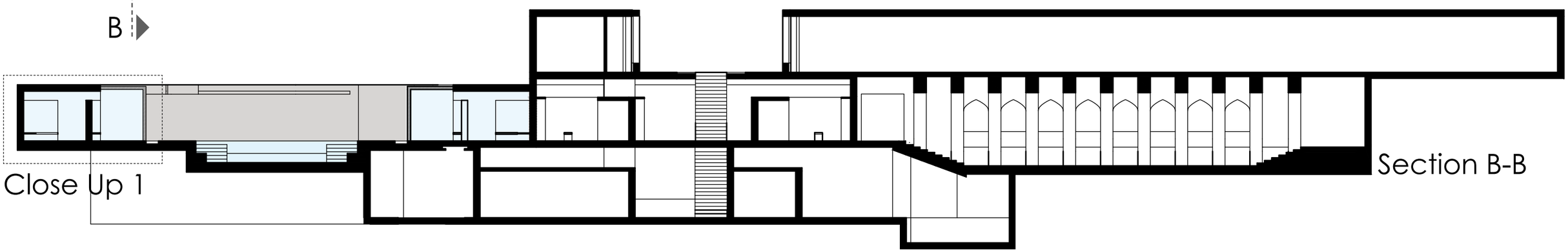
-1 Plan



Main hall view

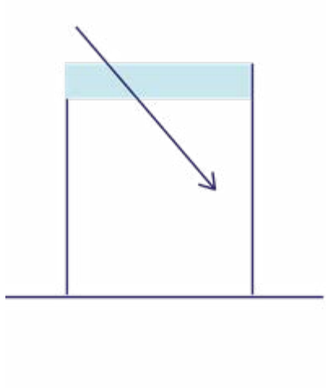


Close Up 1 Diagram



Close Up 1

Section B-B



Dialogue

This phase harnesses caustic effects to establish a dynamic dialogue between the visitor and the environment, with the surrounding patterns shifting in response to the visitor's movements.



Background color

Dark background doesn't show caustics as much as light background



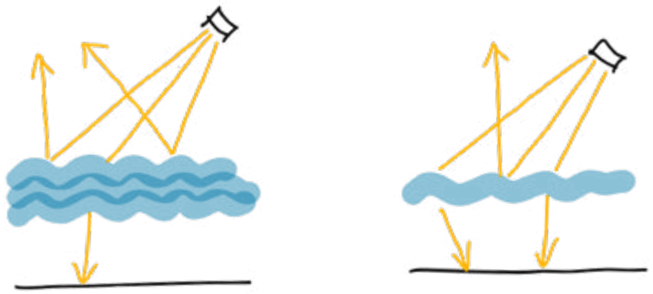


Dark background

Light background

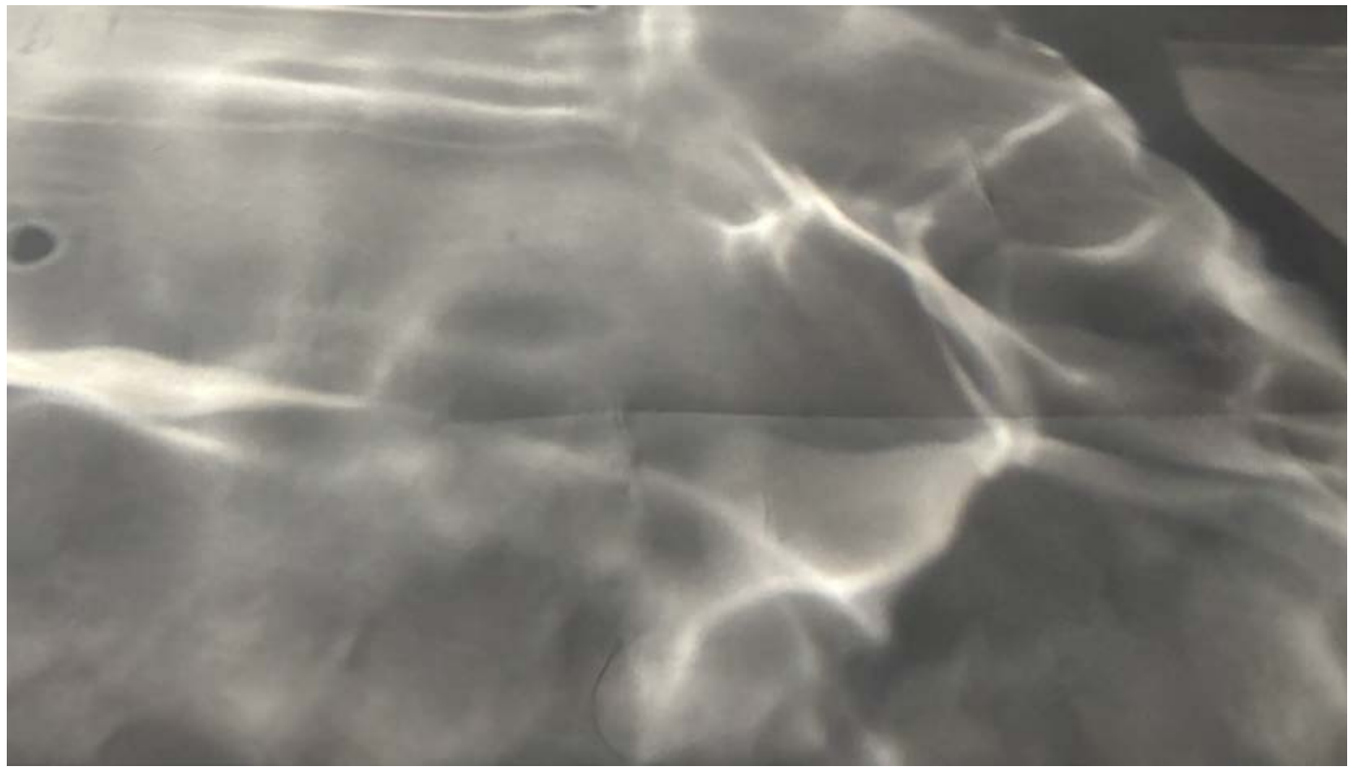
Light through water

Light through shallow pool of water has less dispersion and refraction hence making the caustics sharper.





Shallow water



Deep water

Angle of of displayed surface

A wall tilted towards the water surface captures and reflects the caustics more effectively than a perpendicular wall because it allows light to interact with the water at a more favorable angle, making the caustic patterns more defined and visible.



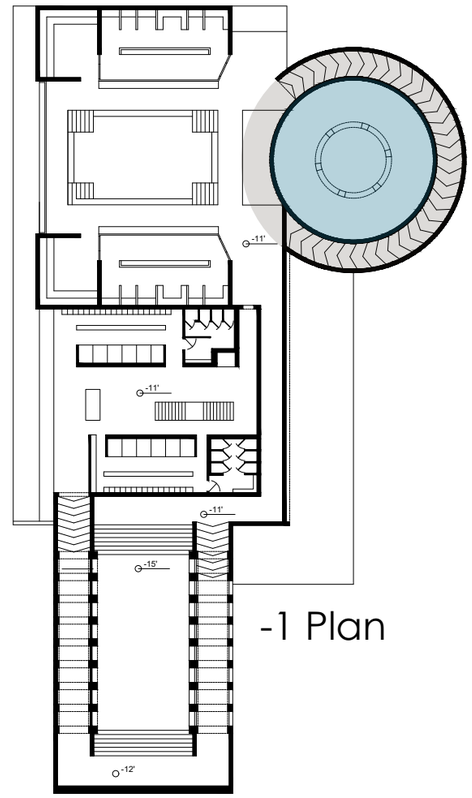
Wall prependicular to water surface



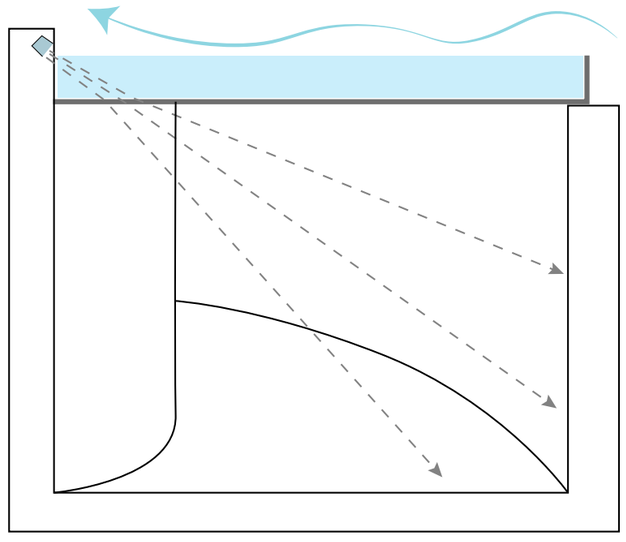
Wall tilted towards water surface



Hall View

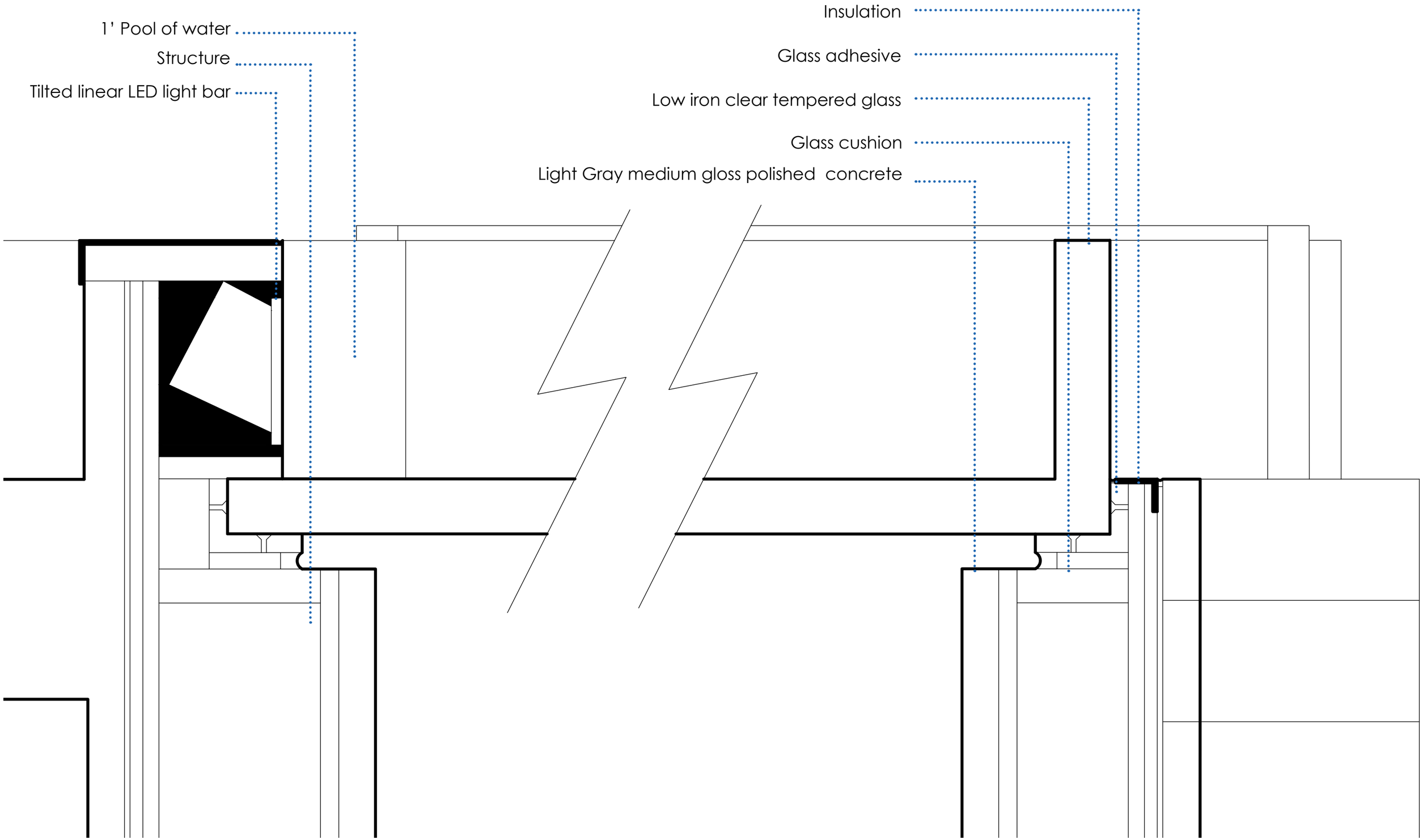


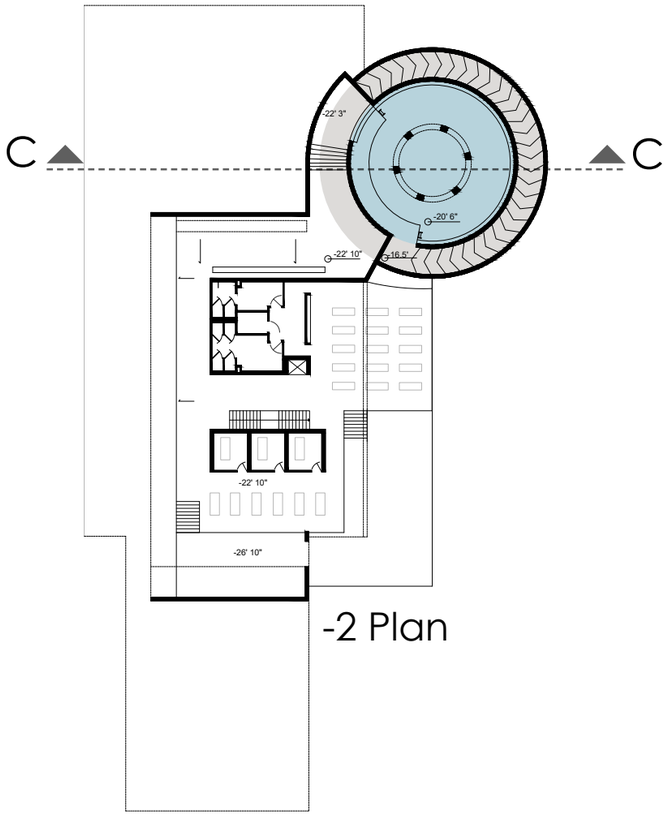
-1 Plan



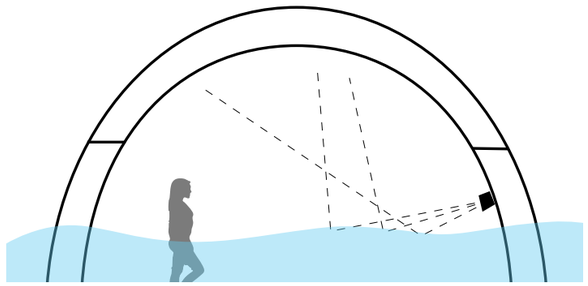
Hall night diagram

Construction Section



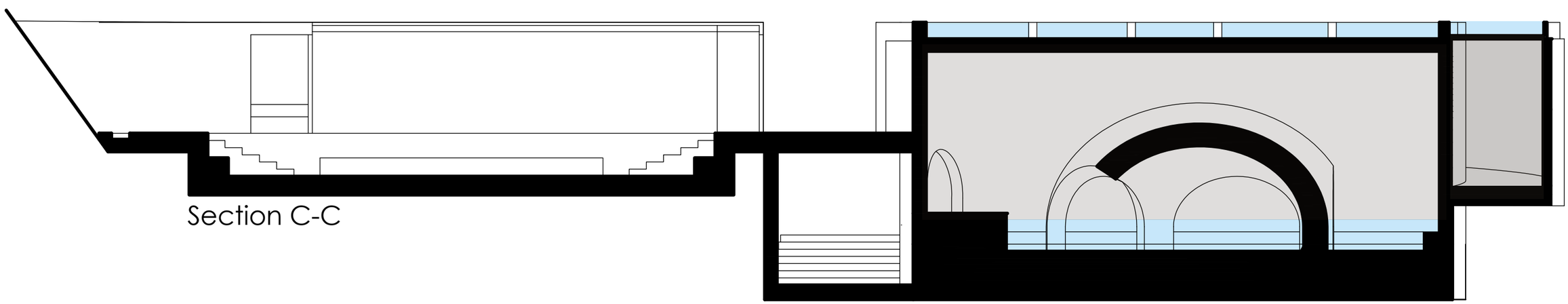


-2 Plan

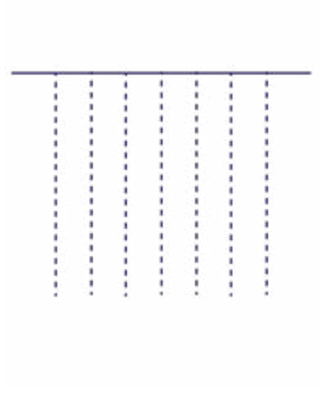


Dome Diagram



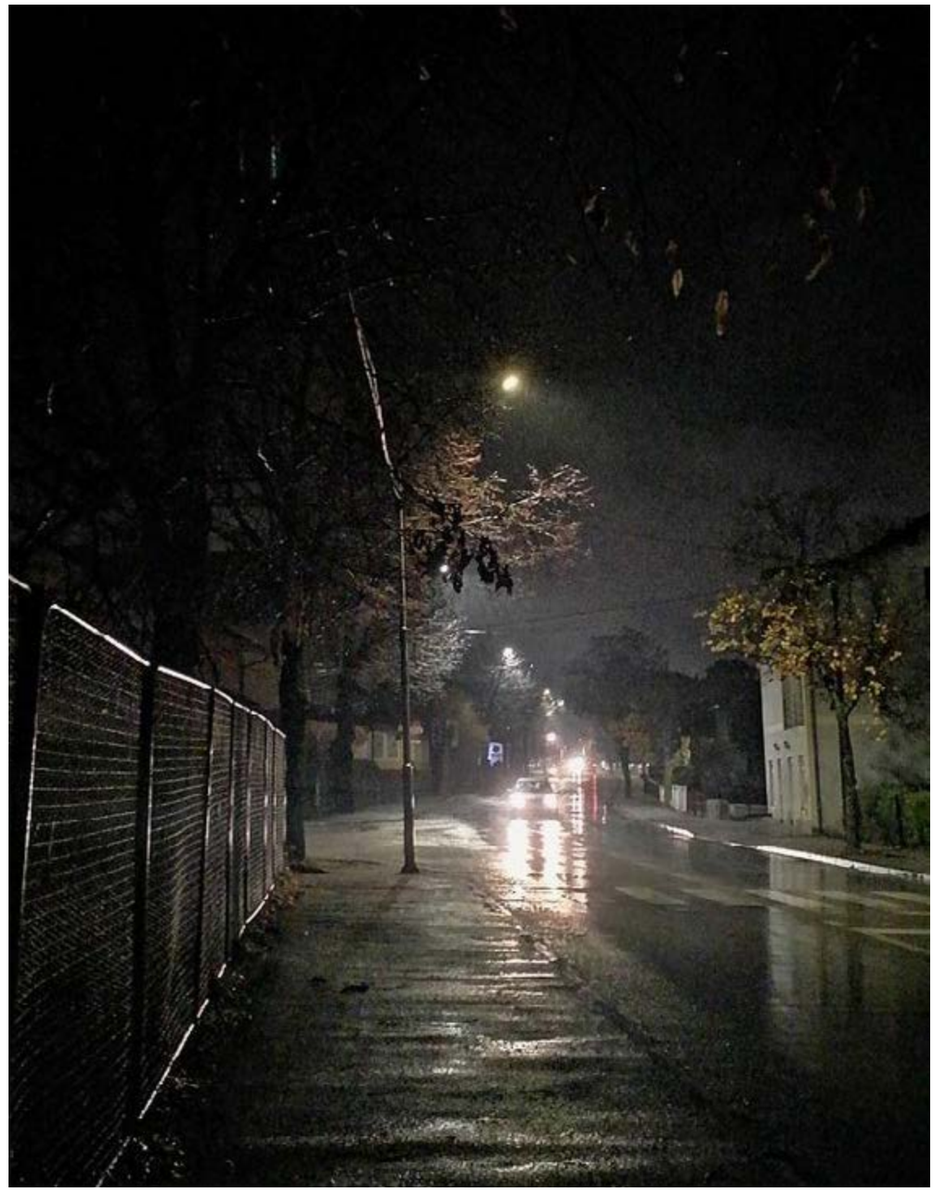


Section C-C



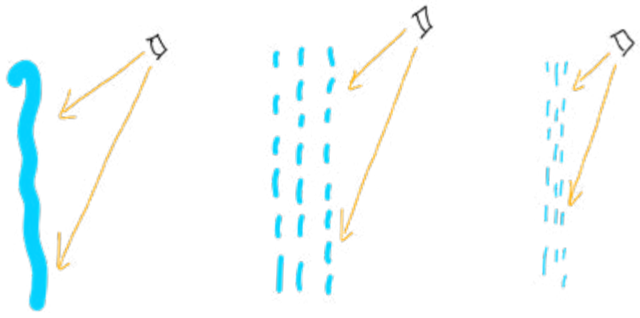
Illuminate

This phase employs mist to allow water to reveal light, shaping and defining the surrounding space.



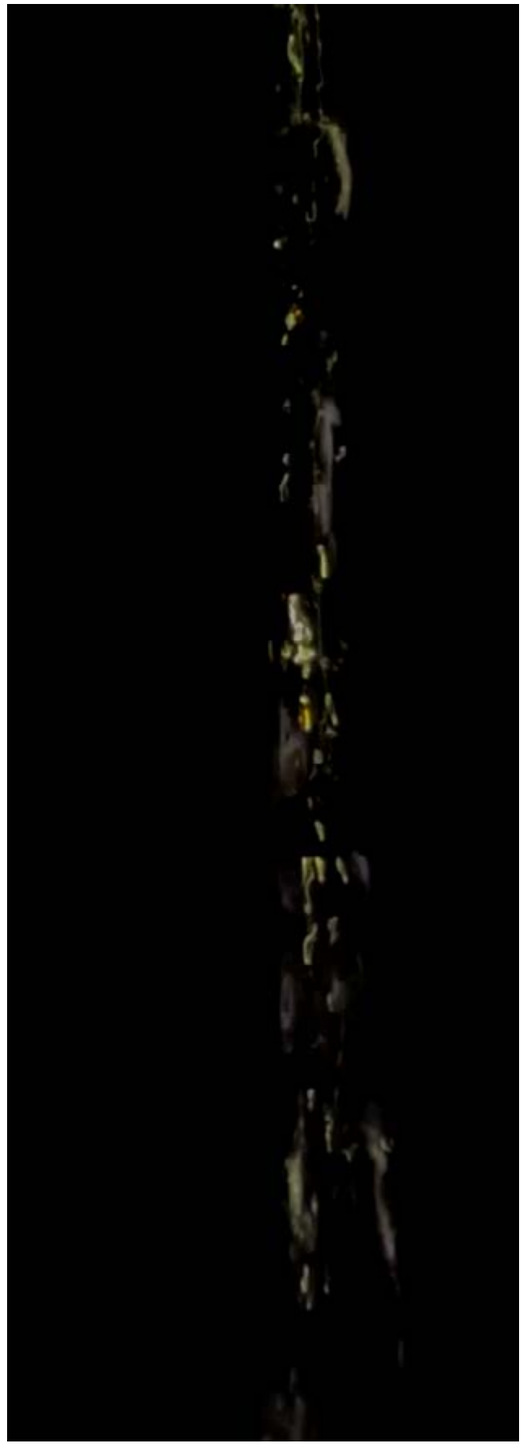
Droplet size

Smaller drops = better illumination

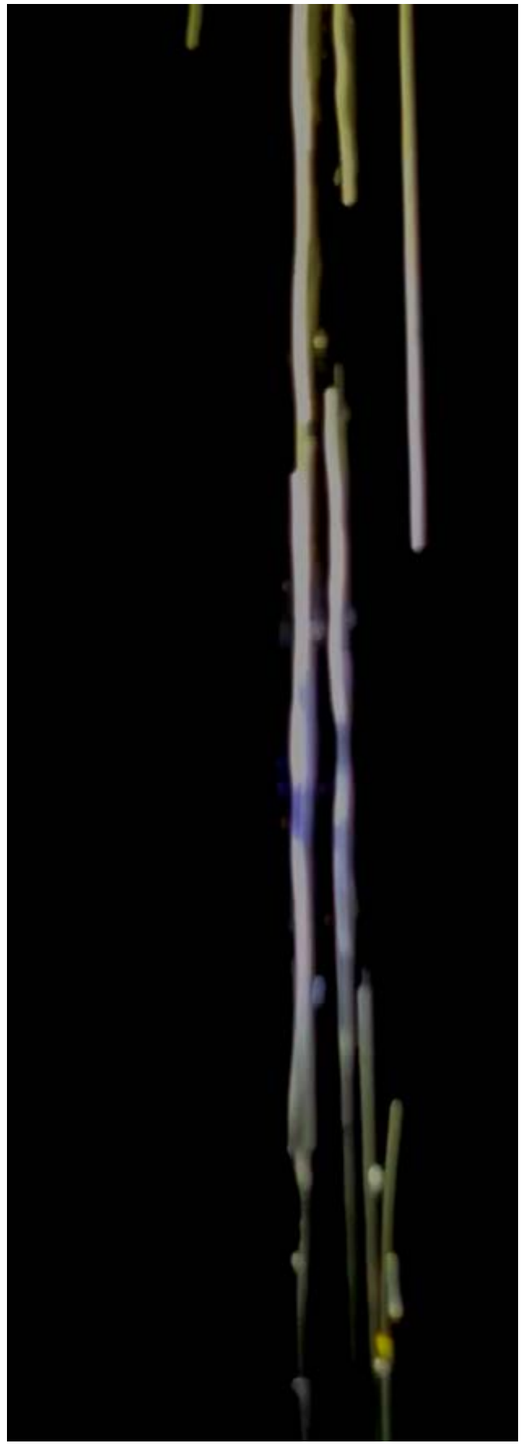




Flowing water



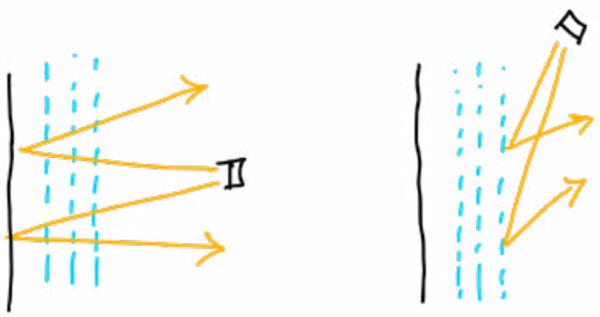
Water drops



Water droplets

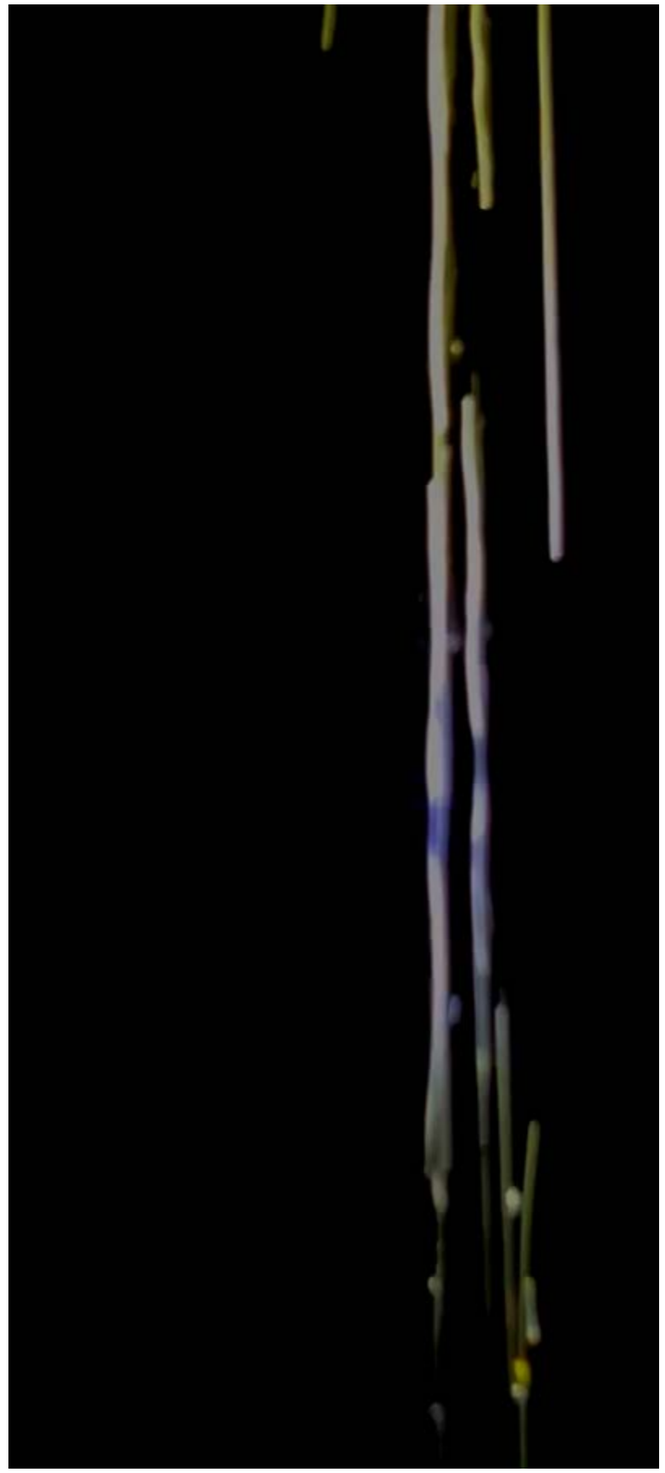
Angle of light

Angled light to the direction of flow is better than perpendicular light

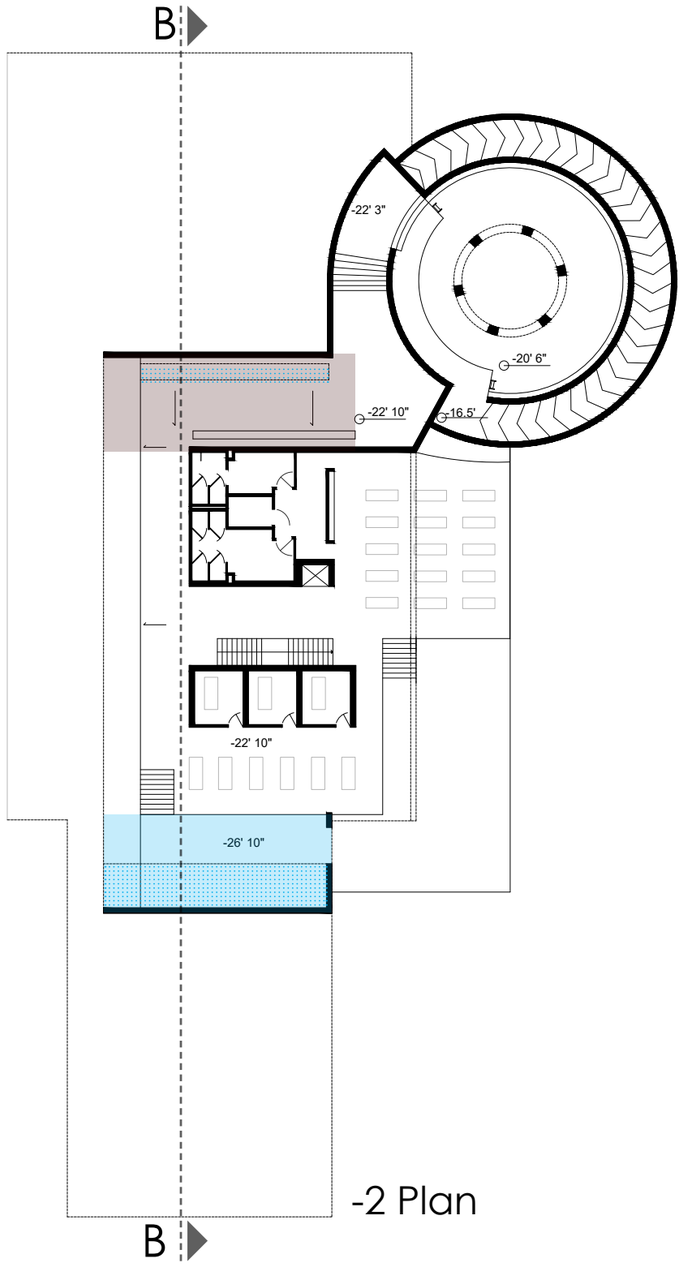




Light perpendicular to the flow of water



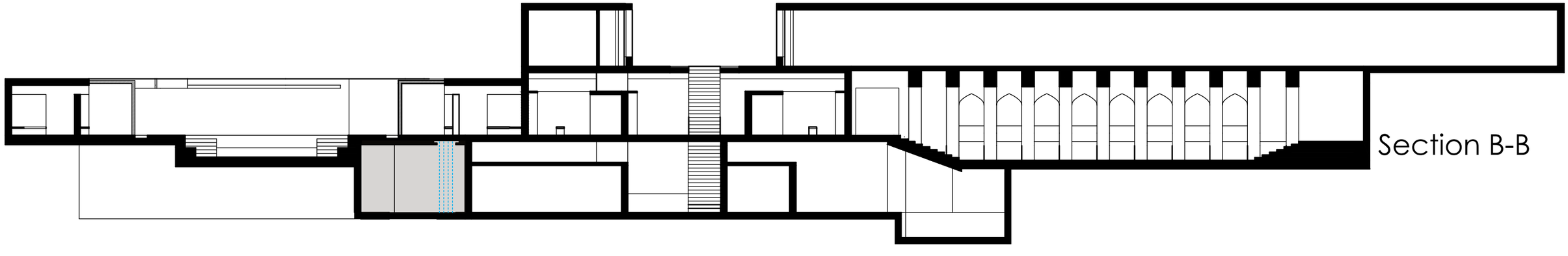
Light angled to the flow of water



-2 Plan

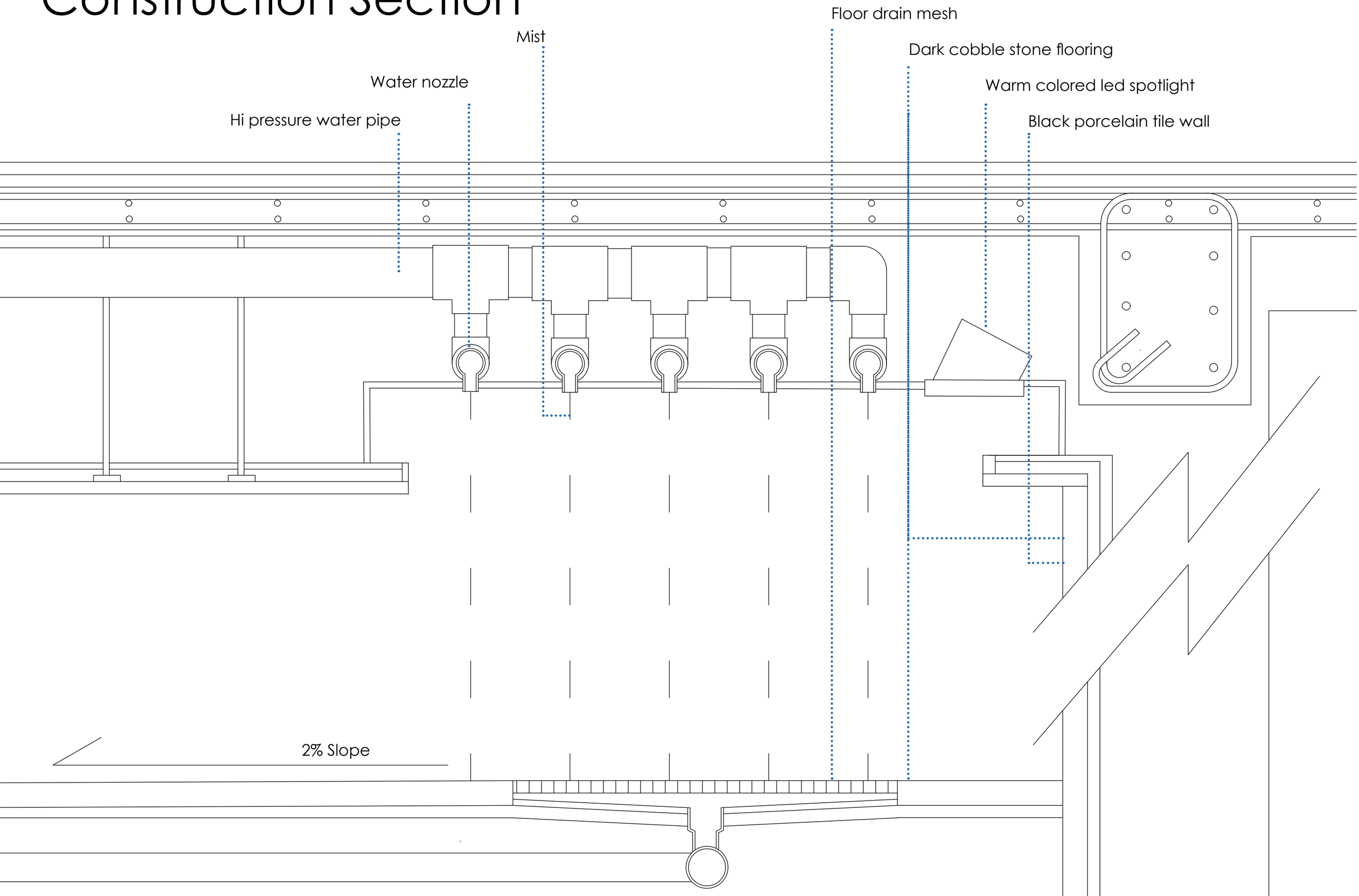


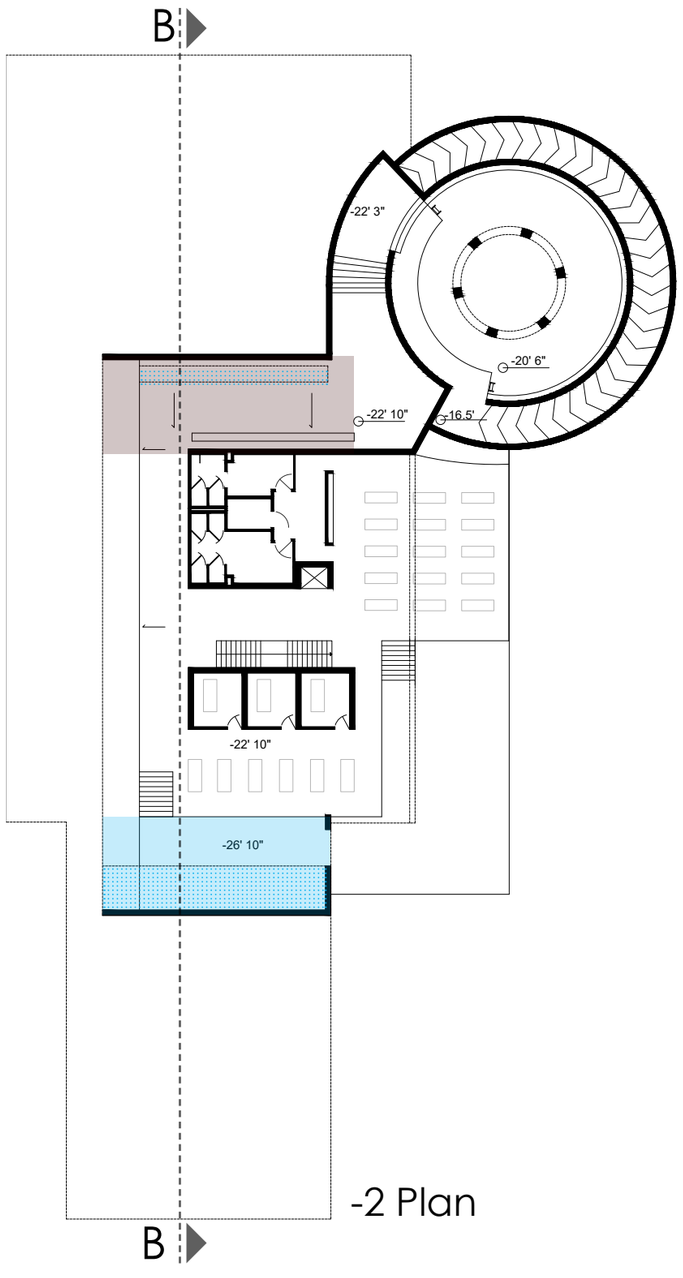
Hall View



Section B-B

Construction Section

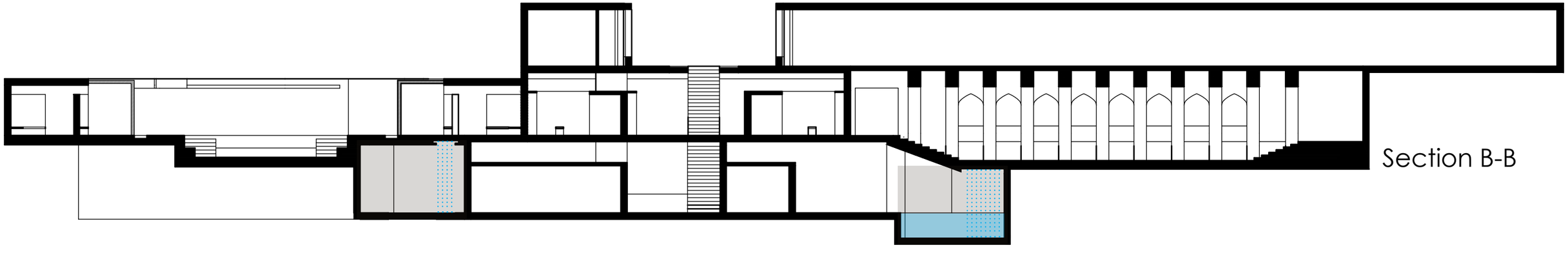




-2 Plan



Infinity pool view



Section B-B

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Conclusion

Through this thesis, I discovered that the interplay of water and light in architectural space can evoke deep emotional and sensory responses. However, I also learned that architecture is not solely defined by its spatial elements; it encompasses and integrates other existing elements, such as water, light, and natural surroundings, which contribute to the creation of space and the responses it generates. Each element, like water or light, has vast potential to be manipulated and shaped in various ways to serve specific design goals, offering endless possibilities for influencing how a space is experienced. While we can guide these responses through thoughtful design, each visitor's experience is unique, shaped by their personal perceptions and individual takeaways. This fluidity ensures that space is not a fixed entity but a dynamic and evolving experience, one that fosters a deep, personal connection between the individual and their environment. Yet, I have only explored a fraction of this potential. There are many ways to explore how these elements can participate in architecture, influencing not just the space itself but also the unique experiences it creates for those who encounter it.

Thank You