

**Influencing human reactions through the sense of space:
Revealing the nature of water through architecture**

Sara Jamal Eddin

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fulfillment of the requirements for the degree of**

Master of Architecture

James R Jones, Committee Chair

David Dugas

Howard S Gartner

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ABSTRACT

This study focuses on the importance of the quality of space through the introduction of water and its influence on the human reactions. Each space we enter has the potential to create a lasting impression in our mind. In other words, a space evokes emotions and reveals the phenomenological nature of elements such as water. The nature of water is revealed as it is presented in different ways. Each water event seeks to be a catalyst for creating atmospheres for human experience.

Dedication:

My success in this beautiful journey is dedicated to the most precious people in my life, I thank God every day for having you in my life, you are the biggest support to me:

My Mother, who never left me alone, you are the one who always pushes me up to be better and better, my hero. You are my guidance in the dark and the light that lightens up my life. Rana Jamal Aldeen.

My Father, my pride and the shoulder that I lean on to get stronger. Mahmoud Jamal Eddin.

My Sons, my life. There are no words that can describe you or my love to you. My gift from God and my sun shine in this life: Majd and Adam.

My sisters and brother, who are the reason behind my smile, being with you makes my heart truly alive. Nour, Mohammad Jamal, Lama.

My husband who is my company in life, thank you for your love and support. Amr Sayed Issa.

My Father and Mother in law, thank you for being there for me and my children, I love you. Majd Eddin Sayed Issa – Ghalia Martini

To my professors who kept supporting me and pushing me to do better and better. Thank you for your kindness and for every information and advise you gave it to me. I will always be proud that I had the chance to work with you. James Jones, David Dugas, Scott Gartner.

To all my friends and everyone I met in this journey, each one of you has its beautiful touch in my heart that impacted my work and life in a good way.

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Introduction

I am from Syria, to be specific from Aleppo city. Being away from my country for more than four years, did not change the fact that Aleppo is still a part of me. Therefore, I wanted to design a place for the community and people there.

The project is a community center. The aim of the design is to create a place where people can gather, socialize, have fun, relax, and learn through the place where they are.

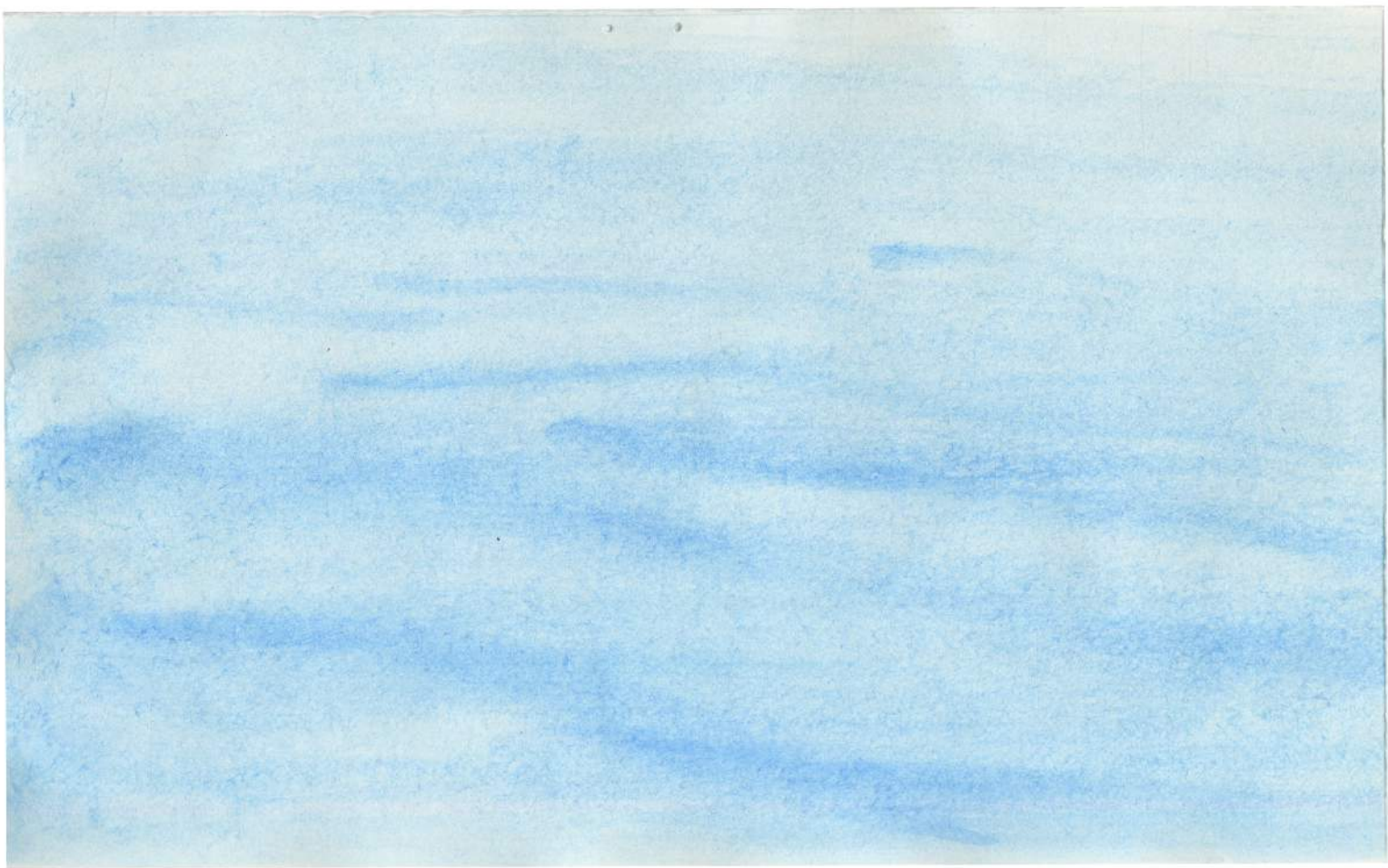
Water is important; it is one of the main factors behind our survival. I chose water to be the educator in my project, trying to present water in different architectural places, where in each you will have a different experience. For example, in one place you will feel quiet, in another you feel that you want to move and make while noise...

People have different readings to water. Some people see water as small molecules that are capable to move in different directions. They see freedom in water, so feelings interact with water. And water itself interact with the surroundings possibly affecting its color according to the context that water is in.

Water----Feeling(ex:warm/cold)



People may also read water as a whole. In other words, see water as a liquid that is contained in a specific context; a pool, or a space



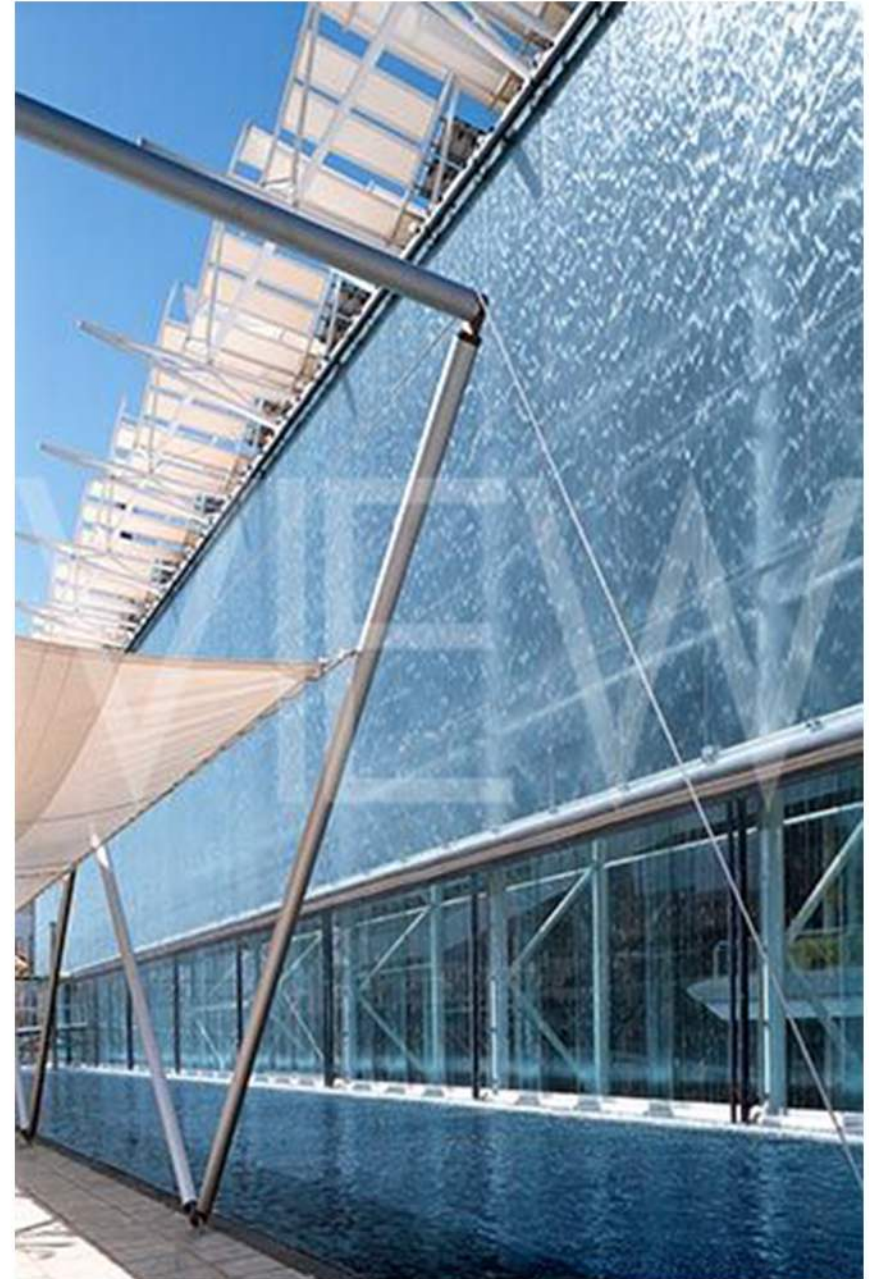
INFLUENCES

In the Cranbrook Institute, Steven Holl presents water in more than one physical state, telling us a story about the nature of the water. In one place he introduces water in its vapour form; where the visitor's view is obscured by the mist as one feels the cooling effect of evaporation.



figure(1)

In the British pavilion for the 2000 expo, Nicholas Grimshaw collects and lets water run down the glass wall; using the solar panels located on the roof of the building to generate the energy to move and pump the water up to the top of the wall. The water presentation on the wall reveals the random nature of the water, where each drop has its special response to gravity and surface tension. The project also lets one experience light reflecting and refracting through the glass and water.



figure(2)



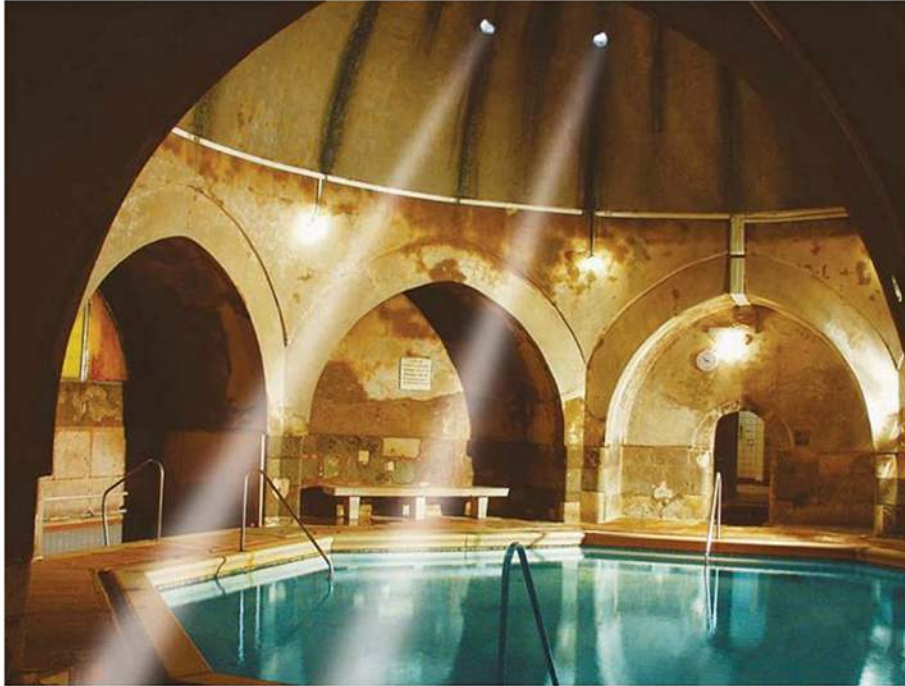
Old Damascus, Syria

figure(3)

"Light gives of itself freely, filling all available space. It does not seek anything in return; it asks not whether you are friend or foe. It gives of itself and is not thereby diminished." (1)

(Michael Strassfeld)

Other Influences : Water and Light



Kiraly Bath, Medieval Turkish Bath, Budapest

figure(4)

The brain is less interested in the overall illumination than it is in the relative light intensity throughout the scene.



The Umayyad Mosque, Aleppo, Syria

figure(5)

The Court yard is used as a source for light.

The dark shade is used in the lower level to emphasize the color of rocks and the ground which symbolize life, our world. While the brighter areas presented on the upper level, associated with calmness and the bright spiritual life.



Idlib, Syria

figure(6)

"light me a light any light tonight.
All I need is darkness away tonight,
So light me a light any kind of light." (2)

(Barak Al'Mondia)



"The sky is our ROOF "

figure(7)

"Over sky all white, light
Gives impact always bright, light
Shows path, put on right, light
If one thinks it is a life, light" (3)

(Zaibar Zee)



Ma'alula, Damascus, Syria

figure(8)

"Light can convey a feeling and color is property of light"
(Steven Holl) (4)

Considering Light as not only as physical (wave length) but
also as an emotional thing.



figure(9)

The Umayyad Mosque, Aleppo, Syria

The perceptual sensation of light where the relationship
between the color and space gives a memory and impression.
(Color as expression of tradition)

The thesis concentrates on using water to create places that allow us to experience and reveal the nature of water. The building will be a place to learn from and to experience a feeling between the one's self and the water and the space.

Water is presented in a specific context in five different spaces. In the building water will be accompanied with different elements:

- 1- Water and activity (quiet-noisy).
- 2- Water and light.
- 3- Water and the dryness of the site.

And the water itself will play the main role in making the experience to the visitor and creating the identity of the space. Water is presented in the building as:

- 1-A guide.
- 2- Active
- 3- Quiet.
- 4-Vapour.

The project is located in Aleppo, Syria. The city's urban texture shows the importance of the green areas, where green areas are distributed all through the city, and much of the outdoor life of Aleppo is concentrated in those 'green' areas. The building respects its location and complements the city, so the green areas were part of the design in the site.

The site:

Aleppo, Syria

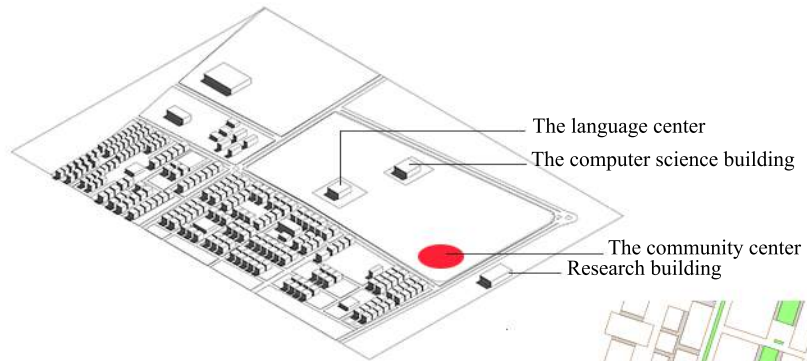
I chose my home city of Aleppo to be the place for the thesis exploration, the place where I was born and learned the first line to draw.



figure(10)

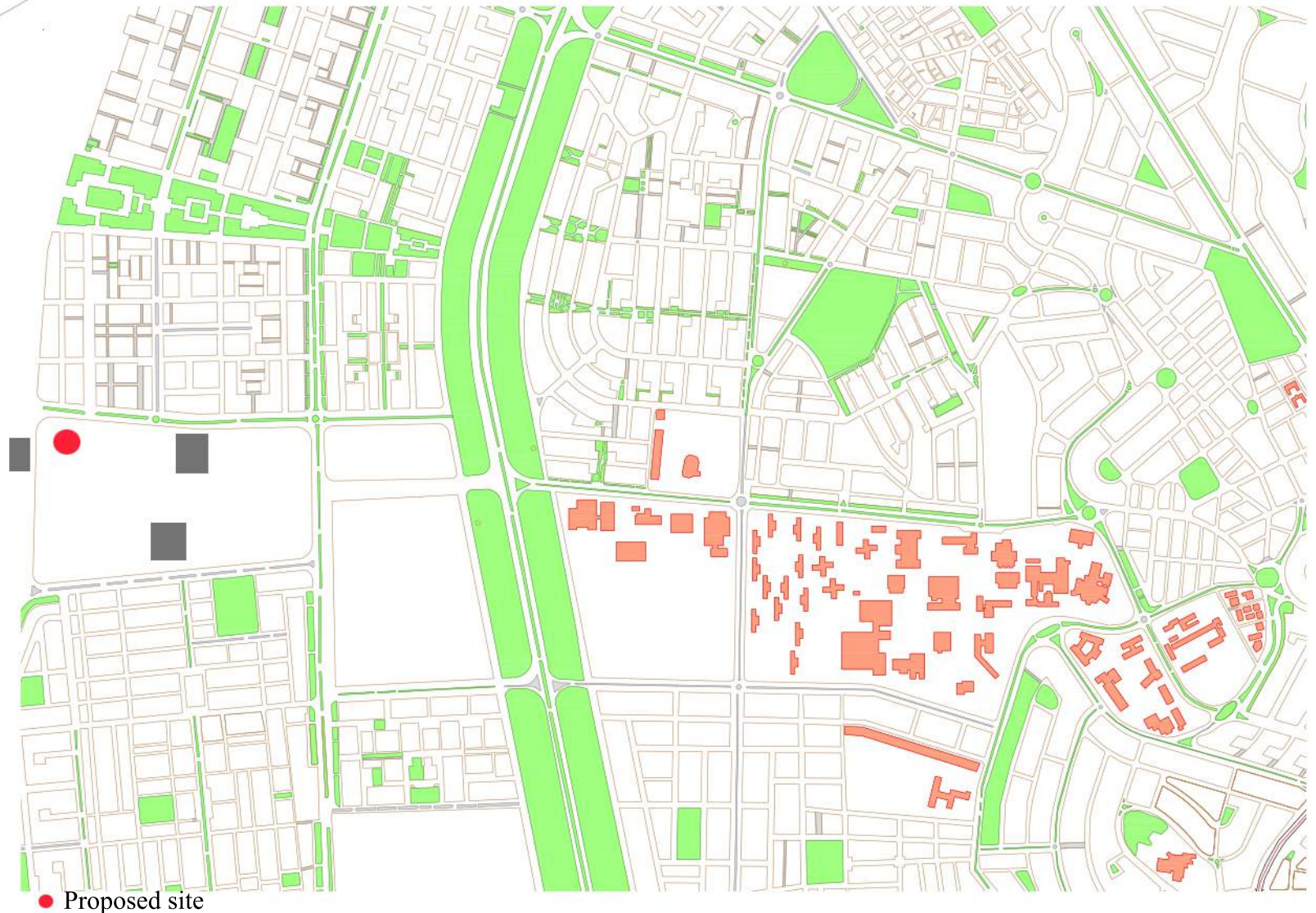
Site significances:

- Being a part of an educational context.
- Being a void of water to highten the appreciation of water.

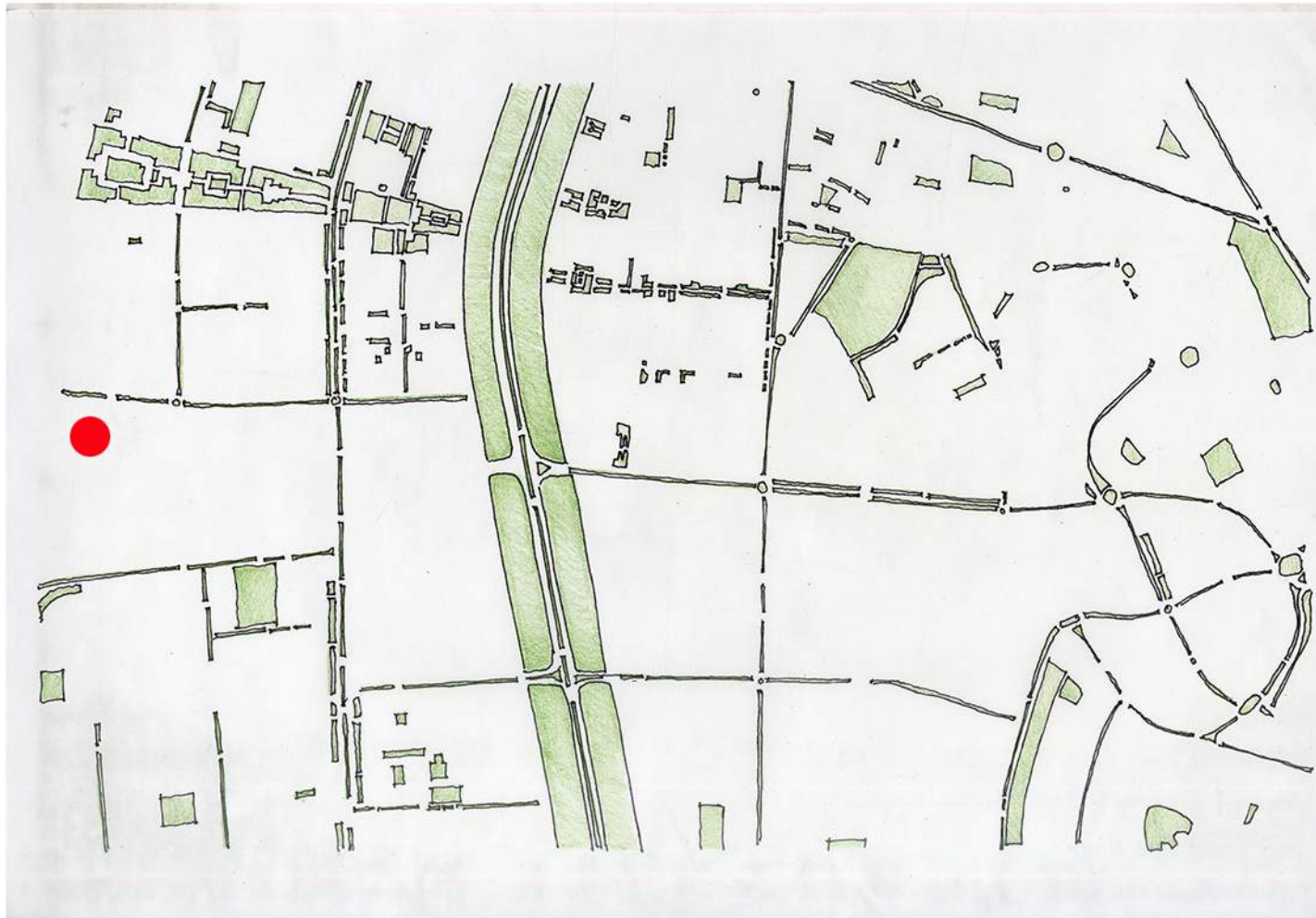


The site is in a region for the third expansion of the University of Aleppo. A computer science building and a language center are located near the site. To the east of the site is space for future educational buildings.

The community center is to be located on the north side of the site, adjacent to the research center.



The drawing shows the distribution of the green areas in the city. The community center, with its presentation of water, was approached as a complement to the green spaces.



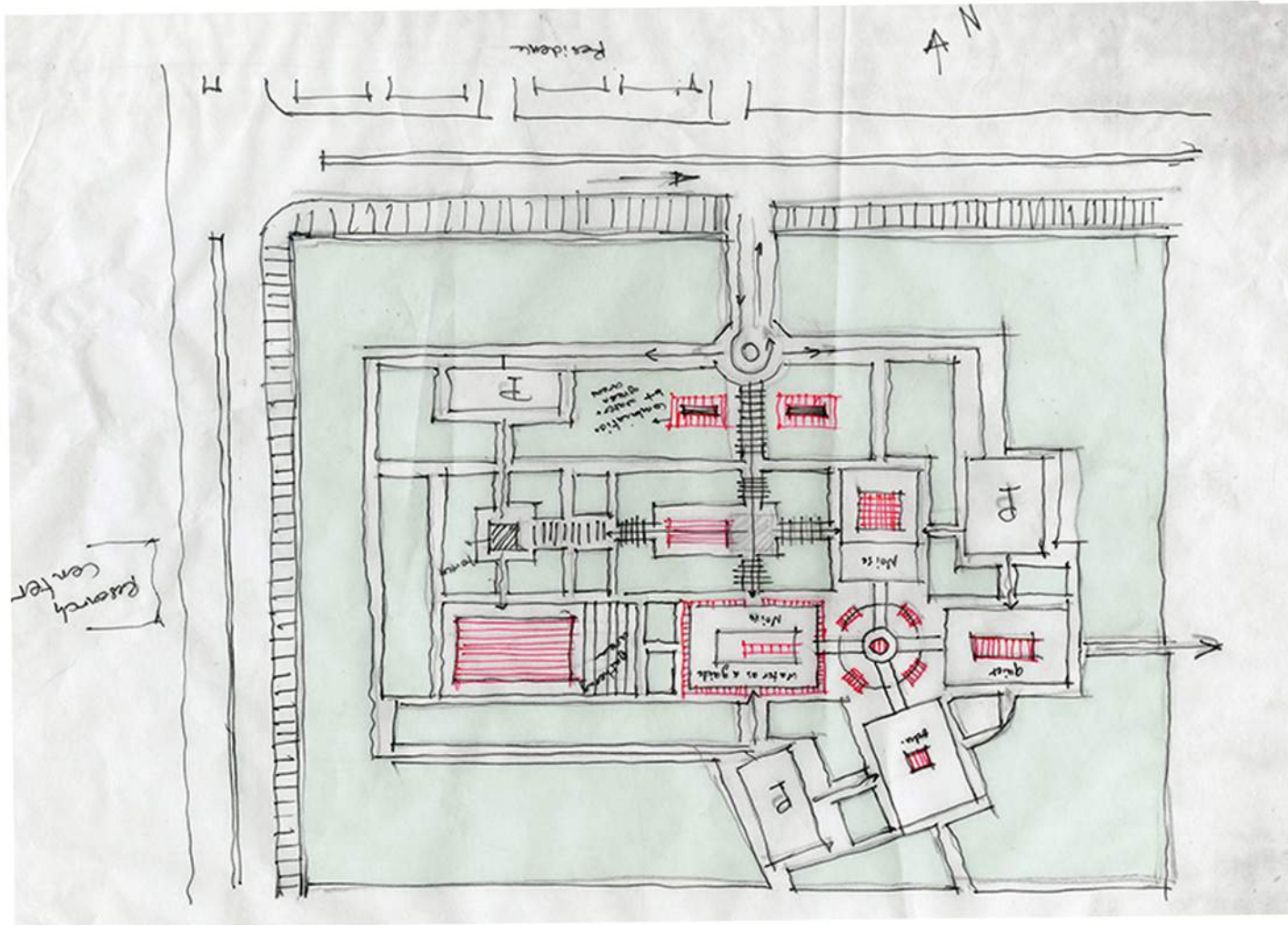
● The community center

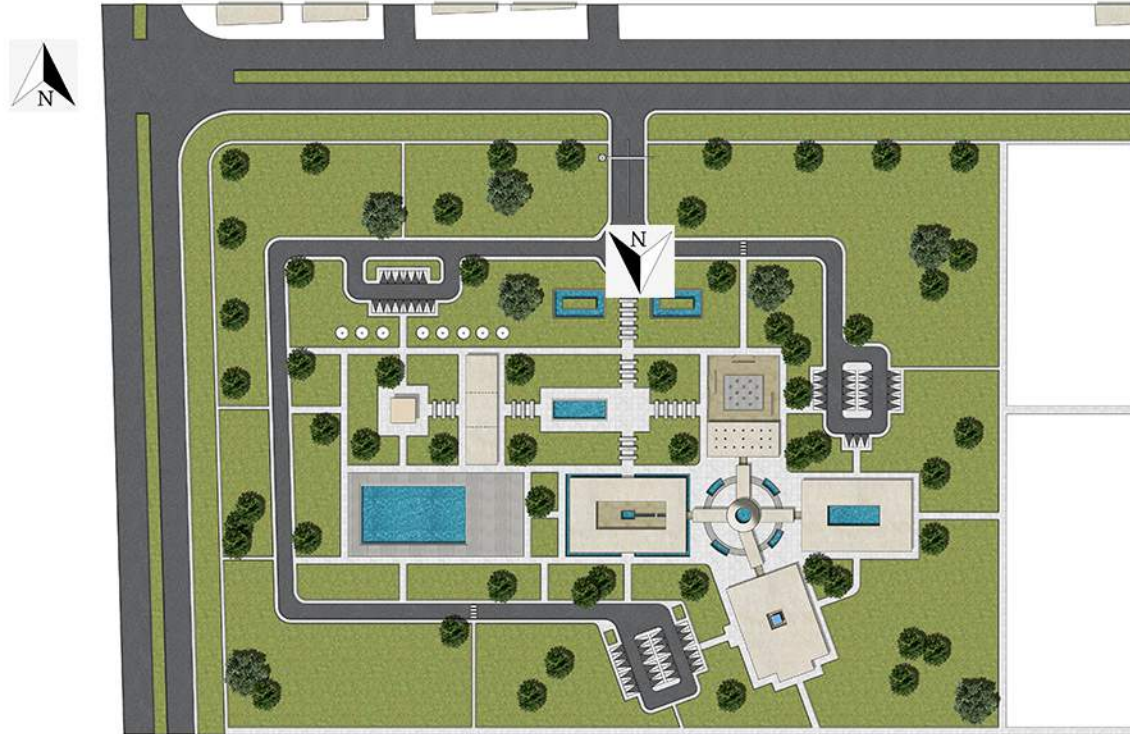
The West area of Aleppo, Syria

A sketch of the site:

The design of the site complements the design of the city, where it considers the importance of the green areas in the city context. Green areas are known to be part of outdoor activities that happens mostly at the weekends, beside the late night activities that happens in holidays.

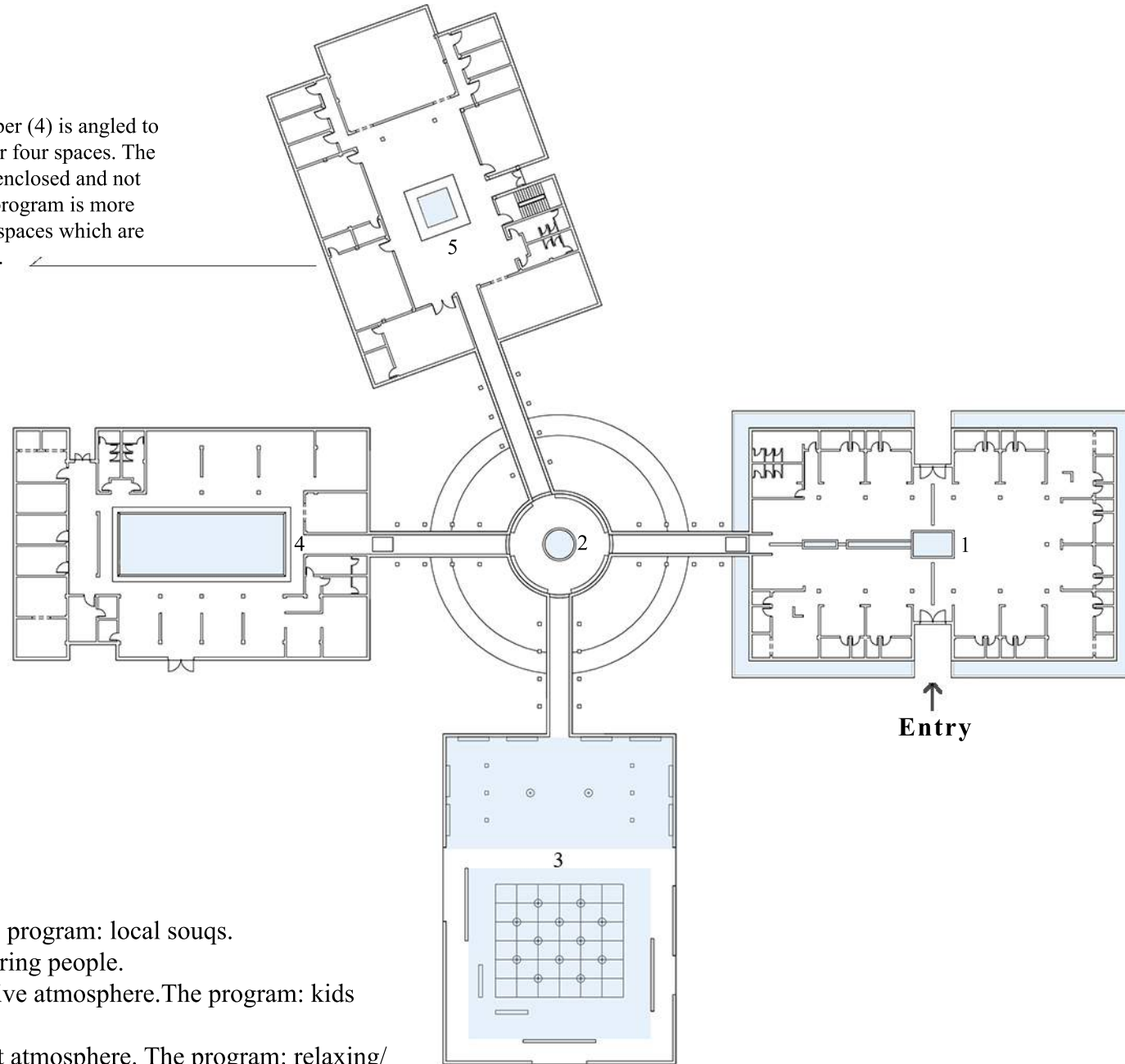
The water interacts with the green areas in the site to introduce a unique scene to the visitor.





Site plan

The plan of the space number (4) is angled to distinguish it from the other four spaces. The rooms of this building are enclosed and not open to the court, and the program is more private than the other four spaces which are designed for the public use.



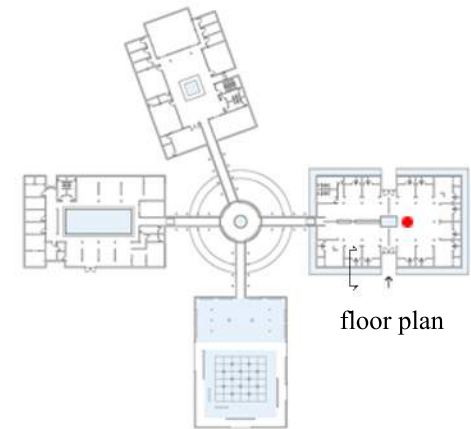
- 1- Water as a guide. The program: local souqs.
- 2- The hub: Water gathering people.
- 3- Water creating an active atmosphere. The program: kids playground.
- 4- Water creating a quiet atmosphere. The program: relaxing/ open study area.
- 5- Water as vapor. The program: classes.

Being inside the building, one will encounter the interactions between one's self and the water, the sky, light, and finish materials (flooring material specifically).

Water as a guide :

This is the first space when entered in the building. The program includes local souqs (shops). People who have small businesses can rent a space and sell their goods there.

Here water is contained in pools which are made with a polished marble, to signify the importance of the water. Ribbons of black marble are also introduced in the flooring to lead one to the water, where the water leads one to the hub space, the central space in the building.



This space will be crowded, people will be moving in different directions but when they finish their shopping, they will see themselves in the center of the space where water will be their guide, leading them to the corridor.



Popular local goods:



Figure(10)

Ceramics

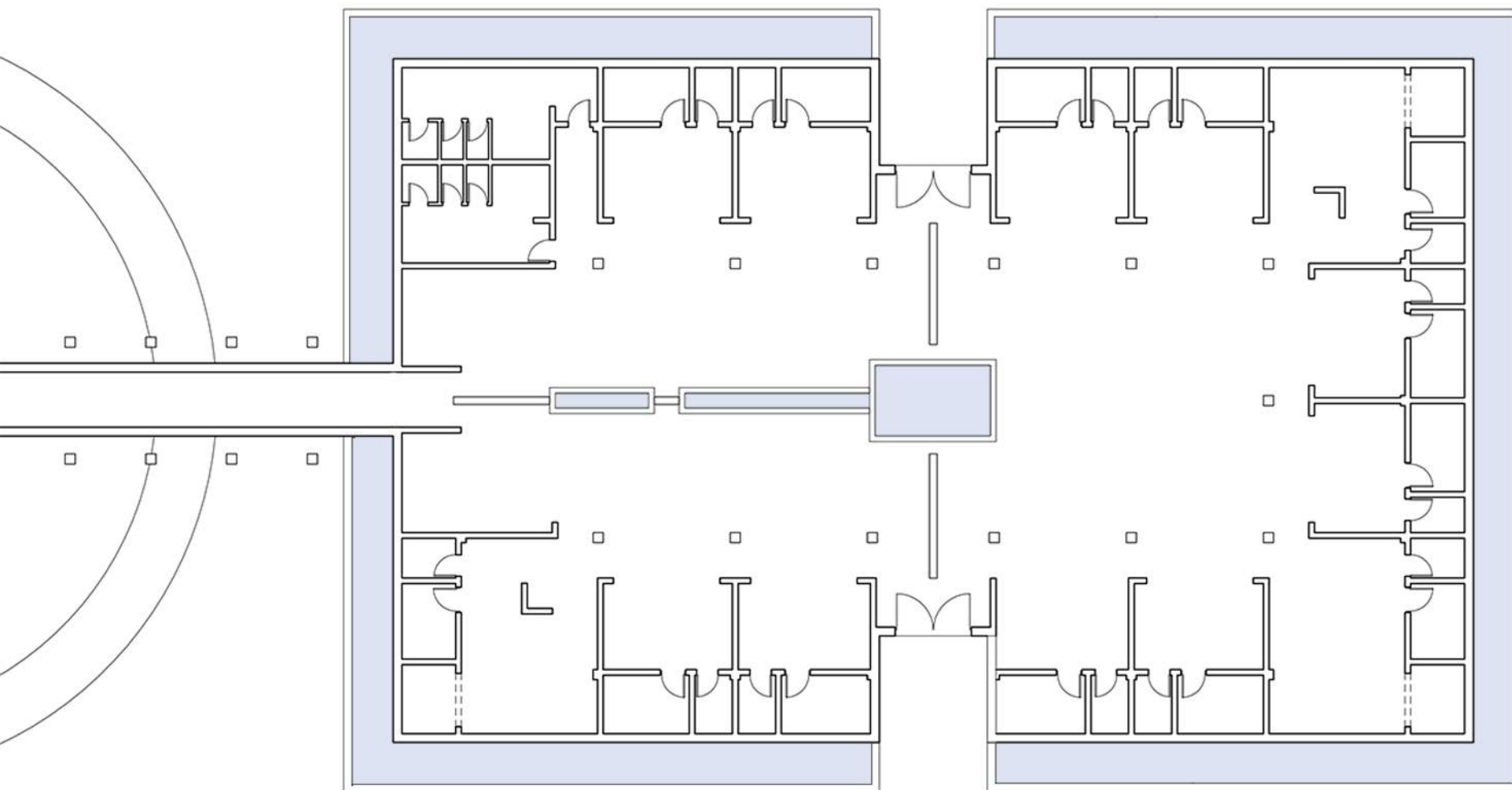


figure(11)

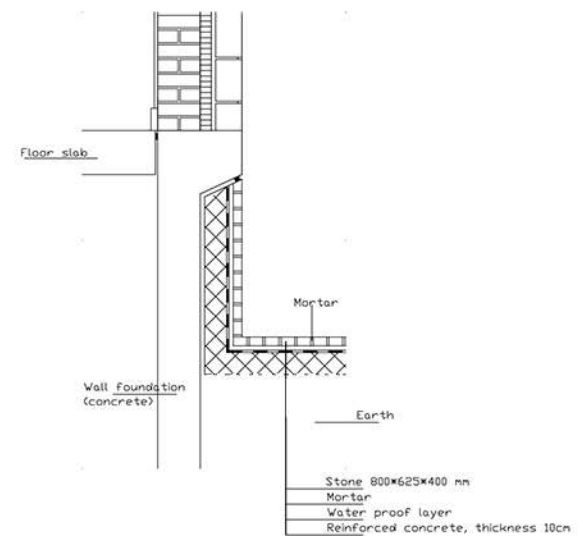
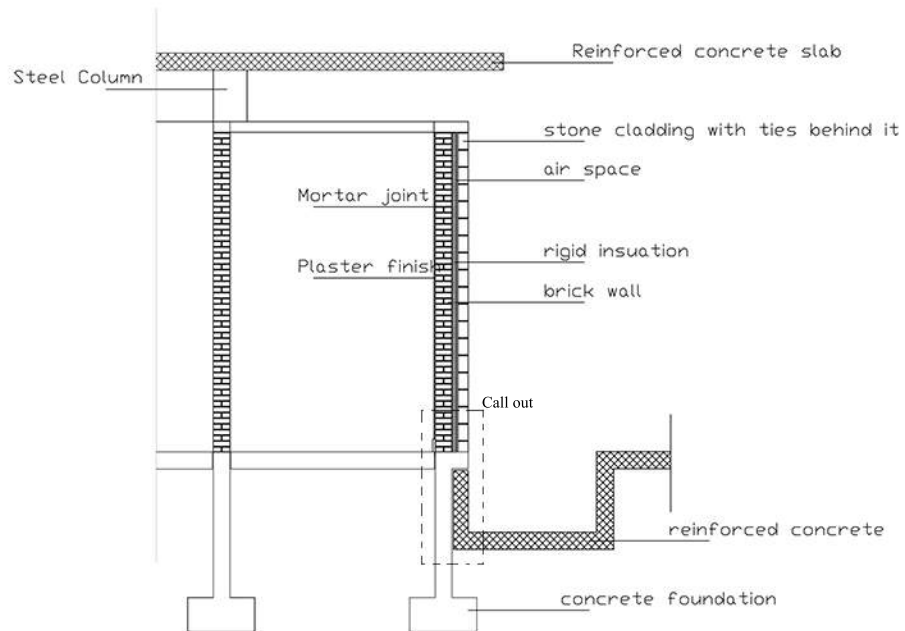
Ghar Soap

Goods that may be presented in the local souqs area: Made by local materials, complementing the use of the local materials for building the community center.

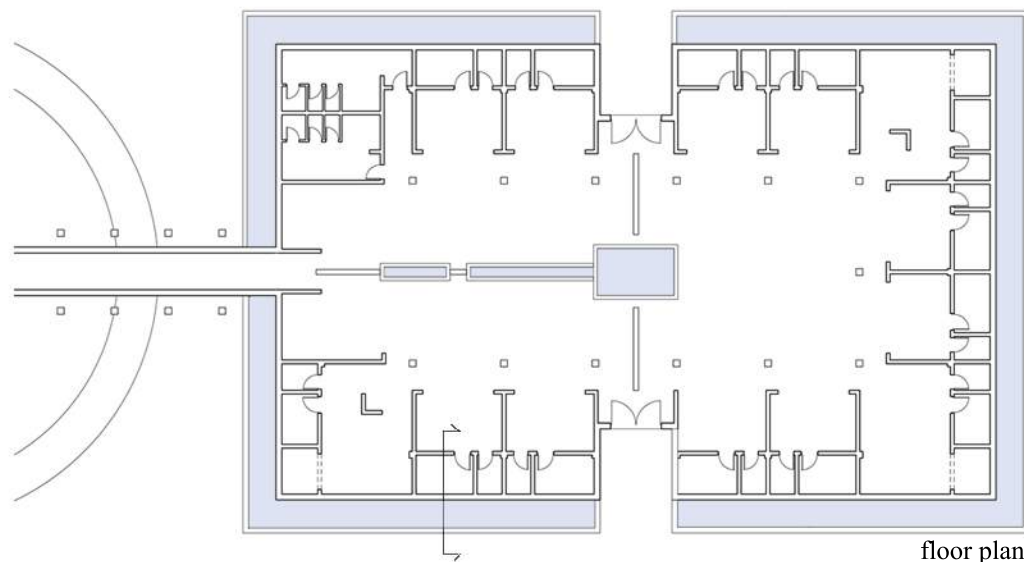




Floor plan
scale 3/64"=1'-0"



Details

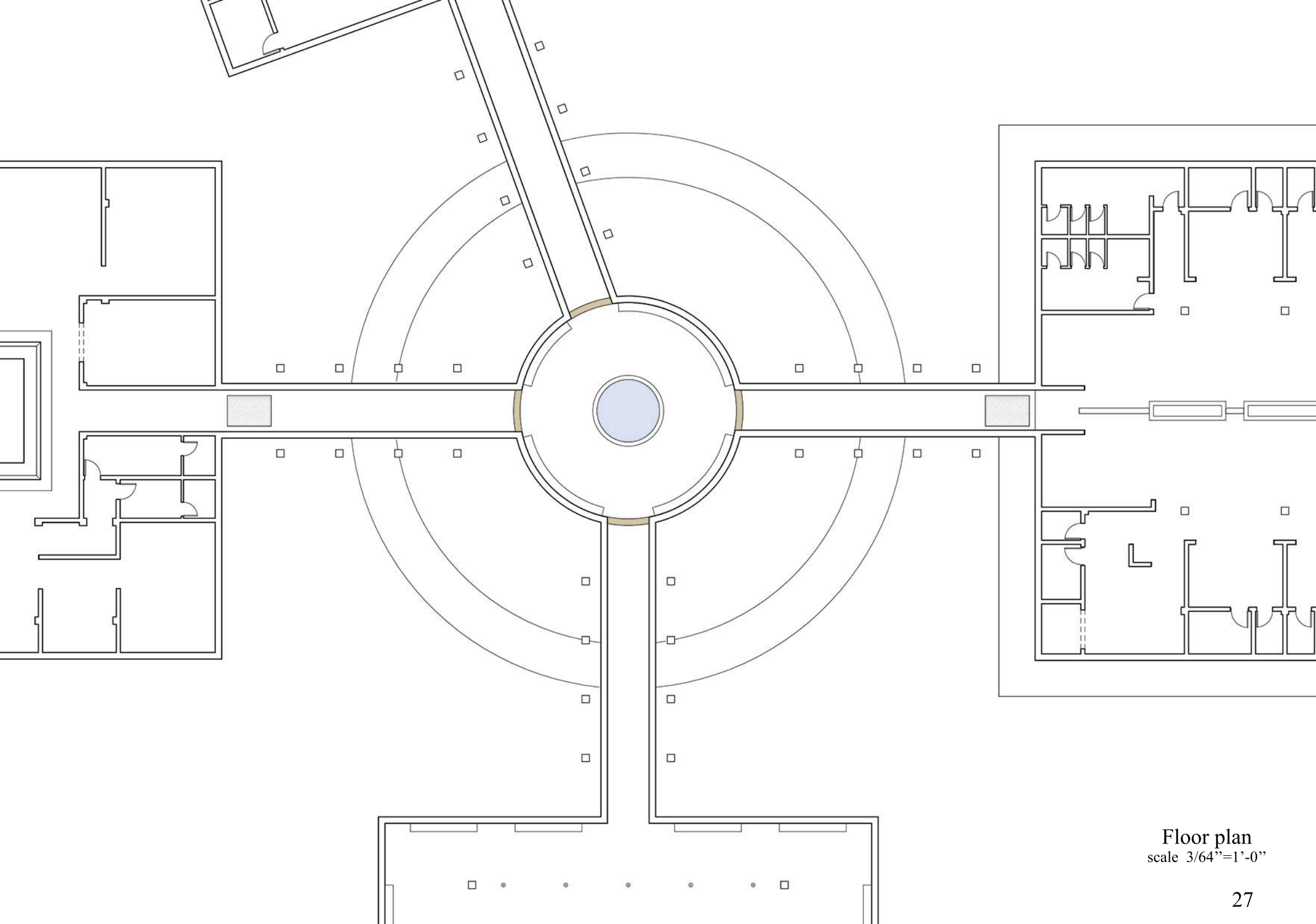


The Hub:

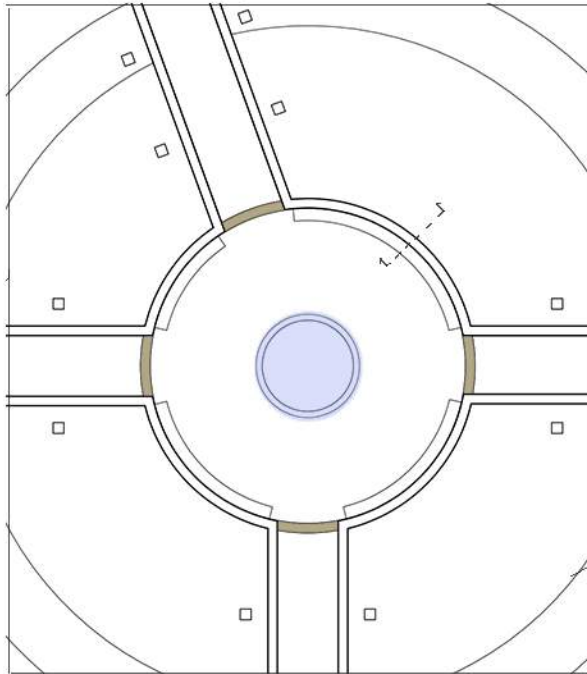
The central space in the building both collects and distributes visitors. Being here will give you the chance to rest and then choose your next destination. The space is covered with a brick dome to distinguish it from the other four spaces. The flooring is also different where it has no clear direction in the pattern; the material also accommodates with the experience that one's will have when seeing a large brick dome, so old stones have been used for the flooring.

The water sits in the middle of the place, making soft noises that attract the person to listen to it and watch its ripples.

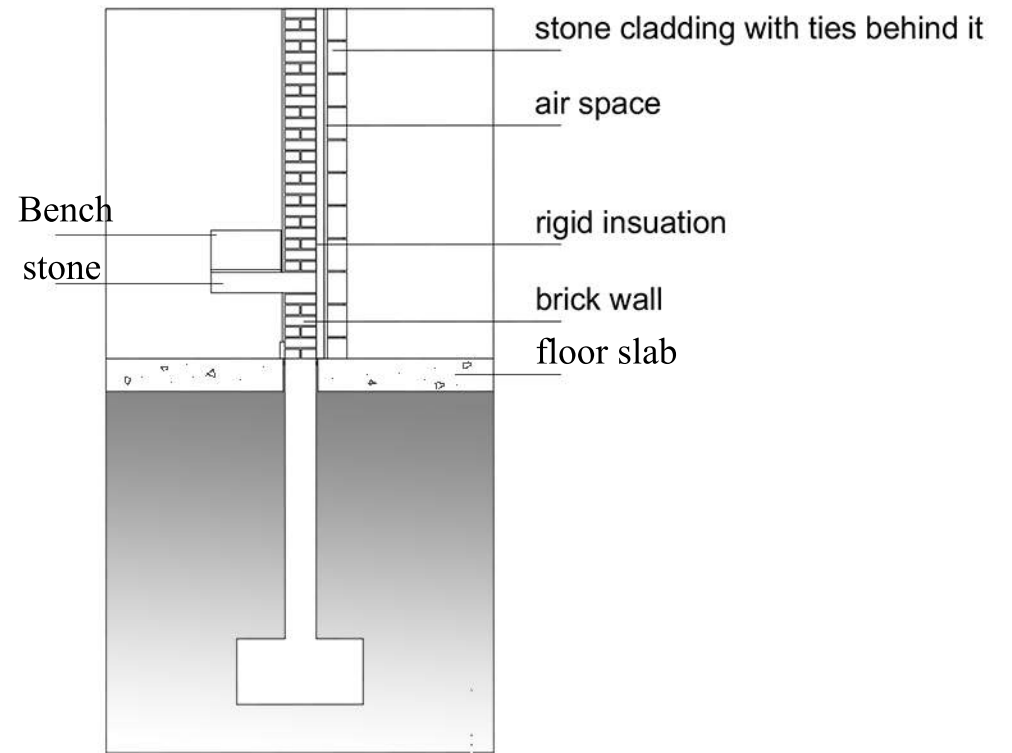




Floor plan
scale 3/64"=1'-0"



Plan



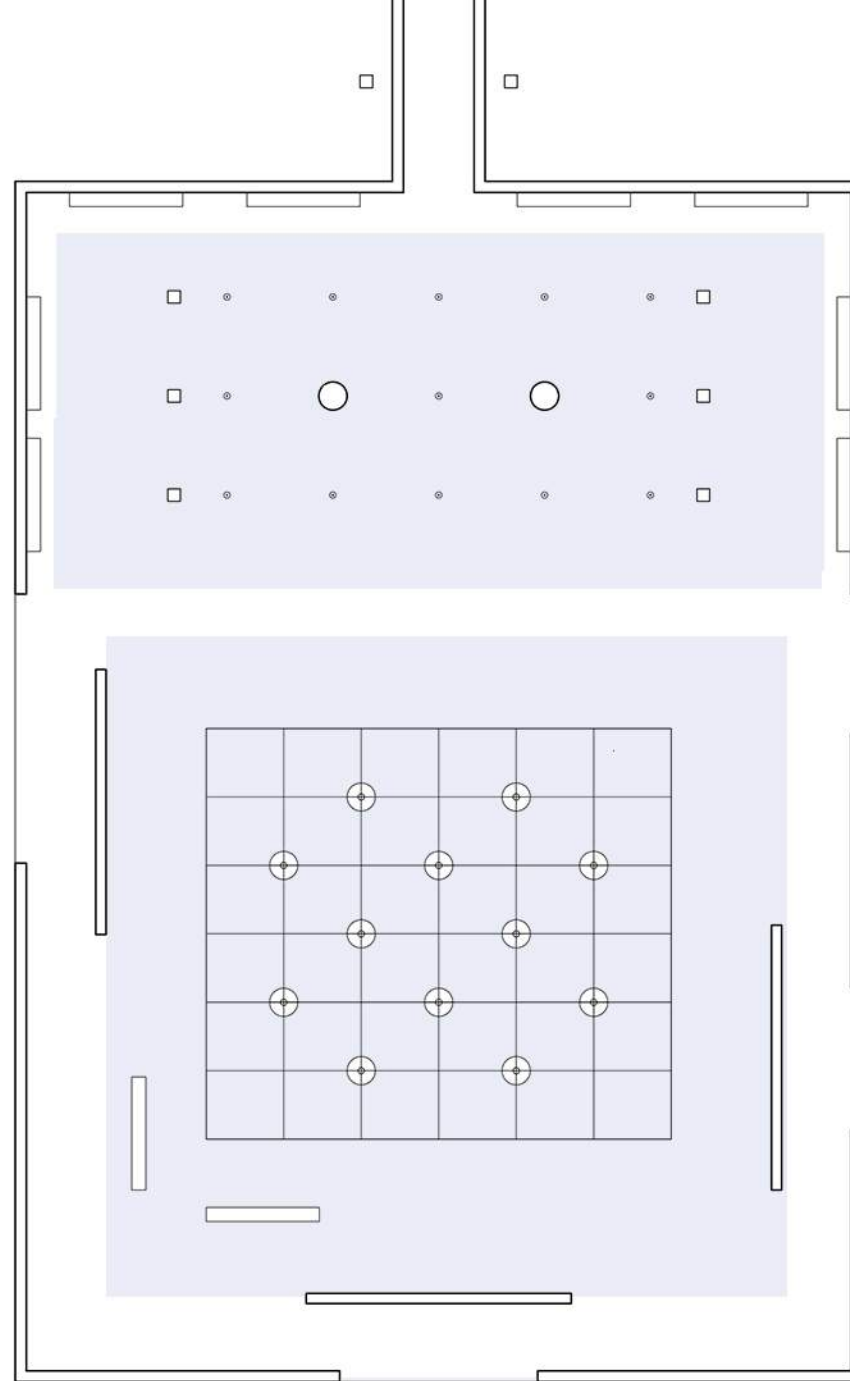
Section in the wall

Water creating an active atmosphere :

In this space water spouts from the ground, as if it is telling us to run and try to catch it, in this way creating an active space. The water participates with the program, which is a children's playground.

Being underneath the covered area gives you the feeling that you are within the boundary of the building because of the large span roof. At the same time you will feel that you are outdoors because of the open view to the outside. Being in the uncovered space will generate a feeling that you are outside because of the absence of the roof, but at the same time you will feel that you are within the confines of the walls that surround the space, where a child may sense that they are untouchable.





Floor plan
Scale 3/64"=1'-0"

Water creating a Quiet atmosphere :

The water is introduced as a large plane to create a quiet atmosphere. The edges of the pool are rounded to give the water the illusion of infinity, inviting us to be calm, dreamy, and quiet.

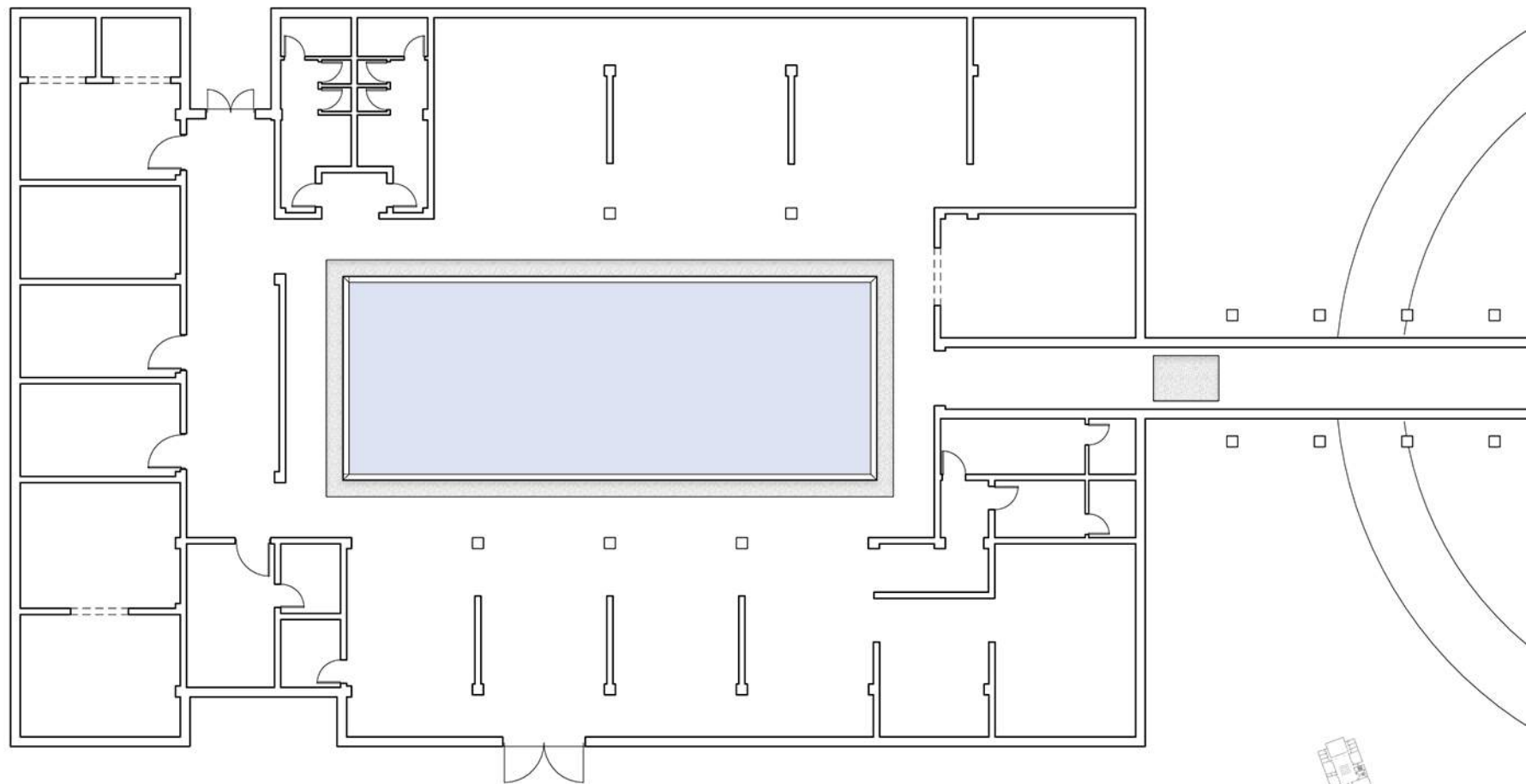
Water rolls quietly over the edge. Due to capillary attraction the water rolls under the rounded edge and quietly falls to the collection pools below.

In this place people can come and relax, or do their homework/work.



A sketch of the section of the pool

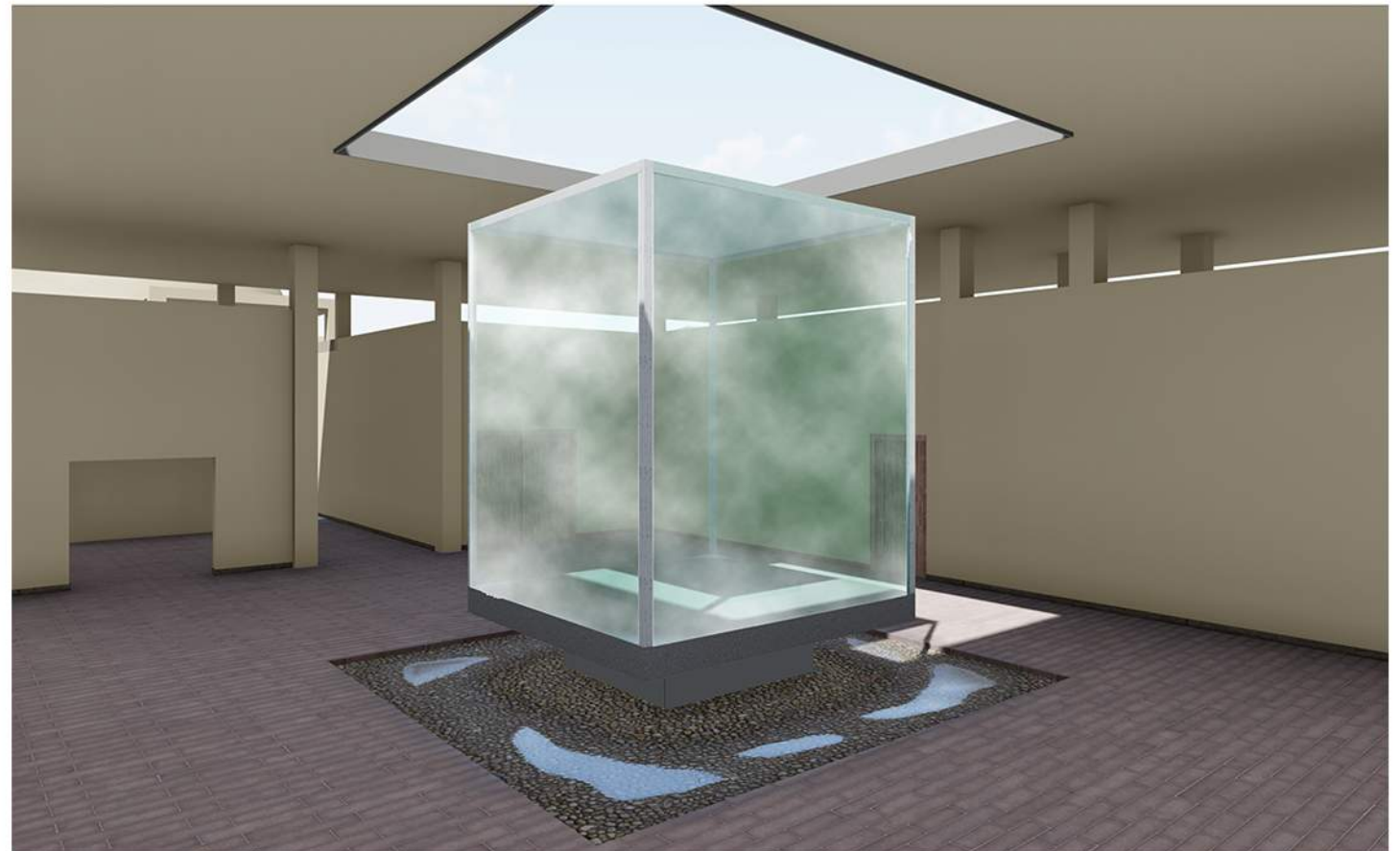
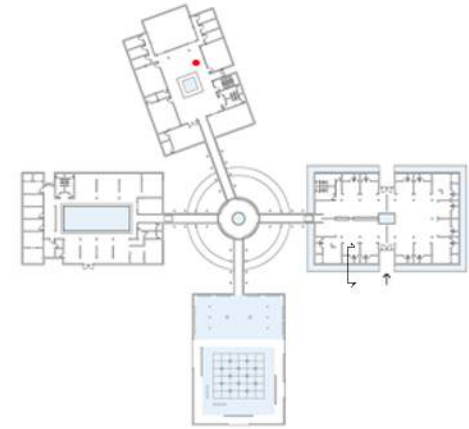


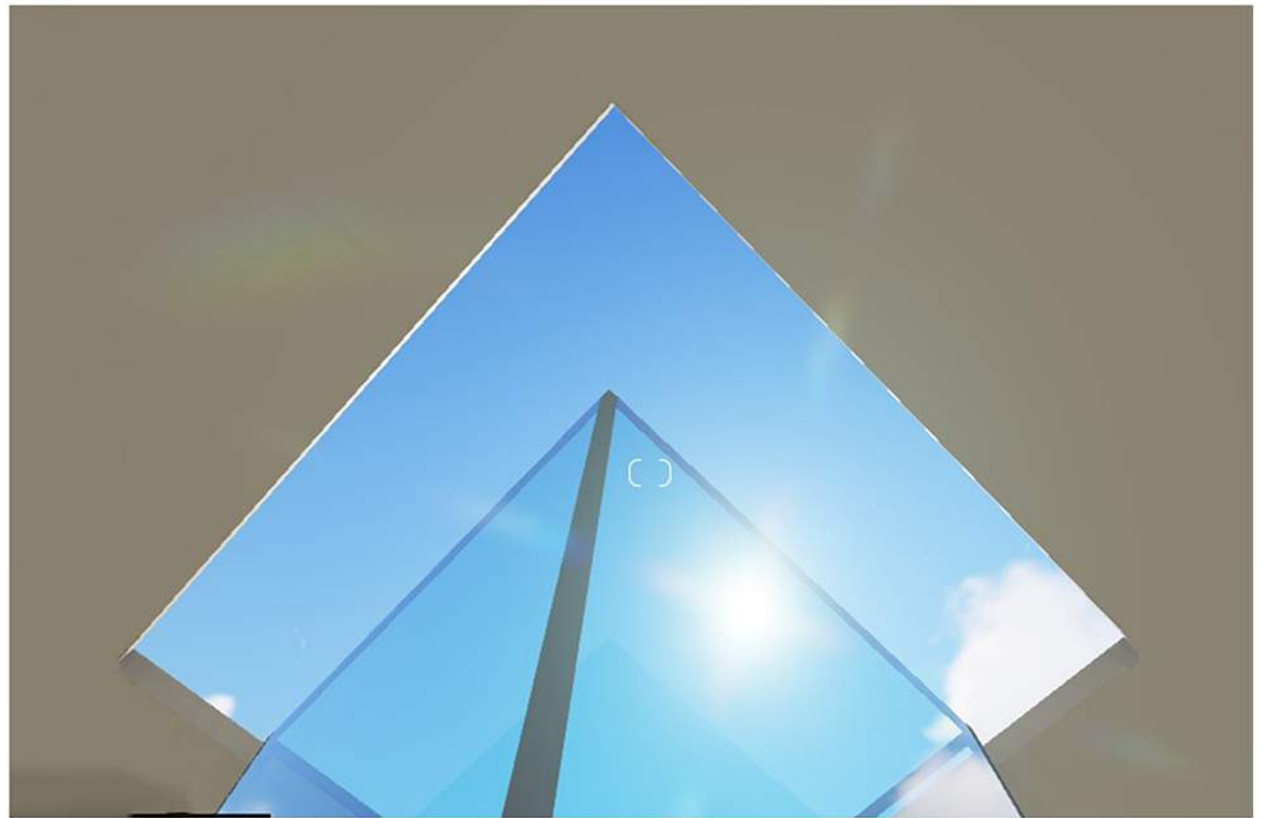


Floor plan
Scale 3/64"=1'-0"

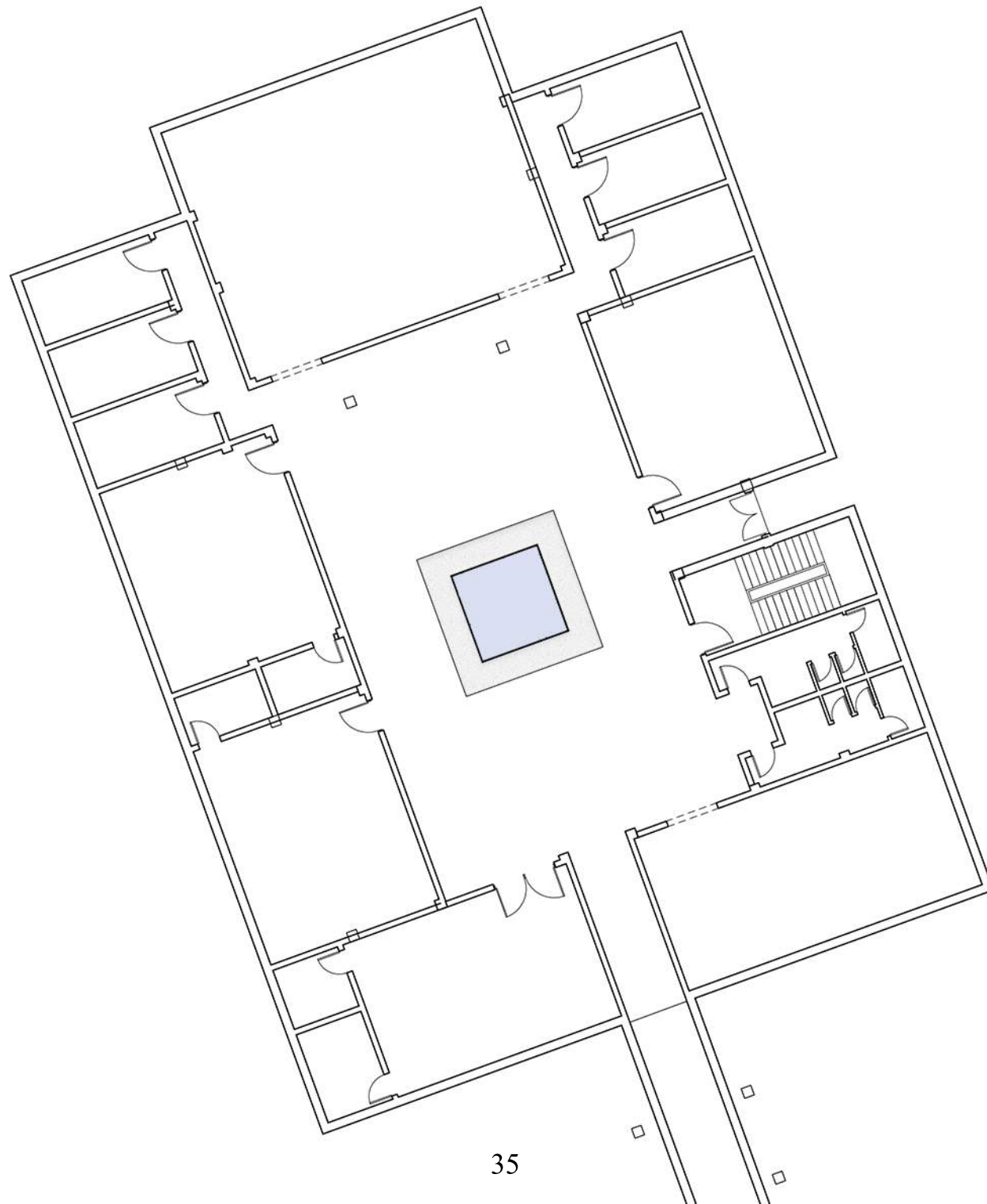
Water as vapour:

Here the space is educational, for lectures and classes. Learning means being exposed to new things, so I wanted to present the water in a new physical form that is different from the liquid phase. In the center of the space a glazed cube filled with fog is placed. Because the program is different and the phase of the water is different, the space is shifted off of the axis and grid. In this space rooms are closed and not opened to the central court. Here the flooring has the look of the pavement to remind the visitor of the outdoors.





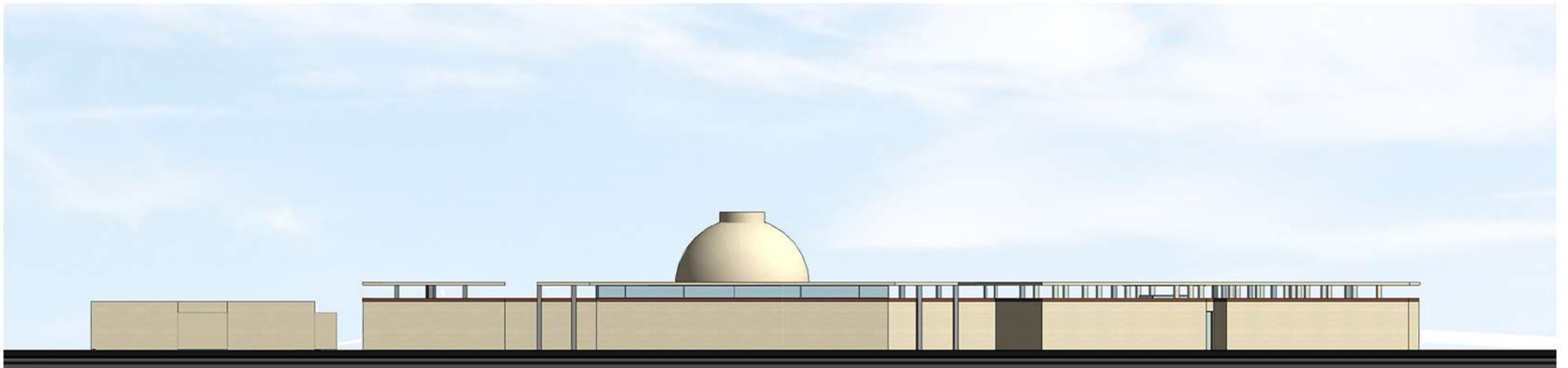
The sky meets the cube



Floor plan
Scale 3/64"=1'-0"

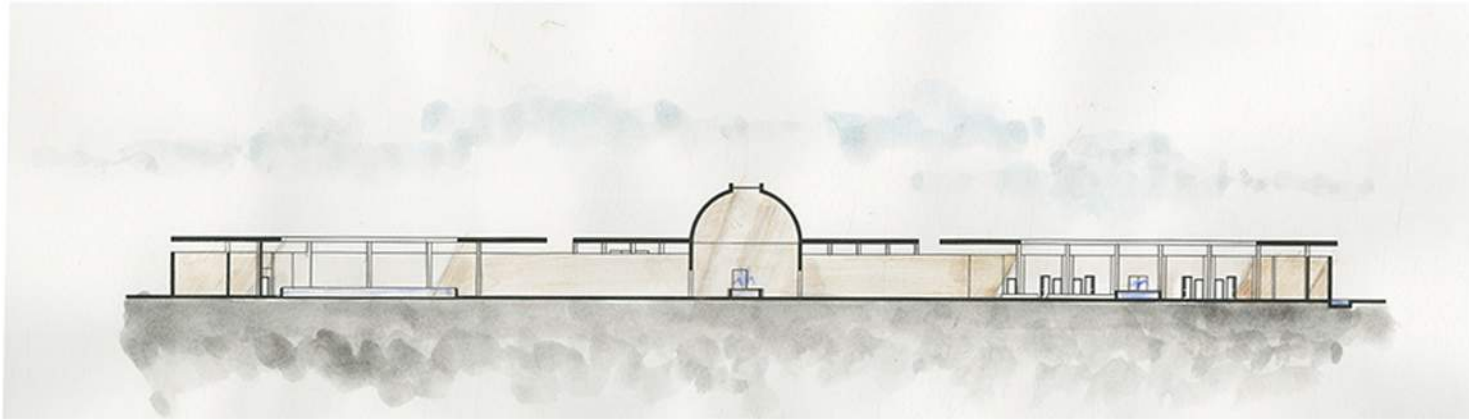


The North Elevation

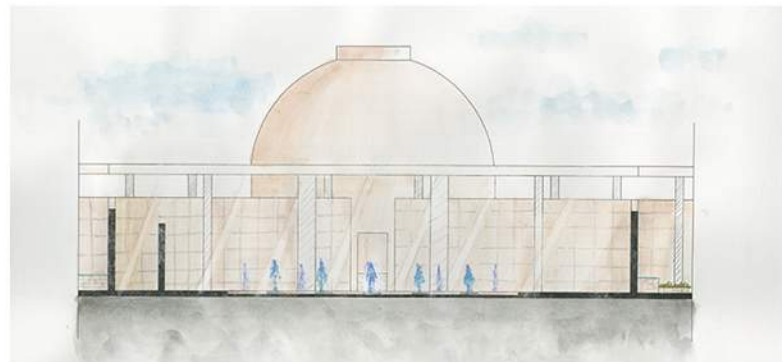
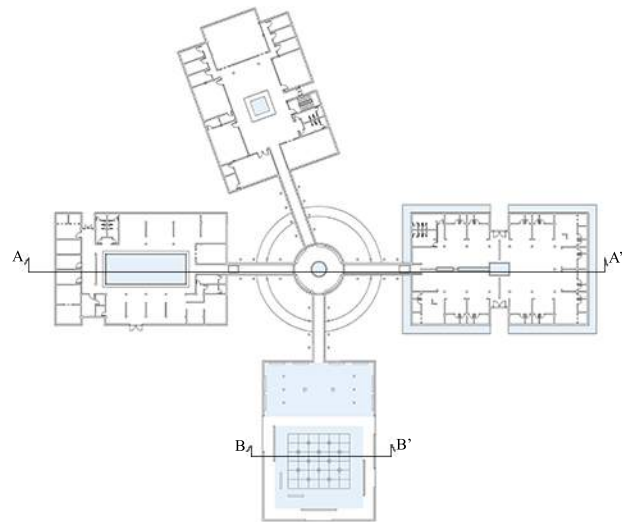


The West Elevation

Sections:

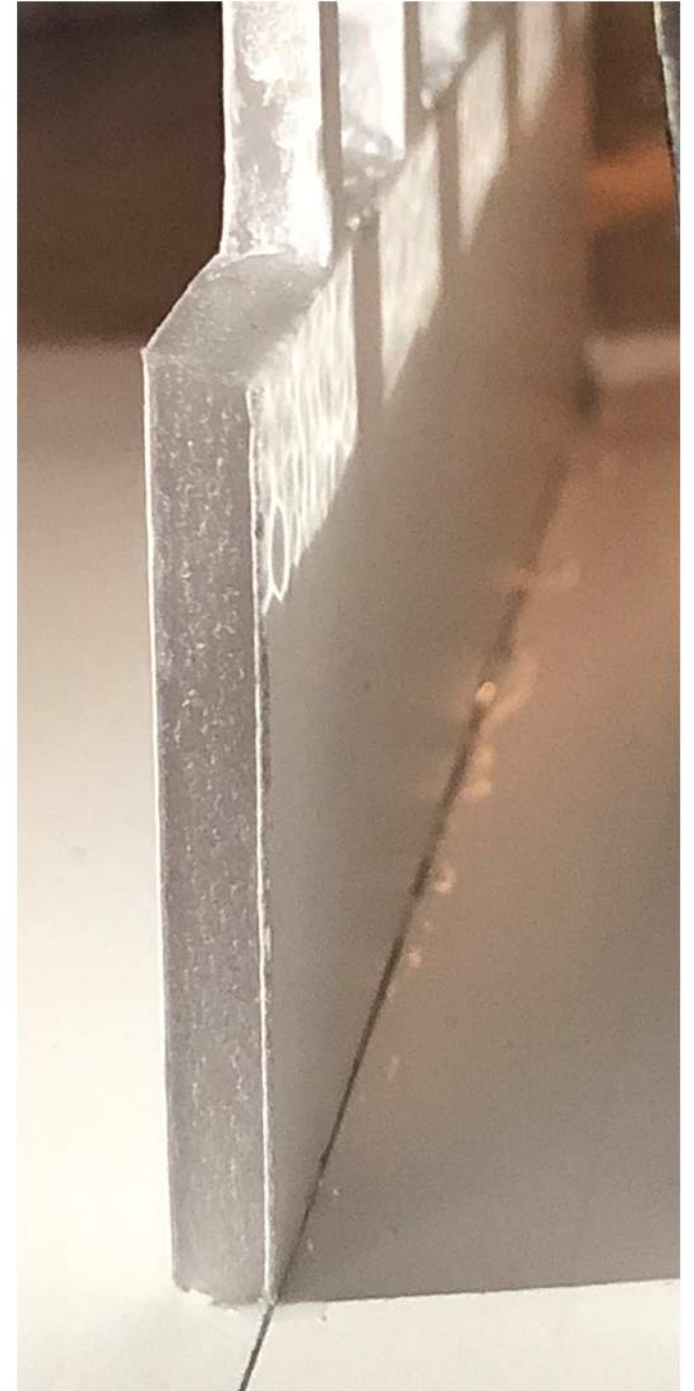


Section AA'



Section BB'

LIGHT and WATER Studies



Thr Corridor space



The kids space

The study shows how light can sometimes imitate the water effect and complement the water to achieve the desired atmosphere.

Light Studies

for the corridor space



Progress in the design:

The following sets of drawings show the changes that happened to the spaces in order to perceive the wanted results.

The entrance space:

The black marble ribbons were added to the flooring to emphasize on the presense of the water and its role as a guide in the space. Ripples of water were also added to the water to make the scene more realistic.



Original conition



Second iteration



The final rendering

The Hub space:

Changes in the flooring material had accrued in order to distinguish the hub space from the other four spaces. The pattern of the flooring now does not follow a specific direction but instead it shows its independence in appearance compared to the other spaces. When the hub's flooring meets the flooring of the corridor a brick piece is placed as a flooring material, following the path of the wall, acting as if it was a piece of it. The openings that connect the hub space with the other four spaces are enlarged to give the visitors more welcoming feelings.



Original condition



The final rendering

The Active space:

Chnges in the presentation had accured. Adding the wet effect to the flooring to make the space more realistic.



Original condition



Second iteration



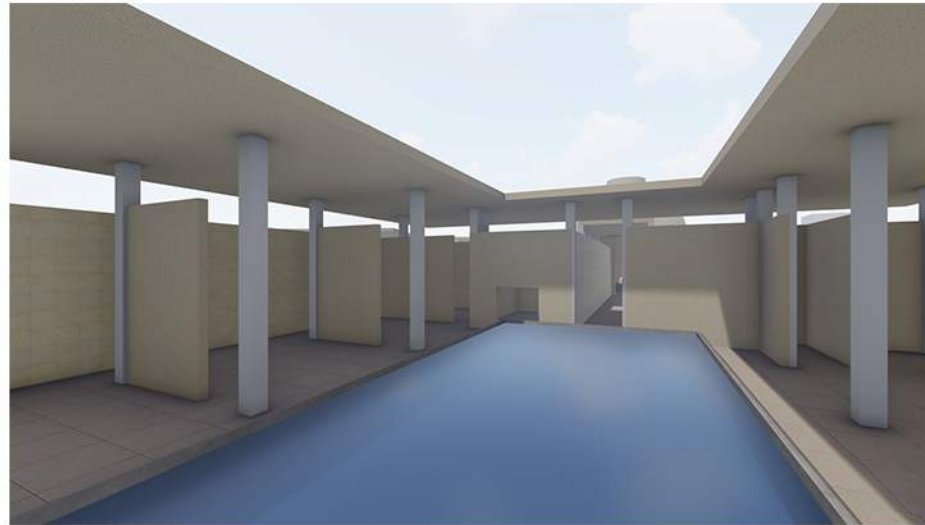
The final rendering

The Quiet space:

In the final rendering, the water level is now higher where water touches the upper round edges of the pool; giving us the sense that the water is infinity with no boundaries.

The Water wants to imitate the sky trying to give the visitor the impression that the sky usually gives, the calm feelings that would let us be dreamy and quiet.

The rendering also shows how the natural light touches the water leaving a trace of light that moves slowly through the time.



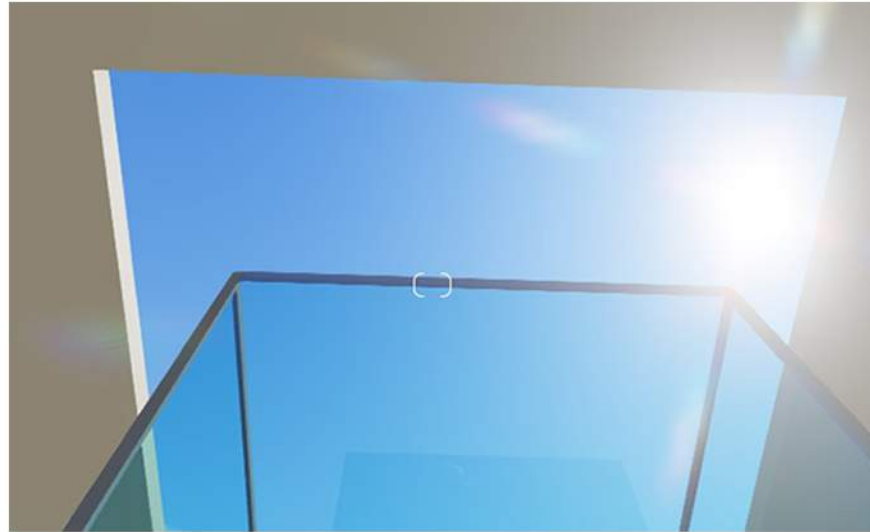
Original condition



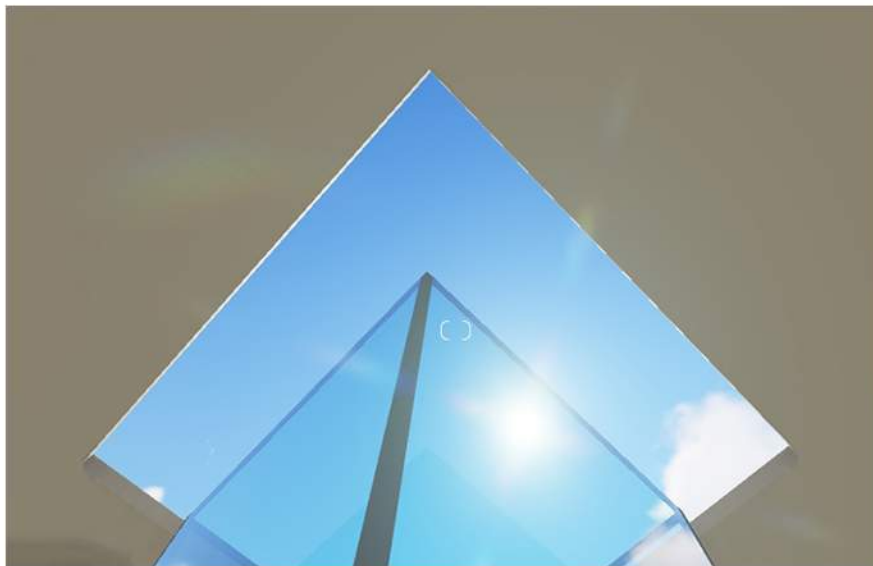
The final rendering

The Classes space:

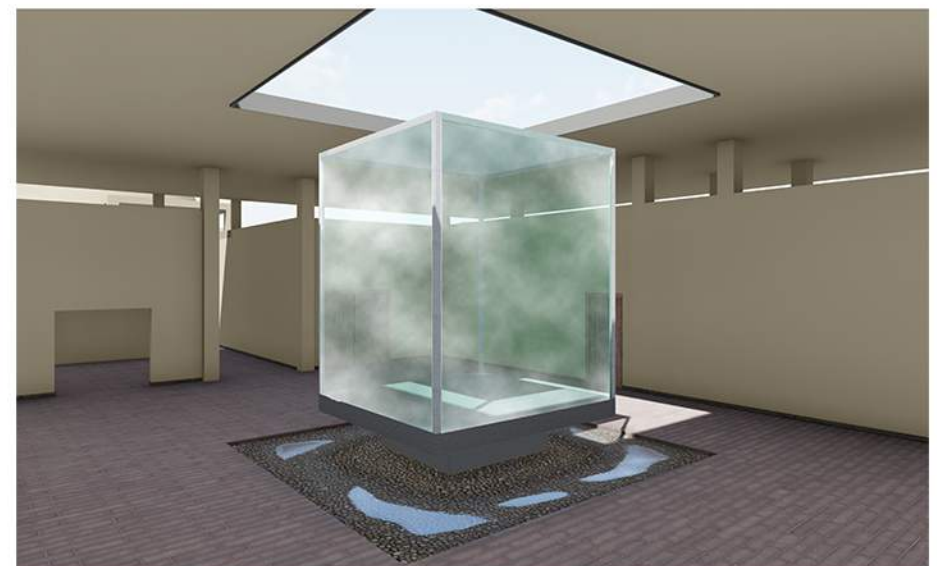
The final renderings show more details about the decisions that were made for the opening in the roof and the flooring. The edges of the roof's opening are covered with stone pieces that would help preventing the leakage of the rain water underneath the roof surface. The flooring also shows changes in the material; gravel is placed under the opening in the roof, in the area where rain is expected to fall.



Original condition



The final rendering

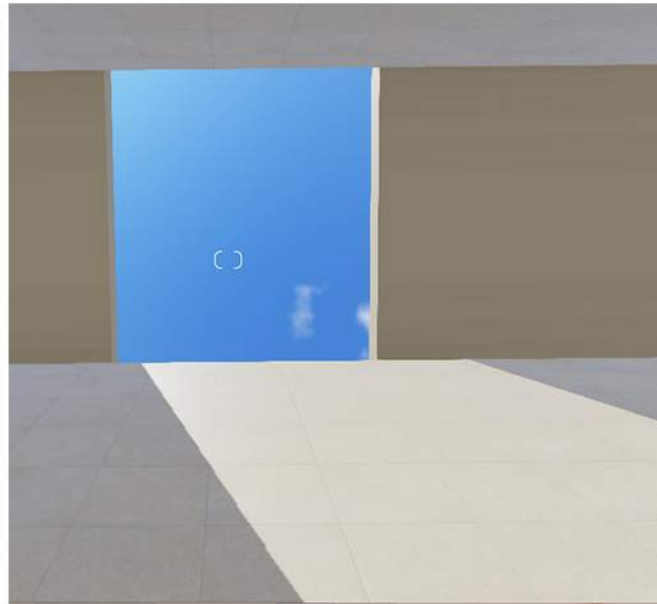


The final rendering

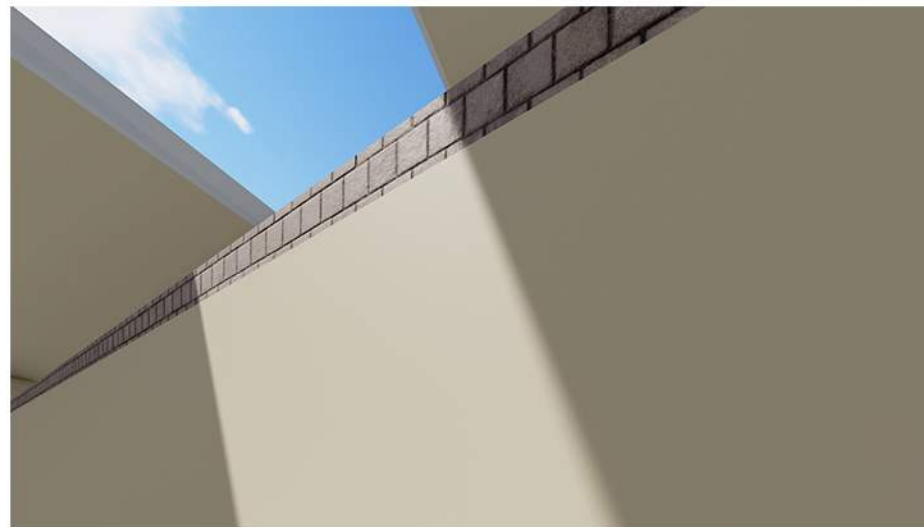
The Corridor spaces:

Brown brick Pieces were added to the top of the walls, as a coping to cover the top of the wall and give the visitors an indicator about the hidden brick that is used to construct the walls.

The edges of the openings in the roof were also covered by stone pieces to protect the edges of the roof and prevent the rain water to pass underneath the roof surface.



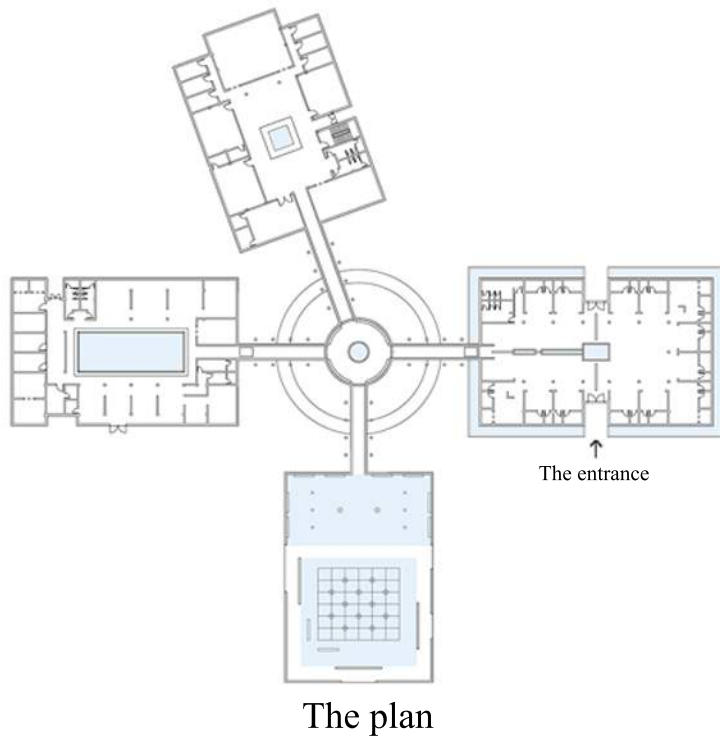
Original conition



The final rendering

The structure :

The structure includes steel columns supporting the roof. To emphasize the role of the columns and to make this more readable, the walls do not touch the roof. This provides moments of view to the sky, the source of rain and life-giving water. The type of the structure is the same in the whole building but it is presented in two different ways. Inside the four main spaces, the columns are located inside the space just behind the exterior walls. Whereas in the four corridors the columns are located outside the space of the corridor, in front of the exterior walls.

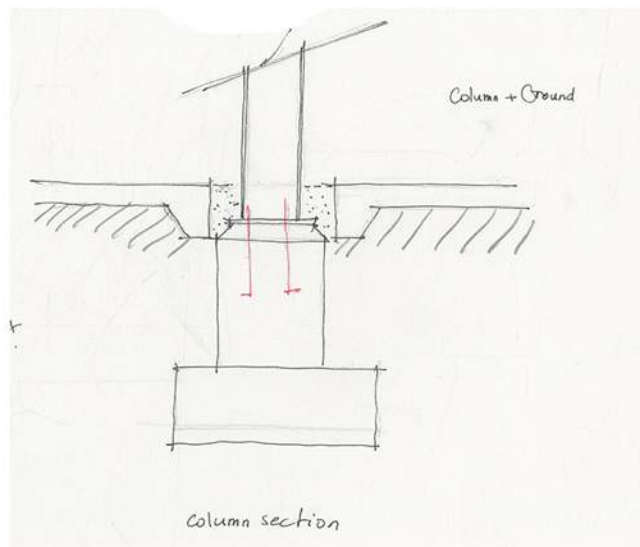
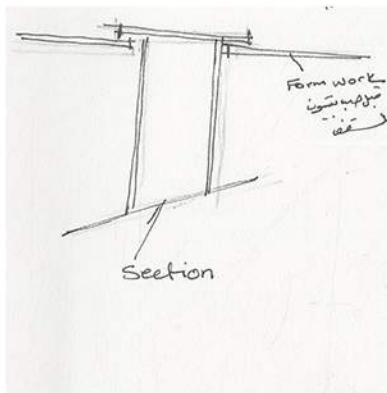


The Materials:

The Material which directly touches the water is marble (black/white), to indicate the importance of water. The focus of the visitor is on the water and its role in experiencing the space, so the overall look of the spaces is simple, clear and unified. The walls are made with brick masonry covered with plaster in the interior and stone cladding from the exterior.

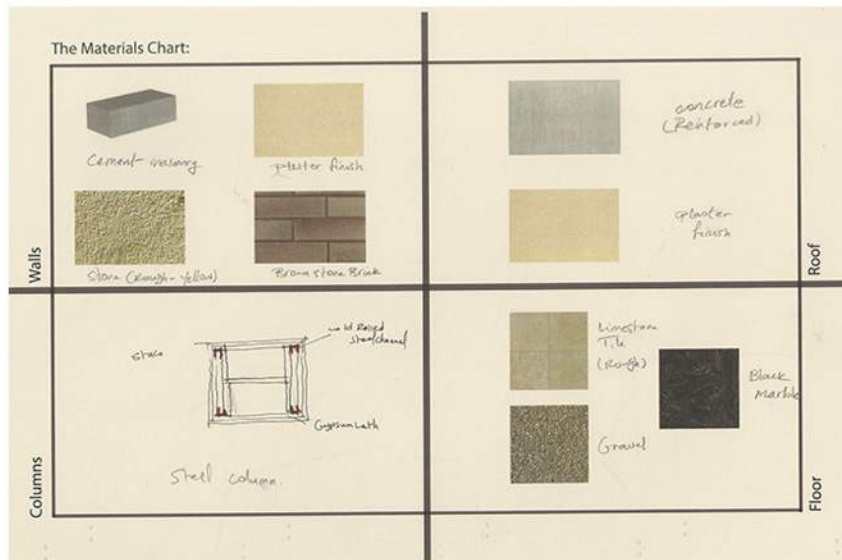
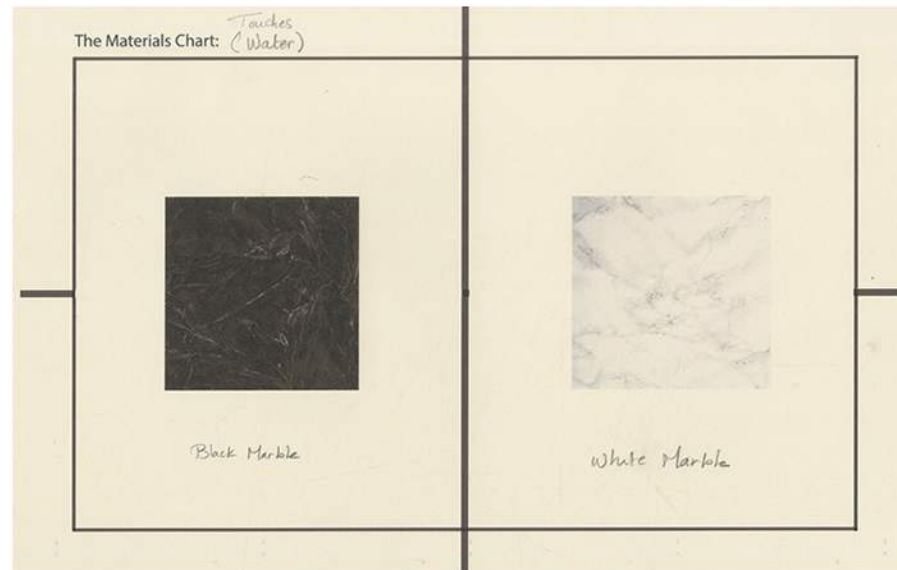
The steel columns are covered with gypsum lath with a plaster finish. The steel plates located at the top and down the steel columns are hidden, where the level of the form work is under the top plates, the ground level (slab) is higher than the plates that are located down the columns.

The flooring is rough stone tiles. The floor is intended to appear continuous like the sky, so the tiles are used in all the spaces giving the effect that the tile/floor is holding the columns and walls. There are some moments where the flooring material must change for spacial needs. For example there is a moment in the covered corridor where you will be under the sky with no roof.

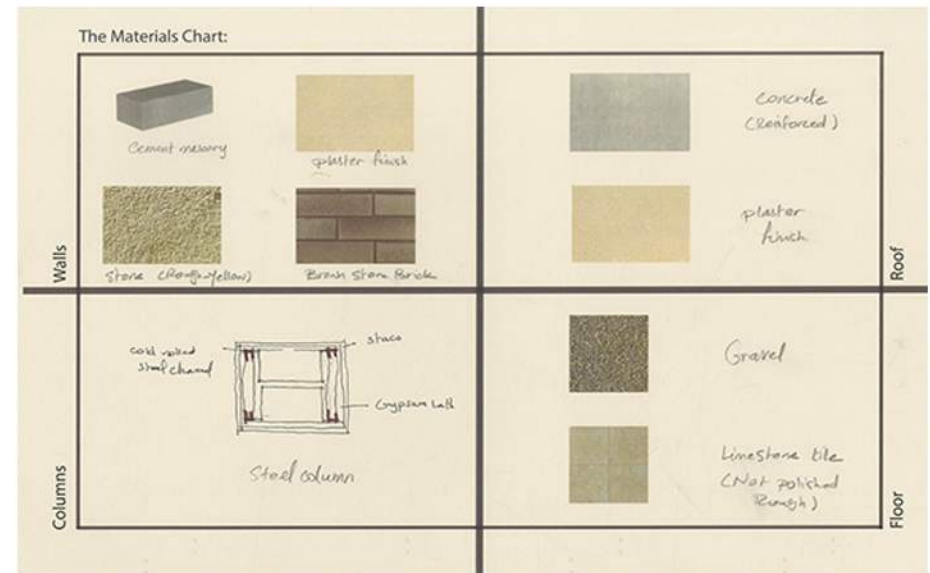


Interior view in the corridor space

The Material Charts:

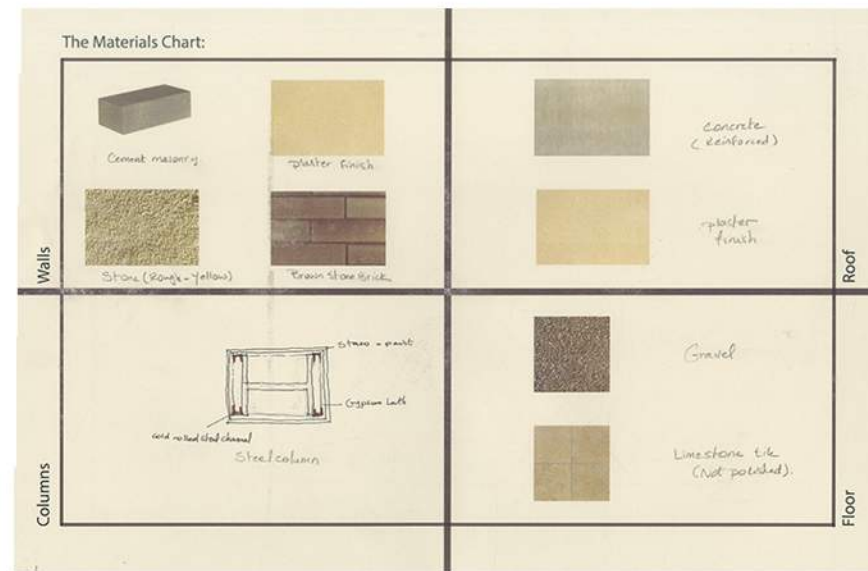


The entrance space

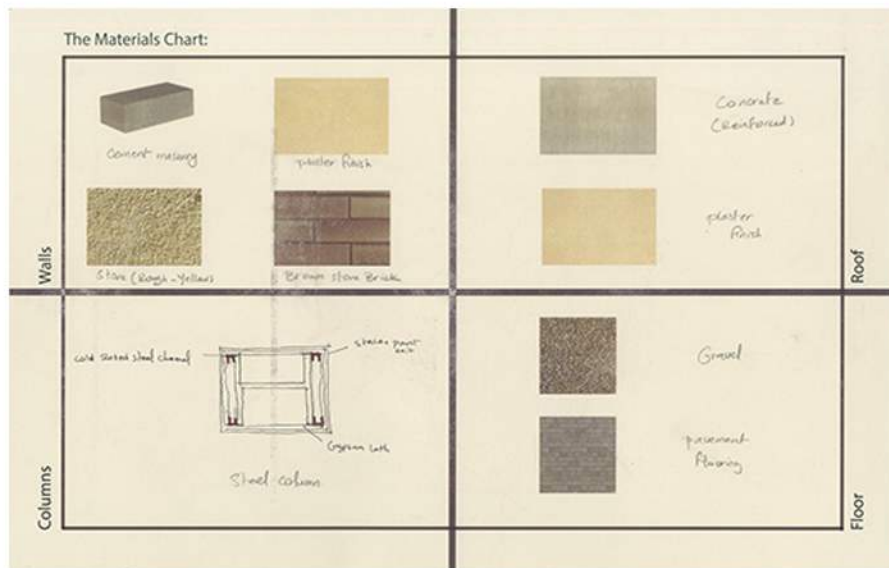


The playground (kids) space

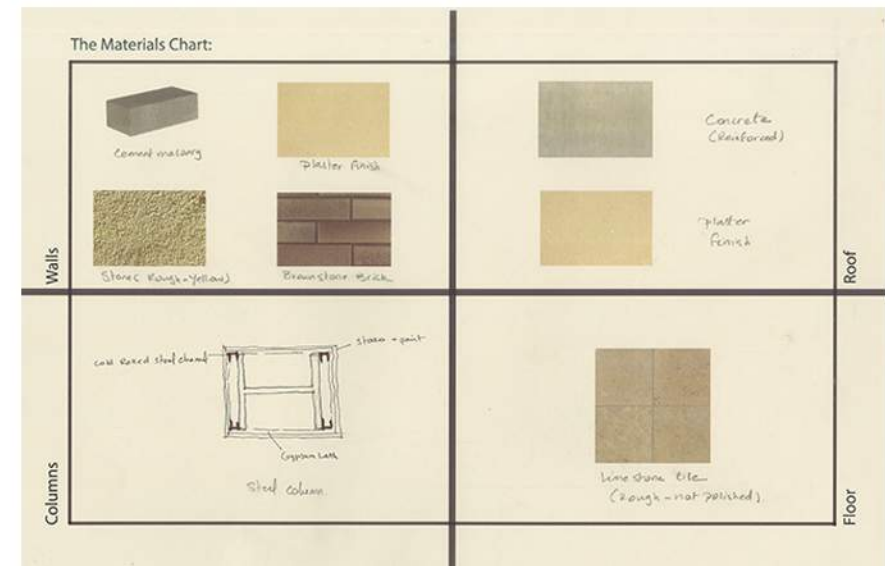
The Material Charts:



The Quiet space



The Vapour space

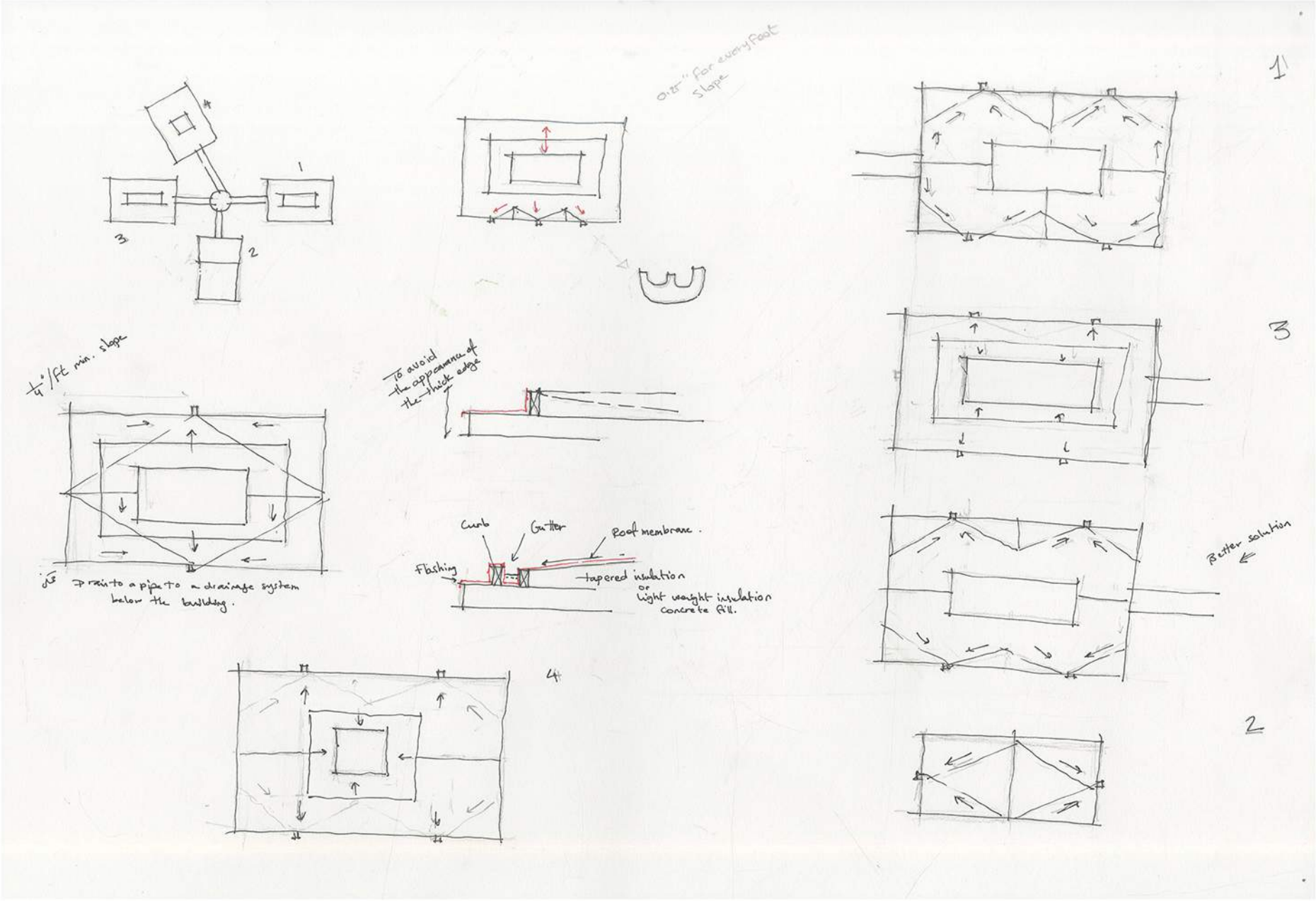


The Hub space

Details:

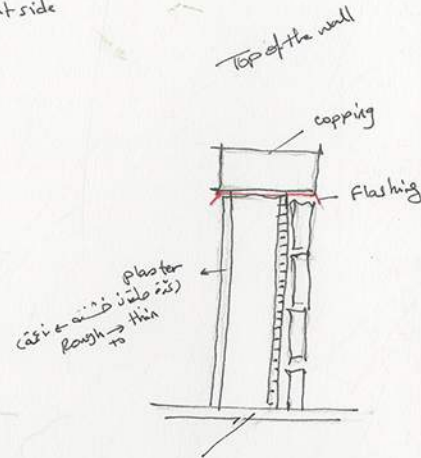
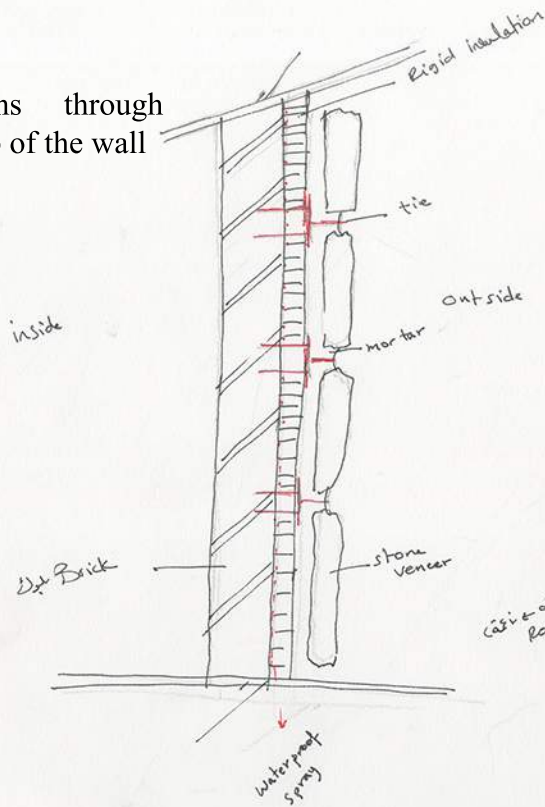
The following sets of drawings show some of the decisions that were made for making the roof, the exterior walls, and the column connections with roof and with the ground.

Details in the roofings:

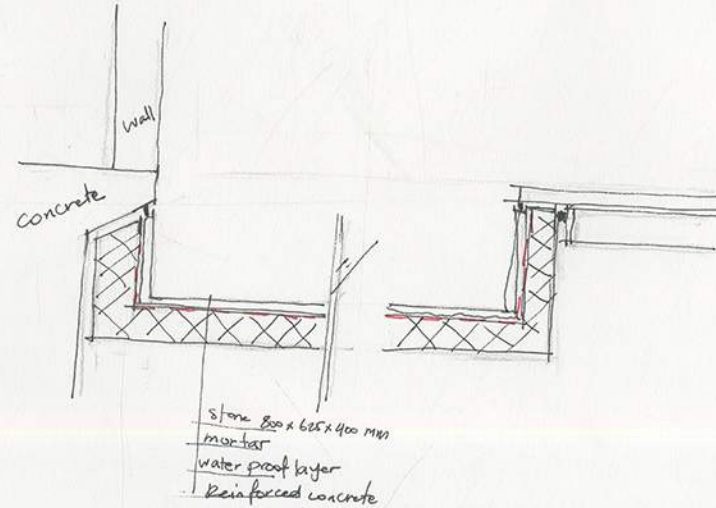
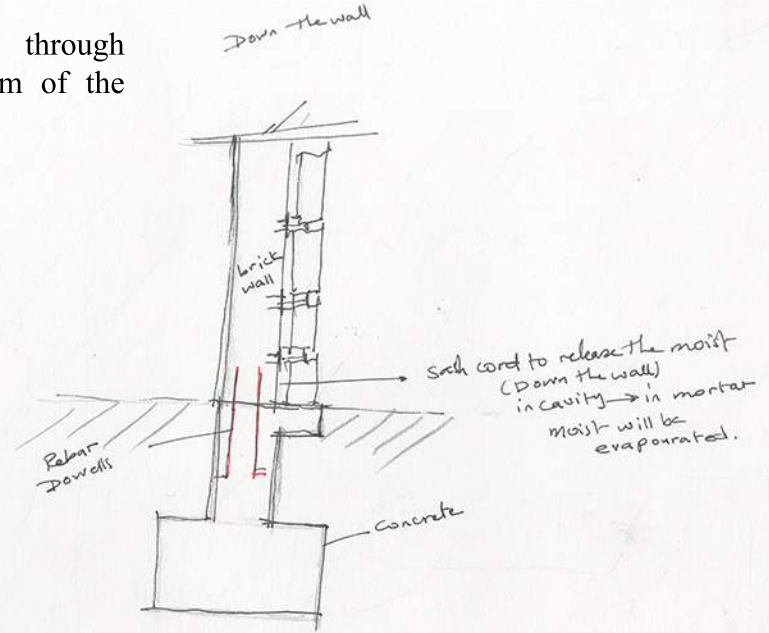


Details in the exterior wall:

Sections through the top of the wall



Sections through the bottom of the wall



- الحجر مسدود ريف حلب جبل الاضري لونه اصفر (م)
لونه
مستوي دونه ريف حلب

- العنبر عند الارتفاع 30 سم ارتفاع الطابق
30-35-40

- سماكة الحجر (الركاب) 12-15
cm

سماكة الأتربة 7-6 cm (غير المتساوية)

التيضير كان بارتفاع 30 سم سماكة (الارتفاع الطابق)

- البوك صحت (ملا)

تقريباً (ملا) (ملا)

سماكة 6-8-10-15-20 cm

- سماكة القرميد يترك مراد 10 سم

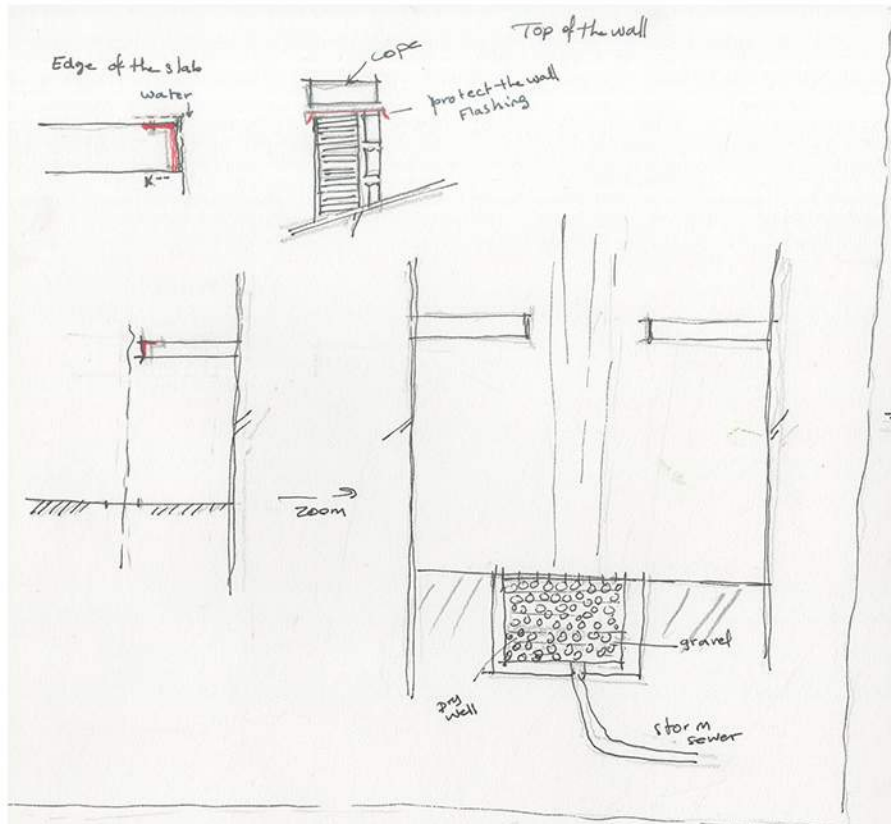
- لونه من لون الاسمنت

- سماكة الحصى + حصى 10 سم

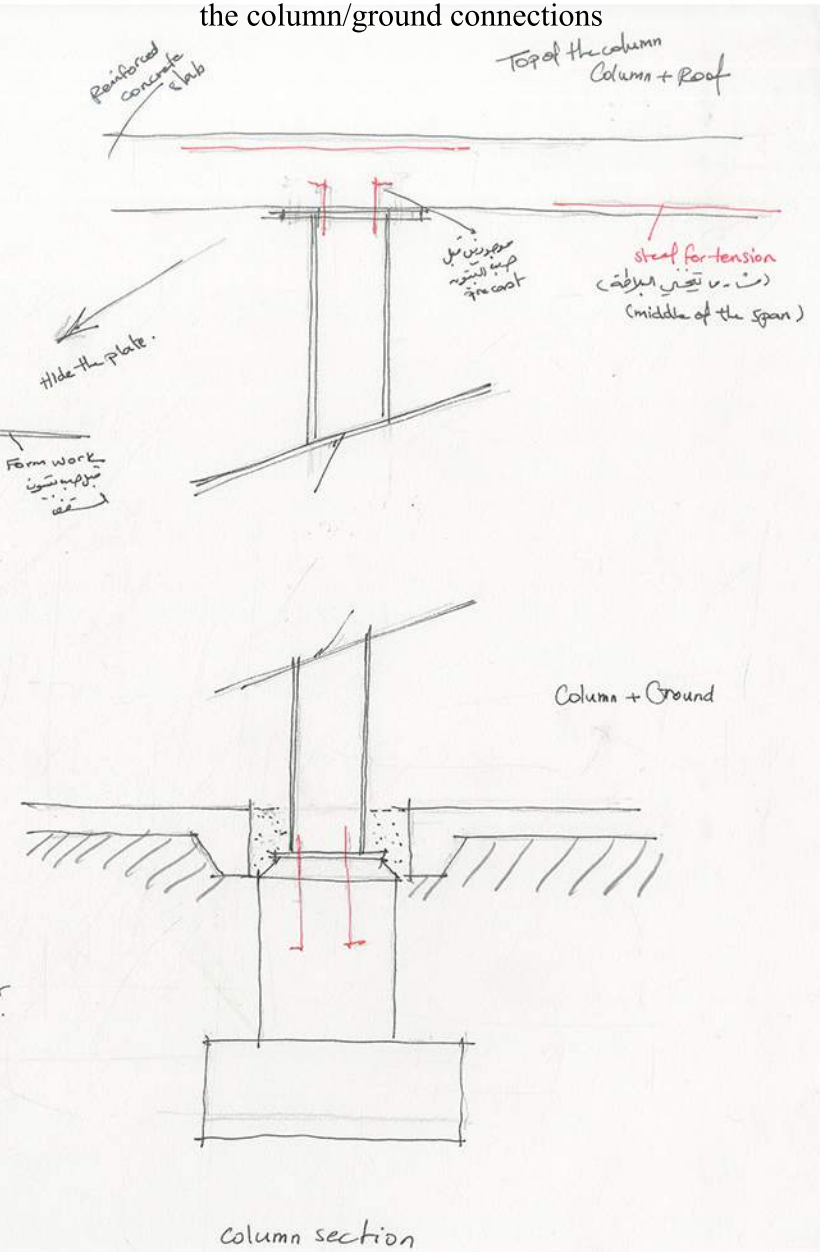
قوة او رطب

مستوي بالمكب

Details in the corridor spaces



Details that show the column/roof and the column/ground connections



The plan of the column

Conclusion

Designing a good community center needs more than just making places to do the required activities. It needs considering designing good spaces that may teach the visitors new things and encourage their curiosity about the world.

In this center, water with the assistance of the natural light had played a big role in teaching the visitors about the nature of the water and its role in life not just as an important natural element but also as an architectural element that helps in creating the wanted atmosphere in each space.

So the architectural space is a combination of many elements that work together to generate specific experiences in our minds that will result in creating certain actions and reactions. Each space has a specific identity that will introduce itself to us and affect us in a deliberate way; and the architect has the opportunity to tell us the story of the building through the generated spaces.

References:

Steven Holl, The Cranbrook institute of science, figure (1).

https://www.google.com/search?q=cranbrook+institute+of+science+fog&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjihauAtsDiAhXPneAKHZ0oA2QQ_AUIDygC&biw=1366&bih=657#imgsrc=cpQ6-IT0r3Fi6M:

Nicholas Grimshaw, The British exhibition, figure (2).

https://www.google.com/search?q=british+pavilion+expo+2000&tbm=isch&source=iu&ictx=1&fir=x-g2hFc5TdPqhM%253A%252CL1JMDnKztjam2M%252C_&vet=1&usg=AI4_-kS9DZT5Bw6CPjrm1O70hVMZjUTnEQ&sa=X&ved=2ahUKEwjg9qb-tsDiAhUxtlkKHcctBTwQ9QEwAnoECAkQCA#imgsrc=0vx8WDBDQNbfMM:&vet=1

Figure(3)

<https://www.instagram.com/aleppophotos/>

Figure(4)

<https://www.instagram.com/aleppophotos/>

Figure(5)

<https://www.instagram.com/aleppophotos/>

Figure(6)

<https://www.instagram.com/aleppophotos/>

Figure (7)

<https://www.instagram.com/aleppophotos/>

Figure(8)

<https://www.instagram.com/aleppophotos/>

Figure(9)

<https://www.instagram.com/aleppophotos/>

figure(10)

https://www.freepik.com/free-vector/grey-world-map_893780.htm

Figure(11)

https://www.google.com/search?biw=1366&bih=608&tbm=isch&sa=1&ei=SH3wXOrtBuGc_QbU85fgCQ&q=ceramic+arabic+vase&oq=ceramic+arabic+vase&gs_l=img.3...44109.45654..45818...0.0..0.159.548.2j3.....0.....1..gws-wiz-img.ZBgbpJmJcZY#imgsrc=r0AQVP22AG5DzM:

(1)

<https://www.goodreads.com/quotes/548068-light-gives-of-itself-freely-filling-all-available-space-it>

(2)

<https://www.poemhunter.com/poem/light-7/>

(3)

<https://www.poemhunter.com/best-poems/zaibar-zee/light-35/>

(4)

<https://www.archdaily.com/221093/color-light-time-scale-steven-holl>