

Metanioa

IDES 401-2022
Nadine Al Sous

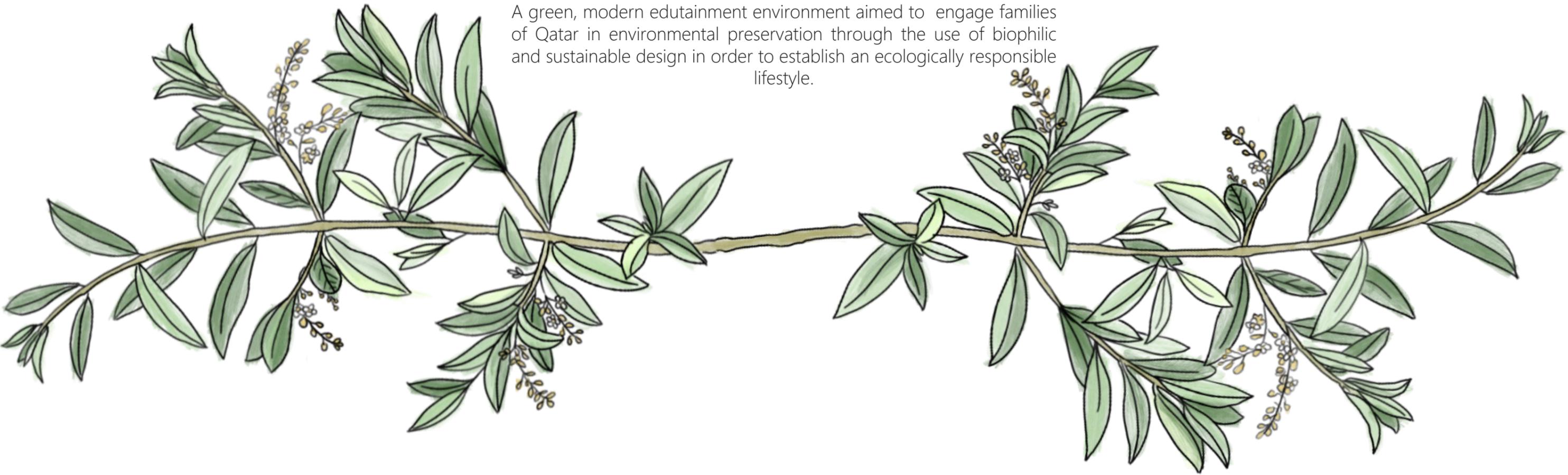
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Concept Statement

A green, modern edutainment environment aimed to engage families of Qatar in environmental preservation through the use of biophilic and sustainable design in order to establish an ecologically responsible lifestyle.

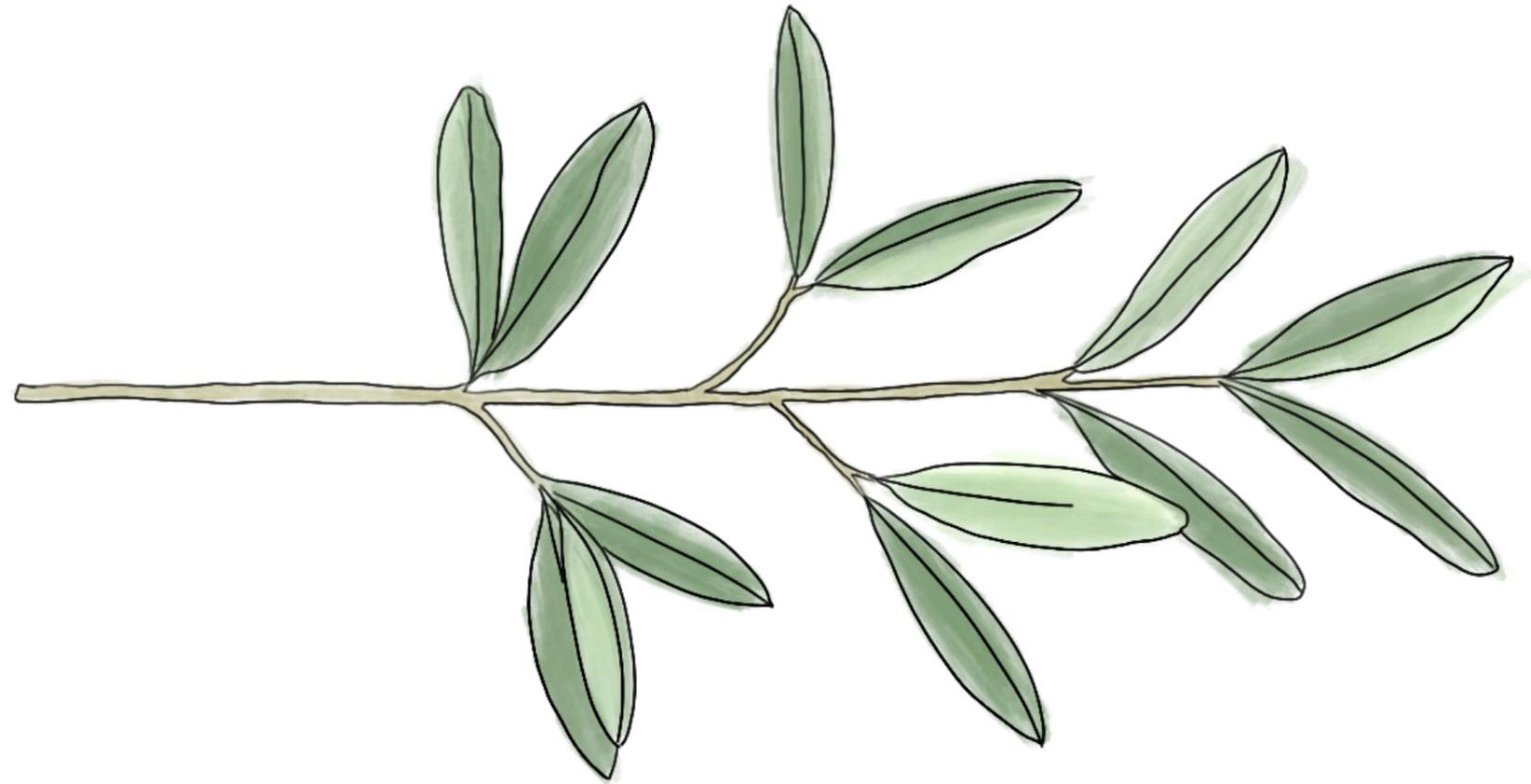


Abstract

This thesis aims to respond to Qatar's classification as the world's most polluting country per capita in a worldwide rating. The country's rapid industrialization and urbanization, as well as Traffic-Related Air Pollution (TRAP), contributed to the rising air pollution. According to an article by the International Journal of Occupational Medicine and Environmental Health in 2015, particulate matter (PM) "come mainly from motor vehicle emissions, road dust, power generation, industrial combustion, construction and demolition activities, or of natural origin such as sea salt, volcanic emissions and naturally suspended dust." It is evident through research carried out by the Mental Health Weekly Digest that "Long-term exposure to nitrogen dioxide or fine particulate air pollution was associated with increased depressive symptoms." Children and adolescents between the ages of 5 and 16 exhibit signs of developing mental health disorders. If not addressed, these problems may persist until adulthood. Therefore, there is a great need to educate the families in Qatar about this issue so as to help raise awareness for proper environmental preservation as the main source of daily pollution comes from the citizens' daily activities.

Qatar has been environmentally impacted over the past decade by increased daily road traffic along with industrialization as the FIFA 2022 World Cup is coming up. This development has made a contribution to the lives of the citizens. Consequently, it is essential to raise the public's awareness about air pollution levels that are still on the rise. This awareness should spark the urge to protect the environment. This will help in finding more sustainable solutions to avoid more possible air pollution and try to improve it. According to The State of Qatar, in Sustainable Development: An Appraisal from the Gulf Region, Qatar's National Vision 2030, intends to create an environmentally aware population that values the preservation of the natural state of Qatar, including management and protection of the Qatari environment.

The proposed edutainment-based approach will be achieved through an interactive hub that will entertain and educate people about air pollution in Qatar and how a more sustainable lifestyle can be developed. This will be done through the use of sustainable and biophilic design principles throughout the space, as well as workshops that are designed to educate people about the environmental effects of daily life pollutants and how they increase air pollution, thus increasing the risk of mental health issues.



Rationale

Mental health disorders are on the rise due to air pollution that comes from the growing pace of industrialization and urbanization as well as Traffic Related Air Pollution (TRAP). Epidemiology is the study of the spread of health-related diseases in the population. According to Changsoo Kim and Jaelim Cho's article Air Pollution and Mental Health, "numerous epidemiological studies have suggested associations of air pollution with suicidal behaviors (attempted suicide and completed suicide), psychiatric disorders (depression and anxiety), neurodegenerative diseases (cognitive decline, dementia, and Parkinson's disease), and neurodevelopmental disorders (attention deficit hyperactivity disorder [ADHD] and autism").

According to research data from Tokyo, Japan, suicidal behaviors have been associated with one of the effects of air pollution. The daily concentration of nitrogen oxide in the air was correlated with a higher suicidal rate among people under the age of 30. This is because they are more vulnerable to the stresses of the environment. Their life conditions tend to have a greater impact on them and contribute to their mental problems, which increases their proclivity to commit suicide acts.

Psychiatric disorders such as depression and anxiety are the most common mental health disorders that could develop. According to an article, Cristina Vert, a researcher that focuses on environmental epidemiology, contributed to a research paper that focuses on the effects of long-term exposure to air pollution on anxiety and depression in adults, mentions that "Air pollution can cause systemic and neuroinflammation, oxidative stress, cerebrovascular damage, and neurodegenerative pathology". Depression is a mood disorder that can cause continuous feelings of sadness or a loss of interest in daily life activities. Anxiety is a natural body mechanism that responds to stress. Air pollution exposure at levels below 2.5 PM levels, can "increase the severity of anxiety and depression symptoms". A high risk of psychological illnesses is increased by inflammation, oxidative diseases and vascular diseases. This shows that air pollution does have a negative impact on mental health. Through the same research paper, Cristina concludes that "Our study shows that increasing long-term exposure to air pollution may increase the odds of depression and the use of antidepressants."

Cognitive decline, dementia, and Parkinson's disease are examples of neurodegenerative illnesses that can be caused by industrialization's growth in human civilization, as well as the severe air pollutants that come with it. According to an article that discusses Outdoor Ambient Air Pollution and Neurodegenerative Diseases, "the most common central nervous system pathology in human and animal studies is the presence of a Central Nervous System response, which has given rise to the neuroinflammation (defined as a state of inflammation inside the brain or spinal cord) hypothesis as a key mechanism of how inhaled pollutants can impact central nervous system health." The increase in cytokines and reactive oxygen species in the brain are common

denominators of neurodegenerative disorders that may be directly caused by outdoor air pollution. Neurodevelopmental disorders are a type of central nervous system disease that mostly affects children who have been exposed to pollutants in the air. An investigation done with Swedish Twins concluded that "recent studies have reported associations between air pollution exposure and neurodevelopmental disorders in children". This established that air pollution may be neurotoxic to developing neurons and may have a role in the genesis of neurodevelopmental diseases, including autism spectrum disorder. Thus, exposure to air pollution has been linked to higher expression of markers associated with neurodegenerative disease pathologies.

According to a study taken of the Czech Republic's men and their reproductive systems, "men were at increased risk of stress, poor QoL (quality of life), and depressiveness from air pollution exposure than were women." This is because the quality of men's sperm is deteriorating, posing a threat to humanity's reproductive system. "Reproductive health studies were prompted by reports that rates of conception and incidence of congenital anomalies were affected by seasonal increases in air pollution"

In a recent study on air pollution, Qatar was ranked first among the world's most polluted countries per capita. This is because of the increased particulate matter (PM) that is caused by "motor vehicle emissions, road dust, power generation, industrial combustion, construction and demolition activities, or of natural origin such as sea salt, volcanic emissions and naturally suspended dust." A cohort study is required to determine the effects of air pollution on the Qatari population's mental health because mental stress and air pollution are relatively unexplored in this region. Despite the fact that Qatar is a fast-growing country, little study has been done in the Gulf region that contributes to the harmful consequences of air pollution on its citizens. It is critical to be aware of these effects in order to address the issue of air pollution and mental effects.



Approach

This proposal aims to assess the mental health effects caused by air pollution on Qatar's citizens. The research strategies will be qualitative in nature, ranging from data gathered and compiled from primary research methods such as interviews, to secondary sources such as literature reviews and precedent studies.

Precedent studies such as Daughters of Ali Ahmadi House, a traditional Qatari residence that no longer exists, will be extensively researched to determine the solutions used at the time to combat the harsh climate. Traditional ventilation and natural cooling technologies will be examined in order to improve the performance of sustainable buildings. Another precedent study is SportPlaza Mercator in Amsterdam, which will be analyzed in depth to understand how greenery is implemented in modern spaces. These case studies will be used to undertake biophilic design and sustainability studies that will assist in creating a fundamental understanding of the causes of air pollution in Qatar and how a citizen's lifestyle influences overall air quality.

A secondary literature analysis that explore greenery and how biophilic principles may strengthen design methodologies and thinking by focusing on the effects of the environment and well-being, with an emphasis on key aspects such as "introducing "nature" into the space".

This will be beneficial to connect the mental wellness benefits of nature with mental health and atmospheric design. Investigating the potential of biophilic design and how it may help better incorporate the notion of greenery in a space. Furthermore, an in depth grasp of how to implement principles of sustainability while having the least negative influence on the environment.

Interviews will examine two perspectives: architectural and design, and scientific. These interviews will conduct the characteristics and efficacy of greenery in design, as well as how air pollution may be reduced from a scientific standpoint. Dr. Ali Ahmed Eltohami will be interviewed for the scientific information about mental health, while architect Dana Kraidli will be interviewed for the architectural and design advice.

To approach the idealized interior environment while incorporating design aspects such as biophilic design to better boost one's mental health, the concept of air pollution and its impacts on mental health will be incorporated. The VCU-Q library and Google scholar portals will be utilized to gather this information, which will be applicable to reply to research proposals.



Literature review

Introduction

The rise of air pollution in Qatar, due to the fast urbanization, caused an increase in the citizens mental health problems. The low diameter of particulate matter levels causes pollutants to be absorbed easily into the body, resulting in more problems in mental health patients. Literature reviews assists in finding a number of topics that are related to air pollution and its negative effects on people's mental health. The key concerns raised in the articles highlight the following: suicidal behaviors and psychiatric disorders. Despite the fact that these publications are based on Western literature, due to a lack of local research, there is no reason to believe that different residents in the local area would have different experiences because they are subjected to such poor air quality. The authors investigate the mental damage air pollution can cause over a long period of time. Some of these articles provide suggestions for improving general air quality in order to prevent long term mental harm to future generations.

Air pollution Causes

Several projects have been launched in the recent decades in Qatar to determine the most effective strategies to address the issue of environmental degradation. Even though the environment sustainability pillar of Qatar National Vision (QNV) 2030 Qatar has taken the obligation to contribute to this global agenda, but it seems the country's environmental statistics have not been encouraging up to this point.

Air pollution is a serious concern in Qatar, particularly with future events such as the FIFA World Cup 2022 coming up, which has prompted several projects such as the construction of multiple stadiums, the metro, hotels and other infrastructure. The fast development in the industry and urbanization in such a short period of time has resulted in a significant increase in air pollution. The main question of concern is whether it is possible to increase the quality of the environment without lowering the economic growth as well as what strategies Qatar should pursue to maintain economic growth while also protecting the environment to improve the overall air quality of the country. Energy consumption has been a major contributor to Greenhouse Gas (GHG) emissions in Qatar. It is critical to consider ways to minimize the GHG emissions to enhance the air quality without jeopardizing economic development.

It is critical for a country that is reliant on hydrocarbon resources to promote renewable energy as a viable alternative source of energy. This also indicates that lowering the country's economic reliance on oil and gas, as well as expanding the country's overall green area, will assist to improve air quality and reduce CO₂ emissions.

However, a study from North and Eastern China found that in the last several decades they have seen substantial changes in air quality and temperature. After investigating the causes further, the authors concluded among the multiple causes of

air pollution, the most prominent were airplane observations of atmospheric trace gases, aerosols, and clouds over this area of China, which is heavily impacted by both natural desert dust and pollution-induced smog. A further observation was taken place to investigate Extremely high levels of gaseous air pollutants and haze particles, occurring in conjunction with non precipitating stratiform clouds. Clouds were characterized by a large number of droplets that were significantly smaller than those seen in a less polluted environment. The primary source of cloud condensation nuclei is the coating of dust particles by pollutant acids. Air pollution-enhanced activation of dust particles into droplets is demonstrated to be very effective, forming clouds even at relative humidity levels below 100 percent.



Literature review

Air pollution effects on Mental Health:

The research "Ambient air pollution and suicide in Tokyo, 2001-2011" examined how suicidal behavior has been linked to air pollution as a result of the high concentration of Nitrogen Oxide, in the air pollution, is being absorbed into the body. This study focuses on the link between air pollution and depression leading to suicide in Tokyo, Japan, one of the world's most populated cities. The authors concluded that those under the age of 30 in Tokyo have a greater suicidal risk due to the air pollution. Results for this study showed higher levels of particulate matter (PM2.5 and PM10), which contains sulphur dioxide, nitrogen dioxide and ozone, are all connected to the "increase in suicide morality or suicidal attempts". This analysis also highlighted how several characteristics, such as the presence of disease, sex, age as well as the season of the year, might all play a role in identifying the relationship between air pollution and suicide. It is important to note, that over half of the suicide victims in this study had previously suffered with depression. Some of the results show that the suicidal death rates that came from depression caused by local air pollution were 69% male and 31% female in Tokyo.

On the other hand, the article "Impact of air pollution on depression and suicide", states that "60–80% of all suicide victims suffer from depression, while 15% of patients with severe depression eventually commit suicide" as a result of environmental parameters like air temperature, atmospheric pressure, humidity and air pollution. An experimental study was conducted to determine whether or not exposure to air pollution had an effect on depression and suicide. The results contain limitations due to the paucity of long term effects of exposure to air pollution. Diversity was also required to investigate the many impacts on various sorts of people, rather than just focusing on a group of people who were very similar. Future study should compare depression and suicide statistics from different locations like those with higher average air pollution levels to regions with lower air pollution levels.

In contrast, according to a German based research titled "Examining air pollution (PM10), mental health and well-being in a representative German sample" claims that "previous literature is inconsistent in terms of associations between air pollution and depression or anxiety". This article included a study of four additional nations as well as Germany. The author establishes that there is no consistent data linking air pollution to mental disorders such as depression symptoms in Germany even though other studies did establish a relationship between air pollution and depression or anxiety from the United States and Asia, not Germany. This might be related to the sort of air pollution discovered (in Germany) when anxiety measurements were taken. Instead, it was observed that life circumstances had a substantial impact on both male's and female's mental health concerns. In fact, characteristics such as their age, wealth and life experiences seemed to have a larger impact on their mental Acute stress is a

health. When looking at why assertions are made that males are more impacted, it's because of life satisfaction, which diminishes with age and their stress when earning money. Age and income does have a considerable impact on women, although it is less stressful than it is for males according to the findings of this paper. Therefore, daily activity causes pollution stress and therefore impacts mental health. Stressors can be either acute or chronic. Acute stress is a kind of stress that occurs in a brief period of time. Chronic stress is a kind of stress that lasts a lengthy period of time. Individuals who are exposed to chronic stressors such as air pollution may develop mental illnesses over a period of time. more impacted, it's because of life satisfaction, which diminishes with age and their stress when earning money. Age and income does have a considerable impact on women, although it is less stressful than it is for males according to the findings of this paper. Therefore, daily activity causes pollution stress and therefore impacts mental health. Stressors can be either acute or chronic. Acute stress is a kind of stress that occurs in a brief period of time. Chronic stress is a kind of stress that lasts a lengthy period of time. Individuals who are exposed to chronic stressors such as air pollution may develop mental illnesses over a period of time.



Literature review

Introducing "Nature" into the Space

Greenery in general has a calming effect and can aid mental wellness is a claim made in the article, "The impact of greenery on physical activity and mental health of adolescent and adult residents of deprived neighborhoods: A longitudinal study". The addition of natural components to spaces has been proven to have a positive impact on one's mental health. It was discovered that the quality and quantity of greenery is critical for people's mental health, particularly for adolescence.

Biophilic design explores the ways in which nature can be incorporated into a space harmoniously. According to an article "The Practice of Biophilic Design", more modern settings have grown "inhumane" since they focus primarily on sensory deprived ambiance devoid of greenery. Greenery has been proved in the past in healthcare facilities to alleviate stress caused by air pollution, which reduces blood pressure, provides pain relief, improves sickness recovery, accelerates healing, boosts staff morale and performance, and results in fewer confrontations between patients and staff. As a result, establishing that there is a natural and biological relationship between humans and nature to begin with, and that increasing natural components in the environment can benefit mental health tremendously.

"Nature is a part of our humanity, and without some awareness and experience of that divine mystery man ceases to be man. When the Pleiades and the wind in the grass are no longer a part of the human spirit, a part of very flesh and bone, man becomes, as it were, a cosmic outlaw, having neither the completeness and integrity of the animal nor the birthright of a true humanity." - Henry Beston

Conclusion

In conclusion, the research studies discussed above highlights the significance of looking into the impacts of air pollution on people's mental health in Qatar. The proposal will focus on addressing the mental health issues caused by air pollution and how they can be drastically improved when combined with greenery that is incorporated into the environment and spaces through biophilic design. Multiple variables were discovered in these publications that might aid the proposal in detecting adverse effects such as suicidal and psychiatric disorders. Similar scenarios in other regions of the world have been used to fill in the study gaps in local data. The articles reviewed in this literature review emphasize that air pollution is a severe problem that can have substantial mental health consequences in the community, and that it should be effectively addressed in Qatar in order to preserve a healthy and functional society.



SITE ANALYSIS



DEMOGRAPHICS:

Capital: Doha

Area: 11,610 km²

Population: 2,946,103 (2021)

Urban Population: 2,770,452 people in 2020 (92.6%)

Population Density: 248 per km²

Median Age: 32.3 years

Language: Arabic

Currency: Qatari Riyal (QAR)

Location: Qatar is a Middle Eastern sovereign state. It is located on a peninsula jutting into the Arabian Gulf. Qatar became one of the world's most important oil and gas producers after gaining independence from the United Kingdom in 1971.

Geography: Qatar is a peninsula located on the Arabian Gulf's western shore. The peninsula is roughly 100 kilometers long and 200 kilometers wide, and it stretches into the Gulf. The three biggest islands in Qatar are Halul, Shraouh, and Al-Asshat. Saudi Arabia has a land border with Qatar, as well as a marine border with Bahrain, the United Arab Emirates, and Iran.

Fig. 1: Map Of Qatar

Why Qatar?

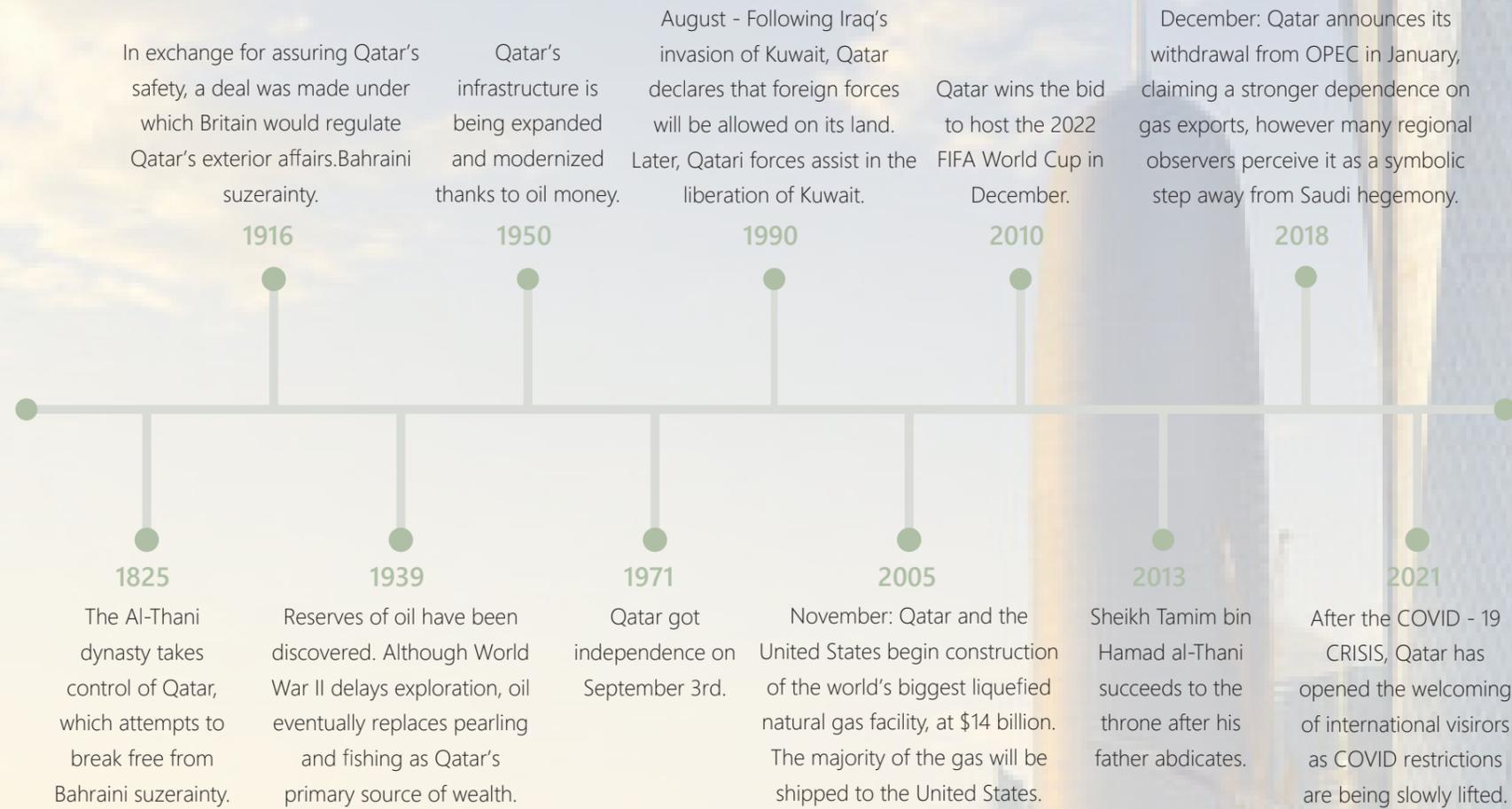
The topic of study, i. e. Air pollution and the relationship to mental health, is location specific to Qatar's current situation. How can citizens become more conscious of this long-term problem? This proposal aims to inspire families of Qatar to contribute to the preservation of the environment to help minimize the issue of air pollution by promoting more sustainable and biophilic design aspects. As a preservation, sustainability and biophilic design is part of the project, the location was dependent on where the target audience, families of Qatar, were. Doha is the most populated area in Qatar, meaning that the space is going to be easily accessible to more people, increasing its reach and significance,



Fig. 2: Map of Gulf region with Qatar Highlighted

QATAR HISTORY TIMELINE:

Qatar's history shown to demonstrate the growth of industrialization throughout the years, which has resulted in an increase in air pollution.



COUNTRY CLIMATE:

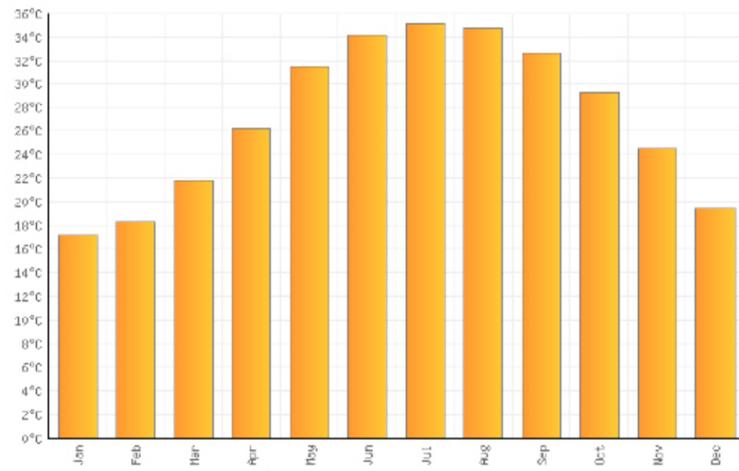


Fig. 3: Average daytime temperature

The **warmest** months, with the highest temperature average are **July (42° C)**. The **coldest** month is **January (13 °C)**.

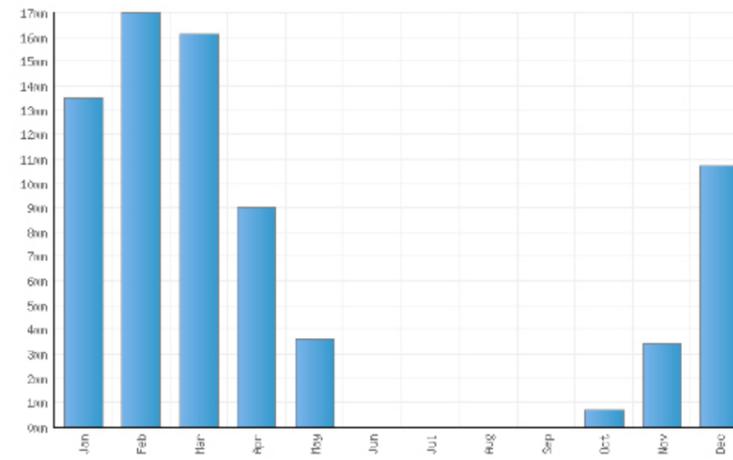


Fig. 4: Average rainfall & rainy days

This graph shows the **average rainfall** and the number of rainy days per month over the year. **February** is the month with most rainfall.

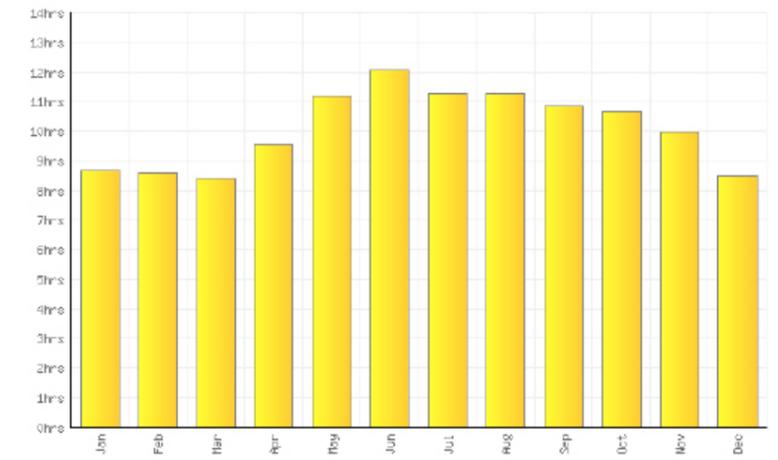


Fig. 5: Average daily sunshine

The average **peak** daytime temperatures are usually around **mid-afternoon**. **June** is the **sunniest** month with the longest sunshine period.

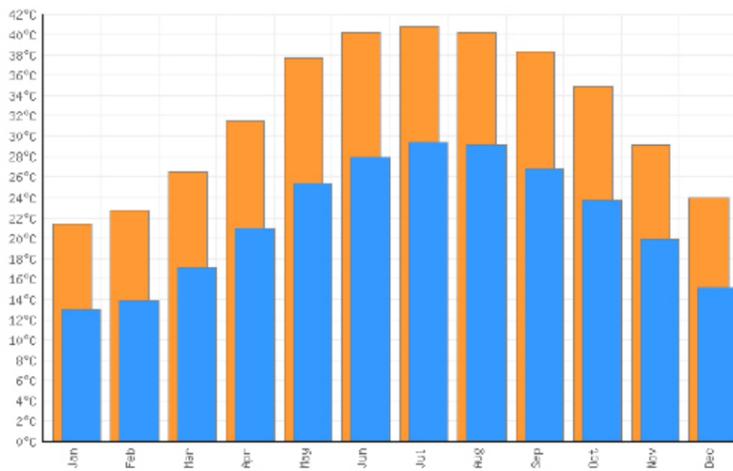


Fig. 6: Daylight hours

June is the month with the **most** daylight (**Average Daylight: 13.7h**). **March** and **December** are the months with the **least** amount of sunlight (**Average Sunshine: 7.8 h**).

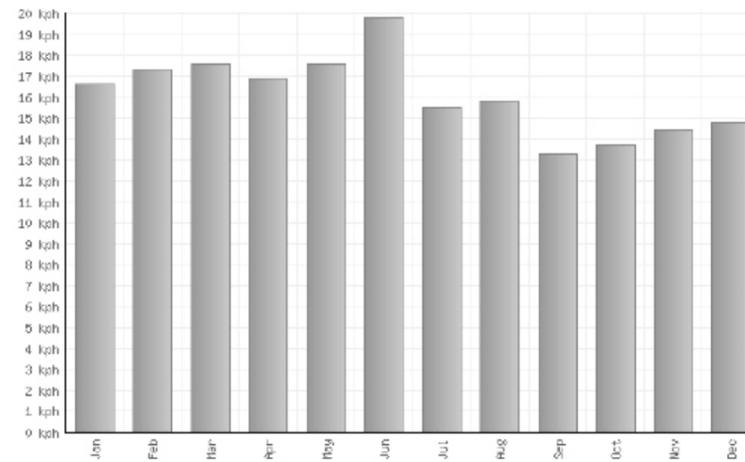


Fig. 7: Wind speed

A monthly **average** windspeed of over **16km/h** indicating that Qatar is a windy country overall.

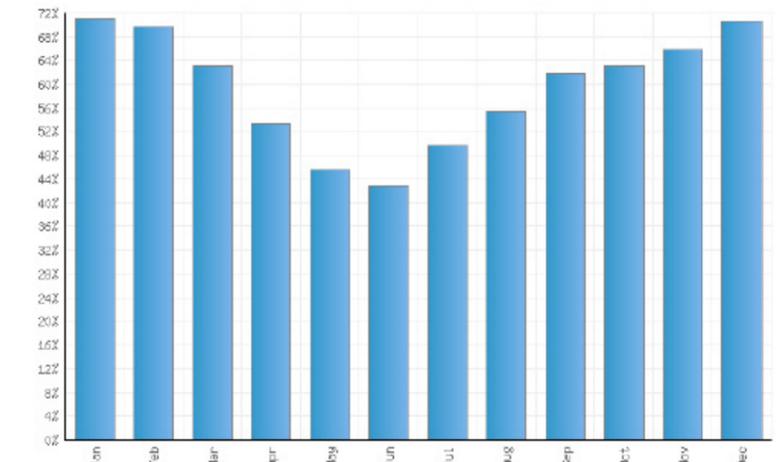


Fig. 8: Relative humidity

June is the **driest** month. Qatar is a humid country on average, given that the majority of its territory is surrounded by water.

SITE LOCATION:



Why Katara Cultural Village?

The cultural village was constructed on reclaimed lands towards the eastern coast between the pearl and west bay, to the North of Doha. It was designed to reflect Qatari culture in its architecture, which includes a variety of activities. Heritage centers, opera houses, libraries, an amphitheatre, art galleries, and other academic facilities, as well as cafés, museum facilities, other commercial organizations, green areas, and an information center, are all part of this \$82 million project. The addition of greenery to the outside area improves and enhances the experience. Katara is one of Doha's most popular tourist destinations. It's a location where families can get together to enjoy activities and quality time in a multicultural setting.

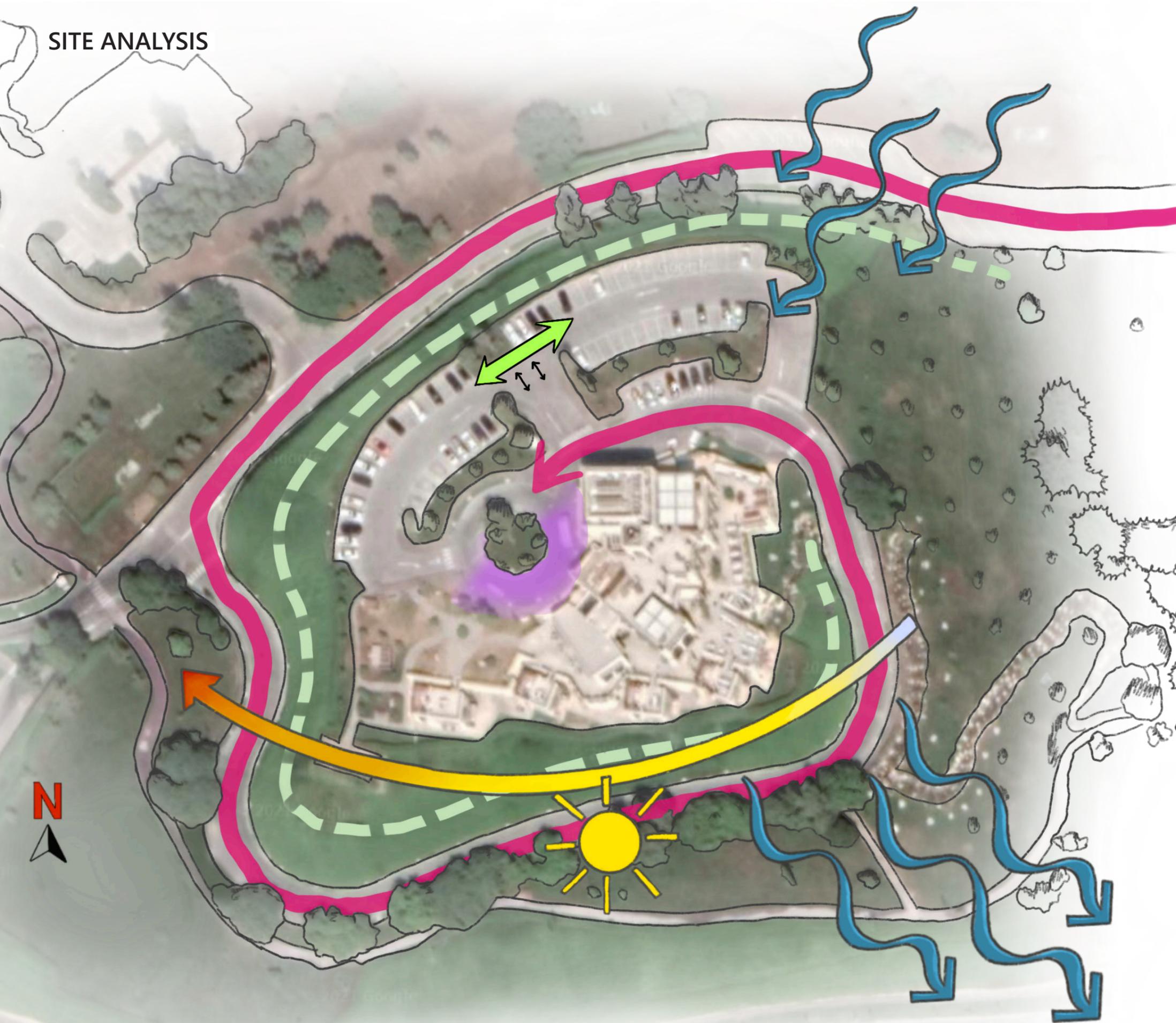
Fig. 9: Map Of Katara

Why Bayt El Talleh?

Bayt El Talleh is a Levantine restaurant with a view of Katara's south hills. It provides authentic Lebanese and Middle Eastern food prepared at home. It is situated on a grassy hill near the North of Doha's Katara Cultural Village. Due to a variety of factors, this site is the greatest fit for the proposal's strategy. Firstly, it is a green space with plenty of open spaces that let natural light in, which best suits the proposed "natural space". Secondly, because it is built on a hill, its elevated view of the rest of the cultural village. It's also surrounded by greenery, which adds to the idea of promoting greenery for environmental and mental health reasons. Mental healing occurs as a result of the magnificent view and greenery in the surroundings, as well as what will be added to the current area. This is a unique structure in terms of architecture since the façade is covered with raw stone cladding, which contributes to biophilic design as the architectural piece is one with nature.



SITE ANALYSIS



LEGEND:

-  Wind Direction (Summer & Winter)
-  Parking lot exclusive to site
-  Access way for Visitors
-  Entrance Highlighted
-  North Arrow
-  Sun path (East to West along South)
-  Greenway surrounding the site
-  (events can occur) Public Park

Fig. 10: Map Of Bayt El Talleh & Site analysis of this site.

THE SITE



Fig. 11: Interior space and how light comes into the space

There isn't a sense of being hemmed in. It makes you feel as though you're **sitting in a garden**. Many of the **glass facades** have a design that resembles flora. The inner area is separated into various spaces that are accessible to one another. The **windows** on the building's perimeter can also be **opened** and utilized for different purposes.



Fig. 12: The greenery surroundings

The structure is **surrounded** by flora, which visitors may wander through as if it were a park. The following private rooms can be utilized for a variety of purposes and programs. This provides for more green space, which can **aid** in the **mental health** recovery process. Along with typical Lebanese houses, the raw stone veneer on the facade adds a touch of nature.

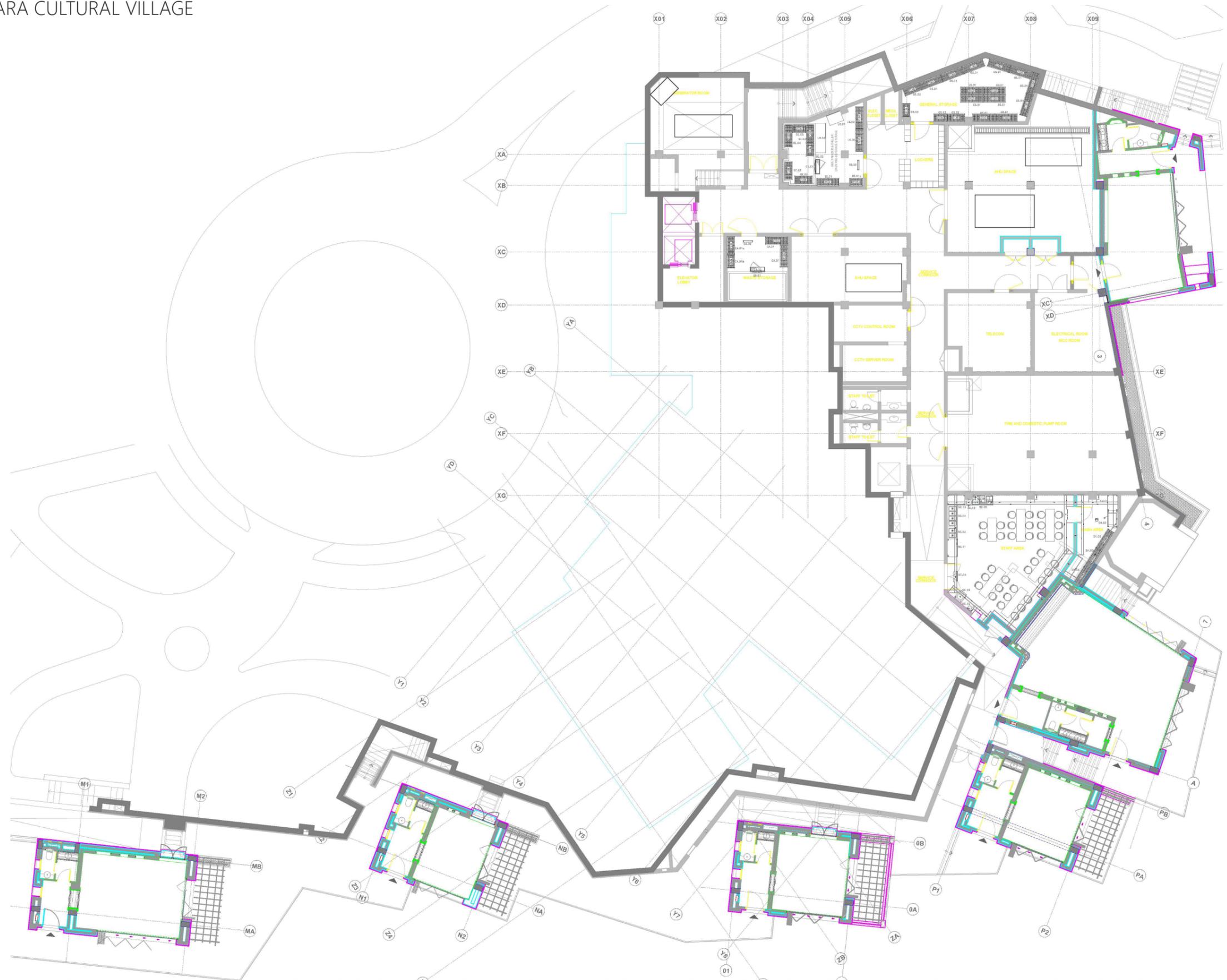


Fig. 13: The view from the top

The tarrace is very large, meaning it can fit alot of people or be split to other fincyioning space. The elevated view from this could be refreshing for a mental health patient. An attraction can be used in this area to attract the out side tome learn more about the problems

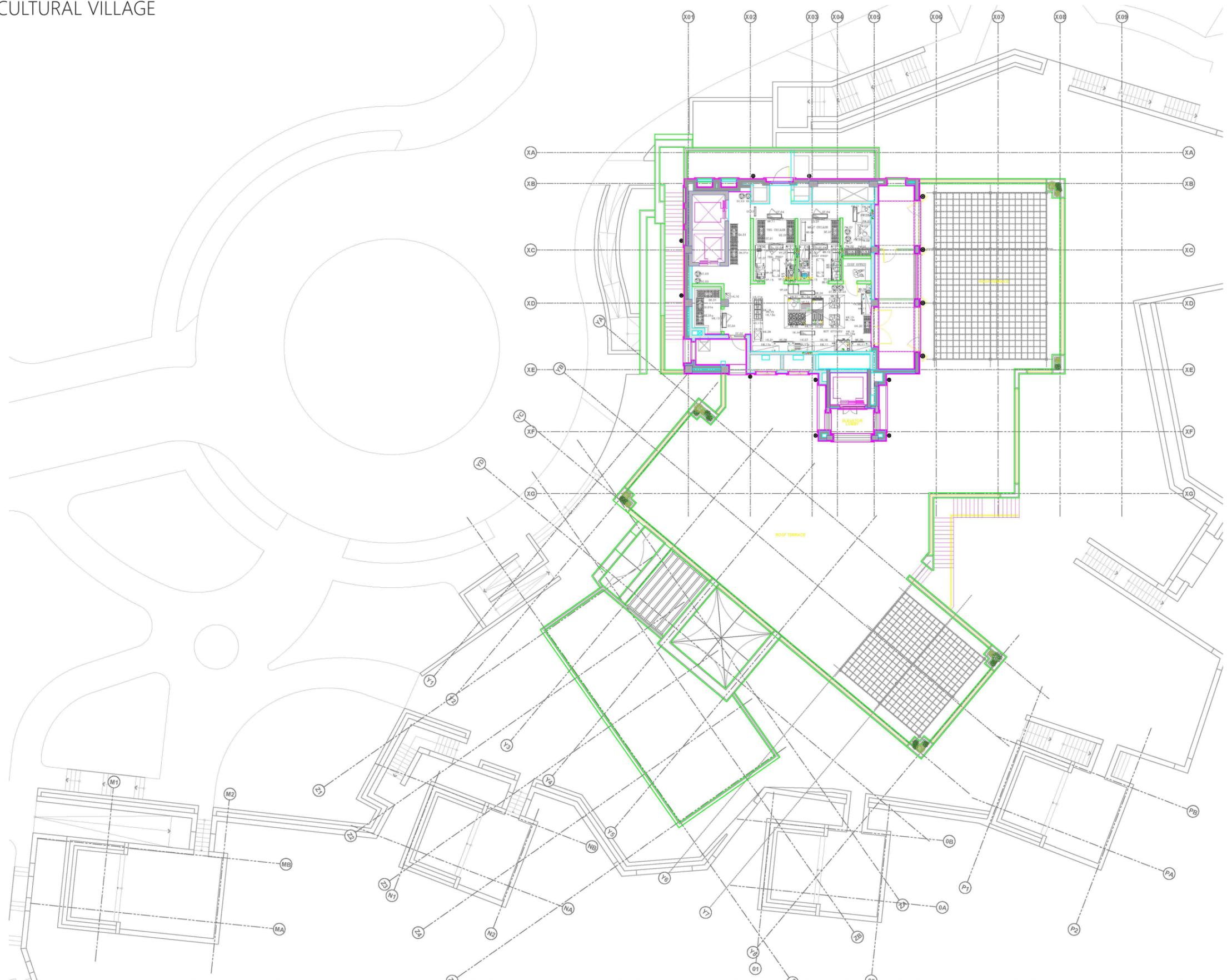
EXISTING BUILDING -GROUND FLOORPLAN

BAYT EL TALLEH - KATARA CULTURAL VILLAGE



EXISTING BUILDING - ROOF FLOORPLAN

BAYT EL TALLEH - KATARA CULTURAL VILLAGE



EXISTING BUILDING - BASEMENT FLOORPLAN

BAYT EL TALLEH - KATARA CULTURAL VILLAGE

BASEMENT FLOOR LEVEL		
UNIT/SPACE	NET AREA, m ²	AC / NON AC
CABIN TYPE-1	51.60	AC
CABIN TYPE-2	34.50	AC
CABIN TYPE-3	30.20	AC
CABIN TYPE-4	39.20	AC
CABIN TYPE-5	50.50	AC
CABIN TYPE-6	50.20	AC

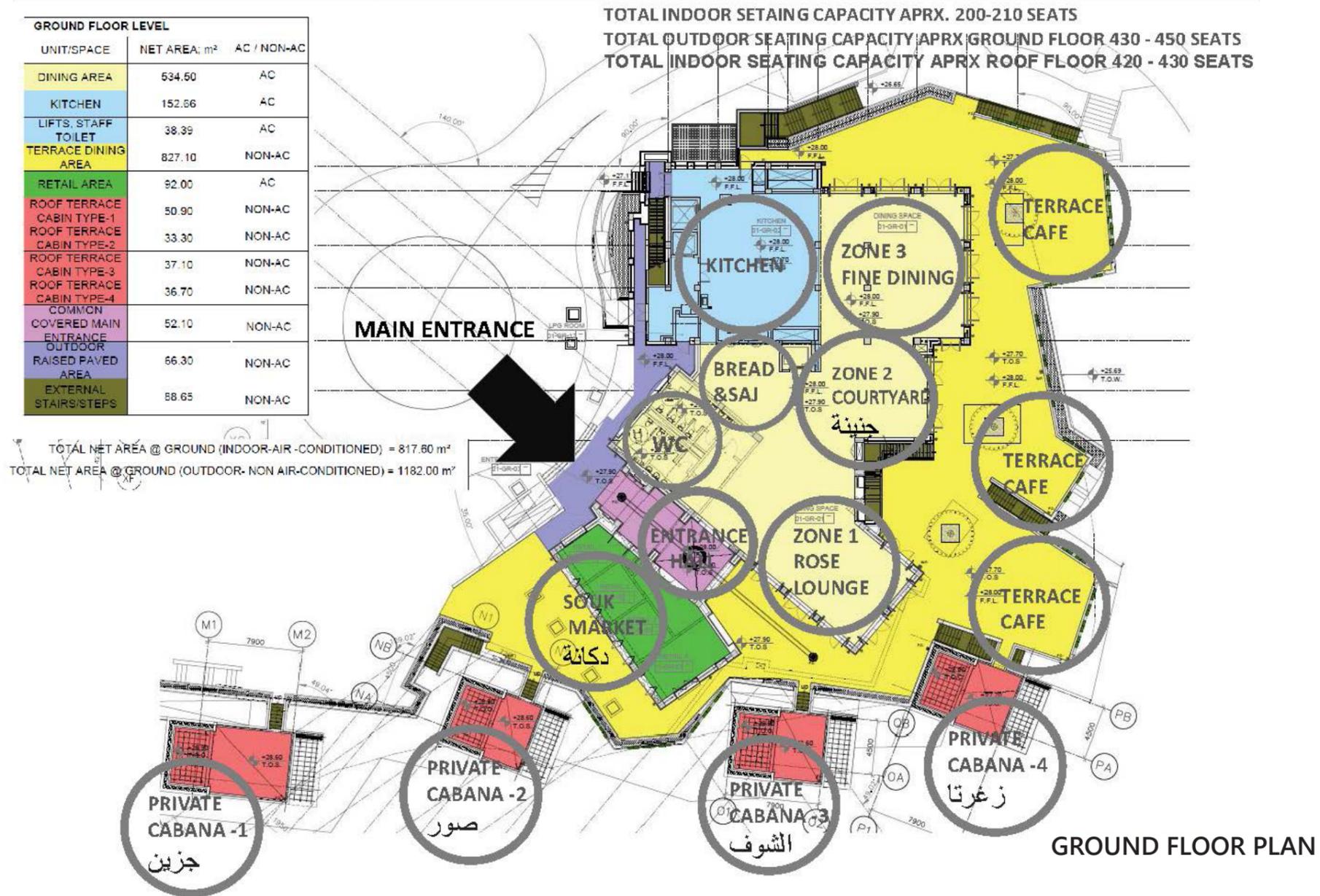
BASEMENT FLOOR LEVEL		
UNIT/SPACE	NET AREA, m ²	AC / NON AC
MEP	357.40	AC/NON-AC
WASH STORAGE	18.70	AC
CLEAN STORAGE	26.30	AC
STORAGE	113.40	AC
SERVICE ELEVATOR	10.10	AC
ELEVATOR LOBBY	13.20	AC
HCH AREA	204.30	AC
CABIN DINING TERRACE	75.00	NON-AC
SERVICE & ACCESS TERRACE	411.58	NON-AC



BASEMENT FLOOR PLAN

EXISTING BUILDING - ROOF FLOORPLAN

BAYT EL TALLEH - KATARA CULTURAL VILLAGE

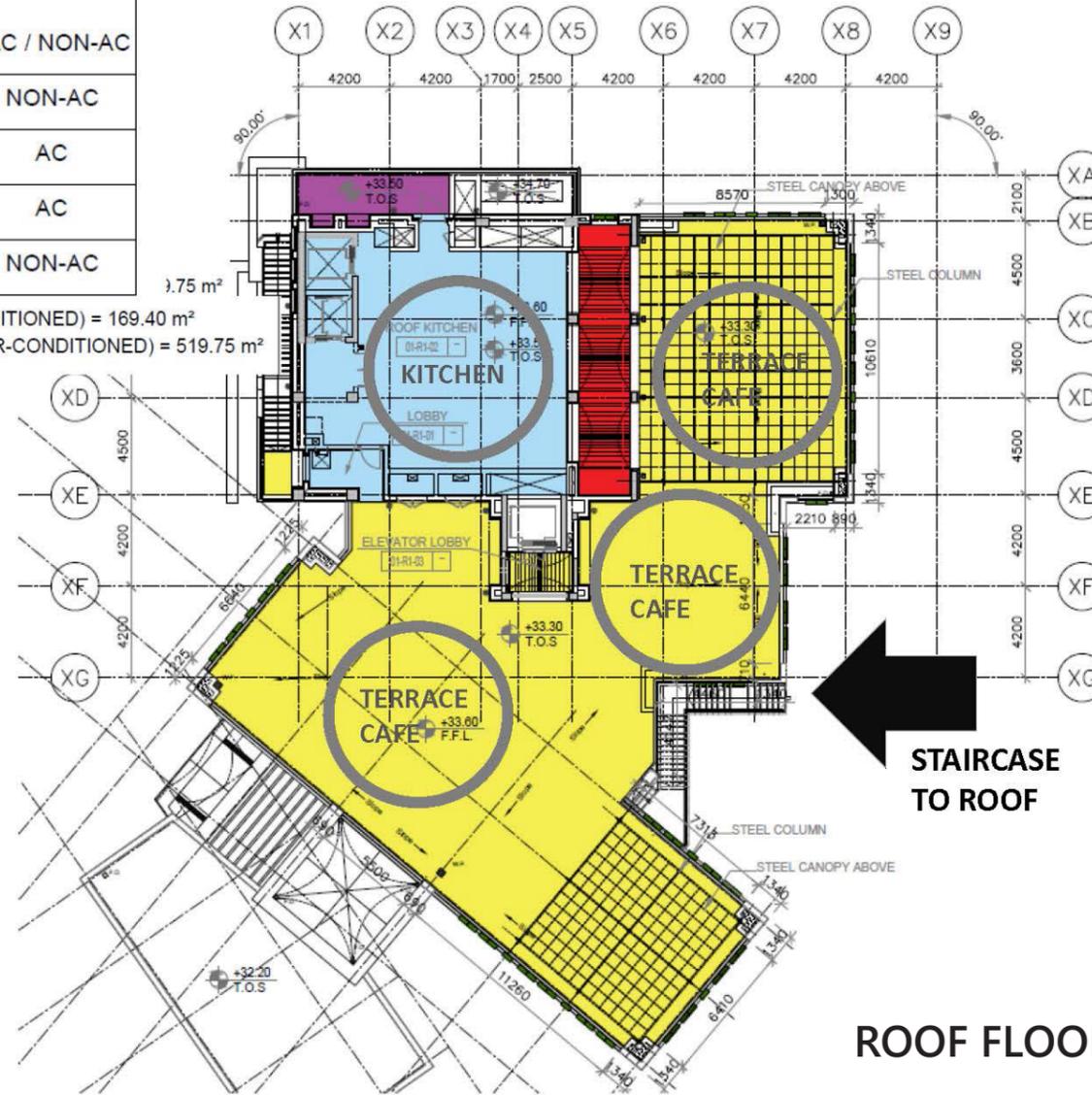


EXISTING BUILDING - ROOF FLOORPLAN

BAYT EL TALLEH - KATARA CULTURAL VILLAGE

ROOF FLOOR LEVEL		
UNIT/SPACE	NET AREA; m ²	AC / NON-AC
ROOF TERRACE, LIFT & LOBBY	505.75	NON-AC
ROOF KITCHEN	139.90	AC
SHOW KITCHEN	29.50	AC
KITCHEN TERRACE	14.00	NON-AC

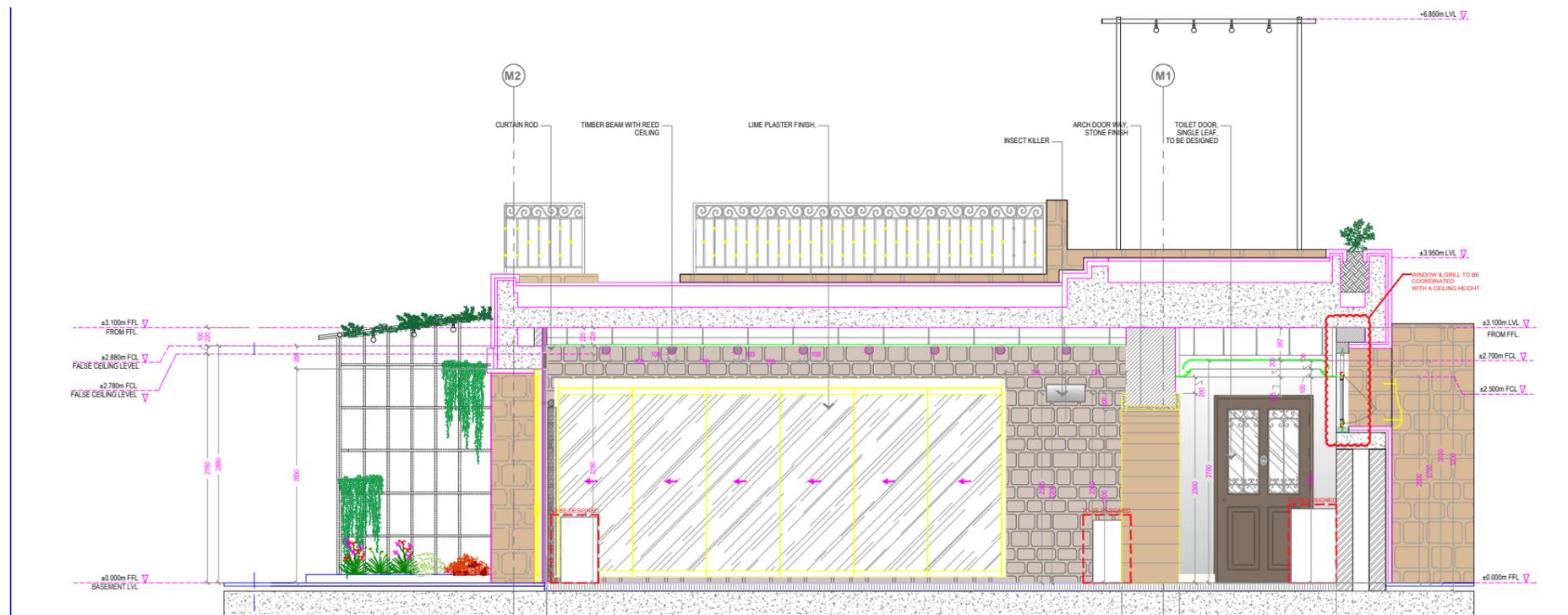
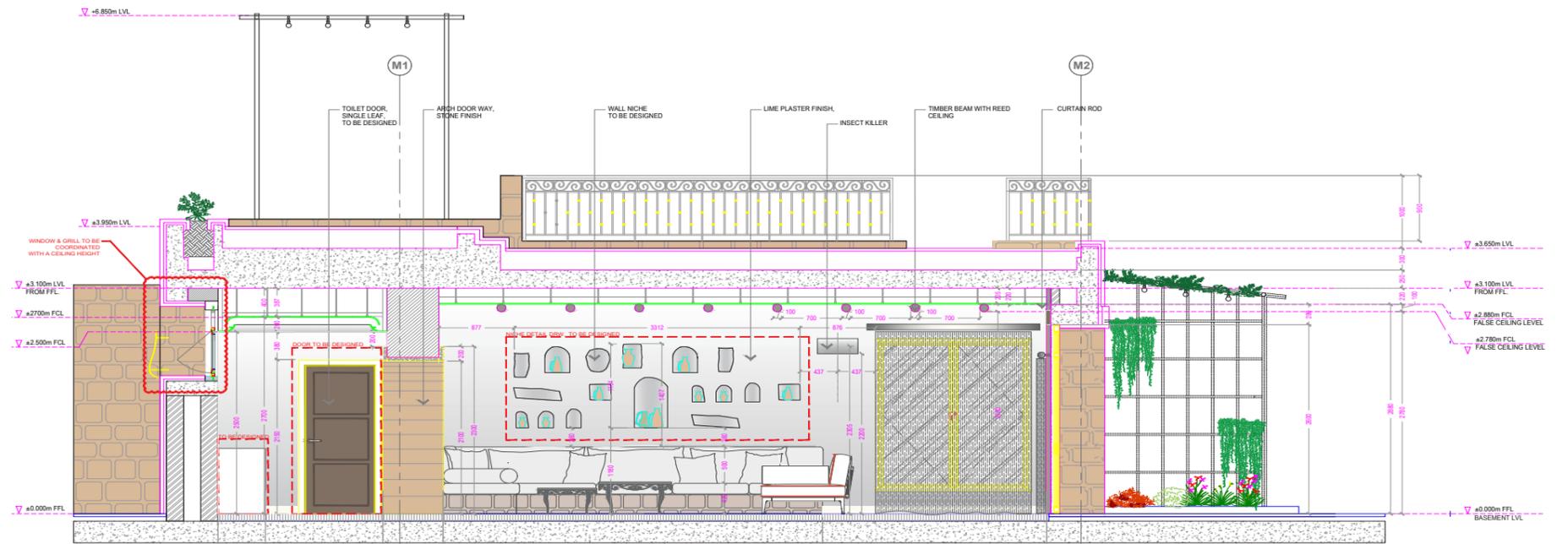
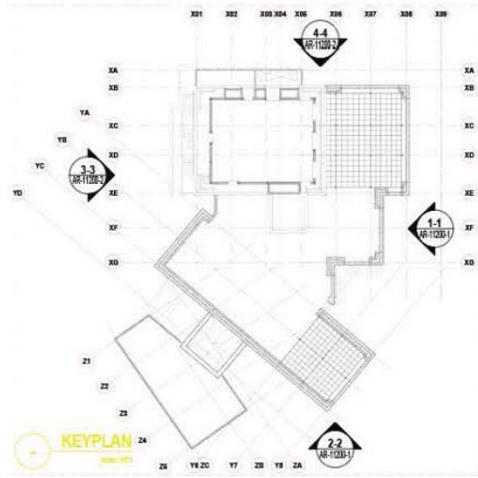
TOTAL NET AREA @ ROOF (INDOOR-AIR-CONDITIONED) = 169.40 m²
 TOTAL NET AREA @ ROOF (OUTDOOR NON AIR-CONDITIONED) = 519.75 m²



ROOF FLOOR PLAN

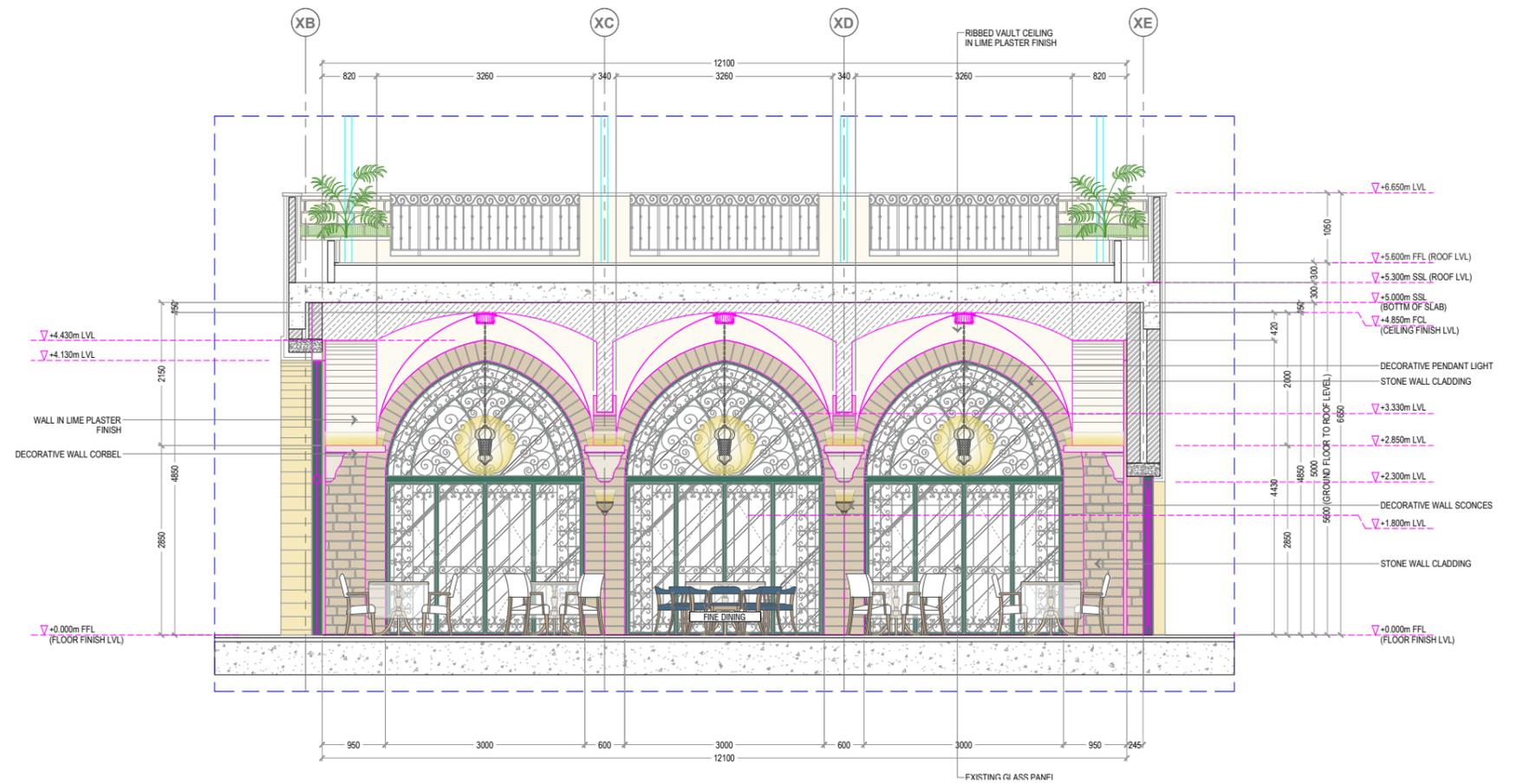
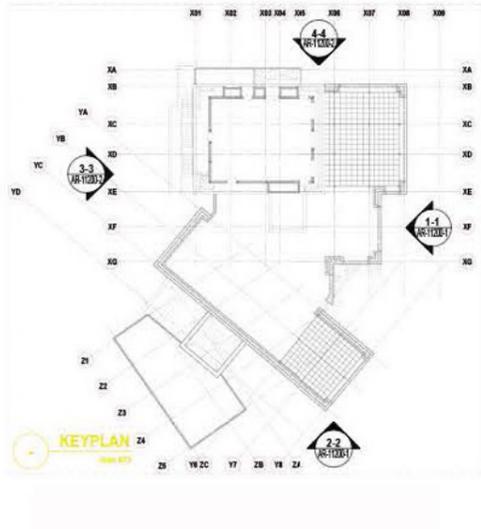
EXISTING BUILDING - ELEVATIONS

BAYT EL TALLEH - KATARA CULTURAL VILLAGE



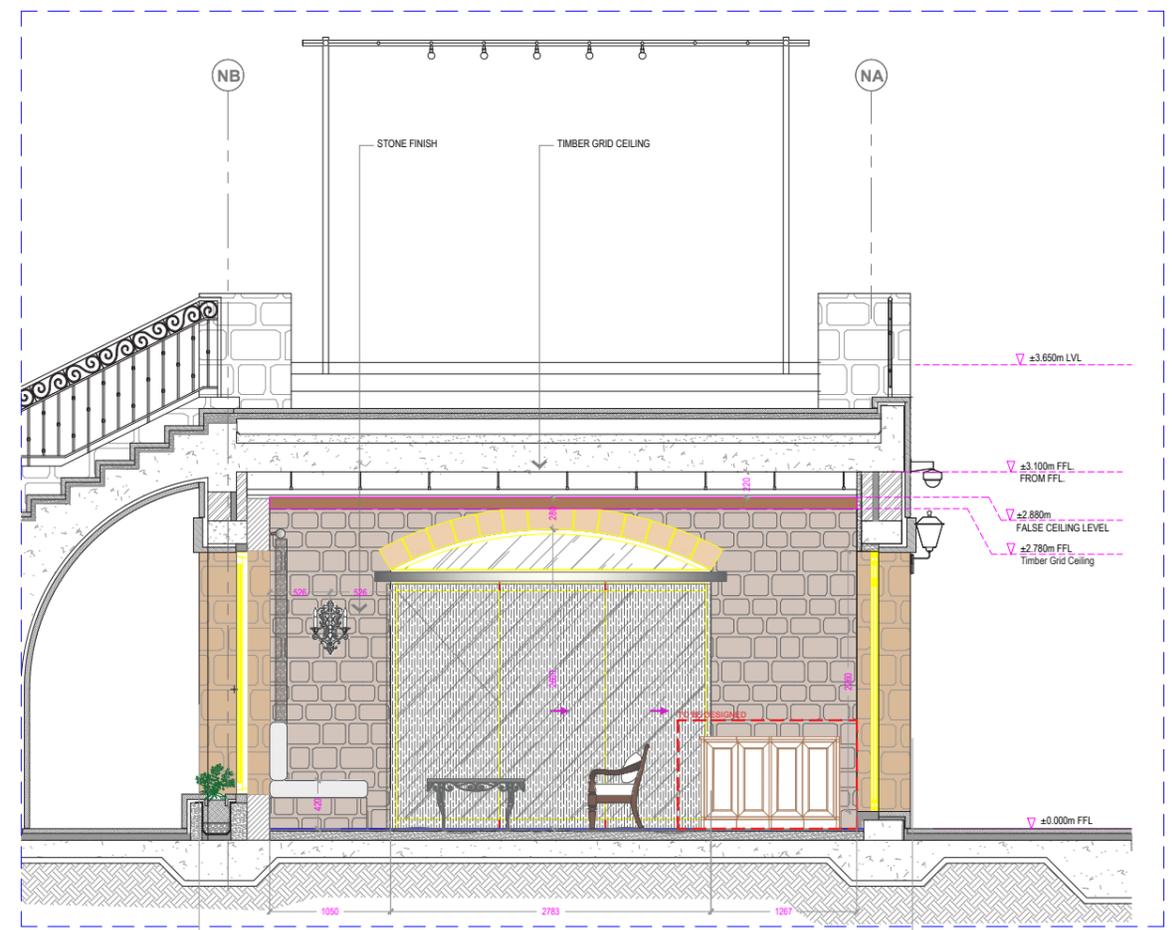
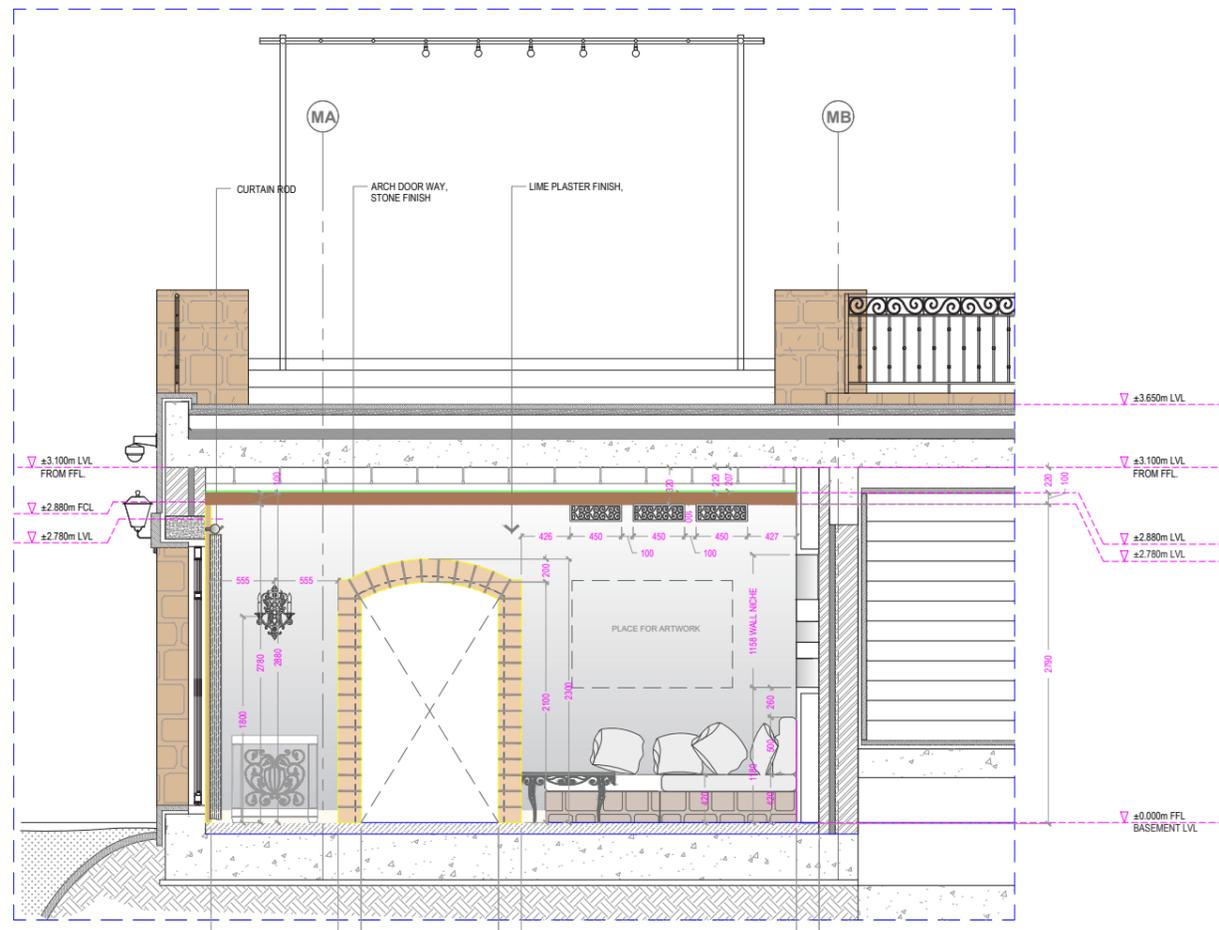
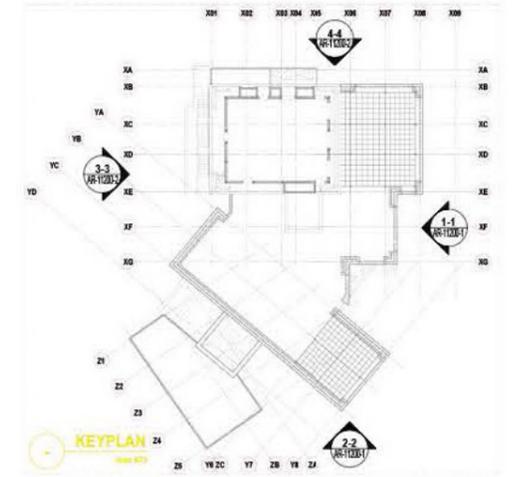
EXISTING BUILDING - ELEVATIONS

BAYT EL TALLEH - KATARA CULTURAL VILLAGE



EXISTING BUILDING - ELEVATIONS

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PRECEDENT STUDY 1

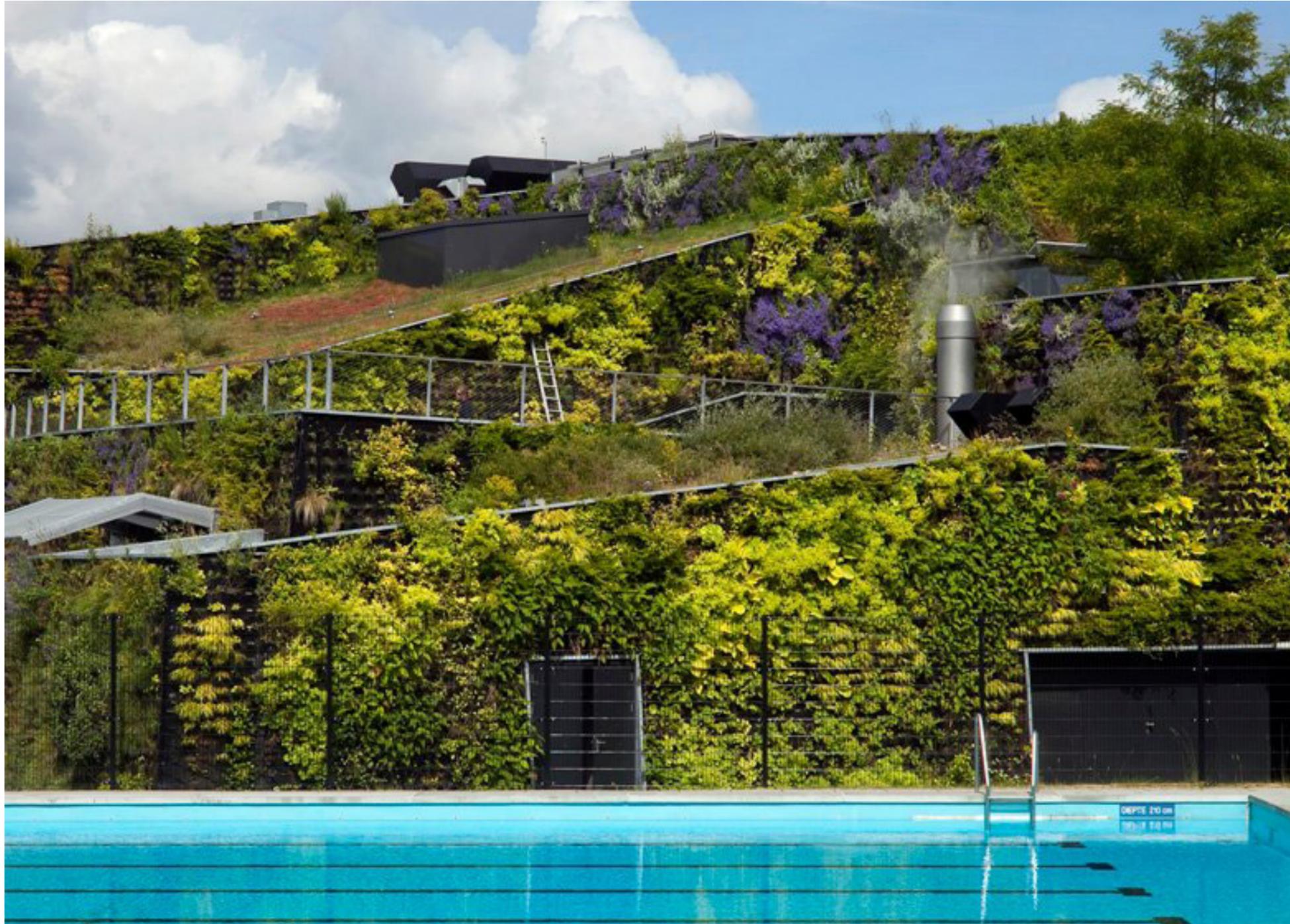


Fig. 1: Front Facade

Name

SportPlaza Mercator

Location

Amsterdam, De Baarsjes neighbourhood

Project Type, Year

SportPlaza, 2006

Size

7100 m²

Architect

VenhoevenCS

Keywords/special features

Community life, diverse program, green façades and roof

Award

Nominated for the Green Building Award organised by Dak & Gevel Groen magazine in the Netherlands.

Project Description

SportPlaza Mercator is a structure that houses a **variety of activities** for people of **all ages**. It was created to **bring together** 129 diverse **cultures** that reside in Amsterdam's De Baarsjes neighborhood and form a community for them. Everyone can observe different activities inside, which **inspires** their curiosity and **encourages** them to utilize other facilities. **Facilities** provided may include swimming pools, a therapy pool, fitness, aerobics, a sauna and steam bath, a party centre, café and childcare alongside a fast food restaurant. The building was **built in a park**, the idea was to **conserve** as much of the **land** as possible, which is totally covered in **greenery**, hiding the structure's varied program. A **greenery façade and roof** let the structure blend in with its surroundings, keeping the **biophilic** notion.

Relevance to Project

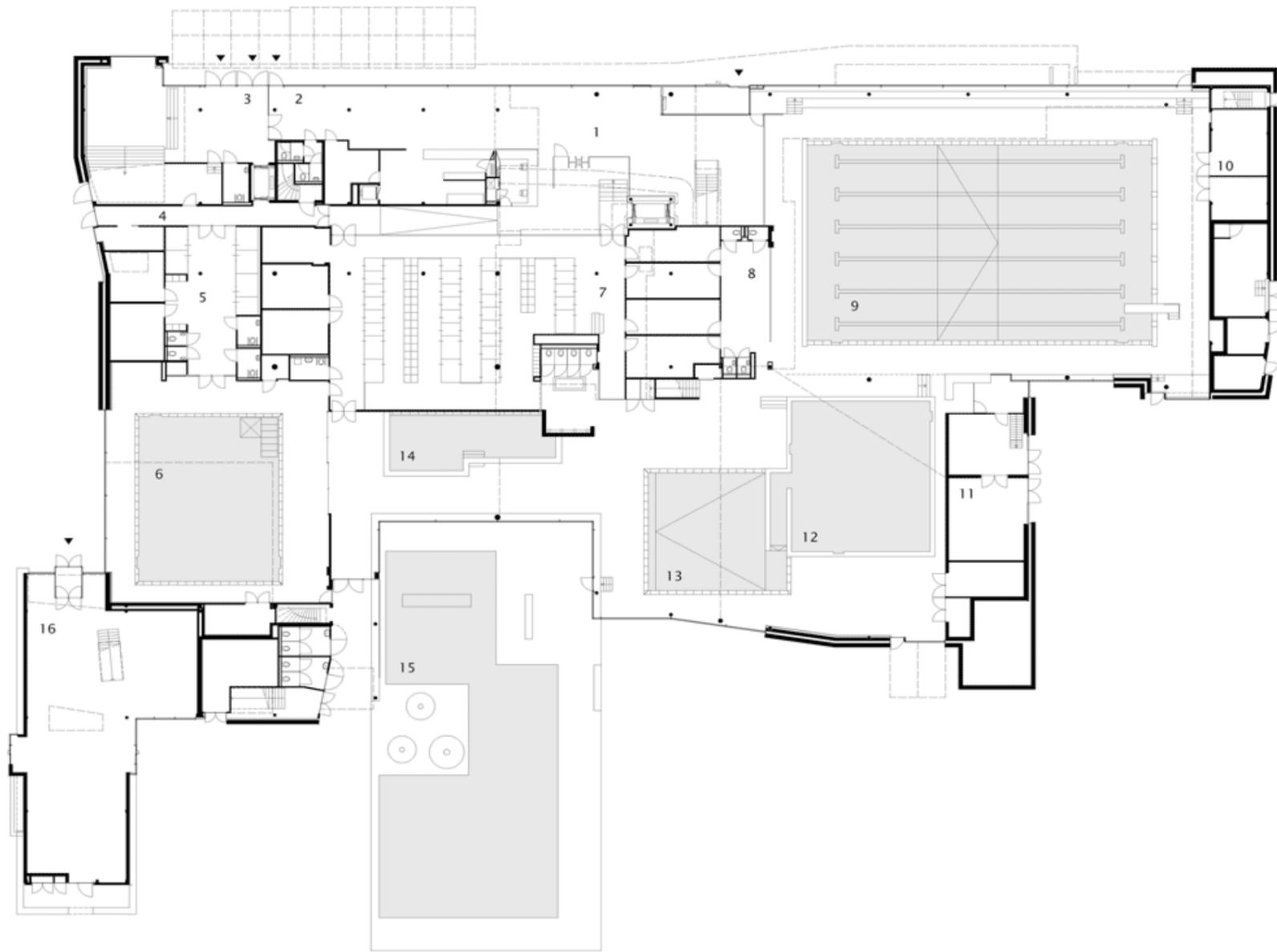
It was created to **foster a sense of solidarity among vegetation and people of all cultures**. The society-driven architecture gives a perspective on including as much greenery as possible into the project, similar to the proposed project, which will be used to **improve people's mental well-being**. This is a space that arouses **curiosity** about additional facilities, which the proposed project wants to achieve by educating the necessity of **environmental preservation**. The structure of the building aids in the development of these elements, which may be considered. Furthermore, the usage of greenery in the **facade and roof** may be utilized for the suggested project's interior.

01) Site plan and The distribution of Spaces

02) Exterior

03) Exterior and Interior

04) The interior



- 1 - Entrance
- 2 - Resturant
- 3 - Entrance Event Hal
- 4 - Entrance Treatment pool
- 5 - Changing Rooms Treatment
- 6 - Treatment Pool
- 7 - Changing rooms
- 8 - Showers
- 9 - Competition pool
- 10 - Storage
- 11 - Technical Systems
- 12 - Target Group Pool
- 13 - Teaching Pool
- 14 - Toddlers Pool
- 15 - Outdoor pool
- 16 - Fast Food Resturant

Fig. 2: Ground Floor Plan

The rooms were laid up in such a way that circulation was simple and wayfinding was straightforward. Because this building was created for people of all ages, it's critical that the ease of finding your way around was taken into account. The privacy of which rooms is more concealed is also made evident. The overall layout of the three-story structure showed the many amenities offered on the various floors.

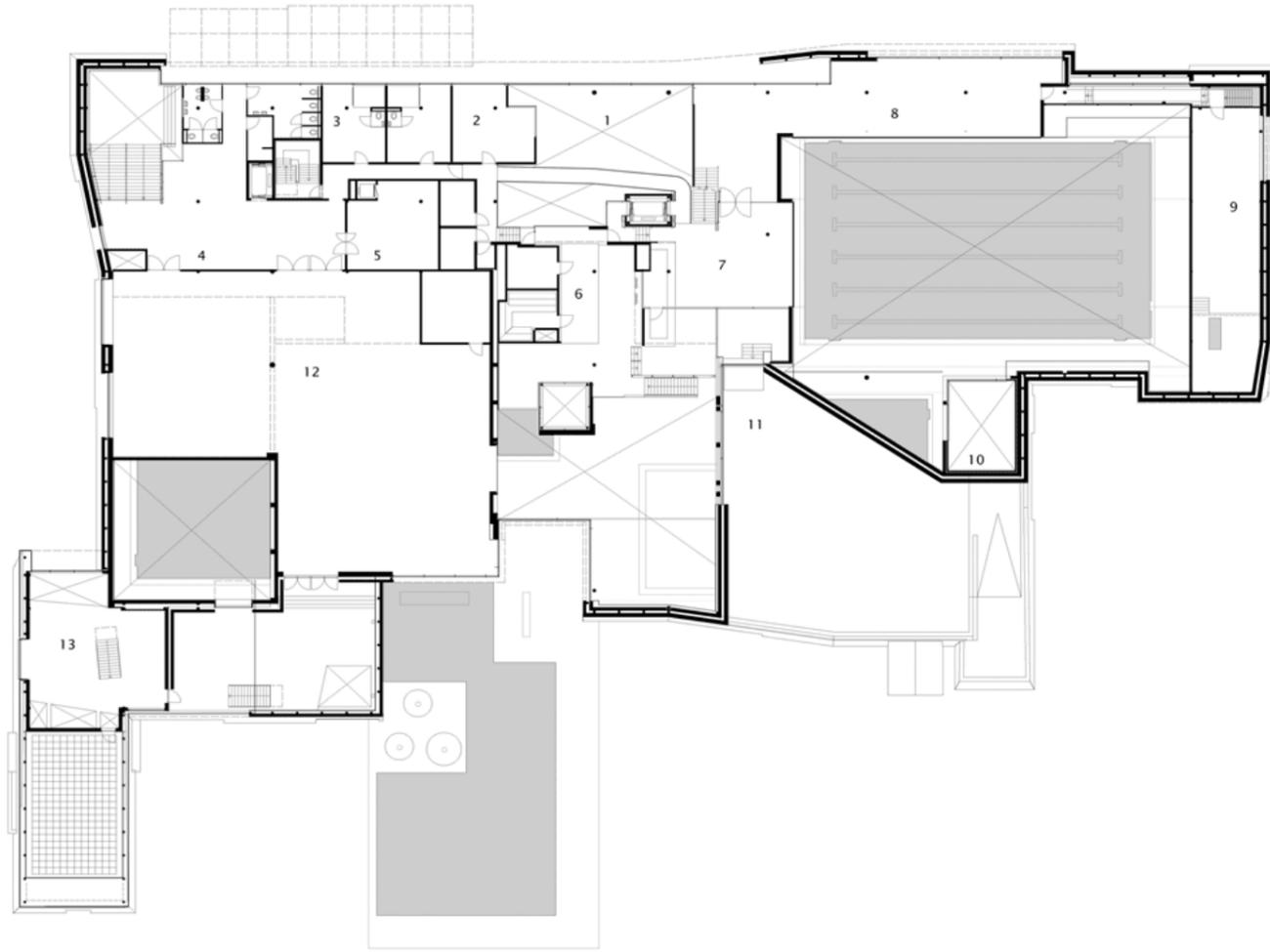


Fig. 3: Second Floor Plan

- 1 - Void
- 2 - Office
- 3 - Changing Rooms
- 4 - Entrance Events Hall
- 5 - Kitchen
- 6 - Sauna
- 7 - Reception Fitness
- 8 - Fitness Room
- 9 - Technical Systems
- 10 - Patio
- 11 - Roof Tarrace
- 12 - Fast Food Resturant

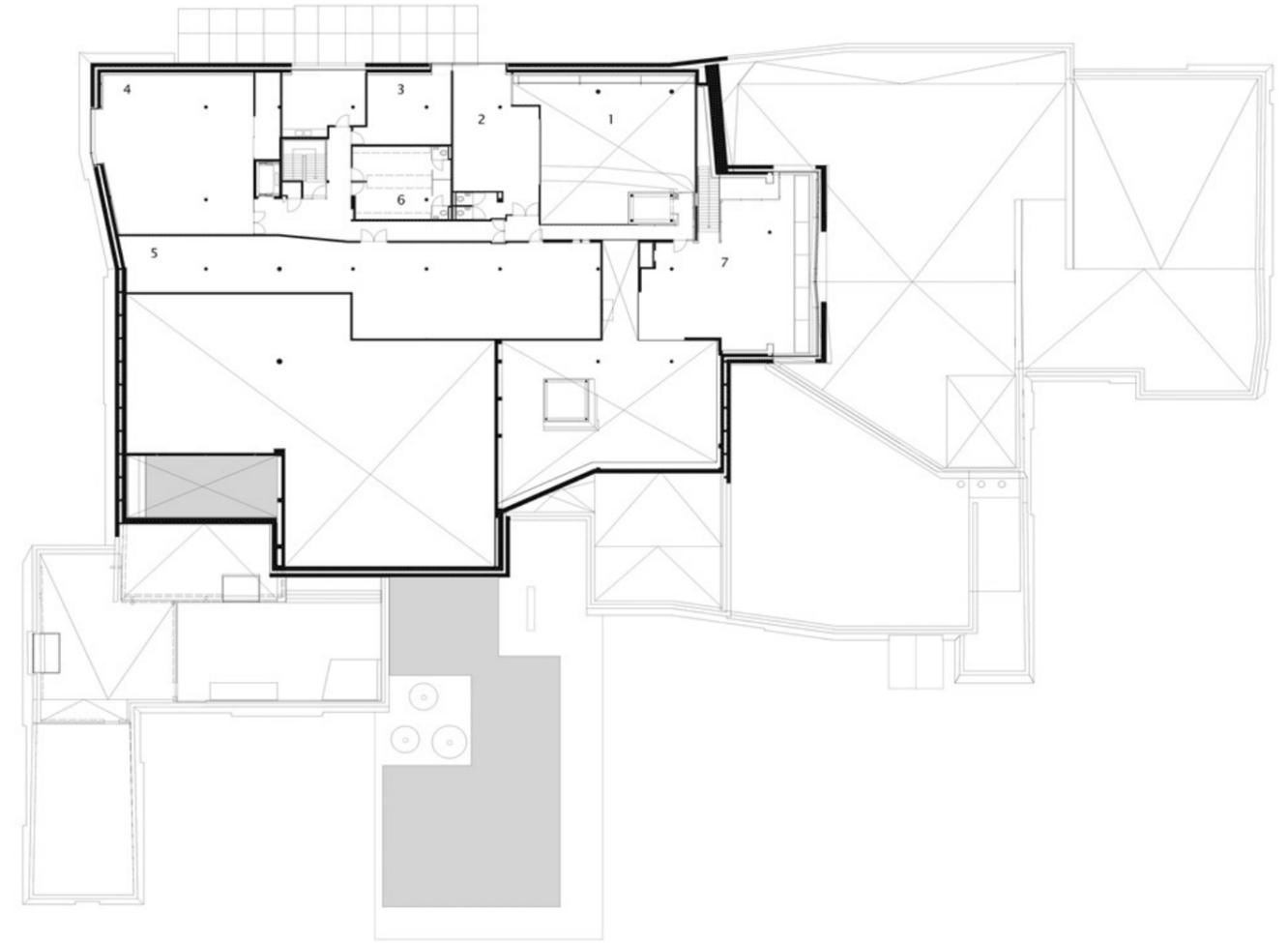


Fig. 4: First Floor Plan

- 1 - Void
- 2 - Nursery
- 3 - Meeting Room
- 4 - Aerobics
- 5 - Technical Systems
- 6 - Changing rooms
- 7 - Fitness

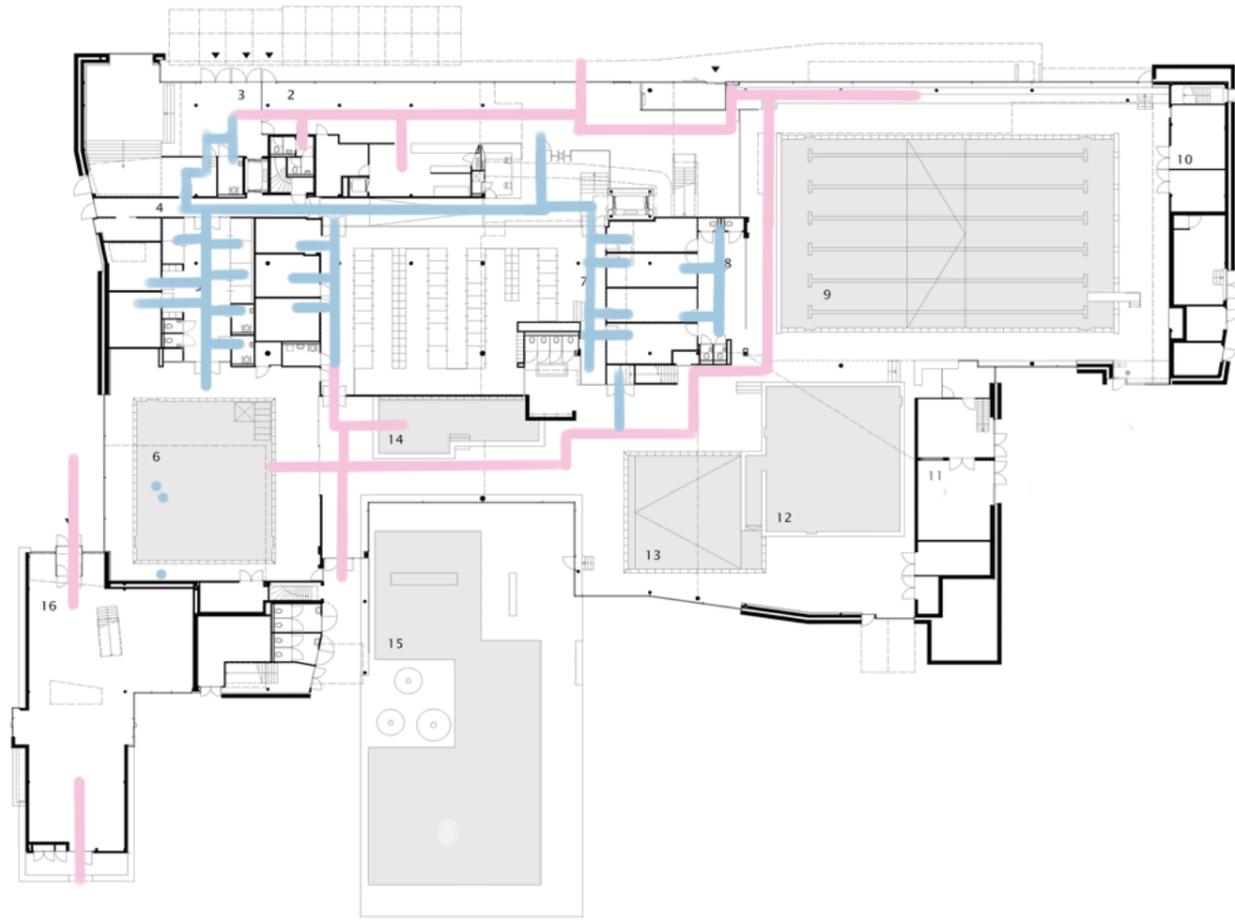


Fig. 5: round Floor Plan

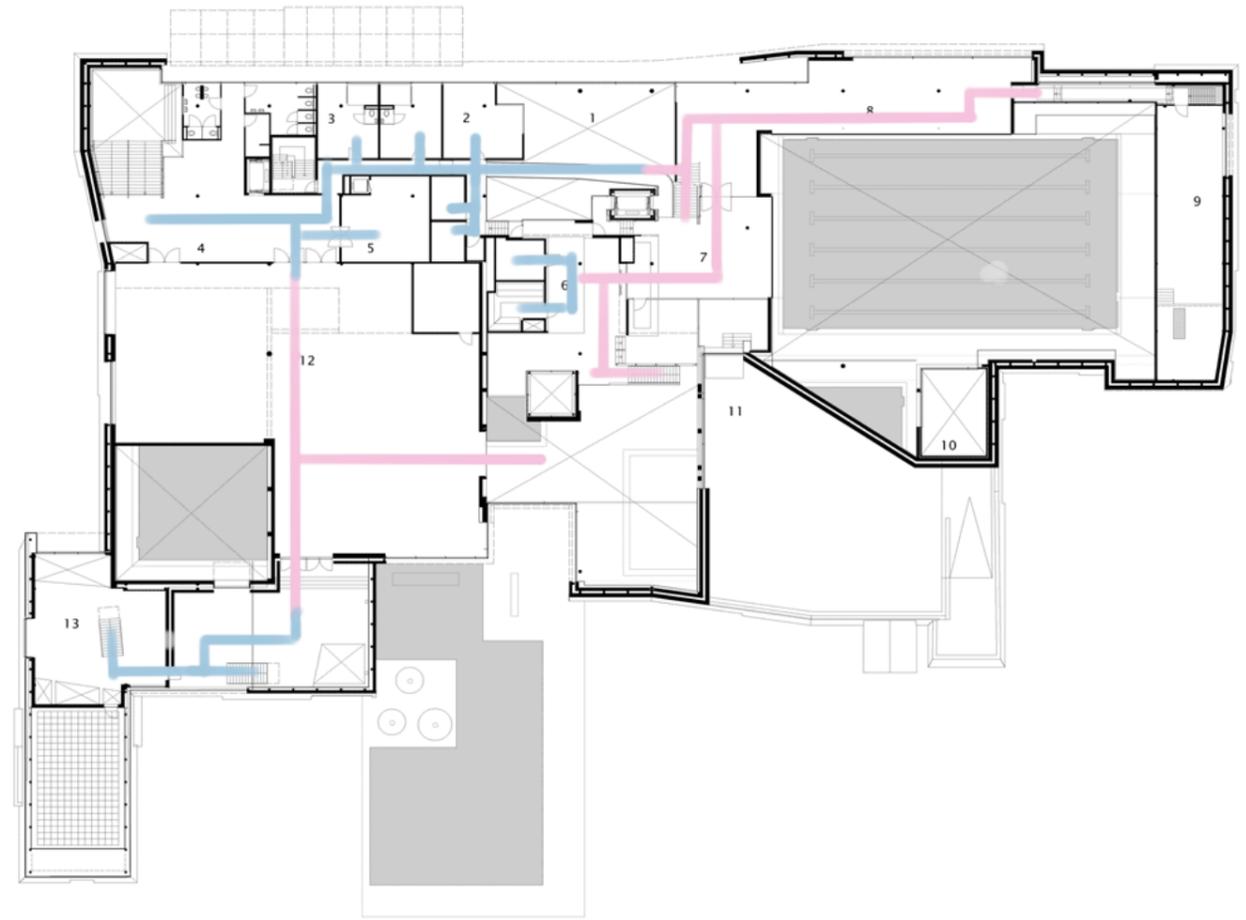


Fig. 6: econd Floor Plan

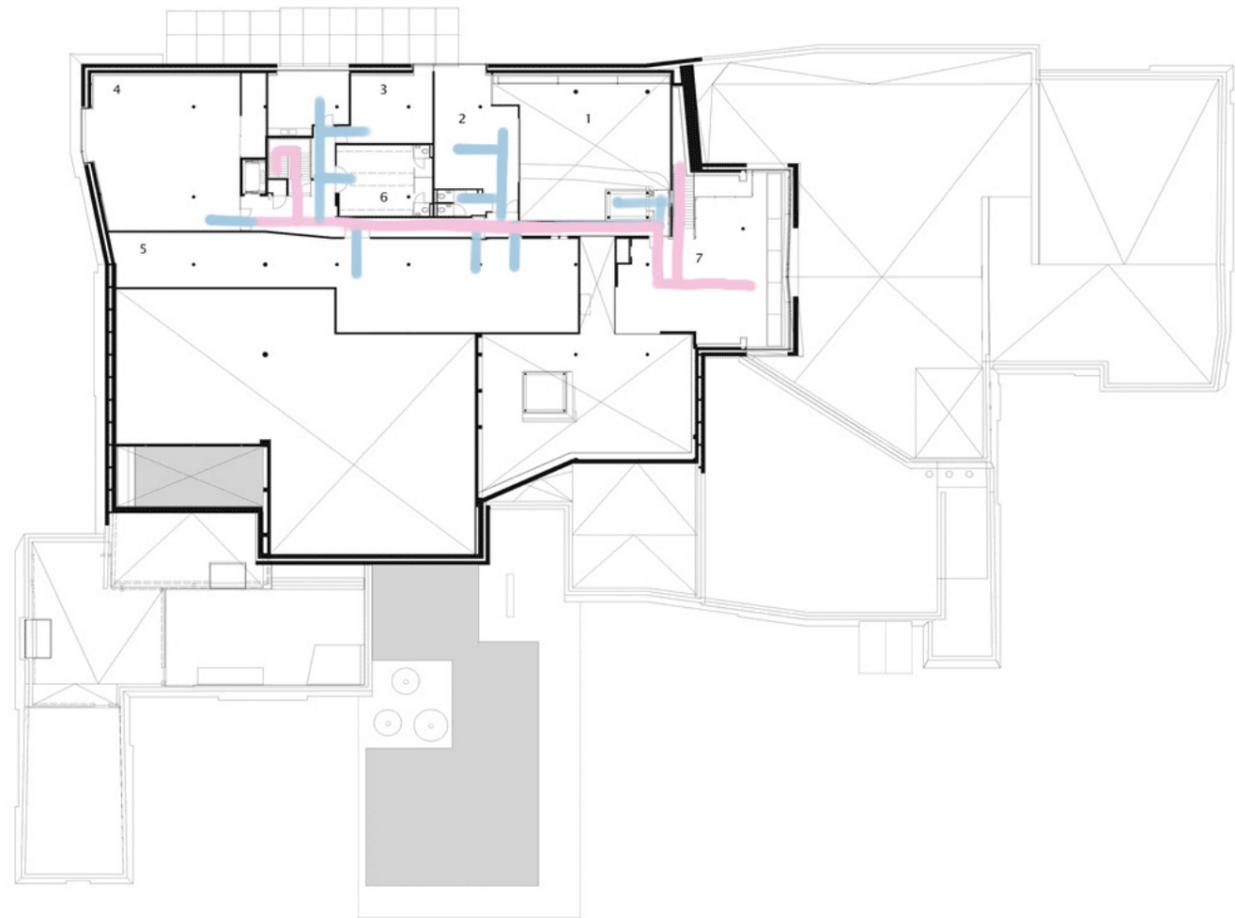


Fig. 7: First Floor Plan

- Primary Circulation
- Secondary Circulation

There are two types of circulation in a space: main and secondary. The major circulation is open to all visitors, but the secondary circulation is only open to guests who have access to the spaces (like the swimming pool). Another sense of seclusion was created by the dispersal of different facilities' areas. It's crucial to observe how this is an excellent technique for encouraging people who enter the room to wonder around and explore different things.



Fig. 8: Perspective

EXTERIOR

The atmosphere



Fig. 9: Sportplaza Mercator now symbolizes the beginning and conclusion of the Rembrandtpark with its **green façades and roof**.



Fig. 10: It seems to be an overgrown green castle with a glimpse of a glass facade from distance. This is a type of biophilic design that was employed in the building's construction, with the goal of preserving as much of the natural landscape as possible.



Fig. 11: The **entrance** is the most obvious and exposed part of the building, revealing the glass door and window. This was done to differentiate the entrance from the rest of the building and make it stand out to visitors.

EXTERIOR AND INTERIOR

The atmosphere



Fig. 12: The outdoor swimming pool area. The **structure** was supposed to resemble a city or a small civilisation within a cave, which it does very well. The building is linear, with lines of sight and hasps that allow views of the numerous visitors, **activities, and cultures** that take place inside. This was done as a source of privacy to ensure that people felt safe visiting this building.

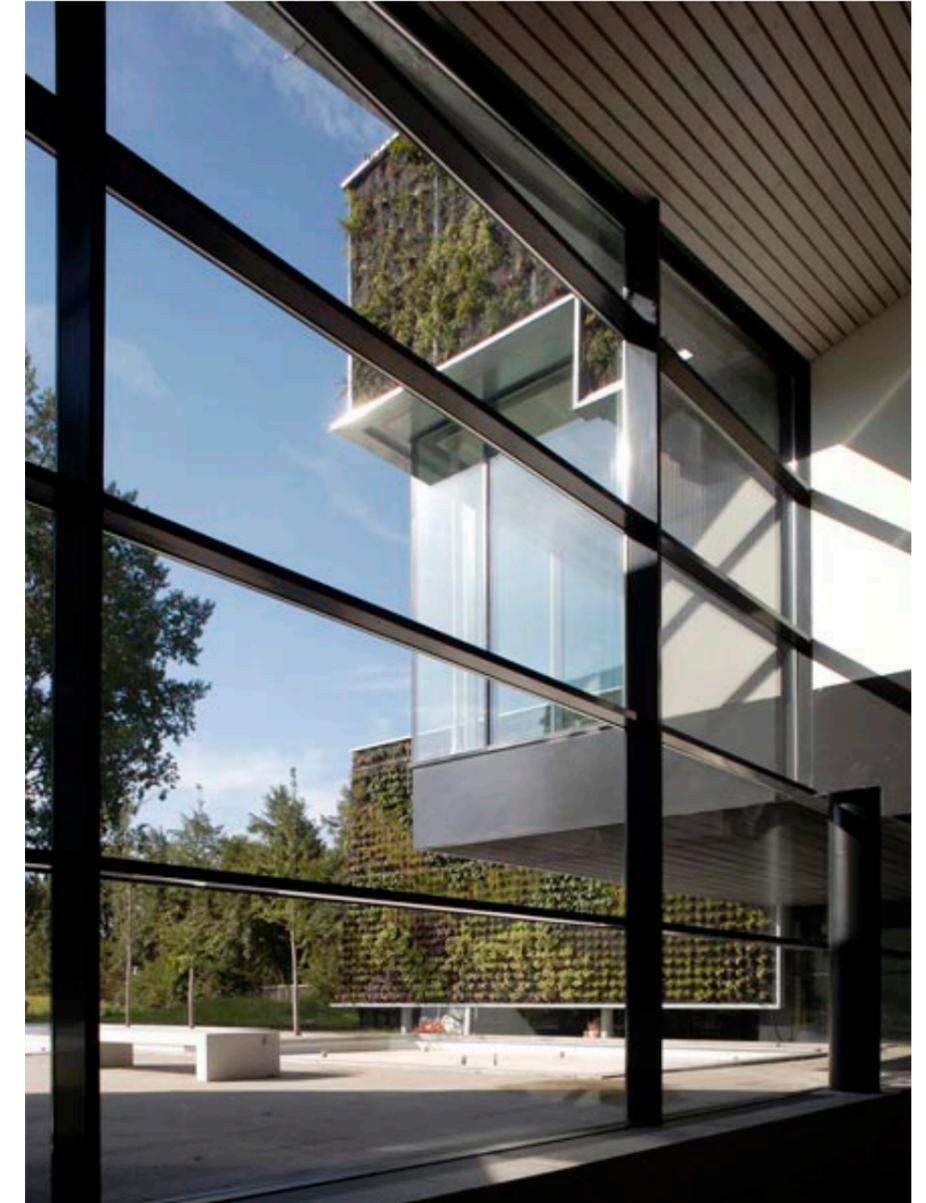


Fig. 13: Through a variety of roof apertures, **sunlight penetrates** deep into the building's interior. The street and the sun terrace are framed by low windows.

THE INTERIOR

Spaces and Facilities



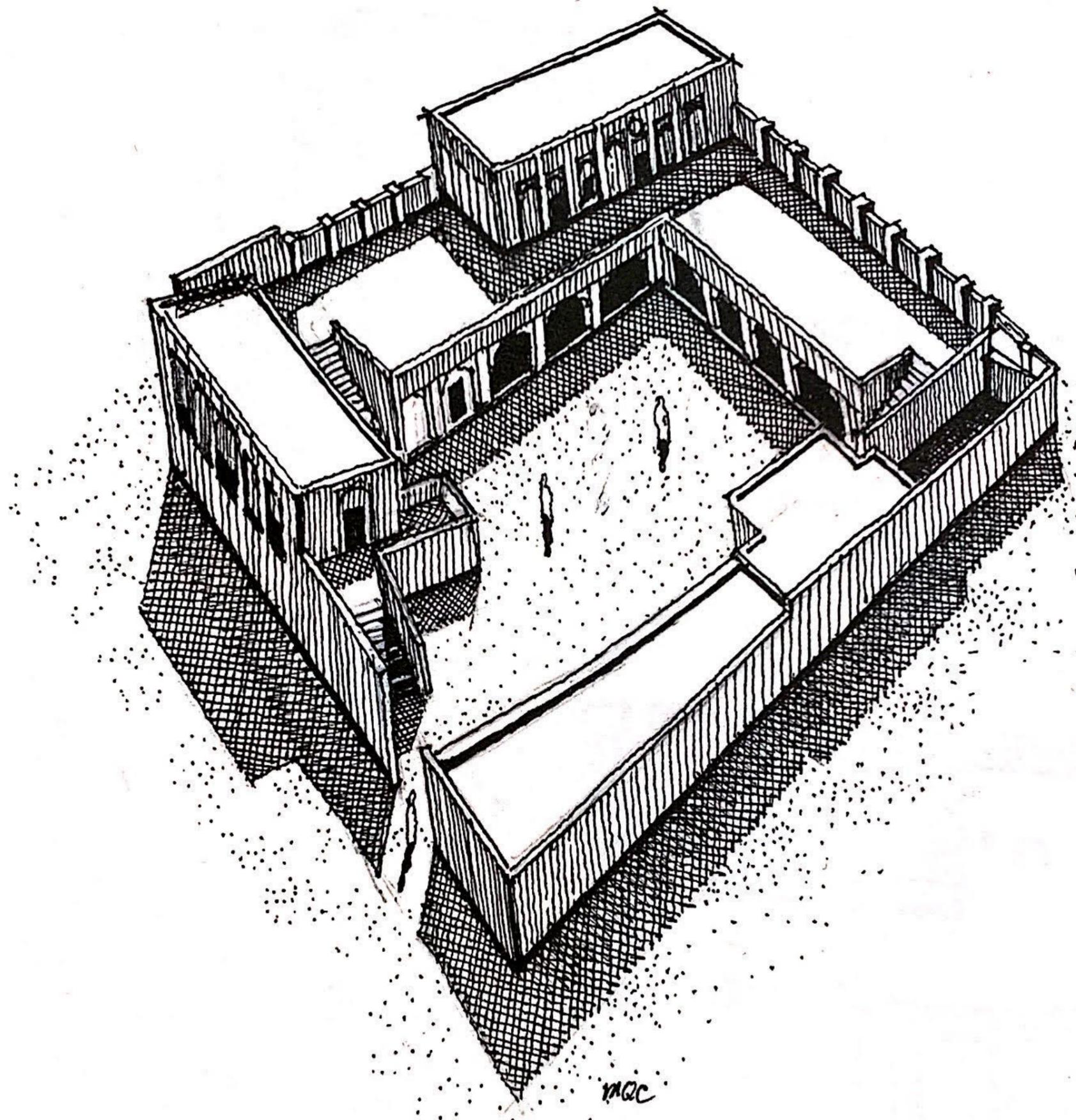
Fig. 14: The interior space



Fig. 15: The interior space

The inside is a gleaming modern spa-style complex featuring swimming pools, fitness facilities, a restaurant, and party facilities. This is a place where individuals may get together and **participate** in various sports. A area like this was created to **encourage** visitors to check out the other facilities and try them out by opening up the space just enough for viewers to see inside, but not too much that **privacy** protocols are violated.

PRECEDENT STUDY2



Name

Daughters of Ali Ahmadi House

Location

Al Asmakh, Doha

Project Type, Year

House, 1940

Size

Approximately 120 m²

Architect

Unknown

Keywords/special features

Community house, ventilation

Fig. 1: Perspective view of Daughters of Ali Ahmadi House

Project Description

The Daughters of Ali Ahmadi House is one of the most architecturally significant structures in Qatar's history. It is completely **surrounded by a courtyard**. Due to the country's redevelopment, this structure no longer exists. For security and privacy reasons, access to the residence was restricted and controlled. The **ventilation systems** used in this structure exemplify the procedures used in Qatar in 1940 to keep the indoor area cool.

Relevance to Project

The house, which was built to support a Qatari family, features **ventilation systems** which could be used in the proposed project as a way to provide more sustainable ventilation to the space. The building's **orientation**, combined with its "windows," gives just the appropriate amount of shade throughout the day, as well as just the correct amount of internal light when needed. In order to honor Qatari culture, the concept of **private and public** spaces, as well as communitive, inspiring culture, must be incorporated into the project, which is done in the form of a courtyard.

01) Site plan and the distribution of Spaces

02) Ventillation

03) Materiality

04) Visualls

- 1 - Majlis
- 2 - Courtyard
- 3 - Shaded walkway
- 4 - Room
- 5 - Kitchen
- 6 - Private room
- 7 - Entrance

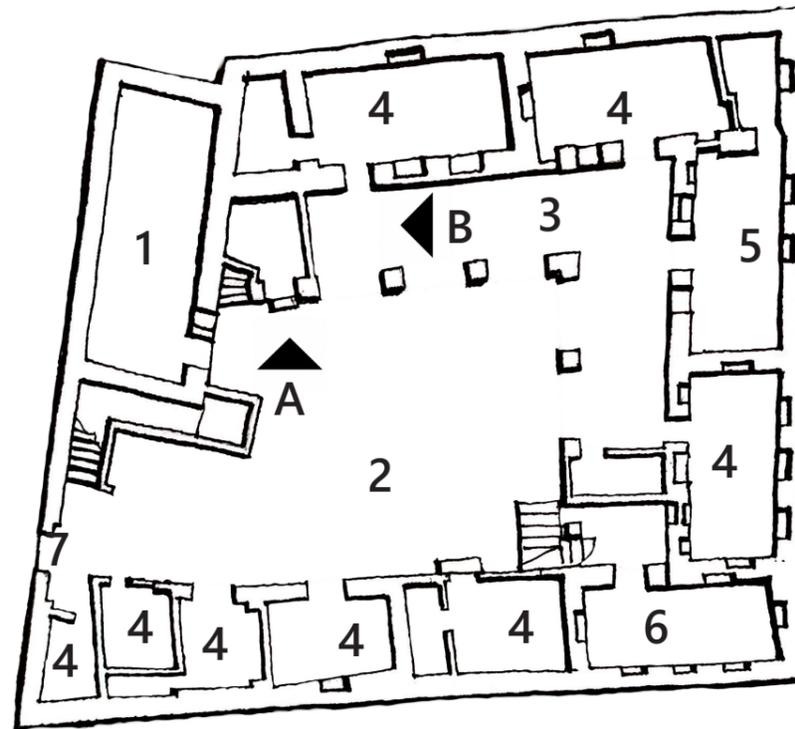


Fig. 2: Ground Floor Plan

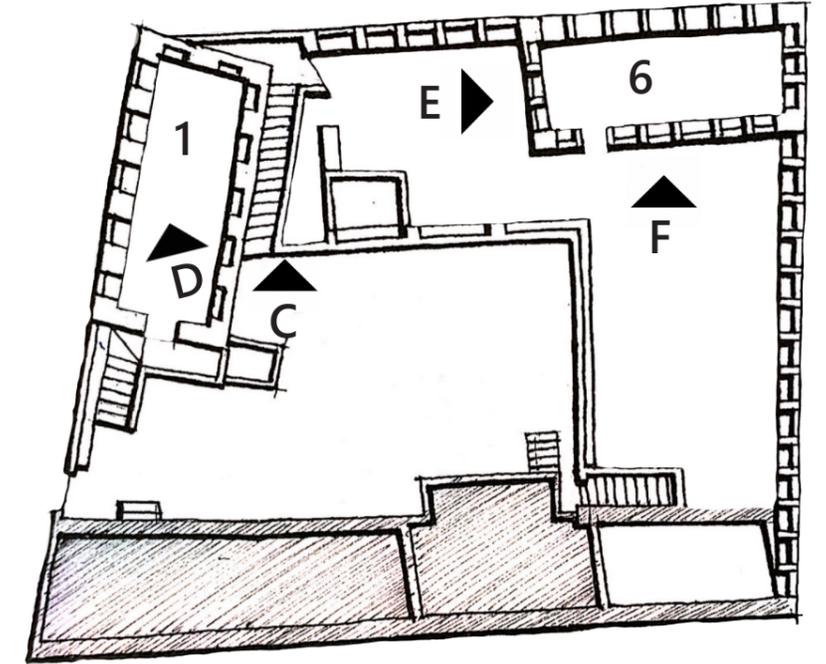


Fig. 5: First Floor Plan

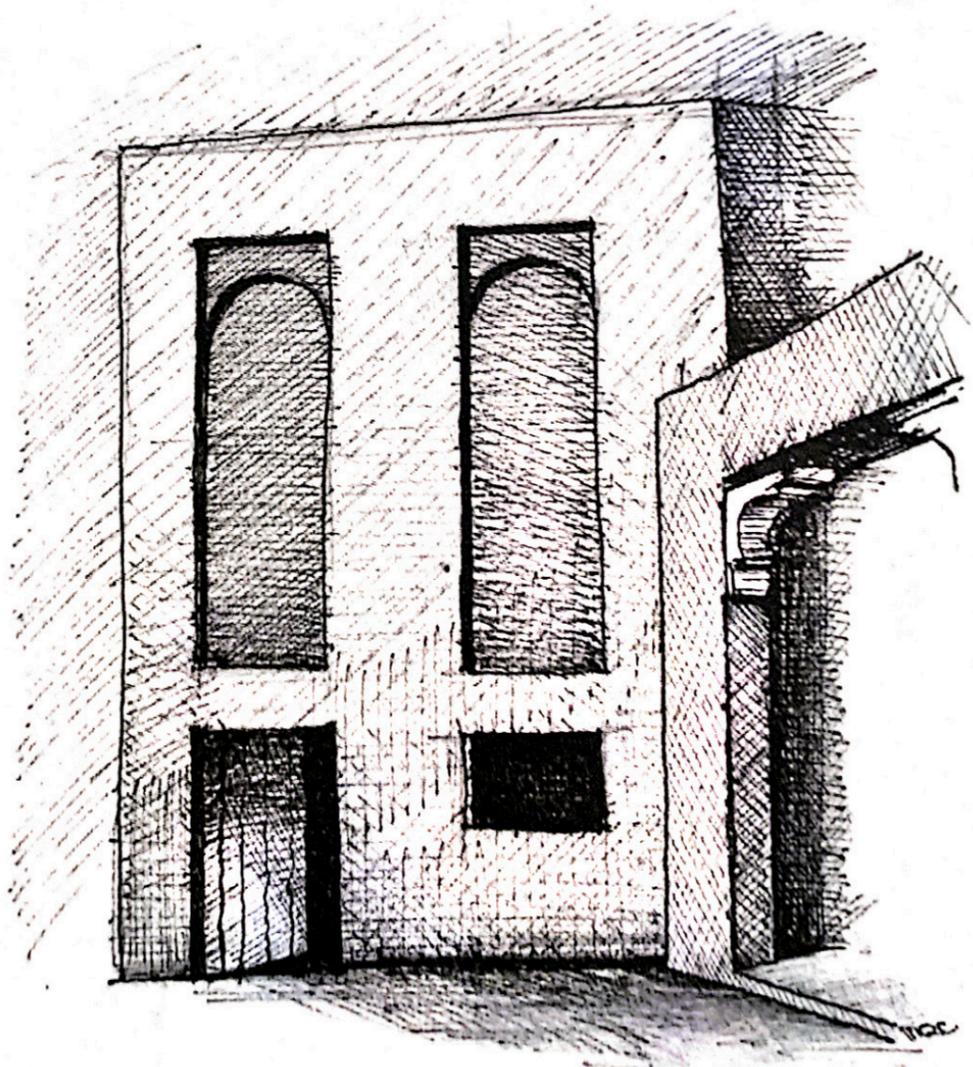


Fig. 7: Perspective A

Site plan and Privacy

Due to the variety of internal and outdoor spaces provided by courtyard dwellings, there were several chances for **vertical and horizontal** movement in response to climate forces. Living environments in Qatar, particularly during the warm months, were designed to be as comfortable as possible. A large degree by the presence of shade and ventilation, as well as the arrangement of rooms intended to maximize shade in certain areas at specific times of day. To accomplish this, the structure was designed with the entrance facing north and the thickest and tallest walls facing south.

In Islamic communities, such as Qatar, the **notion of privacy**, particularly as it pertains to female family members, is a distinguishing feature. As a result, households in the Islamic world are still physically divided according to activity, purpose, gender, and stringent privacy laws. In the design of a home's layout, the hierarchy of spaces is crucial. The house's Private Spaces are hidden from view. Semi-private spaces are areas where family members and visitors can mingle. The presence of additional public places, such as the Courtyard and the Majlis, encourages family and visitors to visit.

- Primary Circulation
- Secondary Circulation
- Tertiary Circulation

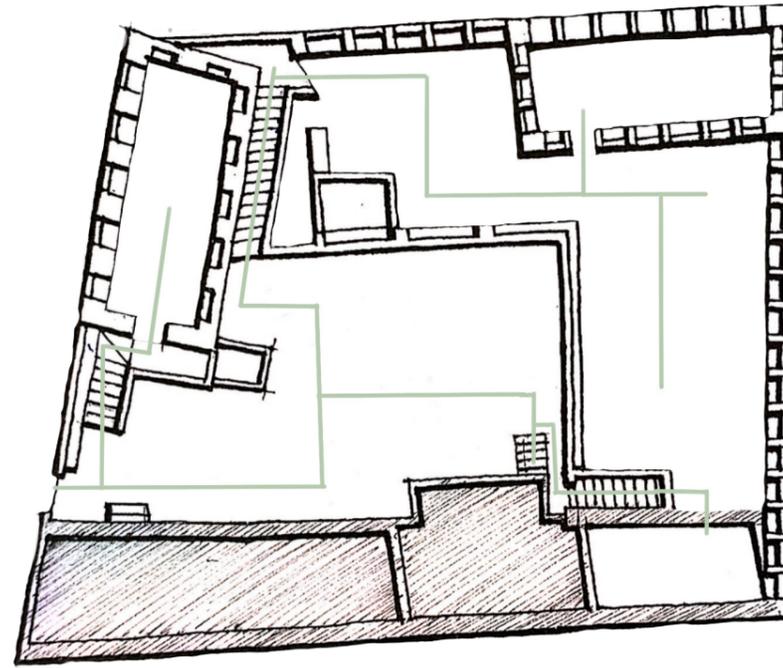


Fig. 4: Ground Floor Plan Circulation



Fig. 7: First Floor Plan Circulation

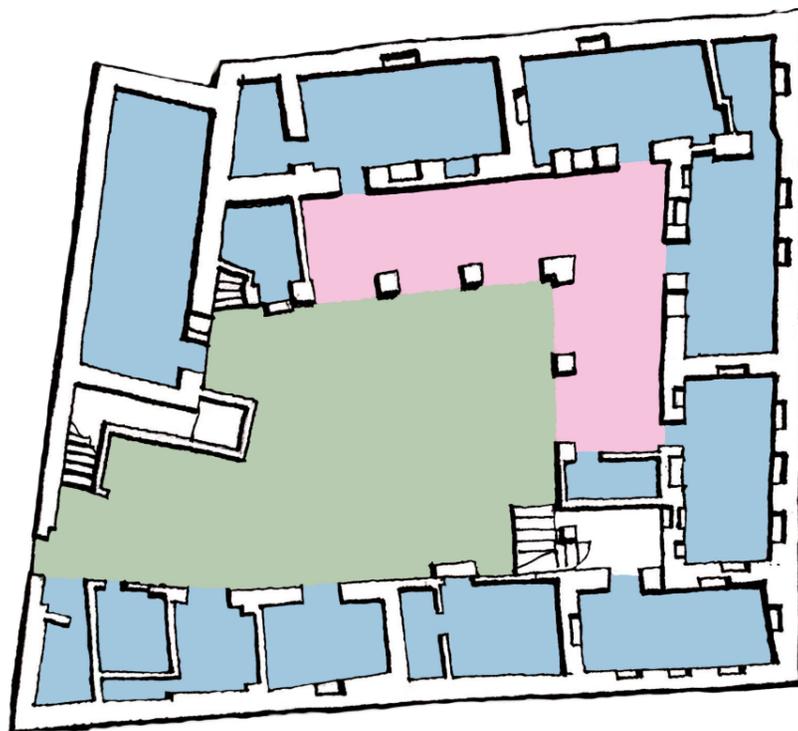


Fig. 3: Ground Floor Plan Privacy Diagram

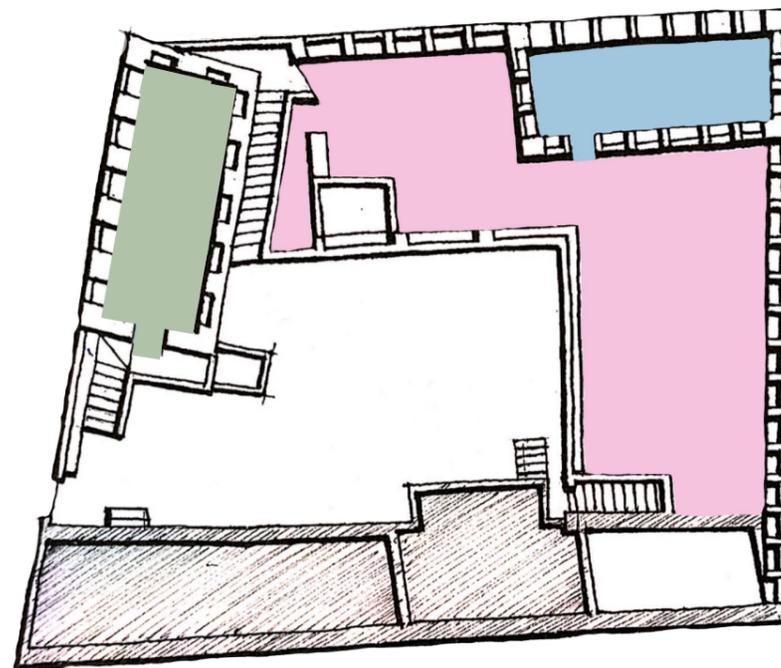


Fig. 6: First Floor Plan Privacy Diagram

- Public
- Semi Public
- Private

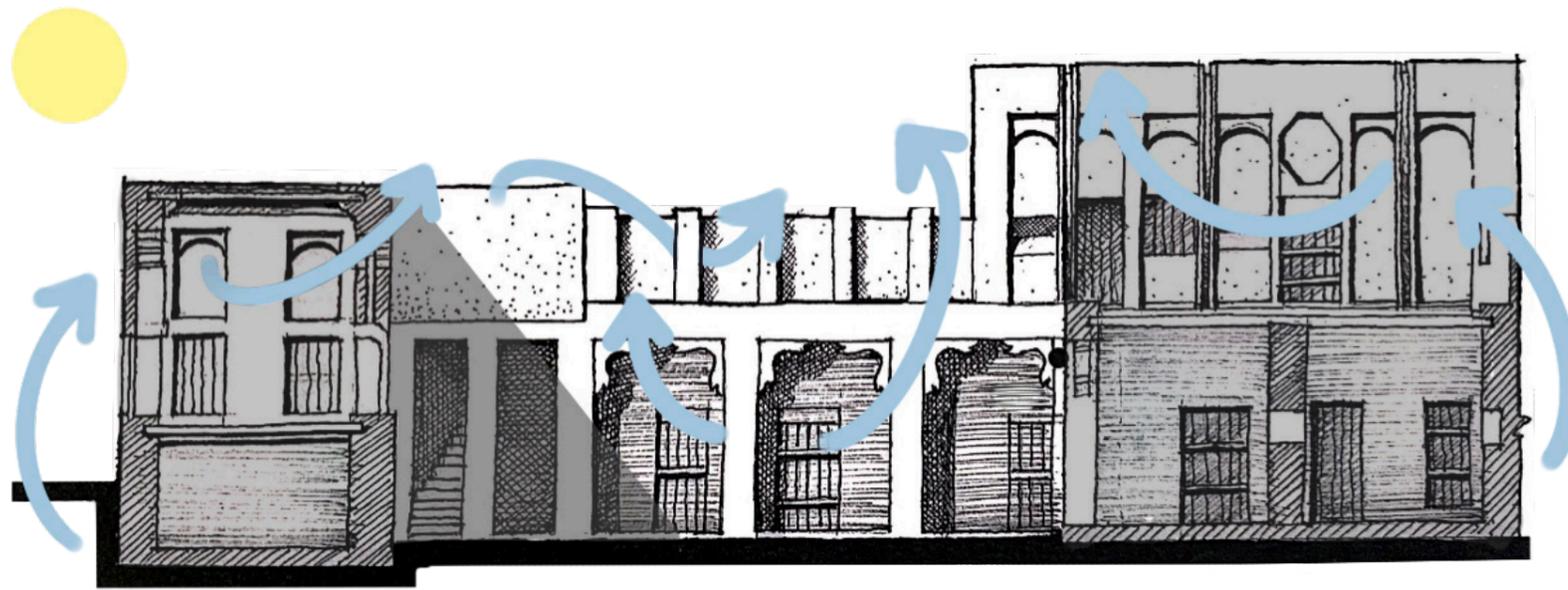


Fig. 8: Section showing sun direction and wind ventilation system

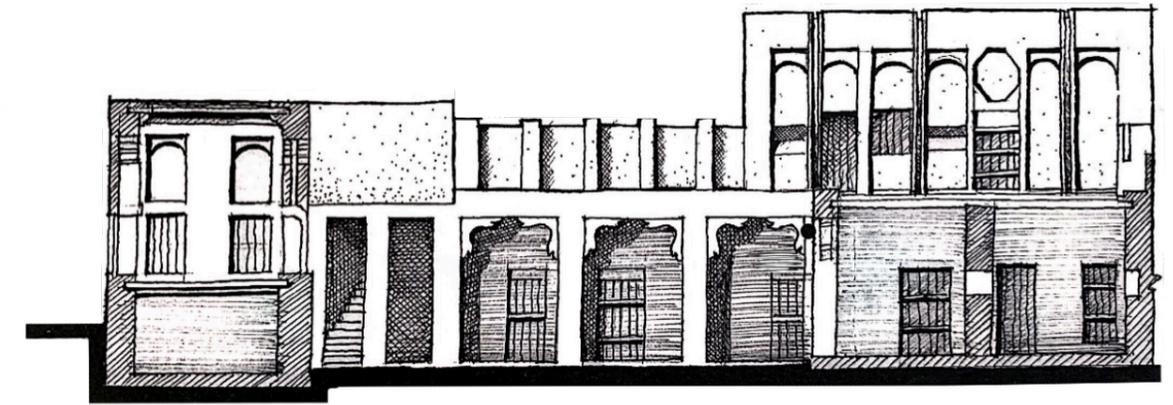


Fig. 9: Section

Ventilation system

Qatar has a **harsh environment**, with summer temperatures routinely surpassing 40 degrees Celsius and winter temperatures dropping below 10 degrees Celsius. Short but very strong rainstorms are prevalent throughout the winter months, in addition to temperature changes. The majority of houses are built around a central courtyard. A variety of elements aid in providing protection from the Gulf summer heat. **Thermal insulation** is provided by stone walls that are up to 0.60m thick, which reduce the amount of heat that is carried to the inside of the structure. **During the winter**, this process is reversed, with the structure retaining heat to the same beneficial effect. Buildings' exterior facades often feature few windows. This helps to retain seclusion in the house's interior parts. Heavy wooden shutters are commonly found on windows, which may be closed to keep the sun out when needed.

Badgheer is a type of traditional construction that circulates air through a structure to keep it cool on the inside. It's a type of natural ventilation in which air passes via a small space (fig 10). These architectural features not only shield the structure from the extreme summer heat, but they also produce or take advantage of any refreshing wind. The large open courtyard allows for air circulation throughout the entire structure (fig 8). The vented roof's horizontal air-gaps allow for air circulation and a refreshing cool breeze.

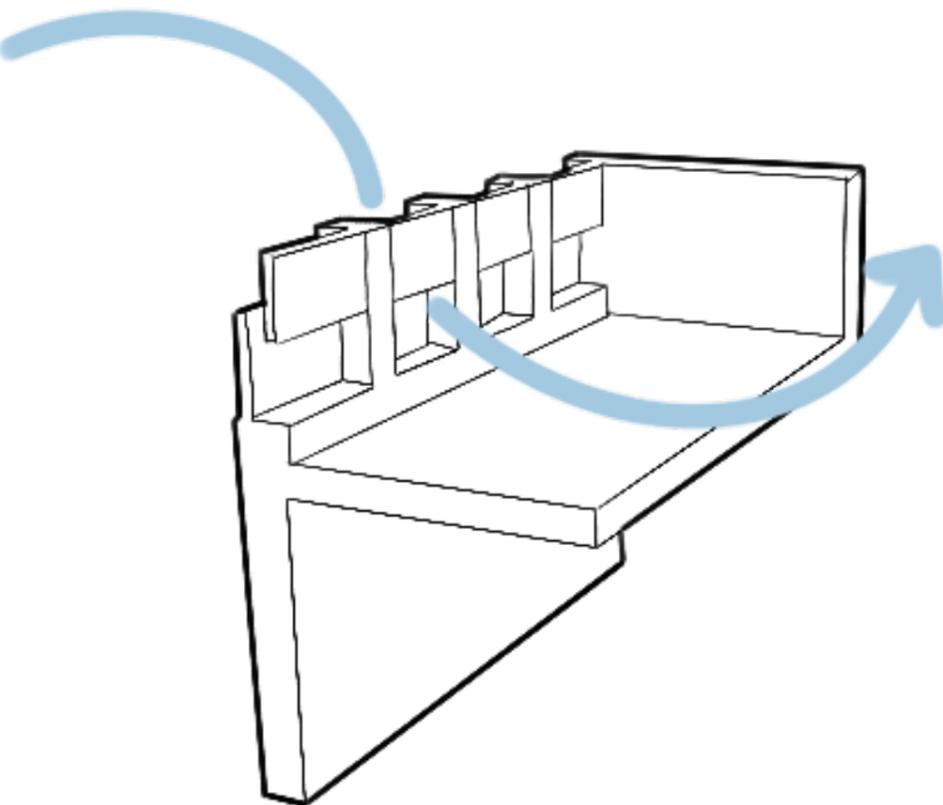


Fig. 10: Badgheer Ventilation System

Materiality

The **availability and cost** of local and imported construction materials have a significant impact on the specific approaches used in Qatari architecture. Another aspect that shaped the style of Qatar's traditional architecture was the amount of money available for construction; Qataris typically had limited resources. As a result, **local materials** and the reuse of wood, a relatively rare and expensive resource, were prioritized. Local materials were desert stones (limestone), packed desert earth (rawdha) and gravel, gypsum mortar, lime mortar, date palm wood, date palm fronds, carved gypsum decoration. **Imported materials** were timber for doors, shutters, windows, danshal beams (mangrove) for roofing timbers, jute rope.

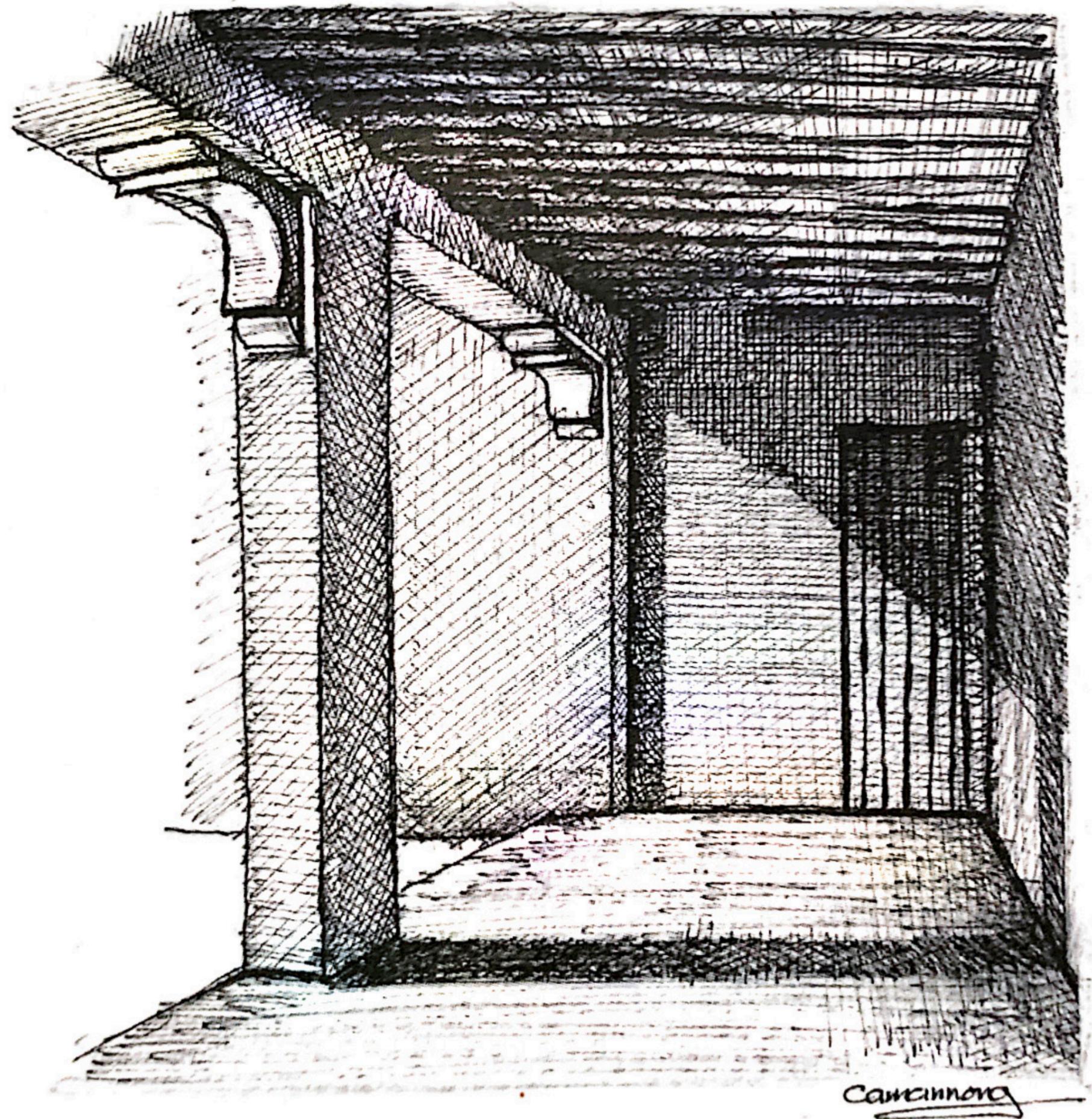


Fig. 11: Perspective B

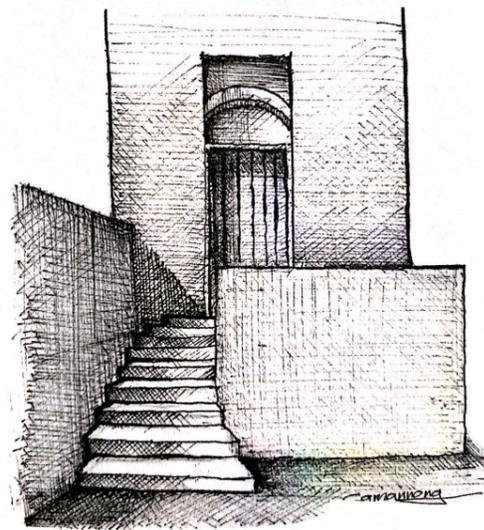


Fig. 12: Perspective C

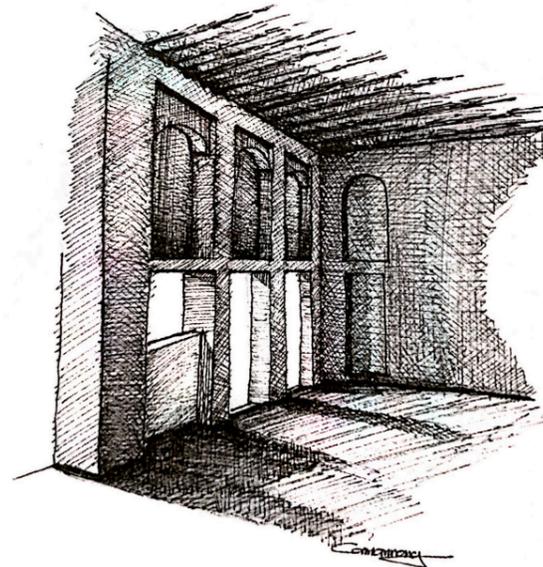


Fig. 13: Perspective D

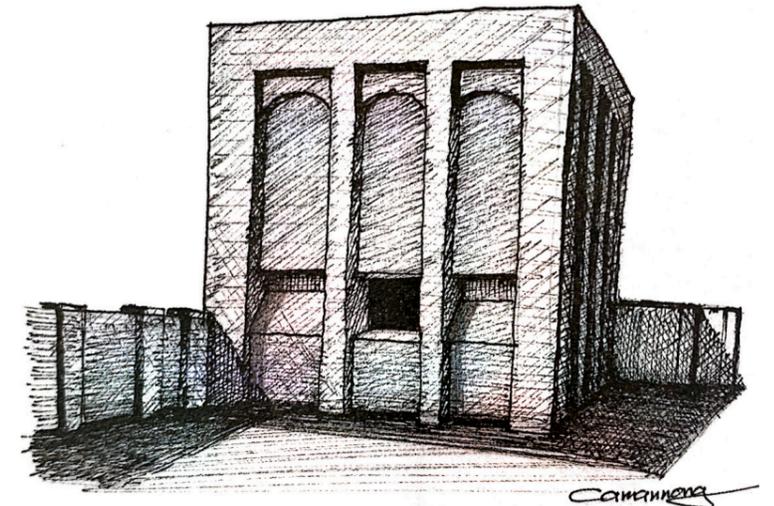


Fig. 14: Perspective E

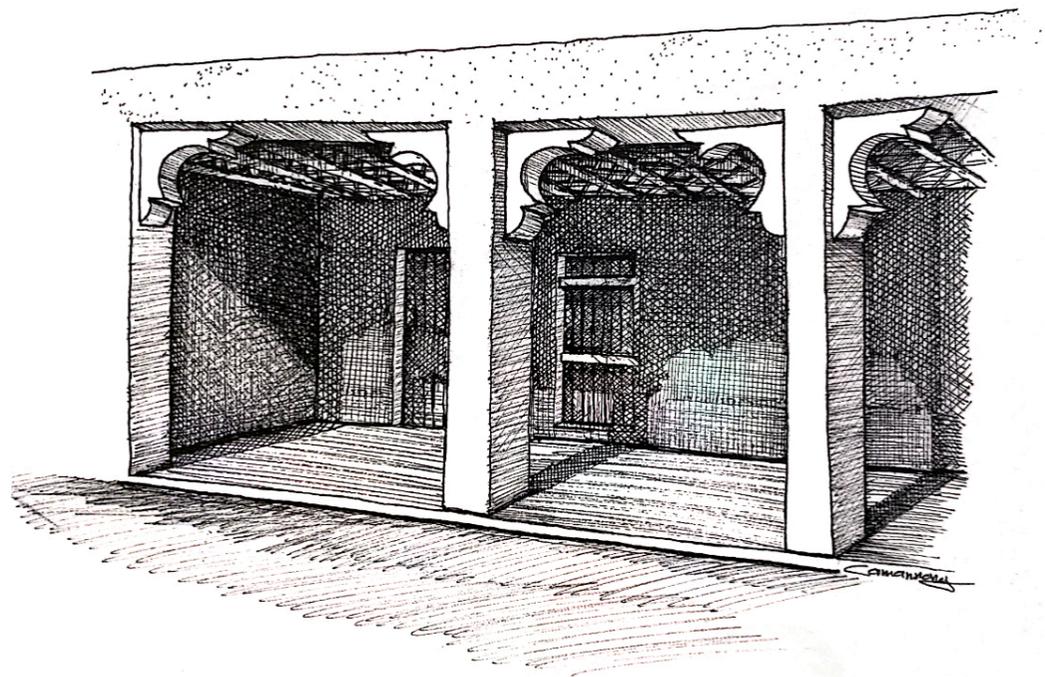


Fig. 15: Perspective F

The apartments were separated from the courtyards by **arcade porches** (fig 15). Square columns and ornamental ornaments in the corners support the square arcades. The staircase (fig 12) leads to the **majlis**, the primary public seating space for visitors. The majlis is encircled by recesses and badgheers on the walls. The facade of the house's entry is seen in the elevation (fig 17). The home featured only **one entrance door**, which was a controlled mechanism to keep track of who entered and exited the residence.

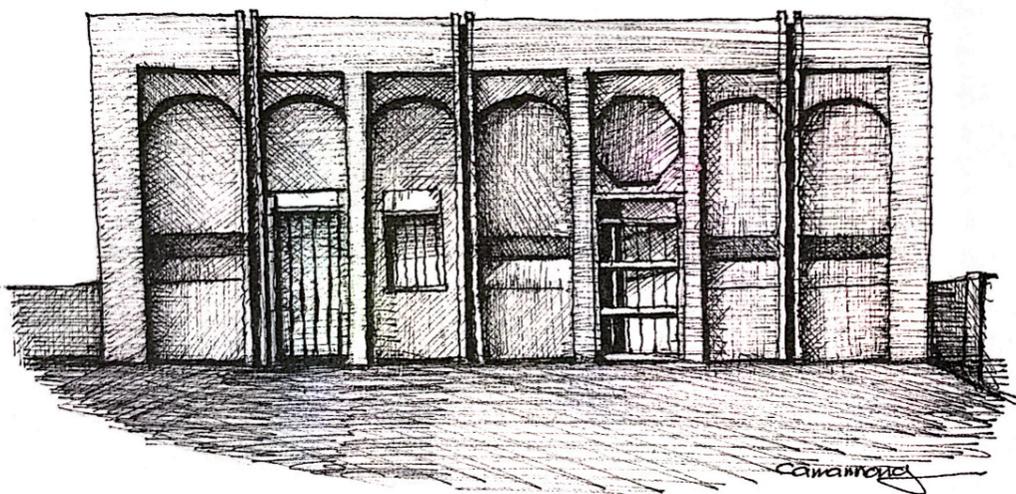


Fig. 16: Perspective F

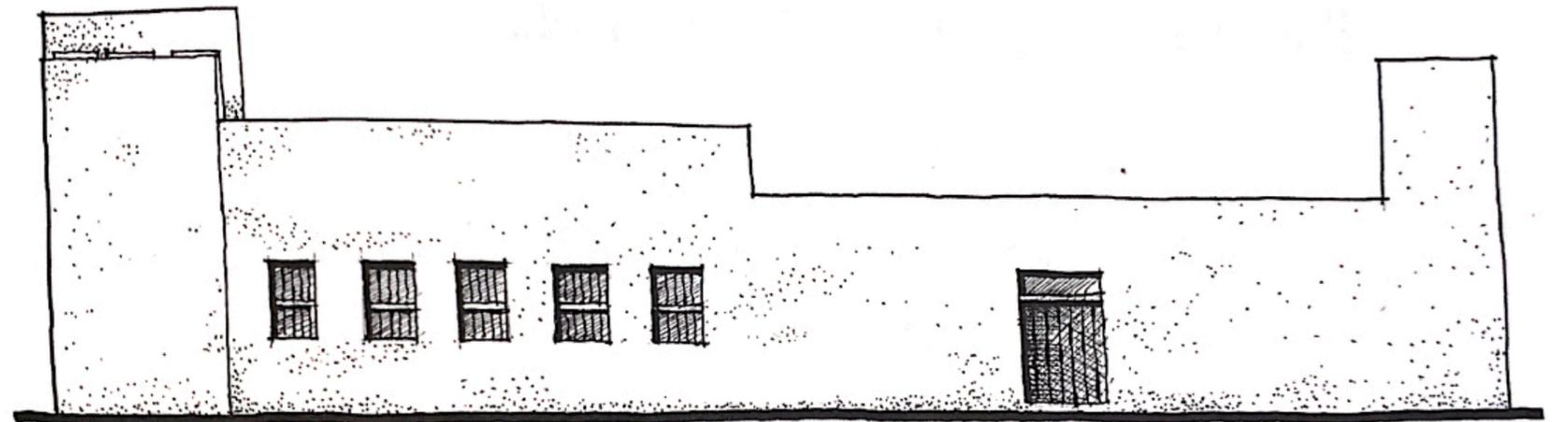


Fig. 17: Exterior elevation

INTERVIEWS

Interview 1

Name: Dr. Ali Ahmed Eltohami

Position: Clinical psychologist

Q1) Can you briefly tell me about yourself?

I am a consultant, psychologist, I work in Al Rumailah Hospital and the services we provide here are psychology assessment, and psychotherapy for out patients. We have 2 types of patients in-patients and out patients. The in-patients are those who sleep here at the facility so that we can keep an eye on their behavior and work on improving their mental state in the most effective way possible and there are out-patients, which are patients that come in however times needed weekly to talk to a psychologist like me and they would take their medication and leave.

Q2) Is Al Rumailah Hospital funded by the Government?

Yes

Q3) How long have you been working in this field?

Since 2003 so

Q4) When was the demand for psychotherapy raised and what was the cause?

It has raised in the past decade, it's either due to the awareness of people and the stigma of going to get help when they feel mentally not okay, so this has been more normalized in some families, but not everywhere it could also be the larger levels of stress that is being put on people in a daily basis nowadays, so its sometimes the stress of work and the industrializations yts been happening here in Qatar, or even factors from the outside on social media that putting a stress on people to be in a certain way, it has caused a large increase. There are some families that there are no contact with families, so each person would be sitting alone on their phones speaking to their friends, but physical contact with each other as members of the family is becoming less and less and that could also contribute to this increase of demand because it could just be that these people don't speak enough to their family, they don't open up to them like they should.

Q5) What considerations are typically taken into account when admitting patients to an inpatient psychiatric facility?

Patients are typically admitted for three reasons: if they are dangerous to themselves, if they are dangerous or may hurt those around them, or if they are unaware of their mental illness and are unable to conduct daily activities.

Q6) What are the most common mental disorders in Qatar?

Statiscaally, the majority of the people who come here have depression, anxiety, or obsessive compulsive disorder (OCD).

Q7) What are the most common age groups?

Before and until now we get patients that are in the range of 25 years - 45 years old. But more recently, in the past 7 years I've been seeing more and more young adults, so early 20's are coming up more. Teenagers are rare but I have seen pateints that were 16-17 but there are more rare cases.

Q8) How would you divide the most common mental disorder per age group?

So ages between 35 years and 55 years old deal with anxiety more. Younger generations are dealing with depressive disorders and OCD more.

Q9) What is it like in the in-patient facilities?

Currently the in-patient facilities are divided into 1 female section and 3 male sections, simply because there are more male patients. The different mental disorders are generally put together because it is too expensive to split them so that forensic cases that have been involved with crime are combined with those who have depression, anxiety, or obsessive compulsive disorder (OCD). The units themselves are just normal rooms that have separate bathrooms. Most rooms are shared. There is a cafeteria, TV room, an outdoor area and a sports room. That is basically it

Interview 2

Interviewee: Dana Kraidli

An architect currently working in Midmac Contracting I interviewed her to get a better understanding of Design principles that are currently being in Qatar today. The interview was done face to face at a cafe near where she works. This interview was in English

Can you tell me what you do and where you work?

I am a project architect at Midmac Contracting. My job is divided into different scopes coordinating between Mep and the Design finishes. So what i usually do is translate construction, help with the design aspects and produce shot drawings of ceilings, walls flooring. I also help coordinate with MEP, meaning Mechanical, Electrical and Plumbing. The MEP is the heart of a project, without it, the design part of the project can not be done and vice versa.i am currently working on a project in Lusail Plaza which you can check out once its done.

Do you find that the environment in Qatar generally has an impact on your projects/ if so how?

Yes, the environment greatly impacts our projects. Construction wise, the heat during the summer is considered to be an extreme weather situation that sometimes pulls back our projects and to deal with them, we have more night shifts than day shifts. We also try to provide the workers on site with food and water to keep them active and healthy while working. To cope with the heat no AC's are available on site but we use fans. As for the design aspect, AC's should always be included and on at all times. The building should always be ready to accept the heat. Insulation and high levels of ventilation should be included. The orientation of the building is the most important because it can help a lot in the future of the design and trying to minimize the power used for example. The orientation is necessary to avoid harsh environments.

I wanted to know when you would work on retail projects, what are the most important aspects of the project, such as when it comes to the planning or the designing?

In retail projects, the most important thing is circulation. The main idea is that the visitor can get around the space without the need of any maps or anything because there is a clear path and circulation for them to know where to go. It's also interesting because you really need to understand the space when designing because different purposes require different approaches for example, in a restaurant, you need to understand the circulation needs in a restaurant and how to get more people going and coming, you would have to lower the ceiling so that the customer doesn't stay for too long while on the other hand, in malls we have very high ceilings to make the person feel comfortable and stay in that space for longer.

Is greenery a big factor when designing? If so, how and where is it used?

Of Course, greenery should always be included as one of the main factors of the design. You need to also think about the science behind it that the greenery gives oxygen, so with such harsh weather in Qatar, greenery can help a lot. Plus for aesthetic purposes, greenery makes the overall building look better, not just feel better.

Have you ever worked in mental health facilities projects?

No, unfortunately, I've only worked on 2 hospital projects in the past. I wish one day I get the opportunity to work in a mental health facility. I think they are very interesting and it would be different to what I'm used to.

Have you done biophilic design before in a project?

In my current career in Qatar, no, but during my undergraduate years I have, we were working on a project that was related to the sea and the water and we were looking into methods to respect that environment as well as emphasize it. It was a sustainable city. But in reality in Qatar I dont think it has been used or its not as popular because Qatar's desert nature doesn't help

Do you believe that having greenery in space can help someone's mental health?

Ofcourse, there is something in the design we go by that talks about the psychology of the building. Psychology of the building depends on the designed environment and how that in return makes the person in the building feel. The greenery category falls under this line because it is taken into consideration to make sure the psychology of the person is taken care of and that they are as comfortable as possible in the building.

Do you believe more greenery can help reduce air pollution?

Yes of course, in biology, the more greenery you have the better because, the less polluted air will be there. The greenery takes in the pollutants and carbon dioxide and releases oxygen, therefore cleaning the air. In a project like Hamad Trauma center, the terrace of the patient rooms include trees and a bunch of plants because it helps the patients. The center is near a highway, where it's very polluted from cars, so integrating nature helps the patient when they walk out onto the terrace, they can have some fresh air from the greenery. Another precedent is a facade in France of all greenery that welcomes visitors. So greenery is very essential and makes the space more inviting.

What are the types of problems that you tend to face when it comes to adding greenery to projects?

The main difficulty is how to integrate them. As you may know greenery needs water, so providing that may be more difficult sometimes, more building systems need to be taken into consideration. Also you need to consider where you are, so in Doha you need to consider what type of plants live here in such harsh conditions, most plants will die during the summer. Off the top of my head the plants we've used in the past and can live in Qatar are aloe vera, palm trees, cactuses, etc.

How is this problem of integrating greenery into a space and building systems?

There are two systems that can be used when integrating plants, outdoor and indoor. For outdoor it's quite simple, we tend to use pipe systems that are drop irrigation, meaning throughout the day droplets of water will drop onto the plants. There is another method for outdoor use, the use of water sprinklers but we minimized the use of these because they tend to waste a lot of water and aren't sustainable. The drop irrigation method is more sustainable.

As for indoor, it is more difficult, you have to make sure the piping system of watering will fit within the construction of the building. This falls under the MEP category with the mechanics and plumbing required. This system sits within the concrete itself. It would go through pipes and shafts that then goes through slabs that are covered with the finish material but you have that system already implemented thus creating access to water. Before any finish material though, there are several layers to be considered to avoid moss and water leakage. If you are interested in this topic i can ask a mechanical engineer at our company to help explain this better since he knows this system more.

Interview 2

How would you go about trying to attract people to a space?

First thing: it's all about the visual, once you achieve an interesting design people will be attracted to enter your building or design space. To keep people coming you need to work on function, we have 2 concepts for that. First concept Form Follow Function: meaning you define the function of your space and the circulation and the activity within and then you develop your design. second concept: Function Follow Form: meaning you design your project and from there you define the circulation and activities. All this falls again under the concept of Building Psychology. When the function is defined it's easier to the user to mitigate in the space freely without getting lost a huge example is Hamad Airport (one of the projects i worked on) if you don't follow the signs you will get lost which tells us that the circulation is not properly studied in order to give the user a clear path. But again this is a huge airport so people are meant to get lost. Another example is a hospital, from the entrance the design of the space tells you exactly where to go without reading the signs. You know you have to directly go to the reception for the information you need because it's right in front of the entrance.

Is sustainability a factor when designing? What methods are used in construction to make sure you have a sustainable design?

Yes it is, sustainability is very important to us and how we achieve it is by using less power, more glazing on glass leading to heat form in to out. When glass heats up, it lets heat in, this means that you need to provide more ventilation, so therefore more glazing is needed, so the more glazing the less power used. So you see everything is connected in that sense. Concrete is our best friend here because it doesn't get too hot. On the other hand, stone is a nightmare because it absorbs so much. We also add more greenery to a space to promote a more healthy atmosphere. In my opinion though, the best form of sustainability is providing a method that creates energy because pretty much everything runs on energy. In Qatar, the best way this is done is through solar panels since we get long summer days, why not make use out of it, so that is my way of trying to promote a more sustainable design.

Is a natural ventilating system a good option to use in qatar?

Possibly is an option if done correctly but it could be very hard since we get 7 months of hot and humid weather. For that reason I think the best source of renewable energy is Solar Energy.

What type of materials would you use to have a more sustainable building and are there any that are locally found?

Concrete, cement, gypsum board are good options as well as steel since we have a steel manufacturer here in Qatar. All of these are the essentials and are found locally. Since the blockade we were cut from resources from the UAE so we had to look for other options, so we had to turn to international options. Some international materials are also used especially for high quality finishes like slabs from Italy that tend to be very high quality.

CONCEPTUAL FRAMEWORK

Conceptual Framework

Preference Framework Theory, Air pollution and Greenery Edutainment Center

Air pollution is one of Qatar's most critical environmental problems, as the country ranks first in a worldwide list of the most polluted nations per capita²⁹. The rapid industrialization, urbanization and traffic-related air pollution contributed to the rise in air pollution (TRAP)³⁰. Qatar's environmental deterioration has accelerated in the last decade leading up to the FIFA 2022 World Cup. This has had a detrimental effect on citizens' life and on residents' mental health. The proposed project's objective is to establish an atmosphere that educates and entertains Qatari families about the importance of environmental preservation and the development of an ecologically responsible lifestyle.

To achieve this, a theory in environmental psychology, which is the study of human interactions with their constructed and natural environments³¹, will be implemented within the edutainment center. Kaplan and Kaplan's Preference Framework Theory is based on the idea that individuals prefer scenarios that are interesting and intriguing rather than basic or dull. To add that element of fascination, a parallel hypothesis, Biophilia, will be incorporated into the proposed conceptual framework. It will be used to enhance human-nature interaction and to amplify the influence of environmental preservation on the visitors. Four aspects of the theory are established to analyse the preference framework: coherence, legibility, complexity and mystery³². Each element's significance changes according to its place within the theory's framework. The four frameworks are classified into two categories where it was shown through research that "high relationship was found between legibility and coherence"³³ as well as "Exploration, the promise of additional information, is predicted by complexity and a sense of mystery"³⁴. In actual situations, the classified groups assist one another. This is because coherence allows clearer legibility and complexity enables a more fascinating mystery.

The first two preference frameworks are coherence and legibility. Coherence is the process through which components in a space come together to create a comprehensible context, or in other words, when the scene begins to make sense. Legibility refers to an individual's ability to comprehend and identify an environment and the objects in it. Thomas R Herzog, known for his focus on climate and energy use through the use of technologically advanced architectural skins, mentions that, "outdoor scenes that lacked identifiability evoked "anger and hostility" in observers."³⁵ As a result, outdoor scenes that do not lack in identifiability and have clear landmarks and elements that are memorable, will prevent feelings of anger and hostility, therefore, resulting in a much calmer state.

The other two preference frameworks are complexity and mystery. Complexity refers to how involved individuals are in a situation, which is proportional to the diversity of components present in that environment. The complexity is greatly varied due to the fact that each individual's perception of a space is unique.

According to John Falk, a Portland-based director of the Institute for Learning Innovation, concludes that, "The complexity of urban landscape has been shown to have a positive influence on preference."³⁶ Therefore this will be implemented in the proposed project through design elements introduced with biophilia. The direct experience of nature will aid in the creation of a sufficient complexity for the visitors to keep them engaged in the area. This can be accomplished, for example, by adding greenery. The many textures and kinds of greenery will add to the space's intricacy.

Mystery refers to the extent to which a scene includes unexplored information. This captures the visitor's interest and encourages them to continue investigating. Mystery may evoke ambiguity, which may result in fear, which is why a safe setting should be enhanced to ensure both safety and enjoyment. However, not everything must be revealed in order to maintain the visitor's curiosity in the experiential learning environment. Each space will reveal something to the guest, which will entice them to stay and learn more. Thomas found that, "Mystery has been found to be reliably associated with high preference in natural environments (R. Kaplan, 1975)".³⁷

The complexity may have a positive impact on the visitors, yet a sense of mystery can also provoke people's curiosities where they are satisfied by the richness and diversity but intrigued to see more of the space. This will be used in the proposed project by revealing new information to the visitors as they walk through the space. This will be done through atmospheric design, since this is a more effective method of learning and will spark the visitors' interest in learning more. Having such encounters in settings leaves a lasting impression on visitors even after they leave. It will help in increasing public awareness of air pollution and inspire the trend toward a more ecologically responsible lifestyle.

Biophilic theory, as an expansion from the Preference Framework theory, will be explored to enhance the experience of space. The biophilia hypothesis refers to increasing residents' connection to the natural environment by using direct nature, indirect nature, and space and place conditions. The two theories that will work in parallel cohesively to support one another and provide an appropriate outcome for the proposed project are "Direct Experience of Nature" and "Indirect Nature Experience". They will be applied through the use of natural ventilation, natural light, and adding plants to provide a direct link to nature inside the built environment.

The use of these biophilic principles can aid in achieving the required outcome and support the preference framework theory. Specifically within legibility where the Biophilic elements can help define a more legible environment by organizing it into districts, landmarks and paths through the use of naturalistic shapes and forms³⁸. Kevin Lynch, an urban planner and author renowned for his perceptual approach to urban life, mentions that legibility uses,

legibility uses, " shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment."³⁹ Moreover, by structuring the environment, a more comprehensible setting will provide positive values to the visitors of the space.

By incorporating the four components of the Preference Framework Theory with the two Biophilic design principles, it begins to symbolize a collective function that creates harmony across the area by articulating the many roles of each element. This approach may be applied to the proposed project by including components of interior design, wayfinding, and zoning/space planning. It will exercise ultimate decision-making authority over the proposed project's core components. The use of biophilic principles from the primary preference framework theory will assist visitors in comprehending and remembering the information presented in order to raise awareness. Through their experiences, a resonance of an ecologically responsible lifestyle will help in modifying social views about environmental preservation.

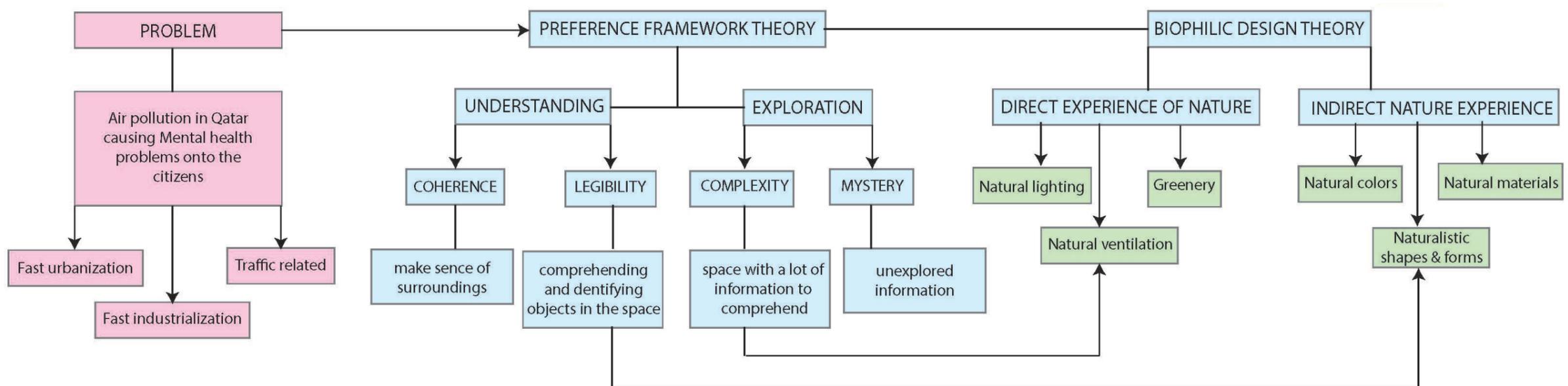


Fig. 54: Conceptual framework, theory diagram

ACOUSTIC CONSIDERATIONS

Acoustic Considerations

When developing an edutainment center aimed at increasing public awareness of air pollution and its potential consequences on residents, acoustic techniques are critical for creating the appropriate atmospheric design that maximizes the space's impression on the visitors. The reception area, merchandise store, and experiential space may be the noisiest areas because of the increased interaction in these locations. "Consideration of acoustics, at least to some degree, is required in practically all occupied environments and in all building types."⁴⁰ Acoustic levels may be adjusted according to the zones (fig 55) and their intended usage by the visitors.

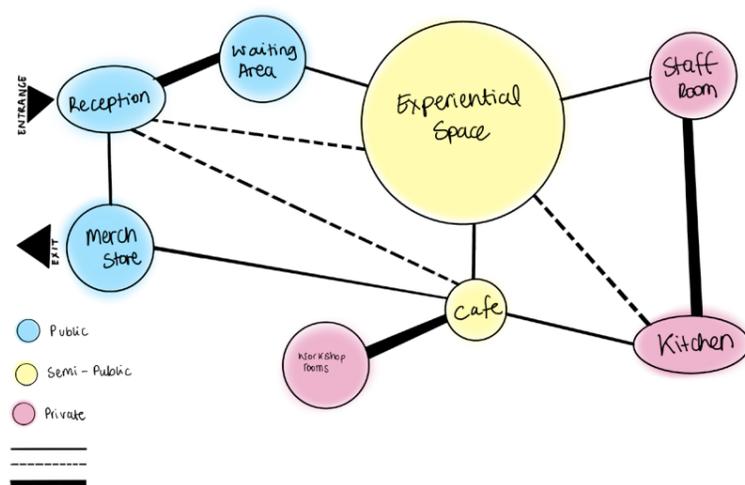


Fig. 55: Bubble diagram and privacy

In the reception and waiting area, it is important that objects on the walls (fig 56) disperse sound coherently in order to inform the receptionist of the presence of a guest without creating a distracting noise to those in the waiting area. This may be accomplished by alternating the depths of the wall panels. The fluctuations in the wall will disperse the sound patterns and scatter them into multiple different paths throughout the space⁴¹. This assists in orienting visitors to the rest of the space while also notifying the receptionist to the presence of a visitor. "Acoustics is the invisible art. When done well, spaces feel right – elevating one's

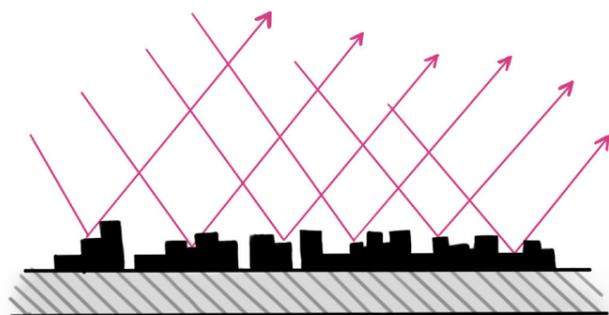


Fig. 56: Sound waves diffused

To keep the environment from being loud, due to the interaction of the visitors, acoustical absorption furniture may be used to absorb just enough sound to provide a calmer atmosphere in the merchandise shop. This is to ensure that all visitors still have a clear speech intelligibility within the space. The atmospheric space may become noisy as a result of the number of people it can accommodate and its openness to the outside building environment, but the inclusion of such furniture will assist in keeping the sound from becoming a bothersome noise as sound waves get absorbed into them. As stated in a study article, sound-absorbing materials used in furniture may significantly enhance an interior space's acoustic properties.⁴³

The cafe is a high activity space, it is important to consider acoustical control to avoid unwanted noise. This may be accomplished effectively by including greenery around the café area, both as a sound absorber and as a biophilic design feature. "vertical gardens can be a useful tool for mitigating noise pollution in urban environments"⁴⁴, as shown in figure 57, thus it may be used to create an acoustically pleasant atmosphere in which people can sit and interact with each other comfortably.

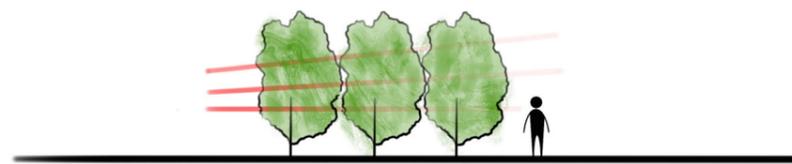


Fig. 57: Sound waves absorbed by greenery

With regards to the experiential spaces, each room must create a unique experience that is distinct from the other rooms, making it critical to retain sound in each of these spaces in order to elevate the atmospheric experience for the visitors. This can be done through the use of well absorbent acoustical walls and flooring. Due to the high foot traffic in the experiential spaces, the flooring (shown in fig 58) would become the primary source of noise. A material such as vinyl tiling might be considered for its longevity and durability in conjunction with the installation of an acoustical underlay to absorb and decrease noise, further enhancing the visitor's experience of the space.⁴⁵

The children's educational workshop rooms will be taken into account during the zoning stage of the space planning and will be located further away from the areas visitors frequently pass by. They should be accessible to children, which is why they will be located near the café area, where parents will sit, but farther away from the experiencing area, to prevent a sound clash. This is an advantage since it avoids the extra expenditures associated with installing acoustic panels, but it is also acoustically mindful in the location where the rooms are being placed. These rooms may

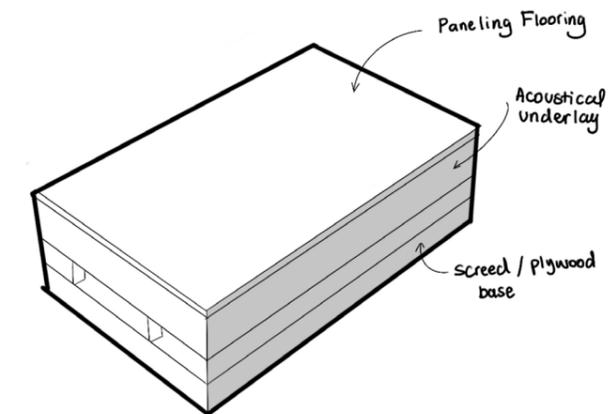


Fig. 58: Acoustic underlay in flooring

include equipment that generates noise. To reduce transmission of vibration and sound to adjacent spaces, these machines should avoid being placed against walls. Carpeting may be included in the staff room to increase the space's quietness and to provide personnel for the staff during their break. Regarding the workshop rooms, it is critical to consider their acoustics because they are connected to the cafe, which may be noisy, but the purpose of these rooms is to provide privacy for children's workshops by preventing sound waves from traveling back and forth between the cafe and the workshop rooms. As a result, plantation (fig 57) and sound-absorbing materials should be employed in the rooms to help generate the desired sense of privacy. The method in which the material is installed might have an effect on its performance.⁴⁶ Therefore careful material selection and placement will be done when designing these rooms.

In conclusion, through the use of acoustical control, the different zones will be designed according to the function of the spaces. The right sound quality will be established through the application of various acoustical control methods to create the suitable atmosphere for the visitors. This will enhance their whole experience, in hopes of providing the intended information communicated about the importance of environmental lifestyle and as a result allowing them to adopt a more environmentally responsible lifestyle.

INDOOR AIR QUALITY (IQA)

Indoor Air Quality (IAQ)

Indoor Air Quality (IAQ) is a term that refers to the quality of air inside a building. The quality of the air can drastically change how visitors feel inside of a space. It is critical to evaluate the air quality in the area in order to protect the visitors' comfort, health, and mental well-being, since an increase in air pollutants may create stress. Inadequate Indoor Air Quality may result in Sick Building Syndrome (SBS). "SBS symptoms include headache, lethargy, eye, nose and throat irritation, breathing problems, and skin irritation (World Health Organization, 1983)."⁴⁷ Even though the proposed project will produce an atmospheric design environment that evokes the sensation of air pollution, the air quality in the area must be clean and healthy to guarantee the visitors' safety.

The proposed project is located in Katara, Qatar. The building's entrance is adjacent to a road that serves as the building's access point as shown in Fig. 59. Throughout the day, the cars visiting and parking in the area emit harmful gases and smoke, affecting the air quality in and around the place. Additionally, the project is situated near the sea, which might raise the humidity levels in the area (as seen in Fig 60). If it becomes too humid, it may negatively impact the air quality.

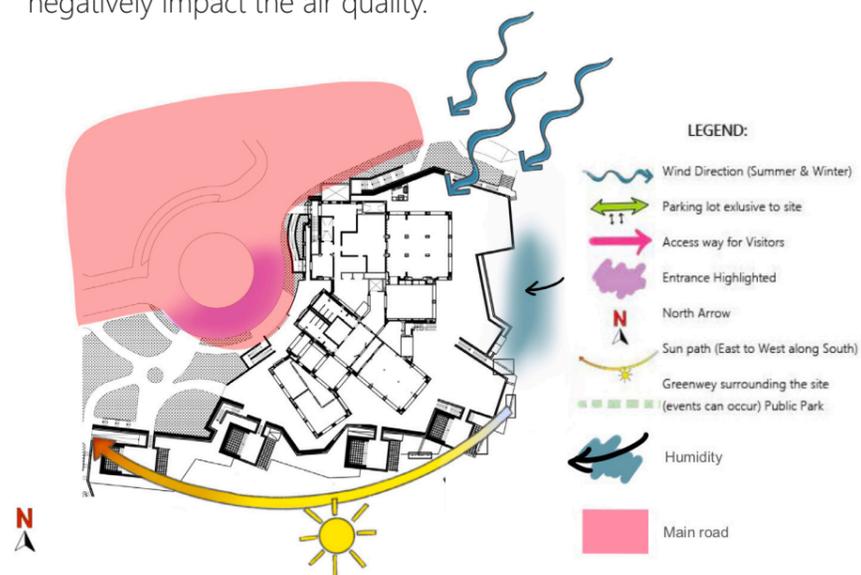


Fig. 59: Site Analysis

Increasing the amount of plants would assist in filtering out the pollutants in the air. It is scientifically proven that "Plants are natural filters for air pollution which directly uptake pollutants by leaves stomata. Large surface area of plants extends the probability of deposition compared with the other urban surfaces"⁴⁸. The concentration of Particulate Matter (PM), which is made up of both biological and inorganic liquid and solid components, decreases with the addition of plantations as they effectively remove pollutants in the air by replacing toxins in the air (shown in Fig 61).⁴⁹ When the impact of a green area is contrasted with the opposing environment, the value of greenery is heightened, which is why



Fig. 60: Site and surrounding environment, showing the sea and direction of humidity

the usage of greenery is crucial to the proposed project's learning experience. This will aid in raising awareness of the existing local problem of air pollution in general.

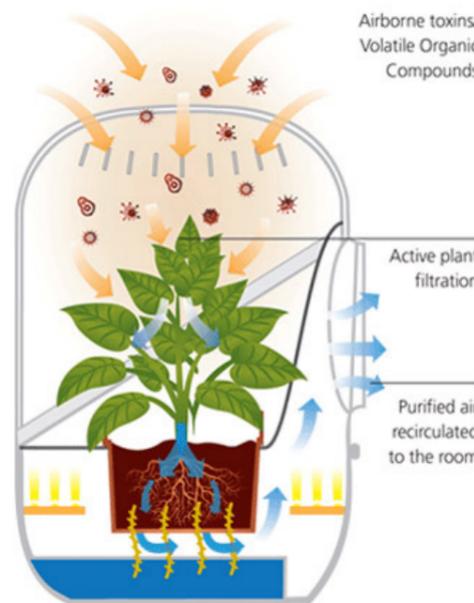


Fig. 61: Plant filtration process

The heating, ventilation, and air condition (HVAC) system of a building is believed to be responsible for regulating air temperatures and quality of air to ensure the visitor's comfort. The HVAC system will be utilized to circulate air from the outside of the building and distribute it evenly throughout the different spaces of the proposed project. "A ventilation system consists of several key components: (1) the contaminant source, (2) an exhaust hood, (3) an air mover, (4) ducts and fitting, (5) makeup air, (6) exhaust air, (7) a pollutant removal device, (8) a discharge stack, and (9)

air circulation."⁵⁰ Numerous components of the system are utilized to regulate indoor air quality and remove air contaminants. Filters used within the HVAC systems, as shown in Fig 62, will aid in Filtering the air pollution that enters from outside of the building. The HVAC system's maintenance will be monitored and inspected annually to ensure that the air is kept clean.⁵¹

The HVAC system will enable users to customize their temperature preferences. This will be accomplished by the use of thermostats located around the facility in conveniently accessible locations for employees. Additionally, the device can automatically control temperatures to a preset level that is appropriate for building occupants.

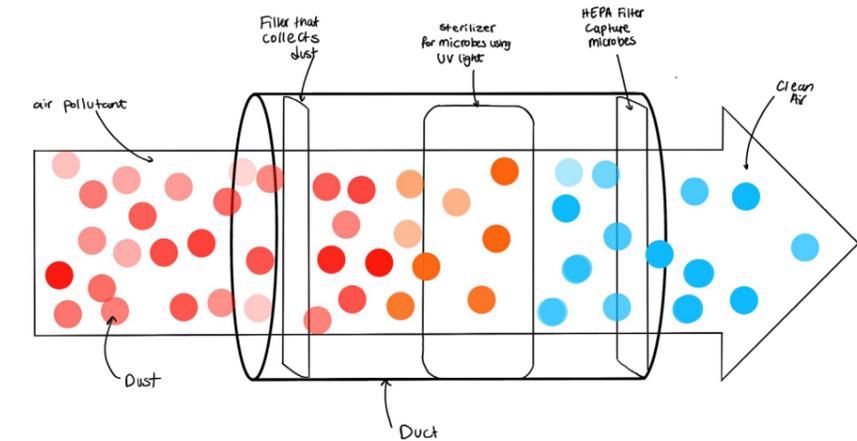


Fig. 62: HVAC system, air purifying

Controlling space humidity is critical for the successful operation of any HVAC system operated in humid conditions. A chilled beam system, which is a component of the HVAC system, circulates cold water through tubes (Fig. 63). As heated humid air rises from inside the room, the tubes cool and fall down to the ground, generating a "convective air motion" to cool the space.⁵² This system will be utilized to minimize the humidity created by the outdoor environment. It was discovered in an experiment done by Loudermilk, Kenneth, and Darren S. Alexander that "The primary air requirement and fan energy use of Scenario C is 10% less than the baseline due to its relaxed space relative humidity requirement."⁵³ Proving that with the implementation of a chilled beam system, less air is required by fan energy, thus saving and reducing energy consumption. Therefore, the chilled beam system will aid in the promise of making the planned project as sustainable as possible through careful design.

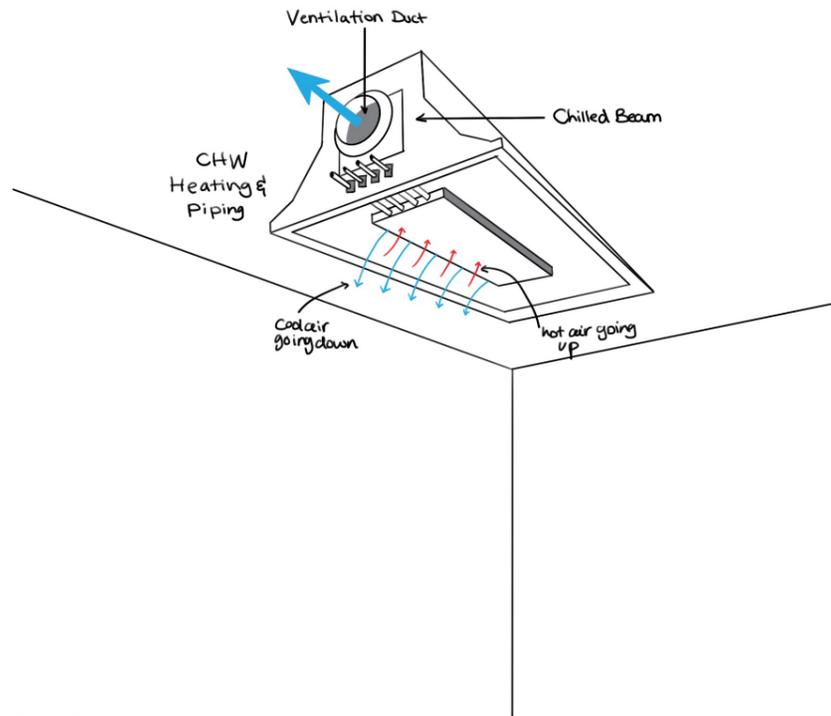


Fig. 63: Chilled beam system

Traditional Qatari homes feature ventilation systems which will be used in the proposed project as a way to provide more sustainable ventilation to the space. The orientation of the structure (Fig. 1) indicates that air flows through it from north to south. To encourage natural ventilation within the space, the appropriate number of windows and openings (Fig. 65) will be considered. The system will ensure that more windows are put on the north and south sides of the building to ensure that air enters and exits the space uniformly, creating a cool interior atmosphere without completely relying on the HVAC system throughout the whole year. When the HVAC system is in use, these openings and windows may be manually closed to prevent air leakage. The hybrid system will take into account Qatar's harsh climate and does contain HVAC systems throughout the majority of the year. However, for around four months, HVAC system consumption is reduced, therefore promoting a more sustainable method of ventilation by resurrecting historic Qatari traditions similar to the way it is shown in Fig 64.

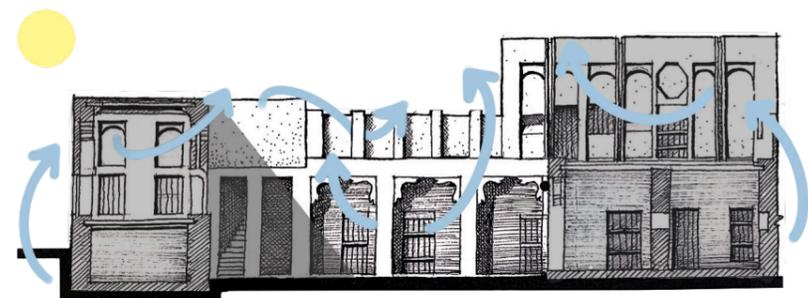


Fig. 64: Natural air ventilation within traditional qatari homes

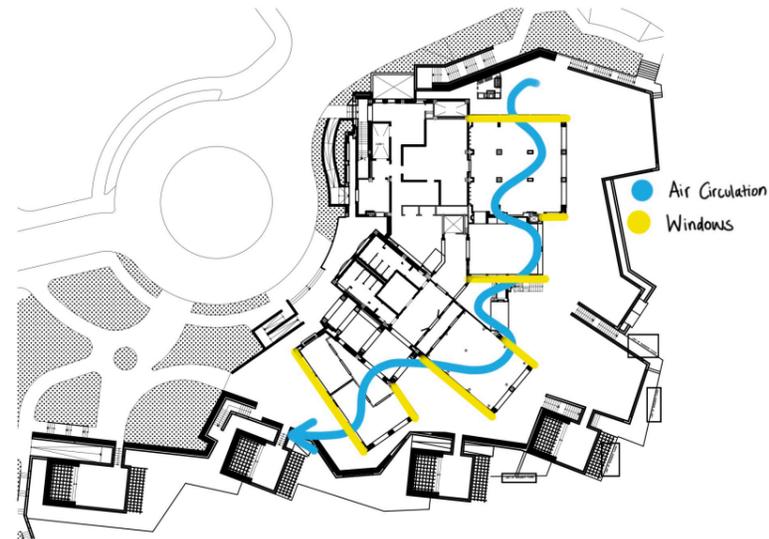


Fig. 65: Natural air ventilation within the space based on window placements

In conclusion, maintaining indoor air quality is vital for the mental health and well-being of visitors who enter the space. The installation of an appropriate HVAC system, as well as the inclusion of greenery and the ideal window orientation to allow for natural ventilation, will all work in unison to produce a healthy environment and a pleasant ambiance for the visitors. The hybrid system, which incorporates both HVAC and traditional Qatari air ventilation methods, is critical for achieving a sustainable building environment. When the influence of a green space is compared to the opposite environment, the value of greenery is enhanced. This will assist to raise public awareness of the local problem of air pollution and encourage visitors to the building to live a more environmentally responsible lifestyle.

ERGONOMIC CONSIDERATIONS

Universal Design

To target the population, “ designs/products related to (1) general populations, (2) working populations, (3) children and (4) the elderly and people with disabilities”⁶⁰ will be considered. With such a wide range in size across the age groups, the most effective method of overcoming the gaps and assuring the comfort and safety of all visitors is to incorporate universal design. “Universal Design (UD) is defined as an approach to creating environments and products that are usable by all people to the greatest extent possible.”⁶¹ This will aid in creating spaces that will meet the unique needs of each person. This is accomplished by the consideration of human factors such as equitable, adjustable, flexible, adaptable, perceptive, risk-free, simple, efficient, and comfortable settings (fig. 71). This is critical for the visitors, as it welcomes a diverse group of people.

PRINCIPLES	DESCRIPTION
1. Equitable use	The design is useful and marketable to people with diverse abilities.
2. Flexibility in use	The design accommodates a wide range of individual preferences and abilities.
3. Simple and intuitive use	Use of the design is easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level.
4. Perceptible information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities.
5. Tolerance for error	The design minimizes hazards and the adverse consequences of accidental or unintended actions.
6. Low physical effort	The design can be used efficiently and comfortably, and with a minimum of fatigue.
7. Size and space for approach and use	Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of the user’s body size, posture, or mobility.

Fig. 71: The principles of Universal Design (Center for Universal Design, 1997)

Cognitive Design

Since Qatar is culturally versatile, it is important to consider cognitive ergonomics in addition to physical ergonomics, since different cultures would perceive spaces differently. Cognitive design needs to be considered for the experiential area (fig 67). “Cognitive ergonomics is one of the most important ergonomics disciplines associated with various aspects of design, among which is metal furniture design as a design system that is directly connected to the human- system interaction, hence, is a key towards achieving a quality interaction with humans.”⁶² Through the layering of materials (such as textured and reflective glass) the atmospheric design creates a setting favorable to dynamic interactions with one’s surroundings. As this may become visually challenging as the space blurs, visual components and transitional clearance are required.

Visual proximity

Visual proximity is critical in order to offer a safe environment for visitors. This may be accomplished through the use of appropriate signs (fig 72). When considering signage, it is vital to keep the line of sight in mind to ensure the sign is visible to all users. “The ability to keep focus on a process for the duration of time is called alertness or vigilance. Since humans are not naturally good at remaining vigilant for a long time, it is important to support attention using enough sensory stimulation, the right amount of pressure and the right frequency of activity.”⁶³ It is essential that the visual impact is accompanied by signs to guarantee that the viewer’s memory is retained and the message is conveyed effectively. To support this, the single channel theory “reveal an increasing number of different processing mechanisms underlying its general manifestations in human performance (e.g., different dimensions of abilities, mechanisms of attention, and forms of processing bottlenecks, respectively).”⁶⁴ This approach maximizes one’s ability to comprehend the environment since the focus of attention is not divided over several distinct components in the space, but rather to a single element that is uniformly combined with others. What is meant by uniformly combined is that the signs and the space will work in unison to create visual appeal, rather than competing with one another.

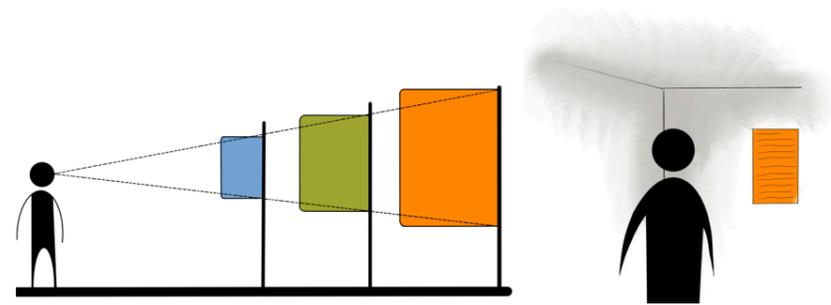


Fig. 72: Line of sight and visual proximities

Perception

Perception is another aspect of cognitive ergonomics that must be considered, since individuals with varying backgrounds and cultures may interpret elements and sights differently. This is why atmospheric clearance will be combined with visual direction of the space. “Systemization provides rules for building a correct visual composition that allows easier reading and understanding of the information that it carries.”⁶⁵ As shown in fig 73, a clear path circulation will be implemented in the space to ensure the ease of wayfinding throughout the space. Thresholds will be placed used to direct people to the appropriate locations. With the help of light, shapes and forms, visual clarity will be created coherently.

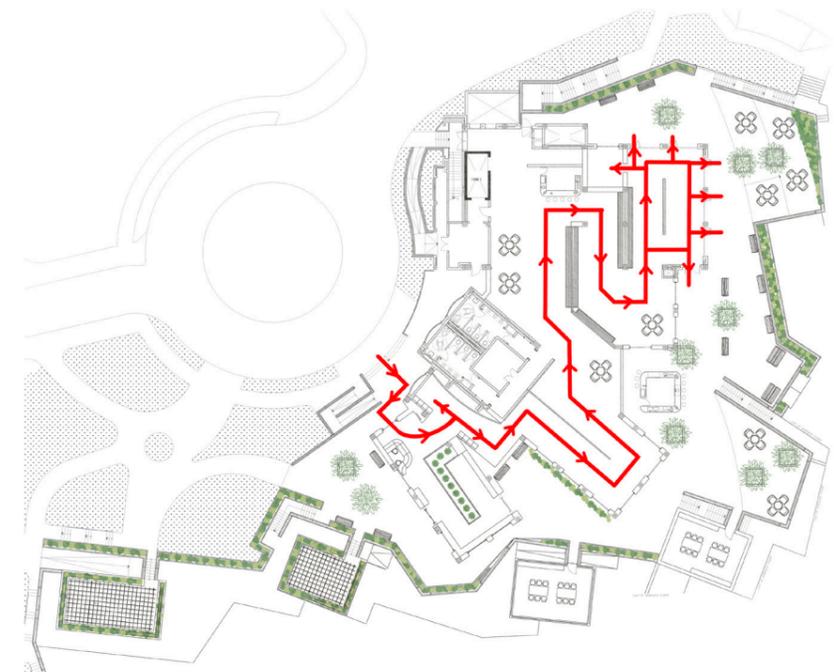


Fig. 73: Circulation in the space

Conclusion

In conclusion, ergonomic considerations will assist in ensuring visitor safety, as anthropometry, universal design, visual proximity, and perception are all critical criteria that should be fully exploited to address the requirements of the edutainment center’s visitors. This accomplishes the primary tasks of a comfortable, and enjoyable setting, tailored to most users, that maximizes the visitors’ learning experience.

LIGHTING CONSIDERATIONS

Lighting Considerations

Introduction

The proposed project aims to educate Qatari families about the country's poor air quality. Lighting is a crucial element of the planned edutainment environment since it will be used to highlight various components of the different spaces while also functioning as a guide for the visitors on where to go to engage with the rest of the environment. Light dispersion is essential to consider because it ensures optimum light distribution inside the room. Lighting and the way it bounces off of the space's materials will play a significant influence in emphasizing certain components of the proposed project's intended message. This will also be done to ensure that the light is being reflected comfortably, without creating glare.

Additionally, within the spaces, various components of the building will be divided into distinct sections, each of which will reveal more about the impacts of air pollution on the environment through the process of weathering than the previous section. These sections are divided into 4 parts: engage, explore, reflect and appreciate. These phases will be connected to the preference framework theory (fig 54), since the many levels of the project will orient visitors to the area and encourage them to understand and explore it. The various degrees of pollution require the use of distinct lighting techniques, which will be explored in the following paper.

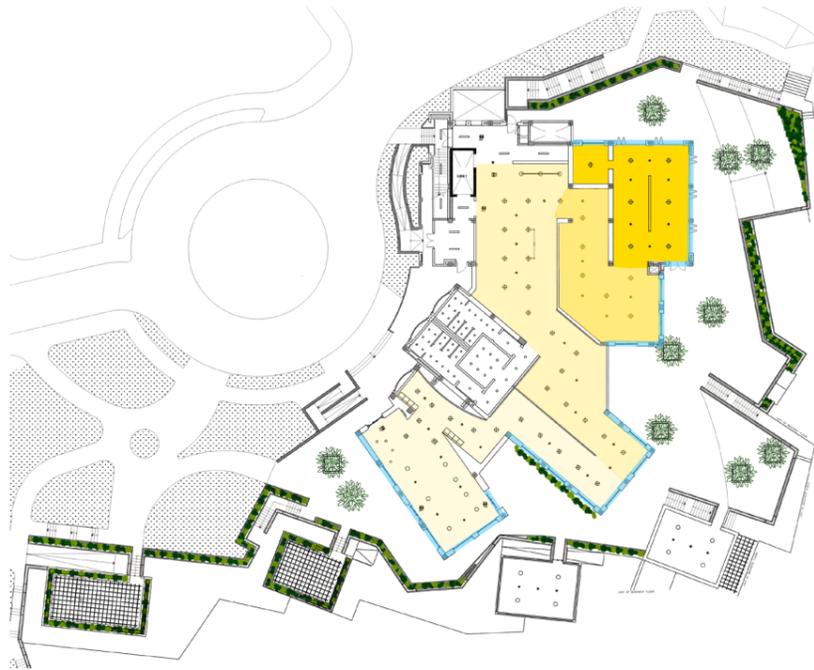


Fig. 74: Reflected ceiling plan showing the lighting of the 4 different spaces and how the lighting will gradually get

Lighting Temperatures

warmer. The blue represents the glass facade that lets in natural daylight. Lighting temperature will help the project reach its full potential in displaying the intended message by creating the correct atmosphere. "Correlated Colour Temperature (CCT) of lighting may affect not only occupant visual perception, but also other indoor environment perceptions, such as perceptions of the thermal

environment or the air quality."⁶⁶ The lighting temperature throughout the space will gradually decrease, getting warmer as the visitors walk through the different spaces (shown in figure 74). The lighting temperatures required will range between 3000k to 2700k (fig 75). This warmth will be utilized to recreate Qatar's natural sand and dusty climate. However, warm lighting is often considered as a calming and relaxing lighting temperature⁶⁷. Therefore, light diffusion is required to amplify and replicate the effects of an air polluted sky. This may be accomplished by the use of materiality or fog (shown in figure 76). The fog helps diffuse the light and imparts a grayish tinge⁶⁸ to the space's general ambiance, simulating the effects of an air-polluted sky (shown in figure 77). The combination of the warmth of the light and the 'fog' will recreate the effects shown in figure 77, but in a confined space. This will assist visitors to the building in comprehending the consequences of air pollution and how they might feel as a result. Their experience in this place should trigger feelings associated with what is genuinely occurring around them, even if they are unable to see it. This atmospheric design will be supported with signs that will reinforce the information being conveyed to the audience and help them in leaving the experience better informed about the current local issue.

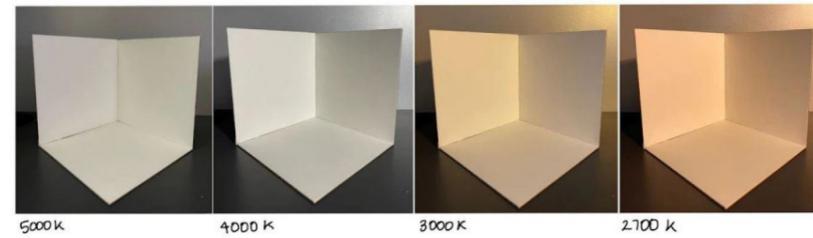


Fig. 75: Lighting temperatures used within the different spaces



Fig. 76: Light diffusion with fog



Fig. 77: Air Polluted sky

Natural Lighting

The orientation of the building, shown in the site analysis in figure 78, along with the glass facade (shown in figure 74 and 79), allows a large portion of the building to admit sunlight throughout the day. The average number of hours of daylight in Qatar is around 13.7 in the summer (May to October) and 7.8 in the winter (December to March). This day light allows this project to keep its promise of being as sustainable as possible as artificial lighting would not need to be turned on throughout the whole day. The natural daylight penetrates most of the first half of the building. This includes the experiential area, the merch store, the private family rooms and the reception and waiting area. "Automatic daylighting control systems feature a photoelectric sensor that generates a signal to dim interior lights when adequate daylight enters the room through windows and skylights. Modern sensors are designed to connect directly to fluorescent dimming ballasts"⁶⁹ These automated lights will keep the room illuminated at all times, preserving the space's atmosphere. The utilization of natural day light in conjunction with warm temperature light will assist in establishing the desired ambiance in the room, resulting in a visual and environmental impact similar to that shown in figure 5.

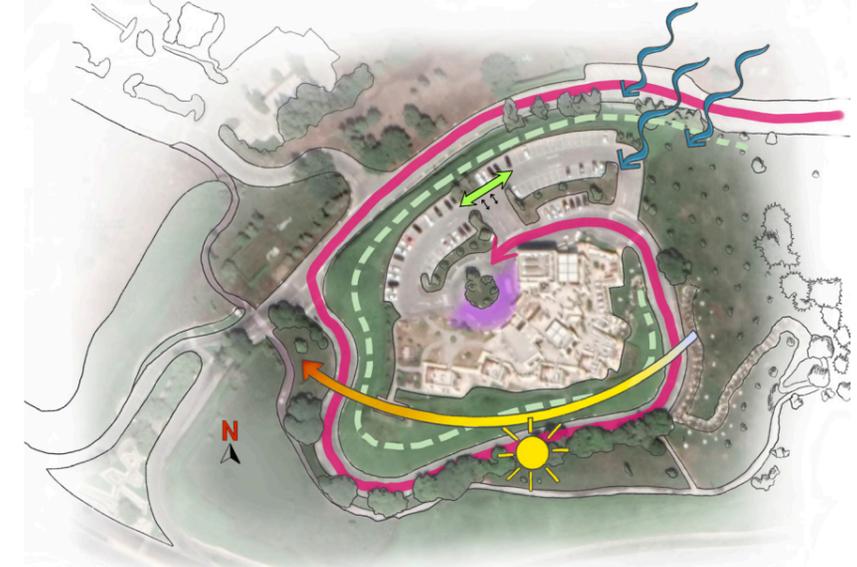


Fig. 78: Site study illustrating the sun's direction and the glass façade that wraps around the south side of the building.

Light Control

The access to the long hours of daylight throughout the day does not mean that the light throughout the day will remain consistent. In fact, some unwanted shadows may begin to appear as the sun moves and begin to fade throughout the day. This can be avoided by implementing a preset dimming system which includes sensors to detect the natural dimming of the spaces, thus activating the artificial lights needed to support the spaces required lighting. "Daylighting controls are photoelectric eyes that turn lights

Lighting Considerations



Fig. 79: Glass façade that wraps around the south side of the building.

off or dim them when daylight is sufficient. In basic applications, photoelectric switches turn off parking lot lights and streetlights during the day.⁷⁰ For the interior of the building, photoelectric dimmers assist in reducing energy consumption, since the majority of light is provided by the building's façade. However, the majority of the artificial light is required to maintain a steady level of illumination across the space and gradually raise the intensity of artificial light as the natural lighting begins to fade into the night.

To ensure that the lighting systems are comfortable, the building's staff will be able to control the lights using light switches and dimmers (shown in Figure 80). Light switches will allow for the staff to turn on and off the lighting whenever required. The light dimmers, which will be connected to a more automated light sensor, will regulate the amount of light required throughout the day as the sun sets. This could also be controlled by staff in the case of emergencies.



Fig. 80: Light switches and Dimmers

Another sensor that may be implemented is the time clock control method. This would be used to allow light to turn on and off at set times everyday. This will be used for the outdoor space of the building. When the sun sets in Qatar, a timer set at 5:15pm will activate the exterior lights. Another timer will be set around 5:40am to switch off the artificial light as the sun begins to rise.

Conclusion

Lighting is a vital component of the proposed project since it contributes to the creation of an environment consistent with the desired message, a polluted sky. It completes the project since it will have a significant impact on how the space's environment is intended to be perceived. By using natural lighting, artificial lighting and lighting diffusion to produce such situations, the appropriate atmosphere will be established. Controls will complete the project by ensuring that the light is uniform at all times.

BUILDING CODES

Building Codes

Introduction

It is critical to evaluate diverse building codes and commit to building standards for clearance, construction, and design in order to create a suitable atmosphere that will inform Qatari families about the local air pollution crisis. Given that the edutainment center is a public space that welcomes a diverse range of occupancy groups, strict adherence to construction rules is required to maintain the facility's safety and ease of operation during crises such as fire. The occupancy loads of the building's various sections, as well as egress lengths and accessibility, will be guided by international building codes, which serve as a reliable resource throughout the design process to ensure the building is safe and permitted. Additionally, the Local Ministry of Defense in Qatar has its own set of fire and safety regulations⁷¹ that must be applied in order to get a license to operate the building.

Occupancy Load

Calculating the occupant load is critical for determining the estimated number of individuals who will use the various places. This will assist in determining the number of sitting locations and amount of furniture needed that will be appropriate without crowding the space, as well as the proper distance between them to maintain a sense of spaciousness and comfort. "Level of occupancy may also lead to an overestimation of occupant actions, since occupants are necessarily required for adaptive actions to be made."⁷² The approach taken when modeling occupancy may result in significant differences in building performance. Therefore, enabling visitors to experience the space in the manner it was designed and meant to be experienced, some components such as thresholds and lighting will be employed to support the space's primary function and way of circulation. Moreover, the occupancy load is important data that guides the egress capacity to securely and effectively accommodate the people, avoiding overcrowding and probable inadequate departure path.

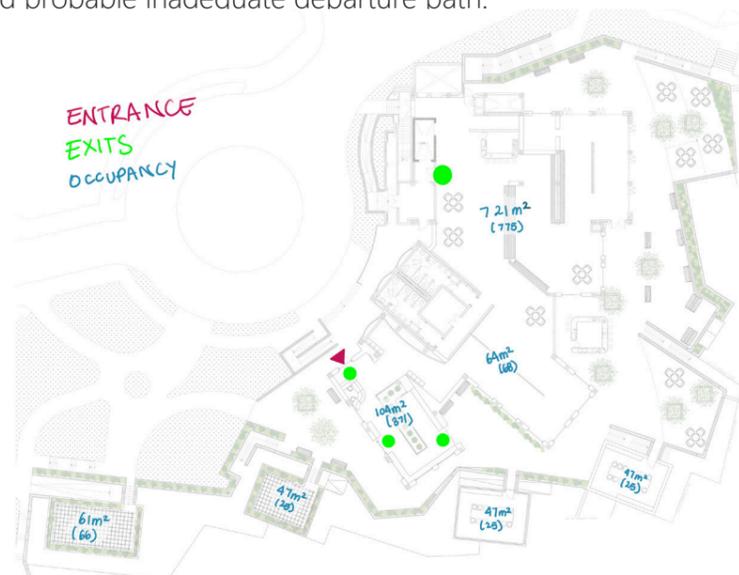


Fig. 81: Occupancy and exits

Fire Safety

The purpose of the edutainment center is to educate the visitors about the potential effects of weathering due to air pollution and entertain the visitors with the cafe and potential guidance and signage elements. The atmospheric design will create an interactive environment for its occupants. Due to the fact that the atmospheric space is a gathering area, where several people may come to interact with the environment, the building's classification, at around 889 square meters, comes into the classification Mercantile Occupancy Type B.

According to the Local Ministry of Defense in Qatar, fire and safety precautions must adhere to the Mercantile Occupancy classification type B in order to ensure the visitors' safety while within the building. Therefore, the space should have a minimum of 3 and a maximum of 4 exits. Figure 81 shows the potential location to which the building's exits could be placed, with consideration of having the traveling distances no less than 2285mm. To provide safe egress, the exit passages must be at least three-quarters the width of the exit stair. To avoid fast smoke accumulation inside the building, all enclosures, including doors, windows, and materials used for partitions, must be Fire Resistant Rating (FPR) 1 hour or a maximum of 1.5 hours.

Sprinklers are required in the building to minimize the dangers involved with fire. "Within the IBC, it is assumed that, where sprinklers are provided, additional time will be afforded for occupant egress: as a result, the required width per occupant are reduced."⁷³ The fire suppression system will require precision and the correct arrangement to function to its full potential. Therefore, the Automatic Sprinkler System (ASS) spacing between sprinklers should not exceed 4.6 meters in a large open space plan as shown in figure 82.

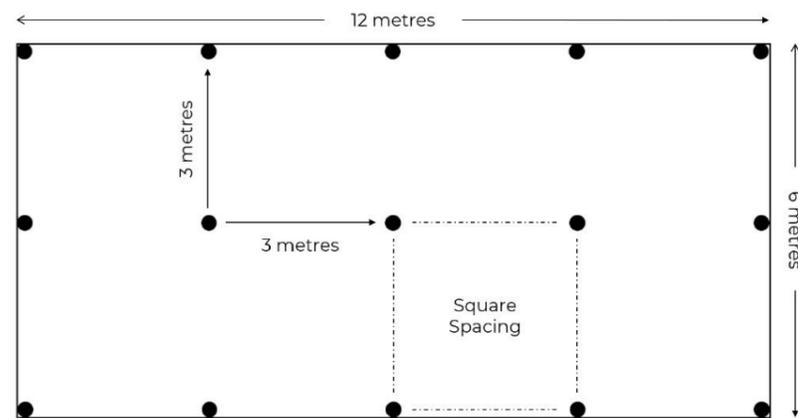


Fig. 82: Distance between Sprinklers

Signage

The edutainment center's objective is to educate visitors about the possible impacts of weathering caused by air pollution. Signage directs visitors' attention to the message that is being given

and serves as a type of safety by communicating to people where they should go in the event of a dangerous situation. "A successful signage system can reduce the apparent complexity of an enclosure, thereby improving wayfinding under both general circulation and emergency conditions."⁷⁴ Signage will assist the building's atmospheric design; hence, signage must be incorporated throughout the space to direct visitors and clarify the message expressed through the atmospheric design. These will be included into the building's design as design elements.

Additionally, safety signage will be implemented throughout the space. Figure 83 demonstrates the potential areas to where the safety exit signs may be placed, with consideration of the Qatari fire and safety standards being no more than 30 meters between each exit sign. Due to the fact that these exit signs should always be on, especially when it gets dark and smoky, a consistent electrical source is connected to keep them on at all times. A power source to keep them lit in the smoky and dark condition, as well as a method to keep the lights on in the dark, must be implemented. Many of these types of signs feature two sets of bulbs. One would be turned on in normal situations and the other set turns on only during a power outage in an emergency situation. This second bulb has a lower voltage than the first, which enables the light to operate on battery power accumulated from electrical currents generated when the lights were turned on.⁷⁵

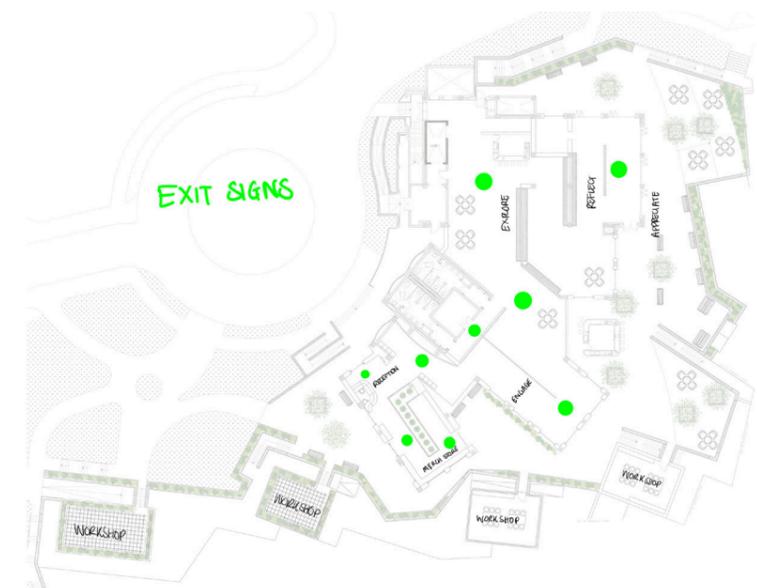


Fig. 83: Suggested positions for the Exit signs

The results of a research examining the significance of exit signs in a stressful and difficult circumstance indicates "that during emergency egress, participants preferred wider and brighter corridors in a left/right decision, and the front corridor (when it was available), even when it was darker and narrower. In the presence of competing information from exit signs, decisions that favored these environmental variables decreased along the route."⁷⁶ Thus

proving that the usage of signs assists visitors in navigating throughout the building. Figure 84 illustrates the emergency signs that will be incorporated into the area in the event of an emergency. Exit signs are used to identify exit or escape pathways and should effectively direct evacuees out of the building during emergency evacuation situations.⁷⁷



Fig. 84: Exit signs developed by the International Organization for Standardization (ISO) are required by law to depict an arrow and running figure in a doorway.

Accessibility

Accessibility will enable the space to be comfortable by a wide range of users. The entrance will have a welcome desk that will assist guests with their inquiries and direct them to their desired destination or seating area if they have made a reservation in the café. The design of the whole space will ensure that all visitors are accommodated, which is why furniture items such as the reception desk (fig 85) will be designed to accommodate both standing and sitting guests (wheelchair users). According to ADA (Americans With Disabilities Act) standards, "A portion of the reception desk should be no higher than 36 inches in height. 7) Visitor waiting areas, which include restrooms, telephones, drinking fountains, and locker storage areas, must be fully accessible".⁵⁰

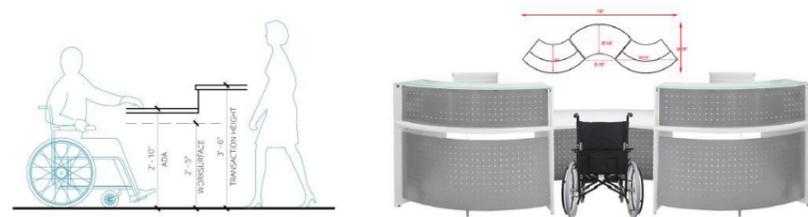


Fig. 85: Reception desk design to be comfortable to all users

Conclusion

In conclusion, including building codes into the design of the edutainment center allows for the establishment of a safe, accessible, and considerate environment that places a high priority on the safety and well-being of visitors. The fire and safety defense in Qatar, ADA and IBC aid in addressing the demands of the occupants. The goal of these codes is to assist in the development of atmospheric design and to help visitors in leaving the space well educated about the consequences of air pollution.

CONCEPTUAL AND SCHEMATIC PHASE

Precedent and Lighting

Precedent: The Weather Project (fig 86)

This project is attempting to replicate the realistic look of the sun in the sky, comparable to a sunset. This piece was installed at London's Turban Hall. This is significant given how infrequently the sun shines in London. This adds to the project's importance for visitors, since many do not see the sun on a regular basis, and others never at all. This leaves a lasting impression on the visitors' minds.

The weather becomes a dynamic element. It is a two-toned environment that creates the atmosphere of a sunset. Although it seems to be warm, this is a result of the light temperature and fog creating an illusion, the temperature is normal.

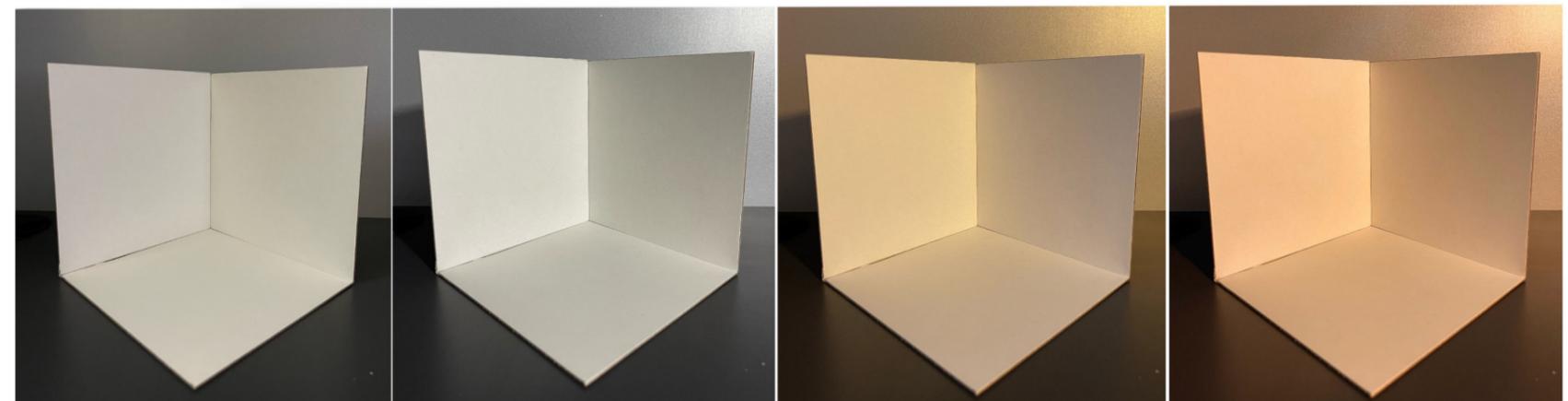
Warm light, fog, and a reflective material were used to create the ambient design. The space is warmed by the warm-toned LED light (the sun). This light is diffused by a layer of hazy opaque material, which enhances the hue. The usage of fog further diffuses the light further inside the room. Finally, a reflecting substance is used in the ceiling to give the area a wider appearance while also enabling visitors to view themselves while lying down.



Fig. 86: The weather project



Fig. 86: Light diffusing with the use of fog



5000K

4000K

3000K

2700K

Layering Materiality

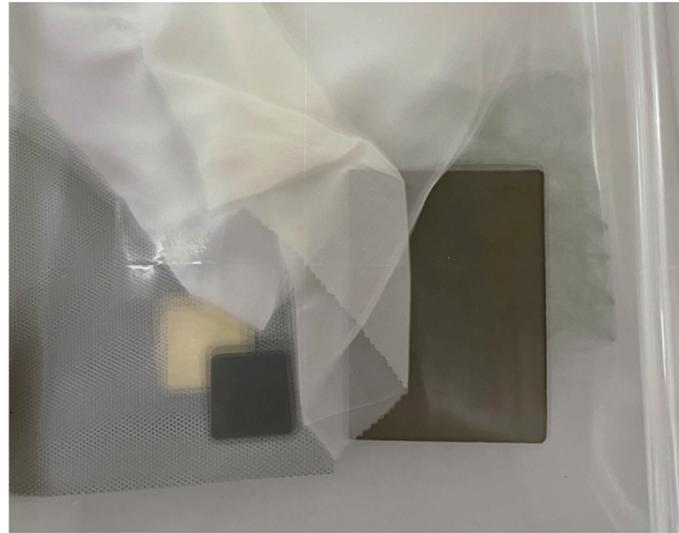
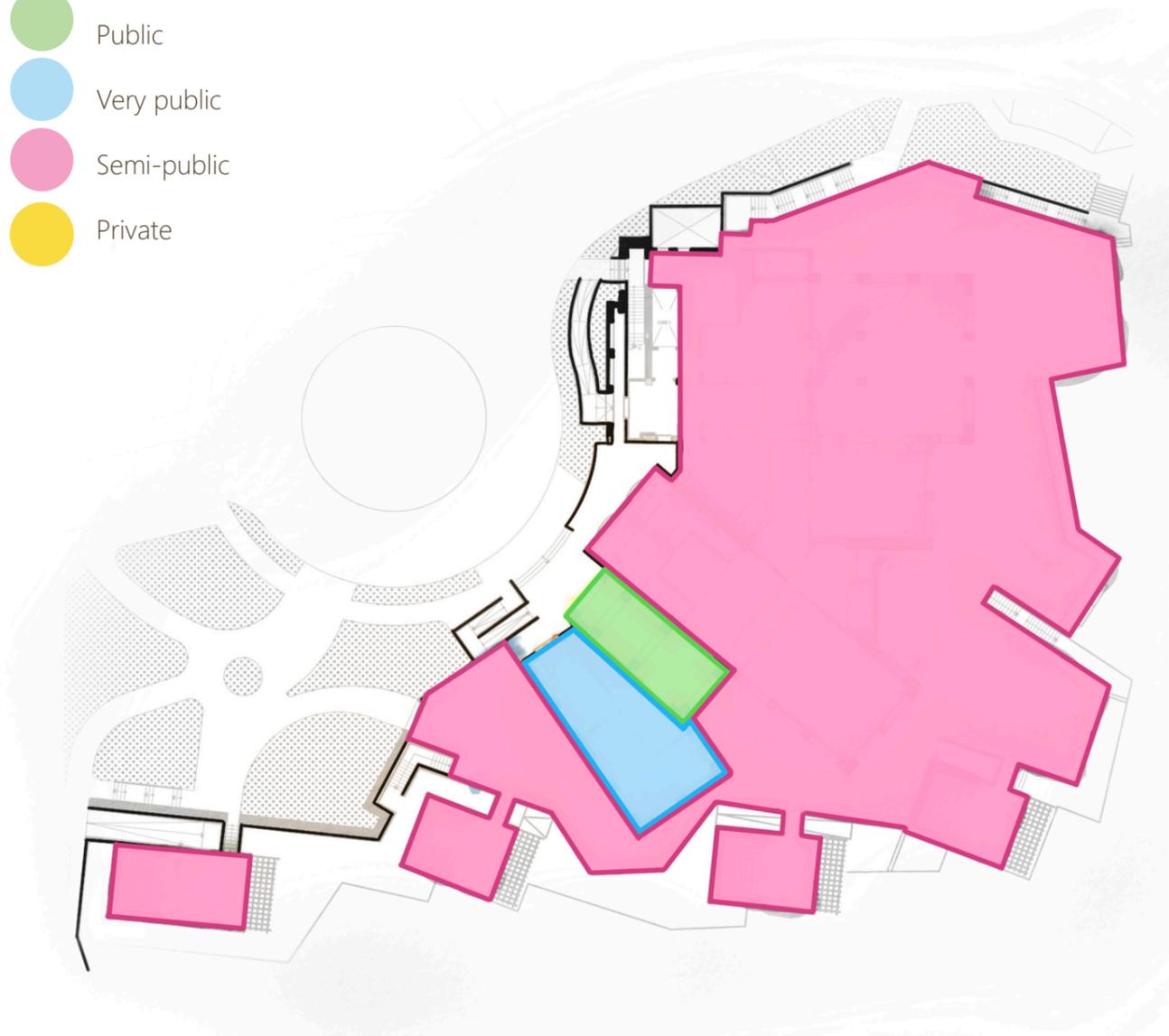


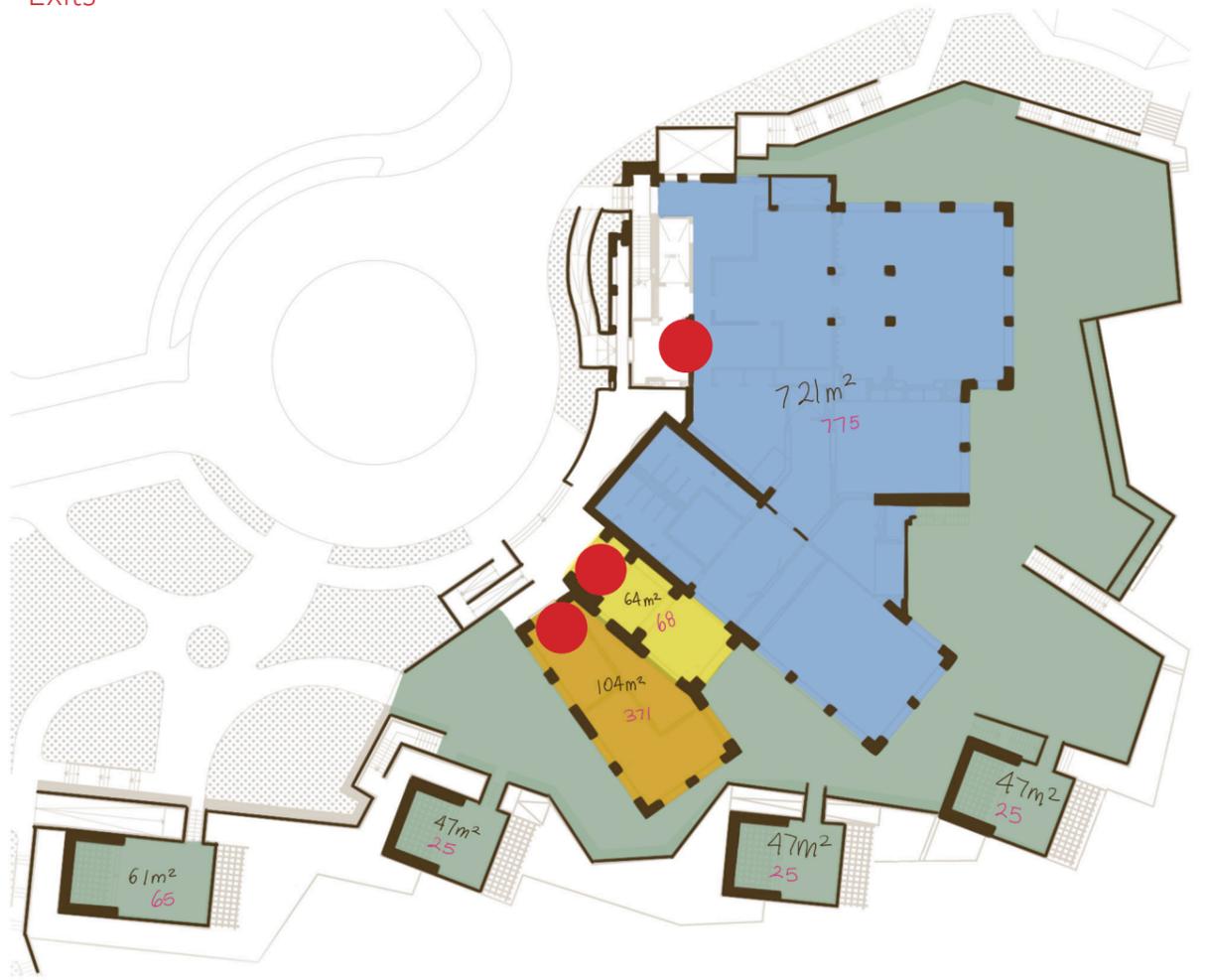
Fig. 87: William Turner's paintings depict space as flowing. Applying a roll of iridescent transparent plastic roll over the material board enhanced the effect of fading into space, just as Turner intended in his painting and just as humans do when it's foggy. The key is to increase the distance between the layers in order to get a more dispersed look.

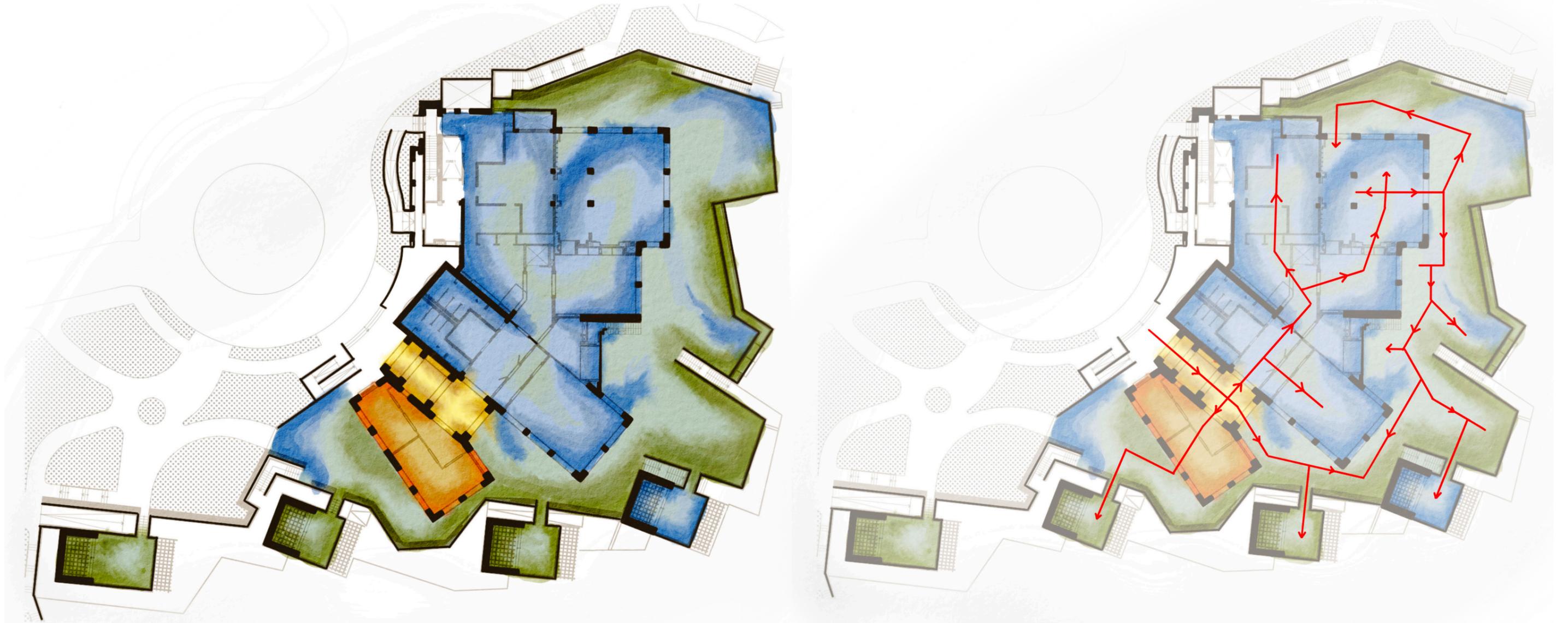
Space planning

- Public
- Very public
- Semi-public
- Private

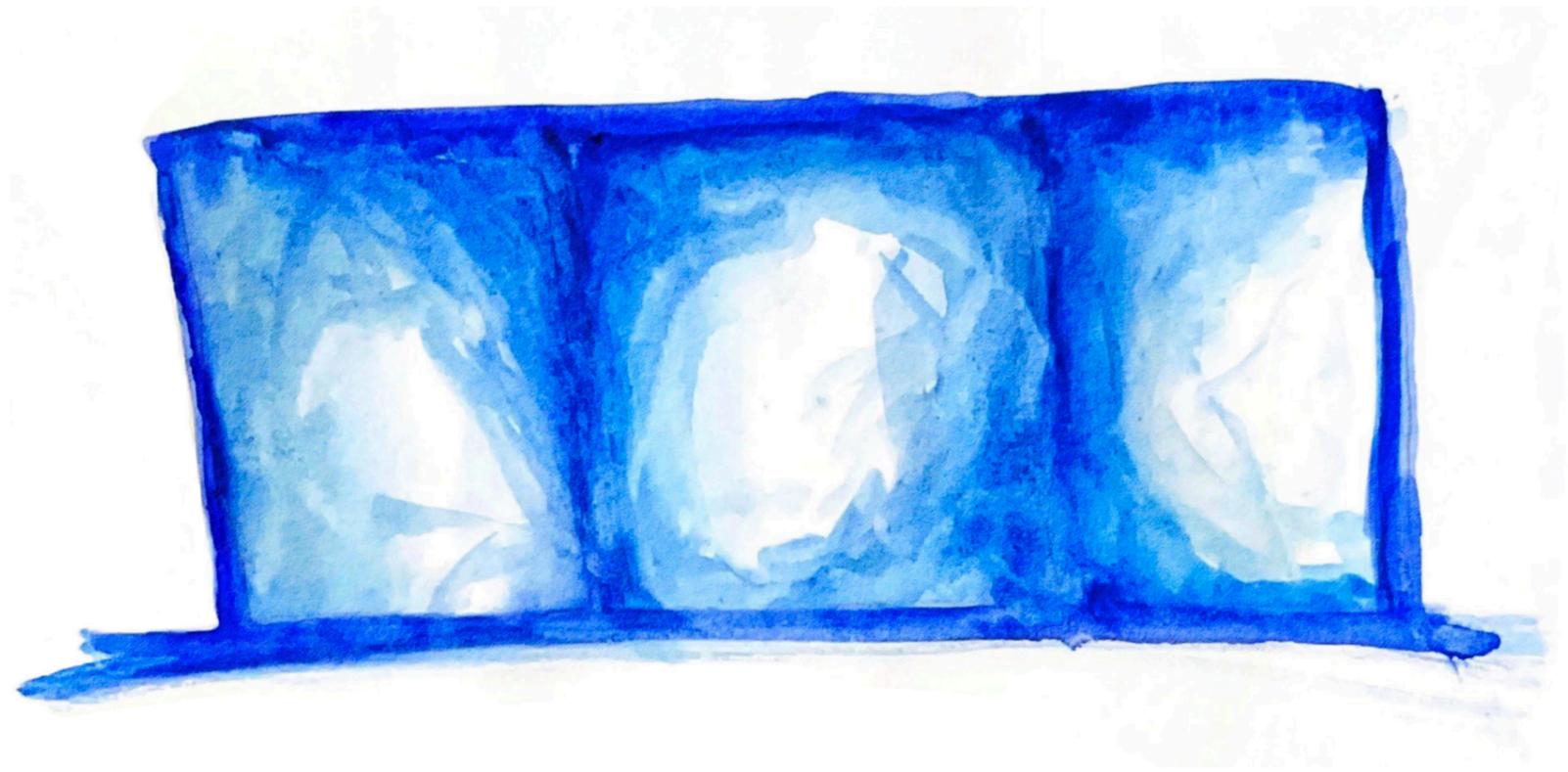
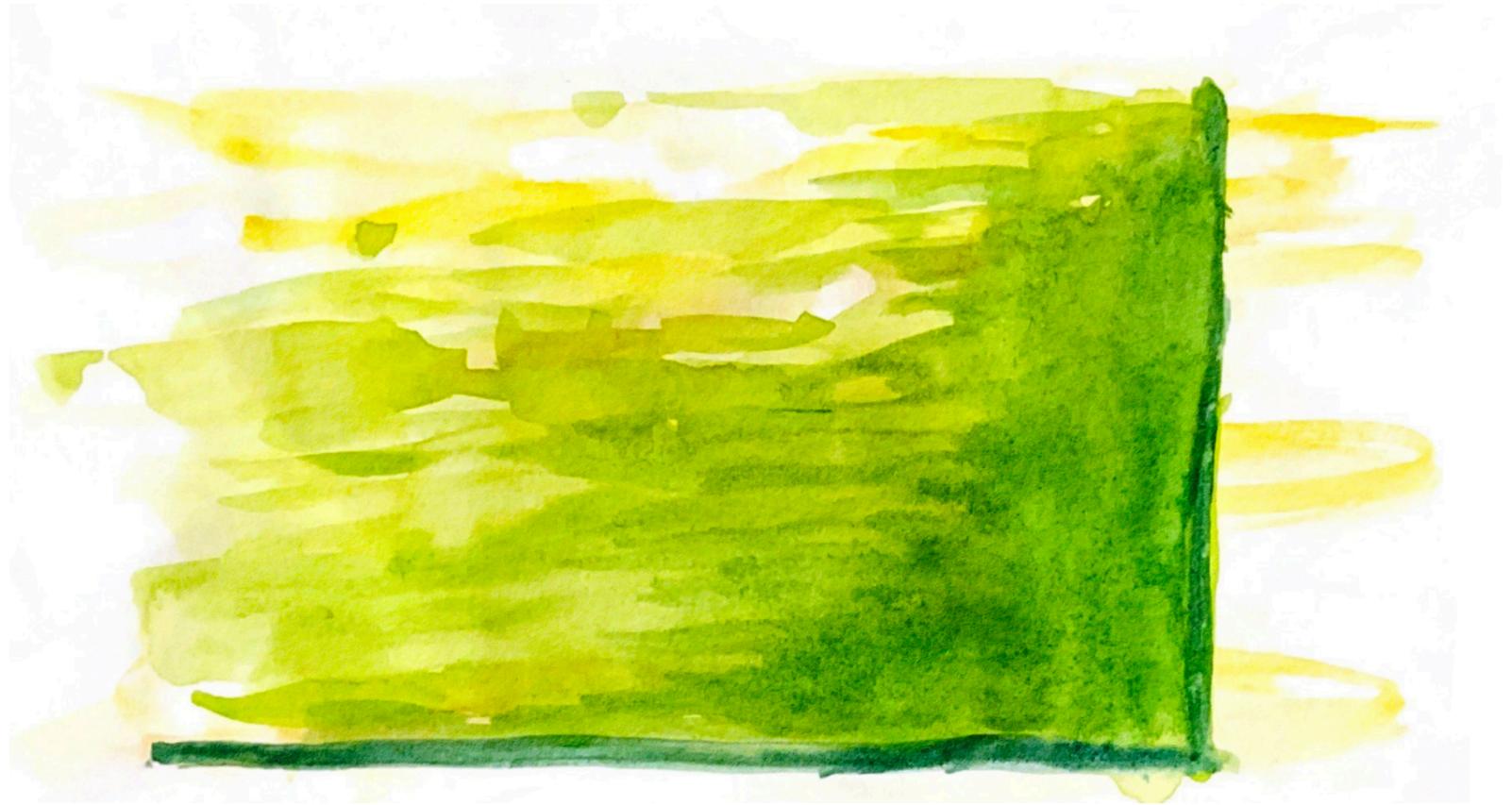
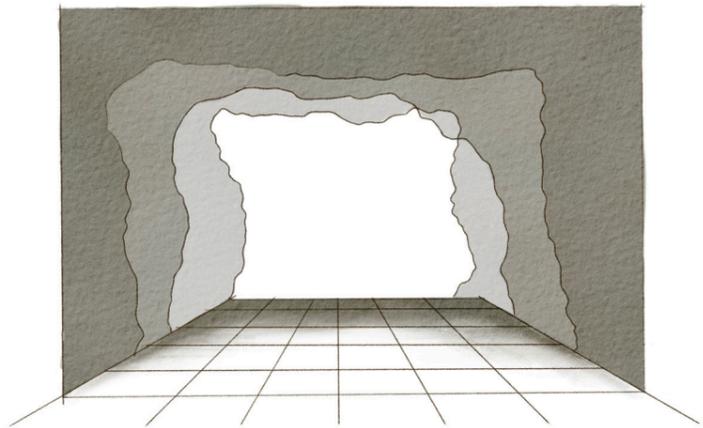


Occupancy Exits

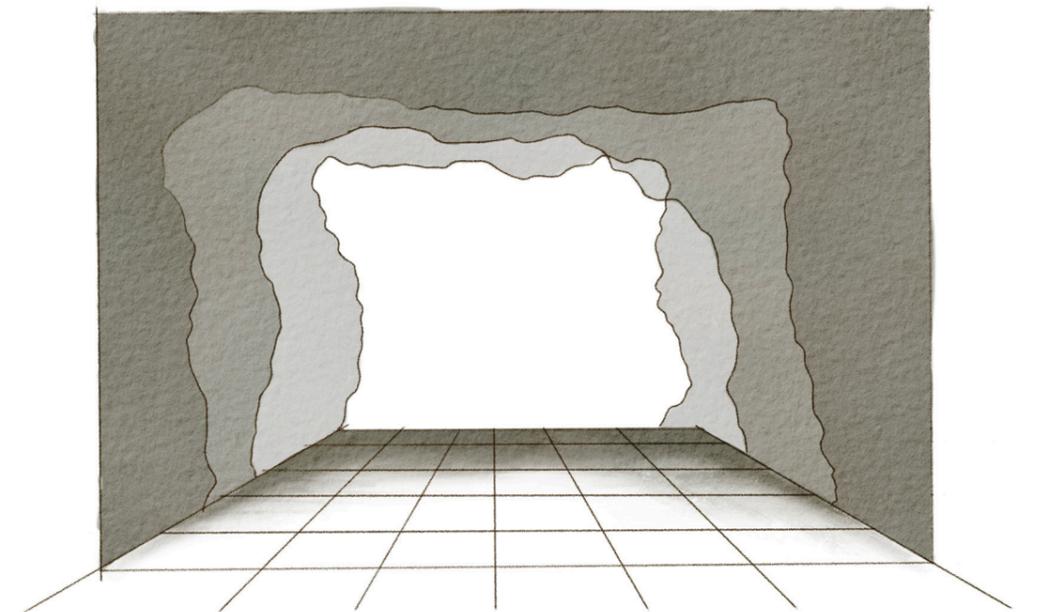




Water color effect flow



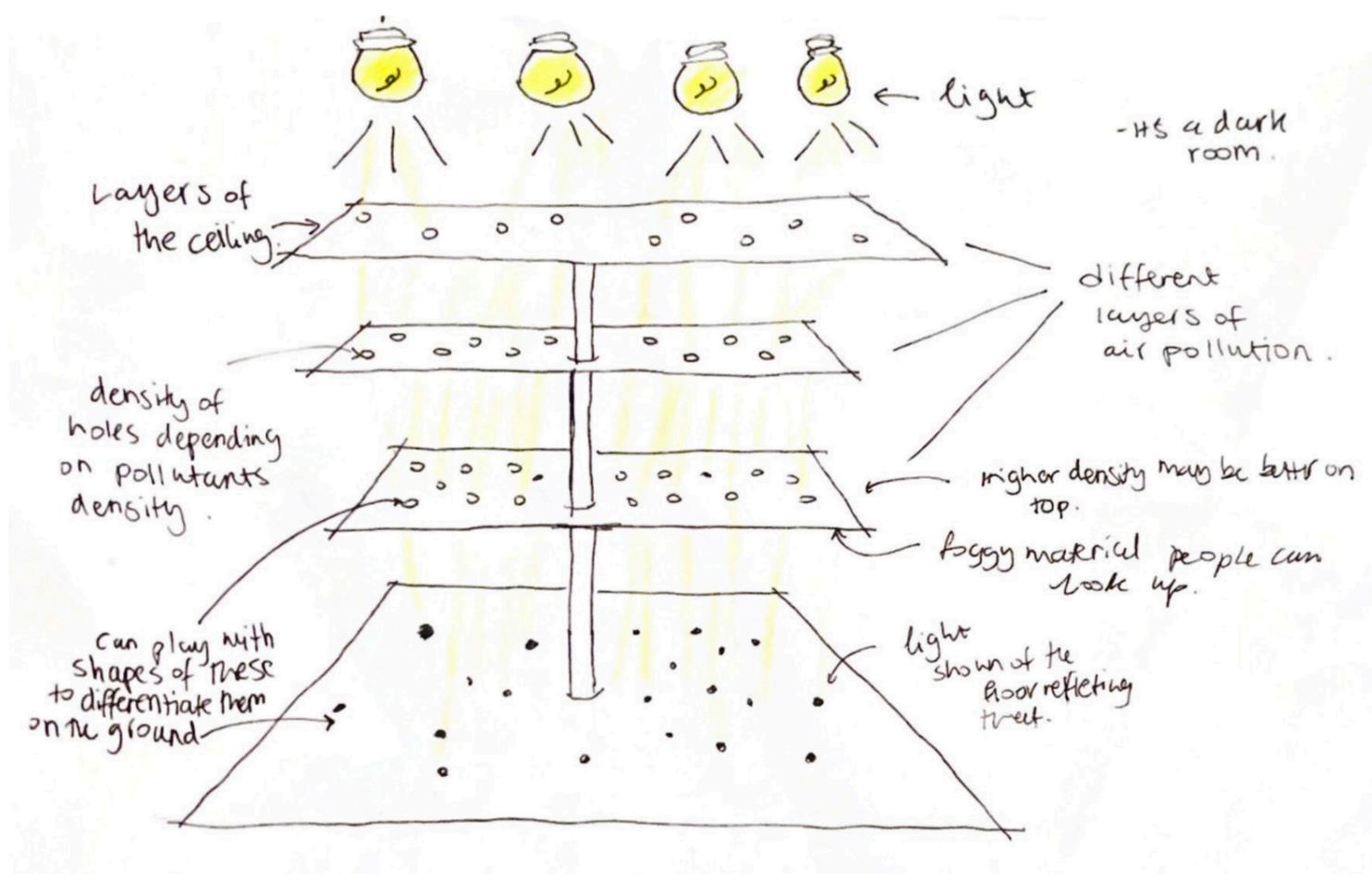
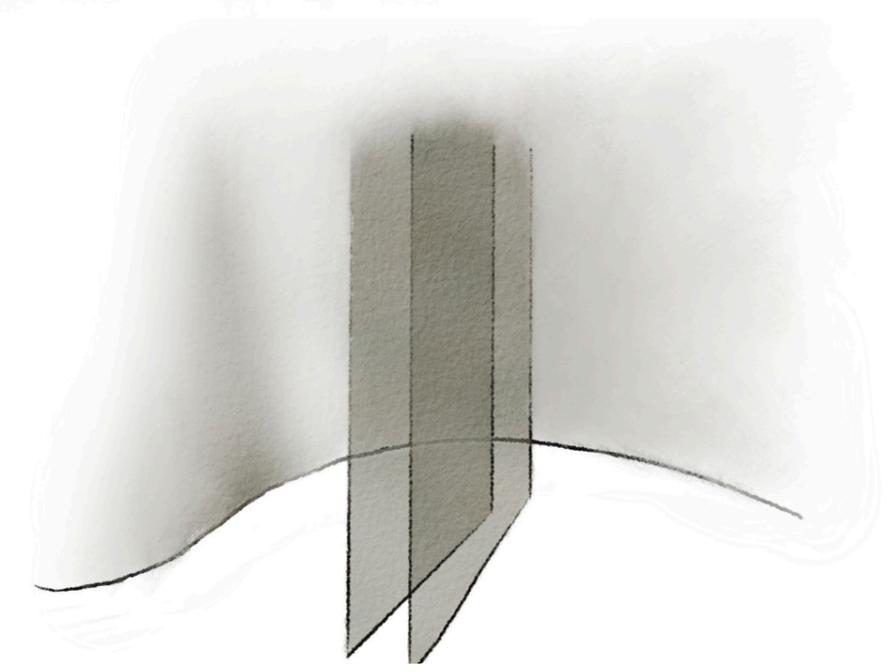
The Effect of Layering Material



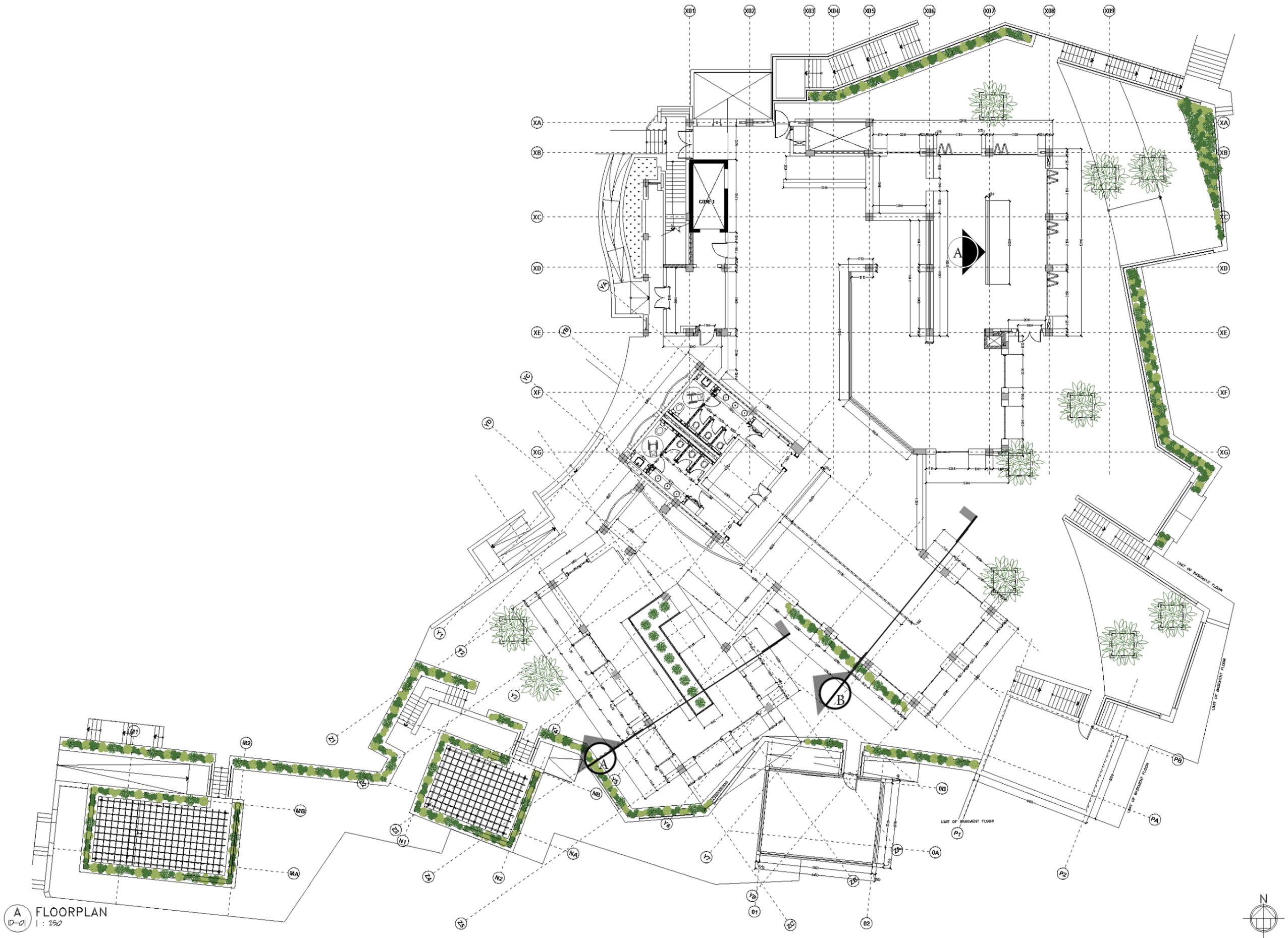
Color Scheme
Using The colors for an air polluted sky

Design Concept

The space's narrative contains 4 stages: engage, explore, reflect and appreciate. When a visitor walks in space, they experience the levels of air pollution chronologically. The earlier stages are much more contained and structured but the more one walks into the space, the more the boundaries begin to dissolve and the structure of the atmosphere becomes more uncontained or unstructured where the atmosphere shows the visitors the chaotic effects of air pollution.



CONSTRUCTION DOCUMENTS



A FLOORPLAN
 ID-01
 1 : 250

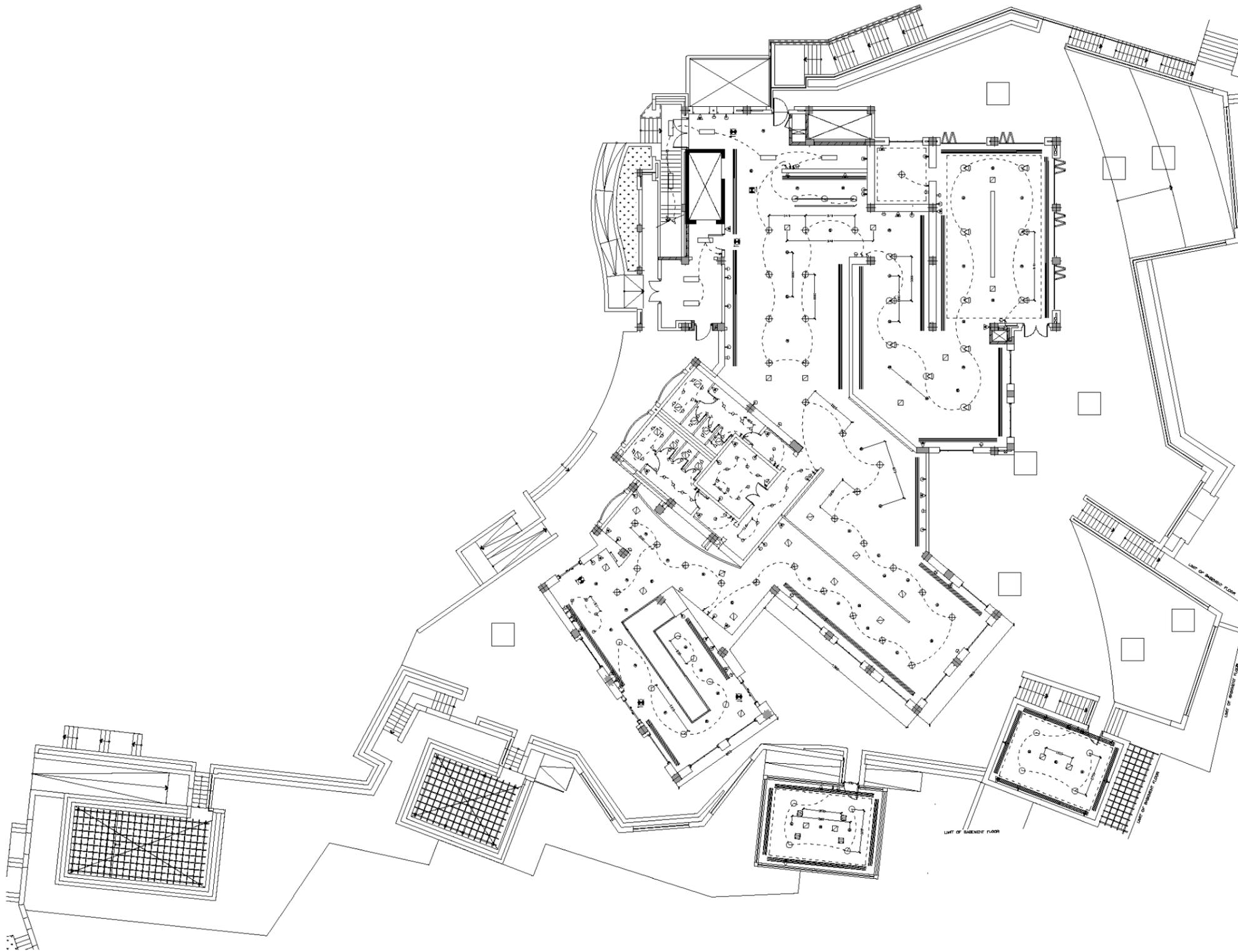




A FURNITURE PLAN
 10-02 | : 250



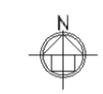
FURNITURE SCHEDULE							
SYMBOL	QUANTITY	SIZE	MANUFACTURER	CATALOG NO.	LOCATION	FINISH	DESCRIPTION
(S-1)	40	900x420MM	ONLINE HOME IMPROVEMENTS	29032	EXPERIENTIAL AREA, OUTDOOR	CAST ALUMINUM, GREEN COATED	DURABLE, WITHSTANDS HARSH WEATHER, SUITABLE FOR INDOOR AND OUTDOOR
(S-2)	12	1700X520 X450MM	VESTRE	503C	OUTDOOR SEATING	ALUMINUM,NORDIC PINE WOOD	DURABLE, SUITABLE FOR OUTDOOR USE AND HARSH CLIMATES
(S-3)	2	1450X735X 680MM	VESTRE	322 BERG	OUTDOOR SEATING	ALUMINUM,NORDIC PINE WOOD	PICNIC TABLE, OUTDOOR USE, SUITABLE FOR HARSH CLIMATE
(S-4)	2	870X700MM	HERMAN MILLER	5987P	RECEPTION AREA	SUSPENSION TEXTILE SEAT FRAME	HARMONIC 2 TILT, FLEXIBLE MOVEMENT SEAT
(S-5)	13	380X1900MM	OVERSTICK	37796755	CAFE	ALUMINUM, FAUX LEATHER TOP	SILVER ORCHID GODDARD GOLD ADJUSTABLE BAR STOOL
(S-6)	2	2500X480MM	HERMAN MILLER	4504J	SCREENING	OAK, FAUX LEATHER	LISPENARD SOFA
(S-7)	5	560MM X CUSTOM	VESTRE	54484	EXPERIENTIAL AREA	ALUMINUM, OAK	CUSTOMIZED TO FIT THE SIZE OF THE SPACE REQUIRED
(S-8)	12	390X670MM	IKEA	603.653.46	CHILDREN WORKSHOP ROOMS	ORANGE PLASTIC	MAMMUT, COMFORTABLE, WITH BACKING, LIGHT WEIGHT
(S-9)	12	300X300MM	IKEA	203.823.24	CHILDREN WORKSHOP ROOMS	BLUE PLASTIC	MAMMUT, COMFORTABLE, WITOUT BACKING, LIGHT WEIGHT MAMMUT
(T-1)	10	1200X762MM	HOMEDEPOT	42292	EXPERIENTIAL AREA, OUTDOOR	CAST ALUMINUM, GREEN COATED, GLASS TOP	DURABLE, WITHSTANDS HARSH WEATHER, SUITABLE FOR INDOOR AND OUTDOOR
(T-2)	6	480X850MM	IKEA	903.651.80	CHILDREN WORKSHOP ROOMS	YELLOW PLASTIC	MAMMUT, COMFORTABLE, WITOUT BACKING, LIGHT WEIGHT MAMMUT
(T-3)	1	CUSTOM	STEEL VINTAGE	8799	RECEPTION AREA	OAK LAMINATE	INVITING FRONT DESK WITH DIFFERENT HEIGHTS TO BE ADA FRIENDLY
(T-4)	2	CUSTOM	STEEL VINTAGE	7799	CAFE	OAK LAMINATE	COUNTER WITH LIGHTING FIXTURE, DURABLE, INDOOR AND OUTDOOR USE
(C-1)	4	1600x680MM	IKEA	304.395.65	CHILDREN WORKSHOP ROOMS	OAK LAMINATE, TEMPERED GLASS	SYVDE CABINET, COATING APPLIED TO PROTECT IT FROM HARSH WEATHER
(C-2)	3	600MM X CUSTOM	VESTRE	5565	MERCH STORE	OAK LAMINATE	STRONG ENOUGH TO HOLD UP MERCHANDISE
(C-3)	2	CUSTOM	VESTRE	7979	TOILET	MATT WHITE	STORAGE FOR TOILET SUPPLIES



RCP LEGEND

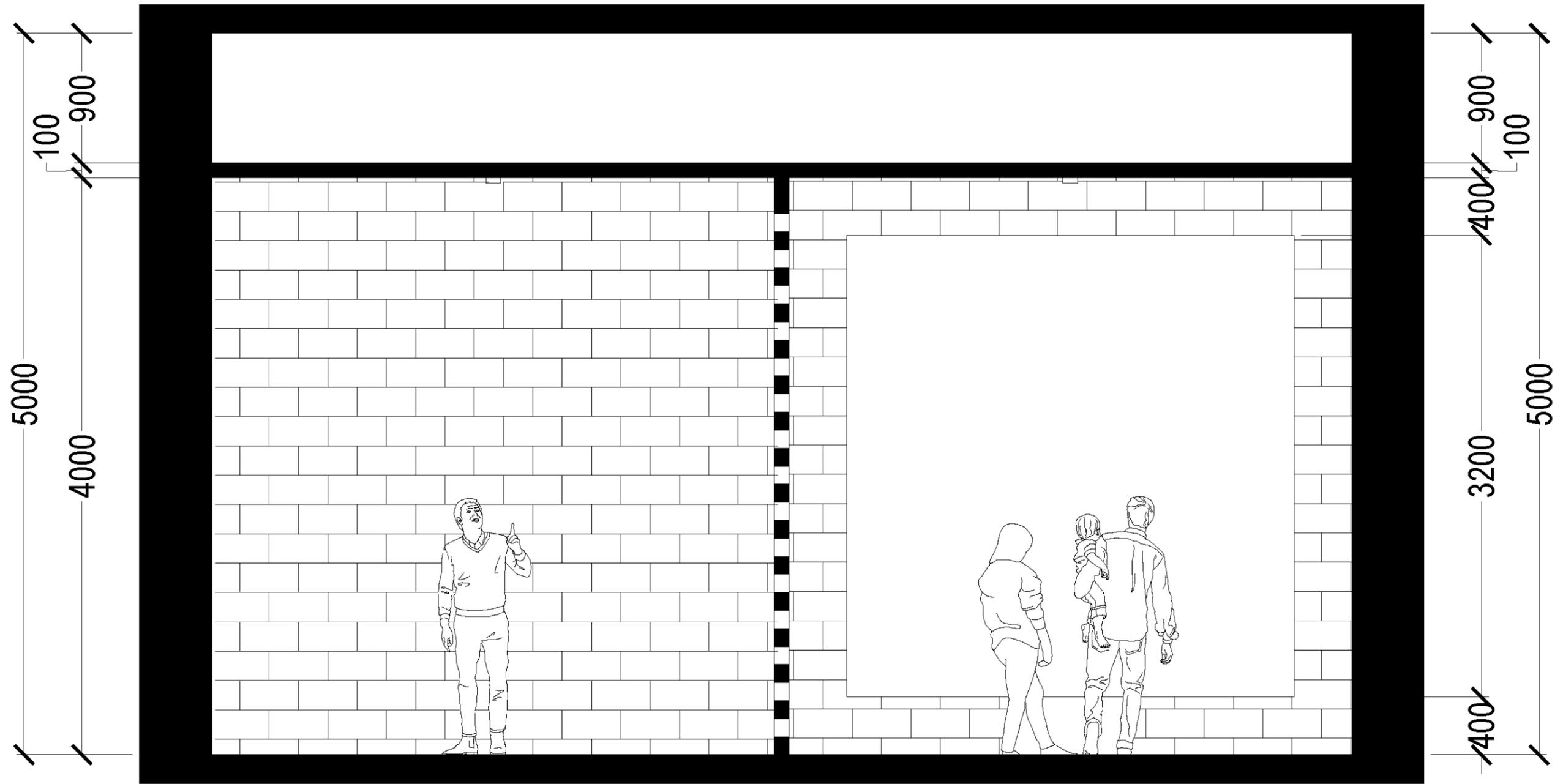
- LED CEILING LIGHT SURFACE MOUNTED
- ⊕ CEILING MOUNTED LIGHT
- TRIPLE SUSPENDED PENDANT LIGHT MOUNTED
- RECESSED LED SPOTLIGHT
- ⊙ TRACK MOUNTED SPOTLIGHT
- LED PANEL LIGHT
- ▭ LED BULKHEAD BATTERY LIGHTING
- LED STRIP LIGHTING LAMB
- LED STRIP LIGHTING LAMB
- ⊙ SPRINKLERS
- ⊙ SMOKE DETECTORS
- ⊙ FIRE EXIT EMERGENCY LIGHTING
- ▬ SUPPLY AIR GRILLE
- ▭ RETURN AIR GRILLE
- ⌘ SWITCH
- ⌘ 3-WAY SWITCH
- ⌘ SWITCH DIMMER
- ⌘ OUTLET
- ▭ FLOOR MOUNTED OUTLET
- ▲ FIRE EXTINGUISHER
- ⌘ MANUAL PULL FIRE ALARM

A REFLECTED CEILING PLAN
 10-09 | 1 : 500

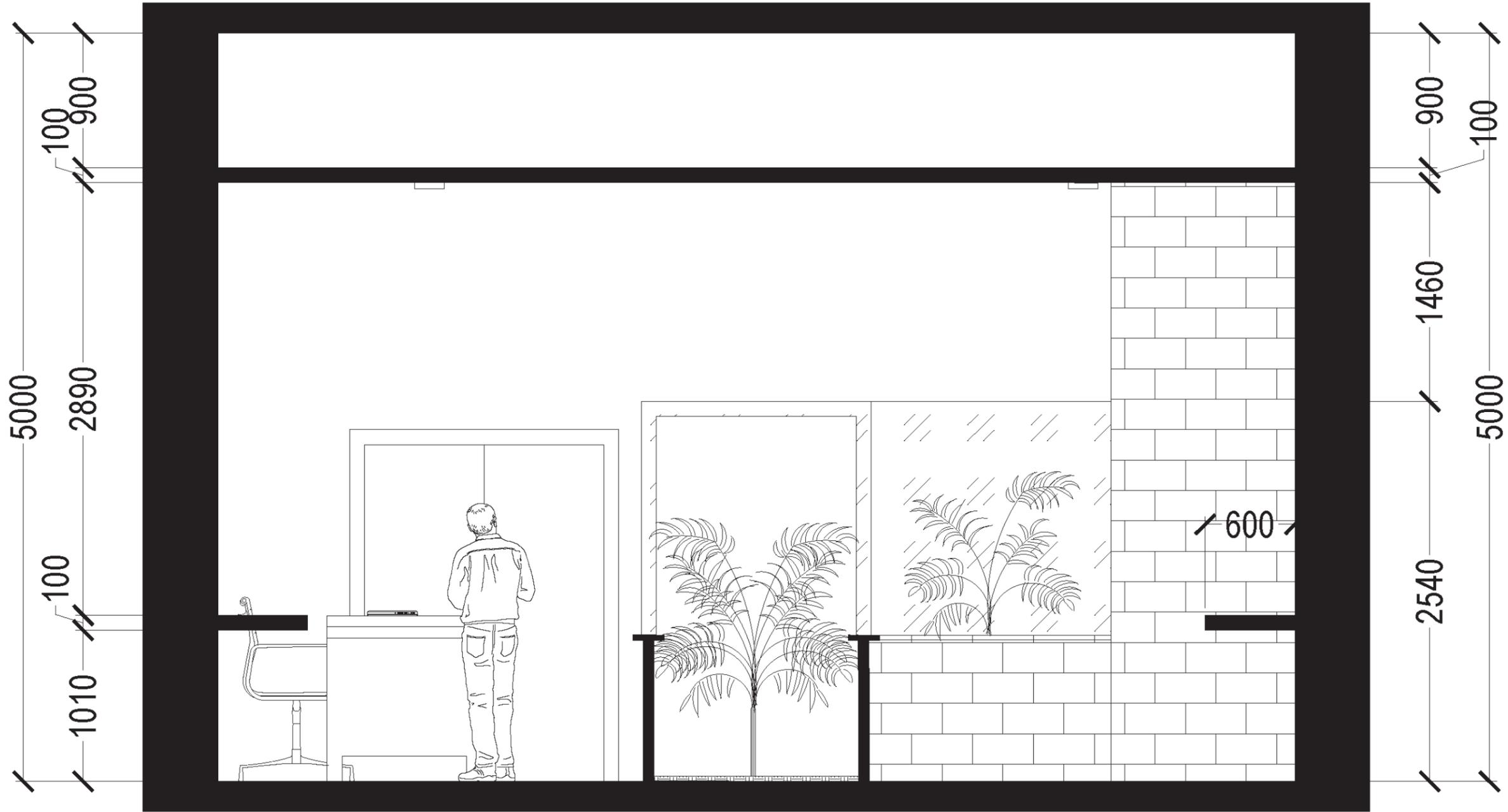


LIGHTING SCHEDULE

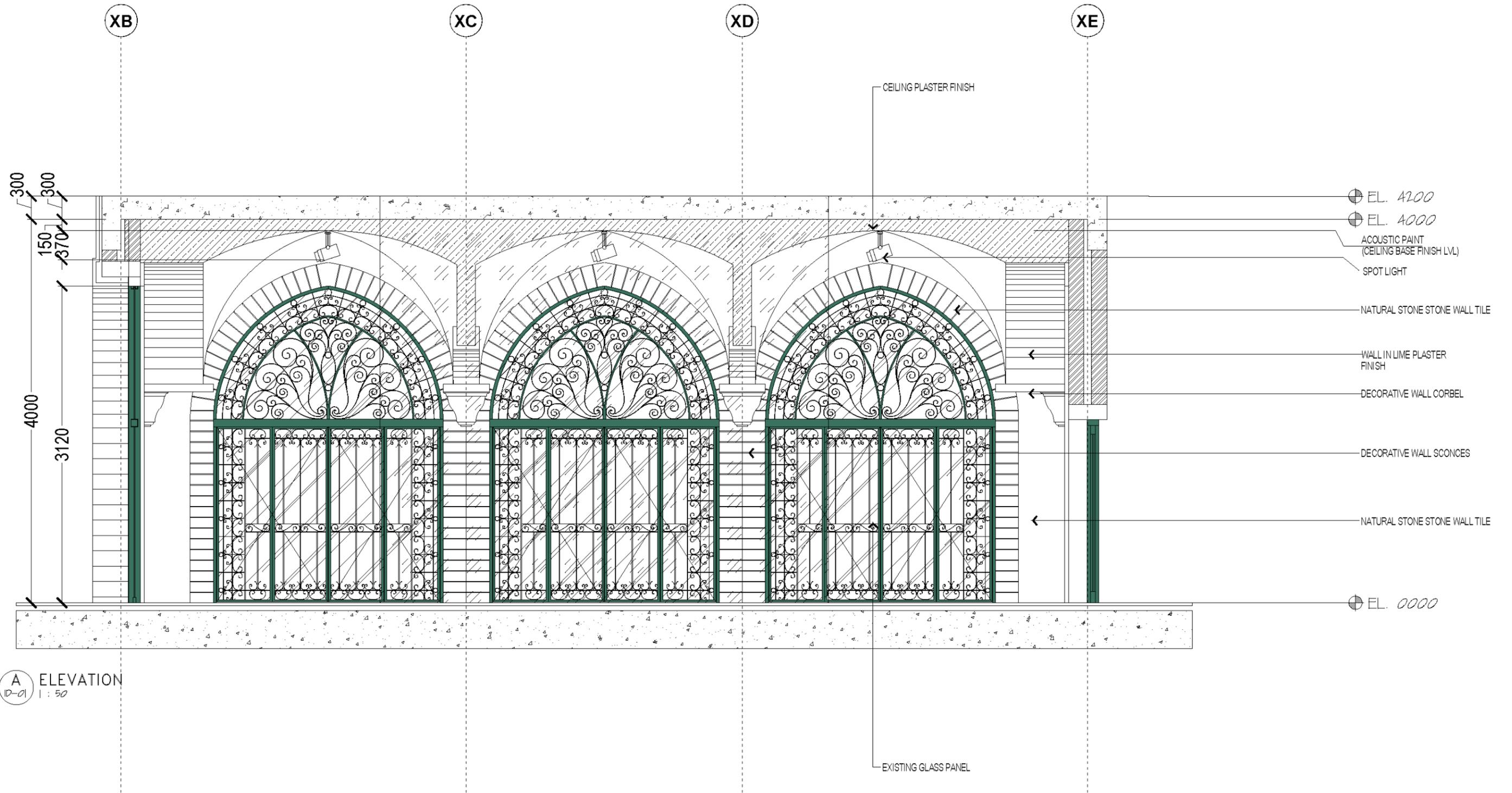
SYMBOL	FIXTURE NO.	QUANTITY	SIZE	DESCRIPTION	MANUFACTURER	CATALOG NO.	USE	LOCATION	FINISH	CCT	LAMP TYPE	VOLT	WATT	EFFICACY (LM/W)
○	F-1	15	220MM X 39MM	LED PANEL LIGHT SURFACE MOUNTED	MY PLANET LED	SMD2835	AMBIENT LIGHT	MERCH STORE AND WORKSHOP ROOMS	ALUMINUM	3000K	LED	85-265V	18W	90
⊕	F-2	31	100MM X 88MM	SMARTBRIGHT LED OYSTER	PHILLIPS	CL261	AMBIENT LIGHT	EXPERIENTIAL AREA 1 AND 2	METAL - PLASTIC	3000K-2700K	LED	220-240V	15.50	87
⊖	F-3	1	4000MM X 200MM	AMBIT RAIL LAMP	MUUTO	SKU12250	TASK LIGHT	CAFE	ALUMINUM	3500K	INCANDESCENT LAMP	120V	60W	16
◦	F-4	19	47MM X 47MM	FIRE RATED LED DOWNLIGHTS	AURORA	IP65	AMBIENT LIGHT	RECEPTION AND PRAYER ROOM	MATT WHITE	3500K	LED DOWNLIGHT	240V	50W	640
⊗	F-5	12	150MM X 55MM	SURFACE MOUNTED SLIM CYLINDER SPOTLIGHT	ORLIGHT	APPOLLO-SF	AMBIENT LIGHT	EXPERIENTIAL AREA 3 AND 4	ALUMINUM	2700K - 2500K	LED SPOTLIGHT	220-240v	15w	63
□	F-6	34	150MM X 150MM	LED PANEL	ORLIGHT	ORLLED150	AMBIENT LIGHT	TOILETS	ALUMINUM	3500K	LED	240V	20W	84
▭	F-7	9	117MM X 350MM	IP65 RATED LED BULKHEAD BATTERY LIGHTING	RS PRO	7740-43-9	AMBIENT LIGHT FIRE SAFETY	FIRE EXIT	POLYCARBONATE	3500K	LED	230V	6W	25
—	F-8	2	10MM X CUSTOM	LED STRIP LIGHTING	ORLIGHT	LUMENFLEX-SIDE	DECORATIVE LIGHT	TOILETS	ALUMINUM	3500K	LED STRIP	24V	12W	50
—	F-9	2	16MM X CUSTOM	LED STRIP LIGHTING	ORLIGHT	LUMENFLEX-SIDE	DECORATIVE LIGHT	CAFE	ALUMINUM	3500K	LED STRIP	24V	12W	50
■	F-12	6	117MM X 350MM	EMERGENCY LIGHTING	STAHL	6118	FIRE SAFETY	FIRE EXITS	ALUMINUM	4000K	LED	240V	8W	84



A SECTION
 D-01 | : 30



B SECTION
 10-01 | : 30



A ELEVATION
 10-01 1:50



...d project aims to engage families of Qatar in environmental preservation











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