NEAR EAST UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

DEPARTMENT OF ARCHITECTURE

PROPOSED BIOPHILIC SPORTS COMPLEX IN A RESIDENTIAL ENVIRONMENT IN LAPTA, NORTH CYPRUS

M.Sc. NON-THESIS

Abdulazeez Abdulkareem DUROSINLORUN

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Approval

We certify that we have read the thesis submitted by Osmah Mohammed Hasan titled **"Lung Disease Classification Using Deep Learning And Transfer Learning Techniques"** and that, in our combined opinion, it is fully adequate, in scope and quality, as a thesis for the degree of Master in Artificial Intelligence Engineering.

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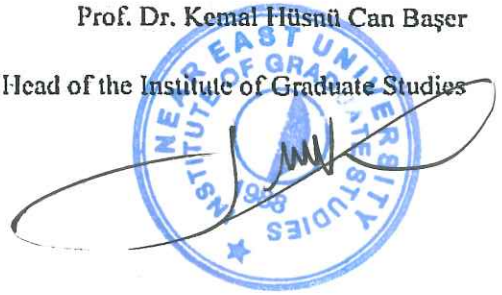

Declaration of Ethical Principles

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

Abdulazeez Abdulkareem Durosinlorun

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All gratitude and praise to the Almighty God for His direction and support throughout my Master's degree and my life. I am particularly grateful to my adviser, Assoc. Prof. Dr. Can Kara, for his encouragement, support, and advice during this program. Your knowledge and advice have been crucial in molding my academic and professional progress. I would also want to convey my heartfelt gratitude to all my teachers that taught me throughout the master's program. Your critiques and support have greatly improved my love for architecture. I am also very grateful to my colleagues for helping me especially Shaaban Sanni Saka for his invaluable assistance and friendship. I am also very grateful to my family for their love and support. Thank you to my parents, for their unwavering belief in me and for always being there for me.

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Abdulazeez Abdulkareem Durosinlorun

Abstract

Proposed Biophilic Sports Complex in a Residential Environment in Lapta, North Cyprus

Durosinlorun, Abdulazeez Abdulkareem
MA, Department of Architecture
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This study aims to design a sports complex within an abandoned seaside site in Lapta, North Cyprus, with the primary aims being designing a space that is easily accessible, encourages human connection, promotes physical well-being, and seamlessly integrates with the natural environment. It will involve understanding the specific needs of a sports complex, prioritizing accessibility, and creating an inviting environment that is conducive to social interaction. Furthermore, there will be an effort to use sustainable design by trying to incorporate the already existing buildings on site instead of demolishment. The research methodology used will be a qualitative approach. Thorough site analysis will be conducted that involves factors like location, size, the state of the natural surroundings and other factors. Sustainable design principles are integral to the layout and insights and ideas will be drawn from existing literature and case studies of successful sport centers all over the world. Biophilic design has a vital role in the design of the sports complex with the main aim being to create a deep connection between users and nature. Key considerations in the development of the sports complex include walkability, fostering human connection, and the incorporation of biophilic design elements so that an inviting sports complex that serves the diverse needs of the local community can be created.

Keywords: sports facility, walkability, accessibility, biophilic design, natural surroundings

Özet

Kuzey Kıbrıs Lapta'da Konut Ortamında Önerilen Biyofilik Spor Kompleksi

Durosinlorun, Abdulazeez Abdulkareem
MA, Mimarlık Bölümü
Mayıs 2025, 65 sayfa

Bu çalışma, Kuzey Kıbrıs, Lapta'da terk edilmiş bir sahil alanında bir spor kompleksi tasarlamayı amaçlamakta olup, temel hedefleri kolay erişilebilir, insan ilişkilerini teşvik eden, fiziksel refahı destekleyen ve doğal çevre ile sorunsuz bir şekilde bütünleşen bir alan tasarlamaktır. Bir spor kompleksinin özel ihtiyaçlarını anlamayı, erişilebilirliğe öncelik vermeyi ve sosyal etkileşime elverişli davetkar bir ortam yaratmayı içerecektir. Ayrıca, yıkım yerine halihazırda var olan binaları sahaya dahil etmeye çalışarak sürdürülebilir tasarım kullanmaya gayret edilecektir. Kullanılan araştırma metodolojisi nitel bir yaklaşım olacaktır. Konum, büyüklük, doğal çevrenin durumu ve diğer faktörleri içeren kapsamlı bir saha analizi yapılacaktır. Sürdürülebilir tasarım ilkeleri yerleşim planının ayrılmaz bir parçasıdır ve içgörüler ve fikirler mevcut literatürden ve tüm dünyadaki başarılı spor merkezlerinin vaka çalışmalarından alınacaktır. Biyofilik tasarım, spor kompleksinin geliştirilmesinde hayati bir rol oynamakta olup, temel amaç kullanıcılar ile doğa arasında derin bir bağ oluşturmaktır. Spor kompleksinin geliştirilmesinde göz önünde bulundurulan temel hususlar arasında yürünebilirlik, insan bağının güçlendirilmesi ve yerel toplumun farklı ihtiyaçlarına hizmet eden davetkâr bir spor kompleksinin oluşturulabilmesi için biyofilik tasarım unsurlarının bir araya getirilmesi yer almaktadır.

Anahtar Kelimeler: spor tesisi, yürünebilirlik, erişilebilirlik, biyofilik tasarım, doğal çevre

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TRNC: Turkish Republic of North Cyprus

CHAPTER I
Introduction

This chapter introduces the main focus on this study which is the proposal for a biophilic sporting complex in Lapta, North Cyprus. It explains why green spaces are important, the importance of biophilic design and the local context of Lapta emphasizing the need for recreational infrastructure. It also presents the problem statement, defines the research aims and outlines the scope, methodology and key terms used in the study.

Green open spaces filled with vegetation occur naturally or are man-made. They include gardens, community parks, natural areas, play areas, yards and trees in street. Rural areas include marshlands, natural resources and land used for agriculture (Dwiyanti et al., 2021). According to Nur et al. (2022), the primary functions of green open spaces include supporting sustainable living by maintaining the quality of the ecology. This contributes to the social, economic and cultural sustainability of that environment. Despite the tremendous benefits of urban open green space, landscape designers and urban planners should prioritize their planning and design especially in developing countries where these spaces are often overlooked(Ahmadpoor & Shahab 2021).

Lapta is a coastal town situated in the northern parts of North Cyprus and it has been chosen as the ideal location for the proposed sporting complex. It is nestled along the stunning coastline of the mediterranean sea and is surrounded by picturesque mountains. This makes Lapta a unique and well-suited setting for sports and recreational activities. Lapta currently has about eight thousand residents. These residents need a sport complex for recreation and exercise. Currently, there are facilities used for recreation in Lapta which are Suna’s beach and Lapta stadium. Both of these are not sport complexes open to all residents and visitors. Suna’s beach serves as a recreational area while Lapta stadium serves the local football team.

To meet the demand of the growing population, there is a need to develop a sporting complex that can serve all the residents and visitors. The proposed complex aims to create a sporting facility than can cater to the diverse sporting needs of the whole town and to be used by both athletes, sports enthusiasts and the whole community.

The new sporting complex intends to incorporate the principles of biophilic design to integrate the natural elements on site into the design. This will bring about a pleasant connection between natural elements on site and complex which will improve user experience by creating a refreshing and energizing environment that will surely improve the mental and physical health of its users.

Due to the existing natural elements such as the rocky coast, multiple trees and the nice views of water and the active lifestyle of its residents, Lapta serves as the ideal location for a sporting complex with an emphasis on biophilic design in North Cyprus. This innovative project if executed will leave a lasting positive impact on the community, inviting athletes and visitors alike to experience the atmosphere of sports and nature integrated in this coastal town.

I would like to incorporate biophilic design into the design of the sporting complex. The term biophilic comes from the word biophilia which means the human beings primal need to want to connect with nature. Therefore, biophilic design as a concept means incorporating and strengthening the connection between nature and people in the built environment. It recognizes the human being's affinity towards nature and seeks to combine natural elements into the design of buildings and cities (Ma et al., 2022). The principles this concept is based on the belief that exposure to nature has a lot a of positive effects human beings and can make the users experience better. One of the key aspects of biophilic design is the use of natural elements like water features, trees, plants in the designing buildings and urban spaces because they create visual and sensory stimulation which makes the environment more uplifting (Lee & park, 2018). For example, having green spaces and vegetation can boost moods, ease tension and increase mental clarity (Ulrich, 1984). Similarly, having views of nature whether

through a window or outdoor areas has been seen to boost surgery recovery (Ulrich, 1984).

Problem Statement

Currently, Lapta does not have enough recreational facilities to serve its residents and visitors. Although Suna's beach and Lapta stadium exists, the do not fully serve the sporting and recreational needs of the residents and visitors of Lapta. The stadium is used by a specific sports team and the beach does not offer facilities for sports or wellness activities. As the population of Lapta grows, the need for a central accessible sports complex because more evident. Furthermore, other urban developments do not integrate nature into its design so this study seeks to solve these problems by proposing a new sporting complex that serves the residents while integrating biophilic design to get all its benefits.

Aim of the Research

The study seeks to propose a new sporting complex in Lapta to serve the needs of its growing population with an emphasis on including biophilic design principles to make the user experience better and promote a harmonious connection with nature. Specific objectives include:

- To identify local sports and recreational needs to inform the design of the complex.
- To integrate biophilic design elements into the architecture of the town therefore elevating user experience.
- To improve existing structures on-site, and integrate them with the new proposed design.

Importance of the Research

This study addressed the gap of a lack of a sporting complex in Lapta by proposing a biophilic sporting complex. It provides a solution which aims to improve the physical, social, mental and environmental awareness of its users. This will contribute to a sustainable urban development. Using natural elements in the design will increase

health, relaxation and social cohesion. Its findings can be applied to similar regions and towns looking to design inclusive, nature integrated community facilities.

Limitations

This research presents certain limitations in the literature review conducted and gatherings found during the field visit conducted in Lapta. While a lot of literature was consulted to learn about biophilic design, sustainable recreational spaces and sport centers, the available literature specific to a small town like Lapta in North Cyrprus was limited. Another limitation came up during the site visit and analysis. Although multiple factors such as topography, sun path, vegetation, existing infrastructure and environmental conditions were examined, no formal surveys or interviews were carried out to gather data from residents or potential users of the complex. Therefore, this design is based on observational data and theoretical frameworks gotten from the literature review. This study is also a proposal and is not a built project therefore, real world implementation challenges such as budgeting, policy approvals and other factors have not been addressed. These factors are the limitations of the study and should be considered when interpreting its findings and recommendations.

Definition of Terms

Biophilic Design

An architectural concept that integrates the natural world with manmade structures to improve users' health and connection with the natural environment.

Green Open Space

Areas with vegetation such as parks, gardens, and natural landscapes, providing ecological and recreational value.

Sporting Complex

A facility designed to accommodate a variety of sports and recreational activities.

User Experience

The overall experience a person has when interacting with a space, including physical comfort, psychological well-being, and visual appeal.

CHAPTER II
Literature Review

In this chapter, previously published research is reviewed to form the main basis for the design of the proposed sporting complex in Lapta. It explores various aspects of sport complex design, biophilic design principles and its importance in promoting the well-being of users. It also discusses the different types of sport facilities, their characteristics and how they contribute in creating a functional and healthy environment. Additionally, it highlights related research studies that support the theoretical framework and show how similar design principles have been used in the development of this thesis.

Theoretical Framework

Sport Complex Design Principles

Orientation: The way a sport complex is oriented affects the safety, comfort and performance of both athletes and spectators. Factors like sunlight and wind direction require a sport complex to be oriented optimally. Some sports that are sensitive to wind can be affected by strong crosswinds if not oriented properly and other factors like glare can also affect performance. This is why it is necessary to orient sport complexes properly. Neufert's book suggests an ideal orientation of 15 degrees northeast to true north for outdoor sports. This reduces the amount of direct sunlight that affects those using the field (Neufert,1980).

Accessibility: Most sport facilities have a lot of people using it at once. It is therefore very important to design it in such a way that movement is easy and unobstructed and paths and connections between outdoor and indoor areas should be available. For example, convenient access from locker rooms to courts make the user experience more pleasant (Lee et al., 2016).

Safety: The design should ensure the well-being and safety of those using the facility. This includes making clear and visible signage, following the health and safety standards of the region to making the facility it secure and accessible to everyone including specially abled individuals (Poel & Robaey, 2017).

Lighting: The design should take into account proper visibility at all times as visibility affects usability. Natural sources of lights should be a priority and should be supplemented with artificial lighting that are placed at the proper location as this improves safety and creates a welcoming environment (Amorim et al., 2017).

Ventilation: Considering the direction of natural airflow reduces the need to rely on artificial ventilation sources which helps create a healthy environment inside sports facilities. (Salonen et al., 2020).

Flexibility: Sports complexes should be designed in a way that its rooms and spaces can serve different functions and activities. Multipurpose halls and rooms make spaces more adaptable usable for different needs (Nurdiani et al., 2020).

Universal Design: Sports facilities should embrace diversity and inclusivity so that they can meet the needs of everyone. This approach creates an environment where everyone feels safe and comfortable (Nurdiani et al., 2020).

Biophilic Design

Biophilic design is about blending nature seamlessly within architectural spaces. The term biophilic design is gotten from the term biophilia, which means the human beings desire to connect with nature. Research has shown that bringing natural features into our surroundings generally improves our health and well-being. One of the most common ways of applying biophilic is the use of natural materials like wood and stone then finding ways to add plants and water features. Bringing elements of nature into the built environment, creates a feeling of connection to the natural world (Mehaffy, 2012). Another way biophilic design is used is by biomimicry which means to copy patterns and behaviors we see in nature and bring them into the built environment. For example,

using fractal patterns like the way trees and branches grow in designs and decorations or creating ventilation systems that blow air the same way it happens in the forest (Mehaffy, 2012). Another way biophilic design can be used is by ensuring the space itself is designed in such a way that the lay out and structure connects with nature and the environment. It can be as simple as creating big windows that gives one the views of trees, the sky, the sea and simply nature in general (Mehaffy, 2012). Research has shown that bringing nature into the built environment can have a lot of good effects on people. For example, a study by Ulrich (1984) observed that surgical patients that had a view of trees instead of a brick wall recovered faster, needed less painkillers and received fewer negative comments in the nurses' records. Besides the physical advantages, biophilic design also improves mental health and well-being. Studies have shown that being around nature improves mood, reduces stress levels and improves thinking and focus (Ulrich, 1984). Furthermore, using biophilic principles can support efforts toward ecological sustainability and the protection of natural resources. Biophilic design incorporates natural elements to cities and buildings thereby making the cities healthier and stronger. Adding these natural elements promotes biodiversity, cleans the air and water and reduces urban heat island effect because plants help lower city temperatures (Andreucci et al., 2021). Overall, biophilic design offers a promising approach to creating healthier and more sustainable built environments. Designing buildings and cities that include green roofs and parks can make people heathier, happier and build a more sustainable greener future for everyone (Verma, 2023).

Sustainable practices in architecture

Sustainable design is becoming more important in the design of sport complexes and recreational centers. Designing these places in an environmentally friendly way is cost efficient, energy efficient, protects the environment and makes the experience better for everyone using the facility. Using energy-efficient lighting systems and HVAC (heating, ventilation, and air conditioning) solutions helps minimize the cost and environmental footprint of these facilities (Brown & Cresciani, 2017).

Saving water is another important part of sustainable design. The use of low flow toilets and faucets and setting up rainwater collection and storage systems can cutdown the costs of water usage (Brown & Cresciani, 2017).

Another important part of sustainable design is using natural landscaping and green infrastructure. Adding features like bioswales and permeable pavements helps manage stormwater naturally (Brown & Cresciani, 2017). Using local and recycled materials helps by reducing pollution while using sustainable materials that release less volatile organic compounds (VOCs) helps keep the air in the building healthier for all users (Brown & Cresciani, 2017). In terms of the benefits of incorporating sustainable design principles in sports complexes and recreational facilities, research has shown that these practices can yield environmental advantages and enhance user experience. For example, a study by (Thormann & Wicker, 2021) looked what made people in German sports clubs behave in more ecofriendly ways and they found out that people who cared more about environment travelled in more ecofriendly ways like carpooling and also used more ecofriendly habits in other areas of their lives (Thormann & Wicker, 2021). This suggests that incorporating sustainable practices in sports facilities can help promote environmentally friendly behavior among users.

Types of sports facilities

There are many kinds of sport amenities and they can be grouped by how they are designed and by the activities they are used for. They include stadiums, sport centers, football fields, watersports facilities, ice rinks, ski resorts, baseball fields, badminton courts, gyms and much more (Guo, 2022; Sun et al., 2022). Each type of facility serves a specific function and caters to different sports and activities. Outdoor sports facilities such as stadiums and sports centers are designed to accommodate large scale sporting events and competitions. These facilities often have seating arrangements for spectators and are equipped with amenities like locker rooms, showers, and concession stands (Guo, 2022). They provide a suitable environment for team sports like football, basketball, and cricket. Swimming and diving halls are specialized facilities that are designed for aquatic sports and activities. These facilities typically include swimming pools, diving boards, and other amenities for water-based sports and recreation (Guo,

2022). They are essential for swimming, diving, synchronized swimming, and water polo. Specialized sports facilities like football fields, golf courses, and shooting ranges are designed to meet the specific requirements of these sports.

Football fields provide a dedicated space for playing football matches and training sessions (Guo, 2022). Golf courses are designed with carefully manicured greens, fairways, and hazards to create a challenging and enjoyable golfing experience (Guo, 2022). Shooting ranges are designed to provide a secure and regulated space for shooting sports such as archery, rifle shooting, and clay pigeon shooting (Guo, 2022). Indoor sports facilities are essential in offering spaces where recreational and athletic activities can be enjoyed regardless of weather conditions. These facilities include fitness centers, badminton fields, and community sports facilities. Fitness centers are equipped with exercise machines, weights, and other equipment for physical fitness training (Guo, 2022). Badminton fields provide dedicated spaces for playing badminton, a popular racquet sport (Sepdanius, 2021). Community sports facilities are built for everyone in the to enjoy whatever sport activities they do (Sun et al., 2022). These facilities usually have things like indoor courts, swimming pools, fitness areas, and multipurpose rooms. Having easy access to these types of facilities makes a big difference in participation level. Research has shown that the closer you live to a sports facility, the more the chance of you using it and staying active (Hoekman et al., 2016). Also, the more types of sports amenities nearby, the more the chances they are to participate in different sports (Hoekman et al., 2016). Another research shows that the farther specific sports are from people, less likely they are to participate in those sports (Karusisi et al., 2013).

Additionally, the characteristics of sports facilities, such as space availability, location, and accessibility, can influence the decision to participate in sports and the frequency of participation (Kumar et al., 2018; Hill & Green, 2012). It is essential to consider the quality and maintenance of sports amenities, especially in indoor settings. Indoor sports facilities, like other indoor places, are affected by factors such as ventilation, building materials, and maintenance, which can impact the indoor air quality (Salonen et al., 2020). The number of occupants and the nature of activities conducted indoors can also affect the indoor air quality (Salonen et al., 2020). Therefore, it is

crucial to ensure proper ventilation and maintenance practices in indoor sports facilities to create a healthy and safe environment for users.

Importance of sports facilities

Sports facilities are very important because they help people stay active, live healthier lives and they bring communities together. They encourage people to exercise more which improves health. They can raise the property value of the neighborhood. They help people connect and build friendships through sports and other activities. They boost the local economy by creating jobs and other local events ad they are a symbol of public health in the community. Research has shown that adults are more likely to exercise if the sports facilities are accessible (Lee et al., 2016; Karusisi et al., 2013) and individuals who have easy access to sports facilities are more likely to engage in regular exercise compared to those who has no access (Lee et al., 2016). Therefore, proximity of sports amenities influences peoples ability to participate in various sports and recreational activities, which will improve their fitness, health, and well-being (Lee et al., 2016).

Having sports facilities can encourage even people struggling with depression to become active and that helps them get the mental health benefits that comes with doing exercise. including those with depression to engage in physical activity and get the associated benefits (Lee et al., 2016). Sports facilities also have an impact on property values. Studies have found that the presence of sports facilities generally makes the value of properties appreciate (Feng & Humphreys, 2016). Proximity to sports facilities, such as stadiums or sports centers make a community more attractive to live in and that also leads to the appreciation of the property, (Feng & Humphreys, 2016). The main reason for this in because in such locations, the amenities and recreational facilities are nearby. (Feng & Humphreys, 2016). This positive impact on property values is beneficial to the local community and homeowners.

Sport facilities contribute significantly in bringing people together and building strong communities. They are gathering places where people from different backgrounds can meet, play sports, enjoy local activities and take part in events (Gieling et al., 2018). Local sports clubs and facilities are places where friendships are built, social ties get

stronger and people feel a real sense belonging to the community (Gieling et al., 2018). When sports facilities are available, they make it easier for people to connect, feel included and help the whole community feel healthier and happier (Gieling et al., 2018).

Additionally, having sports facilities can improve the image and reputation of a city or region. Their presence attracts businesses, investors and new residents which helps the city grow and develop (Feng & Humphreys, 2016). From a public health perspective, sports facilities encourage people to be more physically active and lowers the risk of illnesses and increases mental health and overall well-being (Lee et al., 2016).

Moreover, sports facilities can serve as settings for health promotion programs Moreover, sports facilities can be important spaces for running health programs, teaching sports skills, and organizing community projects that aim to improve public health (Kumar et al., 2018).

Related Research

Ulrich et al. (1984). “Stress Recovery During Exposure to Natural and Urban Environments” investigated the effects of natural and urban environments on stress reduction and found out that those who were more exposed to the natural environment recovered quicker. This provides strong evidence for the application of biophilic design principles in the proposed design of a sports complex in Lapta.

Lee et al (2016). “The Relationship Between Sports Facility Accessibility and Physical Activity Among Korean Adults” studied the relationship between accessibility of sport activities and the frequency of exercise. The researchers found that individuals with easier access to sports amenities were more inclined to engage in regular exercise. This finding reinforces the importance of incorporating accessible pathways and well-connected spatial layouts in sports facility design.

Andreucci et al. (2021). “Exploring Challenges and Opportunities of Biophilic Urban Design: Evidence from Research and Experimentation” researched how Biophilic design principles can be useful in urban environments to support human and ecological health using research from cities like London and Chicago.

CHAPTER III
Methodology

This section presents the methodology used in developing the proposed biophilic sporting complex in Lapta. It outlines the design-oriented research model and the qualitative strategies used throughout the study. The study group section shows the specific site conditions and contextual factors that influenced the design approach. Data collection involved site visits, observation, sketches, photographs, and spatial analysis using topographic and satellite imagery which were supplemented by case studies of precedent projects to guide design decisions. The data analysis section explains how findings were interpreted into the proposed design that prioritize sustainability, accessibility, and user well-being. The chapter also includes visual documentation, tables, and figures that support the texts written.

Research Model

This research adopts a qualitative, design-oriented approach. Following the literature review that formed the theoretical framework, a site analysis of Lapta was conducted to understand the physical, environmental, and spatial context of the proposed complex. Case studies of well-known architectural projects that successfully apply biophilic design such as the Barbican Centre, Apple Park, and Egora Turó de la Peira were examined to extract design strategies and inform the development process.

Study Group

Within the scope of this study, the following topics were first examined based on a literature review. The principles of biophilic design and sustainable architecture in sports and recreational facilities. For the analysis of the Lapta project site, spatial and physical characteristics of the area were studied in detail. These included the existing buildings on site, natural topography, terrain conditions, sunlight and wind orientation, accessibility patterns, existing amenities, vegetation, and proximity to the coastline. Zoning was also carried out to inform the design proposal. Direct survey data was not available so assumptions about user needs and spatial requirements were drawn from

observation, site analysis, and the evaluation of case studies involving similar biophilic and recreational projects.

Data Collection Tools

The first tool used was the site analysis which was carried out during the physical visit to the project site in Lapta. Observations included elements such as terrain slope, vegetation density, natural views, sunlight direction, wind flow, and existing buildings. These were documented using photographs, hand sketches, and site notes which formed the primary source of data for the design process. The topographic map of the site in Lapta were obtained to understand the ground levels and Google maps was used to reflect the location of existing structures, roads, access points, and recreational zones. These were used to inform the design layout and adjustments were made based on the current site conditions to integrate natural features and improve accessibility across the sports complex.

Data Analysis and Interpretation

Collected data and site observations were used to inform layout, orientation, and environmental integration. Other design elements such as walkability, accessibility, and public space hierarchy were shaped by the terrain and existing structures. Each case study was reviewed to extract relevant design strategies. For example, the Barbican Centre informed how to balance brutalist architecture with green integration, while Apple Park showed large-scale sustainability. Egora Turó de la Peira showed how to blend sports complexes with green infrastructure and rainwater systems. These analyses were integrated into the design to ensure the project integrated the principles found out in the data analysis.

The Barbican Centre

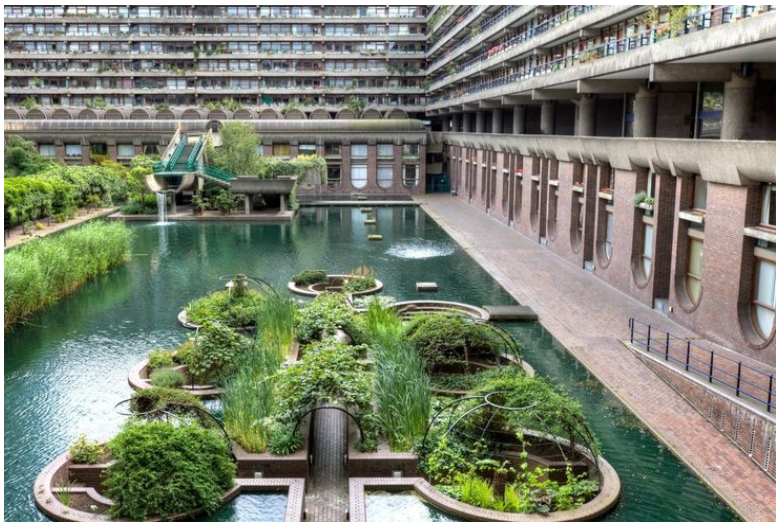
The Barbican complex is a performing arts complex located in the Barbican estate in the city of London, England. It is the largest arts center in Europe and it offers a wide range of activities including live music, theatrical performances and much more. It

has a blend of brutalist architecture with a subtle blend of biophilic design principles. This center is a good example of how urban and cultural spaces can be integrated seamlessly with the natural environment. It was designed by Chamberlain, Powell and Bon and opened in 1982.

Biophilic Integration: The Barbican center's architects ingeniously incorporated biophilic elements into its design which created a connection with nature within an urban environment. It is known for its concrete ziggurat design but the complex features ample green spaces, rooftop gardens, and a big lakeside terrace (see figures 1 & 2). These elements not only provide visual relief by directly contrasting the concrete style of the complex but also serve as a place of relaxation for visitors and residents. This balances the overall design of the center and enhances the overall well-being of the users of this space.

Figure 1:

Biophilic aspect of the design



(TripAdvisor, 2023)

Figure 2 :

Outdoor view of Barbican center

(TripAdvisor, 2023)

Green Oases Amidst Concrete: One of the key strengths of the barbican center is in the strategic placement of greenery throughout the complex. The residential towers have small green areas built into them. This creates a strong contrast with the concrete surroundings. The green spaces serve as a meeting place for people increasing social activity and a sense of community and it also serves as a space to take a break from the busy city atmosphere in London.

Elevated Walkways and Natural Light: The Barbican center's elevated pathways by design do more than just connect different parts of the complex but they also let in a lot of natural light (see figure 3). conduits for movement and channels for natural light. The interconnected walkways through the complex make it easy for people to move around in the natural environment. The use of large glass windows also helps to bring in sunlight to the interior helping people inside feel more connected to the outside environment and the natural changes happening around them.

Figure 3:

Elevated Walkways at Barbican Center

(Frearson,2013)

Residential Integration of Nature: The residential parts of the Barbican integrate nature in multiple ways. The balconies are filled with plants and green areas are included in the shared spaces inside the towers. This makes it feel like people are living in a green urban environment. The architects recognized the importance of nature in enhancing residents' quality of life and therefore created a residential environment that embraces the principles of biophilic design.

Symbiosis with Water: The lake at the center of the Barbican complex adds a calming water-based element to the overall design (see figure 4). Many studies show the relaxing effect natural waterbodies or water features have and the lake gives residents and visitors a peaceful place to rest and reflect. It was carefully planned and designed to create a quiet and relaxing atmosphere helping the natural and built environment work together seamlessly.

Figure 4:

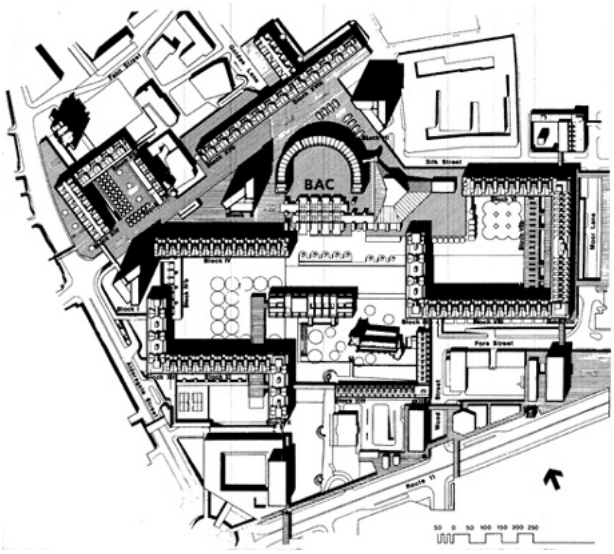
Facades in Relation with Plants and Water Elements

(TripAdvisor, 2023)

In conclusion, the Barbican Centre's success comes not just from its Brutalist style (see figure 5) but from how it successfully incorporates nature into an urban setting. By blending green spaces, water, and natural light into the complex, The Barbican center serves as a good case study that shows it is possible to create balanced spaces that meet both cultural and human needs even in the middle of a busy city like London.

Figure 5:

Site plan of Barbican Estate



(Frearson,2013)

Table 1:

Barbican Center

Architect	**Chamberlain, Powell and Bon**
Year	1971-1982
City	London
Country	UK

(Author, 2023)

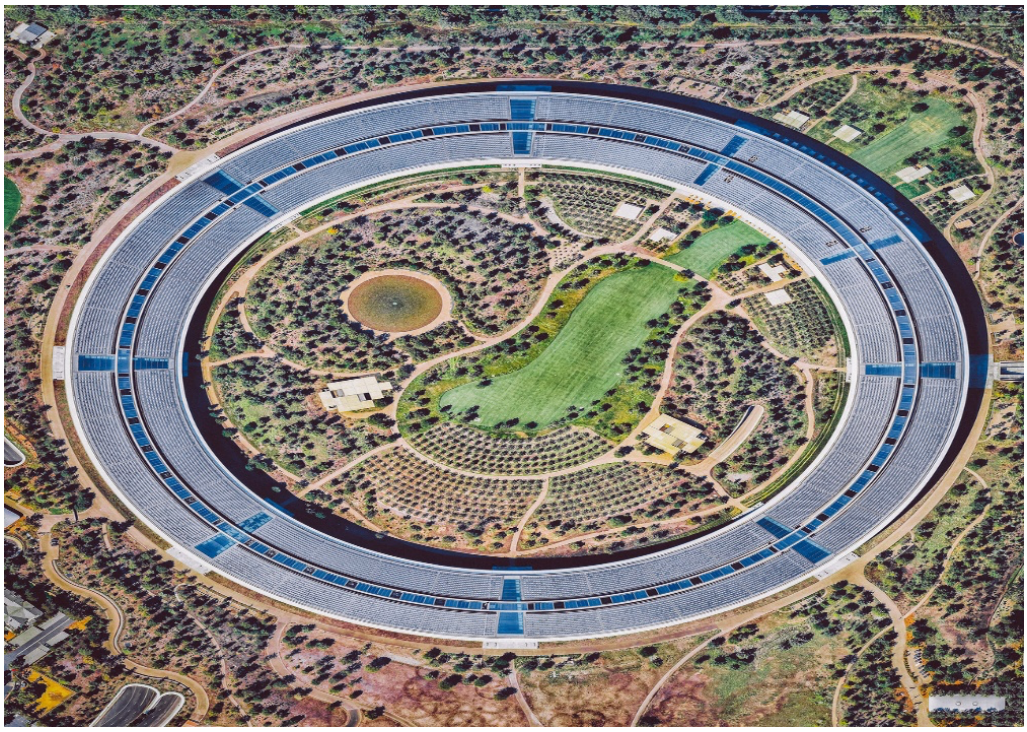
Apple Park

Apple Park, located in Cupertino, California, is Apple Inc.'s corporate headquarters. Completed in 2017, this architectural masterpiece, designed by Foster + Partners, reflects a commitment to innovation, sustainability, and a collaborative work environment.

Circular Design and Foster + Partners Collaboration: Apple Park's most distinctive feature is its circular design (see figure 6), often likened to a spaceship. The vision for this architectural masterpiece was realized through the collaboration between Jony Ive who led Apples design team, and renowned architectural firm Foster + Partners. The circular form represents and encourages a sense of unity and connection between employees.

Figure 6:

Satellite view of Apple Park, Cupertino

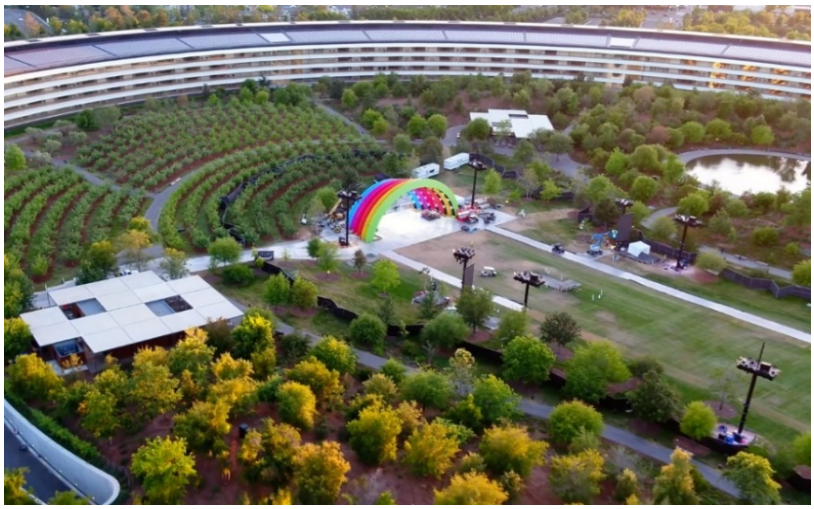


(Nearmap, 2019)

Landscaped Campus and Green Spaces: The Apple campus is about 175 acres big, with more than 80% of the site dedicated to green space (see figure 7) which is way above the local green area standards. It has a central courtyard with a pond and the landscaping was carefully designed using drought-resistant plants and a dense orchard. This contributes to the campus's aesthetic appeal while shows Apple's commitment to environmental sustainability.

Figure 7:

Apple Park Exterior View



(Fingas,2019)

Fostered Collaboration with Open Workspaces: Apple Parks open flexible work areas were designed to encourage teamwork and communication (see figure 8). The large floor-to-ceiling glass and the way the indoor and outdoor spaces flow together creates a feeling of openness and transparency which promotes collaboration and communication. The Steve Jobs Theater, which has an underground auditorium with a carbon fiber roof above it serves as a focal point for product launches and events.

Figure 8:

Apple Park Interior View

(Guerron, 2023)

Sustainable Design and Energy Efficiency: Apple Park was built with sustainability in mind. It has on-site recycling facilities and a plant that handles construction waste. The campus runs completely on renewable energy, with most of it energy primarily sourced from the solar panels installed on its roof. The design also uses natural light as much as possible which cuts down the need for artificial lighting and improves energy efficiency.

Innovative Structural Elements: The main building, often referred to as the "Spaceship" or "Ring," is known for having the world's largest curved glass panels. These huge panels were custom-designed for Apple Park and they provide unobstructed views of the surrounding landscape. The building also has a ventilation system that draws in outside air to cool the interior which reduces the need for traditional air conditioning.

Steve Jobs Theater: The Steve Jobs Theater is a separate structure on the campus with a minimalistic design. With a 20-foot-tall glass cylinder entrance and an auditorium below ground level, it combines architectural aesthetics with functional considerations and sits perfectly on the landscape. It is used for Apple's key events.

In conclusion, Apple Park is more than a corporate headquarter. It is one of the most sustainable buildings on earth and a lot can be learned from Apple's design philosophy and commitment to sustainability (see figure 9). The collaboration between Apple's design team and Foster + Partners has resulted in a campus that seamlessly integrates nature, fosters collaboration, and reflects the company's dedication to excellence and innovation.

Table 2*:*

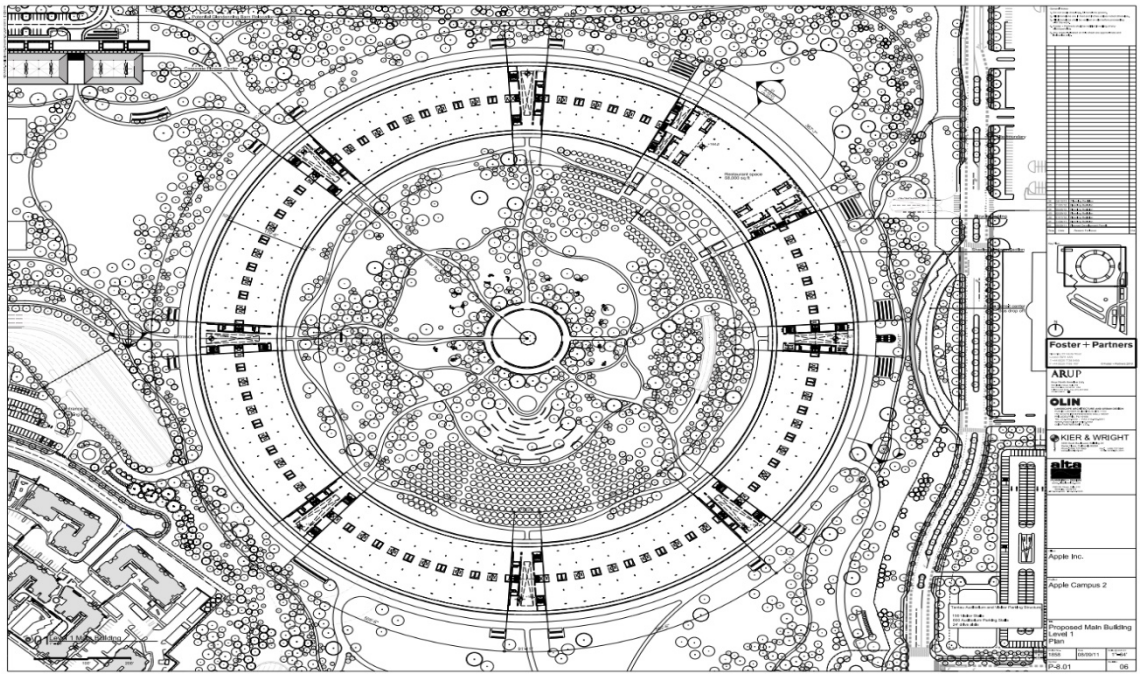
Apple Park

Architect	**Norman Foster**
Year	2017
Area (ft^2)	2,820,000 sq (262,000m^2)
City	Cupertino, California
Country	United States

(Author, 2022)

Figure 9 :

Floor Plan Layout of Apple Park



(Rosenfield, 2013)

Egora Turo De La Peira's Sports Center

The Barcelona City Council organized a competition to design the layout of an urban area and sports venue, which needed to include a heated indoor pool and a sports court (see Figures 11-16). The winning design was chosen for its seamless mixing of a unique green building into the city block, its focus on sustainability, and its respect for the environment. Before the redesign, the area lacked organization, with scattered spaces holding a sports court and old pool facilities. The site was full of hard pavement, concrete walls, and no plants or trees.

By combining both facilities into one building, extra space was freed up to create a new garden green slopes that allowed rainwater to seep into the ground. This garden helped bring people together and the new green spaces attracted birds and insects which improved the biodiversity in the area. This garden not only enhanced quality of life but also supported biodiversity. The building was half-buried into the landscape which made it fit naturally with its surroundings. A heated indoor pool was placed on the ground

level while the upper levels had the sport courts The Sant Iscle Street façade got a new urban feel featuring a corner porch extending the sidewalk.

To minimize the buildings impact, a green gallery was added allowing the structure to blend with its surroundings. Wood was used for construction because energy efficiency was a major factor in the design. A green façade wrapped around the building which helped to filter natural light and protect the building from excessive sun thereby making the building cooler (see figure 12). The emphasis on energy efficiency and self-sufficiency led to the adoption of a wooden structure, chosen for its environmental lifecycle characteristics, mechanical performance, lightness, and quick construction.

The green façade was made using a hydroponic system which was chosen for its light weight, durability excellent water retention and easy installation. Water recycling played a vital role, with a basement tank collecting roof water for irrigation using a hydroponic system. The garden had draining strips at the slope bottoms gathered rainwater, returning it to the water table. Overall, the project showcased a holistic approach to urban regeneration, integrating green infrastructure, and promoting sustainability.

Table 3:

Egora Turo De La Peira's Sports Center

Architect	**Anna Noguera, Javier Fernandez J2J architects**
Year	2018
Area (m^2)	4430 m^2
City	Barcelona
Country	Spain

(Author, 2022)

Figure 10:

Exterior Views of Turo de la Peira's Sports Centre.

(Jewell, 2020)

Figure 11:

Interior Views of Turo de la Peira's Sports Centre.

(Jewell, 2020)

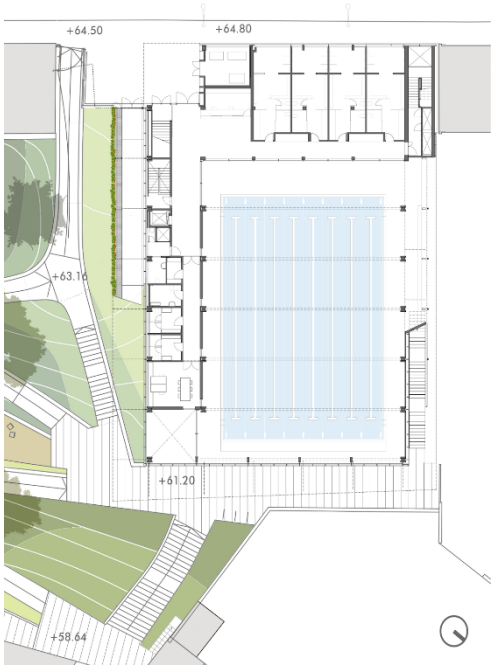
Figure 12:

Interior Views of Turo de la Peira's Sports Centre.

(Jewell, 2020)

Figure 13:

Floor plan of Turo De La Peira's Sports Center



(Noguera & Fernandez, 2019)

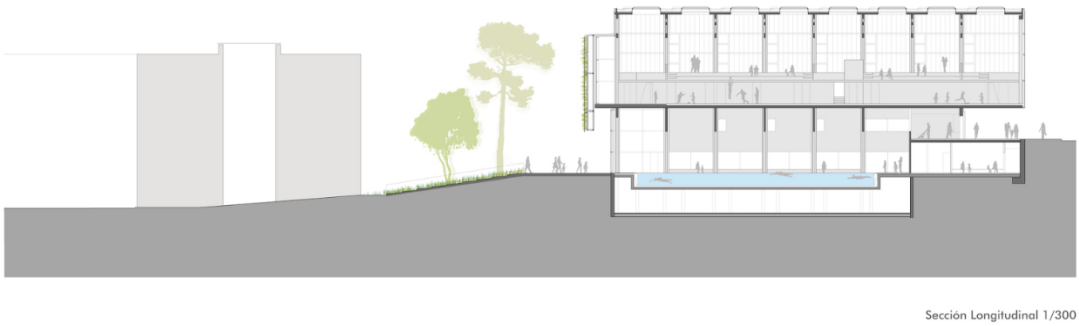
Figure 14:

Site Plan of Turo De La Peira's Sports Center

(Noguera & Fernandez, 2019)

Figure 15:

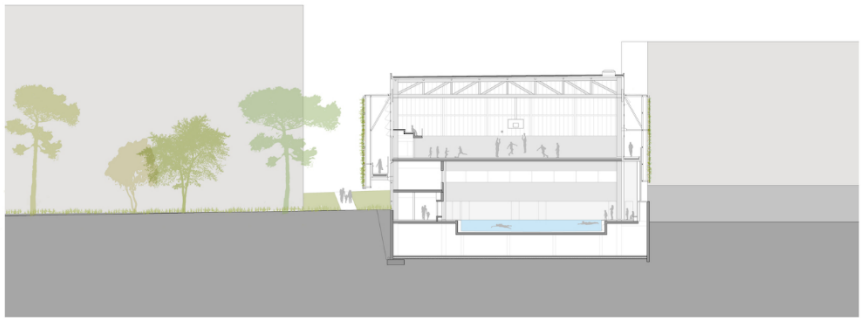
Longitudinal section of Turo De La Peira's Sports Center



(Noguera & Fernandez, 2019)

Figure 16:

Transversal section



(Noguera & Fernandez, 2019)

CHAPTER IV

Design Proposal of Biophilic Sports Complex in Lapta

This chapter outlines the results derived from the field study and design analysis of the proposed biophilic sports complex in Lapta, North Cyprus. It begins with a detailed overview of the study area, which includes site zoning, geographical contexts and specific characteristics. The results of the field study conducted is shown and analytical methods such as SWOT analysis were applied to access the strength and weaknesses of the location. The chapter then outlines design considerations and the final architectural drawings showing a comprehensive view of the development of the proposed project.

Study Area

Lapta also known as Lapithos in Greek, is a town in the northern coastline of Cyprus (see figure 17). It borders Alsancak to the east, Karsiyaka to the west and Akcicek to the south. It is under the Turkish Republic of Northern Cyprus (TRNC) since 1974. Some of the economic activities practiced by the population are fishing, agriculture, tourism and small-scale industry.

Figure 17:

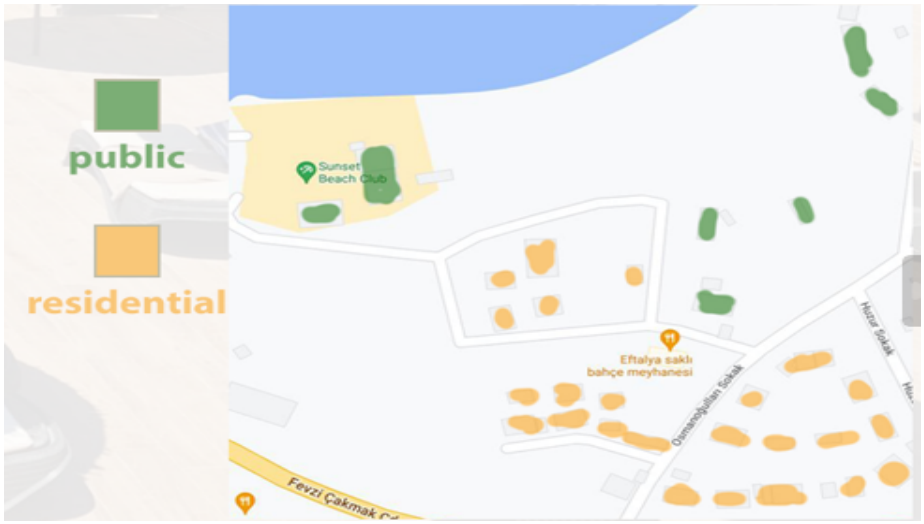
Location of the Site

(Author, 2022)

Lapta is a residential district (see figure 18) it is mainly consisting of villas and apartments that are 2 – 3 floors high. There are also mix use buildings that are used for commercial purposes in the ground floors and are residential in the upper floors. This is mostly evident with the buildings adjacent to the main road. There are cottages and resorts in the study area, mainly adjacent to the main road. There's also an industrial zone located in the area, that is mainly garages.

Figure 18:

Site Zoning



(Google earth, 2022)

Site Location

The site for the sports village is located just on Lapta's border with Alsancak district. It is north of the Karaognaloglu Highway. The area of the site is approximately 33,110 m^2. The site area is approximately 15 km West of Kyrenia. It is adjacent to the Mediterranean Sea. The area boasts stunning views of the sea to the North and huge hill ranges to the south. It is located 25.4 km away from the capital and 36 km from Ercan Airport. As shown in the figure below, the site is assessable through a single road that connects with the highway. There's also a bus stop a few meters east of the main access of the site. This connects the area to Kyrenia through public transportation. The case area is bordered by residential buildings (villas and cottages) making it a tranquil area.

Research Design and Analysis

A field study was undertaken to collect data on the physical attributes and existing activities of the site. The primary methods of data collection involved observation and photography. Pictures were taken to document the beach, topography, and vegetation present. The field survey revealed various features, such as the site's entrance location, the bus stop, traffic flow, car park placement, and the positioning of nearby residential, commercial, industrial, and mixed-use areas. This information is crucial for assessing the potential impact of the proposed project on the surrounding environment. On-site built elements included a football field, camping site, central park, retaining walls, and a partially collapsed ruin.

In addition to the field study, Google Earth was used as a secondary source to capture a satellite image of the site and its surroundings. Using the information gathered from the field study and satellite images, a site analysis and a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) were conducted.

Site Analysis

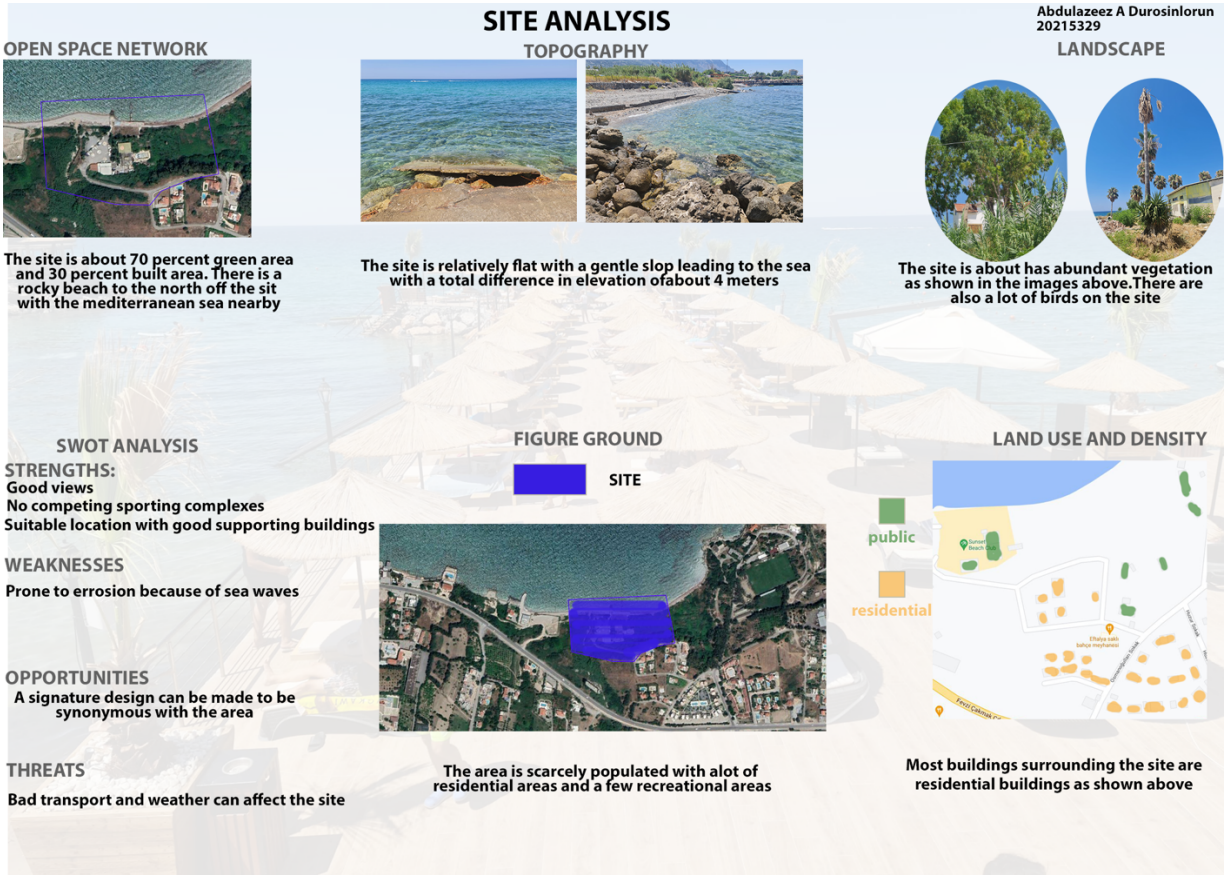
The site analysis focused on examining several important factors such as climate, vegetation, and topography (see figure 19). This site analysis was essential in shaping the concept of the proposed project and continued to guide decisions throughout the entire design process.

Climate

The region has a Mediterranean climate characterized by dry summers and mild but rainy winters. Most of the rainfall occurs between November and March while May to September is much drier. August is usually the hottest month, with temperatures around 30 degrees Celsius, while January is the coldest, with temperatures around 11 degrees Celsius. June stands out as the windiest month, with an average speed of 13 km/h. The annual precipitation in the area totals 687.5 mm. During the winter months, cold winds blow from the north and northwest, while hot winds prevail from the south and southwest during the summer.

Figure 19:

Site Analysis



(Author, 2022)

Vegetation

The site has a large number of trees, constituting a vital aspect of its ecological makeup (see figure 20). Preserving these trees is paramount, not only for maintaining the sites natural beauty but also as a step to fight climate change. just for the site itself, but also as a strategic effort to combat climate change. Trees naturally produce oxygen and absorbs carbon dioxide, forming a natural defense against the environmental challenges posed by climate change. Therefore, safeguarding the diverse array of trees on the site, including Eucalyptus, Pine, Cypress, and Palm, becomes not only a measure to protect

the immediate environment but also a broader contribution to mitigating the global effects of climate change.

Figure 20:

Images of Trees on Site

(Author, 2022)

Topography

The site exhibits a gradient of 7%, calculated by taking the vertical elevation difference and dividing it by the horizontal distance covered. The outcome is then multiplied by 100. Given the sloping nature of the terrain, the site already features existing structures which follow the design of the terrain (see figure 21).

Figure 21:

Images of the Existing Site

(Author, 2022)

The shoreline in the vicinity is characterized by rocky terrain, a consequence of the impact of destructive waves crashing onto the shore. These waves induce erosion, leading to the development of caves on the cliffside. Over time, these caves expand until their collapse, leaving behind rocks that contribute to the formation of the rocky beach (see figure 22). This stands in stark contrast to constructive waves, which, instead of eroding, deposit sand and other particles, shaping sandy beaches. Designing in the beach area requires careful precautions due to these dynamics.

Figure 22:

Image of Rocky Beach

(Author, 2022)

Figure 23:

Pre-Existing Site Condition

(Author, 2022)

The photo depicted above illustrates the site, indicating existing structures and contour areas (see figure 23).

SWOT Analysis

The reason for this analysis is to identify the areas of strength, area of weaknesses, opportunities, and threats associated with the site.

Strengths

- Proximity to the sea
- Captivating sea views and expansive hill ranges visible from the South.
- Dense population of trees on the site
- Surrounding buildings are limited to a maximum of three stories.

Weaknesses

- The nearest major city, Kyrenia, is 15 km away.
- Implementation of a significant urban development may disrupt the natural environment.
- Upon completion, the project may attract people from across the country, potentially disturbing the peace and tranquility of the area.

Opportunities

- Substantial increase in employment opportunities
- Significance as a major urban development in the region
- Social activities associated with the project can bring the community together after years of isolation.
- Sports facilities can foster teamwork, strengthening community bonds.

Threats

- Coastal cliff erosion due to destructive waves
- Deforestation risks
- Potential for increased noise and air pollution resulting from heightened human and vehicular traffic.
- Disruption of the peaceful residential ambiance in the area

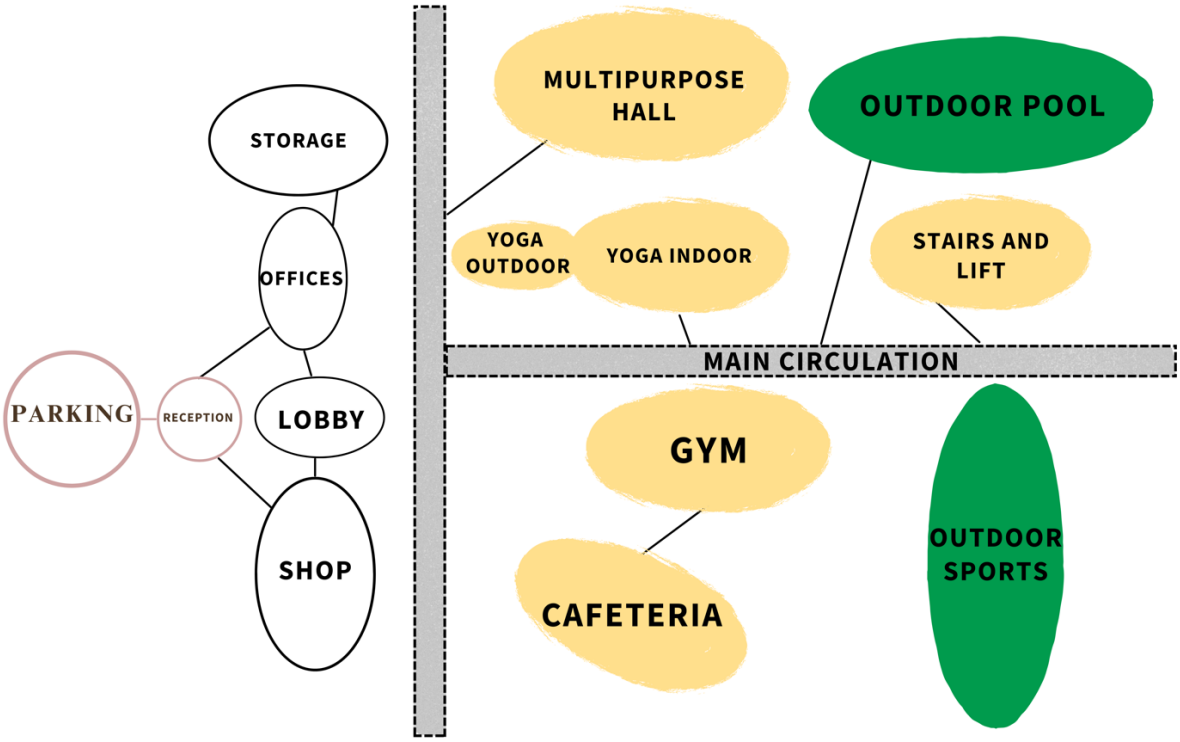
Design Consideration

The primary objective of the design centered around the preservation of the natural environment, necessitating seamless integration with the surrounding vegetation.

Recognizing the highest density of trees on the western side of the site, this area was designated as a green path to minimize tree removal, as the trees could serve as cover for pedestrian users. The site was delineated into four zones: Sports, Social, Garden, and Recreational (see figure 24). The layout depicted, featured a one big building with two smaller ones, while the recreational zone, situated along the sea, incorporated a scenic path connecting to the existing path. The central location, due to the steep terrain, accommodated a tiered path as well.

Figure 24 :

Bubble Diagram



(Author, 2022)

The social area encompassed the yoga, garden, rooftop sit out overseeing the view of the sea. The sports area, strategically placed on the southern edge for easy access by tourists and spectators, included a sport building-oriented north-south to shield players from the sun. Outdoor sports courts such as tennis, volleyball, and badminton

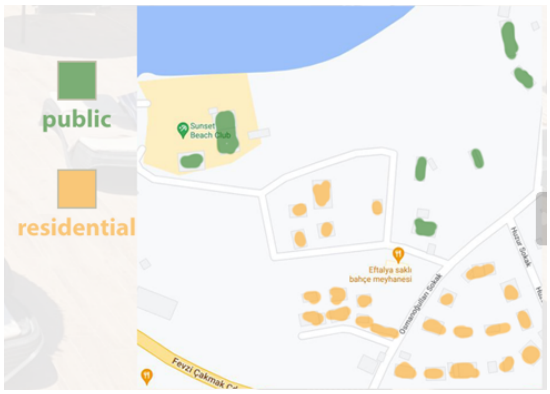
were also aligned in this direction. The building, influenced by the steep slope, was partially submerged to harmonize with the environment (see figure 25).

Addressing accessibility, a bus stops on the main road aimed to promote public transportation. The road on the southern edge connected the social and sports buildings with the main entrance, while paths interconnected every zone. To counter the rocky beach and strong waves, a harbor was designed, providing calm waters ideal for swimming and an additional sea access point.

Walkability considerations restricted vehicles to the southern road, encouraging pedestrian movement. Bicycle lanes and racks were integrated into pedestrian paths, with urban furniture like benches, streetlights, trash cans, fountains, outdoor gym equipment, and planters enhancing walkability and aesthetic appeal throughout the site.

Figure 25:

Site Zoning



(Author, 2022)

Design Results

The biophilic sports center design focused on preserving and protecting the natural environment and blending it with the surrounding greenery. This created a practical layout that kept the wellbeing and user experience of the residents in mind. By keeping most of the trees, deforestation was avoided helping to lower the potential

impact on climate change. The dense tree covers served as windbreakers and noise insulators creating a calm and tranquil atmosphere within the site.

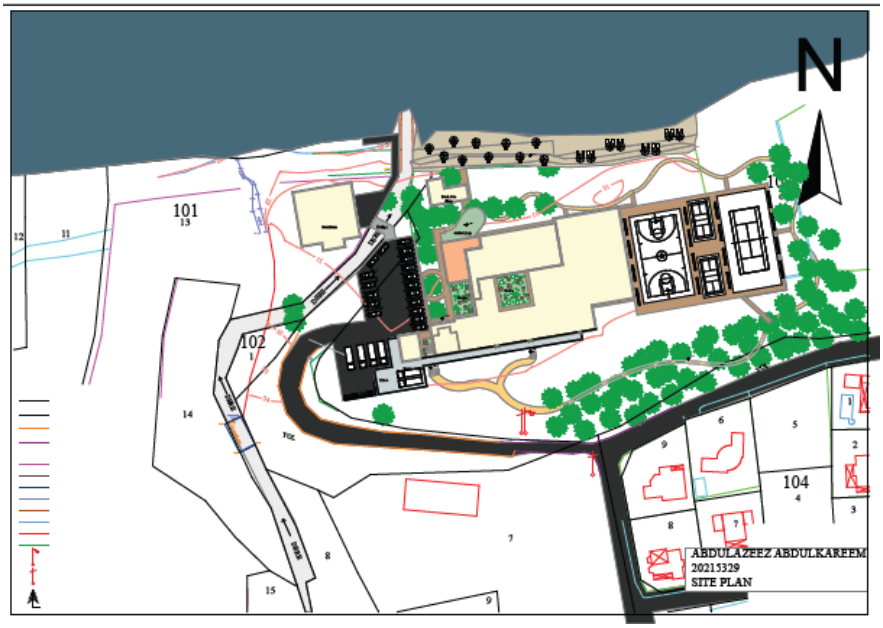
Incorporating a central park played a pivotal role in increasing a sense of community among users. This communal space is meant to bring together a diverse group of individuals increasing interactions which is crucial for forming friendships that empower and strengthen communities. Additionally, the green garden and recreational area aims to positively impact the physical and mental health of the users. Many research investigations have emphasized the myriad benefits associated with engaging in outdoor pursuits. These activities not only enhance our immune system's functionality but also contribute to better cardiovascular and metabolic well-being. In essence, spending time outdoors has been shown to fortify our body's defenses and promote overall physical health through activities like hiking, cycling, or simply enjoying nature's tranquility. This was the basis for creating an outdoor path where these activities can be done while enjoying the scenic views of greenery and water.

Considering the challenging conditions of the rocky beach and strong waves, harbor was designed strategically to mitigate wave intensity and create calm waters suitable for swimming. This harbor not only addressed safety concerns but also provided an additional means of transportation through the sea (see figure 26&27).

Promoting walkability was a key aspect of the design aiming to boost physical activity and improve people’s health and well-being. Walking is the main way of getting around on the site. This reduces traffic congestion, lowers greenhouse effects and can even keep the complex’s temperature cooler. Walkable neighborhoods also create more chances for socialization therefore bringing about a stronger close knot community. To support walkability, the design includes well-planned sidewalks, proper lighting, clear signage, and safe crosswalks, all of which help to make walking safer and more comfortable for everyone.

Figure 26:

Site Plan



(Author, 2022)

Figure 27:

Site Sections

(Author, 2022)

Sports Center Design

Designing a biophilic sports center follows a systematic and careful architectural process. The main goal was to bring different facilities together in a way that made the space functional, attractive, easy to use, and environmentally friendly. The process began with a deep understanding of the environment and the needs of the future users. In

the early stages, it was important to identify the target user groups and understand their expectations. At the same time, a detailed site analysis was carried out through thorough visits, looking closely at topography, climate, and existing structures to know the opportunities and limitations of the site better.

During the conceptual design phase, different ideas, layouts, and spatial arrangements were created and presented. Each concept went through review and improvement, with several rounds of corrections and refinements, until a final design was selected for further development. As the design moved into the schematic phase, the focus shifted to carefully planning the spaces and organizing zones. Space plans were developed to decide where different facilities would be placed, ensuring smooth user movement, easy accessibility, and clear zoning. The layout was thoughtfully designed to connect spaces efficiently and use the area effectively.

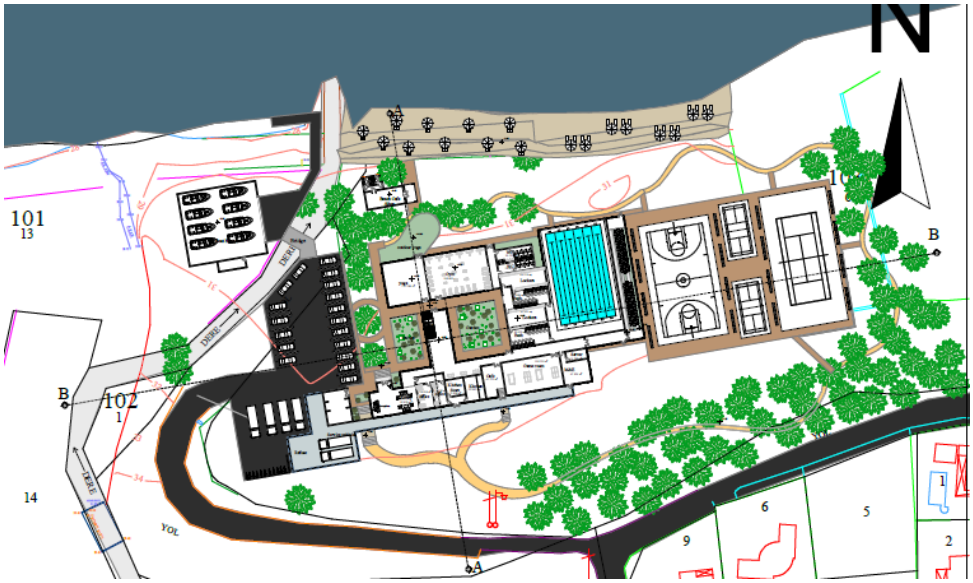
This design evolution eventually led to the creation of a more developed plan, including the addition of one or two gardens within the building, using specific materials and biophilic design features to further strengthen the connection between nature and architecture.

Site Design

The image displayed below shows the finalized layout of the sports building, in accordance with the design considerations previously mentioned (see figure 28).

Figure 28:

Proposed Sports Center Site Plan



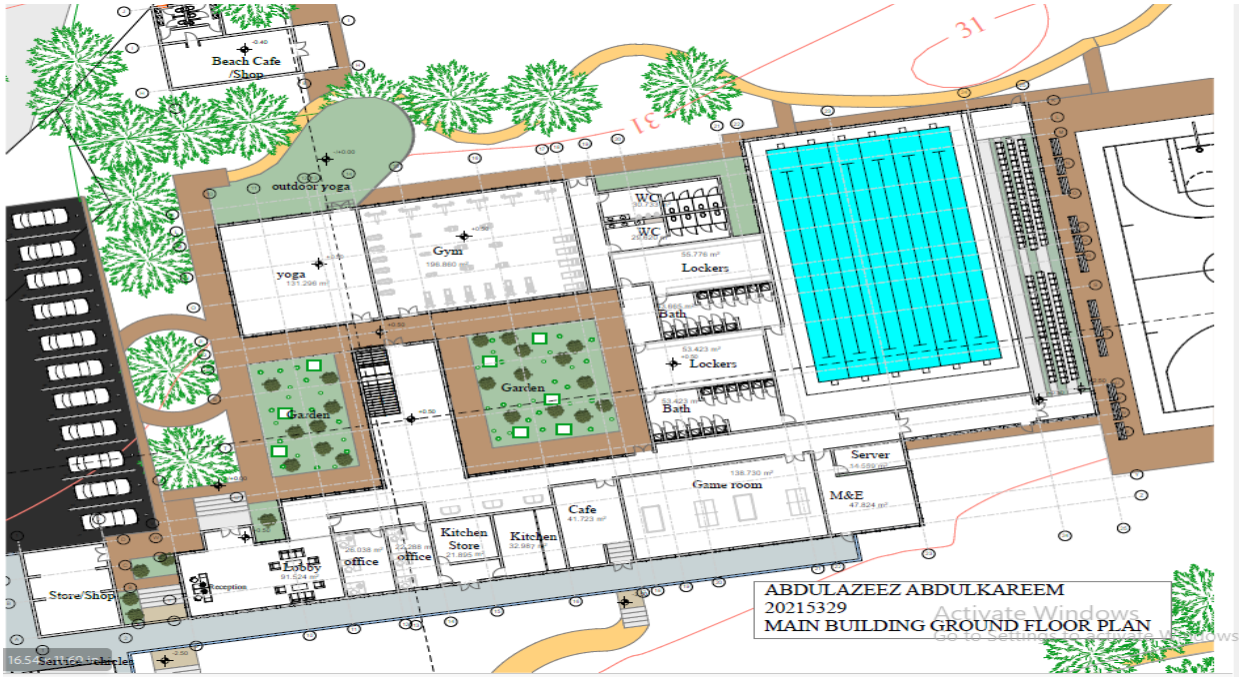
(Author, 2022)

Architectural Drawings

Below are the final architectural drawings for the design of the proposed sports complex in Lapta. They include the plans (see figure 29 & 30), elevations and sections (see figures 31-34) and the 3D views. (see figures 35-47).

Figure 29:

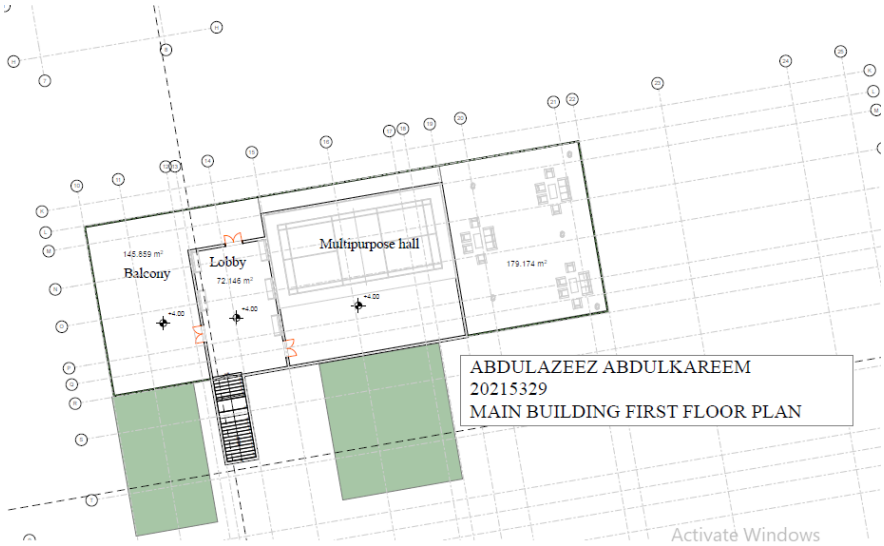
Proposed Ground floor Plan.



(Author, 2022)

Figure 30:

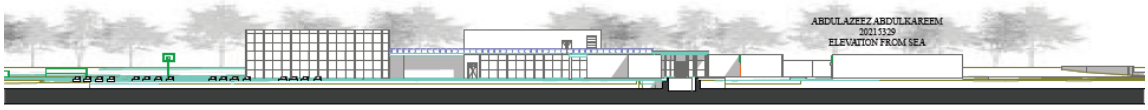
Proposed First Floor Plan



(Author, 2022)

Figure 31:

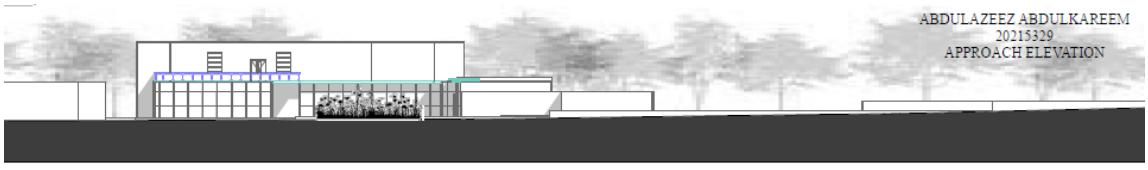
Proposed North Elevation



(Author, 2022)

Figure 32:

Proposed West Elevation



(Author, 2022)

Figure 33 :

Proposed Section A - A

(Author, 2022)

Figure 34:

Proposed Section B – B

(Author, 2022)

Figure 35:

Proposed Aerial view

(Author, 2022)

Figure 36:

Proposed Exterior View 1

(Author, 2022)

Figure 37:

Proposed Exterior View 2

(Author, 2022)

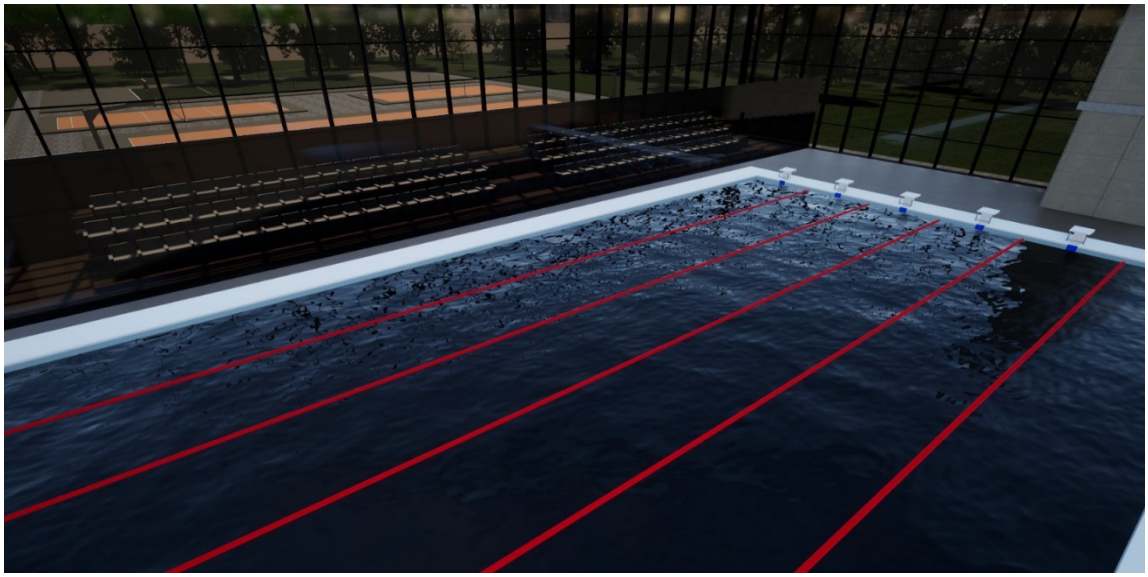
Figure 38:

Proposed Exterior View 3

(Author, 2022)

Figure 39:

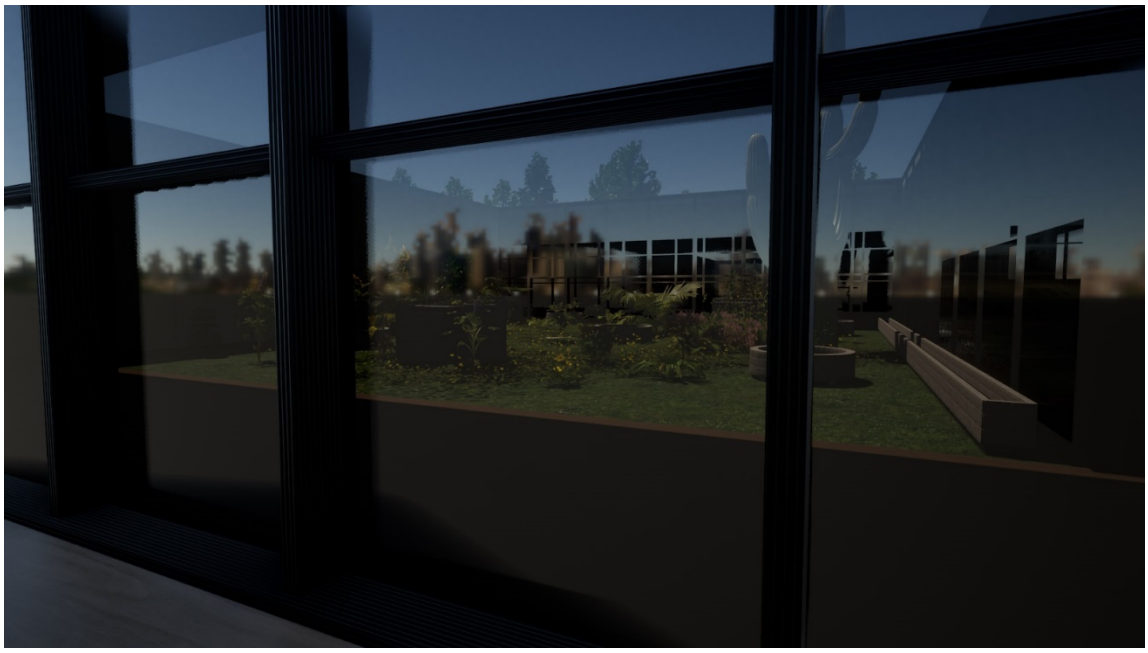
Proposed Indoor Pool



(Author, 2022)

Figure 40:

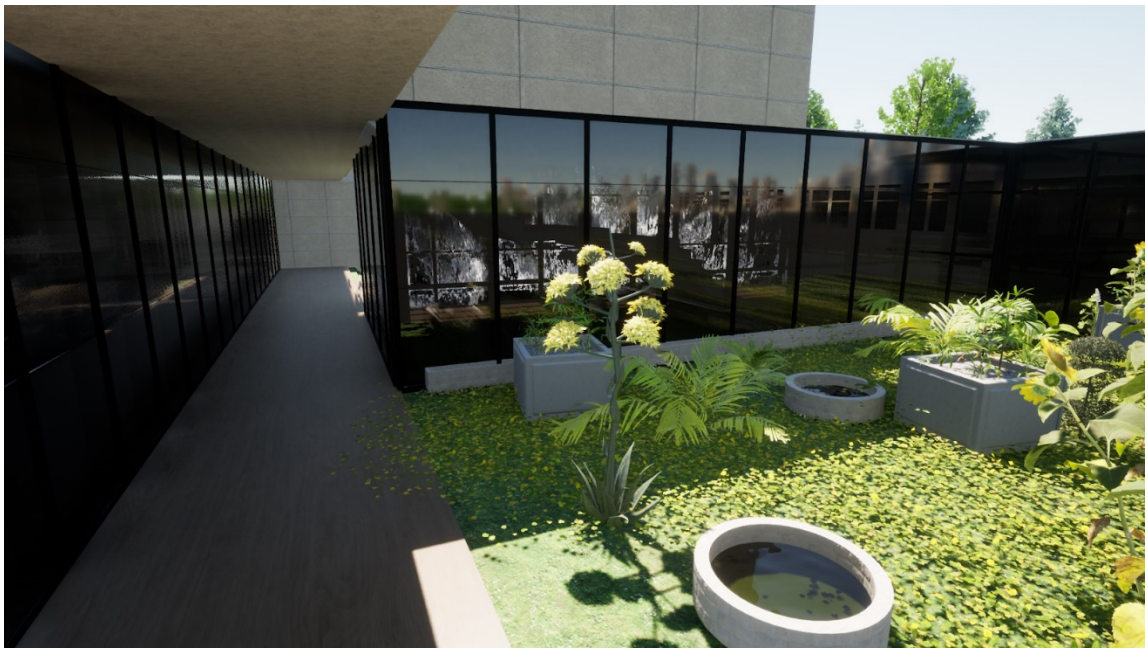
Proposed Indoor Area



(Author, 2022)

Figure 41:

Proposed Indoor Garden 1



(Author, 2022)

Figure 42:

Proposed Indoor Garden 2

(Author, 2022)

Figure 43:

Proposed Outdoor sports 1

(Author, 2022)

Figure 44:

Proposed Outdoor Sports 2

(Author, 2022)

Figure 45

Proposed Cobblestone Beach

(Author, 2022)

Figure 46:

Proposed Outdoor Yoga

(Author, 2022)

Figure 47:

Proposed Path

(Author, 2022)

CHAPTER V

Discussion and Conclusion

The proposed biophilic sports center for Lapta, North Cyprus, holds the promise of delivering numerous advantages to the environment. It is poised to enhance the health and well-being of individuals across diverse age groups, ethnic backgrounds, and abilities by actively encouraging their participation in physical activities and mixing with nature. Emphasizing crucial elements like orientation, accessibility, safety, lighting, ventilation, flexibility, and universal design, the sports center and garden aims to craft a functional, welcoming, and inclusive setting.

Comprehensively addressing aspects such as architecture, pedestrian pathways, green pathways, public spaces, greeneries, accessibility, and recreational options, the design is committed to preserving the natural environment, fostering human connections, and seamlessly blending with the surroundings. The user-centered design approach prioritizes the specific needs and preferences of the residents, ensuring the provision of barrier-free pathways and features for individuals with disabilities to navigate and enjoy the facilities effortlessly.

Recognizing the significance of parks, playgrounds, and community gardens in residential areas, the design seeks to promote community collaboration and cultivate a sense of belonging among the residents. The sports building, ingeniously designed to be partially green, harmonizes with the terrain, minimizing alterations to the topography. Its strategic orientation and the utilization of standard design with vertical glazed sections maximize natural light while minimizing direct sunlight and glare. The garden in between the building further increases the building's aesthetic appeal, seamlessly integrating it with the natural environment.

In essence, the envisioned biophilic sports center in Lapta serves as a proof to the interdependent relationship between residents and their surroundings. By carefully addressing both environmental considerations and the diverse needs of users, this project stands as a model for creating flourishing communities that inspire and positively impact nature and society.

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Curriculum Vitae

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PROFILE INFO

As a graduate architect with sound design/technical knowledge and internship experience my objective is to complete my master's degree and to secure a responsible career opportunity to fully utilize my training and skills, while making a significant contribution to the success of the company.

EDUCATION

2022 - 2023
NEAR EAST UNIVERSITY
- Master of Architecture

2016 - 2021
NEAR EAST UNIVERSITY
- Bachelor of Architecture

SKILLS

- Hand drafting
- Adobe applications
- Autodesk AutoCAD
- Autodesk Revit
- Microsoft office
- Videography
- Video Editing(Davinci Resolve)
- Figma UI/UX

LANGUAGES

- English (Fluent)
- Arabic (Intermediate)
- Turkish (Basic)

WORK EXPERIENCE

JULIUS BERGER (PRIMETECH) March - December 2021.
NYSC(Architectural designer)
- Site Inspection
- Architectural drawings
- 3D designs

JULIUS BERGER Aug - Sep 2018
Architectural Intern
- site Inspection
- Aerial photos
- documentation
- Supervision of site workers

GABADAN PROPERTIES May - Sep 2021.
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