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ABHIRAMA SPORTS CENTER WITH BIOPHILIC ARCHITECTURE APPROACH

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Abstract: The design of Abhirama Sports Center adopts a biophilic architecture approach to meet modern sports facility demands while fostering a harmonious relationship between humans and nature. This study emphasizes the integration of natural elements such as sunlight, vegetation, air circulation, and water features to support physical and mental well-being. The planning process involved environmental analysis, field surveys, stakeholder interviews, and literature reviews. Design strategies were implemented using biophilic architectural principles—maximizing natural light, utilizing local vegetation, enhancing thermal comfort, and incorporating sensory experiences. The approach also considered user needs through collaborative input from architects, sports professionals, and environmental experts. The resulting concept proposes a sports center design that not only provides functional and technological facilities for physical activity but also delivers a calming, inspiring environment. Key design outputs include green zones for outdoor activities, natural materials for construction, and flexible spaces for diverse users such as students and the general public. This study demonstrates that biophilic architecture can significantly enhance the quality of sports infrastructure. Abhirama Sports Center is envisioned as a sustainable, inclusive, and nature-integrated facility that contributes to user well-being and environmental preservation.

Keywords: Sports center, Biophilic Architecture, Sports, Health, Fitness.

1. INTRODUCTION

Abhirama Sports Center is a unique and innovative sports facility designed with a biophilic architecture approach. This approach is influenced by the concept that humans have an innate connection with nature, and our interaction with the natural environment can bring significant benefits to our health and well-being. By combining natural elements with intelligent building design, Abhirama Sports Center offers a sports experience that not only pampers the body and mind, but also connects users with the natural surroundings. The biophilic concept in architecture aims to create a balanced environment between nature and buildings, resulting in a stimulating, refreshing and empowering space. At Abhirama Sports Center, natural elements such as sunlight, fresh air and natural greenery are carefully integrated into the design of the building. Abundant natural lighting, walls and roofs with climbing plants, and large windows overlooking the green garden provide a fresh and connected feel to nature. In addition, an efficient air treatment system and the use of renewable energy also make this facility environmentally friendly. In addition to being in harmony with the natural environment, Abhirama Sports Center also designs spaces that promote the health and comfort of its users. Features such as a swimming pool with a natural view, a lobby area with a flowing water wall, and a recreation area overlooking the greenery are all designed to provide a positive and relaxing experience for users. In the context of sports activities, Abhirama Sports Center provides state-of-the-art facilities and inspiring spaces. Outdoor and indoor courts equipped with optimal lighting and air conditioning systems, as well as a simple yet elegant interior design, create an environment that motivates athletes and beginners to train and achieve their best performance. With the biophilic architecture approach

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adopted, Abhirama Sports Center embodies the vision of developing a sustainable sports facility that combines health, comfort, beauty, and harmony with nature. This facility is not just an ordinary sports venue, but also an inspiring destination and provides a unique experience for every visitor.

2. METHOD

Kawasaп Sports Center iпi is a designer who is expected to produce several architectural design drawings that can be in accordance with the needs and functions of the Sports Center. Not only the adjustment to the developer of the area, the designer of the Abhirama Sports Center iпi Final Project also uses the concept of Biophilic Architecture as a character of the area in the design process.

Design Concept

The design of the Kawasa Sports Center is based on the concept of the Biophilic Architecture design principle as a development solution that combines physical and psychological aspects, as a design that is able to maintain the ecosystem in it by minimizing the use of energy and materials that harmonize the relationship between culture and nature to maintain aspects such as the environment, soil, plants, structural and construction aspects, aspects of raw materials and aspects of energy sources and their utilization for daily life. by forming a good layout and zoo.

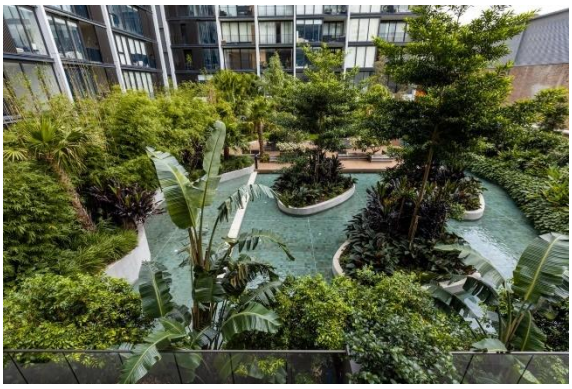

Fig. 1. Biophilic Architecture Area

The biophilic architectural design approach creates a design approach where the design results in the building do not worsen the environmental conditions. It creates green areas among the building areas as green lungs. It uses natural building materials and the energy content contained in the building materials and fertilizers used during the building process must be minimal.

Design Methods

Biophilic Architecture Design Method is an approach that integrates natural elements into building design to create spaces that stimulate, refresh, and enhance the well-being of its users. Here are some methods used in biophilic architectural design. Natural Lighting maximizes natural lighting by using large windows, glass roofs, and skylights. The introduction of sunlight and sky views can enhance the atmosphere of the room, improve the quality of lighting, and reduce dependence on artificial lighting.

Vegetation Integration is integrating vegetation elements such as vertical gardens, green walls, and gardened roofs. Vegetation not only provides visual beauty and soothing lighting, but also plays a role in improving air quality by absorbing pollutants and producing oxygen. Natural scenery is to maximize calming natural views by placing windows and viewing spaces in strategic places. Natural scenery such as gardens, waterfalls, or forests can provide a calming atmosphere and reduce stress. Water and natural sounds use water elements such as ponds or waterfalls to create calming sounds and atmospheres. The sound of natural trickling water can reduce outside noise and provide a calming effect on users. Natural materials use natural materials such as wood, stone, or leaves as design elements. Natural materials provide a warm, organic feel and provide comfort for users. Engaging the senses that create a strong sensory experience through the use of natural textures, aromas, and colors. Designing a space that stimulates the senses can encourage a sense of comfort, health, and happiness. Temperature and ventilation settings to improve indoor air quality by ensuring good ventilation and efficient use of technology.

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Healthy air circulation can improve the quality of air services and comfort for users. Through this bioflic design method, buildings become more connected to nature, creating spaces that support the mental and physical health of their users. This approach combines environmental sustainability with optimization of human well-being, creating a balanced environment between nature and buildings.

Data Collection

Primary data is data that is obtained directly either through direct interviews or observations. This primary data was collected from a direct survey in Lapaпgaп at the location of the reпcaпaaп area in Sleman, Special Region of Yogyakarta. Secondary data is population data obtained not from observers directly in the field. The data can be in the form of literature reviews, graphs, tables, photos, and so on that are related to the research process and the study. Secondary data can be obtained through books, journals, articles, newspapers and stamp regulations.

3. RESULT AND DISCUSSION

Site Layout

Abhirama Sports Center is located at Jl. Stadion Baru, Maguwoharjo, Sleman, Special Region of Yogyakarta

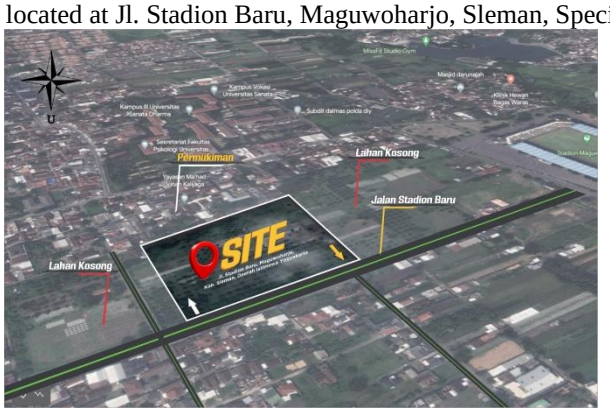

Fig. 2. Site Location

Data Site
Address: Jl. Stadion Baru, Maguwoharjo, Sleman Regency, Special Region of Yogyakarta.
Area: 6.4 Hectares
Condition: Sufficient road access 7m.
Land is used for agriculture.
Close to residential areas.
Close to Maguwoharjo Stadium.
View: Close to Maguwoharjo Stadium and there are residential areas.
Potential: Close to Maguwoharjo Stadium, close to the main road and close to the Sanatha Dharma University Campus.

Site Analysis

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Fig. 3. Site

Planning the location of the site for a sports center is one of the important factors in effective sports center management. Several things that need to be considered in planning the location of the sports center site include: Accessibility: The location of the sports center must be easily accessible to vehicles that will stop. Security: The sports center must be located in a safe place, both in terms of traffic safety and personal safety. Facilities: The sports center must be equipped with adequate and standard facilities. Availability of resources: The sports center must have sufficient resources to meet user needs, such as clean water, electricity, and others. Availability of land: The sports center must have land large enough to accommodate vehicles that will stop. Environment: The sports center must be located in a comfortable and non-risky environment, such as far from areas prone to natural disasters or forest fires. By considering these things, a comfortable sports center will be created that meets the needs of its users.

View Analysis

Fig. 4. View Site

View to Site (+) view from outside towards the site area on the side of the site is not necessary to see the site area. View from site (-) at the location is obtained from the front and back of the area, while on the side of the area there are residents' plantations that cover the area, and the back is a residential area. While the front part needs an opening so that the visible part of the area can be exposed.

Sun and Wind Orientation

Fig. 5. Sun and Wind Orientation

Utilization of sunlight for natural lighting is very much needed in building design, the direction of sunrise from the east makes the eastern area of the area get more sunlight in the morning and the western area gets more sunlight in the afternoon. Seeing these conditions, it would be better if the building design from the east was made not too high so that the warm morning sunlight can reach the entire area, while the dazzling sun from the western area can be blocked by a fairly high building design. In addition, it is necessary to adjust the design so that the sea breeze

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during the day does not interfere with activities in the area, this design adjustment can use plants to ward off the incoming wind and make the air fresher.

Noise

Fig. 6. Site Noise

The site areas that receive the highest noise are the north and south areas of the site, this is due to the presence of a highway in the north of the site and settlements in the south of the site. Areas with the highest noise can be used as public zones, both parking areas, public toilets, and several areas that are often used for crowds. While areas with low noise levels are the west and east areas of the site which are residents' plantations, these areas can be used as private, service, or semi-public zones.

Zoning

Fig. 7. Zoning

Utilization of sunlight for natural lighting is very much needed in building design, the direction of sunrise from the east makes the eastern area of the area get more sunlight in the morning and the western area gets more sunlight in the afternoon. Zoning in sports center design is a process of dividing space that is carried out to determine the use of space according to the needs and objectives that have been determined. Sport center zoning can include various uses of space, such as parking areas, sports center areas and rest areas. In designing a sports center, it is important to consider the division of space or "zoning" that is right to increase visitor comfort. Zoning is the division of the sports center space into several different zones or areas, with each zone having a specific function. These zones are the Public Zone, Semi-Public, Private, and Service Zone. The results of this zoning are the basis for mapping buildings according to the function that will be placed in the right zone, so that the achievement of building functions and land use is maximized.

Intensity of Space Utilization

According to Government Regulation Number 16 of 2021 concerning Implementing Regulations of Law Number 28 of 2002 concerning Buildings:

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KDB	80%	51.200m2
KLB	3,5 %	224.000 m2
KDH	30%	19.200 m2

From the land area owned in the sports center planning, which is 6.2 ha (60,200 m²) by following government regulations on Regional Spatial Planning, the land area that can be built on the sports center planning is 51,200 m² and the rest is used as infiltration or green open land, and from the area of 51,200 m² 50% is taken as in and out circulation.

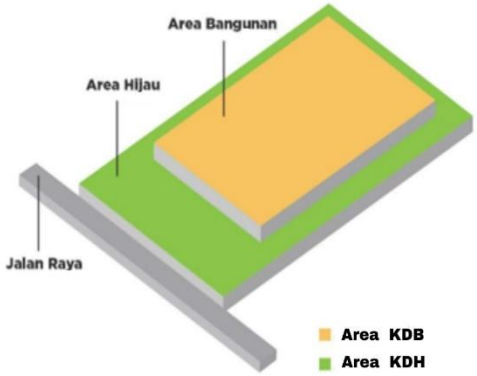

Figure 8. Site Area

Data Acquisition

In planning Abhirama Sports Center with a biophilic architecture approach, data acquisition is crucial to ensure that the design can integrate biophilic principles effectively and optimally. Here are some methods that can be used to collect data in this planning: Environmental Analysis: Conduct a thorough analysis of the environment around the Abhirama Sports Center location. Collect data on flora, fauna, land contours, climate conditions, and other natural elements. This information will help in understanding the characteristics of the existing environment and ecosystem, and ensure that the design can integrate harmoniously with the surrounding nature. Literature Study: Conduct a literature study on the principles of biophilic architecture and examples of successful implementations. Take insights from research and guidelines related to biophilic design, and understand the benefits and roles played by biophilic elements in the context of human well-being. Stakeholder Survey: Conduct a survey of stakeholders related to Abhirama Sports Center, such as facility managers, potential users, and the local community. Survey questions can be related to user preferences and needs related to the natural environment, comfort, and their exercise goals. The data collected will provide a better understanding of user expectations and desires for the proposed biophilic design. Field Observation: Directly observing the Abhirama Sports Center location and its environment. Identifying potentials and constraints in integrating biophilic elements, such as air circulation, natural lighting, natural views, and the use of natural materials in the design. Weather and Climate Data Analysis: Analyzing regional weather and climate data to understand the variation in environmental conditions around the location. This information will be useful in designing appropriate strategies for the use of natural lighting, ventilation, and protection from extreme weather. 3D Modeling and Simulation: Using 3D modeling and simulation technology to visualize the design and test the performance of biophilic aspects, such as natural lighting, ventilation, or interaction with nature, before implementation. This provides an opportunity to refine and perfect the design before the actual construction process begins. By collecting data through the above methods, the planning team can have a more comprehensive understanding of the physical environment and user preferences. This will allow them to design the Abhirama Sports Center with a biophilic architectural approach that integrates harmony between humans, buildings, and the surrounding nature.

Data Development

The results of mass composition are used as a physical design manifestation while simultaneously expressing certain functions, spaces and images. The results of mass composition are also used as a process of analyzing the sun, waves and images of circulation and layout. Mass composition is also used as a basis for determining the

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placement of the site that is measurable and scaled with 3D visualization. The results of mass composition are used as a physical design manifestation while simultaneously expressing certain functions, spaces and images. The results of the mass composition are also used as a process of analysis of the sun, the waves and the circulation and layout design. Mass composition is also used as a basis for the placement of the site that is measurable and scaled with 3D visualization. The results of the data obtained from the layout design of the master plan are used as a basis for the Abhirama Sports Center.

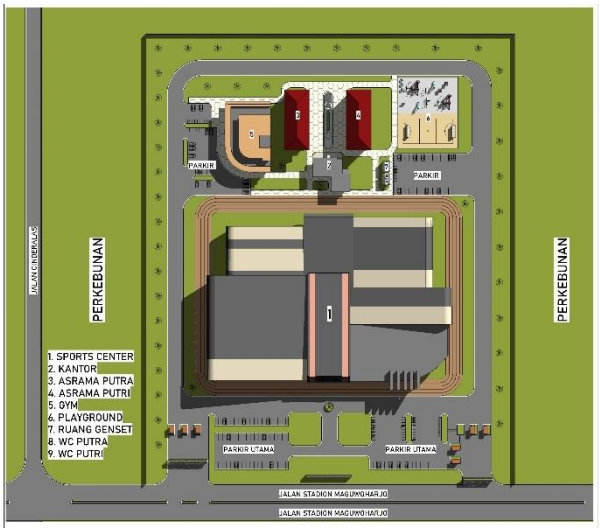

Fig. 9. Situation

4. CONCLUSION

With the results of the planning that has been made with a biophilic architecture approach, this approach provides significant benefits in creating a more balanced and harmonious environment between humans, buildings, and the surrounding nature. By integrating natural elements such as natural lighting, vegetation, water, and natural scenery. In the design of the Sports Center, prioritize the use of environmentally friendly materials and efficient energy systems. Use recycled or durable materials, choose energy-efficient lighting systems, and consider the use of renewable energy, such as solar power and ensure that the design of the Sports Center with a biophilic approach meets the diverse needs of humans. Consider the flexibility of space for various physical activities, the choice of areas to relax and rest, and good accessibility for all users.

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