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AQUATIC CENTER WITH HIGH-TECH ARCHITECTURE APPROACH IN SOUTH TANGERANG CITY

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Abstract. Aquatic sports are among the disciplines contested in both national and international championships. The design of the Aquatic Center in South Tangerang City aims to serve as a central facility for physical activity and personal development for both aquatic athletes and non-athletes, supporting the improvement of performance and specialized training in swimming, diving, water polo, and artistic diving. This Aquatic Arena provides a training space equipped with internationally standardized facilities, including a 50-meter competition pool, a diving pool, a warm-up pool, and other supporting amenities, making it suitable for hosting competitions at both national and international levels. Located on Jl. Graha Raya Bintaro with a site area of approximately 3.5 hectares, the project also aims to complement the competition facilities of the GBK Aquatic Stadium and contribute to the development of human resources through aquatic sports. As a distinctive architectural identity, the design adopts a High-Tech Architecture approach to realize a wide-span structure that emphasizes the form and façade of the building. The visual character of the facility will be dominated by materials such as metal, aluminum, steel, and glass, ensuring not only an attractive form but also environmental sustainability, safety, and user comfort.

Keywords: *Aquatic Center, High-Tech Architecture, South Tangerang City*

INTRODUCTION

The development of aquatic sports in Indonesia has not yet achieved results that significantly elevate the nation's reputation, particularly in international aquatic events such as the Olympics. This can be seen from the limited number of gold medals won at the Asian Games. Therefore, Indonesia needs to give greater attention to aquatic sports. However, at the 2023 SEA Games, the Indonesian swimming team showed progress by winning gold medals, although only in the swimming discipline out of the 51 aquatic athletes sent. This condition presents an opportunity to plan the development of an Aquatic Center, with the aim of improving facilities and producing more athletes in various aquatic sports disciplines.

According to World Aquatics, there is a governing organization formerly

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known as FINA, which officially changed its name to World Aquatics in 2023. This organization oversees aquatic sports such as swimming, water polo, artistic swimming, and open water swimming, and it has engaged athletes from 208 countries, including Indonesia. The high number of participating countries in international competitions indicates that aquatic sports are taken seriously on a global scale. In addition to organizing international and regional championships, World Aquatics also strives to promote swimming worldwide by increasing the number of swimming facilities. Therefore, there is a need for venues that serve not only as recreational spaces but also as platforms for developing future athletes.

The sports scene in Tangerang City has become increasingly prominent, both in terms of achievements and facilities. After hosting the Banten Province Sports Week (Porprov) VI and IV in November-December 2022, Tangerang City, with its growing sports infrastructure, continues to demonstrate its presence in the world of sports. From athletes achieving numerous national and international accolades to facilities being widely used for national sports events, Tangerang is firmly establishing itself as a key player in the sports arena.

The Head of the Youth and Sports Department stated that the Tangerang City is currently hosting an increasing number of sporting events, which serves as evidence that the sports facilities developed in the city have met national and even international standards. The decision to establish an Aquatic Center in Tangerang is based on the absence of internationally standardized aquatic sports facilities that can be used for athlete training and international championships. The Aquatic Center is designed as a training and competition venue aimed at enhancing the quality of athletes and supporting their development by providing internationally standardized competition facilities. The design of the Aquatic Center is expected to serve as a supporting effort for the Jakarta Aquatic Stadium by offering a facility that accommodates training activities and aquatic sports events at an international standard.

Based on the potential and challenges previously outlined, the author takes the initiative to design an Aquatic Center using a High-Tech Architecture approach, which is considered essential as a facility that can accommodate aquatic sports activities and realize a wide-span structure focused on materials, form, and building façade in the modern era. The appearance of the building will be dominated by materials such as metal, steel, and glass. The proposed design not only emphasizes an appealing form, but also ensures environmental friendliness, safety, and user comfort. The application of High-Tech Architecture in this design is expected to establish the Aquatic Center as a sports facility that promotes swimming as a popular sport in the future and a source of pride for the Indonesian people.

METHODS

This final project report employs a descriptive method by presenting, explaining, and detailing factual data about the existing conditions of the site and its surroundings through Literature Review, Observational Study, Data Analysis, and Conclusions.

CONCEPT

The Aquatic Center is a sports facility designed primarily for the public. Its purpose is to develop athletes and increase public interest, with a focus on providing high quality and efficient circulation to ensure user comfort.. Additionally, the design of this internationally standardized Aquatic Center is intended for competitions and to support the GBK Aquatic Stadium. The

High-Tech Architecture approach was chosen as the foundation to achieve an aesthetic industry in technological development while still maintaining the functional elements of modern architecture.. High-Tech Architecture typically prioritizes visual criteria as the main focus, and this architectural style is reflected not only in the building's structure but also in its utility systems, which leads to the concept of a "smart building" with the characteristics of High-Tech Architecture.

Site Determination Criteria

Several criteria are analyzed to gain a comprehensive understanding of the site location to be used, including:

1. Site Selection Aspect: The location must comply with Peraturan Menteri Olahraga RI No. 0636 Tahun 2014. The location must align with the city's Spatial Planning or be based on a sustainable urban development plan, with adequate infrastructure systems in place and the availability of accommodation (hotels) and hospitals within a maximum travel time of 2 hours.
2. Site Availability Aspect: The minimum Building Coverage Ratio (KDB) is 30%, allowing for available land for outdoor sports arenas, emergency evacuation areas, parks, greenery, pedestrian pathways, roads, and parking facilities.
3. Topography Aspect: The general condition of the land must not have extreme slopes, must be safe in terms of geomorphology, have good soil bearing capacity, be stable, not marshy, and not prone to landslides.
4. Climatology Aspect: In selecting a location for the construction of a swimming pool, sites with extreme climatic conditions and high risk levels should be avoided.
5. Environmental Sustainablity Aspect: The development of the swimming pool arena should contribute to green spaces and function as the city's lungs, while also providing a positive impact on the surrounding area or city.

Selected Site

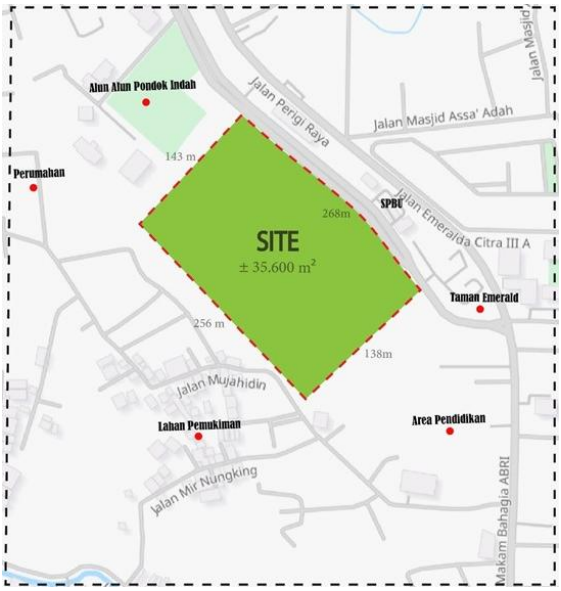

Figure 1 Selected Site

Location : Jl. Graha Raya Bintaro Kecamatan Pondok Aren, Kota Tangerang Selatan, Banten.
Area : ± 3,5 Ha
Function : Aquatic Center
KDB : Max. 60%
KLB : Max. 7,2
KDH : Min. 10%

Contextual Aspect Approach

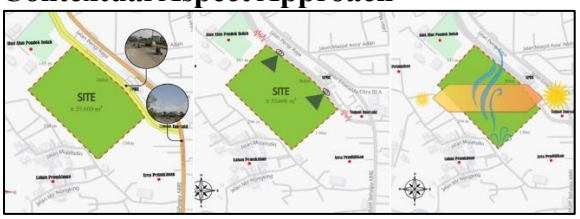

Figure 2 Site Analysis

1. Accesibility: The site can be accessed through the main route, Jl. Tol Parigi. To the north, Jl. Raya Graha Bintaro

Jaya is divided into two directions, with the entrance located on the western side to facilitate access, while the exit is directed to the eastern side.

2. Sensory: The site is bordered by residential areas and a school. Meanwhile, the site is clearly visible to drivers only from the northern direction on the main road, as the southern area is occupied by housing and a school.
3. Climatology: a. The eastern part of the site will be exposed to afternoon sunlight with a relatively high radiation level, which may increase the interior temperature and affect the building's thermal comfort. On the other hand, the morning sunlight on the western side does not have high radiation, so it will not significantly affect the interior temperature of the building. b. The wind direction from morning to afternoon predominantly blows strongly from the south to the north and northwest, while in the evening to night, the wind primarily blows strongly, around 15% of the year, from the southeast to the northwest, with an average wind speed of 15-25 mph.

Architectural Concept Approach

According to Charles Jencks in his book High Tech Maniera, the services and structural elements of High-Tech buildings are often expressed as external decoration or sculptures. The features of High-Tech architecture include the use of frosted and clear glass, overlapping ducts, and bright colors on stairs, escalators, and elevators, all designed to clarify the function of each structural element and service.

In his writings on High-Tech architecture, "The Battle of High Tech" and "Great Buildings with Great Faults," Charles Jencks mentions six key principles that define High-Tech architecture, which are:

a. Inside-Out
   In High-Tech buildings, the structure, service areas, and utilities are almost always emphasized on the exterior, either in the form of ornaments or sculptures.
b. Celebration of Process
   High-Tech emphasizes the understanding of a building, making it comprehensible.
c. Transparancy, Layering and Movement
d. Flat Bright Colouring
   The bright colors used in High-Tech buildings have an associative meaning, distinguishing different types of structure and utilities in the building.
e. A Light Weight Filigree of Tensile Member
   The thin intersecting steel is likened to the Doric columns of High-Tech, in terms of its appearance and composition. The expression and application follow a hierarchy that clarifies these components.
f. Optimistic Confidence in Scientific Culture
   The use of High-Tech is a vision for the future, encompassing the use of materials and colors.

DESIGN RESULT

In the site layout, it can be seen that the Aquatic Center building is designed with a space frame roof, which was chosen to achieve a roof form resembling water waves. The site plan clearly shows that there are three building masses in this design: the main aquatic building, the administration building, and the parking structure. The main building is divided into three zones: public, private, and spectator stands (VIP, regular, and accessible/disability seating).

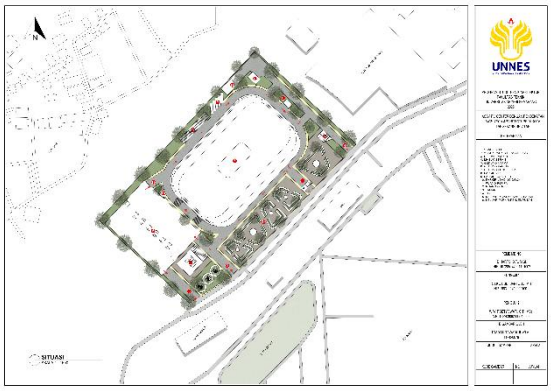

Figure 3 Blockplan

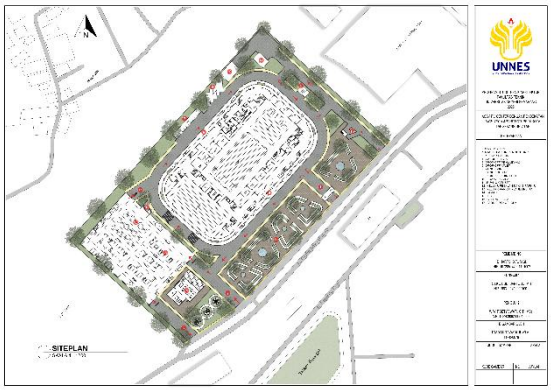

Figure 4 Siteplan

The floor plan includes two competition pools, one training pool, as well as various rooms such as training rooms, VIP lounges for competing athletes, event management offices, and commercial spaces.

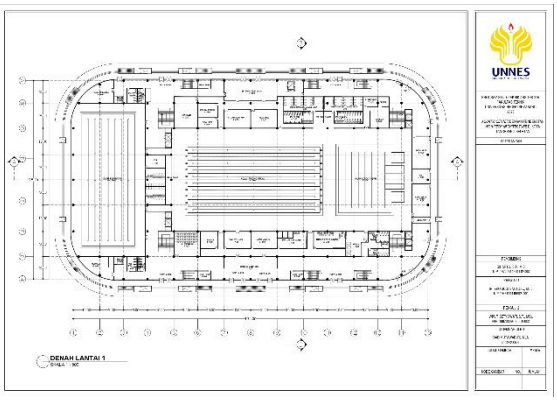

Figure 5 1st Floor Plan Main Building

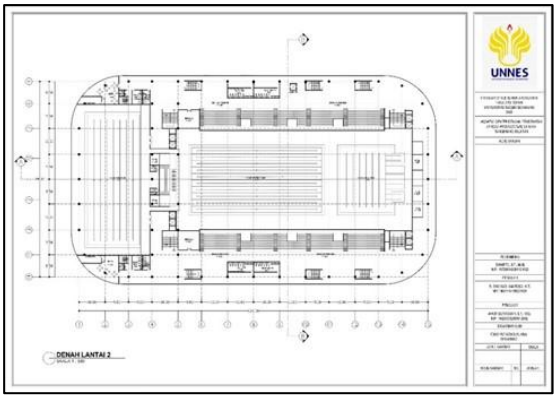

Figure 6 2nd Floor Plan Main Building

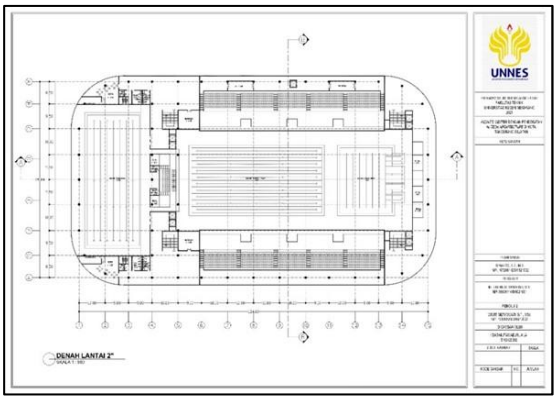

Figure 7 2nd" Floor Plan Main Building

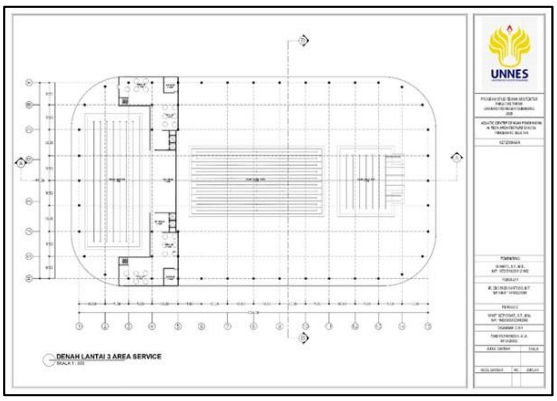

Figure 8 3rd Floor Plan Main Building

The elevations are presented based on the four cardinal directions: North, East, South, and West. There are a total of six sections, with two sections for each building mass. The two sections of the main aquatic building clearly illustrate the depth of the swimming pool area as well as the spectator stands.

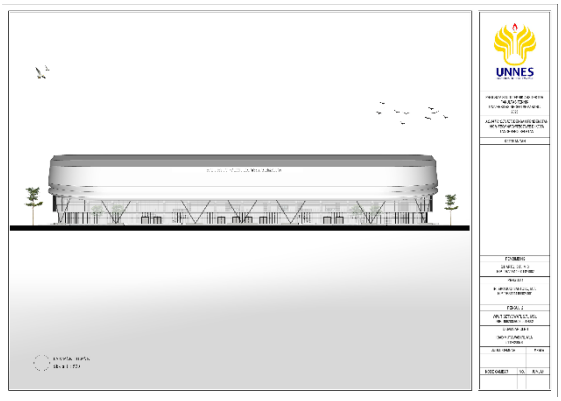

Figure 9 Front Elevation

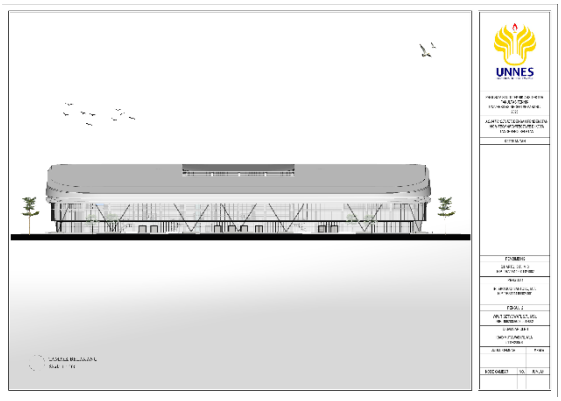

Figure 10 Back Elevation

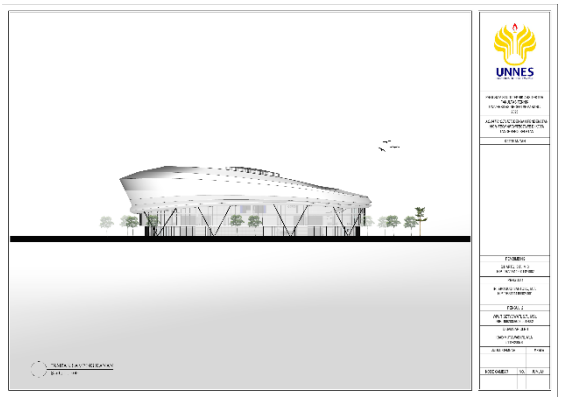

Figure 11 Right Elevation

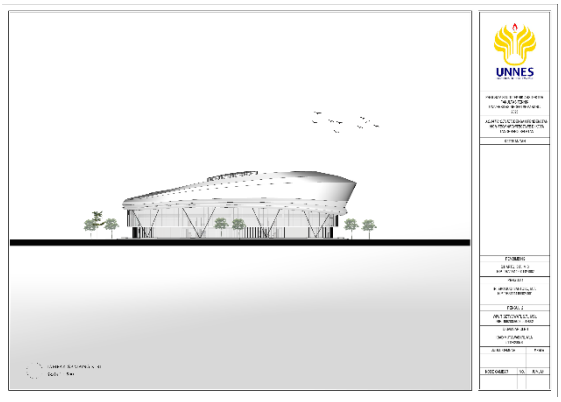

Figure 12 Left Elevation

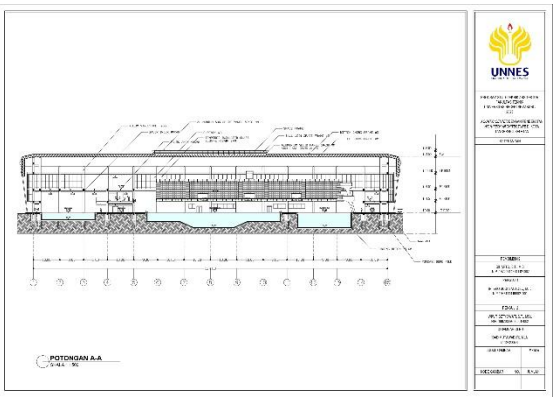

Figure 13 A-A Section

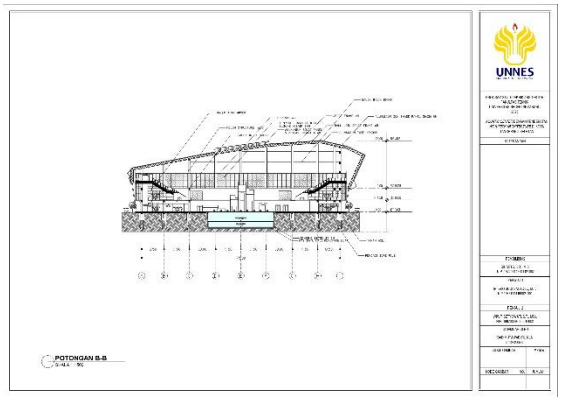

Figure 14 B-B Section

Both the exterior and interior of the building adopt a modern design style to reflect the High-Tech Architecture approach, showcasing modern materials. This design style aims to enhance user comfort, with some meeting rooms also equipped with sound-absorbing materials to ensure a comfortable experience for all users.

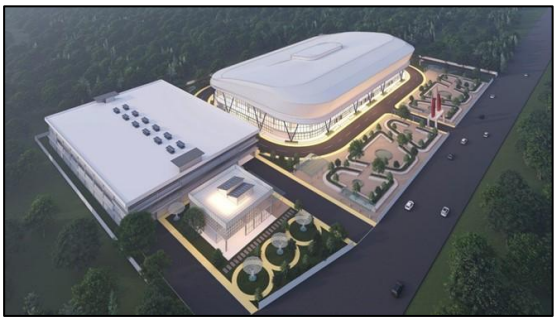

Figure 15 Exterior Perspective 1

Figure 16 Exterior Perspective 2

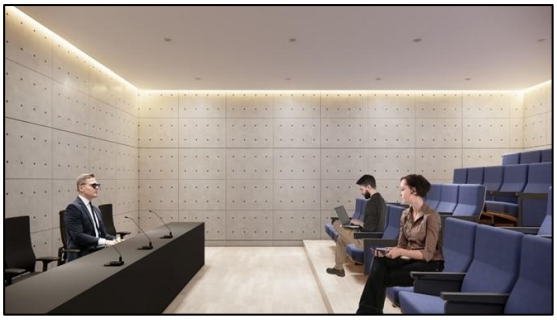

Figure 20 Interior Perspective 1

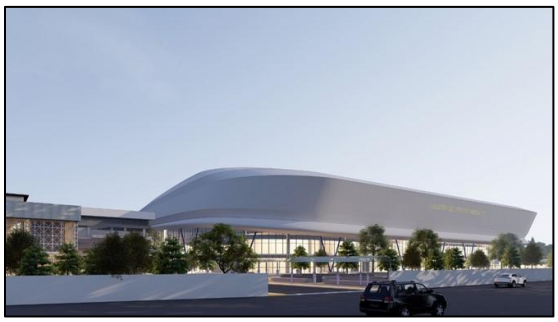

Figure 17 Exterior Perspective 3

Figure 21 Interior Perspective 2

Figure 18 Exterior Perspective 4

Figure 22 Interior Perspective 3

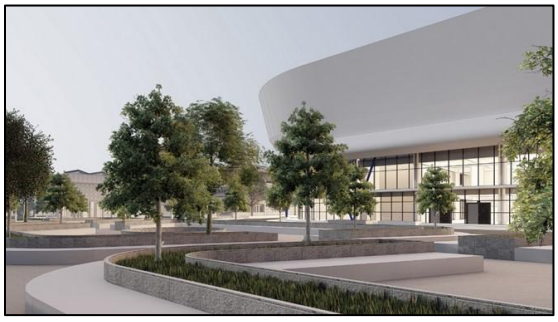

Figure 19 Exterior Perspective 5

Figure 23 Interior Perspective 4

Figure 24 Interior Perspective 5

Figure 25 Interior Perspective 6

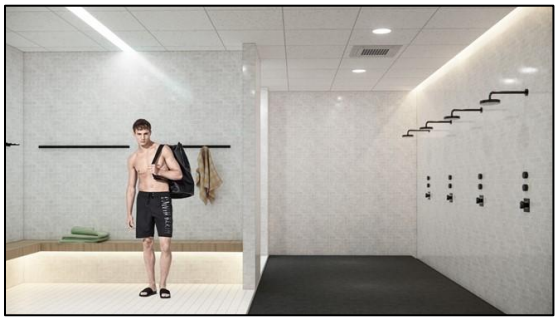

Figure 26 Interior Perspective 7

CONCLUSION

The Aquatic Center, with a High-Tech Architecture approach, is a planning initiative aimed at creating an internationally standardized sports facility with a concept that prioritizes functionality as an effort to produce professional athletes. This design is driven by several issues, including the lack of facilities that provide comfort for athletes, as well as the decline in achievements in aquatic sports, which affects public interest in water sports. The issue of adding an Aquatic Center facility serves as support for the GBK Aquatic Stadium as a venue for international competitions and training.

South Tangerang City is one of the cities with numerous sports facilities that meet national and even international standards. Therefore, it is necessary to design an Aquatic Center with the application of High-Tech Architecture in a strategic location, providing various main facilities along with supporting areas that are suitable to accommodate various types of competitions and training activities.

It is hoped that the planning of the Aquatic Center in South Tangerang City, with international standards, will meet the needs for better sports facilities for the people of Indonesia, enabling them to achieve success and elevate Indonesia's status in international aquatic Olympic events.

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