

## ***FOOTBALL TRAINING CENTER IN TEGAL REGENCY WITH A SUSTAINABLE ARCHITECTURE APPROACH***

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**Abstract.** Football is one of the most popular sports in Indonesia and the world today. The interest of the community is very excited even to the corners of the region. Football knows no age, gender, or social status. From children to the elderly, men and women, from businessmen to ordinary villagers, all love it. Sports areas, especially the Football Training Center have an important role in the development of quality football athletes. This research aims to design and develop a sustainable sports area that focuses on the efficient use of natural resources. The methodology used involved field surveys, environmental analysis, and an in-depth understanding of the needs and demands of the Football Training Center users. A sustainable approach was applied in the design by considering aspects such as energy efficiency, use of environmentally friendly materials, utilization of renewable energy, wise water management, and creation of a healthy environment. The result of this design includes various facilities that support quality football training, such as training fields, fitness centers, classrooms, and treatment and recovery facilities. These facilities were designed with user comfort, energy efficiency, and reduced environmental impact in mind. In addition, measures such as the use of environmentally friendly building materials, efficient waste treatment, and utilization of solar energy for lighting and water heating were implemented in this design. A wastewater treatment system was also built to reduce negative impacts on the surrounding environment. With this sustainable architecture approach, the Football Training Center is expected to be an example in the development of a sustainable sports area. The application of sustainable practices in the design of sports areas can provide long-term benefits for both users, the surrounding community, and the natural environment as a whole.

**Keywords:** Football, Training Center, Tegal Regency, Sustainability, Environmentally Friendly, Efficiency

### **INTRODUCTION**

Indonesian football has a long history starting from the early 20th century. Football was first introduced to Indonesia by the Dutch in the early 20th century, when Indonesia was still a Dutch colony. During the colonial period, soccer was used as a

means of entertainment by the Dutch. They also established soccer clubs such as Persija Jakarta (previously named Voetbalbond Indonesische Javabond) in 1928. After Indonesia's independence in 1945, soccer became increasingly popular among Indonesians. Local clubs were established

all over the country. PSSI is the governing body of soccer in Indonesia. The organization was founded in 1930 under the name “Nederlandsch Indische Voetbal Bond” (NIVB) and later changed to PSSI after Indonesia's independence. PSSI is a member of FIFA and AFC. Liga Indonesia, also known as Liga 1, is one of the premier soccer leagues in Indonesia. The competition involves professional clubs from various regions in Indonesia. Indonesia's soccer achievements at the international level have varied throughout history. The Indonesian national team known as “Garuda” has participated in various soccer tournaments such as the AFC Asian championship as well as FIFA World Cup qualifiers. However, their results in these competitions cannot be compared to some other Asian countries. The construction of the Football Training Center in Indonesia aims to achieve several key objectives to improve and develop football in the country.

Tegal Regency has a community that appreciates the development of sports, especially soccer. In fact, the people of Tegal Regency have made soccer an important part of their daily activities, which due to the lack of land for training, they practice in less representative locations because of the increasing demand for soccer. People in Tegal Regency who want to play soccer are forced to use vacant land that can be used as a place for sports such as running and soccer. This can disrupt or reduce the quality and quantity of sports development in Tegal Regency. Another major problem is that soccer facilities in Tegal Regency are widely scattered, making it difficult for sponsors and local communities to provide coaching to athletes and clubs. Tegal Regency has one club that competes in national competitions, namely Persekat Tegal Regency. Persekat was established on August 16, 1962, where they were based at

the Tri Sanja stadium in Tegal Regency. Currently, Persekat is commanded by Mr. Haron Bagas Prakosa, who is the president of the Persekat Tegal club and Mr. Muhammad Ersal Aburizal as the club manager.

## METHODS

The method used in this LPA is descriptive, describing and explaining even related to the provisions of the layout in the preparation and design of the building “Football Training Center in Tegal Regency with Sustainable Architecture approach”. From the requirements and provisions that exist, then proceed with the collection of data needed for planning and design. Then the existing data is analyzed and conclusions are drawn.

So the conclusion of the discussion and analysis in the form of basic concepts and things that need to be considered in building “Football Training Center in Tegal Regency with Sustainable Architecture approach” as a foundation in the design of the final architectural project. Data used in the planning and design of “Football Training Center in Tegal Regency with Sustainable Architecture approach” can be grouped into two types namely:

### a. Primary Data

Which is obtained through various government websites and journals that can be trusted and the implementation of observations on the location and site planning and design of “Football Training Center in Tegal Regency with Sustainable Architecture approach”.

### b. Secondary Data

Generated through literature research from books and other sources, both written and unwritten related to the planning and design of “Football Training Center in Tegal Regency with Sustainable Architecture approach”, as well as information on technical

standards related to the preparation process of providing “Football Training Center in Tegal Regency with Sustainable Architecture approach”, which include the following:

- Selection of Location and Site  
Discussion related to the location and site is done through a study in advance by collecting the data needed in determining the location and site that is suitable for use in planning and designing Football Training Center in Tegal Regency with Sustainable Architecture approach. The data in question are as follows:
  - Land use data or land use in the area of planning and designing Football Training Center in Tegal Regency with Sustainable Architecture approach.
  - Data on the physical potential of the site includes geographical data, topography, climate, regulations governing building requirements and environmental data around the site that can support the planning and design of Football Training Center in Tegal Regency with Sustainable Architecture approach.
- Space Program  
Discussion related to the space program by first collecting data related to the planning and design of Football Training Center in Tegal Regency with Sustainable Architecture approach, including data on space actors and their activities with literature studies related to the planning and design of Football Training Center in Tegal Regency with Sustainable Architecture approach.
- Architectural Design Approach

Discussion of the architectural design approach in the planning and design of the Football Training Center in Tegal Regency with a descriptive approach to Sustainable Architecture.

## CONCEPT

Sustainable Architecture is a conceptual approach in architecture that aims to minimize the negative impact on the environment due to the development process. Development that is good for society is sustainable development. Sustainable Development is development that aims to improve the quality of human life around the world, both present and future generations, without exploiting the use of natural resources that exceed the power and capacity of the earth.

### *Application of Sustainable Architecture*

#### a. Building Ventilation

Building ventilation is intended to provide natural airing, because the site is located on a plateau that still has fresh air, so it can be utilized as natural airing through building gaps.



**Figure 1** Building Ventilation

Source: [sustainablebuildingsinitiative.org](http://sustainablebuildingsinitiative.org)

#### b. Solar Panel System

One of the principles of a sustainable building approach is the use of renewable energy, so solar panel systems are very relevant to apply. Solar panels installed on the outside of the building will be the side that captures heat and converts it into

a source of electrical energy. The number of panels affects the amount of heat that can be converted into electrical energy. These solar panels can be installed on the roof of a building or on the outer wall of the building itself. The benefit of this solar panel is as a producer of electrical energy other than PLN, so that the use of PLN electricity can be minimized for electricity needs in this Football Training Center building.



**Figure 2** Solar Panels on the Building  
Source: solarkita.com

c. Protection Membrane from Outside

Protection membrane from outside means that the natural atmosphere that enters the building brings comfort, without fear of the health effects of environmental pollution, especially air pollution outside the building. Utilize existing vegetation on site to protect activities in the building and maintain comfort.



**Figure 3** Protection Membrane on the Building  
Source: christiesrealestate.com

d. Green Barrier

Green Barrier is one of the basics of landscape management is the provision of green space. Provision of grasslands in this case is done by planting trees which is an effort to preserve the ecology of the

surrounding environment. Trees also play a role in reducing heat and noise so that the perpetrators of activities can walk smoothly without interruption.



**Figure 4** Green Barrier System  
Source: christiesrealestate.com

### Site Determination Criteria

Based on the Regulation of the Minister of Youth and Sports of the Republic of Indonesia Number 0445 of 2014 concerning Sports Infrastructure Standards in the Form of a Football Field Building, it is explained that the location criteria that must be met in the construction of a Football Field include:

- a. Spatial Planning and Infrastructure
  - 1) In accordance with the existing district / city spatial plan.
  - 2) Adequate infrastructure systems are available, such as transportation, electricity, clean water, city sewers and telecommunications.
  - 3) There are adequate accommodation facilities such as hotels and hospitals, especially if international competitions are to be held.
- b. Available Land Area
  - 1) To produce a good and ideal planning in accordance with the concept of sustainable architecture, then the land provided must have a maximum Basic Building Coefficient (KDB) of 60%, so that there is still sufficient land available for outdoor sports activities arena (outdoor), parks and greening,

- pedestrian paths, roads and parking lots.
- 2) If there is insufficient land available, then the land area used should be at least 3 times the ground floor area of the sports hall.
  - 3) In certain cases due to limited land supply, it is possible to use a minimum land area of 2 times the ground floor area of the sports building.
- c. Topography and Land Condition
- 1) Land provided and planned for the construction of sports halls must meet land requirements including:
    - It is a piece of land with a flat surface.
    - Does not have an extreme slope (safe geomorphology).
    - Has good soil bearing capacity.
    - Unstable soil conditions.
    - Not a swamp area
    - Not prone to landslides.
  - 2) Land located on earthquake paths must take into account the strength of the building structure based on applicable provisions on earthquake resistant buildings.
  - 3) In certain cases due to limited land supply and not in accordance with the aforementioned requirements, it can be adjusted with compensation for the availability of technology and costs.
- d. Climatology
- The selection of locations for the construction of sports buildings is advised to avoid extreme climatic conditions and have a high level of vulnerability, such as areas with high rainfall, strong winds, and or, have a high frequency and intensity of lightning.
- e. Environmental Sustainability
- 1) The construction of sports halls should not have an impact on damage or degradation of environmental quality.
  - 2) The construction of sports halls including the environment must be

able to become a greening area and function as the lungs of the city and be able to make a positive contribution to an area or city.

Based on the existing planning location criteria in the planning of Football Training Center in Tegal Regency, the site selection approach consists of:

a. Spatial Planning and Infrastructure

In the planning of Football Training Center in Tegal regency in accordance with local regulations Tegal regency No. 4 Year 2012 59 paragraph 9 of the General Provisions of Zoning Regulations Protected Areas. In accordance with these provisions, it is allowed to develop cultivation activities in the form of tourism activities, children's playgrounds, and sports arenas, art performances, small / micro trade and services on a limited basis provided that it does not interfere with the protected function of RTH areas.

In addition to the suitability of the land use function, the availability of adequate infrastructure and a strategic location close to accommodation facilities is one of the main aspects in determining the location of the Football Training Center. This is determined to facilitate the fulfillment of the needs of the perpetrators of activities at the Football Training Center.



**Figure 5** Map of Tegal Regency Spatial Structure Plan  
Source: Scribd.com

b. Land Selection

Based on the results of the analysis of the availability of land in Tegal regency, there are 2 selected land locations, namely Bumijawa sub-district and Slawi sub-district. The reason for the selection of these two locations is that first, Bumijawa sub-district is an area that still has a large open land, so there are many choices about suitable land in accordance with the criteria of land that will be used to create a Football Training Center. The second is Slawi Subdistrict, the reason for choosing Slawi Subdistrict is because Slawi Subdistrict is located in the city, so it is close to the center of government and health facilities, it can facilitate access to several public locations that can facilitate the activities of the Football Training Center later.

c. Land Area Availability

After determining the land use function, then determining the site based on the area requirements in the Football Training Center planning.

Based on the existing land needs and consideration of the current land conditions of Tegal Regency, the potential land is located in Bumijawa and Slawi Districts.



Figure 6 Map of Bumijawa District

Source: Tegal Regency Public Housing, Settlement Areas, Spatial Planning and Land Agency

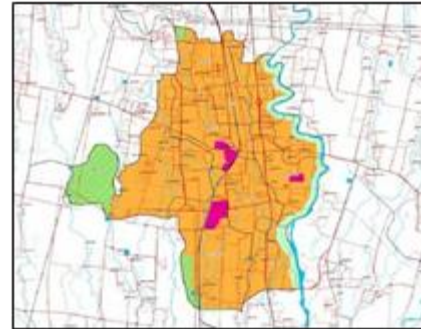


Figure 7 Map of Slawi Subdistrict

Source: Office of Public Housing, Settlement Areas, Spatial Planning and Land of Tegal Regency

d. Topography and Land Condition

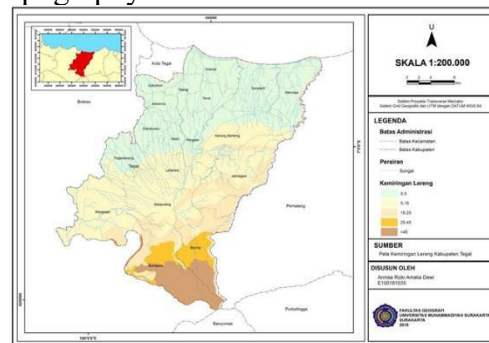


Figure 8 Tegal regency slope map

Source: Analysis of Anisa Rizki A.D.

After assessing the location that meets the provisions of applicable regulations, then identify the topographic conditions of the existing land, in order to avoid the worst scenario arising from natural disaster response in the construction development plan. For Bumijawa sub district itself, topographically, it is included in the highland area with a sloping area category ( $\pm 25\%$ ) and the sub-district is an urban lowland area with a sloping area category of less than (5%), so it is still possible to plan soccer field facilities and dormitory buildings.

## Selected Sites



Figure 9 Tread

The site is located on Jl. Karanganyar, Bumijawa Village, Bumijawa Kec. Bumijawa, Tegal Regency, Central Java, with an assessment score of 350. The site is considered to have very easy accessibility, clear visibility, adequate infrastructure and utilities, contoured topography, and a fairly low noise level.

- 1) Existing Site Conditions
  - a. Location: Jl. Karanganyar, Bumijawa Village, Kec. Bumijawa, Tegal Regency, Central Java
  - b. Road Width: 4 m
  - c. Area : 49.731 m<sup>2</sup>
- 2) Site Limitation
  - a. North: Residential area
  - b. East : Provincial Road
  - c. South : Community land
  - d. West : Residents' land
- 3) Site Analysis
  - a. Accessibility



Figure 10 Tread Accessibility  
Source: Google Maps

Based on accessibility, the site is located in a settlement that is still not densely populated. The site can

be accessed through one main route, namely through the Central Java provisional road with a road width of 4m. In supporting easy access for visitors, the location is quite strategic because it is next to the main road so as to facilitate accessibility for visitors from across the city.

### b. Topography Condition

The existing condition of the site is in the form of a very large plantation with a contoured land surface. The condition of the site itself is not a swamp area, so it meets the requirements in the construction of the Football Training Center.

### c. View & Visibility

The location of the site in a spacious area allows the planned building to get a view from all cardinal directions. In addition, the location of the site on the edge of the main road in visibility allows the planned building to be clearly visible from the main road.

### d. Noise Level

The site is located on land that is passed by local vehicles with small-scale loads and small intensity. This shows that the highest noise level is on the east side of the site, which is on the Central Java Provincial Road access. Low noise levels are on the west, north and south sides of the site which are directly adjacent to residential areas and plantations.

### e. Infrastructure and utility networks.

The water network is sourced from springs whose distribution is next to the road and the electricity source comes from PLN which runs along the provincial road.

## DESIGN RESULTS

The site plan is the planning and arrangement of physical elements on the site. In the design of the Football Training Center with a Sustainable Architecture approach, visitor vehicle circulation paths, placement of green open spaces, utilities, and other supporting elements that function to support activities in this building.



Figure 11 Siteplan Design

The situation in the design site area has many elements that are interconnected according to their respective functions.



Figure 12 Situation

On the 1st floor of building A, it functions as a management building and also an MEP room. There is a main hall lobby, cold pool, security & CCTV room, water pump room and rainwater treatment, travo room and electrical panel, generator room,

pantry, janitor and KM / WC. Building B is used as a dormitory building for the academy participants, there is also a warehouse, pantry, and KM/WC.



Figure 13 1<sup>st</sup> Floorplan

On the 2nd floor, Building A functions as the office building for the management staff, there is a press conference room, guest room, food staff and nutritionist, physical testing laboratory, prayer room, archive room, director's room, secretary's room, manager's room, physiotherapist's room, doctor's room, pantry, janitor & KM/WC. Then for building B functioned as a building for visitors and academy participants, there is a Football Store, R. Gym & Fitness, R. Audiovisual, Canteen, Hall, & Gallery.



Figure 14 2<sup>nd</sup> Floorplan

On the 3rd floor of building A, it functions as a management building. There are R. HR staff, R. competition staff, R. public relations staff, R. guests and library. Then for the 3rd floor of building B functioned as an education building for academy participants. There are classrooms, prayer room, trainer's room, and audiovisual room.



Figure 15 3<sup>rd</sup> Floorplan

On the 4th floor there is only in Building A, functioning as a management building. There are R. Operational staff, R. administrative and financial staff, R. coaching & Education staff, R. Marketing staff & Musholla.



Figure 16 4<sup>th</sup> Floorplan

### Exterior & Interior Design



Figure 17 Exterior Perspective



Figure 18 Interior Perspective 1



**Figure 18** Interior Perspective 2

## CONCLUSION

With a Sustainable Architecture approach, the Football Training Center in Tegal Regency is designed to have minimal environmental impact. This involves the use of environmentally friendly materials, renewable energy sources, and efficient water development. The facility is designed with energy efficient systems, including the use of solar power, good building insulation, and energy efficient lighting systems. This can reduce energy consumption and operational costs over time.

Sustainable architecture considers the maintenance of the surrounding environment. This includes preserving vegetation, reducing construction waste, and environmentally friendly rainwater management. Despite its focus on sustainability, the Football Training Center also provides comfortable and functional facilities for its players and staff. This includes a high-quality football field, changing rooms, and a complete training area.

The construction of the Football Training Center with a Sustainable Architecture approach can be a positive

example for other projects in the region. It can also motivate the community and stakeholders to pay more attention to the sustainability of their projects. Therefore, the Football Training Center in Tegal Regency with a Sustainable Architecture approach is a positive step in combining sports needs and environmental responsibility, which can bring long-term benefits for the environment and local communities.

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