

Development of Architectural Typologies in The Tourist Attraction Area of Gamat Bay, Sakti Village, Nusa Penida, Bali

Kadek Tania Utami Putri, Ida Bagus Gede Parama Putra, Ni Nyoman Sri Rahayu Damayanti

Correspondence Email: taniautamiputrikadek@gmail.com
Universitas Warmadewa, Denpasar-Indonesia

Abstract. The Nusa Penida area has received special attention with the selection of Nusa Penida as one of the National Tourism Strategic Areas (KSPN). Particularly, the Gamat area, one of the destinations in Nusa Penida, possesses various natural potentials. The natural potential of Gamat Bay has become a significant attraction for both foreign and domestic tourists, especially for water-related activities such as snorkeling. However, the full potential of Gamat Bay remains untapped due to its challenging access and difficult-to-navigate road infrastructure. In addition to addressing the access and infrastructure issues in the area, there is a need for collaborative efforts to develop a more complex and integrated tourism destination to support the high influx of tourists. One proposal from partners in Sakti Village is the development of architectural typologies that embrace traditional building characteristics and emphasize sustainability. This approach is expected to stimulate increased interest from tourists in visiting the Gamat Bay area. The development of architectural typologies is of utmost importance, given that the development site is located within a protected forest zone and needs to align with the proposed area branding, "The Nusa Penida Heritage." The purpose of this paper is to provide a solution to this issue by empowering the community to create a concept for architectural typology in the development of Gamat Bay, based on Green Architecture principles to preserve the protected forest area. This concept is presented as a planning guide, encompassing aspects of form, structural systems, intensity regulations, building orientation, construction location requirements, and materials. The concept is complemented with recommended illustrations of various building forms.

Keywords: Architecture typology; green architecture; gamat bay

1. Introduction

Nusa Penida District is one of the districts located in Klungkung Regency with an area of 202.84 km². Nusa Penida District possesses diverse natural potentials and coastal characteristics that are highly favored by tourists. In addition to various tourism activities, the Nusa Penida area is also known for its numerous temples, which serve as sacred places crucial to the Hindu community. The rich natural potentials and cultural significance make Nusa Penida an important area, placing it within Bali's golden triangle of tourism. Consequently, Nusa Penida receives special attention, being selected as one of the National Strategic Tourism Areas and included as a Tourist Attraction.

According to Zaenuri (2012), tourist attraction refers to something that possesses allure and is worth presenting to the tourism market. Despite the overall potential, some areas in Nusa Penida have not received specific attention. One such area is Gamat, a destination within the Nusa Penida region with various natural potentials. Gamat Bay resembles the conditions of Crystal Bay, which has now become a popular tourist destination in Nusa Penida. The natural potentials of Gamat Bay currently attract both domestic and international tourists for water-based activities such as snorkeling. However, the potentials of Gamat Bay have yet to be fully developed due to the challenging terrain and difficult road infrastructure.

Initially, the target is to produce a masterplan for the development of the area as a tourist destination. In the initial planning phase, a branding concept named "The Nusa Penida Heritage" has been established as a guideline for planning all aspects, starting from material, structure, architecture, to natural aspects. In addition to improving access and infrastructure in the area, the need for partners in developing a more complex and integrated area will be pursued to support tourist visits. One proposal discussed with the Sakti Village is the development of an architectural typology concept that incorporates traditional building characteristics and emphasizes sustainability aspects. It is hoped that this concept will stimulate increased tourist interest in visiting the Gamat Bay area. Therefore, the current issues faced by the Sakti Village include the development issues of the new tourist attraction of Gamat Bay and the architectural typology concept.

2. Method

The first implemented method is observation and data collection survey. Observation involves gathering data by observing natural behaviors, events, and situations. Meanwhile, the survey entails data collection by posing a series of questions to respondents. The observation phase involved visiting locations situated in Gamat Bay, Nusa Penida.



Fig 1. Observation and Data Collection Survey

Source: Author's, 2023

Access to the location, characterized by steep terrain, posed a challenge during observation due to the rugged contours and lack of proper roads. During the observation phase, field observations were

conducted concerning the situation, natural conditions, and measurements. Surveys were conducted with the Village Head of Sakti Village and the Tourism Awareness Group (PokDarWis) of Sakti Village to understand user needs, potentials, and encountered issues. Additionally, data collection was also conducted through a literature review method to obtain secondary data. Literature review was conducted to understand regulations related to buildings/architecture in the Protected Forest Zone that could be managed by the village.

After obtaining primary and secondary data, analysis was conducted using a qualitative descriptive method to formulate facilities for the Gamat Bay tourist attraction and formulate architectural typology concepts. In this process, Focus Group Discussions were also conducted with the Sakti Village authorities to ensure that the outputs align with partner needs. The general steps in developing schematic building typology concepts include: (1) Identifying Needs and Objectives; (2) Research and Analysis; (3) Understanding Typology; (4) Conceptual Ideation; (5) Form and Layout Selection; (6) Space Utilization; (7) Visual Considerations; (8) Environmental Considerations; (9) Accessibility Study; (10) Concept Presentation.

3. Discussion

Formulation of Facilities for Gamat Bay Tourist Attraction

The formulation stage of facilities for the Gamat Bay tourist attraction was conducted at the initial phase before detailing the service plan regarding the formulation of building/architectural typology concepts. Based on the results of observation and preliminary data surveys, it was decided that the Protected Forest Zone in Sakti Village would be developed into a natural tourist area/nature park. According to Untoro (2009), a nature park is a tourist forest that possesses natural beauty, including the beauty of flora, fauna, and the environment itself, which has distinctive characteristics for recreational and cultural purposes.

Efforts to transform the Protected Forest into a prominent natural tourist destination include developing tourism products as offerings in tourism marketing, encompassing attractions that induce tourists to visit, facilities available for tourists during their visit, and ease of access for tourists to visit the location. Tourist attractions must also have something to see, do, and purchase (Yoeti, 2013).

Several tourist attraction facilities will be developed according to the potentials and issues found in the field. The results of formulating the facilities for the Gamat Bay tourist attraction are presented in the form of two-dimensional schematic drawings in the Masterplan Planning Document. This masterplan can be used to assist the village authorities in drafting the Forest Utilization Business Work Plan, abbreviated as RKUPH, which is a 10-year work plan for all PBPH working areas, including aspects of forest sustainability, business sustainability, environmental balance, and local socio-economic development. This RKUPH needs to be submitted to follow up on the approval of the village forest management application.

The formulation of facilities for the Gamat Bay tourist attraction is then used as a reference to identify the buildings to be developed at the location. Thus, during the formulation of Architectural Typology Concepts, recommendations can be made for concepts that align with the function/facilities

of the tourist attraction to be developed. In the initial discussions regarding the masterplan, several adjustments were made to comply with the Minister of Forestry Regulation Number P.22/MENHUTII/2012 regarding Guidelines for Business Activities for the Utilization of Environmental Services in Protected Forest Nature Tourism (State Gazette of the Republic of Indonesia Year 2012 Number 543). The conclusion of the Gamat Bay Area development masterplan in Sakti Village, Nusa Penida, is as follows.

1. The initial site area covers 33 hectares, in accordance with the Guidelines for Business Activities for the Utilization of Environmental Services in Protected Forest Nature Tourism, which allows for utilization of 10%, equivalent to 3.3 hectares.
2. The masterplan planning is divided into 3 zones:
 - Zone A, comprising accommodation and commercial functions
 - Zone B, consisting of supporting functions for traditional and cultural activities
 - Zone C, designated as a protected forest area
 Boundary demarcations between zones are represented by forests.
3. The detailed facility functions developed within the area include parking, tourism information center, accommodation, restaurant, water revetment, commercial facilities, reservoir, as well as arts and cultural facilities.
4. Based on the proposed facility functions in the masterplan, it can be generally concluded that the buildings to be developed within the area serve commercial purposes.
5. Thus, in formulating schematic building/architectural typologies, the focus will be on commercial building typologies. These typologies aid in designing a harmonious, functional, and aesthetic area.

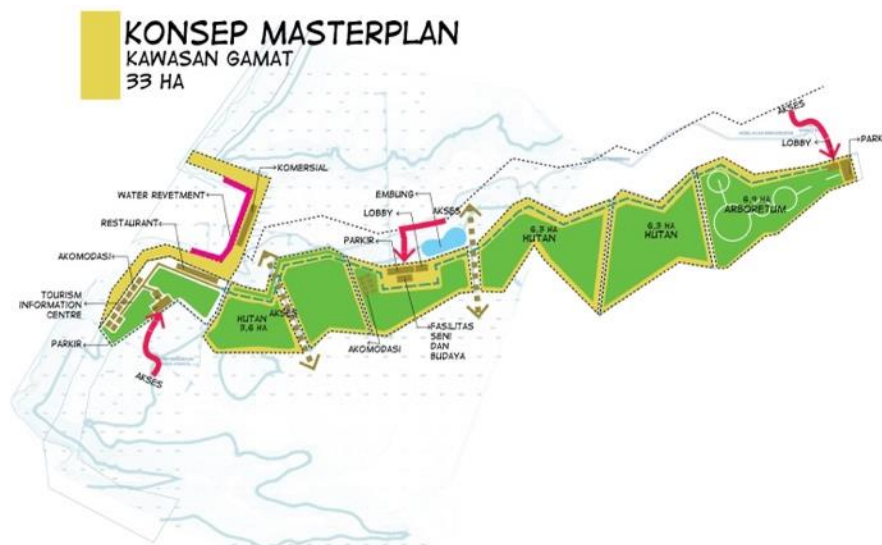


Fig 2. Masterplan Concept for the Development of Gamat Bay Area

Source: Author's Analysis, 2023

Development of Architectural Typology Concept

In formulating the concept of building/architectural typology, it was based on a literature review of architectural typology concepts suitable for the location in Gamat Bay, Nusa Penida. After the study, it was decided that the principle to be used in formulating this architectural typology concept is Green Architecture. Based on various approaches within the principles of Green Architecture, the architectural typology concept in Gamat Bay was formulated. Furthermore, this formulation of architectural typology concept utilized data collected from observation and surveys regarding the natural landscape and availability of natural resources in the Gamat Bay area. Another approach used in formulating the architectural typology concept in Gamat Bay is the development/architecture guidance from the applicable policies in Bali Province, especially in the protected forest zone of Nusa Penida Island. This concept formulation is presented in the form of building planning guidelines covering aspects of form, structural systems, intensity regulations, building orientation, construction location regulations, and materials. This concept is complemented with illustrative recommendations of several building forms. The observational and interview data obtained include:

1. Observation data includes:
 - Measurement results using drones, focused on the location area due to the steep terrain where some locations do not allow direct access by the team.
 - Soil condition data at the planned area location to determine suitable structural structures for the area.
 - Documentation of surrounding building typologies that match the environmental conditions.
 - Documentation of natural resource conditions in the area and its surroundings to identify abundant materials available in the area.
 - Photos and videos depicting the conditions of the area and its surrounding environment.
2. Interview data includes :
 - Results of interviews with Sakti Village officials, with several conclusions: the village agrees to develop the area for tourism purposes according to the village's and community's wishes, the village desires to have its own regulations regarding building typologies in the Gamat Bay area to ensure control and compliance with the requirements of the village forest management approval, the building development plan aligns with the submitted masterplan, priority is given to access and building construction, thus building design guidelines need to be promptly submitted, building typologies that do not harm the protected forest and support tourism activities.
 - Material architecture inputs, building materials can utilize those abundantly available around Nusa Penida Island.
 - Results of interviews with the Tourism Awareness Group regarding nature-based tourism development, ensuring the planned buildings integrate with and do not harm the local environment.

In the theory of urban design, building typology refers to the classification and grouping of buildings based on their characteristics, functions, and relationship with the surrounding environment. These typologies aid in designing harmonious, functional, and aesthetic areas. The schematic concept of building or architectural typology is an initial step in the design of a building. It involves the development of conceptual ideas that will form the basis of the overall building design..

Green Architecture or green design is an approach to development that minimizes harmful impacts on human health and the environment. Architects or "green" designers aim to protect the air, water, and earth by selecting environmentally friendly building materials and construction practices (Roy, 2008; Ragheb, 2016). In more detail, green architecture is architecture that addresses climate issues in its environment and should be approached by the field of building science (Karyono, 2000); saves energy, reduces emissions, conserves resources, enhances production, minimizes expenditure, and increases building added value (Design Media Publishing Limited, 2010); sustainable, environmentally friendly, climate-responsive, energy-conscious, and culturally intelligent (Nugroho, 2019).

Building typologies with green architecture are an approach to designing and constructing buildings that consider environmental impacts and sustainability. The primary goal of green architecture is to reduce environmental footprint, improve energy efficiency, and create a healthy and comfortable environment for occupants. Here are several architectural typologies with green architecture: (1) Sun-oriented Design; (2) Use of Environmentally Friendly Materials; (3) Energy Efficiency; (4) Efficient Water Use; (5) Waste Reduction; (6) Green Open Spaces; (7) Smart Technologies; (8) Health and Comfort Design; (9) Sustainable Development Concepts; (10) Environmental Certification and Standards. Additionally, building height in green architecture is closely related to: (1) optimizing lighting and air distribution (Nugroho, 2018); (2) minimizing heat radiation from the ceiling, (3) optimizing cross ventilation (Karyono, 2010); (4) surface geometry (Givoni in Dotulong, 2008); (5) building envelope efficiency (Sudarwani, 2013).

By applying these typologies, architects can create more environmentally friendly buildings, reduce negative environmental impacts, and create healthier and more sustainable environments for occupants. The schematic concept of building typologies is an important step in the design process and helps map out initial views to be followed by more detailed design stages.

Table 1. Schematic Concept of Typology

Criteria	Semi-Permanent Buildings	Non-Permanent Buildings
Function	Tourism information centre, accommodation, restaurant, commercial, and supporting cultural facilities	Commercial, parking support, reservoir support, and supporting cultural facilities
Structure	Stage building structure	Substructure: without structure Superstructure: wooden columns Upper Structure: wooden frame wall structure / wooden rafters
Dimensions	3m x 3m – 6m x 6m	2m x 1.5m – 3m x 3m
Building Height	Maximum 7 meters	Maximum 3 meters
Materials	Concrete pile foundation, coconut wood (seseh), mahogany wood, dolken wood (gelam), bamboo, alang-alang, coconut leaf roof	Coconut wood (seseh), mahogany wood, dolken wood (gelam), alang-alang, coconut leaf roof
Building Utilities	Solar panels, bio-septic tank	
Orientation	Towards the beach / protected forest	
Location	Site location from the beach at least 100 meters inland from the high tide sea level Land on the edge of a cliff with a slope of at least 45%, a depth of at least 5 meters, and a flat upper surface of at least 11 meters	

Source: Author's Analysis, 2023

In the theory of urban design, façade typology refers to the classification and grouping of building exterior designs based on characteristics, architectural styles, functions, and visual expressions. Façade typology helps create visual harmony among buildings in an area and reflects the identity and context of the area. Here are two basic façade typologies commonly used in the design of areas in Gamat Bay. Façade typology is divided based on the types of semi-permanent and non-permanent buildings.

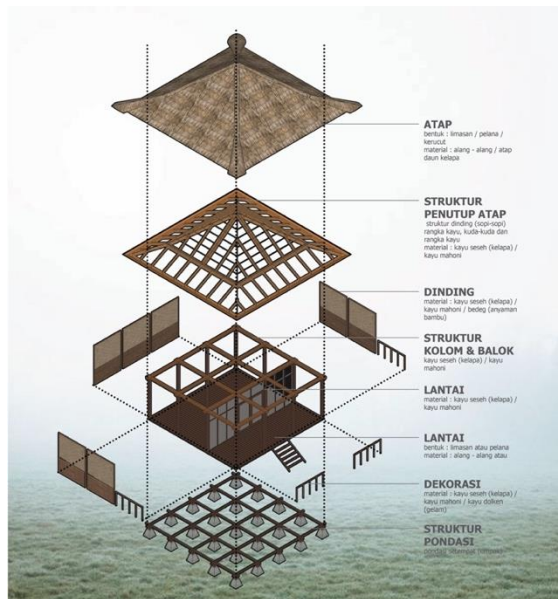


Fig 3. Schematic Typology of Semi-Permanent Buildings

Source: Author's Analysis, 2023

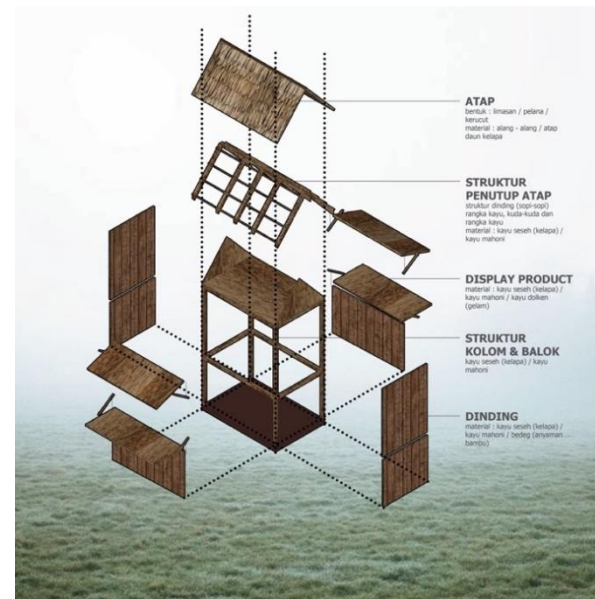


Fig 4. Schematic Typology of Non-Permanent

Source: Author's Analysis, 2023

Recommendations for Implementing Architectural Typology Concepts

The application of schematic architectural typology concepts in the form of three-dimensional drawings can help communicate conceptual ideas more clearly and visually. These recommended drawings can be used as references in future designs. The building design does not have to be identical to the following concept application recommendations, but it can be further developed and detailed as needed, as long as it still adheres to the schematic building typology guidelines.



Fig 5. Recommendations Semi-Permanent Building Typology

Source: Author's Analysis, 2023



Fig 6. Recommendations Non-Permanent Building Typology

Source: Author's Analysis, 2023

4. Conclusion

Conclusion of architectural typology development in the Gamat Bay area, Nusa Penida, yields several conclusions, including:

There are 2 building typologies that can be developed in the Gamat Bay area, namely semi-permanent and non-permanent buildings.

The developed building typology concept utilizes the Green Architecture approach.

The resulting document of building typology concept can serve as a recommendation guide for development, especially construction based on the functions to be developed in the masterplan in the Gamat Bay area, Nusa Penida.

The building typology concept has been recommended based on aspects of function, structure, dimensions, building height, materials, building utilities, orientation, and building location.

Recommendations for building illustrations that can be used as references when constructing using building/architectural typology concepts as guidance.

A recommendation to be made is the involvement of architecture and economics experts not only in the area development preparation stage but also during the implementation stage to the village authorities and the community, emphasizing the importance of organizing the area to harmonize with the environment and enhance investment value. Thus, it is hoped that what is planned can be executed well and meet expectations.

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