

# TOWARDS SUSTAINABLE AND FINANCIALLY VIABLE MILITARY WELFARE HOUSING PROJECTS IN THAILAND: A HYBRID MANAGEMENT APPROACH AND INNOVATIVE CONSTRUCTION

\* Cherdasak Soisuwan<sup>1</sup>, Preechaya Sitthipunt<sup>2</sup>

<sup>1,2</sup> Faculty of Architecture, Chulalongkorn University, Thailand

\*Corresponding Author, Received: 14 Feb. 2023, Revised: 16 May 2023, Accepted: 21 May 2023

**ABSTRACT:** This paper proposes alternative physical and environmental features for the military housing welfare system, aimed at increasing stability and improving the quality of life in accordance with welfare objectives. The study examines welfare-related concepts, theories, studies, laws, and the management of homes in mixed-housing developments. Primary data was gathered through surveys and interviews, while secondary data was obtained from relevant documents and sources. Based on this data, a virtual project was developed to evaluate the progress of the proposed features and to determine how to integrate the concept of an integrated military housing welfare system into the physical features and surroundings of the project. The project's viability was assessed over a 30-year period from legal, financial, and practical perspectives. The results provide a framework for more adaptable and effective project management, which could be applied to other charity housing programs, and also address the shortcomings of previous government-run welfare housing schemes.

*Keywords: Welfare housing, Hybrid welfare, Ecovillage, Universal design, Innovative construction material*

## 1. INTRODUCTION

The provision of various forms of welfare for personnel in various organizations is considered useful and appropriate. Various public and private agencies turned their attention to welfare, especially in terms of housing welfare, which is very important because residence is one of four factors that are important to human life. It can be seen that, on the part of all civil servants, there are still a lot of needs in their own residences. And if the agency has organized a housing welfare program, whether in the form of a central accommodation, condominium, townhouse, or detached house that has residences owned by the state and belonging to residents, all are good and beneficial to personnel in the department.

As Aronsson and Löfgren have explained, the term "welfare" has the same meaning as other words used in personnel management, such as "employee services," "benefit programs," and "employee welfare" [1]. The aim is to provide any service or activity that government agencies or private businesses offer to their employees or those working in the organization to make them feel comfortable and supported at work. This includes offering a variety of careers, job security, benefits beyond wages and salaries, incentives to boost morale, and encouragement to work to the best of one's physical, intellectual, and professional abilities. This approach aims to minimize personal

and family problems, promote job satisfaction, and encourage employees to stay with the organization for as long as possible.

According to Beach [2], welfare refers to the total benefits that an agency provides to its personnel, which may go beyond the normal salary or wages provided for the job. These benefits may include protections against illness, accidents, and unexpected absences from work, as well as assistance with retirement and additional income. In addition to monetary benefits, welfare can also encompass conveniences such as paid vacation time and a comfortable and pleasant work environment.

Koontz and O'Donnell [3] define welfare as a benefit offered by an agency to its personnel as a means of encouraging and supporting morale. This can take the form of additional payments beyond salary or wages, profit-based incentives like bonuses, or other forms of solicitation. Additionally, welfare may involve special services aimed at improving morale, such as occasional vacations, sick leave, and cafeteria-style dining that allows staff to serve themselves, save money, and work under comfortable conditions.

The development of welfare states can be attributed to various factors, including industrialization and the emergence of class cleavages within civil society. The term "welfare" refers to the benefits and services provided by agencies to their employees to promote morale, build faith, and ensure efficiency. These benefits

may be provided in addition to regular salaries and wages. Housing welfare is one of the fundamental aspects of welfare, and social housing providers vary depending on the country, including public, private, non-profit, or limited-profit sectors, co-operatives, or a mix of providers. Social housing is a significant component of the rental housing stock in many countries and represents a key "third sector" in the housing market, operating alongside the public and for-profit sectors. The governance of housing policy is complex and often involves multiple ministries and levels of government. [4]

## **2. RESEARCH SIGNIFICANCE**

The Thai government must allocate adequate resources to cater to the housing needs of military personnel and retirees, as it is essential for their well-being, morale, retention, and recruitment can be explored. Addressing the issue of building deterioration and damage is crucial to ensure the safety and habitability of housing units for military personnel and their families. To fulfill these needs, partnerships with private developers or non-profit organizations can be explored.

## **3. MILITARY WELFARE HOUSING IN THAILAND**

The military welfare housing projects in Thailand aim to provide housing for military personnel, especially for those who serve in remote areas or have low-income levels. However, according to a preliminary study, there are still not enough residential units to meet the needs of soldiers, and many retirees lack housing and have to submit waiver applications every year. Additionally, there is a lack of funding for general management, resulting in building deterioration and damage, as well as a shortage of necessary tools and personnel to oversee major residential initiatives.

The government has implemented various measures to address these issues, such as increasing the budget for military welfare housing projects, improving the management and maintenance of existing residential units, and promoting private sector participation in the provision of affordable housing for military personnel. The government has also encouraged retired military personnel to use their retirement benefits to purchase homes and provided them with low-interest loans to facilitate home ownership.

Overall, the military welfare housing projects in Thailand play an important role in ensuring the well-being of military personnel and their families. However, more efforts are needed to address the existing challenges and to ensure that adequate housing is available to all military personnel,

especially those who are in need.

### **3.1 Facts of Military Welfare Housing Projects in Thailand**

The central welfare housing projects of the Royal Thai Armed Forces Headquarters are situated in both Bangkok and provincial areas, covering an area of around 271-3-79 rai (348,716 square meters). The projects were planned more than 20 years ago, based on the needs of the past. The majority of the buildings are low-rise, with a maximum of 7 floors and an average age of 20-50 years. As the public housing projects have a higher proportion of common areas to residential units, it is crucial to effectively manage the community and environment within the project to provide good housing welfare for troops and their families while maintaining a high quality of life. The Military Welfare Bureau supervises the central welfare housing complex, which comprises 2,621 residential units for commissioned officers, representing 46.25% of all central residential units, and 3,040 units for non-commissioned officers, representing 53.75% of all central housing units. The central welfare housing project has approximately 7,550 residents. Additionally, there are 4,480 units of 7-unit welfare housing buildings under the direct supervision of the Thai Armed Forces Headquarters, including the welfare housing projects of the Royal Thai Armed Forces Headquarters in both central and direct units. The total number of units is 10,029, with a total of 14,336 residents, which accounts for approximately 35% of the total manpower. Despite this, a demand survey conducted in the fiscal year 2018 revealed the need for an additional 864 accommodations, with 137 for commissioned and 727 for non-commissioned officers. [5]



Fig.1 RTARF Military welfare housing, Prachachuen, Bangsue, Bangkok

Based on these facts, it appears that the military welfare housing projects in Thailand have a significant number of residential units, but there is still a demand for additional accommodation. Many of the buildings are relatively old, and effective management of the community and environment within the project is necessary to provide good housing welfare for troops and families. It is also worth noting that a significant portion of the military personnel in Thailand resides in these welfare housing projects, with around 35% of the total manpower living in these units.

The management of the central welfare housing project of the Royal Thai Armed Forces Headquarters is currently overseen by the project management committee in each respective area. Comprising civil servants who reside within the project, this committee is supported by the welfare building office in each area, acting as the administrator under the purview of the Military Welfare Bureau. The administration budget is derived from two sources, namely the general administrative budget and monthly service fees deducted in accordance with Military Welfare Bureau regulations. Budget allocations for building maintenance, new construction, or material alterations within the project area are determined by annual proposals submitted for budget approval, based on resolutions taken during committee meetings, or on directives issued by the commander-in-chief on an annual basis.

### **3.2 Conceptual Framework**

The Royal Thai Armed Forces Headquarters has established a welfare accommodation project in the Prachachuen area since 1966. The project has an area of approximately 52800 square meters and is the first area used for the construction of residential welfare buildings. Currently, the entire area is being built and can accommodate a total of 479 families. Despite being maintained over the years, the buildings have been used for over 40 years and are now old and deteriorating.

Considering the potential of the area and its strategic location, with important roads and transportation systems, the value of the land in the area is very high. Hence, it is important to study and review the ways to manage the area to achieve the best value and benefits.

In Thailand, it was discovered that the primary factors influencing the quality and sustainability of accommodation welfare include the welfare provision system and stipulation of welfare conditions, determining the physical project model, project management, and the budget system. Given the land size, diversity of residential units, and amount of dwellers, the RTARF Military welfare housing in Prachachuen, Bangsue, Bangkok was

chosen as the study subject for simulation.

The study's conceptual framework is based on the factors mentioned above, with a focus on the physical and environmental aspects, which are important factors in the project. Based on this conceptual framework, this research presents design criteria for determining the physical characteristics that are suitable for the integrated military housing welfare system, ensuring quality and sustainability.

## **4. RESEARCH METHODOLOGY**

Over the past few decades, there has been a growing trend towards blending market- and government-sponsored studies, as well as state-based organizational characteristics and control systems for various aspects of project management such as hiring, performance evaluation, and financial and investment decisions. [6] The concept of welfare has transformed into a hybrid model due to the patterns of mutual linkages between the welfare state, market elements, and civil society. [7]

The hybrid military welfare housing system represents a shift away from a focus on welfare for permanent civil servants alone and instead aims to increase the project's potential to accommodate retired civil servants, employees, and family members of all ages who need housing and can pay for services at welfare prices under a shared common area. This enables the project to generate income to create a sufficient budget for long-term management and maintenance.

The researcher surveyed and studied government welfare accommodation projects, including the housing buildings of the National Housing Authority and four military welfare accommodation buildings in Bangkok, and identified several problems with these projects. These included insufficient residential units, an average FAR of 0.5:1 resulting in insufficient monthly income for management and maintenance, inconsistent allocation of space for utilities, a lack of consideration for green areas and environmental quality, a failure to account for a master plan for long-term project development, and building materials and capacity regulated by current legislation.

To address these issues, the researcher proposes a hybrid welfare housing model that mixes permanent officers' residentials, retired officers' residentials, and short-term residentials. The physical design solution integrates universal design aspects and the Ecovillage approach, which is consistent with the policy of the National Housing Authority to promote the design and construction of sustainable community projects. Financial feasibility was also tested through an Excel spreadsheet to forecast the return on investment.

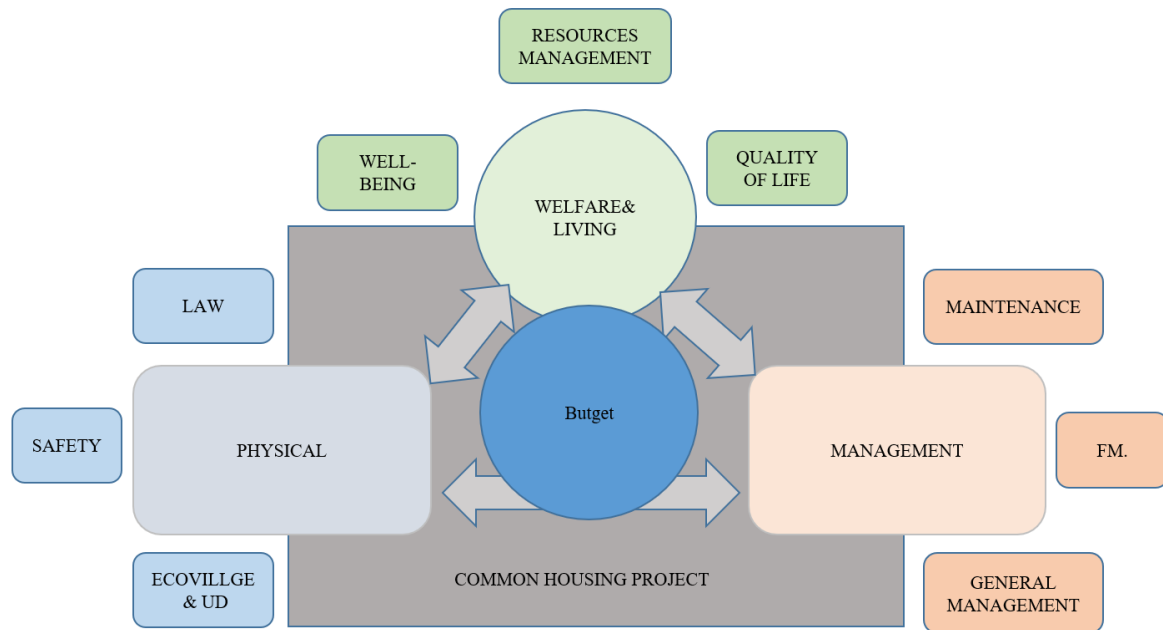


Fig.2 Applying the Retired Residential and Short-term Residential as a Hybrid Welfare Concept within the Military Welfare Housing Project Elements.

In accordance with the conventional welfare housing design concept, the high floor area ratio (FAR) results in a scarcity of residential units and an outdated housing design. To address this issue, the researcher proposes an increased unit ratio per land area, which would increase the project's capacity from 804 to 964 units. Additionally, the dwelling units are updated to cater to the appropriate users. The Ecovillage assessment criteria [8] established by the National Housing Authority encompasses four key categories: Site and Landscape, Building, Systems, and Project Management, all of which contribute to the environmental and economic dimensions. This allows for careful planning of the project to maximize efficiency.

In 2012, the United Nations introduced the Sustainable Development Goals (SDGs), which prioritized sustainable development. Since then, research efforts have focused on identifying renewable construction materials and innovative concepts that can be integrated into the Architecture, Engineering, and Construction (AEC) industry to achieve sustainable development. Many materials with high potential can also be applied to welfare housing projects. One such material is recycled plastic, which can be incorporated into concrete that meets the Thai Industrial Standard (TIS) no. 57-2530 for compressive strength of hollow load-bearing concrete masonry units at 5.5MPa. [9]. Engineered cementitious composite (ECC) [10] is another low-cost and high-ductility cementitious material that can be used in construction and as fire-resistant material for

building structures. Modified aerated concrete based on man-made waste is also an environmentally friendly structural material that reduces industrial waste.

Rice husk, a by-product of the agricultural industry in Thailand, has been found to have advantageous properties when used as a concrete mixing material due to its high compressive strength and lack of harmful substances. [11] For beam structures, lightweight concrete beams that use pumice stone as an aggregate can reduce resource consumption while maintaining good structural performance.

In addition, researchers have experimented with adobe bricks reinforced with water hyacinth fiber, a low-cost material that can reduce water hyacinths in canals and rivers while also improving compressive and flexural strength. [12]. All of these materials could serve as alternatives for future welfare housing construction projects. They promote low-energy consumption, support local materials, and enhance microeconomics to ensure sustainability.

## 5. RESULTS

The study we have been discussing is focused on improving the physical and financial sustainability of military welfare housing projects in Thailand. The study found that many existing government-run welfare housing developments in Thailand are in poor condition and have management and budgetary issues. The Military Welfare Housing Project was selected as a model for this study to address these problems and identify potential solutions.

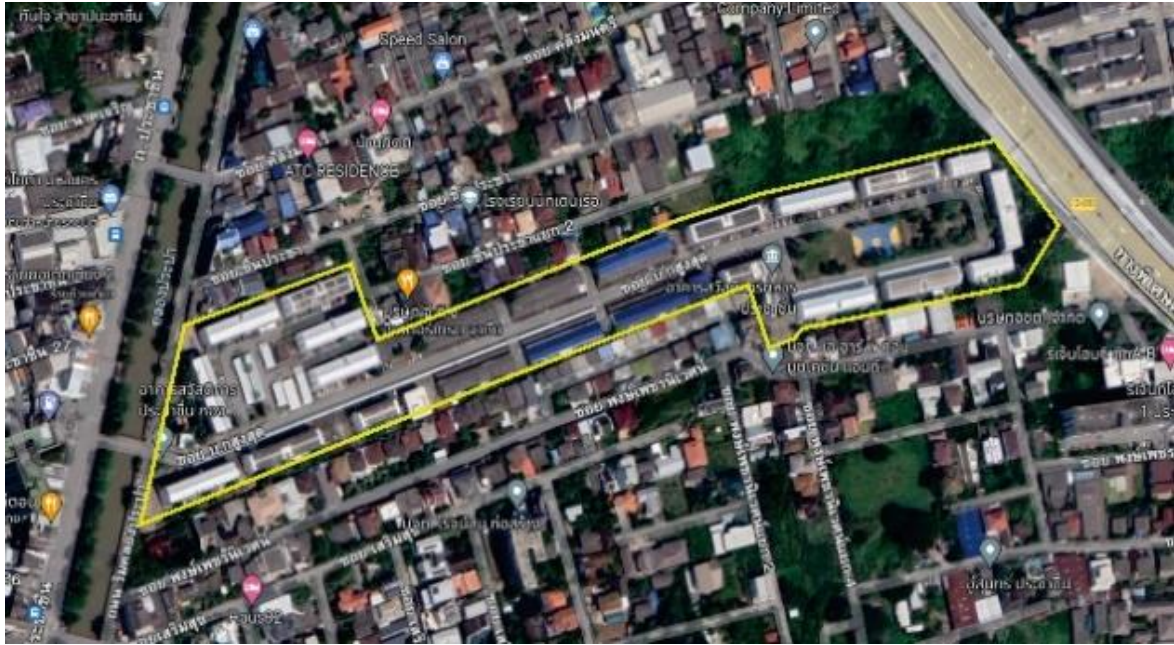


Fig.3 Top View of RTARF Military welfare housing, Prachachuen, Bangsue, Bangkok

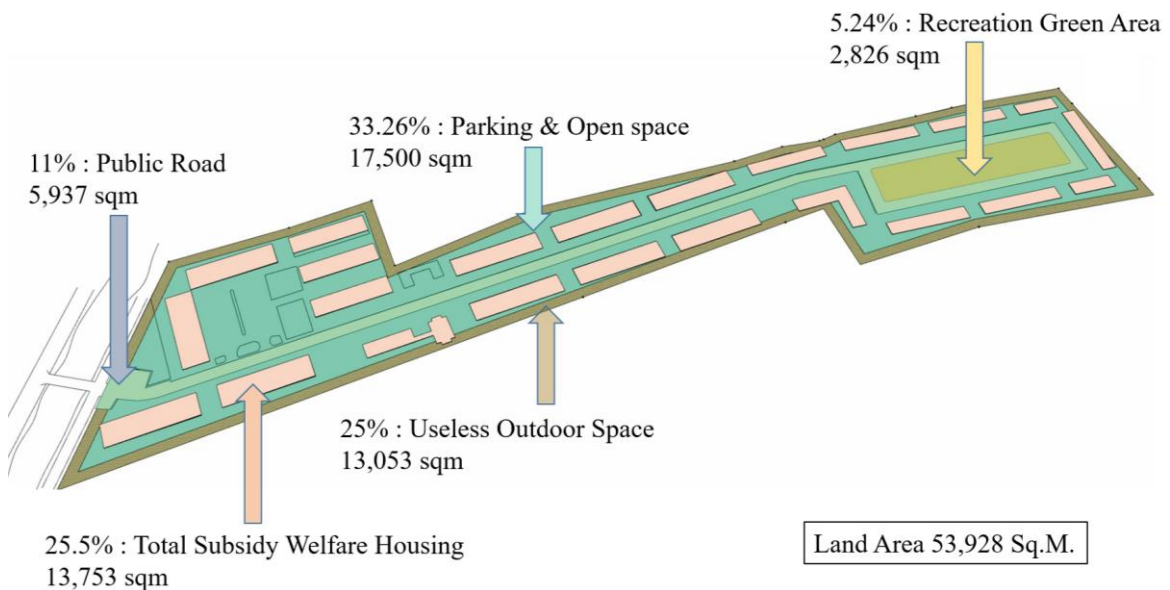


Fig.4 Existing Military Welfare Housing

Table 1 illustrates the shift in the allocation of project funds. Historically, the government had to provide full financial support to the project, relying solely on the income generated by the project itself, particularly the project generator (PG), to generate revenue. This share of the self-earned project's revenue is a critical aspect of the project's sustainability, as it is utilized to finance the project's management and maintenance, which is an area of weakness in the government's budgetary allocations.

In this study, the researcher examined the design and management of welfare housing and found that a complete welfare arrangement must have good

quality, complete coverage, and the ability to maintain its quality in the long run. To this end, the study presents design criteria for determining physical characteristics suitable for a quality and sustainable military welfare housing project under the concept of an integrated military housing welfare system.

The proposed military welfare housing model highlights the benefits of a hybrid system. The project could function autonomously, with 82% of the permanent officer housing, 14% of retired officer housing, and 4% of short-term visitor housing.

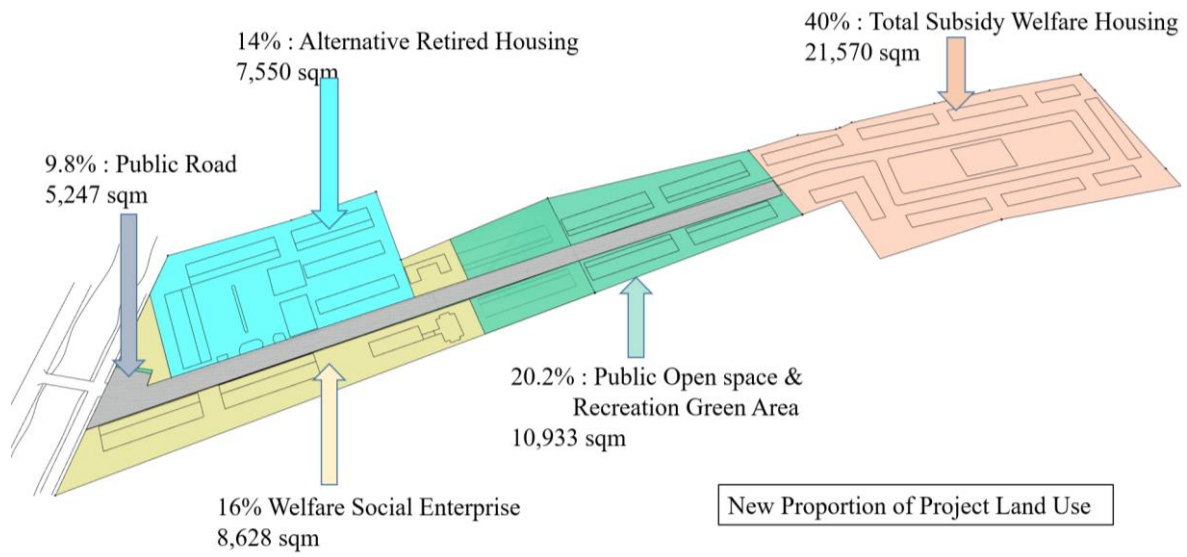


Fig.5 Ratio of Hybrid Welfare Housing's Elements



Fig.6 Testing Model of the Project's Components Arrangement by the Hybrid Welfare Concept

Table.1 Project's financial structure comparison

|                     | Conventional             |     |    | Hybrid                   |     |     |
|---------------------|--------------------------|-----|----|--------------------------|-----|-----|
|                     | Military Welfare Housing |     |    | Military Welfare Housing |     |     |
|                     | GOV                      | HAB | PG | GOV                      | HAB | PG  |
| Investment Cost     | 100%                     | 0%  | 0% | 100%                     | 0%  | 0%  |
| Post Occupancy Cost | 69%                      | 31% | 3% | 2%                       | 28% | 70% |

\*Remarks: GOV – Government, HAB – Habitants, PG – Project income generator

The permanent officers' housing, consisting of commissioned and non-commissioned residential units, generates 48% of the project's income, while the retired officers' housing generates 44%, and the short-term visitor housing generates 8%.

Table.2 Project's improvement comparison between the existing project with the new design

|            | Existing    | New Design |
|------------|-------------|------------|
| Land Area  | 53,928 sqm. |            |
| FAR        | 1/0.85      | 1/2.03     |
| OSR        | 73.70%      | 80.90%     |
| BCR        | 26.30%      | 19.10%     |
| Green Area | 28.10%      | 31.50%     |

\*Remarks: FAR – Floor Area Ratio, OSR – Open Space Ratio, BCR – Building Coverage Ratio

Table 2 provides a visual representation of how the physical components of the project are directly affected by the new design concept, resulting in increased usable area and ample shared spaces. These changes are critical in achieving the project's maximum potential and enhancing the quality of life for residents.

Financial forecasting explains that the ROI of the project is at 30 years without any government subsidizing. The study model shows the sustainability of the project itself. The study's findings, outlined in this paper, illustrate how welfare management can be transformed from traditional state grants to innovative management strategies, leading to the sustainability of the project. These factors have a significant impact on the operations of welfare accommodation projects and can be applied to similar projects in the future.

## 6. CONCLUSIONS

Certainly, the study we have been discussing is focused on improving the physical and financial sustainability of military welfare housing projects in Thailand. The study found that many existing government-run welfare housing developments in Thailand are in poor condition and have management and budgetary issues. The Military Welfare Housing Project was selected as a model for this study to address these problems and identify potential solutions.

One major issue the study found was that the project had a financial problem with management and maintenance, and was primarily dependent on government funding. To address this, the study proposed a hybrid management approach that combines both management principles and design and layout ideas to introduce new resident proportions and generate additional income from the project itself. By adjusting the proportion of

residents to include a mixed style from the three groups (permanent officers, retired officers, and short-term visitors), the project's income turnover increased, reducing the burden on government funding and making the project more sustainable in the long run.

Another important factor the study found was the need for appropriate architectural style and functionality, especially with universal design, as well as the incorporation of the Ecovillage concept to create a sustainable community for the future. By focusing on users who are not regular civil servants, such as retired individuals with increased purchasing power and short-term residents who stay during training periods, the project can accommodate a wider range of residents and generate more revenue.

Overall, the study proposes a hybrid military welfare housing system concept that creates a welfare system that does not focus solely on permanent civil servants but can accommodate a range of residents under a shared common area. This approach generates income from the project itself to create a sufficient budget for project management and maintenance to maintain buildings and a good environment in the long run. The study presents criteria for determining the physical characteristics of buildings and environments suitable for a quality and sustainable military welfare housing project under the concept of an integrated military housing welfare system.

## 7. ACKNOWLEDGMENTS

This research is part of a doctoral study at the Faculty of Architecture, Chulalongkorn University, titled "Guidelines for Sustainable Military Welfare Housing Project: Case Study: Central Military Welfare Housing Project of the Royal Thai Armed Forces Headquarters." The article includes a description of the military welfare housing building and project layout. These pieces of information are not classified and are accessible to the general public through the military's website and Google Maps. For the experimental design of the desirable welfare housing project, the researchers incorporated the scope of the original project area and proceeded to independently design a new project as a trial.

## 8. REFERENCES

- [1] Aronsson T. and Löfgren K G., Welfare Theory : History and Modern Results. Department of Economics Umeå University, 2007, pp.13-22.
- [2] Beach D. S., Personnel: The Management of People at Work, NEW YORK: The Macmillan Co., 1971, pp.786.

- [3] Koontz H. and O'Donnell C.O. Management. In Hicks, H.G. and Gullet, C.R. Management, New York: McGraw-Hill. 1980, pp.187-189.
- [4] Gough I., European Welfare States: Explanations and Lessons for Developing Countries, A. A. Dani and A. de Haan (eds.), Inclusive States: Social Policy and Structural Inequalities, Washington DC: World Bank 2008, pp.46-48.
- [5] Boonkajay A., Guidelines for Residential Management for Military Welfare Housing, Royal Thai Armed Forces Headquarters. Bangkok: Joint War College, 2018, pp.1-3. (in Thai)
- [6] Pollitt C., Is the Emperor in His Underwear? An Analysis of the Impacts of Public Management Reform., Public Management, 2:2, 2000, pp.181-99.
- [7] Evers A., Mixed welfare systems and hybrid organizations: Changes in the governance and provision of social services, International Journal of Public Administration, September, 2005, pp.3-4.
- [8] Sreshthaputra A. and Sirithumpiti S., Ecovillage: Design Guidelines and Assessment System for Sustainable Housing Projects, Final Report, National Housing Authority, 2016, pp.1-18. (in Thai)
- [9] Chusilp, N., Laksanakit, C. Effect of recycled plastic content as fillers on mechanical and durability properties of concrete. Geomate Journal, 22(92), 2022, pp.56–63.
- [10] Banaay K.M.H., Cruz, O.D., Muhi, M. M., Engineered cementitious composites as a high-performance material: A review. Geomate Journal, 24(106), 2023, pp.101–110.
- [11] Yanaka A., Ueno T., Okazaki S., Matsumoto, N., Yoshida, H. Study on properties of concrete mixed with rich husk ash adsorbing heavy metals. Geomate Journal, 22(92), 2022, pp.77–82.
- [12] Chotikan R., Pisut R. mechanical behavior of adobe bricks reinforced with water hyacinth fiber. Geomate Journal, 21(85), 2021, pp.10–16.

---

Copyright © Int. J. of GEOMATE All rights reserved, including making copies, unless permission is obtained from the copyright proprietors.

---