Terbit *online* pada laman web jurnal : https://jes-tm.org/index.php/jestm/index

Journal of Engineering Science and Technology Management

| ISSN (Online) 2828 -7886 |

Article

Evaluation of the Implementation of the *Greenship Neighborhood Concept* Version 1.0 in the Pahlawan Tuanku Tambusai University Campus Area

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DOI: 10.31004/jestm.v5i2.381

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ARTICLE INFORMATION

Volume 5 Issue 2
Received: 28 August 2025
Accepted: 29 September 2025
Publish *Online*: 30 September 2025
Online: at https:JESTM.org/

Keywords

Greenship Neighborhood
Sustainable Area
Green Campus Evaluation
Pahlawan Tuanku Tambusai University

A B S T R A C T

This study aims to evaluate the implementation of the Greenship Neighborhood version 1.0 concept at Pahlawan Tuanku Tambusai University Campus. The evaluation was carried out to determine the level of application of sustainability principles, which include aspects of land ecological enhancement, movement and connectivity, water management, waste management, community wellbeing, energy efficiency, and innovation. The research employed descriptive qualitative and quantitative methods through field observations, interviews, and documentation. The collected data were analyzed based on the Greenship Neighborhood assessment criteria established by the Green Building Council Indonesia (GBCI). The results indicate that the implementation of the sustainable neighborhood concept at Pahlawan Tuanku Tambusai University has been carried out quite well but still requires improvement in several aspects, particularly in energy efficiency and land ecology management. The campus has shown a real commitment to sustainable development through the provision of green open spaces, environmental management systems, and public facilities that support the comfort and wellbeing of the academic community. Based on the evaluation results, the campus area obtained a score that falls into the Bronze category in the Greenship Neighborhood rating system. This research is expected to serve as a reference for developing a more environmentally friendly and sustainable green campus in the future.

1. Introduction

One of the most pressing environmental issues today is climate change. Increased greenhouse gas emissions from various human activities, such as transportation, industry, and the construction sector, are a cause of climate change. Climate change has significant impacts, such as rising global temperatures, increased frequency and intensity of extreme weather, rising sea levels, environmental damage, and threats to the survival of humans and other living things on Earth (Adeswastoto et al., 2023).

Due to the ever-increasing energy consumption while natural resources are limited, the current energy crisis is a global threat. The concept of green is no longer just considered to evoke charm or just the shade of trees. According to Rika Widianita (2023) To ensure the sustainability of the environment, especially for future generations, we must truly implement the green concept because our environmental challenges are increasingly real.

The Indonesian government has also initiated a national movement to reduce energy consumption. They do this by reducing the amount of building materials used and the amount of electricity and water used. This movement is known as the green building movement. Within a region or city, the concept of "green" is used more broadly. Sustainable cities are called "green cities," "resilient cities," and several other terms. Meanwhile, for areas smaller than cities, the concept of "green neighborhoods" is known.

Humans cannot be separated from the environment because the environment is a place of life, activity, and provision of essential basic materials such as water, food, and oxygen. Uncomfortable environmental conditions, such as excessively high temperatures, low humidity, and air pollution, make living and working places uncomfortable (Widodo et al., 2021).

Sustainable areas accommodate human needs without exceeding the ecosystem's capacity, ensuring the sustainability and preservation of the ecosystem for present and future generations. This allows sustainable use of areas to mitigate future crises (Widodo et al., 2021).

As an area that serves the functions of education, research, and community service, the campus plays a crucial role in demonstrating a commitment to sustainability. Campuses around the world have long adopted the concept of an eco-campus or green campus. A green campus is defined as an environmentally conscious campus that applies environmental science to its policies, management, and tridharma activities. However, currently, campuses worldwide have long adopted the concept of an eco-campus or green campus.

Environmental comfort and health are very important, but until now human understanding of the environment is still far from perfect, to overcome this problem, Green Building Indonesia (GBCI) is encouraged to apply sustainable construction development with green building certification based on the Indonesian green building benchmark called Greenship (Nurwidyaningrum et al., 2022).

According to Green Building Indonesia (GBCI), "Greenship Neighborhood is a certification system aimed at creating a sustainable and environmentally friendly area for its users, with a broader scope than just the scale of buildings that looks at the interaction between buildings, nature, and humans."

The implementation of a good sustainable area can be an attraction for the area, a sense of comfort and investment can remain profitable. Analysis of the implementation of Green Building in the Pahlawan University building was also carried out by Riky Wahyudi (2023) resulting in several suggestions, namely, carrying out comprehensive energy utilization to identify areas in the building that produce high energy consumption, using water-saving technologies such as rainwater collection, irrigation systems, and water-efficient equipment, The importance of building occupant awareness of green practices, their benefits, and how they can actively contribute to maintaining the sustainability of the building, Conduct regular evaluations and monitoring of building performance in aspects of energy efficiency, water management, and overall environmental impact.

Meanwhile, there has been no evaluation of Greenship Neighborhoods within existing campus environments. Universities serve as platforms for developing educated and skilled human resources. Due to their relatively large footprint, universities also serve as a means for cities to achieve sustainable development (Widodo et al., 2021).

Pahlawan Tuanku Tambusai University, one of the campuses in Bangkinang, has an area of 1,800 m2. This research was used to evaluate

the implementation of the sustainable area concept at Pahlawan Tuanku Tambusai University. It is hoped that it will provide input for aspects of improving land ecology, movement and connectivity, water management and conservation, solid waste and materials, community strategy and welfare, buildings and energy, and development and innovation.

2. Literature Riview

2.1 Campus Definition

A campus is an area dedicated to higher education activities, encompassing lecture buildings, laboratories, libraries, lecturers' offices, and various supporting facilities. The campus area functions as a center for academic, research, and community service activities, providing an environment that supports productivity and learning comfort (Arif, 2023; Terro et al., 2021).

2.2 Sustainable Development

Sustainable development refers to efforts to meet present needs without compromising the ability of future generations to meet their own. Its core principles involve balancing economic growth, social equity, and environmental preservation (Utami et al., 2023; Wahjono, 2022). In the context of sustainable areas, this concept focuses on planning and managing spaces that maintain ecological balance while enhancing the quality of life in a continuous and inclusive manner.

2.3 Green Building Council Indonesia (GBCI) and the Greenship Concept

The Green Building Council Indonesia (GBCI) is an independent organization that developed the *Greenship* rating system to evaluate the implementation of green building and sustainable area principles in Indonesia. *Greenship* serves as a benchmark for assessing sustainability through criteria such as energy efficiency, water conservation, waste management, and environmental well-being (GBCI, 2015).

2.4 Greenship Neighborhood

The Green Building Council Indonesia (GBCI) is an independent organization that developed the Greenship rating system to evaluate the implementation of green building and sustainable area principles in Indonesia. Greenship serves as a benchmark for assessing sustainability through criteria such as energy efficiency, water conservation, waste management, and environmental well-being (GBCI, 2015).

2.6 Assessment and Benefits of Implementing Greenship Neighborhood

Each category in the Greenship Neighborhood system carries a specific weight that determines the sustainability rating of a site. The certification levels—Bronze, Silver, Gold, and Platinum—reflect the total score achieved by a project. Implementing this framework offers several benefits, including maintaining ecosystem balance, improving energy efficiency, enhancing microclimate conditions, and promoting safe, healthy, and environmentally friendly communities (GBCI, 2015).

3. Research Methodology

3.1 Research Design

This study entitled "Evaluation of the Implementation of the Greenship Neighborhood Version 1.0 in the Pahlawan Tuanku Tambusai University Campus Area" employs a descriptive qualitative and quantitative approach. The research aims to assess the extent to which the principles of the Greenship Neighborhood Version 1.0 are implemented within the university campus area.

The qualitative descriptive method was used to describe the existing conditions of the study area based on field observations, interviews, and documentation. Meanwhile, the quantitative descriptive method was applied to evaluate and score the implementation level using the Greenship Neighborhood assessment criteria set by the Green Building Council Indonesia (GBCI).

3.2 Data Sources

This subsection explains how the data were collected and how the results were analyzed. Authors must clearly describe the type of data collected, the procedures used to collect it, and the tools or instruments involved (e.g., questionnaires, sensors, observation sheets, software). Two types of data were used in this study:

1. Primary Data were obtained directly from field activities, including:
   a. Observation, conducted to identify the physical and environmental conditions of

the campus according to the Greenship assessment criteria.

b. Interviews, carried out with campus management, particularly the head of the facilities and maintenance department, to gather information on sustainability practices and infrastructure management.
c. Documentation, consisting of photographs, notes, and visual evidence collected during the field survey.

2. Secondary Data were acquired from institutional sources and related literature, including the university's master plan, utility network data (water, electricity, waste), and supporting regulatory documents relevant to the assessment.

3.3 Research Tools and Materials

The tools and materials used in this research included:

3. Tools:Laptop or personal computer, ArcGIS 10.8 software, Google Earth Pro, and Google Chrome for spatial and data analysis.
4. Materials: Data checklists and physical maps of the study area to evaluate each Greenship criterion.

3.4 Location and Period

The study was conducted at Pahlawan Tuanku Tambusai University, located on Tuanku Tambusai Street No. 23, Bangkinang City, Kampar Regency, Riau Province, Indonesia. The total campus area studied is approximately 1.8 hectares. Data collection was carried out over several months, from initial observation through final evaluation.

Figure 1. Location Research

3.5 Data Analysis

The data were analyzed using two complementary techniques:

1. Descriptive Scoring Analysis, applied to assess the degree of implementation of each Greenship Neighborhood category (LEE, MAC, WMC, SWM, CWS, BAE, and IFD).
2. Quantitative Descriptive Analysis, used to calculate the total score and determine the sustainability rating (Bronze, Silver, Gold, or Platinum) based on the GBCI scoring system.

4. Results and Discussion

4.1 Analysis of the application of the Greenship Neighborhood Concept

This study successfully evaluated the implementation of the Greenship Neighborhood concept at Pahlawan Tuanku Tambusai University using the comprehensive assessment tool, Greenship Neighborhood Version 1.0, developed by Green Building Council Indonesia (GBCI) in 2015. The evaluation was structured around the tool's seven core categories: Land Ecological Enhancement (LEE), Movement and Connectivity (MAC), Water Management and Conservation (WMC), Solid Waste and Material (SWM), Community Wellbeing Strategy (CWS), Building and Energy (BAE), and Innovation and Future Development (IFD).

The application of this structured rating system provided a clear and measurable framework for assessing the university campus's sustainability performance. The findings offer a critical baseline understanding of the current state of sustainable practices within the campus area, pinpointing specific strengths and areas requiring intervention. This research demonstrates the practical utility of the Greenship Neighborhood tool as an effective instrument for auditing and planning sustainable development in educational environments, contributing valuable empirical data to the field of green campus assessment in Indonesia. The results underscore the importance of such diagnostic evaluations in guiding strategic decisions and targeted actions towards achieving broader sustainability goals in the higher education sector.

a. Land Ecological Enhancement (LEE)

Based on the research findings, the campus area of Pahlawan Tuanku Tambusai University meets the land ecological enhancement criteria with a score of 12 points according to the Greenship Neighborhood version 1.0 assessment. However, the study reveals that the revitalization of degraded lands remains

unaddressed, indicating an area requiring improvement in ecological restoration efforts.

The following are the results of the assessment of land ecological improvements.

Table 1. Assessment of land ecological improvement in the Pahlawan Tuanku Tambusai University campus area

Assessment criteria	Max value	Value
LEE P	Has no value	fulfilled
LEE 1	4	3
LEE 2	6	6
LEE 3	4	0
LEE 4	3	1
LEE 5	2	2
Amount	**19**	**12**

b. Movement and Connectivity (MAC)

This category is the second-lowest performing in the assessment. The campus only scored points for providing basic public utilities and universal accessibility features. However, it received zero points for movement analysis, pedestrian facilities, public transport connectivity, pedestrian pathway design strategy, public transport availability, and bicycle networks. Shared parking received only 1 point.

This poor performance is fundamentally caused by a campus design that is entirely centered around motorized vehicles. This is characterized by the absence of safe pedestrian walkways and bicycle lanes, the lack of integrated public transport stops within the campus area, and a complete lack of analysis and planning for sustainable mobility. Consequently, the campus environment is inconvenient for walking and cycling, discourages the use of public transport, and perpetuates a reliance on private cars, which undermines safety, environmental sustainability, and efficient land use.

Table 2. Movement and Connectivity improvement in the Pahlawan Tuanku Tambusai University campus area.

Assessment criteria	max value	mark
MAC P1	Has no value	not fulfilled
MAC P2	Has no value	not fulfilled
MAC P3	Has no value	not fulfilled
MAC 1	10	0
MAC 2	6	0
MAC 3	2	2
MAC 4	3	2
MAC 5	3	0
MAC 6	2	1
Amount	**26**	**5**

The campus must immediately build integrated pedestrian and bicycle pathways and provide public transport stops within the area to shift dependence from private vehicles towards sustainable mobility.

c. Water Management and Conservation (WMC)

The campus received no points in this category due to several critical deficiencies: the absence of a water schematic diagram (WMCP), no utilization of alternative water sources (WMC1) such as rainwater harvesting, lack of a stormwater management system (WMC2), and no wastewater treatment unit (WMC4). This complete reliance on groundwater without any conservation or recycling strategy represents a significant sustainability gap that requires immediate intervention through developing an integrated water management plan, implementing rainwater collection systems, constructing retention ponds and infiltration wells, establishing wastewater treatment facilities, and promoting water-saving practices across campus operations.

Table 3. Water Management and Conservation improvement in the Pahlawan Tuanku Tambusai University campus area.

Assessment criteria	Max value	Mark
WMC P	Has no value	fulfilled
WMC 1	6	0
WMC 2	7	0
WMC 3	3	0
Amount	**16**	**0**

Based on the results of the assessment above, water management and conservation received zero points. The solution to increase the score on this point is to build a rainwater harvesting system in the campus area that can be used for watering plants, non-portable water reserves, then apply absorption wells in open areas, replace taps and sanitation with low-flow

to save clean water and provide an environmentally friendly drainage system.

d. Solid Waste and Material (SWM)

The SWM category received 11 out of 16 points, making it one of the highest-performing categories. This demonstrates adequate solid waste management, including waste sorting, the use of local materials, and construction materials management. However, the use of recycled materials is not yet optimal, indicating room for improvement.

Table 4. Solid Waste and Material improvement in the Pahlawan Tuanku Tambusai University campus area.

Assessment criteria	Max value	Mark
SWM P	Has no value	fulfilled
SWM 1	6	6
SWM 2	4	0
SWM 3	4	4
SWM 4	2	1
Amount	**16**	**11**

To optimize the implementation of the Solid Waste and Material (SWM) category, campuses need to increase the use of recycled and reused materials in various development and maintenance activities. Furthermore, campuses can establish waste bank systems and advanced sorting facilities to make recycling processes more effective. Strengthening internal policies that mandate the use of environmentally friendly materials in infrastructure projects is also a crucial step to ensure increased value in the SWM category.

e. Community Wellbeing Strategy (CWS)

The CWS category received 12 out of 16 points, making it the highest-scoring category. The campus area provides community interaction facilities, local economic facilities, socio-cultural activities, and user satisfaction surveys. However, indicators related to area security have not been fully met, so its contribution has not reached its maximum score.

Table 5. Community Wellbeing Strategy improvement in the Pahlawan Tuanku Tambusai University campus area.

Assessment criteria	Max value	Mark
CWS 1	2	**2**
CWS 2	4	5
CWS 3	4	1
CWS 4	2	2
CWS 5	2	1
CWS 6	2	0
Amount	**16**	**12**

To improve the CWS score, the campus can take more comprehensive measures related to area security. Although social interaction facilities, local economic facilities, cultural activities, and satisfaction surveys have been implemented effectively, the lack of fully meeting security standards has prevented the score in this category from reaching its maximum level. Therefore, the campus needs to enhance and strengthen its security system by installing CCTV in all potentially risky areas, providing adequate lighting on pedestrian paths and high-traffic points, and deploying 24-hour security personnel. Furthermore, developing emergency procedures and providing safety training for students and staff is crucial to ensure the safety and security of all campus residents. By improving these aspects, the quality of comfort and security within the campus environment will improve, potentially raising the CWS score to a more optimal level.

f. Building and Energy (BAE)

The BAE category received 2 out of 18 points, primarily due to the lack of certified green buildings, the lack of alternative energy sources, and the lack of street and garden lighting. Points were earned solely for light pollution reduction indicators.

Table 6. Building and Energy improvement in the Pahlawan Tuanku Tambusai University campus area.

Assessment criteria	Max value	Mark
BAE 1	6	0
BAE 2	1	0
BAE 3	4	0
BAE 4	3	0
BAE 5	2	2
BAE 6	2	0
Amount	**18**	**2**

To improve their score in the Buildings and Energy (BAE) category, campuses need to take several mutually supportive strategic steps. The most fundamental step is to begin building or designate a building as a green building model that meets sustainability criteria, such as energy efficiency, utilization of natural light, and the use of environmentally friendly materials. Furthermore, campuses can increase energy independence by installing solar panels on key buildings to provide more efficient alternative energy sources. Improving area lighting is also important through the installation of street and garden lights, especially in high-activity areas, using energy-efficient or solar-powered lamps to align with resource efficiency principles. These efforts not only help the campus earn additional points in the BAE assessment but also strengthen its image as a region committed to sustainable development.

g. Innovation and Future Development (IFD)

The IFD category received 0 out of 11 points. The campus did not involve Greenship Associate/Professional experts, did not have standard operating procedures (SOPs) for area management, and did not propose innovations that could improve the area's sustainability. The low score in this category indicates a lack of innovative policies in area management.

Table 7. Innovation and Future Development improvement in the Pahlawan Tuanku Tambusai University campus area.

Assessment criteria	Max value	Mark
IFD 1	3	0
IFD 2	2	0
IFD 3	6	0
Amount	**11**	**0**

To increase their score in the Innovation and Future Development (IFD) category, campuses need to start involving experts with Greenship Associate or Greenship Professional certifications to ensure area management adheres to recognized sustainability standards. Furthermore, campuses must develop and implement clear Standard Operating Procedures (SOPs) for area management, including energy, water, and waste management, as well as strengthening the function of open spaces. Campuses should also design and propose innovative programs that can improve environmental quality, such as implementing a digital-based energy monitoring system, innovative integrated waste management, or developing educational green spaces. With structured policies, expert involvement, and innovative programs submitted to the GBCI, the IFD category will significantly increase its score.

5. Conclusion

Based on the evaluation results of the implementation of Greenship Neighborhood Version 1.0 in the Pahlawan Tuanku Tambusai University Campus area, a total value of 41 points was obtained from a maximum of 124 points, or equivalent to 33%, so that the campus is ranked Bronze.

According to the Green Building Council Indonesia (GBCI) classification, the assessment of seven main categories showed that the implementation of sustainability concepts across campus areas is not yet evenly distributed. The Community Welfare Strategy (CWS) and Solid Waste and Materials (SWM) categories achieved the highest scores, indicating that the campus has paid sufficient attention to social aspects, community facilities, and waste management. Meanwhile, the Water Conservation and Management (WMC) and Development and Innovation (IFD) categories received zero scores due to the absence of a water conservation system, the lack of regional innovation, and the lack of experts and supporting documentation for regional management. The Buildings and Energy (BAE) and Movement and Connectivity (MAC) categories also showed low performance, indicating the need for improvements in the provision of energy-efficient facilities, regional lighting, environmentally friendly transportation facilities, and internal connectivity. Overall, the study results show that although some aspects have partially met Greenship standards, the campus area still requires significant improvement efforts, particularly in the aspects of water conservation, innovation, energy management, and strengthening regional management to achieve a higher level of sustainability in the future.

References

Adeswastoto, H., Setiawan, B., Desrimon, A., Febryanto, F., Putra, A. A., & Islah, M. (2023). Analisis Penerapan Green Building Pada Bangunan Gedung Klinik Universitas

Pahlawan. Journal of Engineering Science and Technology Management (JES-TM), 3(1), 37–43. https://doi.org/10.31004/jestm.v3i1.99

Arif, M. (2023). Perancangan Kampus Universitas Negeri Pasangkayu Dengan Penerapan Sistem Green Roof Di Kabupaten Pasangkayu.

El Baqir, A. A. M., & Syamsiyah, N. R. (2021). Identifikasi Green Area Pada Kawasan De Tjolomadoe Karanganyar Melalui Penilaian Greenship Neighborhood Versi 1.0. Arsir, 13-23.

Fajri, M. (2021). Neighborhood Pada Kawasan Perumahan Cluster Bali Pavilion Di Pekanbaru. 163410085.

Nurwidyaningrum, D., Leoriza, A., Pertiwi, E. P., & Broto, A. B. (2022). Assessment Greenship Neighborhood Pada Pemanfaatan Limbah Padat Di Kampus (Studi Kasus : Politeknik Negeri Jakarta). Seminar Nasional Teknik Sipil Politeknik Negeri Jakarta, E-Issn: 27(September), 35–42.

Rabbianty, E. N. (2022). Pemahaman Mahasiswa Terhadap Literasi Lingkungan. Andragogi: Jurnal Diklat Teknis Pendidikan Dan Keagamaan, 10(2), 163–176.

Ratnaningsih, A., Kriswardhana, W., & Ufiantara, H. (2021). Analisis Investasi Kawasan Hijau Perumahan Berdasarkan Greenship Neighborhood V.1.0 (Studi Kasus Istana Kaliwates Regency). Teras Jurnal : Jurnal Teknik Sipil, 11(1), 17. https://doi.org/10.29103/tj.v11i1.344

Riky Wahyudi. (2023). Analisis Penerapan Green Building Pada Diajukan Guna Melengkapi Persyaratan Untuk Memenuhi Gelar Sarjana Teknik Program Studi S1 Teknik Sipil Program Studi S1 Teknik Sipil.

Sapitri, & Aziz, Z. (2021). Penilaian Kawasan Perumahan dengan Pendekatan Konsep Berkelanjutan (Greenship Neighborhood Assessment). Cantilever: Jurnal Penelitian Dan Kajian Bidang Teknik Sipil, 10(1), 63–71. https://doi.org/10.35139/cantilever.v10i1.98

Sasongko, I. (2023). Pengembangan Berkelanjutan Penyediaan Infrastrukstur Pada Kawasan Pemukiman Secara Berkelanjutan (Vol. 1). http://eprints.itn.ac.id/id/eprint/11360

SYAH, P. R. (2023). Penilaian Kawasan Hijau Kampus Gedong Meneng Universitas Lampung Dengan Metode Greenship Neighborhood Untuk Mendukung …. 223–228. Http://Digilib.Unila.Ac.Id/72694/%0ahttp://Digilib.Unila.Ac.Id/72694/3/Tesis Tanpa Bab Pembahasan.Pdf

Terro, M. J., Soliman, A. M., & Angell, J. (2021). Taxonomy of tertiary education campus planning. Journal of Architecture and Urbanism, 45(1), 19–37. https://doi.org/10.3846/jau.2021.13514

Utami, N., Saragih, R. F., Daulay, M., Daffa Maulana, M., & Ramadani, P. (2023). Sosial Dan Ekonomi Indonesia. Journal of Management and Social Sciences, 2(1), 2963–5047.

Wahjono, H. (2022). Pembangunan Kawasan Industri Berkelanjutan Dalam Perencanaan EX Lanud. Gorda-Serang Sebagai Kawasan Industri. Seminar Nasional Keberlanjutan Ruang Huni Masa Depan, 261–268.

Widodo, Y. W., Hajji, A. M., & Ariestadi, D. (2021). Peningkatan Ekologi Lahan di Universitas Negeri Malang melalui Rating tool Greenship Kawasan. Dampak, 18(2), 78. https://doi.org/10.25077/dampak.18.2.78-90.2021