

## STRATEGIC PLANNING FORMULATION FOR THE DEVELOPMENT OF A GREEN HOUSING ESTATE DESIGN

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### ABSTRACT

*The rapid development of Balikpapan built environment is influenced by the development of the relocation of Indonesia's capital city to the East Kalimantan Province. One impact that should be anticipated is the increase in immigrant and land conversion due to infrastructure expansion and the effect on the natural urban ecosystem. The disruption of the natural environment can indirectly affect welfare, such as the lack of accessibility of residents to appropriate resources. The quality of the housing environment has a fundamental significance on the quality of life; however, a measurable design approach is still unseen in the Grand City housing in Balikpapan. This research aims to formulate an improvement design strategy for a green neighborhood following the greenship criteria. Using SWOT analysis, internal and external factors were compiled in the qualitative matrix to generate design strategies. The result shows that internal and external source factors support the improvement by depicting the developed area's strengths and weaknesses. The essential enhancements for the area are the movement and connectivity and the building and energy criteria. At the same time, the other improvements are related to the provision and the development of the existing elements could improve the green innovation of the area to be more environmental-friendly.*

**Keywords:** Green Neighborhood, Greenship Criteria, Strategic Planning

### INTRODUCTION

Urban development is an ongoing activity that aims to utilize land or improve areas to become more efficient and productive. In the context of using vacant land in built-up areas, the uncontrolled conversion of green land into buildings without being balanced by green landscape conservation in urban areas will contribute to the emergence of the UHI (Urban Heat Island) phenomenon in urban areas. Previous research conducted in Balikpapan City showed that in about 3 decades, there was an increase in built-up areas of 67%, which can be seen from the land cover in the form

of buildings and pavements compared to the total city land during that period. This shows that urban growth and development occur rapidly and quickly so that the area of green land that functions as a medium for water absorption is significantly reduced (Jordan, Sherlia and Syafitri, 2021). Buildings are one of the objects of development that contribute to the addition of greenhouse gases through the implemented systems and the activities of their users. Although the contribution percentage is still smaller than the energy, forestry, and agriculture sectors, building construction significantly increases the surface temperature in the surrounding area, contributing to the UHI effect (Ditjen Cipta Karya, 2021). The relationship between these two phenomena indirectly leads to an increase in greenhouse gases due to the increase in the number of buildings.

According to the World Green Building Council, green buildings are buildings that have reduced or eliminated the negative impacts of the development of the built environment on the natural environment, starting from the design planning process, construction, and operation. The benefits of green built environment planning are not only in terms of energy and natural resource efficiency that support economic and environmental sustainability but are correlated with public health that encourages the welfare of quality of life. This is in line with Sustainable Development Goal number 11, namely, to create inclusive, safe, resilient and sustainable cities and settlements. However, behind these benefits, there are challenges in the implementation of green buildings, such as the lack of public tendency towards green buildings, the lack of information regarding green building methods, and the uncertainty of regulations regarding the construction of green buildings (Kevin *et al.*, 2016).

Balikpapan as a developing industrial city has the potential for regional growth that needs to be considered for its continuation. The emergence of sustainable development has become a pressing priority within the real estate sector. Alongside traditional cost-saving objectives, there is a growing recognition of the potential for sustainable buildings to address broader economic, social, and health-related sustainability challenges (Walker and Goubran, 2020). As the industry confronts mounting pressure to integrate new and more stringent environmental and urban development guidelines, it is essential to explore strategies that empower developers to tackle these multifaceted sustainability imperatives. Integrating the "green" concept into the overall neighborhood design and planning can yield substantial benefits, including energy savings, reduced environmental impact, and enhanced quality of life for residents (Feng and Xingkuan, 2011; Nurdiani, 2020; Shareef and Altan, 2021). This necessitates a comprehensive approach that addresses various factors, such as building design, transportation, landscaping, and community engagement (Ramli *et al.*, 2019).

GreenSHIP neighborhood is a certification system, created by Green Building Council Indonesia, aimed at creating a sustainable and environmentally friendly area for users. Generally, GreenSHIP neighborhood is used to assess residential areas, trade and service centers, industrial areas, and other small or large areas. The benefits of implementing this criterion include maintaining the harmony and balance of the environmental ecosystem, as well as improving the quality of a healthy area environment, minimizing the impact of development on the environment, improving

the quality of the microclimate, implementing the principles of connectivity, ease of access, safety, and comfort on pedestrian paths, and maintaining a balance between needs and availability of resources in the future (Green Building Council Indonesia, 2015).

The application of the green concept in the Grand City housing complex, Balikpapan was first carried out as a promotional media to the community to position this location as an environmentally friendly residential area. The visible effort from this is the proportional provision of green open space compared to the building. However, claims for green design have not been truly measured using clear references regarding the achievement of green design strategies. Measuring greenship criteria is a reference in submitting certification or examining existing elements against the required provisions. In fact, in the context of design, the use of design references such as greenship criteria can be said to play an important role in the sustainability of concepts in areas that are still developing and are used as clear benchmarks in the application of concepts. This study uses greenship criteria as evaluation criteria that are observed from the internal and external points of view to generate development planning strategies.

## **THEORY / RESEARCH METHODS**

Application of green built environment design is one step in realizing a sustainable built environment that specifically prioritizes the use of environmentally friendly materials, balanced design between buildings and green spaces, and the use of integrated energy efficiency building systems. However, the function of design will in line with public awareness and also proficient understanding by building users (Akpan Umoh *et al.*, 2024). Simultaneously, the behavior of users of the Green Area also supports the success of the environmental acts, through external factors such as the environment that creates a necessity for green behavior. In the design process, the formation of space can be done by looking at the activities of space users in detail, to create a sense of belonging (Pramudito, 2014; Jordan and Ulimaz, 2019). Several cases of green architecture show a strong relationship between energy-efficient design decisions and the users' right to clean water and fresh air, while creating high-performance low-emission buildings (Philip Jadidio, 2000).

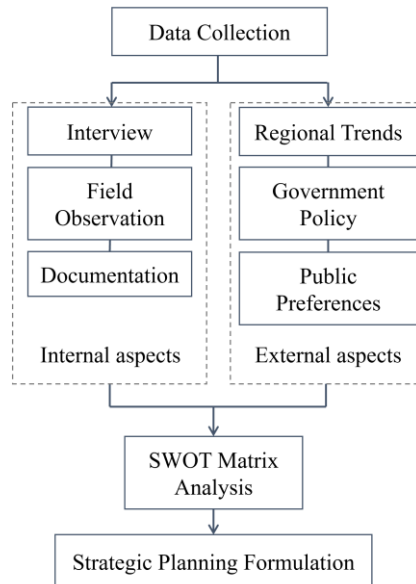
In the context of green areas assessment, the physical criteria for greenship neighborhoods that are set include Land Ecological Enhancement (LEE) which assesses the site management in terms of ecologically adaptive, sustainable, and productive public green space provision. While the Movement and Connectivity (MAC) category measures the availability of supporting infrastructure and accessibility that prioritize energy efficiency. Water Management and Conservation (WMC) emphasizes water management on site, including clean water, grey water, and stormwater. The Solid Waste and Material (SWM) category focuses on the management of solid waste and post-construction waste that minimizes off-site waste disposal. The Community Wellbeing Strategy (CWS) assesses the availability of public facilities, and an inclusive and safe environment, meanwhile,

Building and Energy (BAE) evaluates renewable energy use in buildings to minimize carbon emissions (Green Building Council Indonesia, 2015).

Through a study of these criteria, the greenship neighborhood model generally links the global agenda on climate change with design and planning applications. This connects the importance of the natural environment sustainability such as flora and fauna to human activities that produce pollution, consumption of natural resources, and also carbon footprint with the environment design. Meanwhile, the focus on the provision of infrastructure and utilities for the user community is an indicator of social sustainability that can support aspects of regional inclusivity. This is in line with research findings that show a relationship between the condition of the living-built environment that can affect social cohesion. Aspects that influence include the existence of green space can increase the vitality of the area, and the availability of public facilities, area density, and the availability of public transportation that have a positive impact on the creation of productive space for the community (Ahmad *et al.*, 2017; Mouratidis and Poortinga, 2020).

This research employed a qualitative analysis approach to focus the discussion on the natural conditions of the observed object. Through data interpretation emphasizing the qualities of the location, its people, and the meaning attributed to the place, the qualitative method utilized interviews, mapping, documentation, and focused observation (Figure 1) to obtain a comprehensive understanding (Groat and Wang, 2013). This study falls under the category of case study research, aiming to conduct an in-depth analysis of specific issues within a particular location. In design research focused on a specific location, qualitative methods are valuable for establishing priorities used to maximize the effectiveness of the chosen strategies (Fross *et al.*, 2015).

The SWOT analysis is used to generate the optimal possibilities for planning and decision-making. It uses internal and external aspects of the case study, collected by field observation survey and desktop survey of the physical condition. Identification of the aspects helps the researchers to investigate the different perspectives and possibilities of certain development plans (Gurl, 2017). Internal aspects are sought as the advantages and disadvantages of the object, which are generally obtained through field studies, site data, interviews with managers and users, and documents related to the location and manager. Meanwhile, external aspects are opportunities and challenges in developing the location in accordance with the vision. The external aspect is generally obtained through studies of relevant policies, market, and competitor aspects, and elements from outside the location and manager that can be utilized or addressed in further planning. The focused physical object for this planning is grouped by the greenship neighborhood criteria, which mostly related to the land and open spaces, drainage systems, and waste receptables.



**Figure 1.** The Steps of SWOT Analysis

Internal and external aspects are then arranged in a SWOT matrix to go through a matching process between positive things that can be strengthened and negative things that need to be addressed in a strategy. In the context of housing location development, the strategy developed is focused on achieving growth (Mashuri and Nurjannah, 2020), both in terms of increasing the potential of the location and increasing sales. Therefore, the use of SWOT analysis can be an integrative step for the development of various sector considerations (Benzaghta *et al.*, 2021). The final stage was the formulation of strategic planning from a SWOT matrix that employed a descriptive technique to ensure the whole greenship criteria was addressed.

## RESULTS AND DISCUSSION

This research was conducted at Grand City Estate, Balikpapan, Indonesia, which is one of the housing developments, developing since 2019. Located in the northern city development area, this area has an area of 240 ha (Figure 2), with a built-up area of around 80 ha until 2024. At the beginning of the planning, this housing area used a green design concept, the main one being the provision of green space that is balanced with the planned buildings. In addition to residential areas that are grouped into several clusters with different types of houses, this area is starting to be equipped with commercial areas and schools.

Referring to the Greenship Neighborhood criteria, there are 6 out of 7 criteria that are physically appropriate to the case study, which must be met by an area to be designed as a green neighborhood: Land Ecological Enhancement (LEE), Movement

and Connectivity (MAC), Water Management and Conservation (WMC), Solid Waste and Material (SWM), Community Wellbeing Strategy (CWS), and Building and Energy (BAE). A SWOT analysis process was then conducted on all criteria to develop strategies from all aspects of neighborhood development because these criteria are inseparable. The components of strength, weakness, opportunity, and threat for each criterion were arranged in a matrix to align internal and external aspects into a strategy.



**Figure 2.** Grand City Housing Complex Location

Source: satellite map, 2024

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Firstly, the LEE criterion is the basic land management that is related to the land employment concept to create a pleasant microclimate. According to Figure 3, the site's strong aspect is the availability of green open space, which is generally uncultivated land, while the weak point of the site is the detailed planning of the *softscape* (vegetation and water) landscape elements. This condition happened because the housing area has not been fully built, so the availability of green space is still quite extensive. In addition, the existing development provides open areas in the form of green paths and pavements that are incidentally used by the community for exercise. Along with these internal aspects, the possibility of external funding and the high intensity of rain and sun exposure are the factors that can support the planning. This criterion can be achieved by improving the plant management that significantly retains the native vegetation, especially the wide-shaded one for

protection. In addition, the provision of fruit and vegetable trees at the park can enhance people's experience and drive social interaction. Developing as one city's access, the development of a multifunction public park can create a livable street and square for the residents and travelers.

	<b>Strength (S)</b> <ul style="list-style-type: none"> <li>• A park that accommodates community interaction is available for residents' recreational area.</li> <li>• Green areas, including green pathways and lawns, cover more than 35% of the total land area.</li> <li>• Plant management documents within the area are available</li> </ul>	<b>Weakness (W)</b> <ul style="list-style-type: none"> <li>• The Grand City area does not preserve indigenous trees but plants new ones.</li> <li>• There is no revitalization of land and buildings from new land clearing.</li> <li>• There is no planning for public spaces aimed at improving the microclimate conditions in the area.</li> <li>• There is no designated land for local vegetable or fruit production.</li> </ul>
<b>Opportunity (O)</b> <ul style="list-style-type: none"> <li>• There is a Physical Special Allocation Fund (DAK) from the National Budget (APBN) in the field of Environment and Forestry for the provision of green open spaces.</li> <li>• A growing trend among the community for activities in public spaces, such as relaxing or exercising.</li> <li>• The strategic location of Grand City along the main city axis as a primary circulation route.</li> </ul>	<b>S-O</b> <ul style="list-style-type: none"> <li>• Develop a more detailed plant management plan, using local plant species, while utilizing the special allocation fund in the field of environment and forestry.</li> <li>• Provide functional green open spaces, particularly for relaxation and exercise.</li> <li>• Provide transit areas with play and relaxation spaces for both intra-city and inter-city travelers.</li> </ul>	<b>W-O</b> <ul style="list-style-type: none"> <li>• Utilize the special allocation fund in the field of Environment and Forestry to provide green open spaces using native site vegetation, which can enhance the microclimate.</li> <li>• Provide fruits and vegetable farm that accessible for residents and travelers from the main inter-city route</li> </ul>
<b>Threat (T)</b> <ul style="list-style-type: none"> <li>• The city's annual rainfall data shows that the category is classified as Very Heavy Rain, ranging between 100-150 mm/day.</li> <li>• The sunlight intensity in Balikpapan is at a high level, with the UV index ranging from very high to extreme.</li> </ul>	<b>S-T</b> <ul style="list-style-type: none"> <li>• Provide green open spaces with wide-shaded vegetation in activity areas to mitigate high temperatures and UV exposure.</li> <li>• Provide open spaces for relaxation and play with shelter and shading elements on building walls to protect against heavy rainfall.</li> </ul>	<b>W-T</b> <ul style="list-style-type: none"> <li>• Plan for green land revitalization due to new developments to anticipate heavy rainfall, equipped with a rainwater drainage system.</li> <li>• Provide open spaces outside buildings with broad-canopied vegetation that can shade building windows to address high temperatures.</li> </ul>

**Figure 3.** SWOT Analysis of Land Ecological Enhancement Criteria

Secondly, the MAC element provided includes the bicycle lane and off-street parking, while the pedestrian pathway and transit facilities are unavailable (Figure 4). The main street provided that connects both entrances is equipped with a dedicated bicycle lane, bordered by road markings, that was used not only by cyclists but also by pedestrians, as there was no pedestrian path yet. These aspects can be maximized to provide connected and integrated basic pedestrian facilities. High pedestrian activity, especially in commercial areas, needs to be supported by pedestrian pathways connected to both entrance and public transportation stops. Additionally, to enhance pedestrian safety, traffic calming devices and lane separation should be planned to ensure smooth movement for various road users.

	<b>Strength (S)</b> <ul style="list-style-type: none"> <li>• Accessibility planning for the area has been conducted through a local traffic study.</li> <li>• It meets 7 basic infrastructure utility standards.</li> <li>• Dedicated bicycle lanes are available on the main roads of the area.</li> <li>• Off-street public parking spaces are available.</li> </ul>	<b>Weakness (W)</b> <ul style="list-style-type: none"> <li>• A dedicated path for pedestrians is unavailable, both in the main route and the secondary route</li> <li>• No bus stop is accessible 400 m from the site boundary</li> <li>• There are no specific facilities that support accessibility for users with special needs and children.</li> </ul>
<b>Opportunity (O)</b> <ul style="list-style-type: none"> <li>• The area is located between the city's primary arterial routes which connect municipal intermodal facilities, such as bus station and airport</li> <li>• There is the development of bus rapid transit that passes one of the housing entrances</li> </ul>	<b>S-O</b> <ul style="list-style-type: none"> <li>• Improvement of the quality and scale of basic infrastructure services in the area to support the mobility of public facilities</li> <li>• Provision of multimodal traffic management using surrounding traffic studies to connect residential routes with city arterial routes</li> <li>• Improvement of off-street parking areas to accommodate the needs of public area users to support the use of multi-mode mobility</li> </ul>	<b>W-O</b> <ul style="list-style-type: none"> <li>• Provision of bus rapid transit stops at both site's entrances</li> <li>• Provision of pedestrian paths equipped with facilities for users with special needs on the main routes that are connected to the city's primary arterial routes</li> </ul>
<b>Threat (T)</b> <ul style="list-style-type: none"> <li>• The location is not connected to the city's public transportation route</li> <li>• As one of the city's shortcut routes, traffic on the main housing route tends to be high speed, which can threaten the safety of cyclists and pedestrians.</li> </ul>	<b>S-T</b> <ul style="list-style-type: none"> <li>• Provision of traffic calming features through traffic studies to anticipate vehicles traveling at high speeds</li> <li>• Improving the function of regional infrastructure to support the planning of public transportation routes through the area</li> </ul>	<b>W-T</b> <ul style="list-style-type: none"> <li>• Planning of pedestrian facilities integrated with city accessibility improvement plans</li> <li>• Provision of public transportation stops to reduce high vehicle speeds</li> </ul>

**Figure 4.** SWOT Analysis of Movement and Connectivity Criteria



In the WMC criteria (Figure 5), the aspect that needs significant improvement is stormwater management, which can lead to water pooling during heavy rain. One green design solution approach is to manage rainwater as an alternative water source on-site. This not only involves providing water storage facilities like ponds but also includes rainwater channels and drainage systems that can efficiently handle high water volumes. The system should be comprehensively planned for buildings, roads, and open spaces to prevent water overflow. Additionally, liquid waste management can be carried out using a centralized system or managed independently by buildings, following standards that consider the sustainability of the natural environment.

	<b>Strength (S)</b> <ul style="list-style-type: none"> <li>Provision of clean water in the area is carried out independently by processing groundwater and rainwater</li> <li>Zoning has been carried out on the distance between water bodies and buildings in the area masterplan</li> <li>Availability of wastewater management using bio fil for septic tanks</li> </ul>	<b>Weakness (W)</b> <ul style="list-style-type: none"> <li>There is no provision of alternative water for 30% of the area's clean water needs.</li> <li>There is no management of rainwater runoff in the area.</li> </ul>
<b>Opportunity (O)</b> <ul style="list-style-type: none"> <li>Rainfall data are in the category of very heavy rain, namely 100-150 mm/day</li> <li>The area is on a contour that tends to be low</li> </ul>	<b>S-O</b> <ul style="list-style-type: none"> <li>Provision of clean water can maximize the processing of abundant rainwater as an alternative to clean water source</li> <li>Improvement of wastewater management in low contour areas can be maximized to minimize the black water discharge off-site</li> </ul>	<b>W-O</b> <ul style="list-style-type: none"> <li>Planning a rainwater harvesting system in existing or new buildings in the area.</li> <li>Planning a rainwater runoff management in areas with very heavy rainfall to the lowest area, utilizing the site's contour.</li> </ul>
<b>Threat (T)</b> <ul style="list-style-type: none"> <li>The main access to the housing complex bordering MT Haryono Street is vulnerable to flooding during heavy rain</li> <li>Limited water supply from the city's clean water company to meet the housing's water needs</li> </ul>	<b>S-T</b> <ul style="list-style-type: none"> <li>Provide a clean water supply system independently in the area and buildings to overcome the limited water supply from the city</li> <li>Improve the function of water bodies to reduce the risk of rainwater runoff into the building area and onto the road to the main access</li> </ul>	<b>W-T</b> <ul style="list-style-type: none"> <li>Planning a drainage system that can quickly drain rainwater into water bodies in the area to reduce the risk of flooding</li> <li>Planning a recycling system for gray water from buildings to become an alternative secondary water source to anticipate insufficient water supply from the city</li> </ul>

**Figure 5.** SWOT Analysis of Water Management and Conservation

Overall, the SWOT component of the SWM criteria indicated in Figure 6 is minimally achieved, particularly regarding the use of local materials for roads. However, the area still needs to provide a waste management and processing system.

The integration of the waste processing programs of the local government can be improved by providing independent waste processing facilities. This refers to the green neighborhood criteria, that the site should implement on-site waste processing and minimize the disposal of waste off-site. The waste includes not only food and beverage waste but also construction waste, liquid waste, and hazardous waste (B3) from related activities. Furthermore, the use of recycled materials in construction and activities on-site can reduce the volume of waste generated.

	<b>Strength (S)</b> <ul style="list-style-type: none"> <li>• Road construction used local materials from the Kariangau area.</li> <li>• Public awareness in Grand City Housing is high regarding environmental cleanliness.</li> <li>• The Grand City food court area has recycled waste pick-up points. The collected waste will be distributed to the advanced waste processor in Karang Rejo, Balikpapan.</li> </ul>	<b>Weakness (W)</b> <ul style="list-style-type: none"> <li>• The absence of specific management of B3 and construction waste can cause pollution.</li> <li>• The absence of specific management of liquid waste will cause GHG emissions in lakes, rivers, and seas.</li> <li>• There is no waste sorting from the source.</li> <li>• The built environment on site does not use recyclable materials</li> </ul>
<b>Opportunity (O)</b> <ul style="list-style-type: none"> <li>• Some companies open B3 waste management services in Balikpapan, this opens up opportunities for construction waste or toxic waste to be managed immediately by local companies that already have B3 management permits.</li> <li>• There is Local Government Regulation No. 4 of 2022 which regulates the management of household waste and household-like waste</li> </ul>	<b>S-O</b> <ul style="list-style-type: none"> <li>• Creation and improvement of new waste management facilities and infrastructure, supported by service companies and Balikpapan City regional regulations.</li> <li>• Provision of standardized trash bins especially in food courts, tenants, shops, cafes, and other public areas.</li> </ul>	<b>W-O</b> <ul style="list-style-type: none"> <li>• Cooperation between private companies engaged in the field of B3 waste management services, construction waste, and toxic waste with the Grand City Housing.</li> <li>• Using recyclable local materials to reduce carbon emissions and costs incurred.</li> </ul>
<b>Threat (T)</b> <ul style="list-style-type: none"> <li>• In 2022, floods hit the city of Balikpapan, one of the external factors included littering that affected drainage blockages that caused flooding.</li> </ul>	<b>S-T</b> <ul style="list-style-type: none"> <li>• Provision of environmental awareness signage and infographic about waste management and environmentally friendly technology on site.</li> <li>• Improve the waste system from containers to waste transportation by scheduled garbage trucks and a dedicated waste processing plant.</li> </ul>	<b>W-T</b> <ul style="list-style-type: none"> <li>• Provision of separated waste bins for organic, inorganic, and toxic waste, as well as improving the waste transportation system so that the waste produced can be processed on-site.</li> <li>• Utilizing waste to be recycled, reused and not producing environmental pollution.</li> </ul>

**Figure 6.** SWOT Analysis of Solid Waste and Material

The Community Wellbeing Strategy is a criterion that is not evenly achieved in the area (Figure 7). Despite the cluster layout of housing, which tends to create individualistic residents, the commercial area and public facilities, on the contrary, encourage interaction between residents and visitors or travelers. Increasing the number of shared facilities for residents within the clusters is necessary to enhance the comfort and security of the community. Adding public facilities that are accessible to the public as environmental elements can improve the comfort of people in their activities.

	<b>Strength (S)</b> <ul style="list-style-type: none"> <li>• The commercial area supports the user's social interaction and is open to the public.</li> <li>• There are various types of tenants.</li> <li>• There are commercial areas</li> <li>• The housing employs one-gate system, guarded by a 24-hour security officer and camera surveillance.</li> </ul>	<b>Weakness (W)</b> <ul style="list-style-type: none"> <li>• The cost of renting a shop or tenant is too expensive.</li> <li>• The characteristics of the community tend to be individualistic</li> <li>• Public facilities tend to be incomplete, such as the absence of a prayer room, family recreation, sports facilities, gym, and medical facilities.</li> <li>• There is no concept of bargaining (traditional market)</li> </ul>
<b>Opportunity (O)</b> <ul style="list-style-type: none"> <li>• The location is very strategic toward the city (accessible through MT Haryono - Soekarno Hatta Street)</li> <li>• Access to the housing site is open to the public</li> </ul>	<b>S-O</b> <ul style="list-style-type: none"> <li>• Development of trade and service areas and supporting areas, such as public parks as a means of recreation.</li> <li>• Development of the security sector both from crime and from vehicle speed using Internet of Things technology with complete web cameras and speed sensors.</li> </ul>	<b>W-O</b> <ul style="list-style-type: none"> <li>• Development of public facilities in the Housing area to provide comfort for activities and space for movement of the housing community.</li> <li>• Adding and Developing tenants at affordable prices.</li> </ul>
<b>Threat (T)</b> <ul style="list-style-type: none"> <li>• Tenant rental prices are very expensive, so food and beverage prices exceed the standard price in Balikpapan City.</li> <li>• People's lifestyles tend to be modern</li> </ul>	<b>S-T</b> <ul style="list-style-type: none"> <li>• Development of supporting facilities and infrastructure for commercial areas within housing such as pedestrian access, public open spaces, street lighting, and parking.</li> <li>• Development of public spaces to conserve local culture.</li> </ul>	<b>W-T</b> <ul style="list-style-type: none"> <li>• Improve governance and marketing of Grand City Housing</li> <li>• Development of a supermarket with a modern concept.</li> </ul>

**Figure 7.** SWOT Analysis of Community Wellbeing Strategy

Lastly, the BAE criteria are also minimally achieved (Figure 8), specifically regarding the separation of residential areas from public zones to minimize noise. On the other hand, the energy aspect in the area has not been met, as there are no certified green buildings. A key improvement is to create an alternative energy supply system for public facilities and encourage its use in residential areas. As an area designed to balance the built environment and the natural environment, the

residential area needs to implement a green building pilot project in new developments. Additionally, the use of energy-efficient technology in construction and equipment used on-site can be an initial step towards the area becoming self-sufficient in energy provision.

	<b>Strength (S)</b> <ul style="list-style-type: none"> <li>Green environment concept complex or cluster</li> <li>Housing design uses a cluster concept to reduce noise pollution and create more private and distanced neighborhoods from public facilities.</li> </ul>	<b>Weakness (W)</b> <ul style="list-style-type: none"> <li>There are no Greenship-certified buildings</li> <li>Not using environmentally friendly technology</li> <li>Only using PLN as an energy and electricity source</li> </ul>
<b>Opportunity (O)</b> <ul style="list-style-type: none"> <li>Grand City Housing is under the auspices of Sinar Mas Land Corp, the largest and most diversified property developer in Indonesia.</li> </ul>	<b>S-O</b> <ul style="list-style-type: none"> <li>Developing the concept of smart living by making energy-efficient housing clusters and buildings.</li> <li>Housing development by optimizing sunlight and natural lighting around.</li> </ul>	<b>W-O</b> <ul style="list-style-type: none"> <li>Plan the green building clusters that certify new and existing houses</li> <li>Development of buildings using environmentally friendly technology</li> <li>Development of alternative energy for outdoor appliances and commercial buildings.</li> </ul>
<b>Threat (T)</b> <ul style="list-style-type: none"> <li>Does not involve certified greenship professional experts in the planning and construction phase</li> </ul>	<b>S-T</b> <ul style="list-style-type: none"> <li>Collaborate with experts who have professional greenship certification</li> </ul>	<b>W-T</b> <ul style="list-style-type: none"> <li>Cooperate with professional greenship experts to conduct green certification building assessments.</li> <li>Buildings use renewable energy sources with low-carbon energy systems.</li> </ul>

**Figure 8.** SWOT Analysis of Building and Energy

Based on the strategic formulation conducted, although the area does not fully meet the Greenship Neighborhood criteria, there is evidence of efforts to implement green neighborhood principles in several aspects. Moreover, there is an interrelationship between various criteria, which, if planned with holistic environmental considerations, can create a sustainable system. For example, the LEE (Land Ecological Enhancement) criteria and the CWS (Community Wellbeing Strategy) criteria are interconnected in creating user-friendly interaction spaces that promote outdoor activities. This is indirectly related to the provision of relaxation and recreation areas that serve as spaces for users to unwind. Another example is the relationship between the WMC (Water Management and Conservation) and SWM (Solid Waste Management) criteria, particularly in waste management. The choice of smart and energy-efficient technology drives user behavior on-site in generating both solid and liquid waste that directly impacts the waste management process. By

minimizing and segregating waste production, sustainable waste processing can be effectively conducted, potentially entirely within the site.

The incomplete master plan of the area is one of the factors contributing to the unfulfilled criteria. However, through an analysis of existing conditions in light of the current development progress, planners can undertake evaluations as steps toward refining and improving the built environment. For instance, the absence of integrated pedestrian facilities in the existing conditions, due to the proximity of parking areas to vehicular roads, necessitates reconsideration. Given current usage patterns and the high volume of pedestrian traffic, the provision of dedicated pedestrian pathways is essential.

To attain recognition as a green neighborhood, the area must adhere to the standards outlined in the guidelines. According to the Greenship Neighborhood criteria, Grand City Estate must enhance all aspects that are currently lacking, such as public parks, pedestrian facilities, integrated multi-modal transport systems, waste, and stormwater management systems, and the provision of alternative water and energy sources. Meeting these criteria is crucial not only for improving the comfort of residents but also for ensuring environmental sustainability on-site. Furthermore, such development can enhance the area's role as a strategic residential location and a social epicenter at the city level.

## CONCLUSIONS

The adaptation of Greenship Neighborhood criteria as an evaluative framework for sites that have not yet adopted these standards requires alignment with the specific development goals and design intents of the project. The applied green design in the current built area needs to be improved by sets of indicators that can ensure a successful sustainable design. Physical enhancement in the desired concept, appointed by Green Building Council Indonesia, shows a connection between the creation of public space with the user's comfort, which drives livability in the development area. Such alignment ensures a cohesive understanding among stakeholders, thereby enhancing the effectiveness of the evaluation and its direct applicability to management and planning processes.

The SWOT analysis process was conducted with a comprehensive examination of potential strengths, weaknesses, opportunities, and threats, both within the site and in its external environment. This method enables researchers to consider various perspectives, thereby facilitating the formulation of robust strategies for neighborhood development.

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