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Research Paper

Analysis of Space Designation Direction Based on Building Area Coefficient, Accessibility, and Building Function: Study on Lakidende University Development Plan

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Abstract

The growing population and increasing demand for space have made spatial planning a critical component of sustainable development. In a campus environment, efficient spatial organization supports both academic and social functions. With Lakidende University experiencing a rise in student numbers, strategic space utilization has become essential. This study analyzes the spatial development direction of Lakidende University based on building coefficient, accessibility, and building functions. A qualitative approach with a quantitative descriptive design was applied. Data were collected through field observations, documentation, and document review. Key variables included the building coverage ratio (minimum 30%), accessibility, and functional use of buildings. The analysis compared existing campus conditions with relevant spatial regulations. Tools such as ArcGIS and SketchUp supported site planning analysis. The findings indicate that Lakidende University, spanning 30,000 m^2, has 27,197.16 m^2 of non-buildable land (8.1%), while the current building coefficient reaches the minimum threshold of 30%. The available development area is 8,159.15 m^2. Based on the number of students, lecturers, and staff in 2023, projected spatial needs for new faculty buildings, a library, canteens, parking, and open areas amount to 5,964.5 m^2. This remains within the allowable development area. The results demonstrate adequate space for future expansion. This research offers fresh insight into campus spatial planning at Lakidende University, addressing previously unexamined gaps. By evaluating land use coefficients, accessibility, and spatial functions, the study presents practical strategies for efficient space management to support long-term institutional growth and sustainability.

Keywords: *Space Designation, Building Area Coefficient, Accessibility, Building Function*

INTRODUCTION

The rapid population growth, along with the need for space for housing and business activities, makes spatial planning increasingly crucial. According to Kuncorowati et al. (2024) and Permana (2023), permanent space requires planned planning so that its use does not cause negative impacts. The practice of uncontrolled use of space requires concrete regulations through a number of laws and regulations to ensure that the existence of space can be organized effectively and sustainably.

Spatial planning is an important element in sustainable regional development. With good planning, the use of space can support community welfare while maintaining environmental sustainability. As the complexity of community needs increases, the potential for misuse of space increases. This can lead to violations of spatial use that risk threatening the sustainability of the area (Simamora et al., 2022). Therefore, spatial planning efforts based on legal policies are very important to ensure the use of space in accordance with its intended use.

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Law No. 26 of 2007 concerning Spatial Planning regulates aspects of the arrangement, control, supervision, and evaluation of regional space. This arrangement aims to create order in the use of space. Control functions to prevent misuse of space, while evaluation aims to monitor and correct errors in the use of space.

One of the important aspects regulated in the Law is the provision of public space, especially in urban areas. This public space includes green open spaces and social areas that function as a place for community interaction while also having an ecological role to maintain environmental quality. For this reason, every use of space must be designed inclusively to be able to meet the social, ecological, and aesthetic needs of the community.

Studies on public space in the past focused more on the visual, physical, and boundary aspects of space (Chibli 2021; Grodach, 2009). However, in the modern era, the concept of public space has developed as a means of improving the quality of life of the community. Public space is not only in the form of public land, but also includes individual spaces that can be widely utilized by the community. One form of public space that plays an important role in the world of education is public space in the campus environment.

A university campus functions as both a private academic environment and a public space that facilitates intellectual exchange, psychological well-being, and ecological sustainability through the provision of green open areas. Well-designed public spaces are essential for fostering healthy interaction not only among academics but also between the university and the surrounding community. In contrast, inadequate spatial planning may result in fragmented spaces, limited interaction, and even spatial conflict.

For instance, research by Purnomo (2014) at Tanjungpura University revealed that inefficient spatial layout led to reduced academic interaction, disjointed building arrangements, and difficulties in supervision and coordination among faculties. Such spatial fragmentation can increase the potential for misunderstandings and conflict among university stakeholders. These findings underscore the importance of integrated spatial design that enhances connectivity, facilitates supervision, and strengthens institutional functionality.

In this context, Lakidende University (Unilaki), a private higher education institution located in Lolasabila Village, Wawotobi District, Unaaha City, Konawe Regency, occupies a total land area of approximately 3 hectares. According to the latest institutional data, the university currently accommodates 225 students and employs 124 academic staff members. Based on the Indonesian National Standard for educational infrastructure (SNI 03-1733-2004), the minimum recommended built area for academic use is 1.5 m^2 per individual. Applying this standard, the projected space requirement for academic and administrative functions at Unilaki is approximately 523.5 m^2 (calculated as 1.5 m^2 × [225 students + 124 lecturers]). This estimate excludes spatial allocations for ancillary facilities such as laboratories, libraries, circulation areas, and open green spaces. At present, the available built infrastructure falls below this threshold. Moreover, faculty offices remain integrated with the rectorate building, with each faculty unit able to accommodate only up to 10 individuals. This spatial limitation may hinder institutional efficiency and compromise the quality of academic service delivery.

Several scholars have explored the role of spatial design in enhancing the quality of campus environments. Gandasari et al. (2020), Kato and Taslim (2019), and Purwanto and Setioko (2018) emphasize the integration of green spaces to support ecological and spatial coherence. Meanwhile, Purnomo et al. (2014) proposed alternative layout models to optimize spatial distribution, and Ramadhani et al. (2013) examined usage patterns of academic spaces in large public universities.

However, most of these studies primarily focus on large, established public universities with extensive infrastructure and well-developed spatial resources. In contrast, spatial planning in small, private institutions, especially in peri-urban or rural contexts, remains underrepresented in

academic discourse.

Moreover, while the notion of public space is well-theorized in urban planning literature, its conceptualization and operationalization within the microcosm of university campuses, particularly as integrative social-ecological spaces, is still insufficiently explored.

This study addresses these gaps by investigating a real-world case of spatial constraints and functional fragmentation in a modestly scaled private university. It aims to offer a contextually grounded planning framework tailored to low-resource academic environments, which may be adaptable to other similar institutions in Indonesia and comparable regions.

Building upon these insights and recognizing the spatial limitations at Unilaki, this study aims to develop a spatial planning framework tailored to the institution's current conditions. Specifically, it proposes planning directives that allocate a minimum of 30% of the total campus land for building development, while incorporating accessibility and functional zoning. The goal is to create a safe, accessible, and ecologically integrated campus environment that supports long-term academic development.

The contribution of this study lies in its analytical approach to spatial planning within a small-scale university setting, with practical implications for improving academic infrastructure in developing regions. Furthermore, it offers a theoretical contribution to the discourse on campus public space design and serves as a reference for future research on integrated spatial planning in higher education environments.

LITERATURE REVIEW

The rapid growth of urban populations and increasing demand for land use, especially in educational institutions, have made spatial planning a critical issue for sustainable development. Effective spatial planning ensures that land use is organized, controlled, and monitored to prevent negative environmental and social impacts (Li, 2024; Kalfas et al., 2023; Surya et al., 2020; Bibri et al., 2020; Hersperger et al., 2018). Several studies have highlighted that spatial regulations, such as building area coefficients, are essential tools to balance built-up areas with open spaces, thereby maintaining environmental quality and providing adequate public spaces (Permana, 2023; Kuncorowati et al., 2024). The regulation of building area, often stipulated as a maximum percentage of land coverage, serves to prevent excessive development that could hinder accessibility and reduce ecological functions within campus environments.

Accessibility within campus settings plays a vital role in fostering interaction and efficient movement between academic and administrative buildings (Abo-Khalil, 2024; Abu-Elkhair et al., 2023; Al-Dmour, 2023; Zallio & Clarkson, 2021). Research by Kato and Taslim (2019) demonstrates that spatial layouts facilitating ease of access promote academic collaboration and campus cohesion. Conversely, the absence of well-planned pathways and zoning can fragment campus space, creating obstacles for students and staff and leading to underutilization of facilities (Ramadhani et al., 2013). The design of campus spaces must therefore consider not only physical distance but also connectivity, inclusivity, and user comfort to optimize spatial functionality.

In addition to accessibility and building regulations, the function of campus spaces as both individual and collective environments is widely acknowledged. Public spaces on campuses are not only venues for social interaction but also contribute significantly to psychological well-being and ecological sustainability through the inclusion of green open spaces (Chibli, 2021; Grodach, 2009). Studies indicate that inadequate spatial planning in universities can lead to reduced social engagement among students and difficulties in managing campus facilities (Purnomo et al., 2014). This underscores the importance of integrating spatial design strategies that balance academic requirements, environmental concerns, and community needs.

The case of Lakidende University reflects common challenges faced by many campuses with limited land area and suboptimal building distribution. With current facilities unable to meet standard space requirements per capita, the campus experiences constraints that may limit academic effectiveness and comfort. Previous research in campus spatial planning suggests that prioritizing minimum building area coefficients while enhancing accessibility and functional zoning can create a more comfortable, safe, and sustainable learning environment (Gandasari et al., 2020; Purwanto & Setioko, 2018). Applying these principles in the Lakidende context is crucial to address its spatial inefficiencies and to support its growth as an academic institution.

RESEARCH METHOD

This study employs a quantitative descriptive research design. This approach aims to objectively describe and analyze the current conditions by using numerical data collected from measurements and institutional records. The study focuses on describing the needs and availability of building space at Lakidende University Campus, based on projections of student and staff numbers, and applying relevant spatial standards.

This research was conducted from May to November 2023. The research location is at Lakidende University, which is located in Lolasabila Village, Wawotobi District, Konawe Regency. This campus borders Kasumewuho Village to the north, Wawotobi Village to the east, Tobeu Village to the west, and Puuwonua Village to the south, with a land area of 30,000 m^2.

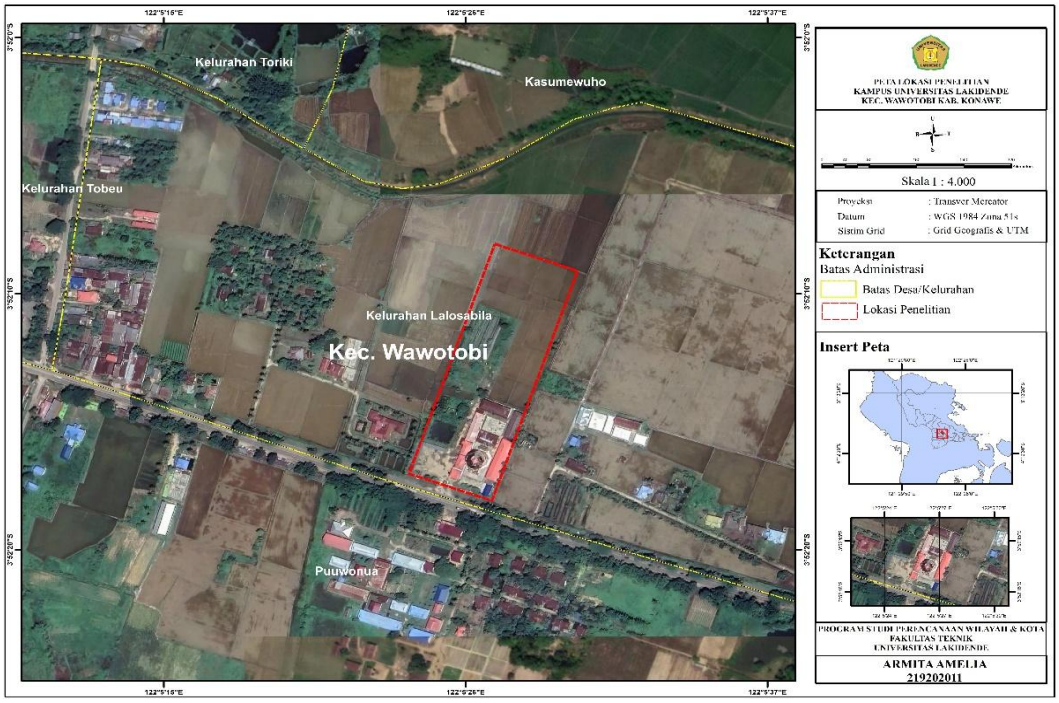

Figure 1. Map of Lakidende University campus location

Note: The red line box indicates the delineation area of the Lakidende University campus, which is located in Lalosabila Village, Wawotibi District, Unaaaha.

The variables used in this study are as follows:

1) Basic Building Coefficient (*Koefisien Dasar Bangunan/KDB*), defined as the ratio of the building's ground floor area to the total available land area, expressed as a percentage. KDB was calculated by measuring the footprint area of each campus building and dividing it by the total land area, serving as an indicator of land use intensity.

2) Accessibility, assessed by analyzing the spatial configuration and connectivity of campus facilities to determine the ease of movement for students, staff, and visitors across key functional areas such as lecture halls, administrative offices, and parking spaces. Measurement indicators included building proximity, availability, and capacity of parking areas, and distribution of open public spaces, based on site plans and land use maps; and
3) Building Function, categorized based on the intended use and role of each building within the campus environment. Buildings were classified into administrative, academic, and support functions, with evaluations considering their contributions to teaching, learning, administration, and social activities. Assessment criteria were derived from spatial allocation standards and functional descriptions.

All variables were analyzed through a quantitative descriptive approach in analyzing space requirements, KDB calculations, and site planning guidelines. This combined approach allows for an integrated understanding of land use efficiency, functional accessibility, and the role of campus facilities, which is consistent with the methods used in previous studies such as Zallio and Clarkson (2021) and Al-Dmour (2023).

The data used in this study include the number of students, faculty, and staff, which are essential for assessing the adequacy of existing facilities and projecting future space requirements. A total of 225 students were involved, selected using an accidental sampling method (i.e., individuals encountered on-site who were willing to participate), along with 124 academic staff members currently working in campus offices. These quantitative data points were cross-referenced with information from university management regarding the designated functions and actual utilization of each building. Primary data were collected through direct field observation, while secondary data consisted of institutional reports, academic literature, and official documents that provide detailed information on user numbers and spatial planning standards.

Data collection techniques included observation, documentation, and document review. Field observation allowed the researcher to assess the physical condition, layout, and use of each facility directly. Documentation involved collecting relevant photographs, architectural drawings, and written notes. The document review process focused on existing planning documents, policy frameworks, and academic sources relevant to campus development.

To ensure that the data informs actionable planning outcomes, user counts (students, faculty, staff) are applied directly to calculate the allocation of space needed for various campus functions, such as classrooms, laboratories, administrative offices, and common areas, based on standard spatial benchmarks. These calculations help identify spatial deficits or surpluses across campus zones. The results guide recommendations for optimizing campus layout, functional zoning (e.g., academic, administrative, recreational), and potential reallocation or development of space. In this way, the data collected informs strategic planning decisions to improve the efficiency, accessibility, and sustainability of campus infrastructure.

The data analysis technique applied in this study is space requirement analysis, which calculates the ideal building area based on the number of students, lecturers, and staff, as well as the functional needs of academic and support activities. This approach adheres to Law No. 26 of 2007 concerning Spatial Planning (Undang-undang No. 26 Tahun 2007 tentang Penataan Ruang, 2007) and aligns with national benchmarks for educational facilities. The projected space requirement was estimated using the following formula: Total Required Building Area (m^2) = Number of Users × Standard Space Allocation per User (m^2/person).

To support the analysis and visualization, several software tools were utilized: ArcGIS 10.8 for creating spatial maps and analyzing land use distribution, SketchUp 2018 for modeling the building designs in three dimensions, and CorelDRAW 2020 for generating complementary visual

elements and layout composition.

FINDINGS AND DISCUSSION

Existing Built-up and Non-Built-up Land at Lakidende University

Lakidende University has a total built-up area of 2,802.84 m^2, which includes various facilities and infrastructure to support academic activities, administration, and public facilities. Buildings included in the built-up area include the rectorate building with an area of 70.3 m^2, which functions as the campus administration center, and the language UPT building with an area of 87 m^2, which is used to support language learning activities. In addition, there is a meeting and storage building with an area of 126.99 m^2, which plays a role in academic meeting activities and storing campus archives.

Furthermore, several lecture buildings support academic activities in various study programs, including the Civil Engineering lecture building with an area of 126.99 m^2, a lecture building that accommodates the Indonesian Language Education, English, and Urban and Regional Planning study programs with an area of 316 m^2, and the Law, Management, Agribusiness, and Public Administration lecture building which has the largest area of 829 m^2. This campus also has a Civil Engineering laboratory building and a library with an area of 317.2 m^2, which plays an important role in supporting student practicums and research.

Public facilities that complement this built-up area include a hall with an area of 252.96 m^2 that functions as a large meeting room, a ceremonial activities, and other campus events. There is also a parking area with an area of 219.8 m^2 to accommodate vehicles of the academic community, as well as a public space of 75.64 m^2 that functions as an open area for students and staff to interact and socialize.

Based on the data, the total built-up land area at Lakidende University reaches 2,802.84 m^2 with a KDB of 7.98% and a Building Floor Coefficient (*Koefisien Lantai Bangunan*/KLB) of 0.171. Each building has varying KDB and KLB values, where the Law, Management, Agribusiness, and Public Administration buildings have the highest KDB of 2.7% and a KLB of 0.027, reflecting a significant building area compared to other buildings. In contrast, the rectorate building has the lowest KDB of 0.23% with a KLB of 0.007. Other buildings, such as the Language UPT, meeting and storage building, and Civil Engineering lecture building, each have KDBs of 0.29%, 0.42%, and 0.42%, with relatively small KLB values, indicating that these buildings do not dominate the overall land area.

In addition to built-up land, Lakidende University also has non-built-up land that includes empty areas and land that has been filled, with a total area reaching 27,197.16 m^2. With a KDB on non-built-up land of 8.1%, the area of land that still has the potential to be developed reaches 8,159.148 m^2. The potential of this non-built-up land is an important aspect in supporting future campus development plans, both for the addition of lecture rooms, laboratories, and other supporting facilities. The development of this land has the potential to increase Lakidende University's capacity to accommodate a larger number of students, along with the need for more representative facilities to support academic activities, research, and student development.

Considering all of this data, Lakidende University has quite a large potential in optimizing land use to support academic, social, and administrative activities of the campus in the future. The combination of existing built-up land and potential development on non-built-up land is a strategic opportunity for the university to continue to grow and meet the increasingly complex needs of higher education.

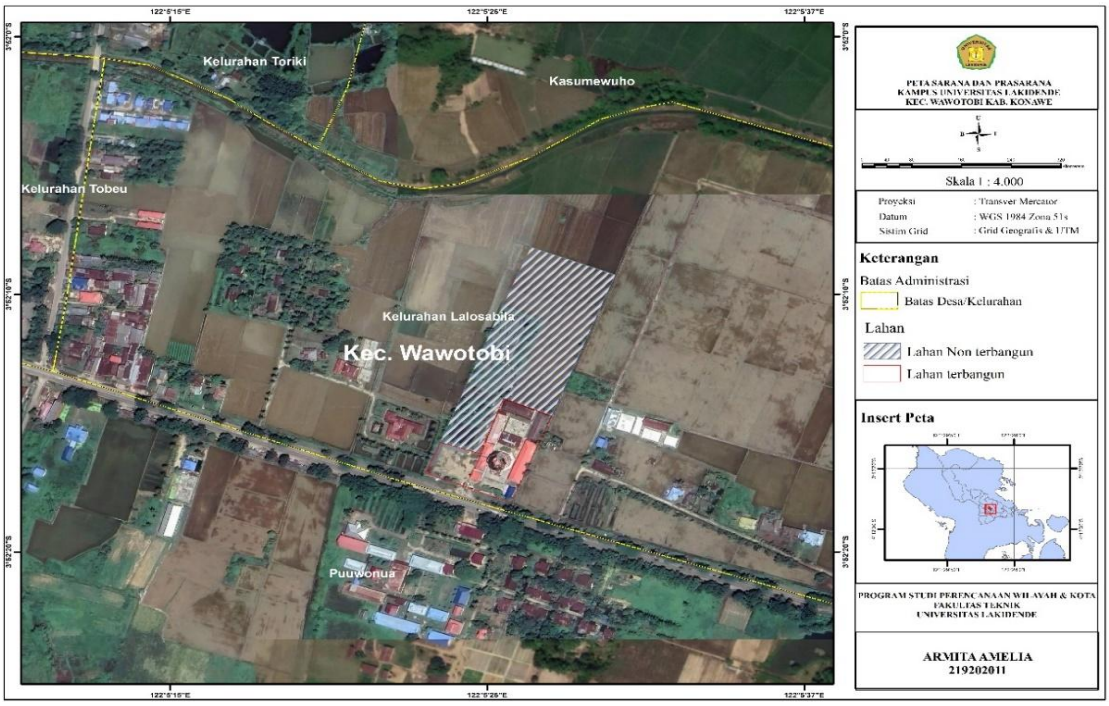

Figure 2. Map of built-up and non-built-up land at Lakidende University
Note: The shaded area is the undeveloped land of Lakidende University Campus.

Facilities and infrastructure

Lakidende University has various facilities and infrastructure that support academic activities, administration, and services for the academic community. The main facilities on this campus include lecture buildings, rectorate buildings, language laboratory buildings, meeting and storage buildings, canteens, libraries, and halls. Each building has a strategic function in supporting the smooth operation of the campus and the activities of students and educators.

The physical form of buildings at Lakidende University is dominated by mass structures, with building positions generally located at the front of the campus area. Each building has a varying number of floors, adjusting to the needs of space and its function. The following is a breakdown of the number of floors in each building at Lakidende University (see Figure 3):

a) Rectorate Building: This building has three floors that function as the main administrative center of the campus. Inside, there are university leadership offices, meeting rooms, and academic and financial service offices.
b) Lecture Building: This building consists of one floor and is the main room for student learning activities from various study programs.
c) Hall: This one-story campus hall functions as a multi-purpose room used for large activities such as seminars, workshops, ceremonial activities, and student events;
d) Library: The library building, which also has one floor, is the center of campus literacy services, providing various sources of scientific references to support student learning activities and lecturer research.
e) Language UPT Building: This building functions as a center for language training and development activities, and is equipped with language laboratory facilities that support students' language skills;
f) Meeting and Storage Building: This building plays an important role in supporting campus administrative needs and is a storage space for important university archives.

g) Canteen: As a supporting facility, the campus canteen functions as an area providing food and drinks for students, lecturers, and staff.

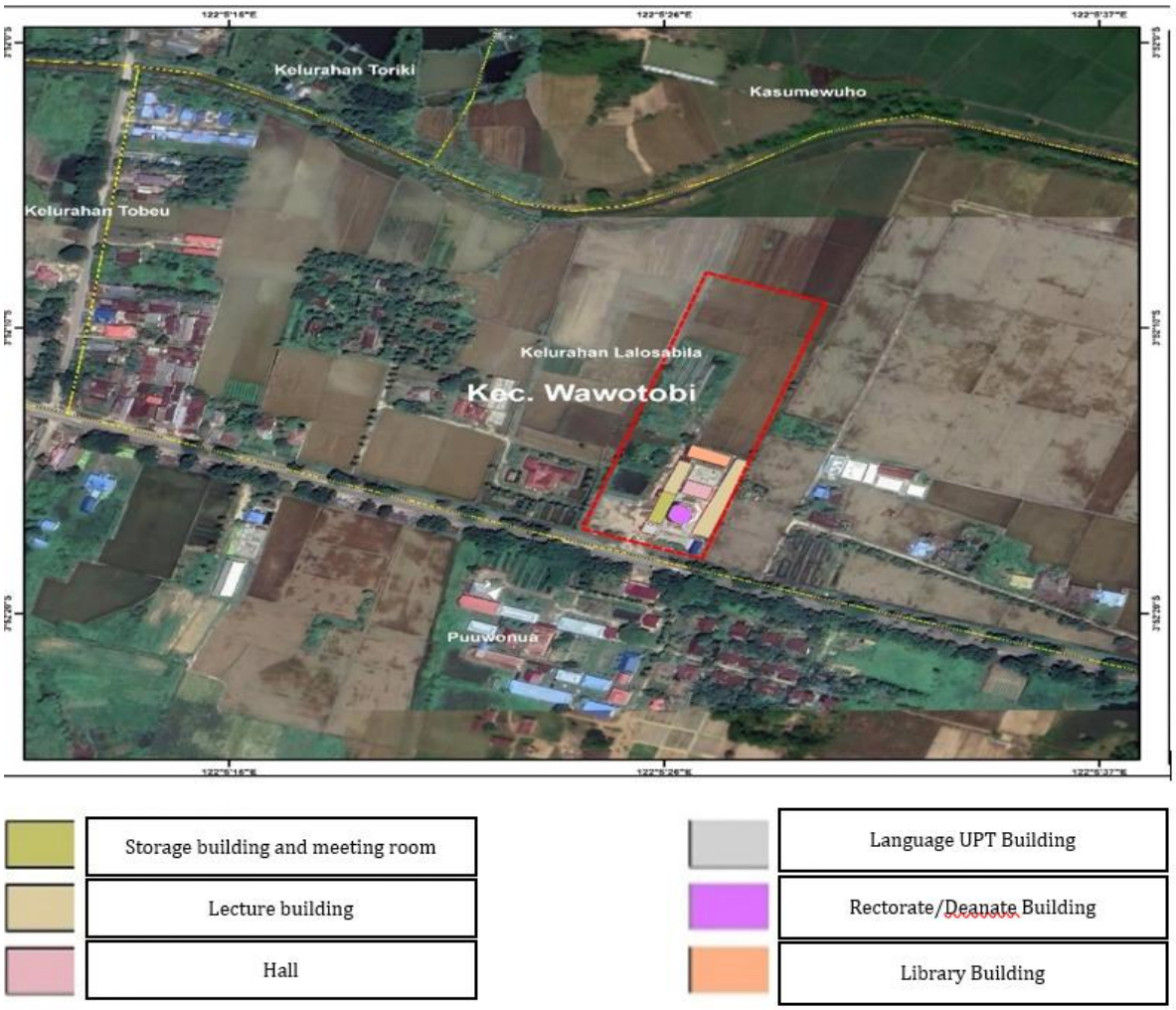

Figure 3. Distribution of facilities and infrastructure at Lakidende University

With these adequate facilities and infrastructure, Lakidende University strives to create a conducive educational environment, support the teaching and learning process, and support various academic and non-academic activities for the entire academic community. The potential for developing campus facilities in the future is also a strategic opportunity for the university to continue to improve the quality of educational services and comfort for its users.

Facilities and infrastructure

Site Planning Guidelines

Site planning at Lakidende University is based on the available land area, which is 27,197.16 m^2. In accordance with the KDB, which is set at 30%, the maximum site area that can be planned is 8,159.148 m^2. This area is the main reference in spatial planning and development of campus facilities and infrastructure in the future.

Space Allocation Guidelines

The spatial allocation plan is designed to accommodate the required building area, which is calculated based on the number of students, lecturers, and staff at Lakidende University.

Specifically, the allocation for faculty buildings is determined by adhering to the standard space requirement per person to ensure functionality and comfort. Consequently, the total planned area for faculty buildings is 565.5 m^2, complemented by 968.4 m^2 of open space. The detailed distribution is as follows:

a) The Faculty of Engineering requires a building area of 123 m^2 with an open space of 205 m^2, has a KDB of 1.50%, KLB 0.015, and KDH 2.51%;
b) The Faculty of Law is planned to have a building area of 54 m^2 and an open space of 90 m^2 with a KDB of 0.66%, KLB 0.006, and KDH 1.10%;
c) The Faculty of Agriculture requires a building area of 69 m^2 with an open space of 119.6 m^2, KDB 0.84%, KLB 0.008, and KDH 1.46%;
d) The Faculty of Teacher Training and Education requires a building area of 159 m^2 with an open space of 275.6 m^2, KDB 1.94%, KLB 0.019, and KDH 3.37%;
e) The Faculty of Economics and Business is planned to have a building area of 91.5 m^2 and an open space of 158.6 m^2 with a KDB of 1.12%, KLB of 0.011, and KDH of 1.94%; and
f) The Faculty of Administrative Sciences requires a building area of 69 m^2 with an open space of 119.6 m^2, KDB of 0.84%, KLB of 0.008, and KDH of 1.46%.

Second, the library area requirement is planned based on the total number of students, lecturers, and staff of 382 people. Based on the library area standard of 0.2 m^2/person and open space of 2.6 m^2/person, the planned library area is 76.4 m^2 with 955 m^2 of open space. The library's KDB value is 0.93%, KLB 0.009, and KDH 11.70%, so the total area planned for the library is 1,031.4 m^2.

Third, the need for a canteen area is also adjusted to the number of students, lecturers, and staff. With a standard canteen area of 1.3 m^2/person, the planned canteen area is 496.6 m^2 with an open space of 955 m^2. The canteen's KDB was recorded at 0.93%, KLB 0.009, and KDH 11.70%, so that the total area planned for the canteen reached 1,451.6 m^2.

Fourth, the parking area requirement is adjusted to the capacity of student, lecturer, and staff vehicles. With a standard parking area of 2.5 m^2/vehicle and an open space of 2.6 m^2/person, the planned parking area is 955 m^2 with an open space of 993.2 m^2 and a KDH of 1.04%. Thus, the total area planned for the parking area reaches 1,948.2 m^2.

Overall, the total area planned for the development of Lakidende University which includes faculty buildings, libraries, canteens, parking lots, and open spaces, reaches 5,964.5 m^2. This planning is expected to meet the need for space in accordance with the number of academicians at Lakidende University and support optimal campus development in the future.

Lakidende University Site Allocation Guidelines

The future site plan is based on the existing site conditions of Lakidende University, as seen in Figure 4. The site plan is prepared by considering the direction of space allocation and building area requirements, which can be seen in Figure 5. This plan aims to optimize land use effectively to support academic and non-academic activities at Lakidende University.

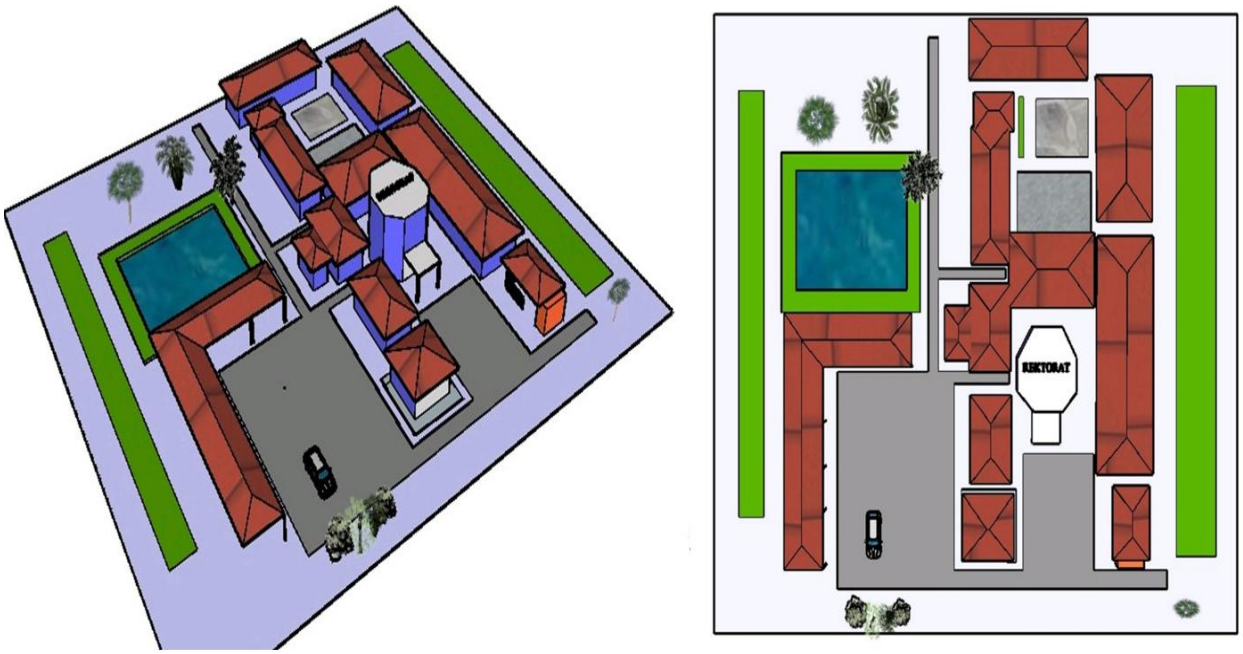

Figure 4. Existing site at Lakidende University

Based on Figure 5, it can be seen that the delineation of the Lakidende University site plan for future development. Delineation A is designated as a parking area, delineation B as a park or green open space, delineation C as the Faculty of Law building, delineation D as the Faculty of Administrative Sciences building, delineation E as the Faculty of Engineering building, delineation F as the Faculty of Teacher Training and Education building, delineation G as the Faculty of Economics and Business building, delineation H as the Faculty of Agriculture building, delineation I as the library building, and delineation J as the canteen building.

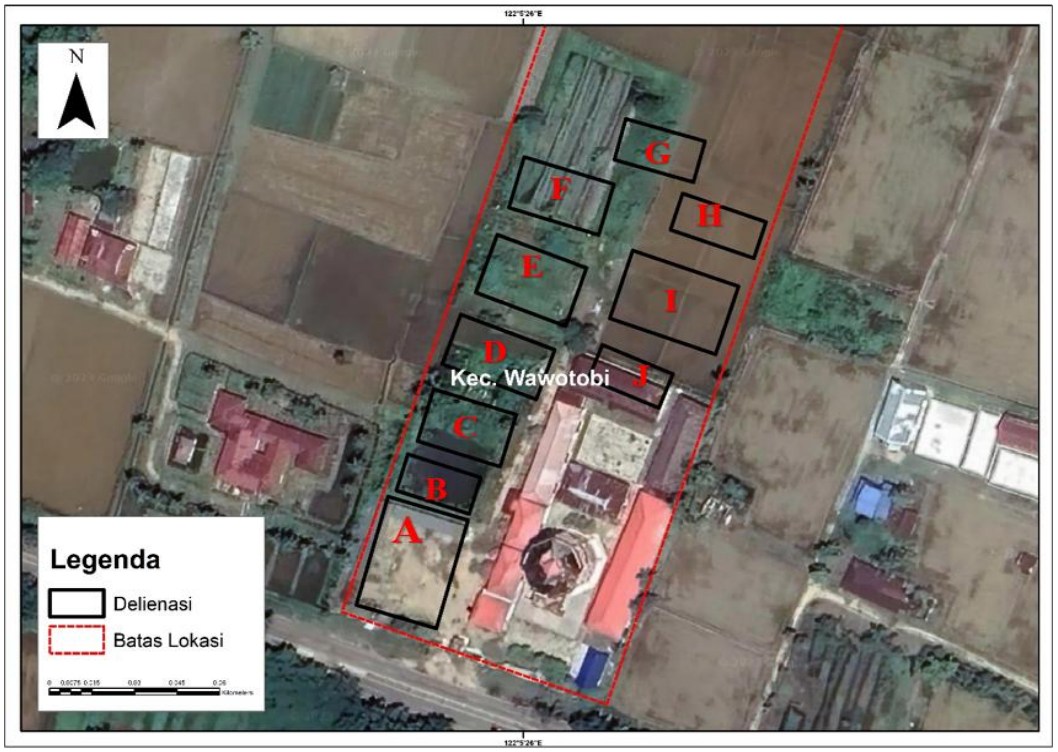

Figure 5. Site plan delineation at Lakidende University
Legend Note: The black line box is the delineation area. The red line is the boundary of the Lakindede University campus area.

For more details, the Lakidende University site plan can be seen in Figure 6, which includes six faculty buildings, namely the Faculty of Law, Faculty of Administrative Sciences, Faculty of Engineering, Faculty of Teacher Training and Education, Faculty of Economics and Business, and Faculty of Agriculture. In addition, there is also a general lecture building that functions as a cross-faculty study room, a rectorate building that is the center of university administration and management, and a hall that functions as a multi-purpose room for academic and non-academic activities such as seminars, workshops, and student events.

Other supporting facilities include a canteen as an area for providing consumption needs for students, lecturers, and staff; a library that provides academic reference sources to support learning and research activities; and a parking area designed to accommodate vehicles of students, lecturers, and staff.

In addition to physical buildings, this site plan also pays attention to environmental aspects by providing green open spaces that function as water catchment areas, air circulation, and recreation spaces for the academic community. This arrangement is expected to create a comfortable, beautiful campus environment that supports the teaching and learning process optimally. This plan was prepared by considering the need for proportional space and is oriented towards the sustainable development of Lakidende University in the future.

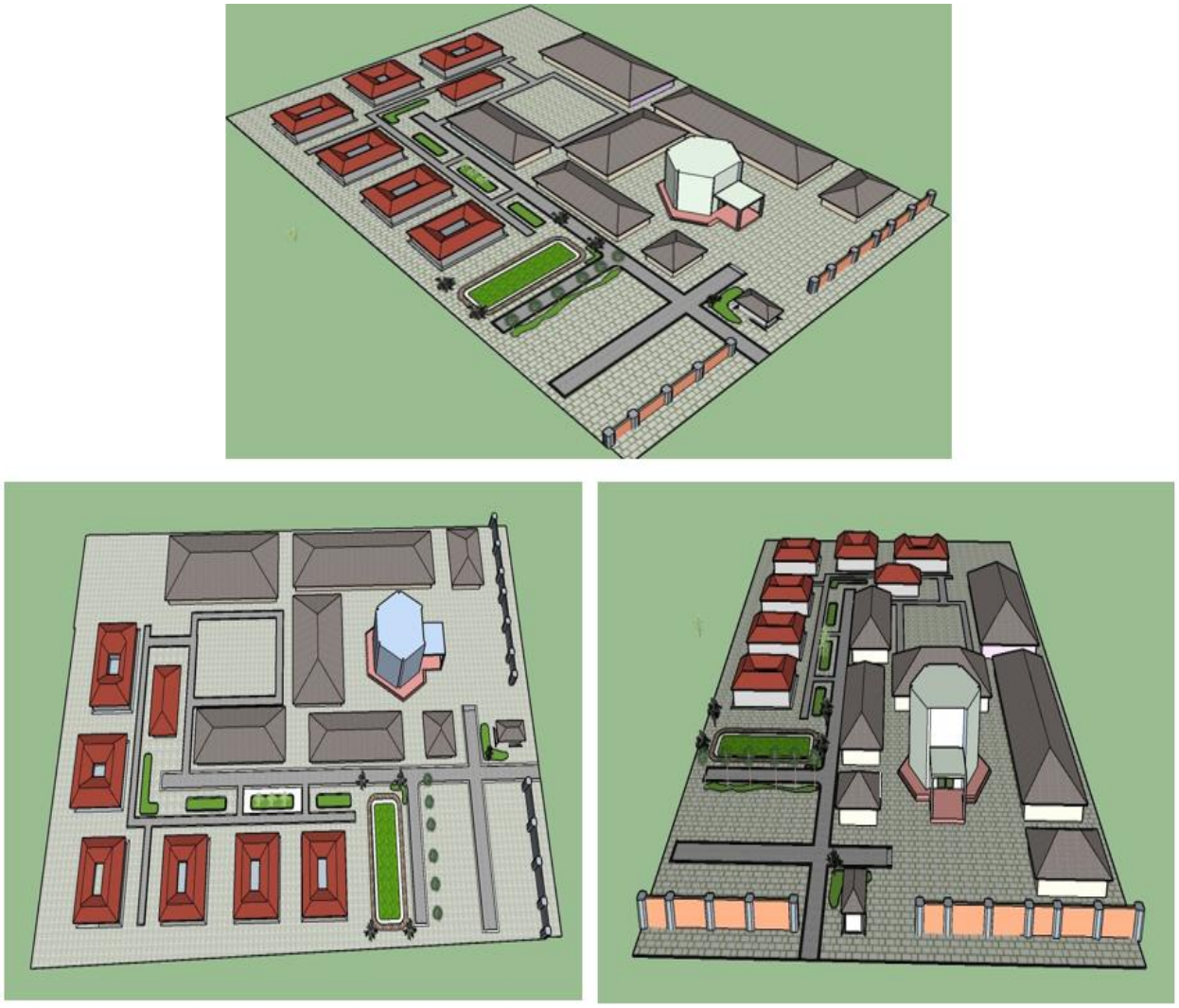

Figure 6. Lakidende University Site Plan

CONCLUSION

Based on the identification and observation conducted at the research site, it can be concluded that Lakidende University still has sufficient land available for future development, while adhering to the maximum KDB of 30%. The proposed development plan includes the construction of six faculty buildings (Faculty of Law, Faculty of Administrative Sciences, Faculty of Engineering, Faculty of Teacher Training and Education, Faculty of Economics and Business, and Faculty of Agriculture), as well as general lecture halls, a rectorate building, an auditorium, canteens, library, parking areas, and green open spaces.

According to calculations based on the standards set by the National Higher Education Standards Agency (BSNPT), the total space requirement for the planned faculty buildings, library, canteens, parking areas, and green open spaces is approximately 5,964.5 m^2.

Therefore, the total planned space requirement remains within the allowable limit based on the maximum KDB. This indicates that the development plan has been carefully designed to ensure effective and optimal land utilization in accordance with applicable spatial planning standards. The proposed spatial layout is expected to support both academic and non-academic activities, contributing to the creation of a comfortable, aesthetically pleasing, and sustainable campus environment.

This study provides theoretical contributions in the development of site planning concepts based on academic and non-academic space needs that refer to higher education planning standards, especially in the context of universities with large land characteristics and development potential. Theoretically, this study:

1. Application of the Principle of Spatial Efficiency. This study integrates the principle of spatial efficiency by considering the standards of the National Higher Education Standards Agency (BSNPT) in determining the need for building space and open space. This enriches the theory of optimal educational space development according to the number of students, lecturers, and staff, so that it can be a reference in other campus planning.
2. Integration of Academic and Non-Academic Functions. This development plan highlights the importance of balancing the needs of academic space (faculty buildings, libraries) and non-academic supporting spaces (canteens, parking lots, green open spaces). This approach adds theoretical insight regarding the importance of developing spaces that support comfort, social interaction, and recreational activities in an educational environment; and
3. Optimization of Land Utilization Based on KDB. By adopting the KDB concept of 30%, this study provides a theoretical model on how campus land can be utilized optimally without violating applicable spatial regulations.

This theoretical contribution is expected not only to be the basis for planning the development of Lakidende University but also to become a reference for other educational institutions in designing effective, efficient, and sustainable spaces.

LIMITATION & FURTHER RESEARCH

The data utilized in this study are limited exclusively to Lakidende University, which may constrain the comprehensiveness and generalizability of the spatial allocation analysis. As the research focuses solely on Lakidende University, the findings may not be directly applicable to other university campuses with different contextual characteristics. Furthermore, this study primarily addresses short- to medium-term spatial planning considerations, leaving long-term development dynamics and potential future scenarios insufficiently explored.

For future research, it is recommended to expand the scope by incorporating comparative studies involving multiple universities across diverse geographical and institutional contexts to enhance the robustness and applicability of spatial planning models. Additionally, integrating long-term forecasting and scenario analysis would provide deeper insights into sustainable campus development under varying demographic, technological, and environmental changes. Incorporating stakeholder engagement and advanced spatial simulation tools could further refine planning strategies and improve decision-making processes for campus development.

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