Canopy 14 (2) December 2025, pp. 102-111
CANOPY: Journal of Architecture
https://journal.unnes.ac.id/journals/canopy/index

REDESIGN OF THE PALEMBANG HOUSING COMPLEX IN BUKIT KECIL DISTRICT, PALEMBANG CITY WITH A BIOPHILIC ARCHITECTURE APPROACH

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Abstract. High-rise flats are a form of vertical housing built as a solution to meet the housing needs of the community, especially low-income communities, as well as an effort to prevent the growth of slums in urban areas. The 24 Ilir Housing Complex in Bukit Kecil District, Palembang City, is a vertical housing complex located in a very strategic location in the city centre. However, it has experienced a decline in environmental quality, building functionality, aesthetic value, population density, and suboptimal utility systems. These conditions have resulted in a low quality of life for residents and the formation of an uninhabitable residential environment. This paper aims to formulate a concept for the redesign of housing complex through the application of biophilic architecture principles as a design approach to improve the quality of housing and the environment. The research method used is descriptive through literature study, observational study, and field study. This method uses primary and secondary data analysis covering functional, biophilic, technical, performance, and architectural aspects. The redesign idea results in improvements in spatial layout, utility systems, and social interaction among residents. The author's conclusion in this idea shows that the biophilic architecture approach is effective as a strategy for redesigning urban flats to maximise natural resources around the flats, improve the quality of life with the natural environment, and enhance the well- being of residents.

Keywords: *Flats, Biophilic Architecture, Housing, Environment*

INTRODUCTION

Vertical housing in the form of flats was built as a solution to provide housing for urban communities, especially low-income communities, and as an instrument to control the growth of slums.

However, in practice, many public housing areas experience environmental degradation characterised by a decline in building functionality, high population density, poor physical condition of buildings, and weak integrated area management. These conditions not only the visual and aesthetic quality of the area but also directly impacts the health, comfort, and quality of life of the residents.

Published 2025

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e-ISSN 2503-0655
ISSN 2252-679X

Figure 1. Existing Conditions of the 24 Ilir Housing Complex in Palembang City

The 24 Ilir Public Housing Complex in Bukit Kecil District, Palembang City, is a vertically oriented residential area strategically located in the city centre. This public housing complex is situated in the Ilir area and has good access to surrounding areas. Initially, the 24 Ilir Flats were built in 1980 as housing for fire victims from the 22, 23, 24, and 26 Ilir areas. This area consists of around 35 four-storey buildings and is inhabited by more than 2,000 families. The data is as follows:

Table 1. Data on Palembang Housing Complex, Kec. Bukit Kecil, Palembang

Village	Number Block	Number Units	Number Household
26 Ilir	8	916	403
24 Ilir	37	5168	1588
23 Ilir	8	1552	561

Based on these conditions, the idea of redesigning the Palembang Flats in Bukit Kecil Subdistrict using a biophilic architectural approach emerged. The redesign was carried out without changing the main function of the building, but by rearranging the mass and space to better integrate with the urban environment by utilising local natural resources. The location was chosen was based on the condition of the 24 Ilir Housing Complex, which had experienced a decline in function and effectiveness, as well as suboptimal wastewater and waste management systems.

The biophilic architecture approach is understood as a conceptual basis for designing climate-adaptive, contextual, and quality-of-life- oriented housing. Therefore, this paper aims to formulate a redesign concept for the 24 Ilir Flats in Palembang City through the application of biophilic architecture principles as the basis for planning and designing vertical housing.

METHODS

This paper uses a descriptive method, presenting, explaining, and elaborating on the design requirements and conditions in the planning of *the Redesign* of the Palembang Housing Complex in Bukit Kecil District, Palembang City. The research stages include:

- Primary data collection, through:
  Field observation in the Housing Complex ilir 24 area, interviews with residents and managers, and documentation of the physical condition and environment of the site.
- Secondary data collection, through:
  Literature studies (books, journals, regulations, SNI, housing policies) case housing complex buildings and environmentally-based vertical housing as well as studies of biophilic architecture theory

Primary and secondary data collection was conducted for systematic analysis as the basis for formulating planning and design concepts. The results of this analysis were used as the basis for architectural design in the redevelopment planning of Palembang Housing Complex in Bukit Kecil District.

The planning process *for the redesign* of the Palembang Housing Complex, which originated from the problem of a densely populated area with limited green open space and social space. The planning process was carried out through literature studies, observations, and field reviews, which were then analysed as the basis for determining the biophilic concept.

CONCEPT

The Biophilic Architecture Approach is applied to blocks 18-30 located north of the 24 Ilir housing complex.

Figure 2. Site (Source: Author's analysis based on SAS Planet Map, 2025)

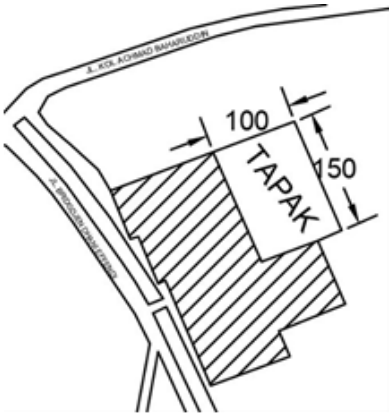

Figure 3. Site for Redesign Planning

A. Site Location

The selected site is located on Jl. Kol Achmad Baharuddin, Kelurahan 24 Ilir, Kec. Bukit Kecil, Palembang City, South Sumatra, where according to the South Sumatra Government's RDTR No. 1 of 2017, the Bukit Kecil District, Palembang City, is one of the most densely populated areas in Palembang City, making it feasible for the area to construct buildings up to 20 storeys tall. The land area is 15,000m² or 1.5 hectares, with land boundaries:

- East, Colonel Achmad Badaruddin Road
- West, Residential area/Housing complex
- South,Residential area/ Housing complex
- North, Palembang Indah Mall

In accordance with regulations, the plot has a Building Floor Area Ratio (BFAR) as per the local government regulations of Palembang City:

- KDB max.. 70% from area plot = 10.500 m²
- Green Base Coefficient based on the theme of Biophilic Architecture
- Green Base Coefficient (GBC) min. 30% of site area = 4,000 m²
- Building Setback Line (BSL) BSL = ½ x road width (8 m) = 4 m
- Drainage channel = 50 cm
- Land use plan = Residential and commercial
- KLB = 2.0
- Building height = 5-20 storeys (Type 2 high-rise building)

B. Contextual Aspects

Achievement of the footprint requires analysis based on applicable technical regulations. The purpose of the footprint is to achieve the right results for building users coming to the site.

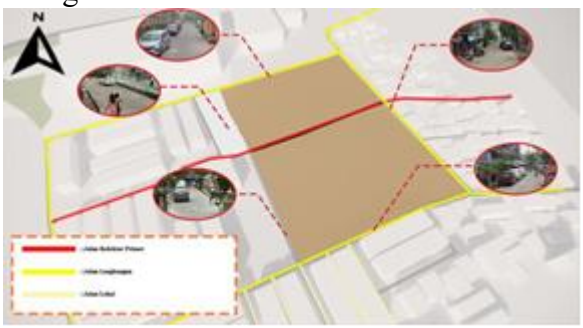

Figure 4. Site Boundaries

Kol. Achmad Badaruddin road is easily accessible and recognisable. This road is the entrance to the 24 Ilir Housing Complex. This can be taken into consideration when determining the location of the main entrance for residents

Figure 5. Main Entrance placement

The site has three access points from the north, west, and south. Kolonel Achmad Badaruddin road serves as the main access route connecting the housing complex with the surrounding area. Vehicle access and drop-off points are controlled, while the pedestrian are designed to be safe and comfortable, directly connected to the lobby, communal spaces, and green open areas.

C. Spatial Utilisation Analysis

Based on the Detailed Spatial Plan (RDTR) Palembang city which regulates the ilir 24, bukit kecil area:

KDB = 70%
KDH = 30%
KLB = 40 – 100%
GSB = 7 m (Arterial), 5 m (Collector), 4m (Local), 3 m (Residential)

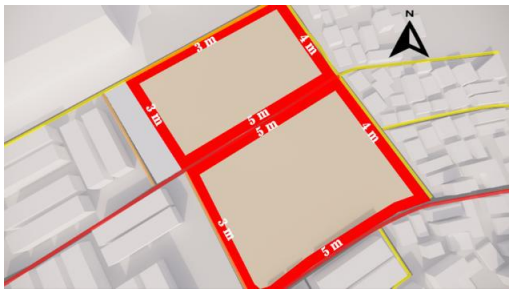

Figure 6. GSB regulations on the site (source: RDTR Palembang city)

The site borders on the east side with Kolonel Achmad Badaruddin road as a local road with a GSB requirement of 4 metres. On the other side, the site also borders Jalan Tua Pati Naya Raya as a primary collector road with a GSB requirement of 5 metres, and borders on the south side with a flat area with a GSB requirement of 5 metres.

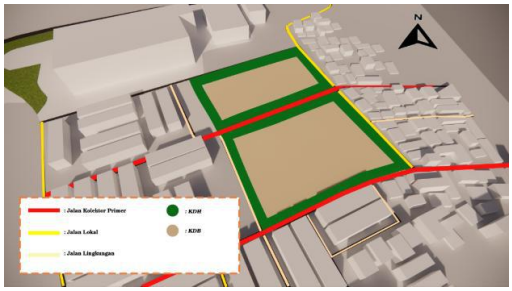

Figure 7. Space Utilisation within the site

The Building Setback Line is a building-free zone, so the management of the setback line becomes the Green Base Coefficient (GBC).

C. Climate Analysis

By understanding climate characteristics, designs can be optimised to improve thermal comfort, energy efficiency, and building resilience. This approach results in designs that are not only functional and aesthetically pleasing, but also responsive to local environmental conditions.

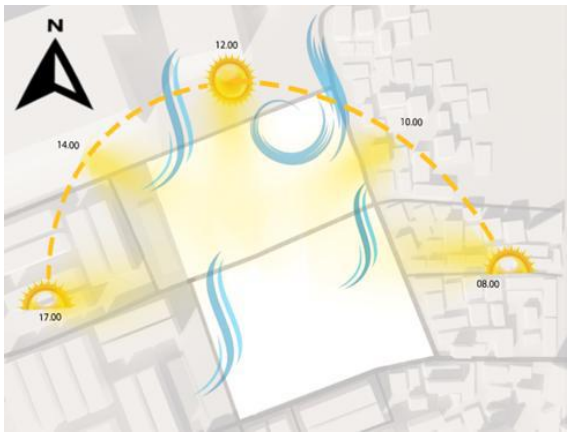

Figure 8. Sun Movement Analysis

The building is oriented towards the west as it directly borders the main road, facilitating access and increasing the building's visibility. This orientation supports efficient site circulation and north-south building massing to optimise natural lighting and ventilation. Exposure to afternoon sun is controlled through shading elements, a secondary skin, and vegetation, thereby maintaining thermal comfort.

Figure 9. Building orientation

D. Massing Analysis

The building form is designed based on residential function, site shape, and aesthetics, following the principles of basic form development according to Francis D.K. Ching. The area consists of four towers above a three-storey podium as a public zone. The building mass is separated to optimise lighting, natural ventilation, and create green and communal open spaces. The podium houses reception facilities, circulation, parking, and open spaces for residents' social activities.

E. Landscape and Material Analysis

The landscape architecture of the housing complex is designed to create comfortable, functional outdoor spaces that blend with nature. The landscape planning applies biophilic principles through the use of vegetation and water elements as shade, directional elements, pollution reducers, and aesthetic enhancers. Hard materials and street furniture complement the function of outdoor spaces to support residents' activities and comfort.

F. Utilities Analysis

The utility system of the housing complex is designed to support the comfort and safety of the building. Clean water is sourced from the city network and distributed to residential units via reservoirs. Wastewater and rainwater are drained through separate drainage systems. The electrical system uses the PLN network with a generator as a backup as, and equipped a protection fire and centralized waste management.

G. Structural Analysis

The structural system of the housing complex building is designed to ensure the strength and safety of the building. The main structure uses reinforced concrete, including foundations, columns, beams, and floor slabs. The roof structure is designed to be lightweight and efficient to reduce the load on the building. The entire structural system is adapted to the soil conditions and building load to ensure stability and safety for use as a multi-storey residential building.

RESULTS AND DISCUSSION

The site plan and layout determine the circulation, green open spaces, utilities, and supporting facilities for the apartment complex. The building consists of several towers with a podium as a common area, adapted to the site conditions, sun direction, and wind for residential comfort. Vehicle access is from Kolonel Achmad Badaruddin road in the centre of the site, leading to the car park, drop-off point, and lobby. Pedestrian paths are separated from vehicles and connected to green spaces for safety and comfort.

Figure 10. Siteplan

Figure 11. Situation

The floor plan of the first floor of the housing complex building is designed as a public and service area that accommodates building support functions, such as utility rooms, lobby, drop-off, and management rooms. The layout is designed to facilitate access and circulation and to separate public and service areas. This floor plays an important role in supporting building operations and the

comfort of the upper floors, in line with the concept of a functional and sustainable apartment building.

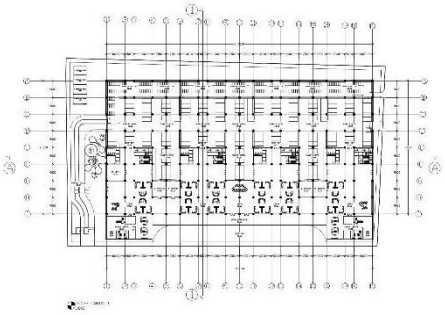

Figure 12. Floor plan of the first floor

The second floor plan of the housing complex building is designed as a public and semi-public zone that accommodates shared facilities such as commercial areas, multipurpose rooms, prayer rooms, and social interaction spaces. This area functions as a connector between the ground floor and the residential units at above, with spaces that surround the podium and are directly connected to the vertical circulation. The spatial layout and circulation are designed to be clear, easily accessible, comfortable, and supportive of residents' social activities.

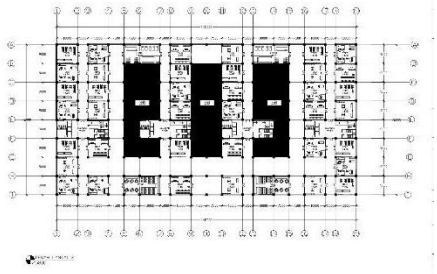

Figure 13. Floor plan of second floor

The third floor of the housing complex building is designated as an administrative zone housing building management and operational activities. This area contains administrative rooms, staff rooms, meeting rooms, and other support rooms that are efficiently and organised. Access to this floor is controlled through vertical circulation to maintain the safety and comfort of residents, with adequate lighting and ventilation so that the managers' work activities run optimally.

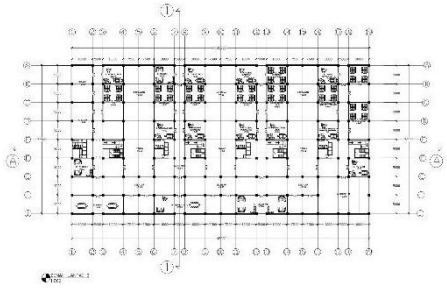

Figure. 14. Floor plan of third floor

Type 18 residential units are designed for one to two occupants with efficient and functional room layouts. These units consist of one bedroom, one bathroom, a pantry, a multifunctional room, and a balcony with an open-space concept to create a spacious feel. The façade openings are utilised for natural lighting and ventilation.

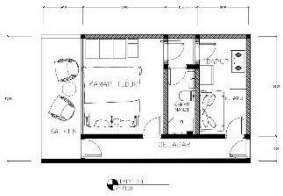

Figure 15. Type 18 Floor Plan

The Type 36 residential unit is designed for small families with comfortable and well- organised spaces. This unit consists of a living room, two bedrooms, a kitchen, and one bathroom with a clear division between private and semi- public zones. The spatial layout, façade openings, and proximity of the service zone to the utility shaft support natural lighting, cross ventilation, and installation efficiency, creating a functional residence.

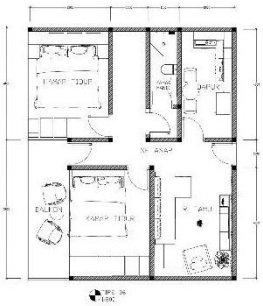

Figure 16. Type 36 Floor Plan

The Type 54 residential unit is intended for families with larger space requirements. This unit consists of a living room, kitchen and dining room, three bedrooms, one bathroom, and a balcony with clear zoning. The layout and openings of the building allow natural lighting and ventilation to enter the unit.

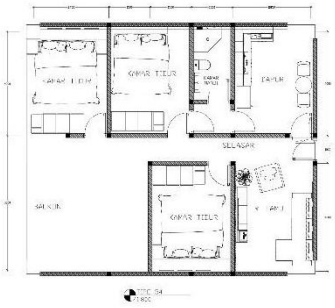

Figure 17. Type 54 Floor Plan

The front and rear of the building are designed with a modular and repetitive façade typical of housing complex units. Horizontal elements are shown through floor slabs and balconies, while vertical elements are highlighted in the building core as vertical circulation. The façade uses uniform modular window and balcony door openings with glass and aluminium frames, equipped with iron railings and louvers for shade. The massive facade uses concrete walls with neutral colours and wood motif accents, as well as the addition of vegetation in certain areas to support the comfort of the building.

Figure 18. Front View

Figure 19. Back view

Figure 20. Right view

Figure 21. Left view

Section A–A shows a cross-section of the building from north to south, revealing the area management, commercial space and other spaces. Meanwhile, section B–B is taken from west to east to show the building mass arrangement and space functions such as the lobby, management room, commercial area, garden, and other supporting spaces.

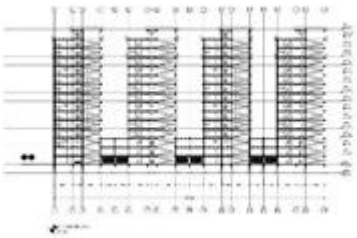

Figure 22. Section A-A

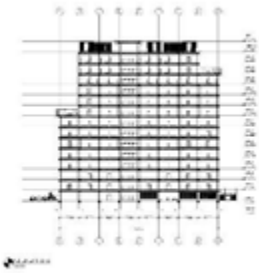

Figure 23. Section B-B

The structural isometric drawing shows the three-dimensional construction system of the building, which consists of columns, beams, and foundations. The building uses footplate foundations with main columns measuring 100 × 100 cm and practical columns measuring 15 × 15 cm. The beam system consists of main beams measuring 100 × 80 cm and secondary beams measuring 15 × 15 cm.

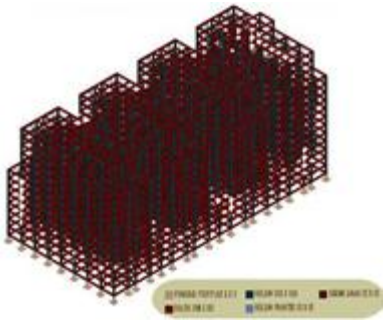

Figure 24. Structural isometric drawing

The exterior perspective of the housing complex building in Palembang shows an open area that functions as a transition space and recreation area. The landscape consists of gardens, ponds, pedestrian paths, and seating areas spread around the building. The placement of landscape elements takes into account circulation, lighting, and comfort, while the parking area is located at the rear so as not to interfere with the main area.

Figure 25. Bird's eye perspective

Figure 26. Human eye perspective

Figure 27. Front garden exterior

Figure 28. Exterior of residential balcony

Figure 29. Exterior of the rooftop garden

Figure 30. Exterior of the garden and courtyard

Figure 31. Exterior of the Sky Garden

The interior of the housing complex building is designed to be comfortable with a biophilic approach. The lobby and corridors utilise natural lighting and ventilation with the use of natural materials. In the centre of the building is an interior garden as a shared space for residents to interact and relax.

Figure 32. Lobby interior

Figure 33. Interior of the management room

Figure 34. Commercial room interior

Figure 35. Interior of unit type 18

Figure 36. Interior of unit type 36

Figure 37. Interior of unit type 54

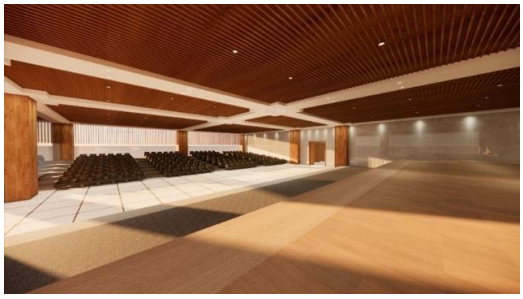

Figure 38. Auditorium interior

CONCLUSION

The city of Palembang faces problems with the quality of its flats, which do not fully meet the aspects of comfort, health, and environmental quality. The deterioration of the physical condition of the buildings, the limited green open space, and the lack of integration of natural elements have an impact on the quality of life and social interaction of the residents. Therefore, a redesign of the housing complex with a biophilic architectural approach is needed to integrate natural lighting, cross ventilation, vegetation, and natural materials to create healthy, comfortable, and sustainable housing that supports the improvement of the quality of life of urban communities.

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