

## DESIGNING PUBLIC LIBRARY, IN MEDAN CITY WITH BIOPHILIC ARCHITECTURE

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### Abstract

In the context of the Medan City Library, situated in a bustling and densely populated urban area, there is a pressing need for biophilic architectural design to address urban community challenges related to development, building comfort, and the monotony of city life. This approach seeks to respond to the issues posed by biophilic architecture by integrating natural elements into the design to enhance user comfort. Several steps are necessary to finalize the design of a contemporary library using biophilic architecture alongside other structures. These include evaluating the functional roles of additional buildings in architecture, modernizing the approach to library buildings, and applying biophilic principles such as thermal, visual, and natural lighting considerations, natural analogies, and spatial characteristics. The exploration of digital biophilic architecture has revealed opportunities to adapt biophilic architectural elements into modern forms that align with current advancements, thereby supporting natural elements, natural analogies, and spatial qualities.

### Article History

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### Key Words

Public Library, Literacy,  
Biophilic

## 1. Introduction

According to the results of the 2018 PISA (International Student Achievement Survey) survey released in March 2019, Indonesian peoples interest in reading is relatively low, with UNESCO stating that only 0.001% of the Indonesian population showed an interest in reading in 2012 [1]. This means that out of 1,000 people, only 1 who has a tendency to read. ranked 62nd out of 70 countries surveyed with a literacy score of 371 (PISA, 2018). Even in 2022, the reading literacy score in Indonesia will decrease by 12 points to 359 (PISA, 2022) and will be the lowest in the last 20 years [2].

By considering the challenges, the design of public libraries is to increase library capacity so that it can accommodate more visitors and book collections, creating a comfortable atmosphere for those who spend time in the hustle and bustle of Medan City [6]. In addition, it is recommended that libraries provide services and facilities that are modern and attractive, with the hope of stimulating public interest in visiting the library and, in turn, increasing interest in reading in Medan City.

Meanwhile, biophilic architecture is a design approach that integrates natural elements in the built environment to improve the quality of human life and strengthen human connections with nature [5]. The principles of biophilic architecture include the use of plants, natural light, water, and sustainable materials in building design to create cooler, more comfortable, and more attractive environments (Kellert, 2018) [4]. Studies show that a biophilic architectural approach can improve peoples physical and mental well-being, as well as reduce stress in urban environments (Wilson, 1993) [8].

This theme is very suitable to be applied in a library context because the library functions as a place to read books, so a comfortable and calm atmosphere is needed [9]. The Medan City Library requires the application of an environmentally friendly biophilic theme, creating a natural atmosphere in the middle of the building to increase visitor comfort.

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Library requires the application of an environmentally friendly biophilic theme, creating a natural atmosphere in the middle of the building to increase visitor comfort [10].

## 2. Method

The methodology used in the design of the There are two components to Medan City Cultural Park. The first is choosing the design location, which is determined by the Medan City Regional Spatial Plans regional regulation, An investigation of the layout of the city, the sites accessibility, its current state, general zoning laws, rules on the use of space, and utilities [7]. In order to develop and produce a suitable and functional design, the second step is data collection based on primary and secondary data. Data can be gathered by direct or indirect observation and analysis, which is then thoroughly reviewed to provide the required studies.

## 3. Result and Discussion

The Result section of a research paper objectively presents the findings, using data, tables, and figures to summarize key observations without interpretation. In contrast, the Discussion section interprets these results, comparing them with previous research, discussing their implications, acknowledging limitations, and suggesting directions for future research. While the "Result" section focuses on what was found, the "Discussion" elaborates on what the findings mean, their relevance, and their contribution to the broader field.

### 3.1 Project Description

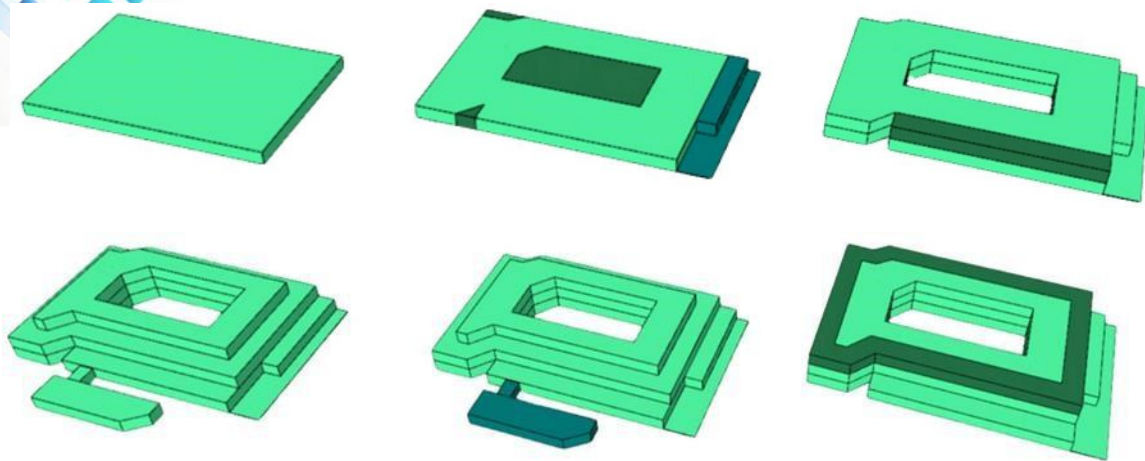
The Public Library is located on Iskandar Muda Street, Medan Petisah North Sumatra. With a land area of 12.000 m<sup>2</sup> / 1,2 Ha and has a relatively flat land contour. The site location is an empty area surrounded by trade, residential, and recreational areas. Therefore, the buildings around the site are predominantly commercial. This site is highly strategic as it is located in the city center with easy access to public transportation, making it an ideal location for a public library.



**Figure 1** . Project Location Source: Google Earth

### 3.2 Mass Concept

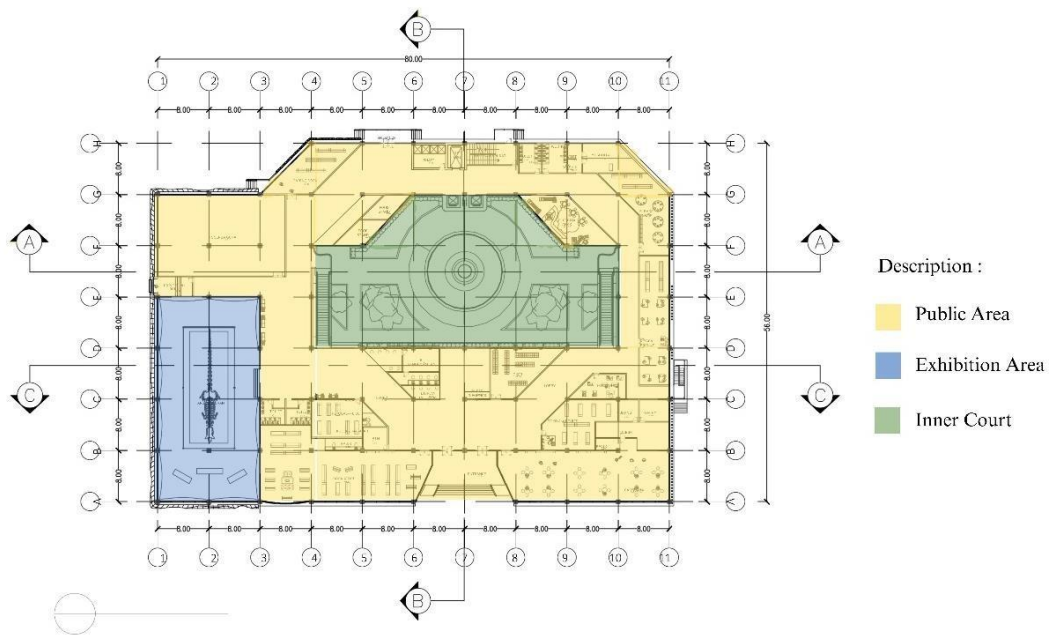
The initial mass of the building is derived from a beam structure, followed by a series of subtractive and additive processes that give it a multi-mass appearance. Subtraction on the second floor creates a courtyard effect in the center of the building, while additional subtraction on the third floor helps avoid monotony. These subtractive and additive processes are meticulously implemented to achieve a dynamic and harmonious design, ultimately resulting in the final form of the building.



**Figure 2.** Massing

### 3.3 Basic Concept

By considering how function and theme are balanced, the concept of the Library uses the principles of biophilic architecture. The building design pays attention to biophilic design principles that prioritize comfort and can be used by all groups in line with modern developments, applied to the form of both the exterior and interior spaces by featuring large openings, and demonstrating flexibility.



**Figure 3.** First-floor zoning

On the second floor is the library area, which includes reading areas and a void to overlook the exhibition area and garden on the first floor.

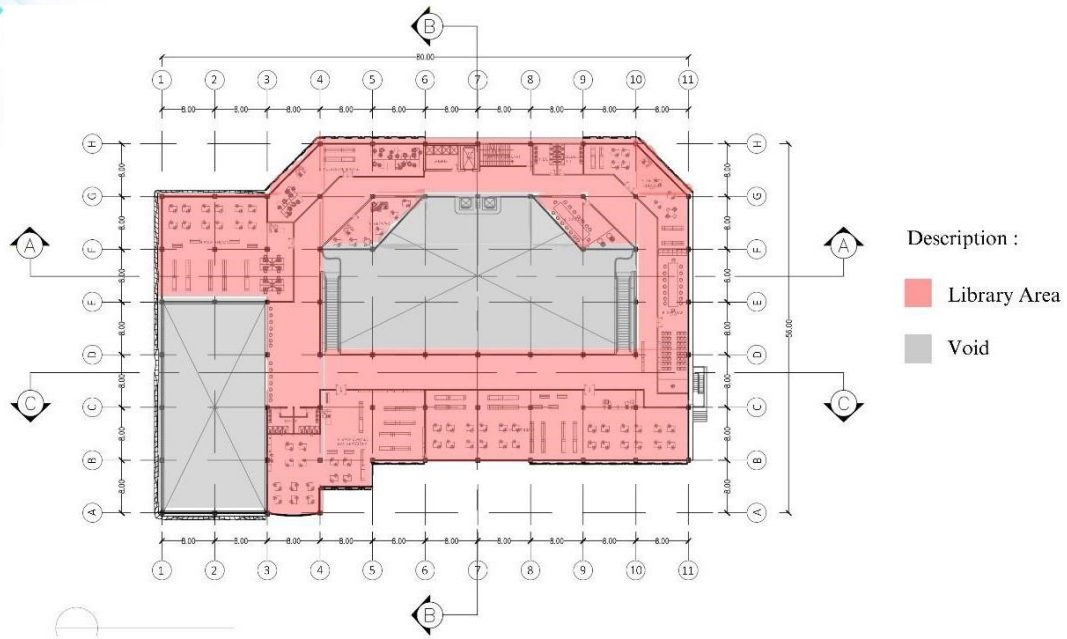


Figure 4. Second-floor zoning

On the third floor, there are three zones. The yellow area is the library area, the pink area is the office area consisting of management rooms, and the orange area is the outdoor area which includes a garden. There is also a void to overlook the garden all the way down to the first floor.

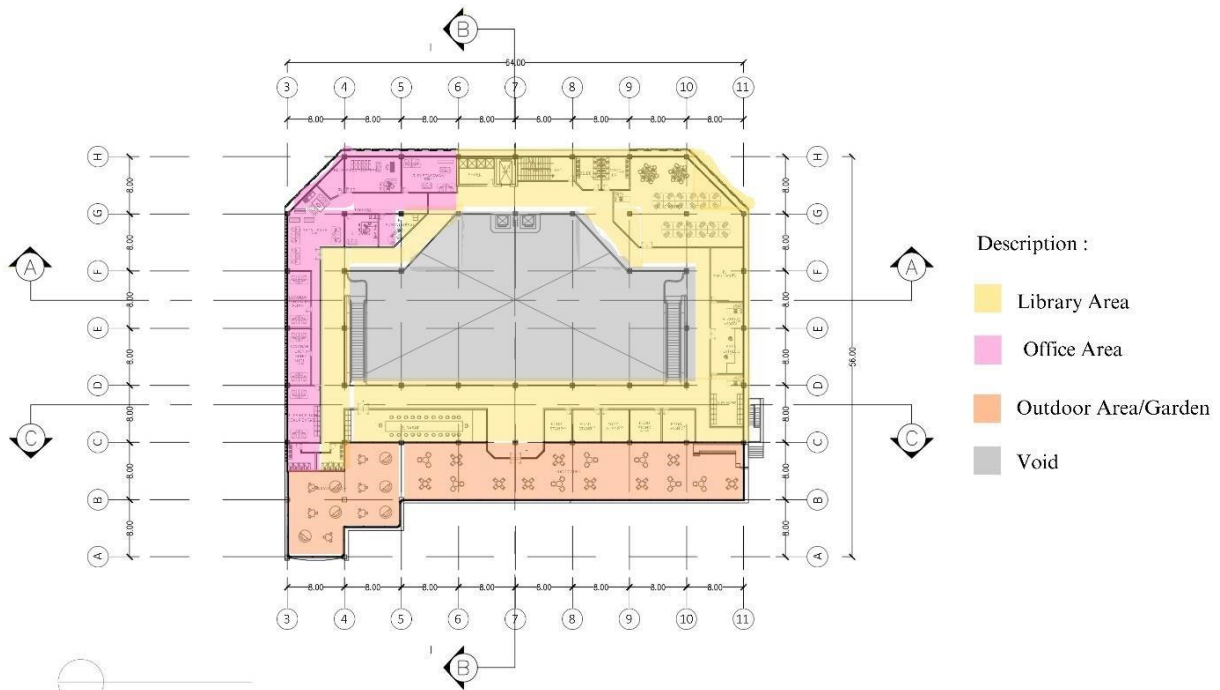


Figure 5. Third-floor zoning

### 3.4 Facade

The north facade of the building faces the main road, Iskandar Muda Street. This facade features glass windows to maximize natural light entering the building. The window design

incorporates hanging plants designed as a substitute for a secondary skin.



**Figure 6.** North elevation

The south facade is the rear part of the building facing the vehicle parking area and also serves as the entrance to the building. It extensively uses wooden secondary skins and hanging plants to reduce heat entering the building.



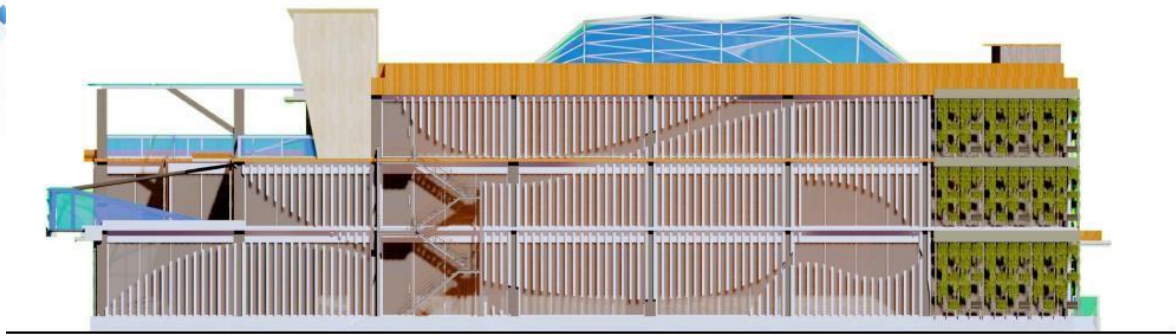
**Figure 7.** South elevation

The east facade employs numerous harmonious wooden secondary skins to minimize direct sunlight entering the building and features a drive-thru for book returns.



**Figure 8.** East elevation

The west facade also utilizes harmonious wooden secondary skins to minimize sunlight and includes an external emergency staircase.



**Figure 9.** West elevation

### 3.5 Application of Biophilic Architecture

Biophilic architecture integrates natural elements into building design to enhance the connection between people and nature. This approach includes the use of natural materials, ample daylight, indoor plants, green walls, and water features to create a more pleasant and health-promoting environment. By incorporating these elements, biophilic architecture aims to reduce stress, improve mental well-being, and boost productivity. It often involves designing spaces that offer views of nature, creating indoor-outdoor connections, and using patterns and textures inspired by the natural world. Ultimately, biophilic architecture seeks to create sustainable, eco-friendly buildings that support the health and well-being of their occupants.

#### 3.5.1 Nature in the Space

Here are some key elements of the "nature in space" concept in biophilic architecture:

- Vegetation and growth
- Water
- Natural light
- Natural scenery
- Natural materials
- Animal presence
- Scents and sounds of nature
- Variety of shapes and patterns



**Figure 10.** Nature in the Space

#### 3.5.2 Nature Natural Analogues

Here are some key elements of the "nature natural analogues" concept in biophilic architecture:

- Biomorphic shapes and patterns / running water
- Natural geometrics/tree structures
- Natural materials and colors

- Simulation of natural systems / waterfall
- Textural variations/differences
- Use of techniques and technologies such as bird sounds or water gurgling

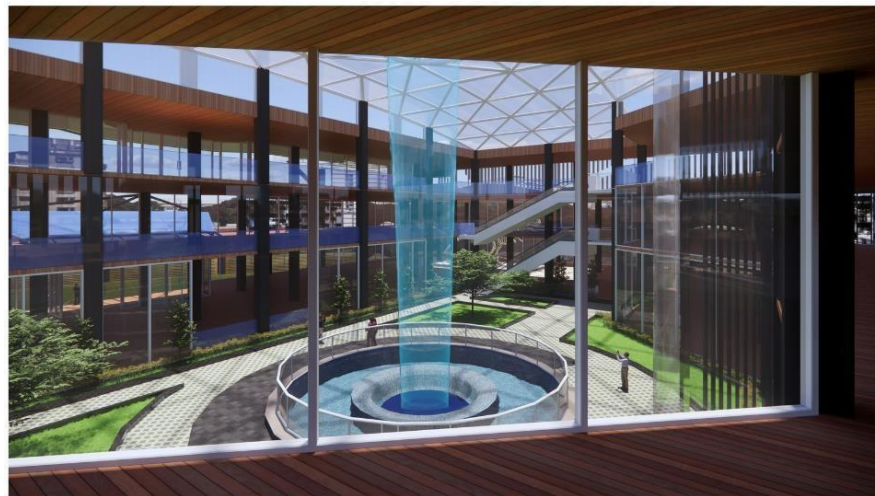


**Figure 12.** Nature Natural Analogues

### 3.5.3 Nature of The Space Patterns

Here are some key elements of the "nature of the space patterns" concept in biophilic architecture:

- Existence of places that provide wide and open views. -
- Places that provide a sense of protection for humans.



**Figure 13.** Nature of The Space Patterns

## 4. Conclusion

The designed Public Library has an area of 12,000 m<sup>2</sup> / 1.2 Ha. This relatively flat land contour has great potential for the development of educational areas. This design area has high potential for the use of strategic functions such as educational facilities, offices, and hotels that will serve as a platform for learning related to literacy improvement in Medan City. This Public Library is designed in accordance with biophilic design principles and other universal architectural norms.

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