

DESIGNING A GREEN MOSQUE IN DELI SERDANG WITH THE APPLICATION OF ISLAMIC ARCHITECTURAL STYLE**Nur Fatimah*¹, Sri Gunana Sembiring²****¹Department of Architecture, Faculty Engineering, Universitas Sumatera Utara, 20155
Medan, Indonesia****nurfatimah2897@gmail.com****Abstract (English)**

Indonesian society, with its strong socialist and religious characteristics, shows dynamic growth in economic, socio-cultural, and population aspects. This growth demands the availability of adequate facilities and infrastructure, including representative worship facilities for the majority religious group, namely Islam. In Deli Serdang Regency, North Sumatra, an area with significant ethnic and cultural diversity and a majority Muslim population (68.24%), the need for a mosque as a spiritual and social center is increasing. In addition to serving as a place of worship, the mosque may also develop into a hub for community outreach and Islamic propagation. The design of this mosque aims to create a building of worship that not only fulfills its main function, but also integrates basic Islamic values, accommodates essential supporting facilities and utilizes the potential of the site optimally to create a functional space without wasted areas. The design approach carried is the concept of a "Green Mosque" which emphasizes the principles of sustainability and environmental friendliness, combined with an Islamic architectural style that is relevant to the local context of Deli Serdang. Through an adaptive Islamic architectural approach and green design principles, this design is expected to produce a mosque that is not only aesthetically beautiful and spatially functional, but also makes a positive contribution to the environment and strengthens Islamic identity in the context of the heterogeneous Deli Serdang community. This mosque is expected to be a harmonious reflection of Islamic spiritual values, the social needs of the community, and environmental sustainability.

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Indonesian society is known as a socialist and religious nation. Where with the increasing economic growth, socio-culture and population growth which is quite high with all its activities, it must be supported by adequate facilities and infrastructure. One of the religions that has developed very rapidly in Indonesian society since long ago is Islam. This began since the entry of Islam from Persia into Indonesia centuries ago. And currently, it is undeniable that the Muslim community is the majority community in Indonesia, and that community also consists of various ethnic groups, economic groups, communities and so on. For people who follow the Islamic religion, they need a place of worship in this case a mosque.

Deli Serdang is a Regency known as one of the 33 Regencies/Cities in North Sumatra Province which has a diversity of resources, Deli Serdang also has cultural diversity, which is enlivened by almost all the tribes in the archipelago. The native tribe of Deli Serdang is the Malay Tribe whose naming of this district is also taken from two sultanates, namely the Deli Malay and Serdang Malay. The Karo Tribe, and Simalungun; and several dominant immigrant tribes such as Javanese, Batak, Minang, Banjar, and others also occupy this district in other words Deli Serdang is a heterogeneous society. With the dominance of the spread of Islam, it has now reached 68.24% of the population of Deli Serdang Regency who are Muslim.

Mosques as places of worship for Muslims, these buildings of worship are spread throughout the archipelago with various forms, areas, and scales of service. Mosques as places of worship are one of the public facilities, usually have the need for wide and spacious building

spans, so that in good planning an expert is needed in designing the mosque building. In the development of the times, mosque buildings themselves have various forms regardless of their function as places of worship.

It can be said that the architecture of mosque buildings is a clear example to describe the blend of culture between Islam and the area around where the mosque stands. In addition to being influenced by local culture, the art of mosque architecture is also influenced by the raw materials available at that time in the area, namely stone, brick, or others. The mosque is a reflection of the relationship between the history of the development of Islamic civilization. With the construction of this mosque, it is hoped that Islamic religious activities can develop further in the environment where the mosque was built, especially for the congregation who generally use it.

With the subject of Islamic architecture and the application of Islamic ideals, the "Deli Serdang Green Mosque" is a place of prayer for Muslims and a hub for activities for the Muslim community in Deli Serdang Regency.

A mosque is a venue created specifically for congregational prayers, which are a way for people to worship Allah SWT [1]. According to linguistics, a mosque is a place where people prostrate themselves. Its significance then grew to include a unique structure where people congregate to offer congregational prayers. According to Az-Zarkasyi, "When prostration is the most honorable act in prayer, the word *sujud* (*masjad* = place of prostration) is used to refer to the location of the prayer because of how close the servant of Allah is to Him when prostrating." They don't refer to it by any other name, such as "place of bowing." The term "*masjad*" then evolved into "*masjid*," which refers to a particular structure used for the five daily prayers. Distinct from the location known as "*mushallaa*," which is an open field used for "*Id* prayers" or similar events (like the *Istisqa* prayer) [2]. One of the key components of Islamic society's framework is the mosque. The mosque holds immense spiritual and material significance for Muslims. The Arabic words *sajada*, *yasjudu*, and *sajdan* are the origin of the word "*masjid*." To prostrate, obey, and submit with complete respect and *ta'dzim* is the definition of *sajada*. The word "*sajada*" is transformed to "*masjidun*" (meaning *isim*), which denotes a location where people can kneel in prayer of Allah SWT. It contains two types of virtue: virtue packed in specific worship, such as required prayer, either in individual or group settings, and virtue packaged in daily *amaliyah* to interact and mingle with other worshippers [3].

The mosque is basically a holy, noble and the best place on earth, a place that connects a servant and the creator or in religious terms is *habblum minallah*, from there the evidence and existence of *tauhid* in a person's soul, the prosperity of the mosque is proof of the realization of the propagation of Islam in the country. Muslims have an obligation to prosper the mosque by always being active in it not only limited to worship alone, besides that we also make the mosque a center for educational activities, religious studies and other positive activities which ultimately aim to foster our love for the mosque itself and as proof of our faith in Allah SWT. Generally speaking, the mosque is a sacred site for Muslims that serves as a hub for religious activity, a place of worship, and a community that needs to be routinely and purposefully created. to improve the quality of Muslims' service of Allah, boost religious fervor, and accelerate the spread of Islam in order to raise Muslims' involvement and accountability for the advancement of their country [4].

Seeing how important the existence of the mosque is, Muslims themselves must be able to care for, manage, guard and move the mosque in order to revive and prosper the mosque, improvements are needed to the management of the mosque. Poor mosque management will have an impact on the congregation and the surrounding community. In order not to be abandoned by the congregation and the community, the mosque needs to improve itself. If

managed with good management, the optimization of the function and role of the mosque as in the time of the Prophet Muhammad SAW can certainly be realized [5].

RTH is defined by Law Article 1 Point 31 UUPR as an extended or clustered space with an open use that serves as a habitat for naturally occurring or purposefully planted plants. Research shows that RTH in the mosque area has an ecological function (cooling, natural ventilation), social (comfort of the congregation), and can even influence the behavior of the congregation [6].

In January 2019, the first Green Mosque in Europe, the Cambridge Central Mosque, was inaugurated, claiming to be a zero-carbon emission mosque. The mosque uses a natural air conditioning system and an efficient water recycling mechanism. In addition, most of the mosque's ornaments are made from environmentally friendly materials such as wood and rattan [7]. The Hatta Mosque, which was most recently inaugurated in September 2021 by the Dubai Electricity and Water Authority (DEWA), is reportedly the first mosque in the world to receive a platinum rating for green buildings from the US Green Buildings Council's Leadership for Energy and Environmental Design (LEED v4) [8]. For Muslims concerned about the long-term, mutually beneficial relationship between living things and their surroundings, Eco Masjid is a permanent house of worship [9]. Mosque buildings need to pay attention to the concept of environmentally friendly buildings (green buildings). In the context of mosque buildings, according to building experts, it focuses on the elaboration of 6 major aspects, namely water conservation, land use, air quality and room comfort, energy efficiency and conservation, material sources, and waste management [10].

Mosque architecture emerged as an element of Islamic architecture that is guided by the provisions contained in Islamic law with buildings as an expression of the highest values that are realized in a building [11]. Seyyed Hossein Nasr As a leading scholar in the field of Islamic studies and philosophy, Nasr emphasized that Islamic architecture is more than just a visual style. For him, Islamic architecture is a physical manifestation of the Islamic worldview, reflecting tawhid (oneness of God), unity, and harmony with nature. He saw elements such as domes, minarets, and geometric ornaments as symbols that have deep spiritual meaning [12].

The earliest Islamic architecture is the Kaaba, with its celestial axis penetrating the earth. This primordial monument built by Adam and later rebuilt by Abraham, is an earthly reflection of the heavenly monument that is also reflected in the human heart. The harmony of the dimensions of the Kaaba, its balance and symmetry, the center of the Islamic cosmos can be found in the sacred architecture of Islam throughout the Islamic world. Aesthetics is defined as a branch of philosophy that pays attention to or relates to beautiful phenomena in nature and art. In addition, aesthetics is also defined as sensitivity to art and beauty. Therefore, seeking the form and pattern of Islamic aesthetics is to trace the philosophy that developed in Islam [13].

In general, scholars agree that Islamic architecture has unique characteristics that set it apart from other architectural traditions. More than just a visual style, it carries profound spiritual values, symbolism, and social functions. Despite differences in emphasis and approach, these scholars help us understand the richness and complexity of Islamic architecture as an essential part of Islamic civilization.

2 Methodology

Mixed approaches, which incorporate quantitative and qualitative data collection techniques, were used to construct this study. A research approach known as "mixed methods" blends qualitative and quantitative methodologies. Mix methods are used when either quantitative or qualitative approaches by themselves are less accurate in addressing research issues or when mixing the two approaches will produce the best insight, according to Creswell (2009) [14]. Compared to the other two methods qualitative and quantitative mixed methods

are less well-known. In order to investigate the validity of psychological qualities, Campbell and Fisk combined these two distinct approaches for the first time in 1959. They urged other writers to collect data for a research using this combined approach. Authors from all over the world subsequently started combining these two distinct approaches to create more thorough, accurate, trustworthy, and impartial data.

3 Results and Discussion

3.1 Project Description

Based on the assessment for the selected site location that has the most points based on the assessment criteria, namely the location of Site A on Selamat Ketaren Street, Percut Sei Tuan District, Deli Serdang. Percut Sei Tuan is a district with development development where housing organizations/complexes, educational centers, and commercials have large growth in the area.

The estimated population growth in Percut Sei Tuan District will be relatively large. In this area there is availability of development land, but it needs to be limited. Deli Serdang has a population of 2,029,308 people (2015), a density of 722.45 people/km², with coordinates 2°57'-3°16' N and 98°33'-99°27' E. For transportation to and from the location, it can be reached by using public transportation and private vehicles. the area dominated by the function of buildings around the location is in the form of housing, shops, and educational centers. Project description as a plan footprint (Figure 1).



Figure 1. Project Site
Source: Google Earth [15].

3.2 Basic Concept

The layout of the mosque is square. Because with a square shape, the space will be used maximally and can be utilized entirely. In accordance with Islamic teachings so that there is no waste in the room. In Islamic worship buildings, the square shape is applied more flexibly. Because the square shape has a greater capacity for worshipers and minimizes the empty space that occurs (Figure 2).

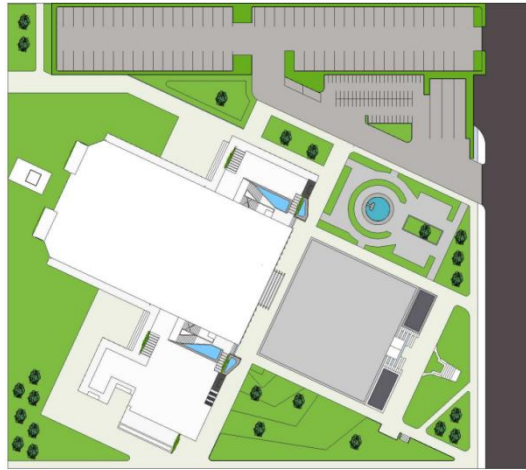


Figure 2. Site Plan

3.3 Outdoor Space Design Concept

The circulation plan of the access will facilitate access to the site for users. Circulation must follow the analysis, because it will facilitate in determining the entrance and exit, and if possible add new paths within the site for the convenience of reaching the building. In this Deli Serdang Green Mosque project, vegetation is placed on the edge of the site as a buffer to reduce noise caused by public vehicles. Vegetation is also placed around the park to add beauty to the site (Figure 3).

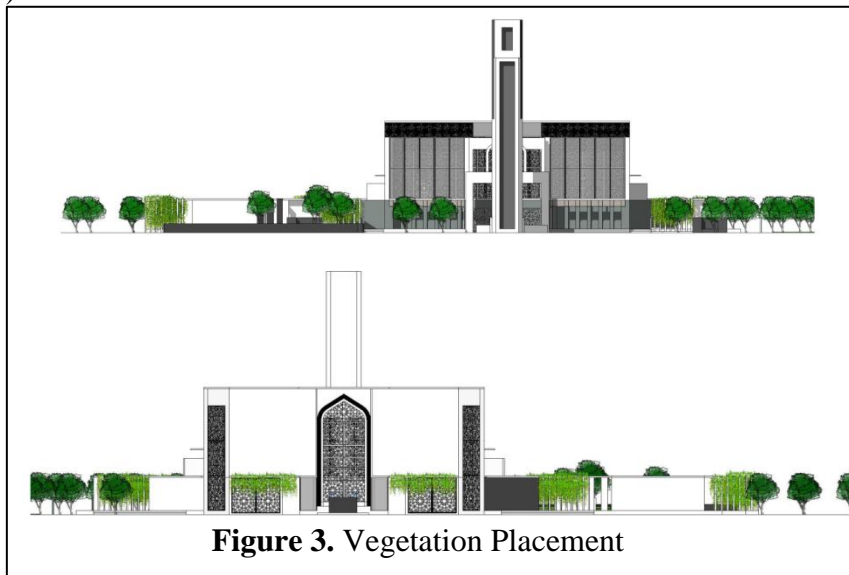


Figure 3. Vegetation Placement

In an effort to mitigate the negative impacts of noise pollution, the placement of buildings, especially houses of worship such as mosques and prayer rooms, needs to consider an in-depth analysis of the surrounding noise sources. Ideally, these buildings are designed and constructed at an adequate distance from noisy activity centers, such as main highways, industrial areas, airports, or busy commercial areas. This consideration is crucial in order to create a calm and solemn atmosphere, which supports the solemnity and comfort of the congregation when performing worship. Excessive noise can disrupt concentration, reduce the quality of spiritual experience, and even cause physical discomfort, so choosing a strategic location that is free from significant noise sources is a top priority in planning the construction of a house of worship."

3.4 The Idea of Appearance and Mass

The shape of the mosque adopts an Islamic concept based on the following principles: (1) Minimizing the use of transparent materials, so that private spaces are not clearly visible, (2) Not using shapes, symbols or statues of animals or humans, this is so as not to cause the nature of worshipping idols. (3) The building must be in harmony with the environmental conditions and minimize the use of excessive materials or energy. (4) Can create a sacred impression, but comfortable. The goal is that the congregation can carry out prayer activities properly (Figure 4).

This mosque will use symbolism from the verses of the Qur'an. Because from the holy verses can bring calmness that is like being close to God. So, by applying this symbol to the mosque, it can increase the quantity of people who pray in congregation. This mosque will use symbolism that reflects Islam, such as the use of verses in the carvings. For the landscape, the mosque will have a large public area. Because this public area can function as a place for socializing with the surrounding community by providing a pool and several parks (Figure 5).



Figure 4. Building Mass



Figure 5. Symbolic Façade

Symbolic facade There are two sources of lighting, namely natural and artificial. Artificial lighting is obtained from the State Electricity Company. For natural lighting in the building is obtained from sunlight because the sunlight is from east to west, then in that direction many openings will be made so that natural light from sunlight can be used optimally. From the many openings also allows the circulation of wind into the building to move freely so as to reduce the use of air conditioning in the building.

4 Conclusion

This concept integrates the principles of environmental sustainability with the values and aesthetics of Islamic architecture. The design of a green mosque does not only focus on reducing environmental impacts through energy efficiency, the use of sustainable materials, wise water management, and design that is responsive to the local climate. More than that, the Islamic architectural approach provides a deep philosophical and spiritual foundation for this sustainable practice. Islamic values such as tauhid (the oneness of Allah) which teaches harmony with creation, the concept of khalifah (the caretaker of the earth) which emphasizes human responsibility towards nature, and the principle of moderation (israf) in the use of resources, become ethical and practical guidelines in designing an environmentally friendly mosque. Visually, a green mosque with an Islamic architectural approach can combine traditional elements of Islamic architecture such as the mihrab, dome, minaret, and geometric ornaments with modern, sustainable design solutions. The use of natural lighting, cross ventilation, local materials that are low in carbon emissions, and the integration of green open spaces not only increase building efficiency but also create a comfortable, healthy, and natural prayer space. Thus, designing a green mosque with an Islamic architectural approach is not only about building an energy efficient building, but also about embodying Islamic spiritual and ethical values in architectural practice, creating a meaningful, sustainable space of worship and being a role model for the community.

5 Acknowledgment

This design is expected to design a green mosque with an Islamic architectural approach that can provide a positive contribution and be an inspiration in realizing a mosque building that not only functions as a place of worship, but is also environmentally friendly and in harmony with Islamic values in the city of Medan and its surroundings.

6 Conflict of Interest

The writers' names are listed below, and they declare that the manuscript has no conflicts of interest.

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All the authors sign this statement to indicate agreement that the above information is true and correct (a photocopy of this form may be used if there are more than 10 authors):

Author's name (typed)

Author's signature

Date

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19 April 2025



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