Abstract. One of the facilities owned by SD Muhammadiyah Ambarketawang 2 is a 36 m² prayer room. The facility was deemed insufficient to foster students in the field of religion, so they added new facility in the form of a mosque with a size of 10 m x 11.5 m having two floors. For this purpose, experts were needed to be able to design the building. From the results of the service, the required Mosque Design and Budget Plan were created.

Keywords: elementary school, mosque, prayer room

1 Introduction

Ambarketawang is a village located in the Gamping Sub-district, Sleman, Special Region of Yogyakarta. Ambarketawang Village consists of 13 hamlets with an area of 635.8975 ha and a population of 19,237 people. Geographically, the Ambarketawang Village area is located between 110°21° to 110°22° East Longitude and 7°47° to 7°48° South Latitude.

a. To the north: Sidoarum Village, Gamping Sub-district, Sleman Regency
b. East side: Banyuraden Village, Gamping Sub-district, Sleman Regency
c. To the south: Bangunjiwo and Tamantirto Villages, Kasihan Sub-district, Bantul Regency.
d. West side: Balecatur Village, Gamping and Sidoarum Sub-district, Godean Sub-district.

The area of Ambarketawang Village lies from north to south, where the southern area is hills/limestone mountains. The existence of Ambarketawang Village on the Yogyakarta - Purwokerto/Jakarta main route has resulted in rapid development of Ambarketawang village area, especially in the economic, industrial, educational, trade, and population sectors. The height of the land is between 80-100 m above sea level.

The number of elementary schools in Gamping Sub-district is 37 schools, including SD Muhammadiyah Ambarketawang 2. The number of SMP/MTs schools is 11 schools, while the number of SMA/SMK schools is 6 schools. SD Muhammadiyah Ambarketawang 2
Gamping Sleman is an elementary school with B Accreditation, with a total of 143 students. Currently, one of the facilities it has is a 36 m² prayer room. The musalla currently owned is deemed insufficient to foster students in the religious field, so they added new facility in the form of a mosque with a size of 10 m x 11.5 m having two floors. The current condition of the mosque that has begun to be worked on, is shown in Figure 1.

The mosque was originally planned to be built with 3 floors, but by looking at the available funds, it became 2 floors. By looking at these conditions, planners are needed to be able to redesign from 3 floors to 2 floors. For this purpose, reliable experts needed are the people who can design the building. The experts are expected to be able to design the structure of the mosque building, including its architecture, to be able to calculate the need for a budget plan (RAB), and a drafter who is able to draw the building. The solutions that can be implemented in overcoming partner problems are helping to provide structural and architectural experts, budget plan estimators and drafters, and those who can help carry out mosque work.

2 Methodology

The method used in carrying out this service is a method that is usually carried out in project planning and work implementation, which is often referred to as: "Design and Build". In general, this method has advantages and disadvantages. The advantages include:
1. Having direct communication between the owner and the executor (contractor). So, the time spent is more efficient and the effort produced is more optimal for both parties.
2. Avoiding disputes with many parties.
3. Assigning responsibility more easily.
4. Having potential to gain greater benefits or savings from faster communication between owner and executor.
5. Lowering construction costs with the combination of design and execution because it only finances one party. Besides, the planned design can be implemented.
6. Having potential for innovative designs leading to greater profits.

Meanwhile, the disadvantages include:
1. Having owner who lacks competence in construction and costs. It can be suspicious and doubtful, thus hindering project progress because he is unable to understand complaints and disputes.
2. Having owner with limited ability to directly communicate with the contractor.
3. Having potential conflicts with the existence of a combination (planner & implementer) that restricts the provision of architectural design services, or does not recognize or support engineering contracts.

4. Having new engineering firm that may not have the necessary skills and experience to deal directly with the owner.

5. Having the owner that may have to make a more significant initial payment due to the initial costs involved in making the proposal.

6. Evaluating design proposals from bidders that may be problematic. The owner needs to hire a consultant to evaluate the proposal.

   The steps taken in this work were: preparation, examination of the results of soil testing, architectural design, structural design, depiction of architectural and structural designs, calculation of budget plans and assistance in the implementation.

2.1 Preparation.

   Before this service was carried out, it was ascertained in advance what work has been carried out and what work would be carried out, but it still had technical constraints. To achieve this goal, coordination with SD Muhammadiyah Mosque Development Team was carried out.

2.2 Examination of soil test results.

   Soil testing in the form of a sondir test was not carried out because the foundation of the mosque had already been worked on. By laying the foundation at a depth of 2 m, it was estimated that at that depth the location of hard soil was located.

2.3 Architectural Design and Structural Design.

   The Architectural Design was done first before the Structural design. The loading analysis used for structural design was based on SNI 1726: 2012 (BSN, 2012) and SNI 1727: 2013 (BSN, 2013). Meanwhile, the planning was calculated based on SNI 1726: 2019 (BSN, 2019) and SNI 2847: 2019 (BSN, 2019). The structural analysis was calculated using the Structure Analysis Program (SAP 2000) (Sholeh, 2021). The depth of the foundation was designed based on the technical theory required, from Hary Cristady (2020) and Joetata Hadihardaja (1997).

2.4 Architectural Design Drawing and Structural Design.

   After the architectural design (in the form of 3-dimensional drawing) had been completed, it was followed by working on drawing in the form of architectural and structural drawings. Architectural and structural drawings drawn with Autocad program.

2.5 Calculation of the budget plan.

   After carrying out the delineation of classroom buildings, in the form of architectural and structural drawings, it was continued with the calculation of the Budget Plan (RAB) (Ronny and Irika, 2014).

2.6 Implementation of Making Mosque Buildings.

   After the planning was complete, it was proceeded with implementation. The implementation and evaluation steps followed Hafnidar (2017) and Rudy Tantra (2012).

3 Results and Discussion

   The non-physical activities carried out in this work apart from coordinating as shown in Figure 2, the three-dimensional mosque design was also carried out as shown in Figure 3. The designs for the first and second floors can be seen in Figure 4 and Figure 5.
Figure 2. Coordination with Mosque Managers

The design of the mosque that has been done is shown in Figure 6 and Figure 7. The results of the Estimation of the Budget Plan (RAB) for the implementation of this Two-Floor Mosque amounted to Rp. 803,765,900. - (Eight hundred three million seven hundred sixty-five thousand and nine hundred rupiah).

Figure 3. Expected Mosque Design.
The physical activities that have been carried out at this mosque are shown in Figure 5 and Figure 6. The work was stopped at the end of January 2022. The work was stopped due to budgetary issues, besides an implementation error on the 2nd floor. There should be a 2nd floor in the middle of the slab floor, but there is no floor plate, and there is only a floor plate in the terrace area. The expected design from the project owner is as illustrated in Figure 2.
4 Conclusion

Based on the results of community service activities regarding the Design and Implementation of Mosques SD Muhammadiyah Ambarketawang 2 Gamping Sleman, the conclusion is as follows:
1. The design of the mosque with a size of 10 m x 11.5 m for two floors has been completed.
2. Solving the problem in the form of adding a 2nd floor plate has been designed.
3. The need for a Budget Plan is Rp. 803,765,900. - (eight hundred three million seven hundred sixty-five thousand nine hundred rupiah).
4. At the time of implementation, a companion is needed.

References

[5]. Hafnidar, Dr., Construction Project Management, deepublish, Yogyakarta, 2017