

Sustainable Design of Muhammadiyah Edu-tourism Site Plan

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Abstract. Istana Qur'an is the only contemporary Islamic boarding school in Sarwodadi Village, Pejawaran District, Banjarnegara, Central Java Province. This Islamic boarding school is one of Muhammadiyah's charities in the Pejawaran Muhammadiyah Branch (PCM) and partners in research project activity. Sarwodadi Village has initiated a Muhammadiyah-based educational-tourism complex since 2021 due to its relatively close location to the Dieng tourist destination in Central Java. This research paper aims to rearrange the Muhammadiyah edu-tourism site plan to be following the appropriate technical requirements while also considering land usage and the environment for edu-tourism. The research methods included aerial photography, land mapping by using drone and Google earth map, actual field measurements, and technical descriptions utilizing CAD and Sketch-up -based programs. The redesign for the preparation of a site plan in a specific interest tourism complex area must pay attention to the conditions of existing space utilization and its environment, consider user behavior, and consider long-term benefits and investment factors in order to generate an adequate redesign concept for user needs at a given time. The renovated edu-tourism complex is intended to provide more value, particularly in terms of local revenue.

1 Introduction

Located in Sarwodadi Village, Pejawaran District, Banjarnegara, Central Java Province, Istana Qur'an is the only contemporary Islamic boarding school in the area. This Islamic boarding school is a partner in the research project since it is one of the organizations supported by Muhammadiyah's Pejawaran Muhammadiyah Branch (PCM). Due to its proximity to the popular tourist destination of Dieng in Central Java, the village of Sarwodadi in Pejawaran, Banjarnegara, has begun developing a Muhammadiyah-based educational-

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tourism complex since 2021 [1]–[5]. Since no other Muhammadiyah site has been investigated for its potential as an educational tourist destination, Sarwodadi Village is a good candidate; it is home to a highly developed Muhammadiyah Islamic boarding school that has attracted the attention of religious tourists from Yogyakarta, Jakarta, Pekalongan, and other nearby cities [4]. In addition to its function as an Islamic boarding school, the property also houses the MTs Muhammadiyah of Sarwodadi Campus. Since 2021, this area has benefited from Universitas Muhammadiyah Yogyakarta's aid, particularly in the form of MSME assistance to bolster the local economy. It includes coffee, snack, beverage, herbal MSMEs, and others [3], [6]. Moreover, one of the dormitory buildings in the school complex has gone through the design process [5].

The planned educational-tourism complex would occupy a space of 4.02 hectares, including a new building measuring 1.3 hectares currently occupied by MTs Muhammadiyah of Sarwodadi [4]. A preliminary site plan was created during volunteer work in the neighborhood of the previous year [4]. Nevertheless, in 2022, some benefactors provided funding for building a mosque and a male dormitory, and they selected sites that did not adhere to the site plan's original design. Because of this, this service project aims to equip the partner with the resources required to reorganize the Muhammadiyah edu-tourism site plan under the relevant technical regulations, with special consideration given to land use and the natural environment related to the goals of the project. Edu-tourism, or "educational tourism," is a subset of the tourist industry in which visitors specifically seek educational opportunities [4], [7]. Elementary and high school students from various regions interested in comparative studies and members of the Muhammadiyah Organization are the ideal visitors to this edu-tourism site. The new special interest tour will provide several positive outcomes for the residents of Sarwodadi Village, including growth in the micro, small, and medium enterprise (MSE), transportation, and tourism-related human resource sectors [8]–[10]. To achieve a spatial arrangement that fulfils the criteria of an edu-tourism [11], reviewing the site design and landscaping to ensure compliance with the relevant technical and environmental principles is essential [7], [12].

2 Methods

Preparation, literature study, field surveys (including interviews), data processing and analysis, and conceptualization led to the final site plan design for this educational-tourism complex [4]. As with other similar volunteer projects, the theoretical inspiration was drawn from studies of educational tourism, site layouts, and natural scenery discovered in the literature [11]–[14]. Reviewing the site in person, taking overhead photographs using a drone, documenting information, and data on the site, and conducting interviews with local officials, boarding school administrators, and MTs Muhammadiyah of Sarwodadi and PCM Pejawaran [4] were all methods employed to collect field data.

After gathering all available library and field data, analysis and conceptualization were performed, and the site plan design was reworked. Figure 1 depicts the process for carrying out research project flow.

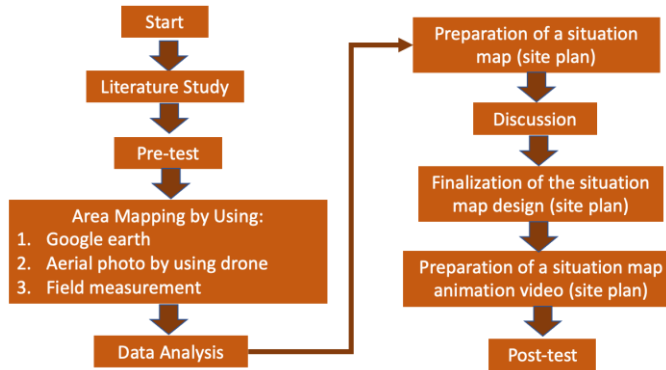


Fig. 1. Flowchart of the research methods

3 Results and Discussion

3.1 Aerial Photography by Using Drones on Existing Buildings

Drone aerial photography was utilized to assess the state of infrastructure in constructed structures. Figure 2 depicts the building map created using drone footage. The buildings of MTs Muhammadiyah of Sarwodadi, the school office, sports hall, mosque, and female dormitory, were all being put to good use.



Fig. 2. Aerial photo of the existing condition of the old building in the Istana Qur'an Islamic Boarding School complex

3.2 Zoning and mapping area plan

The regionalization or zoning step was used to plan the concept of a situation plan used in the previous project [4] Figure 3 depicts the previously existing land use and building use map. Numbers 1-4 and 22 represent the education area, number 5 the office area, numbers 6 and 17 the sports area, numbers 7-8 and 11 the residential area, numbers 12 and 13 the water treatment plant area, number 14 the independent energy supply area, and number 19 the specific symbolic site area [4]. The number 2, 5, 6, and 15 were used as building blocks [4]. Figure 3 depicts the previous two-dimensional (2D) situation plan, whereas Figure 4 displays the updated site plan.

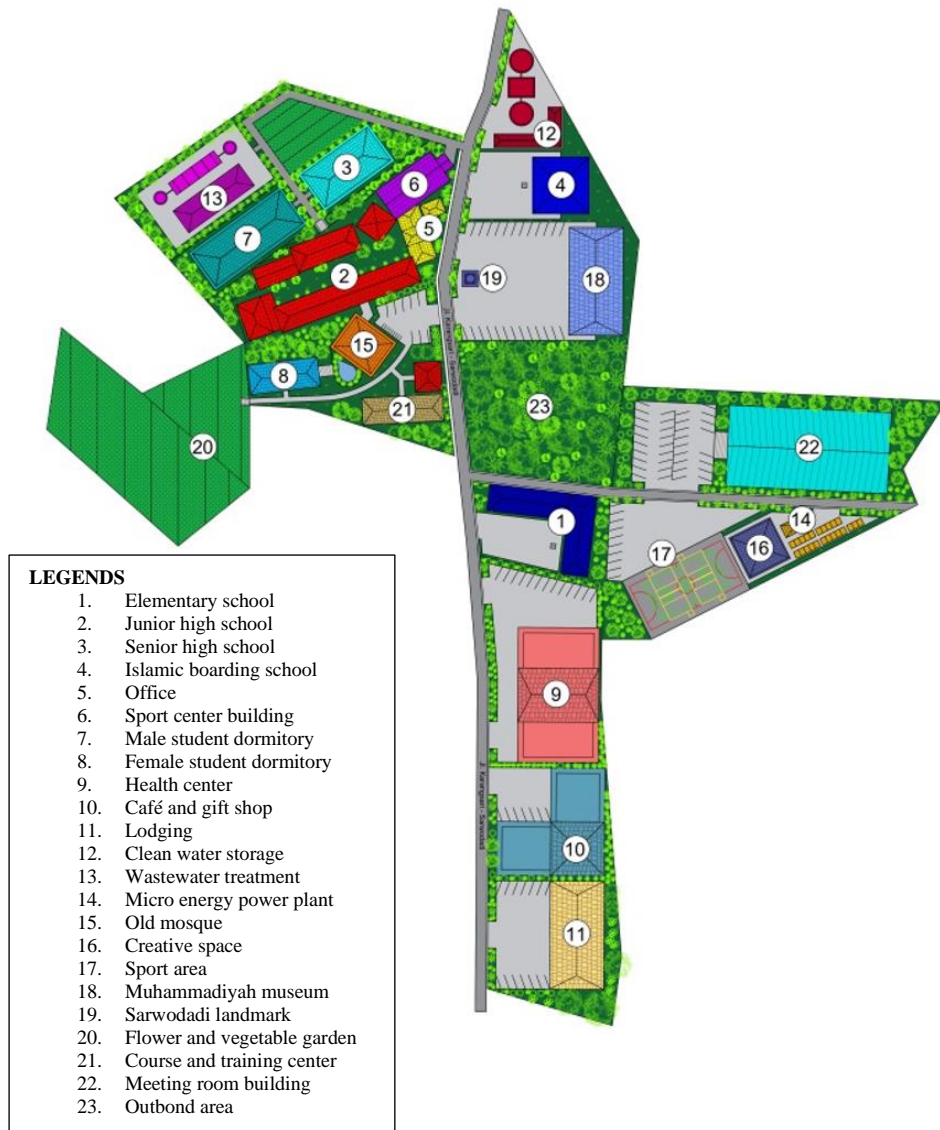


Fig. 3. Previous site plan version

Numbers 7 and 17 distinguish between the old and new site plans. Position 17 was converted from a sports arena to a male student mosque. The number 7 male dormitory would be relocated to a new location near the tower, near the male student mosque.

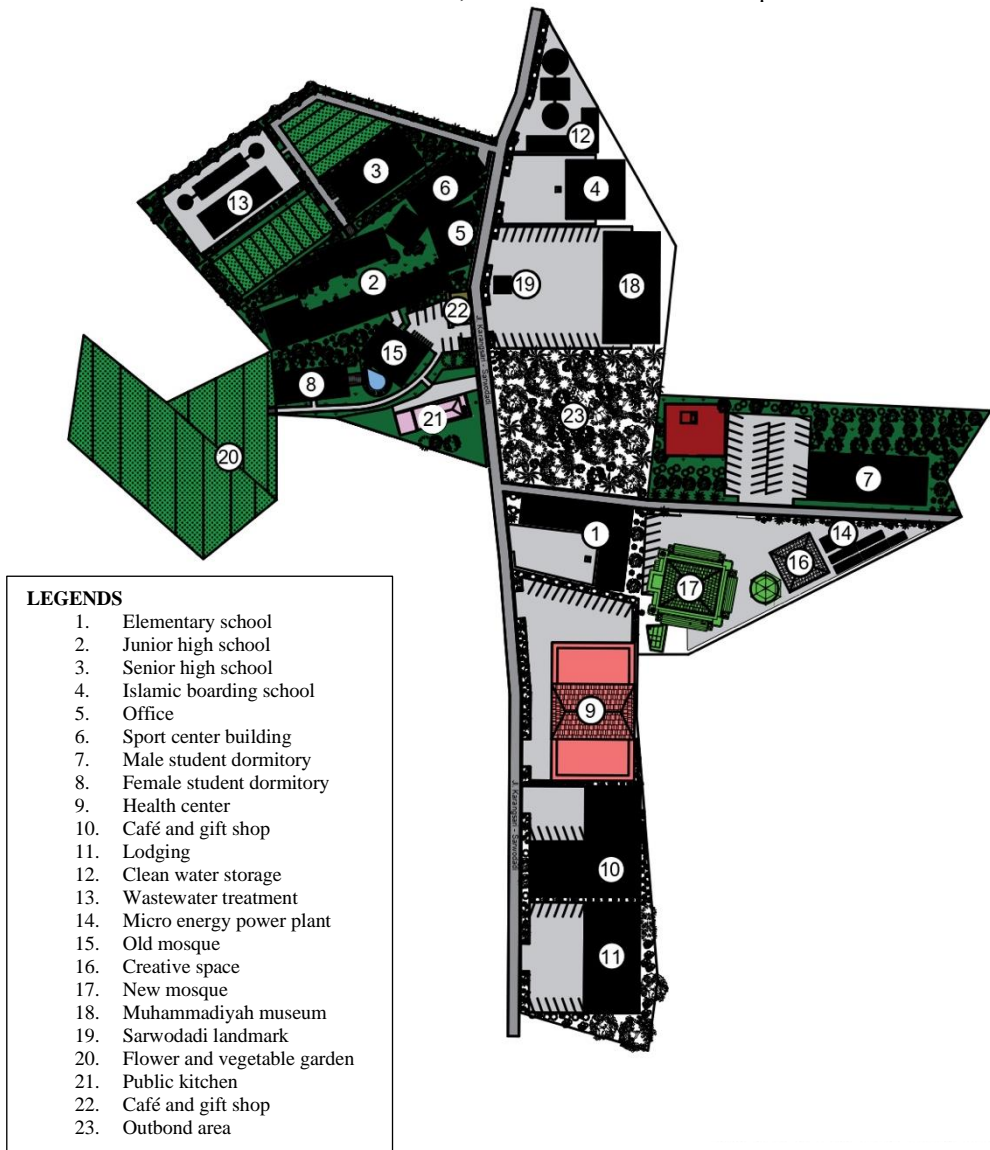


Fig. 4. New site plan design

3.3 New perspective of situation plan

Figures 5-9 exhibit the situation plan perspective. Figure 5 presented the male dormitory building constructed by using reinforced concrete. Reinforced concrete structure was chosen as the building material that well-known to the durability, strength, easy to be casted and cheap [15]–[18]. The dormitory was designed as three stories to facilitate the male student. The new site of it was on the higher location than before.



Fig. 5. Plan for a male dormitory building to be moved to a location near the new mosque



Fig. 6. New mosque for male students



Fig. 7. The position of the new mosque with the new male dormitory

The edu-tourism was also developed to some attraction, such as souvenir shops, recreational park and garden, and sport centre. The detail of attraction site plan was depicted in Figure 8 and 9.

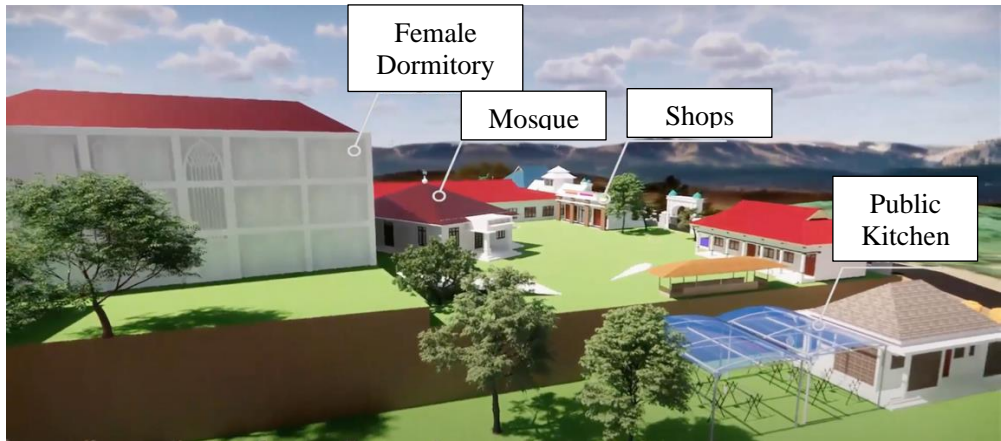


Fig. 8. The situation of the female dormitory, old mosque, shop and kitchen



Fig. 9. Perspective of the situation plan in the education area

Table 1 lists the results of a pre-test and post-test evaluation of the societies' understanding of redesigning the site plan following technological principles after completing the activity. To determine the level of partner's understanding of the need for site plan changes, the redesign process, analysis and design concepts, environmental principles in land use in the area to be changed, and development and sustainable development of the area, interviews were conducted with all relevant parties encompassing 18 respondents. The results revealed an increase in comprehension, with the average score on the five-question post-test rising from 22% to 88.4%. As a result, the partner collaborating with the service team to develop the site plan has benefited from this research project initiative.

Table 1. Pre-test and post-test results concerning the understanding of the site plan redesign concept

No.	Assessment item	Average pre-test value	Average post-test value
1.	Understanding whether changes to the site plan are necessary	22%	90%
2.	Understanding of the site plan redesign process	12%	82%
3.	Understanding of analytical processes and concepts	5%	80%
4.	Understanding of environmental rules in land use in the area to be changed	33%	96%
5.	Understanding of sustainable regional development	38%	94%
Total Average		22%	88.4%

4 Conclusions

To generate an adequate redesign concept for user needs at a given time, the redesign for the preparation of a site plan in a specific interest tourism complex area must pay attention to the conditions of existing space utilization and its environment, consider user behavior, and consider long-term benefits and investment factors. The redesigned edu-tourism complex is expected to increase value creation, particularly in terms of local revenue. The research was also evaluated based on the increasing score of pre-test and post-test from 22% to 88.4%.

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