

The Efficiency of Settlement Land Arrangement Case Study: Taman Gunung Anyar Housing in Surabaya

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Abstract: The increasing of population in urban area results in the increase of the housing need and it is followed by the increase of land demand. So that, the development of settlement that considered based on sustainability principle plays an important role for the realization of land use that can be built optimally and efficiently. Therefore, this research needs to be done to propose formulation design concepts for housing site plan rearrangement to make it more efficient. This study used research method and design method. The research method used qualitative research strategy, while data collection techniques used observation and interview with qualitative descriptive analysis technique. While the process of design method included analysis, synthesis, appraisal and decision. The result of this study is design alternative of housing site plan which is proposed to be more efficient.

Keywords: Land efficiency, housing, site plan, sustainable development, ecological

1 INTRODUCTION

General problem faced by big cities in Indonesia is high urban population. It is caused by rapid population growth that occurred naturally and the high level of urbanization [8]. These problems also occurs in Surabaya city, in which Surabaya becomes one of migrant's destination. It is happened because Surabaya is the largest city in Indonesia after Jakarta, Moreover Surabaya is also the provincial capital of East Java which becomes the center of governmental activities, economy, and services on a provincial scale [9]. The increasing of population in urban area leads to high demand of settlement. It is also accompanied by the high demand of land that causes the availability of land in the city center is becoming scarcer and more expensive. So the development of the city gradually tend to thrive in the suburbs. Consequence of this phenomena is the transfer of agricultural land use (fields, ponds, plantations and forests) changed to developed land. The process of land transfer continually will expand urban area to rural areas or suburbs. It causes the environmental degradation like the decrease in agricultural production, energy wastage and increase in pollution and social problems in the suburbs. So, the development of settlement that considered based on sustainability principle plays an important role for the realization of land use that can be built optimally and efficiently which is suitable with land use that has been planned by the government. The main purpose is that, the development area can contribute to the realization of sustainable development.

The question of this research is How the site plan design of Taman Gunung Anyar housing to be more efficient? The purpose of this research is to rearrangement the site plan of Taman Gunung Anyar housing to be more efficient. This research is expected to contribute to the government and the developer in formulating or designing the development plan of settlements in Surabaya city.

2 MATERIALS AND METHOD

2.1 Housing And Settlement

According to [10], housing is a collection of home as part of the settlement, both urban and rural areas, which is equipped with the infrastructure, facilities, and public utilities as a result of efforts to comply with the habitable house. Settlements are part of a residential neighborhood consisting of more than one housing unit that has the infrastructure, facilities, public utilities, as well as other function spaces to support activities in urban areas or rural areas. A good and orderly settlement will be created if it meets the criteria of ideal physical and non-physical aspects (Silas (1985) in [7]). The physical aspects include:

- Geographical location: aspects that determine the success and development of a region
 - Natural and built environment: aspects of the natural and built environment that will greatly affect the condition of the settlement as well as the lives of its inhabitants.
 - Facilities and infrastructure environment: the availability of facilities and infrastructure will support the activities and lives of the people in the settlement.
- As for the non-physical aspects of the settlement include:
- Political aspect: which includes the wisdom that regulate residential areas, where village institutions and so on.
 - The economic aspect: the aspect that includes activities related to people's livelihood
 - The social aspect: including the life of the community, neighbors and so on.
 - The cultural aspects: the aspects related to the customs of life, religious life and work habits.

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The basic requirements or provisions that are good for a settlement [4], are :

1. The location is not distracted by other activities such as factories, which generally could have an impact on air pollution or other environmental pollution.
2. Having access to the center services such as education, health, trade, and others
3. Having a drainage facility, which can drain rainwater quickly and does not lead to a puddle of water even though heavy rains
4. Has the water supply, in the form of a distribution network that is ready to be distributed to each houses.
5. Equipped with dirty water / faeces that can be made with the individual systems are septic tanks and seepage field, or communal septic tank.
6. The settlements must be served by waste disposal facilities on a regular basis in order to keep a comfortable residential environment
7. Equipped with common facilities such as a children's playground , courts or parks, places of worship, education and health in accordance with the magnitude of settlements scale.
8. It is served by electricity and telephone networks.

2.2 Housing and Settlement- Sustainability

Housing is one of those basic social conditions that determine the quality of life and welfare of humans and the environment. Where homes are located, how well designed and built, and how well they are weaved into the environmental, social, cultural and economic fabric of communities are factors that, in a very real way, influence the daily lives of people, their health, security and wellbeing, and which, given the long life of dwellings as physical structures, affect both the present and future generations. Housing is therefore central to sustainable development [11]. According to Johan Silas in [12], Sustainable Development is development that can meet the needs of the present without compromising future generations to meet their own needs. This complex web of inter-relationships between sustainability and housing is addressed by the policies for sustainable housing [11]. Sustainable housing is housing that can ensure a better quality of life not only for the present generation, but also for future generations [2]. Sustainable housing offers a great spectrum of opportunities to promote economic development, environmental stewardship, quality of life and social equality, while mitigating the precarious convergences of the problems related to population growth, urbanisation, slums, poverty, climate change, lack of access to sustainable energy, and economic uncertainty. Therefore in order to achieve sustainable conditions, there are four dimensions are environmental, social, economic and cultural dimension [11]. However, in this study the concept of sustainable housing only put emphasis on environmental dimensions. Due to the construction or development of settlements will be giving a significant impact for the environmental damage that is followed by the increasing of population density and urbanization. This is because the process of operation and construction of housing often consume amount of natural resources in such large quantities such us land, energy, water and building materials. While the construction process will generate waste and air and water pollution. While on the other hand, the housing will also be faced with various environmental impacts and threats, including natural disasters

and climate change [11]. One way to improve the quality of neighborhoods is the implementation of the concept of Environmental Settlements. According to [1] in Health Settlement and Environmental book Series III, there are 12 concept of environmental settlement, as follows :

1. Located on land that is suitable and intended for settlement
2. Spatial and efficient circulation network
3. There are adequate clean water
4. There are drainage system, sanitation and sewerage
5. Implementation of water catchment wells
6. The density, size and quality of the buildings meet the minimum standards
7. The use of local materials and renewable energy
8. There are housing environment facilities (health, education, worship facilities, market / store staples, meeting hall, and security facility)
9. Green open space (production, conservation, cultural, recreational / social) of at least 30%
10. Affordability and ease of achievement to workplace / market
11. Treatment and waste in order not to endanger the local settlement and surrounding area
12. Maintaining culture and local wisdom (philosophy of protecting the environment, architecture / building design, use of elements / ornaments, cultural activities / art and social systems).

2.3 Site- Planning

Site Planning is a science, engineering and art at the same time related to planning (overall) of site or land or areas where a set of buildings or facilities will be established. In the site-planning basically there is 'business' or 'intervention' of human in changing the form of the origin of the natural environment into the built environment to the needs of human life [5], [6]. In essence, site planning activities focused on efforts planning and design of the site (the land) where the building will be erected thereon. Due to the changes of the natural environment (the origin of it) into the built environment (outcome of his), then there 'changes' that should be able to predict or overcome both technically technologically. Also the possibility of predictions about the negative impact of natural environmental alteration that occur from the aspects of ecological (environmental). The objective of the site-planning in the planning-design of residential areas, including: (a) the purpose aspects of the use / function, (b) the purpose of structural and engineering aspect, and (c) the purpose of the aesthetic aspect / beauty in a residential area [6]. Because it involves the process of changing site environmental (land) in a residential. There are two important aspects to be taken into consideration of the site planning activity . First (a) the natural aspects or natural or ecological (environmental) that is physical. And the second, (b) the socio-cultural aspects that are non-physical. Natural or ecological aspects are aspects of the consideration that is used to predict the environmental conditions of the site (the land) to be used for the purposes of human life. While the socio-cultural aspects are non-physical aspects are considered in site planning, so that culturally people who live on site (land) that is planned will feel safe, comfortable and happy [6].

2.4 Method

The method used in this research is a combination between research and design method. This research is descriptive qualitative which used data collection observation and interview. From the result of the data collection, it is done some analysis such as the analysis of housing condition to evaluate the housing efficiency level which has been built (Taman Gunung Anyar), analysis of housing condition based on the concept of sustainable housing with ecological approach and site analysis. The result from all analysis data are concluded, and then are used as criteria for making site design concept. In designing, there are some processes based on the opinion of Mark and Meyer quoted in the Urban Design Methods and Techniques book by [3] that using some stages which consist of analysis, synthesis, appraisal and decision (see figure 1 to know the stages of this research method)

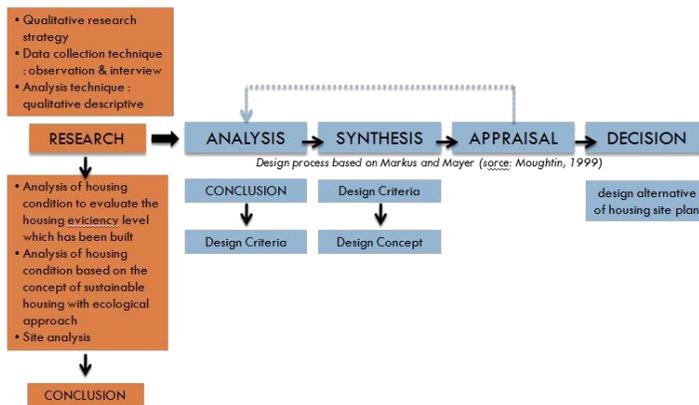


Figure 1. Stages of research method

3 RESULT AND DISCUSSION

Taman Gunung Anyar is one of the housing which be built in East Surabaya. This area is prospective for the development of property business. Taman Gunung Anyar is one of the housing that was built near the outer east ring road plan that connects the Port Tandjoeng Perak and Juanda Airport. Taman Gunung Anyar consists of 325 kavlings with a total area around of 4.06 hectares. Based on the summary result of several literature reviews and analysis that has been done, it is found the conclusion that used as criteria to make the design concept, as follows:

Design criteria:

- Integrating housing design with spatial planning and efficient circulation. Site circulation pattern on the existing condition is linear.
- Integrating planning and housing design with existing access. In the existing condition, entrance on the east side. (see figure 2 code a).
- Integrating rearrangement housing site with the total of 325 kavling in existing condition.
- Optimizing the width of the existing road in housing neighborhood. The width of the main street in housing neighborhood is around of 8.5 meters, while the width of the secondary road is around of 5-6 meters.
- Integrating planning and housing design with sewer on the north, west and south.

- Considering the sufficient high noise area in planning and housing design. Noise area on the west side, because of there is outer east ring road plan.
- Integrating planning and design with considering of power pole existence. The location of power poles on the east side (see figure 2 code b).
- Integrating rearrangement housing site with green open space need. The lack of green open space in housing neighborhood.
- Integrating housing design with the built environment such us park, boundary and region sign. In the existing condition, park, boundary and region sign have not provided yet.
- Integrating housing design with the availability of housing facilities such us sport facility and meeting hall. Because in the existing condition, sport facility and meeting hall have not provided yet.
- Integrating housing design by minimizing the use of energy.
- Integrating housing design with application of water absorption well before waste water disposed to drain city
- Integrating design housing with the availability of an adequate drainage system. In the existing condition, drainage can not be used optimally. Because when it rains, there are some points that welled.

Existing condition of housing site before rearrangement can be seen in Figure 2 below.

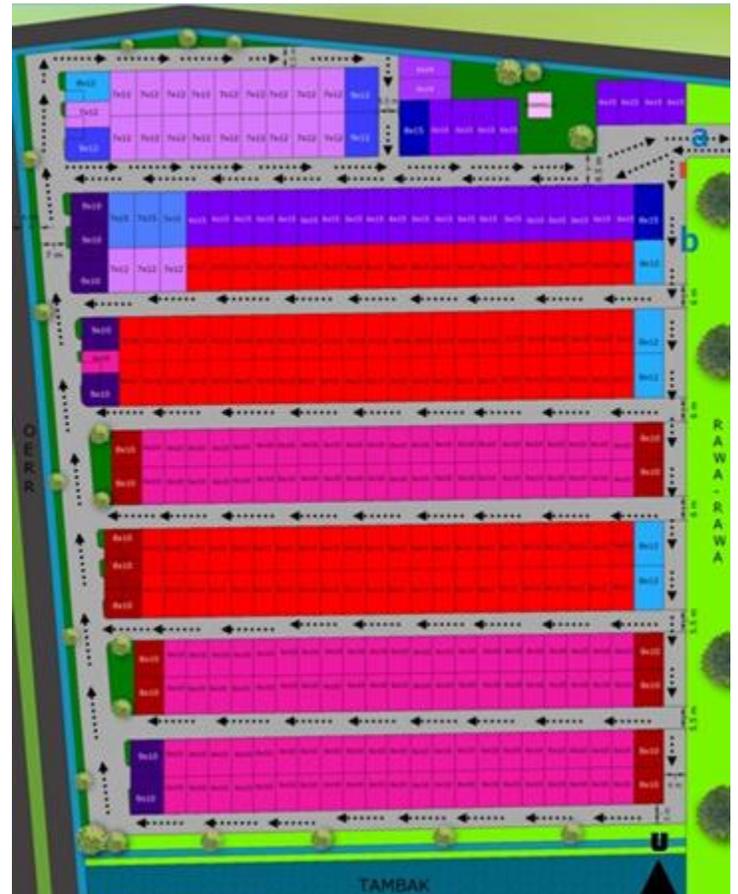


Figure 2. Site plan before rearrangement

Design Concept:

- a. Proposed linear circulation pattern
- b. Proposed housing entrance gate remain on the east side with one gate system (see figure 6 code a).
- c. Does not reduce the total of 325 kavling
- d. Proposed the road width in housing neighborhood into 4 meters with 0.5 meter of drainage width. The minimum standard of road width in housing neighborhood based on SNI 03-1733-2004 is 4 meters with 0.5 meter of drainage width. So, the width road on the existing condition still can be utilized optimally to the needs of other facilities such as green open space for sports and park facility.
- e. Proposed sewer directed to the north, west and south
- f. Solutions to overcome a fairly high noise area is to install barrier like trees and plants on the west side (see figure 6 code b).
- g. Proposed the location of power pole remained on the east side with 5 meters of the road width on the east side (1 meter for space power poles also plant placement and 4 meters for road vehicles)(See figure 6 code c).
- h. Proposed the addition of green open space on site after rearrangement
- i. Availability of the park (see figure 6 code d), boundary area like trees also plants and sculpture for entrance sign (see figure 6 code e).

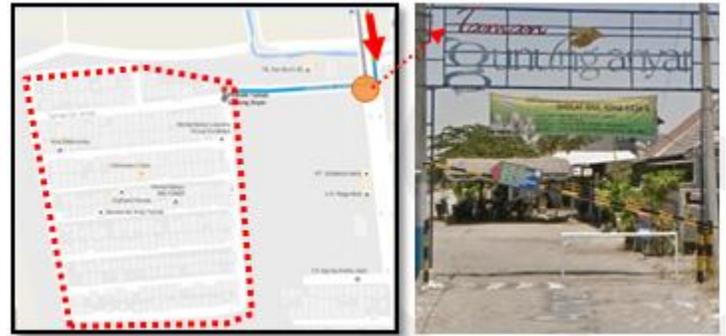


Figure 5. Proposed location of entrance gate



Figure 3. Entrance sign condition before rearrangement site



Figure 4. Proposed sculpture for entrance sign, after rearrangement site

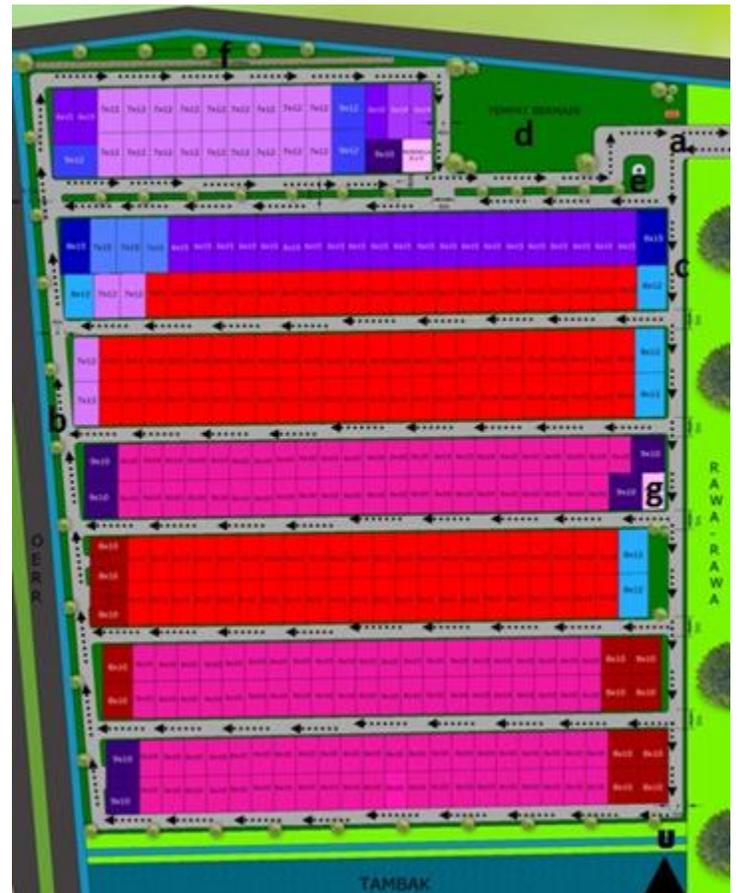


Figure 6. Site plan after rearrangement

Proposed the location of entrance gate with labeled “Taman Gunung Anyar” placed at roadside before entering the road to the location of housing. (See figure 5).

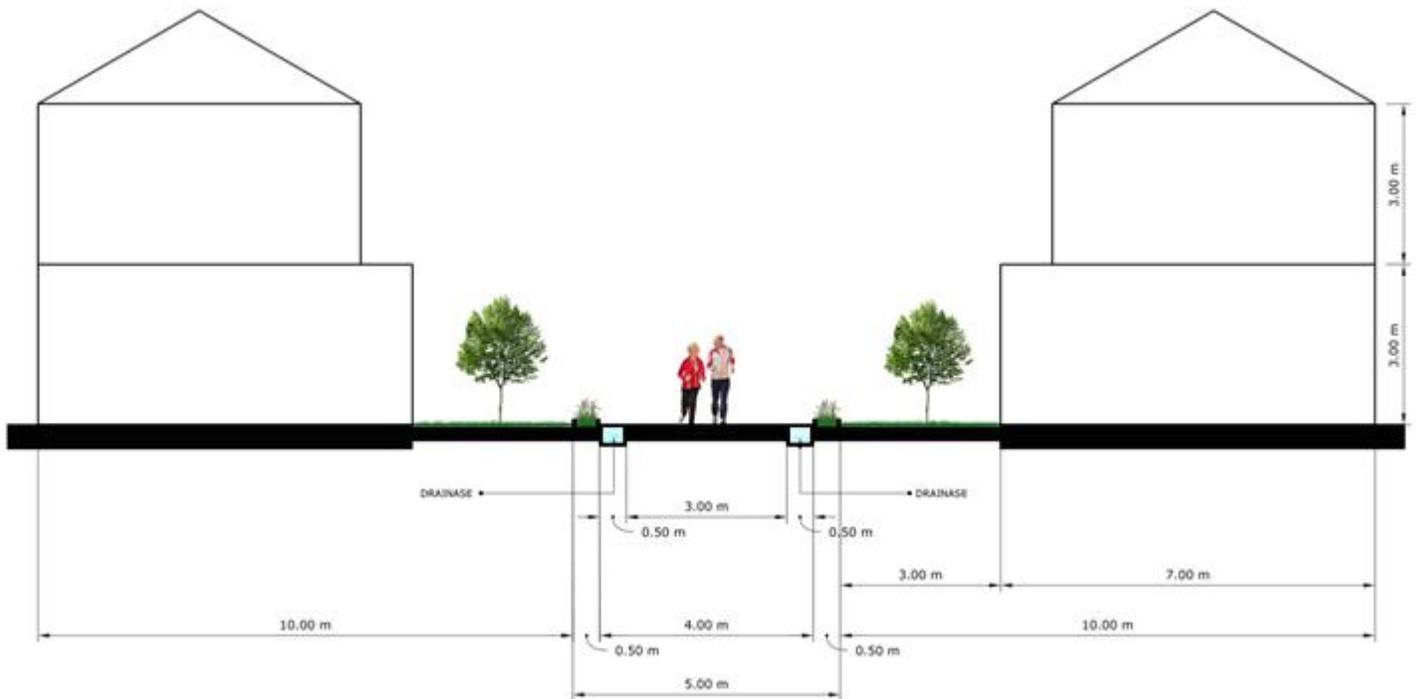


Figure 7. Illustration of proposed road section and including drainage



Figure 8. Proposed material for drainage

- j. Proposed sports facility (see figure 6 code f) and meeting hall (see figure 6 code g)
- k. Proposed use of solar cell on street lighting to save energy
- l. Proposed each occupancy required to have absorption well
- m. Drainage concept that proposed after site rearrangement is the drainages are on two sides of the road with a width of 0.5 meters which made of concrete material with holes in the lid (see Figure 8), and at some point put the manholes to facilitate the cleaning of drainages(see Figure 7).

4 CONCLUSION

Land in Taman Gunung Anyar housing has not used optimally, so it needs rearrangement site plan to optimize the use of existing land. Therefore, this research is conducted to produce the alternative design to be more efficient and optimal. In general, design concept which was proposed including the addition of green open space in housing neighborhood, providing sport facility and meeting hall, providing entrance sign and solving drainage problem. This optimization of land use is very important to be made, because of the high demand for urban land need.

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