

# Living Room Layout and Master Bedroom Layout of Type 54 House Considered By Natural Lighting

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**Abstract:** After Indonesia's independence, Indonesian Government starts to develop a national housing program. Indonesian people require a house to live as basic needs. A high number of population caused a high demand for a house. Then comes up the phenomenon of developing the type 54 house in Indonesia. The type 54 house was built with typical layout of living room and master bedroom. But the layout design didn't consider the orientation. It caused the room become dark. The layout of the living room and master bedroom which considered natural lighting is the issue of this research. The main focus of this research is a layout of living room and master bedroom on type 54 house after renovation at Subur Street number 11 *Kedung Badak Baru* Residence Bogor. Layout design guidelines for a living room and master bedroom which considered natural lighting at type 54 house is the main goals of this research. It also to give another idea for architects and government in Bogor. The Quantitative descriptive-analytic method was used to this research. As a consideration on making analysis, the tropical architecture theory and natural lighting theory is used as a basic theory to designing layout. The result of this research is the dark living room and master bedroom due to the improper layout and opening placement. The conclusion of this research is to change the layout of living room and master bedroom. Living room moves to the front of the house while master bedroom moved to the back of the house. And the opening should be placed to maximize sunlighting.

**Keywords:** house, layout, opening, lighting

## I. INTRODUCTION

Housing development program in Indonesia was based on a kampung improvement program in 1935. The construction started after Healthy Housing Congress in Bandung. The high population numbers of Indonesian people raises the housing demand. Due to that condition, PERUMNAS started to develop affordable housing in new areas to support a socio-economic life of Indonesian people. History records that development housing process in Indonesia started from the colonial era. Housing policy is arranged by *Bugerijske Woningenregeling* 1934.

House is just not only for shelter. More than that, it should be enjoyable, sufficient floor area, near workplace, and adequate public facilities. And all of it should be affordable for Indonesia people. [8]

And also house means a developing process at a certain time which influenced by the socio-economic life of Indonesian people. [6]

The living room and master bedroom were designed with a typical layout which not considered the type 54 house orientation. It because of the demands of rapid and affordable housing development. Then it raises the phenomenon of development type 54 house in Indonesia.

The issue of this research is the typical layout of living room and master bedroom and the opening of type 54 house after the renovation which not considered the natural lighting so that room becomes dark. This required a study of the living room layout and master bedroom layout which considering the lighting aspect. In the end, the layout guidelines for a living room and openings type for type 54 house with suitable lighting found.

## Research Method

The data were processed based on qualitative descriptive-analytic method. This research method is collecting data living room and master bedroom based on field survey, documentation, field note, interview, lux measurement, sketch up and ecotect simulation, literature, and analysis. Then the data is processed and presented in the narrative.

## Research Scope

Type 54 were designed with a typical layout of living room and master bedroom and also with typical openings. Because it can't maximize natural light so the living room and master bedroom become dark. The layout of living room and master bedroom and its openings of type 54 house in Subur Street number 11 *Kedung Badak Baru* Residence Bogor are the main focus of this research.

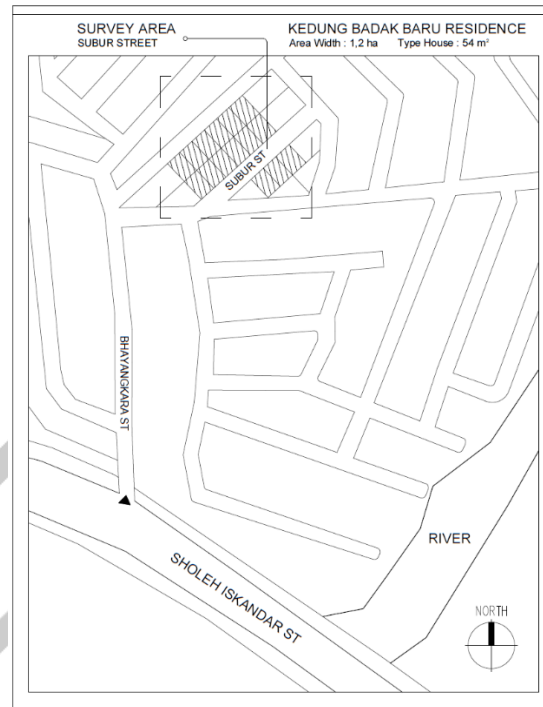
Research steps:

1. Selection of object study (type 54 house after renovation in Street number 11 Street *Kedung Badak Baru* Residence Bogor)
2. Identification problem of living room layout and master bedroom layout which considered natural lighting aspect
3. Define the comprehension of master bedroom layout and bedroom layout which considered natural lighting through the theoretical studies
4. Do field survey, documentation, lux measurement of living room and master bedroom type 54 house

5. Analysis and field synthesis. After observation, data are collected and simulated with sketch up and ecotect applications to get layout guidelines
6. A conclusion to resolve the problem design. Then it applied to the living room layout and master bedroom layout at type 54 house in Subur Street number 11 Kedung Badak Baru Residence Bogor.

### Object Study

Bogor City located between  $106^{\circ}43'30''$  EL –  $106^{\circ}51'00''$  EL dan  $30^{\circ}30''$  SL –  $6^{\circ}41'00''$  SL. The altitude between 190 m to 330 above the sea. The average air temperature is  $26^{\circ}$  C and 70% humidity and high orographic rainfall.



**Figure 1:** Survey Area

Table 1: General data

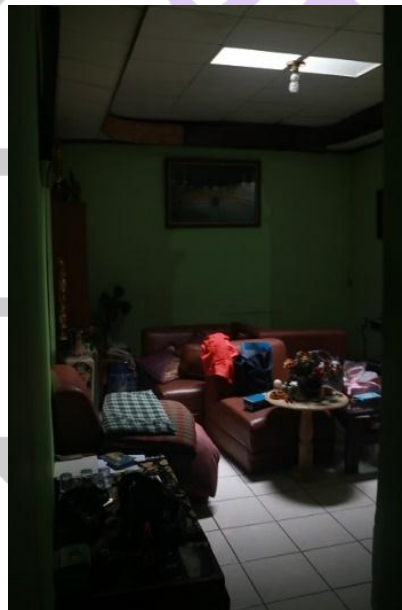
1	Location	KEDUNG BADAK BARU RESIDENCE, K. H. SHOLEH ISKANDAR ST, TANAH SEREAL SUB-DISTRICT, BOGOR CITY
2	Land Area	1,2 HA
3	Developer	PT. INTAN INNOVACO AND PT. BENTENG
4	Study Object	TYPE 54 HOUSE AFTER RENOVATION
5	Study Object Location	SUBUR ST NO. 11



**Figure 2: Ms. Iwa's House**

Table 2: Study Object

1	Owner	MS. IWA
2	Long lived	27 YEARS
3	Occupation	HOUSEWIFE
4	Number of occupants	1 WOMAN AND 1 MAN



**Figure 3: Living Room**

Table 3: Study Object

1	Living Room	5,37 LUX AT 10 AM & 3,05 LUX AT 3PM
2	Master Bedroom	6,06 LUX AT 10 AM & 1,83 LUX AT 3 PM

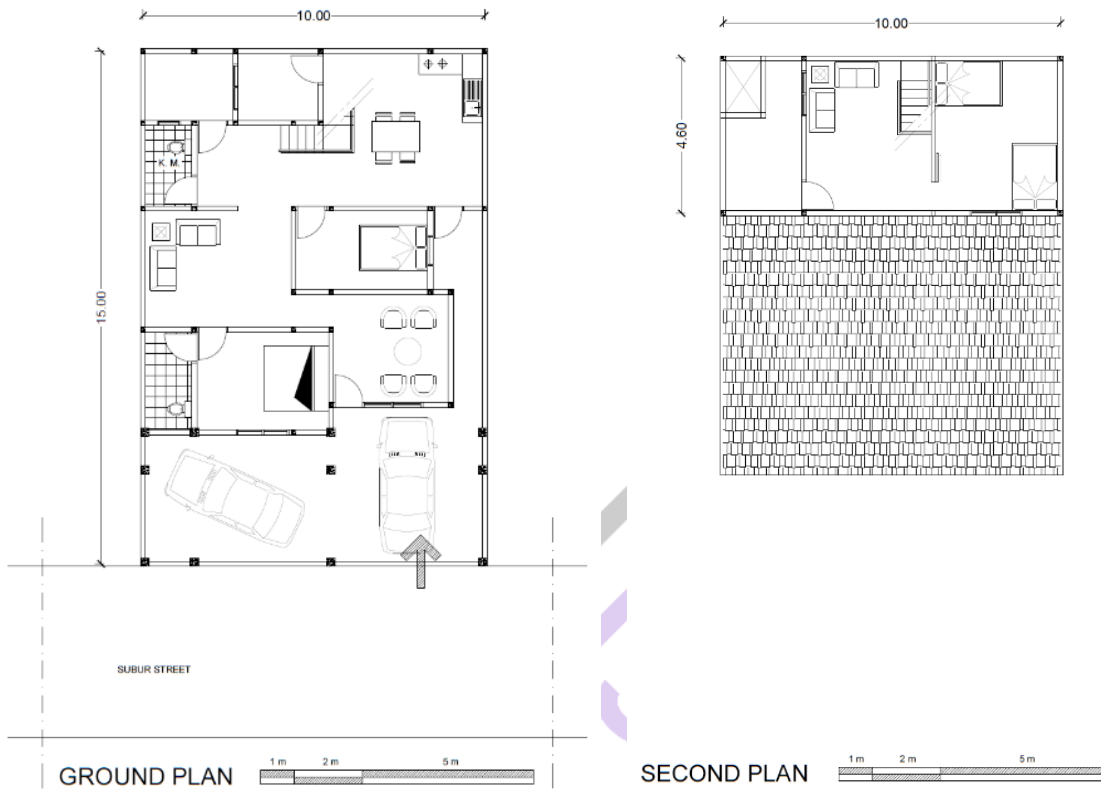


Figure 4: Ground & Second Plan

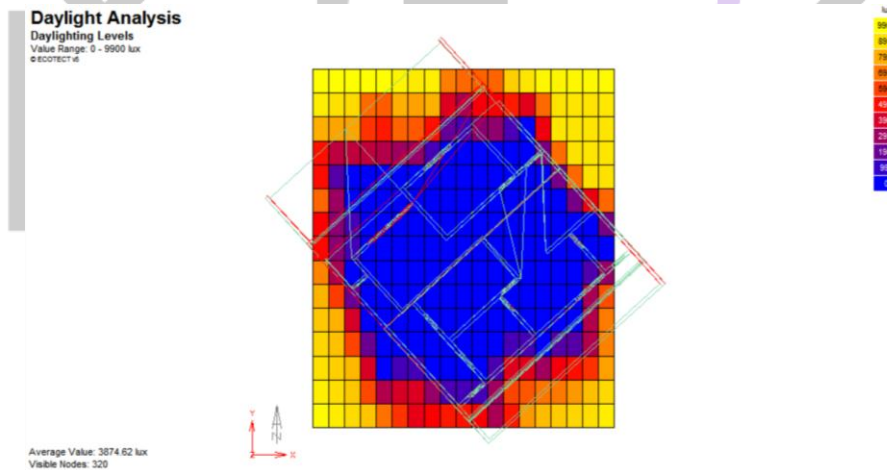


Figure 5: Ecotect Analysis

**II. RESULT AND ANALYSIS**

The study object is a renovated type 54 house. It consists of two floors. On the first floor, the house divided into three parts, front, center, and back. The front has a guest room, master bedroom, and bathroom. Center has a living room and bedroom. And back has a dining room, kitchen, storage, and bathroom. On the second floor, there is a bedroom, living room, and service area. The sun moved from the front right corner to the back left corner of the house. It makes the front and right walls of the house get the sunlight in the morning. And it makes the back and left of the building get sunlight in the afternoon.

The master bedroom located in the front can't maximize the sunlight due to the improper openings. While the living room located in the middle doesn't have a source of lighting because surrounded by the other rooms. The guest room is the closet function to the living room in Indonesia. Therefore the guest room should be planned with living room together. [7]

### III. DESIGN GUIDELINES

The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

Layout guidelines for a living room and master bedroom are generated through analytical process and literature. And it considered the natural lighting aspect to become the right solution. There are several basic aspects in designing residential. The five main parts as the basic tools to designing residential are:

1. Roof
2. Supporting roof
3. Joint
4. Floor
5. Walls. [3]

House is formed by primary factors and modification factors. Primary factors include socio-culture while modification factors include climate, material, construction, technology, and land factors. [4] Layout changes occur due to several things. Several factors to make people change their house is:

1. Identification
2. Lifestyle
3. A will to be up to date
4. Changes in family structure. [1]

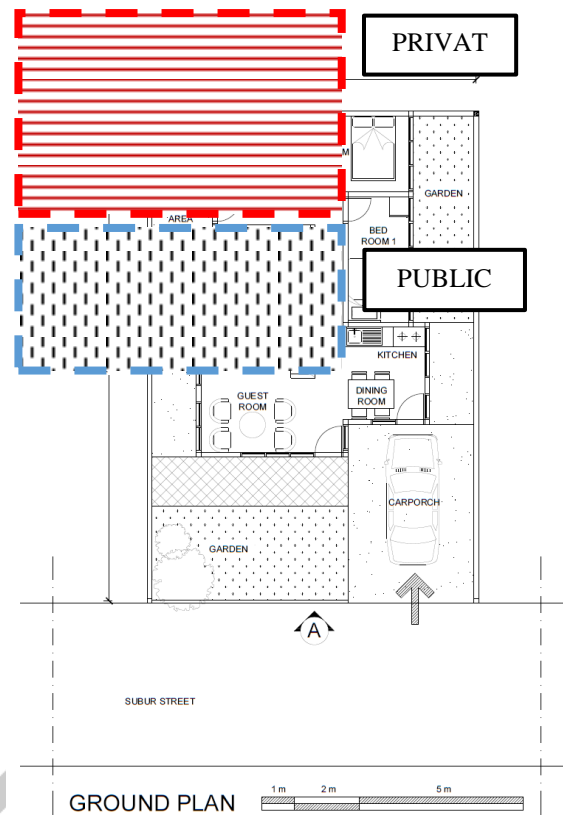
Table 4: Study Object

Five main part :	
1.	Roof
2.	Supporting roof
3.	Joint
4.	Floor
5.	Walls
Divide the house into two section, front, and back	
Divide zoning of the house, public and private	
1.	Guest room ( $\geq 9 \text{ m}^2$ )
2.	Dining room ( $\geq 6 \text{ m}^2$ )
3.	Living room ( $\geq 9 \text{ m}^2$ )
4.	Master bedroom ( $\geq 9 \text{ m}^2$ )
5.	Bedroom ( $\geq 6 \text{ m}^2$ )
6.	Bathroom ( $\geq 2 \text{ m}^2$ )
7.	Kitchen ( $\geq 4 \text{ m}^2$ )
Living room categorized as public zone and placed in front of the house while master bedroom categorized as private zone and placed in the back of the house.	
The openings are placed on a wall of the living room and master bedroom which exposed to the sun	
Massive walls are placed on the east and west orientation	
Reduce the area that gets shadow	

#### *Type 54 House Design Concept*

Basically, in designing buildings, an architect needs to consider the climatic factor. It simply said that tropical architecture is an architectural design that leads to the problematical solution of tropical climate. [10] Renovated type 54 house divided into two zones, public and private. Placed in front and back of the house.

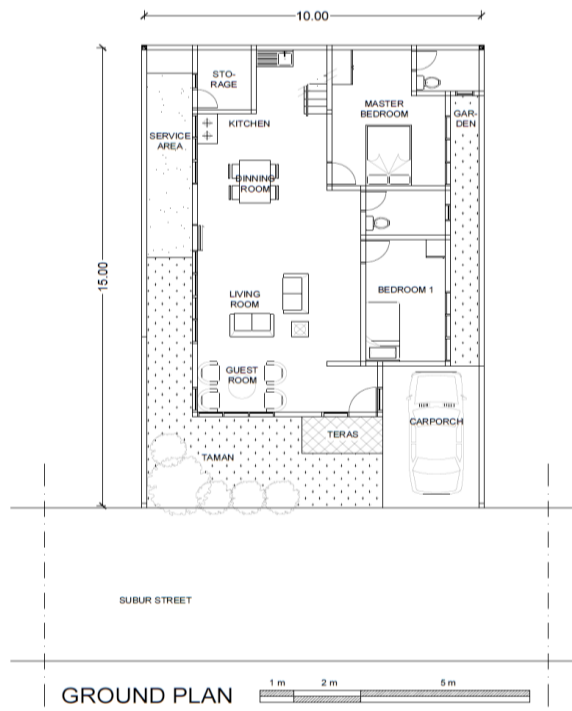
Basically, a house is a unity of various space with different function and character. [5]



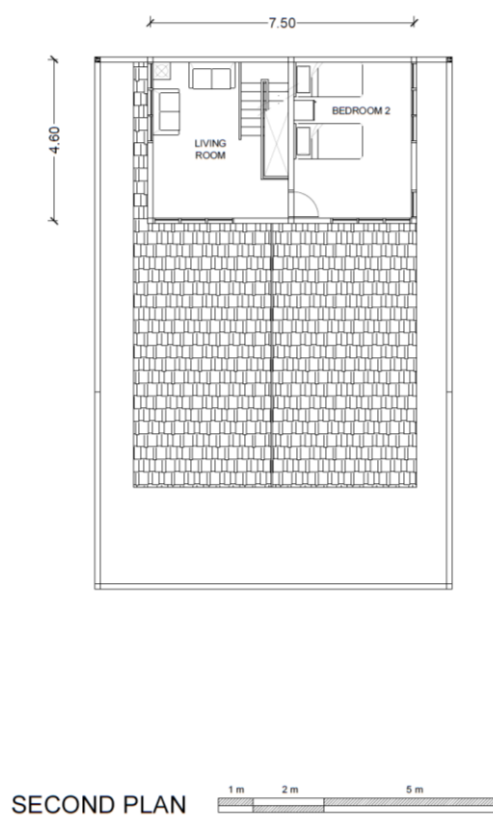
**Figure 6:** Zoning Concept

### ***Layout Concept***

The living room and master bedroom became dark because its lighting source wasn't good. To solve the problem, the living room placed in front of the house and master bedroom placed in the back of the house. Living room placed together with guest room, dining room, and kitchen without any surrounded partition. So the living room can maximize the sunlight in the afternoon and the master bedroom can maximize the sunlight in the morning. In addition, the scheming is intended to make the activity and circulation in the room more efficiently.



**Figure 7: Renovated Ground Plan**



**Figure 8: Renovated Second Plan**

### Opening Concept

Openings type placed on each side of the house. It obtained based on the result of field data analysis, SketchUp and Ecotect application. And also to maximize the sunlight either window or glass can be the openings. The opening frame material can be wood or aluminium. The opening width of the frame is 50 mm.

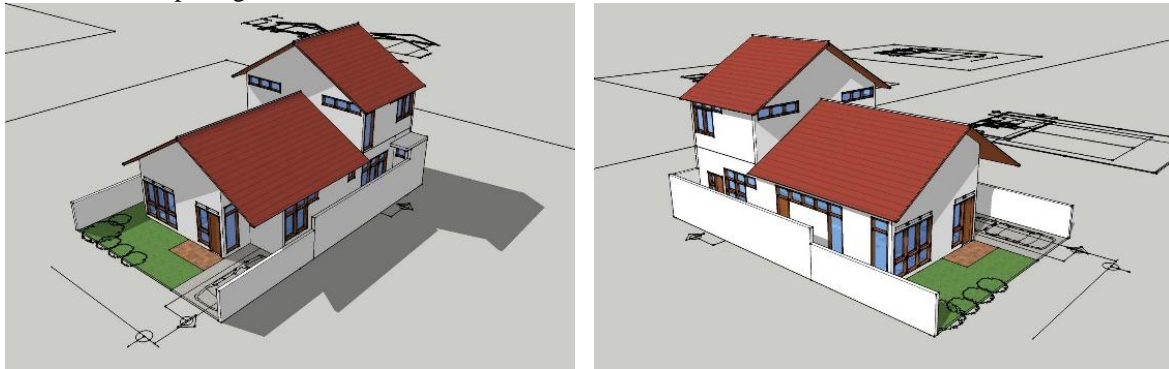


Figure 9: Opening placement

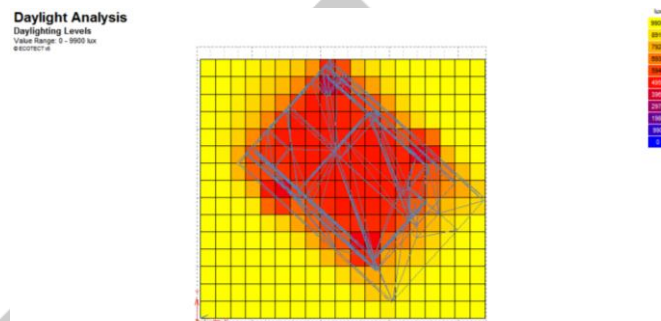


Figure 10: Ecotect Analysis

Tabel 5: Concept implementation

Dimension	Space between walls of the house and the neighbors so the sunlight can enter. The house is attached to the back wall and the dimension changed to 8,5-meters x 12 meters.
Layout	House divided into two zones, public and private. House also divided into two sections, front and back. Public zone placed in front and private zone placed behind. The living room in public zone. Placed in front of the house. And the master bedroom in private zone. Placed in back of the house. It is intended for the living room to maximize the sunlight in the afternoon. It also for the master bedroom to maximize the sunlight in the morning.
Openings	The house orientation faces to the southeast. The openings are placed on each side of the house. Windows are placed at the façade and the right side of the house to maximize the sunlight in the morning. Windows are placed at the left side of the house to maximize the sunlight in the afternoon. Windows are placed in the living room on the right side and master bedroom on the left side of the house.

### IV. CONCLUSION

The result of this research, based on field data process and data analysis supported by literature and simulation, showed the dark living room and master bedroom. It because of the improper layout and improper placement of opening. This research is to solve the problem of a living room and master bedroom layout which considered natural lighting.

This research revealed changes in zoning, layout, and opening in the living room and master bedroom. House is divided into two zones, public and private. The public zone, while a living room located, placed in the front of the house. The private zone, while master bedroom located, placed in the back of the house. The openings placed in a living room and master bedroom. It aims to maximize the sunlight in the morning and the afternoon. These changes are meant to keep the living room and master bedroom far from being dark.



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