

# Comfort Quality of Pedestrian Paths on Tombolotutu Street

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## **Abstract**

*Pedestrian paths are a vital component in city design that focuses not only on aesthetic aspects, but also on user comfort and safety. However, the reality of the pedestrian path on Tombolotutu road shows that this pedestrian path has not been utilized optimally by the community. This study aims to evaluate the factors that influence pedestrian comfort on Tombolotutu Street. Using a qualitative approach, the method applied includes in-depth interviews with local communities and direct observation to analyze pedestrian conditions. The research results show that the use of pedestrian routes on Street Tombolotutu is still low, due to several factors, including a lack of shade, the use of part of the route for parking and selling, and the presence of channel covering materials that have the potential to endanger pedestrians. Apart from that, the rise and fall of the pedestrian surface is also a significant problem. These findings underline the importance of providing comfort for pedestrian path users so that pedestrian path facilities can be maximally useful according to their function.*

**Keywords:** Sidewalk, Pedestrian, Comfort, Pedestrian

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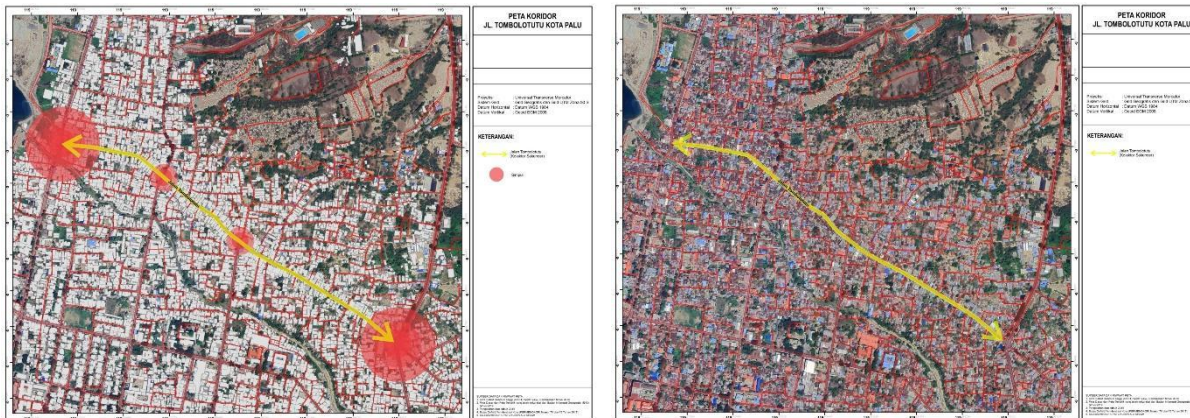
## 1. INTRODUCTION

Modern city design increasingly emphasizes the importance of infrastructure that supports the mobility of all users, including pedestrians. Pedestrian paths, as a vital element, must be designed not only for aesthetics, but also for comfort and safety. Rapid urban development demands public facilities that are able to support community activities optimally. A well-designed pedestrian path not only creates city aesthetics, but also provides comfort and safety for its users. In H Shirvani 1985, pedestrian paths are an important element of city design [1]. Pedestrian paths are physical infrastructure facilities in the form of roads/lanes intended for the walking activities of humans/pedestrians.

In Spiro Kostof, 1992 This pedestrian path was first known in 6000 BC in Khirokitia, Cyprus, in the form of a limestone road whose surface was raised to the ground and at certain intervals ramps were made to lead to residential groups on both sides [2]. Another term known as a pedestrian path is a sidewalk which comes from the French word *trottoire* which is a small path 1.5 – 2 meters wide, extending along major roads or highways. [2]

A humane urban environment is one that is pedestrian-friendly. The friendlier a city is to pedestrians, the more livable the city will be. One effort that can be made in this direction is by providing adequate pedestrian facilities in Rumija for all user groups.

The study location in this research is the pedestrian path along Street Tombolotutu, the space utilization location is in the trade and services area with secondary collector road class, in general at the research location of shophouses, mini markets, kiosks/stalls, mosques and some residential houses. Tombolotutu Road is included in the sub-district area, namely Talise Valangguni sub-district and Talise sub-district.



**Figure 1: Research Location**  
**Source: Dock. Palu City Land and Spatial Planning Department**

In Palu City, especially on Street Tombolotutu, pedestrian paths have a vital role in supporting community mobility. However, the reality on the ground shows that this facility has not been utilized optimally by the community. Many factors influence the low use of pedestrian paths, such as inadequate physical conditions and a lack of supporting element facilities.

This research is motivated by the importance of ensuring that pedestrian paths can meet people's needs for safe and comfortable walking space. Evaluation of the comfort quality of pedestrian paths is an important step in efforts to improve the quality of public facilities in Palu City. This research aims to identify and analyze the factors that influence the quality of pedestrian comfort on Tombolotutu Street. Through a qualitative approach using in-depth interview methods and field observations, this research is expected to provide a comprehensive picture of the problems that make pedestrian path users feel uncomfortable.

## II. THEORETICAL BASIS

### 2.1 Pedestrian

According to Giovanni (1977), walking is a means of transportation that can connect one function in an area with other functions. Meanwhile, according to Fruin (1979), walking is a tool for internal city movement, the only tool to fulfill the need for face-to-face interaction in commercial and cultural activities in the city life environment. Walking is a means of connecting other modes of transportation. Meanwhile, Rusmawan (1999) stated that walking also includes using mobility aids such as sticks and the blind are also part of the pedestrian group [3]. According to Amos Rapoport (1977) In [4] a review and basic understanding of pedestrians, namely looking at their speed, the walking mode has the advantage of low speed so it is advantageous because it can observe the surrounding environment and observe objects in detail and easily become aware of the surrounding environment.

The term pedestrian or pedestrian comes from the Latin word *pedesterpedestris*, namely a person who walks or pedestrians. Pedestrian also comes from the Greek word *pedos* which means foot, so pedestrian can be interpreted as a pedestrian or person who walks. In Rubenstein, Pedestrian is also defined as the movement or circulation or movement of people or humans from one place to the point of origin (origin) to another place as a destination (destination) on foot [5].

However, pedestrian paths in an urban context are usually intended as special spaces for pedestrians which function as a means of access that can protect pedestrians from dangers coming from motorized vehicles. In Indonesia it is better known as a sidewalk, which means a small path 1.5 to 2 meters wide or more extending along a public road.

Pedestrian Paths or Sidewalks are pedestrian paths that are parallel and adjacent to traffic lanes that are surfaced, hardened, protected, and can have a higher elevation than the surface of the road pavement to ensure pedestrian safety [6].

According to Pattisnai, 2013 in [7] a quality pedestrian path can be defined as a path for walking which is equipped with pedestrian facilities and can provide safety and comfort which refers to the International Charter for Walking (1999), which the declaration supports pedestrian rights in carrying out pedestrian activities.

## 2.2 Physical Aspects of Pedestrian Paths (Sidewalks)

### A. Pedestrian Path

Pedestrian paths in an urban context are usually intended as special spaces for pedestrians which function as a means of access that can protect pedestrians from dangers coming from motorized vehicles. In Indonesia it is better known as a sidewalk, which means a small path 1.5 to 2 meters wide or more extending along a public road.

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According to [6] The general principles for planning pedestrian facilities are at least to fulfill the following principles:

- Fulfill aspects of system integration, from environmental planning, transportation systems, and accessibility between areas;
- Fulfilling the continuity aspect, namely connecting the place of origin to the destination, and vice versa;
- Fulfilling safety, security and comfort aspects;
- Fulfilling the accessibility aspect, where the planned facilities must be accessible to all users, including pedestrians with special needs;
- Fulfilling the convenience aspect, namely ensuring that pedestrians can reach their destination using the track as closely as possible, comfortably, smoothly and safely from interference; And
- Fulfill the principles of gender equality, disability and social inclusion (GEDSI), including the elimination of violence against children and women in pedestrian facilities

### B. Sidewalk Dimensions

Based on the guidelines [6], physical dimensions are divided into the height and width of the sidewalk.

- Sidewalks with a certain height aim to provide safety for pedestrians from vehicle traffic. The height of the sidewalk is divided into 4 (four) categories based on the following conditions:
  - a. A sidewalk height of 0 – 6 cm is applied in urban areas with sidewalk segments that have protection in the form of fences, continuous plant/tree barriers and/or roads that are only intended for pedestrians, cyclists and public transportation with vehicle speed restrictions.
  - b. A sidewalk height of 6 – 15 cm is applied in urban areas with land segments that have parking yard edges. The provisions for area and slope follow the provisions for access roads in and out of a plot
  - c. A sidewalk height of 15 – 20 is applied to arterial and collector roads or other roads that have heavy traffic and fairly high vehicle speeds.
  - d. A sidewalk height of 20 – 25 is applied to roads with an arterial function that are routinely passed by heavy vehicles.
- The effective width of a pedestrian lane based on the needs of two wheelchair users passing each other or two adults with goods walking past each other is at least 185 cm.



Figure 2: Sidewalk Surface

Source: Technical Planning of Pedestrian Facilities of the Ministry of PUPR 2023.

### C. Ramp

A ramp is a replacement path for stairs that has a certain slope and width. Ramps are used as alternative access to facilitate mobility, especially for people who cannot use stairs, such as wheelchair users.

Provisions based on [6] Ramps are placed at entrances, intersections, bus or public transportation stops, and pedestrian crossings. The function of the ramp is to facilitate changes in height properly and to facilitate pedestrians who use wheelchairs. The specific requirement for ramps is a maximum slope of 8% (1:12). To achieve this value, the ramp should be within the facility path zone as far as possible. If necessary, the height of the sidewalk can be lowered and the ramp area must have sufficient lighting.

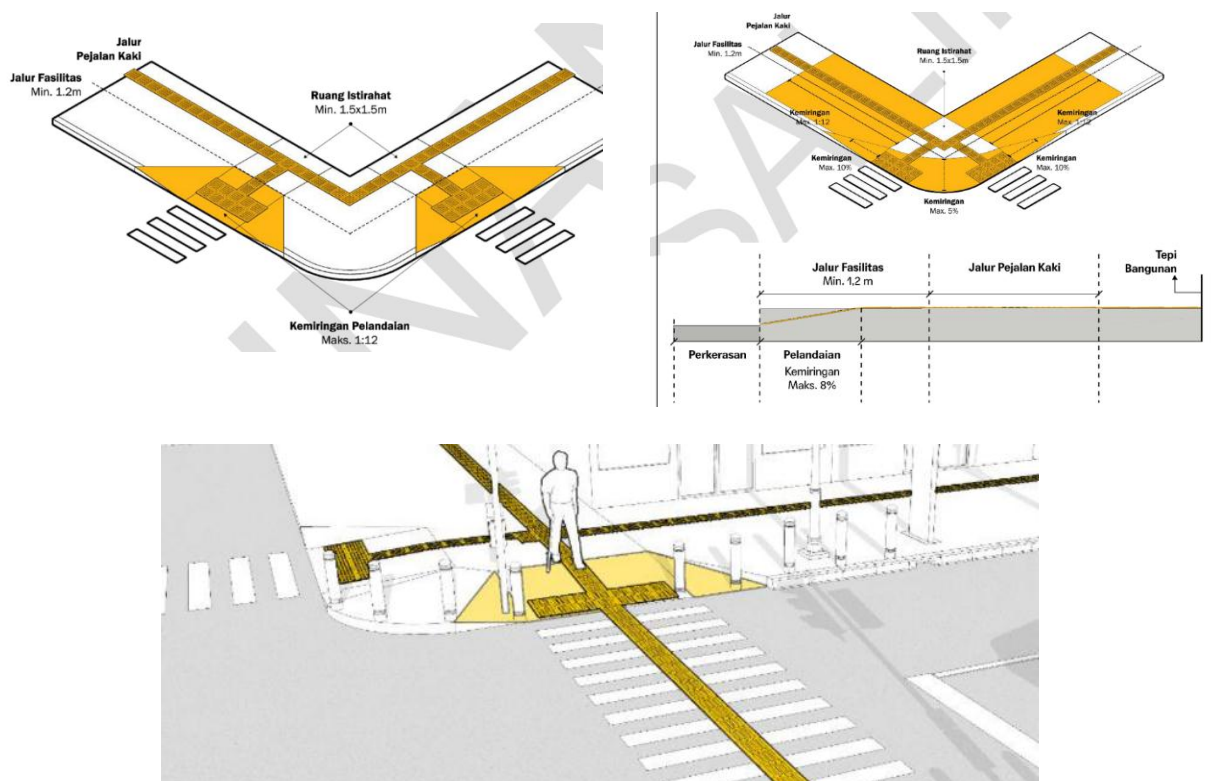


Figure 3: Ramp on Pedestrian Lane

Source: Technical Planning of Pedestrian Facilities of the Ministry of PUPR. 2023

### D. Vehicle Entry and Exit Access Road

The aim of arranging driveways is to reduce conflicts between pedestrians and vehicles, prioritize access for pedestrians and increase visibility between cars and pedestrians on driveways.

The method for arranging the entrance is to use perpendicular curb ramps and if the sidewalk is 1.85 cm wide, guide paths are provided continuously on the flat surface by observing a minimum distance of 0.6 m from the face of the building and warning pattern guide paths are provided at the beginning and end of the road. getting in and out of the vehicle. Especially for vehicle entry and exit roads in commercial areas, alleys or other public spaces, a warning pattern is installed in two layers.

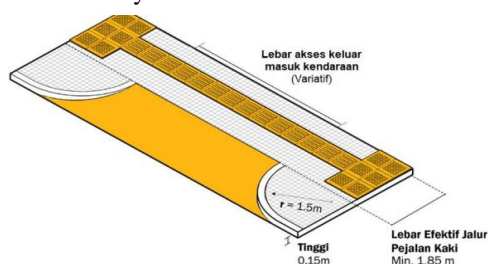
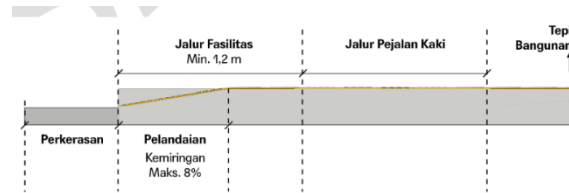


Figure 4: Vehicle Entry and Exit Access Road

Source: Technical Planning of Pedestrian Facilities of the Ministry of PUPR. 2023



**Figure 5: Ramps are placed in the Facility Lane and Pedestrian Lane sections.**  
**Source: Technical Planning of Pedestrian Facilities of the Ministry of PUPR. 2023**

**E. Guideway for Pedestrians with Special Needs**

Pedestrians with special needs (blind and visually impaired) require special information on the surface of pedestrian facilities. This information is called guide lines. The guide path consists of a dome or dot pattern as a warning to provide warning of changes in the surrounding situation and a line pattern as a guide to indicate the direction of travel.

There are several requirements for providing guide routes as follows:

- The guideway laying must have free space horizontal 0.60 meters from the left and right edges of the guideway, and the top vertical clearance is 2.50 meters;
- Must be installed with the aim of providing a clear orientation to the user towards the object/goal to be achieved;
- Must be made of strong, non-slip material, and given a color that contrasts with the color of the existing guideway such as yellow, orange, or other colors so that it is easily recognized by people with visual impairments who can only see partially (low vision) by following the provisions of SNI 8160: 2015 concerning Specifications for Guide Blocks on Pedestrian Paths or changes thereto; And
- Guide paths are placed in areas where there is minimal conflict with supporting facilities for pedestrians or the flow of vehicles in and out



**Figure 6: Guide Path according to the Technical Planning Guidelines for Pedestrian Facilities**  
**Source: Technical Planning of Pedestrian Facilities of the Ministry of PUPR. 2023**

**E. Protector, Green Line Shade**

The technical implementation of protective/shade installation follows the Road Landscape Engineering Guidelines. Protection/shade can be in the form of trees, vines, or canopy structures. Green lanes can be placed on sidewalks without reducing the effective width of pedestrian paths and function as a separator between road space and pedestrian paths. The width is 1.20 meters, adapting to street space activities. The selection of plant types can refer to the Minister of Public Works Regulation Number 05/PRT/M/2012 concerning Guidelines for Planting Trees on Road Network Systems or its amendments



**Figure 7: Shade and Green Paths that utilize the Facility path**  
**Source: Technical Planning of Pedestrian Facilities of the Ministry of PUPR. 2023**

### E. Seats and trash cans

Seating is placed at a distance of 110 – 120 meters taking into account the characteristics of the location. The seat is 40 – 50 centimeters wide, 120 centimeters long, 35 – 40 centimeters high and the materials used are materials with high durability such as metal and printed concrete.

Trash bins are placed every 20 meters and at meeting points (for example intersections), in sizes according to needs, and the materials used are materials with high durability such as metal and cast concrete. The height of the waste pit is at a maximum height of 90 centimeters from the surface. The trash can hole leads to a pedestrian walkway.

### F. Pedestrian Lighting

Located every 10 meters with a maximum height of 4 meters, and the materials used are materials with high durability such as metal and printed concrete. Lighting Pedestrians are prioritized at locations such as level and non-level pedestrian crossings. Provisions for lighting pedestrian facilities refer to Minister of Transportation Regulation Number 27 of 2018 concerning Street Lighting Equipment or its amendments.

### 2.3 Quality Comfort

The definition formulated by Goeth and Davis in [8] states that quality is a dynamic condition related to products, services, people, processes and the environment that meet or exceed expectations. On the contrary, definitions of quality vary from the controversial to the more strategic. According to Garvin, there are five perspectives regarding quality, one of which is that quality is seen depending on the person who evaluates it, so that the product that best satisfies a person's preferences is the highest quality product. [8]

According to Rustam Hakim and Hardi Utomo (2003: 185) in [9] comfort is everything that shows the appropriate and harmonious use of space, both with the space itself and with various shapes, textures, colors, symbols and signs, sounds and sound effects, intensity and color of light or smell, or others. Comfort can also be said to be human enjoyment or satisfaction in carrying out activities.

So it can be defined that the quality of comfort is a dynamic condition related to the appropriate and harmonious use of space and meeting or exceeding expectations.

## III. SCOPE OF RESEARCH MATERIAL

The scope of study in this research is limited to aspects of perception of pedestrian route users and comfort assessments for pedestrian route users. This research discusses the following:

- Problem identification: Identify problems related to the comfort of pedestrian paths at the study location
- Theory and regulations: Discusses theories and government regulations relating to pedestrian paths, as consideration for finding and solving problems according to perception trail users pedestrian.
- Analysis of physical and non-physical aspects: Analyzing physical and non-physical aspects that are taken into consideration in the availability and provision of pedestrian infrastructure facilities based on comfort criteria in the use of pedestrian paths.

## IV. RESEARCH METHODS

The approach method used in this research is descriptive analysis to determine the state of something that is qualitative in nature, a qualitative approach to understand the phenomenon of pedestrian comfort on

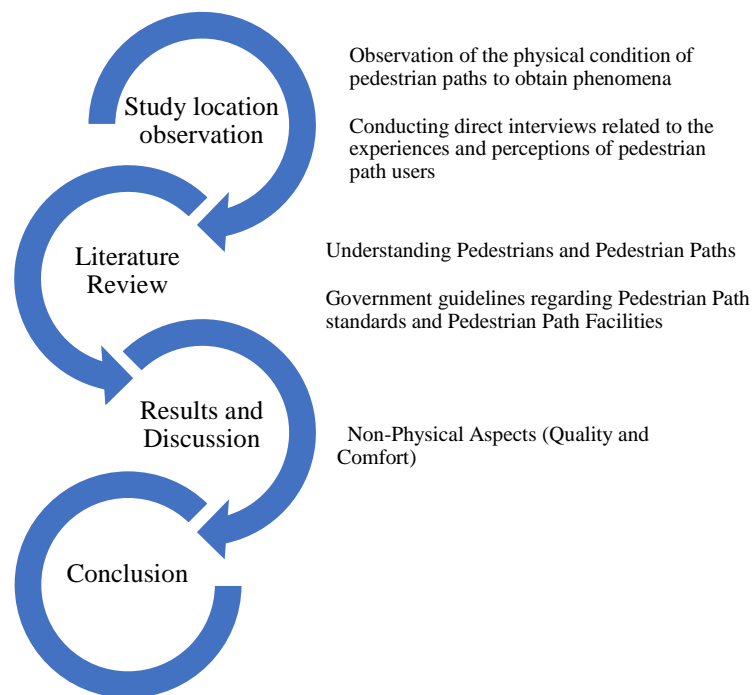
Tombolotutu Street in a natural context. This allows researchers to observe and explore users' experiences and perceptions directly without interventions that could influence their behavior. These studies were reviewed based on development criteria. The approaches taken in achieving the study objectives are:

- Field approach, by conducting direct observations and interviews with pedestrians who use pedestrian paths. Field observations and interviews were carried out in order to find out the environment and actual problems of pedestrian paths along the Tombolotutu road, Talise Valangguni sub-district, Palu City, Central Sulawesi province.
- Theoretical and policy/regulatory approaches, this approach is used to analyze problems by referring to theories and regulations regarding factors and guidelines related to pedestrian paths.

The researcher is the main instrument that collects, analyzes and interprets the data. However, respondents are also very important as sources of information that provide the insight and experience necessary to achieve research objectives, to create a deeper understanding of the phenomenon under study.

The following is the flow diagram used as the research methodology below:

**Diagram 1: Research methodology**  
**Source: Research Analysis**



### **Method of collecting data**

Researchers carried out direct observations at the location to understand the condition of the pedestrian path and user interactions with the environment. During the observation period, researchers recorded various aspects of the physical condition of the pedestrian path (width, surface, shade), the activities of path users, such as pedestrians, traders and vehicles, as well as social interactions that occurred on the pedestrian path.

Researchers also do interviews with pedestrians who use pedestrian paths. Researchers randomly selected respondents who were met at the research location, interview questions focused on the user's personal perceptions and experiences when walking on the path, factors that influence comfort and safety as users of the pedestrian path.

### **Data Analysis Methods**

Interview data were transcribed verbatim to ensure accuracy. Coding was carried out to identify themes that emerged from the transcripts. Coding will include categories such as Non-Physical Comfort and Factors that influence comfort when walking, Security and Issues related to user safety as well as Environmental Conditions and Environmental Aspects that influence user experience

After the coding process, thematic analysis was carried out to group the findings into main themes. Researchers look for patterns and relationships between themes to understand user experiences holistically. findings may include:

Respondents stated that uneven surface paths and manhole covers in the middle of the sidewalk could be dangerous, mainly respondents complained about discomfort during the day due to the lack of shade and non-physical disturbances such as users reporting difficulties due to parked vehicles and using vehicles on the pedestrian path.

## V. RESULTS AND DISCUSSION

In this case, comfort in using pedestrian paths is more emphasized on non-physical problems.

a. **Physical aspect** describes the current physical condition of the pedestrian path, which includes:

- Dimensions
- Ramp
- Guided path for pedestrians with special needs
- Protectors, Shades and Green Paths
- Seating and Trash Cans
- Pedestrian lighting

b. **Non-physical aspects** describe the condition of pedestrian paths at the study location based on the function of the sidewalk, as well as the users of the sidewalk.

The method used in the analysis is to compare the current condition of the sidewalk with the standards and guidelines set by the government.

### 5.1 Physical Aspects of Pedestrian Paths (Sidewalks) on Tombolotutu Street

#### A. Dimensions

The results of observations and measurements in the field, the pedestrian paths on Tombolotutu road have various heights and widths, such as the width of the pedestrian paths varying in size according to observations of land or community fences with irregular border lines, the height of the Pedestrian Path does not vary, visible until it follows the body of the sidewalk so that looks up and down. The results can be seen in the table below:

**Table 1: Dimensions of Pedestrian Paths at Study Locations by Segment**  
Source: Researcher Analysis

	<b>Sigma segment - Tombolotutu Bridge</b> Sidewalk Height 6, 15 and 20 CM
	<b>Tombolotutu Bridge Segment - Setia Budi</b> Sidewalk Height 6, 15 and 20 CM
	<b>Setia Budi – Suprapto Segment</b> Sidewalk Height 6, 15 and 20 CM
	<b>Suprapto - Yos Sudarso Segment</b> Sidewalk Height 6, 15 and 20 CM



### B. Ramp

The results of direct observation of the ramp according to information from the informant regarding comfort are seen at the study location, there is no Ramp like at intersections or pedestrian crossings. As for the ramp on the pedestrian path of Jalan Tombolotutu, in general in 4 segments the slopes are seen to vary. Because they do not feel comfortable, some pedestrians are seen using the road for vehicles as a means of walking.



**Figure 8: Ramp Intersection and Entry Road to Residents' Land Sidewalk Study Location**  
Source: Field Data

### C. Guideway for Pedestrians with Special Needs

The guideway consists of a dome or dot pattern as a warning to warn of changes in the surrounding situation and a line pattern as a guide to indicate the direction of travel. For pedestrians with special needs (blind and visually impaired),

At the study location, a guide path has been provided, although in general it is not optimal, as in the picture it is obstructed and broken.



**Figure 9: Guide Path at Study Site**  
Source: Field Data

### D. Vehicle Entry and Exit Access Road

Arrangements for driveways are carried out to reduce conflicts between pedestrians and vehicles, prioritize access for pedestrians and increase visibility between cars and pedestrians on the driveway, and if there is entry and exit access via the sidewalk, a 1.20 m wide sidewalk facility is very necessary. outside the sidewalk body is 1.85 M, so the Ramp does not use or uses the Sidewalk Body

The results of observations at the Study Location based on respondents' statements related to the sidewalk going up and down which disrupts comfort, according to the analysis, this occurs due to the limited width of the sidewalk and the lack of a Facility Lane, so the sidewalk body is lowered to minimize the incline or slope of the Ramp, as seen in the picture below, pedestrians prefer to walk on the motorized vehicle road..



**Figure 10: Ramp conditions at the study location**  
Source: Field Data



**Figure 11: Access Road for Vehicles Entry and Exit Study Location**  
Source: Field Data

### E. Protectors, Shades and Green Paths

In general, at the study location there are no protectors or shades for pedestrian path facilities. Observations at the study location have protectors and shades that are positioned in the yard of the owner of the residential building at the study location and this can also be an alternative shade for pedestrians.

Judging from the function of other buildings such as shophouses, minimarkets, shops and kiosks along the Tombolotutu road, they do not have shade, so the impression and feeling of heat when walking will influence the desire to use pedestrians. Judging from the designation of the study location area as trade and services.

There are no green lanes at the study location at all, considering that the standard width of the pedestrian lane is only for the sidewalk.



Figure 12: Condition of Shade and Green Lanes at the Study Location  
Source: Field Data

### F. Seats and Trash Cans

The study location does not provide seating or rubbish bins. The rubbish bins appear to maximize the residents' rubbish bins in front of the residents' buildings. Ideally, pedestrian facilities include seating and rubbish bins placed at a distance of 110 - 120 meters, taking into account the characteristics of the location. By designation, this location is included in the trade and services area, so this facility is really needed, to provide comfort for pedestrians who travel more than 100 meters.

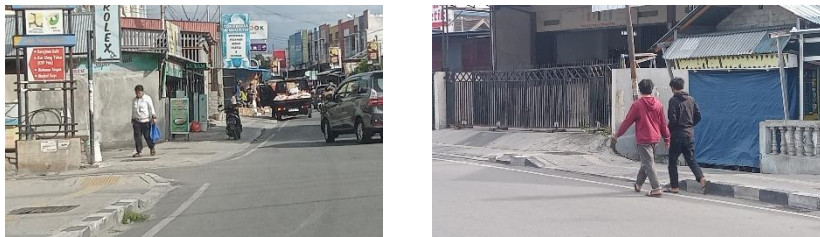


Figure 13: There are no seats or trash bins  
Source: Field Data

### G. Pedestrian Lighting

At the study location, pedestrian path lighting utilizes public road lighting, and in terms of functionality, public road lighting can accommodate pedestrian lighting needs, although in general, according to the planning guidelines for pedestrian facilities, the distance and height have been regulated.

#### 5.1 Non-Physical Aspects of Pedestrian Paths (Sidewalks) on Tombolotutu Street

From the results of interviews and observations, researchers analyzed several problems that disturb pedestrian path users in non-physical aspects, such as:

- a) Quality of Pathway Physical Function Pedestrian
  - There is a change in pathway function pedestrian Which caused by traders who own shops, kiosks or stalls directly adjacent to the lane Pedestrian so buyer activity utilise track pedestrian.
  - Building owners and visitors, whether traders or buyers, are used to using the route pedestrian as a means parking, until the primary function of the strip pedestrian disturbed
- b) Comfort Pedestrians

It can be seen from observations at the location, there are some people who use two-wheeled vehicles, to avoid traffic jams they use pedestrian paths,



Sidewalks are made for socializing



Buildings bordering the sidewalk



Parking on the Sidewalk Disturbs Pedestrians



Parking on the Sidewalk Disturbs Pedestrians



Using motorized vehicles on the sidewalk

**Figure 14: Non-Physical Aspects Disturb the Comfort of Pedestrian Paths**  
**Source: Field Data**

## VI. CONCLUSION

From the results of observations and interviews, identification and analysis of problems have been carried out and the results of research have been formulated at the study location regarding the quality of comfort of the pedestrian path on the Tombolotutu road based on 2 aspects, namely physical and non-physical aspects. It can be concluded that physically the pedestrian path at the study location has not fully provided comfort for pedestrian path users and for non-physical based on observations and perceptions of respondents and the results of observations confirm that there are parking lots and vehicles passing through the pedestrian path, causing discomfort and can be dangerous for pedestrians.

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