

Planning Feeder Transport Supporting Trans Metro Dewata in Ubud Area Gianyar Regency

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Abstract The increase in the number of tourists in the Ubud area has an impact on traffic density. The government has attempted to meet the need for transportation services with the Trans Metro Dewata Bus route K4B Terminal Ubung-Sentral Parking Monkey Forest with the Buy The Service (BTS) scheme. This service has not yet reached the Ubud area as a whole, causing the public and tourists to still predominantly use private vehicles. This is because there is no feeder transport that can accommodate the movement of people and tourists after using the Trans Metro Dewata Bus. This research aims to analyze passenger characteristics, vehicle types and Trans Metro Dewata feeder transport routes in the Ubud area. The method used in this research is field data collection and quantitative and qualitative descriptive analysis. After going through the data processing process, the results of this research are the characteristics of respondents regarding feeder transport planning, the planned routes are 1) Monkey Forest Parking Center-Blanco Museum-Singakerta Street-Pengosekan Street -Monkey Forest Parking Center, and 2) Monkey Forest Parking Center-Ubud Art Market-Hanoman Street-Sentral Parking Monkey Forest, and the type of vehicle used is a small bus with a capacity of 19 people.

Keywords Feeder Transport, The Ubud Area, Movement, Route

1. Introduction

The Ubud area, which is famous for art and culture and gets the nickname Spirit of Bali, is one of the tourist destinations. Based on data obtained from the Central Statistics Agency in March 2023, the Ubud area experienced an increase in the number of tourist visits, which was 14.59% from the previous month [1]. This certainly causes an impact on traffic density, due to the high use of private vehicles both by the public and tourists who come to the Ubud Area [2][3]. The rate of private vehicle usage in Ubud Area reached 91.67%.

To meet the need for transportation services, the government has provided the Trans Metro Dewata Bus K4B route to serve the public and tourists from Ubung Terminal to Monkey Forest Parking Center [4][5][6]. The Trans Metro Dewata bus is implemented under the Buy The Service (BTS) scheme. The service only serves from Ubung Terminal to Monkey Forest Parking Center, and vice versa from Monkey Forest Parking Center to Ubung Terminal. The Trans Metro Dewata Bus has not been able to reach the Ubud Area as a whole and based on the survey results, the load factor of the Trans Metro Dewata Bus on the route is 33.58%. So that the public and tourists still remain dominant in using private vehicles to carry out movement (mobility) in the Ubud Area.

This is because there is no feeder transport that can accommodate the movement of people and tourists after using the Trans Metro Dewata Bus. Therefore, feeder transport is needed that can accommodate and facilitate

the movement of people and tourists in the Ubud Area after using the Trans Metro Dewata Bus, so as to reduce traffic density in the Ubud Area [4][7][8][9]. Based on this, a transportation plan that is able to overcome problems is needed [7][10], namely with the research title "**Planning Feeder Transport Supporting Trans Metro Dewata in Ubud Area, Gianyar Regency**".

Feeder Transport Concept

The feeder transport concept is the concept of connecting trunk line corridors with residential areas or activity centers with residential areas, thus supporting the main route in collecting passengers or as a distributor [6]. Where feeder transport can be a link between the main corridor to the generation area or vice versa the generation area to the main corridor. The objectives of feeder transport services in general are:

- 1) Efficient utilization of trunk line capacity;
- 2) Expanding the trunk line service coverage area;
- 3) Improving the quality of transportation services;
- 4) Good coordination of transportation services between modes of public transportation;
- 5) Creation of operational efficiency;
- 6) Creation of an effective tariff system.

Feeder systems based on their operation are classified into 2 types:

a) Non Integrated Feeder

Non Integrated Feeder which is feeder transport that is not integrated with the trunk line both physically and tariffs.

b) Integrated Feeder

Integrated Feeder which is feeder transport that is integrated with the trunk line both physically and at rates.

The physical form of the feeder freight line to be planned is influenced by the local/collector road configuration and demand profile, and the form of the feeder freight line is as follows:

- a) Loop route;
- b) Straight round trip route;
- c) A combination of straight and circular routes;
- d) A straight route connecting the two main corridors.

2. Materials and Methods

This research was conducted in the Ubud area, Gianyar Regency. Respondents in this study are people and tourists who use private vehicles and travel in Ubud Area. Based on the calculation results using the slovin formula, the number of samples was 349 respondents. The data needed in this study is divided into 2 groups of data, namely primary data and secondary data with the location of the study is in the Ubud Area [4][11][12].

This research is research with a quantitative method where the process of collecting secondary data is carried out using comparative techniques, while for primary data

using survey techniques.

- 1) Identify the problem, various problem will be found in the study area after direct observation. After finding the existing problems, the next stage is to take several problems to formulate.
- 2) Data collection in this research is grouped into:
 - a) The primary data in this study is in the form of data on tourist location points in the Ubud Area as materials for planning feeder transportation routes supporting the Trans Metro Dewata in Ubud Area, Gianyar Regency through direct observation to the field, road sections that are often traveled in the Ubud Area are obtained through interview.
 - b) Secondary data come from related agencies, whether obtained directly from the agency or through the relevant agency's website in form of documents.
- 3) Data analysis, is used to help in solving a problem through data processing.
 - a) Recapitulating the results of the interview from several questions to analyze the characteristic of the respondent.
 - b) Compile data, both primary data is based on the results of direct observations and the results of interviews that have been conducted and secondary data which have been obtained from the relevant agencies, needed to plan feeder transport routes (freight route determination) in Ubud Areas.
 - c) Calculate the number of passengers requested, to find out how many people and tourists who use private vehicles and travel in Ubud Area. So that it can be used as the requirement for the type of vehicle that must be provided.
- 4) Output, is the result of this research namely analysis of the respondent characteristics, freight route determination, and vehicle type determination.

3. Result and Discussion

3.1. Analysis of Respondents Characteristics

Based on the results of the interview survey, the characteristics of respondents were obtained:

- 1) The percentage of gender by respondents

Table 1. The Percentage of Gender

No.	Gender	People	Percentage
1	Male	172	49 %
2	Female	177	51 %
	Total	349	100 %

Source: Analysis Result, 2023

Based on the results of an interview survey conducted with 349 respondents, as shown in the Table 1 above, 51% of respondents (177 people) were male and 49% of respondents (172 people) were female.

2) The percentage of vehicle waiting time by respondents

Table 2. The Percentage of Vehicle Waiting Time

No.	Waiting time	People	Percentage
1	5 minutes	331	95 %
2	10 minutes	14	4 %
3	11 minutes	4	1 %
	Total	349	100 %

Source: Analysis Result, 2023

The time respondents expected to wait for a vehicle at the start or end point was dominated by 95% choosing a waiting time of 5 minutes at the start/end point.

3) The percentage of comfort factor expected by respondents

Table 3. The Percentage of Comfort Factor Expected

No.	Indicator	People	Percentage
1	Equipped with air conditioning	168	48 %
2	Cleanliness	143	41 %
3	Carrying capacity	38	11 %
	Total	349	100 %

Source: Analysis Result, 2023

The percentage of comfort factor expected by respondents. 48% of respondents expect vehicles to be equipped with air conditioning, 41% of respondents expect clean vehicles, and 11% of respondents expect carrying capacity not to exceed capacity according to Minimum Service Standards.

4) The percentage of safety factors expected by respondents

Table 4. The Percentage of Safety Factors Expected

No.	Indicator	People	Percentage
1	Vehicle identity	157	45 %
2	Driver's identification card	126	36 %
3	Danger signal lights	66	19 %
	Total	349	100%

Source: Analysis Result, 2023

The percentage of safety factors expected by respondents. 45% of respondents expect vehicles to be equipped with vehicle identities, 36% of respondents expect vehicles to be equipped with driver identification

card, and 19% of respondents expect vehicles to be equipped with danger signal lights.

5) The percentage of affordability factors expected by respondents

Table 5. The Percentage of Affordability Factors Expected

No.	Indicator	People	Percentage
1	Ease of movement	164	47 %
2	Tariff (travel cost)	66	19 %
3	Fleet availability	119	34 %
	Total	349	100%

Source: Analysis Result, 2023

The percentage of affordability factors expected by respondents. 47% of respondents expect ease of movement, 34% of respondents expect fleet availability, and 19% of respondents expect affordable fares or travel costs.

6) The percentage of regularity factors expected by respondents

Table 6. The Percentage of Regularity Factors Expected

No.	Indicator	People	Percentage
1	Service information	42	12 %
2	Travel speed	73	21 %
3	Schedule	234	67 %
	Total	349	100%

Source: Analysis Result, 2023

The percentage of regularity factors expected by respondents. 67% of respondents expect vehicles to be equipped with scheduling, 21% of respondents expect vehicles to pay attention to travel speed, and 12% of respondents expect vehicles to be equipped with service information.

3.2. Freight Route Determination Analysis

Determination of the route of the feeder transport plan, of course, pays attention to several factors considered in determining the route:

- 1) Land Use Pattern, namely by paying attention to the surrounding land use that will be used as a plan route [2][8], where the Ubud Area, Gianyar Regency with land use that will be passed is shops and settlements and tourist attractions;
- 2) Distance and travel time, in determining the route, of course, you must choose the shortest distance to get the fastest or shortest time so that the vehicle can deliver passengers in an efficient and effective time [9][6].

- 3) Regional Spatial Plan of Gianyar Regency, namely by paying attention to the RTRW related to the area to be developed so that it can plan transportation to support the movement or mobility of the community and tourists.
- 4) The point of origin of the trip and the destination point of the trip to be addressed [7];
- 5) The characteristics and conditions of the road network, namely by taking into account both the width of the road to be traversed and the function of the road to be used as a planned route [2].

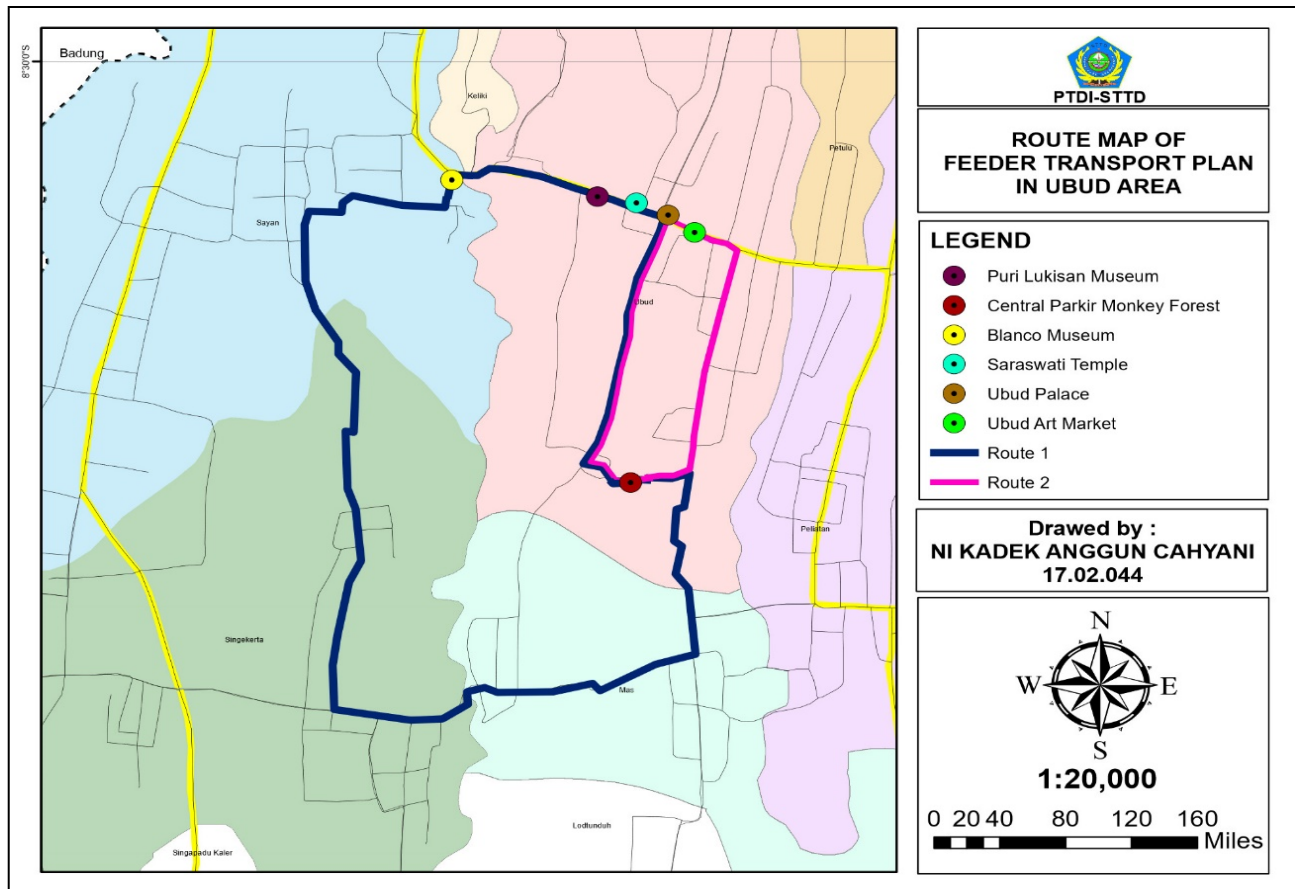
So based on some of the factors mentioned above, the selected plan route for planning feeder transport supporting Trans Metro Dewata in the Ubud Area, Gianyar Regency is as follows (Figure 1).

- a) Monkey Forest Parking Center - Monkey Forest Street- Ubud Street Segment 4 - Penestanan Street - Campuhan Street - Singakerta Street - Pengosekan Street - Monkey Forest Parking Center, with a total distance of 10.5 km.
- b) Monkey Forest Parking Center - Monkey Forest Street - Ubud Street Segment 2 - Hanoman Street -

Sentral Parkir Monkey Forest, with a total distance of 4.5 km.

In determining the route of the planning of feeder transport supporting Trans Metro Dewata in the Ubud Area, Gianyar Regency using trunk-feeder techniques, namely larger transportation serving the main corridor in this case is the Trans Metro Dewata Bus. At the end of the corridor is built with an integrated system to facilitate the efficient movement of passengers to feeder transport or smaller buses as feeder transport. In this case, it has the advantage that the size of the bus can be adjusted according to the route to be planned.

Line or route services from the Trans Metro Dewata Bus feeder transport in the Ubud Area, Gianyar Regency are intended to provide feeder access to the trunk line. Through the integration of trunk line and feeder network services, it is expected to optimize travel time and minimize travel costs, as well as provide accessibility to and from major corridors in mobility or movement [11]. So that the planning of feeder transport ruta as a trunk line system support network can create a connected, efficient, integrated public transportation network and expand the reach of public transportation service areas.



Source: Analysis Results, 2023

Figure 1. Route Map of Feeder Transport Plan in Ubud Area

3.3. Vehicle Type Determination Analysis

Determination of the type of vehicle for feeder transport to be operated in the Ubud Area, Gianyar Regency, of course, must pay attention to several aspects such as route classification, type of service, city size, and road facilities and infrastructure [11]. The average road width in Ubud Area is 5.5 meters, with the function of the road to be traversed is collector and local. So based on some of these aspects and with a population in the Ubud Area is less than 100,000 people, the types of vehicles used to support passenger transportation operations in the Ubud Area, Gianyar Regency are:

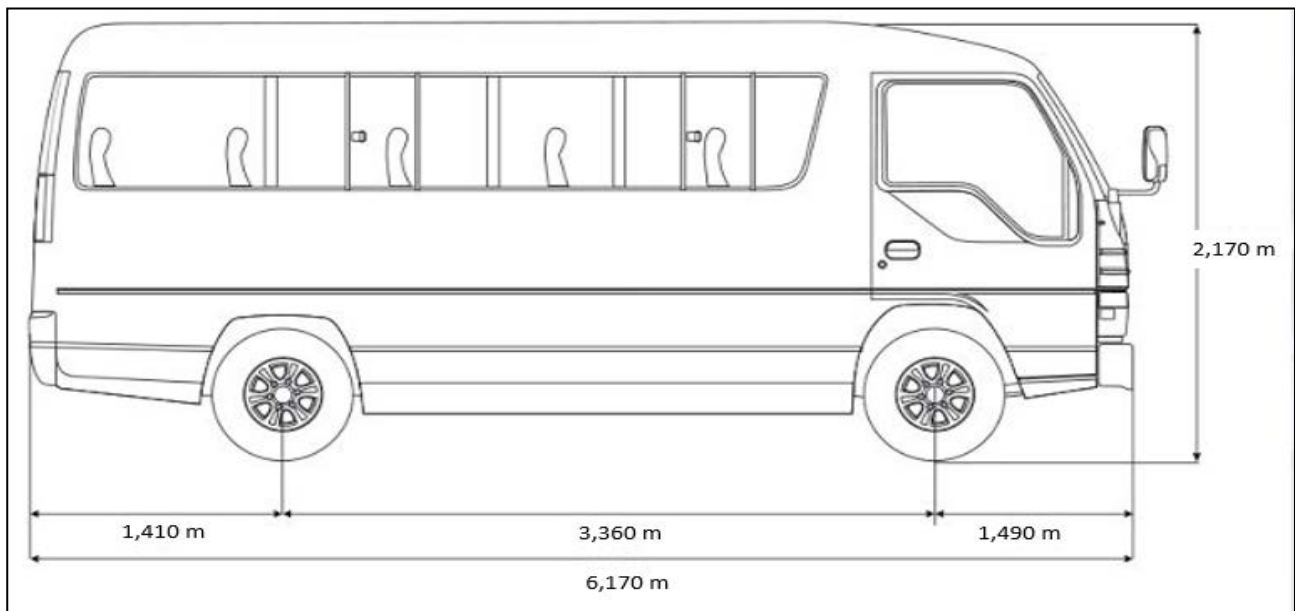
Vehicle Type : small bus (long elf)
 Vehicle Capacity : 19 seats
 Vehicle Length : 6.170 mm
 Vehicle Width : 1.835 mm
 Vehicle Height : 2.170 mm

4. Conclusions

Based on the results of the discussion above, it can be

concluded as follows:

- 1) Based on the results of interview survey data analysis, the characteristics of respondents obtained from the planning of feeder transport supporting Trans Metro Dewata in the Ubud Area, Gianyar Regency are as follows:
 - a) The percentage of respondents by gender is 51% male and 49% female.
 - b) The percentage of vehicle waiting time is 95% of respondents are willing to wait 5 minutes.
 - c) The percentage of comfort factor expected by respondents is 48% of respondents expect the vehicle to be equipped with air conditioning.
 - d) The percentage of safety factors expected by respondents is 45% of respondents expect vehicles to be equipped with vehicle identities.
 - e) The percentage of affordability factors expected by respondents is 47% of respondents expect ease of movement.
 - f) The percentage of regularity factors expected by respondents is 67% of respondents expect vehicles to be equipped with scheduling.



Source: Analysis Results, 2023

Figure 2. Small Bus Visualization

- 2) There are 2 routes of the proposed Trans Metro Dewata feeder transport operational plan in the Ubud Area Gianyar Regency, and the starting point of departure of the 2 routes is from the Monkey Forest Parking Center. The proposed 2 route plans are as follows:
- a) Route 1 is a route departing from Monkey Forest Parking Center - Monkey Forest Street - Ubud Street Segment 4, and return route Ubud Street Segment 4- Penestanan Street - Campuhan Street - Singakerta Street - Pengosekan Street - Monkey Forest Parking Center.
 - b) Route 2 is a route departing from Sentral Parkir Monkey Forest - Monkey Forest Street - Ubud Street Segment 2, and the return route Ubud Street Segment 2 - Hanoman Street - Sentral Parkir Monkey Forest.
- 3) Determination of vehicle type is based on route classification, type of service, city size, and road facilities and infrastructure (i.e. road width, road conditions, road function). So based on these aspects, the type of vehicle used to support the operation of feeder transport supporting Trans Metro Dewata in the Ubud Area, Gianyar Regency is a small bus with a capacity of 19 passengers.

So the results of this research can be applied in other places if those other places have the same characteristics as the Ubud area.

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