



Planning of School Transportation in Tulang Bawang Regency: A Case Study of Banjar Agung and Banjar Margo Districts

Ghinayya Ramadhania Shofi¹, Hendrik Prasetyo², Femmy Sofie Schouten³

¹Road Transportation Management Study Program, Sekolah Tinggi Transportasi Darat (PTDI-STTD), Bekasi, Indonesia

²Land Transportation Study Program, Sekolah Tinggi Transportasi Darat (PTDI-STTD), Bekasi, Indonesia

³Masgister Program in Transportation, Sekolah Tinggi Transportasi Darat (PTDI-STTD), Bekasi, Indonesia

Correspondence: ghinayyaramadhania@gmail.com

Article Info

Article history:

Received Jul 12th, 2026

Revised Aug 15th, 2026

Accepted Aug 20th, 2026

Keyword:

School Transportation;
Transportation Planning; Student
Safety; Vehicle Operating Cost
(VOC); Ability to Pay (ATP);
Willingness to Pay (WTP).

ABSTRACT

The high number of traffic accidents involving students in Tulang Bawang Regency, particularly in Banjar Agung and Banjar Margo Districts, is primarily attributed to the lack of public transportation services that meet students' travel needs. Consequently, the use of private vehicles, particularly motorcycles, among students remains high. This study aims to develop an effective and safe school transportation plan as an alternative mode of transport for students. A quantitative descriptive approach was employed using interview surveys, land use surveys, and Vehicle Operating Cost (VOC) component surveys, supported by secondary data obtained from relevant government agencies. The analyses included student travel characteristics, potential travel demand, route and bus stop determination, vehicle type selection, operational performance, Vehicle Operating Cost (VOC), Ability to Pay (ATP), and Willingness to Pay (WTP). The results identified three school transportation routes serving five schools, requiring a total of 21 small buses with a seating capacity of 19 passengers each. The proposed fares on all routes were lower than students' Ability to Pay (ATP) and Willingness to Pay (WTP), indicating that the proposed fares are affordable for students while remaining sufficient to cover vehicle operating costs. The proposed school transportation system is expected to reduce students' dependence on private vehicles and improve the safety of their journeys to school.



© 2025 The Authors. Published by CV PITAPA KARYA GEMILANG. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>)

INTRODUCTION

Tulang Bawang Regency is located in Lampung Province, Indonesia, covering an area of 3,466.32 km² with a population of 442,320 distributed across 15 districts (Badan Pusat Statistik Kabupaten Tulang Bawang, 2025). Transportation is an essential component of daily life, playing a significant role in supporting community activities and serving as one of the key indicators of regional development (Schouten, 2021). The increasing intensity and diversity of human activities in the modern era have led to a growing demand for transportation facilities (Mentari, n.d.).

Traffic accident data in Tulang Bawang Regency during the 2021–2025 period recorded 1,560 accidents, of which 240 involved students (Satlantas Polres Kabupaten Tulang Bawang, 2025). The primary contributing factors include students' low compliance with traffic regulations and the widespread use of private motorcycles for commuting to school. One of the schools in Banjar Agung District, SMP Negeri 2 Banjar Agung, has implemented a policy prohibiting students from bringing motorcycles to school. However, this policy requires the support of a safer transportation alternative, as the existing public transportation services in Tulang Bawang Regency remain inadequate. Therefore, the local government has the responsibility to provide safe, accessible, and free school transportation services for students (Farida et al., 2024).

Law Number 22 of 2009 concerning Road Traffic and Transportation, Article 139 paragraph (4), authorizes local governments to provide public transportation services, including school transportation, as part of public service delivery and efforts to improve road safety (Law Number 22 of 2009 on Road Traffic and Transportation, 2009). Furthermore, Article 21 of the Minister of Transportation Regulation Number PM 117 of 2018 emphasizes that school transportation services are intended to ensure students' safety, security, comfort, and affordability (Minister of Transportation Regulation Number PM 117 of 2018 on the Provision of Non-Scheduled Passenger Transport Services, 2018).

Based on these issues, this study aims to: (1) identify the existing condition of public transportation services in Banjar Agung and Banjar Margo Districts; (2) develop a school transportation plan based on students' travel demand; and (3) formulate an operational plan and fare structure for school transportation within the study area as an effort to reduce traffic accidents involving students and decrease the use of private vehicles.

RESEARCH METHODS

This study employed a quantitative descriptive approach. The research objects were junior high school and vocational high school students from five schools located in Banjar Agung and Banjar Margo Districts, namely HMPTI Banjar Agung Vocational High School, SMP Negeri 2 Banjar Agung, SMP Negeri 3 Banjar Agung, SMP Negeri 1 Banjar Margo, and SMP Negeri 3 Banjar Margo.

The study utilized both primary and secondary data. Primary data were collected through land use surveys, student interview surveys, and Vehicle Operating Cost (VOC) component surveys. Secondary data were obtained from the Central Bureau of Statistics (BPS), the Traffic Police of Tulang Bawang Regency, and the Department of Education, Youth, and Sports of Tulang Bawang Regency.

The sample size for the student interview survey was determined using the Slovin formula with a 5% margin of error. Based on a total population of 2,417 students from the five selected schools, the required sample size was 343 students. The number of respondents from each school was allocated proportionally according to the student population of each school, as presented in Table 1.

Table 1. Distribution of Interview Survey Samples

No	School	Number of students	Sample	Expansion Factor
1	SMP Negeri 3 Banjar Agung	431	61	7,07
2	SMP Negeri 2 Banjar Agung	599	85	7,05
3	SMKS HMPTI Banjar Agung	306	44	6,95
4	SMP Negeri 1 Banjar Margo	712	101	7,05
5	SMP Negeri 3 Banjar Margo	369	52	7,10
Jumlah		2417	343	-

The data were analyzed through several stages, including analyses of students' travel characteristics, potential travel demand, route and bus stop determination based on the Decree of the Director General of Land Transportation Number SK.271/HK.105/DRJD/1996, vehicle type selection referring to Decree Number SK.967/AJ.202/DRJD/2007, operational performance analysis (travel time, cycle time, number of trips, headway, and fleet requirements), as well as analyses of Vehicle Operating Cost (VOC), Ability to Pay (ATP), and Willingness to Pay (WTP) as the basis for determining school transportation fares.

RESULTS AND DISCUSSION

Student Travel Characteristics and Potential Demand

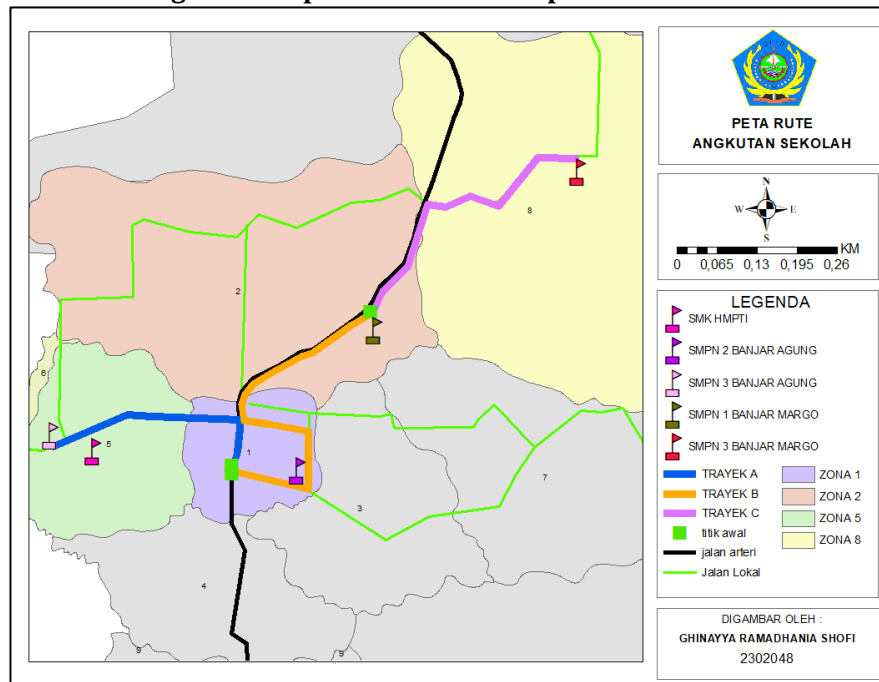
The interview survey results from 343 respondents indicate that the gender distribution was relatively balanced, consisting of 51% male and 49% female students. The most commonly used mode of transportation for commuting to school was motorcycles, accounting for 77% of all trips. Students' mode choice was influenced by several factors, including travel time (37%), transportation cost (37%), and comfort (12%). The willingness of students to shift from private vehicles to school transportation services reached 60%, representing the potential demand for the proposed service. Students' travel

patterns were predominantly home-based, with trip origins distributed across four main zones serving five selected schools. The highest travel demand was observed from Zone 1 to SMP Negeri 2 Banjar Agung.

Route, Bus Stop, and Vehicle Type Planning

The school transportation routes were planned based on the spatial distribution of potential demand and the compatibility between the road network and the characteristics of the selected vehicles. The analysis resulted in three service routes covering five schools within the study area. Route 1 serves Zones 1 and 5 and connects students to SMP Negeri 3 Banjar Agung and SMKS HMPTI Banjar Agung, with a route length of 4.8 km. Route 2 serves Zones 1 and 2 and provides access to SMP Negeri 2 Banjar Agung and SMP Negeri 1 Banjar Margo, with a total route length of 6.2 km. Route 3 serves Zones 2 and 8 and connects students to SMP Negeri 1 Banjar Margo and SMP Negeri 3 Banjar Margo, with a route length of 10.3 km. The service network of the three proposed routes is illustrated in Figure 1.

Figure 1 Proposed School Transportation Routes



The locations of the proposed bus stops were determined in accordance with the Decree of the Director General of Land Transportation Number 271/HK.105/DRJD/1996 by considering the proximity of each bus stop to the main passenger concentration areas within each trip-generation zone. The proposed vehicle type is a small bus with a seating capacity of 19 passengers. The selection of this vehicle type refers to the Decree of the Director General of Land Transportation Number SK.967/AJ.202/DRJD/2007, which specifies the suitability of vehicle types according to urban size classification, while also considering the average road width in the study area, which is approximately 7 meters.

Operational Performance and Fleet Requirements

The proposed school transportation service is scheduled to operate in two daily shifts: a morning shift (06:15–07:30 WIB) and an afternoon shift (14:00–15:30 WIB), with an effective operating time of 60 minutes per shift, a planned operating speed of 30 km/h, and a load factor of 100%. Based on the analyses of travel time, cycle time, and headway for each route, the required fleet consists of seven vehicles on Route 1 operating four trips per day, nine vehicles on Route 2 operating four trips per day, and six vehicles on Route 3 operating two trips per day. Consequently, a total of 21 small buses is required to serve the three proposed routes. Vehicle Operating Cost (VOC), Fare, Ability to Pay (ATP), and Willingness to Pay (WTP) The Vehicle Operating Cost (VOC) analysis considered both fixed and

variable operating costs for small buses on each route. Based on the VOC analysis, the basic fare was determined using the following formula : $\text{Fare} = \text{Vehicle Operating Cost} / (\text{Load Factor} \times \text{Vehicle Capacity})$ A comparison of route length, fleet requirements, Vehicle Operating Cost (VOC), and the proposed fare for each route is presented in Table 2.

Route	Route Length (km)	Fleet Requirement (Vehicles)	Trips per Day	VOC (IDR/km)	Proposed Fare (IDR)
1	4,8	7	4	10.234,79	2.844,2
2	6,2	9	4	8.246,42	2.960,0
3	10,3	6	2	9.757,79	5.649,2

The Ability to Pay (ATP) analysis was calculated based on the 2025 per capita income of Tulang Bawang Regency, amounting to IDR 72,988,555, with 10% of income allocated to transportation expenses. The analysis resulted in an ATP value of IDR 11,742. Meanwhile, the Willingness to Pay (WTP), obtained from the student interview survey, was IDR 6,234 for the proposed school transportation service. A comparison between the fares derived from the Vehicle Operating Cost (VOC) analysis and the ATP and WTP values indicates that the proposed fares for all three routes are lower than both students' ability and willingness to pay. Therefore, the proposed fares are considered affordable for students while remaining sufficient to cover vehicle operating costs.

CONCLUSION

The existing public transportation services in Banjar Agung and Banjar Margo Districts are unable to adequately meet students' travel needs. This is reflected in the high proportion of students using private motorcycles (77%) and the limited coverage of the existing public transportation system, which consists of only one route served by 10 vehicles. The proposed school transportation plan comprises three service routes serving five schools. Route 1 has a length of 4.8 km and requires seven vehicles operating four trips per day. Route 2 has a length of 6.2 km and requires nine vehicles operating four trips per day. Route 3 has a length of 10.3 km and requires six vehicles operating two trips per day. Overall, the proposed system requires a total of 21 small buses, each with a seating capacity of 19 passengers. The results of the Vehicle Operating Cost (VOC), Ability to Pay (ATP), and Willingness to Pay (WTP) analyses indicate that the proposed fares for all routes are below both the ATP value (IDR 11,742) and the WTP range (IDR 5,534–6,234). Therefore, the proposed fare structure is considered financially feasible for implementation while remaining sufficient to cover vehicle operating costs. The proposed school transportation system is expected to reduce traffic accidents involving students and decrease students' reliance on private vehicles for commuting to school. Periodic evaluation of the Vehicle Operating Cost (VOC) components and fare structure is recommended, considering that fuel prices and spare-part costs may change over time.

REFERENCES

- Alkam, R. B., Said, L. B., Fakultas Teknik, & Universitas Muslim Indonesia. (2018). Pemilihan moda transportasi menuju kampus. *Jurnal Teknik*, 18(3), 201–210.
- Ayu, K., & Wibisono, R. E. (2024). Analisis tarif angkutan umum berdasarkan BOK, ATP, dan WTP dilengkapi simulasi penetapan tarif berbasis website (Studi kasus: Angkutan lingkungan Kota Blitar). *Jurnal Teknik Sipil*, 2(2), 128–137.
- Badan Pusat Statistik Kabupaten Tulang Bawang. (2025). *Kabupaten Tulang Bawang dalam angka 2025*. <https://tulangbawangkab.bps.go.id/id>
- Farida, N., Maulana, A., & Jember, D. P. (2024). Strategi program bus sekolah gratis bagi risiko pelajar dalam berlalu lintas di Kabupaten Jember (Studi di Dinas Perhubungan Kabupaten Jember). *Jurnal Transporasi*, 1–12.

- Gautama, G., & Yanto, W. A. (2019). Analisa tarif angkutan sekolah (abudemen) berdasarkan biaya operasional kendaraan, ability to pay dan willingness to pay. *Tapak (Teknologi Aplikasi Konstruksi)*, 8(1), 91–105.
- Keputusan Direktur Jenderal Perhubungan Darat Nomor: SK.687/AJ.206/DRJD/2002 tentang Pedoman Teknis Penyelenggaraan Bus Umum di Wilayah Perkotaan. (2002).
- Kresnanto, N. C., Tamin, O. Z., & Frazila, R. B. (2009). Model pemilihan rute dan pembebanan perjalanan dengan sistem. *Jurnal Transportasi*, 9(2), 147–158.
- Mentari, O. (t.t.). Implementasi kebijakan pengadaan bus sekolah gratis bagi pelajar di Kecamatan Mandau Kabupaten Bengkalis. *Jurnal Ilmu Pemerintahan*, 4(2), 1–14.
- Narendra, A., Malkhamah, S., & Sopha, B. M. (2019). The modeling of dwelling time of buses at bus stop. *IOP Conference Series: Materials Science and Engineering*. <https://doi.org/10.1088/1757-899x/508/1/012039>
- Novrinda, S. T., Sari, N., & Seno, W. (2024). Perencanaan rute angkutan sekolah di Kabupaten Empat Lawang (Studi kasus: Kecamatan Tebing Tinggi). *Paulus Civil Engineering Journal*.
- Peraturan Direktur Jenderal Perhubungan Darat Nomor: SK.967/AJ.202/DRJD/2007 tentang Pedoman Teknis Penyelenggaraan Angkutan Sekolah. (2007).
- Peraturan Menteri Perhubungan Republik Indonesia Nomor PM 117 Tahun 2018 tentang Penyelenggaraan Angkutan Orang Tidak Dalam Trayek. (2018).
- Peraturan Menteri Perhubungan Republik Indonesia Nomor PM 10 Tahun 2012 tentang Standar Pelayanan Minimal Angkutan Massal Berbasis Jalan. (2012).
- Rodrigue, J., Comtois, C., & Slack, B. (t.t.). *The geography of transport systems*.
- Saputra, A. B., Sunarto, S., & Samin, S. (2021). Analisis tarif angkutan umum berdasarkan biaya operasional kendaraan, ability to pay dan willingness to pay. *Jurnal Teknik Sipil: Rancang Bangun*, 7(1), 1–8.
- Satlantas Polres Kabupaten Tulang Bawang. (2025). *Data kecelakaan lalu lintas Kabupaten Tulang Bawang tahun 2021–2025*.
- Schouten, F. (2021). Kontribusi keberlangsungan usaha jasa layanan transportasi publik kereta rel listrik commuter line terhadap produk domestik bruto sub sektor. *Jurnal Manajemen Transportasi*, 5(2), 55–64.
- Sugiyono. (2014). *Metode penelitian kuantitatif kualitatif dan R&D*. Alfabeta.
- Surat Keputusan Direktur Jenderal Perhubungan Darat No. 271/HK.105/DRJD/1996 tentang Pedoman Teknis Perekayasa Tempat Perhentian Kendaraan Penumpang. (1996).
- Tamin, O. Z. (2008). *Perencanaan dan pemodelan transportasi*. Penerbit ITB.
- Undang-Undang Nomor 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan. (2009). <https://peraturan.bpk.go.id/Details/38654/uu-no-22-tahun-2009>
- Yulianto, B., Mahmudah, A. M. H., & Mardi, W. A. G. R. S. (2023). Analisis potensi demand, ability to pay (ATP) dan willingness to pay (WTP) Batik Solo Trans (BST) koridor 6 pada sekolah. *Jurnal Transportasi*.