IJCIET

INTERNATIONAL JOURNAL OF CIVIL ENGINEERING AND TECHNOLOGY

Journal ID: 6971-8185

IAEME Publication

Chennai, India

editor@iaeme.com/ iaemedu@gmail.com

https://iaeme.com/Home/journal/IJCIET

International Journal of Civil Engineering and Technology (IJCIET)
Volume 16, Issue 4, July-August 2025, pp. 98-107, Article ID: IJCIET_16_04_005
Available online at https://iaeme.com/Home/issue/IJCIET?Volume=16&Issue=4
ISSN Print: 0976-6308 and ISSN Online: 0976-6316
Impact Factor (2025): 21.69 (Based on Google Scholar citation)
Journal ID: 6971-8185; DOI: https://doi.org/10.34218/IJCIET_16_04_005

THE INFLUENCE OF TRAFFIC VOLUME ON NOISE LEVELS ON OUTSIDE CITY ROADS JL. MAHIR MAHAR PALANGKA RAYA

[1]Ryco Prawira Purba, [2]Muhammad Arsyad
[1, 2]Master of Civil Engineering, Faculty of Engineering, Lambung Mangkurat University, Banjarmasin, South Kalimantan, Indonesia.

ABSTRACT

Transportation activities result in traffic flow movements which also have an impact on noise pollution. This noise is produced from the sound of motor vehicles, friction between tires and the road, and the sound of horns. Even though at a certain level this sound can still be tolerated, this noise can become a nuisance called noise pollution. Observations were carried out for four consecutive days, from Monday to Thursday, with measurement intervals of 12 hours per day. Data were analyzed using the Indonesian Road Capacity Manual. The research results show that the noise level on Jl. The average Mahir Mahar that occurs is 72.59 dBa, the 10 m point is 68.59 dBa, the 20 m point is 67.57 dBa, the 30 m point is 66.37 dBa, the 40 m point is 65.76 dBa, the 50 m point is 63.15 dBa, the average noise calculation results exceed the quality standards of Ministerial Decree No.48/MENLH/1 1/1996, namely office, trade and residential areas, namely 65 -55 dB with the highest average influence of traffic volume and noise (Leq) in the form of the best correlation equation value, namely linear correlation with an equation of 38.14%. Natural and artificial noise reduction methods, treatment can be in the form of creating artificial barriers and natural barriers such as

planting trees, have a value of 10 m point of 61.59 dBa, 20 m point of 59.57 dBa, 30 m point of 51.37 dBa, 40 m point of 49.76 dBa, and 50 m point of 46.51 dBa, so that with this method the average noise that occurs on roads outside the city, the dowry expert receives treatment and the value is below the quality standard, namely below 65 dB (Ministerial Decree No.48/MENLH/1 1/1996)

Keywords: Traffic Volume, Distance, Noise, Noise Level, Noise Reducing Building

Cite this Article: Ryco Prawira Purba, Muhammad Arsyad. (2025). The Influence of Traffic Volume on Noise Levels on Outside City Roads JL. Mahir Mahar Palangka Raya. *International Journal of Civil Engineering and Technology (IJCIET)*, 16(4), 98-107.
DOI: https://doi.org/10.34218/IJCIET_16_04_005

1. INTRODUCTION

Transportation is one of the essential components that cannot be separated from urban development, as it provides services that facilitate public mobility and contribute to the realization of community welfare. Roads, as part of land transportation infrastructure, play a crucial role in the land transportation sector. In modern society, the advancement of technology, economic growth, and population increase have led to a significant rise in various human activities (Marunsenge, Timboeleng, & Elisabaet, 2015). Most road users are intercity transport actors, predominantly using public transportation, private vehicles, and motorcycles. This has led to a rapid increase in road use, in line with the growing population and the intensification of socio-economic activities in each sector. Mahir Mahar Road is categorized as an undivided road type, specifically a two-lane, two-way urban road (Indonesian Highway Capacity Manual, 1997). In accordance with Law of the Republic of Indonesia No. 38 of 2004 on Roads and Government Regulation No. 34 of 2006 concerning Roads, this road is classified as a provincial road, namely a primary collector road that connects the provincial capital with regency or city capitals. Along this road segment, there are several public facilities such as places of worship and economic establishments. As such, traffic flow remains relatively smooth, except during peak hours. During peak hours, this road segment experiences a high volume of transportation activity, with vehicles frequently entering and exiting from the direction of Banjarmasin and Palangka Raya. This continuous traffic flow generates sound that contributes to noise pollution. Therefore, it is necessary to measure the level of noise generated in the area. This study will examine whether the noise levels conform to the environmental noise quality standards

stipulated in Decree of the Minister of Environment No. KEP-48/MENLH/11/1996, which specifies that in commercial zones, the acceptable noise levels according to the Indonesian National Standard (SNI) range from 55 to 65 dB.

2. METHODS

2.1. Location and Time of Research

The research location was on the Mahir Mahar Road section, an outer road in Palangka Raya City. The research on this road section was aimed at determining the effect of traffic performance on vehicle noise on the Mahir Mahar road section, which is a primary collector road that connects district or city capitals. with 6 measurement points at a distance of 0-50 meters from the road. Measurements were conducted over four consecutive days, Monday-Thursday, at 12-hour intervals per day.

2.2. Preliminary Survey

Obtaining data on traffic volume, speed, and side obstacles is a manual method. This method requires multiple surveyors, as each surveyor records different types of vehicles at different locations. The method of calculating vehicle volume, recording speed, and using the Vehicle Sound Level Meter (SLM) is carried out simultaneously.

2.3. Research Implementation

2.3.1 Data Collection

The data collection is classified into two, namely primary data and secondary data. For secondary data is data obtained from other sources, this source is obtained from related agencies such as population data from the government agency Statistics Agency, and location maps from Google Earth (Google Map). Meanwhile, primary data is obtained by conducting a survey. The method, number of surveyors, and equipment used in conducting the survey. Sound "level meter is a test tool used to measure noise "sound. This tool is capable of measuring noise on a scale of" 30-130 dB and a frequency of "20-20,000 Hz. Noise data is taken according to a predetermined distance at the point of 0-50 meters, so that the data can be read in "10 seconds per 15 minutes.

2.3.2 Primary and Secondary Data

Primary data is data obtained directly from field surveys. This data includes road geometry, traffic volume based on vehicle classification, side obstacle data, spot speed data, and vehicle noise data. Secondary data is data or information obtained in a structured format, in the form of publications through other parties (institutions or agencies). This data is typically

used to determine regional growth conditions, so that data reviews and analyses will be projected based on previous conditions.

2.3.3 Data Analysis

The results of the sound level meter readings obtained every 10 minutes will then be entered into the Leq formula based on the Minister of Environment's regulations in formula 48 of 1996. After obtaining the noise level, it is then compared with the Noise Level Quality Standards of "KEPMEN LH-48" of 1996, from the comparison it can be determined whether the noise results at the observation location exceed the "determined" standards or not. If the results exceed the standards, handling is needed to control the noise that occurs at that location. The noise quality standards based on these regulations can be seen in **Table 1.**

Tabel 1. Noise Level Standard Value

Area/Environmental Designation	Noise Level (dB)
a. Area Designation	
1. Housing and Settlements	55
2. Trade and Services	70
3. Offices and Commerce	65
4. Green Open Space	50
5. Industry	70
6. Government and Public Facilities	60
7. Recreation	70
8. Special:	
- Airport	60
- Train Station	70
b. Activity Environment	
1. Hospital or similar	55
2. School or similar	55
3. Place of worship or similar	55

If the noise level results obtained at the research location exceed the specified quality standards, then handling is required to resolve the problem.

3. RESULTS AND DISCUSSION

3.1.1 Traffic Volume

The results of the traffic flow survey above, along with traffic volume on the road segment used as the research object, Jl. Mahir Mahar, KM. 18.85, from Monday to Thursday,

from 6:00 a.m. to 6:00 p.m. WIB (Western Indonesian Time), yield total traffic volume and peak hour data, as shown in **Figure 1**.

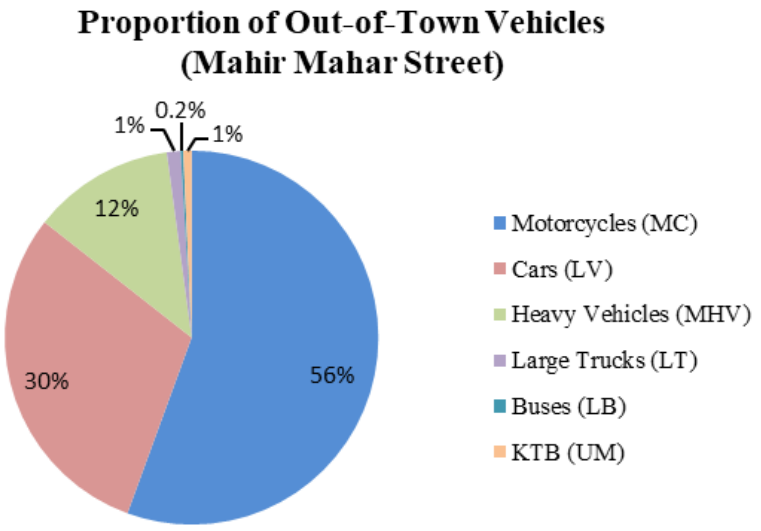

Figure 1. Proportion of Out-of-Town Vehicles

3.1.2 Traffic Volume

The noise intensity obtained from the sound level meter was recorded on a form with readings recorded every 15 minutes and every 10 seconds over a predetermined 12-hour observation period in 4 days rate. The readings were then analyzed using frequency distribution before being entered into the Leq formula. The noise data obtained at the study site can be seen in **Table 2** and **Figure 2.**

Tabel 2. Noise Level Against Distance

TIME SLICE	Measurement Point (m)					
O'clock	**0**	**10**	**20**	**30**	**40**	**50**
06.00 - 07.00	71,19	70,71	68,99	67,49	63,08	59,54
06.15 - 07.15	72,23	70,02	68,63	65,16	62,21	60,35
06.30 - 07.30	70,30	67,53	65,08	64,98	63,99	64,10
06.45 - 07.45	72,59	68,59	67,57	66,37	65,76	63,15
07.00 - 08.00	70,43	67,47	65,37	63,71	62,86	61,57
07.15 - 08.15	69,15	67,35	65,08	64,98	63,99	61,68
07.30 - 08.30	69,84	67,79	65,03	64,98	61,57	59,89
07.45 - 08.45	72,59	68,87	67,62	66,86	65,69	59,65

08.00 - 09.00	68,76	66,36	65,08	63,37	61,28	58,05
08.15 - 09.15	70,84	70,17	69,16	68,53	63,80	59,65
08.30 - 09.30	67,35	67,07	65,97	64,74	61,71	60,76
08.45 - 09.45	69,54	67,36	66,61	64,18	61,11	58,42
09.00 - 10.00	69,92	68,94	67,60	64,74	61,26	58,92
09.15 - 10.15	70,58	68,93	66,70	64,94	61,37	59,65
09.30 - 10.30	72,30	68,79	66,70	66,95	67,86	61,11
09.45 - 10.45	67,60	65,97	61,35	60,72	60,76	61,11
10.00 - 11.00	69,21	67,65	66,36	65,31	66,81	67,50
10.15 - 11.15	68,59	68,26	67,07	66,37	65,15	63,97
10.30 - 11.30	67,86	67,51	62,45	61,11	59,81	58,42
10.45 - 11.45	71,71	66,20	66,03	63,97	65,46	63,97
11.00 - 12.00	70,58	63,27	66,70	62,77	66,61	62,45
11.15 - 12.15	70,37	71,78	67,36	66,61	64,18	64,88
11.30 - 12.30	71,71	69,84	68,75	67,71	64,98	63,97
11.45 - 12.45	70,84	70,17	67,33	65,88	63,80	59,65
12.00 - 13.00	68,00	67,86	66,53	65,88	63,97	62,13
12.15 - 13.15	70,02	68,23	66,58	66,29	61,57	59,65
12.30 - 13.30	66,89	65,56	63,85	63,77	61,46	61,11
12.45 - 13.45	70,24	67,36	65,97	64,74	64,94	61,26
13.00 - 14.00	68,67	66,56	66,33	64,69	63,97	61,14
13.15 - 14.15	70,94	68,57	69,27	67,60	65,76	63,11
13.30 - 14.30	68,95	67,60	65,69	64,00	61,35	61,07
13.45 - 14.45	69,84	69,56	68,70	63,97	61,57	59,63
14.00 - 15.00	70,27	68,27	67,42	64,11	63,83	61,02
14.15 - 15.15	68,87	67,60	67,56	66,87	64,17	64,00
14.30 - 15.30	70,02	68,72	68,21	67,71	67,50	59,68
14.45 - 15.45	71,19	70,71	68,99	67,49	63,08	59,54
15.00 - 16.00	72,30	68,79	66,95	66,70	67,86	61,11
15.15 - 16.15	70,11	69,84	67,79	65,03	64,98	61,57
15.30 - 16.30	68,59	68,57	65,76	66,37	65,15	61,11
15.45 - 16.45	70,17	70,00	70,27	69,16	68,16	67,80
16.00 - 17.00	70,93	68,26	66,95	66,52	66,16	61,71
16.15 - 17.15	66,89	65,56	63,85	63,77	61,46	61,11
16.30 - 17.30	68,59	68,57	65,76	66,37	65,15	61,11
16.45 - 17.45	68,95	67,60	65,69	64,00	61,35	61,07
17.00 - 18.00	70,73	69,27	67,60	66,56	63,83	61,57

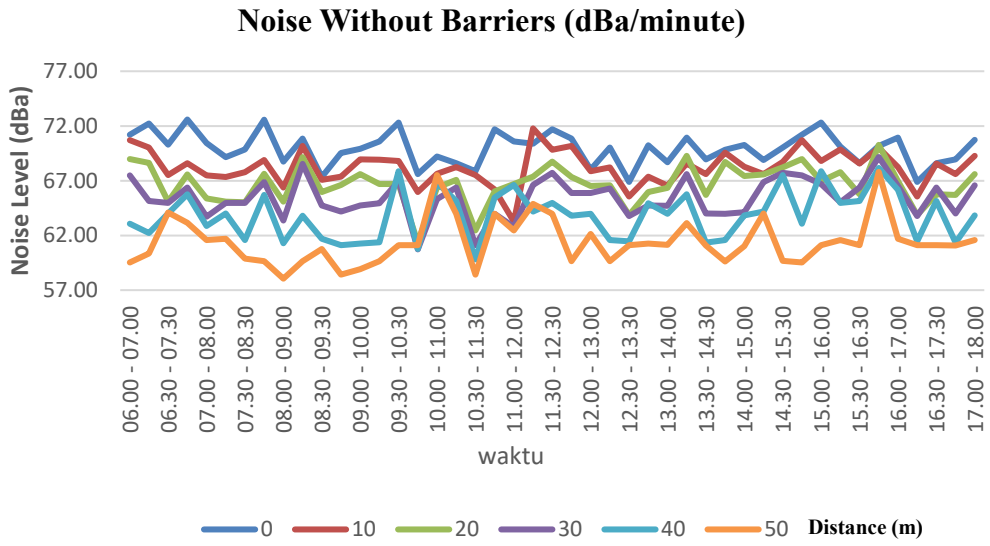

Figure 2. Mahir Mahar Street Noise

The results To represent the level of disturbance experienced on the Mahir Mahar road section, it can be seen in table IV.8, at 06.45 – 07.45 WIB, the highest traffic volume occurred on the road section, namely 347.1 SMP/Hour, and the occurrence of disturbance at point 0 m was 72.59 dBa, point 10 m was 68.59 dBa, point 20 m was 67.57 dBa, point 30 m was 66.37 dBa, point 40 m was 65.76 dBa, point 50 m was 63.15 dBa, the average result of the disturbance calculation exceeded the quality standard of Decree No. 48/MENLH/1 1/1996, namely residential, trade and organizational areas, namely 65-55 dB.

4. CONCLUSION

The influence of distance to the noise source caused by traffic flow shows that noise due to traffic on the outer city road of Mahi Mahar City of Palangka Raya, the Palangka Raya Banjarmasin road section was measured in the area at 06.45 - 07.45 WIB, which is the highest traffic volume that occurs on the road section, namely 347.1 SMP / Hour, and the occurrence of noise at point 0 m is 72.59 dBa, point 10 m is 68.59 dBa, point 20 m is 67.57 dBa, point 30 m is 66.37 dBa, point 40 m is 65.76 dBa, point 50 m is 63.15 dBa, the average result of the noise calculation exceeds the quality standard of Decree No. 48 / MENLH / 1 1 / 1996, namely office, trade and residential areas, namely 65 -55 dB, with the excess of this noise will greatly affect activities of the surrounding community.

According to the Regulation of the Minister of Environment No. 48 of 1996, the noise level exceeds the quality standards for office, trade and residential areas, namely 65-55 dB with an average of the highest traffic volume at the research location. This shows that the noise value at the research location has a value exceeding the established standard.

To mitigate noise levels around Mahir Mahar Palangkaraya's outer city roads, natural and artificial barriers can be used in the area to reduce noise by 17-18 dB. Tree planting can reduce noise by 7-13 dB, effectively minimizing noise levels. Conduct regulatory enforcement, inspection, and noise control (exhausts) on all two-wheeled and four-wheeled vehicles passing through the area that produce noise (noisy exhausts) to minimize the noise experienced. Add adequate signs and supporting facilities at the research location.

REFERENCE

[1] Agus, B., Lanalyawati, & Fredy, D. (1996–1998). Development of the design and construction of noise dampening structures (Research Report). Road Research and Development Center, Bandung, Indonesia.

[2] Ali, M. I., & Abidin, M. R. (2015). The effect of population density on traffic congestion intensity in Rappocini Subdistrict, Makassar. In Proceedings of the National Seminar of the Research Institute of Makassar State University. Makassar, Indonesia.

[3] Ariyadi, I. P., Sukawati, N. K. S. A., Wirasutama, C. P., & Yoga, I. W. G. D. (2023). Influence of traffic volume on road traffic noise levels on Waturenggong Road, Denpasar City, Bali. Jurnal Ilmiah Teknik Unmas, 3(1), 55–56.

[4] Minister of Environment. (1996). Noise level standards (Ministerial Decree No. 48/MENLH/II/1996). Indonesia.

[5] Department of Public Works. (1997). Indonesia Road Capacity Manual. Directorate General of Highways, Jakarta, Indonesia.

[6] Department of Public Works. (2005). Guidelines for mitigation of traffic noise impacts on roads (PEDOMAN). Jakarta, Indonesia.

[7] Lord, H., Gately, W., & Evensen, H. A. (1979). Noise control for engineers. J. C. Webster (Publisher), USA.

[8] Huda, R. M. (2020). Analysis of noise levels due to transportation activity on Raden Panji Suroso – Sunandar Priyo Sudarmo Streets, Malang City, East Java Province. Jurnal Enviro.

[9] Hardiani, D. P., Ruhaidani, E., & Anggarini, E. (2022). Noise level analysis in the area surrounding Pasar Lama I State Elementary School, Banjarmasin. In Proceedings (pp. 636–641).

[10] Halil, A., Yanis, A., & Noer, M. (2015). Effect of traffic noise on academic concentration of junior high school students at SMP Negeri 1 Padang. Jurnal Kesehatan Andalas, 1. Retrieved from http://jurnal.fk.unand.ac.id

[11] Hamzah, H., Agriawan, M. N., & Abubakar, M. Z. (2020). Analysis of noise levels using Arduino Uno based sound level meter in Majene Regency. J HEST: Journal of Health, Education, Economics, Science, and Technology, 1, 25–32.

[12] Khairulnas, Haris, V. T., Winayati, & Civil Engineering Study Program, Faculty of Engineering, Universitas Lancang Kuning. (2018). Analysis of saturation degree and road service level on Sudirman Street, Pekanbaru City. Jurnal Teknik, 12(2), 148–154.

[13] Bruel & Kjaer. (1995). Environmental noise measurement manual book. Denmark.

[14] Minonu, Y., Kouichi, M., & Miyania, T. (1998, May 3–8). Noise reduction effects of low noise pavement and noise barriers. In Proceedings of the Road Engineering Association of Asia and Australasia Conference, Wellington, New Zealand.

[15] Morlok, E. K. (1991). Introduction to transportation engineering and planning. Erlangga, Jakarta.

[16] Malluluang, E. M., Alwi, A., & Rustamaji, R. M. Analysis of road service level (LOS) and traffic characteristics on Gusti Situt Mahmud Street, Pontianak City. (Unpublished master's report). Civil Engineering, Universitas Tanjungpura.

[17] (2007). The influence of traffic flow on noise (case study in several educational zones in Surakarta). Dinamika Teknik Sipil, 7(1), 45–54.

[18] Purba, R. P., Puspasari, N., & Novrianti. (2017). Side friction analysis on Kinibalu Road segment, Palangka Raya (case study: STA 0+250 – STA +450). Media Ilmiah Teknik Sipil, 6(1), 61–71.

[19] Pratangga, A., Ariati, Badaron, S. F., Syarkawi, M. T., & Maricar, M. H. (2022). The impact of motor vehicle activity on noise and air pollution in the Mall Panakukkang shopping center area, Makassar. Jurnal Ilmiah Matematika dan Teknologi Sains, 4(1). Retrieved from https://mail.jurnal.ft.umi.ac.id/index.php/JILMATEKS

[20] Republic of Indonesia. (2009). Law No. 22 of 2009 regarding traffic and road transportation. Jakarta, Indonesia.

[21] Tamin, O. Z. (2000). Transportation planning and modeling (2nd ed.). Bandung, Indonesia.

[22] Timboeleng, J. A., & Elisabeth, L. (2015). Effect of side friction on performance on Panjaitan Road segment (Kelenteng Ban Hing Kiong) using MKJI 1997 method. Jurnal Sipil Statik, 3(8), 571–582.

[23] Vedagama, M. G. V., Ansusanto, J. D., Handoko, L., Setiawan, A. H., & Ardika, I. W. C. (2020, June). Traffic induced noise level analysis in the area of State Elementary School 1 Ubung, Denpasar, Bali. Unpublished conference paper or Proceedings.

[24] Waas, R. H., & Matitaputty, V. (2023). Traffic performance and noise level analysis due to school pick up/drop off activities during the New Normal era (Case study: Dr. Siwabessy Street, Ambon). Publikasi Riset Orientasi Teknik Sipil, 5(1), 13–20.

[25] Wedagama, D. M. P., Suthanaya, I. P. A., & Wirya, M. D. S. P. (2022). Traffic noise analysis inside and outside buildings at the Simpang Lima Sunset Road area. Jurnal Spektran, 10(1), Article 2. https://doi.org/10.24843/spektran.2022.v10.i01.p02

Citation: Ryco Prawira Purba, Muhammad Arsyad. (2025). The Influence of Traffic Volume on Noise Levels on Outside City Roads JL. Mahir Mahar Palangka Raya. International Journal of Civil Engineering and Technology (IJCIET), 16(4), 98-107.

Abstract Link: https://iaeme.com/Home/article_id/IJCIET_16_04_005

Article Link:
https://iaeme.com/MasterAdmin/Journal_uploads/IJCIET/VOLUME_16_ISSUE_4/IJCIET_16_04_005.pdf

✉ **editor@iaeme.com**