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Analysis of the Effect of Movement Due to the Relocation of the Mataram City Mayor's Office on Road Network Performance

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Keywords
Road Segment Performance; Degree of Saturation; Road Network Performance.

ABSTRACT
This research was motivated by the planned relocation of the Mataram City Mayor's Office, which had the potential to alter traffic movement patterns and affect the performance of the surrounding road network. The rapid growth of urban activities has contributed to traffic congestion in the city center; therefore, the relocation of government offices was expected to support more balanced urban development while reducing traffic pressure. However, the relocation could also increase vehicle volumes on certain road segments and change the distribution of community travel patterns. This study aimed to analyze the magnitude of trip attraction and evaluate road network performance before and after the relocation of the mayor's office. The study employed a quantitative approach using a four-step transportation planning model combined with road performance analysis based on the 2023 Indonesian Road Capacity Guidelines (Pedoman Kapasitas Jalan Indonesia / PKJI) and transportation simulation software. The results indicated an increase in traffic volume on several road segments leading to the new office location, which affected the decline in road service performance at certain points. Therefore, appropriate traffic management strategies and infrastructure improvements are required to maintain optimal road network performance.

INTRODUCTION

Mataram City, as the center of government and economic activities in West Nusa Tenggara Province, faces traffic congestion problems due to increasing community mobility (Andina et al., 2019; Hadi et al., 2025; Pratama et al., 2026; Sutarna et al., 2026). Rapid urbanization and population growth have increased transportation demand, resulting in declining road network performance, particularly during peak hours (Chen et al., 2024; Din et al., 2023; Downs, 2000; Holloway, 2025; Koenig, 2026; C. Liu et al., 2024; Shen et al., 2024; Wang et al., 2025). High activity levels in the city center have contributed to reduced road network performance during periods of peak traffic. Congestion in urban areas is a common challenge in developing cities, where the growth of vehicle ownership often exceeds the capacity of infrastructure development (Tamin, 2000; Sulistyorini et al., 2021). To address this issue, the Mataram City Government planned to relocate the Mayor's Office to the southern

region as an effort to promote more balanced development and reduce traffic pressure in the city center (Pratama et al., 2026; Sumiati, 2024; Syaban, 2026).

However, this policy had the potential to alter traffic movement patterns, including increases in vehicle volumes and changes in travel distribution across the road network (Chang et al., 2025; Fujiu et al., 2024; Li et al., 2024; Q. Liu et al., 2024; Salvo et al., 2025; Zargiannaki et al., 2024). Therefore, an analysis was required to evaluate the impact of the relocation on road network performance.

The urgency of this research was supported by the ongoing planning process of the Mataram City Government, in which decisions regarding traffic management and infrastructure investment needed to be based on comprehensive analysis. Without adequate impact assessment, the relocation could potentially create new congestion points, reduce accessibility, and decrease the efficiency of the road network (Tamin, 2000). The novelty of this research lies in its integrated approach, which combines transportation planning models with road performance analysis based on the 2023 Indonesian Road Capacity Guidelines (Pedoman Kapasitas Jalan Indonesia / PKJI) through transportation software simulation to provide comprehensive insights for policymakers.

This study employed a quantitative approach using a four-step transportation planning model and road performance analysis based on the 2023 Indonesian Road Capacity Guidelines (Pedoman Kapasitas Jalan Indonesia / PKJI) to assess changes in road network performance before and after the relocation. The results of this study are expected to serve as a basis for formulating traffic management strategies and developing sustainable transportation infrastructure.

METHOD

This study employed a quantitative approach to analyze the impact of the Mayor's Office relocation on road network performance in Mataram City. The data used consisted of primary and secondary data. Primary data were obtained through field surveys, including traffic volume, vehicle speed, travel time, and road and intersection geometric conditions. Secondary data included population data, road network data, land use information, and regional planning documents obtained from relevant agencies.

The analysis was conducted using the four-stage transportation planning model (four-step model), which included trip generation, trip distribution, mode choice, and route assignment. Transportation software was used to model traffic movement patterns at both macro and micro levels. Furthermore, road network performance was evaluated based on the 2023 Indonesian Road Capacity Guidelines (Pedoman Kapasitas Jalan Indonesia / PKJI), using key parameters such as road capacity, degree of saturation, volume-to-capacity (V/C) ratio, and level of service (LOS).

The analysis results were used to compare road network conditions before and after the relocation of the Mayor's Office and to formulate recommendations for traffic management strategies and more effective transportation infrastructure development.

RESULTS AND DISCUSSION

The analysis results show that the existing condition of the road network in Mataram City is still functioning with varying levels of service, ranging from stable conditions to near-

saturation on several segments and intersections, especially during peak hours. High traffic volume in the city center area causes an increase in the degree of saturation and a decrease in vehicle speed, thus impacting travel efficiency.

After modeling the conditions following the relocation of the Mayor's Office, a significant change in traffic movement patterns occurred. Several road segments leading to the new office location experienced an increase in vehicle volume, which impacted the rise of the volume-to-capacity ratio and the decline of the road level of service. Additionally, several intersections that were previously in stable conditions experienced increased delays due to the added traffic flow.

The simulation results also show a shift in travel distribution from the city center toward the southern region, indicating a redistribution of the road network burden. This condition demands adjustments to infrastructure and traffic management, especially on segments and intersections experiencing a significant increase in load.

Based on these results, handling strategies such as traffic regulation, increasing road capacity, and optimizing intersection performance are required to maintain an optimal road network level of service. Furthermore, public transportation development also becomes an important solution to reduce dependence on private vehicles and support a sustainable transportation system.

Existing Road Segment Performance

The following is an analysis of road performance consisting of the Degree of Saturation (DS), Passenger Car Travel Speed (VMP), and existing Road Segment Density for the year 2026.

Table 1. Existing Road Segment Performance

No	Name	Type	Volume (pcu/hour)	Capacity	DJ	Velocity(km/hour)	Density (pcu/hour)
1	Stuttgart	3/1 TT	2542,50	4096	0,62	42	60,5
2	E-Mail	4/2 T	4052,80	5630	0,72	35	115,8
3	Stuttgart	3/1 TT	3413,10	3969	0,86	33	103,4
4	Erlangga Resort & Spa	4/2 T	3879,75	5349	0,73	36	107,8
5	Copyright © 2019 Bung Karno. All Rights Reserved.	4/2 T	3063,85	5011	0,61	39	78,6
6	Sriwijaya Resort & Spa	4/2 T	4128,30	5405	0,76	35	118,0
7	Copyright © 2019 Copyright © 2019 Copyright	4/2 T	2458,25	6120	0,40	45	54,6
8	Copyright © 2019 Copyright © 2019 Copyright © 2019	4/2 T	3369,00	6120	0,55	43	78,3
9	Holiday rentals in Gajah Mada	4/2 T	4428,00	5122	0,86	32	138,4
10	Copyright © 2019 Copyright	2/1 TT	1521,05	2759	0,55	39	39,0

	© 2019 Copyright □						
11	Jl. W.R. Supratman	2/2 TT	1764,15	2444	0,72	33	53,5
12	Jl. A. Rahman Hakim	2/2 TT	1583,20	2394	0,66	34	46,6
13	E-Mail Address	4/2 T	3711,45	5758	0,64	37	100,3
14	Jl. Sultan Kaharudin	2/2 TT	1587,95	2083	0,76	36	44,1
15	Copyright © 2019 Bangkol Hotels. All Rights Reserved.	2/2 TT	968,90	1369	0,71	37	26,2
16	Copyright © 2019 Mapak Hotels. All Rights Reserved.	2/2 TT	986,05	1298	0,76	36	27,4
17	Jl. By pass Bill	8/2 T	3866,95	12240	0,32	55	70,3

Source : Analysis

Based on the results of the traffic volume analysis, the road segments with the highest volumes are found on Jl. Gajah Mada at 4,428.00 pcu/hour, followed by Jl. Sriwijaya at 4,128.30 pcu/hour and Jl. Majapahit at 4,052.80 pcu/hour. These high traffic volumes affect the value of the degree of saturation (DS), particularly on Jl. Gajah Mada and Jl. Pejanggik, which each have a DS value of 0.86. A DS value approaching 1 indicates that the traffic flow conditions on these segments are nearing the maximum road capacity, thus potentially causing congestion, especially during peak hours.

The segments with the highest density levels were recorded on Jl. Gajah Mada at 138.4 pcu/km, followed by Jl. Sriwijaya at 118.0 pcu/km and Jl. Majapahit at 115.8 pcu/km. This high density is inversely proportional to vehicle speed, where the speeds on these segments are relatively low, at 32 km/h, 35 km/h, and 35 km/h, respectively. This indicates that an increase in volume and density directly impacts the decrease in average vehicle speed, in accordance with the basic characteristics of traffic flow.

Conversely, the best traffic performance is observed on Jl. By Pass BIL (type 8/2 D), which has a very large capacity of 12,240 pcu/hour and a low DS value of 0.32. This segment recorded the highest speed of 55 km/h with a relatively low density of 70.3 pcu/km, showing very smooth traffic flow conditions. Similar conditions are also seen on Jl. TGH Rais (DS = 0.40; speed 45 km/h) and Jl. Dr. Soedjono (DS = 0.55; speed 43 km/h), indicating that the level of service is still in the good to moderate category.

For road segment types 2/2 UD and 2/1 UD, such as Jl. Catur Warga, Jl. W.R. Supratman, Jl. A. Rahman Hakim, Jl. Sultan Kaharudin, Jl. TGH Bangkol, and Jl. Mapak–Perempuan, they generally have smaller capacities compared to types 4/2 D or 8/2 D. Some of these show fairly high DS values, such as Jl. Sultan Kaharudin and Jl. Mapak–Perempuan with DS values of 0.76 each, as well as Jl. TGH Bangkol (0.71) and Jl. W.R. Supratman (0.72), which indicate fairly heavy traffic conditions with speeds ranging between 33–37 km/h.

Overall, it can be concluded that road segments with DS values above 0.80, namely Jl. Gajah Mada and Jl. Pejanggik, are in near-saturated conditions and require attention in traffic

control and management. Meanwhile, segments with a DS below 0.50, such as Jl. TGH Rais and Jl. By Pass BIL, show relatively stable and smooth traffic flow conditions.

Analysis of Condition and Roundabout Performance

In this study, there is 1 roundabout analyzed to determine the magnitude of the influence of the Mayor's Office relocation, with the following intersection performance results:

Table 2. Roundabout Capacity

Approach	QLENMAX (Max Queue Length) Meters	VEHDELAY(ALL) (delay)	THE(ALL)
Copyright © 2019 Dr. Soedjono. All Rights Reserved.	50,1	33,5	LOS_D
Copyright © 2019 Copyright © 2019	63,1	14,3	LOS_B
Jl By Pass Bill	27,7	7,4	LOS_A
Elephant Mada Resort & Spa	33,1	8,9	LOS_A
Copyright © 2019 Copyright © 2019 Copyright © 2	31,4	11,1	LOS_B
Roundabout	63,1	14,1	LOS_B

Source: Analysis

Based on the results of the roundabout performance analysis using modeling simulations, it is observed that the operational conditions of the roundabout intersection vary across approaches and show an imbalance in traffic flow distribution.

Overall, the roundabout performance is at level of service LOS B with an average delay value of 14.1 seconds/pcu. This condition indicates that the traffic flow is still classified as stable with relatively low resistance, allowing vehicle movement to remain fairly smooth.

However, there are differences in performance at each intersection approach. The Jl. Dr. Soedjono approach has the largest delay value, which is 33.5 seconds/pcu, placing it in the LOS D category. This indicates that a significant decline in performance has occurred at that approach, marked by increased resistance and instability of traffic flow.

Meanwhile, other approaches such as Jl. TM Rais, Jl. By Pass Bill, Jl. Gajah Mada, and Jl. Mapak Parampuan are still in good service conditions, specifically at LOS A and LOS B. This condition shows that most of the intersection approaches are still able to serve the traffic flow well, with relatively low delays and stable vehicle movement.

Model Zone Partitioning

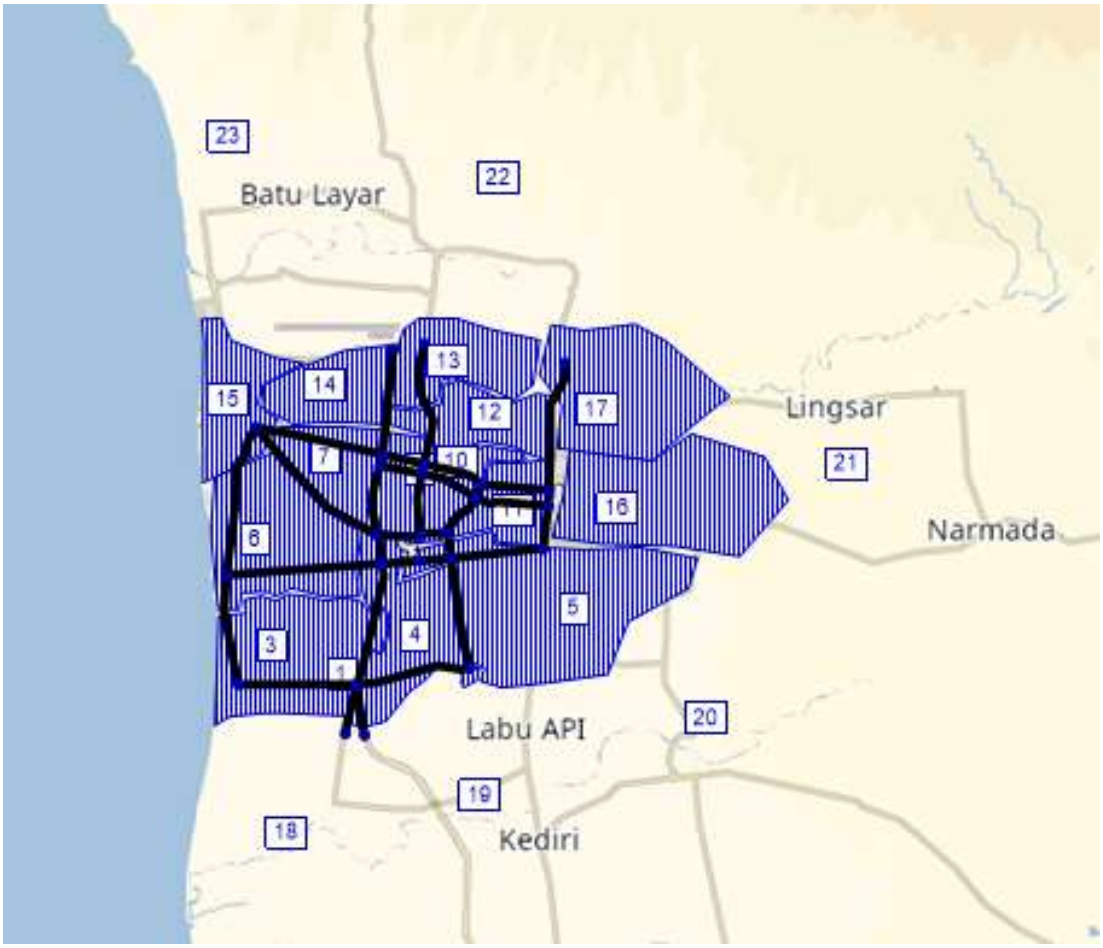
To facilitate the process of estimating trip generation and attraction, trip distribution, transport mode choice, and traffic assignment on the road network, a partitioning of transportation analysis zones is required. The zone partitioning is carried out based on administrative boundaries and geographical characteristics of the sub-district (kelurahan) areas which function as the source (production) and destination (attraction) of trip movements. The zone partitioning within the study area is as follows:

Table 3. Zone Partitioning

No	Zone	Area
Internal Zone		
1	Zone 1	Mayor's Office
2	Zone 2	Old Mayor's Office
3	Zone 3	Ex. New Jempong

4	Zone 4	West Pagutan District, Pagutan District, Pagesangan District, West Pageangan District, Pageangan West District, Pageangan District,
5	Zone 5	East Pagutan District, Abian Badan Baru District, Dasan Cermen District, Babakan District, Turida District, Pagesangan District, East District.
6	Zone 6	Tanjung Karang District, Karang Pule, Kekalik Jaya, Tanjung Karang Permai District
7	Zone 7	Kel. Gomong, Kel. Dasan Agung Baru, Kel. Dasan Agung
8	Zone 8	Punia District, East Mataram District
9	Zone 9	Kel. Mataram Barat
10	Zone 10	Ex. Pejanggik
11	Zone 11	Kel. Cilinaya, Kel. Sapta Marga, Kel. Cakra Barat
12	Zone 12	West Monjok District, East Monjok District, Monjok District
13	Zone 13	Karang Baru District, Rembiga District
14	Zone 14	Pejeruk District, Kebon Sari District, Pejarakan Karya District
15	Zone 15	Bintaro District, South Ampenan District, Banjar District, Central Ampenan District, Dayen Peken District, North Ampenan District
16	Zone 16	South Cakranegara District, Mayura District, East Cakranegara District, Bertais District
17	Zone 17	North Cakranegara District, Selagalas District, Karang Taliwang District, Sayang-Sayang District
External Zone		
18	Zone 18	Squirrel, Squirrel, Squirrel, Squirre
19	Zone 19	Eggplant Field, Gerung
20	Zone 20	Kediri, Praya, Workshop, Bagek Polak
21	Zone 21	Narmada
22	Zone 22	Gunung Sari
23	Zone 23	Batulayar, Senggigi

Source : Analysis



Ket : - Model Zone

- Road Sections

Figure 1. Zone Model Partitioning

Source : Analysis

Volume Model

The following traffic assignment volumes for the existing condition were obtained through a modeling process using transportation software, as shown in the following table:

Table 4. Volume Model

Name	Type	Capacity	Volume (pcu/hour)	DJ	Velocity (km/hour)	Density (pcu/km)
Stuttgart	3/1 TT	4096	2531	0,62	42	60,3
E-Mail	4/2 T	5630	3557	0,63	35	101,6
Stuttgart	3/1 TT	3969	3416	0,86	33	103,5
Erlangga Resort & Spa	4/2 T	5349	3886	0,73	36	107,9
Copyright © 2019 Bung Karno. All Rights Reserved.	4/2 T	5011	3080	0,61	39	79,0
Sriwijaya Resort & Spa	4/2 T	5405	4120	0,76	35	117,7
Copyright © 2019 Copyright © 2019 Copyright □	4/2 T	6120	2460	0,40	45	54,7

Copyright © 2019 Copyright © 2019 Copyright © 2019	4/2 T	6120	3366	0,55	43	78,3
Holiday rentals in Gajah Mada	4/2 T	5122	4421	0,86	32	138,2
Copyright © 2019 Copyright © 2019 Copyright □	2/1 TT	2759	1528	0,55	39	39,2
Jl. W.R. Supratman	2/2 TT	2444	1764	0,72	33	53,5
Jl. A. Rahman Hakim	2/2 TT	2394	1591	0,66	34	46,8
E-Mail Address	4/2 T	5758	3700	0,64	37	100,0
Jl. Sultan Kaharudin	2/2 TT	2083	1595	0,77	36	44,3
Copyright © 2019 Bangkol Hotels. All Rights Reserved.	2/2 TT	1369	829	0,61	37	22,4
Copyright © 2019 Mapak Hotels. All Rights Reserved.	2/2 TT	1298	990	0,76	36	27,5
Jl. By pass Bill	8/2 T	12240	3865	0,32	55	70,3

Source : Analysis

Model Validation

Model validation was conducted to test the level of consistency between the traffic volumes resulting from the modeling and the volumes from field surveys on the reviewed road segments. The method used in this test is the Chi-Square (χ^2) test, which aims to determine whether there are significant differences between the observation data and the model results. The results of the chi-square test can be seen in the table below:

Table 5. Chi-square Test

Validation				
No	Road Link	Volume (pcu/hr)	Volume Model	Chi Square
1	Stuttgart	2542	2531	0,05
2	E-Mail	3555	3557	0,00
3	Stuttgart	3413	3416	0,00
4	Erlangga Resort & Spa	3880	3886	0,01
5	Copyright © 2019 Bung Karno. All Rights Reserved.	3064	3080	0,08
6	Sriwijaya Resort & Spa	4128	4120	0,02
7	Copyright © 2019 Copyright © 2019 Copyright □	2458	2460	0,00
8	Copyright © 2019 Copyright © 2019 Copyright © 2019	3369	3366	0,00
9	Holiday rentals in Gajah Mada	4428	4421	0,01
10	Copyright © 2019 Copyright © 2019 Copyright □	1521	1528	0,03
11	Jl. W.R. Supratman	1750	1764	0,11
12	Jl. A. Rahman Hakim	1583	1591	0,04
13	E-Mail Address	3711	3700	0,03
14	Jl. Sultan Kaharudin	1587	1595	0,04

15	Copyright © 2019 Bangkol Hotels. All Rights Reserved.	829	829	0,00
16	Copyright © 2019 Mapak Hotels. All Rights Reserved.	986	990	0,02
17	Jl. By pass Bill	3866	3865	0,00
			Quantity	**0,45**
	Decision	**Ho Accepted**		
			Chi table	**7,962**

Source : Analysis

Based on the Chi-Square test results in the validation table, a calculated value (total) of 0.45 was obtained, while the table value is 7.962 at the significance level used. Since the calculated value (0.45) is smaller than the table (7.962), H0 is accepted.

This result indicates that there is no significant difference between the modeled traffic volume and the observed (existing) traffic volume. Thus, the model used is capable of representing field conditions with a good level of accuracy. Therefore, the developed traffic movement model can be declared valid and feasible for further analysis, specifically in evaluating road network performance and analyzing the impact of changes in movement patterns due to the development or shifting of activity centers.

Existing Network Performance

The existing road network performance can be analyzed through indicators of travel time and travel distance as the main parameters in assessing movement efficiency. Based on the analysis results, a total travel distance on the road network of 77,819 km was obtained, with a total travel time reaching 1,962 hours and 58 minutes. This value represents the accumulation of all vehicle movements within the studied network system.

To determine the level of network efficiency, the average travel speed was calculated using the relationship between distance and travel time, resulting in an average travel speed of approximately 39.64 km/h.

Referring to the road level of service criteria, an average speed of 39.64 km/h generally falls into the Level of Service C category. This condition indicates that traffic flow is still stable, but interaction between vehicles has begun to influence travel speeds. Drivers have limitations in choosing speed and maneuvers, and have started to experience delays during travel.

Performance Analysis of Road Segments After the Operation of the Mataram Mayor's Office

In the initial stage of the Mayor's Office relocation, a total of 414 employees were moved from several Regional Apparatus Organizations (OPD) at the old mayor's office located on Jalan Pejanggik to the new mayor's office on Jalan Gajah Mada. This relocation has the potential to cause changes in traffic movement patterns, particularly during peak hours.

Based on the survey results of employee travel characteristics, the proportion of transportation mode usage was obtained as 27% using four-wheeled vehicles (cars) and 73% using two-wheeled vehicles (motorcycles). Subsequently, the number of vehicles was converted into passenger car units (pcu) to standardize the analysis unit, resulting in a total volume of 211 pcu/hour from a total of 414 vehicles/hour.

The converted traffic volume was then used as input in the transportation modeling process. Traffic assignment to the road network was performed using PTV VISUM software with the User Equilibrium principle approach, where every road user is assumed to choose a route with minimum travel time. To achieve this condition, the equilibrium assignment method was used, which is the process of distributing trips into the road network until an equilibrium state is reached, where no road user can reduce their travel time by changing routes. The assignment results are as follows:

Table 6. Volume changes after the relocation of the mayor's office

No	Road Link	Existing Volume (pcu/hr)	Volume After Redistribution (pcu/hr)	Difference	Percentage Change
1	Stuttgart	2531	2498	-33,00	-1%
2	E-Mail	3557	3571	14,00	0%
3	Stuttgart	3416	3314	-102,00	-3%
4	Erlangga Resort & Spa	3886	3877	-9,00	0%
5	Copyright © 2019 Bung Karno. All Rights Reserved.	3080	3143	63,00	2%
6	Sriwijaya Resort & Spa	4120	4127	7,00	0%
7	Copyright © 2019 Copyright © 2019 Copyright □	2460	2533	73,00	3%
8	Copyright © 2019 Copyright © 2019 Copyright © 2019	3366	3409	43,00	1%
9	Holiday rentals in Gajah Mada	4421	4465	44,00	1%
10	Copyright © 2019 Copyright © 2019 Copyright □	1528	1493	-35,00	-2%
11	Jl. W.R. Supratman	1764	1701	-63,00	-4%
12	Jl. A. Rahman Hakim	1591	1573	-18,00	-1%
13	E-Mail Address	3700	3694	-6,00	0%
14	Jl. Sultan Kaharudin	1595	1577	-18,00	-1%
15	Copyright © 2019 Bangkol Hotels. All Rights Reserved.	829	826	-3,00	0%
16	Copyright © 2019 Mapak Hotels. All Rights Reserved.	990	990	0,00	0%
17	Jl. By pass Bill	3865	3865	0,00	0%

Source : Analysis

Based on the comparison of traffic volumes between the existing condition and the condition after the relocation of the Mataram City Mayor's Office, it is observed that, in general, relatively small changes in traffic volume occurred on most road segments. This indicates that the relocation of the government center did not cause a significant change in total movement, but rather a shift in the distribution of traffic flow across the road network.

Several road segments experienced notable increases in traffic volume, such as Jalan TGH Rais (+73 vehicles) with an addition of 3% from the condition before the relocation, Jalan Bung Karno (+63 vehicles) which saw an increase of 2%, Jalan Gajah Mada (+44 vehicles), and Jalan Dr. Soedjono (+43 vehicles). These increases indicate that these segments serve as alternative corridors or primary links to the new mayor's office location, thus experiencing additional traffic load due to changes in community travel patterns.

Conversely, there were also road segments that experienced a decrease in traffic volume, with the largest decrease occurring on Jalan Pejanggik (-102 vehicles) which saw a

reduction of 3% from the initial condition, followed by Jalan W.R. Supratman (-63 vehicles), Jalan Catur Warga (-35 vehicles), and Jalan Langko (-33 vehicles). This decrease shows a diversion of traffic flow to other more efficient segments, resulting in a load reduction on several segments that previously served as main routes.

Overall, the pattern of traffic volume changes indicates that the relocation of the Mataram City Mayor's Office has more of an impact on the redistribution of traffic movement locally.

Figure 2. Traffic Assignment Results After the Relocation of the Mayor's Office
Source : Analysis

Figure 3. Desire Line After the Relocation of the Mataram City Mayor's Office
Source : Analysis

Road Segment Performance After Relocation

The following is the performance of the road segments after the relocation of the Mataram City Mayor's Office:

Table 7. Comparison of Road Segment Performance After Relocation

No	Name	Type	Capacity	Before Redistribution				After Redistribution			
				Volume (pcu/hour)	DJ	Velocity (km/hour)	Density (pcu/km)	Volume (pcu/hour)	DJ	Velocity (km/hour)	Density (pcu/km)
1	Stuttgart	3/1 TT	4096	2531	0,62	42	60,3	2498	0,61	42	59
2	E-Mail	4/2 T	5630	3557	0,63	35	101,6	3571	0,63	35	102
3	Stuttgart	3/1 TT	3969	3416	0,86	33	103,5	3314	0,83	33	100
4	Erlangga Resort & Spa	4/2 T	5349	3886	0,73	36	107,9	3877	0,72	36	108
5	Copyright © 2019 Bung Karno. All Rights Reserved.	4/2 T	5011	3080	0,61	39	79,0	3143	0,63	39	81
6	Sriwijaya Resort & Spa	4/2 T	5405	4120	0,76	35	117,7	4127	0,76	35	118
7	Copyright © 2019 Copyright © 2019 Copyright □	4/2 T	6120	2460	0,40	45	54,7	2533	0,41	45	56
8	Copyright © 2019 Copyright © 2019 Copyright © 2019	4/2 T	6120	3366	0,55	43	78,3	3409	0,56	43	79
9	Holiday rentals in Gajah Mada	4/2 T	5122	4421	0,86	32	138,2	4465	0,87	32	140
10	Copyright © 2019 Copyright © 2019 Copyright □	2/1 TT	2759	1528	0,55	39	39,2	1493	0,54	39	38
11	Jl. W.R. Supratman	2/2 TT	2444	1764	0,72	33	53,5	1701	0,70	33	52
12	Jl. A. Rahman Hakim	2/2 TT	2394	1591	0,66	34	46,8	1573	0,66	34	46
13	E-Mail Address	4/2 T	5758	3700	0,64	37	100,0	3694	0,64	37	100
14	Jl. Sultan Kaharudin	2/2 TT	2083	1595	0,77	36	44,3	1577	0,76	36	44
15	Copyright © 2019 Bangkol Hotels. All Rights Reserved.	2/2 TT	1369	829	0,61	37	22,4	826	0,60	37	22
16	Copyright © 2019 Mapak	2/2 TT	1298	990	0,76	36	27,5	990	0,76	36	28

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17	Jl. By pass Bill	8/2 T	12240	3865	0,32	55	70,3	3865	0,32	55	70

Source : Analysis

Berdasarkan hasil pemodelan dan perhitungan kinerja lalu lintas pada kondisi setelah pemindahan Kantor Walikota, diperoleh parameter The main parameters include traffic volume, degree of saturation (DS), speed, and density on each road segment. In general, the analysis results indicate that the relocation of the government activity center does not cause significant changes to the overall road network performance, but triggers a redistribution of traffic movement on certain segments.

In terms of traffic volume, there is a visible trend in flow distribution changes. Several segments experienced a decrease in volume, such as Jalan Majapahit, which decreased from 4,052.80 pcu/hour to 3,571 pcu/hour, and Jalan Pejanggik from 3,413.10 pcu/hour to 3,314 pcu/hour. Conversely, volume increases occurred on Jalan Gajah Mada from 4,428.00 pcu/hour to 4,565 pcu/hour, Jalan Bung Karno from 3,063.85 pcu/hour to 3,143 pcu/hour, and Jalan TGH Rais from 2,458.25 pcu/hour to 2,533 pcu/hour. This condition shows that the relocation of the Mayor's Office has altered the patterns of trip attraction and generation, leading to a diversion of flow on specific segments.

Viewed from the degree of saturation (DS), most road segments remain in the moderate category (0.60–0.80), indicating that road capacity is still able to serve traffic flow reasonably well. However, there are several segments with high DS values that require attention, namely Jalan Gajah Mada with a DS of 0.87, which experienced an increase from the previous condition (0.86), and Jalan Pejanggik with a DS of 0.83. These DS values indicate that both segments are nearing saturated conditions, thus potentially experiencing performance degradation if there is an increase in traffic volume in the future.

From the speed aspect, there were no significant changes between the conditions before and after the relocation. The average speed on each segment tends to remain constant, such as Jalan Gajah Mada at 32 km/h and Jalan By Pass BIL at 55 km/h. This indicates that despite the redistribution of traffic volume, general road operational conditions remain stable and have not experienced significant disruption.

Meanwhile, traffic density shows a pattern consistent with changes in volume and the degree of saturation. An increase in density occurred on Jalan Gajah Mada from 138.4 pcu/km to 140 pcu/km, and on Jalan Bung Karno from 78.6 pcu/km to 81 pcu/km. On the other hand, a decrease in density occurred on Jalan Majapahit from 115.8 pcu/km to 102 pcu/km. This reinforces the indication that a shift in traffic load between segments occurred due to the change in the mayor's office location.

Thus, it can be concluded that the performance of the road network after the relocation remains in a relatively stable condition; however, special attention is required for segments with high degree of saturation values through traffic management efforts, such as intersection regulation, flow engineering, and access control, to keep the road level of service optimal.

Roundabout Performance

Table 8. Roundabout Performance After the Operation of the Mayor's Office

Approach	Before		After		
	VEHDELAY (ALL) (Delay)	THE (ALL)	VEHDELAY (ALL) (Delay)	THE (ALL)	Percentage
Copyright © 2019 Dr. Soedjono. All Rights Reserved.	33,5	LOS_D	30,7	LOS_D	8%
Copyright © 2019 Copyright © 2019	14,3	LOS_B	21,4	LOS_C	-50%
Jl By Pass Bill	7,4	LOS_A	17,8	LOS_C	-141%
Elephant Mada Resort & Spa	8,9	LOS_A	24,0	LOS_C	-170%
Copyright © 2019 Copyright © 2019 Copyright © 2	11,1	LOS_B	11,6	LOS_B	-5%
Roundabout	14,1	LOS_B	23,6	LOS_C	-68%

Source : Analysis

Overall, the roundabout performance is at level of service LOS C with an average delay value of 23.6 seconds/pcu. This condition indicates that traffic flow is beginning to experience resistance, with vehicle movements no longer being fully stable, especially during certain periods.

Viewed from each intersection approach, Jl. Dr. Soedjono again shows the lowest performance with the largest delay value, which is 30.7 seconds/pcu, placing it in the LOS D category. This indicates that heavy traffic conditions with a fairly high level of resistance have occurred at that approach.

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In addition, several other approaches such as Jl. TM Rais, Jl. By Pass Bill, and Jl. Gajah Mada are at level of service LOS C, with delays of 21.4 seconds/pcu, 17.8 seconds/pcu, and 24.0 seconds/pcu, respectively. This condition shows that the traffic flow at these approaches is starting to experience a decline in performance, marked by a significant increase in delays and queue lengths.

Meanwhile, Jl. Mapak Parampuan still shows relatively good performance with LOS B and a delay of 11.6 seconds/pcu, which means the traffic flow is still stable with low resistance.

Thus, although the roundabout performance is generally in a moderate condition (LOS C), there is a tendency toward declining performance at most intersection approaches. Therefore, handling efforts are required, especially at the Jl. Dr. Soedjono approach as well as approaches with LOS C, to improve traffic performance and reduce the occurring delays.

Network Performance After Relocation

A comparison of the road network performance after the relocation of the Mayor's Office. In the existing condition, a total travel distance of 77,819 km was obtained with a travel time of 1,962 hours and 58 minutes. Meanwhile, after the relocation of the Mayor's Office, the total travel distance increased to 78,089 km and the travel time became 1,972 hours and 4 minutes.

The increase in travel distance by 270 km indicates a change in movement patterns, where road users tend to take longer routes due to the shift in the activity center. This indicates that the new office location is not yet fully and optimally integrated into the existing road network structure. In terms of travel time, there was an increase of approximately 9 hours and 6 minutes, signaling an additional travel burden within the network system. This increase in travel time is influenced not only by the added travel distance but also by the potential for increased traffic density on specific segments that serve as primary access to the new office location.

When reviewed from the average travel speed, the existing condition yielded a value of approximately 39.64 km/h, while after the relocation, it slightly decreased to approximately 39.60 km/h. Although the decrease is relatively small, it still shows a trend toward declining network performance.

Referring to the road level of service criteria, both conditions remain in the LOS C category, meaning that traffic flow is still stable but interactions between vehicles have begun to affect speed and driving comfort. However, the condition after the relocation shows a tendency to approach the boundary of LOS D if no intervention is implemented.

Overall, the relocation of the Mayor's Office has an impact on the road network performance, as shown by the increase in travel distance and travel time, travel speed.

Management Recommendations

To maintain and improve the performance of the affected roundabout, several traffic management and engineering interventions are necessary, with the following results:

a. Roundabout

To minimize the potential decline in roundabout performance due to the increase in traffic volume after the operation of the Mataram Mayor's Office—which potentially burdens intersection performance—mitigation steps in the form of traffic engineering are required. One of the efforts implemented is changing the movement system at the Jalan Mapak – Perampuan intersection approach from two-way to one-way toward the roundabout entry.

As for vehicle movement from Mataram City toward the Perampuan area, it is diverted through Jalan By Pass BIL via the first underpass. The implementation of this scheme aims to reduce traffic conflicts and improve the smoothness of vehicle flow in the roundabout area.

Based on the implementation of these engineering measures, the roundabout performance is obtained as follows:

Table 9. Roundabout Management Recommendations

Approach	Before		After		Do Something	
	VEHDELAY (ALL) (delay)	THE (ALL)	VEHDELAY (ALL) (delay)	THE (ALL)	VEHDELAY (ALL) (delay)	THE(ALL)
Copyright © 2019 Dr. Soedjono.	33,5	LOS_D	30,7	LOS_D	9,0	LOS_A

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Copyright © 2019 Copyright © 2019	14,3	LOS_B	21,4	LOS_C	15,2	LOS_C
Jl By Pass Bill	7,4	LOS_A	17,8	LOS_C	7,3	LOS_A
Elephant Mada Resort & Spa	8,9	LOS_A	24,0	LOS_C	2,6	LOS_A
Copyright © 2019 Copyright © 2019 Copyright © 2	11,1	LOS_B	11,6	LOS_B	3,6	LOS_A
Roundabout	14,1	LOS_B	23,6	LOS_C	8,8	LOS_A

Source : Analysis

Overall, the roundabout performance also shows good results with a queue length of 16.0 meters and a delay of 8.8 seconds, which remains in the LOS A category. This confirms that the implementation of a one-way system on the Jalan Mapak – Perampuan intersection approach is effective in reducing traffic conflicts and improving the smoothness of vehicle movement in the roundabout area.

CONCLUSIONS

In general, the relocation of the Mataram City Mayor's Office resulted in a shift in traffic movement patterns, as indicated by changes in traffic volumes on the analyzed road segments. Based on the traffic assignment results, the volume changes were relatively small, ranging from −4% to +3%. Several road segments experienced decreases in traffic volume, including Jalan Pejanggik (−102 pcu/hour or −3%), Jalan W.R. Supratman (−63 pcu/hour or −4%), and Jalan Catur Warga (−35 pcu/hour or −2%), indicating reduced traffic activity around the former mayor's office area. Conversely, several road segments experienced increases in traffic volume, including Jalan TGH Rais (+73 pcu/hour or +3%), Jalan Bung Karno (+63 pcu/hour or +2%), Jalan Dr. Soedjono (+43 pcu/hour or +1%), and Jalan Gajah Mada (+44 pcu/hour or +1%), indicating a redistribution of traffic flow toward the new mayor's office location. Therefore, the relocation of the Mayor's Office not only reduced traffic pressure around the former location but also increased traffic loads on road segments serving as primary access routes to the new office, resulting in a new traffic distribution pattern within the Mataram City road network.

The impact of the Mayor's Office relocation varied across road segments, with some experiencing decreases in traffic volume and others experiencing increases. Regarding intersection performance, changes before and after the relocation were relatively minor, except at the roundabout, where the level of service (LOS) changed from LOS B to LOS C. At the overall road network level, the relocation affected movement efficiency. Under existing conditions, the total network travel distance was recorded at 77,819 km, with a total travel time of 1,962 hours and 58 minutes. After the relocation, these values increased to 78,089 km and 1,972 hours and 4 minutes, respectively. The increase of 270 km in travel distance and

additional travel time indicated that road users tended to travel through longer routes and required more time to complete their trips.

Several control measures were proposed to maintain road network performance following the relocation of the Mataram City Mayor's Office. First, traffic management optimization was required on critical road segments, particularly those with high degrees of saturation (DS). One proposed measure was improving the performance of Jalan Gajah Mada by reducing side friction caused by U-turning vehicles, including limiting the number of U-turn locations and improving U-turn geometry through the provision of lay-bys. Second, traffic engineering improvements were recommended at the roundabout by implementing a one-way traffic system on the Jalan Mapak–Perampuan intersection approach. Third, the development of an integrated public transportation system connecting educational facilities, government offices, residential areas, and commercial centers was recommended to reduce dependence on private vehicles.

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