

Parking Planning In Muradi Commercial Area Of Sungai Penuh City As An Effort To Improve Traffic Performance

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ABSTRACT

The Muradi Commercial Area is one of the economic activity centers in Sungai Banyak City, Jambi Province, which is traversed by a national road connecting Sungai Banyak City and Kerinci Regency, while also serving as one of the city center areas or Central Business Districts (CBD) in Sungai Banyak City. The road segment in this area experiences traffic problems due to on-street parking or parking on the roadway. This condition causes a reduction in road capacity and creates side friction of 4 meters, resulting in a decline in the performance of the road segment within the Muradi Commercial Area. To address this problem, parking management is required through more adequate parking planning by relocating on-street parking to off-street parking facilities.

This study includes an analysis of road segment performance, parking characteristics and parking demand, as well as pedestrian analysis. The analysis in this study uses primary data obtained through direct field surveys and secondary data obtained from relevant institutions. The analysis of parking characteristics and parking demand was conducted to determine parking demand and parking area requirements as a reference for planning off-street parking facilities, which were visualized using Autocad (2D) and Sketchup (3D) applications. Through this analysis, it is expected that an off-street parking plan can be designed to accommodate both two-wheeled and four-wheeled vehicles. This plan aims to reduce parking density on the roadway and create a safer and more orderly area.



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INTRODUCTION

The Muradi Commercial Area, located in Sungai Bungkal District, serves as a hub for economic activity, surrounded by various land uses such as shops, offices, educational institutions, healthcare facilities, and places of worship. The Muradi Commercial Area is strategically located on the National Road connecting Sungai Penuh City with Kerinci Regency, and is also part of Sungai Penuh City's Central Business District (CBD). This situation has led to significant increases in traffic volume, particularly during peak hours in the morning and afternoon, even into the evening. Based on results field observations and observations , Commercial Area Muradi traversed by 3 sections one way namely Jalan Muradi 2 and Jalan Basuki Rachmat which are point location parking *on the street* which causes decrease wide effective and capacity section road Commercial Area muradi , the existence of parking on the road (*on street*) causes smoothness current Then cross around this area disturbed . Meanwhile that , on the section the same way there is Lots interesting shops Lots visitors parking haphazard Because Not yet availability of parking area *off street* in the Commercial Area Muradi , the existence of parking on *street* along section road the more narrow down room for passing vehicles , things This cause occurrence conflict Then cross between passing vehicles , vehicles parked on the road , and pedestrians .

In terms of regulations, according to Law Number 22 of 2009 Article 43, it is stated that on-street parking facilities are only permitted in certain locations on district roads, village roads, or city roads that must be marked with traffic signs and/or road markings. The existence of on-street parking on the national road section of the Muradi Commercial Area which is prohibited from being used as a parking area indicates that it is necessary to regulate and provide adequate and organized parking spaces. This

regulation needs to be carried out so as not to disrupt the smooth flow of traffic and to ensure the safety of road users is maintained . Therefore That need done A study as an effort to improve performance section roads in commercial areas Muradi and improvement quality service transportation urban specifically facility parking , then required existence planning parking in this area that focuses on transfers parking on the road (*on street*) to parking land (*off street*) as instrument control obstacle side effects direct to capacity section roads and quality facility pedestrian .

RESEARCH METHODS

The research was conducted in Sungai Penuh City, Jambi Province, from September 2025 to December 2025. Data collected namely primary data and secondary data , primary data is obtained with method conduct a direct survey to field with method observation that is do survey direct to location and secondary data obtained from agency related . The secondary data obtained are the Road Network Map, the Land Use Map of Sungai Penuh City, and the Administrative Map of Sungai Penuh City. The methods used to collect primary data are Road Section Inventory Data, *Traffic Counting* (TC) Survey, Parking Survey, and Pedestrian Survey.

Data analysis techniques include road section performance analysis , parking needs characteristics analysis , pedestrian facility needs analysis .

RESULTS AND DISCUSSION

1. Existing Performance

a. Road Section Performance Analysis

Road section performance consists of the degree of saturation or V/C ratio, speed, density, and level of service of the road section. The results of the V/C ratio calculation for the road section are presented in Table 1 below.

Table 1. Road Section Performance Assessment

Street Name	Capacity (smp /hour)	Peak Hour Volume (smp /hour)	V/C Ratio	MCO speed (km/h)	Density (smp /km)	LOS
Jl. Muradi 2	1775.84	1482.40	0.83	19.94	74.35	D
Jl. Muradi 3	2318.40	1360.30	0.59	27.27	49.88	B
Jl. Basuki Rachmat	1797.77	1480.15	0.82	22.11	66.95	C
Jl . H. Bakri	2082.78	1384.50	0.66	25.00	55.38	C

Source : 2026 Analysis Results

b. Pedestrian Analysis

The following are the results of pedestrian analysis in the Muradi Commercial Area.

Table 2. Pedestrian Volume Data in Commercial Areas Muradi

No	Street Name	Time	Number of People Traversing		Number of Crossings (People)
			Left	Right	
1	Jl Muradi 2	07.00 - 09.00	206	187	111
		12.00 - 14.00	102	124	71
		16.00 - 18.00	188	185	121
2	Jl Muradi 3	07.00 - 09.00	64	62	25
		12.00 - 14.00	30	26	31
		16.00 - 18.00	59	65	23
3		07.00 - 09.00	184	175	100

No	Street Name	Time	Number of People Traversing		Number of Crossings (People)
			Left	Right	
4	Basuki Rachmat Street	12.00 - 14.00	118	113	54
		16.00 - 18.00	201	206	103
		07.00 - 09.00	49	47	28
	Jl. H. Bakri	12.00 - 14.00	32	35	16
		16.00 - 18.00	70	79	41

Source : 2026 Analysis Results

2. Analysis of Parking Planning Proposals in the Muradi Commercial Area, Sungai Penuh City
 - a. Analysis Planning Parking in Commercial Areas Muradi
 Characteristics parking moment This is in the Commercial Area Muradi is as following :

Table 3. Summary Data of Analysis Results Characteristics Parking

Street Name	Maximum Accumulation	Static Capacity	Average Parking Duration	Dynamic Capacity	Parking Volume	Parking Index
	(Vehicle)	(SRP)	(Minute)	(SRP)	(Vehicle / Day)	(%)
Jl. Muradi 2 (car)	13	30	40.34	535	115	43
Jl. Muradi 2 (motorcycle)	39	40	34.70	830	313	98
Jl. Basuki Rachmat (car)	58	50	50.49	713	195	116
Jl. Basuki Rachmat (motorcycle)	62	40	61.09	471	303	155

Source : 2026 Analysis Results

Based on Table 3 shows that at the location on-street parking on Jl. Basuki Rachmat have index vehicle indexed cars and motorbikes parking is above 100 %, which shows that request parking Already beyond available capacity . At the location parking other with mark approaching 100%, indicating quality service provision facility room parking bad .

- b. Proposal Planning Parking

Based on results observation problem Parking in Commercial Areas Muradi is Not yet availability facility parking *Off-street parking* . This results in visitors to shops and other facilities in the area parking *on-street parking* on Jalan Muradi 2 and Jalan Basuki Rachmat. Therefore, the solution problem Then cross on the section road This can done with propose transfer parking *on the street* to parking *Off-street parking*. The following table shows parking space requirements:

Table 4. On-Street Parking Space Requirements

No	Street Name	Survey Duration	Average Parking Duration (Hours)	Parking Volume (Vehicles/Day)	Parking Space Requirement (SRP)
		a	b	c	(c*b)/a
1	Jl. Muradi 2 (car)	12	0.67	115	6
2	Jl. Muradi 2 (motorcycle)	12	0.58	313	15
3	Jl. Basuki Rachmat (car)	12	0.84	195	14
4	Jl. Basuki Rachmat (motorcycle)	12	1.02	303	26

Source : 2026 Analysis Results

Once the required parking space is known, the following are the available parking spaces and the available parking capacity:

Table 5. Land Area Requirements Parking Proposal

Street Name	Parking Angle	Maximum Accumulation (Vehicle)	Parking Space Foot Width	Effective Parking Space (M2)	Maneuver Space (M2)	Parking Space Unit (M2)	Total Parking Area (M2)
	a	b	c	d	e	c (d+e)	b*(c(d+e))
Jl. Muradi 2 (Car)	90°	13	2.5	5	6.5	28.75	374
Jl. Muradi 2 (Motorcycle)	90°	39	0.75	2	2	3	117
Jl. Basuki Rachmat (Car)	90°	58	2.5	5	6.5	28.75	1668
Jl. Basuki Rachmat (Motorcycle)	90°	62	0.75	2	2	3	186

Source : 2026 Analysis Results

For fulfil need parking so proposed planning manufacturing location parking *off street*. Location proposal location parking This there are two locations , positions proposal on Jalan Muradi 2 with the area reaches 688 m2, has length 43 m and width 16 m and the proposal land on Jalan Basuki Rachmat with the area reaches 2,553 m2, has 69 m long and 37 m wide .

Planning parking should done in a way integrated with facility pedestrians , because function parking No stop at provision room for vehicles , but also supports displacement users going to objective end journey . Because of that that , is necessary safe , comfortable , free pedestrian path obstacles , and easy reached in order to create connectivity between location parking with area activities , especially in the area commercial with intensity high movement .

Therefore That required analysis about pedestrians for give recommendation facility appropriate pedestrians as well as make it easier accessibility pedestrians from location parking to location objective .

Table 6. Required Sidewalk Width

Street Name	Standard	Constant Value	Average Pedestrian Volume		Average Pedestrian Volume		Required Sidewalk Width	
			(Person/Hour)		(People/Minute)		(M)	
		(N)	Left	Right	Left	Right	Left	Right
Jl. Muradi 2	35	1.5	110	97	1.83	1.62	1.5	1.5
Jl. Muradi 3	35	1	37	36	0.62	0.6	1	1
Jl. Basuki Rachmat	35	1.5	105	113	1.75	1.88	1.5	1.5
Jl. H. Bakri	35	1.5	51	47	0.85	0.78	1.5	1.5

Source : 2026 Analysis Results

Table 7. Recommendations Facility Commercial Area Crossing Muradi

Section Name	Average Number of People Crossing (Person/Hour)	Volume (Vehicle/Hour)	PV ²	Results of the Analysis	Recommendations Crossing Facilities
	P	V			
Jl. Muradi 2	51	2194	243,162,488	Pelican Crossing	Zebra Cross
Jl. Muradi 3	13	2171	62,076,731	-	-
Jl. Basuki Rachmat	43	2131	194,421,796	Pelican Crossing	Zebra Cross
Jl. H. Bakri 1	14	2243	71,283,787	-	-

Source : 2026 Analysis Results

In the table on show results calculation about recommendation facility crossing For section roads in commercial areas Muradi . On Jalan Muradi 2 and Jalan Basuki Rachmat required existence facility crossing in the form of *pelican crossing* will but distance between intersection from section road the not enough from 300 meters, based on (Minister of Public Works and Public Housing Circular Letter No. 18/SE/Db/2023 Concerning Guidelines for Technical Planning of Pedestrian Facilities, 2023) *pelican crossing* installed on the section road , at least 300 meters from intersection so that the pelican does not fulfil condition to be installed on the section road said . Therefore That recommendation proposal facility proper crossing with condition section road that is *zebra crossing*.

3. Traffic Performance Conditions After Parking Planning

Based on the results of the analysis that has been carried out on the proposed problem handling, a comparison of road traffic performance can be seen before and after handling on-street parking by providing recommendations to move parking from the original on-street parking to off-street parking in the Muradi Commercial Area, Sungai Penuh City.

Table 8. Proposed Road Capacity of Commercial Area Muradi

No	Street Name	Co	FClj	FCPA	FChs	FCcs	C
							(smp/hour)
1	Jl Muradi 2	2800	1.14	1.00	0.88	0.90	2528.06
2	Jl Muradi 3	2800	1	1.00	0.92	0.90	2318.40
3	Basuki Rachmat Street	2800	1.14	1.00	0.91	0.90	2614.25
4	Jl. H. Bakri	2800	0.87	1.00	0.95	0.90	2082.78

Source : 2026 Analysis Results

Table 9. Comparison of Traffic Performance Before and After Problem Handling

Street Name	Degree of Saturation		Free Flow Speed (Km/Hour)		Speed Travel (Km/Hour)		Density (smp /km)		Service Level	
	Ex	Proposal	Ex	Proposal	Ex	Proposal	Ex	Proposal	Ex	Proposal
Jl. Muradi 2	0.83	0.59	29.38	37.25	19.94	30.60	74.35	48.44	D	B
Jl. Muradi 3	0.59	0.59	36.33	36.33	27.27	27.27	49.88	49.88	B	B
Basuki Rachmat Street	0.82	0.57	29.74	38.50	22.11	31.93	66.95	46.36	C	B
Jl. H. Bakri	0.66	0.66	34.82	34.82	25.00	27.49	55.38	50.36	C	B

Source : 2026 Analysis Results

Based on the analysis results shown in Table 8, performance changes occurred in three road segments in the Muradi Commercial Area. The parameters that experienced a decrease were the degree of saturation and density. The largest performance changes occurred on Jalan Muradi 2 and Jalan Basuki Rachmat due to the transfer of on-street parking to off-street parking, thus restoring the effective lane width to optimal.

While the other two sections, namely Muradi 3 Street, did not experience an increase because there was no proposal to handle the problems on the road section where its performance was already at LOS B, while for H. Bakri Street, there was an increase in LOS from C to LOS B after being given a proposal to build sidewalks to improve accessibility for pedestrians, thereby reducing side obstacles by eliminating pedestrian activities on the shoulder of the road. The proposal for sidewalks for pedestrians in this study was carried out for the convenience of parking users' access to their main destination.

4. Parking Planning Proposed Design

After the proposal is submitted, a proposed parking design is created to provide an overview of the proposed parking plan. The following is a proposed off-street parking design for passenger cars and motorcycles, after the on-street parking is moved to off-street parking in the Muradi Commercial Area.



Figure 1 Visualization of the Plan Parking Location Jalan Muradi 2



Figure 2 Visualization of the Plan Parking Location on Jalan Basuki Rachmat

CONCLUSION

As for the conclusions that can be drawn taken after do analysis is as following :

1. Based on the existing traffic conditions in the Muradi Commercial Area, Sungai Penuh City has a poor level of service with the worst road segment performance being on Jalan Muradi 2 with a *level of service* D. This is caused by the reduced effective width of the road due to high side obstacles due to on-street *parking* .
2. Based on the analysis of the proposed parking planning, the total parking area required on Jalan Muradi 2 is 491 m² located on Jalan Muradi 2. The land can accommodate a maximum accumulation of 39 SRP motorcycles and 13 SRP passenger cars. Meanwhile, the total parking area required on Jalan Basuki Rachmat is 1854 m² located on Jalan Basuki Rachmat. The land can accommodate a maximum accumulation of 62 SRP motorcycles and 58 SRP passenger cars.
3. Before the proposal was made, Jalan Muradi 2 had a travel speed of 19.94 km/h, a degree of saturation of 0.83, and a traffic density of 74.35 pcu/km with a level of service (*Level of Service*) in category D. After the implementation of the proposal, there was an increase in road capacity which resulted in a decrease in the degree of saturation to 0.59, an increase in travel speed to 30.60 km/h, and a decrease in traffic density to 48.44 pcu/km. These changes indicate an increase in the performance of the Jalan Muradi 2 section with the level of service increasing to category B.
4. The parking planning layout design for the study area of the Muradi Commercial Area in Sungai Penuh City is adjusted to the proposed design of the off-street parking park by taking into account vehicle circulation, required parking patterns, separate entry and exit routes, and complete facilities such as signs, markings, canopies, and the provision of pedestrian facilities from the parking area to the main destination for drivers who park their vehicles in the *off-street parking area* .

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