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Parking Arrangement for Business Area on Pemuda Street in Medan City

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ABSTRACT

The purpose of the parking arrangement is: a) to determine the parking system on the Jalan Pemuda Medan City section; b) to organize and simulate parking in the business area of Jalan Pemuda, Medan City. The results are as follows: a) The existing Static Capacity is 41 SRP on the left side and the right side is 62 SRP; b) Section A parking duration is 1.28 hours and 1 hour. Section B is 1.85 hours and 1.14 hours; c) The dynamic capacity of Section A is 144 SRP and 247 SRP. Section B is 137 SRP and 238 SRP; d) The parking volume on Jalan Pemuda section A is 27 and 36 passenger cars. Section B as many as 37 and 39 passenger cars; e) Section A parking index is 71.42% and 58.33%, in Section B is 95% and 73.53%; f) Turn Over in section A is 1.3 vehicles/space and 1 vehicle/space, in section B it is 1.85 vehicles/space and 1.14 vehicles/space; g) Optimizing the parking length from 205 meters to 210 meters. The parking arrangement on Jalan Pemuda has 4 alternatives, namely 1) the shape of the parking angle remains but the parking length increases from 205 meters to 210 meters; 2) change the existing parking angle of 00 in the left lane and 450 in the right lane to 450 for the right and left lanes; 3) both right sides change with the shape of the parking angle to 600; 4) change the parking angle to 300 so that it can increase static capacity.

Keywords: *Business District; Parking; Parking Accumulation.*

INTRODUCTION

The city of Medan continues to experience development in all fields. Of course, this development, apart from being a potential for development, is also a challenge for the City Government as a regulator. One of the main challenges related to the development of this city is the increase in development needs with the consequence that the City Government must be able to increase its ability to overcome city problems. The development of commercial and service centers that attract visitor vehicle movements will have an impact on parking demand. The government has regulated parking issues as written in Government Regulation number 79 of 2013 concerning Road Traffic and Transportation Networks [1]. Apart from that, it is also regulated by the Directorate of City Traffic and Transportation Systems Development regarding Guidelines for Planning and Operation of Parking Facilities [2].

Parking is a situation where a vehicle does not move in a temporary place because it has been abandoned by the driver. Parking is a place where vehicles stop for short or long periods of time. Parking is always adjusted to the needs of parking lot users. Parking is part of the transportation infrastructure that is directly connected to the transportation network system. The arrangement and arrangement of parking greatly influences the performance of the road network transportation system [3]. Parking is a problem that often causes congestion and

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parking problems will also arise if parking demand exceeds existing parking spaces [4][5][6]. The number of visitor parking spaces cannot be accommodated so parking is done on the road. The arrangement of on-street parking disturbs people's aesthetic sensibilities because when people want to use or pass by the road, they feel disturbed and unhappy with the presence of on-street parking. Influencing factors are congestion, pollution, and no time limit for on-street parking. The main reason for legalizing roads as parking areas is because there are not enough parking areas available. Apart from that, many vehicle owners prefer to use on-street parking facilities as their parking place because it is closer to where they want to go. The large number of activities on urban roads, such as Jalan Pemuda, result in road utilization being less than optimal due to disorganized parking areas which can result in traffic jams. Generally, road sections already have parking spaces, while others are not yet available.

There are two types of parking on Jalan Pemuda, namely on-street parking and off-street parking. On-street parking is the use of land on the road that facilitates vehicles to stop [7][8]. The most common on-street parking is on the side of the curb. The most common curbside parking found on the street is parallel parking. Parallel parking has the smallest impact on all vehicles and requires a smaller lane width than corner parking [9]. Parking on the road turns out to cause quite complicated problems for the city, traffic jams often occur due to parking of vehicles taking up the road [10]. Off-street parking is a parking activity carried out outside the road, such as in the yard of an office building, supermarket or in a fenced parking lot. On-street parking can create limited space for vehicle traffic and have an impact on less smooth vehicle mobility. The on-street parking system has a fairly high level of parking turnover efficiency compared to off-street parking [11].

Jalan Pemuda has the Santo Yosep school which is on the right side. This school is next to the Medan Cathedral church. At certain times this area is very busy with parked vehicles, both for dropping off school children and waiting for school children. Parked vehicles create 2 parking lanes using the road. As a result, the number of available vehicle lanes (2 lanes) becomes full of vehicles, resulting in traffic jams during rush hours. The parking space in front of the school is 450 in the shape of a slant. This is what causes disruption to traffic flow in the business area of Jalan Pemuda, Medan City.

Jalan Pemuda as a business area has several offices that provide off-street parking, such as BNI, Artha Graha, QnB, and Panin Bank. For banking areas, there is a limited number of off-street parking spaces and SRP dimensions as presented in table 1.

Table 1. Provision of off-street banking parking lots

No	Name	Parking amount		Dimensions SRP (m)
		two wheels	four wheels	
1	BNI	100	30	2x3
2	Artha Graha	50	15	2x3
3	QnB	-	10	2x3.5
4	Panin Bank	20	10	2.5 x 3.5
5	Santo Yosep	50	30	Tidak Ada

Several studies are relevant to this research, namely regarding the potential for parking arrangements in Bandung Regency [12]. Research on Needs Analysis and Parking Arrangement at Pegandon Market, Kendal Regency [13]. Apart from that, Analysis of PT. Office Parking Space Needs. Intipratama Bandar Kariangau Balikpapan [14]. Research on

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Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

Needs Analysis and Parking Arrangement at Pegandon Market, Kendal Regency [15]. Research on parking system analysis and transportation network development in the Losari coastal area of Makassar City [16]. Research Analysis of Parking Facilities and Accessibility of the Goa Gong Tourist Attraction, Pacitan [17].

Parking area problems are a phenomenon that deserves to be studied. It is hoped that this evaluation will provide an alternative solution to the problem of parking space requirements, where the available parking area is insufficient to accommodate the number of parked vehicles. So it is necessary to arrange parking so as not to disrupt city traffic. The parking arrangement for the Jalan Pemuda Medan City business area aims to:

a) to find out the parking system on Jalan Pemuda Medan City
b) to organize and simulate parking in the business area of Jalan Pemuda, Medan City

METHODS

The research on parking arrangements for business areas on Jalan Pemuda took place on Jalan Pemuda which is limited from Jalan Simpang Waspada (Jalan Suprapto) to Jalan Simpang Kesawan (Jalan A. Yani).

Figure 1. presents the existing parking conditions at the research location.

This research will be carried out on Jalan Pemuda starting from the intersection of Jalan Suprapto (Simpang Waspada) to the intersection of Jalan Ahmad Yani (Simpang Kesawan) along ± 400 meters. The research flow diagram for Parking Arrangement in the Business District of Jalan Pemuda Medan City can be seen in Figure 2 below

Journal of Civil Engineering and Vocational Education
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Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

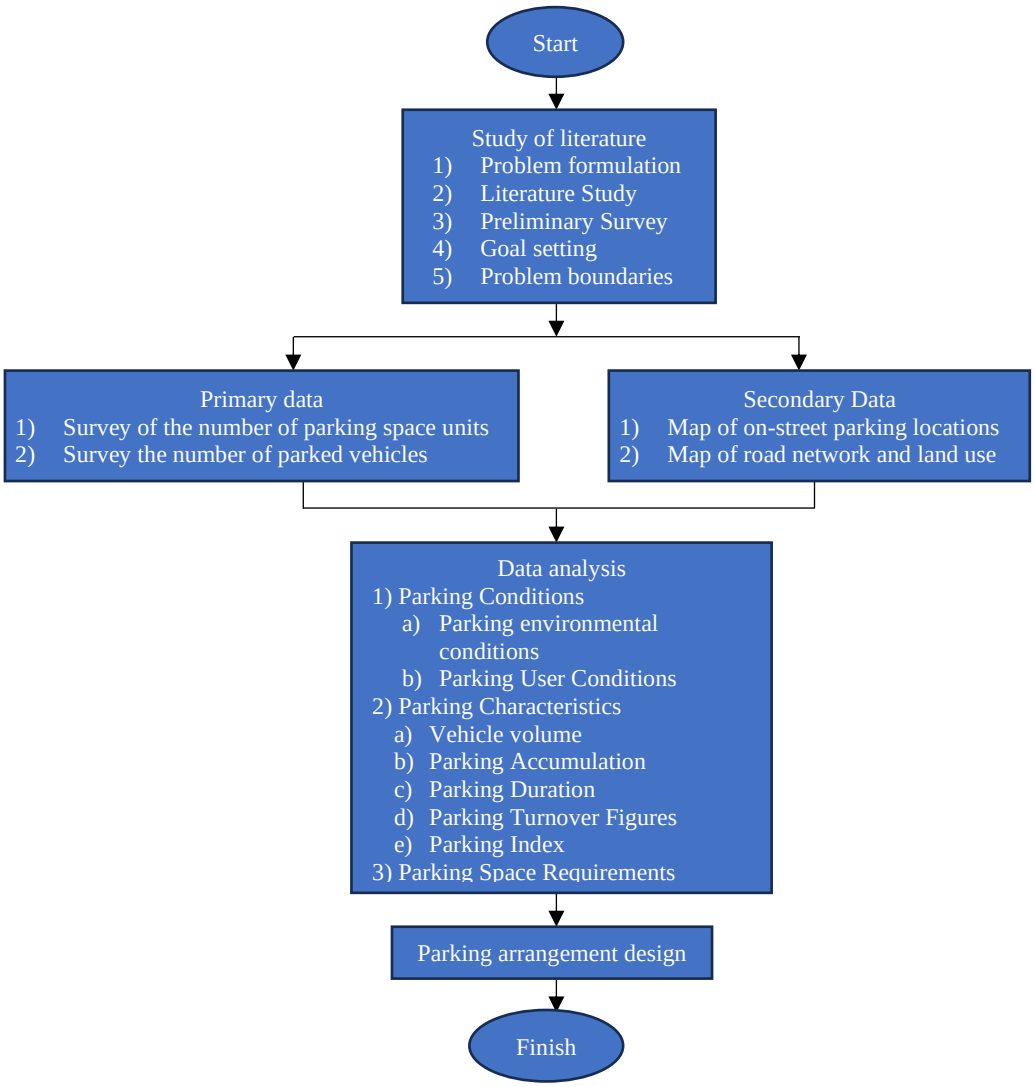

Figure 2. Research flow diagram

RESULTS AND DISCUSSION

A. Existing Condition of the Pemuda Road Section

The Pemuda Street section is located in the city's business center with a length of research road around 400 meters with traffic flow in the same direction towards the Kesawan area. Along the research road there are shops and offices which are busy with consumers both on two wheels and on four wheels. Along Jalan Pemuda there is a road median with a width of 1.2–1.5 meters, which is located right in front of Jalan Mangkubumi to Jalan Palang Merah and there is a crossing area (without median) for vehicles moving from the left to the right lane.

The Jalan Pemuda CBD area requires a parking area to facilitate vehicle parking. In several places such as BNI, Panin Bank, Bank Danamon, QnB, Artha Graha and Bank BTN as well as St. Catholic Church. Yoseph has off-street parking for both motorbikes (two-wheeled vehicles) and four-wheeled vehicles (passenger cars, buses, trucks and other vehicles). The Jalan Pemuda section to the left of the on-street parking is parallel with a parking capacity of 41 SRP (Parking Space Units) only for four wheels. Meanwhile, on the right, the Jalan Pemuda section has a

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

capacity of 62 SRP, especially for four wheels which are available in SRP form. Two-wheeled parking does not have SRP and only random parking such as on the sidewalk, in between four-wheeled vehicle parking

B. Performance Analysis of Youth Roads

As a result of observations made during the parking survey, an analysis of existing conditions was carried out by dividing the research road section into 2 sections to make observations easier, namely section A and section B. This observation was carried out to obtain primary data to analyze the calculation of parking accumulation, parking capacity, dynamic parking capacity, parking volume, parking index, parking turnover rate, and parking demand. Section A starts from Jalan Suprapto (Simpang Waspada) to Jalan Pemuda Baru for ± 200 meters, while Section B starts from Jalan Simpang Pemuda Baru to Jalan Palang Merah for ± 200 meters. This section division applies to both sides of the road, both the left and the right. Characteristics Vehicles parked on Jalan Pemuda Medan City are still irregular, for example vehicles that do not use the parking boxes (SRP) that have been provided, parking misaligned and parking in places where there is no SRP. To evaluate the performance of road sections, the research was based on road section length, parking section length, section width and road type/

Table 2. Length of road sections, length of parking sections, width of sections and road type

Name Of the Road Section	Section	length of road section (m)	length of parking area (m)	section width (m)	road type
Pemuda street	A	200	105	15	4 sections, 1 direction and there are barriers
	B	200	100	15	4 sections, 1 direction and there are barriers

C. Analysis of Parking Characteristics

The Jalan Pemuda section is used as an on-street parking area for office areas. Jalan Pemuda is used as an on-street parking area for all types of cars. Analysis of parking characteristics is the result of analysis of the existing conditions of Jalan Pemuda by describing various studies such as parking accumulation, static capacity, parking duration, dynamic capacity.

1) Analysis of parking accumulation during peak hours

Parking accumulation in Section A to the left of Jalan Pemuda is in the form of parking 0^0 or parallel parking. The results of observations made showed that the maximum parking accumulation was on Friday at 13.30. This hour is the time for local residents to pray, so that the parking accumulation reaches the peak (maximum), namely 17 passenger cars (Figure 3).

EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

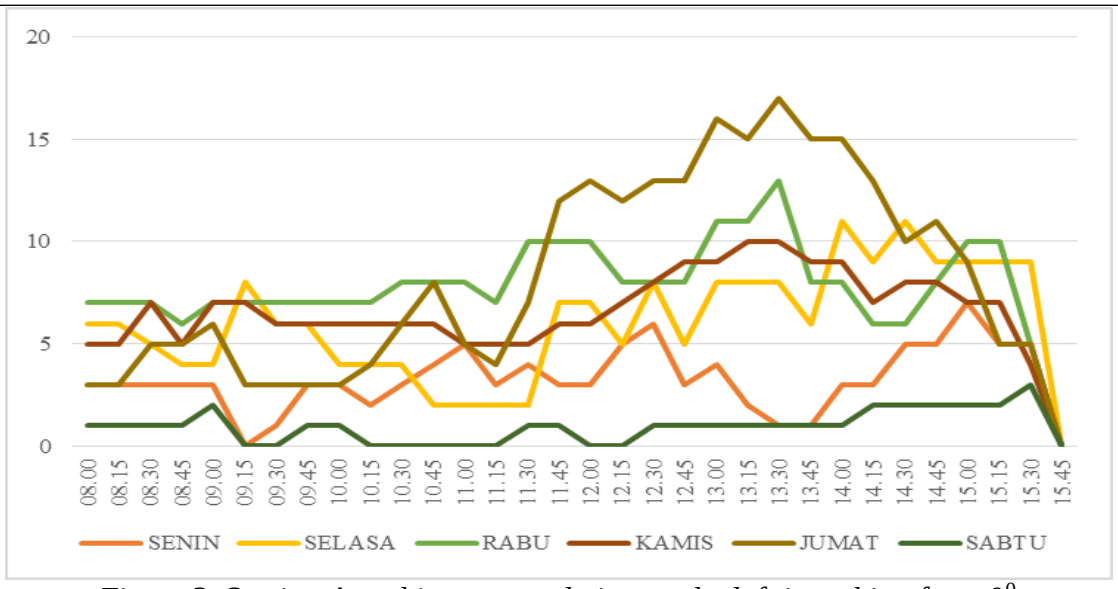

Figure 3. Section A parking accumulation on the left is parking form 0^0

On the right side, the parking accumulation in Section A of Jalan Pemuda has 45^0 parking lots. The results of the observations made showed that the maximum parking accumulation was on Tuesday at 12.15. This is due to the need for parking space in locations where there are offices and shops. (Figure 4)

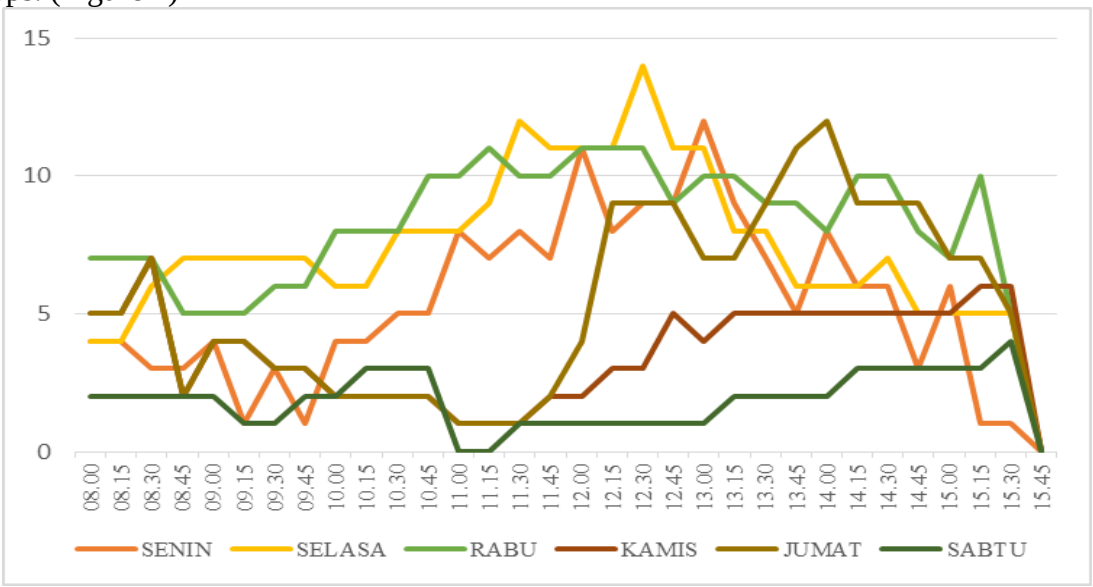

Figure 4. Section A parking accumulation on the right of parking form 45^0

Section B parking form on the left of Jalan Pemuda is parking form 0^0 or parallel parking. The results of the observations carried out showed that the maximum parking accumulation was at that hour, which is the time for residents to enter the office after resting, and can also carry out worship, so that at that hour there is a peak (maximum) accumulation of parking, namely 15 passenger cars on Mondays and also Wednesday, the Accumulation chart can be (Figure 5).

EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

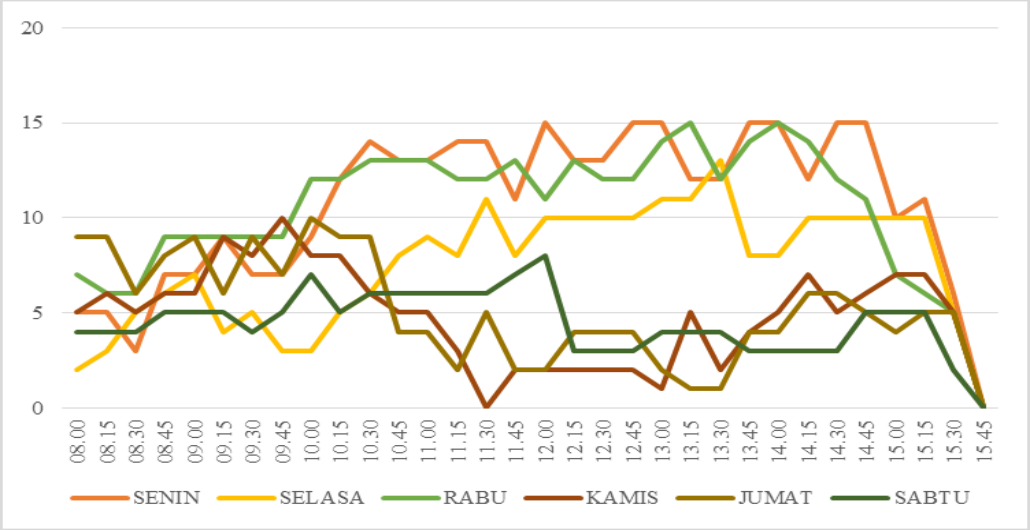

Figure 5. Section B parking accumulation on the left is 0^0/parallel parking

The right side of Section B is the parking area for the Jalan Pemuda section which has 45^0 parking lots. The results of the monitoring carried out showed that the maximum parking accumulation was on Monday at 14.00. This is due to the need for parking space in locations where there are offices

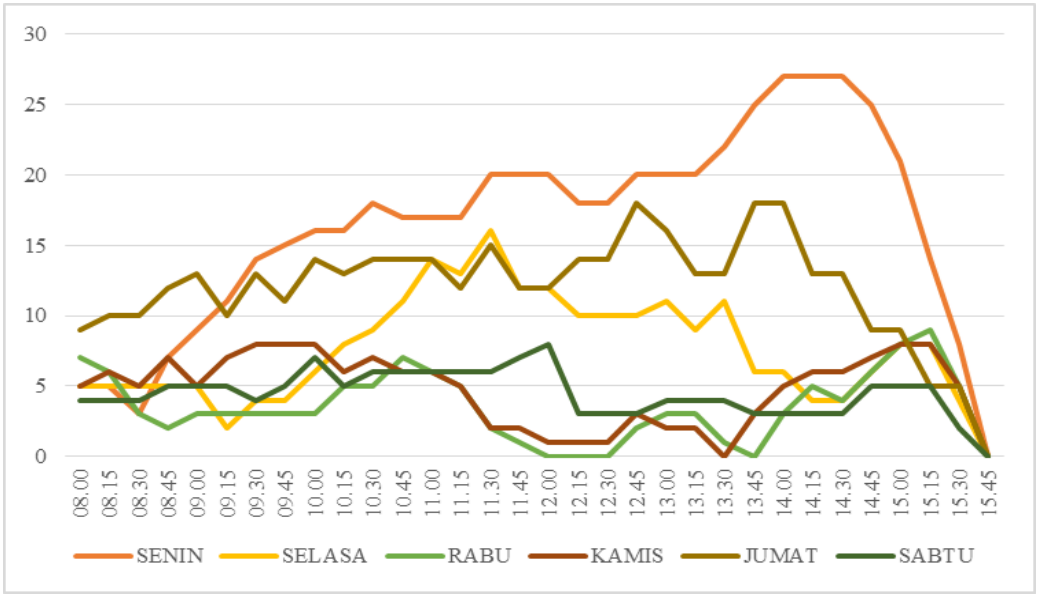

Figure 6. Section B right parking accumulation form parking 45^0

Based on the results of parking observations carried out for 6 days, it was found that there was a day that experienced peak parking, namely Friday. This can be seen from the results of observations made, that parking is distributed evenly every day and peaks on Friday. Parking peaks also vary according to observation results.

2) Static Capacity Analysis

Static capacity (parking spaces) is the number of parking spaces provided for parking. Calculation of static capacity for on-street parking on Jalan Pemuda with angles 0^0 and 45^0 for passenger cars. From the analysis in Table 3, the data states that the highest static capacity occurs in the 45^0 parking area.

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

Table 3. Static Capacity of Passenger Cars

Road Section Name	Section	long street parking (m) (L)	Corner (x^0)	the width of the parking space (X)	Static capacity (SRP) (KS=L/X)
Pemuda Street	A	105	0^0	5	21
			45^0	2.9	36
	B	100	0^0	5	20
			45^0	2.9	34

Source: Analysis results, 2023

3) Parking Duration Analysis

Parking duration is the time span for a vehicle to park in a place in minutes or hours. The highest parking duration for passenger cars on Jalan Pemuda is > 60 minutes with the number of vehicles parked during this duration varying according to the section.

Table 4. Analysis of Parking Duration

Road Section Name	Section	long street parking (m)	Corner (x^0)	Number of vehicles	parking vehicle	long parking time	Parking duration (hours)
Pemuda Street	A	105	0^0	21	27	1 hours	1.28
			45^0	36	36	1 hours	1
	B	100	0^0	20	37	1 hours	1.85
			45^0	34	39	1 hours	1.14

Source: Analysis results, 2023

4) Dynamic Capacity Analysis

Dynamic capacity depends on the average parking duration or the length of time vehicles are parked on the road. The dynamic capacity or parking space on Jalan Pemuda can be seen in Table 5 below.

Table 5. Dynamic Capacity of Passenger Cars

Road Section Name	Section	Static capacity (SRP)	Corner (x^0)	Parking duration (hours) Vehicle (S)	P (X)	Dynamic Capacity (SRP) (KD = (L*X)/S
Pemuda Street	A	21	0^0	1.31	9 hours	144
		36	45^0			247
	B	20	0^0			137
		34	45^0			233

Source: Analysis results, 2023

5) Parking volume analysis

Parking volume is the total number of vehicles using on-street parking facilities per unit time for 9 hours (research time) with a time interval of 15 minutes. The volume of vehicles parked on Jalan Pemuda can be seen in Table 6 below.

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

Table 6. Volume of Parked Vehicles

Road Section Name	Section	Corner (x^0)	Car Parking Volume
Pemuda Street	A	0^0	27
		45^0	36
	B	0^0	37
		45^0	39

The proportion of vehicles on Jalan Pemuda is dominated by vehicles parked in the 45^0 Section B corner with a percentage of 28.06%, while the 0^0 Section A corner has a maximum of 25.90%. This shows that the parking angle determines the number of parked vehicles that can be accommodated on Jalan Pemuda.

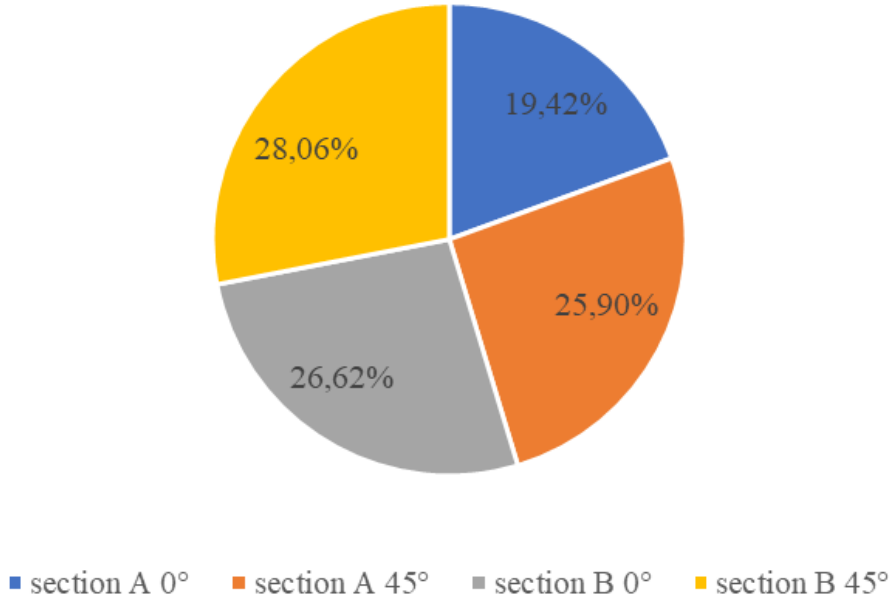

Figure 7. Composition of Parked Vehicles on Jalan Pemuda

6) Parking Usage Analysis (Parking Index)

The level of use of parking spaces at any time is the use of parking spaces as seen from the comparison between the accumulation and capacity of youth roads for passenger cars, a maximum of 95%, which means that the capacity of parking spaces has not exceeded the capacity provided, but is almost close to peak capacity (100%) which means that parking capacity has reached its peak (Agustien Dyah T, 2016). Table 7 is the parking index for each road section at the research location.

Table 7. Parking Index

Road Section Name	Section	Corner (x^0)	Static Capacity (KS)	Maximum Accumulation of Parking Vehicles	hourly parking index (%)
				Cars	Cars
Pemuda Street	A	0^0	21	15	71.42
		45^0	36	21	58.33
	B	0^0	20	19	95.00
		45^0	34	25	73.53

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

7) Analysis of Parking Turn Over Rates

Comparison of parking volume for a certain time period with the number of spaces/static capacity on Jalan Pemuda in section A, namely 1.3 vehicles/space at the 0^0 angle and 1 vehicle/space at the 45^0 angle, while in section B it is 1.85 vehicles /space at corner 0^0 and 1.14 vehicles/space at corner 45^0, Table 8. The following is the parking turnover rate on Jalan Pemuda.

Table 8 Parking Turnover Rates

Road Section Name	Section	Corner (x^0)	Car Parking Volume	Static Capacity	Replacement Rate (Vehicle/Space)
Pemuda Street	A	0^0	27	21	1.3
		45^0	36	36	1
	B	0^0	37	20	1.85
		45^0	39	34	1.14

Discussion

The discussion in this research will focus on two analyses

A. Optimization of Parking Length

Impact of optimizing road length on Jalan Pemuda by redesigning the SRP form at the research location. The shape of the 0^0 parking angle has an impact on the existing static capacity, namely from 41 vehicles to 42 vehicles, whereas different angles will produce a different parking capacity than the existing one. The proposed design for parking management can be seen in Table. 9 following.

Table 9. Parking Capacity Design at Various Angles

Road Section Name	Parking road length (m) (L)	Corner (x^0)	Width of parking space	Static Capacity (SRP) (KS = (L/X)
Pemuda Street	210	0^0	5	42
	210	30^0	3.5	60
	210	45^0	2.9	72
	210	60^0	2.7	78
	210	90^0	2.5	84

From the table above, static capacity is produced in the form of SRP, namely the number of vehicles that can be accommodated on Jalan Pemuda. The addition of the length of the parking road will result in changes in the static capacity of the Jalan Pemuda section with various planned corners. The results show that for corner 0^0, there is an increase in static capacity from 41 to 42 vehicles. so there is only an increase in vehicle parking capacity. This will be different if there is engineering for parking vehicles with different shapes, such as a 30^0 corner will produce a static capacity of 60 vehicles, a 45^0 corner can produce a static capacity of 72 vehicles, and for a 60^0 corner it can produce a static capacity of 78 vehicles while for a 90^0 vehicle corner that that can be accommodated at that corner is 84 vehicles.

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

Table 10. Passenger Car Maneuvering Space

Corner (x^0)	Width of parking space	Vehicle maneuvering space (m)
0^0	5	3
30^0	3.5	2.9
45^0	2.9	3.7
60^0	2.7	4.6
90^0	2.5	5.8

To meet the SRP capacity for the demand and supply of passenger vehicle types, an alternative has been made to change the length of the road from 205 m to 210 m to meet the unit need for parking spaces on the Jalan Pemuda section.

The length of the road used in the analysis above is adjusted to existing demand, so that it can accommodate parking vehicles as effectively as possible. Changes in road capacity and changes in parking space units have opposite characteristics in changing angles so that one of the two things can be prioritized and must be put aside. By prioritizing road space performance, there are limited parking space units that can be provided for on-street parking in office areas. Parking offers for left side passenger cars can be seen in Table 11.

Table 11. Parking Offers for Passenger Cars for the Left Side

Parking Location	Passenger Car Space Demand	Corner (x^0)	Passenger Car Deals	Demand for supply
Pemuda Street	42	0^0	42	0
		30^0	60	18
		45^0	72	30
		60^0	78	36
		90^0	84	42

Table 12. Parking Offers for Passenger Cars on the Right Side

Parking Location	Passenger Car Space Demand	Corner (x^0)	Passenger Car Deals	Demand for supply
Pemuda Street	72	0^0	42	0
		30^0	60	0
		45^0	72	0
		60^0	78	6
		90^0	84	12

Source: Analysis results, 2023

Based on the results of the analysis above, it can be seen that by implementing an angle of 45^0 on the left side and 45^0 on the right side on Jalan Pemuda, the length of the road adjusted for this vehicle is still able to accommodate the existing parking demand.

B. Parking Arrangement

Existing condition with an SRP capacity on the left side of 41 (parking angle 0^0) while on the right side it is 72 SRP (parking angle 45^0). Alternative parking planning based on analysis carried out at various parking angles. The corner shape designed is adapted to the conditions of Jalan Pemuda. Alternative 1 is to plan the left side of the SRP, namely with an angle of 45^0

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
http://cived.ppj.unp.ac.id/index.php/CIVED

and the right side remains at 45^0. Alternative 1 for Section A and Section B can be seen in Figure 8 and figure 9 following. The number of SRPs in the left lane of Section A is 40 SRP and the right Section A is 40 SRP. The number of SRPs on the left lane of Section B is 32 SRP and on the right Section B is 32 SRP.

Table 13. Alternative 1

Street Name	Section	Corner (x^0)	Number of vehicles
Pemuda Street	A	45^0	40
		45^0	40
	B	45^0	32
		45^0	32

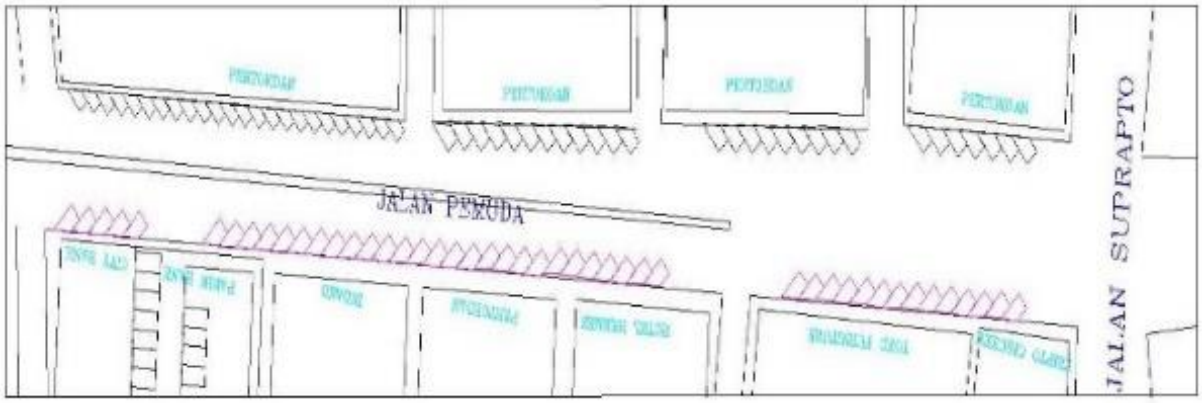

Figure 8. Alternative parking arrangement 1 Section A corner 45^0

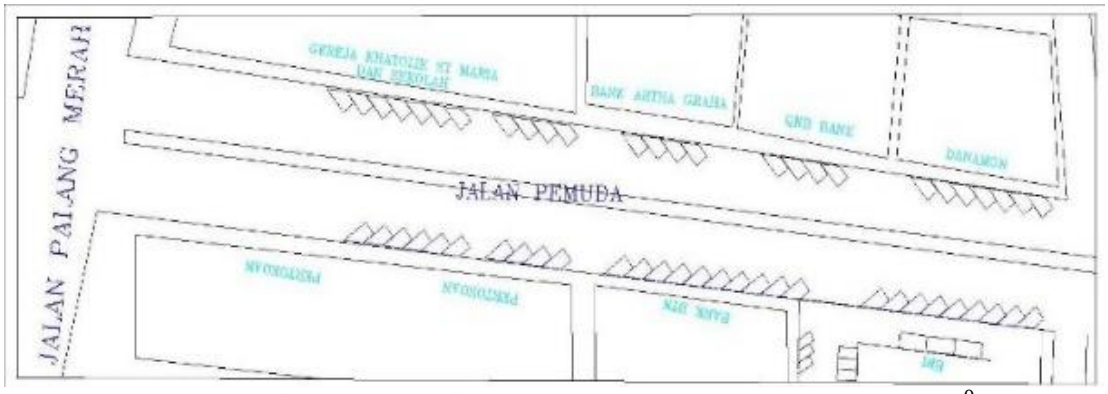

Figure 9. Alternative parking arrangement 1 Section B corner 45^0

Alternative 2 for Section A and Section B can be seen in Figure 10 and figure 11 below. The number of SRPs in the left lane of Section A is 22 SRP and the right Section A is 40 SRP. The number of SRPs in the left lane of Section B is 20 SRP and the right Section B is 32 SRP

Table 14. Alternative 2

Street Name	Section	Corner (x^0)	Number of vehicles
Pemuda Street	A	0^0	22
		45^0	40
	B	0^0	20
		45^0	32

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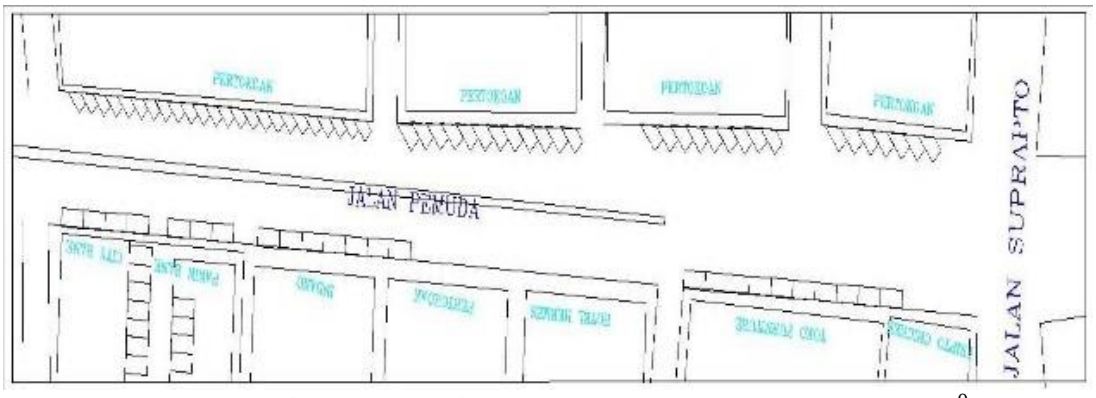

Figure 10. Alternative parking arrangement 2 Section A corner 0^0

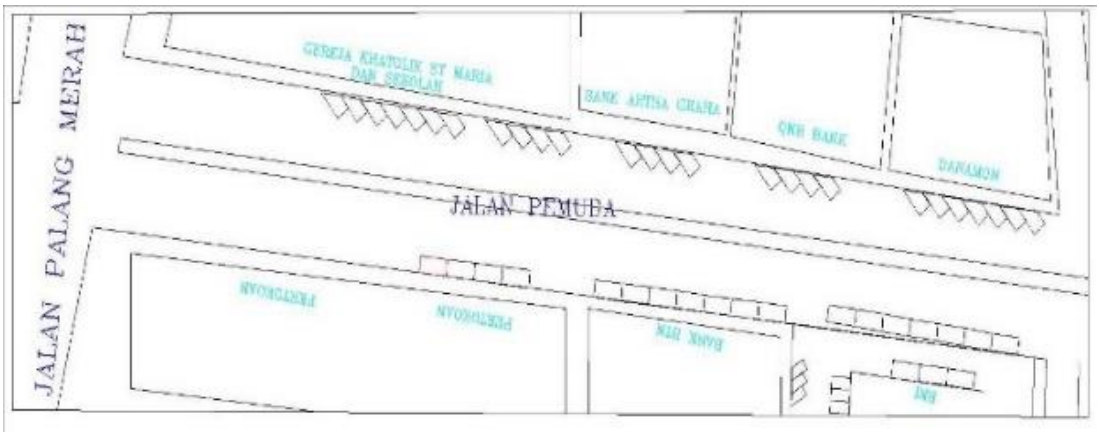

Figure 11. Alternative parking arrangement 2 Section B corner 0^0

Alternative 3 for Section A and Section B can be seen in Figure 12 and figure 13. following. The number of SRPs in the left lane of Section A is 40 SRP and the right Section A is 40 SRP. The number of SRPs in the left lane of Section B is 38 SRPs and the right Section B is 38 SRPs

Table 15. Alternative 3

Street Name	Section	Corner (x^0)	Number of vehicles
Pemuda Street	A	60^0	40
		60^0	40
	B	60^0	38
		60^0	38

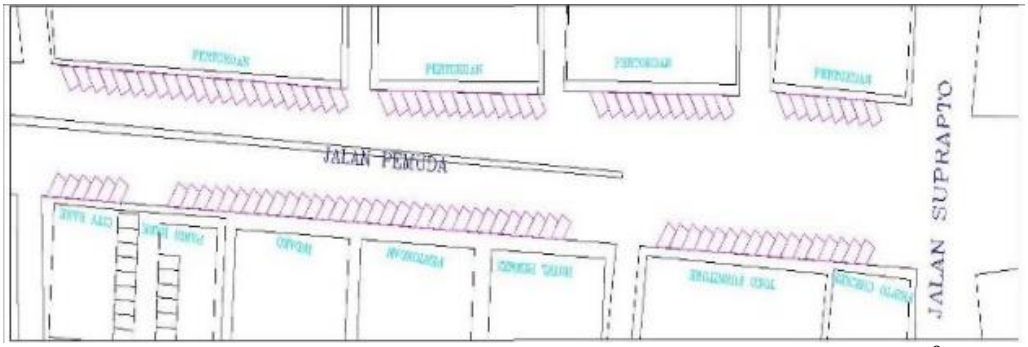

Figure 12. Alternative parking arrangement 3 Section A corner 60^0

CIVED Journal of Civil Engineering and Vocational Education
EISSN: 2622-6774
Vol 11 No.1 March 2024
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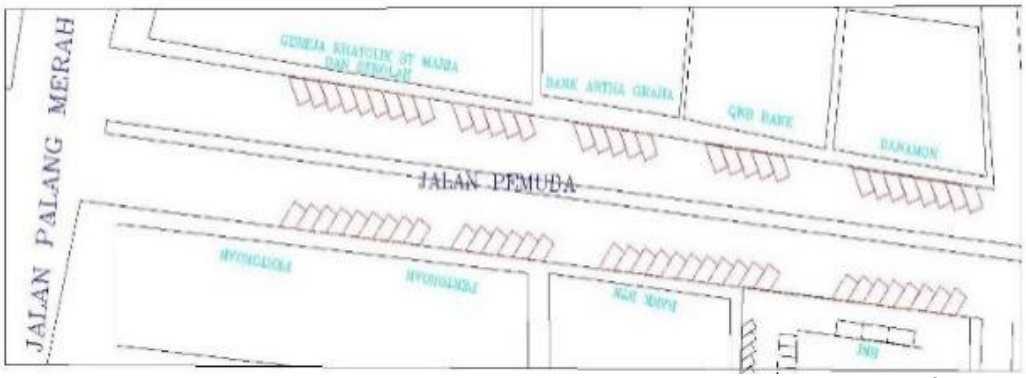

Figure 13. Alternative parking arrangement 3 Section B corner 60^0

Alternative 4 for Section A and Section B can be seen in Figure 14 and figure 15 below. The number of SRPs in the left lane of Section A is 30 SRP and the right Section A is 30 SRP. The number of SRPs in the left lane of Section B is 30 SRP and the right Section B is 30 SRP

Table 16. Alternative 4

Street Name	Section	Corner (x^0)	Number of vehicles
Pemuda Street	A	30^0	30
		30^0	30
	B	30^0	30
		30^0	30

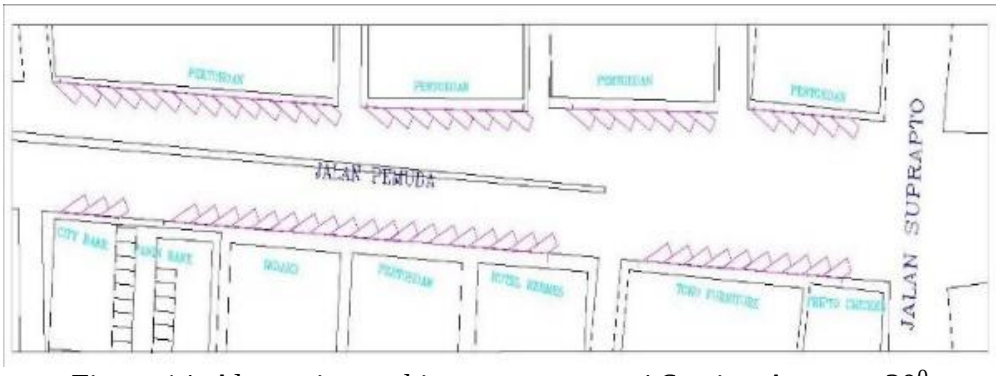

Figure 14. Alternative parking arrangement 4 Section A corner 30^0

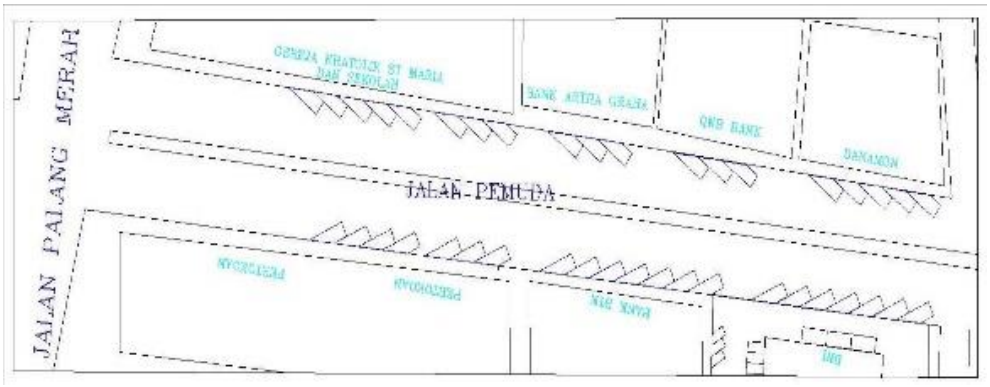

Figure 15. Alternative parking arrangement 4 Section B corner 30^0

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The 90^0 angle cannot be used because the maneuvering space used is very large so it can cause congestion and reduce road capacity. Apart from that, the 90^0 angle also requires a wide area to plan the SRP. Therefore, the parking arrangement is carried out with various alternative designs, namely with angles of 0^0, 30^0, 45^0, and 60^0.

CONCLUSIONS

Conclusions that can be drawn from the results of the analysis and discussion are as follows:

a) The existing condition of the Jalan Pemuda section which is located between Jalan Suprapto (Simpang Waspada) to Jalan Palang Merah (Simpang Kesawan) has a road length of ± 400 meters and a road width of 20 meters and has a road median with a width of 1.2–1.5 meters. The existing Static Capacity is 41 SRP on the left and has a 0^0 angle shape. The right side with a 45^0 angle shape has a Static Capacity of 62 SRP
b) The parking characteristics of the Jalan Pemuda section have a maximum parking accumulation in Section A with a parking angle of 0^0 at 13.30 WIB of 14 passenger cars. Parking corner 45^0 has a maximum parking accumulation at 12.15 WIB of 14 passenger cars. Section B has corner parking form 0^0, maximum parking accumulation from 12.45 to 14.45 WIB of 15 passenger cars. Maximum parking accumulation of 45^0 parking angles has at 14.00 WIB a total of 27 passenger cars
c) The static capacity of Jalan Pemuda is divided into 2 sections. Section A for corner 0^0 parking has a static capacity of 21 SRP and corner 45^0 parking has 36 SRP, Section B for corner 0^0 parking has a static capacity of 20 SRP and shape 45^0 corner parking has 34 SRP
d) The duration of parking in Section A for corner 0^0 parking is 1.28 hours and for corner 45^0 parking is 1 hour. Section B 0^0 corner parking form is 1.85 hours and for 45^0 corner parking form it is 1.14 hours
e) The dynamic capacity of Section A with a 0^0 parking angle shape has 144 SRP and a 45^0 parking angle shape has a dynamic capacity of 247 SRP. Section B with a 0^0 parking angle shape has a dynamic capacity of 137 SRP and a 45^0 parking angle shape has a dynamic capacity of 238 SRP
f) The parking volume on Jalan Pemuda, namely in Section A, is 27 passenger cars for the 0^0 parking angle, while the 45^0 parking angle has a volume of 36 passenger cars. Section B parking volume is 37 passenger cars for the 0^0 parking angle, while for the 45^0 parking angle the volume is 39 passenger cars.
g) The parking index for Jalan Pemuda is 71.42% at corner 0^0 and 58.33% at parking corner 45^0 which is located in Section A, while Section B has a parking index of 95% at corner 0^0 and 73.53% at corner parking 45^0.
h) Turn Over for Jalan Pemuda in section A is 1.3 vehicles/space at corner 0^0 and 1 vehicle/space at corner 45^0, while in section B it is 1.85 vehicles/space at corner 0^0 and 1.14 vehicles/space space at a 45^0 angle
i) Optimizing the parking length of Jalan Pemuda, which was originally 205 meters, changed to 210 meters, which caused a change in static capacity at corner 0^0 from 41 vehicles to 42 vehicles, and at corner 45^0 from 62 vehicles to 70 vehicles
j) The parking arrangement on Jalan Pemuda has 4 alternatives, namely alternative 1, the shape of the parking angle remains but the parking length increases from 205 meters to 210 meters. Alternative 2, by changing the existing parking angle from 0^0 in the left

lane and 45^0 in the right lane to 45^0 for the right and left lanes. Alternative 3, both right sides change the shape of the parking angle to 60^0 and alternative 4, changes the parking angle to 30^0 so as to increase static capacity

Jalan Pemuda, the CBD in Medan City Center, is always busy with vehicles, both for traffic and parking. The existing parking pattern has not been used optimally and there are still many vehicles that do not use the appropriate SRP in their place. Therefore, it is necessary to have traffic signs so that the existing SRP can be used optimally. Another suggestion is to enforce the law so that traffic violations caused by parking and traffic flow can be overcome. In general, the traffic flow on this road is quite dense and smooth if vehicles are parked in their places and traffic signs are obeyed by road users. Suggestions that can be given to the Transportation Department are to put a parking levy for every hour which can enable workers to park in their buildings and parking on the street can be used for bank or other service users.

REFERENCE

[1] Peraturan Pemerintah Nomor 79 Tahun 2013 Tentang Jaringan Lalu Lintas dan Angkutan Jalan, Departemen Perhubungan, Jakarta.

[2] Direktorat Bina Sistem Lalu lintas Dan Angkutan kota. Tahun 1998 tentang Pedoman Perencanaan dan Pengoperasian Fasilitas Parkir

[3] Munawar, A. 2011. Dasar-Dasar Teknik Transportasi. Yogyakarta. Beta Offset.

[4] Dima, A. K., Supriyanti, D., & Rahma, P. D. (2023). Penataan Lahan Parkir di Kawasan Pasar Kepanjen (Doctoral dissertation, Fakultas Teknik Universitas Tribhuwana Tunggadewi).

[5] Isminingtias, S. (2017). Dampak penataan parkir badan jalan terhadap estetika kota di kawasan niaga kota surabaya. Kebijakan dan Manajemen Publik, 5(3), 1-18.

[6] Iman, F. (2018). Evaluasi Kebutuhan Ruang Parkir di Kampus ITS Manyar Surabaya, Jawa Timur (Doctoral dissertation, Institut Teknologi Sepuluh Nopember).

[7] Munawar, A., 2014, Manajemen Lalu Lintas Perkotaan, Yogyakarta

[8] David, Y dan Budi. 2018. Analisis Karakteristik On Street Parking Di Ruas Jalan Brigjend Slamet Riyadi (Simpang Empat Gladag–Simpang Empat Pasar Pon) Kota Surakarta., Jurnal Matriks Teknik Sipil Vol. 6, No 2 (2018), Hal 339-349, https://jurnal.uns.ac.id/matriks/article/view/36574 download 3 Juni 2023

[9] Mahardika, K. (2020). Potensi Penataan Parkir Di Kabupaten Bandung. Majalah Ilmiah UNIKOM, 17(2), 131-142.

[10] Pradana, M. F., Bethary, R. T., & Nurhaesih, D. (2013). Evaluasi Parkir Di Badan Jalan/On Street Parkin (Studi Kasus Ruas Jl Jenderal Ahmad Yani–Cilegon). Fondasi: Jurnal Teknik Sipil, 2(2). DOI: http://dx.doi.org/10.36055/jft.v2i2.1727

[11] Sulistiani dan Munawar, A. 2018. Analisis Off Street Parking dan On Street Parking di Obyek Wisata Goa Gong. Jurnal Nasional Pariwisata Vol 10 No 1

[12] Mahardika, K. (2020). Potensi Penataan Parkir Di Kabupaten Bandung. Majalah Ilmiah UNIKOM, 17(2), 131-142.

[13] Putrato, P. A., Utami, S. R. L., & Setiawan, M. B. (2021). Analisis Kebutuhan Dan Penataan Lahan Parkir Di Pasar Pegandon, Kabupaten Kendal. Reviews in Civil Engineering, 5(1).

[14] Maslina dan Irawan, R. 2020. Analisa Kebutuhan Ruang Parkir Kantor PT. Intipratama Bandar Kariangau Balikpapan. Jurnal TRANSUKMA Vol 03 No 01 Desember 2020. Download 5 Agustus 2023 https://www.researchgate.net/publication/364793548_Analisa_Kebutuhan_Ruang_Parkir_Kantor_PT_Intipratama_Bandar_Kariangau_Balikpapan_Requirements_of_Parking_Analysis_in_PT_Intipratama_Bandar_Kariangau_Balikpapan

[15] Puriyadi dan Rejeki. 2021. Analisa Kebutuhan dan Penataan Lahan Parkir di Pasar Pegandon, Kabupaten Kendal, Reviews in Civil Engineering, Vol. 05, No. 1, Hal.33-39, April 2021. Download 21 agustus 2023 https://www.researchgate.net/publication/367994361_ANALISIS_KEBUTUHAN_DAN_PENATAAN_LAHAN_PARKIR_DI_PASAR_PEGANDON_KABUPATEN_KENDAL

[16] Ruchjat dan Yamin. 2019. Analisis sistem perparkiran dan pengembangan jaringan transportasi Pada kawasan pantai losari Kota Makassar. Vol 1. Hal 1-13. https://r.search.yahoo.com/_ylt=Awr.1TnA4xJlUi0JhD9XNyoA;_ylu=Y29sbwNncTEEcG9zAzMEdnRpZANMT0NVSTEwMkJfMQRzZWMDc3I-/RV=2/RE=1695765568/RO=10/RU=https%3a%2f%2frepository.uksw.edu%2fbitstream%2f123456789%2f5041%2f2%2fT1_222009015_BAB%2520I.pdf/RK=2/RS=7uq8dHGpHiGcB.ytkWV80CWlMxc-

[17] Sulistiani dan Munawar, A. 2018, Analisis Fasilitas Parkir dan Aksesibilitas 70 Teknisia, Volume 27, No. 01, Mei 2022 Objek Wisata Goa Gong, Pacitan, Jurnal Riset Rekayasa Sipil Vol 1 No 2.