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Traffic Impact Analysis Due to Construction of Special Eye Hospital Padang Eye Center

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ABSTRAK

Padang Eye Center is one of the hospitals under construction on Jalan Khatib Sulaiman, Lolong Belanti, North Padang District, Padang City, West Sumatra. The construction of the hospital will certainly have an impact on traffic on Jalan Khatib Sulaiman. The purpose of conducting andalalin is to analyze the amount of travel demand that occurs at the Padang Eye Center Hospital in pre-construction, construction period, operational period, and post 5 years of construction, as well as seeing the impacts that occur and how alternative solutions are carried out. The parameters used are based on the Regulation of the Minister of Transportation of the Republic of Indonesia Number 17 of 2021 concerning the implementation of andalalin, the Indonesian Road Capacity Guidelines (PKJI) of 2023 concerning the performance of road sections and the Directorate General of Land Transportation of 1996 concerning parking. The results of the analysis, namely the existing conditions obtained a V / C ratio of 0.43 level B, the construction period obtained a V / C ratio of 0.45 level C, the operational period with a V / C ratio of 0.45 level C, and after 5 years of operation the V / C ratio is 0.58 level C which means that the flow is stable, but the operating speed begins to be limited based on the level of service (LOS) table. Parking needs based on the building area of 2832 m2 were obtained as many as 113 srp, while based on the available parking area it can accommodate as many as 121 srp, so the parking space requirements of the Padang Eye Center Special Eye Hospital have been met. The alternative solution to this analysis is the placement of regulatory officers in front of the entrance and exit of the Khatib Sulaiman Road intersection during the construction period, regulating parking circulation within the hospital area, and making barrier gates to regulate vehicle traffic flow.

Keywords: *Hospital; Andalalin; Traffic Performance; Parking.*

INTRODUCTION

Along with the development of society in Padang City and the construction of buildings, one of which is the Padang Eye Center Special Eye Hospital (RSKM) located on Jalan Khatib Sulaiman, Lolong Belanti, North Padang District. The construction of the Special Eye Hospital functions as a health facility in which there are several activities such as treatment, care, healing, and medical therapy specifically for people with eye diseases in Padang City. The construction of the Padang Eye Center Eye Hospital will certainly have an impact on the smooth running of traffic around the area.

Padang City is the center of economy, education, and health in West Sumatra, which causes the development of potential throughout the West Sumatra region in the form of agriculture,

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plantation, industry, and tourism sectors in Indonesia. One of the developments that occurred in Padang City was influenced by transportation facilities in the form of roads.

Figure 1. Visual Condition of Khatib Sulaiman Road Section

METHODS

Based on the Regulation of the Minister of Transportation of the Republic of Indonesia Number 17 of 2021 concerning the implementation of the implementation of andalalin states "Every development plan that includes activity centers, settlements, infrastructure, which causes disturbances to security, safety, order, and smoothness of traffic and road transportation must be carried out a Traffic Impact Analysis (Andalalin)". In addition, to reduce the impact of problems, alternative solutions are needed from the development location area. The flow chart of the andalalin research on the construction of the Padang Eye Center specialty eye hospital is shown in Figure 2 below.

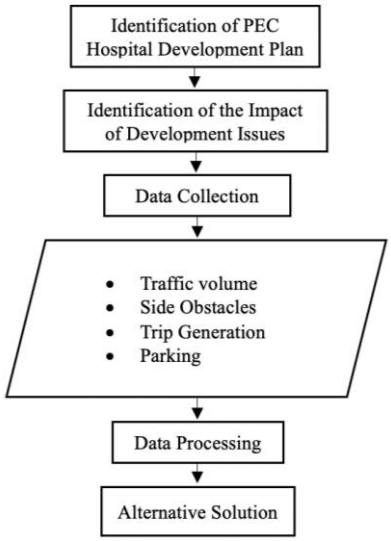

Figure 2. Flow Chart for the Construction of Padang Eye Center Specialized Eye Hospital

The initial stage in the research is to identify the construction plan of the hospital building, then the problems that occur are obtained. The next stage is to collect data, namely traffic volume, side obstacles, trip generation, parking. Analysis of road section performance and parking

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demand is carried out. From these problems will be seen the impact caused and minimize the problem by providing alternative solutions.

RESULT AND DISCUSSION

Traffic Volume of Khatib Sulaiman Road Section

- Traffic Volume on Jalan Khatib Sulaiman Direction Telkom-President's Intersection (Weekday)

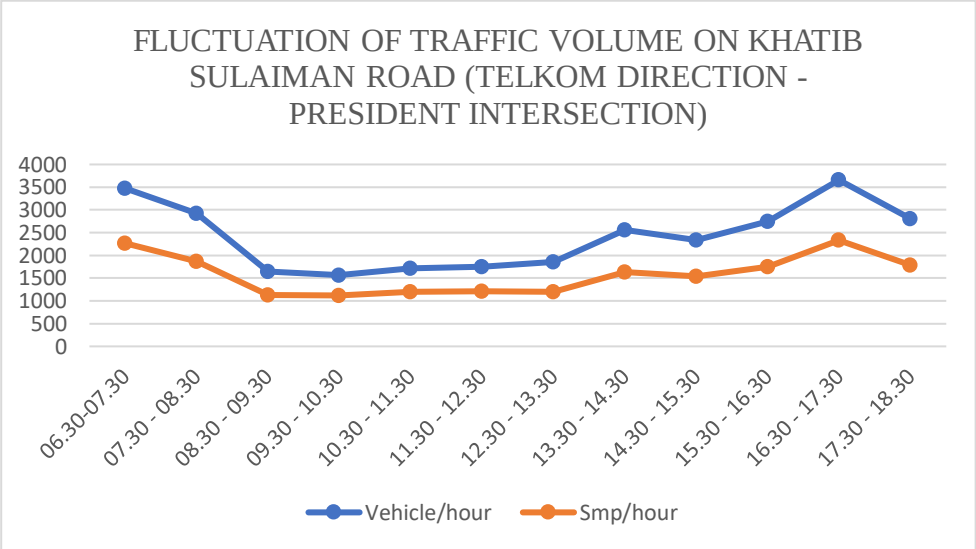

Figure 3. Traffic Volume Fluctuations on Jalan Khatib Sulaiman (Telkom-President's Intersection) on Weekdays

Traffic Volume on Khatib Sulaiman road towards President-Telkom Intersection (Weekday)

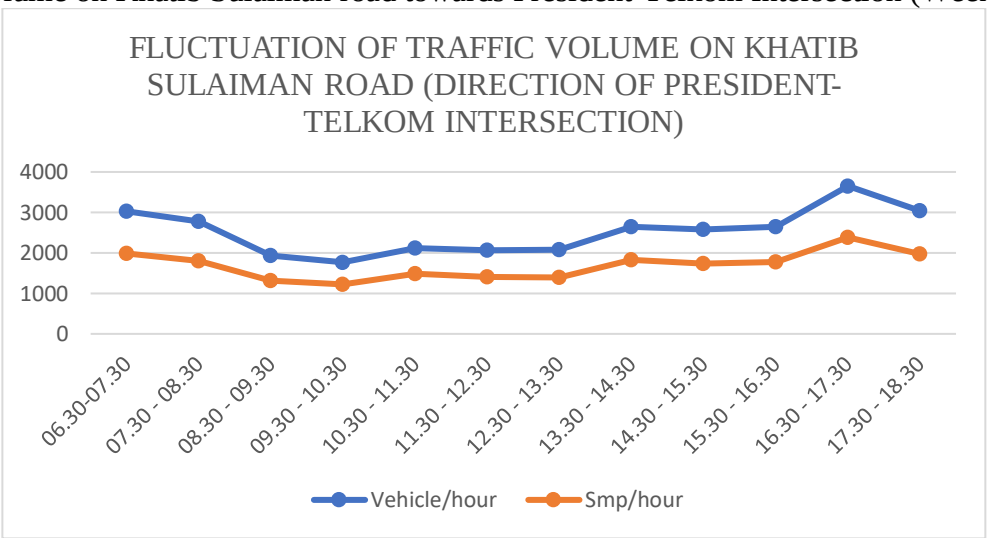

Figure 4. Traffic Volume Fluctuations on Khatib Sulaiman Street (President-Telkom Intersection) on Weekdays

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- Combined Khatib Sulaiman Road Traffic Volume (Weekdays)

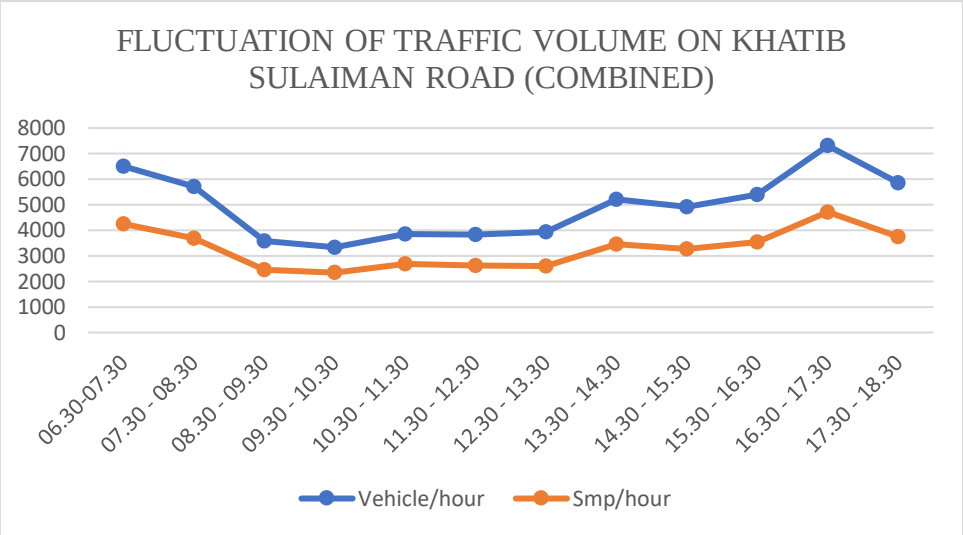

Figure 5. Traffic Volume Fluctuations on Khatib Sulaiman Street (Combined) on Weekdays

Predicted Existing Traffic Performance

- Road Section Performance

The results of the calculation of road capacity in existing conditions can be seen in Table 1:

Table 1. Road Capacity Analysis Under Existing Conditions

Morning					
No	**Road Section Name**	**C**	**V**	**V/C**	**Ratio**
		Smp/hour	**Smp/hour**		
1	Khatib Sulaiman (Telkom-President's Intersection)	5145,56	2265,60	0,44	B
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	1982,00	0,44	B
Noon					
No	**Road Section Name**	**C**	**V**	**V/C**	**Ratio**
		Smp/hour	**Smp/hour**		
1	Khatib Sulaiman (Telkom-President's Intersection)	5145,56	1631,60	0,32	B
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	1826,80	0,40	B
Evening					
No	**Road Section Name**	**C**	**V**	**V/C**	**Ratio**
		Smp/hour	**Smp/hour**		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	2332,30	0,45	C
2	Khatib Sulaiman Road (President-Telkom Intersection)	4516,33	2383,60	0,53	C

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Based on the results of the calculation of the capacity of the Jalan khatib Sulaiman section, the Telkom-President Intersection direction was obtained at 5145.56 smp / hour, while the President-Telkom Intersection direction was obtained at 4516.33 smp / hour, in the morning hours with a V / C ratio value of 0.44 at level B, in the afternoon hours with a V / C ratio value of 0.32 Telkom-President Intersection direction and 0.40 President-Telkom Intersection direction at level B, in the afternoon hours with a V / C ratio value of 0.45 Telkom-President Intersection direction and 0.53 President-Telkom Intersection direction at level C.

Construction Period Traffic Performance Prediction

Road Section Performance

The results of the road capacity calculation during the construction period can be seen in Table 2:

Table 2. Road Capacity Analysis During Construction Period

Morning					
No	**Road Section Name**	**C**	**V**	**V/C**	**Ratio**
		Smp/hour	**Smp/hour**		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	2286,20	0,44	B
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	1992,50	0,44	B
Noon					
No	**Road Section Name**	**C**	**V**	**V/C**	**Ratio**
		Smp/hour	**Smp/hour**		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	1710,41	0,33	B
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	1915,03	0,42	B
Evening					
No	**Road Section Name**	**C**	**V**	**V/C**	**Ratio**
		Smp/hour	**Smp/hour**		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	2444,95	0,48	C
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	2498,73	0,55	C

Based on the results of the calculation of the capacity of the Jalan khatib Sulaiman section, the Telkom-President Intersection direction was obtained at 5145.56 smp / hour, while the President-Telkom Intersection direction was obtained at 4516.33 smp / hour, in the morning hours with a V / C ratio value of 0.44 at level B, in the afternoon hours with a V / C ratio value of 0.33 Telkom-President Intersection direction and 0.42 President-Telkom Intersection direction at level B, in the afternoon hours with a V / C

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ratio value of 0.48 Telkom-President Intersection direction and 0.55 President-Telkom Intersection direction at level C.

Predicted Operational Period Traffic Performance

Road Section Performance

The results of the calculation of road capacity during the operational period can be seen in Table 3:

Table 3. Road Capacity Analysis During Operational Period

Morning					
No	Road Section Name	C	V	V/C	Ratio
		Smp/hour	Smp/hour		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	2414,15	0,47	C
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	2097,48	0,46	C
Noon					
No	Road Section Name	C	V	V/C	Ratio
		Smp/hour	Smp/hour		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	1631,60	0,32	B
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	1826,80	0,40	B
Evening					
No	Road Section Name	C	V	V/C	Ratio
		Smp/hour	Smp/hour		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	2332,30	0,45	C
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	2383,60	0,53	C

Based on the results of the calculation of the capacity of the Jalan khatib Sulaiman section, the Telkom-President Intersection direction was obtained at 5145.56 smp / hour, while the President-Telkom Intersection direction was obtained at 4516.33 smp / hour, in the morning hours with a V / C ratio value of 0.47 Telkom-President Intersection and 0, 46 in the direction of the President-Telkom Intersection at level C, at noon with a V / C ratio of 0.32 in the Telkom-President's Intersection direction and 0.40 in the President-Telkom Intersection direction at level B, in the afternoon with a V / C ratio of 0.45 in the Telkom-President's Intersection direction and 0.53 in the President-Telkom Intersection direction at level C.

Predicted Traffic Performance After 5 Years of Operation

Trip Attraction

The predicted total trip attraction of Padang Eye Center Specialty Hospital can be seen in Table 4:

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Table 4. Total Predicted Trip Generation

Type of Attraction	Attraction	Total Trip Attraction
	Smp/hour	Smp/hour
Attraction from Number of Visitors	39,126	58,876
Attraction of Labor	19,75	

Trip Distribution

To see the increase in traffic volume, 3 divisions of traffic zoning were carried out at the construction site of the Padang Eye Center Special Eye Hospital in Figure 6 and travel distribution calculations were carried out as shown in Table 5:

Figure 6. Traffic Zoning of RSKM PEC

Table 5. Distribution of Traffic Movement After 5 Years of Operation

OD	1	2	3	amount
1	0,00	2690,72	66,70	2757,42
2	3065,12	0,00	86,85	3151,97
3	36,46	41,68	0,00	78,14

Road Section Performance

The results of the calculation of road capacity after 5 years of operation can be seen in Table 6:

Table 6. Road Capacity Analysis After 5 Years of Operation

Morning					
No	Road Section Name	C	V	V/C	Ratio
		Smp/hour	Smp/hour		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	3203,90	0,62	C
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	2783,63	0,62	C
Noon					

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No	Road Section Name	C	V	V/C	Ratio
		Smp/hour	Smp/hour		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	2165,35	0,42	B
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	2424,40	0,54	C
Evening					
No	Road Section Name	C	V	V/C	Ratio
		Smp/hour	Smp/hour		
1	Khatib Sulaiman (President-Telkom Intersection)	5145,56	3095,27	0,60	C
2	Khatib Sulaiman (President-Telkom Intersection)	4516,33	3163,35	0,70	C

Based on the results of the calculation of the capacity of the Jalan khatib Sulaiman section, the Telkom-President Intersection direction is obtained at 5145.56 smp / hour, while the direction of the President-Telkom Intersection is obtained at 4516.33 smp / hour, in the morning hours with a V / C ratio value of 0.62 Telkom-President Intersection and 0, 62 in the direction of the President-Telkom Intersection at level C, at noon with a V / C ratio of 0.42 in the Telkom-President's Intersection direction and 0.54 in the President-Telkom Intersection direction at level B, in the afternoon with a V / C ratio of 0.60 in the Telkom-President's Intersection direction and 0.70 in the President-Telkom Intersection direction at level C.

Parking Space Requirement

Parking space requirements are based on the building area as shown in Table 7:

Table 7. Parking Space Needs Based on Building Area

Vehicle Type	**Building Area (m2)**		**Parking Requirement (Srp)**		**Parking Capacity**
	Floor plan	**Standard**	**Floor plan**	**Standard**	
Passenger Cars	2832	4000	26	37	45
Motorcycles			87	123	76
Total			113	160	121

From the table above, it can be seen that the building area of RSKM PEC is 2832 m2 and parking needs as many as 113 vehicles, including 26 passenger cars and 87 motorbikes. Meanwhile, when viewed based on the plan, the parking space can accommodate 121 vehicles where passenger cars are 45 vehicles and motorbikes are 76 vehicles.

Parking Circulation

The following is the parking circulation in the Padang Eye Center Special Eye Hospital building shown in Figure 7:

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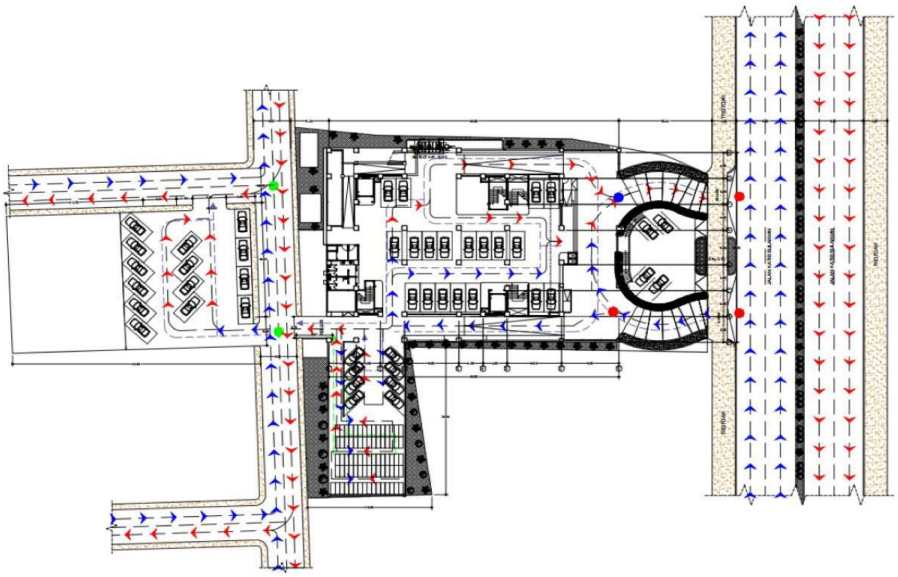

Figure 7. Padang Eye Center Specialty Hospital Parking Circulation

Alternative Solutions and Recommendations

Based on the problems obtained related to RSKM PEC, among others:

1. Construction Period
   The solutions or recommendations made are:
   a. Placement of regulatory officers in front of the exit and from the intersection of Jalan Khatib Sulaiman
   b. Not allowing the movement of heavy vehicles during peak hours and required during vehicle fluctuations
   c. Installing caution signs around the PEC Hospital gate area
   d. Repairing road pavement in case of damage due to heavy equipment mobilization
2. Operational Period
   The solutions and recommendations during the operational period are:
   a. Organize parking circulation in the area in accordance with the direction signs for the location of PEC RSKM
   b. Provide parking availability in accordance with the standards and capacity of the RSKM PEC area
   c. Provide officers who function to organize vehicles from visitors to the RSKM PEC area.
   d. Installing Barrier Gate at the entrance and automatic portal at RSKM PEC.Ruas Jalan Khatib Sulaiman
   3. Khatib Sulaiman Road Section

The solutions and recommendations on the Khatib Sulaiman Road Section are:

a. Installing signs prohibiting speeds exceeding 40 km/h on the Khatib Sulaiman Road Section so as not to cause accidents.
b. For vehicles that stop on the road body, traffic signs are installed in the prohibition of stopping along the Khatib Sulaiman Road section
c. Due to the large number of pedestrian crossing activities, a zebra crossing was installed in front of the PEC Hospital
d. Installing signs prohibiting motorcyclists who go against the direction around Khatib Sulaiman Road.

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CONCLUSIONS

Based on the results of the analysis, namely the existing conditions obtained V / C ratio of 0.43 level B, the construction period obtained a V / C ratio of 0.45 level C, the operational period with a V / C ratio of 0.45 level C, and after 5 years of operation V / C ratio of 0.58 level C which means that the flow is stable, but the operating speed begins to be limited based on the level of service (LOS) table. Parking needs based on a building area of 2832 m2 were found to be 113 srp, while based on the available parking area it can accommodate as many as 121 srp, so the parking space requirements of the Padang Eye Center Special Eye Hospital have been met. The alternative solution for this analysis is the placement of regulatory officers in front of the exit and intersection of Jalan Khatib Sulaiman during the construction period, regulating parking circulation within the hospital area, and creating a barrier gate to regulate vehicle traffic flow.

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