



Performance Analysis Gilingan's Underpass Development

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INTRODUCTION

Transportation is the lifeblood of a city's economy; therefore, the reliability of a transportation system is very important. A good performance of the urban transport system needs to be reached to support the economic growth of the city.



Viaduck
Gilingan

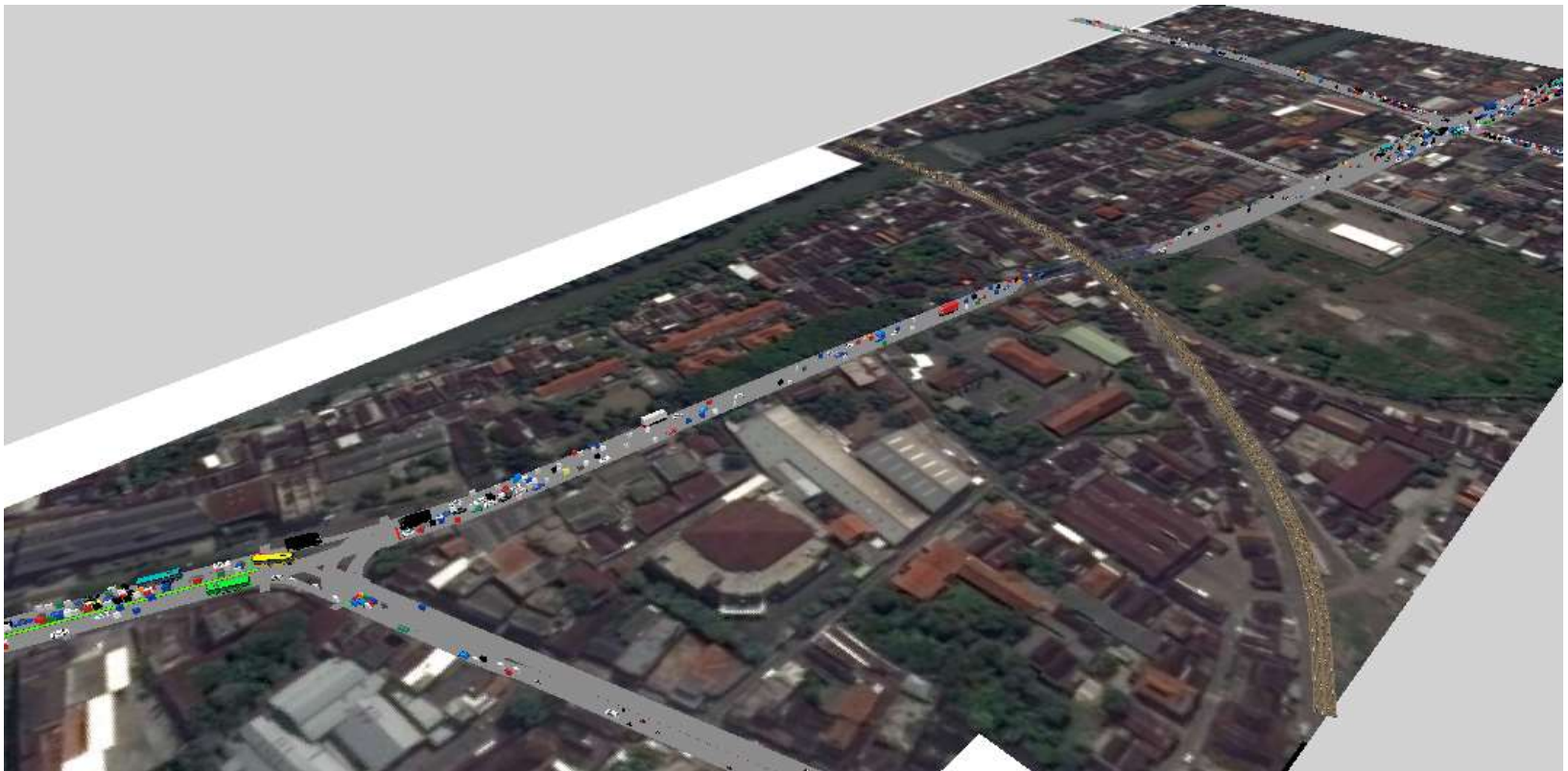
The existence of the Gilingan Viaduct potentially creates traffic jams



Strategies and techniques proposed to overcome the above problems are amongst others by widening the road and raising infrastructure the existing viaduct to become a construction of an underpass followed by management and traffic engineering efforts around the viaduct area.

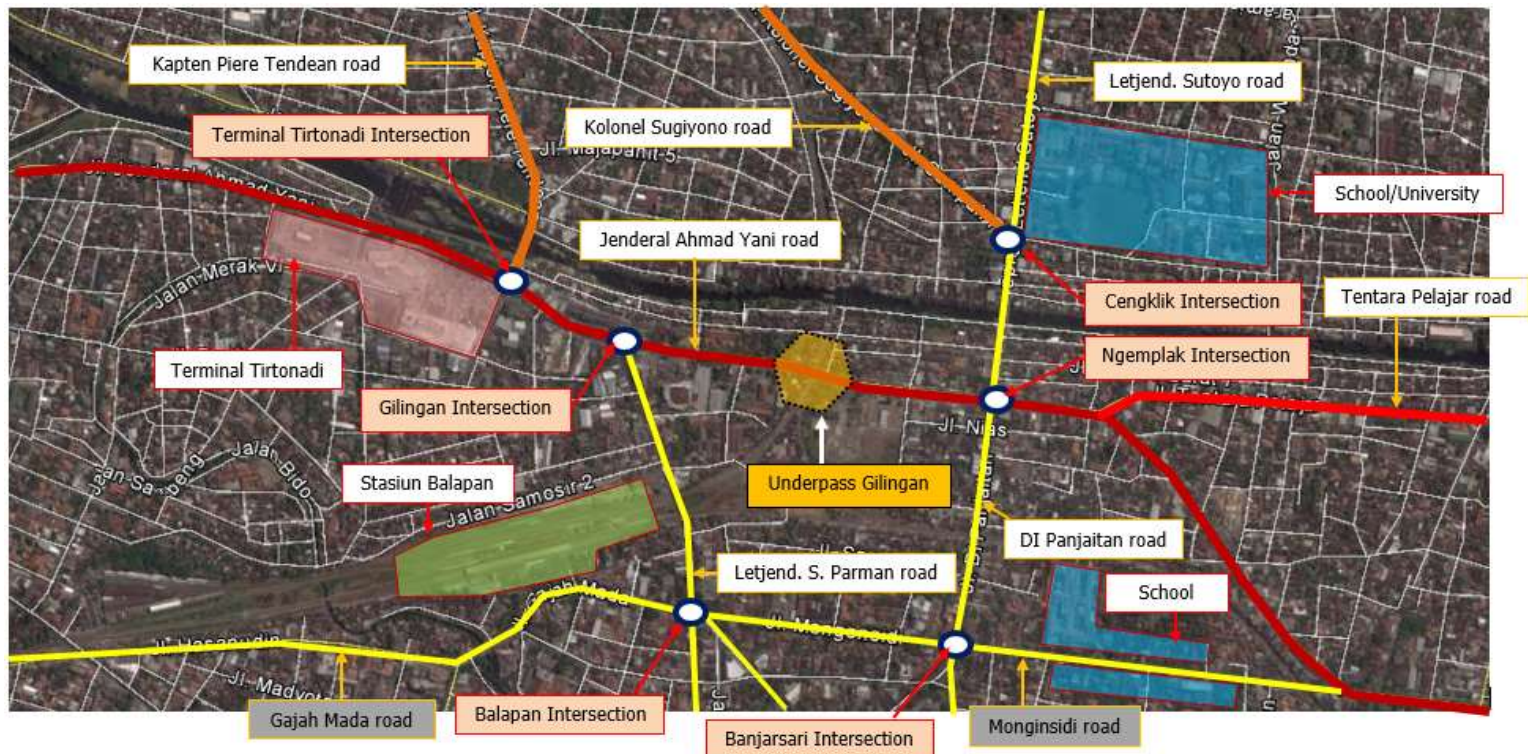
OBJECTIVE

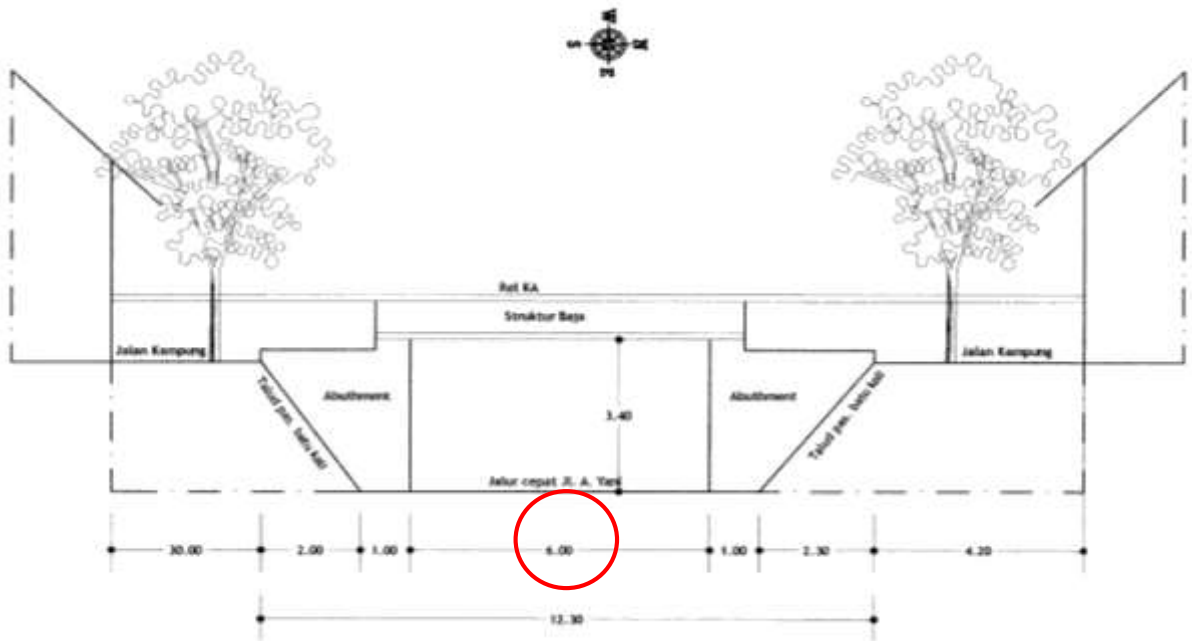
This study aims to determine the performance of traffic in the study area on the existing condition and after the development of the Gilingan Underpass in order to measure the impact of its development.



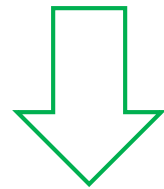
RESEARCH METHOD

The research is conducted on area covering all roads and intersections around the development area of the underpass which includes Jenderal Ahmad Yani road, Terminal Tirtonadi Intersection, Gilingan Intersection, Ngemplak Intersection, Balapan Intersection, Banjarsari Intersection, Cengklik Intersection and the pass road of the freight transport in Surakarta City.



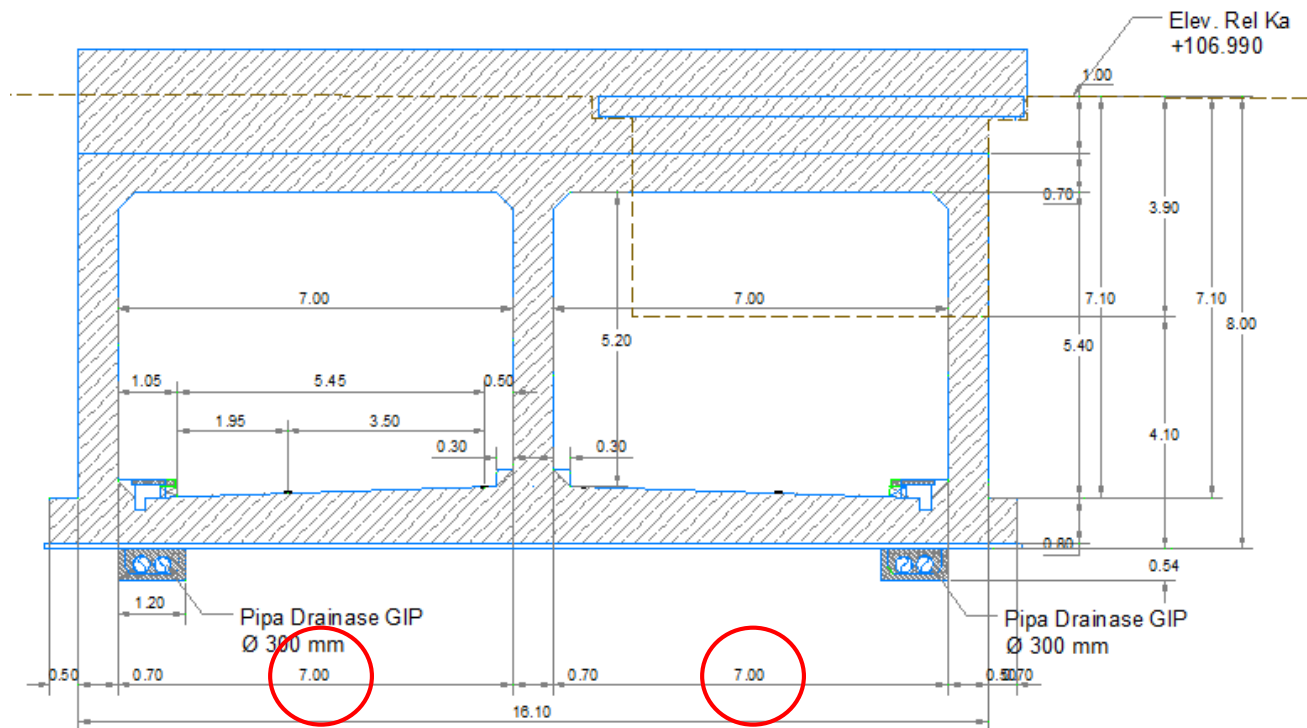


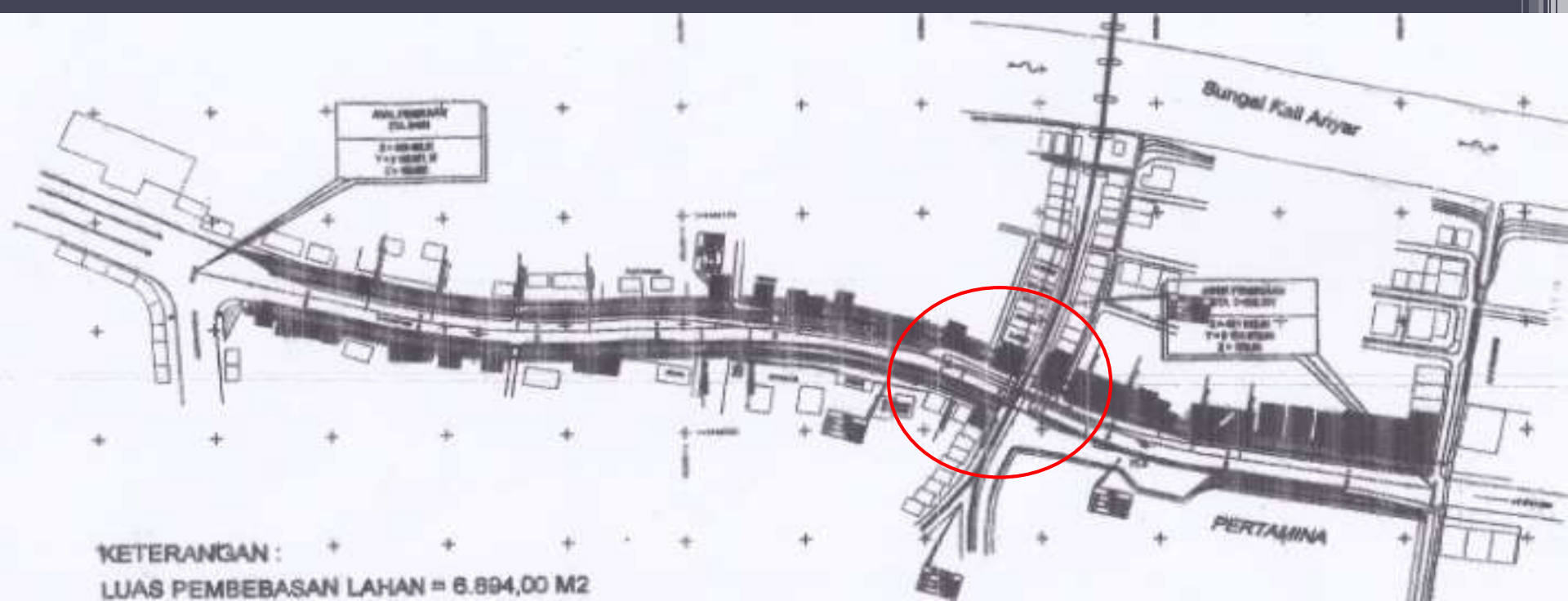
VIADUCK GILINGAN



UNDERPASS GILINGAN

INFRASTRUCTURE





Primary data related to the volume of traffic was taken at the busiest hour from 06.45 to 07.45 am. The traffic count survey at the intersection was conducted to obtain volume of data, a composition of vehicle type, and movement distribution of vehicle turns.

The road and intersection inventory survey is conducted to obtain geometric data and road side friction parameters, and geometric and junction control types.

Related to heavy vehicles, a survey is conducted on the passenger and freight public transport service network

ANALYSIS, RESULTS AND DISCUSSION

Network modelling and traffic performance

Traffic performance for the road segment and signalized intersection) were calculated by using Indonesian Highway Capacity Manual 1997 method.

Traffic performance for the road segment can be seen from the degree of saturation (DS), while for the intersection this can be seen from the value of degree of saturation and delay of intersection (D).

The impact of the underpass construction development on the traffic performance in the study area is measured by comparing traffic performance under existing conditions (base model) and after the development of the underpass (scenario model).

Road performance comparison on existing condition and after development of the Gilingan Underpass.

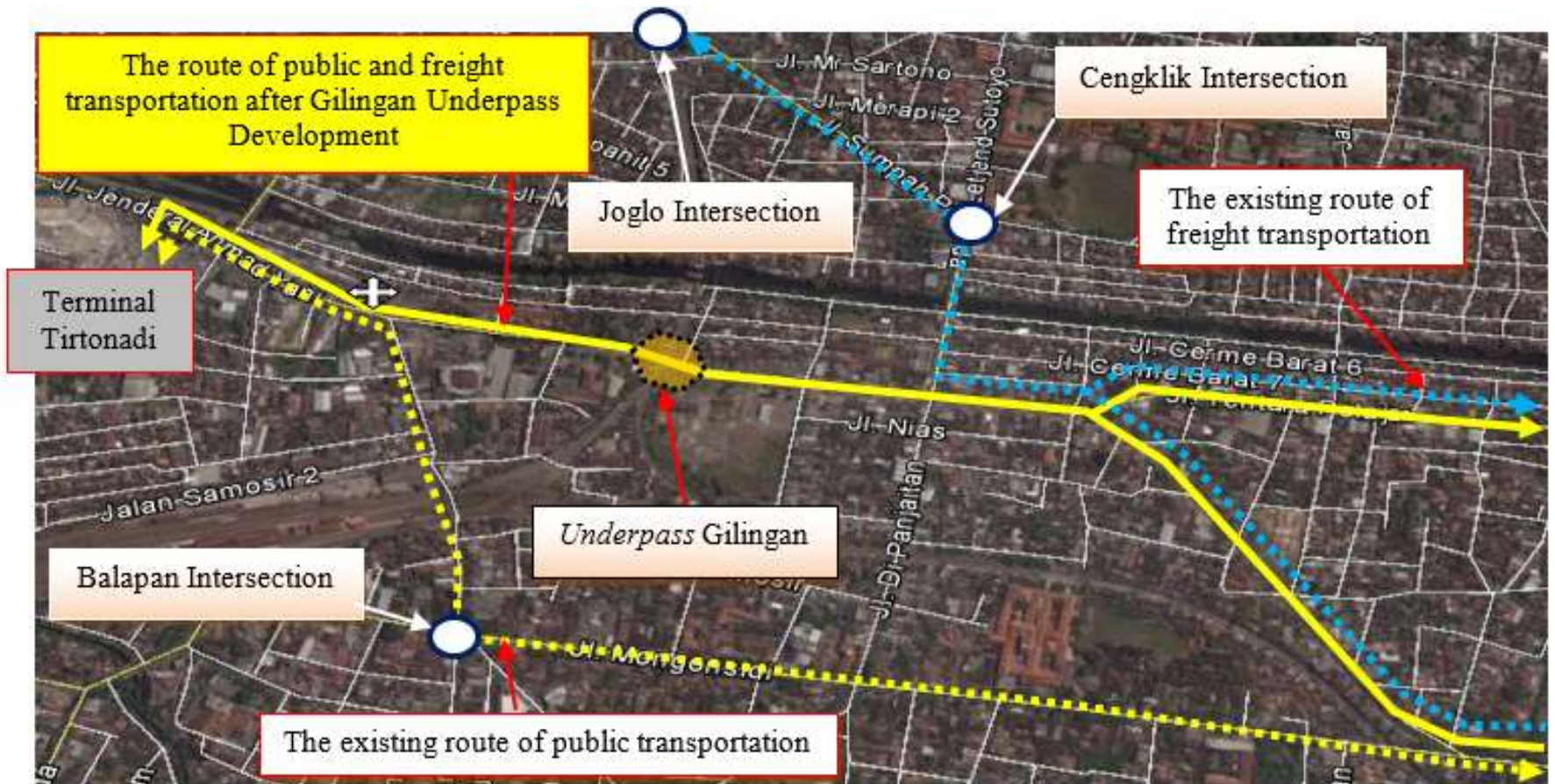
No.	Street's Name	Existing		Gilingan Underpass	
		DS	LOS	DS	LOS
1	Jenderal Ahmad Yani road – West of Terminal Tirtonadi Intersection	0.36	B	0.40	B
2	Jenderal Ahmad Yani – East of Terminal Tirtonadi Intersection	0.56	C	0.62	C
3	Jenderal Ahmad Yani road – Gilingan Underpass	1.19	F	0.52	C
4	Jenderal Ahmad Yani road – East of Ngemplak Intersection	0.54	C	0.59	C
5	Tentara Pelajar road	0.49	C	0.55	C
6	Kolonel Sugiyono road	0.38	B	0.41	B
7	Kapten Piere Tendean road	0.78	D	0.85	D
8	Letjend. Sutoyo road – South of Cengklik Intersection	0.73	D	0.79	D
9	DI Panjaitan road	0.60	C	0.65	C
10	Monginsidi road – West of Banjarsari Intersection	0.33	B	0.35	B
11	Letjend. S. Parman road	0.48	C	0.52	C
12	Monginsidi road – East of Banjarsari Intersection	0.60	C	0.64	C
13	Jenderal Ahmad Yani road (Southeast)	0.64	C	0.69	C
14	Letjend. Sutoyo road – North of Cengklik Intersection	0.62	C	0.67	C
15	Gajah Mada road	0.34	B	0.36	B

The results show that, in general, the value of DS road segment in the condition after underpass development is greater than the existing condition. This is due to the addition of traffic as a result of traffic growth.

Comparison of Signal Intersection Performance on Existing Conditions and After Development of the Gilingan Underpass

Intersection Name	Approach	Existing			Gilingan Underpass		
		DS	D (sec/pcu)	LOS	DS	D (sec/pcu)	LOS
Terminal Tirtanadi Intersection	East	0.72	38.2	D	0.83	38.1	D
	South	0.62			0.69		
	West	0.88			0.87		
	North	0.89			0.71		
Gilingan Intersection	East	0.75	28.0	D	0.77	28.6	D
	South	0.39			0.50		
	West	0.80			0.78		
Ngemplak Intersection	East	1.16	243.2	F	1.12	224.7	F
	South	0.73			1.03		
	West	1.28			1.03		
	North	0.98			1.20		
Balapan Intersection	East	0.53	44.0	E	0.53	39.5	D
	South	0.43			0.48		
	West	0.69			0.61		
	North	0.52			0.66		
Banjarsari Intersection	East	0.70	42.5	E	0.76	46.5	E
	South	0.75			0.84		
	West	0.83			0.88		
	North	0.87			0.88		
Cengklik Intersection	West	0.84	41.7	E	0.85	37.7	D
	South	0.54			0.81		
	North	0.93			0.84		

The performance of Balapan Intersection and Cengklik Intersection increase after the development of the underpass this is because with the development of the underpass, the public transport and freight routes, which previously passed the Balapan Intersection and Cengklik Intersection, can pass through Jenderal Ahmad Yani road (see Figure).



CONCLUSION

The development of the Gilingan Underpass improves the performance of Jenderal Ahmad Yani road and the performance of Balapan Intersection and Cengklik Intersection.

In addition, with the development of the Gilingan Underpass, the **freight transport** which previously passed Joglo Intersection can be rerouted to Jenderal Ahmad Yani road. This will reduce the acute traffic jam at Joglo Intersection.

Similarly, the change of **public transport** routes to Jenderal Ahmad Yani road has the potential to reduce the accident rate in the Monginsidi road segment, where most land is used for schools.

With the reroute of the public transport system to Jenderal Ahmad Yani road, it is necessary to improve the performance of Ngemplak Intersection by widening the road segment and equipping the intersection with traffic lights that are responsive to the traffic, namely demand traffic signal control.

MATUR NUWUN

