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# Traffic Engineering Management of Cikarang Wholesale Center, Cikarang Terminal, and Jababeka Area

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## ABSTRACT

Bekasi Regency is the second-highest in number of motorized vehicles for motorbikes and first for cars. During peak hours at certain sections and intersections, especially in the SGC area, Cikarang Terminal, and Jababeka area, there are traffic problems ranging from side obstacles, public transport dropping/picking up passengers incorrectly, and so on. This research aims to outline the performance of existing sections and intersections in the SGC area, Cikarang Terminal, and Jababeka area as well as identify existing traffic problems and how to handle them. The methods used are The step model, section performance analysis, intersection performance analysis, Forecasting, model validation, and PTV Vissim. The research results show that there are 3 problematic road segments with a high level of service, including Jl. Fatahillah 2, Jl. Raya Industri, Jl. Captain Sumantri with a VC Ratio of 0.75, 0.85, and 0.94 respectively and there are 6 of the 9 intersections that have problems, namely the Brigief Dormitory intersection, the terminal intersection, and the Yos Sudarso-Kp. Sumantri intersection, the Arief Rahman Hakim- Jl. Industry intersection, Pasir Gombong intersection, and SGC intersection. Changes resulting from traffic management and engineering are not very significant every 5 years because many drivers will switch to the road section with the lowest VCR.

**Keywords:** method; section performance; intersection performance; VC Ratio.

## INTRODUCTION

According to Steenbrink (1974), transportation is the movement of people or goods using equipment or vehicles to and from geographically separated places. Transportation is a supporting sector in every human activity, whether routine work, business, education, social activities and so on. As supporting infrastructure, transportation must be able to provide good service so that an effective and efficient movement system is obtained for transportation users.

According to Morlok (1981), transportation means moving or transporting something from one place to another. The main components in transportation are people and goods (which are transported), vehicles (transportation equipment), roads (place of movement), terminals (transportation system nodes) and operating systems (managing the other 4 components). However, from the perspective of the movement itself, it only consists of the movement of vehicles and people. Therefore, these two components must receive adequate and proportional attention in the system of providing transportation infrastructure and services.

A transportation problem that often occurs in big cities is traffic jams on roads that have high accessibility. This high accessibility can be caused by, among other things, the geometry of the road, the quality of the pavement, the distance traveled, the travel time, the nature of the land use around the road and so on. The congestion that occurs is caused by traffic demand not being proportional to traffic supply - which in this case is the capacity of the roads.

Bekasi Regency is one of the supporting districts of the nation's capital. According to data from the West Java Provincial Central Statistics Agency (2018), Bekasi Regency ranks 2nd highest in the number of motorized vehicles, namely motorbikes, and occupies the top rank, namely 1st in the number of motorized vehicles for cars. The number of residents in an area greatly influences the number of private vehicles and travel levels. There is an international scale industrial area in Bekasi

Regency, located in Cikarang. So that the industrial area becomes a travel destination for Bekasi Regency residents to fulfill economic and social activities.

During peak hours on certain roads and intersections, especially in the SGC area, traffic congestion occurs. This area consists of shops, shopping centers, markets, terminals and offices, so there are many traffic problems that arise in the SGC area, Cikarang Terminal, and the Jababeka area starting from side obstacles on the road, starting from loading and unloading on the road, public transportation/angdes dropping off passengers not in the right place, spilled markets, not optimal u-turns, many two-wheeled and four-wheeled vehicles going in the opposite direction to shorten distance to the station, lack of pedestrian paths, less than optimal intersections, and less than optimal APILL cycles

This study will analyze the traffic performance in the study area, namely the road network in the Jababeka area, Cikarang Terminal, and Cikarang Wholesale Center (SGC). In the end, recommendations for handling the problems that have been identified will be proposed so that traffic performance can be better. The aim of this research is to analyze traffic performance in the Bekasi Regency SGC Area, Cikarang Terminal, and Jababeka Industrial Area under existing conditions.

## RESEARCH METHODS

### Four Step Model (4 Stage Transportation Model)

1. The Generation and Attraction of Travel

Travel Generation and Attraction is a modeling stage that estimates the number of movements originating from a zone or land use as well as the number of movements attracted to a land use or zone (Tamin, 2000). Traffic movement is a land use function that produces traffic movement. This traffic generation and attraction includes: Traffic leaving a location, as well as traffic heading to or arriving at a location. The output results from calculating traffic generation and attraction are the number of vehicles, people or goods transported per unit time, for example vehicles/hour. To get travel generation and attraction, you can easily calculate the number of people or vehicles entering or leaving a certain area of land in one day (or one hour). The generation and attraction of traffic depends on two aspects of land use, including: the type and number of activities/intensity of the land use (Tamin, 2000).

2. Travel Distribution

Trip distribution is the number of trips originating from an origin zone that spread to many destination zones or conversely the number of trips that come together to a destination zone that previously came from a number of origin zones. At this stage the number of trips and distribution from one zone to another is based on the results of trips generated and trips drawn to each zone. The spread of travel occurs because it is greatly influenced by land use and existing facilities in each zone. Trip distribution processing is presented in the form of a trip destination origin matrix.

3. Mode Selection

This mode selection stage is a stage of the transportation planning process which functions to determine travel charges or find out the proportion of use of available transportation modes to serve a certain origin-destination point, so that there are certain travel purposes as well. Mode selection analysis basically uses information from the trip generation stage of transportation planning and assigns or assigns trips according to transportation mode, both before and after the trip distribution analysis.

4. Travel Charges

Route selection is the 4th stage of travel forecasting which aims to model the behavior of travelers in choosing the route that according to the traveler is the best route.

At this stage there are several factors involved, namely:

1) Trip generation, the number of trips generated from the origin zone to the destination zone.
2) Travel distribution, the largest number of trips to various zones in the study area.

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Route selection, the number of travel flows is assigned to certain road sections in the road network that connects a pair of origin zones with destination zones, so that the target of this route selection stage is to allocate trips from the origin zone to the destination zone with the number of trips based on the origin destination matrix that has been established. converted from trips per day to smp per hour. These trips are spread across various routes most frequently used by travelers.

## RESULT AND DISCUSSION

### Road Segment Performance

1. Road Section Capacity

Road capacity is the ability of a road section to accommodate the ideal volume per unit of time, expressed in vehicles per hour or passenger car units per hour (pcu/hour). For road inventory data in the research area, you can see the table below. Jalan Fatahillah 4 is a 4/2 D type road with medium side resistance, so the side resistance coefficient factor is 1.00. Then the population in Bekasi Regency is 3,889,000 people. For a population >3,000,000 people, the adjustment factor for city size is 1.04. The following is an example of calculating the capacity of Jalan Fatahillah 4:

$C = Co \times FCw \times FCsp \times FCsf \times FCcs$

C = 3300 x 1.14 x 1 x 0.94 x 1.04

C = 3678 pcu/hour

For more details regarding the capacity calculation for each road section, you can see the following table.

**Table 1.** Road Section Capacity

| Codification | | Roads | Co | FCw | FCsp | FCsf | FCcs | C (pcu/hour) |
|---|---|---|---|---|---|---|---|---|
| Initial Node | End Node | | | | | | | |
| **SECTION 1** | | | | | | | | |
| 1 | 50 | Jl. Fatahilah 4 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 50 | 1 | Jl. Fatahilah 3 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 50 | 51 | Jl. Fatahilah 2 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 51 | 50 | Jl. Fatahilah 1 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 51 | 52 | Jl. RE. Martadinata 4 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 52 | 51 | Jl. RE. Martadinata 3 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 52 | 20 | Jl. RE. Martadinata 2 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 20 | 52 | Jl. RE. Martadinata 1 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 51 | 53 | Jl. Yos Sudarso | 2900 | 1.14 | 1 | 0.92 | 1.04 | 3163 |
| **SECTION 2** | | | | | | | | |
| 20 | 56 | Jl. Raya Industri 1 | 2900 | 1.14 | 1 | 0.89 | 1.04 | 3060 |
| 56 | 57 | Jl. Raya Industri 2 | 2900 | 1.14 | 1 | 0.89 | 1.04 | 3060 |
| 56 | 52 | Jl. Arief Rahman Hakim | 2900 | 1 | 1 | 0.92 | 1.04 | 2775 |
| 57 | 21 | Jl. Raya Industri 3 | 2900 | 1.14 | 1 | 0.89 | 1.04 | 3060 |
| **SECTION 3** | | | | | | | | |
| 20 | 53 | Jl. Captain Sumantri | 2900 | 0.87 | 1 | 0.82 | 1.04 | 2152 |
| 53 | 55 | Jl. Gatot Subroto | 2900 | 1 | 1 | 0.94 | 1.04 | 2835 |
| 20 | 55 | Jl. RE. Martadinata 5 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |
| 55 | 20 | Jl. RE. Martadinata 6 | 3300 | 1.14 | 1 | 0.94 | 1.04 | 3678 |

Source: Analysis Results, 2023

2. Traffic Volume

To find out the characteristics of traffic, a traffic enumeration survey must be carried out on the roads around the location. At the location of the study area, the road sections where the traffic enumeration survey is carried out are the road sections being studied. Based on the results of the traffic enumeration survey, the following traffic volume data was obtained:

**Table 2.** Traffic volume on road sections

| **Codification** | | **Roads** | **Capacity** | **C (pcu/hour)** |
|---|---|---|---|---|
| **Initial Node** | **End Node** | | | |
| **SECTION 1** | | | | |
| 1 | 50 | Jl. Fatahilah 4 | 3678 | 2199.6 |
| 50 | 1 | Jl. Fatahilah 3 | 3678 | 1876.9 |
| 50 | 51 | Jl. Fatahilah 2 | 3678 | 2480.0 |
| 51 | 50 | Jl. Fatahilah 1 | 3678 | 2072.9 |
| 51 | 52 | Jl. RE. Martadinata 4 | 3678 | 2418.1 |
| 52 | 51 | Jl. RE. Martadinata 3 | 3678 | 1494.8 |
| 52 | 20 | Jl. RE. Martadinata 2 | 3678 | 2418.1 |
| 20 | 52 | Jl. RE. Martadinata 1 | 3678 | 1778.9 |
| 51 | 53 | Jl. Yos Sudarso | 3163 | 2012.9 |
| **SECTION 2** | | | | |
| 20 | 56 | Jl. Raya Industri 1 | 3060 | 2586.5 |
| 56 | 57 | Jl. Raya Industri 2 | 3060 | 2009.4 |
| 56 | 52 | Jl. Arief Rahman Hakim | 2775 | 603.2 |
| 57 | 21 | Jl. Raya Industri 3 | 3060 | 2106.7 |
| **SECTION 3** | | | | |
| 20 | 53 | Jl. Captain Sumantri | 2152 | 2012.9 |
| 53 | 55 | Jl. Gatot Subroto | 2835 | 1274.2 |
| 20 | 55 | Jl. RE. Martadinata 5 | 3678 | 2320.6 |
| 55 | 20 | Jl. RE. Martadinata 6 | 3678 | 1567.4 |

3. V/C Ratio

Road mobility is a description of the level of ease of travel from a place of origin to a destination using a road section. Ease of travel shows the traffic performance on that road section, which in this study uses the V/C ratio measure. Based on the results of the survey and analysis, the value of the traffic volume crossing the affected road sections is obtained as seen in the table below.

**Table 3.** V/C Ratio of Road Segments

| **Codification** | **Roads** | **C (pcu/hour)** | **VCRs** |
|---|---|---|---|

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| Initial Node | End Node | | Q (junior high school/hour) | | |
|---|---|---|---|---|---|
| **SECTION 1** | | | | | |
| 1 | 50 | Jl. Fatahilah 4 | 2199.6 | 3677.7 | 0.60 |
| 50 | 1 | Jl. Fatahilah 3 | 1876.9 | 3677.7 | 0.51 |
| 50 | 51 | Jl. Fatahilah 2 | 2479.95 | 3677.7 | 0.67 |
| 51 | 50 | Jl. Fatahilah 1 | 2072.85 | 3677.7 | 0.56 |
| 51 | 52 | Jl. RE. Martadinata 4 | 2418.1 | 3677.7 | 0.66 |
| 52 | 51 | Jl. RE. Martadinata 3 | 1494.75 | 3677.7 | 0.41 |
| 52 | 20 | Jl. RE. Martadinata 2 | 2418.1 | 3677.7 | 0.66 |
| 20 | 52 | Jl. RE. Martadinata 1 | 1778.9 | 3677.7 | 0.48 |
| 51 | 53 | Jl. Yos Sudarso | 2012.9 | 3163.2 | 0.64 |
| **SECTION 2** | | | | | |
| 20 | 56 | Jl. Raya Industri 1 | 2586.5 | 3060.0 | 0.85 |
| 56 | 57 | Jl. Raya Industri 2 | 2009.4 | 3060.0 | 0.66 |
| 56 | 52 | Jl. Arief Rahman Hakim | 603.2 | 2774.7 | 0.22 |
| 57 | 21 | Jl. Raya Industri 3 | 2106.7 | 3060.0 | 0.69 |
| **SECTION 3** | | | | | |
| 20 | 53 | Jl. Captain Sumantri | 2012.9 | 2151.6 | 0.94 |
| 53 | 55 | Jl. Gatot Subroto | 1274.2 | 2835.0 | 0.45 |
| 20 | 55 | Jl. RE. Martadinata 5 | 2320.6 | 3677.7 | 0.63 |
| 55 | 20 | Jl. RE. Martadinata 6 | 1567.35 | 3677.7 | 0.43 |

4. Speed

One of the important traffic performance indicators in traffic management and engineering is speed. The following are the results of a speed survey using the spot speed method.

**Table 4.** Speed on Road Sections

| **Codification** | | **Roads** | **Distance (m)** | **travel time (minutes)** | **Speed (kph)** |
|---|---|---|---|---|---|
| **Initial Node** | **End Node** | | | | |
| **SECTION 1** | | | | | |
| 1 | 50 | Jl. Fatahilah 4 | 700 | 1 | 42.0 |
| 50 | 1 | Jl. Fatahilah 3 | 700 | 1 | 42.0 |
| 50 | 51 | Jl. Fatahilah 2 | 600 | 1 | 36.0 |
| 51 | 50 | Jl. Fatahilah 1 | 600 | 1 | 36.0 |
| 51 | 52 | Jl. RE. Martadinata 4 | 350 | 0.8 | 26.3 |
| 52 | 51 | Jl. RE. Martadinata 3 | 350 | 0.8 | 26.3 |

| Codification | | Roads | Distance (m) | travel time (minutes) | Speed (kph) |
|---|---|---|---|---|---|
| Initial Node | End Node | | | | |
| 52 | 20 | Jl. RE. Martadinata 2 | 550 | 1 | 33.0 |
| 20 | 52 | Jl. RE. Martadinata 1 | 550 | 1 | 33.0 |
| 51 | 53 | Jl. Yos Sudarso | 1400 | 3 | 28.0 |
| **SECTION 2** | | | | | |
| 20 | 56 | Jl. Raya Industri 1 | 450 | 1.5 | 18.0 |
| 56 | 57 | Jl. Raya Industri 2 | 3000 | 9 | 20.0 |
| 56 | 52 | Jl. Arief Rahman Hakim | 500 | 1 | 30.0 |
| 57 | 21 | Jl. Raya Industri 3 | 140 | 0.42 | 20.0 |
| **SECTION 3** | | | | | |
| 20 | 53 | Jl. Captain Sumantri | 210 | 1 | 12.6 |
| 53 | 55 | Jl. Gatot Subroto | 600 | 1 | 36.0 |
| 20 | 55 | Jl. RE. Martadinata 5 | 1000 | 2 | 30.0 |
| 55 | 20 | Jl. RE. Martadinata 6 | 1000 | 3 | 20.0 |

Source: Analysis Results, 2023

5. Density

Based on the results of the speed and traffic volume survey from the results of the traffic enumeration survey, the traffic density values are shown in the table below.

**Table 5.** Road Density

| Codification | | Roads | Speed (kph) | Q (junior high school/hour) | Density (pcu/km) |
|---|---|---|---|---|---|
| Initial Node | End Node | | | | |
| **SECTION 1** | | | | | |
| 1 | 50 | Jl. Fatahilah 4 | 42.0 | 2199.6 | 52.4 |
| 50 | 1 | Jl. Fatahilah 3 | 42.0 | 1876.9 | 44.7 |
| 50 | 51 | Jl. Fatahilah 2 | 36.0 | 2479.95 | 68.9 |
| 51 | 50 | Jl. Fatahilah 1 | 36.0 | 2072.85 | 57.6 |
| 51 | 52 | Jl. RE. Martadinata 4 | 26.3 | 2418.1 | 92.1 |
| 52 | 51 | Jl. RE. Martadinata 3 | 26.3 | 1494.75 | 56.9 |
| 52 | 20 | Jl. RE. Martadinata 2 | 33.0 | 2418.1 | 73.3 |
| 20 | 52 | Jl. RE. Martadinata 1 | 33.0 | 1778.9 | 53.9 |
| 51 | 53 | Jl. Yos Sudarso | 28.0 | 2012.9 | 71.9 |
| **SECTION 2** | | | | | |
| 20 | 56 | Jl. Raya Industri 1 | 18.0 | 2586.45 | 143.7 |
| 56 | 57 | Jl. Raya Industri 2 | 20.0 | 2009.4 | 100.5 |

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| Codification | | Roads | Speed (kph) | Q (junior high school/hour) | Density (pcu/km) |
|---|---|---|---|---|---|
| Initial Node | End Node | | | | |
| 56 | 52 | Jl. Arief Rahman Hakim | 30.0 | 603.2 | 20.1 |
| 57 | 21 | Jl. Raya Industri 3 | 20.0 | 2106.725 | 105.3 |
| **SECTION 3** | | | | | |
| 20 | 53 | Jl. Captain Sumantri | 12.6 | 2012.9 | 159.8 |
| 53 | 55 | Jl. Gatot Subroto | 36.0 | 1274.2 | 35.4 |
| 20 | 55 | Jl. RE. Martadinata 5 | 30.0 | 2320.6 | 77.4 |
| 55 | 20 | Jl. RE. Martadinata 6 | 20.0 | 1567.35 | 78.4 |

Source: Analysis Results, 2023

**Matric Origin Travel Destination Current Conditions in 2024 (Existing)**

As discussed in the previous chapter, the study area is divided into eight zones which are the origin and destination of travel on the study area road network, namely zone 1 (access towards Cibitung), zone 2 (access Jl. Brigief), zone 3 (access South railroad intersection), zone 4 (North Pilar Access), zone 5 (Pilar East Access), zone 6 (Jababeka Door 7 Access), zone 7 (Pasir Gombong West Access), zone 8 (Pasir Gombong East Access). The travel origin-destination matrix obtained from the survey results is as follows.

**Table 6.** Origin Destination Matrix 2024 (pcu/hour)

| OD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Hey |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 360 | 44 | 439 | 1341 | 1320 | 1530 | 446 | 5480 |
| 2 | 247 | 0 | 16 | 164 | 500 | 492 | 571 | 238 | 2228 |
| 3 | 19 | 10 | 0 | 13 | 55 | 54 | 63 | 18 | 233 |
| 4 | 262 | 143 | 17 | 0 | 531 | 523 | 606 | 252 | 2335 |
| 5 | 430 | 234 | 29 | 286 | 0 | 859 | 996 | 415 | 3248 |
| 6 | 341 | 186 | 23 | 227 | 989 | 0 | 790 | 329 | 2885 |
| 7 | 662 | 515 | 63 | 628 | 1918 | 1889 | 0 | 638 | 6313 |
| 8 | 476 | 370 | 45 | 451 | 1379 | 1358 | 1574 | 0 | 5655 |
| Ai | 2437 | 1819 | 238 | 2207 | 6713 | 6496 | 6130 | 2337 | 28377 |

Source: Analysis Results, 2024

**Demonstrate Current Conditions of Traffic Performance in 2024**

Current performance needs to be analyzed to identify traffic condition problems so that it can be used as a basis for determining potential treatments. From the results of the traffic loading carried out, the performance value of each road section, intersection performance and road network performance for current (existing) conditions can be seen in the table below.

**Table 7.** Traffic Performance of Road Sections in Existing Conditions

| Segment | Codification | Roads | VCRs | LOS |
|---|---|---|---|---|

| | Initial Node | End Node | | Q (junior high school/hour) | | Speed (kph) | Density (pcu/km) | |
|---|---|---|---|---|---|---|---|---|
| **SECTION 1** | | | | | | | | |
| 1 | 1 | 50 | Jl. Fatahilah 4 | 2199.6 | 0.60 | 42.0 | 52.4 | C |
| 2 | 50 | 1 | Jl. Fatahilah 3 | 1876.9 | 0.51 | 42.0 | 44.7 | C |
| 3 | 50 | 51 | Jl. Fatahilah 2 | 2764.4 | 0.75 | 36.0 | 76.8 | D |
| 4 | 51 | 50 | Jl. Fatahilah 1 | 2072.85 | 0.56 | 36.0 | 57.6 | C |
| 5 | 51 | 52 | Jl. RE. Martadinata 4 | 2418.1 | 0.66 | 26.3 | 92.1 | C |
| 6 | 52 | 51 | Jl. RE. Martadinata 3 | 1494.75 | 0.41 | 26.3 | 56.9 | B |
| 7 | 52 | 20 | Jl. RE. Martadinata 2 | 2418.1 | 0.66 | 33.0 | 73.3 | C |
| 8 | 20 | 52 | Jl. RE. Martadinata 1 | 1778.9 | 0.48 | 33.0 | 53.9 | C |
| 9 | 51 | 53 | Jl. Yos Sudarso | 2660.35 | 0.64 | 28.0 | 95.0 | C |
| **SECTION 2** | | | | | | | | |
| 1 | 20 | 56 | Jl. Raya Industri 1 | 2586.45 | 0.85 | 18.0 | 143.7 | E |
| 2 | 56 | 57 | Jl. Raya Industri 2 | 2009.4 | 0.66 | 20.0 | 100.5 | C |
| 3 | 56 | 52 | Jl. Arief Rahman Hakim | 603.2 | 0.22 | 30.0 | 20.1 | B |
| 4 | 57 | 21 | Jl. Raya Industri 3 | 2106.725 | 0.69 | 20.0 | 105.3 | C |
| **SECTION 3** | | | | | | | | |
| 1 | 20 | 53 | Jl. Captain Sumantri | 2012.9 | 0.94 | 12.6 | 159.8 | E |
| 2 | 53 | 55 | Jl. Gatot Subroto | 1274.2 | 0.45 | 36.0 | 35.4 | C |
| 3 | 20 | 55 | Jl. RE. Martadinata 5 | 2320.6 | 0.63 | 30.0 | 77.4 | C |
| 4 | 55 | 20 | Jl. RE. Martadinata 6 | 1567.35 | 0.43 | 20.0 | 78.4 | B |

Source: Analysis Results, 2023

**Table 8.** Performance of non-signalized intersections in existing conditions

| No | Intersection | Capacity (pcu/hour) | Traffic Flow (pcu/hour) | DS | Delay (sec/smp) | Queuing Probability (%) |
|---|---|---|---|---|---|---|
| | | Existing | | Existing | Existing | Existing |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | Brigief Dormitory intersection | 4844 | 3775 | | 0.78 | 12.81 | 23-49 |
| 2 | Terminal Junction | 4648 | 4071 | 1509 | 0.88 | 14.83 | 31-61 |
| 3 | Yos Sudarso-Kp. Sumantri intersection | 2847 | 2065 | | 0.73 | 10.50 | 28-56 |
| 4 | Arief Rahman Hakim intersection - Pantura | 4029 | 2596 | | 0.64 | 10.51 | 17-36 |
| 5 | Simpang Arief Rahman Hakim - Jl. Industry | 2875 | 2159 | | 0.75 | 12.74 | 25-50 |
| 6 | Simpang 7 Jababeka | 4359 | 3039 | | 0.70 | 11.65 | 20-40 |
| 7 | Simpang Pilar | 5189 | 3159 | | 0.61 | 10.46 | 16-33 |

**Table 9.** Performance of Signalized Intersections in Existing Conditions

| No | Name of the intersection | Queue Length (m) | LOS | Delay (sec/smp) |
|---|---|---|---|---|
| 1 | Simpang Pasir Gombong | 94 | E | 43 |
| 2 | SGC intersection | 127 | E | 76 |

**Table 10.** Road Network Performance in Existing Conditions

| No | Network Performance Parameters | Performance |
|---|---|---|
| 1 | Total Travel Time (PCU/Hour) | 931.2 |
| 2 | Total Travel Length (Smp/Km) | 49127.8 |
| 3 | Network Speed (Km/Hr) | 33.8 |

Based on the table above, information on traffic performance in favorable conditions for 2024 can be obtained, showing that the road section that has the highest V/C ratio is the Jalan Captain Sumantri section with a V/C ratio value of 0.94, a speed value of 12.6 km/hour, and the density value of Selbelsar is 159.8 pcu/km, along with LOS at level E. Ultimate performance of Simpang Terminal has a degree of saturation (DS) of 0.88, delays of 14.83 sec/pcu and ultimate performance of Simpang Pasir Gombong has long queues 94 m, LOS at level E and altitude of Selbelsar 43 deltics/pcu. Meanwhile, the performance of the SGC intersection has a queue length of 127 m, LOS at level E and traffic speed of 76 seconds/pcu.

## CONCLUSION

Based on the results of the analysis of road performance in the existing year, it was found that 3 road sections had high VCR, including Jl. Fatahillah 2, Jl. Raya Industri 1 and Jl. Kapten Sumantri with respective VCRs namely 0.75 (C), 0.85 (D), and 0.94 (E). Performance of the Road Section in the 2029 plan year without any treatment on Jl. Fatahillah 2 with VCR 0.76 (C), Jl. Raya Industri with VCR 0.86 (D) and Jl. Captain Sumantri with VCR 0.95 (E). road performance in the 2034 plan year without any treatment on Jl. Fatahillah with a VCR of 0.77, Jl. Raya Industri with a VCR of 0.86

and Jl. Kapten Sumantri with a VCR of 0.96. After handling the VCR, road sections and intersections decreased significantly. Jl. Fatahillah 2, Jl. Raya Industri 1 and Jl. Kapten Sumantri with respective VCRs namely 0.74 (C), 0.67 (B), and 0.77 (D). Road Section Performance in the 2029 plan year on jl. Fatahillah 2 with VCR 0.75 (C), Jl. Raya Industri with VCR 0.68 (D) and Jl. Captain Sumantri with VCR 0.78 (C). road performance in the 2034 plan year on Jl. Fatahillah with a VCR of 0.75, Jl. Raya Industri with a VCR of 0.68 and Jl. Kapten Sumantri with a VCR of 0.79(C). Based on the results of the intersection performance analysis, there are 6 out of 9 intersections that have high VCR, including the Brigief Dormitory intersection, the terminal intersection, the Yos Sudarso-Kp.Sumantri intersection, the Arief Rahman Hakim-Jl.Industri intersection, the Pasir Gombong intersection and the SGC intersection. Changes resulting from traffic management and engineering are not very significant every 5 years because many drivers will switch to the road section with the lowest VCR.

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