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Planning Of Rest And Service Areas (TIP) In Kulon Progo Regency

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Abstract

This research is motivated by the increasing volume of goods and passenger transport movements in the Wates-Purworejo Road corridor in Kulon Progo Regency, which has resulted in high on-road parking activity and the risk of reducing traffic safety. The objectives of this study are to analyze the characteristics of traffic movements, determine the best locations for Rest and Service Areas (TIP), and design TIP facilities in Sindutan Village. This study uses a quantitative descriptive approach with a case study method. The study population includes all goods and passenger transport movements in the study corridor, while the sample was determined using purposive sampling based on the survey location and vehicle movement characteristics. Research instruments include Roadside Interview surveys, parking surveys, and field observations, as well as secondary data from related agencies. Data analysis techniques include origin-destination matrix analysis, location feasibility analysis, facility needs analysis, and road section performance evaluation based on PKJI 2023. The results show a high movement volume, namely 468 internal goods transport vehicles, 2,973 external vehicles, and 16,590 passenger transport vehicles per day, as well as high on-road parking activity. The analysis results show that Alternative Location 1 is superior in terms of saturation level, land price, and spatial suitability. In conclusion, the selected location is suitable for development as a Type II TIP with a total facility area requirement of 10,442.01 m² to improve traffic safety and smoothness.

***Keywords:*Location Selection, Rest Area, Road Safety, Traffic Flow, Transportation Planning**

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INTRODUCTION

The increased mobility of people and goods is a consequence of economic development and transportation infrastructure development in various regions. This situation drives increased traffic volumes on strategic corridors, but also increases the risk of accidents due to driver fatigue and limited travel support facilities (Fatimah et al., 2023; Khanehshenas et al., 2022). Therefore, the provision of rest areas is a crucial component in supporting the safety and smooth operation of the road transportation system.

Kulon Progo Regency is a strategic area in the Special Region of Yogyakarta, experiencing increased transportation activity with the operation of Yogyakarta International Airport (YIA) and the development of the southern coastal area. Data from 2025 shows that freight transportation will reach 8,830 trips per day and passenger transportation will reach 103,600 trips per day. This high mobility has resulted in increased traffic congestion on the Wates-Purworejo road, which recorded 44 traffic accidents between 2021 and 2025, with driver fatigue and lack of concentration being the dominant factors (Kulon Progo Regency Street Vendor Team, 2025; Laskara, 2021).

Various studies have shown that the presence of rest areas plays a crucial role in reducing driver fatigue and improving travel safety. Rest areas not only serve as temporary stopping points but also support road user comfort and improve the quality of transportation services on long-distance travel routes (Khanehshenas et al., 2022; Setyarini et al., 2020).

However, most previous research has focused more on driver safety or the evaluation of existing facilities. Studies that comprehensively integrate analysis of vehicle movement characteristics, location determination, and rest area design are still relatively limited, particularly on non-toll national roads serving intercity and interprovincial traffic.

This situation also occurs in Sindutan Village, which has been designated as a rest area by Kulon Progo Regency's Spatial Plan (RTRW). However, these facilities are currently under-utilized, resulting in many vehicles stopping and parking on the roadside and on the main road. This situation has the potential to reduce road capacity, disrupt traffic flow, and increase the risk of accidents.

Based on these problems, this study aims to analyze the characteristics of freight and passenger transportation, determine the best location for the construction of Rest and Service Areas (TIP), and develop a facility layout design in Sindutan Village. The research's novelty lies in its integrated approach, which combines traffic movement analysis, location determination, and facility design within a single planning framework to support safety and optimal transportation services.

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METHOD

This research uses a quantitative descriptive approach with a case study method. The aim is to analyze the characteristics of freight and passenger transportation, determine the location of Rest and Service Areas (TIP), and design TIP facilities in Kulon Progo Regency. This approach was chosen because it can provide an objective picture of existing traffic conditions, road user needs, and location feasibility based on measurable data (Sugiyono, 2022; Creswell & Creswell, 2023). The research focuses on the Wates–Purworejo Road corridor, which has a strategic role as a regional and interregional movement route and has experienced increased mobility due to the development of the Yogyakarta International Airport (YIA) area (Fatimah et al., 2023).

The study population included all freight and passenger transport movements across the Wates–Purworejo Road corridor, as well as potential locations that could be developed as Rest and Service Areas (TIP). The study sample was determined using a purposive sampling technique, taking into account the characteristics of vehicle movement, roadside parking locations, and land suitability based on the technical criteria stipulated in the Circular Letter of the Minister of Public Works and Public Housing Number 02/SE/M/2018. Sample data were obtained through Roadside Interview (RSI) surveys, vehicle parking surveys, and field observations at locations that are alternatives for TIP development (Sudaryono, 2023).

The research data consists of primary data and secondary data. Primary data were obtained through site condition surveys, roadside parking surveys, road section inventory surveys, classified traffic enumeration surveys, and Road Side Interview (RSI) surveys, while secondary data were obtained from RTRW documents, administrative maps, road network maps, land use maps, traffic accident data, and the results of the Kulon Progo Regency PKL Team survey in 2025. Data analysis was carried out through analysis of vehicle movement characteristics using an origin-destination matrix, analysis of location feasibility based on technical and spatial criteria, analysis of TIP facility needs based on vehicle parking characteristics, and analysis of changes in road section performance using capacity parameters, free flow speed, and travel time according to the Indonesian Road Capacity Guidelines (PKJI) in 2023 (Directorate General of Highways, 2023; Emzir, 2022).

The research was conducted through four main stages: problem identification, data collection, data analysis, and recommendation development. The problem identification stage was conducted through initial observations and literature studies to formulate the research focus. The data collection stage was conducted through field surveys and document collection from relevant agencies. Next, the data was analyzed to identify vehicle movement

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characteristics, determine the best location for TIP development using the Comparative Feasibility Analysis method, calculate facility requirements, and evaluate changes in road section performance after TIP development. The final stage was the preparation of a facility layout design and recommendations for selected locations as the basis for developing Rest and Service Areas in Kulon Progo Regency (Creswell & Creswell, 2023; Sugiyono, 2022).

RESULTS AND DISCUSSION

Analysis of the Characteristics of Freight Transportation Movement in Kulon Progo Regency

1. Travel Distribution

Table1OD Freight Transport Matrix

ZONE	CBD	1	2	3	7	8	12	20	AMOUNT
CBD	0	0	0	0	0	0	0	76	**76**
1	0	0	0	0	0	0	0	25	**25**
2	0	0	0	0	0	0	0	0	**0**
3	0	0	0	0	0	0	0	0	**0**
7	0	0	0	0	0	0	0	34	**34**
8	0	0	0	0	0	0	0	0	**0**
12	0	0	0	0	0	0	0	187	**187**
20	45	11	0	22	23	0	45	0	**146**
AMOUNT	**45**	**11**	**0**	**22**	**23**	**0**	**45**	**322**	**468**

A total of 468 freight vehicles per day cross the TIP planned area in Zone 12 which is connected to Purworejo Regency, indicating high movement of medium to long-distance travel.

Table2OD External-External Travel Matrix of Freight Transport

ZONE	17	18	19	20	AMOUNT
17	63	17	810	124	**1014**
18	60	0	181	17	**259**
19	891	116	36	463	**1506**
20	56	106	32	0	**194**
AMOUNT	**1071**	**239**	**1060**	**604**	**2973**

External-external movement reached 2,973 freight vehicles per day crossing the TIP planned area in Zone 12 as a connecting corridor with Purworejo Regency.

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2. Split Mode of Freight Transport



Picture 1 Vehicle Proportion Diagram



Picture 2 Mode Selection Reason Diagram



Picture 3 Freight Transport Trip Intent Diagram

Analysis of the Characteristics of Passenger Transportation Movement in Kulon Progo Regency

1. Travel Distribution

Table 3 OD Matrix of People Transport

ZONE	CBD	1	2	3	7	8	12	20	AMOUNT
CBD	0	0	0	0	0	0	0	2694	**2694**
1	0	0	0	0	0	0	0	2123	**2123**
2	0	0	0	0	0	0	0	878	**878**

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3	0	0	0	0	0	0	0	773	**773**
7	0	0	0	0	0	0	0	1268	**1268**
8	0	0	0	0	0	0	0	353	**353**
12	0	0	0	0	0	0	0	1475	**1475**
20	4011	522	0	938	157	0	1798	0	**7426**
AMOUNT	**4011**	**522**	**0**	**938**	**157**	**0**	**1798**	**9564**	**16990**

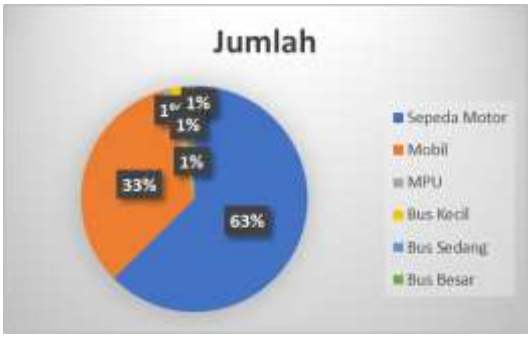
A total of 16,990 passenger vehicles per day cross the TIP planned area in Zone 12, indicating high long-distance travel movements.

Table 3 OD External-External Travel Matrix of People Transport

ZONE	17	18	19	20	AMOUNT
17	69	562	835	808	**2274**
18	264	236	753	1969	**3222**
19	845	2135	275	432	**3687**
20	2733	3982	691	0	**7406**
AMOUNT	**3911**	**6915**	**2554**	**3209**	**16590**

External-external movement reached 16,590 vehicles per day crossing the TIP planned area in Zone 12 as a connecting corridor with Purworejo Regency.

2. Split Mode of Passenger Transport



Picture 4 Vehicle Proportion Diagram for People Transport



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Picture 5 Mode Selection Reason Diagram



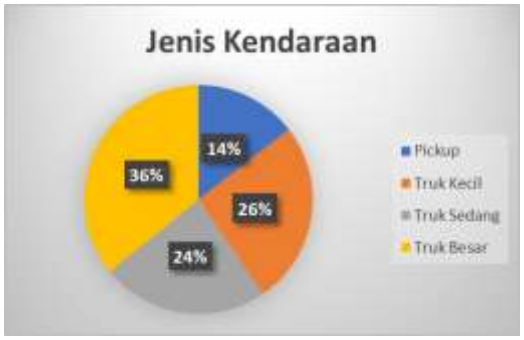
Picture 6 Transportation travel intent diagram

Freight Transport Parking Analysis

Table4Freight Transport Parking Data

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total	Average Vehicle/Day	
Amount	51	60	52	48	62	53	45	371	53	

The survey results showed that there were 371 goods transport vehicles parked on the side of Jalan Wates–Purworejo during one week or an average of 53 vehicles per day, with the peak parking occurring on Friday at 62 vehicles.



Picture 7 Proportion of Types of Freight Vehicles Parked

The proportion of vehicles parked on the roadside is dominated by large trucks at 36%, while pick-up vehicles are the least with a percentage of 14%.

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Picture 8 Proportion of Reasons for Parking Freight Transport

Shows the proportion of reasons why freight drivers park their vehicles on the road with the highest percentage of 39% for resting reasons and the smallest percentage of 12% for tire inspection reasons.



Picture 9 Freight Transport Parking Duration Curve

Based on Figure 9, the maximum parking duration for goods transport vehicles was 3 hours for 112 vehicles, while the minimum was 7 hours for 15 vehicles.

Parking Analysis for Public Transport

Table 5 Public Transport Parking Data

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total	Average Vehicle/Day
Amount	39	33	37	35	40	67	41	292	42

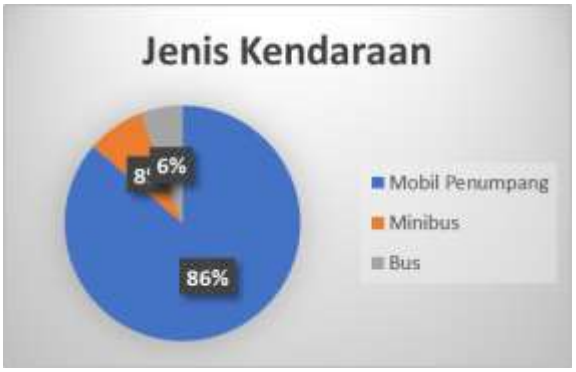
The survey results showed that there were 292 passenger transport vehicles parked on the side of Jalan Karang Nongko–Toyan 4 during one week or an average of 42 vehicles per day, with the highest number occurring on Saturday at 67 vehicles.

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Picture 10 Proportion of Types of Vehicles Parked for Transporting People

The proportion of vehicles parked on the roadside is dominated by passenger cars at 86%, followed by minibuses at 8%, while buses are the type of vehicle with the smallest percentage at 6%.



Picture 11 Proportion of Reasons for Parking Public Transport

The main reasons drivers park their vehicles on the road are to eat/drink (62%), followed by resting (33%), going to the repair shop (3%), and checking tires (2%).



Picture 12 Parking Duration Curve for Passenger Transport

Above, we can see that the highest parking duration for passenger vehicles was 2 hours, with 125 vehicles. The lowest parking duration was 5 hours, with 8 vehicles.

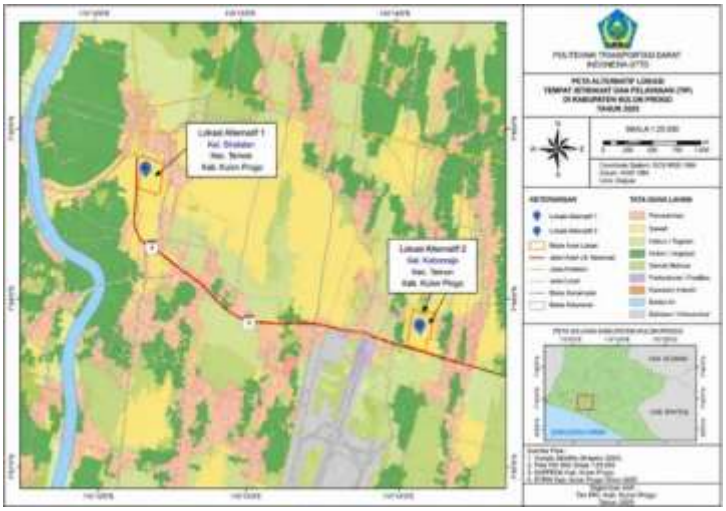
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Alternative Location Selection



Picture 13 Alternative Location Map

Technical Feasibility Analysis Based on Criteria with Comparative Feasibility Analysis Method

1. Road Section Performance Criteria

Table 7 Characteristics of Road Section Service Level (LOS)

TINGKAT PELAYANAN	KARAKTERISTIK	DERAJAT KEJENUHAN
A	Kondisi arus bebas dengan kecepatan tinggi, pengemudi dapat memilih kecepatan yang diinginkan	0,00 - 0,20
B	lintas. Pengemudi memiliki kebebasan yang cukup untuk memilih kecepatan	0,21 - 0,44
C	Arus stabil, tetapi kecepatan dan gerak kendaraan dikendalikan. Pengemudi dibatasi dalam memilih kecepatan	0,45 - 0,74
D	Arus mendekati tidak stabil, kecepatan masih dapat ditolerir	0,75 - 0,84
E	Volume lalu lintas mendekati/berada pada kapasitas. Arus tidak stabil, kecepatan terkadang berhenti	0,75 - 1,00
F	Arus yang dipaksakan atau macet, kecepatan, rendah, volume di atas kapasitas. Antrian panjang dan terjadi hambatan yang besar	>1,00

Table 6 Road Section Performance Comparison

Parameter	Alternative Location 1	Alternative Location 2	Best Location
Road Capacity (smp/hour)	2803.5	3106.6	Location 2
Degree of Saturation (DS)	0.21	0.45	Location 1
Level of Service (LOS)	B	C	Location 1

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2. Accessibility Criteria

Table 9 Measurement of Accessibility Parameters using Google Earth

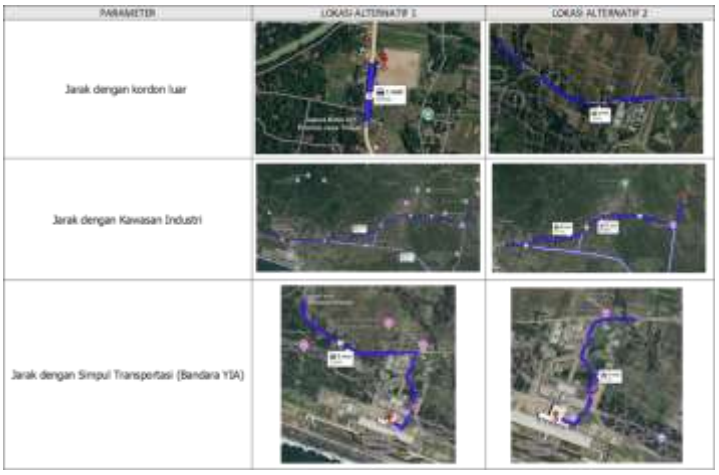


Table 7Accessibility Comparison

Parameter	Alternative Location 1	Alternative Location 2	Best Location
Travel time to the outer cordon	1 minute	4 minutes	1
Travel time to Industrial Area	33 minutes	29 minutes	2
Travel time to Transportation Hub (YIA Airport)	9 minutes	5 minutes	2

3. Criteria for Compliance with Regional Spatial Planning (RTRW)

Table8Comparison of Location Suitability with RTRW

Parameter	Alternative Location 1	Alternative Location 2	Best Location
Suitability of location (Sindutan sub-district, Temon sub-district	Sindutan Village, Temon District	Kebonrejo Village, Temon District	1

4. Financial Criteria (Initial Investment Cost)

Table 12 Land Price Comparison

Parameter	Alternative Location 1	Alternative Location 2	Best Location
Land price (Rp/m²)	500,000-1,000,000	2,000,000-5,000,000	1

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5. Environmental Sustainability Criteria

Table 13 Comparison of Land Use Conditions

Parameter	Alternatif Lokasi 1	Alternatif Lokasi 2	Lokasi Terbaik
Kondisi Penggunaan Lahan	 Lahan Kosong	 Persawahan	1

6. Location Determination with Accumulation of Criteria Assessments using the Comparative Feasibility Analysis Method

Table 14 Accumulation of Technical Feasibility Assessment of Alternative Locations

KRITERIA	PARAMETER	LOKASI TERBAIK	
		Lokasi Alternatif 1	Lokasi Alternatif 2
KINERJA RUAS JALAN	Kapasitas Jalan		✓
	Derajat Kejenuhan (DS)	✓	
	Level of Service (LOS)	✓	
AKSESIBILITAS	Jarak dengan kordon luar	✓	
	Jarak dengan Kawasan Industri		✓
	Jarak dengan Simpul Transportasi (Bandara YIA)		✓
KESESUAIAN DENGAN RTRW	Kesesuaian Lokasi (Kelurahan Sindutan,Kecamatan temon	✓	
BIAYA INVESTASI AWAL	Harga lahan (Rp/m²)	✓	
Kelestarian Lingkungan	Kondisi Penggunaan Lahan	✓	
TOTAL SKOR		**6**	**3**

Analysis of Rest and Service Facilities Needs (TIP)

This analysis aims to identify the need for TIP facilities in Kulon Progo Regency based on parking space requirements, number of users, and area activities with reference to the Minister of PUPR Circular Letter No. 02/SE/M/2018. The analysis results indicate that the planned TIP is type II according to the required service standards and capacity.

The main facility is designed with separate lanes for goods and passengers to ensure smooth and safe traffic flow. The minimum turning radius is set at 13.70 meters, in accordance with Indonesian National Standards (SNI) for large trucks, with each lane consisting of two entry and exit lanes and a median, for a total lane width of 54 meters.

Freight parking needs are determined based on a roadside survey, which showed a peak parking volume of 62 vehicles on Fridays. This data serves as the basis for determining TIP's parking capacity to accommodate actual demand and reduce on-street parking.

Table9 Pickup Parking Duration Calculation

PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF PICKUP VEHICLES	PARKING SPACE USE TIME
120	2	2	240

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180	3	3	540	
300	5	3	900	
TOTAL	**10**	**8**	**1680**	
AVERAGE PARKING DURATION (MINUTES)			**210.0**	
AVERAGE PARKING DURATION (HOURS)			**3.50**	

Table10 Calculation of Small Truck Parking Duration

PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF SMALL TRUCKS	PARKING SPACE USE TIME	
60	1	3	180	
120	2	5	600	
180	3	2	360	
300	5	5	1500	
360	6	3	1080	
TOTAL	**17**	**18**	**3720**	
AVERAGE PARKING DURATION (MINUTES)			**206.7**	
AVERAGE PARKING DURATION (HOURS)			**3.44**	

Table11Calculation of Medium Truck Parking Duration

PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF MEDIUM TRUCKS	PARKING SPACE USE TIME	
120	2	1	120	
180	3	4	720	
240	4	5	1200	
360	6	2	720	
420	7	2	840	
TOTAL	**22**	**14**	**3600**	
AVERAGE PARKING DURATION (MINUTES)			**257.1**	
AVERAGE PARKING DURATION (HOURS)			**4.29**	

Table12Large Truck Parking Duration Calculation

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PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF LARGE TRUCKS	PARKING SPACE USE TIME
120	2	2	240
180	3	4	720
240	4	6	1440
300	5	5	1500
360	6	5	1800
TOTAL	**20**	**22**	**5700**
AVERAGE PARKING DURATION (MINUTES)			**259.1**
AVERAGE PARKING DURATION (HOURS)			**4.32**

Table13 Pickup Parking Space Requirements

PICK UP PARKING SPACE REQUIREMENTS			
PARKED VEHICLES	**AVERAGE PARKING DURATION**	**Survey Interval (Hours)**	**Parking Space Requirements**
8	3.5	9	3

Table14 Small Truck Parking Space Requirements

SMALL TRUCK PARKING SPACE NEEDS			
PARKED VEHICLES	**AVERAGE PARKING DURATION**	**Survey Interval (Hours)**	**Parking Space Requirements**
18	3.44	9	7

Table15 Medium Truck Parking Space Requirements

MEDIUM TRUCK PARKING SPACE NEEDS			
PARKED VEHICLES	**AVERAGE PARKING DURATION**	**Survey Interval (Hours)**	**Parking Space Requirements**
14	4.29	9	7

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Table16 Large Truck Parking Space Requirements

REQUIREMENTS FOR LARGE TRUCK PARKING SPACE			
PARKED VEHICLES	AVERAGE PARKING DURATION	Survey Interval (Hours)	Parking Space Requirements
22	4.32	9	11

Table17 Parking Space Requirements for Pickup Trucks

Parking Angle	Pick Up Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)
90	3	2.3	5	5.49	24.1	72

Table18 Parking Space Requirements for Small Trucks

Parking Angle	Small Truck Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)
60	7	3.4	12.5	7.69	68.64	481

Table19 Medium Truck Parking Space Requirements

Parking Angle	Medium Truck Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)
60	7	3.4	12.5	9.08	73.37	514

Table20Large Truck Parking Space Requirements

Parking Angle	Large Truck Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)

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60	11	3.4	12.5	9.5	74.8	897	

Table21 Passenger Car Parking Duration Calculation

PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF VEHICLES MP	PARKING SPACE USE TIME	
60	1	20	1200	
120	2	26	3120	
180	3	7	1260	
TOTAL	**6**	**53**	**5580**	
AVERAGE PARKING DURATION (MINUTES)			**105.3**	
AVERAGE PARKING DURATION (HOURS)			**1.75**	

Table22 Minibus Parking Duration Calculation

PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF MINIBUS VEHICLES	PARKING SPACE USE TIME	
120	2	2	240	
180	3	1	180	
240	4	3	720	
300	5	1	300	
TOTAL	**14**	**7**	**1440**	
AVERAGE PARKING DURATION (MINUTES)			**205.7**	
AVERAGE PARKING DURATION (HOURS)			**3.43**	

Table23 Bus Parking Duration Calculation

PARKING DURATION (MINUTES)	PARKING DURATION (HOURS)	NUMBER OF BUSES	PARKING SPACE USE TIME	
120	2	1	120	
180	3	2	360	
240	4	1	240	
300	5	3	900	
TOTAL	**14**	**7**	**1620**	

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AVERAGE PARKING DURATION (MINUTES)	231.4
AVERAGE PARKING DURATION (HOURS)	3.86

Table24 Passenger Car Parking Space Requirements

PARKING SPACE NEEDS FOR PASSENGER CARS			
PARKED VEHICLES	AVERAGE PARKING DURATION	Survey Interval (Hours)	Parking Space Requirements
53	1.75	9	10

Table25 Minibus Parking Space Requirements

MINIBUS PARKING SPACE REQUIREMENTS			
PARKED VEHICLES	AVERAGE PARKING DURATION	Survey Interval (Hours)	Parking Space Requirements
7	3.43	9	3

Table26 Bus Parking Space Requirements

BUS PARKING SPACE NEEDS			
PARKED VEHICLES	AVERAGE PARKING DURATION	Survey Interval (Hours)	Parking Space Requirements
7	3.86	9	3

Table27 Parking Space Requirements for Passenger Cars

Parking Angle	Passenger Car Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)
90	10	2.3	5	5.49	24.1	249

Table28Minibus Parking Space Requirements

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Parking Angle	Minibus Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)	
90	3	2.5	5	7.41	31.0	83	

Table29 Bus Parking Area Requirements

Parking Angle	Bus Parking Space Requirements	Parking Space Width B (m)	Effective Parking Space D (m)	Maneuvering Space (m)	Parking Space Unit (m2) (B*(D+M))	Total Parking Area (m2)	
60	3	3.4	12.5	10:53	78.3	235	



Picture14Proportion of Reasons for Parking Freight Vehicles



Picture15Proportion of Reasons for Parking Freight Vehicles



Picture16 Proportion of Reasons for Parking of Passenger Transport Vehicles

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Table30 Calculation of Green Open Space (RTH) Area Requirements

FACILITY TYPE	FACILITY FUNCTIONS		AREA (m2)
MAIN FACILITIES	GOODS TRANSPORT PARKING		1963.73
	PARKING FOR PEOPLE'S TRANSPORT		566.95
SUPPORTING FACILITIES	WORKSHOP		680
	ISLAMIC PRAYER ROOM		220
	TOILET		160
	CAFETERIA/RESTAURANT		300
	REST AREA		177.6
	HEALTH POST		36
	INFORMATION POST		75
	ROAD MANAGEMENT POST		150
	EMERGENCY POST		150
	PUBLIC FACILITIES	ATM	9
		gas station	1600
		SPKLU	90.42
TOTAL			6178.70
Green Open Space (30%)			1853.6

Table31Calculation of Total Area Requirements for TIP Facilities

FACILITY TYPE	FACILITY FUNCTIONS	AREA (m2)
MAIN FACILITIES	GOODS TRANSPORT PARKING	1963.73
	PARKING FOR PEOPLE'S TRANSPORT	566.95
SUPPORTING FACILITIES	WORKSHOP	680
	ISLAMIC PRAYER ROOM	220
	TOILET	160
	CAFETERIA/RESTAURANT	300
	REST AREA	177.6
	HEALTH POST	36
	INFORMATION POST	75
	ROAD MANAGEMENT POST	150
	EMERGENCY POST	150

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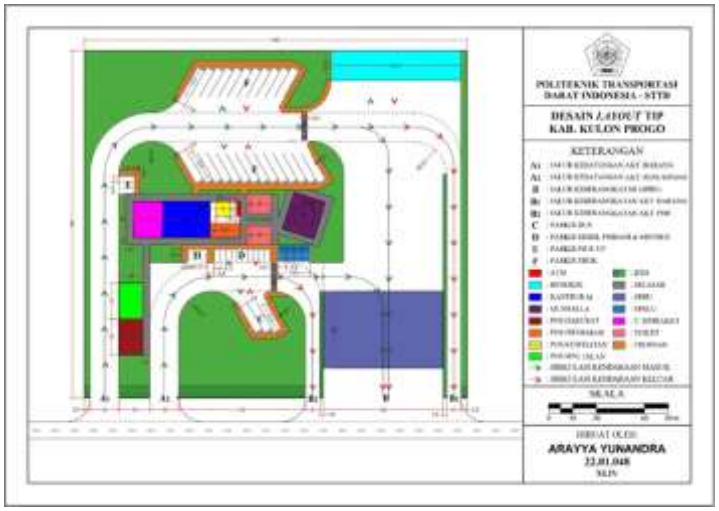
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	PUBLIC FACILITIES	ATM	9
		gas station	1600
		SPKLU	90.42
	PEDESTRIAN PARALLEL		2409.7
	Green Open Space		1853.6
TOTAL			**10442.01**

Proposed Layout Design



Picture17Layout Design of Proposed TIP Planning in Kulon Progo Regency

Analysis of Changes in Road Section Performance Before and After Rest and Service Area (TIP) Planning

Table32Calculation of Capacity and Degree of Saturation of Road Sections

ROAD CAPACITY	
C = C0 × FCLJ × FCPA × FCHS x FCUK	
EXISTING	THERE IS A REST AREA
2803.5	3106.65
DEGREE OF SATURATION	
EXISTING	THERE IS A REST AREA
0.21	0.19

Table 33Calculation of Average Free Flow Speed of Vehicles

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FREE FLOW SPEED (KM/HOUR)	
VB = (VBD + VBL) × FVBHS × FVBUK	
EXISTING	THERE IS A REST AREA
39	44

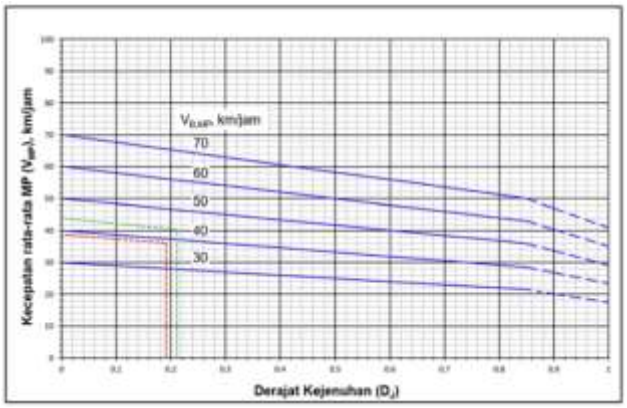


Figure 22 Diagram for Determining Vehicle Travel Speed

Table34Average Vehicle Travel Time Calculation

TRAVEL TIME (SECONDS)	
EXISTING	THERE IS A REST AREA
40	36

CONCLUSION

This study shows that the Wates–Purworejo Road corridor has a high volume of goods and passenger transport movements, reaching 468 vehicles per day (internal), 2,973 vehicles per day, and 16,590 vehicles per day for external-external movements that cross the TIP plan area. This condition is also reinforced by high parking activity on the roadside, namely 371 goods transport vehicles and 292 passenger transport vehicles for one week, which is dominated by the need for long-distance travel rest. The results of the feasibility analysis show that Alternative Location 1 is superior in terms of the degree of saturation, level of road service, land price, and suitability of the RTRW, while Alternative Location 2 is superior in terms of road capacity and several accessibility indicators. Overall, the selected location is considered more feasible for the development of TIP type II with a total facility area requirement of 10,442.01 m².

The limitations of this study lie in the use of short-term survey data that does not fully represent the temporal variation of traffic conditions, and the assessment method that does not use weighting between criteria, resulting in a simple comparative approach. Future research is

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recommended to use longitudinal data, a more comprehensive multi-criteria decision-making method, and traffic performance simulations to examine the operational impact of the TIP in more depth. Practically, the results of this study can serve as a reference in determining the location of the TIP, planning facilities, and efforts to improve traffic safety and smoothness in Kulon Progo Regency.

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