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Traffic Impact Analysis of Tajur Bogor Mall Boxies Building on Roads

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ABSTRACT

Traffic congestion that occurs almost evenly throughout the Bogor City area can be caused by several main factors, namely. The narrower roads and the increasing number of motorized vehicles result in congestion. The area of Bogor City, which is only 11,850 ha with a road length of 783,412 km, is already congested to accommodate the number of vehicles that are increasingly exceeding the carrying capacity of the road. In addition, the rapid development of business and trade areas in the city of Bogor spurred changes in traffic intensity. This study aims to create a model of generation and attraction caused by land use such as Educational Buildings, Industrial Estates, Traditional Markets and Supermarkets located in the sub-district. Research data retrieval is carried out using primary and secondary data methods, then the data is processed using (Trip Generation Manual) then modeled with (Software Saturn). The number of generation and towing in the studied area is 491 trips/hour. With Service Levels ranging from C to F. Then the design equation for transportation modeling for the East Bogor sub-district in 2021 is Y = 2963.66+0.840(X) then in 2026, namely Y = 2963.66+0.840(X).

Keywords: congestion; land use; Saturn; generation; attraction.

INTRODUCTION

The city of Bogor has serious problems in the field of transportation, especially traffic. The problem of traffic jams, which conceptually should have been planned and realized by the Department of Transportation of the City of Bogor, but apparently still has not. Traffic jams that occur almost evenly throughout the Bogor City area can be caused by several main factors, namely: The narrower roads and the increasing number of motorized vehicles result in congestion. The area of Bogor City, which is only 11,850 ha with a road length of 783,412 km, is already congested to accommodate the number of vehicles that are increasingly exceeding the carrying capacity of the road. In addition, the rapid development of business and trade areas in the city of Bogor spurred changes in traffic intensity. The development of a certain area has an influence on the traffic around it. Changes in land use, both changes in category and intensity will generate traffic, so small or large will have an influence on the surrounding traffic. With the construction of a new shopping center, it is estimated that it will generate traffic and affect the existing traffic around the new activity center. Through the evaluation of the impact of traffic, it can be calculated how much new trip generation that requires traffic engineering and traffic management to overcome the impact. Traffic impact evaluation is used to predict whether the transportation infrastructure is capable of serving the existing (existing) traffic plus the traffic generated or withdrawn by the new activity center. If the existing infrastructure cannot support the traffic, a study on infrastructure handling and traffic management arrangements must be carried out.

The Boxies Tajur Bogor Mall building owned by PT. Sinar Indonesia Loka which is located on Jl. Raya Tajur No.123, Tajur, East Bogor, Bogor City. Boxies is predicted to be the most luxurious mall in the Bogor City area, which is equipped with recreational facilities and family education in the form of Taman Bunga Nusantara, Petting Zoo Theme Park, Restaurant and Café. This of course will cause changes in traffic characteristics in the form of trip generation and attraction as well as changes in other characteristics. In response to this, it is necessary to analyze the traffic impact of the building in order to predict the possible magnitude of the impact generated as well as to anticipate the impact of the construction of the Boxies Mall Building on the surrounding traffic. Based on this thought, Mall Boxies will have a negative impact on the performance of road

segments, performance of intersections, so it is necessary to conduct a study in order to anticipate the possibility of decreasing LOS performance of the road network. So that the construction of a new building or area must be carried out with a Traffic Impact Analysis study so that the performance conditions of the surrounding road network are not disturbed.

Transportation travel allows individuals to process travel according to their travel concept. This trip places conditions that best suit the form of a planned trip. A well-planned trip will set a good pattern too (Ganda CF et.al, 2019; Karimah H, Akbardin J, 2022; Syaiful S et.al, 2022; Syaiful S et.al, 2022; Syaiful S, Rusfana H, 2022). So that the provisions in the travel process require general provisions that are in accordance with the appropriate pattern. A person's travel activities adapt to conditions in the field (Syaiful S, Pratama Y, 2019; Syaiful S, Hariyadi D, 2019; Syaiful S et.al, 2020; Syaiful S, Fadly A, 2020). Determine travel patterns according to well-conceptualized steps. Travel activities adjust to the background that places road users according to the steps that have been prepared before traveling (Syaiful S et.al, 2021; Syaiful S et.al, 2023; Syaiful S et.al. 2023).

Rise and pull

Generation is the number of movements originating from a land use (zone) while pull is the number of movements that lead to a zone.

Movement generation is a modeling stage that estimates the number of movements originating from a zone or land use and the number of movements attracted to one land use or other zone. Traffic movement is a land use function that produces traffic movement. This traffic generation includes:

• Traffic leaving a location

• Traffic going to or arriving at a location

The output from the calculation of traffic generation and pull is in the form of the number of vehicles, people, or goods transport per unit time, for example vehicles/hour. We can easily count the number of people or vehicles that enter or leave a certain area of land in one day (or one hour) to get the generation and pull of movement.

Movement Spread

The purpose of moving in one area will cause problems such as congestion, air pollution, noise, delays and so on. One way to be able to find solutions to these problems is to understand the movement patterns that occur in the present and in the future.

Understanding the pattern can be known by searching for data about the origin and destination of the movement, the magnitude of the movement, and when the movement occurred.

MAT

MAT is an origin-destination matrix that contains information about the magnitude of movement between zones within a certain area. In this case, the Tid notation states the magnitude of the flow of movement (vehicles, passengers, and goods) moving from the origin zone i to the destination zone during a certain time interval (Hadi W.P: 2018).

Almost all transportation problem solving techniques and methods (both urban and regional) require MAT information as the basic and most important information in representing the need for movement.

Public Transportation Problems

During peak hours, overcrowding is a common occurrence in the city of Bogor, especially in the areas of activity centers. This condition, which is very dense vehicles and irregular schedules, causes passengers to experience delays in their journey, immaterial losses and others.

During the off peak hour period, services will run irregularly, so that the level of public confidence in public transportation will be reduced, which in turn causes them to switch to using private

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vehicles to fulfill their mobility. As a result, we can predict that the level of congestion is getting higher, which in turn causes the level of public transportation services to decrease.

RESEARCH METHODS

Research Time and Place

At this stage the researchers conducted direct observations in the District of East Bogor. by conducting direct surveys on existing roads in the research location area.

Place of execution

The research locations are on the Arterial and Collector roads, as well as in Education Buildings, Industrial Estates, Hospitals, Traditional Markets and Supermarkets. that exist in this research area.

Figure 1. Study Location. Source: Google Maps/Earth Analysis)

Research time

The research was carried out on 11 to 19 May 2021. The research time was only carried out at peak hours or the busiest hours, as seen from daily traffic habits on the Google maps application.

While the implementation is carried out for 8 days, namely Monday which is a working day and study day, and also on Saturday and Sunday which is a weekend.

Materials and tools

a) Material

The materials needed in this research are Primary and Secondary data obtained from the results of the analysis and related agencies in the form of Bogor City growth data, Bogor City existing conditions, and Bogor City Spatial Planning Map data (RTRW Bogor City).

b) Tool
The tools needed consist of:
• Traffic Counting questionnaire form
• Stationery, Road Board, Meter
• Counting Tool,
• Mobile as a tool for Documentation and Communication
• Computer to process data, and Printer, A4 Paper as Print Out result of planning and report.
c) How it Works
The workings of this research are described based on the stages that have been designed in the research flow chart shown in Figure 2 below.

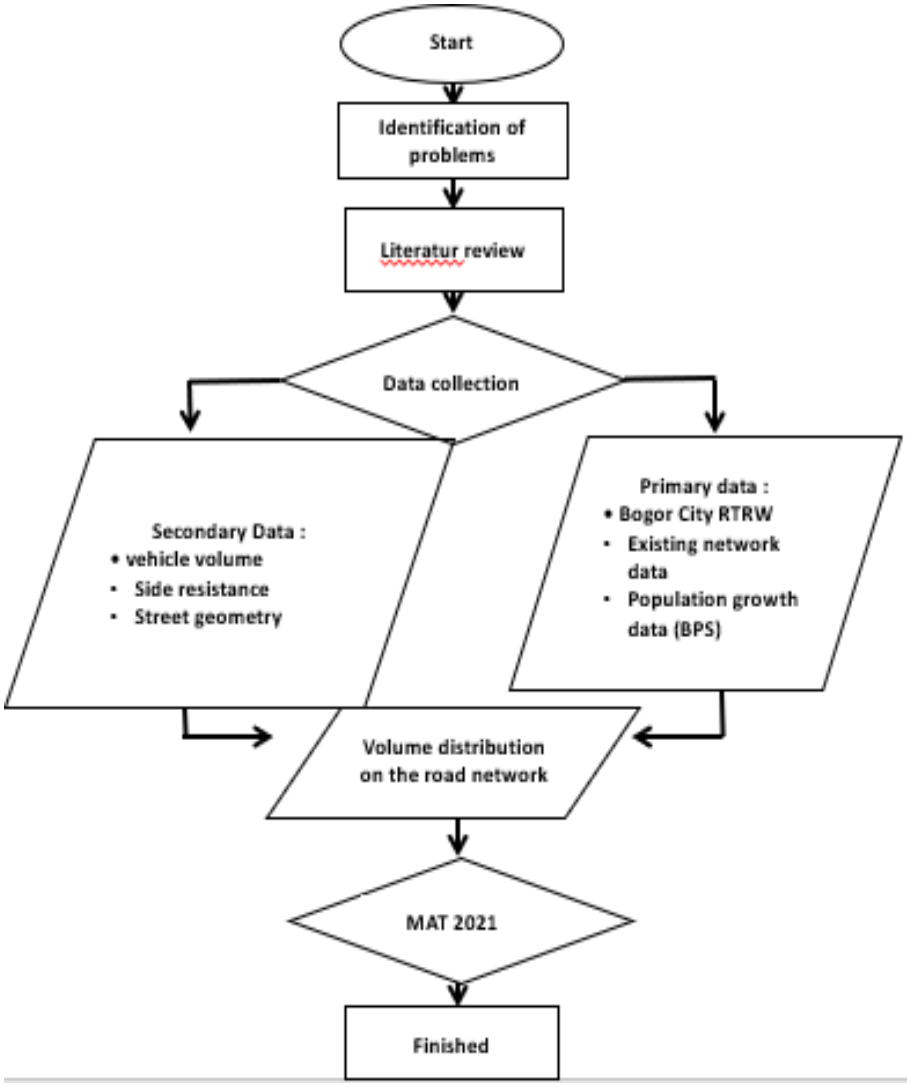

Figure 2. Flowchart (Source: Analysis Results)

RESULTS AND DISCUSSION

Existing Condition

Figure 3. Location of Traffic Counting and Generation Prediction (Source: Google Earth, 2021)

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No.	Nama Jalan	Type	Lebar Badan Jalan (m)	Fungsi Jalan
1	Jln. Raya Tajur 1	2/2 TT	6	Arteri
2	Jln. Raya Tajur 2	2/2 TT	6	Arteri
3	Jln. Raya Padjajaran 1	4/2 T	12	Arteri
4	Jln. Raya Padjajaran 2	4/2 T	12	Arteri
5	Jln. Sukasari	4/2 TT	6.5	Kolektor
6	Jln. Lawanggintung	4/2 TT	6	Kolektor

Figure 4. Inventory of Roads. Source: Analysis Results, 2021

Traffic Counting Data Calculation

	Jl. Raya Tajur 1	Barat	Type Jalan 2/2 TT		smp/jam	Jumlah
	Periode	SM	KR	KB		
	06.00 - 07.00	652	642	14	1.308	3.260
	07.00 - 08.00	444	613	8	1.065	2.395
	11.00 - 12.00	413	558	6	977	2.216
	12.00 - 13.00	660	722	23	1.404	3.379
	16.00 - 17.00	469	439	10	917	2.322
	17.00 - 18.00	376	389	12	777	1.901

Figure 5. Vehicle Volume Flow With Urban Road Classification on Jln. Raya Tajur 1. Source: Analysis Results, 2021.

	Jl. Raya Tajur 2	Timur	Type Jalan 2/2 TT		smp/jam	Jumlah
	Periode	SM	KR	KB		
	06.00 - 07.00	343	882	14	1.240	2.267
	07.00 - 08.00	364	720	10	1.093	2.182
	11.00 - 12.00	375	558	10	973	2.096
	12.00 - 13.00	482	908	19	1.409	2.851
	16.00 - 17.00	404	929	4	1.337	2.549
	17.00 - 18.00	347	625	6	978	2.016

Figure 6. Vehicle Volume Flow With Urban Road Classification on Jln. Raya Tajur 2. Source: Analysis Results, 2021

	Jl. Raya Padjajaran 1	Timur	Type Jalan 4/2 TT		smp/jam	Jumlah
	Periode	SM	KR	KB		
	06.00 - 07.00	690	1.092	11	1.793	3.862
	07.00 - 08.00	661	994	11	1.666	3.648
	11.00 - 12.00	691	1.016	7	1.714	3.784
	12.00 - 13.00	811	1.242	24	2.077	4.504
	16.00 - 17.00	659	1.025	10	1.694	3.669
	17.00 - 18.00	632	920	10	1.561	3.454

Figure 7. Vehicle Volume Flow With Urban Road Classification on Jln. Raya Padjajaran 1. Source: Analysis Results, 2021

	Jl. Raya Padjajaran 2	Timur	Type Jalan 4/2 TT		smp/jam	Jumlah
	Periode	SM	KR	KB		
	06.00 - 07.00	530	1.321	8	1.859	3.447
	07.00 - 08.00	558	1.355	6	1.919	3.590
	11.00 - 12.00	521	1.426	6	1.953	3.515
	12.00 - 13.00	690	1.460	20	2.170	4.236
	16.00 - 17.00	585	1.333	4	1.922	3.677
	17.00 - 18.00	537	1.321	10	1.867	3.476

Figure 8. Vehicle Volume Flow With Urban Road Classification on Jln. Raya Padjajaran 2. Source: Analysis Results, 2021

	Jl. Sukasari	Timur	Type Jalan 4/2 TT		smp/jam	Jumlah
	Periode	SM	KR	KB		
	06.00 - 07.00	320	389	4	712	1.671
	07.00 - 08.00	286	355	5	645	1.501
	11.00 - 12.00	300	273	2	575	2.110
	12.00 - 13.00	397	515	10	921	4.504
	16.00 - 17.00	291	405	4	699	1.570
	17.00 - 18.00	262	366	4	631	1.415

Figure 9. Vehicle Volume Flow With Urban Road Classification on Jln. Sukasari. Source: Analysis Results, 2021)

	Jl. Lawanggintung	Selatan	Type Jalan 4/2 TT		smp/jam	Jumlah
	Periode	SM	KR	KB		
	06.00 - 07.00	324	467	4	795	1.766
	07.00 - 08.00	318	587	2	907	1.860
	11.00 - 12.00	306	493	6	805	1.720
	12.00 - 13.00	375	707	11	1.093	2.217
	16.00 - 17.00	333	794	7	1.134	2.130
	17.00 - 18.00	328	704	8	1.040	2.022

Figure 10. Vehicle Volume Flow With Urban Road Classification on Jln. Lawanggintung. Source: Analysis Results, 2021

Calculation of the Average Speed of Roads

$VB = (VB_D + VB_L) . FV_{BHS} . FV_{BUK}$

NO	NAMA JALAN	VBD	VBL	FVBHS	FVBUK	VB
		km/jam	km/jam	LBe (m)		
1	JLN.RAYA TAJUR 1	55	-4	0,95	1,00	48,45
2	JLN.RAYA TAJUR 2	55	-4	0,95	1,00	48,45
3	JLN.RAYA PADJAJARAN 1	55	0	0,95	1,00	52,25
4	JLN.RAYA PADJAJARAN 2	55	0	0,95	1,00	52,25
5	JLN.SUKASARI	55	7	0,95	1,00	58,9
6	JLN. LAWANGGINTUNG	55	7	0,95	1,00	58,9

Figure 11. Average Speed of Urban Road Classification Section. Source: Analysis Results, 2021)

$VB = (VB_D + FV_{B-W}). FVB\text{-}_{HS}.FVB\text{-}_{FJ}$

Calculation of Road Segment Capacity

The calculation of road capacity based on MKJI 2017 is stated in table 9 below:

$C = C_0 \times FC_{Lj} \times FC_{PA} \times FC_{HS} \times FC_{UK}$

NO	Nama Jalan	skr/jam	C_0	FC_{LJ}	FC_{PA}	FC_{HS}	FC_{UK}	C
1	JLN.RAYA TAJUR 1	1650	3300	0,92	1,00	0,98	1,00	2975
2	JLN.RAYA TAJUR 2	1650	3300	0,92	1,00	0,98	1,00	2975
3	JLN.RAYA PADJAJARAN 1	1650	3300	1,00	1,00	0,95	1,00	3135
4	JLN.RAYA PADJAJARAN 2	1650	3300	1,00	1,00	0,95	1,00	3135
5	JLN.SUKASARI	2900	5800	0,87	1,00	0,94	1,00	4743
6	JLN. LAWANGGINTUNG	2900	5800	0,87	1,00	0,94	1,00	4743

Figure 12. Urban Road Capacity. Source: Analysis Results, 2021

$C = C0 \times FC_{LJ} \times FC_{PA} \times FC_{HS}$

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Service Level (Existing)

No	Nama Jalan	Type	Arah Menuju	Lebar Badan Jalan (m)	C	V	VCR	LoS
1	Jln. Raya Tajur 1 (Depan Boxies Mall -Lippo Plaza)	2/2 TT	Jln. Raya Padjajaran	6	2975	1404,3	0,47	C
2	Jln. Raya Tajur 2 (Trasnmart – Lippo Plaza)	2/2 TT	Jln. Raya Padjajaran	6	2975	1408,95	0,47	C
3	Jln. Raya Padjajaran 1 (Jl.Padjajaran-Jl.Raya Tajur)	4/2 T	Jln. Raya Tajur	12	3135	2076,5	0,66	C
4	Jln. Raya Padjajaran 2 (Jl.Sukasari-Jl.Padjajaran)	4/2 T	Jln. Sukasari	12	3135	2170,15	0,69	C
5	Jln. Sukasari (PDAM Tirta Pakuan-Jl.Tajur)	4/2 TT	Jln. Raya Tajur	6,5	4743	921,35	0,19	A
6	Jln. Lawanggintung (Jl.Tajur-Jl. Lawanggintung)	4/2 TT	Jln. Raya Padjajaran	6	4743	1133,7	0,24	B

Figure 13. Level of Road Traffic Service in East Bogor District. Source: Analysis Results, 2021

No	Nama Jalan	Type	VCR 2021	LOS	VCR 2026	LOS
1	Jln. Raya Tajur 1 (Depan Boxies Mall -Outlet Tajur Tas)	2/2 TT	0,47	C	0,50	C
2	Jln. Raya Tajur 2 (Trasnmart-Lippo Plaza)	2/2 TT	0,47	C	0,50	C
3	Jln. Raya Padjajaran 1 (Jl.Padjajaran-Jl.Raya Tajur)	4/2 T	0,66	C	0,70	C
4	Jln. Raya Padjajaran 2 (Jl.Sukasari-Jl.Padjajaran)	4/2 T	0,69	C	0,73	C
5	Jln. Sukasari (PDAM Tirta Pakuan-Jl.Tajur)	4/2 TT	0,19	A	0,21	B
6	Jln. Lawanggintung (Jl.Tajur-Jl. Lawanggintung)	4/2 TT	0,23	B	0,24	B

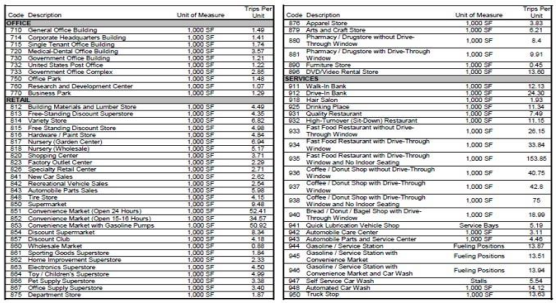
Figure 14. Road Traffic Service Levels in East Bogor District in 2021 and 2026. Source: Analysis Results, 2021

Generation Calculation Prediction Using ITE (Institute Transportation Engineers)

(Trip Generation Manual, 9th Edition)

Code	Description	Unit of Measure	Trips Per Unit
PORT AND TERMINAL			
30	Truck Terminal	Acres	6.55
90	Park and Ride Lot with Bus Service	Parking Spaces	0.62
INDUSTRIAL			
110	General Light Industrial	1,000 SF	0.97
120	General Heavy Industrial	Acres	2.16
130	Industrial Park	1,000 SF	0.85
140	Manufacturing	1,000 SF	0.73
150	Warehousing	1,000 SF	0.32
151	Mini-Warehouse	1,000 SF	0.26
152	High-Cube Warehouse	1,000 SF	0.12
170	Utilities	1,000 SF	0.76
RESIDENTIAL			
210	Single-Family Detached Housing	Dwelling Units	1.00
220	Apartment	Dwelling Units	0.62
221	Low-Rise Apartment	Dwelling Units	0.58
230	Residential Condominium / Townhouse	Dwelling Units	0.52
240	Mobile Home Park	Dwelling Units	0.59
251	Senior Adult Housing - Detached	Dwelling Units	0.27
252	Senior Adult Housing - Attached	Dwelling Units	0.25
253	Congregate Care Facility	Dwelling Units	0.17
254	Assisted Living	Beds	0.22
255	Continuing Care Retirement Community	Dwelling Units	0.16
LODGING			
310	Hotel	Rooms	0.60
320	Motel	Rooms	0.47
330	Resort Hotel	Rooms	0.42
RECREATIONAL			
411	City Park	Acres	0.19
412	County Park	Acres	0.09
413	State Park	Acres	0.07
415	Beach Park	Acres	1.30
416	Campground / Recreation Vehicle Park	Camp Sites	0.27
417	Regional Park	Acres	0.20
420	Marina	Berths	0.19
430	Golf Course	Acres	0.30
431	Miniature Golf Course	Holes	0.33

Code	Description	Unit of Measure	Trips Per Unit
432	Golf Driving Range	Tees / Driving Positions	1.25
433	Batting Cages	Cages	2.22
435	Multi-Purpose Recreational Facility	Acres	5.77
437	Bowling Alley	1,000 SF	1.71
441	Live Theater	Seats	0.02
443	Movie Theater without Matinee	1,000 SF	6.16
444	Movie Theater with Matinee	1,000 SF	3.80
445	Multiplex Movie Theater	1,000 SF	4.91
452	Horse Race Track	Acres	4.30
454	Dog Race Track	Attendance Capacity	0.15
460	Arena	Acres	3.33
473	Casino / Video Lottery Establishment	1,000 SF	13.43
480	Amusement Park	Acres	3.95
488	Soccer Complex	Fields	17.70
490	Tennis Courts	Courts	3.88
491	Racquet / Tennis Club	Courts	3.35
492	Health / Fitness Club	1,000 SF	3.53
493	Athletic Club	1,000 SF	5.96
495	Recreational Community Center	1,000 SF	1.45
INSTITUTIONAL			
520	Elementary School	1,000 SF	1.21
522	Middle School / Junior High School	1,000 SF	1.19
530	High School	1,000 SF	0.97
536	Private School (K-12)	Students	0.17
540	Junior / Community College	1,000 SF	2.54
560	Church	1,000 SF	0.55
565	Daycare Center	1,000 SF	12.46
566	Cemetery	Acres	0.84
571	Prison	1,000 SF	2.91
580	Museum	1,000 SF	0.18
590	Library	1,000 SF	7.30
591	Lodge / Fraternal Organization	Members	0.03
MEDICAL			
610	Hospital	1,000 SF	0.93
620	Nursing Home	1,000 SF	0.74
630	Clinic	1,000 SF	5.18
640	Animal Hospital / Veterinary Clinic	1,000 SF	4.72



Code	Description	Unit of Measure	Trips Per Unit
OFFICE			
710	General Office Building	1,000 SF	1.49
714	Corporate Headquarters Building	1,000 SF	1.41
715	Single Tenant Office Building	1,000 SF	1.74
720	Medical-Dental Office Building	1,000 SF	3.57
730	Government Office Building	1,000 SF	1.21
732	United States Post Office	1,000 SF	1.22
733	Government Office Complex	1,000 SF	2.85
750	Office Park	1,000 SF	1.48
760	Research and Development Center	1,000 SF	1.07
770	Business Park	1,000 SF	1.29
RETAIL			
812	Building Materials and Lumber Store	1,000 SF	4.49
813	Free-Standing Discount Superstore	1,000 SF	4.35
814	Variety Store	1,000 SF	6.82
815	Free-Standing Discount Store	1,000 SF	4.98
816	Hardware / Paint Store	1,000 SF	4.84
817	Nursery (Garden Center)	1,000 SF	6.94
818	Nursery (Wholesale)	1,000 SF	5.17
820	Shopping Center	1,000 SF	3.71
823	Factory Outlet Center	1,000 SF	2.29
826	Specialty Retail Center	1,000 SF	2.71
841	New Car Sales	1,000 SF	2.62
842	Recreational Vehicle Sales	1,000 SF	2.54
843	Automobile Parts Sales	1,000 SF	5.98
848	Tire Store	1,000 SF	4.15
850	Supermarket	1,000 SF	9.48
851	Convenience Market (Open 24 Hours)	1,000 SF	52.41
852	Convenience Market (Open 16-16 Hours)	1,000 SF	34.57
853	Convenience Market with Gasoline Pumps	1,000 SF	50.92
854	Discount Supermarket	1,000 SF	8.34
857	Discount Club	1,000 SF	4.18
860	Wholesale Market	1,000 SF	0.88
861	Sporting Goods Superstore	1,000 SF	1.84
862	Home Improvement Superstore	1,000 SF	2.33
863	Electronics Superstore	1,000 SF	4.50
864	Toy / Children's Superstore	1,000 SF	4.99
866	Pet Supply Superstore	1,000 SF	3.38
867	Office Supply Superstore	1,000 SF	3.40
875	Department Store	1,000 SF	1.87

Code	Description	Unit of Measure	Trips Per Unit
876	Apparel Store	1,000 SF	3.83
879	Arts and Craft Store	1,000 SF	6.21
880	Pharmacy / Drugstore without Drive-Through Window	1,000 SF	8.4
881	Pharmacy / Drugstore with Drive-Through Window	1,000 SF	9.91
890	Furniture Store	1,000 SF	0.45
896	DVD/Video Rental Store	1,000 SF	13.60
SERVICES			
911	Walk-in Bank	1,000 SF	12.13
912	Drive-in Bank	1,000 SF	24.30
918	Hair Salon	1,000 SF	1.93
925	Drinking Place	1,000 SF	11.34
931	Quality Restaurant	1,000 SF	7.49
932	High-Turnover (Sit-Down) Restaurant	1,000 SF	11.15
933	Fast Food Restaurant without Drive-Through Window	1,000 SF	26.15
934	Fast Food Restaurant with Drive-Through Window	1,000 SF	33.84
935	Fast Food Restaurant with Drive-Through Window and No Indoor Seating	1,000 SF	153.85
936	Coffee / Donut Shop without Drive-Through Window	1,000 SF	40.75
937	Coffee / Donut Shop with Drive-Through Window	1,000 SF	42.8
938	Coffee / Donut Shop with Drive-Through Window and No Indoor Seating	1,000 SF	75
940	Bread / Donut / Bagel Shop with Drive-Through Window	1,000 SF	18.99
941	Quick Lubrication Vehicle Shop	Service Bays	5.19
942	Automobile Care Center	1,000 SF	3.11
943	Automobile Parts and Service Center	1,000 SF	4.46
944	Gasoline / Service Station	Fueling Positions	13.87
945	Gasoline / Service Station with Convenience Market	Fueling Positions	13.51
946	Gasoline / Service Station with Convenience Market and Car Wash	Fueling Positions	13.94
947	Self Service Car Wash	Stalls	5.54
948	Automated Car Wash	1,000 SF	14.12
950	Truck Stop	1,000 SF	13.63

Figure 15. Trip Generation Manual. Source: Trip Generation Manual, 9th Edition

Lokasi	Fasilitas	Luas Sqm	Unit Of Measure	Koefisien ITE	ITE Bangkitan (Trip/jam)
Boxies Mall	Low Cost Apt	16.380	545	0,58	316
	Komersil	2.864	30,83	6,82	210
	Park and Ride	4.200	605	0,62	375
	Total	23.444	1.181		901

Bangkitan Mall Boxie tajur			
sqm	sqf	koef	trip/jam
4.810	52	9,48	491

Figure 16. Generating and Attractive Calculations in the Transmart Mall Tajur Bogor Area. Source: Analysis Results

Condition of Study Zone and MAT 2021

Six zones in one study sub-district were observed based on the administrative division of the kelurahan.

Table 1. Study Area Zone Division

Zone	Kelurahan	Subdistrict
1	Baranangsiang	Bogor Timur
2	Katulampa	Bogor Timur
3	Sindangrasa	Bogor Timur
4	Sukasari	Bogor Timur
5	Tajur	Bogor Timur
6	Sindagsari	Bogor Timur

(Source: Analysis Results)

Origin Destination Matrix

MAT is a two-dimensional matrix that contains information about the magnitude of movement between zones within a certain area. The row represents the origin zone and the column represents the destination zone, so that each cell of the matrix represents the magnitude of the movement current that moves from the origin zone i to the destination zone.

MAT 2021								OI
Tahun 2021	No. Zona	1	2	3	4	5	6	
Zona Study	1	0	610	65	5	21	23	724
	2	2.044	0	151	16	582	39	2832
	3	1.561	1.088	0	12	51	75	2787
	4	1.617	2.841	302	0	53	42	4855
	5	1.099	562	205	16	0	134	2016
	6	2.324	1.619	234	25	30	0	4232
	DD	8645	6720	957	74	737	313	1

Figure 17. Existing MAT in 2021. Source: Analysis Results

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MAT 2026								OI
Tahun 2026	No. Zona	1	2	3	4	5	6	
Zona Study	1	0	647,53	69,00	5,31	22,29	24,41	769
	2	2169,75	0	160,29	16,98	617,80	41,40	3006
	3	1	1154,93	0	12,74	54,14	79,61	2958
	4	1716,48	3015,78	320,58	0	56,26	44,58	5154
	5	1166,61	596,57	217,61	16,98	0	142,24	2140
	6	2466,97	1718,60	248,40	26,54	31,85	0	4492

Figure 19. Existing MAT in 2026 Source: Analysis Results

Road Network in Study Area

The road network modeling at the study site is shown in Figure 20 below.

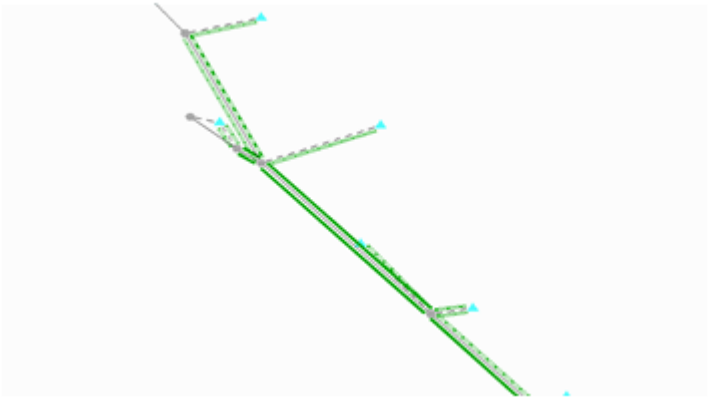

Figure 20. Road Network Modeling at the study site (Source: Analysis Results, 2021)

In the following, figure 21 and figure 22 are presented in the form of road loading (VCR Variable Intensity) at the study site.

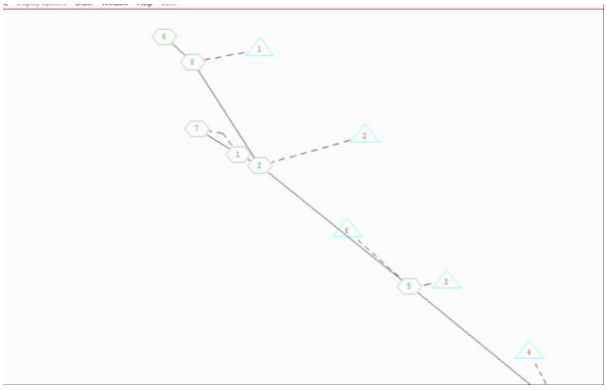

Figure 21. VCR Variable Intensity and MAT 2021 (Source: Analysis Results, 2026)

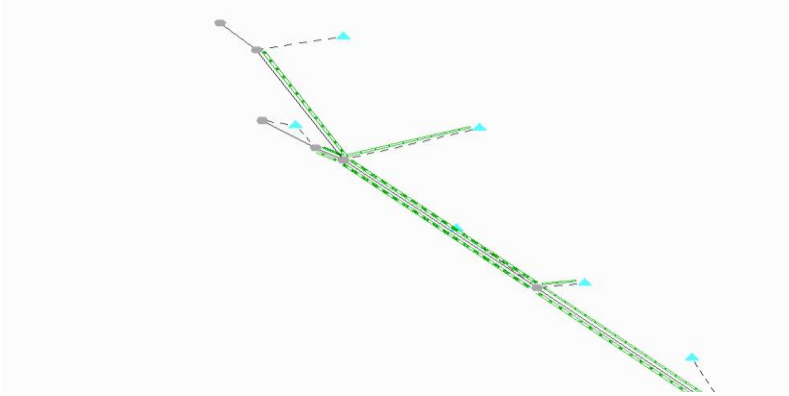

Figure 22. Variable Intensity VCR and MAT 2026 (Source: Analysis Results, 2021)

There is also the Pattern of Generating and Attractive Movements at the study site using the origin-destination matrix modeled on the SATURN application, which is shown in figure 23, figure 24 and figure 25 below.

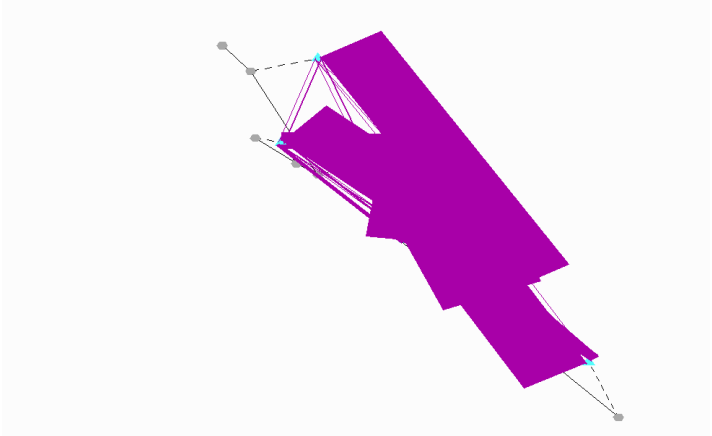

Figure 23. Generating and Attractive Patterns of Existing 2021 Study Locations (Source: Analysis Results, 2026)

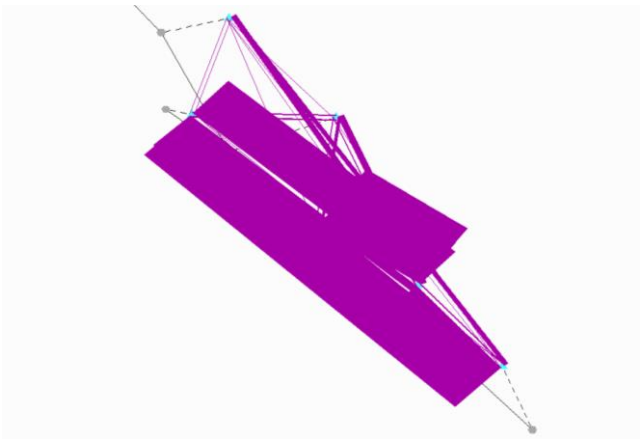

Figure 24. Generating and Attractive Patterns of Existing Study Locations in 2026. Source: Analysis Results, 2021

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Network Calibration Results and Transport Modeling Equation Design

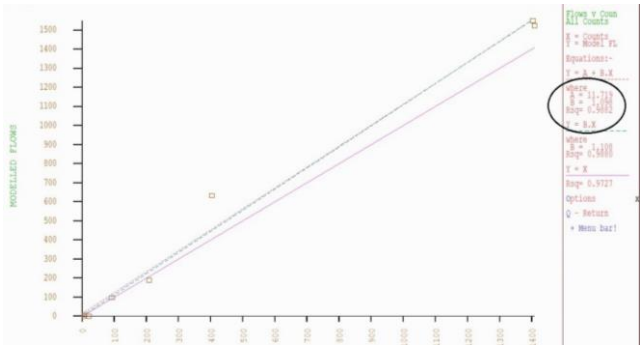

Figure 25. Results of Network Calibration in East Bogor District 2019 Y = 11,719 + 1,098 (X).
Source: Analysis Results, 2026

CONCLUSION

The construction and development of various types of land use, in essence, will directly or indirectly cause traffic impacts. The construction of the Boxies Mall in Tajur Bogor is predicted to cause a number of trips and trips that can have a negative impact on traffic flow performance on the surrounding roads. Based on the calculation results. The negative impacts that arise as a result of the increase in the number of course need to be anticipated by conducting an analysis of the resulting impacts and the steps needed to anticipate these impacts. Based on the results of the studies that have been carried out, there are several conclusions as follows, the existing condition of the Primary Arterial and Primary Collector road network in the study area obtained LOS in the range B to E. East Bogor District has a fairly good road network condition with an average LoS of C. there are several roads that are quite congested because the desire is approaching capacity, and the lack of traffic control for vehicles that stop carelessly, street vendors who are less orderly and so on. Boxies Tajur Mall building in East Bogor District in 2021 with a generation value of 9,074 smp/hour and a pull of 491 trips/hour. Then in 2026 with a rise value of 12717 smp/hour and a pull of 491 trips/hour. Traffic problems Jl. Raya Tajur 1 and Jl. Raya Tajur 2 is the high rate of travel which is indicated by the high value of the VCR. Especially in the afternoon peak hours (16.00 - 17.00) for directions to enter and exit the study area and peak hours during the day (12.00 – 13.00). This is because the road is a way out or in from the development.

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