

Analysis of financing schemes from land value in Transit Oriented Development at Bubulak Terminal

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ABSTRACT

Oriented areas are often known as Transit Oriented Development (TOD) requiring financing, which is absolutely necessary to accommodate developing activities and encouraging regional growth and land use plans in accordance with TOD regulations. Bubulak Terminal is one of the terminals in Bogor City because it has a variety of economic activities such as bus companies (PO), public transport, trade and services. This study plans land use in accordance with PermenATR/KaBPN No. 16 of 2017 concerning TOD Development Guidelines and using a financing scheme for the Bubulak Terminal Area using analysis calculations with the Financial and Economic Calculation Methods, the results of these calculations that are in accordance with data from internet literature studies of scientific papers and books. The results of the analysis of the TOD area of Bubulak Terminal with a mix use designation of 1606 pcu/hour. The results of the calculation of the Financial Calculation value of NPV (Net Present Value) are RP 38.144.000.000,00 and the results of the IRR calculation for the Bubulak Terminal area show an IRR value of 14.92 %, so the project is feasible to run/choose with a capital cost (WACC) of 11.56%. While the calculation result of the Economic Net Present Value (ENPV), the calculation result is RP 325.848.272.000,00 and the result of the Economic internal rate of return (EIRR) is 31.19%, the project will benefit and is feasible to run with revenue in 2023. Stakeholders involved in the TOD area at Bubulak Terminal, namely BPTJ as the regulator as well as the Responsible Agency for Cooperation Projects (PJKP) in developing TOD in Jabodetabek.

Key word: transit oriented development (TOD); financial and economic calculation; NPV KPBU solicited; BPTJ.

INTRODUCTION

The congestion and transportation problems that occur at this time occur because of the high level of community activity resulting from various uses of land use which are not accompanied by good accessibility. So that the number of community movements in using transportation modes, the majority of which are users of private transportation, is increasing. This has resulted in congestion and ineffectiveness between community activities and the available accessibility. Because the relationship between land use patterns and the choice of accessibility of transportation modes to support land use is very close, a design system is needed that is able to integrate the development of transportation modes with the use of land around the modes of transportation that can support the activities and needs of the community as users. modes of transportation. This congestion problem can be reduced by shifting the orientation of the use of private vehicles to transit-based mass transportation. However, it must be supported by the development of a compact urban form around the modal change point. The development of an area that is oriented towards a transit point in order to increase the demand for transit-based mass transportation is often known as Transit Oriented Development (TOD).

Good road conditions will affect travel patterns. This travel pattern will affect very diverse forms. This road shape will occupy a good scope. This form will be able to bring something good (Syaiful S et.al, 2022; Syaiful S, Pratama Y, 2019; Syaiful S, Hariyadi D, 2019). The density of vehicles determines the quality of the road. Good road quality comes from quality components and materials. This material will affect the smoothness of the road surface (Syaiful S, Fadly A, 2020). A smooth road surface will affect a good travel pattern as well. This pattern increases everyone's journey in moving from one place to another (Syaiful S et.al, 2020).

Definition of Transit Oriented Development (TOD)

According to Permen ATR/KaBPN No. 16 of 2017 concerning the Guidelines for the Development of Transit Oriented Areas is an area defined in the spatial plan as a centralized area on intermodal and intermodal integration located at a radius of 400 (four hundred) meters to 800 (eight hundred) meters from the transit node of mass public transportation modes which has a mixed and dense space utilization function with moderate to high space utilization intensity.

Table 1. Precondition Mass Transportation in the development of the TOD area

Criteria		TOD City - Center City services	TOD Sub City - Sub City service center	TOD Environment - Center Environmental service
Transit	Close distance (within the city)			
Mode	Microbus	✓	✓	✓
	City bus, BRT	✓	✓	✓
	A. Light rail transit (LRT)	✓	✓	✓
	B. Heavy rail (MRT)	✓	✓	-
	Long distance (between cities, between provinces)			
	A. Light rail transit (LRT)	✓	✓	✓
	B. Heavy rail (MRT) :			
	- Fast train	✓	✓	-
	- Train	✓	✓	-
	- Commuter line	✓	✓	✓
	- Express bus (Intercity/Province)	✓	✓	-
Headway		< 5 menit	5 - 15 menit	15 - 30 menit

The concept of structural and environmental design

A basic design idea at a macro scale, from interventions to design structures for structures and the environment to be achieved in the planning area, related to spatial structures that integrate with the surrounding area broadly, and by integrating all existing design components of the area. Which is the result of the analysis stage of the building and environmental program, contains a basic description of the arrangement of the planning land which is then followed up by elaborating the design ideas in more detail from each design element. (Permen PU No. 06 of 2007).

Basic building coefficient (BBC)

The Basic Building Coefficient is the percentage ratio between the total area of the ground floor of the building and the area of land/land owned. The basic coefficient of this building will later become a benchmark for how much area the ground floor of the building is allowed to be built.

$$\text{BBC} = \frac{\text{Building foot print area}}{\text{Land area}} \times 100 \%$$

Building floor coefficient (BFC)

Building Floor Coefficient is the percentage coefficient of the ratio of the total floor area of the building to the area of land owned. The regulation regarding the building floor coefficient only applies to buildings with more than one floor. The purpose of determining the KLB number is to regulate the density of buildings in an area. This outbreak arrangement aims to:

1. Creating and providing comfortable outdoor space, which still allows the entry of natural lighting and air in open areas, as well as sufficient walking paths to accommodate the flow of people generated by activities in the area.

2. Obtain a balance between the flow or vehicle capacity caused by an activity in a building with the existing road capacity.
3. Give character to a city area with the existing road capacity.
4. The considerations in determining BFC numbers are the type of land use, BBC numbers, road sizes, building distances, and building heights.

$$\text{BFC} = \frac{\text{Total floor area of the building}}{\text{Land area}} \times 100 \%$$

Green Base Coefficient (GBC)

Green Base Coefficient is the percentage ratio between the total area of open space outside the building designated for reforestation and the area of land / land owned. The green basic coefficient (GBC) is determined according to the designation in the regional spatial plan that has been determined. GBC of at least 10% in very dense areas. GBC is set to increase in proportion to the increase in building height and a decrease in area density. For general GBC calculations, the following formula is used:

$$\text{GBC} = \frac{\text{Green area or Open area}}{\text{Land area}} \times 100 \%$$

Generation and Withdrawal

The transportation system for Bogor City only has road-based and rail-based land transportation which consists of aspects of the road network, movement systems, public transportation services, both road-based and urban public transportation, passenger terminals, train services, parking systems and pedestrian path. Traffic movement is a land use function that results in traffic movements. This traffic generation includes (Tamin, 2000):

1. Traffic leaving a location, and
2. Traffic to or from a location.

Definition land value capture

Land Value Capture is an increase that is not yet an income caused by an increase in land value as a result of changes in land use, from public investment or decisions, or because the general growth of the community must be controlled again by a public body (community). (United Nation, 1976). LVC is a powerful financing & planning tool, but the risks and challenges involved in a large investment transit must be handled carefully prior to financial closure of a project. The Bubulak Terminal uses developments-based LVC with the cooperation of the Business Entity Government (Project Solicited) with the Bus + Property (B + P) approach, in order to replace the investment costs for transit, operation and maintenance. The mechanism used is development rights and its implementation has yielded favorable results due to the high number of passengers (ridership), as well as continuous cooperation between the government and business entities.

Method land value capture

Some theorists categorize LVC into several classifications formulating LVC into two main groups, namely development-based and tax-based. The first relates to direct transactions where the property value increases due to government decisions, while the second is obtained by indirect transactions (for example: taxes, tax increases, property taxes). Basically, there are various variations of the LVC mechanism that have been implemented in various countries.

RESEARCH METHODS

Place and time of research

The place where this research was conducted is in the Transit Oriented Development (TOD) Area at Bubulak Terminal in Bubulak Village, West Bogor District, Bogor City, West Java Province, which is the primary collector road that connects Bogor City and Bogor Regency which is the main access for community movements to carry out activities. daily activities.

Geographical location

Geographically, Bubulak Terminal is located between 6°34'12.1" South Latitude and 106° 45'17.9" East Longitude in West Bogor City, with a land area of ± 7000 m².

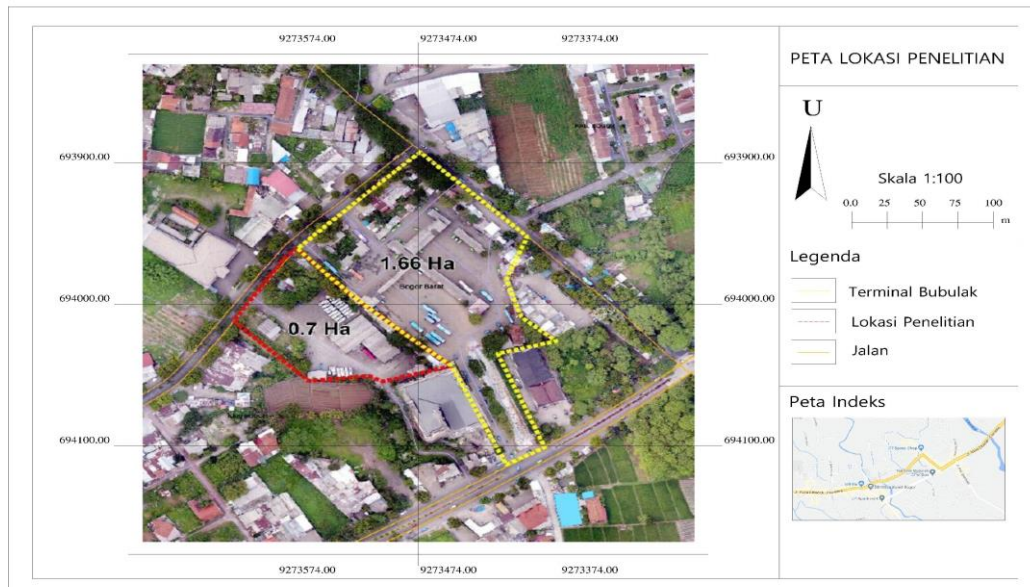


Figure 1. Research Location Map

Materials and tools

Material

In this study, the research material consisted of a literature study by collecting information relevant to the topic or problem that became the object of research. This information can be obtained from books, scientific papers, theses, dissertations, encyclopedias, the internet, and other sources. By conducting a literature study, researchers can utilize all the information and thoughts relevant to their research.

Tools

The tools needed consist of:

1. Computer or laptop with Microsoft Excel, Microsoft Word and AutoCad tools.
2. Surveyor.
3. Digital cameras as documentation tools in the field.
4. Stationery

Research Stages

Collecting research data using data collection methods including primary and secondary data collection. The analysis method used in this research is the Financial and Economics Calculation method for the feasibility of financing the development of the Bubulak Terminal TOD Area, the flowchart is shown in figure 2 below.

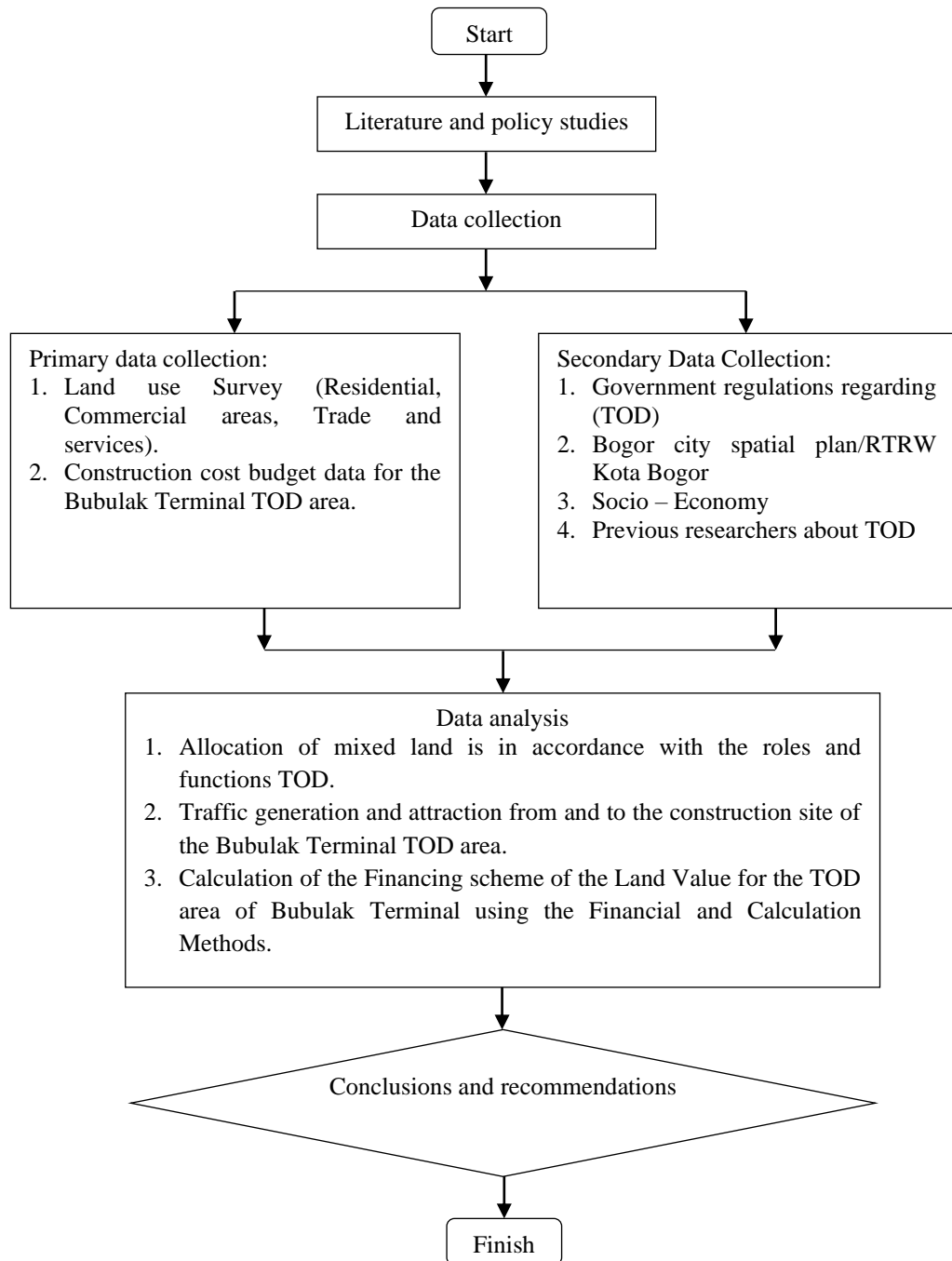


Figure 2. Reasearch Flowchart

RESULTS AND DISCUSSION**Table 2.** Density Intensity in TOD space utilization

No.	Space Utilization Intensity	Land area	%	Total Basic Building coefficient	Building floor		
					Number of floors	Total floor area (m ²)	Total Building floor coefficient
Land area : 7000 m²							
Close space							
1	Residential	1450	30%	20.70%	6 - 15	20000	2.86
2	Non-Residential	3352	70%	47.90%	1 - 5	14650	2.09
Sub Total		4802	100%	68.60%		34650	4.95
Outdoor							
1	Green open space/RTH	771	11%				
2	Street	1427	20%				
Sub Total		2198					
Total Number		7000					

Table 3. Parking Space calculation for Park and Ride area TOD

No	Assumption area Net saleable Park and Ride = 4500 m ²	Land area (m ²)	Parking space units Area (m ²)	Parking Space	Description
Assumption					
1	55% Motorcycle	0.75 x 2.00	3094	1.5	Park and Ride
2	40% Car (Group II)	2.50 x 5.00	2250	12.5	
3	5% Bus/Truck	3,4 x 12,5	281	42.5	
Sub Total				2243	

Table 4. ITE Generation and Attraction of Bubulak Terminal TOD area

No	Facility	Description (ITE Code)	Units	Units	Sqm GFA	1000 Sqf GFA	Coefficient ITE	ITE Generation (trip/hours)
1	Apartment	Residential	Dwelling Units	233	-	-	0.62	145
2	Supermarket	Retail	1000 SF	-	1467	16	9.48	150
3	Factory Outlet Center	Retail	1000 SF	-	1467	16	2.29	36
4	Variety Store	Retail	1000 SF	-	350	4	6.82	26
5	Apartment	Residential	Dwelling Units	800	-	-	0.62	496
6	General Office	Office	1000 SF	-	2985	32	1.49	48

Building								
7	Park and Ride Lot with Bus Service	Port and Terminal	Parcking Spaces	-	2243	-	0.62	1390
Sub Total		1033	8512	67				2290

Table 5. Generation in the Bubulak Terminal TOD area

No	Land Use	ITE Generation (Trip/jam)	Type of mode			Generation (Smp/jam)
			LV %	MC %	HV %	
1	Apartement	145				112
2	Supermarket	150				104
3	Factory Outlet Center	36				25
4	Variety Store	26	60.00%	32.00%	8.00%	18
5	Apartement	496				345
6	General Office Building	48				33
7	Park and Ride Lot with Bus Service	1390				968
Sub Total						1606

Table 6. Generation (IN) and Attraction (OUT) during peak hours in the TOD area

No	Land Use	Total Generation (smp/jam)	Peak hour of adjacent street rate AM (7 - 9)				Total	Peak hour of adjacent street rate PM (4-6)			
			in	out	in	out		in	out		
1	Apartment	112	20%	80%	22	90	112	65%	35%	73	39
2	Supermarket	104	62%	38%	65	40	104	51%	49%	53	51
3	Factory Outlet Center	25	73%	27%	18	7	25	47%	53%	12	13
4	Variety Store	18	NA	NA	NA	NA	18	NA	NA	NA	NA
5	Apartment	345	20%	80%	69	276	345	65%	35%	224	121
6	Office	33	88%	12%	29	4	33	17%	83%	6	28
7	Park and Ride	968	79%	21%	764	203	968	25%	75%	242	726
Sub Total		1606					1606				

Table 7. Capex Data (Capital expenditure) of the Bubulak Terminal TOD area

No	Jenis	Land	Building	Total	Units	Cost
		Area (m ²)	Floor	area (m ²)		
1	Apartement Lt. 5-15	1467	7	10269	233	25,672,500,000
2	Supermarket	1467	2	2934	42	7,335,000,000
3	Factory Outlet Center	1467	2	2934	42	2,934,000,000
4	Variety Store	350	1	350	7	700,000,000
5	Apartment Lt. 6-13	2985	5	14925	800	44,775,000,000
6	General Office Building	2985	2	5970	160	14,925,000,000
7	Park and Ride	2985	3	8955	3	8,955,000,000
8	Main Road	1427	1	1427	1	3,567,500,000
9	Circulation	1875	1	1875	1	937,500,000
10	Green open space/RTH	771	1	771	1	3,855,000,000
Total		7000		50410		113,656,500,000

Description	The stages per years		
	2021	2022	2023
Variety store	700,000,000		
Apartemen + General Office Building + Supermarket + Factory outlet	70,447,500,000	60,417,750,000.0	
Park and Ride	8,955,000,000.0		
Main road + Circulation + Green open space/RTH	4,505,000,000	3,855,000,000	
Total 1	84,607,500,000	64,272,750,000	Operasi
Desain	8,460,750,000.0	6,427,275,000.0	
OC	16,921,500,000.0	12,854,550,000.0	
IDC	8,460,750,000.0	6,427,275,000.0	
Total 2	118,450,500,000	89,981,850,000	
Tax	14,214,060,000.0	11,247,731,250.0	
GRAND TOTAL	132,664,560,000	101,229,581,250	

Table 8. Income Bubulak Terminal TOD area

No	Description		Total
A	Rental income for 7 kiosks, rental price of 20 million / year	IDR	140,000,000
	1 Motorcycle	IDR	15,738,800
	2 Passenger car	IDR	303,534,000
	3 APTB, AKAP and AKDP	IDR	7,247,576,875
	4 Light truck parking / pick up / box	IDR	117,274,500
	Overnight parking per vehicle from 22:00 to 04:00		
	5 Cars and trucks	IDR	689,850,000
	6 APTB, AKAP and AKDP	IDR	406,617,300
B	Total Parkir Income	IDR	8,780,591,475
	1 Release my self	IDR	821,250,000
	2 Urination	IDR	821,250,000
	3 Bath	IDR	1,642,500,000
	4 Wash the vehicle	IDR	1,365,100,000
	5 Vehicle crew lodging	IDR	6,626,356,000
	6 Storage of goods	IDR	451,797,000
C	Total Other Income	IDR	11,728,253,000
	Total Income at Bubulak Terminal	IDR	20,648,844,475

Table 9. Financial Calculation Bubulak Terminal TOD area

*Calculation in million rupiah													
Years												2021	2022
CAPEX													
Supermarket + Factory outlet + Variety store												700	
Apartement + General Office Building												70,448	60,418
Park and Ride												8,955	
Utilities												4,505	3,855
Design												8,461	6,427
Environmentally Friendly Transportation Development													100
Improvement of the Development of Reporting System for Performance and Financial Achievement													64
OC												16,922	12,855
IDC												8,461	6,427
Capex Tax												14,214	11,248
TOTAL CAPEX												132,665	101,393
*Calculation in million rupiah													
Years	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
OPEX													
Management			386	400	415	430	445	461	478	495	513	531	
Labor			1,681	1,742	1,804	1,869	1,937	2,006	2,079	2,154	2,231	2,311	
Utilities (Electricity, Water, Telephone, Internet, Waste)			8,826	9,143	9,472	9,813	10,167	10,533	10,912	11,305	11,712	12,133	
Administration and General			537	556	576	597	618	640	664	687	712	738	
Selection of Building and Cleanliness			1,610	1,668	1,728	1,790	1,855	1,921	1,991	2,062	2,136	2,213	
Improved Transportation Safety & Security					12,077			8,742				9,721	
Increased Competence of Transportation Human Resources						764				7,880			
Insurance			2,147	2,224	2,304	2,387	2,473	2,562	2,654	2,750	2,849	2,951	
Marketing		1,036	1,073	1,112	1,152	1,193					1,424	1,476	
Tax			436	449	463	477	491	506	521	536	553	569	
TOTAL OPEX	0	1,036	16,696	17,294	29,991	19,321	17,985	27,372	19,297	27,869	31,850	22,923	
TOTAL COST	132,665	102,429	16,696	17,294	29,991	19,321	17,985	27,372	19,297	27,869	31,850	22,923	
TERMINAL INCOME													
Kiosk Rental			150	156	161	167	173	179	186	192	199	207	
Terminal Parking			9,424	9,763	10,115	10,479	10,856	11,247	11,652	12,072	12,506	12,956	
Other Income			12,588	13,041	13,511	13,997	14,501	15,023	15,564	16,124	16,704	17,306	
NON TERMINAL													
Rent an apartment			4,435	4,568	4,705	4,847	4,992	5,142	5,296	5,455	5,619	5,787	
Selling Apartments			38,384	39,536	40,722	41,943	43,202	44,498	45,833	47,208	48,624	50,083	
Apartment parking rates			2	2	5	9	11	12	12	12	3	7	
TOTAL INCOME	0	0	64,984	67,066	69,219	71,442	73,735	76,100	78,542	81,063	83,655	86,345	
	-132,665	-102,429	48,288	49,772	39,228	52,122	55,750	48,728	59,245	53,193	51,804	63,422	
NPV	IDR38,144												
IRR	14.92%												
Accumulated Net Cash Flow	-132,665	-235,094	-186,806	-137,034	-97,806	-45,684	10065.63421	58793.95939	118,039	171,232	223,037	286,459	
Positive Indicators	0	0	0	0	0	0	1	1	1	1	1	1	
Cumulative Lags	0	0	0	0	0	0	0	1	1	1	1	1	
Payback Years		0	0	0	0	0	7	0	0	0	0	0	

Table 10. Economic Calculation Bubulak Terminal TOD area

*Calculation in million rupiah												
Years	0	1	2	3	4	5	6	7	8	9	10	11
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
TOTAL CAPEX	132,665	101,393										
TOTAL OPEX	0	1,036	16,696	17,294	29,991	19,321	17,985	27,372	19,297	27,869	31,850	22,923
TOTAL COST	132,665	102,429	16,696	17,294	29,991	19,321	17,985	27,372	19,297	27,869	31,850	22,923
ECONOMIC BENEFITS												
Use of local materials	13,266	10,139										
Improvement of the Development of Reporting System for Performance and Financial Achievement			1,681	1,742		1,869	1,937	2,006	2,079	2,154	2,231	2,311
Increase in Bogor City's Gross Regional Domestic Product	0	0	75,629	84,203	93,754	104,390	116,230	129,411	144,089	160,432	178,608	198,878
TOTAL INCOME	13,266	10,139	77,310	85,944	93,754	106,260	118,167	131,418	146,167	162,585	180,839	201,189
CASHFLOW	-119,398	-92,290	60,614	68,650	63,763	86,939	100,182	104,046	126,870	134,716	148,988	178,267
ENPV	IDR325,848											
EIRR	31.19%											

Roles stakeholders involved for the transit oriented zone in Bubulak Terminal

Based on the results of calculations using Microsoft Excel with the Financial and Calculation Method the roles stakeholders are involved for the Transit Oriented Zone at the Bubulak Terminal, namely BPTJ as the regulator as well as the Responsible Agency for the Cooperation Project (PJPK) in the development of TOD in Jabodetabek especially for Bubulak Terminal Area with indicative project structure as follows:

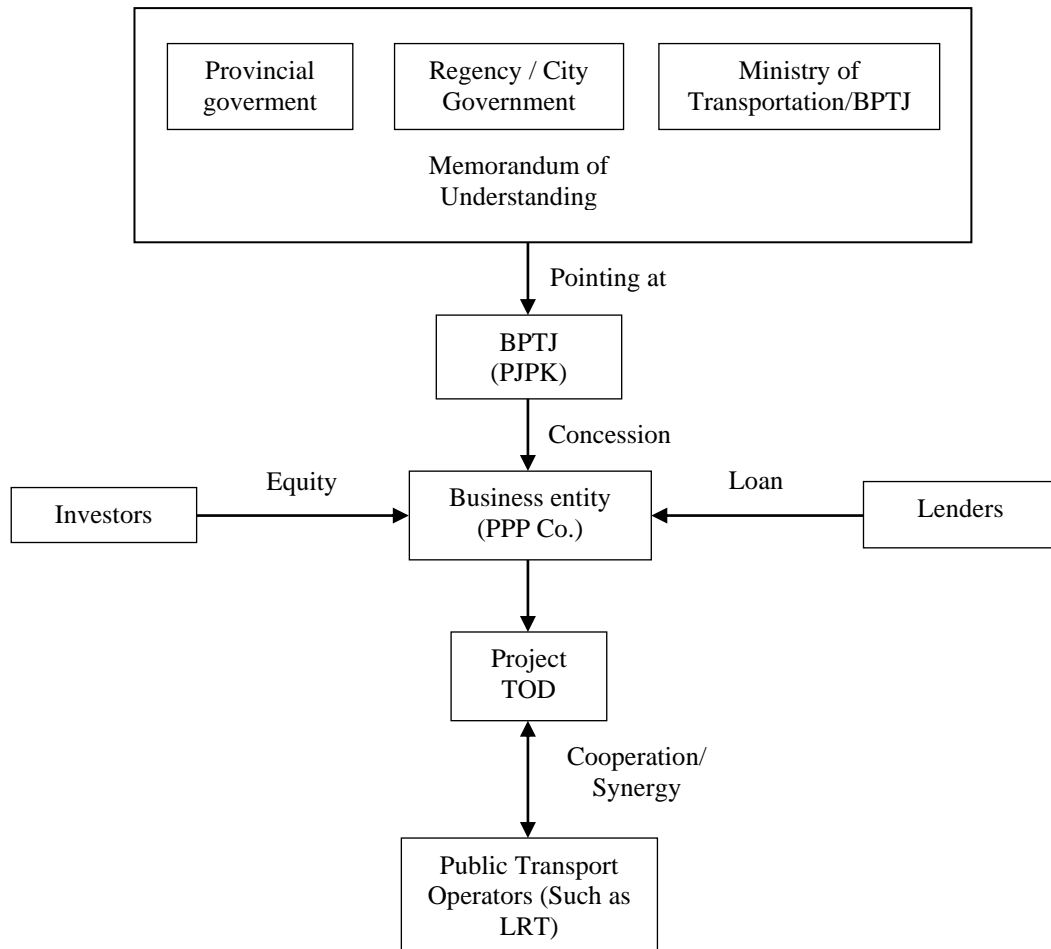


Figure 3. Indicative Project Structure

CONCLUSION

The spatial development of the Bubulak Terminal TOD Area is directed to transit, this causes land use in the Bubulak Terminal TOD Area to have Park and Ride facilities covering an area of 2,500 m² with a 3-story building. The suitability of the TOD for the Bubulak Terminal Area with the TOD concept has an advanced value (ITDP 2014), the construction of TOD for Bubulak Terminal is in accordance with the TOD principle according to the 2014 ITDP and the criteria for space utilization according to Permen ATR No. mixed land use (Mix Use) of 1606 pcu / hour. From the results of the overall calculation using the Financial and Economic Calculation Method, the results for the Bubulak Terminal Area get an NPV (Net Present Value) of IDR 38,144,000,000.00, an IRR (Internal rate of return) of 14.92% and get a profit in the 7th year, namely in 2027 and the ENPV (Economic Net Present Value) value of IDR 325,848,272,000.00 and the resulting value from the analysis of the EIRR (Economic Internal rate of return) calculation of 31.19%, the project will benefit and is feasible to run with income in the year 2023 when the construction of the Bubulak Terminal TOD area is completed, the project is feasible to run. The roles (stakeholders) involved in the Transit Oriented Zone at the Bubulak Terminal are BPTJ as the regulator and in charge of the Cooperation Project (PJK) in the development of TOD in Jabodetabek, especially for the TOD Area of Bubulak Terminal. The program from the analysis results for the Bubulak Terminal TOD Area is the Bus plus Property (B + P) program which involves the actors (stakeholders) involved in the development of the TOD Area at the Bubulak Terminal, namely BPTJ as the regulator which determines the standardization of the TOD to be developed. And the LVC method used for the Bubulak Terminal TOD area is development-based using the Profit-sharing arrangement mechanism.

REFERENCES

- ADEC. 2012. Value Capture from Transit Oriented Development (TOD) and Other Transport Interchanges for poverty Alleviation, African Development Economics Consultants (pty) Ltd. Africa, 13 April, 2012.
- Anonim, 2017. *PermenATR/KaBPN No. 16 Tahun 2017 tentang Pedoman Pengembangan Kawasan Berorientasi Transit*. Kementerian Tata ruang/Kepala Badan Pertanahan Nasional. <https://www.atrbpn.go.id/Publikasi/Peraturan-Perundangan/Peraturan-Menteri-ATR-Kepala-BPN/peraturan-menteri-agraria-dan-tata-ruang-kepala-badan-pertanahan-nasional-republik-indonesia-nomor-16-tahun-2017-70794>
- Dittmar, H., dan G. Ohland, 2004, *The New Transit Town Best Practice in Transit – Oriented Development*, Wasingthon, DC: Island Press.
- Dwiana Novianti, Puspita Dirgahayani. 2018. *Identifikasi potensi Land Value Capture dikawasan Stasiun Gedebage menggunakan Hedonic Pricing Model*, Jurnal of Sustainable City and Urban Development, Vol. 1, 2018.
- Hiroaki Suzuki. 2014. *Financing Transit Oreinted Development with Land Values, Adapting Land Value Capture in Developing Countries*, Japan – OECD Forum on Urban Development and Green Growth, Tokyo, 15 Oktober, 2014.
- H.M. Shivanand Swamy. 2015. *Financing Transit Development Through Land Value Capture. Assessing Value Capture Mechanisms for MRTS*
- Keputusan Menteri Perhubungan Nomor 31 Tahun 1995 tentang *Terminal Transportasi Jalan*
- Ketut Dewi Martha Erli Handayani, 2012, *Penerapan TOD (Transit Oriented Development) sebagai Upaya Mewujudkan Transportasi yang Berkelanjutan di Kota Surabaya*, Perencanaan Wilayah dan Kota, Institut Teknologi Sepuluh Nopember.
- Muhammad Fauzi Novrizaldy. 2018. *Penerapan Konsep Transit Oriented Development (TOD) Sebagai solusi masalah transportasi di DKI Jakarta*.
- Mu, Rui dan Martin de Jong, 2012, *Establishing The Conditions For Effective Transit-Oriented Development In China: The Case Of Dalian*, Journal of Transport Geography.

Puspita Dirgahayani. 2019. *Transit Oriented Development Kebijakan dan Kelembagaan TOD*, Bappenas, 16 Juli 2019.

RM. Petrus Natalivan Indradjati. 2019. *Konsep dan Prinsip Pengembangan Kawasan Beroorientasi Transit/Transit Oriented Development*, *Buletin Penataan Ruang*, Edisi 5, September – Oktober 2019.

Rizky Herdiansyah. 2019. *Analisis Dampak Lalu lintas Pembangunan Transit Oriented Development (TOD) Green Walk Station Bekasi Timur*, *Jurnal Rekayasa Sipil Astonjadro*, vol 8, no. 1, juni 2019. (Indonesian). <http://ejournal.uika-bogor.ac.id>

S Syaiful, H Siregar, E Rustiadi, ES Hariyadi. 2022. Performance of Three Arms Signalized Intersection at Salabenda in Bogor Regency, *ASTONJADRO: CEAESJ*, 11(1),pp.13-29.

S Syaiful, Y Pratama. 2019. Sustainable Studies about General Public Transport Performance in the City of Bogor, *ARPN Journal of Engineering and Applied Sciences* 14 (18), 3241-3247.

S Syaiful, D Hariyadi. 2019. Case Study on Sustainable T-Jungtion Cibinong City Mall (CCM) in Bogor Indonesia, *ARPN Journal of Engineering and Applied Sciences* 14 (17), 2960-2971.

S Syaiful, A Fadly. 2020. Analysis of the Effectiveness of Bus Services Outside of Campus IPB Dramaga Bogor. *ASTONJADRO: CEAESJ* 9 (2), 173-186.

S Syaiful, H Siregar, E Rustiadi, ES Hariyadi. 2021. Traffic Improvement Strategy in Transportation System Using AHP Method. *ARPN Journal of Engineering and Applied Sciences* 16 (22), 2431-2439.

Suzuki, Hiroaki, Robert Cervero, and Kanako Iuchi. Actual and projected number of motorized vehicles in the world, 1975–2050. Chart. Washington, DC: The World Bank, 2013.

Undang – undang Republik Indonesia, 2009. *Pajak Daerah dan Retribusi Daerah dengan Rahmat Tuhan yang Maha Esa Presiden Republik Indonesia*. Kementerian Keuangan Republik Indonesia. No. 28, 2009. http://www.djpk.kemenkeu.go.id/attach/post-no-28-tahun-2009-tentang-pajak-daerah-dan-retribusi-daerah/UU-427-973-UU_28_Tahun_2009_Ttg_PDRD.pdf

Wikibooks. *Manajemen Lalu Lintas/Transit Oriented Development*. 9 Mei 2018. https://id.wikibooks.org/wiki/Manajemen_Lalu_Lintas/Transit_Oriented_Development.