



Environmental Impact Analysis on School Building Reconstruction (Case Study: SDN Sukatani 7, Depok City)

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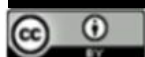
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Abstract

In order to improve educational facilities and infrastructure, Department of Housing and Settlements, Depok City plans to reconstruct a school building. With the impacts caused by this activity, an environmental impact assessment is needed. The purpose of this study is to know the quality of initial environmental baseline at the reconstruction location of SDN Sukatani 7 and obtain the results of an analysis of environmental impact studies and ways of mitigation in minimizing the impacts that occur during pre construction stage, construction stage, and operation stage. The method used is observation, interview and scoping methods to determine the impact and good handling of the environment. The results of this study are baseline environment at the location of the study shows that the quality of the environment of the study location is in the good category, either in terms of ambient air quality components or noise as well as water quality components and at each activity starting from the pre-construction stage, construction, and up to the operation stage, each has a positive and negative impact on the environment. Negative impacts that occurred can be minimized by making good environmental management efforts at each stage of the activity starting from the pre-construction stage until the operation stage.

Keywords: Impact, Environmental, Reconstruction, School, Minimize

1. Introduction

As one form of service to the community, the Depok City Housing and Settlements Department plans to reconstruct the SDN Sukatani 7 Building. The building is administratively located on Pekapuran Street No. 45, Sukatani, Tapos Regency, Depok City, West Java. It is expected that the building reconstruction will improve educational facilities and qualities especially in Sukatani Village.

Based on the act No. 32 of the year 2009 Article 68, everyone who conducts business and/or activities is obliged to provide information related to environmental protection and management in a true, accurate, open and timely manner (Anonymous, 2009b) and Government Regulation of Republic Indonesia No. 27 of 1999 Article 3 paragraph (4) that business plan and/or activities outside business and/or activities which can have a large and significant impact on environment is obliged to do environmental management efforts.

Despite of many benefits in this reconstruction, there are various negative impacts occurred in society. It caused by unsuitable planning process to the needs and necessities exist in

society. However, a study of various impacts on development plans and ongoing development activities is needed. It will make society as the direct impact addressee able to get benefits from the existed reconstruction. In brief, the reconstruction of SDN Sukatani 7 building encourages a positive impact on the environment. Nevertheless, this reconstruction also has a negative impact. As there are positive and negative impacts on this construction, it is necessary to have an environmental impact analysis used as a guide or reference on controlling impact management caused by the construction activities in SDN Sukatani 7 building. Moreover, the purpose of environmental impact analysis on planned reconstruction activities of SDN Sukatani 7 building in Depok is to provide development plan's overview, analyze initial environmental baseline, identify affected development plan activities; identify affected environmental components as well as provide suggestion on environmental management in SDN Sukatani 7 building's construction activities.

2. Literature reviews

2.1. Definition of Environment

According to Law No 32 of 2009, environment is a relationship of all space, power, living things, including human and their behaviour which affect nature itself, the survival of life and humans.

The environment is the sum of all living things and inanimate objects as well as all the conditions that exist in the environment where we live in our place (Supardi, 2003).

Natural environment is everything that exists in nature and was created by Almighty God, Allah SWT, examples of the natural environment on the surface of the earth are rivers, lakes, seas, mountains and valleys (Rahmadi T, 2011).

2.2. Impact of Development

Development is an effort to manage and utilize resources to improve human prosperity. Development is said to have an important impact if within the process it caused very fundamental changes to the environment that be through development process.

The Government Regulation of Republic of Indonesia No. 27 of 2012 about Environmental Permits and Law of Republic Indonesia No. 32 of 2009 about Environmental Protection and Management which states that any development activity that have an impact on the environment needs to be supplemented with an Environmental Impact Analysis (EIA). Forecast of significant impact is based on seven (7) important criteria:

(1). Number of people affected

Development plans can give benefits to the people around the construction site or it can give negative impact to the environment around it. If there are several people that are negatively affected, then the impact caused is an important impact

(2). Total area of impact distribution

Total area of impact distribution is one of the factors that can determine the significance of the development impact on environment. The negative impact caused by development is aspired to be overcome so it will not spread to a wider area.

(3). Duration of impact and intensity of impact

There are few impacts of development that only lasted for a short time, that is only in one stage of the development processes (planning, construction, or operational). But there are also those that last a long time, start from the planning stage until the end of the process is finished.

Impact intensity is a severe environmental change that takes place over a relatively wide area and in a relatively short time. Impacts have high intensity or called as significant impacts if many environmental components will be impacted further and the impact is cumulative.

(4). The number of other components affected

A development is said to have significance impact if in the process the development caused secondary impacts and subsequent impacts, other than primary impacts.

(5). The cumulative nature of the impact

The impact that is predicted to occur will accumulate (accumulate) in one particular area, and

the environmental impacts from various activities generate reinforcing effect.

(6). Whether the impact is reversed or not

The impact of a development is categorized as significance impact if the predicted impact occurs cannot be recovered (not reversed) back to the original condition, either restored by nature or by human intervention.

(7). Other criteria in accordance with the development of science and technology

What is meant in this point is that the negative impacts caused can or cannot be overcome by the available science and technology.

2.3. Environmental Baseline

An environmental baseline is the current environmental conditions, which are natural conditions or initial environmental components before physical planning and development begin. An environmental baseline is an initial environmental condition before being affected by activities for planning, construction (physical construction), and operational activities. The subjects included in the environmental baseline.

2.3.1. Environmental Physical – Chemistry Components

It is a component of the environment around the development activities.

(1). Climate

The climatic factors observed included rainfall, rainy day, air temperature, humidity, wind direction, wind speed, and duration of sun exposure.

(2). Water Quality

Water quality consists of physics, chemistry and biology parameters.

(3). Ambient air quality and noise

Noise is an unwanted sound from an activity that can cause health and human comfort problems. The noise level is expressed in decibels (dB (A)). Activities that can cause noise include the operation of vehicles and equipment.

Noise level measurements are carried out directly using the Sound Level Meter. The method of measuring, calculating, and evaluating noise levels refers to Appendix 2 Regulations of Minister of Environment No. 48 of 1996 concerning Noise Level Quality Standards.

2.3.2. Biological Components

The impact of an activity on components of the biological environment, both terrestrial and aquatic ecosystems, can be seen from the structure and composition of existing flora and fauna types. The higher diversity of flora and fauna species, the higher the level of biological environment sustainability or the smaller the level of pollution, and vice versa.

Observations were made on the components of the biological environment, both terrestrial and aquatic ecosystems, to determine the types of flora and fauna contained at the study area.

2.3.3. Socio - economic and Cultural Components

Within this region, social interaction occurs following the socio-economic and cultural dynamics of the community, especially social interactions related to activities. Some components in this

research include demographic/population, socio economic data in the form of community livelihoods and income, and socio-cultural data in the form of education and views of public perception.

2.3.4. Public Health Components

The components in this research are health facilities and public health services, as well as access to clean water and environmental sanitation.

2.4. Construction Project

The definition of construction projects, according to Ervianto (2005), is a construction project that is a series of activities that are only carried out once and are generally short-term. According to Ervianto (2005), construction projects

can be divided into two types of building groups, particularly structure buildings and civil buildings.

Structure building consists of houses, offices, factories, and others, while civilian buildings consist of roads, bridges, dams, and other infrastructure.

3. Research Method

3.1. Research Time and Location

Administratively the location of the activity is located on Jl. Pekapuran No. 45, Sukatani, Tapos District, Depok City, West Java. Research location map was presented in figure 1, and the study was conducted from February to May 2020.

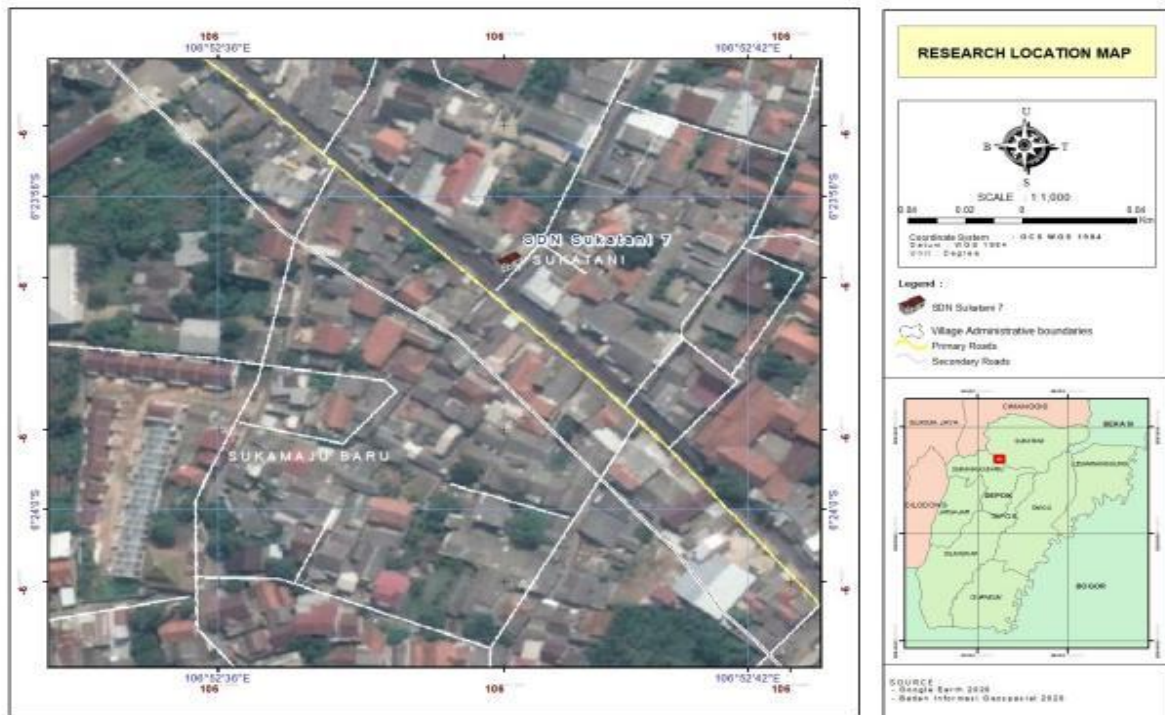


Figure 1 Research Flow Diagram

3.2. Research Time and Location

The material that used in this study are air absorbance and water sample. The tools that used in this study are stationary, questionnaire, camera and tape recorder, survey measuring tools (Digital DO meter, Digital pH meter, Impinger, Sound level meter and Hygrometer, computer set, printer and papers.

3.3. Stage of Research

Generally, there are 5 stages of research that is done, research stages begin with studying a literature study of previous studies, books, scientific paper, theses, dissertations, and other sources.

The second stage is data collection consists of primary and secondary data. Primary data was obtained directly from the location and survey results, such as: (1) Observation, was conducted in order to see the location of Sukatani 7 Public Elementary School reconstruction project directly and documentation was conducted as well, (2) Interview, was conducted in the form of survey towards the closest residents to the project site by

asking their responses about plans Sukatani 7 Elementary School reconstruction. It consists of 30 samples in Sukatani Village, (3) water and air quality, obtained by taking water and air samples at the research site. Secondary data in the form of climate data in the research site and socio-economic and cultural data of the community in the study location, obtained by the relevant institution.

The third stage is Data processing, was conducted by collecting data obtained from field survey result. It was conducted by reviewing the baseline environment and combining it with secondary data such as climate and socio-economic and cultural data. Therefore, the result of data processing are included on impact analysis in the form of matrix.

The next stage is grouping the environmental impact is the result stage of data processing and conducted by reviewing the physical-chemical and socio-economic and cultural aspect using scoping method.

The conclusion is the final stage of the results of the grouping, containing the estimated impact that

occurred during the reconstruction Sukatani 7 Public Elementary School building and how to minimize the impact from the pre-construction stage to the operation stage. The research flow chart was presented in the figure 2.

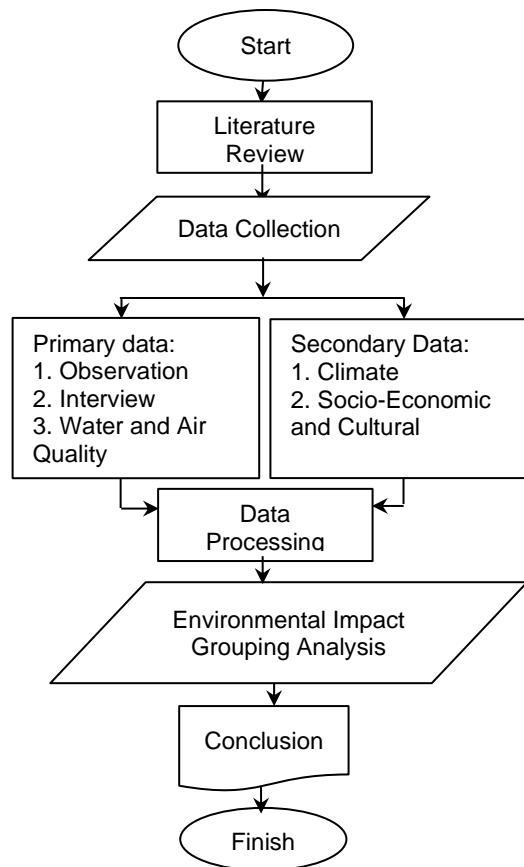


Figure 2 Research flow diagram

4. Results and Discussion

Administratively the location of the activity is located on Jl. Pekapuran No. 45, Sukatani, Tapos District, Depok City, West Java. The location of the development plan is on vacant land, which is the origin of land from waqf land with a deed of grant. Research location map was presented in figure 2:

4.1. Environmental Baseline

The environmental baseline in this research is the initial environmental baseline at the beginning of the research. The initial environmental baseline to be examined includes the physical-chemical component, the biological component, the socio-economic and cultural component, and the component of public environmental health.

4.1.1. Environmental Physical - Chemical Components

Climate factors observed included rainfall, rainy day, air temperature, humidity, direction and speed of wind, and duration of sun exposure.

The average annual rainfall was 14.1 mm/month. The lowest rainfall occurred in March which is 6.8 mm and the highest rainfall occurred in May which is 21.9 mm. According to this data, in this research location, there was rainfall throughout

the year and it was almost no significant dry season. Thus, it can be concluded that the research location did not have a dry month.

The temperature of the research location ranged around 25.6°C – 26.6°C and the average was 26.1°C. In general, the average annual air temperature had a pattern towards its monthly temperature. The minimum air temperature pattern occurred in the wet months while the maximum air temperature pattern usually increased towards the dry months.

The humidity in the location of study was ranged around 74.5%-85.4% by the average annual was 74.9%. The highest humidity occurred in rainy season while the lowest humidity occurred in the dry season. Afterwards, the humidity monthly fluctuations in the location of study were relatively small and no extreme changes confirmed. That humidity then included as relative humidity which was still able to be tolerated (80-90%).

The wind direction in the location of the study was similarly blowing to the north. Wind speeds ranged around 1.2 m/s – 2.1 m/s by the annual average speeds was 1.6 m/s. The wind direction and the wind speeds were greatly affecting the pollutants distribution pattern that caused air pollution spread in the location of study.

The duration of sun exposure in the location of study was ranged around 2.4 – 8.5 hours by the average was 5.9 hours. The lowest sun exposure was occurred in January, meanwhile the highest sun exposure was occurred in relatively dry months with the peak was in July.

Annual average climate data at the location of study was presented in table 1.

Table 1. Annual Average Climate Data at the Location of Study

Month	Rainfall (mm)	Air Temperature (°C)	Humidity (%)	Wind direction	Wind velocity (m/s)	Exposure duration to the sun (hour)
Jan	8,2	25,7	81,6	N	2,1	2,4
Feb	15,4	25,6	85,4	N	1,8	3,7
March	6,8	26,0	83,3	N	1,4	5,1
April	18,7	26,3	85,3	N	1,5	5,9
May	21,9	26,6	81,9	N	1,5	7,3
June	18,6	26,2	82,5	N	1,4	6,2
July	9,1	25,8	76,3	N	1,2	8,5
Aug	7,4	25,9	74,5	N	1,7	7,9
Sept	14,4	26,1	75,4	N	1,8	7,5
Oct	13,3	26,6	79,6	N	1,4	7,0
Nov	20,4	26,4	83,3	N	1,3	4,8
Dec	15,1	26,2	84,1	N	1,6	4,5
Average	14,1	26,1	74,9	N	1,6	5,9

Source: *Tapos Districts in the Numbers, 2018*

The laboratory analysis results on ambient air quality and noise were presented in the table 2 below. It showed that ambient air quality in the planned study location and around was categorized as good, since the measured parameters still fulfilled environmental quality standards (BML). That was in accordance with Government Regulation of Republic Indonesia No. 41 of 1999 for SO₂, NO₂, TSP, CO, and O₃, Decree of State Minister for the Environment No. 50 of 1996 for H₂S and NH₃, and Government Regulation of Republic Indonesian No.

41 of 1999 about National Ambient Air Quality Standards.

Noise level measurements were conducted directly using sound level meter. The method of measurement, calculation, and evaluation of the noise was referred to the Attachment 2 in Environment Ministry Regulation No. 48 of 1996 about Noise Level Standards. Noise level measurements in the location of study were amounted 55.4 dB (A), however the results of measurement level were still below the quality standards.

Table 2. Results of Laboratory Analysis of Ambient Air Quality and Noise

No	Test Description	Regulatory Limit **	Unit	Sample Result	
				UA-1	UA-2
Ambient Air Quality:					
1	Sulfur Dioxide, SO ₂	900/1H	µg/Nm ³	<47.9	<47.9
2	Carbon Monoxide, CO	30000/1H	µg/Nm ³	640	560
3	Nitrogen Dioxide, NO ₂	400/1H	µg/Nm ³	29,43	29,37
4	Oxidant, O ₃	235/1H	µg/Nm ³	<48.3	<48.3
5	Dust, Particulate	230/24H	µg/Nm ³	34,5	26,6
Odor Air Quality :					
1	Ammonia, NH ₃ *	2*	ppm	<0.023	0,151
2	Hydrogen Sulfide, H ₂ S*	0.02*	ppm	< 0.004	< 0.004
Noise :					
1	Equivalent Noise, Leq	55 – 70	dB (A)	42,4	52,7
2	Minimum Noise, L _{min}			40,2	50,5
3	Maximum Noise, L _{max}			44,6	54,8

- (**) *Ambient Air Standard Quality Regulation, PPRI No. 41/1999*

- *The test results relate only to the items tested*

- *References sampling SNI 19.7119.6 - 2005*

- (■) *The test results can not be compared to the regulation of PPRI No. 41/1999*

Meteorology Data

No	Description	Unit	Result	
			UA-1	UA-2
1	Temperature	°C	31,5	32,4
2	Relative Humidity	%	57,8	54,3
3	Wind Speed	m/s	0,2 - 0,5	0,3 - 1,9
4	Wind Direction	-	T - B	T - B

Based on the data of groundwater quality analysis results, all parameters were fulfilling the quality standards set in accordance with Minister of Health Regulation No. 32 of 2017 concerning Environmental Health Standard Quality and Water Health

Requirements for Sanity Hygiene, Swimming Pool, Solus Per Aqua, and Public Bathing. The result of groundwater quality analysis was presented in table 3 below.

Table 3. Laboratory Analysis Results of Groundwater Quality

No	Test Description	Sample Result		Regulatory Limit**	Unit
		AT-1	AT-2		
Physical Properties:					
1	Turbidity*	1,26	0,28	25	NTU
2	Color*	< 1	< 1	50	TCU
3	Total Dissolved Solid, TDS*	66	133	1000	mg/L
4	Temperature*	27,6	28,2	air temperature ± 3	-
5	Taste	Tasteless	Tasteless	Tasteless	-
6	Odor	Odorless	Odorless	Odorless	-
Chemical Anorganic Properties:					
1	pH*	5,51	6,57	6.5 - 8.5	mg/L
2	Iron, Fe*	0,106	<0.013	1	mg/L
3	Hardness Total as CaCO ₃ *	30,59	53,54	500	mg/L
4	Manganese, Mn*	0,236	0,035	0,5	mg/L
5	Nitrogen, Nitrate as N (NO ₃ -N)*	0,133	0,146	10	mg/L
6	Nitrogen, Nitrite as N (NO ₂ -N)*	0,004	0,013	1	mg/L
7	Mercury, Hg*	< 0.00009	< 0.00009	0,001	mg/L
8	Arsenic, As	< 0.00006	< 0.00006	0,05	mg/L
9	Chromium hexavalent, Cr ⁶⁺ *	< 0.001	< 0.001	0,05	mg/L
10	Zinc, Zn*	0,041	0,028	15	mg/L
11	Sulphate, SO ₄ ²⁻ *	0,76	5,36	400	-
12	Lead, Pb*	<0.0002	<0.0002	0,05	mg/L
Biological Properties:					
1	Total Coliform	<1.8	<1.8	50	CFU/100 mL
2	E. Coli	< 1.8	< 1.8	0	CFU/100 mL

- (*) *Accreditade by KAN*

- (**) *Clean Water Standard Quality Regulation, PerMenKes No. 32/2017*

- *The test results relate only to the items tested*

- *References sampling SNI 6989.58:2008*

4.1.2. Biological Components

The observation obtained on biological environment both terrestrial and aquatic ecosystems to determine the types of flora and fauna found in the location of study.

Generally, the types of flora existed in the location of study were some natural vegetation (wild plants) such as puzzles grass. Meanwhile, the types of fauna existed in the location of study were pets in general such as cats, chickens, and ducks.

4.1.3. Socio - Economic and Cultural Components.

(1). Livelihood

Livelihood is a fundamental aspect of human life because it covers social and economic dimensions. The social dimension of work is related to the community's recognition of individual abilities and the economic dimension to the fulfillment of daily life needs.

The dominant economic activity is the livelihood of the people in the project location, mainly traders, private employees, laborers, civil servants, military, and police. The building construction of the SDN Sukatani 7 Activities will have an impact on the livelihoods of the surrounding population/community because it will open up employment opportunities and business

opportunities for the community to work on projects and trade in providing daily needs. Therefore, they can increase local economic activities with the increasingly crowded and developing stalls and small shops around the location of study.

(2). Household income

Along with the increase in employment opportunities with the community who work in schools who will receive salaries both daily and monthly, and business opportunities people around the project to do business. Based on interviews with respondents, the value of the community income range is obtained as shown in the following table.

An attitude is the potential driving force that exists in an individual's soul to react to his/her environment, along with everything that exists in that environment in the form of other humans, animals, plants, objects, or concepts. According to Mattulada (1985: 47), although the attitude lies within the soul of each individual in society and as if not a part of his/her culture, yet that attitude is influenced by culture, meaning that it is influenced by norms or concepts of cultural values adopted by the individual concerned. The individual attitude is usually determined by three elements, particularly the physical state of the individual, the state of his/her soul, and the norms and concepts of cultural values that he/she adopts. Perception, according to the

Indonesia Dictionary, is someone's direct response or process in identifying several things through the senses (Ministry of Education and Culture, 1991: 759). According to the Psychology Dictionary, perception is the process of remembering or identifying something (Drever, 1986: 338).

Table 4. Public Income from Main Works at the Location of Study

No	Income (Rp)	Percentage (%)
1.	≤ 1.000.000	12.38
2.	1.000.000 – 3.000.000	55.16
3.	3.000.000 – 5.000.000	22.44
4.	≥ 5.000.000	4.26
5.	Uncertain	2.28
6.	No respond	3.48
Total :		100.00

Source: survey team 2020

Table 5. Respondents Responses to the SDN Sukatani 7 Building Construction Plan.

No	Description	Total (%)	Information
1	Have you ever heard about the SDN Sukatani 7 construction plan?		
	a. Yes	97	
	b. No	3	
	Total	100	
2	If so, where did the information come from?		
	a. Socialization	55	
	b. District/kelurahan	9	
	c. Public figure	11	
	d. Others	25	Neighbors
	Total	100	
3	How do you respond to the activity plan?		
	a. Strongly agree	23	
	b. Agree	77	
	c. Disagree	0	
	Total	100	
4	What are your expectations regarding the SDN Sukatani 7 construction plan?		
	a. Possibility of job opportunities	46	
	b. There is a business opportunity	49	
	c. The company's contribution to the advancement of the region	5	
	Total	100	
5	What do you worry about from the SDN Sukatani 7 construction plan		
	a. Air pollution	44	
	b. Increased noise	39	
	c. Disruption of traffic	14	
	d. Others	3	
	Total	100	

Source: survey team 2020

4.1.4. Community Health Components

Development in the health field aims to provide health services that are easy, equitable, and inexpensive. One of the government's efforts in order to equalize health services to the community is to provide health facilities, especially Community Health centers, and supporting Community Health centers because both facilities can reach all community layers up to the remote areas. One indicator of the welfare of an area's population is the condition of public health. Health facilities in Sukatani Village are available, particularly 1 unit of Community Health centers and Posyandu (Integrated Service Post).

Perception is a concept that refers to the problem of how individuals respond or give meaning and value to something. If these perceptions are expressed by many people or groups of people in a particular area, then these perceptions are no longer individual perceptions but community perceptions or social perceptions. Thus it can be said that perception is part of attitude.

Based on the interview results conducted with respondents, in general, 97% of respondents were aware of the plan to build SDN Sukatani 7 to be built in their area. More complete about the responses of respondents regarding the information on the SDN Sukatani 7 building construction plan, Depok City is presented in the table 5 below.

Clean water is an essential requirement for households in daily life, the availability in total sufficiency, especially for drinking and cooking purposes, is the goal of the clean water supply program that is aimed continuously by the government.

Community access at the location of activities to healthy drinking water is quite reliable. Based on the interview results with respondents, the percentage of households with access to drinking/clean water comes from dug well water, which is as much as 90%. In contrast, the source of water for drinking comes from bottled water/gallons.

4.2. Impact Source, Type of Impact, significance of impact and how to minimize impact.

The impact source, type of impact, significance of impact and how to minimize impact related to the

reconstruction activities of the building of SDN Sukatani 6 are presented in the table below.

Table 6. Impact source, Type of Impact, Significance of Impact and How to minimize Impact for SDN Sukatani 7 Building Construction Plan, Depok City

Impact Source	Type of Impact	Significance of Impact	How to minimize Impact
1. Pre-Construction Stage			
- Community Perception			
Registration of Licensing and Socialization of Activity Plans	The emergence of community perception both positive and negative	Communities around the location of the activity plan embrace this project	<ul style="list-style-type: none"> - Fostering good relations with community leaders, authorized institutions around the location of the project - Immediately resolve problems that arise with the local community by deliberation and kinship - Facilitating and accommodating the wishes and expectations of the affected community members according to the ability of the proponent
2. Construction Stage			
- Decreased air quality			
Construction activities	Decreased air quality	Increase of total flue gas discharged into the air in the form of NH ₃ , CO, H ₂ S, NO ₂ , Pb, SO ₂ , and dust	<ul style="list-style-type: none"> - Using roadworthy material vehicles - Material transporter vehicles are equipped with good tarp covers. - Cleaning the vehicle tires before leaving the project footprint - Creating a protective fence around the project site as a windbreak to isolate gases, dust, and pollutants in order for the wind does not carry those over to other locations.
- Increased noise			
Construction activities	Increased noise	It is predicted to have an impact in the form of increased noise. This impact is continuous and is limited around the project site	<ul style="list-style-type: none"> - Creating a protective fence around the project site as a windbreak to reduce noise - Not to perform noisy night work, where the surrounding community is sleeping/resting. - Using roadworthy vehicles
- Increased runoff surface water			
Land preparation	Increased runoff of surface water	It is predicted to have an impact on increasing surface runoff. This impact is continuous and is limited around the project site	<ul style="list-style-type: none"> - Making drainage patterns following the slop of the road, especially at points that have a lower slope. - Complying with the width of green open areas and water infiltration areas following the site plan approved by the Depok City Government - Making infiltration wells. The volume of the infiltration well is adjusted to the applicable regulations - Maintaining an adequate proportion of green open areas
- Employment and business opportunities for resident			
	Employment and business opportunities for residents	Labors are recruited based on need. The process of recruiting non-skilled workers will prioritize the local community at 70%	<ul style="list-style-type: none"> - Providing the primary opportunity or priority for people directly affected by the activity plan to be able to work as labor according to the qualifications and workforce requirements required - providing information about employment opportunities to the community and village officials around the location of the activity - Provide wages following the UMK Depok City

Impact Source	Type of Impact	Significance of Impact	How to minimize Impact
- Public health disorders			
Construction activities	Public health disorders	The impact of health problems is proportional to the volume of solid waste production and liquid waste from construction worker activities	<ul style="list-style-type: none"> - Provision of separate organic and inorganic waste containers, in a sufficient total - Provision of cleaning equipment in a sufficient total and adequate types - Provision of cleaning officers who are responsible for the cleanliness of the work environment, worker hygiene facilities, and disease vector control - Cooperating with third parties in the transportation of waste from the Temporary Collection Site (TPS) to the Final Disposal Site (TPA)
- Change in environmental sanitation			
Construction activities	Domestic waste production	Total waste generated is 100 l/day (0.1 m ³ /day)	<ul style="list-style-type: none"> - Provision of separate organic and inorganic waste containers (bags), in total that is sufficient in the base camp - Provision of cleaning equipment in a sufficient total and adequate types - Provision of cleaning officers who are responsible for the cleanliness of the work environment, worker hygiene facilities, and disease vector control - Collaborate with third parties in the transportation of rubbish from Temporary Collection Sites (TPS) to Final Disposal Sites (TPA)
- Community perception			
All construction activities	The emergence of community perception both positive and negative	Communities around the location of the activity plan embrace this project	<ul style="list-style-type: none"> - Fostering good relations with community leaders, authorized institutions around the location of activities - Immediately resolve problems that arise with the local community by deliberation and kinship - Facilitating and accommodating the hopes and expectations of the affected community members according to the ability of the initiator
3. Operational Stage			
- Decreased air quality			
Building operational activities and maintenance of buildings, facilities, and infrastructure.	Decreased air quality	It is predicted to have an impact in the form of an increase in dust particles and exhaust gases from vehicles and exhaust emissions from the use of generators	<ul style="list-style-type: none"> - Planting and maintaining greenery on the lawn or garden - Optimization of greening in the environment and green open spaces with plants that can function to reduce dust and pollutant gases, such as a pole, walnut, mahogany, cape, and ornamental bamboo/needles
- Increased noise			
Building operational activities and maintenance of buildings, facilities, and infrastructure.	Increased noise	It is predicted to have an impact in the form of increased noise. This impact is continuous and is limited around the project site	<ul style="list-style-type: none"> - Creating a generator set particular room (hermetic) to minimize noise from the engine generator set. - Installing the silencer on the generator that serves to reduce noise.
- Employment and business opportunities for residents			
Building operational activities and maintenance of buildings,	Employment and business opportunities for residents	Labors are recruited based on need. The process of recruiting non-skilled workers will prioritize the local	<ul style="list-style-type: none"> - Providing the first opportunity or priority for people directly affected by the activity plan to be able to work as labor according to the qualifications and workforce requirements required.

Impact Source	Type of Impact	Significance of Impact	How to minimize Impact
facilities, and infrastructure.		community at 70%	<ul style="list-style-type: none"> - Providing information about employment opportunities and business opportunities to the community and village officials around the location of the activity. - Providing wages following the Depok City UMK
<ul style="list-style-type: none"> - Public health disorders Building operational activities and maintenance of buildings, facilities, and infrastructure.	Public health disorders	Total waste generated during operation is 3,350 l/day (3.35 m3/day)	<ul style="list-style-type: none"> - Provision of separate organic and inorganic waste containers, in a sufficient total - Provision of cleaning equipment in a sufficient total and adequate types - Provision of cleaning officers who are responsible for the cleanliness of the work environment, worker hygiene facilities, and disease vector control - Cooperating with third parties in the transportation of waste from the Temporary Collection Site (TPS) to the Final Disposal Site (TPA)
<ul style="list-style-type: none"> - Change in environmental sanitation Solid and liquid waste management.	Change in environmental sanitation.	Changes in environmental sanitation that trigger various kinds of disease vectors	<ul style="list-style-type: none"> - Preparing trash bins on each floor and separate organic and non-organic waste. - Implementing the 3R principle (reduce, reuse, and recycle) - Providing and disposing of waste at a temporary dumpsite and transport it according to the schedule and requirements to the landfill in collaboration with relevant agencies
<ul style="list-style-type: none"> - Traffic disruption School building operational activities	Traffic disruption.	Traffic disruptions will remain during operational activities and are cumulative, which can trigger traffic congestion and accidents	<ul style="list-style-type: none"> - Providing security unit to manage guest vehicle traffic at the entrance/exit - Installation of road equipment such as traffic signs and road markings as needed and crossing facilities in the form of zebra cross. - Follow and comply with traffic technical advice provided by relevant agencies
<ul style="list-style-type: none"> - Community perception School building operational activities	The emergence of community perception both positive and negative	The community around the activity plan site expects that at this stage of the operation, the negative impact can be minimized. In contrast, the positive impact can be maximized.	<ul style="list-style-type: none"> - Fostering good relations with community leaders, authorized institutions around the location of activities - Immediately resolve problems that arise with the local community by deliberation and kinship - Facilitating and accommodating the desires and expectations of the affected community members according to the ability of the initiator

5. Conclusion

Based on the results and discussion of environmental impact analysis, the reconstruction activities of the building of Sukatani 7 Elementary School in Depok city can be concluded as follows.

- 1) The baseline environment at the location of the study shows that the quality of the environment of the study location is in the good category, either in terms of ambient air quality components or noise as well as water quality components.
- 2) At each activity starting from the pre-construction stage, construction, and up to the operation stage, each has a positive and negative impact on the environment. Negative

impacts that occurred can be minimized by making good environmental management efforts at each stage of the activity starting from the pre-construction stage until the operation stage.

References

- Abdulgani, H. 2011. Analisis Dampak Pengelolaan Dan Pemantauan Lingkungan Hidup Pada Rencana Kegiatan Pembangunan Embung Bubur Gadung Kecamatan Cikedung Kabupaten Indramayu. Jurnal ISSN 1693-7945, Universitas Wiralodra. Indramayu.
- Darmono. 2001. Lingkungan Hidup dan Pencemaran. Penerbit Universitas Indonesia. Jakarta.
- Ervianto, Wulfram I. 2005. Manajemen Proyek Konstruksi. Penerbit And, Yogyakarta.
- Hakim, M Furqon. 2016. Analisa Dampak Lingkungan Komponen Fisika-Kimia Dan Biologi Bahan Galian C Di Desa Candimulyo Kecamatan Kertek Wonosobo. Jurnal Penelitian dan Pengabdian Kepada Masyarakat UNSIQ, vol. 3, No. 3.
- Indrawati, Rosiana 2012 Telaah Studi AMDAL Pada Tahap Prakonstruksi Pabrik Peleburan Timah (Smelter) PT. Laba-Laba Multindo Pangkalpinang Propinsi Kepulauan Bangka Belitung. Jurnal Lingkungan Sultan Agung, vol.1,no.1.
- Kecamatan Tapos dalam Angka Tahun 2018. BPS Kota Depok
- Keputusan Menteri Lingkungan Hidup Republik Indonesia No. 50 Tahun 1996 tentang Baku Mutu Tingkat Kebauan.
- Keputusan Menteri Lingkungan Hidup Republik Indonesia Nomor 112 tahun 2003 tentang Baku Mutu Air Limbah Domestik
- Pandulu, GD, Suhudi. 2012. Kajian Dampak Lingkungan Pada Pembangunan Infrastruktur Blok Office Kabupaten Malang. Jurnal Buana Sains, vol.12, No.1, hh. 93-98.
- Peraturan Menteri Kesehatan No. 32 Tahun 2017 Tentang Standar Baku Mutu Kesehatan Lingkungan dan Persyaratan Kesehatan Air Untuk Keperluan Higiene Sanitasi, Kolam Renang, Solus Per Aqua, dan Pemandian Umum (Lampiran I. A Tabel 1,2 & 3).
- Prasetyo, Doni. Alimuddin. 2018. Kajian Dampak Lingkungan Terhadap Proyek Konstruksi Pembangunan Pembangkit Listrik Tenaga Minihidro (PLTM) Pongkor. Jurnal e-ISSN 2460-8416, Universitas Muhammadiyah, Jakarta.
- Rahmadi, Takdir. 2011. Hukum Lingkungan di Indonesia. Depok: PT Rajagrafindo Persada.
- Soedjono. 1979. Pengamanan Hukum Terhadap Pencemaran Lingkungan Akibat Industri. Bandung: Alumni.
- Supardi, M.d. 2006. Metodologi Penelitian. Mataram : Yayasan Cerdas Press.
- Undang - Undang Republik Indonesia Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup.