Environmental Impact Analysis

MASS RAPID TRANSIT (MRT) EAST – WEST LINE

Route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java)
Along ±24,527 Km and access to the Rorotan Depot ±5.90 Km

Directorate General of Railways
Ministry of Transportation of the Republic of Indonesia

November 2023

Introduction

At the time of preparing the Amdal document, the activity plan for the construction of the Mass Rapid Transit (MRT) East - West Line Phase 1 (Tomang - Medan Satria) train line referred to the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number 4 of 2021 concerning Business Listings and/or Activities Required to Have an Analysis of Environmental Impacts, Environmental Management Efforts and Environmental Monitoring Efforts or a Statement of Capability for Environmental Management and Monitoring, Appendix II letter B Non KBLI Transportation Sector Number 1 Underground Railway Infrastructure Construction Permit and above ground level (elevated) including types of business and/or activities that are required to have an AMDAL.

The planned Mass Rapid Transit (MRT) East - West Line Phase 1 (Tomang – Medan Satria) train line construction activities previously had an AMDAL environmental document, Recommendations for Reliable RKL- RPL MRT East - West Line (Ujung Menteng – Kembangan) by the Directorate General of Railways Ministry of Transportation of the Republic of Indonesia number 64/Andal/-1,774,151 dated 24 December 2013. Refers to Government Regulation Number 22 of 2021 in Appendix V Part One Types and Criteria for Changes in Business and/or Activities that Can Cause Changes in Environmental Approval, as well as the results of evaluation and analysis of the Information Presentation document The environment submitted, the Mass Rapid Transit (MRT) East - West Line Phase 1 (Tomang - Medan Satria) train line development activity plan includes the types and criteria that require changes to the Environmental Impact Assessment for a new Amdal, taking into account business changes and/or activities, causing changes in Hypothetical Significant Impacts (DPH) that have not been covered in the previous Amdal document. Changes in DPH have the potential to cause, among other things, changes in the magnitude and nature of impacts.

Preparation of Amdal documents for plans for East - West Line Mass Rapid Transit (MRT) train line Phase 1 (Tomang – Medan Satria) refers to Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning Guidelines for Preparing Environmental Documents, Appendix II concerning Implementation of Protection and Environmental Management which consists of preparing 1) Terms of Reference Form, 2) Reliable Documents (Environmental Impact Analysis) and 3 Environmental Management Plan Documents and Environmental Monitoring Plans (RKL-RPL).

Referring to Republic of Indonesia Government Regulation Number 5 of 2021 Regarding the Implementation of Risk-Based Business Licensing, Appendix I Letter B Business Licensing to Support Business Activities in the Transportation Sector Number 5 Public Railway Facilities Development Permit, Mass Rapid Transit (MRT) East - West Line Phase 1 Phase 1 (Tomang – Medan Satria) train line construction activities) is a type of activity that falls under the authority of the Minister because its operational scope is national and the assessment of Amdal documents is carried

out by the Amdal Assessment Commission of the Ministry of Environment and Forestry (KLHK).

On this occasion, we as the party responsible would like to thank all parties who have helped in the preparation of this Amdal document, we hope that what is contained therein will be useful.

Jakarta, November 2023
Director General of Railways,

Ir. Mohamad Risal Wasal, A. TD., MM, IPM
NIP. 19670608 199003 1 005

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDIX LIST

Improvements according to the Minutes of the Central AMDAL Commission Technical Team Meeting Discussion on Andal and RKL-RPL Jakarta Mass Rapid Transit (MRT) East-West Line Activity Plan September 14, 2023

No	Suggestions / Feedback	Repair	Repair Page	Information
Prof. Dr. Dody Prayogo, M.PSt (Social market)				
1	The presentation of the document is very good, neat and structured, showing that it was prepared carefully.	Thank you for the appreciation given	-	-
2	a. Community involvement is only carried out in Bekasi?	• Public consultations in the framework of the Amdal study were carried out on 3 - 4 February 2022 at the Santika Mega City Hotel Bekasi and on 15 February 2023 at Horison Ultima Bekasi which was attended by representatives of affected communities from 31 sub-districts along the MRT-EWLP1S1 development plan route. • A recapitulation of the number of representatives of affected residents who attended the public consultation is presented in Table 4.1. (page IV-1). Formal evidence of the announcement and public consultation of the Amdal study is presented in Appendix. J.	IV-1 to IV-2	Table 4.1. Appendix J
	b. The community on Senen-Pulo Gadung route has not been represented in public consultations and is asking how the land acquisition plan will proceed.	• Based on the results of the recapitulation of the public consultation attendance list (Table 4.1), community representatives on Senen – Pulo Gadung route were recorded as attending the public consultation activity. • The process and mechanism for land acquisition through land acquisition refers to Law no. 2 of 2012 and Government Regulation no. 19 of 2021 which is implemented through 4 stages (planning, preparation, implementation and delivery of results). To date, no land has been acquired. The land acquisition activities that have been carried out currently are only limited to the Land Acquistion and Resettlement Plan (LARAP) study as an initial step in the land acquisition planning stage.	IV-1 to IV-2 I-9; II-1 to II-10	Table 4.1. Appendix J
	c. Community involvement has been regulated in PP 22/2021 Article 28. For this reason, there must be public consultation again with residents, especially in station areas that will be affected by land acquisition and disturbed. It is important that the joint meeting and written statement of their agreement be attached to this reliable document, along with a photo of the meeting.	Public consultations in the framework of the Amdal study were carried out on 3 - 4 February 2022 at the Santika Mega City Hotel Bekasi and on 15 February 2023 at Horison Ultima Bekasi which was attended by representatives of affected communities from 31 sub-districts along the MRT-EWLP1S development plan route (including community representatives on Senen – Pulo Gadung route. However, we plan to hold another public consultation (in accordance with the direction of the	IV-1 to IV-2	Table 4.1. Appendix J

No	Suggestions / Feedback	Repair	Repair Page	Information
		Ministry of Environment and Forestry's Amdal assessment commission) on 3 – 6 October 2023.		
3	Land acquisition :			
	a. Apart from calculating the economic impact, they must show their involvement (representatives) and written statement of consent from affected residents, especially groups of residents who have not been included in public consultations (Senen-Pulo Gadung). As long as the affected residents agree with the land acquisition scheme, this activity is legitimate (socially valid).	• Based on the results of the recapitulation of the attendance list for the public consultation on the Amdal study (Table 4.1.), community representatives on Senen - Pulo Gadung route were recorded as having attended the public consultation activity on the Amdal study. • We can present written information about the residents' approval in the form of Public Consultation Minutes which are known (signed) by the Person in Charge of the Activity, the Amdal Drafting Team and Community Representatives, because the land acquisition process that has been carried out at this time is only limited to a Land Acquistion and Resettlement Plan (LARAP) study, as an initial step in the land acquisition planning stage.	IV-1 to IV-2	Table 4.1. Appendix J
	b. Look at the route where land will be acquired, are all affected residents included in the public consultation?	Based on the results of the recapitulation of the public consultation attendance list (Table 4.1), representatives of communities affected by land acquisition in 31 sub-districts of the planned MRT-EWLP1S construction location were recorded as attending the public consultation activity. However, we plan to hold another public consultation (in accordance with the direction of the Ministry of Environment and Forestry's Amdal assessment commission) on 3 – 6 October 2023.	IV-1 to IV-2	Table 4.1. Appendix J
	c. Present the table explain in matrix 1-5. This stage is the most important stage in social impact. Apart from calculating the economic impact, there is also certainty of consent from the affected residents. Re-equip	• Data on land acquisition plans based on the results of the LARAP study are presented in Table 2.1. up to 2.3., while the map and data on land parcels to be acquired are presented in Appendix G	II-4 to II-9	Appendix G
		• Based on the results of public consultation, the affected communities provided support for the MRT development plan with several notes as presented in Table 4.2. and all of that has been translated into DPH in this study	IV-2 to IV3	Table 4.2.
		• We can present written information about the residents' approval in the form of Public Consultation Minutes which are known (signed) by the Person in Charge of the Activity, the Amdal Drafting Team and Community Representatives, because the land acquisition process that has been carried out at this time is only limited to a Land Acquistion and Resettlement Plan (LARAP) study. as an initial step in the land acquisition planning stage.		Appendix J

No	Suggestions / Feedback	Repair	Repair Page	Information
4	Make sure and prove that the earthworks will not cause inundation (flooding) and environmental disruption of sediment accumulation for local residents. The social impact of environmental disturbances has the potential to occur on nearby residents.	We have added this to the RKL-RPL		
5	In the initial phase, public consultations are not yet complete and agreements have not been realized in several segments. Hold meetings and present evidence of activities and results, especially to residents in a number of segments	• Public consultations in the framework of the Amdal study were carried out on 3 - 4 February 2022 at the Santika Mega City Hotel Bekasi and on 15 February 2023 at Horison Ultima Bekasi which was attended by representatives of affected communities from 31 sub-districts along the MRT-EWLP1S1 development plan route. However, we plan to hold another public consultation (in accordance with the direction of the Ministry of Environment and Forestry's Amdal assessment commission) on 3 – 6 October 2023. • A recapitulation of the number of representatives of affected residents who attended the public consultation is presented in Table 4.1. (page IV-1). Formal evidence of the announcement and public consultation of the Amdal study is presented in Appendix. J. • We can present written information about the residents' approval in the form of Public Consultation Minutes which are known (signed) by the Person in Charge of the Activity, the Amdal Drafting Team and Community Representatives, because the land acquisition process that has been carried out at this time is only limited to a Land Acquistion and Resettlement Plan (LARAP) study. as an initial step in the land acquisition planning stage.	IV-1 to IV-2	Table 4.1. Appendix J
7	If there is data and forecasts of changes in land prices will be very good, there will be an increase in the price of land around the station that is not released, which will have a positive impact.	Determination of land prices is carried out after the local area is formed and implemented in stages in accordance with applicable regulations. This is to avoid land speculation in land acquisition.		
8	Exposure to respondents' perceptions is not/has not been presented, what is shown is the perceptions of respondents in general, not those affected by land acquisition. The most important thing is what and how the residents' perceptions are affected by land acquisition. Complete it again, at least with qualitative data and a statement of consent from the affected residents.	Respondents' perceptions have been presented in Andal. The respondents in the sample for this study were people directly and indirectly affected. Communities directly affected are those affected by land acquisition, while communities indirectly affected are communities around the planned activities who are not affected by land acquisition but are affected due to construction activities that will be carried out in the MRT Development plan.		
9	Is there land acquisition for underground? If there isn't, just take it out. The most important thing is what the opinion of the residents whose	Land procurement in the underground segment, especially for access routes to underground stations		

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	land will be acquired is (agree or disagree, or agree with the conditions), and what the reasons are. Revise again.			
10	In the scoping chapter, the data requested is not the respondents but the number of families of residents whose land was acquired.	Respondents included in this study are heads of families or representatives of heads of families from communities directly affected (affected by land acquisition) and communities affected indirectly (affected by activities during the construction phase).		
	1) Calculate how many families of residents will be displaced by development;	• The number of residents affected by land acquisition is presented in Table 2.1. (pages II-5 to II-6)	II-5 to II-6	Table 2.1.
	2) Prove that residents at each station agree with their land acquisition scheme, show written approval to anticipate disappointment and rejection.	• We can present written information about the residents' approval in the form of Public Consultation Minutes which are known (signed) by the Person in Charge of the Activity, the Amdal Drafting Team and Community Representatives, because the land acquisition process that has been carried out at this time is only limited to a Land Acquistion and Resettlement Plan (LARAP) study. as an initial step in the land acquisition planning stage.		Appendix J
11	The implementation of land acquisition must first ensure that public consultation is carried out, an agreement on the area of acquisition and price is agreed, and most importantly, the evicted residents agree to have their land released.	The process and mechanism for land acquisition through land acquisition refers to Law no. 2 of 2012 and Government Regulation no. 19 of 2021 which is implemented through 4 stages (planning, preparation, implementation and delivery of results).		
12	(Page V-2) The impact of environmental disturbances, especially the construction phase, on residents has not been included in the analysis, in the form of a) disturbances from dust and sediment piles, b) noise, and c) potential flooding (discuss one by one). This impact must be included as a social impact, discussed with the relevant team and an analysis and evaluation of how environmental disturbance will be felt by nearby residents, especially in the area around the station. Explain what the recommendations are for managing and monitoring social. Repair it again.	Each impact on the geophysical-chemical environmental component has been analyzed and predicted its derivative impacts on the socio-economic and cultural components of the community, and a management and monitoring plan has been formulated in the RKL-RPL document.		
13	(p. V-20) as before, the impact of traffic jams as a social impact (not just transportation) that will be felt by residents nearby during construction	Regarding the impacts due to traffic, it has been discussed in the traffic reliability document, and has been outlined in the RKL-RPL, so it will not affect social impacts because it has been studied and monitoring management is in place.		

No	Suggestions / Feedback	Repair	Repair Page	Information
	must be studied as a social impact. Explain what will happen and what recommendations there are for managing and monitoring social media			
14	Present current land price data (average or example of a specific location) and estimate what the price will be after the station is built. Make an analogy with existing MRT stations. The impact of increasing land prices is a positive impact on nearby residents who are not evicted.	-		
15	Perception data is generally "legitimate" supported by general respondents, but may differ from the perception of residents (who will be) affected by land acquisition. (see perception table data in baseline)	Respondents included in this study are heads of families or representatives of heads of families from communities directly affected (affected by land acquisition) and communities affected indirectly (affected by activities during the construction phase).		
16	The most important impact is the land acquisition plan, it must be evaluated whether it has the potential to cause protests/conflicts or not, how to reach agreement/consensus in land acquisition. Public consultation/communication and agreement on compensation pricing are key.	Regarding land acquisition, it has been studied in detail and has also been stated in the RKL-RPL. In Andal and RKL-RPL it has also been explained how the mechanism for land acquisition and agreement in land acquisition is explained, so that the existence of RKL-RPL will be able to minimize protests/conflicts from community members affected by land acquisition.		
17	Preconstruction Phase 1. Carry out public consultations with residents in station areas and others whose land will be acquired but there has been no meeting or agreement. Build an agreement with them. Make sure there is an agreement with the residents who will be evicted. 2. Explain, apart from monetary compensation, what social monitoring and management will be carried out; a) make a list of residents who were evicted, b) record where they moved, c) monitor how they are doing after the land is acquired and they move house, is it better or worse. If worse manage what will be done to them.	• Public consultations in the framework of the Amdal study were carried out on 3 - 4 February 2022 at the Santika Mega City Hotel Bekasi and on 15 February 2023 at Horison Ultima Bekasi which was attended by representatives of affected communities from 31 sub-districts along the MRT-EWLP1S1 development plan route. However, we plan to hold another public consultation (in accordance with the direction of the Ministry of Environment and Forestry's Amdal assessment commission) on 3 – 6 October 2023. • Referring to the results of the LARAP study (2022), the land acquisition plan is only carried out with monetary compensation		

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18	Construction Phase Explain what social management and monitoring will be carried out on environmentally disturbed residents/affected subjects (dust disturbance and sediment build-up, noise, flooding, if any): a) what will be done, b) how to do it, c) where it will be done (mainly in the area of the future station). a. During construction, monitor environmental disturbances regularly, at least once a week, for residents closest to surface construction. The Enviro and PR units are responsible for carrying out this task. b. For: 1. Environmental Problem Complaints Center, if the public has a complaint, it will be clear where it will be submitted, inform the public within social limits: a) complaint unit and name of officer, b) address and telephone. 2. Communication Forum/Joint Deliberation between company-sub-district/village-community, if problems arise they will be discussed together in this forum.	This has become our concern and we have added it to the environmental management directive.	VII-14 to VII-21	Table 7.3.
Prof. Dr. Ir. Kardono, M. Eng. (Air quality and noise expert)				
1	Page I-14; It is best to provide DPHs from each activity source as a result of the agreement in the FKA, not just grouped into activity stages (meeting minutes).	We have corrected this by adding a list of DPHs that have been determined based on each stage and activity plan	I – 14 up to I – 15	Table 1.6.
2	Pages III-1 to III-7 • The climate parameter data is relatively complete • Secondary air quality data→Good	Thank You	-	-
3	Sub chapter 3.1.6; air quality Give an example of converting PM10 concentration to ISPU PM10.	We have added an example of converting PM10 concentration to ISPU PM10 on page III-13	III – 13	Table 3.7.
4	Page III-6; The segment written "Underground" is the measurement underground or is it just the name of the location but the measurement is still above ground level?	The "Underground" segment is only for MRT line segmentation, while measurements are still carried out above ground level	-	-

No	Suggestions / Feedback	Repair	Repair Page	Information
5	Pg V-2			
	a. Why does activity number 10 (passenger transport activities and station operations) have no potential impact on reducing air quality? Isn't the transportation activity to and from the station as well as the vehicle parking process part of this activity, which of course will have a potential impact on reducing air quality and increasing noise, especially if it causes congestion.	a. -		
	b. Why is there no potential ISPA impact from activity number 5 (land clearing and relocation of public facilities/utilities)?	b. The potential impact of ARI has been added to pd. land clearing activities and relocation of public facilities/utilities	V – 2	Table 5.1.
6	Table 5.2. Potential Impact Evaluation Matrix			
	a. The West Elevated and East Elevated segments are combined as Earthwork and Dewatering activity types in Table 5.2, so Table 5.1 should also be combined. b. Also from construction work at ground level.	a and b West Elevated and East Elevated segments in Table 5.1. and Table 5.2. have been merged as suggested	V – 2; V – 6 up to V – 36	Table 5.1. Table 5.2.
	c. This means that all determined potential impacts for decreasing air quality and increasing noise will be DPH including the subsequent impact of public health disturbances (ISPA) except land clearing activities and relocation of public facilities/utilities.	c. The potential impact of ARI has been added to pd. land clearing activities and relocation of public facilities/utilities	V – 2	Table 5.1.
Dr. Eko Sugiharto, DEA (Environmental Expert)				
1	Chapter V Determination of DPH, the management plan is not relevant to the potential impacts within the scope. Examples of waste management plans are not relevant to the potential impact of reducing surface water quality	This has been corrected	V – 6 up to V - 36	Table 5.2.
2	Chapter V Determination of DPH, in the management plan it is written that it will provide STP and IWTP, where will the waste water be channeled? The activity plan should have a waste water disposal facility	Water from processing at the STP and IWTP will be sucked up and transported to the Integrated IPAL in collaboration with PD PAL JAYA. Referring to the Letter of the Director of the Directorate of Water Pollution and Control – KLHK No. S.583/ PPA/PSPA/PKL.2/7/2023 dated 10 July 2023, based on the documents submitted, technical approval is not required for this activity with the following provisions: • Waste water must enter the Integrated IPAL (channel or transportation)	II – 52 up to II – 53	Appendix K

No	Suggestions / Feedback	Repair	Repair Page	Information
		• Integrate wastewater management plans into environmental documents		
3	B3 waste concluded by DTPH? The planned monitoring management of B3 waste is not yet clear. It was concluded by DTPH that there was no RKL RPL for waste water, rubbish and B3 waste, there must be an RKL RPL	Trash and B3 waste are concluded as a direct impact of Monitoring Management (DL-KP) and have been added to the RKL-RPL. Specifically for LB3, refer to the Technical Details of Hazardous Waste Storage (Appendix K)	RKL-RPL	Appendix K
4	In calculating the magnitude of the impact of ISPA prevalence. In calculating the estimated magnitude of the impact mathematically it is formulated as follows KLdp-KLtp, however the estimated figure cannot be deducted directly because the value is uncertain.	This has been corrected		
5	The Success Indicators in the RKL matrix are not relevant to the Indicators monitored in the RPL matrix.	This has been corrected	RKL-RPL	
Agus Hendratno, ST, MT (Geology Expert)				
1	What is the geotechnical / engineering geological capability of the soil above the MRT tunnel up to its surface, is there a minimum - maximum impact of deformation / vibration that affects the stability of the building above the MRT tunnel during the construction phase? This has not been explained in this ANDAL document in the project description / hypothetical impact study?			
2	MRT tunnel line connection (during the construction stage) are there any mechanical vibrations during tunneling that have an impact on the leakage of the shallow groundwater network / river lines above the MRT tunnel? This needs to be studied carefully, because it could cause social issues in the MRT Tunnel area, if there is a decrease in the water level of local residents' wells?			
3	The coverage is good for DL-KP from the reduction in groundwater quantity in the ecological hydrogeological segment of the MRT Tunnel area. So it is necessary to model the influence of tunnels on groundwater levels.			
4	What if during the construction phase there are leaks from river seepage above or seepage from shallow groundwater table aquifer leaks in the MRT Tunnel area; so that it impacts project workers during the construction phase? Please check the type of aquifer along the MRT			

No	Suggestions / Feedback	Repair	Repair Page	Information
	route, is there a shallow groundwater table or a deep groundwater table?			
Retnomurti (Dit PDLUK KLHK)				
1	In the Background, please clarify the relationship between the scope of this AMDAL and Andal, RKL-RPL which has received recommendations from the DKI Jakarta BPLHD	The Amdal MRT-EWLP1S1 currently being prepared is in the framework of changes to the Environmental Approval (recommendation Andal-RKL-RPL from the Head of the DKI Jakarta Regional Environmental Management Agency No. 64/Andal/-1,774,151 dated 24 December 2013), due to a change in route Kembangan (West Jakarta) to Ujung Menteng (East Jakarta) is 27 km long, the Tomang (DKI Jakarta) to Medan Satria (Bekasi, West Java) route is 24,527 km long and the Rorotan Depot access is 5.9 km long.	I-1 to I-2	-
2	There are a number of AMDAL compilers whose certification has expired, please renew it	We have updated this: Then Ahmalian Bahari, ST, MT Competency Certification (KTPA) No. Reg: 74909 2133 8 0000074 2023 Valid until March 15 2026	I – 3	-
3	a. For the schedule of planned activities for 2023, please specify the months b. Has the land acquisition to be implemented in 2023 already begun?	a. Details of months in 2023 have been added b. To date, no land has been acquired. Land acquisition activities that have been carried out currently are only limited to the Land Acquistion and Resettlement Plan (LARAP) study as an initial step in the planning stage for land acquisition based on Law no. 2/2012, Law no. 11/2020, PP no. 19/2021 and ATR Ministerial Regulation No. 19/2021	I – 9 I – 9	-
4	Regarding KKPR, please update the information in the document that the KKPR has been obtained and state the number.	We have added this: Based on Confirmation of Suitability of Space Utilization Activities for National Strategic Activities No. PF.01/1240-200/IX/2023 and No. PF.01/1241-200/IX/2023 (Appendix E)	I – 5	Appendix E
5	In the tool and material mobilization plan, please provide information on the mobilization rate/frequency per unit of time.	We have added this: Based on BED MRT-EWLP1S1, the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as	I – 10 up to I – 11	-

No	Suggestions / Feedback	Repair	Repair Page	Information
		stockpile) to each construction activity location is ± 5,940,741.52 m3 using 243 dump trucks with a rotation number of 1-5 cycles/ day.		
6	Please confirm whether there is a B3 waste TPS planned for this activity? (Information in the document is at the Rorotan depot), regarding TPS for B3 waste, please attach the technical details as per the format in Minister of Environment and Forestry Regulation 06/2021.	• The LB3 TPS is planned at the Rorotan Depot with a capacity of ± 50 m3 • Technical details of hazardous waste storage are presented in APPENDIX K	APPENDIX K	
7	In the activity description, please provide information regarding the SOP for the emergency response system in implementing this activity	We have added this	II-44 up to II - 47	
8	In the results and community involvement, please add a little information about those present at the public consultation before referring to the attachment for details, to find out that the affected communities were indeed present and were represented in the affected areas.	We have added this in the form of Table 4.1. Recapitulation of the Number of Representatives of Affected Residents Who Attended the Public Consultation	IV – 1 up to IV – 2	Table 4.1.
9	When determining ecological limits (distribution of impacts through the air), please provide justification as to why 300 meters left and right along the route can be set.	We have added this: Determination of the impact distribution limit through air media is carried out by paying attention to the dominant wind direction at the activity location which blows towards the south (66.67%) with a speed of 1.5 – 3.3 m/s, the length and direction of the MRT-EWLP1S1 route, and receptor distance. Based on these factors, the spread of impacts by air is estimated to occur up to a distance of 300 m left - right from the MRT-EWLP1S1 route which is ± 24,527 km long and access to the Rorotan Depot is ± 5.9 km long, with a total area of 18,256,200 m2.	I – 16	-
10	Please make the DPH matrix Table 5.3 consistent with the description and scoping matrix, for example the impact of reducing surface water quality, is it a DPH or not?	We have corrected this. The decline in surface water quality at the operational stage is designated as a direct managed and monitored impact (DL-KP), because there is a change in the activity plan from initially being discharged into water bodies to being sucked up periodically (in collaboration with PD PAL Jaya) to then be processed at the Integrated IPAL .	DPH Matrix	Description of activity plan on p. II-47 and II-52
11	For social boundaries, please state the area that is the social boundary.	We have added this: a. Recipients (receptors) of direct impact The population directly affected by land acquisition in 31 sub-districts is 1,659 people (488 families)	I – 16	-

No	Suggestions / Feedback	Repair	Repair Page	Information
		b. Recipient (receptor) of indirect impact Residents living in 13 sub-districts are affected c. Receiver (receptor) of environmental disturbances People who live and/or carry out activities around the location		
12	Table 6.3, where does the DPH recapitulation come from? Please readjust to the results of the agreement based on the BA Terms of Reference, and please be consistent between the scoping table and the results from Chapter 5	This has been corrected	CHAPTER VI	
13	For impact estimates that use an environmental quality scale, please explain for each type of impact the basis for determining the scale, for each parameter including clarity of the range/value for each scale.	In accordance with the results of the discussion on railway improvements, the impact forecasting method does not use the environmental quality scale, but directly uses the value of the difference in conditions with and without the project	CHAPTER VI	
14	In a holistic impact evaluation, what are the conclusions regarding the holistic relationship between impacts? Because what is listed is still partial per type of impact with the conclusion that the impact is important/not important. Please add conclusions about the relationship between impacts, and what impacts occur the most and which sources of impact cause the most impacts so that later the RKL-RPL will be more focused and require more attention to the impacts and sources of these impacts.	We have added this	CHAPTER VII	
15	Please add a sub-chapter regarding environmental feasibility criteria accompanied by justification for each criterion.	We have added this	CHAPTER VII	
16	Added a sub-chapter on environmental management approaches (technological approach, social approach, institutional approach) before the RKL RPL matrix.	We have added this	RKL-RPL	
Mustika Milka Payung Sallago & Dwi Pertiwi (Directorate of Road Traffic, Ministry of Transportation)				
1	Regarding the processing of the ANDALALIN technical approval, please also coordinate with the Jabodetabek Transportation Management Center and the West Java Provincial/Bekasi City Transportation Agency because the MRT route passes through 2 different provinces;	That matter		
2	During the construction period, it is necessary to explain in the relevant documents that there is a plan to divert traffic flow for affected communities during the MRT construction, and then add technical			

No	Suggestions / Feedback	Repair	Repair Page	Information
	drawings for traffic engineering management during the construction period, especially for material vehicle entry and exit access;			
3	Also provide technical map drawings related to the road network and affected intersections, cross-sections of road sections, as well as photos of the existing conditions of road sections and intersections affected by the location of the activity.			
4	To ensure that guidance signs regarding lane reduction/flow diversion are installed so that road users can be well informed;			
5	Regarding the operational period, arrangements must be made at the drop off point with the provision of a laybay so that there is no accumulation in the TOD area due to the large number of parked vehicles, especially online vehicles;			

Nugroho Widiarto, ST., M.Sc. (P3EJ KLHK)		
1	In the underground segment, land is designated for industrial and warehousing zones, mixed zones, office, trade and service zones, medium-high KDB residential zones, national government zones, regional government zones, green belt zones, vertical housing zones, recreational green zones. **Some things to pay attention to are:** a. When constructing tunnels, please pay attention to the cable network (electricity and telkom)/pipes (water and oil/gas) so that it does not interfere with network activities/users, how can you explain the technicalities? b. What form of compensation should a cable/pipe network break? c. The risk that can occur is causing building cracks both during the construction and operation stages due to lack of soil stability. What is the form of management/monitoring and compensation for damaged buildings?	
2	In 2 elevated segments (Office, trade and service zone, Medium-high KDB residential zone, National government zone) and (Industrial and warehousing zone, Mixed zone, Office, trade and service zone, Medium-high KDB residential zone, National government zone , Regional government zone, Green belt zone. 1) Industrial and warehousing zone, Mixed zone, Office, trade and service zone) **Some things to pay attention to are:** especially those that pass through busy activities, both residential and office, during the construction and operation stages, in anticipation of work accidents or during operations that impact the surrounding environment, what is the form of management/monitoring and compensation for damaged buildings?	
3	Notes on ecoregional characteristics in the study area: a. Dominance of Fluviomarine Plains with Alluvium Material (Grogol Petamburan and Cilincing Districts) • The infiltration rate is low / water does not pass easily • Its morphological condition is a relatively slightly concave plain and is located in the downstream part of the river flow and is a transition area from fluvial to coastal areas, so the speed of the river flow is hampered, which causes the river flow to overflow during the rainy season, which has the potential for inundation and flooding.	

- The constituent material is dominated by clay deposits which have high soil swelling properties, which causes asphalt road infrastructure buildings and other building foundations to quickly become damaged, broken or shifted.

b. Dominance of Anthropogenic Landscapes (Districts of Cakung, Cempaka Putih, Gambir, Johar Baru, Kelapa Gading, Kemayoran, Menteng, Pulo Gadung, Senen, Tanah Abang, and Medan Satria)

- The problem of urban flooding is due to the closure of the land surface by buildings and roads, as well as poor or inadequate urban drainage systems, which cause the rainwater infiltration process to be hampered.

Construction Stage

1. Civil-technical approach, adapting to ecoregional characteristics
2. Water channels during construction must be properly prepared with sluge catchers/floating items before being discharged into water bodies

Operation Phase

1. Water seepage through building gaps, how to manage it
2. The intersection between the water/drainage channel and the MRT tunnel

Water drainage in the underground segment is good so that no puddles occur

Seeing that the number of workers living in Baseccame is quite large, what needs to be planned, managed and monitored is:

1. Waste Generation: TPS (Temporary Storage Place) for waste. Waste transportation to the TPA (Final Processing Place) will be carried out in collaboration with the DKI Jakarta Government, (total waste generation 1.51 tons/day)
2. Wastewater Generation: gray water (62.87 m3/day) and black water (44.08 m3/day)
3. Clean water supply: 133.69 m3/day (where does it come from?)
4. Noise Impact: Do not carry out work that makes noise at night because it disturbs the rest time of local residents
5. Earth excavation work, affected buildings covering an area of 47,189.69 m2 (estimated amount of demolition was ± 5,898.70 m3), where were they dumped with what means and how many times/day did they pass along which roads?
6. Dewatering work, with the volume of dewatering in underground construction estimated at ± 697,268.77 m3.

	7. At the construction stage, by looking at the type of equipment used (table 2.11) and the physical construction process for Hypothetical Significant Impacts or DLKP for increasing Vibrations, how come there is no such thing (see table 5.3. DPH or DLKP (Direct Monitored Impacts)?	
	Add an explanation of the dewatering method chosen and ensure that the building and environment around the project site are safe from the earth excavation and dewatering process	
	Table 2.1. Existing Land Use Affected, input suggestions: write down the units for each land use to make it clearer and check other tables with the same problem	
	MRT operational activities that have an impact on waste generation, for its management by providing waste sorting places, if possible also a daily/monthly waste generation balance (unit weight/time), which is reported periodically to the DKI Jakarta DLH as a basis for preparing the DKI Jakarta Waste Management Jakstrada report which contains targets and achievements for handling and reducing waste every day.	
	Important notes from the results of public consultations on the construction of the Mass Rapid Transit (MRT) East - West Line Phase 1 Phase 1 (Tomang - Medan Satria) train line that require attention include: 1. Traffic jams, dust and noise, flooding/puddles, damage to drainage channels and water quality are things to consider in determining Hypothetical Significant Impacts (DPH). 2. Community concerns regarding the land compensation process for the construction of the MRT-EWLP1S1 were taken into account in determining the Hypothetical Significant Impact (DPH). 3. Handling and repairing affected public facilities is something that is taken into account when determining environmental management and monitoring plans. 4. Repair affected public facilities after construction work is completed, especially buildings, roads and drainage channels affected by the project. 5. MRT to provide toilets for ELDERLY and people with disabilities, more toilets for women, and provide special carriages for ELDERLY, people with disabilities and women.	
Rustam (Center for Ground Water Resources and Environmental Geology, Geological Agency)		
1	Description of Activity Plans at the Construction Phase:	

	1. In the basecamp area there will be stockpiling of materials and construction materials. It is necessary to explain the volume of materials and construction materials and the procedures for storing them, so that these materials are not easily washed away by runoff, so that they do not increase the turbidity of surface water. 2. It is necessary to explain the domestic water requirements for basecamp operations both in depot work areas, underground construction and elevated construction and PADM's ability to fulfill them. In the underground segment, for dewatering activities, it is necessary to explain the dewatering techniques so that uplift does not occur during construction and does not have a significant impact on lowering the ground water level in the surrounding area.	
2	The initial geological environmental assessment for the MRT route plan must include a detailed description of the engineering geological conditions along the route plan. Bear in mind that the planned underground and elevated construction activities will go through alluvial deposits, then the description should be displayed per segment of geological conditions. The description of the geological environmental tone should include: 1. Lithology (soil and rock) • Describe the type, physical properties and engineering of soil/rock for the MRT route plan • Lithological descriptions should use data from soil tests or geotechnical study results in the FS/DED • A description of the physical and engineering properties of the soil/rock for the MRT plan is necessary because it will relate to foundation stability and underground construction stability. • Make detailed geotechnical maps and geotechnical cross-sections on the MRT route plan and depict them clearly 2. Hydrogeology For underground construction on plain land, excavation will cut the surface of shallow groundwater/free groundwater. This will affect the potential for shallow groundwater which may be a source of clean water for the surrounding community, and also the presence of shallow groundwater in the underground construction route will affect the level of difficulty of tunnel construction work (for example dewatering is required). The study of hydrogeological aspects must at least include the existence of shallow aquifers, the depth of the shallow groundwater table, and groundwater flow. Actually, there is no need to	

discuss the potential of groundwater too much, both free groundwater and deep groundwater, because the MRT construction activities will not use groundwater.	
Akhfian Mustika Agung, ST., M.Eng (Directorate of Land Use, ATR BPN)	
The list of attachments can be completed with pages to make it easier to search in the document.	
Due to the context of land acquisition for national development, in handling social impacts resulting from the implementation of the Jakarta Mass Rapid Transit (MRT) DKI Jakarta - Bekasi City development, we must refer to the Minister of Agrarian and Spatial Planning/Head of BPN Regulation Number 6 of 2020 concerning Provisions for implementing regulations Presidential Decree Number 62 of 2018 concerning Handling social impacts in the context of providing land for national development.	
In the Description of the MRT-EWLP1S1 Activity Plan, you can add in the activity details how much land will be used for the Jakarta Mass Rapid Transit (MRT) development plan in the form of a table detailing the development area, including routes, railway construction, stations, depots and supporting facilities, which will be built. To clarify later the use and utilization of land at the location of the planned activity.	
Look at table Table 2.31. The relationship between the location of the planned activity and the surrounding area and pictures or maps around the location of the planned activity for the development of the Jakarta Mass Rapid Transit (MRT), which has various types of activities and is very dense and there is effective land use, meaning that around the location there are also people/other parties who are in charge of these lands. Efforts should be made to ensure that there is no conflict between the community and the initiator so that activities can run in tandem with each other. If possible, improve road access for communities around the Jakarta Mass Rapid Transit (MRT) construction site.	
In order to clarify the Initial Environmental Baseline. Even though there is a Land Cover Map, in the Andal RKL RPL document there is very little review or narrative regarding land use/land cover around the location of the Jakarta Mass Rapid Transit (MRT) Development plan. Therefore, it is best to add a review regarding land use/land cover which contains the use and utilization of land around the location of the planned activity which is based on the Land Technical Consideration (PTP)	

document issued by the Bekasi City Land Office in 2022 which is used as the basis for issuing the KKPR Approval.	
Based on Figure 1.2. Activity Location Map In the Spatial Planning that the location of the planned activities for the Development of Jakarta Mass Rapid Transit (MRT) is appropriate and strengthened by the KPPR Confirmation document for National Strategic Activities located in the DKI Jakarta location and KPPR Approval for National Strategic Activities KKPR which is located in Bekasi City. However, there is still minimal review or narrative regarding the suitability of the location of the Jakarta Mass Rapid Transit (MRT) Development activity plan for the DKI Jakarta RDTR and Bekasi City RTRW. It would be better for this narrative or review to see the detailed KPPR Confirmation and KKPR Approval documents.	
In this Andal RKL RPL document, in the discussion of Community Knowledge of MRT Activity Plans, it can be seen that 70.37% of the community is not aware of the Jakarta Mass Rapid Transit (MRT) Development Plan. This is whether the initiator has not carried out socialization optimally or what kind of plan will it be carried out? Will there be any more outreach or what kind of explanation will it take?	
In table 3.43 there are people who do not support and do not respond to the planned Jakarta Mass Rapid Transit (MRT) Development activities. What steps are being taken by the initiator to convince the public that the Jakarta Mass Rapid Transit (MRT) development plan will not disturb the environment and can make a significant contribution to society. To provide an explanation.	
There are many concerns from the public regarding the Jakarta Mass Rapid Transit (MRT) development plan as shown in table 3.47. so that this can be answered in the Environmental Management Plan (RKL) and Monitoring Plan Environment (RPL) so that community concerns can be addressed anticipated and minimized so that it does not cause impacts which is very disturbing for the community.	
Map presentation: 1. For completeness of the document, it is necessary to add an impact map- The impact of this activity is on a detailed scale to make it more informative and make it easier to read spatially. 2. There are some map images displayed that have not yet been presented, adjusted to scale, legend, projection system, layout and	

map source in accordance with the rules and principles of cartography. To be repaired and adjusted. 3. For the RKL and RPL maps, if possible, per stage, for example the Environmental Management Plan Map at the pre-construction stage, construction stage and operational stage. Likewise, the Environmental Monitoring Plan (RPL) applies at the pre-construction stage, construction stage and operational stage. So it will make the data presented spatially clearer and more informative. To obtain land information, see the pagehttp://bhumi.atrbpn.go.id	

Dyah Prabaningrum, SKM, MKM (Indonesian Ministry of Health)	
Table 2.15 List of Affected Public Facilities and Utilities 1. Drainage channels, so that additional efforts are made to prevent disturbances in drainage channels because they have the potential to cause flooding, an increase in vectors and the incidence of vector-borne diseases 2. The clean water pipe network should be a concern in its management because it has the potential to disrupt people's access to clean water and drinking water and has the potential for diseases due to poor hygiene and water quality such as diarrhea and skin diseases.	
Minister of Health Regulation No. 32 of 2017 has been revoked. Furthermore, water quality standards refer to Minister of Health Regulation no. 2 of 2023 concerning Implementing Regulations of Government Regulation no. 66 of 2016 concerning Environmental Health	
Initial environmental baseline of public health components 1. For disease prevalence data, what is presented in the document is the number of cases, so that it can be corrected into data in the form of prevalence data so that the magnitude of the problem can be seen. Disease prevalence data is also available for the last 3 years. First, identify the community health centers that have work areas that are affected by the activities 2. In order to add data on the prevalence of specific diseases related to air quality degradation, both acute and chronic, such as eye irritation, acute respiratory infections (ARI), COPD, asthma attacks, heart and blood vessel disease, cancer and even stunting. 3. Environmental Health Data includes STBM and PHBS data (community-based total sanitation and clean and healthy living	

	behavior) such as access and sources of clean water, drinking water/ready-to-drink water, sanitation conditions (such as sanitation/latrine access, latrine ownership, and the type of latrine used used), as well as wastewater drainage and waste disposal (such as how the community manages waste, availability of rubbish bins and waste TPS) are collected in questionnaires, data is collected from the community directly based on sub-districts or villages/kelurahan in the study area and displayed in graphical form and better yet in map form	
	Determination of Hypothetical Significant Impacts: 1. In the affected components, it is best to look at diseases that have the potential to increase in cases due to activities such as: vector-based diseases, ARI, COPD, cardiovascular (due to exposure to PM2.5) and look at all affected locations. Data was taken from community health centers in the study area 2. The potential impact should not only be ARI. Can be added to vector-based diseases, COPD, asthma, cardiovascular, ARI	
	RKL-RPL, to involve Community Health Centers and Health Sub-departments and Health Services in monitoring and managing the types of impacts of public health disorders/increasing disease prevalence	
	Our suggestion is to use Environmental Health Risk Analysis (ARKL) calculations to estimate the public health impacts due to environmental quality degradation. From the ARKL calculation, you will get a Risk Quotient for each environmental parameter that will experience a decrease and this risk quotient can be the basis for determining the impact. Apart from that, ARKL is also useful for determining effective public health interventions to reduce community exposure. At least PM2.5 parameters can be used in ARKL calculations.	

Chapter 1
Introduction

1.1. Background

Mass Rapid Transit East-West Line Phase 1 Stage 1 (MRT-EWLP1S1) is a national strategic project based on Coordinating Minister for Economic Affairs Regulation No. 7 of 2021 concerning Changes to the List of National Strategic Projects, in order to overcome traffic congestion and improve transportation facilities in DKI Jakarta and its surroundings. This project was implemented by the Directorate General of Railways (DJKA), Ministry of Transportation of the Republic of Indonesia with funding from the Japan International Cooperation Agency (JICA).

The MRT-EWLP1S1 project has been initiated since 2010 with Kembangan (West Jakarta) – Ujung Menteng (East Jakarta) route measuring ± 27 km, consisting of the elevated segment of Semanan – Grogol and Cempaka Baru – Ujung Menteng routes for 19 km and the underground segment of Roxy route for 8 km long. This plan has received an Andal-RKL-RPL recommendation from the Head of the DKI Jakarta Regional Environmental Management Agency No. 64/Andal/-1,774,151 dated 24 December 2013 (APPENDIX A). However, until now, this has not been realized.

Then based on the Decree of the Minister of Transportation No. KM 203 of 2022 concerning Determining the Route of the Jakarta Mass Rapid Transit Route, East – West Corridor (Cikarang – Balaraja) (APPENDIX B), then starting in early 2022, a basic engineering design and change of the MRT-EWLP1S1 route to the Tomang (DKI Jakarta) – route will be carried out. Medan Satria (Bekasi, West Java) is ± 24,527 Km and Rorotan Depot access is ± 5.90 Km with a summary of activity plans presented in **Table 1.1.**

Administratively, the MRT-EWLP1S1 Tomang – Medan Satria route and access to Rorotan Depot crosses 2 Provinces (DKI Jakarta and West Java), 5 Cities (West Jakarta, Central Jakarta, North Jakarta, East Jakarta & Bekasi City) and 13 Districts

Table 1.1. MRT-EWLP1S1 Activity Plan

<table>
<tr><th>Criteria</th><th>Description</th></tr>
<tr><td>Route</td><td>Tomang – Grogol – Roxy – Petojo – Cideng – Thamrin – Kebon Sirih – Kwitang – Senen – Galur – Cempaka Baru – Sumur Batu – West Pakulonan – East Pakulonan – Perintis – Pulo Gadung – Milling – Cakung Barat – Pulo Gebang – Ujung Menteng – Medan Satria and access to Rorotan Depot</td></tr>
<tr><td>Railroad construction</td><td>a. Elevated(± 15,527 Km)
● ElevatedWest: Tomang – Grogol – Roxy
● ElevatedEast: Galur – Cempaka Baru – Sumur Batu – West Pakulonan – East Pakulonan – Perintis – Pulo Gadung – Milling – Cakung Barat – Pulo Gebang – Ujung Menteng – Medan Satria
b. Elevated(± 5.9 Km)
● access to Rorotan Depot
c. Underground(± 9 Km)
● Roxy – Petojo – Cideng – Thamrin – Kebon Sirih – Kwitang – Senen – Galur</td></tr>
<tr><td>Station</td><td>a. Elevated(13 stations)
Tomang, Grogol, Cempaka Baru, Sumur Batu, West Pakulonan, East Pakulonan, Perintis, Pulo Gadung, Milling, Cakung Barat, Pulo Gebang, Ujung Menteng, Medan Satria
b. Underground(8 stations)
Roxy, Petojo, Cideng, Thamrin, Kebon Sirih, Kwitang, Senen, Galur
<table>
<tr><th>Station</th><th>Type</th><th>Amount of platform</th><th>Amount of Track</th><th>Height/ Depth (m)</th><th>Distance (m)</th><th>Area (m2)</th></tr>
<tr><td>Tomang</td><td>EL</td><td>2</td><td>2</td><td>20,4</td><td>0</td><td>5.706,68</td></tr>
<tr><td>Grogol</td><td>EL</td><td>2</td><td>2</td><td>9,3</td><td>1.308</td><td>5.706,68</td></tr>
<tr><td>Roxy</td><td>UG</td><td>1</td><td>2</td><td>-23,74</td><td>1.360</td><td>5.877,40</td></tr>
<tr><td>Petojo</td><td>UG</td><td>2</td><td>2</td><td>-29,05</td><td>1.180</td><td>4.771,20</td></tr>
<tr><td>Cideng</td><td>UG</td><td>2</td><td>2</td><td>-30,25</td><td>1.531</td><td>4.573,94</td></tr>
<tr><td>Thamrin</td><td>UG</td><td>1</td><td>2</td><td>-27,3</td><td>1.017</td><td>9.186,14</td></tr>
<tr><td>Kebon Sirih</td><td>UG</td><td>1</td><td>2</td><td>-22,5</td><td>706</td><td>5.555,70</td></tr>
<tr><td>Kwitang</td><td>UG</td><td>1</td><td>2</td><td>-15,9</td><td>835</td><td>6.383,39</td></tr>
<tr><td>Senen</td><td>UG</td><td>2</td><td>2</td><td>-29,45</td><td>839</td><td>4.808,97</td></tr>
<tr><td>Galur</td><td>UG</td><td>1</td><td>2</td><td>-16,4</td><td>1.432</td><td>6.404,40</td></tr>
<tr><td>Cempaka Baru</td><td>EL</td><td>2</td><td>2</td><td>13,8</td><td>1.275</td><td>5.706,68</td></tr>
<tr><td>Sumur Batu</td><td>EL</td><td>2</td><td>2</td><td>19,5</td><td>939</td><td>5.706,68</td></tr>
<tr><td>Pakulonan Barat</td><td>EL</td><td>2</td><td>2</td><td>13,8</td><td>1.243</td><td>5.706,68</td></tr>
<tr><td>Pakulonan Timur</td><td>EL</td><td>2</td><td>2</td><td>16,4</td><td>1.052</td><td>5.706,68</td></tr>
<tr><td>Perintis</td><td>EL</td><td>2</td><td>2</td><td>13,8</td><td>2.008</td><td>5.706,68</td></tr>
<tr><td>Pulo Gadung</td><td>EL</td><td>2</td><td>2</td><td>13,8</td><td>734</td><td>5.706,68</td></tr>
<tr><td>Penggilingan</td><td>EL</td><td>1</td><td>2</td><td>14,6</td><td>1.622</td><td>5.706,68</td></tr>
<tr><td>Cakung Barat</td><td>EL</td><td>1</td><td>2</td><td>17,7</td><td>1.261</td><td>5.706,68</td></tr>
<tr><td>Pulo Gebang</td><td>EL</td><td>1</td><td>2</td><td>16,1</td><td>1.322</td><td>5.706,68</td></tr>
<tr><td>Ujung Menteng</td><td>EL</td><td>2</td><td>2</td><td>16,6</td><td>1.111</td><td>7.652,26</td></tr>
<tr><td>Medan Satria</td><td>EL</td><td>2</td><td>2</td><td>13,8</td><td>1.752</td><td>5.706,68</td></tr>
<tr><td>Total</td><td></td><td></td><td></td><td></td><td>24.527</td><td>123.693,56</td></tr>
</table></td></tr>
<tr><td>Depot</td><td>Rorotan, Cilincing, North Jakarta (area ± 23 Ha)</td></tr>
</table>

Source : JMCA, 2022

(Grogol Petamburan, Gambir, Tanah Abang, Menteng, Senen, Johar Baru, Kemayoran, Cempaka Putih, Kelapa Gading, Pulo Gadung, Cakung, Cilincing, Medan Satria) and 31 sub-districts (Tomang, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng , North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, Cempaka Putih Timur, Kelapa Gading Barat, Kelapa Gading Timur , Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, Cakung Barat, Cakung Timur, Ujung Menteng, Medan Satria, and Rorotan).

Referring to Article 89 paragraph (1) Government Regulation no. 22 of 2021 concerning the Implementation of Environmental Protection and Management, the person responsible for the business and/or activity is obliged to make changes to the Environmental Approval if the business and/or activity that has obtained an Environmental Feasibility Decree is planned to undergo changes. Furthermore, based on the letter of direction from the Directorate General of Forestry Planning and Environmental Management, KLHK No. S.845/PDLUK/P2T/PLA4/4/ 2022 dated 4 April 2022, changes to the Environmental Approval for MRT-EWLP1S1 activities must be accompanied by a new Amdal (APPENDIX C). Therefore, the Amdal document currently being prepared is in the context of amending the Environmental Approval.

1.2. Goals and Benefits of Business and/or Activities

The aim of developing the MRT-EWLP1S1 is to provide comfortable and safe mass transportation services in the DKI Jakarta area and its surroundings. Whereas the expected benefits from the construction of MRT-EWLP1S1 are:

a. Reducing traffic congestion in the DKI Jakarta area and its surroundings.
b. Facilitate community mobility in the DKI Jakarta area and its surroundings.
c. Improvei environmental quality in the DKI Jakarta area and its surroundings.

1.3. Study Implementer

1.3.1. Person responsible

Institution Name	:	Directorate General of Railways, Ministry of Transportation of the Republic of Indonesia
Address	:	Jl. Medan Merdeka Barat No. 08, Central Jakarta, DKI Jakarta 10110
Person in charge	:	Mohamad Risal Wasal
Position	:	Director General of Railways

1.3.2. Amdal preparer

Referring to Article 23 paragraph 1 of Government Regulation Number 22 of 2021 concerning Implementation of Environmental Protection and Management, the person responsible for activities in preparing the Amdal can appoint another party in accordance with the applicable statutory provisions. The preparation of the Amdal MRT-EWLP1S1 is carried out by the Amdal Preparation Service Provider (LPJP), as follows:

institution name	:	PT Hayuningrat Environment Consultant
Registration Sign	:	0059/LPJ/AMDAL-1/LRK/KLHK
Validity Period Until	:	December 15, 2024
Address	:	Jl.Raya Bogor, Km.17, Uniko D2, No.26-27, Pasar Induk Kramat Jati, Kampung Tengah, Kramat Jati, East Jakarta.
Tel/Fax.	:	(021) 29835747
Person in charge	:	Arief Setiawan, ST.
Position	:	Director

Jakarta Mass Rapid Transit (MRT) East-West Line Amdal Study Implementation Team as presented in **Table 1.2.,** whereas formal evidence from LPJP and the Amdal Study Implementation Team is presented in APPENDIX D.

Table 1.2. Amdal Study Implementation Team

No	Name	Position	Certification/Education
Amdal preparer			
1	Andy Mizwar, ST, M.Si.	Chairman	Competency Certification (KTPA) No. Reg : 74909 2133 8 0000050 2022 Valid until 12 December 2025
2	Lalu Ahmalian Bahari, ST, MT	Member	Competency Certification (KTPA) No. Reg : 74909 2133 8 0000074 2023 Valid until March 15 2026
3	Untung Hendro Prayogo, ST	Member	Competency Certification (ATPA) No. Reg : 74909 2133 7 0000063 2022 Valid until 12 December 2025
4	Agus Dian Setyanto, ST	Member	Competency Certification (ATPA) No. Reg : 74909 2133 7 0000064 2022 Valid until 12 December 2025
5	Bayu Sakti, ST, MT	Member	Competency Certification (ATPA) No. Reg : 74909 2133 7 0000066 2022 Valid until 12 December 2025
6	Arief Setiawan, ST	Member	Competency Certification (ATPA) No. Reg : 74909 2133 7 0000067 2022 Valid until 12 December 2025
Experts			
1	Juda Suwandi, ST., MT.	Civil Engineering	S1 Civil Engineering (Gadjah Mada University) S2 PWK (Univ. Tarumanagara)
2	Dr. Maya Amalia, ST, MT	Hydrology	S1 Civil Engineering (Univ. Lambung Mangkurat) Master of Civil Engineering (Gadjah Mada University) Doctoral Degree in Civil Engineering (Saga University, Japan)
3	Fraya Annisa, ST, M.Sc	Hydrogeology	S1 Geological Engineering (Gadjah Mada University) Master's Degree in Hydrogeology and Environmental Geoscience (Universitat Gottingen, Germany)

No	Name	Position	Certification/Education
4	Lalu Ahmalian Bahari, ST, MT	Water quality	Bachelor of Environmental Engineering (STTL Yogyakarta) Master of Environmental Engineering (ITY Yogyakarta)
5	Untung Hendro Prayogo, ST	Water quality	Bachelor of Environmental Engineering (STTL Yogyakarta)
6	Andri Kamajaya, ST, MT	Air Quality	Bachelor of Environmental Engineering (STTL Yogyakarta) Master of Environmental Engineering (ITY Yogyakarta)
7	Agus Dian Setyanto, ST	Air Quality	Bachelor of Environmental Engineering (STTL Yogyakarta)
8	Aris Johansyah, S.Si, MT	Environmental Biology	Bachelor of Forestry (Nusa Bangsa University) Master of Civil Engineering (Tama Jagakarsa University)
9	Dra. Yuningtyas Setyawati, M.Sc.	Social and Cultural Affairs	Bachelor of Sociology (FSIP - UGM) Masters in Sociology (Postgraduate – UGM)
10	Geri Suryadi, SE	Social and Cultural Affairs	Bachelor of Economics (Bogor Agricultural Institute)
11	Bayu Sakti, ST, MT	Social and Cultural Affairs	Bachelor of Environmental Engineering (STTL Yogyakarta)
12	Seno Resdianto, ST	Social and Cultural Affairs	Bachelor of Environmental Engineering (STTL Yogyakarta)
13	Dadi Supriadi, SKM, M.Sc.	Public health	S1 Public Health (Urindo Jakarta) Masters in Tropical Medicine (UGM)
Support Staff			
1	Muhammad Akbar, ST	Descriptor	Bachelor of Environmental Engineering (Univ. Lambung Mangkurat)
2	Andrias Febiasten, ST	GIS	Bachelor of Environmental Engineering (ITY Yogyakarta)
3	Tari Budiyanti, ST	Administration	Bachelor of Environmental Engineering (ITY Yogyakarta)

1.3.3 Implementing and Sub-implementing Agency

In accordance with the Cabinet Secretary letter dated 27 September 2023 regarding the Presidential Meeting directives, during construction and operation stages, the institution that will implement MRT East-West are:

Implementing Agency : Pemprov DKI Jakarta

Sub-Implementing Agency : PT MRT Jakarta (Perseroda)

1.4. Brief description of business plan and/or activities

1.4.1. Status of EIA Study

The MRT-EWLP1S1 Amdal study was carried out simultaneously with the preparation of basic engineering design (BED), land acquisition and resettlement plan (LARAP) studies and traffic impact analysis studies (Andalalin). Therefore, the results of the planning and study are used as material for assessing the environmental impact of the MRT-EWLP1S1 construction. BED is presented in APPENDIX E.

1.4.2. Location of Business Plans and/or Activities

Administratively, the construction of the MRT-EWLP1S1 Tomang – Medan Satria route crosses 2 provinces, 5 cities, 13 sub-districts and 31 sub-districts, as presented in **Table 1.3.** and **Figure 1.1..** Based on Confirmation of Suitability of Space Utilization Activities for National Strategic Activities No. PF.01/1240-200/IX/2023 and No. PF.01/1241-200/IX/2023 (APPENDIX F), results of overlaying the Activity Location Map with the Detailed Spatial Plan Map for the DKI Jakarta Province (Regulation of the Governor of DKI Jakarta Number 31 of 2022 concerning the Detailed Spatial Plan for the Planning Area of the DKI Jakarta Province) and the Bekasi City Regional Spatial Planning Map (Bekasi City Regional Regulation Number 5 of 2016 concerning Detailed Bekasi City Spatial Planning Plans for 2015 - 2035) are presented in **Table 1.4.** and **Figure 1.2.**.

Table 1.3. MRT-EWLP1S1 Construction Location

No	Ward	Subdistrict	City	Province
1	Tomang	Grogol Petamburan	West Jakarta	DKI Jakarta
2	Tanjung Duren Selatan			
3	Grogol			
4	Duri Pulo	Gambir	Central Jakarta	
5	Cideng			
6	North Petojo			
7	South Petojo			
8	Gambir			
9	Kampung Bali	Tanah Abang		
10	Kebon Sirih	Menteng		
11	Senen	Senen		
12	Kwitang			
13	Kramat			
14	Tanah Tinggi	Johar Baru		
15	Galur			
16	Harapan Mulia	Kemayoran		
17	Cempaka Baru			
18	Sumur Batu			

No	Ward	Subdistrict	City	Province
19	Cempaka Putih Barat	Cempaka Putih		
20	Cempaka Putih Timur			
21	Kelapa Gading Barat	Kelapa Gading	North Jakarta	
22	Kelapa Gading Timur			
23	Pegangsaan Dua			
24	Rorotan	Cilincing		
25	Kayu Putih	Pulo Gadung	East Jakarta	
26	Pulo Gadung			
27	Rawa Terate	Cakung		
28	Cakung Barat			
29	Cakung Timur			
30	Ujung Menteng			
31	Medan Satria	Medan Satria	Bekasi city	West Java

Table 1.4. Results of Spatial Planning Suitability Study

Segment	Station Name	Code	Distance (km)	Type Construction	ROW area (m2)	Spatial plans
West Elevated	Tomang	TMG	1,308	*Elevated*	29,873.00	Office, trade and service zones, medium-high KDB residential zones, national government zones. 1)
	Grogol	GRG	1,360			
	Roxy	RXY	1,180			
Underground	Petojo	PTJ	1,531	*Underground*	92,294.67	Industrial and warehousing zone, mixed zone, office, trade and service zone, medium-high KDB residential zone, national government zone, regional government zone, green belt zone, vertical housing zone, recreational green zone. 1)
	Cideng	CDG	1,017			
	Thamrin	TRM	0.706			
	Kebon Sirih	KBS	0.835			
	Kwitang	KWT	0.839			
	Senen	SNN	1,432			
	Galur	GLR	1,275			
	Cempaka Baru	CPB	0.939			
East Elevated	Sumur Batu	SMB	1,246	*Elevated*	187,863.01	Industrial and warehousing zone, mixed zone, office, trade and service zone, medium-high KDB residential zone, national government zone, regional government zone, green belt zone. 1) Industrial and warehouse zones, mixed zones, office, trade and service zones. 2)
	West Pakulonan	CLA	1,052			
	East Pakulonan	CCP	2,008			
	Pioneer	domestic worker	0.737			
	Pulo Gadung	PLG	1,622			
	Milling	PGG	1,261			
	Cakung Barat	CKB	1,322			
	Pulo Gebang	PGB	1,111			
	Ujung Menteng	UJM	1,756			
	Medan Satria	MDS				
Depot	Deposit Access	-	5.90	*Elevated*	76,733.43	Medium-high KDB residential zone, Green belt zone. 1)
	Rorotan Depot	-		*at grade*	237,500.00	

Source : JMCA, 2022
Information : 1) DKI Jakarta Governor Regulation Number 31 of 2022 concerning Detailed Spatial Planning Plans for the DKI Jakarta Provincial Planning Area
2) Bekasi City Regional Regulation Number 5 of 2016 concerning Detailed Spatial Plans for Bekasi City for 2015 - 2035.

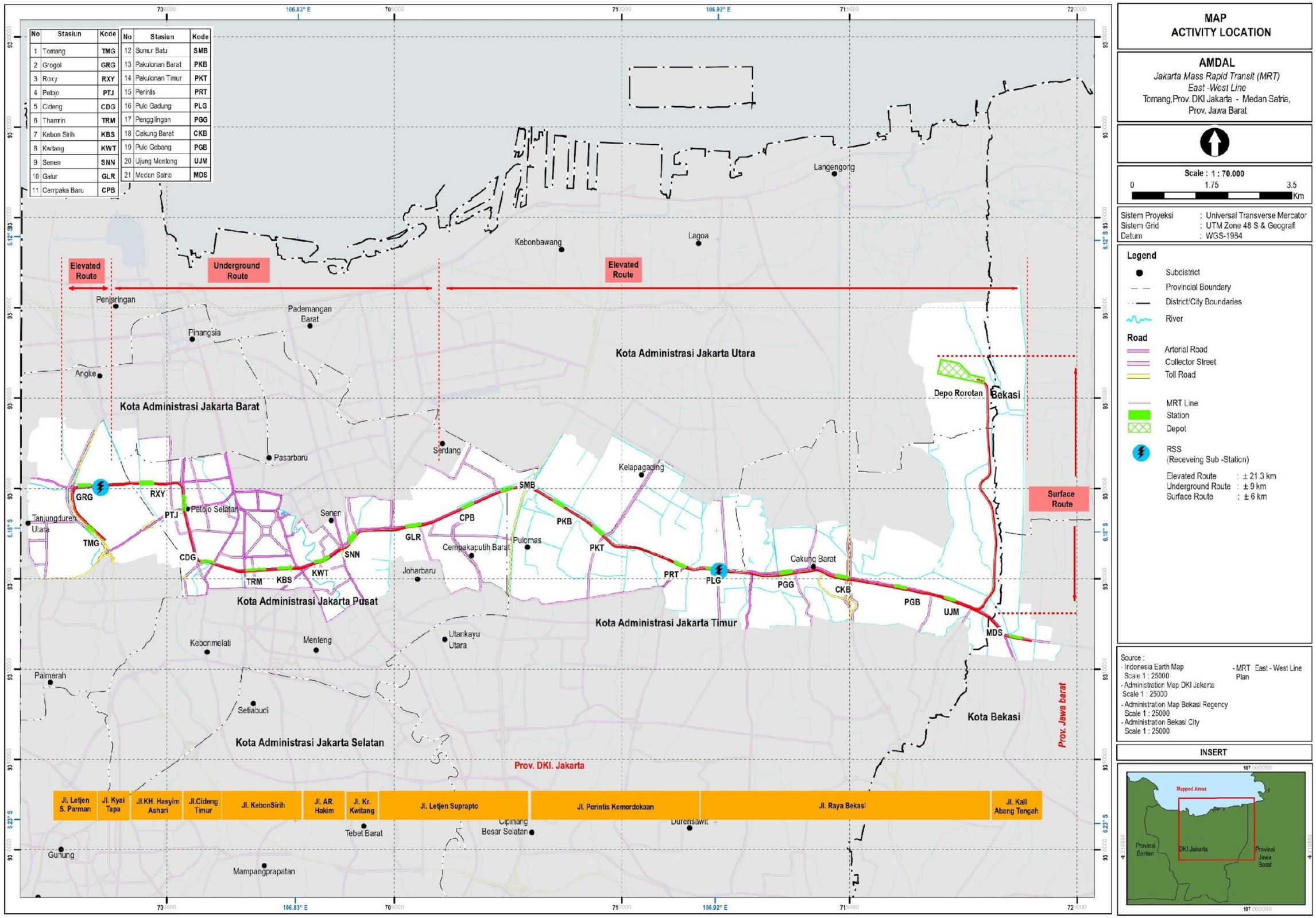

Figure 1.1. MRT-EWLP1S1 Construction Location Map

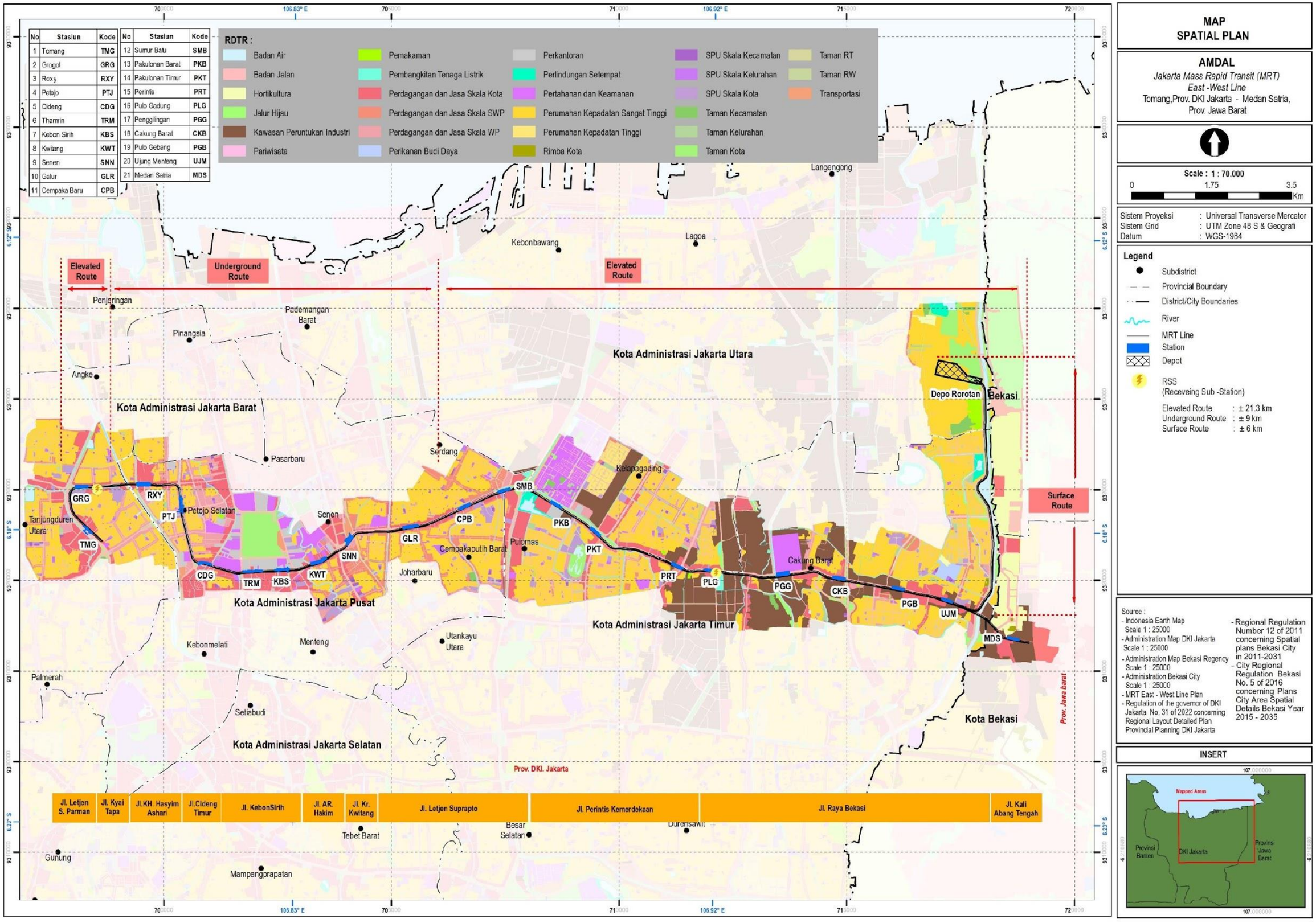

Figure 1.2. Activity Location Map in Spatial Planning

1.4.3. Business Plan and/or Activity Schedule

The schedule for implementing the MRT-EWLP1S1 project activities on Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) route is as shown in **Table 1.5**..

Table 1.5. MRT-EWLP1S1 Project Activity Schedule

	Activities Plan	2024	2025	2026	2027-2031	2032	2033-dst
A	**Pre-Construction Stage**						
	Land Acuisition						
B	**Construction Stage**						
	Construction worker recruitment						
	Mobilization of construction tools & material						
	Land clearing & public facilities relocation						
	Earthwork & dewatering						
	Underground construction						
	Aboveground construction						
C	**Operational Stage**						
	Operational worker recruitment						
	Passenger transport activities & station operation						
	Rolling stock maintenance & depot operation						

1.5. Scoping Summary

1.5.1. Description of Approved Business Plan and/or Activities in the Terms of Reference Form

A. Pre-Construction Stage

1. Land Acquisition

Referring to Law No. 2 of 2012 and Government Regulation no. 19 of 2021, land acquisition for development in the public interest is carried out through a land acquisition mechanism. Based on the results of the LARAP study (2022), the land that will be acquired for the construction of the MRT-EWLP1S1 covers an area of 997,535.87 m^2 with a total of 743 land plots (623 land plots are ownership land and 120 land plots are public facilities). The number of residents affected by the liberation was 300 families or 1,388 people. The building area of economic facilities (office houses, shop houses and business houses) affected by the acquisition is 41,389.40 m^2 (87.71% of the total building area, 27.39% of the total land area of economic facilities and 4.15% of the total land area occupied released). At the time of preparing this Amdal, no land had been acquired for the construction of the MRT-EWLP1S1. Land acquisition activities that have been carried out are limited to the Land Acquistion and Resettlement Plan (LARAP) study as an initial step in the land acquisition planning stage.

B. Construction Phase

1. Acceptance of Construction Workers

MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers (JMCA, 2022), with a minimum of 20% (1,242 people) involving local workers (mainly residents affected by land acquisition and environmental disturbances who meet skill qualification requirements). Considering that construction work is temporary for a certain period of time and refers to Law no. 13 of 2003 concerning Employment as amended in Law no. 11 of 2020 concerning Job Creation and its implementing regulations, the work system, wages and insurance

arrangements (BPJS Employment and BPJS Health) for construction workers must be agreed in writing in a Specific Time Work Agreement (PKWT).

2. Basecamp Operations

The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live in three separate basecamp locations.

a. The DEPO Basecamp (BC-DEPO) is planned to be located in Rorotan Depot area and is intended as a construction support facility for Rorotan Depot development. The construction of the Depot segment is estimated to involve 790 construction workers with 30% (237 people) of the workforce staying at the base camp.
b. The underground construction basecamp (BC-UG) is planned to be located near the planned location of Roxy Station and is intended as a supporting facility for construction activities in the West underground and elevated segments. The construction of the underground segment is estimated to involve 2,520 construction workers with 30% (756 people) of the workforce staying at the base camp.
c. The elevated construction basecamp (BC-ELV) is planned to be located near the Pulo Gadung Station location and is intended as a supporting facility for construction activities in the East elevated segment. The construction of the elevated segment is estimated to involve 2,900 construction workers with 30% (870 people) of the workforce staying at the base camp.

To manage waste water resulting from construction workers' activities, portable toilets equipped with septic tanks will be provided at each basecamp location. Waste water suction is carried out periodically in collaboration with the Regional Company PAL Jaya. For waste management, each basecamp location will be equipped with segregated waste bins (organic waste and inorganic waste) and temporary storage areas (TPS) in the form of container boxes. Transporting waste to the TPA (Final Processing Place) will be carried out in collaboration with the DKI Jakarta Government. Meanwhile, the LB3 temporary storage facilities planned for each basecamp location are semi-permanent buildings with a design in accordance with the provisions of Minister of Environment and Forestry Regulation No. 6 of 2021 concerning Procedures and Requirements for B3 Waste Management.

The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts.

3. Mobilization of Construction Equipment and Materials

The construction of the MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or supporting equipment, as well as a large amount of construction materials supplied from Rorotan Depot location to each construction site. Equipment mobilization uses a tronton truck, construction material distribution uses a dump truck, and ready mix supply uses a mixer truck. Based on BED MRT-EWLP1S1, the estimated amount of construction materials to be

distributed from Rorotan Depot area (as stockpile) to each construction activity location is ± 5,940,741.52 m^3 using 243 dump trucks with a rotation rate of 1-5 cycles/day. To reduce the impact of increasing traffic density, transportation of equipment and materials is carried out from 22.00 – 05.00 WIB or as stated in Andalalin, via predetermined routes.

4. Land Clearing and Relocation of Public Facilities/Utilities

Land clearing activities aim to clear the construction site of buildings, plants and other objects that could interfere with construction implementation. Based on the results of the LARAP study (2022), the affected building area is 47,189.69 m^2 (estimated amount of demolition is ± 5,898.70 m^3) and 105 trees will be affected. The results of the land clearing in the form of building debris and felled trees will be transported using 42 of 6 m^3 dump trucks with a rotation rate of 1-5 cycles/day, and used to pave Rorotan Depot land. To reduce the impact of increasing traffic density, transportation of cleaning materials is carried out from 22.00 – 05.00 WIB or as stated in Andalalin, via a predetermined route.

Public facilities and utilities along the MRT-EWLP1S1 corridor that need to be relocated or secured prior to construction include TransJakarta bus stops, pedestrian bridges, drainage channels, telecommunications networks, clean water pipe networks, gas pipe networks, electricity networks and waste water networks (JMCA, 2022). The relocation of public facilities and utilities along the MRT-EWLP1S1 corridor will be coordinated by the DKI Jakarta Provincial Highways Service, while the relocation costs will be borne by the utility owner agency in accordance with DKI Jakarta Provincial Governor Regulation No. 106 of 2019 concerning Guidelines for Implementing Utility Network Infrastructure for the Development Interests of the DKI Jakarta Government and/or the Central Government.

5. Earthworks and Dewatering

Earthworks and dewatering are carried out based on the work location segmentation as follows:

a. West Elevated and East Elevated Segments
   The volume of excavated soil from the elevated (pier) construction is estimated at 237,432 m^3. The excavated soil will be transported using 56 of 20 m3 dump trucks with a rotation rate of 1-4 rit/day and used as backfill material for the embankment area of Rorotan Depot, if the soil quality complies with the technical design requirements. To reduce the impact of increasing traffic density, transportation of cleaning materials is carried out from 22.00 – 05.00 WIB or as stated in Andalalin, via a predetermined route.
b. Underground Segment
   The volume of excavated soil from underground construction is estimated at 1,630,725.71 m^3 (underground station 937,640.75 m^3 and underground tunnel 693,084.96 m^3). The excavated soil will be transported using 106 of 20m^3 dump trucks with a rotation rate of 3-4 rit/day and used as backfill material for the embankment area of Rorotan Depot, if the soil quality complies with the technical design requirements. To reduce the impact of increasing traffic density, transportation of cleaning materials is carried out from 22.00 – 05.00 WIB or as stated in Andalalin, via a predetermined route. Meanwhile, the dewatering volume in underground construction is estimated at ± 697,268.77m^3. The water produced

from the dewatering process will mainly be used for construction activities, while the rest will be sucked up periodically in collaboration with the PAL Jaya Regional Company.

c. Deposit Segment

Based on BED MRT-EWLP1S1, the amount of backfill material that will be stockpiled and compacted in Rorotan Depot area is ± 1,868,157.71 m^3 with the number of trucks carrying excavated soil active in the depot area are 162 units (106 units from underground construction and 56 units from elevated construction) 1-4 rit/day. Earthworks in the depot area in the form of structuring and compacting embankment material are carried out using heavy equipment and/or other supporting equipment.

6. Underground Construction Work

Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel measuring ± 9 km using a Tunnel Boring Machine (TBM).

7. Ground Surface Construction Work

Construction work on the ground surface is carried out based on the work location segmentation as follows;

a. The western elevated segment includes: construction of 2 elevated stations, construction of an elevated line measuring ± 2,668 km, and construction of 1 Receiving Substation (RSS) unit.
b. The eastern elevated segment includes: construction of 11 elevated stations, construction of an elevated line measuring ± 13,054 km, and construction of 1 Receiving Substation (RSS) unit.
c. The depot segment includes: construction of Rorotan Depot (23 Ha), and construction of the access route to Rorotan Depot (± 5.9 km).

C. Operation Phase

1. Acceptance of Operational Workers

MRT-EWLP1S1 operations are estimated to involve at least 1,120 workers with a minimum of 20% local workers (mainly residents affected by land acquisition and environmental disturbances who meet skill qualification requirements). Considering that MRT-EWLP1S1 operations are long term and refer to Law no. 13 of 2003 concerning Employment as amended in Law no. 11 of 2020 concerning Job Creation and its implementing regulations, the work system, wages and insurance arrangements (BPJS Employment and BPJS Health) for operational workers must be agreed in writing in an Indefinite Time Work Agreement (PKWTT) as permanent workers, as well as in a Time Work Agreement Certain (PKWT) as temporary workers.

2. Passenger Transportation and Station Operations

The main activity of MRT-EWLP1S1 is passenger transport services. MRT-EWLP1S1 will operate for 19 hours/day (05.00 - 24.00 Western Indonesian Time) with peak hours are estimated to be around 4.5 hours (morning 06.30 - 08.30 Western Indonesian Time and afternoon 16.00 - 18.30 Western Indonesian Time). Passenger transportation services at each station are

supported by the operation of supporting facilities in the form of providing clean water, waste water processing, waste management and B3 waste transit areas.

The clean water supply at each station comes from PDAM which is stored inside domestic water tank with a capacity of 250 m^3 and then distributed through a network of pipes using a booster pump. Wastewater processing uses a Sewage Treatment Plan (STP) anaerobic-aerobic biofilter system to then be sucked up and transported to the Integrated IPAL (in collaboration with PD PALJAYA). Specifically for Roxy, Petojo, Cideng, Thamrin and Kebon Sirih stations, it is planned to be connected to the city IPAL channel.

For waste management, each station will be equipped with segregated waste bins which will be placed in strategic locations and can be easily accessed by station users. The waste collected in the rubbish bin is then collected at the Temporary Storage Place (TPS) for transportation to the TPA in collaboration with the DKI Jakarta Government and/or Bekasi City. Meanwhile, B3 waste will be temporarily stored at the B3 waste transit site (capacity ± 5 m^3) and then transported periodically by a third party who has a permit to transport B3 waste from the Ministry of Environment and Forestry to TPS LB3 at Rorotan Depot location.

3. Train Maintenance and Depot Operations

The depot is a place for storing (parking) and maintaining trains. MRT train maintenance consists of light maintenance and heavy maintenance. Light maintenance includes MRT train cleaning (daily), MRT train washing (weekly), pre-departure inspection (weekly) and routine inspection (quarterly). Meanwhile, heavy maintenance takes the form of main inspections, overhauls and wheel scraping. Depot operations are supported by the operation of supporting facilities in the form of providing clean water, waste water processing, waste management and temporary storage of B3 waste.

The clean water supply comes from PDAM which is stored insideThe water tank has a capacity of 363 m^3 and is then distributed through a network of pipes using a booster pump. Domestic wastewater treatment uses a Sewage Treatment Plan (STP) anaerobic-aerobic biofilter system (capacity 28 m^3/day), while wastewater for MRT train washing and workshop activities is processed using IWTP (industrial waste water treatment plant) with a capacity of 93 m^3/day , using a coagulation system followed by sand filtration and activated carbon. About ±35% of the wastewater effluent from the IWTP will be recirculated and the rest together with the effluent from the STP will be sucked up and transported to the Integrated IPAL (in collaboration with PD PALJAYA).

The waste management steps at Rorotan Depot are the same as those applied to waste management at the station, namely by providing segregated waste bins and Temporary Storage Places (TPS). Transporting waste to the landfill in collaboration with the DKI Jakarta Government. Meanwhile, waste containing B3 waste will be stored in the Temporary B3 Waste Storage Site (TPS LB3). Transportation of B3 waste for further handling is carried out periodically by third parties who have a B3 waste transportation permit from the Ministry of Environment and Forestry.

1.5.2. Hypothetical Significant Impacts That Have Been Set Out in the Terms of Reference Form Agreement

Hypothetical significant impacts (DPH) have been determined in the Terms of Reference Form agreement as presented in Table 1.6.

Table 1.6. Assigned Hypothetical Significant Impacts

Activity plan		Hypothetical Significant Impact (DPH)
Pre-Construction Stage		
1)	Land Acquisition	a. Changes in public perceptions and attitudes
Construction Phase		
2)	Acceptance of Construction Workers	a. Open job opportunities b. Increase in family income c. Changes in public perceptions and attitudes
3)	Basecamp Operations	a. Open business opportunities b. Increase in family income c. Changes in public perceptions and attitudes
4)	Mobilization of Construction Equipment and Materials	a. Decreased air quality b. Increased noise c. Increased prevalence of ARI d. Changes in public perceptions and attitudes
5)	Land Clearing and Relocation of Public Facilities/Utilities	a. Decreased air quality b. Increased noise c. Increased runoff water discharge d. Increased prevalence of ARI e. Changes in public perceptions and attitudes
6)	Earthworks and Dewatering	
	a) West Elevated Segment and East Elevated Segment	a. Decreased air quality b. Increased noise c. Increased prevalence of ARI
	b) Underground Segment	a. Decreased air quality b. Increased noise c. Increased prevalence of ARI
	c) Deposit Segment	a. Decreased air quality b. Increased noise c. Increased runoff water discharge d. Increased prevalence of ARI
7)	Underground Construction Work	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
8)	Ground Surface Construction Work	
	a) West Elevated Segment and East Elevated Segment	a. Decreased air quality b. Increased noise c. Increased prevalence of ARI
	b) Deposit Segment	a. Decreased air quality b. Increased noise c. Increased prevalence of ARI
Operational Stage		
9)	Acceptance of Operational Workers	a. Open job opportunities b. Increase in family income c. Changes in public perceptions and attitudes

Activity plan	Hypothetical Significant Impact (DPH)
10) Passenger Transportation and Station Operations	a. Increased noise b. Increased vibration c. Open business opportunities d. Increase in family income e. Changes in public perceptions and attitudes
11) Train Maintenance and Depot Operations	-

1.5.3. Study Area Boundaries and Study Time Limits Based on Scoping Results in the Terms of Reference Form

A. Study Area Boundaries

The study area boundaries are the resultant of project boundaries, ecological boundaries, social boundaries and administrative boundaries as follows.

1. Project Limits

The project boundary is the area planned as the location for construction activities for the MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) along ± 24,527 km and access to Rorotan Depot along ± 5.9 km, with a total area of 997,535.87 m^2.

2. Ecological Limits

The ecological boundary is the area around the MRT-EWLP1S1 construction project site which is estimated to be a medium for spreading impacts (especially air). Determination of the impact distribution limit through air media is carried out by paying attention to the dominant wind direction at the activity location which blows towards the south (66.67%) with a speed of 1.5 – 3.3 m/s, the length and direction of the MRT-EWLP1S1 route, and receptor distance. Based on these factors, the spread of impacts via air is estimated to occur up to a distance of 300 m left - right from the MRT-EWLP1S1 route which is ± 24,527 km long and access to Rorotan Depot is ± 5.9 km long, with a total area of 18,256,200 m^2.

3. Social Boundaries

The social boundary is the socio-economic-cultural and public health area around the MRT-EWLP1S1 development project site which is estimated to be the recipient (receptor) of the impact, namely:

- Recipients (receptors) of direct impact
  The population directly affected by land acquisition (997,535.87 m^2) is 1,659 people (488 families) in Tomang Village, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, Cempaka Putih Barat, Cempaka Putih Timur, Kelapa Gading Barat, Kelapa Gading Timur, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, Cakung Barat, Cakung East, Ujung Menteng, Medan Satria, and Rorotan.
- Recipient (receptor) of indirect impact

The affected residents live in the districts of Grogol Petamburan, Gambir, Tanah Abang, Menteng, Senen, Johar Baru, Kemayoran, Cempaka Putih, Kelapa Gading, Pulo Gadung, Cakung, Cilincing and Medan Satria with a total area of approximately ± 0.26 km^2

- Receiver (receptor) of environmental disturbances
  Communities who live and/or carry out activities around the activity location, especially those affected by the spread of impacts through air media.

4. Administrative Limits

Administrative boundaries are administrative areas that include 3 elements of project boundaries, ecological and social. Therefore, the administrative boundaries for MRT-EWLP1S1 construction activities include:

- 31 sub-districts: Tomang, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang,Kramat,Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru,Sumur Batu,West Cempaka Putih, Cempaka Putih Timur, Kelapa Gading Barat, Kelapa Gading Timur, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, Cakung Barat, Cakung Timur, Ujung Menteng, Medan Satria, and Rorotan.
- 13 sub-districts: Grogol Petamburan, Gambir, Tanah Abang, Menteng, Senen, Johar Baru, Kemayoran, Cempaka Putih, Kelapa Gading, Pulo Gadung, Cakung, Cilincing and Medan Satria
- 5 cities: West Jakarta, Central Jakarta, North Jakarta, East Jakarta and Bekasi City
- 2 provinces: DKI Jakarta and West Java

1.6. Study Deadline

The study deadline for each Hypothetical Significant Impact (DPH) is presented in **Table 1.7.**.

Table 1.7. Study Deadline for Each DPH

DPH	Study Deadline
Pre-Construction Stage	
Changes in public perceptions and attitudes	7 Years during the Pre-construction and Construction stages
Construction Phase	
Decreased air quality	6 Years during the Construction stage
Increased noise	6 Years during the Construction stage
Increased runoff water discharge	6 Years during the Construction stage
Open job opportunities	6 Years during the Construction stage
opening up business opportunities	6 Years during the Construction stage
Increase in family income	6 Years during the Construction stage
Changes in public perceptions and attitudes	6 Years during the Construction stage
Increased prevalence of ARI	6 Years during the Construction stage
Operational Stage	
Increased noise	Operational Stage
Increased vibration	Operational Stage
Open job opportunities	Operational Stage

DPH	Study Deadline
Open business opportunities	Operational Stage
Increase in family income	Operational Stage
Changes in public perceptions and attitudes	Operational Stage

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Chapter 2

Plan Description Business and/or Activities

2.1. Planned Activities that Have the Potential to Cause Environmental Impacts

2.1.1. Pre-Construction Stage

A. Land Acquisition

Land procurement for the construction of the MRT-EWLP1S1 is limited to the MRT planned right of way (ROW) area through an acquisition process with reference to:

- The 1945 Constitution of the Republic of Indonesia
- Law no. 2 of 2012 concerning Land Acquisition for Development in the Public Interest
- Law no. 11 of 2020 concerning Job Creation
- Government Regulation no. 19 of 2021 concerning the Implementation of Land Acquisition for Development in the Public Interest.
- Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency of the Republic of Indonesia No. 19 of 2021 concerning Provisions for Implementing Government Regulation Number 19 of 2021 concerning the Implementation of Land Acquisition for Development in the Public Interest.

Referring to Law No. 2 of 2012 and Government Regulation no. 19 of 2021, land procurement for development in the public interest is carried out through 4 (four) stages, namely:

1) Planning

   The Director General of Railways, Ministry of Transportation, carries out Feasibility Study (including AMDAL and LARAP). Final documents are then to be shared to Pemprov DKI as the Implementing Agency

2) Preparation

After receiving LARAP, the Governor of DKI Jakarta will appoint a Commitment-Making Official, from an agency under Pemprov DKI, who will carry out:

a. Determination of Land Acquisition Planning Documents (DPPT)
b. Submission of the DPPT to the Governor of DKI Jakarta
c. Notification of development plans to the community
d. Preliminary data collection of development plan locations
e. Public consultation on development plans for rights holders and affected communities.
   - If an agreement is reached, a location determination application will be immediately submitted to the Governor.
   - If an agreement has not been reached, a public consultation will be held again.
   - If, after repeated public consultations an agreement has not been reached, it will be reported to the Governor to form a study team for the development location that has not been agreed upon.
   - The study team is tasked with identifying the main issues of community disagreement with the development location and formulating recommendations for solutions.
   - Recommendations produced by the study team may include suggestions for improvements to development plans, environmental impact mitigation measures, social welfare improvement programs, fairer compensation, or even suggestions for evaluating alternative locations.
f. Location determination by the Governor
g. Announcement of development location determination
h. Submission of procurement implementation to the National Land Agency

3) Implementation

After receiving the proposal for implementing land acquisition for development in the public interest, the Committee-Making Official will appoint the Land Acquisition Preparation Committee, who will ca out:

a. Inventory takes the form of measurement, mapping and data collection
b. Announcement of inventory, verification and repair results
c. Determination of inventory results
d. Determination and announcement of an independent appraiser (appraisal)
e. Assessment of compensation and delivery of results by an independent appraiser
f. Deliberation with rights holders and affected communities involving the National Land Agency and related Ministries.
   - If the results of the deliberations reach an agreement, then the object released from the rights holder will become the property of the state.
   - If an agreement has not been reached at the deliberation, then mediation efforts are carried out, as follows:

- The mediation process is carried out by a mediator who is neutral and agreed upon by the parties, trained, experienced in land acquisition mediation, and has no personal interest in the outcome of the mediation.
- The mediator holds meetings with interested parties to identify the main issues and interests of each party in each position.
- The mediator facilitates communication between interested parties in a safe and equal environment in conveying the opinions of each party
- The mediator helps to formulate a solution that is acceptable to each party. Alternative solutions could be in the form of additional compensation, land replacement, or other agreements that meet the interests of each party.
- If the interested parties have reached an agreement, then the details of the agreement resulting from the mediation process are stated in a written agreement.

● If the results of the mediation have not reached an agreement, then negotiation efforts are carried out, as follows:
- Each party determines a representative (negotiator) to plan and carry out the negotiation process.
- The negotiation process is carried out through negotiators from each party
- The party who will carry out land acquisition submits an initial offer, including compensation and other conditions.
- Rights holders and affected communities respond to the initial offer from the party who will carry out land acquisition,
- The interested parties negotiate and negotiate (offers and counter-offers) until they reach an agreement that is acceptable to each party.
- If the interested parties have reached an agreement, then the details of the agreement resulting from the negotiation process are stated in a written agreement.

● If the results of the negotiations do not reach an agreement, an objection process will be carried out to the District Court. In this case, the person in charge of the business and/or activity will assist residents in undergoing the process in court. If the objection is not granted, compensation will be deposited with the District Court.

● If possible, consideration can be given to evaluating alternative planned development locations, so that a solution is obtained that is more acceptable to all parties.

4) Delivery of Results
   a. The Head of the National Land Agency conveyed the results of the land acquisition to the Governor.

b. Pemprov DKI carries out the process of certifying land plots resulting from land acquisition.

Based on the results of the Land Acquisition and Resettlement Plan (LARAP, 2022) study, the land to be acquired for the construction of the MRT-EWLP1S1 is ±997,535.87 m^2 with a total of 743 plots of land (623 plots of land are ownership land and 120 plots of land are public facilities). The number of residents affected by the liberation was 300 families or 1,388 people (Table 2.1). The building area of economic facilities (office houses, shop houses and business houses) affected by the acquisition is 41,389.40 m^2 (87.71% of the total building area, 27.39% of the total land area of economic facilities and 4.15% of the total land area occupied released). Apart from that, the land that will be acquired is land that has economic value, such as shopping yards, offices and parking lots. Meanwhile, public facilities in the form of social facilities include places of worship and schools (Table 2.2. and Table 2.3.). A map of the land to be acquired is presented in APPENDIX G.

The compensation scheme planned in land acquisition for the construction of MRT-EWLP1S1 (LARAP, 2022) is:

1. Land, buildings and/or other personal physical assets that are lost in part or in full will receive compensation equal to the agreed replacement value or in the form of an incentive scheme in accordance with statutory provisions. If the building owner is different from the land owner, then each asset owner is entitled to compensation for losses equal to the agreed replacement value.
2. Land, buildings and/or other physical assets belonging to Government Agencies that are partially or completely lost will receive compensation in accordance with the capital replacement value. Meanwhile, buildings and/or other privately owned physical assets on land belonging to Government Agencies (equipped with a loan-to-use agreement) that are partially or completely lost will receive compensation in accordance with applicable regulatory provisions.
3. Buildings and/or other physical assets belonging to Government Agencies on land belonging to the Provincial Government of DKI Jakarta or West Java that are partially or completely lost will receive compensation in accordance with the value of capital replacement or an equivalent replacement building. Meanwhile, land replacement is carried out through a Land Use Permit mechanism in accordance with applicable regulatory provisions.
4. Buildings and/or other physical assets belonging to the Provincial Government of DKI Jakarta or West Java that are partially or completely lost will receive compensation in accordance with the value of capital replacement or an equivalent replacement building. Meanwhile, land replacement is carried out through a Land Use Permit mechanism in accordance with applicable regulatory provisions.

Table 2.1. Details of Land to be Acquisitioned

Segment	Province	City	Subdistrict	Ward	Area (m^2)	Amount Field	Field Status		Affected Residents	
							Private	Public	K.K	Person
Elevated West	DKI Jakarta	West Jakarta	Grogol Petamburan	Tomang	31,494.62	19	14	5	2	5
				Tanjung Duren Selatan	9,296.29	3	0	3	0	0
				Grogol	21,680.10	5 + 4 a)	0	5 + 4 a)	0	0
Under-ground	DKI Jakarta	West Jakarta	Grogol Petamburan	Grogol	13,267.03	34 + 4 a)	32	2 + 4 a)	55	188
		Central Jakarta	Gambir	Duri Pulo	29,933.52	98	94	4	15	372
				Cideng	21,723.62	31	26	5	6	16
				North Petojo	11,590.09	17	15	2	7	23
				South Petojo	17,414.82	13	10	3	2	5
				Gambir	27,242.26	15	8	7	0	0
			Tanah Abang	Kampung Bali	8,086.77	6	2	4	0	0
			Menteng	Kebon Sirih	28,929.38	22	16	6	0	0
			Senen	Senen	18,754.64	7	2	5	0	0
				Kwitang	14,765.11	19	16	3	5	7
				Kramat	14,340.83	36	33	3	0	0
			Johar Baru	Tanah Tinggi	6,155.54	40	36	4	24	82
				Galur	14,982.50	29	26	3	18	84
			Kemayoran	Harapan Mulia	8,955.58	24	22	2	17	64
				Cempaka Baru	6,061.87	2b)	0	2b)	0	0

Segment	Province	City	Subdistrict	Ward	Area (m^2)	Amount Field	Field Status		Affected Residents	
							Private	Public	K.K	Person
			Cempaka Putih	Cempaka Putih Barat	5,990.08	1 c)	0	1 c)	0	0
Elevated East	DKI Jakarta	Central Jakarta	Kemayoran	Cempaka Baru	16,604.28	20 + 2 b)	20	2b)	18	67
				Sumur Batu	11,913.91	3	0	3	0	0
			Cempaka Putih	Cempaka Putih Barat	3,536.40	1 c)	0	1 c)	0	0
				East Cempaka Putih	21,443.30	3	0	3	0	0
		North Jakarta	Kelapa Gading	West Kelapa Gading	18,758.94	3	0	3	0	0
				East Kelapa Gading	14,501.60	2	0	2	0	0
				Pegangsaan Dua	18,954.94	11	9	2	5	16
		East Jakarta	Pulo Gadung	Kayu Putih	29,332.86	8	6	2	3	11
				Pulo Gadung	15,664.89	4	1	3	0	0
Elevated East	DKI Jakarta	East Jakarta	Cakung	Rawa Terate	33,415.90	51	45	6	30	120
				West Cakung	54,942.90	52	44	8	44	160
				East Cakung	16,119.84	7 + 2 d)	5	2 + 2 d)	3	10
				Ujung Menteng	62,154.85	44 + 2 e)	41	3 + 2 e)	5	18
	West Java	Bekasi	Medan Satria	Medan Satria	24,031.44	34	31	3	32	104
Depot	DKI Jakarta	East Jakarta	Cakung	East Cakung	33,263.04	1 + 2 d)	0	1 + 2 d)	0	0
				Ujung Menteng	46,825.40	16 + 2 e)	16	2 e)	9	36
		North Jakarta	Cilincing	Rorotan	265,406.75	55	53	2	0	0

Segment	Province	City	Subdistrict	Ward	Area (m^2)	Amount Field	Field Status		Affected Residents	
							Private	Public	K.K	Person
TOTAL					**997,535.87**	**743**	**623**	**120**	**300**	**1388**

Source: LARAP, 2022

Information :

a) 4 parcels of public land are in the West Elevated segment and the Underground segment
b) 2 parcels of public land are in the Underground and East Elevated segments
c) 1 parcel of public land is in the Underground and East Elevated segments
d) 2 parcels of public land are in the East Elevated and Depo segments
e) 2 parcels of public land are in the East Elevated and Depo segments

Table 2.2. Existing Land Use Affected

Segment	Province	City	Subdistrict	Ward	Residential home	Home Business/ Office/ Business	Education House	House of worship	Vacant land	Agriculture	RTH	Railway	Channel	Road	Sidewalk	River	Wide Land (m2)
Elevated West	DKI Jakarta	West Jakarta	Grogol Petamburan	Tomang	120.41	12,339.31	1,770.98	0.00	0.00	0.00	0.00	0.00	0.00	11,455.51	5,808.40	0.00	31,494.62
				Tanjung Duren Selatan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7,294.80	1,193.35	808.13	9,296.29
				Grogol	0.00	10,026.57	0.00	0.00	0.00	0.00	2,924.52	0.00	0.00	7,575.26	662.62	491.13	21,680.10
Under-ground	DKI Jakarta	West Jakarta	Grogol Petamburan	Grogol	688.93	2,369.66	0.00	23.18	0.00	0.00	2,956.53	0.00	0.00	2,489.65	1,758.69	2,980.39	13,267.03
		Central Jakarta	Gambir	Duri Pulo	1,545.87	16,719.23	0.00	0.00	0.00	0.00	0.00	291.39	0.00	10,356.69	40.76	979.59	29,933.52
				Cideng	139.93	2,217.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13,040.73	2,988.31	3,337.45	21,723.62
				North Petojo	494.31	2,536.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,314.52	2,244.87	0.00	11,590.09
				South Petojo	0.00	5,108.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,330.63	959.54	16.53	17,414.82
				Gambir	0.00	3,045.86	0.00	0.00	0.00	0.00	0.00	247.73	0.00	20,275.70	3,672.98	0.00	27,242.26
			Tanah Abang	Kampung Bali	0.00	717.91	397.00	0.00	0.00	0.00	0.00	0.00	0.00	5,730.10	982.86	258.89	8,086.77
			Menteng	Kebon Sirih	0.00	3,817.52	0.00	0.00	0.00	0.00	2,846.93	197.08	0.00	17,019.16	5,031.62	17.06	28,929.38
			Senen	Senen	0.00	881.21	0.00	0.00	0.00	0.00	603.44	0.00	0.00	9,655.63	7,614.36	0.00	18,754.64
				Kwitang	0.00	2,607.15	0.00	163.79	0.00	0.00	0.00	0.00	0.00	8,270.87	3,613.46	109.84	14,765.11
				Kramat	0.00	8,274.07	0.00	0.00	298.05	0.00	0.00	0.00	0.00	4,577.89	1,190.81	0.00	14,340.83
			Johar Baru	Tanah Tinggi	0.00	1,766.09	0.00	16.37	0.00	0.00	0.00	152.11	0.00	4,051.74	64.59	104.64	6,155.54
				Galur	173.74	3,528.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8,550.28	2,680.46	49.34	14,982.50
			Kemayoran	Harapan Mulia	0.00	1,396.12	0.00	6.90	0.00	0.00	0.00	0.00	0.00	6,004.53	1,548.03	0.00	8,955.58
				Cempaka Baru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,200.13	861.75	0.00	6,061.88
			Cempaka Putih	Cempaka Putih Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,990.08	0.00	0.00	5,990.08
		Central Jakarta	Kemayoran	Cempaka Baru	0.00	591.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13195.62	2816.91	0.00	16,604.28
				Sumur Batu	0.00	0.00	0.00	0.00	0.00	0.00	1,165.32	0.00	0.00	10,015.15	733.44	0.00	11,913.91
			Cempaka Putih	Cempaka Putih Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,536.40	0.00	0.00	3,536.40
				East Cempaka Putih	0.00	0.00	0.00	0.00	0.00	0.00	579.93	0.00	0.00	16,966.10	3,897.27	0.00	21,443.30
Elevated East	DKI Jakarta			West Kelapa Gading	0.00	0.00	0.00	0.00	0.00	0.00	257.59	0.00	0.00	13,543.31	4,958.03	0.00	18,758.94
		North Jakarta	Kelapa Gading	East Kelapa Gading	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9,995.54	4,506.06	0.00	14,501.60
				Pegangsaan Dua	0.00	2,668.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14,495.28	1,791.41	0.00	18,954.94
		East Jakarta	Pulo Gadung	Kayu Putih	0.00	456.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,981.10	9,894.99	0.00	29,332.86
				Pulo Gadung	0.00	158.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,957.92	3,040.91	507.35	15,664.89
Elevated	DKI Jakarta	East Jakarta	Cakung	Rawa Terate	562.27	13,375.94	0.00	39.24	34.22	0.00	386.68	0.00	0.00	13,693.85	4,574.21	749.49	33,415.90

Segment	Province	City	Subdistrict	Ward	Residential home	Home Business/ Office/ Business	Education House	House of worship	Vacant land	Agriculture	RTH	Railway	Channel	Road	Sidewalk	River	Wide Land (m2)
East				West Cakung	858.85	30,290.89	0.00	0.00	0.00	0.00	919.86	0.00	17.58	22,364.90	0.00	490.81	54,942.90
				East Cakung	0.00	1,143.80	0.00	0.00	11,575.57	0.00	490.51	0.00	0.00	2,153.14	756.83	0.00	16,110.54
				Ujung Menteng	0.00	13,089.81	0.00	0.00	17,173.92	0.00	0.00	0.00	0.00	0.00	31,891.12	0.00	62,154.85
	West Java	Bekasi	Medan Satria	MedanSatria	0.00	7,861.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10,959.89	4,985.70	223.94	24,031.44
Depot	DKI Jakarta	East Jakarta	Cakung	East Cakung	0.00	0.00	0.00	0.00	30,673.99	0.00	0.00	0.00	0.00	1469.69	0.00	1119.35	33,263.04
				Ujung Menteng	0.00	4,102.12	0.00	0.00	35,423.27	0.00	0.00	0.00	0.00	0.00	7,300.01	0.00	46,825.40
		North Jakarta	Cilincing	Rorotan	0.00	0.00	0.00	0.00	24,241.63	238,730.06	0.00	0.00	0.00	0.00	0.00	2,435.06	265,406.75
				TOTAL	**4,584.31**	**151,091.02**	**2,167.98**	**249.47**	**119,420.66**	**238,730.06**	**13,131.32**	**888.31**	**17.58**	**328,521.11**	**124,064.36**	**14,669.68**	**997,535.87**
				Percentage	**0.460%**	**15.146%**	**0.217%**	**0.025%**	**11.972%**	**23.932%**	**1.316%**	**0.089%**	**0.002%**	**32.933%**	**12.437%**	**1.471%**	

Source: LARAP, 2022

Table 2.3. Details of Affected Buildings (m^2)

Segment	Province	City	Subdistrict	Ward	Residential home	Home Office	House Shop	House of worship	Home Education	Business House	Total area Building (m2)
Elevated West	DKI Jakarta	West Jakarta	Grogol Petamburan	Tomang	120.41	640.24	44.34	0.00	492.55	0.00	1,297.53
				Tanjung Duren Selatan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Grogol	0.00	1,607.44	0.00	0.00	0.00	0.00	1,607.44
Under-ground	DKI Jakarta	West Jakarta	Grogol Petamburan	Grogol	614.56	0.00	1,573.11	23.18	0.00	88.07	2,298.91
		Central Jakarta	Gambir	Duri Pulo	1,404.56	271.07	7,099.42	0.00	0.00	79.78	8,854.83
				Cideng	47.66	387.70	85.28	0.00	0.00	0.00	520.63
				North Petojo	494.31	1,391.06	0.00	0.00	0.00	0.00	1,885.38
				South Petojo	0.00	366.62	0.00	0.00	0.00	0.00	366.62
				Gambir	0.00	76.67	0.00	0.00	0.00	0.00	76.67
			Tanah Abang	Kampung Bali	0.00	25.92	0.00	0.00	173.00	0.00	198.92
			Menteng	Kebon Sirih	0.00	265.11	0.00	0.00	0.00	215.69	480.80
			Senen	Senen	0.00	156.41	0.00	0.00	0.00	0.00	156.41
				Kwitang	0.00	14.77	0.00	41.38	0.00	328.66	384.81
				Kramat	0.00	0.00	0.00	0.00	0.00	7,090.19	7,090.19
			Johar Baru	Tanah Tinggi	0.00	124.50	1,002.58	0.00	0.00	559.55	1,686.63
				Galur	0.00	126.76	0.00	0.00	0.00	2,167.34	2,294.10
			Kemayoran	Harapan Mulia	0.00	106.46	0.00	0.00	0.00	473.23	579.69
				Cempaka Baru	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Cempaka Putih	Cempaka Putih Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Central Jakarta	Kemayoran	Cempaka Baru	0.00	0.00	0.00	0.00	0.00	528.62	528.62
				Sumur Batu	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Cempaka Putih	Cempaka Putih Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				East Cempaka Putih	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		North Jakarta	Kelapa Gading	West Kelapa Gading	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				East Kelapa Gading	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Pegangsaan Dua	0.00	0.00	0.00	0.00	0.00	654.62	654.62
		East Jakarta	Pulo Gadung	Kayu Putih	0.00	0.00	0.00	0.00	0.00	12.23	12.23
				Pulo Gadung	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elevated	DKI Jakarta	East Jakarta	Cakung	Rawa Terate	521.99	327.71	76.08	17.01	0.00	991.56	1,934.35

Segment	Province	City	Subdistrict	Ward	Residential home	Home Office	House Shop	House of worship	Home Education	Business House	Total area Building (m2)
East				West Cakung	782.15	315.50	0.00	0.00	0.00	2,928.06	4,025.71
				East Cakung	0.00	0.00	0.00	348.14	0.00	1,334.37	1,682.51
				Ujung Menteng	625.90	742.40	763.25	0.00	0.00	3,045.87	5,177.42
	West Java	Bekasi	Medan Satria	MedanSatria	0.00	956.64	1,643.52	0.00	0.00	0.00	2,600.16
Depot	DKI Jakarta	East Jakarta	Cakung	East Cakung	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				Ujung Menteng	93.53	141.82	202.29	0.00	0.00	356.89	794.53
		North Jakarta	Cilincing	Rorotan	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				TOTAL	**4,705.05**	**8,044.80**	**19,580.07**	**429.70**	**665.54**	**13,764.52**	**47,189.71**
				Percentage	**9.97%**	**17.05%**	**41.49%**	**0.91%**	**1.41%**	**29.17%**	

Source: LARAP, 2022

5. Buildings and/or other physical assets belonging to BUMN (State-Owned Enterprises) or BUMD (Regional-Owned Enterprises) that are lost in whole or in part will receive compensation as follows:
   a. If it is on land owned by the State, Government Agency or Provincial Government, then compensation for losses to buildings and/or other physical assets is in accordance with the capital replacement value. Meanwhile, land replacement is carried out through a Land Use Permit mechanism in accordance with applicable regulatory provisions.
   b. If the land belongs to BUMN/BUMD, then compensation for losses of land, buildings and/or other physical assets is in accordance with the capital replacement value or land management cooperation.

At the time of preparing this Amdal, no land had been acquired for the construction of the MRT-EWLP1S1. Land acquisition activities that have been carried out are limited to the Land Acquistion and Resettlement Plan (LARAP) study as an initial step in the land acquisition planning stage.

5) Follow-up Plan Based on Community Input

Based on the results of community involvement from public consultations carried out on 3-4 February 2022, 15 February 2023 and 6 - 10 October 2023, in general, several community inputs were obtained to be followed up in the implementation of the MRT East-West Phase 1 Stage development activities. 1 is as follows.

Table 2.4. Results of Community Input and Follow-up Plans

No.	Community Input	Follow up plan
1.	Public consultations need to be held again before construction and land acquisition at the sub-district level	• Limited public consultation/socialization will be held in affected areas prior to construction/pre-construction phase • Together with the Land Acquisition Team, Pemprov DKI will socialize the parcel maps that have been approved by the Governor to affected residents • Socialization of construction plans by contractors accompanied by the initiator to residents around the construction area
2.	Guarantees are needed so that the land acquisition process runs well and can be accepted by affected residents	• The Pemprov DKI will accompany and supervise the land acquisition process for affected residents which will be carried out by the Land Acquisition Team • Pemprov DKI will provide assistance to the land owners to go to court to be released if the negotiation process is not achieved

No.	Community Input	Follow up plan
3.	It is hoped that MRT-EWLP1S1 construction activities will not disturb community comfort, especially those related to dust and noise, flooding/puddles, damage to drainage channels and water quality	• Mitigate the impact of the spread of dust, noise, flooding as well as damage to drainage channels and decreased water quality as described in Sub-chapter 2.2.3. • Carry out routine monitoring of construction work sites and surrounding areas • Coordinate with relevant government agencies as well as sub-district and sub-district authorities regarding construction plans that will potentially impact the condition of drainage channels • Preparing a complaint handling service forum/post consisting of the initiator, contractor, supervisor and involving local sub-district officials. • Conduct dialogue with affected residents based on complaints • Prepare compensation mitigation as necessary, of course after going through a dialogue and investigation process
4.	It is hoped that the MRT-EWLP1S1 construction activities will not disturb the comfort of the community regarding traffic jams	• Mitigate the impact of traffic congestion as described in Sub-chapter 2.2.3. • Provide information to residents and the public regarding planned activities that will be on the road as well as traffic diversion plans • Collaborate with DLLAJ (Dinas Lalu Lintas dan Angkutan Jalan "Traffic And Road Transport Department") and the police in establishing traffic management plans for construction activity areas that may affect traffic conditions
5.	MRT-EWLP1S1 planning must pay attention to road conditions and the surrounding environment, so as not to interfere with residents' access	The initiator will conduct a coordination dialogue with residents and involve relevant government agencies regarding the existence of public roads as access for residents so that they do not feel disturbed and/or cut off.
6.	The activity organizers are willing to accommodate and follow up on any complaints submitted by the public regarding the impact of the MRT-EWLP1S1 development and operational activities.	• Preparing a complaint handling service forum/post consisting of the initiator, contractor, supervisor and involving local sub-district officials. • Prepare SOPs (Standar Operation Procedure) for handling complaints • Inform the flow of complaints to residents • Outline ofComplain harvesting mechanisms as explained in the RKL/RPL chapter
7.	Implementers of MRT-EWLP1S1 construction activities must repair/relocate public facilities and utilities	The initiator will carry out further coordination by involving relevant government agencies and the community regarding planned construction activities that will affect utilities and public facilities

2.1.2. Construction Phase

A. Acceptance of Construction Workers

The construction of the MRT-EWLP1S1 is estimated to involve at least 6,210 workers (JMCA, 2022). To meet these needs, the contractor accepts workers in stages according to needs, stages of project development and qualifications of prospective workers. It is planned that local workers (especially residents affected by land acquisition and environmental disturbances who meet the skill qualification requirements) will be involved as workers at a minimum of 20% (1,242 people) of the construction labor requirements. Estimates of the number of labor requirements based on skills or expertise during the construction phase are presented in Table 2.5.

Table 2.5. Estimated Construction Labor Needs

Workforce Composition	Education Minimal	Labor Needs (people)				Labor
		Depot	*Elevated*	*Underground*	Total	
Director	S1				1	LD
Project Management Office Division (Project Management Office Division)						
Head of Division (Division Head)	S1	1	1	1	3	LD
Head of Dept. Quality Assurance & Quality Control	S1	1	1	1	3	LD
Head of Dept. Project Control & Monitoring	S1	1	1	1	3	LD
Head of Dept. Quantity Surveyor & Contractor	S1	1	1	1	3	LD
Department Staff Quality Assurance & Control	high school	5	5	5	15	DS/LD
Project Control & Monitoring Staff	high school	5	5	5	15	DS/LD
Department Staff Quantity Surveyor & Contractor	high school	5	5	5	15	DS/LD
Engineering Division (Engineering Division)						
Head of Division (Division Head)	S1	1	1	1	3	LD
Head of Dept. Civil Infrastructure	S1	1	1	1	3	LD
Head of Dept. Railway Engineering	S1	1	1	1	3	LD
Head of Dept. Transport Planning	S1	1	1	1	3	LD
Civil Infrastructure Planner	S1	4	4	4	12	LD
Railway Planner	S1	4	4	4	12	LD
Transport Planner	S1	4	4	4	12	LD
Department Staff Civil Infrastructure	high school	6	6	6	18	DS/LD
Department Staff Railway Engineering	high school	6	6	6	18	DS/LD
Department Staff Transport Planning	high school	6	6	6	18	DS/LD
Railway Systems Division (Railway System Division)						
Head of Division (Division Head)	S1	1	1	1	3	LD
Head of Dept. Signaling, Telecommunication & Information	S1	1	1	1	3	LD
Head of Dept. Power Systems	S1	1	1	1	3	LD
Head of Dept. Trackwork	S1	1	1	1	3	LD
Head of Dept. Rolling Stock	S1	1	1	1	3	LD
Signaling, Telecommunication & Information Planner	S1	4	4	4	12	LD
Power System Planner	S1	4	4	4	12	LD
Trackwork Planner	S1	4	4	4	12	LD

Workforce Composition	Education Minimal	Labor Needs (people)				Labor
		Depot	*Elevated*	*Underground*	Total	
Rolling Stock Planner	S1	4	4	4	12	LD
Department Staff Signaling, Telecommunication & Information	high school	6	6	6	18	DS/LD
Department Staff Power Systems	high school	6	6	6	18	DS/LD
Department Staff Trackwork	high school	6	6	6	18	DS/LD
Department Staff Rolling Stock	high school	6	6	6	18	DS/LD
Construction Division (Construction Division)						
Head of Division (Division Head)	S1	1	1	1	3	LD
Deputy Division Head (Deputy Division Head)	S1	1	1	1	3	LD
Civil Infrastructure Engineer	S1	4	4	4	12	LD
Railway Engineer	S1	4	4	4	12	LD
Transport Engineer	S1	4	4	4	12	LD
Signaling, Telecommunication & Information Engineer	S1	4	4	4	12	LD
Power Systems Engineer	S1	4	4	4	12	LD
Trackwork Engineer	S1	4	4	4	12	LD
Rolling Stock Engineer	S1	4	4	4	12	LD
Construction Division Administrative Staff	high school	6	6	6	18	DS/LD
Security	high school	10	10	10	30	DS/LD
Logistics and Warehouse	junior high school	6	6	6	18	DS/LD
Heavy equipment operator	junior high school	50	50	50	150	DS/LD
Field workers	junior high school	590	2700	2320	5610	DS/LD
Amount		**790**	**2900**	**2520**	**6210**	

Source: JMCA, 2022
Information: DS = Local Area (local workforce)
LD = Outside Region

Referring to Presidential Decree Number 4 of 1980 concerning Mandatory Reporting of Job Vacancies, the process of recruiting construction workers begins with submitting a written report every time there is a job vacancy to the local Manpower Service. This report contains the type of work, type of workforce, age, gender and other required conditions. Information about job vacancies is then announced in the mass media and/or socialized by job implementers in collaboration with regional governments (district, sub-district, district/city) and local community leaders.

Considering that construction work is temporary for a certain period of time and refers to Law no. 13 of 2003 concerning Employment as amended in Law no. 11 of 2020 concerning Job Creation and its implementing regulations, the work system, wages and insurance arrangements (BPJS Employment and BPJS Health) for construction workers must be agreed in writing in a Specific Time Work Agreement (PKWT).

B. Basecamp Operations

The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts.

To support the implementation of MRT-EWLP1S1 construction activities, it is planned to build basecamps (in the form of non-permanent buildings) in 3 separate locations according to segmentation and work areas (depot, underground construction and elevated construction). The facilities for each basecamp consist of a project office (director's kit), worker barracks, material warehouse, heavy equipment and vehicle parking area, and security guard post. Especially for the Depot basecamp, there will also be facilities for a stockpile area for materials and construction materials, as well as a batching plant. At each basecamp location, a project name board is installed to identify the work, construction K3 signs and a safety fence to prevent unauthorized parties from entering the project area and at the same time function as a barrier to the community's daily activities.

During the construction phase, it is estimated that around 30% of the workforce (1,863 people) will live in the base camp (worker barracks), while the rest of the workforce will only be active during working hours. Electrical power for basecamp activities comes from the PT electricity network. PLN. Meanwhile, clean water for domestic workers' needs will use PDAM's clean water network and/or supply from third parties using water trucks.

To manage Wastewater generated from construction workers' activities, portable toilets equipped with septic tanks will be provided (Figure 2.1) at each basecamp location. Wastewater suction is carried out periodically in collaboration with the Regional Company PAL Jaya. Apart from Wastewater treatment, each basecamp location will also be equipped with domestic waste management facilities and temporary storage of hazardous and toxic waste (LB3). The waste management facilities provided are in the form of segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes (Figure 2.2.). Transporting waste to the TPA (Final Processing Place) is carried out periodically in collaboration with the DKI Jakarta Government.

Figure 2.1. Portable MCK (Toilet) With Septic Tank (illustration)
Source: Documentation MRTJ

Figure 2.2. Segregated Waste Bins and TPS Containers (illustration)
Source: Documentation MRTJ

Meanwhile, the temporary LB3 storage facilities planned for each basecamp location are non-permanent buildings (Figure 2.3.) with a design in accordance with the provisions of Minister of Environment and Forestry Regulation No. 6 of 2021 concerning Procedures and Requirements for B3 Waste Management. Referring to the implementation of similar activities (Jakarta MRT North – South Line) the type of B3 Waste produced during basecamp operations is as presented in Table 2.6. Transport of LB3 for further handling is carried out periodically in collaboration with third parties who have an LB3 transportation permit from the Ministry of Environment and Forestry.

Figure 2.3. Temporary LB3 TPS (illustration)
Source: Documentation MRTJ

Table 2.6. B3 Waste Generated at Basecamp Operations

Waste Code	Waste Description	Waste Sources	Characteristics
A102d	Used Batteries	AC/LCD Projector/TV remote battery replacement etc.	Toxic, Corrosive
	Used Battery	Replacing vehicle and/or heavy equipment batteries in the workshop room	Toxic, Corrosive
B107d	Electronic waste includes cathode ray tubes (CRT), fluorescent lamps, printed circuit boards (PCBs), and wires	Replacement of damaged/dead electronic equipment and TL lamps	Poisonous

Waste Code	Waste Description	Waste Sources	Characteristics
B105d	Used lubricating oil includes used lubricating oil for hydraulics, engines, gears, lubrication, insulation, heat transmission, git chambers, separators and/or mixtures thereof.	Change vehicle and/or heavy equipment oil in the workshop room	Poisonous
B110d	Used rags and similar	Maintenance of vehicles and/or heavy equipment in the workshop room	Poisonous
B104d	Used B3 packaging	Use of B3 materials such as paint, thinner, varnish, glues, resins, epoxies etc.	Poisonous
A337-3	Expired Pharmaceutical Products	Replacement of medicine stock in the health room and PPPK box	Poisonous

Source: JMCA, 2022

1) *Basecamp* DEPOT

The DEPO Basecamp (BC-DEPO) is planned to be located in the Rorotan Depot area (Figure 2.4.) and is intended as a construction support facility for the Rorotan Depot development. This basecamp also functions as a stockpile area for materials and construction materials before they are distributed to the Underground Construction Basecamp (BC-UG), Elevated Construction Basecamp (BC-ELV) and/or to construction sites. Apart from that, BC-DEPO also functions as a ready mix production site to meet concrete needs at each construction site.

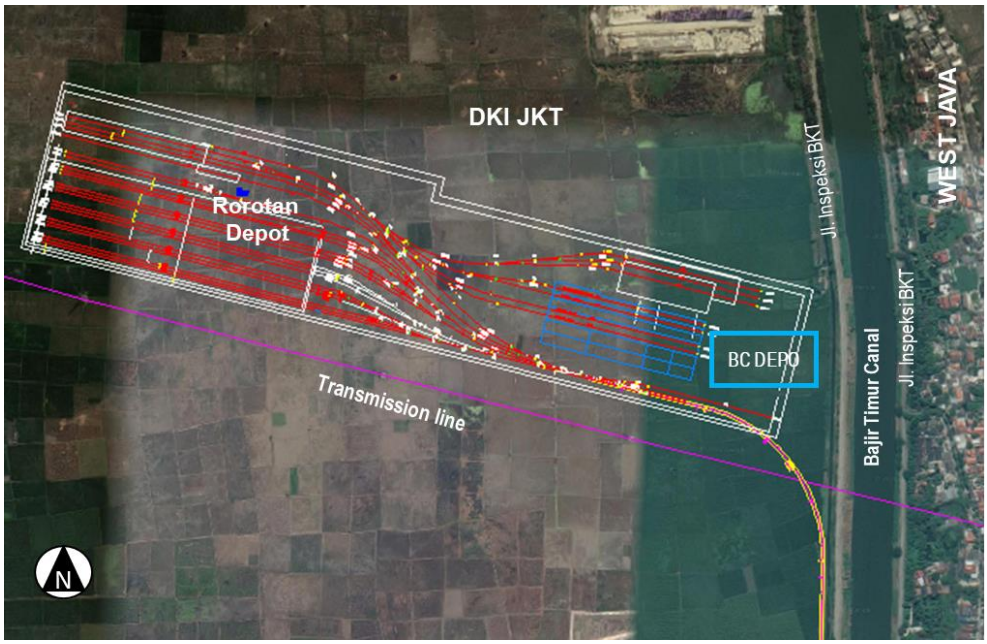


Figure 2.4. DEPO Basecamp Location Plan (Tentative)

The construction of the Depot segment in the construction of the MRT-EWLP1S1 is estimated to involve 790 construction workers with 30% (237 people) of the workforce living in the base camp (workers' barracks), while the other workers are only active during working hours. Estimates of the need for clean water, the amount of Wastewater and the amount of waste generated in DEPO basecamp activities are presented in Table 2.7. and Table 2.8.

Table 2.7. Estimated need for clean water and the amount of Wastewater in DEPO Basecamp activities

Type of Need	Amount (person)	Volume Units	Clean water	Wastewater [2]		MCK [3] Portable
			Total	*Gray water*	*Black water*	

		Types of Plumbing Tools	(L) [1]	Plumbing Unit (L/day)	(m^3/day)	Plumbing Unit (L/day)	Total (m^3/day)	Plumbing Unit (L/day)	Total (m^3/day)	
Workers living in basecamp	237	Toilet	14	3,318	20.38	-	-	2,654	3.60	10 toilets, 6 bathrooms, 2 units of 15 m^3 septic tanks
		Peturasan	5	1,185		-		948		
		Shower	42	9,954		7,963	12.70	-	-	
		Sink	10	2,370		1,896		-		
		Washing faucet	15	3,555		2,844		-		
Workers who do not live in basecamp	553	Toilet	14	7,742	16.04	-	-	6,193	8.41	
		Peturasan	5	2,765		-		2,212		
		Sink	10	5,530		4,424	4.42	-		
Amount	**790**			**36,419**	**36.42**	**17,127**	**17.13**	**12,008**	**12.01**	

Information: 1) SNI-03-7065-2005 Procedures for Planning Plumbing Systems (Use of clean water in plumbing equipment)
2) Estimated volume of liquid waste is 80% of clean water use (Raharjo, 2014)
3) SNI 03-2399-2002 Procedures for Planning General MCK Buildings

Table 2.8. Estimated Amount of Arise Waste in DEPO Basecamp activities

Source of Generation	Number of people)	Arise Waste		Number of Arise Waste		TPS [3]
		L/person/day	kg/person/ day	m^3/day	tons/day	
Workers living in basecamp [1]	237	3.25	0.80	0.77	0.19	1 unit TPS 2 m^3
Workers who don't stay at basecamp [2]	553	1.63	0.40	0.90	0.22	
Amount	**790**			**1.67**	**0.41**	

Information: 1) Arise Waste refers to SNI 3242-2008 Waste management in residential areas
2) Estimated Arise Waste of 50% of the Arise Waste of workers living in basecamp
3) TPS in the form of factory container boxes (sizes 2 m^3, 4 m^3, 6 m3, 8 m^3 and 10 m^3)

2) Basecamp Underground Construction

The underground construction basecamp (BC-UG) is planned to be located near the planned location of Roxy Station (Figure 2.5) and is intended as a supporting facility for construction activities in the West underground and elevated segments. The construction of the underground segment in the construction of the MRT-EWLP1S1 is estimated to involve 2,520 construction workers with 30% (756 people) of the workforce living in the basecamp (workers' barracks), while the rest of the workforce is only active during working hours. Estimates of the need for clean water, the amount of Wastewater and the amount of waste generated in DEPO basecamp activities are presented in Table 2.9. and Table 2.10.

Figure 2.5. Underground Construction Basecamp Location Plan (BC-UG) (Tentative)

Table 2.9. Estimated need for clean water and the amount of Wastewater in BC-UG Basecamp activities

Type of Need	Amount (person)	Types of Plumbing Tools	Volume Units (L) [1]	Clean water		Wastewater [2]				MCK [3] Portable
				Plumbing Unit (L/day)	Total (m^3/day)	*Gray water* Plumbing Unit (L/day)	*Gray water* Total (m^3/day)	*Black water* Plumbing Unit (L/day)	*Black water* Total (m^3/day)	
Workers living in basecamp	756	Toilet	14	10,584	65.02	-	-	8,467.2	11.49	40 toilets, 24 bathrooms, 4 units of 25 m3 septic tanks
		Peturasan	5	3,780		-		3,024.0		
		Shower	42	31,752		25,401.6	40.52	-	-	
		Sink	10	7,560		6,048.0		-		
		Washing faucet	15	11,340		9,072.0		-		
Workers who do not live in basecamp	1,764	Toilet	14	24,696	51.16	-	-	19,756.8	26.81	
		Peturasan	5	8,820		-		7,056.0		
		Sink	10	17,640		14,112.0	14,11	-		
Amount	**2,520**			**116.172**	**116.17**	**54,634**	**54.63**	**38,304**	**38.30**	

Information: 1) SNI-03-7065-2005 Procedures for Planning Plumbing Systems (Use of clean water in plumbing equipment)
2) Estimated volume of liquid waste is 80% of clean water use (Raharjo, 2014)
3) SNI 03-2399-2002 Procedures for Planning General MCK Buildings

Table 2.10. Estimated amount of Arise Waste in BC-UG Basecamp activities.

Source of Generation	Number of people)	Arise Waste		Number of Arise Waste		TPS [3]
		L/person/day	kg/person/ day	m^3/day	tons/day	
Workers living in basecamp [1]	756	3.25	0.80	2.46	0.60	1 unit TPS 6 m3
Workers who don't stay at basecamp [2]	1,764	1.63	0.40	2.87	0.71	
Amount	**2,520**			**5.32**	**1.31**	

Information: 1) Arise Waste refers to SNI 3242-2008 Waste management in residential areas
2) Estimated Arise Waste of 50% of the Arise Waste of workers living in basecamp
3) TPS in the form of factory container boxes (sizes 2 m^3, 4 m^3, 6 m^3, 8 m^3 and 10 m^3)

3) *Basecamp* Elevated Construction

Basecamp Elevated construction (BC-ELV) is planned to be located near the Pulo Gadung Station location (Figure 2.6.) and is intended as a supporting facility for construction activities in the East elevated segment. The construction of the elevated segment in the construction of the MRT-EWLP1S1 is estimated to involve 2,900 construction workers with 30% (870 people) of the workforce living in the base camp (workers' barracks), while the rest of the workforce will only be active during working hours. Estimates of the need for clean water, the amount of Wastewater and the amount of waste generated in DEPO basecamp activities are presented in Table 2.11. and Table 2.12.

Figure 2.6. Elevated Construction Basecamp Location Plan(BC-ELV) (Tentative)

Table 2.11. Estimated clean water needs and the amount of wastewater in BC-ELV Basecamp activities.

Type of Need	Amount (person)	Types of Plumbing Tools	Volume Units (L) [1]	Clean water		Wastewater [2]				MCK [3] Portable
				Plumbing Unit (L/day)	Total (m^3/day)	*Gray water*		*Black water*		
						Plumbing Unit (L/day)	Total (m^3/day)	Plumbing Unit (L/day)	Total (m^3/day)	
Workers living in basecamp	870	Toilet	14	12,180	74.82	-	-	9,744.0	13.22	40 toilets, 24 bathrooms, 4 units of 25 m3 septic tanks
		Peturasan	5	4,350		-		3,480.0		
		Shower	42	36,540		29,232.0	46.63	-	-	
		Sink	10	8,700		6,960.0		-		
		Washing faucet	15	13,050		10,440.0		-		
Workers who do not live in basecamp	2,030	Toilet	14	28,420	58.87	-	-	22,736.0	30.86	
		Peturasan	5	10,150		-		8,120.0		
		Sink	10	20,300		16,240.0	16.24	-		
Amount	**2,900**			**133,690**	**133.69**	**62,872**	**62.87**	**44,080**	**44.08**	

Information: 1) SNI-03-7065-2005 Procedures for Planning Plumbing Systems (Use of clean water in plumbing equipment)
2) Estimated volume of liquid waste is 80% of clean water use (Raharjo, 2014)
3) SNI 03-2399-2002 Procedures for Planning General MCK Buildings

Table 2.12. Estimated Amount of Waste Generated in Basecamp BC-ELV activities

Source of Generation	Number of people)	Arise Waste		Number of Arise Waste		TPS [3]
		L/person/day	kg/person/ day	m^3/day	tons/day	
Workers living in basecamp [1]	870	3.25	0.80	2.83	0.70	1 unit TPS 6 m^3
Workers who don't stay at basecamp [2]	2,030	1.63	0.40	3.30	0.81	
Amount	**2,900**			**6.13**	**1.51**	

Information: 1) Arise Waste refers to SNI 3242-2008 Waste management in residential areas
2) Estimated Arise Waste of 50% of the Arise Waste of workers living in basecamp
3) TPS in the form of factory container boxes (sizes 2 m^3, 4 m^3, 6 m^3, 8 m^3 and 10 m^3)

C. Mobilization of Construction Equipment and Materials

The construction of the MRT-EWLP1S1 is estimated to use at least 774 heavy equipment and/or other supporting equipment (JMCA, 2022). To meet these needs, equipment mobilization is carried out by the contractor in stages according to needs and stages of project development. Mobilization of this equipment will use a *tronton* truck.

Table 2.13. Equipment Plans at the Construction Phase

No	Type of Heavy Equipment	Requirements (units)			Total (units)
		Depot	Elevated Construction	Underground Construction	
1	*Wheel loaders*	7	-	9	16
2	*Backhoes*	12	29	18	59
3	*Bulldozer*	20	-	-	20
4	*Dump trucks*	20	56	99	105
5	*Truck cranes*	-	25	15	40
6	*Unik truck*	5	15	9	29
7	*Vibratory hammers*	-	15	9	24
8	*Air compressors*	-	50	30	80
9	*Crawler cranes*	-	23	-	23
10	*Bore pile machine*	5	29	-	34
11	*Pile augering machine*	-	50	-	50
12	*Clamshells*	-	-	10	10
13	*Diaphragm wall machine*	-	-	12	12
14	*Generator*	10	16	12	38
15	*Car*	5	-	-	5
16	*Tunnel boring machine*	-	-	5	5
17	*Concrete mixer truck*	10	-	-	10
18	*Concrete pump truck*	3	12	15	30
19	*Agilator truck*	7	35	27	69
20	*Tire rollers*	10	12	9	31
21	*Asphalt finisher*	3	6	5	14
	AMOUNT	**117**	**373**	**284**	**774**

Source: JMCA, 2022

Table 2.14. Specifications for Vehicles Transporting Construction Equipment and Materials

Transportation type	Specification		
	Main Dimensions	**Cargo Body Dimensions**	**Capacity**
 *Tronton Truck*	Wide : 2,500 mm Long : 11,950 mm Tall : 3,080 mm FOH : 1,200 mm SPIRIT : 3,450 mm	Wide : 2,500 mm Long : 9,500 mm Tall : 1,000 mm Volume : 24 m^3	BK : 10,610 kg G : 180 kg L : 8,842 kg Axis : 1 – 2.2 JBB : 26,500 kg JBI : 19,632 kg Road Class : Class II
 *Mixer Truck*	Wide : 2,500 mm Long : 7,880 mm Tall : 3,700 mm FOH : 1,250 mm SPIRIT : 1,950 mm	Wide : - mm Long :-mm Tall :-mm Volume : 7 m^3	BK : 8,810 kg G : 180 kg L : 9,715 kg Axis : 1 – 2.2 JBB : 26,000 kg JBI : 18,705 kg Road Class : Class II
 *Tronton Dump Truck*	Wide : 2,500 mm Long : 11,950 mm Tall : 3,080 mm FOH : 1,200 mm SPIRIT : 3,450 mm	Wide : 2,500 mm Long : 9,500 mm Tall : 1,000 mm Volume : 24 m^3	BK : 10,610 kg G : 180 kg L : 8,842 kg Axis : 1 – 2.2 JBB : 26,500 kg JBI : 19,632 kg Road Class : Class II
 *Dump Trucks*	Wide : 2,050 mm Long : 6,100 mm Tall : 2,450 mm FOH : 1,100 mm SPIRIT : 1,650 mm	Wide : 2,050 mm Long : 4,400 mm Tall : 700 mm Volume : 6 m^3	BK : 3,300 kg G : 180 kg L : 4,020 kg Axis : 1 – 2 JBB : 7,500 kg JBI : 7,500 kg Road Class : Class III

Construction materials such as sand, stone, cement, iron and wood are imported from the nearest source and stockpiled in the BC-DEPO stockpile area before being distributed to the Underground Construction Basecamp (BC-UG), Elevated Construction Basecamp (BC-ELV) and/or to the construction site. Distribution of construction materials uses dump trucks covered with tarpaulin. Concreting needs will be met by a batching plant unit which is planned to be placed at the BC-DEPO location. Supply ready mix from batching plant to construction site using mixer truck. Meanwhile, construction materials in the form of precast concrete (girders, pierheads, precast rings, sleepers, rail fasterners, turnouts and buffer stops), 150 KV cables, fiber optic cables, HDPE pipes, cooling units and ventilation units will be imported directly from the factory to MRT-EWLP1S1 construction activity location using *tronton* truck.

Based on the Basic Engineering Design (BED) MRT-EWLP1S1, the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as stockpile) to each construction activity location is ± 5,940,741.52 m3 using 243 dump trucks with a rotation number of 1- 5 trip/day. To reduce the impact of increasing traffic density, transportation of equipment and materials is carried out outside busy traffic times, namely 22.00 – 05.00 WIB via predetermined routes as stipulated in Andalalin (Figure 2.7. and Table 2.15.).

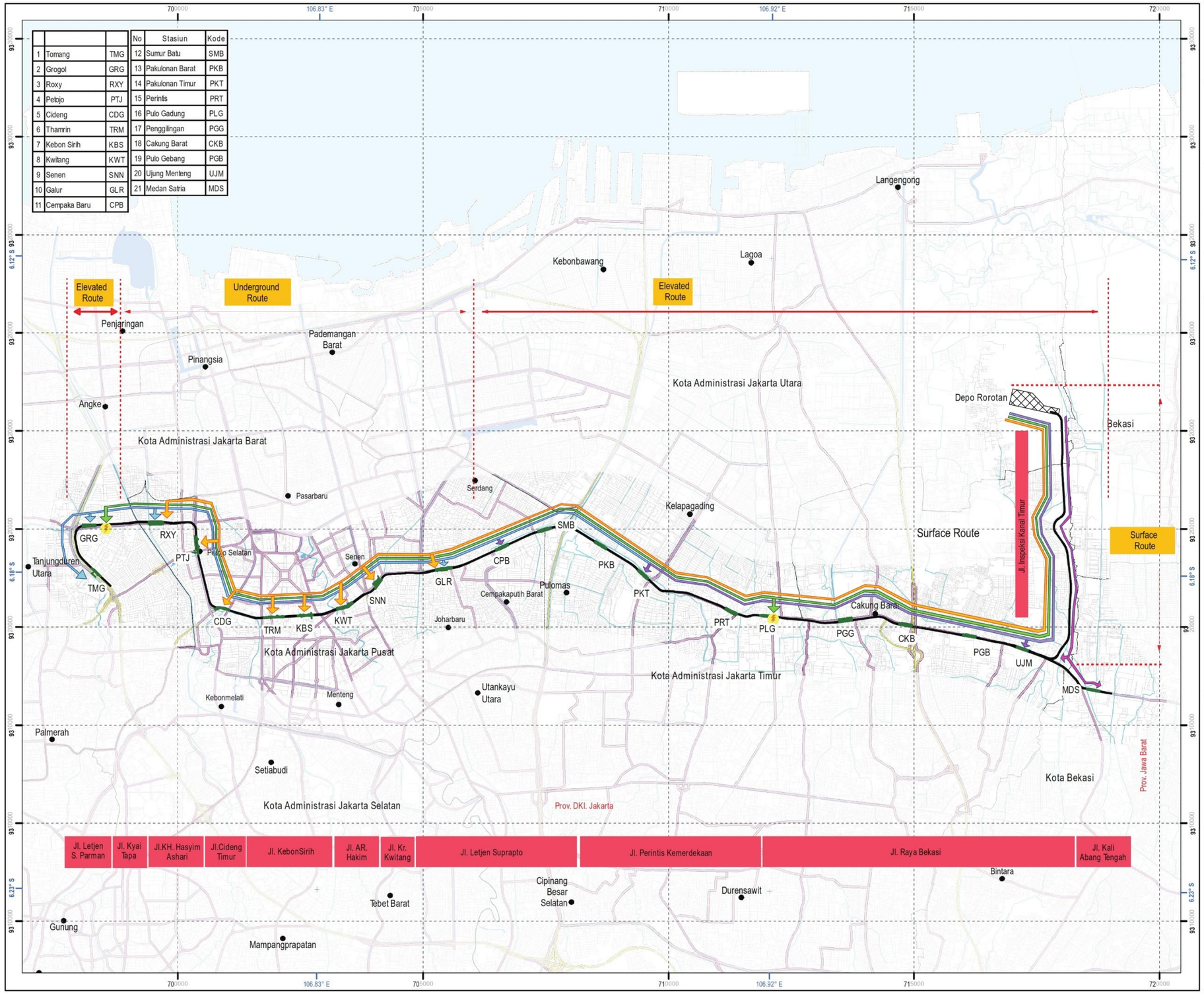


Figure 2.7. Route Map for Transporting Construction Equipment and Materials

Table 2.15. Route Plan for Transporting Construction Equipment and Materials

Segmen	Lokasi	Estimasi Volume Material (m^3)	Jarak dari Depo (km)	Trip		Jumlah Dump Truck Tronton	Jl. Kali Abang Tengah	Jl. Raya Bekasi	Jl. Inspeksi Kanal Timur	Jl. Raya Bekasi	Jl. Perintis Kemerdekaan	Jl. Letjend. Suprapto	Jl. Kramat Bunder	Jl. Kramat Kwitang	Jl. A.R. Hakim	Jl. Kebon Sirih	Jl. Jatibaru Raya	Jl. Cideng Timur	Jl. KH. Hasyim Asy'ari	Jl. Kyai Tapa	Jl. Letjend. S. Parman	Jl. Daan Mogot
				Waktu Tempuh (jam)	Jumlah (ritasi/hari)																
Elevated Barat	St. Tomang - St. Grogol	53.240	29,161	1,84	3	8															
	St. Grogol - St. Roxy	19.225	27,853	1,77	3	4															
	RSS Barat	13.895	27,853	1,77	3	4															
Underground	St. Roxy	665.212	26,493	1,70	4	20															
	St. Petojo	567.102	25,313	1,64	4	17															
	St. Cideng	628.262	23,782	1,57	4	19															
	St. Thamrin	1.001.977	22,765	1,52	5	22															
	St. Kebon Sirih	486.489	22,059	1,48	4	16															
	St. Kwitang	426.734	21,224	1,44	4	14															
	St. Senen	725.534	20,385	1,40	5	19															
	St. Galur	654.943	18,953	1,33	4	20															
Elevated Timur	St. Galur - St. Cempaka Baru	19.718	18,953	1,33	3	4															
	St. Cempaka Baru - St. Pakulonan Timur	108.451	17,678	1,26	3	12															
	St. Pakulonan Timur - St. Ujung Menteng	262.255	14,441	1,10	3	28															
	RSS Timur	13.895	11,696	0,96	3	4															
	St. Ujung Menteng - St. Medan Satria	101.550	7,176	0,74	3	12															
Depo	Feeder Depo Rorotan	192.254	5,9	0,67	3	20															

Source: JMCA, 2022

D. Land Clearing and Relocation of Public Facilities/Utilities

Land clearing activities aim to clear the construction site of buildings, plants and other objects that could interfere with construction implementation. Cleaning of buildings will be carried out by dismantling, while cleaning of plants will be carried out by moving/relocating and/or cutting down and replacing after obtaining permission to cut protective trees from the competent authority. To minimize the spread of dust, water the land clearing area regularly.

Based on the results of the LARAP study (2022), the affected building area is 47,189.71 m^2 (Table 2.4.), with an estimated amount of demolition of ±5,849.69m^3 and planting that will be affected is 105 trees. The results of the land clearing in the form of building debris and felled trees will be transported and used to pave the land for the Rorotan depot. To reduce the impact of increasing traffic density, transportation of building debris and felled trees is carried out outside busy traffic times, namely 22.00 – 05.00 WIB via predetermined routes as stipulated in Andalalin. (Figure 2.8. and Table 2.17.).

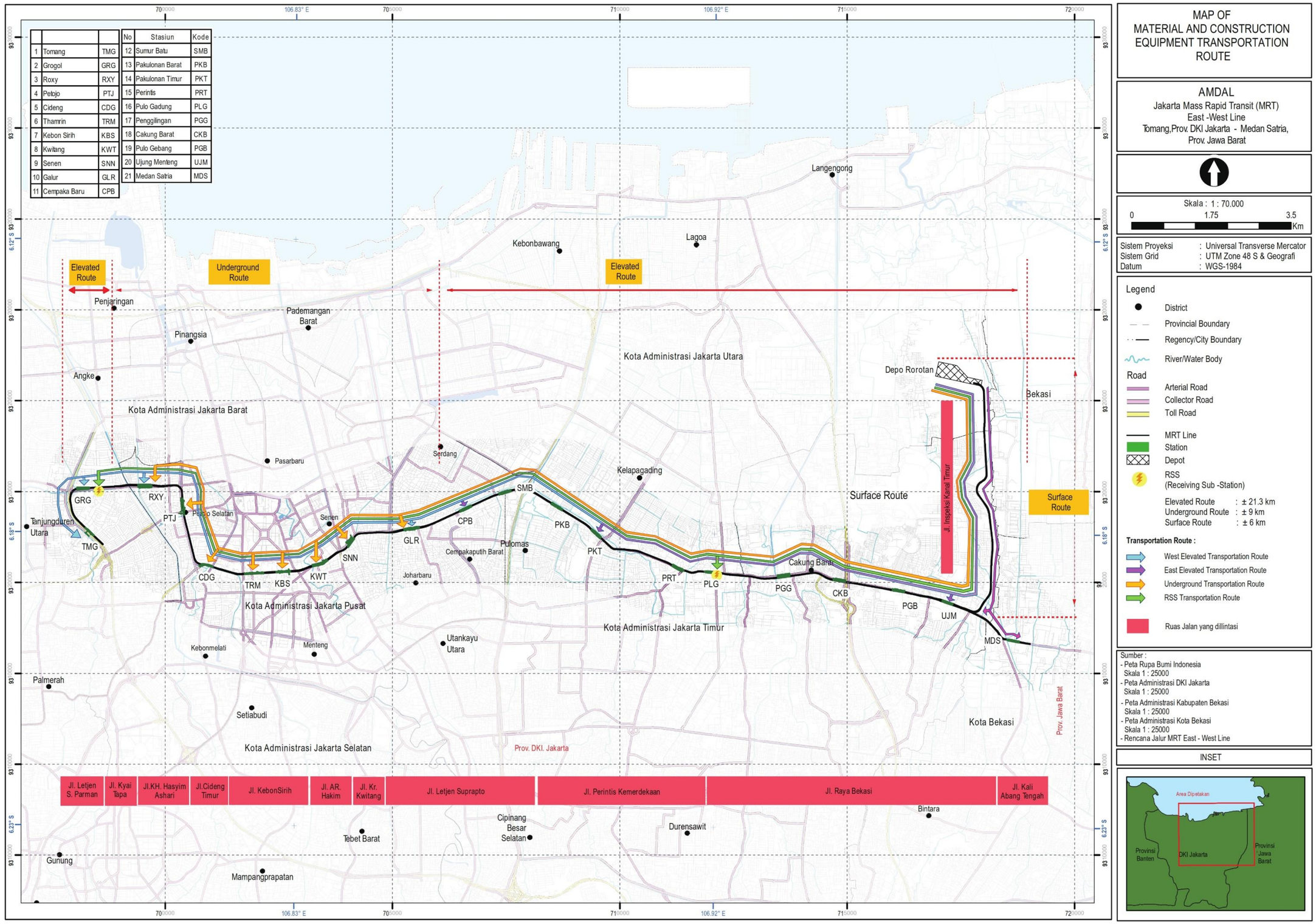


Figure 2.8. Map of Transport Routes for Land Clearing Results

Table 2.16. Details of Affected Plants/Trees

Kotamadya	Kecamatan	Kelurahan	Jenis Pohon								Total
			Mangga	Palem	Gamal	Cendana	Trembesi	Dadap	Nangka	Tanjung	
Jakarta Barat	Grogol Petamburan	Tomang	12	10	0	0	0	0	0	0	22
		Tanjung Duren Selatan	0	0	0	0	0	0	0	0	0
		Grogol	1	0	0	0	0	0	0	0	1
Jakarta Pusat	Gambir	Duri Pulo	2	0	0	0	16	0	0	0	18
		Cideng	0	4	4	0	0	0	0	0	8
		Petojo Utara	0	0	0	0	0	0	0	0	0
		Petojo Selatan	0	0	0	0	0	0	0	0	0
		Gambir	0	0	0	0	0	0	0	0	0
	Tanah Abang	Kampung Bali	0	0	0	2	0	0	0	0	2
	Menteng	Kebon Sirih	0	0	0	0	0	0	0	0	0
	Senen	Senen	0	0	0	0	0	0	0	0	0
		Kwitang	0	0	0	0	0	0	0	0	0
		Kramat	0	0	0	0	0	0	0	0	0
	Johar Baru	Tanah Tinggi	0	0	0	0	0	1	0	0	1
		Galur	1	0	0	0	5	1	1	0	8
	Kemayoran	Harapan Mulia	0	0	0	0	0	0	0	0	0
		Cempaka Baru	0	0	0	0	0	0	0	0	0
		Sumur Batu	0	0	0	0	0	0	0	0	0
	Cempaka Putih	Cempaka Putih Barat	0	0	0	0	0	0	0	0	0
		Cempaka Putih Timur	0	0	0	0	0	0	0	0	0
Jakarta Utara	Kelapa Gading	Kelapa Gading Barat	0	0	0	0	0	0	0	0	0
		Kelapa Gading Timur	0	0	0	0	0	0	0	0	0
		Pegangsaan Dua	0	0	0	0	0	0	0	0	0
	Cilincing	Rorotan	0	0	0	0	0	0	0	0	0
Jakarta Timur	Pulo Gadung	Kayu Putih	0	0	0	0	0	0	0	0	0
		Pulo Gadung	0	0	0	0	0	0	0	4	4
	Cakung	Rawa Terate	0	9	0	0	8	0	0	0	17
		Cakung Barat	0	0	0	0	8	0	0	6	14
		Cakung Timur	0	0	0	0	0	0	0	0	0
		Ujung Menteng	0	0	0	0	0	0	0	0	0
Bekasi	Medan Satria	Medan Satria	0	0	0	0	6	0	4	0	10
TOTAL			16	23	4	2	43	2	5	10	105

Source: LARAP, 2022

Table 2.17. Transport Route Plan for Land Clearing Results

Segment	Sub Distirct	Area of Affected Building (m^2)	Potential Ruins of Demolishion (m^3)	Distance to Depo (km)	Trip		Amount of Dump truck	Road Traversed
					Hauling time (Jam)	Amount (ritation/day)		Jl. Letjend. S. Parman; Jl. Kyai Tapa; Jl. KH. Hasyim Asy'ari; Jl. Cideng Timur; Jl. Jatibaru Raya; Jl. Kebon Sirih; Jl. A.R. Hakim; Jl. Kramat Kwitang; Jl. Kramat Bunder; Jl. Letjend. Suprapto; Jl. Perintis Kemerdekaan; Jl. Raya Bekasi; Jl. Inspeksi Kanal Timur; Jl. Raya Bekasi; Jl. Kali Abang Tengah
Elevated Barat	Tomang	1.297,53	160,59	29,16	1,84	4	1	
	Tanjung Duren Selatan	0,00	0,00	-	-	-	-	
	Grogol	1.607,44	200,93	27,85	1,77	5	3	
Underground	Grogol	2.298,91	287,36					
	Duri Pulo	8.854,83	1106,85	26,49	1,70	5	7	
	Petojo Utara	1.885,38	241,08	25,31	1,64	5	2	
	Cideng	520,63	65,08					
	Petojo Selatan	366,62	45,84	23,78		4	1	
	Kampung Bali	198,92	24,87					
	Kebon Sirih	480,8	60,10	22,09	1,57	3	1	
	Gambir	76,67	9,58	22,06	1,48	1	1	
	Kwitang	384,81	48,10	21,22	1,44	3	1	
	Senen	156,41	19,55	20,39	1,40	5	6	
	Kramat	7.090,19	886,27					
	Tanah Tinggi	1.686,62	210,83	18,95	1,40	5	4	
	Galur	2.294,11	286,73					
	Harapan Mulla	579,69	72,46					
Elevated Timur	Cempaka Baru	528,62	66,08	17,68	1,26	4	1	
	Sumur Batu	0,00	0,00	-	-	-	-	
	Cempaka Putih Barat	0,00	0,00	-	-	-	-	
	Cempaka Putih Timur	0,00	0,00	-	-	-	-	
	Kelapa Gading Barat	0,00	0,00	-	-	-	-	
	Kelapa Gading Timur	0,00	0,00	-	-	-	-	
	Pulo Gadung	0,00	0,00	-	-	-	-	
	Kayu Putih	12,23	1,56	15,49	1,15	1	1	
	Pegangsaan Dua	654,62	81,83	11,70	0,96	4	3	
	Rawa Terate	1.934,35	240,20					
	Cakung Barat	4.025,71	503,19	10,07	0,88	5	3	
	Cakung Timur	1.682,51	208,07	7,49	0,96	5	1	
	MedanSatria	2.600,16	315,59	7,18	0,74	5	2	
	Ujung Menteng	5.177,42	555,24	6,38	0,70	5	5	
Depo	Ujung Menteng	794,53	151,71					
	Cakung Timur	0,00	0,00	-	-	-	-	
	Rorotan	0,00	0,00	-	-	-	-	
	JUMLAH	**47.189,71**	**5.849,69**					

Source: JMCA, 2022

Information:

- dump truck capacity 6 m^3
- Maximum number of transportation is 5 trips/DT/day
- duration of transportation work 5 days/subdistrict

Considering that the activity location is located in a built-up area, there are many public facilities and utilities, both above and below the ground surface, that need to be relocated or secured first before construction begins. Based on the Road Diversion Plan report (JMCA, 2022), there are several public facilities and utilities that will be relocated along the MRT-EWLP1S1 corridor such as TransJakarta bus stops, pedestrian bridges, drainage channels, telecommunications networks, clean water pipe networks, gas pipe networks, electricity networks and wastewater networks (Table 2.18.). The person responsible for the activity will coordinate with related agencies such as the DKI Jakarta Provincial Government, West Java Provincial Government, Perusahaan Gas Negara Tbk., State Electricity Company and telecommunications providers to plan the technical implementation of the relocation of public facilities and utilities.

Table 2.18. List of Affected Public Facilities and Utilities

No	Types of Public Facilities and Utilities	Location	Quantity	Plan	Relevant agencies
1	Stop TransJakarta	Jl. Lieutenant General S. Parman	2 units	Integration	PT TransportasI Jakarta - Transjakarta
		Jl. Kyai Tapa	1 unit	Integration	
		Jl. Kebon Sirih	2 units	Integration	
		Jl. Kramat Kwitang	1 unit	Relocation	
		Jl. Letjen Suprapto	3 units	Integration	
		Jl. Letjen Suprapto	2 units	Relocation	
		Jl. Perintis Kemerdekaan	3 units	Integration	
		Jl. Perintis Kemerdekaan	1 unit	Relocation	
		Jl. Raya Bekasi	6 units	Integration	
2	Pedestrian Bridge	Jl. Let. Gen. S. Parman	343 m		DKI Jakarta Provincial Highways Department
		Jl. Kyai Tapa	145 m		
		Jl. KH Ashari	34 m		
		Jl. Kebon Sirih	54 m		
		Jl. Letjen. Suprapto	416 m		
		Jl. Raya Pantura	255 m		
		Jl. Raya Bekasi	183m		
3	Channel Drainage	*elevated track* Jl. Letjen. S. Parman – Jl. Kyai Tapa – St Grogol			DKI Jakarta Provincial Water Resources Service
		Jl. KH Hasyim Ashari (St. Roxy)			
		Jl. East Cideng (St. Petojo)			
		Jl. Jatibaru Raya (St. Cideng)			
		Jl. Kebon Sirih (St. Thamrin and St. Kebon Sirih)			
		Jl. Kramat Kwitang (St. Kwitang)			
		Jl. Kembang Sepatu and Jl. Melati (St. Senen)			
		Jl. Letjen. Suprapto (St. Galur)			
		Jl. Raya Bekasi (St. Perintis)			
		elevated track Jl. Raya Bekasi (St. Pulo Gadung to St. Ujung Menteng)			
		elevated track Jl. Raya Bekasi (St. Ujung Menteng to BKT)			

No	Types of Public Facilities and Utilities	Location	Quantity	Plan	Relevant agencies
		elevated track Jl. Raya Bekasi (BKT to Jakarta-Bekasi Border Monument)			
		Jl. Raya Bekasi – Jl. Kali Abang Tengah intersection			
		Jl. Kali Abang Tengah (St. Medan Satria)			
4	Telecommunication network (FO Cable)	Jl. East Cideng	163 m	Relocation	PT Link Net Tbk.
		Jl. Kebon Sirih	122 m	Relocation	
		Jl. Raya Bekasi	27 m	Relocation	
		Jl. Inspeksi Kanal Timur	56 m	Relocation	
		Jl. Raya Bekasi	1,971 m	Relocation	PT. Dayamitra Telecommunication Tbk [MTEL]
		Jl. Letjen. S. Parman	163 m	Relocation	PT Indonet Tbk
		Jl. Letjen. S. Parman	124 m	Relocation	PT Indosat Tbk
		Jl. KH Ashari	10m	Relocation	
		Jl. Kebon Sirih	415 m	Relocation	
		KKO Usman Harun	165 m	Relocation	
		Jl. Letjen. Suprapto	582 m	Relocation	
		Jl. Raya Pantura	454 m	Relocation	
		Jl. Raya Bekasi	494 m	Relocation	
		Jl. Let. Gen. S. Parman	886 m	Relocation	PT Telkom Indonesia (Persero) Tbk
		Jl. KH Ashari	16m	Relocation	
		Jl. Kebon Sirih	415 m	Relocation	
		Jl. Letjen. Suprapto	215 m	Relocation	
		Jl. Raya Pantura	31 m	Relocation	
		Jl. Raya Bekasi	3,865 m	Relocation	
5	Clean water pipe network	Jl. Let. Gen. S. Parman	1,127m	Relocation	PT PAM Lyonnaise Jaya (PALYJA)
		Jl. KH Ashari	233 m	Relocation	
		Jl. Kebon Sirih	398 m	Suspension	
		KKO Usman Harun	133 m	Suspension	PT Aetra Air Jakarta
		Jl. Letjen. Suprapto	631 m	Relocation	
		Jl. Raya Pantura	294 m	Relocation	
		Jl. Raya Bekasi	2,641 m	Relocation	
		Jl. Inspeksi Kanal Timur	1,267 m		
6	Gas pipeline network	Jl. KH Ashari	17 m	Suspension	PT Perusahaan Gas Negara Tbk
		Jl. East Cideng	212 m	Suspension	
		Jl. Kebon Sirih	571 m	Suspension	
		Kwitang	21 m	Suspension	
		Jl. Perintis Kemerdekaan	11m	Suspension	
		Jl. Raya Bekasi	2,062 m	Relocation	
7	Electric network				
	a. SUTT Tower	KKO Usman Harun	1 unit	Relocation	State Electricity Company PT (Persero)
		Jl. Letjen. Suprapto	1 unit	Relocation	
	b. SUTT cable	Jl. Raya Bekasi	1 unit	Uplift cable	State Electricity Company PT (Persero)
		Jl. Inspeksi Kanal Timur	1 unit	Uplift cable	
	c. Power house	Jl. Kyai Tapa	2 units	Relocation	State Electricity Company PT (Persero)
		Jl. KH Ashari	20 units	Relocation	

No	Types of Public Facilities and Utilities	Location	Quantity	Plan	Relevant agencies
		Jl. East Cideng	38 units	Relocation	
		Jl. Kebon Sirih	98 units	Relocation	
		Jl. KKO Usman Harun	26 units	Relocation	
		Jl. Letjen. Suprapto	76 units	Relocation	
		Jl. Raya Pantura	52 units	Relocation	
		Jl. Raya Bekasi	32 units	Relocation	
8	Wastewater network	Jl. Raya Bekasi	1,245 m	Relocation	Paljaya Municipal Corporation
		Jl. Let. Gen. S. Parman	15m		Jakarta Sewerage Development Project (JSDP), Ministry of PUPR
		Jl. KH Ashari	100 m		
		Jl. East Cideng	76 m		
		Jl. Kebon Sirih	182 m		

Source: JMCA, 2022

Referring to the Letter of the Head of City Infrastructure and Utilities - DKI Jakarta Bina Marga Service No. 1597/TM.10-2 dated 17 July 2023 regarding Minutes of the Coordination Meeting for Utility Networks Affected by the Construction of MRT East – West Phase 1 Stage 1 (APPENDIX H), the relocation of public facilities and utilities along the MRT-EWLP1S1 corridor will be coordinated by the Highways Service DKI Jakarta Province, while relocation costs are borne by the utility owner agency in accordance with DKI Jakarta Province Governor Regulation No. 106 of 2019 concerning Guidelines for Implementing Utility Network Infrastructure for the Development Interests of the DKI Jakarta Government and/or the Central Government.

E. Earthworks and Dewatering

Earthworks is the process of preparing land according to predetermined specifications before construction work is carried out. In general, earthworks include excavation work, embankment work and compaction work. Meanwhile, dewatering is work carried out to dry excavated land and to overcome uplift forces during the construction period. In the construction of MRT-EWLP1S1, earthworks and dewatering are grouped based on work segmentation as follows:

1) Underground Segment

a. Underground Station

Earthworks for underground station construction begin with digging a diaphragm wall trench using a mechanical and hydraulic clamshell. Diaphragm walls function as temporary retaining walls during construction work and also function as permanent retaining walls for underground station structures. After the diaphragm walls are built on all four sides of the underground station box, the next earthwork is excavation using a top-down method in stages on each layer using an excavator. Before being transported to the Rorotan Depot location, the excavated soil is temporarily stored in a stockpile site with a capacity of ± 590 m^3. The final earthwork process for underground station construction is to backfill the roof slab with soil and compact it with a grader and vibratory roller. An illustration of earthworks for underground station construction is presented in Figure 2.9.

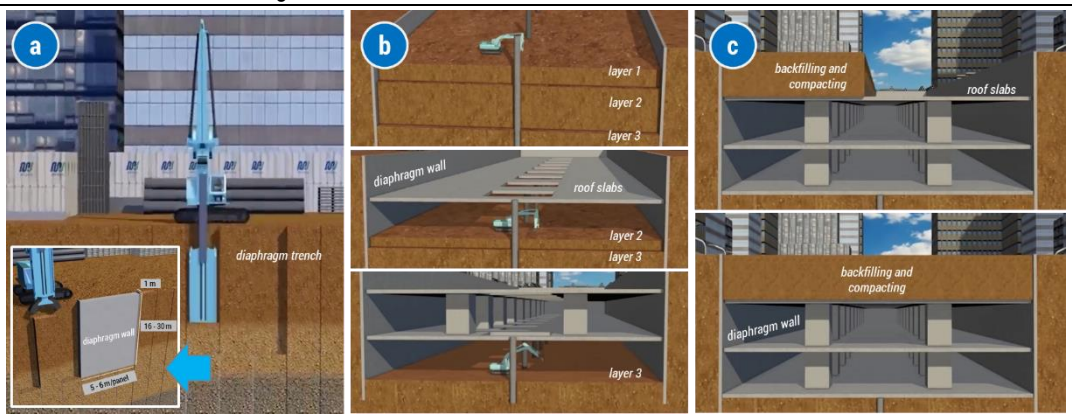


Figure 2.9. Illustration of Earthworks for Underground Station Construction
a) diaphragm wall trench excavation, b) per-layer soil excavation, c) backfilling and compacting
Source: https://www.youtube.com/watch?v=-ojEXp8COwk

Based on the Basic Engineering Design MRT-EWLP1S1, the volume of excavated soil for underground station construction is ± 937,640.75 m^3. The excavated soil will be transported from the cut and cover location of the underground station along the project route to the Rorotan Depot area and used for embankment of the Rorotan Depot land. Thus, the road section in the project alignment that will be passed is Jl. KH Hasyim Ashari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. KKO Usman Harun, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Letjen. Suprapto, Jl. Perintis Kemerdekaan, Jl. Raya Bekasi and Jl. Inspeksi Kanal Timur (Table 2.19.). Transportation of excavated soil is carried out from 22.00 – 05.00 WIB or as stipulated in Andalalin

Table 2.19. Volume and Routes of Transport of Excavated Soil from Underground Stations

Segmen	Lokasi	Volume Tanah Galian (m^3)	Jarak menuju Depo (km)	Trip		Jumlah Dump Truck Tronton	Ruas Jalan yang Dilintasi
				Waktu Tempuh (Jam)	Jumlah (ritasi/hari)		Jl. KH. Hasyim Asy'ari; Jl. Cideng Timur; Jl. Jatibaru Raya; Jl. Kebon Sirih; Jl. A.R. Hakim; Jl. Kramat Kwitang; Jl. Kramat Bunder; Jl. Letjend. Suprapto; Jl. Perintis Kemerdekaan; Jl. Raya Bekasi; Jl. Inspeksi Kanal Timur
Stasiun Underground	St. Roxy	103.102,82	26,493	1,702	3	4	→
	St. Petojo	85.351,22	25,313	1,643	3	3	→
	St. Cideng	110.364,10	23,782	1,566	3	4	→
	St. Thamrin	257.268,10	22,765	1,516	3	9	→
	St. Kebon Sirih	100.456,88	22,059	1,480	3	3	→
	St. Kwitang	76.930,08	21,224	1,439	3	2	→
	St. Senen	116.047,73	20,385	1,397	4	4	→
	St. Galur	88.119,82	18,953	1,325	4	3	→
	JUMLAH	**937.640,75**					

Source : JMCA, 2022
Description: tronton dump truck capacity 20 m3; maximum number of transportation 5 trips/DT/day; duration of transportation work 15 months/station

Although installing a diaphragm wall as a retaining wall during construction work can reduce the risk of groundwater seepage causing waterlogging in the excavation area and disrupting work, waterlogging still has the potential to occur due to rain, floodwater and/or groundwater seepage (especially during layered floors). the bottom of the underground station plan has not been covered with concrete) which enter and gather in the excavation area. Therefore, during the earthworks for the construction of this underground station, dewatering work will

also be carried out. Based on the Basic Engineering Design MRT-EWLP1S1, the dewatering volume is ± 697,268.77 m3 (Table 2.20.) The water produced from the dewatering process will mainly be used for construction activities, while the rest will be sucked out periodically in collaboration with the PAL Jaya Regional Company.

Table 2.20. Dewatering Volume in Underground Station Construction

Sta	Roxy	Petojo	Cideng	Thamrin	Kb. Sirih	Kwitang	Senen	Galur
VD (m^3)	90,073.82	76,536.98	99,418.9	105,534.9	87,062.63	62,414.97	104,226.23	72,000.34
Total (m3)	**697,268.77**							

Source: JMCA, 2022
Note: Dewatering volume (VD) is determined based on the area and depth of station construction

b. Underground Tunnel

Earthworks for underground tunnel construction begin with the installation of soldier piles (in the form of H-beam steel) at the boundaries of the cut and cover area of the specified transition route (Figure 2.10.).

Figure 2.10. Cut Box Area Location Plan
a) cut box area - west, b) cut box area - east

*Soldier pile*functions as a retaining wall (retaining wall) to secure the excavation work for the transition route structure. After the retaining walls are built on all four sides of the cut and cover area, the next earthwork is gradual excavation layer by layer using an excavator (Figure 2.11.). The cut and cover area functions as a place for assembling the Tunnel Boring Machine (TBM), workshop, stockpile of materials and construction materials, as well as a temporary storage place for excavated earth materials.

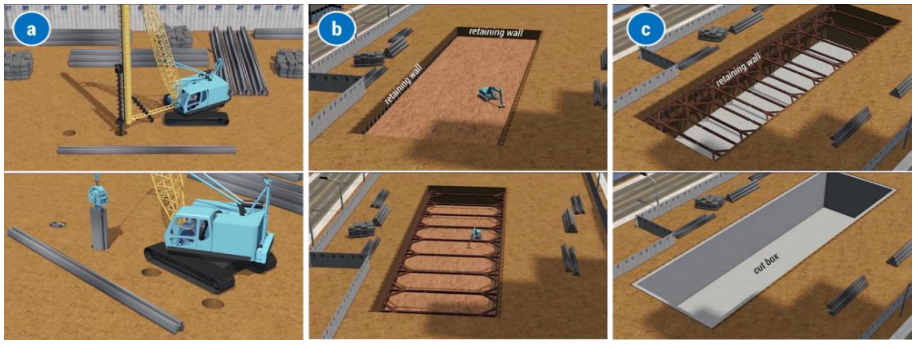


Figure 2.11. Illustration of Earthworks for Cut Box Area Construction

a) installation of soldier piles, b) excavation of soil per layer, c) cut box area
Source: https://www.youtube.com/watch?v=-ojEXp8COwk

The earthworks then continued with underground tunnel excavation (tunnel excavation route plans on the geotechnical soil profile are presented in Figure 2.12 to Figure 2.15). Based on the Basic Engineering Design MRT-EWLP1S1, underground tunnel excavation is planned at a depth of -15 to -30 m, while the depth of groundwater is at a depth of -3 to 9.2 m (Figure 2.16.). Thus, digging underground tunnels does not have the potential to cut off groundwater flow.

Underground tunnel excavation is carried out using an Earth Pressure Balance (EPB) type TBM. The use of TBM-EPB allows effective control of soil pressure and prevents failure of the surrounding soil structure. Apart from that, TBM-EPB also emphasizes precision and accuracy in controlling groundwater flow and pressure around the tunnel. Effective control of earth pressure and appropriate segment design are important factors in maintaining the stability and accuracy of tunnel dimensions (Priyono et al, 2023).

The TBM consists of several separate parts and will be assembled in the launching shaft area. The main component of the TBM for earth excavation is the cutterhead. In general, the types of cutterheads used on soft soil are spoke type and plate type (Figure 2.17.). Once assembled, the TBM machine will be placed in front of the eye shield tunnel (the barrier between the launching shaft area and the soil to be excavated), the TBM machine will slowly start digging. The tunnel seal will be destroyed by the cutterhead. The TBM will then exit the launching shaft and enter the ground. To simplify the excavation process, chemical injection is carried out in front of the cutterhead and in the mixing chamber. This chemical injection aims to produce excavated soil that is easily liquefied by the screw conveyor. The Cutterhead rotates and grinds the ground, and so on while the TBM moves forward. The soil that enters through the cutterhead cylinder is channeled to the discharge pipe (Ø 14 inch) using a screw conveyor.

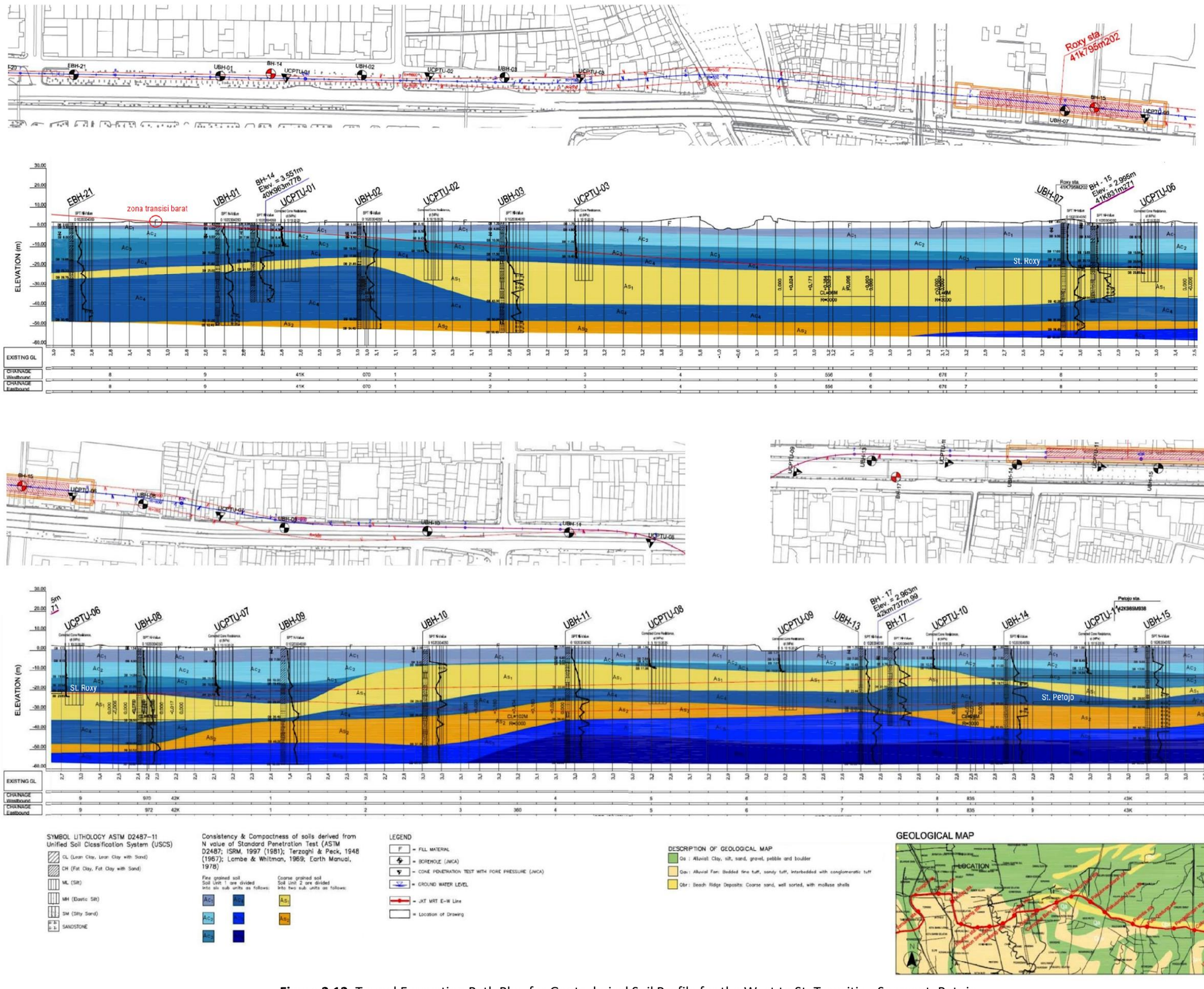


Figure 2.12. Tunnel Excavation Path Plan for Geotechnical Soil Profile for the West to St. Transition Segment. Petojo

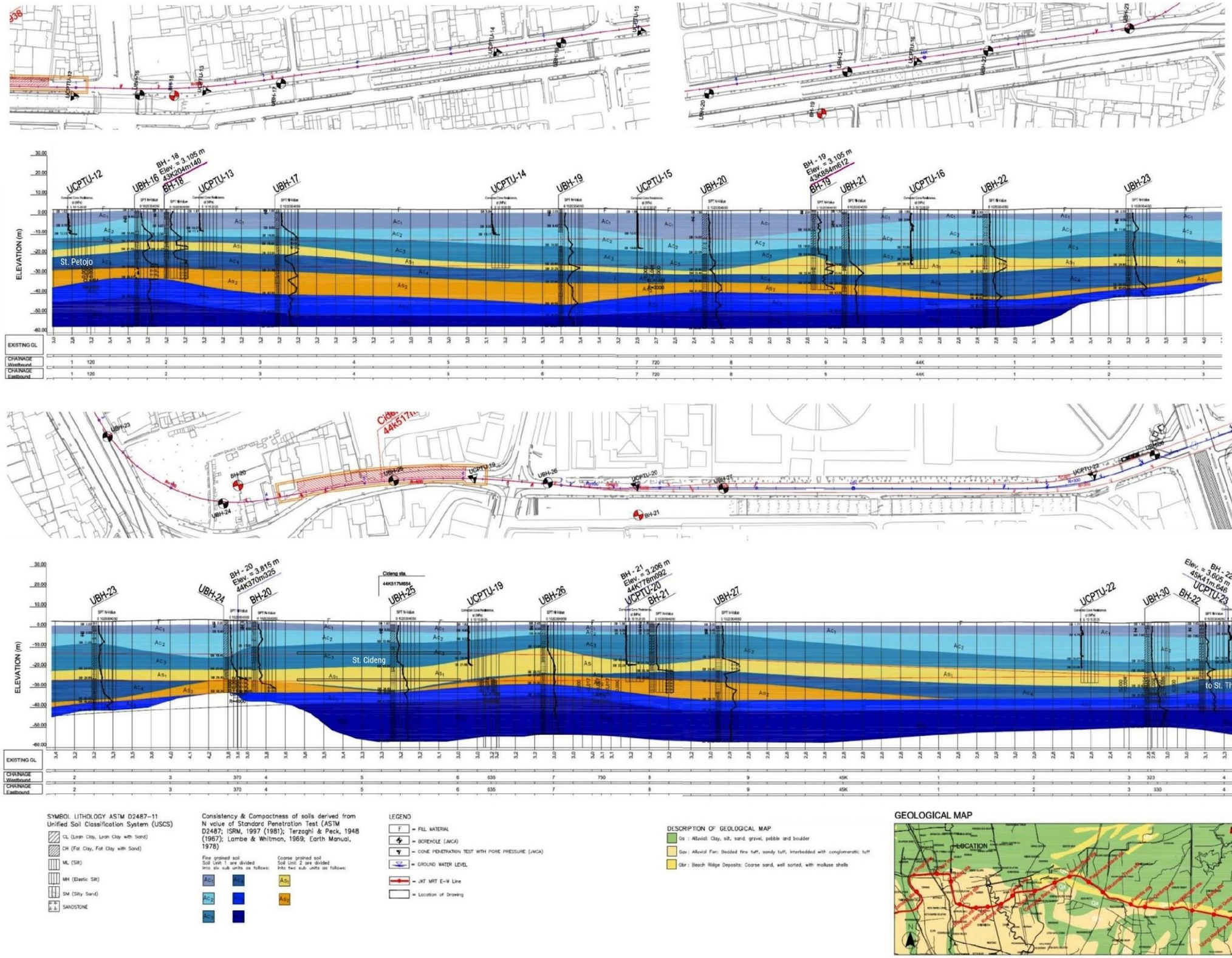


Figure 2.13. Tunnel Excavation Path Plan for Geotechnical Soil Profile of St. Petojo to St. Thamrin

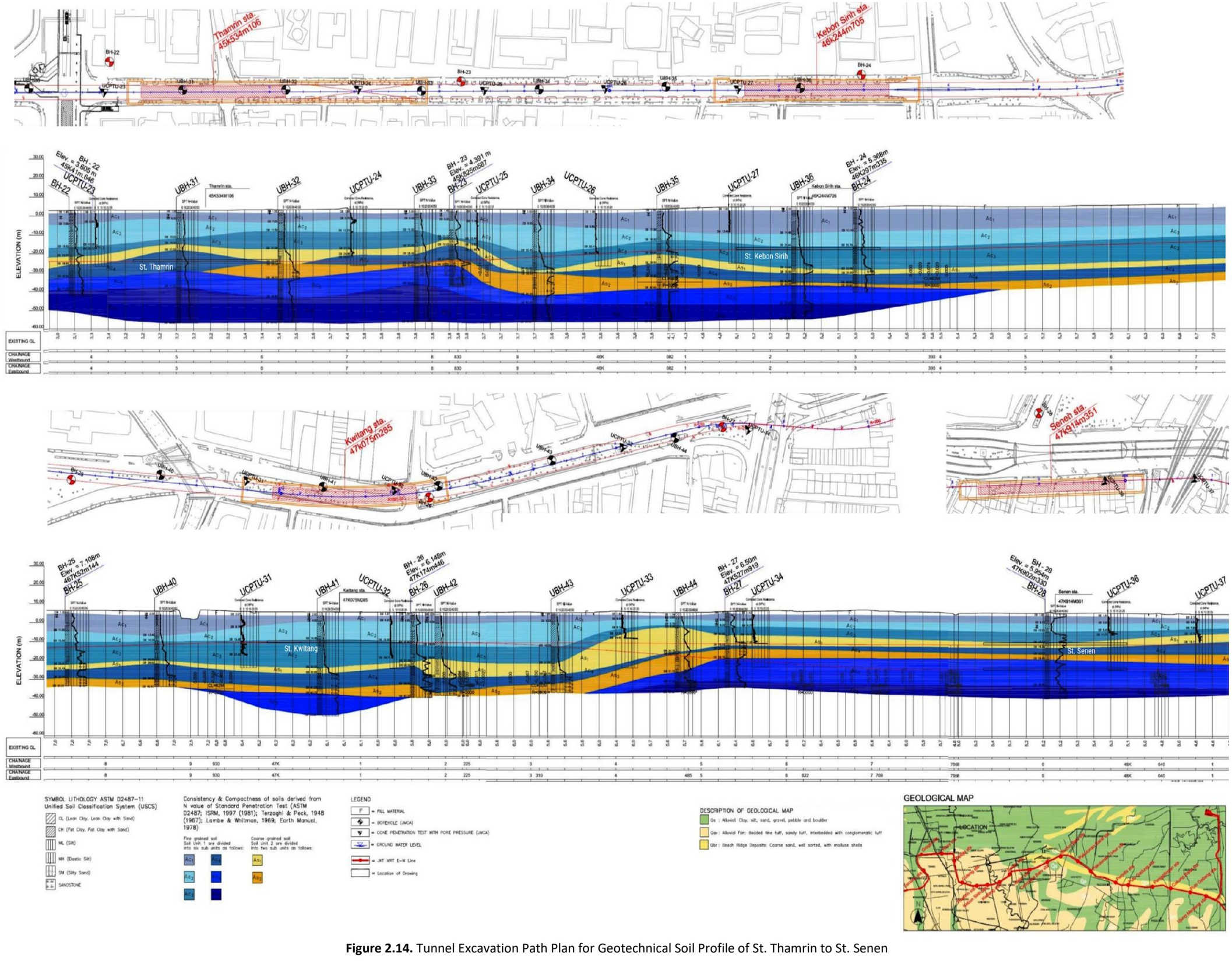
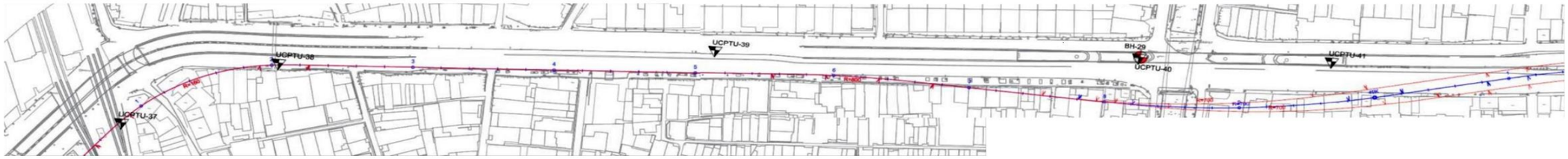
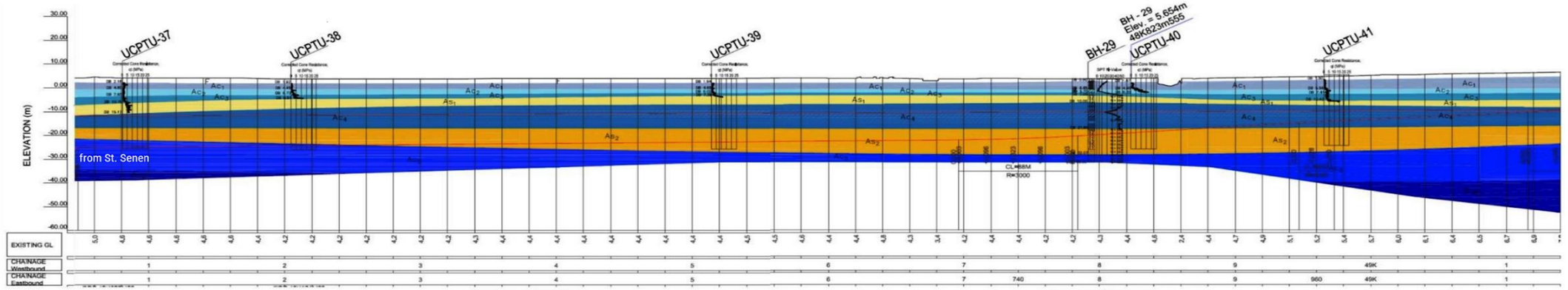
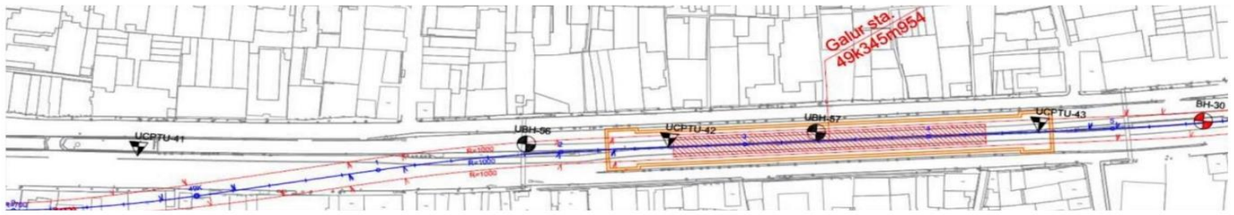
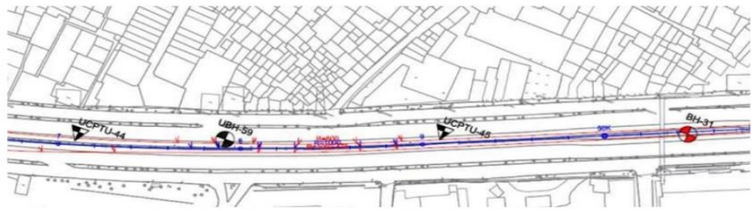


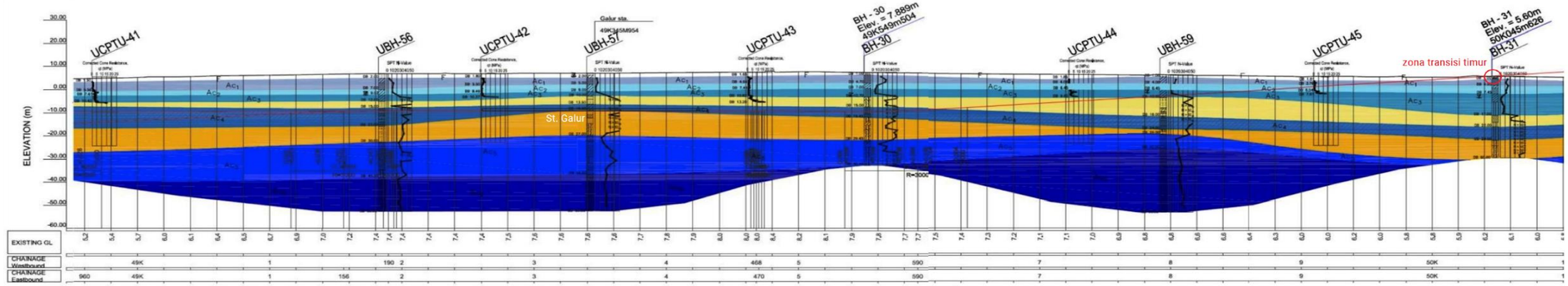
Figure 2.14. Tunnel Excavation Path Plan for Geotechnical Soil Profile of St. Thamrin to St. Senen

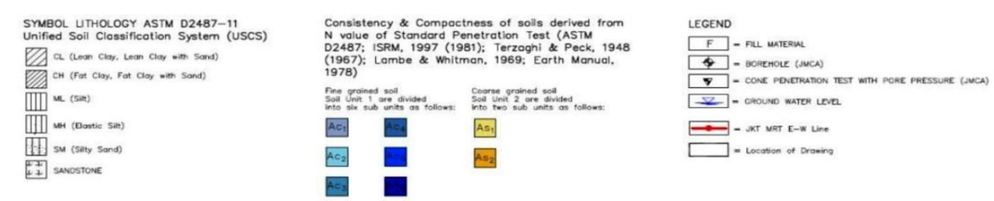












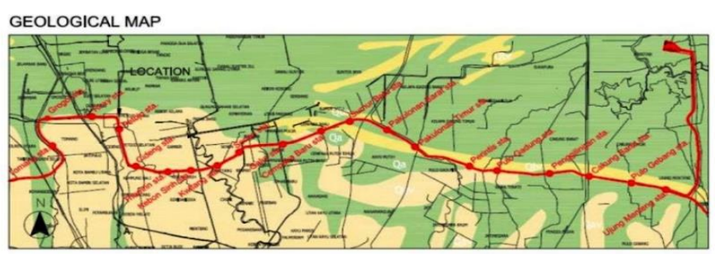
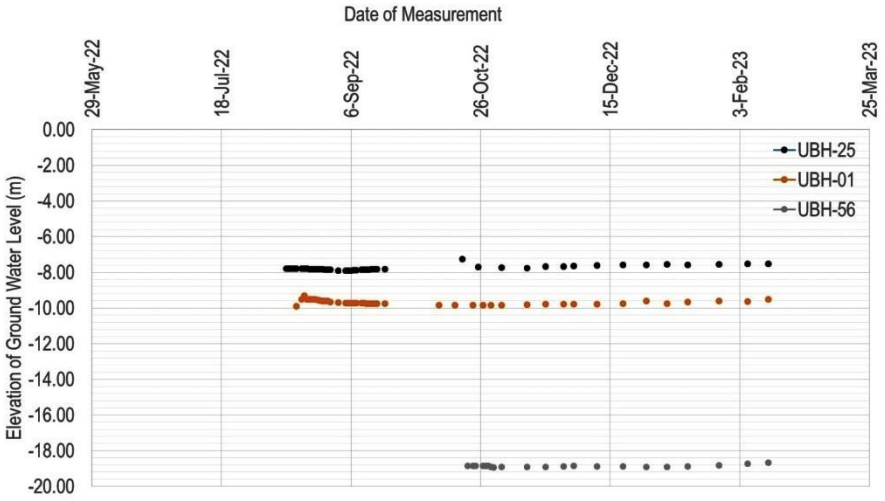


Figure 2.15. Tunnel Excavation Route Plan on Geotechnical Profile of St. Senen Segment to East Transition Zone



Point No.	Coordinates(1)		Elevation(1) (meter)	Ground Water Depth(2) (meter)	Length of Embedded Casing (meter)	Drilled Depth (meter)
	Easting (meter)	Northing (meter)				
UBH-01	698,656.150	9,318,097.940	2.60	-7.15	52.20	52.35
UBH-25	700,913.597	9,316,383.057	3.26	-5.53	52.00	60.00
UBH-56	705,252.510	9,317,166.400	7.40	-9.20	58.00	60.00

Figure 2.16. Groundwater Depth Profile

Figure 2.17. TBM cutterhead
a) spoke type, b) plate type

This drain pipe stretches to the very back of the TBM host system and functions to drain the excavated soil to the mud cart. The full mud cart is then pulled out using a locomotive to the cut and cover area. Meanwhile, another locomotive will return to TBM carrying concrete segments and 3 empty mud carts. After the mud cart carrying excavated soil arrives at the cut and cover area, the mud cart is then lifted to the surface and emptied into the mud pit (capacity ± 590 m^3). From the mud pit, the excavated soil is transported using a *tronton* dump truck every day to the soil disposal location and used for land embankment at the Rorotan depot. Based on the Basic Engineering Design MRT-EWLP1S1, the volume of excavated soil for underground tunnel construction is ± 694,084.96 m^3.

The excavated soil will be transported from the underground station cut and cover location along the project route to the Rorotan Depot area and used to pave the Rorotan Depot land. Thus, the road section in the project alignment that will be passed is Jl. Kyai Tapa, Jl. KH Hasyim Ashari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. KKO Usman Harun, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Letjen. Suprapto, Jl. Perintis Kemerdekaan, Jl. Raya Bekasi and Jl. Inspeksi Kanal Timur (Table 2.21.). To reduce the impact of increasing traffic density, excavation of excavated soil is carried out from 22.00 – 05.00 WIB or as stipulated in Andalalin

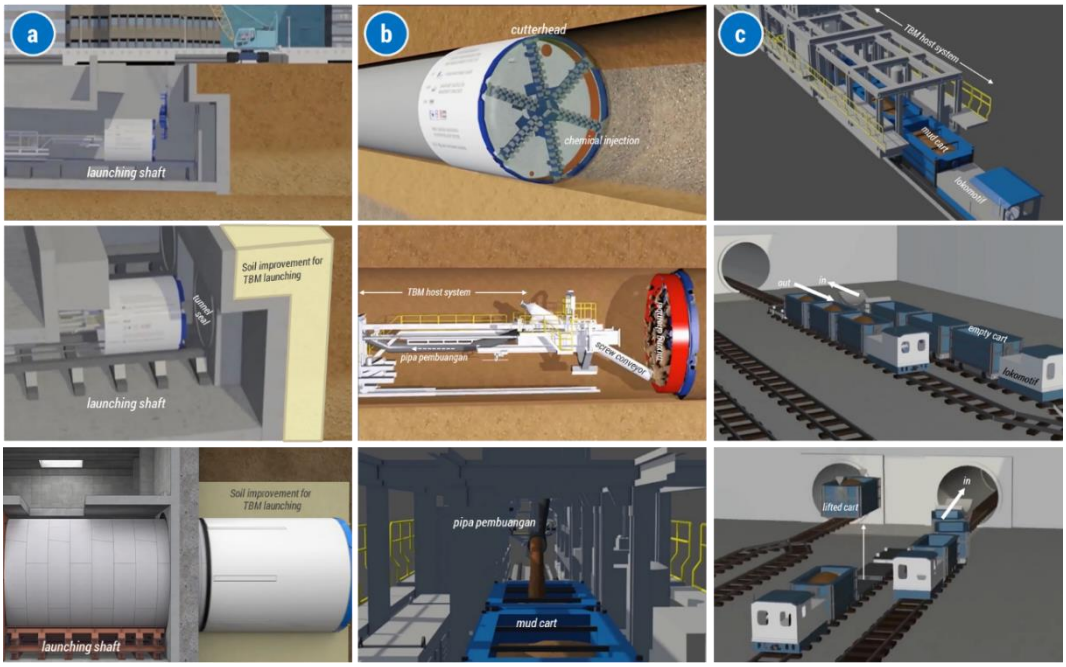


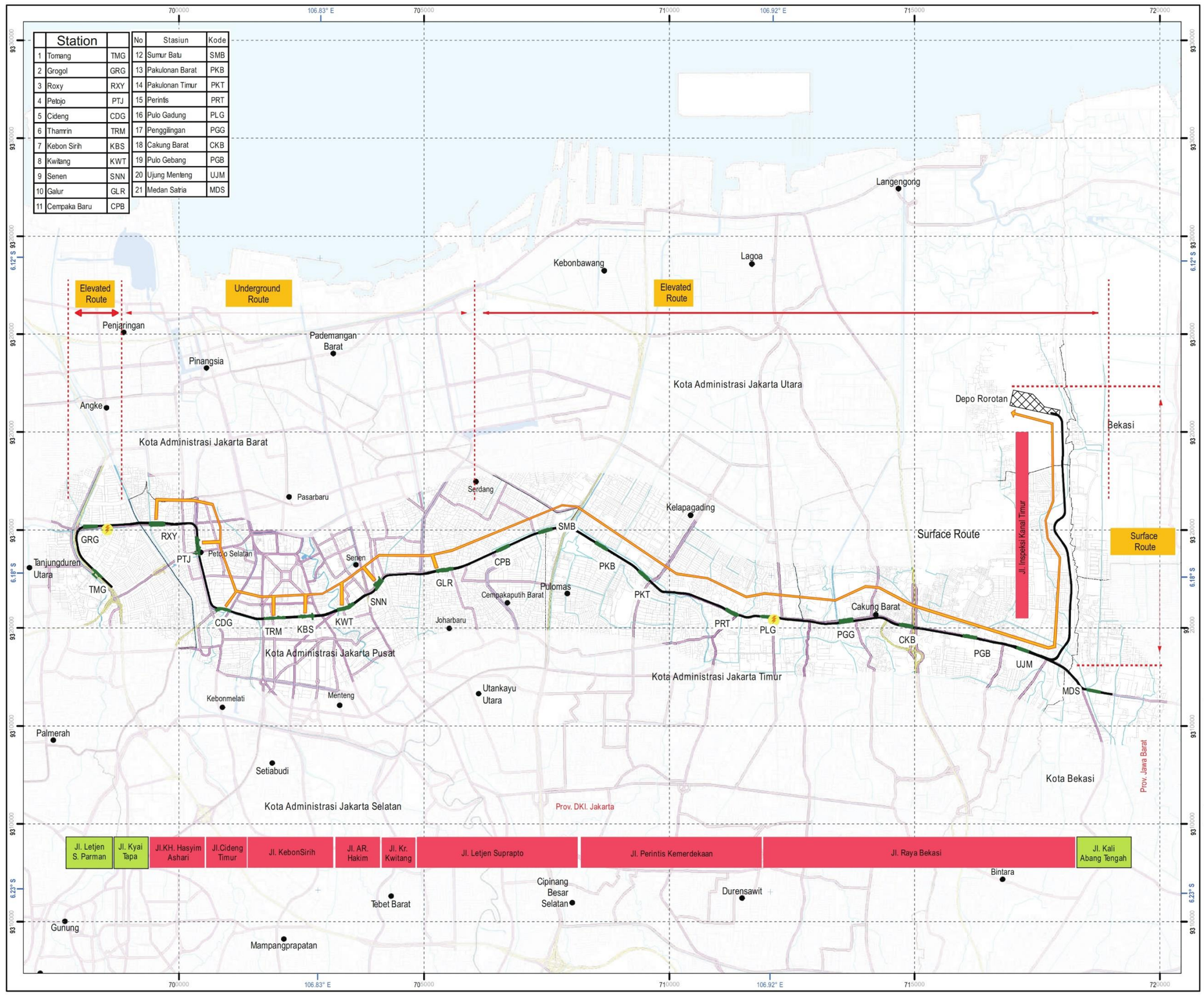
Figure 2.18. Illustration of Tunnel Excavation
a) TBM installation and launching, b) tunnel excavation, c) handling of excavated soil
Source: https://www.youtube.com/watch?v=-ojEXp8COwk

Table 2.21. Volume and Transport Route of Excavated Soil from Underground Tunnels

Segmen	Lokasi	Volume Tanah Galian (m^3)	Jarak menuju Depo (km)	Trip		Jumlah Dump Truck Tronton	Ruas Jalan yang Dilintasi
				Waktu Tempuh (Jam)	Jumlah (ritasi/hari)		Jl. KH. Hasyim Asy'ari; Jl. Cideng Timur; Jl. Jatibaru Raya; Jl. Kebon Sirih; Jl. A.R. Hakim; Jl. Kramat Kwitang; Jl. Kramat Bunder; Jl. Letjend. Suprapto; Jl. Perintis Kemerdekaan; Jl. Raya Bekasi; Jl. Inspeksi Kanal Timur
Terowongan Underground	St. Roxy	107.407,17	26,493	1,702	3	11	
	St. Petojo	94.111,45	25,313	1,643	3	10	
	St. Cideng	88.452,96	23,782	1,566	3	10	
	St. Thamrin	59.813,36	22,765	1,516	3	9	
	St. Kebon Sirih	53.495,29	22,059	1,480	3	9	
	St. Kwitang	58.112,35	21,224	1,439	3	9	
	St. Senen	113.551,66	20,385	1,397	4	9	
	St. Galur	119.140,72	18,953	1,325	4	8	
	JUMLAH	**694.084,96**					

Source: JMCA, 2022
Information: - *Tronton* dump truck capacity 20 m3
- Maximum number of transportation is 5 trips/DT/day

The final earthwork process for underground tunnel construction is soil compaction in the cut and cover area which will then function as a transition segment for the MRT-EWLP1S1 train line.



MAP OF
EXCAVATED LAND TRANSPORTATION ROUTE (UNDERGROUND)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Skala : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend
- District
- Provincial Boundary
- Regency/City Boundary
- River/Water Body

Road
- Arterial Road
- Collector Road
- JToll Road

- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

Transportation Route :
- Underground Transportation Route
- Traveled Road
- Not Traveled Road

Sumber :
- Peta Rupa Bumi Indonesia Skala 1 : 25000
- Peta Administrasi DKI Jakarta Skala 1 : 25000
- Peta Administrasi Kabupaten Bekasi Skala 1 : 25000
- Peta Administrasi Kota Bekasi Skala 1 : 25000
- Rencana Jalur MRT East - West Line

INSET

Figure 2.19. Excavated Soil Transport Route from Underground Construction

2) Elevated Segment

Earthworks for elevated construction are mainly carried out in making foundations for elevated construction support pillars (piers). Earthwork begins with installing a protective casing, then continues with drilling (Ø 1200 mm) using a drilling auger machine. Each foundation point consists of 4 bore piles. The earthwork was then continued with the installation of sheet piles (6 x 6 m) to protect the pile cap structure excavation area. Excavation of the pile cap structure area 1.8 – 2 m deep using an excavator. To accommodate the soil from the construction of the supporting pile foundation, temporary shelter holes with a volume of ± 4 m^3 are provided at each location.

Based on the Basic Engineering Design MRT-EWLP1S1, 761 piers will be built with an estimated amount of excavated soil of ± 237,432 m^3. The excavated soil will be transported from the location along the project route to the Rorotan Depot area and used for embankment of the Rorotan Depot land. Thus, the road section in the project alignment that will be passed is Jl. Letjen. S. Parman, Jl. Kyai Tapa, Jl. KH Hasyim Ashari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. KKO Usaman Harun, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Letjen. Suprapto, Jl. Perintis Kemerdekaan, Jl. Raya Bekasi and Jl. Inspection of the East Canal (west elevated and east elevated segments), as well as Jl. Kali Abang Tengah (specifically from the location of Medan Satria Station, Bekasi) (Table 2.22.). To reduce the impact of increasing traffic density, excavation of excavated soil is carried out from 22.00 – 05.00 WIB or as stipulated in Andalalin

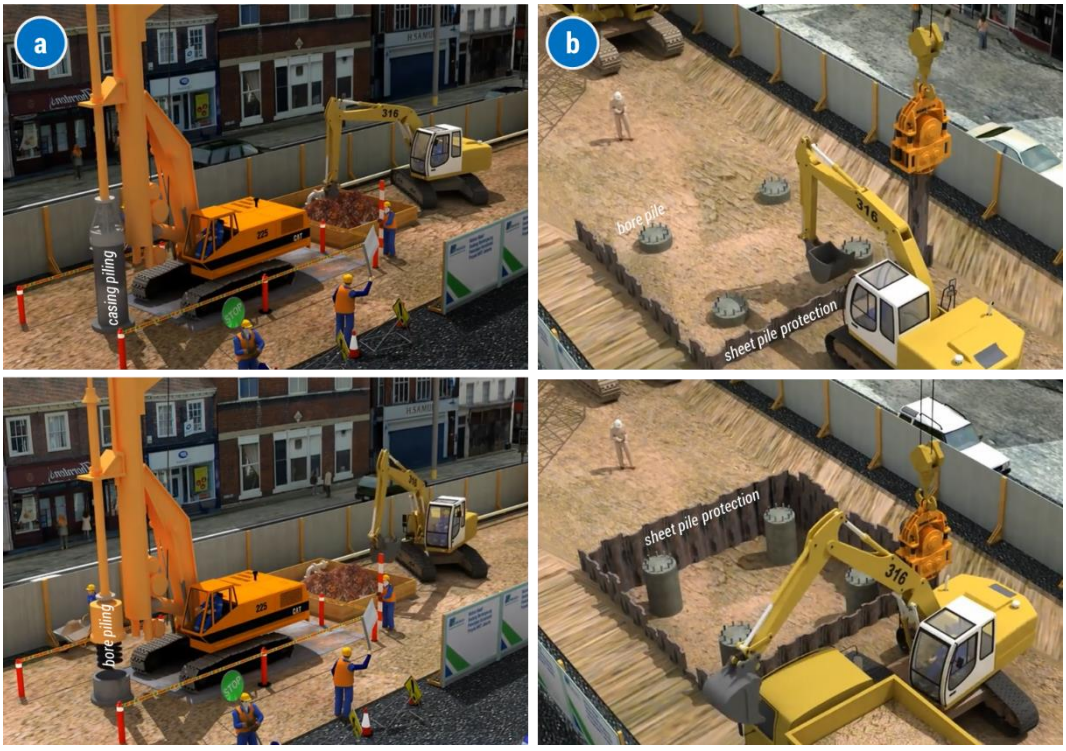


Figure 2.20. Illustration of Earthwork in Making Pier Foundations
a) installing casing and drilling piles, b) installing sheet piles and excavating pile caps
Source: https://www.youtube.com/watch?v=m64aJLyHh5s

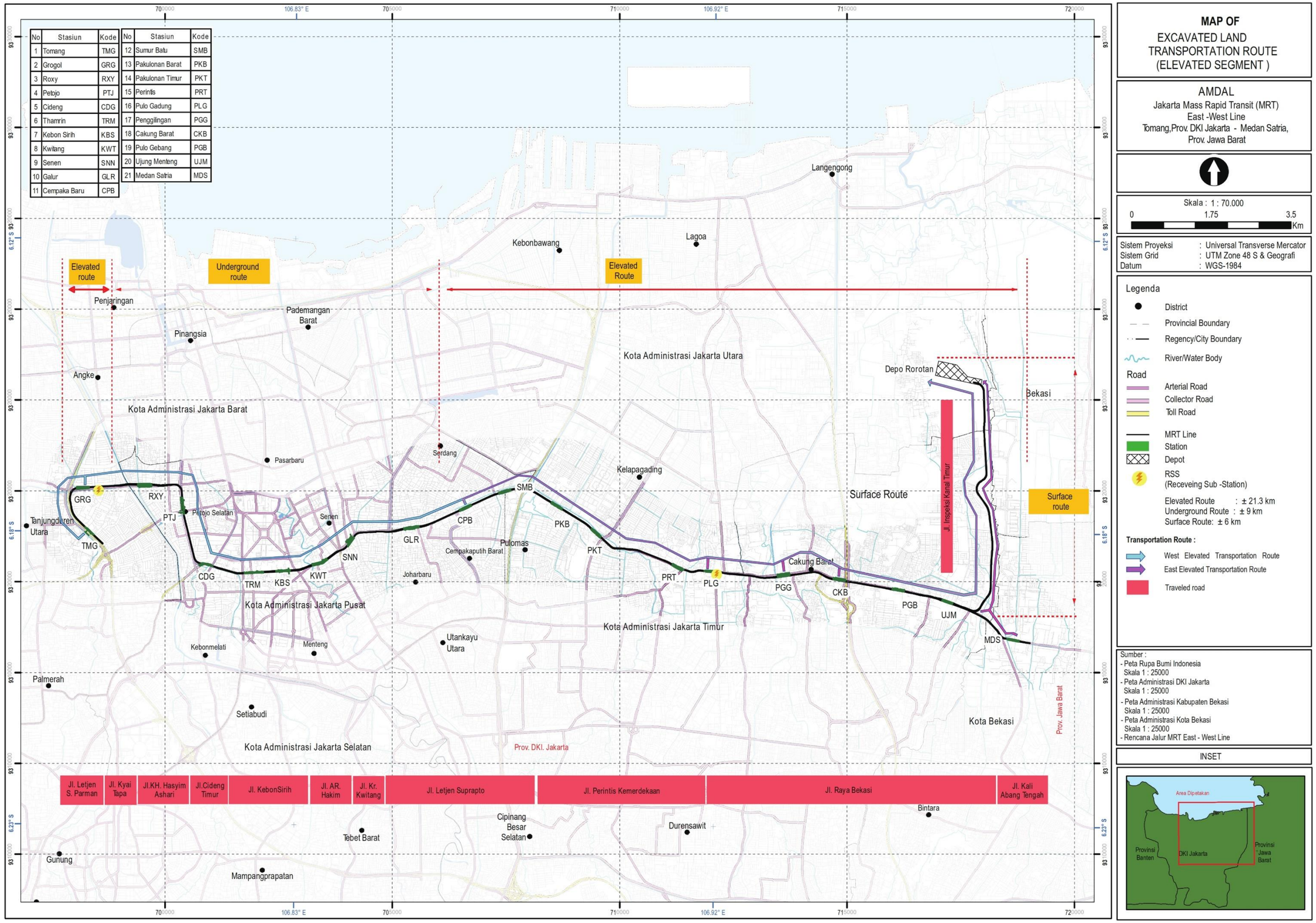


Figure 2.21. Excavated Soil Transport Route Map from the Elevated Segment

Table 2.22. Volume and Transport Routes of Excavated Soil from Elevated Segments

Segmen	Lokasi	Jumlah Pier (unit)	Volume Tanah Galian (m^3)	Jarak menuju Depo (km)	Trip		Durasi Pekerjaan (hari)	Jumlah Dump Truck Tronton	Ruas Jalan yang Dilintasi
					jam	Qty			Jl. Letjend. S. Parman; Jl. Kyai Tapa; Jl. KH. Hasyim Asy'ari; Jl. Cideng Timur; Jl. Jatibaru Raya; Jl. Kebon Sirih; Jl. A.R. Hakim; Jl. Kramat Kwitang; Jl. Kramat Bunder; Jl. Letjend. Suprapto; Jl. Perintis Kemerdekaan; Jl. Raya Bekasi; Jl. Inspeksi Kanal Timur; Jl. Raya Bekasi; Jl. Kali Abang Tengah
Elevated Barat	St. Tomang - St. Grogol	54	16.848	29,161	1,835	1	135	8	
	St. Grogol - St. Roxy	13	4.056	27,853	1,770	1	33	8	
Elevated Timur	St. Galur - St. Cempaka Baru	20	6.240	18,953	1,325	2	50	8	
	St. Cempaka Baru - St. Pakulonan Timur	110	34.320	17,678	1,261	2	275	8	
	St. Pakulonan Timur - St. Ujung Menteng	266	82.992	14,441	1,099	2	665	8	
	St. Ujung Menteng - St. Medan Satria	103	32.136	7,176	0,736	3	258	8	
	Feeder Depo Rorotan	195	60.840	5,9	0,672	4	488	8	
	TOTAL	**761**	**237.432**						

Source: JMCA, 2022
Information: - Tronton dump truck capacity 20 m3
- Maximum number of transportation is 5 trips/DT/day

3) Depot Segment

Earthworks in the Depot segment are mainly carried out at the Rorotan Depot construction site plan in the form of arranging and compacting backfill material for embankments with a height of ± 1 m. Backfilling is carried out layer by layer with a maximum thickness of each layer of 15 cm. Each layer is compacted mechanically using a grader and vibratory roller until it reaches a predetermined height. In this work, pumps and temporary drainage channels will be provided to avoid puddles of water and mud during the soil structuring and compaction process. Based on the Basic Engineering Design MRT-EWLP1S1, the amount of backfill material that will be stockpiled and compacted in the Rorotan Depot area is ± 1,869,157.71 m^3 (Table 2.23.).

Table 2.23. Volume of Fill Material for Embankment Area of Rorotan Depot

No	Backfill Material	Volume
1	Excavated soil from underground stations	937,640.75 m3
2	Excavated soil from underground tunnels	694,084.96 m3
3	Excavated soil from the pier foundation	237,432.00 m3
	TOTAL	**1,869,157.71 m3**

Source: JMCA, 2022

F. Underground Construction Work

1) Underground Station Construction

Construction of the MRT-EWLP1S1 underground station uses top-down and bottom-up methods. The top-down method (construction method from the top to the bottom) is mainly applied to making diaphragm walls (D-walls), foundations, beam columns, floor slabs and roof slabs. This construction work is carried out in parallel with earthwork as previously explained. Meanwhile, the construction of the entrance to the station building was carried out using the bottom-up method, which is a construction method from the bottom to the top. Each

underground station will be equipped with a cooling tower and ventilation tower (CTVT) which functions as a cooling and air ventilation system in underground stations and tunnels. The design of each station is presented in APPENDIX I.

Apart from structural construction work, the construction of an underground station also includes architectural and MEP (mechanical, electrical and plumbing) work. Architectural work in the form of station exterior and interior work which includes work on walls, floors, door and window frames, glass, bathrooms and other facilities in the station location area. Specifically for the entrance, landscaping work will also be carried out to arrange the land in the entrance area. Meanwhile, MEP work includes electricity networks, signals and telecommunications, and pipeline networks.

Figure 2.22. Underground Station illustration
a) underground station profile, b) entrance, c) concourse, d) platform
Source: https://www.youtube.com/watch?v=m64aJLyHh5s

The electricity supply for each underground station comes from the RSS (receiving substation) and is distributed via a cable network in the tunnel route. Meanwhile, the clean water supply comes from PDAM which is stored in a domestic water tank with a capacity of 250 m^3 and then distributed through a network of pipes using a booster pump. Apart from clean water, there is also a network of pipes for the drainage system. The underground station drainage system will use a closed channel in the form of a 4 inch pipe which will drain seepage water from the tunnel route and spills/splatter from plant room and back-office activities to the sum pit (holding pool) to then be transferred using a submersible pump to the wash water manhole on the surface before being discharged into the city drainage channel.

To protect against flooding from outside the station, a dike will be made at the station entrance and a drainage channel to divert water flow to the city drainage channel to protect water from entering the underground station area.

2) Construction of Underground Tunnels

Underground tunnel construction work is carried out in parallel with earthwork for tunnel construction. Apart from eroding the soil, TBM also works to install ring segments (Figure 2.23). The segment ring functions to withstand pressure from outside the tunnel and forms the tunnel walls. Every time the TBM moves forward about 1.7 meters, the machine automatically installs the segment ring. Each ring segment has a width of 1.5 m and a thickness

of 25 cm. Once a ring of tunnels is formed, the shield jack will push forward and the excavation cycle will continue. The TBM can work 24 hours/day with a rotation speed of 0.96 rpm and drilling progress of 12-18 meters per day. Installation of all ring segments will be completed after tightening all the bolts.

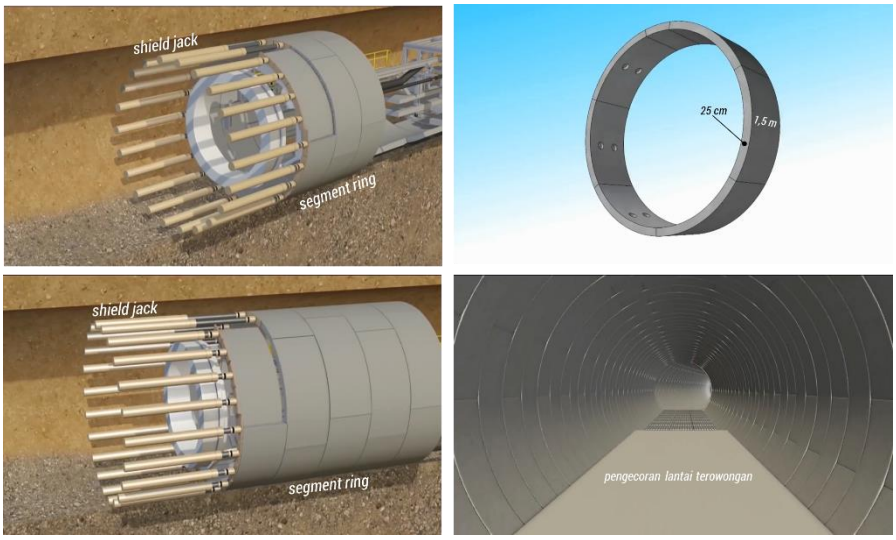


Figure 2.23. Illustration of Underground Tunnel Construction Work
Source: https://www.youtube.com/watch?v=m64aJLyHh5s

Next, the tunnel floor is cast, which is a permanent structure and will later become a place for laying the MRT train tracks. In tunnel construction activities, a coating (sealer) is applied to prevent potential water from entering through the joint gaps between tunnel segments and the tunnel design meets Indonesian earthquake resistant standards.

Based on the Basic Engineering Design MRT-EWLP1S1, tunnel construction will be built for 2 lines, each ± 9 km long (Roxy Station to Galur Station) with an outer diameter of 6,650 mm, an inner diameter of 6,050 mm and a thickness (concrete) of 300 mm.

G. Ground Surface Construction Work

1) Elevated Station Construction

Construction of the MRT-EWLP1S1 elevated station uses the bottom-up method (from support pole construction to station building construction). This work is carried out in parallel with earthworks for elevated construction (Figure 2.15.). Construction of the station support poles begins with concreting the bore pile (each foundation point consists of 4 bore piles), then continues with concreting the pile cap, concreting the pier column and pier head. The construction of the station support pillars was carried out using on-site concrete casting. After that, work continued with the installation of precast box girders (which will later become a place for laying MRT train tracks) using a launching gantry. The floor structure of the elevated station begins with installing crosshead beams and precast beams, then continues with concreting the floor plates and columns, roof beams and perimeter walls. The design of each station is presented in APPENDIX I.

Apart from structural construction work, the construction of an elevated station also includes architectural and MEP (mechanical, electrical and plumbing) work. Architectural work in the form of station exterior and interior work which includes work on walls, floors, door and window frames, glass, bathrooms and other facilities in the station location area. Meanwhile,

MEP work includes electricity networks, signals and telecommunications, and pipeline networks.

The electricity supply for each elevated station comes from RSS (receiving substation) and is distributed via a cable network on the MRT train line. Meanwhile, the clean water supply comes from PDAM which is stored in a domestic water tank with a capacity of 250 m^3 and then distributed through a network of pipes using a booster pump.

Figure 2.24. Illustration of Elevated Station Support Pole Construction
a) construction of support poles, b) installation of box girders
Source: https://www.youtube.com/watch?v=m64aJLyHh5s

2) Construction of Elevated Train Tracks

The construction of the elevated train track is carried out in parallel with the earthworks for the elevated construction (Figure 2.15). The construction process for elevated train track support poles is the same as the explanation for the construction process for elevated station support poles (Figure 2.24.). The elevated train track is designed in the form of a bridge using box girders as the main structure of the train base (segmental box girder/SBG) which connects one support pillar to another support pillar. SBG standard spans usually consist of 13 box girder units with a total length of ± 40 m. Installation of box girders with standard spans is generally carried out using a launching gantry (LG) or with an erect trestle crane (TSC).

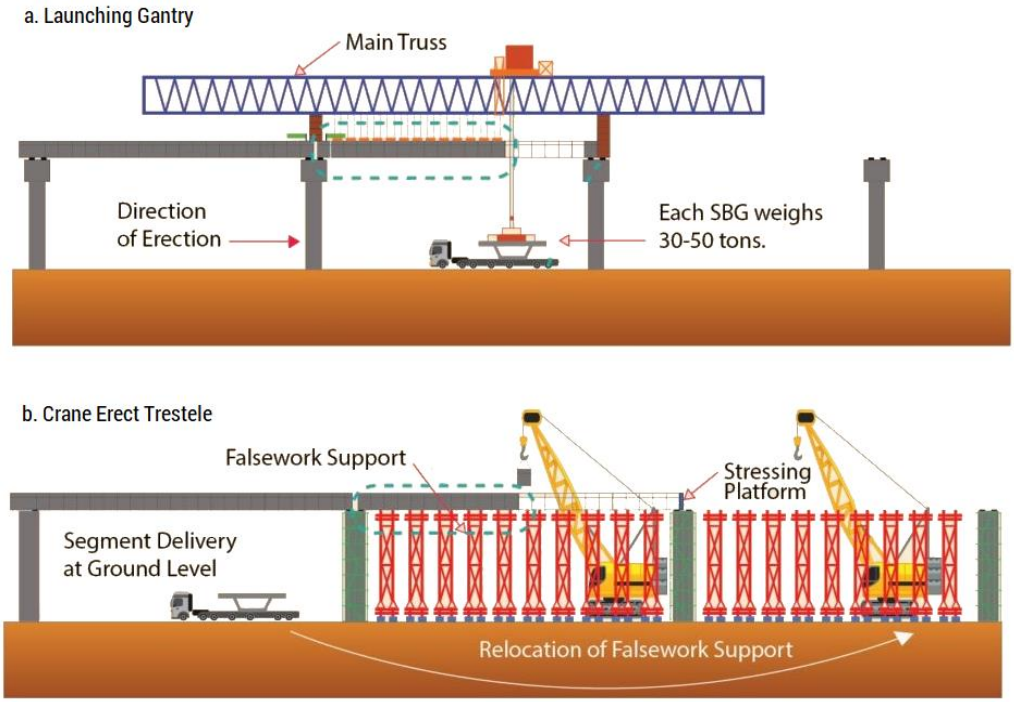


Figure 2.25. Illustration of Standard Span Elevated Train Track Construction
Source: JMCA, 2022

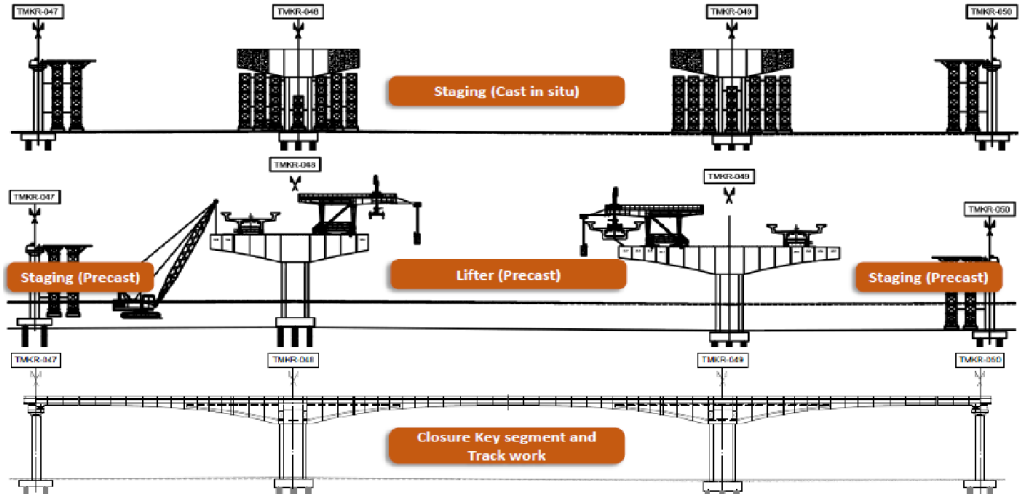


Figure 2.26. Illustration of the Balanced Cantilever Segmental Launching (BSCL) Technique
Source: JMCA, 2022

Long span bridges are required when the distance between support pillars is more than 40 m and are usually designed to cross highways, rivers, railway tracks or other existing structures. Installation of box girders and/or long-span in-situ concreting is generally carried out using the balanced cantilever segmental launching (BSCL) technique. Based on the Basic Engineering Design MRT-EWLP1S1, the construction of the elevated train line will be ± 15,527 km long and access to the Rorotan Depot will be ± 5.9 km long, with a total of 761 support poles.

Table 2.24. Elevated Train Line Construction Plan

Segment	Location	Pier		PC Girder	
		Qty. (units)	Distance (m)	Qty. (units)	Distance (m)
West Elevated	St. Tomang - St. Grogol	54	20 - 46	57	19 - 35
	St. Grogol - St. Roxy	13	30	10	25 - 30
East Elevated	St. Straw - St. Cempaka Baru	20	20 - 30	15	20 - 30
	St. Cempaka Baru - St. East Pakulonan	110	30	103	20 - 70
	St. East Pakulonan - St. Ujung Menteng	266	30	253	24 - 70
	St. Ujung Menteng - St. Medan Satria	103	30	57	20 - 30
	Rorotan Depot Feeder	195	30	200	20 - 30
	TOTAL	**761**		**695**	

Source: JMCA, 2022

3) Depot Development

The depot construction was built on land in the Rorotan area, Cilincing, North Jakarta on an area of 23 Ha. Before entering the depot area, there is a transition in the construction of the train track from elevated to at grade to then become an access road at the depot location. The depot access road material will use concrete consisting of rigid pavement and flexible pavement and a small part of the area such as the parking area will use asphalt. Meanwhile, the area of the train route to the stabling (train parking area) will use a gravel base.

The facilities to be built at the Rorotan Depot are as shown in Figure 2.27. and Table 2.25. For train maintenance buildings such as workshops, light and heavy maintenance buildings and main warehouses, light steel structural materials are used. Likewise with the train parking (stabling) building which uses a light steel roof structure. Meanwhile, the office administration building, canteen, wastewater treatment and water supply building will use light brick material. The drainage system in the depot area will provide an open channel measuring 1 x 1 m 2,078 m long, and 0.8 x 0.8 m 1,461 m long which will be channeled to the drainage channel next to the East Flood Canal (Figure 2.28.).

Table 2.25. Rorotan Depot Area Development Plan

No	Facility building	Area (m^2)
1	Admin/OCC building	2,400
2	Canteen	784
3	Play warehouse	3,240
4	Traction Substation (TSS)	985
5	Water supply & Fire protection	489.75
6	IWTP	1,111.50
7	STP	60
8	Infrastructure Maintenance Building	4,500
9	Vehicle workshop	7,350
10	LB3 TPS	50
11	Heavy maintenance building	3,392
12	Light maintenance building	8,335
13	Automatic Train Wash and Cleaning tracks	312
14	Stabling Building	40,880

No	Facility building	Area (m^2)
15	Stabling Track Area	53,264
16	LPG Plant	17.05
17	Vehicle parking area	2,637.40
18	Access Road	27,110
19	Security Post	
	a. Main Gate	21.70
	b. Post Tower 1	27.36
	c. Post Tower 2	27.36

Source: JMCA, 2022

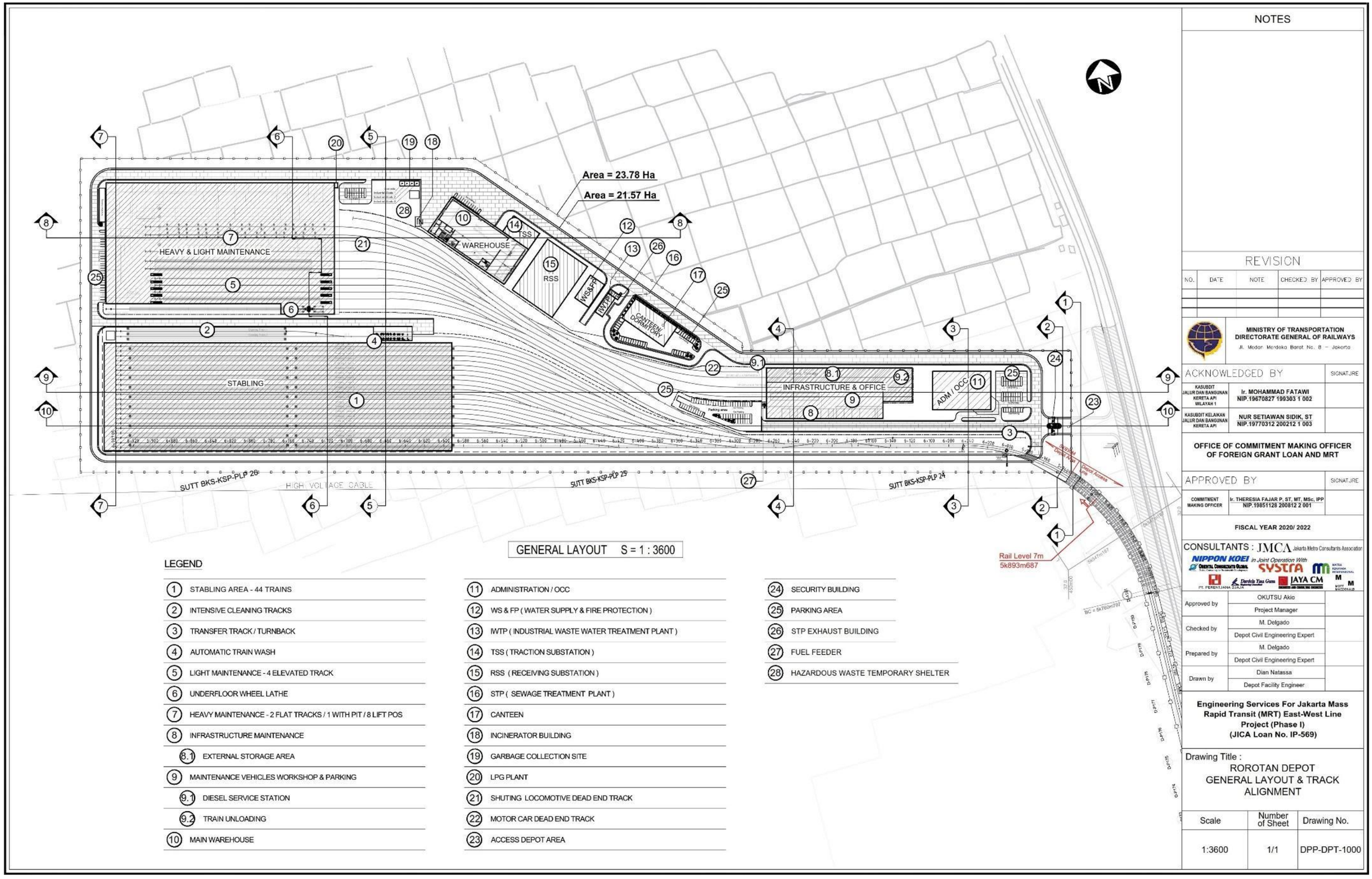


Figure 2.27. Depot Layout Plan
(Source: JMCA, 2022)

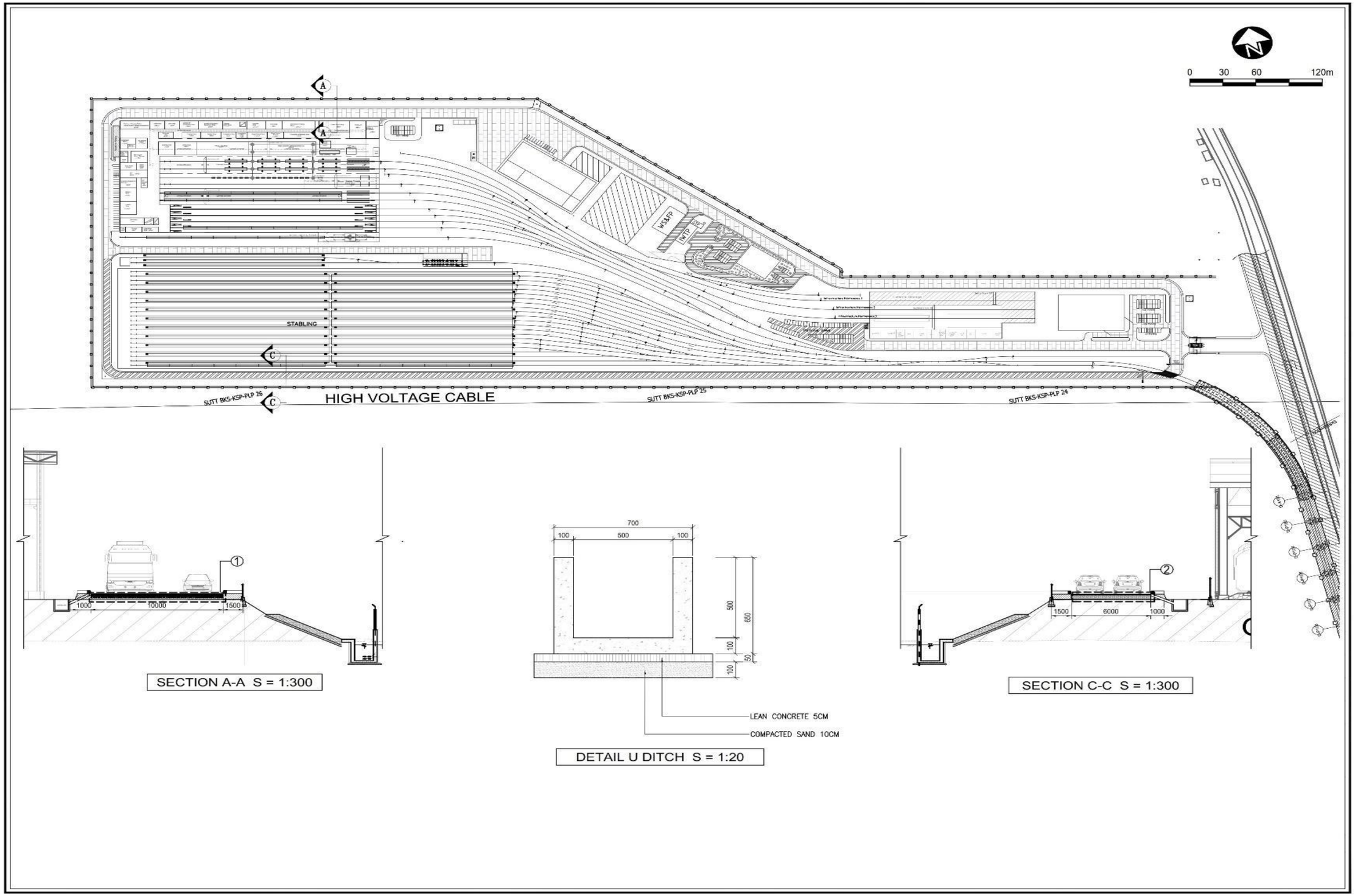


Figure 2.28. Rorotan Depot Drainage Channel Plan
(Source: JMCA, 2022)

4) Construction of Receiving Substation (RSS)

Receiving Substation (RSS) is the MRT's electricity source obtained from the main substation belonging to PT PLN (Persero). From the substation, electricity with a voltage of 150kV is received by the RSS and then converted into 20kV. Furthermore, electricity with a voltage of 20 kV is distributed to the electricity substation at each station to meet the station's utility needs and to the traction substation (TSS) for MRT train operational needs.

Figure 2.29. RSS illustration
Source: JMCA, 2022

RSS MRT-EWLP1S1 construction uses top-down and bottom-up methods. The top-down method (construction method from the top to the bottom) is mainly applied to making diaphragm walls (D-walls), foundations, beam columns, floor slabs and roof slabs. This construction work is carried out in parallel with earthwork as previously explained. Meanwhile, entrance construction is carried out using the bottom-up method, which is a construction method from the bottom to the top.

At MRT-EWLP1S1, it is planned to build 2 RSS units, namely 1 unit between Grogol and Roxy Stations (west segment) and 1 unit near Pulo Gadung Station (east segment). The western segment of the RSS is planned to supply electricity for Tomang Station to Cempaka Baru Station, while the eastern segment of RSS is for Sumur Batu Station to Rorotan Depot.

2.1.3. Operational Stage

A. Acceptance of Operational Workers

The operation of MRT-EWLP1S1 will be managed by PT MRT Jakarta, with an estimated number of workers required of 1,120 people. It is planned that local workers (residents affected by land acquisition and environmental disturbances who meet the skill qualification requirements) will be involved as workers at a minimum of 20% (244 people) of the operational workforce requirements. Estimates of the number of labor requirements based on skills or expertise during the operational phase are presented in Table 2.26.

Table 2.26. Operational Workforce Number Plan

Workforce Composition	Educational Qualification Minimal	Labor Needs (people)				Origin of Labor
		Depot	*Station*		Total	
			Per-station	*Amount*		
Director	S1/S2	1			1	
Deputy	S1/S2	1			1	
Assistant	S1/S2	2			2	
OCC	D3-S1	35			35	
MCC staffing	D3-S1	20			20	
Support Office Staff	D3-S1	16			16	Local
Station Management Office	D3-S1		18	378	378	Local
Crew Office Staffing	Senior High School-S1	30			30	Local

Workforce Composition	Educational Qualification Minimal	Labor Needs (people)				Origin of Labor
		Depot	*Station*		Total	
			Per-station	*Amount*		
Station Staffing	Senior High School-S1		12	252	252	Local
Train Drivers	Senior High School-S1	120			120	Local
Security	Senior High School-D3	55	10	210	265	Local
TOTAL		**280**	**40**	**840**	**1120**	

Source: JMCA, 2022
Note: The origin of the workforce is open from any area, but specifically the "Local" column states that specifically for the position in question, it is stipulated that there must be local workers from the local sub-district and/or sub-district.

Referring to Presidential Decree Number 4 of 1980 concerning Mandatory Reporting of Job Vacancies, the process of recruiting operational workers begins with submitting a written report every time there is a job vacancy to the local Manpower Service. This report contains the type of work, type of workforce, age, gender and other required conditions. Information about job vacancies is then announced in the mass media and/or socialized by job implementers in collaboration with regional governments (district, sub-district, district/city) and local community leaders.

Considering that MRT-EWLP1S1 operations are long term and refer to Law no. 13 of 2003 concerning Employment as amended in Law no. 11 of 2020 concerning Job Creation and its implementing regulations, the work system, wages and insurance arrangements (BPJS Employment and BPJS Health) for operational workers must be agreed in writing in an Indefinite Time Work Agreement (PKWTT) as permanent workers, as well as in a Time Work Agreement Certain (PKWT) as temporary workers.

B. Passenger Transportation and Station Operations

The main activity of MRT-EWLP1S1 is passenger transport services. It is planned that MRT-EWLP1S1 will operate for 19 hours/day (05.00 - 24.00 WIB) with peak hours estimated at around 4.5 hours (morning 06.30 - 08.30 WIB and afternoon 16.00 - 18.30 WIB). The MRT trip frequency (headways) is planned to be every ± 5 minutes, with a speed of between 80-100 km/hour. Each MRT series consists of 8 carriages, with a capacity for each carriage of 144 passengers (TC) and a maximum of 162 (MC). The estimated distribution of MRT-EWLP1S1 passengers is presented in Table 2.27.

Table 2.27. Estimated MRT-EWLP1S1 Passenger Distribution

Station	Code	Number of passengers (people/day)		
		Go on	Down	Total
Tomang	TMG	63,292	63,566	126,858
Grogol	GRG	33,362	38,219	71,581
Roxy	RXY	41,678	32,394	74,072
Petojo	PTJ	42,337	44,267	86,604
Cideng	CDG	57,704	52,136	109,840
Thamrin	TMR	180,701	139,187	319,888
Kebon Sirih	KBS	17,427	21,914	39,341

Station	Code	Number of passengers (people/day)		
		Go on	Down	Total
Kwitang	KWT	30,827	30,767	61,594
Senen	SNN	83,751	80,326	164,077
Galur	GLR	30,324	27,839	58,163
Cempaka Baru	CPB	30,408	36,666	67,074
Sumur Batu	SMB	112,989	80,729	193,718
West Pakulonan	CLA	45,886	47,335	93.221
East Pakulonan	CCP	99,087	114,586	213,673
Perintis	domestic worker	47,551	42,146	89,697
Pulo Gadung	PLG	27,827	35,974	63,801
Penggilingan	PGG	8,722	9,335	18,057
West Cakung	CKB	80,476	82,750	163,226
Pulo Gebang	PGB	8,432	8,868	17,300
Ujung Menteng	UJM	25,555	25,487	51,042
Medan Satria	MDS	8,432	8,868	17,300

Source: JMCA, 2022
Note: Passenger calculations with predicted estimates until 2060

In its operations, a number of events can result in disruption to MRT services, from delays to stopping MRT operations. Therefore, the MRT is designed to prevent emergencies and support emergency response efforts.

Emergency precautions include:

1) The MRT system is designed with special features, equipment, and facilities such as:
   - The elevated path is equipped with a safety walkway and emergency access
   - The underground tunnel is equipped with safety passages, passageways between the twin tunnels, emergency and ventilation shafts, ventilation systems, lighting and emergency telephone cables.
   - The building is equipped with fire and smoke detection equipment and facilities, Uninterrupted Power supply (UPS), Access Control System (ACS), CCTV, PA, emergency lighting, as well as emergency evacuation routes and signage.
   - The station is equipped with equipment and facilities such as PED, EI, EST, CCTV, PA, emergency evacuation gates and signage.
   - The system is equipped with redundancy and UPS.
   - The control center is equipped with Emergency Train Stop and Emergency Power Cut buttons, CCTV, radio, telephone, direct telephone with Emergency Service Providers, a train scheduling system that supports preparing and downloading emergency schedules, voice recording.
   - Radio alarms provide a general radio warning signal to all trains operating on the line.
   - Emergency information to passengers via PIDS and PA.

- Disaster Warning System (earthquakes, floods and strong winds) that will alert operators in the event of a natural disaster and enable appropriate preventive or mitigation measures to be taken.
- Trains are equipped with facilities/equipment in the cabin such as recording devices, fire and smoke detectors, emergency intercoms, emergency door opening devices, emergency evacuation windows, and energy storage.
- The depot is equipped with engineering vehicles and work trains for rescue, repair and recovery work.
- Incident Management Room to support management and response to emergency situations.
- Design documentation that provides details about the operation and maintenance of systems, facilities and equipment that contribute to responding to the management of emergency situations.

2) Provide emergency response rules and procedures that are developed, tested and verified periodically with Emergency Service Providers.
3) Carry out maintenance (preventive and corrective) periodically according to planning to ensure the reliability, availability and safe function of assets.
4) Staff and management receive appropriate training regarding the operation and maintenance of systems, equipment facilities that contribute to responding to the management of emergency situations.
5) Providing a special organization tasked with managing and coordinating the handling of emergency situations.

Emergency response efforts include:

1) Disaster prevention
   Aims to reduce the impact of disasters (earthquakes, floods and strong winds) on people and MRT property at stations, depots and offices.
2) Handling emergency conditions
   Aims to ensure efficient and safe management of emergency situations to reduce damage and casualties.
3) Recovery
   Aims to quickly and safely restore the MRT service system, including temporary restoration work.

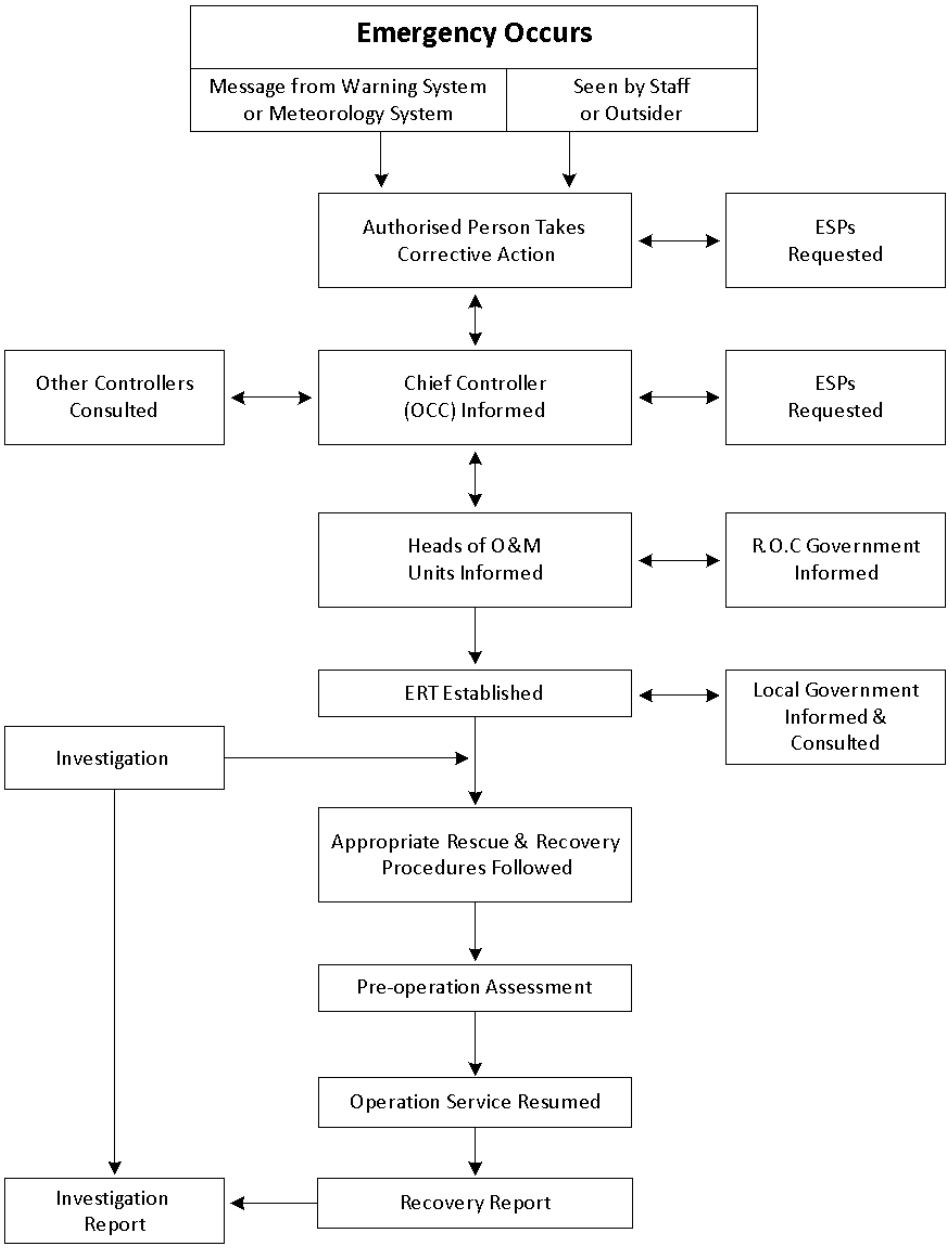


Figure 2.30. Emergency Response Workflow
Source: JMCA, 2022

4) Passenger Evacuation

The main passenger evacuation scenarios are as follows:

Table 2.28. Main Scenario Passenger Evacuation

	Emergency Conditions	Design and Action Scenarios
1	Traction power failure	
	a. Design – application of emergency brake due to loss of traction power	The train is designed not to trigger the emergency brake in order to roll to the next station
	b. The train failed to move to the nearest UG station	The train is equipped with a spare battery to allow it to travel a distance of approximately 2 km
2	Rolling Stock Failure	
	a. The brakes failed to release after stopping in the middle of the lane	Train evacuation and/or passengers transferred to another train

	Emergency Conditions	Design and Action Scenarios
	b. Case of fire	The train stopped at a nearby station and passengers were evacuated
3	Track Failure	The train reverses to the previous station
4	Accidents that hinder train movement	Train evacuation and/or passengers transferred to another train
5	Natural disasters	
	a. Earthquake	If it doesn't derail, the train is directed to creep to the next station
	b. Flood	Anticipated with a disaster warning and alarm system
	c. Fire in the station platform area	Trains passed through burning stations or turned back to previous stations

Source: JMCA, 2022

Passenger transportation services at each station are supported by the operation of supporting facilities in the form of providing clean water, wastewater treatment and waste management. The clean water supply at each station comes from PDAM which is stored in a domestic water tank with a capacity of 250 m^3 and then distributed through a network of pipes using a booster pump. The need for clean water at each station is estimated by using the value of clean water usage in similar activities that are already operating, namely employees 100 L/person/day, passengers 5.84 L/person/day, and commercial areas estimated at 25 L/m^2. The estimated number of passengers using clean water at each station is around 4% of the number of passengers (up and down), while the estimated wastewater volume is 100% of clean water use. The estimated calculation of the need for clean water and wastewater produced at each station is presented in Table 2.9.

The resulting wastewater will be processed using the Sewage Treatment Plan (STP) anaerobic-aerobic biofilter system (Figure 2.31.) to then be sucked up and transported to the Integrated IPAL (Instalasi Pengolahan Air Limbah "Waste Water Treatment Plant") in collaboration with PD PAL JAYA. Specifically for Roxy, Petojo, Cideng, Thamrin and Kebon Sirih stations, only sum pit tanks are provided and then pumped into manholes and are planned to be connected to the city IPAL channel. To ensure the functioning of the STP as planned, STP management staff and a maintenance room will be provided to control the effectiveness of STP performance. Meanwhile, STP mud suction will collaborate with PD PAL JAYA and UPTD PALD Bekasi City.

Waste management steps at each station refer to Law no. 18 of 2008 concerning Waste Management and Government Regulation no. 81 of 2012 concerning Management of Household Waste and Similar Types of Household Waste, consisting of:

Table 2.29. Calculation of Estimated Needs for Clean Water and Wastewater Generated at Station Operations

Segment	Station	Type of Need	Amount		Clean Water Needs			Wastewater[2)]	STP	Sum pit[3)]	Ritation/ day[4)]
					L/day[1)]	L/day	m^3/day	(m^3/day)	(m^3/day)	(m^3)	
West Elevated	Tomang	Station staff	40	person	4,000	55,182.16	55.18	44.14	60	45	9
		Passenger	5,074	person	29,632						
		Commercial area (1st floor)	862	m2	21,550						
	Grogol	Station staff	40	person	4,000	20,720	20.72	16.57	25	17	4
		Passenger	2863	person	16,720						
	Roxy	Station staff	40	person	4,000	21,304	21.30	17.04	Connection with city IPAL channel		
		Passenger	2963	person	17,304						
	Petojo	Station staff	40	person	4,000	24,230	24,23	19.38			
		Passenger	3464	person	20,230						
	Cideng	Station staff	40	person	4,000	29,661	29.66	23.73			
		Passenger	4394	person	25,661						
Underground	Thamrin	Station staff	40	person	4,000	131,979	131.98	105.58			
		Passenger	12796	person	74,729						
		Commercial area (B1 floor)	930	m^2	23,250						
		Commercial area (B2 floor)	1,200	m^2	30,000						
	Kebon Sirih	Station staff	40	person	4,000	13,192	13,19	10.5			
		Passenger	1574	person	9,192						
	Kwitang	Station staff	40	person	4,000	18,390	18.39	14.72	20	15	3
		Passenger	2464	person	14,390						
	Senen	Station staff	40	person	4,000	42,328	42.33	11.77	45	34	7
		Passenger	6563	person	38,328						
	Galur	Station staff	40	person	4,000	17,590	17.59	14.07	20	14	3
		Passenger	2327	person	13,590						
East Elevated	Cempaka Baru	Station staff	40	person	4,000	19,669	19.67	15.74	20	16	3
		Passenger	2683	person	15,669						
East Elevated	Sumur Batu	Station staff	40	person	4,000	69,804	69.80	55.84	70	56	11
		Passenger	7749	person	45,254						

Segment	Station	Type of Need	Amount		Clean Water Needs			Wastewater[2]	STP	Sum pit[3]	Ritation/ day[4]
					L/day[1]	L/day	m^3/day	(m^3/day)	(m^3/day)	(m^3)	
		Commercial area (1st floor)	822	m2	20,550						
	West Pakulonan	Station staff	40	person	4,000	25,777	25.78	20.63	30	21	4
		Passenger	3729	person	21,777						
	East Pakulonan	Station staff	40	person	4,000	53,914	53.91	43.13	55	44	9
		Passenger	8547	person	49,914						
	Pioneer	Station staff	40	person	4,000	24,954	24.95	19.96	25	20	4
		Passenger	3588	person	20,954						
	Pulo Gadung	Station staff	40	person	4,000	18,904	18.90	15,12	20	16	3
		Passenger	2552	person	14,904						
	Milling	Station staff	40	person	4,000	8,216	8.22	6.57	10	7	2
		Passenger	722	person	4,216						
	West Cakung	Station staff	40	person	4,000	42,129	42.13	33.7	45	34	7
		Passenger	6529	person	38,129						
	Pulo Gebang	Station staff	40	person	4,000	8,041	8.04	6.43	10	7	2
		Passenger	692	person	4,041						
	Ujung Menteng	Station staff	40	person	4,000	15,925	15.93	12.74	20	13	3
		Passenger	2042	person	11,925						
	Medan Satria	Station staff	40	person	4,000	8,041	8.04	6.43	10	7	2
		Passenger	692	person	4,041						

Information:
[1]The average water requirement for employees is 100L/person/day (Sahse J) and passengers 5.84 L/passenger/day (Sahse J)
[2]Wastewater accounts for 80% of clean water needs
[3]The sum pit is a tank for collecting wastewater effluent after leaving the STP and before being sucked up by a suction truck for transportation to the integrated IPAL every day.
[4]Suction truck with a capacity of 5 m3 per cycle for transportation to the integrated WWTP

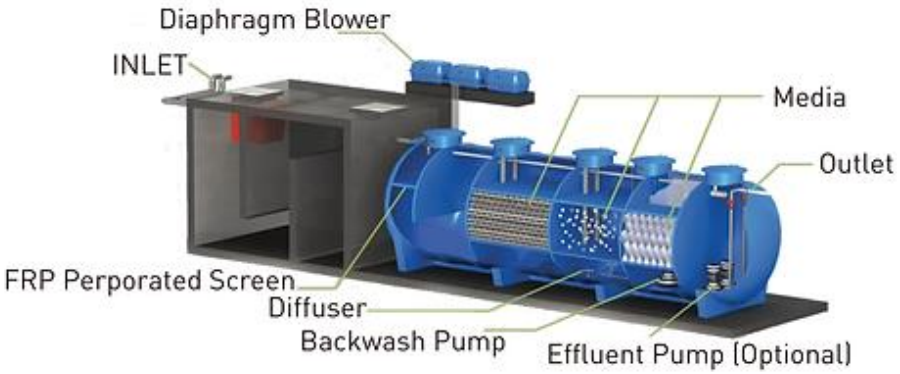
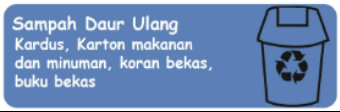
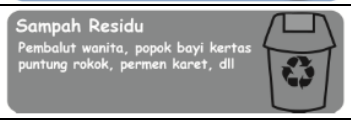


Figure 2.31. STP Anaerobic-Aerobic Biofilter System
Source: JMCA, 2022

1) Provision of segregated waste bins

Providing segregated waste bins at each station as a form of implementing the 3R (reduce, reuse and recycle) program. Trash bins will be placed in strategic locations and can be easily accessed by station users. The coating and coloring of trash bins refers to attachment II of Minister of Public Works Regulation No. 3 of 2013 concerning the Implementation of Waste Infrastructure and Facilities in Handling Household Waste and Similar Types of Household Waste.

Table 2.30. Trash Can Labels and Colors

No	Waste Type	Label	Color
1	Garbage containing hazardous and toxic materials and waste of hazardous and toxic materials.		Red
2	Waste that is easily decomposed		Green
3	Reusable trash		Yellow
4	Recyclable waste		Blue
5	Other rubbish		Gray

Source: PU Ministerial Decree No. 3 of 2013

2) Provision of Temporary Shelters (TPS)

The waste collected in the trash can is then collected at the Temporary Storage Place (TPS) for the sorting process. Reusable waste and recyclable waste that still have economic value such as plastic bottles, paper and cardboard are collected and then handed over to the DKI Jakarta Waste Bank. Easily biodegradable waste and other waste (residues) that have no economic value are transported to the landfill in collaboration with the DKI Jakarta Government and/or Bekasi City. Meanwhile, waste containing B3 waste will be temporarily

stored at the B3 waste transit site. It is hoped that this sorting process can reduce the burden of waste entering the landfill.

3) Providing a transit place for B3 waste
   At each MRT-EWLP1S1 station, a B3 waste transit space/place with a capacity of ± 5 m^3 is provided. The B3 waste is then transported periodically by a third party who has a permit to transport B3 waste from the Ministry of Environment and Forestry to TPS LB3 at the Rorotan Depot location.

The amount of waste generated at each station is estimated at 50% of the large city Arise Waste (50% x 3.25 l/org/day = 1.63 l/org/day ≈ 0.4 kg/org/day) referring to SNI 3242-2008 concerning Waste Management in Settlements. The estimated calculation of arise waste at each station is presented in Table 2.31.

Table 2.31. Calculation of Estimated Amount of Arise Waste

Segment	Station	Generating Source (org)			Number of Months [2]			TPS [3] (m^3)
		Passengers 1)	Station Officer	Tenant Guard	Qty	m^3/day	tons/day	
Elevated West	Tomang	3,806	40	20	3,866	6.28	1.55	8
	Grogol	1,432	40	20	1,492	2.42	0.60	4
Underground	Roxy	1,481	40	20	1,541	2.50	0.62	4
	Petojo	1,732	40	20	1,792	2.91	0.72	4
	Cideng	2,197	40	20	2,257	3.67	0.90	4
	Thamrin	6,398	40	20	6,458	10.49	2.58	2 x 6
	Kebon Sirih	787	40	20	847	1.38	0.34	2
	Kwitang	1,232	40	20	1,292	2.10	0.52	4
	Senen	2,871	40	20	2,931	4.76	1.17	6
	Galur	1,163	40	20	1,223	1.99	0.49	2
Elevated East	Cempaka Baru	1,174	40	20	1,234	2.00	0.49	2
	Sumur Batu	4,359	40	20	4,419	7.18	1.77	8
	West Pakulonan	1,864	40	20	1,924	3.13	0.77	4
Elevated East	East Pakulonan	3,472	40	20	3,532	5.74	1.41	6
	Perintis	1,570	40	20	1,630	2.65	0.65	4
	Pulo Gadung	1,117	40	20	1,177	1.91	0.47	2
	Penggilingan	406	40	20	466	0.76	0.19	2
	West Cakung	2,856	40	20	2,916	4.74	1.17	6
	Pulo Gebang	433	40	20	493	0.80	0.20	2
	Ujung Menteng	1,148	40	20	1,208	1.96	0.48	2
	Medan Satria	433	40	20	493	0.80	0.20	2

Information:
1) Estimated number of passengers at peak hours
2) SNI 3242-2008 concerning Waste Management in Settlements
3) TPS in the form of factory container boxes (sizes 2 m^3, 4 m^3, 6 m^3, 8 m^3 and 10 m^3)

C. Train Maintenance and Depot Operations

The depot is a storage area (train parking area) and train maintenance. This area is an important component in every railway system to ensure safety and comfort aspects are always maintained. MRT train maintenance consists of:

a. Light Maintenance, comprises:

- Pre departure inspection (Daily)

  Inspection conducted before the train departs. Inspection the condition of the train and train components
- Cleanning MRT train (Daily)

  Cleannign rolling stock from garbange
- Medium Washing MRT Train (Bi-weekly):

  Body train washing which using chemical agent in Auto Car Washing facility
- Routine Inspection (Monthly)

  Inspection regarding to train condition and functional system

b. Heavy maintenance, comprises:

- Heavy Manual Cleanning (Monthly)

  Washing train in interior and exterior
- *Overhaul*

  Train machinery services which conducted per 8 years or after traveling distance 1,200,00 Km
- Major Inspection Equipment

  Inspection and changing spare parts in period 4 years

Train washing and maintenance activities at the Depot are supported by the operation of supporting facilities in the form of providing clean water, Wastewater processing, waste management and B3 waste management. The clean water supply comes from PDAM which is stored in a water tank with a capacity of 363 m^3 and then distributed through a network of pipes using a booster pump. The need for clean water at each station is estimated by using the value of clean water usage in similar activities that are already operating, namely employees at 100 L/person/day and the need for clean water for washing MRT trains is estimated at 121 m^3/day. Estimated Wastewater volume is 100% of clean water use. The estimated calculation of the need for clean water and Wastewater produced at the Depot is presented in Table 2.32.

Table 2.32. Estimation of the need for clean water and the amount of Wastewater in the domestic activities of the Rorotan Depot

No	Type of Need	Amount	Clean Water Needs			Wastewater (m^3/day)	STP/IWTP (m^3/day)	Sum pit[3] (m^3)	Ritation /day[4]
			L/day	L/day	m^3/day				
1	Domestic	280 person	28.0002)	28,000	28	22.4	28	25	5
2	Train maintenance		60.4501)	93,000	93	74.4	93	42	9

Note: 1) The need for clean water for train maintenance activities (including train washing) is 93 m3/day with Wastewater discharge 74.4 m3/day (80% clean water). However, Wastewater will be recycled at 35% of the clean water, namely 32.55 m3/day. Thus, the Wastewater discharge is 41.85 m3/day which is then stored in a sum pit with a capacity of 42 m3 before being sucked up by a suction truck. Meanwhile, the routine need for clean water is 60.45 m3/day (60.45 m3/day + 32.55 m3/day = 93 m3/day).

[2)]The average domestic water requirement of employees is 100L/person/day (Sahse J)

[3)]The sum pit is a tank for collecting Wastewater effluent after leaving the STP and before being sucked up by trucks suction for transportation to the integrated IPAL every day.

[4)]Suction truck with a capacity of 5 m3 per cycle for transportation to the integrated WWTP

The domestic wastewater produced will be treated using a Sewage Treatment Plan (STP) with an anaerobic-aerobic biofilter system with a capacity of 28 m^3/day, while wastewater for washing MRT trains and workshop activities will be processed using an IWTP (industrial Wastewater treatment plant) with a capacity of 93 m^3/day, using a coagulation system followed by sand filtration and activated carbon. About ± 35% of the Wastewater effluent from the IWTP will be recirculated and the rest together with the effluent from the STP will be sucked up and transported to the Integrated IPAL in collaboration with PD PAL JAYA. To ensure the functioning of the STP and IWTP as planned, management staff and maintenance space will be provided to control the effectiveness of the STP and IWTP performance. STP and IWTP sludge suction will collaborate with PD PALJAYA and UPTD PALD Bekasi City.

Meanwhile, the amount of waste generated from domestic activities of workers at the Rorotan Depot is estimated at 50% of the waste generated in large cities (50% x 3.25 l/org/day = 1.63 l/org/day ≈ 0.4 kg/org /day) refers to SNI 3242-2008 concerning Waste Management in Settlements. The estimated calculation of arise waste from the domestic activities of workers at the Rorotan Depot is presented in Table 2.33.

Table 2.33. Estimated amount of Arise Waste in Rorotan depot activities

Source of Arise Waste	Number of people)	Arise Waste [1)]		Number of Arise Waste		TPS [2)] (m^3)
		L/person/ day	kg/person/ day	m^3/day	tons/day	
Worker	280	1.63	0.40	0.46	0.12	2
Amount	**280**			**0.46**	**0.12**	

Information: 1) SNI 3242-2008 concerning Waste Management in Settlements
2) TPS in the form of factory container boxes (sizes 2 m^3, 4 m^3, 6 m^3, 8 m^3 and 10 m^3)

The waste management steps at the Rorotan Depot are the same as those applied to waste management at the station, namely by providing segregated waste bins and Temporary Storage Places (TPS). Transporting waste to the landfill in collaboration with the DKI Jakarta Government. Meanwhile, waste containing B3 waste will be stored in the Temporary B3 Waste Storage Site (TPS LB3), as further explained in the MRT-EWLP1S1 B3 waste management plan.

2.2. Prepared Environmental Management Plan

2.2.1. B3 Waste Management

Referring to the Technical Details of B3 Waste Storage (Appendix K), the management of B3 waste which has been prepared as part of the MRT-EWLP1S1 work plan consists of identifying B3 waste; location and storage facilities for B3 waste; packaging, labels and symbols; recording and reporting; as well as transporting B3 waste. Identification of B3 waste produced during the MRT-EWLP1S1 operational stage, both from each station and the Rorotan Depot, is presented in Table 2.34.

Table 2.34. Identification of B3 Waste for Operational Phase MRT-EWLP1S1

Waste Code	Waste Description	Waste Sources	Danger Category	Characteristics/ Symbol	Amount of Waste
A102d	Used battery/batteries	Generators, production machines, vehicles	1		1 piece/ Month
B105d	Used lubricating oil for hydraulics, engines, gears, lubrication, insulation, heat transmission, grit chambers, separators and/or mixtures thereof	Maintenance/ maintenance of trains and vehicles	2		1,500 l/ month
B107d	Electronic waste includes cathode ray tubes (CRT), fluorescent lamps, printed circuit boards (PCB), wire rubber.	Maintenance/ Maintenance of buildings and office equipment	2		5 kg/ month
B109d	Used filters from air pollution control facilities	Generator	2		50 kg/ month
B110d	Used rags and similar	Maintenance/ maintenance of train engines and vehicles	2		2 kg/ month

The Temporary Storage Place for B3 Waste (TPS LB3) is a building located in the Rorotan Depot area at the coordinate position UTM E 525850 : N 235375 (Figure 2.32.). The LB3 TPS location is a flood-free area and is not prone to natural disasters, and is easy to engineer in the context of environmental protection and management. TPS LB3 is planned to measure 9.15 m long, 7.65 m wide with a building height of 3.6 m including ventilation measuring 60 cm. The floor has a 2% slope towards the LB3 spill drainage channel and at the end of the channel there is a spill reservoir. A bund wall was built around the hazardous waste storage facility to anticipate leaks of used oil and prevent the spread of fire if a fire occurs.

B3 waste packaging is planned to use metal drums and/or plastic drums with lids with a capacity of 50 – 200 L. Each B3 waste packaging is marked with symbols and labels in accordance with the provisions in Minister of Environment and Forestry Regulation No. 6 of 2021. Each B3 waste package stored in TPS LB3 is placed on a pallet board with a distance between pallets of ± 60 cm.

B3 waste recording is carried out routinely every time B3 waste is received at the LB3 TPS and every time the B3 waste is handed over to LB3 users and/or LB3 processors. The results of recording B3 waste are reported to the Environmental Approval Issuing Official at least once every 6 months electronically via https ://plb3.menlhk.go.id.

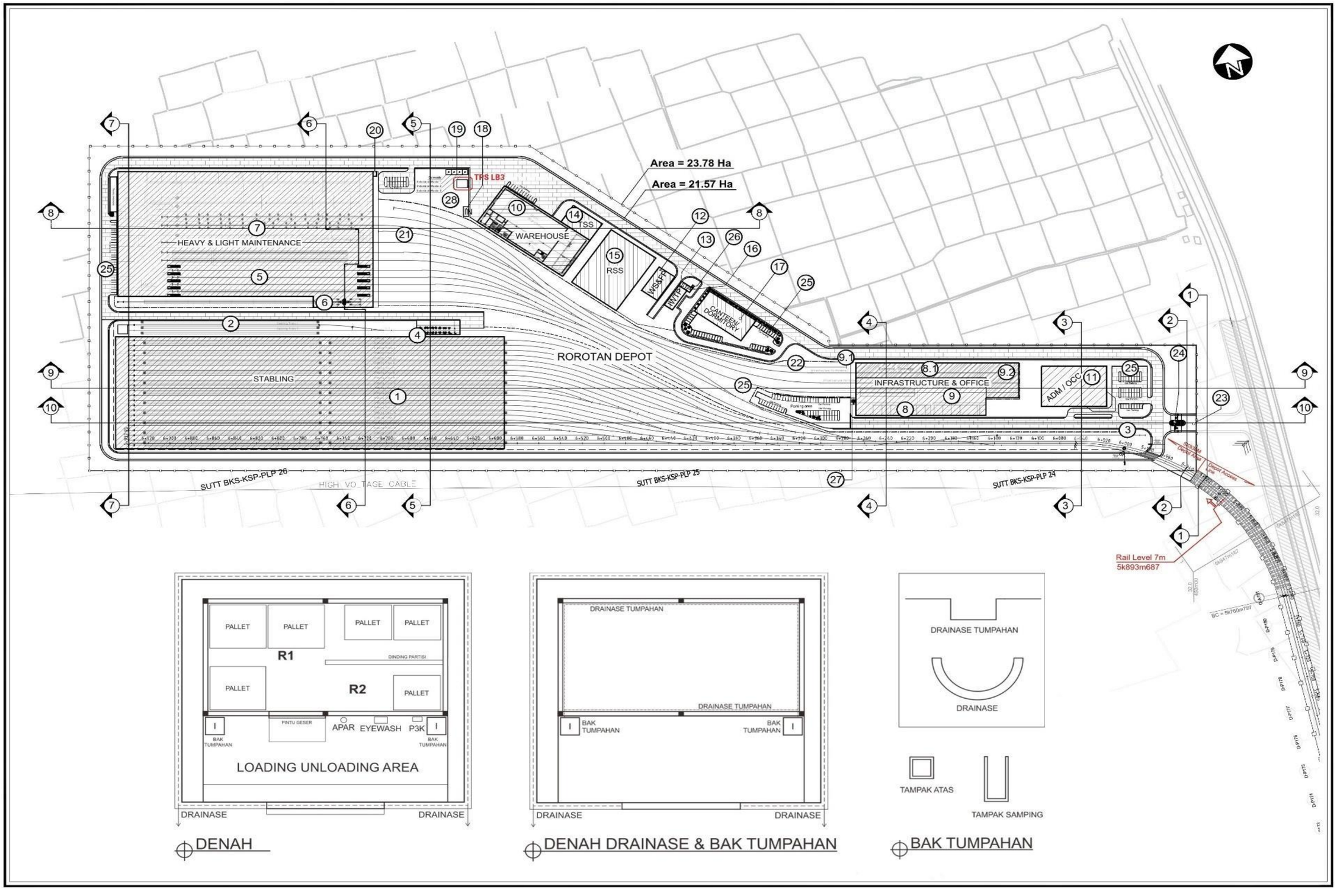


Figure 2.32. Hazardous Waste TPS Plan
(Source: JMCA, 2022)

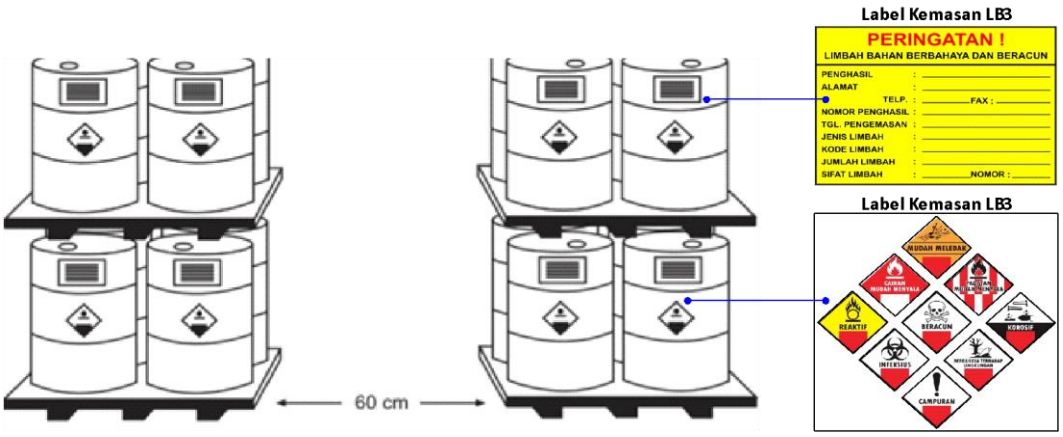


Figure 2.33. Packaging, Labels, Symbols and Placement of B3 Waste

2.2.2. Traffic Management and Engineering

Referring to the results of the Traffic Impact Analysis Study (Andalalin, 2023), the construction of the MRT-EWLP1S1 will have an impact on the performance of roads at the construction site and its surroundings, both at the construction stage and at the operational stage. The results of the comparison of road performance simulations under conditions before and during the MRT-EWLP1S1 construction work (Table 2.33.) show that there will be an increase in the Vc Ratio (the number of vehicles on one road segment at one time compared to the road capacity) value and a decrease in road traffic performance in the study area. For this reason, several efforts are recommended to manage the impact of decreasing road traffic performance in the study area, as follows:

1) Carrying out outreach to the community along the MRT-EWLP1S1 construction site route and the wider community.
2) Close the work area in the middle of the road with a work fence, so that traffic flow is not disturbed by the process of carrying out the MRT-EWLP1S1 construction work.
3) Carry out station construction work in stages for each side of the building, so as not to block the entire road at the station construction site.
4) Limiting heavy vehicle operating hours to 22.00 – 05.00 WIB or as stated in Andalalin.
5) Providing lay-by for four-wheeled vehicles for passenger drop off/pick up locations with a minimum length of 100 meters in each MRT-EWLP1S1 construction area.
6) Providing adequate pedestrian paths and road crossing facilities along the MRT-EWLP1S1 construction site.
7) Operational adjustments and affected Transjakarta Bus stops during the construction period. One way is to redesign bus stops or shift existing bus stops.
8) Resetting signals at intersections to reduce queues and improve intersection performance.
9) Clarify road markings, ensure street lighting functions properly and add no-stop signs at traffic jam points along the MRT-EWLP1S1 construction site route.

Table 2.35. Comparison of Road Section Performance in Conditions Before and During the MRT-EWLP1S1 Construction Work

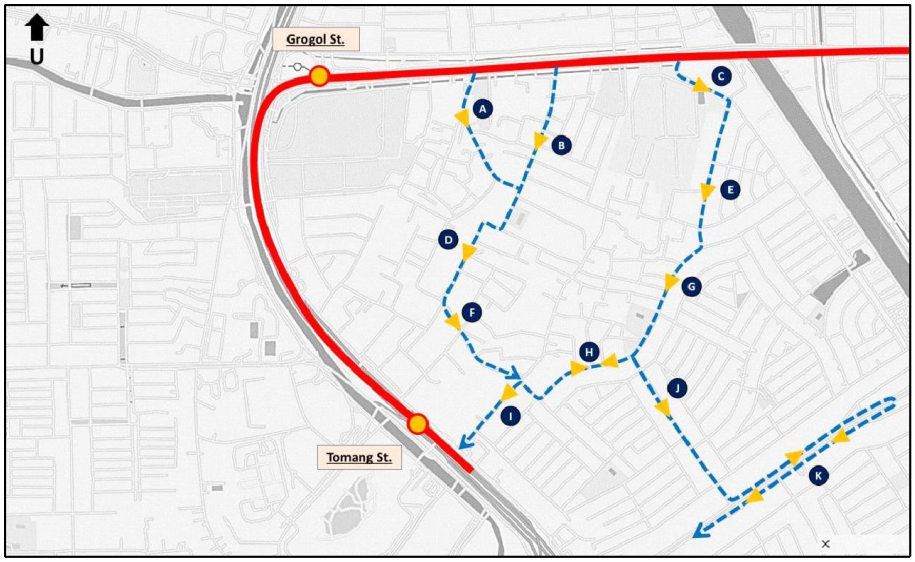
Segment	Roads	Code	Direction	Before Any Construction Work						During Construction Work						Difference in Vc ratio		Information
				Capacity	Morning			Afternoon		Capacity	Morning			Afternoon		Morning	Afternoon	
					volume	Vc ratio	LOS	volume	Vc ratio LOS		volume	Vc ratio	LOS	volume	Vc ratio LOS			
***Elevated*West**	JL. S Parman	TC1	US	4,752	5.103	1.07	F	4,743	1.00 F	4,752	5,635	1.19	F	5,235	1.10 F	0.11	0.10	Not exposed to construction fences, the pier location is on the sidewalk
			S.U	4,752	2,967	0.62	B	2,015	0.42 A	4,752	3,274	0.69	C	2,220	0.47 A	0.06	0.04	
	Jl. Kyai Tapa	TC2	TB	3,208	2,094	0.65	B	3,989	1.24 F	2,733	2,312	0.85	E	4,402	1.61 F	0.19	0.37	There is a narrowing of the lane
	Jl. Kyai Tapa	TC3	US	3,208	1,795	0.56	A	2,341	0.73 C	3,208	1,979	0.62	C	2,579	0.80 D	0.06	0.07	Not exposed to construction fences, the pier location is on the sidewalk
	Jl. Kyai Tapa	TC4	BT	4,812	4,000	0.83	D	3,291	0.68 B	4,812	4,414	0.92	E	3,631	0.76 D	0.09	0.07	Not exposed to construction fences (underground construction)
	Jl. Kyai Tapa	TC5	TB	4,812	5,187	1.08	F	6,167	1.28 F	4,812	3,892	0.81	D	6,809	1.42 F	-0.27	0.13	Not exposed to construction fences (underground construction)
	Jl. KH Hasyim Ashari	TC6	BT	3,073	2,550	0.83	D	2,271	0.74 C	3,073	2,815	0.92	E	2,508	0.82 D	0.09	0.08	Not exposed to construction fences (underground construction)
			TB	3,073	1,491	0.49	A	2,576	0.84 D	3,073	1,646	0.54	A	2,842	0.93 E	0.05	0.09	
	Jl. West Cideng and Jl. East Cideng	TC7	US	3,208	1,007	0.31	A	1,486	0.46 A	3,208	1,110	0.35	A	1,640	0.51 A	0.03	0.05	Not exposed to construction fences (underground construction)
			S.U	3,208	2,808	0.88	D	3,219	1.00 F	3,208	3,100	0.97	E	3,552	1.11 F	0.09	0.10	
	Jl. Cideng Timur access to Jl. Jati Baru Raya	TC8	UT	2,852	1,156	0.41	A	863	0.30 A	2,852	1,278	0.45	A	955	0.34 A	0.04	0.03	Not exposed to construction fences (underground construction)
Underground	Jl. Jati Baru Raya	TC9	BT	4,610	4,215	0.91	E	4,840	1.05 F	4,610	4,653	1.01	F	5,345	1.16 F	0.09	0.11	Not exposed to construction fences (underground construction)
	Jl. Kebon Sirih	TC10	BT	4,099	1,744	0.43	A	2,910	0.71 C	4,099	1,924	0.47	A	3,213	0.78 D	0.04	0.07	Not exposed to construction fences (underground construction)
	U Turn at Tugu Tani	TC11	BB	3,458	1,727	0.50	A	2,021	0.58 A	3,458	1,906	0.55	A	2,233	0.65 C	0.05	0.06	Not exposed to construction fences (underground construction)
	Jl. Kramat Kwitang	TC12	BT	2,854	2,797	0.98	F	3,366	1.18 F	2,854	3,086	1.08	F	3,693	1.29 F	0.10	0.12	Not exposed to construction fences (underground construction)
			TB	2,854	2,412	0.85	D	1,821	0.64 B	2,854	2,662	0.93	E	1,968	0.69 C	0.09	0.05	
	Jl. Lieutenant General Suprapto	TC13	BT	4,281	195	0.05	A	226	0.05 A	4,281	215	0.05	A	251	0.06 A	0.01	0.01	Not exposed to construction fences (underground construction)
			TB	4,281	1,355	0.32	A	1,246	0.29 A	4,281	837	0.20	A	1,267	0.30 A	-0.12	0.01	
	Jl. Lieutenant General Suprapto	TC14	BT	4,802	2,488	0.52	A	4,042	0.84 D	4,802	2,744	0.57	A	4,462	0.93 E	0.05	0.09	Not exposed to construction fences (underground construction)
			TB	4,802	4,461	0.93	E	4,797	1.00 E	4,802	4,924	1.03	F	5,297	1.10 F	0.10	0.10	
	Jl. Lieutenant General Suprapto	TC15	BT	5,708	2,156	0.38	A	3,608	0.63 B	5,708	2,376	0.42	A	3,985	0.70 C	0.04	0.07	Not exposed to construction fences (underground construction)
			TB	5,708	4,454	0.78	C	3,941	0.69 B	5,708	4,919	0.86	E	4,357	0.76 D	0.08	0.07	
***Elevated*East**	Jl. Perintis Kemerdekaan	TC16	UT	3,300	1,766	0.54	A	1,829	0.55 A	3,300	1,949	0.59	A	2,019	0.61 C	0.05	0.06	Not affected by construction fences, the pier location is in the median of the road
	Jl. Perintis Kemerdekaan	TC17	T.S	3,201	1,011	0.32	A	1,142	0.36 A	3,201	1,113	0.35	A	1,262	0.39 A	0.03	0.04	Not affected by construction fences, the pier location is in the median of the road
	Jl. Perintis Kemerdekaan	TC18	BT	5,708	2,592	0.45	A	5,272	0.92 E	5,708	2,860	0.50	A	5,820	1.02 F	0.05	0.10	Not hit by construction fences or project fences on the Transjakarta route
			TB	5,708	3,240	0.57	A	1,685	0.30 A	5,708	3,576	0.63	C	1,861	0.33 A	0.06	0.03	

Segment	Roads	Code	Direction	Before Any Construction Work						During Construction Work						Difference in Vc ratio		Information
				Capacity	Morning			Afternoon		Capacity	Morning			Afternoon		Morning	Afternoon	
					volume	Vc ratio	LOS	volume	Vc ratio LOS		volume	Vc ratio	LOS	volume	Vc ratio LOS			
	Jl. Perintis Kemerdekaan	TC19	BT	5,708	2,898	0.51	A	4,684	0.82 D	4,281	3,203	0.75	D	5,143	1.20 F	0.24	0.38	There is a narrowing of the lane
			TB	5,708	4,420	0.77	C	3,043	0.53 A	4,281	3,185	0.74	D	3,361	0.79 D	-0.03	0.25	
	Jl. Raya Bekasi	TC20	BT	3.102	1,582	0.51	A	2,372	0.77 C	1,551	1,741	1.12	F	2,618	1.69 F	0.61	0.92	There is a narrowing of the lane
			TB	3.102	2,573	0.83	D	1,582	0.51 A	1,551	2,840	1.83	F	1,747	1.13 F	1.00	0.62	
	Jl. Raya Bekasi	TC21	BT	4,190	2,063	0.49	A	4,864	1.16 F	4,190	2,281	0.54	A	5,369	1.28 F	0.05	0.12	Not exposed to construction fences, the pier location is on the sidewalk
			TB	4,190	4,069	0.97	E	1,944	0.46 A	4,190	4,491	1.07	F	2,148	0.51 A	0.10	0.05	
	Jl. Raya Bekasi	TC22	BT	4,653	1,996	0.43	A	4,747	1.02 F	4,653	2,206	0.47	A	5,240	1.13 F	0.05	0.11	Not exposed to construction fences, the pier location is on the sidewalk
			TB	4,653	4,796	1.03	F	2,044	0.44 A	4,653	5,293	1.14	F	2,257	0.49 A	0.11	0.05	
	Jl. Raya Bekasi	TC23	BT	3,066	1,895	0.62	B	2,694	0.88 D	3,066	2,049	0.67	C	2,972	0.97 E	0.05	0.09	Not exposed to construction fences, the pier location is on the sidewalk
			TB	3,066	3,768	1.23	F	4,186	1.37 F	3,066	4,066	1.33	F	4,622	1.51 F	0.10	0.14	
***Elevated*East**	Jl. Raya Bekasi	TC24	BT	3.102	1,117	0.36	A	2,707	0.87 D	1,676	1,209	0.72	C	2,989	1.78 F	0.36	0.91	There is a narrowing of the lane
			TB	3.102	2,009	0.65	B	1,222	0.39 A	1,676	2,173	1.30	F	1,349	0.81 D	0.65	0.41	
	Jl. Raya Bekasi	TC26	US	3,201	2,096	0.66	B	2,858	0.89 D	1,729	2,315	1.34	F	3,155	1.83 F	0.68	0.93	There is a narrowing of the lane
			S.U	3,201	2,704	0.85	D	2,450	0.77 C	1,729	2,983	1.73	F	2,706	1.57 F	0.88	0.80	
	Jl. Raya Bekasi	TC27	BT	2,073	833	0.40	A	1,485	0.72 C	-	-	-	-	-	- -	-	-	There was a complete road closure
			TB	2,073	1,143	0.55	A	1,472	0.71 C	-	-	-	-	-	- -	-	-	
	Jl. Raya Bekasi	TC28	US	2,904	2,126	0.73	C	2,467	0.85 D	2,904	2,346	0.81	D	2,725	0.94 E	0.08	0.09	Not exposed to construction
			S.U	2,904	2,481	0.85	D	2,051	0.71 C	2,904	2,736	0.94	E	2,268	0.78 D	0.09	0.08	
Depot	Jl. Inspeksi Kanal Timur	TC25	US	4,418	212	0.05	A	214	0.05 A	4,418	228	0.05	A	236	0.05 A	0.00	0.01	Not affected by construction fences, the pier location is in the median of the road
			S.U	4,418	460	0.10	A	885	0.20 A	4,418	496	0.11	A	979	0.22 A	0.01	0.02	

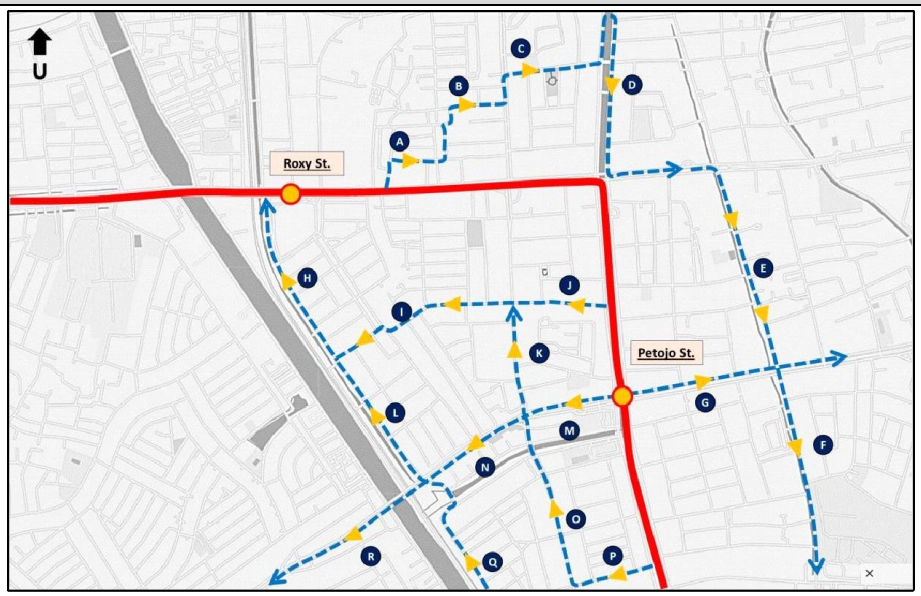
Source: Andalalin Jakarta MRT East – West Line Report (2023)

10) Implement a ban on right turns at every intersection on the MRT-EWLP1S1 construction route, to avoid crossings that occur at that intersection.
11) Implementing an odd-even system on roads at the MRT-EWLP1S1 construction site during the construction period in order to reduce vehicle volume density that occurs during peak hours (morning and evening).
12) Additional Transjakarta Bus frequency specifically for the MRT-EWLP1S1 construction area to divert the movement of people who will use this route using public transportation.
13) Provide warning signs or notifications to avoid road sections affected by MRT-EWLP1S1 construction work.
14) Divert traffic flow via alternative roads (Table 2.34) on the North and South sides of the MRT-EWLP1S1 construction route.
15) Provide signs indicating alternative route routes on diverted road sections.
16) Sterilization and improvement of alternative routes, in the form of resurfacing, marking repairs, and other potential improvements.
17) Parking management on construction routes and alternative routes, to ensure parking availability and support community activities around the project. Provide several on street parking points in each construction area.
18) Controlling sidewalks and side obstacles by officers, so that road capacity and supporting facilities can be used optimally.

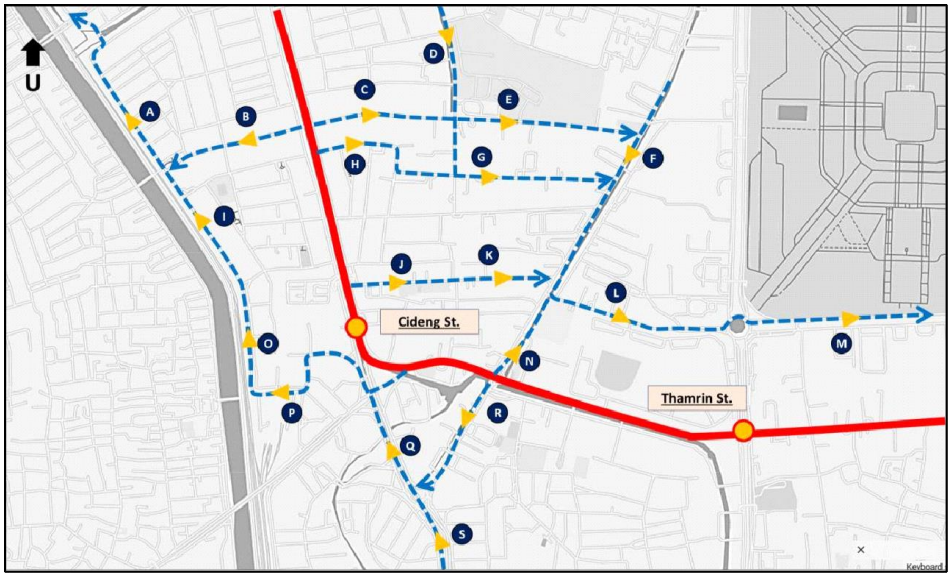
Table 2.36. Recommendations for Diverting Traffic Flow Through Alternative Roads

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
Jl. S. Parman – Jl. Kyai Tapa				
				
A	**Jl. Tanjung Gedong**	**2/2 UD**	**4**	
B	**Jl. Tawakal Raya**	**2/2 UD**	**5**	

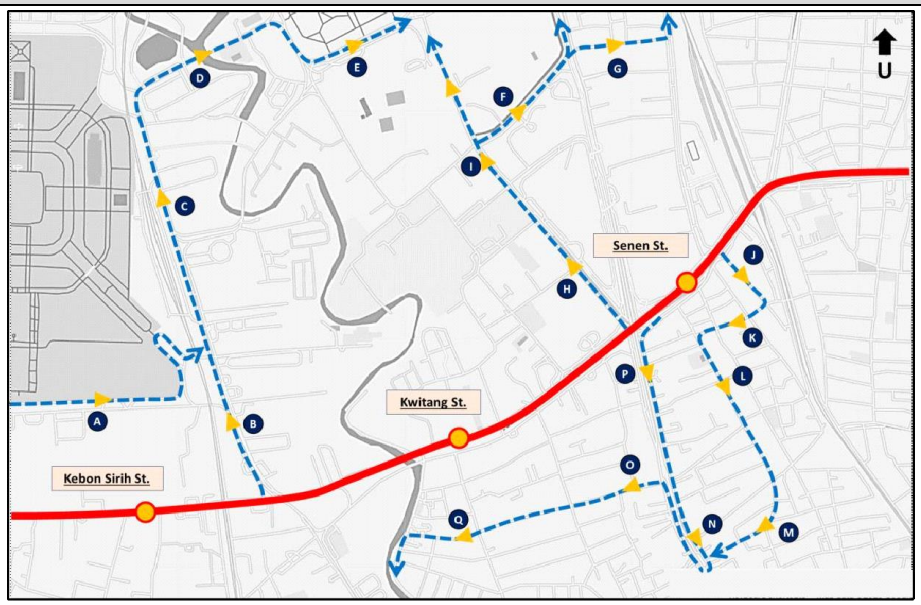
Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
C	Jl. Tomang Utara 1	2/2 UD	6	
D	Jl. Tawakal Ujung	2/2 UD	6	
E	Jl. Mandala Utara	2/2 UD	6	
F	Jl. Tawakal Ujung	1/1	3	
G	Jl. Mandala Utara	2/2 UD	6	
H	Jl. Utara Mandala	2/2 UD	6	
I	Jl. Gelong Baru Utara	2/2 UD	7	
J	Jl. Mandala Raya	2/2 UD	7	
K	Jl. Tomang Raya	2/6 D	18	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
Jl. KH. Hasyim Ashari – Jl. Cideng Timur				
				
A	Jl. Duri B 1	1/1	2.5	
B	Jl. Cibunar	2/2 UD	5.5	
C	Jl. Petojo Barat V	2/2 UD	5	
D	Jl. Cideng Timur/Barat	2/6 D	17.5	
E	Jl. AM Sangaji	2/2 UD	14	
F	Jl. Kesehatan	2/2 UD	11	
G	Jl. Balikpapan	2/6 D	30.5	

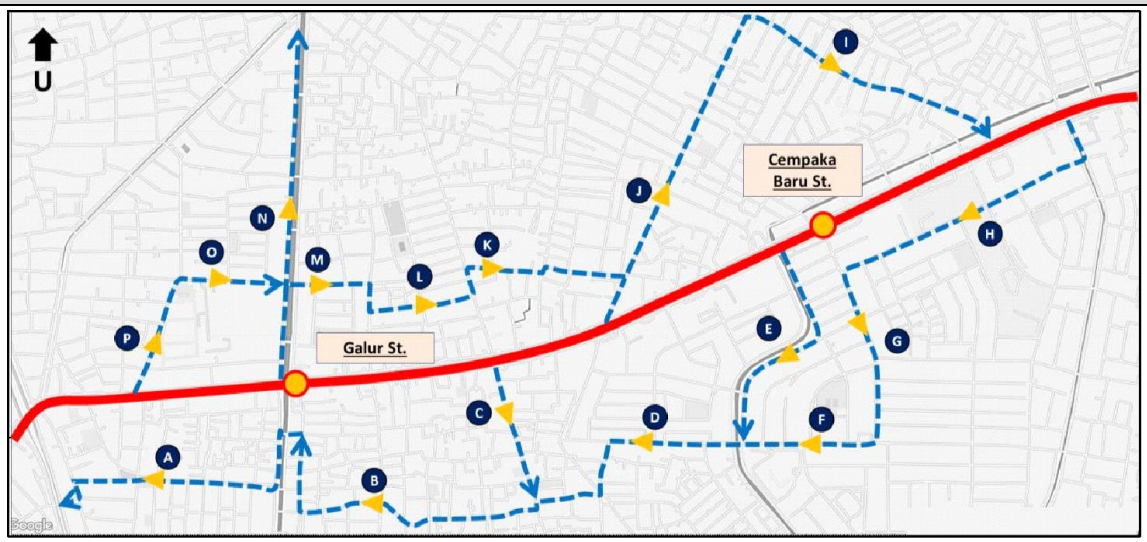
Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
H	Jl. Tanjung Selor	2/2 UD	7	
I	Jl. Ternate	2/2 UD	6	
J	Jl. Petojo Selatan VII	2/2 UD	5	
K	Jl. Biak	2/2 UD	14	
L	Jl. Tanjung Selor	2/2 UD	7	
m	Jl. Kyai Caringin	2/6 UD	21	
N	Jl. Tomang Raya	2/6 UD	20	
O	Jl. Musi	2/2 UD	7	
P	Jl. Tanah Abang II	2/2 UD	7	
Q	Jl. Belawan	2/2 UD	5.5	
R	Jl. Tomang Raya	2/2 UD	9.1	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
Jl. Cideng Timur – Jl. Jati Baru Raya – Jl. Kebon Sirih				
				
A	Jl. Belawan	2/2 UD	5.5	
B	Jl. Tanah Abang II	2/2 UD	7	
C	Jl. Tanah Abang II	2/2 UD	7	
D	Jl. Kesehatan	2/2 UD	11	
E	Jl. Tanah Abang II	2/2 UD	7	
F	Jl. Abdul Muis	2/4 D	14	
G	Jl. Tanah Abang III	2/2 UD	8	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
H	Jl. Petojo Sabangan II	1/1	3.5	
I	Jl. Citarum	2/2 UD	5.5	
J - K	Jl. Tanah Abang V	1/1	3.5	
L	Jl. Budi Mulia	2/4 UD	13.5	
m	Jl. Medan Merdeka Selatan	2/8 D	27.2	
N	Jl. Abdul Muis	2/2 UD	14	
O	Jl. Citarum	2/2 UD	7.5	
P	Jl. Taman Jati Baru	2/2 UD	8.6	
Q	Jl. H. Fachrudin	1/2	6.57	
R	Jl. H. Fachrudin	1/4	14.7	
S	Jl. KH Mas Mansyur	2/4 UD	13.5	

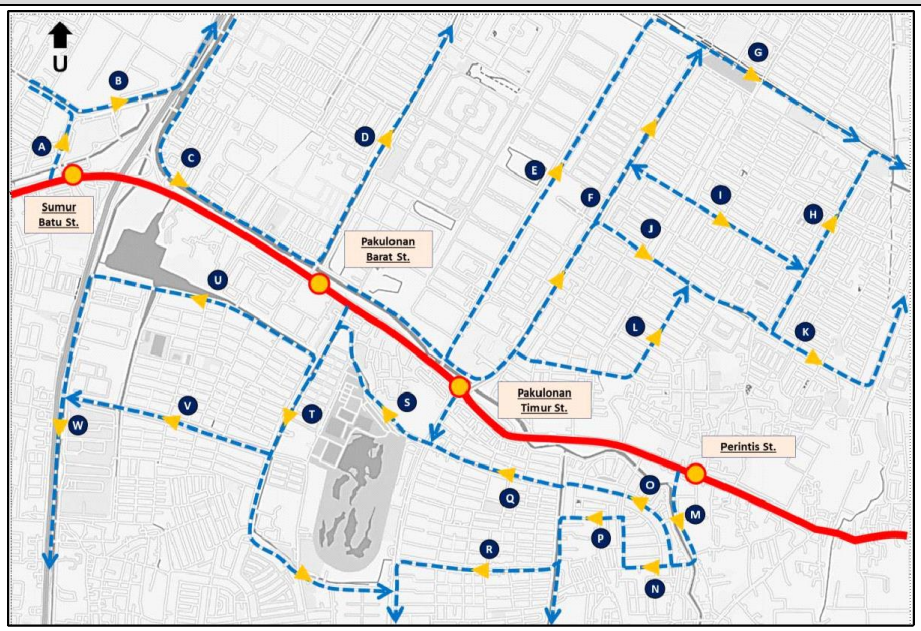
Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
Jl. SIrih Garden – Jl. Arief Rachman Hakim – Jl. Lieutenant General Suprapto				
				
A	Jl. Medan Merdeka Selatan	2/8 D	27.2	
B	Jl. MI Ridwan Rais	2/6 D	24.5	
C	Jl. Medan Merdeka Timur	1/6	22.7	
D	Jl. Perwira	1/3	10.5	
E	Jl. Wipe. Bull South	1/4	13.5	
F	Jl. Senen Raya IV	2/4 D	14	
G	Jl. Mount Sahari 1	1/1	4	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
H	Jl. Senen Raya	1/4	14	
I	Jl. Senen Raya	1/5	17.5	
J	Jl. Jasmine	1/1	4	
K	Jl. Gandasuli	1/1	3.5	
L	Jl. Kramat Pulo	2/2 UD	5.5	
m	Jl. Kramat Pulo	2/2 UD	5.5	
N	Jl. Kramat Raya	2/6 D	25.6	
O	Jl. Kramat II	2/2 UD	7	
P	Jl. Kramat Raya	1/2	6	
Q	Jl. Flower III	1/1	5.5	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
Jl. Letjen. Suprapto (St. Galur – St. Cempaka Baru)				
				
A	Jl. Balarama	2/2 UD	6.5	
B	Jl. RW. South 1	1/1	3	
C	Jl. Asem Base	2/2 UD	6.5	
D	Jl. Cempaka Putih Barat	2/2 UD	7	
E	Jl. Cempaka Putih Middle	2/2 UD	7.2	
F	Jl. Cempaka Putih Raya	2/2 UD	7	
G - H	Jl. Cempaka Putih Middle	2/2 UD	7.2	

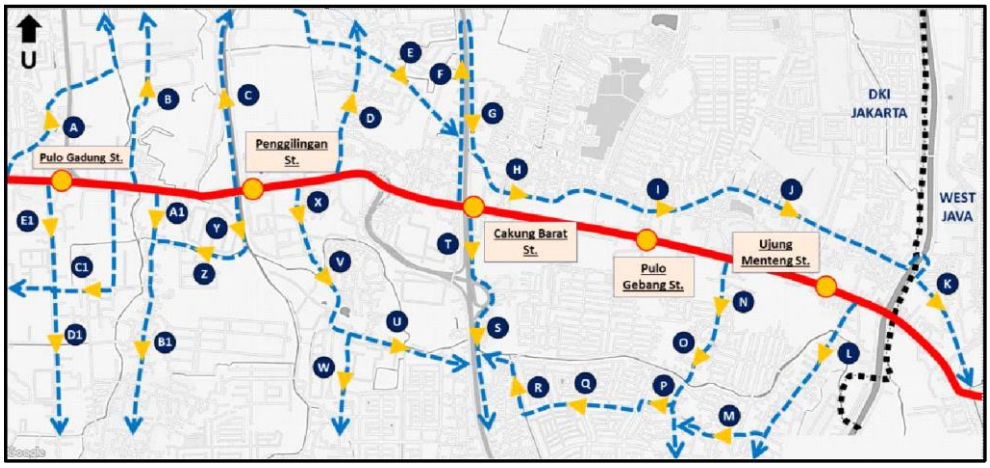
Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
I	Jl. Batu Raya Well	2/2 UD	6.5	
J	Jl. East Cempaka Baru	1/1	3.5	
K	Jl. Cempaka Sari I	1/1	3	
L	Jl. Harapan Mulia I	1/1	3.5	
m	Jl Sukamulia 1	2/2 UD	6.5	
N	Jl. West/East Highlands	2/4 D	14	
O - P	Jl. East Kalibaru III/V	2/2 UD	6	

Jl. Letjen. Suprapto – Jl Perintis Independen



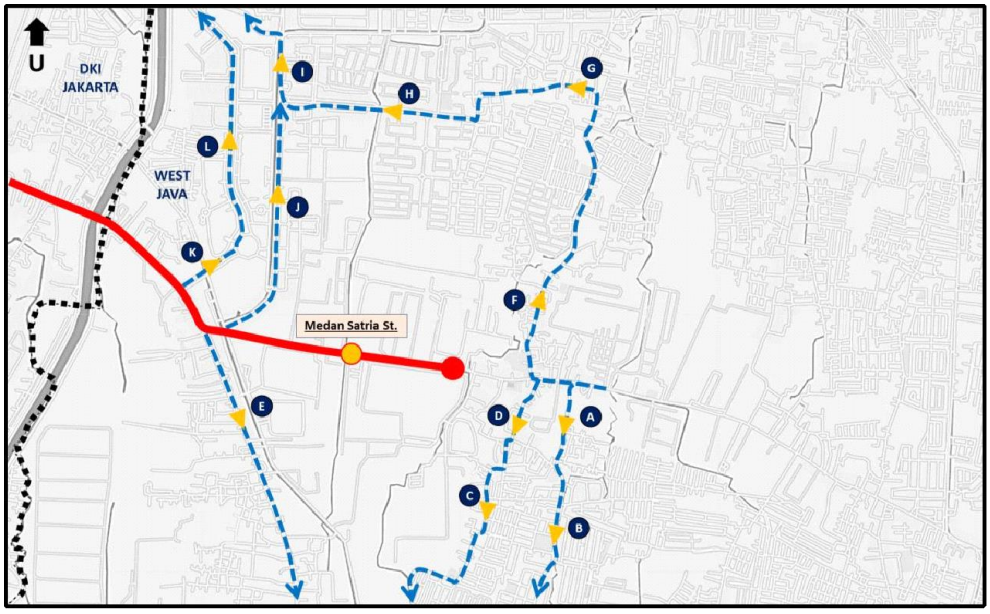
Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
A	Jl. Cempaka Mas Utama	2/6 UD	22.4	
B	Jl. North Cempaka Mas	2/4 UD	14.5	
C	Jl. Gading Raya	1/1	3.5	
D	Jl. Hill Boulevard Gading Raya	2/4 UD	14	
E	Jl. Greater Midrib	2/2 UD	7	
F	Jl. Grand Boulevard	2/6 D	21.5	
G	Jl. East Boulevard	2/8 D	28.5	
H	Jl. Western Grand Dance	2/4 D	14	
I	Jl. Cengkir Raya Coconuts	2/4 D	13.5	
J	Jl. Raya Kelapa Kopyor	2/4 D	13	
K	Jl. Accordion	2/4 D	14.5	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
L	Jl. Great Quail	2/2 UD	7	
m	Jl. Sunter	2/2 UD	6.5	
N	Jl. Kayu Mas Selatan 7	1/1	3.5	
O	Jl. Kayu Mas Timur Raya	2/2 UD	6	
P	Jl. Maswood 1	2/2 UD	5.5	
Q	Jl. East Nangka Pulo	2/2 UD	6	
R	Jl. Kayuputih III	2/2 UD	6	
S	Jl. White Wood (Side South)	2/2 UD	6.5	
Q	Jl. East Pulo Mas	2/4 D	15	
U	Jl. North Mas Pulo	2/2 UD	7	
V	Jl. Pulo Mas	2/4 D	15	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
W	**Jl. Gen. Ahmad Yani**	**2/4 D**	**16.5**	
Jl. Raya Bekasi (St. Pulo Gadung – to St. Ujung Menteng)				
				
A	**Jl. H. Oyar**	**1/1**	**3.5**	
B	**Jl. Krama Yudha**	**2/2 UD**	**5.5**	
C	**Jl. Cakung Inspection Drains**	**2/2 UD**	**6**	
D	**Jl. Tipar Cakung**	**2/2 UD**	**7**	
E	**Jl. Pam Inspection**	**2/2 UD**	**5**	
F	**Jl. Cakung Cilincing Raya (North direction)**	**1/3**	**11**	
G	**Jl. Cakung Cilincing Raya (Southern Direction)**	**1/3**	**11**	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
H	Jl. People's Hall	2/2 UD	5.5	
I	Jl. People's Hall	2/2 UD	6	
J	Jl. Irrigation	2/2 UD	5.5	
K	Jl. Irrigation Channels Gempol	2/2 UD	6	
L	Jl. Rw Yellow	2/2 UD	6	
m	Jl. Self-Help Post	2/2 UD	5.5	
N	Jl. Raya Pulo Gebang	2/2 UD	7	
O	Jl. Raya Pulo Gebang	2/2 UD	7	
P	Jl. Pulo Gebang Permai	2/2 UD	6	
Q	Jl. Pulo Java	2/4 D	13.5	
R	Jl. Andalas Raya Island	2/2 UD	7	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
S	Jl. Cakung Cilincing East	2/2 UD	7.5	
Q	Jl. Cakung Cilincing East	2/2 UD	8	
U	Jl. Wathoniyah	1/1	3	
V	Jl. Mill Kingdom	2/2 UD	7	
W	Jl. Mill Kingdom	2/2 UD	7	
X	Jl. Mill Kingdom	2/2 UD	7	
Y	Jl. Inspection	1/2	3.5	
Z	Jl. Inspection	1/2	3.5	
A1	Jl. Dr. KRT Radjiman Widyodiningrat	2/4 D	14	
B1	Jl. Dr. KRT Radjiman Widyodiningrat	2/4 D	14	
C1	Jl. Pulo Gadung 1	2/2 UD	7	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
D1	Jl. Pulo Gadung	2/4 D	14	
E1	Jl. Pulo Gadung	2/4 D	14	
Jl. Raya Bekasi – Jl. Kali Abang Tengah				
				
A	Jl. Ceger Self-Help	1/1	3	
B	Jl. Raya Seroja	2/2 UD	6.5	
C	Jl. Flamboyant	2/2 UD	6	
D	Jl. Raya Seroja	2/2 UD	6.5	
E	Jl. Kaliabang Bungur	2/2 UD	6.5	

Code	Street Name	Lane/Lane	Road Width (m)	Street Photo
F	Jl. Raya Bungur	2/2 UD	7	
G	Jl. Kalia Ilir's Brother	1/1	3	
H	Jl. Greater Green Boulevard	2/8 D	27.5	
I - J	Jl. Beautiful Hope	2/8 D	28	
K	Jl. Raya Bekasi	2/8 D	28	
L	Jl. Beautiful Hope Boulevard	2/6 D	21	

Information:

UD : road without median

D : the road has a median

Soource: Andalalin 2023

Meanwhile, the results of a comparison of the simulation of road performance in 2029 under conditions without and with the operation of the MRT-EWLP1S1 (Table 2.37) show that there will be a decrease in the Vc Ratio value and an increase in traffic performance on several road sections in the study area. To maintain and improve the traffic performance of roads along the MRT-EWLP1S1 route, several management efforts are recommended, as follows:

1) Immediately dismantle notification signs and route instructions for alternative routes when construction work has been completed, so that motorists do not have to detour to look for alternative routes.
2) Providing crossing facilities for pedestrians and vehicles wishing to turn from the South or North.
3) Implementing an odd-even system along the road section where the MRT-EWLP1S1 station is located to reduce vehicle volume on that road section.
4) Creation of zebra crossings at every intersection for pedestrians.
5) Controlling sidewalks and side obstacles (especially in the area around the MRT-EWLP1S1 station) by officers so that road capacity and supporting facilities can be used optimally.

2.2.3. Environmental Management as Part of the Work Plan

The environmental management plan that has been prepared as part of the MRT-EWLP1S1 work plan is presented in Table 2.37.

Table 2.37. Comparison of Road Performance in 2029 in Conditions Without and with MRT-EWLP1S1 in Operation

Segment	Roads	Code	Direction	No MRT							By MRT							Difference in Vc ratio	
				Capacity	Morning			Afternoon			Capacity	Morning			Afternoon			Morning	Afternoon
					Show the	Vc ratio	LOS	volume	Vc ratio	LOS		volume	Vc ratio	LOS	volume	Vc ratio	LOS		
***Elevated*West**	JL. S Parman	TC1	US	4,752	5,863	1.23	F	5,451	1.15	F	4,752	5,277	1.11	F	4,906	1.03	F	-0.12	-0.12
			S.U	4,752	3,406	0.72	C	2,315	0.49	A	4,752	3,065	0.65	C	2,084	0.44	A	-0.07	-0.05
	Jl. Kyai Tapa	TC2	TB	3,208	2,408	0.75	D	4,583	1.43	F	3,208	2,167	0.68	C	4,124	1.29	F	-0.08	-0.14
	Jl. Kyai Tapa	TC3	US	3,208	2,062	0.64	C	2,685	0.84	D	3,208	1,856	0.58	A	2,417	0.75	D	-0.06	-0.08
	Jl. Kyai Tapa	TC4	BT	4,812	4,596	0.96	E	3,780	0.79	D	4,812	4,136	0.86	E	3,402	0.71	C	-0.10	-0.08
	Jl. Kyai Tapa	TC5	TB	4,812	4,050	0.84	E	7,083	1.47	F	4,812	3,645	0.76	D	6,374	1.33	F	-0.08	-0.15
	Jl. KH Hasyim Ashari	TC6	BT	3,073	2,932	0.95	E	2,612	0.85	E	3,073	2,639	0.86	E	2,351	0.77	D	-0.10	-0.09
			TB	3,073	1,716	0.56	A	2,955	0.96	E	3,073	1,544	0.50	A	2,660	0.87	E	-0.06	-0.10
	Jl. West Cideng and Jl. East Cideng	TC7	US	3,208	1,156	0.36	A	1,705	0.53	A	3,208	1,040	0.32	A	1,535	0.48	A	-0.04	-0.05
			S.U	3,208	3,226	1.01	F	3,694	1.15	F	3,208	2,904	0.91	E	3,324	1.04	F	-0.10	-0.12
	Jl. Cideng Timur access to Jl. Jati Baru Raya	TC8	UT	2,852	1,331	0.47	A	993	0.35	A	2,852	1,198	0.42	A	893	0.31	A	-0.05	-0.04
Underground	Jl. Jati Baru Raya	TC9	BT	4,610	4,844	1.05	F	5,562	1.21	F	4,610	4,360	0.95	E	5,005	1.09	F	-0.11	-0.12
	Jl. Kebon Sirih	TC10	BT	4,099	2,004	0.49	A	3,344	0.82	D	4,099	1,804	0.44	A	3,010	0.73	C	-0.05	-0.08
	U Turn at Tugu Tani	TC11	BB	3,458	1,982	0.57	A	2,325	0.67	C	3,458	1,784	0.52	A	2,093	0.61	C	-0.06	-0.07
	Jl. Kramat Kwitang	TC12	BT	2,854	3,214	1.13	F	3,864	1.35	F	2,854	2,893	1.01	F	3,478	1.22	F	-0.11	-0.14
			TB	2,854	2,770	0.97	E	2,091	0.73	C	2,854	2,493	0.87	E	1,882	0.66	C	-0.10	-0.07
	Jl. Lieutenant General Suprapto	TC13	BT	4,281	225	0.05	A	261	0.06	A	4,281	202	0.05	A	235	0.06	A	-0.01	-0.01
			TB	4,281	1,321	0.31	A	1,193	0.28	A	4,281	1,189	0.28	A	1,074	0.25	A	-0.03	-0.03
	Jl. Lieutenant General Suprapto	TC14	BT	4,802	2,860	0.60	A	4,646	0.97	E	4,802	2,574	0.54	A	4,182	0.87	E	-0.06	-0.10
			TB	4,802	5.125	1.07	F	5,513	1.15	F	4,802	4,613	0.96	E	4,962	1.03	F	-0.11	-0.12
	Jl. Lieutenant General Suprapto	TC15	BT	5,708	2,476	0.43	A	4,148	0.73	C	5,708	2,228	0.39	A	3,733	0.65	C	-0.04	-0.07
			TB	5,708	5.118	0.90	E	4,537	0.80	D	5,708	4,606	0.81	D	4,083	0.72	C	-0.09	-0.08
	Jl. Perintis Kemerdekaan	TC16	UT	3,300	2,031	0.62	C	2,103	0.64	C	3,300	1,828	0.55	A	1,893	0.57	A	-0.06	-0.06
	Jl. Perintis Kemerdekaan	TC17	T.S	3,201	1,160	0.36	A	1,316	0.41	A	3,201	1,044	0.33	A	1,185	0.37	A	-0.04	-0.04
	Jl. Perintis Kemerdekaan	TC18	BT	5,708	2,973	0.52	A	6,054	1.06	F	5,708	2,675	0.47	A	5,448	0.96	E	-0.05	-0.11
			TB	5,708	3,719	0.65	C	1,937	0.34	A	5,708	3,348	0.59	A	1,743	0.31	A	-0.07	-0.03
***Elevated*East**	Jl. Perintis Kemerdekaan	TC19	BT	5,708	3,335	0.58	A	5,353	0.94	E	5,708	3,001	0.53	A	4,818	0.84	E	-0.06	-0.09
			TB	5,708	3,335	0.58	A	3,496	0.61	C	5,708	3,001	0.53	A	3,147	0.55	A	-0.06	-0.06
	Jl. Raya Bekasi	TC20	BT	3.102	1,815	0.59	A	2,727	0.88	E	3.102	1,633	0.53	A	2,455	0.79	D	-0.06	-0.09
			TB	3.102	2,957	0.95	E	1,815	0.59	A	3.102	2,661	0.86	E	1,633	0.53	A	-0.10	-0.06
	Jl. Raya Bekasi	TC21	BT	4,190	2,370	0.57	A	5,590	1.33	F	4,190	2,133	0.51	A	5,031	1.20	F	-0.06	-0.13
			TB	4,190	4,675	1.12	F	2,234	0.53	A	4,190	4,207	1.00	F	2,010	0.48	A	-0.11	-0.05
	Jl. Raya Bekasi	TC22	BT	4,653	2,292	0.49	A	5,456	1.17	F	4,653	2,063	0.44	A	4,910	1.06	F	-0.05	-0.12
			TB	4,653	5,510	1.18	F	2,347	0.50	A	4,653	4,959	1.07	F	2,113	0.45	A	-0.12	-0.05
	Jl. Raya Bekasi	TC23	BT	3,066	2,179	0.71	C	3,095	1.01	F	3,066	1,961	0.64	C	2,785	0.91	E	-0.07	-0.10
			TB	3,066	4,336	1.41	F	4,811	1.57	F	3,066	3,903	1.27	F	4,330	1.41	F	-0.14	-0.16
	Jl. Raya Bekasi	TC24	BT	3,351	1,279	0.38	A	3,109	0.93	E	3,351	1,151	0.34	A	2,798	0.84	D	-0.04	-0.09
			TB	3,351	2,312	0.69	C	1,401	0.42	A	3,351	2,081	0.62	C	1,261	0.38	A	-0.07	-0.04
	Jl. Raya Bekasi	TC26	US	3,458	2,409	0.70	C	3,281	0.95	E	3,458	2,168	0.63	C	2,953	0.85	E	-0.07	-0.10
***Elevated*East**			S.U	3,458	3,100	0.90	E	2,814	0.81	D	3,458	2,790	0.81	D	2,532	0.73	C	-0.09	-0.08
	Jl. Raya Bekasi	TC27	BT	2,073	953	0.46	A	1,708	0.82	D	2,073	858	0.41	A	1,537	0.74	D	-0.05	-0.08
			TB	2,073	1,307	0.63	C	1,697	0.82	D	2,073	1,177	0.57	A	1,527	0.74	C	-0.06	-0.08
	Jl. Raya Bekasi	TC28	US	2,904	2,442	0.84	E	2,834	0.98	E	2,904	2,198	0.76	D	2,551	0.88	E	-0.08	-0.10
			S.U	2,904	2,844	0.98	E	2,361	0.81	D	2,904	2,560	0.88	E	2,125	0.73	C	-0.10	-0.08
Depot	Jl. Inspeksi Kanal Timur	TC25	US	4,418	245	0.06	A	246	0.06	A	4,418	221	0.05	A	222	0.05	A	-0.01	-0.01

Segment	Roads	Code	Direction	No MRT							By MRT							Difference in Vc ratio	
				Capacity	Morning			Afternoon			Capacity	Morning			Afternoon			Morning	Afternoon
					Show the	Vc ratio	LOS	volume	Vc ratio	LOS		volume	Vc ratio	LOS	volume	Vc ratio	LOS		
			S.U	4,418	529	0.12	A	1,019	0.23	A	4,418	476	0.11	A	917	0.21	A	-0.01	-0.02

Information :

US : North South

S.U: South North

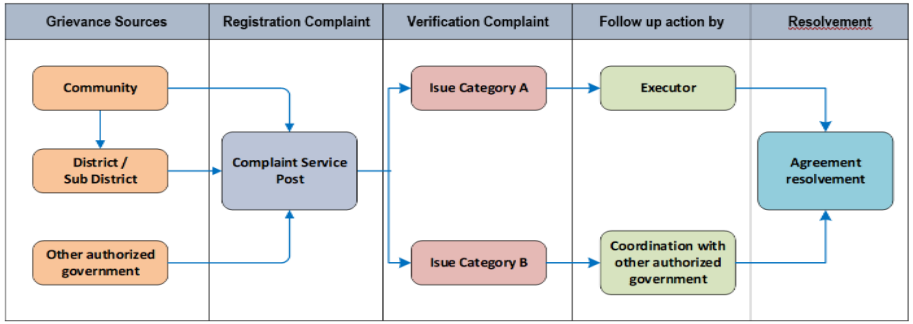
TB : East West

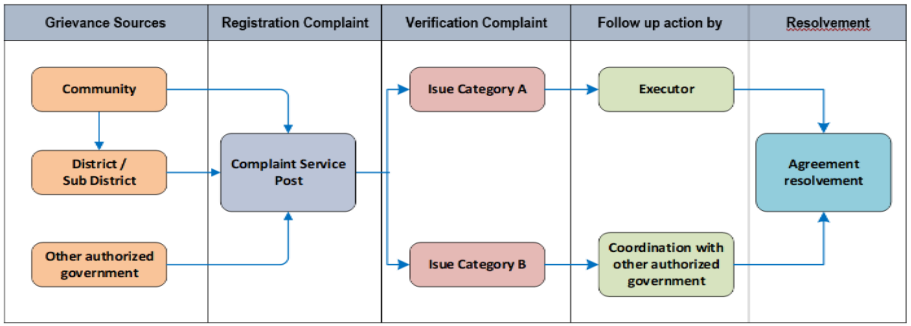
BT: East West

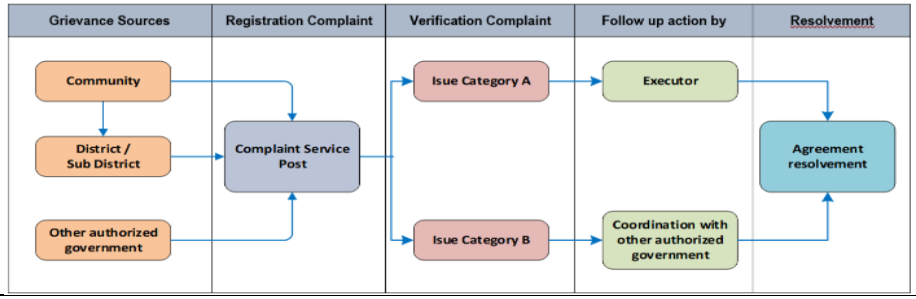
LOS : Level of Service

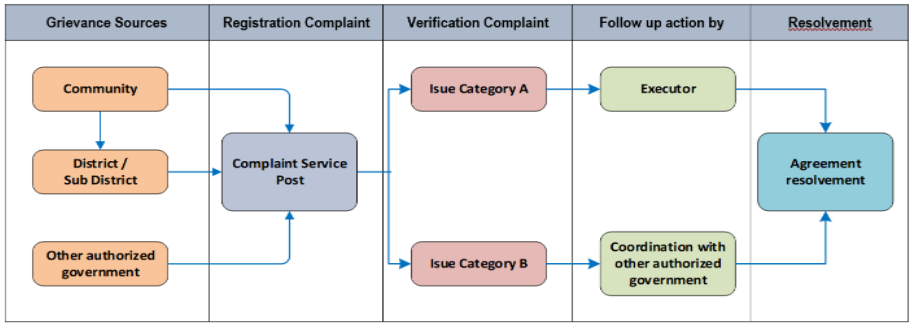
Source: Andalalin Jakarta MRT East – West Line Report (2023)

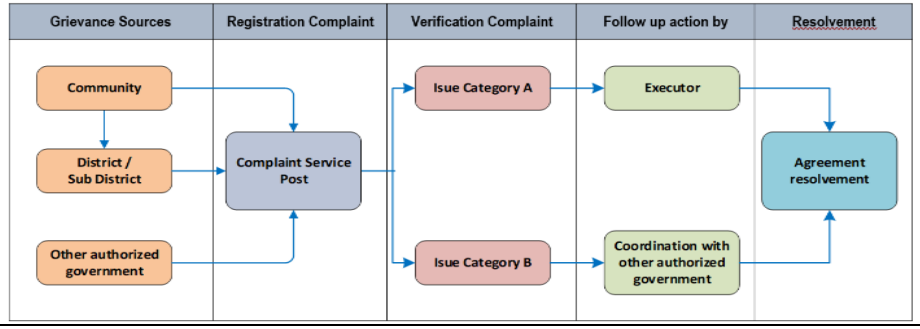
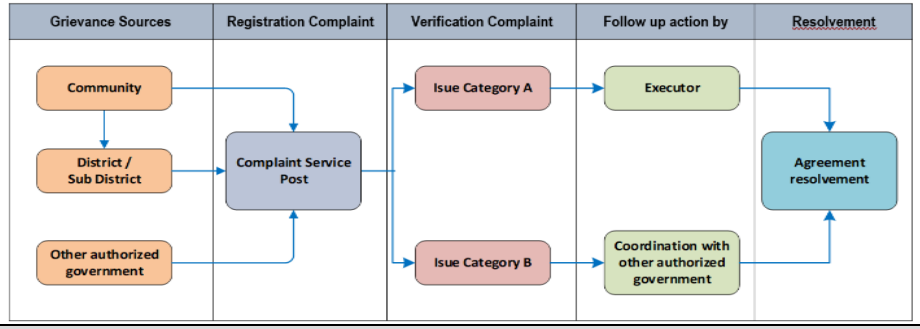
Table 2.38. Management Plan Prepared as Part of the Work Plan

Planned Activities that Have the Potential to Cause Environmental Impacts	Environmental Components Affected	Potential Impact	Management Plan Prepared as Part of the Work Plan
Construction Phase			
1. Basecamp Operations	Public health: Environment sanitation	Generation of Wastewater	● providing portable MCKs equipped with septic tanks at each basecamp location (BC-Depo, BC-UG and BC-ELV) ● carry out regular Wastewater suction in collaboration with the PAL Jaya Regional Company.
	Public health: Environment sanitation	Garbage arises	● providing segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes at each basecamp location (BC-Depo, BC-UG and BC-ELV) ● transporting waste to the landfill periodically in collaboration with the DKI Jakarta Government
	Public health: Environment sanitation	Emergence b3 waste	● provide temporary storage for non-permanent B3 waste (TPS LB3) at each basecamp location (BC-Depo, BC-UG and BC-ELV) ● carry out LB3 transportation periodically for further handling in collaboration with a third party who has an LB3 transportation permit from the Ministry of Environment and Forestry.
2. Land Cleaning and Relocation of Public Facilities/Utilities	Biology: Land vegetation	Decreased density of land vegetation	● carry out the removal and/or felling and replacement of protective trees after obtaining a felling permit from the authorized agency. ● replanting shade trees that are removed and/or planting replacements for trees cut down as part of landscaping work in locations that have been determined according to permission from the competent authority
	Socio-cultural: Environmental Disorders	Dust, noise, puddles/floods and traffic disturbances	● coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for land clearing work and relocation of public facilities/utilities ● providing a Complaint Service Post to accommodate public complaints regarding the implementation of land clearing work and relocation of public facilities/utilities ● handle public complaints using the following mechanism: 

Planned Activities that Have the Potential to Cause Environmental Impacts	Environmental Components Affected	Potential Impact	Management Plan Prepared as Part of the Work Plan
			Source of Complaints Parties who may submit complaints: individuals (community), sub-districts/districts and other government authorities. **Complaint Service Post** Providing a Complaints Service Post at each stage of activity with the contractor and HSE supervised by the Supervisory Consultant as the representative in charge of the activity. **Complaint Verification** Complaint Service Post members verify the status of complaints received: ▪ Category A: Problems that can be repaired and resolved by contractors in the field. ▪ Category B: Issues that must be coordinated with other government authorities. **Complaint Follow-up** ▪ Category A: Followed up by the contractor within a certain time based on agreement with the Community. ▪ Category B: Followed up by the contractor in coordination with the relevant government agency. **Complaint Resolution** The settlement process will involve the party submitting the complaint to obtain an official settlement agreement.
3. Mobilization of Construction Equipment and Materials	Socio-cultural: Environmental Disorders	Dust, noise, puddles/floods and traffic disturbances	● coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for the mobilization of construction equipment and materials ● providing a Complaint Service Post to accommodate public complaints regarding the implementation of the work of mobilizing construction equipment and materials ● handle public complaints using the following mechanism: 

Planned Activities that Have the Potential to Cause Environmental Impacts	Environmental Components Affected	Potential Impact	Management Plan Prepared as Part of the Work Plan
4. Earthworks and Dewatering			
a. West Elevated and East Elevated Segments	Geophysics-Chemistry: Vibration	Increased vibration	● Carrying out construction work at ground level begins with the installation of a protective casing which functions to resist vibrations ● Carrying out pier drilling is carried out using a drilling auger machine only at drilling points where a protective casing has been installed
	Socio-cultural: Environmental Disorders	Dust, noise, puddles/floods and traffic disturbances	● coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering ● providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering ● handle public complaints using the following mechanism: 
b. Underground Segment	Geophysics-Chemistry: Vibration	Increased vibration	● carrying out earthworks for underground station construction starting with the installation of a guide wall (G-wall) & diaphragm wall (D-wall) which functions as a retaining wall for the station structure and to withstand vibrations ● carry out underground tunnel excavations with a Tunnel Boring Machine (TBM) which directly lines the tunnel walls with concrete at the same time as a retaining wall for the tunnel structure and resists vibrations. ● regulate the excavation speed of the TBM drilling machine according to the geologist's recommendations
	Geophysics-Chemistry: Hydrogeology	Decrease in ground water level	● Carrying out earthworks for underground station construction begins with installing a guide wall (G-wall) & diaphragm wall (D-wall) which functions as a retaining wall for the station structure and groundwater seepage (design criteria for water leakage ratio ≤ 0.12 L/m^2. day and every 10 m ≤ 0.20 L/m^2.day) ● carrying out underground tunnel excavations with an EPB type Tunnel Boring Machine (TBM) which immediately lines the tunnel walls with concrete at the same time to prevent leaks and groundwater seepage (design criteria for water leakage ratio ≤ 0.12 L/m^2.day and every 10 m ≤ 0.20 L/m^2.day) and has features to control soil flow and water pressure around the tunnel.

Planned Activities that Have the Potential to Cause Environmental Impacts	Environmental Components Affected	Potential Impact	Management Plan Prepared as Part of the Work Plan
	Geophysics-Chemistry: Hydrogeology	Decreased groundwater quality	● provide a dewatering water storage pond ● utilize dewatering water for construction activity needs ● periodically suction the remaining unused dewatering water in collaboration with the PAL Jaya Regional Company.
	Socio-cultural: Environmental Disorders	Dust, noise, puddles/floods and traffic disturbances	● coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering ● providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering ● handle public complaints using the following mechanism: 
4. Underground Construction Work	Geophysics-Chemistry: Vibration	Increased vibration	● carrying out underground station construction work starting with the installation of a guide wall (G-wall) & diaphragm wall (D-wall) which functions as a retaining wall for the station structure and to withstand vibrations ● carrying out underground tunnel construction work in parallel with tunnel excavation using a Tunnel Boring Machine (TBM) which directly covers the tunnel walls with concrete at the same time as a retaining wall for the tunnel structure and resisting vibrations.
	Socio-cultural: Environmental Disorders	Dust, noise, puddles/floods and traffic disturbances	● coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering ● providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering

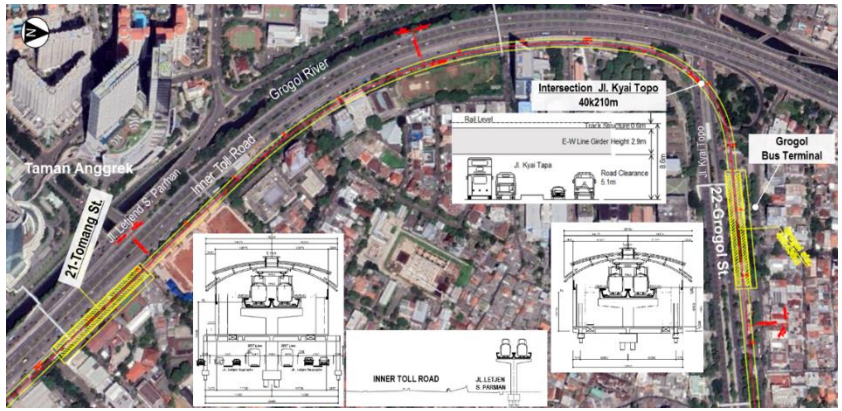
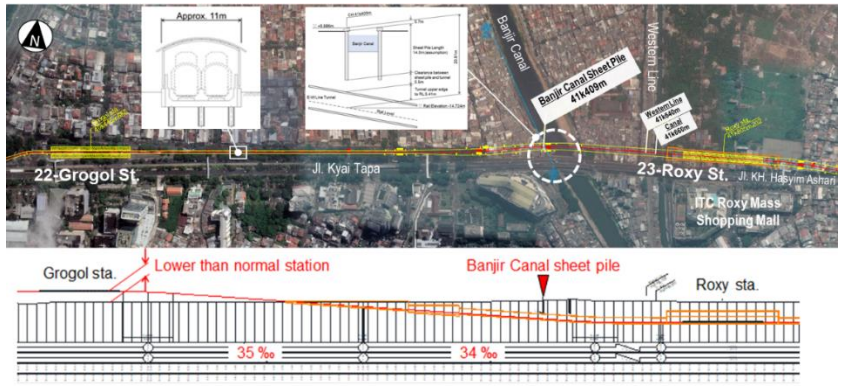
Planned Activities that Have the Potential to Cause Environmental Impacts	Environmental Components Affected	Potential Impact	Management Plan Prepared as Part of the Work Plan
			● handle public complaints using the following mechanism: 
5. Construction work at ground level	Geophysics-Chemistry: Vibration	Increased vibration	● Carrying out construction work at ground level begins with the installation of a protective casing which functions to resist vibrations ● Carrying out pier drilling is carried out using a drilling auger machine only at drilling points where a protective casing has been installed
	Socio-cultural: Environmental Disorders	Dust, noise, puddles/floods and traffic disturbances	● coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering ● providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering ● handle public complaints using the following mechanism: 
Operational Stage			
1. Passenger Transportation & Station Operations	Public health: Environment sanitation	Generation of Wastewater	● providing a Sewage Treatment Plan (STP) with an anaerobic-aerobic biofilter system ● periodically suctioning STP processed wastewater in collaboration with PD PAL Jaya. ● for St. Roxy, Petojo, Cideng, Thamrin and Kebon Sirih will be connected to the city IPAL channel

Planned Activities that Have the Potential to Cause Environmental Impacts	Environmental Components Affected	Potential Impact	Management Plan Prepared as Part of the Work Plan
	Public health: Environment sanitation	Garbage arises	● providing segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes at each MRT station ● periodically transporting waste to the landfill in collaboration with the DKI Jakarta and Bekasi City Governments
	Public health: Environment sanitation	Emergence b3 waste	● provide a transit place for B3 waste (± 5 m^3) at each MRT station ● carry out regular transportation of LB3 to TPS LB3 at the Rorotan Depot location in collaboration with a third party who has an LB3 transportation permit from the Ministry of Environment and Forestry.
	Geophysics-Chemistry: Air Quality	Decreased Air Quality	● provide toll gates at the access route to enter the parking area and separate parking areas for bicycles, 2-wheeled and 4-wheeled motorized vehicles ● provide adequate air ventilation, exhaust fans and blowers at the parking basement location ● provide first aid kits and oxygen cylinders at the basement parking location ● providing green open space/landscaping with tree species that absorb emissions, including: ganitri, bungur, cempaka, kembang merak, saputangan, tanjung, asam kranji, kiara payung, etc.
2. Train Maintenance and Depot Operations	Public health: Environment sanitation	Generation of Wastewater	● providing a Sewage Treatment Plan (STP) with an anaerobic-aerobic biofilter system for domestic wastewater treatment ● providing an industrial Wastewater treatment plant (IWTP) with a sand and activated carbon coagulation-filtration system for processing MRT train washing Wastewater and workshop activities. ● recirculate or reuse 35% of IWTP processed water for MRT train washing and workshop activities ● carry out regular suction of IWTP and STP processed wastewater in collaboration with PD PAL Jaya.
	Public health: Environment sanitation	Garbage arises	● providing segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes ● transporting waste to the landfill periodically in collaboration with the DKI Jakarta Government
	Public health: Environment sanitation	Emergence b3 waste	● provide TPS for B3 waste (capacity ± 50 m^3) ● carry out LB3 transportation periodically for further handling in collaboration with a third party who has an LB3 transportation permit from the Ministry of Environment and Forestry.

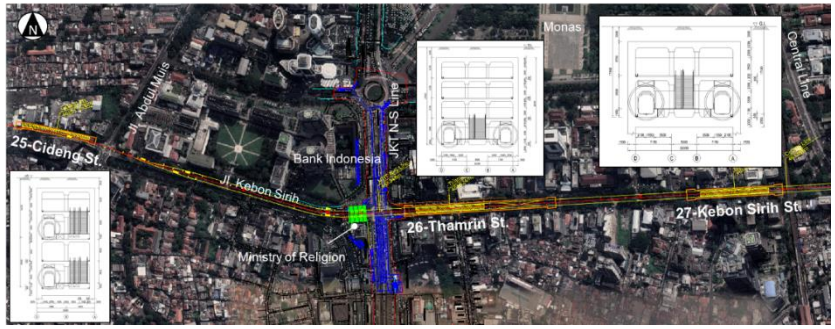
2.3. Relationship between the location of the planned activity and the surrounding area

Based on the Basic Design Engineering Services for MRT-EWLP1S1 (JMCA, 2022), there are several control points related to the surrounding area and are taken into consideration in planning the MRT-EWLP1S1 route as explained in Table 2.39.

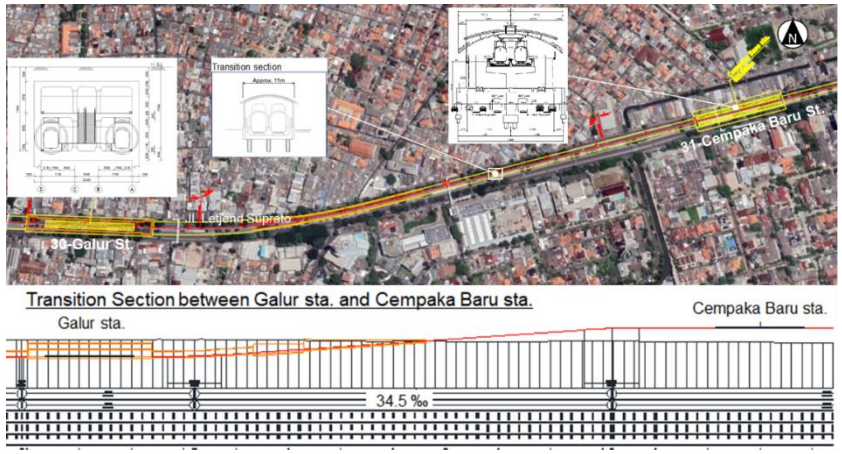
Table 2.39. Relationship between the location of the planned activity and the surrounding area

Segment	Description
I. West Elevated Segment (St. Tomang - St. Roxy)	
 Tomang Station – Grogol Station	The Tomang Station line (39k137m) - Grogol Station (40k445m) is an elevated line 1,308 km long. Considering that the Jakarta Inner Ring Road (JIRR) is in the middle of Jl. Letjen. S. Parman, the MRT line is planned to be on the sidewalk of Jl. Letjen. S. Parman (eastern side of JIRR). Tomang Station (level +20.4 m and area 4,689.17 m^2) is planned to be on the sidewalk of Jl. Letjen S. Parman which is adjacent to the S. Parman Podomoro City TransJakarta Bus Stop (K08-18 and K09-20) and the PT Office area. Telkom Indonesia. The MRT line then crosses Jl. Kyai Tapa at 40k210m. Assuming the height of the MRT line girder is 2.9 m, the height of the MRT train tracks from the road surface is at least 8.6 m. Grogol Station (level +9.30 m and area 4,219.78 m^2) is planned to be in the Grogol Integrated Terminal area on the north side of Jl. Kyai Tapa. The station is located close to each other and will be integrated with the Grogol TransJakarta Bus Stop (K03-11) which is on Jl. Kyai Tapa.
 Grogol Station – Roxy Station	The Grogol Station line (40k445m) - Roxy Station (41k805m) is a transition line (elevated to underground) along 1,360 km. The elvated line from Grogol Station is 0.394 km long to the transition section at 40k849m which is also planned as a cut box area (western part) for the MRT-EWLP1S1 underground construction. It is planned that the gradient between Grogol station and the transition point will be 35‰, so that Grogol station will be an elevated station which is lower than other elevated stations. After that, the MRT line is an underground line with a width of ± 11 m which is under Jl. Kyai Tapa and Jl. KH. Hasyim Ashari. The MRT line passes under the Banjir Kanal sheet pile at 41k409m, the KRL Commuterline western line at 41k640m and the canal at 41k660m. With the Flood Canal bridge and flyover on Jl. KH. Hasyim Ashari, the MRT underground tunnel must avoid the pile foundations of the two structures. The planned gradient between the transition point and the Banjir Kanal sheet pile is 34‰. The elevation of the top edge of the pile was recorded at +5,886 m with a sheet pile length of 14.0 m. The clearance between the piles and the tunnel is planned to be 0.5 m, so the elevation of the MRT train track at 41k409m will be -14,724 m.

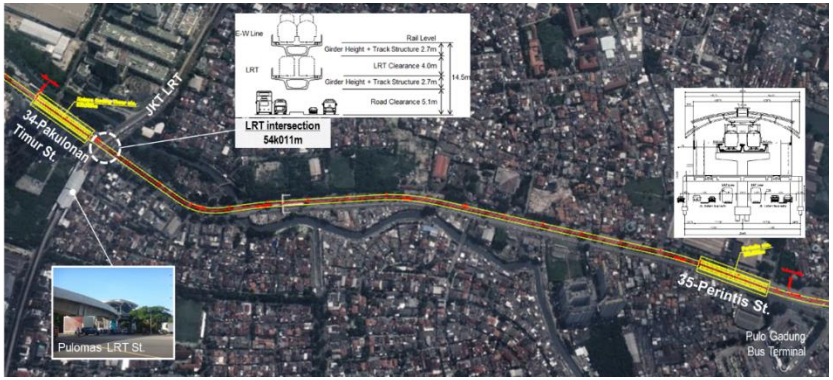
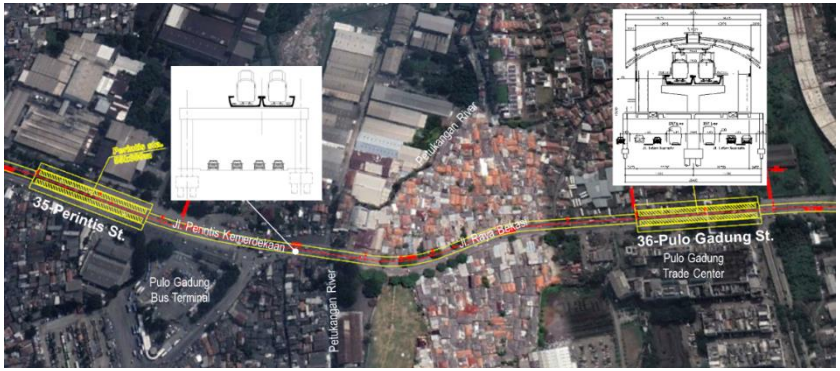
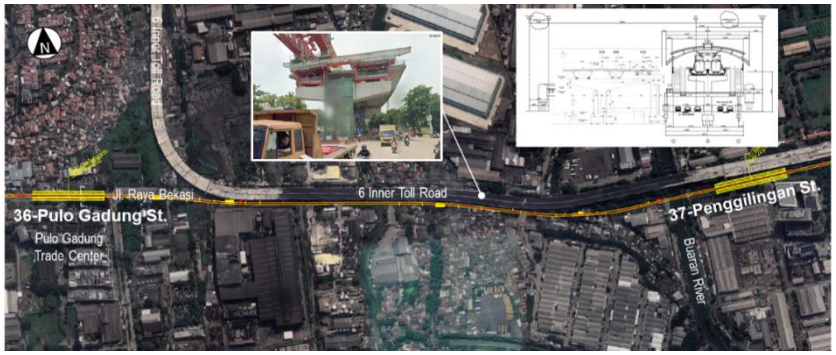
Segment	Description
II. Underground Segment (St. Roxy – St. Galur)	
 Roxy Station – Petojo Station	The Roxy Station line (41k805m) - Petojo Station (42k985m) is an underground line 1,180 km long. Roxy Station (level -23.74 m and area 4,343 m^2) is planned to be on the north side of Jl. KH. Hasyim Ashari and opposite ITC Roxy Mass Shopping Mall. The Roxy Station (41k805m) - Petojo Station (42k985m) line is under Jl. KH. Hasyim Ashari along 0.745 km, then turn onto Jl. Cideng Timur with a bend radius of 160 m at 42k550m. The MRT train line passes under the Cideng Canal concrete pile at 42k620m. Referring to the design drawing for the Cideng Canal rehabilitation project, it is assumed that the length of the concrete pillar is 4 m. Therefore, the depth from the ground surface to the rail surface is planned to be ± 15.38 m. Next, the underground route is parallel to the Cideng Canal for 0.435 km to Petojo Station. With the wide condition of Jl. East Cideng ± 13 m, so the MRT train line tunnels are arranged vertically. Petojo Station (level -29.05 m and area 2,938.08 m^2) is planned to be on the north side of the Jl. East Cideng – Jl. Balikpapan – Jl. Kyai Caringin.
 Cideng Station	The underground line Petojo Station (42k985m) - Cideng Station (44k516m) is under Jl. East Cideng and parallel to the Cideng Canal for 1,531 Km, then turn onto Jl. Kebon Sirih with a bend radius of 160 m at 44k300m to Cideng Station. Cideng Station (level -30.25 m and area 3,648.40 m^2) is planned to be on the north side of Jl. Kebon Sirih, close to Tasik Cideng Market and the intersection of Jl. Kebon Sirih – Jl. Abdul Muis. In this area there are also development plans by private companies. Detailed discussions will be held with the developer regarding the design of the MRT train line tunnel that passes under this development area.

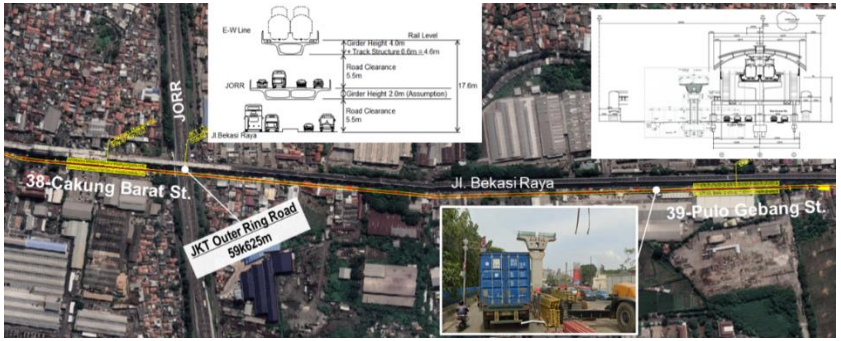
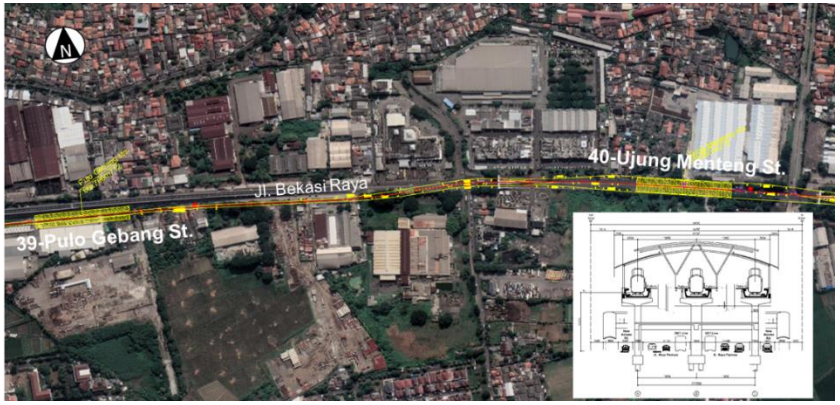
Segment	Description
 Cideng Station - Thamrin Station – Kebon Sirih Station	The underground line Cideng Station (44k516m) - Thamrin Station (45k533m) is under Jl. Kebon Betel is 1,017 km long. Thamrin Station (level -27.30 m and area 9,423.74 m^2) is planned to be on the north side of Jl. Kebon Sirih, close to the intersection of Jl. Kebon Sirih – Jl. MH Thamrin and City Hall TransJakarta Bus Stop (K02-22). Thamrin Station is planned as a transfer station between MRT-EWLP1S1 and Jakarta MRT North – South Line (JMRT-NS) with several considerations: ● It is estimated that many passengers will transfer at this transfer station. ● Improved passenger services will attract more passengers. ● Reduction of operation & maintenance costs by sharing carriage maintenance, materials, spare parts and depot between MRT-EWLP1S1 and JMRT-NS. ● The merge can also serve as a bypass in an emergency
At this location, the MRT-EWLP1S1 tunnel passes under the JMRT-NS station. The distance between the JMRT-NS station box and the MRT-EWLP1S1 tunnel is at least 1 x D (tunnel diameter), so the position of Thamrin Station is -27.30 m and deeper than a normal underground station. The underground line Thamrin Station (45k533m) - Kebon Sirih Station (46k239m) is under Jl. Kebon Betel is 0.706 km long. Therefore, a maximum gradient of 35‰ will be applied to make the Kebon Sirih station shallower. Kebon Sirih Station (level -22.50 m and area 4,464.75 m^2) is planned to be on the north side of Jl. Kebon Sirih, close to the intersection of Jl. Kebon Sirih – Jl. Srikaya II, Gondangdia Station – Gambir Station railway line and Gambir 2 TransJakarta Bus Stop (K02-23).	
 Kebon Sirih Station - Kwitang Station	The underground line Kebon Sirih Station (46k239m) - Kwitang Station (47k074m) is under Jl. Kebon Sirih – Jl. Arief Rachman Hakim – Jl. Kramat Kwitang is 0.835 km long. Kwitang Station (level -15.90 m and area 4,838.37 m^2) is planned to be on the median (RTH) of the double track Jl. Kramat Kwitang and coincides with the location of the Kwitang TransJakarta Bus Stop (K02-24).

Segment	Description
 Kwitang Station - Senen Station	The underground line Kwitang Station (47k074m) - Senen Station (47k913m) is under Jl. Kramat Kwitang – Jl. Letjen. Suprapto along 0.839 km. On this route there is a High Voltage Air Line (SUTT) belonging to PT PLN. Therefore, detailed discussions will be held with PT PLN regarding options for relocating the SUTT tower. Apart from that, there is an underpass in the middle of Jl. Kramat Kwitang near Senen station, plans to develop 6 inner toll roads on Jl. Kramat Kwitang and a shopping center are being built on the north side of Jl. Kramat Kwitang. To minimize collisions with these activities, Senen Station (level -29.45 m and area 3,940.50 m^2) is planned to be located on the south side of Jl. Letjen Suprapto and close to the TransJakarta Senen Bus Stop (K02-12).
 Galur Station	The underground line Senen Station (47k913m) - Galur Station (49k345m) is under Jl. Letjen. Suprapto along 1,432 km. Galur Station (level -16.40 m and area 5,373.16 m^2) is planned to be on the median (RTH) of the double track Jl. Letjen Suprapto which is close to the Galur TransJakarta Bus Stop (K02-11) and Rawa Selatan (K02-10).

Segment	Description
III. East Elevated Segment (St. Galur - St. Medan Satria)	
 Galur Station – Cempaka Baru Station	The Galur Station line (49k345m) - Cempaka Baru Station (50k620m) is a transition line from the 1 km underground line to the transition section at 50k345m (also planned as the eastern cut box area) to the 0.275 km long elevated line. The planned gradient between Galur and Cempaka Baru stations is 34.5 ‰. Cempaka Baru Station (level +13.80 m and area 5,215.12 m^2) is planned to be on the median (RTH) of the double track Jl. Letjen. Suprapto which coincides with the location of the Central Cempaka TransJakarta Bus Stop (K02-08).
 Cempaka Baru Station - Sumur Batu Station	The Cempaka Baru Station line (50k620m) - Sumur Batu Station (51k559m) is an elevated line 0.939 km long and is planned to be on the median (RTH) of the double track Jl. Lieutenant General Suprapto. Sumur Batu Station (level +19.50 m and area 5,286.99 m^2) is planned to be on the median (RTH) of the double track Jl. Letjen. Suprapto which coincides with the location of the East Cempaka TransJakarta Bus Stop (K02-06).

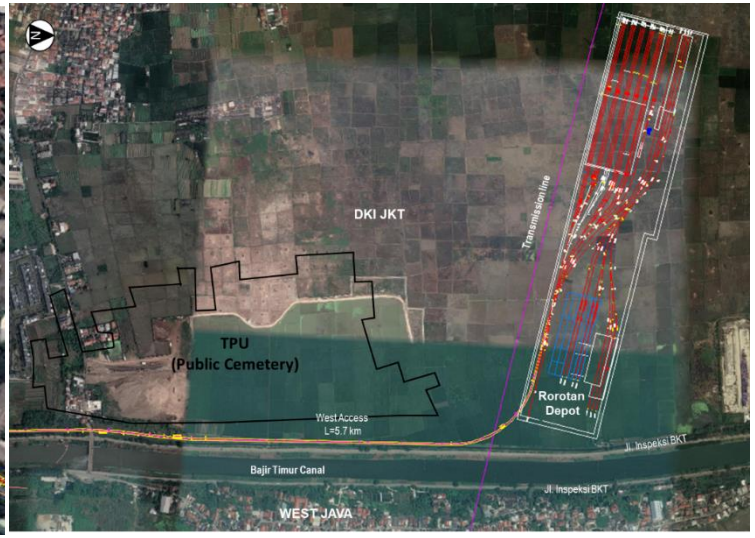
Segment	Description
 Sumur Batu Station – West Pakulon Station	The Sumur Batu Station line (51k559m) – West Pakulon Station (52k805m) is an elevated line 1,246 km long and is planned to be on the median (RTH) of the double track Jl. Letjen Suprapto and Jl. Perintis Kemerdekaan. The MRT train line will cross the Jakarta Inner Ring Road (JIRR) at 51k969m. The surface elevation of the JIRR road is 13,538 m (JICA, 2013). Assuming the girder height is 5.1 m, the planned MRT rail track elevation is 24,738 m. West Pakulon Station (level +13.80 m and area 4,220.78 m^2) is planned to be on the median (RTH) of the double track Jl. Perintis Kemerdekaan which is adjacent to the ASMI TransJakarta Bus Stop (K02-04).
 West Pakulon Station - East Pakulon Station	The West Pakulon Station line (52k805m) - East Pakulon Station (53k857m) is an elevated line 1,052 km long and is planned to be on the median (RTH) of the double track Jl. Perintis Kemerdekaan. East Pakulon Station (level +16.40 m and area 4,220.77 m^2) is planned to be on the median (RTH) of the double track Jl. Perintis Independen is close to the Pulomas LRT station and coincides with the location of the Pulomas TransJakarta Bus Stop (K02-03).

Segment	Description
 East Pakulon Station - Perintis Station	The East Pakulon Station line (53k857m) - Perintis Station (55k865m) is an elevated line 2,008 km long and is planned to be on the median (RTH) of the double track Jl. Perintis Kemerdekaan. The MRT train line will cross the LRT at 54k011m. Assuming the height of the LRT line is 7.8 m, the height of the MRT train line is at least 14.5 m from the road surface. Perintis Station (level +13.80 m and area 5,104.97 m^2) is planned to be on the median (RTH) of the double track Jl. Perintis Kemerdekaan which is close to the Pulo Gadung Bus Terminal and the Pulo Gadung TransJakarta Bus Stop.
 Perintis Station - Pulo Gadung Station	The Perintis Station line (55k865m) - Pulo Gadung Station (56k602m) is an elevated line 0.737 km long and is planned to be on the median of the double track Jl. Perintis Independen and Jl. Raya Bekasi. Pulo Gadung Station (level +13.80 m and area 5,208.22 m^2) is planned to be in the median of the double track Jl. Raya Bekasi which is close to the Pulo Gadung Trade Center (PTC) and the PTC Pulo Gadung TransJakarta Bus Stop.
 Pulo Gadung Station - Penggilingan Station	The Pulo Gadung Station line (56k602m) - Penggilingan Station (58k224m) is an elevated line 1,622 km long and is planned to be on the south side of Jl. Raya Bekasi and 6 Inner Toll Road. Assuming the height of the toll road is 7.1 m, the height of the MRT train line is at least 16.1 m from the road surface. The Penggilingan Station (level +14.60 m and area 3,694.27 m^2) is planned to be on the south side of Jl. Raya Bekasi and 6 Inner Toll Road, and close to the Cakung United Tractor TransJakarta Bus Stop.

Segment	Description
 Penggilingan Station - West Cakung Station	The Pilingan Station line (58k224m) - West Cakung Station (59k485m) is an elevated line 1,261 km long and is planned to be on the south side of Jl. Raya Bekasi and 6 Inner Toll Road. The MRT train line will cross 6 inner toll roads at 58k984m and 59k085m. Assuming the height of the toll road is 7.1 m, the height of the MRT train line is at least 16.1 m from the road surface. West Cakung Station (level +17.10 m and area 3,694.27 m^2) is planned to be on the south side of Jl. Raya Bekasi, close to the Bekasi Raya Toll Gate and the Cakung Cilincing TransJakarta Bus Stop.
 West Cakung Station - Pulo Gebang Station	The West Cakung Station line (59k485m) - Pulo Gebang Station (60k807m) is an elevated line 1,322 km long and is planned to be on the south side of Jl. Raya Bekasi. The MRT train line will cross the Jakarta Outer Ring Road (JORR) at 59k625m. Assuming the road height is 7.5 m, the height of the MRT train line is at least 17.6 m from the road surface. Pulo Gebang Station (level +16.10 m and area 3,694.27 m^2) is planned to be on the south side of Jl. Raya Bekasi, close to TransJakarta Lion Metal and Gempol Baru stops.
 Pulo Gebang Station – Ujung Menteng Station	The Pulo Gebang Station line (60k807m) - Ujung Menteng Station (61k918m) is an elevated line 1,111 km long and is planned to be on the south side of Jl. Raya Bekasi with vertical alignment is determined by the height required at stations and control points, especially elevated toll roads. If the station location is close to an elevated toll road, then the height of the station must be at least 9 m from the surface of the nearest elevated toll road. Ujung Menteng Station (level +16.60 m and area 6,142.20 m^2) is planned to be on the south side of Jl. Raya Bekasi, close to the Ujung Menteng TransJakarta Bus Stop. Ujung Menteng Station, which is a depot branch station, will be higher than other elevated stations because the Rorotan Depot access route is planned to be below the main route.

Segment	Description
 Ujung Menteng Station – Medan Satria Station	The Ujung Menteng Station line (61k918m) - Medan Satria Station (63k674m) is an elevated line 1,756 km long and is planned to be in the median of Jl. Raya Bekasi (DKI Jakarta), Jl. Sultan Agung and Jl. Central Abang River (Bekasi, West Java). Apart from that, the MRT train line will cross the East Flood Canal (BKT). Medan Satria Station (level +13.80 m and area 4,212.69 m^2) is planned to be in the median of Jl. Kali Abang Tengah.

Segment	Description
IV. Depot Segment (St. Ujung Menteng – Rorotan Depot)	



The Ujung Menteng Station line (61k918m) – Rorotan Depot is a special access route to the Rorotan Depot with a length of 5.9 km. This line starts from the MRT East – West Line branching point at 62k500m on the elevated track on Jl. Raya Bekasi, then turn north along Jl. BKT inspection on the west side of the East Flood Canal (BKT). The location of the Rorotan Depot is planned to be to the north of the Public Cemetery (TPU) belonging to the DKI Jakarta Government.

2.4. Consideration Basis for Route Determination of MRT East-West Line

2.4.1. Scenario without MRT Jakarta Project

If there is no improvement in the transportation network, the traffic situation in DKI Jakarta will get worse and most of the arterial roads will experience chronic congestion in the future. In addition, the problem of air pollution will be more serious. To meet the growing demand for transportation, it is necessary to develop/improve transportation infrastructure. If the proposed new transportation projects including the East and West JKT-MRT lines are to be implemented, the future traffic situation will drastically improve. The mode shift from private vehicles to the MRT helps reduce air pollution. For this reason, the 'no project' option is not recommended.

2.4.2. Project Alignment Comparison

The feasibility of the MRT East-West Line project was assessed in the 2013 feasibility study, as shown in Figure 2.34.

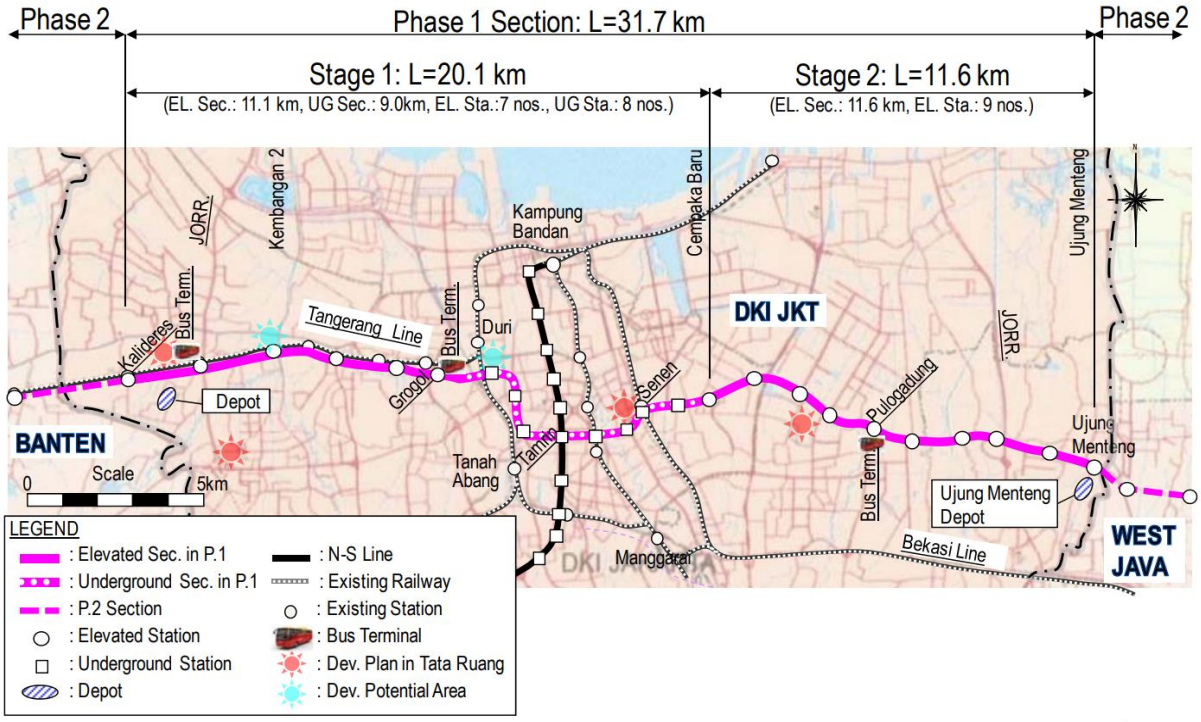


Figure 2.34. Phase 1 Section in 2013 FS

Source: JMCA, 2022

During the Consulting Service of JMCA, the route which was planned in 2013 FS has been reviewed. After over 7 years of the FS, the conditions studied have changed and it requires to have a revising plan for West Route Section of Phase 1 Stage 1 with the reasons below: (Refer to Figure 2.24)

Bina Marga DKI informed that the Land acquisition in the south of ROW PT. KAI is not in their program anymore. In the 2013 FS, 16.5km of MRT E-W Line on the West Side was planned along the ROW of Tangerang Station.

6 inner toll roads (PT. JTD), informed that they already had 'Penetapan Lokasi' (Location Designation), signed by governor, in the route Jl. Daan Mogot, so no space for MRT E-W line.

Using Depot MRT N-S in Lebak Bulus as support for Heavy Maintenance is not possible anymore. (In FS 2013, Workshop in Lebak Bulus Depot was planned to be used, through underground connecting line in Thamrin Station. However, Thamrin Station is now under construction by MRTJ in MRT N-S phase 2 without connecting line due to the land issue at Indonesia Bank.)

Three Depot Alternatives for Stage 1, Depot W1 (utilization of DKI Land in front of Rawa Buaya Station near Rawabuaya Station), Depot W2 (Private Land on Western Side of Kalideres Station) and W3 (utilization of PT. Garuda & Private Land near Rawa Buaya Station) are not suitable space for full function.

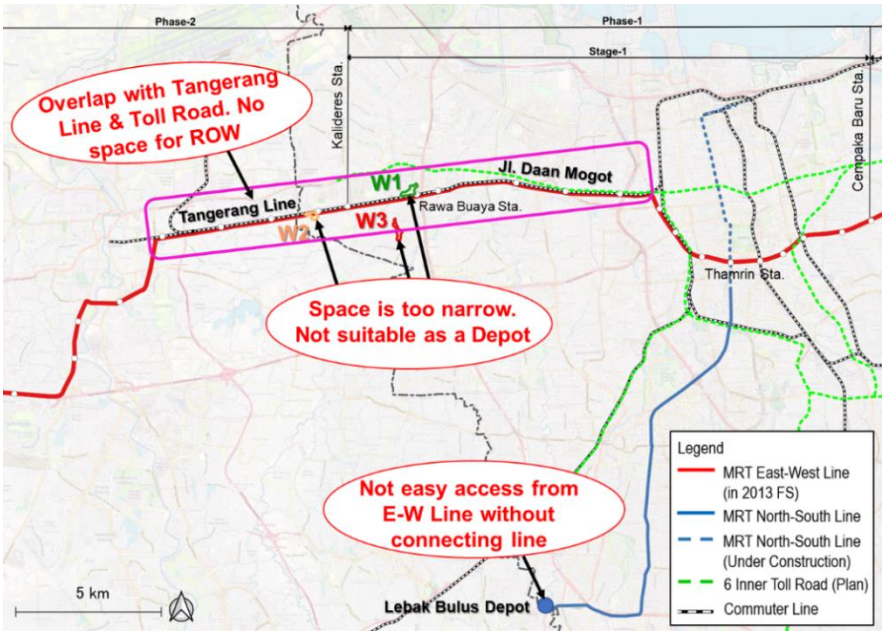


Figure 2.35. Changing Condition from 2013 FS of MRT E-W Line
Source: JMCA

A. First Consideration

JMCA considered five options for western routes shown in Figure 2.36. In the 1st screening, option 1, option 2 and option 5 were screened out from among five routes. Because the new alignment candidate shall be designed to avoid routes along/overlapping existing elevated structures (e.g., the Tangerang and Jl. Daan Mogot lanes) and narrow road areas, as there are potential land acquisition issues and large-scale settlements. The next reason is the increase in construction costs and the long-term construction period for the development of complex structures because a lot of infrastructure is at the crossroads.

Option 1: Overlap with 6 Inner Toll Road (JI. Daan Mogot)

Option 2 and Option 5: No space on long section

The remaining options are options 3 and option 4. These all two options are along JKT Merak Toll Road in Banten Province

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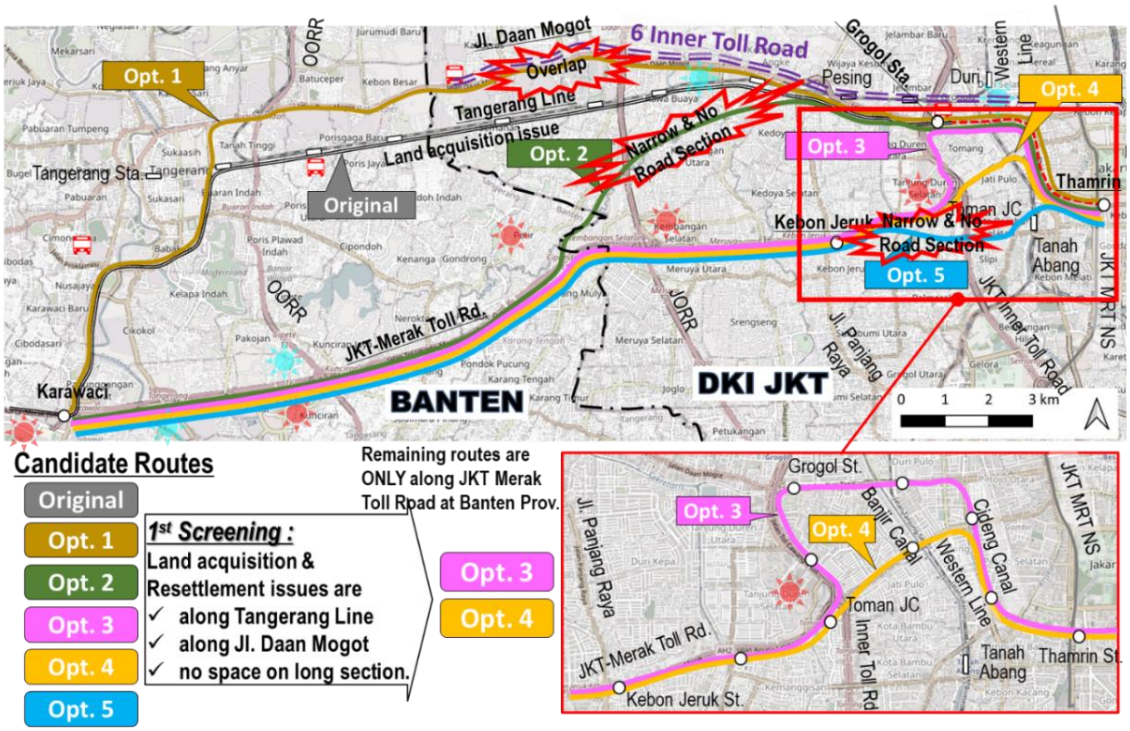

Figure 2.36. Five Alternative Routes and 1st Screening Result
Source: JMCA

B. Second Consideration

As for final route selection, a 2nd Screening which consists of more detailed evaluation items in terms of technical aspect, environment aspect and economy aspect of the two options was conducted. The details of comparative evaluation are shown in Table 2.40.

Based on the result of 2nd Screening, Option 3 (Grogol Route) was selected as final route of MRT E-W Line due to higher total score than Option 4.

Table 2.40. 2nd Screening for Route of MRT E-W Line

Item	Opt. 3 : Grogol Route	Opt. 4 : Jl. Toman Raya Route	Remarks
A. Outline of Route	Keb. Jeruk – Toman JC - Grogol - Cideng – Thamrin L=9.9 km (Elv.:4.4 km, UG: 4.5 km)	Keb. Jeruk - Jl. Toman Raya - Cideng - Thamrin L=7.3 km (UG: 7.3 km)	
B. Technical Aspect ① Connectivity to Public Transp. & Dev. Plan Area	○ 4 nos. (Taman Anggrek Mall / Grogol Bus Terminal / TOD around Hospital / Develop Area at the corner of Jl. Cideng)	▲ 1 no. (Develop Area at the corner of Jl. Cideng) * Access to Taman Anggrek Mall & TOD around Hospital is longer, compared to Opt. 3	
② Operation Plan	○ + 2 more stations compared to Opt. 4 ◎ Easy install turnback facility at elevated terminal station, Taman Anggrek Station	◎ -2 stations compared to Opt. 3. △ Not easy install turnback facility at underground terminal station, Toman Park Station	
③ Obstacles	○ 4 obstacles (Narrow road along JM toll road / cross JKT Inner toll road at Toman JC / Buildings at the corner of Jl. Cideng / Develop Area at the corner of Jl. Cideng) Score : 5.0	△ 6 obstacles (Transition & Underground section continue to the west side more. / Narrow road along JM toll road / cross JKT Inner toll road at Toman JC / Hospital at the corner of Jl. Cideng / Develop Area at the corner of Jl. Cideng) Score : 2.5	
C. Env. Aspect ① Natural Env. Imp. ② Social Env. Imp. (Resetl. Houses)	◎ No natural conservation area ○ approx. 140 houses Score : 3.0	◎ No natural conservation area △ approx. 160 houses Score : 2.6 (= 3.0 x 140/160)	Based on Google earth
D. Eco. Aspect ① Demand Forecast (Y2035 & Full sec.) ② Const. Cost ③ Daily Pax./km / Cost	✓ Daily Pax. : 560,000 pax ✓ Daily Pax. /km : 6,200 pax. /km ✓ Const. Cost : IDR 12.5 T (JPY 96 Bil.) 496 (pax./km) / Cost Score : 5.0 (=496/100)	✓ Daily Pax. Vol. : 545,000 pax. ✓ Daily Pax. /km : 6,200 pax. ✓ Const. Cost : IDR 14.3 T (JPY 110 Bil.) 434 (pax./km) / Cost Score : 4.4 (=5.0 x 434/496)	Estimate based on JUTPI-2 Direct Cost
Evaluation	Total Score : 13.0	Total Score : 9.5	

◎: 2 points, ○: 1 point, △: 0.0 - 0.5 point, ▲: -0.5 point, ●: -1.0 point

Source: JMCA

C. Final alignment

After alternatives analysis including screening process in twice, the final alignment shifts southward as a result, as shown in Figure 2.26

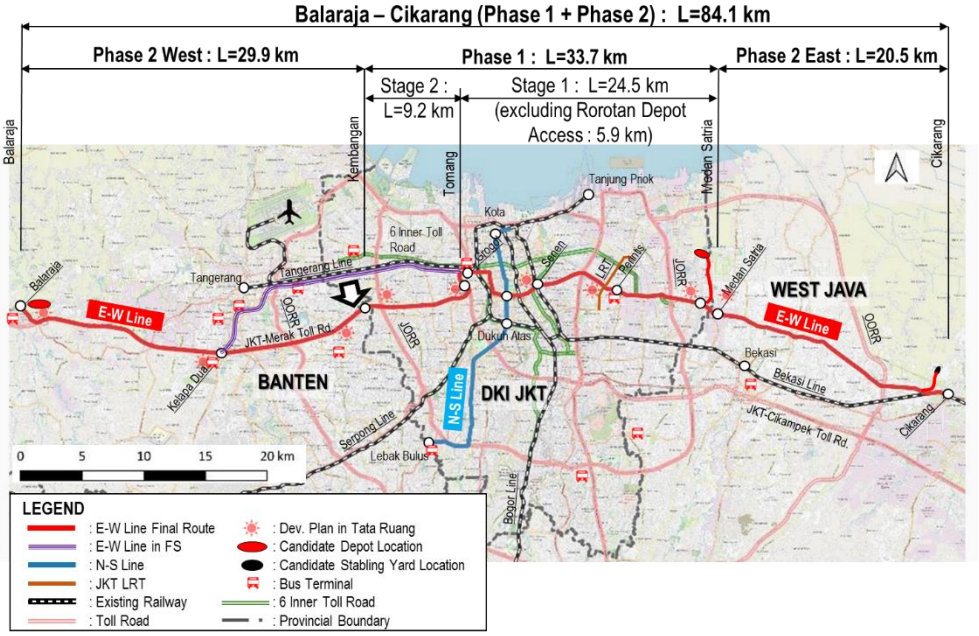

Figure 2.37. Final Route Revised from The Route of 2013
Source: JMCA

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Chapter 3

Rona Description Detailed Living Environment

3.1. Geophysics – Chemistry

3.1.1. Rainfall

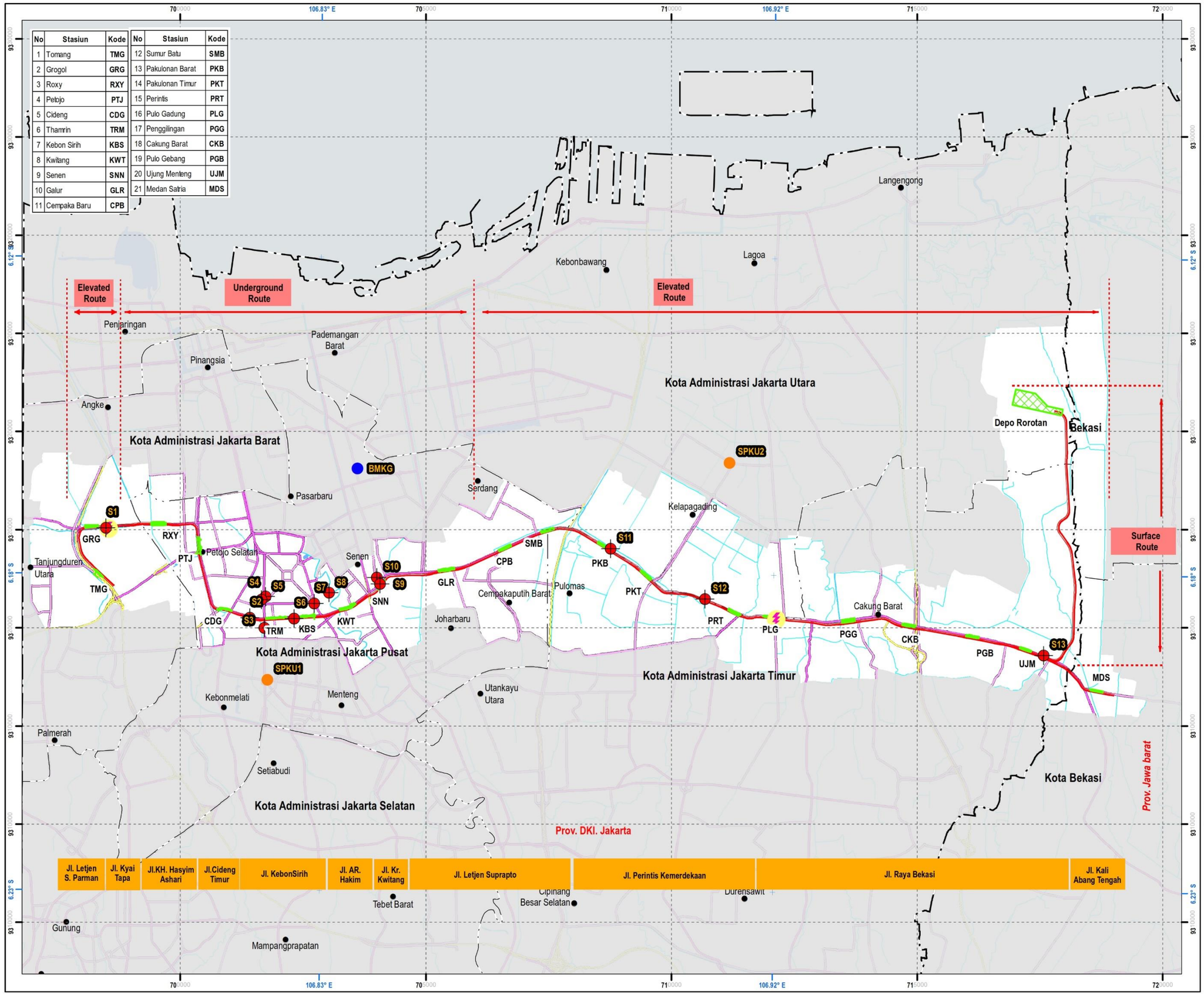
Based on Station dataMeteorologyKemayoranfor the 2012-2022 period, the average annual rainfall in the study area ranges from 124.02 – 236.43 mm, with an average annual rainy day of 9 – 15 days. The amount of rain per year is between 1,488 – 2,837 mm, with the number of rainy days per year being 108 – 182 days. Detailed rainfall data at the Kemayoran Meteorological Station for the period 2012 - 2022 is presented in **Table 3.1.**. Meanwhile, the location of the Kemayoran Meteorological Station is presented in **..**

3.1.2. Length of Sunlight

Solar radiation (solar irradiance) is the power of solar radiation per unit area received in the form of electromagnetic wave radiation.The duration of solar radiation as an element of climatology is defined as the strength of solar radiation that exceeds 120 W/m2. Based on Station dataMeteorologyKemayoranperiod 2012-2022,long exposure to sunlightThe annual average in the study area ranges from 111.57 – 156.26 hours, with an annual average sunshine day of 26 – 30 days.Length of sunlightper year between 1,338 – 1,875 hours, with the number of days of sunlight per year being 310 – 354 days. Detailed datalong exposure to sunlightat the Kemayoran Meteorological Station for the period 2012 - 2022 is presented in **Table 3.2.**.

3.1.3. Temperature

Based on data from the Kemayoran Meteorological Station for the period 2012-2022, the annual average temperature in the study area ranges from 28.24 – 28.79 °C, with the highest average temperature (29.16 °C) in May and October, while the lowest average temperature (27.51 °C) is in February. In detail, the average temperature data at the Kemayoran Meteorological Station for the period 2012 - 2022 is presented in **Table 3.3.**.



No	Stasiun	Kode
1	Tomang	TMG
2	Grogol	GRG
3	Roxy	RXY
4	Petojo	PTJ
5	Cideng	CDG
6	Thamrin	TRM
7	Kebon Sirih	KBS
8	Kwitang	KWT
9	Senen	SNN
10	Galur	GLR
11	Cempaka Baru	CPB
12	Sumur Batu	SMB
13	Pakulonan Barat	PKB
14	Pakulonan Timur	PKT
15	Perintis	PRT
16	Pulo Gadung	PLG
17	Penggilingan	PGG
18	Cakung Barat	CKB
19	Pulo Gebang	PGB
20	Ujung Menteng	UJM
21	Medan Satria	MDS

MAP
METEOROLOGICAL STATION LOCATION
KEMAYORAN

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : 1 : 70.000
0 — 1.75 — 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend
- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River

Road
- Arterial Road
- Collector Street
- Toll Road
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

- Air Quality Measurement Station
- Air Quality Past Studies
- BMKG

Source :
- Indonesia Earth Map Scale 1 : 25000
- Administration Map DKI Jakarta Scale 1 : 25000
- Administration Map Bekasi Regency Scale 1 : 25000
- Administration Bekasi City Scale 1 : 25000
- MRT East - West Line
- DKI Jakarta Air Quality Monitoring Report for 2021

INSERT

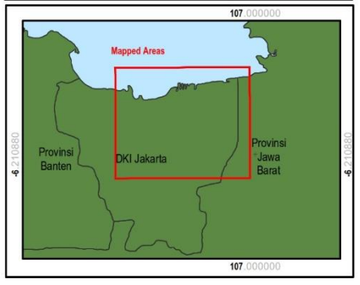


Figure 3.1. Location Map of Kemayoran Meteorological Station, SPKU and Air Quality Measurements from Previous Studies

Table 3.1. Rainfall and Rainy Days 2012-2022

Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Amount	Average
2012	CH	259.20	110.50	177.50	195.70	78.90	66.90	21.00	0.00	19.50	20,20	314.70	224.10	1488.20	124.02
	HH	23	15	16	13	7	4	1	0	2	6	18	17	122	10
2013	CH	621.90	146.60	184.40	204.30	101.00	256.70	256.70	61.40	49.50	110.10	196.60	338.90	2528.10	210.68
	HH	22	18	14	16	9	17	17	8	5	8	12	23	169	14
2014	CH	925.60	743.60	179.80	165.50	52.00	166.80	214.10	38.10	0.10	50.80	65.10	235.60	2837.10	236.43
	HH	26	21	17	12	11	11	12	3	1	4	10	13	141	12
2015	CH	472.60	939.50	207.10	82.90	16.60	10,10	0.00	5.20	0.00	0.00	79.50	273.20	2086.70	173.89
	HH	20	22	17	18	1	4	0	1	0	0	8	17	108	9
2016	CH	163.80	516.50	350.10	204.00	156.30	202.10	259.30	227.20	227.20	136.80	199.90	58.10	2701.30	225.11
	HH	16	22	20	9	16	11	12	14	14	20	16	12	182	15
2017	CH	214.20	520.80	138.70	156.50	135.00	138.50	119.90	0.80	165.80	112.40	195.40	254.10	2152.10	179.34
	HH	17	23	15	14	9	8	5	1	7	9	14	10	132	11
2018	CH	215.40	431.20	202.00	159.10	16.50	12.50	14.50	32.80	64.80	159.60	140.90	52.30	1501.60	125.13
	HH	18	23	19	14	5	5	1	1	3	7	10	9	115	10
2019	CH	382.20	270.10	327.30	194.60	47.80	23.10	0.00	0.00	0.00	1.00	50.10	263.80	1560.00	130.00
	HH	25	16	23	19	6	2	0	0	0	1	8	17	117	10
2020	CH	692.00	1043.20	220.70	182.80	50.40	21.10	12,10	101.00	3.90	208.30	87.30	134.70	2757.50	229.79
	HH	25	24	19	12	8	6	4	4	2	12	13	14	143	12
2021	CH	332.80	604.40	244.10	213.90	203.60	79.10	35.80	79.70	113.40	182.10	134.10	171.60	2394.60	199.55
	HH	21	23	20	13	9	13	5	4	7	10	14	16	155	13
2022	CH	377.00	337.80	138.30	258.30	184.10	95.80	92.80	31.50	120.50	219.50	144.10	22.90*)	2022.60	168.55
	HH	17	21	17	18	13	9	6	4	10	12	13	5*)	145	12

Source: Kemayoran BMKG Station (https://dataonline.bmkg.go.id/)
Note: CH = Rainfall (mm); HH = Rainy Day (day)
*) Data for December 2022 is recorded in the period 1 – 15 December 2022

Table 3.2. Length of Sunlight in 2012-2022

Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Amount	Average
2012	SS	80.4	121.6	125.3	164.8	143.3	119.8	150.3	217.2	194.7	156.9	100.8	100.4	1675.5	139.63
	HSS	24	27	26	29	30	27	30	31	30	29	26	28	337	28
2013	SS	56.7	97.9	150.5	123.9	84.2	67.9	71.9	195.5	183.6	171.2	117.0	81.5	1401.8	116.82
	HSS	22	26	31	27	24	21	22	31	30	31	28	26	319	27
2014	SS	85.3	49.6	110.7	134.2	100.3	66.1	72.2	143.0	218.4	191.3	135.4	92.1	1398.6	116.55
	HSS	16	18	25	28	29	24	29	26	30	31	30	26	312	26
2015	SS	90.6	74.6	127.5	92.9	154.5	116.5	178.2	173.8	206.4	215.3	141.9	97.9	1670.1	139.18
	HSS	25	22	30	25	28	24	31	29	29	30	27	25	325	27
2016	SS	115.5	64.8	135.8	146.8	107.3	111.3	144.1	126.5	195.4	16.6	81.4	93.3	1338.8	111.57
	HSS	28	22	28	28	26	28	31	30	30	6	23	30	310	26
2017	SS	109.0	85.5	120.1	122.6	128.5	126.7	139.4	159.7	194.3	171.5	108.4	97.6	1563.3	130.28
	HSS	25	21	27	29	28	26	29	30	28	31	28	21	323	27
2018	SS	94.5	103.7	129.2	150.0	154.6	137.3	160.9	165.6	196.7	198.8	102.1	101.5	1694.9	141.24
	HSS	29	26	28	27	30	28	31	31	28	31	29	25	343	29
2019	SS	108.0	138.1	125.9	133.1	158.1	150.6	172.6	166.9	197.9	216.6	173.2	134.1	1875,1	156.26
	HSS	27	28	29	29	30	30	31	31	30	31	30	28	354	30
2020	SS	87.6	82.0	128.3	135.6	122.5	137.7	142.2	168.1	105.7	171.3	142.3	98.9	1522.2	126.85
	HSS	23	25	28	30	28	28	30	31	17	30	28	30	328	27
2021	SS	56.5	102.2	141.3	148.1	143.9	106.5	142.9	152.1	182.0	167.1	94.1	95.3	1532.0	127.67
	HSS	24	26	30	29	30	27	30	31	28	30	28	27	340	28
2022	SS	104.5	70.0	116.6	145.7	116.3	100.7	151.3	162.8	137.5	116.5	98.0	45.2*)	1365.1	113.76
	HSS	27	24	28	29	29	27	30	31	27	30	24	15.0*)	321	27

Source: Kemayoran BMKG Station (https://dataonline.bmkg.go.id/)
Information: SS = duration of sunlight (hours); HSS = Number of Days of Sunlight (days)
*) Data for December 2022 is recorded in the period 1 – 15 December 2022

Table 3.3. Average Temperature 2012-2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
2012	27.67	28.34	28.35	28.68	28.96	28.76	28.37	28.64	28.92	29.50	28.53	28.16	28.57
2013	26.93	27.91	28.82	28.69	28.67	27.30	27.34	28.60	28.99	29.42	28.51	27.75	28.24
2014	26.65	26.61	27.98	28.78	29.35	28.65	28.02	28.74	29.24	29.86	29.38	28.16	28.45
2015	26.98	26.72	27.77	28.46	29,22	28.80	28.54	28.44	28.77	29.43	29.16	28.24	28.38
2016	28.58	27.72	28.50	29.38	29.18	28.70	28.47	28.35	28.93	28,27	28.39	28.34	28.57
2017	28.15	27.25	28.09	28.55	29.05	28.70	28.63	28.69	28.83	28.96	28,27	28.22	28.45
2018	27.77	27.15	27.90	28.63	29.40	28.87	28,21	28.18	28.76	29.48	28.90	28.74	28.50
2019	27.95	28.28	28.16	28.88	29.64	29.18	28.71	28.28	28.84	29.55	29.55	28.48	28.79
2020	27.88	27.67	28.56	28.92	29.48	29.44	28.62	28.92	29.54	28.81	28.95	28.06	28.74
2021	27.16	27.33	28.03	28.52	29.23	28.39	28.49	28.75	29.02	29.06	28.60	28.15	28.39
2022	27.99	27.66	28.28	28.54	28.59	28.08	28.70	28.97	28.65	28,29	28.31	28.31*)	28.36
Average	**27.61**	**27.51**	**28.22**	**28.73**	**29.16**	**28.62**	**28.37**	**28.60**	**28.95**	**29.15**	**28.78**	**28.24**	

Source: Kemayoran BMKG Station (https://dataonline.bmkg.go.id/)
Note: *) Data for December 2022 is recorded in the period 1 – 15 December 2022

3.1.4. Humidity

Based on data from the Kemayoran Meteorological Station for the 2012-2022 period, the annual average humidity in the study area ranges from 73.97 – 78.54%, with the highest average humidity (82.10%) in February, while the average humidity lowest (77.66%) in September. In detail, the average humidity data at the Kemayoran Meteorological Station for the period 2012 - 2022 is presented in**Table 3.4.**.

Table 3.4. Average Humidity 2012-2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
2012	79.71	77.55	75.90	76.80	74.52	72.90	70.42	68.61	69.40	71.45	78.07	78.58	74.49
2013	84.29	79.57	76.06	78.97	78.13	80.30	80.06	72.23	72.80	71.81	75.80	79.32	77.45
2014	84.13	85.79	81.16	76.27	75.81	77.73	76.87	70.42	65.37	67.58	72.90	76.29	75.86
2015	82.10	84.29	79.37	78.37	73.60	72.79	70.42	71.45	68.03	68.24	74.83	78.32	75.15
2016	80.45	83.17	81.42	77.27	79.19	77.13	78.10	76.84	76.64	78.19	78.03	76.10	78.54
2017	77.52	82.07	78.42	77.60	75.90	76.87	73.94	69.39	72.20	74.61	78.17	76.52	76.10
2018	76.48	82.57	79.74	78.57	73.52	75.17	70.84	70.10	68.37	71.39	75.53	74.81	74.76
2019	79.97	80.21	78.55	78.43	73.77	71.90	68.48	68.61	68.67	68.90	71.00	79.10	73.97
2020	83.06	84.07	79.84	79.03	76.19	74.34	72.65	71.71	68.00	74.23	76.13	76.10	76.28
2021	82.26	82.86	79.19	76.77	76.35	79.70	73.65	73.13	73.00	73.90	76.13	79.65	77.22
2022	80.45	80.96	79.06	78.63	79.74	78.80	75.55	73.40	74.77	76.65	77.00	76.00*)	77.58
Average	**80.95**	**82.10**	**78.98**	**77.88**	**76.07**	**76.15**	**73.72**	**71.44**	**70.66**	**72.45**	**75.78**	**77.34**	

Source: Kemayoran BMKG Station (https://dataonline.bmkg.go.id/)
Note: *) Data for December 2022 is recorded in the period 1 – 15 December 2022

3.1.5. Wind Speed and Direction

Based on Station dataMeteorologyKemayoran2012-2022 period, most of the wind in the study area blows to the South (66.67%), while a small portion blows to the East (10.97%) and to the West (8.70%) withaverage speed1.6m/s. Detailed data on wind speed and direction at the Kemayoran Meteorological Station for the period 2012 - 2022 are presented in**Table 3.5.**, while windrose (wind rose) is served on**Figure 3.2. ..**

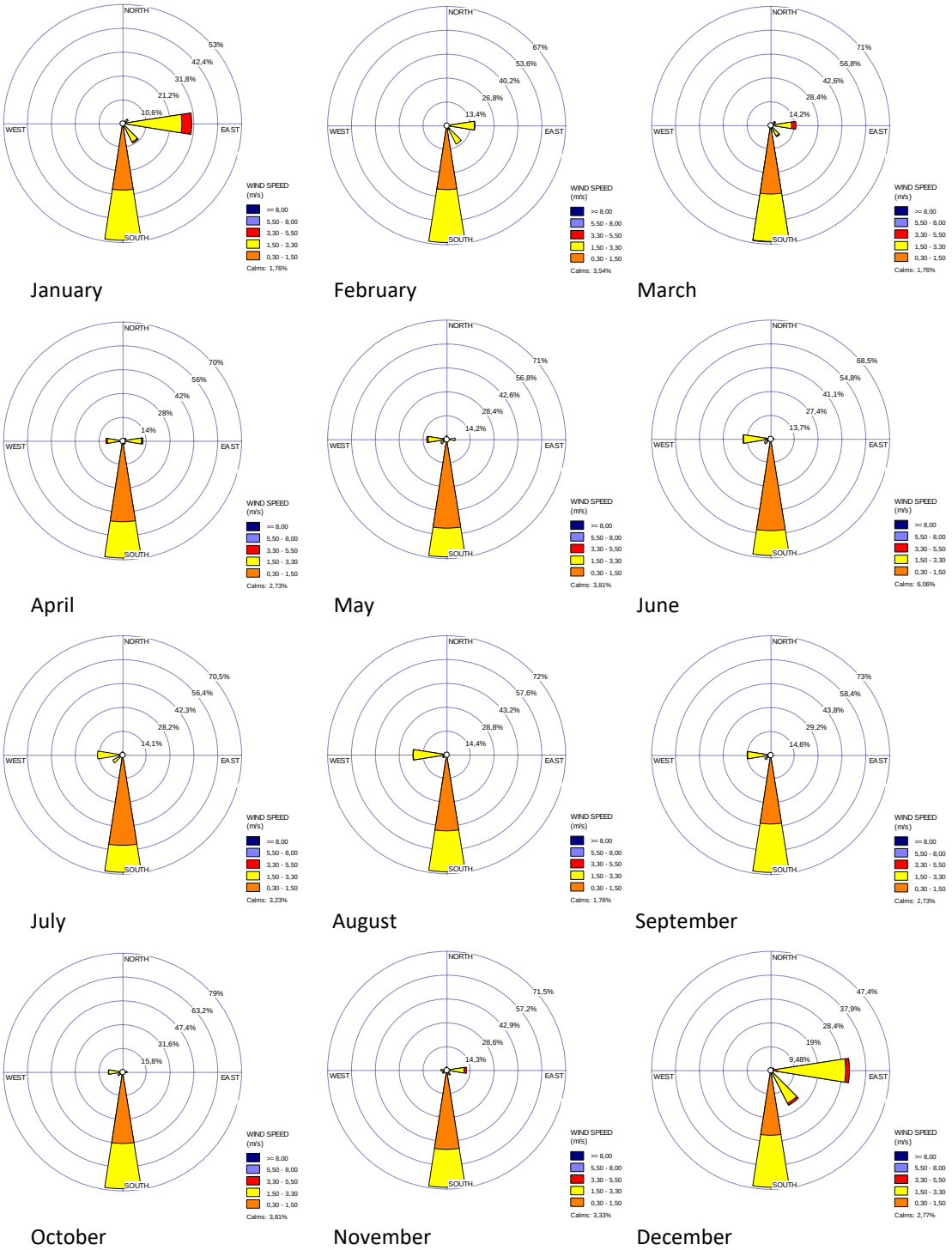


Figure 3.2. Windrose (Wind Rose) Monthly Averages 2012 - 2022
Source :Kemayoran BMKG Station (https://dataonline.bmkg.go.id/)

Table 3.5. Average Wind Speed 2012-2022 (m/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
2012	2.90	2.48	3.10	2.77	2.94	2.73	2.52	2.77	2.47	2.48	2.53	2.90	2.72
2013	3.32	2.75	3.13	2.73	1.81	1.53	1.55	1.74	1.97	1.68	1.83	2.10	2.18
2014	2.19	1.18	1.32	1.80	1.48	1.37	1.55	1.87	1.80	1.65	1.80	1.87	1.66
2015	1.55	1.14	1.10	1.13	1.03	1.03	1.52	1.45	1.47	1.42	1.17	1.61	1.30
2016	1.39	1.38	1.45	1.47	0.97	1.10	1.26	1.13	1.30	1.26	1.40	2.19	1.36
2017	1.97	1.82	1.32	1.33	1.10	1.33	1.10	1.61	1.30	1.32	1.50	1.65	1.45
2018	1.97	1.61	1.48	1.17	1.19	1.13	1.10	1.16	1.33	1.19	1.13	1.71	1.35
2019	1.58	1.39	1.65	1.50	1.48	1.23	1.26	1.42	1.33	1.35	1.33	1.45	1.42
2020	1.45	1.45	1.52	1.37	1.26	1.33	1.42	1.39	1.71	1.58	1.47	2.03	1.50
2021	1.65	1.96	1.68	1.40	1.32	1.20	1.19	1.65	1.43	1.29	1.60	1.39	1.48
2022	1.55	1.43	1.71	1.00	1.10	0.77	1.10	1.13	1.20	1.10	1.23	1.27	1.21
Average	**1.96**	**1.69**	**1.77**	**1.61**	**1.43**	**1.34**	**1.41**	**1.57**	**1.57**	**1.48**	**1.55**	**1.83**	

Source: Kemayoran BMKG Station (https://dataonline.bmkg.go.id/)
Note: *) Data for December 2022 is recorded in the period 1 – 15 December 2022

Based on the distribution of wind speeds, the most incidents were in the 1.5-3.3 m/s speed group (48.1%) and the 0.3-1.5 m/s speed group (46.9%). Meanwhile, in the <0.3 m/s (calm) group it was 3.1% and in the 3.3-5.5 m/s speed group it was 1.6%.

3.1.6. Air Quality

A. Secondary Data

There are 2 SPKUs (Air Quality Measurement Stations) in the study area, namely SPKU Bundaran HI and SPKU Kelapa Gading (**.**). Air quality measurements at SPKU are carried out using the Air Quality Monitoring System (AQMS). AQMS measurement data is used as the basis for determining the Air Pollution Standard Index (ISPU) in accordance with PP No. 41 of 1999 concerning Air Pollution Control. ISPU is a unitless number used to describe the condition of ambient air quality in a particular location based on the impact on human health, aesthetic value and other living things. ISPU calculations refer to Minister of Environment and Forestry Regulation No. P.14/MENLHK/SETJEN/KUM.1/7/2020 concerning Air Pollution Standard Index with parameters Particulates (PM10 and PM2.5), Sulfur Dioxide (SO2), Carbon Monoxide (CO), Ozone (O3) and Nitrogen Dioxide (NO2). ISPU determination refers to the highest ISPU parameter value.

Based on the 2021 DKI Jakarta Air Quality Monitoring Report, it is known that the ISPU at SPKU Bundaran HI and SPKU Kelapa Gading is in the Unhealthy category with the critical parameter PM2.5. However, in general, the ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the Medium category (81% and 82% respectively).Detailed dataair quality and ISPU determinationonSPKU Bundaran HI and SPKU Kelapa Gading2021 presented on**Table 3.6.**.

The daily maximum concentration of PM10 that exceeds the BMUA value (75 µg/m³; PP No. 22 of 2021) at the HI Roundabout SPKU was monitored in August

2021 and at the Kelapa Gading SPKU from March to October 2021. Meanwhile, the daily maximum concentration of PM2.5 at the SPKU Bundaran HI and SPKU Kelapa Gading were observed to exceed the BMUA value (55 µg/m³) throughout 2021. The daily maximum concentration of SO2 which exceeded the BMUA value (75 µg/m³) at SPKU Kelapa Gading was observed in October and November 2021, while at SPKU Bundaran HI It was observed that the BMUA value was still met throughout 2021. The same thing also happened to the maximum daily O3 concentration. At SPKU Kelapa Gading it was observed that in January 2021 it exceeded the BMUA O3 value (100 µg/m³), while at SPKU Bundaran HI it was observed that it still met the BMUA value throughout 2021. Meanwhile, the maximum daily concentrations of CO and NO2 at SPKU Bundaran HI and at SPKU Kelapa Ivory was observed to still meet the BMUA values (100 µg/m³ and 65 µg/m³ respectively) throughout 2021. Comparison of daily maximum concentrations with BMUA parameter values is presented in **Figure 3.3. .**. Apart from air quality data from the 2 SPKUs mentioned above, air quality data in the study area was also obtained from the results of air quality measurements in previous studies, as presented in**Table 3.7.** and **Figure 3.4. .**.

B. Primary data

Primary data on air quality in the study area was obtained by taking air samples directly from the field in 12 locations in June and July 2022 and then analyzed in the laboratory.Determination of sampling locations refers to SNI 19.7119.6-2005 concerning Determination of Sampling Locations for Ambient Air Quality Monitoring Tests and is based on considerations of wind direction and speed in relation to the project site plan and affected areas. Air quality parameters and standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (Appendix VII – Ambient Air Quality Standards).

Next dThe results of air quality measurements are used as a basis for determining the Air Pollution Standard Index (ISPU) in accordance with PP No. 41 of 1999 concerning Air Pollution Control. ISPU calculations refer to Minister of Environment and Forestry Regulation No. P.14/MENLHK/SETJEN/ KUM.1/7/2020 concerning Air Pollution Standard Index. The ISPU number used refers to the ISPU number for the highest parameter measurement results.Air quality sampling locations are presented in **Figure 3.5. .**, the results of air quality analysis and determination of ISPU figures are presented in**Table 3.8.**,while the comparison of concentrations with BMUA parameter values is presented in **Figure 3.6.**

Table 3.6. ISPU at SPKU Bundaran HI and SPKU Kelapa Gading in 2021

SPKU / Segment	Month	Concentration (µg/m3) 1)						MAX[2] (µg/m3)	Critical[3]	Category 4)	Number of ISPU Status Days 5)					Distribution Chart Number of ISPU Status Days
		PM10	PM2.5	SO2	CO6)	O3	NO2				B	S	T.S	STS	BHY	
HI roundabout (underground)	**Jan**	72	108	29	0.43	62	20	108	PM25	NOT HEALTHY	12	18	1	0	0	
	Feb	59	79	29	0.26	21	33	79	PM25	CURRENTLY	19	9	0	0	0	
	Mar	64	102	32	0.23	31	45	102	PM25	NOT HEALTHY	3	27	1	0	0	
	Apr	66	101	33	0.24	30	42	101	PM25	NOT HEALTHY	3	26	1	0	0	
	May	74	110	31	0.26	28	45	110	PM25	NOT HEALTHY	0	29	2	0	0	
	Jun	75	109	39	0.25	28	47	109	PM25	NOT HEALTHY	0	29	1	0	0	
	Jul	74	108	35	0.23	39	38	108	PM25	NOT HEALTHY	0	25	6	0	0	
	Aug	79	112	33	0.17	40	41	112	PM25	NOT HEALTHY	1	29	1	0	0	
	Sept	68	94	34	0.2	38	45	94	PM25	CURRENTLY	1	29	0	0	0	
	Oct	75	106	38	0.19	38	48	106	PM25	NOT HEALTHY	0	30	1	0	0	
	Nov	58	85	50	0.19	34	47	85	PM25	CURRENTLY	12	18	0	0	0	
	Dec	63	85	61	0.28	33	49	85	PM25	CURRENTLY	6	25	0	0	0	
	MAX	**79**	**112**	**61**	**0.43**	**62**	**49**	**112**	**PM25**	**NOT HEALTHY**						
	%										**15%**	**81%**	**4%**	**0%**	**0%**	
Kelapa Gading (West elvated)	**Jan**	73	108	26	0.43	134	19	134	O3	NOT HEALTHY	0	29	2	0	0	
	Feb	66	87	44	0.25	60	27	87	PM25	CURRENTLY	11	17	0	0	0	
	Mar	78	115	59	0.23	74	41	115	PM25	NOT HEALTHY	1	28	2	0	0	
	Apr	88	115	63	0.21	73	34	115	PM25	NOT HEALTHY	1	22	5	0	0	
	May	86	116	74	0.2	72	34	116	PM25	NOT HEALTHY	0	29	2	0	0	
	Jun	81	108	66	0.2	76	43	108	PM25	NOT HEALTHY	0	27	3	0	0	
	Jul	94	129	62	0.16	81	30	129	PM25	NOT HEALTHY	0	15	16	0	0	
	Aug	79	110	58	0.17	67	36	110	PM25	NOT HEALTHY	0	27	4	0	0	
	Sept	79	105	63	0.17	68	35	105	PM25	NOT HEALTHY	1	27	2	0	0	
	Oct	82	115	82	0.16	72	38	115	PM25	NOT HEALTHY	0	26	5	0	0	

SPKU / Segment	Month	Concentration (µg/m3) 1)						MAX[2)] (µg/m3)	Critical[3)]	Category 4)	Number of ISPU Status Days 5)					Distribution Chart Number of ISPU Status Days
		PM10	PM2.5	SO2	CO6)	O3	NO2				B	S	T.S	STS	BHY	
	Nov	64	95	77	0.16	63	42	95	PM25	CURRENTLY	8	22	0	0	0	
	Dec	70	99	51	0.23	78	49	99	PM25	CURRENTLY	2	28	0	0	0	
	MAX	**94**	**129**	**82**	**0.43**	**134**	**49**	**134**	**PM25**	**NOT HEALTHY**						
	%										**7%**	**82%**	**11%**	**0%**	**0%**	

Source: 2021 DKI Jakarta Air Quality Monitoring Report (DLH DKI, 2021)
https://data.jakarta.go.id/dataset/index-standard-pencemaran-udara-ispu-tahun-2021

Information :
1) Concentration: The highest daily measured value for each parameter
2) MAX: The highest measured value of all parameters measured at the same time
3) Critical: The parameter with the highest measurement results
4) category: Category resulting from the calculation of the air pollution standard index (ISPU)
5) Number of days based on each ISPU status
   a. B = GOOD (number range 1 – 50) : LevelVery good air quality, has no negative effects on humans, animals, plants
   b. S = CURRENTLY (number range 51 – 100) : LevelAir quality is still acceptable for human, animal and plant health
   c. T.S = NOT HEALTHY (number range 101 – 200) : Levelair quality that is detrimental to humans, animals and plants
   d. STS = VERY UNHEALTHY (number range 201 – 300) : Air quality levels that can increase health risks in a number of exposed segments of the population
   e. BHY = DANGEROUS (number range ≥ 301) : Air quality levels that can seriously harm the health of the population and require immediate treatment
6) CO concentration: 8 hour measurement results x 1,000µg/m3

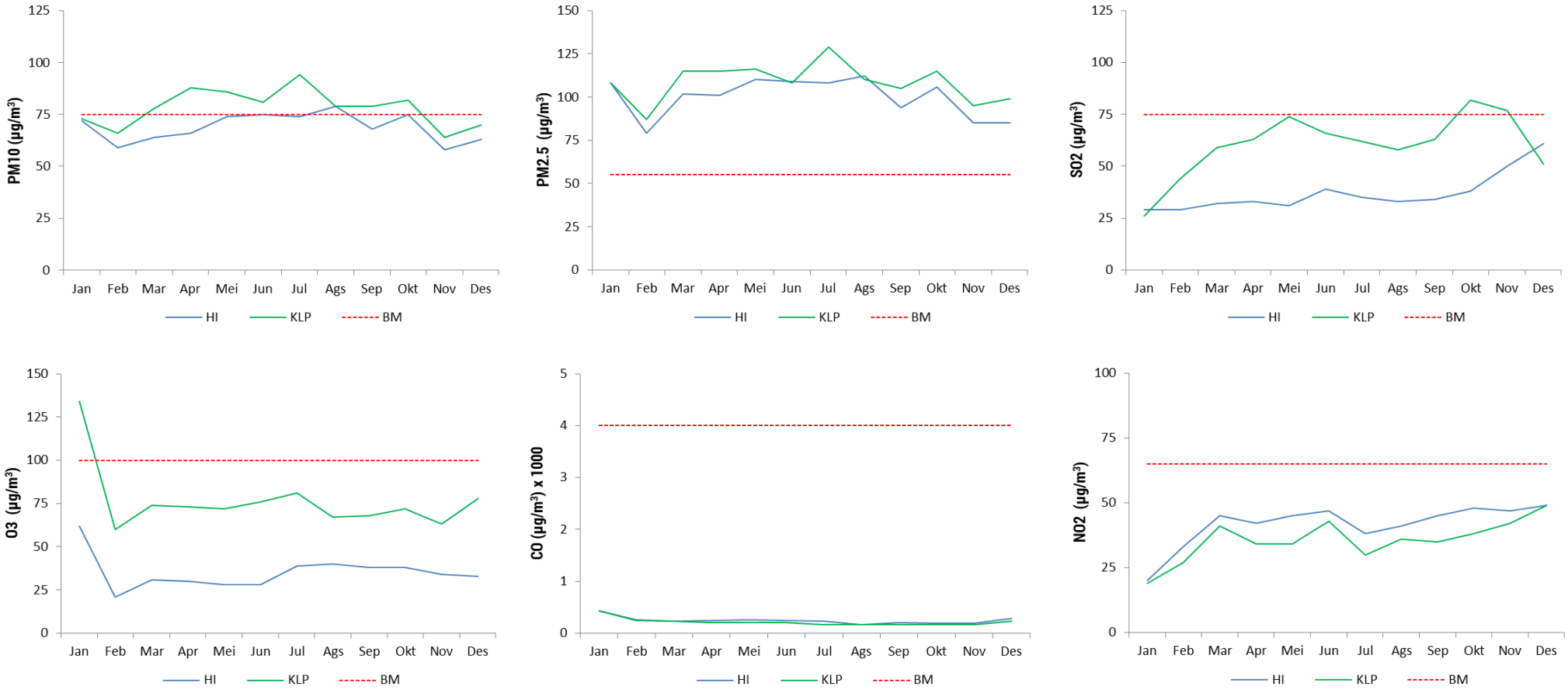


Figure 3.3. Comparison of Concentration Results from DKI Jakarta DLH Monitoring withBMUA Parameter Value
HI :SPKU HI Roundabout, KLP: SPKU Kelapa Gading, BM : Quality Standards (PP No. 22 of 2021)

Table 3.7. Results of Air Quality Measurements in the Study Area in Previous Studies

Segment	Code	Location	Coordinate	Measurement Results (µg/m3)									ISPU figures						
				TSP	PM10	PM2.5	CO	SO2	H.C	O3	PB	NO2	PM10	PM2.5	SO2	CO	O3	NO2	H.C
*Elevated*West	S1	Jl. Kyai Tapa	S 06°10'00.1" ; E 106°47'37.5"	196	72	-	1571	49	-	22	-	144	97	-	75	39	9	126	-
Underground	S2	Jl. Betel Garden	S 06°10'59.5" ; E 106°49'13.0"	94	-	-	1260	47	-	90	-	67	-	-	74	32	38	101	-
	S3	Jl. MH Thamrin (St. Thamrin)	S 06°11'06.2" ; E 106°49'22.7"	87	-	-	1588	47	-	97	-	72	-	-	74	40	40	102	-
	S4	Jl. Budi Mulia	S 06°10'47.5" ; E 106°49'20.7"	144	-	-	1619	46	-	82	-	80	-	-	73	40	34	105	-
	S5	Jl. MH Thamrin (St Monas)	S 06°10'45.3" ; E 106°49'23.4"	153	-	-	1506	48	-	84	-	77	-	-	75	38	35	104	-
	S6	Jl. Betel Garden	S 06°10'59.9" ; E 106°49'42.2"	169	64	-	1283	58	-	34	-	73	89	-	84	32	14	103	-
	S7	Jl. Medan Merdeka Selatan	S 06°09'52.5" ; E 106°49'15.2"	148	-	-	1489	51	-	94	-	76	-	-	77	37	39	104	-
	S8	Jl. Batu III, Gambir	S 06°10'42.7" ; E 106°50'05.3"	160	-	-	860	42	-	76	-	52	-	-	69	22	32	83	-
	S9	Jl. Lieutenant General Suprapto (St. Senen)	S 06°10'36.7" ; E 106°50'39.1"	153	66	-	1824	27	-	26	-	44	91	-	55	46	11	73	-
	S10	Jl. Senen Market	S 06°10'32.5" ; E 106°50'37.0"	143	42	-	2125	18	-	26	-	77	67	-	41	53	11	104	-
*Elevated*East	S11	Jl. Pioneers of Independence	S 06°10'12.9" ; E 106°53'11.7"	126	26	-	982	48	-	18	-	56	51	-	75	25	8	88	-
	S12	Jl. Pioneers of Independence	S 06°10'46.0" ; E 106°54'14.3"	82	44	-	1266	30	-	16	-	12	69	-	58	32	7	23	-
	S13	Jl. Raya Bekasi	S 06°11'22.7" ; E 106°57'58.7"	162	54	-	1180	27	-	16	-	44	79	-	55	30	7	73	-
Ambient Air Quality Standards			(PP No. 22 of 2021)	230	75	55	4,000	75	160	100	2	65							
Measurement Time				24 hours	24 hours	24 hours	24 hours	8 hours	8 hours	24 hours	3 hours	24 hours							
International Finance Corporation, General Environmental, Health, and Safety (EHS) Guidelines, 2007 (Forreference)				**PM10 :** 50 (target -1) 100 (target -2) 75 (target -3) 50 (guidelines)	**PM2.5 :** 75 (target -1) 50 (target -2) 37.5 (target -3) 25 (guidelines)			**SO2 :** 125 (24h, target -1) 50 (24h, target -2) 20 (24h, guidelines)		**O3 :** 160 (8h, target -1) 100 (8h, guidelines)		**NO2 :** 40 (1 year) 200 (1h)							

Source : 1) Jakarta MRT North – South Line AMDAL Addendum, 2020 (S2, S3, S4, S5, S7 and S8)
2) EIAJakarta MRT East – West Line, 2013 (S1, S6, S9, S10, S11, S12 and S13)

Example of calculating the conversion of PM10 concentration to ISPU PM10 (S1 - Jl. Kyai Tapa):

- Measured concentration of PM10 = 72µg/m3
- ISPU calculation:

$$I = \frac{(I_a - I_b)}{(X_a - X_b)} \ (X_x - X_b) \ + \ I_b$$

Information :

I = ISPUcounted
He = ISPU limiton = 100
Ib = ISPU limitlower = 50
xx = Concentration of measurement results = 72µg/m3
Xa = Upper limit concentration = 75µg/m3
Xb = Lower limit concentration = 25µg/m3

$$I = \frac{(100 - 50)}{(75 - 25)} \text{ X } (72 - 25) \ + \ 50$$

$$I = (1 \text{ x } 47) + 50$$

$$I = 97$$

ISPU Parameter Concentration Value Conversion Table

ISPU	24 Jam PM_{10} ($\mu g/m^3$)	24 Jam $PM_{2,5}$ ($\mu g/m^3$)	24 Jam SO_2 ($\mu g/m^3$)	24 Jam CO ($\mu g/m^3$)	24 Jam NO_2 ($\mu g/m^3$)	24 Jam HC ($\mu g/m^3$)
0-50	25	15,5	22	2000	26	45
51-100	75	55	75	4000	65	100
101-200	225	150,4	167	7500	367	215
201 – 300	420	250,4	800	30000	2260	432
> 300	500	500	1200	45000	3000	648

*) Source: Minister of Environment and Forestry Regulation No. P.14/MENLHK/SETJEN/KUM.1/7/2020 with adjustments to Quality Standards Ambien Air based on PP No. 22 of 2021 – Appendix VII
This table is used to determine the values of Ia, Ib, Xa and Xb

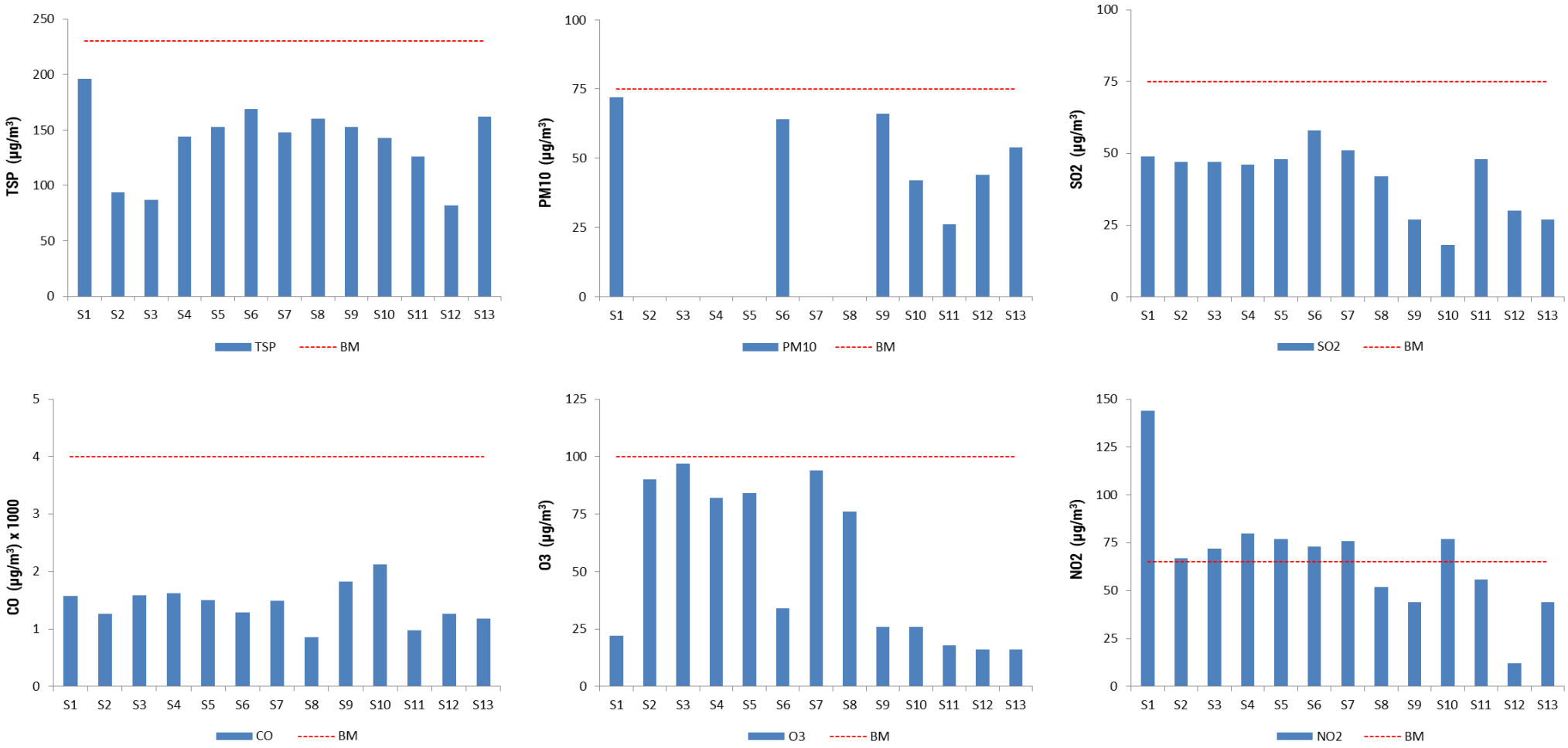


Figure 3.4. Comparison of Concentration Measurement Results in Previous Studies withBMUA Parameter Value
Source :Addendum to Amdal Jakarta MRT North – South Line (2020),Amdal Jakarta MRT East – West Line (2013)

No	Stasiun	Kode
1	Tomang	TMG
2	Grogol	GRG
3	Roxy	RXY
4	Petojo	PTJ
5	Cideng	CDG
6	Thamrin	TRM
7	Kebon Sirih	KBS
8	Kwitang	KWT
9	Senen	SNN
10	Galur	GLR
11	Cempaka Baru	CPB

No	Stasiun	Kode
12	Sumur Batu	SMB
13	Pakulonan Barat	PKB
14	Pakulonan Timur	PKT
15	Perintis	PRT
16	Pulo Gadung	PLG
17	Penggilingan	PGG
18	Cakung Barat	CKB
19	Pulo Gebang	PGB
20	Ujung Menteng	UJM
21	Medan Satria	MDS

Koordinat Sampling

Kode	X	Y
UKG1	106.793	-6.175472
UKG2	106.801781	-6.166103
UKG3	106.825556	-6.183056
UKG4	106.811056	-6.170389
UKG5	106.859444	-6.173333
UKG6	106.875	-6.166667
UKG7	106.892694	-6.174972
UKG8	106.916169	-6.18285
UKG9	106.940806	-6.184222
UKG10	106.963417	-6.1886
UKG11	106.975528	-6.195306
UKG12	106.969461	-6.139653

Elevated Route
Underground Route
Elevated Route
Surface Route
Penjaringan
Pademangan Barat
Pinangsia
Angke
Kebonbawang
Lagoa
Langengong
Kota Administrasi Jakarta Utara
Kota Administrasi Jakarta Barat
Kota Administrasi Jakarta Pusat
Kota Administrasi Jakarta Timur
Kota Administrasi Jakarta Selatan
Kota Bekasi
Prov. DKI. Jakarta
Prov. Jawa barat
Pasarbaru
Serdang
Kelapagading
Tanjungduren Utara
Petojo Selatan
Senen
Pulomas
Cempakaputih Barat
Cakung Barat
Joharbaru
Utankayu Utara
Kebonmelati
Menteng
Palmerah
Setiabudi
Tebet Barat
Cipinang Besar Selatan
Durensawit
Gunung
Mampangprapatan
Depo Rorotan
Bekasi
UKG1 TMG
UKG2 GRG RXY PTJ
UKG3 CDG TRM KBS KWT SNN
UKG4
UKG5 GLR CPB
UKG6 SMB
UKG7 PKB PKT PRT
UKG8 PLG PGG
UKG9 CKB PGB
UKG10 UJM
UKG11 MDS
UKG12
Jl. Letjen S. Parman
Jl. Kyai Tapa
Jl.KH. Hasyim Ashari
Jl.Cideng Timur
Jl. KebonSirih
Jl. AR. Hakim
Jl. Kr. Kwitang
Jl. Letjen Suprapto
Jl. Perintis Kemerdekaan
Jl. Raya Bekasi
Jl. Kali Abang Tengah

MAP
SAMPLING POINT
(Air, Nois and Vibration)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria,
Prov. Jawa Barat

Scale : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	:	Universal Transverse Mercator
Sistem Grid	:	UTM Zone 48 S & Geografi
Datum	:	WGS-1984

Legend
- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River

Road
- Arterial Road
- Collector Street
- Toll Road
- Sampling Location
  Air, Nois and Vibration
- MRT Line
- Station
- Depot
- RSS
  (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

Source :
- Indonesia Earth Map
  Scale 1 : 25000
- Administration Map DKI Jakarta
  Scale 1 : 25000
- Administration Map Bekasi Regency
  Scale 1 : 25000
- Administration Bekasi City
  Scale 1 : 25000

- MRT East - West Line
- Sampling Location

INSERT

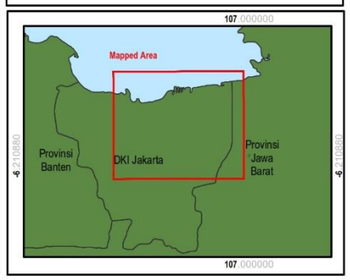


Figure 3.5. Map of Air Quality Sampling Locations and Measurement of Environmental Noise Levels

Table 3.8. Hresults of Air Quality Analysis and Determination of ISPU Figures

Segment	Code	Location	Coordinate	Measurement Results (µg/m3)									ISPU figures							ISPU		
				TSP	PM10	PM2.5	CO	SO2	H.C	O3	PB	NO2	PM10	PM2.5	SO2	CO	O3	NO2	H.C	MAX	Category	Critical
*Elevated*West	UKG1	Jl. S. Parman	S 06°10'30.59": E 106°47'33.35"	21	13	8	4,540	44	20	44	0.2	38	26	26	71	115	18	65	22	115	Not healthy	CO
Underground	UKG2	Jl. KH Hasyim Ashari	S 06°09'56.71": E 106°48'09.07"	45	25	14	4,823	48	24	42	0.3	41	50	45	75	124	18	69	27	124	Not healthy	CO
	UKG3	Jl. Betel Garden	S 06°10'59.50": E 106°49'23.74"	22	14	9	4,632	45	20	45	0.2	39	28	29	72	118	19	67	22	118	Not healthy	CO
	UKG4	Jl. Eastern Cendeng	S 06°10'13.40": E 106°48'39.79"	50	29	16	4,861	49	26	42	0.3	42	54	51	75	125	18	71	29	125	Not healthy	CO
	UKG5	Jl. Lieutenant General Suprapto	S 06°10'27.62": E 106°51'19.45"	48	27	15	4,701	46	22	44	0.2	40	52	48	73	120	18	68	24	120	Not healthy	CO
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	S 06°10'00.59": E 106°52'29.49"	20	12	7	4,842	48	24	43	0.3	41	24	23	75	124	18	69	27	124	Not healthy	CO
	UKG7	Jl. Pioneers of Independence	S 06°10'31.25": E 106°53'36.19"	39	22	12	4,903	50	26	44	0.3	42	44	39	76	126	18	71	29	126	Not healthy	CO
	UKG8	Jl. Raya Bekasi	S 06°10'57.48": E 106°54'58.80"	54	32	18	4,720	46	24	45	0.3	40	57	53	73	121	19	68	27	121	Not healthy	CO
	UKG9	Jl. Raya Bekasi	S 06°11'03.85": E 106°56'32.89"	73	40	23	4,640	45	24	41	0.2	39	65	59	72	118	17	67	27	118	Not healthy	CO
	UKG10	Jl. Raya Bekasi	S 06°11'25.46": E 106°58'05.75"	32	18	10	4,582	44	22	44	0.2	38	36	32	71	117	18	65	24	117	Not healthy	CO
	UKG11	Jl. Kali Abang Tengah	S 06°11'46.05": E 106°58'33.59"	41	23	13	4,239	38	15	43	0.1	34	46	42	65	107	18	60	17	107	Not healthy	CO
Depot	UKG12	Jl. BKT inspection	S 06°08'38.72": E 106°57'59.62"	60	34	20	4,296	39	17	44	0.1	35	59	56	66	108	18	62	19	108	Not healthy	CO
Ambient Air Quality Standards			(PP No. 22 of 2021)	230	75	55	4,000	75	160	100	2	65										
Measurement Time				24 hours	24 hours	24 hours	24 hours	8 hours	8 hours	24 hours	3 hours	24 hours										
International Finance Corporation, General Environmental, Health, and Safety (EHS) Guidelines, 2007 (Forreference)				**PM10 :** 50 (target -1) 100 (target -2) 75 (target -3) 50 (guidelines)		**PM2.5 :** 75 (target -1) 50 (target -2) 37.5 (target -3) 25 (guidelines)		**SO2 :** 125 (24h, target -1) 50 (24h, target -2) 20 (24h, guidelines)		**O3 :** 160 (8h, target -1) 100 (8h, guidelines)		**NO2 :** 40 (1 year) 200 (1h)									

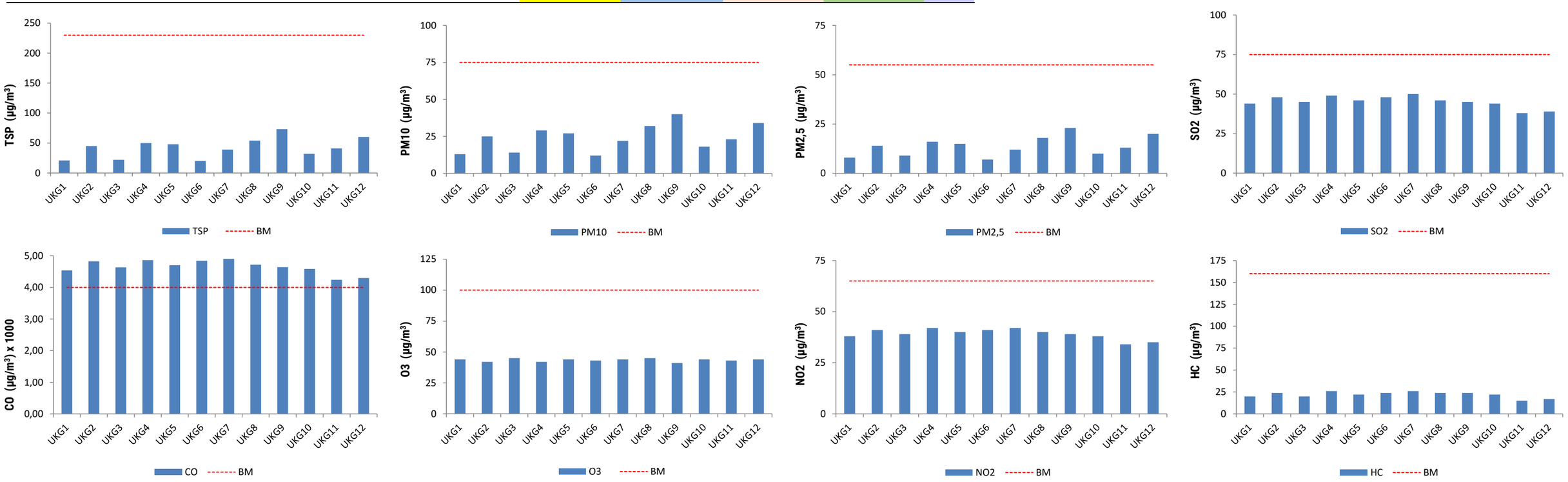


Figure 3.6. Comparison of the concentration of measurement results withBMUA Parameter Value

C. Environmental Quality Conditions

Determining the environmental quality conditions of air components is carried out by converting the Air Pollution Standard Index (ISPU) in Table 3.8. into the Environmental Quality Scale (SKL) in **Table 3.9**. and the results are presented in **Table 3.10.**.

Table 3.9. SKL Air Quality Components

Air Pollution Standard Index (ISPU)		Environmental Quality Scale (SKL)	
Range Numbers	**Category**	**Mark**	**Category**
1 – 50	Good	5	Very good
51 – 100	Currently	4	Good
101 – 200	Not healthy	3	Currently
201 – 300	Very Unhealthy	2	Bad
≥ 301	Dangerous	1	Very bad

Table 3.10. Environmental Quality Conditions Air Quality Components

Segment	Code	Location	ISPU		SKL	
			Number	**Category**	**Mark**	**Category**
*Elevated*West	UKG1	Jl. S. Parman	115	Not healthy	3	Currently
Underground	UKG2	Jl. KH Hasyim Ashari	124	Not healthy	3	Currently
	UKG3	Jl. Betel Garden	118	Not healthy	3	Currently
	UKG4	Jl. Eastern Cendeng	125	Not healthy	3	Currently
	UKG5	Jl. Lieutenant General Suprapto	120	Not healthy	3	Currently
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	124	Not healthy	3	Currently
	UKG7	Jl. Pioneers of Independence	126	Not healthy	3	Currently
	UKG8	Jl. Raya Bekasi	121	Not healthy	3	Currently
	UKG9	Jl. Raya Bekasi	118	Not healthy	3	Currently
	UKG10	Jl. Raya Bekasi	117	Not healthy	3	Currently
	UKG11	Jl. Kali Abang Tengah	107	Not healthy	3	Currently
Depot	UKG12	Jl. BKT inspection	108	Not healthy	3	Currently

Based on Table 3.10. So it can be concluded that the air quality conditions in the study area are in the Medium category (SKL value 3)

3.1.7. Noise

A. Secondary Data

DataNoise levels in the study area were obtained from the results of noise level measurements in previous studies (2013 and 2020), as presented in **Table 3.11**. and **Figure 3.7. .**. Based on this data, it is known that the noise level in the study area has exceeded the Standard Noise Level (Decree of the Minister of the Environment No. 48/MENLH/11/1996) for each designated area/activity environment.

Table 3.11. Results of Noise Level Measurements in the Study Area in Previous Studies

Segment	Code	Measurement Results (dBA)			BTK 1)	IFC 2) (day and night)	Allocation of Area/Activity Environment
		L.S	L.M	NGO			
*Elevated*West	S1	81	76	81	70	70/70	Trade and Services
Underground	S2	65	54	64	55	55/45	Settlement
	S3	71	65	70	60	55/45	Government
	S4	69	62	68	60	55/45	Government
	S5	65	57	64	60	55/45	Government
	S6	81	76	81	70	70/70	Trade and Services
	S7	73	62	72	60	55/45	Government
	S8	54	51	51	55	55/45	Settlement
	S9	75	71	76	70	70/70	Trade and Services
	S10	67	67	69	55	55/45	Settlement
*Elevated*East	S11	74	68	73	55	55/45	Settlement
	S12	72	66	72	70	70/70	Trade and Services
	S13	71	67	72	55	55/45	Settlement

Information: 1) BTK = Standard Noise Level (Decree of the Minister of the Environment No.48/MENLH/11/1996)
2) IFC = International Standard Reference

Source: Jakarta MRT North – South Line AMDAL Addendum, 2020 (S2, S3, S4, S5, S7 and S8)
Amdal Jakarta MRT East – West Line, 2013 (S1, S6, S9, S10, S11, S12 and S13)

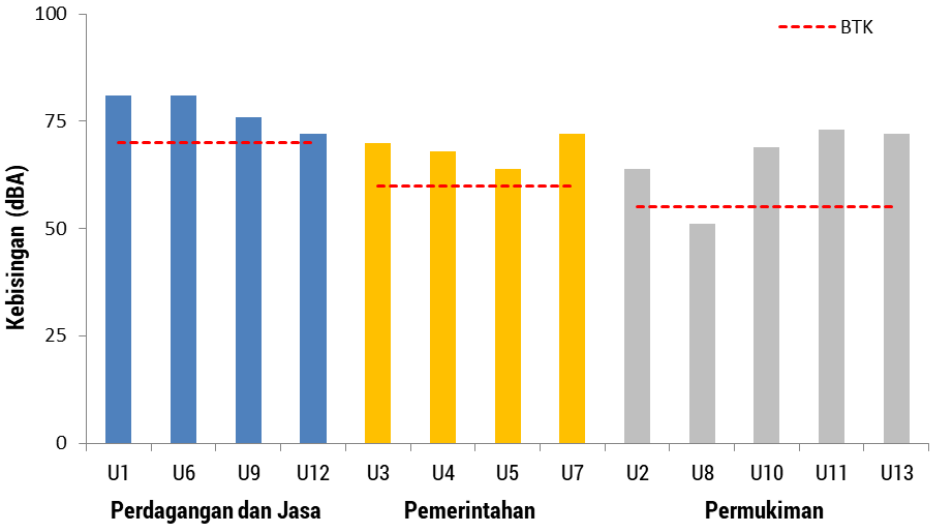


Figure 3.7. Comparison of Measurement Results with Noise Level Standards in Previous Studies

B. Primary data

Primary data on noise levels in the study area was obtained by direct measurements in the field using a sound level meter and calculating the equivalent average noise level in 12 locations in June and July 2022. The noise level sampling location is the same as the ambient air quality sampling location (**Figure 3.5. .**). Noise level quality standards refer toMinister of Environment Decree No. KEP-48/MENLH/11/1996 concerning Noise Level Standards.The results of noise level measurements are presented in**Table 3.12.**.

Table 3.12. Results of Measurement of Equivalent Average Noise Levels in the Study Area in 2022

Segment	Code	Coordinate	Yield (dBA)			Quality standards		Comparison with Quality Standards	Information
			NGO	L.S	L.M	BTK*)	IFC**) (Day/Night)		
*Elevated*West	UKG1	S 06°10'30.59": E 106°47'33.35"	72	74	68	55 1) 65 2)	55 / 45	Sta Tomang (TMG) shows values above the threshold caused by heavy vehicle traffic flow	• The noise value is the Equivalent Value during the time the measurement is carried out for a moment for 10 minutes with an interval of 5 seconds • LSM = Leq value for 24 hours • The calculated LSM value is compared with the standard Noise level value set with a tolerance of + 3 dB(A) • Ls = Leq value for daytime noise L1.0700 L2.1000 L3.1500 L4.2000 • Lm = Leq value for nighttime noise L5.2300 L6.0100 L7.0400 KEP-48/MENLH/11/1996 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services / Recreation / Industry [70 dB(A)] Method SNI 8427 : 2017
Underground	UKG2	S 06°09'56.71": E 106°48'09.07"	68	68	65	55 1) 65 2)	55 / 45	Sta Roxy (RXY) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG3	S 06°10'59.50": E 106°49'23.74"	73	74	68	55 1) 65 2)	55 / 45	Sta Thamrin (TRM) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG4	S 06°10'13.40": E 106°48'39.79"	69	70	65	55 1)	55 / 45	Sta Petojo (PTJ) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG5	S 06°10'27.62": E 106°51'19.45"	73	74	65	55 1) 70 3)	55 / 45	Sta Galur (GLR) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG6	S 06°10'00.59": E 106°52'29.49"	70	71	65	55 1) 70 3)	55 / 45	Sta Sumur Batu (SMB) shows values above the threshold caused by heavy vehicle traffic flow	
*Elevated*East	UKG7	S 06°10'31.25": E 106°53'36.19"	72	73	65	55 1) 70 3)	55 / 45	Sta Pakulonan Timur (PKT) shows values above the threshold caused by the heavy flow of vehicle traffic	
	UKG8	S 06°10'57.48": E 106°54'58.80"	70	72	64	55 1) 70 3)	55 / 45	Sta Pulo Gadung (PLG) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG9	S 06°11'03.85": E 106°56'32.89"	72	74	65	55 1) 70 3)	55 / 45	West Cakung Sta (CKB) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG10	S 06°11'25.46": E 106°58'05.75"	70	72	63	55 1) 70 3)	55 / 45	Sta Ujung Menteng (UJM) shows values above the threshold caused by heavy vehicle traffic flow	
	UKG11	S 06°11'46.05": E 106°58'33.59"	66	68	59	55 1)	55 / 45	Sta Medan Satria (MDS) shows values above the threshold caused by heavy vehicle traffic flow	
Depot	UKG12	S 06°08'38.72": E 106°57'59.62"	69	71	59	55 1)	55 / 45	Rorotan Depot – shows values above the threshold caused by heavy vehicle traffic	

Information: *) BTK: Standard Noise Level based on Decree of the Minister of the Environment No.48/MENLH/11/1996

**) IFC : International Standard Reference

The results of noise level measurements at 12 locations in the study area were recorded in the range of 66 dB(A) – 73 dB(A), so that when compared with the provisions of environmental quality standards as requiredonMinister of Environment Decree No. KEP-48/MENLH/11/1996 can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)].

C. Environmental Quality Conditions

Determination of environmental quality conditions and noise levels is carried out by converting the measurement results in **Table 3.12**. into the Environmental Quality Scale (SKL) in **Table 3.13**. and the results are presented in **Table 3.14.**.

Table 3.13. SKL Component Noise Level

Noise Level (dB[A])	Environmental Quality Scale (SKL)	
	Mark	Category
50 – 55	5	Very good
56 – 60	4	Good
61 – 65	3	Currently
66 – 70	2	Bad
≥ 71	1	Very bad

Table 3.14. Condition Quality Noise Level

Segment	Code	Location	Noise Level (dB[A])	SKL	
				Mark	Category
*Elevated*West	UKG1	Jl. S. Parman	68	2	Bad
Underground	UKG2	Jl. KH Hasyim Ashari	65	3	Currently
	UKG3	Jl. Betel Garden	68	2	Bad
	UKG4	Jl. Eastern Cendeng	65	3	Currently
	UKG5	Jl. Lieutenant General Suprapto	65	3	Currently
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	65	3	Currently
	UKG7	Jl. Pioneers of Independence	65	3	Currently
	UKG8	Jl. Raya Bekasi	64	3	Currently
	UKG9	Jl. Raya Bekasi	65	3	Currently
	UKG10	Jl. Raya Bekasi	63	3	Currently
	UKG11	Jl. Kali Abang Tengah	59	4	Good
Depot	UKG12	Jl. BKT inspection	59	4	Good

3.1.8. Vibration

A. Secondary Data

DataVibration levels in the study area were obtained from the results of vibration level measurements in previous studies, as presented in **Table 3.15**. Based on these data, it is known that the vibration level conditions in the study area are in the non-disturbing category referring to the Decree of the Minister of the Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards.

Table 3.15. Results of Vibration Level Measurements in the Study Area in Previous Studies

Frequency (Hz)	Vibration Measurement Results (mm/sec)							Peak Movement Limit (mm/sec) Category A 1)
	*Elv.*West	*Underground*			*Elevated*East			
	S1	S6	S9	S10	S11	S12	S13	
4	0.1047	0.1165	0.1036	0.1163	0.1162	0.1175	0.1210	< 2
5	0.0961	0.1069	0.0950	0.1067	0.1066	0.1078	0.1111	< 7.5
6.3	0.0659	0.0733	0.0652	0.0732	0.0731	0.0739	0.0762	< 7
8	0.1334	0.1484	0.1319	0.1481	0.1480	0.1497	0.1542	< 6
10	0.0383	0.0426	0.0379	0.0426	0.0425	0.0430	0.0443	< 5.2
12.5	0.0360	0.0400	0.0356	0.0399	0.0399	0.0404	0.0416	< 4.8
16	0.0953	0.1059	0.0942	0.1057	0.1057	0.1069	0.1101	< 4
20	0.1024	0.1139	0.1013	0.1137	0.1136	0.1149	0.1183	< 3.8
25	0.0919	0.1021	0.0908	0.1020	0.1019	0.1031	0.1062	< 3.2
31.5	0.1636	0.1820	0.1618	0.1817	0.1816	0.1836	0.1891	< 3
40	0.0754	0.0838	0.0746	0.0837	0.0837	0.0846	0.0871	< 2
50	0.0627	0.0697	0.0620	0.0696	0.0696	0.0703	0.0724	< 1
Evaluation2)	**Category A**	**Category A**	**Category A**	**Category A**	**Category A**	**Category A**	**Category A**	

Information: 1) Standard Mechanical Vibration Level Based on Damage Impact (KepMenLH No. 49/MENLH/11/1996)
2) Category A = Does not cause damage

B. Primary data

Primary data on vibration levels in the study area was obtained by direct measurements at 12 locations in June and July 2022 using a vibrationmeter. The vibration sampling location is the same as the ambient air quality sampling location (**Figure 3.5. .**). Vibration level standards refer to Minister of Environment Decree No. KEP-48/MENLH/11/1996 concerning Vibration Level Standards. The results of noise level measurements are presented in**Table 3.16.**, and based on these data it is known that the vibration level conditions in the study area are in the non-disturbing category.

Table 3.16. Results of Vibration Level Measurements in the Study Area in 2022

Segment	Code	Coordinate	Measurement results*) in microns (10-6)	Evaluation
*Elevated*West	UKG1	S 06°10'30.59": E 106°47'33.35"	0.004	Category A
Underground	UKG2	S 06°09'56.71": E 106°48'09.07"	0.265	Category A
	UKG3	S 06°10'59.50": E 106°49'23.74"	0.003	Category A
	UKG4	S 06°10'13.40": E 106°48'39.79"	1,823	Category A

Segment	Code	Coordinate	Measurement results*) in microns (10-6)	Evaluation
	UKG5	S 06°10'27.62": E 106°51'19.45"	0.003	Category A
	UKG6	S 06°10'00.59": E 106°52'29.49"	0.585	Category A
*Elevated*East	UKG7	S 06°10'31.25": E 106°53'36.19"	0.003	Category A
	UKG8	S 06°10'57.48": E 106°54'58.80"	1,140	Category A
	UKG9	S 06°11'03.85": E 106°56'32.89"	0.003	Category A
*Elevated*East	UKG10	S 06°11'25.46": E 106°58'05.75"	0.228	Category A
	UKG11	S 06°11'46.05": E 106°58'33.59"	0.003	Category A
Depot	UKG12	S 06°08'38.72": E 106°57'59.62"	0.027	Category A

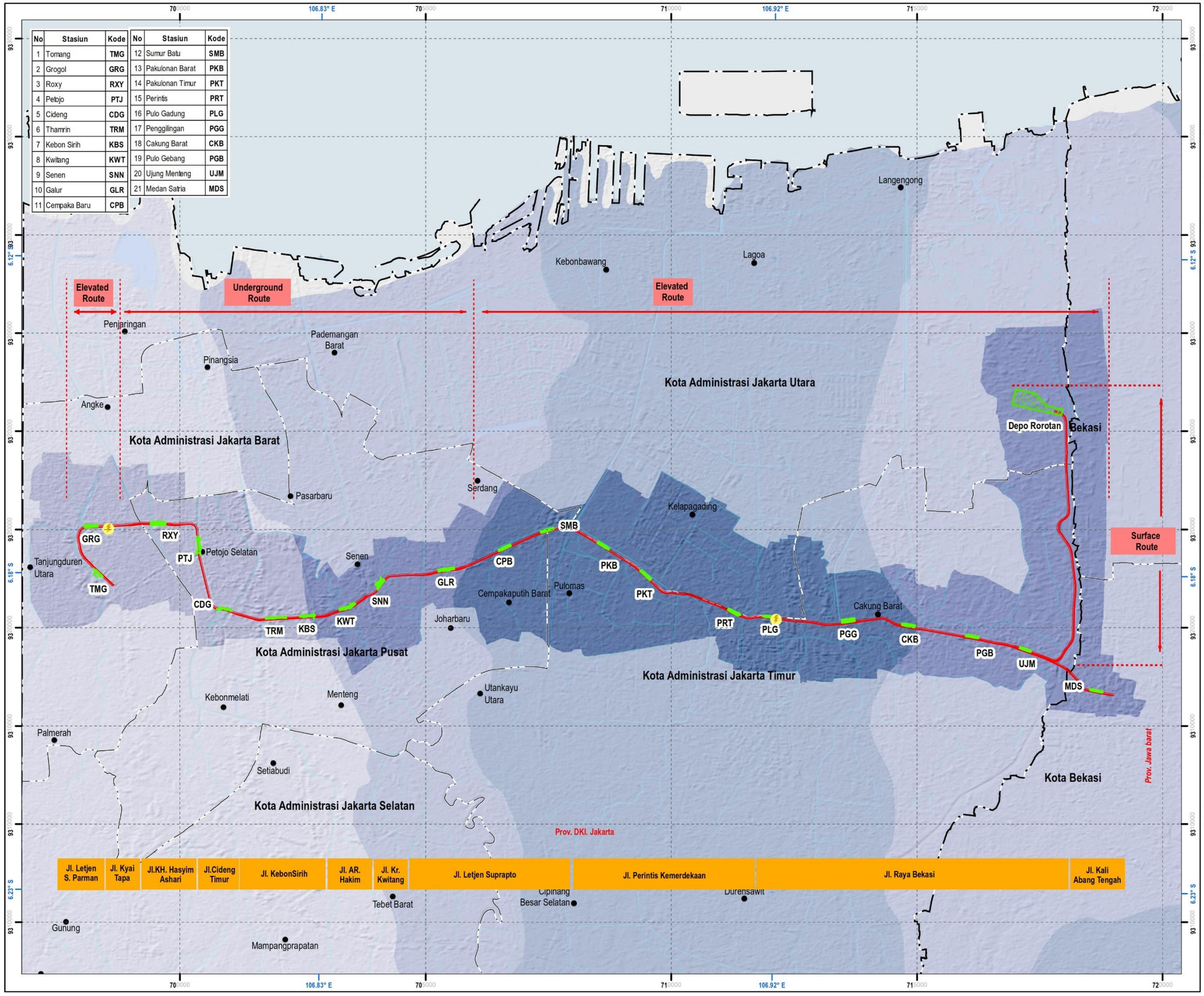
Information: 1) Standard Vibration Level based on Minister of Environment Decree No. 49/MENLH/11/1996
2) Measurement at a frequency of 4.5 Hz

3.1.9. Hydrology

Based on the KLHK Watershed Boundary Map (DAS), there are 5 (five) watersheds in the study area (K. Krukut, K. Ciliwung, K. Sunter, K. Buaran and K. Cakung watersheds) with 7 main rivers (S. Grogol, S. Krukut, S. Ciliwung, S. Sunter, S. Cideng, S. Sunter, S. Buaran and S. Cakung) and 2 Flood Canals (West Canal Flood and East Canal Flood) which all empty into Jakarta Bay (**Figure 3.8. .**). River flow patterns in the Jakarta area are generally parallel, that is, the direction of the flow of the tributaries is parallel, winding, the flow is laminar and relatively slow, the sedimentation level is quite high as a result of land erosion and the transport of clay material in the upstream section.

Flooding is still the main problem faced by the DKI Jakarta Provincial Government. This is because geographically DKI Jakarta is a lowland area and functions as a watershed (DAS) of 13 rivers. Based on DIKPLHD DKI Jakarta in 2022 (**Figure 3.9. .**), there are 82 flood-prone sub-districts in Jakarta, namely:

1. South Jakarta
   West Cilandak, Lebak Bulus, Pondok Labu, North Cipete, Petogogan. Then Cipulir, North Kebayoran Lama, Pondok Pinang, Bangka, and West Kuningan, Mampang Prapatan, Pela Mampang, Tegal Parang, Kalibata, Pengadegan. Next are Rawajati, East Cilandak, Jati Padang, East Pejaten, Bintaro. As well as South Petukangan, Ulujami, Bukit Duri, Kebon Baru, and Manggarai.
2. East Jakarta
   East Cakung, Pulo Gebang, Rawa Terate, Cibubur, Kelapa Dua Wetan, Rambutan, Pondok Bambu, Bidara Cina. Next are Cipinang Besar Selatan, Cipinang Muara, Kampung Melayu, Cawang, and Cililitan, Dukuh, Kramat Jati, Cipinang Melayu, Halim Perdana Kusuma, Kebon Pala, Makassar, Pinang Ranti, Kebon Manggis, Kalisari, and Pekayon.
3. West Jakarta
   West Cengkareng, East Cengkareng, Duri Kosambi, Kapuk, Kedaung Kali Angke, Rawa Buaya, Jelambar Baru, Wijaya Kesuma, Semanan, Tegal Alur, Duri Kepa, South Kedoya, North Kedoya, Joglo, South Kembangan, North Kembangan, and Pinangsia.



MAP
WATERSHED (DAS)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria,
Prov. Jawa Barat

Scale : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend
- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

DAS :
Ciliwung, K. Cakung, K. Bekasi, K. Krukut, K. Buaran, K. Sunter

Source :
- Indonesia Earth Map Scale 1 : 25000
- Administration Map DKI Jakarta Scale 1 : 25000
- Administration Map Bekasi Regency Scale 1 : 25000
- Administration Bekasi City Scale 1 : 25000
- MRT East - West Line Plan
- Watershed Map KLHK

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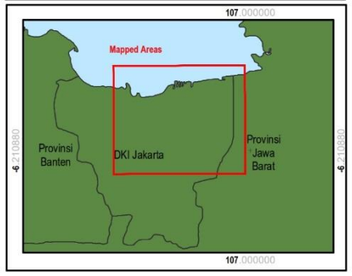


Figure 3.8. Map of Watersheds in the Study Area

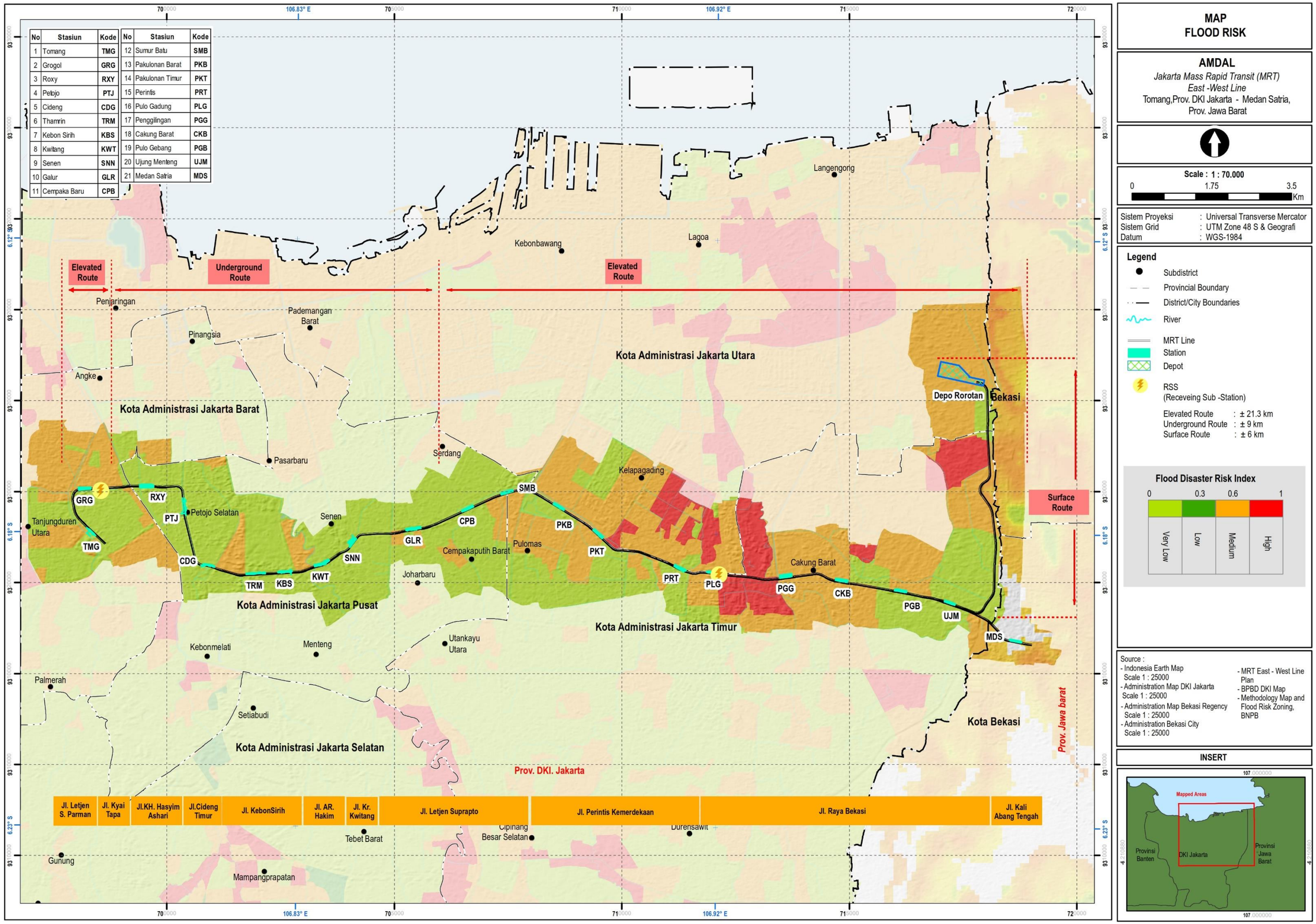


Figure 3.9. Flood Disaster Risk Map in the Study Area

4. North Jakarta
   Cilincing, Marunda, West Semper, East Semper, Suka Pura, East Kelapa Gading, Pegangsaan Dua, South Tugu, West Pademangan, Kamal Muara. Next are Kapuk Muara, Pejagalan, Penjaringan, Pluit and Tanjung Priok.
5. Central Jakarta
   Karet Tengah and Petamburan Subdistricts.

The MRT East – West Line Phase 1 Stage 1 planned site is a built environment area that has been built, so the run off coefficient is quite high and has the potential for flooding when it rains, coupled with the inadequate condition of the existing drainage system.The initial environmental baseline condition of runoff water discharge is determined based on the current condition of land use, rainfall and catchment area area, which is then calculated using the rational formula:

Q = 0.0028 x C x I x A

Q = 0.0028 x 0.30 x 481.46 x 99.75

Q = 40.34 m3/sec.Ha

Determination of environmental quality conditionsrunoff water dischargeThis is done by converting the run off discharge calculation value into the Environmental Quality Scale (SKL) in **Table 3.17.**

Table 3.17. SKL Components of Runoff Water Discharge(run off)

Runoff Water Discharge (m3/sec.Ha)	Environmental Quality Scale (SKL)	
	Mark	Category
<0.50	5	Very good
0.6-1.0	4	Good
1.1-2.5	3	Currently
2.6-5	2	Bad
>5.5	1	Very bad

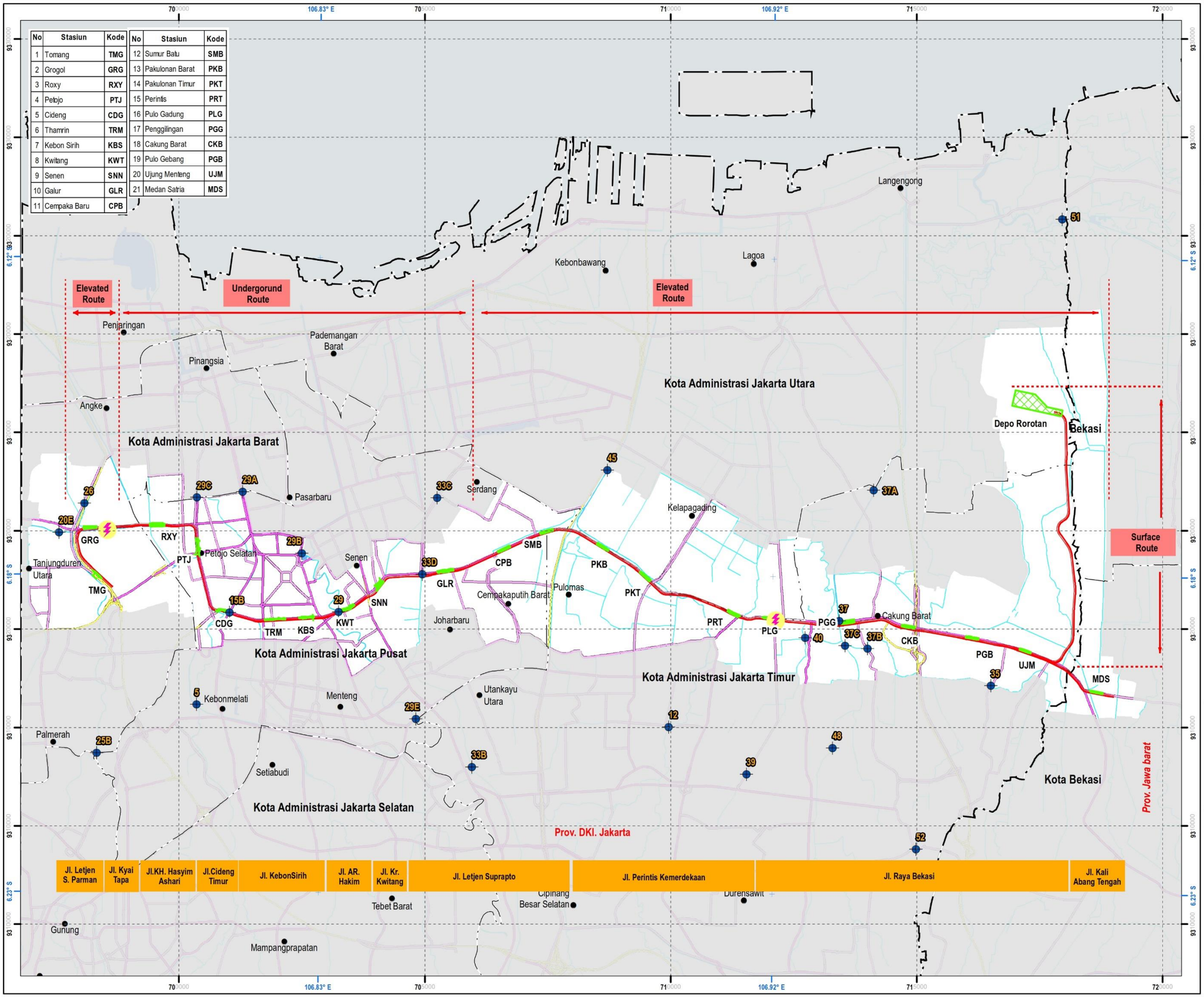
Source: PSLH UGM, 2010

Based on **Table 3.17.** This means the condition of the environmental quality of the Runoff Water Discharge Component(run off) is included in the very bad category.

3.1.10. River Water Quality

A. Secondary Data

There are 25 DKI Jakarta DLH river water quality monitoring points in the study area (**Figure 3.10. .**). River water quality measurements are carried out routinely every year, and the results are used as a basis for determining river water quality status in accordance with Minister of Environment Decree No. 115 of 2003 concerning Guidelines for Determining Water Quality Status. Based on the 2021 DKI Jakarta River Water Quality Monitoring Report, it is known that 24 monitoring points (96%) are in the Severely Polluted category, while 1 monitoring point (4%) is in the Moderately Polluted category (monitoring point 33B).Detailed datariver quality and determining water quality statuspresented on**Table 3.18.**.



MAP
LOCATION OF MONITORING RIVER WATER QUALITY DLH DKI JAKARTA

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend
- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River

Road
- Arterial Road
- Collector Street
- Toll Road
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

- river water quality monitoring point

Source :
- Indonesia Earth Map Scale 1 : 25000
- Administration Map DKI Jakarta Scale 1 : 25000
- Administration Map Bekasi Regency Scale 1 : 25000
- Administration Bekasi City Scale 1 : 25000
- MRT East - West Line
- River water quality monitoring data for 2018-2021, DLH DKI Jakarta

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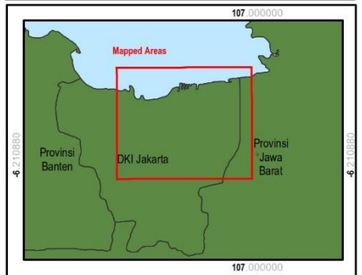


Figure 3.10. Map of DKI Jakarta DLH River Water Quality Monitoring Locations

Table 3.18. Results of DKI Jakarta DLH River Water Quality Monitoring in the Study Area

Segment	River Name	Code	Coordinate	Measurement results																			Pollutant Index	Category
				TSS	BOD5	COD	P	NO3	NO2	CD	CR VI	Cu	PB	Hg	Zn	F	Cl2	H2S	Oils & Fats	MBAS	Phenol	Fecal Coliforms	Total Coliforms	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	Qty/100 mL	Qty/100 mL	
West Elevated	Grogol River	25B	S 06°12'28.44" ; E 106°47'32.82"	50	14.1	53	1.32	0.04	0.03	0.01	0	0.02	< 0.005	0	0.01	0.21	0.16	0.02	744.3	560	9	52 x 109	59 x 109	29.59	Heavy Pollution
	Secretary River	20E	S 06°10'02.59" ; E 106°47'07.34"	10	2.23	10	1.14	0.04	0.03	0.01	0	0.02	< 0.005	0	0.01	0.17	0.2	0.03	853.9	1454	24	57 x 108	73 x 108	26.04	Heavy Pollution
	Grogol River	26	S 06°09'43.20" ; E 106°47'24.18"	46	23.39	48	1.35	0.03	0.04	0.01	0	0.02	< 0.005	0	0.03	0.36	0.21	0.6	233.6	634	26	15 x 1010	16 x 1010	31.25	Heavy Pollution
Underground	Ciliwung River	5	S 06°11'56.20" ; E 106°48'38.96"	198	23.37	85	0.57	1.53	0.25	0.01	0	0.02	< 0.005	0	0.01	0.05	0.08	0	94.9	32	7	18 x 106	33 x 106	17.72	Heavy Pollution
	Cideng River	15B	S 06°10'55.33" ; E 106°49'00.45"	57	15.3	62	1.75	0.02	0.03	0.01	0	0.02	< 0.005	0	0.04	0.64	0.07	0.48	629.5	923	21	10 x 1010	16 x 1010	31.21	Heavy Pollution
	Cideng River	29C	S 06°09'39.23" ; E 106°48'38.62"	68	20.59	56	1.52	0.05	0.03	0.01	0	0.02	< 0.005	0	0.03	0.02	0.05	0.41	425	1226	8	11 x 108	17.8 x 108	23.34	Heavy Pollution
	Ciliwung River	29E	S 06°12'05.31" ; E 106°51'03.94"	614	14.32	45	0.44	1.57	0.19	0.01	0	0.02	< 0.005	0	0.02	0.05	0.41	0	32.3	256	4	22 x 106	24 x 106	17.23	Heavy Pollution
	Ciliwung River	29	S 06°10'54.66" ; E 106°50'12.50"	30	45.39	216	0.14	1.56	0.21	0.01	53	0.02	< 0.005	0	0.01	0.12	0.51	0	56.2	53	4	21 x 106	43 x 106	18.05	Heavy Pollution
	Ciliwung River	29B	S 06°10'15.92" ; E 106°49'48.03"	22	15.7	52	0.65	1.21	0.21	0.01	0	0.02	< 0.005	0	0.01	0.05	0.42	0	62.8	51	4	19 x 106	33 x 106	17.55	Heavy Pollution
	Ciliwung River	29A	S 06°09'35.39" ; E 106°49'08.73"	127	5.32	29	0.74	0.09	0.03	0.01	0	0.02	< 0.005	0	0.03	0.23	0.32	0	266.3	64	4	22 x 106	39 x 106	17.79	Heavy Pollution
	East Kalibaru River	33B	S 06°12'37.06" ; E 106°51'41.04"	52	27.1	118	0.08	1.65	0.17	0.01	0	0.02	< 0.005	0	2.02	0.06	0.1	0	124	26	2	14 x 104	22 x 104	8.54	Moderately Soiled
	East Kalibaru River	33D	S 06°10'29.58" ; E 106°51'07.68"	62	25.06	113	0.6	0.13	0.02	0.01	0	0.02	< 0.005	0	0.02	0.05	0.26	0.03	352	434	20	12 x 105	66 x 105	12.57	Heavy Pollution
	East Kalibaru River	33C	S 06°09'39.03" ; E 106°51'17.44"	49	13.75	76	0.75	0.12	0.04	0.01	0	0.02	< 0.005	0	0.05	0.07	0.22	0.03	368	419	27	12 x 106	16 x 106	16.46	Heavy Pollution
East Elevated	Sunter River	45	S 06°09'20.02" ; E 106°53'10.02"	53	22.18	68	0.96	*	0.01	0.01	0	0.02	< 0.005	0	0.02	0.05	0.04	0.22	336.9	146	60	41 x 106	64 x 106	18.06	Heavy Pollution
	Sunter River	12	S 06°12'10.06" ; E 106°53'51.11"	119	32.68	76	0.86	*	0.04	0.01	0	0.02	< 0.005	0	0.02	0.09	0.09	0.2	450.1	571	47	49 x 106	70 x 106	18.43	Heavy Pollution
	Petukangan River	39	S 06°12'41.26" ; E 106°54'42.63"	12	10.01	51	1.17	*	0.04	0.01	0	0.02	< 0.005	0	0.01	0.1	0.15	0.15	1221.8	1623	44	36 x 108	40 x 108	25.09	Heavy Pollution
	Buaran River	40	S 06°11'10.77" ; E 106°55'21.05"	25	38.61	99	0.93	0.03	0.04	0.01	0	0.02	< 0.005	0	0.06	0.07	0.06	0.08	188.9	1320	62	39 x 106	79 x 106	18.05	Heavy Pollution
	Buaran River	48	S 06°12'23.56" ; E 106°55'39.58"	9	23.88	63	0.99	0.19	0.04	0.01	0	0.02	< 0.005	0	0.02	0.27	0.08	0.19	395.1	2528	45	3.3 x 1010	45 x 1010	29.15	Heavy Pollution
	Cakung River	35	S 06°11'42.06" ; E 106°57'24.03"	14	10.41	24	1.35	*	0.04	0.01	0	0.02	< 0.005	0	0.01	0.17	0.17	0.37	421.2	1356	75	43 x 107	57 x 107	21.67	Heavy Pollution
	Cakung River	37B	S 06°11'17.71" ; E 106°56'02.41"	17	24.28	77	1.28	*	0.03	0.01	0	0.02	< 0.005	0	0.02	0.35	0.17	0.55	577.3	1135	76	37 x 107	45 x 107	21.51	Heavy Pollution
	Buaran River	37C	S 06°11'15.84" ; E 106°55'47.53"	26	31.27	84	1.19	*	0.03	0.01	0	0.02	< 0.005	0	0.01	0.1	0.24	0.35	910	616	71	31 x 107	51 x 107	21.33	Heavy Pollution
*Elevated*East	Cakung River	37A	S 06°09'33.03" ; E 106°56'06.09"	41	41.04	81	0.99	0.03	0.04	0.01	0	0.02	< 0.005	0	0.02	0.08	0.13	0.04	183.4	,436.0	27	4.3 x 108	13 x 108	21.9	Heavy Pollution
	Cakung River	37	S 06°10'59.47" ; E 106°55'43.55"	23	26.08	63	1.41	0.06	0.03	0.01	0	0.02	< 0.005	0	0.01	0.16	0.19	0.57	809.9	1248	81	34 x 107	61 x 107	21.46	Heavy Pollution
	East Canal River	51	S 06°06'33.17" ; E 106°58'10.18"	13	6.22	12	0.18	0.06	0.04	0.01	0	0.02	< 0.005	0	0.01	0.21	0.06	0	*	49	34	8.8 x 107	18 x 107	20.04	Heavy Pollution
Depot	East Canal River	52	S 06°13'30.32" ; E 106°56'34.99"	129	5.39	10	0.13	0.5	0.11	0.01	0	0.02	< 0.005	0	0.01	0.18	0.08	0	*	48	30	5.8 x 107	67 x 107	22.1	Heavy Pollution
	CLASS 2 RIVER WATER QUALITY STANDARDS (PP No. 22 of 2021)			**50**	**3**	**25**	**0.2**	**10**	**0.06**	**0.01**	**0.05**	**0.02**	**0.03**	**0.02**	**0.05**	**1.5**	**0.03**	**0.002**	**1**	**0.2**	**0.005**	**1 x 103**	**5 x 103**		

Source : 2021 DKI Jakarta River Water Quality Monitoring Report

Referring to yearly river water quality monitoring data2018-2021, it is known that the main pollutant parameters of rivers in DKI Jakarta are dominated by domestic pollution, namely fecal coliform, total coliform, free chlorine (Cl2), BOD and H2S (DLH DKI Jakarta, 2021). These five parameters have always been the parameters with the largest Ci/Li values (the ratio of the measured parameter value to the quality standard value) during 2018-2021.

B. Primary data

Primary data on river water quality in the study area was obtained by taking river water samples directly at 12 locations in June and July 2022 and then analyzed in the laboratory. River water quality sampling locations in the study area are presented in Figure 3.11. River water quality parameters and standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (Appendix VI – River Water Quality Standards and the Like). Furthermore, the data from river water quality measurements are used as a basis for determining water quality status using the Pollution Index method in accordance with Minister of Environment Decree No. 115 of 2003 concerning Guidelines for Determining Water Quality Status. The results of the analysis of river water quality and determining the status of water quality in the study area are presented in **Table 3.19.** Comparison of the concentration of the measurement results with the standard values for river water quality is presented in **Figure 3.12.**.

3.1.11. Topography and Morphology

Based on the Indonesian Earth Map **(Figure 3.13**), the study area is a plain area, with a height of < 5 meters above sea level, a slope of < 5% and generally a swampy plain. Physiographically, the study area is included in the shelf of the North Coast of Jakarta, which is formed by river alluvial deposits, coastal alluvial deposits and swamp deposits.

Based on the Geomorphological Map of the Jabodetabek Punjur Area (Department of Regional Settlements and Infrastructure, 2011) the study area is in the morphological units of coastal alluvial plains, coastal embankments and fine-relief alluvial fans. Coastal alluvial land units lie along the north coast (Jakarta Bay) and large river valleys. The height in this unit is 0 - 16 meters above sea level, with a slope of 0 - 1%. The lithology of this unit consists of a mixture of clay, mud, sand, gravel, gravel and unconsolidated boulders. The coastal embankment units are spread from west to east, in the same direction as the coastline that borders the Java Sea. The lithology that makes up this morphology is fine to coarse sand. Meanwhile, the fine-relief alluvial fan units are spread lengthwise from west to east bordering the northern part of Bogor City. The height in this unit is around 16 - 195 meters above sea level with a slope of 1 – 5%. The lithology that composes it consists of fine tuff, conglomerate tuff, sandy tuff and pumice tuff. This lithology is thought to originate from young volcanic rocks in the Bogor highlands which were then deposited in the terrestrial environment and formed a fan (spreading) morphology.

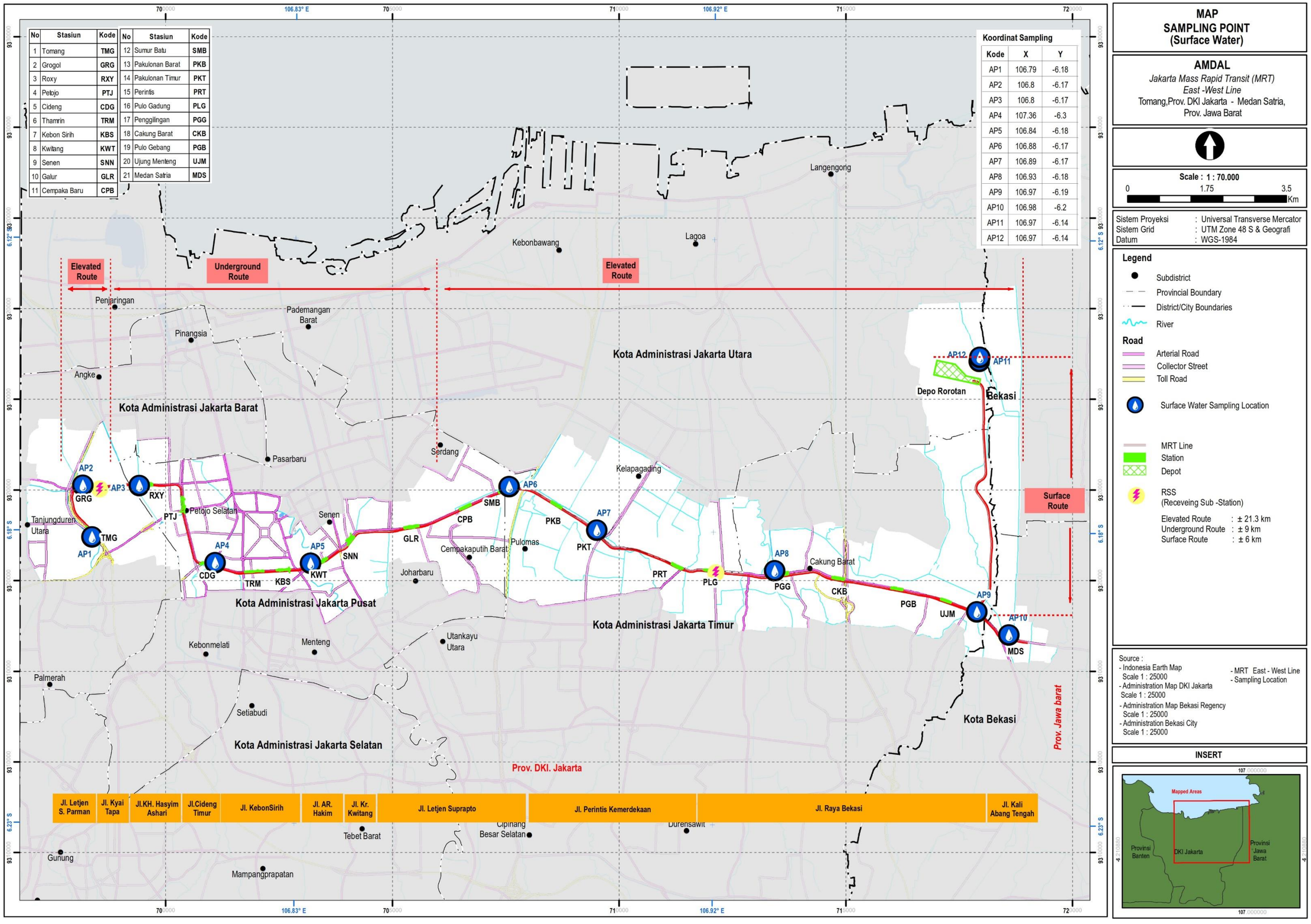


Figure 3.11. Map of River Water Quality Sampling Locations

Table 3.19. Results of River Water Quality Measurements in the Study Area in 2022

Segment	River Name	Code	Coordinate	Measurement results																			Pollutant Index	Category
				TSS	BOD5	COD	P	NO3	NO2	Ammonia	CD	Cr-VI	Cu	PB	Hg	Zn	F	Cl2	H2S	Oil & Fat	MBAS	Phenol	Total Coliforms		
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	MPN/100 mL		
Elevated West	S. Grogol	AP1	S 06°10'35.00" : E 106°47'34.00"	15	15	64	1	< 0.1	<0.002	15	< 0.0006	< 0.004	< 0.005	0.01	< 0.0005	0.007	0.3	0.1	<0.002	< 0.2	< 0.05	<0.001	2700	7.41	Moderately Soiled
	S. Grogol Branch	AP2	S 06°09'57.50" : E 106°48'05.90"	26	22	88	0.18	2	0.6	4	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	<0.0006	0.2	0.1	<0.002	< 0.2	< 0.05	<0.001	2400	5.42	Moderately Soiled
Underground	S. Duri	AP3	S 06°10'00.15" : E 106°48'09.70"	74	30	107	2	< 0.1	<0.002	23	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.02	0.1	0.09	<0.002	2.0	1.0	<0.001	2300	8.13	Moderately Soiled
	S. Cideng	AP4	S 06°18'17.00" : E 106°81'41.00"	60	15	55	0.8	< 0.1	<0.002	9	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.005	<0.01	0.1	<0.002	< 0.2	1.0	<0.001	2400	6.65	Moderately Soiled
	S. Ciliwung	AP5	S 06°10'53.51" : E 106°50'10.73"	53	42	131	2	0.2	0.03	41	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.01	0.2	0.08	<0.002	< 0.2	2.0	<0.001	4500	9.02	Moderately Soiled
*Elevated*East	S. Utan Kayu	AP6	S 06°09'58.00" : E 106°52'33.00"	25	23	94	1	< 0.1	<0.002	17	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.02	<0.01	0.1	<0.002	< 0.2	2.0	<0.001	2700	7.65	Moderately Soiled
	S. Sunter	AP7	S 06°10'29.00" : E 106°53'36.00"	100	33	103	1	< 0.1	<0.002	20	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.01	0.2	0.1	<0.002	8.0	2.0	<0.001	2700	7.95	Moderately Soiled
	S. Rawa Malang	AP8	S 06°10'57.62" : E 106°55'43.81"	54	32	113	1	< 0.1	<0.002	24	< 0.0006	< 0.004	0.008	< 0.009	< 0.0005	0.02	0.02	0.1	<0.002	< 0.2	2.0	<0.001	2700	8.18	Moderately Soiled
	East Canal Flood	AP9	S 06°11'26.76" : E 106°58'08.95"	17	22	98	0.3	3	0.9	6	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.0008	0.2	0.09	<0.002	< 0.2	< 0.05	<0.001	2300	6.05	Moderately Soiled
	BKT Channel	AP10	S 06°11'43.10" : E 106°58'31.90"	85	24	80	0.09	0.5	0.02	0.05	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.004	0.09	0.08	<0.002	< 0.2	< 0.05	<0.001	2700	3.96	Light Pollution
Depot	Rorotan Irrigation	AP11	S 06°8'26.62" : E 106°58'09.91"	11	20	98	0.3	8	1	0.3	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.004	0.4	0.09	<0.002	< 0.2	< 0.05	<0.001	230	5.12	Moderately Soiled
	East Canal Flood	AP12	S 06°8'23.66" : E 106°58'10.38"	162	38	115	0.5	5	0.4	5	< 0.0006	< 0.004	< 0.005	< 0.009	< 0.0005	0.004	0.08	0.1	<0.002	< 0.2	< 0.05	<0.001	2400	5.81	Moderately Soiled
CLASS 2 RIVER WATER QUALITY STANDARDS (PP No. 22 of 2021)				**50**	**3**	**25**	**0.2**	**10**	**0.06**	**0.2**	**0.01**	**0.05**	**0.02**	**0.03**	**0.002**	**0.05**	**1.5**	**0.03**	**0.002**	**1**	**0.2**	**0.005**	**5000**		

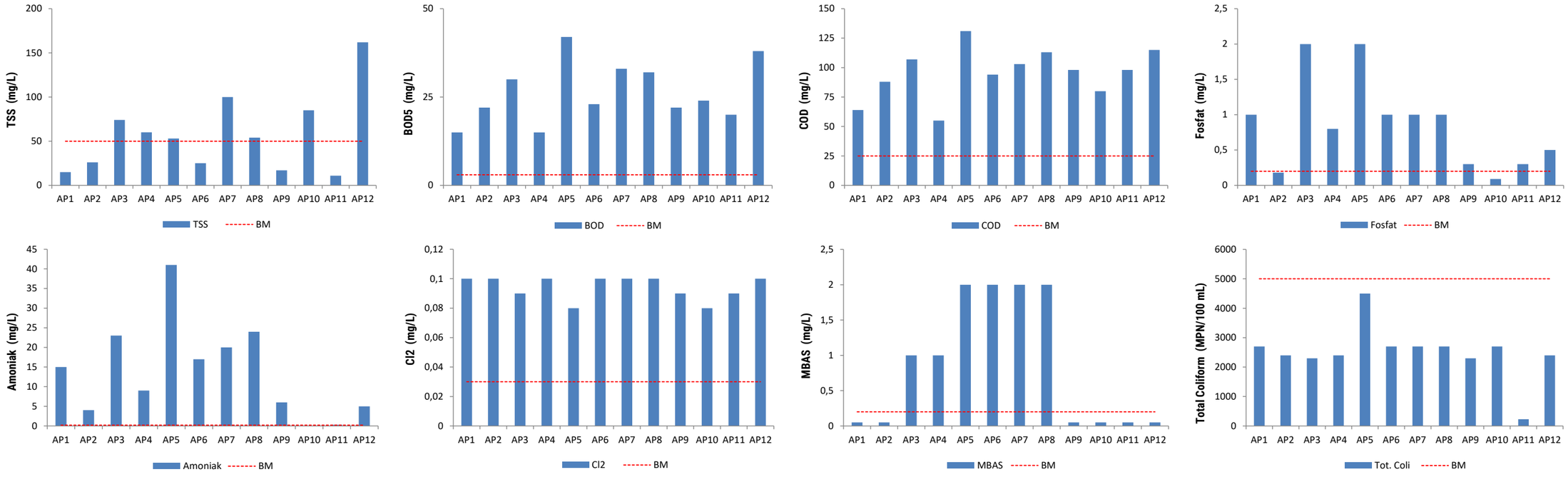
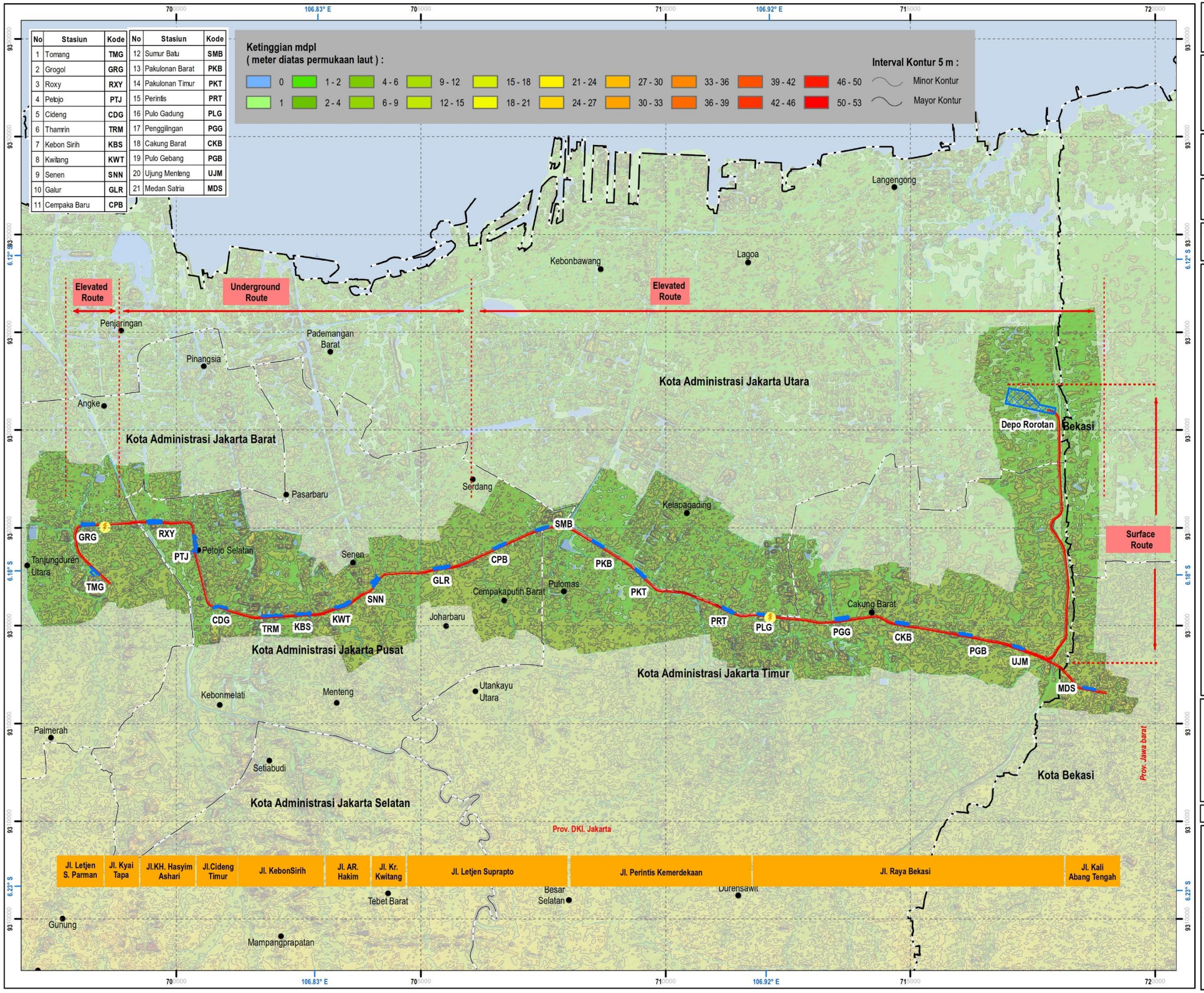


Figure 3.12. Comparison of the concentration of measurement results withRiver Water Quality Standard Values



MAP
TOPOGRAPHY

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	:	Universal Transverse Mercator
Sistem Grid	:	UTM Zone 48 S & Geografi
Datum	:	WGS-1984

Legend
- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

Source :
- Indonesia Earth Map Scale 1 : 25000
- Administration Map DKI Jakarta Scale 1 : 25000
- Administration Map Bekasi Regency Scale 1 : 25000
- Administration Bekasi City Scale 1 : 25000
- MRT East - West Line Plan
- Denmas 0.27-arcsecond resolution

INSERT

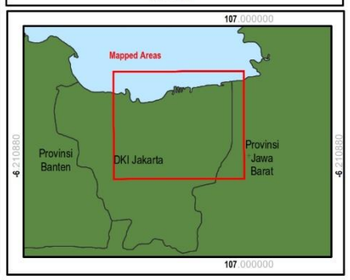


Figure 3.13. Topography in the Study Area
Source: Indonesian Earth Map (BIG, 2014)

3.1.12. Geology and Hydrogeology

Based on the Regional Geological Map Sheet of Jakarta and the Thousand Islands (Turkandi, et al., 1992), the geological setting in the DKI Jakarta area is dominated by Quaternary deposits and is composed of Tertiary age bedrock which is bounded by the Tangerang High to the west and the Rengasdengklok High to the east. Tertiary deposits consist of claystone (claystone), marl (marl) with inserts of coral limestone (limestone) of Pliocene age (**Figure 3.14. .**). Meanwhile, Quaternary deposits originating from volcanic eruptions to the south of Jakarta consist of alluvium units, coastal embankment sediment units, and alluvial fan units. These three units are interfingering which forms the morphology of the plain. Lithological units in the DKI Jakarta area from young to old consist of four rock groups, namely:

1. UnitAlluvium (Qa): This rock unit is an alluvium deposit which includes current coastal deposits as well as river deposits and swamp deposits. The rocks are composed of a mixture of clay, mud, sand, gravel, gravel and unconsolidated boulders. The distribution of this unit is along the valleys of large rivers and along the north coast (Jakarta Bay).
2. Pematang Pantai Sediment Unit (Qbr): This unit is distributed in the northern part of Jakarta, with a distribution direction from west to east in the direction of the coastline. This rock unit consists of fine to coarse sand and mollusk fragments. Judging from the morphology and constituent rocks, this rock unit is thought to have been formed due to wind deposits which formed sand dunes.
3. Alluvium Fan Unit (Qav): The deposition area of this unit starts from the Bogor area and then spreads to Jakarta. This rock unit consists of fine tuff, conglomerate tuff, sandy tuff and pumice tuff, some of which are well consolidated. The formation of this unit came from Mount Salak and Mount Pangrango which were deposited in a terrestrial environment and formed a fan (spreading) morphology. The age of this unit is estimated to be Late Pleistocene or younger with a thickness of ± 300 m.
4. Banten Tuff Unit (QTvb): This unit is of Pliocene age and consists of tufa, pumice tuff, tuff sandstone. This unit is estimated to be of early-middle Pliocene age, and its depositional environments are terrestrial and tidal environments.

Based on Minister of Energy and Mineral Resources Decree No. 716 K/10/MEM/2003 concerning Horizontal Boundaries of Groundwater Basins (CAT) on Java Island and Madura Island, the study area is in CAT Jakarta (area 1,439 km2 with the amount of free groundwater (Q1) 803 million m3/year and groundwater pressure (Q2) 40 million m3/year). CAT Jakarta is a cross-border CAT of provinces (Banten Province, DKI Jakarta Province and West Java Province) which covers part of Tangerang City, part of Tangerang Regency, part of Bogor Regency and part of Bekasi Regency as well as the entire area of DKI Jakarta and Depok City (**Figure 3.15.**) .

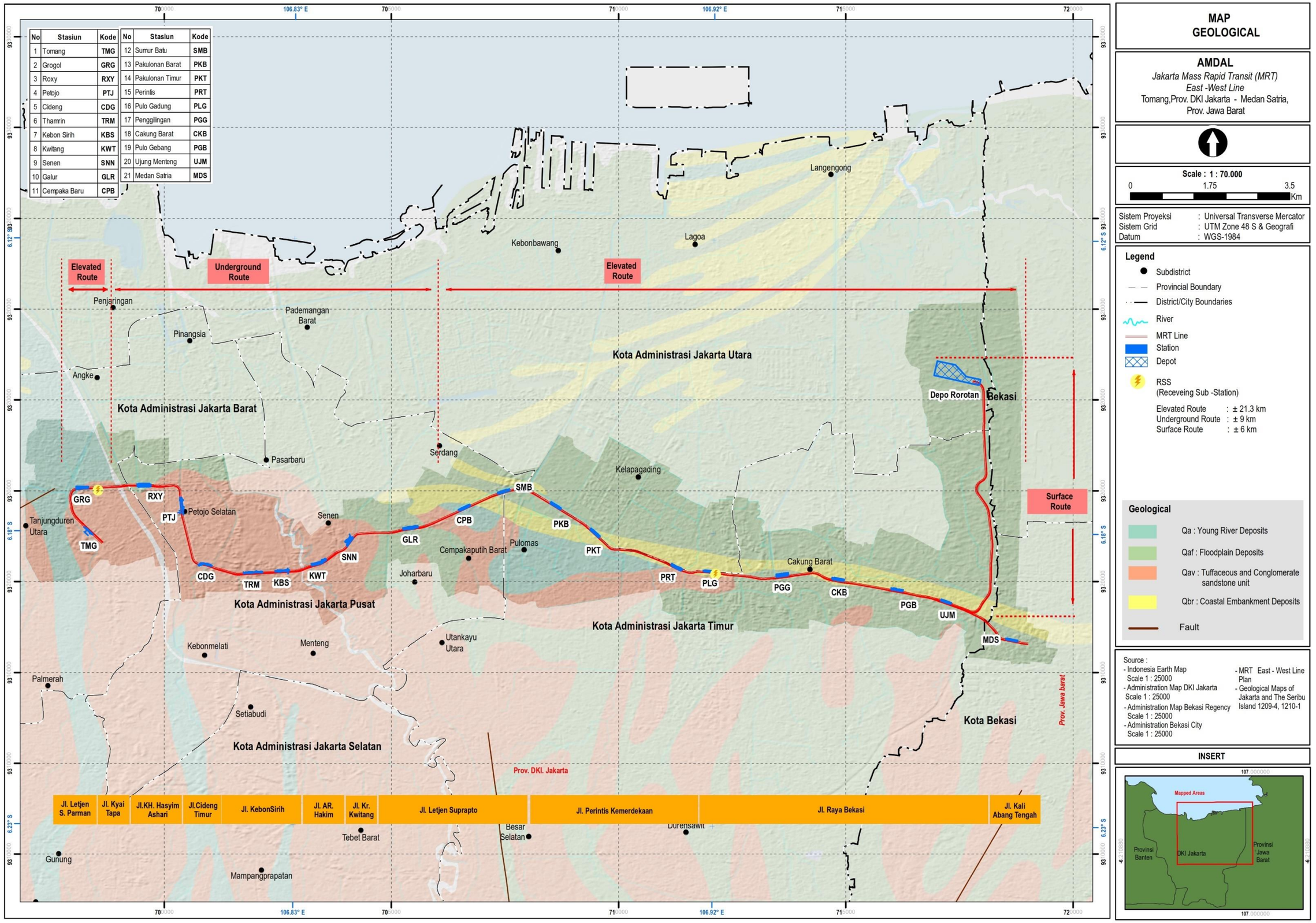


Figure 3.14. Geological Map of the Study Area
Source: Regional Geological Map of Jakarta and the Thousand Islands (1992)

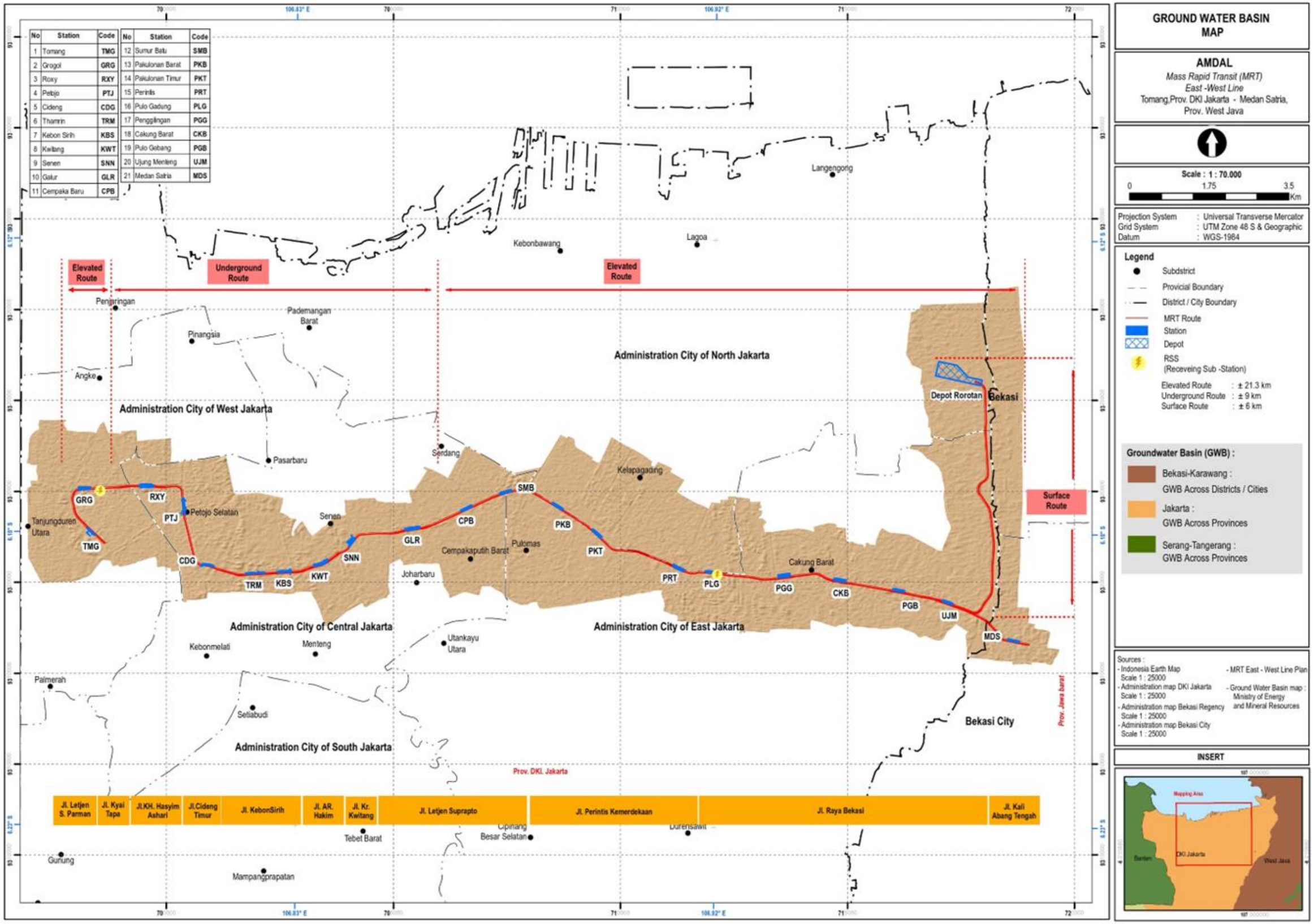


Figure 3.15. Map Ground Water Basin (CAT)in the Study Area

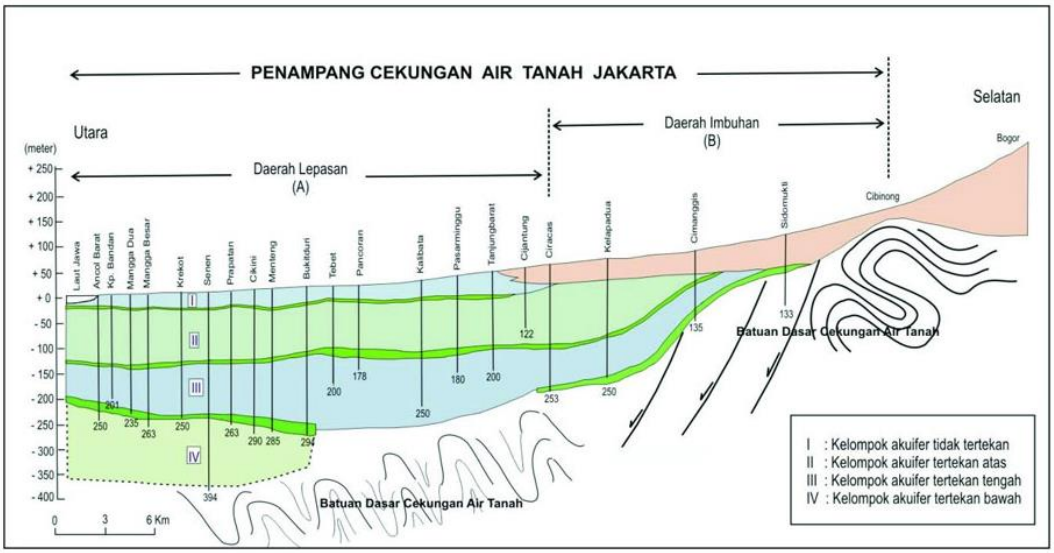


Figure 3.16. Jakarta CAT Zone

The presence of groundwater is influenced by the physiography of the groundwater basin, especially rock type (geology), morphology and geometry. The geological setting determines the amount of water stored based on the influence of the presence of rocks that are impermeable and permeable (high porosity). Morphology determines the direction of groundwater movement and the area where water seeps into high areas (recharge areas). Meanwhile, geometry provides an idea of how large the groundwater basin's capacity is to accommodate groundwater that seeps in and is stored. Laterally, the Jakarta CAT is limited by geological structures in the form of faults. In the west it is bounded by the Cidurian Fault and in the east it is thought to be bounded by a descending fault related to the Rengasdengklok High. Meanwhile, in the southern part of the Jakarta CAT it is limited by the Bogor Anticlinorium Line and in the northern part it is estimated that the distribution of the system in this basin is limited by stratigraphic symptoms in the form of facies changes.

Based on the physiography of the Jakarta CAT, it is known that the study area is in a groundwater mandala of coastal plains and alluvial plains, with an alluvial sedimentary aquifer typology. In general, the aquifer system in the study area and its surroundings is of the flow type through intergranular spaces, locally through gaps and between voids, especially for bedrock aquifers. Based on the magnitude of the well discharge for the surface aquifer and bedrock aquifer, the study area is in an area with well discharge:

- **Surface deposited aquifer**

  The well flow is more than 5 lt/sec. The aquifer system flows through the spaces between grains, spreads around Central Jakarta - Cengkareng, generally utilized through dug wells in several places taken through shallow drilled wells. This aquifer system consists of several layers of aquifer ranging from sand to gravel with a thickness of less than 15 m. The static groundwater level is less than 2 m below the local ground level.

***Well flow 1 – 5 lt/sec*.**The aquifer system flows through the intergranular spaces, spread across relatively flat areas in the central and northern areas of Jakarta, generally exploited through dug wells. This aquifer system consists of several aquifer layers, namely gravelly sand and clayey sand with an average thickness of less than 10 m. The static groundwater level varies generally between 0.5 to 5 m below the local ground level.

- **Bedrock Aquifer**

  ***The well flow is more than 25 lt/sec*.**An aquifer system with flow through fissures, fractures and dissolution channels, locally through voids between grains, locally found in sandy limestone.

  ***Well flow 5 – 25 lt/sec*.**AQuifers with flow through intergranular spaces, locally through fractures, generally found in Quaternary rock units. This aquifer system consists of several sandstone aquifers, thickness ranging from 3 – 18 meters, depth reaching 150 m below the local land surface.

Based on hydrostratigraphy which refers to the lithology approach from drill data, the Jakarta CAT zone is divided into:

a. The unconfined zone (unconfined aquifer) is in quaternary rocks at a depth of 0 – 40 meters
b. The confined aquifer zone is located in young alluvial deposits and is divided into 2 sub-zones, namely:
   - Upper depressed subzone at a depth of 40 – 140 meters;
   - Lower sub-zone at a depth of >140 meters.

3.1.13. Depth and Quality of Ground Water

A. Secondary Data

Based on the Jakarta Aquifer Contour Map (Ministry of Energy and Mineral Resources, 2019),The northern Jakarta groundwater basin has a relatively shallow groundwater depth(**Figure 3.18. 17.**). This condition is related to coastal morphological units which have low land elevations with flat contours. Meanwhile, the southern part of Jakarta has a higher land surface elevation and wavy land contours due to its morphology consisting of volcanic fans.

Based on the Jakarta CAT Groundwater Depth Map (Ministry of Energy and Mineral Resources, 2019), the study area is in an area with a groundwater depth of - 5 to - 35 m.bmt (Figure 3.18.).Meanwhile, based on the Final Report on Groundwater Quality Monitoring (DLH DKI Jakarta, 2021), the depth of groundwater in residents' wells in Tomang to Ujung Menteng subdistricts ranges from -3 to -40 m.bmt (Table 3.20.). Judging from its depth and stratigraphy, the residents' well is located in the unconfined aquifer Zone 1 (Aquifer 1) in the Citalang Formation. Because its position at the top causes groundwater flow to move vertically and horizontally. The direction of groundwater movement is influenced by the rainy season and the dry season, where groundwater flow tends to move vertically in the rainy season and move horizontally in the dry season.

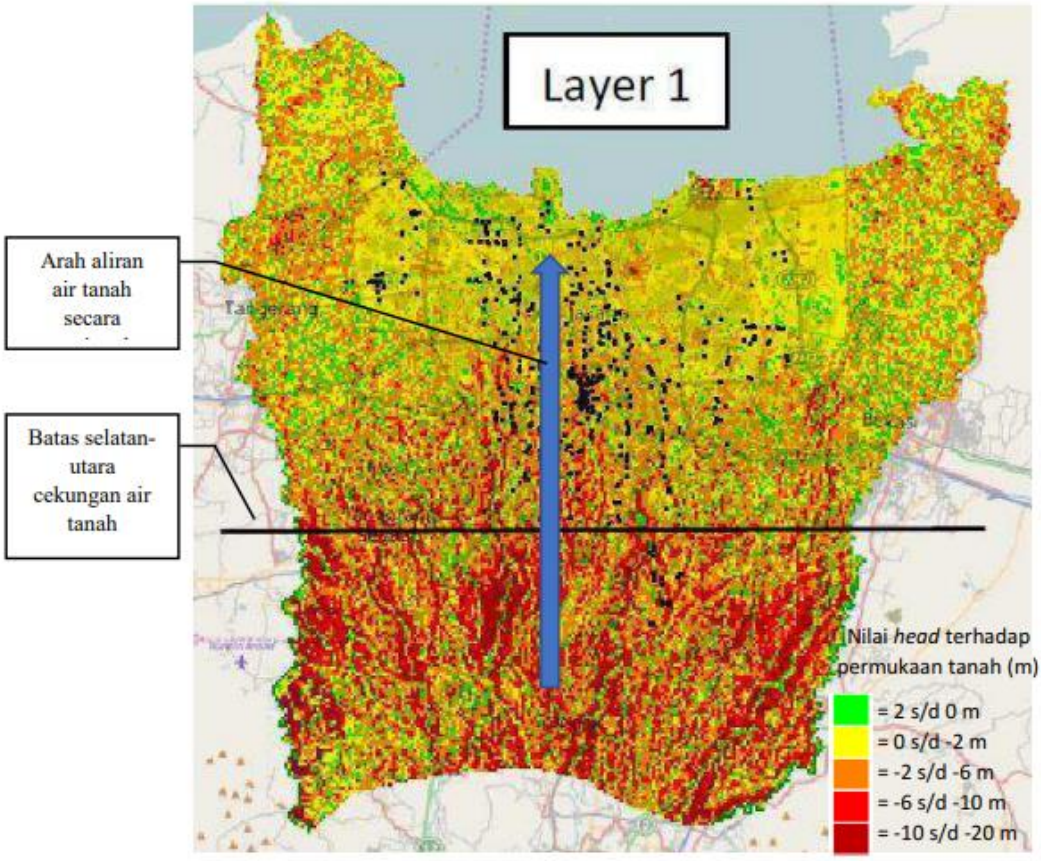


Figure 3.17. CAT Jakarta Unconfined Aquifer Contour
Source: 2021 DLH DKI Groundwater Quality Monitoring Final Report

Figure 3.18. CAT Jakarta Groundwater Depth
Source: Ministry of Energy and Mineral Resources, 2019

Table 3.20. Groundwater Depth in the Study Area

City	Subdistrict	Ward	Location	Coordinate	Well Depth (m)
West Jakarta	Grogol Petamburan	Grogol	Grogol Village Head Office	S: 06°09'33.09" ; E: 106°47'36.41"	10
		Tanjung Duren	South Tanjung Duren Village Head Office	S: 06°10'52.16" ; E: 106°47'15.83"	30
		Tomang	Tomang Village Head Office	S: 06°10'18.83" ; E: 106°48'01.04"	12
Central Jakarta	Gambier	Cideng	Cideng Village Head Office	S: 06°10'05.10" ; E: 106°48'33.50"	33
		Duri Pulo (I)*	Melati Duri Pulo RPTRA	S: 06°09'48.10" ; E: 106°48'32.80"	21
		Duri Pulo (II)*	Settlements	N/A	20
		Gambier	Gambir Village Head Office	S: 06°09'48.10" ; E: 106°48'38.80"	12
		South Petojo	South Petojo Village Head Office	S: 06°10'18.90" ; E: 106°49'01.10"	24
		North Petojo	North Petojo Village Head Office	S: 06°09'44.50" ; E: 106°49'03.00"	25
	Tanah Abang	Balinese Village	Bali Village Head Office	S: 06°11'03.61" ; E: 106°49'04.23"	17
	Menteng	KebonSirih (I)*	Kebon Sirih District Office	S: 06°11'03.31" ; E: 106°49'36.94"	21
		KebonSirih (II)*	RW 02 Kebon Sirih Secretariat Office	S: 06°11'03.38" ; E: 106°49'38.59"	17
	Monday	Kramat (I)*	Kramat Village Head Office	S: 06°11'06.30" ; E: 106°50'52.40"	20
		Kramat (II)*	Settlements	N/A	30
		Kwitang	Kwitang Village Head Office	S: 06°18'75.20" ; E: 106°84'04.30"	25
		Monday	Senen District Office	S: 06°10'21.30" ; E: 106°50'33.30"	25
	New Johar	Upland	Tanah Tinggi Village Head Office	S: 06°11'01.30" ; E: 106°50'58.40"	15
		Strains	Galur Village Head Office	S: 06°10'32.12" ; E: 106°51'00.00"	40
	Kemayoran	New Cempaka	Cempaka Baru Village Head Office	S: 06°10'11.50" ; E: 106°51'33.90"	20
		Glorious Hope	Harapan Mulia Village Head Office	S: 06°10'04.60" ; E: 106°51'27.70"	25
		Stone Well	Sumur Batu Village Head Office	S: 06°09'52.80" ; E: 106°52'16.30"	15
	Cempaka Putih	Cempaka Putih Barat	West Cempaka Putih Village Head Office	S: 06°11'02.50" ; E: 106°52'03.37"	40
		East Cempaka Putih	East Cempaka Putih Village Head Office	S: 06°10'24.90" ; E: 106°52'11.35"	35
North Jakarta	Kelapa Gading	West Kelapa Gading	West Kelapa Gading Village Head Office	S: 06°09'46.99" ; E:	68
		East Kelapa Gading	East Kelapa Gading Village Head Office	S: 06°09'59.89" ; E:	10
		Pegaggsaan Two	Kelapa Pegangsaan Dua Village Head Office	S: 06°10'93.84" ; E: 106°54'56.62"	11
	Cilincing	Rorotan	Mrs. Lefiana, Jl. Rorotan IV No. 4	S: 06°09'06.10" ; E: 106°57'19.60"	3
East Jakarta	Gadung Island	Eucalyptus	Kayu Putih Village Head Office	S: 06°11'10.40" ; E: 106°53'14.80"	20
		Gadung Island	SDN 1 Pulogadung	S: 06°10'59.84" ; E: 106°54'22.16"	20
		Gadung Island	Pulo Gadung Village Head Office	S: 06°11'09.28" ; E: 106°53'37.29"	16
	Cakung	Terate swamp	KUKM DIKLAT Hall Office	S: 06°11'08.11" ; E: 106°55'21.19"	20
		West Cakung	SMPN 168	S: 06°11'29.01" ; E: 106°56'34.71"	28
		West Cakung	Mirna's mother's house	S: 06°10'19.98" ; E: 106°55'57.03"	8
		East Cakung	East Cakung Village Head Office	S: 06°11'01.17" ; E: 106°57'28.17"	25
		East Cakung	SMUN 102	S: 06°10'02.73" ; E: 106°57'04.16"	30
		East Cakung	SMPN 234	S: 06°10'30.90" ; E: 106°57'04.00"	17
		Menteng Edge	Ujung Menteng Village Head Office	S: 06°11'11.52" ; E: 106°57'46.14"	30

Note: *The location of the monitoring point in period II has changed, because the location in period I is no longer used
N/A : location coordinates not available.
Source: 2021 DLH DKI Groundwater Quality Monitoring Final Report

Based on geotechnical data in the feeder line area to the depot, the depth of the drill hole reaches 60 m, and it is estimated that other drill holes along the MRT-EWLP1S1 route have been drilled to a depth of 60 m. This drill hole crosses the Zone 1 free aquifer (dug wells owned by residents). To minimize the impact of underground construction on groundwater levels, several actions will be taken such as installing diaphragm walls as temporary retaining walls during construction work, not using groundwater supplies for domestic and construction

activities, providing oil storage with watertight floor bases and embankment walls, and providing septic tanks that can prevent seepage into groundwater.

For groundwater quality, there are 38 DKI Jakarta DLH monitoring points in the study area. Groundwater quality measurements are carried out routinely every year, and the results are used as a basis for determining groundwater quality status in accordance with Minister of Health Regulation No. 32 of 2017 concerning Environmental Health Quality Standards and Water Health Requirements for Sanitation Hygiene, Swimming Pools, Solus Per Aqua and Public Baths.LLocations for monitoring groundwater quality by DLH DKI Jakarta are presented in**Figure 3.19. .**, while determining the status of groundwater qualitypresented on**Table 3.21.**.

Based on the 2021 DKI Jakarta Groundwater Quality Monitoring Report, in period I (dry season) there were 20 monitoring points (52.63%) included in the Light Pollution category, 10 monitoring points (26.32%) Good, and 8 monitoring points (21.05%) Moderately Polluted. Meanwhile, in period II (rainy season) there were 22 monitoring points (57.89%) included in the Light Pollution category, 8 monitoring points (21.05%) Moderate Pollution, 7 monitoring points (18.42%) Good and 1 monitoring point (2.63%) Heavily Polluted. The main groundwater pollutant parameters in the study area are dominated by domestic pollution, namely detergent (MBAS), total coliform, Manganese (Mn), E. Coli and pH (DLH DKI Jakarta, 2021). These five parameters are the parameters with the largest Ci/Li values (ratio of measurement result parameter values to quality standard values).

B. Primary data

Primary data on groundwater quality in the study area was obtained by taking groundwater samples directly at 9 locations (9 shallow groundwater and 3 deep groundwater) in June and July 2022 and then analyzed in the laboratory.Groundwater quality sampling locations are presented in **Figure 3.20. .**, while the results of groundwater quality analysis and determination of water quality status are presented in**Table 3.22.**and **Figure 3.21**..

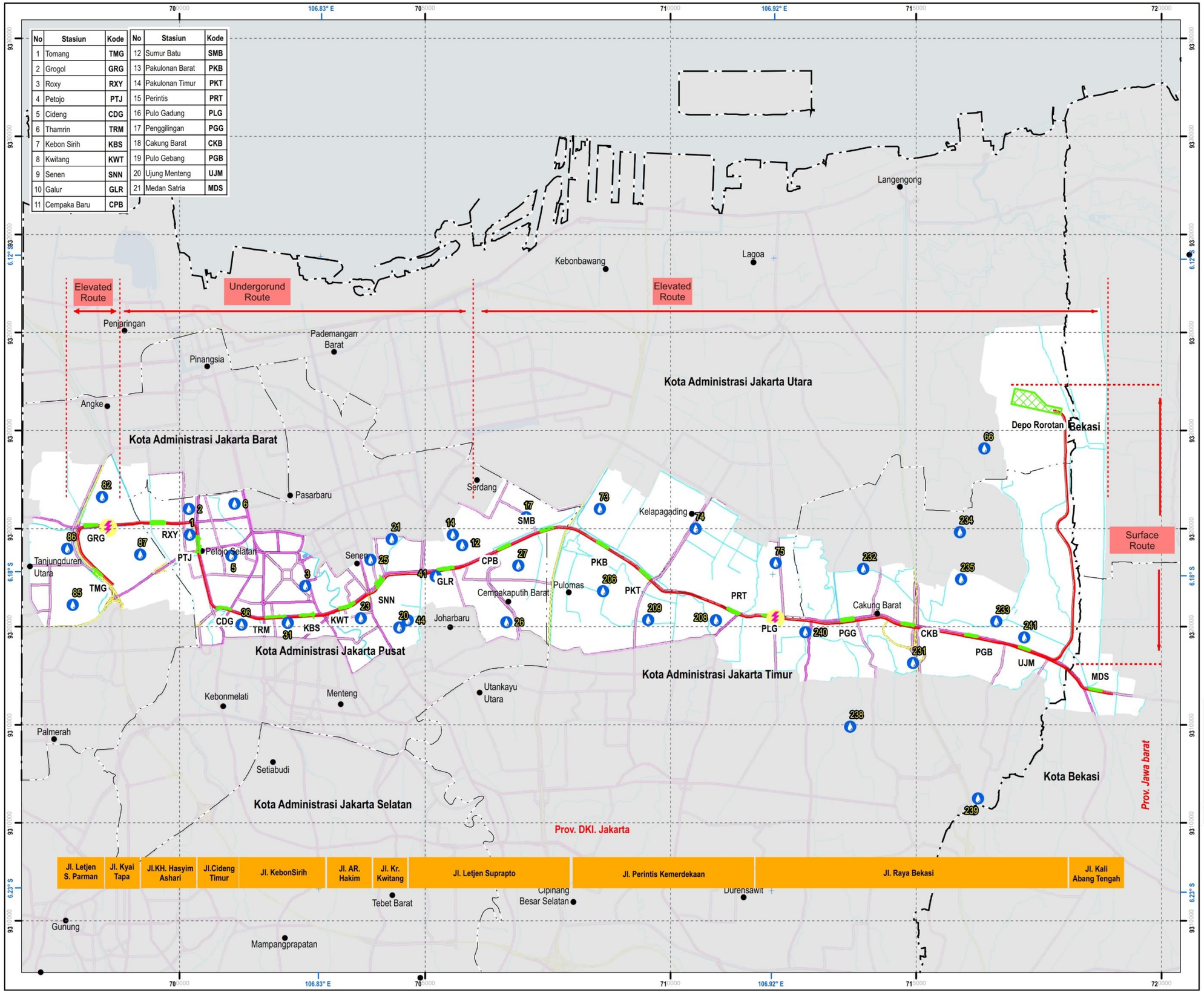
Based on the results of the groundwater quality analysis, there are 7 shallow groundwaters (77.78%) that meet quality standards and 3 shallow groundwaters (22.22%) are included in the Lightly Polluted category. Meanwhile, for deep ground water, there are 2 locations (66.67%) that meet the quality standards and 1 location (33.33%) is included in the Lightly Polluted category.

3.1.14. Land Cover

Based on the Indonesian Earth Map at a scale of 1: 25,000, the study area is in an area with residential land cover, non-cultivated vegetation, bushes, empty land and military areas.In detail, the area of land cover in each sub-district in the study area is presented in**Figure 3.22. 2.**.

3.1.15. Soil Type and Quality

Based on a study by Lutifayanti, et al. (2013), the study area is in an area with soil types: Red Latosol Association and Reddish Brown Latosol, Low Humus Glei Association and Gray Alluvial, and Dark Reddish Brown Latosol (**Figure 3.23. 3.**).



No	Stasiun	Kode
1	Tomang	TMG
2	Grogol	GRG
3	Roxy	RXY
4	Petojo	PTJ
5	Cideng	CDG
6	Thamrin	TRM
7	Kebon Sirih	KBS
8	Kwitang	KWT
9	Senen	SNN
10	Galur	GLR
11	Cempaka Baru	CPB

No	Stasiun	Kode
12	Sumur Batu	SMB
13	Pakulonan Barat	PKB
14	Pakulonan Timur	PKT
15	Perintis	PRT
16	Pulo Gadung	PLG
17	Penggilingan	PGG
18	Cakung Barat	CKB
19	Pulo Gebang	PGB
20	Ujung Menteng	UJM
21	Medan Satria	MDS

MAP
LOCATION OF MONITORING GROUNDWATER QUALITY DLH DKI JAKARTA

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : **1 : 70.000**
0 1.75 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend
- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River

Road
- Arterial Road
- Collector Street
- Toll Road
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

groundwater quality monitoring point

Source :
- Indonesia Earth Map Scale 1 : 25000
- Administration Map DKI Jakarta Scale 1 : 25000
- Administration Map Bekasi Regency Scale 1 : 25000
- Administration Bekasi City Scale 1 : 25000
- MRT East - West Line
- groundwater quality monitoring data for DKI Jakarta 2021,

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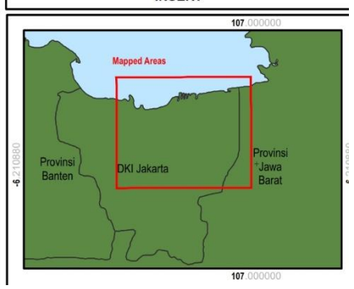


Figure 3.19. Map of DKI Jakarta DLH Groundwater Quality Monitoring Locations

Table 3.21. Results of DKI Jakarta DLH Groundwater Quality Monitoring in the Study Area in 2022

Segment	Municipality	Subdistrict	Subdistrict/Location	Monitoring Point	Period	IP value	Quality Status	Critical Parameters
West Elevated	West Jakarta	Grogol Petamburan	Grogol	82	I	8.66	Moderately Soiled	Detergent, Total Coliform, E.Coli
					II	7.16	Moderately Soiled	Total Coliforms
			South Cape Duren	85	I	0.72	Good	-
					II	5.47	Moderately Soiled	Total Coliforms
			North Cape Duren	86	I	1.79	Light Pollution	Total Coliforms
					II	2.11	Light Pollution	Detergent
			Tomang	87	I	7.42	Moderately Soiled	Detergent, Total Coliform
					II	5.34	Moderately Soiled	Manganese, Detergent, Total Coliform
Underground	Central Jakarta	Gambier	Cideng	1	I	2.51	Light Pollution	Detergent
					II	1.78	Light Pollution	Detergent
			Duri Pulo	2	I	1.38	Light Pollution	Iron (Fe) Detergent
					II	7.86	Moderately Soiled	Iron (Fe), Detergent
			Gambier	3	I	5.68	Moderately Soiled	Color, Turbidity, Organic Substances, Detergents
					II	7.44	Moderately Soiled	Color, Turbidity, Organic Substances, Detergents
			South Petojo	5	I	1.43	Light Pollution	Color, Detergent
					II	1.44	Light Pollution	Color, Detergent
			North Petojo	6	I	0.87	Good	Detergent
					II	1.93	Light Pollution	Detergent
		Menteng	Betel Garden	31	I	2.76	Light Pollution	Color, Turbidity, Manganese (Mn), Detergent, Total Coliform
					II	8.12	Moderately Soiled	Turbidity, Detergent, Total Coliform
		Tanah Abang	Balinese Village	36	I	1.79	Light Pollution	Manganese (Mn), Total Detergent, Coliform
					II	7.57	Moderately Soiled	pH, Total Coliforms
		Monday	Kramat	20	I	0.87	Good	Detergent
					II	0.86	Good	Detergent
			Bungur	21	I	1.24	Light Pollution	Detergent
					II	0.72	Good	Detergent
	Central Jakarta	Monday	Kwitang	23	I	1.71	Light Pollution	Detergent
					II	0.59	Good	-
			Monday	25	I	0.73	Good	Detergent
					II	0.58	Good	-
*Elevated*East	Central Jakarta	New Johar	Strains	41	I	6.74	Moderately Soiled	Detergent, Total Coliform, E. Coli
					II	7.70	Moderately Soiled	Total Coliforms
			Upland	44	I	1.24	Light Pollution	Detergent pH
					II	2.69	Light Pollution	Detergent
		Cempaka Putih	Cempaka Putih Barat	26	I	5.48	Moderately Soiled	Detergent, Total Coliform
					II	2.87	Light Pollution	Detergent, Total Coliform
			East Cempaka Putih	27	I	1.15	Light Pollution	Detergent
					II	2.99	Light Pollution	Detergent
		Kemayoran	New Cempaka	12	I	5.17	Moderately Soiled	Detergent, Total Coliform, E. Coli
					II	4.54	Light Pollution	Detergent, Total Coliform, E. Coli

Segment	Municipality	Subdistrict	Subdistrict/Location	Monitoring Point	Period	IP value	Quality Status	Critical Parameters
Elevated East	Central Jakarta	Kemayoran	Noble Hope	14	I	1.01	Light Pollution	Detergent
					II	1.24	Light Pollution	Detergent
			Stone Well	17	I	0.91	Good	Florida, Detergent
					II	2.86	Light Pollution	Florida, Detergent
	East Jakarta	Pulogadung	Eucalyptus	206	I	0.59	Good	-
					II	1.79	Light Pollution	Total Coliforms
			Pulogadung (SDN 1)	208	I	0.59	Good	-
					II	0.74	Good	-
			Pulogadung	209	I	0.72	Good	-
					II	0.87	Good	Detergent
		Cakung	West Cakung (SMPN 168)	231	I	1.62	Light Pollution	Detergent
					II	2.54	Light Pollution	Color, Iron, Detergent
			West Cakung (PPD)	232	I	2.83	Light Pollution	Manganese, Detergent, Dissolved Solids
					II	2.35	Light Pollution	Detergents, Organic Substances, Dissolved Solids
	East Jakarta	Cakung	East Cakung	233	I	3.18	Light Pollution	pH, Color, turbidity, Iron, Manganese, Detergent
					II	2.89	Light Pollution	Color, Iron, Manganese, Detergent
			East Cakung (SMUN 102)	234	I	0.74	Good	-
					II	2.42	Light Pollution	Colors, Detergents, Organic Substances, Dissolved Solids
			East Cakung (SMPN 234)	235	I	2.08	Light Pollution	Colors, Detergents, Organic Substances, Dissolved Solids
					II	1.60	Light Pollution	Colors, Detergents, Organic Substances, Dissolved Solids
			Call	238	I	2.86	Light Pollution	Detergent, Total Coliform
					II	2.42	Light Pollution	Detergent, Total Coliform
			Pulogebang	239	I	0.72	Good	-
					II	1.00	Light Pollution	pH, Detergent
			Rawaterate (BPPKUKM)	240	I	2.79	Light Pollution	pH, Detergent, Total Coliform
					II	3.02	Light Pollution	Detergent, Total Coliform
			Menteng Edge	241	I	3.10	Light Pollution	Color, Iron, Manganese, Detergent
					II	12.79	Heavy Pollution	Color, Iron, Manganese, Detergent, Total Coliform
	North Jakarta	Kelapa Gading	West Kelapa Gading	73	I	6.16	Moderately Soiled	Dissolved Solids, Total Coliforms
					II	3.92	Light Pollution	Detergent, Total Coliform
			East Kelapa Gading	74	I	7.12	Moderately Soiled	Detergent, Total Coliform, E.Coli
					II	3.94	Light Pollution	Detergent, Total Coliform
			Pegangsaan Dua	75	I	1.79	Light Pollution	Detergent, Total Coliform
					II	0.73	Good	-
Depot	North Jakarta	Cilincing	Rorotan	66	I	1.81	Light Pollution	pH, Manganese, Total Coliform, E. Coli
					II	2.01	Light Pollution	Manganese, Dissolved Solids

Source : Water Quality Monitoring ReportDKI Jakarta Land in 2021

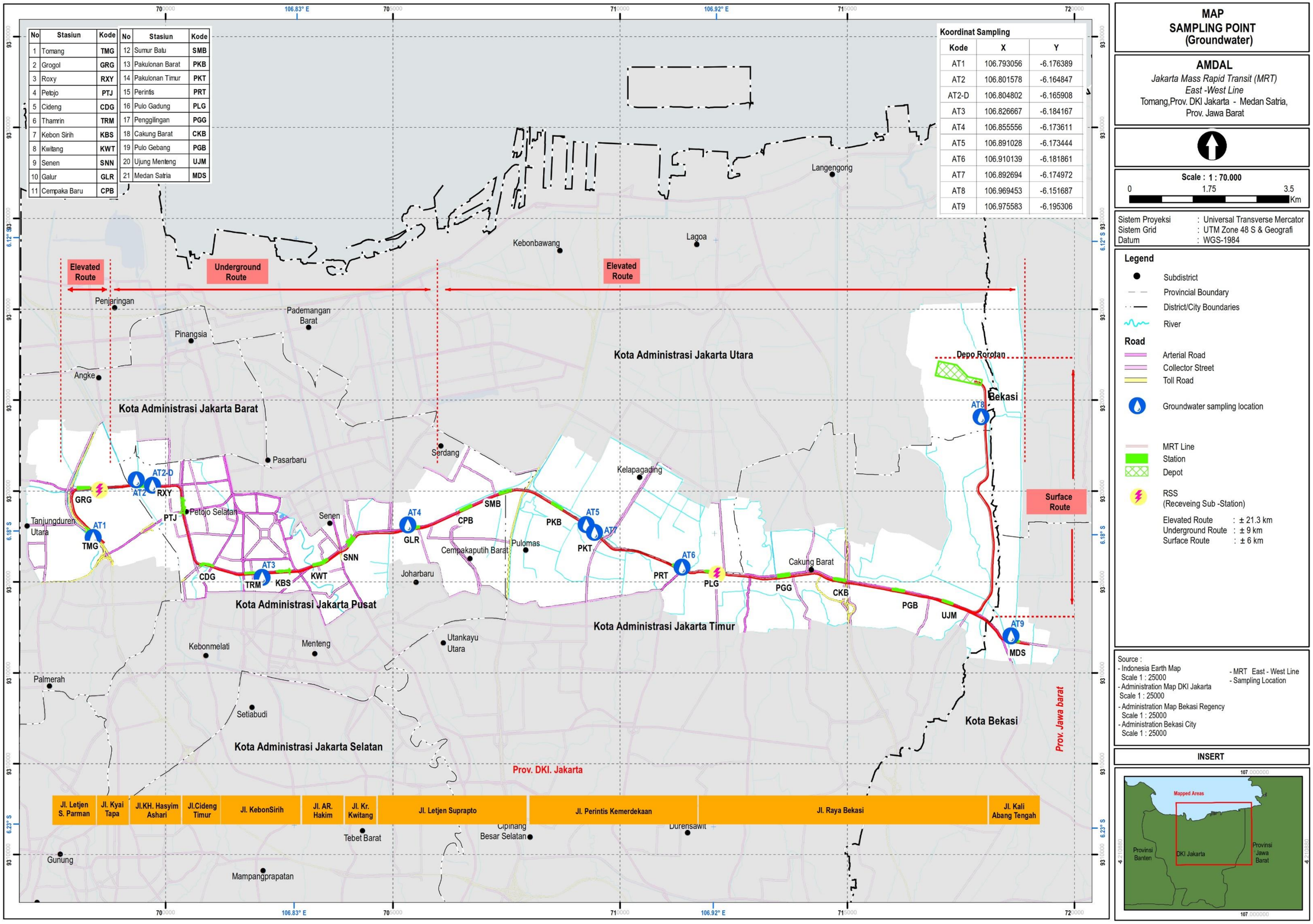


Figure 3.20. Map of Ground Water Quality Sampling Locations in the Study Area

Table 3.22. Results of Ground Water Quality Measurements in the Study Area in 2022

Segment	Location	Code	Coordinate	Measurement results																		Pollutant Index	Category
				TDS	Fe	F	CaCO3	M N	NO3	NO2	C.N	MBAS	Hg	US	CD	CR VI	Se	Zn	SO4	PB	KMnO4	Total Coliforms	E. Coli	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	CFU/100 mL	CFU/100 mL	
Elevated West	Tomang Sta (TMG)	AT1	S 06°10'35.00": E 106°47'35.01"	192	<0.004	0.4	112	0.004	0.8	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	51	<0.009	1	25	0	0.58	Fulfil Quality standards
Underground	Roxy Sta (RXY)	AT2	S 06°09'03.45": E 106°48'05.69"	859	<0.004	0.3	66	0.05	0.8	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	0.006	78	<0.009	2	48	0	0.70	Fulfil Quality standards
	Roxy Sta (deep well)	AT-2D	S 06°09'57.28": E 106°48'17.35"	192	<0.004	0.4	112	0.004	0.8	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	51	<0.009	1	25	0	0.58	Fulfil Quality standards
	Thamrin Sta (TRM)	AT3	S 06°11'03.01": E 106°49'36.01"	339	0.1	0.5	230	3	<0.1	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	14	<0.009	5	47	0	3.47	Light Pollution
	Kwitang Sta (deep well)	AT-3D	S 06°10'49.72": E 106°50'22.48"	859	<0.004	0.3	66	0.05	0.8	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	0.006	78	<0.009	2	48	0	0.70	Fulfil Quality standards
	Sta strain (GLR)	AT4	S 06°10'24.99": E 106°51'20.01"	279	<0.004	0.07	142	0.005	3	0.03	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	0.001	49	<0.009	2	31	0	0.58	Fulfil Quality standards
	Sta strain (deep well)	AT-4D	S 06°10'27.84": E 106°51'21.92"	265	0.1	0.2	80	0.008	2	0.006	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	0.02	29	<0.009	22	49	0	1.93	Light Pollution
East Elevated	Pakulonan Barat Sta (PKB)	AT5	S 06°10'24.39": E 106°53'27.70"	988	0.07	0.6	33	<0.0007	0.2	0.007	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	233	<0.009	6	30	0	0.72	Fulfil Quality standards
	Pioneer Sta (PRT)	AT6	S 06°10'54.69": E 106°54'36.50"	172	<0.004	0.3	148	0.002	2	0.3	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	0.003	66	<0.009	3	42	0	0.61	Fulfil Quality standards
	West Cakung Sta (CKB)	AT7	S 06°10'29.89": E 106°53'33.68"	975	0.01	0.5	69	0.002	0.3	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	232	<0.009	7	35	0	0.71	Fulfil Quality standards
	Medan Satria	AT9	S 06°11'43.10": E 106°58'32.08"	266	<0.004	0.2	202	2	<0.1	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	61	<0.009	1	46	0	2.85	Light Pollution
Depot	Rorotan Depot	AT8	S 06°09'16.07": E 106°58'10.01"	145	<0.004	0.09	95	<0.0007	0.4	<0.002	<0.006	<0.05	<0.0005	<0.0003	<0.0006	<0.004	<0.0004	<0.0006	46	<0.009	3	41	0	0.59	Fulfil Quality standards
	CLASS 2 RIVER WATER QUALITY STANDARDS (PP No. 22 of 2021)			**1000**	**1**	**1.5**	**500**	**0.5**	**10**	**1**	**0.1**	**0.05**	**0.001**	**0.05**	**0.005**	**0.05**	**0.01**	**15**	**400**	**0.05**	**10**	**50**	**0**		

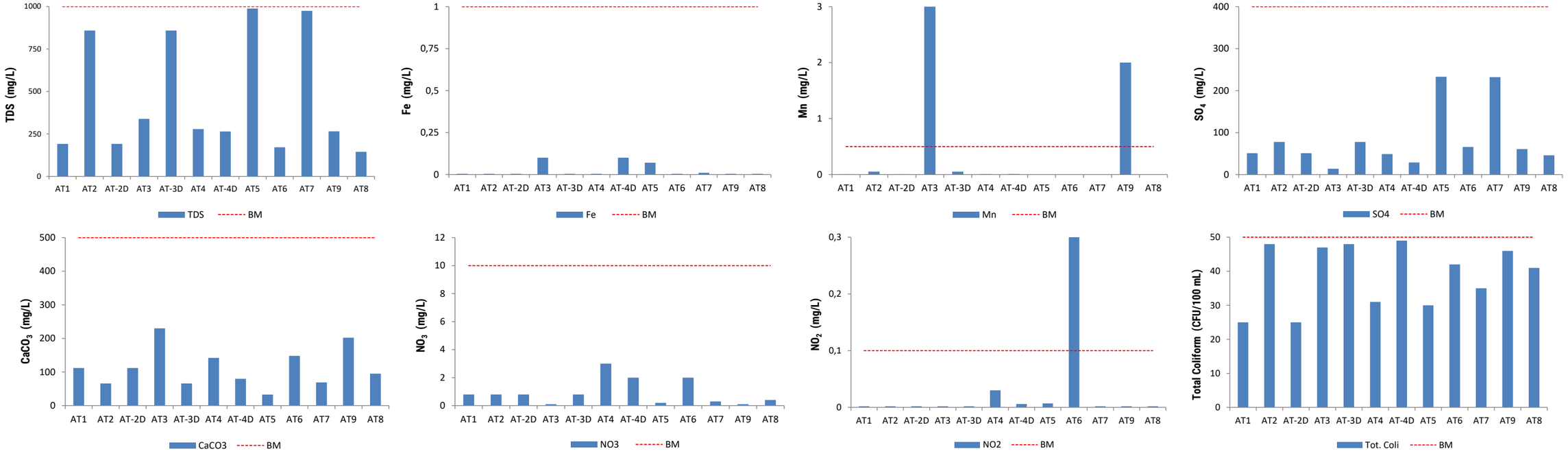
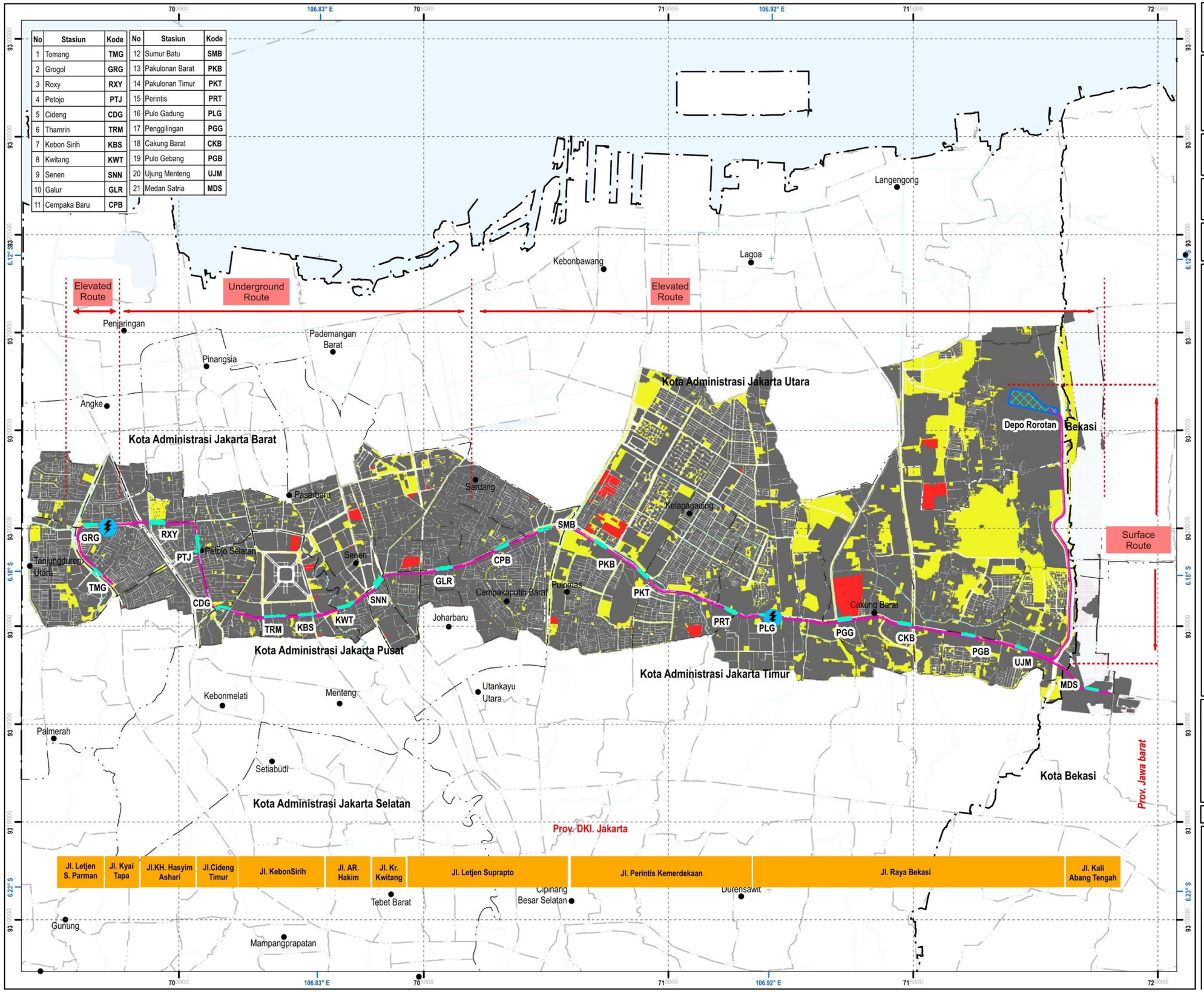


Figure 3.21. Comparison of the concentration of measurement results withGroundwater Quality Standard Values



MAP
LAND COVER

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend
- Subdistrict
- District Boundaries
- Provincial Boundary
- District/City Boundaries
- River
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

Land Cover :
- Ricefield
- Shrubs
- Empty/bare land
- Military
- Settlement
- Other Non-Cultivated Vegetation

Source:
- Indonesia Earth Map Scale 1 : 25000
- Administrative Map of DKI Jakarta Scale 1 : 25000
- Bekasi Regency Administrative Map Scale 1 : 25000
- Bekasi City Administrative Map Scale 1 : 25000
- MRT East - West Line
- KLHK Land City Map

INSET

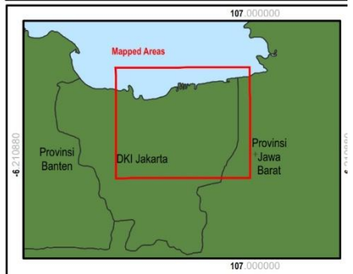


Figure 3.22. Land Cover Map

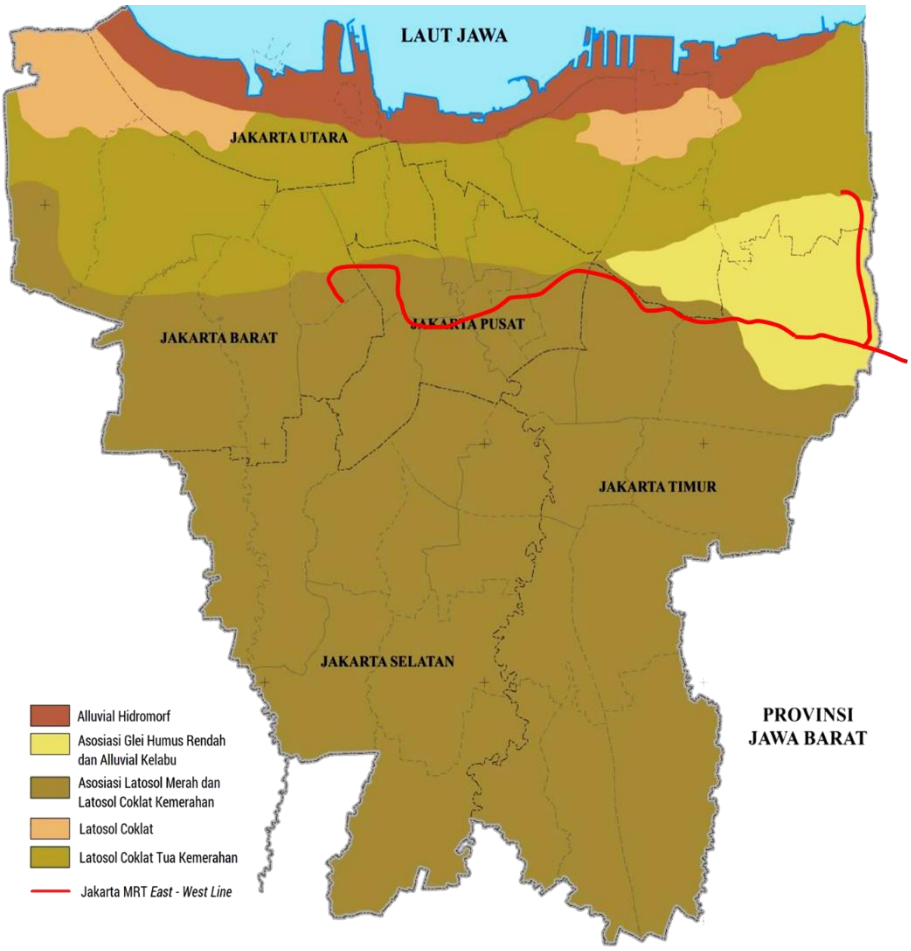


Figure 3.23. Soil Types in the Study Area

A. Secondary Data

Soil quality data in the study area was obtained from the results of measurements of heavy metal pollutant concentrations in a previous study (Amdal Jakarta MRT East – West Line, 2013) as presented in**Table 3.23.**. Based on the results of these measurements, it is known that the condition of the soil in the study area still meets the standard values for TCLP (toxicity characteristic leaching procedure) characteristics and/or TK (total concentration) column C in Appendix XIII PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management

Table 3.23. Soil Quality in the Study Area in the 2013 Amdal Study

No	Parameter	Measurement results (mg/L)			Quality Standard (mg/L) 1)		MDL2)	Environmental Quality for. Soil Pollution in Japan (Reference)	
		T1	T2	T3	TCLP-C	TK-C		(mg/L)	mg/kg
1	Copper (Cu)	0.005	0.003	0.002	4	30	1	-	-
2	Manganese (Mn)	0.04	0.06	0.05	-	-	0.02	-	-
3	Cobalt (Co)	signed	signed	signed	-	-	0.1	-	-
4	Nickel (Ni)	0.02	0.06	0.08	1.4	60	1	-	-
5	Cadmium (Cd)	0.02	0.01	0.01	0.06	3	0.05	0,003	45
6	Lead (Pb)	signed	signed	signed	0.2	300	0.5	0.01	150

No	Parameter	Measurement results (mg/L)			Quality Standard (mg/L) 1)		MDL2)	Environmental Quality for. Soil Pollution in Japan (Reference)	
		T1	T2	T3	TCLP-C	TK-C		(mg/L)	mg/kg
7	Zinc (Zn)	0.5	0.8	0.3	20	120	0.05	-	-
8	Arsenic (As)	signed	signed	signed	0.2	20	0.05	0.01	150
9	Barium (Ba)	0.2	0.4	0.02	14	160	1	-	-
10	Boron (B)	signed	signed	signed	10	36	20	1	4000
11	Cr-IV	0.009	0.04	0.008	1	1	0.5	0.05	250
12	Mercury (Hg)	signed	signed	signed	0.02	0.3	0.05	0.0005	15
13	Selenium (Se)	signed	signed	signed	0.2	10	0.05	0.01	150
14	Silver (Ag)	signed	signed	signed	2	10	0.2	-	-

Source :Amdal Jakarta MRT East – West Line, 2013
Information : 1) PP No. 22 of 2021, attachment XIII
2) MDL =*Method Detection Limit*
T1 : Jl.Pioneers of Independence (S 06°10'46.0" ; E 106°54'14.3")
T2 : Jl. Raya Bekasi (S 06°11'22.7" ; E 106°57'58.7")
T3 : Jl.Pioneers of Independence (S 06°10'12.9" ; E 106°53'11.7")

B. Primary data

Primary data on soil quality in the study area was obtained by taking soil samples directly at 8 locations in June and July 2022 and then analyzed in the laboratory. Soil quality sampling locations are presented in **Figure** 3.24. **..** Soil quality parameters and standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (attachment XIII).

The results of the soil quality analysis are presented in Table 3.24. AndComparison of the concentration of measurement results with the Soil Quality Standard Value is shown in Figure 3.25.Based on the results of these measurements, it is known that the Ba, Cu and Zn parameters in several soil samples exceed the standard values for the TCLP (toxicity characteristic leaching procedure) characteristics and/or TK (total concentration) column C in Appendix XIII PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management.

3.2. Biology

Referring to the DKI Jakarta Biodiversity Profile (DLH, 2018), the study area is in an artificial ecosystem area (man made ecosytem). The characteristic of artificial ecosystems is that they lack biodiversity and are mostly created to meet human needs. Artificial ecosystems in DKI Jakarta include urban forests, city parks, agricultural ecosystems (gardens and rice fields), and yard ecosystems.

Location of development plan siteMRT-EWLP1S1located in the Road Owned Space (RUMIJA) area and road planting lanes. The vegetation at the activity location generally consists of roadside plants which fall into the categories of greening plants, protective plants and ornamental plants. Meanwhile, outside the development plan siteMRT-EWLP1S1is an area that is very densely packed with buildings (shops, offices, residential areas, infrastructure and utilities), with limited types of vegetation, namely roadside vegetation, yards and parks (green open spaces).

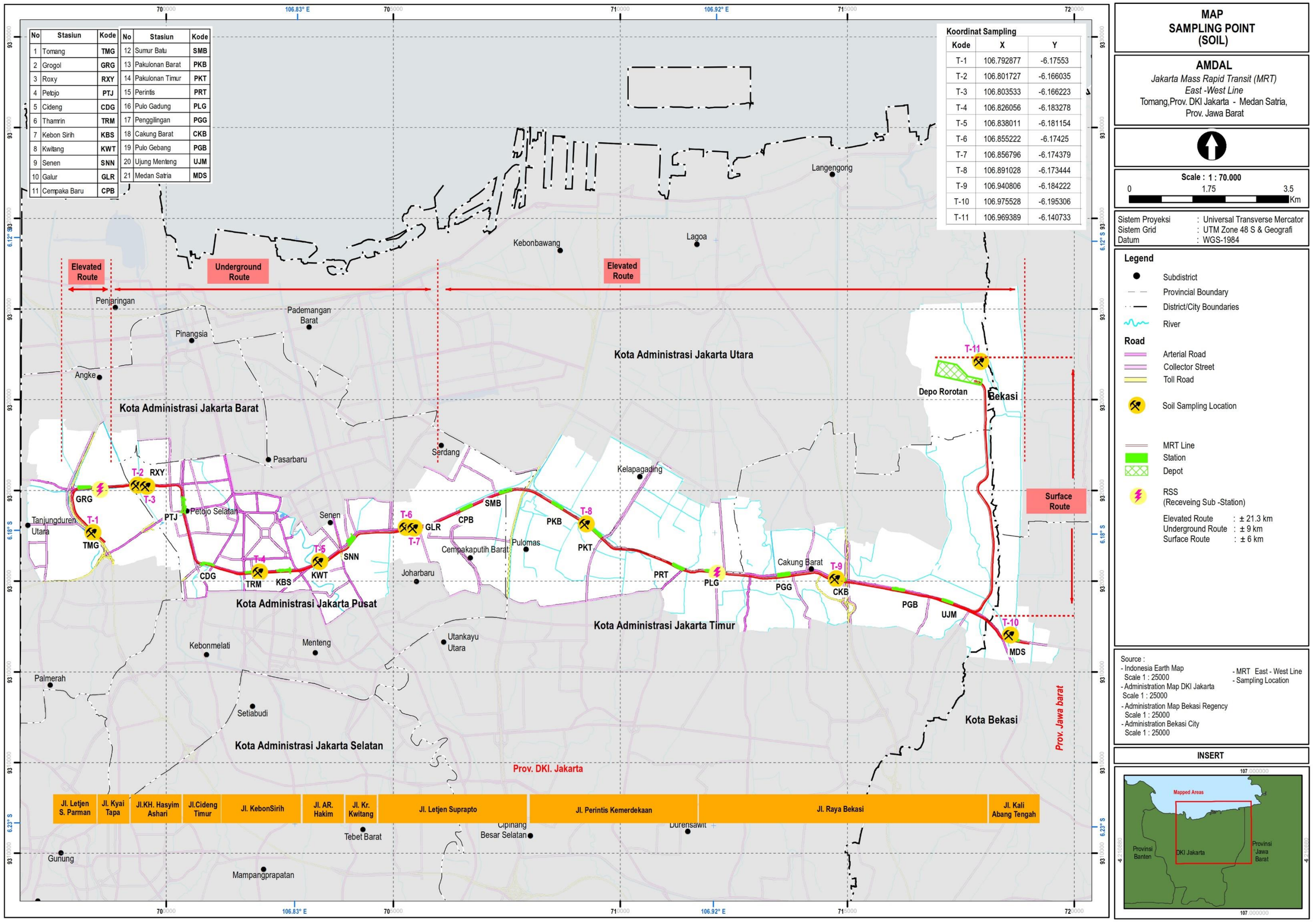


Figure 3.24. Map of Soil Quality Sampling Locations

Table 3.24. Results of Soil Quality Analysis in the Study Area in 2022

Segment	Location	Code	Coordinate	Depth (m)	Measurement Results (mg/kg)													
					US	Ba	B	CD	CR VI	Cu	PB	Hg	Ni	Se	Ag	Zn	M N	Co
Elevated West	Tomang Sta (TMG)	T1	S 06°10'31.90": E 106°47'34.36"	0.3	<0.05	166	5	<2	<0.2	77	26	0.04	8	<0.5	<2	174	896	23
Underground	Roxy Sta (RXY)	T2	S 06°09'57.72": E 106°48'6.228"	0.3	<0.05	149	4	<2	<0.2	73	38	0.06	7	<0.5	<2	209	1475	21
	Roxy Sta (deep)	T-3	S 06°09'57.28": E 106°48'17.35"	40	<5	110	2	<2	<0.2	20	6	0.01	<3	<0.5	<2	42	183	10
	Thamrin Sta (TRM)	T4	S 06°10'59.80": E 106°49'33.81"	0.3	<0.05	170	4	<2	<0.2	75	135	0.2	8	<0.5	<2	280	986	22
	Kwitang Sta (deep)	T-5	S 06°10'49.72": E 106°50'22.48"	40	<5	97	4	<2	<0.2	60	8	0.04	4	<0.5	<2	78	943	14
	Sta strain (GLR)	T6	S 06°10'27.29": E 106°51'18.79"	0.3	<0.05	123	6	<2	<0.2	48	84	0.1	11	<0.5	<2	184	1099	21
	Sta (deep) strain	T-7	S 06°10'27.84": E 106°51'21.92"	40	<5	31	<0.08	<2	<0.2	49	<3	0.07	6	<0.5	<2	60	617	25
East Elevated	Pakulonan Timur Sta (PKT)	T8	S 06°10'24.39": E 106°53'27.70"	0.3	<0.05	120	3	<2	<0.2	157	135	0.1	25	<0.5	<2	723	1351	20
	West Cakung Sta (CKB)	T9	S 06°11'03.20": E 106°56'26.91"	0.3	<0.05	197	3	<2	<0.2	69	22	0.08	6	<0.5	<2	187	994	25
	Medan Satria	T10	S 06°11'43.10": E 106°58'31.90"	0.3	<0.05	105	4	<2	<0.2	348	43	0.06	8	<0.5	<2	185	742	15
Depot	Rorotan Depot	T11	S 06°08'26.63": E 106°58'09.80"	0.3	<0.05	120	6	<2	<0.2	153	89	0.03	27	<0.5	<2	655	757	17
TK-C Quality Standards (PP No. 22 of 2021)					**20**	**160**	**36**	**3**	**1**	**30**	**300**	**0.3**	**60**	**10**	**10**	**120**	**-**	**-**

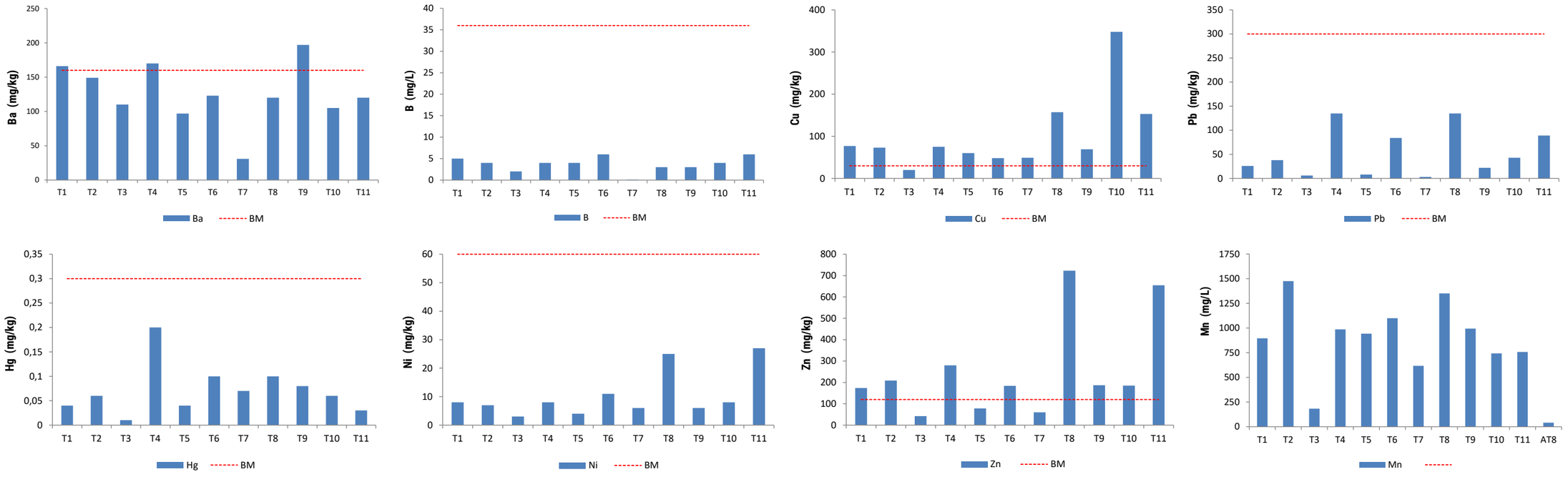


Figure 3.25. Comparison of the concentration of measurement results withSoil Quality Standard Value

3.2.1. Land Vegetation

Vegetation (flora) in an ecosystem has an important role, including:

- Aesthetic benefits, namely adding to the beauty of the area, especially those related to tourism activities
- Orological benefits, to reduce the level of soil damage, especially landslides, and support soil stability
- Hydrological benefits to support the natural cycle of groundwater, so that it can be beneficial for human life
- The benefits of climatology, the presence of plants can support microclimatic factors, reduce the greenhouse effect, increase the coolness and comfort of the environment
- The benefits of edaphic plants provide a place to live (habitat) for animals
- Benefits of ecological balance of the elements that form the ecosystem
- The protective benefits are as protection from the hot sun, protection from strong winds and soundproofing from noise
- Hygienic benefits, because plant leaves are able to filter dust and suck up dirt and pollutants in the air. Plants are also able to produce oxygen gas which is really needed by humans.

The vegetation in the study area is differentiated from the shape of the stands. The form of vegetation stands is divided into trees. Community forms are differentiated based on ecologically dominated vegetation/flora.

Trees in the study area that will be affected by the project will be moved/relocated and/or felled and replaced after obtaining permission in accordance with DKI Jakarta Governor Regulation Number 24 of 2021 concerning tree management and protection. Article 34 states that for every tree recommended for felling, 3 (three) trees with a diameter of 15-20 cm must be replaced with the dominant tree species in the surrounding area or other tree species determined by the government agency.

A. Secondary Data

Tree level vegetation data was obtained from the results of an inventory in a previous study (Amdal Jakarta MRT East – West Line, 2013) as presented in**Table 3.25.**. Based on the results of the inventory, no protected plant species were found as stated in PP No. 7 of 1999 concerning Preservation of Plant and Animal Types.

B. Primary data

Primary tree-level vegetation data in the study area was obtained by direct observation and calculations in the field, as presented in**Table 3.26.**. Based on the results of the inventory, no protected plant species were found as stated in PP No. 7 of 1999 concerning Preservation of Plant and Animal Types.

Table 3.25. Results of Tree Level Vegetation Inventory in the Study Area in the 2013 Amdal Study

Local Name	Scientific name	Elv. West	Underground							East Elevation						Amount
		GRG	RXY	PTJ	CDG	TRM	KBS	KWT	SNN	GLR	CPB-PKT	PKT-PRT	PRT-PGG	PGG-CKB	CKB-PGB	PGB-UJM	
Acacia	*Acacia auriculiformis*											10		6	1	2	**19**
Angsana	*Pterocarpus indicus*	2	6	2		7	5	5	1	4	240	105	50	117	14	64	**622**
Tamarind	-															1	**1**
Batavia	*Jatropha pandurifolia*			1												25	**26**
Starfruit	*Averhoa bilimbi*					1										1	**2**
Banyan	*Ficus benjamin*	1		3	3			4	5	7	31	16	5	28	14	19	**136**
Varigate banyan	*Ficus benjamina variegata*										20	21		150		4	**195**
Bintaro	*Cerbera manghas*											25	7		5	68	**105**
Bougainvillea	*Bougainvillea glabra*										2	2					**4**
Red flower	*Jatropha pandurifolia*										20						**20**
Mountain spruce	*Casuarina junghuniana*												1				**1**
Fan cypress	*Thuja orientalis*															1	**1**
Sea Pine	*Casuarinas Sp*												1				**1**
Red chestnut	*Erythrina crista-galli L.*										1						**1**
Flamboyant	*Delonix regia*										6					7	**13**
Glodogan	*Polyalthia sp.*	9			2						2	1	11	5			**30**
Hanjuang green	*Dracaena fragrans*															17	**17**
Water apple	*Syzygium aquaeum*	3														2	**5**
Guava	*Psidium Sp*															2	**2**
Guava	*Psidium guajava*	3														3	**6**
Cambodia	*Plumiera acuminata Aft*						1										**1**
Kebo Rubber	*Ficus elastica*										3		1	14		35	**53**
African Wood	-											2					**2**
Eucalyptus	-															2	**2**
Lyre	*Sondaricum I said*											1					**1**
Coconut	*Cocos nucifera*	4									3					1	**8**
Butterfly flower	*Bauhinia purpurea*						1										**1**
Kemlanding	*Leucaena leucocephala*(Lmk.)	7									10	5	1		12	8	**43**
Cherry	*Muntingia calabura*	6	4	4							17	3	10		8	7	**59**
Ketapang	*Terminalia catappa*											1					**1**
Lamtoro	*Leucaena leucocephala*(Lmk.)															1	**1**
Wide leaf mahogany	*Swietenia mahagoni*	3					2			3	205	160	2		38	20	**433**
Mango	*Mangifera indica*	36								1			2			2	**41**
Noni	*Morinda citrifolia*	1												1	3	1	**6**

Local Name	Scientific name	Elv. West			Underground						East Elevation						Amount
		GRG	RXY	PTJ	CDG	TRM	KBS	KWT	SNN	GLR	CPB-PKT	PKT-PRT	PRT-PGG	PGG-CKB	CKB-PGB	PGB-UJM	
Jackfruit	*Artocarpus heterophyllus*										2						**2**
Fan Palm	-														2		**2**
Yellow palm	*Chrysalidocarpus lutescens*										4						**4**
King palm	*Roystonea regia*	17			5	7					4	9				8	**50**
Pawpaw	*Carica papaya*	5														5	**10**
Banana	*Musa parasitiaca*	40														11	**51**
Randu	*Ceiba petandra*	2						3			2	2	1	9	1	1	**21**
Breadfruit	*Arthrocarphus altilis*															1	**1**
Suren	*Toona sureni*								2		1	4	2	1	7	4	**21**
Cape	*Mimusops elengi*	5			8				1		36	1		73	37	158	**319**
Trembesi	*Samanea saman*						4				200						**204**
Sea Waru	*Hibiscus Sp*												1				**1**
Amount		**144**	**10**	**10**	**18**	**15**	**13**	**12**	**9**	**15**	**809**	**368**	**95**	**404**	**142**	**481**	**2545**

Source :Amdal Jakarta MRT East – West Line, 2013

Information :
GRG = Grogol Station
RXY = Roxy Station
PTJ = Petojo Station
CDG = Cideng Station
TRM = Thamrin Station
KBS = Kebon Sirih Station
KWT = Kwitang Station
SNN = Senen Station
GLR = Galur Station

CPB – CCP = Elevated St.Cempaka Baru – St. East Pakulonan
PKT – PRT = Elevated St.East Pakulonan – St. Pioneer
PRT – PGG = Elevated pathSt. Pioneer – St. Milling
PGG–CKB = Elevated St.Mill – St. West Cakung
CKB – PGB = Elevated St.West Cakung – St. Pulo Gebang
PGB – UJM = Elevated St.Pulo Gebang – St. Menteng Edge

Table 3.26. Results of Tree Level Vegetation Inventory in the Study Area in 2022

Local Name	Scientific name	*Elevated*West					*Underground*				*Elevated*East											DEPOT	Amount
		TMG	GRG	RXY	PTJ	CDG	TRM	KBS	KWT	SNN	GLR	CPB	SMB	CLA	CCP	domestic worker	PLG	PGG	CKB	PGB	UJM	MDS	
Angsana	*Pterocarpus indicus*	25	45	30	30	3	40	25	20		45	25	38	45			20			4	10		50	**455**
Banyan	*Ficus benjamin*	6		6	3	11	5												2					**33**
Bintaro	*Cerbera manghas*		1						1						2			30			5			**39**
Paper flower	*Bougainvillea glabra*		5		5	3																		**13**
Yellow Flowers	*Tabebuia rosea*		8																					**8**
Fan cypress	*Thuja orientalis*		1																					**1**
Eucalyptus	*Eucalyptus*																					5		**5**
Glodogan Mast	*Polyalthia sp.*	5	15	3	30		3	5	9		10					2		3						**85**
Water apple	*Syzygium aquaeum*																					5		**5**
Jati Kebon	*Tectona grandis Lf*																					2		**2**
Guava	*Psidium guajava*		2																					**2**
Cambodia	*Plumiera acuminata Aft*					1	3	15	3		1	10	5								2		5	**45**
Kebo Rubber	*Ficus elastica*															7								**7**
Kelapa Gading	*Cocos nucifera L.*	5		5														30				1		**41**
Cherry	*Muntingia calabura*	15		15		2														5		27		**64**
Ketapang Kencana	*Terminalia mantaly*				10									5				5						**20**
Lamtoro	*Leucaena leucocephala*	2		5	5												5			2		5		**24**
Wide leaf mahogany	*Swietenia mahagoni*		3		15		20	35	10		10			25	49		15						38	**220**
Mango	*Mangifera indica*		2			1												2				3		**8**
King palm	*Roystonea regia*		2		10	8	5	6	11						1				3					**46**
Banana	*Musa parasitiaca*	2		2																	2	17	300	**323**
Red Shoot	*Syzygium myrtifolium*																				2			**2**
Randu	*Ceiba petandra*													3			2	2						**7**
Trembesi	*Samanea saman*		2		20						15	6	1			18	25					5		**92**
	Amount	**60**	**86**	**66**	**128**	**29**	**76**	**86**	**54**	**0**	**81**	**41**	**44**	**78**	**52**	**27**	**67**	**72**	**5**	**11**	**21**	**70**	**393**	**1547**

Information :
TMG = Tomang Station
GRG = Grogol Station
RXY = Roxy Station
PTJ = Petojo Station
CDG = Cideng Station
TRM = Thamrin Station
KBS = Kebon Sirih Station
KWT = Kwitang Station
SNN = Senen Station
GLR = Galur Station
CPB = Cempaka Baru Station
SMB = Sumur Batu Station
CLA = West Pakulonan Station
CCP = East Pakulonan Station
domestic worker = Pioneer Station
PLG = Pulo Gadung Station
PGG = Milling Station
CKB = West Cakung Station
PGB = Pulo Gebang Station
UJM = Ujung Menteng Station
MDS = Medan Satria Station
DEPOT = DepotRorotan

3.2.2. Land Fauna

The diversity of fauna in a place is closely related to the conditions of its habitat. The general definition of habitat is a living place that provides the resources necessary for the survival of fauna, so that it can develop naturally. These resources include food as a source of energy, cover as protection and space as a place to carry out daily activities and the regeneration process (breeding, caring for and raising young).

Not many types of fauna were found, this is because the area has become open land and/or there has been a change in land use. The land fauna found and the results of interviews with the community around the study location are generally domestic and wild animals that have a wide home range, such as those from the aves and mammal classes. Domestic animals kept by people are usually chickens, cats, birds. Overall, the types of fauna in the project location and its surroundings generally include birds (aves), mammals (mammals) and reptiles (reptiles), as well as insects (insects). The types of birds (aves) that exist generally belong to the tropic level of insectivores (insect eaters) and herbivores (eaters of plant parts). Types of reptiles found in the study area include lizards (Maboia multifasciata), types of insects found such as dragonflies (Libelulla forensic), butterflies and others.

Meanwhile, from field observations, the types of wild animal fauna that can be found in the study area are as follows:

a) Reptile
   - Chameleon (Bronchocela jubata), IUCN Status: Least Concern (LC)
   - Lizard (Eutropis multifasciata), IUCN Status: Least Concern (LC)
   - Phyton Family (Pythonidae), IUCN Status: Least Concern (LC)
   - Common Water Monitor (Varanus salvator), IUCN Status: Least Concern (LC)
   - Banded Krait (Bungarus fasciatus), IUCN Status: Least Concern (LC)
   - Green Snake (Dryopis), IUCN Status: Least Concern (LC)

b) Aves and Insects
   - House Sparrow (Passer domesticus), IUCN Status: Least Concern (LC)
   - Sooty-headed bulbul (Pycnonotus aurigaster), IUCN Status: Least Concern (LC)
   - Black Drongo (Dicrurus macrocercus), IUCN Status: Least Concern (LC)
   - Spotted Pigeon (Spilopelia chinensis), IUCN Status: Least Concern (LC)
   - Three-spotted grass yellow butterfly (Eurema blanda), IUCN Status: Least Concern (LC)

c) Amphibian
   - Common Tree Frog (Polypedates leucomystax), IUCN Status: Least Concern (LC)
   - Javanese Warty Frog (Fejervarya cancrivora), IUCN Status: Least Concern (LC)

d) Rodentia
   - Black Rat (Rattus rattus), IUCN Status: Least Concern (LC)
   - Brown Rat (Rattus norvegicus), IUCN Status: Least Concern (LC)
   - Field Rat (Rattus argentiventer), IUCN Status: Least Concern (LC)

3.2.3. Aquatic Biota

Identification of water biota (especially plankton and benthos) as a baseline for the environment in the study area was carried out on 14-16th September2022 at 3 sampling points that were the same as the water quality sampling locations, namely the Cengkareng River, the Angke Kosambi River (upstream), and the Angke River (downstream).

a) Plankton

Plankton are aquatic organisms with the ability to move very freely and follow currents. Most plankton live floating on the surface and are carried by currents (Odum, 1971). The distribution of plankton depends on the movement of water masses such as currents and waves. Plankton can be classified into phytoplankton and zooplankton. Phytoplankton have an important role in the ecosystem as primary producers that will support life in waters, so phytoplankton are also known as the basis of food webs in aquatic ecosystems. Phytoplankton which contain chlorophyll pigments will carry out photosynthesis. Through this process, water and carbon dioxide with the help of sunlight and nutrients will produce organic compounds. The abundance of phytoplankton in waters can describe the condition of the aquatic environment, including its fertility. Zooplankton is a type of animal plankton. This species utilizes phytoplankton as an energy source. Unlike phytoplankton, this biota can move both in an effort to defend itself and in search of food. Zooplankton can influence phytoplankton community structure directly through selective predation or indirectly through nutrient regeneration. The results of plankton analysis (phytoplankton and zooplankton) can be seen at **Table 3.27.**.

Table 3.27. Plankton Identification Results

No	Phyllum	Genera	Analysis Results		
			A3	A4	A5
Phytoplankton					
1	*Cyanophyceae*	*Phormidium sp.*	127600	46400	-
		Spirulina sp	23200	-	-
2	*Euglenophyta*	*Euglene sp.*	150800	69600	11600
		Phacus sp.	150800	69600	11600
3	*Chlorophyceae*	*Ulothrix sp.*	208800	-	-
		Pediastrum sp.	440800	1252800	185600
		Scenedesmus sp.	1322400	278400	185600
		Pandorina sp.	243600	69600	-
		Neprocytium sp.	185600	-	-
4	*Baccilariophyceae*	*Navicula sp.*	11600	-	-
		Melosira sp.	452400	-	-
		Nitzschia sp.	81200	23200	11600
		Abundanace	**3398800**	**1809600**	**406000**
		Taxa (S)	**12**	**7**	**5**
		Diversity (H')	**0.85**	**0.46**	**0.44**
		Equitability (E)	**0.79**	**0.55**	**0.63**
		Dominance (D)	**0.2**	**0.51**	**0.42**

No	Phyllum	Genera	Analysis Results		
			A3	A4	A5
Zooplankton					
1	*Protozoa*	*Arcella sp.*	859	1719	-
		Centropyxis sp.	859	-	-
		Euglypha sp.	859	-	-
2	*Rotifera*	*Euglene sp.*	859	3437	859
		Phacus sp.	859	-	-
		Abundanace	**4295**	**5156**	**859**
		Taxa (S)	**5**	**2**	**1**
		Diversity (H')	**1.61**	**0.64**	**0.00**
		Equitability (E)	**1.00**	**0.92**	**0.00**
		Dominance (D)	**0.2**	**0.56**	**1.00**

Information : A3 = RiverCengkareng (S 06°09'13.11" : E 106°44'52.22")
A4 = Angke Kosambi River - upstream (S 06°10'40.87" : E 106°43'36.15")
A5 = RiverAngke – downstream (S 06°10'35.19" : E 106°43'40.72")

According to Wibisono (2005), the diversity index (H') can describe the state of the biota community structure and the level of pollution in aquatic ecosystems. Based on Table 3.27. It is known that the plankton diversity index in the waters in the study area ranges from 0 - 1.61, so it can be classified as a less stable to stable community.

b) Benthos

Benthos are benthic invertebrate animals that live and live at the bottom of the water or attached to objects in the water. The results of identification, enumeration and analysis of benthos samples can be seen in **Table 3.28.** Based on this table, it is known that only one type of benthos was detected living and living at the bottom of these waters. This situation indicates that the bottom of the waters as a living medium and benthos habitat is less supportive for the life and reproduction of benthos, so that only species that have high adaptation can reproduce well, while sensitive species will disappear.

Table 3.28. Benthos Identification Results

No	Phyllum	Genera	Analysis Results		
			A3	A4	A5
1	*Gastropods*	*Tubifex sp.*	-	151	44
		Abundanace	**-**	**151**	**44**
		Taxa (S)	**-**	**1**	**1**
		Diversity (H')	**-**	**0.00**	**0.00**
		Equitability (E)	**-**	**0.00**	**0.00**
		Dominance (D)	**-**	**1.00**	**1.00**

Information : A3 = RiverCengkareng (S 06°09'13.11" : E 106°44'52.22")
A4 = RiverAngke Kosambi - upstream (S 06°10'40.87" : E 106°43'36.15")
A5 = RiverAngke – downstream (S 06°10'35.19" : E 106°43'40.72")

3.3. Socioeconomic Components of Culture

3.3.1. Population

Administratively, the locations for MRT-EWLP1S1 construction activities are in 13 (thirteen) sub-districts in 5 (five) cities, namely West Jakarta City (Grogol Petamburan District), Central Jakarta City (Gambir District, Tanah Abang District, Menteng District, Senen District, Johar Baru District, Kemayoran District and Cempaka Putih District), North Jakarta City (Kelapa Gading District, Cilincing District), East Jakarta City (Pulo Gadung District and Cakung District) and Bekasi City (Medan Satria District) (Central Statistics Agency, 2021) .

The population, sex ratio and population density in each sub-district in the study area are as presented in**Table 3.29.**. The composition of the population by age group and education level at the city level in the study area is presented in Table 3.30. And**Table 3.31.**. The total area of the study area based on subdistrict area is 83.26 km2, with the largest area being Rorotan Subdistrict (Cilincing District, North Jakarta) 10.64 km2 and the smallest area being Galur Subdistrict (Johar Baru Subdistrict, Central Jakarta) 0.26 km2 . The largest population is in Cakung Barat Subdistrict (Cakung District, East Jakarta) 74,621 people and the lowest is in Gambir Subdistrict (Gambir District, Central Jakarta) 2,607 people. Meanwhile, the highest population density is in Galur Village (88,938 people/km2) and the lowest is in Gambir Village (1,010 people/km2).

Table 3.29. Population, Sex Ratio and Population Density in the Study Area in 2022

City/District	Ward	Wide (km2)	Population (people)			Sex Ratio	Density (people/km2)
			L	P	Qty		
West Jakarta	**8 Districts**	**129.54**	**1,279,137**	**1,277,501**	**2,556,638**	**100.13**	**19,736**
Grogol Petamburan	**7 Subdistricts**	**9.90**	**108,532**	**120.216**	**228,748**	**90.28**	**23,106**
	Tomang	1.88	17,896	17,979	35,875	99.54	19,082
	South Cape Duren	1.77	14,973	15,756	30,729	95.03	17,361
	Grogol	1.22	10,140	10,263	20,403	98.80	16,724
Central Jakarta	**8 Districts**	**48.13**	**1,229,435**	**1,205,076**	**2,434,511**	**102.02**	**50,582**
Gambier	**6 Subdistricts**	**7.59**	**48,740**	**48,200**	**96,940**	**101.12**	**12,772**
	Duri Pulo	0.71	12,311	11,968	24,279	102.87	34,196
	Cideng	1.26	9,055	9,395	18,450	96.38	14,643
	North Petojo	1.12	10,579	10,588	21,167	99.91	18,899
	South Petojo	1.14	9,312	8,831	18,143	105.45	15,915
	Gambier	2.58	1,297	1,310	2,607	99.01	1,010
Tanah Abang	**7 Subdistricts**	**9.29**	**92,529**	**90.136**	**182,665**	**102.65**	**19,663**
	Balinese Village	0.73	7,336	7,288	14,624	100.66	20,033
Menteng	**5 Subdistricts**	**6.53**	**46,467**	**45,871**	**92,338**	**101.30**	**14,141**
	Betel Garden	0.83	8,044	7,574	15,618	106.21	18,817
Monday	**6 Subdistricts**	**4.22**	**65,245**	**64,058**	**129,303**	**101.85**	**30,641**
	Monday	0.81	4,428	4,263	8,691	103.87	10,730
	Kwitang	0.45	9,663	9,670	19,333	99.93	42,962
	Kramat	0.71	18,756	18,052	36,808	103.90	51,842
New Johar	**4 Subdistricts**	**2.37**	**73,579**	**71,704**	**145,283**	**102.61**	**61,301**

City/District	Ward	Wide (km2)	Population (people)			Sex Ratio	Density (people/km2)
			L	P	Qty		
	Upland	0.62	24,413	23,543	47,956	103.70	77,348
	Strains	0.26	11,914	11,210	23,124	106.28	88,938
Kemayoran	**8 Subdistricts**	**7.25**	**130,388**	**129,241**	**259,629**	**100.89**	**35,811**
	Glorious Hope	0.53	14,281	14,216	28,497	100.46	53,768
	New Cempaka	0.99	20,588	20,400	40,988	100.92	41,402
	Stone Well	1.15	14,195	14,295	28,490	99.30	24,774
Cempaka Putih	**3 Subdistricts**	**4.69**	**50,945**	**51,095**	**102,040**	**99.71**	**21,757**
	Cempaka Putih Barat	1.22	22,388	22,296	44,684	100.41	36,626
	East Cempaka Putih	2.22	14,906	15,024	29,930	99.21	13,482
North Jakarta	**6 Districts**	**137.97**	**984,305**	**964,942**	**1,949,247**	**102.01**	**14,128**
Kelapa Gading	**3 Subdistricts**	**16,11**	**70,581**	**73,649**	**144,230**	**95.83**	**8,953**
	West Kelapa Gading	6.28	21,292	22,011	43,303	96.73	6,895
	East Kelapa Gading	5.30	19,257	20,767	40,024	92.73	7,552
	Ascension Two	4.53	30,032	30,871	60,903	97.28	13,444
Cilincing	**7 Subdistricts**	**38.15**	**224,383**	**219,522**	**443,905**	**102.21**	**11,636**
	Rorotan	10.64	27,782	27,156	54,938	102.31	5,163
East Jakarta	**10 Districts**	**188.03**	**1,630,286**	**1,615,623**	**3,245,909**	**100.91**	**17,263**
Gadung Island	**7 Subdistricts**	**15.61**	**154,460**	**155,353**	309,813	99.43	19,847
	Eucalyptus	4.37	24,793	25,127	49,920	98.67	11,423
	Gadung Island	1.92	21,542	21,266	42,808	101.30	22,296
Cakung	**7 Subdistricts**	**42.28**	**292,768**	**284,379**	**577,147**	**102.95**	**13,651**
	Terate Swamp	3.30	16,311	15,201	31,512	107.30	9,549
	West Cakung	6.12	37,942	36,679	74,621	103.44	12,193
	East Cakung	9.81	37,834	36,679	74,513	103.15	7,596
	Menteng Edge	5.04	19,005	18,742	37,747	101.40	7,489
Bekasi city	**12 Districts**	**210.49**	**1,291,982**	**1,272,959**	**2,564,941**	**101.49**	**12,186**
Medan Satria	**4 Subdistricts**	**11.88**	**79,061**	**77,887**	**156,948**	**101.51**	**13,211**
	Medan Satria	3.75	14,274	13,810	28,084	103.36	7,489
Amount		**83.26**	**526,539**	**522,230**	**1,048,769**	**100.83**	**12,596**

Source: Central Statistics Agency (2022)

Table 3.30. Population Composition Based on Age Groups in the Study Area in 2022

Age Group	West Jakarta	Central Jakarta	North Jakarta	East Jakarta	Bekasi city
0 - 4	194,098	168,475	156,028	254,891	199,420
5 - 9	199,801	172,676	153,956	254,502	191.603
10 - 14	201,052	179,999	151,686	258,540	205.174
15 - 19	201,055	193,306	151,795	262,771	201,047
20 -24	203,783	198,836	156,349	265,762	207,569
25 - 29	210,905	200,016	160,194	267,390	223,924
30 - 34	224,146	202,563	167,701	272,137	229,778
35 - 39	220,398	192,797	165,388	265,737	214,503
40 - 44	210.228	188,436	159.103	260,024	202,248
45 - 49	183,255	179,506	138,214	236,409	177,081

Age Group	West Jakarta	Central Jakarta	North Jakarta	East Jakarta	Bekasi city
50 - 54	154,512	163,043	115,068	201,505	158,185
55 - 59	125,904	137,399	93,878	163,443	133,864
60 - 64	93,536	102.202	72,630	121,015	100,394
65 - 69	65,892	73,545	51,967	84,586	66,163
70 - 74	33,012	36,987	27,529	38,974	31,827
75+	35,061	44,726	27,761	38,221	22,161
Amount	**2,556,638**	**2,434,511**	**1,949,247**	**3,245,909**	**2,564,941**

Source: Central Statistics Agency (2022)

Table 3.31. Education Level of Population Aged 15 Years and Over in the Study Area in 2022

Education	West Jakarta	Central Jakarta	North Jakarta	East Jakarta	Bekasi city
≤ Elementary	362,067	299,161	285,337	307.111	268,803
JUNIOR HIGH SCHOOL	526,642	355,036	311,084	400,558	339,063
SENIOR HIGH SCHOOL	837.192	894,979	717,910	1,200,717	910.868
College	235,786	364,186	173,246	569,591	450,011
Amount	**1,961,687**	**1,913,362**	**1,487,577**	**2,477,976**	**1,968,744**

Source: Central Statistics Agency (2022)

In addition to the secondary data mentioned above, interviews were conducted with 384 affected families at the activity location consisting of 252 families in the west elevated and east elevation segments, 123 families in the underground segment, and 9 families in the depot segment. The location of the socio-economic survey is presented in Figure 3.26, while the respondent profiles are presented in **Table 3.32.**to T**able 3.36.**.

Based on these data, it is generally known that the majority of respondents were aged 51-60 years (33.07%), had a high school/equivalent education level (47.66%) and had lived for more than 5 years (91.67%), which means that Most of the affected residents are local/native residents at the location or residents who have lived at the activity location for a long time.

3.3.2. Employment

The concept and definition of employment refers to The Labor Force Concept suggested by the International Labor Organization (BPS, 2022). The population is divided into two groups, namely the working age population (15 years and over) and the non-working age population (under 15 years). The working age population is divided into two groups, namely the labor force (working age population who are economically active) and non-labor force (working age population who are not economically active). Employment conditionsat the municipal level in the study area is presented in **Source :** Questionnaire 2022 & 2023

Table 3.37. Employment Conditions in the Study Area

Description	West Jakarta	Central Jakarta	North Jakarta	East Jakarta	Bekasi city	Amount
Total population	2,556,638	2,434,511	1,949,247	3,245,909	2,564,941	12,751,246
Working Age Population	1,961,687	1,913,362	1,487,577	2,477,976	1,968,744	9,809,346
Workforce	1,257,727	1,219,358	978,701	1,507,879	1,274,861	6,238,526
a. Work	1,146,814	1,085,652	882,420	1,383,804	1,136,205	5,634,895
• < SD	186,451	150,803	162,168	161,480	157,237	818.140
• JUNIOR HIGH SCHOOL	256,528	147,187	145,052	168,925	140,849	858,543
• SENIOR HIGH SCHOOL	529,798	530,751	449,084	663,612	512.126	2,685,372
• PT	174,036	256,911	126.115	389,787	325,991	1,272,841
b. Open unemployment	110.913	133,706	96,281	124,075	138,656	603,631
• < SD	19,187	4,500	4,661	6,146	12,658	47,151
• JUNIOR HIGH SCHOOL	20,972	16,177	18,295	10,377	9,969	75,790
• SENIOR HIGH SCHOOL	58,677	87,591	64,055	83,833	79,857	374,013
• PT	12,076	25,438	9,270	23,719	36,173	106,676
Not the Labor Force	703,960	694,004	508,876	970,097	693,883	3,570,820
• < SD	156,429	143,858	118,508	139,485	98,908	657,188
• JUNIOR HIGH SCHOOL	249,142	191,672	147,737	221,255	188,244	998,050
• SENIOR HIGH SCHOOL	248,717	276,637	204,771	453,271	318,884	1,502,280
• PT	49,673	81,837	37,860	156,085	87,847	413.302
TKK 1)	**91.18**	**89.03**	**90.16**	**91.77**	**89.12**	**90.32**
SITE 2)	**64.11**	**63.73**	**65.79**	**60.85**	**64.76**	**63.60**
TPT 3)	**5.65**	**6.99**	**6.47**	**5.01**	**7.04**	**6.15**

Source: Central Statistics Agency (2022)

Information : 1) TKK (Level of Employment Opportunities) is the ratio of the number of working people to the total workforce. TKK represents an opportunity to enter the job market.
2) TPAK (Level of Labor Force Participation) is the ratio of the number of the labor force to the working age population. TPAK describes the supply of labor in the labor market
3) TPT (Level of Open Unemployment) is the ratio of the number of open unemployed to the working age population. TPT describes labor that is not absorbed by the labor market and underutilization of the labor supply.

.. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents' occupations are self-employed (36.98%) with the number of working family members being 2 people (50%), as presented in **Table 3.38**. to **Table 3.40**..

No	Stasiun	Kode
1	Tomang	TMG
2	Grogol	GRG
3	Roxy	RXY
4	Petojo	PTJ
5	Cideng	CDG
6	Thamrin	TRM
7	Kebon Sirih	KBS
8	Kwitang	KWT
9	Senen	SNN
10	Galur	GLR
11	Cempaka Baru	CPB

No	Stasiun	Kode
12	Sumur Batu	SMB
13	Pakulonan Barat	PKB
14	Pakulonan Timur	PKT
15	Perintis	PRT
16	Pulo Gadung	PLG
17	Penggilingan	PGG
18	Cakung Barat	CKB
19	Pulo Gebang	PGB
20	Ujung Menteng	UJM
21	Medan Satria	MDS

Koordinat Sampling

Kode	Koordinat	
	X	Y
S1	106.792788	-6.175445
S2	106.802974	-6.165923
S3	106.824681	-6.183231
S4	106.838911	-6.180864
S5	106.866731	-6.170289
S6	106.894081	-6.175956
S7	106.916141	-6.182607

Kode	Koordinat	
	X	Y
S8	106.930803	-6.183332
S9	106.942297	-6.184281
S10	106.956113	-6.186726
S11	106.963655	-6.188707
S12	106.97582	-6.196073
S13	106.970174	-6.144716

Elevated Route
Underground Route
Elevated Route
Surface Route
Penjaringan
Pademangan Barat
Pinangsia
Angke
Kebonbawang
Lagoa
Langengong
Kota Administrasi Jakarta Utara
Kota Administrasi Jakarta Barat
Kota Administrasi Jakarta Pusat
Kota Administrasi Jakarta Timur
Kota Administrasi Jakarta Selatan
Kota Bekasi
Prov. DKI. Jakarta
Prov. Jawa barat
Depo Rorotan
Bekasi
Pasarbaru
Serdang
Kelapagading
Tanjungduren Utara
Petojo Selatan
Senen
Cempakaputih Barat
Pulomas
Cakung Barat
Joharbaru
Kebonmelati
Menteng
Utankayu Utara
Palmerah
Setiabudi
Tebet Barat
Cipinang Besar Selatan
Durensawit
Gunung
Mampangprapatan
GRG RXY PTJ TMG CDG TRM KBS KWT SNN GLR CPB SMB PKB PKT PRT PLG PGG CKB PGB UJM MDS
S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13
Jl. Letjen S. Parman
Jl. Kyai Tapa
Jl.KH. Hasyim Ashari
Jl.Cideng Timur
Jl. KebonSirih
Jl. AR. Hakim
Jl. Kr. Kwitang
Jl. Letjen Suprapto
Jl. Perintis Kemerdekaan
Jl. Raya Bekasi
Jl. Kali Abang Tengah
106.83° E
106.92° E
6.12° S
6.18° S
6.23° S

MAP SAMPLING POINT (Socioeconomic Culture)

AMDAL

Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : 1 : 70.000
0 1.75 3.5 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legend

- Subdistrict
- Provincial Boundary
- District/City Boundaries
- River

Jalan

- Arterial Road
- Collector Street
- Toll Road
- Socio-economic Cultural Sampling Location
- MRT Line
- Station
- Depot
- RSS (Receveing Sub -Station)

Elevated Route : ± 21.3 km
Underground Route : ± 9 km
Surface Route : ± 6 km

Source :
- Indonesia Earth Map Scale 1 : 25000
- Administration Map DKI Jakarta Scale 1 : 25000
- Administration Map Bekasi Regency Scale 1 : 25000
- Administration Bekasi City Scale 1 : 25000
- MRT East - West Line
- Sampling Location

INSERT

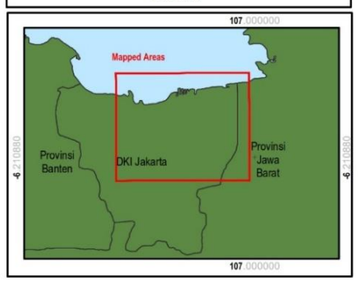


Figure 3.26. Socio-Economic Survey Location Map

Table 3.32. Respondents from Affected Residents by Gender

Type Sex	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Man	180	65.45	90	32.73	5	1.82	275	100
		71.43		73.17		55.56		71.61
Woman	72	66.06	33	30.27	4	3.67	109	100
		28.57		26.83		44.44		28.39
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.33. Respondents from Affected Residents based on Marital Status

Marital status	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Marry	227	66.37	106	30.99	9	2.63	342	100
		90.08		86.18		100		89.06
Not married	25	59.52	17	40.48	0	0.00	42	100
		9.92		13.82		0.00		10.94
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.34. Respondents from Affected Residents by Age

Age Range	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
< 30 years	9	42.86	12	57.14	0	0.00	21	100
		3.57		9.76		0.00		5.47
31 – 40 yrs.	38	67.86	17	30.36	1	1.79	56	100
		15.08		13.82		11,11		14.58
41 – 50 yrs.	73	74.49	24	24.49	1	1.02	98	100
		28.97		19.51		11,11		25.52
51 – 60 yrs.	86	67.72	38	29.92	3	2.36	127	100
		34.13		30.89		33.33		33.07
> 61 years	46	56.10	32	39.02	4	4.88	82	100
		18.25		26.02		44.44		21.35
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.35. Respondents from Affected Residents based on Education Level

Level of education	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
No school	0	0.00	4	66.67	2	33.33	6	100
		0.00		3.25		22.22		1.56
Elementary school/equivalent	15	65.22	6	26.09	2	8.70	23	100
		5.95		4.88		22.22		5.99

Level of education	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
junior high school/ equal	32	69.57 12.70	13	28.26 10.57	1	2.17 11,11	46	100 11.98
high school/ equal	123	67.21 48.81	57	31.15 46.34	3	1.64 33.33	183	100 47.66
Academy (D1 – D3)	29	56.86 11.51	21	41.18 17.07	1	1.96 11,11	51	100 13.28
Bachelor (S1 – S3)	53	70.67 21.03	22	29.33 17.89	0	0.00 0.00	75	100 19.53
Total	**252**	**65.63** **100**	**123**	**32.03** **100**	**9**	**2.34** **100**	**384**	**100** **100**

Source : Questionnaire 2022 & 2023

Table 3.36. Respondents from Affected Residents based on Length of Stay

Length of stay	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
< 1 year	2	40.00 0.79	3	60.00 2.44	0	0.00 0.00	5	100 1.30
15 years	18	66.67 7.14	8	29.63 6.50	1	3.70 11,11	27	100 7.03
> 5 years	232	65.91 92.06	112	31.82 91.06	8	2.27 88.89	352	100 91.67
Total	**252**	**65.63** **100**	**123**	**32.03** **100**	**9**	**2.34** **100**	**384**	**100** **100**

Source : Questionnaire 2022 & 2023

Table 3.37. Employment Conditions in the Study Area

Description	West Jakarta	Central Jakarta	North Jakarta	East Jakarta	Bekasi city	Amount
Total population	2,556,638	2,434,511	1,949,247	3,245,909	2,564,941	12,751,246
Working Age Population	1,961,687	1,913,362	1,487,577	2,477,976	1,968,744	9,809,346
Workforce	1,257,727	1,219,358	978,701	1,507,879	1,274,861	6,238,526
a. Work	1,146,814	1,085,652	882,420	1,383,804	1,136,205	5,634,895
• < SD	186,451	150,803	162,168	161,480	157,237	818.140
• JUNIOR HIGH SCHOOL	256,528	147,187	145,052	168,925	140,849	858,543
• SENIOR HIGH SCHOOL	529,798	530,751	449,084	663,612	512.126	2,685,372
• PT	174,036	256,911	126.115	389,787	325,991	1,272,841
b. Open unemployment	110.913	133,706	96,281	124,075	138,656	603,631
• < SD	19,187	4,500	4,661	6,146	12,658	47,151
• JUNIOR HIGH SCHOOL	20,972	16,177	18,295	10,377	9,969	75,790
• SENIOR HIGH SCHOOL	58,677	87,591	64,055	83,833	79,857	374,013

Description	West Jakarta	Central Jakarta	North Jakarta	East Jakarta	Bekasi city	Amount
• PT	12,076	25,438	9,270	23,719	36,173	106,676
Not the Labor Force	703,960	694,004	508,876	970,097	693,883	3,570,820
• < SD	156,429	143,858	118,508	139,485	98,908	657,188
• JUNIOR HIGH SCHOOL	249,142	191,672	147,737	221,255	188,244	998,050
• SENIOR HIGH SCHOOL	248,717	276,637	204,771	453,271	318,884	1,502,280
• PT	49,673	81,837	37,860	156,085	87,847	413.302
TKK 1)	**91.18**	**89.03**	**90.16**	**91.77**	**89.12**	**90.32**
SITE 2)	**64.11**	**63.73**	**65.79**	**60.85**	**64.76**	**63.60**
TPT 3)	**5.65**	**6.99**	**6.47**	**5.01**	**7.04**	**6.15**

Source: Central Statistics Agency (2022)

Information : 1) TKK (Level of Employment Opportunities) is the ratio of the number of working people to the total workforce. TKK represents an opportunity to enter the job market.
2) TPAK (Level of Labor Force Participation) is the ratio of the number of the labor force to the working age population. TPAK describes the supply of labor in the labor market
3) TPT (Level of Open Unemployment) is the ratio of the number of open unemployed to the working age population. TPT describes labor that is not absorbed by the labor market and underutilization of the labor supply.

Based on **Table 3.37**., it is known that the TKK (Level of Employment Opportunities) value for 5 cities in the study area is 90.32%, which means that 90 people out of 100 people in the workforce are working residents, while the remaining 10 people are residents looking for work. The TPAK (Level of Labor Force Participation) value for 5 cities in the study area is 63.60%, which means that out of 100 people of working age, almost 64 of them are in the labor force, while around 36 people are not in the labor force. The highest TPAK value was 65.79% in North Jakarta City and the lowest TPAK value was 60.85% in East Jakarta City. Meanwhile, the TPT (Level of Open Unemployment) value for 5 cities in the study area is 6.15%, which means that out of 100 people of working age, approximately 6 people are openly unemployed, while around 94 people are employed. The highest TPT value was 7.04% in Bekasi City and the lowest TPT value was 5.01% in East Jakarta City.

Table 3.38. Respondents from Affected Residents based on Main Type of Work

Work Main	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Civil servants	27	67.50	10	25.00	3	7.50	40	100
		10.71		8.13		33.33		10.42
TNI/POLRI	3	100	0	0.00	0	0.00	3	100
		1.19		0.00		0.00		0.78
Private sector employee	41	60.29	25	36.76	2	2.94	68	100
		16.27		20.33		22.22		17.71
Farmer (owner/cultivator)	0	0.00	0	0.00	0	0.00	0	0
		0.00		0.00		0.00		0.00
Laborer	16	76.19	5	23.81	0	0.00	21	100
		6.35		4.07		0.00		5.47
	42	75.00	13	23,21	1	1.79	56	100

Work Main	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Hawkers/stall traders		16.67		10.57		11,11		14.58
Self-employed	85	59.86	54	38.03	3	2.11	142	100
		33.73		43.90		33.33		36.98
Driver/other services	8	100	0	0.00	0	0.00	8	100
		3.17		0.00		0.00		2.08
Retired	6	75.00	2	25.00	0	0.00	8	100
		2.38		1.63		0.00		2.08
Student/ Student	1	33.33	2	66.67	0	0.00	3	100
		0.40		1.63		0.00		0.78
Housewife	15	60.00	10	40.00	0	0.00	25	100
		5.95		8.13		0.00		6.51
Doesn't work	8	80.00	2	20.00	0	0.00	10	100
		3.17		1.63		0.00		2.60
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.39. Number of People Living in the House

Number of people living/home	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
1 person	13	61.90	8	38.10	0	0.00	21	100
		5.16		6.50		0.00		5.47
2 persons	55	70.51	21	26.92	2	2.56	78	100
		21.83		17.07		22.22		20.31
3 people	65	68.42	29	30.53	1	1.05	95	100
		25.79		23.58		11,11		24.74
4 people	77	62.60	45	36.59	1	0.81	123	100
		30.56		36.59		11,11		32.03
5 people	29	64.44	14	31.11	2	4.44	45	100
		11.51		11.38		22.22		11.72
6 people	10	71.43	3	21.43	1	7.14	14	100
		3.97		2.44		11,11		3.65
7 people	2	66.67	1	33.33	0	0.00	3	100
		0.79		0.81		0.00		0.78
8 people	1	20.00	2	40.00	2	40.00	5	100
		0.40		1.63		22.22		1.30
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.40. Number of Working Family Members

Number of people working	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
	143	84.62	22	13.02	4	2.37	169	100

Number of people working	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
1 person		56.75		17.89		44.44		44.01
2 persons	100	52.08	88	45.83	4	2.08	192	100
		39.68		71.54		44.44		50.00
3 people	6	30.00	13	65.00	1	5.00	20	100
		2.38		10.57		11,11		5.21
4 people	3	100.00	0	0.00	0	0.00	3	100
		1.19		0.00		0.00		0.78
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Determining the condition of the environmental quality of the employment opportunity component is carried out by converting the percentage of the community population in the study area who are not yet employed into the Environmental Quality Scale (SKL) in **Table 3.41**.

Table 3.41. SKL Job Opportunity Component

Determination Criteria Approach	Environmental Quality Scale	
	Mark	Category
The community population in the study area has not worked ≤7.00%	5	Very good
The population in the study area has not yet worked 7.10-10.60%	4	Good
The population in the study area has not yet worked 10.70-13.20%	3	Currently
The population in the study area has not yet worked 13.30-16.80%	2	Bad
The community population in the study area has not worked ≥16.90%	1	Very bad

Source: Narsuka DR and Sujali (2009)

Based on **Table 3.41**, this means that the condition of environmental quality is a component of employment opportunitiesincluded in the very good category.

3.3.3. Household Income and Expenditures

Income measurement is carried out using a household expenditure data approach (BPS, 2022). Referring to the 2022 People's Welfare Indicator Report (data from the national socio-economic survey, March 2021), the average monthly expenditure in 5 cities in the study area is IDR. 2,320,813/capita with a proportion of expenditure (consumption patterns) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387). Detailed expenditure data in 5 cities in the study area is presented in**Table 3.42.**.

Over time, there has been a growing understanding that the size of the proportion of expenditure on food consumption to all household expenditure can provide an overview of the household's welfare. Households with a greater proportion of expenditure on food consumption indicate that the household has a low income. The higher the household income, the smaller the proportion of expenditure on food to total household expenditure.

Table 3.42. Household Expenditures in the study area

City	Expenditure (per-capita per-month)				Amount
	Food		Non Food		
	Rp.	%	Rp.	%	
West Jakarta	983,538	43.98	1,252,721	56.02	2,236,259
Central Jakarta	894,645	41.38	1,267,410	58.62	2,162,055
North Jakarta	902,760	32.12	1,907,595	67.88	2,810,355
East Jakarta	865,665	42.26	1,182,645	57.74	2,048,310
Bekasi city	1,005,521	42.84	1,341,565	57.16	2,347,086
Average	**930,426**	**40.09**	**1,390,387**	**59.91**	**2,320,813**

Source: Central Statistics Agency (2022)

Table 3.43. Income and Amount Saved Per Month by Affected Resident Respondents

Segment	Number of Respondents Affected Residents	Income Monthly (Rp)	Income Saved (Rp)
Elevated (±15,527 Km)	252 families	5,455,333	944,864
Underground (± 9 Km)	123 families	4,906,250	765,375
Deposit (±5, 9 Km)	9 families	5,186,364	803.886
Average		**5,182,649**	**838,042**

3.3.4. Economic Facilities

Economic facilities are a type of public service that plays a role in providing trade and service facilities. Economic facilities consist of groups of shops, markets with permanent buildings (having roofs, floors and walls), markets with semi-permanent buildings (having roofs and floors, no walls), markets without buildings (shock market, dawn market, floating market), minimarkets or supermarkets, restaurants or eateries, food and drink stalls or stalls, and grocery stores or stalls.

Economic facilities in 31 sub-districts in the study area are presented in**Table 3.44.**. Based on this table, it is known that economic facilities in the study area are dominated by grocery stores/stalls (48.21%) and food and beverage stalls (20.52%).

Table 3.44. Economic Facilities and Infrastructure in the Study Area

City	Subdistrict	Ward	Shop Group	Market with Permanent Buildings	Market with Semi-Permanent Buildings	Buildingless Market	Minimarket/Supermarket	Restaurant/Eating House	Food and Beverage Stall/Shop	Shop/Grocery Stall	Amount
West Jakarta	Grogol Petamburan	Tomang	4	1	1		18			400	424
		South Cape Duren	8	1			18			150	177
		Grogol	1	1			13			350	365
Central Jakarta	Gambier	Duri Pulo	1				4	2			7
		Cideng	1			1	7	15			24
		North Petojo	1	1			6	15			23
		South Petojo	1		1		3	6			11
		Gambier					3	5			8
	Tanah Abang	Balinese Village	1	1			3	20			25
	Menteng	Betel Garden	1	1			2	36			40
	Monday	Monday	1	1			8	5			15
		Kwitang	2	1			6	3			12
		Kramat	6		1		2	2			11
	New Johar	Upland	8	1			10	9			28
		Strains		1			5	5			11
	Kemayoran	Glorious Hope	2	1			6				9
		New Cempaka	1				9				10
		Stone Well	1	1			8	10			20
	Cempaka Putih	Cempaka Putih Barat	14	2	1		10	8			35
		East Cempaka Putih	4	1		1	14	30			50

City	Subdistrict	Ward	Shop Group	Market with Permanent Buildings	Market with Semi-Permanent Buildings	Buildingless Market	Minimarket/Supermarket	Restaurant/Eating House	Food and Beverage Stall/Shop	Shop/Grocery Stall	Amount
North Jakarta	Kelapa Gading	West Kelapa Gading	27	1	2	1	16	95	235	45	422
		East Kelapa Gading	18	3		1	14	61	141	470	708
		Ascension Two	41	1	99	1	9	26	154	56	387
	Cilincing	Rorotan	1	1	1		7		111	35	156
East Jakarta	Gadung Island	Eucalyptus	7	1	1	1	18	1			29
		Gadung Island	1	1	1	1	1	1			6
	Cakung	Terate Swamp	1		1		1	2			5
		West Cakung	1	1	1		1	3			7
		East Cakung	4	1			8	8			21
		Menteng Edge	5	1	1	1	4	24			36
Bekasi city	Medan Satria	Medan Satria	4			2	11	25			42
Amount			**168**	**26**	**111**	**10**	**245**	**417**	**641**	**1,506**	**3,124**

Source: Central Statistics Agency (2022)

3.3.5. Socio-cultural

1. Startification and Social Interaction

Clearly, social stratification refers to the process of social stratification that exists in society. Even though both religions, especially Islam and other religions, or the rules of science, especially those concerning social aspects, teach that there is no social stratification, in reality social stratification will continue to process and form the layers that exist in society. The society of the study area, which is characterized by metropolis urban life, which focuses on the trade and service sectors, will eventually change along with changing times. Current social stratification tends to be vertical, which is simply manifested in the form of wealth owned, such as houses, which differ between the houses of people with high incomes and the houses of people with low incomes. Sociologically, social interaction is defined as a reciprocal relationship between people, between groups and between individuals and groups who mutually influence each other. Because of its reciprocal nature and mutual influence, social interaction is always ongoing and occurs dynamically throughout time. Social interaction that takes place in such a way and continues over a long period of time will produce a particular social process that is unique.

The specifics of social interactions can be recognized through patterned, common, socially common behaviors, and this is what is then called customs or customs. What is called custom, generally and custom is assessed as something of value which then again influences and/or regulates social interactions in everyday life. That is why the nature and form of social interaction in everyday life will again be colored and/or influenced by the society concerned. The habit of mutual cooperation in social relations is a community culture that is still prominent, so this potential will be very helpful in efforts to carry out environmental management programs.

Based on the results of interviews with 384 affected families at the activity location, it is known that the forms of community activities that still exist are recitation activities (30.73%) and social gatherings (28.13%), while the forms of traditional and religious activities that still exist are celebrations of religious holidays. (48.70%) and traditional marriage ceremonies (28.91%). Detailed data on social interaction conditions at activity locations are presented in**Table 3.45.**and **Table 3.46.**.

Table 3.45. Forms of Community Activities that Still Exist at the Activity Location

Form Activity	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Lottery club	84	81.55	15	14.56	4	3.88	103	100
		33.33		12.20		44.44		26.82
PKK	24	54.55	19	43.18	1	2.27	44	100
		9.52		15.45		11,11		11.46
Youth organization	15	78.95	4	21.05	0	0.00	19	100
		5.95		3.25		0.00		4.95

Form Activity	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Worship	24	63.16	14	36.84	0	0.00	38	100
		9.52		11.38		0.00		9.90
Study	69	58.47	48	40.68	1	0.85	118	100
		27.38		39.02		11,11		30.73
Other	6	75.00	2	25.00	0	0.00	8	100
		2.38		1.63		0.00		2.08
There isn't any	16	50.00	15	46.88	1	3.13	32	100
		6.35		12.20		11,11		8.33
No answer	14	63.64	6	27,27	2	9.09	22	100
		5.56		4.88		22.22		5.73
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.46. Forms of Traditional and Religious Activities that Still Exist at the Activity Location

Form Activity	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Celebration of Religious Holidays	137	73.26	44	23.53	6	3.21	187	100
		54.37		35.77		66.67		48.70
Traditional Circumcision Ceremony	10	76.92	2	15.38	1	7.69	13	100
		3.97		1.63		11,11		3.39
Local Traditional Activities	9	69.23	3	23.08	1	7.69	13	100
		3.57		2.44		11,11		3.39
Traditional Wedding Ceremony	62	55.86	48	43.24	1	0.90	111	100
		24.60		39.02		11,11		28.91
Other	12	38.71	19	61.29	0	0.00	31	100
		4.76		15.45		0.00		8.07
No answer	22	75.86	7	24.14	0	0.00	29	100
		8.73		5.69		0.00		7.55
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

2. Acculturation and Assimilation (Social Process)

Social processes are an important aspect related to cooperation mechanisms (associative processes), social conflict (disassociative processes), acculturation, assimilation and integration, as well as social cohesion which makes the existence of local communities what they are today. The process of cooperation (cohesiveness) and closeness to grow and develop begins with family groups who are in a position of struggling to find and maintain sources of livelihood that are usually created or sought after which are still public property. Each individual in many family units usually still has close blood relations. This can especially be

observed in the local indigenous population, who in recent conditions still live in groups even though the government has intervened with development programs.

The process of cooperation that develops in society in general is a process of mutual assistance in dealing with difficulties in dealing with religious ritual problems and economic problems related to sources of livelihood, for example trade and services, self-employment or employees for daily needs. Even though it is in a big city, the sense of shared destiny among the community grows and develops, especially in the economic position of households which is still in a minimal state. Natural resources are increasingly limited due to the intervention of other infrastructure (immigrants) who use them, making them work together more closely, although in some cases it also causes them to conflict because they fight over available natural resources.

The people in the study area are generally of mixed ethnicity, where there is usually a mixture of ethnicities that are highly social, friendly, and help each other and others among their neighbors. In this case, sometimes negative things happen, including the emergence of personal disagreements that are exaggerated into groups, but this can be resolved well thanks to cooperation between the community, leadership elements and officials. The existence of these family organizations is quite useful as a vehicle for fostering communities to respect each other and work together to develop their areas, however, care needs to be taken so that the activities of these organizations are not carried away by the narrow understanding of pre-modalism. With so many ethnic groups, various cultural endeavors and customs also color people's lives, but these forms of social patterns and values can live harmoniously and harmoniously. Based on the results of interviews with 384 affected families at the activity location, it was found that for social conflict, the majority of respondents stated that there had never been any social conflict (50.78%).

Table 3.47. Disputes (Social Conflicts) at Activity Locations

Form Activity	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Once	35	76.09	10	21.74	1	2.17	46	100
		13.89		8.13		11,11		11.98
Never	129	66.15	60	30.77	6	3.08	195	100
		51.19		48.78		66.67		50.78
Don't know	72	59.02	50	40.98	0	0.00	122	100
		28.57		40.65		0.00		31.77
No answer	16	76.19	3	14.29	2	9.52	21	100
		6.35		2.44		22.22		5.47
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Social resources in a pluralistic society can produce social energy that is able to drive the development growth process. This social energy includes all social elements, the creative potential of society, initiatives and ideas developing in society, all areas of which are mobilized to become a force for development. Social energy can come from individual activities, in society, families, groups, associations, social institutions or community groups (ethnicity and religion). Although social energy can be a constructive or destructive force, it really depends on the social system that regulates it.

3.3.6. Community Attitudes and Perceptions

People's attitudes and perceptions will be determined by their knowledge and understanding of the object of the attitude itself. Apart from that, the cultural background and environmental conditions (physical environment and social environment) of a society also determine the attitudes and perceptions of that society. Attitude is an expression of feelings that reflects whether an individual likes (positive) or dislikes (negative) or is neutral in responding to a particular activity or program. Meanwhile, perception is an individual's views and opinions regarding an activity or program based on their knowledge and experience.

1. Community Support and Knowledge of MRT-EWLP1S1

Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan (**Table 3.48.**). However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the public's knowledge, especially affected residents, of the MRT-EWLP1S1 development plan, the majority of whom (53.39%) still do not know and have not provided an answer (**Table 3.49**).

Table 3.48. Support for the MRT-EWLP1S1 Development Plan

Support	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Very Supportive	171	82.61	30	14.49	6	2.90	207	100
		67.86		24.39		66.67		53.91
Support	56	41.48	77	57.04	2	1.48	135	100
		22.22		62.60		22.22		35.16
Less Supportive	7	70.00	3	30.00	0	0.00	10	100
		2.78		2.44		0.00		2.60
No answer	18	56.25	13	40.63	1	3.13	32	100
		7.14		10.57		11,11		8.33
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.49. Knowledge of Affected Residents regarding the MRT-EWLP1S1 Development Plan

Citizen Knowledge	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Do not know	133	70.37	52	27.51	4	2.12	189	100
		52.78		42.28		44.44		49.22
Know	108	60.34	67	37.43	4	2.23	179	100
		42.86		54.47		44.44		46.61
No answer	11	68.75	4	25.00	1	6.25	16	100
		4.37		3.25		11,11		4.17
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Furthermore, affected residents expect clearer and more definite information regarding the MRT-EWLP1S1 development plan, especially from the government (district/district/city officials/officials) and from the project implementer (**Table 3.50.**).

Table 3.50. Source of Information on the Expected MRT-EWLP1S1 Development Plan

Source Information	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Government	133	70.37	52	27.51	4	2.12	189	100
		52.78		42.28		44.44		49.22
Project Party	108	60.34	67	37.43	4	2.23	179	100
		42.86		54.47		44.44		46.61
Neighbors/community	11	68.75	4	25.00	1	6.25	16	100
		4.37		3.25		11,11		4.17
Other	11	68.75	4	25.00	1	6.25	16	100
		4.37		3.25		11,11		4.17
No answer	11	68.75	4	25.00	1	6.25	16	100
		4.37		3.25		11,11		4.17
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

2. Benefits, Negative Impacts and Community Concerns Regarding MRT-EWLP1S1

Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (84.90%) understand the benefits of building the MRT-EWLP1S1 to improve public transportation services and reduce congestion (Table 3.51). Apart from that, the majority of respondents (76.82%) did not feel worried about the MRT-EWLP1S1 development plan (Table 3.52). However, there were still 5.21% of respondents who said they did not feel there were any direct benefits and 23.18% of respondents who felt worried about the MRT-EWLP1S1 development plan.

Table 3.51. Community Perception of the Benefits of MRT-EWLP1S1 Development

Benefits of MRT-EWLP1S1	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Reduce congestion	117	73.58	39	24.53	3	1.89	159	100
		46.43		31.71		33.33		41.41
Public transportation facilities are increasingly complete	94	56.29	69	41.32	4	2.40	169	100
		37.30		56.10		44.44		43.49
Other benefits	5	55.56	2	22.22	2	22.22	9	100
		1.98		1.63		22.22		2.34
Didn't feel there was any immediate benefit	12	60.00	8	40.00	0	0.00	20	100
		4.76		6.50		0.00		5.21
No answer	24	82.76	5	17.24	0	0.00	29	100
		9.52		4.07		0.00		7.55
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.52. Community Concerns about MRT-EWLP1S1 Construction

Worried about being affected by MRT-EWLP1S1	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
No	195	66.10	93	31.53	7	2.37	295	100
		77.38		75.61		77.78		76.82
Yes	57	64.04	30	33.71	2	2.25	89	100
		22.62		24.39		22.22		23.18
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Respondents also expressed their perceptions of the negative impacts that might arise from the construction of the MRT-EWLP1S1. Based on the results of interviews with 384 affected families at the activity location, it was found that 33.33% of respondents stated that there were no negative impacts due to the construction of the MRT-EWLP1S1. However, 30.21% and 13.54% of respondents stated that the construction of the MRT-EWLP1S1 had an impact on increasing noise and air pollution, respectively (**Table 3.53**).

Table 3.53. Community Perception of the Negative Impact of MRT-EWLP1S1 Development

Negative impact Development MRT-EWLP1S1	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Surface water pollution	15	83.33	2	11,11	1	5.56	18	100
		5.95		1.63		11,11		4.69
Groundwater pollution	11	61.11	6	33.33	1	5.56	18	100
		4.37		4.88		11,11		4.69
Air pollution	40	76.92	12	23.08	0	0.00	52	100

Negative impact Development MRT-EWLP1S1	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
		15.87		9.76		0.00		13.54
Increased disease vectors	0	0.00	0	0.00	0	0.00	0	0.00
		0.00		0.00		0.00		0.00
Social conflict/dispute in society	19	65.52	9	31.03	1	3.45	29	100
		7.54		7.32		11,11		7.55
Increased noise	68	58.62	46	39.66	2	1.72	116	100
		26.98		37.40		22.22		30.21
There isn't any	87	67.97	38	29.69	3	2.34	128	100
		34.52		30.89		33.33		33.33
Other	12	52.17	10	43.48	1	4.35	23	100
		4.76		8.13		11,11		5.99
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

3. Community Perceptions of Land Acquisition for MRT-EWLP1S1

Based on the results of interviews with 384 affected families at the activity location, it was discovered that 145 respondents (37.76%) were owners of land, houses and/or business premises affected by land acquisition for the construction of the MRT-EWLP1S1, 61 respondents (15.89%) not the owner, and the remaining 178 respondents (46.35%) did not know/did not answer (Table 3.54). The large number of respondents who did not know/did not answer shows that there are still residents who own land, houses and/or business premises affected by land acquisition for the construction of the MRT-EWLP1S1 who have not received information regarding the land acquisition plan.

Table 3.54. Land/House/Business Ownership Affected by Land Acquisition

Land/House/Business Ownership Affected by Land Acquisition	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
No	195	66.10	93	31.53	7	2.37	295	100
		77.38		75.61		77.78		76.82
Yes	57	64.04	30	33.71	2	2.25	89	100
		22.62		24.39		22.22		23.18
Don't know/ No answer	57	64.04	30	33.71	2	2.25	89	100
		22.62		24.39		22.22		23.18
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Furthermore, 85 respondents (58.62%) out of 145 respondents who owned land, houses and/or business premises affected by land acquisition for the construction of the MRT-EWLP1S1 expressed concerns regarding the land acquisition process. Meanwhile, the remaining 60 respondents (41.48%) stated the opposite.

Table 3.55. Concerns about the Land Acquisition Process

Concerns about the Land Acquisition Process	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
No	35	58.33	23	38.33	2	3.33	60	100
		33.98		63.89		33.33		41.38
Yes	68	80.00	13	15.29	4	4.71	85	100
		66.02		36.11		66.67		58.62
Total	**103**	**26.82**	**36**	**9.38**	**6**	**1.56**	**145**	**100**
		40.87		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

4. Community Expectations for the Development of MRT-EWLP1S1

In general, the community's hopes for the construction of the MRT-EWLP1S1 include hopes of getting job opportunities, business opportunities and hopes of resolving problems (conflicts between the community and the company/project). Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (63.02%) hope to get job opportunities at MRT-EWLP1S1 (**Table 3.56**.), but the majority of respondents (46.36%) do not know/did not answer the type of job expected (Table 3.57.). This condition is likely related to the public's knowledge, especially affected residents, of the MRT-EWLP1S1 development plan, the majority of whom (53.39%) still do not know and have not provided an answer.

Table 3.56. Hope to Get Job Opportunities

Hope to Get Job Opportunities	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
No	64	45.07	75	52.82	3	2.11	142	100
		25.40		60.98		33.33		36.98
Yes	188	77.69	48	19.83	6	2.48	242	100
		74.60		39.02		66.67		63.02
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Table 3.57. Expected Type of Work

Type of work which are expected	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Daily workers/laborers	83	80.58	19	18.45	1	0.97	103	100
		32.94		15.45		11,11		26.82
Security Guard/Security	31	67.39	13	28.26	2	4.35	46	100
		12.30		10.57		22.22		11.98
Administrative Employees	44	77.19	10	17.54	3	5.26	57	100
		17.46		8.13		33.33		14.84
	94	52.81	81	45.51	3	1.69	178	100

Type of work which are expected	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Don't know/ No answer		37.30		65.85		33.33		46.35
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Apart from job opportunities, affected residents also hope to get business opportunities, both at the construction and operational stages of MRT-EWLP1S1 as suppliers of goods and materials needed for the project (14.42% of respondents), canteens/restaurants/tenants (16.67% of respondents) and trading business (28.13% of respondents).

Table 3.58. Expected Types of Business Opportunities

Hope Business opportunities	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Supplier of goods and materials needed for the project	27	49.09	26	47.27	2	3.64	55	100
		10.71		21.14		22.22		14.32
Canteen/restaurant/tenant	50	78.13	13	20.31	1	1.56	64	100
		19.84		10.57		11,11		16.67
Other trading businesses	88	81.48	19	17.59	1	0.93	108	100
		34.92		15.45		11,11		28.13
Don't know/ No answer	87	55.41	65	41.40	5	3.18	157	100
		34.52		52.85		55.56		40.89
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

Furthermore, affected residents expressed their hopes regarding steps to resolve the problem (conflict between the community and the company/project) through deliberations with village, RW (Rukun Warga“neighborhood Association”)

and RT (Rukun Tetangga“citizens Association”) officials to be conveyed to the company/project (64.32%).

Table 3.59. Expectations Regarding Problem Solving Steps
(conflict between the community and the company/project)

Completion Steps Expected Problems	Segment *Elevated*		Segment *Underground*		Segment Depot		Total	
	n	%	n	%	n	%	n	%
Personally, each of them resolves it with the company/project	17	70.83	6	25.00	1	4.17	24	100
		6.75		4.88		11,11		6.25
Conduct deliberations with village officials, RW, RT to convey this to the company/project	179	72.47	63	25.51	5	2.02	247	100
		71.03		51.22		55.56		64.32
	6	40.00	8	53.33	1	6.67	15	100

Completion Steps Expected Problems	Segment *Elevated*		Segment *Underground*		Segment Depot		Total	
	n	%	n	%	n	%	n	%
Convey problems to the company/project represented by the Traditional Leader/community figure		2.38		6.50		11,11		3.91
The community directly conveys it in writing to the company/project	5	55.56	4	44.44	0	0.00	9	100
		1.98		3.25		0.00		2.34
Carrying out demonstrations by mobilizing the masses	1	33.33	2	66.67	0	0.00	3	100
		0.40		1.63		0.00		0.78
Don't Know/Didn't Answer	44	51.16	40	46.51	2	2.33	86	100
		17.46		32.52		22.22		22.40
Total	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Source : Questionnaire 2022 & 2023

3.4. Public health

3.4.1. Health Facilities and Personnel

The number of health facilities and health personnel in the 13 sub-districts in the study area is presented in **Table 3.60**. and **Table 3.61**. Based on these data, it can be seen that the availability of health facilities in the 13 sub-districts in the study area is 0.24/1,000 population or 1 health facility serves 4,207 residents. The highest level of availability of health facilities is in Gambir District (Central Jakarta) at 0.74/1,000 population or 1: 1,346, and the lowest is in Cakung District (East Jakarta) at 0.08/1,000 population or 1: 12,280.

Table 3.60. Health Facilities in the Study Area

City	Subdistrict	Hospital	Maternity Hospital/ Maternity Hospital	Public health center	Polyclinic/Clinic/ Medical Hall
West Jakarta	Grogol Petamburan	4	1	10	52
Central Jakarta	Gambier	3		6	63
	Tanah Abang	4		6	69
	Menteng	8	2	3	42
	Monday	7		6	22
	New Johar	1		6	14
	Kemayoran	3		7	44
	Cempaka Putih	5	1	4	29
North Jakarta	Kelapa Gading	2		5	86
	Cilincing	4		10	24
East Jakarta	Gadung Island	9	1	9	36
	Cakung	1	1	9	36
Bekasi city	Medan Satria	4		4	19
	Amount	**55**	**6**	**85**	**536**

Source: Central Statistics Agency 2021

Meanwhile, the availability of health workers in the 13 sub-districts in the study area is 5.98/1,000 residents or 1 health worker serves 167 residents. The highest level of availability of health workers is in Senen District (Central Jakarta) at 45.85/1,000 population or 1 : 22, and the lowest is in Medan Satria District (Bekasi City) at 0.27/1,000 population or 1 : 3,737.

Table 3.61. Health Workers in the Study Area

City	Subdistrict	Doctor	Nurse	Midwife	Pharmacy	Nutritionists
West Jakarta	Grogol Petamburan	42	35	40	4	9
Central Jakarta	Gambier	444	1274	199	124	22
	Tanah Abang	468	485	96	107	29
	Menteng	514	693	116	148	24
	Monday	1498	3639	224	445	123
	New Johar	76	45	42	15	8
	Kemayoran	493	476	218	111	22
	Cempaka Putih	502	679	107	122	33
North Jakarta	Kelapa Gading	424	332	64	210	32
	Cilincing	324	354	203	94	19
East Jakarta	Gadung Island	296	206	110	48	14
	Cakung	185	272	97	65	12
Bekasi city	Medan Satria	17	8	15		2
	Amount	**5283**	**8498**	**1531**	**1493**	**349**

Source: Central Statistics Agency 2021

3.4.2. Disease Prevalence

Disease prevalence is the number of cases of disease in a population at a certain time. In this study, the prevalence of disease observed was environmentally based disease. According to Purnama (2016), types of environmental-based diseases (PBL) can be grouped into 3 groups, namely:

1) PBL caused by viruses such as: ARI (upper respiratory tract infection), pulmonary TB (Tuberculosis), Diarrhea, Polio, Measles and Wormworms;
2) PBL caused by animals such as: Bird flu, Plague, Anthrax;
3) PBL is caused by mosquito vectors such as: DHF (Dengue Hemorrhagic Fever), Malaria and Chikungunya.

Based on the 2020 DKI Jakarta Health Profile and the 2020 Bekasi City Health Profile, below is presented data on the prevalence of environmental-based diseases in the DKI Jakarta area (**Figure 3.27**.) and in the Bekasi City area (**Figure 3.28**.).

3.5. Cultural heritage

The existence of cultural heritage buildings has been regulated in Law No. 11 of 2010 concerning Cultural Heritage and selected objects as cultural heritage in the form of building structures and monuments have been determined by DKI Jakarta Governor Decree No. 475 of 1993 and confirmed in the planning plan space based on DKI Jakarta Governor Regulation No.31 of 2022 in Appendix XIV concerning Detailed Plans for DKI Jakarta Regional Spatial Planning

Further verification based on these regulations, has identified 12 cultural heritage locations less than 500m from the project location for the East - West MRT Line MRT ROW from the Tomang - Medan Satria line. The closest object as a cultural heritage building has been revealed, namely the Indonesian Christian Church building which is located in Senen Village, Kwitang District, Central Jakarta at a distance of 2.74 meters from the boundary of the East-West Tomang - Medan Satria MRT line, to be precise around ± 26.5 m from construction structure plan for underground Kwitang Station. A clear picture of the cultural heritage building with the MRT East-West Line ROW is shown in **Figure 3.29**.

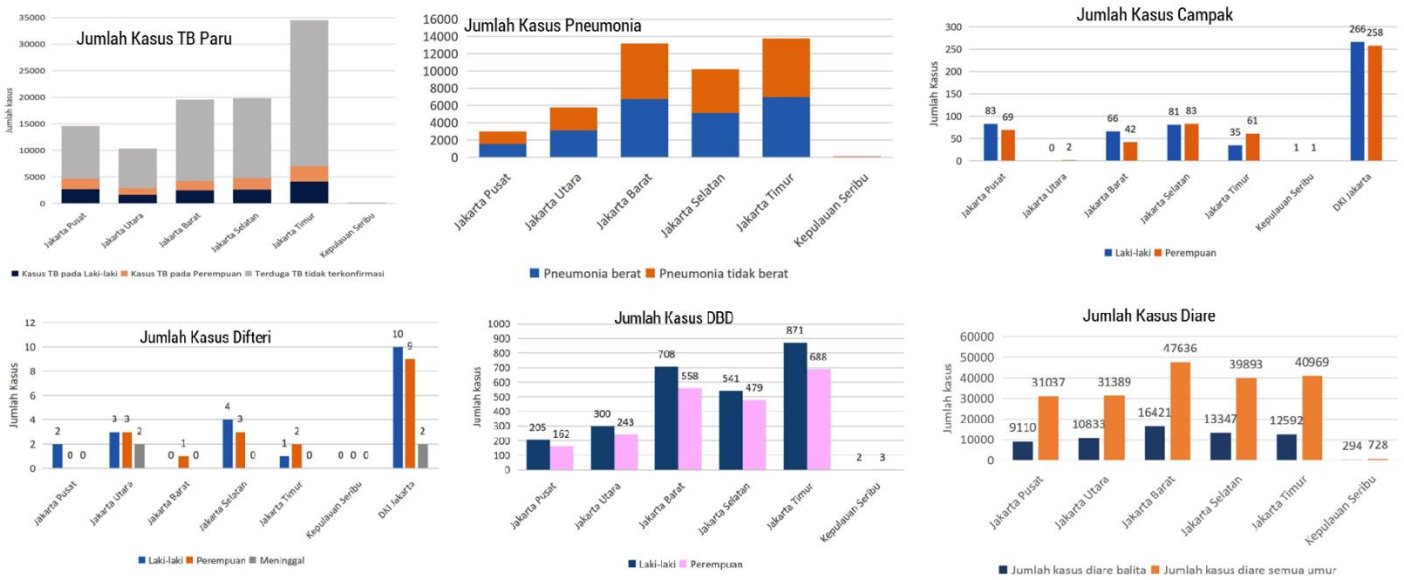


Figure 3.27. Prevalence of Environmental Based Diseases in the DKI Jakarta Area
Source: DKI Jakarta Health Profile in 2020

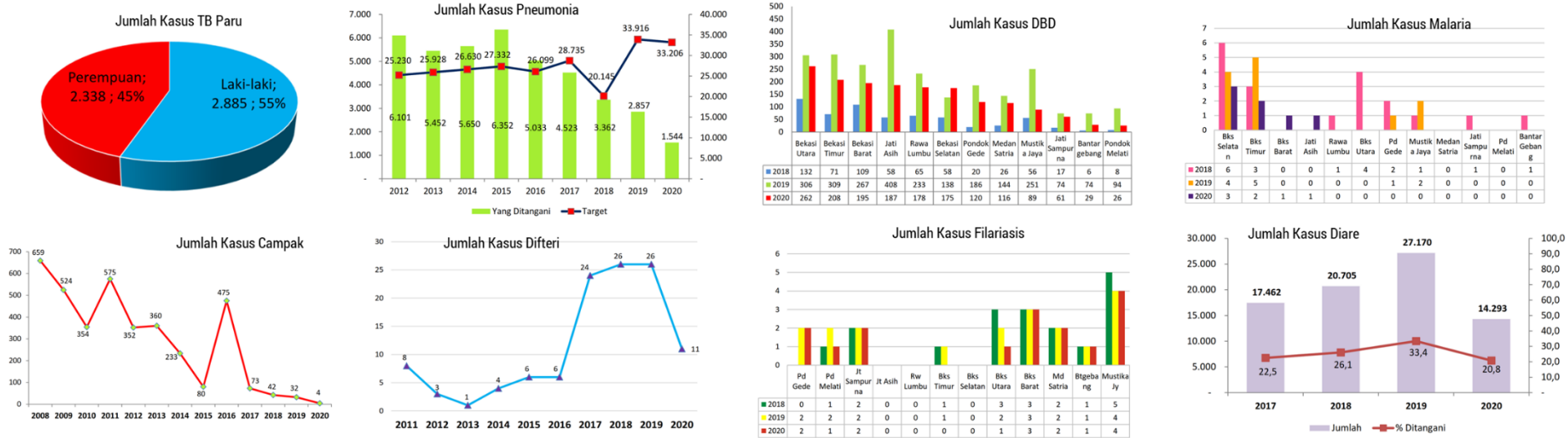
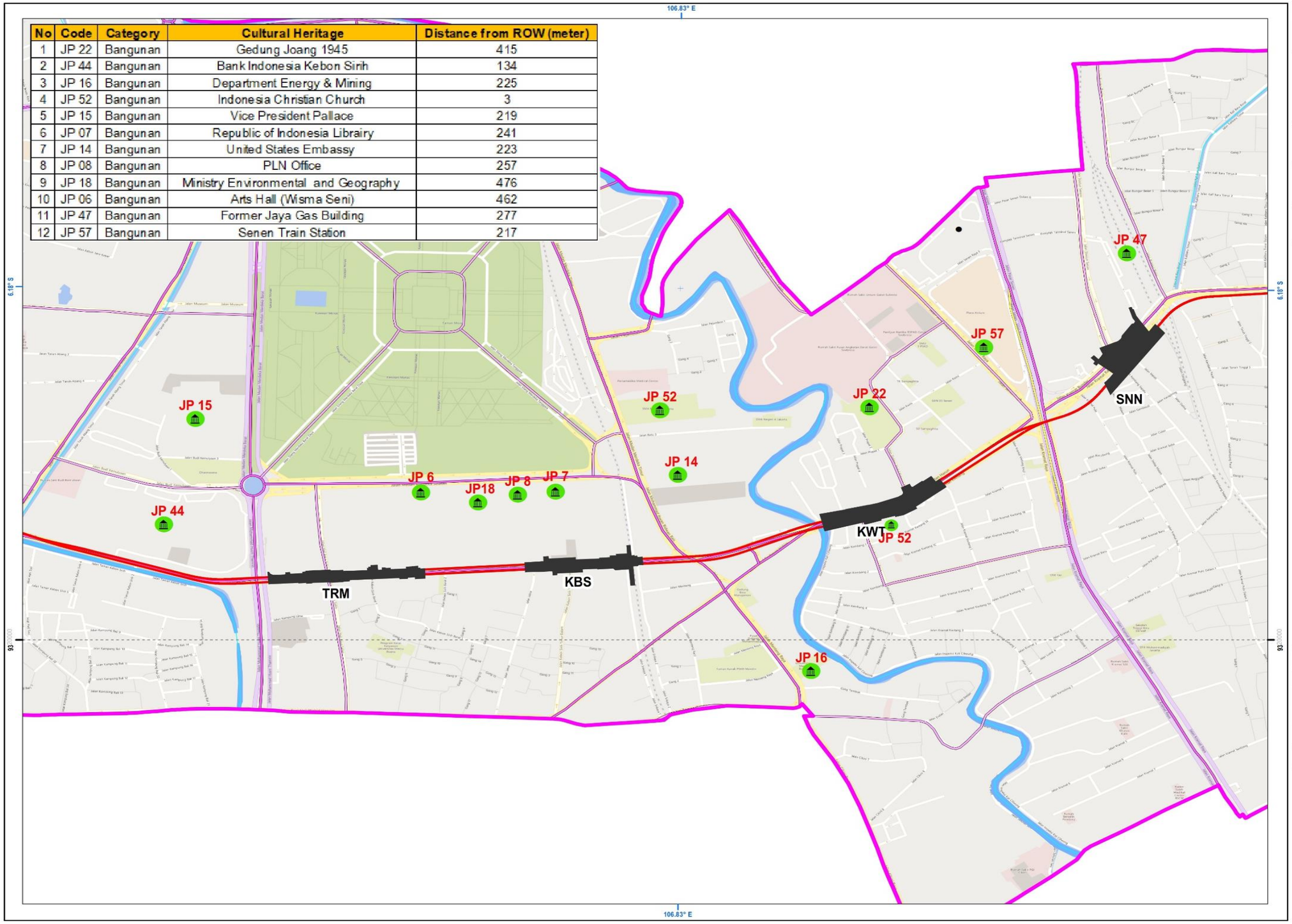


Figure 3.28. Prevalence of Environmentally Based Diseases in the Bekasi City Area
Source: Bekasi City Health Profile in 2020

No	Code	Category	Cultural Heritage	Distance from ROW (meter)
1	JP 22	Bangunan	Gedung Joang 1945	415
2	JP 44	Bangunan	Bank Indonesia Kebon Sirih	134
3	JP 16	Bangunan	Department Energy & Mining	225
4	JP 52	Bangunan	Indonesia Christian Church	3
5	JP 15	Bangunan	Vice President Pallace	219
6	JP 07	Bangunan	Republic of Indonesia Librairy	241
7	JP 14	Bangunan	United States Embassy	223
8	JP 08	Bangunan	PLN Office	257
9	JP 18	Bangunan	Ministry Environmental and Geography	476
10	JP 06	Bangunan	Arts Hall (Wisma Seni)	462
11	JP 47	Bangunan	Former Jaya Gas Building	277
12	JP 57	Bangunan	Senen Train Station	217



CULTURAL HERITAGE DISTRIBUTION MAP

AMDAL
Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Scale : 1:10,000
0 0.25 0.5 Km

Projection System	: Universal Transverse Mercator
Grid System	: UTM Zone 48 S & Geography
Datum	: WGS-1984

Legenda
- District
- Province Boundary
- Subdistric / City Boundary
- River

Road
- Arterial Road
- Collector Road
- Highway

- Line MRT
- Station

Station Code:
- SNN : Senen
- KWT : Kwitang
- KBS : Kebon Sirih
- TRM : Thamrin
- Study Boundary

Cultural Heritage:
- Building

Sources :
- Indonesia Earth Map Scale 1 : 25000
- Administration map DKI Jakarta Scale 1 : 25000
- Administration map Bekasi Regency Scale 1 : 25000
- Administration map Bekasi City Scale 1 : 25000
- MRT East - West Line Plan
- Ministry of education and culture Republic Indonesia
- Governor DKI Jakarta Decree No. 475 , 1993

INSERT

Figure 3.29. Map of Cultural Heritage and Monuments around the MRT EW Phase 1 Phase 1 Line
Source:https://data.jakarta.go.id/dataset/data-location-patung-dan-monumenAndhttps://jakarta.bisnis.com/read/20220108/77/1486707/pemprov-dki-tetapkan-14-produk-cagar-kultur-ini-besarnya

Isi

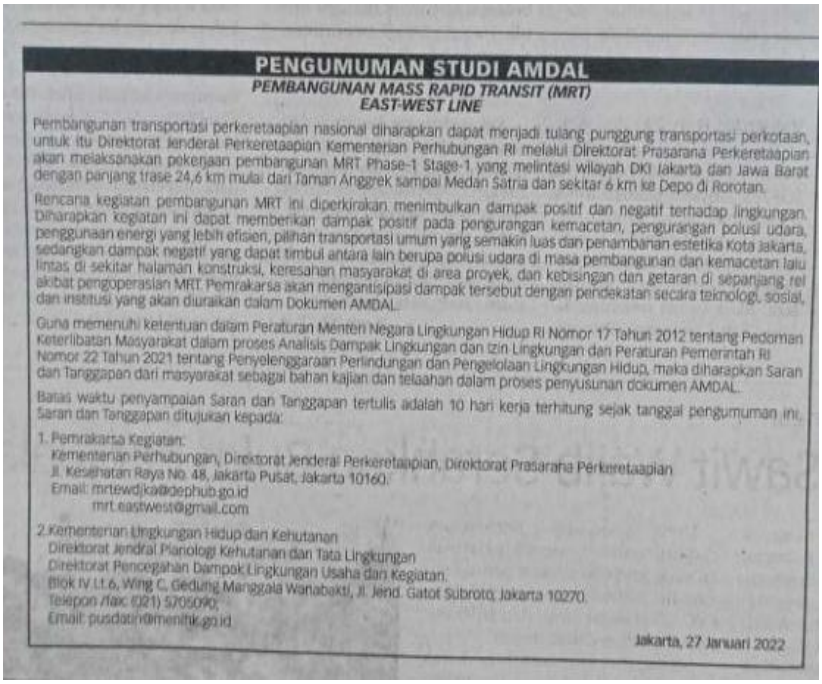
Chapter 4

Results and Evaluation Community Involvement

4.1. Outline of Public Consultation Meeting Program for AMDAL Study Requirements

Community involvement in the preparation of the Mass Rapid Transit East-West Line Phase 1 Stage 1 (MRT-EWLP1S1) AMDAL took the form of:

a. The first Public consultation Meeting (PCM1) was held on 3 – 4 February 2022 at Santika Mega City Hotel. Socialization is carried out through announcements of Amdal studies in print media.
   - Jakarta newspaper published on January 25 2022 and January 27 2022
   - Koran Sindo published on January 26 2022 and January 27 2022



PENGUMUMAN STUDI AMDAL
PEMBANGUNAN MASS RAPID TRANSIT (MRT) EAST-WEST LINE

Pembangunan transportasi perkeretaapian nasional diharapkan dapat menjadi tulang punggung transportasi perkotaan, untuk itu Direktorat Jenderal Perkeretaapian Kementerian Perhubungan RI melalui Direktorat Prasarana Perkeretaapian akan melaksanakan pekerjaan pembangunan MRT Phase-1 Stage-1 yang melintasi wilayah DKI Jakarta dan Jawa Barat dengan panjang trase 24,6 km mulai dari Taman Anggrek sampai Medan Satria dan sekitar 6 km ke Depo di Rorotan.

Rencana kegiatan pembangunan MRT ini diperkirakan menimbulkan dampak positif dan negatif terhadap lingkungan. Diharapkan kegiatan ini dapat memberikan dampak positif pada pengurangan kemacetan, pengurangan polusi udara, penggunaan energi yang lebih efisien, pilihan transportasi umum yang semakin luas dan penambahan estetika Kota Jakarta, sedangkan dampak negatif yang dapat timbul antara lain berupa polusi udara di masa pembangunan dan kemacetan lalu lintas di sekitar halaman konstruksi, keresahan masyarakat di area proyek, dan kebisingan dan getaran di sepanjang rel akibat pengoperasian MRT. Pemrakarsa akan mengantisipasi dampak tersebut dengan pendekatan secara teknologi, sosial, dan institusi yang akan diuraikan dalam Dokumen AMDAL.

Guna memenuhi ketentuan dalam Peraturan Menteri Negara Lingkungan Hidup RI Nomor 17 Tahun 2012 tentang Pedoman Keterlibatan Masyarakat dalam proses Analisis Dampak Lingkungan dan Izin Lingkungan dan Peraturan Pemerintah RI Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup, maka diharapkan Saran dan Tanggapan dari masyarakat sebagai bahan kajian dan telaahan dalam proses penyusunan dokumen AMDAL.

Batas waktu penyampaian Saran dan Tanggapan tertulis adalah 10 hari kerja terhitung sejak tanggal pengumuman ini. Saran dan Tanggapan ditujukan kepada:

1. Pemrakarsa Kegiatan:
   Kementerian Perhubungan, Direktorat Jenderal Perkeretaapian, Direktorat Prasarana Perkeretaapian
   Jl. Kesehatan Raya No. 48, Jakarta Pusat, Jakarta 10160.
   Email: mrtewdjka@dephub.go.id
   mrt.eastwest@gmail.com
2. Kementerian Lingkungan Hidup dan Kehutanan
   Direktorat Jendral Planologi Kehutanan dan Tata Lingkungan
   Direktorat Pencegahan Dampak Lingkungan Usaha dan Kegiatan.
   Blok IV Lt.6, Wing C, Gedung Manggala Wanabakti, Jl. Jend. Gatot Subroto, Jakarta 10270.
   Telepon /fax: (021) 5705090;
   Email: pusdatin@menlhk.go.id

Jakarta, 27 Januari 2022

Figure 4.1. *Newspaper "Jakarta Newspaper" January 27, 2022*

Socialization through the announcement of the Amdal study by installing banners announcing the Amdal study in 13 sub-district offices along the MRT-EWLP1S1 route. Likewise with the distribution of invitation letters for PCM 1 on January 31 2022 to 31

sub-districts, 13 sub-districts, 5 municipalities/mayors, 2 NGOs/NGOs, DLH DKI, DLH Bekasi City and KLHK (Ministry of Environment and Forestry) totaling 55 invitation letters.

AMDAL Presentation-HEC AMDAL leader team Andy Mizwar

Zoom meeting Public Consultation (hybrid)

Question and answer session

Hayuningrat Team

Participants from Women's NGO – KOWANI

PCM Minutes Signing

Figure 4.2. Situation of 1st Public Consultation Meeting

On the first day of PCM 1, participants came from the West Jakarta and Central Jakarta administrative areas with a total presence of 50 participant representatives. On the second day, participants came from the administrative areas of North Jakarta, East Jakarta, Bekasi City with a total presence of 46 participant representatives. The total attendance of participant representatives was 96 people. The percentage diagram of male and female attendance can be seen in Figure 4.3.

Table 4.1. Percentage of attendance of all PCM 1 participants

PresencePCM 1				
Date	3 February 2022	4 February 2022	Total	
Location	- West Jakarta - Central Jakarta	- North Jakarta - East Jakarta - Bekasi	():Female % of total participants	
Man	34	33	67	69.79%
Woman	16	13	29	30.21%
Total	50	46	96	100%

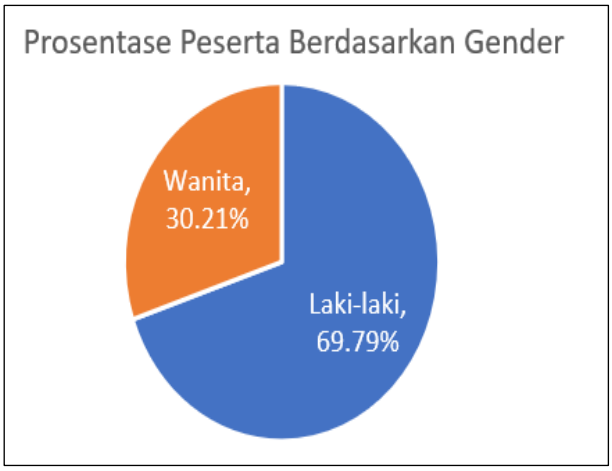


Figure 4.3. Percentage of male and female attendance at PCM 1

b. The 2nd public consultation was held on February 15, 2023 at Horison Ultima Bekasi. Where socialization is carried out through print media in the Rakyat Merdeka Newspaper which is published on February 10, 2023.

   Distribution of PCM2 invitation letters on January 31, 2023 was addressed to 104 City Governments, 1 Walhi, 1 Kowani, 482 Residents, including NGOs, vulnerable community groups, educational and/or medical institutions.

PENGUMUMAN STUDI AMDAL

PEMBANGUNAN MASS RAPID TRANSIT (MRT) EAST-WEST LINE

Pembangunan transportasi perkeretaapian nasional diharapkan dapat menjadi tulang punggung transportasi perkotaan, untuk itu Direktorat Jenderal Perkeretaapian Kementerian Perhubungan RI melalui Direktorat Prasarana Perkeretaapian akan melaksanakan pekerjaan pembangunan MRT Phase-1 Stage-1 yang melintasi wilayah DKI Jakarta dan Jawa Barat dengan panjang trase 24,527 km mulai dari Tomang sampai Medan Satria dan sekitar 5,90 km ke Depo di Rorotan.

Rencana kegiatan pembangunan MRT ini diperkirakan menimbulkan dampak positif dan negatif terhadap lingkungan. Diharapkan kegiatan ini dapat memberikan dampak positif pada pengurangan kemacetan, pengurangan polusi udara, penggunaan energi yang lebih efisien, pilihan transportasi umum yang semakin luas dan penambahan estetika Kota Jakarta, sedangkan dampak negatif yang dapat timbul antara lain berupa polusi udara di masa pembangunan dan kemacetan lalu lintas di sekitar halaman konstruksi, keresahan masyarakat di area proyek, dan kebisingan dan getaran di sepanjang rel akibat pengoperasian MRT. Pemrakarsa akan mengantisipasi dampak tersebut dengan pendekatan secara teknologi, sosial, dan institusi yang akan diuraikan dalam Dokumen AMDAL.

Guna memenuhi ketentuan dalam Peraturan Menteri Negara Lingkungan Hidup RI Nomor 17 Tahun 2012 tentang Pedoman Keterlibatan Masyarakat dalam proses Analisis Dampak Lingkungan dan Izin Lingkungan dan Peraturan Pemerintah RI Nomor 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup, maka diharapkan Saran dan Tanggapan dari masyarakat sebagai bahan kajian dan telaahan dalam proses penyusunan dokumen AMDAL.

Batas waktu penyampaian Saran dan Tanggapan tertulis adalah 10 hari kerja terhitung sejak tanggal pengumuman ini.

Saran dan Tanggapan ditujukan kepada:

Pemrakarsa Kegiatan:
Kementerian Perhubungan, Direktorat Jenderal Perkeretaapian,
Direktorat Prasarana Perkeretaapian
Jl. Kesehatan Raya No. 48, Jakarta Pusat, Jakarta 10160
Email: mrtewdjka@dephub.go.id
mrt.eastwest@gmail.com

Jakarta, 09 Februari 2023

Figure 4.4. Newspaper "Koran Rakyat Merdeka" January 09, 2023

Figure 4.5. Situation of 2nd Public Consultation Meeting

PCM 2 is divided into two sessions in one day. In the first session, participants came from the administrative areas of Bekasi, East Jakarta and North Jakarta with a total presence of 138 participant representatives. In the second session, participants came from the Central Jakarta and West Jakarta administrative areas, with a total attendance of 119 participant representatives. The total attendance of representative participants was 257 people. The percentage diagram of male and female attendance can be seen in **Figure 4.6.**

Table 4.2. Percentage of attendance of all PCM 2 participants

PresencePCM 2				
Session	1	2	Total	
Location	- North Jakarta - West Jakarta - Bekasi	- Central Jakarta - West Jakarta	():% of each gender to total participants	
Man	90	80	170	(66%)
Woman	48	39	87	(34%)
Total	138	119	257	100%

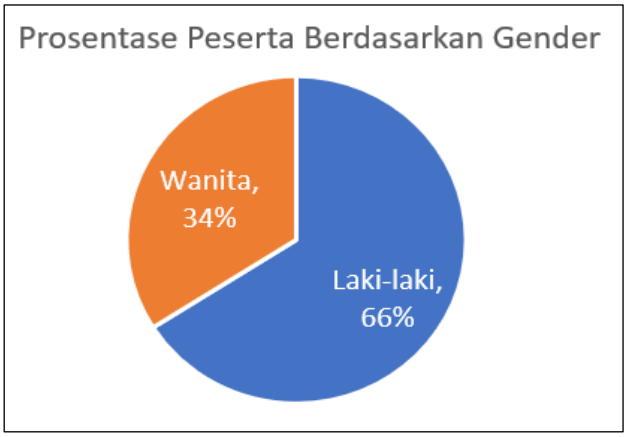
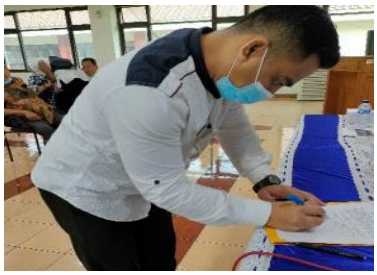


Figure 4.6. Percentage of male and female attendance at PCM 2

The complete formal evidence of the announcement and public consultation of the Amdal study is presented in Appendix J.

c. Apart from that, a series of public consultations were also carried out in all sub-districts of the affected communities in the framework of the LARAP study as a Focus Group Discussion (FGD) on 4 June 2022 – 4 October 2022 which was held at the sub-district office. Apart from socializing the MRT East-West Line Phase 1 Stage 1 development activity plan in relation to the land acquisition plan, we also informed about the AMDAL study activities that were being carried out.


LARAP FGD public consultation activities in Kelapa Gading District

LARAP FGD public consultation activities in Cakung District


LARAP FGD public consultation activities in Senen District


LARAP FGD public consultation activities in Medan Satria District

Figure 4.7. A series of several public consultation focus group discussions (FGD) in all sub-districts affected by the MRT East-West Line Phase 1 Stage 1

4.2. Community Response

4.2.1. Question and answer session

The results of community involvement in the public consultation held on 3 - 4 February 2022 at the Mega City Hotel Bekasi, West Java, which was carried out with a question and answer session, appointed community representatives who would sit as members of the AMDAL document assessors and provided suggestions for responses and public opinions on during the question and answer session as in the table below:

Table 4.3. Questions and Answers at the First Public Consultation Meeting – PCM 1 (February 2022)

No	Name	Address	Question	Answer
Thursday, February 3 2022				
1	Man	District Monday	The construction phase is being reconsidered because the area being traversed is a densely populated area. The concern is that underground construction will impact the quantity of groundwater in the community. Both in the construction and operational stages to involve the local community.	This matter will receive attention from the activity initiator, and will be included in the study in the Amdal.
2	Man	Duri Pulo	How many meters of KH Hasyim Asyhari road are affected for MRT activities. So that the compensation process can benefit the community.	The LARAP team will go out into the field and hold several meetings with the community and will carefully calculate based on the details of the MRT-EWLP1S1 Map.
3	Man	Stone Well	Approximately 12 families were affected. However, there is a river bank, namely the edge of a wood forest river. So that activities do not cause flooding.	This impact will be minimized, including flooding.
4	Man	Chairman of RW 10 Kodam Jaya Central Jakarta	So that construction activities do not disturb the comfort of local residents. So that public complaints during construction can be accommodated and followed up so that they do not receive rejection from the community	It is planned to establish a communication forum from the MRT-EWLP1S1 initiator to accommodate complaints and suggestions from the public, so that a direct path can be sought to resolve these complaints.

No	Name	Address	Question	Answer
Thursday, February 3 2022				
5	Man	Bungur Village RW 9	So that the initiator always involves the community, sub-district officials, sub-districts and local community leaders.	The Amdal and LARAP teams will involve the community. For example, after this public consultation there are still other meetings with the community.
6	Man	Kemayoran District	So that the initiator always involves the community, sub-district officials, sub-districts and local community leaders. Why is there an elevated activity route in the Kemayoran area? Looking at the Kemayoran area, there is a fairly dense level of congestion.	The ANDALALIN team will analyze the area and the results will be included in the future construction of the MRT-EWLP1S1.
7	Woman	Medan Satria. Bekasi	In Harapan Mulya Subdistrict there is a land dispute where until now PT KAI has asked to resolve the problem	As an input for the LARAP Team, AMDAL is also working on this. However, it will be reviewed whether this area is on the MRT-EWLP1S1 route or not (Harapan Mulya Bekasi)
8	Man	Duri Pulo, Gambir District	What impact will the construction of the MRT have on our area? So that the initiator clarifies the area of activity, especially in our area	The Duri Pulo area, Gambir District, will pass through the MRT-EWLP1S1 route, and will be affected by the construction of the MRT-EWLP1S1. However, the size of the impact will be analyzed in the Amdal Document, for example the socio-economic, cultural, public health and other impacts.
9	Man	Tomang Village, Grogol Petamburan	The impact of activities is definitely traffic jams, dust and noise. Construction of the MRT so that it can carry out outreach using online platforms so that information related to activities can be more easily obtained by the general public.	Good suggestions that will also be considered include establishing an online community forum/communication center so that the public can easily get information regarding MRT-EWLP1S1, including overcoming the impacts of activities.

No	Name	Address	Question	Answer
Thursday, February 3 2022				
10	Man	Indonesian Women's Congress	Ready to work with initiators, consultants and project contractors in socialization efforts both using social media and other forums in various media. Founded in 1928 with members including 98 Indonesian women's organizations and women's organizations registered with the United Nations Requesting more attention to public facilities that cover toilet needs for the elderly (there are handles). The number of women's toilets is greater than men's toilets, because women go to the toilet more often and bring children. It is hoped that the MRT will also be disabled-friendly, with special carriages available for them and women.	This will be a priority and efforts will be made to make MRT-EWLP1S1 Disability Friendly, parents/seniors, vulnerable women: pregnant, breastfeeding or carrying children. Including facilities such as increasing the number of women's toilets, which have handles for seniors, etc.

No	Name	Address	Question	Answer
Friday 4 February 2022				
1	Man	LMK Cakung District, East Jakarta	We ask that from the construction stage to the operational stage to employ local residents. Before the construction stage, the initiator should document the houses of residents adjacent to the activity location, so that when vibrations occur during the construction stage which result in damage to residents' houses, they can be identified and if damage to residents' houses is caused by MRT construction, the initiator can repair residents' houses.	It is hoped that this will be the attention of the initiator when building the MRT. - The Amdal Team, in coordination with the LARAP Team, will inventory residents' houses and more intensively hold meetings with residents to accommodate complaints. - and contractors (MRT construction) are strongly expected to refer to the Amdal documents related to the impact of vibrations and other suggestions in these documents.
2	Woman	Cilincing	So that the initiator explains in more detail regarding the activities carried out at the depot location.	Regarding MRT train maintenance, including train cleaning and others.
3	Man	LMK Pulo Gadung	Our experience with the LRT project can narrow our drainage channels. So we ask that the initiator pay attention to the impact of narrowing the channel because it can cause flooding.	Yes, we will pay attention to this

No	Name	Address	Question	Answer
Friday 4 February 2022				
4	Man	Menteng Village	Even though we already have Andalalin, there are still traffic jams during the construction phase. We hope that the initiator will pay more attention to the impact of congestion. Most of our people still use groundwater. We hope that construction activities will not disrupt residents' clean water supply.	- We will pay attention to excellent input and traffic engineering also needs evaluation. - We will pay attention and include it in the AMDAL document, including a groundwater study as a reference when building the MRT later
5	Man	Medan Satria	To better explain the position of activity locations in our area.	1 StationMRT-EWLP1S1from Ujung Menteng
6	Man	Kel Pulo Gadung	So that the initiator explains in more detail step by step the work to be carried out. In order to explain in more detail the location of the station in the Pulo Gadung area. So that construction activities do not disturb the comfort of the community	A development forum/communication center is neededMRT-EWLP1S1to express opinions and seek information, including employment information, location details, impact on society etc.
7	Man	Kelapa Gading District	We hope there will be more intense public consultation in our sub-district. We hope that there will be a post-construction program such as improving facilities and infrastructure. We generally support the activity plan.	There will be further meetings by the community social environmental impact assessment team. And the Larap Team is holding meetings even more intensively at sub-districts and sub-districts. Efforts will be made after operational developmentMRT-EWLP1S1improvement of existing facilities and infrastructure.

No	Name	Address	Question	Answer
Friday 4 February 2022				
8	Woman	East Jakarta Mayor's Office	Can social and economic surveys involve dasa homesteads? How is traffic engineering related to this activity considering that at the same time there is an LRT project? There are still social facilities and public facilities that have not been repaired, so that the initiator can pay attention to avoid traffic accidents	- Yes. The socio-economic survey will involve dasa homesteads. - Become input for the ANDALIN Team. - Become material for evaluation and attention of the initiator regarding improvements to public facilities and social facilities after developmentMRT-EWLP1S1
9	Woman	DLH Bekasi City	So that Andalalin and AMDAL can assess the impact of traffic considering that there are many national strategic projects taking place in Bekasi. So that the initiator coordinates with the surrounding area so that activities do not encounter obstacles.	The proposal is good and will serve as input and evaluation for the initiator.

4.2.2. Questionnaire Results

In public consultation activities, public responses, perceptions and suggestions from participants were also explored through the distribution of questionnaires. The results of data processing from public consultation participant questionnaires can be seen in the image below:

1. Do you know about the plans to build the MRT EW Line?

Based on the results of surveys and interviews, 72.22% of respondents in PCM 1 and 47% in PCM 2 knew about the planned activities. For more details, it can be presented in Figure 4.8 and Figure 4.9.

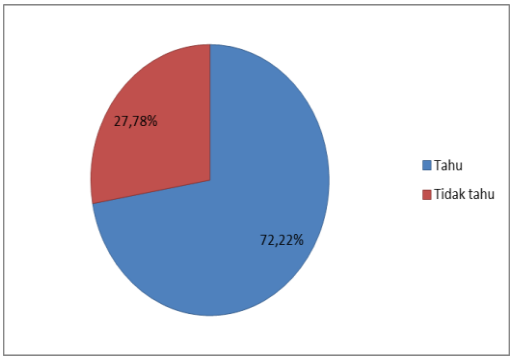


Figure 4.9. Respondents' Knowledge of PCM Development Plans 1

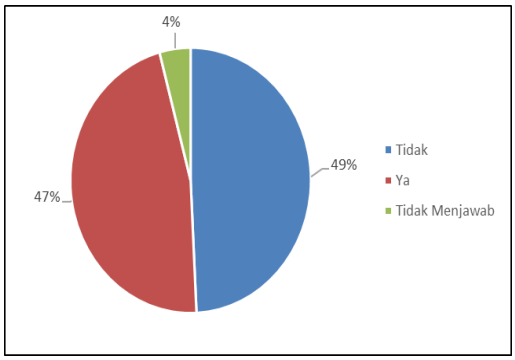


Figure 4.8. Respondents' knowledge of PCM 2 development plans

The high percentage of respondents and the public who knew about the activity plan was because respondents had previously received an initial coordination letter and invitation regarding public consultation on the activity plan. Where the source of information for the public who know about activities mostly comes from the project party.

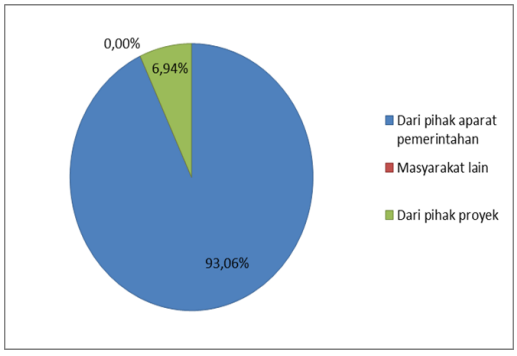


Figure 4.11. Respondents' Sources of Information about PCM Development Plans 1

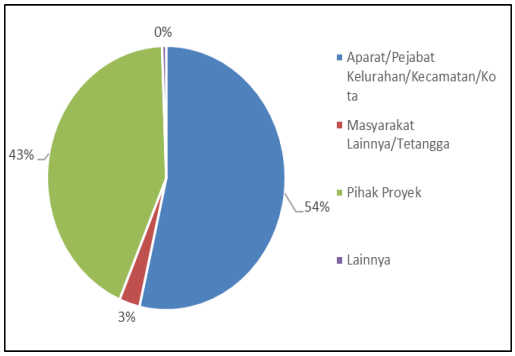


Figure 4.10. Respondents' Source of Information about the PCM 2 Development Plan

2. Do you agree with the development plan?

The activity plan received a positive response from the community. The community's support is quite large as evidence of participation in development and the community hopes that development will open up new jobs and business opportunities and will have a positive impact on development and the economy in the respondent area in general.

The positive response as mentioned above is shown through indicators of public perception of the activity plan, namely by agreeing or disagreeing. To find out more clearly about the attitudes of the surrounding community regarding the development plan, it is presented in Figure 4.12 and Figure 4.13 below.

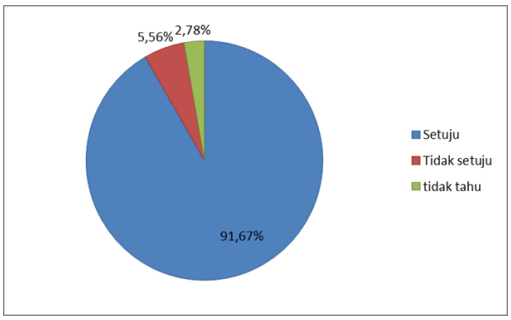


Figure 4.13. Respondents' Perceptions of PCM Development Plans 1

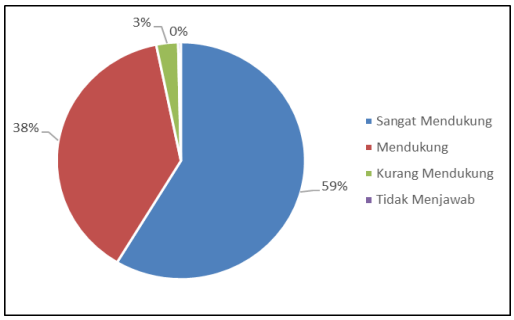


Figure 4.12. Respondents' Perceptions of PCM 2 Development Plans

Based on the picture above, 91.67% of respondents stated that they agreed with the development plan. Meanwhile, for PCM 2, fewer people (59% of respondents) supported the development plan compared to PCM 1. The high level of community support for the development plan was due to the strong and high hopes and desires of the community that this development would open up job opportunities.

3. What benefits (choose the most important one) will you and the community feel from the development plan?

In general, respondents around the development plan project site stated that the benefits that would be felt by the development plan could reduce traffic jams (43.06% in PCM 1 and 41% in PCM 2) and the community's hope that MRT activities could complement public transportation facilities (56.94% on PCM 1 and 44% on PCM 2). More details of the questionnaire results are presented inpicture below

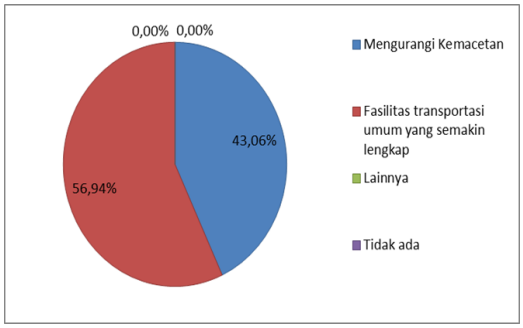


Figure 4.15. Percentage of Respondents regarding the Benefits They Will Experience According to PCM Respondents 1

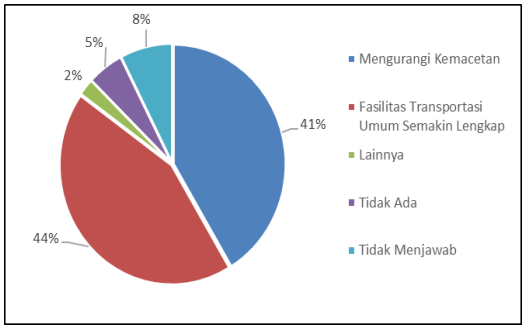


Figure 4.14. Percentage of the number of respondents regarding the benefits that will be felt according to PCM 2 respondents

4. **In your opinion, what negative impacts (choose the most important one) will arise?**

It is predicted that the existence of development activities, both directly and indirectly, will have a negative impact. Based on the results of a questionnaire with the surrounding community regarding the negative impacts of the construction phase, the majority of respondents (36.11% in PCM 1 and 33% in PCM 2)) gave the answer that development This will cause surface water pollution, while some respondents (25% in PCA 1 and 30% in PCM 2) stated that the planned activities could increase noise, while the rest stated that the planned activities would cause social conflict (13.89% in PCM 1 and 8 % on PCM 2), and groundwater pollution (16.67% on PCM 1 and 5% on PCM 2). For more details, the community's views and attitudes towards the negative impacts of activities are presented in the picture below.

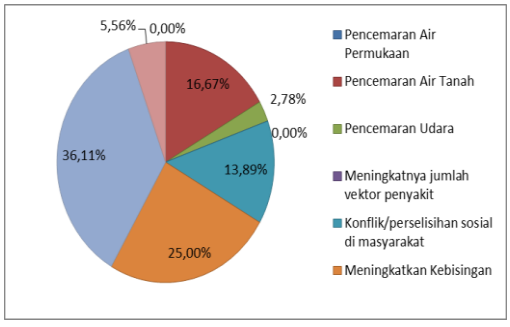


Figure 4.17. Negative Impact of the Construction Phase According to PCM Respondents 1

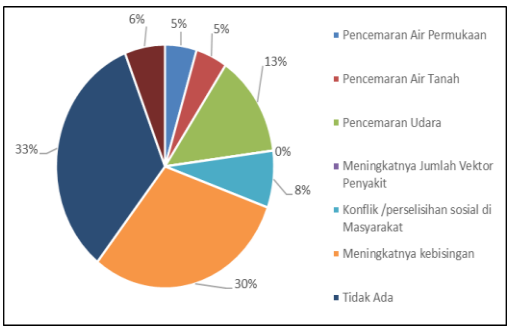


Figure 4.16. Negative Impact of the Construction Phase According to PCM 2 Respondents

5. Respondents' answers regarding other questions presented on the questionnaire sheet can be seen in the table below:

Table 4.4. Answer sheet on Questionnaire at PCM1

No	Information	Percentage
1	Has there ever been a dispute (social conflict) here between the local community and the activities of a project/industry/company?	
	Once	13.89%
	Never	77.78%
	Don't know	8.33%
2	If so, a dispute (social conflict) occurred in the case of:	
	Employment Opportunity	0.00%
	Clean Water Source	1.39%
	Land acquisition	4.17%
	Traffic Disruption	0.00%
	Water/Air/Soil Pollution	1.39%
	Other	6.94%
3	If the community has a dispute with the company/project, what steps do you recommend taking?	
	Personally, each of them resolves it with the company/project	0.00%
	Conduct deliberations with village officials, RW, RT to convey to the project leadership	13.89%
	Conveying problems is represented by the Traditional Leader/community figure	0.00%
	The community directly submitted written submissions to the project leader	0.00%
	Carrying out demonstrations by mobilizing the masses	0.00%
4	What job opportunities are desired on this project?	
	Daily worker	27.78%
	Security Guard/Security	20.83%
	Administrative employees	18.06%
	There isn't any	33.33%
5	What business opportunities do you want to realize during construction?	
	Supplier of goods and materials for project needs	27.78%
	Canteen/restaurant for workers	16.67%
	Trading businesses around the workers' barracks	22.22%
	There isn't any	33.33%
6	In your opinion, will economic conditions here improve with this development?	
	Yes	86.11%
	No	0.00%
	Don't know	13.89%
7	In your opinion, what compensation (reciprocal) (choose the most important) should be done to the surrounding community for this activity?	
	Improvement of village/sub-district facilities and infrastructure	12.50%

No	Information	Percentage
	Job and business opportunities	44.44%
	Construction of social and public facilities	29.17%
	Medical assistance to the community	0.00%
	Conduct training	0.00%
	Don't know	13.89%

Table 4.5. Answer sheet on Questionnaire at PCM2

No	Information	Percentage
1	Has there ever been a dispute (social conflict) between the local community and the activities of a project/industry/company?	
	Very	11.98 %
	Never	50.78 %
	Don't know	31.77 %
	No answer	05.47%
2	Related to the East-West Line Mass Rapid Transit (MRT) Project/Activity plan	
	NO	76.82 %
	Yes	23.18 %
3	If a community has a dispute with a company/project, what steps would you suggest?	
	Personally every time you finish with the company / project	06.25 %
	Conduct deliberations with village officials, RW, RT to submit to the project leader	64.32 %
	The presentation of the problem is represented by traditional leaders/community leaders	03.91 %
	The community immediately submitted a written request to the project leader	02.34 %
	Demonstration by mobilizing the masses	00.78 %
	No answer	05.47%
4	What job opportunities do you want in this project?	
	Daily laborer	26.82 %
	Security	11.98 %
	Administrative employee	14.84 %
	There isn't any	46.36 %
5	What business opportunities do you hope to realize during construction?	
	Supplier of goods and materials for project needs	14.32 %
	Canteen/restaurant for workers	16.67 %
	Trading businesses around the workers' barracks	28.13 %
	There isn't any	40.88 %
6	To land/house/business owners affected by land acquisition	
	NO	15.88 %
	Yes	37.76 %
	No answer	46.36 %

No	Information	Percentage
7	Concerns regarding Land Acquisition Projects/Activities using Mass Rapid Transit (MRT).	
	NO	41.38 %
	Yes	58.62 %

4.2.3. Suggestions and Feedback

Suggestions and responses from the public in filling out the questionnaire can be seen in Table 4.6. the following.

Table 4.6. Respondents' Suggestions and Responses (Questionnaire sheet)

No	Suggestions and Responses	Percentage	
		PCM 1	PCM 2
1.	**Community Socialization**improved, including: - Coordination with government officials - In the process of building and managing the MRT to provide a sense of security and comfort to residents - Minimize obstacles/conflicts, embrace/involve the surrounding community - Good communication channels with residents, such as: quick response to problems and input from residents, delivery of important information related to the MRT - The community participated as support for the construction of the MRT - There is a socio-economic study of society	27.78 %	13 %
2.	Construction of an environmentally friendly MRT, maintaining environmental cleanliness, paying attention to environmental/development impacts such as: Noise, vibration, groundwater availability, drainage disturbances, flood impacts, disturbances to river routes, decreased surface water quality, air pollution, etc.	22.22 %	3%
3.	With the construction of the MRT, it is hoped that the regional economy will improve by: - Opening employment opportunities for people around the route, - The community is involved in the construction and management of the MRT. - Recruitment of employees is requested from residents around the MRT construction project. - Each station is provided with commercial spots	12.04 %	6%

No	Suggestions and Responses	Percentage	
		PCM 1	PCM 2
4.	Traffic Engineering, ANDALALIN, an effort to reduce congestion during the development stage.	10.18%	11%
5.	Pay attention to improvements to public facilities and facilities before and after the impact of the MRT construction. Like: - PDAM/drinking water pipe network, - Electric network - Phone network - Wifi Network	9.26 %	2%
6.	**Suggestions** - It is hoped that there will be Wifi in the MRT, and - At the management stage, the MRT uses the Play Store/IOS application for the community. - More corridors are being built in Jakarta's busy routes. - The MRT is friendly to seniors, pregnant women, people with disabilities, has more women's toilets, and has handles for seniors	7.41 %	17%
7.	Do not fill out the suggestion & response sheet (only fill out the questionnaire)	11.11%	48%

4.3. Conclusion of Public Consultation Results of AMDAL Study

- **PCM 1**which was attended by around 51 spectators on the first day and 46 spectators on the second day, PCM 2 which was attended by around 138 spectators in the first session and 119 spectators in the second session.
- Previous socialization was through media announcements in the Jakarta Newspaper and Sindo Newspaper
- PCM 1 with 10 audiences providing feedback on the first day of Public Consultation and 9 audiences on day 2, PCM 2 where 10 audiences provided feedback on the first day of Public Consultation and 14 audiences on day 2 expressed their concerns about project development activities and some suggestions for required facilities.
- The results of the Public Consultation can be in the form of an official signing of the Public Consultation Resume (Public Consultation Minutes) which is a mandatory requirement for the KA ANDAL document as well as the appointment of 9 people as people's representatives to take part in the ANDAL, RKL and RPL examination meetings.

- There are 8 issues that have been accepted by the public to be used as material for consideration and study of the AMDAL. These notes have been submitted in the Minutes of Public Consultation 3 -4 Feb 2022, namely:

  1. Residents have no objections to the MRT EW Line construction plan
  2. Residents request that negative impacts caused during construction activities and at the operational stage be minimized or immediately managed/repaired so that disturbances do not occur that could reduce the health and comfort of residents around the project.
  3. Residents request that the initiator involve local workers in both the construction and operational stages so that the benefits of the project are truly felt by the local community.
  4. The initiator always coordinates with sub-district/sub-district officials/local community leaders both during construction and operations so that the development plans to be implemented can run well and have strong support from the community.
  5. Residents hope that the initiator will pay attention to the quantity of groundwater in the underground alignment so that residents do not worry about the quantity of groundwater because there are still residents who use water sources that come from groundwater.
  6. So that construction activities do not disturb the comfort of residents. The initiator is expected to be able to accommodate complaints and follow up on community complaints while construction is underway.
  7. The initiator documents the houses of residents around the activity location before the construction phase is carried out. So that we can identify the source of the cause, when there are complaints about residents' houses being damaged or cracked during the construction stage.
  8. The initiator will create a communication center so that residents can submit complaints and facilitate coordination.

     - The MRT design needs to provide several additional facilities to accommodate the particular needs of people with disabilities, women and the elderly
     - Several environmental impacts that need serious attention include noise, vibration, drainage and water disturbances, traffic jams, groundwater disturbances and employment opportunities for local communities.
     - People want to know more details about alignments and alignments, so they can better understand their condition

4.4. Further Public Consultation

Based on coordination with the AMDAL expert team and considering that some people do not know about the MRT East-West Line Phase 1 Stage 1 development plan, the initiator is following up by holding another public consultation activity with the aim of sharpening the socialization of the MRT East-West Line Phase 1 Stage development plan 1, especially regarding land acquisition plans.

Thus, the third or follow-up public consultation was carried out by inviting all sub-district representatives in the MRT East-West Line Phase 1 Stage 1 alignment area, namely on October 3, 2023 for the Central Jakarta area at the Central Jakarta Mayor's Office, October 9, 2023 for the Central Jakarta area. East Jakarta and North Jakarta at the D'Arcici Cempaka Putih Hotel, October 10, 2023 for the Bekasi City area at the Medan Satria Bekasi District Office and October 11, 2023 for the West Jakarta area at the Maple Grogol Hotel.

Figure 4.18. Public Consultation Activities on the MRT-EWLP1S1 Development Plan

Advance public consultation activities have been carried out in 32 sub-districts in DKI Jakarta Province and Bekasi City, West Java Province which are affected by the MRT East-West Line, Phase 1 Stage1. Where apart from conducting socialization by explaining activity plans and AMDAL implementation, it also provides information about land acquisition plans. Residents can directly submit questions, responses and suggestions openly or by filling out a questionnaire. At the end of the public consultation event, residents signed a statement regarding their acceptance of the MRT East-West Line, Phase 1 Stage1 development plan and approval for the land acquisition process.

4.5. Recapitulation of Public Consultation Results

Table 4.7. Recapitulation of the Number of Representatives of Affected Residents Who Attended the Public Consultation

No	Province	City	Subdistrict	Ward	Amdal			LARAP
					KP-I	KP-II	KP-III	
1	DKI Jakarta	West Jakarta	Grogol Petamburan	Tomang	2	2	5	11
2				South Cape Duren	2	6	4	-
3				Grogol	2	19	4	12
4		Central Jakarta	Gambier	Duri Pulo	2	11	3	9
5				Cideng	2	4	4	11
6				North Petojo	2	8	1	8
7				South Petojo	1	1	4	16
8				Gambier	2	1	3	9
9	DKI Jakarta	Central Jakarta	Tanah Abang	Balinese Village	2	2	2	10
10			Menteng	Betel Garden	3	6	4	8
11			Monday	Monday	6	2	4	9
12				Kwitang	4	5	3	8
13				Kramat	2	2		7
14				Bungur	4	2	3	7
15			New Johar	Upland	5	11	3	9
16				Strains	1	4	3	10
17			Kemayoran	Noble Hope	1	10	3	8
18				New Cempaka	2	7	2	12
19				Stone Well	1	2	4	3
20			Cempaka Putih	Cempaka Putih Barat	4	4	1	4
21				East Cempaka Putih	1	2	3	6
22		North Jakarta	Kelapa Gading	West Kelapa Gading	3	2	2	11
23				East Kelapa Gading	4	1	3	13
24				Ascension Two	3	11	2	12
25			Cilincing	Rorotan	4	1	3	7
26		East Jakarta	Gadung Island	Eucalyptus	1	2	1	6
26 27				Gadung Island	2	2	1	8
28			Cakung	Terate Swamp	1	39	2	11
29				West Cakung	3	37	2	6
30				East Cakung	1	11	3	9
31				Menteng Edge	6	14	3	-
32	West Java	Bekasi city	Medan Satria	Medan Satria	3	23	10	9
				AMOUNT	96	257	**99**	**262**

Information :

- KP-I= Public Consultation I on 3 – 4 February 2022 at Santika Mega City Hotel Bekasi
- KP-II= Public Consultation II on 15 February 2023 at Horison Ultima Bekasi
- KP-III= Public Consultation III on October 3 2023 at the Central Jakarta Mayor's Office, October 9 2023 at the D'Arcici Cempaka Putih Hotel, October 10 2023 at the Medan Satria Bekasi District Office and October 11 2023 at the Maple Grogol Hotel
- LARAP= public consultation in the framework of the LARAP study 4 June 2022 – 4 October 2022
- The number of participants was based on representatives of residents of each sub-district, excluding participants from sub-districts and NGOs, where in KP I there were 18 participants outside of sub-district representatives and in KP II there were 5 people.

Based on suggestions, opinions and responses from the community obtained from socialization (announcement of the Amdal study) and public consultation presented in Table 4.8., it is known that in general the community in the study area supports the MRT-EWLP1S1 development plan and agrees to carry out the land acquisition process related to the MRT-EWLP1S1 development.

Table 4.8. Evaluation of Results, Suggestions, Opinions and Community Responses from a Series of Public Consultations

Summary of Suggestions, Opinions and Community Responses	Evaluation
1. Impact on the environment a. It is hoped that MRT-EWLP1S1 construction activities will not disturb public comfort, especially those related to: traffic jams, dust and noise, flooding/puddles, damage to drainage channels and water quality b. The MRT-EWLP1S1 construction implementer must provide a complaint service post that can be accessed by the public	a. Community concerns regarding the impact of MRT-EWLP1S1 construction activities, especially those related to: traffic jams, dust and noise, flooding/puddles, damage to drainage channels and water quality are things to consider in determining Hypothetical Significant Impacts (DPH). b. Providing a complaint service post is an important thing to pay attention to in determining environmental management and monitoring plans
2. Community involvement a. Implementers of the MRT-EWLP1S1 development are expected to carry out more intensive outreach to the community (via offline and online media) in collaboration with regional governments (Kelurahan, Subdistrict, City) and local community leaders. b. Involving the local community as workers, both during construction and operation of MRT-EWLP1S1. c. The activity organizers are willing to accommodate and follow up on any complaints submitted by the public regarding the impact of the MRT-EWLP1S1 development and operational activities.	a. Socialization of MRT-EWLP1S1 development and operational activities (via offline and online media) is something that is taken into account in determining environmental management and monitoring plans. Likewise with socialization prior to land acquisition and construction activities b. Involving the surrounding community as workers (construction and operational) for MRT-EWLP1S1 at least 20% of the workforce requirements is part of the development and operational activity plan for MRT-EWLP1S1 c. Providing a complaint service post is an important thing to pay attention to in determining environmental management and monitoring plans
3. Land compensation a. Implementers of the MRT-EWLP1S1 development are expected to carry out more intensive outreach to the community (at least for each sub-district) regarding the land acquisition plan. b. The MRT-EWLP1S1 construction implementer conveys detailed information regarding the	a and b : Socialization and delivery of detailed information regarding land acquisition plans for the construction of the MRT-EWLP1S1 (via offline and online media) is something that is taken into account in determining environmental management and monitoring plans

Summary of Suggestions, Opinions and Community Responses	Evaluation
land acquisition plan (ownership status, area, implementation time, compensation scheme and payment mechanism) and provides information on the land map/exact location of the project that can be accessed by the community, so that there is no spread of information. which is confusing and detrimental to society. c. There are several land disputes that must be resolved first before the land compensation process for the MRT-EWLP1S1 development activities. d. The MRT-EWLP1S1 construction implementer must ensure that the compensation process is carried out directly to the land owner (free from brokers or intermediaries), according to the rules and does not harm the community. e. Land acquisition often leaves a small amount of land that is not compensated for losses, but the remaining land cannot be reused. f. The emergence of information about land acquisition plans for the construction of MRT-EWLP1S1 has resulted in land owners at the current location having difficulty processing building construction permits (IMB).	c Until f : Community concerns regarding the land compensation process for the construction of the MRT-EWLP1S1 were taken into account in determining the Hypothetical Significant Impact (DPH) For this reason, it is necessary to prepare assistance to go to court for land owners to be released if the negotiation process is not achieved
4. Public facility a. MRT-EWLP1S1 planning must pay attention to road conditions and the surrounding environment, so as not to interfere with residents' access b. Implementers of MRT-EWLP1S1 construction activities must repair affected public facilities after construction work is completed, especially buildings, roads and drainage channels affected by the project c. MRT to provide toilets for ELDERLY and people with disabilities, more toilets for women, and provide special carriages for ELDERLY, people with disabilities and women.	a and b : Handling and repairing affected public facilities is something that is taken into account when determining environmental management and monitoring plans For this reason, it is necessary to carry out further coordination involving relevant government agencies and the community regarding planned construction activities that will affect drainage channels and public road traffic. c. The provision of public facilities is something that is considered in planning MRT-EWLP1S1

Daftar Isi

Chapter 5

Determination of Hypothetical Significant Impacts (DPH), Study Area Boundaries and Study Deadline

5.1. Determination of DPH

5.1.1. Potential Impact

Identification of potential impacts is carried out to estimate all possible impacts that may occur as a result of MRT-EWLP1S1 construction activities. At this stage all impacts are identified theoretically without paying attention to the magnitude and significance of the impact. Potential impacts are predicted based on causal interaction relationships between business plans and environmental components using an interaction matrix (**Table 5.1**). The results of identifying potential impacts are as follows.

A. Pre-Construction Stage

1. Land Acquisition

Land acquisition activities are carried out in all segments of the MRT-EWLP1S1 development and are predicted to have a direct (primary) impact on social environmental components in the form of changes in community perceptions and attitudes.

B. Construction Phase

1. Acceptance of Construction Workers

Recruitment of construction workers is carried out for construction implementation in all segments of the MRT-EWLP1S1 development. This activity is predicted to have a direct (primary) impact on the social environmental component in the form of opening up employment opportunities. These primary impacts, either directly or in synergy with other impacts, are predicted to cause further impacts (secondary, tertiary, etc.) on components of the social environment in the form of increasing family income, as well as changes in community perceptions and attitudes.

Table 5.1. Identify Potential Impacts

Environmental Components Affected	Dampak Potential Impact	Activity plan												
		Pre-Cons Stage.	Construction Phase										Operational Stage	
		1	2	3	4	5	6			7	8		9	10	11
		Elv. West Elv. East	All	All	All	All	West Elv. E	U.G	Depot	U.G	West Elv. E	Depot	All	All	Depot
A Geophysics – Chemistry															
1 Air quality	Decreased air quality				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)		√ (-)	
2 Noise	Increased noise				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)		√ (-)	
3 Vibration	Increased vibration						√ (-)	√ (-)		√ (-)	√ (-)			√ (-)	
4 Hydrology	Increased runoff water discharge (*run off*)					√ (-)			√ (-)						
5 Hydrogeology	Decrease in ground water level							√ (-)							
	Decreased groundwater quality							√ (-)							
6 Traffic	Decreased/increased traffic performance				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)		√ (-)	
B Biology															
1 Land vegetation	Decreased density of land vegetation					√ (-)									
C Socioeconomic, Cultural Society															
1 Socioeconomic	Open job opportunities		√ (+)										√ (+)		
	Loss/opening up of business opportunities			√ (+)										√ (+)	
	Increase/Decrease in family income		√ (+)	√ (+)									√ (+)	√ (+)	
2 Socio-cultural	Changes in public perceptions and attitudes	√ (+/-)	√ (+/-)	√ (+/-)	√ (+/-)	√ (+/-)							√ (+/-)	√ (+/-)	
	Environmental disturbances (dust, noise, flooding and traffic jams)				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)			
D Public health															
1 Disease prevalence	Increased prevalence of ARI				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)			
2 Environment sanitation	Generation of waste water			√ (-)										√ (-)	√ (-)
	Generation of domestic waste			√ (-)										√ (-)	√ (-)
	The generation of B3 waste			√ (-)										√ (-)	√ (-)

Information :

Pre - Construction Phase
1 Land Acquisition

Construction Phase
2 Acceptance of Construction Workers
3 Operational*Basecamp*
4 Mobilization of Construction Equipment and Materials
5 Land Clearing and Relocation of Public Facilities/Utilities
6 Earthworks and*Dewatering*
7 Underground Construction Work
8 Ground Surface Construction Work

Operational Stage
9 Acceptance of Operational Workers
10 Passenger Transport Activities and Station Operations
11 Train Maintenance and Depot Operations

√ (+/-) : it is predicted that there is a causal interaction between the business plan/ activities with impacted environmental components

Segment:
All : West Elevated, Underground, East Elvated and Depot
Elv. West : West Elevated
St. Tomang to transition point (*transition section*) at 40k849m (in the middle of the St. Grogol – St. Roxy line)
U.G : Underground
transition point (*transition section*) at 40k849m to transition point (*transition section*) at 50k345m (in the middle of the St. Galur – St. Cempaka Baru route)
Elv. East : East Elevated
transition point (*transition section*) at 50k345m (in the middle of the St. Galur – St. Cempaka Baru route) to Medan Satria Station
Depot : Deposit
St. Ujung Menteng to Rorotan Depot

2. Basecamp Operations

The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts.

Basecamp operational activities are carried out in the underground, east elevated and depot segments. This activity is predicted to have a direct (primary) impact on environmental sanitation in the form of waste water, domestic waste and B3 waste. Apart from that, it also has an impact on the social environmental component in the form of opening up business opportunities. These primary impacts, either directly or in synergy with other impacts, are predicted to cause further impacts (secondary, tertiary, etc.) on components of the social environment in the form of increasing family income, as well as changes in community perceptions and attitudes.

3. Mobilization of Construction Equipment and Materials

Mobilization activities for construction equipment and materials are carried out in all segments of the MRT-EWLP1S1 construction and are predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of reduced traffic performance, decreased air quality and increased noise. This primary impact, either directly or in synergy with other impacts, is predicted to cause further impacts (secondary, tertiary, etc.) on the environmental component of public health in the form of an increase in the prevalence of ISPA (various types of infections that affect the upper and lower respiratory tract, including the nose, throat, sinuses, bronchi, and lungs), as well as on the social environmental component in the form of environmental disturbances in society and changes in perceptions and attitudes. public.

4. Land Clearing and Relocation of Public Facilities/Utilities

Land clearing activities and relocation of public facilities/utilities are carried out in all segments of the MRT-EWLP1S1 development and are predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of decreased traffic performance, increased runoff water discharge, decreased air quality , increased noise, and the biological environmental component in the form of a decrease in land vegetation density. This primary impact, either directly or in synergy with other impacts, is predicted to cause further impacts (secondary, tertiary, etc.) on the environmental component of public health in the form of an increase in the prevalence of ISPA, as well as on the social environmental component in the form of environmental disturbances in society and changes in perceptions and attitudes. public.

5. Earthworks and Dewatering

Earthworks and dewatering were carried out in all segments of the MRT-EWLP1S1 construction. In the west elevated and east elevated segments, this activity is predicted to have a direct (primary) impact on geophysical-chemical

environmental components in the form of reduced traffic performance, decreased air quality, increased noise and increased vibration. In the underground segment, this activity is predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of decreased traffic performance, decreased air quality, increased noise, increased vibration, decreased groundwater levels and decreased groundwater quality. Meanwhile, in the depot segment, this activity is predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of decreased traffic performance, decreased air quality, increased noise, and increased runoff water discharge. This primary impact, either directly or in synergy with other impacts, is predicted to cause further impacts (secondary, tertiary, etc.) on the environmental component of public health in the form of an increase in the prevalence of ARI(ISPA" various types of infections that affect the upper and lower respiratory tract, including the nose, throat, sinuses, bronchi, and lungs) diseases, and the social environmental component in the form of environmental disturbances to society.

6. Underground Construction Work

Underground construction work is carried out only in the underground segment and is predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of decreased traffic performance, decreased air quality, increased noise andincreased vibration. This primary impact, either directly or in synergy with other impacts, is expected to cause further impacts (secondary, tertiary, etc.) on the environmental component of public health in the form of an increase in the prevalence of ARI diseases, and the social environmental component in the form of environmental disturbances in society.

7. Ground Surface Construction Work

Construction work at ground level is carried out in the west elevated, east elevated and depot segments. In the west elevated and east elevated segments, this activity is predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of reduced traffic performance, decreased air quality, increased noise and increased vibration. In the depot segment, this activity is predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of reduced traffic performance, decreased air quality and increased noise. This primary impact, either directly or in synergy with other impacts, is expected to cause further impacts (secondary, tertiary, etc.) on the environmental component of public health in the form of an increase in the prevalence of ARI diseases, and the social environmental component in the form of environmental disturbances in society.

C. Operational Stage

1. Acceptance of Operational Workers

The recruitment of operational workers is carried out for the implementation of MRT-EWLP1S1 operations in all segments. This activity is predicted to have a direct (primary) impact on the social environmental component in the form of opening up employment opportunities. These primary impacts, either directly or in synergy with other impacts, are predicted to cause further impacts (secondary, tertiary, etc.) on components of the social environment in the form of increasing family income, and changes in community perceptions and attitudes.

2. Passenger Transport Activities and Station Operations

Passenger transportation and station operational activities are carried out to implement MRT-EWLP1S1 operations in all segments. This activity is predicted to have a direct (primary) impact on geophysical-chemical environmental components in the form of increased traffic performance, decreased air quality, increased noise and increased vibration, and on environmental sanitation in the form of the generation of waste water, domestic waste and the generation of B3 waste. Apart from that, it also has an impact on the social environmental component in the form of opening up business opportunities. These primary impacts, either directly or in synergy with other impacts, are predicted to cause further impacts (secondary, tertiary, etc.) on components of the social environment in the form of increasing family income and changes in community perceptions and attitudes.

3. Train Maintenance and Depot Operations

Train maintenance and depot operational activities are carried out only in the depot segment and are carried out to support the implementation of MRT-EWLP1S1 operations. This activity is predicted to have a direct (primary) impact on environmental sanitation in the form of waste water, domestic waste and B3 waste.

5.1.2. Potential Impact Evaluation

Potential impact evaluation is carried out to sort suspected impacts that have been included in the list of potential impacts into hypothetical significant impacts (DPH) and will be studied in more depth. Referring to PP no. 22 of 2021, the criteria used in determining DPH are based on the following 4 things:

a. The size of the planned business and/or activity that causes the impact and the initial environmental management plan that is part of the business plan and/or activity to overcome the impact.
b. The existing environmental conditions include the ability to support the business and/or activity or not.
c. The influence of the business plan and/or activity on other business conditions and/or activities around the location of the business plan and/or activity or vice versa.

d. The intensity of public attention to business plans and/or activities, including hopes and concerns regarding approval or rejection of business plans and/or activities.

Table 5.2. Potential Impact Evaluation Matrix

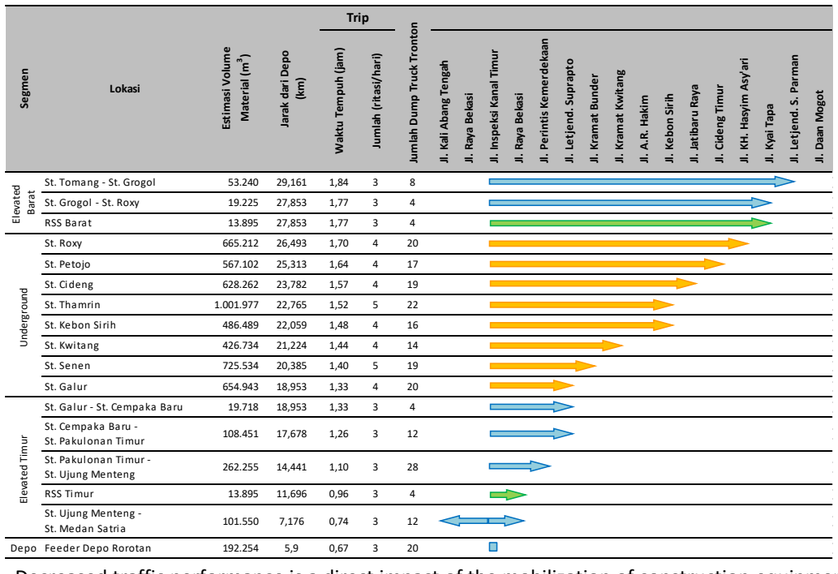
No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
A	**Pre-Construction Stage**							
1	Land Acquisition	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan. However, the residents requested that the person in charge of activities provide detailed information regarding the land acquisition plan and that the land acquisition process be carried out in accordance with the provisions and without harming the community. Based on the results of interviews with 145 respondents who owned land, houses and/or business premises affected by land acquisition, 85 respondents (58.62%) expressed concerns regarding the land acquisition process.	Changes in public perceptions and attitudes	1. The land to be acquired is 997,535.87 m2 with economic facility buildings (office houses, shop houses and business houses) covering an area of 41,389.40 m2 (87.71% of the total building area, 27.39% of the total economic facility land area and 4 .15% of the total area of land acquired) [LARAP, 2022]. The number of residents directly affected by land acquisition activities is 1,659 people (488 families) [LARAP, 2022]. 2. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan. 3. Changes in community perceptions and attitudes can be a direct impact of land acquisition activities, especially if the land acquisition process is not carried out according to provisions and is felt to be detrimental to the community. Apart from that, changes in people's perceptions and attitudes are also a derivative impact of the loss of business opportunities and a decrease in family income. 4. The results of community involvement show that residents requested that the Person in Charge of Activities provide detailed information regarding the land acquisition plan and that the land acquisition process be carried out in accordance with regulations and not harm the community. Based on the results of interviews with 145 respondents who owned land, houses and/or business premises affected by land acquisition, 85 respondents (58.62%) expressed concerns regarding the land acquisition process. Due to community concerns regarding the land acquisition process, as well as the possibility of derivative impacts from loss of business opportunities and decreased family income, changes in community perceptions and attitudes resulting from land acquisition activities are categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	Plots of land (private and public) to be acquired in Tomang (19), Tj. South Duren (3), Grogol (43), Duri Pulo (98), Cideng (31), North Petojo (17), South Petojo (13), Gambir (15), Kampung Bali (6), Kebon Sirih (22) , Senen (7), Kwitang (19), Kramat (36), Tanah Tinggi (40), Galur (29), Harapan Mulia (24), Cempaka Baru (22), Cempaka Putih Barat (1), Cempaka Putih Timur (3), West Kelapa Gading (3), East Kelapa Gading (2), Pegangsaan Dua (11), Kayu Putih (8), Pulo Gadung (4), Rawa Terate (51), West Cakung (52), East Cakung (47), Ujung Menteng (62), Rorotan (55), and Medan Satria (34) with a total area of 997,535.87 m2.	7 years during pre-construction and construction stages
B	**Construction Phase**							
2	Recruitment of Construction Workers	Not yet exist	Sosekbud: Socioeconomic The total workforce in the 5 cities at the MRT-EWLP1S1 construction site is 6,238,526 people with a percentage of 90.32% employed and 9.68% unemployed (BPS, 2022). Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents' occupations were self-employed (36.98%) and 10 respondents (2.6%) did not work.	Open job opportunities	1. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers with a minimum of 20% (1,242 people) local workers (mainly residents affected by land acquisition and environmental disturbances who meet skill qualification requirements) 2. The total workforce in the 5 cities at the MRT-EWLP1S1 construction site is 6,238,526 people with a percentage of 90.32% employed and 9.68% unemployed (BPS, 2022). Based on the results of interviews with 384 affected families at the activity location, it was discovered that the majority of respondents' occupations were self-employed (36.98%) and 10 respondents (2.6%) did not work. 3. The opening of job opportunities is a direct impact of construction labor recruitment activities (especially if they involve affected communities). This impact can influence family income levels, as well as community perceptions and attitudes towards the construction of the MRT-EWLP1S1. 4. The results of community involvement show that residents requested that local workers be a priority to be able to work on the MRT-EWLP1S1 construction project. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (63.02%) hope to get job opportunities on the MRT-EWLP1S1 development project. With the community's high hopes for employment opportunities in the MRT-EWLP1S1 construction project, the employment opportunities resulting from construction labor recruitment activities are categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	MRT-EWLP1S1 construction location in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru , Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with a population of Directly affected were 1,659 people (488 families)	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
	Recruitment of Construction Workers	Not yet exist	Sosekbud: Socioeconomic The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/month/capita with the proportion of expenditure (consumption patterns) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month.	Increase in family income	1. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers with a minimum of 20% (1,242 people) local workers (mainly residents affected by land acquisition and environmental disturbances who meet skill qualification requirements) 2. The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/capita with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month. 3. An increase in family income (especially for those involved in the MRT-EWLP1S1 project as construction workers) is a derivative impact of opening up job opportunities, and can influence community perceptions and attitudes towards the construction of the MRT-EWLP1S1. 4. Based on the results of community involvement, it is known that residents requested that local workers be a priority to be able to work on the MRT-EWLP1S1 construction project. This shows that there is great hope from the community to be involved and benefit from the MRT-EWLP1S1 development project, especially to increase family income. By setting the work system, wages and insurance (BPJS Employment and BPJS Health) for construction workers agreed in writing in a Specific Time Work Agreement (PKWT) in accordance with applicable regulations, then construction workers will receive a minimum income equivalent to the DKI Jakarta UMP (in 2023 amounting to 4.9 million rupiah). Apart from that, there is the community's hope that local workers will be a priority to be able to work on the MRT-EWLP1S1 construction project. Therefore, the increase in family income due to construction labor recruitment activities is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	MRT-EWLP1S1 construction location in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru , Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with a population of Directly affected were 1,659 people (488 families)	6 years during the construction phase
	Recruitment of Construction Workers	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan. However, the residents requested that the person in charge of activities convey detailed information regarding plans for recruiting construction workers and that the recruitment process be carried out openly, in accordance with regulations and without harming the community.	Changes in public perceptions and attitudes	1. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers with a minimum of 20% (1,242 people) local workers (residents affected by land acquisition and environmental disturbances who meet skill qualification requirements) 2. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan. 3. Changes in public perceptions and attitudes can be a direct impact of construction labor recruitment activities, especially if the recruitment process is not carried out openly, does not comply with regulations and is felt to be detrimental to society. Apart from that, changes in people's perceptions and attitudes are also a derivative impact of opening up job opportunities and increasing family income. 4. The results of community involvement show that residents requested that the Person in Charge of Activities convey detailed information regarding plans for recruiting construction workers and that the recruitment process be carried out openly, in accordance with regulations and without harming the community. Based on the results of interviews with 384 affected families at the activity location, it was discovered that 29 respondents (7.55%) expressed concern about social conflict/dispute occurring in the community, one of which is likely to occur during the recruitment of construction workers for the construction of the MRT-EWLP1S1. With the community's hope that local workers will be a priority to be able to work on the MRT-EWLP1S1 construction project, as well as the possibility of derivative impacts from opening up job opportunities and increasing family income, changes in community perceptions and attitudes resulting from construction labor recruitment activities are categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	MRT-EWLP1S1 construction location in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru , Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with a population of Directly affected were 1,659 people (488 families)	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
3	Basecamp Operations	a. Providing portable toilets equipped with septic tanks at each basecamp location (BC-Depo, BC-UG and BC-ELV) b. Carrying out regular waste water suction in collaboration with the PAL Jaya Regional Company	Public health : Environment sanitation	The generation of domestic wastewater	1. The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts. 2. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live at the basecamp. Construction labor activities in the basecamp area will produce waste water estimated at each basecamp: a) BC_DEPO = 17.13 m3/day (GW) and 12.01 m3/day (BW) b) BC_UG = 54.63 m3/day (GW) and 38.30 m3/day (BW) c) BC_ELV = 62.87 m3/day (GW) and 44.08 m3/day (BW) *Information: GW = gray water, BW = black water* 3. Typical domestic wastewater characteristics: TSS 120 – 400 mg/L, BOD 110 – 350 mg/L, COD 250 – 800 mg/L, oil and fat 50 – 100 mg/L, Ammonia 12 – 45 mg/L, Total Coliform 106 – 1010 / 100 mL (Metcalf & Eddy, 2004) 4. Activities around the location of each basecamp are residential areas. By providing portable toilets and regular suctioning, basecamp operations will not increase the pollutant load on the surrounding environment. 5. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing portable toilets and regular suctioning, basecamp operations will not increase the pollutant load on the surrounding environment. With wastewater management that has been planned as part of the basecamp operational activity plan, the impact of domestic wastewater generation can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).	DL-KP	-	-
	Basecamp Operations	a. Providing segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes at each basecamp location (BC-Depo, BC-UG and BC-ELV) b. Transporting waste to the landfill periodically in collaboration with the DKI Jakarta Government	Public health : Environment sanitation	Generation of domestic waste	1. The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts. 2. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live at the basecamp. Construction labor activities in the basecamp area will produce domestic waste with estimates for each basecamp: a) BC_DEPO = 0.41 tons/day b) BC_UG = 1.31 tons/day c) BC_ELV = 1.51 tons/day 3. Typical composition of domestic waste: food waste 40.7%, plastic 18%, wood/twigs/leaves 13%, paper/cardboard 11.3%, metal 3%, cloth 2.6%, glass 2.2%, rubber/ skin 2.1%, others 7.1% (https://sipsn.menlhk.go.id/sipsn/, accessed 10 October 2023). 4. Activities around the location of each basecamp are residential areas. By providing rubbish bins and TPS and transporting them to the TPA regularly, basecamp operations will not increase the pollutant burden on the surrounding environment. 5. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing rubbish bins and TPS and transporting them to the TPA regularly, basecamp operations will not increase the pollutant burden on the surrounding environment. With waste management that has been planned as part of the basecamp operational activity plan, the impact of domestic waste generation can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
	Basecamp Operations	a. Providing temporary storage for non-permanent B3 waste (TPS LB3) at each basecamp location (BC-Depo, BC-UG and BC-ELV)	Public health : Environment sanitation	The generation of B3 waste	1. The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts. 2. The activities of the project office (director's kit), workers' barracks, material warehouse, heavy equipment and vehicle parking areas in the basecamp area have the potential to produce B3 waste. 3. The types of B3 waste produced at basecamp operations are used batteries, electronic waste, used lubricating oil, used fabric, used B3 packaging and expired pharmaceutical products (an analogy of Jakarta MRT North – South Line activities) 4. Activities around the location of each basecamp are residential areas. By providing LB3 TPS and carrying out regular transportation for further handling in collaboration with third parties who have LB3 transportation permits from the Ministry of Environment and Forestry, basecamp operations will not increase the pollutant burden on the surrounding environment.	DL-KP	-	-
		b. Carrying out LB3 transportation periodically for further handling in collaboration with a third party who has an LB3 transportation permit from the Ministry of Environment and Forestry.			5. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing LB3 TPS and carrying out regular transportation for further handling in collaboration with third parties who have LB3 transportation permits from the Ministry of Environment and Forestry, basecamp operations will not increase the pollutant burden on the surrounding environment. With B3 waste management which has been planned as part of the basecamp operational activity plan, the impact of B3 waste generation can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).			
	Basecamp Operations	Not yet exist	Sosekbud: Socioeconomic Community business opportunities in the 31 sub-districts at the activity locations are quite good with the existence of 3,124 business premises (the majority of which are micro and medium scale) [BPS, 2022]. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (69.27%) own a business and/or work at the activity location and its surroundings.	Open business opportunities	1. The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts. 2. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live in basecamp: a) DEPO Basecamp • 237 people live at basecamp • 553 people are active during working hours b) UG Basecamp • 756 people live at basecamp • 1,764 people are active during working hours c) ELV Basecamp • 870 people live in basecamp • 2,030 people are active during working hours 3. Community business opportunities in the 31 sub-districts at the activity locations are quite good with the existence of 3,124 business premises (the majority of which are micro and medium scale) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (69.27%) own a business and/or work at the activity location and its surroundings. 4. The activities of construction workers (especially 1,863 people living in basecamp) can be a business opportunity for the community, especially to provide the daily needs of construction workers. This business opportunity can have a derivative impact in the form of an increase/decrease in family income and changes in people's perceptions and attitudes 5. The results of community involvement show that residents have great hopes to be involved and benefit from the MRT-EWLP1S1 development project. Based on the results of interviews with 384 affected families at the activity location, it is known that 14.42% of respondents hope to get business opportunities as suppliers of goods and materials needed for the project, 16.67% of respondents are canteen/restaurant/tenant businesses and 28.13% of respondents are other trading businesses. . With the daily activities of construction workers (especially 1,863 people living in the base camp), it will open up business opportunities for the local community, especially in terms of meeting the living needs of these workers. Apart from that, there is public hope that the local community can	DPH	Basecamp location & surroundings: a) Ex. Rorotan (BC_DEPO) b) Ex. Ascension Two (BC_UG) c) Ex. Duri Pulo (BC_ELV)	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					be involved in the MRT-EWLP1S1 development project. Therefore, the opening of business opportunities resulting from development activities and basecamp activities is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.			
	Basecamp Operations	Not yet exist	Sosekbud: Socioeconomic The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/capita with a proportion of expenditure (consumption patterns) for food of 40.09%(Rp. 930,426)and non-food by 59.91% (Rp. 1,390,387) [BPS, 2022].	Increase in family income	1. The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts. 2. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live in basecamp: 5) DEPO Basecamp • 237 people live at basecamp • 553 people are active during working hours b) UG Basecamp • 756 people live at basecamp • 1,764 people are active during working hours c) ELV Basecamp • 870 people live in basecamp • 2,030 people are active during working hours	DPH	Basecamp location & surroundings: a) Ex. Rorotan (BC_DEPO) b) Ex. Ascension Two (BC_UG) c) Ex. Duri Pulo (BC_ELV)	6 years during the construction phase
			Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month.		3. The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/capita with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month. 4. An increase/decrease in family income, especially for people who benefit from business opportunities to fulfill the daily needs of construction workers, is a derivative impact of the opening of business opportunities and can influence people's perceptions & attitudes towards the construction of the MRT-EWLP1S1. 5. Based on the results of community involvement, it shows that there is great hope from the community to be involved and benefit from the MRT-EWLP1S1 development project. With the local community's business opportunities to meet the daily needs of construction workers (especially the 1,863 people who live in the base camp), family income (especially people who benefit from business opportunities) will increase. Therefore, the increase in family income due to construction activities and basecamp activities is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.			
	Basecamp Operations	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan.	Changes in public perceptions and attitudes	1. The abovementioned basecamps will be used by workers during short breaks during working hours. All of the workers will not live on the site and instead will sleep in rented houses nearby (rented by the contractors), which locations will be confirmed just before construction starts. 2. The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live in basecamp: a) DEPO Basecamp • 237 people live at basecamp • 553 people are active during working hours b) UG Basecamp • 756 people live at basecamp • 1,764 people are active during working hours c) ELV Basecamp	DPH	Basecamp location & surroundings: a) Ex. Rorotan (BC_DEPO) b) Ex. Ascension Two (BC_UG) c) Ex. Duri Pulo (BC_ELV)	6 years during the construction phase

<table>
<tr><th rowspan="2">No</th><th rowspan="2">Potential Activity Plans Environmental Impact.</th><th rowspan="2">Prepared Environmental Management Plan</th><th rowspan="2">Environmental Components Affected</th><th colspan="3">Scoping</th><th rowspan="2">Study Area</th><th rowspan="2">Study Deadline</th></tr>
<tr><th>Potential Impact</th><th>Potential Impact Evaluation</th><th>DPH</th></tr>
<tr><td></td><td></td><td></td><td>However, residents asked that the MRT-EWLP1S1 construction project provide benefits and not harm the community.</td><td></td><td>• 870 people live in basecamp
• 2,030 people are active during working hours
3. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan.
4. Changes in community perceptions and attitudes can be a direct impact of basecamp construction and operational activities, especially if they are felt to be detrimental to the community. Apart from that, changes in people's perceptions and attitudes are also a derivative impact of opening up business opportunities and increasing/decreasing family income.
5. The results of community involvement show that residents requested that the construction of the MRT-EWLP1S1 provide benefits and not harm the community.
With the community's hope that the construction of the MRT-EWLP1S1 can provide benefits and not harm the community, as well as the possibility of derivative impacts from opening up business opportunities and increasing family income, changes in community perceptions and attitudes resulting from construction activities and basecamp activities are categorized as DPH (Hypothetical Significant Impacts).)and studied further in CHAPTER 6.</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>Mobilization of Construction Equipment and Materials</td><td>Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including:
a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin
b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route.
c. Install signs indicating alternative routes on road sections where traffic is being diverted.</td><td>Geophysics – Chemistry : Traffic
The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].</td><td>Decreased traffic performance</td><td>1. Based on the Basic Engineering Design (BED) MRT-EWLP1S1, the construction of MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or other supporting equipment. The amount of construction material that will be distributed from the Rorotan Depot area (stockpile) to each construction activity location is ± 5,940,741.52 m3 using 105 dump trucks (capacity 24 m^3 and 6 m^3) with a rotation of 1-5 cycles/day via a predetermined route.
2. The traffic performance (level of service) of roads and intersections in each segment varies from service levels A to F. Service levels E and F mainly occur in the morning and evening [Andalalin, 2023].
Volume and Transport Routes of Construction Equipment and Materials
 
3. Decreased traffic performance is a direct impact of the mobilization of construction equipment and materials and can cause derivative impacts in the form of decreased air quality and increased noise levels, and together with other impacts can result in an increase in the prevalence of ISPA, as well as changes in public perceptions and attitudes towards construction of MRT-EWLP1S1.</td><td>DL-KP</td><td>-</td><td>-</td></tr>
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No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic jams so as not to disturb the comfort of the community. However, with traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to transportation of construction equipment and materials can be controlled. With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to transportation of construction equipment and materials can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).			
	Mobilization of Construction Equipment and Materials	Not yet exist	Geophysics – Chemistry: Air Quality The ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category with parameters that exceed the BMUA (PP No. 22/2021): a. West Elvated : NO2 b. Underground: PM10, PM2.5, and NO2 c. East Elvated: PM10, PM2.5, SO2, O3 d. Depot Segment : - (DKI Jakarta Air Quality Monitoring Report, 2021)	Decreased air quality	1. Based on the Basic Engineering Design (BED) of MRT-EWLP1S1, the construction of MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or other supporting equipment, while the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as stockpile) to each construction activity location ± 5,940,741.52 m3 using 105 dump trucks (capacity 24 m^3 and 6 m^3) with a rotation rate of 1-5 cycles/day. 2. ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category (DKI Jakarta Air Quality Monitoring Report, 2021). Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category (Primary Data, 2022). 3. The decline in air quality is a direct impact of the mobilization of construction equipment and materials. Apart from that, it can also be a derivative impact of a decrease in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. This impact together with other impacts could result in an increase in the prevalence of ARI, as well as changes in community perceptions and attitudes towards the development of MRT-EWLP1S1.	DPH	Distance of 300 m left and right on the route for transporting construction equipment and materials a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim, Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi. b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Access to Rorotan Depot (Jl. Inspeksi Kanal Timur)	6 years during the construction phase
			Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category with parameters that exceed the BMUA (PP No. 22/2021): a. West Elvated : CO b. Underground : CO c. East Elvated : CO, PM2.5 d. Depot Segment: PM2.5 (Primary Data, 2022)		4. The results of community involvement show that residents asked the person in charge of activities to pay attention to any impacts caused, especially the distribution of dust so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns about air pollution and the possibility of derivative impacts in the form of an increase in the prevalence of ISPA, the decrease in air quality due to mobilization of construction equipment and materials is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.			
	Mobilization of Construction Equipment and Materials	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated activity area/environment.	Increased noise	1. Based on the Basic Engineering Design (BED) of MRT-EWLP1S1, the construction of MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or other supporting equipment, while the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as stockpile) to each construction activity location ± 5,940,741.52 m3 using 105 dump trucks (capacity 24 m^3 and 6 m^3) with a rotation rate of 1-5 cycles/day. 2. The noise level at the MRT-EWLP1S1 Line construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment. 3. Increased noise is a direct impact of the mobilization of construction equipment and materials. Apart from that, it can also be a derivative impact of a decrease in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. This impact together with other impacts can result in changes in community perceptions and attitudes towards the construction of the MRT-EWLP1S1. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project.	DPH	Distance of 300 m left and right on the route for transporting construction equipment and materials a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim, Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi. b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					Due to public concerns regarding increased noise, the impact of increased noise due to mobilization of construction equipment and materials is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.			
	Mobilization of Construction Equipment and Materials	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. Based on the Basic Engineering Design (BED) of MRT-EWLP1S1, the construction of MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or other supporting equipment, while the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as stockpile) to each construction activity location ± 5,940,741.52 m3 using 105 dump trucks (capacity 24 m^3 and 6 m^3) with a rotation rate of 1-5 cycles/day. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. This impact together with other impacts can result in changes in community perceptions and attitudes towards the construction of the MRT-EWLP1S1. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. With public concerns regarding air pollution, the increase in the prevalence of ARI due to the mobilization of construction equipment and materials is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Distance of 300 m left and right on the route for transporting construction equipment and materials a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim, Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi. b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	6 years during the construction phase
	Mobilization of Construction Equipment and Materials	a. Coordinate and collaborate with village heads, sub-district heads and related agencies to carry out socialization of work implementation plans for the mobilization of construction equipment and materials b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of the work of mobilizing construction equipment and materials c. Handling public complaints in accordance with established mechanisms	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. Based on the Basic Engineering Design (BED) of MRT-EWLP1S1, the construction of MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or other supporting equipment, while the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as stockpile) to each construction activity location ± 5,940,741.52 m3 using 105 dump trucks (capacity 24 m^3 and 6 m^3) with a rotation rate of 1-5 cycles/day. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of the mobilization of construction equipment and materials, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbances on the community due to transportation of construction equipment and materials can be controlled and categorized as DL-KP (Impact Directly Manage Monitoring).	DL-KP	-	-
	Mobilization of Construction Equipment and Materials	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported	Changes in public perceptions and attitudes	1. Based on the Basic Engineering Design (BED) of MRT-EWLP1S1, the construction of MRT-EWLP1S1 is estimated to use at least 744 heavy equipment and/or other supporting equipment, while the estimated amount of construction materials that will be distributed from the Rorotan Depot area (as stockpile) to each construction activity location ± 5,940,741.52 m3 using 105 dump trucks (capacity 24 m^3 and 6 m^3) with a rotation rate of 1-5 cycles/day. 2. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan.	DPH	Distance of 300 m left and right on the route for transporting construction equipment and materials a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim, Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen.	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping: Potential Impact	Scoping: Potential Impact Evaluation	Scoping: DPH	Study Area	Study Deadline
			(35.16%) the MRT-EWLP1S1 development plan. However, residents asked that the MRT-EWLP1S1 construction project provide benefits and not harm the community.		3. Changes in community perceptions and attitudes can be a direct impact of mobilization of construction equipment and materials, especially if it is felt to be detrimental to the community. Apart from that, changes in public perceptions and attitudes are also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents requested that the construction of the MRT-EWLP1S1 provide benefits and not harm the community. Changes in public perception and attitudes are the knock-on effects of decreased traffic performance, decreased air quality, increased noise and increased prevalence of ISPA. In addition, with public concerns regarding air pollution and increased noise, changes in public perceptions and attitudes resulting from mobilization of construction equipment and materials are categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.		Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi. b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	
5	Land Cleaning and Relocation of Public Facilities/Utilities	Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including: a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route. c. Install signs indicating alternative routes on road sections where traffic is being diverted.	Geophysics – Chemistry : Traffic The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].	Decreased traffic performance	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.69 m3 and planting that will be affected is 105 trees [LARAP, 2022]. The results of land clearing in the form of building debris and felled trees will be transported using 43 dump trucks capacity 6 m3 with a rotation rate of 1-5 cycles/day, and used to pave the Rorotan depot land. Public facilities and utilities along the MRT-EWLP1S1 corridor that need to be relocated or secured prior to construction include TransJakarta bus stops, pedestrian bridges, drainage channels, telecommunications networks, clean water pipe networks, gas pipe networks, electricity networks and waste water networks (JMCA , 2022). The relocation of public facilities and utilities will be coordinated by the DKI Jakarta Provincial Highways Service, meanwhile Relocation costs are borne by the utility owner agency in accordance with DKI Jakarta Provincial Governor Regulation No. 106 of 2019 concerning Guidelines for Implementing Utility Network Infrastructure for the Development Interests of the DKI Jakarta Government and/or the Central Government.	DL-KP	-	-

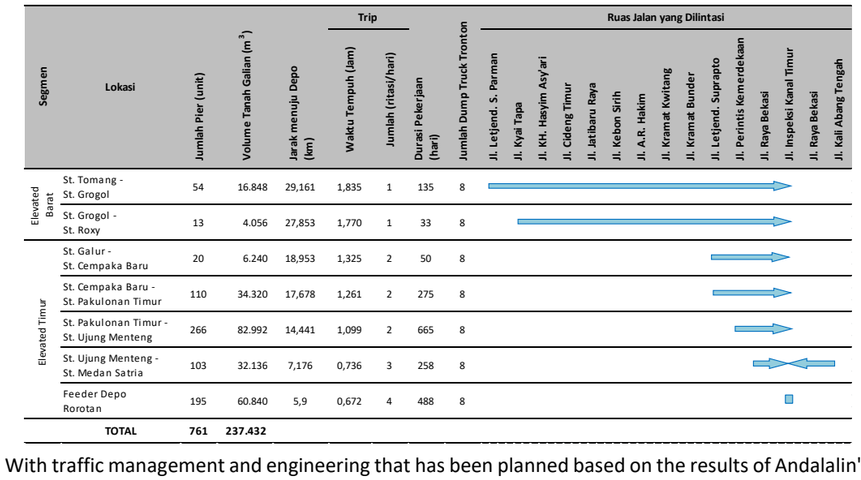
Volume and Transport Routes of Land Clearing Results

Segment	Sub Distirct	Area of Affected Building (m^2)	Potential Ruins of Demolishion (m^3)	Distance to Depo (km)	Trip: Hauling time (Jam)	Trip: Amount (ritation/day)	Amount of Dump truck	Road Traversed: Jl. Letjend. S. Parman	Jl. Kyai Tapa	Jl. KH. Hasyim Asy'ari	Jl. Cideng Timur	Jl. Jatibaru Raya	Jl. Kebon Sirih	Jl. A.R. Hakim	Jl. Kramat Kwitang	Jl. Kramat Bunder	Jl. Letjend. Suprapto	Jl. Perintis Kemerdekaan	Jl. Raya Bekasi	Jl. Inspeksi Kanal Timur	Jl. Raya Bekasi	Jl. Kali Abang Tengah
Elevated Barat	Tomang	1.297,53	160,59	29,16	1,84	4	1															
	Tanjung Duren Selatan	0,00	0,00	-	-	-	-															
	Grogol	1.607,44	200,93	27,85	1,77	5	3															
Underground	Grogol	2.298,91	287,36																			
	Duri Pulo	8.854,83	1106,85	26,49	1,70	5	7															
	Petojo Utara	1.885,38	241,08	25,31	1,64	5	2															
	Cideng	520,63	65,08																			
	Petojo Selatan	366,62	45,84	23,78		4	1															
	Kampung Bali	198,92	24,87																			
	Kebon Sirih	480,8	60,10	22,09	1,57	3	1															
	Gambir	76,67	9,58	22,06	1,48	1	1															
	Kwitang	384,81	48,10	21,22	1,44	3	1															
	Senen	156,41	19,55	20,39	1,40	5	6															
	Kramat	7.090,19	886,27																			
	Tanah Tinggi	1.686,62	210,83	18,95	1,40	5	4															
	Galur	2.294,11	286,73																			
	Harapan Mulla	579,69	72,46																			
...ated Timur	Cempaka Baru	528,62	66,08	17,68	1,26	4	1															
	Sumur Batu	0,00	0,00	-	-	-	-															
	Cempaka Putih Barat	0,00	0,00	-	-	-	-															
	Cempaka Putih Timur	0,00	0,00	-	-	-	-															
	Kelapa Gading Barat	0,00	0,00	-	-	-	-															
	Kelapa Gading Timur	0,00	0,00	-	-	-	-															
	Pulo Gadung	0,00	0,00	-	-	-	-															
	Kayu Putih	12,23	1,56	15,49	1,15	1	1															

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2022]. 3. The decline in traffic performance is a direct impact of land clearing activities, especially due to transport activities resulting from land clearing in the form of building debris and relocation of public facilities/utilities. This impact can cause derivative impacts in the form of decreasing air quality, increasing noise levels, as well as changes in public attitudes and perceptions. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic so as not to disturb the comfort of the community. However, with traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to transportation of construction equipment and materials can be controlled. With traffic management and engineering that has been planned based on the results of the Andalalin study, the impact of additional traffic volume due to land clearing activities and relocation of public facilities/utilities can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).			
	Land Cleaning and Relocation of Public Facilities/Utilities	Not yet exist	Geophysics – Chemistry: Hydrology The site of the planned construction site for MRT-EWLP1S1 is a built environment area that has been built, so the run off coefficient is quite high and has the potential for puddles to occur when it rains, coupled with the inadequate condition of the existing drainage system.	Increased runoff water discharge	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.69 m3 and planting that will be affected is 105 trees [LARAP, 2022]. 2. The site of the planned construction site for MRT-EWLP1S1 is a built environment area that has been built, so the run off coefficient is quite high and has the potential for puddles to occur when it rains, coupled with the inadequate condition of the existing drainage system. 3. Changes in runoff water discharge are a direct impact of land clearing activities, especially due to changes in land cover and runoff coefficient. Apart from that, considering that the condition of the existing drainage system is inadequate, this condition has the potential to result in puddles when it rains. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially puddles and damage to drainage channels so as not to disturb the comfort of the community. Due to public concerns regarding inundation and damage to drainage channels, the impact of increased runoff due to land clearing activities and relocation of public facilities/utilities is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	The land to be cleaned covers an area of 47,189.69 m2	6 years during the construction phase
	Land Cleaning and Relocation of Public Facilities/Utilities	Not yet exist	Geophysics – Chemistry: Air Quality The ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category with parameters that exceed the BMUA (PP No. 22/2021): a. West Elvated : NO2 b. Underground: PM10, PM2.5, and NO2 c. East Elvated: PM10, PM2.5, SO2, O3 d. Depot Segment : -	Decreased air quality	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.69 m3 and planting that will be affected is 105 trees [LARAP, 2022]. The results of land clearing in the form of building debris and felled trees will be transported using 43 dump trucks capacity 6 m3 with a rotation rate of 1-5 cycles/day, and used to pave the Rorotan depot land. 2. ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category (DKI Jakarta Air Quality Monitoring Report, 2021). Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category (Primary Data, 2022). 3. The decline in air quality is the impact of transporting the results of land clearing in the form of building debris and felled trees. Apart from that, it can also be a derivative impact of a decrease	DPH	Distance 300 m left and right of the transportation route for land clearing results a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim, Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi.	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
			(DKI Jakarta Air Quality Monitoring Report, 2021) Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category with parameters that exceed the BMUA (PP No. 22/2021): a. West Elvated : CO b. Underground : CO c. East Elvated : CO, PM2.5 d. Depot Segment: PM2.5 (Primary Data, 2022)		in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents asked the person in charge of activities to pay attention to any impacts caused, especially the distribution of dust so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns regarding air pollution and the possibility of derivative impacts in the form of increasing the prevalence of ISPA, the decrease in air quality due to land clearing activities and relocation of public facilities/utilities (especially in the form of transport activities resulting from land clearing) is categorized as DPH (Significant Impact). Hypothetical)and studied further in CHAPTER 6.		b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	
	Land Cleaning and Relocation of Public Facilities/Utilities	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated activity area/environment.	Increased noise	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.69m3 and planting that will be affected is 105 trees [LARAP, 2022]. The results of land clearing in the form of building debris and felled trees will be transported using 43 dump trucks capacity 6 m3 with a rotation rate of 1-5 cycles/day, and used to pave the Rorotan depot land. 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standard (KepMenLH No.48/ MENLH/ 11/1996) for each designated area/activity environment. 3. The increase in noise is the impact of transporting the results of land clearing in the form of building debris and felled trees. Apart from that, it can also be a derivative impact of a decrease in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to land clearing activities and relocation of public facilities/utilities (especially in the form of land clearing product transportation activities) is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Distance 300 m left and right of the transportation route for land clearing results a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim, Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi. b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	6 years during the construction phase
	Land Cleaning and Relocation of Public Facilities/Utilities	a. Carry out the removal and/or felling and replacement of protective trees after obtaining a felling permit from the authorized agency. b. Replanting shade trees that are removed and/or planting replacements for trees that are cut down as part of landscaping work in locations that have been determined according to permission from the competent authority	Biology: Land vegetation The vegetation at the activity location generally consists of roadside plants which fall into the categories of greening plants, protective plants and ornamental plants.	Decreased density of land vegetation	1. Planting plants that will be affected by land clearing activities are 105 trees (8 types of trees) [LARAP, 2022]. 2. The vegetation at the activity location generally consists of roadside plants which fall into the categories of greening plants, protective plants and ornamental plants. 3. The decrease in land vegetation density is a direct impact of land clearing activities, especially due to the removal and/or felling and replacement of protective trees. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. With the logging permit process from the authorized agency and the planned replanting of protective trees as part of the planned land clearing activities and relocation of public facilities/utilities, the impact of decreasing land vegetation density can be controlled and categorized as DL-KP (Direct Management Monitoring Impact) .	DL-KP	-	-
	Land Cleaning and Relocation of Public Facilities/Utilities	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the	Increased prevalence of ARI	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.60 m3 and planting that will be affected is 105 trees [LARAP, 2022]. The results of land clearing in the form of building debris and felled trees will be transported using 43 dump trucks capacity 6 m3 with a rotation rate of 1-5 cycles/day, and used to pave the Rorotan depot land.	DPH	Distance 300 m left and right of the transportation route for land clearing results a) Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
			prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.		2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Health Center) to 14.69% (Menteng Health Center) with an average value of 4.79 %. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. Due to public concerns about air pollution, the increase in the prevalence of ISPA due to land clearing activities and relocation of public facilities/utilities (especially in the form of transport activities resulting from land clearing) is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.		Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	
	Land Cleaning and Relocation of Public Facilities/Utilities	a. Coordinate and collaborate with village heads, sub-district heads and related agencies to carry out socialization of plans for land clearing work and relocation of public facilities/utilities b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of land clearing work and relocation of public facilities/utilities c. Handling public complaints in accordance with established mechanisms	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.69 m3 and planting that will be affected is 105 trees [LARAP, 2022]. The results of land clearing in the form of building debris and felled trees will be transported using 43 dump trucks capacity 6 m3 with a rotation rate of 1-5 cycles/day, and used to pave the Rorotan depot land. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of land clearing work and relocation of public facilities/utilities, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints which has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbances on the community due to land clearing work and relocation of public facilities/utilities can be controlled and categorized as DL- KP (Direct Impact Manage Monitor).	DL-KP	-	-
	Land Cleaning and Relocation of Public Facilities/Utilities	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan. However, residents asked that the MRT-EWLP1S1 construction project provide benefits and not harm the community.	Changes in public perceptions and attitudes	1. The building affected by the cleaning and relocation is 47,189.71 m2 with an estimated amount of demolition of ± 5,849.69 m3 and planting that will be affected is 105 trees [LARAP, 2022]. The results of land clearing in the form of building debris and felled trees will be transported using 43 dump trucks capacity 6 m3 with a rotation rate of 1-5 cycles/day, and used to pave the Rorotan depot land. Public facilities and utilities along the MRT-EWLP1S1 corridor that need to be relocated or secured prior to construction include TransJakarta bus stops, pedestrian bridges, drainage channels, telecommunications networks, clean water pipe networks, gas pipe networks, electricity networks and waste water networks (JMCA , 2022). 2. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan. 3. Changes in community perceptions and attitudes can be a direct impact of land clearing activities and relocation of public facilities/utilities, especially if they are felt to be detrimental to the community. Apart from that, changes in public perceptions and attitudes are also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased runoff. 4. The results of community involvement show that residents requested that the construction of the MRT-EWLP1S1 provide benefits and not harm the community.	DPH	Distance 300 m left and right of the transportation route for land clearing results a) Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	6 years during the construction phase

<table>
<tr><th rowspan="2">No</th><th rowspan="2">Potential Activity Plans Environmental Impact.</th><th rowspan="2">Prepared Environmental Management Plan</th><th rowspan="2">Environmental Components Affected</th><th colspan="3">Scoping</th><th rowspan="2">Study Area</th><th rowspan="2">Study Deadline</th></tr>
<tr><th>Potential Impact</th><th>Potential Impact Evaluation</th><th>DPH</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>Changes in public perception and attitudes are a derivative impact of decreased traffic performance, decreased air quality, increased noise and increased runoff. In addition, with public concerns regarding air pollution and increased noise, changes in public perceptions and attitudes resulting from land clearing activities and relocation of public facilities/utilities are categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>Earthworks and Dewatering
a. West Elevated and East Elevated Segments</td><td>Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including:
a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin.
b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route.</td><td>Geophysics – Chemistry : Traffic
The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].</td><td>Decreased traffic performance</td><td>1. Earthworks for the construction of the West Elevated and East Elevated segments of the elevated (pier) segment will use heavy equipment and/or other supporting equipment. The volume of excavated soil from this activity is estimated at 237,432 m3. The excavated soil was transported using 56 dump trucks 20 m3 (amount of rotation 1-4 rit/day) to the Rorotan Depot area and used as backfill material.
2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2022].
3. The decline in traffic performance is a direct impact of earthwork activities, especially the transportation of excavated soil from the elevated construction site to the landfill area at the Rorotan Depot location. This impact can cause derivative impacts in the form of decreased air quality and increased noise, and together with other impacts can result in an increase in the prevalence of ARI diseases.
4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic, so as not to disturb the comfort of the community. However, with management and traffic engineering that has been planned based on the results of the Andalalin study means that the impact of increasing traffic volume due to land transportation activities can be controlled.
Elevated Segment Excavated Soil Transport Volume and Route
 
With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).</td><td>DL-KP</td><td>-</td><td>-</td></tr>
<tr><td>Earthworks and Dewatering
a. West Elevated and East Elevated Segments</td><td>Not yet exist</td><td>Geophysics – Chemistry: Air Quality
The ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category with parameters that exceed the BMUA (PP No. 22/2021):</td><td>Decreased air quality</td><td>1. Earthworks for the construction of the West Elevated and East Elevated segments of the elevated (pier) segment will use heavy equipment and/or other supporting equipment. The volume of excavated soil from this activity is estimated at 237,432 m3 which will be transported using 56 dump trucks 20 m3 (amount of 1-4 cycles/day) to the Rorotan Depot area.
2. ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category (DKI Jakarta Air Quality Monitoring Report, 2021). Based on the results of ambient air quality</td><td>DPH</td><td>Distance 300 m left-right excavation route (elevated segment)
a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru</td><td>6 years during the construction phase</td></tr>
</table>

Elevated Segment Excavated Soil Transport Volume and Route

Segmen	Lokasi	Jumlah Pier (unit)	Volume Tanah Galian (m^3)	Jarak menuju Depo (km)	Trip: Waktu Tempuh (Jam)	Trip: Jumlah (ritasi/hari)	Durasi Pekerjaan (hari)	Jumlah Dump Truck Tronton	Ruas Jalan yang Dilintasi
Elevated Barat	St. Tomang - St. Grogol	54	16.848	29,161	1,835	1	135	8	Jl. Letjend. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. A.R. Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Letjend. Suprapto, Jl. Perintis Kemerdekaan, Jl. Raya Bekasi, Jl. Inspeksi Kanal Timur, Jl. Raya Bekasi, Jl. Kali Abang Tengah
	St. Grogol - St. Roxy	13	4.056	27,853	1,770	1	33	8	
Elevated Timur	St. Galur - St. Cempaka Baru	20	6.240	18,953	1,325	2	50	8	
	St. Cempaka Baru - St. Pakulonan Timur	110	34.320	17,678	1,261	2	275	8	
	St. Pakulonan Timur - St. Ujung Menteng	266	82.992	14,441	1,099	2	665	8	
	St. Ujung Menteng - St. Medan Satria	103	32.136	7,176	0,736	3	258	8	
	Feeder Depo Rorotan	195	60.840	5,9	0,672	4	488	8	
	TOTAL	**761**	**237.432**						

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
			• West Elvated : NO2 • East Elvated: PM10, PM2.5, SO2, O3 (DKI Jakarta Air Quality Monitoring Report, 2021) Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category with parameters that exceed the BMUA (PP No. 22/2021): • West Elvated : CO • East Elvated : CO, PM2.5 (Primary Data, 2022)		measurements, it is known that the ISPU in the study area is in the Medium category (Primary Data, 2022). 3. The decline in air quality is the impact of heavy/other supporting equipment activities and the transportation of excavated soil from the elevated construction (pier) to the Rorotan Depot area using 56 dump trucks 20 m3 with a rotation rate of 1-4 cycles/day. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns about air pollution and the possibility of derivative impacts in the form of an increase in the prevalence of ISPA, the decrease in air quality due to earthworks in the West Elevated and East Elevated segments is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.		Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	
	Earthworks and Dewatering a. West Elevated and East Elevated Segments	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. Earthworks for the construction of the West Elevated and East Elevated segments of the elevated (pier) segment will use heavy equipment and/or other supporting equipment. The volume of excavated soil from this activity is estimated at 237,432 m3. The excavated soil was transported using 56 dump trucks 20 m3 (amount of 1-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. The noise level at the MRT-EWLP1S1 location has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment. 3. The increase in noise is a direct impact of heavy/other supporting equipment activities and the transportation of excavated soil from the elevated construction (pier) to the Rorotan Depot area using 56 dump trucks 20 m3 with a rotation rate of 1-4 cycles/day. Apart from that, it can also be a derivative impact of a decrease in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to earthworks in the West Elevated and East Elevated segments is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Distance 300 m left-right excavation route (elevated segment) a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	6 years during the construction phase
	Earthworks and Dewatering a. West Elevated and East Elevated Segments	a. Carrying out construction work at ground level begins with the installation of a protective casing that functions to withstand vibrations b. Carrying out pier drilling is carried out using a drilling auger machine only at drilling points where a protective casing has been installed	Geophysics – Chemistry: Vibration The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards.	Increased vibration	1. Earthworks for the construction of the West Elevated and East Elevated segments will use heavy equipment and/or other supporting equipment, starting with the installation of a protective casing. Pier drilling is carried out using a drilling auger machine at the drilling point where a protective casing has been installed. 2. The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards. 3. Increased vibration is a direct impact from heavy equipment/other support activities on earthworks for elevated (pier) construction. 4. Based on the results of community involvement, it is known that residents have requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community, but there are no concerns related to vibrations. By installing protective casing before carrying out the work and by drilling using a drilling auger machine at drilling points where protective casing has been installed which has been planned as part of the earthwork plan in the West Elevated and East Elevated segments, the impact of increased vibration can be controlled and categorized as DL-KP (Direct Impact Manage Monitoring).	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
	Earthworks and Dewatering a. West Elevated and East Elevated Segments	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. Earthworks for the construction of the West Elevated and East Elevated segments of the elevated (pier) segment will use heavy equipment and/or other supporting equipment. The volume of excavated soil from this activity is estimated at 237,432 m3. The excavated soil was transported using 56 dump trucks 20 m3 (amount of 1-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Health Center) to 14.69% (Menteng Health Center) with an average value of 4.79 %. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. Due to public concerns about air pollution, the increase in the prevalence of ARI due to earthworks in the West Elevated and East Elevated segments is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Distance 300 m left-right excavation route (elevated segment) a) Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. Kali Abang Tengah, Jl. Raya Bekasi c) Jl. East Canal Inspection	6 years during the construction phase
	Earthworks and Dewatering a. West Elevated and East Elevated Segments	a. Coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering c. Handling public complaints in accordance with established mechanisms	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. Earthworks for the construction of the West Elevated and East Elevated segments of the elevated (pier) segment will use heavy equipment and/or other supporting equipment. The volume of excavated soil from this activity is estimated at 237,432 m3. The excavated soil was transported using 56 dump trucks 20 m3 (amount of rotation 1-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of earthworks and dewatering, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbance on the community due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Impact Monitor).	DL-KP	-	-
	Earthworks and Dewatering b. Underground Segment	Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including: a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin. b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route.	Geophysics – Chemistry : Traffic The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].	Decreased traffic performance	1. The volume of excavated soil from underground construction is estimated at 1,631,725.71 m3 (underground station 937,640.75 m3 and underground tunnel 693,084.96 m3). The excavated soil was transported using 107 dump trucks 20 m3 (amount of 3-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2022]. 3. The decline in traffic performance is a direct impact of earthwork activities, especially the transportation of excavated soil from the underground construction site to the landfill area at the Rorotan Depot location. This impact can cause derivative impacts in the form of decreased air quality and increased noise, and together with other impacts can result in an increase in the prevalence of ARI diseases. **Volume and Routes of Transport of Excavated Soil from Underground Stations**	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		

Segmen	Lokasi	Volume Tanah Galian (m^3)	Jarak menuju Depo (km)	Trip: Waktu Tempuh (Jam)	Trip: Jumlah (ritasi/hari)	Jumlah Dump Truck Tronton	Ruas Jalan yang Dilintasi: Jl. KH. Hasyim Asy'ari	Jl. Cideng Timur	Jl. Jatibaru Raya	Jl. Kebon Sirih	Jl. A.R. Hakim	Jl. Kramat Kwitang	Jl. Kramat Bunder	Jl. Letjend. Suprapto	Jl. Perintis Kemerdekaan	Jl. Raya Bekasi	Jl. Inspeksi Kanal Timur
Stasiun Underground	St. Roxy	103.102,82	26,493	1,702	3	4											
	St. Petojo	85.351,22	25,313	1,643	3	3											
	St. Cideng	110.364,10	23,782	1,566	3	4											
	St. Thamrin	257.268,10	22,765	1,516	3	9											
	St. Kebon Sirih	100.456,88	22,059	1,480	3	3											
	St. Kwitang	76.930,08	21,224	1,439	3	2											
	St. Senen	116.047,73	20,385	1,397	4	4											
	St. Galur	88.119,82	18,953	1,325	4	3											
	JUMLAH	**937.640,75**															

Volume and Transport Route of Excavated Soil from Underground Tunnels

Segmen	Lokasi	Volume Tanah Galian (m^3)	Jarak menuju Depo (km)	Trip: Waktu Tempuh (Jam)	Trip: Jumlah (ritasi/hari)	Jumlah Dump Truck Tronton	Ruas Jalan yang Dilintasi: Jl. KH. Hasyim Asy'ari	Jl. Cideng Timur	Jl. Jatibaru Raya	Jl. Kebon Sirih	Jl. A.R. Hakim	Jl. Kramat Kwitang	Jl. Kramat Bunder	Jl. Letjend. Suprapto	Jl. Perintis Kemerdekaan	Jl. Raya Bekasi	Jl. Inspeksi Kanal Timur
Terowongan Underground	St. Roxy	107.407,17	26,493	1,702	3	11											
	St. Petojo	94.111,45	25,313	1,643	3	10											
	St. Cideng	88.452,96	23,782	1,566	3	10											
	St. Thamrin	59.813,36	22,765	1,516	3	9											
	St. Kebon Sirih	53.495,29	22,059	1,480	3	9											
	St. Kwitang	58.112,35	21,224	1,439	3	9											
	St. Senen	113.551,66	20,385	1,397	4	9											
	St. Galur	119.140,72	18,953	1,325	4	8											
	JUMLAH	**694.084,96**															

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic, so as not to disturb the comfort of the community. However, with traffic management and engineering that has been planned based on the results of the Andalalin study, the impact of additional traffic volume due to land transportation activities can be controlled. With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).			
	Earthworks and Dewatering b. Underground Segment	Not yet exist	Geophysics – Chemistry: Air Quality The ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category with parameters that exceed the BMUA (PP No. 22/2021): • Underground: PM10, PM2.5, and NO2 (DKI Jakarta Air Quality Monitoring Report, 2021) Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category with parameters that exceed the BMUA (PP No. 22/2021): • Underground : CO (Primary Data, 2022)	Decreased air quality	1. The volume of excavated soil from underground construction is estimated at 1,631,725.71 m3 (underground station 937,640.75 m3 and underground tunnel 693,084.96 m3). The excavated soil was transported using 107 dump trucks 20 m3 (amount of 3-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. ISPU at the HI Roundabout SPKU and Kelapa Gading SPKU during 2021 is in the medium category (DKI Jakarta Air Quality Monitoring Report, 2021). Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category (Primary Data, 2022). The decline in air quality is the impact of heavy/other supporting equipment activities and the transportation of excavated soil for underground construction using 106 20 m3 dump trucks (31 dump trucks for underground stations and 75 dump trucks for underground tunnels) with a rotation rate of 3-4 cycles/day. 3. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. 4. Due to public concerns about air pollution and the possibility of derivative impacts in the form of an increase in the prevalence of ISPA, the decrease in air quality due to earthworks and dewatering in the underground segment is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	Distance 300 m left and right of excavated soil transportation route (underground segment) a) Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. East Canal Inspection	6 years during the construction phase
	Earthworks and Dewatering b. Underground Segment	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. The volume of excavated soil from underground construction is estimated at 1,631,725.71 m3. The excavated soil was transported using 107 dump trucks 20 m3 (amount of 3-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment. 3. The increase in noise is a direct impact of heavy/other supporting equipment activities and the transportation of excavated soil for underground construction using 107 capacity 20 m3 dump trucks (32 dump trucks for underground stations and 75 dump trucks for underground tunnels) with a rotation rate of 3-4 cycles/day. Apart from that, it can also be a derivative impact of decreasing/increasing traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to earthworks and dewatering in the underground segment is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Distance 300 m left and right of excavated soil transportation route (underground segment) a) Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. East Canal Inspection	6 years during the construction phase
	Earthworks and Dewatering b. Underground Segment	a. carry out ground work for underground station construction by installing guide walls (G-wall) & diaphragm walls (D-wall) which function as retaining	Geophysics – Chemistry: Vibration The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No.	Increased vibration	1. Earthwork for underground construction uses heavy equipment and/or other supporting equipment starting with the installation of a guide wall (G-wall) & diaphragm wall (D-wall), while underground tunnel excavation is carried out with a Tunnel Boring Machine (TBM) which directly lines the walls. tunnel with concrete at the same time. 2. The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards.	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		walls for the station structure and to withstand vibrations b. carrying out underground tunnel excavations with TBM-EPB which directly coats the tunnel walls with concrete at the same time as a retaining wall for the tunnel structure and resists vibrations. c. regulate the rotational speed of the TBM drilling machine according to the geologist's recommendations	49/MENLH/11/1996 concerning Vibration Level Standards.		3. Increased vibration is a direct impact of heavy equipment/other support activities on earthworks for underground construction. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts that arise so as not to disturb the comfort of the community, but there were no concerns related to vibrations. By installing a guide wall (G-wall) & diaphragm wall (D-wall) as a retaining wall for the station structure, and digging an underground tunnel with a TBM which directly lines the tunnel walls with concrete which has been planned as part of the earthwork and dewatering plan for the segment underground, then the impact of increased vibrations can be controlled and categorized as DL-KP (Direct Impact Manage Monitoring).			
	Earthworks and Dewatering b. Underground Segment	a. carrying out earthworks for underground station construction by installing guide walls (G-wall) & diaphragm walls (D-wall) which function as retaining walls for station structures and groundwater seepage (design criteria for water leakage ratio ≤ 0.12 L/m2.day & every 10 m ≤ 0.20 L/m2 day) b. carry out underground tunnel excavation with TBM-EPB which directly lines the walls	Geophysics – Chemistry: Hydrogeology The depth of groundwater in the underground segment ranges from - 5 to - 15 m.bmt (CAT Jakarta Groundwater Depth Map, 2019)	Decrease in ground water level	1. The dewatering volume in underground construction is estimated at ± 697,268.77 m3 (JMCA, 2022) 2. The depth of groundwater in the underground segment ranges from - 5 to - 15 m.bmt (CAT Jakarta Groundwater Depth Map, 2019) 3. The decrease in groundwater levels is a direct impact of dewatering work on underground construction 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially ground water so as not to disturb community comfort. By installing a guide wall (G-wall) & diaphragm wall (D-wall) as a retaining wall for the station structure, and digging an underground tunnel with a TBM which directly lines the tunnel walls with concrete which has been planned as part of the earthwork and dewatering plan for the segment underground, then the impact of decreasing groundwater levels can be controlled and categorized as DL-KP (Direct Impact of Monitoring Management).	DL-KP	Distance 300 m left and right of underground construction site a) Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. East Canal Inspection	6 years during the construction phase
		tunnel with concrete at the same time to prevent leaks and groundwater seepage (design criteria for water leakage ratio ≤ 0.12 L/m2.day and every 10 m ≤ 0.20 L/m2.day), and has features to be able to controlling soil flow and water pressure around the tunnel.						
	Earthworks and Dewatering b. Underground Segment	a. provide dewatering water storage ponds b. utilize dewa-tering water for construction activities needs c. periodically suction the remaining unused dewatering water in collaboration with PD PAL Jaya.	Geophysics – Chemistry: Hydrogeology The status of groundwater quality in the underground segment varies from Good to Moderately Polluted	Decreased groundwater quality	1. The dewatering volume in underground construction is estimated at ± 697,268.77 m3 (JMCA, 2022). The dewatering water will mainly be used for construction activities, and the remainder will be sucked out periodically in collaboration with the PAL Jaya Regional Company. 2. The status of groundwater quality in the underground segment varies from Good to Moderately Polluted 3. Decreased groundwater quality is a direct impact of dewatering in underground construction 4. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. With limited utilization and regular suction of dewatering water as part of the earthwork and dewatering plan in the underground segment, the impact of decreasing groundwater quality can	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					be controlled and categorized as DTPH (Hypothetical Non-Significant Impact), but still managed and monitored.			
	Earthworks and Dewatering b. Underground Segment	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. The volume of excavated soil from underground construction is estimated at 1,630,725.71 m3. The excavated soil was transported using 107 dump trucks 20 m3 (amount of 3-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Health Center) to 14.69% (Menteng Health Center) with an average value of 4.79 %. 3. The increase in the prevalence of ARI is a derivative impact of air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of air quality. With the public's concern about air pollution, the increase in the prevalence of ARI due to earthworks and dewatering in the underground segment is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Distance 300 m left and right of excavated soil transportation route (underground segment) a) Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi b) Jl. East Canal Inspection	6 years during the construction phase
	Earthworks and Dewatering b. Underground Segment	a. Coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. Earthworks for the construction of the West Elevated and East Elevated segments of the elevated (pier) segment will use heavy equipment and/or other supporting equipment. The volume of excavated soil from this activity is estimated at 237,432 m3. The excavated soil was transported using 56 dump trucks 20 m3 (amount of rotation 1-4 rit/day) to the Rorotan Depot area and used as backfill material. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of earthworks and dewatering, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA.	DL-KP	-	-
		c. Handling public complaints according to the established mechanism			4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbance on the community due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Impact Monitor).			
	Earthworks and Dewatering c. Depot Segment	Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including: a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin. b. Install warning or notification signs to avoid the road section due to	Geophysics – Chemistry : Traffic The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].	Decreased traffic performance	1. The number of trucks carrying excavated earth carrying activities in the depot area is 163 units (107 units from underground construction and 56 units from elevated construction) 1-4 units/day. Earthworks in the depot area in the form of structuring and compacting embankment material are carried out using heavy equipment and/or other supporting equipment. 2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2023]. 3. The decline in traffic performance is a direct impact of earthwork activities, especially the transportation of excavated soil. This impact can cause derivative impacts in the form of decreased air quality and increased noise, and together with other impacts can result in an increase in the prevalence of ARI diseases. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic, so as not to disturb the comfort of the community. However, with traffic management and engineering that has	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		construction work on the MRT-EWLP1S1 route.			been planned based on the results of the Andalalin study, the impact of additional traffic volume due to land transportation activities can be controlled. With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).			
	Earthworks and Dewatering c. Depot Segment	Not yet exist	Geophysics – Chemistry: Air Quality Based on the results of ambient air quality measurements, it is known that the ISPU in the study area is in the Medium category with parameters that exceed the BMUA (PP No. 22/2021): • Depot Segment: PM2.5 (Primary Data, 2022)	Decreased air quality	1. The number of trucks carrying excavated earth carrying activities in the depot area is 163 units (107 units from underground construction and 56 units from elevated construction) 1-4 units/day. Earthworks in the depot area in the form of structuring and compacting embankment material are carried out using heavy equipment and/or other supporting equipment. 2. Based on the results of ambient air quality measurements, it is known that the ISPU in the Depo segment is in the Medium category with parameters that exceed the BMUA (PP No. 22/2021) namely PM2.5 3. The decline in air quality in the Rorotan Depot area is the impact of the activities of 163 dump trucks carrying excavated soil and other heavy/supporting equipment. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns about air pollution and the possibility of derivative impacts in the form of increasing the prevalence of ARI diseases, the reduction in air quality due to earthworks in the depot segment is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	Distance 300 m left-right Jl. Inspection of the East Canal and a radius of 300 m from the Rorotan Depot location	6 years during the construction phase
	Earthworks and Dewatering c. Depot Segment	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. The number of trucks carrying excavated earth carrying activities in the depot area is 163 units (107 units from underground construction and 56 units from elevated construction) 1-4 units/day. Earthworks in the depot area in the form of structuring and compacting embankment material are carried out using heavy equipment and/or other supporting equipment. 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Standard Noise Level (Decree of the Minister of the Environment No.48/MENLH/11/1996) for each designated area/activity environment. 3. The increase in noise in the Rorotan Depot area is the impact of the activities of 163 dump trucks carrying excavated earth and other heavy/supporting equipment.	DPH	Distance 300 m left-right Jl. Inspection of the East Canal and a radius of 300 m from the Rorotan Depot location	6 years during the construction phase
					4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to earthworks in the depot segment is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.			
	Earthworks and Dewatering c. Depot Segment	Not yet exist	Geophysics – Chemistry: Hydrology The planned location for the Rorotan Depot is an agricultural area and has the potential for flooding when it rains, coupled with the inadequate condition of the existing drainage system.	Increased runoff water discharge	1. Earthworks in the depot area consist of arranging and compacting backfill material using heavy equipment and/or other supporting equipment. The amount of excavated land that will be used for embankment in the Rorotan Depot area is 1,869,157.71 m3. 2. The planned location for the Rorotan Depot is an agricultural area and has the potential for flooding when it rains. The condition of the existing drainage system is inadequate. 3. The increase in runoff water discharge is the impact of activities to use excavated soil as fill material for the embankment of the Rorotan Depot area which will change the topography and runoff coefficient at the Rorotan Depot location. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially the occurrence of inundation so as not to disturb the comfort of the community. Due to public concerns regarding inundation, the impact of increased runoff due to earthworks in the depot segment is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	*Catchment*Rorotan Depot location area	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
	Earthworks and Dewatering c. Depot Segment	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. The number of trucks carrying excavated earth carrying activities in the depot area is 163 units (107 units from underground construction and 56 units from elevated construction) 1-4 units/day. Earthworks in the depot area in the form of structuring and compacting embankment material are carried out using heavy equipment and/or other supporting equipment. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) to 14.69% (Menteng Community Health Center) with an average value of 4 .79%. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community The increase in the prevalence of ARI is a derivative impact of decreasing air quality. With public concerns regarding air pollution, the increase in the prevalence of ARI due to earthworks in the depot segment is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Distance 300 m left and right of the East Canal Inspection Road and a radius of 300 m from the Rorotan Depot location	6 years during the construction phase
	Earthworks and Dewatering c. Depot Segment	a. Coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing earthworks and dewatering b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of earthworks and dewatering	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. The number of trucks carrying excavated earth carrying activities in the depot area is 163 units (107 units from underground construction and 56 units from elevated construction) 1-4 units/day. Earthworks in the depot area in the form of structuring and compacting embankment material are carried out using heavy equipment and/or other supporting equipment. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of earthworks and dewatering, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA.	DL-KP	-	-
		c. Handling public complaints according to the established mechanism			4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbance on the community due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Impact Monitor).			
7	Underground Construction Work	Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including: a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin. b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route.	Geophysics – Chemistry : Traffic The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].	Decreased traffic performance	1. Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel of ± 9 km using TBM. Underground construction work will use heavy equipment and/or other supporting equipment. 2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2022]. 3. The decline in traffic performance is a direct impact of underground construction work (underground stations and tunnels). This impact can cause derivative impacts in the form of changes in air quality and noise levels 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic, so as not to disturb the comfort of the community. However, with traffic management and engineering that has been planned based on the results of the Andalalin study, the impact of additional traffic volume due to construction work can be controlled. With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to construction work can be controlled and categorized as DL-KP (Direct Impact of Monitoring Management).	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
	Underground Construction Work	Not yet exist	Geophysics – Chemistry: Air Quality ISPU in the underground segment is in the medium category with parameters that exceed BMUA (PP No. 22/2021) namely PM10, PM2.5, and NO2 (DKI Jakarta Air Quality Monitoring Report, 2021). Based on the results of ambient air quality measurements, it is known that ISPU in the underground segment is in the medium category with a parameter that exceeds BMUA, namely CO (Primary Data, 2022).	Decreased air quality	1. Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel measuring ± 9 km using a Tunnel Boring Machine (TBM). Underground construction work will use heavy equipment and/or other supporting equipment. 2. ISPU in the underground segment is in the medium category with parameters that exceed BMUA (PP No. 22/2021) namely PM10, PM2.5, and NO2 (DKI Jakarta Air Quality Monitoring Report, 2021). Based on the results of ambient air quality measurements, it is known that ISPU in the underground segment is in the medium category with a parameter that exceeds BMUA, namely CO (Primary Data, 2022). 3. The decline in air quality is a direct impact of the activities of heavy equipment/other supports for underground construction. Apart from that, it can also be a derivative impact of a decrease in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns about air pollution and the possibility of derivative impacts in the form of increasing the prevalence of ISPA, the reduction in air quality due to underground construction work is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	Distance 300 m left-right Jl. KH. Hasyim Asy'ari, Jl. East Cideng, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto	6 years during the construction phase
	Underground Construction Work	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel measuring ± 9 km using a Tunnel Boring Machine (TBM). Underground construction work will use heavy equipment and/or other supporting equipment. 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment. 3. Increased noise is a direct impact of heavy equipment/other support activities for underground construction. Apart from that, it can also be a derivative impact of a decrease in traffic performance, especially if there are delays in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to underground construction work is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Distance 300 m left-right Jl. KH. Hasyim Asy'ari, Jl. East Cideng, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto	6 years during the construction phase
	Underground Construction Work	a. Carrying out under-ground station construction work begins with the installation of a guide wall (G-wall) & diaphragm wall (D-wall) which functions as a retaining wall for the station structure and to withstand vibrations b. Carrying out underground tunnel construction work in	Geophysics – Chemistry: Vibration The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards.	Increased vibration	1. Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel of ± 9 km using a Tunnel Boring Machine (TBM). Underground construction work will use heavy equipment and/or other supporting equipment. 2. The vibration level in the study area is in the "not disturbing" category referring to KepMenLH No. 49/MENLH/11/1996 concerning Vibration Level Standards. 3. Increased vibration is a direct impact of heavy equipment/other support activities on underground construction work.	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		parallel with tunnel excavation using a Tunnel Boring Machine (TBM) which directly covers the tunnel walls with concrete at the same time as a retaining wall for the tunnel structure and resisting vibrations.			4. Based on the results of community involvement, it is known that residents have requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community, but there are no concerns related to vibrations. By installing a guide wall (G-wall) & diaphragm wall (D-wall) as a retaining wall for the station structure and preventing vibrations, as well as digging an underground tunnel with a TBM which directly lines the tunnel walls with concrete which has been planned as part of the construction work plan in underground, then the impact of increased vibrations can be controlled and categorized as DL-KP (Direct Impact Manage Monitoring).			
	Underground Construction Work	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel measuring ± 9 km using a Tunnel Boring Machine (TBM). Underground construction work will use heavy equipment and/or other supporting equipment. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Health Center) to 14.69% (Menteng Health Center) with an average value of 4.79 %. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. With the public's concern about air pollution, the increase in the prevalence of ARI due to underground construction work is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Distance 300 m left-right Jl. KH. Hasyim Asy'ari, Jl. East Cideng, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto	6 years during the construction phase
	Underground Construction Work	a. Coordinate and collaborate with village heads, sub-district heads and related agencies to carry out socialization of plans for implementing underground construction work b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of underground construction work c. Handling public complaints according to the established mechanism	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. Underground construction work includes: construction of 8 underground stations using the top-down method, and construction of an underground tunnel measuring ± 9 km using a Tunnel Boring Machine (TBM). Underground construction work will use heavy equipment and/or other supporting equipment. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of underground construction work, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 can provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbance on the community due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Impact Monitor).	DL-KP	-	-
8	Ground Surface Construction Work a. West Elevated and East Elevated Segments	Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including: a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin.	Geophysics – Chemistry : Traffic The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].	Decreased traffic performance	1. Construction work on the ground surface includes: a) West elevated segment - construction of 2 elevated stations - construction of an elevated route ± 2,668 Km - construction of 1 Receiving Substation (RSS) unit b) East elevated segment - construction of 11 elevated stations - construction of an elevated route ± 13,054 Km - construction of 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment.	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route.			2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2022]. 3. The decline in traffic performance is a direct impact of construction work on the ground surface (stations, train lines and RSS). This impact can cause derivative impacts in the form of changes in air quality and noise levels. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic, so as not to disturb the comfort of the community. However, with traffic management and engineering that has been planned based on the results of the Andalalin study, the impact of additional traffic volume due to construction work can be controlled. With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to construction work can be controlled and categorized as DL-KP (Direct Impact of Monitoring Management).			
	Ground Surface Construction Work a. West Elevated and East Elevated Segments	Not yet exist	Geophysics – Chemistry: Air Quality ISPU in the elevated segment is in the medium category with parameters that exceed BMUA (PP No. 22/2021) namely NO2 (West elvated) and PM10, PM2.5, SO2, O3 (East elvated) [DKI Jakarta Air Quality Monitoring Report, 2021] . Based on the results of ambient air quality measurements, it is known that ISPU in the elevated segment is in the medium category with parameters that exceed BMUA, namely CO (West elvated) and CO, PM2.5 (East elvated) [Primary Data, 2022].	Decreased air quality	1. Construction work on the ground surface includes: a) West elevated segment: construction of 2 elevated stations, elevated line ± 2,668 Km and 1 Receiving Substation (RSS) unit b) East elevated segment: construction of 11 elevated stations, construction of an elevated line ± 13,054 Km and 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. ISPU in the elevated segment is in the medium category with parameters that exceed BMUA (PP No. 22/2021) namely NO2 (West elvated) and PM10, PM2.5, SO2, O3 (East elvated) [DKI Jakarta Air Quality Monitoring Report, 2021] . Based on the results of ambient air quality measurements, it is known that ISPU in the elevated segment is in the medium category with parameters that exceed BMUA, namely CO (West elvated) and CO, PM2.5 (East elvated) [Primary Data, 2022]. 3. Decreased air quality is a direct impact of heavy equipment/other support activities for construction on the ground surface. Apart from that, it can also be a derivative impact of decreasing/increasing traffic performance, especially if there is a delay in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns regarding air pollution and the possibility of derivative impacts in the form of increasing the prevalence of ISPA, the decrease in air quality due to construction work at ground level in the elevated segment is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	Distance 300 m left-right a. West Elevated Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari b. East Elevated Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi	6 years during the construction phase
	Ground Surface Construction Work a. West Elevated and East Elevated Segments	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. Construction work on the ground surface includes: a) West elevated segment: construction of 2 elevated stations, elevated line ± 2,668 Km and 1 Receiving Substation (RSS) unit b) East elevated segment: construction of 11 elevated stations, construction of an elevated line ± 13,054 Km and 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standard (KepMenLH No.48/ MENLH/ 11/1996) for each designated area/activity environment. 3. Increased noise is a direct impact of heavy equipment/other support activities for construction on the ground surface. Apart from that, it can also be a derivative impact of decreasing/increasing traffic performance, especially if there is a delay in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location,	DPH	Distance 300 m left-right a. West Elevated Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari b. East Elevated Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to ground level construction work in the elevated segment is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.			
	Ground Surface Construction Work a. West Elevated and East Elevated Segments	a. Construction work at ground level begins with the installation of a protective casing which functions to withstand vibrations b. Pier drilling is carried out using a drilling auger machine at the drilling point where a protective casing has been installed	Geophysics – Chemistry: Vibration The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards.	Increased vibration	1. Construction work on the ground surface includes: a) West elevated segment: construction of 2 elevated stations, elevated line ± 2,668 Km and 1 Receiving Substation (RSS) unit b) East elevated segment: construction of 11 elevated stations, construction of an elevated line ± 13,054 Km and 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards. 3. Increased vibration is a direct impact of heavy equipment/other support activities on construction work at ground level. 4. Based on the results of community involvement, it is known that residents have requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community, but there are no concerns related to vibrations. By installing a protective casing before drilling the pier using a drilling auger machine which has been planned as part of the construction work plan on the ground surface in the elevated segment, the impact of increased vibrations can be controlled and categorized as DLKP (Direct Management Monitoring Impact).	DL-KP	Distance 300 m left-right a. West Elevated Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari b. East Elevated Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi	6 years during the construction phase
	Ground Surface Construction Work a. West Elevated and East Elevated Segments	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. Ground level construction work in the Depot segment: a) West elevated segment: construction of 2 elevated stations, elevated line ± 2,668 Km and 1 Receiving Substation (RSS) unit b) East elevated segment: construction of 11 elevated stations, construction of an elevated line ± 13,054 Km and 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79 %. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. With the public's concern about air pollution, the increase in the prevalence of ARI due to construction work on the ground surface in the elevated segment is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Distance 300 m left-right a. West Elevated Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari b. East Elevated Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi	6 years during the construction phase
	Ground Surface Construction Work a. West Elevated and East Elevated Segments	a. Coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of construction work implementation plans b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of construction work	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. Ground level construction work in the Depot segment: a) West elevated segment: construction of 2 elevated stations, elevated line ± 2,668 Km and 1 Receiving Substation (RSS) unit b) East elevated segment: construction of 11 elevated stations, construction of an elevated line ± 13,054 Km and 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of underground construction work, especially if it is felt to be detrimental to the community. Apart from that,	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		c. Handling public complaints according to the established mechanism			environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 can provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community. By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbance on the community due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Impact Monitor).			
	Ground Surface Construction Work b. Depot Segment	Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including: a. Transportation is carried out in stages from 22.00 – 05.00 WIB via a predetermined route as stipulated in Andalalin. b. Install warning or notification signs to avoid the road section due to construction work on the MRT-EWLP1S1 route.	Geophysics – Chemistry : Traffic The traffic performance (level of service) of roads and intersections in each segment varies from service level A (free flow) to F (impeded flow). Service levels E (unstable flow) and F (impeded flow) mainly occur in the morning and evening [Andalalin, 2023].	Decreased traffic performance	1. Ground level construction work in the Depot segment: a) Construction of Rorotan Depot (23 Ha) b) Construction of an access route to the Rorotan Depot (± 5.9 km). Construction work on the ground surface will use heavy equipment and/or other supporting equipment. 2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2023]. 3. The decline in traffic performance is a direct impact of construction work on the ground surface (stations, train lines and RSS). This impact can cause derivative impacts in the form of changes in air quality and noise levels. 4. Based on the results of community involvement, it is known that residents asked the person in charge of activities to pay attention to any impacts caused, especially traffic, so as not to disturb the comfort of the community. However, with traffic management and engineering that has been planned based on the results of the Andalalin study, the impact of additional traffic volume due to construction work can be controlled. With traffic management and engineering that has been planned based on the results of Andalalin's study, the impact of additional traffic volume due to construction work can be controlled and categorized as DL-KP (Direct Impact of Monitoring Management).	DL-KP	-	-
	Ground Surface Construction Work b. Depot Segment	Not yet exist	Geophysics – Chemistry: Air Quality Based on the results of ambient air quality measurements, it is known that ISPU in the Depo segment is in the medium category with parameters that exceed BMUA, namely PM2.5 [Primary Data, 2022].	Decreased air quality	1. Ground level construction work in the Depot segment: a) Construction of Rorotan Depot (23 Ha) b) Construction of an access route to the Rorotan Depot (± 5.9 km). Construction work on the ground surface will use heavy equipment and/or other supporting equipment. 2. Based on the results of ambient air quality measurements, it is known that ISPU in the Depo segment is in the medium category with parameters that exceed BMUA, namely PM2.5 [Primary Data, 2022]. 3. The decline in air quality is a direct impact of heavy equipment/other support activities for the construction of the depot building and the access route to the Rorotan Depot. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. Due to public concerns regarding air pollution and the possibility of derivative impacts in the form of an increase in the prevalence of ISPA, the reduction in air quality due to ground-level construction work in the depot segment is categorized as DPH (Hypothetical Significant Impact).and studied further in CHAPTER 6.	DPH	Distance 300 m left and right of the East Canal Inspection road and a radius of 300 m from the Rorotan Depot location	6 years during the construction phase
	Ground Surface Construction Work b. Depot Segment	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. Ground level construction work in the Depot segment: a) Construction of Rorotan Depot (23 Ha) b) Construction of an access route to the Rorotan Depot (± 5.9 km). Construction work on the ground surface will use heavy equipment and/or other supporting equipment. 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment. 3. The increase in noise is a direct impact of heavy equipment/other support activities for the construction of the depot building and the access route to the Rorotan Depot.	DPH	Distance 300 m left and right of the East Canal Inspection road and a radius of 300 m from the Rorotan Depot location	6 years during the construction phase

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to ground-level construction work in the depot segment is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.			
	Ground Surface Construction Work b. Depot Segment	Not yet exist	Public health : Prevalence of ARI Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79%.	Increased prevalence of ARI	1. Ground level construction work in the Depot segment: a) Construction of Rorotan Depot (23 Ha) b) Construction of access route to Rorotan Depot (± 5.9 km) Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. Based on data on the 10 biggest diseases in 2022 in 13 Community Health Centers in the MRT-EWLP1S1 development area, it is known that the prevalence of ISPA is 0.06% (Medan Satria Community Health Center) – 14.69% (Menteng Community Health Center) with an average value of 4.79 %. 3. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. The increase in the prevalence of ARI is a derivative impact of decreasing air quality. With the public's concern about air pollution, the increase in the prevalence of ARI due to ground-level construction work in the depot segment is categorized as DPH (Hypothetical Significant Impact) and is studied further in CHAPTER 6.	DPH	Social boundaries: Surrounding communities at a distance of 300 m left and right of the East Canal Inspection road and a radius of 300 m from the Rorotan Depot location	6 years during the construction phase
	Ground Surface Construction Work b. Depot Segment	a. Coordinating and collaborating with village heads, sub-district heads and related agencies to carry out socialization of construction work implementation plans b. Providing a Complaint Service Post to accommodate public complaints regarding the implementation of construction work c. Handling public complaints according to the established mechanism	Sosekbud: Socio-Cultural Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%). %) and other impacts (5.99%).	Environmental Disruption to Society	1. Ground level construction work in the Depot segment: a) West elevated segment: construction of 2 elevated stations, elevated line ± 2,668 Km and 1 Receiving Substation (RSS) unit b) East elevated segment: construction of 11 elevated stations, construction of an elevated line ± 13,054 Km and 1 Receiving Substation (RSS) unit Construction work on the ground will use heavy equipment and/or other supporting equipment. 2. Based on the results of interviews with 384 affected families at the activity location, it is known that respondents expressed several concerns about environmental disturbances to the community in the form of water pollution (9.38%), air pollution (13.54%), noise (30.21%) and other impacts (5.99%). 3. Environmental disturbances to the community can be a direct impact of construction work, especially if it is felt to be detrimental to the community. Apart from that, environmental disruption to society is also a derivative impact of decreased traffic performance, decreased air quality, increased noise, and increased prevalence of ISPA. 4. The results of community involvement show that residents request that the construction of the MRT-EWLP1S1 can provide benefits, not harm the community and must provide a complaint service post that can be accessed by the community.	DL-KP	-	-
					By providing a Complaint Service Post to accommodate community complaints and a mechanism for handling community complaints that has been planned as part of the MRT-EWLP1S1 Development activity plan, the impact of environmental disturbance on the community due to earthworks and dewatering can be controlled and categorized as DL-KP (Direct Management Impact Monitor).			
B	**Operational Stage**							
9	Acceptance of Operational Workers	Not yet exist	Sosekbud: Socioeconomic The total workforce in the 5 cities at the MRT-EWLP1S1 construction site is 6,238,526 people with a percentage of	Open job opportunities	1. MRT-EWLP1S1 operations are estimated to involve at least 1,120 workers with a minimum of 20% (244 people) local workers (residents affected by land acquisition and environmental disturbances who meet skill qualification requirements) 2. The total workforce in the 5 cities at the MRT-EWLP1S1 construction site is 6,238,526 people with a percentage of 90.32% employed and 9.68% unemployed (BPS, 2022). Based on the results of interviews with 384 affected families at the activity location, it was discovered that the	DPH	Location of MRT-EWLP1S1 in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, Petojo Utara, Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih,	During the operational stage

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
			90.32% employed and 9.68% unemployed (BPS, 2022). Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents' occupations were self-employed (36.98%) and 10 respondents (2.6%) did not work.		majority of respondents' occupations were self-employed (36.98%) and 10 respondents (2.6%) did not work. 3. The opening of job opportunities is a direct impact of operational workforce recruitment activities (especially if they involve affected communities). This impact can influence family income levels, as well as community perceptions & attitudes towards the construction of MRT-EWLP1S1. 4. The results of community involvement show that residents requested that local workers be a priority to be able to work on the MRT-EWLP1S1 construction project. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (63.02%) hope to get job opportunities on the MRT-EWLP1S1 development project. With the community's high hopes of getting job opportunities in MRT-EWLP1S1 operations, the job opportunities opened up as a result of operational workforce recruitment activities are categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.		Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with the number of residents affected directly as many as 1,659 people (488 families)	
	Acceptance of Operational Workers	Not yet exist	Sosekbud: Socioeconomic The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/month/capita with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month.	Increase in family income	1. MRT-EWLP1S1 operations are estimated to involve at least 1,120 workers with a minimum of 20% (244 people) local workers (residents affected by land acquisition and environmental disturbances who meet skill qualification requirements) 2. The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/capita with the proportion of expenditure (consumption patterns) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month. 3. An increase in family income (especially for those involved in the MRT-EWLP1S1 project as operational workers) is a derivative impact of the opening of job opportunities, and can influence community perceptions and attitudes towards the MRT-EWLP1S1 project 4. Based on the results of community involvement, it is known that residents requested that local workers be a priority to be able to work on the MRT-EWLP1S1 project. This shows that there is great hope from the community to be involved and benefit from the MRT-EWLP1S1 project, especially to increase family income. By regulating the work system, wages and insurance (BPJS Employment and BPJS Health), operational workers are agreed in writing in a Work Agreement for a Certain Time (PKWTT) as permanent workers, or in a Work Agreement for a Certain Time (PKWT) as temporary workers in accordance applicable regulations, operational workers will receive a minimum income equivalent to the DKI Jakarta UMP (in 2023 of 4.9 million rupiah). Apart from that, there is the community's hope that local workers will be a priority to be able to work on the MRT-EWLP1S1 project. Therefore, the increase in family income due to operational labor recruitment activities is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Location of MRT-EWLP1S1 in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, Petojo Utara, Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with the number of residents affected directly as many as 1,659 people (488 families)	During the operational stage
	Acceptance of Operational Workers	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan. However, residents requested that the person in charge of activities convey detailed information regarding plans for recruiting operational workers and that the recruitment process be carried out openly, in accordance with	Changes in public perceptions and attitudes	1. MRT-EWLP1S1 operations are estimated to involve at least 1,120 workers with a minimum of 20% (244 people) local workers (residents affected by land acquisition and environmental disturbances who meet skill qualification requirements) 2. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan. 3. Changes in community perceptions and attitudes can be a direct impact of operational workforce recruitment activities, especially if the recruitment process is not carried out openly, does not comply with regulations and is felt to be detrimental to the community. Apart from that, changes in people's perceptions and attitudes are also a derivative impact of opening up job opportunities and increasing family income. 4. The results of community involvement show that residents requested that the Person in Charge of Activities convey detailed information regarding plans for hiring operational workers and that the recruitment process be carried out openly, in accordance with regulations and without harming the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 29 respondents (7.55%) expressed concerns about social	DPH	Location of MRT-EWLP1S1 in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, Petojo Utara, Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with the number of residents affected directly as	During the operational stage

<table>
<tr><th rowspan="2">No</th><th rowspan="2">Potential Activity Plans Environmental Impact.</th><th rowspan="2">Prepared Environmental Management Plan</th><th rowspan="2">Environmental Components Affected</th><th colspan="3">Scoping</th><th rowspan="2">Study Area</th><th rowspan="2">Study Deadline</th></tr>
<tr><th>Potential Impact</th><th>Potential Impact Evaluation</th><th>DPH</th></tr>
<tr><td></td><td></td><td></td><td>regulations and without harming the community.</td><td></td><td>conflict/dispute occurring in the community, one of which was the possibility of occurring during the recruitment of MRT-EWLP1S1 operational workers.
With the community's hope that local workers will be a priority to be able to work on the MRT-EWLP1S1 project, as well as the possibility of derivative impacts from opening up job opportunities and increasing family income, changes in community perceptions and attitudes resulting from operational workforce recruitment activities are categorized as DPH (Impact Important Hypothetical)and studied further in CHAPTER 6.</td><td></td><td>many as 1,659 people (488 families)</td><td></td></tr>
<tr><td>10</td><td>Passenger Transport & Station Operations</td><td>Carry out traffic management and engineering by referring to the recommendations from the Andalalin study results, including:
1) Providing crossing facilities for pedestrians and vehicles wishing to turn from the South or North.
2) Implementing an odd-even system along the road section where the MRT-EWLP1S1 station is located to reduce vehicle volume on that road section.
3) Creation of zebra crossings at every intersection for pedestrians.
4) Clearing sidewalks and side barriers (especially in the area around the MRT-EWLP1S1 station) by officers so that road capacity and supporting facilities can be used optimally.</td><td>Geophysics – Chemistry: Traffic
The traffic performance (level of service) of road sections in each segment varies from service level A (free flow, low volume and high speed, the driver can choose the desired speed) to E (unstable flow, low speed and varies, volume approaches capacity). Service level E mainly occurs in the morning and evening [Andalalin, 2022].</td><td>Improved traffic performance</td><td>1. MRT-EWLP1S1 Operational:
a. 21 stations (8 underground stations and 13 elevated stations)
b. operates 19 hours per day (05.00 – 24.00)
Estimation of passenger distribution
<table>
<tr><th rowspan="2">Stasiun</th><th rowspan="2">Kode</th><th colspan="3">Jumlah penumpang (orang/hari)</th></tr>
<tr><th>Naik</th><th>Turun</th><th>Total</th></tr>
<tr><td>Tomang</td><td>TMG</td><td>63.292</td><td>63.566</td><td>126.858</td></tr>
<tr><td>Grogol</td><td>GRG</td><td>33.362</td><td>38.219</td><td>71.581</td></tr>
<tr><td>Roxy</td><td>RXY</td><td>41.678</td><td>32.394</td><td>74.072</td></tr>
<tr><td>Petojo</td><td>PTJ</td><td>42.337</td><td>44.267</td><td>86.604</td></tr>
<tr><td>Cideng</td><td>CDG</td><td>57.704</td><td>52.136</td><td>109.840</td></tr>
<tr><td>Thamrin</td><td>TMR</td><td>180.701</td><td>139.187</td><td>319.888</td></tr>
<tr><td>Kebon Sirih</td><td>KBS</td><td>17.427</td><td>21.914</td><td>39.341</td></tr>
<tr><td>Kwitang</td><td>KWT</td><td>30.827</td><td>30.767</td><td>61.594</td></tr>
<tr><td>Senen</td><td>SNN</td><td>83.751</td><td>80.326</td><td>164.077</td></tr>
<tr><td>Galur</td><td>GLR</td><td>30.324</td><td>27.839</td><td>58.163</td></tr>
<tr><td>Cempaka Baru</td><td>CPB</td><td>30.408</td><td>36.666</td><td>67.074</td></tr>
<tr><td>Sumur Batu</td><td>SMB</td><td>112.989</td><td>80.729</td><td>193.718</td></tr>
<tr><td>Pakulonan Barat</td><td>PKB</td><td>45.886</td><td>47.335</td><td>93.221</td></tr>
<tr><td>Pakulonan Timur</td><td>PKT</td><td>99.087</td><td>114.586</td><td>213.673</td></tr>
<tr><td>Perintis</td><td>PRT</td><td>47.551</td><td>42.146</td><td>89.697</td></tr>
<tr><td>Pulo Gadung</td><td>PLG</td><td>27.827</td><td>35.974</td><td>63.801</td></tr>
<tr><td>Penggilingan</td><td>PGG</td><td>8.722</td><td>9.335</td><td>18.057</td></tr>
<tr><td>Cakung Barat</td><td>CKB</td><td>80.476</td><td>82.750</td><td>163.226</td></tr>
<tr><td>Pulo Gebang</td><td>PGB</td><td>8.432</td><td>8.868</td><td>17.300</td></tr>
<tr><td>Ujung Menteng</td><td>UJM</td><td>25.555</td><td>25.487</td><td>51.042</td></tr>
<tr><td>Medan Satria</td><td>MDS</td><td>8.432</td><td>8.868</td><td>17.300</td></tr>
</table></td><td>DL-KP</td><td>-</td><td>-</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2. The traffic performance (level of service) of roads in each segment varies from service level A to E. Service level E mainly occurs in the morning and evening [Andalalin, 2022].
3. The operation of the MRT-EWLP1S1 will improve traffic performance and can overcome the problem of traffic congestion in the DKI Jakarta area.
4. Based on the results of community involvement, it is known that residents hope that the MRT can reduce traffic congestion. Based on the results of interviews with 384 affected families at the activity location, it was found that 41.41% of respondents stated that the MRT-EWLP1S1 was useful for reducing congestion, and 43.49% stated that the MRT-EWLP1S1 was useful for improving public transportation facilities.
With traffic management and engineering that has been planned based on the results of the Andalalin study, traffic performance on several road sections in the study area can be maintained and/or improved, so that it is categorized as DL-KP (Direct Impact Management Monitoring).</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Passenger Transport & Station Operations</td><td>1) provide toll gates at the access route to enter the parking area and separate parking areas for bicycles, 2-wheeled and 4-wheeled motorized vehicles</td><td>Geophysics – Chemistry: Air Quality
ISPU in the elevated segment is in the medium category with parameters that exceed BMUA (PP No. 22/2021) namely NO2 (West elvated) and PM10,</td><td>Decreased air quality</td><td>1. MRT-EWLP1S1 Operational:
a. 21 stations (8 underground stations and 13 elevated stations)
b. operates 19 hours per day (05.00 – 24.00)
2. ISPU in the elevated segment is in the medium category with parameters that exceed BMUA (PP No. 22/2021) namely NO2 (West elvated) and PM10, PM2.5, SO2, O3 (East elvated) [DKI Jakarta Air Quality Monitoring Report, 2021] . Based on the results of ambient air quality measurements,</td><td>DL-KP</td><td>-</td><td>-</td></tr>
</table>

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		2) provide adequate air ventilation, exhaust fans and blowers at the parking basement location 3) provide first aid kits and oxygen cylinders at the basement parking location 4) providing green open space/landscaping with tree species that absorb emissions, including: ganitri, bungur, cempaka, peacock flower, kerchief, tanjung, asam kranji, kiara umbrella, etc.	PM2.5, SO2, O3 (East elvated) [DKI Jakarta Air Quality Monitoring Report, 2021] . Based on the results of ambient air quality measurements, it is known that ISPU in the elevated segment is in the medium category with parameters that exceed BMUA, namely CO (West elvated) and CO, PM2.5 (East elvated) [Primary Data, 2022].		it is known that ISPU in the elevated segment is in the medium category with parameters that exceed BMUA, namely CO (West elvated) and CO, PM2.5 (East elvated) [Primary Data, 2022]. 3. Decreased air quality is a direct impact of motorized vehicle activity in the station area, especially if there is a delay in traffic flow in the same location and for quite a long time. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 52 respondents (13.54%) expressed concerns about air pollution due to the MRT-EWLP1S1 construction project. However, with a management plan that has been prepared as part of the activity plan, the impact of decreasing air quality due to passenger transportation & station operations can be controlled. With a management plan that has been prepared as part of the activity plan, the impact of decreasing air quality due to passenger transportation & station operations can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).			
	Passenger Transport & Station Operations	Not yet exist	Geophysics – Chemistry: Noise level The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment.	Increased noise	1. MRT-EWLP1S1 Operational: a. 21 stations (8 underground stations and 13 elevated stations) b. operates 19 hours per day (05.00 – 24.00) 2. The noise level at the MRT-EWLP1S1 construction site has exceeded the Noise Level Standards (KepMenLH No.48/MENLH/11/1996) for each designated area/activity environment. 3. The increase in noise is a direct impact from passenger transportation activities & station operations, especially from train operating activities in the elevated segment. 4. The results of community involvement show that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Based on the results of interviews with 384 affected families at the activity location, it was found that 116 respondents (30.21%) expressed concern about increased noise due to the MRT-EWLP1S1 construction project. Due to public concerns regarding increased noise, the impact of increased noise due to passenger transport activities & station operations (especially from train operating activities in the elevated segment) is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Distance 300 m left-right along the MRT-EWLP1S1 line	During the operational stage
	Passenger Transport & Station Operations	Not yet exist	Geophysics – Chemistry: Vibration The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards.	Increased vibration	1. MRT-EWLP1S1 Operational: a. 21 stations (8 underground stations and 13 elevated stations) b. operates 19 hours per day (05.00 – 24.00) 2. The vibration level in the study area is in the "not disturbing" category referring to the Decree of the Minister of Environment No. 49/MENLH/11/1996 concerning Vibration Level Standards. 3. The increase in vibration is a direct impact of passenger transportation activities & station operations, especially from train operating activities in the elevated and underground segments. 4. Based on the results of community involvement, it is known that residents requested that the person in charge of activities pay attention to any impacts that arise so as not to disturb the comfort of the community. Due to public concerns regarding increased vibrations, the impact of increased vibrations due to passenger transport activities & station operations (especially from train operating activities in the elevated segment) is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Distance 300 m left and right on the MRT-EWLP1S1 line	During the operational stage
	Passenger Transport & Station Operations	a. providing a Sewage Treatment Plan (STP) with an anaerobic-aerobic biofilter system b. periodically suctioning STP processed wastewater in collaboration with PD PAL Jaya.	Public health : Environment sanitation	The generation of domestic wastewater	1. MRT-EWLP1S1 operations produce waste water of ± 513.79 m3/day. 2. Typical domestic wastewater characteristics: TSS 120 – 400 mg/L, BOD 110 – 350 mg/L, COD 250 – 800 mg/L, oil and fat 50 – 100 mg/L, Ammonia 12 – 45 mg/L, Total Coliform 106 – 1010 / 100 mL (Metcalf & Eddy, 2004) 3. Activities around the station location are residential areas. By providing STP and carrying out regular suction, station operations will not increase the pollutant burden on the surrounding environment. 4. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		c. for St. Roxy, Petojo, Cideng, Thamrin and Kebon Sirih will be connected to the city IPAL channel			residents around the project. By providing STP and carrying out regular suction, station operations will not increase the pollutant burden on the surrounding environment. With waste water management that has been planned as part of the plan for passenger transport activities & station operations, the impact of domestic waste water generation can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).			
	Passenger Transport & Station Operations	a. providing segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes at each MRT station b. periodically transporting waste to the landfill in collaboration with the DKI Jakarta and Bekasi City Governments	Public health : Environment sanitation	Generation of domestic waste	1. MRT-EWLP1S1 operations produce ± 70.17 m3/day of waste. 2. Typical composition of domestic waste: food waste 40.7%, plastic 18%, wood/twigs/leaves 13%, paper/cardboard 11.3%, metal 3%, cloth 2.6%, glass 2.2%, rubber/ skin 2.1%, others 7.1% (https://sipsn.menlhk.go.id/sipsn/, accessed 10 October 2023). 3. Activities around the station location are residential areas. By providing rubbish bins and TPS and transporting them to the TPA regularly, basecamp operations will not increase the pollutant burden on the surrounding environment. 4. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing rubbish bins and TPS and transporting them to the TPA regularly, station operations will not increase the pollutant burden on the surrounding environment. With waste management that has been planned as part of the plan for passenger transport activities & station operations, the impact of domestic waste generation can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).	DL-KP	-	-
	Passenger Transport & Station Operations	a. provide a transit place for B3 waste (± 5 m3) at each MRT station b. carry out periodic transportation of LB3 to TPS LB3 at the Roro-tan Depot location in collaboration with a third party who has an LB3 transportation permit from the Ministry of Environment and Forestry.	Public health : Environment sanitation	The generation of B3 waste	1. Station operational activities have the potential to produce B3 waste. 2. Types of B3 waste generated during station operations are used batteries, electronic waste, used lubricating oil, used fabric, used B3 packaging and expired pharmaceutical products (an analogy of Jakarta MRT North – South Line activities) 3. Activities around the station location are residential areas. By providing LB3 TPS and carrying out regular transportation for further handling in collaboration with third parties who have LB3 transportation permits from the Ministry of Environment and Forestry, station operations will not increase the pollutant burden on the surrounding environment. 4. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing LB3 TPS and carrying out regular transportation for further handling in collaboration with third parties who have LB3 transportation permits from the Ministry of Environment and Forestry, station operations will not increase the pollutant burden on the surrounding environment. With the management of B3 waste which has been planned as part of the station operational activity plan, the impact of the generation of B3 waste can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).	DL-KP	-	-
	Passenger Transport & Station Operations	Not yet exist	Sosekbud: Socioeconomic Based on data from observations and interviews with 384 affected families at the activity locations, it is known that the majority of respondents' occupations are self-employed (36.98%), private employees (17.71%) and hawkers/stall traders (14.58%).	Open business opportunities	1. MRT-EWLP1S1 Operational: a. 21 stations (8 underground stations and 13 elevated stations) b. operates 19 hours per day (05.00 – 24.00) c. keg facilities. businesses such as shops, kiosks etc. at each station 2. Based on data from observations and interviews with 384 affected families at the activity location, it is known that the majority of respondents' occupations are self-employed (36.98%), private employees (17.71%) and hawkers/stall traders (14.58%). 3. Facilities for business activities such as shops, kiosks etc. It is hoped that at every station on MRT-EWLP1S1 it will be a business opportunity, especially for the 488 families affected. 4. The results of community involvement show that residents have great hopes to be involved and benefit from MRT-EWLP1S1 operations. Based on the results of interviews with 384 affected families at the activity location, it was found that 14.42% of respondents hoped to get business opportunities as suppliers of goods and materials needed for the project, 16.67% were canteen/restaurant/tenant businesses and 28.13% of respondents were other trading businesses.	DPH	Location of MRT-EWLP1S1 in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, Petojo Utara, Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with the number	During the operational stage

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
					With the hope that the local community (especially affected residents) will get business opportunities in MRT-EWLP1S1 operations, business opportunities will be opened as a result of passenger transport activities & station operations being categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.		of residents affected directly as many as 1,659 people (488 families)	
	Passenger Transport & Station Operations	Not yet exist	Sosekbud: Socioeconomic The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/capita with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month.	Increase in family income	1. MRT-EWLP1S1 Operational: a. 21 stations (8 underground stations and 13 elevated stations) b. operates 19 hours per day (05.00 – 24.00) c. keg facilities. businesses such as shops, kiosks etc. at each station 2. The level of community income based on household expenditure data in 5 cities in the study area is IDR. 2,320,813/capita with the proportion of expenditure (consumption patterns) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387) [BPS, 2022]. Based on the results of interviews with 384 affected families at the activity location, it is known that the average income is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month. 3. An increase in family income (especially for people who open businesses) is a derivative impact of changes in business opportunities and can influence people's perceptions and attitudes towards MRT-EWLP1S1 operations. 4. Based on the results of community involvement, it shows that there is great hope from the community to be involved and benefit from MRT-EWLP1S1 operations. An increase in family income is a derivative impact of changes in business opportunities. With the hope that local communities (especially affected residents) will get business opportunities in MRT-EWLP1S1 operations, the increase in family income due to passenger transport activities & station operations is categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Location of MRT-EWLP1S1 in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, Petojo Utara, Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with a population directly affected of 1,659 people (488 families)	During the operational stage
	Passenger Transport & Station Operations	Not yet exist	Sosekbud: Socio-Cultural The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents were very supportive (53.91%) and supportive (35.16%) of the MRT-EWLP1S1 development plan. However, residents asked that the MRT-EWLP1S1 construction project provide benefits and not harm the community.	Changes in public perceptions and attitudes	1. MRT-EWLP1S1 Operational: a. 21 stations (8 underground stations and 13 elevated stations) b. operates 19 hours per day (05.00 – 24.00) c. keg facilities. businesses such as shops, kiosks etc. at each station 2. The results of community involvement show that residents support the MRT-EWLP1S1 development plan. Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan. 3. Changes in public perceptions and attitudes can have a direct impact on passenger transport activities and station operations, especially if they are felt to be detrimental to the public. Apart from that, changes in people's perceptions and attitudes are also a derivative impact of improving traffic performance, increasing noise, increasing vibration, opening up business opportunities and increasing family income. 4. The results of community involvement show that residents requested that the construction of the MRT-EWLP1S1 provide benefits and not harm the community. Changes in people's perceptions and attitudes are a derivative impact of increased traffic performance, increased noise, increased vibration, opening up business opportunities and increasing family income. Apart from that, with the public's concern regarding the increase in noise, changes in public perceptions and attitudes resulting from passenger transport activities & station operations are categorized as DPH (Hypothetical Significant Impact)and studied further in CHAPTER 6.	DPH	Location of MRT-EWLP1S1 in Tomang sub-district, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng, Petojo Utara, Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan with the number of residents affected directly as many as 1,659 people (488 families)	During the operational stage
11	Train Maintenance and Depot Operations	a. providing a Sewage Treatment Plan (STP) with an anaerobic-aerobic biofilter system for domestic wastewater treatment b. providing an industrial waste water treatment plant (IWTP) with a sand and	Public health : Environment sanitation	The generation of domestic wastewater	1. The operation of the MRT-EWLP1S1 Depot produces waste water of ± 96.80 m3/day. 2. Typical domestic wastewater characteristics: TSS 120 – 400 mg/L, BOD 110 – 350 mg/L, COD 250 – 800 mg/L, oil and fat 50 – 100 mg/L, Ammonia 12 – 45 mg/L, Total Coliform 106 – 1010 / 100 mL (Metcalf & Eddy, 2004) 3. Activities around the Rorotan Depot location are residential areas. By providing STP, IWTP and regular desludging, depot operations will not increase the pollutant burden on the surrounding environment.	DL-KP	-	-

No	Potential Activity Plans Environmental Impact.	Prepared Environmental Management Plan	Environmental Components Affected	Scoping			Study Area	Study Deadline
				Potential Impact	Potential Impact Evaluation	DPH		
		activated carbon coagulation-filtration system for processing MRT train washing waste water and workshop activities c. recirculate or reuse 35% of IWTP processed water for MRT train washing and workshop activities d. carry out regular suction of IWTP and STP processed wastewater in collaboration with PD PAL Jaya.			4. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing STP, IWTP and regular desludging, depot operations will not increase the pollutant burden on the surrounding environment. With waste water management that has been planned as part of the train maintenance activity plan and depot operations, the impact of waste water generation can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).			
	Train Maintenance and Depot Operations	a. providing segregated waste bins (organic waste and inorganic waste) and Temporary Storage Places (TPS) in the form of container boxes b. transporting waste to the landfill periodically in collaboration with the DKI Jakarta Government	Public health : Environment sanitation	Generation of domestic waste	1. The operation of the MRT-EWLP1S1 Depot produces ± 0.46 m3/day of waste. 2. Typical composition of domestic waste: food waste 40.7%, plastic 18%, wood/twigs/leaves 13%, paper/cardboard 11.3%, metal 3%, cloth 2.6%, glass 2.2%, rubber/ skin 2.1%, others 7.1% (https://sipsn.menlhk.go.id/sipsn/, accessed 10 October 2023). 3. Activities around the depot location are residential areas. By providing rubbish bins and TPS and transporting them to the TPA regularly, depot operations will not increase the pollutant burden on the surrounding environment. 4. The results of community involvement show that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing rubbish bins and TPS and transporting them to the TPA regularly, depot operations will not increase the pollutant burden on the surrounding environment. With waste management that has been planned as part of the train maintenance activity plan and depot operations, the impact of domestic waste generation can be controlled and categorized as DL-KP (Direct Management Monitoring Impact).	DL-KP	-	-
	Train Maintenance and Depot Operations	a. Providing a Temporary Storage Place for B3 Waste (TPS LB3) with an area of ± 50 m2 at the Rorotan Depot location b. Carrying out storage of B3 waste by referring to the Technical Details for Storage of B3 Waste, including: packaging, installation of LB3 labels and symbols, LB3 storage time and LB3 balance reporting. c. Carrying out LB3 transportation periodically in collaboration with third parties who have LB3 transportation permits from the Ministry of Environment and Forestry for further handling	Public health : Environment sanitation	The emergence of B3 waste	1. Depot operations will produce B3 waste, especially from train maintenance activities and maintenance of Rorotan Depot facilities and utilities. Apart from that, TPS LB3 Depo Rorotan is used for temporary storage of hazardous waste from 21 MRT-EWLP1S1 stations. 2. Estimated amount of LB3 generation: used batteries/batteries (1 piece/month), electronic waste (5 Kg/month), used filters (50 Kg/month) and used fabric (2 Kg/month). 3. Activities around the Rorotan Depot location include agricultural and residential areas. By providing LB3 TPS and transporting it (a third party who has an LB3 transport permit from the Ministry of Environment and Forestry) periodically for further handling, depot operations will not increase the burden of B3 waste pollution on the surrounding environment. 4. Based on the results of community involvement, it is known that residents ask the person in charge of activities to manage/repair any negative impacts that arise so that they do not disturb the comfort of residents around the project. By providing LB3 TPS and transporting it (a third party who has an LB3 transport permit from the Ministry of Environment and Forestry) periodically for further handling, depot operations will not increase the burden of B3 waste pollution on the surrounding environment. With the management of B3 waste which has been planned as part of the depot's operational activity plan, the impact of the generation of B3 waste can be controlled and categorized as DL-KP (Direct Impact Management Monitoring).	DL-KP	-	-

Note :
DPH : Determination of Hypothetical Significant Impacts
DL-KP : Direct Impact Management Monitoring

5.1.3. Hypothetical Significant Impact (DPH)

Hypothetical significant impacts (DPH) are the results of potential impact evaluations that have been carried out, as follows:

Table 5.3. Hypothetical Significant Impact Matrix (DPH)

Activity plan		Hypothetical Significant Impact (DPH)
Pre-Construction Stage		
1)	Land Acquisition	a. Loss of business opportunities b. Decrease in family income c. Changes in public perceptions and attitudes
Construction Phase		
2)	Acceptance of Construction Workers	a. Open job opportunities b. Increase in family income c. Changes in public perceptions and attitudes
3)	Basecamp Operations	a. Open business opportunities b. Increase in family income c. Changes in public perceptions and attitudes
4)	Mobilization of Construction Equipment and Materials	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI e. Changes in public perceptions and attitudes
5)	Land Clearing and Relocation of Public Facilities/Utilities	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased runoff water discharge e. Increased prevalence of ARI f. Changes in public perceptions and attitudes
6)	Earthworks and Dewatering	
	a) West Elevated Segment and East Elevated Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
	b) Underground Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
	c) Depot Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased runoff water discharge e. Increased prevalence of ARI
7)	Underground Construction Work	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
8)	Ground Surface Construction Work	
	a) West Elevated Segment and East Elevated Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI

Activity plan		Hypothetical Significant Impact (DPH)
	b) Depot Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
Operational Stage		
9)	Acceptance of Operational Workers	a. Open job opportunities b. Increase in family income c. Changes in public perceptions and attitudes
10)	Passenger Transportation and Station Operations	a. Increased noise b. Increased vibration c. Open business opportunities d. Increase in family income e. Changes in public perceptions and attitudes
11)	Train Maintenance and Depot Operations	-

5.2. Study Area Boundaries

The study area boundaries are the resultant of project boundaries, ecological boundaries, social boundaries and administrative boundaries as presented in Figure 5.1.

5.2.1. Project Boundaries

The project boundary is the area planned as the location for construction activities for the MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) along ± 24,527 km and access to the Rorotan Depot along ± 5.9 km, with a total area of 997,535.87 km. m2.

5.2.2. Ecological Boundaries

The ecological boundary (Figure 5.2 to Figure 5.5) is the area around the MRT-EWLP1S1 construction project site which is estimated to be the medium for spreading impacts (especially air). Determination of the impact distribution limit through air media is carried out by paying attention to the dominant wind direction at the activity location which blows towards the south (66.67%) with a speed of 1.5 – 3.3 m/s, the length and direction of the MRT-EWLP1S1 route, and receptor distance. Based on these factors, the spread of impacts via air is estimated to occur up to a distance of 300 m left - right from the MRT-EWLP1S1 route which is ± 24,527 km long and access to the Rorotan Depot is ± 5.9 km long, with a total area of 18,256,200 m2.

5.2.3. Social Boundaries

The social boundary (Figure 5.6 to Figure 5.9) is the socio-economic-cultural and public health area around the MRT-EWLP1S1 development project site which is estimated to be the recipient (receptor) of the impact, namely:

- Recipients (receptors) of direct impact
  The population directly affected by land acquisition (997,535.87 m2) is 1,659 people (488 families) in Tomang Village, Tanjung Duren Selatan, Grogol, Duri

Pulo, Cideng, North Petojo, South Petojo, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang, Kramat, Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru, Sumur Batu, Cempaka Putih Barat, Cempaka Putih Timur, Kelapa Gading Barat, Kelapa Gading Timur, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, Cakung Barat, Cakung East, Ujung Menteng, Medan Satria, and Rorotan.

Table 5.4. Hypothetical Significant Impact Matrix (DPH)

Environmental Components Affected	Dampak Potential Impact	Activity plan												
		Pre-Cons Stage.	Construction Phase										Operational Stage	
		1	2	3	4	5	6			7	8		9	10	11
		Elv. West Elv. East	All	All	All	All	West Elv. E	U.G	Depot	U.G	West Elv. E	Depot	All	All	Depot
A Geophysics – Chemistry															
1 Air quality	Decreased air quality				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)		√ (-)	
2 Noise	Increased noise				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)		√ (-)	
3 Vibration	Increased vibration						√ (-)	√ (-)		√ (-)	√ (-)			√ (-)	
4 Hydrology	Increased runoff water discharge (*run off*)					√ (-)			√ (-)						
5 Hydrogeology	Decrease in ground water level							√ (-)							
	Decreased groundwater quality							√ (-)							
6 Traffic	Decreased/increased traffic performance				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)		√ (-)	
B Biology															
1 Land vegetation	Decreased density of land vegetation					√ (-)									
C Socioeconomic, Cultural Society															
1 Socioeconomic	Open job opportunities		√ (+)										√ (+)		
	Loss/opening up of business opportunities			√ (+)										√ (+)	
	Increase/Decrease in family income		√ (+)	√ (+)									√ (+)	√ (+)	
2 Socio-cultural	Changes in public perceptions and attitudes	√ (+/-)	√ (+/-)	√ (+/-)	√ (+/-)	√ (+/-)							√ (+/-)	√ (+/-)	
	Environmental disturbances (dust, noise, flooding and traffic jams)				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)			
D Public health															
1 Disease prevalence	Increased prevalence of ARI				√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)	√ (-)			
2 Environment sanitation	Generation of waste water			√ (-)										√ (-)	√ (-)
	Generation of domestic waste			√ (-)										√ (-)	√ (-)
	The generation of B3 waste			√ (-)										√ (-)	√ (-)

Information :

Pre - Construction Phase
1 Land Acquisition

Construction Phase
2 Acceptance of Construction Workers
3 Operational*Basecamp*
4 Mobilization of Construction Equipment and Materials
5 Land Clearing and Relocation of Public Facilities/Utilities
6 Earthworks and*Dewatering*
7 Underground Construction Work
8 Ground Surface Construction Work

Operational Stage
9 Acceptance of Operational Workers
10 Passenger Transport Activities and Station Operations
11 Train Maintenance and Depot Operations

√ (+/-) : it is predicted that there is a causal interaction between the business plan/ activities with impacted environmental components

Segment:
All : West Elevated, Underground, East Elvated and Depot
Elv. West : West Elevated
St. Tomang to transition point (*transition section*) at 40k849m (in the middle of the St. Grogol – St. Roxy line)
U.G : Underground
transition point (*transition section*) at 40k849m to transition point (*transition section*) at 50k345m (in the middle of the St. Galur – St. Cempaka Baru route)
Elv. East : East Elevated
transition point (*transition section*) at 50k345m (in the middle of the St. Galur – St. Cempaka Baru route) to Medan Satria Station
Depot : Deposit
St. Ujung Menteng to Rorotan Depot

- Recipient (receptor) of indirect impact
  The affected residents live in the districts of Grogol Petamburan, Gambir, Tanah Abang, Menteng, Senen, Johar Baru, Kemayoran, Cempaka Putih, Kelapa Gading, Pulo Gadung, Cakung, Cilincing and Medan Satria with a total area of approximately ± 0.26 km2
- Receiver (receptor) of environmental disturbances
  Communities who live and/or carry out activities around the activity location, especially those affected by the spread of impacts through air media.

5.2.4. Administrative Boundaries

Administrative boundaries are administrative areas that include 3 elements of project boundaries, ecological and social. Therefore, the administrative boundaries for MRT-EWLP1S1 construction activities include:

- 31 sub-districts: Tomang, Tanjung Duren Selatan, Grogol, Duri Pulo, Cideng,North Petojo,Petojo Selatan, Gambir, Kampung Bali, Kebon Sirih, Senen, Kwitang,Kramat,Tanah Tinggi, Galur, Harapan Mulia, Cempaka Baru,Stone Well,West Cempaka Putih, East Cempaka Putih, West Kelapa Gading, East Kelapa Gading, Pengangsaaan Dua, Kayu Putih, Pulo Gadung, Rawa Terate, West Cakung, East Cakung, Ujung Menteng, Medan Satria, and Rorotan.
- 13 sub-districts: Grogol Petamburan, Gambir, Tanah Abang, Menteng, Senen, Johar Baru, Kemayoran, Cempaka Putih, Kelapa Gading, Pulo Gadung, Cakung, Cilincing and Medan Satria
- 5 cities: West Jakarta, Central Jakarta, North Jakarta, East Jakarta and Bekasi City
- 2 provinces: DKI Jakarta and West Java

However, as per the result of MOD Wrap-up Meeting with Bappenas and DGR and Pemprov DKI, it is agreed that the area within DKI Jakarta will be constructed first.

5.3. Study Time Limit

The study time limit for each Hypothetical Significant Impact (DPH) is presented in Table 5.5.

Table 5.5. Study Time Limit

DPH	Study Deadline
Pre-Construction Stage	
Changes in public perceptions and attitudes	7 Years during Pre-construction and Construction stages
Construction Phase	
Decreased air quality	6 Years during Construction stage
Increased noise	6 Years

DPH	Study Deadline
	During Construction stage
Increased runoff water discharge	6 Years During Construction stage
Open job opportunities	6 Years during Construction stage
opening up business opportunities	6 Years During Construction stage
Increase in family income	6 Years During Construction stage
Changes in public perceptions and attitudes	6 Years During Construction stage
Increased prevalence of ARI	6 Years during Construction stage
Operational Stage	
Increased noise	Operational Stage
Increased vibration	Operational Stage
Open job opportunities	Operational Stage
Open business opportunities	Operational Stage
Increase in family income	Operational Stage
Changes in public perceptions and attitudes	Operational Stage

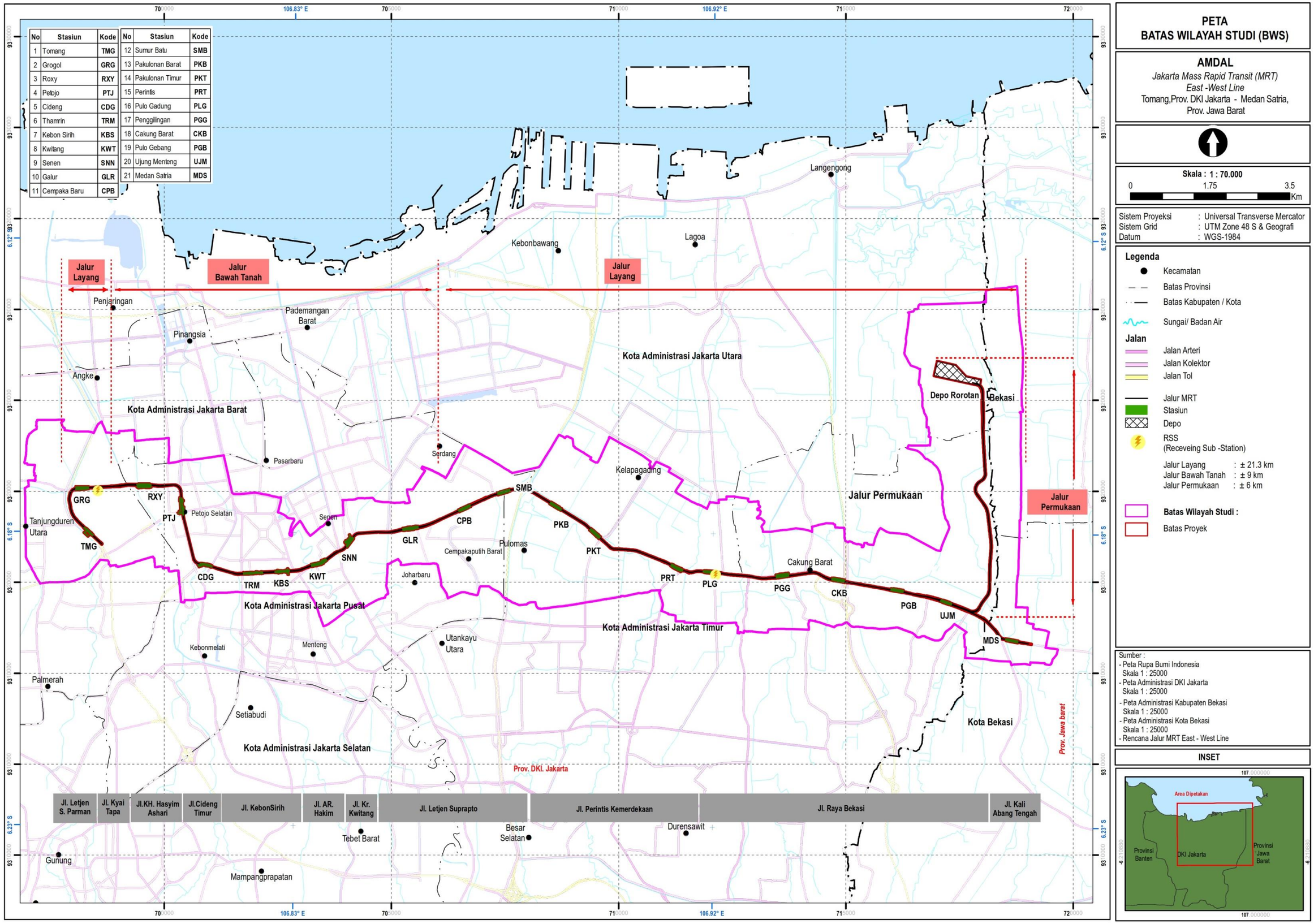
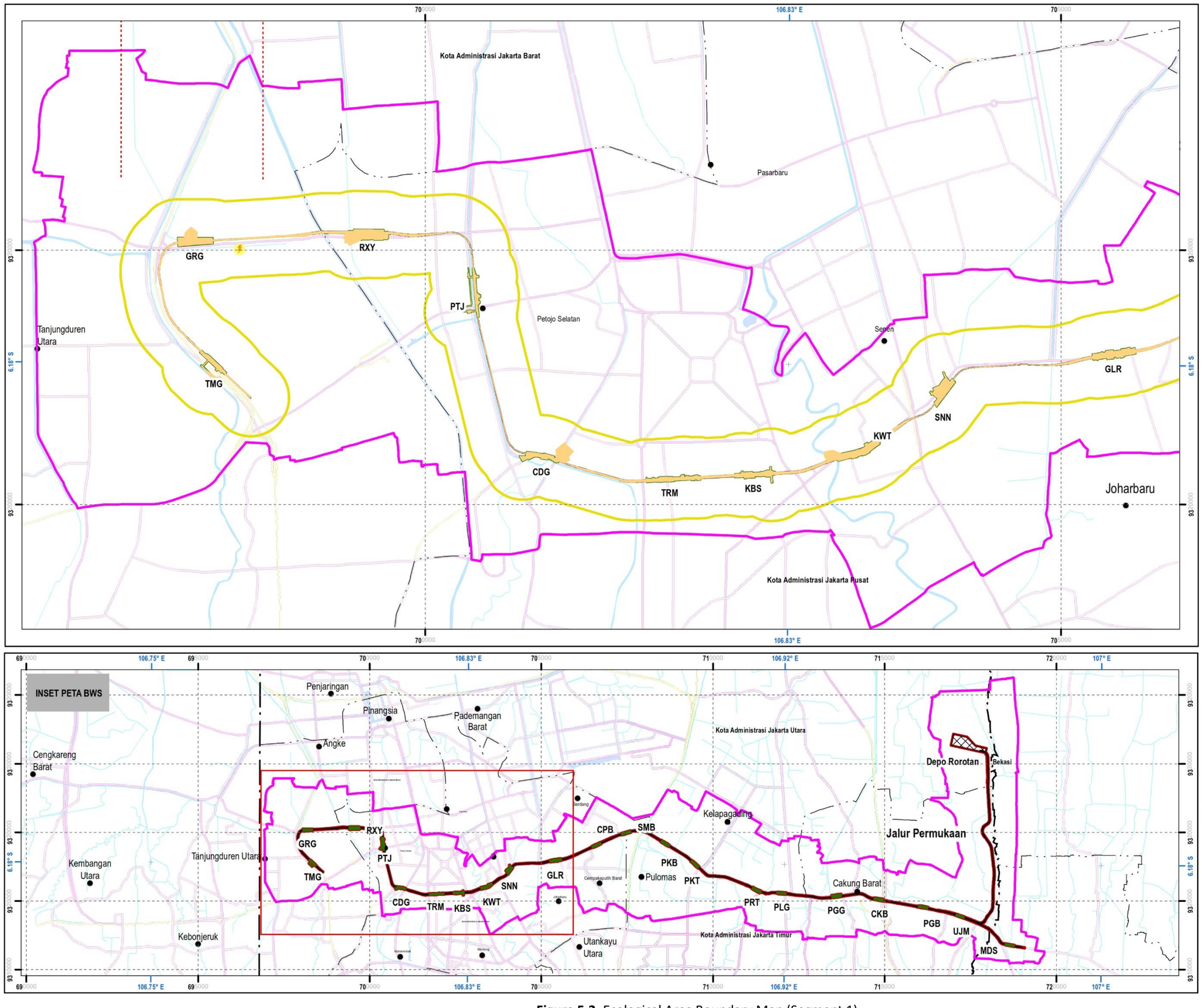


Figure 5.1. Study Area Boundary Map



PETA
BATAS WILAYAH STUDI (BWS) :
BATAS WILAYAH EKOLOGI
(Segmen 1)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Skala : 1 :27.000
0 0.5 1 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legenda
- Kecamatan
- Batas Provinsi
- Batas Kabupaten / Kota
- Sungai/ Badan Air

Jalan
- Jalan Arteri
- Jalan Kolektor
- Jalan Tol
- Jalur MRT
- Stasiun
- Depo
- RSS (Receveing Sub -Station)

Jalur Layang : ± 21.3 km
Jalur Bawah Tanah : ± 9 km
Jalur Permukaan : ± 6 km

- **Batas Wilayah Studi :**

Batas Ekologi :
- Batas Ekologi Udara
- Batas Ekologi Air

Sumber :
- Peta Rupa Bumi Indonesia Skala 1 : 25000
- Peta Administrasi DKI Jakarta Skala 1 : 25000
- Peta Administrasi Kabupaten Bekasi Skala 1 : 25000
- Peta Administrasi Kota Bekasi Skala 1 : 25000
- Rencana Jalur MRT East - West Line

INSET

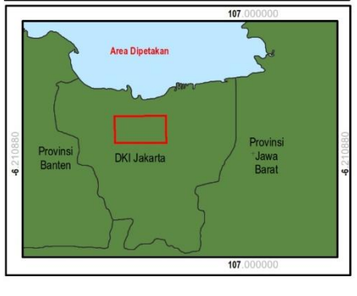


Figure 5.2. Ecological Area Boundary Map (Segment 1)

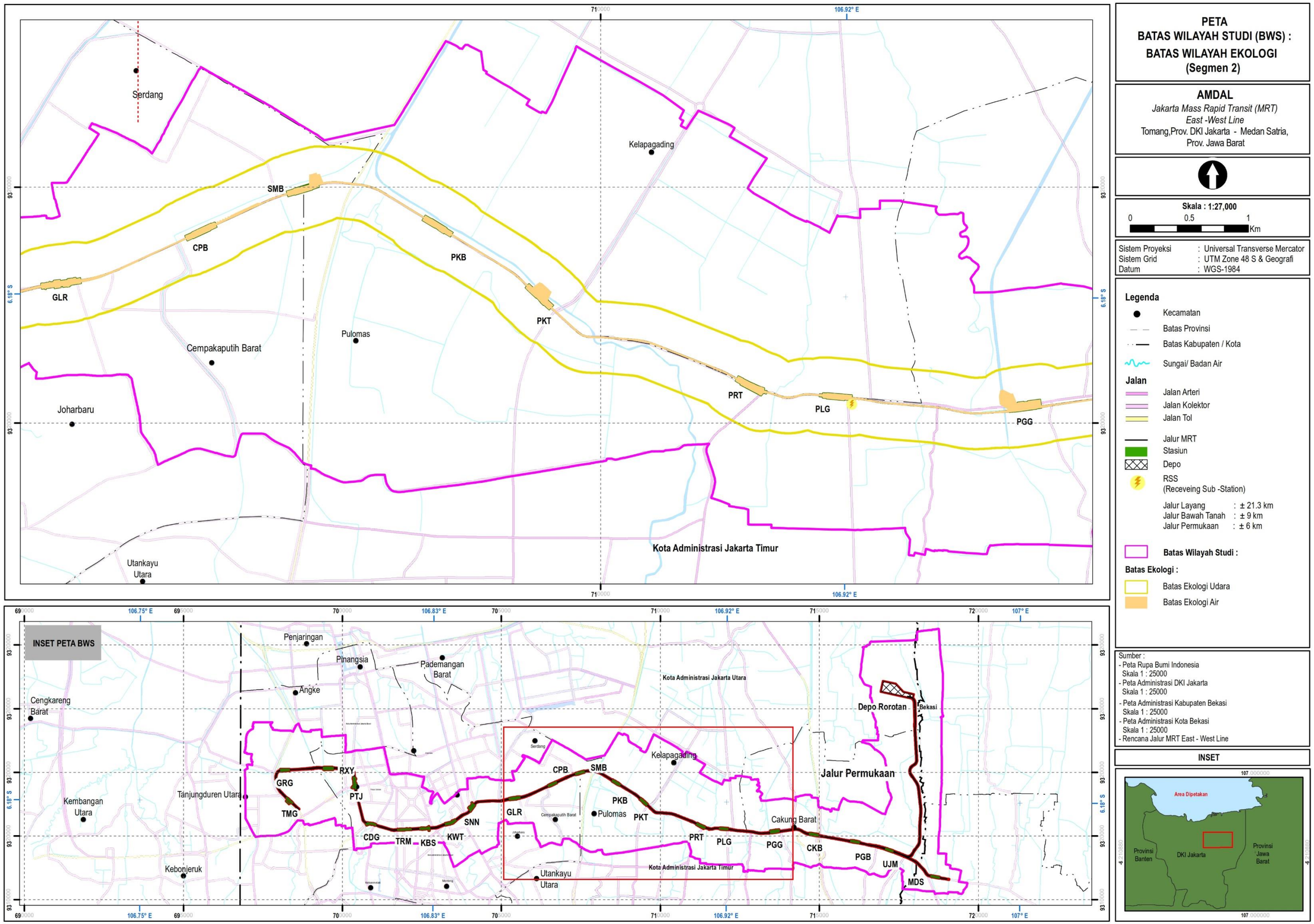
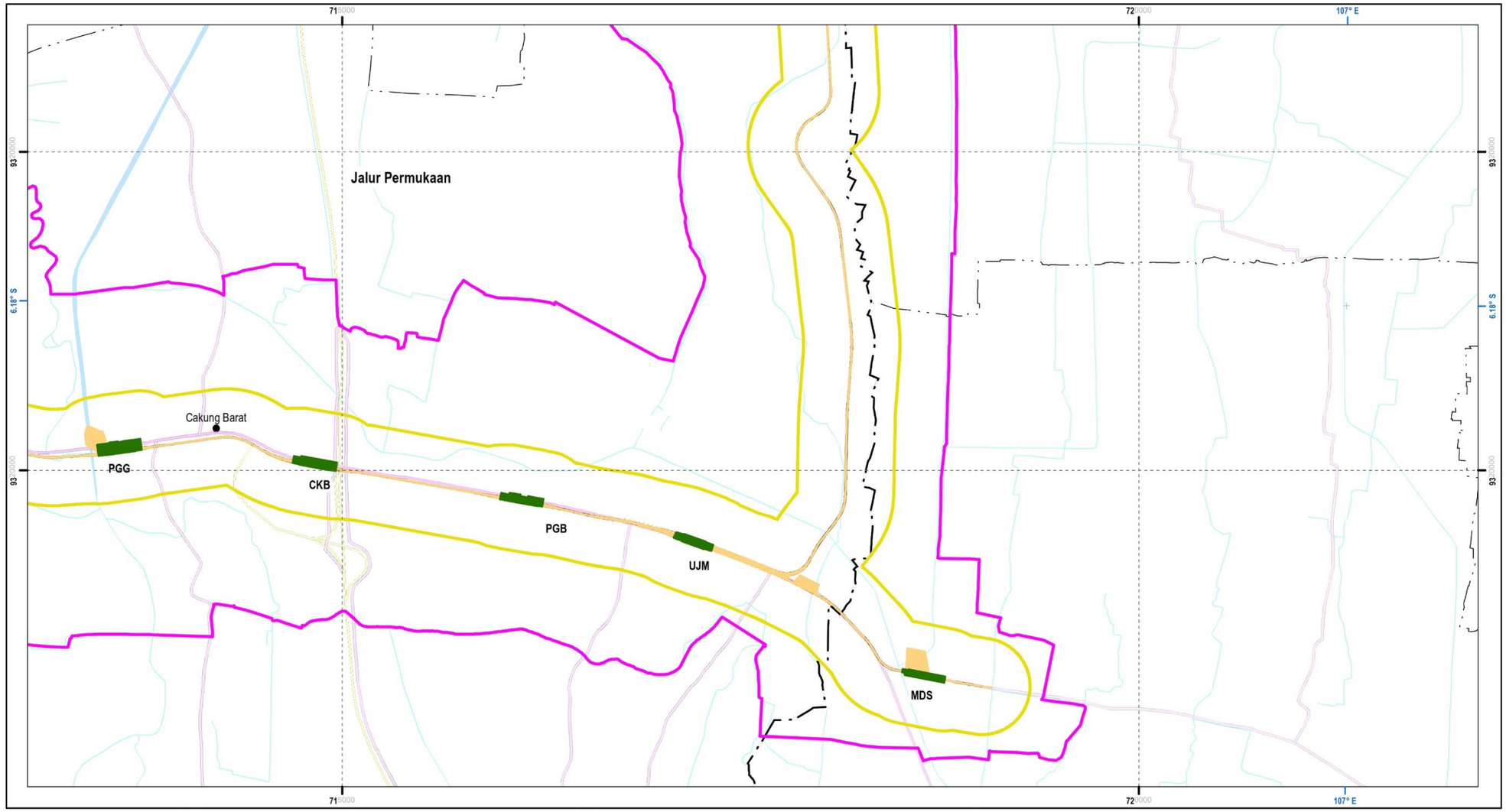


Figure 5.3. Ecological Area Boundary Map (Segment 2)



PETA
BATAS WILAYAH STUDI (BWS) :
BATAS WILAYAH EKOLOGI
(Segmen 3)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria,
Prov. Jawa Barat

Skala : 1:27,000
0 0.5 1
Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

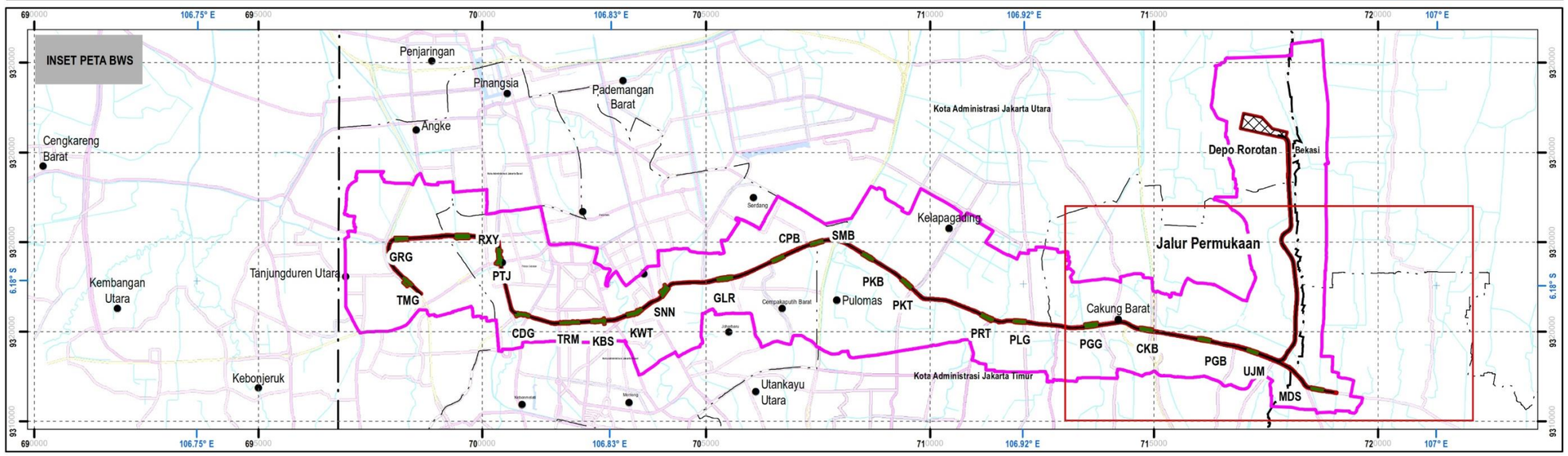
Legenda
- Kecamatan
- Batas Provinsi
- Batas Kabupaten / Kota
- Sungai/ Badan Air

Jalan
- Jalan Arteri
- Jalan Kolektor
- Jalan Tol
- Jalur MRT
- Stasiun
- Depo
- RSS (Receveing Sub -Station)

Jalur Layang	: ± 21.3 km
Jalur Bawah Tanah	: ± 9 km
Jalur Permukaan	: ± 6 km

Batas Wilayah Studi :

Batas Ekologi :
- Batas Ekologi Udara
- Batas Ekologi Air



Sumber :
- Peta Rupa Bumi Indonesia
  Skala 1 : 25000
- Peta Administrasi DKI Jakarta
  Skala 1 : 25000
- Peta Administrasi Kabupaten Bekasi
  Skala 1 : 25000
- Peta Administrasi Kota Bekasi
  Skala 1 : 25000
- Rencana Jalur MRT East - West Line

INSET

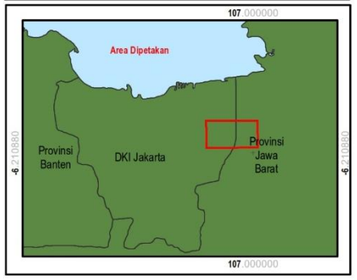
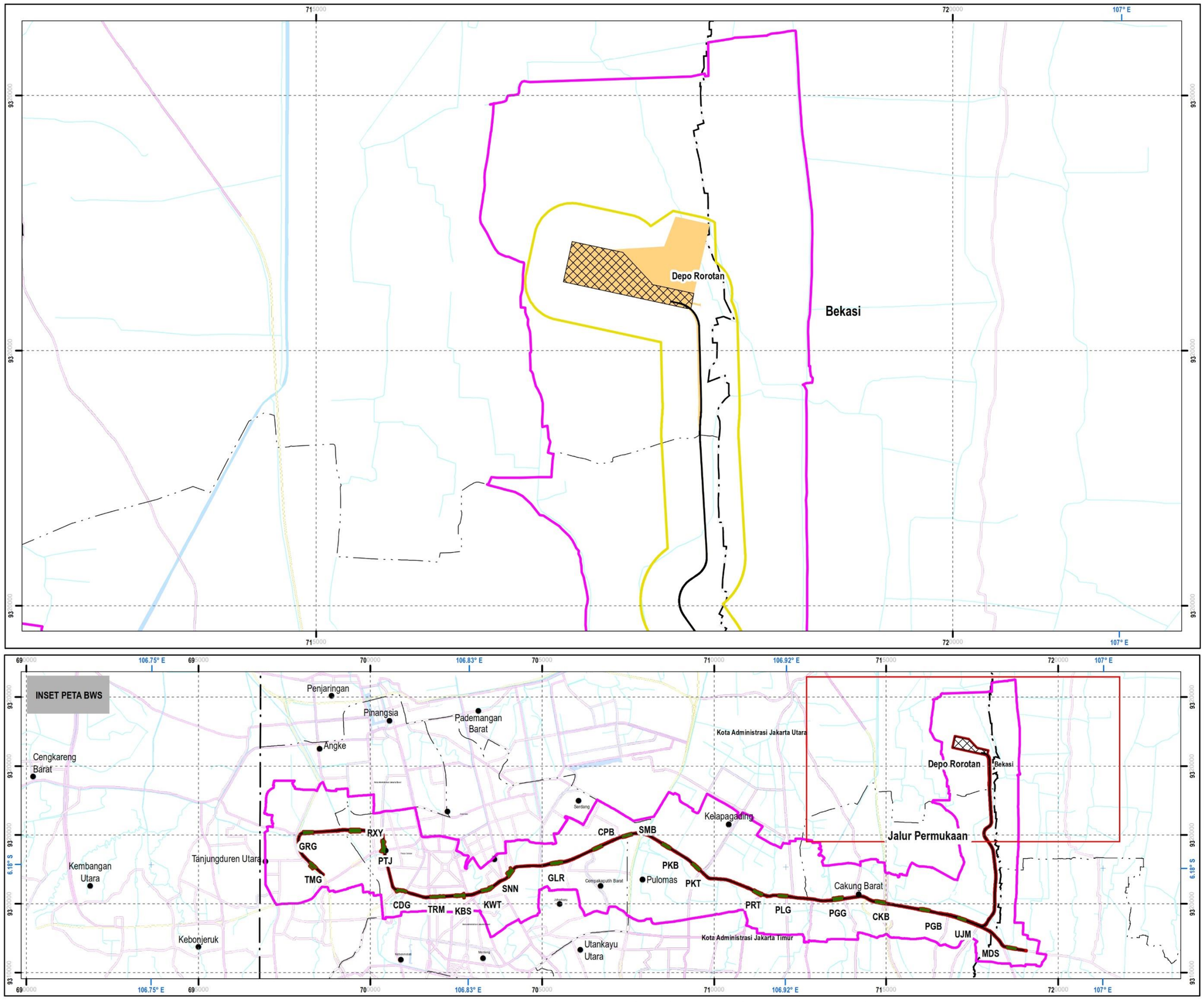


Figure 5.4. Ecological Area Boundary Map (Segment 3)



PETA
BATAS WILAYAH STUDI (BWS) :
BATAS WILAYAH EKOLOGI
(Segmen 4)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Skala : 1:27,000
0 0.5 1 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legenda
- Kecamatan
- Batas Provinsi
- Batas Kabupaten / Kota
- Sungai/ Badan Air

Jalan
- Jalan Arteri
- Jalan Kolektor
- Jalan Tol
- Jalur MRT
- Stasiun
- Depo
- RSS (Receveing Sub -Station)

Jalur Layang : ± 21.3 km
Jalur Bawah Tanah : ± 9 km
Jalur Permukaan : ± 6 km

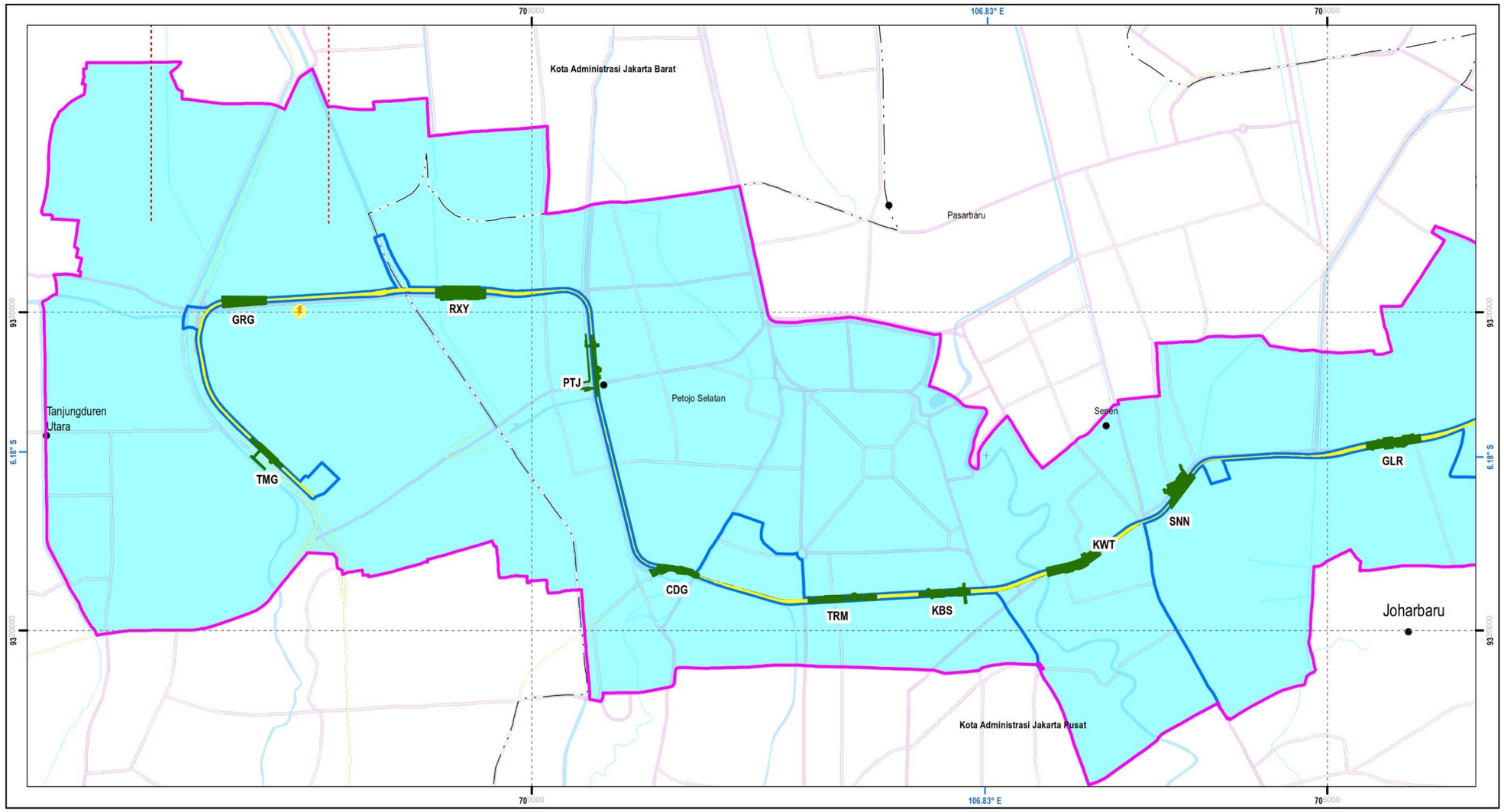
Batas Wilayah Studi :

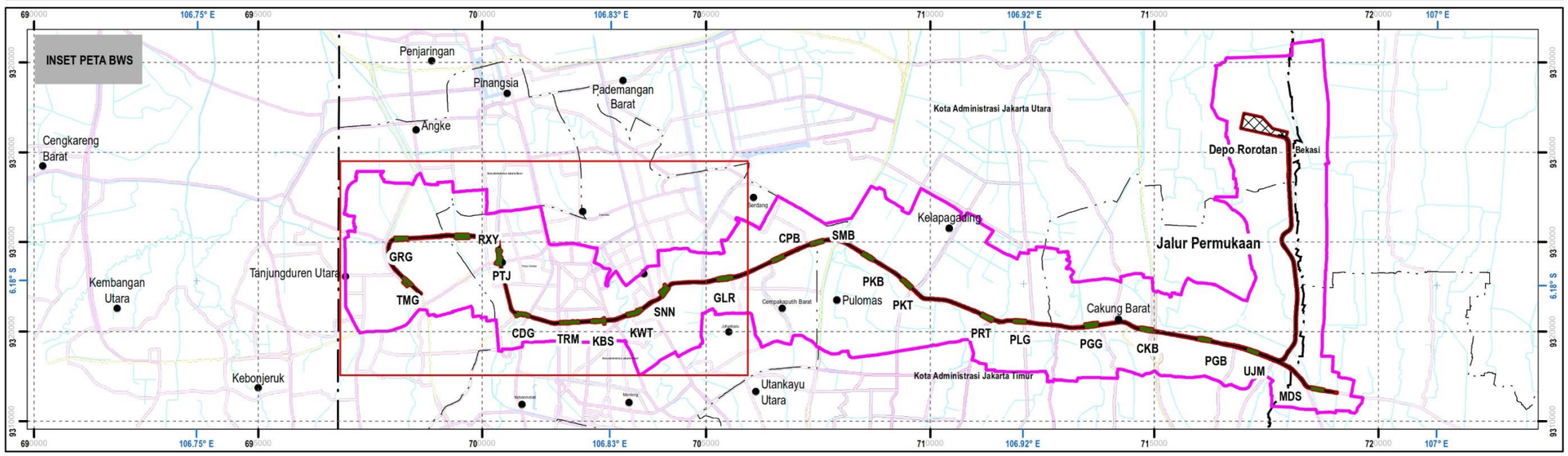
Batas Ekologi :
- Batas Ekologi Udara
- Batas Ekologi Air

Sumber :
- Peta Rupa Bumi Indonesia Skala 1 : 25000
- Peta Administrasi DKI Jakarta Skala 1 : 25000
- Peta Administrasi Kabupaten Bekasi Skala 1 : 25000
- Peta Administrasi Kota Bekasi Skala 1 : 25000
- Rencana Jalur MRT East - West Line

INSET

Figure 5.5. Ecological Area Boundary Map (Segment 4)





PETA
BATAS WILAYAH STUDI (BWS) :
BATAS WILAYAH SOSIAL
(Segmen 1)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria,
Prov. Jawa Barat

Skala : 1 :27.000
0 0.5 1 Km

Sistem Proyeksi	: Universal Transverse Mercator
Sistem Grid	: UTM Zone 48 S & Geografi
Datum	: WGS-1984

Legenda
- Kecamatan
- Batas Provinsi
- Batas Kabupaten / Kota
- Sungai/ Badan Air

Jalan
- Jalan Arteri
- Jalan Kolektor
- Jalan Tol
- Jalur MRT
- Stasiun
- Depo
- RSS (Receveing Sub -Station)

Jalur Layang : ± 21.3 km
Jalur Bawah Tanah : ± 9 km
Jalur Permukaan : ± 6 km

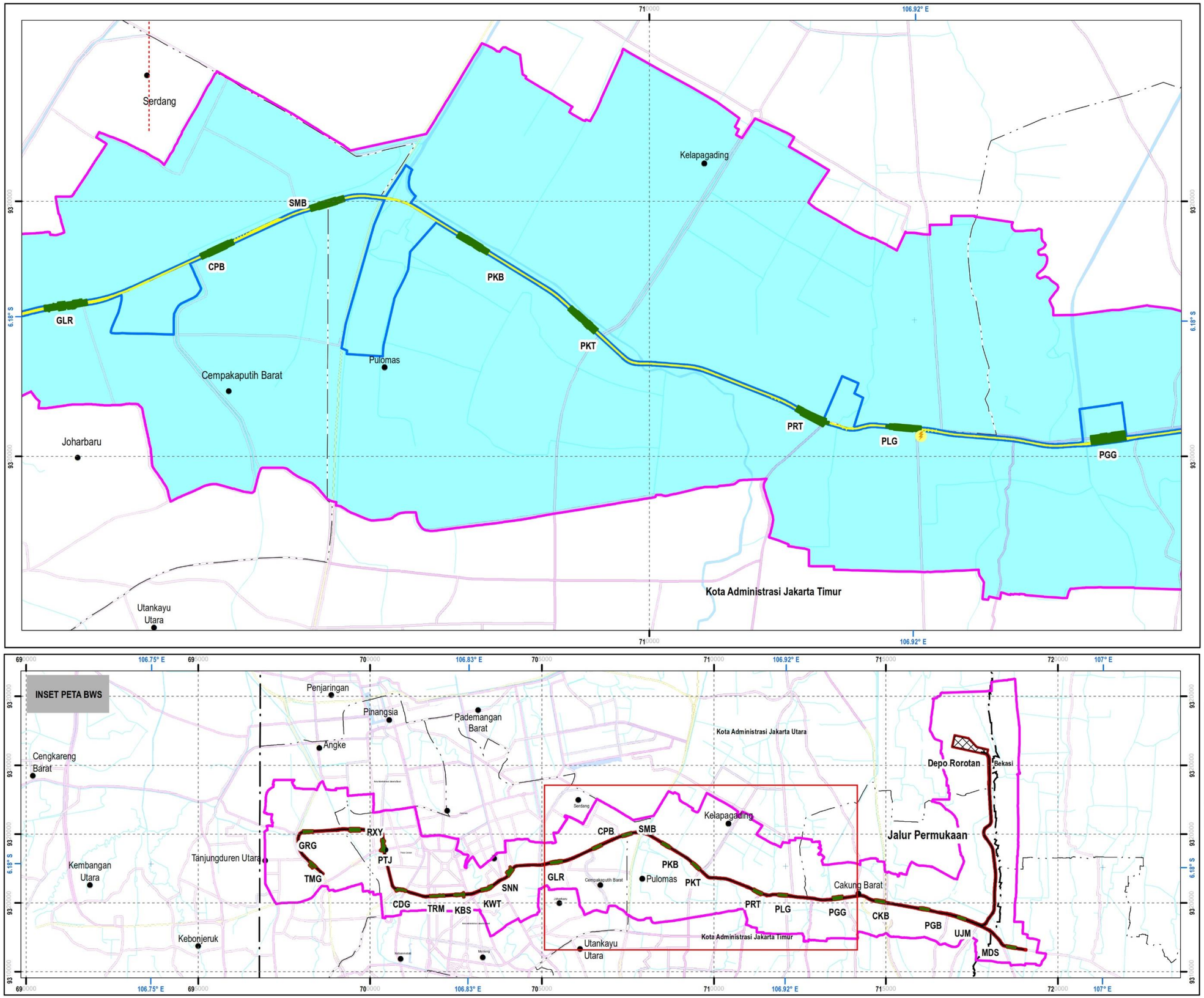
Batas Wilayah Studi :

Batas Sosial :
- Masyarakat Terdampak
- Terdampak Langsung
- Lalu Lintas

Sumber :
- Peta Rupa Bumi Indonesia Skala 1 : 25000
- Peta Administrasi DKI Jakarta Skala 1 : 25000
- Peta Administrasi Kabupaten Bekasi Skala 1 : 25000
- Peta Administrasi Kota Bekasi Skala 1 : 25000
- Rencana Jalur MRT East - West Line

INSET

Figure 5.6. Social Area Boundary Map (Segment 1)



PETA
BATAS WILAYAH STUDI (BWS) :
BATAS WILAYAH SOSIAL
(Segmen 2)

AMDAL
Jakarta Mass Rapid Transit (MRT)
East -West Line
Tomang,Prov. DKI Jakarta - Medan Satria, Prov. Jawa Barat

Skala : 1:27,000
0 0.5 1 Km

Sistem Proyeksi	:	Universal Transverse Mercator
Sistem Grid	:	UTM Zone 48 S & Geografi
Datum	:	WGS-1984

Legenda
- Kecamatan
- Batas Provinsi
- Batas Kabupaten / Kota
- Sungai/ Badan Air

Jalan
- Jalan Arteri
- Jalan Kolektor
- Jalan Tol
- Jalur MRT
- Stasiun
- Depo
- RSS (Receveing Sub -Station)

Jalur Layang : ± 21.3 km
Jalur Bawah Tanah : ± 9 km
Jalur Permukaan : ± 6 km

- **Batas Wilayah Studi :**

Batas Sosial :
- Masyarakat Terdampak
- Terdampak Langsung
- Lalu Lintas

Sumber :
- Peta Rupa Bumi Indonesia Skala 1 : 25000
- Peta Administrasi DKI Jakarta Skala 1 : 25000
- Peta Administrasi Kabupaten Bekasi Skala 1 : 25000
- Peta Administrasi Kota Bekasi Skala 1 : 25000
- Rencana Jalur MRT East - West Line

INSET

Figure 5.7. Social Area Boundary Map (Segment 2)

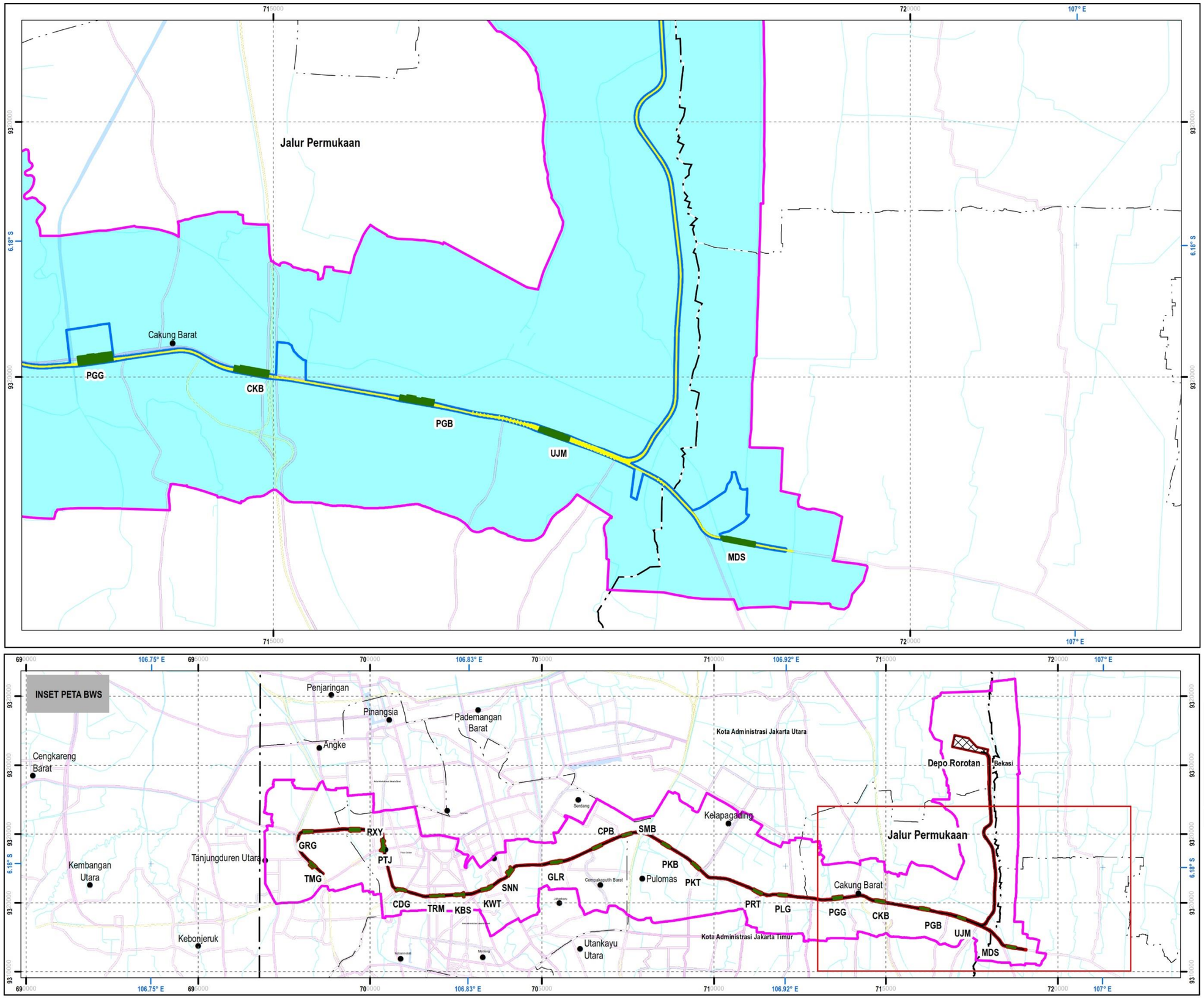


Figure 5.8. Social Area Boundary Map (Segment 3)

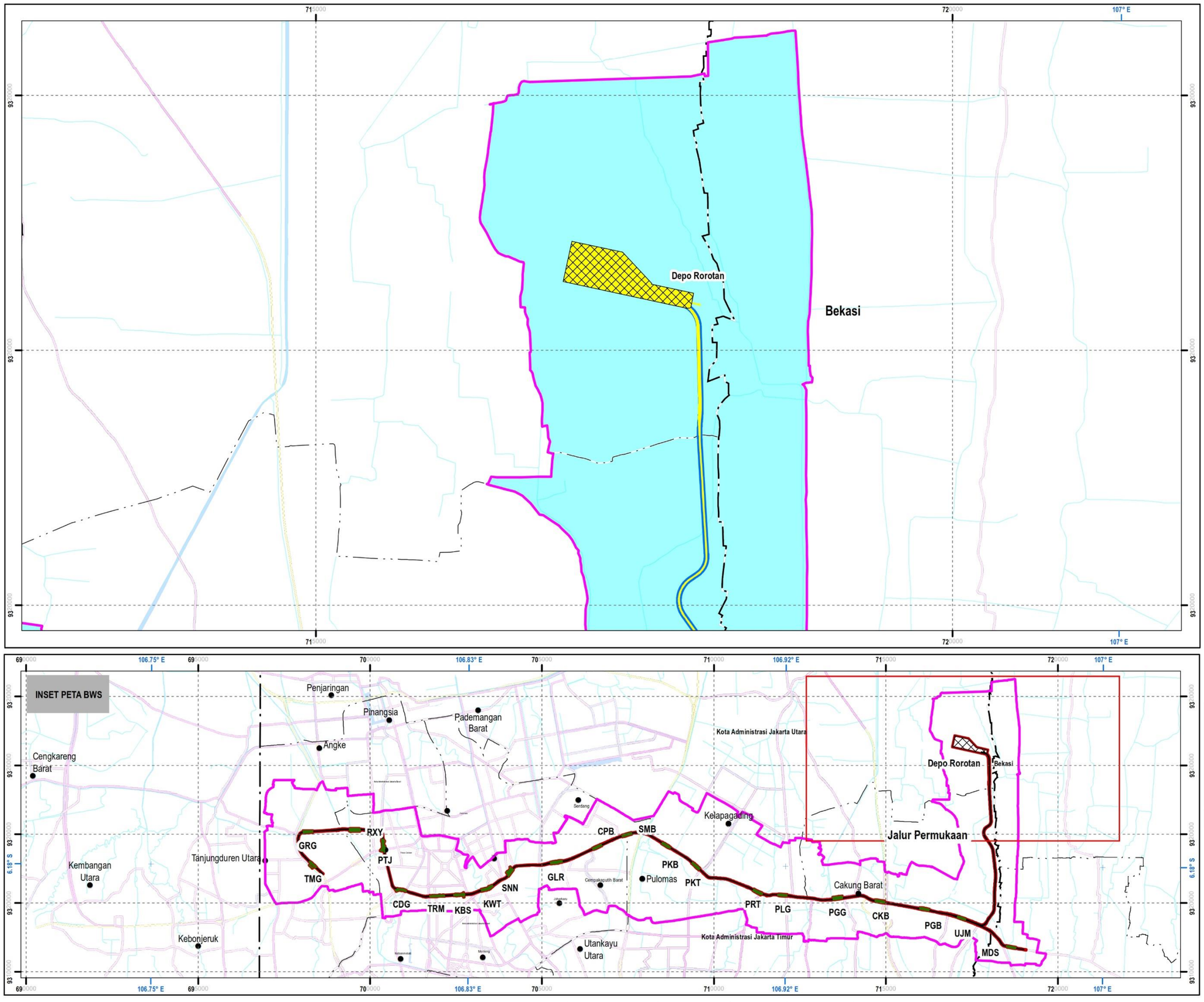


Figure 5.9. Social Area Boundary Map (Segment 4)

Isi

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Chapter 6

Estimated Significant Impacts and Determination of the Significance of the Impact

6.1. Pre-Construction Stage

6.1.1. Land Acquisition

A. Attitudes Changes and Public Perception

- **Initial environmental conditions**

  Based on the results of community involvement in public consultation activities (3 - 4 February 2022 and 15 February 2023) show that in general the community in the study area supports the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1 development plan (Table 3.44).

  However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT-EWLP1S1 development plan. Especially the concerns of 58.62% (85 families) of the 145 families who own land at the activity locations that will be released are regarding the process of acquiring their land. For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

- **Environmental conditions that will come with the project**

  Based on the negative impacts that arise during land acquisition activities (especially the impact of loss of business opportunities and a decrease in family income levels) if it is not managed well, it is predicted that there will be negative changes in community attitudes and perceptions in the form of a decrease in the number and percentage of people who agree with the plan. activities become less agreeable or even strongly disagreed. It is estimated that the decrease in the percentage of people who agree to this activity could reach 50%, whereas previously 342 families who agreed could decrease to only 171 families from the community who agreed. Thus, it can be concluded that if the delivery of information and socialization of activity plans is not carried out intensively byperson in charge of the activity, thenThe environmental quality conditions that will come with the project for the components of community attitudes and perceptions regarding land acquisition activities through land acquisition are included in the negative impacts.

- **The magnitude of the impact**

  RLA = 342 families (89.07%) said they agreed/supported it
  No Project = the same as RLA
  342 families (89.07%) said they agreed/supported it
  With Projects = 171 families(44.53%)who expressed agreement/support
  The magnitude of the impact = With Project – Without Project
  = 171 families –342 families
  = - 171 families
  ≈ - 50% of existing conditions

  If the delivery of information and socialization of activity plans is not carried out intensively byperson in charge of the activity, the impact of loss of business opportunities and a decrease in family income levels, especially for the 266 families who have been running businesses and/or working at the activity location and its surroundings (69.27% of the total 384 respondents affected) due to land acquisition through the acquisition process land will cause derivative impacts in the form of changes in attitudes and perceptions of societywhich is negativeamounting to - 50% of existing conditions.

- **Important Nature of Impact**

Table 6.1. Important Characteristics of the Impact of Land Acquisition on Changes in Community Attitudes and Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 266 families (69.27% of the total 384 respondents affected) or the equivalent of 1,064 people (64.14% of the total population affected by land acquisition)

No	Criteria	Interest		Information
		P	T.P	
2	The area of impact distribution	P		The impact distribution area is 47,189.69 m2 (30.22% of the number of existing economic facilities) and 64.14% of the total population is affected by land acquisition in 31 sub-districts at the MRT-EWLP1S1 construction site
3	The intensity and duration of the impact	P		The impact of changes in community perceptions and attitudes, if not managed well, especially those related to land compensation, loss of livelihoods and a decrease in family income levels, will have further impacts in the form of community unrest which will lead to conflicts between local residents and those responsible for activities. It is predicted that the impact of changes in community perceptions and attitudes will not only occur at the pre-construction stage, but can continue until the construction stage.
4	Many other environmental components are affected		T.P	The impact of changes in people's perceptions and attitudes does not have a derivative impact on other components.
5	Cumulative nature of impact	P		Impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impact of changes in community perceptions and attitudes can be reversed and recovered if the primary impacts in the form of land compensation, loss of business opportunities (livelihoods) and decline in family income are managed well through a social approach and/or institutional approach.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria according to the development of science and technology
	Amount	**4**	**3**	**Important (P1)**

6.2. Construction Phase

6.2.1. Acceptance of Construction Workers

A. Open job opportunities

- **Initial environmental conditions**

  Based on data from observations and interviews with 384 affected families at activity locations (Table 3.36), it is known that the majority of respondents (90.10%) are working, while the remaining 9.90% are not/are not working. This condition shows that job opportunities at the activity location are quite good.

- **Future environmental conditions without the project**

  Forecasting employment opportunities in future environmental conditions without the project is carried out using a secondary data approach related to the number of forces

  work in 5 cities at the MRT-EWLP1S1 construction site as presented in**Table 6.2. .**.

Table 6.2. Labor Force Participation Rate and Unemployment Rate

City	Workforce	Level of Participation Workforce		Level Unemployment	
		Amount	%	Amount	%
Bekasi	1,274,861	1,136,205	89.12	138,656	10.88
North Jakarta	978,701	882,420	90.16	96,281	9.84
East Jakarta	1,507,879	1,383,804	91.77	124,075	8.23
West Jakarta	1,257,727	1,146,814	91.18	110.913	8.82
Central Jakarta	1,219,358	1,085,652	89.03	133,706	10.97
Total	**6,238,526**	**5,634,895**	**90.32**	**603,631**	**9.68**

Source: Central Statistics Agency (2022)

Based on the number of unemployed from the data above, it can be concluded that the environmental quality conditions that will come without the project for the employment opportunity component (seen from the percentage of the number of people who are not/are not working) will be 9.68% or in the range of <10%. This condition shows that job opportunities at the activity location are quite good.

The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers with a minimum of 20% (1,242 people) involving local workers (residents affected by land acquisition and environmental disturbances who meet skill qualification requirements). If all of these job opportunities can be filled by local workers from 31 sub-districts in the study area, it can be said that new job opportunities from the project can reduce the number of unemployed in the study area by ± 0.21%. So the percentage of unemployment rate in the study area with the project is in the range of 9.47% (<10%).

- **The magnitude of the impact**

RLA = 90.10% working,9.90% have not/don't work
No Project = 90.32% working,9.68% have not/don't work
With Projects = 90.53%working, 9.47% have not/don't work
The magnitude of the impact = With Project – Without Project

1) Labor force participation rate
   = 90.53%Work -90.32% working
   = 0.21%Work
   ≈ increased 0.23% from existing conditions

2) Unemployment rate
   = 9.47% not yet/not working - 9.68% not yet/not working
   = -0.21% have not/didn't work
   ≈ reduced by 0.23% from existing conditions

The recruitment of construction workers for the construction of MRT-EWLP1S1 is estimated to open up employment opportunities (with a positive impact) for 1,242 local workers, especially for residents affected by land

acquisition and environmental disturbances who meet the skill qualification requirements. If all these job opportunities can be filled by local workers from 31 sub-districts in the study area, it will increase the labor force participation rate by + 0.21% and will directly reduce the unemployment rate by + 0.21%.

- **Important Nature of Impact**

Table 6.3. Important Characteristics of the Impact of Accepting Construction Workers on the Opening of Job Opportunities

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 1,242 people (if the MRT construction implementers recruit local workers as planned in the activity description) from 31 sub-districts in the study area. Meanwhile, outside the study boundary area, the total number of people who will be positively impacted by this construction workforce recruitment activity is 4,968 people.
2	The area of impact distribution	P		The area of impact distribution for the recruitment of local workers (1,242 people) covers 31 sub-districts in the study area. Meanwhile, for workers outside the study area (4,968 people), the impact could spread even more widely to sub-districts outside the study area, even sub-districts outside the study area, to outside the City of Bekasi, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		The impact is an increase in labor force participation of + 0.21% in a relatively long time (±6 years during the MRT construction phase).
4	Many other environmental components are affected	P		Other environmental components that are affected are changes in income levels (secondary impacts) and changes in people's perceptions and attitudes (tertiary impacts).
5	Cumulative nature of impact	P		Impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed, in the sense that after construction activities are completed there will definitely be a release of construction workers and this will return employment conditions to conditions that are relatively not much different from the initial level before the project.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria according to the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

B. Increase in family income

- **Initial environmental conditions**

Based on the results of interviews with 384 affected families at the activity location, it is known that the average family income at the MRT-EWLP1S1 construction site is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month (Table 3.39.). When compared with West Java Governor's Decree No. 561.7/Kep.776-Kesra/2022 concerning Determination of the Regency/City Minimum Wage for 2023 (for Bekasi City) of IDR.

5,158,248.20 and DKI Jakarta Governor Decree No. 1153 of 2022 concerning Determination of the Minimum Wage in DKI Province in 2023 of IDR. 4,901,798.00, it can be seen that the average family income at the MRT-EWLP1S1 construction site is 0.47% higher than the Bekasi City UMK and 5.73% from the DKI Jakarta UMP.

Estimates of family income levels in future environmental conditions without the project were carried out using a secondary data approach related to community income levels in the 5 cities at the MRT-EWLP1S1 construction site as measured by the household expenditure data approach (BPS, 2022) as presented in Table 3.35. Referring to this data, it is known that the average expenditure is Rp. 2,320,813/month with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387).

- **Environmental conditions that will come with the project**

  The recruitment of construction workers for the construction of the MRT East – West Line is estimated to have an impact on opening up job opportunities for 1,242 local workers and 4,968 workers from outside the study area.

  The opening of job opportunities will have a secondary impact in the form of increasing family income, especially for 266 families who lost their businesses (livelihoods) due to land acquisition. With a plan to regulate the work system, wages and insurance (BPJS Employment and BPJS Health) for construction workers agreed in writing in a Specific Time Work Agreement (PKWT) in accordance with applicable provisions, it can be estimated that the income that will be obtained by construction workers will be at least the same as the conditions initial environmental baseline (Rp. 5,182,649/month).

- **The magnitude of the impact**

  RLA = average income Rp. 5,182,649/month
  No Project = income based on average expenditure of Rp. 2,320,813/month
  With Projects = Minimum income Rp. 5,182,649/month
  The magnitude of the impact = With Project – Without Project

  1) Residents who were not affected lost their businesses (livelihoods)
     = Rp. 5,182,649/$_{month}$- Rp. 2,320,813/month
     = Rp. 2,861,836/month
     ≈ increased 55.22% from existing conditions
  2) Affected residents lost their businesses (livelihoods)
     = Rp. 5,182,649/$_{month}$- Rp. 2,591,325/month
     = Rp. 2,591,325/month
     ≈ increased 50% from existing conditions

  The impact of opening job opportunities will have a derivative (secondary) impact in the form of increasing family income (positive impact) for 1,242 local workers (especially those who have lost their business/livelihood) and 4,968

workers from outside the study area amounting to IDR. 2,591,325/month (50% of the average family income in existing conditions).

- **Important Nature of Impact**

Table 6.4. Important Characteristics of the Impact of Construction Labor Employment on Increasing Family Income

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 1,242 people (if the MRT construction implementers recruit local workers as planned in the activity description) from 33 sub-districts in the study area. Meanwhile, outside the study boundary area, the total number of people who will be positively impacted by this construction workforce recruitment activity is 4,968 people.
2	The area of impact distribution	P		The area of impact distribution for the recruitment of local workers (1,242 people) covers 31 sub-districts in the study area. Meanwhile, for workers outside the study area (4,968 people), the impact could spread even more widely to sub-districts outside the study area, even sub-districts outside the study area, to outside the City of Bekasi, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		The impact is an increase in family income by 50% of the average family income in existing conditions over a relatively long period of time (± 5 years during the MRT construction phase).
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening of employment opportunities (primary impact) and changes in people's perceptions and attitudes (tertiary impact).
5	Cumulative nature of impact	P		Impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed, in the sense that after construction activities are completed there will definitely be a release of construction workers and this will return the level of community income to a condition that is relatively not much different from the initial level before the project.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria according to the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

C. Attitudes Changes and Public Perception

- **Initial environmental conditions**

Based onThe results of community involvement in public consultation activities (3 - 4 February 2022 and 15 February 2023) show that in general the community in the study area supports the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT-EWLP1S1

development plan (Table 3.44). Apart from that, there are 242 families (63.02%) who hope to get work opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT-EWLP1S1 construction project.

However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT-EWLP1S1 development plan. For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. So in general the people in the study area strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Apart from that, there are 242 families (63.02%) who hope to get work opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT-EWLP1S1 construction project.

- **Environmental conditions that will come with the project**

  Based on the positive impact on construction labor recruitment activities (especially the impact of opening up job opportunities and increasing family income levels), if managed well, it is predicted that it will increase the community's positive attitudes and perceptions towardsMRT-EWLP1S1 construction project. In addition, with the results of interviews with 384 affected families at the activity location, it was discovered that 242 families (63.02%) had hopes of getting employment opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT construction project. -EWLP1S1.By accommodating optimallyresidents' hopes of getting employment opportunities and maximizing the positive impacts that arise, then dIt is estimated that the percentage of people who agree to this activity could reach 95%, from the previous 342 families to 365 families. Thus it can be concluded that the environmental quality conditions that will come with the project for the components of community attitudes and perceptions are included in the positive impact.

- **The magnitude of the impact**

  RLA = 342 families (89.07%) said they agreed/supported it
  No Project = the same as RLA
  342 families (89.07%) said they agreed/supported it
  With Projects = 365 families (95%)who expressed agreement/support
  The magnitude of the impact = With Project – Without Project

= 365 families -342 families
= 23 families
≈ increased 6.73% from existing conditions

The impact of opening job opportunities and increasing family income for 1,242 local workers (especially for 266 families who lost their businesses (livelihoods) due to land acquisition) and 4,968 workers from outside the study area will have derivative (tertiary) impacts in the form of changes in attitudes and perceptions publicthat is positive or supports the planconstruction of MRT-EWLP1S1 to ± 95% (initial environmental baseline condition of 89.07%).

- **Important Nature of Impact**

Table 6.5. Important Characteristics of the Impact of Accepting Construction Workers on Changes in Community Attitudes and Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 1,242 people (if the MRT construction implementers recruit local workers as planned in the activity description) from 33 sub-districts in the study area. Meanwhile, outside the study boundary area, the total number of people who will be positively impacted by this construction workforce recruitment activity is 4,968 people.
2	The area of impact distribution	P		The area of impact distribution for local workforce recruitment (1,242 people) covers 31 sub-districts in the study area. Meanwhile, for workers outside the study area (4,968 people), the impact could spread even more widely to sub-districts outside the study area, even sub-districts outside the study area, to outside the City of Bekasi, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		If managed well, the positive impact of construction labor recruitment activities (especially involving local workers) will increase the percentage of people who support the MRT-EWLP1S1 development project to±95%. This impact will last for a relatively long time (±5 years during the MRT construction phase).
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening of employment opportunities (primary impact) and increasing family income (secondary impact).
5	Cumulative nature of impact	P		Impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed, in the sense that after construction activities are completed there will definitely be a release of construction workers and this will return people's attitudes and perceptions to a condition that is relatively not much different from the initial level before the project.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria according to the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

6.2.2. Basecamp Operations

A. Open business opportunities

- **Initial environmental conditions**

  Based on BPS data (2022), there are 7 economic facilities (shops, markets, minimarkets/supermarkets, restaurants/eating houses, food stalls/shops and grocery stores) as community business places in Duri Pulo Subdistrict (underground basecamp location plan). Pengangsaan Dua (planned elevated basecamp location) is 387 units and in Rorotan Village (planned Depo basecamp location) is 156 units.

  Meanwhile, based on data from observations and interviews with 384 families affected at the activity location, it is known that respondents who work and/or own a business at the activity location either as entrepreneurs, hawkers/stalls or drivers/other services in each segment as presented in **Table 6.6.**

Table 6.6. Number of Respondents Who Work as Entrepreneurs, Hawker/Stall Traders and Drivers/Services

Work Main	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Hawkers/stall traders	42	75.00	13	23,21	1	1.79	56	100
		16.67		10.57		11,11		14.58
Self-employed	85	59.86	54	38.03	3	2.11	142	100
		33.73		43.90		33.33		36.98
Driver/other services	8	100	0	0.00	0	0.00	8	100
		3.17		0.00		0.00		2.08
Total Number of Respondents	**252**	**65.63**	**123**	**32.03**	**9**	**2.34**	**384**	**100**
		100		**100**		**100**		**100**

Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. So that economic facilities as community business places in Duri Pulo, Pengangsaan Dua and Rorotan subdistricts are 7, 387 and 156 units respectively. Meanwhile, the number of respondents who work and/or own a business at the respective activity locations is 54.47% in the underground segment, 53.57% in the elevated segment and 44.44% in the depot segment.

- **Environmental conditions that will come with the project**

  Basecamp will be a place to rest during short breaks in working hours and not for living. All of the workers will live in rental houses in the neighborhood, rented by the contractors.

  The MRT-EWLP1S1 construction work is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live in basecamp, which consists of: 1) underground basecamp (BC UG) with 756 people, 2) elevated basecamp (BC ELV) as many as 870 people, and 3) basecamp DEPO (BC DEPO) as many as 237 people.

With these basecamp operational activities, it will be a business opportunity for the local community to be able to meet the operational needs of the basecamp, especially for the needs of construction workers. This is in line with the results of interviews with 384 affected families at activity locations (Table 3.50.) which shows that 59.12% (227 families) have hopes of being able to take advantage of business opportunities, both as suppliers of goods and materials for project needs (14.32 %), canteens/restaurants for workers (16.67%) and trading businesses around basecamp (28.13%).

- **The magnitude of the impact**

RLA = number of respondents who work and/or own a business at the activity location:
1) 54.47% in the underground segment (BC-UG)
2) 53.57% in the elevated segment (BC-ELV)
3) 44.44% in the deposit segment (BC-DEPO)

No Project = the same as RLA
1) 54.47% in the underground segment (BC-UG)
2) 53.57% in the elevated segment (BC-ELV)
3) 44.44% in the deposit segment (BC-DEPO)

With Projects = Number of respondents who hope to take advantage of business opportunities:
1) 65.48% in the underground segment (BC-UG)
2) 60.16% in the elevated segment (BC-ELV)
3) 55.56% in the deposit segment (BC-DEPO)

The magnitude of the impact = With Project – Without Project

1) Underground segment
   = 65.48% - 54.47%
   = 11.01%
   ≈ increased 20.21% from existing conditions

2) Elevated segment
   = 60.16% - 53.57%
   = 6.59%
   ≈ increased 12.30% from existing conditions

3) Deposit segment
   = 55.56% - 44.44%
   = 11.12%
   ≈ increased 25.02% from existing conditions

Basecamp operations will have the impact of opening up business opportunities (positive impact) on the community around the activity location, especially for residents who are directly affected by land acquisition and loss of their livelihoods.

- **Important Nature of Impact**

Table 6.7. Important Characteristics of the Impact of Basecamp Development and Operations on Business Opportunities

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected in the underground segment is 67 families (268 people), in the elevated segment is 135 families (540 people) and in the depot segment is 4 families (16 people). while in general it will impact 384 families in 31 sub-districts in the study area.
2	The area of impact distribution	P		The impact distribution areas are mainly in Duri Pulo Village, Pengangsaan Dua Village and Rorotan Village. Meanwhile, in general, the impact will be spread across 31 sub-districts at the MRT-EWLP1S1 construction site.
3	The intensity and duration of the impact		T.P	The impact intensity is 12.31% - 25.01% of the total number of residents who work and/or own a business at the activity location, but it is temporary only during the operational period of the basecamp.
4	Many other environmental components are affected	P		Other environmental components that are affected are changes in income levels (secondary impacts) and changes in people's perceptions and attitudes (tertiary impacts).
5	Cumulative nature of impact	P		The impact of opening up business opportunities is cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed if it is handled properly immediately
7	Other criteria are in accordance with developments in science and technology		T.P	Impacts can be handled using socio-economic and cultural approaches
	Amount	**4**	**3**	**Important (P1)**

B. Increase in family income

- **Initial environmental conditions**

Based on the results of interviews with 384 affected families at the activity location, it is known that the average family income at the MRT-EWLP1S1 construction site is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month (Table 3.39.). When compared with West Java Governor's Decree No. 561.7/Kep.776-Kesra/2022 concerning Determination of the Regency/City Minimum Wage for 2023 (for Bekasi City) of IDR. 5,158,248.20 and DKI Jakarta Governor Decree No. 1153 of 2022 concerning Determination of the Minimum Wage in DKI Province in 2023 of IDR. 4,901,798.00, it can be seen that the average family income at the MRT-EWLP1S1 construction site is 0.47% higher than the Bekasi City UMK and 5.73% from the DKI Jakarta UMP.

Estimates of family income levels in future environmental conditions without the project were carried out using a secondary data approach related to community income levels in the 5 cities at the MRT-EWLP1S1 construction site as measured by the household expenditure data approach (BPS, 2022) as presented in Table 3.35. Referring to this data, it is known that the average expenditure is Rp. 2,320,813/month with the proportion of expenditure

(consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387).

- **Environmental conditions that will come with the project**

  Basecamp construction and operational activities can be a business opportunity for the local community, especially for the needs of construction workers. The opening of business opportunities will have a secondary impact in the form of an increase in family income, at least equal to the average family income at the MRT-EWLP1S1 construction site of Rp. 5,182,649/month.

- **The magnitude of the impact**

  RLA = average income Rp. 5,182,649/month
  No Project = income based on average expenses Rp. 2,320,813/month
  With Projects = Minimum income Rp. 5,182,649/month
  The magnitude of the impact = With Project – Without Project
  = Rp. 5,182,649/$_{month}$– Rp. 2,320,813/month
  = Rp. 2,861,836/$_{month}$
  ≈ increased 55.22%

  The impact of opening up business opportunities will have a derivative (secondary) impact in the form of an increase in family income (positive impact) of + IDR. 2,861,836/month (increased 55.22%).

- **Important Nature of Impact**

Table 6.8. Important Characteristics of the Impact of Basecamp Development and Operation on Family Income

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected in the underground segment is 67 families (268 people), in the elevated segment is 135 families (540 people) and in the depot segment is 4 families (16 people). while in general it will impact 384 families in 31 sub-districts in the study area.
2	The area of impact distribution	P		The impact distribution areas are mainly in Duri Pulo Village, Pengangsaan Dua Village and Rorotan Village. Meanwhile, in general, the impact will be spread across 31 sub-districts at the MRT-EWLP1S1 construction site
3	The intensity and duration of the impact		T.P	The impact intensity is 12.31% - 25.01% of the total number of residents who work and/or own a business at the activity location, but it is temporary only during the operational period of the basecamp.
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening of business opportunities (primary impact) and changes in people's perceptions and attitudes (tertiary impact).
5	Cumulative nature of impact	P		The impact of this increase in income is cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed if it is handled properly immediately
7	Other criteria are in accordance with		T.P	Impacts can be handled using socio-economic and cultural approaches

No	Criteria	Interest		Information
		P	T.P	
	developments in science and technology			
	Amount	**4**	**3**	**Important (P1)**

C. Attitudes Changes and Public Perception

- **Initial environmental conditions**

Based onThe results of community involvement in public consultation activities (3 - 4 February 2022 and 15 February 2023) show that in general the community in the study area supports the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan (Table 3.43.), with details:

1) Underground segment (86.99% of the total number of respondents 123 families)
   - Strongly support 24.39%
   - Support 62.60%
2) Elevated segment (90.08% of the total number of respondents 252 families)
   - Strongly support 67.86%
   - Support 22.22%
3) Deposit segment (88.89% of the total number of respondents 9 families)
   - Strongly support 66.67%
   - Support 22.22%

Apart from that, there are 227 families (59.12%) who hope to be able to take advantage of business opportunities, either as suppliers of goods and materials for project needs (14.32%), canteens/restaurants for workers (16.67%) and trading businesses around basecamp (28.13%).

However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT-EWLP1S1 development plan. For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

ConditionThe future environment without the project is predicted to remain the same as the initial environmental baseline. So in general the people in the study area strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Apart from that, there are 227 families (59.12%) who hope to be able to take advantage of business opportunities,

either as suppliers of goods and materials for project needs (14.32%), canteens/restaurants for workers (16.67%) and trading businesses around basecamp (28.13%).

- **Environmental conditions that will come with the project**

  Based on the positive impact on basecamp construction and operational activities (especially the impact of opening up business opportunities and increasing family income levels), if managed well, it is predicted that it will increase the community's positive attitudes and perceptions towardsMRT-EWLP1S1 construction project. In addition, the results of interviews with 384 affected families at the activity location showed that there were 227 families (59.12%) who had hopes of being able to take advantage of business opportunities, both as suppliers of goods and materials for project needs (14.32%), canteens/ restaurants for workers (16.67%) and trading businesses around basecamp (28.13%).By accommodating optimallyresidents' hopes of getting business opportunities and maximizing the positive impacts that arise, then dIt is estimated that the percentage of people who agree to this activity could reach 95%, from the previous 342 families to 365 families, with details:

  1) Underground segment (96.03% of the total number of respondents 123 families)
  2) Elevated segment (92.68% of the total number of respondents 252 families)
  3) Deposit segment (98.22% of the total number of respondents 9 families)

  Thus it can be concluded that the environmental quality conditions that will come with the project for the components of community attitudes and perceptions are included in the positive impact.

- **The magnitude of the impact**

  RLA = Number of respondents who support the MRT-EWLP1S1 development plan:
  1) underground segment (BC-UG) = 86.99%
  2) elevated segment (BC-ELV) = 90.08%
  3) deposit segment (BC-DEPO) = 88.89%

  No Project = the same as RLA
  1) underground segment (BC-UG) = 86.99%
  2) elevated segment (BC-ELV) = 90.08%
  3) deposit segment (BC-DEPO) = 88.89%

  With Projects = Number of respondents who benefit from business opportunities and support the MRT-EWLP1S1 development plan:
  1) underground segment (BC-UG) = 92.68%
  2) elevated segment (BC-ELV) = 96.03%
  3) deposit segment (BC-DEPO) = 98.22%

  The magnitude of the impact = With Project – Without Project

  1) Underground segment (BC-UG)
     = 92.68% - 86.99%
     = 5.69%
     ≈ increased 6.54%
  2) Elevated segment

= 96.03% - 90.08%
= 5.95%
≈ increased 6.61%

3) Deposit segment
= 98.22% - 88.89%
= 9.33%
≈ increased 10.50%

The impact of opening up business opportunities and increasing family income, especially for 266 families who lost their businesses (livelihoods) due to land acquisition, will have derivative (tertiary) impacts in the form of changes in community attitudes and perceptions.that is positive or supports the planconstruction of MRT-EWLP1S1 to 95% (initial environmental baseline condition of 89.07%).

- **Important Nature of Impact**

Table 6.9. The Important Characteristics of the Impact of Basecamp Development and Operations on Change Community Attitudes and Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected in the underground segment is 67 families (268 people), in the elevated segment is 135 families (540 people) and in the depot segment is 4 families (16 people). while in general it will impact 384 families in 31 sub-districts in the study area.
2	The area of impact distribution	P		The impact distribution areas are mainly in Duri Pulo Village, Pengangsaan Dua Village and Rorotan Village. Meanwhile, in general, the impact will be spread across 31 sub-districts at the MRT-EWLP1S1 construction site
3	The intensity and duration of the impact		T.P	The impact intensity is 12.31% - 25.01% of the total number of residents who work and/or own a business at the activity location, but it is temporary only during the operational period of the basecamp.
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening up of business opportunities (primary impact) and increasing family income (secondary impact).
5	Cumulative nature of impact	P		Impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed if it is handled properly immediately
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria according to the development of science and technology
	Amount	**4**	**3**	**Important (P1)**

6.2.3. Mobilization of Construction Equipment and Materials

A. Decreased air quality

- **Initial environmental conditions**

  The results of air quality measurements at 12 locations in the study area were recorded in the ISPUMAX range of 107 – 126 (Unhealthy category) with the critical parameter CO (Table 3.8).

Table 6.10. Environmental Quality Components of Air Quality in Initial Environmental Base Conditions

Segment	Code	Location	Coordinate	ISPU		SKL	
*Elevated*West	UKG1	Jl. S. Parman	S 06°10'30.59": E 106°47'33.35"	115	Not healthy	3	Currently
Underground	UKG2	Jl. KH Hasyim Ashari	S 06°09'56.71": E 106°48'09.07"	124	Not healthy	3	Currently
	UKG3	Jl. Betel Garden	S 06°10'59.50": E 106°49'23.74"	118	Not healthy	3	Currently
	UKG4	Jl. Eastern Cendeng	S 06°10'13.40": E 106°48'39.79"	125	Not healthy	3	Currently
	UKG5	Jl. Lieutenant General Suprapto	S 06°10'27.62": E 106°51'19.45"	120	Not healthy	3	Currently
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	S 06°10'00.59": E 106°52'29.49"	124	Not healthy	3	Currently
	UKG7	Jl. Pioneers of Independence	S 06°10'31.25": E 106°53'36.19"	126	Not healthy	3	Currently
*Elevated*East	UKG8	Jl. Raya Bekasi	S 06°10'57.48": E 106°54'58.80"	121	Not healthy	3	Currently
	UKG9	Jl. Raya Bekasi	S 06°11'03.85": E 106°56'32.89"	118	Not healthy	3	Currently
	UKG10	Jl. Raya Bekasi	S 06°11'25.46": E 106°58'05.75"	117	Not healthy	3	Currently
	UKG11	Jl. Kali Abang Tengah	S 06°11'46.05": E 106°58'33.59"	107	Not healthy	3	Currently
Depot	UKG12	Jl. BKT inspection	S 06°08'38.72": E 106°57'59.62"	108	Not healthy	3	Currently

- **Environmental conditions that will come with the project**

  The mobilization of construction equipment and materials will use transport vehicles in the form of dump trucks with a capacity of 2 m3 which are estimated to pass through 7 trucks in 30 minutes or 14 trucks in 1 hour. Assuming diesel fuel consumption is 0.4 liters/km, the emission load and pollutant concentration are obtained as presented in Table 6.16, and used as a basis for determining air quality and ISPU figures based on activities.

  Next, determining the environmental quality conditions of air components is carried out by convertingISPU figuresin Table 6.11. into the Environmental Quality Scale (SKL) in Table 6.12. and the results are presented in Table 6.13..

Table 6.11. Emission Load and Pollutant Concentration in Mobilization Activities of Construction Equipment and Materials

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)	Information
SO2	6.36	$Q = \frac{14\ unit/jam}{3600\ dt/jam} x \frac{0,4\ L/km}{1000\ m/km} x\ 6,36\ gr/L$ $Q = 9,89.10^{-6}$	$C = \frac{2x9,89.10^{-6}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ 0,9998$ $C = 0,17 \mu g/m^3$	• **Emission Load Calculation:** **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E= Emission factor * (gr/liter) *) Source: Blue Sky Program (KLHK, 2007)
NO2	9.21	$Q = \frac{14\ unit/jam}{3600\ dt/jam} x \frac{0,4\ L/km}{1000\ m/km} x\ 9,21\ gr/L$ $Q = 1,43.10^{-5}$	$C = \frac{2x1,43.10^{-5}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ 0,9998$ $C = 0,25 \mu g/m^3$	
CO	36.42	$Q = \frac{14\ unit/jam}{3600\ dt/jam} x \frac{0,4\ L/km}{1000\ m/km} x\ 36,42\ gr/L$ $Q = 5,67.10^{-5}$	$C = \frac{2x5,67.10^{-5}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ 0,9998$ $C = 0,98 \mu g/m^3$	• **Emission concentration calculation:** $C_{(x,0,0,H)} = \frac{2.Q}{\sqrt{2\pi}\sigma_z u} x \left[e^{-\frac{1}{2}\left(H/\sigma\right)^2}\right] \int_{p1}^{p2} \frac{1}{\sqrt{2\pi}}\ e^{-\frac{1}{2}}.p^2.dp$ Information : C = concentration of pollutants in the air (µg/m³) Q = burdenemissions (gr/sec.m) π = phi (3.14) µ = district average. wind on the x axis (m/s) = 1.6 m/s σz = vertical dispersion coefficient (m) H = tallemission source (m) = 1.5m x = receiver distance (m) = 200 m p = y/σy (horizontal dispersion coefficient (m)) σy = axb = 213 x 0.20.894 = 50.5 y = 200 m σz = cxd + f = (440.8 x 0.21941) + 9.27 = 28.65
Particulates (PM10)	2.01	$Q = \frac{14\ unit/jam}{3600\ dt/jam} x \frac{0,4\ L/km}{1000\ m/km} x\ 2,01\ gr/L$ $Q = 3,13.10^{-6}$	$C = \frac{2x3,13.10^{-6}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ 0,9998$ $C = 0,05 \mu g/m^3$ Distribution of dust (particulates) along transportation roads: $e_u = 5,9\ x\left(\frac{0,02}{12}\right) x\left(\frac{19,95}{30}\right) x\left(\frac{25}{7}\right)^{0,7} x\left(\frac{10}{4}\right)^{0,5} x\left(\frac{210}{365}\right)$ $e_u = 0,015 \mu g/m^3$ $C = 14\ truck\ x\ \|0,015 \mu g/m^3$ $C = 0,21 \mu g/m^3$ Total Particulate Concentration: $C_{total} = 0,05 + 0,21\ \ \mu g/m^3$ $C_{total} = 0,26\ \ \mu g/m^3$	• **Calculation of dust distribution on transportation roads:** $e_u = 5,9\ x\left(\frac{s}{12}\right) x\left(\frac{S}{30}\right) x\left(\frac{W}{7}\right)^{0,7} x\left(\frac{w}{4}\right)^{0,5} x\left(\frac{d}{365}\right)$ Information : eu = amount of dust per road length (1 lb/mile) s = silt content(%) S = speed (miles/hour) =30 km/hour ≈ 19.95 miles/hour W = vehicle weight (tons) w = amountvehicle wheels d = number of days without rain

Table 6.12. SKL Air Quality Components

Air Pollution Standard Index (ISPU)		Environmental Quality Scale (SKL)	
Range Numbers	**Category**	**Mark**	**Category**
1 – 50	Good	5	Very good
51 – 100	Currently	4	Good
101 – 200	Not healthy	3	Currently
201 – 300	Very Unhealthy	2	Bad
≥ 301	Dangerous	1	Very bad

Table 6.13. Air Quality Forecasts and ISPU Figures on Mobilization of Construction Equipment and Materials

Location	ISPU figures				ISPU		SKL	
	PM10	CO	SO2	NO2	MAX	Category	Mark	Class
Segment*Elevated*West								
Jl. S. Parman	13.03	42.39	156.76	23.83	156.76	Not healthy	3	Currently
Segment*Underground*								
Jl. KH Hasyim Ashari	25.03	46.24	160.29	25.70	160.29	Not healthy	3	Currently
Jl. Betel Garden	14.03	43.35	157.91	24.45	157.91	Not healthy	3	Currently
Jl. Eastern Cendeng	29.03	47.20	160.77	26.33	160.77	Not healthy	3	Currently
Jl. Lieutenant General Suprapto	27.03	44.31	158.77	25.08	158.77	Not healthy	3	Currently
Segment*Elevated*East								
Jl. Lieutenant General Suprapto	12.03	46.24	160.53	25.70	160.53	Not healthy	3	Currently
Jl. Pioneers of Independence	22.03	48.16	161.29	26.33	161.29	Not healthy	3	Currently
Jl. Raya Bekasi	32.03	44.31	159.01	25.08	159.01	Not healthy	3	Currently
Jl. Raya Bekasi	40.03	43.35	158.01	24.45	158.01	Not healthy	3	Currently
Jl. Raya Bekasi	18.03	42.39	157.28	23.83	157.28	Not healthy	3	Currently
Jl. Kali Abang Tengah	23.03	36.62	152.99	21.33	152.99	Not healthy	3	Currently
SegmentDepot								
Jl. BKT inspection	34.03	37.58	153.71	21.95	153.71	Not healthy	3	Currently

- **The magnitude of the impact**

  The magnitude of the impact of changes in air quality on the mobilization of construction equipment and materials is presented in Table 6.14.

Table 6.14. Magnitude of the Impact of Changes in Air Quality on Mobilization of Construction Equipment and Materials

Location	SKL Without Project		SKL With Projects		Impact Magnitude
	Mark	Class	Mark	Class	
Segment*Elevated*West					
Jl. S. Parman (Tomang Station)	3	Currently	3	Currently	0
Segment*Underground*					
Jl. KH Hasyim Asy'ari (Sta Roxy)	3	Currently	3	Currently	0
Jl. Betel Garden (Sta Thamrin)	3	Currently	3	Currently	0

Jl. East Cindeng (Sta Petojo)	3	Currently	3	Currently	0
Jl. Lieutenant General Suprapto (Sta Galur)	3	Currently	3	Currently	0
Segment*Elevated*East					
Jl. Lt. Gen. Suprapto (Sta Sumur Batu)	3	Currently	3	Currently	0
Jl. Pioneers of Independence (East Pakulonan Sta.)	3	Currently	3	Currently	0
Jl. Raya Bekasi (Sta Pulo Gadung)	3	Currently	3	Currently	0
Jl. Raya Bekasi (West Cakung Station)	3	Currently	3	Currently	0
Jl. Raya Bekasi (Ujung Menteng Station)	3	Currently	3	Currently	0
Jl. Kali Abang Tengah (Medan Satria Sta.)	3	Currently	3	Currently	0
SegmentDepot					
Jl. BKT Inspection (Rorotan Depot)	3	Currently	3	Currently	0

- **Important Nature of Impact**

Table 6.15. Important Characteristics of the Impact of Mobilization of Construction Equipment and Materials on Air Quality

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people who will be affected, especially people who live around the project location and along the route/access road used by project trucksas many as 384 families (1,536 people) residents in 33 sub-districts live along the MRT-EWLP1S1 route.
2	The area of impact distribution		T.P	The impact that occurs is not extensive only along the route/access road that the project trucks pass through and the increase in emission levels that appears spreads to a distance of 200 meters from the source of the impact around the route/access road, but will be assimilated by the environment around the project site.
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur every time a Dump truck passes which will cause additional emissions contributions (SO2 = 0.065 µg/m3, NO2 = 0.093 µg/m3, CO = 0.34 µg/m3 and Particulates = 0.02 µg/m3), but the impact temporary when the transport truck passes through residential/residential areas,therefore the criteria are not important.
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal when the transport trucks are not passing
6	Reversal or non-reversal of impact		T.P	This impact will disappear when the activity has been completed
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**2**	**5**	**Not Important (TP)**

B. Increased noise

- **Initial environmental conditions**

The results of noise level measurements at 12 locations in the study area were recorded in the range of 66 dB(A) – 73 dB(A) (Table 3.10.), so that when compared with the provisions of environmental quality standards as required

in the Decree of the Minister of the Environment Number Kep-48 /MENLH/1996 concerning Noise Level Standards, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)].

Table 6.16. Condition Quality Noise Level

Segment	Code	Location	Noise Level (dB[A])	SKL	
				Mark	Category
*Elevated*West	UKG1	Jl. S. Parman	68	2	Bad
Underground	UKG2	Jl. KH Hasyim Ashari	65	3	Currently
	UKG3	Jl. Betel Garden	68	2	Bad
	UKG4	Jl. Eastern Cendeng	65	3	Currently
	UKG5	Jl. Lieutenant General Suprapto	65	3	Currently
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	65	3	Currently
	UKG7	Jl. Pioneers of Independence	65	3	Currently
	UKG8	Jl. Raya Bekasi	64	3	Currently
	UKG9	Jl. Raya Bekasi	65	3	Currently
	UKG10	Jl. Raya Bekasi	63	3	Currently
	UKG11	Jl. Kali Abang Tengah	59	4	Good
Depot	UKG12	Jl. BKT inspection	59	4	Good

- **Environmental conditions that will come with the project**

  The mobilization of construction equipment and materials will use transport vehicles in the form of dump trucks with a capacity of 24 m3 which are estimated to pass 7 DT in 1 hour. Based on the Road Environmental Monitoring Guidelines (2003), the noise level from 1 dump truck unit at the source is 64.6 dB(A). So, the noise level generated by 7 DT is:

  L2 = L_1+ 10 log n
  = 64.6 + 10 Log 7
  = 73.05 dBA

  and the noise level generated by the 7 DT stack is as presented in Table 6.17. and Figure 6.1..

Table 6.17. Noise Levels at Certain Distances in Mobilization Activities of Construction Equipment and Materials

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
1	61.29	Does not meet quality standards	Calculations using the equation: **L2 = L_1+10 log r2/r1** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter)
15	58.28		
30	56.52		
45	55.27		

60	54.30		r2 = distance from noise source (meters)
75	53.51		
90	52.84		Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
105	52.26		
120	51.75		
135	51.29		
150	50.88	Meet Quality Standards	
165	50.50		
180	50.15		
195	49.83		
210	49.53		
225	49.29		

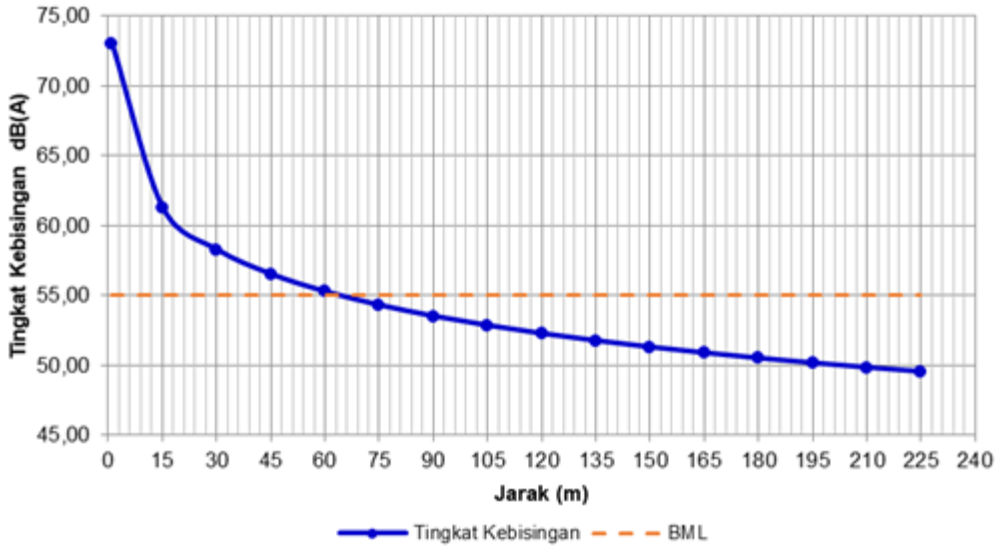


Figure 6.1. Noise Levels at Certain Distances in Mobilization Activities of Construction Equipment and Materials

- **The magnitude of the impact**

  With the closest distance to settlements/buildings being ± 15 m from the road axle, the magnitude of the impact of noise levels on the mobilization of construction equipment and materials is as presented in Table 6.19.

Table 6.18. SKL Component Noise Level

Noise Level (dB[A])	Environmental Quality Scale (SKL)	
	Mark	Category
50 – 55	5	Very good
56 – 60	4	Good
61 – 65	3	Currently
66 – 70	2	Bad
≥ 71	1	Very bad

Table 6.19. Magnitude of the Impact of Changes in Noise Levels on Mobilization of Construction Equipment and Materials

Segment/Path	Noise Level (db(A))			SKL	Information
	L1 (RLA)	L2 (105m)	L		
West Elevated Segment					Combining the 2 noise level components with the equation: **L = 10 log [Σ Antilog (Ln/10)]** Information : L = Combined noise level (dBA) Ln = Nth noise level (dBA) n = lots of noisy components (Traffic Noise Prediction Guidelines, PU, 2004)
Jl. S. Parman (Sta. Tomang)	72	52.26	72.05	1	
Underground Segment					
Jl. KH Hasyim Asy'ari (Sta Roxy)	68	52.26	68.11	2	
Jl. Betel Garden (Sta Thamrin)	73	52.26	73.04	1	
Jl. Eastern Cendeng (Sta Petojo)	69	52.26	69.09	2	
Jl. Lieutenant General Suprapto (Sta Galur)	73	52.26	73.04	1	
East Elevated Segment					
Jl. Lieutenant General Suprapto (Stone Well Station)	70	52.26	70.07	2	
Jl. Pioneers of Independence (East Pakulonan Sta.)	72	52.26	72.05	1	
Jl. Raya Bekasi (St Pulo Gadung)	70	52.26	70.07	1	
Jl. Raya Bekasi (West Cakung Sta)	72	52.26	72.05	1	
Jl. Raya Bekasi (Ujung Menteng Station)	70	52.26	70.07	1	
Jl. Kali Abang Tengah (Medan Satria Sta.)	66	52.26	66.18	2	
Deposit Segment					
Jl. BKT inspection (Rorotan Depot)	69	52.26	69.09	2	

Segment	Code	Location		Noise Level (dB[A])		SKL	
						Mark	Category
Elevated West	UKG1	Jl. S. Parman	2	Bad	1	Very bad	-1
Underground	UKG2	Jl. KH Hasyim Ashari	3	Currently	2	Bad	-1
	UKG3	Jl. Betel Garden	2	Bad	1	Very bad	-1
	UKG4	Jl. Eastern Cendeng	3	Currently	2	Bad	-1
	UKG5	Jl. Lieutenant General Suprapto	3	Currently	1	Very bad	-2
Elevated East	UKG6	Jl. Lieutenant General Suprapto	3	Currently	2	Bad	-1
	UKG7	Jl. Pioneers of Independence	3	Currently	1	Very bad	-2
	UKG8	Jl. Raya Bekasi	3	Currently	1	Very bad	-2
	UKG9	Jl. Raya Bekasi	3	Currently	1	Very bad	-2
	UKG10	Jl. Raya Bekasi	3	Currently	1	Very bad	-2
	UKG11	Jl. Kali Abang Tengah	4	Good	2	Bad	-2
Depot	UKG12	Jl. BKT inspection	4	Good	2	Bad	-2

- **Important Nature of Impact**

Table 6.20. Important Characteristics of the Impact of Mobilization of Construction Equipment and Materials on Noise Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people who will be affected, especially the people who live around the project location and along the route/access road used by the project trucks, is 384 families (1,536 people) residents in 33 sub-districts who live along the MRT-EWLP1S1 route.
2	The area of impact distribution		T.P	The impact that occurred was not widespreadinalong the route/access road passed by the project trucks and the noise level that appears is 58.28 dB (A) spread to a distance of 15 meters from the noise source around the route/access road.
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur only when the dump truck passes, which causes a noise of 58.28 dBA, but the impact is temporary when the transport truck passes through a residential/residential area.therefore the criteria are not important.
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal when the transport trucks are not passing
6	Reversal or non-reversal of impact		T.P	This impact will disappear when the activity has been completed
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**2**	**5**	**Not Important (TP)**

C. Prevalence of ARI

- **Initial environmental conditions**

  Based on the results of interviews with 384 affected families at the activity location, it is known that the types of illnesses suffered in the last 3 months consisted of cough/cold (71.09%), diarrhea (18.23%), ARI (4.95%), itching. - itching (5.21%) and others (0.52%). Referring to these data, it can be concluded that the prevalence of ARI disease for initial environmental conditions is in the good category.

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions.

- **Environmental conditions that will come with the project**

  Forecasting future environmental conditions with the project in the ARI disease prevalence component is carried out using an approach to the potential for dust exposure, especially during construction material mobilization activities. The exposure process and potential are identified through exposure pathways as presented in **Table 6.21.**.

Table 6.21. Dust Exposure Routes in Construction Material Mobilization Activities

Path of Exposure	Information
Path 1	Source of pollution: mobilization of construction equipment and materials can have an impact in the form of increased dust levels in the air as a result of the movement of transport vehicles with an average concentration value of 42,083µg/Nm3
Path 2	Exposure Point: polluted environmental media (air) at a distance of ± 100 meters left and right of the road which is used as access for mobilization activities for construction equipment and materials
Path 3	Environmental media and distribution mechanisms: Pollutants are released through the air which spreads the pollution by certain mechanisms to the point of exposure in the study area.
Path 4	Method of exposure: increased concentration of dust particulates (TSP) entering or coming into contact with the human body through the nose (respiratory tract).
Path 5	Population at risk: communities at risk of being affected consist of communities along roads that are used as routes/access points for the mobilization of construction equipment and materials. a. Jl. Lt. Gen. S. Parman, Jl. Kyai Tapa, Jl. KH. Hasyim Asy'ari, Jl. Cideng Timur, Jl. Jatibaru Raya, Jl. Kebon Sirih, Jl. AR Hakim, Jl. Kramat Kwitang, Jl. Kramat Bunder, Jl. Lt. Gen. Suprapto, Jl. Pioneers of Independence, Jl. Raya Bekasi. b. Jl. Kali Abang Tengah, Jl. Raya Bekasi c. Jl. East Canal Inspection The number of people at risk is 1,388 people, plus 6,210 construction workers, so the number of people at risk is 7,598 people.

Source: Decree of the Minister of Health of the Republic of Indonesia Number 876/Menkes/SK/VIII/2001 concerning Technical Guidelines for Environmental Health Impact Analysis

Next, the contribution of pollutants (dust) from transport vehicles to changes in air quality at the activity location is determined, as presented in**Table 6.22.**.

Table 6.22. Contribution of Pollutants (Dust) from Transport Vehicles at a Distance of 100 m

Segment	Code	Location	Coordinate	TSP (µg/m3)	Pollutant Contribution (µg/m3)	TSP w. Project (µg/m3)
*Elevated*West	UKG1	Jl. S. Parman	S 06°10'30.59": E 106°47'33.35"	21	0.066	21,066
Underground	UKG2	Jl. KH Hasyim Ashari	S 06°09'56.71": E 106°48'09.07"	45	0.066	45,066
	UKG3	Jl. Betel Garden	S 06°10'59.50": E 106°49'23.74"	22	0.066	22,066
	UKG4	Jl. Eastern Cendeng	S 06°10'13.40": E 106°48'39.79"	50	0.066	50,066
	UKG5	Jl. Lieutenant General Suprapto	S 06°10'27.62": E 106°51'19.45"	48	0.066	48,066
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	S 06°10'00.59": E 106°52'29.49"	20	0.066	20,066
	UKG7	Jl. Pioneers of Independence	S 06°10'31.25": E 106°53'36.19"	39	0.066	39,066
	UKG8	Jl. Raya Bekasi	S 06°10'57.48": E 106°54'58.80"	54	0.066	54,066
	UKG9	Jl. Raya Bekasi	S 06°11'03.85": E 106°56'32.89"	73	0.066	73,066
	UKG10	Jl. Raya Bekasi	S 06°11'25.46": E 106°58'05.75"	32	0.066	32,066
	UKG11	Jl. Kali Abang Tengah	S 06°11'46.05": E 106°58'33.59"	41	0.066	41,066

Depot	UKG12	Jl. BKT inspection	S 06°08'38.72": E 106°57'59.62"	60	0.066	60,066
			Average			**42,149**

Health Risk is determined using the Dose Response Relationship method (Ostro, 1994), as follows:

dHi = bi X POPi X dA

= 0.057587 X 7,598 people X 42.149 µg/m3

=18,414 people

When compared with the total population in the 31 sub-districts at the activity location (2,780,338 people), the percentage of affected population is 0.66% (total 5.61%).

- **The magnitude of the impact**

RLA = prevalence of ARI disease 4.95%
No Project = the same as RLA
prevalence of ARI disease 4.95%
With Projects = prevalence of ARI disease5.61%
The magnitude of the impact = With Project – Without Project
= 5.61% - 4.95%
= 0.66 %

- **Important Nature of Impact**

Table 6.23. Important Characteristics of the Impact of Mobilization of Construction Equipment and Materials on the Prevalence of ISPA

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people potentially affected is 18,414 people, especially people whose residences are less than 100 m along the route/access for the mobilization of construction equipment and materials.
2	The area of impact distribution	P		The area of distribution of impacts follows the area of distribution of impacts of air pollution to which humans are receptors, namely 0.2 km x length of route/access for mobilization of construction equipment and materials.
3	The intensity and duration of the impact		T.P	High impact intensity occurs in residents who live at a distance of less than 100 meters, while for residents who live at a distance of 100 - 200 m the intensity is moderate and for more than 200 m left and right of the road the intensity is low. Judging from the length of time the impact lasts, the duration of the impact is during the Mobilization of Construction Equipment and Materials activities.
4	Many other environmental components are affected	P		There are other environmental components that are affected, namely changes in people's attitudes and perceptions in positive and/or negative directions which are influenced by the number of people suffering from health problems (number of ISPA cases).
5	Cumulative nature of impact	P		As described in the estimated impact size, the causes of respiratory infections are influenced by many factors, air pollution can be a predisposing factor for the occurrence of ISPA along with other trigger factors. Judging from the cumulative nature of the impact of dust particles with a size

No	Criteria	Interest		Information
		P	T.P	
				of 2.5 microns that enter the respiratory tract in lung tissue, especially the alveoli, these particles will accumulate and ultimately reduce respiratory capacity and lead to pneumonia or pneumonia.
6	Reversal or non-reversal of impact	P		Dust particles that are already in the alveoli are very difficult to excrete out of the body. By looking at this, the nature of the impact is categorized as irreversible.
7	Other criteria are in accordance with developments in science and technology		T.P	There are other criteria in accordance with developments in science and technology that are already available and easy to obtain. The science and technology criteria that can be used to overcome this impact are managing it through a technical approach and a social approach.
	Amount	**5**	**2**	**Important (P1)**

D. Attitudes Changes and Public Perception

- **Initial environmental conditions**

  Based onThe results of community involvement in public consultation activities (3 - 4 February 2022) show that in general the community in the study area supports the MRT East - West Line development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT East - West Line development plan (Table 3.44).

  However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT East - West Line development plan, especially 13.54% of respondents who said they were worried about the negative impact in the form of air pollution. For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

- **Future environmental conditions without the project**

  The forecast of environmental quality conditions for components of community attitudes and perceptions regarding future environmental conditions without the project is carried out using an initial environmental baseline condition approach from survey data in the study area.Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (70%)gave the answer that social relations between residents at the activity location were very good and 6% gave the answer quite good. Meanwhile, 17% of respondents gave normal answers and 7% answered that social relations between residents at the activity location were decreasing. The results of this survey show that the study area still has good social relations as indicated by the percentage of

respondents' answers stating that conditions are good and improving, above 50%.

- **Environmental conditions that will come with the project**

  Based on the negative impacts caused during the mobilization of construction equipment and materials (especially the impact of decreased traffic performance, decreased air quality, increased noise and the prevalence of ISPA), if it is not managed well, it is predicted that negative changes in community attitudes and perceptions will occur. in the form of changes in the number and percentage of people who agree with the activity plan to less agree or even strongly disagree. It is estimated that the decrease in the percentage of people who agree to this activity could reach 50%, whereas previously 342 families who agreed could decrease to only 171 families from the community who agreed. Thus it can be concluded that the environmental quality conditions that will come with the project for the components of community attitudes and perceptions are included in the negative impacts.

- **The magnitude of the impact**

  RLA = 342 families (89.07%) said they agreed/supported it
  No Project = the same as RLA
  342 families (89.07%) said they agreed/supported it
  With Projects = 171 familieswho expressed agreement/support
  The magnitude of the impact = With Project – Without Project
  = 171 families -342 families
  = - 171 families (- 50%from existing conditions)

  The impact of decreasing traffic performance, decreasing air quality, increasing noise and the prevalence of ISPAwill cause derivative (tertiary) impacts in the form of changes in attitudes and perceptions of societywhich is negativeamounting to 50% of existing conditions.

- **Important Nature of Impact**

Table 6.24. Important Characteristics of the Impact of Mobilization of Construction Equipment & Materials on Changes in Community Attitudes & Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be affected is 384 families (1,324 people). This number is only calculated from the number of families representing residents in the 31 sub-districts at the MRT East – West Line construction site
2	The area of impact distribution	P		The impact distribution area includes 31 sub-districts at the MRT East – West Line construction site
3	The intensity and duration of the impact	P		The impact of changes in community perceptions and attitudes, if not managed well, will have further impacts in the form of community unrest which can lead to conflict between local residents and those responsible for activities. The impact of changes in community perceptions and attitudes is predicted to occur during the construction phase.
4	Many other environmental components are affected		T.P	The impact of changes in people's perceptions and attitudes is a derivative impact of the impact of other components and does not cause other derivative impacts.
5	Cumulative nature of impact	P		impacts are cumulative

No	Criteria	Interest		Information
		P	T.P	
6	Reversal or non-reversal of impact		T.P	The impact of changes in people's perceptions and attitudes can be reversed and recovered if the primary and secondary impacts are managed well through a social approach and/or institutional approach.
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology
	Amount	**4**	**3**	**Important (P1)**

6.2.4. Land Clearing and Relocation of Public Facilities/Utilities

A. Decreased traffic performance

- **Initial environmental conditions**

  The results of calculating the traffic performance of existing roads on transport routes resulting from land clearing in the form of building debris and tree felling are presented in Table 6.25.

Table 6.25. Existing Road Traffic Performance

Road	junior high school/h	VC Ratio	LOS
West Elevated Segment			
Jl. S. Parman	5.103	1,074	F
Jl. Kyai Tapa	5,187	1,078	F
Underground Segment			
Jl. KH Hasyim Asy'ari	3,069	0.830	D
Jl. East Cideng	3,219	0.875	D
Jl. Greater Jatibaru	4,215	0.914	E
Jl. Betel Garden	1,744	0.426	C
Jl. AR Hakim	1,727	0.499	C
Jl. Kramat Kwitang	2,797	0.980	E
Jl. Kramat Round	1,355	0.317	B
East Elevated Segment			
Jl. Lt. Gen. Suprapto	4,454	0.780	C
Jl. Pioneers of Independence	1,766	0.535	C
Jl. Raya Bekasi	2,704	0.845	D
Deposit Segment			
Jl. East Canal Inspection	460	0.104	A

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions, so that in general road traffic performance in conditions without the project is as follows:

  1) West elevated segment

The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).

2) Underground segment
The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to E (unstable flow, low and different speeds -different, volume approaches capacity).

3) East elevated segment
The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to D (unstable flow, low speed).

4) Deposit Segment
The traffic performance (level of service) of roads in the Depo segment includes service level category A (free flow, low volume and high speed, the driver can choose the desired speed).

- **Environmental conditions that will come with the project**

The results of road traffic performance calculations due to transport route activities resulting from land clearing in the form of building debris and tree felling during the construction of the MRT-EWLP1S1 are presented in Table 6.26.

Table 6.26. Road Traffic Performance in Land Clearing Activities and Relocation of Public Facilities/Utilities

Segment/Path		West Elevated		Underground							East Elevated			Depot
		Jl. S. Parman	Jl. Kyai Tapa	Jl. KH Hasyim Asy'ari	Jl. East Cideng	Jl. Greater Jatibaru	Jl. Betel Garden	Jl. AR Hakim	Jl.Kramat Kwitang	Jl. Kramat Round	Jl. Lt. Gen.Suprapto	Jl. Pioneers of Independence	Jl. Raya Bekasi	Jl. East Canal Inspection
Dump trucks. concrete pump trucks in elevated construction		11	21	21	21	21	21	21	21	21	36	43	54	68
Dump trucks. concrete pump trucks in underground constrc.		-	-	14	28	42	60	74	88	100	114	114	114	114
Dump trucks soil material & debris		9	20	42	57	72	91	104	114	131	142	157	165	165
Total Vol. Traffic	units	20	41	77	106	135	172	199	223	252	292	314	333	347
	junior high school/h	30	61.5	115.5	159	202.5	258	299	334.5	378	438	471	499.5	521
Vol. Existing traffic	junior high school/h	5103	5187	3069	3219	4215	1744	1727	2797	1355	4454	1766	2704	460
Vol. during project	junior high school/h	5133	5249	370.5	3378	4418	2002	2026	3132	1733	4892	2237	3204	981
AVE Traffic Capacity	junior high school/h	4752	4812	3073	3208	4610	4099	3458	2854	4281	4930	5708	3315	4418
VC Ratio		1,080	1,091	1,036	1,053	0.958	0.488	0.586	1,097	0.405	0.992	0.392	0.966	0.222
Level of Service (LOS)		F	F	F	F	E	C	C	F	B	E	C	E	B

Note: The SMP factor for dump trucks as large trucks is 1.5 according to Regional Highway Regulation No. 016/T/BNKT/1990

- **The magnitude of the impact**

RLA (Table 6.25.) :

1) West elevated segment
   The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
2) Underground segment
   The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to E (unstable flow, low and different speeds -different, volume approaches capacity).
3) East elevated segment
   The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to D (unstable flow, low speed).
4) Deposit Segment
   The traffic performance (level of service) of roads in the Depo segment includes service level category A (free flow, low volume and high speed, the driver can choose the desired speed).

No Project = the same as RLA

By Project (Table 6.26.) :

1) West elevated segment
   The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
2) Underground segment

The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to F (obstructed flow, low speed, low volume). under capacity, lots of stops).

3) East elevated segment
   The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to E (unstable flow, low speed).
4) Deposit Segment
   The traffic performance (level of service) of roads in the Depo segment is in service level category B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed).

The magnitude of the impact = With Project – Without Project
(Table 6.27.)

Table 6.27. The Magnitude of the Impact of Construction Equipment and Material Mobilization Activities on Traffic Performance

Road	With Projects		No Project		Impact Magnitude (Vc)
	VC ratio	LOS	VC ratio	LOS	
West Elevated Segment					
Jl. S. Parman	1,080	F	1,074	F	0.006
Jl. Kyai Tapa	1,091	F	1,078	F	0.013
Underground Segment					
Jl. KH Hasyim Asy'ari	1,036	F	0.830	D	0.206
Jl. East Cideng	1,053	F	0.875	D	0.178
Jl. Greater Jatibaru	0.958	E	0.914	E	0.044
Jl. Betel Garden	0.488	C	0.426	C	0.062
Jl. AR Hakim	0.586	C	0.499	C	0.087
Jl. Kramat Kwitang	1,097	F	0.980	E	0.117
Jl. Kramat Round	0.405	B	0.317	B	0.088
East Elevated Segment					
Jl. Lt. Gen. Suprapto	0.992	E	0.780	C	0.212
Jl. Pioneers of Independence	0.392	C	0.535	C	-0.143
Jl. Raya Bekasi	0.966	E	0.845	D	0.121
Deposit Segment					
Jl. East Canal Inspection	0.222	B	0.104	A	0.118

- **Important Nature of Impact**

Table 6.28. Important Characteristics of the Impact of Land Clearing and Relocation of Public Facilities/Utilities on Traffic Performance

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	**P**		The number of people estimated to be affected is 384 families (1,324 people). This number is only calculated from the number of households representing the population in 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
2	The area of impact distribution	P		The impact distribution area includes 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
3	The intensity and duration of the impact	P		The impact of traffic disruption will result in further impacts in the form of public unrest if it is not managed well. which creates conflict between residents and those in charge of activities. Impacts are expected to occur during the construction phase.
4	Many other environmental components are affected	P		The impact of traffic disruption is a derivative impact from other impact components and does not cause other derivative impacts.
5	Cumulative nature of impact	P		the impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impacts of traffic disruptions can be reversed and reversible if both primary and secondary impacts are properly managed through social institutions and/or institutional approaches.
7	Other criteria are in accordance with		T.P	There are no other criteria that are in accordance with the development of science and technology

No	Criteria	Interest		Information
		P	T.P	
	developments in science and technology			
	Amount	**5**	**2**	**Important (P1)**

B. Decreased air quality

- **Initial environmental conditions**

  The results of air quality measurements at 12 locations in the study area were recorded in the ISPUMAX range of 52.99 – 61.29 (Medium category) withcritical parameters CO and PM2.5(Table 3.8.). When compared withAir quality standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (Appendix VII – Ambient Air Quality Standards), then the CO parameter is measuredhas exceeded the Air Quality Standards at all sampling location points (Figure 3.6.).

- **Future environmental conditions without the project**

  Air quality forecasts for future environmental conditions without the project are carried out by comparing initial environmental baseline conditions with measurement data in previous studies (Table 3.7.) in each segment of the MRT-EWLP1S1 Development. The results of air quality measurements at 13 locations in the study area were recorded in the ISPUMAX range of 40.38 – 76.67 (good to moderate category) withcritical parameters SO2, NO2 and PM10.Informationanother comparison of previous studiesis the DKI Jakarta Air Quality Monitoring Report for 2021. Based on this report, it is known that in general the ISPU at SPKU Bundaran HI and SPKU Kelapa Gading during 2021 is in the Medium category (81% and 82% respectively) withcritical parameter PM2.5 (Table 3.6.).Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

  Based on the number and needs of transport trucks during land clearing activities and relocation of public facilities/utilities, round trips from the origin of the equipment/materials to the activity location will be 7 vehicles/hour. Apart from that, there are other vehicles which also have the potential to cause lower irritation than trucks, namely 3 vehicles/hour.

Table 6.29. Emission Burden of Land Clearing Activities and Relocation of Public Facilities/Utilities

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{7\,unit/\,jam}{3600\,dt/\,jam} x \frac{0{,}4L/km}{1000\,m/km} x \;\; 6{,}36\,gr/L$ $Q = 4{,}95.10^{-6}$	Calculations using the equation: **Q = nkFE** Information :

NO2	9.21	$Q = \frac{7unit/\ jam}{3600dt/\ jam} x \frac{0{,}4L/km}{1000m/km} x\ \ 9{,}21gr/L$ $Q = 7{,}16.10^{-6}$
CO	36.42	$Q = \frac{7unit/\ jam}{3600dt/\ jam} x \frac{0{,}4L/km}{1000m/km} x\ \ 36{,}42gr/L$ $Q = 2{,}83.10^{-5}$
Particulates (PM10)	2.01	$Q = \frac{7unit/\ jam}{3600dt/\ jam} x \frac{0{,}4L/km}{1000m/km} x\ \ 2{,}01gr/L$ $Q = 1{,}56.10^{-6}$
Emission Loads of Heavy Equipment and Other Vehicles		
SO2	6.36	$Q = \frac{3unit/\ jam}{3600dt/\ jam} x \frac{3{,}7L/km}{1000m/km} x\ \ 6{,}36gr/L$ $Q = 1{,}96.10^{-5}$
NO2	9.21	$Q = \frac{3unit/\ jam}{3600dt/\ jam} x \frac{3{,}7L/km}{1000m/km} x\ \ 9{,}21gr/L$ $Q = 2{,}84.10^{-5}$
CO	36.42	$Q = \frac{3unit/\ jam}{3600dt/\ jam} x \frac{3{,}7L/km}{1000m/km} x\ \ 36{,}42gr/L$ $Q = 1{,}12.10^{-4}$
Particulates (PM10)	2.01	$Q = \frac{3unit/\ jam}{3600dt/\ jam} x \frac{3{,}7L/km}{1000m/km} x\ \ 2{,}01gr/L$ $Q = 6{,}20.10^{-6}$
Total Emission Burden		
SO2	2,46.10-5	
NO2	3,56.10-5	
CO	1,41.10-4	
SO2	7,76.10-6	

Q = burdenemissions (gr/sec.m)
n = number of vehicles (units)
k = fuel consumption (liters/km)
F.E = Emission factor * (gr/liter)
*) Blue Sky Program (KLHK, 2007)

Fuel Consumption* (litres/km)
DumpTruck = 0.4
Backhoes = 0.6
WheelLoaders = 0.5
Bulldozer = 0.5
CrawlersCranes = 0.6
*) BPPT in Jinca et al. (2009)

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

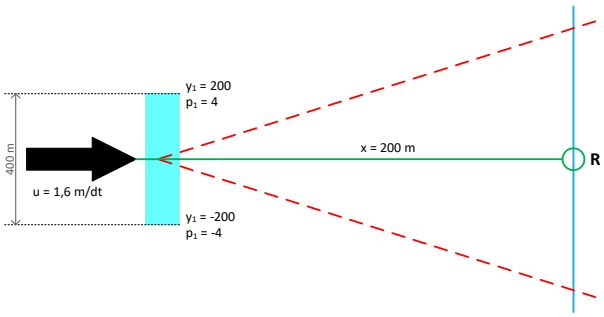
Table 6.30. Concentration of Pollutants in Land Clearing Activities and Relocation of Public Facilities/Utilities

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	2,46.10-5	$C = \frac{2x2{,}46.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}43\mu g/m^3$
NO2	3,56.10-5	$C = \frac{2x3{,}56.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}62\mu g/m^3$
CO	1,41.10-4	$C = \frac{2x1{,}41.10^{-4}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 2{,}44\mu g/m^3$

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
Particulates (PM10)	7,76.10-6	$C = \frac{2x7{,}76.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ 0{,}9998$ $C = 0{,}13 \mu g / m^3$

Information :
Calculation of emission concentrations using the equation

$$C_{(x,0,0,H)} = \frac{2.Q}{\sqrt{2\pi}\sigma_z u} x\left[e^{-\frac{1}{2}\left(H/\sigma\right)^2}\right]\int_{p1}^{p2}\frac{1}{\sqrt{2\pi}} \ e^{-\frac{1}{2}}.p^2.dp$$



C = concentration of pollutants in the air (µg/m³)
Q = burdenemissions (gr/sec.m)
π = phi (3.14)
µ = district average. wind on the x axis (m/s)
= 1.6 m/s = atmospheric stability category A
σz = vertical dispersion coefficient (m)
H = height of emission source (m)
= 1.5m
x = receiver distance (m)
= 200 m
p = y/σy (horizontal dispersion coefficient (m))
σy = axb = 213 x 0.20.894 = 50.5
y = 200 m
σz = cxd + f = (440.8 x 0.21941) + 9.27 = 28.65

Table 6.31. Air Quality Forecasts and ISPU Figures for Land Clearing Activities and Relocation of Public Facilities/Utilities

Location	Concentration				ISPU figures				ISPU		
	PM10	CO	SO2	NO2	PM10	SO2	CO	NO2	MAX	Category	Critical
Segment*Elevated*West											
Jl. S. Parman	13,13	4,542.44	44.43	38.62	13,13	42.72	56.78	24.14	56.78	Currently	CO
Segment*Underground*											
Jl. KH Hasyim Ashari	25.13	4,825.44	48.43	41.62	25.13	46.57	60.32	26.01	60.32	Currently	CO
Jl. Betel Garden	14,13	4,634.44	45.43	39.62	14,13	43.68	57.93	24.76	57.93	Currently	CO
Jl. Eastern Cendeng	29.13	4,863.44	49.43	42.62	29.13	47.53	60.79	26.64	60.79	Currently	CO
Jl. Lieutenant General Suprapto	27.13	4,703.44	46.43	40.62	27.13	44.64	58.79	25.39	58.79	Currently	CO
Segment*Elevated*East											
Jl. Lieutenant General Suprapto	12,13	4,844.44	48.43	41.62	12,13	46.57	60.56	26.01	60.56	Currently	CO
Jl. Pioneers of Independence	22.13	4,905.44	50.43	42.62	22.13	48.49	61.32	26.64	61.32	Currently	CO
Jl. Raya Bekasi	32.13	4,722.44	46.43	40.62	32.13	44.64	59.03	25.39	59.03	Currently	CO
Jl. Raya Bekasi	40.13	4,642.44	45.43	39.62	40.13	43.68	58.03	24.76	58.03	Currently	CO
Jl. Raya Bekasi	18.13	4,584.44	44.43	38.62	18.13	42.72	57.31	24.14	57.31	Currently	CO
Jl. Kali Abang Tengah	23.13	4,241.44	38.43	34.62	23.13	36.95	53.02	21.64	53.02	Currently	CO
SegmentDepot											
Jl. BKT inspection	34.13	4,298.44	39.43	35.62	34.13	37.91	53.73	22.26	53.73	Currently	CO

- **The magnitude of the impact**

  The magnitude of the impact of changes in air quality on Land Clearing activities and Relocation of Public Facilities/Utilities is presented in Table 6.32.

Table 6.32. Magnitude of the Impact of Changes in Air Quality on Land Clearing Activities and Relocation of Public Facilities/Utilities

Location	ISPU Without Project		ISPU With Projects		Impact Magnitude
	MAX	Category	MAX	Category	
Segment*Elevated*West					
Jl. S. Parman (Tomang Station)	56.75	Currently	56.78	Currently	0.03
Segment*Underground*					
Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29	Currently	60.32	Currently	0.03
Jl. Betel Garden (Sta Thamrin)	57.90	Currently	57.93	Currently	0.03
Jl. East Cindeng (Sta Petojo)	60.76	Currently	60.79	Currently	0.03
Jl. Lieutenant General Suprapto (Sta Galur)	58.76	Currently	58.79	Currently	0.03
Segment*Elevated*East					
Jl. Lt. Gen. Suprapto (Sta Sumur Batu)	60.53	Currently	60.56	Currently	0.03
Jl. Pioneers of Independence (East Pakulonan Sta.)	61.29	Currently	61.32	Currently	0.03
Jl. Raya Bekasi (Sta Pulo Gadung)	59.00	Currently	59.03	Currently	0.03
Jl. Raya Bekasi (West Cakung Station)	58.00	Currently	58.03	Currently	0.03
Jl. Raya Bekasi (Ujung Menteng Station)	57.28	Currently	57.31	Currently	0.03
Jl. Kali Abang Tengah (Medan Satria Sta.)	52.99	Currently	53.02	Currently	0.03
SegmentDepot					
Jl. BKT Inspection (Rorotan Depot)	53.70	Currently	53.73	Currently	0.03

- **Important Nature of Impact**

Table 6.33. Significance of the Impact of Land Clearing and Relocation of Public Facilities/Utilities on Air Quality

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people who will be affected, especially people who live around the project location and along the route/access road used by project trucks as many as 384 families (1,536 people) residents in 33 sub-districts live along the MRT East – West Line Phase1 Stage1 route.
2	The area of impact distribution		T.P	The impact that occurs is not extensive, only relocated in the project site area and along the route/access road used by the project trucks and the increase in emission levels that appears spreads to a distance of 200 meters from the source of the impact around the project site and the route/access road, but it will assimilated by the environment around the project site
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur every time the work equipment is in operation and when a Dump truck passes by carrying leftover materials which causes additional emissions contributions (SO2 = 0.32 µg/m3, NO2 = 0.43 µg/m3, CO = 1.83 µg/m3 and Particulate matter = 0.101 µg/m3), but the impact is temporary,therefore the criteria are not important
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal when the work equipment is finished operating and dump trucks/transport trucks do not pass by.
6	Reversal or non-reversal of impact		T.P	This impact will disappear when the activity has been completed

No	Criteria	Interest		Information
		P	T.P	
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**2**	**5**	**Not Important (TP)**

C. Increased noise

- **Initial environmental conditions**

  The results of noise level measurements at 12 locations in the study area were recorded in the range of 66 dB(A) – 73 dB(A) (Table 3.10.), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48 /MENLH/1996 concerning Noise Level Standards, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)].

- **Future environmental conditions without the project**

  Forecasts of noise levels in future environmental conditions without the project are carried out by comparing initial environmental conditions with data measured in previous studies (Table 3.9.) in each segment of the MRT-EWLP1S1 Development.

  The results of noise level measurements at 13 locations in the study area were recorded in the range of 51 dB(A) – 81 dB(A), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48/MENLH/1996 concerning Standard Noise Level, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)]. Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

  During land clearing activities and relocation of public facilities/utilities, it is necessary to transport the remaining land, rubbish and leftover materials outside the project area, so there will be an intensity of transportation by transport trucks which has the potential to cause noise. Areas that are potentially affected by noise are the people who live around the project location, 15-30 meters away along the route/access road used by transport trucks.

  Based on planning data during land clearing activities and relocation of public facilities/utilities, transport vehicles will be used in the form of dump trucks with a capacity of 20 m3 where 10 trucks will pass every 1 hour. The noise level from the dump truck at the source is based on the 2003 Road

Environmental Monitoring Guidelines of 64.6 dB(A), so the noise level generated by the dump truck can be calculated using the formula:

L2 = L_1+ 10 log n
= 64.6 + 10 Logs10
= 74.60 dBA

and the noise level generated by the 10 DT stack is as presented in Table 6.34. and Figure 6.2..

Table 6.34. Noise Levels at Certain Distances in Land Clearing Activities and Relocation of Public Facilities/Utilities

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
1	64.60	Does not meet quality standards	Calculations using the equation: **L2 = L_1+10 log r2/r1** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters) Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
15	62.84		
30	59.83		
45	58.07		
60	56.82		
75	55.85		
90	55.06		
105	54.39	Meet Quality Standards	
120	53.81		
135	53.30		
150	52.84		
165	52.43		
180	52.05		
195	51.70		
210	51.38		
225	51.08		

- **The magnitude of the impact**

  With the closest distance to settlements/buildings being ± 15 m from the road axle, the magnitude of the impact of noise levels on the mobilization of construction equipment and materials is as presented in Table 6.38.

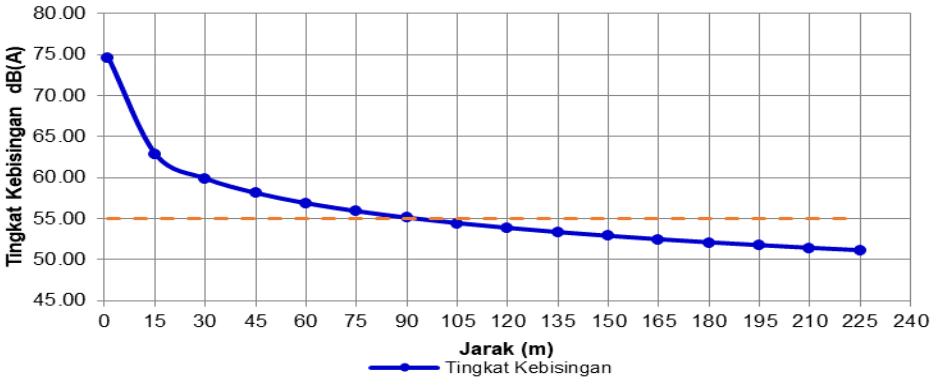


Figure 6.2. Noise Levels at Certain Distances in Land Clearing Activities and Relocation of Public Facilities/Utilities

Table 6.35. Magnitude of the Impact of Changes in Noise Levels on Mobilization of Construction Equipment and Materials

Segment/Path	Noise Level (db(A))			Impact Magnitude	Information
	L1 (RLA)	L2 (105m)	L		
West Elevated Segment					Combining the 2 noise level components with the equation: **L = 10 log [Σ Antilog (Ln/10)]** Information : L = Combined noise level (dBA) Ln = Nth noise level (dBA) n = lots of noisy components (Traffic Noise Prediction Guidelines, PU, 2004)
Jl. S. Parman (Sta. Tomang)	72	54.39	72.07	0.07	
Underground Segment					
Jl. KH Hasyim Asy'ari (Sta Roxy)	68	54.39	68.19	0.19	
Jl. Betel Garden (Sta Thamrin)	73	54.39	73.06	0.06	
Jl. Eastern Cendeng (Sta Petojo)	69	54.39	69.15	0.15	
Jl. Lieutenant General Suprapto (Sta Galur)	73	54.39	73.06	0.06	
East Elevated Segment					
Jl. Lieutenant General Suprapto (Stone Well Station)	70	54.39	70.12	0.12	
Jl. Pioneers of Independence (East Pakulonan Sta.)	72	54.39	72.07	0.07	
Jl. Raya Bekasi (St Pulo Gadung)	70	54.39	70.12	0.12	
Jl. Raya Bekasi (West Cakung Sta)	72	54.39	72.07	0.07	
Jl. Raya Bekasi (Ujung Menteng Station)	70	54.39	70.12	0.12	
Jl. Kali Abang Tengah (Medan Satria Sta.)	66	54.39	66.29	0.29	
Deposit Segment					
Jl. BKT inspection (Rorotan Depot)	69	54.39	69.15	0.15	

- **Important Nature of Impact**

Table 6.36. Significance of the Impact of Land Clearing and Relocation of Public Facilities/Utilities on Noise Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people who will be affected, especially people who live around the project location and along the route/access road used by project trucks as many as 384 families (1,536 people) residents in 33 sub-districts live along the MRT East – West Line Phase1 Stage1 route.
2	The area of impact distribution		T.P	The impact that occurred was not extensive, only relocatedinalong the route/access road used by project trucks. The noise level that appears is 62.84 dB (A) and

No	Criteria	Interest		Information
		P	T.P	
				spreads up to a distance of 15 meters from the noise source along the route/access road
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur every time a dump truck passes, causing a noise of 62.84 dBA, but the impact is temporary when the dump truck passes through residential/residential areas.therefore the criteria are not important
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal when the transport trucks are not passing
6	Reversal or non-reversal of impact		T.P	This impact will disappear when the activity has been completed
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**2**	**5**	**Not Important (TP)**

D. Increased runoff water discharge

- **Initial environmental conditions**

  The initial environmental baseline condition of runoff water discharge is determined based on the current condition of land use, rainfall and catchment area area, which is then calculated using the rational formula:

  Q = 0.0028 x C x I x A

  Q = 0.0028 x 0.30 x 481.46 x 1.77

  Q = 0.716 m3/sec

- **Future environmental conditions without the project**

  It is estimated that there will be no significant changes to the runoff water discharge in the study area before the construction process begins. Thus the runoff water discharge in future conditions without the project will remain the same as the baseline environmental conditions (0.716 m3/second)

- **Environmental conditions that will come with the project**

  Land clearing activities can have an impact on increasing runoff water discharge in the study area. Estimates of changes in runoff water discharge are carried out by comparing the runoff coefficient for built-up land conditions of 0.8 with the runoff coefficient for existing conditions of 0.3, resulting in a change in runoff coefficient of 0.5. Thus, the runoff water discharge due to land clearing is as follows:

  Q = 0.0028 x 0.8 x 481.46 x 1.77

  Q = 1.908 m3/sec

- **The magnitude of the impact**

  RLA = 0.716m3/sec
  No Project = the same as RLA (0.716m3/sec)
  With Projects = 1.908 m3/sec
  The magnitude of the impact = With Project – Without Project

= 1,908 m3/sec -0.716m3/sec
= 1.192 m3/sec

Land clearing has a negative impact on runoff in the form of an increase in runoff water discharge of 1,192 m3/second.

- **Important Nature of Impact**

Table 6.37. Important Characteristics of the Impact of Land Clearing and Relocation of Public Facilities/Utilities on Increased Run Off

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected, especially if the increase in runoff discharge becomes flooding, is 384 families (1,536 people) residents in 33 sub-districts who live along the MRT East - West Line.
2	The area of impact distribution	P		The impact area is 0.2 km x the length of the MRT East – West Line
3	The intensity and duration of the impact	P		The intensity of the impact is momentary but lasts during the operation of the MRT East – West Line
4	Many other environmental components are affected		T.P	no other components are affected
5	Cumulative nature of impact		T.P	impacts are not cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed because the intensity of the impact is only temporary
7	Other criteria are in accordance with developments in science and technology		T.P	Impacts can be controlled with existing technology
	Amount	**3**	**4**	**Important (P)**

E. Prevalence of ARI

- **Initial environmental conditions**

  Based on the results of interviews with 384 affected families at the activity location, it is known that the types of illnesses suffered in the last 3 months consisted of cough/cold (71.09%), diarrhea (18.23%), ARI (4.95%), itching. - itching (5.21%) and others (0.52%). Referring to these data, it can be concluded that the prevalence of ARI disease for initial environmental conditions is in the good category.

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions.

- **Environmental conditions that will come with the project**

  Forecasting environmental conditions in the future with the project in the ISPA disease prevalence component is carried out using an approach to the potential for dust exposure, especially during land clearing activities and relocation of public facilities/utilities. Next, the contribution of pollutants (dust) from transport vehicles to changes in air quality at the activity location is determined, as presented in Table 6.38.

Table 6.38. Contribution of Pollutants (Dust) from Transport Vehicles at a Distance of 100 m

Segment	Code	Location	Coordinate	TSP (µg/m3)	Pollutant Contribution (µg/m3)	TSP w. Project (µg/m3)
*Elevated*West	UKG1	Jl. S. Parman	S 06°10'30.59": E 106°47'33.35"	21	0.066	21,066
Underground	UKG2	Jl. KH Hasyim Ashari	S 06°09'56.71": E 106°48'09.07"	45	0.066	45,066
	UKG3	Jl. Betel Garden	S 06°10'59.50": E 106°49'23.74"	22	0.066	22,066
	UKG4	Jl. Eastern Cendeng	S 06°10'13.40": E 106°48'39.79"	50	0.066	50,066
	UKG5	Jl. Lieutenant General Suprapto	S 06°10'27.62": E 106°51'19.45"	48	0.066	48,066
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	S 06°10'00.59": E 106°52'29.49"	20	0.066	20,066
	UKG7	Jl. Pioneers of Independence	S 06°10'31.25": E 106°53'36.19"	39	0.066	39,066
	UKG8	Jl. Raya Bekasi	S 06°10'57.48": E 106°54'58.80"	54	0.066	54,066
	UKG9	Jl. Raya Bekasi	S 06°11'03.85": E 106°56'32.89"	73	0.066	73,066
	UKG10	Jl. Raya Bekasi	S 06°11'25.46": E 106°58'05.75"	32	0.066	32,066
	UKG11	Jl. Kali Abang Tengah	S 06°11'46.05": E 106°58'33.59"	41	0.066	41,066
Depot	UKG12	Jl. BKT inspection	S 06°08'38.72": E 106°57'59.62"	60	0.066	60,066
			Average			**42,149**

Health Risk is determined using the Dose Response Relationship method (Ostro, 1994), as follows:

dHi = bi X POPidA
= 0.057587 X 7.598soul X 42.149 µg/m3
= 18,414soul

When compared with the total population in the 31 sub-districts at the activity location (2,780,338 people), the percentage of affected population is 0.66% (total 5.61%).

- **The magnitude of the impact**

RLA = prevalence of ARI disease 4.95%
No Project = the same as RLA
prevalence of ARI disease 4.95%
With Projects = prevalence of ARI disease5.61%
The magnitude of the impact = With Project – Without Project
= 5.61% - 4.95%
= 0.66 %

- **Important Nature of Impact**

Table 6.39. Important Characteristics of the Impact of Land Clearing and Relocation of Public Facilities/Utilities on the Prevalence of ISPA

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people potentially affected is 18,414 people, especially people whose residences are less than 100 m along the route/access for the mobilization of construction equipment and materials.
2	The area of impact distribution	P		The area of distribution of impacts follows the area of distribution of impacts of air pollution to which humans are receptors, namely 0.2 km x length of route/access for mobilization of construction equipment and materials.
3	The intensity and duration of the impact		T.P	High impact intensity occurs in residents who live at a distance of less than 100 meters, while for residents who live at a distance of 100 - 200 m the intensity is moderate and for more than 200 m left and right of the road the intensity is low. Judging from the length of time the impact lasts, the duration of the impact is during the Mobilization of Construction Equipment and Materials activities.
4	Many other environmental components are affected	P		There are other environmental components that are affected, namely changes in people's attitudes and perceptions in positive and/or negative directions which are influenced by the number of people suffering from health problems (number of ISPA cases).
5	Cumulative nature of impact	P		As described in the estimated impact size, the causes of respiratory infections are influenced by many factors, air pollution can be a predisposing factor for the occurrence of ISPA along with other trigger factors. Judging from the cumulative nature of the impact of dust particles with a size of 2.5 microns that enter the respiratory tract in lung tissue, especially the alveoli, these particles will accumulate and ultimately reduce respiratory capacity and lead to pneumonia or pneumonia.
6	Reversal or non-reversal of impact	P		Dust particles that are already in the alveoli are very difficult to excrete out of the body. By looking at this, the nature of the impact is categorized as irreversible.
7	Other criteria are in accordance with developments in science and technology		T.P	There are other criteria in accordance with developments in science and technology that are already available and easy to obtain. The science and technology criteria that can be used to overcome this impact are managing it through a technical approach and a social approach.
	Amount	**5**	**2**	**Important (P1)**

F. Attitudes Changes and Public Perception

- **Initial environmental conditions**

  Based onThe results of community involvement in public consultation activities (3 - 4 February 2022) show that in general the community in the study area supports the MRT East - West Line development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at

the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT East - West Line development plan (Table 3.44).

However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT East - West Line development plan, especially 13.54% of respondents who said they were worried about air pollution and 9.38% of respondents who said worried about contamination of ground water and surface water (rivers). For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

- **Future environmental conditions without the project**

  The forecast of environmental quality conditions for components of community attitudes and perceptions regarding future environmental conditions without the project is carried out using an initial environmental baseline condition approach from survey data in the study area.Based on the results of interviews with 384 affected families at the activity location, it is known that the majority of respondents (70%)gave the answer that social relations between residents at the activity location were very good and 6% gave the answer quite good. Meanwhile, 17% of respondents gave normal answers and 7% answered that social relations between residents at the activity location were decreasing. The results of this survey show that the study area still has good social relations as indicated by the percentage of respondents' answers stating that conditions are good and improving, above 50%.

- **Environmental conditions that will come with the project**

  Based on the negative impacts caused during land clearing activities and relocation of public facilities/utilities (especially the impact of decreasing traffic performance, decreasing air quality, increasing noise and increasing runoff water discharge) if it is not managed well, it is predicted that there will be changes in attitudes and perceptions. negative community in the form of changes in the number and percentage of people who agree with the activity plan to less agree or even strongly disagree. It is estimated that the decrease in the percentage of people who agree to this activity could reach 50%, whereas previously 342 families who agreed could decrease to only 171 families from the community who agreed. Thus it can be concluded that the environmental quality conditions that will come with the project for the components of community attitudes and perceptions are included in the negative impacts.

- **The magnitude of the impact**

  RLA = 342 families (89.07%) said they agreed/supported it

No Project = the same as RLA
342 families (89.07%) said they agreed/supported it
With Projects = 171 familieswho expressed agreement/support
The magnitude of the impact = With Project – Without Project
= 171 families -342 families
= - 171 families (- 50%from existing conditions)

The impact of decreasing traffic performance, decreasing air quality, increasing noise and the prevalence of ISPAwill cause derivative (tertiary) impacts in the form of changes in attitudes and perceptions of societywhich is negativeamounting to 50% of existing conditions.

- **Important Nature of Impact**

Table 6.40. Significance of the Impact of Land Clearing and Relocation of Public Facilities/Utilities on Changes in Public Attitudes & Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be affected is 384 families (1,324 people). This number is only calculated from the number of families representing residents in the 31 sub-districts at the MRT East – West Line construction site
2	The area of impact distribution	P		The impact distribution area includes 31 sub-districts at the MRT East – West Line construction site
3	The intensity and duration of the impact	P		The impact of changes in community perceptions and attitudes, if not managed well, will have further impacts in the form of community unrest which can lead to conflict between local residents and those responsible for activities. The impact of changes in community perceptions and attitudes is predicted to occur during the construction phase.
4	Many other environmental components are affected		T.P	The impact of changes in people's perceptions and attitudes is a derivative impact of the impact of other components and does not cause other derivative impacts.
5	Cumulative nature of impact	P		impacts are cumulative
6	Reversal or non-reversal of impact		T.P	The impact of changes in people's perceptions and attitudes can be reversed and recovered if the primary and secondary impacts are managed well through a social approach and/or institutional approach.
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology
	Amount	**4**	**3**	**Important (P1)**

6.2.5. Earthworks and Dewatering

A. Decreased traffic performance

- **Initial environmental conditions**

The results of calculating the traffic performance of existing roads on land transport routes are presented in Table 6.41.

Table 6.41. Existing Road Traffic Performance

Road	junior high school/h	VC Ratio	LOS
West Elevated Segment			
Jl. S. Parman	5.103	1,074	F
Jl. Kyai Tapa	5,187	1,078	F
Underground Segment			
Jl. KH Hasyim Asy'ari	3,069	0.830	D
Jl. East Cideng	3,219	0.875	D
Jl. Greater Jatibaru	4,215	0.914	E
Jl. Betel Garden	1,744	0.426	C
Jl. AR Hakim	1,727	0.499	C
Jl. Kramat Kwitang	2,797	0.980	E
Jl. Kramat Round	1,355	0.317	B
East Elevated Segment			
Jl. Lt. Gen. Suprapto	4,454	0.780	C
Jl. Pioneers of Independence	1,766	0.535	C
Jl. Raya Bekasi	2,704	0.845	D
Deposit Segment			
Jl. East Canal Inspection	460	0.104	A

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions, so that in general road traffic performance in conditions without the project is as follows:

  1) West elevated segment
     The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
  2) Underground segment
     The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to E (unstable flow, low and different speeds -different, volume approaches capacity).
  3) East elevated segment
     The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to D (unstable flow, low speed).
  4) Deposit Segment
     The traffic performance (level of service) of roads in the Depo segment includes service level category A (free flow, low volume and high speed, the driver can choose the desired speed).

- **Environmental conditions that will come with the project**

  The results of road traffic performance calculations due to soil transportation activities during the construction of MRT-EWLP1S1 are presented in Table 6.42.

Table 6.42. Road Traffic Performance in Earthworks and Dewatering

Segment/Path		West Elevated	Underground							East Elevated			Depot
		Jl. S. Parman	Jl. Kyai Tapa	Jl. KH Hasyim Asy'ari	Jl. East Cideng	Jl. Greater Jatibaru	Jl. Betel Garden	Jl. AR Hakim	Jl.Kramat Kwitang	Jl. Kramat Round	Jl. Lt. Gen.Suprapto	Jl. Pioneers of Independence	Jl. Raya Bekasi	Jl. East Canal Inspection
Dump trucks. concrete pump trucks in elevated construction		11	21	21	21	21	21	21	21	21	36	43	54	68
Dump trucks. concrete pump trucks in underground constrc.		-	-	14	28	42	60	74	88	100	114	114	114	114
Dump trucks soil material & debris		9	20	42	57	72	91	104	114	131	142	157	165	165
Total Vol. Traffic	units	20	41	77	106	135	172	199	223	252	292	314	333	347
	junior high school/h	30	61.5	115.5	159	202.5	258	299	334.5	378	438	471	499.5	521
Vol. Existing traffic	junior high school/h	5103	5187	3069	3219	4215	1744	1727	2797	1355	4454	1766	2704	460
Vol. during project	junior high school/h	5133	5249	370.5	3378	4418	2002	2026	3132	1733	4892	2237	3204	981
AVE Traffic Capacity	junior high school/h	4752	4812	3073	3208	4610	4099	3458	2854	4281	4930	5708	3315	4418
VC Ratio		1,080	1,091	1,036	1,053	0.958	0.488	0.586	1,097	0.405	0.992	0.392	0.966	0.222
Level of Service (LOS)		F	F	F	F	E	C	C	F	B	E	C	E	B

Note: The SMP factor for dump trucks as large trucks is 1.5 according to Regional Highway Regulation No. 016/T/BNKT/1990

- **The magnitude of the impact**

  RLA (Table 6.41.) :

  1) West elevated segment

     The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).

  2) Underground segment

     The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to E (unstable flow, low and different speeds -different, volume approaches capacity).

  3) East elevated segment

     The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to D (unstable flow, low speed).

4) Deposit Segment
The traffic performance (level of service) of roads in the Depo segment includes service level category A (free flow, low volume and high speed, the driver can choose the desired speed).

No Project = the same as RLA

By Project (Table 6.42.) :

1) West elevated segment
The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
2) Underground segment
The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to F (obstructed flow, low speed, low volume). under capacity, lots of stops).
3) East elevated segment
The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to E (unstable flow, low speed).
4) Deposit Segment
The traffic performance (level of service) of roads in the Depo segment is in service level category B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed).

The magnitude of the impact = With Project – Without Project
(Table 6.43.)

Table 6.43. Magnitude of the Impact of Earthworks and Dewatering on Traffic Performance

Road	With Projects		No Project		Impact Magnitude (Vc)
	VC ratio	LOS	VC ratio	LOS	
West Elevated Segment					
Jl. S. Parman	1,080	F	1,074	F	0.006
Jl. Kyai Tapa	1,091	F	1,078	F	0.013
Underground Segment					
Jl. KH Hasyim Asy'ari	1,036	F	0.830	D	0.206
Jl. East Cideng	1,053	F	0.875	D	0.178
Jl. Greater Jatibaru	0.958	E	0.914	E	0.044
Jl. Betel Garden	0.488	C	0.426	C	0.062
Jl. AR Hakim	0.586	C	0.499	C	0.087
Jl. Kramat Kwitang	1,097	F	0.980	E	0.117
Jl. Kramat Round	0.405	B	0.317	B	0.088
East Elevated Segment					
Jl. Lt. Gen. Suprapto	0.992	E	0.780	C	0.212

Road	With Projects		No Project		Impact Magnitude (Vc)
	VC ratio	LOS	VC ratio	LOS	
Jl. Pioneers of Independence	0.392	C	0.535	C	-0.143
Jl. Raya Bekasi	0.966	E	0.845	D	0.121
Deposit Segment					
Jl. East Canal Inspection	0.222	B	0.104	A	0.118

- **Important Nature of Impact**

Table 6.44. Significance of the Impact of Earthworks and Dewatering on Traffic Performance

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	**P**		The number of people estimated to be affected is 384 families (1,324 people). This number is only calculated from the number of households representing the population in 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
2	The area of impact distribution	P		The impact distribution area includes 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
3	The intensity and duration of the impact	P		The impact of traffic disruption will result in further impacts in the form of public unrest if it is not managed well. which creates conflict between residents and those in charge of activities. Impacts are expected to occur during the construction phase.
4	Many other environmental components are affected	P		The impact of traffic disruption is a derivative impact from other impact components and does not cause other derivative impacts.
5	Cumulative nature of impact	P		the impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impacts of traffic disruptions can be reversed and reversible if both primary and secondary impacts are properly managed through social institutions and/or institutional approaches.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria that are in accordance with the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

B. Decreased air quality

- **Initial environmental conditions**

The results of air quality measurements at 12 locations in the study area were recorded in the ISPUMAX range of 52.99 – 61.29 (Medium category) withcritical parameters CO and PM2.5(Table 3.8.). When compared withAir quality standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (Appendix VII – Ambient Air Quality Standards), then the CO parameter is measuredhas exceeded the Air Quality Standards at all sampling location points (Figure 3.6.).

- **Future environmental conditions without the project**

  Air quality forecasts for future environmental conditions without the project are carried out by comparing initial environmental baseline conditions with measurement data in previous studies (Table 3.7.) in each segment of the MRT-EWLP1S1 Development. The results of air quality measurements at 13 locations in the study area were recorded in the ISPUMAX range of 40.38 – 76.67 (good to moderate category) withcritical parameters SO2, NO2 and PM10.Informationanother comparison of previous studiesis the DKI Jakarta Air Quality Monitoring Report for 2021. Based on this report, it is known that in general the ISPU at SPKU Bundaran HI and SPKU Kelapa Gading during 2021 is in the Medium category (81% and 82% respectively) withcritical parameter PM2.5 (Table 3.6.).Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

1) West elevated segment

   The number and frequency of transport trucks for earthworks and dewatering is 1 vehicle/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.45. Earthworks and Dewatering Emission Loads on the West Elevated Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4 L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 7{,}07.10^{-7}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
NO2	9.21	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4 L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 1{,}02.10^{-6}$	
CO	36.42	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4 L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 4{,}05.10^{-6}$	
Particulates (PM10)	2.01	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4 L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 2{,}23.10^{-7}$	
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{2{,}1 L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 3{,}71.10^{-6}$	
NO2	9.21	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{2{,}1 L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 5{,}37.10^{-6}$	

CO	36.42	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{2{,}1 L/km}{1000 m/km} x \ \ 36{,}42 gr/L$ $Q = 2{,}12.10^{-5}$
Particulates (PM10)	2.01	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{2{,}1 L/km}{1000 m/km} x \ \ 2{,}01 gr/L$ $Q = 1{,}17.10^{-7}$
Total Emission Burden		
SO2	4,42.10-6	
NO2	6,40.10-6	
CO	2,53.10-5	
SO2	1,40.10-6	

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.46. Concentration of Emissions from Earthworks and Dewatering in the West Elevated Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	4,42.10-6	$C = \frac{2x4{,}42.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ \ 0{,}9998$ $C = 0{,}08 \mu g/m^3$
NO2	6,40.10-6	$C = \frac{2x6{,}40.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ \ 0{,}9998$ $C = 0{,}11 \mu g/m^3$
CO	2,53.10-5	$C = \frac{2x2{,}53.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ \ 0{,}9998$ $C = 0{,}44 \mu g/m^3$
Particulates (PM10)	1,40.10-6	$C = \frac{2x1{,}40.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ \ 0{,}9998$ $C = 0{,}02 \mu g/m^3$

2) Underground segment

The number and frequency of transport trucks for earthworks and dewatering is 3 vehicles/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.47. Earthwork and Dewatering Emission Loads in the Underground Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{3\ \ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4 L/km}{1000 m/km} x \ \ 6{,}36 gr/L$ $Q = 2{,}12.10^{-6}$	Calculations using the equation: **Q = nkFE** Information :

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
NO2	9.21	$Q = \frac{3\ unit/\ jam}{3600 dt/\ jam} x \frac{0,4L/km}{1000 m/km} x\ \ 9,21 gr/L$ $Q = 3,07.10^{-6}$	Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
CO	36.42	$Q = \frac{3\ unit/\ jam}{3600 dt/\ jam} x \frac{0,4L/km}{1000 m/km} x\ \ 36,42 gr/L$ $Q = 1,21.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{3\ unit/\ jam}{3600 dt/\ jam} x \frac{0,4L/km}{1000 m/km} x\ \ 2,01 gr/L$ $Q = 6,70.10^{-7}$	
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{2,1L/km}{1000 m/km} x\ \ 6,36 gr/L$ $Q = 3,71.10^{-6}$	
NO2	9.21	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{2,1L/km}{1000 m/km} x\ \ 9,21 gr/L$ $Q = 5,37.10^{-6}$	
CO	36.42	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{2,1L/km}{1000 m/km} x\ \ 36,42 gr/L$ $Q = 2,12.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{2,1L/km}{1000 m/km} x\ \ 2,01 gr/L$ $Q = 1,17.10^{-7}$	
Total Emission Burden			
SO2	5,83.10-6		
NO2	8,44.10-6		
CO	3,34.10-5		
SO2	1,84.10-6		

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.48. Concentration of Emissions from Earthworks and Dewatering in the Underground Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	5,83.10-6	$C = \frac{2x5,83.10^{-6}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ \ 0,9998$ $C = 0,10 \mu g/m^3$
NO2	8,44.10-6	$C = \frac{2x8,44.10^{-6}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ \ 0,9998$ $C = 0,15 \mu g/m^3$
CO	3,34.10-5	$C = \frac{2x3,34.10^{-5}}{\sqrt{2x3,14}x28,66x1,6} x \exp\left[-0,5\left(\frac{1,5}{28,66}\right)^2\right] x\ \ 0,9998$ $C = 0,58 \mu g/m^3$

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
Particulates (PM10)	1,84.10-6	$C = \frac{2x1{,}84.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ 0{,}9998$ $C = 0{,}03 \mu g / m^3$

3) East elevated segment

The number and frequency of transport trucks for earthworks and dewatering is 2 vehicles/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.49. Earthwork and Dewatering Emission Loads in the East Elevated Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{2 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 6{,}36 gr/L$ $Q = 1{,}41.10^{-6}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
NO2	9.21	$Q = \frac{2 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 9{,}21 gr/L$ $Q = 2{,}05.10^{-6}$	
CO	36.42	$Q = \frac{2 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 36{,}42 gr/L$ $Q = 8{,}09.10^{-6}$	
Particulates (PM10)	2.01	$Q = \frac{2 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 2{,}01 gr/L$ $Q = 4{,}47.10^{-7}$	
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{2{,}1L/km}{1000 m/km} x \ 6{,}36 gr/L$ $Q = 3{,}71.10^{-6}$	
NO2	9.21	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{2{,}1L/km}{1000 m/km} x \ 9{,}21 gr/L$ $Q = 5{,}37.10^{-6}$	
CO	36.42	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{2{,}1L/km}{1000 m/km} x \ 36{,}42 gr/L$ $Q = 2{,}12.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{2{,}1L/km}{1000 m/km} x \ 2{,}01 gr/L$ $Q = 1{,}17.10^{-7}$	
Total Emission Burden			
SO2	5,12.10-6		
NO2	7,42.10-6		
CO	2,93.10-5		
SO2	1,62.10-6		

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.50. Concentration of Emissions from Earthworks and Dewatering in the East Elevated Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	5,12.10-6	$C = \frac{2x5{,}12.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ 0{,}9998$ $C = 0{,}09 \mu g / m^3$
NO2	7,42.10-6	$C = \frac{2x7{,}42.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ 0{,}9998$ $C = 0{,}13 \mu g / m^3$
CO	2,93.10-5	$C = \frac{2x2{,}93.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ 0{,}9998$ $C = 0{,}51 \mu g / m^3$
Particulates (PM10)	1,62.10-6	$C = \frac{2x1{,}62.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x \ 0{,}9998$ $C = 0{,}03 \mu g / m^3$

4) Deposit Segment

The number and frequency of transport trucks for earthworks and dewatering is 1 vehicle/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.51. Earthwork and Dewatering Emission Expenses in the Depot Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 6{,}36 gr/L$ $Q = 7{,}07.10^{-7}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
NO2	9.21	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 9{,}21 gr/L$ $Q = 1{,}02.10^{-6}$	
CO	36.42	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 36{,}42 gr/L$ $Q = 4{,}05.10^{-6}$	
Particulates (PM10)	2.01	$Q = \frac{1 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 2{,}01 gr/L$ $Q = 2{,}23.10^{-7}$	
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1 unit/jam}{3600 dt/jam} x \frac{2{,}1L/km}{1000 m/km} x \ 6{,}36 gr/L$ $Q = 3{,}71.10^{-6}$	

NO2	9.21	$Q = \frac{1unit/\ jam}{3600dt/\ jam} x \frac{2{,}1L/km}{1000m/km} x\ \ 9{,}21gr/L$ $Q = 5{,}37.10^{-6}$
CO	36.42	$Q = \frac{1unit/\ jam}{3600dt/\ jam} x \frac{2{,}1L/km}{1000m/km} x\ \ 36{,}42gr/L$ $Q = 2{,}12.10^{-5}$
Particulates (PM10)	2.01	$Q = \frac{1unit/\ jam}{3600dt/\ jam} x \frac{2{,}1L/km}{1000m/km} x\ \ 2{,}01gr/L$ $Q = 1{,}17.10^{-7}$
Total Emission Burden		
SO2	4,42.10-6	
NO2	6,40.10-6	
CO	2,53.10-5	
SO2	1,40.10-6	

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.52. Concentration of Emissions from Earthworks and Dewatering in the Depot Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	4,42.10-6	$C = \frac{2x4{,}42.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}08\mu g/m^3$
NO2	6,40.10-6	$C = \frac{2x6{,}40.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}11\mu g/m^3$
CO	2,53.10-5	$C = \frac{2x2{,}53.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}44\mu g/m^3$
Particulates (PM10)	1,40.10-6	$C = \frac{2x1{,}40.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}02\mu g/m^3$

Table 6.53. Air Quality Forecasts and ISPU Figures on Earthworks and Dewatering

Location	Concentration				ISPU figures				ISPU		
	PM10	CO	SO2	NO2	PM10	SO2	CO	NO2	MAX	Category	Critical
Segment*Elevated*West											
Jl. S. Parman	13.02	4,540.44	44.08	38.11	13.02	42.38	56.76	23.82	56.76	Currently	CO
Segment*Underground*											
Jl. KH Hasyim Ashari	25.03	4,823.58	48.10	41.15	25.03	46.25	60.29	25.72	60.29	Currently	CO
Jl. Betel Garden	14.03	4,632.58	45.10	39.15	14.03	43.37	57.91	24.47	57.91	Currently	CO
Jl. Eastern Cendeng	29.03	4,861.58	49.10	42.15	29.03	47.21	60.77	26.34	60.77	Currently	CO
Jl. Lieutenant General Suprapto	27.03	4,701.58	46.10	40.15	27.03	44.33	58.77	25.09	58.77	Currently	CO
Segment*Elevated*East											

Jl. Lieutenant General Suprapto	12.03	4,842.51	48.09	41.13	12.03	46.24	60.53	25.71	60.53	Currently	CO
Jl. Pioneers of Independence	22.03	4,903.51	50.09	42.13	22.03	48.16	61.29	26.33	61.29	Currently	CO
Jl. Raya Bekasi	32.03	4,720.51	46.09	40.13	32.03	44.32	59.01	25.08	59.01	Currently	CO
Jl. Raya Bekasi	40.03	4,640.51	45.09	39.13	40.03	43.36	58.01	24.46	58.01	Currently	CO
Jl. Raya Bekasi	18.03	4,582.51	44.09	38.13	18.03	42.39	57.28	23.83	57.28	Currently	CO
Jl. Kali Abang Tengah	23.03	4,239.51	38.09	34.13	23.03	36.63	52.99	21.33	52.99	Currently	CO
SegmentDepot											
Jl. BKT inspection	34.02	4,296.44	39.08	35.11	34.02	37.58	53.71	21.94	53.71	Currently	CO

- **The magnitude of the impact**

  The magnitude of the impact of changes in air quality on Earthworks and Dewatering is presented in Table 6.54..

Table 6.54. Magnitude of the Impact of Changes in Air Quality on Earthworks and Dewatering

Location	ISPU Without Project		ISPU With Projects		Impact Magnitude
	MAX	Category	MAX	Category	
Segment*Elevated*West					
Jl. S. Parman (Tomang Station)	56.75	Currently	56.76	Currently	0.01
Segment*Underground*					
Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29	Currently	60.29	Currently	0.00
Jl. Betel Garden (Sta Thamrin)	57.90	Currently	57.91	Currently	0.01
Jl. East Cindeng (Sta Petojo)	60.76	Currently	60.77	Currently	0.01
Jl. Lieutenant General Suprapto (Sta Galur)	58.76	Currently	58.77	Currently	0.01
Segment*Elevated*East					
Jl. Lt. Gen. Suprapto (Sta Sumur Batu)	60.53	Currently	60.53	Currently	0.00
Jl. Pioneers of Independence (East Pakulonan Sta.)	61.29	Currently	61.29	Currently	0.00
Jl. Raya Bekasi (Sta Pulo Gadung)	59.00	Currently	59.01	Currently	0.01
Jl. Raya Bekasi (West Cakung Station)	58.00	Currently	58.01	Currently	0.01
Jl. Raya Bekasi (Ujung Menteng Station)	57.28	Currently	57.28	Currently	0.00
Jl. Kali Abang Tengah (Medan Satria Sta.)	52.99	Currently	52.99	Currently	0.00
SegmentDepot					
Jl. BKT Inspection (Rorotan Depot)	53.70	Currently	53.71	Currently	0.01

- **Important Nature of Impact**

Table 6.55. Significance of the Impact of Earthworks and Dewatering on Air Quality

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people who will be affected, especially people who live around the project location and along the route/access road used by project trucks as many as 384 families (1,536 people) residents in 33 sub-districts live along the MRT East – West Line Phase1 Stage1 route.
2	The area of impact distribution		T.P	The impact that occurs is not extensive, it is only relocated around the project site and along the route/access road used by the project trucks and the increase in emission levels that appears spreads to a distance of 200 meters from the source

No	Criteria	Interest		Information
		P	T.P	
				of the impact around the route/access road, but will be assimilated by the environment. around the project site
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur every time the work equipment is in operation and when a Dump truck passes by carrying leftover materials which will cause additional emissions (SO2 = 0.044 µg/m3, NO2 = 0.064 µg/m3, CO = 0.225 µg/m3 and Particulates = 0.014 µg/m3), but the impact is temporary
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal in timework activity has ended.
6	Reversal or non-reversal of impact		T.P	This impact occurs only temporarily and will return shortly after the heavy equipment/source machines are turned off, therefore the criteria are not important
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**2**	**5**	**Not Important (TP)**

C. Increased noise

- **Initial environmental conditions**

  The results of noise level measurements at 12 locations in the study area were recorded in the range of 66 dB(A) – 73 dB(A) (Table 3.10.), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48 /MENLH/1996 concerning Noise Level Standards, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)].

- **Future environmental conditions without the project**

  Forecasts of noise levels in future environmental conditions without the project are carried out by comparing initial environmental conditions with data measured in previous studies (Table 3.9.) in each segment of the MRT-EWLP1S1 Development.

  The results of noise level measurements at 13 locations in the study area were recorded in the range of 51 dB(A) – 81 dB(A), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48/MENLH/1996 concerning Standard Noise Level, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)]. Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

1) West elevated segment

The operation of heavy equipment and other construction equipment during earthworks and dewatering will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.56. Earthwork and Dewatering Noise Levels in the West Elevation Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	2	98
2	*Dump Trucks*	4	64.6
3	*Unik truck*	1	64.6
4	*Agilator truck*	3	82
5	*Truck Cranes*	2	64.6

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {2.10 98/10 + 4.10 64.6/10 + 1.10 64.6/10 + 3 x 10 822/10 + 2 x 10 64.6/10 }

=**101.18 dB(A)**

and the noise levels generated are as presented in Table 6.57. and Figure 6.3..

Table 6.57. Noise Levels for Specific Distances of Earthworks and Dewatering on the West Elevation Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	101.18	Does not meet quality standards	Calculations using the equation: **$L2 = L_1 + 10 \log r2/r1$** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters) Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
30	95.16		
45	91.64		
60	89.14		
75	87.20		
90	85.62		
105	84.28		
120	83.12		
135	82.10		
150	81.18		
165	80.35		
180	79.60		
195	78.90		
210	78.26		
225	77.66		

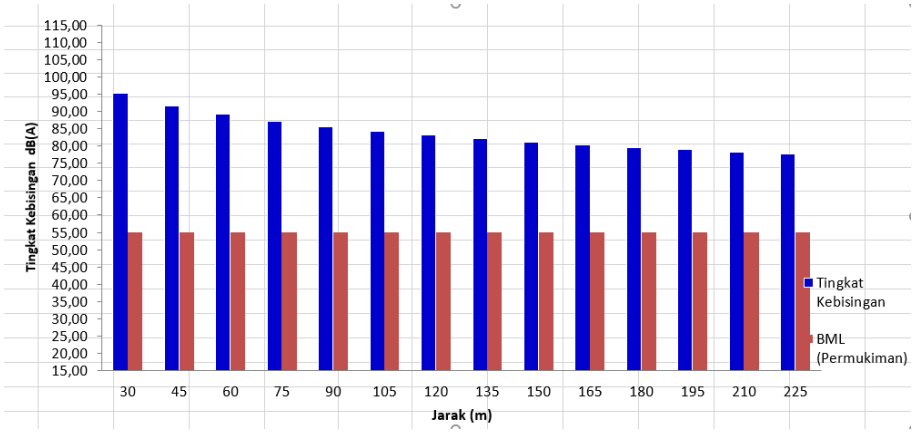


Figure 6.3. Noise Levels for Specific Distances of Earthworks and Dewatering on the West Elevation Segment

2) Underground Segment

The operation of heavy equipment and other construction equipment during earthworks and dewatering will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.58. Earthwork and Dewatering Noise Levels in the Underground Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	18	98
2	*Dump Trucks*	99	64.6
3	*Unik truck*	9	64.6
4	*Agilator truck*	27	82
5	*Truck cranes*	15	64.6
6	*Wheel Loaders*	9	101
7	*Clamshells*	10	98

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {18.10 98/10 + 99.10 64.6/10 + 9.10 64.6/10 + 27.10 82/10 + 15.10 64.6/10 + 9.10 101/10 + 10.10 98/10 }
= 114.69 dB(A)

and the noise levels generated are as presented in Table 6.58. and Figure 6.4..

Table 6.59. Noise Levels for Specific Distances of Earthworks and Dewatering in the Underground Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	114.69	Does not meet quality standards	Calculations using the equation: **$L2 = L_1 + 10 \log r2/r1$** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters) Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)]
30	108.67		
45	105.15		
60	102.65		
75	100.71		
90	99.13		
105	97.79		
120	96.63		

135	95.61		2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
150	94.69		
165	93.86		
180	93.11		
195	92.41		
210	91.77		
225	91.17		

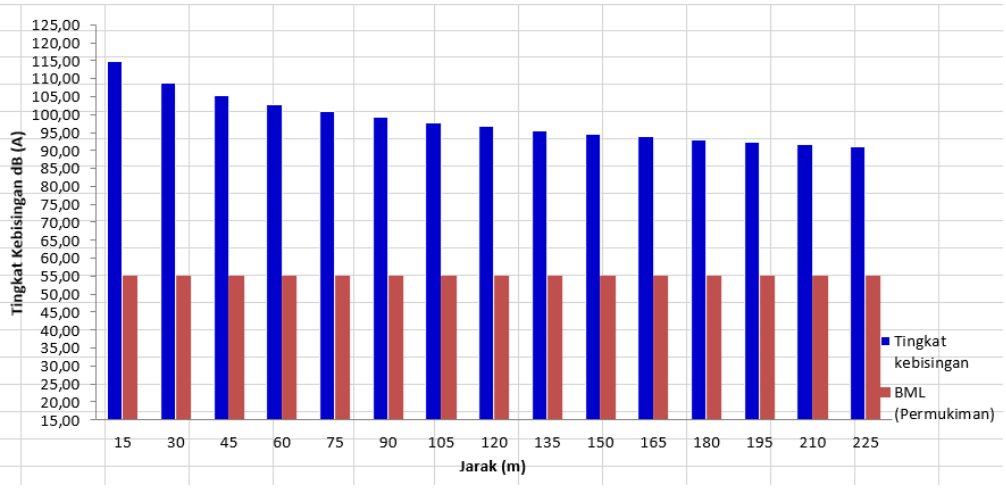


Figure 6.4. Noise Levels for Specific Distances of Earthworks and Dewatering in the Underground Segment

3) East elevated segment

The operation of heavy equipment and other construction equipment during earthworks and dewatering will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.60. Earthwork and Dewatering Noise Levels in the East Elevated Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	26	98
2	*Dump Trucks*	51	64.6
3	*Unik truck*	14	64.6
4	*Agilator truck*	32	82
5	*Truck Cranes*	23	64.6

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {26.10 98/10 + 51.10 64.6/10 + 14.10 64.6/10 + 32.10 82/10 + 23.10 64.6/10 }
= 112.29 dB(A)

and the noise levels generated are as presented in Table 6.61. and Figure 6.5..

Table 6.61. Noise Levels for Specific Distances of Earthworks and Dewatering on the East Elevated Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	112.29		Calculations using the equation:

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
30	106.27		**L2 = L_1+10 log r2/r1** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters)
45	102.75		
60	100.25		
75	98.31		
90	96.73		
105	95.39		
120	94.23	Does not meet quality standards	Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
135	93.21		
150	92.29		
165	91.46		
180	90.71		
195	90.01		
210	89.37		
225	88.77		

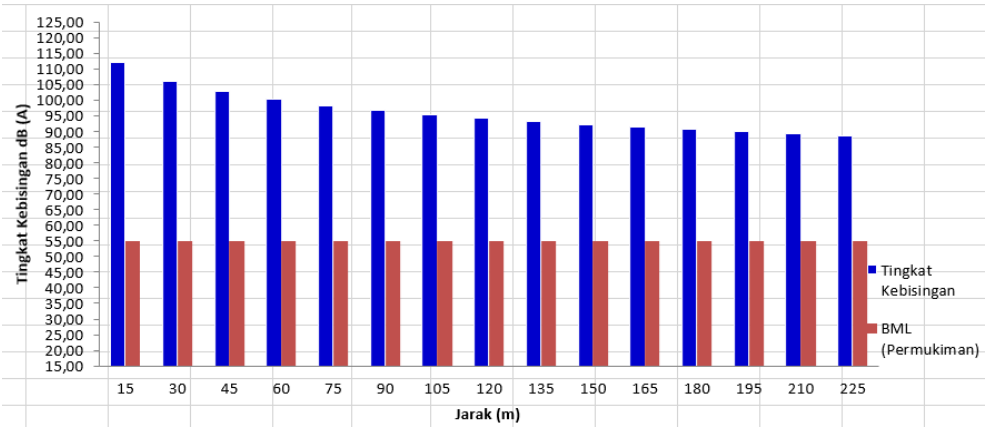


Figure 6.5. Noise Levels for Specific Distances of Earthworks and Dewatering on the East Elevated Segment

4) Deposit Segment

The operation of heavy equipment and other construction equipment during earthworks and dewatering will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.62. Earthwork and Dewatering Noise Levels in the Depot Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	12	98
2	*Dump Trucks*	20	64.6
3	*Unik truck*	5	64.6
4	*Agilator truck*	7	82
5	*Truck cranes*	2	64.6
6	*Wheel Loaders*	7	104
7	*Bulldozer*	20	101

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {12.10 98/10 + 20.10 64.6/10 + 5.10 64.6/10 + 7.10 82/10 + 2.10 64.6/10 + 7.10 104/10 + 20.10 101/10 }
= 117.03 dB(A)

and the noise levels generated are as presented in Table 6.63. and Figure 6.6..

Table 6.63. Noise Levels for Specific Distances of Earthworks and Dewatering in the Underground Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	117.03	Does not meet quality standards	Calculations using the equation: **$L2 = L_1 + 10 \log r2/r1$** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters) Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
30	111.01		
45	107.49		
60	104.99		
75	103.05		
90	101.47		
105	100.13		
120	98.97		
135	97.95		
150	97.03		
165	96.20		
180	95.45		
195	94.75		
210	94.11		
225	93.51		

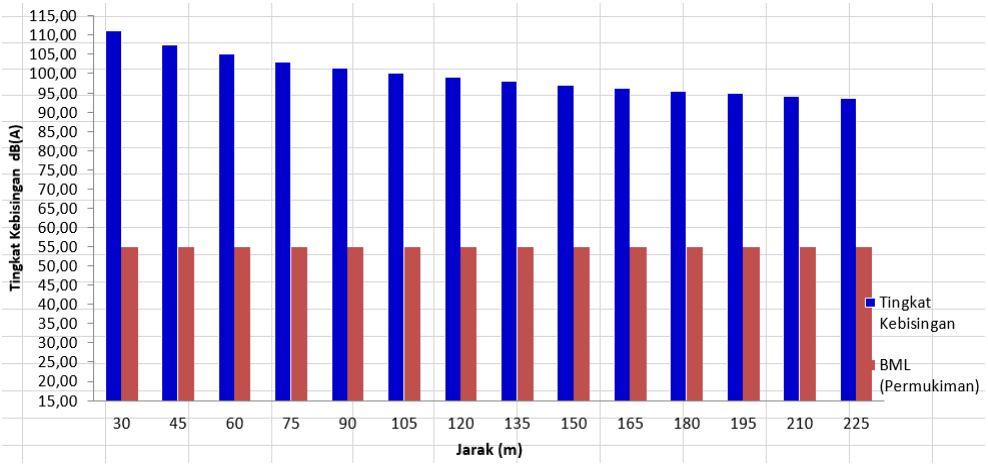


Figure 6.6. Noise Levels for Specific Distances of Earthworks and Dewatering in the Depot Segment

Table 6.64. Magnitude of the Impact of Changes in Noise Levels on Earthworks and Dewatering

Segment/Path	Noise Level (db(A))			Impact Magnitude	Information
	L1 (RLA)	L2 (105m)	L		
West Elevated Segment					Combining the 2 noise level components with the equation: **L = 10 log [Σ Antilog (Ln/10)]** Information :
Jl. S. Parman (Sta. Tomang)	72	84.28	84.53	12.53	

Segment/Path	Noise Level (db(A))			Impact Magnitude	Information
	L1 (RLA)	L2 (105m)	L		
Underground Segment					L = Combined noise level (dBA) Ln = Nth noise level (dBA) n = lots of noisy components (Traffic Noise Prediction Guidelines, PU, 2004)
Jl. KH Hasyim Asy'ari (Sta Roxy)	68	97.79	97.79	29.79	
Jl. Betel Garden (Sta Thamrin)	73	97.79	97.80	24.80	
Jl. Eastern Cendeng (Sta Petojo)	69	97.79	97.80	28.80	
Jl. Lieutenant General Suprapto (Sta Galur)	73	97.79	97.80	24.80	
East Elevated Segment					
Jl. Lieutenant General Suprapto (Stone Well Station)	70	95.39	95.40	25.40	
Jl. Pioneers of Independence (East Pakulonan Sta.)	72	95.39	95.41	23.41	
Jl. Raya Bekasi (St Pulo Gadung)	70	95.39	95.40	25.40	
Jl. Raya Bekasi (West Cakung Sta)	72	95.39	95.41	23.41	
Jl. Raya Bekasi (Ujung Menteng Station)	70	95.39	95.40	25.40	
Jl. Kali Abang Tengah (Medan Satria Sta.)	66	95.39	95.39	29.39	
Deposit Segment					
Jl. BKT inspection (Rorotan Depot)	69	100.13	100.13	31.13	

- **Important Nature of Impact**

Table 6.65. Significance of the Impact of Earthworks and Dewatering on Noise Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		Many people will be affected384 families (1,536 people),especially community memberswhose residence is less than 100 m from the project site. However, the impact of the noise does not affect residential areas so it does not really disturb the comfort of residents.
2	The area of impact distribution		T.P	The impact occurs at a distance of 15 meters from the noise source around the project site up to a radius of 100 meters
3	The intensity and duration of the impact	P		Intensity occurs every day when activities take place and the impact contribution exceeds the specified quality standard threshold (55 dBA). The duration of the impact is temporary only during the earthwork and dewatering activities
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal in timework activity has ended.

No	Criteria	Interest		Information
		P	T.P	
6	Reversal or non-reversal of impact		T.P	This impact occurs only temporarily and will return shortly after the heavy equipment/source machines are turned off, therefore the criteria are not important
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**3**	**4**	**Important**

D. Increased runoff water discharge

- **Initial environmental conditions**

  The initial environmental baseline condition of runoff water discharge in the Rorotan Depot area is determined based on the current land use conditions, rainfall and catchment area area, which is then calculated using the rational formula:

  Q = 0.0028 x C x I x A

  Q = 0.0028 x 0.10 x 481.46 x 15.69

  Q = 2.11 m3/sec

- **Future environmental conditions without the project**

  It is estimated that there will be no significant changes to the runoff water discharge in the Rorotan Depot area before the construction process begins. Thus, the runoff water discharge in future conditions without the project will remain the same as the baseline environmental conditions (2.11 m3/second).

- **Environmental conditions that will come with the project**

  Earthworks, especially filling up excavated soil in the Rorotan Depot area, can have an impact on increasing runoff water discharge in the study area. Estimates of changes in runoff water discharge are carried out by comparing the runoff coefficient for built/open land conditions of 0.8 with the runoff coefficient for existing conditions of 0.1 (rice fields), resulting in a change in runoff coefficient of 0.7. Thus, the runoff water discharge due to earthworks is as follows:

  Q = 0.0028 x 0.8 x 481.46 x 15.69

  Q = 16.92 m3/sec

- **The magnitude of the impact**

  RLA = 2.11 m3/sec
  No Project = same as RLA (2.11 m3/sec)
  With Projects = 16.92 m3/sec
  The magnitude of the impact = With Project – Without Project
  = 16.92 m3/sec - 2.11 m3/sec
  = 14.81 m3/sec

Earthworks, especially piling up excavated soil in the Rorotan Depot area, have a negative impact on runoff in the form of an increase in runoff water discharge of 14.81 m3/secondor 700%**higher**than without a project.

- **Important Nature of Impact**

Table 6.66. Important Characteristics of the Impact of Earthworks and Dewatering on Increased Run Off

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected, especially if the increase in runoff discharge becomes flooding, is 384 families (1,536 people) residents in 33 sub-districts who live along the MRT East - West Line.
2	The area of impact distribution	P		The impact area is 0.2 km x the length of the MRT East – West Line
3	The intensity and duration of the impact	P		The intensity of the impact is momentary but lasts during the operation of the MRT East – West Line
4	Many other environmental components are affected		T.P	no other components are affected
5	Cumulative nature of impact		T.P	impacts are not cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed because the intensity of the impact is only temporary
7	Other criteria are in accordance with developments in science and technology		T.P	impacts can be controlled with existing technology
	Amount	**3**	**4**	**Important**

E. Increased prevalence of ARI

- **Initial environmental conditions**

Based on the results of interviews with 384 affected families at the activity location, it is known that the types of illnesses suffered in the last 3 months in each segment are as presented in**Table 6.67.**.

Table 6.67. Types of Diseases Suffered by Respondents in the Last 3 Months

Type Disease	Elevated Segment		Underground Segment		Deposit Segment		Total	
	n	%	n	%	n	%	n	%
Cough and cold	185	67.77 73.41	83	30,40 67.48	5	01.83 55.56	273	100 71.09
Diarrhea	38	54.29 15.08	31	44.29 25,20	1	01.43 11,11	70	100 18.23
ISPA	12	63.16 4.76	5	26.32 4.06	2	10.53 22.22	19	100 4.95
Itchy rash	15	75.00 5.95	4	20.00 3.25	1	05.00 11,11	20	100 5.21
Other	2	100.00 0.79	0	0.00 0.00	0	0.00 0.00	2	100 0.52
Total Number of Respondents	**252**	**65.63** **100**	**123**	**32.03** **100**	**9**	**2.34** **100**	**384**	**100** **100**

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. Refers to**Table** 6.67. **67.**, it is known that the prevalence of ARI disease for future environmental conditions without the project in the elevated segment is 4.76%, the underground segment is 4.06% and in the depot segment is 22.22%.

- **Environmental conditions that will come with the project**

  Forecasting environmental conditions that will come with the project in the ARI disease prevalence component is carried out using an approach to the potential for dust exposure, especially during construction work. Contribution of pollutants (dust) from construction work to changes in air quality at activity locations, as presented in**Table 6.68.**.

Table 6.68. Contribution of Pollutants (Dust) from Construction Activities at a Distance of 100 m

Segment	Code	Location	Coordinate	TSP (µg/m3)	Pollutant Contribution (µg/m3)	TSP w. Project (µg/m3)
*Elevated*West	UKG1	Jl. S. Parman	S 06°10'30.59": E 106°47'33.35"	21	0.066	21,066
*Elevated*East	UKG6	Jl. Lieutenant General Suprapto	S 06°10'00.59": E 106°52'29.49"	20	0.066	20,066
	UKG7	Jl. Pioneers of Independence	S 06°10'31.25": E 106°53'36.19"	39	0.066	39,066
	UKG8	Jl. Raya Bekasi	S 06°10'57.48": E 106°54'58.80"	54	0.066	54,066
	UKG9	Jl. Raya Bekasi	S 06°11'03.85": E 106°56'32.89"	73	0.066	73,066
	UKG10	Jl. Raya Bekasi	S 06°11'25.46": E 106°58'05.75"	32	0.066	32,066
	UKG11	Jl. Kali Abang Tengah	S 06°11'46.05": E 106°58'33.59"	41	0.066	41,066
Elevated Segment Average						**40,066**
Underground	UKG2	Jl. KH Hasyim Ashari	S 06°09'56.71": E 106°48'09.07"	45	0.066	45,066
	UKG3	Jl. Betel Garden	S 06°10'59.50": E 106°49'23.74"	22	0.066	22,066
	UKG4	Jl. Eastern Cendeng	S 06°10'13.40": E 106°48'39.79"	50	0.066	50,066
	UKG5	Jl. Lieutenant General Suprapto	S 06°10'27.62": E 106°51'19.45"	48	0.066	48,066
Underground Segment Average						**41,316**
Depot	UKG12	Jl. BKT inspection	S 06°08'38.72": E 106°57'59.62"	60	0.066	60,066
Average Deposit Segment						**60,066**

Health risks are determined using the Dose Response Relationship method (Ostro, 1994), as follows:

1) Elevated Segment

   dHi = bi X POPidA

   = 0.057587$_{\text{org. resident}}$+ 2,900 people. workers) X 40.066 µg/m3

   = 7,870soul

When compared with the total population in 17 sub-districts in the elevated segment locations (714,534 people), the percentage of affected population is 1.10% (total 6.05%).

2) Underground Segment
dHi = bi X POPidA
= 0.057587841 people. population + 2,520 people. workers) X 41.316 µg/m3
= 7,997 people
When compared with the total population in 16 sub-districts in the underground segment (385,372 people), the percentage of affected population is 2.08% (total 7.03%).

3) Deposit Segment
dHi = bi X POPidA
= 0.057587$_{\text{org. resident}}$+ 790 people. workers) X 60.066 µg/m3
= 2,857soul
When compared with the total population in the 3 sub-districts in the depot segment (167,198 people), the percentage of affected population is 1.71% (total 6.66%).

- **The magnitude of the impact**

RLA = prevalence of ARI disease 4.95%
No Project = the same as RLA
prevalence of ARI disease 4.95%
With Projects = 1)elevated segment 6.05%
2) underground segment 7.03%
3) depot segment6.66%

The magnitude of the impact = With Project – Without Project

1) elevated segment
= 6.05%-4.95%
= 1.10%

2) underground segment
= 7.03%-4.95%
= 2.08%

3) depot segment
= 6.66%-4.95%
= 1.71%

The impact of increasing dust levels in the air (decreasing air quality) on earthworks and dewatering causes secondary impacts in the form of increasing the prevalence of ARI diseases.

- **Important Nature of Impact**

Table 6.69. Important Characteristics of the Impact of Earthworks and Dewatering on the Prevalence of ISPA

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people potentially affected is 18,724 people, especially people whose residences are less than 100 m along the elevated and depot routes.
2	The area of impact distribution	P		The area of distribution of impacts follows the area of distribution of impacts of air pollution to which humans are receptors, namely 0.2 km x the length of elevated, underground and depot routes.

No	Criteria	Interest		Information
		P	T.P	
3	The intensity and duration of the impact		T.P	High impact intensity occurs in residents who live at a distance of less than 100 meters, while for residents who live at a distance of 100 - 200 m the intensity is moderate and for more than 200 m left and right of the road the intensity is low. Judging from the length of time the impact lasts, the duration of the impact is during earthworks and dewatering.
4	Many other environmental components are affected	P		There are other environmental components that are affected, namely changes in people's attitudes and perceptions in positive and/or negative directions which are influenced by the number of people suffering from health problems (number of ISPA cases).
5	Cumulative nature of impact	P		As described in the estimated impact size, the causes of respiratory infections are influenced by many factors, air pollution can be a predisposing factor for the occurrence of ISPA along with other trigger factors. Judging from the cumulative nature of the impact of dust particles with a size of 2.5 microns that enter the respiratory tract in lung tissue, especially the alveoli, these particles will accumulate and ultimately reduce respiratory capacity and lead to pneumonia or pneumonia.
6	Reversal or non-reversal of impact	P		Dust particles that are already in the alveoli are very difficult to excrete out of the body. By looking at this, the nature of the impact is categorized as irreversible.
7	Other criteria are in accordance with developments in science and technology		T.P	There are other criteria in accordance with developments in science and technology that are already available and easy to obtain. The science and technology criteria that can be used to overcome this impact are managing it through a technical approach and a social approach.
	Amount	**5**	**2**	**Important (P1)**

6.2.6. Underground Construction Work

A. Decreased traffic performance

- **Initial environmental conditions**

The results of calculations of existing road traffic performance at underground construction work sites are presented in Table 6.70.

Table 6.70. Existing Road Traffic Performance

Road	junior high school/h	VC Ratio	LOS
Jl. KH Hasyim Asy'ari	3,069	0.830	D
Jl. East Cideng	3,219	0.875	D
Jl. Greater Jatibaru	4,215	0.914	E
Jl. Betel Garden	1,744	0.426	C
Jl. AR Hakim	1,727	0.499	C
Jl. Kramat Kwitang	2,797	0.980	E
Jl. Kramat Round	1,355	0.317	B

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions, so that the traffic performance (level of service) of roads in the underground segment varies from service level B (stable flow, slightly hampered speed, volume, drivers can still select the desired speed) to E (unstable flow, low and variable speed, volume approaching capacity).

- **Environmental conditions that will come with the project**

  The results of road traffic performance calculations due to soil transportation activities during the construction of MRT-EWLP1S1 are presented in Table 6.71..

Table 6.71. Road Traffic Performance in Underground Construction Works

Segment/Path		Underground Segment						
		Jl. KH Hasyim Asy'ari	Jl. East Cideng	Jl. Greater Jatibaru	Jl. Betel Garden	Jl. AR Hakim	Jl.Kramat Kwitang	Jl. Kramat Round
Dump trucks. concrete pump trucks in elevated construction		21	21	21	21	21	21	21
Dump trucks. concrete pump trucks in underground constrc.		14	28	42	60	74	88	100
Dump trucks soil material & debris		42	57	72	91	104	114	131
Total Vol. Traffic	units	77	106	135	172	199	223	252
	junior high school/h	115.5	159	202.5	258	299	334.5	378
Vol. Existing traffic	junior high school/h	3069	3219	4215	1744	1727	2797	1355
Vol. during project	junior high school/h	370.5	3378	4418	2002	2026	3132	1733
AVE Traffic Capacity	junior high school/h	3073	3208	4610	4099	3458	2854	4281
VC Ratio		1,036	1,053	0.958	0.488	0.586	1,097	0.405
Level of Service (LOS)		F	F	E	C	C	F	B

- **The magnitude of the impact**

  RLA (Table 6.70.) :

  The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to E (unstable flow, low and different speeds -different, volume approaches capacity).

  No Project = the same as RLA

  By Project (Table 6.71.) :

The traffic performance (level of service) of roads in the underground segment varies from level of service B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed) to F (obstructed flow, low speed, low volume). under capacity, lots of stops).

The magnitude of the impact = With Project – Without Project

Table 6.72. Magnitude of the Impact of Earthworks and Dewatering on Traffic Performance

Road	With Projects		No Project		Impact Magnitude (Vc)
	VC ratio	LOS	VC ratio	LOS	
Jl. KH Hasyim Asy'ari	1,036	F	0.830	D	0.206
Jl. East Cideng	1,053	F	0.875	D	0.178
Jl. Greater Jatibaru	0.958	E	0.914	E	0.044
Jl. Betel Garden	0.488	C	0.426	C	0.062
Jl. AR Hakim	0.586	C	0.499	C	0.087
Jl. Kramat Kwitang	1,097	F	0.980	E	0.117
Jl. Kramat Round	0.405	B	0.317	B	0.088

- **Important Nature of Impact**

Table 6.73. Significance of the Impact of Earthworks and Dewatering on Traffic Performance

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be affected is 384 families (1,324 people). This number is only calculated from the number of households representing the population in 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
2	The area of impact distribution	P		The impact distribution area includes 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
3	The intensity and duration of the impact	P		The impact of traffic disruption will result in further impacts in the form of public unrest if it is not managed well. which creates conflict between residents and those in charge of activities. Impacts are expected to occur during the construction phase.
4	Many other environmental components are affected	P		The impact of traffic disruption is a derivative impact from other impact components and does not cause other derivative impacts.
5	Cumulative nature of impact	P		the impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impacts of traffic disruptions can be reversed and reversible if both primary and secondary impacts are properly managed through social institutions and/or institutional approaches.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria that are in accordance with the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

B. Decreased air quality

- **Initial environmental conditions**

  The results of air quality measurements at 12 locations in the study area were recorded in the ISPUMAX range of 52.99 – 61.29 (Medium category) withcritical parameters CO and PM2.5(Table 3.8.). When compared withAir quality standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (Appendix VII – Ambient Air Quality Standards), then the CO parameter is measuredhas exceeded the Air Quality Standards at all sampling location points (Figure 3.6.).

- **Future environmental conditions without the project**

  Air quality forecasts for future environmental conditions without the project are carried out by comparing initial environmental baseline conditions with measurement data in previous studies (Table 3.7.) in each segment of the MRT-EWLP1S1 Development. The results of air quality measurements at 13 locations in the study area were recorded in the ISPUMAX range of 40.38 – 76.67 (good to moderate category) withcritical parameters SO2, NO2 and PM10.Informationanother comparison of previous studiesis the DKI Jakarta Air Quality Monitoring Report for 2021. Based on this report, it is known that in general the ISPU at SPKU Bundaran HI and SPKU Kelapa Gading during 2021 is in the Medium category (81% and 82% respectively) withcritical parameter PM2.5 (Table 3.6.).Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

  The number and frequency of transport trucks for underground work is 3 vehicles/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.74. Emission Loads of Underground Work

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{3 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 6{,}36 gr/L$ $Q = 2{,}12.10^{-6}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6
NO2	9.21	$Q = \frac{3 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 9{,}21 gr/L$ $Q = 3{,}07.10^{-6}$	
CO	36.42	$Q = \frac{3 \ unit/jam}{3600 dt/jam} x \frac{0{,}4L/km}{1000 m/km} x \ 36{,}42 gr/L$ $Q = 1{,}21.10^{-5}$	

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Particulates (PM10)	2.01	$Q = \frac{3\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 6{,}70.10^{-7}$	*) BPPT in Jinca et al. (2009)
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{4L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 7{,}07.10^{-6}$	
NO2	9.21	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{4L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 1{,}02.10^{-5}$	
CO	36.42	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{4L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 4{,}05.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{4L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 2{,}23.10^{-6}$	
Total Emission Burden			
SO2	9,19.10-6		
NO2	1,33.10-5		
CO	5,26.10-5		
SO2	2,90.10-6		

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.75. Concentration of Emissions from Earthworks and Dewatering in the Underground Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	9,19.10-6	$C = \frac{2x9{,}19.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}16 \mu g/m^3$
NO2	1,33.10-5	$C = \frac{2x1{,}33.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}23 \mu g/m^3$
CO	5,26.10-5	$C = \frac{2x5{,}26.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}91 \mu g/m^3$
Particulates (PM10)	2,90.10-6	$C = \frac{2x2{,}90.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}05 \mu g/m^3$

Table 6.76. Air Quality Forecasts and ISPU Figures for Underground Work

Location	Concentration				ISPU figures				ISPU		
	PM10	CO	SO2	NO2	PM10	SO2	CO	NO2	MAX	Category	Critical
Jl. KH Hasyim Ashari	25.05	4,823.91	48.16	41.05	25.05	46.31	60.30	25.66	60.30	Currently	CO
Jl. Betel Garden	14.05	4,632.91	45.16	39.05	14.05	43.42	57.91	24.41	57.91	Currently	CO
Jl. Eastern Cendeng	29.05	4,861.91	49.16	42.05	29.05	47.27	60.77	26,28	60.77	Currently	CO
Jl. Lieutenant General Suprapto	27.05	4,701.91	46.16	40.05	27.05	44.38	58.77	25.03	58.77	Currently	CO

- **The magnitude of the impact**

  The magnitude of the impact of changes in air quality on Earthworks and Dewatering is presented in Table 6.77..

Table 6.77. Magnitude of the Impact of Air Quality Changes on Underground Work

Location	ISPU Without Project		ISPU With Projects		Impact Magnitude
	MAX	Category	MAX	Category	
Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29	Currently	60.30	Currently	0.01
Jl. Betel Garden (Sta Thamrin)	57.90	Currently	57.91	Currently	0.01
Jl. East Cindeng (Sta Petojo)	60.76	Currently	60.77	Currently	0.01
Jl. Lieutenant General Suprapto (Sta Galur)	58.76	Currently	58.77	Currently	0.01

- **Important Nature of Impact**

Table 6.78. Significance of the Impact of Underground Construction Work on Air Quality

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	Many people will be affected, especially residents who live nearbyas many as 384 families (1,536 people) residents in 33 sub-districts along the MRT East - West Line Phase1 Stage1 route, especially people whose residences are less than 100 m from the project siteHowever, the impact did not affect residential areas and disturb the comfort of residents because it was implementedbelow ground level.
2	The area of impact distribution		T.P	The impact that occurred was not extensive, only relocatedin the project site areathe implementation of which is below the ground surface (underground).
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur every time the work equipment is operated and when the Dump truck comes to the surface to transport the remaining materials which will cause additional emissions (SO2 = 0.038 µg/m3, NO2 = 0.055 µg/m3, CO = 0.22 µg/m3 and Particulates). = 0.012 µg/m3), but the impact is temporary,therefore the criteria are not important
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal when construction work goes undergroundhas ended.
6	Reversal or non-reversal of impact		T.P	This impact occurs only temporarily and will return shortly after the heavy equipment machines/noise sources are turned off, therefore the criteria are not important
7	Other criteria are in accordance with		T.P	There isn't anyother criteria in accordance with developments in science and technology

No	Criteria	Interest		Information
		P	T.P	
	developments in science and technology			
	Amount	**1**	**6**	**Not Important (TP)**

C. Increased noise

- **Initial environmental conditions**

  The results of noise level measurements at 12 locations in the study area were recorded in the range of 66 dB(A) – 73 dB(A) (Table 3.10.), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48 /MENLH/1996 concerning Noise Level Standards, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)].

- **Future environmental conditions without the project**

  Forecasts of noise levels in future environmental conditions without the project are carried out by comparing initial environmental conditions with data measured in previous studies (Table 3.9.) in each segment of the MRT-EWLP1S1 Development.

  The results of noise level measurements at 13 locations in the study area were recorded in the range of 51 dB(A) – 81 dB(A), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48/MENLH/1996 concerning Standard Noise Level, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)]. Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

  The operation of heavy equipment and other construction equipment during earthworks and dewatering will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.79. Noise Levels of Underground Construction Work

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	18	98
2	*Dump trucks*	15	64.6
3	*Unik truck*	14	64.6
4	*Agilator truck*	27	82
5	*Truck cranes*	15	64.6
6	*Wheel loaders*	9	104

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
7	*Concrete pump truck*	15	82
8	*Tire rollers*	9	101
9	*Asphalt finisher*	5	101

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {18.10 98/10 + 15.10 64.6/10 + 14.10 64.6/10 + 27.10 82/10 + 15.10 64.6/10 + 9.10 104/10 + 15.10 82/10 + 9.10 101/10 + 5.10 101/10 } = 117.18 dB(A)

and the noise levels generated are as presented in Table 6.80. and Figure 6.7..

Table 6.80. Noise Levels for Specific Distances of Underground Construction Work

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	117.18		
30	111.16		Calculations using the equation: **L2 = L_1+10 log r2/r1** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters)
45	107.64		
60	105.14		
75	103.20		
90	101.62		
105	100.28		Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
120	99.12	Does not meet quality standards	
135	98.10		
150	97.18		
165	96.35		
180	95.60		
195	94.90		
210	94.26		
225	93.66		

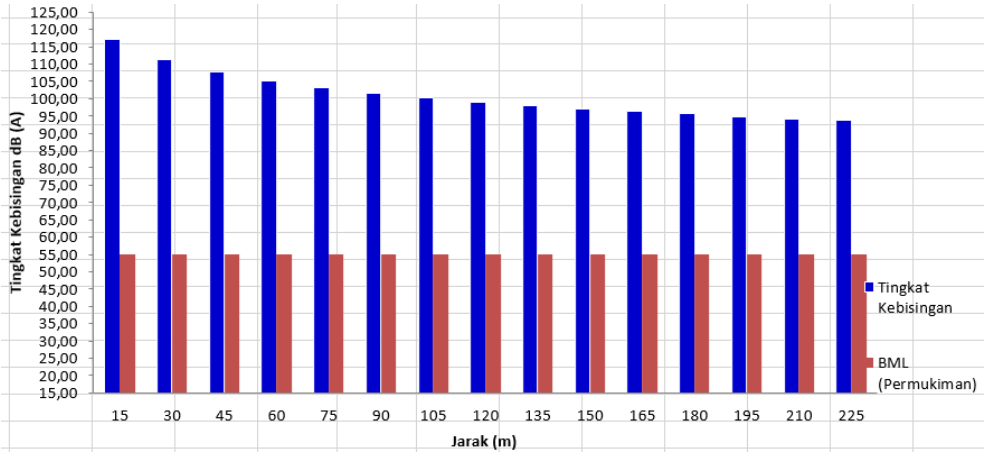


Figure 6.7. Noise Levels for Specific Distances of Underground Work

Table 6.81. Magnitude of the Impact of Changes in Noise Levels on Underground Work

Segment/Path	Noise Level (db(A))			Impact Magnitude	Information
	L1 (RLA)	L2 (105m)	L		
Jl. KH Hasyim Asy'ari (Sta Roxy)	68	100.28	100.28	32.28	Combining the 2 noise level components with the equation: **L = 10 log [Σ Antilog (Ln/10)]** Information : L = Combined noise level (dBA) Ln = Nth noise level (dBA) n = lots of noisy components (Traffic Noise Prediction Guidelines, PU, 2004)
Jl. Betel Garden (Sta Thamrin)	73	100.28	100.29	27.29	
Jl. Eastern Cendeng (Sta Petojo)	69	100.28	100.28	31.28	
Jl. Lieutenant General Suprapto (Sta Galur)	73	100.28	100.29	27.29	

- **Important Nature of Impact**

Table 6.82. Significance of the Impact of Underground Construction Work on Noise Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		Many people will be affected, especially residents who live nearbyas many as 384 families (1,536 people) residents in 33 sub-districts along the MRT East - West Line Phase1 Stage1 route, especially people whose residences are less than 100 m from the project siteHowever, the impact of the noise does not affect residential areas so it does not really disturb the comfort of residents because it is implementedbelow ground level. Otherefore this criterion is not important.
2	The area of impact distribution		T.P	The impact occurs at a distance of 15 meters from the noise source around the project site up to a radius of 100 meters
3	The intensity and duration of the impact	P		Intensity occurs every day when activities take place and the impact contribution exceeds the specified quality standard threshold (55 dBA). Noise levels in residential areas can reach up to117.18 dB(A); The duration of the impact is temporary only during the earthwork and dewatering activities
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal when construction work goes undergroundhas ended.
6	Reversal or non-reversal of impact		T.P	This impact occurs only temporarily and will return shortly after the heavy equipment machines/noise sources are turned off, therefore the criteria are not important
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**3**	**4**	**Important**

D. Increased prevalence of ARI

- **Initial environmental conditions**

  Based on the results of interviews with 123 affected families at the activity location, it is known that the prevalence of ISPA in the underground segment is 4.06%.

- **Future environmental conditions without the project**

Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. Thus, the prevalence of ARI disease for future environmental conditions without the project in the underground segment is 4.06%.

- **Environmental conditions that will come with the project**

  Forecasting environmental conditions that will come with the project in the ARI disease prevalence component is carried out using an approach to the potential for dust exposure, especially during construction work. Contribution of pollutants (dust) from construction work to changes in air quality at activity locations, as presented in**Table 6.83.**.

Table 6.83. Contribution of Pollutants (Dust) from Construction Activities at a Distance of 100 m

Segment	Code	Location	Coordinate	TSP (µg/m3)	Pollutant Contribution (µg/m3)	TSP w. Project (µg/m3)
Underground	UKG2	Jl. KH Hasyim Ashari	S 06°09'56.71": E 106°48'09.07"	45	0.066	45,066
	UKG3	Jl. Betel Garden	S 06°10'59.50": E 106°49'23.74"	22	0.066	22,066
	UKG4	Jl. Eastern Cendeng	S 06°10'13.40": E 106°48'39.79"	50	0.066	50,066
	UKG5	Jl. Lieutenant General Suprapto	S 06°10'27.62": E 106°51'19.45"	48	0.066	48,066
Underground Segment Average						**41,316**

Health risks are determined using the Dose Response Relationship method (Ostro, 1994), as follows:

dHi = bi X POPidA
= 0.057587$_{\text{org. resident}}$+ 2,520 people. workers) X 41.316 µg/m3
= 7,997soul

When compared with the total population in 16 sub-districts in the underground segment (385,372 people), the percentage of affected population is 2.08% (total 6.14%).

- **The magnitude of the impact**

RLA = prevalence of ARI disease 4.95%
No Project = the same as RLA
prevalence of ARI disease 4.95%
With Projects = prevalence of ARI disease6.14%
The magnitude of the impact = With Project – Without Project
= 6.14%-4.06%
= 2.08%

- Important Nature of Impact

Table 6.84. Important Characteristics of the Impact of Underground Construction Work on the Prevalence of ISPA

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people potentially affected is 18,724 people, especially people who live less than 100 m along the route.
2	The area of impact distribution	P		The area of distribution of impacts follows the area of distribution of impacts of air pollution to which humans are

No	Criteria	Interest		Information
		P	T.P	
				receptors, namely 0.2 km x the length of elevated, underground and depot routes.
3	The intensity and duration of the impact		T.P	High impact intensity occurs in residents who live at a distance of less than 100 meters, while for residents who live at a distance of 100 - 200 m the intensity is moderate and for more than 200 m left and right of the road the intensity is low. Judging from the length of time the impact lasts, the duration of the impact is during earthworks and dewatering.
4	Many other environmental components are affected	P		There are other environmental components that are affected, namely changes in people's attitudes and perceptions in positive and/or negative directions which are influenced by the number of people suffering from health problems (number of ISPA cases).
5	Cumulative nature of impact	P		As described in the estimated impact size, the causes of respiratory infections are influenced by many factors, air pollution can be a predisposing factor for the occurrence of ISPA along with other trigger factors. Judging from the cumulative nature of the impact of dust particles with a size of 2.5 microns that enter the respiratory tract in lung tissue, especially the alveoli, these particles will accumulate and ultimately reduce respiratory capacity and lead to pneumonia or pneumonia.
6	Reversal or non-reversal of impact	P		Dust particles that are already in the alveoli are very difficult to excrete out of the body. By looking at this, the nature of the impact is categorized as irreversible.
7	Other criteria are in accordance with developments in science and technology		T.P	There are other criteria in accordance with developments in science and technology that are already available and easy to obtain. The science and technology criteria that can be used to overcome this impact are managing it through a technical approach and a social approach.
	Amount	**5**	**2**	**Important (P1)**

6.2.7. Ground Surface Construction Work

A. Decreased traffic performance

- **Initial environmental conditions**

The results of calculations of existing road traffic performance at ground level construction work sites are presented in Table 6.85.

Table 6.85. Existing Road Traffic Performance

Road	junior high school/h	VC Ratio	LOS
West Elevated Segment			
Jl. S. Parman	5.103	1,074	F
Jl. Kyai Tapa	5,187	1,078	F
East Elevated Segment			
Jl. Lt. Gen. Suprapto	4,454	0.780	C
Jl. Pioneers of Independence	1,766	0.535	C
Jl. Raya Bekasi	2,704	0.845	D
Deposit Segment			
Jl. East Canal Inspection	460	0.104	A

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions, so that in general road traffic performance in conditions without the project is as follows:

  1) West elevated segment
     The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
  2) East elevated segment
     The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to D (unstable flow, low speed).
  3) Deposit Segment
     The traffic performance (level of service) of roads in the Depo segment includes service level category A (free flow, low volume and high speed, the driver can choose the desired speed).

- **Environmental conditions that will come with the project**

  The results of road traffic performance calculations due to construction work on the ground surface during the MRT-EWLP1S1 construction are presented in Table 6.86.

Table 6.86. Road Traffic Performance on Ground Surface Construction Work

Segment/Path		West Elevated		East Elevated			Depot
		Jl. S. Parman	Jl. Kyai Tapa	Jl. Lt. Gen.Suprapto	Jl. Pioneers of Independence	Jl. Raya Bekasi	Jl. East Canal Inspection
Dump trucks. concrete pump trucks in elevated construction		11	21	36	43	54	68
Dump trucks. concrete pump trucks in underground constrc.		-	-	114	114	114	114
Dump trucks soil material & debris		9	20	142	157	165	165
Total Vol. Traffic	units	20	41	292	314	333	347
	junior high school/h	30	61.5	438	471	499.5	521
Vol. Existing traffic	junior high school/h	5103	5187	4454	1766	2704	460
Vol. during project	junior high school/h	5133	5249	4892	2237	3204	981
AVE Traffic Capacity	junior high school/h	4752	4812	4930	5708	3315	4418
VC Ratio		1,080	1,091	0.992	0.392	0.966	0.222
Level of Service (LOS)		F	F	E	C	E	B

- **The magnitude of the impact**

RLA (Table 6.85.) :

1) West elevated segment
   The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
2) East elevated segment
   The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to D (unstable flow, low speed).
3) Deposit Segment
   The traffic performance (level of service) of roads in the Depo segment includes service level category A (free flow, low volume and high speed, the driver can choose the desired speed).

No Project = the same as RLA

By Project (Table 6.86.) :

1) West elevated segment
   The traffic performance (level of service) of the road section in the West elevated segment is in the service level category F (impeded flow, low speed, volume below capacity, lots of stops).
2) East elevated segment
   The traffic performance (level of service) of roads on the East elevated segment varies from service level C (stable flow, speed can be controlled by traffic) to E (unstable flow, low speed).
3) Deposit Segment
   The traffic performance (level of service) of roads in the Depo segment is in service level category B (stable flow, slightly hampered speed, volume, driver can still choose the desired speed).

The magnitude of the impact = With Project – Without Project

Table 6.87. The Magnitude of the Impact of Ground Surface Construction Work on Traffic Performance

Road	With Projects		No Project		Impact Magnitude (Vc)
	VC ratio	LOS	VC ratio	LOS	
West Elevated Segment					
Jl. S. Parman	1,080	F	1,074	F	0.006
Jl. Kyai Tapa	1,091	F	1,078	F	0.013
East Elevated Segment					
Jl. Lt. Gen. Suprapto	0.992	E	0.780	C	0.212
Jl. Pioneers of Independence	0.392	C	0.535	C	-0.143
Jl. Raya Bekasi	0.966	E	0.845	D	0.121
Deposit Segment					
Jl. East Canal Inspection	0.222	B	0.104	A	0.118

- **Important Nature of Impact**

Table 6.88. Important Characteristics of the Impact of Ground Surface Construction Work on Traffic Performance

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	**P**		The number of people estimated to be affected is 384 families (1,324 people). This number is only calculated from the number of households representing the population in 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
2	The area of impact distribution	P		The impact distribution area includes 31 sub-districts at the MRT East – West Line Phase1 Stage1 construction site
3	The intensity and duration of the impact	P		The impact of traffic disruption will result in further impacts in the form of public unrest if it is not managed well. which creates conflict between residents and those in charge of activities. Impacts are expected to occur during the construction phase.
4	Many other environmental components are affected	P		The impact of traffic disruption is a derivative impact from other impact components and does not cause other derivative impacts.
5	Cumulative nature of impact	P		the impact is cumulative
6	Reversal or non-reversal of impact		T.P	The impacts of traffic disruptions can be reversed and reversible if both primary and secondary impacts are properly managed through social institutions and/or institutional approaches.
7	Other criteria are in accordance with developments in science and technology		T.P	There are no other criteria that are in accordance with the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

B. Decreased air quality

- **Initial environmental conditions**

  The results of air quality measurements at 12 locations in the study area were recorded in the ISPUMAX range of 52.99 – 61.29 (Medium category) withcritical parameters CO and PM2.5(Table 3.8.). When compared withAir quality standards refer to PP No. 22 of 2021 concerning Implementation of Environmental Protection and Management (Appendix VII – Ambient Air Quality Standards), then the CO parameter is measuredhas exceeded the Air Quality Standards at all sampling location points (Figure 3.6.).

- **Future environmental conditions without the project**

  Air quality forecasts for future environmental conditions without the project are carried out by comparing initial environmental baseline conditions with measurement data in previous studies (Table 3.7.) in each segment of the MRT-EWLP1S1 Development. The results of air quality measurements at 13 locations in the study area were recorded in the ISPUMAX range of 40.38 – 76.67 (good to moderate category) withcritical parameters SO2, NO2 and PM10.Informationanother comparison of previous studiesis the DKI Jakarta Air Quality Monitoring Report for 2021. Based on this report, it is known that

in general the ISPU at SPKU Bundaran HI and SPKU Kelapa Gading during 2021 is in the Medium category (81% and 82% respectively) withcritical parameter PM2.5 (Table 3.6.).Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

1) West elevated segment

The number and frequency of transport trucks for work on the ground is 1 vehicle/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.89. Ground Surface Occupational Emission Loads in the West Elevated Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 7{,}07.10^{-7}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
NO2	9.21	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 1{,}02.10^{-6}$	
CO	36.42	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 4{,}05.10^{-6}$	
Particulates (PM10)	2.01	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 2{,}23.10^{-7}$	
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 6{,}18.10^{-6}$	
NO2	9.21	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 8{,}95.10^{-6}$	
CO	36.42	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 3{,}54.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 1{,}95.10^{-6}$	
Total Emission Burden			
SO2		6,89.10-6	

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
NO2		9,98.10-6	
CO		3,95.10-5	
SO2		2,18.10-6	

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.90. Concentration of Emissions from Ground Work on the West Elevated Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	6,89.10-6	$C = \frac{2x6{,}89.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}12 \mu g/m^3$
NO2	9,98.10-6	$C = \frac{2x9{,}98.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}17 \mu g/m^3$
CO	3,95.10-5	$C = \frac{2x3{,}95.10^{-5}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}69 \mu g/m^3$
Particulates (PM10)	2,18.10-6	$C = \frac{2x2{,}18.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}04 \mu g/m^3$

2) East elevated segment

The number and frequency of transport trucks for earthworks and dewatering is 2 vehicles/hour. Apart from that, there are other heavy equipment/vehicles which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.91. Ground Surface Occupational Emission Loads in the East Elevated Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{2\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ 6{,}36 gr/L$ $Q = 1{,}41.10^{-6}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007)
NO2	9.21	$Q = \frac{2\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ 9{,}21 gr/L$ $Q = 2{,}05.10^{-6}$	
CO	36.42	$Q = \frac{2\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ 36{,}42 gr/L$ $Q = 8{,}09.10^{-6}$	Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Particulates (PM10)	2.01	$Q = \frac{2\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4 L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 4{,}47.10^{-7}$	Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5 L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 6{,}18.10^{-6}$	
NO2	9.21	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5 L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 8{,}95.10^{-6}$	
CO	36.42	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5 L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 3{,}54.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{3{,}5 L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 1{,}95.10^{-6}$	
Total Emission Burden			
SO2	7,60.10-6		
NO2	1,10.10-5		
CO	4,35.10-5		
SO2	2,40.10-6		

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.92. Concentration of Emissions from Ground Work on the East Elevated Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	7,60.10-6	$C = \frac{2x7{,}60.10^{-6}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}13 \mu g/m^3$
NO2	1,10.10-5	$C = \frac{2x1{,}10.10^{-5}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}19 \mu g/m^3$
CO	4,35.10-5	$C = \frac{2x4{,}35.10^{-5}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}76 \mu g/m^3$
Particulates (PM10)	2,40.10-6	$C = \frac{2x2{,}40.10^{-6}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}04 \mu g/m^3$

3) Deposit Segment

The number and frequency of transport trucks for work on the ground is 1 vehicle/hour. Apart from that, there are other heavy equipment/vehicles

which also have the potential to have an impact on air quality of up to 1 vehicle/hour. So the emission load is calculated as follows:

Table 6.93. Ground Surface Work Emission Loads in the Depot Segment

Parameter	Emission Factors (gr/L)	Emission Load (gr/sec.m)	Information
Transport Vehicle Emission Load			
SO2	6.36	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 7{,}07.10^{-7}$	Calculations using the equation: **Q = nkFE** Information : Q = burdenemissions (gr/sec.m) n = number of vehicles (units) k = fuel consumption (liters/km) F.E = Emission factor * (gr/liter) *) Blue Sky Program (KLHK, 2007) Fuel Consumption* (litres/km) DumpTruck = 0.4 Backhoes = 0.6 WheelLoaders = 0.5 Bulldozer = 0.5 CrawlersCranes = 0.6 *) BPPT in Jinca et al. (2009)
NO2	9.21	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 1{,}02.10^{-6}$	
CO	36.42	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 4{,}05.10^{-6}$	
Particulates (PM10)	2.01	$Q = \frac{1\ unit/\ jam}{3600 dt/\ jam} x \frac{0{,}4L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 2{,}23.10^{-7}$	
Emission Loads of Heavy Equipment and Other Vehicles			
SO2	6.36	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{4{,}6L/km}{1000 m/km} x\ \ 6{,}36 gr/L$ $Q = 8{,}13.10^{-6}$	
NO2	9.21	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{4{,}6L/km}{1000 m/km} x\ \ 9{,}21 gr/L$ $Q = 1{,}18.10^{-5}$	
CO	36.42	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{4{,}6L/km}{1000 m/km} x\ \ 36{,}42 gr/L$ $Q = 4{,}65.10^{-5}$	
Particulates (PM10)	2.01	$Q = \frac{1 unit/\ jam}{3600 dt/\ jam} x \frac{4{,}6L/km}{1000 m/km} x\ \ 2{,}01 gr/L$ $Q = 2{,}57.10^{-6}$	
Total Emission Burden			
SO2	8,83.10-6		
NO2	1,28.10-5		
CO	5,06.10-5		
SO2	2,79.10-6		

Based on the emission load calculation, the emission concentration of each pollutant can be determined as follows:

Table 6.94.. Concentration of Emissions from Ground Work in the Depot Segment

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
SO2	8,83.10-6	$C = \frac{2x8{,}83.10^{-6}}{\sqrt{2x3{,}14}x28{,}66x1{,}6} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ \ 0{,}9998$ $C = 0{,}15 \mu g/m^3$

Parameter	Emission Load (gr/sec.m)	Emission Concentration (µg/m3)
NO2	1,28.10-5	$C = \frac{2x1{,}28.10^{-5}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}22 \mu g/m^3$
CO	5,06.10-5	$C = \frac{2x5{,}06.10^{-5}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}88 \mu g/m^3$
Particulates (PM10)	2,79.10-6	$C = \frac{2x2{,}79.10^{-6}}{\sqrt{2x3{,}14x28{,}66x1{,}6}} x \exp\left[-0{,}5\left(\frac{1{,}5}{28{,}66}\right)^2\right] x\ 0{,}9998$ $C = 0{,}05 \mu g/m^3$

Table 6.95. Air Quality Forecasts and ISPU Figures for Ground Work

Location	Concentration				ISPU figures				ISPU		
	PM10	CO	SO2	NO2	PM10	SO2	CO	NO2	MAX	Category	Critical
Segment*Elevated*West											
Jl. S. Parman	13.04	4,540.69	44.12	38.17	13.04	42.42	56.76	23.86	56.76	Currently	CO
Segment*Elevated*East											
Jl. Lieutenant General Suprapto	12.04	4,842.76	48.13	41.19	12.04	46.28	60.53	25.74	60.53	Currently	CO
Jl. Pioneers of Independence	22.04	4,903.76	50.13	42.19	22.04	48.20	61.30	26.37	61.30	Currently	CO
Jl. Raya Bekasi	32.04	4,720.76	46.13	40.19	32.04	44.36	59.01	25.12	59.01	Currently	CO
Jl. Raya Bekasi	40.04	4,640.76	45.13	39.19	40.04	43.39	58.01	24.49	58.01	Currently	CO
Jl. Raya Bekasi	18.04	4,582.76	44.13	38.19	18.04	42.43	57.28	23.87	57.28	Currently	CO
Jl. Kali Abang Tengah	23.04	4,239.76	38.13	34.19	23.04	36.66	53.00	21.37	53.00	Currently	CO
SegmentDepot											
Jl. BKT inspection	34.05	4,296.88	39.15	35.22	34.05	37.64	53.71	22.01	53.71	Currently	CO

- **The magnitude of the impact**

  The magnitude of the impact of changes in air quality on work at ground level is presented in Table 6.96..

Table 6.96. Magnitude of the Impact of Changes in Air Quality on Work at Ground Level

Location	ISPU Without Project		ISPU With Projects		Impact Magnitude
	MAX	Category	MAX	Category	
Segment*Elevated*West					
Jl. S. Parman (Tomang Station)	56.75	Currently	56.76	Currently	0.01
Segment*Elevated*East					
Jl. Lt. Gen. Suprapto (Sta Sumur Batu)	60.53	Currently	60.53	Currently	0.00
Jl. Pioneers of Independence (East Pakulonan Sta.)	61.29	Currently	61.30	Currently	0.01
Jl. Raya Bekasi (Sta Pulo Gadung)	59.00	Currently	59.01	Currently	0.01
Jl. Raya Bekasi (West Cakung Station)	58.00	Currently	58.01	Currently	0.01
Jl. Raya Bekasi (Ujung Menteng Station)	57.28	Currently	57.28	Currently	0.00
Jl. Kali Abang Tengah (Medan Satria Sta.)	52.99	Currently	53.00	Currently	0.01

SegmentDepot					
Jl. BKT Inspection (Rorotan Depot)	53.70	Currently	53.71	Currently	0.01

- **Important Nature of Impact**

Table 6.97. Significance of the Impact of Ground-Level Work on Air Quality

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people who will be affected, especially people who live around the project location and along the route/access road used by project trucks as many as 384 families (1,536 people) residents in 33 sub-districts live along the MRT East – West Line Phase1 Stage1 route.
2	The area of impact distribution		T.P	The impact that occurs is not extensive, it is only relocated around the project site and along the route/access road used by the project trucks and the increase in emission levels that appears spreads to a distance of 200 meters from the source of the impact around the route/access road, but will be assimilated by the environment. around the project site
3	The intensity and duration of the impact		T.P	The intensity of the impact will occur every time the work equipment is in operation and when a Dump truck passes by carrying leftover materials which will cause additional emissions (SO2 = 0.044 µg/m3, NO2 = 0.064 µg/m3, CO = 0.225 µg/m3 and Particulates = 0.014 µg/m3), but the impact is temporary
4	Many other environmental components are affected	P		Other components affected are the social component and public health
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal in timework activity has ended.
6	Reversal or non-reversal of impact		T.P	This impact occurs only temporarily and will return shortly after the heavy equipment/source machines are turned off, therefore the criteria are not important
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**2**	**5**	**Not Important (TP)**

C. Increased noise

- **Initial environmental conditions**

  The results of noise level measurements at 12 locations in the study area were recorded in the range of 66 dB(A) – 73 dB(A) (Table 3.10.), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48 /MENLH/1996 concerning Noise Level Standards, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)].

- **Future environmental conditions without the project**

  Forecasts of noise levels in future environmental conditions without the project are carried out by comparing initial environmental conditions with

data measured in previous studies (Table 3.9.) in each segment of the MRT-EWLP1S1 Development.

The results of noise level measurements at 13 locations in the study area were recorded in the range of 51 dB(A) – 81 dB(A), so that when compared with the provisions of environmental quality standards as required in the Decree of the Minister of the Environment Number Kep-48/MENLH/1996 concerning Standard Noise Level, can be concludedhas exceeded the Noise Level Standards for each area/environment designationhousing and settlements [55 dB(A)], offices and commerce [65 dB(A)] as well as trade and services/recreation/industry [70 dB(A)]. Thus, the changes that occurred in the results of previous studies were not significant enough or the same as the initial environmental baseline conditions.

- **Environmental conditions that will come with the project**

1) West elevated segment

Operation of heavy equipment and other construction equipment during work on the ground will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.98. Noise LevelGround Work on the West Elevated Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	4	98
2	*Dump trucks*	4	64.6
3	*Unik Truck*	5	64.6
4	*Truck cranes*	2	64.6
5	*Tire rollers*	1	101
6	*Asphalt finisher*	1	101
7	*Concrete pump truck*	1	82

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {4.10 98/10+4.10 64.6/10+5.10 64.6/1 +2.1064.6/10 +1.10101/10 +1.10101/10 + 1.10 82/10 }
= 107.04 dB(A)

and the noise level generated is as presented in Table 6.99. and Figure 6.8..

Table 6.99. Noise Levels for Specific Distances of Work at Ground Level on the West Elevated Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	107.04	Does not meet quality standards	Calculations using the equation: **$L2 = L_1 + 10 \log r2/r1$** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters)
30	101.02		
45	97.50		
60	95.00		
75	93.06		
90	91.48		

105	90.14
120	88.98
135	87.96
150	87.04
165	86.21
180	85.46
195	84.76
210	84.12
225	83.52

Quality Standards (KEP-48/MENLH/11/1996):
4) Housing and Residential [55 dB(A)]
5) Office and Commerce [65 dB(A)]
6) Trade and Services/Industry [70 dB(A)]

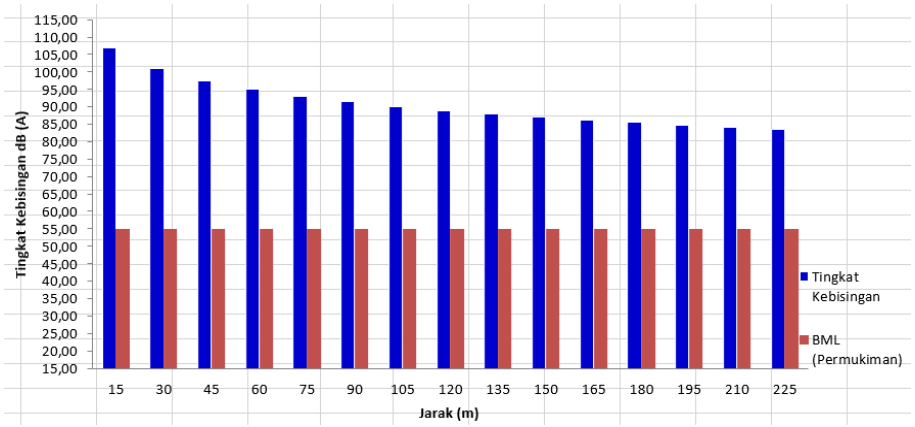


Figure 6.8. Noise Levels for Specific Distances of Work at Ground Level on the West Elevated Segment

2) East Elevated Segment

Operation of heavy equipment and other construction equipment during work on the ground will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.100. Noise Level Ground Work on the East Elevated Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	4	98
2	*Dump trucks*	51	64.6
3	*Unik Truck*	23	64.6
4	*Truck cranes*	23	64.6
5	*Tire rollers*	11	101
6	*Asphalt finisher*	6	101
7	*Concrete Pump Truck*	1	82

The accumulated noise levels from heavy equipment operations and construction tools used are:

LT = 10 log {4.10 98/10 + 51.10 64.6/10 + 23.10 64.6/10 + 23.10 64.6/10 + 11.10 101/10 + 6.10 101/10 + 1.10 82/10 }
= 113.80 dB(A)

and the noise levels generated are as presented in Table 6.101. and Figure 6.9..

Table 6.101. Noise Levels for Specific Distances of Work at Ground Level on the West Elevated Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	113.80		
30	107.78		Calculations using the equation: **$L2 = L_1 + 10 \log r2/r1$** Information : L1 = Noise level at source (dBA) L2 = Noise level at distance r2 from source (dBA) r1 = constant (1 meter) r2 = distance from noise source (meters)
45	104.26		
60	101.76		
75	99.82		
90	98.24		
105	96.90	Does not meet quality standards	Quality Standards (KEP-48/MENLH/11/1996): 1) Housing and Residential [55 dB(A)] 2) Office and Commerce [65 dB(A)] 3) Trade and Services/Industry [70 dB(A)]
120	95.74		
135	94.72		
150	93.80		
165	92.97		
180	92.22		
195	91.52		
210	90.88		
225	90.28		

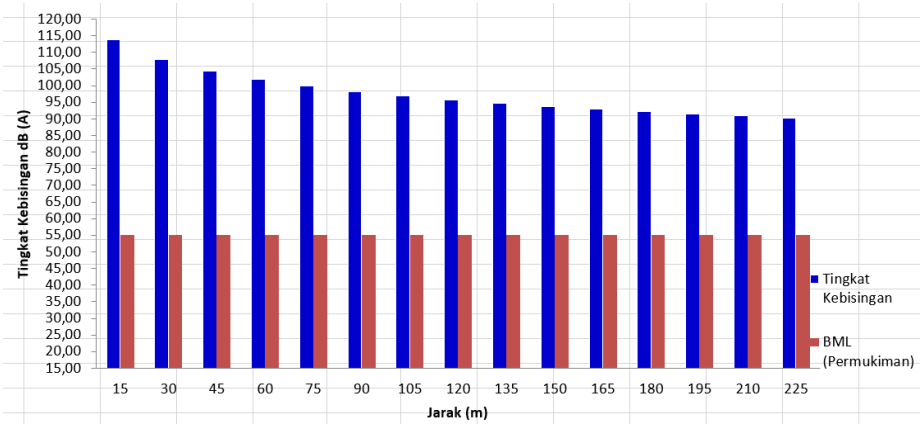


Figure 6.9. Noise Levels for Certain Distances of Work at Ground Level in the East Elevated Segment

3) Deposit Segment

Operation of heavy equipment and other construction equipment during work on the ground will result in increased noise around the activity site. Based on planning,noise level from operationsheavy equipment and construction toolsused (at a distance of 15 m) can be calculated as follows:

Table 6.102. Noise LevelGround Surface Work in the Depot Segment

No	Equipment Type	Amount (units)	Noise Source [dB(A)]
1	*Backhoes*	4	98
2	*Dump trucks*	20	64.6
3	*Unik truck*	5	64.6
4	*Truck Cranes*	5	64.6

5	*Wheel loaders*	7	104
6	*Concrete mixer truck*	10	85
7	*Concrete pump truck*	1	82
8	*Tire rollers*	10	101
9	*Asphalt finisher*	3	101

The accumulated noise levels from heavy equipment operations and construction tools used are:

L1 = 10 log {4.10 98/10 + 20.10 64.6/10 + 5.10 64.6/10 + 5.10 64.6/10 + 7.10 104/10 + 10.10 85/10 + 1.10 82/10 + 10.10 101/10 + 3.10 101/10 }
= 115.66 dB(A)

and the noise levels generated are as presented in Table 6.103. and Figure 6.10..

Table 6.103. Noise Level for Certain Distances of Work at Ground Level in the Depot Segment

Distance r2 (meters)	Noise Level L2 (db(A))	Conclusion	Information
15	115.66		
30	109.64		
45	106.12		Calculations using the equation: **L2 = L_1+10 log r2/r1** Information : L1 = Noise level at source (dBA)
60	103.62		
75	101.68		
90	100.10		
105	98.76	Does not meet quality standards	
120	97.60		
135	96.58		
150	95.66		
165	94.83		
180	94.08		
195	93.38		
210	92.74		
225	92.14		

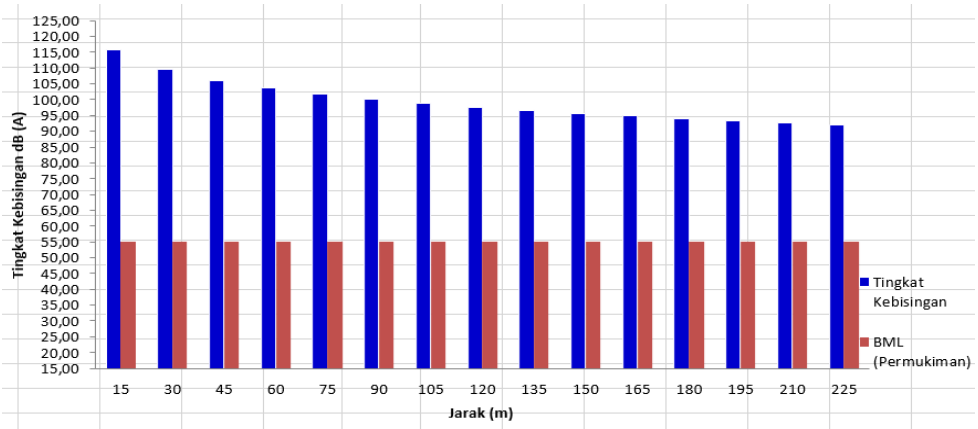


Figure 6.10. Noise Level for Certain Distances of Work at Ground Level in the Depot Segment

Table 6.104. Magnitude of the Impact of Changes in Noise Levels on Earthworks and Dewatering

Segment/Path	Noise Level (db(A))			Impact Magnitude	Information
	L1 (RLA)	L2 (105m)	L		
West Elevated Segment					
Jl. S. Parman (Sta. Tomang)	72	90.14	90.21	18.21	Combining the 2 noise level components with the equation: **L = 10 log [Σ Antilog (Ln/10)]** Information : L = Combined noise level (dBA) Ln = Nth noise level (dBA) n = lots of noisy components (Traffic Noise Prediction Guidelines, PU, 2004)
East Elevated Segment					
Jl. Lieutenant General Suprapto (Stone Well Station)	70	96.90	96.91	26.91	
Jl. Pioneers of Independence (East Pakulonan Sta.)	72	96.90	96.91	24.91	
Jl. Raya Bekasi (St Pulo Gadung)	70	96.90	96.91	26.91	
Jl. Raya Bekasi (West Cakung Sta)	72	96.90	96.91	24.91	
Jl. Raya Bekasi (Ujung Menteng Station)	70	96.90	96.91	26.91	
Jl. Kali Abang Tengah (Medan Satria Sta.)	66	96.90	96.90	30.90	
Deposit Segment					
Jl. BKT inspection (Rorotan Depot)	69	98.76	98.76	29.76	

- **Important Nature of Impact**

Table 6.105. Significance of the Impact of Ground Surface Construction on Noise Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		Many people will be affected, especially residents who live nearby and own itthe residence is less than 100 m from the project site as many as 4 families (16 people),However, the impact of the noise does not affect residential areas so it does not really disturb the comfort of residentsbecause the depot work location is still dominated by the arearice fieldsand moors and not far from the East Canal drainage area so it is an unspoiled area, so in this case the noise level conditions are not much different from the initial environmental conditions. Otherefore this criterion is not important.
2	The area of impact distribution		T.P	The impact that occurred was not extensive, only relocatedaround the project siteand the noise level that appears is 115.66 dB(A) spreading up to a distance of 15 meters from the noise source around the project site to a radius of 100 meters
3	The intensity and duration of the impact	P		Intensity occurs every day when activities take place and the impact contribution exceeds the specified quality standard threshold (55 dBA). Noise levels in residential areas can reach up to115.66 dB(A); The duration of the impact is temporary only during construction work on the ground surface
4	Many other environmental components are affected	P		Other components affected are the social component and public health

No	Criteria	Interest		Information
		P	T.P	
5	Cumulative nature of impact		T.P	This impact is not accumulative, conditions will return to normal in timework activity has ended.
6	Reversal or non-reversal of impact		T.P	This impact occurs only temporarily and will return shortly after the heavy equipment/source machines are turned off, therefore the criteria are not important
7	Other criteria are in accordance with developments in science and technology		T.P	There isn't anyother criteria in accordance with developments in science and technology
	Amount	**3**	**4**	**Important**

D. Increased prevalence of ARI

- **Initial environmental conditions**

  Based on the results of interviews with 384 affected families at the activity locations, it is known that the types of illnesses suffered in the last 3 months in each segment are as presented in Table 6.29.

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. Referring to Table 6.29, it is known that the prevalence of ARI disease for future environmental conditions without the project in the elevated segment is 4.76% and in the depot segment is 22.22%.

- **Environmental conditions that will come with the project**

  Forecasting environmental conditions that will come with the project in the ARI disease prevalence component is carried out using an approach to the potential for dust exposure, especially during construction work. The contribution of pollutants (dust) from construction work to changes in air quality at activity locations, as presented in Table 6.30.

  Health risks are determined using the Dose Response Relationship method (Ostro, 1994), as follows:

  1) Elevated Segment
     dHi = bi X POPidA
     = 0.057587(511 people + 2,900 people workers) X 40.066 µg/m3
     = 7,870 people

     When compared with the total population in 17 sub-districts in the elevated segment locations (714,534 people), the percentage of affected population is 1.10% (total 6.05%).

  2) Deposit Segment
     dHi = bi X POPidA
     = 0.057587(36 people + 790 people workers) X 60.066 µg/m3
     = 2,857 people

     When compared with the total population in the 3 sub-districts in the depot segment (167,198 people), the percentage of affected population is 1.71% (total 6.66%).

- **The magnitude of the impact**

  RLA = prevalence of ARI disease 4.95%
  No Project = the same as RLA
  prevalence of ARI disease 4.95%
  With Projects = 1) elevated segment 6.05%
  2)deposit segment 6.66%
  The magnitude of the impact = With Project – Without Project
  1) elevated segment
  = 6.05% - 4.95%
  = 1.10%
  2) depot segment
  = 6.66% - 4.95%
  = 1.71%

  The impact of increasing dust levels in the air (decreasing air quality) on ground-level construction work causes secondary impacts in the form of increasing the prevalence of ARI diseases.

- **Important Nature of Impact**

Table 6.106. Important Characteristics of the Impact of Construction Work on the Ground Surface on the Prevalence of ISPA

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people potentially affected is 10,727 people, especially people whose residences are less than 100 m along the elevated and depot routes.
2	The area of impact distribution	P		The area of distribution of the impact follows the area of distribution of the impact of air pollution to which humans are receptors, namely 0.2 km x the length of the elevated route and depot.
3	The intensity and duration of the impact		T.P	High impact intensity occurs in residents who live at a distance of less than 100 meters, while for residents who live at a distance of 100 - 200 m the intensity is moderate and for more than 200 m left and right of the road the intensity is low. Judging from the length of time the impact lasts, the duration of the impact is during construction work on the ground surface.
4	Many other environmental components are affected	P		There are other environmental components that are affected, namely changes in people's attitudes and perceptions in positive and/or negative directions which are influenced by the number of people suffering from health problems (number of ISPA cases).
5	Cumulative nature of impact	P		As described in the estimated impact size, the causes of respiratory infections are influenced by many factors, air pollution can be a predisposing factor for the occurrence of ISPA along with other trigger factors. Judging from the cumulative nature of the impact of dust particles with a size of 2.5 microns that enter the respiratory tract in lung tissue, especially the alveoli, these particles will accumulate and ultimately reduce respiratory capacity and lead to pneumonia or pneumonia.

No	Criteria	Interest		Information
		P	T.P	
6	Reversal or non-reversal of impact	P		Dust particles that are already in the alveoli are very difficult to excrete out of the body. By looking at this, the nature of the impact is categorized as irreversible.
7	Other criteria are in accordance with developments in science and technology		T.P	There are other criteria in accordance with developments in science and technology that are already available and easy to obtain. The science and technology criteria that can be used to overcome this impact are managing it through a technical approach and a social approach.
	Amount	**5**	**2**	**Important (P1)**

6.3. Operational Stage

6.3.1. Acceptance of Operational Workers

A. Open job opportunities

- **Initial environmental conditions**

  Based on data from observations and interviews with 384 affected families at activity locations (Table 3.36), it is known that the majority of respondents (90.10%) are working, while the remaining 9.90% are not/are not working. This condition shows that job opportunities at the activity location are quite good.

- **Future environmental conditions without the project**

  Forecasting employment opportunities in future environmental conditions without the project is carried out using a secondary data approach related to the number of forces

  work in 5 cities at the MRT East – West Line construction site as presented in**Table 6.2. .**.

  Based on the number of unemployed from this data, it can be concluded that the environmental quality conditions that will come without the project for the employment opportunity component (seen from the percentage of the number of people who have not/don't work) will be 9.68% or in the range of <10%. This condition shows that job opportunities at the activity location are quite good.

- **Environmental conditions that will come with the project**

  The operation of the MRT East – West Line is estimated to involve at least 940 workers with a minimum of 20% (188 people) involving local workers (residents affected by land acquisition and environmental disturbances who meet skill qualification requirements). If all of these job opportunities can be filled by local workers from 33 sub-districts in the study area, it can be said that new job opportunities from the project can reduce the number of unemployed in the study area by ± 0.03%. So the percentage of unemployment rate in the study area with the project is in the range of 9.65% (<10%).

- **The magnitude of the impact**

  RLA = 90.10% working,9.90% have not/don't work

No Project = 90.32% working,9.68% have not/don't work
With Projects = 90.35%working, 9.65% have not/don't work
The magnitude of the impact = With Project – Without Project

1) Labor force participation rate
   = 90.35%Work -90.32% working
   = +0.03%Work
2) Unemployment rate
   = 9.65% not yet/not working - 9.68% not yet/not working
   = - 0.03%not yet/not working

It is estimated that the recruitment of operational workers for the MRT East – West Line will open up employment opportunities (with a positive impact) for 188 local workers, especially for residents affected by land acquisition and environmental disturbances who meet the skill qualification requirements. If all these job opportunities can be filled by local workers from 33 sub-districts in the study area, it will increase the labor force participation rate by 0.03% and will directly reduce the unemployment rate by 0.03%.

- **Important Nature of Impact**

Table 6.107. Important Characteristics of the Impact of Hiring Operational Workers on the Opening of Job Opportunities

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 188 people (if the MRT management recruits local workers according to the plan in the activity description) from 33 sub-districts in the study area. Meanwhile, outside the study boundary area, the total number of people who will be positively impacted by this construction workforce recruitment activity is 752 people.
2	The area of impact distribution	P		The area of impact distribution for the recruitment of local workers (188 people) covers 31 sub-districts in the study area. Meanwhile, for workers outside the study area (752 people), the impact could spread even more widely to sub-districts outside the study area, even sub-districts outside the study area, to outside the City of Bekasi, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		quite high intensity and for a relatively long time (during MRT operations).
4	Many other environmental components are affected	P		Other environmental components that are affected are changes in income levels (secondary impacts) and changes in people's perceptions and attitudes (tertiary impacts).
5	Cumulative nature of impact	P		impacts are cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed, in the sense that during MRT operations there will be a release of workers (termination/end of contract) and this will return to conditions that are relatively not much different from the initial baseline.
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology

No	Criteria	Interest		Information
		P	T.P	
	Amount	**5**	**2**	**Important (P1)**

B. Increase in Family Income

- **Initial environmental conditions**

  Based on the results of interviews with 384 affected families at the activity location, it is known that the average family income at the MRT East – West Line construction site is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month (Table 3.39.). When compared with West Java Governor's Decree No. 561.7/Kep.776-Kesra/2022 concerning Determination of the Regency/City Minimum Wage for 2023 (for Bekasi City) of IDR. 5,158,248.20 and DKI Jakarta Governor Decree No. 1153 of 2022 concerning Determination of the Minimum Wage in DKI Province in 2023 of IDR. 4,901,798.00, it can be seen that the average family income at the MRT East – West Line construction site is 0.47% higher than the UMK of Bekasi City and 5.73% of the UMP of DKI Jakarta.

- **Future environmental conditions without the project**

  Estimates of family income levels in future environmental conditions without the project were carried out using a secondary data approach related to community income levels in the 5 cities at the MRT East – West Line construction site as measured by the household expenditure data approach (BPS, 2022) as presented in Table 3.35 .. Referring to this data, it is known that the average expenditure is Rp. 2,320,813/month with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387).

- **Environmental conditions that will come with the project**

  The recruitment of operational workers for the MRT East – West Line is estimated to have an impact on opening up job opportunities for 188 local workers and 752 workers from outside the study area. The opening of job opportunities will have a secondary impact in the form of increasing family income. With plans to regulate work systems, wages and insurance (BPJS Employment and BPJS Health), operational workers are agreed in writing in a Work Agreement for a Certain Time (PKWTT) as permanent workers, or in a Work Agreement for a Certain Time (PKWT) as temporary workers in accordance with the provisions in force, it can be estimated that the income that will be obtained by operational workers will be at least the same as the initial environmental conditions (Rp. 5,182,649/month).

- **The magnitude of the impact**

  RLA = average income Rp. 5,182,649/month
  No Project = income based on average expenditure of Rp. 2,320,813/month
  With Projects = Minimum income Rp. 5,182,649/month

The magnitude of the impact = With Project – Without Project
= Rp. 5,182,649/$_{month}$- Rp. 2,320,813/month
= Rp. 2,861,836/month (increased 55.22%)

The impact of opening job opportunities will have a derivative (secondary) impact in the form of increasing family income (positive impact) for 188 local workers and 752 workers from outside the study area amounting to IDR. 2,861,836/month (increased 55.22%).

- **Important Nature of Impact**

Table 6.108. Important Characteristics of the Impact of Acceptance of Operational Labor on Increasing Family Income

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 188 people (if the MRT management recruits local workers according to the plan in the activity description) from 33 sub-districts in the study area. Meanwhile, outside the study boundary area, the total number of people who will be positively impacted by this construction workforce recruitment activity is 752 people.
2	The area of impact distribution	P		The area of impact distribution for the recruitment of local workers (188 people) covers 31 sub-districts in the study area. Meanwhile, for workers outside the study area (752 people), the impact could spread even more widely to sub-districts outside the study area, even sub-districts outside the study area, to outside the City of Bekasi, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		quite high intensity and for a relatively long time (during MRT operations).
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening of job opportunities (primary impact) and changes in community perceptions and attitudes (tertiary impact).
5	Cumulative nature of impact	P		impacts are cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed, in the sense that during MRT operations there will be a release of workers (termination/end of contract) and this will return to conditions that are relatively not much different from the initial baseline.
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

C. Attitudes Changes and Public Perception

- **Initial environmental conditions**

Based onThe results of community involvement in public consultation activities (3 - 4 February 2022) show that in general the community in the study area supports the MRT East - West Line development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at

the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT East - West Line development plan (Table 3.44). Apart from that, there are 242 families (63.02%) who hope to get employment opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT East – West Line construction project.

However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT East - West Line development plan. For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. So in general the people in the study area strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Apart from that, there are 242 families (63.02%) who hope to get work opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT-EWLP1S1 construction project.

- **Environmental conditions that will come with the project**

  Based on the positive impact on operational workforce recruitment activities (especially the impact of opening up job opportunities and increasing family income levels) if managed well, it is predicted that it will increase the community's positive attitudes and perceptions towardsMRT East – West Line construction project. In addition, with the results of interviews with 384 affected families at the activity location, it was found that 242 families (63.02%) had hopes of getting work opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT East project. – West Line.By accommodating optimallyresidents' hopes of getting employment opportunities and maximizing the positive impacts that arise, then dIt is estimated that the percentage of people who agree to this activity could reach 95%, from the previous 342 families to 365 families. Thus it can be concluded that the environmental quality conditions that will come with the project for the components of community attitudes and perceptions are included in the positive impact.

- **The magnitude of the impact**

  RLA = 342 families (89.07%) said they agreed/supported it
  No Project = the same as RLA

342 families (89.07%) said they agreed/supported it
With Projects = 365 families (95%)who expressed agreement/support
The magnitude of the impact = With Project – Without Project
= 365 families -342 families
= 23 families
≈ +5.93%from existing conditions

The impact of opening job opportunities and increasing family income for 188 local workers and 752 workers from outside the study area will have a derivative (tertiary) impact in the form of changes in attitudes and perceptions of the communitythat is positive or supports the planconstruction of the MRT East – West Line to 95% (initial environmental baseline condition of 89.07%).

- **Important Nature of Impact**

Table 6.109. Important Characteristics of the Impact of Hiring Operational Workers on Changes in Community Attitudes and Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 188 people (if the MRT management recruits local workers according to the plan in the activity description) from 33 sub-districts in the study area. Meanwhile, outside the study boundary area, the total number of people who will be positively impacted by this construction workforce recruitment activity is 752 people.
2	The area of impact distribution	P		The area of impact distribution for the recruitment of local workers (188 people) covers 31 sub-districts in the study area. Meanwhile, for workers outside the study area (752 people), the impact could spread even more widely to sub-districts outside the study area, even sub-districts outside the study area, to outside the City of Bekasi, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		quite high intensity and for a relatively long time (during MRT operations).
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening of employment opportunities (primary impact) and increasing family income (secondary impact).
5	Cumulative nature of impact	P		impacts are cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed, in the sense that during MRT operations there will be a release of workers (termination/end of contract) and this will return people's attitudes and perceptions to a condition that is relatively not much different from the initial level before the project.
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology
	Amount	**5**	**2**	**Important (P1)**

6.3.2. Passenger Transportation and Station Operations

A. Increased noise

- **Initial environmental conditions**

  By paying attention to the data from noise level measurements (Table 3.10), it is known thatNoise levels in the study area have exceeded the Standard Noise Levels (Decree of the Minister of the Environment No. 48/MENLH/11/1996) for residential areas/neighborhoods with an average noise level value in the elevated segment of 70.33 dBA and in the underground segment of 70.60 dBA.

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to be the same as the initial environmental baseline conditions, so it can be determined thatNoise levels in the study area have exceeded the Standard Noise Levels (Decree of the Minister of Environment No. 48/MENLH/11/1996) for residential areas/neighborhoods. This is supported by the results of previous studies (Table 3.9) which show that the noise level in the study area has exceeded the Standard Noise Level for residential areas/neighborhoods, trade and services, and government, with an average noise level value in the elevated segment of 74. 5 dBA and in the underground segment it is 68.3 dBA.

- **Environmental conditions that will come with the project**

1) Elevated Segment

   The increase in noise due to the operation of the MRT East – West Line on the elevated segment is caused by the sound that comes from train movements. Determination of the noise level in the elevated segment (including the transition zone) is carried out by referring to the "Draft Proposal of the Prediction of Noise from Elevated Railway" (K. Ishii, M. Koyasu, Y. Cho and H. Koba, 1980) which is a prediction method most common for noise by elevated railway tracks in Japan.

   Referring to the land use conditions along the planned MRT East – West Line route which consists of sensitive buildings (educational buildings, office buildings, places of worship, health facilities etc.), commercial buildings and industrial areas, there are more than 100 sensitive buildings and a minimum of 1 office buildings between each elevated station were selected as target recipients of the impact in calculating the increase in noise due to train movements on the elevated line, as presented in**Figure 6.11.**up to**Figure 6.15.**And**Table 6.110.**up to**Table 6.114..**

2) Underground Segment

   Based on an analogous study with reference to noise data on MRTJ Lebak Bulus - Bundaran HI operations, the noise level of train operations on the MRT East – West Line underground segment is almost zero and it is estimated that the noise level is the same as noise from pure traffic.

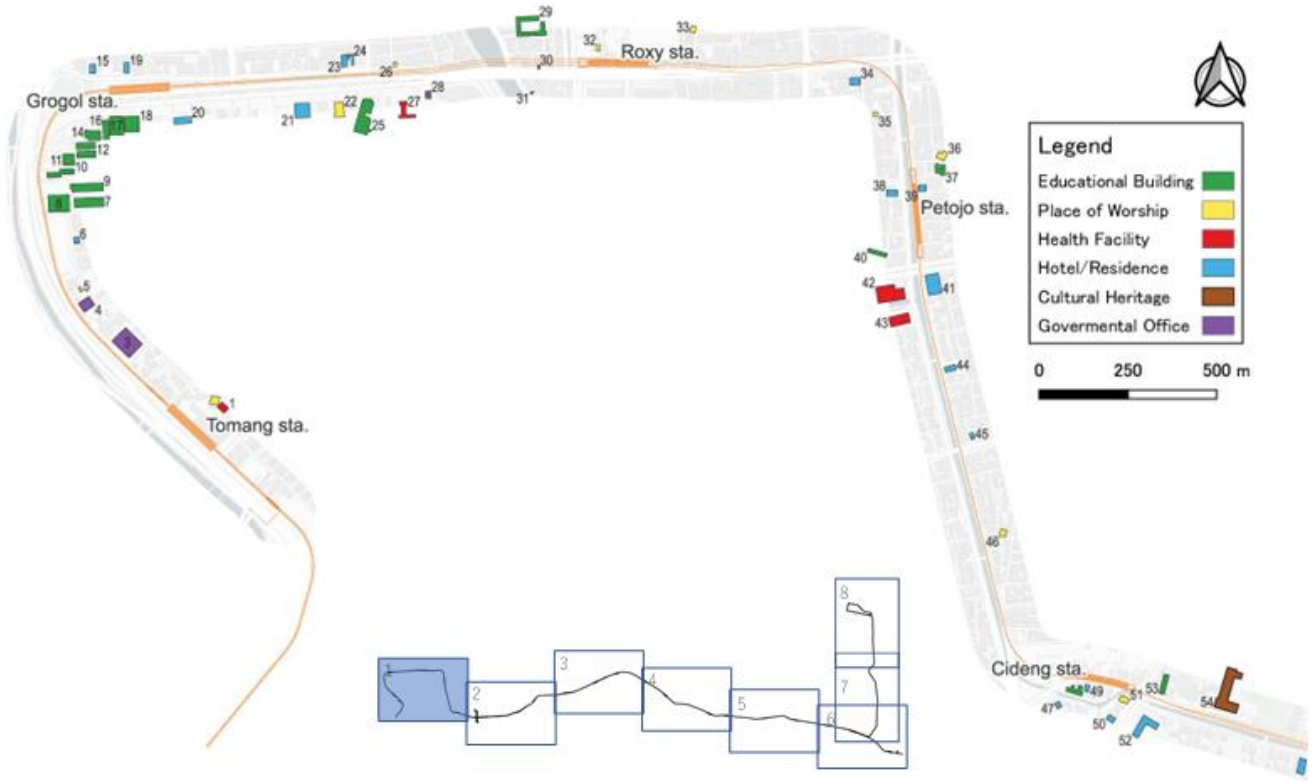


Figure 6.11. Evaluation Point for Noise and Vibration Levels Due to Train Movement

(Tomang Station – Cideng Station)

Table 6.110. Elevated Segment Noise Level Sta. Tomang – Sta. Roxy (projected year 2029)

Target buildings		Location		Structure Type	Forecast 2029 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
1	Health Facility (Hospital)	39K100	Tomang - Grogol	Elevated	47.2	40.8	60	55	OK	OK
2	Place of Worship (Mosque)	39K120		Elevated	46.6	40.2	60	55	OK	OK
3	Office (Govermental Office)	39K403		Elevated	49.7	43.3	65	60	OK	OK
4	Office (Govermental Office)	39K617		Elevated	54.9	48.5	65	60	OK	OK
5	Place of Worship (Mosque)	39K657		Elevated	48.3	41.9	60	55	OK	OK
6	Office (Govermental Office)	39K800		Elevated	47.6	41.2	65	60	OK	OK
7	Educational Building (University)	39K895		Elevated	52.6	46.2	60	55	OK	OK
8	Educational Building (University)	39K896		Elevated	58.0	51.6	60	55	OK	OK
9	Educational Building (University)	39K948		Elevated	49.4	42.9	60	55	OK	OK
10	Educational Building (University)	40K011		Elevated	48.8	42.4	60	55	OK	OK
11	Educational Building (University)	40K078		Elevated	52.2	45.8	60	55	OK	OK
12	Educational Building (University)	40K095		Elevated	44.6	38.2	60	55	OK	OK
13	Educational Building (University)	40K122		Elevated	46.1	39.7	60	55	OK	OK
14	Educational Building (University)	40K219		Elevated	47.2	40.8	60	55	OK	OK
15	Hotels/Residences	40K325		Elevated	51.6	45.2	60	55	OK	OK
16	Educational Building (University)	40K335		Elevated	47.5	41.1	60	55	OK	OK
17	Educational Building (University)	40K355		Elevated	50.3	43.8	60	55	OK	OK
18	Educational Building (University)	40K397		Elevated	54.7	48.3	60	55	OK	OK
19	Hotels/Residences	40K418		Elevated	57.3	50.9	60	55	OK	OK
20	Hotels/Residences	40K586	Grogol - Roxy	Elevated	55.3	48.9	60	55	OK	OK
21	Hotels/Residences	40K881		Transitions	54.8	48.4	60	55	OK	OK
22	Place of Worship (Church)	40K994		Transitions	46.5	40.1	60	55	OK	OK
23	Hotels/Residences	41K036		Transitions	59.0	52.6	60	55	OK	OK

Target buildings		Location		Structure Type	Forecast 2029 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
24	Hotels/Residences	41K054		Transitions	58.7	52.3	60	55	OK	OK
25	Educational Building (University)	41K084		Transitions	45.4	39.0	60	55	OK	OK
26	Place of Worship (Mosque)	41K176	Grogol - Roxy	Transitions	53.0	46.6	60	55	OK	OK
27	Health Facility (Hospital)	41K199		Transitions	39.5	33.0	65	60	OK	OK
28	Office (Govermental Office)	41K252		Transitions	42.0	35.6	65	60	OK	OK

Description: Day: 6:00-22:00, Night: 22:00-6:00
Source : JMCA, 2022

Table 6.111. Elevated Segment Noise Level Sta. Tomang – Sta. Roxy (projection year 2060)

Target buildings		Location		Structure Type	Forecast 2060 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
1	Health Facility (Hospital)	39K100		Elevated	51.4	45.0	60	55	OK	OK
2	Place of Worship (Mosque)	39K120		Elevated	50.8	44.4	60	55	OK	OK
3	Office (Govermental Office)	39K403		Elevated	53.9	47.5	65	60	OK	OK
4	Office (Govermental Office)	39K617		Elevated	59.1	52.7	65	60	OK	OK
5	Place of Worship (Mosque)	39K657		Elevated	52.4	46.1	60	55	OK	OK
6	Office (Govermental Office)	39K800		Elevated	51.8	45.4	65	60	OK	OK
7	Educational Building (University)	39K895		Elevated	56.8	50.4	60	55	OK	OK
8	Educational Building (University)	39K896		Elevated	62.1	55.8	60	55	+2.1	+0.8
9	Educational Building (University)	39K948		Elevated	53.5	47.1	60	55	OK	OK
10	Educational Building (University)	40K011	Tomang - Grogol	Elevated	53.0	46.6	60	55	OK	OK
11	Educational Building (University)	40K078		Elevated	56.4	50.0	60	55	OK	OK
12	Educational Building (University)	40K095		Elevated	48.8	42.4	60	55	OK	OK
13	Educational Building (University)	40K122		Elevated	50.3	43.9	60	55	OK	OK
14	Educational Building (University)	40K219		Elevated	51.3	44.9	60	55	OK	OK
15	Hotels/Residences	40K325		Elevated	55.8	49.4	60	55	OK	OK
16	Educational Building (University)	40K335		Elevated	51.7	45.3	60	55	OK	OK
17	Educational Building (University)	40K355		Elevated	54.4	48.0	60	55	OK	OK
18	Educational Building (University)	40K397		Elevated	58.8	52.5	60	55	OK	OK
19	Hotels/Residences	40K418		Elevated	61.4	55.0	60	55	+1.4	+0.0
20	Hotels/Residences	40K586		Elevated	59.5	53.1	60	55	OK	OK
21	Hotels/Residences	40K881		Transitions	59.0	52.6	60	55	OK	OK
22	Place of Worship (Church)	40K994		Transitions	50.7	44.3	60	55	OK	OK
23	Hotels/Residences	41K036		Transitions	63.2	56.8	60	55	+3.2	+1.8
24	Hotels/Residences	41K054	Grogol - Roxy	Transitions	62.8	56.5	60	55	+2.8	+1.5
25	Educational Building (University)	41K084		Transitions	49.6	43.2	60	55	OK	OK
26	Place of Worship (Mosque)	41K176		Transitions	57.2	50.8	60	55	OK	OK
27	Health Facility (Hospital)	41K199		Transitions	43.6	37.2	65	60	OK	OK
28	Office (Govermental Office)	41K252		Transitions	46.2	39.8	65	60	OK	OK

Description: Day: 6:00-22:00, Night: 22:00-6:00
Source : JMCA, 2022

Table 6.110.shows that the noise level of train operations on the elevated segment of the Sta. Tomang - Sta. Roxy in 2029, all building targets are in accordance with the target noise level at the operational stage. Meanwhile in Table 6.111. It is known that the noise level of train operations on the elevated segment of the Sta. Tomang - Sta. Roxy in 2060 towards the nearest education/university building (Sta. Tomang - Sta. Grogol) and residential buildings in the transition area (Sta. Grogol - Sta. Roxy) is estimated to be higher than the target noise level at the operation stage.

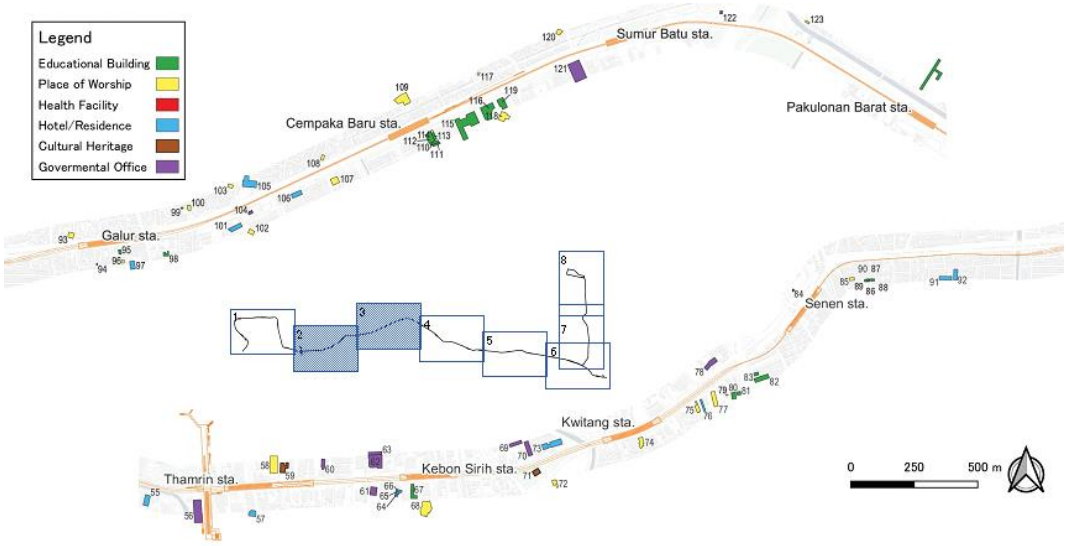


Figure 6.12. Evaluation Point for Noise and Vibration Levels Due to Train Movement
(Thamrin Station – West Pakulonan Station)

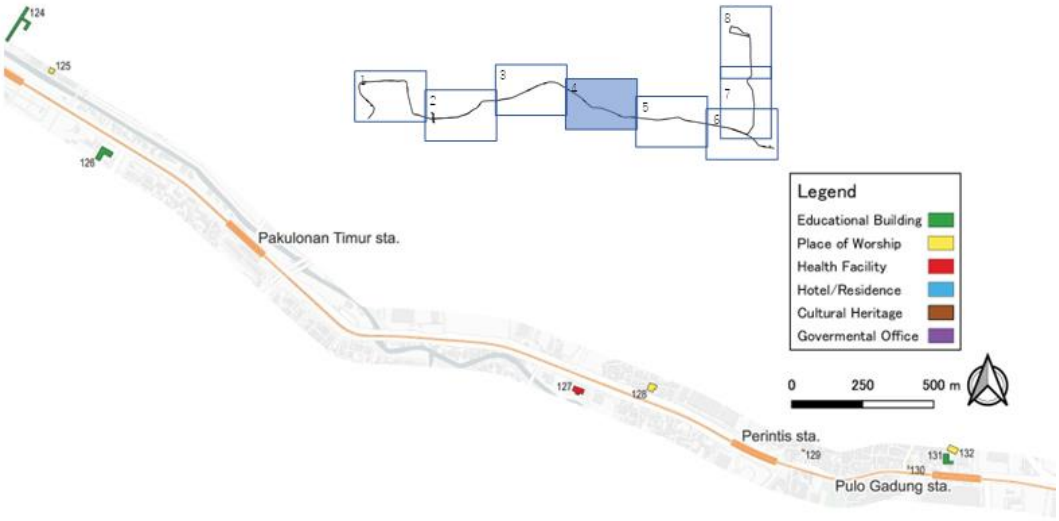


Figure 6.13. Evaluation Point for Noise and Vibration Levels Due to Train Movement
(East Pakulonan Station – Pulo Gadung Station)

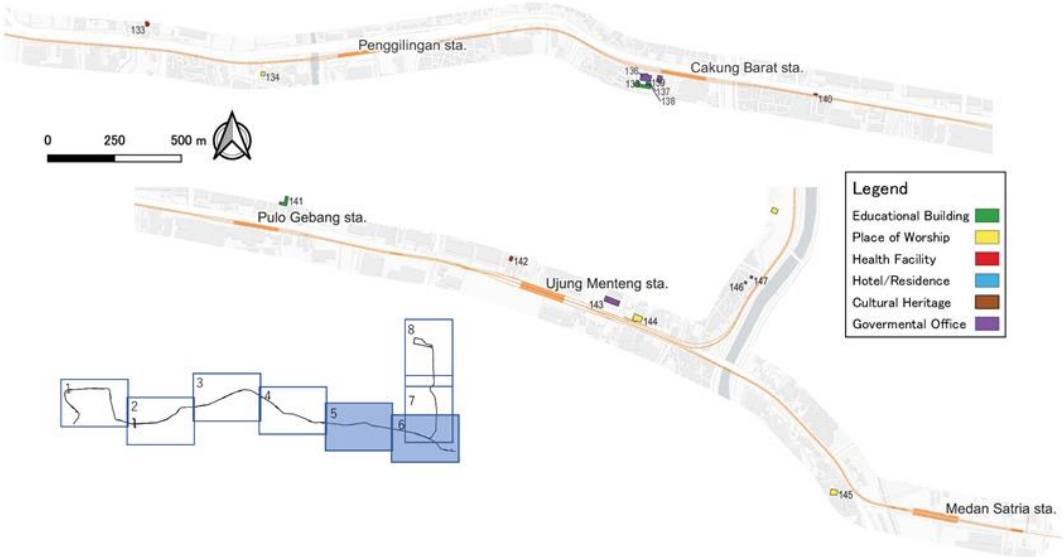


Figure 6.14. Evaluation Point for Noise and Vibration Levels Due to Train Movement
(Milling Station – Medan Satria Station)

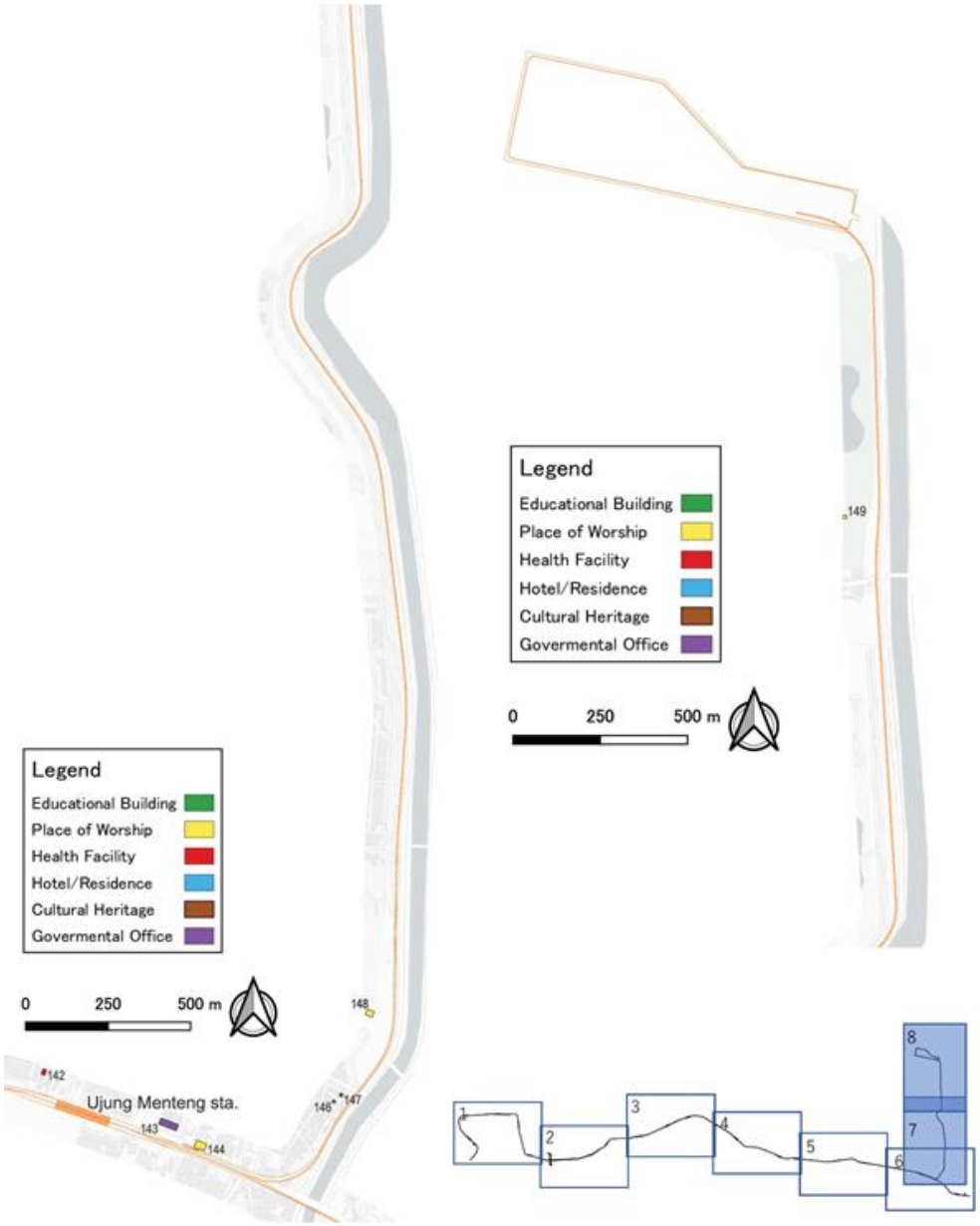


Figure 6.15. Evaluation Point for Noise and Vibration Levels Due to Train Movement
(Ujung Menteng Station – Rorotan Depot Access Route)

Table 6.112. Elevated Segment Noise Level Sta. Strain – Sta. Medan Satria (projection year 2029)

Target buildings		Location		Structure Type	Forecast 2029 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
101	Hotel/Residence	49K860	Strains - New Cempaka	Transitions	54.4	48.0	60	55	OK	OK
102	Place of Worship (Mosque)	49K882		Transitions	42.9	36.5	60	55	OK	OK
103	Place of Worship (Mosque)	49K887		Transitions	43.6	37.2	60	55	OK	OK
104	Office (Governmental office)	49K908		Transitions	50.9	44.5	65	60	OK	OK
105	Hotel/Residence	49K974		Transitions	57.0	50.6	60	55	OK	OK
106	Hotel/Residence	50K088		Elevated	58.5	52.1	60	55	OK	OK
107	Place of Worship (Church)	50K254		Elevated	52.7	46.3	60	55	OK	OK
108	Place of Worship (Church)	50K259		Elevated	54.0	47.6	60	55	OK	OK
109	Place of Worship (Church)	50K644	Cempaka Baru-Sumur Batu	Elevated	47.9	41.5	60	55	OK	OK
110	Educational Building (college)	50K671		Elevated	49.2	42.8	60	55	OK	OK
111	Educational Building (college)	50K678		Elevated	48.8	42.4	60	55	OK	OK
112	Educational Building (college)	50K683		Elevated	57.1	50.7	60	55	OK	OK
113	Educational Building (college)	50K695	Cempaka Baru-Sumur Batu	Elevated	50.5	44.1	60	55	OK	OK
114	Place of Worship (Mosque)	50K695		Elevated	50.9	44.5	60	55	OK	OK

Target buildings		Location		Structure Type	Forecast 2029 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
115	Educational Building(University)	50K800		Elevated	57.1	50.7	60	55	OK	OK
116	Educational Building(University)	50K911		Elevated	57.1	50.7	60	55	OK	OK
117	Place of Worship (Mosque)	50K961		Elevated	48.7	42.3	60	55	OK	OK
118	Place of Worship (Mosque)	50K982		Elevated	47.9	41.4	60	55	OK	OK
119	Educational Building(University)	50K984		Elevated	57.1	50.7	60	55	OK	OK
120	Place of Worship (Mosque)	51K309		Elevated	47.6	41.2	60	55	OK	OK
121	Office (Governmental office)	51K350		Elevated	54.0	47.6	65	60	OK	OK
122	Office (Governmental office)	51K930	West Batu-Pakulonan Well	Elevated	49.8	43.4	65	60	OK	OK
123	Place of Worship (Mosque)	52K256		Elevated	48.8	42.4	60	55	OK	OK
124	Educational Building (college)	52K770		Elevated	49.7	43.3	60	55	OK	OK
125	Place of Worship (Mosque)	52K948	West Pakulonan-East Pakulonan	Elevated	49.7	43.3	60	55	OK	OK
126	Educational Building (School)	53K293		Elevated	57.6	51.2	60	55	OK	OK
127	Health Facility(Hospital)	55K222	East Pakulonan - Pioneers	Elevated	53.1	46.7	60	55	OK	OK
128	Place of Worship (Mosque)	55K452		Elevated	52.6	46.2	60	55	OK	OK
129	Place of Worship (Mosque)	56K034	Pioneer-Gadung Island	Elevated	43.3	36.9	60	55	OK	OK
130	Place of Worship (Mosque)	56K425		Elevated	46.4	40.0	60	55	OK	OK
131	Educational Building (School)	56K550		Elevated	45.5	39.1	60	55	OK	OK
132	Place of Worship (Mosque)	56K592		Elevated	43.7	37.3	60	55	OK	OK
133	Health Facility (Clinic)	57K399	Pulo Gadung-Milling	Elevated	50.3	43.9	60	55	OK	OK
134	Place of Worship (Mosque)	57K846		Elevated	52.6	46.2	60	55	OK	OK
135	Educational Building (School)	58K243	West Cakung Milling	Elevated	48.9	42.5	60	55	OK	OK
136	Office (Governmental office)	59K342		Elevated	50.3	43.9	65	60	OK	OK
137	Educational Building (School)	59K351		Elevated	49.3	42.9	60	55	OK	OK
138	Educational Building (School)	59K351		Elevated	46.6	40.2	60	55	OK	OK
139	Office (Governmental office)	59K390		Elevated	49.1	42.7	65	60	OK	OK
140	Health Facility (Clinic)	59K982	West Cakung-Pulo Gebang	Elevated	54.3	47.9	60	55	OK	OK
141	Educational Building (School)	60K908	Pulo Gebang-Ujung Menteng	Elevated	50.3	43.9	65	60	OK	OK
142	Health Facility (Clinic)	61K770		Elevated	49.5	43.1	60	55	OK	OK
143	Office (Governmental office)	62K146	Ujung Menteng-Medan Satria	Elevated	49.8	43.4	65	60	OK	OK
144	Place of Worship (Mosque)	62K287		Elevated	48.9	42.5	60	55	OK	OK
145	Place of Worship (Mosque)	63K315		Elevated	52.7	46.3	60	55	OK	OK
146	Educational Building (School)	0K950	Ujung Menteng-Rorotan Depot	Elevated	52.5	46.1	60	55	OK	OK
147	Office (Governmental office)	0K980		Elevated	52.0	45.6	65	60	OK	OK
148	Place of Worship (Mosque)	1K280		Elevated	49.7	43.3	60	55	OK	OK
149	Place of Worship (Mosque)	5K100		Elevated	54.5	48.1	60	55	OK	OK

Description: Day: 6:00-22:00, Night: 22:00-6:00
Source : JMCA, 2022

Table 6.113. Elevated Segment Noise Level Sta. Strain - Sta. Medan Satria (projection year 2060)

Target buildings		Location		Structure Type	Forecast 2060 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
101	Hotel/Residence	49K860	Strains - New Cempaka	Transitions	58.6	52.2	60	55	OK	OK
102	Place of Worship (Mosque)	49K882		Transitions	47.1	40.7	60	55	OK	OK
103	Place of Worship (Mosque)	49K887		Transitions	47.8	41.4	60	55	OK	OK
104	Office (Governmental office)	49K908		Transitions	55.0	48.7	65	60	OK	OK
105	Hotel/Residence	49K974		Transitions	61.2	54.8	60	55	+ 1.2	OK
106	Hotel/Residence	50K088		Elevated	62.7	56.3	60	55	+ 2.7	+ 1.3
107	Place of Worship (Church)	50K254	Strains - New Cempaka	Elevated	56.8	50.5	60	55	OK	OK
108	Place of Worship (Church)	50K259		Elevated	58.2	51.8	60	55	OK	OK
109	Place of Worship (Church)	50K644	Cempaka Baru-Sumur Batu	Elevated	52.0	45.7	60	55	OK	OK
110	Educational Building (college)	50K671		Elevated	53.3	47.0	60	55	OK	OK

Target buildings		Location		Structure Type	Forecast 2060 (dBA)		Target Levels (dBA)		Evaluation	
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night
111	Educational Building (college)	50K678		Elevated	52.9	46.6	60	55	OK	OK
112	Educational Building (college)	50K683		Elevated	61.3	54.9	60	55	+ 1.3	OK
113	Educational Building (college)	50K695		Elevated	54.7	48.3	60	55	OK	OK
114	Place of Worship (Mosque)	50K695		Elevated	55.1	48.7	60	55	OK	OK
115	Educational Building(University)	50K800		Elevated	61.2	54.9	60	55	+ 1.2	OK
116	Educational Building(University)	50K911		Elevated	61.3	54.9	60	55	+ 1.3	OK
117	Place of Worship (Mosque)	50K961		Elevated	52.9	46.5	60	55	OK	OK
118	Place of Worship (Mosque)	50K982		Elevated	52.0	45.6	60	55	OK	OK
119	Educational Building(University)	50K984		Elevated	61.3	54.9	60	55	+ 1.3	OK
120	Place of Worship (Mosque)	51K309		Elevated	51.8	45.4	60	55	OK	OK
121	Office (Governmental office)	51K350		Elevated	58.1	51.8	65	60	OK	OK
122	Office (Governmental office)	51K930	West Batu-Pakulonan Well	Elevated	54.0	47.6	65	60	OK	OK
123	Place of Worship (Mosque)	52K256		Elevated	53.0	46.6	60	55	OK	OK
124	Educational Building (college)	52K770		Elevated	53.9	47.5	60	55	OK	OK
125	Place of Worship (Mosque)	52K948	West Pakulonan-East Pakulonan	Elevated	53.9	47.5	60	55	OK	OK
126	Educational Building (School)	53K293		Elevated	61.7	55.3	60	55	+ 1.7	+ 0.3
127	Health Facility(Hospital)	55K222	East Pakulonan - Pioneers	Elevated	57.3	50.9	60	55	OK	OK
128	Place of Worship (Mosque)	55K452		Elevated	56.7	50.4	60	55	OK	OK
129	Place of Worship (Mosque)	56K034	Pioneer-Gadung Island	Elevated	47.4	41.0	60	55	OK	OK
130	Place of Worship (Mosque)	56K425		Elevated	50.5	44.2	60	55	OK	OK
131	Educational Building (School)	56K550		Elevated	49.7	43.3	60	55	OK	OK
132	Place of Worship (Mosque)	56K592		Elevated	47.9	41.5	60	55	OK	OK
133	Health Facility (Clinic)	57K399	Pulo Gadung-Milling	Elevated	54.4	48.1	60	55	OK	OK
134	Place of Worship (Mosque)	57K846		Elevated	56.7	50.3	60	55	OK	OK
135	Educational Building (School)	58K243	West Cakung Milling	Elevated	53.0	46.7	60	55	OK	OK
136	Office (Governmental office)	59K342		Elevated	54.4	48.1	65	60	OK	OK
137	Educational Building (School)	59K351		Elevated	53.5	47.1	60	55	OK	OK
138	Educational Building (School)	59K351		Elevated	50.8	44.4	60	55	OK	OK
139	Office (Governmental office)	59K390		Elevated	53.2	46.9	65	60	OK	OK
140	Health Facility (Clinic)	59K982	West Cakung-Pulo Gebang	Elevated	58.5	52.1	60	55	OK	OK
141	Educational Building (School)	60K908	Pulo Gebang-Ujung Menteng	Elevated	54.5	48.1	65	60	OK	OK
142	Health Facility (Clinic)	61K770		Elevated	53.6	47.3	60	55	OK	OK
143	Office (Governmental office)	62K146	Ujung Menteng-Medan Satria	Elevated	54.0	47.6	65	60	OK	OK
144	Place of Worship (Mosque)	62K287		Elevated	53.1	46.7	60	55	OK	OK
145	Place of Worship (Mosque)	63K315		Elevated	56.9	50.5	60	55	OK	OK
146	Educational Building (School)	0K950	Ujung Menteng-Rorotan Depot	Elevated	56.6	50.2	60	55	OK	OK
147	Office (Governmental office)	0K980		Elevated	56.1	49.8	65	60	OK	OK
148	Place of Worship (Mosque)	1K280		Elevated	53.9	47.5	60	55	OK	OK
149	Place of Worship (Mosque)	5K100		Elevated	58.7	52.3	60	55	OK	OK

Description: Day: 6:00-22:00, Night: 22:00-6:00
Source : JMCA, 2022

Table 6.112.shows that the noise level of train operations on the elevated segment of the Sta. Strain - Sta. Medan Satria in 2029, all building targets are in accordance with the target noise level at the operational stage. Meanwhile in Table 6.116. It is known that the noise level of train operations on the elevated segment of the Sta. Strain - Sta. Medan Satria in 2060 for two residential buildings (Sta. Galur - Sta. Cempaka Baru) and five educational buildings (Sta. Cempaka Baru - Sta. Sumur Batu and Sta. Pakulonan Barat - Sta. Pakulonan Timur) is estimated to be higher than the target noise level in the operating phase.

To meet the operational phase noise level target in 2060, the following mitigation measures are proposed:

1) Installation of Elasticity Sleeper for Anti-vibration (decreasing effect assumed to be -3 to -4 dBA (Y. Tanaka et.al., 2004)) in sensitive areas (Sta. Tomang – Sta. Grogol, Sta. Grogol – Sta. Roxy , Galur Sta. – Cempaka Baru Sta., Cempaka Baru Sta. – Sumur Batu Sta., and West Pakulonan Sta. – East Pakulonan Sta.).
2) Installation of Long Rail on tangent and transition curves (R>=400).
3) Roof installation on the open cut section of the transition section (St. Galur – Sta. Cempaka Baru and Sta. Cempaka Baru – Sta. Sumur Batu).

The results of noise level calculations with mitigation measures are presented in**Table 6.114.** Noise Levels with Mitigation Efforts During the Operation Phase in 2060.

- **The magnitude of the impact**

1) Elevated Segment

RLA = averagenoise level 70.33 dBA
No Project = averagenoise level 70.33 dBA
With Projects = averagetrain operational noise level
Afternoon = 54.70 dBA
Evening = 48.40 dBA
averagenoise equal to RLA (70.33 dBA)

The magnitude of the impact = With Project – Without Project
= 70.33 dBA - 70.33 dBA
= 0

With the mitigation measures in place to meet the operational phase noise level targets in 2060, the noise level of train operations on the elevated segment of the MRT East – West Line has met the noise level standards (Decree of the Minister of the Environment No. 48/MENLH/11/1996) for residential areas/neighborhoods, so it is not expected to have an impact on existing noise levels.

2) Underground Segment

RLA = average noise level 70.60 dBA
No Project = average noise level 70.60 dBA
With Projects = the train's operational noise level is 0 dBA, so
averagenoise equal to RLA (70.60 dBA)

The magnitude of the impact = With Project – Without Project
= 70.60 dBA - 70.60 dBA
= 0

Table 6.114. Noise Levels with Mitigation Efforts During the Operation Phase in 2060

Target buildings		Location		Structure Type	Target Levels (dBA)		Forecast 2060 Without Mitigation (dBA)				Proposed Mitigation Measures	Forecast 2060 With Mitigation (dBA)			
ID	Building Categories	kp	Sections		Day	Night	Day	Night	Day	Night		Day	Night	Day	Night
8	Educational Building (University)	39K896	Tomang - Grogol	Elevated	60	55	62.1	55.8	+2.1	+0.8	Anti-Vibration	58.1	51.8	OK	OK
19	Hotels/Residences	40K418		Elevated	60	55	61.4	55.0	+1.4	+0.0	Anti-Vibration	57.4	51.0	OK	OK
23	Hotels/Residences	41K036	Grogol - Roxy	Transitions	60	55	63.2	56.8	+3.2	+1.8	Anti-Vibration+Roof	59.2	52.8	OK	OK
24	Hotels/Residences	41K054		Transitions	60	55	62.8	56.5	+2.8	+1.5	Anti-Vibration+Roof	58.8	52.5	OK	OK
105	Hotel/Residence	49K974	Strains - New Cempaka	Transitions	60	55	61.2	54.8	+ 1.2	OK	Anti-Vibration+Roof	57.2	50.8	OK	OK
106	Hotel/Residence	50K088		Elevated	60	55	62.7	56.3	+ 2.7	+ 1.3	Anti-Vibration	58.7	52.3	OK	OK
112	Educational Building (college)	50K683	Cempaka Baru-Sumur Batu	Elevated	60	55	61.3	54.9	+ 1.3	OK	Anti-Vibration	57.3	50.9	OK	OK
115	Educational Building(University)	SOK800		Elevated	60	55	61.2	54.9	+ 1.2	OK	Anti-Vibration	57.2	50.9	OK	OK
116	Educational Building(University)	50K911		Elevated	60	55	61.3	54.9	+ 1.3	OK	Anti-Vibration	57.3	50.9	OK	OK
119	Educational Building(University)	50K984		Elevated	60	55	61.3	54.9	+ 1.3	OK	Anti-Vibration	57.3	50.9	OK	OK
126	Educational Building (School)	53K293	West Pakulonan-East Pakulonan	Elevated	60	55	61.7	55.3	+ 1.7	+ 0.3	Anti-Vibration	57.7	51.3	OK	OK

Source : JMCA, 2022

Based on an analogous study with reference to noise data on MRTJ Lebak Bulus - Bundaran HI operations, the noise level of train operations on the MRT East - West Line underground segment is almost zero, so it is estimated that it will have no impact on existing noise levels.

- **Important Nature of Impact**

Table 6.115. Important Characteristics of the Impact of Passenger Carriage Activities and Station Operations on Noise Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people estimated to be directly affected is 384 families (1,536 people) residents in 33 sub-districts who live along the MRT East - West Line, while in general it will have an impact on people who use roads and who carry out activities along the MRT East - West line. Line
2	The area of impact distribution		T.P	The impact area is 0.2 km x the length of the MRT East – West Line
3	The intensity and duration of the impact	P		The intensity of the impact is momentary but lasts during the operation of the MRT East – West Line
4	Many other environmental components are affected		T.P	no other components are affected
5	Cumulative nature of impact		T.P	impacts are not cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed because the intensity of the impact is only temporary
7	Other criteria are in accordance with developments in science and technology		T.P	Impacts can be controlled with existing technology
	Amount	**1**	**6**	**Not Important (TP)**

B. Increased vibration

- **Initial environmental conditions**

1) Elevated and Deposit Segments

By paying attention to the vibration level measurement results data (Table 3.12), it is known that the vibration level in the study area in the elevated and depot segments still meets the Standard Vibration Level (Decree of the Minister of the Environment No. 49/MENLH/11/1996) in the category "No Disturbing" and an average value of vibration level of 10.97 microns (55.10 dB), as presented in**Table 6.116.**.

Table 6.116. Vibration Levels in Elevated and Depot Segments

Segment	Code	Coordinate	Measurement Results 1) in microns (10-6)	VAL 2) (dB)	Evaluation
*Elevated*West	UKG1	S 06°10'30.59": E 106°47'33.35"	4	50.09	Do not disturb
*Elevated*East	UKG7	S 06°10'31.25": E 106°53'36.19"	3	47.59	Do not disturb

Segment	Code	Coordinate	Measurement Results 1) in microns (10-6)	VAL 2) (dB)	Evaluation
	UKG8	S 06°10'57.48": E 106°54'58.80"	14	60.97	Do not disturb
	UKG9	S 06°11'03.85": E 106°56'32.89"	3	47.59	Do not disturb
	UKG10	S 06°11'25.46": E 106°58'05.75"	22.8	65.21	Do not disturb
	UKG11	S 06°11'46.05": E 106°58'33.59"	3	47.59	Do not disturb
Depot	UKG12	S 06°08'38.72": E 106°57'59.62"	27	66.67	Do not disturb
		Average	**10.97**	**55.10**	

Information :
1) Measurement at a Frequency of 4.5 Hz
2) VAL (vibration acceleration level conversion value in dB)
   VAL (dB) = 20 log VA/VA0
   VA = (2.∏.f)2 x deviation (10-6)
   VA0 = 10-5

2) Underground Segment

By paying attention to the vibration level measurement data (Table 3.12), it is known thatVibration levels in the study area in the underground segment still meet the Vibration Level Standards (Decree of the Minister of the Environment No. 49/MENLH/11/1996) in the "Not Disturbing" category and the average vibration level value is 21.84 microns (59.67 dB), as presented in Table 6.117..

Table 6.117. Vibration Levels in Underground Segments

Segment	Code	Coordinate	Measurement Results 1) in microns (10-6)	VAL 2) (dB)	Evaluation
Underground	UKG2	S 06°09'56.71": E 106°48'09.07"	26.5	66.51	Do not disturb
Underground	UKG3	S 06°10'59.50": E 106°49'23.74"	3	47.59	Do not disturb
	UKG4	S 06°10'13.40": E 106°48'39.79"	18.2	63.25	Do not disturb
	UKG5	S 06°10'27.62": E 106°51'19.45"	3	47.59	Do not disturb
	UKG6	S 06°10'00.59": E 106°52'29.49"	58.5	73.39	Do not disturb
		Average	**21.84**	**59.67**	

Information :
1) Measurement at a Frequency of 4.5 Hz
2) VAL (vibration acceleration level conversion value in dB)
   VAL (dB) = 20 log VA/VA0
   VA = (2.∏.f)2 x deviation (10-6)
   VA0 = 10-5

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to be the same as the initial environmental baseline conditions, so it can be determined

that the vibration level in the study areastill meets Vibration Level Standards (Decree of the Minister of the Environment No. 49/MENLH/11/1996) in the "Not Disturbing" category and the average value of vibration levels in the underground segment is 21.84 microns (59.67 dB) and at elevated segment and depot of10.97 microns (55.10 dB).

- **Environmental conditions that will come with the project**

1) Elevated Segment

The increase in vibration due to the operation of the MRT East – West Line on the elevated segment caused by train movements is predicted by referring to "the research regarding the calculation of damping constants in an equation to predict railway vibration" (M. Yanagisawa, 1996) which is one of the models official method for predicting the impact of vibrations on soil in Japan.

Referring to the condition of land use along the planned MRT East – West Line route which consists of sensitive buildings (educational buildings, office buildings, places of worship, health facilities etc.), commercial buildings and industrial areas, there are more than 100 sensitive buildings and a minimum of 1 office buildings between each elevated station were selected as target recipients of the impact in calculating the increase in vibrations due to train movements on elevated lines, as presented in**Figure 6.11. .**to Figure 6.15. and Table 6.118. to Table 6.119.

Table 6.118. Forecast of Vibration Levels in the Elevated Segment (Sta. Tomang - Sta. Grogol)

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
1	Health Facility (Hospital)	39K100	Tomang - Grogol	Elevated	43.8	75	OK
2	Place of Worship (Mosque)	39K120		Elevated	44.4	75	OK
3	Office (Govermental Office)	39K403		Elevated	52.1	75	OK
4	Office (Govermental Office)	39K617		Elevated	53.5	75	OK
5	Place of Worship (Mosque)	39K657		Elevated	48.8	75	OK
6	Office (Govermental Office)	39K800		Elevated	50.4	75	OK
7	Educational Building (University)	39K895		Elevated	44.2	75	OK
8	Educational Building (University)	39K896		Elevated	54.5	75	OK
9	Educational Building (University)	39K948		Elevated	44.3	75	OK
10	Educational Building (University)	40K011		Elevated	50.3	75	OK
11	Educational Building (University)	40K078		Elevated	45.2	75	OK
12	Educational Building (University)	40K095		Elevated	42.4	75	OK
13	Educational Building (University)	40K122		Elevated	42.9	75	OK
14	Educational Building (University)	40K219		Elevated	42.4	75	OK
15	Hotels/Residences	40K325		Elevated	45.8	75	OK
16	Educational Building (University)	40K335		Elevated	43.0	75	OK
17	Educational Building (University)	40K355		Elevated	45.2	75	OK
18	Educational Building (University)	40K397		Elevated	44.9	75	OK
19	Hotels/Residences	40K418		Elevated	47.9	75	OK
20	Hotels/Residences	40K586	Grogol - Roxy	Elevated	44.4	75	OK
21	Hotels/Residences	40K881		Transitions	46.1	75	OK
22	Place of Worship (Church)	40K994	Grogol - Roxy	Transitions	45.9	75	OK
23	Hotels/Residences	41K036		Transitions	53.0	75	OK

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
24	Hotels/Residences	41K054		Transitions	52.3	75	OK
25	Educational Building (University)	41K084		Transitions	46.4	75	OK
26	Place of Worship (Mosque)	41K176		Transitions	56.9	75	OK
27	Health Facility (Hospital)	41K199		Transitions	45.3	75	OK
28	Office (Govermental Office)	41K252		Transitions	47.9	75	OK

Table 6.119. Forecast of Vibration Levels in the Elevated Segment (Sta. Cempaka Baru - Sta. Medan Satria)

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
101	Hotel/Residence	49K860	Strains - New Cempaka	Transitions	47.5	75	OK
102	Place of Worship (Mosque)	49K882		Transitions	44.2	75	OK
103	Place of Worship (Mosque)	49K887		Transitions	44.9	75	OK
104	Office (Governmental office)	49K908		Transitions	52.2	75	OK
105	Hotel/Residence	49K974		Transitions	48.8	75	OK
106	Hotel/Residence	50K088		Elevated	47.5	75	OK
107	Place of Worship (Church)	50K254		Elevated	47.5	75	OK
108	Place of Worship (Church)	50K259		Elevated	50.3	75	OK
109	Place of Worship (Church)	50K644	Cempaka Baru-Sumur Batu	Elevated	43.8	75	OK
110	Educational Building (college)	50K671		Elevated	44.0	75	OK
111	Educational Building (college)	50K678		Elevated	43.4	75	OK
112	Educational Building (college)	50K683		Elevated	48.0	75	OK
113	Educational Building (college)	50K695		Elevated	46.9	75	OK
114	Place of Worship (Mosque)	50K695		Elevated	48.2	75	OK
115	Educational Building(University)	50K800		Elevated	48.0	75	OK
116	Educational Building(University)	50K911		Elevated	48.0	75	OK
117	Place of Worship (Mosque)	50K961		Elevated	45.0	75	OK
118	Place of Worship (Mosque)	50K982		Elevated	43.7	75	OK
119	Educational Building(University)	50K984		Elevated	48.0	75	OK
120	Place of Worship (Mosque)	51K309		Elevated	44.0	75	OK
121	Office (Governmental office)	51K350		Elevated	50.4	75	OK
122	Office (Governmental office)	51K930	West Batu-Pakulonan Well	Elevated	49.0	75	OK
123	Place of Worship (Mosque)	52K256		Elevated	44.4	75	OK
124	Educational Building (college)	52K770		Elevated	43.8	75	OK
125	Place of Worship (Mosque)	52K948	West Pakulonan-East Pakulonan	Elevated	44.7	75	OK
126	Educational Building (School)	53K293		Elevated	48.4	75	OK
127	Health Facility(Hospital)	55K222	East Pakulonan - Pioneers	Elevated	48.7	75	OK
128	Place of Worship (Mosque)	55K452		Elevated	49.0	75	OK
129	Place of Worship (Mosque)	56K034	Pioneer-Gadung Island	Elevated	44.7	75	OK
130	Place of Worship (Mosque)	56K425		Elevated	53.3	75	OK
131	Educational Building (School)	56K550		Elevated	47.2	75	OK
132	Place of Worship (Mosque)	56K592		Elevated	43.5	75	OK
133	Health Facility (Clinic)	57K399	Pulo Gadung-Milling	Elevated	44.8	75	OK
134	Place of Worship (Mosque)	57K846		Elevated	50.2	75	OK
135	Educational Building (School)	58K243	West Cakung Milling	Elevated	46.2	75	OK
136	Office (Governmental office)	59K342		Elevated	52.5	75	OK
137	Educational Building (School)	59K351		Elevated	46.9	75	OK
138	Educational Building (School)	59K351		Elevated	46.2	75	OK
139	Office (Governmental office)	59K390		Elevated	53.2	75	OK
140	Health Facility (Clinic)	59K982	West Cakung-Pulo Gebang	Elevated	63.7	75	OK

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
141	Educational Building (School)	60K908	Pulo Gebang-Ujung Menteng	Elevated	44.1	75	OK
142	Health Facility (Clinic)	61K770		Elevated	45.8	75	OK
143	Office (Governmental office)	62K146	Ujung Menteng-Medan Satria	Elevated	47.9	75	OK
144	Place of Worship (Mosque)	62K287		Elevated	54.1	75	OK
145	Place of Worship (Mosque)	63K315		Elevated	47.5	75	OK
146	Educational Building (School)	0K950	Ujung Menteng-Rorotan Depot	Elevated	50.2	75	OK
147	Office (Governmental office)	0K980		Elevated	51.3	75	OK
148	Place of Worship (Mosque)	1K280		Elevated	46.3	75	OK
149	Place of Worship (Mosque)	5K100		Elevated	45.1	75	OK

Table 6.118.shows that the vibration level of train operation on the underground segment of the Sta. Roxy - Sta. The grooves for all building targets are in accordance with the target vibration level at the operation stage. Meanwhile, Table 6.118. and Table 6.119. shows that the vibration level of train operations on the elevated segment of the Sta. Tomang - Sta. Grogol and the Sta. Cempaka Baru - Sta. Medan Satria for all building targets is in accordance with the target vibration level at the operational stage.

2) Underground Segment

The increase in vibrations due to the operation of the MRT East - West Line in the underground segment caused by train movements is predicted by referring to the "Vibration Prediction Model of Underground Section" (H. Shito, 1997) which is one of the official models for predicting the impact of vibrations on the underground section In Japan

Referring to the land use conditions along the planned MRT East – West Line route which consists of sensitive buildings (educational buildings, office buildings, places of worship, health facilities etc.), commercial buildings and industrial areas, there are more than 100 sensitive buildings and a minimum of 1 office buildings between each underground station were chosen as target recipients of the impact in calculating the increase in vibrations due to train movements on underground lines, as presented in**Figure 6.11. .**up to**Figure 6.12. .**and Table 6.120..

Table 6.120. Forecast of Vibration Levels in the Underground Segment (Sta. Roxy - Sta. Galur)

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
29	Educational Building (School)	41K517	Grogal-Roxy	Underground	48.1	75	OK
30	Health Facility (Cl nic)	41K582		Underground	56.1	75	OK
31	Educational Building (School)	41K570		Underground	47.2	75	OK
32	Place of Worship (Mosque)	41K743		Underground	53.0	75	OK
33	Place of Worship (Mosque)	42K014	Roxy-Petojo	Underground	43.3	75	OK
34	Hotel/Residence	42K503		Underground	45.6	75	OK
35	Place of Worship (Mosque)	42K683		Underground	42.2	75	OK
36	Place of Worship (Mosque)	42K830		Underground	44.0	75	OK
37	Educational Building (School)	42K875	Roxy-Petojo	Underground	44.5	75	OK
38	Hotel/Residence	42k920		Underground	45.0	75	OK

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
39	Hotel/Residence	42K922		Underground	50.4	75	OK
40	Educational Building (School)	43K090	Petojo-Cideng	Underground	45.1	75	OK
41	Hotel/Residence	43K200		Underground	49.2	75	OK
42	Health Facility(Hospital)	43K218		Underground	48.2	75	OK
43	Health Facility(Hospital)	43K282		Underground	48.4	75	OK
44	Hotel/Residence	43K428		Underground	53.1	75	OK
45	Hotel/Residence	43K627		Underground	50.1	75	OK
46	Place of Worship (Mosque)	43K931		Underground	48.7	75	OK
47	Hotel/Residence	44K412		Underground	42.6	75	OK
48	Educational Building (School)	44K463		Underground	48.0	75	OK
49	Hotel/Residence	44K482		Underground	52.3	75	OK
50	Hotel/Residence	44K570	Cideng-Thamrin	Underground	43.6	75	OK
51	Place of Worship (Church)	44K596	Cideng	Underground	49.9	75	OK
52	Hotel/Residence	44K672		Underground	46.0	75	OK
53	Educational Building (School)	44K690		Underground	50.6	75	OK
54	Cultural heritage	44K900		Underground	49.9	75	OK
55	Hotel/Residence	45K127		Underground	48.2	75	OK
56	Office (Governmental office)	45K304		Underground	49.1	75	OK
57	Hotel/Residence	45K530		Underground	43.6	75	OK
58	Place of Worship (Mosque)	45K644	Thamrin-Betel Garden	Underground	49.3	75	OK
59	Cultural heritage	45K680		Underground	49.3	75	OK
60	Office (Governmental office)	45K828		Underground	48.8	75	OK
61	Office (Governmental office)	46K009		Underground	52.6	75	OK
62	Office (Governmental office)	46K041		Underground	50.5	75	OK
63	Office (Governmental office)	46K062		Underground	44.9	75	OK
64	Hotel/Residence	46K105		Underground	48.0	75	OK
65	Hotel/Residence	46K107		Underground	49.1	75	OK
66	Hotel/Residence	46K110		Underground	50.2	75	OK
67	Educational Building (School)	46K169		Underground	52.8	75	OK
68	Place of Worship (Mosque)	46K241	Betel Garden-Kwitang	Underground	44.5	75	OK
69	Office (Governmental office)	46K578		Underground	55.6	75	OK
70	Office (Governmental office)	46K653		Underground	50.6	75	OK
71	Cultural heritage	46K680		Underground	54.4	75	OK
72	Place of Worship (Church)	46K705		Underground	45.8	75	OK
73	Hotel/Residence	46K797		Underground	51.5	75	OK
74	Place of Worship (Church)	47K087	Kwitang-Senen	Underground	53.6	75	OK
75	Place of Worship (Mosque)	47K343		Underground	54.7	75	OK
76	Hotel/Residence	47K362		Underground	53.5	75	OK
77	Place of Worship (Mosque)	47K415		Underground	52.7	75	OK
78	office (Governmental office)	47K455		Underground	49.9	75	OK
79	Place of Worship (Mosque)	47K457		Underground	46.8	75	OK
80	Educational Building (college)	47K478		Underground	46.1	75	OK
81	Educational Building (college)	47K498		Underground	45.3	75	OK
82	Educational Building (college)	47K608		Underground	43.5	75	OK
83	Educational Building (college)	47K614		Underground	47.9	75	OK
84	Cultural heritage	47K940	Senen-Galur	Underground	46.1	75	OK
85	Place of Worship (Mosque)	48K154		Underground	43.8	75	OK
86	Educational Building (School)	48K248		Underground	45.9	75	OK
87	Educational Building (School)	48K255		Underground	45.9	75	OK
88	Educational Building (School)	48K264	Senen-Galur	Underground	45.9	75	OK
89	Educational Building (School)	48K370		Underground	45.9	75	OK

Target buildings		Location		Structure Type	Forecast (dB)	Target Levels (dB)	Evaluation
ID	Building Categories	kp	Sections				
90	Educational Building (School)	48K500		Underground	46.0	75	OK
91	Hotel/Residence	48K530		Underground	45.3	75	OK
92	Hotel/Residence	48K591		Underground	47.4	75	OK
93	Place of Worship (Mosque)	49K205		Underground	52.7	75	OK
94	Office (Governmental office)	49K282		Underground	46.7	75	OK
95	Educational Building (college)	49K376		Underground	52.7	75	OK
96	Place of Worship (Mosque)	49K384		Underground	47.1	75	OK
97	Hotel/Residence	49K433		Underground	46.2	75	OK
98	Educational Building (kindergarten)	49K563	Strains-New Cempaka	Underground	47.8	75	OK
99	Educational Building (kindergarten)	49K665		Underground	47.0	75	OK
100	Place of Worship (Mosque)	49K692		Underground	48.6	75	OK

Source : JMCA, 2022

- **The magnitude of the impact**

1) Elevated Segment

RLA = average vibration level 55.10 dB
No Project = average vibration level 55.10 dB
With Projects = the average operational vibration level of the train is 47.55 dB,
so that the average vibration is the same as the RLA (55.10 dB)

The magnitude of the impact = With Project – Without Project
= 55.10 dB - 55.10 dB
= 0

The vibration level of train operations on the elevated segment of the MRT East – West Line has met vibration level standards (Decree of the Minister of the Environment No. 49/MENLH/11/1996), so it is estimated that it will not have an impact on existing vibration levels.

2) Underground Segment

RLA = averagevibration level 59.67 dB
No Project = averagevibration level 59.67 dB
With Projects = averagetrain operational vibration level 48.32 dB,
so that the average vibration is the same as the RLA (59.67 dB)

The magnitude of the impact = With Project – Without Project
= 59.67 dB - 59.67 dB
= 0

The vibration level of train operations on the underground segment of the MRT East – West Line has met vibration level standards (Decree of the Minister of the Environment No. 49/MENLH/11/1996), so it is estimated that it will not have an impact on existing vibration levels.

- **Important Nature of Impact**

Table 6.121. Important Characteristics of the Impact of Passenger Carriage and Station Operations on Vibration Levels

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected		T.P	The number of people estimated to be directly affected is 384 families (1,536 people) residents in 33 sub-districts who live along the MRT East - West Line, while in general it will have an impact on people who use roads and who carry out activities along the MRT East - West line. Line
2	The area of impact distribution		T.P	The impact area is 0.2 km x the length of the MRT East – West Line
3	The intensity and duration of the impact	P		The intensity of the impact is momentary but lasts during the operation of the MRT East – West Line
4	Many other environmental components are affected		T.P	no other components are affected
5	Cumulative nature of impact		T.P	impacts are not cumulative
6	Reversal or non-reversal of impact		T.P	The impact can be reversed because the intensity of the impact is only temporary
7	Other criteria are in accordance with developments in science and technology		T.P	Impacts can be controlled with existing technology
	Amount	**1**	**6**	**Not Important (TP)**

C. Open business opportunities

- **Initial environmental conditions**

  Based on BPS data (2022), there are 3,124 economic facilities (shops, markets, minimarkets/supermarkets, restaurants/eating houses, stalls/shops and grocery stores) as community business places in 31 sub-districts at the MRT East – West Line construction site. Meanwhile, based on data from observations and interviews with 384 affected families at the activity location, it is known that 142 families (36.98%) of respondents who work and/or own a business at the activity location as entrepreneurs, 56 families (14) hawkers/stalls. .58) and drivers/other services as many as 8 families (2.08%).

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. So that there are 3,124 economic facilities as community business places at the MRT East – West Line construction site (BPS, 2022) with an area of 148,240.20 m2 (LARAP, 2022). Meanwhile, the number of respondents who own a business and/or work at the MRT East – West Line location is 206 families (53.64% of the total 384 respondents).

- **Environmental conditions that will come with the project**

MRT East – West Line operations are planned to be able to serve an average number of passengers of 100,000 people/day. This condition can become a business opportunity for the local community, such as selling necessities for station workers and passengers and other needs. This is in line with the results of interviews with 384 affected families at the activity location which showed that 59.12% (227 families) had hopes of being able to take advantage of business opportunities, both as suppliers of goods and materials for MRT operational needs (14.32%), canteens. /restaurants (16.67%) and trading businesses around MRT stations (28.13%).

- **The magnitude of the impact**

RLA = number of respondents who work and/or own a business at the activity location 53.64%
No Project = the same as RLA (53.64%)
With Projects = number of respondents who have hopes of being able to take advantage of business opportunities 59.12%
The magnitude of the impact = With Project – Without Project
= 59.12% - 53.64%
= 5.48% (increased 10.22%)

Passenger transport activities and station operations will have an impact on opening up business opportunities (positive impact) on the community around the activity location by 10.22%.

- **Important Nature of Impact**

Table 6.122. Important Characteristics of the Impact of Passenger Transport & Station Operations on Opening Job Opportunities

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 277 families (if the MRT management can facilitate the opening of community businesses), while in general it could impact 384 families (1,536 people) residents in 33 sub-districts in the study area.
2	The area of impact distribution	P		The impact area covers 31 sub-districts in the study area, and can even spread even wider beyond Bekasi City, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		quite high intensity and for a relatively long time (during MRT operations).
4	Many other environmental components are affected	P		Other environmental components that are affected are changes in income levels (secondary impacts) and changes in people's perceptions and attitudes (tertiary impacts).
5	Cumulative nature of impact	P		impacts are cumulative
6	Reversal or non-reversal of impact	P		In terms of whether the impact is reversible or not, the weight of the impact can be stated to be important, because the impact cannot be reversed
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology

No	Criteria	Interest		Information
		P	T.P	
	Amount	**6**	**1**	**Important (P1)**

D. Increase in Family Income

- **Initial environmental conditions**

  Based on the results of interviews with 384 affected families at the activity location, it is known that the average family income at the MRT East – West Line construction site is IDR. 5,182,649/month and the average amount of income saved is Rp. 838,042/month (Table 3.39.). When compared with West Java Governor's Decree No. 561.7/Kep.776-Kesra/2022 concerning Determination of the Regency/City Minimum Wage for 2023 (for Bekasi City) of IDR. 5,158,248.20 and DKI Jakarta Governor Decree No. 1153 of 2022 concerning Determination of the Minimum Wage in DKI Province in 2023 of IDR. 4,901,798.00, it can be seen that the average family income at the MRT East – West Line construction site is 0.47% higher than the UMK of Bekasi City and 5.73% of the UMP of DKI Jakarta.

- **Future environmental conditions without the project**

  Estimates of family income levels in future environmental conditions without the project were carried out using a secondary data approach related to community income levels in the 5 cities at the MRT East – West Line construction site as measured by the household expenditure data approach (BPS, 2022) as presented in Table 3.35 .. Referring to this data, it is known that the average expenditure is Rp. 2,320,813/month with the proportion of expenditure (consumption pattern) for food of 40.09% (Rp. 930,426) and non-food of 59.91% (Rp. 1,390,387).

- **Environmental conditions that will come with the project**

  Basecamp construction and operational activities can be a business opportunity for the local community, especially for the needs of construction workers. The opening of business opportunities will have a secondary impact in the form of an increase in family income, at least equal to the average family income at the MRT East – West Line construction site of Rp. 5,182,649/month.

- **The magnitude of the impact**

  RLA = average income Rp. 5,182,649/month
  No Project = income based on average expenditure of Rp. 2,320,813/month
  With Projects = Minimum income Rp. 5,182,649/month
  The magnitude of the impact = With Project – Without Project
  = Rp. 5,182,649/$_{month}$- Rp. 2,320,813/month
  = Rp. 2,861,836/month (increased 55.22%)

The impact of opening business opportunities will have a derivative (secondary) impact in the form of an increase in family income (positive impact) of IDR. 2,861,836/month (increased 55.22%).

- **Important Nature of Impact**

Table 6.123. Important Characteristics of the Impact of Passenger Carriage & Station Operations on Increasing Family Income

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 277 families (if the MRT management can facilitate the opening of community businesses), while in general it could impact 384 families (1,536 people) residents in 33 sub-districts in the study area.
2	The area of impact distribution	P		The impact area covers 31 sub-districts in the study area, and can even spread even wider beyond Bekasi City, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		quite high intensity and for a relatively long time (during MRT operations).
4	Many other environmental components are affected	P		Other environmental components that are affected are the opening of job opportunities (primary impact) and changes in community perceptions and attitudes (tertiary impact).
5	Cumulative nature of impact		T.P	impacts are not cumulative
6	Reversal or non-reversal of impact		T.P	can be reversed if treated immediately and well
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology
	Amount	**4**	**3**	**Important (P1)**

E. Attitudes Changes and Public Perception

- **Initial environmental conditions**

Based onThe results of community involvement in public consultation activities (3 - 4 February 2022) show that in general the community in the study area supports the MRT East - West Line development plan with several notes that must be taken into account by the person in charge of the activity. Meanwhile, based on the results of interviews with 384 affected families at the activity location, it was found that the majority of respondents strongly supported (53.91%) and supported (35.16%) the MRT East - West Line development plan (Table 3.44). Apart from that, there are 227 families (59.12%) who hope to be able to take advantage of business opportunities, both as suppliers of goods and materials for MRT operational needs (14.32%), canteens/restaurants (16.67%) and trading businesses around MRT stations (28.13%).

However, there were still 2.61% of respondents who said they did not support it and 8.33% of respondents who did not answer. This condition is likely

related to the majority of respondents (53.39%) who still do not know and are worried about the impact of the MRT East - West Line development plan. For this reason, a more intense approach is needed by the person in charge of activities to socialize activity plans and find out existing problems so that social unrest does not occur in society.

- **Future environmental conditions without the project**

  Future environmental conditions without the project are predicted to remain the same as the initial environmental conditions. So in general the people in the study area strongly support (53.91%) and support (35.16%) the MRT-EWLP1S1 development plan with several notes that must be taken into account by the person in charge of the activity. Apart from that, there are 242 families (63.02%) who hope to get work opportunities, either as daily workers/laborers, security guards/security guards, or employees/administrative staff on the MRT-EWLP1S1 construction project.

- **Environmental conditions that will come with the project**

  Based on the positive impact on passenger transportation activities and station operations (especially the impact of opening up business opportunities and increasing family income levels), if managed well, it is predicted that it will increase the community's positive attitudes and perceptions towardsMRT East – West Line construction project. In addition, the results of interviews with 384 affected families at the activity location showed that there were 227 families (59.12%) who had hopes of being able to take advantage of business opportunities, both as suppliers of goods and materials for MRT operational needs (14.32%), canteens /restaurants (16.67%) and trading businesses around MRT stations (28.13%).By accommodating optimallyresidents' hopes of getting employment opportunities and maximizing the positive impacts that arise, then dIt is estimated that the percentage of people who agree to this activity could reach more than 90%, from the previous 342 families to 365 families. Thus it can be concluded that the environmental quality conditions that will come with the project for the components of community attitudes and perceptions are included in the positive impact.

- **The magnitude of the impact**

  RLA = 342 families (89.07%) said they agreed/supported it
  No Project = the same as RLA
  342 families (89.07%) said they agreed/supported it
  With Projects = 365 families (95.00%)who expressed agreement/support
  The magnitude of the impact = With Project – Without Project
  = 365 families -342 families
  = 23 families

The impact of opening up business opportunities and increasing family income will have derivative (tertiary) impacts in the form of changes in attitudes and perceptions of societythat is positive or supports the planconstruction of the MRT East – West Line is more than 90% complete (initial baseline condition of 89.07%).

- **Important Nature of Impact**

Table 6.124. Important Characteristics of the Impact of Hiring Operational Workers on Changes in Community Attitudes and Perceptions

No	Criteria	Interest		Information
		P	T.P	
1	The number of people who will be affected	P		The number of people estimated to be directly affected is 277 families (if the MRT management can facilitate the opening of community businesses), while in general it could impact 384 families (1,536 people) residents in 33 sub-districts in the study area.
2	The area of impact distribution	P		The impact area covers 31 sub-districts in the study area, and can even spread even wider beyond Bekasi City, North Jakarta, West Jakarta, East Jakarta and Central Jakarta.
3	The intensity and duration of the impact	P		quite high intensity and for a relatively long time (during MRT operations).
4	Many other environmental components are affected		T.P	Judging from the number of components affected, the weight of the impact can be declared unimportant, because the impact on people's perceptions and attitudes is the final impact (tertiary impact).
5	Cumulative nature of impact	P		impacts are cumulative
6	Reversal or non-reversal of impact		T.P	In terms of whether the impact is reversible, the weight of the impact can be declared unimportant, because the impact can be reversible
7	Other criteria are in accordance with developments in science and technology		T.P	there are no other criteria in accordance with the development of science and technology
	Amount	**4**	**3**	**Important (P1)**

Isi

Chapter 7

Holistic Evaluation on Environmental Impact

A holistic evaluation of environmental impacts aims to evaluate the impacts that are predicted to occur at all stages of activities (pre-construction, construction, and operations) and the relationship between these impacts. The results of a holistic evaluation of environmental impacts are used as a basis for determining the environmental feasibility of planned activities and as a reference for determining environmental impacts that will be managed and monitored. In this way, it is hoped that environmental management and monitoring can be effective and efficient to prevent and overcome negative impacts and develop positive impacts that are predicted to occur.

In the Amdal study of MRT-EWLP1S1, a holistic evaluation of environmental impacts is carried out using a simple matrix (Table 7.1.) which presents the interaction between the magnitude of the impact and the significance of the impact resulting from the estimation of significant impacts and determination of the significance of the impact (CHAPTER VI), with the following criteria:

I. If the criteria for the significance of the impact "number of people affected" is determined to be important (P1), regardless of the value of the impact magnitude (M), then the conclusion is that the impact is included in the category of important impacts that are managed and monitored (KP).

II. If the number of important criteria is ≥ 4 (P2) and the impact magnitude (M) value is positive/negative, then the impact conclusion is included in the category of important impacts that are managed and monitored (KP).

III. If the number of important criteria is ≥ 1 and the parameter value of the impact magnitude (M) exceeds the quality standard and/or has an impact on the social economy and culture of the community, then the conclusion is that the impact is included in the important impact category that is managed and monitored (KP).

IV. Apart from criteria I, II, and III, the impact conclusion is included in the category of unimportant impacts that are not managed and monitored (TKKP).

Table 7.1. Significant Impact Evaluation Matrix

Activity plan	Environmental Components	DPH	Parameter	Impact Magnitude					Class	Important Nature of Impact										M/I	Criteria	Conclusion	Number of Significant Impacts
				RLA	T.P	D.P	m			Criteria for the Significance of Impact							Σp	Σtp	I				
							Mark	%		1	2	3	4	5	6	7							
A Pre-Construction Stage																							
1 Land Acquisition	Socioeconomic	Lost business opportunities	Economic facility building area (m²)	148.240,20	148.240,20	101.050,51	-47.189,69	-31,83%	Negative	p	p	p	p	p	tp	tp	5	2	P1	-0,318% / P1	I	Significant Impacts are managed and monitored	3
		Decrease in family income	Average income (rupiah/month)	5.182.649	5.182.649	2.591.325	-2.591.325	-50%	Negative	p	p	p	p	tp	tp	p	5	2	P1	-0,500 / P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 384 families)	89,06%	89,06%	44,53%	-44,53%	-50%	Negative	p	p	p	tp	p	tp	tp	4	3	P1	-0,5 / P1	I	Significant Impacts are managed and monitored	
B Construction Phase																							
2 Acceptance of Construction Workers	Socioeconomic	Open business opportunities	Labor force participation rate (%)	90,10	90,32	90,53	0,21	0.23%	Positive	p	p	p	p	p	tp	tp	5	2	P1	0.23% / P1	I	Significant Impacts are managed and monitored	3
		Increase in family income	Average income (rupiah/month) of residents who have not lost their business (livelihood)	5.182.649	2.320.813	5.182.649	2.861.836	55.22%	Positive	p	p	p	p	p	tp	tp	5	2	P1	55.22% / P1	I	Significant Impacts are managed and monitored	
			Average income (rupiah/month) of residents who lost their business (livelihood)	5.182.649	2.591.325	5.182.649	2.591.325	50%	Positive											50% / P1			
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 384 families)	89,06%	89,06%	95,05%	5,99%	6.73%	Positive	p	p	p	p	p	tp	tp	5	2	P1	6.73% /P1	I	Significant Impacts are managed and monitored	
3 Basecamp Operational																							
a. Basecamp Underground (BC-UG)	Socioeconomic	Open business opportunities	Number of respondents who own a business and/or work at the activity location (total respondents 123 families)	54,47%	54,47%	65,48%	11,01%	20.21%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	20.21% / P1	I	Significant Impacts are managed and monitored	3
		Increase in family income	Average income (rupiah/month)	5.182.649	2.320.813	5.182.649	2.861.836	55.22%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	55.22% /P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 123 families)	86,99%	86,99%	92,68%	5,69%	6.54%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	6.54% / P1	I	Significant Impacts are managed and monitored	
b. Basecamp Elevated (BC-ELV)	Socioeconomic	Open business opportunities	Number of respondents who own a business and/or work at the activity location (total respondents 135 families)	53,57%	53,57%	60,16%	6,59%	12.30%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	12.30% / P1	I	Significant Impacts are managed and monitored	3
		Increase in family income	Average income (rupiah/month)	5.182.649	2.320.813	5.182.649	2.861.836	55.22%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	55.22% /P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 252 families)	90,08%	90,08%	96,03%	5,95%	6.61%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	6.61% / P1	I	Significant Impacts are managed and monitored	
c. Basecamp Depo (BC-DEPO)	Socioeconomic	Open business opportunities	Number of respondents who own a business and/or work at the activity location (total respondents 9 families)	44,44%	44,44%	55,56%	11,12%	25.02%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	25.02% / P1	I	Significant Impacts are managed and monitored	3
		Increase in family income	Average income (rupiah/month)	5.182.649	2.320.813	5.182.649	2.861.836	55.22%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	55.22% /P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 9 families)	88,89%	88,89%	98,22%	9,33%	10.50%	Positive	p	p	tp	p	p	tp	tp	4	3	P1	10.50% / P1	I	Significant Impacts are managed and monitored	
4 Mobilization of Construction Equipment and Materials																							
a. West Elevated and East Elevated Segments	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. S. Parman	1,074 (F)	1,074 (F)	1,080 (F)	0,006	0.56%	Negative	p	p	p	p	p	tp	tp	5	2	P1	0.56% / P1	I	Significant Impacts are managed and monitored	1
			Jl. Kyai Tapa	1,078 (F)	1,078 (F)	1,091 (F)	0,013	1.21%												1.21% / P1			
			Jl. Lt. Jen. Suprapto	0.780 (C)	0.780 (C)	0.992 (E)	0,212	27.18%	Negative	p	p	p	p	p	tp	tp	5	2	P1	27.18% / P1			
			Jl. Perintis Kemerdekaan	0.535 (C)	0.535 (C)	0.392 (C)	0,143	26.73%												26.73% / P1			
			Jl. Raya Bekasi	0.845 (D)	0.845 (D)	0.966 (E)	0,121	14.32%												14.32% / P1			

Activity plan	Environmental Components	DPH	Parameter	Impact Magnitude					Class	Important Nature of Impact										M/I	Criteria	Conclusion	Number of Significant Impacts
				RLA	T.P	D.P	m			Criteria for the Significance of Impact							∑p	∑tp	I				
							Mark	%		1	2	3	4	5	6	7							
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. S. Parman (Tomang Station)	56.75 (Medium)	56.75 (Medium)	56.76 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP			
			Jl. Lt. Jen. Suprapto (Sta Sumur Batu)	60.53 (Medium)	60.53 (Medium)	60.53 (Medium)	0	0.00%												0.00% / TP			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	61.29 (Medium)	61.29 (Medium)	61.29 (Medium)	0	0.00%												0.00% / TP			
			Jl. Raya Bekasi (Sta Pulo Gadung)	59.00 (Medium)	59.00 (Medium)	59.01 (Medium)	0,01	0.02%												0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Raya Bekasi (West Cakung Station)	58.00 (Medium)	58.00 (Medium)	58.01 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP			
			Jl. Raya Bekasi (Ujung Menteng Station)	57.28 (Medium)	57.28 (Medium)	57.28 (Medium)	0	0.00%												0.00% / TP			
			Jl.Kali Abang Tengah (Sta Medan Satria)	52.99 (Medium)	52.99 (Medium)	52.99 (Medium)	0	0.00%												0.00% / TP			
	Noise	Noise increase (dB(A))	Jl. S. Parman (Tomang Station)	72	72	72,05	0,05	0.07%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.07% / TP			
			Jl. Lt. Jen. Suprapto (Sta Sumur Batu)	70	70	70,07	0,07	0.10%												0.10% / TP			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	72	72	72,05	0,05	0.07%												0.07% / TP			
			Jl. Raya Bekasi (Sta Pulo Gadung)	70	70	70,07	0,07	0.10%												0.10% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Raya Bekasi (West Cakung Station)	72	72	72,05	0,05	0.07%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.07% / TP			
			Jl. Raya Bekasi (Ujung Menteng Station)	70	70	70,07	0,07	0.10%												0.10% / TP			
			Jl. Kali Abang Tengah(Sta Medan Satria)	66	66	66,18	0,18	0.27%												0.27% / TP			
b. Underground Segment	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. KH Hasyim Asy'ari	0.830 (D)	0.830 (D)	1,036 (F)	0,206	24.82%	Negative	p	p	p	p	p	tp	tp	5	2	P1	24.82% / P1			
			Jl. East Cideng	0.875 (D)	0.875 (D)	1,053 (F)	0,178	20.34%												20.34% / P1			
			Jl. Jatibaru Raya	0.914 (E)	0.914 (E)	0.958 (E)	0,044	4.81%												4.81% / P1			
			Jl. Kebon Sirih	0.426 (C)	0.426 (C)	0.488 (C)	0,062	14.55%												14.55% / P1	I	Significant Impacts are managed and monitored	1
			Jl. AR Hakim	0.499 (C)	0.499 (C)	0.586 (C)	0,087	17.43%												17.43% / P1			
			Jl. Kramat Kwitang	0.980 (E)	0.980 (E)	1,097 (F)	0,117	11.94%												11.94% / P1			
			Jl. Kramat Bundar	0.317 (B)	0.317 (B)	0.405 (B)	0,088	27.76%												27.76% / P1			
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29 (Medium)	60.29 (Medium)	60.29 (Medium)	0	0.00%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.00% / TP			
			Jl. Kebon Sirih (Sta Thamrin)	57.90 (Medium)	57.90 (Medium)	57.91 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. East Cindeng (Sta Petojo)	60.76 (Medium)	60.76 (Medium)	60.77 (Medium)	0,01	0.02%												0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Letjen Suprapto (Sta Galur)	58.76 (Medium)	58.76 (Medium)	58.77 (Medium)	0,01	0.02%												0.02% / TP			
	Noise	Noise increase (dB(A))	Jl. KH Hasyim Asy'ari (Sta Roxy)	68	68	68,11	0,11	0.16%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.16% / TP			
			Jl. Kebon Sirih (Sta Thamrin)	73	73	73,04	0,04	0.05%												0.05% / TP			
			Jl. East Cindeng (Sta Petojo)	69	69	69,09	0,09	0.13%												0.13% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Letjen Suprapto (Sta Galur)	73	73	73,04	0,04	0.05%												0.05% / TP			

Activity plan	Environmental Components	DPH	Parameter	Impact Magnitude					Class	Important Nature of Impact										M/I	Criteria	Conclusion	Number of Significant Impacts
				RLA	T.P	D.P	m			Criteria for the Significance of Impact							Σp	Σtp	I				
							Mark	%		1	2	3	4	5	6	7							
c. Deposit Segment	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. Inspeksi Kanal Timur	0.104 (A)	0.104 (A)	0.222 (B)	0,118	113.46%	Negative	p	p	p	p	p	tp	tp	5	2	P1	113.46% / P1	I	Significant Impacts are managed and monitored	1
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. Inspeksi Kanal Timur	53.70 (Medium)	53.70 (Medium)	53.71 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
	Noise	Noise increase (dB(A))	Jl. Inspeksi Kanal Timur	69	69	69,09	0,09	0.13%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.13% / TP	IV	Non-Significant Impacts are not managed or monitored	
All	Public health	0	prevalence of ARI (%)	4,95	4,95	5,61	0,66	13.33%	Negative	p	p	tp	p	p	p	tp	5	2	P1	13.33% /P1	I	Significant Impacts are managed and monitored	2
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 384 families)	89,06%	89,06%	44,53%	-44,53%	-50%	Negative	p	p	p	tp	p	tp	tp	4	3	P1	-50% /P1	I	Significant Impacts are managed and monitored	
5 Land clearing and relocation of public facilities/utilities																							
a. West Elevated and East Elevated Segments	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. S. Parman	1,074 (F)	1,074 (F)	1,080 (F)	0,006	0.56%	Negative	p	p	p	p	p	tp	tp	5	2	P1	0.56% / P1	I	Significant Impacts are managed and monitored	1
			Jl. Kyai Tapa	1,078 (F)	1,078 (F)	1,091 (F)	0,013	1.21%												1.21% / P1			
			Jl. Lt. Jen. Suprapto	0.780 (C)	0.780 (C)	0.992 (E)	0,212	27.18%	Negative	p	p	p	p	p	tp	tp	5	2	P1	27.18% / P1			
			Jl. Perintis Kemerdekaan	0.535 (C)	0.535 (C)	0.392 (C)	0,143	26.73%												26.73% / P1			
			Jl. Raya Bekasi	0.845 (D)	0.845 (D)	0.966 (E)	0,121	14.32%												14.32% / P1			
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. S. Parman (Tomang Station)	56.75 (Medium)	56.75 (Medium)	56.78 (Medium)	0,03	0.05%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.05% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Lt.Jen. Suprapto (Sta Sumur Batu)	60.53 (Medium)	60.53 (Medium)	60.56 (Medium)	0,03	0.05%												0.05% / TP			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	61.29 (Medium)	61.29 (Medium)	61.32 (Medium)	0,03	0.05%												0.05% / TP			
			Jl. Raya Bekasi (Sta Pulo Gadung)	59.00 (Medium)	59.00 (Medium)	59.03 (Medium)	0,03	0.05%												0.05% / TP			
			Jl. Raya Bekasi (West Cakung Station)	58.00 (Medium)	58.00 (Medium)	58.03 (Medium)	0,03	0.05%												0.05% / TP			
			Jl. Raya Bekasi (Ujung Menteng Station)	57.28 (Medium)	57.28 (Medium)	57.31 (Medium)	0,03	0.05%												0.05% / TP			
			Jl. Kali Abang Tengah (Sta Medan Satria)	52.99 (Medium)	52.99 (Medium)	53.02 (Medium)	0,03	0.05%												0.05% / TP			
	Noise	Noise increase (dB(A))	Jl. S. Parman (Tomang Station)	72	72	72,07	0,07	0.10%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.10% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Lt. Jen. Suprapto (Sta Sumur Batu)	70	70	70,12	0,12	0.17%												0.17% / TP			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	72	72	72,07	0,07	0.10%												0.10% / TP			
			Jl. Raya Bekasi (Sta Pulo Gadung)	70	70	70,12	0,12	0.17%												0.17% / TP			
			Jl. Raya Bekasi (West Cakung Station)	72	72	72,07	0,07	0.10%												0.10% / TP			
			Jl. Raya Bekasi (Ujung Menteng Station)	70	70	70,12	0,12	0.17%												0.17% / TP			
			Jl. Kali Abang Tengah (Sta Medan Satria)	66	66	66,29	0,29	0.44%												0.44% / TP			
b. Underground Segment	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. KH Hasyim Asy'ari	0.830 (D)	0.830 (D)	1,036 (F)	0,206	24.82%	Negative	p	p	p	p	p	tp	tp	5	2	P1	24.82% / P1	I	Significant Impacts are managed and monitored	1
			Jl. East Cideng	0.875 (D)	0.875 (D)	1,053 (F)	0,178	20.34%												20.34% / P1			
			Jl. Jatibaru Raya	0.914 (E)	0.914 (E)	0.958 (E)	0,044	4.81%												4.81% / P1			
			Jl. Kebon Sirih	0.426 (C)	0.426 (C)	0.488 (C)	0,062	14.55%												14.55% / P1			
			Jl. AR Hakim	0.499 (C)	0.499 (C)	0.586 (C)	0,087	17.43%												17.43% / P1			
			Jl. Kramat Kwitang	0.980 (E)	0.980 (E)	1,097 (F)	0,117	11.94%												11.94% / P1			
			Jl. Kramat Bundar	0.317 (B)	0.317 (B)	0.405 (B)	0,088	27.76%												27.76% / P1			

Activity plan	Environmental Components	DPH	Parameter	Impact Magnitude						Important Nature of Impact										M/I	Criteria	Conclusion	Number of Significant Impacts
				RLA	T.P	D.P	m		Class	Criteria for the Significance of Impact							∑p	∑tp	I				
							Mark	%		1	2	3	4	5	6	7							
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29 (Medium)	60.29 (Medium)	60.32 (Medium)	0,03	0.05%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.05% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Kebon Sirih (Sta Thamrin)	57.90 (Medium)	57.90 (Medium)	57.93 (Medium)	0,03	0.05%													0.05% / TP			
			Jl. East Cindeng (Sta Petojo)	60.76 (Medium)	60.76 (Medium)	60.79 (Medium)	0,03	0.05%													0.05% / TP			
			Jl. Letjen Suprapto (Sta Galur)	58.76 (Medium)	58.76 (Medium)	58.79 (Medium)	0,03	0.05%													0.05% / TP			
	Noise	Noise increase (dB(A))	Jl. KH Hasyim Asy'ari (Sta Roxy)	68	68	68,19	0,19	0.28%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.28% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Kebon Sirih (Sta Thamrin)	73	73	73,06	0,06	0.08%													0.08% / TP			
			Jl. East Cindeng (Sta Petojo)	69	69	69,15	0,15	0.22%													0.22% / TP			
			Jl. Letjen Suprapto (Sta Galur)	73	73	73,06	0,06	0.08%													0.08% / TP			
d. Deposit Segment	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. Inspeksi Kanal Timur	0.104 (A)	0.104 (A)	0.222 (B)	0,118	113.46%	Negative	p	p	p	p	p	tp	tp	5	2	P1	113.46% / P1	I	Significant Impacts are managed and monitored	1
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. Inspeksi Kanal Timur	53.70 (Medium)	53.70 (Medium)	53.73 (Medium)	0,03	0.05%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.05% / TP	IV	Non-Significant Impacts are not managed or monitored	
	Noise	Noise increase (dB(A))	Jl. Inspeksi Kanal Timur	69	69	69,15	0,15	0.22%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.22% / TP	IV	Non-Significant Impacts are not managed or monitored	
All	Hydrology	Increased runoff water discharge	Running water discharge (m³/sec)	0,716	0,716	1,908	1,192	166.48%	Negative	p	p	p	tp	tp	tp	tp	3	4	P1	166.48% /P1	I	Significant Impacts are managed and monitored	3
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	4,95	5,61	0,66	13.33%	Negative	p	p	tp	p	p	p	tp	5	2	P1	13.33% /P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitudes	Percentage of respondents who agree/support (total respondents 384 families)	89,06%	89,06%	44,53%	-44,53%	-50%	Negative	p	p	p	tp	p	tp	tp	4	3	P1	-50% /P1	I	Significant Impacts are managed and monitored	
6 Earthworks and Dewatering																							
a. West Elevated and East Elevated Segments	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. S. Parman	1,074 (F)	1,074 (F)	1,080 (F)	0,006	0.56%	Negative	p	p	p	p	p	tp	tp	5	2	P1	0.56% / P1	I	Significant Impacts are managed and monitored	3
			Jl. Kyai Tapa	1,078 (F)	1,078 (F)	1,091 (F)	0,013	1.21%													1.21% / P1			
			Jl. Lt. Jen. Suprapto	0.780 (C)	0.780 (C)	0.992 (E)	0,212	27.18%	Negative	p	p	p	p	p	tp	tp	5	2	P1	27.18% / P1			
			Jl. Perintis Kemerdekaan	0.535 (C)	0.535 (C)	0.392 (C)	0,143	26.73%													26.73% / P1			
			Jl. Raya Bekasi	0.845 (D)	0.845 (D)	0.966 (E)	0,121	14.32%													14.32% / P1			
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. S. Parman (Tomang Station)	56.75 (Medium)	56.75 (Medium)	56.76 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Lt. Jen. Suprapto (Sta Sumur Batu)	60.53 (Medium)	60.53 (Medium)	60.53 (Medium)	0	0.00%													0.00% / TP			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	61.29 (Medium)	61.29 (Medium)	61.29 (Medium)	0	0.00%													0.00% / TP			
			Jl. Raya Bekasi (Sta Pulo Gadung)	59.00 (Medium)	59.00 (Medium)	59.01 (Medium)	0,01	0.02%													0.02% / TP			
			Jl. Raya Bekasi (West Cakung Station)	58.00 (Medium)	58.00 (Medium)	58.00 (Medium)	0,01	0.02%													0.02% / TP			
			Jl. Raya Bekasi (Ujung Menteng Station)	57.28 (Medium)	57.28 (Medium)	57.28 (Medium)	0	0.00%													0.00% / TP			
			Jl. Kali Abang Tengah (Sta Medan Satria)	52.99 (Medium)	52.99 (Medium)	52.99 (Medium)	0	0.00%													0.00% / TP			

Activity plan	Environmental Components	DPH	Parameter	Impact Magnitude					Class	Important Nature of Impact										M/I	Criteria	Conclusion	Number of Significant Impacts
				RLA	T.P	D.P	m			Criteria for the Significance of Impact							∑p	∑tp	I				
							Mark	%		1	2	3	4	5	6	7							
	Noise	Noise increase (dB(A))	Jl. S. Parman (Tomang Station)	72	72	84,53	12,53	17.40%	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	17.40% / P1			
			Jl. Lt. Jen. Suprapto (Sta Sumur Batu)	70	70	95,40	25,40	36.29%												36.29% / P1			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	72	72	95,41	23,41	32.51%												32.51% / P1			
			Jl. Raya Bekasi (Sta Pulo Gadung)	70	70	95,40	25,40	36.29%												36.29% / P1	I	Significant Impacts are managed and monitored	
			Jl. Raya Bekasi (West Cakung Station)	72	72	95,41	23,41	32.51%	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	32.51% / P1			
			Jl. Raya Bekasi (Ujung Menteng Station)	70	70	95,40	25,40	36.29%												36.29% / P1			
			Jl. Kali Abang Tengah (Sta Medan Satria)	66	66	95,39	29,39	44.54%												44.54% / P1			
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	4,95	6,05	1,1	22.22%	Negative	p	p	tp	p	p	p	tp	5	2	P1	22.22% /P1	I	Significant Impacts are managed and monitored	
b. Underground Segment	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. KH Hasyim Asy'ari	0.830 (D)	0.830 (D)	1,036 (F)	0,206	24.82%												24.82% / P1			
			Jl. East Cideng	0.875 (D)	0.875 (D)	1,053 (F)	0,178	20.34%												20.34% / P1			
			Jl. Jatibaru Raya	0.914 (E)	0.914 (E)	0.958 (E)	0,044	4.81%												4.81% / P1			
			Jl. Kebon Sirih	0.426 (C)	0.426 (C)	0.488 (C)	0,062	14.55%	Negative	p	p	p	p	p	tp	tp	5	2	P1	14.55% / P1	I	Significant Impacts are managed and monitored	
			Jl. AR Hakim	0.499 (C)	0.499 (C)	0.586 (C)	0,087	17.43%												17.43% / P1			
			Jl. Kramat Kwitang	0.980 (E)	0.980 (E)	1,097 (F)	0,117	11.94%												11.94% / P1			
			Jl. Kramat Bundar	0.317 (B)	0.317 (B)	0.405 (B)	0,088	27.76%												27.76% / P1			
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29 (Medium)	60.29 (Medium)	60.29 (Medium)	0,00	0.00%												0.00% / TP			3
			Jl. Kebon Sirih (Sta Thamrin)	57.90 (Medium)	57.90 (Medium)	57.91 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. East Cindeng (Sta Petojo)	60.76 (Medium)	60.76 (Medium)	60.77 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Letjen Suprapto (Sta Galur)	58.76 (Medium)	58.76 (Medium)	58.77 (Medium)	0,01	0.02%												0.02% / TP			
	Noise	Noise increase (dB(A))	Jl. KH Hasyim Asy'ari (Sta Roxy)	68	68	97,79	29,79	43.82%												43.82% / P1			
			Jl. Kebon Sirih (Sta Thamrin)	73	73	97,80	24,80	33.98%												33.98% / P1			
			Jl. East Cindeng (Sta Petojo)	69	69	97,80	28,80	41.73%	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	41.73% / P1	I	Significant Impacts are managed and monitored	
			Jl. Letjen Suprapto (Sta Galur)	73	73	97,80	24,80	33.98%												33.98% / P1			
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	4,95	7,03	2,08	42.02%	Negative	p	p	tp	p	p	p	tp	5	2	P1	42.02% /P1	I	Significant Impacts are managed and monitored	
d. depo Segment	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. Inspeksi Kanal Timur	0.104 (A)	0.104 (A)	0.222 (B)	0,118	113.46%	Negative	p	p	p	p	p	tp	tp	5	2	P1	113.46% / P1	I	Significant Impacts are managed and monitored	4
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. Inspeksi Kanal Timur	53.70 (Medium)	53.70 (Medium)	53.71 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
	Noise	Noise increase (dB(A))	Jl. Inspeksi Kanal Timur	69	69	100,13	31,13	45.12%	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	45.12% / P1	I	Significant Impacts are managed and monitored	
	Hydrology	Increased runoff water discharge	Running water discharge (m³/sec)	2,11	2,11	16,92	14,81	701.90%	Negative	p	p	p	tp	tp	tp	tp	3	4	P1	701.90% /P1	I	Significant Impacts are managed and monitored	
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	4,95	6,66	1,71	34.55%	Negative	p	p	tp	p	p	p	tp	5	2	P1	34.55% /P1	I	Significant Impacts are managed and monitored	

Activity plan	Environmental Components	DPH	Parameter	Impact Magnitude					Class	Important Nature of Impact										M/I	Criteria	Conclusion	Number of Significant Impacts
				RLA	T.P	D.P	m			Criteria for the Significance of Impact							∑p	∑tp	I				
							Mark	%		1	2	3	4	5	6	7							
7 Underground Construction Work	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. KH Hasyim Asy'ari	0.830 (D)	0.830 (D)	1,036 (F)	0,206	24.82%	Negative	p	p	p	p	p	tp	tp	5	2	P1	24.82% / P1	I	Significant Impacts are managed and monitored	3
			Jl. East Cideng	0.875 (D)	0.875 (D)	1,053 (F)	0,178	20.34%												20.34% / P1			
			Jl. Jatibaru Raya	0.914 (E)	0.914 (E)	0.958 (E)	0,044	4.81%												4.81% / P1			
			Jl. Kebon Sirih	0.426 (C)	0.426 (C)	0.488 (C)	0,062	14.55%												14.55% / P1			
			Jl. AR Hakim	0.499 (C)	0.499 (C)	0.586 (C)	0,087	17.43%												17.43% / P1			
			Jl. Kramat Kwitang	0.980 (E)	0.980 (E)	1,097 (F)	0,117	11.94%												11.94% / P1			
			Jl. Kramat Bundar	0.317 (B)	0.317 (B)	0.405 (B)	0,088	27.76%												27.76% / P1			
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. KH Hasyim Asy'ari (Sta Roxy)	60.29 (Medium)	60.29 (Medium)	60.30 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Kebon Sirih (Sta Thamrin)	57.90 (Medium)	57.90 (Medium)	57.91 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. East Cindeng (Sta Petojo)	60.76 (Medium)	60.76 (Medium)	60.77 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. Letjen Suprapto (Sta Galur)	58.76 (Medium)	58.76 (Medium)	58.77 (Medium)	0,01	0.02%												0.02% / TP			
	Noise	Noise increase (dB(A))	Jl. KH Hasyim Asy'ari (Sta Roxy)	68	68	100,28	32,28	47.47%	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	47.47% / P1	I	Significant Impacts are managed and monitored	
			Jl. Kebon Sirih (Sta Thamrin)	73	73	100,29	27,29	37.38%												37.38% / P1			
			Jl. East Cindeng (Sta Petojo)	69	69	100,28	31,28	45.34%												45.34% / P1			
			Jl. Letjen Suprapto (Sta Galur)	73	73	100,29	27,29	37.38%												37.38% / P1			
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	4,95	6,14	1,19	24.04%	Negative	p	p	tp	p	p	p	tp	5	2	P1	24.04% /P1	I	Significant Impacts are managed and monitored	
8 Construction Work at Ground Level																							
a. West Elevated and East Elevated Segments	Traffic	Decreased traffic performance (VC Ratio and LOS)	Jl. S. Parman	1,074 (F)	1,074 (F)	1,080 (F)	0,006	0.56%	Negative	p	p	p	p	p	tp	tp	5	2	P1	0.56% / P1	I	Significant Impacts are managed and monitored	3
			Jl. Kyai Tapa	1,078 (F)	1,078 (F)	1,091 (F)	0,013	1.21%												1.21% / P1			
			Jl. Lt. Jen. Suprapto	0.780 (C)	0.780 (C)	0.992 (E)	0,212	27.18%	Negative	p	p	p	p	p	tp	tp	5	2	P1	27.18% / P1			
			Jl. Perintis Kemerdekaan	0.535 (C)	0.535 (C)	0.392 (C)	0,143	26.73%												26.73% / P1			
			Jl. Raya Bekasi	0.845 (D)	0.845 (D)	0.966 (E)	0,121	14.32%												14.32% / P1			
	Air quality	Decreased air quality (ISPU Max and ISPU Category)	Jl. S. Parman (Tomang Station)	56.75 (Medium)	56.75 (Medium)	56.76 (Medium)	0,01	0.02%	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
			Jl. Lt. Jen. Suprapto (Sta Sumur Batu)	60.53 (Medium)	60.53 (Medium)	60.53 (Medium)	0	0.00%												0.00% / TP			
			Jl. Perintis Kemerdekaan (East Pakulonan Sta)	61.29 (Medium)	61.29 (Medium)	61.30 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. Raya Bekasi (Sta Pulo Gadung)	59.00 (Medium)	59.00 (Medium)	59.01 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. Raya Bekasi (West Cakung Station)	58.00 (Medium)	58.00 (Medium)	58.01 (Medium)	0,01	0.02%												0.02% / TP			
			Jl. Raya Bekasi (Ujung Menteng Station)	57.28 (Medium)	57.28 (Medium)	57.28 (Medium)	0	0.00%												0.00% / TP			
			Jl. Kali Abang Tengah (Sta Medan Satria)	52.99 (Medium)	52.99 (Medium)	53.00 (Medium)	0,01	0.02%												0.02% / TP			

	Noise	Noise increase (dB(A))	Jl. S. Parman (Tomang Station)	72	90,21	18,21	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	25.29% / P1	I	Significant Impacts are managed and monitored	
			Jl. Lt. Gen. Suprapto (Sta Sumur Batu)	70	96,91	26,91												38.44% / P1			
			Jl. Pioneers of Independence (East Pakulonan S	72	96,91	24,91												34.6% / P1			
			Jl. Raya Bekasi (Sta Pulo Gadung)	70	96,91	26,91												38.44% / P1			
			Jl. Raya Bekasi (West Cakung Station)	72	96,91	24,91												34.6% / P1			
			Jl. Raya Bekasi (Ujung Menteng Station)	70	96,91	26,91												38.44% / P1			
			Jl. Central Abang River (Sta Medan Satria)	66	96,90	30,90												46.82% / P1			
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	6,05	1,1	Negative	p	p	tp	p	p	p	tp	5	2	P1	22.22% /P1	I	Significant Impacts are managed and monitored	
b. Deposit Segment	Traffic	Decreased traffic performance (VC Ratio	Jl. East Canal Inspection	0.104 (A)	0.222 (B)	0,118	Negative	p	p	p	p	p	tp	tp	5	2	P1	113.46% / P1	I	Significant Impacts are managed and monitored	
	Air quality	Decreased air quality (ISPU Max and ISP	Jl. East Canal Inspection	.70 (Medium)	53.71 (Medium)	0,01	No impact	tp	tp	tp	p	tp	tp	tp	1	6	TP	0.02% / TP	IV	Non-Significant Impacts are not managed or monitored	
	Noise	Noise increase (dB(A))	Jl. East Canal Inspection	69	98,76	29,76	Negative	p	tp	p	p	tp	tp	tp	3	4	P1	43.14% / P1	I	Significant Impacts are managed and monitored	
	Public health	Disease prevalence	prevalence of ARI (%)	4,95	6,66	1,71	Negative	p	p	tp	p	p	p	tp	5	2	P1	34.55% /P1	I	Significant Impacts are managed and monitored	
B Operational Stage																					
9 Acceptance of Operational Workers	Socioeconomic	Open job opportunities	Labor force participation rate (%)	90,10	90,35	0,03	Positive	p	p	p	p	p	tp	tp	5	2	P1	0.03% /P1	I	Significant Impacts are managed and monitored	
		Increase in family income	Average income (rupiah/month)	5.182.649	5.182.649	2.861.836	Positive	p	p	p	p	p	tp	tp	5	2	P1	55.22% /P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitu	Number of respondents who agree/support (total respondents 384 families)	342	365	23	Positive	p	p	p	p	p	tp	tp	5	2	P1	6.73% /P1	I	Significant Impacts are managed and monitored	
10 Passenger Transport Activities and Station Operations	Noise	Increased noise	Noise level (dBA) on the segment*Underground*	70,6	70,6	0	No impact	tp	tp	p	tp	tp	tp	tp	1	6	TP	0% /TP	IV	Non-Significant Impacts are not managed or monitored	
			Noise level (dBA) on the segment*Elevated*	70,33	70,33	0	No impact	tp	tp	p	tp	tp	tp	tp	1	6	TP	0% /TP	IV	Non-Significant Impacts are not managed or monitored	
	Vibration	Increased vibration	Vibration level (dB) on the segment*Undergroun*	59,67	59,67	0	No impact	tp	tp	p	tp	tp	tp	tp	1	6	TP	0% /TP	IV	Non-Significant Impacts are not managed or monitored	
			Vibration level (dB) on the segment*Elevated*	55,1	55,1	0	No impact	tp	tp	p	tp	tp	tp	tp	1	6	TP	0% /TP	IV	Non-Significant Impacts are not managed or monitored	
	Socioeconomic	Open business opportunities	Number of respondents who own a business and/or work at the activity location (total respondents 123 families)	53,64	59,12	5,48	Positive	p	p	p	p	p	p	tp	6	1	P1	10.22% /P1	I	Significant Impacts are managed and monitored	
		Increase in family income	Average income (rupiah/month)	5.182.649	5.182.649	2.861.836	Positive	p	p	p	p	tp	tp	tp	4	3	P1	55.22% /P1	I	Significant Impacts are managed and monitored	
	Socio-cultural	Changes in public perceptions and attitudes	Number of respondents who agree/support (total respondents 123 families)	342	365	23	Positive	p	p	p	tp	p	tp	tp	4	3	P1	6.73% /P1	I	Significant Impacts are managed and monitored	
11 Train Maintenance and Depot Operations	Hydrogeology	Decreased groundwater quality	water pollution index value (Plj)	5,47	22,10	0,00	No impact	p	p	p	tp	tp	tp	tp	3	4	P1	0 /P1	I	Significant Impact	1

Information :

Pre - Construction Phase
- A Land Acquisition

Construction Phase
- A Acceptance of Construction Workers
- B Development and Operations*Basecamp*
- C Mobilization of Construction Equipment and
- D Land Clearing and Relocation of Public
- E Earthworks and*Dewatering*
- F Underground Construction Work
- G Ground Surface Construction Work

Operational Stage
- A Acceptance of Operational Workers
- B Passenger Transport Activities and Station Operations
- C Train Maintenance and Depot Operations

√ (+/-) : it is predicted that there is a causal interaction between the business plan/

Segment:
- **All** : West Elevated, Underground, East Elvated and Depot
- **Elv. West** : West Elevated
  St. Tomang to transition point (*transition section*) at 40k849m (in the middle of the St. Grogol – St. Roxy line)
- **U.G** : Underground
  transition point (*transition section*) at 40k849m to transition point (*transition section*) at 50k345m
  (in the middle of the St. Galur – St. Cempaka Baru route)
- **Elv. East** : East Elevated
  transition point (*transition section*) at 50k345m (in the middle of the St. Galur – St. Cempaka Baru route)
  to Medan Satria Station
- **Depot** : Deposit
  St. Ujung Menteng to Rorotan Depot

7.1. Study of Significant Impacts

Basically, every stage of activity in the development plan of MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) with a length of ± 24,527 Km and access to the Rorotan Depot with a length of ± 5.90 Km will have an impact on environmental components, both negative and positive. Based on the results of the significant impact evaluation (Table 7.1.), the important impact of development plan of MRT-EWLP1S1 is as follows:

Table 7.2. Important Impact due to the Development plan of MRT-EWLP1S1

Activity plan		Significant Impact
Pre-Construction Stage		
1)	Land Acquisition	a. Loss of business opportunities b. Decrease in family income c. Changes in public perceptions and attitudes
Construction Phase		
2)	Acceptance of Construction Workers	a. Open job opportunities b. Increase in family income c. Changes in public perceptions and attitudes
3)	Basecamp Operations	a. Open business opportunities b. Increase in family income c. Changes in public perceptions and attitudes
4)	Mobilization of Construction Equipment and Materials	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI e. Changes in public perceptions and attitudes
5)	Land Clearing and Relocation of Public Facilities/Utilities	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased runoff water discharge e. Increased prevalence of ARI f. Changes in public perceptions and attitudes
6)	Earthworks and Dewatering	
	a) West Elevated Segment and East Elevated Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
	b) Underground Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
	c) Depot Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased runoff water discharge e. Increased prevalence of ARI
7)	Underground Construction Work	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI

	Activity plan	Significant Impact
8)	Ground Surface Construction Work	
	a) West Elevated Segment and East Elevated Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
	b) Depot Segment	a. Decreased traffic performance b. Decreased air quality c. Increased noise d. Increased prevalence of ARI
Operational Stage		
9)	Acceptance of Operational Workers	a. Open job opportunities b. Increase in family income c. Changes in public perceptions and attitudes
10)	Passenger Transportation and Station Operations	a. Increased noise b. Increased vibration c. Open business opportunities d. Increase in family income e. Changes in public perceptions and attitudes
11)	Train Maintenance and Depot Operations	-

7.1.1. Pre-Construction Stage

Activities in the pre-construction stage of the MRT-EWLP1S1 development take the form of Land acquisition is carried out through land acquisition mechanisms with reference to Law No. 2 of 2012 and Government Regulation No. 19 of 2021. Activities of land acquisition is predicted that it will have an impact on socio-economic components, especially the loss or reduction in the area and number of economic facilities (shops, markets, minimarkets/supermarkets, restaurants/restaurants, food stalls/taverns and grocery stores) which have been community businesses in 31 sub-districts at the MRT-EWLP1S1 construction site. This condition then resulted in the loss of livelihood/business opportunities for the people who had been working and/or doing business at the MRT-EWLP1S1 construction site. The derivative impact of losing business opportunities will then result in a decrease in family income. This condition can cause changes in people's perceptions and attitudes (socio-cultural component)in the negative direction.

7.1.2. Construction Phase

Activities covered at the construction stage are recruitment of construction workers, basecamp operations, mobilization of construction equipment and materials, land clearing and relocation of public facilities/utilities, earthworks and dewatering, underground construction work, and construction work on the ground surface. Activities in the construction phase are predicted to have an impact on the geophysical-chemical, public health and socio-economic and cultural components of the community. The nature of the impact caused is positive and negative with the impact size including small and large. If viewed holistically, the magnitude of the impact for most of what occurs is

categorized as small for each parameter, but is still categorized as an important impact for management efforts to be carried out in each activity. The parameters of the physical-chemical components that are affected are a decrease in traffic performance, an increase in noise and an increase in runoff water discharge. The parameters for the socio-economic and cultural components of the affected communities are the opening up of employment opportunities, the opening up of business opportunities, increasing family income and changes in community perceptions and attitudes. The parameter in the health component affected is an increase in the prevalence of ARI.

7.1.3. Operational Stage

The activities covered at the operational stage are the recruitment of operational workers, as well as passenger transportation and station operations. Activities for recruiting operational workers as well as transporting passengers and station operations are predicted to have an impact on the socio-economic and cultural components of the community, especially on the parameters of opening up job opportunities, opening up business opportunities, increasing family income and changing community perceptions and attitudes. The nature of the impact is positive with the magnitude of the impact including large, so management efforts need to be made for each activity.

7.2. Study as a Basis for Management

The environmental components that need to be managed during the implementation of this project activity are determined based on the results of forecasts and evaluations of significant impacts.

7.2.1. Pre-Construction Stage

1) Loss of business opportunities

   Land acquisition through land acquisition mechanisms is predicted that this will result in the loss or reduction of the area and number of economic facilities (shops, markets, minimarkets/supermarkets, restaurants/restaurants, food stalls/taverns and grocery stores) which have been community businesses in 31 sub-districts at the MRT-EWLP1S1 construction site. This condition then resulted in the loss of business opportunities/livelihoods for the people who had been working and/or doing business at the MRT-EWLP1S1 construction site. This impact management approach is carried out through an institutional approach and a social approach.

2) Decrease in family income

   A decrease in family income is a derivative impact of loss business/livelihood opportunities for people who have been working and/or doing business at the MRT-EWLP1S1 construction site due to land acquisition. This impact management approach is carried out through an institutional approach and a social approach.

3) Changes in public perceptions and attitudes

If the delivery of information and socialization of activity plans is not carried out intensively by the person in charge of the activity, the impact of loss of business opportunities and a decrease in family income levels, especially for people who have been running businesses and/or working at the activity location and its surroundings, will have derivative impacts in the form of changes in attitudes. and negative public perceptions. This impact management approach is carried out through an institutional approach and a social approach.

7.2.2. Construction Phase

1) Decreased traffic performance

   Activities that are expected to result in a decrease in traffic performance are the mobilization of construction equipment and materials, land clearing and relocation of public facilities/utilities, earthworks and dewatering, underground construction work, and ground-level construction work. To support activities during the construction phase, a number of equipment and materials will be required. Various types of equipment (including heavy equipment) that will be transported to the activity location will result in a decrease in traffic performance which can be seen from the performance of the affected roads and intersections. If the decline in traffic performance that occurs can be managed well, by bringing in construction equipment and materials in stages at predetermined times and transportation routes, then the impact of a decline in traffic performance will be avoided.

2) Increased noise

   Activities that are expected to result in increased noise are earthworks and dewatering, underground construction work, and ground-level construction work. This noise is caused, among other things, by the sound of heavy equipment engines and transport trucks. The impact of noise is a primary impact. The impact of noise can cause derivative impacts in the form of negative changes in people's attitudes and perceptions. Therefore, managing the impact of noise also means automatically being able to avoid its subsequent impacts.

3) Increased runoff water discharge

   Activities that are expected to result in an increase in runoff are land clearing and relocation of public facilities/utilities, as well as earthworks and dewatering (at the Rorotan Depot location). Land clearing and soil compaction in the Rorotan Depot location area will increase runoff water discharge and have the potential to cause puddles at the activity location and its surroundings. Therefore, an increase in runoff water discharge is a large and important negative impact and management efforts must be made.

4) Open job opportunities

   The activity that is expected to result in the opening of employment opportunities is the recruitment of construction workers. The MRT-EWLP1S1

construction work is estimated to involve at least 6,210 workers, with a minimum of 20% (1,242 people) involving local workers (mainly residents affected by land acquisition and environmental disturbances who meet skill qualification requirements).Opening up job opportunities is a positive impact that must be optimized. This impact management approach is carried out through an institutional approach and a social approach.

5) Open business opportunities

The activity that is expected to open up business opportunities is basecamp operations. The MRT-EWLP1S1 construction is estimated to involve at least 6,210 workers and around 30% of the construction workforce (1,863 people) will live at basecamp. With these basecamp operational activities, there will be business opportunities for the surrounding community to be able to fulfill the operational needs of the basecamp, especially as suppliers of goods and materials for project needs, canteens/restaurants for workers and other trading businesses around the basecamp. The opening up of business opportunities is a positive impact that must be optimized. This impact management approach is carried out through an institutional approach and a social approach.

6) Increase in family income

Activities that are expected to result in an increase in family income are the recruitment of construction workers and basecamp operations. An increase in family income is a derivative impact of opening up job opportunities and opening up business opportunities. Increasing family income is a positive impact that must be optimized. This impact management approach is carried out through an institutional approach and a social approach.

7) Increased prevalence of ARI

Activities that are expected to result in an increase in the prevalence of ARI disease are the mobilization of construction equipment and materials, land clearing and relocation of public facilities/utilities, earthworks and dewatering, underground construction work, and ground-level construction work. The increase in the prevalence of ARI is a derivative impact of geophysical-chemical impacts. Therefore, managing geophysical-chemical impacts also means automatically avoiding the impact of increasing the prevalence of ISPA.

8) Changes in public perceptions and attitudes

Changes in people's perceptions and attitudes are a derivative impact of impacts on geophysical-chemical, public health and socio-economic, cultural and community. Therefore, managing impacts on geophysical-chemical, public health and socio-economic and cultural aspects of the community also means automatically being able to avoid the impact of changes in community perceptions and attitudes.

7.2.3. Operation Phase

1) Open job opportunities

   The activity that is expected to result in the opening of job opportunities is the recruitment of operational workers.MRT-EWLP1S1 operations are expected to involve at least 1,120 workforces with a minimum of 20% local workforce (mainly residents affected by land acquisition and environmental disturbances who meet skill qualification requirements). Opening up job opportunities is a positive impact that must be optimized. This impact management approach is carried out through an institutional approach and a social approach.

2) Open business opportunities

   Activities that are expected to open up business opportunities are passenger transportation and station operations. MRT East – West Line operations are planned to be able to serve an average number of passengers of 100,000 people/day. This condition can become a business opportunity for local communities, especially as suppliers of goods and materials for MRT operational needs, canteens/restaurants and trading businesses around MRT stations. The opening up of business opportunities is a positive impact that must be optimized. This impact management approach is carried out through an institutional approach and a social approach.

3) Increase in family income

   Activities that are expected to result in an increase in family income are hiring operational workers, and transporting passengers and station operations. An increase in family income is a derivative impact of opening up job opportunities and opening up business opportunities. Increasing family income is a positive impact that must be optimized. This impact management approach is carried out through an institutional approach and a social approach.

Table 7.3. Environmental Management Directions

Managed Environmental Impact	Environmental Management Directions
A. Pre-Construction Stage	
1. Land Acquisition	
a) Loss of business opportunities	• Land acquisition is limited to the right of way (ROW) area of the MRT plan through an acquisition process referring to Law no. 2 of 2012, Law no. 11 of 2020, PP No. 19 of 2021 and PerMenATR No. 19 of 2021 • Carry out compensation according to the scheme based on the results of the Land Acquisition and Resettlement Action Plan (LARAP) study • Determination of land compensation prices is carried out by deliberation and consensus by considering a reasonable price for purchasing replacement land
b) Decrease in family income	• Land acquisition is limited to the right of way (ROW) area of the MRT plan through an acquisition process referring to Law no. 2 of 2012, Law no. 11 of 2020, PP No. 19 of 2021 and PerMenATR No. 19 of 2021 • Carry out compensation according to the scheme based on the results of the Land Acquisition and Resettlement Plan (LARAP) study

Managed Environmental Impact	Environmental Management Directions
	• Determination of land compensation prices is carried out by deliberation and consensus by considering a reasonable price for purchasing replacement land
c) Changes in public perceptions and attitudes	• Land acquisition is limited to the right of way (ROW) area of the MRT plan through an acquisition process referring to Law no. 2 of 2012, Law no. 11 of 202, PP No. 19 of 2021 and PerMenATR No. 19 of 2021 • Coordinate and collaborate with village heads, sub-district heads, related agencies to carry out land ownership survey and inventory activities, benchmarking, land acquisition and socialization of activities. • Invite affected communities to take part in outreach activities. • Accommodate aspirations (suggestions and responses) submitted by the community during socialization activities, so that they can be realized during the implementation of business plans and/or activities. • Socialization activities are carried out in places that are easily accessible to the local community, with a minimum frequency of activities once before construction activities are carried out. • Providing a forum in the form of a complaint box at the sub-district office where the activity is located to accommodate aspirations from the community, especially for affected communities. • Respond and respond directly and realize the aspirations and suggestions expressed by the community regarding the implementation of MRT-EWLP1S1 development activities.
B. Construction Phase	
2. Acceptance of Construction Workers	
a) Open job opportunities	• Requires contractors as construction implementers to prioritize the community (especially residents affected by land acquisition and environmental disturbances who meet the skill qualification requirements) to be recruited as construction workers at a minimum of 20% of the construction workforce requirements (1,242 people). • Require contractors implementing activities to submit written reports of job vacancies to the local Manpower Department and provide transparent information about job vacancies needed for construction activities to the community, especially to people who live around the activity location. The form of information can be in the form of: announcements that can be posted at the location of the planned activity, at the local sub-district and sub-district office. • Involve and coordinate with local government officials, including the local village head and sub-district head, for labor recruitment activities. Forms of involvement and coordination that can be carried out include meetings or notification letters regarding labor requirements for construction activities. • Requires contractors as construction implementers to accept construction workers by referring to Law no. 13 of 2003 concerning Employment as amended in Law no. 11 of 2020 concerning Job Creation and its implementing regulations and agreed in writing in a Specific Time Work Agreement (PKWT).
b) Increase in family income	• Wages for workers refer to Law No. 13 of 2003 concerning Employment, Articles 88 – 98 concerning wages. • Providing BPJS Employment and Health insurance to recruited workers, so that there is guaranteed medical costs for workers who experience work accidents during construction. • Work system arrangements, wages and insurance (BPJS Employment and BPJS Health) for construction workers must be agreed in writing in a Specific Time Work Agreement (PKWT).
c) Changes in public perceptions and attitudes	• Carrying out environmental management activities for primary and secondary impacts arising from labor recruitment activities, and paying attention to and

Managed Environmental Impact	Environmental Management Directions
	responding to suggestions from the community regarding labor recruitment activities • Development/construction activities involve the community around the activity location and involve people who have lost their livelihoods because their land was acquired. • Providing a forum in the form of a complaint box at the village head or sub-district office to accommodate aspirations from the community, especially for affected communities and working together with the village head and sub-district head to respond to aspirations and suggestions submitted by the community. • As soon as possible, collaborate with village heads and sub-district heads in the activity area, community leaders and related agencies if problems occur in the field in labor recruitment activities.
3. Basecamp Operations	
a) Open business opportunities	• Prioritize the surrounding community to fulfill the operational needs of the base camp, especially as suppliers of goods and materials for project needs, canteens/restaurants and other trading businesses for workers. • Involve and coordinate with local government officials, including the local village head and sub-district head, to fulfill the operational needs of the basecamp. Forms of involvement and coordination that can be carried out include meetings with residents.
b) Increase in family income	• Prioritize the surrounding community to fulfill the operational needs of the base camp, especially as suppliers of goods and materials for project needs, canteens/restaurants and other trading businesses for workers. • Involve and coordinate with local government officials, including the local village head and sub-district head, to fulfill the operational needs of the basecamp. Forms of involvement and coordination that can be carried out include meetings with residents.
c) Changes in public perceptions and attitudes	• Carrying out environmental management activities for primary and secondary impacts arising from basecamp operations, and pay attention to and respond to suggestions from the public regarding basecamp operations • Providing a forum in the form of a complaint box at the village head or sub-district office to accommodate aspirations from the community, especially for affected communities and working together with the village head and sub-district head to respond to aspirations and suggestions submitted by the community. • As soon as possible, cooperate with village heads and sub-district heads in the activity area, community leaders and related agencies if a conflict occurs in the field due to basecamp operations.
4. Mobilization of Construction Equipment and Materials	
a) Decreased traffic performance	• Transportation is carried out in stages at night from 22.00 – 05.00 WIB and via predetermined transportation routes as stipulated in Andalalin • Carry out observations and supervision by circulation control officers when vehicles enter and exit construction activity sites and during peak hours/busy travel hours so that the potential for traffic flow conflicts can be minimized • Provide special parking spaces for material transport vehicles and construction worker vehicles in the construction activity area
	• Provide material storage locations completely within the construction area • Install traffic signs and temporary road equipment during the construction period in accordance with what is recommended in the Andalalin document and can be adjusted to actual conditions in the field

Managed Environmental Impact	Environmental Management Directions
b) Increased prevalence of ARI	• Covering materials and flushing vehicle wheels when leaving the project site. • Regular watering on dry roads to minimize dust. • Do not transport materials beyond capacity, to avoid material spillage. • We urge the public and workers to use masks when passing dusty roads to reduce the impact. • Coordinate with related agencies, such as the Health Service and local Community Health Centers, to reduce the morbidity rate for ISPA and other diseases
c) Changes in public perceptions and attitudes	• Carry out environmental management efforts for primary impacts arising from mobilization activities construction equipment and materials. • Providing a forum in the form of a complaint box at the village head or sub-district office to accommodate aspirations from the community, especially for affected communities and working together with the village head and sub-district head to respond to aspirations and suggestions submitted by the community. • As soon as possible, collaborate with village heads and sub-district heads in the activity area, community leaders and related agencies if problems occur in the field in mobilizing equipment and materials.
5. Land Cleaning and Relocation of Public Facilities/Utilities	
a) Decreased traffic performance	• Transportation is carried out in stages at night from 22.00 – 04.00 WIB and via predetermined transportation routes as stipulated in Andalalin • Carry out observations and supervision by circulation control officers when vehicles enter and exit construction activity sites and during peak hours/busy travel hours so that the potential for traffic flow conflicts can be minimized • Provide special parking spaces for material transport vehicles and construction worker vehicles in the construction activity area • Provide material storage locations completely within the construction area • Install traffic signs and temporary road equipment during the construction period in accordance with what is recommended in the Andalalin document and can be adjusted to actual conditions in the field
b) Increased runoff water discharge	• Create drainage and sedimentation (deposition) ponds as sediment trap ponds • Create a water channel equipped with a control gate • Cooperate and coordinate with the Public Works Department in terms of repairing or maintaining drainage channels and developing drainage systems • Land clearing is carried out in stages
c) Increased prevalence of ARI	• Covering materials and flushing vehicle wheels when leaving the project site. • Regular watering on dry roads to minimize dust. • Do not transport materials beyond capacity, to avoid material spillage. • We urge the public and workers to use masks when passing dusty roads to reduce the impact. • Coordinate with related agencies, such as the Health Service and local Community Health Centers, to reduce the morbidity rate for ISPA and other diseases
d) Changes in public perceptions and attitudes	• Carry out environmental management efforts for primary impacts arising from activities land clearing and relocation of public facilities/utilities. • Providing a forum in the form of a complaint box at the village head or sub-district office to accommodate aspirations from the community, especially for affected communities and working together with the village head and sub-district head to respond to aspirations and suggestions submitted by the community.

Managed Environmental Impact	Environmental Management Directions
	• As soon as possible, collaborate with village heads and sub-district heads in the activity area, community leaders and related agencies if problems occur in the field inland clearing and relocation of public facilities/utilities.
6. Earthworks and Dewatering	
a) Decreased traffic performance	• Transportation is carried out in stages at night from 22.00 – 05.00 WIB and via predetermined transportation routes as stipulated in Andalalin • Carry out observations and supervision by circulation control officers when vehicles enter and exit construction activity sites and during peak hours/busy travel hours so that the potential for traffic flow conflicts can be minimized • Provide special parking spaces for material transport vehicles and construction worker vehicles in the construction activity area • Provide material storage locations completely within the construction area • Install traffic signs and temporary road equipment during the construction period in accordance with what is recommended in the Andalalin document and can be adjusted to actual conditions in the field
b) Increased noise	• Heavy equipment activities are carried out from 08.00 to 16.00 WIB • Equip workers with ear plugs/ear muffs • Instruct, provide and require the use of Occupational Safety and Health (K3) equipment • Carry out routine maintenance on heavy equipment • Coordinate with local government and community leaders before carrying out work using heavy equipment
c) Increased runoff water discharge	• Create drainage and sedimentation (deposition) ponds as sediment trap ponds • Create a water channel equipped with a control gate • Cooperate and coordinate with the Public Works Department in terms of repairing or maintaining drainage channels and developing drainage systems • Land clearing is carried out in stages
d) Increased prevalence of ARI	• Covering materials and flushing vehicle wheels when leaving the project site. • Regular watering on dry roads to minimize dust. • Do not transport materials beyond capacity, to avoid material spillage. • We urge the public and workers to use masks when passing dusty roads to reduce the impact. • Coordinate with related agencies, such as the Health Service and local Community Health Centers, to reduce the morbidity rate for ISPA and other diseases
7. Underground Construction Work	
a) Decreased traffic performance	• Transportation is carried out in stages at night from 22.00 – 04.00 WIB and via predetermined transportation routes as stipulated in Andalalin • Carry out observations and supervision by circulation control officers when vehicles enter and exit construction activity sites and during peak hours/busy travel hours so that the potential for traffic flow conflicts can be minimized • Provide special parking spaces for material transport vehicles and construction worker vehicles in the construction activity area • Provide material storage locations completely within the construction area • Install traffic signs and temporary road equipment during the construction period in accordance with what is recommended in the Andalalin document and can be adjusted to actual conditions in the field
b) Increased noise	• Heavy equipment activities are carried out from 08.00 to 16.00 WIB • Equip workers with ear plugs/ear muffs

Managed Environmental Impact	Environmental Management Directions
	• Instruct, provide and require the use of Occupational Safety and Health (K3) equipment • Carry out routine maintenance on heavy equipment • Coordinate with local government and community leaders before carrying out work using heavy equipment
c) Increased prevalence of ARI	• Covering materials and flushing vehicle wheels when leaving the project site. • Regular watering on dry roads to minimize dust. • Do not transport materials beyond capacity, to avoid material spillage. • We urge the public and workers to use masks when passing dusty roads to reduce the impact. • Coordinate with related agencies, such as the Health Service and local Community Health Centers, to reduce the morbidity rate for ISPA and other diseases
8. Underground Construction Work	
a) Decreased traffic performance	• Transportation is carried out in stages at night from 22.00 – 04.00 WIB and via predetermined transportation routes as stipulated in Andalalin • Carry out observations and supervision by circulation control officers when vehicles enter and exit construction activity sites and during peak hours/busy travel hours so that the potential for traffic flow conflicts can be minimized • Provide special parking spaces for material transport vehicles and construction worker vehicles in the construction activity area • Provide material storage locations completely within the construction area • Install traffic signs and temporary road equipment during the construction period in accordance with what is recommended in the Andalalin document and can be adjusted to actual conditions in the field
b) Increased noise	• Heavy equipment activities are carried out from 08.00 to 16.00 WIB • Equip workers with ear plugs/ear muffs • Instruct, provide and require the use of Occupational Safety and Health (K3) equipment • Carry out routine maintenance on heavy equipment • Coordinate with local government and community leaders before carrying out work using heavy equipment
c) Increased prevalence of ARI	• Covering materials and flushing vehicle wheels when leaving the project site. • Regular watering on dry roads to minimize dust. • Do not transport materials beyond capacity, to avoid material spillage. • We urge the public and workers to use masks when passing dusty roads to reduce the impact. • Coordinate with related agencies, such as the Health Service and local Community Health Centers, to reduce the morbidity rate for ISPA and other diseases
C. Operational Stage	
9. Acceptance of Operational Workers	
a) Open job opportunities	• Requires operators to prioritize the community (especially residents affected by land acquisition and environmental disturbances who meet the skill qualification requirements) to be recruited as operational workforce at a minimum of 20% of operational workforce requirements (244 people). • Requires operators to submit written reports of job vacancies to the local Manpower Department and provide transparent information about the required job vacancies to the community, especially to people who live around the activity location.

Managed Environmental Impact	Environmental Management Directions
	• Involve and coordinate with local government officials, including the local village head and sub-district head, for labor recruitment activities. Forms of involvement and coordination that can be carried out include meetings or notification letters regarding labor requirements for MRT operational activities. • Requires operators to recruit operational workers by referring to Law no. 13 of 2003 concerning Employment as amended in Law no. 11 of 2020 concerning Job Creation and its implementing regulations and agreed in writing in the Indefinite Time Work Agreement (PKWTT) as a permanent worker, or in the Certain Time Work Agreement (PKWT) as a non-permanent worker.
b) Increase in family income	• Wages for workers refer to Law No. 13 of 2003 concerning Employment, Articles 88 – 98 concerning wages. • Providing BPJS Employment and Health insurance to recruited workers, so that there is guaranteed medical costs for workers who experience work accidents. • Work system arrangements, wages and insurance (BPJS Employment and BPJS Health) for construction workers must be agreed in writing in a Work Agreement for a Certain Time (PKWTT) as permanent workers, or in a Work Agreement for a Certain Time (PKWT) as a temporary worker.
c) Changes in public perceptions and attitudes	• Carrying out environmental management activities for primary and secondary impacts arising from labor recruitment activities, and paying attention to and responding to suggestions from the community regarding labor recruitment activities • MRT operational activities involve the community around the activity location. • Providing a forum in the form of a complaint box at the village head or sub-district office to accommodate aspirations from the community, especially for affected communities and working together with the village head and sub-district head to respond to aspirations and suggestions submitted by the community. • As soon as possible, collaborate with village heads and sub-district heads in the activity area, community leaders and related agencies if problems occur in the field in labor recruitment activities.
10. Passenger Transportation and Station Operations	
a) Open business opportunities	• Prioritize the surrounding community to fulfill the operational needs of the station, especially as suppliers of goods and materials for MRT operational needs, canteens/restaurants for and trading businesses around the MRT station. • Involve and coordinate with local government officials, including the local village head and sub-district head, to fulfill the operational needs of the MRT station. Forms of involvement and coordination that can be carried out include meetings with residents.
b) Increase in family income	• Prioritize the surrounding community to fulfill the operational needs of the station, especially as suppliers of goods and materials for MRT operational needs, canteens/restaurants for and trading businesses around the MRT station. • Involve and coordinate with local government officials, including the local village head and sub-district head, to fulfill the operational needs of the MRT station. Forms of involvement and coordination that can be carried out include meetings with residents.
c) Changes in public perceptions and attitudes	• Carrying out environmental management activities for primary and secondary impacts arising from station operations, and pay attention to and respond to suggestions from the public regarding station operations • Providing a forum in the form of a complaint box at the village head or sub-district office to accommodate aspirations from the community, especially for affected communities and working together with the village head and sub-

Managed Environmental Impact	Environmental Management Directions
	district head to respond to aspirations and suggestions submitted by the community. • As soon as possible, work together with village heads and sub-district heads in the activity area, community leaders and related agencies if problems occur in the field due to station operations

7.3. Environmental Feasibility Recommendations

Environmental feasibility assessment of development plan of the MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) with a length of ± 24,527 Km and access to the Rorotan Depot with a length of ± 5.90 Km implemented by considering environmental feasibility criteria as presented in Table 7.4.

Table 7.4. Environmental Feasibility Assessment

No	Eligibility Parameters	Feasibility Assessment	Information
1	Spatial planning in accordance with statutory provisions.	The construction of the MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) with a length of ± 24,527 Km and access to the Rorotan Depot with a length of ± 5.90 Km has had a Confirmation Letter of Suitability for Space Utilization Activities for National Strategic Activities No. . PF.01/1240-200/IX/2023 and No. PF.01/1241-200/IX/2023 (Appendix F). Based on the confirmation letter, it can be concluded that the MRT-EWLP1S1 construction activities were approved with the provisions on permitted space utilization.	Environmentally Friendly
2	Policies in the field of environmental protection and management and natural resources are regulated in statutory regulations.	In accordance with the work plan, the initiator will comply with all applicable laws and regulations in the field of environmental protection and management and natural resources.	Environmentally Friendly
3	Defense and security interests.	The activity plan does not affect designated areas related to defense and security activities	Environmentally Friendly
4	Careful forecasts regarding the magnitude and important nature of impacts from chemical, social, economic, cultural, spatial and public health biogeophysical aspects at the pre-construction, construction, operation and post-operation stages of businesses and/or activities	Activities have a large and important impact on physical, chemical, biological, socio-economic and cultural aspects, spatial planning, public health at the pre-construction, construction and operational stages. The study of the magnitude and significance of impacts has been carefully described in Chapter VI in the Andal document. The impacts caused can still be managed with available technology and the costs required can still be borne by the initiator	Environmentally Friendly
5	The results of a holistic evaluation of all important impacts as a unit that are interrelated and influence each other so that the balance of positive and negative important impacts is known.	The results of a holistic evaluation of all important impacts as an interrelated and mutually influencing unit show that there is a balance of positive and negative important impacts, and the resulting negative impacts can still be managed.	Environmentally Friendly
6	The ability of the initiator and/or related parties responsible for	The initiator is able and able to overcome the significant negative impacts that will arise from the construction of the	Environmentally Friendly

No	Eligibility Parameters	Feasibility Assessment	Information
	overcoming significant negative impacts that will arise from businesses and/or activities planned using a technological, social and institutional approach.	MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) along ± 24,527 Km and Rorotan Depot access along ± 5.90 Km which is planned using a technological, social and institutional/institutional approach.	
7	Business plans and/or activities do not interfere with social values from the community's view (emic view).	In this study a social study has been carried out related to the prediction and evaluation of social impacts. Overall, it can be concluded that the planned activities do not disturb social values or community views and received a positive response from the community.	Environmentally Friendly
8	Business plans and/or activities will not affect and/or disturb ecological entities.	**a. Key Entities and/or Species** There are no key species that have important value in the eyes of the community (key cultural species/keystone species) at the study location. **b. Ecological Entities/ecologically important values** There are no species that have protected status based on PermenLHK P.106/2018. **c. Economic Importance** There are no plants that have economic importance. **d. Scientific Important Value (Scientific importance)** There are no areas of scientific importance in the study area.	Environmentally Friendly
9	The planned business and/or activity does not cause disruption to businesses and/or activities located in the vicinity of the planned business and/or activity location.	The construction of the MRT-EWLP1S1 route Tomang (DKI Jakarta) – Medan Satria (Bekasi, West Java) along ± 24,527 Km and access to the Rorotan Depot along ± 5.90 Km will affect existing businesses and/or activities. However, the person responsible for the activity is committed to preparing alternative prevention and/or handling negative impacts.	Environmentally Friendly
10	The environmental carrying capacity and capacity of the location of the planned business and/or activity is not exceeded in the event that there is a calculation of the environmental carrying capacity and capacity in question.	A study of the carrying capacity and capacity of the environment around the activity location was not carried out, but as a limit for the activities the initiator used quality standards as a benchmark to compare estimates of impacts that could occur. For activities that can exceed quality standards, management has been planned so that they do not increase the burden on environmental components, so that in terms of environmental carrying capacity, the implementation of these activities does not threaten environmental sustainability.	Environmentally Friendly

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