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Indonesia Mass Transit Project (MASTRAN)
Bandung Basin Metropolitan Area - Bus Rapid Transit Project
Ministry of Transportation, the Republic of Indonesia

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

REV.11

BBMA DEDC

ABBREVIATION/ACRONYM

AFD	Agency France development
AMDAL	*Analisis Mengenai Dampak Lingkungan Hidup* (Environmental Impact Assessment)
ANDAL	*Analisis Dampak Lingkungan Hidup* (Environmental Impact Statement)
ANDALALIN	*Analisis Dampak Lalu Lintas* (Traffic Impact Assessment)
Angkot	*Angkutan Kota* (urban transportation paratransit)
Bappeda	Regional Development Planning Agency
BBMA	Bandung Basin Metropolitan Area
BLUD	Regional Public Service Unit
BRT	Bus Rapid Transit
BUMD	Regional Owned Enterprise
DISHUB	Provincial/City Transport Agency
DLH	Provincial/City Environmental Agency
E&S	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
GBV	Gender-Based Violence
GESI-AP	Gender Equality and Social Inclusion Action Plan
GHG	Greenhouse gas
GOI	Government of Indonesia
GRM	Grievance Redress Mechanism
Jl.	Jalan (street)
MASTRAN	Indonesia Mass Transit Project
MOE	Ministry of Environment
MOF	Ministry of Finance
MOT	Ministry of Transport
PPP	Public-Private Partnership
PSO	Public Service Obligation
SEA/SH	Sexual Exploitation, Abuse, and Harassment
SEP	Stakeholder Engagement Plan
TOD	Transit-Oriented Development
UKL-UPL	Environmental Management and Monitoring Effort Document (*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup)*
WB	World Bank

TABLE OF CONTENTS

ABBREVIATION/ACRONYM i
TABLE OF CONTENTS ii
LIST OF TABLES v
LIST OF FIGURES vii
EXECUTIVE SUMMARY 1
1. INTRODUCTION 7
1.1. Project Background, Objectives, and Benefits 7
1.2. ESIA and Environmental Approval 9
1.3. Scope of ESIA 10
2. PROJECT DESCRIPTION AND ALTERNATIVES 11
2.1. Key Project Design Selected and its Alternatives 11
2.2. Dedicated BRT Corridor 14
2.3. BRT Bus Stop/Platforms 17
2.4. Reconstruction of Road Intersections 22
2.5. Estimated Passengers 23
2.6. Bus Specification 25
2.7. BRT Direct Service Route (Off-corridor) 26
2.8. Infrastructure, Facilities, and Landscaping Works 27
2.9. Bus Depots, Terminals, and End Stations/Terminus 29
2.10. Clean Water Supply and Waste Management 32
2.11. Affected Lands, People, and Trees 34
2.12. Construction Materials, Equipment, and Vehicles 37
2.13. Contractor Basecamp and Workers 40
2.14. Key Activities as per Project Phases 42
3. KEY POLICY AND REGULATORY FRAMEWORKS 46
3.1. Key Indonesian Laws and Regulations – Environment, Health & Safety 46
3.2. Social, Gender and Customary Communities 48
3.3. The World's Bank Environmental and Social Framework (ESF) 51
4. ESIA METHODOLOGY 59
4.1. Scoping Process and the Project Area of Influence 59
4.2. Stakeholder Identification and Analysis 62
4.3. Risk and Impact Assessment Method 62
4.4. Rapid Cumulative Impact Assessment 66
5. ENVIRONMENTAL AND SOCIAL BASELINE 67
5.1. Environment 67
5.1.1. Climate 67
5.1.2. Air Quality 67
5.1.3. Noise Level 68
5.1.4. Vibration 69
5.1.5. Hydrology and Surface Runoff 70
5.1.6. Surface and Groundwater Quality 71

5.1.7. Tree Species 73
5.1.8. Greenhouse Gas Emissions 74
5.1.9. Disaster Risk Profile 77
5.1.10. Existing Public Transport Services and Road Traffic 79
5.2. Socio-economic and Public Health Profiles 80
5.2.1. Population Profile 81
5.2.2. Education and Health 81
5.2.3. Employment and Livelihood 83
5.2.4. Community Perception 89
5.2.5. Accessibility and Mobility Pattern 91
5.2.6. Cultural Heritage 93
5.2.7. Gender Profile 95
5.2.8. Harassment and Gender-Based Violence 96
6. ENVIRONMENTAL AND SOCIAL RISK AND IMPACT ASSESSMENT 99
6.1. Pre-Construction Phase 101
6.1.1. Livelihoods and Access Restriction 101
6.1.2. Vulnerable People 102
6.2. Construction Phase 104
6.2.1. Ambient Air Quality 104
6.2.2. Noise and Vibration Level 106
6.2.3. Greenhouse Gas Emission 110
6.2.4. Stormwater Runoff 112
6.2.5. Soil and Groundwater 113
6.2.6. Road Traffic and Infrastructure 116
6.2.7. Affected Trees/City Landscape 118
6.2.8. Local Economy 120
6.2.9. Restriction to Buildings and Traffic Congestion 121
6.2.10. Vulnerable People 122
6.2.11. Cultural Heritage 124
6.2.12. Labor and Working Conditions 126
6.2.13. Community Health and Safety 128
6.3. Operational Phase 130
6.3.1. Ambient Air Quality 130
6.3.2. Noise Level 131
6.3.3. Greenhouse Gas Emissions 134
6.3.4. Stormwater Runoff 136
6.3.5. Soil and Groundwater 138
6.3.6. Road Traffic 139
6.3.7. Labor and Working Conditions 143
6.3.8. Community Health and Safety 145
6.3.9. Livelihoods 147
6.4. Cumulative Impact Assessment 148
7. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE 156
7.1. Consultation with Stakeholders and Project Affected Peoples (PAPs) 156

7.2. Future Engagement and Information Disclosure 157
8. GRIEVANCE REDRESS MECHANISM 160
9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN 164
9.1. Mitigation Measures and Monitoring Plans 164
9.2. Institutional Roles and Responsibilities 180
9.3. Monitoring, Capacity Building and Budgeting 182
10. REFFERENCES 185

ANNEXES:

A. UKL-UPL Administrative Screening of BBMA BRT Project

B. Approval and Final Report Traffic Impact Assessment (ANDAL Lalin)

C. The Minutes of Public Consultation Already Conducted

LIST OF TABLES

Table 1. Summary of Risk and Impact Assessment Results 4
Table 2. Dedicated BRT Corridor Design 14
Table 3. Existing Road Segments to be Used by BRT Corridor 17
Table 4. Platform Type 18
Table 5. On-Corridor Bus Stops/Platforms 21
Table 6. Road Intersections Subject to Reconstructed/Adjusted 22
Table 7. Estimated Number of Passengers at the Bus Stops 24
Table 8. BRT Bus Specification 25
Table 9. BRT Off-corridor Service Routes 27
Table 10. Facilities and Area Required for the BRT Depots 29
Table 11. Area Required for BRT Stations 32
Table 12. Affected Land and Area 34
Table 13. Number of the Affected Kiosks/Tenants 36
Table 14. Affected Government-owned Assets 36
Table 15. Number of Trees Affected by Construction 37
Table 16. Indicative Construction Materials Required 38
Table 17. Construction Equipment and Vehicles 38
Table 18. Estimated Fresh Water Supply for Construction 39
Table 19. Indicative Workforce Skills and Requirements 41
Table 20. Key Laws and Regulations - Environment, Health & Safety 46
Table 21. Key Indonesian Laws and Regulations – Social and Gender Aspects 49
Table 22. The Bank ESS Requirements and Key Gaps Addressed in the ESIA 52
Table 23. The BRT Project's Area of Influence 60
Table 24. E&S Impact Severity/Consequence 64
Table 25. Likelihood of the Impact to Occur 65
Table 26. Risk Level/Significance of the Impact 66
Table 27. Climate of Bandung City (2022) 67
Table 28. Baseline Ambient Air Quality (July 2024) 68
Table 29. Baseline Noise Level 69
Table 30. Baseline Vibration Measurement 69
Table 31. Potential Stormwater Run Off Capacity on BRT Road Corridor 70
Table 32. Surface Water Quality of *Cikapundung* and *Citepus* Rivers 72
Table 33. Groundwater Quality Results 73
Table 34. Traffic Counting Results at BRT Intersections 75
Table 35. Estimated Baseline GHG Emissions (tCO2e/day) within On-corridor 76
Table 36. Natural Hazard Exposure of BRT Corridor 78
Table 37. Road Service Levels 80
Table 38. Demographic Profiles 81
Table 39. Education and Health Profiles (2022 – 2023) 82
Table 40. Number of Schools (2022) 82

Table 41. Number of Health Facilities (2022) 83
Table 42. Number of Sickness Recorded in Bandung City (2021) 83
Table 43. Employment Rate of Bandung City and Bandung Regency 84
Table 44. Average Monthly Income of Parking Attendants 84
Table 45. Status of Parking Attendants 84
Table 46. Vulnerable Groups Among Parking Attendants 85
Table 47. Number of Street Vendors within BRT Corridors 86
Table 48. Affected Kiosk Tenants 87
Table 49. Household Income of Affected Kiosk Tenants/Owners 88
Table 50. Vulnerable Individuals Among Affected Kiosk Tenants/Owners 88
Table 51. Affected Angkot Drivers and Operators and their Households 89
Table 52. Online Transport Drivers in the BRT Corridor 89
Table 53. Mobility Generators within the BBMA 91
Table 54. List of Cultural Heritage within the BRT Corridor 94
Table 55. Identified Potential Environmental and Social Impacts 100
Table 56. Noise Level of Construction Vehicle and Equipment 107
Table 57. Projection of Accumulative Noise in the Construction Phase 108
Table 58. Estimated GHG emissions during BRT construction phase 110
Table 59. Projected Noise Levels during the Operation of BRT Buses 133
Table 60. Estimated Road Traffic Volume – Without (Existing) vs With BRT Operation 141
Table 61. Existing Activities and Foreseeable Future Development within BBMA Area 149
Table 62. Environmental and Social Cumulative Impacts 153
Table 63. Consultation with Project's Stakeholders and PAPs 156
Table 64. Planned Stakeholder Engagement Prior to and During Construction 158
Table 65. Complaints based on Its Risk Level 160
Table 66. Roles and Responsibilities on GRM 163
Table 67. Environmental and Social Management and Monitoring Plan 165
Table 68. Indicative Cost Items for CESMP Implementation and Capacity Building 183

LIST OF FIGURES

Figure 1. Dedicated BRT On-corridor Layout 2
Figure 2. BRT On-Corridor 12
Figure 3. Proposed BRT Corridors and Motorcycle Park and Ride (Initial Design) 13
Figure 4. BRT Corridor Design 16
Figure 5. Overview of BRT On-corridor and Bus Stop/Platform 16
Figure 6. Platform Type A 18
Figure 7. Platform Type B 19
Figure 8. Platform Type C 19
Figure 9. Platform Type D 20
Figure 10. Platform Type E 20
Figure 11. Platform Type F 20
Figure 12. BRT Bus Size 26
Figure 13. BRT Service Routes in Relation to Bandung Basin Metropolitan Area 26
Figure 14. Sidewalk/Pedestrian Design 29
Figure 15. BRT Depot Design – Cicaheum and Leuwipanjang 32
Figure 16. Wastewater Treatment and Reuse Schematic at Depot 33
Figure 17. Flowchart Water Mass Balance of Bus Washing Machine System 33
Figure 18. The Project Area of Influence 62
Figure 19. Baseline Air Quality Sampling and Noise Measurement (2024) 68
Figure 20. Vibration Measurements 70
Figure 21. Groundwater and Clean Water Sampling Activities 73
Figure 22. Some Existing Trees along BRT Corridor and Station Location 74
Figure 23 GHG Emission based on Transportation Modes 76
Figure 24. Occurrences of Natural Disasters in Bandung 77
Figure 25. Flooding and Water Puddles Sites within BRT On-corridor 78
Figure 26. Public Transportation Modes in BBMA 80
Figure 27. Street Vendors and Street Parking Conditions 87
Figure 28. Interview Survey Activities 90
Figure 29. Public Responses to the BRT-BBMA Project 90
Figure 30. Community Concerns on E&S Impacts of BRT - BBMA Project 91
Figure 31. Cultural Heritage Buildings Near BRT On-corridor 94
Figure 32. BBMA Gender Development Index 2017–2019 96
Figure 33. GESI Survey Results—Experience when Using Public Transportation 96
Figure 34. GESI Survey Results Based on Mobility Impaired Respondents 97
Figure 35. GBV Cases from 2008 - 2020 (Kota Bandung Diskominfo) 98
Figure 36. Traffic Load at Morning and Evening Busy Hours 2024 117
Figure 37. Noise Level of Electric Bus Compared with Conventional Bus 132
Figure 38. Forecasted Traffic Load within Peak Hours - BRT Operation 141
Figure 39. Grievance Redress Mechanism 162
Figure 40. Organization of BBMA – BRT Project 181

EXECUTIVE SUMMARY

Project Background and Key Objectives

The Government of Indonesia (GOI), through the Ministry of Transport (MoT), with support from the World Bank (WB), has launched the Indonesia Mass Transit Project (MASTRAN). This initiative is designed to strengthen the financial, technical, and institutional capacities of Sub-National Governments (SNGs) in planning, delivering, and managing public transport systems. Aligned with the 2020–2024 Medium-Term National Development Plan (RPJMN) of the Indonesian Government, MASTRAN prioritizes mass transit development across six metropolitan areas, including Bandung City.

The Ministry of Transportation, through the Directorate General of Land Transportation and specifically the Directorate of Traffic and Road Transport, is leading the implementation of this project, with support from the Transportation Agencies of Bandung and West Java. One of its central focuses is the development of Bus Rapid Transit (BRT), or "the project," for the Bandung Basin Metropolitan Area (BBMA), where rapid urbanization is projected to intensify mobility demands by 2030. The project is designed with an inclusive approach, addressing the mobility needs of women, persons with disabilities, and other vulnerable groups who rely on public transport.

The main objectives of the project include improving urban mobility, expanding public transportation access, encouraging a shift away from private vehicles, and strengthening institutional frameworks for the operation of the BRT system. On the other hand, the project aims to deliver social, environmental, and economic benefits, ultimately contributing to more sustainable cities, a better quality of life, and equitable access to economic opportunities in the medium- to long-term.

Key Components of the Project

The BRT project is designed to include civil works and the installation of related transportation systems, to be undertaken by contractors appointed and supervised by MOT, with the assistance of sub-national governments. Key components of this project that will be funded through the loan include the following:

- Construction of approximately 21.7 km long, dedicated BRT lane known as "on-corridor" using existing roads that will be reinforced using a combination of asphalt and reinforced concrete pavement. Many of the dedicated corridors are designed to be a segregated lane with a barrier separate from other road users;
- Construction of 38 on-corridor bus stops/platforms along dedicated BRT lanes;
- Construction of 242 off-corridor bus stop/shelters on nine (9) transportation services routes that will be connected with nine BRT services;
- Construction of two BRT end-stations/terminals within the existing *Antapani* and *Ledeng* Terminals;
- Construction of two BRT bus depots within the existing *Cicaheum* and *Leuwipanjang* Terminals;
- Landscaping works along the BRT corridors and areas disturbed by construction-related

activities; and

- Providing sidewalk/pedestrian adjacent to the bus stops and stations, including construction of access for people with disabilities, as well as undertaking landscaping works.

The procurement of BRT buses, including engagement with future bus operators, is outside the scope of the WB and AFD loans. The on-corridor dedicated BRT bus route within Bandung City and the off-corridor routes connected to the BRT services are shown in the following figure.

Source: The figure is redrawn and updated from the Andalalin report of BBMA (2025)

Figure 1. Dedicated BRT On-corridor Layout

The Need for ESIA and Environmental Approval

The MASTRAN project including implementation of BRT project in BBMA is classified as 'Substantial Risk' project according to the World Bank Environmental and Social Framework (2018) and, therefore, an Environmental and Social Impact Assessment (ESIA) including Environmental Social Management Plan (ESMP) according to the Bank standards is prepared (this document) for clearance by the Bank and then is disclosed on the websites of the Bank and the Implementing Agency.

At the national level, the project also falls under Indonesia's environmental regulatory framework. Based on recommendations from the Ministry of Environment in the AMDALNET registration number: 6644BDAA45DDA (dated 15 May 2024), the project, including its dedicated main corridor, bus stops and end-stations, terminals and depots fell under the requirement an Environmental Management Efforts and Environmental Monitoring Efforts (UKL/UPL) document subject to evaluation by the ministry and subsequent issuance of the environmental approval.

Environmental and Social Risk and Impact Assessment

The ESIA evaluates the potential environmental and social impacts of the project throughout its pre-construction, construction, and operational phases. It identifies both direct and indirect environmental and social effects and outlines corresponding mitigation measures along with a monitoring plan known as the Environmental and Social Monitoring Plan (ESMP). As part of the ESIA scoping process, the project's Area of Influence (AoI) was defined to assess how project activities may interact with environmental and social receptors. This approach also facilitated the identification of data gaps requiring further investigation.

To inform the ESIA, several key documents and relevant data were utilized, including but not limited to:

- Final Detailed Engineering Design (DED) reports of BBMA BRT (2025);
- Traffic Management Review Report/ANDALALIN of BBMA BRT (2025);
- Draft Environmental Management and Monitoring Plan known as UKL-UPL (2025); and
- Other relevant information was sourced from websites and publicly available domains.

The risk level or significance of an Impact Is determined using a standardized method as a function of the impact severity and its likelihood of occurring, which yields the following classifications:

- 'Low risk' if the impact is detectable but not considered significant and, therefore, mitigation measures are discretionary or precautionary in nature;
- 'Medium risk' if the impact is of moderate level and reversible and, therefore, can be mitigated using common mitigation measures;
- 'Substantial risk' if the impact is significant, adverse, irreversible, and, therefore, should be mitigated using specialized measures, or
- 'High risk' if the impact is significant, adverse, widespread, and irreversible that cannot be mitigated using common measures, and therefore, alternatives to the project or less-impact activities should be identified and adopted for the Project.

The risk and impact assessment of the project identified several significant environmental impacts, including elevated dust and fugitive emissions, noise levels, and road traffic congestion on top of existing poor air quality and heavy motorcycle and vehicle traffic in BBMA. From a social perspective, the project would affect approximately 1,735 street vendors, 193 parking attendants, 124 kiosk tenants at *Cicaheum*, *Antapani*, and *Ledeng* terminals, and 400 paratransit minibus (*angkot*) operators. The summary of potential environmental and social impacts of project implementation is presented in the table below.

Table 1. Summary of Risk and Impact Assessment Results

No	Potential Impacts within Project Area of Influence	Inherent Risk Level (without any mitigation measures)	Residual Risk Level (with implementation of mitigation measures)
	Pre-construction Phase		
1	Livelihood and access restriction land acquisition	Substantial	Moderate
2	Marginalization of vulnerable people and gender-based violence	Moderate	Low
	Construction Phase		
1	Increased airborne dust and fugitive gas emissions exceeding the baseline level	Substantial	Moderate
2	Elevated noise and vibration levels exceeding the baseline level	Moderate	Low
3	Increased greenhouse gas emissions	Moderate	Low
4	Increased stormwater runoff and siltation of drainage channels	Moderate	Low
5	Soil and groundwater contamination (particularly at future BRT depots)	Substantial	Moderate
6	Road traffic and infrastructure	Substantial	Moderate
7	Affected trees and landscape	Moderate	Low
8	Local economy	Low	Low
9	Access restriction and road traffic congestion	Substantial	Moderate
10	Marginalization of vulnerable people and gender-based violence	Moderate	Low
11	Disturbance to cultural heritage (building)	Moderate	Low
12	Poor labor and working conditions	Moderate	Low
13	Community health and safety exposure	Substantial	Moderate
	Operation Phase		
1	Improved ambient air quality	Moderate	Low
2	Reduced noise level	Moderate	Low
3	Reduced GHG emissions	Moderate	Low
4	Stormwater runoff	Moderate	Low
5	Groundwater resources	Substantial	Moderate
6	Road traffic	Low	Low
7	Labor and working conditions	Moderate	Low
8	Community health and safety	Moderate	Low

Stakeholder Engagement and Information Disclosure

Several stakeholder consultations and project information disclosures were conducted in 2023 – 2024 as part of the Land Acquisition and Resettlement Action Plan (LARAP) for the project.

Grievance Redress Mechanism

A project-specific Grievance Redress Mechanism (GRM) has been established in the Stakeholder Engagement Plan (SEP) to ensure that any concerns, complaints, or disputes arising from the BBMA BRT Project are addressed fairly, promptly, and transparently.

The GRM is designed to promote accountability, improve stakeholder trust, and support inclusive project implementation. Key features of the GRM include (i) Multiple access channels to submit grievances such as in-person visits, phone calls, email, social media or an online web portal in each city/district; (ii) Complaints are categorized according to their risk level (low, moderate, or high) to prioritize urgent and sensitive cases; (iii) Defined timeline for grievance resolution; and (iv) Dedicated GRM team where a specialized unit within the Project Implementation Unit (PIU) is responsible for managing the grievance process.

Environmental and Social Management Plan (ESMP)

The ESMP is developed based on the project's risk and impact assessment and is included in this ESIA, in accordance with applicable regulatory frameworks and standards. Its effective implementation relies on the development of several overarching plans and procedures listed below. The ESMP is the primary reference for guiding the project in implementing E&S risk mitigation and monitoring. Adequate environmental mitigation measures and monitoring budget should be included in the bidding documents and civil work contracts awarded to BBMA.

Upon contract award, the contractor should prepare the following documents for submission to the PIU for review and endorsement before commencement of construction activities. These documents include, among others:

- *Construction Environmental and Social Management Plan (CESMP),* which is an overarching project-specific E&S risk mitigation measures and monitoring requirements that should be implemented by the contractors and is also applicable to their primary suppliers as well as subcontractors.
- *Traffic Management Plan (TMP),* which is the management plan included already in the BRT project's ANDALALIN describing mitigation measures, monitoring, and agencies' coordination required to manage the existing traffic congestion and disturbance to public transportation services and road users during construction of the BRT project.
- *Labor Management Procedures (LMP),* which *detail* labor and working conditions, including health and safety requirements for project workers, should be provided by the project. The LMP would include codes of conduct for preventing sexual exploitation and abuse/sexual harassment, as well as gender-based violence.
- *Heritage Impact Assessment (HIA)* that would *include* assessment of the integrity and existing damages of the cultural heritage building within the dedicated BRT corridors and define mitigation measures to be implemented. The need for an HIA to be conducted by the BRT project is incorporated into ESMP and could be detailed in CESMP.
- *Standard Operating Procedures (SOP)* for *managing* hazardous and non-hazardous wastes as well as construction wastes, including their disposal, to ensure compliance with prevailing laws and regulations.

Institutional Responsibilities and Budget for ESMP Implementation

The project will be implemented and governed through a three-tiered management level to ensure coordinated delivery and oversight of project activities. This framework comprises three key levels: the Project Steering Committee, the Project Management Unit (PMU), and the Project Implementation Unit (PIU).

The responsibility for implementing CESMP and other plans, and for reporting, primarily lies with the contractors, who will be directly supervised by the Detailed Engineering Design and Supervision (DEDS) Consultant on behalf of the PIU.

At the national level, the PMU, represented by the Directorate General of Land Transportation, will support the project's implementation and ensure compliance with its environmental and social safeguard requirements. The PMU will consolidate monthly, quarterly, and semi-annual reports to produce a semi-annual environmental and social monitoring report (in English language) for submission to the World Bank. This monitoring report will cover the January to June and July to December periods and will be submitted to the Bank no later than 30 days after each reporting period. The report should be subject to adequate review by DEDS, PMC, and PIU prior to submission to the Bank.

In the event of design revisions or the emergence of unanticipated environmental or social impacts, the PIU is required to promptly inform the PMU and the Bank. Any necessary updates to ESIA and safeguard documents will need to be decided in alignment with the Loan Agreement and mutually agreed upon by the parties involved.

1. INTRODUCTION

1.1. Project Background, Objectives, and Benefits

Project Background. Bandung City, as the capital of West Java Province, has been experiencing heavy road traffic congestion, and this situation extends to the Greater Bandung Area, including neighboring areas in the regency (*kabupaten*) of West Bandung Barat and Bandung. In comparison to 1995, the number of trips per day has increased by 66% in 2010, and is projected to increase by 193% in 2030, following the growth of the urban population (Lubis et al. 2003 in Tarigan et al. 2016). Several mass transit proposals have been under consideration by relevant government authorities, but none have materialized to date. Considering this challenge, the Government of Indonesia (GoI), particularly the Ministry of Transport (MOT), intends to implement the Indonesia Mass Transit Project (MASTRAN) to increase the capacities of subnational governments (e.g., provincial and municipality/regency level) to plan, implement, and manage an effective public transport system. The MASTRAN aligns with the Indonesian Medium-Term National Development Plan of 2020-2024, which has targeted mass transit development in six metropolitan areas.

MASTRAN has two key components: (i) Institutional development, capacity building, and technical assistance, which will provide support to MoT and sub-national governments to operate the mass transit projects; and (ii) Demonstration of mass transit projects in Bandung Basin Metropolitan Area (BBMA) in West Java and in Medan, Binjai and Deli Serdang (Mebidang) in North Sumatera.

The Feasibility Study of the Bus Rapid Transit (BRT) scheme was finalized in 2020, and subsequently, the Urban Mobility Plan for BBMA was completed in the same year. The Ministry of Transportation (MOT) will be the implementing agency for the Project and responsible for developing BRT infrastructure and system, managing the procurement and management of all contracts, and implementing environmental and social safeguards according to the World Bank's Environmental and Social Framework (ESF). Once the construction and system installation have been completed, the BRT operation will be handed over to West Java Province.

The World Bank (WB) and *Agence Française de Développement* (AFD) agree with the Government of Indonesia to provide loans for the design and construction of BBMA – BRT Project ("the BRT project") in addition to the funding provided by the Government of Indonesia. Therefore, this BRT project shall comply with the requirements of the WB and AFD as well as the laws and regulations stipulated by the Government of Indonesia, including the need to prepare an environmental and social impact assessment and obtain required approvals from the government agencies.

Key Objectives and Benefits. The key objectives of the BRT project are, among others, as follows:

- To improve urban mobility by reducing commuter travel time, enhancing speed and efficiency, and improving traffic flow in BBMA.
- To enhance public transport accessibility by providing safe, reliable, and comfortable

public transport services to residents and commuters, making it more affordable and accessible to all segments of the population. It will also improve connectivity between residential areas, employment centers, and important destinations.

- To promote a shift from private to public transport by encouraging private vehicle users to switch to the BRT system, and hence reducing traffic congestion, pollution, air quality, and greenhouse gas emissions in the project area.
- To strengthen the institutional capacity of local governments to plan, implement, and maintain mass transit systems, improve public transport service delivery efficiency and effectiveness, promote sustainable urban development, and improve residents' quality of life.

In addition, the BRT project is expected to offer a multitude of benefits to the BBMA population in terms of social, environmental, and economic benefits, as outlined below.

Social Benefits

- *Improved mobility* – by providing a dedicated bus lane and frequent service, the BRT can significantly reduce travel times for commuters.
- *Enhanced accessibility and social inclusion* – the BRT can connect people to jobs, education, and healthcare facilities, especially in underserved areas.
- *Increased road safety* – dedicated bus lanes and improved infrastructure can reduce accidents and improve overall road safety.
- *Improved user satisfaction* – reliable, efficient, and comfortable BRT services can enhance user satisfaction and encourage more people to use public transportation.
- *Reduced traffic congestion* – By reducing the number of cars on the road, the BRT can help alleviate traffic congestion.
- *Enhanced urban aesthetics* – well-designed BRT stations and infrastructure can contribute to the overall aesthetic appeal of the city.
- *Increased institutional capacity* – the BRT can strengthen the capacity of local authorities to plan, implement, and manage public transportation systems.
- *Enhanced human capital* – Training and capacity-building programs can improve the skills of local staff in various areas, including public transport planning, management, and operation.

Environmental Benefits

- *Reduced greenhouse gas emissions* – by reducing car usage, the BRT can help mitigate climate change.
- *Improved air quality* – fewer cars on the road due to the presence of BRT buses can lead to cleaner air and improved public health.
- *Reduced noise pollution* – the BRT is designed to minimize noise pollution, especially in residential areas.
- *Promotion of Green City concepts* – the BRT can encourage sustainable urban development practices, such as transit-oriented development.

Economic Benefits

- *Economic development* – the BRT can stimulate economic activity by attracting businesses and investments to transit-oriented development areas.
- *Job creation* – construction and operation of the BRT system can create jobs in various sectors, including construction, engineering, and transportation.
- *Reduced traffic congestion* – the BRT can improve productivity by saving travel time for commuters and businesses utilizing the services.
- *Increased land value* – the development of transit-oriented development areas can increase property values in nearby areas.
- *Public health* improvement – reduced air pollution and increased physical activity can improve public health.

1.2. ESIA and Environmental Approval

Environmental and Social Due Diligence. According to the World Bank's Environmental and Social Framework (2018), the BRT project is classified as having 'substantial risk' in terms of environmental and social (E&S) risks. Furthermore, this risk classification is underscored by limited technical capacity, complex coordination across multiple agencies at various government levels, and other technical and non-technical risks in aligning the BRT project with existing transportation modes and operations in BBMA. Therefore, an environmental and social impact assessment (ESIA) including an environmental and social management plan (ESMP) shall be prepared by the MOT as the IA according to the World Bank Environmental and Social Framework (2018), particularly the provisions of the Environmental and Social Standard (ESS) 1: Assessment and Management of Environmental and Social Risks and Impacts. The ESIA shall be reviewed and cleared by the WB before disclosure on the websites of the WB, MOT, and sub-national governments.

The implementation of the BRT project is expected to result in positive, long-term outcomes through reduced road traffic congestion, improved air quality, and the promotion of local employment and business opportunities. BRT operation will also provide mobility and urban transport services to a broad range of citizens in an inclusive manner through the application of Universal Access. BRT construction will generate adverse, temporary impacts during construction activities, such as increased road traffic on top of the already congested traffic in Bandung city and neighboring areas, and elevated gaseous emissions and noise levels, as well as access restrictions to the residents living nearby.

In the event of any design changes or modifications that may cause significant E&S impacts or unanticipated E&S impacts not covered in this ESIA, the IA shall inform the Bank of this matter and determine whether an amendment to the existing ESIA and other E&S safeguard documents, including environmental approvals, will be required.

Environmental Permit Required by the Indonesian Government. The BRT project is required to prepare an environmental management and monitoring effort document (known as UKL-UPL) in accordance with Advice registration number 6644BDAA45DDA (dated 15 May 2024), issued by the AMDALNET online system of the Ministry of Environment (MOE). The advice letter No. 4.356/LH.01.06.05/PDL (dated 2 September 2021) issued by the Environmental Agency of West Java Province states that the authority to evaluate the UKL-UPL and issue the environmental permit for the BRT project resides with the Ministry of Environment (MOE) based on the design that the dedicated BRT corridor will traverse two national roads at Jl. Rajawali Timur and Jl. Jenderal Sudirman, which the National Government owns.

1.3. Scope of ESIA

The ESIA includes an E&S risk and impacts assessment of potential risks and impacts generated by the implementation of the BRT project and the ESMP, and outlines measures to mitigate them to as low as reasonably practicable, from the pre-construction through to the operation phases. Further, the ESIA includes the following chapters to align with the intent of the Bank's ESF:

- Executive Summary
- Chapter 1 Introduction
- Chapter 2 BRT Project Description
- Chapter 3 Key Policy and Regulatory Framework
- Chapter 4 ESIA Methodology
- Chapter 5 Environmental and Social Baseline
- Chapter 6 Environmental and Social Risk and Impact Assessment
- Chapter 7 Stakeholder Engagement Plan and Information Disclosure
- Chapter 8 Grievance Redress Mechanism
- Chapter 9 Environmental and Social Management Plan
- Chapter 10 Institutional Arrangements.

2. PROJECT DESCRIPTION AND ALTERNATIVES

The BRT project for BBMA is designed to include civil and landscaping works and installation of related transportation systems to ensure an effective and efficient construction and operation. Key components of the BRT project that will be funded through the loan and are anticipated to generate E&S risk and impacts are described below. The procurement of BRT buses, including engagement with the bus operators, is outside the scope of the loan.

2.1. Key Project Design Selected and its Alternatives

Final BRT Project Design Selected. The BBMA BRT project is designed to include civil works and installation of related transportation systems that will be undertaken by the contractors to be appointed and supervised by MOT, with the assistance of sub-national governments. The procurement of BRT buses, including engagement with the bus operators, is outside the scope of the WB and AFD loans. Key components of the BRT project that will be funded through the loan include:

- Construction of approximately 21.7 km long, dedicated BRT corridor using existing roads that will be primarily reinforced using asphalt pavement and, to a lesser extent, using reinforced concrete pavement. The majority of the dedicated corridors are designed to be a segregated lane with a barrier separate from other road users;
- Construction of 38 on-corridor bus stops/platforms along dedicated BRT lanes;
- Construction of 242 off-corridor bus stop/shelters on nine (9) transportation services routes that will be connected with nine BRT services;
- Construction/upgrade of two BRT-end stations, also serving as terminals in *Antapani* and *Ledeng*;
- Construction of two BRT bus depots within the existing *Cicaheum* terminal and *Leuwipanjang* Terminals.
- Landscaping works along the BRT corridors and areas disturbed by construction-related activities; and
- Providing sidewalk/pedestrian adjacent to the bus stops and stations, including access for people with disabilities.

To finalize the Detailed Engineering Design (DED) for the BBMA BRT project, a traffic impact assessment was conducted to identify the most effective configuration in terms of technical feasibility, financial efficiency, and socio-economic outcomes. Three alternatives were considered: (i) the baseline route using existing infrastructure, (ii) an integrated route connecting BRT with '*angkot*,' commuter rail, and dense residential/educational areas, and (iii) an expanded corridor to peripheral zones to promote equitable mobility and long-term urban development.

Of the three alternatives above, the final DED combines elements of Alternatives 2 and 3, emphasizing high-demand corridors, intermodal connectivity, and targeted expansions to maximize coverage and reduce congestion. This integrated approach was determined to be both technically and financially viable, while also minimizing environmental and social impacts during construction. As detailed in the earlier sub-section, the resulting, final DED

comprises a 21-km dedicated BRT on-corridor with 38 bus stop platforms (see figure below); 2 bus depots within the existing *Cicaheum* and *Leuwipanjang* Terminals; Layover at two existing *angkot* (paratransit minibus) terminals at *Antapani* and *Ledeng,* which also serve as the end stations; and 9 BRT off-corridor services.

Figure 2. BRT On-Corridor

"Do Nothing" scenario. In the absence of the BRT project, BBMA will encounter worsening mobility and heavily congested road traffic. Traffic congestion will be severe due to the increasing use of motorcycles and private vehicles. The implication of such situations will lead to longer daily commuting, higher transportation costs, and the loss of productivity for businesses and formal workers. Without a reliable mass transit system, opportunities to integrate urban mobility with other planned modes, such as commuter rail and bus services, would be missed, keeping the transport network in the BBMA area fragmented and inefficient.

On the other hand, the environmental and social consequences would also be significant. Greenhouse gas emissions and air pollution would continue to rise due to the increasing use of private vehicles. Vulnerable road users, including pedestrians and cyclists, would remain exposed to safety risks in a network system dominated by mixed and unpredictable traffic. Communities, particularly low-income families, would continue to bear the burden of rising transportation costs, deepening inequities, and limited access to economic opportunities and inclusive growth across the metropolitan area. Therefore, the 'Do Nothing' option is considered not feasible and therefore not adopted.

"Do Something" Scenario Leading to Final DED. Prior to finalizing the Detailed Engineering Design (DED), the BRT system planning in the BBMA underwent a comprehensive review of the design and alternative routes. The initial concept was developed under the Bandung Low Carbon Mobility Plan by SYSTRA (France) in 2017 and later refined through the Sutrinama–

Indobus Project by German International Cooperation Agency (GIZ) in 2021. These initiatives led by the MOT produced feasibility studies for BRT systems in BBMA, forming the basis for subsequent design refinements by Dohwa Engineering (Korea) and PT Lenggogeni (Indonesia) consortium as the DED and supervision firm.

As shown in the figure below, the original BRT design proposed a 23 km long corridor connecting major activity hubs along BKR street, Bandung city centre, and primary transport terminals. To address Bandung's high motorcycle traffic volume and spatial constraints, a mixed-lane configuration was adopted, comprising 13.2 km of segregated BRT lanes, 4.8 km of mixed BRT–motorcycle lanes, and 5.0 km of mixed-traffic lanes. A total of 33 bus stops were planned based on local conditions with median stations on wide boulevards, kerb-side stations on adequate sidewalks, and directional stations on one-way streets.

A Motor Park and Ride (MPR) scheme was initially proposed at some terminals to provide parking areas for the public who will use BRT. However, this scheme is not adopted due to technical and financial considerations. The proposed depots at *Rancanumpang* and *Gedebage* were also deemed unsuitable due to geotechnical and flood risk assessment results.

Source: Feasibility Study by German Agency for International Cooperation (GIZ), 2021

Figure 3. Proposed BRT Corridors and Motorcycle Park and Ride (Initial Design)

To finalize the Detailed Engineering Design (DED) for the BBMA BRT project, a traffic impact assessment was conducted to identify the most effective configuration in terms of technical feasibility, financial efficiency, and socio-economic outcomes. Three alternatives were considered: (1) a baseline route using existing infrastructure, (2) an integrated route connecting BRT with *angkot*, commuter rail, and dense residential/educational areas, and (3) an expansion corridor to peripheral zones to promote equitable mobility and long-term urban development.

Of the three alternatives above, the final DED combines elements of Alternatives 2 and 3, emphasizing high-demand corridors, intermodal connectivity, and targeted expansions to maximize coverage and reduce congestion. This integrated approach was determined to be both technically and financially viable, while also minimizing environmental and social

impacts during construction. As detailed in the earlier sub-section, the resulting DED comprises a 21-km dedicated BRT corridor with 38 bus stops/platforms; 2 bus depots within the existing *Cicaheum* and *Leuwipanjang* Terminals; Layover at two existing *angkots* (paratransit minibus) terminals at *Antapani* and *Ledeng*, which also serve as the end stations; and 9 BRT off-corridor services.

2.2. Dedicated BRT Corridor

BRT On-corridor. A dedicated BRT corridor is designed for approximately 21.7 km long using existing roads that will be reinforced using asphalt pavement and, to a lesser extent, using concrete pavement at the BRT bus stops (platforms). The majority of the dedicated corridors are designed to be a segregated lane with a physical barrier separate from other road users. The geometric design of the dedicated BRT corridor is generally unaltered from the existing road and only requires some widening at certain road segments. The horizontal and vertical alignments along the BRT corridor comply with the standards of ASHTO A Geometric Design Policy for Highways and Roads; Road Geometric Design Guidelines No. 13/P/BM/2021; and the Ministry of Public Works and Housing Regulation No. 5 of 2023 on Technical Requirements for Roads and Technical Planning of Roads, as summarized in the following table.

Table 2. Dedicated BRT Corridor Design

Criteria	Value
Minimum design speed	40 km/h
Minimum stopping sight distance	50 m
Minimum stopping sight distance at station areas (passenger comfort)	85 m
Minimum passing sight distance (station areas only)	410 m
Minimum horizontal sight distance	AASHTO Exhibit 3-58
Maximum superelevation	6 %
Maximum superelevation at stations	2%
Minimum horizontal curve radius, mainline	55 m
Minimum horizontal curve radius, station areas	120 m
Spirals, all curves less than 870 m radius	25 m
Minimum tangent at station ends	20 m
Maximum intersection skew angle	20°
Minimum turning radius at intersections	12 m
Minimum grade	30%
Maximum grade	5% up to 8% for short runs (120-150 m)
Grade range, stations	0.5% - 2.0%
Minimum crest and sag curves	35 m
Minimum crest and sag curves at stations (passenger comfort)	K= 14

Source: DED 2024, Interim Report 3 page III-65 to page III-71; and 10072024_Project_BBMA BRT_ver1.4

Traffic Design Consideration. The BRT corridor is approximately 22 km long, with a dedicated 1-lane for BRT buses. The BRT corridor will use existing road networks, primarily asphalt-paved, and at bus stop stations, the roads will likely be paved with reinforced concrete. The BRT corridor will have a combination of: (i) Segregated Lane using markings for approximately 4.20 km long and that using a physical barrier for approximately 9.45 km long; and (ii) Mixed Lane (without segregation) with a total length of 7.35 km.

Key advantages of the above corridor design are, among others:

- The speed of the bus can be higher than that of other vehicles outside the dedicated corridor due to small interference from ordinary bus stops, roadside motor vehicle parking, roadside non-motor vehicles, and pedestrians;
- Simple traffic management at the road intersection, which is provided with divided lanes, and the BRT traffic flow is controlled by a signal phase to follow the traffic flow in the same direction;
- High flexibility of station layout with the on-corridor bus stations is designed according to the stopping function, including right stopping, left stopping, and left and right stopping of the bus;
- Relatively little impact on the entrance/exit of units along the route as the BRT lane is arranged in the median mode and operated independently, which has no impact on the access of motor vehicles along the route; and
- Relatively little impact on the long-term reconstruction of the road due to the adoption of the dedicated lane in the road median.

The figure presenting the BRT corridor with segregated and mixed lanes is shown earlier. Typical cross-section design of the BRT corridor for segregated and mixed lanes is illustrated in the following.

Proposed Standard Width	
Busway lane	: 3.5 meters
Busway passing lane	: 3.5 meters
Busway lane at station	: 3 meters
Station	: 5 meters
Barrier/curb separator	: 0.5 meter
Mixed-traffic lanes	: 3 meters
Typical Conceptual Design	
Mixed lanes	

Source: Interim Report: Preliminary Engineering Design BRT-BBMA (DOHWA – Lenggogeni, 2024)

Figure 4. BRT Corridor Design

The existing road network will require widening, particularly to accommodate the dedicated BRT lane and the construction of 30 on-corridor bus stops based on the following design considerations:

- The width of the dedicated lane is in a range of 3.00 – 3.25m for the speed of the BRT bus of less than 40km/h and in a range of 3.25 – 3.50 m for the speed of the BRT bus of 40 - 50km/h. Crash barrier shall be arranged for hard isolation, and further road marking and colored asphalt shall be used to indicate the exclusive right-of-way of BRT in sections with limited road width.

Source: Presentation Preliminary Design Report (DOHWA – Lenggogeni, 2024)

Figure 5. Overview of BRT On-corridor and Bus Stop/Platform

- The width of the bus platform stopping lane is in a range of 2.75 – 3.25m. The platform stopping lane should be marked with road markings and colored asphalt to indicate the exclusive right-of-way for BRT. Typical BRT bus stops are illustrated in the following figures.

Road Segments to be Used by BRT Corridor. The following table describes the existing roads (called 'jalan', abbreviated as "Jl.'), including estimated length and road status, that will be used as the BRT corridor in Bandung City.

Table 3. Existing Road Segments to be Used by BRT Corridor

Name of the road	Length (m)	Road Status
Jl. Asia Afrika	1,474.90	City road
Jl. Jenderal Sudirman (from Jl. Otto Iskandardinata intersection to Jl. Nurtanio)	2,990.17	City road
Jl. Jenderal Sudirman (from Jl. Nurtanio intersection to Jl. Rajawali Barat)	1,250.0	National road
Jl. Rajawali Barat	956.80	Nasional road
Jl. Rajawali Timur	1,461.90	City road
Jl. Kebon Jati	1,541.70	City road
Jl. Suniaraja	205.92	City road
Jl. Banceuy	632.67	City road
Jl. ABC	354.34	City road
Jl. Naripan	835.15	City road
Jl. Ahmad Yani (SW -NE direction)	2,409.00	City road
Jl. Ahmad Yani A (SW-NE direction from Jl. Laswi to Jl. Supratman)	535.00	Provincial road
Jl. Ahmad Yani B (NE-SW)	1,049.00	City road
Jl. Ahmad Yani B (NE-SW direction from Jl. Laswi to Jl. Supratman)	535.00	Provincial road
Jl. Ibrahim Adjie	515.00	City road
Jl. Jakarta	1,049.00	City road
Jl. Otto Iskandar Dinata	2,333 .00	City road
Jl. BKR	279.00	Provincial road
Jl. Mochamad Toha	1,056 .00	City road
Jl. Pungkur	87.00	City road
Jl. Dewi Sartika	533.00	City road
Jl. Dalem Kaum	101.00	City road
Jl. Alun Alun Timur	133.00	City road
Jl. Sunda	57.74	City road
Jl. Veteran	169.01	City road

Source: Interim Report 3 - Preliminary Engineering Design BRT-BBMA (DOHWA – Lenggogeni, 2024)

2.3. BRT Bus Stop/Platforms

The BRT project design includes 6 (six) types of platforms for 38 bus stops, designated Type A to Type F, as presented and illustrated below. The use of these platforms depends on the typical cross-section of BRT lanes.

Table 4. Platform Type

Plafform	Number Of Lanes	Number of Roadways	Bus Stop	
			Position	Roadways Number
Type A	1	3	Curb	1
Type B	1	4	Median	2
Type C	2	4	Median	3
Type D	2	2	Curb	1
Type E	2	2 - 1	Curb	1
Type F	2	3 - 2	Curb	1

Source: DOHWA-Lenggogeni, 2024

Figure 6. Platform Type A

Figure 7. Platform Type B

Figure 8. Platform Type C

Figure 9. Platform Type D

Figure 10. Platform Type E

Figure 11. Platform Type F

The proposed type of platforms at each of the on-corridor BRT stations are located at the bus station area. BRT stations are designed to enable passengers to board and alight from buses, purchase and validate tickets, and wait for service. The construction of BRT stations will include new bus stops equipped with improved access and arrival areas, platforms, and an information system related to BRT services. To serve passengers efficiently, buses must approach and align designated areas within the station. The following table lists the names of BRT stations and the proposed type of platforms used.

Table 5. On-Corridor Bus Stops/Platforms

Code	Name	Platform Type	Platform Dimension		
			Length (m)	Width (m)	Area Required (m^2)
BS 1	Stasiun Hall (Terminal)	Type A	27	3	81
BS 2	Pasar Baru	Type B	72	3	216
BS 3	Dalam Kaum	Type A	72	3.2	230.4
BS 4	Pasir Koja	Type A	15	3	45
BS 5	Tegallega (Jalan BKR)	Type A	33	3	99
BS 6A	Taman Tegallega - Sisi Utara	Type D	72	3.,1	223.2
BS 6B	Taman Tegallega - Sisi Selatan	Type D	15	3	45
BS 7	Ciateul	Type F	28	3.2	89.6
BS 8	ITC Kebon Kelapa	Type A	24	3	72
BS 9	Kapatihan	Type A	72	3.5	252
BS 10	Alun-Alun	Type A	72	6.75	486
BS 11	Cikapundung	Type A	15	3	45
BS 12	Naripan	Type E	15	3	45
BS 13A	Pasar Kosambi	Type D	33	3.6	118.8
BS 13B	Pasar Kosambi	Type D	24	2.5	60
BS 14A	Stadion Sidolig	Type D	15	3	45
BS 14B	Stadion Sidolig	Type D	33	3.5	115.5
BS 15A	IBCC (Istana Building Commodities Centre)	Type D	24	3	72
BS 15B	Santa Maria	Type D	24	3.5	84
BS 16	Cicadas	Type A	28	3.5	98
BS 17	Kebon Waru	Type A	24	3.5	84
BS 18	Simpang Lima	Type A	24	3.5	76.8
BS 19	Asia Afrika	Type A	18	3.5	63
BS 20	Dulatip	Type A	24	3.5	84
BS 21	GKI Anugrah	Type A	15	3.3	49.5
BS 22	Andir	Type A	24	3.2	76.8
BS 23	Jamika	Type F	12	3.0	36
BS 24	Suryani	Type F	24	3.0	72
BS 25	Bundaran Cibereum	Type C	46	3.0	138
BS 26	Batas Kota	Type C	46	3.0	138
BS 27	RS Rajawali	Type A	24	3.4	81.6
BS 28	YWKA (Yayasan Wanita Kereta Api)	Type A	18	3.5	63
BS 29	Rajawali Timur	Type A	12	3.0	36
BS 30	Ciroyom	Type A	24	3.0	72

Code	Name	Platform Type	Platform Dimension		
			Length (m)	Width (m)	Area Required (m^2)
BS 31	Trinitas	Type A	13	3.0	39
BS 32	Kebon Jati	Type A	22	3.5	77
			16	3.5	56
BS 33	Banceuy Center	Type A	24	3.,5	84
BS 34	BTM (Bandung Trade Mall)	Type A	33	3.5	115.5

Source: DED Report (2024); and Transport Management Review Report of BRT-BBMA (March 2025)

2.4. Reconstruction of Road Intersections

The BRT project will require a reconstruction or adjustment of 38 road intersections along the BRT corridor, including a four-way intersection, which is a crossroad where two roads meet, and a T-intersection, which is a three-legged intersection where two roads meet. This can take the form of traffic light management, providing road markings and signs, as well as creating curb islands to regulate traffic movements. The road intersections subject to reconstruction and adjustment, including installation of road traffic signals, are presented in the following table.

Table 6. Road Intersections Subject to Reconstructed/Adjusted

Code	BRT Corridor Site	Intersection Type	Intersecting Roads			
SP01	Ahmad Yani – St Yusuf	T-Intersection	Santo Yusuf	Kiaracondong	Ahmad Yani	
SP02	Kiaracondong	4-Intersection	Santo yusuf	Kiara condong	Antapani	Sudirman
SP03	Jakarta – A Yani	4-Intersection	Supratman	Kiara condong	Cicadas	Cihapit Laswi
SP04	Laswi	4-Intersection	Cihapit	Cikaso	Laswi	Kosambi
SP05	Simpang Lima	5-Intersection	Naripan	Malabar	Karapitan	Kosambi, Asia Afrika
SP06	Lengkong Besar	4-Intersection	Tamblong	Lengkong Besar	Naripan	Braga
SP07	Karanganyar	4-Intersection	Gardujati	Braga	Cibadak	Kebon Jati
SP08	Gardujati	4-Intersection	Gardujati	Karanganyar	Cibadak	Kebon Jati
SP09	Jamika	T-Intersection	Jamika	Andir	Garuda	
SP10	Garuda	T-Intersection	Sudirman	Cibeureum	Rajawali	
SP11	Bunderan Cibereum	4-Intersection	Jamika	Rajawali	Soekarno-Hatta	Cimahi
SP12	Cibeureum	3 Ramp merge	Sudirman	Rajawali	Cimahi	
SP13	Nurtanio	4-Intersection	Nurtanio	Andir	Rajawali	Garuda
SP14	Pasirkaliki	4-Intersection	Pasirkaliki	Suniaraja	Gardujati	Kebon Jati
SP15	Simpang Pasar Baru	4-Intersection	Braga	Suniaraja	Pasar Baru	Kebon Jati
SP16	Suniaraja	T-Intersection	Braga	Suniaraja	Banceuy	
SP17	ABC	4-Intersection	Naripan	Suniaraja	Alun-alun BDG	ABC/Pasar Baru
SP18	Naripan – Braga	4-Intersection	Braga	Naripan	Asia Afrika	Banceuy

Code	BRT Corridor Site	Intersection Type	Intersecting Roads			
SP19	Naripan – Sunda	4-Intersection	Braga	Naripan	Veteran	Asia Afrika
SP20	Veteran – A Yani	4-Intersection	Veteran	Kosambi	Burangrang	Asia Afrika
SP21	Banceuy	T-Intersection	Banceuy	Braga	Karanganyar	
SP22	Alun – alun bandung	T-Intersection	Banceuy	Braga	Kepatihan	
SP23	Dalem kaum	4-Intersection	Alun-alun BDG	Dalem kaum	Kepatihan	Bojong gede
SP24	Pungkur	4-Intersection	Alun-alun BDG	Pungkur	Moh. Toha	Pasir Koja
SP25	Balonggede	4-Intersection	Alun-alun BDG	Lengkong Besar	Tegalega	Pasir Koja
SP26	Inggit G – Moh. Toha	4-Intersection	Pungkur	Lengkong Besar	Moh. Toha	Ciateul
SP27	BKR – M Toha	4-Intersection	Pungkur	Lengkong Besar	Moh. Toha	Tegalega
SP28	BKR – Tegalega	4-Intersection	Pungkur	Astana anyar	Moh. Toha	Kopo
SP29	Inggit – Otista	4-Intersection	Panjunan	Ciateul	Pasir Koja	Tegalega
SP30	Jl. Pasirkoja	4-Intersection	Pungkur	Karanganyar	Pasir Koja	Tegalega
SP31	Tamblong	4-Intersection	Tamblong	Naripan	Asia Afrika	Braga
SP32	Gudang Utara – A Yani	4-Intersection	Merdeka	Laswi	Cikudapateuh	Kosambi
SP33	Ciroyom	3 Ramp merge	Rajawali	Kebon Jati	Andir	
SP34	Andir	T-Intersection	Andir Market	Jamika	Cibadak	
SP35	Rajawali	T-Intersection	Cimahi	Garuda	Soekarno-Hatta	
SP36	Braga – Asia Afrika	T-Intersection	Braga	Lengkong Besar	Alun-alun BDG	Cikawao
SP37	Veteran – Sunda	4-Intersection	Siliwangi	Lembong	Kosambi	Asia Afrika
SP38	Malabar	T-Intersection	Asia Afrika	Laswi	Papandayan	

Source: Interim Report 1: Preliminary Engineering Design BRT-BBMA (DOHWA – Lenggogeni, 2024)

2.5. Estimated Passengers

On-corridor Bus Stops. In the table below, the DED report of BRT-BBMA (DOHWA – Lenggogeni JV, March 2025) estimates the total number of passengers boarding and alighting at each on-corridor bus station in a range of 5 passengers/hour at Rajawali Timur station to 1,560 passengers/hour at Taman Tegallega station. The highest numbers of passengers are estimated at 948 passengers/hour at Kebon Jati and 1,038 passengers/hour at Alun-Alun. The scenarios used in this estimate are as follows:

- 77 BRT buses with a combination of electric and internal combustion engines will be operated for 16 hours per day from 06.00 to 22.00; In addition, nine (9) buses will be on stand-by at the depots.
- At peak hours in the morning and evening, the BRT will provide a higher service frequency to meet the demand of a large number of passengers with a bus operating frequency of every 3 – 5 minutes;

- At non-peak hours, the BRT service frequency will be reduced as the number of passengers decreases, and the number of buses operating frequency of every 5 – 10 minutes, ensuring that the passengers have a reasonable waiting time; and
- During weekends and public holidays, the BRT service frequency will be adjusted depending on the passenger demand and other operational factors.
- Dedicated on-corridor services are designed to connect with the existing transport service providers in BBMA.

Table 7. Estimated Number of Passengers at the Bus Stops

BRT Bus Stop Code	Bus Stop Name	Number of Passengers/hours				
		Boarding	Alighting	Total	Bus frequency/ day	No of bus trip/ hours
BS 01	Station Hall	22	166	188	55	3
BS 02	Pasar Baru	250	289	539	61	4
BS 03	Kalipah Apo	127	328	455	72	5
BS 04	Otista	176	96	272	45	3
BS 05	Terminal Tegallega	126	68	194	36	2
BS 06	Taman Tegallega	769	791	1,560	52	3
BS 07	Ciateul	8	194	202	36	2
BS 08	ITC-Kebon Kalapa	60	29	89	36	2
BS 09	Kepatihan	393	465	858	63	4
BS 10	Alun Alun	520	518	1,038	104	7
BS 11	Cikapundung	380	179	559	18	1
BS 12	Naripan	51	119	170	28	2
BS 13	Pasar Kosambi	273	384	657	25	2
BS 14	Stadion Sidolig	275	280	555	34	2
BS 15	Ahmad Yani	231	331	562	25	2
BS 16	Cicadas	242	79	321	25	2
BS 17	BTM (Baru)	254	249	503	25	2
BS 18	Kebon Waru	254	249	503	25	2
BS 19	Simpang Lima	143	118	261	42	3
BS 20	Asia Afrika	5	75	80	42	3
BS 21	Sudirman Dulatip	255	246	501	31	2
BS 22	Sudirman GKI Anugerah	218	137	355	31	2
BS 23	Sudirman Pasar Andir	54	302	356	31	2
BS 24	Sudirman Jamika	75	94	169	31	2
BS 25	Sudirman – Suryani	64	51	115	31	2
BS 26	Bundaran Cibeureum	252	51	303	31	2
BS 27	Sudirman Batas Kota	10	19	29	22	1
BS 28	RS Rajawali	245	216	461	22	1
BS 29	Rajawali YWKA	7	303	310	31	2
BS 30	Rajawali Timur	5	0	5	31	2
BS 31	Pasar Ciroyom	50	50	100	31	2
BS 32	Sekolah Trinitas	59	84	143	31	2
BS 33	RS Kebon Jati	309	639	948	31	2
BS 34	Banceuy/Suniaraja	5	3	8	55	3
	TOTAL				-	-

Source: Propose DED Report (2024); and Transport Management Review Report of BRT-BBMA (March 2025)

2.6. Bus Specification

The BRT project will use 12-meter-long buses to serve passengers within the on-corridor and 9-meter-long buses to serve passengers off-corridor, taking into account the width of the road. The bus will have a low deck to provide accessibility for passengers and allow those boarding from the curb and those with special needs to hop on directly without stairs/steps. Special platforms will be provided at several bus stops to allow passengers to board the BRT on the on-corridor high deck. The following table provides the bus specifications of the BRT project.

Table 8. BRT Bus Specification

Parameter	12-m long bus (large size)	9-m long bus (medium size)
Length	12 m	9 m
Width	Max 2.50 m	Max 2.45 m
Height	Max 3.1 m	Max 3.1 m
Entrance height	300 mm	300 mm
Door width	1.200 mm (mid door)	1.200 mm (mid door)
	1.000 mm (front door)	1.000 mm (front door)
Number of seats	29 seats	20 seats
Wheelchair space	1 space	1 space
Number of people standing	Max 55 passengers	Max 25 passengers

Source: DED by Dohwa-Lenggogeni, 2024

The following illustrates two types of buses to be operated by the BRT project.

Medium-size Bus

Large-size Bus

Figure 12. BRT Bus Size

2.7. BRT Direct Service Route (Off-corridor)

The BRT project plans to connect directly with on-corridor BRT services, initially supported by nine (9) transport service routes in the off-corridor area. The off-corridor routes providing direct service to and from the BRT corridor are shown in the following figures. A total of 242 off-corridor bus stops/shelters will be constructed along these off-corridor service areas.

Source: Redrawn from draft Andalalin BRT-BBMA (DOHWA – Lenggogeni, 2024)

Figure 13. BRT Service Routes in Relation to Bandung Basin Metropolitan Area

As presented in the following table, nine (9) transport service routes (BRT off-corridor) are planned to be connected with the BRT on-corridor services.

Table 9. BRT Off-corridor Service Routes

Service Number	From	To (and vice versa)	Total travel distance of both directions (km)
BRT01	Bundaran Cibiru	Halte BRT Kebon Kalapa	31.25
BRT02	Terminal Ledeng	Halte BRT Kebon Kalapa	19.80
BRT03A	Terminal Leuwipanjang	Dago Tea House	27.27
BRT03B	Terminal Leuwipanjang	Dago Tea House (via Dipati Ukur)	28.62
BRT04	Pangkalan Elang	Riau	26.38
BRT06	TVRI Jawa Barat, Cibaduyut	Halte BRT Alun-Alun Bandung	11.55
BRT07	Padalarang	Alun-Alun	45.50
BRT08	Stasiun Cimahi	Terminal Cicaheum	36.67
BRT09	Terminal Ledeng	Terminal Antapani	30.22

Source: Off-Corridor Bidding Document of BBMA (August 2025)

2.8. Infrastructure, Facilities, and Landscaping Works

BRT Pavement and Markings. According to BRT DED, rigid/concrete pavement is only used at the bus stops/platforms of the dedicated BRT on-corridor, while the asphalt-typed pavement would be used for the remaining road segments of the on-corridor. To ensure driving comfort at high speeds and connection with the existing pavement, the pavement structure uses flexible pavement, such as asphalt- and/or concrete pavement. Compared with other types of pavement structures, asphalt pavement has advantages such as road surface smoothness, driving comfort for vehicles, low driving noise, good road friction performance, and easy maintenance.

Based on the pavement inspection conducted as part of the DED, reinforcement shall be provided for the subgrade defects identified along the BRT corridor. The stopping lane at the platform is reinforced. Colored epoxy resin would be applied within a 50-meter-long range of the entrance lane and exit lane at the road intersection, as well as at the entire range of dedicated lanes on both sides of the platform. Non-BRT lanes shall be repaired and reconstructed, including the repair of the sidewalk surface of the existing sidewalk.

Crash Barrier. Crash barriers will be installed at some segments of the dedicated BRT on-corridor to segregate the lane for BRT buses and those for other road users. The raised barriers are generally 50 cm high and used to separate the dedicated BRT lane from non-BRT bus traffic, preventing traffic flow from entering the BRT lane in violation of regulations, and guiding the vehicles to drive according to the specified route, so as to avoid collisions between vehicles. At the same time, the crash barrier can effectively absorb energy when the vehicles hit the guardrail, reduce the damage to vehicles, and protect the safety of the related drivers.

Road Drainage. The road drainage system within the dedicated BRT corridor shall be designed and constructed according to the provisions of the Ministry of Public Works and Housing (MPWH) Regulation No. 12/PRT/M/2014 (dated 2 October 2014) on City Drainage System and the MPWH Guidelines No. 06/P/BM/2023 (dated 14 April 2023) on the Road Drainage Inventory as well as international standards for drainage aspects not covered in these Indonesian regulations and guidelines. The drainage system design uses estimated daily rainfall data from 1992 to 2021 and a 10-year return-period design flood discharge. The existing drainage channel, likely affected by bus stop platform construction and some road reconstructions, consists of side ditches that will be adjusted to 0.6–1.2 m in width and 0.1–1.0 m in depth.

Road Curb. The code requirements according to Letter of Director General of Highways No./BM0402-Db/145 2022 regarding "*Peninjauan Ulang Pekerjaan Kereb Beton untuk Jalan, Pengecatan Marka Jalan, dan Pengecatan Bagian-bagian Jalan dan Jembatan* Lainnya" would be adopted for the works related to the road curb. Road curbs are used to establish the boundary between the carriageway (vehicle lanes) and the sidewalk. They are also important facilities for road drainage and protect the edges of the road surface structure. The curbs are made of prefabricated concrete. Damaged road curbs would be newly constructed along the dedicated BRT corridor.

Landscaping Works. As shown in the figure below, the existing sidewalks/pedestrian along the dedicated BRT corridor will be upgraded. In this circumstance, the presence of trees and vegetation and landscaping works will be undertaken to improve the urban landscape within the dedicated BRT corridor while restoring the surrounding aesthetic within the project area that may have been disturbed during the construction of the BRT project. The landscaping works would include construction of permanent, concrete-made seats, pavement of the pedestrian with durable and anti-slip materials, street lighting, and other ancillary facilities such as trash can. The following images are examples of the urban landscaping works that will be undertaken as part of the BRT project.

Facilities for Disabled Persons. The marching blind road as a guiding block (as referred to in Figure 14) of 0.30 m wide will be installed on the pedestrian to guide the person with visual disability while walking. The barrier-free paving location is generally 0.10 to 0.60 m away from the greening belt or roadside. A prompt blind road is set at the turning point of the marching blind road. Protruding objects on the pedestrian path that may cause danger to the visually impaired person will be enclosed, enabling them to bypass them. At the same time, no sudden height differences or cross ridges are established on the sidewalks of the road section to facilitate the use of wheelchairs for physically disabled individuals. In case of a height difference or cross ridge, a slope is used as a transition and ramp

Source: Interim Report: Preliminary Engineering Design BRT-BBMA (DOHWA – Lenggogeni, 2024)

Figure 14. Sidewalk/Pedestrian Design

Electrical Equipment. Since PLN is reducing its electricity supply, solar panels are expected to be used as an alternative energy source for the bus stops. Bus stop electrical equipment will include CCTV, Sound system, Wi-Fi, LED TV, shelter lighting, waiting-time panel, stop contact/socket, and charger for cellular phones.

2.9. Bus Depots, Terminals, and End Stations/Terminus

Bus Depots. Two BRT bus depots, which also serve as terminals, will be constructed within the existing *Cicaheum* and *Leuwipanjang* Terminals. Essential depot facilities to be constructed include parking space, high-quality pavement, bus maneuvering space, fueling stations, bus cleaning and washing areas, maintenance and repair workshops, and operator administration offices. These depots will also serve as the BRT end stations. The facilities and area required for the design of the bus depots are presented in the following table.

Table 10. Facilities and Area Required for the BRT Depots

Facilities	Cicaheum (m^2)	Leuwipanjang (m^2)
Depo entrance/exit gate (security post)	18	18
Parking areas:		
- Internal parking (bus)	3710.5	2805.5
- External parking (Officials & Visitors)	190	175.75
Bus fuelling and charging area	90.2	83
Cleaning washing facility with a washing bay	60	60
Maintenance facility		
- Main workshop	345	309,75
- Body shop zone (painting)	119.41	119.41
Administrative facility		
- General office	95	95

Facilities	Cicaheum (m^2)	Leuwipanjang (m^2)
- Operation office	55	55
- Employee facilities (including toilet, kitchen, bathroom, and canteen)	297	240,5
Total Area	**4,980.11**	**3,961.91**
BRT bus parking capacity (unit)	57	29
Land/facility ownership	City Government of Bandung	Partly owned by Bandung City & MOT

Source: Final DED Report (2024); and Transport Management Review Report of BRT-BBMA (March 2025)

Existing Cicaheum Terminal (Ref: https://www.google.com/search?q=terminal+bus+cicaheum&rlz=1C1GCEA_enID1148ID1148&oq=terminal+bus+cicaheum&gs_lcrp=EgZjaHJvbWUyBggAEEUYOdIBCDg0NTFqMGo5qAIAsAIB&sourceid=chrome&ie=UTF-8#vhid=/g/11h_vwn7jh&vssid=lcl&lpg=cid:CgIgAQ%3D%3D,ik:CAoSF0NJSE0wb2dLRUlDQWdJRE1tdl9XOXdF

Future BRT Depot – Cicaheum

Ref: https://www.antarafoto.com/id/view/1556457/revitalisasi-terminal-leuwipanjang

Existing Leuwipanjang Terminal

Future BRT Depot – Leuwipanjang

Figure 15. BRT Depot Design – Cicaheum and Leuwipanjang

Bus Terminals/End Stations. Based on existing public transport routes and demand analysis, the *Ledeng* and *Antapani* Terminals are selected as the BRT bus terminals and serve as the end stations/terminus. The area required for the BRT station is shown in the table below.

Table 11. Area Required for BRT Stations

Existing Terminal	Current Use	Future Use	Existing area (m^2)	Area needed for BRT (m^2)
Ledeng	*Angkot* terminal	Current use and future BRT terminal	2,600	699.8
Antapani	*Angkot* terminal	Current use and future BRT terminal	3,200	689.8

Source: DED Report (2024); and Transport Management Review Report of BRT-BBMA (March 2025)

In addition, 14 BRT end stations/terminus will be designated as part of the BRT system as presented in the following table.

2.10. Clean Water Supply and Waste Management

Water Supply and Wastewater Treatment. The DED estimates that the clean water supply required to support the operation of BRT depots and terminals/end stations is approximately 493 m^3/day, particularly for domestic usage by passengers and operators, housekeeping, and BRT bus washing at the depots. Clean water supply will be primarily sourced from the local government water supply company (PDAM), supplemented by groundwater extraction as a backup, given that PDAM's existing capacity may not be sufficient to meet the project's full water demand. Therefore, the groundwater utilization permit (as SIPA) will be processed and obtained in the subsequent phase of the project. Furthermore, the wastewater generated by clean water use is estimated at 379 m3/day (i.e., less than 80% of the clean water supply).

A wastewater treatment system, known as STP-FRP Biotech (using aerobic and anaerobic processes), to treat domestic wastewater from depot and terminal operations, with a treatment capacity of 5-25 m^3/d, will be installed. The effluent from the WWTP will enter an

interim storage tank before discharge to a soil infiltration area. The sludges accumulated in the WWTP will be periodically removed using vacuum trucks. In addition, a pre-treatment grease trap with a capacity of 2.5 m^3/d will be provided at depots and terminals at the wastewater discharge point from the cafeteria and kitchen.

The following diagram illustrates the clean water supply and wastewater treatment flows for the depot, indicating that wastewater from BRT bus washing will undergo some treatment for reuse in the washing system. Approximately 60% of the water generated by the bus-washing WWTP system will be recirculated and reused to wash incoming BRT buses.

Figure 16. Wastewater Treatment and Reuse Schematic at Depot

Water supply required for bus washing machines is about 4.8 m^3/day. Then, the effluent from its wastewater treatment will be reused for about 60%, whilst the remaining 20% will go to the WWTP of STP-FRP biotech, as shown in the following diagram.

Figure 17. Flowchart Water Mass Balance of Bus Washing Machine System

Solid Wastes. The BRT operation is anticipated to generate approximately 10 m3/day of solid waste, comprising approximately 53% organic/putrescible waste and 42% recyclable waste. Provide a dust bin with volumetric capacities of 40L, 100L, and 240L, for a total of 446 units, to be allocated at depots, terminals, and bus stops. These wastes will be collected by the Bandung City Environmental and Cleanliness Department and disposed of at a licensed waste disposal facility operated by the local government.

Hazardous Wastes. Hazardous waste from bus maintenance and office activities, such as used batteries from e-buses and buses with combustion engines, used lubricant oil, paint waste, and cartridges from office printers. Hazardous waste storage will be located at each depot and terminal, with complete facilities, as per the Minister of Environmental and Forestry Regulation No. 6 of 2021. Hazardous waste will be removed periodically by cooperating with a licensed transporter for official hazardous waste disposal. Therefore, the management of hazardous waste activities, which comprises collecting, packaging, recording, and spillage protection, will be established by providing SOP (Standard Operating Procedure).

2.11. Affected Lands, People, and Trees

Affected Land and Area. No acquisition of privately owned land will be required for the BRT project, according to the project's LARAP (dated March 2025). The land and/or areas required for the BRT Project include, among others, 21.7 km long existing roads for BRT on-corridor; 38 BRT stops/platforms covering 3,965-m^2 area; 14 terminals/end stations covering 4,008-m^2 area; and *Cicaheum* and *Leuwipanjang* Depots. The breakdown of affected lands and areas is presented in the following table.

Table 12. Affected Land and Area

Facility	Length/Area	Current Use	Land Ownership and Area Affected
Dedicated BRT corridor	21.7-km	Existing road's right-of way	• Ministry of Public Works: 2.206.8-meter-long • West Java Province: 814 meter long • Bandung City: 18,560 meter-long
38 BRT bus stops	3,964.70 m^2	Sidewalk within ROW	• Ministry of Public Works: 357.6 m2 • West Java Province: 424 m^2 • Bandung City: 3,182.90 m^2
Terminals/End Stations	4,008 m^2 (total)	Sidewalk within ROW	• Bandung City: 1.583 m2 • Ministry of PWH: 90 m2 • PT. KAI: 90 m2 • PT. KCIC: 45 m2 • West Java Province; 2.200 m2
End stations within on-corridor 1. Alun-Alun 2. ITC Kebon Kalapa		Existing bus stop; and road within RoW	
12 End stations within off-corridor			
1. Terminal Antapani		Type C Terminal (Angkot terminal)	
2. Cibaduyut		Sidewalk/existing bus stop	
3. Bundaran Cibiru		Sidewalk and parking area	
4. Cicaheum		Intercity bus and *angkot* terminals	
5. Cimahi		Sidewalk	
6. Dago		Park	
7. Elang (Cibeureum)		Existing Bus Stop	

Facility	Length/Area	Current Use	Land Ownership and Area Affected
8. Terminal Ledeng		*Angkot* terminal	
9. North Leuwipanjang		Dishub Office	
10. South Leuwipanjang		Sidewalk	
11. Padalarang Station		Parking area	
12. Riau		Sidewalk	
Cicaheum Depot	10,058 m^2	Active terminal with offices and kiosks	Bandung City
Leuwipanjang Depot – south of the existing terminal	6,298 m^2	Active terminal with offices	Bandung City

Source : LARAP Document (DOHWA – Lenggogeni, Feb 2025)

Project Affected Peoples (PAPs). Based on the LARAP prepared for BBMA, it is identified that the PAPs whose livelihoods may be impacted by the BRT project are as follows:

- Affected street vendors (*pedagang kaki lima* or PKL) along the BRT corridor, depots, terminals, and end stations. Overall, the number of affected street vendors is around 1,735, which were grouped by zone based on the provisions of Bandung City Regulation No. 4/2011 as 331 street vendors in the green zone, 353 street vendors in the yellow zone, and 1,051 street vendors in the red zone. The green zone and the yellow zone refer to allocated spaces where street vendors could sell their goods. Meanwhile, the red zone refers to unallocated space for street vendors (from the local government regulation's viewpoint, it is 'illegal' for street vendors to sell there).
- Parking attendants of on-street parking along the on-corridor and other parking locations at the terminal, end station, and depot locations. The total number of parking attendants potentially affected by the BRT project is around 193 people, including 188 people who are the household heads. These 193 people consist of permanent parking attendants (as electronic and manual parking offers) registered with the Transportation Agency of Bandung City (*Dinas Perhubungan Kota Bandung*) and unregistered parking attendants.
- Land/kiosk tenants are found in several terminals that are planned to become BRT Depot and End Station locations, as follows: (1) Existing *Cicaheum* Terminal which is planned to be a Depot, (2) Existing *Antapani* Terminal, planned to be an end station/Terminus, and (3) Existing *Ledeng* Terminal planned to be an end station/terminus. No kiosk is identified at the existing *Leuwipanjang* Terminal. The distribution of the number of land/kiosks likely to be affected by the BRT project is shown below.

Table 13. Number of the Affected Kiosks/Tenants

Location	Number of Kiosk Tenants
Terminal Cicaheum	59
Terminal Antapani	22
Terminal Ledeng	43
Total	**124**

Source: LARAP Document of BBMA BRT Project (DOHWA – Lenggogeni, Feb 2025)

- Paratransit *angkot* (mini-bus service), which operates within the BRT on- and off-corridor routes, based on Systra's (2022) Feasibility Study report, the proposed BRT routes will overlap to some degree with 48 existing *angkot* routes, including eight of them that are highly overlapped. Approximately 1,554 *angkot* vehicles operate on overlapping routes, affecting angkot cooperatives and 5,069 *angkot* operators (drivers, ticketing, timers, and maintenance staff). *Angkot* impact assessment and mitigation actions plan are to be discussed and presented in the Public Transport Reform document.
- Government/public assets at the proposed bus stations and corridors that are potentially affected, as presented in the following table.

Table 14. Affected Government-owned Assets

Items	Type of Assets	Number	Unit
Affected asset at bus stop location	Iron poles (electricity, telephone, traffic sign, etc.)	66	unit
	Concrete poles (electricity, telephone, traffic sign, etc.)	5	unit
	Concrete balls	10	unit
	Iron fence	56.5	meter
	Pots and plants	19	unit
	Park bench	1	unit
	Bicycle parking set	1	unit
Affected asset in the BRT corridor	Concrete balls	95	unit
	Pots and plants	44	unit
	Park bench	35	unit
	Police post	1	unit
	Billboard	1	unit

Affected Trees. As shown in the table below, about 270 trees within the BRT on-corridor area will need to be relocated or removed. Relocating or replanting the tree elsewhere is preferred due to its maturity, aesthetic appeal, and shade function. If tree cutting is necessary to enable construction work, it must be informed to and agreed with the relevant government agency. For each tree to be cut, 5 (five) replacement trees will be required and planted in a designated area and maintained until they are considered growing.

Table 15. Number of Trees Affected by Construction

Location	Tree Names													Total
	Ketapang	Pule	Bintaro	Jackfruit	Palm	Oil Palm	Mahogany	Pterocarpus	Cinnamon	Flamboyant	Ashoka	Crape Myrtle	Banyan	
BS 3 Dalem Kaum	1		1											**2**
BS 6B Taman Tegallega Selatan							3			1				**4**
BS 7 Ciateul							2							**2**
BS 12 Naripan						1								**1**
BS 14A Stadion Sidolig								1						**1**
BS 14B Stadion Sidolig							2							**2**
BS 17 Kebon Waru							4							**4**
BS 18 Simpang Lima												2		**2**
BS 19 Asia Afrika											3	2		**5**
BS 20 Dulatip	1													**1**
BS 21 GKI Anugrah		2												**2**
BS 22 Andir					2									**2**
BS 23 Jamika							1							**1**
BS 24 Suryani							6							**6**
BS 25 Bundaran Cibereum	8								4					**12**
BS 26 Batas Kota	1				5					5			2	**13**
BS 27 RS Rajawali							5							**7**
BS 28 YWKA				2			2							**4**
BS 34 BTM			2				0							**2**
Sudirman street	29	42					55			10				**166**
A Yani street						10	20							**30**
													Total	**269**

Source : LARAP Document (DOHWA – Lenggogeni, Feb 2025)

Urban landscaping and amenity work will be undertaken to improve the urban landscape within the dedicated BRT corridor and depot construction, while restoring the areas disturbed by the construction of bus stops/shelters within the off-corridor. The landscaping works would include the construction of permanent concrete seats, pedestrian-grade pavement with durable, anti-slip materials, street lighting, and other ancillary facilities such as trash cans.

2.12. Construction Materials, Equipment, and Vehicles

The implementation of the BRT project will require construction materials, among others, boulders, sand, concrete, and asphalt. These materials will be sourced from suppliers with valid operating licenses and environmental permits. In addition, facilities such as base camp, trucks, and equipment will be required to support construction activities as described below.

Construction Materials. Wood, stone, iron, asphalt, cement, and sandstone that meet material or technical criteria will be required for construction activities. The building materials are generally sourced from local suppliers. However, especially for asphalt and concrete materials to be procured from the asphalt and concrete plants contracted by the contractors.

The indicative construction materials required for the BRT project are listed in the table below, indicating that a significant volume of materials will be required, including boulders/rocks up to 480.000 m3, sand up to 230.225 tons, and cement up to 390.000 bags. These volumes are subject to change based on the final DED design and the bidding outcome.

Table 16. Indicative Construction Materials Required

Items	Unit	Amount
Wood	m^3	1,200
Boulder, rocks	m^3	480,000
Sand	m^3	230,225
Iron/steel bars	ton	18,000
Asphalt	ton	15,000
Portland **Cement**	bag	390,000

Source: Estimates by Dohwa-Lenggogeni, 2024

Construction Equipment and Vehicles. A range of equipment and vehicles in various capacities that would be operated during the construction of the BRT project is presented in the table below.

Table 17. Construction Equipment and Vehicles

Items and Specifications	Number of Units Required		
	Depot Construction	On-Corridor Construction	Off-corridor Construction
Mobile crane (up to 15-ton capacity)	1	9	6
Excavator (various capacities)	4	30	4
Dump truck (up to 10-ton capacity)	3	39	8
Flatbed truck 3 to 4-ton capacity	2	15	6
Water tanker 3,000 – 4,500 litres	2	12	6
Concrete mixer 0.3 – 0.6 m^3	2	15	6
Generator set 5000 watts	2	21	6
Concrete vibrator	2	15	6
Water pump 70 – 100mm	2	15	6
Tamper 5 HP	2	12	6
Welding set	2	12	9
Bar bender	2	15	6
Bar cutter	2	15	6
Survey equipment	2	12	4
Bore pile testing equipment	2	-	-
Jack hammer	-	12	4
Asphalt finisher	-	6	-
Powered broom	-	6	-

Items and Specifications	Number of Units Required		
	Depot Construction	On-Corridor Construction	Off-corridor Construction
Motor grader	-	3	-
Wheel loader	-	3	-
Tyre, vibratory & pedestrian rollers	-	15	-
Cold mill machine	-	6	-
Concrete mixer truck	-	18	-
Air compressor	-	3	-

Source: Bidding documents of BBMA Depot, On-corridor and Off-corridor Works (August 2025)

Freshwater Supply. To support construction activities of the project, freshwater supply will be required for concrete making, dust suppression, general washing purposes, and workers' sanitation at approximately 20.3 m^3/day based on the estimation presented in the following table. This water need will be supplied through existing boreholes and water tankers, and, for drinking, through the supply of bottled water or similar alternatives. The final volume is subject to change depending on the number of workers, the final DED, and the working method applied.

Table 18. Estimated Fresh Water Supply for Construction

Items	No of workers		Consumption	Amount (litres/day)
Contractor offices	45	persons	50 litres/person/day	2,250
Field workers	240	persons	50 litres/person/day	12,000
Construction activities incl. general washing purposes	-		-	6,050
			Total	**20,300**

Source: Estimation by Dohwa-Lenggogeni, 2024

Fuel and Lubricants. The operation and maintenance of construction trucks, vehicles, and heavy equipment would consume a moderate volume of fuel and lubricant. The volume of diesel fuel and lubricant required during project construction is estimated at 39,000 liters/month and 5,000 liters/month, depending upon the number and efficiency of the construction fleets.

Hazardous Waste Management. The appointed contractors for the BRT project would generate a relatively small amount of hazardous waste, such as used lubricants, off-specification fuels, oily-contaminated rags, used spill kits, and other waste, such as leftover or containerized paints, coatings, solvents, and resin residues. These wastes are commonly generated by the operation and maintenance of the project fleet at construction sites or at the contractor basecamps. Infectious waste that may be generated from such a clinic would be limited to used medicine packaging and bandages.

According to the Government Regulation No. 22/2021 on Environmental Protection and Management, these wastes are categorized as hazardous waste and, therefore, should be handled and disposed of separately from non-hazardous wastes. These hazardous wastes will be stored in 200-L capacity of steel drums or similar materials.

All those hazardous wastes will be stored in some dedicated shelter which is equipped by roof, isolated bund wall, signage and safety tools such as fire extinguisher within the construction sites or the contractor basecamps prior to removal by the appointed third parties and disposal to licensed facilities. The volume of hazardous waste that would be generated by the project is not yet estimated at the time of the ESIA preparation.

Wastewater/Sewage Treatment. Sewage/wastewater in the order of 12 m^3/day (see **Error! Reference source not found.**) would be generated from the number of workers employed by the project. This waste stream would be channeled to mobile toilets (latrine) and the sludge is removed regularly using a third-party service provider and eventually disposed to a licensed facility operated by the private sector or a government entity.

Management of Construction and Other Non-hazardous Wastes. The main waste streams from the construction activities would be, among others, spoils, concrete and steel rods that do not meet specifications, used planks, and packaging. It is estimated that the construction waste, including demolition waste,, will be generated at approximately 411 tons.

In addition, household-typed waste such as leftover food, plastic bottles, and paper boxes packaging would be generated and estimated from the worker activities at around 53 kg/day. These wastes are not considered hazardous but require safe, temporary storage at construction sites prior to use as backfill materials or disposal to the final waste disposal sites (*tempat pembuangan akhir/*TPA) operated and have licenses issued by the local governments. Disposal of the construction waste to these TPAs or other designated sites should be agreed among the appointed contractor, the project proponent, and the relevant government agencies.

2.13. Contractor Basecamp and Workers

The sites that may be required for the contractor basecamps, including temporary accommodation for the project workers and storage of construction materials and equipment, have not been identified at the time of ESIA preparation, as this will depend on the outcome of the bidding process of the civil and other associated works. Limited temporary accommodation may be provided for project workers from outside the Bandung area, and this may be provided at the contractor's basecamp, rented houses, or hotels nearby. The contractor base camp may include small workshops for simple maintenance of the contractor's equipment and vehicles.

The appointed contractors will be responsible for selecting the contractor basecamp that are located away from environmentally sensitive areas such as residential, public facilities, sensitive rivers, and protected areas. Further, the access road to the contractor basecamp is expected to be on a wide and paved road.

The construction of the BRT Project will be divided into several civil work packages for: Dedicated BRT corridor, or called "On-corridor", off-corridor serving direct BRT service routes; Terminal layover; and Construction of *Leuwipanjang* and *Cicaheum* Depots that will be implemented by qualified contractors to be appointed through a competitive bidding process.

Worker Recruitment. The workforce requirement for the construction phase of BRT – BBMA is estimated at approximately 285 people, with 25% of them, subject to meeting the qualification and opportunities available, would be prioritized from local communities residing near the project location, selected based on their qualifications and the specific needs of the project. The number of workers required could change depending on the construction workload, schedule, and the worker qualifications required at a particular time. The following table presents the expected qualifications of skilled workers to be provided by the contractors.

Table 19. Indicative Workforce Skills and Requirements

Job Type	Education Background	Area of Expertise	Minimum Working Experience (years)
Key Personnel			
Project Manager	Bachelor – Civil Engineering	Project management specialist (SKK level 8)	8
Site Manager	Bachelor – Civil Engineering	Project management specialist (SKK level 8)	5
Civil Engineer	Bachelor – Civil Engineering	Technical building expert – SKK level 7	3
Architect	Bachelor – Architect	Architect (SKK level 7)	3
Electrical Engineer	Bachelor – Civil Engineering	Electrical expert (SKK level 7)	3
HSE Specialist	Bachelor – Civil Engineering	Construction expert (SKK level 7)	3
Environmental, Health and Safety Specialist	Bachelor – Environmental Engineering	Environmental expert (SKK level 7)	3
Social Specialist	Bachelor – Social Science	-	3
Utility and Liaison Officer	Bachelor – Civil Engineering		5
Supporting Personnel			
Finance Manager	Bachelor – Economic/ Accountant	-	3
General Affair Officer	Bachelor – Social/Communication	-	3
Surveyor	Diploma (3 years)- Technical	-	3
Administration - Technical aspect	Diploma (3 years)- Technical	-	3
Administration - Financial aspect	Diploma (3 years)- Finance	-	3
Logistic personnel	Diploma (3 years)- General	-	3

Source: Bidding Documents of BBMA BRT Project, 2025.
Note: SKK – *Sertifikat Kompetensi Kerja* (Work Competency Certificate)

Selected, Final DED of the BRT project. Following the decision to finalize the DED for the BBMA BRT project, a traffic impact assessment was conducted to identify the most effective configuration with respect to technical feasibility, financial efficiency, and socio-economic outcomes. The options considered were as follows:

- *Alternative 1 – Baseline Route*. Focused on a core corridor utilizing existing infrastructure. While cost-effective and faster to implement, this option provided limited coverage, weak intermodal integration, and minimal benefits for traffic congestion.
- *Alternative 2 – Integrated Route*. Prioritized integration with Bandung Raya Bus Transit, minibus/*angkot* networks, and commuter rail, while extending service to dense residential and educational areas. This option offers high potential for modal shift but requires greater capital investment and more complex coordination across operators.
- *Alternative 3 – Expansion Corridor*. Targeting peripheral growth areas to promote equitable mobility and long-term urban development. However, this alternative requires substantial capital, extensive land acquisition, and longer construction timelines.

Of the three alternatives above, the selected, final DED combines elements of Alternatives 2 and 3. It emphasizes high-demand corridors, intermodal connectivity, and targeted expansions to maximize coverage and reduce congestion. This integrated approach was determined to be both technically and financially viable, while also minimizing environmental and social impacts during construction. As detailed in earlier sub-section, the final design of the BRT project includes: 21 km-long dedicated BRT corridor and associated 38 bus stops/platforms; 2 bus depots within the existing *Cicaheum* and *Leuwipanjang* Terminals; Layover at two existing *angkot* (paratransit minibus) terminals at *Antapani* and *Ledeng,* which also serve as the end stations; and 9 BRT off-corridor services.

2.14. Key Activities as per Project Phases

The BRT project will be undertaken in the following phases, from pre-construction through to operation, as described below to inform the E&S risk and impact assessment (see Section 6 of this ESIA). The BRT project activities will comprise some stages at pre-construction, construction, and post-construction (operational), which can be described as follows:

A. Pre-construction Phase

Land Acquisition, including Disclosure of Project-Related Information. Socialization for the BRT-BBMA Project will be conducted in accordance with the recommendations of the environmental documents (ESIA & UKL/UPL) for the surrounding community around the project area. Socialization will cover all affected areas, which comprise 17 districts at Bandung City, two districts at West Bandung Regency, 1 district at Bandung Regency, and 1 district at *Cimahi* City. At this stage, the community is expected to be informed about project activities, including the implementation of the DED and the mitigation measures to address potential adverse impacts. An asset inventory survey will also be conducted by relevant government authorities to identify and record affected utilities and trees in an accurate manner prior to their removal or demolition.

B. Construction Phase

Construction Permits. It is a necessary process that must be completed before construction activities begin. In this regard, the project proponent and implementing agency are required to open coordination with relevant authorized government agencies. Key permits include:

- Permission for road use for material mobilization and construction within the road right-of-way (for bus station construction and conduit pipe crossing) was issued by the Regional Public Works Department.
- Tree-cutting permits are issued by the Regional Environmental and Parks Department in Bandung City.
- Type C Mineral Permit and UKL/UPL (Environmental Management and Monitoring Documents) for quarry operations.
- Operating License and UKL-UPL for batching plant and/or asphalt mixing plant.
- Permissions from landowners and surrounding communities regarding the use of land for soil borrowing and disposal locations.

The Operation of Contractor Basecamps. Several base camps would be constructed or contracted by the contractor winning the tender process. The number and locations of basecamps are not yet known at the time of ESIA preparation, as it depends on the outcomes of the tender process and the number of civil work packages awarded. The activities that will be carried out at the basecamp and site office include the daily activities of workers and office staff; apart from that, it is also used for vehicle or heavy equipment repair activities and material storage. To support activities at the base camp, it is necessary to provide clean water, interim waste storage, and a potable water supply.

Recruitment of Project Workers. The BRT project would require approximately 285 workers; of this total, about 25% would be prioritized from local communities residing near the project location, selected based on their qualifications and the specific needs of the project.

Mobilization of Construction Equipment and Project Vehicles. The appointed contractors would mobilize their construction equipment and project vehicles to their basecamps and/or directly to parts of the project areas, including BRT depots, off-corridor as well as off-corridor sites where the civil work packages are awarded.

Transportation/Interim Storage of Construction Materials, Fuels, and Wastes. To facilitate the transportation of materials using trucks, the contractor will coordinate in advance with the relevant government agencies, such as the Bandung City Transportation Department, and engage with the local community through regional officials. This coordination aims to minimize traffic disruptions and reduce environmental impacts.

Heavy equipment will be transported to the site in two phases: first, it will arrive and remain on-site for the duration of construction; second, it will be removed upon completion of the work. Therefore, heavy equipment transportation will occur at least twice during the construction period. In contrast, material transport will continue throughout the construction phase.

Civil and Landscaping Works. These works are the primary components of the BRT project implementation that include the civil and landscaping works below, which would be divided into several packages:

- *Relocation/dismantling of infrastructure and utilities* - some existing utilities, such as electrical cables, including conduit pipeline and power poles, and water supply pipelines, that may have potentially been crossed by project construction, will need to be relocated or demolished. This relocation process will take place after prior coordination and completion of necessary permitting procedures with the relevant government authorities. Before the relocation begins, public socialization will be conducted, and protective measures will be implemented to delineate the utilities targeted to establish a safety zone for the public and project workers.
- *Land clearing and demolition of structures* - the existing conditions along the BRT-BBMA corridor area include existing roads as well as bus stop buildings and terminals, which will be renovated to accommodate additional functions. The land is government-owned and falls under the authority of the Transportation Department. Accordingly, site-clearing activities will involve dismantling existing building structures and removing sections of asphalt pavement for overlay.
- *Asbestos survey and safe disposal* - before demolition activities, an investigation to identify the presence of Asbestos Containing Material (ACM) must be carried out. This includes an inventory of potential ACM. If any indications of ACM are found, a certified third-party asbestos specialist must be engaged to conduct sampling, develop an asbestos management plan, and oversee the safe handling, transportation, and disposal of the material. Demolition of existing structures will take place specifically at the depot areas at the *Cicaheum* and *Leuwipanjang* terminals.
- *Construction of dedicated BRT corridor and road pavement* **-** overlay work on the existing road section of 21,7 km with asphalt material transported from AMP. The re-paving work activities will be initially conducted by determining the part of the road body and/or the area of the road body that needs to be re-paved with asphalt up to 3 cm thick using a Cold Milling Machine. The dredging process is assisted by a dump truck, which is positioned at the front of the machine.

  The cleaning process at work areas in the field that had previously been dismantled will begin with drying using a gas torch. Then, subsequently, cleaned up the remains of demolition parts that were not previously removed using an air jet compressor, and finally sprayed with tack coat in the work area that had dried and been cleaned. Asphalt is spread by the asphalt finisher in the area that has been previously cleaned. As for spreading, it is carried out using a hopper which is pulled by a dump truck, where hot-mixture asphalt is poured from the asphalt finisher with a layer thickness of 7 cm as loose thickness.

The vibration machine is turned on throughout the spread in order that the asphalt combination is distributed thoroughly. Then the workers in the field will evenly distribute the asphalt mixture using shovels and lackers to ensure that the mixture is evenly distributed. The overlay compaction will be undertaken by adhering to the Bina Marga General Specification in the 2018 method.

- *Construction of BRT Depots, Terminals, and End Stations* **-** Construction work includes BRT foundation and column work as well as construction of facilities and infrastructure. Foundation work planning uses drilled piles, with K-350 reinforced concrete material, and the columns used are transverse beam columns with reinforced concrete material. The transverse beams use I-girder beams with precast concrete material, and the floor slabs use reinforced concrete. Construction of facilities and infrastructure includes building a platform equipped with counters, waiting rooms, and information rooms. Especially for the terminal, toilets are also provided. The BRT depo construction at two areas at *Cicaheum* and *Leuwipanjang* Terminals will be undertaken as additional facilities to the existing bus and *angkot* terminals at these locations.
- *Landscaping works* – The landscaping works would include construction of permanent, concrete-made seats, pavement of the pedestrian with durable and anti-slip materials, street lighting, and other ancillary facilities such as trash cans. The following images are examples of the urban landscaping works that will be undertaken as part of the BRT project.

C. Operation and Maintenance (O&M) Phase

Operational stage worker recruitment of the BRT project is estimated to be up to 232 people with different qualifications, and this number excludes the workers employed by bus operators, infrastructure, and systems. Further, indirect employment is anticipated to occur as a result of the need for goods, services, and human resources to operate, maintain, and repair the associated BRT bus, infrastructure, and system.

3. KEY POLICY AND REGULATORY FRAMEWORKS

This chapter summarizes key policy and regulatory frameworks related to environmental, health, safety, social, and labor aspects of the BRT Project, as stipulated by the Indonesian Government and the 2018 World Bank Environmental and Social Framework (ESF). This section is not intended to list all policies, laws, regulations, and standards, but rather to provide an understanding of applicable key requirements that should be adhered to by the BRT project.

3.1. Key Indonesian Laws and Regulations – Environment, Health & Safety

In planning and implementing the BBMA Project, national and subnational (local) governments must prevent environmental pollution and health and safety accidents, and ensure compliance with the provisions of the laws and regulations listed in the following table.

Table 20. Key Laws and Regulations - Environment, Health & Safety

Key Laws and Regulations	Provisions
Law 32/2009 on Environmental Protection and Management was superseded by Law 11/ 2020 on Job Creation (also known as the Omnibus Law)	Law 32/2009 stipulates that all business and/or project activities must prepare an environmental assessment and subsequently obtain the Environmental Permit, in addition to complying with environmental standards. This Law has been superseded by Law 11/2020, with the main provisions remaining the same as the former Law, but some changes are introduced and detailed in the implementing regulations, i.e., Government Regulation or GR (*Peraturan Pemerintah*) and Technical Ministerial Regulation (*Peraturan Menteri*) listed below.
Law 22/2009 on Road Traffic and Transportation	This Law stipulates the provisions of road traffic and transportation concerning transportation network, vehicle and driver requirements, safety and security of traffic and transportation, traffic impacts, and facilities for disabled persons, pregnant women, and those with sickness.
Law 2/2017 on Construction Services and Government Regulation No. 14/2021 as the Implementing Regulation of Law 2/2017	This Law stipulates that in every construction undertaking, the user and provider of construction services are required to meet security, safety, health, and sustainable standards. Therefore, a project is required to establish and implement a management system on construction safety (Sistem Manajemen Keselamatan Konstruksi or SMKK). The SMKK is provided in a project-specific document, containing: – Conceptual SMKK; – Construction Safety Plan (*Rencana Keselamatan Konstruksi* or RKK); – Construction Quality Plan (*Rencana Mutu Pekerjaan Konstruksi* or RMPK); – Quality Assurance/Quality Control Plan (*Program Mutu*); – Environmental Management and Monitoring Plan (*Rencana Kerja Pengelolaan dan Pemantauan Lingkungan Hidup* or RKPPL); and

Key Laws and Regulations	Provisions
	– Project Traffic Management (*Rencana Manajemen Lalu Lintas Pekerjaan* or RMLLP). This regulation stipulates that material resources such as stone, sand, steel, concrete blocks, and timber, etc., have to be obtained from the local sources and their surrounding areas that have obtained relevant and valid licenses. Further, construction, heavy equipment, and machinery used in construction activities should pass the tests and obtain relevant certificates or licenses from the authorized agencies.
Law 1/1970 on Occupational Safety Provisions	This Law stipulates provisions for occupational safety. Further, the Ministry of Manpower Regulation No. 5/2018 on Occupational Health and Safety Standard for the Working Areas includes the provisions on the threshold values of physical, chemical, and biological parameters for the working areas. It also includes the standard on ergonomics and physiological factors, indoor air quality, and hygiene.
Government Regulation (GR) No. 22/2021 on the Implementation of Environmental Protection and Management stipulates the provisions on: - Environmental assessment - Ambient air quality standards - Surface water quality standards - Hazardous and toxic (infectious) waste management.	This GR stipulates, among others, the requirements for the Project to obtain an environmental approval prior to construction, including other technical recommendations related to water and air pollution control, hazardous and toxic wastes management within the authority of the MoEF. It stipulates that a project shall be screened to determine the type of environmental assessment required, i.e., Amdal (similar to ESIA for a project likely to generate significant E&S impacts), UKL-UPL (similar to EMP for a project with non-significant E&S impacts) or SPPL, which is a commitment letter to conduct environmental management and monitoring related to micro- and small-scale activities. The environmental screening is undertaken based on the MoEF regulation No. 4/2021 that includes a prescribed list of businesses and/or activities requiring Amdal, UKL-UPL, or SPPL. Further, GR No. 22/2021 stipulates the regulations and standards on the matters below into one regulation, whereas in the past these were stipulated individually. - Guidelines to prepare Amdal, UKL-UPL, and SPPL - Ambient air quality standards - Freshwater quality standards - Hazardous and toxic (infectious) waste management. - Non-hazardous and non-toxic waste management.
MoEF Regulation No. 4/2021 on Business and/or Activity Requiring AMDAL, UKL-UPL, or SPPL	This MoEF regulation stipulates the types and scale of business and/or activities that need to be completed by Amdal, UKL-UPL or SPPL. Further, this ministerial regulation provides the list of types and/or businesses that shall undertake Amdal Types A, B or C. In principle, this ministerial regulation serves as a self-screening tool to determine the type of environmental assessment required for a particular business sector and/or activity.

Key Laws and Regulations	Provisions
Government Regulation No. 81/2012 on Management of Household Wastes and Similar Wastes	The GR also stipulates provisions for those negatively affected by the operation of waste disposal sites to be compensated in the form of resettlement, environmental remediation, provision of medical treatments, sanitation facilities, etc.
Minister of Environment and Forestry No. 6 of 2021 on Procedures and Requirements for Hazardous and Toxic Waste Management	This regulation stipulates the guidance of hazardous waste collection and transportation management, final treatment, and also requests and issues permits of technical approval for hazardous waste management.
Minister of Manpower Regulation No. 5/2018 on Occupational Safety and Health in the Work Environment	This regulation stipulates guidelines on threshold values of physical, chemical, and biological factors, ergonomic factors, hygiene, and sanitation at workplaces.
Minister of Manpower Regulation No. 50/2012 on Implementation of Occupational Health and Safety Management System	This ministerial regulation stipulates that the occupational health and safety management system (*sistem manajemen keselamatan dan kesehatan kerja*, or SMK3) is an integral part of a company's overall risk management, and therefore it is an obligation for the company to implement that management system. This SMK3 is mandatory for companies employing 100 workers or more or operating in potentially high-risk activities.
Minister of Manpower No. PER-03-/MEN/1985 concerning Occupational Safety and Health in the Use of Asbestos	This regulation stipulates the obligation for the management executor (especially workers) to work with asbestos material.
Ministry of Environment Decree No. 48/1996 on Noise Level Standard	This decree stipulates noise level standards for the environment and sensitive receptors that should be adhered to during project implementation.
Ministry of Environment Decree No. 49/1996 on Vibration Standard	This decree stipulates vibration standards applicable to buildings and other physical structures that should be adhered to during project implementation.
Relevant sub-National regulations	- Major of Bandung City Regulation No.18/2025 regarding Water Quality Management and Pollution Control - Governor of West Java Regulation No. 78/2013 regarding the implementation of the Regional Regulation of West Java Province concerning Air Pollution Control - Regional Regulation of Bandung City No. 9/2018 regarding Solid Waste Management

3.2. Social, Gender and Customary Communities

Besides EHS considerations, social, gender and customary community aspects are seen as important considerations for the BRT-BBMA Project. Key laws and regulations on this matter applicable for the Project are presented in the following table.

Table 21. Key Indonesian Laws and Regulations – Social and Gender Aspects

Laws and Regulations	Summary and Relevance with the Project
The Indonesian Constitution (Article 18, Point B, No. 2)	The Indonesian Constitution (known as Undang-Undang Dasar) recognizes and respects traditional communities and their customary rights where these exist, and if these are in accordance with the societal development and principles of the state. The agrarian reform and management of natural resources is stipulated by the Decree No. IX/MPR/2001 of the People's Consultative Assembly of the Republic of Indonesia. Further, the Agrarian Law 5/1960 and the Human Rights Law 39/1999 provide implicit, though conditional, recognition of some rights of customary communities known as "masyarakat hukum adat" (or MHA). This terminology has been adopted in various policies, such as forest management under the customary forest scheme of the social forestry stipulated by the MoEF, the customary village under the Village Law, and the communal certificate belongs to the MHA group under the regulations stipulated by the Ministry of Agrarian and Spatial Plan/National Land Agency regulations.
Law Number 6 of 2023 concerning Job Creation	This Law stipulates changes in land acquisition for public interest, including in terms of providing compensation and land acquisition. This law also regulates the acceleration of the licensing process and land acquisition for public interest.
Law 2/2012 on Land Acquisition for Development in the Interest of the Public	Chapter 40 of this Law recognizes that "masyarakat hukum adat" is entitled to compensation. Any project location will be determined and decided by the provincial/district/city government only if it has been agreed with the entitled parties and the affected communities.
Law 14/2008 on Disclosure of Information for the Public	This Law requires that public information is made available and transparent for use by the public at large.
Law 12/2022 on Criminal Acts of Sexually Related Crime	This Law stipulates protection for the public from sexually related crime and promotes cultures that prevent violation and harassment in these regards.
Government Regulation 19/2021 on Land Acquisition for Development in the Interest of the Public	The provisions of this GR replace Presidential Regulation No. 71/2012, including its four amendments. This GR includes the following provisions: - Six additional types of activities/businesses that are included in the development of the public interest where this GR is applied; - Release permits for lands with unique characteristics affected by the project (sustainable agri-food land, forest-lab, village treasury, waqf-land, state-owned land) are finalized before issuing the Location Determination Permit (Penlok); - Involvement of Land Office/Spatial Plan (Kantor Agraria dan Tata Ruang/Badan Pertanahan Nasional) during the planning stage; and - Land acquisition for the public interest is carried out by providing appropriate and fair compensation, and it is emphasized that the results of the assessment are final and binding. Independent

Laws and Regulations	Summary and Relevance with the Project
	appraisals involve negotiations with affected people to obtain a compensation agreement.
Government of Regulation No. 39/2023 on the Amendment of GR No. 19/2021 Government Regulation No 19/2021 on Land Acquisition for Development in the Interest of the Public	The GR No. 39/2023 amends several articles of GR No. 19/2021, including: - The acquisition of land indicated as destroyed land (*tanah musnah*) is to be implemented following the provisions of the land acquisition law/regulation; - The government appraiser can do valuation of compensation in addition to the independent appraiser. A government appraiser is a civil servant who is given duties, authority, rights, and obligations to conduct valuation assessment; and - Articles 17 and 18 of GR No. 39/2023 recognize "Masyarakat hukum adat" as the party eligible for compensation in the land acquisition process. - Article 41 of the above GR states the need to ascertain the consent of affected IPs for the acquisition of customary community land ("tanah ulayat").
Presidential Regulation No. 62/2018 on the Handling of Social Impacts in the Community during the Land Acquisition Process for National Development	It regulates the provision of compensation in the form of money or relocation to non-titled land users. This regulation requires that compensation should consider the cost of mobilization, cost for moving, house rent during the transition period, and loss of income. It also requires the proponent to produce documents on the Social Impact Management Plan if affected government-land has been physically used/controlled by the community consecutively for a minimum of 10 years. The Social Impact Management Plan shall be proposed to the Governor, which subsequently forms an Integrated Team to undertake data inventory, compensation appraisal, and facilitate grievance management.
Presidential Regulation No. 78/2023 on the Amendment of Presidential Regulation No. 62/2018 on the Handling of Social Impacts in the Community during the Land Acquisition Process for National Development	This regulation amends several provisions in Presidential Regulation No. 62/2018, including the addition of two new articles, namely Articles 14A and 14B, and the Minister of Agrarian and Spatial Planning/National Land Agency Regulation No. 6/2020 regulates the Provisions for the Implementation of Presidential Regulation No. 62/2018 on Handling Community Social Impacts in the Framework of Land Provision for National Development. This regulation was established to improve and accelerate the implementation of national development by ensuring that societal impacts are considered in the process of providing land for development.
Presidential Regulation No. 78/2007 on Ratification of the Convention for Safeguarding of the Intangible Cultural Heritage	Indonesia through, which is regulated further in the Minister of Education and Culture Regulation No. 106/2013. This ministerial regulation requires the national and local governments to guarantee the preservation of Indonesia's intangible cultural heritage.

Laws and Regulations	Summary and Relevance with the Project
Presidential Instruction No. 9/2000 on Gender Mainstreaming	This Presidential Instruction stipulates gender mainstreaming in development planning, also in its implementation and evaluation; it is done by gender analysis that includes participation in the development process and the benefits they enjoy.
Minister of Transportation Regulation No. 98/2017 on Provision of Access for Those with Special Needs on Public Transportation	This regulation sets out universal access provisions that can be used by all groups, including vulnerable groups (people with disabilities, the elderly, pregnant women, and children), in public transportation and its associated facilities.

3.3. The World's Bank Environmental and Social Framework (ESF)

The BRT-BBMA Project is an investment project financing (IPF) to be funded through loan from the World Bank and AFD, and therefore, is subject to due diligence process of the WB ESF to ensure this Project is implemented in a sustainable manner from both E&S perspectives. The scoping process undertaken for the BBMA BRT Project identifies some gaps between the requirements of the Indonesian E&S laws and regulations and those of the WB ESS, and therefore, gap filling measures are undertaken to bridge these gaps and comply with the mentioned ESS (see the following table).

Table 22. The Bank ESS Requirements and Key Gaps Addressed in the ESIA

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	This ESS is directly relevant for the BRT Project in identifying and assessing E&S risks and impacts, and defining associated mitigation measures and monitoring (ESMP). - Description of key legal and institutional setting and responsibilities, - Scope of ESIA including potential indirect and cumulative E&S risks and impacts - Environmental and social risk and impact assessment, including labor and working conditions, health and safety, cultural heritage, and resettlement - Mitigation measures and monitoring (ESMP) and reporting arrangements - Capacity building, budget items, and institutional responsibility to implement the ESMP - Stakeholder Engagement Plan (SEP) and Feedback and Grievance Redress Mechanism (FGRM) of the Project.	**Law 32/2009 on Environmental Protection and Management, then superseded by Law 11/ 2020 on Job Creation, requires all projects to conduct environmental assessments and obtain environmental approval, and to** streamline environmental approval as part of the risk-based, online business licensing process. **Government Regulation (GR) No. 22/2021 on the Implementation of Environmental Protection and Management** – This regulation implements Law 11/2020, detailing AMDAL, UKL-UPL, and SPPL procedures; monitoring and reporting; and environmental approval. **Ministry of Environment and Forestry (MoEF) Regulation No. 4/2021 on Business and/or Activity Requiring AMDAL, UKL-UPL, or SPPL** – This regulation lists types and scales of businesses and/or activities for determining the level of environmental assessment needed.	The current Indonesian regulatory framework has, in several aspects, demonstrated alignment in principle with the requirements of ESS 1. However, notable gaps remain as the existing regulations do not consistently or comprehensively address social impacts with the same level of rigor as environmental impacts, particularly on the issues related to livelihoods, vulnerable groups, labor and working conditions, community health and safety influx, cultural heritage, and risks of gender-based violence. Further, the impact assessment of the Indonesian EIA does not evaluate the risk of such impact, i.e., it does not use a risk-based approach. The above limitations are addressed in this ESIA in alignment with good international industry practice.
ESS2 Labor and Working Conditions	This ESS is directly relevant for the BRT project, involving construction activities that would require a significant number of workers within a relatively short construction period. from areas near BBMA. The ESIA needs to include an assessment of potential risks and impacts related to labor and working	**Law 1/1970 on Occupational Safety** – This law establishes employer duties to ensure workplace safety and worker protection, with authority for inspections and accident prevention measures. **GR No. 50 of 2012 on the Occupational Health and Safety Management System** – This	The mentioned Indonesia regulatory frameworks provide key foundation, ensuring legal obligations for worker protection, safe work environments, contractor accountability, and labor rights, which broadly align with ESS2's objectives.

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
	conditions including gender-based violence risk. The assessments will also explore options to increase capacity to manage occupational health and safety issues for workers.	regulation mandates companies to implement the Occupational Health and Safety Management System (known as SMK3). **Ministry of Manpower Regulation No. 5 of 2018 and No. 11 of 2023 on Occupational Safety and Health Regulations** – These specify standards for workplace safety, hazard management, emergency preparedness, and the appointment of competent OHS officers. **Law No. 35 of 2014 on Child Protection** – This law has provisions on child protection from abuse and hazardous labor, ensuring government responsibility for enforcement. **Law 2/2017 on Construction Services and Government Regulation No. 14/2021 as the Implementing Regulation of Law 2/2017** – These regulations regulate the construction sector, including contractor qualifications, safety standards, supervision, and dispute resolution.	However, key gaps remain in translating these legal provisions into project-level ESIA to be consistent with ESS2 requirements. The national framework has limited coverage of gender-based violence (GBV) risk or community workers. Therefore, this ESIA document is prepared to bridge the above gaps in the risk and impact assessment section, emphasizing the requirement to develop project-specific Labor Management Procedures (LMP) and a worker grievance mechanism. Bidding documents and civil work contracts will need to include requirements for labor and working conditions reflecting the relevant elements specified in the LMP.
ESS3 Resource Efficiency and Pollution Prevention and Management	This ESS is directly relevant for the BRT-BBMA Project, where technical specifications for the Project will incorporate climate resilience, as well as good engineering and energy efficiency standards (e.g., such as the combination of electric and combustion engine buses, and sourcing construction materials from facilities and quarries that have valid operating permits. Hazardous and non-hazardous waste	**MoEF Regulation No. 6 of 2021 on Hazardous and Toxic Waste Management Procedures** – This regulation governs hazardous waste management procedures, from generation to disposal including licensing, recordkeeping, technical standards, and emergency response **Law No. 22 of 2009 on Road Traffic and Transportation** – This law regulates transport	Indonesia's environmental laws and regulations provide a solid foundation for pollution control and waste management that generally aligns with the ESS3. They ensures legal obligations for preventing and managing impacts due to hazardous and non-hazardous wastes, air quality, water quality, noise and vibration, as well as road traffic.

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
	management will need to be assessed for its risk and impacts in the ESIA.	safety, emission control, and vehicle operation standards. **MoE Decrees No. 48/1996 on Noise Level Standards and No. 49/1996 on Vibration Standards** – These decrees set noise and vibration standards for residential, commercial, and industrial areas. **Minister of Manpower Decree PER-03/MEN/1985 on Occupational Safety in Asbestos Use** - This decree regulates asbestos handling, requiring PPE, worker training, air monitoring, and safe disposal procedures **GR No. 81 of 2012 on the Management of Household and Similar Wastes** - This regulation promotes waste reduction, reuse, and recycling through integrated solid waste management by local governments.	However, these regulations lack explicit provisions on resource efficiency, GHG emissions assessment, climate, and disaster risks, which are central to the ESS 3. Therefore, the scope of this ESIA is expanded to cover components such as GHG emissions, climate and disaster risks, and emphasizes the project to implement waste minimization and recycling strategies.
ESS4 Community Health and Safety	Community health and safety risks and impacts will arise from the Project's construction and operation activities and will be assessed in the ESIA pursuant to meeting the requirement of ESS1 and ESS4. The PMU and PIUs will need to develop an Emergency Preparedness and Response Plan (EPRP) for managing an emergency situation such as fire, earthquake, labor strike, etc. and communicating this matter and undertake exercise to the community within the Project area.	**Law No. 36 of 2009 on Health** – This law ensures the right to a healthy environment and sanitation, and preventive health measures in development projects. **Law No. 24 of 2007 on Disaster Management** - This law establishes disaster risk reduction, preparedness, response, and recovery frameworks, emphasizing coordination and community participation. **Law No. 12 of 2022 on Criminal Acts of Sexual Violence** - This law made provisions on prohibition and sanction on sexual violence,	The mentioned Indonesia laws and regulations include requirements that are generally aligned with the ESS 4. However, they lack of detailed requirements for project proponents to prepare site-specific emergency response plans, labor influx and GBV risk management, and impacted community-level health monitoring and awareness, which are key to WB ESS 4 components. Therefore, the above gaps will be addressed in this ESIA to address the missing ESS4 requirements.

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
	The Project will need to include requirements and procedures for GBV "prevention" to be applied for project workers and subcontractors, provision of GBV grievance redress mechanisms and confidential reporting with safe and ethical documentation of GBV cases, and coordination with licensed service provider for GBV cases handling.	mandates victim protection and confidentiality. **Law No. 22 of 2009 on Road Traffic and Transportation** - This law governs road traffic safety, transportation management, and vehicle operation standards and traffic planning. **Minister of Transportation Regulation No. 98 of 2017 on Provision of Access for Persons with Special Needs in Public Transportation** – This regulation mandates that all public transportation systems, including buses and terminals, to provide accessibility for persons with disabilities and other vulnerable users, with design and training standards.**Minister of Manpower Regulation No. 5 of 2018 and No. 11 of 2023 on Occupational Safety and Health Regulations.** Although designed for workplaces, these regulations may apply to community health and safety by establishing provisions on spills or emissions that could extend beyond the project site.	
ESS5 Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement	The BRT-BBMA Project will not involve land acquisition as the lands required by the Project are owned by the government. However, resettlement, including compensation, will be required for kiosk owners/tenants and street vendors affected by the construction of on-corridor, terminals, and depots. The impacts on these affected people, including those with	**Law No. 2 of 2012 on Land Acquisition for Development in the Interest of the Public** – This law includes provisions on land acquisition planning and implementation including dispute resolution for landowners. **Government Regulation No. 19 of 2021 on Implementation of Land Acquisition for Public**	Indonesia's current regulatory frameworks on land acquisition provide a clear legal pathway for compulsory acquisition, valuation, compensation, and institutional coordination for public-interest projects. These laws generally align with WB ESS5, but don't recognize resettlement and compensation for

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
	legal title of landownership as well as those without legal title but have structures or access on the land, will need to be assessed, and mitigation measures are described in the ESIA.	**Interest** – This is the implementing regulation of Law 2/2012, detailing procedures for planning, valuation, determining compensation, and dispute resolution in land acquisition processes. **Presidential Regulation No. 62 of 2018 on the Handling of Social Impacts in the Land Acquisition Process** – This regulation requires social assessment and impact mitigation during land acquisition, ensuring community welfare and coordination among agencies. **Presidential Regulation No. 78/2023 on the Amendment of Presidential Regulation No. 62/2018 on the Handling of Social Impacts in the Community during Land Acquisition Process for National Development** – This regulation updates Presidential Regulation No. 62/2018 to clarify roles and accelerate procedures for social impact handling in national development projects.	those affected but do not have legal title to their lands. However, important gaps remain at the project level, such as statutory valuation methods and accelerated procedures, which may undercompensate non-titled/ informal users and vulnerable individuals, fail to capture full replacement costs or livelihood losses, and compress the time needed for culturally appropriate consultation. Therefore, to align with the WB ESS 5 requirements, the BRT BBMA Project is complemented with ESIA and LARAP studies to ensure that all affected persons, including those without legal land title, are documented and fairly compensated.
ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	The requirements of ESS6 applies to the BRT project as it include construction on the existing road involving dedicated on-corridor corridor and bus stop platforms within the heavily developed urban setting of Bandung City. Nevertheless, some mature trees that will need to be removed and relocated elsewhere	**Law No. 5 of 1990 on Conservation of Biological Natural Resources and Their Ecosystems** – This law establishes biodiversity conservation principles, protected areas, species protection, and penalties for violations. **MoEF Regulation No. 106 of 2018 on Technical Guidelines for Biodiversity Inventory, Monitoring, and Reporting** – This regulation	The Project's ESIA provides a screening of protected and critical flora and fauna species potentially affected by the proposed BRT BBMA project development. This screening was conducted not only in accordance with national regulations but also by referencing international indicators such as the IUCN Red List. Based on the findings, the ESIA proposes appropriate mitigation and monitoring measures to minimize impacts, support

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
	for conservationm to enable the establishment of on-corridor and bus stop platforms.	provides technical guidance for biodiversity inventory, monitoring, and reporting to the national biodiversity information system.	biodiversity offsets, and achieve a no-net-loss outcome for biodiversity.
ESS8 Cultural Heritage	Several buildings in Bandung City have been identified as cultural heritage objects from the colonial era and preserved within the proximity of BRT-BBMA corridor. Therefore, the ESIA requires assessment of potential risk and impact of these cultural heritages due to construction of the project. The ESIA will also include a Chance Finds Procedure, for the situation where affected cultural heritage may be found during the construction of BRT bus stops, end station, terminal and depot.	**Law No. 11 of 2010 on Cultural Heritage** – This law defines protection of tangible and intangible cultural heritage. It establishes procedures for identifying, designating, and preserving cultural heritage assets. It also requires developers to protect registered heritage sites and prohibits destruction, alteration, or relocation without official approval. In addition, it mandates public participation, local government responsibility for heritage management, and penalties for damage to cultural heritage.	The existing Indonesia's law on cultural heritage ensures that recognized heritage assets are protected through official listing, permitting, and community involvement. However, the prevailing laws and regulations do not explicitly require any development to assess the risk and impact on both tangible and intangible cultural heritage due to construction of the project. Therefore, the Project's ESIA addresses these gaps by recommending that a Heritage Impact Assessment (HIA) be conducted prior to the commencement of the construction phase. This assessment will help identify and evaluate potential impacts on cultural heritage and ensure that appropriate mitigation measures are in place. In addition, the ESIA emphasizes the need to develop and implement a Chance Find Procedure to manage any unexpected discoveries of cultural heritage sites or objects during construction activities.
ESS10 Stakeholder Engagement and Information Disclosure	The BRT project will involve stakeholder engagement at various levels, including government authorities, project management entities, BRT authorities, and project-affected parties such as local communities,	**Law No.14 of 2008 on Public Information Disclosure** – This law guarantees public access to government information and mandates institutions to disclose and manage public data proactively.	The prevailing Indonesian laws and regulations, however, do not provide structured mechanisms for engaging and documenting stakeholder input, monitoring engagement outcomes, or establishing

Applicable ESS	Key Requirements to be Fulfilled by the BRT Project According to the ESS	Indonesian Laws and Regulations	Gap-filling Measures
	landowners/occupiers, and vulnerable groups. However, the need for a strategic and regular stakeholder engagement and information disclosure is not regulated in Indonesia, other than, a one-time disclosure of project information and public consultation to be undertaken as integral part of the Indonesian impact assessment.	**Presidential Instruction No. 9 of 2000 on Gender Mainstreaming** – This Presidential Instruction directs all government bodies to integrate gender perspectives in development planning, implementation, and evaluation.	grievance redress systems (GRMs) to meet WB ESS10 standard for accessibility, confidentiality, and responsiveness. Therefore, the Project's ESIA includes the development of a Stakeholder Engagement Plan (SEP), Grievance Redress Mechanism (GRM) designed to be gender-sensitive and responsive to the needs of vulnerable groups, with clearly defined timelines for resolution and confidential handling of sensitive cases.

4. ESIA METHODOLOGY

This section describes the methodologies adopted to undertake the ESIA of the Project, including desk-top study and literature review, collecting E&S baseline data and information through conducting E&S risk and impact assessments, and developing an environmental and social management plan (ESMP) to mitigate these risks and impact.

4.1. Scoping Process and the Project Area of Influence

The scoping process was conducted to define the project's area of influence (Project's AoI) and identify interactions between the project's key activities/components and the E&S resources and receptors. It also assists in identifying key gaps on the existing E&S data and those required for the ESIA.

A desk-top study and literature review, including project-related documents, such as the DED reports, and relevant data and information already available, was conducted. The following data and information collated and presented in this ESIA are primarily sourced from:

- Data and information related to the DED (proposal) of the BBMA-BRT project;
- Draft UKL-UPL document of BBMA-BRT;
- Draft Traffic Analysis Report (ANDAL Lalin) of BBMA-BRT[2]
- Draft Land Acquisition and Resettlement Action Plan (LARP) of the BBMA-BRT project (2025);
- Very limited, one-time primary environmental data such as ambient air quality and noise levels;
- Relevant environmental and social data and information sourced from websites and public domains; and
- Key E&S policy, legal, and administrative frameworks (e.g., national laws and regulations, required permits, the World Bank's Environmental and Social Framework (2018), and good industry international practices.

The area of influence, as defined by the World Bank's ESS 1: Environmental and Social Assessment and Management, refers to the geographic and socio-economic zone where a project's environmental and social impacts may occur. This area is not only limited to the project footprint but also includes its associated facilities and all other locations or factors directly and indirectly affected by the Project, such as traffic and transport shifts, adjacent areas impacted by the project's direct impacts, and socio-economic changes resulting from changes in accessibility or economic activities. Additionally, the area of influence also accounts for cumulative impacts, where incremental impacts from the project combine with those of other existing or planned developments that may occur to sensitive receptors and the environment.

Table 23. The BRT Project's Area of Influence

E&S Components	Area of Influence (Construction Phase)	Area of Influence (Operational Phase)	Consideration
Air Quality Noise Vibration	Up to 500m from the project boundary at depot and terminal and at end station and bus stop on BRT corridors	Up to 250m from the project boundary at depot and terminal/ end stations and bus stop on BRT corridors	Based on professional judgement that the distribution of air quality, noise and vibration impact could be felt at considerable distance beyond the project boundary depending on atmospheric, physical structures. However, in operational the potential of air quality issue may not significant since BRT buses will use a combination of electric bus and conventional bus.
Surface Water Quality; Soil and Groundwater Quality	Any watercourse such as river, streams, wells within the project boundary. Note: The nearest project area to the river is Bus stop at Kebon Jati (BS32) and Cikapundung (BS11)	Any watercourse such as river, streams, wells within the proximity of project area, especially at terminal and depot	The BRT project will be undertaken within the urban landscape of Bandung basin which dominantly at Bandung City where the number of rivers likely affected by the project is limited (Cikapundung river and Citepus river) and water quality is likely to have been significantly degraded by sewage and wastewater discharges from residential and commercial areas.
Stormwater and run off	Within the BRT project boundary	Within the BRT project boundary including the BRT corridor and on-corridor and off-corridor bus stops.	DED of the BRT project

E&S Components	Area of Influence (Construction Phase)	Area of Influence (Operational Phase)	Consideration
Terrestrial flora and fauna as biodiversity and landscape	Within the project boundary and the areas (yet to be determined) designated for replanting the trees that will be removed to enable the construction of BRT corridor, stations, terminal and bus depots.	Within the BRT project boundary including the BRT corridor and on-corridor and off-corridor bus stops.	DED of the BRT project
Road traffic and infrastructure	The roads used by the project vehicles/trucks to transport construction materials and wastes; the roads leading to/from the quarries and concrete plants supporting the project.	Within the BRT project boundary including the BRT on-corridor and off-corridor bus stops.	Based on the BBMA-BRT ANDAL Lalin report. Based on the requirements of the Bank's ESS 1.
Local economy development	Within the project boundary, particularly future BRT corridors, bus depots, terminals and end stations.	Within the BRT project boundary at depot and terminalincluding the dedicated BRT on-corridor and off-corridor bus stops.	The UKL/UPL documents of BBMA-BRT and LARAP document of the BBMA-BRT project
Economic displacement, livelihood, and access restriction	Within the project boundary, particularly the BRT corridor, bus depots at Leuwipajang and Cicaheum, and the locations of workshop and basecamp of construction activity.	Within the BRT project boundary including the BRT corridor and on-corridor and off-corridor bus stops	Based on the LARAP document of the BBMA-BRT project.
Cultural heritage	Within the project boundary, particularly at nearby BRT corridor.	Not applicable as the cultural heritage impact would be primarily during construction.	Based on the requirements of the Bank's ESS 1.
Health & Safety (workers and communities)	Within the project boundary and the roads used by the project vehicles and equipment	Within the project boundary, particularly the BRT corridor and bus terminal at Antapani and Ledeng and bus depots at Ciaheum and Leuwipanjang	Based on the requirements of the Bank's ESS1 and ESS4.

Based on the above considerations, the project's AoI of the BBMA-BRT project is shown as shaded areas in the in the following figure.

Source: Reproduced from existing maps of Egis et al.

Figure 18. The Project Area of Influence

4.2. Stakeholder Identification and Analysis

The identification of stakeholders related to the Project has been undertaken and documented in the project-specific Stakeholder Engagement Plan (SEP). Both formal and informal consultations have been conducted as part of the ESIA, and the land acquisition and resettlement plan (LARAP) document.

4.3. Risk and Impact Assessment Method

In this case, the impact is defined as a noticeable effect on a person, including his/her activities and the changes in physical and biological environment due to the Project's activities. The risk is defined as the exposure to harm and other adverse outcomes due to the impact. While the risk assessment is a process of determining the probability of an impact occurring and the severity of its impact. The risk assessment of the Project is conducted to determine the inherent risk of an impact, i.e., without any mitigation measures and the residual risk of an impact which remains after the related mitigation measures are implemented.

E&S risk and impact assessment in this ESIA are conducted using the following approach:

(i) *Impact identification* - all potentially significant impacts are identified based on the main activities described in the project description and local environmental and social context described in relevant baseline sections of this ESIA. These impacts include:

- Direct impacts potentially resulting from a direct interaction between the Project's activities and the receiving environment and/or receptors (e.g., land clearing resulting in soil erosion and changes in water run-off pattern).
- Indirect impacts potentially resulting from subsequent interactions of the Project's direct impacts and other related receiving environment and/or receptors (e.g., soil erosion will increase turbidity of the receiving water bodies or changes in water run-off pattern could result in water inundation or flooding at low lying areas downstream of the Project).
- Induced impacts potentially resulting from other activities, which are not part of the Project, but happening because of the Project (e.g., Increased pressure to the existing road and public facilities due to mobilization of large numbers of workforce working for the Project).

(ii) *Impact prediction and evaluation* - the significance of an impact will be predicted and also evaluated for its severity and likelihood to occur. The inherent risk level (i.e., without any mitigation measures) of an impact is evaluated using the severity, likelihood, and risk level matrices below to ensure a standardized and consistent process.

(iii) *Defining mitigation measures* – relevant mitigation measures will be proposed to address significant impacts commensurate with its risk level using the principles of impact avoidance, reduction, minimization, mitigating or offsetting the impacts.

(iv) *Determining residual risk of an impact* – The residual risk is defined as the impact remaining after all proposed mitigation measures are implemented. If residual impacts are still significant, additional measures will be required to minimize the risk.

(v) *Defining monitoring requirement* - monitoring and audit will be proposed to gauge the actual impacts onto receptors during project implementation. Based on the monitoring results, adaptation or addition of mitigation measures may be required

The severity or consequence of each environmental, social or health and safety impact is determined using the matrix and criteria presented in the following table.

Table 24. E&S Impact Severity/Consequence

Severity level / Aspects	1	2	3	4	5
	Incidental	**Minor**	**Medium**	**Major**	**Severe**
Environmental including biodiversity	Localized, brief concerns and issues.	Minor scale, short-term, and reversible impacts.	Medium-scale, medium-term, adverse but reversible impacts.	Large-scale, medium-term, adverse, beyond the subproject area, but reversible impacts. These impacts may result in penalties and/or legal prosecution.	Large-scale, long-term, adverse, beyond the subproject area, but reversible impacts. These impacts result in penalties, legal prosecution, and/or the project is suspended.
Socio-economic; Physical cultural resources	Localized, brief concerns raised by some individuals of affected community.	Minor scale, short-term concerns raised by minority of affected community.	Medium-scale, medium-term, adverse, but reversible impacts on moderate number of affected populations.	Widespread, ongoing impact affecting majority of the affected population and other stakeholders. These impacts may result in penalties and/or legal prosecution.	Widespread, ongoing impact affecting majority of the affected population and other stakeholders. These impacts result in penalties, legal prosecution, and/or the project is suspended.
Health & Safety - Occupational & Community aspects	Near-miss or incidents requiring first aid treatment. Minor, brief-term health impacts, no medical intervention required.	Minor incidents require one-time medical treatment. Short-term health impacts require one-time medical treatment.	Moderate incidents causing functional impairment require multiple medical treatments. Moderate illness requires multiple medical treatments and hospitalization.	Major incidents cause permanent impairment requiring a high level of medical treatment. Serious illness with reversible effect requires a high level of medical treatments or management.	Serious incidents resulting in fatality. Serious and irreversible illness requires a high level and ongoing medical treatments or management.

Source: This matrix is a consensus of the ESIA authors by considering the risk assessment methods commonly used for ESIA.

The likelihood of each environmental, social of health and safety impact to occur is determined based on the criteria presented in the following table.

Table 25. Likelihood of the Impact to Occur

Likelihood	Descriptions	Level
Certain	The impact will occur even though the project proceeds as planned e.g., soil erosion when conducting land clearing	5
Likely	The impact will occur under normal operating conditions e.g., minor spills during handling and storage of lubricants	4
Possible	The impact would occur in certain circumstances although it is not intended to be the case e.g., reduced fauna due to increased access to forest areas	3
Unlikely	The impact may occur only in exceptional circumstances e.g., oil spills due to absence of secondary containment in the storage area	2
Rare	The impact is not expected to occur under normal circumstances but still represents a risk in the event of an incident or unforeseen condition happening e.g., fire incident due to the operation of heavy equipment.	1

Source: This matrix is a consensus of the ESIA authors by considering the risk assessment methods commonly used for ESIA.

The risk level of an impact is determined as a function of the impact consequence and its likelihood of occurring is determined as follows using the criteria presented in the table below:

- ‘Low risk’ if the impact is detectable but not considered significant and, therefore, mitigation measures are discretionary.
- ‘Moderate risk’ if the impact is evaluated as moderate, irreversible, or reversible and, therefore, can be mitigated using readily, common available measures to reduce the risk to an acceptable level.
- ‘Substantial risk’ if the impact is evaluated as significant, adverse, irreversible, or reversible and, therefore, should be mitigated using specialized measures to reduce the risk to as low as reasonably practicable.
- ‘High risk’ if the impact is evaluated as significant, adverse, widespread, and irreversible that cannot be mitigated and, therefore, alternatives to the project’s activities that are of less impact should be identified and adopted for the project.

Table 26. Risk Level/Significance of the Impact

Likelihood Level	Consequence/Severity Level				
	5 Severe	4 Major	3 Medium	2 Minor	1 Incidental
5 Certain	25 High	20 High	15 High	10 Substantial	5 Moderate
4 Likely	20 High	16 High	12 Substantial	8 Moderate	4 Moderate
3 Possible	15 High	12 Substantial	9 Moderate	6 Moderate	3 Low
2 Unlikely	10 Substantial	8 Moderate	6 Moderate	4 Moderate	2 Low
1 Rare	5 Moderate	4 Moderate	3 Low	2 Low	1 Low

Source: This matrix is a consensus of the ESIA authors by considering the risk assessment methods commonly used and found in the following references: https://www.riskpal.com/risk-assessment-matrices/
https://www.safeworkpro.com.au/an-example-of-risk-assessment-matrix/

4.4. Rapid Cumulative Impact Assessment

A cumulative impact assessment (CIA) of the Project will be conducted using the Rapid Cumulative Impact Assessment (RCIA) approach recommended in the Good Practice Handbook: Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets (IFC, August 2013). The CIA was undertaken to obtain an appreciation as to how the Project may contribute to the existing E&S impacts (cumulative impacts) on valued environmental and social components due to existing or future developments within the project's area of influence. Subsequently, based on this assessment, measures to enhance the cumulative positive impacts and those to mitigate adverse impacts to an acceptable level are defined. The step-by-step process to conduct the CIA and the corresponding results are described in relevant sections of the ESIA.

5. ENVIRONMENTAL AND SOCIAL BASELINE

Prehistorically a lake, Bandung City is the third most populated metropolitan city in Indonesia after DKI Jakarta and Surabaya (Dam 1994 in Tarigan et al. 2016; Indonesian Population Census 2010 in Katherina 2018). This city is the capital of West Java Province that has historical value for Indonesia, is marked by various heritage buildings, such as Kantor Pos Besar (main post office) and Asia Afrika Conference Museum, and is known as the education city housing the Bandung Institute of Technology and Padjajaran University and many private universities. Key environmental and social baseline conditions within BBMA are presented in this section as the basis to conduct risk and impact assessment of the BRT project.

5.1. Environment

5.1.1. Climate

The climate of Bandung City is affected by the humid and cool mountainous climate, that refers to Koppen Climate classification is categorized to Rain Tropical Climate (A). Based on the 2022 data, the average temperature of the city was around 25.35 °C, with the highest temperature reached 32.2 °C in September, and the minimum temperature reached 16.8 °C in July. The highest rainfall occurred in October, which amounted to 366.7 mm with 30 days of rain. While the lowest rainfall is in August when the rainfall only reached 29.9 mm with 26 days of rain. According to BMKG criteria that that monthly rainfall may indicate that the daily rainfall can approximately reach the maximum value on the scale of High Rainfall (300 – 500 mm) which likely occurred in October.

Table 27. Climate of Bandung City (2022)

Month	Temperature (°C)	Humidity (%)	Wind Velocity (mm/sec)	Rainfall (mm)	No of Rainy Day
January	26.4	66.6	3.5	59.5	20
February	25.0	72.5	2.7	117.1	21
March	26.0	70.2	2.7	238.9	25
April	25.3	75.3	1.6	336.2	28
May	25.7	73.8	2.3	146.9	25
June	24.5	75.8	1.8	150.6	20
July	25.1	70.5	2.2	98.5	23
August	25.6	68.8	2.3	29.9	26
September	25.6	70.3	2.2	182.2	26
October	25.0	74.9	1.9	366.7	30
November	25.0	75.8	2.2	307.2	28
December	24.9	75.1	2.3	277.7	29

Source: Bandung City in Numbers, 2023

5.1.2. Air Quality

Air quality sampling has been conducted on 22 – 30 July 202 as part of the preparation of the environmental management and monitoring effort document (known as UKL-UPL) required by law for the BBMA BRT Project. The air quality sampling was undertaken at eight (8) locations representing some of the future BRT bus stops/platforms, bus depots, and terminals/end stations. The air quality sampling code/location is as follows: U1: *Antapani*

Terminal; U2: Ledeng Terminal; U3: Shadow terminal at Jl. Elang; U4: Shadow terminal at Kebon Kelapa; U5: Bus station at Alun-alun; U6: Leuwipanjang Terminal; U7: Cicaheum Terminal; and U8: Bus station at Kebon Jati Hospital.

Ambient air quality measurement using a High-Volume Sampler (HVS) and noise level measurement using a Sound Level Meter by KAN-accredited independent laboratory personnel

Figure 19. Baseline Air Quality Sampling and Noise Measurement (2024)

The weather conditions at the time of sampling were reportedly stable, with low wind speeds and bright skies. All ambient air quality parameters during this monitoring period complied with the national air quality standard stipulated in Government Regulation No. 22/2021, Appendix VII. However, several parameters exceeded the international standard set by the 2021 WHO Air Quality Guidelines, including nitrogen dioxide at all monitoring locations and PM_{10} at U2 (*Ledeng* Terminal). Particulate matter of 2.5 µm ($PM_{2.5}$) was not analyzed from the samples collected and, therefore, identified as the baseline gap in this regard.

Table 28. Baseline Ambient Air Quality (July 2024)

Parameter	Standard		Sampling Sites/ Results							
	GoI	WHO	U1	U2	U3	U4	U5	U6	U7	U8
Sulphur dioxide	150	40	<27,6	<39,3	<37,7	<29,1	<30,5	<30,6	<29,5	<27,3
Carbon monoxide	10,000	-	3,369	3,560	3,418	3,097	3,117	3,349	3,261	3,070
Nitrogen dioxide	200	25	**27.6**	**48.8**	**51.3**	**47.6**	**48.1**	**56.2**	**49.6**	**46.7**
Ozone	150	100	46	39	31	22	25	30	27	22
Hydrocarbon	160	-	17	21	26	20	32	36	28	24
Total suspended particulates	230	-	112	135	124	108	121	132	127	119
Particulate Matter (PM_{10})	77	45	38	**48**	37	25	29	33	30	26
Lead (Pb)	2	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Source: Kementrian Perhubungan, 2025

Remark: Standard of Government of Indonesia based on Government Regulation No. 22 of 2021 - Appendix VII on Ambient Air Quality Standard; Quality standard of WHO as stipulated in the Air Quality Guidelines Global Update (WHO, 2021)

5.1.3. Noise Level

Noise level measurement was carried out at the same locations as air quality monitoring. The monitoring results, as presented in the following table shows that noise level at all locations remained below the noise level standards for their designated land use, in accordance with Ministry of Environment Decree No. 48/1996. Specifically, at location K3 near the shadow

terminal on Jl. Elang and K8 near Kebon Jati bus stop (adjacent to Kebon Jati hospital), daytime noise levels were slightly higher than the noise standard for residential areas and special zones such as hospitals, which are set at 55 dB(A). Furthermore, when compared to the international standard as set by the World Bank EHS General Guidelines, nighttime noise level at all monitoring locations exceeded the recommended limit of 45 dB(A).

Table 29. Baseline Noise Level

Parameter and designated land use of noise level	Monitoring Location							
	K1	K2	K3	K4	K5	K6	K7	K8
	22/7/24	23/7/24	24/7/24	25/7/24	26/7/24	27/7/24	29/7/24	30/7/24
Daytime noise (Ls)	56.1	56.6	55.9	56.9	57.2	54.4	55.1	55.5
Night-time noise (Lm)	49.3	49.4	47.1	47	47.9	44.8	45.4	46.6
Total noise (Lsm)	55.6	56.0	55.0	55.8	56.1	53.3	54	54.6

Source: Ministry of Transportation (2025)

5.1.4. Vibration

Baseline vibration level was measured at Cicaheum Terminal and Leuwipanjang Terminal, where these terminals will be renovated and designated as BRT depo. In these terminals, there is frequent movement of buses and paratransit (angkot). Vibration parameter measured in these locations was mechanical vibration which indicated the potential structural damage of the buildings as stipulated in the MoE Decree No.49/1996 – Annex II.

The monitoring result as presented in Table 30 shows that baseline vibration levels at Terminal Cicaheum and Terminal Leuwipanjang were classified as Category A as per Kep.Men-LH No.49/1996 – Annex II, which indicates that the existing activities at these terminals do not appear to pose a potential risk of structural damage to nearby buildings.

Table 30. Baseline Vibration Measurement

Frequency (Hz)	Vibration Standard based on Velocity of Set Frequency (mm/second)	Measurement Result (mm/second)	
		Terminal Cicaheum	Terminal Leuwipanjang
		29/7/2024	30/7/2024
4	<2	0.376	0.298
5	<7.5	0.285	0.276
6.3	<7	0.26	0.262
8	<6	0.228	0.253
10	<5.2	0.217	0.241
12.5	<4.8	0.8	0.23
16	<4	0.2	0.34
20	<3.8	0.18	0.35
25	<3.2	0.198	0.21
31.5	<3	0.19	0.23
40	<2	0.17	0.22
50	<1	0.15	0.2

Source: UKL/UPL BRT-BBMA, 2024
Remarks: Category A: No damage caused

Vibration measurement at Terminal Cicaheum and Terminal Leuwipanjang

Figure 20. Vibration Measurements

5.1.5. Hydrology and Surface Runoff

River Hydrology. Two main rivers, i.e., Cikapundung and Citepus Rivers will be traversed by the dedicated BRT corridor. The Cikapundung River divides the city of Bandung, in West Java, Indonesia. The length of this river is 28 km with flowrate of 12 – 250 m^3/sec. This river is categorized as lightly polluted. Domestic waste, including human waste and detergents, is the main source of pollution as more people are living along the riverbanks.

Citepus River that passes through Kebon Jati Road and Jend. Sudirman Road is the closest, future BRT bus stops are Bus Stop RS Kebon Jati (around 82m) and Bus Stop GKI Anugerah (around 208m). Length of the river is 6,5 Km with a flow rate of 0.1 - 38 m^3/s. The river status is categorized as slightly polluted.

Stormwater Runoff. Rainy conditions on urban areas can potentially lead to flooding and inundation, particularly when existing drainage channels are no longer sufficient to accommodate stormwater runoff. The recent survey results on stormwater runoff capacity on each road segment within BRT corridor are presented below.

Table 31. Potential Stormwater Run Off Capacity on BRT Road Corridor

BRT Corridor	Estimated Stormwater Runoff (m3/s)	Remarks
Jl. Rajawali Barat	0.039 – 0.374	Average runoff capacity 1.88 m3/ with maximum run off area at outlet cross box culvert under Jl. Rajawali Barat/Superindo
Jl. Rajawali Timur	0.055 – 0.385	Averagely run off capacity 0.247 m3/s with maximum run off area at outlet cross box culvert under Jl. Rajawali Timur/Jl.Ajuna
Jl. Kebon Jati	0.192 – 0.324	Averagely run off capacity 0.242 m3/s with maximum run off area IC Jl. Pasir Kaliki/Jl.Gardujati to IC Jl. Dulatip
Jl. Suniaraja	0.41	IC Jl. Dulatip - Jl. Suniaraja to outlet location in Kali Cikapundung
Jl. Banceuy	0.296	IC Jl. Suniaraja - IC Jl. ABC
Jl. ABC	0.181	IC Jl. Ottp Iskandar Dinata to outlet location in Kali Cikapundung
Jl. Naripan	0.117 – 0.774	Maximum run off capacity at IC Jl. Braga to outlet location in cross drain canal Jl. A. Yani/Kosambi

BRT Corridor	Estimated Stormwater Runoff (m3/s)	Remarks
Jl. Asia Afrika	0.274 – 0.455	Maximum run off capacity at IC Jl. Lengkong Besar/Jl. Tamblong to Simpang Lima/Jl. Sunda
Jl. Sudirman	0.177 – 0.553	Averagely run off capacity 0.345 m3/s with maximum area at IC Jl. Sudirman/Jl. Raya Cibeureum to outlet location in cross drain canal Jl. Sudirman/Lucky Petshop
Jl. Ahmad Yani	0.014 – 0.209	Averagely run off capacity 0.113 m3/s with maximum are at FO Jl. Supratman to outlet location in cross drain canal Jl. A.Yani/Jl. Cikaso
Jl. Ibrahim Adjie	0.277 – 0.360	Maximum run off area at IC Jl. A. Yani to outlet location in cross drain canal Jl. Terusan Jakarta
Jl. Jakarta	0.091 – 0.201	Averagely run off capacity 0.144 m3/s with maximum area at FO Supratman to outlet location in cross drain canal Jl. Jakarta/Jl. Labuan
Jl. Otto Iskandar Dinata	0.203 – 0.332	Averagely run off capacity 0.242 m3/s with maximum area at IC Jl. Inggit Garnasih to IC Jl. Astana Anyar/Taman Tegalega
Jl. BKR	0.193	IC Jl. Otto Iskandar Dinata to outlet location in cross box culvert under Jl. Moh. Toha
Jl. Alun-alun Timur	0.109	IC Jl. Asia Affrika to Jl. Dalem Kaum
Jl. Dalem Kaum	0.186	IC Jl. Dewi Sartika to outlet location in Kali Cikapundung
Jl. Dewi Sartika	0.1 – 0.195	IC Jl. Kautamaan Istri to Jl. Dalem Kaum
Jl. Pungkur	0.198	IC Jl. Dewi Sartka to Jl. Moh. Toha
Jl. Moh. Toha	0.028 – 0.323	Averagely run off capacity 0.196 m3/s with maximum area at IC Jl. Inggit Garnasih to outlet location in cross box culvert under Jl. Moh Toha/Jl. BKR

Source: Dohwa – Lenggogeni, 2023

Note: Stormwater runoff estimation based on rainfall data for 30 years (1992 – 2021) from 3 BMKG station as Sta Ujung Berung, Sta Bandung and Sta Cibeureum. Average daily rainfall from Sta Bandung data was 79.35 mm with maximum 191 mm when occurred in 2020

Based on the potential stormwater runoff capacity shown in **Table 31**, Jl. Naripan has the highest estimated runoff, reaching 0.774 m^3/s. However, the likelihood of flooding or inundation is also influenced by drainage conditions, including the dimensions of the drainage system and the presence of trash.

5.1.6. Surface and Groundwater Quality

Bandung City primarily has two soil types underlying the hydrology and water quality within the BRT project area. Latosol, a type of soil formed from the weathering of sedimentary and metamorphic rocks it is widely found across Indonesia. This soil has a thick solum layer, ranging from 130 cm to 5 meters, and is typically clay-textured. Its color ranges from red to brown to slightly yellowish, and it typically has a moderately acidic pH of 4.5-6.5. Meanwhile, alluvial deposits form from sediment, especially river mud that dries and builds up into compact layers. It is greyish-brown and rich in minerals, making it highly fertile and ideal for farming, especially rice cultivation. However, it's also relatively soft and easy to erode.

Surface Water Quality. In this regard, the baseline environmental study for water quality sampling was conducted at two points along the *Cikapundung* and *Citepus* Rivers, specifically in areas intersecting the planned BRT corridor, and the analytical results are presented below.

Table 32. Surface Water Quality of *Cikapundung* and *Citepus* Rivers

Parameter	Quality Standard (GR 22/2021-Annex VI)		Analytical Result	
			Citepus River	Cikapundung River
	Class II	Class II	26/7/2024	26/7/2024
Physical aspects				
TDS	1,000	1,000	447	390
TSS	50	100	38	21
Color	50	100	40	15
Inorganic Chemical				
pH	6 – 9	6 – 9	6.8	6.5
BOD5	3	6	<2	<2
COD	25	40	19.7	12.6
DO	4	3	**3.4**	**3**
Sulphate (SO4)	300	300	75	20
Chloride (Cl)	300	300	121	17
Nitrate (N-NO3)	10	20	5.2	4.3
Nitrite (N-NO2)	0.06	0.06	<0.002	<0.002
Ammonia (N-NH3)	0.2	0.5	0.029	0.002
Total Nitrogen (N-total)	15	25	3.7	2.23
Total Phosphate (P)	0.2	1	0.04	0.001
Fluoride (Fl)	1.5	1.5	0.48	0.03
Sulphide (H2S)	0.002	0.002	<0.0002	<0.0002
Cyanide (CN)	0.02	0.02	<0.0001	<0.0001
Free Chlorine	0.03	0.03	<0.006	<0.006
Barium (Ba)	-	-	<0.002	<0.002
Boron (B)	1	1	<0.03	<0.03
Mercury (Hg)	0.002	0.002	<0.0005	<0.0005
Arsen (As)	0.05	0.05	<0.0005	<0.0005
Selenium (Se)	0.05	0.05	<0.0005	<0.0005
Iron (Fe)	-	-	0.068	0.034
Cadmium (Cd)	0.01	0.01	0.002	0.003
Cobalt (Co)	0.2	0.2	<0.003	<0.003
Manganese (Mn)	-	-	<0.003	<0.003
Nikel (Ni)	0.05	0.05	<0.005	0.006
Zinc (Zn)	0.05	0.05	<0.005	<0.005
Copper (Cu)	0.02	0.02	0.009	0.007
Lead (Pb)	0.03	0.03	0.008	0.005
Chrom Hexavalent (Cr6+)	0.05	0.05	0.008	0.004
Organic Chemical	0.005	0.01	<0.0003	<0.0003
Phenol				
Oil & grease	1	1	0.48	0.22
Detergent	0.2	0.2	0.062	0.005
Faecal Coliform	1,000	2,000	601	224
Total Coliform	5,000	10,000	3,702	2,902

Source: Ministry of Transportation (2025)

Water quality in *the Citepus and Cikapundung rivers during this monitoring period was relatively good, with most parameters remaining within applicable standards per GR 22/2021, Annex VI,* for river Class II. However, Dissolved Oxygen (DO) levels were below the recommended 4 mg/L: 3 mg/L in the *Cikapundung* River and 3.4 mg/L in *the Citepus* River.

Groundwater Quality. Baseline condition was established through groundwater sampling at four locations to provide a general condition of groundwater characteristics within the proposed BBMA corridor area. These locations include Terminal *Cicaheum*, Terminal *Leuwipanjang*, Terminal *Antapani* and Terminal *Ledeng*. The monitoring results of the groundwater are shown in the following table. Groundwater quality at all monitoring locations was in good condition, where all parameters were within the recommended thresholds as regulated in the Minister of Health Regulation No. 2 of 2023 for sanitary hygiene. Nevertheless, the pH condition at Terminal Ledeng showed at 6.58, approaching the quality standard threshold of 6.5.

Table 33. Groundwater Quality Results

Parameter	Unit	Quality Standard*	Monitoring Results			
			Terminal Cicaheum	Terminal Leuwipanjang	Terminal Antapani	Terminal Ledeng
			29/7/2024	30/7/2024	29/7/2024	29/7/2024
Physical						
Total Dissolved Solids (TDS)	mg/L	<300	106	119	127	116
Turbidity	NTU	<3	1.2	1	1.1	2.1
Color	TCU	10	3.2	3.5	2.9	2.3
Chemical						
pH		6.5 - 8.5	7.25	6.83	7.03	6.58
Nitrate (NO3)	mg/L	20	2.1	2.6	1.7	2.4
Nitrite (NO2)	mg/L	3	<0.2	<0.4	<0.2	<0.1
Chrom hexavalent (Cr +6)	mg/L	0.01	<0.001	<0.001	<0.002	<0.001
Iron (Fe)	mg/L	0.2	0.022	<0.029	0.015	<0.008
Manganese (Mn)	mg/L	0.1	<0.002	<0.001	<0.002	<0.01
Microbiology						
E. Coli	MPN/100ml	0	0	0	0	0
Total Coliform	MPN/100ml	0	0	0	0	0

Source: (Kementrian Perhubungan, 2025)
Note: *Ministry of Health Standard No. 2/2023 on Water Standard for Hygiene Purpose

Groundwater sampling at the Terminals area was carried out by KAN-accredited laboratory personnel.

Figure 21. Groundwater and Clean Water Sampling Activities

5.1.7. Tree Species

Bandung city can be considered to have typically urban and artificial biodiversity and landscape. Furthermore, biodiversity and landscape is essentially represented by the

existence of vegetation along the BRT corridor. The BRT route will pass about 20 existing roads where part of these roads will be used as BRT corridors. A recent vegetation inventory along these roads, conducted by Dohwa – Lenggogeni JO, identified various trees that could potentially be affected by the BRT development, as follows:

Young-age trees at Jl. Asia Afrika – Alun-alun corridor	Mature trees and middle-age trees at Jl. Cicadas – BTM Corridor	Mature trees and middle-age trees and young-age trees at Jl. Ciateul

Figure 22. Some Existing Trees along BRT Corridor and Station Location

Most of these trees are not identified as protected species under MoEF Regulation No. 106/2018, except the Angsana tree (*Pterocarpus indicus*), and as vulnerable species, such as the cinnamon tree (*Cinnamomum spp.*). For palm trees, it was reported that these trees—especially located around future Bus Station (BS) 22 *Andir* and BS 26 Batas Kota—are presumably classified as protected species. However, further confirmation is required to accurately identify the species of these palm trees.

5.1.8. Greenhouse Gas Emissions

Bandung City has experienced rapid urbanization and motorization, with vehicle growth reaching 10% or more annually. This surge has significantly contributed to the increasing greenhouse gas (GHG) emissions. To estimate baseline GHG emissions, this study adopts the methodology used in a previous BRT project analysis by Restiana et.al (2023). Given that the primary source of emissions within the project's area of influence is associated with traffic- and transportation-related activities, the estimation follows a Line Emission Source Estimation approach, which provides a reliable framework for quantifying emissions generated along major traffic corridors, as follows:

GHG emissions = Q x L x EF x GWP

Where:

Q = Vehicles number based on traffic counting results (unit/day)
L = Approximation of total road length at intersection as traffic counting location (km),
EF = Emission factor (gr/km)
GWP = Global Warming Potential (tCO2e/ton GHG) based on IPCC fifth assessment report.

Table 34. Traffic Counting Results at BRT Intersections

Code	Road Intersection at BRT Corridor	Road length (km)	Traffic Counting (unit)[1]				
			MC	PC	Para	Bus	Truck
SP01	A. Yani – St Yusuf	4.28	109,674	29,544	2,058	307	2,040
SP02	Kiaracondong	12.03	176,193	64,522	4,451	415	5,120
SP03	Jakarta – A Yani	6.33	200,557	49,384	18,418	552	4,998
SP04	Laswi	6.74	117,119	18,403	11,792	444	2,704
SP05	Simpang Lima	3.78	101,436	42,409	2,119	186	3,406
SP06	Lengkong Besar	2.85	107,114	27,155	2,668	363	1,501
SP07	Karanganyar	2.60	127,493	36,434	2,547	656	2,661
SP08	Gardujati	5.98	114,698	23,779	1,558	403	3,087
SP09	Jamika	7.02	69,018	13,865	5,633	212	5,112
SP10	Garuda	5.61	69,123	18,427	5,337	576	5,973
SP11	Bunderan Cibeureum	8.87	147,895	25,908	6,366	981	8,623
SP12	Cibeureum	4.24	132,306	19,880	5,738	714	10,559
SP13	Nurtanio	5.14	143,203	31,727	8,626	1,184	8,658
SP14	Pasirkaliki	7.32	133,275	30,409	4,830	490	3,751
SP15	Simpang Pasar Baru	1.64	70,716	24,923	3,887	594	2,391
SP16	Suniaraja	0.97	44,421	14,622	1,332	199	1,171
SP17	ABC	2.51	40,778	13,261	1,266	305	952
SP18	Naripan - Braga	2.39	44,785	15,518	618	69	748
SP19	Naripan	2.50	56,356	21,621	2,744	228	2,065
SP20	Veteran – A. Yani	8.30	69,682	21,268	1,491	192	1,560
SP21	Banceuy	0.78	107,183	32,886	2,681	856	2,054
SP22	Alun – alun Bandung	0.78	97,560	26,590	1,526	572	1,918
SP23	Dalem Kaum	1.89	43,420	14,529	2,005	171	1,416
SP24	Pungkur	3.45	49,386	13,318	2,698	280	1399
SP25	Balonggede	2.24	39,872	8,882	2,141	253	799
SP26	Inggit G – Moh. Toha	9.03	51,207	11,055	3,858	321	2,095
SP27	BKR – Moh Toha	11.52	165,942	29,956	6,303	966	5,365
SP28	BKR – Tegalega	10.4	242,659	35,963	9,130	1,361	5,580
SP29	Inggit – Otista	3.61	71,761	15,156	4,408	316	2,248
SP30	Jl. Pasirkoja	4.39	67,647	16,056	4,201	440	3,034
SP31	Tamblong	2.81	54,773	20,613	2,128	314	1,124
SP32	Gudang utara – A Yani	6.18	52,963	14,935	1,551	174	1,595
SP33	Ciroyom	0.32	38,070	8,589	2,522	177	1,387
SP34	Andir	0.55	51,766	9,599	1,652	224	2,556
SP35	Rajawali	2.89	123,366	22,857	4,221	584	8,130
SP36	Braga – Asia Afrika	1.92	86,869	22,098	617	331	1,254
SP37	Veteran – Sunda	1.5	68,435	26,800	1,855	316	1,625
SP38	Malabar	5.06	57,274	10,153	1,155	70	804
Total (unit)			**3,545,995**	**883,094**	**148,131**	**16,796**	**121,463**

Note: M: motorcycle; PC: personal car; Paratransit - *angkot*

The traffic counts in the table above represent the number of vehicles recorded on weekdays, as traffic volumes during these periods were typically higher than on holidays. Using these data, GHG emissions from various modes of transportation within the BRT BBMA on-corridor were estimated, applying composite emission factors from the International Vehicle Emission (IVE) model, as shown in the table below.

Table 35. Estimated Baseline GHG Emissions (tCO2e/day) within On-corridor

Type of fleet	Emissions Factor[2] (gram/km)			GHG Emissions (ton-GHG/day)			GHG Emissions (tCO_2e/day)
	CO_2	N_2O	CH_4	CO_2	CH_4	N_2O	
Motorcycle	69.4	0	0.41	1,338.8	7.91	0	1,560.28
Personal car	434	0.01	0.43	1,958.4	1.94	0.045	2,024.65
Paratransit - *Angkot*	406	0.01	0.58	344.6	0.49	0.008	360.44
Bus	1,789	0.09	0	158.4	0	0.008	160.52
Truck	1,330	0.015	0.375	895	0.25	0.01	904.65
						Total	**5,010.54**

Emission factor from: Kimoanh et al (2018). * Dewanto (2020). in GIZ (2020)

Based on these calculations, daily GHG emissions within the BRT on-corridor and shown in the following figures are predominantly generated by private/passenger cars (PC), which contribute approximately 2,025 tCO_2e/day or 41% of total emissions. This is followed by motorcycles (MC) and trucks, which both contribute 1,560 tCO_2e/day (31%) and 905 tCO_2e (18%), respectively. Meanwhile, paratransit and buses combined account for the remaining 10% of total GHG emissions, as shown in the following figure.

Figure 23 GHG Emission based on Transportation Modes

5.1.9. Disaster Risk Profile

As part of the ESIA of the BRT project, an initial natural hazard assessment in the Bandung area was conducted. This assessment was drawn up based on publicly available data related to the topography, geographic location, hazard intensity, and recurrence frequency. The proposed BRT networks in Bandung were then overlaid on these maps to highlight sections of the network that are exposed to specific risks. However, it's important to note that the analysis was based on an earlier version of the planned BRT network, which covers only about half of the current proposed routes.

Bandung faces multiple natural hazards, with flooding, earthquakes, and landslides being the most frequent, as shown in the figure below. While the city lies in the shadow of the *Tangkuban Perahu* volcano, which poses some volcanic risk, the topography and spatial layout of Greater Bandung result in distinct hazards affecting different areas of the region.

Figure 24. Occurrences of Natural Disasters in Bandung

The central area of Bandung is particularly prone to flooding due to its bowl-shaped topography, flanked by mountains to the north and south, and intersected by a network of rivers. This geography makes the city centre especially vulnerable to both flash floods caused by intense rainfall and more gradual flooding from accumulated rainfall. As a result, key sections of the proposed mass transit system are located in areas with a likelihood of frequent flooding. Much of Greater Bandung lies in an area of high seismic risk, although the southern part of the region tends to be less affected.

A summary of the BRT network's exposure to these natural hazards is presented in the table below. Each hazard is considered separately, as they occur in different locations and require distinct mitigation strategies.

Table 36. Natural Hazard Exposure of BRT Corridor

Location		Exposure			
Street	Station / bus stop	Volcanic Eruption	Landslide	Earthquake	Flood
Jl. A. Yani	B30 Cikaso	Low	Low	High	Medium
	B31 Cicadas	Low	Low	High	Medium
	B29 Bandung Juara	Low	Low	High	Medium
	B28 Kosambi	Low	Low	High	Medium
Jl. Jakarta	B32 Jl. Jakarta	Low	Low	High	High
Jl. Asia Afrika	B25 Simpang Lama	Low	Low	High	Low
	B17 Alun alun	Low	Medium	High	Low
	B24 Grand Preanger	Low	Low	High	Low
Jl. Naripan	B27 Click Square	Low	Low	High	Low
Jl. Otista	B22 Panjunan	Low	Low	High	Medium
	B20 Cibadak	Low	Low	High	Medium
	B18 Kebon Jeruk	Low	Low	High	Low
Jl. Dewi Sartika	B19 Kepatihan	Low	Low	High	Low
Jl. ABC	B26 ABC - Cikapundung	Low	Medium	High	Low
Jl. Banceuy	Banceuy Baru	Low	Low	High	Low

Source: Adapted from ITP for World Bank. 2021

On 11 - 12 December 2021, a field team conducted a street survey along the Bandung BRT route during periods of heavy rainfall. Based on observations, there were no major instances of road flooding observed along the BRT route during the survey. However, the survey team noted that during prolonged or intense rain, temporary surface flooding or water puddles can occur. This is mainly due to the limited number of drainage outlets resulting in water does not drain efficiently because the outlets are spaced too far apart. Compounding the issue, garbage often clogs these drains, further slowing the flow of rainwater and leading to water build up. Some areas were identified as more prone to surface flooding, especially around the Andir Market—specifically along Jl. Rajawali Timur and Jalan Sudirman. Similar issues were also seen along Jl. Otista/Kalipah Apo and near Kiara Artha station.

Figure 25. Flooding and Water Puddles Sites within BRT On-corridor

The problems of flooding and road puddles in Bandung City are primarily caused by, among others, watershed damage, unregulated agricultural practices, sporadic housing development, soil degradation, and land subsidence (exploitation of groundwater).

5.1.10. Existing Public Transport Services and Road Traffic

The baseline study of the existing public transport services and road traffic is documented and analyzed in the draft Traffic Impact Assessment (Andalalin) report of BBMA prepared by Egis et al. (2025). Relevant baseline aspects are summarized below and further described in the 'Rapid Cumulative Impact Assessment' section of the ESIA to avoid repetition.

Public transportation services in Bandung City are mostly provided by paratransit minibus or *angkot*, medium- and large-size buses operated by individual, local government-owned operators and state-owned bus company known as DAMRI [1] Based on this mode of transportation, there are 78 public transportation routes that will be intersected by the BBMA BRT routes.

Paratransit (*Angkot*). *Angkot* routes typically operate along secondary roads not served by buses, giving them different characteristics compared to BRT and conventional bus networks. Within the BBMA area, the *angkot* system comprises approximately 15,000 minibuses operating on 84 fixed routes, making it the most widely used mode of public transportation for Bandung residents. This system largely operates informally and is managed by two main organizations: Kobanter Baru (*Koperasi Jasa Angkutan Umum Bandung Tertib Baru*), which oversees 40 routes, and ORGANDA (*Organisasi Angkutan Darat*), which manages 80 routes. Based on the assessment, 40 *angkot* routes will have intersections with the planned BRT corridors, and seven of them were identified as having more than 80% overlap.

In addition to bus-based public transportation, the BBMA area is also served by local commuter trains operated by KAI Commuter. These include Bandung Raya, Cibatuan, and *Garut Cibatuan* local trains. Most of these services operate between *Cicalengka* station and *Padalarang* station, with some routes extending to Purwakarta, Cibatu, and Garut City, providing important rail connectivity for daily commuters in the region. The following figure presents transportation modes serving BBMA.

[1] DAMRI: Djawatan Angkoetan Motor Repoeblik Indonesia

Figure 26. Public Transportation Modes in BBMA

Traffic surveys were performed to determine road service status (LOS) based on the amount ratio of vehicles upon the road capacity (VC Ratio). The category of LOS based on VC Ratio refers to the national guidance as stipulated in the *Manual Kapasitas Jalan Indonesia, 1997* which described below.

Table 37. Road Service Levels

Level of Service (LOS)	V/C Ratio	Traffic Flow Characteristics
A	0 – 0.19	Free traffic flow, low volume and high speed, and the driver can choose the desired speed.
B	0.20 – 0.44	The traffic flow is stable, the speed is slightly limited by traffic, but the driver can still freely choose their speed.
C	0.45 – 0.74	The traffic flow is stable, and the speed can be controlled by traffic
D	0.74 – 0.84	The traffic flow is unstable, the speed is low and varies, and the traffic volume approaches the road capacity.
E	0.85 – 1.00	Unstable traffic flow, low and variable speed, and the traffic volume approaches the road capacity.
F	>1.00	The traffic flow is hampered, low speed, the traffic volume is above its road capacity, and traffic jams often occur for relatively long periods.

Source: (Kementrian Pekerjaan Umum, SWEROAD, PT Bina Karya (Persero), 1997)

In the morning and evening peak hours, it can be seen that all road sections have reached a VC Ratio above 0.7, even some road sections have reached a VC Ratio above 1, requiring further handling of traffic conditions on these road sections. The results of the analysis of existing conditions at road intersections show that some intersections have vehicle delays that have reached level F. Meanwhile, intersections that are still in good condition are dominated by intersections without traffic lights, with a Level of Service (LOS) B.

5.2. Socio-economic and Public Health Profiles

This section describes the current socio-economic and public health profiles of BBMA area, namely Bandung City and Bandung Regency based on relevant secondary data. There are no customary communities (*masyarakat hukum adat)* identified within the BBMA – BRT Project area, and therefore, no description in this regard is provided in the ESIA.

5.2.1. Population Profile

Based on 2023 Statistics, the population of Bandung City and Bandung Regency exceeded 6 million, with approximately 50% female and 50% male. The population density in Bandung City is significantly higher than in Bandung Regency. Most of the population in Bandung City and Bandung Regency is in the productive age group of 15-64 years, accounting for approximately 70%. The age dependency ratio (% of working-age population) in Bandung City and Bandung Regency is around 41% and 45% respectively.

As of 2022, the percentage of poor people in Bandung City was 4.25% and in Bandung Regency 6.8%, which is below the national rate of 8.57% (BPS Statistic, 2024). These values increased relative to 2019 data, in which the percentage in Bandung City was 3.38% and in Bandung Regency was 5.94%. Demographic profile of Bandung City and Bandung Regency is summarized in the table below.

Table 38. Demographic Profiles

Parameter	Unit	Bandung City		Bandung Regency	
Population	people	2,461,553		3,718,660	
Female	% population	50.34		50.96	
Male	% population	49.66		49.04	
People with density	Person/Sq.km	14.72		2.08	
Population growth	annual %	0.35		1.3	
Age structure					
▪ 0 - 14 years	% population	Male:	11.35	Male:	13.21
		Female:	10.8	Female:	12.57
▪ 15 - 64 years	% population	Male:	35.62	Male:	35.08
		Female:	34.87	Female:	33.52
▪ ≥65 years	% population	Male:	3.37	Male:	2.67
		Female:	4	Female:	2.73
Dependency ratio	%	41.87		45.45	
Percentage of poor people	% population	4.25		6.8	

Source: Bandung City in Numbers, 2023 and Bandung Regency in Numbers, 2023

5.2.2. Education and Health

In Bandung City, the average years of schooling were approximately 11.06 years, whereas in Bandung Regency, they were 9.1 years. In Bandung City, the average years of schooling among individuals aged 25 and older is 10.71 years for women and 11.42 years for men. Gender inequality in education also exists in the Bandung Regency. The average years of schooling for individuals aged 25 and over in Bandung Regency are 8.93 years for women and 9.32 years for men.

The life expectancy at birth in Bandung City is 73.3 years for males and 76.93 years for females. Meanwhile. the average life expectancy in Bandung Regency was 74.27 years (72.5 for males and 76.2 for females). The under-five mortality rate for Bandung City and Bandung Regency is 15.77 and 12.96 deaths per 1.000 live births, respectively.

The maternal mortality ratios for Bandung City and Bandung Regency were 28 and 39 deaths per 1,000 live births, respectively.

Table 39. Education and Health Profiles (2022 – 2023)

Items	Year	Statistics	Bandung City	Bandung Regency
Average years of schooling				
Total	2023	Years	11.06	9.1
Male	2023	Years	11.42	9.32
Female	2023	Years	10.71	8.93
Life expectancy rate				
At birth	2022	Years	75.04	74.27
Male	2023	Years	73.30	72.50
Female	2023	Years	76.93	76.2
Under-five mortality rate	2020	Per 1,000 live births	15.77	12.96
Maternal mortality rate	2020	Per 1,000 live births	28	39

Source: https://BPS Statistik.go.id/, West Java Health Profile 2020, Bandung City in Numbers 2023, Bandung Regency in Numbers 2023, West Java Province in Numbers 2023

The table below shows that the average number of students per class at primary, middle, and high school levels at Bandung Regency is slightly higher than the National Education Standards, while at Bandung City is slightly lower[2]. Furthermore, the number of universities in Bandung City is shown to be much more than in Bandung Regency (approximately more than 13 times).

Table 40. Number of Schools (2022)

Items	Bandung City	Bandung Regency
Primary school		
Number of primary school (SD+MI)	555	1,636
Average student per classroom. excluding MI	37	38
Middle school		
Number of junior high school (SMP+MTs)	312	581
Average student per classroom. excluding MTs	28	34
High school		
Number of senior high school (SMU+MA)	171	150
Average student per classroom. excluding MA	28.5	34.5
Vocational high school		
Number of vocational high school (SMK)	120	128
Average student per classroom	23.7	26
Number of Universities	96	7

Source: https://disdik.jabarprov.go.id/, Bandung City in Numbers 2023, Bandung Regency in Numbers 2023

[2] According to Regulation of the Minister of Education and Culture No. 23 of 2013, Regulation of the Minister of National Education No. 41 of 2007 and Regulation of the Minister of National Education No. 40 of 2008

Based on the Bandung City in Numbers 2023, Bandung Regency in Numbers 2023, the total number of hospitals are 48 units in Bandung City and Bandung Regency. The total number of hospital beds was around 5,421 and this equivalent to approximately 2.12 beds per 1,000 population[3]. Meanwhile, Bandung Regency requires at least 3.700 hospital beds, but only 1.200 beds are available currently. Hospital beds are used to indicate the availability of inpatient services.

Posyandu performs as a community-based healthcare unit at a grassroots level. Information and service on maternal and child health, immunization, nutrition, basic sanitation are usually conducted by local health cadres with regular visits by *Puskesmas* staff.

Table 41. Number of Health Facilities (2022)

Items	Bandung City	Bandung Regency
Health Center (Puskesmas)	75	134
Clinic (Balai Pengobatan)	121	126
Integrated Service Post (Posyandu)	2,034	3,899
Hospital	28	10

Source: https://e-prodeskel.kemendagri.go.id/, Bandung City in Numbers 2023, Bandung Regency in Numbers 2023

Based on a survey conducted in December 2021, approximately five (5) hospitals were observed along the Bandung BRT route in Jl. Rajawali Timur, Jl.Kebon Jati, and Jl.Lembong, with only one school on Jl. Rajawali Barat may experience a direct impact on their access due to the construction of the BRT. Based on the BPS Bandung City statistic data in 2021, there were 5 top sicknesses recorded in Bandung City. Aside from COVID-19, dengue was the second-highest disease burden, as shown in the following table.

Table 42. Number of Sickness Recorded in Bandung City (2021)

Sickness	No of Cases
Diarrhoea	177
Dengue	328
Covid 19	13,814
Others (Chikungunya, Leptospirosis, Cholera etc)	301
Malnutrition	138

Source: https://bandungkota.bps.go.id/

5.2.3. Employment and Livelihood

The table below shows that, in 2022, the labor force participation rates in Bandung City and Bandung Regency were estimated at 69.42% and 63.45%, respectively. During the same period, most employees in Bandung City and Bandung Regency were employed in the services sector, followed by industry and agriculture. Meanwhile, the open unemployment rate was estimated at 9.55% in Bandung City and 6.98% in Bandung Regency. The minimum wage in Bandung City was IDR 4.05 million/month. In Bandung Regency, the average monthly wage was 3.49 million, higher than the minimum wage in West Java Province, which is set at approximately IDR 2.0 million.

[3] Dinas Kesehatan Kota bandung. (2019). Profil Kesehatan Kota Bandung. https://dinkes.bandung.go.id/wpcontent/uploads/2020/09/Profil-Kesehatan-Kota-Bandung-Tahun-2019.pdf

Table 43. Employment Rate of Bandung City and Bandung Regency

Items	Year	Statistics	Bandung City	Bandung Regency
Labor force participation rate	2022	Years	69.42	63.45
Open unemployment rate	2022	%	9.55	6.98
Formal labor	2020	%	53.51	48.62
Labor force by occupation:	-	-	-	-
Agriculture sector	2023	%	0.5	6.79
Industry sector	2023	%	23.34	37.59
Service sector	2023	%	76.22	55.61

Source: Bandung City in Numbers 2023, Bandung Regency in Numbers 2023, Labor Force Situation in West Java Province 2023

A Land Acquisition and Resettlement Action Plan (LARAP) serves as a Resettlement Action Plan (RAP), which was carried out to provide a baseline condition of community livelihoods, following the World Bank and AFD's requirements, as one of the project funders. This study focused on identifying people in the community who may be affected by the development and future operation of the BRT project, referred to as Project Affected Peoples (PAPs), as described below.

- *Parking attendants* - The presence of parking attendants who work on the parking areas along the planned BBMA BRT Corridor location—official parking attendants under the local government service agency—was identified to total 193 individuals, of which 188 (or approximately 97%) are male and also the heads of households. Based on the survey, their average monthly income ranges widely, from less than IDR 1,500,000/month to as much as Rp 6,000,000/month, as shown below.

Table 44. Average Monthly Income of Parking Attendants

Monthly Income in Average	Number of Parking Attendants	Percentage
< Rp 1.500.000	29	15%
Rp 1.501.000 - 2.500.000	108	56%
Rp 2.501.000 - 4.210.000	54	28%
Rp 4.211.000 - 6.000.000	2	1%
Total	**193**	**100%**

Source: LARAP document by Dohwa-Lenggogani, 2025

The distribution of respondents by their status and their average monthly income is presented in the following tables.

Table 45. Status of Parking Attendants

Respondent's Status in the Household	Number	Percentage
Husband and Head of Household.	188	97,4%
Wife and Head of Household	1	0,5%
Husband	1	0,5%
Wife	0	0,0%

Respondent's Status in the Household	Number	Percentage
Children	3	1,6%
Total	**193**	**100%**

Source: LARAP document of BBMA, Dohwa-Lenggogani, 2025

Furthermore, referring to Law No. 9 of 1999 on Human Rights, specifically Article 5, the distribution of vulnerable groups among the parking attendants affected by the project is as follows.

Table 46. Vulnerable Groups Among Parking Attendants

Category of Vulnerable Households	Number
Individuals over 79 years old	4
Women as heads of household	1
Individuals with income below the poverty line (< minimum wage) *	184
Individuals with disabilities	0

Source: LARAP document of BBMA by Dohwa-Lenggogani, 2025

- *Street Vendors* - Based on the LARAP survey, a total of 1,735 street vendors (PKL) were identified and categorized by zone according to Bandung City Regional Regulation No. 4/2011. This includes 331 vendors in green zones, 353 vendors in yellow zones, and 1,051 vendors in red zones. The zoning classification reflects the project's approach to managing affected street vendors in accordance with the Bandung City Regional Regulation No. 4/2011. Vendors located in green zones are permitted to continue operating without restrictions. In contrast, those in yellow zones are permitted to operate under specified time or location restrictions, in coordination with the local government. Vendors are situated in red zones, where street vending is prohibited. All affected PKL/street vendors are subject to relocation or livelihood restoration assistance in accordance with the approved LARAP (2025).

Table 47. Number of Street Vendors within BRT Corridors

Road Name	Green Zone				Yellow Zone				Red Zone			
	Left side		Right side		Left side		Right side		Left side		Right side	
	Kiosk	Non-Kiosk	Kiosk	Non-Kiosk	Kiosk	Non-Kiosk	Kiosk	Non-Kiosk	Kiosk	Non-Kiosk	Kiosk	Non-Kiosk
Moh. Toha	0	0	0	0	0	0	0	0	6	25	12	3
Pungkur	0	0	0	0	0	9	2	2	0	0	0	0
Dewi Sartika	0	0	0	0	0	0	0	0	0	13	1	4
Dalem Kaum	0	0	0	0	0	0	0	0	0	4	0	5
Alun-Alun Timur	0	0	0	0	0	0	0	0	0	1	0	0
Banceuy	0	0	0	0	10	40	0	21	0	0	0	0
Sunia Raja	0	0	0	0	0	0	0	0	0	11	5	10
Otto Iskandar Dinata	0	0	0	0	0	0	0	0	3	250	3	214
BKR	0	0	0	0	0	0	0	0	0	6	0	3
ABC	15	5	0	0	15	2	0	3	0	0	0	0
Naripan	0	0	0	0	0	0	0	0	14	25	10	25
Ahmad Yani	2	173	7	29	0	0	0	7	0	89	0	65
Ibrahim Adjie	0	0	0	0	0	0	0	0	15	14	30	2
Jakarta	0	0	0	0	3	9	2	0	4	5	4	2
Asia Afrika	0	0	0	0	0	0	0	0	1	44	1	3
Jenderal Sudirman	5	53	4	38	0	0	0	0	5	10	1	3
Rajawali Barat	0	0	0	0	0	0	0	0	10	28	3	4
Rajawali Timur	0	0	0	0	10	34	3	12	14	15	4	4
Kebon Jati	0	0	0	0	120	11	35	3	0	0	0	0
Sunda	0	0	0	0	0	0	0	0	0	2	0	0
Veteran	0	0	0	0	0	0	0	0	0	4	0	12
	22	**231**	**11**	**67**	**158**	**105**	**42**	**48**	**72**	**546**	**74**	**359**
	Total for Green Zone = 331				**Total for Yellow Zone = 353**				**Total for Red Zone = 1,051**			

Source: (Dohwa-Lenggogeni, 2024)

Figure 27. Street Vendors and Street Parking Conditions

- *Kiosk Tenants and Owners* - Kiosk or stall tenants are located at several terminals designated as future depot and final terminal locations, namely: *Cicaheum* Terminal, planned as a depot; *Antapani* Terminal, planned as an end terminal (terminus), and *Ledeng* Terminal, planned as a terminal. Tenants at these locations are expected to be directly affected, as all existing terminals (except *Rancanumpang*, which will be newly developed on vacant land) are planned to undergo complete renovation. According to the LARAP survey (see table below), the number of respondents is significantly lower than the number of existing kiosks, as many kiosks were found inactive, permanently closed, or unavailable at the time of the census.

Table 48. Affected Kiosk Tenants

Location	Number of Kiosk Tenants/Owners
Terminal Cicaheum	59
Terminal Antapani	16
Terminal Ledeng	43
Total	**118**

Source: (Dohwa-Lenggogeni, 2024)

According to the LARAP survey conducted on October 31, 2024, the average monthly income of households renting land or kiosks ranges from less than Rp 1,500,000 up to Rp 7,500,000. The respondents' income distribution is presented below.

Table 49. Household Income of Affected Kiosk Tenants/Owners

No.	Household Income Range	Number of Respondent	Percentage
1	< Rp. 1.500.000	24	12%
2	Rp. 1.501.000 - 2.500.000	112	58%
3	Rp. 2.501.000 - 4.210.000	53	27%
4	Rp. 4.211.000 - 6.000.000	2	1%
5	Rp. 6.001.000 - 7.500.000	0	0%
8	No answer from the respondents	2	1%
	Total	**193**	**100%**

Source: (Dohwa-Lenggogeni, 2024)

A total of 32 individuals among the land/kiosk tenants were identified as vulnerable, with the following breakdown.

Table 50. Vulnerable Individuals Among Affected Kiosk Tenants/Owners

No	Vulnerability Category	Number
1	Individuals over 79 years old	1
2	Women as heads of household	14
3	Individuals with income below the poverty line (< minimum wage) *	17
4	Individuals with disabilities	0
	Total	189

Source: (Dohwa-Lenggogeni, 2024)

- *'Angkot' Drivers and Crews*- The development of the BRT system is expected to significantly affect the current public transportation system, particularly those operated by the private sector. GIZ (2020, p. 125) in the Bandung BRT Feasibility Study reported that *angkot* (public minivan) drivers will be among the most affected groups when the BRT becomes operational. According to the Systra study (2022), the proposed BRT routes will overlap with 48 *angkot* routes, with 8 of them showing high levels of overlap. A total of 1,554 vehicles is estimated to operate on these overlapping routes, and if BRT project is operational, would potentially impacting *angkot c*ooperatives, drivers, and the families who rely on this livelihood. Study for the *angkot* drivers is addressed in separate project-level Public Transport Reform, as part of the MASTRAN project sub-component.

Table 51. Affected Angkot Drivers and Operators and their Households

Items	Unit	Scope			
		Core BRT	Core BRT + Extended BRT Network	Core BRT + Priority BRT Routes	Total
Impacted *angkot* fleet	number	858	1.093	1.228	1.554
Impacted workers (drivers & ticketing operators)	person	2.574	3.279	3.684	4.662
Timers	person	96	96	96	96
Maintenance staff	person	172	219	246	311
Approximate affected people	person	11.366	14.374	16.102	20.275
Approximate affected family members	household	2.842	3.594	4.026	5.069

Source: Preliminary Report by Dohwa-Lenggogeni based on Systra Study, 2022

Each *angkot* unit typically involves 3 workers—2 drivers and 1 ticketing staff—while maintenance needs are generally supported by 1 technician for every 5 vehicles. Additionally, each route involves 2 timers. With 48 routes confirmed to overlap with BRT corridors, it is estimated that the total number of individuals affected across the BRT-BBMA system could reach 5,069 households, or 20,275 people, assuming an average household size of 4.

Another group that may be impacted is paratransit drivers, including those working for ride-hailing services such as Grab and Gojek. A traffic count survey conducted on January 23, 2020, over a 17-hour period (5:30 AM – 10:30 PM), found that motorbike-based ride-hailing drivers typically account for 10 – 15% of all two-wheeled vehicles on several major roads in Bandung.

Table 52. Online Transport Drivers in the BRT Corridor

Road Segment (BRT Corridor)	Grab/Gojek Motorcycles	Percentage of Total Two-Wheelers
Jl. Asia Afrika	9,065	11.8%
Jl. Banceuy	3,906	15.3%
Jl. PETA	6,209	10.0%

Source: Bandung City Daily Video Traffic Output (2020), as cited in GIZ (2020, p. 126)

5.2.4. Community Perception

A community perception survey was conducted at and around several terminal locations, including Cicaheum, Leuwipanjang, Antapani, and Ledeng terminals, as well as informal terminals in Kebon Kalapa and Jalan Elang, and around BRT stop areas near Alun-Alun Bandung and Kebon Jati Hospital. The survey aimed to capture the public's awareness and attitudes toward the planned construction and operation of the Bandung BRT-BBMA project. A total of approximately 30 respondents participated, comprising terminal staff, kiosk traders,

Angkot drivers, passengers, and local residents including shopkeepers and hospital staff. The survey results among these respondents indicated that:

- 46% of respondents were not yet aware of the BRT Project
- Despite limited awareness, 92% expressed general support for the project
- 77% of respondents believed that BRT Project would bring benefits, particularly in enhancing accessibility and mobility for Bandung citizens, and potentially reducing traffic congestion
- 8% perceived potential negative impacts, primarily from *Angkot* drivers who were concerned about route competition and loss of income.
- 15% were not sure or had no opinion on the potential impacts of BRT BBMA.

These findings generally indicate a positive perception and expectation of public benefit, though also point to a need for broader information dissemination and engagement with affected stakeholders, especially the *angkot* drivers.

An interview-based survey using a structured questionnaire was conducted with Angkot drivers, kiosk vendors and terminal staff

Figure 28. Interview Survey Activities

Figure 29. Public Responses to the BRT-BBMA Project

Meanwhile, the potential concerns regarding the construction and operation of the BRT–BBMA are presented in the following figure.

Figure 30. Community Concerns on E&S Impacts of BRT - BBMA Project

Based on the above figure, the main public concerns on BRT-BBMA construction activities include an increase in waste generation (33%), followed by traffic disruption (29%), air pollution (16.5%), and noise pollution (12.5%). During the operational phase, the primary concern remains waste generation (43%), followed by traffic congestion (24%), social issues (14%), and drainage disruption (10%). In terms of social concerns, communities living near the terminal expressed particular concern about a potential rise in street crime or gang-related activity. For kiosk vendors, the biggest concern is uncertainty over whether they will still be allowed to operate their business in the terminal area once the project is underway.

Despite these concerns, the dominant sentiment among respondents reflects expectation for a more comfortable and efficient transportation system that can connect people with various parts of Bandung more reliably. The community also sees potential in the BRT-BBMA project to create new job opportunities, both during the construction phase and operational phase.

5.2.5. Accessibility and Mobility Pattern

Employment Opportunities. A total of 3,272 activity centers has been identified as key generators of mobility within the BBMA. These include destinations for work, education, health services, and recreation. The three largest categories are educational facilities (32%), cafes and restaurants (23%), and offices (19%). Most of these activities are concentrated within Bandung City.

Table 53. Mobility Generators within the BBMA

Type of Activity	Number of Activities	Percentage of total
Shopping malls	48	1%
Shopping centers	44	1%
Convenience stores	365	11%
Traditional markets	78	2%
Offices	614	19%
Educational facilities	1,060	32%

Type of Activity	Number of Activities	Percentage of total
Health facilities	255	8%
Tourist attractions	64	2%
Cafes and Restaurants	745	23%
Total	3.273	100%

Source: The World Bank. 2020

Despite the high concentration of activities, access to employment by public transportation remains limited. Of the approximately 3.77 million jobs in the BBMA, only:

- 1 million jobs (27%) are accessible within 60 minutes via walking and public transport from Bandung Station;
- 1.5 million jobs (40%) are accessible within 90 minutes; and
- 1.75 million jobs (46%) are accessible within 120 minutes.

This highlights significant transportation challenges, particularly for low-income and transit-dependent populations. Long commute times reduce access to jobs and have been associated with increased stress, lower energy levels, and poorer sleep quality, as observed in comparative studies such as those conducted in Southern Sweden.

Accessibility to Public Facilities. Based on the BRT Feasibility Report (GIZ. 2020), the average travel times between sub-districts in Bandung are in a range of 7 to 21 minutes, with the highest accessibility sub-districts located in the center of the city and within the area of influence. However, this estimation does not consider delays due to traffic congestion effects. The latest administration of Bandung City has introduced new approaches by improving public transportation and promoting sustainable urban transportation to reduce auto dependency by, for example, providing subsidies for students who use public transport and promoting the wider use of bicycles.

Since 2015, Bandung City Government has launched 23 programs on poverty alleviation by providing access to basic services for the poor, including for street vendors:

- Structuring street vendors by relocating them to designated locations;
- Coaching street vendors through management organizations, business development, capital facilitation, providing identity cards to street vendors, and the establishment of street vendor forums in 27 sub-districts; and
- Renovation of traditional markets.

Accessibility for Persons with Disabilities and Other Vulnerable Groups. Community facilities and the mobility system should be accessible to all citizens, particularly people with reduced mobility such as people with disabilities, elderly, pregnant women or parents with baby strollers and people carrying groceries or packages. Issues faced by people with disabilities and other vulnerable groups in terms of access and their usage of public transport facilities and services may be improved by reviewing the current usage and issues experienced.

Several regulations and policies require consideration of the accessibility of public facilities for individuals with specific needs, such as people with disabilities and older adults. The first step in implementing national-level regulations and policies is typically the enactment of local regulations. The Regional Government (West Java Province and Bandung City) shows its commitment through the issuance of the following regulations:

- West Java Provincial Regulation No. 13 of 2013 concerning Buildings;
- West Java Provincial Regulation No. 7 of 2013 concerning the Implementation of Protection for People with Disabilities;
- West Java Governor Regulation No. 97 of 2015 concerning Accessibility for People with Disabilities; and
- Bandung City Regulation No. 15 of 2019 concerning Protection and Fulfillment of the Rights of People with Disabilities.

Bandung City has developed a network of Universal Access Design-based footpaths throughout the Central Business District. Trans Metro Bandung operates two buses that are accessible to People with Disabilities (PwD), which have been in service since 2018. In 2020, DAMRI operated 17 Scania buses that are considered friendly to people with disabilities and the elderly, but the service is still limited to the route of *Dipatiukur – Jatinangor*.

5.2.6. Cultural Heritage

Cultural heritage is an integral part of a people's and a country's cultural identity and practice and may be a source of valuable historical and scientific information, as well as an asset for economic and social development. Law No. 11 of 2010 on Cultural Heritage provides the legal basis for the preservation, management, development, and utilization of cultural heritage in Indonesia. The material of cultural heritage may be in the form of objects, structures, situs, buildings, and areas.

According to the Regional Regulation of Bandung City No. 7 of 2018, the BRT Corridor will traverse along 81 locations of cultural heritage buildings and structures listed in the Annex of the ESIA. According to this Bandung Regulation, demolition and/or changes to cultural heritage buildings are prohibited, particularly to cultural heritage building type A (article 44). Type B cultural heritage buildings are prohibited from demolition; however, rehabilitation and revitalization are permitted without altering the building's character (Article 45). Only the cultural heritage building type C can be changed for other functions according to the spatial plan (Article 46). In total, there are 1,759 cultural heritage buildings and 70 sites spread across 24 areas in Bandung City. Of that, there are seven cultural heritage areas that are in, nearby, or around the project sites (please refer to Table 54 on List of Cultural Heritage in BRT BBMA, which lists 27 bus stations that are present in/near/around the cultural heritage sites). Therefore, any construction activities that will result in disturbances and/or changes to cultural heritage buildings would need to be identified as early as possible, and an alternative is proposed. Classification of Cultural Heritage Buildings in Bandung City Areas is divided into 3 (three) groups, including:

- Class A Cultural Heritage Buildings are buildings that are at least 50 years old plus at least meeting 3 (three) other criteria.
- Class B Cultural Heritage Buildings are buildings that are at least 50 years old plus at least meeting 2 (two) other criteria.
- Class C Cultural Heritage Buildings are buildings that are at least 50 years old based on the regional regulations above.

A6-Merdeka Building (EX-Societeit Concordia) on Jl. Asia Afrika

A20- Hubdam III Siliwangi Office (EX-OSVIA)on Jl. Moh. Toha

A25- Gereja Kristen Pasundan on Jl. Kebon Jati

B30- Cup Dua Langit Shop on Jl. Jend. Sudirman

A7-Pikiran Rakyat Building on Jl. Asia Afrika, Braga

A16-Yayasan Pusat Kebudayaan Building on Jl. Naripan

Figure 31. Cultural Heritage Buildings Near BRT On-corridor

In BBMA, part of the proposed BRT corridor follows the west-east city axis passing the Bandung Cultural Heritage Area, where historic buildings are located, and also a tourist destination. Based on these considerations, the implementation of BRT corridor surveys on routes in historic/cultural heritage areas is technically the same as in other areas. Beside cultural heritage building, almost 90% of BRT corridor passes through the cultural heritage area of Bandung, termed as K1 (Old City Center Area), K2 (Sundanese Ethnic Area at Tegallega), K3 (Chinatown Area), K4 (Central City Government Area), K5 (Central Military Area), K6 (Kosambi Area), K8 (Rajawali Area) and K15 (Kiaracondong Industry). More information on cultural heritage is shown in the following tables.

Table 54. List of Cultural Heritage within the BRT Corridor

No	Bus Station	Cultural Heritage Area
1	Cicadas	K15 (Culture Heritage Area Kiaracondong Industry Area)
2	Jl. Jakarta	K15 (Culture Heritage Area Kiaracondong Industry Area)
3	Cikaso	K15 (Culture Heritage Area Kiaracondong Industry Area)

No	Bus Station	Cultural Heritage Area
4	Bandung Juara	K1 (Culture Heritage Area Kota Lama Center Area)
5	Pasar Kosambi	K6 (Culture Heritage Area Kosanobi Area)
6	Simpang 5	K1 (Culture Heritage Area Kota Lama Centre Area)
7	Asia Afrika	K1 (Culture Heritage Area Kota Lama Centre Area)
8	Alun-Alun	K1 (Culture Heritage Area Kota Lama Center Area)
9	Sudirman UBO	K3 (Culture Heritage Area Chinatown Area)
10	Sudirman Gamalier	K3 (Culture Heritage Area Chinatown Area)
11	Sudirman Mayapada	K3 (Culture Heritage Area Chinatown Area)
12	Sudirman Andir	-
13	Sudirman Grand Ballroom	-
14	Sudirman Elang	K8 (Culture Heritage Area Rajawali Area)
15	Sudirman Ujung	-
16	Rajawali Barat	-
17	Rajawali Elang	K8 (Culture Heritage Area Rajawali Area)
18	Kebun Jati Waringin	-
19	Ciroyom	-
20	Pabrikan	K3 (Culture Heritage Area Chinatown Area)
21	Rs. Kebun Jati	K3 (Culture Heritage Area Chinatown Area)
22	Stasiun Hall	K3 (Culture Heritage Area Chinatown Area)
23	Otista Pasar Baru	K3 (Culture Heritage Area Chinatown Area)
24	Kebon Jeruk	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
25	Cibadak	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
26	Panjunan	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
27	Taman Tegalega	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
28	M. Toha	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
29	Kebon Kalapa	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
30	Kepatihan	K2 (Culture Heritage Area Sudanese Etnich (Tegalega)
31	ABC	K1 (Culture Heritage Area Kota Lama Center Area)
32	Click Square	K1 (Culture Heritage Area Kota Lama Center Area)
33	BTM	-
34	Banceuy Center	K3 (Culture Heritage Area Chinatown Area)

Source: Dohwa – Lenggogeni, 2023

5.2.7. Gender Profile

The Gender Development Index (GDI) calculates the average of gender-based development achievements in three basic dimensions: life expectancy. level of participation in education. and the level of participation in the workplace. The higher the index. the greater the equality between males and females. The GDI for the BBMA suggests relatively high rates of equality and little inequality across locations from 2017 to 2019. As shown in the chart below, inequalities are greatest in Kabupaten Bandung Barat, which is also one of the areas in the BBMA with the highest distribution of low-income households.

Source: Regional Statistics Agency. West Java. in GESI report. 2021)

Figure 32. BBMA Gender Development Index 2017–2019

According to the Sexual Exploitation and Abuse/Sexual harassment (SEA/SH) Risk Prevention and Management Action Plan document, to address Gender-Based Violence (GBV) in the Bandung Metropolitan Bus Rapid Transit (BRT) Project. West Java Province is one of the provinces in Indonesia with a relatively high rate of violence against women. The Indonesian Women's National Commission noted that during 2020, about 2.738 women in West Java were victims of violence.

5.2.8. Harassment and Gender-Based Violence

A user survey related to Urban Mobility in the Bandung Basin Metropolitan Area (BBMA) done in 2021 shows that 13% of females report experiences of physical harassment, 4% report emotional abuse, 4% experience sexual violence, and 1% report physical violence when using Public Transport (GESI Report, the World Bank, 2021).

Figure 33. GESI Survey Results—Experience when Using Public Transportation

Figure 34. GESI Survey Results Based on Mobility Impaired Respondents (GESI Report, WB, 2021. p. 17)

Nearly 33% of respondents who are physically impaired have experienced verbal harassment in public transport. Additionally, 2.5% of the elderly and 12.5% of visually impaired respondents reported cases of emotional abuse, 5% of physically impaired, and 3.5% of pregnant women have experienced sexual violence on public transport (GESI Report, WB. 2021, p. 16).

Furthermore, 84% of females and 72% of males state that if they have a GBV issue on public transport, they will raise it with the operator and/or the police nearby. 43% of females are confident that people would come to assist them in an event of violence (GESI Report, WB, 2021, p. 7). Respondents report a higher level of safety during daytime activities. Females feel less safe than males in most situations. Similarly, people feel less safe during nighttime activities (approximately two to three times as often). It seems that safety should be a primary concern for government and civil authorities, as the share of individuals who feel unsafe at night is substantial (GESI Report, WB, 2021, pp. 77-78).

Data from the Bandung City Women's and Children's Empowerment Service (DP3A) also shows an increase in cases of violence against women in 2020 compared to the previous year. During that year, there were 250 cases of violence against women handled by the Integrated Service Center for the Empowerment of Women and Children (P2TP2A) in Bandung City. They consist of 100 cases of sexual violence, 72 cases of psychological violence, 26 cases of physical violence, 7 cases of economic violence, 13 cases of neglect, 12 cases of trafficking (trafficking in persons), 8 cases of violence related to the struggle for child custody, and 12 other cases.

Figure 35. GBV Cases from 2008 - 2020 (Kota Bandung Diskominfo)

6. ENVIRONMENTAL AND SOCIAL RISK AND IMPACT ASSESSMENT

The implementation of BRT project, primarily during construction, will generate some adverse, temporary environmental and social (E&S) impacts but few others may be permanent one. In contrast, the BRT project is designed to provide an overall positive impact in providing a more efficient and reliable public bus service and reducing already congested traffic in BBMA in the medium- to long-term. Some cumulative impacts on E&S generated from prior and existing development and activities, BRT project implementation and those will be resulted from foreseeable future development within BBMA are also assessed in this section.

Potential types of E&S impacts likely to be generated through BRT project cycles are summarized in the following table to provide a snapshot and the assessment of each risk and impact is elaborated in the following sub-sections of the ESIA. The risk and impact assessment methods used in this ESIA are described in Section 4 of the ESIA. The risk level of an impact is determined as low, moderate, substantial or high-risk based on the criteria as follows:

- ‘Low risk’ if the impact is detectable but not considered significant and, therefore, mitigation measures are discretionary.
- ‘Moderate risk’ if the impact is evaluated as moderate, irreversible, or reversible and, therefore, can be mitigated using readily, common available measures to reduce the risk to an acceptable level.
- ‘Substantial risk’ if the impact is evaluated as significant, adverse, irreversible, or reversible and, therefore, should be mitigated using specialized measures to reduce the risk to as low as reasonably practicable.
- ‘High risk’ if the impact is evaluated as significant, adverse, widespread, and irreversible that cannot be mitigated and, therefore, alternatives to the project’s activities that are of less impact should be identified and adopted for the project.

Table 55. Identified Potential Environmental and Social Impacts

Activity / E&S Aspects Affected	Pre-Construction	Construction						Operation & Maintenance
	Relocation of kiosks, street vendors, parking attendants	Project worker recruitment	Equipment, machinery & vehicle operations	Contractor basecamp operations	Civil & landscaping works	Transportation/ storage of construction materials, fuels & construction wastes	Quarries, asphalt & concrete plant operations (Suppliers)	BRT system operation & maintenance
Environment								
Ambient air quality	-	-	√	√	√	√	√	√
Noise & Vibration	-	-	√	√	√	√	√	√
Greenhouse gas emission	-	-	√	√	√	√	√	√
Surface water quality	-	-	-	√	√	√	√	√
Soil and Groundwater	-	-	-	√	√	√	√	√
Road traffic/infrastructure	-	-	√	-	√	√	-	√
Affected trees/City landscape	-	-	-	-	√	-	√	√
Social, Cultural and Health & Safety								
Local economy	-	√	√	-	√	√	√	√
Access and road traffic	-	–	√	-	√	√	√	√
Livelihood	√	√	√		√	-	-	√
Vulnerable groups of peoples	√	√	-	√		-	-	√
Cultural heritage	-	-	√	-	√	-	–	-
Labor and working conditions	-	-	√	√	√	√	√	√
Community health and safety	-	-	-	-	-	-	–	√

Source: Dohwa - Lenggogeni Team Concencus, 2025

6.1. Pre-Construction Phase

6.1.1. Livelihoods and Access Restriction

Overview. The potential impacts on livelihood disruption and access restriction of project affected peoples (PAPs) due to relocation of kiosk tenants, street vendors and parking attendants from the land and/or areas they currently use including payment of associated compensation are evaluated as substantial risk in the absence of any mitigation measures. However, upon consistent and effective implementation of the mitigation measures described below, the residual risk of the above impact could be reduced to moderate risk as described below.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Livelihood and access restriction for kiosk tenants, street vendors and parking attendants	Medium	Likely	**Substantial**	Minor	Possible	**Moderate**

Risk and Impact Assessment – Livelihood and Access Restriction. Although the BRT project does not require the acquisition of privately-owned land, the project activities require the use of government-owned lands and areas currently used by kiosk tenants, street vendors, and parking attendants as the PAPs. Therefore, the kiosk, street vendors, and parking attendants will need to be relocated elsewhere and compensated through cash payment and/or other benefits. This situation will impact the existing livelihood and access restrictions to PAPs within the dedicated BRT corridor, the adjacent bus stops, depots at *Cicaheum* and *Leuwipanjang*, parking lots, and bus terminals at *Ledeng* and *Antapani*, and BRT terminus/end stations. It is identified in the project's LARAP (dated March 2025) that the BRT project will affect approximately 4,802 PAPs, comprising 1,735 street vendors, approximately 120 kiosks, and 193 parking attendants.

Kiosk tenants and street vendors will experience relocation and restricted access to their existing economic activities, resulting in a loss of income if they cannot be relocated and continue to earn a living elsewhere. These impacts, if not timely and properly mitigated, could lead to grievance against the BRT project. Furthermore, the BRT corridor development will also affect on-street parking areas along Jl. Jenderal Sudirman, Jl. Ahmad Yani, Jl. Rajawali and Jl. Kebon Jati, affecting the parking attendants (official workers of the local government service agency), with loss of income if they cannot be accommodated by the government with work relocation. Although the BRT project area may cover four administrative regions, in terms of geographical context, the impact area is considered local and concentrated in Bandung urban areas along the designated BRT on-corridor and off-corridor, as well as within the existing terminals.

Based on the above assessment, the impact severity on livelihood disruption and access restrictions is evaluated as medium, and the likelihood of the impact can be considered as

certain because relocation of kiosk, street vendors, parking attendants, and associated compensation will occur as part of the BRT project implementation. Therefore, the inherent risk, without mitigation measures in place, of the above impacts is evaluated as substantial.

Mitigation Measures. To minimize the above impacts, the BRT project is recommended to implement the following mitigation measures, among others:

- The Livelihood Restoration Programs (included in the project's LARAP) for the PAPs should be disseminated early, prior to land acquisition, and then implemented prior to any construction activities in a transparent and timely manner, with active participation from the PAPs, the Borrower, and related local government agencies.
- The Project's Stakeholder Engagement Plan (SEP) should be implemented through proactive and regular engagement and disclosure of relevant project information to PAPs and other interested parties.
- A functional Grievance Redress Mechanism (GRM) should be established and implemented to address concerns, expectations, and inputs from PAPs and other interested parties. The GRM requirement is summarized in the ESIA and detailed in the project's LARAP.
- Complementary to ESIA, a Public Transport Reform will be undertaken under the project subcomponent 1. Concerning the *angkot* reorganization. This Angkot Reform will lay out the detailed planning of integration of *the angkot system and its drivers to the BRT services in respective cities,* including options such as upskilling and recruitment of drivers, integration of *angkot* and cooperatives to be feeder and end-point providers, etc.

Residual Risk. If the above mitigation measures are conducted in a consistent and effective manner, the above impacts could be reduced from substantial risk to medium risk. Moreover, these impacts are expected to be localized, temporary, with livelihood and access restrictions for PAPs and the public are anticipated to gradually recover upon completion of construction.

6.1.2. Vulnerable People

Overview. The potential impacts on marginalization of vulnerable groups of people and potential for gender-based violence (GBV), including sexual exploitation and abuse and sexual harassment (SEA/SH), due to relocation of kiosk tenants, street vendors and parking attendants from the land and/or areas they currently use including in the payment process of associated compensation are assessed as moderate risk in the absence of any mitigation measures. However, with proper and consistent implementation of mitigation measures and monitoring plans, the residual risk of these activities could be reduced to low as described below.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Marginalization of vulnerable groups of people and potential for gender-based violence	Medium	Possible	**Moderate**	Minor	Possible	**Low**

Risk and Impact Assessment – Vulnerable People. Marginalization of vulnerable groups (i.e., women, low-income households, the elderly, and people with disabilities) and potential for GBV risk are anticipated to occur due to the relocation of their kiosks, street vendors, and parking areas that are required for construction of BRT on-corridor and off-corridor bus stations and stops, and related depots and terminals. These impacts are likely to arise during consultations and the payment of compensation to PAPs. They could disproportionately affect vulnerable groups, particularly female and elderly people, who account for 10% of the total PAPs. The vulnerable group of PAPs may have more constraints than other PAPs in their ability to participate and raise their concerns during consultation and/or have more challenges for their livelihood restoration. The loss of income or restricted access to community spaces could further disrupt their income-generating activities and livelihoods. The vulnerable groups, due to their lower levels of social and/or economic power, are at an elevated risk of GBV.

The Project's impact on vulnerable groups, including gender, is assessed as adverse and temporary, but potentially reversible. The scale of these impacts remains localized, centered on the Project's construction areas.

Based on the above assessment, the likelihood is considered possible, with the severity of the impact rated as medium, given the number of vulnerable PAP groups. Therefore, the inherent risk of the impact on vulnerable people due to the project's pre-construction activities are evaluated as moderate, especially if mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the vulnerable people and gender impacts on the PAPs, including vulnerable groups of people and potential GBV risk, the BRT project is recommended to implement the following mitigation measures, among others:

- The Livelihood Restoration Programs (included in the project's LARAP) for the vulnerable PAPs should be disseminated early prior to land acquisition, with an approach that account for the specific constraints faced by the PAPs, and then implemented in a transparent timely manner, and is accessible to the vulnerable PAPs, with the active participation from the Borrower and related local government agencies.
- The Project's Stakeholder Engagement Plan (SEP) should be implemented through proactive regular engagement and disclosure of relevant project information and updates to the vulnerable PAPs.
- A functional and accessible Grievance Redress Mechanism (GRM) should be established and implemented to address concerns, expectations, and inputs from vulnerable PAPs and other interested parties. The GRM requirement is described in related sections of the ESIA and detailed in the LARAP document.
- GBV prevention code of conduct and its violation sanctions should be socialized and acknowledged by each project worker and socialized to all relevant PAPs. A dedicated and survivor-centered approach of GRM for GBV cases must be established and implemented

to ensure the confidential handling of information related to GBV incidents that may occur during the project implementation.

Residual Risk. If the above mitigation measures are conducted in a consistent and effective manner, the impact described earlier could be reduced from moderate risk to low risk. These impacts are expected to be limited to PAPs.

6.2. Construction Phase

6.2.1. Ambient Air Quality

Overview. The potential air quality impacts on the human receptor and the environment due to the BRT project construction activities and the operation of supporting facilities, such as basecamps, asphalt, and concrete mixing plants, are evaluated as substantial risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of the air quality impacts due to construction activities could be reduced to medium risk as described below.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Increased airborne dust and fugitive gas emissions exceeding the ambient air quality baseline level	Medium	Likely	**Substantial**	Medium	Possible	**Moderate**

Risk and Impact Assessment – Ambient Air Quality. The project's construction activities would impact the ambient air quality within and beyond the BRT on-corridor and off-corridor, as the air pollutants from earthworks and fugitive gaseous emissions from the project's vehicles and equipment would be easily dispersed depending upon the weather and climatic conditions. No air pollutant dispersion modelling of the project has been undertaken as part of the ESIA and/or DED.

The impact on air quality would be primarily generated from the operation of construction equipment, machinery, and project vehicles, activities within contractor basecamps, the transportation of construction materials and fuels from the suppliers to project sites, and the storage and transportation of wastes (hazardous, non-hazardous, and construction waste) from project sites to landfills or third-party vendors. These project activities collectively increase airborne dust/particulate matter (e.g., PM10, PM2.5) and exhaust gas emissions (e.g., NOx, SO2, CO) beyond baseline levels. Additionally, ancillary facilities such as asphalt and concrete mixing plants operated by the contractor or subcontractors used to support the project construction would contribute to elevated pollutant levels in the areas where they operate. Reduced ambient air quality would pose impacts on nearby sensitive receptors, including potential health risks to the residents living within the BRT project areas, quarries and concrete plants.

Furthermore, demolition of existing structures that may contain asbestos materials at *Leuwipanjang* and *Cicaheum* terminals poses additional risks to air quality and public health if not properly managed. Microscopic asbestos fibers are highly resistant to degradation and can remain suspended in the air for prolonged periods, increasing the potential for severe health impacts on workers and surrounding communities.

The nature of the project's impact on air quality would be adverse during construction but then it is anticipated to gradually improve once the BRT is in operation. The duration of the air quality impact is considered medium-term as the construction activities of the BRT project are currently scheduled within 12 to 15-month period. During this period, intermittent spikes of air pollutant concentrations may occur, especially during peak construction works.

On a magnitude scale and in the absence of air pollutant dispersion modelling for the BRT project, the concentration of ambient air quality parameters within the project areas could exceed the national air quality standard stipulated in the Government Regulation No. 22 of 2021 (Appendix VII) and/or the WHO Global Air Quality Guidelines (2021). However, these exceedances are possible to occur during prolonged dry seasons and intense construction activities.

Considering the above assessment and in the absence of air pollutant dispersion modelling conducted for the BRT project, the severity of the air quality impact is considered medium, and the likelihood of this impact occurring is likely since air pollutant emissions are an inherent part of common construction activities. Therefore, the inherent risk of the impact on air quality, including nearby sensitive receptors, is evaluated as substantial risk if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the air quality impacts due to the construction activities, the BRT project is recommended to implement the following mitigation measures, among others:

- Air pollutant dispersion modelling should be undertaken for the project to enable an adequate assessment of whether the airborne particulate matters and fugitive gaseous emissions generated by the project's construction activities would cause further impacts on the existing air quality within the project's area of influence within Bandung city.
- Land clearing, demolition and earthworks should be limited to areas that are immediately required for construction to reduce unnecessary exposure of subsurface soil to wind.
- A temporary fence (e.g. usually made of zinc-alum sheet or other materials of similar function) of approximately 3-m high should be installed within of the perimeter of construction sites in order to minimize dust and gaseous dispersion.
- Vehicles/trucks transporting soil and other construction materials should not be overloaded and the loads should be properly covered with tarpaulin.
- Management for material mobilization which scheduled in night-time (22.00 – 05.00 WIB) instead of day-time if practicable.

- Project vehicles/trucks should use the designated roads commensurate with the tonnage of the vehicles and adhere to the determined speed limits.
- Open burning of construction and solid waste at construction sites and supporting facilities is strictly prohibited.
- Should there be asbestos-containing materials (ACM) found during demolition activities, inform and coordinate with PIU to ensure that such materials are handled, stored, and disposed of in accordance with applicable health, safety, and environmental regulations. Licensed contractors and certified disposal facilities must be engaged to prevent exposure and contamination.
- The contractor shall conduct regular monitoring (e.g., on a quarterly basis) of air quality at the construction sites and other areas where sensitive receptors such as residential and public facilities exist; and the monitoring results should be analyzed against the Indonesian Government and WHO guidelines.

Residual Risk. If the above mitigation measures and air quality monitoring plan are implemented in a consistent and effective manner, the ambient air quality impact on the sensitive receptors during construction could be reduced from substantial risk to medium risk. Moreover, these impacts are expected to be temporary and reversible, with air quality likely to return to the pre-construction baseline level upon completion of construction activities.

6.2.2. Noise and Vibration Level

Overview. The potential noise and vibration impact on the human receptor and the environment due to the BRT project construction activities and the operation of supporting facilities such as basecamps, asphalt, and concrete mixing plants is evaluated as moderate risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented consistently and effectively, the residual risk of this impact from construction activities could be reduced to low risk, as described below.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Elevated noise and vibration levels at construction sites and sensitive areas receptors above the baseline level	Minor	Possible	**Moderate**	Minor	Unlikely	**Low**

Risk and Impact Assessment – Noise and Vibration. Construction activities for the BRT Project would generate elevated noise and vibration levels, resulting in exceedances of the noise baseline at on- and off-corridor bus stops and in the vicinity of the *Cicaheum* and *Leuwipanjang* terminals, where the BRT bus depots will be constructed. The increase in noise

levels would result from the operation of construction equipment, machinery, and project vehicles; activities at the contractor's base camp; civil works; and the transportation and storage of construction materials, fuels, and waste from suppliers to project sites. Collectively, these activities are expected to raise noise levels above the current baseline conditions. Whilst the vibration is derived from piling activity at the depot and terminal construction. Furthermore, ancillary facilities such as asphalt mixing and concrete batching plants that support the construction process would also contribute to elevated noise in their respective areas of operation.

The use of equipment such as dozers, piling machines, motor graders, wheel loaders, excavators, vibro-compactors, and jackhammers contributes to elevated noise levels, particularly during ground-breaking, demolition of existing roads and buildings at terminals, foundation work, and road surface treatments. Simultaneously, the movement of dump trucks and other construction vehicles carrying materials, fuels, and wastes along construction routes adds intermittent peaks in noise and vibration, especially when operating near community settlements, schools, hospitals, and other sensitive areas. At contractor basecamp, which often serves as a hub for equipment storage, vehicle maintenance, and temporary worker accommodation, constant operational activity may lead to sustained background noise, especially during early morning or late evening hours.

Noise propagation from the construction equipment is calculated as a proxy that determines the noise level at a distance from the noise source using the following formulae:

$$L_p(x) = L_p\,(x_o) + 10\lg\left(\frac{x_o}{x_p}\right)$$

Where:

Lp (x_o)	=	Sound Pressure Level (SPL) at distance xo, dB(A)
x_o	=	distance where sound pressure level (SPL) is measured, xo = 2 meter
Lp(x)	=	Noise level at distance x, dB(A)
x_p	=	Distance from the source to the calculation point

The noise levels generated by different types of equipment and machinery typically used by the construction industry and measured at a certain distance from the sources are presented in the following table.

Table 56. Noise Level of Construction Vehicle and Equipment

Equipment and Machinery	Calculated noise at different distances, dB(A)			
	50ft[a]	25m	50 m	100 m
Bulldozer of 100 – 150 PK	85	81	75	69
Bore pile	95	91	85	79
Dump truck 10-ton	84	80	74	68
Motor grader 100 PK	85	81	75	69
Wheel loader 1.0 – 1.6 m3	80	76	70	64
Excavator 80 – 140 PK	85	81	75	69
Vibro compactor	80	76	70	64

Equipment and Machinery	Calculated noise at different distances, dB(A)			
	50ft[a]	25m	50 m	100 m
Truck mounted with concrete mixer	85	81	75	69
Water pump 70 – 100 mm	77	73	67	61
Jack hammer	85	81	75	69

Note: [a]50 feet was determined based on FHWA Roadway Construction Noise Model User's Guide (2006); 50 feet equals to approximately 15.2 meters.

The noise level presented in the above table suggests that construction noise will have a direct impact not only on project workers but also on communities living within the proximity of the construction sites. Prolonged exposure to high noise levels, especially in the absence of proper noise control measures or protective equipment, can pose serious health risks to workers. These may include hearing impairment, stress-related impacts on the central nervous system, and other adverse health effects. However, it is noted that all construction machines are less likely to operate for the same duration and amount at all construction sites, and therefore, the total noise level will be spread out across construction periods and the construction sites.

Furthermore, the projection of the noise level of several vehicles and equipment operating at similar times at particular locations is calculated, and the result is presented below. According to the aforementioned data, the noise level in the construction phase will be contributed from heavy equipment at some construction spots, and is in a range of 74.3 to 75.9 dB(A) within a 21 – 30 m distance from the noise sources.

Table 57. Projection of Accumulative Noise in the Construction Phase

Type of Heavy Equipment	Number of Equipment Operating in Parallel	Specific noise level (dBA)	Equivalent noise level (dBA)
Dump truck	4	76	82
Excavator	1	81	81
Loader	1	80	80
Grader & vibroroller	2	80	83
Asphalt machine	1	80	80
Concrete mixer pump	1	81	81
Accumulative noise level (logarithmic based calculation)			**89**
Accumulative noise level at 21 m from source			**75.9**
Accumulative noise level at 21 m from source			**74.3**

Source: Dohwa – Lenggogeni calculation, 2023

Similar with the noise impact, vibration impacts would be felt within nearby buildings or potentially affect sensitive structures, especially when civil works with the vibration most certain activities as foundation installation with piling construction by spun pile methods and soil compaction by using motor grader. Although vibration intensity typically decreases with distance from the source, structures located near the construction sites, particularly older or structurally fragile buildings, may be more vulnerable to structural damage, wall cracking and other damages compared to newer building and physical structures.

Therefore, the nature of the project's noise and vibration impacts on the sensitive receptors and physical structures during the construction phase is considered adverse but reversible, with levels expected to gradually return to pre-project conditions once construction activities conclude. The duration of these impacts is classified as intermittent during bore piling and use of hammer drills as the construction activities at a particular site may be in a range of 12 to 15 months unless the construction experiences some delays.

The severity of noise and vibration impact is considered minor and its likelihood to occur is possible to occur, as these are inherent to the project's normal operations. Therefore, the inherent risk of the impact on construction workers and nearby sensitive receptors due to the construction activities is evaluated as moderate risk if relevant mitigation measures are not implemented in a consistent and effective manner. Further this moderate risk is justified in the absence of adequate baseline noise level and noise modelling undertaken for the project.

Mitigation measures. To minimize potential noise and vibration impacts described earlier and ensure compliance with the noise and vibration standards set by the Government of Indonesia (GoI), the BRT project is recommended to implement the following mitigation measures, among others:

- Noise dispersion modelling should be conducted to enable assessment of whether the construction activities would generate elevated noise level that may increase the baseline noise level within the project's area of influence and also define what and where proper mitigation measures are needed both in construction and operation phase.
- Construction activities that are near community settlements, public facilities such as educational facilities, healthcare facilities, worship places, and other sensitive receptors should be implemented during daylight hours (e.g., 6.00 to 18.00), and more attention should be paid to the operations of noisy machinery.
- The basecamp and worker accommodation should be situated at a sufficient distance from local communities, public amenities, and other sensitive areas to minimize potential disruptions.
- A temporary fence should be installed around construction sites, particularly those near residential areas or other sensitive locations.
- All equipment used on-site must be adequately maintained and shall undergo regular service throughout the construction phase.
- Construction workers working near noisy equipment and machinery should be equipped with silencers or mufflers.
- The contractor shall conduct regular monitoring of noise and vibration at the construction sites and their supporting facilities, as well as the nearest sensitive receptors, every quarter at a minimum. The results should be compared against GoI standards and documented to verify the effectiveness of implemented control measures and inspections.

Residual Risk. If the above mitigation measures are conducted in a consistent and effective manner, the noise and vibration impact on sensitive receptors due to the construction activities can be reduced from moderate risk to low risk upon the completion of construction activities.

6.2.3. Greenhouse Gas Emission

Overview. The potential greenhouse gas (GHG) emissions impacts on the atmosphere due to construction activities are assessed as a moderate risk without the implementation of any mitigation measures. With consistent and effective implementation of mitigation measures and monitoring plans, the residual risk of GHG impacts is evaluated as a low risk. The following summarizes the risk and impact assessment of GHG due to the construction activities.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	Likelihood	Inherent Risk	Severity	Likelihood	Residual Risk
GHG emissions due to BRT construction activities, contributing to a temporary rise in GHG concentrations in the atmosphere	Minor	Likely	**Moderate**	Incidental	Possible	**Low**

Risk and Impact Assessment – Greenhouse Gas. The construction activities of the BRT project are expected to temporarily increase greenhouse gas (GHG) concentrations in the atmosphere. These emissions primarily arise from the use of fossil fuels to operate construction equipment, machinery, and vehicles. Additionally, fugitive GHG emissions would arise from activities at the workers' basecamp, including air-conditioning and cooking, and operation of the asphalt mixing plant and concrete batching plant supplying the materials for the BRT project. Direct GHG emissions for the ESIA are calculated using the following formula:

GHG emissions (tCO_2e) = Activity Data x Emission Factor x Global Warming Potential (GWP)

Table 58. Estimated GHG emissions during BRT construction phase

Items	Estimated Total Use[1]	Estimated GHG Emissions (tCO2e)
Diesel fuel	39,000 liters per month	1,263.47
Lubricating oil	260 liters per 3 months	2.83

[1]GHG emissions are estimated by assuming that the construction phase will last for 12 months

Based on the estimated fuel consumption data presented in the table above, the total emissions from construction activities over the entire construction phase are approximated to be at least 1,266.29-tCO_2 equivalent. Emissions from air-conditioning and wastewater treatment could not be quantified because of limited data. However, they are expected to be considerably smaller than those from fuel consumption. Consequently, the overall magnitude of GHG emissions during construction is considered small.

From a temporal perspective, despite adverse conditions, the GHG impact during the construction phase is considered short-term as the construction period is expected to last approximately 12 months, unless it experiences some delays. Importantly, the impact is also considered reversible, given the BRT system's long-term goal is to provide a sustainable, low-emission public transport solution, thereby reducing reliance on existing public transport and private vehicles that burn fossil fuels. Over time, the operation of the BRT system is anticipated to offset and ultimately exceed the temporary rise in emissions during construction.

From a geographical perspective, the GHG impact is considered localised and concentrated mainly along the BRT services corridors, contractor basecamps, quarries, and concrete plants supporting the project. Nevertheless, owing to the global nature of GHGs and their long atmospheric lifetimes, emissions from the project will still contribute incrementally to the overall concentration of GHGs within the BBMA regional area.

Taking the above assessment into account, the severity of the GHG impact is classified as minor. Their relative contribution to climate change is modest in comparison with existing urban, transport and industrial emissions sources. Nonetheless, the likelihood of this impact occurring is likely as the use of fossil fuel-based machinery and equipment during construction is needed as there is no immediate alternative fuel for them to use. Accordingly, the inherent risk associated with GHG emissions during the construction phase is evaluated as medium risk if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the impacts on the local atmosphere due to GHG emissions from construction related to the BRT project, it is recommended to implement the following mitigation measures, among others:

- Mitigation measures designated for minimizing air quality impacts, particularly from the operation of equipment, machinery, and vehicles, and other relevant sources, should be implemented.
- Regular GHG inventory and associated calculations should be conducted to track and recognize the sources and scales of actual GHG emissions during the construction phase. The inventory includes regular monthly monitoring of fuel and electricity consumption at construction sites and their supporting facilities.
- Open burning of construction and solid waste at construction sites and supporting facilities is strictly prohibited.
- All machinery equipment used on-site must be adequately maintained and shall undergo regular services to the manufacturer's specifications throughout the construction phase.
- The contractor is encouraged to use energy-efficient appliances and vehicles, including selecting the most feasible routes for the project's vehicles to minimize unnecessary use of fuels and electricity.

Residual Risk. If the above mitigation measures are implemented effectively and consistently, the GHG impacts resulting from construction activities could be reduced from medium risk to low risk. Moreover, GHG levels would resume to a similar baseline level at pre-construction upon completion of construction activities.

6.2.4. Stormwater Runoff

Overview. The potential impacts of uncontrolled stormwater runoff from the BRT construction sites to existing drainage channels near the BRT project area, contractor basecamps, and supporting facilities, such as asphalt and concrete suppliers, are evaluated as moderate risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of this impact is reduced from Moderate to Low risk, as described in the following.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Water pool/flooding and siltation on existing road drainages due to uncontrolled stormwater runoff discharges	Minor	Likely	**Moderate**	Incidental	Possible	**Low**

Risk and Impact Assessment – Stormwater Runoff. The BRT project area in close proximity to water bodies is the BRT bus stops at Jl. ABC around 40m to *Citepus* river and Bus Stop Alun-Alun around 100m to *Cikapundung* river. Other locations, such as *Ledeng, Antapani, Cicaheum, and Leuwipanjang* terminals, are close to the drainage channel. Based on the DED study, the area at Jl. Naripan has the highest potential runoff discharge of about 0.77 m^3/s and indicates that the overall conditions and dimensions of stormwater drainage channels within the BRT project areas are in poor condition, filled with sediments and trash, and of inadequate capacity to accommodate the current surface runoff discharge rate. The stormwater drainage conditions and rivers within the proximity of the future contractor basecamp, and asphalt as well as concrete mixing plants that will supply construction materials, are not yet known at the time of ESIA preparation.

Stormwater runoff from construction sites within the BRT project area and supporting facilities mentioned earlier, which are not well-controlled and discharge into the existing drainage channels, may increase the potential for inundation and flooding. In BBMA areas, besides high, prolonged rainfall due to climate change, flooding and inundation due to stormwater runoff have been occurring due to poor drainage conditions. The presence of rubbish and shallowing of channels that have already occurred can reduce the capacity of the channels to receive stormwater discharges from the roads and other built areas.

Additionally, potential leakage resulting from improper hazardous and construction waste storage and transportation may contaminate stormwater runoff, thereby degrading the water quality of nearby surface waterbodies.

As the construction activities are not anticipated to undertake large-scale clearing for the construction of BRT depots and terminals and given that the conditions of the water bodies within the project area are not directly encountered and it is already reported as slightly to moderately polluted, the impact on surface water quality is considered minor, if any.

Considering the above assessment, the severity of the overall impact on surface water quality due to BRT Project construction activities is considered minor, and the likelihood of this impact occurring is likely. Therefore, the inherent risk of this impact on surface water quality is evaluated as moderate risk if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the above surface water quality impacts, including inundation as well as flooding due to the construction activities, the BRT project is recommended to implement the following mitigation measures, among others:

- Preparation and implementation of a site and stormwater discharge-controlled system, including practical measures to control stormwater runoff from the construction sites into nearby drainage channels.
- Include a temporary settling pond at the time of terminal and depo construction to collect and precipitate materials/soil particles carried by the water flow, and periodically cleaned.
- Coordination with the local people and related government institutions prior to construction activity in order to obtain endorsement regarding channeled rainwater runoff.
- Ensure suitable culverts and other infrastructure for drainage are included in the DED of the BRT Project based on the requirement to enlarge the existing drainage channel at Jl. Rajawali Timur, Jl. Kebonjati, Jl. Naripan, Jl. Simpang Lima – Jl. Asia Afrika, Jl. Simpang Lima – Jl. Ahmad Yani, Jl. Sudirman, Jl. Kiaracondon/Jl. Ibrhim Adjie, Jl. Otista, Jl. Pungkur, Jl. Moh. Toha.

Residual Risk. If the above mitigation measures are implemented in a consistent and effective manner, the residual risk of the impact occurring on surface water quality, including flooding, could be reduced from moderate risk to low risk. Moreover, these impacts are expected to be localized, temporary, and reversible.

6.2.5. Soil and Groundwater

Overview. The potential for soil and groundwater contamination due to past and current use of the existing land and the planned construction activities, particularly on the land for future BRT depots, is evaluated as a substantial risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of the above is evaluated as medium risk as described in the following.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Potential for soil and ground water contamination at future BRT depots	Major	Possible	**Substantial**	Medum	Unlikely	**Moderate**

Risk and Impact Assessment – Soil and Groundwater Quality. The potential for soil contamination due to fuel and lubricant leaks and/or baseline conditions from past and current activities at the *Cicaheum* and *Leuwipanjang* bus terminal that will be constructed/expanded to also serve as future BRT depots is unknown at this stage. Construction activities in the future depot and terminals may cause fuel and lubricant spills, and poor waste management practices, including domestic sanitation and the storage and transportation of hazardous and construction waste, could also cause some contamination during construction. The essential issue that makes contamination of soil and groundwater such a significant impact is that it is irreversible, and the contaminated groundwater may disperse to the adjacent area.

Waste and sanitation are common problems in both construction activities. Waste generated includes solid waste and liquid waste from domestic workers' activities, as well as hazardous and toxic waste from construction activities. Solid waste may also originate from construction materials such as wood scraps, used paint and metal fragments. Domestic waste is closely related to the sanitation conditions of toilets and waste management facilities in construction sites. Poor sanitation conditions can lead to uncontrolled waste disposal, resulting in environmental pollution, reduced aesthetics and hygiene quality, and potential soil and groundwater contamination.

Civil works such as excavation and grading can disturb soil structure, increasing the risk of subsurface contamination from accidental spills of hazardous materials like fuels, lubricants, solvents, and concrete admixtures. Improper handling or storage of materials, fuels, and waste can lead to leaching of the spills and leaks and become contaminants, percolating into shallow groundwater tables, especially during rainfall. Additionally, runoff from asphalt and concrete batching plants may also infiltrate the soil, potentially affecting groundwater quality.

Furthermore, demolition of existing structures that may contain asbestos materials at *Leuwipanjang* and *Cicaheum* terminals may generate asbestos-contaminated dust and debris. If not properly managed, asbestos fragments can settle onto soil surfaces or be transported by stormwater runoff, leading to localized soil contamination and posing long-term environmental and health risks. Proper asbestos identification, removal, handling, and disposal procedures are essential to prevent such contamination during demolition activities.

Therefore, the soil and groundwater contamination impacts, if they occur, are considered adverse and irreversible. The overall severity of soil and groundwater contamination due to past, present, and future activities, if they occur, is considered major and possible to occur.

Thus, the inherent risk of the impact on the environment and human health is evaluated as substantial risk if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize contamination of soil and groundwater impacts and understand the baseline condition of such contamination, if any, the BRT project is recommended to implement the following mitigation measures, among others:

- Soil and groundwater investigation as well as identification of Asbestos Containing Material (ACM) should be conducted prior to commencing construction, particularly at the existing land at *Cicaheum* and *Leuwipanjang* Terminals where future BRT depots will be developed. These investigations are necessary to identify whether past and present activities have caused contamination, particularly hydrocarbon pollutants, in subsurface soils and shallow groundwater, and to confirm the presence of any ACM at the proposed terminals; If contamination is identified, appropriate mitigation measures, such as removal of contaminated soils and shallow groundwater pumping, will be required. Likewise, if ACM is detected, licensed contractors and certified disposal facilities must be engaged to ensure safe handling, removal, and disposal.
- Emergency Preparedness and Response Plan (EPRP) shall be developed and implemented as guidance to prevent as well as handle if oil/chemical spills/leakage occur, with provision of adequate spill kit response equipment. The EPRP should also include management and control measures for other risks, such as fire incidents, natural hazards, etc.
- Sewage and wastewater from toilets and bathrooms in the workers' accommodation should be managed using a modular wastewater treatment unit (commonly referred to as a biofilter system) along with a filtered seepage system.
- Land clearing, including vegetation and subsurface removal, should occur in stages, focusing only on areas needed for immediate construction work to minimize unnecessary land disturbance.
- Disturbed or exposed areas that are no longer needed for construction should be promptly reinstated and landscaping works conducted in a gradual manner, rather than waiting for the entire BRT corridor, stations, and terminals to be fully completed.
- Oil, fuel, and other hazardous substances must be stored separately in bunded, secure areas with waterproof flooring, overhead cover, restricted access, and drainage systems connected to an oil-water separator.
- Manage hazardous and non-hazardous waste generated separately including handling, storage and disposal by complying with the requirements of the Government Regulation No. 22/2021 and/or good international industry practices.
- Any leaks from construction vehicles or equipment must be addressed and repaired without delay.
- Providing dedicated hazardous substance as well as hazardous waste storage shelter and SOP for hazardous waste handling and disposal. .

Residual Risk. If the above mitigation measures are implemented, the residual risk due to soil and groundwater contamination could be reduced from substantial risk to moderate risk.

6.2.6. Road Traffic and Infrastructure

Overview. The impacts anticipated on road traffic and infrastructure due to construction activities associated with BRT on-corridor and off-corridor are evaluated as substantial risk causing pressures on the already congested road traffic within Bandung City without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of this impact is evaluated as moderate risk. The following summarizes the related risk and impact assessment results.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Road traffic disruption and pressure on road infrastructure along BRT on-corridor as well as off-corridor	Medium	Likely	**Substantial**	Medium	Possible	**Moderate**

Risk and Impact Assessment – Road Traffic and Infrastructure. The recent traffic was conducted as part of the traffic impact assessment by measuring the existing traffic condition at 48 points on 14 roads within BRT corridor as shown in the following figure. Congested road traffic is commonly as urban problems, especially in Bandung city and its sub-urban areas. Baseline traffic study shows that traffic volume at the future intersections with BRT on-corridor has road volume/capacity (V/C) ratio of 0.7 at peak traffic (morning and evening) and even some have reached above 1.0. These circumstances lead to the LOS (Level of Service) value of ‘F’ that indicates traffic flow is hampered and critical to traffic jams.

Nama Jalan	Sibuk Pagi	Sibuk Sore
Jl. Asia Afrika 4	0,75	0,71
Jl. Asia Afrika 5	0,71	0,73
Jl. Jend Sudirman 1	0,97	0,90
Jl. Jend Sudirman 2	0,90	0,87
Jl. Jend Sudirman 3	0,80	0,83
Jl. Jend Sudirman 4	0,83	0,91
Jl. Jend Sudirman 5	0,72	1,01
Jl. Jend Sudirman 6	0,77	0,92
Jl. Rajawali Barat	0,80	0,99
Jl. Rajawali Timur 1	0,83	0,94
Jl. Rajawali Timur 2	0,96	0,79
Jl. Kebon Jati 1	0,97	0,80
Jl. Kebon Jati 2	0,82	0,81
Jl. Suniaraja 1	0,88	0,76
Jl. Otista 1	0,96	0,96
Jl. Suniaraja 2	0,91	0,97
Jl. Banceuy 2	0,78	0,81
Jl. Ahmad Yani 1	0,83	0,79
Jl. Ibrahim Adjie	0,94	0,88
Jl. Jakarta	1,03	0,72
Jl. Ahmad yani 2	0,71	0,97
Jl. Ahmad yani 3	0,88	0,83
Jl. Ahmad yani 4	0,80	0,73
Jl. Ahmad yani 5	0,87	1,03
Jl. Ahmad yani 6	0,99	0,79
Jl. Asia Afrika 1	0,75	0,72
Jl. Asia Afrika 2	0,90	0,88
Jl. Asia Afrika 3	0,96	0,97
Jl. Otista 2	0,83	0,80
Jl. Otista 3	0,71	0,77
Jl. Otista 4	0,93	0,84
Jl. Otista 5	0,80	0,75
Jl. BKR	0,89	0,73
Jl. Moch Toha 1	0,95	0,87
Jl. Moch Toha 2	0,83	0,73
Jl. Pungkur	0,80	0,94
Jl. Dewi Sartika 1	0,85	0,73
Jl. Dewi Sartika 2	0,87	0,81
Jl. Dalem Kaum	0,75	0,88
Jl. Alun Alun Timur	0,75	0,78
Jl. Banceuy 1	0,85	0,77
Jl. ABC	0,81	0,96
Jl. Naripan 1	0,89	0,75
Jl. Naripan 2	0,76	0,71
Jl. Sunda	0,88	0,88
Jl. Veteran	0,88	0,94

Source: (EGIS, 2025)

Figure 36. Traffic Load at Morning and Evening Busy Hours 2024

A high V/C ratio shows an indication that the road capacity is no longer suitable to accommodate the traffic volume. This condition may cause worsened traffic conditions contributed by the project on top of existing heavy congestion in Bandung City and neighboring areas, which leads to disturbance for citizen activities and urban function capacity. At the construction stage of the BRT project, a potential traffic jam is anticipated to occur when construction activities use the main road, both asphalting and rigid pavement, along the 21.7 km dedicated BRT on-corridor and the relocation of 3 stations/bus stops.

Conditions may become quite critical, especially on Jl. A. Yani, Jl. General Sudirman, Jl. Kebon Jati and Jl. BKR Road has traffic characteristics with high levels of congestion (LOS Category of F). Likewise on Jl. Asia, Africa, and Jl. M. Toha, where there will be a relocation of the existing bus stations. Furthermore, during the construction phase, traffic congestion may worsen due to projected increases in traffic volume and factors such as paratransit (*angkot*) operations and on-street parking. In terms of spatial context, the impact of the worst traffic conditions due to high traffic volume against road capacity may become a serious disturbance for the public.

Considering the above assessment, the severity of road traffic impact solely from the project construction activities (excluding the existing road congestion of Bandung City) is considered as medium, and the likelihood of this impact occurring is likely. Therefore, the inherent risk

of this impact is evaluated as substantial risk if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the impact on road traffic and infrastructure due to the construction activities, the BRT Project is recommended to implement the following mitigation measures, which has also been determined in the related traffic impact assessment (Andalalin document):

- Implement the Traffic Management Plan and traffic engineering during construction according to the approved ANDALALIN or similar plan required by the Project.
- Close work areas located in the middle or on the left side of the road required for construction.
- Provide warning signs or notifications to avoid the road section because there is construction work at the BBMA BRT bus stops.
- Clarify existing road markings so that traffic conditions are more orderly.
- Provide signs indicating alternative routes that are planned to take up the road body during construction.
- Provide pedestrian access and temporary facilities to safely walk around the construction sites.
- Control street vendors who use sidewalk areas to sell.
- Re-setting signals at intersections to improve performance at intersections.
- During the construction period, heavy vehicles are only allowed to operate at agreed times where road traffic is low, and businesses are closed, such as in late evening or early morning as agreed by the relevant agencies.
- Strict sanctions for vehicles that violate traffic signs and markings.

Residual Risk. If the above mitigation measures and application of traffic management and monitoring (as referred to ANDALALIN) are well-implemented, then the impact of inherent risk could be reduced from substantial risk to moderate risk. Moreover, these impacts are expected to be localized and relatively short- to medium-term, especially when construction activity takes place.

6.2.7. Affected Trees/City Landscape

Overview. The potential impacts of tree cutting and pedestrian landscape to facilitate the construction of bus stops and BRT corridors are evaluated as 'moderate risk' without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of these impacts is evaluated as low risk. The summary of the related risk and impact assessment is presented below.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Affected trees and pedestrian landscape during construction	Minor	Likely	**Moderate**	Minor	Possible	**Low**

Risk and Impact Assessment – Affected Trees and Pedestrian Landscape. As an urban, well-developed area, some tree cuttings and subsequent relocation elsewhere, if feasible, would be required for constructing sidewalks adjacent to BRT bus stops and on-corridors. These trees are the asset of Bandung Municipality and hence, coordination and obtaining written approval from the Bandung Municipality will be required. The areas identified for the tree relocation will need to be discussed and agreed by the mentioned municipality.

The baseline survey conducted as part of the DED design identified about 140 trees will require cutting and relocation particularly within the BRT corridor of Jl. Jenderal Sudirman. Affected trees would primarily include 42 Blackboard trees (Pulai), 25 Mahoni trees and 24 Ketapang trees. Other areas may have affected vegetation within Antapani Terminal dedicated as one of BRT terminal where Angsana tree *(Pterocarpus indicus)* which listed as endangered species and Cinnamon tree *(Pterocarpus indicus)* which classified as vulnerable are identified.

Trees provide shade and serve as natural air filters that capture pollutants to some extent, so removing them leads to hotter air and increased carbon dioxide in the atmosphere within the proximity of the trees to be cut and removed. Cutting or removing trees makes the soil more susceptible to erosion from wind and rainfall, leading to contaminated runoff and sediment buildup in waterways. Most importantly, the loss of trees and shade would reduce the aesthetic value of the city landscape and could have some unfavorable physiological effects for those using the pedestrian.

The above impacts would be adverse but temporary as landscaping works including some tree planting will be undertaken as integral part of the project construction to establish a favorable city landscape including dedicated sidewalks along the on-corridor in the medium-term. Therefore, the impact on affected trees and city landscape during construction is evaluated as minor and the likelihood to occur as certain. Therefore, the inherent risk of this impact is evaluated as moderate if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation measures. To minimize the impact on affected trees and city landscape, the BRT Project is recommended to implement the following mitigation measures, among others:

- Coordinate with the related agency of Bandung Municipality in charge of the trees and landscape to obtain prior approval prior tree cutting and replanting them elsewhere.
- Every tree loss or removal due to project construction is expected to be compensated by a ratio of 1:5 (i.e., 1 tree felled should be replaced with 5 new trees). However, this ratio

and type of trees to be replaced and planted will still need to be discussed and mutually agreed by the Project and Bandung Municipality.

- Adequately map with location and photo of trees to be cut and then replanted elsewhere - particularly for mature trees.
- Install demarcation/barriers for the trees that should not be disturbed during construction.
- Especially for Angsana tree (*Pterocarpus indicus)* and Cinnamon tree (*Cinnamomum spp*.) that should be preserved in situ whenever possible, and ensure that those trees will be relocated and/or replaced elsewhere with care and close supervision if removal is required.
- Conduct vegetation maintenance and monitoring for new trees to be planted and existing trees removed and replanted elsewhere according to the requirements of the civil work contract.

Residual Risk. If the above mitigation measures with vegetation maintenance and monitoring are conducted in consistent and effective manner, hence the risk level can be reduced from 'medium risk' to 'low risk'. Moreover, these impacts are expected to be localized, and temporarily during construction activity before there will be recovered by the landscaping works included in the civil work contract.

6.2.8. Local Economy

The project construction activities are overall expected to generate some positive impacts on local economic development during construction and, therefore, the risk and impact assessment as conducted for the other impact is not required herein. The positive impact expected during construction would be, among others, some employment and business opportunities for some community members as service providers or suppliers within the project's area of influence.

To ensure positive impacts are encouraged for the local economy development, the recruitment of project workers would be prioritized from BBMA area if they meet the skill and requirements of the project. The emergence of small-scale business opportunities as vendors and providers of goods and services is anticipated as another benefit. These opportunities may include the provision of basic needs of workers, building materials (e.g., sand and rocks, wood, iron, cement), daily goods and services (e.g., house rented for the worker's accommodation, workshops, kiosks, and food stalls). Considering this potential for local economic development, the BRT Project is recommended to implement measures, among others:

- Employment and business opportunities with the project, including its requirements and qualifications, should be communicated in a transparent, timely and easily understood manner to local communities and vendors.
- The local governments should be informed and involved regarding the need for workers for the while promoting equal opportunity and non-discrimination for the poor, disadvantaged, and women.

- Prioritizing local manpower, local entrepreneurs, small- and medium-sized enterprises for the opportunity to be part of the workforce, to participate in supplying goods and services for the project, if they meet the specified criteria.
- The project should implement the SEP and GRM, including disclosure of project-related information in a timely and effective manner.

6.2.9. Restriction to Buildings and Traffic Congestion

Overview. The potential impacts on access restriction and traffic congestion due to the construction of the project are evaluated as substantial risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of these impacts is evaluated as moderate risk. The following describes the related risk and impact assessment results.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Access restriction and increased traffic congestion primarily within the BRT on-corridor	Medium	Likely	**Substantial**	Minor	Possible	**Moderate**

Risk and Impact Assessment – Access Restrictions and Traffic Congestion. Construction activities, primarily for the BRT on-corridor and bus stop platforms, depots, and terminals within highly dense urban areas of Bandung City, will adversely impact existing traffic by increasing congestion, travel time, and delays, while also reducing road capacity and access to some shops, houses, and government offices within the on-corridor. Furthermore, access restrictions and increased traffic congestion result in long, time-consuming queues on the road. However, the long-term goal of the project is to improve accessibility, economic productivity, and mobility for people in BBMA through the implementation of the BRT.

Another considerable impact is increased traffic congestion due to partial closures or barricades of road segments required for the construction of bus stops and for improvements to the existing road lane for dedicated BRT on-corridor. People commuting to/from, and within, Bandung City and the wider BBMA will experience longer travel times, resulting in reduced productivity, fatigue, and increased fuel costs. In terms of spatial context, this impact is considered adverse, covering considerable areas and affecting a significant number, e.g., millions of people commuting and/or conducting their jobs and businesses in BBMA for approximately a 12-month construction schedule. Nevertheless, the existing road traffic within BBMA, particularly Bandung City, has been considerably congested most of the time, including weekends.

Considering the above assessment, the severity of the impacts on access restriction contributed by the project is considered medium, and the likelihood to occur is likely, and therefore the inherent risk is considered substantial without implementation of any mitigation measures.

Mitigation measures. To minimize the risk level of the above impacts, the BRT Project is recommended to implement the following mitigation measures, among others:

- A site-specific Traffic Management Plan (TMP) should be developed and approved by the Implementing Agency for mitigating and monitoring road traffic and transportation impacts during mobilization/demobilization and construction of the BRT project based on the results of the Traffic Impact Assessment (ANDALALIN).
- Conduct socialization (i.e., consultation, providing banners and leaflets) to potentially affected parties (*angkot*, adjacent road users, and business owners) prior to any construction activities that may result in livelihood impairments, access restrictions, and traffic disruptions
- Analyze through perception survey and media analysis the concerns of affected parties (e.g., business owners, street vendors, and 'angkot' operators) on the access and traffic congestion resulting from the project.
- Provide temporary access or alternative route information for the public to access the location or areas that may be restricted due to partial road closures or installation of barriers required for construction and safety purposes. This temporary access is to be given especially to critical facilities such as hospitals/medical facilities, schools, markets, etc.
- Implement a functional Grievance Redress Mechanism (GRM) with a clear timeline and accountability of the party in charge.

Residual Risk. If the above mitigation measures are implemented in a consistent and effective manner, the risk level of livelihood impairment, access restriction, and traffic disruption can be expected to be reduced to 'moderate risk'. However, these mitigation measures will require support from all project stakeholders, including the Borrower, the Bandung City Government (particularly the Traffic Safety and Traffic Management Agency), and the police.

6.2.10. Vulnerable People

Overview. The potential impacts of the construction of the project on vulnerable people, including gender-based violence, are assessed as a moderate risk in the absence of any mitigation measures. However, with proper and consistent implementation of mitigation measures and monitoring plans, the residual risk from these activities could be reduced to low risk. The following describes the related risk and impact assessment results.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Marginalization of vulnerable people including gender-based violence risk	Medium	Possible	**Moderate**	Minor	Possible	**Low**

Risk and Impact Assessment – Vulnerable People. Construction activities, particularly recruitment/employment of project workers for construction, pose physical as well as social risks to vulnerable people, including, among others, female workers, low-skilled workers, and workers with disabilities through marginalization, discrimination, and unfair treatment. During the construction works, the vulnerable project workers may be marginalized in the provision of facilities in the workers' basecamp, for example, in the provision of a separate sanitation facility and rooms (i.e., toilet, bathroom, bedroom) for female workers, or an accessible facility for workers with disability, as applicable. They also may face discrimination in the workplace, be pressured to perform beyond their capacity, and feel less protected than their counterpart in the workforce. This situation could lead to a high level of stress due to a lack of autonomy and control over their work.

Moreover, the vulnerable project workers could be exposed to a higher risk of gender-based violence (GBV), including sexual exploitation and abuse (SEA) and/or sexual harassment (SH), resulting in physical and/or psychological trauma, economic and social loss, or other similar issues in the absence of strict enforcement of codes of conduct for project workers. The risk of GBV to the vulnerable community can also increase if the contractor basecamps are situated near residential areas, particularly if the project lacks GBV risk mitigation strategies.

Therefore, the nature of the impact of the project on vulnerable groups including gender-based violence, including SEA/SH, is evaluated as adverse but expected to be reversible and intermittent throughout the construction period. The area of these impacts remains localized in scale, centered around the Project's construction areas and the contractor basecamps. Influx of migrant workers is unlikely as most of the project workers can be mobilized from BBMA and neighboring areas, with a few workers with highly specialized skills being mobilized from elsewhere in Indonesia and abroad. Considering this, the severity of the impacts is considered medium, and the likelihood to occur is possible and therefore the inherent risk is moderate if mitigation measures are not applied effectively and in a timely manner.

Mitigation Measures. To minimize the above impacts, the BRT project is recommended to implement the following mitigation measures, among others:

- The appointed contractor should develop a contractor environment and social management plan (CESMP), adopting the project Labor Management Plan (LMP), which includes provision to protect the vulnerable workers and GBV prevention code of conduct that will need to be socialized and acknowledged by all project workers. The code of

conduct (CoC) includes provisions on preventing and enforcing sanctions on gender-based violence (SEA/SH) cases among the workers and communities near the construction sites.

- Dissemination of the above CoC and gender-based violence, including SEA/SH, including sanctions and work terminations applied if violations occurred, should be acknowledged and communicated to all workers prior to starting work on the project.
- In the presence of vulnerable workers, the project ensures provision and/or availability of accommodating facilities that can address specific needs of these vulnerable workers (i.e., universal access for workers with disabilities, separated women's facilities with sufficient lighting, etc.). The provision and/or recommendation of accommodation will be arranged with the contractor.
- Establish/implement a grievance redress procedure with a clear timeline and accountability specific to logging complaints on employment matters, and this procedure is separate from the project's GRM.
- Establish a dedicated and survivor-centered approach of GRM for GBV cases to ensure the confidential handling of information related to GBV incidents that may occur during the project implementation.
- Establish coordination with external service providers who are experienced in GBV incident mitigation (i.e., government agency or NGO) as a referral for GBV case handling.
- Improve the living standards of vulnerable people, including women, children, and people with disabilities, at least in accordance with national minimum standards, including access to social protection systems.
- Increase representation of women in the decision-making levels of the project.
- Appropriate level of background checks for all project workers should be conducted.
- A supportive work culture where workers feel comfortable reporting issues without fear of retaliation.

Residual Risk. If the above mitigation measures are conducted in a consistent and effective manner, the impacts on vulnerable people, including gender-based violence, could be reduced from moderate risk to low risk.

6.2.11. Cultural Heritage

Overview. The potential impacts on cultural heritage, particularly historical buildings along Asia Afrika and Jenderal Sudirman Streets which are the planned BRT on-corridor, due to construction of BRT on-corridor and bust stop platforms (to be constructed) are evaluated as moderate risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual impacts on cultural heritage is evaluated as low risk.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Structural damage from vibration of construction activities	Medium	Unlikely	**Moderate**	Minor	Rare	**Low**

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	Likelihood	Inherent Risk	Severity	Likelihood	Residual Risk
and degraded aesthetic and convenience values of heritage buildings						

Risk and Impact Assessment – The impact of disturbance to the cultural heritage in construction activities can be considered as a moderate risk, not significant due to its low risk possibility. The scale impact that can be recognized as local impact is unlikely to degrade the aesthetic and convenience value of those cultural heritage areas. In BRT Bandung Basin Metropolitan Area (BBMA) development planning, part of the proposed corridor follows the west-east city development axis crossing through the Bandung Cultural Heritage Area, where there are historic buildings. In fact, the heritage area will be set as "The Old City" area of Bandung, envisioned as a tourist destination.

Cultural heritage buildings and areas that are adjacent to the BRT-BBMA corridor are described in sub-chapter 5.2.6. The planned corridor of BRT-BBMA does not directly impact any cultural heritage buildings, but will certainly cross through some cultural heritage areas. In terms of spatial context, the impact of cultural heritage disturbance in the BRT-BBMA project may not be considered as a serious disturbance, both in local areas and broadly. The planned crossing will be a localized impact with no alteration of the cultural heritage building and will not affect the integrity of the broader cultural heritage area.

Therefore, considering the above assessment, the severity of cultural heritage disturbance is considered as medium, and the likelihood of this impact occurring is considered unlikely. The inherent risk of cultural heritage disturbance impact on any receptor in local and broader areas due to the project's construction activities is evaluated as 'low risk' if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the above impacts, the project is recommended to implement the following mitigation measures, among others:

- A Heritage Impact Assessment (HIA) prior to the commencement of the Project construction phase is highly recommended to provide a thorough analysis on the physical condition of each historic buildings, identify the potential impacts of the Project activities, and recommend strategies to avoid, reduce, or compensate for any negative impacts on heritage sites.
- The Contractors should take into account any mitigation measures proposed in the HIA when undertaking construction activities in proximity to heritage sites.
- Regular visual inspections and photographic documentation should be conducted prior and after the construction works to identify any early signs of structural stress, cracking, or surface damage.
- Construction sites should be delineated and clearly marked to minimize potential disturbance to unknown cultural resources and heritage that may exist in the area.

- Development of a 'Chance Find Procedures' for the unexpected discovery of cultural resources and heritage during construction activities, if they are excavated or discovered, should be developed and disseminated to all parties involved in the Project.
- Any findings on cultural resources and heritage within the Project area should be immediately reported to the Project's supervisor and implementing agencies, and the construction activities in that area should stop for an interim period.
- The contractor should adopt low-vibration construction techniques and restrict the movement of heavy construction equipment, machinery or vehicles to minimize physical stress on the buildings due to ground-borne vibration and air-borne dust when working near the sensitive building.

Residual Risk. If the above mitigation measures are conducted in a consistent and effective manner, the convenience value of the cultural heritage area can be preserved. The risk level can remain as 'low risk' with the severity of risk reduced to minor and with rare likelihood. Moreover, these impacts are expected to be localized and temporary during construction activity.

6.2.12. Labor and Working Conditions

Overview – The impacts on labor and working conditions, including exposure to occupational health and safety risk due to the project's construction activities, are evaluated as 'moderate risk' without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of labor and working condition problems due to the mentioned activities is 'moderate risk', with minor severity and unlikely chance to occur.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Labor and working condition issue which including occupational health and safety	Medium	Possible	**Moderate**	Minor	Unlikely	**Moderate**

Risk and Impact Assessment – The impact of mis-management of labor and working conditions may cause working incident and disease problem in working area. The impacts may include fatalities or outbreak of disease with wide ranging consequences. In construction stage, potential work incidents may occur due to lack of safety assessment and incompliance of implementation safety plan. Construction work activities at terminal and depot sites poses a high risk of work incidents, such as from heavy equipment mobilization and utilization, manual handling, hot work, lifting, etc., impacting all construction workers including the primary supply workers. Work incidents may also be the result of workers' lack of skills in performing their work safely and/or having little to no experience working on construction sites where many unsafe conditions exist.

Therefore, the BRT-BBMA construction project must be prepared with HSE plan, which comprises Hazard Identification, Risk Assessment and Control (HIRAC) and Job Safety Analysis (JSA) prior to any ongoing construction activities. Any injury or fatality may result in significant liability for the contractor as the project construction authority and violate the regulation.

Other issues, such as health problems, may occur due to poor sanitation conditions in the working area and basecamp. Unhygienic and improper working environmental conditions can lead to the spread of disease and reduce worker productivity. Disordered and disorganized working areas, with accumulation of materials and wastes, can easily become the breeding site of mosquitoes. Furthermore, inappropriate hiring practice, unfair working terms and conditions, recruitment of child labor and forced labor can also become a serious issue if labor management practices are not adequately prepared by the project.

In terms of spatial context, the impact on labor and working conditions may be considered a local issue. However, considering the above assessment, the severity of the labor and working condition problems is considered medium, and the likelihood of this impact is possible since all mitigation should have already been planned with the HSE plan and conducted by the HSE unit.

Therefore, the inherent risk of labor and working condition problems to the workers, including due to the project's construction activities, is evaluated as 'moderate risk' if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation measures. To address the labor and working condition issues during construction activities, the project is recommended to implement the following mitigation measures, among others:

- An OHS management system should be established, and a Construction OHS expert needs to be appointed and assigned at construction sites by the Contractor and the Supervision Consultant.
- Labor Management Procedure (LMP) of MASTRAN should be adopted and further specified by the Contractors under the rating of civil and landscaping works.
- Providing the CESMP doc prior to the commencement of construction activity, which included the EHS General Guidelines for construction activity.
- Provide and prioritize job opportunities for local laborers. Such as construction workers and the employees of the BRT entities (e.g. drivers, maintenance, or management employees);
- Contractors' environment and social management plan should be developed, incorporating the requirements of LMP.
- Prepare and implement an OH&S Management Plan, including training for all workers on all relevant aspects associated with their daily work, including emergency arrangements, working at height, etc.
- Provide safe and secure access to the construction sites.

- Provide basecamp with good sanitation facilities, such as clean water, hygiene facilities, and proper air circulation in order to provide comfortable in resting time and maintain the workers health;
- Implement good housekeeping practices in the working site and base camp
- Providing workers with written contract that has a clear working terms of employment, to ensure reasonable working hours and wages, adequate rest days and insurance coverage in the event of incidents/accidents
- Conduct a risk hazard assessment (RHA) and develop a detailed hazard map within the BRT corridor. Structures need to be designed to minimize the earthquake risks and the impedance or redirection of flood flows and support drainage.
- Prepare and implement an OHS management plan, including training for all workers on all relevant aspects associated with their daily work, including emergency arrangements.
- Implement age verification to prevent child labor and ensure fair hiring practices in accordance with each worker's competence.

Residual Risk. If the above mitigation measures for labor and working conditions are conducted in a consistent and effective manner, the risk can be reduced from 'medium risk' to 'low risk'. Moreover, these impacts are expected to be localized, temporary, and reversible.

6.2.13. Community Health and Safety

Overview. The impacts on community health and safety due to the construction of the project are evaluated as substantial risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk can be reduced to moderate risk. The related risk and impact assessment are described in the following.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Community exposure to health and safety risks from construction activities	Medium	Likely	**Substantial**	Minor	Possible	**Moderate**

Risk and Impact Assessment – Community Health and Safety. Community working, living, and commuting within the BRT construction sites would be exposed to health and safety risks inherent in the construction activities of the project. The most common risk to the community is traffic accidents due to increased traffic and possible collisions between construction vehicles, private vehicles, and motorcycles within the construction sites.

The operation of heavy equipment, working at heights, and working with live electricity may introduce some safety risks to pedestrians and nearby public services and business activities due to poor design and safety mitigation measures. Falls, slips, and trips for the public could happen due to unstable ground, debris, and uneven surfaces within the temporary access provided for the public to avoid directly entering the construction sites.

Construction activities generate elevated dust and fumes that could lead to respiratory problems for nearby residents. Improper waste disposal could lead to soil contamination, affecting the local environment and potentially harming human health, who are unintentionally in contact with such wastes. Machinery generating elevated noise and increased traffic due to construction causes excessive noise, which can lead to stress and long-term health effects like hearing loss. Anxiety and fear related to health and safety concerns due to construction activities can lead to mental-related issues like depression.

Interactions between local communities and construction workers may pose a risk to community health, safety, and GBV, especially if the workers are not from the local area and/or not adapted to the local social and cultural norms. Spread of communicable diseases, social conflicts that threaten the safety and security of the community, as well as harassment of vulnerable communities, may occur when there are no preventive measures established by the project. However, the project will prioritize the recruitment of local manpower within the BBMA area. The recruitment of migrant workers will be kept to a minimum, except for specific skills that are unavailable in the local workforce.

Considering the above, the severity of impacts on community health and safety issues is evaluated as medium, and the likelihood of occurrence is possible; therefore, the inherent risk is substantial without the implementation of any mitigation measures.

Mitigation measures. To minimize the above impacts, the project is recommended to implement the following mitigation measures, among others:

- The appointed contractor should develop a contractor environment and social management plan (CESMP), which includes the health and safety management system to mitigate risk for the community. The CESMP should also comply with the requirements of the Ministry of Public Works and Housing Regulation No. 10/2021 on *Pedoman Sistem Manajemen Keselamatan Konstruksi* and Circulate Letter of the same ministry No. 10/2022 on *Panduan Operasional Tertib Penyelenggaraan Keselamatan Konstruksi*.
- Project to socialize the GBV prevention Code of Conduct (CoC) that covers the workers' limitations in their interactions with communities and sanctions for violation, to all project workers prior to starting work on the project, and ensure that workers understand and acknowledge this CoC.
- Provide and prioritize job opportunities for local laborers. Such as construction workers and the employees of the BRT entities (e.g. drivers, maintenance, or management employees);
- Full-time, certified construction H&S experts should be stationed during construction activities to supervise and improve the health and safety practices of the project.
- Adopt and apply the EHS General Guideline for construction activity published by the World Bank Group (i.e., IFC Guidelines).
- Providing good sanitation facilities and safety signboards at construction sites.
- Empowering communities through inclusive implementation of SEP regarding the potential health and safety risks associated with construction activities.

- The Traffic Management Plan should be implemented, including putting up warning signs and assigning traffic wardens to regulate traffic within construction sites.
- Emergency Preparedness and Response Plan (EPRP) should be developed as part of the CESMP, socialized to nearby communities, and a related exercise or drill undertaken.

Residual Risk. If the above mitigation measures are conducted in a consistent and effective manner, the possibility of a community incident due to the project's construction activities can be reduced from substantial risk to moderate risk.

6.3. Operational Phase

6.3.1. Ambient Air Quality

Overview. Despite positive contributions to the overall air quality impacts, the operation of mixed electric- and fuel-powered BRT buses may still generate negative impacts on the human receptor and the environment, which was initially evaluated as 'Moderate Risk' without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of the air quality impacts due to the operational BRT buses could be reduced to 'Low Risk' as described below.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Air quality impacts from the operation of internal combustion engine (ICE) buses	Minor	Likely	**Moderate**	Incidental	Possible	**Low**

Risk and Impact Assessment – Ambient Air Quality. The operation of the BRT system within BBMA, which involves a fleet of 77 buses consisting of both electric and internal combustion (diesel-fuel) engine ("ICE") buses, is expected to generate a combination of positive and negative impacts on air quality. Positive impacts are anticipated as the project aims to reduce traffic congestion, and enhanced public transport reliability is expected to result in long-term improvements in ambient air quality.

However, negative impacts remain present from the tailpipe emissions of the ICE buses, which will emit pollutants such as nitrogen oxides (NO), sulfur dioxide (SO2), carbon monoxide (CO), particulate matter (PM_{10}, $PM_{2.5}$), and volatile organic compounds. Although modern bus engines that comply with stricter emissions standards can significantly reduce pollution levels, the presence of ICE buses can still create local air quality pressures, especially during peak hours when bus frequency increases. These emissions are expected to be concentrated and localized in areas with high bus activity, particularly at terminals and depots, bus stations, and bus stops located in densely populated areas.

Considering the above assessment, the severity of negative impacts from BRT operations is considered minor, and the likelihood of the negative impact occurring is likely given the ICE buses must emit pollutants as part of their normal operation and these emissions will occur daily across repeated routes. Therefore, the inherent risk of the negative impacts on air quality including nearby sensitive receptors is evaluated as moderate risk if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the air quality impacts due to the operation of ICE buses, the BRT project is recommended to implement the following mitigation measures, among others:

- All internal combustion engine (ICE) buses must be required to meet stringent emissions standards, preferably Euro IV or higher compliance standard.
- Vehicles condition, particularly engines, fuel systems, and exhaust systems, should be maintained in good mechanical condition through regular services.
- Anti-idling policies at terminals, depots, and major stations should be introduced and enforced to reduce localized pollutants.
- Deployment of electric buses should be prioritized in densely populated zones, near school or hospital, or narrow road segments where pollutants can easily accumulate.
- Ventilation and emissions control measures within depots can be installed to ensure adequate air circulation.
- Integrating BRT system with feeder services and gradually reorganizing informal paratransit (*angkot*) will help achieve full emissions reduction benefits of the BRT system by lowering the total volume of traffic on the BRT corridor.
- Regular ambient air quality monitoring should be undertaken at critical points along the corridor, particularly around terminals and in BRT corridor areas with vulnerable populations.

Residual Risk. If the above mitigation measures and air quality monitoring plan are implemented in a consistent and effective manner, the negative impact of ICE buses operations on the human receptors and environment during BRT operation phase could be reduced from moderate risk to low risk. Moreover, the BRT system will inherently offer opportunities for air quality improvement in the long-term only once the operational and management measures such as traffic integration, fleet maintenance, and system optimization are implemented.

6.3.2. Noise Level

Overview. The potential noise impacts on the human receptor and the environment due to operational BRT system, particularly from bus depot and terminals activities, are evaluated as 'moderate risk' without the implementation of any mitigation measures. However, If related mitigation measures and monitoring plans are implemented in a consistent and effective

manner, the residual risk of the noise impacts are anticipated to reduce to 'low risk', as described below.

Assessment / Impact	Without Mitigation Measures			With Mitigation Measures		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Overall reduction in noise level	Minor	Likely	**Moderate**	Incidental	Unlikely	**Low**

Risk and Impact Assessment – **Noise Level**. The operation of BRT system within BBMA will influence noise environment in several ways, depending on location, timing, and receptor sensitivity. As the BRT system will deploy 77 buses, comprising a combination of electric and internal combustion engine (ICE) buses, its noise profile will differ from baseline mixed traffic conditions and will be experienced differently along the corridor, at bus stations/stops, and around depots and terminals.

As an analogy, a study conducted in New Zealand by Doran et.al (2022) revealed that noise generated from electric buses is generally smaller than that produced by conventional buses. Noise level vary according to the vehicle speed as presented below.

Source: Doran et.al (2021)

Figure 37. Noise Level of Electric-Bus Compared with Conventional Bus

Based on the figure, noise levels from electric buses are lower than those from conventional buses and hybrid buses. However, at speed of 50 km/h, the noise levels of all bus types become comparable. By using this reference, the noise levels from the operation of BBMA BRT buses are estimated under two conditions: (a) when buses are queueing at a station, with approximately 3 buses idling simultaneously, and (b) when buses are moving along the corridor at an approximate speed of 50 km/h.

Table 59. Projected Noise Levels during the Operation of BRT Buses

Location at BRT Corridor	Unit	Threshold according to Kep.Men-LH no.48/1996	Baseline condition	Projection noise		Total accumulative noise	Noise area at 21-30m from source	Noise area status according to *Keputusan Direktur Jenderal Bina Marga Departemen Pekerjaan Umum* No. 076/Kpts/Db/1999	Area activity status
BKR Street	dBA	60	74,36	1*	88,64	88,8	74,03 - 75,58	Noise Moderate Area	Construction phase
				2*	61,77	74,6	59,83 - 61,38	Noise Safe Area	Operation phase
				3*	78	79,6	64,83 - 66,38	Noise Moderate Area	Operation phase
Alun-alun near Grand Mosque	dBA	60	72,61	1*	88,64	88,7	73,98 - 75,52	Noise Moderate Area	Construction phase
				2*	61,77	73,0	58,18 - 59,73	Noise Safe Area	Operation phase
				3*	78	79,1	64,33 - 65,88	Noise Moderate Area	Operation phase
Jl. Elang	dBA	60	72,93	1*	88,64	88,8	73,87 - 75,42	Noise Moderate Area	Construction phase
				2*	61,77	73,3	58,48 - 60,03	Noise Safe Area	Operation phase
				3*	78	79,2	64,41 - 65,95	Noise Moderate Area	Operation phase
Terminal Cicaheum	dBA	60	76,91	1*	88,64	88,9	74,15 - 75,70	Noise Moderate Area	Construction phase
				2*	61,77	77,0	62,27 - 63,82	Noise Safe Area	Operation phase
				3*	78	80,5	65,73 - 67,28	Noise Moderate Area	Operation phase
Terminal Leuwipanjang	dBA	60	75,57	1*	88,64	88,8	74,08 - 75,63	Noise Moderate Area	Construction phase
				2*	61,77	75,7	60,98 - 62,53	Noise Safe Area	Operation phase
				3*	78	80,0	65,23 - 66,78	Noise Moderate Area	Operation phase
Terminal Ledeng	dBA	60	67,31	1*	88,64	88,7	73,9 - 75,45	Noise Moderate Area	Construction phase
				2*	61,77	68,4	53,61 - 55,16	Noise Safe Area	Operation phase
				3*	78	78,4	63,58 - 65,13	Noise Moderate Area	Operation phase

Source : Dohwa – Lenggogeni, 2023

Note: 1 = route corridor and station during construction phase; 2 = Queueing at station with an approximation of 3 buses idling simultaneously; 3 = Bus moving along BRT corridor at an approximate speed of 50 km/h; and 4) The estimation is presented in Annex 11.

As shown in the above table, the results indicate that noise levels generated by BRT buses, both during idling at bus stations and while moving at approximately 50 km/h, show a consistent reduction at a distance of 21 – 30 meters. Noise levels during idling conditions generally fall within the range of 58.1 – 63.8 dBA, while noise levels during bus movement range from 63.5 – 66.8 dBA. These values indicate that, even with bus movements generating higher noise than idling, the attenuation over distance reduces overall exposure to levels that are generally below or close to the 60–70 dBA thresholds stipulated in Minister of Environment Regulation No. 48/1996, depending on the land-use category (e.g., 55 dBA for residential/sensitive receptors, 60 dBA for public facilities, and 70 dBA for commercial, industry or recreation).

Given these projected noise levels, the operational noise from the BBMA BRT system is not expected to significantly increase the overall ambient noise environment along the corridor, particularly in locations where existing mixed traffic already produces relatively high background noise. Under such conditions, the additional noise contribution from BRT buses, whether from idling queues at stations or from vehicle movement, will generally be limited to short distances and largely masked by the prevailing traffic noise.

Considering that mixed traffic remains the dominant contributor to the BBMA noise environment, the severity of incremental noise from BRT operations is assessed as ‘minor’, and the likelihood of this impact is considered ‘likely’, given that BRT buses will operate under normal conditions. Therefore, the inherent risk of the noise impact due to the operation of

BRT buses is evaluated as 'moderate risk' if relevant mitigation measures are not implemented in consistent and effective manner.

Mitigation Measures. To minimize the noise impacts due to the operation of BRT buses, the project is recommended to implement the following mitigation measures, among others:

- Station layouts should be designed to minimize sound-reflective surface, e.g. avoiding hard concrete walls that amplify sound.
- Landscaping buffer may be enhanced through vegetation/trees at the surrounding terminal and depot location.
- Regular maintenance, including lubrication, brake inspection, tire pressure checks, and exhaust systems, should be carried out to keep buses in good condition.
- Install low-noise tires on BRT buses to reduce rolling noise at higher speeds.
- Speed control in sensitive segments should be maintained (e.g., 30 km/h near schools, hospitals, residential clusters)
- Optimize scheduling to prevent long idling or overlapping bus arrivals that can increase cumulative noise.
- Provide training for drivers regarding eco-driving and noise-minimizing driving behaviors
- Regular monitoring of noise levels should be conducted to identify potential hotspots along the BRT corridors, and to support the timely implementation of mitigation measures if exceedances against the noise standard are observed.

Residual Risk. If the above mitigation measures and noise monitoring plan are implemented in a consistent and effective manner, the noise impact on the sensitive receptors during operation could be reduced from 'moderate risk' to 'low risk'. Residual impacts would be limited, localized, and unlikely to cause significant disturbance to surrounding communities, ensuring that the overall acoustic environment along the BRT corridors remains acceptable throughout the operational phase.

6.3.3. Greenhouse Gas Emissions

Overview. The GHG impacts due to the operation of the BRT system, mainly from direct impacts generated by the operation of both electric- and diesel fuel-powered BRT buses, including their air conditioning system as well as the operation of BRT bus depots, charging stations, and terminals, are evaluated as 'moderate risk' in the absence of any mitigation measures. However, with consistent and effective implementation of mitigation measures and monitoring plans, the residual risk from these activities could be reduced to a low risk. The risk and impact assessment in relation to GHG in the operation phase is described below.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Direct GHG emissions from the operation of BRT buses, depots, charging stations, etc	Incidental	Likely	**Moderate**	Incidental	Possible	**Low**

Risk and Impact Assessment – The implementation of the BRT system is anticipated to contribute to a reduction in greenhouse gas (GHG) emissions. This is because the BRT will operate using electric buses, and the overall purpose of the system is to provide a low-emission, sustainable mode of transport, thereby reducing dependence on public transport and private vehicles that continue to rely on fossil fuels. Nevertheless, a small amount of GHG emissions is still expected from the overall operation of the BRT system. These would mainly originate from exhaust emissions from diesel-fuel power buses and be associated with air-conditioning in the buses, as well as the operation of depots, terminals, and the bus operator and maintenance buildings. In addition, indirect emissions from electricity use will also contribute to the project's overall footprint.

Given limited data availability to estimate GHG emissions from the operational phase of the project, the magnitude of the impact of the GHG emissions due to BRT operation is expected to be adverse but minor, given their relatively small scale compared with the emissions savings generated by replacing fossil-fueled vehicles. The impact is also reversible, as emissions will decrease if cleaner energy sources and efficiency improvements are adopted, and an increasing public shift from using private vehicles to public transport over time.

From a temporal perspective, the GHG impacts are expected to be long-term, persisting throughout the operation of the BRT system. Meanwhile, based on geographical extent, the GHG emissions will be localized and occur mainly at BRT corridors, depots, terminals, and office facilities. Indirect emissions from electricity will also occur, but remain relatively modest if compared with other urban energy demands.

Based on the above assessment, the severity of the GHG emissions during BRT operation is assessed as incidental. The project overall is expected to yield a net environmental benefit, as long-term emissions from the operation of electric and conventional-engine BRT buses will outweigh the residual emissions from ancillary activities. Likewise, the likelihood of the impact is assessed as a certain amount of direct GHG emissions from air conditioning and wastewater treatment operations at the depot would be generated in a marginal volume. Combining the severity and likelihood of this impact, the inherent risk of GHG impacts on the atmosphere due to BRT operation is evaluated as medium risk if further mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize operational-phase GHG impacts, the BRT project is recommended to implement the following mitigation measures, among others:

- Air conditioning systems used in buses, terminals, depots, and office facilities should be optimized through regular maintenance and the use of low-GWP refrigerants.
- Energy efficiency in depots, terminals, and offices should be optimized through the use of, among others, LED lighting, smart building controls, good insulation, and operating air-conditioners at optimum temperature.
- Source electricity from cleaner grids where possible, either through rooftop solar PV installations or other renewable energy options for depots and terminals.

- Proper waste management treatment plants should be provided at depots and terminals to avoid unintended release of methane and nitrous oxide emissions from untreated wastewater.
- GHG inventory plan and monitoring should be established to track energy use, refrigerant leaks, and wastewater management practices.

Residual Risk. If the above mitigation measures are implemented effectively and consistently, the residual GHG emissions are expected to reduce from moderate risk to low risk. Their contribution of GHG emissions is considered negligible compared to that from household, industrial, and transportation emissions from the overall BBMA areas.

6.3.4. Stormwater Runoff

Overview. The potential impacts of higher stormwater runoff carrying potential contaminants due to the operation of the BRT system to existing drainage channels are evaluated as 'moderate risk' without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk is anticipated to reduce to 'low risk'.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Higher stormwater runoff carries potential contaminants	Minor	Possible	**Moderate**	Incidental	Unlikely	**Low**

Risk and Impact Assessment. The operation of the BBMA BRT system has the potential to influence runoff dynamics within the BBAM corridor areas. This impact is introduced through additional impermeable surfaces on the associated infrastructure, such as dedicated lanes, stations, terminals, and depots, that can alter drainage patterns and increase the volume and speed of surface runoff. The stormwater flowing over these paved surfaces will carry higher volumes of water and potential accumulated pollutants into existing drainage systems. These pollutants may originate from hydrocarbons, oils, brake dust, tire residue, sediment and even waste (liquid, solid, and/or hazardous waste) if not properly managed. While the concentration of such pollutants can be generally low during regular operations, cumulative wash-off over time may contribute to a localized reduction in water quality of nearby waterbodies if the drainage system is not adequately maintained.

These stormwater-related impacts are anticipated to occur intermittently, driven by rainfall events rather than continuous operations. Operational activities such as bus washing, cleaning, and maintenance at the depots may also have the potential to generate runoff containing detergents or oils, but these impacts can be avoided since such processes will be conducted in controlled areas connected to the wastewater treatment system rather than

storm drains. From a spatial perspective, these impacts are primarily confined to areas immediately surrounding BRT infrastructures, such as along dedicated lanes, at stations, at terminals where large passenger platforms are present, and especially at depots where bus storage, refueling, and maintenance occur.

Considering the above assessment, the severity of the impact is assessed as minor, and the likelihood of such an impact occurring is possible, given the high rainfall intensity in BBMA and the presence of aging drainage infrastructure in parts of the BBMA corridor. Therefore, the inherent risk of this impact on stormwater runoff and surface water quality due to the operation of the BRT bus is evaluated as 'moderate risk' if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation Measures. To minimize the impacts on stormwater runoff and surface water quality due to the operation of BRT system activities, the project is recommended to implement the following mitigation measures, among others:

- The drainage system surrounding BRT infrastructure, especially within terminal and depot areas, should be designed and maintained to ensure sufficient capacity to manage stormwater runoff during heavy rainfall events, thereby preventing localized flooding and potential operational disruptions.
- Oil separators should be installed at bus depots and washing areas to capture hydrocarbons and lubricants from runoff during rainfall.
- The use of permeable paving or green buffer strips around the perimeter is encouraged to increase infiltration and reduce overall runoff volume.
- Implement operational practices in accordance with established procedures, such as conducting bus washing and maintenance activities only in contained areas equipped with wastewater treatment systems, to prevent detergents, oils, waste, and other contaminants from entering storm drains.
- Regular cleaning of platforms, parking areas, and track surfaces will reduce the accumulation of pollutants during the dry season, thereby reducing the pollutant load carried during rainfall.
- Ensure bus depot wastewater is properly collected in storage tanks and treated via dedicated bus-washing WWTPs and collector basins before discharge into the municipal sewer network.
- Conduct routine inspections, maintenance, and performance checks of WWTPs at *Leuwipanjang* and *Cicaheum* depots to maintain treatment efficiency and regulatory compliance.
- Solid waste should be placed in properly covered and segregated containers, while hazardous waste should be stored in designated, covered, and impermeable containment areas to minimize exposure to rainfall and prevent potential wash-off by stormwater.

Residual Risk. If the above mitigation measures and monitoring plan are implemented in a consistent and effective manner, the residual stormwater runoff impacts during the operation phase of the BRT system could be reduced from 'Medium risk' to 'Low risk'.

6.3.5. Soil and Groundwater

The potential cumulative pressure on local aquifers due to groundwater abstraction required for the operation and maintenance of the BRT system is evaluated as a substantial risk without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk of the above are evaluated as moderate risk, as described in the following.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Groundwater abstraction to meet water supply demand for the operation of BRT systems	Medium	Likely	**Substantial**	Minor	Possible	**Moderate**

Risk and Impact Assessment – During the operation phase of BBMA BRT system, groundwater will be used as one of water sources to support daily BRT depots activities, including bus washing, routine maintenance, cleaning of operational facilities, and meeting basic sanitation needs for depot staffs. The estimated demand for clean water supply to support the operation of BRT system (depots, terminals and end-stations) is approximately 493 m^3/day, where 4.8 m^3/day will be used for bus washing. Although the source of clean water supply will be primarily from PDAM and 60% of the treated effluent from the bus-washing WWTP will be recycled and recirculated for washing incoming BRT buses, additional water supply from groundwater extraction will be required to meet the overall water demand.

Small-scale groundwater abstraction can contribute to cumulative pressure on local aquifers, particularly in the BBMA where groundwater resources are already under significant stress. Historical studies and regional hydrological assessments[4] show that groundwater levels in parts of the BBMA continue to decline due to over-extraction, while certain zones—particularly low-lying areas—have experienced land subsidence linked to prolonged groundwater depletion. In this context, any additional abstraction, regardless of scale, requires careful consideration.

[4] Taufiq, A., Hosono, T., Ide, K. *et al.* Impact of excessive groundwater pumping on rejuvenation processes in the Bandung basin (Indonesia) as determined by hydro geochemistry and modeling. *Hydrogeol J* **26**, 1263–1279 (2018). https://doi.org/10.1007/s10040-017-1696-8; Abidin, H.Z., Gumilar, I., Andreas, H. *et al.* On causes and impacts of land subsidence in Bandung Basin, Indonesia. *Environ Earth Sci* **68**, 1545–1553 (2013). https://doi.org/10.1007/s12665-012-1848-z

The duration of the impact is considered long-term, given that the abstraction required for BRT operation is expected to be continuous throughout the BRT operation phase, with higher usage anticipated to occur during peak operational demand. However, the magnitude of the impact is expected to be low at the project scale, given the relatively limited daily water requirement alongside PDAM supply and water recycling. From the geographical context, the impact will be largely localized around the depots and the immediate aquifer zone where the groundwater bore is located. However, because groundwater systems are interconnected, the effects of sustained abstraction may potentially extend beyond the project boundary.

Considering the above assessment, the severity of the impact is assessed as medium, and the likelihood of the impact is considered likely given that the groundwater abstraction will occur under normal operating conditions unless an alternative water source from PDAM or recycling systems is utilized. Therefore, the inherent risk of the impact due to groundwater abstraction during the operation and maintenance of the BRT system is evaluated as 'Substantial risk'.

Mitigation Measures. To minimize the impacts due to groundwater abstraction during the operation and maintenance of the BRT system, the project is recommended to implement the following mitigation measures, among others:

- The project should prioritize water efficiency by incorporating low-flow fixtures, efficient washing systems, and routine leak detection to minimize unnecessary water use.
- Where feasible, the depot should develop a rainwater harvesting system, particularly for non-potable uses such as vehicle washing or surface cleaning, thereby reducing reliance on groundwater during rainy months.
- Groundwater extraction should be conducted only with a valid permit from the relevant authority, and abstraction volumes must be monitored and reported regularly to ensure compliance with licensed limits.
- Establish groundwater monitoring wells at or near the depots to allow tracking changes in groundwater levels over time, so that early detection of declines can be identified and operational adjustments can be prepared.

Residual Risk. If the above mitigation measures are implemented consistently and maintained throughout the operational phase, the residual risk associated with groundwater abstraction is expected to be reduced from 'substantial' to 'moderate'.

6.3.6. Road Traffic

Overview – The implementation of the BRT project during its operational phase will affect the allocation of road space and traffic patterns along the corridor. These changes are expected to generate positive impacts, such as reducing traffic congestion, decreasing the number of private vehicle users who shift to the BRT, and shortening travel times for road users. Although the operation of the BRT is anticipated to deliver overall benefits, some negative

effects on road and traffic conditions may still arise, including queueing at intersections, curbside conflicts, and temporary pedestrian crowding at stations. The risk and impact assessment in relation to traffic conditions during the operation of BRT is summarized in the following.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Remaining localized traffic congestion at certain road sections during peak hours due to the operation of BRT	Incidental	Possible	**Low**	Incidental	Unlikely	**Low**

Risk and Impact Assessment – Based on the results of traffic impact modelling presented in the ANDALALIN document, traffic conditions during BRT operations are projected to improve overall, with the volume-to-capacity (VC) ratio expected to decrease by approximately 8% compared with current conditions, improving the Level of Service (LOS) from Category E to Category C. Nevertheless, localized congestion may persist at certain points along the main BRT corridor, particularly on Jl. Sudirman – Segment 4, where the estimated VC ratio remains at 0.97 (see red line in Figure 38).

Based on these findings, the impact of BRT operations on traffic conditions is assessed as largely beneficial, as the system is designed to promote efficient and sustainable mobility while reducing the reliance on private vehicles. The adverse impacts at certain road sections are expected to be minor and reversible. In terms of impact duration, the negative impacts are expected to be intermittent and largely limited to peak periods. While geographically, the impacts will be localized, occurring along the BRT corridor, primarily at intersections, within stations, and at curbside pick-up and drop-off points. Some minor spillovers may occur on connecting roads as traffic patterns adjust, but such effects are not expected to be significant. Predicted traffic volume within the dedicated on-corridor upon the operation of the BRT system is presented in the following table.

Source: ANDALALIN BBMA BRT, 2024

Figure 38. Forecasted Traffic Load within Peak Hours - BRT Operation

Table 60. Estimated Road Traffic Volume – Without (Existing) vs With BRT Operation

No.	Point of survey	Existing condition (without BRT)			Future condition with BRT in operation		
		Volume LHR	VC Ratio		Volume LHR	VC Ratio	
		(PCU/hour)	Morning	Evening	(PCU/hour)	Morning	Evening
1	Jl. Asia Afrika 4	55,730	0.75	0.71	51,361	0.58	0.55
2	Jl. Asia Afrika 5	52,431	0.71	0.73	48,321	0.55	0.56
3	Jl. Jend Sudirman 1	44,048	0.97	0.9	40,595	0.74	0.69
4	Jl. Jend Sudirman 2	22,730	0.9	0.87	20,948	0.69	0.67
5	Jl. Jend Sudirman 3	28,408	0.8	0.83	26,181	0.61	0.64
6	Jl. Jend Sudirman 4	29,784	1	1.26	27,449	0.77	0.97
7	Jl. Jend Sudirman 5	38,053	0,72	1.01	35,070	0.55	0.78
8	Jl. Jend Sudirman 6	46,338	0,77	0.92	42,706	0.59	0.71
9	Jl. Rajawali Barat	50,575	0,8	0.99	46,610	0.62	0.76
10	Jl. Rajawali Timur 1	33,489	0,83	0.94	30,863	0.64	0.72
11	Jl. Rajawali Timur 2	24,154	0,97	0.79	22,261	0.74	0.61
12	Jl. Kebon Jati 1	24,039	0,97	0.8	22,155	0.75	0.62
13	Jl. Kebon Jati 2	34,802	0,82	0.81	32,074	0.63	0.62
14	Jl. Suniaraja 1	26,265	0,88	0.76	24,206	0.67	0.58
15	Jl. Otista 1	32,664	0,96	0.96	30,104	0.74	0.73
16	Jl. Suniaraja 2	30,697	0,91	0.97	28,291	0.70	0.75
17	Jl. Banceuy 2	14,178	0,78	0.81	13,067	0.60	0.62
18	Jl. Ahmad Yani 1	60,472	0,83	0.79	55,731	0.64	0.60
19	Jl. Ibrahim Adjie	58,081	0.94	0.88	53,528	0.72	0.67
20	Jl. Jakarta	73,383	1.03	0.72	67,630	0.79	0.55
21	Jl. Ahmad yani 2	48,871	0.71	0.97	45,040	0.54	0.74
22	Jl. Ahmad yani 3	34,666	0.88	0.83	31,949	0.67	0.63
23	Jl. Ahmad yani 4	26,689	0.8	0.73	24,597	0.62	0.56

No.	Point of survey	Existing condition (without BRT)			Future condition with BRT in operation		
		Volume LHR	VC Ratio		Volume LHR	VC Ratio	
		(PCU/hour)	Morning	Evening	(PCU/hour)	Morning	Evening
24	Jl. Ahmad yani 5	24,609	0.87	1.03	22,680	0.66	0.79
25	Jl. Ahmad yani 6	30,615	0.99	0.79	28,215	0.76	0.60
26	Jl. Asia Afrika 1	25,684	0.75	0.72	23,670	0.58	0.55
27	Jl. Asia Afrika 2	42,975	0.9	0.86	39,606	0.69	0.66
28	Jl. Asia Afrika 3	57,639	0.96	0.97	53,121	0.73	0.75
29	Jl. Otista 2	35,792	0.83	0.8	32,986	0.64	0.62
30	Jl. Otista 3	32,813	0.71	0.77	30,241	0.54	0.59
31	Jl. Otista 4	33,030	0.93	0.84	30,441	0.72	0.64
32	Jl. Otista 5	20,063	0.8	0.75	18,490	0.61	0.57
33	Jl. BKR	62,848	0.89	0.73	57,921	0.68	0.56
34	Jl. Moch Toha 1	27,174	0.95	0.87	25,044	0.73	0.67
35	Jl. Moch Toha 2	14,264	0.83	0.73	13,146	0.64	0.56
36	Jl. Pungkur	21,794	0.8	0.94	20,086	0.61	0.72
37	Jl. Dewi Sartika 1	26,382	0.85	0.73	24,313	0.65	0.56
38	Jl. Dewi Sartika 2	27,380	0.87	0.81	25,234	0.67	0.62
39	Jl. Dalem Kaum	29,005	0.75	0.85	26,732	0.57	0.65
40	Jl. Alun Alun Timur	22,873	0.75	0.78	21,080	0.57	0.60
41	Jl. Banceuy 1	19,724	0.85	0.77	18,178	0.65	0.59
42	Jl. ABC	15,053	0.81	0.96	13,873	0.62	0.74
43	Jl. Naripan 1	22,236	0.89	0.75	20,493	0.68	0.58
44	Jl. Naripan 2	8,251	0.76	0.71	7,604	0.58	0.54
45	Jl. Sunda	37,345	0.88	0.88	34,417	0.68	0.68
46	Jl. Veteran	28,786	0.88	0.94	26,530	0.68	0.72
	Average	**33,845**	**0.85**	**0.85**	**31,192**	**0.65**	**0.65**

Source: ANDAL Lalin BRT-BBMA, 2024

Note: Operational stage under scenario of "Do Something" according to ANDAL Lalin study. Remarks on traffic status is represented as color below:

= LOS: C, = LOS: D, = LOS: E, = LOS: F

LOS category description may refer to Table 37 in Sub Chapter 5.1.10

Taking these considerations into account, the severity of negative impact that may arise from the operational of BRT system is assessed 'incidental', compared to the significant benefits arising from reduced congestion and improve network performance. The likelihood of the impact is 'possible' as congestion would remain exist at only a few locations during peak hours. Therefore, the inherent risk of the project is evaluated as moderate.

Mitigation Measures. To minimize the severity and likelihood of the negative impact on road and traffic conditions during the operational phase of BRT system, the project is recommended to implement the following mitigation measures, among others:

- Recommendations as proposed in the ANDALALIN should be implemented to optimize traffic circulation and ensure the efficient operation of the BRT system.
- Strict parking and stopping prohibitions should be enforced within stations and BRT corridors to maintain unobstructed bus lanes and traffic flow.
- Regulate and manage street vendors occupying sidewalks to minimize obstruction and preserve pedestrian accessibility.

- Enforce rigorous control and monitoring of roadside obstructions, including vehicles violating prohibitory signage and unauthorized street vendors to restore and maintain the optimal functionality of roadways and associated facilities, particularly at intersection entrances where prior congestion and encroachments were prevalent.
- Coordinate with traffic police and local authorities to enforce traffic rules and respond to congestion hotspots.
- Awareness campaigns encouraging responsible behavior should be conducted towards passengers, pedestrians, and drivers near BRT stations and corridors.
- Impose strict penalties and corrective measures on vehicles found in violations of traffic regulations
- Implement strategic interventions by government authorities through Transportation Demand Management (TDM) initiatives designed to incentivize and promote public adoption of communal transportation systems, including the electric BRT bus.

Residual Risk. If the above mitigation measures are implemented effectively and consistently, the residual impacts on traffic conditions are expected to remain low risk, with the likelihood of the impact occurring being reduced from likely to unlikely.

6.3.7. Labor and Working Conditions

Overview. The impacts on labor and working conditions, including exposure to occupational health and safety risk due to the BRT operation, are evaluated as 'moderate risk' without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented in a consistent and effective manner, the residual risk can be reduced to 'low risk' as described in the following.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Labor and working condition issue, which include occupational health and safety	Medium	Possible	**Moderate**	Minor	Unlikely	**Low**

Risk and Impact Assessment – Labor and Working Conditions. In the operation stage, the project will have lower risks of labor and working conditions than in the construction stage, due to the lower number of required workforce and the level of hazards that are present in the work activities. Workers will be recruited for the operation and maintenance needs of the bus stop, end station, terminal, and depot. Skilled and semi-skilled positions will be prioritized from the local workforce. However, in this operation stage, there will be a higher demand to recruit migrant workers with relevant skillsets and experience that are not yet available from the local workforce. Unclear or non-transparent work and skill requirements for job openings have the potential to give rise to grievances or protests from the local workforce or previously hired workers from the construction stage who wish to

extend their contracts. Labor issues may also arise from unclear working terms and conditions, unequal opportunities, and/or disproportionate benefits given to workers with the same skillset and experience. Workers with vulnerabilities, such as female workers and workers with disabilities, may have been marginalized in the recruitment opportunities and/or discriminated in the work. Discrimination in the workplace can also be encountered by migrant workers.

In operational stage, the physical work demands will be less than those required during the construction stage. The present of hazards from machinery, manual equipment and hazardous materials during this stage will also be at a lower level than in construction stage. However, there will still be hazards that pose risks to workers and require adequate mitigation measures. The operational workers may encounter the possibility of injury from moving vehicles and electricity, traffic violations that result in traffic incidents at terminals and depots, work stress or fatigue due to inadequate working space for bus stations operators due to high volume of passengers, spread of communicable diseases among workers and passengers, illness due to poor sanitation and inadequate ventilation system, near-miss or incidents due to the absence of safety barriers, signage, warning systems to communicate hazards, adequate lighting, and/or emergency exits for emergencies, poor work scheduling of workers, as well as SEA/SH risks at works. In addition, hazards may also be present from potential earthquakes and flooding events that have been recorded in the proposed project area. Thus, the BRT system's operation workers and also the passengers might face a safety risk if these flood and earthquake disasters occur.

If not adequately managed, project operational workers may face consequences from working incidents, accidents, and diseases in their working area. These consequences may include physical injuries and occupational diseases; however, they are not considered to have the potential to cause fatalities, considering the more advanced and automated technology and infrastructure that apply at the BRT and less exposure to high levels of hazards (i.e., disaster). Therefore, the inherent risk of labor issues and working condition problems to the workers, including due to the project's construction activities, is evaluated as 'moderate risk' if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation measures. To reduce labor and working condition risks from operational activities, the project is recommended to implement the following mitigation measures, among others:

- Provide good work conditions and environments to workers. This includes adequate sanitation, ventilation, and/or air conditioning system, procedures, and good housekeeping practices, and a dedicated room for a smoking area.
- Establish work procedures that incorporate a comprehensive Health, Safety, and Environmental (HSE) management system to ensure all workers are systematically protected from occupational hazards.

- Provide workers with appropriate terms and conditions of employment, equal opportunities, fair benefits, insurance coverage, etc., following the prevailing regulatory practice.
- Provide vulnerable workers with adequate accommodating facilities that can address their specific needs, such as separate sanitation facilities for female workers, universal access or working space arrangements for workers with disabilities, minimize night working hours for female workers, etc.
- Conduct a thorough Risk Hazard Assessment (RHA) and develop a detailed hazard mapping framework along the entire BRT corridor, ensuring that structural designs incorporate earthquake resilience measures and do not impede or redirect natural flood flows, while facilitating adequate stormwater drainage.
- Provide and socialize a hazard and emergency warning system, safety barriers, signage, and emergency exits and scenarios.
- Prepare and implement OHS training for all workers on all relevant aspects associated with their daily work, including emergency arrangements.
- Implement fair and equitable hiring practices, overseen by the Project Manager, to prevent the engagement of unqualified personnel.
- Establish an accessible and functional worker Grievance Redress Mechanism (GRM) separate from the community GRM to address concerns, expectations, and inputs from workers.
- Establish a GBV prevention Code of Conduct to be understood and acknowledged by project workers, provide and socialize GRM channels for GBV incidents that can be used by workers or passengers experiencing these risks while utilizing the BRT services.

Residual Risk. If the above mitigation measures for labor issues and working conditions are implemented consistently and effectively, work incidents and disputes arising from project operations can be reduced from 'moderate risk' to 'low risk'.

6.3.8. Community Health and Safety

Disturbances to community health and safety may occur in communities adjacent to the BRT-BBMA project operational locations due to operational activities. Impacts to community health and safety are evaluated as 'moderate risk' without the implementation of any mitigation measures. If related mitigation measures and monitoring plans are implemented consistently and effectively, the residual risk to community health and safety can be reduced to 'low risk' as described below.

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	**Likelihood**	**Inherent Risk**	**Severity**	**Likelihood**	**Residual Risk**
Community health and safety issues	Medium	Possible	**Moderate**	Minor	Rare	**Low**

Assessment / Impact	Without Mitigation Measures			Mitigation Measures Implemented		
	Severity	Likelihood	Inherent Risk	Severity	Likelihood	Residual Risk
during operational activity						

Risk and Impact Assessment – The Most common safety incident to the community could be traffic incidents/accidents due to the operation of the BRT-BBMA buses. Significant health impacts to adjacent communities may occur if poor environmental management is implemented by the project, such as in dust and air quality management and waste management. Decreased air quality and uncontrolled dust could possibly cause respiratory disease in the community, while poor waste management could possibly cause contamination to water and soil that pose risks of waterborne diseases, spread of vector-borne illnesses, or create breeding habitats for flies, rodents, and other disease-carrying animals.

The increasing number of BRT passengers may increase the number of visitors to the community area. While this may improve the accessibility and economy of the community within the BRT service area, an increase in the number of visitors may also have unintended consequences on community safety. Increased rates of crime and violence, including GBV, may occur at open terminals and bus stations, especially those located in disadvantaged neighborhoods or areas occupied by a high number of vulnerable communities, areas with a lack of adequate lighting and poor visibility, and/or limited police presence. Earthquakes and flooding events have been recorded in the proposed project area. Thus, the BRT system might face endurance challenges and face a safety risk from these disaster events and may further worsen the disaster impact to the communities in the vicinity of the to the BRT system's location, for example a collapse of BRT infrastructure could impede access for evacuation or the delivery of supplies, directly affecting community structures and potentially causing injuries to the community.

Due to the above-mentioned possible scenarios affecting community health and safety, the inherent risk due to the project's operational activities is evaluated as 'medium risk' if relevant mitigation measures are not implemented in a consistent and effective manner.

Mitigation measures. Regarding maintaining the community health and safety issue due to its potential disturbance by operational activities, the project is recommended to implement the following mitigation measures, among others:

- Implement good monitoring and evaluation of environmental mitigation measures implementation, preventing the environmental impacts from affecting community health.
- Enhance lighting and security features at bus stops and terminals, as well as coordinate with local police in the provision of a contact number for response or guard, especially if there is a heightened risk of security.

- Establish and implement good housekeeping and good sanitation practices at BRT facilities and service areas
- Establish and socialize functional and accessible GRM channels for all passengers and adjacent communities
- Conduct a risk hazard assessment (RHA) and develop a detailed hazard map within the BRT corridor. Structures need to be designed to minimize earthquake risk, mitigate flood flow impedance or redirection, and support drainage.
- Prepare and implement an OHS management plan and training for all workers, including on emergency scenarios and evacuation procedures, and provide contact numbers for emergency response.
- Provide officers stationed at the entry/exit of the bus stop and terminal who will also conduct routine inspection and patrol to monitor the safe and secure condition of buses and passenger traffic.

Residual Risk. If the above mitigation measures for community health and safety are implemented consistently and effectively, the likelihood of community incidents and health issues arising from the project's operational activities can be reduced from 'moderate risk' to 'low risk'.

6.3.9. Livelihoods

The BRT operation (on-corridor and off-corridor) is not anticipated to fully displace the paratransit angkot operators on the routes that would overlap with the BRT routes. Instead, partial economic displacement stemming from market competition with the BRT services is anticipated to occur during operation. Assuming better services with affordable prices as per the public transport reform design, passengers are likely to choose BRT services, which would reduce the number of angkot passengers, which, in turn, could lead to reduced income earned by the respective operators and hence, affect their livelihoods.

Approximately 1,554 *angkot* fleet are being operated, which impacted 20,275 persons (or around 5,069 households), comprising the drivers, ticketing operators, timers, and maintenance staff that are associated with such operation. In Bandung, one fleet is commonly owned and used by one '*angkot*' operator (also as the driver). Hence, most drivers are also fleet owners. The impact of the BRT operation on the *angkot* operators will depend on the overlap with the BRT routes to be constructed. It is estimated that there are 48 *angkot* routes that will overlap with BRT routes. A separate study on the *angkot* operators in Bandung Basin Metropolitan Area (BBMA) was undertaken by the consultant, the Regional Economic Development Institute (REDI) in 2023. This study will complement the transport modelling undertaken by consultant SYSTRA to understand the likelihood and scale of impact on the *angkot* drivers/operators during the project implementation. Several options as mitigation measures are still being discussed. At this stage, there are several framework-level options to be considered and implemented by the Government, including:

- **Gradual Angkot Reform Option** - Inviting operators of all *angkot* routes that are impacted by the project to become BRT operators by establishing a consortium or other business entities within a five to seven-year time frame (gradually). A such, the *angkot* drivers can be employed by the consortium to be the feeder operator as part of the BRT system.
- **BRT Feeder Operator Option** - Inviting all affected *angkot* operators to become BRT feeder operators (provide services from and to BRT stations) and provide employment opportunities for *angkot* drivers. The detailed mitigation measures will be presented in a separate project-level *angkot* integration plan/public transport reform, which is part of **the project's sub-component 1. C on *Angkot* Reorganization of the overall MASTRAN project**. This document shall include details on the establishment of the subnational public service enterprise (*Badan Layanan Usaha Daerah* or BLUD) to govern and manage the BRT operations and action plans to mitigate adverse impacts on the affected *angkot* drivers in the Bandung Basin Metropolitan Area (BBMA).

6.4. Cumulative Impact Assessment

This document presents the cumulative impact assessment of the BBMA BRT Project, in accordance with the World Bank Environmental and Social Standard 1 (WB ESS 1). The assessment encompasses a comprehensive evaluation of all pertinent direct, indirect, and cumulative environmental and social risks and impacts associated with the project, while also considering influences from other relevant historical, ongoing, and reasonably foreseeable future developments within the project's area of influence.

The cumulative impact assessment implemented for this Environmental and Social Impact Assessment (ESIA) is characterized as a Rapid Cumulative Impact Assessment (RCIA). The procedural steps for executing the RCIA are outlined as follows:

Step 1: Identification of spatial and temporal boundaries of the study;

Step 2: Identification of Valued Ecosystem Components (VECs), other developments, and external stressors;

Step 3: Establishment of baseline information concerning VECs;

Step 4: Evaluation of the project's contribution to the anticipated cumulative impacts;

Step 5: Assessment of the significance of predicted cumulative impacts on the viability and sustainability of the affected VECs; and

Step 6: Formulation and implementation of mitigation measures aimed at managing the project's contribution to cumulative impacts and associated risks.

Spatial and Temporal Boundaries. The spatial boundary of the CIA is defined as the Area of Influence (AoI) associated with the BRT BBMA project presented in Section 4 of ESIA. The AoI includes both current and projected developments within the Bandung Metropolitan Area, with a focus on regions adjacent to the project footprint.

A comprehensive delineation of the AoI is articulated in a designated section of the ESIA, which encompasses five municipalities: the City of Bandung, the City of Cimahi, the Bandung Regency, the West Bandung Regency, and the Sumedang Regency.

In addition to spatial considerations, the CIA necessitates the definition of a temporal boundary. However, the establishment of this boundary presents challenges due to the uncertain nature of prospective developments and the unpredictable influence of both natural and social stressors. To address this challenge, a temporal boundary of three years has been adopted, in accordance with the relevant guidelines for the CIA pertaining to this project.

Existing and Foreseeable Future Development and Activities. The RCIA took into account external factors, including anticipated future actions stemming from surrounding activities and existing or planned major projects that may affect the same Valued Environmental Components (VECs). Such considerations include projects and activities situated within the project's AoI, evaluating potential environmental and social impacts arising from the BRT and its ancillary facilities. Information regarding significant existing and planned activities and/or projects pertaining to the BRT BBMA Project has been gathered from desktop research and is summarized in the following table.

Table 61. Existing Activities and Foreseeable Future Development within BBMA Area

Administrative Area	Existing Activities	Foreseeable Future Development
Bandung city	The main activities in Bandung City are dominated by: ▪ Trade and services, with activity centers located in the Alun-Alun Bandung area, Jalan Asia Afrika, Jalan Braga, Jalan Riau (RE Martadinata), Dago, Cihampelas, and the Sukajadi–Pasteur corridor. ▪ Education and government, concentrated around the Taman Sari, Dipatiukur, Gedung Sate, Cibiru, and Setiabudi areas. ▪ Tourism and creative industries, spread across the Braga, Asia-Afrika, and Dago areas.	Road infrastructure developments are planned, but the definitive schedule for the implementation is not yet confirmed and subject to funding: ▪ **Bandung Intra-Urban Toll Road (BIUTR)**: This toll road will connect Pasteur and Cileunyi via Pasupati and Gasibu, with alternative routes through Cicaheum or Supratman–Antapani, and a branch toward Gedebage linking to the Padalarang–Cileunyi Toll Road. As of 2025, the project is in the Detailed Engineering Design and investment auction stage, with construction expected to start in 2026 and completion targeted for 2029. ▪ **Bandung Raya LRT**: Planned to serve two priority corridors—Tegal Luar–Leuwipanjang and Leuwipanjang–Babakan Siliwangi. By 2025, the project is in the final feasibility and engineering design phase, with land acquisition targeted for 2026, construction in 2027–2028, and operations by 2030.

Administrative Area	Existing Activities	Foreseeable Future Development
Cimahi city	The main activities in Cimahi City are dominated by manufacturing and garment industries, primarily in the Leuwigajah Industrial Area, as well as educational and military facilities.	No significant future developments have been identified within Cimahi area
West Bandung Regency	Padalarang and Cimareme serve as hubs for trade and logistics activities due to their proximity to the Cipularang Toll access. The presence of the high-speed rail station in Padalarang also drives increased economic activity and mobility for both visitors and residents. Meanwhile, Lembang, Maribaya, and Ciater are primarily driven by nature-based, agro, and culinary tourism activities. Additionally, there are industrial and manufacturing activities around the Batujajar industrial area.	No significant future developments have been identified within West Bandung area
Bandung Regency	Existing activities in Bandung Regency, particularly in the southern and southeastern corridors of the BBMA project area, are dominated by trade and service activities, with main hubs in Soreang, Baleendah, and Banjaran. Meanwhile, the areas of Rancaekek, Dayeuhkolot, and Majalaya serve as centers for manufacturing and garment industries.	Integrated with Bandung City's LRT through Leuwipanjang Terminal connectivity, the Bandung Regency LRT project is planned to serve the Bojongsoang (Podomoro Housing) – Leuwipanjang Terminal – Soreang route. As of November 2024, the project has entered the investment auction stage, but no information has been available on the start of construction.
Sumedang Regency	The Jatinangor area, targeted for off-corridor BBMA development, currently serves as a center for educational activities, hosting several major universities.	No significant future developments have been identified within Sumedang (Jatinangor area)

Identification of Valued Environmental Components (VECs). The VECs are defined as environmental and social attributes that are crucial for evaluating risks associated with physical features, habitats, wildlife populations, ecosystem services, natural processes, social conditions, and cultural elements. The data utilized for identifying VECs corresponds with the sources used in the Environmental and Social Impact Assessment (ESIA), comprising publicly available information obtained through systematic online research of pertinent literature, articles, and media. Additionally, insights gathered during public consultation efforts conducted as part of the Land Acquisition and Resettlement Plan (LARP) and the ESIA development phases, scheduled for 2025, also contribute to this identification process.

The selection of VECs is further guided by the outcomes of the risk and impact assessment pertinent to the Bus Rapid Transit (BRT) project, as detailed in the respective sections of the ESIA. In light of these considerations, the VECs designated for the Rapid Cumulative Impact

Assessment (RCIA) of the BRT BBMA Project, including the justification for their selection, are delineated as follows:

- *Air quality* – The Bus Rapid Transit (BRT) project, particularly throughout its construction phase, is anticipated to produce heightened levels of particulate matter and fugitive emissions in the surrounding areas. The consequent impact on air quality is regarded as a significant risk. Furthermore, similar emissions from other existing activities and projects, including urban mobility initiatives and industrial zones in Majalaya, Leuwigajah, Kopo, and Dayeuhkolot, will cumulatively exacerbate air pollution within the Area of Interest (AoI), thereby increasing the potential risk to public health.
- *Noise* – The BRT project is anticipated to elevate noise levels attributed to the operations of both on-road and off-road vehicles during the construction phase, along with the activities associated with the workers' base camp and earthworks. This resultant noise impact is evaluated as a significant risk. Furthermore, the noise generated by existing projects and activities, predominantly linked to vehicular movement, may synergistically augment noise levels along the routes that coincide with the proposed BRT corridors, thereby exacerbating potential community health issues and nuisance concerns.
- *Greenhouse gas (GHG)* – GHG resulting from the BRT project, in conjunction with other current and forthcoming developments and activities within the Project's AoI, will be released into the global atmosphere. These emissions may persist over extended periods, potentially contributing to warming effects and alterations in the regional climate, thereby impacting both present and future generations.
- *Surface water quality* – The potential for runoff, fuel spills, and waste generated during the construction of the BRT project may cumulatively interact with additional pollutants produced from other ongoing activities and planned developments within the Project's Area of Influence (AoI). Such interactions may surpass the assimilative capacity of adjacent rivers, thereby increasing risks to aquatic ecosystems and public health, especially for communities dependent on surface water sources located downstream of the river.
- *Road traffic and infrastructure* – Changes in traffic flow from the BRT initiative, such as the establishment of dedicated lanes, restructuring of traffic layouts, enlargement of roads, and creation of supporting infrastructures—could collectively impact other current activities and planned projects within the project's AoI. These effects might lead to increased pressure on roadways, reduced access in certain areas, and worsened traffic delays, especially throughout the construction period.
- *Local economic development* – The BRT project is anticipated to generate positive outcomes through enhanced accessibility, provision of employment and business opportunities for the local communities, both during construction and operation phases. However, there may be short-term negative effects mainly during construction, caused by restricted access, possible job competition, and tensions surrounding perceived opportunities and advantages resulting from the influx of migrant workers.

- *Community health and safety* – During the construction phase, the BRT project will impact the health and safety of nearby communities. Along with other current and planned developments in the project's area of interest, this could lead to increased pressure on community health and safety, potentially causing long-term health issues and greater susceptibility to risks.

Cumulative Impacts. The rapid assessment of cumulative impact was undertaken for the VECs, and the results are presented in the following table.

Table 62. Environmental and Social Cumulative Impacts

Potential Impacts of BRT BBMA Project	Impacts from Existing and Future Activities and Development	Impacts due to Natural Disaster and Climate Change Risks	Potential Cumulative Impacts
Ambient Air Quality			
The BRT Project is not anticipated to considerably affect the ambient air quality in the BBMA area due to dust and transient gas emissions, as it intends to improve public transit and alleviate traffic congestion, which should help decrease air pollution overall. However, there might be a temporary rise in emissions around the project site during the construction period.	Emissions of dust and gases from urban and industrial regions, mainly linked to road traffic and industrial outputs in the BBMA area, are projected to greatly affect air quality deterioration in the region. Furthermore, the upcoming construction of LRT and inner-city toll roads could negatively influence air quality in zones that overlap with BRT operation.	The climate change risk induced by temperature rise and the urban heat island effect may elevate ozone and secondary air pollutant levels within the BBMA area, potentially worsening respiratory health risks. While most natural disaster–induced risks are not expected to directly cause long-term air pollution, volcanic activities from Mount Tangkuban Perahu can temporarily increase SO_2 concentrations and particulate levels, particularly in the northern Bandung area.	Based on the assessment described herein, the cumulative impact on air quality within the BBMA area is evaluated as major in term of its severity and the impact is likely to occur without enforcement of the regulatory requirements and, therefore, the impact is ranked as high risk.
Greenhouse Gas Emissions			
During construction phase of the BRT project emissions from machinery and transportation will increase GHG emissions in the BBMA area. However, in operation, the BRT is expected to reduce emissions by shifting commuters from private vehicles to mass transport.	Ongoing operations in this area are a major source of GHG emissions due to industrial processes and urban transportation.	Climate change induced by temperature rise and the urban heat island effect can intensify energy demands (e.g., cooling in the building and transportation) which lead to spike in GHG emissions.	Based on the assessment described herein, the cumulative impact on GHG emissions within the BBMA area is evaluated as moderate in term of its severity and the impact likelihood to occur is possible without enforcement of the regulatory requirements and, therefore, the impact is ranked as medium risk.

Potential Impacts of BRT BBMA Project	Impacts from Existing and Future Activities and Development	Impacts due to Natural Disaster and Climate Change Risks	Potential Cumulative Impacts
Noise Level			
The noise emissions from the Project are not expected to increase the ambient noise within 250 from the nearest sensitive receptors.	Noise emissions from the urban and industrial areas are expected to significantly impact ambient noise levels within the BBMA area as they may originate from multiple sources such as traffic, commercial areas, trade and services, residential and non-residential development.	None.	Based on the assessment described herein, the cumulative impact on ambient noise level within the BBMA area is evaluated as moderate in term of its severity and the impact likelihood to occur is possible and, therefore, the impact is ranked as medium risk.
Surface Water Quality			
Potential contamination from runoff, fuel spills, and waste during construction of the BRT project could reduce water quality on nearby surface water bodies.	Urban and industrial activities often carries runoff with pollutants, especially in areas with poor drainage and waste management	Intensified rainfall may increase surface runoff and erosion, worsening surface water quality. Flooding events during rainy season can spread contaminants into water bodies	Based on the assessment described herein, the cumulative impact on surface water quality within the BBMA area is evaluated as moderate in term of its severity and the impact likelihood to occur is possible without enforcement of the regulatory requirements and, therefore, the impact is ranked as medium risk.
Road Traffic and Infrastructure			
The BRT project has a long-term goal of alleviating traffic congestion in the BBMA area once it becomes operational. However, the project will also cause disruption to current traffic and transportation, particularly during the construction phase.	High intensity of traffic and transportation within the BBMA area has caused traffic congestion and may reduce road integrity. This condition is likely to worsen, especially when the BIUTR and Bandung Raya LRT construction projects commence, considering the	Extreme weather conditions such as prolonged dry period, hotter temperature, and rainstorm events would reduce the life of the road pavement and structure and also causes traffic congestion and blockage in the event of flooding.	The cumulative impact of the BRT project and other activities could result in significant traffic congestion, increased strain on existing infrastructure, and disruptions to mobility, especially during the construction phase. Temporary detours and construction zones may

Potential Impacts of BRT BBMA Project	Impacts from Existing and Future Activities and Development	Impacts due to Natural Disaster and Climate Change Risks	Potential Cumulative Impacts
	potential for lane closures, heavy equipment mobilization, and increased construction-related traffic that intersect with the BBMA corridor area.		hinder traffic flow, while the demand for road space could rise due to the addition of transport systems and industrial traffic. Hence, the impact is evaluated as moderate in term of its severity and the impact likelihood to occur is possible without enforcement of the regulatory requirements and, therefore, the impact is ranked as substantial risk.
Economic Development			
The project is anticipated to deliver positive economic impacts, particularly through the creation of employment and business opportunities for local communities, especially Project-Affected Persons (PAPs) and individuals of productive working age within the project's area of influence, and potentially in other regions of West Java. Recruitment of workers will prioritize local residents who meet the required skills and qualifications. Furthermore, the project is expected to encourage the growth of small-scale enterprises by generating demand for local goods and services, thereby contributing to broader economic benefits.	Urban development is expected to generate positive impacts on the local economy, including job creation, enhanced economic activity, and expanded business opportunities.	Rising temperatures and more intense rainfall are likely to primarily affect agricultural productivity, while also increasing energy costs due to greater demand for cooling. These climate shifts may also influence employment patterns, as people migrate to areas with lower climate risks. Moreover, natural disasters can cause significant economic disruption, particularly for informal workers, low-income households, and those already living below the poverty line.	The combined effects of the BRT project and other concurrent activities are expected to generate positive contributions to local economic development, including improved infrastructure, job creation, and enhanced access to key areas. To maximize these benefits, targeted enhancement measures should be implemented to promote sustainable economic growth within the BBMA area.

7. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

7.1. Consultation with Stakeholders and Project Affected Peoples (PAPs)

As summarized from the LARAP of the BRT-BBMA (June 2025), stakeholder consultations for the project were conducted in July 2024 - January 2025 as shown in the table below.

Table 63. Consultation with Project's Stakeholders and PAPs

Date and Venue	Participants	The discussion topics in the forum
Consultations conducted in 2024		
Outreach and consultation with local governments July 10, 2024 Mercure Bandung Nexa Hotel at Jl. Supratman	74 participants represented among others: – Ministry of Transportation represented by PMC – Regional Development Planning Agency of West Java Province – Office of Highways and Spatial Planning of West Java Province – Transportation Office of West Java Province – Related offices and agencies from Bandung City, Cimahi City, Bandung Regency, Sumedang Regency and West Bandung Regency – PLN (state-owned electricity) – UPTD BLUD Parking of Bandung City – State-owned railway company (PT KAI) – 9 Heads of sub-districts passed by the BRT corridor – Team Leader of DED BRT BBMA	– Government policy on MASTRAN – BBMA BRT project plan, including overview, project location, project components, design plan, risks and impacts and its mitigation measures, land affected by the project, and list of PAPs, and Project's Grievance Redress Mechanism (GRM). – LARAP as part of the process of preparing guidelines or policy frameworks for implementing land acquisition and resettlement.
Consultation meeting at the Community Level:	Community leaders and PAPs	– BBMA BRT project plan including overview, project location, project components, draft design, land affected by the project, and PAPs, – LARAP activities as part of the process of preparing guidelines or policy framework for the implementation of land acquisition and resettlement. – Inputs, Aspirations, and perceptions related to the BBMA BRT Project, land
– Andir Subdistrict on June 13th, 2024	19 Participants (2 Female and 17 Male)	
– Balonggede Subdistrict on July 12th, 2024	18 Participants (7 Female and 11 Male)	
– Astana Anyar Subdistrict on July 25th, 2024	14 Participants (1 Female and 13 Male)	
– Batununggal Subdistrict on July 29th, 2024	15 Participants (2 Female and 13 Male)	

Date and Venue	Participants	The discussion topics in the forum
– Lengkong Subdistrict on August 21st, 2024	23 Participants	acquisition, income restoration and handling mechanisms to be carried out.
– Cicadas Subdistrict on August 29th, 2024	16 Participants (1 Female and 15 Male)	
Consultations Conducted in 2025		
The plenary meeting of the socialization of the BBMA BRT project LARAP document January 16, 2025 Mercure Bandung Nexa Supratman Hotel	74 participants (28 females and 46 males) represented stakeholders and agencies from Bandung City, Cimahi City, Bandung Regency, Sumedang Regency and West Bandung Regency, as well as all sub-district heads, and village head	– Socialize the results of the LARAP study covering the social and economic conditions of the PAPs, including land and other assets affected by the project. – Deliver the PAPs' perceptions and aspirations on the presence of the BBMA BRT project based on the results of the socio-economic survey. – Socialize, obtain inputs and agree on the action plan concept for land acquisition and resettlement.

Source: Dohwa-Lenggogeni Notes from Public Consultation, 2025

7.2. Future Engagement and Information Disclosure

Recognizing this, a series of public consultations involving relevant stakeholders, including the head of the subdistrict and affected communities, will be held throughout the project lifecycle. These consultations aim to gather feedback from affected communities, address their concerns, and ensure transparency in the land acquisition process. A range of stakeholder engagement and information dissemination methods that could be implemented by the Project are, among others, through the distribution of newsletters, flyers, posts on the website, and formal and informal meetings/discussions.

Upon endorsement by the Implementing Agencies and the Banks, the E&S safeguard documents and other related documents prepared for the Project will be posted on the websites of the Bank, visible locations of the project’s sites, the Ministry of Transportation as well as the West Java Provincial Government office and Bandung City Government office. Timely disclosure of these documents is crucial to the effectiveness of the stakeholder engagement process and helps protect the Project's reputation. The primary objective of information disclosure is to reach out to all the Project’s stakeholders through prioritizing the accuracy of information, project stages, timelines, and potential impacts, and other relevant aspects crucial for the benefits of the Project and the stakeholders themselves.

Table 64. Planned Stakeholder Engagement Prior to and During Construction

Aspects	E&S Related Activities/Documents	Key Responsible Parties for Implementation	Timeline
E&S Mitigation Implementation	Implementation of Grievance Redress Mechanism (GRM)	Governments (national, provincial, city, regency) and the Contractors	Pre-construction, Construction and Operational Phase
	Implementation of mitigation measures – ESMP and UKL/UPL (including Construction Management Plan, noise reduction plan, COVID 19 Response Plan, ANDAL Lalin, GESI-AP, GBV (SEA/SH) Risk Assessment	Governments (national, provincial, city, regency); Implementing Business Entity (IBE)	Pre-construction, Construction and Operational Phase
	Labour Management Plan (LMP)	▪ PIU of BRT-BBMA Project	Pre-construction, Construction and Operational Phase
	Heritage Impact Assessment (HIA)	▪ PIU of BRT-BBMA Project Implemented by contractor	Pre-construction and Construction
	Implementation of LRAP	Governments (national, provincial, city, regency); Consultants	Prior to construction
	SOP of Waste Management Which comprises for waste sanitation and hazardous waste	PIU of BRT-BBMA Project Implemented by contractor and operator	Pre-construction, Construction and Operational Phase
Technical Training	Training on WB E&S standards specifically linked to the MASTRAN project	Target audience: Government (national, provincial, city, regency)	Construction & operational phase; daily/monthly monitoring and annually reporting
	Technical guide on green procurement in the transport sector	Target audience: Government (national, provincial, city, regency)	Inception Phase

Aspects	E&S Related Activities/Documents	Key Responsible Parties for Implementation	Timeline
	Training on Grievance Mechanism	Target audience: Government (national, provincial, city, regency)	Inception Phase
	Training on data monitoring analysis	Target audience: Government	Inception Phase
	Training on environmental and social code of practice as well as guideline for green procurement to construction firms	Target audience: Contractors	Inception Phase
	Training on green initiatives in public transport	Target audience: Government	Inception Phase
	Gender training	Target audience: internal team	Construction phase
	Training on stock assessment	Target audience: internal team	Annually
	GHG emission, air and noise pollution monitoring training	Target audience: Sub-project permanent institution	Annually
	Training capacity building for relevant stakeholders on E&S standards for the MASTRANS project, such as occupational health and safety; and community health and safety This would target main stakeholder groups of sub project locations to provide community monitoring on the implementation and fulfillment of the E&S standards	Contractors Target audience: Community and PAPs near the construction site	Annually

8. GRIEVANCE REDRESS MECHANISM

GRM Procedures. The BRT Project establishes a grievance redress mechanism (GRM) for stakeholders and project-affected people to express their grievances/complaints or request information. The GRM aims to capture, process, and resolve concerns promptly, in an impartial, understandable, and transparent manner tailored to the specific community, at no cost and without retribution to the complainants.

The GRM implementation refers to the handbook titled Operational Guidance on the Grievance Redress Mechanism (GRM) for the Indonesia MASTRAN Project, which is also available in the project's Stakeholder Engagement Plan (SEP). There are three (3) types of risk for project grievance, which are classified based on the level of risk (Category 3/low risk to Category 1/high risk).

Grievances that cannot be resolved immediately by the project authority within the site area (Risk 3) will be escalated to a higher risk level, involving higher-level authorities at the sub-national level (Risk 2) or national levels (Risk 1). All complaints will be processed in accordance with the Project's GRM procedure in a timely manner.

Table 65. Complaints based on Its Risk Level

Items	Type of Risks		
	Risk 1 (High)	**Risk 2 (Moderate)**	**Risk 3 (Low)**
Risk description	Complaints due to project activities that have significant negative impacts on the complainant, impacts are serious and systematic, cover broader area than the site location, and/or require PIU/PMU level authorities or court involvement to provide a solution/decision, this may include sexual harassment, work accidents resulting in serious injuries or fatalities, relocation and land acquisition issues, etc. In this category, while some grievances can be resolved by the contractor or PIU Sub-national (for instance: a simple relocation issue). However, there are also grievances under this category that cannot be resolved at the contractor level and the PIU at the Sub-national level. In this case, the grievance must be	Complaints that are significant (but not as significant as High Risk), moderately severe, potentially systematic impact, and/or not being able to be resolved at the site level, thus require PIU at the sub-national level authorities to participate in the discussion and to provide a solution, such as a claim over land ownership or a dispute of compensation payment. Generally, these can be resolved at the PIU-sub-national level. <u>Notes</u>: Complaints related to the handling of environmental and social impacts by the local governments as per the working agreement.	Complaints occur within the site location that can be addressed immediately through discussion and solution given at the contractor level, and are generally minor, such as dust and noise causing annoyance to the communities within the proximity of the project's construction sites.

Items	Type of Risks		
	Risk 1 (High)	Risk 2 (Moderate)	Risk 3 (Low)
	resolved at the PIU/PMU and/or through litigation.		
Response period	To be processed within 24 hours after the complaints are received. To be resolved within 5 x 24 hours after being escalated from Risk 2	To be processed within 24 hours after the complaints are received. To be resolved within 5 x 24 hours after being escalated from Risk 3	To be processed within and resolved within 2 x 24 hours-
Data/information collection period	Max. 12 days	Max. 7 days	Max. 2 days
Closing period	30 days	14 days	7 days
Investigation	Yes	Yes	Not necessary
Review	PMU-PIU National	PMU-PIU National	-
Closing	PIU National	PIU National	Contractor

Source: Operational Guidance of Grievance Redress Mechanism for Indonesia MASTRAN Project, 2024

The GRM Procedure is shown in the following figure. Once the contractor is selected, the contractor will be responsible for adopting the GRM described in this chapter and establishing a site-level GRM to receive and respond to grievances and feedback related to the project's environmental and social risks and impacts. As part of the bidding document, the contractor is required to hire a community liaison, whose responsibilities include collecting, processing, addressing, and documenting grievances from affected people.

Figure 39. Grievance Redress Mechanism

GRM Channel to Receive Complaints. To increase accessibility and ensure communities have options to report grievances, GRM will offer multiple channels for complaint submission. However, GRM for workers is handled in accordance with the Labor Management Procedure (LMP). At the National Level, LAPOR! is an existing GRM portal that could be promoted as a mechanism to be adjusted and adopted for the sub-project grievance-handling process. Alternatively, the Lapor! The process can be followed if the complaint is not considered a matter for the PIU. Lapor! (literally means 'report') It is managed by the Ministry of Administrative Reform and Bureaucracy Reform (PANRB).

Aside from LAPOR above, to increase accessibility and reach, CPMU will also provide other channels for receiving/capturing grievances, including:

- Email: humas_hubdat@dephub.go.id
- Phone: 021) 3456919, 3811308; Ext. 1102, 1350
- Social media: Instagram and Twitter @ditjen_hubdat

- Office address: Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan Republik Indonesia, Jalan Merdeka Barat No. 8, Jakarta, DKI Jakarta. 10110. Indonesia.

At the Sub-national level, GRM can use the official website of the local Government that puts LAPOR! Portal. However, at each subnational level, additional channels must be provided to increase accessibility for project-affected parties and the general public to lodge complaints.

Role and Responsibilities for GRM Implementation. The following table describes the roles and responsibilities of each party and institution involved in the BRT project related to GRM implementation. The Project provides GRM Focal Points/Officers to coordinate with the provided grievance channels at the subnational and national levels. At the subnational level, GRM focal points have been appointed, as substantiated by an Appointment Decree (SK). These GRM Focal Points will sort and receive project-related grievances and channel them to the appropriate project team authorities for resolution.

Table 66. Roles and Responsibilities on GRM

Institution	Role and Responsibility
Contractor	▪ Receive and record complaints ▪ Identify and assess the risk type of each grievance: - RISK 3 grievance is for PIU to send it to the Contractor to be resolved. - RISK 2 grievance is for the PIU at the Subnational government to resolve it - RISK 1 grievance is to be forwarded to PIU/CPMU at the national level (i.e., MoT) to resolve it ▪ Contractor prepares regular records/reports of complaints to be submitted to PIU ▪ Day-to-day implementation of GRM
PIU at the Subnational level/Local governments (GRM Focal Points/ Officer)	▪ Receive and record complaints ▪ Identify and assess the type of each grievance as above for subsequent resolution ▪ Submit the report on GRM cases, handling, and resolution to PIU/CPMU at the national level regularly ▪ Day-to-day implementation of GRM
PIU/CPMU at National Level – Ministry of Transportation (GRM Focal Point/ Officer)	▪ Receive and record complaints ▪ Identify and assess the type of each grievance as above for subsequent resolution ▪ Submit the report on GRM cases, handling, and resolution to PIU/CPMU at the national level regularly ▪ Day-to-day implementation of GRM

Source: Operational Guidance of Grievance Redress Mechanism for Indonesia MASTRAN Project, 2024

In the Operational Stage, grievances will be treated the same as customer complaints due to concerns about BRT operational services. The unit responsible for GRM will be under the Crisis Centre at the headquarters office of the BRT.

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1. Mitigation Measures and Monitoring Plans

As an overall approach, the design of the project should avoid or prevent impacts; for impacts that are anticipated or that result from project activities, there are formal steps and substantive actions outlined in this section to manage and mitigate such risks. In addition to this impact prevention approach through project design of beneficial activities, mitigating the potentially significant adverse impacts arising from project activities could be done through a range of mitigation measures and monitoring plans.

The Environmental and Social Management Plan (ESMP) is the main mechanism for E&S management and mitigation during the construction and operation of the BRT project. Upon contract award, the contractor should prepare a project- and site-specific construction environmental and social management plan (CESMP) to be submitted to the PIU for review and endorsement prior to commencement of construction activities.

The ESMP requires the development of specific, stand-alone management plans as part of project construction and operation including, among others:

- *Construction Environmental and Social Management Plan (CESMP)* which is an overarching project-specific E&S risk mitigation measures and monitoring requirements that should be implemented by the contractors and is also applicable for the sub-contractors and respective primary suppliers.
- *Traffic Management Plan (TMP)* which is a detailed plan describing mitigation measures, monitoring and agencies coordination required to manage the existing traffic congestion and disturbance to public transportation services road users during construction of the BRT project.
- *Labor Management Plan (LMP)* which details labor and working conditions including health and safety requirements for project workers that should be provided by the project. The LMP would include code of conducts for preventing sexual exploitation and abuse/sexual harassment as well as gender-based violence.
- *Heritage Impact Assessment (HIA)* that would include assessment of the integrity and existing damages of the cultural heritage building within the dedicated BRT corridors and define mitigation measures to be implemented.
- *A Chance Find Procedure (CFP)* will need to be develop as precautionary measure if cultural heritage objects unexpectedly found during excavation and construction activities.
- *Standard Operating Procedure (SOP)* for managing hazardous and non-hazardous wastes as well as construction wastes including its disposal to ensure compliant with prevailing laws and regulations.

Table 67. Environmental and Social Management and Monitoring Plan

A. PRE-CONSTRUCTION PHASE

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
Livelihood and access restriction due to relocation of affected kiosks and street vendors	• Disseminate LARAP including the entitlement for PAPs • Implement the LARAP including its Livelihood Restoration Program in a transparent and timely manner. • Conduct periodic stakeholder engagement with PAPs and other relevant parties, following the project's Stakeholder Engagement Plan (SEP). • Establish an accessible/functional Grievance Redress Mechanism (GRM) to address complaints from PAP and other interest shareholders and facilitate its resolutions. (The GRM is described in detail in the LARAP.)	• Monitor transparency in the provision of compensation for project-affected communities, including ensuring that compensation is provided in a fair and transparent manner in accordance with identified rights. • Monitor increases or decreases in employment due to the project, including new sectors that emerge such as trade or services supporting the project. • Monitor the livelihood of existing tenants, street vendors and parking attendants and the extent of losses resulted from the project. • Monitor the impact of the project on access restriction after land acquisition. • Periodically reports on the results of monitoring economic and livelihood impacts of PAPs.	• Mitigation measures are implemented prior to/during LARAP implementation. • Monitoring is conducted/reported monthly or more frequently depending on the needs.	The locations where the project-affected person (PAP) live and working.	The sub-national governments (i.e., Bandung Municipality) including related agencies.
Marginalization of vulnerable groups and gender-based violence	• As recommended in LARAP, provide specific measures to support the identified vulnerable individuals and ensure that their living standards are maintained or improved. • Prioritize the vulnerable groups in the livelihood restoration programs and relocation opportunities. • Establish an accessible and functional, project-level GRM to address concerns, expectations, and inputs. The GRM should be tailored to ensure its accessibility by the vulnerable individuals. • Socialize and ensure the acknowledgement of workers with the GBV prevention code of conducts and its violation sanctions. • Establish and implement a dedicated GRM for GBV cases that ensure the confidential handling of information related to GBV incidents that may occur during the project implementation	• Periodically monitor and evaluate the effectiveness of the implementation of LARAP, SEP and GRM and the level of community satisfaction with the solutions provided. • Monitor the number of vulnerable individuals participating in the project, compare it with the data identified in the LARAP. • Monitor the distribution of Project Information Brochures (PIBs) in local and national languages and evaluate community understanding of the information provided through surveys and interviews. • Evaluate the effectiveness of the implementation of empowerment programs for vulnerable groups, including job skills training and business opportunities for communities around the project. • Monitor transparency in the provision of compensation for project-affected communities, including ensuring that compensation is provided in a fair and transparent manner in accordance with identified rights. • Track the number of women who receive clear and transparent information on land acquisition and compensation processes. • Evaluate the effectiveness of the grievance mechanism (GRM) in handling complaints related to discrimination of vulnerable individuals, including tracking the number of complaints received and resolved. • Monitor the GBV cases reported through the dedicated GBV-GRM channel, ensure that each case is treated in a	• Mitigation measures are implemented during pre-construction phase. • Monitoring actions are conducted quarterly or semi-annual basis as appropriate.	The location where the project-affected persons (PAPs) live and working.	• PIUs assisted by the Design and Supervision Consultant • The sub-national governments including related agencies of BBMA.

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
		confidential manner, with the consent of the victim/survivor, and in coordination with experienced external service providers for the required handling.			

B. Construction Phase

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
Increased airborne particulates (dust) and fugitive gaseous emissions into the local watershed	• Conduct air pollutant dispersion modelling before the commencement of the construction phase. This modelling is required to assess the significance of impact from fugitive gaseous emissions generated by the project's construction activities. • Perform land clearing, demolition, and earthwork activities within designated construction zones as needed. • Install temporary fence (e.g. usually made of zinc-alum sheet) of approximately 3-m high at construction sites. • Ensure that vehicles and trucks transporting soil or other construction materials are not overloaded, and cover all loads properly with tarpaulin. • Use only designated roads suitable for the vehicle's tonnage, and maintain speeds within the allowed limits. • Schedule material mobilization activities during night-time hours (22:00–05:00 WIB) instead of daytime, where practicable • Conduct regular water spraying once per day at minimum or more frequently particularly during dry seasons. • Prohibit any open burning of construction or solid waste at construction sites and supporting facilities. • During demolition activities, if asbestos-containing materials (ACM) are identified, immediately notify and coordinate with the PIU, and ensure that all ACM are handled, contained, transported, and disposed of in full compliance with applicable health, safety, and environmental regulations. • Engage only licensed asbestos-removal contractors and certified disposal facilities to prevent worker exposure and environmental contamination.	• Verify the validity of all operating and driving licenses as well as maintenance records for trucks and heavy equipment. Ensure that any vehicle or equipment without complete documentation is not allowed to operate on-site. • Conduct regular inspection on the implementation of water spraying on roads and construction sites. Ensure no visible dust leaves the site boundary through direct observation. • Conduct regular air quality monitoring (e.g., quarterly) at construction sites and in areas with sensitive receptors such as residential zones and public facilities. Analyze the results against the Indonesian Government and WHO guideline values. • Use the accredited laboratory to collect and analyze air quality samples.	• Mitigation measures are conducted on a weekly or monthly basis as appropriate. • Air quality monitoring is conducted as follows: - Once prior to commencement of construction activities. - Quarterly during construction activities. - Once within three months after completion of construction activities.	• Conduct air quality monitoring at baseline sampling locations, while ensure that selected sites are representative of sensitive receptor areas (e.g., community settlements, environmentally sensitive sites). • Other mitigation and monitoring measures are conducted at: - active construction sites, - access roads used for construction activities. - the operation of auxiliary facilities	• The contractors, including their sub-contractors and primary suppliers. • PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation. .
Elevated noise and vibration levels at construction sites and sensitive areas/ receptors above the baseline level.	• Conduct noise dispersion modelling before the commencement of the construction phase. This modelling is required to assess the significance of noise impact due to project construction activities. • Carry out construction activities near community settlements and sensitive receptors (e.g., schools, healthcare facilities, places of worship) only during daylight hours (e.g., 06:00–18:00), and • Apply strict noise and vibration-control practices when using loud machinery. • Locate the basecamp and worker accommodation at a sufficient distance from local communities, public	• Conduct site inspection to ensure noise mitigation measures are properly implemented (e.g., through field observation, daily logs, maintenance records, PPE audit, etc.). • Conduct regular (at least quarterly) noise and vibration monitoring at construction sites, supporting facilities, and nearby sensitive receptors • Compare noise and vibration monitoring results with Government of Indonesia (GoI) standards (the Minister of Environment Decree No. 48 of 1996 on Noise Level Standards and Decree No. 49 of 1996 on Vibration level	• Mitigation measures are conducted on a weekly or monthly basis as appropriate. • Noise monitoring is conducted as follows: - Once prior to commencement of construction activities. - Quarterly or semi-annually during	• Conduct noise and vibration monitoring at baseline sampling locations, while ensure that selected sites are representative of sensitive receptor areas (e.g., community settlements, environmentally sensitive sites).	• The contractors, including their sub-contractors and primary suppliers. • PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	facilities, and other sensitive areas to minimize potential noise and disturbance. • Install a temporary fence around construction sites, particularly those adjacent to residential areas or other sensitive locations. • Undertake periodic maintenance of equipment and machinery during construction phase. • Provide project workers working near noisy equipment and machinery with silencers or mufflers.	Standards) to verify the effectiveness of control measures and inspections • Use the accredited laboratory to collect and analyze noise and vibration samples	construction activities. - Once within three months after completion of construction activities.	• Other mitigation and monitoring measures are conducted at: - active construction sites, - access roads used for construction activities. - the operation of auxiliary facilities.	work including CESMP implementation.
Release of GHG emissions due to project's construction activities	• Implement the prescribed air-quality mitigation measures to reduce GHG emissions from equipment, machinery, and vehicle operations. • Conduct regular GHG inventories during the construction phase, focusing on fuel use and electricity consumption • Strictly prohibit open burning of construction waste and solid waste at all construction sites and supporting facilities. • Maintain and service all machinery and equipment according to the manufacturer's schedule and specifications throughout construction. • Use energy-efficient appliances and vehicles, and plan the most efficient routes for project vehicles to avoid unnecessary fuel and electricity use.	• The contractor shall conduct regular monitoring and recording of fuel and electricity consumption at the construction sites and its supporting facilities on a regular/monthly basis. • This monitoring can be used as activity data for calculating construction-related GHG emissions. The findings should be compared against applicable standards and documented to verify the effectiveness of implemented control measures and inspections.	• Mitigation measures are conducted on a weekly or monthly basis as appropriate. • GHG monitoring is conducted on a monthly basis based on fuel and electricity consumption.	• Active construction sites. • The operation of auxiliary facilities.	• The contractors, including their sub-contractors and primary suppliers. • PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.
Water pool/flooding and siltation on existing road drainages due to uncontrolled stormwater runoff discharges	• Develop and implement a site and stormwater control system, including practical measures to prevent stormwater runoff from entering nearby drainage channels. This includes installing a temporary settling pond during terminal and depot construction to collect runoff, allow sediment to settle, and ensure the pond is cleaned regularly. • Coordinate with local communities and relevant government agencies before construction to secure approval for directed stormwater discharge. • Ensure that appropriate culverts and drainage structures are included in the BRT Project's DED, based on the need to upgrade existing drainage channels along Jl. Rajawali Timur, Jl. Kebonjati, Jl. Naripan, Jl. Simpang Lima–Jl. Asia Afrika, Jl. Simpang Lima–Jl. Ahmad Yani, Jl. Sudirman, Jl. Kiaracondon/Jl. Ibrahim Adjie, Jl. Otista, Jl. Pungkur, and Jl. Moh. Toha	• Conduct quarterly (at minimum) surface water quality monitoring at the nearest water bodies adjacent to the construction sites. Compare the results with the Indonesian Water Quality Standards (Government Regulation No. 22/2021, Appendix VI – Class II). • Use the accredited laboratory to collect and analyze water quality samples. • Conduct regular site inspection and document any findings to verify the effectiveness of control measures. • Monitor construction sites, equipment and machinery by using simple checklists and forms completed with photos	• Mitigation measures are conducted on a weekly or monthly basis as appropriate. • Water monitoring: - Monitoring is conducted once prior to construction. - Quarterly or semi-annually during construction activities. - Once within three months after completion of construction activities	• Active construction sites. • Water monitoring is conducted if drainage or runoff from construction sites enter nearby water courses. Monitoring locations should be placed at upstream and downstream locations from the discharge points.	• The contractors including their sub-contractors and primary suppliers. • PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.
Potential for soil and ground water	• Conduct soil and groundwater investigations before construction begins, particularly at the Cicaheum and Leuwipanjang Terminal sites, to identify any contamination from previous and on-going activities.	• Conduct soil and groundwater sampling and analysis at the Cicaheum and Leuwipanjang terminals and depots to determine whether contamination from past or ongoing activities is present. The method to conduct	• Mitigation measures are conducted on a weekly or monthly basis as appropriate.	• Active construction sites. • Workers' basecamp	• The contractors, including their sub-contractors and primary suppliers.

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
contamination at future BRT depots	• Conduct Asbestos Containing Materials (ACM) investigation prior to demolishing existing structures at Cicaheum and Leuwipanjang terminal sites. If ACM is identified, immediately notify and coordinate with the PIU, and engange with licensed contractors and certified disposal facilities to ensure safe handling, removal, and disposal. • Develop and implement an Emergency Preparedness and Response Plan (EPRP) that includes procedures for preventing and managing oil or chemical spills, ensures the availability of spill-response equipment, and covers other risks such as fire and natural hazards. • Manage sewage and wastewater from worker accommodation using a modular biofilter (wastewater treatment) system with a filtered seepage system. • Carry out land clearing in stages, limiting it to areas needed for immediate construction activities. • Rehabilitate and landscape disturbed or exposed areas promptly once they are no longer required for construction, rather than waiting for the entire corridor or facilities to be completed. • Store oil, fuel, and hazardous substances in separate, bunded, and secure storage areas equipped with waterproof flooring, overhead cover, restricted access, and a drainage system connected to an oil–water separator. • Manage hazardous and non-hazardous waste separately, including handling, storage, and disposal, in compliance with Government Regulation No. 22/2021 and/or good international industry practices. • Repair any leaks from construction vehicles and equipment immediately. • Provide dedicated storage shelters for hazardous substances and hazardous waste, and establish SOPs for handling and disposal.	these sampling and contamination should adopt good international industry practices and be undertaken by a competent third party that has proven track records in this service. • Conduct regular inspection to ensure the implementation of EPRP is properly maintained. This includes leak detection and equipment monitoring, spill kits, stormwater and drainage monitoring, and incident reports/logbook. • Monitor hazardous material and hazardous waste handling and storage using simple checklists and photo-supported forms. Ensure hazardous waste manifests, temporary storage duration limits, and transfer records to licensed collectors are properly maintained and documented.	• Soil and groundwater sampling and contamination assessment at Cicaheum and Leuwipanjang terminals and depots is conducted once prior to the commencement of construction activities; and subsequent sampling as required.	• Cicaheum and Leuwipanjang terminals and depots	• PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.
Road traffic disruption and pressure on road infrastructure along BRT on-corridor as well as off-corridor	• Implement the Traffic Management Plan and traffic engineering measures during construction in accordance with the approved ANDALALIN or other required project plans. • Close work areas located in the middle or left side of the road as required for construction. • Install warning signs or notifications to advise road users to avoid sections where BBMA BRT bus stop construction is taking place.	• Monitor and report on the implementation of the TMP on a regular basis (e.g., quarterly) to ensure compliance and effectiveness of traffic management measures. • Conduct traffic counts to monitor traffic volumes and assess potential impacts of construction activities. Traffic counting locations should, at a minimum, correspond to baseline sampling points to enable meaningful comparison and trend analysis. Based on baseline conditions, traffic counting was carried out at 48 points at 14 roads along BRT on-corridor. This	• Mitigation measures are conducted on a weekly or monthly basis as appropriate. • Traffic monitoring or counting is conducted on a quarterly basis as appropriate.	• Active construction sites. • BBMA areas and roads used for the project. • Cicaheum and Leuwipanjang Terminals and depots	• The contractors, including their sub-contractors and primary suppliers. • PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	• Refresh or clarify existing road markings to improve traffic order and safety. • Provide signs indicating alternative routes for areas where construction activities will occupy road space. • Provide safe pedestrian access and temporary facilities for walking around construction sites. • Control street vendors operating on sidewalks to ensure pedestrian paths remain clear. • Adjust and reset traffic signals at intersections to improve intersection performance. • Allow heavy vehicles to operate only during agreed low traffic periods, such as late evenings or early mornings, as approved by relevant agencies. • Impose strict sanctions on vehicles that violate traffic signs and road markings.	monitoring framework may be expanded, as appropriate, to also cover off-corridor areas. • Perform regular inspection on road condition along on- and off-corridors, pedestrian access, and the effectiveness of signage placement, as well as complaints related to traffic congestion, access disruption, or road damage through the Project's GRM.			supervising the civil work including CESMP implementation.
Affected trees and pedestrian landscape during construction	• Establish and implement a Landscape Management Plan to guide the establishment, and maintenance of green spaces, while ensuring ecological sustainability, visual quality, and enhanced air quality • Coordinate with the relevant Bandung Municipality agency responsible for trees and landscaping to obtain approval before cutting or replanting any trees. • Compensate every tree removed due to construction at a ratio of 1:5—one tree felled replaced with five new trees—subject to final agreement with Bandung Municipality regarding the ratio and species to be planted. • Prepare a tree inventory map showing all trees to be cut or replanted, including locations and photos, with special attention to mature trees. • Install clear demarcation or barriers around trees that must not be disturbed during construction\. • Preserve Angsana (*Pterocarpus indicus*) and Cinnamon (*Cinnamomum spp.*) trees in situ whenever possible, and relocate or replace them only with proper care and close supervision if removal is unavoidable. • Maintain and monitor vegetation, including newly planted trees and relocated trees, in accordance with the civil works contract requirements	• Verify the number of trees removed and new trees planted. • Monitor the implementation of tree cutting and replanting plan and report the results (such as watering, soil condition, and tree health) on a regular basis..	Mitigation measures are conducted on a weekly or monthly basis as appropriate.	• Active construction sites. • BBMA areas and roads used by the project. • Cicaheum and Leuwipanjang Terminals and depots	• The contractors, including their sub-contractors and primary suppliers. • PIU (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.
Potential local economy development surrounding BRT BBMA areas.	• Communicate employment and business opportunities, including requirements and qualifications, to local communities and vendors in a transparent, timely, and easy-to-understand manner.	• Monitor changes in employment attributed to the project, including both increases and decreases, as well as any new sectors that emerge (e.g., trade or services supporting project activities).	• Mitigation measures are implemented during pre-construction phase.	• The location where the project-affected persons (PAPs), particularly small business owners,	• PIU (under DG Road Transportation) assisted by the Design

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	• Coordinate with local government offices on workforce needs and ensure equal opportunity and non-discrimination for poor households, disadvantaged groups, and women. • Prioritize hiring local workers and engaging local entrepreneurs and small- and medium-sized enterprises (SMEs) to supply goods and services, as long as they meet the specified criteria. • Implement the SEP and GRM effectively, ensuring timely disclosure of project information and responsive handling of community inquiries and complaints	• Monitor the transparency and fairness of the livelihood restoration process for affected business owners, street vendors, and street parking operators, ensuring that implementation aligns with their identified rights. • Periodically assess the effectiveness of LARAP and GRM implementation, including community satisfaction with the solutions provided. • Monitor the number of affected small business owners, street vendors, and street parking lots participating in the project, compare it with the data identified in LARAP. • Monitor the distribution of Project Information Brochures (PIBs) in local and national languages and evaluate their understanding of the information provided through surveys and interviews.	• Monitoring actions are conducted quarterly or semi-annual basis as appropriate.	street vendors and street parking lots, are working.	and Supervision Consultant • The sub-national governments (Bandung municipality) including related agencies of BBMA.
Access restriction and increased traffic congestion primarily within the BRT on-corridor	• Develop a site-specific Traffic Management Plan (TMP) and obtain approval from the Implementing Agency. The TMP should outline measures to manage and monitor traffic impacts during mobilization, demobilization, and construction, in line with the Traffic Impact Assessment (ANDALALIN). • Conduct socialization to potentially affected parties (angkot, adjacent road users, and business owners) prior to any construction activities that may result in livelihood impairments, access restrictions, and traffic disruptions • Analyze concerns from affected parties, such as business owners, street vendors, and angkot operators, through perception surveys and media monitoring to identify access issues and traffic congestion caused by construction activities. • Provide temporary public access routes to areas affected by partial road closures or construction barriers to maintain mobility for communities and businesses. • Implement a functional Grievance Redress Mechanism (GRM) with clear procedures, timelines, and assigned responsibilities to ensure timely and effective resolution of traffic- and access-related complaints.	• Conduct surveys with business owners, street vendors, angkot operators, and nearby residents regarding their perception of project-related congestion and access disruption. • Inspect regularly about the effectiveness of traffic control measures (signage, flaggers, barriers, lighting, and temporary access provisions) • Check and verify the effectiveness of GRM functionality (GRM channel, records, and reporting).	• Mitigation measures are implemented during the construction phase. • Monitoring actions are conducted on a monthly or quarterly basis and the results are reported monthly, quarterly and semi-annually as appropriate.	• Active construction sites • PAP affected areas within the BRT corridors and service routes • Cicaheum and Leuwipanjang terminals and depots	• The contractors, including their sub-contractors and primary suppliers. • PIUs (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.
Marginalization of vulnerable groups of people, including gender-based violence risk	• Prepare a Contractor Environmental and Social Management Plan (CESMP) that includes a Code of Conduct (CoC) with clear rules and sanctions for preventing and addressing gender-based violence,	• In the presence of vulnerable workers, monitor the implementation of mitigation measures as described in the C-ESMP • Monitor and data collection in pertaining to grievance/feedback received through worker GRM, particularly for issue of vulnerable workers and	• Mitigation measures are implemented during the construction phase. • Monitoring actions are conducted on a	• Active construction sites • PAP affected areas within the BRT	• The contractors, including their subcontractors, are responsible for implementing the CESMP.

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	including SEA/SH, involving workers and nearby communities. • Conduct mandatory induction and refresher training to project workers regarding CoC and GBV/SEA/SH prevention, including clear communication of sanctions and contract termination for violations. • Provide accessible and inclusive facilities for vulnerable workers (e.g., universal access in accommodation, sanitation, and work areas, separated women facilities with sufficient lighting, etc.) in coordination with the contractor. • Establish a survivor-centered GBV/SEA/SH grievance system ensuring confidential and safe reporting and referral to licensed service providers. This specified GRM should separate from the project-wide GRM and include clear timelines, confidential reporting channels, and defined responsibilities. • Establish coordination with external service providers experienced in GBV incident mitigation as referral for GBV case handling • Ensure worker living conditions meet national minimum standards, including access to sanitation, clean water, and social protection services • Promote increased representation of women in decision-making and supervisory roles within the project. • Conduct appropriate background checks on all project workers, especially those in supervisory or community-facing positions. • Foster a supportive, non-retaliatory work environment to encourage safe reporting of grievances and misconduct.	GBV/SEAH, ensure that the grievance/feedback is being timely and sufficiently addressed and documented. • Monitor the GBV cases reported through the dedicated GBV-GRM channel, ensure that each case is treated in a confidential manner, with the consent of the victim/survivor, and in coordination with experienced external service providers for the required handling. • Interview to some workers especially female worker regarding their working condition • Presented and reporting periodically labor monitoring activity. • Observation at nearby locations regarding the possibility of GBV/SEAH cases which may involve the project workers	monthly or quarterly basis and the results are reported monthly, quarterly and semi-annually as appropriate.	corridors and service routes • Workers' basecamp • Cicaheum and Leuwipanjang terminals and depots	• PIUs (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.
Disturbance on cultural heritage objects including unaesthetic impacts	• Conduct a Heritage Impact Assessment (HIA) before construction begins to assess the condition of historic buildings, evaluate potential project impacts, and recommend avoidance or mitigation strategies. • Implement all HIA-recommended mitigation measures when carrying out construction activities near heritage structures. • Carry out regular visual inspections and photographic documentation before, during, and after construction to detect early signs of structural stress, cracking, or surface damage. • Clearly demarcate and secure construction areas to prevent accidental disturbance to known or unknown cultural heritage features	• Monitor implementation of the mitigation measures and recommendation in the HIA through regular inspections and monitoring report. • Daily checks by project supervisors to ensure that the construction activities are suspended (for the interim) if unexpected cultural objects are identified. • Conduct site inspections to verify the installation of fences and warning signs in the unexpected object discovery. • Check for complete documentation of the chance find procedures competed by photos and notes.	• Mitigation measures are implemented during the construction phase. • Monitoring actions are conducted on a monthly or quarterly basis and the results are reported monthly, quarterly and semi-annually as appropriate.	• Within the BRT on-corridors where the cultural heritage buildings are located • Other BRT corridors where cultural heritage may be identified.	• The contractors, including their subcontractors, are responsible for implementing the CESMP. • PIUs (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	• Develop and disseminate a Chance Find Procedure to all workers and contractors to ensure proper handling of any cultural resources discovered during excavation. • Immediately report any cultural heritage findings to the project supervisor and implementing agencies, and halt construction activities in the affected area until clearance is granted. • Use low-vibration construction methods and restrict heavy equipment movement near sensitive heritage buildings to minimize vibration, dust, and physical stress.				work including CESMP implementation.
Poor labor and working conditions including unmitigated exposure to health and safety risks	• Establish an Occupational Health and Safety (OHS) management system and appoint a a qualified Construction OHS Expert • Adopt and implement Labor Management Procedure (LMP) developed by MASTRAN into the C-ESMP • Promote local employment opportunities, including construction workers and BRT operations staff (e.g., drivers, maintenance, and management employees), applying fair hiring principles and strict age verification to ensure compliance with labor standards. • Develop and implement contractors' Occupational Health and Safety (OHS) Management Plans in compliance with the Labor Management Procedures (LMP) and align with the World Bank Group (WBG) General EHS and Infrastructure Sector Guidelines. This management plan should include: - Training for all workers on relevant aspects such as emergency preparedness, working at height, and safe handling of hazardous materials - Risk Hazard Assessments (RHA) and development of hazard maps within the BRT corridor. • Ensure safe working and living conditions for workers, including: - Safe and secure access to construction sites with proper signage and barriers - Adequate basecamp facilities with free access to clean water, proper ventilation, and comfortable resting areas • Provide workers with written contract with clear terms of employment, ensuring reasonable working hours, adequate rest days and insurance coverage • A functional and accessible Grievance Redress Mechanism (GRM) for workers should be provided and monitored.	• Supervise the workers and assess their compliance with the LMP, including conducting disciplinary checks and supervision through internal audits. • Monitor the recruitment process transparently and ensure that the number of workers required, criteria set, and selection methods are followed, including monitoring the implementation of fair selection. • Monitor the implementation of working conditions and obligation clauses in tender documents, including minimum age requirements. Verify through employment contracts as well. • Monitor safety and security procedures (K3, LOTO, JSA, use of PPE), worker age verification and possibility of forced labor. • Monitor delivery of OHS and emergency preparedness training, keeping records of frequency, attendance, and effectiveness • Inspect construction sites and basecamps regularly to ensure safe access, clean water, sanitation, proper ventilation, housekeeping, and designated smoking areas. • Verify workers' insurance coverage through policy records and random worker checks; monitor accident reports and claims. • Monitor functionality and accessibility of the GRM through review of complaint records, resolution timelines, visibility of information, and worker awareness. • Monitor and document any occupational incidents and near-miss occurrences among workforce	• Mitigation measures are implemented during the construction phase. • Monitoring actions are conducted on a monthly or quarterly basis and the results are reported monthly, quarterly and semi-annually as appropriate.	• Active construction sites • Workers' basecamp • Cicaheum and Leuwipanjang terminals and depots	• The contractors, including their subcontractors, are responsible for implementing the CESMP. • PIUs (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
Disturbance to community health and safety	• Provide CESMP prior to construction activity which includes community health and safety mitigation strategies. • Socialize GBV prevention Code of Conduct (CoC) to all project workers, ensure all workers understand and acknowledge • Provide and prioritize job opportunities for local laborers to minimize impacts from labor influx • Provide adequate sanitation facilities and maintain a healthy working environment, including conducting mosquito eradication activities to prevent vector-borne diseases. • Provide community awareness programs on construction hazards and temporary access restrictions. • Install safety barriers, signage, and fencing to protect public areas. • Implement Traffic Management Plan (TMP) for construction zones. • Apply mitigation measures to control air emissions, noise, and surface water pollution as outlined above • Coordinate with local authorities to manage temporary utility disruptions. • Establish an accessible and functional Grievance Redress Mechanism (GRM) to address concerns, expectations, and inputs from affected communities	• Conduct regular inspection and monitor the quality of sanitation infrastructure, vector control measures, and overall hygiene management • Monitor functionality and accessibility of the community GRM through review of complaint records, resolution timelines, visibility of information, and community awareness. • Evaluate the effectiveness and adequacy of traffic management strategies and pedestrian safety provisions within and adjacent to construction zones. • Monitor air emissions, noise, and surface water pollution as outlined above	• Mitigation measures are implemented during the construction phase. • Monitoring actions are conducted on a monthly or quarterly basis and the results are reported monthly, quarterly and semi-annually as appropriate.	• Surrounding community areas affected by construction zones • Roads and pedestrian areas near construction zones • Workers' basecamp	• The contractors, including their subcontractors, are responsible for implementing the CESMP. • PIUs (under DG Road Transportation) assisted by the Design and Supervision Consultants is responsible for supervising the civil work including CESMP implementation.

C. Operation Phase

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
Air quality impacts from the operation of internal combustion engine (ICE) buses	• Ensure all internal combustion engine (ICE) buses comply with stringent emissions standards, preferably Euro IV or higher. • Maintain all vehicles, especially engines, fuel systems, and exhaust systems, in good mechanical condition through scheduled servicing and preventive maintenance. • Implement and enforce anti-idling policies at terminals, depots, and major stations to reduce localized pollutant buildup. • Prioritize the deployment of electric buses in densely populated areas, near schools or hospitals, and along narrow road segments where pollutants can accumulate more easily. • Install adequate ventilation and emissions control systems in bus depots to ensure proper air circulation and minimize indoor air pollution. • Integrate the BRT with feeder services and progressively reorganize informal paratransit (angkot) to reduce overall vehicle volume and maximize emission-reduction benefits on the corridor. • Conduct regular ambient air quality monitoring at critical locations, especially around terminals and segments with vulnerable populations.	• Conduct a periodic air quality monitoring using the methodology stipulated in the Government Regulation No. 22 Year 2021 – Appendix VII: Ambient Air Quality Standard; and • Use the accredited laboratory to collect and analyze the air samples. • Conduct regular inspections and verify the validity of all driving licenses as well as maintenance records for buses • Conduct annual review on the operational BRT system, including related to the implementation of bus idling and scheduling efficiency.	• Mitigation measures are conducted on a monthly or quarterly basis as appropriate. • Air quality monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Conduct air quality at baseline sampling locations, while ensure that selected sites are representative of sensitive receptor areas (e.g., community settlements, environmentally sensitive sites). • Other mitigation and monitoring measures are conducted at: - Terminals and depots, - BRT on- and off-corridors, including bus stops and bus shelters.	PIU (under DG Road Transportation) and BBMA BRT operations team
Overall reduction in noise impacts	• Design stations to minimize sound reflection, avoiding hard surfaces that amplify noise • Enhance landscaping buffers using vegetation or trees around terminals and depots • Maintain buses' conditions regularly, including lubrication, brake inspections, tire pressure checks, and exhaust systems • Install low-noise tires on all BRT buses to reduce rolling noise • Enforce speed limits in sensitive areas (e.g., 30 km/h near schools, hospitals, and residential zones). • Optimize bus scheduling to prevent long idling and overlapping arrivals • Train drivers in eco-driving and noise-reduction practices. • Monitor noise levels regularly to identify hotspots and trigger timely mitigation actions.	• Conduct a periodic noise monitoring using the methodology stipulated in the Minister of Environment Decree No. 48 of 1996 concerning noise level standards • Use the accredited laboratory to collect and analyze the noise levels. • Conduct regular inspections and verify the validity of all driving licenses as well as maintenance records for buses • Conduct annual review on the operational BRT system, including related to the implementation of bus idling and scheduling efficiency, driving adherence to noise-reducing practices, landscaping buffer conditions, etc.	• Mitigation measures are conducted on a monthly or quarterly basis as appropriate. • Noise monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Conduct noise monitoring at baseline sampling locations, while ensure that selected sites are representative of sensitive receptor areas (e.g., community settlements, environmentally sensitive sites). • Other mitigation and monitoring measures are conducted at: - Terminals and depots, - BRT on- and off-corridors,	PIU (under DG Road Transportation) and BBMA BRT operations team

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
				including bus stops and bus shelters.	
Direct GHG emissions from the operation of BRT buses, depots, charging stations, etc	• Maintain and optimize all air conditioning systems in buses, terminals, depots, and offices using regular servicing and low-GWP refrigerants. • Maximize energy efficiency in depots, terminals, and offices through LED lighting, smart controls, proper insulation, and operating air-conditioners at optimal temperatures. • If possible, prioritize clean electricity sources via rooftop solar PV or other renewable energy options for depots and terminals. • Ensure proper wastewater management at depots and terminals to prevent methane and nitrous oxide emissions. • Implement a GHG inventory and monitoring plan to track energy consumption, refrigerant leaks, and wastewater management practices.	• Monitor and record consumption of fuel, refrigerants, and electricity, categorized by type (e.g., diesel, pertamax, R134a, R410A, etc.), on a monthly basis • Conduct regular inspections of lighting, smart controls, and insulation performance to ensure optimal energy efficiency, with findings documented and corrective actions implemented promptly	• GHG monitoring is conducted on a monthly basis based on fuel, refrigerant/air cooling, and electricity consumption. • Other mitigation measures are conducted on a monthly or quarterly basis as appropriate.	• BRT terminals and depots, including office operations • BRT bus stations	PIU (under DG Road Transportation) and BBMA BRT operations team
Flooding and inundation due to stormwater runoff, and surface water pollution due to domestic wastewater from terminals and depots area	• Ensure drainage systems at terminals and depots have sufficient capacity to manage stormwater during heavy rainfall and prevent flooding or operational disruptions • Install oil separators at bus depots and washing areas to capture hydrocarbons and lubricants from runoff during rainfall. • Use permeable paving or green buffers around BRT infrastructure to increase infiltration and reduce runoff. • Conduct bus washing and maintenance only in contained areas with wastewater treatment systems to prevent contaminants from entering drains. • Ensure bus depot wastewater is properly collected in storage tanks and treated via dedicated bus-washing WWTPs and collector basins before discharge into the municipal sewer network • Clean platforms, parking areas, and tracks regularly to minimize pollutant accumulation and runoff during rainfall • Establish and implement waste management procedure by ensuring that hazardous and non-hazardous waste generation are managed properly. Non-hazardous solid waste should be placed in properly covered and segregated containers, while hazardous waste is stored	• Perform routine inspections, maintenance, and performance checks of drainage systems as well as WWTPs at Leuwipanjang and Cicaheum depots to ensure consistent treatment efficiency and compliance with regulatory standards. • Conduct a periodic monitoring of treated effluent quality prior to discharge to nearby water courses. Use the accredited laboratory to collect and analyze the effluent samples. • Conduct regular inspections to ensure cleanliness and proper housekeeping, including reviewing the waste management logbooks to verify proper waste segregation, storage, and disposal practices.	• Mitigation measures are conducted on a monthly or quarterly basis as appropriate. • Wastewater effluent monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Conduct wastewater effluent monitoring at designated discharge points where BRT WWTP is located • Other mitigation and monitoring measures are conducted terminals and depots	PIU (under DG Road Transportation) and BBMA BRT operations team

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	in designated, covered, and impermeable containment areas.				
Groundwater abstraction to meet water supply demand for the operation of BRT systems	• Install low-flow fixtures, efficient washing systems, and conduct routing leak detection to ensure optimal water efficiency • Implement rainwater harvesting where feasible for non-potable uses (e.g., vehicle washing, surface cleaning) to reduce groundwater reliance. • Restrict groundwater extraction to licensed volumes and ensure regular monitoring and reporting. • Establish groundwater monitoring wells at or near depots to track levels and enable early operational adjustments.	• Monitor water consumption and compare it with historical usage to identify abnormal patterns and potential water saving/efficiency measures • Monitor groundwater abstraction volumes against licensed limits through regular meter readings and reporting • Conduct regular water quality sampling of extracted groundwater to assess compliance with regulatory standards and ensure suitability for operational use	• Mitigation measures are conducted on a monthly or quarterly basis as appropriate. • Groundwater quality monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Groundwater quality monitoring at all BRT groundwater well locations • Other mitigation and monitoring measures are conducted terminals and depots	PIU (under DG Road Transportation) and BBMA BRT operations team
Remaining localized traffic congestion at certain road sections during peak hours due to the operation of BRT	• Implement ANDALALIN recommendations to optimize traffic circulation and ensure efficient BRT operations. • Enforce strict parking and stopping prohibitions within stations and BRT corridors to maintain unobstructed bus lanes and traffic flow. • Regulate and manage street vendors occupying sidewalks to minimize obstruction and preserve pedestrian accessibility • Monitor and control roadside obstructions, including illegal parking and unauthorized vendors, especially at intersections, to maintain optimal traffic flow • Coordinate with traffic police and local authorities to enforce traffic rules and respond to congestion hotspots. • Conduct awareness campaigns targeting passengers, pedestrians, and drivers to promote responsible behavior near BRT corridors. • Apply strict penalties and corrective measures for violations of traffic regulations. • Implement Transportation Demand Management (TDM) initiatives to encourage public adoption of communal transport, including electric BRT buses.	• Record and analyze all traffic violations and apply sanctions to non-compliant vehicles. • Conduct regular inspection on sidewalks and intersections to ensure removal of obstacles and maintain clear access • Monitor public participation in Transportation Demand Management (TDM) initiatives and track increases in public transit ridership • Assess and verify the implementation and effectiveness of traffic management measures following recommendations in the ANDAL Lalin and Traffic Management Plan.	• Mitigation measures are conducted on a monthly basis as appropriate. • Monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Key road intersections • BRT corridors • Sidewalks along BRT corridor • Cicaheum and Leuwipanjang Terminals/depots	PIU (under DG Road Transportation) and BBMA BRT operations team
Labor and working condition issue which including occupational health and safety	• Provide good work conditions and environments to workers, including adequate sanitation, ventilation and/or air conditioning system, procedures and good housekeeping practices and dedicated smoking area/room • Establish work procedures incorporating a comprehensive Health, Safety, and Environmental (HSE)	• Maintain and review records of HSE system procedures and training implementation. • Track and report worker incidents/accidents and near-misses. • Conduct audits and inspections for compliance with PPE use and safe work practices. • Periodically verify and update hazard maps.	• Mitigation measures are conducted on a monthly or quarterly basis as appropriate. • Monitoring actions are conducted on a monthly or quarterly basis and the results	• Cicaheum and Leuwipanjang terminals and depots • BRT corridors	PIUs and related government agencies such as Transportation Agencies of BBMA

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	management system to ensure all workers are systematically protected from occupational hazards • Provide workers with appropriate terms and conditions of employment, equal opportunities, fair benefits, insurance coverage, etc., following the prevailing regulations • Provide vulnerable workers with adequate accommodating facilities that can address their specific needs, such as universal access, separated sanitation facilities, minimized nigh working hours for female workers, etc. • Conduct a thorough Risk Hazard Assessment (RHA) and develop a detailed hazard mapping framework along the entire BRT corridor, ensuring that structural designs incorporate earthquake resilience measures and do not impede or redirect natural flood flows, while facilitating effective stormwater drainage. • Provide and socialize hazard and emergency warning system, safety barriers, signage and emergency exits and scenarios. • Prepare and implement an Occupational Health and Safety (OHS) management training for all workers, including emergency response training • Implement fair and equitable hiring practice, overseen by the Project Manager, to prevent the engagement of unqualified personnel. • Establish an accessible and functional worker Grievance Redress Mechanism (GRM) separate from the community GRM to address concerns, expectations, and inputs from workers.	• Monitor completion, attendance, and effectiveness of worker training programs. • Regularly verify age documentation and hiring compliance. • Inspect structural designs and drainage systems for adherence to safety standards. Track worker complaints via GRM.	are reported monthly, quarterly and semi-annually as appropriate.		
Community health and safety issues (e.g., traffic accidents) during operational activity	• Enhance lighting and security features at bus stops and terminals, as well as coordinate with local police in provision of contact number for response or guard, especially if there is a heightened risk of security. • Implement good housekeeping and good sanitation practice at BRT facilities and service areas. • Establish and socialize functional and accessible GRM channels for all passengers and adjacent communities • Conduct a risk hazard assessment (RHA) and develop a detailed hazard map within the BRT corridor. Ensure that structural designs mitigate seismic risks, avoid obstruction or diversion of flood flows, and enhance drainage efficiency. • Prepare and implement an OHS management plan and training for all workers, including on emergency	• Record and report number of safety and security incidents at bus stops and terminals • Monitor the cleanliness of BRT facilities and service areas • Conduct regular inspection to check functionality and adequacy of lighting and security measures, sanitation, and emergency response facilities • Evaluate and update regularly RHA and hazard maps • Document training completion records and emergency drill • Track complaints via GRM	• Mitigation measures are conducted on a monthly and quarterly basis as appropriate. • Monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Cicaheum and Leuwipanjang terminals and depots • Ledeng and Antapani terminals • Roads along BRT corridors • Bus stations and bus stops	PIUs and related government agencies such as Transportation Agencies of BBMA

Anticipated Impacts	Mitigation Measures	Monitoring Action/Indicator	Schedule/Monitoring Frequency	Mitigation/Monitoring Area	Main Responsibility
	scenarios and evacuation procedures and provide contact numbers for emergency response. • Provide officers stationed at the entry/exit of the bus stop and terminal that will also conduct routine inspection and patrol to monitor safe and secure condition of buses and passengers traffic.				
Reduced or Loss of Incomes and livelihoods of Angkot Operators	Pending to the result of study for angkot drivers, the following are considered options for mitigation measures: • **Gradual Angkot Reform Option** - Inviting operators of all angkot routes which are impacted by the project to become BRT operators by establishing consortium or other business entities within five to seven years' time frame (gradually). A such, the angkot drivers can be employed by the consortium to be the feeder operator as part of the BRT system. • **BRT Feeder Operator Option** - Inviting all affected angkot operators to become BRT feeder operators (provide services from and to BRT stations) and provide employment opportunities for angkot drivers. The detailed mitigation measures will be presented in a separate project-level angkot integration plan/ public transport reform, which is part of the project's sub-component 1.C on 'Angkot Reorganization' of the overall MASTRAN project. This document shall include details on the establishment of the subnational- public service enterprise (Badan Layanan Usaha Daerah or BLUD) to govern and manage the BRT operations and action plans to mitigate negative impacts on the affected angkot drivers in Bandung Basin Metropolitan Area (BBMA).	Pending to the result of study for angkot drivers, the following mitigation strategies to be adapted with the selected option for livelihood restoration of angkot drivers: • Monitor the number of angkot operators affected by the project and/or switch job due to the presence of the BRT operations • Conduct regular audit to ensure compliance with TMP measures (signage, road diversion, pedestrian safety). • Document stakeholder consultation records and feedback from affected operators.	• Mitigation measures are conducted on a monthly and quarterly basis as appropriate. • Monitoring is conducted on a quarterly basis, and reported on a semi-annual basis as appropriate	• Affected angkot routes along BRT corridor area	PIUs and related government agencies such as Transportation Agencies of BBMA

9.2. Institutional Roles and Responsibilities

As shown in the following figure, the Ministry of Transportation (MOT) is the implementing agency for the project (at national level) and responsible for overall project implementation, including the ESMP of BBMA. The MOT will provide technical assistance to sub-national governments related to project preparation and implementation of the Indonesia Mass Transit. A Project Steering Committee (PSC) and a Project Management Unit (PMU) have been established under the Directorate General of Land Transportation (DGLT) of the MOT. The project steering committee, chaired by Director General of Land Transportation of MOT. The PMU led by the Secretary of DGLT is responsible for carrying out day-to-day management, implementation and coordination of the project and supported by the Director of Road Transportation of MOT as coordinator.

The PMU will be supported by a Program Management Consultant (ProgMC) to assist DGLT in implementing the institutional and capacity development meanwhile the Project Management Consultant (PMC) already onboard to assist the PMU in day-to-day management of the BRT project implementation. The DGLT is also responsible for the development of BRT infrastructure and system and supported by a project implementation Unit (PIU) has also been established under Directorate of Road Transportation of DGLT.

The PIU will be led by the Director of Road Transportation of MOT and responsible for managing contracts related to the development of the BRT. The PIU will be supported by Detailed Engineering Design and Supervision (DEDS) Consultant to design the BRT systems and supervise the implementation of civil and other physical works until completion. Sub-national governments, including West Java Province and related local/sub-national government at BBMA level will be responsible in implementing LARAP and other obligations in the ESMP.

Figure 40. Organization of BBMA – BRT Project

9.3. Monitoring, Capacity Building and Budgeting

Adequate budget, safeguard, biodiversity and other specialists required, as well as budget items for ESMP implementation, monitoring and reporting should be made by the PIU in the bidding and contract documents. These include the budgets and resources for training the workers of contractors including sub-contractors and primary suppliers. on E&S implementation, monitoring, and reporting. The PIU through its PMC and/or Design and Supervision Consultants would develop fit-for-purpose training materials on E&S safeguards and provide required trainings to the workers and project personnel responsible for implementing and monitoring the implementation of CESMP including associated management plans. The training is anticipated to consist of two levels, including:

- E&S awareness/induction targeted for all workers; and
- Specific E&S training in technical subjects and interests targeted for technical experts, supervisors, staff, and managerial level and above. These subjects and interests may include, among others: The Bank's ESSs 1, 2, and 3 including its key requirements; E&S safeguard documents and its obligations; Grievance redress mechanisms; and implementation of the project's CESMP, LARAP, SEP, LMP, HIA including monitoring and reporting requirements.
- Regular monitoring will need to be undertaken throughout the project lifecycle. Monitoring results of environmental components such as air quality, noise and vibration, surface water quality, groundwater quality shall be assessed against applicable national and international quality standards. The frequency of monitoring and reporting for the required environmental and social components is proposed vary from a monthly, quarterly, and semi-annually basis as defined in this ESMP as well as CESMP to be developed by the contractors.
- Semi-annual E&S monitoring report and other safeguard reporting requirements will be prepared by the PMU during the construction phase for submission to the Bank, incorporating the semi-annual CESMP implementation (monitoring) reports. This semi-annual monitoring report of the Project will be prepared for the period of January – June and July – December and submitted to the Bank no later than 30 calendar days after the end of each semester. In addition, the summary of CESMP implementation and monitoring should be included as integral section of the Project's progress reports prepared by the contractor on quarterly basis. In terms of meeting government requirements, the Project will also need to prepare the RKL-RPL (Indonesian EMP) monitoring report for submission to respective environmental agencies, both national and sub-national level as appropriate.
- In the event of any design changes that may cause significant E&S impacts or unanticipated E&S impacts not covered in this ESIA, the PIU and/or PMU are required to inform the Bank of an amendment that may be required to the E&S safeguard documents.
- The ESMP will be implemented and reported during the 12 to 18-month construction schedule including commissioning of the BRT project, and this implementation schedule would continue in the event of contract timeline extension is granted. Cost items and budget of EHS and social aspects to be included in the bidding documents and proposed

by the bidder is indicatively listed in the following table. The estimated cost of the CESMP implementation for the BBMA BRT project is approximately USD 940,000 but this figure is subject to change and evaluation, depending upon the work method and quality of specialist and services to be proposed by each contractor. Indicative cost items for the CESMP implementation are presented in the following table.

Table 68. Indicative Cost Items for CESMP Implementation and Capacity Building

EHS and Social Aspects	Cost Items to be Included in the Bidding and Contract Documents (Indicative)
Subject matter experts	H&S construction specialist including his assistance Environmental specialist Paramedic and/or Medical Doctor Road traffic coordinator Structural engineer Mechanical and Electrical engineer Social specialist Stakeholder engagement specialist
Development of project-specific management plans and monitoring reports	CESMP LMP Code of Conduct Building Heritage Impact Assessment Health and Safety Management Plan
Induction, training, and monitoring	EHS and Social induction Safety toolbox talks Training on mitigation of high-risk activities and environmental impacts OHS monitoring
Personnel protective equipment and fire safety	Safety net Identity card for project workers Safety helmet Safety shoes with steel toe cap Goggles Earmuff/plug Gloves Fire extinguishers
Occupational health	First aider and facilities Fogging equipment HIV check and drugs
Environmental	Handling and disposal of hazardous and non-hazardous wastes including construction wastes Portable toilets at construction sites and contractor's basecamps Air quality and water sampling Noise measurement

EHS and Social Aspects	Cost Items to be Included in the Bidding and Contract Documents (Indicative)
	Water spraying for dust suppression Installation of automatic air quality and noise level monitoring stations
Social related aspects	Stakeholder engagement, socialization, and information disclosure events Provision of GRM channels for stakeholders, workers, and for GBV incidents Coordination with third party provider for GBV case handling GBV prevention, HIV/AIDS and communicable diseases awareness campaign Perception survey
Others	BPJS accident insurance Ambulance Signage, poster, etc., for health & safety warning and campaigns

10. REFFERENCES

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ANNEXES

Annex A: UKL-UPL Administrative Screening of BBMA BRT Project

Annex B: Approval and Final Report Traffic Impact Assessment (ANDAL Lalin)

Annex C: Minutes of Public Consultation Already Conducted

Annex A: UKL-UPL Administrative Screening of BBMA BRT Project

DINAS LINGKUNGAN HIDUP PROVINSI JAWA BARAT

Istana Kawaluyaan, Jl. Kawaluyaan Indah Raya No.6, Jatisari, Kec. Buahbatu,
Kota Bandung, Jawa Barat 40286
Telepon 022-87353565;

HASIL UJI ADMINISTRASI UKL-UPL Pembangunan Bus Rapid Transit (BRT) di Cekungan Bandung (BBMA) oleh Kementerian Perhubungan - Direktorat Jenderal Perhubungan Darat - Direktorat Angkutan Jalan		
Nomor Registrasi [1)]	:	6644bdaa45dda
Nama Kegiatan [2)]	:	Pembangunan Bus Rapid Transit (BRT) di Cekungan Bandung (BBMA)
Jenis Dokumen [3)]	:	UKL-UPL
Kewenangan [4)]	:	Provinsi Jawa Barat
Lokasi Rencana Kegiatan dan keterkaitannya dengan lokasi khusus [5)]	:	Kebon Jeruk, Andir, Kota Bandung, Jawa Barat Kota Bandung Provinsi Jawa Barat
Pemrakarsa [6)]	:	Kementerian Perhubungan - Direktorat Jenderal Perhubungan Darat - Direktorat Angkutan Jalan
Penyusun [7)]	:	Tim Penyusun Mandiri 1. E V Sugiharto () 2. Herman Loekman, SP, MM ()

Hasil Uji Berkas Administrasi:	Dikembalikan untuk Perbaikan
Catatan untuk pemrakarsa:	mohon mengirimkan softfile dokumen dengan ketentuan yang tercantum pada tautan berikut: https://bit.ly/PengajuanDokumenLingkunganJabar dan dikirimkan melalui email doklingdlhjabar@gmail.com untuk progres pemeriksaan kelengkapan administrasi dapat dilihat pada tautan berikut: https://sikeling.jabarprov.go.id/antriandokumenlingkungan terima kasih

FORM KELENGKAPAN ADMINISTRASI
Pembangunan Bus Rapid Transit (BRT) di Cekungan Bandung (BBMA) oleh Kementerian Perhubungan - Direktorat Jenderal Perhubungan Darat - Direktorat Angkutan Jalan

NO	KELENGKAPAN ADMINISTRASI	ADA	TIDAK ADA	SESUAI	TIDAK SESUAI	KETERANGAN
1.	Justifikasi / bukti kesesuaian lokasi rencana usaha dan/atau kegiatan dengan RTRW yang berlaku (KKPR yang diterbitkan lembaga berwenang)	V		V		
2.	Justifikasi/bukti kesesuaian lokasi rencana usaha dan/atau kegiatan dengan PIPPIB	V		V		
3.	Justifikasi/bukti kesesuaian lokasi rencana usaha dan/atau kegiatan dengan Kawasan Lindung	V		V		
4.	Justifikasi / bukti persetujuan awal rencana usaha dan/atau kegiatan	V		V		
5.	Kelengkapan layout peta dalam format PDF beserta data spasial SHP sesuai juknis Amdalnet	V		V		
6.	Sistematika penyusunan formulir sesuai dengan PP 22 Tahun 2021	V			V	mohon mengirimkan softfile dokumen dengan ketentuan yang tercantum pada tautan berikut: https://bit.ly/PengajuanDokumenLingkunganJabar dan dikirimkan

1. Dokumen ini sah, diterbitkan sistem Amdalnet berdasarkan data dari Pemrakarsa Pemerintah, tersimpan dalam sistem Amdalnet dan menjadi tanggung jawab Pemrakarsa Pemerintah.
2. Dalam hal terjadi kekeliruan isi dokumen, maka akan dilakukan perbaikan sebagaimana mestinya.

Sekretariat TUK Provinsi Jawa Barat
Dibuat Tanggal : 02 Desember 2025, 14:03:28 WIB Dicetak Tanggal 04 Desember 2025, 07:47:26 WIB
Operator Administrasi : Lela Rochmah Komalasari, S.T

DINAS LINGKUNGAN HIDUP PROVINSI JAWA BARAT
Istana Kawaluyaan, Jl. Kawaluyaan Indah Raya No.6, Jatisari, Kec. Buahbatu,
Kota Bandung, Jawa Barat 40286
Telepon 022-87353565;

FORM KELENGKAPAN ADMINISTRASI Pembangunan Bus Rapid Transit (BRT) di Cekungan Bandung (BBMA) oleh Kementerian Perhubungan - Direktorat Jenderal Perhubungan Darat - Direktorat Angkutan Jalan						
NO	**KELENGKAPAN ADMINISTRASI**	**ADA**	**TIDAK ADA**	**SESUAI**	**TIDAK SESUAI**	**KETERANGAN**
						melalui email doklingdlhjabar@gmail.com
7.	Persetujuan Teknis	V		V		
8.	Lampiran lainnya	V		V		mohon menyesuaikan sistematika lampiran berdasarkan panduan yang tercantum pada https://bit.ly/PengajuanDokumenLingkunganJabar
9.	Surat Pernyataan Pemrakarsa bahwa Persetujuan Lingkungan yang Diajukan Masih dalam Tahap Perencanaan	V		V		
10.	Surat Permohonan Pemeriksaan Dokumen	V		V		

1. Dokumen ini sah, diterbitkan sistem Amdalnet berdasarkan data dari Pemrakarsa Pemerintah, tersimpan dalam sistem Amdalnet dan menjadi tanggung jawab Pemrakarsa Pemerintah.
2. Dalam hal terjadi kekeliruan isi dokumen, maka akan dilakukan perbaikan sebagaimana mestinya.

Sekretariat TUK Provinsi Jawa Barat
Dibuat Tanggal : 02 Desember 2025, 14:03:28 WIB Dicetak Tanggal 04 Desember 2025, 07:47:26 WIB
Operator Administrasi : Lela Rochmah Komalasari, S.T

Annex B: Approval and Final Report Traffic Impact Assessment (ANDAL Lalin)

KEMENTERIAN PERHUBUNGAN
DIREKTORAT JENDERAL PERHUBUNGAN DARAT

GEDUNG KARYA
JL. MERDEKA BARAT NO. 8
JAKARTA 10110

TELP. (021) 3506138, 3506129, 3506145, 3506143, 3862220

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email : hubdat@hubdat.web.id
Home Page : www.hubdat.web.id

KEPUTUSAN DIREKTUR JENDERAL PERHUBUNGAN DARAT
NOMOR: KP.640/LT.408/DJPD-ANDALALIN/2025
TENTANG

PERSETUJUAN TEKNIS HASIL ANALISIS DAMPAK LALU LINTAS BANGKITAN TINGGI PEMBANGUNAN BANDUNG BASIN METROPOLITAN AREA BUS RAPID TRANSIT SYSTEM OLEH DIREKTORAT ANGKUTAN JALAN, KEMENTERIAN PERHUBUNGAN DI KORIDOR BRT CEKUNGAN BANDUNG, KOTA BANDUNG, PROVINSI JAWA BARAT

DIREKTUR JENDERAL PERHUBUNGAN DARAT,

Menimbang :

a) bahwa sesuai dengan Pasal 7 Peraturan Pemerintah Nomor 30 Tahun 2021 tentang Penyelenggaraan Bidang Lalu Lintas Dan Angkutan Jalan, telah diatur ketentuan bahwa hasil analisis dampak lalu lintas di jalan nasional harus mendapatkan persetujuan dari menteri yang bertanggung jawab di bidang sarana dan prasarana lalu lintas dan angkutan jalan;
b) bahwa Tim Evaluasi Dokumen Hasil Analisis Dampak Lalu Lintas telah melakukan penilaian terhadap Dokumen Analisis Dampak Lalu Lintas yang diajukan oleh Direktorat Angkutan Jalan, Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan;
c) berdasarkan pertimbangan sebagaimana dimaksud pada huruf a dan huruf b, perlu ditetapkan Keputusan Direktur Jenderal Perhubungan Darat tentang Persetujuan Teknis Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat.

Mengingat : 1. Undang-Undang Nomor 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 96, Tambahan Lembaran Negara Republik Indonesia Nomor 5025);

2. Undang-Undang Nomor 6 Tahun 2023 tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 2 Tahun 2022 tentang Cipta Kerja Menjadi Undang-Undang (Lembaran Negara Republik Indonesia Tahun 2022 Nomor 238, Tambahan Lembaran Negara Republik Indonesia Nomor 6841);

3. Peraturan Pemerintah Nomor 32 Tahun 2011 tentang Manajemen dan Rekayasa, Analisis Dampak, serta Manajemen Kebutuhan Lalu Lintas Jalan (Lembaran Negara Republik Indonesia Tahun 2011 Nomor 61, Tambahan Lembaran Negara Republik Indonesia Nomor 5221);

4. Peraturan Pemerintah Nomor 30 Tahun 2021 tentang Penyelenggaraan Bidang Lalu Lintas dan Angkutan Jalan (Lembaran Negara Republik Indonesia Tahun 2021 Nomor 40, Tambahan Lembaran Negara Republik Indonesia Nomor 6642);

5. Peraturan Pemerintah (PP) Nomor 28 Tahun 2025 tentang Penyelenggaraan Perizinan Berusaha Berbasis Risiko (Lembaran Negara Republik Indonesia Tahun 2025 Nomor 98, Tambahan Lembaran Negara Nomor 7115);

6. Peraturan Presiden (Perpres) Nomor 140 Tahun 2024 tentang Organisasi Kementerian Negara (Lembaran Negara Republik Indonesia Tahun 2024 Nomor 250);

7. Peraturan Presiden (Perpres) Nomor 173 Tahun 2024 tentang Kementerian Perhubungan (Lembaran Negara Republik Indonesia Tahun 2024 Nomor 369);

8. Peraturan Menteri Perhubungan Nomor PM 17 Tahun 2021 tentang Penyelenggaraan Analisis Dampak Lalu Lintas (Berita Negara Republik Indonesia Tahun 2021 Nomor 528);

9. Peraturan Menteri Perhubungan Nomor PM 4 Tahun 2025 tentang Organisasi dan Tata Kerja Kementerian Perhubungan (Berita Negara Republik Indonesia Tahun 2025 Nomor 115).

Memperhatikan : a. Nota Dinas Nomor: 200/AJ/VIII/2025 tanggal 1 Agustus 2025 perihal Permohonan Persetujuan Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat;

b. Berita Acara Nomor: BA.233 /ANDALALIN/IX/2025 tanggal 25 September 2025 tentang Pembahasan Dokumen Hasil Analisis Dampak Lalu Lintas Persetujuan Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat;

c. Surat Kesanggupan Nomor: SP.67/SATKER-DAJ/X/2025 tanggal 30 Oktober 2025 perihal Kesanggupan Melaksanakan Kewajiban dalam Dokumen Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat.

MEMUTUSKAN :

Menetapkan : Keputusan Direktur Jenderal Perhubungan Darat tentang Persetujuan Teknis Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat.

KESATU : Berdasarkan Hasil Penilaian/ Evaluasi dari Tim Evaluasi Dokumen Hasil Analisis Dampak Lalu Lintas terhadap Dokumen Hasil Analisis Dampak Lalu Lintas yang diajukan oleh:

Nama Instansi	:	Direktorat Angkutan Jalan, Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan
Alamat	:	Kementerian Perhubungan, Gedung Karya, Jalan Medan Merdeka Barat No 8 Jakarta 10110
No. Tlp/ Fax	:	(021) 3506138, 3506129, 3506145, 3506143, 3862220
Penanggung Jawab	:	Dr. Muiz Thohir, S.T.,M.T. selaku Direktur Angkutan Jalan Direktorat Jenderal Perhubungan Darat

Dinyatakan telah memenuhi persyaratan untuk mendapatkan Persetujuan Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat dengan panjang koridor 21,7 km.

KEDUA : Direktorat Angkutan Jalan, Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan wajib melaksanakan tanggung jawab sesuai Surat Pernyataan Kesanggupan sebagaimana tercantum dalam Lampiran yang merupakan bagian yang tidak terpisahkan dari Keputusan ini.

KETIGA : Apabila tidak dapat memenuhi kewajiban sebagaimana dimaksud dalam Diktum KEDUA dikenakan sanksi sesuai ketentuan dalam Pasal 14 dan Pasal 15 Peraturan Pemerintah Nomor 30 Tahun 2021 tentang Penyelenggaraan Bidang Lalu Lintas dan Angkutan Jalan.

KEEMPAT : Surat rekomendasi persetujuan analisis dampak lalu lintas sebagaimana dimaksud dalam Diktum KESATU akan berakhir dengan sendirinya dalam hal:

a. Direktorat Angkutan Jalan, Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan tidak melaksanakan Pembangunan dalam kurun waktu 2 (dua) tahun sejak diterbitkan surat rekomendasi; dan/ atau;
b. Direktorat Angkutan Jalan, Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan tidak memenuhi salah satu rekomendasi yang tercantum dalam surat pernyataan kesanggupan.

KELIMA : Direktorat Jenderal Perhubungan Darat melalui Tim Monitoring dan Evaluasi Pelaksanaan Persetujuan Analisis Dampak Lalu Lintas melakukan pengawasan terhadap pemenuhan Persetujuan Teknis Hasil Analisis Dampak Lalu Lintas Bangkitan Tinggi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System oleh Direktorat Angkutan Jalan, Kementerian Perhubungan di Koridor BRT Cekungan Bandung, Kota Bandung, Provinsi Jawa Barat.

KEENAM : Keputusan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : J A K A R T A

Pada tanggal : 05 November 2025

DIREKTUR LALU LINTAS JALAN

RUDI IRAWAN, S.SiT., M.T.

NIP. 19740522 199703 1 002

Keputusan ini disampaikan kepada:

1. Menteri Perhubungan Republik Indonesia;
2. Sekretaris Jenderal Kementerian Perhubungan;
3. Inspektur Jenderal Kementerian Perhubungan;
4. Direktur Jenderal Perhubungan Darat;
5. Direktur Jenderal Bina Marga, Kementerian Pekerjaan Umum;
6. Kepala Korps Lalu Lintas Kepolisian Republik Indonesia;
7. Gubernur Jawa Barat;
8. Wali Kota Bandung.

LAMPIRAN KEPUTUSAN DIREKTUR JENDERAL PERHUBUNGAN DARAT
NOMOR: KP.640/LT.408/DJPD-ANDALALIN/2025

PERSETUJUAN TEKNIS HASIL ANALISIS DAMPAK LALU LINTAS
BANGKITAN TINGGI
PERSETUJUAN TEKNIS HASIL ANALISIS DAMPAK LALU LINTAS BANGKITAN TINGGI
PEMBANGUNAN BANDUNG BASIN METROPOLITAN AREA BUS RAPID TRANSIT SYSTEM
OLEH DIREKTORAT ANGKUTAN JALAN, KEMENTERIAN PERHUBUNGAN
DI KORIDOR BRT CEKUNGAN BANDUNG, KOTA BANDUNG,
PROVINSI JAWA BARAT

TAHUN 2025

KEWAJIBAN PIHAK PEMBANGUN

Direktorat Angkutan Jalan, Direktorat Jenderal Perhubungan Darat, Kementerian Perhubungan selaku Pembangun wajib melaksanakan ketentuan dalam Surat Pernyataan Kesanggupan, yaitu:

1. Penanganan Dampak Lalu Lintas Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System pada tahap Pra Konstruksi:
   a. Spanduk sosialisasi pelaksanaan Pembangunan;
   b. Sosialisasi pengurangan lajur lalu lintas;
   c. Koordinasi dengan pihak terkait;
   d. Melakukan peningkatan kinerja jaringan jalan dengan beberapa scenario dan didorong oleh kebijakan *push and pull* untuk meningkatkan *shifting*;
   e. Melakukan penertiban angkutan umum dan angkutan pribadi berhenti sembarangan;
   f. Melakukan penambahan fasilitas jalan berupa rambu, marka, dan fasilitas pejalan kaki; dan
   g. Melakukan pengkajian ulang pada parkir on street di ruas jalan Kota Bandung.
2. Penanganan Dampak Lalu Lintas Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System pada tahap Konstruksi:
   a. Menyediakan petugas satuan keamanan yang bersertifikat untuk menjaga dan membantu keluar masuk kendaraan di lokasi basecamp dan pembangunan halte, JPO konstruksi;
   b. Penyediaan sirkulasi keluar masuk kendaraan pengangkut material;

c. pemasangan lampu peringatan warning light sementara sebanyak 20 unit, lampu selang lalu lintas sebanyak 316 m' dan papan keterangan/petunjuk adanya proyek pada tiap akses keluar masuk konstruksi;
d. Desain pintu masuk dan keluar sesuai dengan lebar kendaraan terbesar yang dioperasikan, serta di dukungan dengan radius yang memenuhi untuk manuver kendaraan;
e. Melakukan manajemen pengaturan waktu pengangkutan material dan alat berat dengan memisahkan jam pengangkutan dengan jam sibuk lalu lintas pada lokasi konstruksi pukul 23.00 - 04.00 WIB;
f. Menyediakan lokasi penyimpanan bahan material di dalam lokasi konstruksi;
g. Menyediakan *Basecamp* dan Kantin untuk kebutuhan kontraktor di dalam area pengembangan yang bersifat sementara;
h. Melakukan Penertiban terhadap pedagang kaki lima dan angkutan Online serta angkutan umum yang berhenti atau parkir di sekitar Kawasan pembangunan;
i. Pelarangan parkir kendaraan konstruksi pada bahu jalan umum;
j. Menyediakan satuan ruang parkir sementara untuk kendaraan material dan pekerja konstruksi di area dalam basecamp konstruksi, sebagai berikut, basecamp 1 untuk Tim A :
   1) Parkir mobil sejumlah 30 SRP;
   2) Parkir truk sejumlah 10 SRP;
   3) Parkir sepeda motor sejumlah 30 SRP.

   basecamp 2 untuk Tim B:

   4) Parkir mobil sejumlah 20 SRP;
   5) Parkir truk sejumlah 10 SRP;
   6) Parkir sepeda motor sejumlah 30 SRP;
k. Peremajaan perlengkapan jalan berupa marka jalan di kawasan internal dengan Rekomendasi Teknis sesuai dengan Peraturan Menteri Perhubungan Nomor PM 67 Tahun 2018 tentang Perubahan Atas Peraturan Menteri Perhubungan Nomor PM 34 Tahun 2014 tentang Marka Jalan, sebagai berikut:
   1) Marka parkir kendaraan mobil (ukuran 5 meter x 2,4 meter);
   2) Marka parkir kendaraan truk (ukuran 7 meter x 3 meter);
   3) Marka parkir kendaraan motor (ukuran 2 meter x 0,8 meter);
   4) Marka pejalan kaki dengan lebar 1 meter;
   5) Marka petunjuk sirkulasi kendaraan.
l. Melakukan pengoptimalan kapasitas ruas jalan;
m. Penentuan rute pengangkutan material dan alat berat sesuai dengan kelas jalan yang ditetapkan;

n. Melaksanakan Pembangunan secara bertahap sesuai dengan timeline pembanguan;
o. Menempel stiker atau memberikan tanda khusus untuk kendaraan proyek pembangunan yang menerangkan terkait kepemilikan kendaraan serta memberikan nomor telepon darurat;
p. Memastikan bahwa kendaraan barang yang digunakan pada masa konstruksi harus sesuai dengan ketentuan yang berlaku (laik jalan, dimensi kendaraan dan tata cara pemuatan) dengan berpedoman pada PM 60 tahun 2019 tentang Penyelenggaraan Angkutan Barang dengan Kendaraan Bermotor di Jalan serta tidak *Over Dimension Over Loading* (ODOL);
q. Mengikuti pedoman dan arahan yang tertuang dalam Instruksi Menteri Pekerjaan Umum dan Perumahan Rakyat Nomor 02/IN/M/2022 Tahun 2022 tentang Larangan Penggunaan Kendaraan Berdimensi Lebih dan/atau Bermuatan Lebih pada Penyelenggaraan Jasa Konstruksi;
r. Melakukan pengaturan pelaksanaan kegiatan pengangkutan material dan alat berat untuk mengurangi dampak terhadap penurunan kualitas udara dan tingkat kebisingan;
s. Menyediakan *water trapping* untuk membersihkan kendaraan pengangkut material dan alat berat dari lokasi konstruksi;
t. Melakukan pembersihan sisa material terhadap ruas jalan yang dilewati kendaraan konstruksi, dilakukan secara berkala;
u. Pengangkutan material sesuai dengan SPM pengangkutan material dan alat berat, seperti dengan menggunakan penutup dan terpal atau plastic;
v. Dilakukan pemasangan pagar seng pembatas ruang kerja dan kawat (jaring- jaring) sebagai batas kegiatan guna mengurangi dampak yang dihasilkan akibat aktivitas konstruksi;
w. Melakukan pengecekan terhadap kendaraan pengangkut bahan material konstruksi yang sudah lulus pengujian kendaraan bermotor (lulus Uji KIR) dan tidak melakukan pengakutan *Over Load Over Dimension* (ODOL);
x. Pengaturan pelaksanaan kegiatan mobilisasi alat- alat berat secara bertahap;
y. Memperbaiki ruas jalan yang dilewati apabila terjadi kerusakan, sesuai dengan koordinasi yang telah dilakukan dengan unsur terkait;
z. Menggunakan Alat Pelindung Diri sesuai dengan yang terdapat pada peraturan (Permen Tenaga Kerja dan Transmigrasi Nomor PER.08/MEN/VII/2010 tentang Alat Pelindung Diri);
aa. Memberikan sosialisasi kepada pekerja terkait petunjuk k3 pada lokasi konstruksi;
bb. Melakukan koordinasi dan sosialisasi dengan pejabat lingkungan seperti rt, rw, dan kelurahan setempat agar mendapatkan toleransi terhadap pembangunan yang dilakukan;
cc. Melakukan koordinasi dengan stakeholder terkait rencana pembangunan yang akan dilaksanakan pada tiap-tiap kabupaten/kota yang terdampak langsung dengan adanya Pembangunan;

dd. Peremajaan perlengkapan jalan sementara berupa rambu lalu lintas di kawasan Jalan terdampak dengan Rekomendasi Teknis sesuai dengan Peraturan Menteri Perhubungan Nomor PM 13 Tahun 2014 tentang Rambu Lalu Lintas, sebagai berikut :

- Rambu Tetap
  1) Rambu Batas Kecepatan sejumlah 24 unit;
  2) Rambu Perintah Mengikuti Lajur sejumlah 12 unit;
  3) Rambu Pengarah Tikungan sejumlah 18 unit;
- Rambu Peringatan Sementara
  1) Rambu Peringatan Dengan Kata-Kata sejumlah 24 unit;
  2) Rambu Pekerjaan di Jalan sejumlah 12 unit;
  3) Traffic Cone sejumlah 130 unit;

ee. Sosialisasi manajemen rekayasa lalu lintas pada lokasi konstruksi apabila terdapat pengalihan arus (*detour*);

ff. Melakukan pemberitahuan terhadap instansi pemerintah di wilayah tersebut.

Selain itu, dilakukan perincian fasilitas perlengkapan jalan pada tahap konstruksi Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System sebagai berikut.

Rambu-Rambu Konstruksi dan Pengalihan	**Bentuk Rambu**	**Kuantitas Minimum**		**Total Kebutuhan**	**Unit**
		TIM A	**TIM B**		
Rambu Tetap					
Rambu Batas Kecepatan		16	8	24	buah
Rambu Perintah Mengikuti Lajur		8	4	12	buah
Rambu Pengarah Tikungan		12	6	18	buah
Rambu Peringatan Sementara					
Rambu Peringatan dengan Kata-kata		16	8	24	buah

Rambu Peringatan Pekerjaan di Jalan		8	4	12	buah
Traffic Cone		92	98	190	buah
Alat Lainnya					
Lampu Putar (Rotary Lamp)		12	8	20	buah
Lampu Selang Lalu Lintas		224	92	316	m'
Peralatan Komunikasi dan Lainnya		20	20	40	set

3. Penanganan Dampak Lalu Lintas Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System pada tahap Operasional:
   a. Menyediakan perlengkapan jalan baru berupa rambu lalu lintas di kawasan pembangunan dengan Rekomendasi Teknis sesuai dengan Peraturan Menteri Perhubungan Nomor PM 13 Tahun 2014 tentang Rambu Lalu Lintas, sebagai berikut :
      1) Rambu petunjuk lokasi fasilitas penyebrangan pejalan kaki sejumlah 282 unit;
      2) Rambu pengaturan persinyalan sejumlah 45 unit;
      3) Rambu penunjuk lokasi sejumlah 49 unit;
      4) Rambu jalur sepeda sejumlah 14 unit;
      5) Rambu petunjuk halte sejumlah 34 unit
   b. Peremajaan perlengkapan jalan berupa marka jalan di Jalan Baru dengan Rekomendasi Teknis sesuai dengan Peraturan Menteri Perhubungan Nomor PM 67 Tahun 2018 tentang Perubahan Atas Peraturan Menteri Perhubungan Nomor PM 34 Tahun 2014 tentang Marka Jalan, sebagai berikut:
      1) Marka parkir kendaraan mobil (ukuran 5 meter x 2,4 meter);
      2) Marka parkir kendaraan truk (ukuran 7 meter x 3 meter);
      3) Marka parkir kendaraan motor (ukuran 2 meter x 0,8 meter);
      4) Marka pejalan kaki dengan lebar 1 meter;

5) Marka petunjuk sirkulasi kendaraan.

c. Menyediakan perlengkapan jalan berupa lampu hati hati atau *warning light* di lokasi sejumlah 20 unit dan dilengkapi dengan lampu penerangan jalan sesuai kebutuhan;

d. Penertiban pedagang kaki lima dan angkutan Online serta angkutan umum yang berhenti serta menaik turunkan penumpang di sembarang tempat;

e. Menyediakan fasilitas untuk pejalan kaki berupa trotoar dan *zebra cross* sesuai dengan kebutuhan di lapangan;

f. Melaksanakan pemasangan *speed trap* pada lokasi yang dibutuhkan sesuai gambar teknis untuk membatasi pergerakan kecepatan arus bebas;

g. Melaksanakan pemasangan speed trap pada lokasi yang dibutuhkan sesuai gambar teknis untuk membatasi pergerakan kecepatan arus bebas;

h. Menyediakan trotoar dan halte yang ramah disabilitas;

i. Berkoordinasi untuk melakukan kerjasama parkir *off street* terhadap lahan yang memungkinkan;

j. Desain halte disesuaikan dengan standar dan ketentuan yang ditetapkan tiap masing-masing daerah;

k. Peningkatan kapasitas jalan alternatif dengan memaksimalkan lebar jalan efektif yang bebas parkir dan pedagang kaki lima;

l. Mendesain halte yang memperhatikan unsur keamanan, kenyamanan, kemudahan dan informatif bagi penggunannya;

m. Peningkatan kinerja BRT terhadap pelayanan yang akan diberikan.

Dilakukan pemenuhan fasilitas perlengkapan jalan pada tahap operasional Pengembangan Bus Rapid Transit BRT Cekungan Bandung adalah sebagai berikut.

No	Jenis Faskes	Visualiasasi Faskes	Kebutuhan Rambu
1	Rambu Petunjuk Lokasi Fasilitas Penyeberangan		282
2	Rambu Pengaturan Persinyalan		45
3	Rambu Penunjuk Lokasi		49
4	Rambu Jalur Sepeda		14

4. Melaksanakan seluruh rekomendasi dalam dokumen Analisis Dampak Lalu Lintas yang disahkan oleh Kementerian Perhubungan menjadi pemrakarsa.
5. Seluruh rekomendasi yang tertuang wajib mengacu pada gambar teknis dan dokumen ANDALALIN.
6. Memenuhi peraturan perundang-undangan yang berlaku dalam melaksanakan rekomendasi penanganan dampak.
7. Dalam pelaksanaan rekomendasi berkoordinasi dengan instansi terkait yaitu (Subdit KKJJ Kementerian PU, Direktorat Kamsel Korlantas POLRI, Balai Besar Pelaksanaan Jalan Nasional DKI Jakarta – Jawa Barat, BPTD Kelas I Jawa Barat, Dinas Perhubungan Provinsi Jawa Barat, Dinas Perhubungan Kota Bandung, Dinas Bina Marga dan Penataan Ruang Provinsi Jawa Barat, Dinas Sumber Daya Air dan Bina Marga Kota Bandung, Ditlantas Polda Jawa Barat, serta Satlantas Polrestabes Bandung.

8. Konsultan bersedia secara aktif melakukan pengawasan terhadap pemenuhan kewajiban pembangun yang telah tertuang dalam surat kesanggupan, selanjutnya dilaporkan secara berkala dalam waktu 6 bulan setelah rekomendasi teknis terbit dan 6 bulan setelah masa operasional kepada Direktorat Lalu Lintas Jalan, Kementerian Perhubungan dalam hal ini Subdirektorat Analisis Dampak Lalu Lintas;
9. Membantu koordinasi dalam pelaksanaan pengawasan/ pemantauan dan evaluasi terkait Pemenuhan Rekomendasi Andalalin Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System.
10. Bersedia melakukan Analisis Dampak Lalu Lintas kembali, pada saat akan melakukan Pengembangan lebih 50% dari total Pembangunan Bandung Basin Metropolitan Area Bus Rapid Transit System.

DIREKTUR LALU LINTAS JALAN

ttd

RUDI IRAWAN, S.SiT., M.T.
NIP. 19740522 199703 1 002

Analisis Penanganan Dampak Lalu Lintas

PEMBANGUNAN KORIDOR BRT DAN TERMINUS

SEPTEMBER 2024

DOHWA

PT. LENGGOGENI
PLANNING - DESIGN & ENGINEERING CONSULTANT

DAFTAR ISI

DAFTAR ISI ii
BAB I PENDAHULUAN 1
I.1 Latar Belakang 1
I.2 Maksud dan Tujuan 2
I.3 Ruang Lingkup 3
I.3.1 Ruang Lingkup Studi 3
I.3.2 Ruang Lingkup Proyek 3
I.4 Gambaran Umum Proyek 4
I.4.3 Koridor dan Stasiun BRT 4
I.4.4 *End Station* BRT 8
I.5 Gambaran Umum Wilayah 12
I.5.1 Tata Ruang dan Wilayah Cekungan Bandung 12
I.5.2 Jaringan Jalan dan Rel Cekungan Bandung 20
I.5.3 Kondisi Kepemilikan Kendaraan Cekungan Bandung 21
I.5.4 Kondisi Angkutan Eksisting Cekungan Bandung 24
I.5.5 Kondisi Demografi Cekungan Bandung 26
I.5.6 Kondisi Sosial Ekonomi Cekungan Bandung 28
BAB II METODOLOGI 8
II.1 Umum 8
II.2 Pengumpulan dan Analisis Data 9
II.2.1 Pengumpulan Data Sekunder 9
II.2.2 Pengumpulan Data Primer 10
II.3 Pengembangan Model Transportasi 13
II.3.1 Deskripsi Umum Model Transportasi 13

II.3.2 Identifikasi Model 14
II.3.3 Pengujian Model Transportasi 17
II.4 Analisis Kinerja Lalu Lintas 18
II.5 Penyusunan Rekomendasi 18
II.5.1 Manajemen Kapasitas (*Management of Capacity)* 19
II.5.2 Manajemen Permintaan (*Management of Demand)* 19
II.5.3 Manajemen Prioritas (*Management of Priority)* 20
II.6 Evaluasi Alternatif 20
BAB III ANALISIS KINERJA LALU LINTAS 21
III.1 Analisis Lalu Lintas dan Angkutan Eksisting 21
III.1.1 Analisis Kondisi Prasarana Jalan..... **Error! Bookmark not defined.**
III.1.2 Analisis Kondisi Angkutan Jalan ..... **Error! Bookmark not defined.**
III.1.3 Analisis Kondisi Ruas Jalan 41
III.1.4 Analisis Kecepatan dan Waku Perjalanan 57
III.1.5 Analisis Fasilitas NMT (*Non-Motorized Transportation*) 213
III.1.6 Identifikasi Permasalahan Lalu Lintas Eksisting 218
III.2 Analisis Kinerja Dampak Lalu Lintas 234
III.2.1 Asumsi Dasar 234
III.2.2 Model Zona dan Jaringan Jalan 235
III.2.3 Distribusi Perjalanan 236
III.2.4 Bangkitan Perjalanan 238
III.2.5 Pembebanan Lalu Lintas 241
BAB IV ANALISIS PENANGANAN DAMPAK LALU LINTAS 243
IV.1 Analisis Penanganan pada Masa Konstruksi 243
IV.1.1 Rencana Konstruksi 243
IV.1.2 Analisis Penanganan pada Masa Konstruksi 244

IV.1.3 Analisis Kinerja Dampak Lalu Lintas pada Masa Konstruksi 298
IV.2 Analisis Penanganan pada Masa Operasional..... 298
IV.2.1 Rencana Implementasi BRT 298
IV.2.2 Intervensi Penggunaan Kendaraan Pribadi 306
IV.2.3 Analisis Kinerja Dampak Lalu Lintas pada Masa Operasional 311
BAB V KESIMPULAN DAN REKOMENDASI PENANGANAN DAMPAK LALU LINTAS..... 314
V.1 KESIMPULAN 315
V.2 Rekomendasi 316
V.2.1 Rekomendasi pada Masa Pra Konstruksi..... 316
V.2.2 Rekomendasi pada Masa Konstruksi 320
V.2.3 Rekomendasi pada Masa Operasional..... 323
V.3 Mitigasi dan Penanggung Jawab Pelaksanaan Rekomendasi..... 324
V.4 Rencana Pemantauan dan Evaluasi 334

BAB I PENDAHULUAN

I.1 Latar Belakang

Kemacetan merupakan salah satu faktor utama yang berdampak negatif pada pertumbuhan ekonomi dan kesetaraan di kota-kota di Indonesia. Mobilitas yang efisien di daerah perkotaan sangat penting untuk memastikan daya saing perekonomian perkotaan. Berdasarkan analisis yang dilakukan oleh *the World Bank*, rata-rata kecepatan lalu lintas di kota-kota di Indonesia masih rendah dan menyebabkan waktu perjalanan lebih tinggi dibandingkan dengan kota-kota lainnya di dunia. Kemacetan lalu lintas di Indonesia menghabiskan biaya setidaknya USD 5,6 Miliar per tahun secara nasional dalam bentuk waktu perjalanan yang tinggi, kerugian konsumsi bahan bakar, dan emisi gas rumah kaca.[1]

Ketergantungan pada transportasi pribadi meningkat di kota-kota di Indonesia. Sebagian besar pertumbuhan populasi perkotaan di Indonesia terjadi di daerah yang jauh dari pusat pekerjaan dan perdagangan. Penduduk membutuhkan transportasi bermotor untuk mencapai pekerjaan, pendidikan, dan aktivitas sosial. Namun demikian, cakupan dan kualitas angkutan umum eksisting yang tersedia tidak menawarkan alternatif yang kredibel dibandingkan dengan angkutan pribadi seperti sepeda motor dan mobil. Hal ini mengakibatkan pertumbuhan kepemilikan sepeda motor dan mobil semakin tinggi dan menyebabkan mobilitas yang tidak berkelanjutan dan tingkat motorisasi yang tinggi.[2]

Dalam upaya untuk meningkatkan mobilitas perkotaan, Pemerintah Indonesia melalui Kementerian Perhubungan sedang mengimplementasikan *Indonesia Mass Transit Project (MASTRAN)* demi meningkatkan kualitas hidup perkotaan di Indonesia. Proyek ini mencakup peningkatan institusi dan pengembangan kapasitas serta pembangunan angkutan massal berbasis jalan dengan sistem *Bus Rapid Transit (BRT)* di wilayah metropolitan Cekungan

[1] World Bank Urban Flagship Time To Act 2010 Report
[2] World Bank analysis using Statistics Indonesia data ("Number of motor vehicles by types, Indonesia 1949-2017")

Bandung dan Mebidang. Proyek BRT Cekungan Bandung mencakup koridor jalur khsusus (*on-corridor)* BRT sepanjang 21 km di Kota Bandung, pengembangan terminal, depo, serta pembangunan halte *off-corridor* pada 21 rencana rute *direct service BRT* yang menjangkau wilayah Kota Bandung, Kota Cimahi, Kabupaten Bandung, Kabupaten Bandung Barat, dan Kabupaten Sumedang.

Untuk mendukung pembangunan koridor BRT serta *end station* sebagai salah satu komponen infrastruktur, diperlukan studi yang menganalisis dampak lalu lintas dari pembangunan dan operasional BRT di Cekungan Bandung, serta penanganan dampak lalu lintasnya. Studi ini diharapkan dapat memberikan rekomendasi mengenai manajemen dan rekayasa lalu lintas di wilayah Cekungan Bandung, sehingga dapat mengurangi dampak lalu lintas akibat pembangunan dan operasional koridor BRT, halte BRT, dan *end station.*

I.2 Maksud dan Tujuan

Tujuan dari studi ini adalah untuk merumuskan kebijakan manajemen lalu lintas dan langkah-langkah teknis lainnya yang diperlukan untuk mengantisipasi dampak lalu lintas dari pembangunan dan operasional Koridor dan *End Station* BRT Cekungan Bandung. Secara lebih rinci, tujuan dari studi ini adalah:

1. Mengidentifikasi kondisi lalu lintas di sekitar proyek BRT Cekungan Bandung.
2. Mengevaluasi kinerja lalu lintas di persimpangan area proyek BRT Cekungan Bandung.
3. Mengidentifikasikan dampak lalu lintas akibat pembangunan infrastruktur BRT Cekungan Bandung.
4. Mengidentifikasikan dampak lalu lintas akibat operasional BRT Cekungan Bandung.
5. Merekomendasikan kebijakan dan langkah-langkah yang diperlukan, untuk meminimalkan dampak lalu lintas akibat pembangunan dan implementasi BRT Cekungan Bandung.

I.3 Ruang Lingkup

I.3.1 Ruang Lingkup Studi

Ruang lingkup dan cakupan dari studi ini disusun berdasarkan PM No. 17 Tahun 2021 tentang Penyelenggaraan Analisis Dampak Lalu Lintas, yang mencakup:

1. Gambaran umum wilayah, yang mencakup kesesuaian tata ruang dan wilayah perkotaan, kondisi jaringan jalan, kepemilikan kendaraan, angkutan umum, demografi, sosial ekonomi, serta gambaran dari proyek yang akan dibangun.
2. Analisis kondisi lalu lintas dan angkutan jalan eksisting yang mencakup kondisi prasarana jalan, lalu lintas jalan, dan angkutan jalan.
3. Analisis dampak lalu lintas yang dilakukan pada kondisi pra konstruksi, pada masa konstruksi, pada masa operasional, serta masa operational pada tahun rencana.
4. Rekomendasi penanganan dampak lalu lintas yang dilakukan pada kondisi pra konstruksi, pada masa konstruksi, pada masa operasional, serta masa operational pada tahun rencana.
5. Studi ini juga akan memberikan rekomendasi mitigasi dan penanggung jawab pelaksanaan rekomendasi penanganan dampak lalu lintas, serta rencana pemantauan dan evaluasi.

I.3.2 Ruang Lingkup Proyek

Cakupan dari penyusunan studi ini disusun berdasarkan Surat dari Direktur Lalu Lintas Kementerian Perhubungan No. UM.209/50/19/LLJ/VII/2024 tentang Surat Arahan Andalalin. Berdasarkan surat tersebut, maka pembangunan halte busway BRT dan terminus/*end station* dan *layover* Bandung Basin Metropolitan Area masuk ke dalam kewenangan Menteri Perhubungan melalui Dirjen Perhubungan Darat dengan kategori bangkitan tinggi.

Secara lebih spesifik komponen yang masuk ke dalam proyek ini mencakup:

1. Koridor BRT yang merupakan pengembangan jalur khusus BRT sepanjang 21 km di Kota Bandung;
2. Stasiun BRT yang berada pada Koridor BRT sebanyak 34 stasiun;
3. *End Station* BRT yang merupakan pemberhentian akhir BRT di setiap rute, dan tersebar di wilayah Cekungan Bandung, sebanyak 24 *end station*.

I.4 Gambaran Umum Proyek

Proyek BRT Cekungan Bandung mencakup koridor jalur khsusus (*on-corridor)* BRT sepanjang 21 km, pengembangan depo, pengembangan terminal atau *end station*, dan pembangunan halte *off-corridor* pada 21 rencana rute *direct service BRT* yang menjangkau wilayah Kota Bandung, Kota Cimahi, Kabupaten Bandung, Kabupaten Bandung Barat, dan Kabupaten Sumedang. Gambaran umum BRT Cekungan Bandung dapat dilihat pada gambar berikut.

Gambar I-1 Gambaran Umum Proyek BRT Cekungan Bandung

Sumber: Project Management Consultant, 2024

I.4.3 Koridor dan Stasiun BRT

Koridor BRT dengan sistem jalur khusus BRT sepanjang 21 km dan 34 stasiun BRT digambarkan pada gambar berikut. Rincian panjang untuk setiap jalan serta lokasi stasiun BRT dijelaskan ke dalam tabel di bawah.

Gambar I-2 Koridor BRT Cekungan Bandung

Sumber: Project Management Consultant, 2024

Tabel I-1 Daftar Jalan pada Koridor BRT Cekungan Bandung

No	Nama Jalan	Panjang (m)	Status Jalan
1	Jl. Asia Afrika	1.474,9	Jalan Kota
2	Jl. Jend Sudirman (Jl. Otto Iskandardinata - Jl. Nurtanio)	2.990,17	Jalan Kota
3	Jl. Jend Sudirman (Jl. Nurtanio - Jl. Rajawali Barat)	1.250,0	Jalan Nasional
4	Jl. Rajawali Barat	956,8	Jalan Nasional
5	Jl. Rajawali Timur	1.461.9	Jalan Kota
6	Jl. Kebon Jati	1.541,7	Jalan Kota
7	Jl. Suniaraja	205,92	Jalan Kota
8	Jl. Banceuy	632,67	Jalan Kota
9	Jl. ABC	354,34	Jalan Kota
10	Jl. Naripan	835,14	Jalan Kota
11	Jl. Ahmad Yani A (SW-NE)	2.409	Jalan Kota
12	Jl. Ahmad Yani A (SW-NE), (Jl. Laswi - Jl. Supratman)	535	Jalan Provinsi
13	Jl. Ahmad Yani B (NE-SW)	1.515	Jalan Kota
14	Jl. Ahmad Yani B (NE-SW), (Jl. Laswi - Jl. Supratman)	535	Jalan Provinsi

No	Nama Jalan	Panjang (m)	Status Jalan
15	Jl. Ibrahim Adjie	515	Jalan Kota
16	Jl. Jakarta	1.049	Jalan Kota
17	Jl. Otto Iskandar Dinata	2.333	Jalan Kota
18	Jl. BKR	279	Jalan Provinsi
19	Jl. Moch. Toha	1.056	Jalan Kota
20	Jl. Pungkur	87	Jalan Kota
21	Jl. Dewi Sartika	533	Jalan Kota
22	Jl. Dalem Kaum	101	Jalan Kota
23	Jl. Alun Alun Timur	133	Jalan Kota
24	Jl. Sunda	57,74	Jalan Kota
25	Jl. Veteran	169,01	Jalan Kota

Sumber: Project Management Consultant, 2024

Tabel I-2 Lokasi Halte BRT pada Koridor BRT Cekungan Bandung

ID	Nama Halte	Koordinat	Estimasi Luas Lahan (m2)	Status Jalan
BS 1	Stasiun Hall	-6.916044°, 107.602581°	81	Jalan Kota
BS 2	Pasar Baru	-6.917732°, 107.604342°	216	Jalan Kota
BS 3	Dalam Kaum	-6.923347°, 107.603977°	230.4	Jalan Kota
BS 4	Pasir Koja	-6.928559°, 107.603636°	45	Jalan Kota
BS 5	Tegallega	-6.934012°, 107.603276°	99	Jalan Kota
BS 6A	Taman Tegallega (Sisi Utara)	-6.937289°, 107.604792°	223.2	Jalan Provinsi
BS 6B	Taman Tegallega (Sisi Selatan)	-6.937466°, 107.604007°	45	Jalan Provinsi
BS 7	Ciateul	-6.933728°, 107.606340°	89.6	Jalan Kota
BS 8	ITC Kebon Kelapa	-6.928687°, 107.606837°	72	Jalan Kota

ID	Nama Halte	Koordinat	Estimasi Luas Lahan (m2)	Status Jalan
BS 9	Kapatihan	-6.923062°, 107.606236°	252	Jalan Kota
BS 10	Alun-Alun	-6.921282°, 107.607234°	486	Jalan Kota
BS 11	Cikapundung	-6.919653°, 107.609034°	45	Jalan Kota
BS 12	Naripan	-6.920796°, 107.616169°	45	Jalan Kota
BS 13A	Pasar Kosambi (Sisi Barat)	-6.919850°, 107.622086°	118.8	Jalan Kota
BS 13B	Pasar Kosambi (Sisi Timur)	-6.919037°, 107.623913°	60	Jalan Kota
BS 14A	Stadion Sidolig (Sisi Barat)	-6.916299°, 107.628806°	45	Jalan Kota
BS 14B	Stadion Sidolig (Sisi Timur)	-6.916331°, 107.629119°	115.5	Jalan Kota
BS 15A	Santa Maria	-6.913683°, 107.633715°	84	Jalan Provinsi
BS 15B	IBCC Station	-6.914367°, 107.632765°	72	Jalan Provinsi
BS 16	Cicadas	-6.910244°, 107.640220°	98	Jalan Kota
BS 17	Kebon Waru	-6.914436°, 107.638814°	84	Jalan Kota
BS 18	Simpang Lima	-6.922301°, 107.616206°	76.8	Jalan Kota
BS 19	Asia Afrika	-6.921900°, 107.612890°	63	Jalan Kota
BS 20	Dulatip	-6.920698°, 107.602733°	84	Jalan Kota
BS 21	GKI Anugerah	-6.920099°, 107.597614°	49.5	Jalan Kota
BS 22	Andir	-6.919391°, 107.591723°	76.8	Jalan Kota
BS 23	Jamika	-6.918614°, 107.585179°	36	Jalan Kota

ID	Nama Halte	Koordinat	Estimasi Luas Lahan (m2)	Status Jalan
BS 24	Suryani	-6.918026°, 107.580302°	72	Jalan Kota
BS 25	Bundaran Cibeureum	-6.917346°, 107.575348°	138	Jalan Nasional
BS 26	Batas Kota	-6.911334°, 107.569565°	138	Jalan Nasional
BS 27	RS Rajawali	-6.912076°, 107.573219°	81.6	Jalan Nasional
BS 28	YWKA	6.913477°, 107.577007°	63	Jalan Kota
BS 29	Rajawali Timur	-6.914413°, 107.581540°	36	Jalan Kota
BS 30	Ciroyom	-6.914547°, 107.581796°	72	Jalan Kota
BS 31	Trinitas	-6.916463°, 107.592424°	39	Jalan Kota
BS 32	Kebon Jati	6.916307°, 107.596523°	240.1	Jalan Kota
BS 33	Banceuy Center	-6.916344°, 107.606241°	84	Jalan Kota
BS 34	BTM	-6.911469°, 107.643536°	115.5	Jalan Kota

Sumber: Project Management Consultant, 2024

I.4.4 *End Station* BRT

End Station BRT merupakan titik ujung pemberhentian dari setiap rute BRT. *End Station* BRT diklasifikasikan ke beberapa tipe sebagai berikut:

1. ***Terminal with Depot***: pengembangan area terminal eksisting atau area yang akan dijadikan sebagai depo yang terintegrasi dengan pemberhentian awal dan akhir dari rute BRT;
2. ***Existing Terminal with Layover***: terminal eksisting yang akan dikembangkan sebagai terminus atau *end station BRT* yang dilengkapi dengan fasilitas pemberhentian bus, *layover* atau parkir sementara bus, serta fasilitas pendukung terminal lainnya;

3. ***New End Station with Layover***: area baru yang akan dikembangkan sebagai terminus atau *end station BRT* yang dilengkapi dengan fasilitas pemberhentian bus, *layover* atau parkir sementara bus, serta fasilitas pendukung terminal lainnya;
4. ***Bus Stop***: pemberhentian akhir bus dari suatu rute berupa *bus pole, small shelter,* atau *big shelter,* tanpa dilengkapi dengan fasilitas *layover*;
5. ***BRT Station***: stasiun BRT di dalam koridor BRT yang dijadikan sebagai pemberhentian akhir, tanpa dilengkapi dengan fasilitas *layover.*

Lokasi dan tipe dari setiap terminus yang akan dikembangkan dijelaskan pada gambar dan tabel sebagai berikut.

Gambar I-3 Lokasi dan Tipe *End Station* BRT Cekungan Bandung

Sumber: Project Management Consultant, 2024

Tabel I-3 Lokasi dan Tipe *End Station* BRT Cekungan Bandung

No	Terminus	Koordinat	Lokasi Eksisting	Tipe End Station
1	Cicaheum	-6.902360°, 107.656685°	Terminal Cicaheum	Terminal with Depot
2	Leuwipanjang	-6.946788°, 107.593237°	Kantor Dishub Kota Bandung	Terminal with Depot

No	Terminus	Koordinat	Lokasi Eksisting	Tipe End Station
3	Majalaya	-7.027689°, 107.751571°	Terminal Majalaya (Depan Thee Matic Mall)	Existing Terminal with Layover
4	Antapani	-6.915204°, 107.665838°	Terminal Antapani	Existing Terminal with Layover
5	Banjaran	-7.047992°, 107.586658°	Terminal Banjaran	Existing Terminal with Layover
6	Ledeng	-6.859185°, 107.595065°	Terminal Ledeng	Existing Terminal with Layover
7	Soreang	-7.028157°, 107.519968°	Terminal Soreang	Existing Terminal with Layover
8	Cibaduyut	-6.959112°, 107.593573°	TVRI	New End Station with Layover
`9	Dago	-6.868278°, 107.620473°	Taman Dago Tea House	New End Station with Layover
10	Dipatiukur	-6.892567°, 107.618083°	Monumen Perjuangan	New End Station with Layover
11	Jatinangor	-6.932472°, 107.772887°	Halte Teman Bus Jatinangor	New End Station with Layover
12	BEC	-6.907974°, 107.609375°	Halte BEC	Bus Stop
13	Bundaran Cibiru	-6.935081°, 107.718401°	Second roundabout (Bundaran Kecil)	Bus Stop
14	Cimahi	-6.886225° 107.535854°	Stasiun Kereta Cimahi	Bus Stop
15	Elang (Cibereum)	-6.914061°, 107.575486°	Halte Elang	Bus Stop
16	Ciroyom	-6.912962°, 107.586330°	Setelah Flyover Ciroyom	Bus Stop
17	Lembang	-6.816955°, 107.622538°	Depan Pasar Panorama Lembang	Bus Stop
18	Stasiun Padalarang	-6.842178°, 107.496138°	Stasiun KCJB Padalarang	Bus Stop
19	Riau	-6.910595°, 107.626518°	Taman Kitri	Bus Stop
20	Sarijadi	-6.881337°, 107.581378°	Depan Setrasari Mall	Bus Stop

No	Terminus	Koordinat	Lokasi Eksisting	Tipe End Station
21	Tegalluar	-6.964822°, 107.714672°	Stasiun KCJB Tegalluar	Bus Stop
22	Alun-Alun	-6.921163°, 107.607049°	Halte BRT Alun-Alun	BRT Station
23	Kalapa	-6.927382°, 107.605931°	Halte BRT ITC Kebon Kalapa	BRT Station
24	St. Hall	-6.916136°, 107.602598°	Halte BRT St. Hall	BRT Station

I.5 Gambaran Umum Wilayah

I.5.1 Tata Ruang dan Wilayah Cekungan Bandung

Saat ini perkembangan kawasan permukiman di Kawasan Metropolitan Cekungan Bandung terpusat di Kota Bandung dan Kota Cimahi. Berdasarkan data tutupan lahan tahun 2020, sebesar 90,6% Kota Bandung dan 88,35% Kota Cimahi sudah merupakan kawasan terbangun. Sementara Kota Bandung dan Kota Cimahi merupakan kawasan perkotaan inti, 15 kawasan perkotaan sekitarnya tersebar di Kabupaten Bandung Barat, Kabupaten Bandung, dan Kabupaten Sumedang.

Gambar I-4 Kawasan Perkotaan Inti dan Sekitarnya di Cekungan Bandung

Sumber: Analisis Konsultan, 2024

I.5.1.1 Rencana Tata Ruang Wilayah (RTRW) Provinsi Jawa Barat

Dalam Rencana Tata Ruang Wilayah Provinsi Jawa Barat Tahun 2022 – 2024, disebutkan beberapa arahan pembagian wilayan pengembangan (WP) KK Cekungan Bandung. Arahan pembagian Wilayah Pengembangan (WP) tersebut dijabarkan sebagia berikut:

a. **Kota Bandung** diarahkan sebagai kota inti dari PKN dengan kegiatan utama perdagangan dan jasa, industri kreatif dan teknologi tinggi, dan pariwisata.
b. **Kota Cimahi** diarahkan sebagai kota inti dari PKN dengan kegiatan utama perdagangan dan jasa, industri kreatif, teknologi tinggi, dan industri non-produktif.
c. **Kabupaten Bandung** diarahkan sebagai bagian dari PKN, dengan kegiatan utama industri non-polutif dan nonekstraktif atau tidak mengganggu irigasi dan cadangan air serta tidak mengakibatkan alih fungsi lahan pada kawasan pertanian pangan berkelanjutan, agro industri, wisata alam, pertanian dan perkebunan.
d. **Kabupaten Bandung Barat** diarahkan sebagai bagian dari PKN dengan kegiatan industri non-polutif dan nonekstraktif atau tidak mengganggu irigasi dan cadangan air serta tidak mengakibatkan alih fungsi lahan pada kawasan pertanian pangan berkelanjutan, pertanian, industri kreatif dan teknologi tinggi.
e. **Kabupaten Sumedang** diarahkan sebagai bagian dari PKN, dilengkapi sarana dan prasarana pendukung, serta pusat pendidikan tinggi di Kawasan Jatinangor, kegiatan tanaman pangan dan hortikultura, agroindustri, serta industri non-polutif dan nonekstraktif atau tidak mengganggu irigasi dan cadangan air serta tidak mengakibatkan alih fungsi lahan pada kawasan pertanian pangan berkelanjutan.

I.5.1.2 Rencana Tata Ruang Kawasan Perkotaan Cekungan Bandung

Berdasarkan Perpres Nomor 45 Tahun 2018 tentang Rencana Tata Ruang Kawasan Perkotaan Cekungan Bandung Pasal 8 (c) menyatakan bahwa salah satu ebijakan penataan ruang Kawasan Perkotaan Cekungan Bandung meliputi: peningkatan kualitas dan jangkauan pelayanan jaringan prasarana transportasi, telekomunikasi, energi, sumber daya air, serta prasarana dan sarana Kawasan Perkotaan Cekungan Bandung yang handal, merata, dan terpadu.

Pada Pasal 11 a dan b juga disebutkan mengenai strategi peningkatan kualitas dan jangkauan pelayanan jaringan prasarana transportasi. Strategi ini

meliputi peningkatan kualitas dan jangkauan pelayanan jaringan transportasi perkotaan yang seimbang dan terpadu untuk menjamin aksesibilitas yang tinggi antara Kawasan Perkotaan Inti dengan Kawasan Perkotaan di Sekitarnya, serta mengembangkan transportasi massal yang terintegrasi dengan moda transportasi lainnya.

Koridor *Bus Rapid Transit* (BRT) Cekungan Bandung yang direncanakan akan melewati kawasan perkotaan inti Cekungan Bandung. Hal ini akan mendukung fungsi kawasan perkotaan ini yang telah ditetapkan dari regulasi spasial eksisting, di mana akan difokuskan sebagai pusat pemerintahan, perdagangan dan jasan skala regional, pusat pelayanan olahraga, sistem angkutan umum penumpang, pelayanan pendidikan, industri dan sebagainya.

Gambar I-5 Konteks Sistem BRT pada Kawasan Perkotaan Inti di Cekungan Bandung

Sumber: Analisis Konsultan, 2024

Selain itu, terdapat 15 kawasan perkotaan pendukung yang akan berfungsi sebagai penyeimbang perkembangan Kawasan Perkotaan Inti. 7 Dari 15 kawasan perkotaan tersebut akan menjadi terminus dan/atau dilewati oleh layanan sistem BRT Cekungan Bandung, yaitu:

a. Kawasan Perkotaan Padalarang-Ngamprah di Kabupaten Bandung Barat

Gambar I-6 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Padalarang-Ngamprah

Sumber: Analisis Konsultan, 2024

b. Kawasan Perkotaan Lembang di Kabupaten Bandung Barat

Gambar I-7 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Lembang

Sumber: Analisis Konsultan, 2024

c. Kawasan Perkotaan Soreang-Kutawaringin-Katapang di Kabupaten Bandung

Gambar I-8 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Soreang-Kutawaringin-Katapang

Sumber: Analisis Konsultan, 2024

d. Kawasan Perkotaan Majalaya-Ciparay di Kabupaten Bandung

Gambar I-9 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Majalaya-Ciparay

Sumber: Analisis Konsultan, 2024

e. Kawasan Perkotaan Baleendah-Dayeuhkolot-Bojongsoang di Kabupaten Bandung

Gambar I-10 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Baleendah-Dayeuhkolot-Bojongsoang

Sumber: Analisis Konsultan, 2024

f. Kawasan Perkotaan Banjaran di Kabupaten Bandung

Gambar I-11 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Banjaran

Sumber: Analisis Konsultan, 2024

g. Kawasan Perkotaan Jatinangor-Tanjungsari di Kabupaten Sumedang

Gambar I-12 Konteks Sistem BRT pada Kawasan Perkotaan Pendukung Jatinangor-Tanjungsari

Sumber: Analisis Konsultan, 2024

Ketujuh kawasan perkotaan tersebut memiliki fungsi salah satunya sebagai pusat pelayanan sistem angkutan umum penumpang.

I.5.1.3 Rencana Detail Tata Ruang dan Peraturan Zonasi Cekungan Bandung Tahun

Peraturan Daerah (Perda) Kota Bandung Nomor 10 Tahun 2015 tentang Rencana Detail Tata Ruang Dan Peraturan Zonasi Kota Bandung Tahun 2015 – 2035 telah diatur bahwa salah satu perwujudan zona sarana pelayanan umum transportasi meliputi penataan terminal/stasiun dengan menyediakan prasarana utilitas dan diintegrasikan dengan sistem angkutan umum massal, jalur pejalan kaki dan memperhatikan aksesibilitas penyandang disabilitas, yang sejalan dengan proyek BRT Cekungan Bandung.

Tabel I-4 Daftar Proyek Transportasi yang Sedang Berjalan/Masa Depan di Kawasan Metropolitan Cekungan Bandung

No	Proyek	Bandung Master Plan 2011-2031	Bandung Urban Mobility Plan	Bandung Mayor Decree Plan
1	Reorganisasi jaringan jalan	✓	✓	✓
2	Pembangunan 4 jalan tol	✓		✓
3	Pembangunan 6 flyover dan 7 perlintasan sebidang terpisah	✓		✓
4	Perluasan dan penataan ulang terminal	✓		✓
5	Pengaturan ulang rute dan sistem pool Angkot (Paratransit)	✓		✓
6	Trans Metro Bandung – BRT Extention	✓	✓	✓
7	Rencana Bus Sekolah dan Bus Wisata		✓	
8	Rencana Monorel/LRT Kota Bandung (2 dari 10 koridor)	✓	✓	✓
9	LRT Bandung Raya (3 koridor)			✓
10	Jaringan Metro Capsule			
11	Revitalisasi Kereta Api (elektrifikasi sinyal, peningkatan jalur ganda)	✓	✓	✓
12	Rencana kereta gantung (3 dari 15 jalur)	✓	✓	✓
13	Pengembangan *Transit Oriented Development* (TOD)	✓	✓	✓
14	Reorganisasi Stasiun Bandung (Konsep TOD)		✓	✓
15	Kawasan Strategis Gedebage dengan stasiun multimoda (Konsep TOD)		✓	✓
16	Pengembangan *Park and Ride*			✓
17	Rencana Bersepeda/*bike sharing*		✓	✓
18	Skywalk dan Jaringan Pejalan Kaki	✓	✓	✓
19	Kereta Cepat (Jakarta - Gedebage)	West Java Masterplan 2009-2029		
20	Bandara Kertajati (BIJB)	West Java Masterplan 2009-2029		

Sumber: BBMA Urban Mobility Strategy and Action Plan, World Bank 2020

I.5.2 Jaringan Jalan dan Rel Cekungan Bandung

Tinjauan yang komprehensif terhadap jaringan jalan maupun infrastruktur dapat menjadi dasar untuk memahami kondisi mobilitas yang ada saat ini, sekaligus mengembangkan strategi atau langkah-langkah ke depan. Pada tahun 2017, jaringan jalan di BBMA terdiri dari sistem hirarki jalan primer dan sekunder seperti yang ditunjukkan pada gambar berikut.

Gambar I-13 Peta Konsep Jaringan Transportasi Cekungan Bandung

Sumber: Bandung Low Carbon Mobility Plan Phase 1 Final Report, SYSTRA 2017

Jaringan primer menghubungkan pusat-pusat nasional dan regional, sedangkan jaringan sekunder menghubungkan jaringan primer dengan pusat-pusat sekunder dan kota.

Guna mendukung pelayanan transportasi publik Kawasan Perkotaan Cekungan Bandung, Pemerintah Provinsi Jawa Barat bersama dengan Pemerintah Kota/Kabupaten di Kawasan Perkotaan Cekungan Bandung merencanakan transportasi publik baik berbasis jalan maupun berbasis rel. Saat ini terdapat 19 rute rencana pengembangan transportasi berbasis jalan dan 5 rute rencana pengembangan transporasi berbasis rel lintas wilayah di Kawasan Perkotaan Cekungan Bandung[3].

[3] BP Cekungan Bandung, Laporan Tahunan 2022, Badan Pengelolaan Cekungan Bandung, Pemerintah Provinsi Jawa Barat, September 2023, diakses 10 September 2024

Gambar I-14 Rencana Jaringan Jalan dan Rel Cekungan Bandung

Sumber: Laporan Tahunan BP Cekban, 2022

I.5.3 Kondisi Kepemilikan Kendaraan Cekungan Bandung

Sekitar 12,3 juta perjalanan dilakukan setiap hari di wilayah BBMA. Rata-rata, sepertiga dari perjalanan tersebut menggunakan transportasi umum. Penggunaan tertinggi tercatat di Kabupaten Bandung Barat (60%) dan Sumedang (55%), sementara penggunaan terendah berada di Kota Bandung (13%), Kota Cimahi (15%), dan Kabupaten Bandung (20%)[4]. Sebagian besar perjalanan yang tidak menggunakan transportasi umum dilakukan dengan sepeda motor, yang mencapai 60% dari total kendaraan pribadi. Distribusi perjalanan antara transportasi umum dan kendaraan pribadi berdasarkan wilayah dapat dilihat sebagai berikut.

[4] Data ini diolah dari berbagai dokumen Rencana Induk Transportasi (2018) dan Indeks Transportasi Perkotaan Berkelanjutan untuk Metropolitan Bandung Raya (2018).

Gambar I-15 Modal Split di Kawasan Perkotaan Cekungan Bandung

Berikut adalah data jumlah kendaraan bermotor di Kawasan Perkotaan Cekungan Bandung, sebagaimana dilaporkan oleh Badan Pusat Statistik Provinsi Jawa Barat. Dari informasi ini, terlihat jelas bahwa sepeda motor mendominasi jumlah kendaraan di Cekungan Bandung, menjadi moda transportasi yang paling umum digunakan.

Tabel I-5 Daftar Jalan pada Koridor BRT Cekungan Bandung

Kota/Kabupaten	Sedan/ sejenisnya	Jeep/ sejenisnya	Mini Bus/ sejenisnya	Bus/ sejenisnya	Truck/ Pick Up	Alat-Alat Berat	Sepeda Motor
Kota Bandung	384510	37467	266948	6434	74667	7	1251080
Kab Bandung Barat	51754	3613	38882	471	21298	3	501796
Kab Bandung	89188	5944	66851	967	35005	0	904737
Kab Sumedang	17142	903	13282	435	8548	0	262720

Kota/Kabupaten	Sedan/ sejenisnya	Jeep/ sejenisnya	Mini Bus/ sejenisnya	Bus/ sejenisnya	Truck/ Pick Up	Alat-Alat Berat	Sepeda Motor
Kota Cimahi	41194	3081	30081	268	7318	0	248674

Sumber: Badan Pusat Statistik Provinsi Jawa Barat, 2016

Berdasarkan hasil analisis survei yang dilakukan oleh *Sustainable Urban Transport* ESCAP, rata-rata jarak harian yang ditempuh oleh pengguna sepeda motor di Kota Bandung adalah 7,89 km, dengan waktu perjalanan harian rata-rata 25,54 menit, dan biaya rata-rata sebesar IDR 11.400 per hari[5]. Distribusi kepemilikan kendaraan sepeda motor dapat dilihat pada gambar berikut.

Gambar I-16 Distribusi Kepemilkan Kendaraan Sepeda Motor di Cekungan Bandung

Sumber: BBMA Urban Mobility Strategy and Action Plan, World Bank 2020

[5] Weningtyas, Widyarini. 2018. Data Collection Report on Sustainable Urban Transport Index Phase-1: Bandung City. ESCAP, Bangkok

I.5.4 Kondisi Angkutan Eksisting Cekungan Bandung

Transportasi umum diatur oleh Peraturan Daerah (Perda) Kota Bandung Nomor 16 Tahun 2012 tentang Penyelenggaraan Perhubungan Dan Retribusi Di Bidang Perhubungan, yang mengatur dua jenis layanan transportasi umum:

1. **Moda trayek tetap:** meliputi transportasi umum antar provinsi (AKAP atau "Angkutan Kota Antar Provinsi"), transportasi umum dalam provinsi (AKDP atau "Angkutan Kota Dalam Provinsi"), transportasi umum di wilayah perkotaan, dan transportasi umum di wilayah perbatasan.
2. **Moda non-trayek tetap:** biasanya digunakan untuk tujuan khusus, seperti layanan taksi, bus wisata, transportasi karyawan, dan bus sekolah.

Layanan transportasi umum di Kota Bandung sebagian besar disediakan oleh bus (seperti Angkot, Trans Metro Bandung, dan DAMRI). Selain itu, terdapat layanan kereta penumpang lokal yang menghubungkan Kota Bandung dengan dua wilayah pinggiran besar, yaitu Padalarang dan Cicalengka. Jaringan transportasi umum di Kota Bandung ditampilkan pada gambar berikut.

Gambar I-17 Peta Jaringan Transportasi Publik Eksisting Kota Bandung

Sumber: Bandung Low Carbon Mobility Plan Phase 1 Final Report, SYSTRA 2017

Layanan Angkot masih menjadi moda transportasi umum yang paling diminati oleh masyarakat yang tinggal di Kota Bandung. Jaringan rute Angkot

mencakup sebagian besar wilayah kota. Namun, jumlah armada Angkot telah menurun belakangan ini akibat persaingan dengan sepeda motor dan ojek. Asosiasi Kobanter mengoperasikan 39 rute dengan total 5.521 kendaraan.

Selain itu, terdapat pula Trans Metro Pasundan, sistem bus yang melayani wilayah Metropolitan Cekungan Bandung. Layanan ini awalnya dikelola oleh Kementerian Perhubungan Republik Indonesia melalui Direktorat Jenderal Perhubungan Darat, sebagai bagian dari program "*Buy The Service*" (BTS) Teman Bus. Sejak awal tahun 2024, pengelolaan Trans Metro Pasundan Koridor 2 & 3 telah dialihkan kepada Dinas Perhubungan Provinsi Jawa Barat melalui UPTD PPP LLAJ Wilayah II, dengan rencana untuk koridor lainnya akan menyusul kemudian. Pengoperasian Trans Metro Pasundan dijalankan oleh Perum DAMRI dan PT Big Bird Pusaka.

Gambar I-18 Peta Trans Metro Pasundan dan Trans Metro Bandung

Sumber: Analisis Konsultan, 2024

I.5.5 Kondisi Demografi Cekungan Bandung

Kawasan Cekungan Bandung telah mengalami pertumbuhan populasi yang pesat selama dua dekade terakhir. Hal ini mengakibatkan ekspansi urban yang signifikan, di mana daerah pinggiran memiliki populasi yang lebih tinggi dibandingkan dengan pusat kota. Berdasarkan sebuah studi pada tahun 2014, tingkat pertumbuhan fisik kawasan urban rata-rata mencapai 4,9 persen per tahun. Kepadatan kota terus menurun seiring dengan meluasnya kota ke arah utara dan selatan.

Peningkatan luas kawasan urban di BBMA dapat dilihat dengan membandingkan situasi pada tahun 2000 dan tahun 2015.

Gambar I-19 Pertumbuhan Populasi Kawasan Cekungan Bandung

Sumber: BBMA Urban Mobility Strategy and Action Plan, World Bank 2020

Gambar I-20 Pertumbuhan dan Penurunan Penduduk Metropolitan Bandung

Sumber: Human Terrain, 2018

Gambar di atas menunjukkan pola peningkatan dan penurunan jumlah penduduk di wilayah Cekungan Bandung. Warna hijau yang semakin gelap pada gambar menggambarkan intensitas peningkatan penduduk yang lebih signifikan. Terlihat bahwa pusat Metropolitan Bandung mengalami pertumbuhan yang lebih tinggi dibandingkan dengan kawasan sekitarnya. Bahkan beberapa kawasan di sekitarnya mengalami penurunan penduduk. Pusat wilayah Cekungan Bandung yaitu Kota Banudng memiliki populasi yang besar dan tingkat kepadatan yang lebih tinggi dibandingkan dengan wilayah lainnya di kota ini. Kepadatan penduduk ini terutama terlihat di area komersial dan pemukiman padat, mencerminkan tingginya aktivitas ekonomi dan sosial di wilayah tersebut.

Populasi Cekungan Bandung diperkirakan mencapai sekitar 9,0 juta jiwa. Pertumbuhan populasi perkotaan di Cekungan Bandung sejalan dengan

peningkatan jumlah kawasan terbangun. Pada periode 2005 hingga 2014, terjadi peningkatan kawasan terbangun sebesar 150%, dengan pengembangan lahan terbesar terjadi di Kabupaten Bandung dan Kabupaten Bandung Barat. Estimasi distribusi populasi di Cekungan Bandung pada tahun 2019 disajikan pada gambar berikut.

Gambar I-21 Jumlah Populasi di Kawasan Perkotaan Cekungan Bandung

Sumber: BBMA Urban Mobility Strategy and Action Plan, World Bank 2020

Distribusi populasi ini tidak memperhitungkan perubahan populasi di Kota Bandung, yang meningkat dari 2,5 juta jiwa pada malam hari menjadi hampir 4 juta jiwa pada siang hari akibat arus masuk komuter dari daerah sekitarnya[6].

I.5.6 Kondisi Sosial Ekonomi Cekungan Bandung

Berdasarkan Distribusi Persentase Produk Domestik Regional Bruto Atas Dasar Harga Berlaku menurut Lapangan Usaha di Kota Bandung, 2019–2023 di Wilayah Cekungan Bandung, ditemukan bahwa Perdagangan Besar dan Eceran

[6] Pemerintah Kota Mendorong Pengembangan Metropolitan Bandung Raya (2020), Wawancara dengan Wali Kota Bandung Oded M. Danial, Times Indonesia.

menjadi salah satu dari tiga lapangan usaha dengan persentase tertinggi di masing-masing kabupaten/kota. Untuk lebih rinci dapat dilihat pada tabel berikut.

Tabel I-6 Distribusi Persentase Produk Domestik Regional Bruto Atas Dasar Harga Berlaku menurut Lapangan Usaha di Kota Bandung, 2023

Kota/Kabupaten	Distribusi PDRB Atas Dasar Harga Berlaku*
Kota Bandung	1. Perdagangan Besar dan Eceran; Reparasi Mobil dan Sepeda (25,33%) 2. Industri Pengolahan (18,73%) 3. Informasi dan Komunikasi (14,69%)
Kab Bandung Barat	1. Industri Pengolahan (41,16%) 2. Perdagangan Besar dan Eceran; Reparasi Mobil dan Sepeda (12,40%) 3. Konstruksi (7,35%)
Kab Bandung	1. Industri Pengolahan (52,53%) 2. Perdagangan Besar dan Eceran; Reparasi Mobil dan Sepeda (12,94%) 3. Konstruksi (Pertanian, Kehutanan, dan Perikanan (7,04%)
Kab Sumedang	1. Industri Pengolahan (19,48%) 2. Pertanian, Kehutanan, dan Perikanan (18,80%) 3. Perdagangan Besar dan Eceran; Reparasi Mobil dan Sepeda (15,76%)
Kota Cimahi	1. Industri Pengolahan (45,74%) 2. Perdagangan Besar dan Eceran; Reparasi Mobil dan Sepeda (15,48%) 3. Konstruksi (12,86%)

Sumber: Badan Pusat Statistik masing-masing Kab/Kota di Cekungan Bandung, 2024

Lokasi dan distribusi kelompok berpenghasilan rendah di seluruh Kawasan Metropolitan Cekungan Bandung juga dapat memberikan kerangka untuk menilai permasalahan mobilitas mereka serta mengembangkan langkah-langkah perbaikan di komunitas mereka dan perjalanan mereka di seluruh kawasan metropolitan. Estimasi distribusi kelompok berpenghasilan rendah di BBMA pada tahun 2019 ditunjukkan pada gambar berikut.

Gambar I-22 Distribusi Kelompok Berpenghasilan Rendah di Cekungan Bandung

Sumber: BBMA Urban Mobility Strategy and Action Plan, World Bank 2020

Di Kota Cimahi dan Kota Bandung, 20-25% keluarga diidentifikasi sebagai kelompok berpenghasilan rencah, sementara di Kabupaten Bandung Barat dan Sumedang di bawah 10%[7]. Kota Bandung menghadapi tantangan urbanisasi cepat, menyebabkan kepadatan dan kekurangan perumahan terjangkau.

Kota Bandung memiliki 45.412 komunitas berpenghasilan rendah di 253 hektar, dengan 13 kawasan sangat miskin diprioritaskan untuk pembangunan apartemen. Di Bandung Barat, 60% pemukiman informal kurang akses jalan memadai. Kota Cimahi memiliki 15 kawasan kumuh seluas 181,89 hektar yang dihuni oleh 4.682 keluarga, sebagian besar di Cimahi Tengah dan Selatan[8].

[7] World Bank, *Bandung Basin Metropolitan Area Urban Mobility Strategy and Action Plan. Volume 1: Baseline Assessment*, IDSUN Multi-Donor Trust Fund, Targeted Advisory Support for Urban Transport at City-Level (ID: P156103), 2020

[8] Maula, F.K., et al., 2019. "Mapping Informal Settlements." IOP Conf. Ser.: Earth Environ. Sci. 385 012035; Jones, P., 2017. "Formalizing the Informal." *Sustainability*, MDPI; Salim, W., et al., 2018. *Access to Urban Services in Asia: Indonesia*. East-West Center.

BAB II METODOLOGI

II.1 Umum

Metodologi ini digunakan konsultan untuk memadukan seluruh proses pekerjaan secara sistematis sehingga tercapai sasaran dan tujuan studi. Sasaran makro dilakukan dengan melakukan analisis lalu lintas untuk mengidentifikasi dampak lalu lintas akibat pembangunan BRT Cekungan Bandung serta menyusun alternatif pemecahan masalah untuk mengurangi dampak tersebut. Metodologi studi yang disusun bersifat komprehensif yang melibatkan suatu rentang alternatif yang telah diidentifikasi dan memiliki potensi yang tinggi untuk diterapkan pada setiap pekerjaan.

Metodologi studi untuk sasaran eksternal terbagi dalam 5 tahap pekerjaan, yaitu:

- Tahap pengumpulan dan analisis data
- Tahap pengembangan model transportasi
- Tahap analisis kinerja jaringan jalan eksisting
- Tahap penyusunan alternatif pemecahan masalah
- Tahap evaluasi rencana pengembangan jaringan jalan

Pada tahap pengumpulan data, konsultan melaksanakan proses koleksi data sekunder dari instansi dan sumber - sumber terkait. Data dan informasi tersebut meliputi jaringan jalan sepanjang pembangunan BRT Cekungan Bandung. Pada tahap pengumpulan data, konsultan juga mempertimbangkan rencana pembangunan Pemerintah Daerah.

Hasil pengumpulan data ini selanjutnya digunakan sebagai dasar pengembangan model transportasi sebagai alat bantu yang digunakan untuk menggambarkan kondisi lalu lintas melalui simulasi. Sebagai upaya untuk lebih mendekati keadaan lalu lintas eksisting, model transportasi akan dilakukan proses kalibrasi dan validasi berdasarkan hasil survei. Dengan menggunakan model transportasi yang telah tervalidasi, konsultan akan dapat mengevaluasi kinerja jaringan jalan eksisting dan melakukan prediksi kondisi lalu lintas di masa mendatang.

Hasil prediksi terhadap masalah yang dilaksanakan secara kuantitatif tersebut memberikan kemungkinan untuk diidentifikasikannya permasalahan lalu lintas yang mungkin terjadi di masa mendatang dengan mempertahankan tingkat pelayanan sistem jaringan yang telah ada. Selanjutnya identifikasi masalah ini dapat dipergunakan sebagai dasar untuk menentukan alternatif pemecahan masalah yang mungkin dilaksanakan.

Gambar II-1 Metodologi Studi

Sumber: Analisis Konsultan

II.2 Pengumpulan dan Analisis Data

Pada tahapan ini, pengumpulan data primer adalah data yang didapat secara langsung dengan melakukan survei di lapangan dan data-data sekunder yang didapatkan tidak melalui survei langsung melainkan, berdasarkan data, regulasi, studi terdahulu, atau dokumen lainnya yang diperlukan.

II.2.1 Pengumpulan Data Sekunder

Beberapa data sekunder yang dibutuhkan pada studi ini bertujuan untuk mendapatkan gambaran lengkap terkait gambaran wilayah studi, mencakup tata

ruang wilayah, jaringan jalan, kepemilikan kendaraan, kondisi angkutan umum, demografi, sosial ekonomi, dan data lainnya terkait kondisi lalu lintas perkotaan.

Data-data dan informasi dikumpulkan oleh konsultan melalui berbagai sumber, yang akan menjadi dasar untuk tahap peninjauan data sekunder untuk memproses hasil studi seperti yang diharapkan.

II.2.2 Pengumpulan Data Primer

Untuk mendukung data-data sekunder yang telah diperoleh dan untuk mendapatkan gambaran mengenai kondisi lalu lintas dan jalan eksisting, maka pengumpulan data primer akan dilakukan secara langsung pada lokasi dengan cara survei lapangan yang bertujuan memperoleh informasi penting berkaitan dengan kinerja lalu lintas, kondisi lalu lintas di wilayah studi, jaringan jalan, serta permasalahan - permasalahan lalu lintas yang ada.

Pelaksanaan waktu survei lapangan dipilih berdasarkan jam sibuk pagi dan sore hari, sehingga penentuan titik - titik survei dan pemilihan waktu akan mencerminkan pola pekerjaan yang sebenarnya.

Dengan melakukan kajian terhadap studi - studi sejenis yang pernah dilakukan, maka akan lebih mempermudah konsultan sehingga tidak seluruh kebutuhan data primer harus dilaksanakan di lapangan. Survei lapangan yang akan dilakukan oleh konsultan didasarkan pada:

1. Survei pendahuluan
2. Inventarisasi jaringan jalan, serta sarana dan prasarana transportasi
3. Pencacahan volume lalu lintas pada simpang eksternal dan ruas jalan
4. Kinerja simpang seperti hambatan, fase, dan lampu lalu lintas.

II.2.2.1 Survei Pendahuluan

Tujuan dari survei pendahuluan ini adalah untuk mengidentifikasi area studi dan membandingkannya dengan data sekunder yang diperoleh untuk digunakan sebagai bahan analisis data dan pengembangan model sistem jaringan jalan.

II.2.2.2 Survei Inventarisasi Jaringan Jalan

Tujuan dari survei inventaris jalan ini adalah untuk mengidentifikasi karakteristik jalan dan persimpangan (geometrik, fase sinyal, pergerakan lalu lintas, perilaku pengemudi, masalah, dll.) Sebagai input dalam menentukan rekomendasi untuk menyelesaikan masalah lalu lintas dan untuk menentukan kondisi aspek lingkungan yang ada di sekitar kawasan.

II.2.2.3 Survei Volume Simpang dan Ruas Jalan

Pelaksanaan survei volume lalu lintas dan ruas jalan perlu dilakukan dengan maksud sebagai berikut:

1. Pengumpulan data volume lalu lintas sebagai dasar pelaksanaan proses validasi dan kalibrasi model transportasi yang telah dikembangkan. Untuk keperluan ini, volume lalu lintas yang diukur adalah *actual flow*, yaitu volume lalu lintas yang diusahakan mendekati nilai demand. Pelaksanaan Survei ini adalah pada suatu titik yang mewakili ruas jalan dengan menggunakan teknik pencacahan terklasifikasi (*Classified Traffic Count*).
2. Pengumpulan data volume lalu lintas sebagai parameter proses penilaian kinerja jaringan jalan dan lalu lintas. Untuk keperluan ini, selain Survei volume lalu lintas ruas jalan sebagaimana disebut pada point di atas, maka diperlukan pula pencacahan volume lalu lintas di simpang dengan menggunakan teknik pencacahan gerakan berbelok yang terklasifikasi (*Classified Turning Movement Counting*).

Pembagian klasifikasi kendaraan terbagi menjadi:

- Motor, yang mencakup sepeda motor.
- Mobil penumpang, yang mencakup jenis kendaraan mobil pribadi, angkot, pick-up, mobil box, taksi, mikrolet dan sejenisnya.
- Kendaraan bus yang mencakup bus sedang dan bus besar.
- Kendaraan truk, yang mencakup truk sedang dan truk besar.

Pelaksanaan survei volume lalu lintas di simpang dan ruas jalan ditentukan pada waktu- waktu sibuk pagi dan sore hari.

II.2.2.4 Survei Kinerja Simpang

Survei kinerja simpang dilaksanakan pada simpang - simpang yang sama pada survei volume simpang. Dengan demikian, waktu pelaksanaan survei ini dapat dilakukan secara bersamaan dengan survei volume simpang. Adapun parameter kinerja simpang yang akan diambil pada survei ini meliputi besarnya hambatan (*delay*) pada simpang dan setting lampu lalu lintas.

Metode pengukuran besarnya hambatan pada simpang adalah dengan melakukan pengukuran besarnya hambatan yang dialami oleh kendaraan - kendaraan sampel selama berada di simpang. Sedangkan pengambilan kendaraan - kendaraan sampel dilakukan secara acak pada jangka waktu tertentu, yaitu 15 menit. Dengan demikian, akan diperoleh sekumpulan data hambatan dari kendaraan yang diambil sebagai sampel, yang dapat diolah untuk memperoleh besar hambatan (*delay*) rata - rata.

Adapun metode survei lampu lalu lintas dilakukan dengan pencatatan langsung di lokasi simpang. Data dan informasi yang dicatat pada survei ini meliputi jumlah fase lampu, urutan fase, dan durasi lampu lalu lintas.

II.2.2.5 Survei Kecepatan dan Hambatan

Survei kecepatan dan hambatan dilakukan dengan beberapa langkah sebagai berikut:

- Catatan waktu perjalanan kendaraan, dari titik asal ke titik tujuan di sekitar area studi.
- Waktu Perjalanan dan Survei Kecepatan, kegiatan yang dilakukan adalah mencatat waktu yang dibutuhkan oleh kendaraan untuk melakukan perjalanan pada rute tertentu, dan mencatat kelambatan perjalanan dan penyebab kelambatan / hambatan.
- Survei dilakukan dalam 2 periode waktu, puncak pagi dan malam puncak.

II.2.2.6 Survei *Stated Preference*

Survei *Stated Preference* dimaksudkan untuk mengetahui preferensi masyarakat terhadap penggunaan moda baru, yakni BRT Mebidang. Metode survei dilakukan dengan survei pemilihan moda antara moda eksisting atau moda baru yang

dibedakan dari variabel waktu perjalanan, biaya perjalanan, *headway,* dan variabel lainnya yang berpengaruh.

II.2.2.7 Survei Pejalan Kaki

Survei pejalan kaki dimaksudkan untuk mengamati kondisi fasilitas pejalan kaki serta volume pejalan kaki eksisting, terutama di lokasi untuk penumpang keluar masuk, apakah kondisi pejalan kaki memungkinkan akses yang baik untuk penumpang yang keluar masuk, serta volume eksisting.

II.3 Pengembangan Model Transportasi

Untuk dapat melakukan analisis transportasi secara lebih mendalam pada suatu jaringan transportasi, perlu dikembangkan suatu model transportasi yang diharapkan mampu merepresentasikan keadaan yang nyata. Model transportasi dapat memberikan gambaran dari jaringan transportasi yang ada di wilayah tersebut. Penjelasan model transportasi dan tahap pengembangannya akan dijabarkan lebih lanjut.

II.3.1 Deskripsi Umum Model Transportasi

Model transportasi merupakan suatu simplifikasi dan simulasi untuk mempresentasikan keadaaan yang sesungguhnya dan yang mungkin terjadi pada sistem transportasi yang direncanakan melalui penggunaan perangkat bantu analisis, pragmatis, matematis dan analogi. Proses simulasi tersebut didasarkan pada hubungan dan interaksi antara aktivitas tata guna lahan dan penyediaan prasarana dan sarana transportasi. Secara umum terdapat beberapa jenis permodelan transportasi yang dapat digunakan untuk perencanaan makro dan mikro. Ditinjau dari aspek atau segi demand (kebutuhan), ada 2 (dua) macam *modelling* dan *forecasting* yang dapat dilakukan, yaitu *Sequential Demand Model* dan *Direct Demand Model* (*Land Use Transport Model* & *Forecasts*).

Dalam studi ini, konsultan akan melakukan proses sequential demand model, yang lebih sesuai untuk diterapkan pada perencanaan yang lebih komperehensif. Proses ini mencakup empat tahapan permodelan yaitu:

- *Trip Generation*, yaitu proses menentukan jumlah perjalanan yang terbagi menjadi bangkitan dan tarikan oleh pengembangan dari setiap zona studi.
- *Trip Distribution*, yaitu proses menentukan arah dan distribusi pergerakan antar setiap zona studi.
- *Modal Split*, menentukan pemilihan moda dari setiap jenis moda transportasi yang tersedia.
- *Trip Assignment*, menentukan pembebanan perjalanan dari setiap rute perjalanan berdasarkan rute yang dipilih. Tahap ini akan mengestimasikan volume lalu lintas jalan serta estimasi penumpang angkutan umum.

Untuk mempermudah proses pemodelan secara umum, maka konsultan akan menggunakan perangkat lunak yang membantu analisis, yakni PTV VISUM untuk pemodelan makro dalam zona wilayah perkotaan, PTV VISSIM dalam pemodelan mikro yang mencakup analisis persimpangan, persinyalan, dan lalu lintas, serta *Microsoft Excel* dalam penggunaan kalkulasi.

Pada proses pengembangan model transportasi ini, kualitas dan kuantitas data akan membentuk gambaran karakteristik - karakteristik transportasi di wilayah kajian kawasan serta tingkat kepercayaannya.

II.3.2 Identifikasi Model

Tahapan awal dari keseluruhan proses pengembangan model transportasi adalah mengumpulkan data - data yang akan digunakan sebagai masukan. Data-data tersebut mencakup data primer maupun data sekunder. Tahapan selanjutnya adalah memformat data-data tersebut hingga siap digunakan sebagai input data untuk tahapan berikutnya. Tahap ini meliputi kodifikasi jaringan jalan dan sistem transportasi dan persiapan untuk mendapatkan Matriks *Origin-Destination* (Asal & Tujuan). Matriks Asal Tujuan perjalanan ini dapat dibangun dengan menggunakan hasil pencacahan volume lalu lintas. Sejalan dengan proses ini adalah proses kodifikasi jaringan jalan dan pembentukan sistem zona pada wilayah studi. Penetapan zona pada wilayah studi ditempuh dengan mengambil pendekatan berdasarkan batas - batas wilayah tertentu.

Pada analisis ini, konsultan akan menggunakan model dasar berdasarkan studi-studi sebelumnya, namun model ini akan diperbaharui berdasarkan data survei terbaru yang dilakukan pada data sekunder dan pengumpulan data primer.

Tahap berikutnya adalah melaksanakan 4 (empat) proses modelling, yaitu *Trip Generation*, *Trip Distribution*, *Modal Split,* dan Traffic Assignment. Seluruh proses ini akan dibantu oleh perangkat lunak yang telah dijelaskan di atas.

II.3.2.1 *Trip Generation*

Tahapan awal dari empat tahapan proses permodelan (*modelling*) ini adalah *Trip Generation* (Bangkitan dan Tarikan Lalu Lintas). Hasil dari tahapan ini berupa *trip production* dan *trip attraction* untuk masing - masing zona studi. Hasil ini akan menjadi masukan bagi proses *Trip End* dan *Trip Modal Split Model*.

Trip Generation dari setiap zona studi dibentuk dengan mengambil asumsi adanya keterkaitan antara kondisi sosio ekonomi dan tata guna lahan di dalam zona dengan besarnya volume kendaraan yang keluar masuk zona tersebut. Faktor pembangkit perjalanan bisa diambil data sosio ekonomi seperti jumlah rumah tangga, pendapatan tiap rumah tangga, dan jumlah kendaraan yang dimiliki oleh tiap keluarga. Sedangkan faktor yang dianggap sebagai penarik perjalanan dapat diambil kondisi tata guna lahan, jumlah pekerja dan jumlah tempat kegiatan (perdagangan, industri dan lain sebagainya).

Dengan mengambil asumsi adanya keterkaitan antara faktor - faktor tersebut di atas dengan jumlah perjalanan yang keluar masuk zona, maka akan dapat ditentukan hubungan matematis yang akan menggambarkan tingkat bangkitan dan tarikan perjalanan dari zona tersebut. Hubungan yang diperoleh disini akan sangat membantu untuk kepentingan model dalam memperkirakan besarnya *zone trip production* dan *zone trip attraction* wilayah studi.

II.3.2.2 *Trip Distribution*

Trip Distribution adalah tahapan untuk mendapatkan matriks asal tujuan (*Origin Destination Matrix*), atau Matriks O-D yang akan digunakan dalam proses pemodelan selanjutnya. Matriks O-D hasil model harus dilakukan kalibrasi dan divalidasikan dengan kondisi nyata, untuk memberikan gambaran nyata dari model.

Tahap awal dari proses ini adalah melakukan kodifikasi terhadap jaringan jalan, proses ini akan dilanjutkan dengan tahap susulan berupa pengembangan jaringan jalan terkomputerisasi. Dasar distribusi yang digunakan adalah dengan proses skim, yaitu berupa penentuan minimum path antar zona. Faktor impedansi yang dapat digunakan sebagai dasar penentuan *minimum path* adalah jarak tempuh perjalanan, waktu tempuh perjalanan, dan kecepatan tempuh perjalanan.

Untuk kota ukuran besar seperti Medan, maka proses distribusi perjalanan dapat dilakukan dengan metode *Gravity Model* atau dengan metoda perkiraan matriks berdasarkan data lalu lintas actual yang didapatkan berdasarkan survei *Traffic Counting* (TC). Pada praktiknya, kualitas dan kuantitas data mengakibatkan kedua moda ini digunakan secara simultan, baik untuk setiap moda (bila mungkin) ataupun total moda.

II.3.2.3 *Modal Split*

Di dalam melaksanakan tahapan modal split, ada 2 (dua) macam konsep pendekatan, yaitu pemilahan moda dilakukan pada saat penetapan *trips end* untuk perjalanan orang menurut masing - masing moda (misalnya kendaraan pribadi, angkutan umum, sepeda motor dll) atau pemilahan moda dilakukan saat tahap distribusi sebelum tahap *trip assignment*. Pada studi ini, konsultan menentukan metode penetapan pada *trip end,* sehingga besaran pergerakan perjalanan sudah ditentukan dari awal pemodelan. Namun demikian, analisis *modal split* ini akan diperbaharui kembali setelah survei *stated preference* dilakukan, untuk mendapatkan persentase penggunaan moda baru yang akan dimodelkan.

II.3.2.4 *Trip Assignment*

Tahapan *Trip Assignment* akan menghasilkan volume kendaraan di tiap ruas jalan yang kemudian divalidasi dengan volume lalu lintas hasil survei. Pada proses ini, jumlah perjalanan antar zona yang sudah dibagi menurut penggunaan moda kendaraan pribadi (mobil pribadi, taxi, sepeda motor, dan angkutan barang), dan angkutan umum (bus, minibus, mikrobus) dialokasikan ke jaringan jalan.

Adapun masukan data yang dibutuhkan pada proses assignment ini adalah:

- Jaringan angkutan umum (*Public Transport Network*)
- Jaringan jalan (*Highway Network*)

- Matriks Perjalanan Kendaraan Pribadi
- Matriks Perjalanan Angkutan Umum
- Hubungan Volume dan Kecepatan untuk tiap ruas jalan

Pembebanan perjalanan yang dilakukan dapat ditempuh dengan metode sebagai berikut:

1. **Metode *All or Nothing***

   Metode *All or Nothing* ini mempunyai dasar asumsi yaitu seluruh perjalanan yang keluar dari suatu zona yang akan melalui serangkaian ruas jalan menurut kriteria *impedance* yang telah ditetapkan tanpa memperhatikan kapasitas ruas jalan yang dilaluinya. Hal ini mengakibatkan adanya kemungkinan suatu ruas jalan terbebani jauh di atas kapasitasnya.

2. **Metode *Capacity Restraint***

   Metode *Capacity Restraint* merupakan modifikasi dari metode *All or Nothing* di atas. Pada metode ini, seluruh perjalanan yang keluar dari suatu zona dianggap tidak bergerak secara bersamaan (*incremental*), akan tetapi secara bertahap. Dengan demikian, apabila ruas jalan pilihan (*minimum path*) telah menerima beban volume tertentu, maka volume perjalanan berikutnya dari zona tersebut akan melalui *minimum path* peringkat berikutnya yang lain.

II.3.3 Pengujian Model Transportasi

Pengujian model transportasi merupakan proses validasi dan kalibrasi faktor/parameter model sehingga hasil model mendekati kondisi yang ada di lapangan. Apabila hal ini sudah tercapai maka model siap dipergunakan untuk melakukan proses peramalan transportasi masa yang akan datang.

Proses kalibrasi adalah proses simulasi parameter model agar sesuai dengan kondisi tahun dasar. Sedangkan proses validasi adalah simulasi hasil model agar model dapat mewakili hasil survei tahun dasar. Untuk pelaksanaan studi ini, model lalu lintas yang diperlukan telah tersedia berdasarkan studi-studi sebelumnya. Dengan demikian, maka proses yang perlu dilakukan adalah melakukan validasi dan kalibrasi terhadap model yang telah ada tersebut.

II.4 Analisis Kinerja Lalu Lintas

Untuk dapat mengetahui dan memahami permasalahan transportasi dan lalu lintas di lokasi studi, pada tahap lanjutan konsultan akan melakukan analisis kinerja jaringan eksisting di lokasi studi yang terdiri dari analisa kinerja ruas jalan dan kinerja simpang.

Oleh karena itu, dalam analisis kinerja jaringan eksisting dan juga jaringan jalan alternatif digunakan antara lain kinerja pemanfaatan jalan dalam unit kendaraan-km dan kendaraan- jam. Kendaraan-km mencerminkan pemanfaatan jaringan jalan dari tinjauan jarak perjalanan sedangkan kendaraan-jam menunjukkan pemanfaatan jaringan dari tinjauan waktu yang dihabiskan di jaringan jalan. Untuk keperluan analisis ini, konsultan akan menggunakan metoda analisis yang sering digunakan oleh konsultan. Metode-metode tersebut adalah metode IHCM (*Indonesian Highway Capacity Manual*) atau Kapasitas Jalan Indonesia. Untuk analisa simpang digunakan antara lain derajat kejenuhan (*Degree of Saturation*), tingkat pelayanan (*Level of Service*), panjang antrian (*queue*) dan besar hambatan (*delay*).

II.5 Penyusunan Rekomendasi

Berdasarkan hasil analisa kinerja jaringan jalan eksisting dan perkiraan kondisi transportasi di masa mendatang, maka konsultan akan dapat memperkirakan kecenderungan sistem lalu lintas di lokasi studi pada masa mendatang.

Kebutuhan sistem transportasi akan diselaraskan dengan penanganan kemacetan lalu lintas pada jaringan jalan yang ada dan peningkatan keselamatan serta kenyamanan bagi pemakai jalan. Untuk pemecahan lalu lintas yang diakibatkan karena adanya bangkitan/tarikan perjalanan pada dasarnya dapat dilakukan dengan menerapkan teknik - teknik manajemen lalu lintas dan manajemen jalan adalah merupakan suatu hal yang umum bahwa alternatif pemecahan yang berbeda memerlukan jangka waktu pelaksanaan yang berbeda pula. Secara umum, alternatif pemecahan masalah akan dilihat berdasarkan dua kondisi, yaitu kondisi tanpa melakukan pengembangan apapun (*do nothing*) dan kondisi dengan melakukan pengembangan tertentu (*do something*).

Secara teknis, pemecahan masalah - masalah lalu lintas pada suatu wilayah kota, pada dasarnya dapat digolongkan ke dalam 2 cara, yaitu dengan penerapan teknik manajemen lalu lintas dan manajemen jalan. Manajemen lalu lintas ini pada umumnya merupakan perencanaan jangka mendesak dan jangka pendek untuk memperbaiki kondisi lalu lintas. Secara umum manajemen lalu lintas dapat dibedakan menjadi 3 macam teknik yang dikaitkan dengan sasaran strategi sebagaimana dijabarkan sebagai berikut:

II.5.1 Manajemen Kapasitas (*Management of Capacity)*

Manajemen kapasitas merupakan manajemen lalu lintas yang berkaitan erat dengan tindakan pengelolaan lalu lintas untuk meningkatkan kapasitas jalan. Dengan kata lain, upaya ini mengambil pendekatan dari sisi perbaikan supply. Beberapa alternatif solusi manajemen kapasitas mencakup:

- Penerapan sistem jalan satu arah atau tidal flow
- Pelebaran ruas jalan dan perbaikan alinyemen
- Penataan dan desain simpang
- Penyediaan jalur lambat
- Pengendalian akses
- Koordinasi setting lampu lalu lintas
- Pengaturan rute dan lajur lalu lintas

II.5.2 Manajemen Permintaan (*Management of Demand)*

Manajemen permintaan berkaitan dengan tindakan pengaturan dan pengendalian terhadap permintaan lalu lintas. Tindakan yang diambil pada umumnya bersifat regulasi dan pembatasan permintaan lalu lintas. Teknik - teknik yang termasuk dalam manajemen permintaan diantaranya adalah:

- Pembatasan lalu lintas
- Manajemen kendaraan dan pengendalian parkir
- Penutupan jalan

II.5.3 Manajemen Prioritas (*Management of Priority)*

Manajemen prioritas pada umumnya berkaitan dengan pemberian prioritas bagi lalu lintas tertentu yang dapat meningkatkan efisiensi dan keselamatan lalu lintas. Manajemen Prioritas dapat dijabarkan dengan menerapkan teknik - teknik seperti:

- Penyediaan lajur khusus bis atau prioritas bagi bus di simpang
- Penataan parkir baik di badan jalan maupun di luar badan jalan
- Penataan jalur bagi pejalan kaki
- Pemberian prioritas bagi kendaraan tertentu
- Pemberian fasilitas angkutan tertentu seperti pelayanan shuttle bus

II.6 Evaluasi Alternatif

Tahap terakhir dari studi ini adalah tahap evaluasi terhadap penerapan alternatif pemecahan masalah yang telah disusun pada tahap sebelumnya. Tahap evaluasi yang harus dilalui oleh setiap alternatif pemecahan masalah merupakan alternatif kinerja lalu lintas, baik ruas maupun simpang.

Dari segi teknis, alternatif pengembangan akan dievaluasi berdasarkan perbaikan kinerja yang dihasilkan terhadap jaringan jalan di wilayah studi. Tahap ini bertujuan mengevaluasi alternatif pemecahan masalah yang diusulkan dan ditinjau dari segi teknik, khususnya bagaimana para pemakai jasa transportasi akan merasakan manfaat kerja jaringan jalanan yang diterima. Kriteria untuk mengukur hal ini adalah perkiraan peningkatan kondisi lalu lintas sesuai dengan tiap - tiap alternatif pemecahan masalah.

BAB III ANALISIS KINERJA LALU LINTAS

III.1 Analisis Lalu Lintas dan Angkutan Eksisting

Untuk melakukan analisis kinerja jaringan, maka diperlukan data kondisi eksisting berupa identifikasi simpang, ruas, dan lokasi pembangunan stasiun di lapangan. Sejalan dengan tujuan studi untuk menentukan dampak lalu lintas si sepanjang koridor dan *End Station* BRT BBMA selanjutnya akan ditentukan simpang dan ruas yang akan bersinggungan langsung dengan konstruksi BRT BBMA.

III.1.1 Analisis Kondisi Prasarana Jalan

Analisis kondisi prasarana jaringan jalan dilakukan secara menyeluruh, dan juga secara spesifik pada Lokasi rencana *On Corridor* akan dibangun.

Jaringan jalan BBMA terdiri dari sistem hierarki jalan primer dan sekunder. Jaringan primer menghubungkan pusat kegiatan nasional dan wilayah. Jaringan sekunder menghubungkan jaringan primer ke pusat-pusat sekunder dan kota.

Gambar IIII-1 Jaringan Jalan BBMA

Sumber: Pemkot Bandung

Rasio panjang jalan terhadap jumlah penduduk Kota Bandung adalah 0,452 km/1.000 orang (2023), yang berada di bawah standar pelayanan minimal indeks mobilitas yang ditetapkan oleh Kementerian Pekerjaan Umum. Menurut Keputusan Menteri No. 534/2011, rasio panjang jalan terhadap jumlah penduduk minimal adalah 0,6 km/1.000 orang. Untuk memenuhi standar minimal tersebut, Kota Bandung membutuhkan total panjang jalan sepanjang 1.488,8 km atau memerlukan tambahan panjang jalan sepanjang 370,66 km.

BBMA terhubung dengan jaringan jalan tol Trans Jawa, yang menghubungkan kota-kota pesisir utara Jawa, melalui Cikampek ke barat. Jalan tol Padalarang-Cileunyi (Padaleunyi) membatasi batas selatan Kota Bandung dan berfungsi sebagai jalan utama penghubung ke kota-kota tetangganya. Jalan tol yang menghubungkan Cileunyi ke TransJawa ke arah timur menuju Dawuan telah beroperasi ditahun 2023. Tol Cisumdawu terdiri dari enam seksi, selain mempermudah akses ke daerah-daerah industri dan pertanian, tol ini juga diharapkan dapat meningkatkan perekonomian Jawa Barat dengan mendorong pengembangan wilayah di sekitar koridor tol tersebut.

Selain itu, kajian Rencana Induk Pembangunan Metropolitan Bandung Raya (Rencana Induk Pembangunan Metropolitan Bandung Raya, 2016) mengidentifikasi 14 titik kemacetan kritis pada jaringan jalan metropolitan yang menghubungkan Kota Bandung (inti) dan kotamadya pinggiran. Di dalam Kota Bandung sendiri, 32 titik kemacetan disebabkan oleh gangguan dari kegiatan ekonomi informal. Hal ini menunjukkan bahwa ada permintaan yang tidak terpenuhi untuk ruang komersial publik di BBMA.

Proyek Mobilitas Perkotaan Bandung mengklasifikasikan fungsi jalan menurut peraturan no. 38/2004 pasal 8 (2-5) sebagai berikut:

- Jalan Arteri merupakan jalan umum yang berfungsi sebagai jalan utama bagi arus transportasi utama dengan jarak tempuh yang panjang. jarak, karakteristik kecepatan tinggi dan memiliki akses terbatas;

- Jalan Kolektor adalah jalan umum yang berfungsi sebagai jalan kolektor untuk angkutan lokal dengan jarak tempuh sedang, kecepatan sedang, dan akses terbatas;
- Jalan Lokal adalah jalan umum untuk angkutan lokal dengan jarak pendek, kecepatan rendah, dan akses.
- Jalan Lingkungan adalah jalan umum yang melayani angkutan ramah lingkungan dengan jarak tempuh pendek dan kecepatan rendah.

Standar desain klasifikasi fungsi jalan Kota Bandung dapat dilihat pada Tabel dibawah ini.

Tabel III-1 Kinerja Ruas Jalan

Sumber: Pemkot Bandung

Fungsi Jalan	Kecepatan Desain (km/jam)	Lebar Minimum (m)
Jalan Arteri Primer	60	**11**
Kolektor Utama	40	**9**
Lokal Primer	20	**7.5**
Lingkungan Primer	15	**6.5**
Arteri Sekunder	30	**11**
Kolektor Sekunder	20	**9**
Lokal Sekunder	10	**7.5**
Lingkungan Sekunder (3 roda plus kendaraan) 10		**6.5**
Lingkungan Sekunder (kendaraan roda 2) 10		**3.5**

III.1.2 Analisis Kondisi Angkutan Jalan

Layanan transportasi umum di Kota Bandung sebagian besar disediakan oleh bus (Angkot, Trans Metro Bandung, Trans Metro Pasundan dan DAMRI). Terdapat layanan kereta api penumpang lokal yang menghubungkan Kota Bandung dengan

dua daerah pinggiran kota utama, Padalarang dan Cicalengka. Jaringan angkutan umum di Kota Bandung dapat dilihat pada gambar dibawah ini.

Gambar IIII-2 Jaringan Angkutan Umum di Kota Bandung

Sumber: BBMA UMS 2020

Hanya sekitar 20% penduduk Kota Bandung yang menggunakan transportasi umum. Angkot, ojek, becak, dan bahkan delman menyediakan layanan penting untuk mengangkut orang di kota. Angkot, moda transportasi umum utama, pada tahun 2009 menyumbang sekitar 31% dari semua perjalanan bermotor. Sistem angkot memiliki armada 15.000 minibus (dengan 12 hingga 14 kursi) dan mencakup 84 rute tetap di BBMA, sementara hanya 97 bus (dengan 45 hingga 50 kursi) yang mencakup tujuh rute di Kota Bandung, dan diperkirakan ada 35.000 unit paratransit lainnya yang mengoperasikan rute tidak tetap yang tak terhitung jumlahnya di seluruh kota. Meskipun belum memiliki izin resmi, ojek juga semakin populer (20.000 operator pada tahun 2009) karena ojek dapat melewati lalu lintas yang padat dan karena jangkauan tujuan yang luas. Karena lalu lintas yang padat, tingkat kenyamanan yang rendah, dan kecepatan rata-rata, angkot tidak dapat diandalkan. Banyaknya jumlah angkot dan ojek di jalan-jalan Kota Bandung menghambat arus lalu lintas dan menyebabkan kemacetan.

Biaya penggunaan transportasi umum dilaporkan 18% lebih tinggi daripada biaya penggunaan sepeda motor, dan membutuhkan waktu 2,2 kali lebih lama.

Istilah “angkot” berasal dari kata angkutan dan kota – angkutan kota (komersial). Di Kota Bandung, seperti banyak kota sekunder di Indonesia, angkot adalah mikrolet yang dioperasikan oleh pemiliknya dan dapat mengangkut hingga 12 penumpang. Selain izin rute yang harus diperoleh operator dari masing-masing Dinas Perhubungan baik itu kota, kabupaten maupun Provinsi, angkot sebagian besar dijalankan sebagai bisnis informal.

Pengemudi menyewa kendaraan mereka dari pemilik yang memiliki ijin trayek. Pengemudi bertanggung jawab atas bahan bakar dan sewa kendaraan yang dibayarkan setiap hari dari pendapatan yang mereka kumpulkan. Karena resiko pendapatan ditanggung oleh pengemudi, tidak ada insentif bagi mereka untuk mengikuti jadwal atau jarak tempuh. Pemilik kendaraan/pemegang ijin trayek diorganisasikan di bawah dua organisasi, Kobanter Baru (Koperasi Jasa Angkutan Umum Bandung Tertib Baru) dan ORGANDA (Organisasi Angkutan Darat) yang melobi agar pasar tetap menjadi milik mereka sebagai pemegang lisensi yang ada. Sebagai bisnis informal, tidak ada cara untuk memastikan tingkat penumpang dan pendapatan operasional dari data sekunder atau wawancara.

Sistem bagi hasil yang merugikan ini menyebabkan rendahnya kualitas layanan karena pengemudi dan pemilik kendaraan lebih memilih untuk meminimalkan biaya. Layanan ini semakin tidak menarik dan hal ini berdampak mengakibatkan penurunan tajam dalam jumlah penumpang dan pendapatan, yang memaksa operator untuk lebih menekan biaya. Hal ini berdampak pada semakin banyaknya orang membeli dan menggunakan sepeda motor untuk perjalanan harian mereka.

Angkot sejauh ini merupakan moda transportasi umum yang paling diminati oleh masyarakat yang tinggal di Kota Bandung. Jaringan rutenya mencakup sebagian besar kota. Akan tetapi, armada angkot akhir-akhir ini menurun karena persaingan dari sepeda motor dan ojek online. Asosiasi Kobanter mengelola 40 rute yang dilayani oleh 5.521 kendaraan.

Tabel III-2 Rute Angkot Kobanter

Sumber: BBMA UMS 2020

Deskripsi	Rute	Panjang (km)	Waktu tempuh*	Jarak Tempuh (km)	Melayani (menit) menjangkau	Armada
K01A	Abdul Muis / Kebon Kelapa - Cicaheum via Binong	16.3	150	5	05.00 - 21.00	355
K01B	Abdul Muis / Kebon Kelapa - Cicaheum via Aceh	11.5	70	5	05.00 - 20.00	100
K02	Abdul Muis / Kebon Kalapa - Dago	9.3	60	8	05.00 - 20.00	271
K03	Abdul Muis / Kebon Kelapa - Ledeng	13.8	80	10	05.00 - 19.00	245
K04	Abdul Muis / Kebon Kalapa - Elang	9.8	60	5	05.00 - 21.00	101
K05	Cicaheum - Ledeng	14.5	100	5	05.00 - 20.00	214
K06	Cicaheum - Ciroyom	17.0	120	10	05.00 - 20.00	194
K07	Cicaheum - Ciwastra - Derwati	17.0	120	10	04.30 - 21.00	200
K08	Cicaheum – Cibaduyut	13.0	60	5	05.00 - 20.00	150
K09	St. Hall – Dago	10.0	60	10	05.00 - 20.00	52

Deskripsi	Rute	Panjang (km)	Waktu tempuh*	Jarak Tempuh (km)	Melayani (menit) menjangkau	Armada
K10	Sadang Serang – St. Hall	11.0	90	5	05.00 - 19.00	150
K11A	St. Hall – Ciumbuleuit Via Eyckman	11.9	80	10	05.00 - 19.00	53
K11B	St. Hall - Ciumbuleuit Via Cihampelas	10.5	75	10	05.00 - 19.00	30
K12	St. Hall – Gedebage	21.0	120	5	05.00 - 20.00	200
K13	St. Hall - Sarijadi	10.2	65	8	05.00 - 19.00	80
K14	St. Hall - Gunung Batu	8.5	50	10	05.00 - 19.00	53
K15	Margahayu Raya - Ledeng	21.9	120	10	05.00 - 21.00	125
K16	Dago - Riung Bandung Permai	20.6	130	5	04.30 - 20.00	201
K17	Dago - Pasar Induk Caringin	19.9	160	5	05.00 - 20.00	140
K18	Panghegar Permai - Dipatiukur	19.4	120	5	05.00 - 19.00	155
K19A	Ciroyom - Sarijadi Via Sukajadi	12.2	60	10	05.00 - 20.00	88
K20	Ciroyom - Bumi Asri	8.4	75	5	05.00 - 20.00	115
K22	Kalapa - Sederhana / Sukajadi	16.2	180	5	05.00 - 19.00	143

Deskripsi	Rute	Panjang (km)	Waktu tempuh*	Jarak Tempuh (km)	Melayani (menit) menjangkau	Armada
K22B	Kalapa - Buah Batu	8.0	45	5	05.00 - 19.00	133
K23	Ciroyom - Cikudapateuh	12.9	120	10	05.00 - 20.00	140
K23B	Sederhana - Cijerah	8.9	60	10	05.00 - 20.00	63
K24	Sederhana – Cimindi	8.8	50	15	05.00 - 18.00	55
K25	Ciwastra - Ujung Berung	13.4	45	10	05.00 - 20.00	32
K26	Cisitu - Tegalega	14.0	60	10	05.00 - 20.00	82
K27	Cijerah - Ciwastra - Derwati	22.3	120	8	05.00 - 19.00	200
K28	Elang - Gede Bage - Ujungberung	22.5	150	5	05.00 - 20.00	115
K29	Abdul Muis / Kebon Kelapa - Mengger	10.6	35	15	05.00 - 20.00	25
K30	Elang – Cicadas	18.1	120	5	05.00 - 20.00	300
K31	Antapani - Ciroyom	13.7	120	6	05.00 - 19.00	160
K32	Cicadas - Cibiru	13.7	90	5	04.30 - 19.00	200
K33	Gede Bage - Simpang Dago		90	5	05.00 - 17.00	
K34	Sedang Serang - Caringin	18.1	150	5	05.00 - 19.00	200
K35	Cibaduyut - Kalapa	5.2	60	10	05.00 - 18.00	100

Deskripsi	Rute	Panjang (km)	Waktu tempuh*	Jarak Tempuh (km)	Melayani (menit) menjangkau	Armada
K35B	Kalapa - Karang Setra	10.3	60	7	05.00 - 19.00	101

Tabel III-3 Rute Angkot Organda

Sumber: BBMA UMS 2020

No	Rute	No	Rute	No	Rute
A004	Cileunyi - Sumedang	A904	Banjaran - Gamblok	A931	Geger Kalong - Sarijadi
A004B	Buah Batu - Ciparay via Sapan	A905	Banjaran - Tegalega	A932	Geger Kalong - Sukamulya
A005	Cicalengka - Tanjungsari	A906	Buahbatu - Dayeuhkolot	A933	Kebon Kalapa - Dayeuhkolot
A008	Antapani - Leuwi Panjang	A907	Pasar Induk Caringin - Soreang	A934	Ledeng - Cimahi
A009	Ciwastra - Gasibu	A908	Cicalengka - Cileunyi	A935	Ledeng - Parongpong
A010	Cicaheum - Cileunyi	A909	Cicalengka - Curug Cinulang	A936	Leuwi Panjang - Ciwidey
A011	Stasiun Hall - Ciumbeuleuit via Eyckman	A910	Cicalengka - Nagreg - Limbangan	A937	Leuwi Panjang - Cimahi - Padalarang
A012	Majalaya - Paseh	A911	Cijapati - Cicalengka	A938	Mahmud - Tegalega
A013	Stasiun Hall - Sarijadi	A912	Cililin - Cijenuk	A939	Majalaya - Cicalengka
A014	Stasiun Hall - Gunung Batu	A913	Cimahi - Cangkorah	A940	Majalaya - Kalapa
A021	Sederhana - Cijerah	A914	Cimahi - Contong - Cibeber	A941	Majalaya - Lembur Awi

No	Rute	No	Rute	No	Rute
A023	Baleendah - Cibaduyut	A915	Cimahi - Cimareme - Batujajar - Cililin	A942	Padalarang - Cikalong
A024	Sederhana - Cimindi	A916	Cimahi - Marga Asih via Kebon Kopi	A943	Padalarang - Cimahi
A025	Ciwastra - - Ujungberung	A917	Cimahi - Parongpong	A944	Padalarang - Gunung Bentang
A035	Cipatik - Tegallega	A918	Cimahi - Stasiun Hall	A945	Padalarang = Parongpong
A036	Halteu Andir - Cibogo Atas	A919	Cimindi - Pasar Antri	A946	Pesantren - Sarijadi
A042	Padalarang - Rajamandala	A920	Cimindi - Cimahi	A947	Pasar Atas - Cidahu
A043	GedeBage - Majalaya via Sayang Jatinangor	A921	Cimindi - Cipatat	A948	Pasar Atas - Cilame
A044	Pasar Antri - Baros - Ciseupan	A922	Cimindi - Cipatik	A949	Pasar Atas - Cipanas
A058	Majalaya - Ciparay	A923	Ciparay - Arjasari	A950	Pasar Atas - Cisarua
A114	Cileunyi - Majlaya	A924	Ciparay - Cibereum	A951	Pasar Atas - Permata
A0019A	Ciroyom - Sarijadi via Sukajadi	A925	Ciparay - Tegalega	A952	Sarijadi - Ciwaruga - Parongpong
A011B	Stasiun Hall - Ciumbeuleuit via Cihampelas	A926	Ciroyom - Lembang	A953	Soreang - Banjaran
A019B	Ciroyom - Sarijadi via sederhana	A927	Cisarua - Lembang	A954	Soreang - Cililin
A901	Baleendah - Cilisung	A928	Elang - Melong Asih	A955	Soreang - Cimahi
A902	Banjaran - Cibaduyut	A929	Gede Bage - Majalaya via Sapan	A956	Soreang - Leuwi Panjang

No	Rute	No	Rute	No	Rute
A903	Banjaran - Cikalong	A930	Geger Kalong - Polban		

Angkutan Umum: Layanan Bus.

Layanan bus di Kota Bandung disediakan oleh DAMRI (Djawatan Angkoetan Motor Repoeblik Indonesia) yang merupakan badan usaha milik negara dan merupakan operator bus tertua di Kota Bandung. DAMRI saat ini memiliki 135 kendaraan yang melayani 12 rute seperti yang ditunjukkan pada Tabel dan Gambar dibawah ini.

Tabel III-4 Rute Bis Damri

Sumber: BBMA UMS 2020

No	Rute	No	Rute
DMR01	Cicaheum - Cibereum	DMR09	Cicaheum - Leuwi Panjang
DMR02	Ledeng - Leuwi Panjang	DMR10	Alun-Alun - Kota Baru Parahyangan Alun-Alun
DMR06A	Elang - Jatinangor via toll road Moh. Toha	DMR10	Alun-Alun - Parahyangan
DMR06B	Elang - Jatinangor via Jalan Soekarno Hatta	DMR11	Cibiru - Kebon Kalapa
DMR07	Dipatiukur - Jatinangor via toll road Moh. Toha	DMR12	Leuwi Panjang - Dago
DMR08	Kebon Kalapa - Tanjung Sari	DMR15	Alunn - Ciburuy

Gambar IIII-3 Jaringan Rute Bis Damri

Sumber: BBMA UMS 2020

Trans Metro Bandung

Trans Metro Bandung adalah sistem yang disebut “Bus Rapid Transit” di Kota Bandung saat ini. Sistem ini merupakan proyek bersama antara pemerintah Kota Bandung dengan Perum II DAMRI Bandung. Sistem TMB tidak mematuhi fitur standar sistem BRT karena tidak beroperasi di jalur khusus. Sistem ini diresmikan pada tanggal 27 Desember 2021 dan dirancang untuk mengurangi jumlah angkot di Kota Bandung dengan menyediakan layanan bus yang lebih nyaman dengan harga murah dan waktu tempuh yang terjamin ke tempat tujuan. Sistem ini dilengkapi dengan kendaraan baru ber-AC, halte bus yang ditentukan, dan sistem tiket otomatis. TMB telah beroperasi di tujuh koridor yang ditunjukkan pada Tabel dan gambar dibawah ini.

Tabel III-5 Rute Trans Metro Bandung

Sumber: BBMA UMS 2020

No	Rute	Panjang Rute (km)	Waktu Tempuh*	Headway (Menit)	Waktu Pelayanan	Jumlah Kendaraan
TMB 1	Elang - Cibiru	21	80	15	05:30 - 18:00	9 bis besar
TMB 2	Cicaheum - Cibereum	12	48	15	05:30 - 18:00	9 bis besar
TMB 3	Cicaheum - Sarijadi	11	40	15	05:30 - 18:00	8 bis besar
TMB 4	Antapani - Leuwi Panjang	10	48	15	05:30 - 18:00	8 bis sedang
TMB 5	Antapani - St. Hall	21,5	80	15	05:30 - 18:00	10 bis besar
TMBF1	Gunung Batu – St. Hall	21,5	80	15	05:30 - 18:00	8 bis sedang
TMBF2	Summarecon - Cibereum	21,5	80	15	05:30 - 18:00	8 bis besar

* Waktu tempuh untuk satu arah di jam sibuk

Gambar IIII-4 Jaringan Rute Trans Metro Bandung

Sumber: BBMA UMS 2020

Trans Metro Pasundan

Trans Metro Pasundan adalah sistem bus raya terpadu yang melayani Kawasan Metropolitan Cekungan Bandung, Jawa Barat. Pada awalnya layanan ini merupakan program dari Kementerian Perhubungan Republik Indonesia melalui Direktorat Jenderal Perhubungan Darat, dan Bandung menjadi layanan yang kedelapan setelah Makassar dan Banyumas dalam program pembelian layanan (Buy The Service/BTS) Teman Bus. Saat ini, Dinas Perhubungan Provinsi Jawa Barat melalui UPTD PPP LLAJ Wilayah II telah mengambil alih layanan untuk Trans Metro Pasundan Koridor 2 & 3 sejak awal tahun 2024, dan untuk koridor lainnya akan menyusul kemudian. Pengoperasian Trans Metro Pasundan dimulai pada 27 Desember 2021, ditandai dengan peresmian di halaman Monumen Perjuangan Rakyat Jawa Barat. Operator yang menjalankan operasional layanan Trans Metro Pasundan adalah Perum DAMRI dan PT Big Bird Pusaka, anak usaha Bluebird. TMP telah beroperasi di lima koridor yang ditunjukkan pada Tabel dan gambar dibawah ini.

Tabel III-6 Rute Trans Metro Pasundan

Sumber: Hasil Analisa Konsultan

No	Rute	Panjang Rute (km)	Waktu Tempuh *	Headway (Menit)	Waktu Pelayanan
K1BD	Leuwi Panjang - Gading Tutuka (via Tol Soroja)	17,8	15	10	04:30 - 20:30
K2BD	Kota Baru Parahyangan - Alun-Alun Bandung	23,3	50	11	05:00 - 21:00
K3BD	Baleendah - BEC	19,1	49	11	04:30 - 21:30
K4BD	Leuwi Panjang - Dago	10,4	40	20	04:30 - 20:20
K5BD	Dipatiukur - Jatinangor (via Tol Moh. Toha)	35,2	40	7	04:30 - 19:26

* Waktu tempuh untuk satu arah di jam sibuk

Gambar IIII-5 Jaringan Rute Trans Metro Pasundan

Sumber: Teman Bus

Pengaruh Angkutan Umum Terhadap Implementasi BRT

Dengan adanya rencana Pembangunan koridor BRT, maka tentunya implementasi BRT akan berdampak terhadapan angkutan eksisting yang ada, beberapa tinjauan awal dilakukan untuk memitigasi hal ini, diantaranya:

1. Pengaruh Implementasi BRT terhadap Layanan Eksisting
2. Identifikasi Layanan Transportasi Umum Terdampak BRT
3. Rekomendasi Penanganan Rute Terdampak BRT

Pengaruh Implementasi BRT terhadap layanan eksisting:

- Implementasi BRT akan merubah pola pelayanan transportasi umum di Cekungan Bandung, sehingga dibutuhkan analisis terkait dampak terhadap layanan eksisting.
- Aspek kunci dari analisis ini adalah menentukan besaran tumpang tindih (*overlap*) antara layanan transportasi umum eksisting dengan rencana rute

layanan BRT untuk selanjutnya menjadi dasar pertimbangan dalam menentukan rekomendasi penanganan.

- Rekomendasi penanganan untuk trayek terdampak tidak hanya dapat mendukung operasional BRT namun juga meningkatkan layanan transportasi umum di Cekungan Bandung secara keseluruhan.

Berdasarkan hasil analisis terdapat 78 rute angkutan umum yang bersinggungan dengan rencana rute BRT BBMA, diantaranya adalah sebagai berikut:

1. Trans Metro Pasundan – 5 trayek
2. Trans Metro Bandung – 7 trayek
3. Layanan Bus DAMRI – 5 trayek
4. Buratas – 1 trayek
5. Angkot Kota Bandung – 40 trayek
6. AKDP Cekungan Bandung – 20 trayek

Identifikasi Layanan Transportasi Umum Terdampak BRT

Trans Metro Pasundan

Pada jaringan trayek Trans Metro Pasundan terdapat 4 trayek yang diadopsi menjadi rute BRT, diantaranya:

- BRT07 Padalarang – Alun-Alun
- BRT15 Banjaran – Baleendah – BEC
- BRT03B Leuwipanjang – Dago via Dipatiukur
- BRT20 Jatinangor – Dipatiukur via Tol

Hanya trayek 1D Geo Dipa Energi – Terminal Leuwipanjang yang memiliki persentase *overlap* yang rendah namun memiliki daerah asal dan tujuan yang sama dengan rute BRT12 Soreang – Leuwipanjang.

Gambar IIII-6 *Overlap* Rute BRT BBMA dengan Trans Metro Pasundan

Sumber: PMC 2024

Trans Metro Bandung

4 trayek Trans Metro Bandung memiliki *overlap* yang signifikan dengan rute BRT:

- BRT08 Cimahi – Cicaheum
- BRT10 Cibeureum – Leuwipanjang – Tegalluar
- BRT13 Jatinangor – Leuwipanjang
- BRT18 Sarijadi – Cicaheum

2 trayek Trans Metro Bandung tidak memiliki kemiripan dengan salah satu rute BRT, namun tetap memiliki *overlap* yang signifikan dengan keseluruhan jaringan rute BRT.

Gambar IIII-7 *Overlap* Rute BRT BBMA dengan Trans Metro Bandung

Sumber: PMC 2024

Damri

Seluruh trayek layanan bus DAMRI memiliki daerah asal dan tujuan yang hampir sama dengan rute BRT. Beberapa segmen penting yang tidak bersinggungan dengan jaringan rute BRT diantaranya:

- Jatinangor – Tanjungsari
- Tol Pasteur – Padalarang
- IKEA KBP – Subanglarang

Gambar IIII-8 *Overlap* Rute BRT BBMA dengan Damri

Sumber: PMC 2024

Buratas

1 trayek Buratas yaitu Majalaya – Leuwipanjang memiliki persentase *overlap* sebesar 96% dengan keseluruhan jaringan rute BRT. Trayek diadopsi menjadi rute BRT14 Majalaya – Baleendah – Leuwipanjang.

Gambar IIII-9 *Overlap* Rute BRT BBMA dengan Buratas

Sumber: PMC 2024

Angkutan Kota Bandung

Trayek angkot biasanya melayani ruas-ruas jalan sekunder yang tidak dilalui bus, sehingga karakteristiknya berbeda dengan jaringan rute BRT dan bus, 7 trayek angkot memiliki *overlap* lebih dari 80% dengan jaringan rute BRT, sedangkan 33 rute memiliki persentase *overlap* antara 25-80%. Sehingga sekitar 83% dari jumlah total trayek angkot masih memiliki peran yang besar untuk melayani *demand* perjalanan di Kota Bandung.

Gambar IIII-10 *Overlap* Rute BRT BBMA dengan Angkutan Kota Bandung

Sumber: PMC 2024

AKDP Cekungan Bandung

Dari 20 trayek AKDP yang bersinggungan dengan jaringan rute BRT, terdapat 12 trayek AKDP yang memiliki *overlap* lebih dari 80% dengan jaringan rute BRT, yang mana 3 diantaranya memiliki overlap 100%. Dari 53 trayek AKDP yang tidak termasuk dalam lingkup analisis, 26 trayek memiliki potensi untuk menjadi angkutan feeder BRT dan 27 trayek tidak memiliki korelasi dengan rute BRT.

Gambar IIII-11 *Overlap* Rute BRT BBMA dengan AKDP Cekugan Bandung

Sumber: PMC 2024

Rekomendasi Penanganan Rute Terdampak

Berdasarkan hasil analisis awal tersebut, maka dapat disimpulkan sebagai berikut:

Tabel III-7 Rekomendasi Penanganan Rute Terdampak

Sumber: Hasil Analisa Konsultan

Persentase Overlap	Rekomendasi Penanganan
Lebih dari 80%	Integrasi dengan layanan BRT
20% - 80%	Modifikasi rute sebagai feeder
Kurang dari 20%	Tidak ada perubahan

Integrasi dengan layanan BRT:

- Rute dapat diintegrasikan dengan rute layanan BRT karena adanya tingkat overlap yang signifikan;
- Armada dan tenaga kerja terdampak dapat diserap ke sistem dan manajemen BRT atau dialokasikan ke trayek feeder sesuai kebutuhan;
- Terdapat 44 trayek diantaranya sebagai berikut:
    - 5 trayek Trans Metro Pasundan
    - 6 trayek Trans Metro Bandung
    - 4 trayek DAMRI
    - 1 trayek Buratas
    - 12 trayek Angkot Kota Bandung
    - 16 trayek AKDP

Modifikasi rute sebagai feeder:

Segmen lintasan trayek yang tidak bersinggungan dengan jaringan rute BRT dapat dipertahankan atau dimodifikasi dengan memperhatikan keseluruhan rute terdampak, sehingga menghasilkan sistem feeder yang efisien dengan cakupan layanan yang luas. Terdapat 31 rute eksising diantaranya sebagai berikut:

- 1 trayek Trans Metro Bandung

- 1 trayek DAMRI
- 25 trayek Angkot Kota Bandung
- 4 trayek AKDP

Tidak ada Perubahan:

Trayek dapat beroperasi dengan lintasan saat ini untuk melayani existing demand dan mendukung operasional BRT. Terdapat 3 trayek angkutan kota Bandung yang tidak perlu mengalami perubahan.

III.1.3 Analisis Kondisi Ruas Jalan Pada Rencana Jalur Khusus BRT

Terdapat 29 ruas jalan yang rencananya akan dibangun jalur khusus BRT, berikut adalah ruas jalan tersebut yang telah dikelompokan berdasarkan karakteristik segmennya.

Tabel III-8 Kondisi Ruas Jalan

Sumber: Analisis Konsultan

No	Nama Jalan	Jml Jalur	Jml Lajur	Lebar perkerasan (m)	Median (m)	Pedestrian Kiri (m)	Pedestrian Kanan (m)	Rumija (m)	Panjang Jalan (m)
1	Jl. ABC	1	2	11		1,4	2,3	14,7	210
2	Jl. Ahmad Yani 1	1	4	12,6		2,7	2,9	18,2	1120
3	Jl. Ahmad yani 2	2	4	12,6		2,7	2,9	18,2	542
4	Jl. Ahmad yani 3	2	2	10,1		3,8	2,1	16	1315
5	Jl. Ahmad yani 4	1	3	12,4		2,8	1,8	17	250
6	Jl. Alun Alun Timur	2	4	11	3,9	4,7	4,8	24,4	140
7	Jl. Asia Afrika 1	1	4	11		3,4	3,5	17,9	610
8	Jl. Asia Afrika 2	1	4	11		3,4	3,5	17,9	241
9	Jl. Asia Afrika 3	1	4	11		3,4	3,5	17,9	244
10	Jl. Asia Afrika 4	1	4	11		3,4	3,5	17,9	140
11	Jl. Asia Afrika 5	1	4	11		3,4	3,5	17,9	265
12	Jl. Banceuy 1	1	2	10,4		2,4	1,5	14,3	244
13	Jl. Banceuy 2	1	2	10,4		2,4	1,5	14,3	396
14	Jl. BKR	2	4	22	1,8	4,1	3,5	31,4	350
15	Jl. Dalem Kaum	1	4	14,9		4	2,3	21,2	130
16	Jl. Dewi Sartika 1	1	6	14,4	0,4	1,6	1,67	18,07	140
17	Jl. Dewi Sartika 2	1	4	15,6		2,5	3,7	21,8	410
18	Jl. Ibrahim Adjie	1	4	11,6		1,6	2,1	15,3	560

No	Nama Jalan	Jml Jalur	Jml Lajur	Lebar perkerasan (m)	Median (m)	Pedestrian Kiri (m)	Pedestrian Kanan (m)	Rumija (m)	Panjang Jalan (m)
19	Jl. Jakarta	1	4	14		2,8	2,3	19,1	1100
20	Jl. Jend Sudirman 1	1	2	10		5,3	4,2	19,5	642
21	Jl. Jend Sudirman 2	1	2	10		5,3	4,2	19,5	918
22	Jl. Jend Sudirman 3	1	2	10		5,3	4,2	19,5	390
23	Jl. Jend Sudirman 4	2	4	13,7	0,4	2,8	3,8	20,7	1097
24	Jl. Jend Sudirman 5	2	4	13,7	0,4	2,8	3,8	20,7	239
25	Jl. Jend Sudirman 6	1	4	13,7	2,6	1,7	1	19	1220
26	Jl. Kebon Jati 1	1	4	16,7		1,8	2	20,5	779
27	Jl. Kebon Jati 2	1	3	14,5		2	2,2	18,7	451
28	Jl. Moch Toha 1	2	4	14,3		3,8	3,4	21,5	500
29	Jl. Moch Toha 2	2	2	15,6		5,5	5,6	26,7	620
30	Jl. Naripan 1	2	2	9,8		2,8	2,9	15,5	200
31	Jl. Naripan 2	2	2	11,5		2	3,1	16,5	590
32	Jl. Otista 1	1	3	13,6		2,4	1,6	17,6	520
33	Jl. Otista 2	1	3	13,6		2,4	1,6	17,6	720
34	Jl. Otista 3	1	3	13,6		2,4	1,6	17,6	480
35	Jl. Otista 4	1	3	13,6		2,4	1,6	17,6	660
36	Jl. Pungkur	2	3	13		4,2	2,3	19,5	120
37	Jl. Rajawali Barat	1	3	10,5		4,3	4,5	19,3	1000
38	Jl. Rajawali Timur 1	1	4	12,2		2,9	2,9	18	877
39	Jl. Rajawali Timur 2	1	4	12,2		2,9	2,9	18	653
40	Jl. Sunda	1	3	12,3		1,55	2,4	16,25	73
41	Jl. Suniaraja 1	1	3	14,5		2	2,2	18,7	250
42	Jl. Suniaraja 2	1	3	14,5		2	2,2	18,7	230
43	Jl. Veteran	1	2	10,3		0,95	0,4	11,65	170

III.1.3.1 Ruas Jalan Asia Afrika

Ruas jalan Asia Afrika mulai dari Jl. Gatot Subroto sampai dengan Jl. Jendral Sudirman, dengan panjang 1,5 km, lebar ruang milik jalan 17,9 m, jalan ini memiliki 4 lajur, satu arah dan tanpa pembatas. Rumija 17,9 m terdiri dari 3,4 m merupakan trotoar sisi kiri, 11 m jalur lalu lintas dan 3,5 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, perkantoran dan kawasan haritage.

Gambar III-12 Ruas Jalan Asia Afrika

Sumber: Analisis Konsultan

III.1.3.2 Ruas Jalan Jendral Sudirman (Sisi Timur)

Segmen ruas jalan Jendral Sudirman (Timur) yang dimaksud mulai dari Jl. Asia Afrika sampai dengan Jl. Jamika, dengan panjang 1,95 km, lebar ruang milik jalan 19,5 m, jalan ini memiliki 2 lajur, satu arah dan tanpa pembatas jalan serta mamiliki ruang parkir pada kiri dan kanan jalan. Rumija 19,5 m terdiri dari 5,3 m merupakan trotoar sisi kiri, 10 m jalur lalu lintas dan 4,2 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang cukup baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-13 Ruas Jalan Jendral Sudirman (Sisi Timur)

Sumber: Analisis Konsultan

III.1.3.3 Ruas Jalan Jendral Sudirman (Tengah)

Segmen ruas jalan Jendral Sudirman (Tengah) yang dimaksud, mulai dari Jl. Jamika sampai dengan Bundaran Cibereum, dengan panjang 1,1 km, lebar ruang milik jalan 20,7 m, jalan ini memiliki 4 lajur, dua arah dan memiliki median. Rumija

20,7 m terdiri dari 2,8 m merupakan trotoar sisi kiri, 13,7 m jalur lalu lintas, 0,4 m median dan 3,8 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, sekolah dan perkantoran.

Gambar III-14 Ruas Jalan Jendral Sudirman (Sisi Tengah)

Sumber: Analisis Konsultan

III.1.3.4 Ruas Jalan Jendral Sudirman (Sisi Barat)

Segmen ruas jalan Jendral Sudirman (Sisi Barat) yang dimaksud mulai dari Bundaran Cibereum sampai dengan Jl. Raya Cibereum, dengan panjang 1,22 km, lebar ruang milik jalan 19 m, jalan ini memiliki 4 lajur, satu arah. Rumija 19 m terdiri dari 1,7 m merupakan trotoar sisi kiri, 13,7 m jalur lalu lintas, 2,6 m median dan 1 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, sekolah, masjid dan perkantoran.

Gambar III-15 Ruas Jalan Jendral Sudirman (Sisi Barat)

Sumber: Analisis Konsultan

III.1.3.5 Ruas Jalan Rajawali Barat

Ruas jalan Rajawali Barat mulai dari Jl. Jendral Sudirman sampai dengan Jl. Rajawali Timur, dengan panjang 1 km, lebar ruang milik jalan 19,3 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 19,3 m terdiri dari 4,3 m

merupakan trotoar sisi kiri, 10,5 m jalur lalu lintas dan 4,5 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-16 Ruas Jalan Rajawali Barat

Sumber: Analisis Konsultan

III.1.3.6 Ruas Jalan Rajawali Timur

Ruas jalan Rajawali Timur mulai dari Jl. Rajawali Barat sampai dengan Jl. Kebon Jati, dengan panjang 1,53 km, lebar ruang milik jalan 18 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 18 m terdiri dari 2,9 m merupakan trotoar sisi kiri, 12,2 m jalur lalu lintas dan 2,9 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang cukup baik. Tata guna lahan disekitar jalan ini adalah area komersil, gudang, publik dan perkantoran.

Gambar III-17 Ruas Jalan Rajawali Timur

Sumber: Analisis Konsultan

III.1.3.7 Ruas Jalan Kebon Jati

Ruas jalan Kebon Jati mulai dari Jl. Rajawali Timur sampai dengan Jl. Suniaraja, dengan panjang 1,23 km, lebar ruang milik jalan 20,5 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median serta memiliki area parkir di badan jalan. Rumija 20,5 m terdiri dari 1,8 m merupakan trotoar sisi kiri, 16,7 m jalur lalu lintas yang disisi kiri jalan ada *parking on street* dan 2 m merupakan trotoar sisi

kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih baik. Tata guna lahan disekitar jalan ini adalah area komersil, rumah sakit dan perkantoran.

Gambar III-18 Ruas Jalan Kebon Jati

Sumber: Analisis Konsultan

III.1.3.8 Ruas Jalan Suniaraja

Segmen ruas jalan Suniaraja yang dimaksud mulai dari Jl. Kebon Jati sampai dengan Jl. Otto Iskandar Dinata, dengan panjang 480 m, lebar ruang milik jalan 18,7 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 18,7 m terdiri dari 2 m merupakan trotoar sisi kiri, 14,5 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 2,2 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-19 Ruas Jalan Kebon Jati

Sumber: Analisis Konsultan

III.1.3.9 Ruas Jalan Banceuy

Ruas jalan Banceuy mulai dari Jl. Asia Afrika sampai dengan Jl. Suniaraja, dengan panjang 640 m, lebar ruang milik jalan 14,3 m, jalan ini memiliki 2 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 14,3 m terdiri dari 2,4 m merupakan trotoar sisi kiri, 10,4 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 1,2 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan

perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-20 Ruas Jalan Kebon Jati

Sumber: Analisis Konsultan

III.1.3.10 Ruas Jalan ABC

Segmen ruas jalan ABC yang dimaksud mulai dari Jl. Banceuy sampai dengan Jl. Naripan, dengan panjang 210 m, lebar ruang milik jalan 14,7 m, jalan ini memiliki 2 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 14,7 m terdiri dari 1,4 m merupakan trotoar sisi kiri, 11 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 2,3 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, Masjid dan perkantoran.

Gambar III-21 Ruas Jalan ABC

Sumber: Analisis Konsultan

III.1.3.11 Ruas Jalan Naripan (Sisi Barat)

Segmen ruas jalan Naripan (sisi barat) mulai dari Jl. ABC sampai dengan Jl.Braga, dengan panjang 200 m, lebar ruang milik jalan 15,5 m, jalan ini memiliki 2 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 15,5 m terdiri dari 2,8 m merupakan trotoar sisi kiri, 9,8 m jalur lalu lintas, dan 2,9 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-22 Ruas Jalan Naripan (Sisi Barat)

Sumber: Analisis Konsultan

III.1.3.12 Ruas Jalan Naripan (Sisi Timur)

Segmen ruas jalan Naripan (sisi timur) mulai dari Jl. Braga sampai dengan Jl.Sunda, dengan panjang 590 m, lebar ruang milik jalan 16,65 m, jalan ini memiliki 2 lajur, ruas ini dua arah dan tidak memiliki median. Rumija 16,65 m terdiri dari 2 m merupakan trotoar sisi kiri, 11,5 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 3,1 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, area publik, rumah sakit, dan perkantoran.

Gambar III-23 Ruas Jalan Naripan (Sisi Timur)

Sumber: Analisis Konsultan

III.1.3.13 Ruas Jalan Ahmad Yani A1 (SW – NE)

Segmen ruas jalan Ahmad Yani A1 (SW – NE) mulai dari Jl. Veteran sampai dengan Jl.Jakarta, dengan panjang 1,87 km, lebar ruang milik jalan 16 m, jalan ini memiliki 2 lajur, ruas ini dua arah dan memiliki median sementara dan median permanen namun tidak disepanjang jalan. Rumija 16 m terdiri dari 3,8 m merupakan trotoar sisi kiri, 10,1 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 2,1 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, perkantoran, rel kereta api dan sekolah

Gambar III-24 Ruas Jalan Ahmad Yani A1 (SW-NE)

Sumber: Analisis Konsultan

III.1.3.14 Ruas Jalan Ahmad Yani A2 (SW – NE)

Segmen ruas jalan Ahmad Yani A2 (SW – NE) mulai dari Jl. Jakarta sampai dengan Jl.Ibrahim Adjie, dengan panjang 1,12 m, lebar ruang milik jalan 18,2 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 18,2 m terdiri dari 2,7 m merupakan trotoar sisi kiri, 12,6 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 2,9 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-25 Ruas Jalan Ahmad Yani A2 (SW-NE)

Sumber: Analisis Konsultan

III.1.3.15 Ruas Jalan Ahmad Yani B1 (NE – SW)

Segmen ruas jalan Ahmad Yani B1 (NE – SW) mulai dari Jl. Jakarta sampai dengan Jl.Veteran, dengan panjang 1,87 km, lebar ruang milik jalan 16 m, jalan ini memiliki 2 lajur, ruas ini dua arah dan memiliki median sementara dan median permanen namun tidak disepanjang jalan. Rumija 16 m terdiri dari 2,1 m merupakan trotoar sisi kiri, 10,1 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* dan 3,8 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan

perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, perkantoran, rel kereta api dan sekolah.

Gambar III-26 Ruas Jalan Ahmad Yani B1 (NE-SW)

Sumber: Analisis Konsultan

III.1.3.16 Ruas Jalan Ahmad Yani B2 (NE - SW)

Segmen ruas jalan Ahmad Yani B2 (NE – SW) mulai dari Jl. Veteran sampai dengan Simpang Lima, dengan panjang 250 m, lebar ruang milik jalan 17 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 17 m terdiri dari 2,8 m merupakan trotoar sisi kiri, 12,4 m jalur lalu lintas dan 1,8 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan area publik.

Gambar III-27 Ruas Jalan Ahmad Yani B2 (NE-SW)

Sumber: Analisis Konsultan

III.1.3.17 Ruas Jalan Ibrahim Adjie

Segmen ruas jalan Ibrahim Adjie yang dimaksud mulai dari Jl. Ahmad Yani sampai dengan Jl.Terusan Jakarta, dengan panjang 560 m, lebar ruang milik jalan

15,3 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 15,3 m terdiri dari 1,6 m merupakan trotoar sisi kiri, 11,6 m jalur lalu lintas dan 2,1 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-28 Ruas Jalan Ibrahim Adjie

Sumber: Analisis Konsultan

III.1.3.18 Ruas Jalan Jakarta

Ruas jalan Jakarta mulai dari Jl. Ibrahim Adjie sampai dengan Jl. Ahmad Yani, dengan panjang 1,1 km, lebar ruang milik jalan 19,1 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 19,1 m terdiri dari 2,8 m merupakan trotoar sisi selatan, 14 m jalur lalu lintas dan 2,3 m merupakan trotoar sisi utara. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik namun marka jalan yang sudah mulai hilang. Tata guna lahan disekitar jalan ini adalah area komersil, perguruan tinggi, rutan, dan perkantoran.

Gambar III-29 Ruas Jalan Jakarta

Sumber: Analisis Konsultan

III.1.3.19 Ruas Jalan Otto Iskandar Dianata

Ruas jalan Otto Iskandar Dinata mulai dari Jl. Suniaraja sampai dengan Jl. BKR, dengan panjang 2,38 km, lebar ruang milik jalan 17,6 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 17,6 m terdiri dari 2,4 m merupakan trotoar sisi kiri, 13,6 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* di sisi kiri dan 1,6 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-30 Ruas Jalan Jakarta

Sumber: Analisis Konsultan

III.1.3.20 Ruas Jalan BKR

Segmen ruas jalan BKR yang dimaksud mulai dari Jl. Otto Iskandar Dinata sampai dengan Jl. Moch Toha, dengan panjang 350 m, lebar ruang milik jalan 31,4 m, jalan ini memiliki 4 lajur, ruas ini dua arah dan memiliki median 1,8 m. Rumija 31,4 m terdiri dari 4,1 m merupakan trotoar sisi kiri, 22 m jalur lalu lintas dan 3,5 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, perkantoran dan area publik.

Gambar III-31 Ruas Jalan BKR

Sumber: Analisis Konsultan

III.1.3.21 Ruas Jalan Moch. Toha (Sisi Selatan)

Ruas jalan Moch. Toha mulai dari Jl. BKR sampai dengan Jl. Inggit Ganarsih, dengan panjang 620 m, lebar ruang milik jalan 26,7 m, jalan ini memiliki 2 lajur, ruas ini dua arah dan tidak memiliki median. Rumija 26,7 m terdiri dari 5,5 m merupakan trotoar sisi kiri, 15,5 m jalur lalu lintas dan 5,6 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil, kantor, dan area publik.

Gambar III-32 Ruas Jalan BKR

Sumber: Analisis Konsultan

III.1.3.22 Ruas Jalan Moch. Toha (Sisi Utara)

Ruas jalan Moch. Toha mulai dari Jl. Inggit Ganarsih sampai dengan Jl. Pungkur, dengan panjang 500 m, lebar ruang milik jalan 21,5 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 21,5 m terdiri dari 3,8 m merupakan trotoar sisi kiri, 14,3 m jalur lalu lintas yang satu lajurnya diguanakan untuk *parking on street* dan 3,4 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil.

Gambar III-33 Ruas Jalan Moch. Toha (sisi utara)

Sumber: Analisis Konsultan

III.1.3.23 Ruas Jalan Pungkur

Segmen ruas jalan Pungkur yang dimaksud mulai dari Jl. Moch. Toha sampai dengan Jl. Dewi Sartika, dengan panjang 120 m, lebar ruang milik jalan 19,5 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 19,5 m terdiri dari 4,2 m merupakan trotoar sisi kiri, 13 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* di sisi kanan dan 2,3 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang cucup baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-34 Ruas Jalan Pungkur

Sumber: Analisis Konsultan

III.1.3.24 Ruas Jalan Dewi Sartika (Sisi Selatan)

Ruas jalan Dewi Sartika (sisi selatan) mulai dari Jl. Pungkur sampai dengan Jl. Dewi Sartika (sisi selatan), dengan panjang 410 m, lebar ruang milik jalan 21,8 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 21,8 m terdiri dari 2,5 m merupakan trotoar sisi kiri, 15,6 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* di sisi kiri dan 3,7 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan gereja.

Gambar III-35 Ruas Jalan Dewi Sartika (sisi selatan)

Sumber: Analisis Konsultan

III.1.3.25 Ruas Jalan Dewi Sartika (Sisi Utara)

Ruas jalan Dewi Sartika (sisi utara) mulai dari Jl. Kepatihan sampai dengan Jl. Dalem Kaum, dengan panjang 140 m, lebar ruang milik jalan 18,07 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan memiliki median 0,4 m. Rumija 18,07 m terdiri dari 1,6 m merupakan trotoar sisi kiri, 14,4 m jalur lalu lintas dan 1,67 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersil dan perkantoran.

Gambar III-36 Ruas Jalan Dewi Sartika (sisi utara)

Sumber: Analisis Konsultan

III.1.3.26 Ruas Jalan Dalem Kaum

Segmen ruas jalan Dalem Kaum yang dimaksud mulai dari Jl. Dewi Sartika (sisi utara) sampai dengan Jl. Alun – alun Timur, dengan panjang 130 m, lebar ruang milik jalan 21,2 m, jalan ini memiliki 4 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 21,8 m terdiri dari 4 m merupakan trotoar sisi kiri, 14,9 m jalur lalu lintas dan 2,3 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area publik, bank dan masjid.

Gambar III-37 Ruas Jalan Dalem Kaum

Sumber: Analisis Konsultan

III.1.3.27 Ruas Jalan Alun – Alun Timur

Ruas jalan Alun – alun Timur mulai dari Jl. Dalem Kaum sampai dengan Jl. Asia Afrika, dengan panjang 140 m, lebar ruang milik jalan 24,4 m, jalan ini memiliki 4 lajur, ruas ini dua arah dan memiliki median 3,9 m. Rumija 24,4 m terdiri dari 4,7 m merupakan trotoar sisi kiri, 11 m jalur lalu lintas dan 4,8 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area publik.

Gambar III-38 Ruas Jalan Alun – alun Timur

Sumber: Analisis Konsultan

III.1.3.28 Ruas Jalan Sunda

Segmen ruas jalan Sunda yang dimaksud mulai dari Jl. Naripan (sisi timur) sampai dengan Jl. Veteran, dengan panjang 73 m, lebar ruang milik jalan 16,25 m, jalan ini memiliki 3 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 16,25 m terdiri dari 1,55 m merupakan trotoar sisi kiri, 12,3 m jalur lalu lintas dan 2,4 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah komersil.

Gambar III-39 Ruas Jalan Sunda

Sumber: Analisis Konsultan

III.1.3.29 Ruas Jalan Veteran

Segmen ruas jalan Veteran yang dimaksud mulai dari Jl. Sunda sampai dengan Jl. Ahmad Yani, dengan panjang 170 m, lebar ruang milik jalan 11,65 m, jalan ini memiliki 2 lajur, ruas ini satu arah dan tidak memiliki median. Rumija 11,65 m terdiri dari 0,95 m merupakan trotoar sisi kiri, 10,3 m jalur lalu lintas yang terkadang difungsikan juga untuk *Parking on Street* di sisi kanan dan 0,4 m merupakan trotoar sisi kanan. Ruas jalan ini menggunakan perkerasan lentur dengan kondisi yang masih sangat baik. Tata guna lahan disekitar jalan ini adalah area komersial.

Gambar III-40 Ruas Jalan

Sumber: Analisis Konsultan

III.1.4 Analilis Kondisi Simpang Pada Jalur Khusus BRT

Terdapat 38 simpang yang dilalui rencana pembangunana jalur khusus BRT diantaranya adalah sebagai berikut:

III.1.4.1 Simpang Ahmad Yani – Santo Yusuf

Simpang Ahmad Yani-Santo Yusuf merupakan persimpangan yang mengakses jalan menuju Kiaracondong. Simpang ini tidak memiliki APILL dan marka jalan yang sudah mulai hilang. Tipe jalan di Simpang Ahmad Yani-Santo Yusuf adalah sebagai berikut:

- Arah ke Santo Yusuf (B) : tipe 4/2 UD dengan lebar total 15 m
- Arah ke Kiaracondong (C) : tipe 4/2 UD dengan lebar total 15 m
- Arah dari Cicadas (D) : tipe 4/2 UD dengan lebar total 15 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Ahmad Yani-Santo Yusuf dilihat pada gambar di bawah ini.

Gambar III-41 Simpang Ahmad Yani – Santo Yusuf

Sumber: Analisis Konsultan

III.1.4.2 Simpang Kiaracondong

Simpang Kiaracondong merupakan Simpang yang mengakses jalan menuju Antapani dan Jalan Supratman. Di persimpangan ini terdapat jembatan layang *(flyover)* yang mengakses dari Antapani menuju Sudirman. Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas. Tipe jalan di Simpang Kiaracondong yang berada di bawah jembatan layang *(flyover)* adalah sebagai berikut:

- Arah dari Santo Yusuf (A) : tipe 4/2 D dengan lebar total 22 m
- Arah ke Antapani (B) : tipe 4/2 D dengan lebar total 28 m
- Arah ke Kiaracondong (C) : tipe 4/2 D dengan lebar total 22 m
- Arah ke Sudirman (D) : tipe 4/2 D dengan lebar total 28 m

Gambar III-42 Simpang Kiaracondong

Sumber: Analisis Konsultan

III.1.4.3 Simpang Jakarta

Simpang Jakarta adalah persimpangan yang mengakses jalan menuju Antapani dan Jalan Supratman. Di persimpangan ini terdapat jembatan layang *(flyover)* yang mengakses dari Antapani menuju jalan Sudirman. Simpang ini tidak memiliki APILL, marka dan rambu sudah mulai hilang. Tipe jalan di Simpang Jakarta yang berada di bawah jembatan layang *(flyover)* adalah sebagai berikut:

- Arah dari Supratman (A) : tipe 4/2 D dengan lebar total 15 m
- Arah ke Cicadas (B) : tipe 4/1 UD dengan lebar total 22 m
- Arah dari Kiaracondong (C) : tipe 4/2 D dengan lebar total 15 m
- Arah dari Cihapit (D) : tipe 4/2 D dengan lebar total 22 m
- Arah ke Laswi (E) : tipe 4/2 UD dengan lebar total 22 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Jakarta dapat dapat dilihat di bawah ini.

Gambar III-43 Simpang Jakarta

Sumber: Analisis Konsultan

III.1.4.4 Simpang Laswi

Simpang Laswi merupakan simpang yang mengakses jalan menuju Kosambi, Cihapit, Cikaso, dan Laswi. Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas. Tipe jalan di Simpang Laswi adalah sebagai berikut:

- Arah ke Cihapit (A) : tipe 4/2 D dengan lebar total 22 m
- Arah ke Cikaso (B) : tipe 4/2 D dengan lebar total 25 m
- Arah ke Laswi (C) : tipe 4/2 D dengan lebar total 22 m
- Arah ke Kosambi (D) : tipe 4/2 D dengan lebar total 25 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Laswi dapat dapat dilihat di bawah ini.

Gambar III-44 Simpang Laswi

Sumber: Analisis Konsultan

III.1.4.5 Simpang Lima Asia Afrika

Simpang 5 Asia Afrika merupakan persimpangan yang menjadi akses jalan menuju Lengkong Besar dan Braga. Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas. Jenis jalan di Simpang 5 Asia Afrika adalah sebagai berikut :

- Arah ke Naripan (A) : tipe 4/1 UD dengan lebar total 12,0 m
- Arah ke Malabar (B) : tipe 3/2 UD dengan lebar total 10,5 m
- Arah dari Karapitan (C): tipe 4/1 UD dengan lebar total 12,0 m
- Arah ke Asia Afrika (D) : tipe 4/1 UD dengan lebar total 12,0 m
- Arah dari Kosambi (D) : tipe 4/1 UD dengan lebar total 12,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja Simpang 5 Asia Afrika

Simpang 5 Asia Afrika dapat dilihat pada gambar di bawah ini.

Gambar III-45 Simpang Lima Asia Afrika

Sumber: Analisis Konsultan

III.1.4.6 Simpang Lengkong Besar

Simpang Lengkong Besar merupakan persimpangan yang mengakses jalan menuju Lengkong Besar dan Braga. Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas. Tipe jalan di Simpang Lengkong Besar adalah sebagai berikut:

- Arah dari Tamblong (A) : tipe 4/1 UD dengan lebar total 12,0 m
- Arah dari Naripan (B) : tipe 4/1 UD dengan lebar total 12,0 m
- Arah ke Lengkong Besar (C): tipe 4/1 UD dengan lebar total 12,0 m
- Arah ke Braga (D) : tipe 4/1 UD dengan lebar total 12,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja Simpang Lengkong Besar dapat dilihat pada gambar di bawah ini.

Gambar III-21 Simpang Stasiun Lengkong Besar

Sumber: Analisis Konsultan

III.1.4.7 Simpang Karanganyar

Simpang Karanganyar merupakan persimpangan yang menjadi akses jalan menuju Cibadak dan Gardujati. Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas. Tipe jalan di Simpang Karanganyar adalah sebagai berikut:

- Arah dari Gardujati (A) : tipe 4/1 UD dengan lebar total 13,5 m
- Arah dari Braga (B) : tipe 2/1 UD dengan lebar total 9,0 m
- Arah ke Cibadak (C) : tipe 4/1 D dengan lebar total 13,5 m
- Arah ke Kebonjati (D) : tipe 2/1 UD dengan lebar total 7,8 m

Kondisi geometrik, kondisi lalu lintas dan kinerja Simpang Karanganyar dapat dilihat di bawah ini.

Gambar III-46 Simpang Karanganyar

Sumber: Analisis Konsultan

III.1.4.8 Simpang Gardu Jati

Simpang Gardujati merupakan persimpangan yang menjadi akses jalan menuju Cibadak dan Kebonjati. Simpang ini memiliki APILL namun marka dan rambu sudah mulai hilang. Tipe jalan di Simpang Gardujati adalah sebagai berikut:

- Arah dari Gardujati (A) : tipe 3/1 UD dengan lebar total 13,5 m
- Arah dari Karanganyar (B) : tipe 2/1 UD dengan lebar total 9,0 m
- Arah ke Cibadak (C) : tipe 4/2 UD dengan lebar total 13,5 m
- Arah ke Kebonjati (D) : tipe 2/1 UD dengan lebar total 9,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja Simpang Gardujati dapat dapat dilihat di bawah ini.

Gambar III-47 Simpang Gardu Jati

Sumber: Analisis Konsultan

III.1.4.9 Simpang Jamika

Simpang Jamika merupakan persimpangan yang mengakses jalan menuju Jalan Rajawali, Jalan Sukarno Hatta dan Cimahi. Simpang ini memiliki APILL namun marka dan rambu sudah mulai hilang. Tipe jalan di Simpang Jamika adalah sebagai berikut:

- Arah dari Andir (B) : tipe 4/1 UD dengan lebar total 11,5 m
- Arah ke Jamika (C) : tipe 4/2 D dengan lebar total 21,0 m
- Arah ke Garuda (D) : tipe 4/2 D dengan lebar total 12,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja Simpang Jamika dapat dapat dilihat pada gambar di bawah ini.

Gambar III-48 Simpang Jamika

Sumber: Analisis Konsultan

III.1.4.10 Simpang Garuda

Simpang Garuda merupakan simpang yang mengakses jalan menuju Cibeureum atau ke Jalan Sudirman. Simpang ini tidak memiliki APILL, marka dan rambu sudah mulai hilang. Tipe jalan di Simpang Garuda adalah sebagai berikut:

- Arah dari Rajawali (A) : tipe 3/1 UD dengan lebar total 10,5 m
- Arah ke Sudirman (B) : tipe 4/2 UD dengan lebar total 15,5 m
- Arah ke Cibeureum (D) : tipe 4/2 UD dengan lebar total 16 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Garuda dapat dapat dilihat pada gambar di bawah ini.

Gambar III-49 Simpang Garuda

Sumber: Analisis Konsultan

III.1.4.11 Bundaran Cibereum

Bundaran Cibeureum merupakan persimpangan yang menjadi akses jalan menuju Rajawali, Jalan Sukarno Hatta dan Cimahi. Simpang ini memiliki APILL serta rambu jelas namun marka sudah mulai menghilang. Tipe jalan di Bundaran Cibeureum adalah sebagai berikut:

- Arah ke Rajawali (A) : tipe 4/2 D dengan lebar total 18,0 m
- Arah dari Jamika (B) : tipe 4/2 D dengan lebar total 18,0 m
- Arah ke Sukarno Hatta (C) : tipe 4/2 D dengan lebar total 18,0 m
- Arah ke Cimahi (D) : tipe 4/2 D dengan lebar total 18,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja Bundaran Cibeureum dapat dilihat di bawah ini.

Gambar III-50 Bundaran Cibereum

Sumber: Analisis Konsultan

III.1.4.12 Simpang Cibereum

Simpang Cibeureum merupakan persimpangan yang mengakses jalan menuju Cimahi dan Rajawali. Simpang ini tidak memiliki APILL tetapi marka dan rambu masih jelas. Tipe jalan di Simpang Cibeureum adalah sebagai berikut:

- Arah ke Rajawali (B) : tipe 3/1 UD dengan lebar total 10 m
- Arah dari Sudirman (C) : tipe 4/2 UD dengan lebar total 16 m
- Arah ke Cimahi (D) : tipe 4/2 UD dengan lebar total 15 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Cibeureum dapat dilihat pada gambar di bawah ini.

Gambar III-51 Simpang Cibereum

Sumber: Analisis Konsultan

III.1.4.13 Simpang Nurtanio

Simpang Nurtanio merupakan simpang yang menjadi akses jalan menuju Andir dan Garuda. Simpang ini memiliki APILL , rambu masih cukup jelas namun marka sudah mulai menghilang. Tipe jalan di Simpang Nurtanio adalah sebagai berikut:

- Arah ke Nurtanio (A) : tipe 4/2 UD dengan lebar total 13,0 m
- Arah ke Andir (B) : tipe 4/1 UD dengan lebar total 13,0 m
- Arah dari Garuda (C) : tipe 4/1 UD dengan lebar total 13,0 m
- Arah dari Rajawali (D): tipe 4/1 UD dengan lebar total 13,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Nurtanio dapat dapat dilihat di bawah ini.

Gambar III-52 Simpang Nurtanio

Sumber: Analisis Konsultan

III.1.4.14 Simpang Pasir Kaliki

Perempatan Pasir Kaliki merupakan persimpangan yang mengakses jalan menuju Pasir Kaliki, Gardujati dan Suniaraja. Simpang ini memiliki APILL , rambu masih cukup jelas namun marka sudah mulai menghilang. Tipe jalan di Simpang Pasir Kaliki adalah sebagai berikut:

- Arah ke Pasir Kaliki (A) : tipe 4/2 UD dengan lebar total 13,5 m
- Arah ke Suniaraja (B): tipe 4/2 UD dengan lebar total 13,5 m
- Arah ke Gardujati (C) : tipe 4/2 D dengan lebar total 15,3 m
- Arah dari Kebonjati (D) : tipe 4/1 UD dengan lebar total 13,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Pasir Kaliki dapat dilihat pada gambar di bawah ini.

Gambar III-53 Simpang Pasir Kaliki

Sumber: Analisis Konsultan

III.1.4.15 Simpang Pasar Baru

Persimpangan Pasar Baru merupakan persimpangan yang mengakses jalan menuju Pasar Baru, Braga dan Suniaraja. Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai hilang. Tipe jalan di Simpang Pasar Baru adalah sebagai berikut:

- Arah ke Braga (A) : tipe 4/1 UD dengan lebar total 13,5 m
- Arah dari Suniaraja Naripan (B) : tipe 2/2 UD dengan lebar total 9 m
- Arah ke Pasar Baru (C) : tipe 4/1 UD dengan lebar total 13,5 m
- Arah dari Kebonjati (D) : tipe 4/1 UD dengan lebar total 7,8 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Pasar Baru dapat dilihat pada gambar di bawah ini.

Gambar III-54 Simpang Pasar Baru

Sumber: Analisis Konsultan

III.1.4.16 Simpang Suniaraja

Simpang Suniaraja merupakan simpang yang mengakses dari arah banceuy menuju Pasar Baru. Simpang ini tidak memiliki APILL tapi rambu dan marka masih jelas. Tipe jalan di Simpang Suniaraja adalah sebagai berikut:

- Arah dari Braga (B) : tipe 3/1 UD dengan lebar total 10,5 m
- Arah dari Banceuy (C) : tipe 4/1 UD dengan lebar total 16 m
- Arah ke Suniaraja/Pasar Baru (D) : tipe 3/1 UD dengan lebar total 10,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Suniaraja dapat dapat dilihat di bawah ini.

Gambar III-55 Simpang Suniaraja

Sumber: Analisis Konsultan

III.1.4.17 Simpang ABC

Simpang ABC merupakan persimpangan yang mengakses jalan menuju Naripan dan suniaraja. Simpang ini memiliki APILL , rambu dan marka masih cukup jelas. Tipe jalan di Simpang ABC adalah sebagai berikut:

- Arah ke Suniaraja (A) : tipe 2/2 UD dengan lebar total 13,5 m
- Arah ke Naripan (B) : tipe 2/2 UD dengan lebar total 9 m
- Arah dari Alun-alun Bandung (C) : tipe 2/2 UD dengan lebar total 13,5 m
- Arah dari ABC/Pasar Baru (D) : tipe 4/2 UD dengan lebar total 9 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang ABC dapat dapat dilihat pada gambar di bawah ini.

Gambar III-56 Simpang ABC

Sumber: Analisis Konsultan

III.1.4.18 Simpang Naripan – Braga

Simpang Naripan - Braga merupakan persimpangan yang mengakses jalan menuju Naripan dan Braga. Tipe jalan di Simpang Naripan - Braga adalah sebagai berikut:

- Arah ke Braga (A) : tipe 4/1 UD dengan lebar total 12 m
- Arah ke Naripan (B) : tipe 4/2 UD dengan lebar total 12 m

- Arah ke Asia Afrika (C) : tipe 4/1 UD dengan lebar total 12 m
- Arah dari Banceuy (D) : tipe 4/2 UD dengan lebar total 12 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Naripan - Braga dapat dilihat pada gambar di bawah ini.

Gambar III-57 Simpang Naripan - Braga

Sumber: Analisis Konsultan

III.1.4.19 Simpang Naripan – Sunda

Simpang Naripan - Sunda merupakan simpang yang menjadi akses jalan menuju jalan Veteran, Naripan dan Braga. Tipe jalan di Simpang Naripan - Sunda adalah sebagai berikut:

- Arah ke Veteran (A) : tipe 4/1 UD dengan lebar total 12 m
- Arah ke Naripan (B) : tipe 2/1 UD dengan lebar total 7 m
- Arah dari Asia Afrika (C) : tipe 4/1 UD dengan lebar total 12 m
- Arah ke Braga (D) : tipe 2/2 UD dengan lebar total 7 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Naripan - Sunda dapat dilihat pada gambar di bawah ini.

Gambar III-58 Simpang Naripan - Sunda

Sumber: Analisis Konsultan

III.1.4.20 Simpang Veteran - Ahmad Yani

Simpang Veteran - A. Yani merupakan simpang yang mengakses jalan dari Veteran, Kosambi dan Naripan menuju Burangrang atau menuju Asia Afrika. Tipe jalan di Simpang Veteran - Simpang A. Yani adalah sebagai berikut:

- Arah dari Veteran (A) : tipe 3/1 UD dengan lebar total 9,5 m
- Arah ke Kosambi (B) : tipe 2/2 UD dengan lebar total 14,3 m
- Arah ke Burangrang (C) : tipe 1/1 UD dengan lebar total 5,5 m
- Arah ke Asia Afrika (D) : tipe 3/1 UD dengan lebar total 9 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Veteran - A. Yani dapat dilihat pada gambar di bawah ini.

Gambar III-59 Simpang Veteran – A. Yani

Sumber: Analisis Konsultan

III.1.4.21 Simpang Banceuy

Simpang Banceuy merupakan simpang yang menjadi akses jalan dari Alun-alun Bandung/Braga ke Banceuy atau ke Karanganyar. Tipe jalan di Simpang Banceuy adalah sebagai berikut:

- Arah ke Banceuy (A) : tipe 2/1 UD dengan lebar total 7,0 m
- Arah dari Braga (B): tipe 4/1 UD dengan lebar total 14,0 m
- Arah ke Karanganyar (C) : tipe 4/1 UD dengan lebar total 14,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Banceuy dapat dapat dilihat di bawah ini.

Gambar III-60 Simpang Banceuy

Sumber: Analisis Konsultan

III.1.4.22 Simpang Alun – alun Bandung

Simpang Alun-alun Bandung merupakan simpang yang menjadi akses jalan menuju Banceuy dan Karapitan. Tipe jalan di Simpang Alun-alun Bandung adalah sebagai berikut:

- Arah dari Braga (B) : tipe 4/1 UD dengan lebar total 14,0 m
- Arah ke Kepatihan (C) : tipe 2/2 D dengan lebar total 11,5 m
- Arah ke Banceuy (D) : tipe 4/1 UD dengan lebar total 14,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Alun-alun Bandung simpang dapat dilihat pada gambar di bawah ini.

Gambar III-61 Simpang Alun – alun Bandung

Sumber: Analisis Konsultan

III.1.4.23 Simpang Dalem Kaum

Simpang Dalem Kaum merupakan simpang yang menjadi akses jalan menuju Alun-Alun Bandung dan Dalem Kaum. Tipe jalan di Simpang Dalem Kaum adalah sebagai berikut:

- Arah ke Alun-alun Bandung (A) : tipe 2/2 D dengan lebar total 11,5 m
- Arah ke Dalem Kaum (B) : tipe 3/1 UD dengan lebar total 10 m
- Arah ke Bojonggede (C) : tipe 2/1 UD dengan lebar total 5 m
- Arah dari Kepatihan (D) : tipe 3/1 UD dengan lebar total 10 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Dalem Kaum dapat dilihat pada gambar di bawah ini.

Gambar III-62 Simpang Dalem Kaum

Sumber: Analisis Konsultan

III.1.4.24 Simpang Pungkur

Simpang Pungkur merupakan simpang yang mengakses jalan menuju Pasir Koja dan Alun-Alun Bandung. Tipe jalan di Simpang Pungkur adalah sebagai berikut:

- Arah ke Alun-Alun (A) : tipe 4/1 UD dengan lebar total 19 m
- Arah dari Lengkong (B) : tipe 4/1 UD dengan lebar total 13 m
- Arah dari Tegalega (C) : tipe 4/1 UD dengan lebar total 19,5 m
- Arah ke Pasir Koja (D) : tipe 4/2 UD dengan lebar total 13 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Pungkur dapat dapat dilihat di bawah ini.

Gambar III-63 Simpang Paungkur

Sumber: Analisis Konsultan

III.1.4.25 Simpang Balonggede

Simpang Balonggede merupakan simpang yang mengakses jalan menuju Naripan dan Suniaraja. Tipe jalan di Simpang Balonggede adalah sebagai berikut:

- Arah ke Suniaraja (A) : tipe 2/2 UD dengan lebar total 13,5 m
- Arah ke Naripan (B) : tipe 2/2 UD dengan lebar total 9 m
- Arah dari Alun-alun Bandung (C) : tipe 2/2 UD dengan lebar total 13,5 m
- Arah dari ABC/Pasar Baru (D) : tipe 4/2 UD dengan lebar total 9 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Balonggede dapat dilihat pada gambar di bawah ini.

Gambar III-64 Simpang Balonggede

Sumber: Analisis Konsultan

III.1.4.26 Simpang Inggit Ganarsih – Moch. Toha

Simpang Inggit Garnasih-Moch. Toha merupakan persimpangan yang menjadi akses jalan menuju jalan Pungkur, Lengkong, Moch. Toha dan Ciateul. Tipe jalan di simpang Inggit Garnasih - Moch. Toha sebagai berikut:

- Arah ke Pungkur (A) : tipe 4/2 UD dengan lebar total 14 m
- Arah ke Lengkong (B) : tipe 4/2 UD dengan lebar total 14 m
- Arah dari Jalan Moh. Toha (C) : tipe 4/2 UD dengan lebar total 14 m
- Arah ke Ciateul (D) : tipe 4/2 D dengan lebar total 14 m

Kondisi geometrik, kondisi lalu lintas dan kinerja ruas jalan Inggit Garnasih - Moch. Toha dapat dilihat pada gambar di bawah ini.

Gambar III-65 Simpang Inggit Ganarsih – Moch, Toha

Sumber: Analisis Konsultan

III.1.4.27 Simpang BKR – Moch. Toha

Persimpangan BKR – Moch. Toha merupakan persimpangan yang menjadi akses jalan menuju Pungkur, Lengkong, Jalan Raya Moch. Toha dan Tegalega. Tipe jalan pada Simpang BKR - Moch. adalah sebagai berikut:

- Arah ke Pungkur (A) : tipe 4/2 D dengan lebar total 10,5 m
- Arah ke Lengkong (B) : tipe 4/2 D dengan lebar total 25 m
- Arah ke Jalan Moh. Toha (C) : tipe 4/2 D dengan lebar total 10,5 m
- Arah ke Tegalega (D) : tipe 4/2 D dengan lebar total 25 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang BKR - Moch. Toha dapat dilihat pada gambar di bawah ini.

Gambar III-66 Simpang BKR– Moch, Toha

Sumber: Analisis Konsultan

III.1.4.28 Simpang BKR – Tegallega

Simpang BKR-Tegalega merupakan persimpangan yang mengakses jalan menuju jalan kopo dan jalan Soekarno Hatta. Tipe jalan di Simpang BKR - Tegalega adalah sebagai berikut:

- Arah ke Pungkur (A) : tipe 4/2 D dengan lebar total 20 m
- Arah ke Moh Toha (B) : tipe 4/2 D dengan lebar total 25 m
- Arah ke Astanaanyar (C) : tipe 2/2 UD dengan lebar total 8 m
- Arah ke Kopo (D) : tipe 4/2 D dengan lebar total 25 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang BKR - Tegalega dapat dilihat pada gambar di bawah ini.

Gambar III-67 Simpang BKR – Tegallega

Sumber: Analisis Konsultan

III.1.4.29 Simpang Inggit Ganarsih – Otto Iskandar Dinata

Perempatan Inggit Garnasih-Otto Iskandar Dinata merupakan perempatan yang mengakses jalan menuju Tegalega, Panjunan, dan Ciateul. Tipe jalan yang ada di Simpang Inggit Garnasih-Otto Iskandar Dinata adalah sebagai berikut:

- Arah ke Suniaraja (A) : tipe 2/2 UD dengan lebar total 13,5 m
- Arah ke Naripan (B) : tipe 2/2 UD dengan lebar total 9 m
- Arah dari Alun-alun Bandung (C) : tipe 2/2 UD dengan lebar total 13,5 m
- Arah dari ABC/Pasar Baru (D) : tipe 4/2 UD dengan lebar total 9 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Inggit Garnasih-Otto Iskandar Dinata dapat dilihat pada gambar di bawah ini.

Gambar III-68 Simpang Inggit Ganarsih – Otto Iskandar Dinata

Sumber: Analisis Konsultan

III.1.4.30 Simpang Pasir Koja

Perempatan Pasir Koja merupakan perempatan yang mengakses jalan menuju Pungkur dan Tegalega. Tipe jalan di Simpang Pasir Koja adalah sebagai berikut:

- Arah dari Karanganyar (A) : tipe 4/1 UD dengan lebar total 14 m
- Arah ke Pungkur (B) : tipe 2/2 UD dengan lebar total 14 m
- Arah ke Tegalega (C) : tipe 4/1 UD dengan lebar total 14 m
- Arah dari Pasir Koja (D) : tipe 2/2 UD dengan lebar total 9,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Pasir Koja dapat dapat dilihat di bawah ini.

Gambar III-69 Simpang Pasir Koja

Sumber: Analisis Konsultan

III.1.4.31 Simpang Tamblong

Perempatan Tamblong merupakan perempatan yang mengakses jalan menuju Braga, Asia Afrika, dan Naripan. Tipe jalan di Simpang Tamblong adalah sebagai berikut:

- Arah dari Tamblong (A) : tipe 3/1 UD dengan lebar total 10,5 m
- Arah ke Naripan (B): tipe 2/2 UD dengan lebar total 10,5 m
- Arah ke Asia Afrika (C) : tipe 3/1 UD dengan lebar total 10,5 m
- Arah ke Braga (D) : tipe 2/2 UD dengan lebar total 9,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Tamblong dapat dapat dilihat di bawah ini.

Gambar III-70 Simpang Tamblong

Sumber: Analisis Konsultan

III.1.4.32 Simpang Gudang Utara - Ahmad Yani

Persimpangan Gudang Utara - A.Yani merupakan persimpangan yang menjadi akses jalan menuju Kosambi, Merdeka, dan Laswi. Jenis jalan di Simpang Gudang Utara - A.Yani. Tipe jalan Simpang Gudang Utara - A.Yani adalah sebagai berikut:

- Arah ke Merdeka (A) : tipe 2/2 UD dengan lebar total 7,0 m
- Arah ke Laswi (B) : tipe 4/2 UD dengan lebar total 15,0 m
- Arah ke Cikudapateuh (C) : tipe 2/2 UD dengan lebar total 4,0 m
- Arah ke Kosambi (D) : tipe 4/2 D dengan lebar total 15,0 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Gudang Utara - A.Yani dapat dilihat pada gambar di bawah ini.

Gambar III-71 Simpang Gudang Utara – A. Yani

Sumber: Analisis Konsultan

III.1.4.33 Simpang Ciroyom

Perempatan Ciroyom merupakan perempatan yang mengakses jalan menuju Kebonjati. Adapun Tipe jalan di Simpang Ciroyom adalah sebagai berikut:

- Arah ke Garuda (B) : tipe 4/1 UD dengan lebar total 13,2 m
- Arah ke Soekarno Hatta (C) : tipe 4/2 D dengan lebar total 18,6 m
- Arah dari Cimahi (D) : tipe 4/1 UD dengan lebar total 13,2 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Ciroyom dapat dapat dilihat di bawah ini.

Gambar III-72 Simpang Ciroyom

Sumber: Analisis Konsultan

III.1.4.34 Simpang Andir

Simpang Andir merupakan persimpangan yang mengakses dari pasar Andir dan dari Cibadak ke Jamika/Cimahi. Tipe jalan di Simpang Andir adalah sebagai berikut:

- Arah dari Pasar Andir (A) : tipe 2/1 UD dengan lebar total 6,5 m
- Arah dari Cibadak (B) : tipe 3/1 UD dengan lebar total 10,5 m
- Arah ke Jamika/Cimahi (C) : tipe 3/1 D dengan lebar total 10,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Andir dapat dapat dilihat di bawah ini.

Gambar III-73 Simpang Andir

Sumber: Analisis Konsultan

III.1.4.35 Simpang Rajawali

Simpang Rajawali merupakan persimpangan yang mengakses jalan menuju jalan Sukarno Hatta dan Garuda. Tipe jalan di Simpang Rajawali adalah sebagai berikut:

- Arah ke Garuda (B) : tipe 4/1 UD dengan lebar total 13,2 m
- Arah ke Soekarno Hatta (C) : tipe 4/2 D dengan lebar total 18,6 m
- Arah dari Cimahi (D) : tipe 4/1 UD dengan lebar total 13,2 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Rajawali dapat dapat dilihat pada gambar di bawah ini.

Gambar III-74 Simpang Rajawali

Sumber: Analisis Konsultan

III.1.4.36 Simpang Braga – Asia Afrika

Simpang Braga - Asia Afrika merupakan persimpangan yang mengakses jalan menuju Naripan dan Suniaraja. Tipe jalan di Simpang Braga - Asia Afrika adalah sebagai berikut:

- Arah dari Braga (A) : tipe 2/1 UD dengan lebar total 7,0 m
- Arah dari Lengkong besar (B) : tipe 3/1 UD dengan lebar total 10,5 m
- Arah dari Cikawao (C) : tipe 1/1 UD dengan lebar total 4,0 m
- Arah ke Alun-alun (D) : tipe 3/1 UD dengan lebar total 10,5 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Braga - Asia Afrika dapat dilihat pada gambar di bawah ini.

Gambar III-75 Simpang Braga – Asia Afrika

Sumber: Analisis Konsultan

III.1.4.37 Simpang Veteran - Sunda

Simpang Veteran-Sunda merupakan persimpangan yang mengakses jalan menuju jalan Siliwangi dan Kosambi. Tipe jalan di Simpang Veteran-Sunda adalah sebagai berikut:

- Arah ke Siliwangi (A) : tipe 4/1 UD dengan lebar total 12,5 m
- Arah ke Kosambi (B) : tipe 4/2 UD dengan lebar total 9,5 m
- Arah dari Asia Afrika (C) : tipe 4/1 UD dengan lebar total 12 m
- Arah dari Lembong (D) : tipe 4/1 UD dengan lebar total 11,3 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Veteran-Sunda dapat dilihat pada gambar di bawah ini.

Gambar III-76 Simpang Veteran - Sunda

Sumber: Analisis Konsultan

III.1.4.38 Simpang Malabar

Simpang Malabar merupakan simpang yang mengakses jalan menuju Laswi dan Pasar Kosambi. Tipe jalan di Simpang ABC adalah sebagai berikut:

- Arah ke Laswi (B) : tipe 4/2 D dengan lebar total 14 m
- Arah dari Malabar (C) : tipe 2/1 UD dengan lebar total 7 m
- Arah ke Asia Afrika (D) : tipe 4/2 UD dengan lebar total 14 m

Kondisi geometrik, kondisi lalu lintas dan kinerja simpang Malabar dapat dapat dilihat pada gambar di bawah ini.

Gambar III-77 Simpang Malabar

Sumber: Analisis Konsultan

III.1.5 Analisis Kecepatan dan Waktu Perjalanan

Untuk dapat melakukan analisis kecepatan dan waktu perjalanan maka dilakukan pengumpulan data dengan metode Move Car Observer, melalui survey ini kita juga dapat melihat perilaku pengemudi di suatu wilayah. Dalam melakukan survey di kumpulkan data terkait panjang antrian waktu delay dan penyebab terjadinya tundaan di waktu sibuk pagi dan waktu sibuk sore. Survei dilakukan di seluruh ruas jalan yang rencananya akan dibangun jalur khusus BRT seperti dapat dilihat pada table dibawah ini.

Tabel III-78 Volume Sibuk Pagi dan Sore pada Ruas Jalan Asia Afrika 1

Sumber: Analisis Konsultan

No	Nama Jalan	Panjang Jalan (m)	Waktu Tempuh (menit)		Kecepatan (km/jam)	
			Sibuk Pagi	Sibuk Sore	Sibuk Pagi	Sibuk Sore
1	Jl. ABC	210	1	2	12,6	6,30
2	Jl. Ahmad Yani 1	1120	3	7	22,4	9,60
3	Jl. Ahmad yani 2 (Barat - Timur)	542	2	3	16,26	10,84
4	Jl. Ahmad yani 2 (Timur - Barat)	542	2	2,3	16,26	14,14
5	Jl. Ahmad yani 3 (Barat - Timur)	1315	9	12	8,77	6,58
6	Jl. Ahmad yani 3 (Timur - Barat)	1315	9	10	8,77	7,89

No	Nama Jalan	Panjang Jalan (m)	Waktu Tempuh (menit)		Kecepatan (km/jam)	
			Sibuk Pagi	Sibuk Sore	Sibuk Pagi	Sibuk Sore
7	Jl. Ahmad yani 4	250	1	1,4	15	10,71
8	Jl. Alun Alun Timur	140	1	2	8,4	4,20
9	Jl. Asia Afrika 1	610	2	3	18,3	12,20
10	Jl. Asia Afrika 2	241	1	2	14,46	7,23
11	Jl. Asia Afrika 3	244	1,2	2,3	12,2	6,37
12	Jl. Asia Afrika 4	140	1	1,8	8,4	4,67
13	Jl. Asia Afrika 5	265	1,4	2,5	11,36	6,36
14	Jl. Banceuy 1	244	1,1	2,4	13,31	6,10
15	Jl. Banceuy 2	396	2	3	11,88	7,92
16	Jl. BKR	350	2	2,3	10,5	9,13
17	Jl. BKR	350	2	3	10,5	7,00
18	Jl. Dalem Kaum	130	1	1,6	7,8	4,88
19	Jl. Dewi Sartika 1	140	1	1,3	8,4	6,46
20	Jl. Dewi Sartika 2	410	1	2	24,6	12,30
21	Jl. Ibrahim Adjie	560	2	3,6	16,8	9,33
22	Jl. Jakarta	1100	3,5	6	18,86	11,00
23	Jl. Jend Sudirman 1	642	2	7	19,26	5,50
24	Jl. Jend Sudirman 2	918	3	4	18,36	13,77
25	Jl. Jend Sudirman 3	390	2	3	11,7	7,80
26	Jl. Jend Sudirman 4 (Timur - Barat)	1097	3	4	21,94	16,46
27	Jl. Jend Sudirman 4 (Barat - Timur)	1097	3	3,2	21,94	20,57
28	Jl. Jend Sudirman 5	239	1	1,3	14,34	11,03
29	Jl. Jend Sudirman 6	1220	2	3	36,6	24,40
30	Jl. Kebon Jati 1	779	2	6	23,37	7,79
31	Jl. Kebon Jati 2	451	2	2,2	13,53	12,30
32	Jl. Moch Toha 1	500	2	2,1	15	14,29
33	Jl. Moch Toha 2 (Selatan - Utara)	620	4	2	9,3	18,60
34	Jl. Moch Toha 2 (Utara - Selatan)	620	3	2	12,4	18,60
35	Jl. Naripan 1	200	1	2,5	12	4,80
36	Jl. Naripan 2	590	1	2	35,4	17,70
37	Jl. Otista 1	520	3	6	10,4	5,20
38	Jl. Otista 2	720	2	3	21,6	14,40
39	Jl. Otista 3	480	2,1	2	13,71	14,40
40	Jl. Otista 4	660	6	2	6,6	19,80
41	Jl. Otista 5 (Utara - Selatan)	660	1,8	1	22	39,60
42	Jl. Otista 5 (Selatan - Utara)	660	1	1,2	39,6	33,00
43	Jl. Pungkur	120	1	1,1	7,2	6,55
44	Jl. Rajawali Barat	1000	3,5	3	17,14	20,00
45	Jl. Rajawali Timur 1	877	3,3	3	15,95	17,54

No	Nama Jalan	Panjang Jalan (m)	Waktu Tempuh (menit)		Kecepatan (km/jam)	
			Sibuk Pagi	Sibuk Sore	Sibuk Pagi	Sibuk Sore
46	Jl. Rajawali Timur 2	653	6	7	6,53	5,60
47	Jl. Sunda	73	1	1,2	4,38	3,65
48	Jl. Suniaraja 1	250	1	2	15	7,50
49	Jl. Suniaraja 2	230	1	2	13,8	6,90
50	Jl. Veteran	170	1	1,4	10,2	7,29

III.1.6 Analisis Kondisi Lalu Lintas Eksisting

Kondisi Lalu Lintas eksisting dilihat dari nilai VC ratio pada jam sibuk pagi dan sore pada ruas jalan dan Level of Service (LOS) pada simpang sebagai berikut:

Nama Jalan	Sibuk Pagi	Sibuk Sore
Jl. Asia Afrika 4	0,75	0,71
Jl. Asia Afrika 5	0,71	0,73
Jl. Jend Sudirman 1	0,97	0,90
Jl. Jend Sudirman 2	0,90	0,87
Jl. Jend Sudirman 3	0,80	0,83
Jl. Jend Sudirman 4	0,83	0,91
Jl. Jend Sudirman 5	0,72	1,01
Jl. Jend Sudirman 6	0,77	0,92
Jl. Rajawali Barat	0,80	0,99
Jl. Rajawali Timur 1	0,83	0,94
Jl. Rajawali Timur 2	0,96	0,79
Jl. Kebon Jati 1	0,97	0,80
Jl. Kebon Jati 2	0,82	0,81
Jl. Suniaraja 1	0,88	0,76
Jl. Otista 1	0,96	0,96
Jl. Suniaraja 2	0,91	0,97
Jl. Banceuy 2	0,78	0,81
Jl. Ahmad Yani 1	0,83	0,79
Jl. Ibrahim Adjie	0,94	0,88
Jl. Jakarta	1,03	0,72
Jl. Ahmad yani 2	0,71	0,97
Jl. Ahmad yani 3	0,88	0,83
Jl. Ahmad yani 4	0,80	0,73
Jl. Ahmad yani 5	0,87	1,03
Jl. Ahmad yani 6	0,99	0,79
Jl. Asia Afrika 1	0,75	0,72
Jl. Asia Afrika 2	0,90	0,86
Jl. Asia Afrika 3	0,96	0,97
Jl. Otista 2	0,83	0,80
Jl. Otista 3	0,71	0,77
Jl. Otista 4	0,93	0,84
Jl. Otista 5	0,80	0,75
Jl. BKR	0,89	0,73
Jl. Moch Toha 1	0,95	0,87
Jl. Moch Toha 2	0,83	0,73
Jl. Pungkur	0,80	0,94
Jl. Dewi Sartika 1	0,85	0,73
Jl. Dewi Sartika 2	0,87	0,81
Jl. Dalem Kaum	0,75	0,85
Jl. Alun Alun Timur	0,75	0,78
Jl. Banceuy 1	0,85	0,77
Jl. ABC	0,81	0,96
Jl. Naripan 1	0,89	0,75
Jl. Naripan 2	0,76	0,71
Jl. Sunda	0,88	0,88
Jl. Veteran	0,88	0,94

Gambar III-79 VC Ratio Sibuk Pagi dan Sore 2024 pada Ruas Jalan *On Corridor* BRT BBMA

Sumber: Analisis Konsultan

Pada jam sibuk pagi dan sore terlihat bahwa seluruh ruas jalan sudah mencapai VC Ratio diatas 0,7, bahkan beberapa ruas jalan sudah mencapai angka VC Rasio diatas 1, perlu adanya penanganan lebih lanjut terhadap kondisi lalu lintas di ruas-ruas jalan tersebut.

No.	Intersection Name	Existing Condition		
		C (smp/jam)	Delay	LOS
1	A. Yani - Santo Yusuf	4178,53	18,354	C
2	Kiaracondong (APILL)	6591,543	40,800	E
3	Jakarta - A Yani	7094,54	14,484	B
4	Laswi (APILL)	4122,979	69,200	F
5	Simpang Lima (APILL)	3557,272	225,100	F
6	Lengkong Besar (APILL)	5510,35	42,900	E
7	Karanganyar (APILL)	5845,241	31,200	D
8	Gardujati (APILL)	2643,504	193,200	F
9	Jamika (APILL)	4034,088	52,989	E
10	Garuda	3334,28	16,662	C
11	Bundaran Cibeureum (APILL)	3463,886	168,500	F
12	Cibeureum	5948,65	15,421	C
13	Nurtanio (APILL)	3496,32	35,000	D
14	Simpang Paskal (APILL)	3583,252	91,500	F
15	Simpang Pasar Baru	8667,39	10,323	B
16	Suniaraja	6633,41	8,383	B
17	ABC	2925,22	15,708	B
18	Naripan-Braga	7388,45	11,197	B
19	Naripan-Sunda	5112,18	13,313	B
20	Veteran - A Yani	7075,95	9,782	B
21	Banceuy	5132,16	18,409	C
22	Alun-alun Bandung	5608,03	11,723	B
23	Dalemkaum	6798,4	8,714	B
24	Pungkur	8652,88	8,783	B
25	Balonggede	6539,12	8,177	B
26	Inggit Ganarsih - Moh.Toha (APILL)	2605,207	52,300	E
27	BKR - M.Toha (APILL)	6478,005	45,900	E
28	BKR - Tegalega (APILL)	4825,979	115,900	F
29	Inggit - Otista	9264,09	8,479	B
30	Jl.Pasirkoja (APILL)	6312,097	22,900	C
31	Tambolong (APILL)	3647,957	52,500	E
32	Gudang Utara - A.Yani (APILL)	2694,357	33,700	D
33	Ciroyom	5672,78	7,715	B
34	Andir	3267,16	10,464	B
35	Rajawali	1672	18,368	C
36	Braga - Asia Afrika	3224,39	17,690	C
37	Veteran p Sunda (APILL)	5804,888	22,200	C
38	Malabar 1	3468,94	9,980	B

Gambar III-80 LOS pada Simpang di Sekitar Lokasi On Corridor BRT BBMA

Sumber: Analisis Konsultan

Hasil analisis kondisi eksisting pada simpang jalan menunjukkan bahwa beberapa simpang memiliki tundaan kendaraan yang sudah mencapai level F. Sementara itu, simpang yang masih dalam kondisi baik didominasi pada simpang tanpa lampu lalu lintas, dengan nilai tingkat pelayanan / *Level of Service* (LOS) B.

III.1.6.1 LHR Jalan Asia Afrika 1

Segmen ruas jalan Asia Afrika 1 dimulai dari Simpang lima Jl. Karapitan sampai dengan Simpang 4 Jl. Lengkong Besar, dengan panjang segmen 610 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 57,995 kend/hari atau 25,688 smp/hari. LHR pada jam sibuk pagi 1,571 smp/jam dan pada jam sibuk sore 1,491 smp/jam.

Gambar III-81 Grafik Volume Kendaraan pada Ruas Jalan Asia Afrika 1

Sumber: Analisis Konsultan

Tabel III-82 Volume Sibuk Pagi dan Sore pada Ruas Jalan Asia Afrika 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.944	736	2.884	721
2	LV	Sedan, Jeep, station wagon	764	824	705	767
		Kijang, Elf, Colt, Carry	7		36	
		Pick up, box kecil	49		26	
		Mikrolet, Bus kecil, Angkot	4		1	
3	HV	Bus Besar	-	12	1	9
		Truk kecil 2 as	10		7	
		Truk sedang 2 as	-		0	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	9		10	
Total			**3.778**	**1.571**	**3.658**	**1.497**

III.1.6.2 LHR Jalan Asia Afrika 2

Segmen ruas jalan Asia Afrika 2 dimulai dari Simpang 4 Jl. Lengkong Besar sampai dengan Simpang 3 Jl. Braga, dengan panjang segmen 241 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 108,785 kend/hari atau 42,975 smp/hari. LHR pada jam sibuk pagi 3,218 smp/jam dan pada jam sibuk sore 3,068 smp/jam.

Gambar III-83 Grafik Volume Kendaraan pada Ruas Jalan Asia Afrika 2

Sumber: Analisis Konsultan

Tabel III-84 Volume Sibuk Pagi dan Sore pada Ruas Jalan Asia Afrika 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	8.882	2.221	5.795	1.449
2	LV	Sedan, Jeep, station wagon	875	965	1.549	1.610
		Kijang, Elf, Colt, Carry	35		35	
		Pick up, box kecil	33		17	
		Mikrolet, Bus kecil, Angkot	22		9	
3	HV	Bus Besar	5	32	3	10
		Truk kecil 2 as	16		4	
		Truk sedang 2 as	6		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	17		8	
Total			**9.874**	**3.218**	**7.413**	**3.068**

III.1.6.3 LHR Jalan Asia Afrika 3

Segmen ruas jalan Asia Afrika 3 dimulai dari Simpang 3 Jl. Braga sampai dengan Simpang 3 Jl. Alun – Alun Timur, dengan panjang segmen 244 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 145,082 kend/hari atau 57,639 smp/hari. LHR pada jam sibuk pagi 4,226 smp/jam dan pada jam sibuk sore 4,313 smp/jam.

Gambar III-85 Grafik Volume Kendaraan pada Ruas Jalan Asia Afrika 3

Sumber: Analisis Konsultan

Tabel III-86 Volume Sibuk Pagi dan Sore pada Ruas Jalan Asia Afrika 3

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)	Sibuk Sore (17:00 - 19:00)

			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	11.089	2.772	8.601	2.150
2	LV	Sedan, Jeep, station wagon	1.271	1.415	2.075	2.147
		Kijang, Elf, Colt, Carry	57		41	
		Pick up, box kecil	64		22	
		Mikrolet, Bus kecil, Angkot	22		10	
3	HV	Bus Besar	5	39	3	15
		Truk kecil 2 as	21		9	
		Truk sedang 2 as	7		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	50		91	
Total			**12.537**	**4.226**	**10.761**	**4.313**

III.1.6.4 LHR Jalan Asia Afrika 4

Segmen ruas jalan Asia Afrika 4 dimulai dari Simpang 3 Jl. Alun – Alun Timur sampai dengan Simpang 3 Jl. Banceuy, dengan panjang segmen 140 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 129,935 kend/hari atau 55,730 smp/hari. LHR pada jam sibuk pagi 3,327 smp/jam dan pada jam sibuk sore 3,153 smp/jam.

Gambar III-87 Grafik Volume Kendaraan pada Ruas Jalan Asia Afrika 4

Sumber: Analisis Konsultan

Tabel III-88 Volume Sibuk Pagi dan Sore pada Ruas Jalan Asia Afrika 4

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	7.436	1.859	5.315	1.329
2	LV	Sedan, Jeep, station wagon	1.217	1.422	1.603	1.793
		Kijang, Elf, Colt, Carry	94		105	
		Pick up, box kecil	88		59	
		Mikrolet, Bus kecil, Angkot	24		27	
3	HV	Bus Besar	8	46	7	31
		Truk kecil 2 as	25		9	
		Truk sedang 2 as	-		6	
		Truk sedang 3 as	6		5	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	29		19	
Total			**8.897**	**3.327**	**7.135**	**3.153**

III.1.6.5 LHR Jalan Asia Afrika 5

Segmen ruas jalan Asia Afrika 5 dimulai dari Simpang 3 Jl. Banceuy sampai dengan Simpang 4 Jl. Otista, dengan panjang segmen 265 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 120,149 kend/hari atau 52,431 smp/hari. LHR pada jam sibuk pagi 3,150 smp/jam dan pada jam sibuk sore 3,212 smp/jam.

Gambar III-89 Grafik Volume Kendaraan pada Ruas Jalan Asia Afrika 5

Sumber: Analisis Konsultan

Tabel III-90 Volume Sibuk Pagi dan Sore pada Ruas Jalan Asia Afrika 5

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	7.054	1.764	4.765	1.191
2	LV	Sedan, Jeep, station wagon	1.138	1.347	1.845	1.998
		Kijang, Elf, Colt, Carry	90		103	
		Pick up, box kecil	91		34	
		Mikrolet, Bus kecil, Angkot	28		17	
3	HV	Bus Besar	8	39	5	22
		Truk kecil 2 as	25		8	
		Truk sedang 2 as	-		6	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	24		11	
Total			**8.434**	**3.150**	**6.782**	**3.212**

III.1.6.6 LHR Jalan Jendral Sudirman 1

Segmen ruas jalan Jendral Sudirman 1 dimulai dari Simpang 4 Jl. Otista sampai dengan Simpang 4 Jl. Astana Anyar, dengan panjang segmen 642 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 99,527 kend/hari atau 44,048 smp/hari. LHR pada jam sibuk pagi 2,700 smp/jam dan pada jam sibuk sore 2,504 smp/jam.

Gambar III-91 Grafik Volume Kendaraan pada Ruas Jalan Jendral Sudirman 1

Sumber: Analisis Konsultan

Tabel III-92 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jendral Sudirman 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	6.074	1.518	4.224	1.056
2	LV	Sedan, Jeep, station wagon	968	1.148	1.287	1.427
		Kijang, Elf, Colt, Carry	85		93	
		Pick up, box kecil	72		35	
		Mikrolet, Bus kecil, Angkot	22		13	
3	HV	Bus Besar	7	34	5	21
		Truk kecil 2 as	20		8	
		Truk sedang 2 as	1		4	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	9		5	
Total			**7.250**	**2.700**	**5.668**	**2.504**

III.1.6.7 LHR Jalan Jendral Sudirman 2

Segmen ruas jalan Jendral Sudirman 2 dimulai dari Simpang 4 Jl. Astana Anyar sampai dengan Simpang 3 Jl. Waringin, dengan panjang segmen 918 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 53,467 kend/hari atau 22,730 smp/hari. LHR pada jam sibuk pagi 1,711 smp/jam dan pada jam sibuk sore 1,667 smp/jam.

Gambar III-93 Grafik Volume Kendaraan pada Ruas Jalan Jendral Sudirman 2

Sumber: Analisis Konsultan

Tabel III-94 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jendral Sudirman 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.865	716	3.226	807
2	LV	Sedan, Jeep, station wagon	886	952	799	839
		Kijang, Elf, Colt, Carry	9		13	
		Pick up, box kecil	53		25	
		Mikrolet, Bus kecil, Angkot	4		1	
3	HV	Bus Besar	10	43	3	21
		Truk kecil 2 as	20		12	
		Truk sedang 2 as	6		3	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	9		11	
Total			**3.852**	**1.711**	**4.083**	**1.667**

III.1.6.8 LHR Jalan Jendral Sudirman 3

Segmen ruas jalan Jendral Sudirman 3 dimulai dari Simpang 3 Jl. Waringin sampai dengan Simpang 3 Jl. Jamika dengan panjang segmen 390 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 56,493 kend/hari atau 28,408 smp/hari. LHR pada jam sibuk pagi 1,554 smp/jam dan pada jam sibuk sore 1,615 smp/jam.

Gambar III-95 Grafik Volume Kendaraan pada Ruas Jalan Jendral Sudirman 3

Sumber: Analisis Konsultan

Tabel III-96 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jendral Sudirman 3

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.981	745	2.640	660
2	LV	Sedan, Jeep, station wagon	522	755	726	914
		Kijang, Elf, Colt, Carry	121		86	
		Pick up, box kecil	100		93	
		Mikrolet, Bus kecil, Angkot	12		9	
3	HV	Bus Besar	2	54	1	41
		Truk kecil 2 as	40		31	
		Truk sedang 2 as	2		2	
		Truk sedang 3 as	1		0	
		Truk Gandeng	-		0	
		Truk Peti kemas/ kontainer	-		0	
4	NMT	Sepeda, Gerobak, Becak, Delman	57		41	
Total			**3.781**	**1.554**	**3.588**	**1.615**

III.1.6.9 LHR Jalan Jendral Sudirman 4

Segmen ruas jalan Jendral Sudirman 4 dimulai dari Simpang 3 Jl. Jamika sampai dengan Simpang 3 Jl. Nurtanio dengan panjang segmen 1,097 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 74,071 kend/hari atau 29,784 smp/hari. LHR pada jam sibuk pagi 1,700 smp/jam dan pada jam sibuk sore 2,139 smp/jam.

Gambar III-97 Grafik Volume Kendaraan pada Ruas Jalan Jendral Sudirman 4

Sumber: Analisis Konsultan

Tabel III-98 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jendral Sudirman 4

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.047	762	4.392	1.098
2	LV	Sedan, Jeep, station wagon	558	894	719	993
		Kijang, Elf, Colt, Carry	210		177	
		Pick up, box kecil	120		96	
		Mikrolet, Bus kecil, Angkot	6		2	
3	HV	Bus Besar	0	44	1	47
		Truk kecil 2 as	17		24	
		Truk sedang 2 as	14		12	
		Truk sedang 3 as	6		1	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		1	
4	NMT	Sepeda, Gerobak, Becak, Delman	28		5	
Total			**3.978**	**1.700**	**5.425**	**2.139**

III.1.6.10 LHR Jalan Jendral Sudirman 5

Segmen ruas jalan Jendral Sudirman 5 dimulai dari Simpang 3 Jl. Nurtanio sampai dengan Bundaran Cibereum dengan panjang segmen 239 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 74,877 kend/hari atau 38,053 smp/hari. LHR pada jam sibuk pagi 2,045 smp/jam dan pada jam sibuk sore 2,890 smp/jam.

Gambar III-99 Grafik Volume Kendaraan pada Ruas Jalan Jendral Sudirman 5

Sumber: Analisis Konsultan

Tabel III-100 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jendral Sudirman 5

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.395	849	4.132	1.033
2	LV	Sedan, Jeep, station wagon	674	1.099	1.199	1.770
		Kijang, Elf, Colt, Carry	296		288	
		Pick up, box kecil	109		271	
		Mikrolet, Bus kecil, Angkot	19		11	
3	HV	Bus Besar	12	97	5	88
		Truk kecil 2 as	24		30	
		Truk sedang 2 as	11		20	
		Truk sedang 3 as	31		16	
		Truk Gandeng	1		1	
		Truk Peti kemas/ kontainer	2		1	
4	NMT	Sepeda, Gerobak, Becak, Delman	14		6	
Total			**4.575**	**2.045**	**5.974**	**2.890**

III.1.6.11 LHR Jalan Jendral Sudirman 6

Segmen ruas jalan Jendral Sudirman 6 dimulai dari Bundaran Cibereum sampai dengan Simpang 3 Rajawali Barat dengan panjang segmen 1,220 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 118,020 kend/hari atau 46,338 smp/hari. LHR pada jam sibuk pagi 2,682 smp/jam dan pada jam sibuk sore 3,188 smp/jam.

Gambar III-101 Grafik Volume Kendaraan pada Ruas Jalan Jendral Sudirman 6

Sumber: Analisis Konsultan

Tabel III-102 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jendral Sudirman 6

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	4.800	1.200	7.931	1.983
2	LV	Sedan, Jeep, station wagon	892	1.361	664	1.129
		Kijang, Elf, Colt, Carry	315		233	
		Pick up, box kecil	123		199	
		Mikrolet, Bus kecil, Angkot	32		32	
3	HV	Bus Besar	25	121	18	76
		Truk kecil 2 as	61		38	
		Truk sedang 2 as	11		6	
		Truk sedang 3 as	2		2	
		Truk Gandeng	1		-	
		Truk Peti kemas/ kontainer	0		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	9		6	
Total			**6.262**	**2.682**	**9.124**	**3.188**

III.1.6.12 LHR Jalan Rajawali Barat

Segmen ruas jalan Rajawali Barat dimulai dari Simpang 3 Rajawali Barat sampai dengan Simpang 4 Nurtanio dengan panjang segmen 1,220 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 116,363 kend/hari atau 50,575 smp/hari. LHR pada jam sibuk pagi 2,767 smp/jam dan pada jam sibuk sore 3,404 smp/jam.

Gambar III-103 Grafik Volume Kendaraan pada Ruas Jalan Rajawali Barat

Sumber: Analisis Konsultan

Tabel III-104 Volume Sibuk Pagi dan Sore pada Ruas Jalan Rajawali Barat

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	5.728	1.432	6.545	1.636
2	LV	Sedan, Jeep, station wagon	793	1.190	842	1.489
		Kijang, Elf, Colt, Carry	209		331	
		Pick up, box kecil	171		287	
		Mikrolet, Bus kecil, Angkot	17		29	
3	HV	Bus Besar	7	146	14	278
		Truk kecil 2 as	70		130	
		Truk sedang 2 as	36		73	
		Truk sedang 3 as	8		10	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	0		5	
4	NMT	Sepeda, Gerobak, Becak, Delman	6		0	
Total			**7.039**	**2.767**	**8.266**	**3.404**

III.1.6.13 LHR Jalan Rajawali Timur 1

Segmen ruas jalan Rajawali Timur 1 dimulai dari Simpang 4 Nurtanio sampai dengan Simpang 3 Andir dengan panjang segmen 877 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 76,890 kend/hari atau 33,489 smp/hari. LHR pada jam sibuk pagi 1,901 smp/jam dan pada jam sibuk sore 2,139 smp/jam.

Gambar III-105 Grafik Volume Kendaraan pada Ruas Jalan Rajawali Timur 1

Sumber: Analisis Konsultan

Tabel III-106 Volume Sibuk Pagi dan Sore pada Ruas Jalan Rajawali Timur 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.746	937	3.630	907
2	LV	Sedan, Jeep, station wagon	502	914	748	1.173
		Kijang, Elf, Colt, Carry	216		257	
		Pick up, box kecil	160		138	
		Mikrolet, Bus kecil, Angkot	36		31	
3	HV	Bus Besar	14	50	17	59
		Truk kecil 2 as	21		18	
		Truk sedang 2 as	4		4	
		Truk sedang 3 as	1		6	
		Truk Gandeng	-		2	
		Truk Peti kemas/ kontainer	0		2	
4	NMT	Sepeda, Gerobak, Becak, Delman	17		14	
Total			**4.702**	**1.901**	**4.852**	**2.139**

III.1.6.14 LHR Jalan Rajawali Timur 2

Segmen ruas jalan Rajawali Timur 2 dimulai dari Simpang 3 Andir sampai dengan Simpang 3 Arjuna dengan panjang segmen 653 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 53,847 kend/hari atau 24,154 smp/hari. LHR pada jam sibuk pagi 1,573 smp/jam dan pada jam sibuk sore 1,289 smp/jam.

Gambar III-107 Grafik Volume Kendaraan pada Ruas Jalan Rajawali Timur 2

Sumber: Analisis Konsultan

Tabel III-108 Volume Sibuk Pagi dan Sore pada Ruas Jalan Rajawali Timur 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.285	821	1.984	496
2	LV	Sedan, Jeep, station wagon	529	732	571	757
		Kijang, Elf, Colt, Carry	157		113	
		Pick up, box kecil	41		64	
		Mikrolet, Bus kecil, Angkot	5		9	
3	HV	Bus Besar	1	20	4	36
		Truk kecil 2 as	13		17	
		Truk sedang 2 as	2		7	
		Truk sedang 3 as	1		2	
		Truk Gandeng	-		0	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	33		22	
Total			**4.033**	**1.573**	**2.771**	**1.289**

III.1.6.15 LHR Jalan Kebon Jati 1

Segmen ruas jalan Kebon Jati 1 dimulai dari Simpang 3 Arjuna sampai dengan Simpang 4 Kebon Jati dengan panjang segmen 779 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 53,732 kend/hari atau 24,039 smp/hari. LHR pada jam sibuk pagi 1,563 smp/jam dan pada jam sibuk sore 1,286 smp/jam.

Gambar III-109 Grafik Volume Kendaraan pada Ruas Jalan Kebon Jati 1

Sumber: Analisis Konsultan

Tabel III-110 Volume Sibuk Pagi dan Sore pada Ruas Jalan Kebon Jati 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.285	821	1.984	496
2	LV	Sedan, Jeep, station wagon	519	722	568	754
		Kijang, Elf, Colt, Carry	157		113	
		Pick up, box kecil	41		64	
		Mikrolet, Bus kecil, Angkot	5		9	
3	HV	Bus Besar	1	20	4	36
		Truk kecil 2 as	13		17	
		Truk sedang 2 as	2		7	
		Truk sedang 3 as	1		2	
		Truk Gandeng	-		0	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	33		22	
Total			**4.023**	**1.563**	**2.768**	**1.286**

III.1.6.16 LHR Jalan Kebon Jati 2

Segmen ruas jalan Kebon Jati 2 dimulai dari Simpang 4 Kebon Jati sampai dengan Simpang 3 Dulatip dengan panjang segmen 451 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 80,811 kend/hari atau 24,039 smp/hari. LHR pada jam sibuk pagi 2,116 smp/jam dan pada jam sibuk sore 2,089 smp/jam.

Gambar III-111 Grafik Volume Kendaraan pada Ruas Jalan Kebon Jati 2

Sumber: Analisis Konsultan

Tabel III-112 Volume Sibuk Pagi dan Sore pada Ruas Jalan Kebon Jati 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	4.276	1.069	3.920	980
2	LV	Sedan, Jeep, station wagon	707	1.012	878	1.081
		Kijang, Elf, Colt, Carry	234		147	
		Pick up, box kecil	55		47	
		Mikrolet, Bus kecil, Angkot	16		10	
3	HV	Bus Besar	6	35	8	28
		Truk kecil 2 as	13		6	
		Truk sedang 2 as	10		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		8	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	10		2	
Total			**5.317**	**2.116**	**5.024**	**2.089**

III.1.6.17 LHR Jalan Suniaraja 1

Segmen ruas jalan Suniaraja 1 dimulai dari Simpang 3 Dulatip sampai dengan Simpang 4 Otista dengan panjang segmen 250 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 55,375 kend/hari atau 26,265 smp/hari. LHR pada jam sibuk pagi 1,757 smp/jam dan pada jam sibuk sore 1,521 smp/jam.

Gambar III-113 Grafik Volume Kendaraan pada Ruas Jalan Suniaraja 1

Sumber: Analisis Konsultan

Tabel III-114 Volume Sibuk Pagi dan Sore pada Ruas Jalan Suniaraja 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.112	778	2.384	596
2	LV	Sedan, Jeep, station wagon	643	949	748	906
		Kijang, Elf, Colt, Carry	234		112	
		Pick up, box kecil	62		38	
		Mikrolet, Bus kecil, Angkot	9		9	
3	HV	Bus Besar	5	31	6	19
		Truk kecil 2 as	16		8	
		Truk sedang 2 as	4		2	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	22		6	
Total			**4.086**	**1.757**	**3.306**	**1.521**

III.1.6.18 LHR Jalan Suniaraja 2

Segmen ruas jalan Suniaraja 2 dimulai dari Simpang 3 Banceuy sampai dengan Simpang 4 Otista dengan panjang segmen 230 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 65,407 kend/hari atau 30,697 smp/hari. LHR pada jam sibuk pagi 1,824 smp/jam dan pada jam sibuk sore 1,952 smp/jam.

Gambar III-115 Grafik Volume Kendaraan pada Ruas Jalan Suniaraja 2

Sumber: Analisis Konsultan

Tabel III-116 Volume Sibuk Pagi dan Sore pada Ruas Jalan Suniaraja 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.333	833	3.155	789
2	LV	Sedan, Jeep, station wagon	764	966	1.036	1.152
		Kijang, Elf, Colt, Carry	130		66	
		Pick up, box kecil	65		43	
		Mikrolet, Bus kecil, Angkot	7		7	
3	HV	Bus Besar	5	25	3	11
		Truk kecil 2 as	15		6	
		Truk sedang 2 as	2		0	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	38		30	
Total			**4.320**	**1.824**	**4.317**	**1.952**

III.1.6.19 LHR Jalan Otto Iskandar Dinata (Otista) 1

Segmen ruas jalan Otto Iskandar Dinata (Otista) 1 dimulai dari Simpang 4 Otista sampai dengan Simpang 4 Asia Afrika dengan panjang segmen 520 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 72,390 kend/hari atau 32,664 smp/hari. LHR pada jam sibuk pagi 1,929 smp/jam dan pada jam sibuk sore 1,918 smp/jam.

Gambar III-117 Grafik Volume Kendaraan pada Ruas Jalan Otista 1

Sumber: Analisis Konsultan

Tabel III-118 Volume Sibuk Pagi dan Sore pada Ruas Jalan Otista 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.762	941	3.390	847
2	LV	Sedan, Jeep, station wagon	776	955	950	1.054
		Kijang, Elf, Colt, Carry	89		65	
		Pick up, box kecil	84		30	
		Mikrolet, Bus kecil, Angkot	7		9	
3	HV	Bus Besar	5	33	4	16
		Truk kecil 2 as	19		8	
		Truk sedang 2 as	3		2	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	32		15	
Total			**4.745**	**1.929**	**4.458**	**1.918**

III.1.6.20 LHR Jalan Otto Iskandar Dinata (Otista) 2

Segmen ruas jalan Otto Iskandar Dinata (Otista) 2 dimulai dari Simpang 4 Asia Afrika sampai dengan Simpang 4 Pungkur dengan panjang segmen 720 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 79,934 kend/hari atau 35,792 smp/hari. LHR pada jam sibuk pagi 2,149 smp/jam dan pada jam sibuk sore 2,074 smp/jam.

Gambar III-119 Grafik Volume Kendaraan pada Ruas Jalan Otista 2

Sumber: Analisis Konsultan

Tabel III-120 Volume Sibuk Pagi dan Sore pada Ruas Jalan Otista 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	4.423	1.106	3.595	899
2	LV	Sedan, Jeep, station wagon	833	1.008	1.044	1.156
		Kijang, Elf, Colt, Carry	84		71	
		Pick up, box kecil	81		30	
		Mikrolet, Bus kecil, Angkot	11		11	
3	HV	Bus Besar	6	35	5	19
		Truk kecil 2 as	21		8	
		Truk sedang 2 as	2		3	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	25		11	
Total			**5.461**	**2.149**	**4.767**	**2.074**

III.1.6.21 LHR Jalan Otto Iskandar Dinata (Otista) 3

Segmen ruas jalan Otto Iskandar Dinata (Otista) 3 dimulai dari Simpang 4 Pungkur sampai dengan Simpang 4 Inggit Garnasih dengan panjang segmen 480 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 72,680 kend/hari atau 32,813 smp/hari. LHR pada jam sibuk pagi 1,825 smp/jam dan pada jam sibuk sore 1,983 smp/jam.

Gambar III-121 Grafik Volume Kendaraan pada Ruas Jalan Otista 3

Sumber: Analisis Konsultan

Tabel III-122 Volume Sibuk Pagi dan Sore pada Ruas Jalan Otista 3

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.091	773	3.561	890
2	LV	Sedan, Jeep, station wagon	590	1.005	743	1.032
		Kijang, Elf, Colt, Carry	329		174	
		Pick up, box kecil	66		100	
		Mikrolet, Bus kecil, Angkot	20		15	
3	HV	Bus Besar	9	47	7	60
		Truk kecil 2 as	28		43	
		Truk sedang 2 as	1		0	
		Truk sedang 3 as	0		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		0	
4	NMT	Sepeda, Gerobak, Becak, Delman	18		20	
Total			**4.135**	**1.825**	**4.644**	**1.983**

III.1.6.22 LHR Jalan Otto Iskandar Dinata (Otista) 4

Segmen ruas jalan Otto Iskandar Dinata (Otista) 4 dimulai dari Simpang 4 Inggit Garnasih sampai dengan Simpang 3 Astana Anyar dengan panjang segmen 450 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 79,955 kend/hari atau 33,030 smp/hari. LHR pada jam sibuk pagi 2,617 smp/jam dan pada jam sibuk sore 2,352 smp/jam.

Gambar III-123 Grafik Volume Kendaraan pada Ruas Jalan Otista 4

Sumber: Analisis Konsultan

Tabel III-124 Volume Sibuk Pagi dan Sore pada Ruas Jalan Otista 4

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	5.578	1.394	5.048	1.262
2	LV	Sedan, Jeep, station wagon	1.000	1.199	873	1.069
		Kijang, Elf, Colt, Carry	130		106	
		Pick up, box kecil	61		78	
		Mikrolet, Bus kecil, Angkot	8		11	
3	HV	Bus Besar	7	24	6	21
		Truk kecil 2 as	11		8	
		Truk sedang 2 as	1		2	
		Truk sedang 3 as	1		1	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	16		20	
Total			**6.796**	**2.617**	**6.134**	**2.352**

III.1.6.23 LHR Jalan Otto Iskandar Dinata (Otista) 5

Segmen ruas jalan Otto Iskandar Dinata (Otista) 5 dimulai dari Simpang 3 Astana Anyar sampai dengan Simpang 4 Peta dengan panjang segmen 450 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 58,515 kend/hari atau 20,063 smp/hari. LHR pada jam sibuk pagi 1,736 smp/jam dan pada jam sibuk sore 1,622 smp/jam.

Gambar III-125 Grafik Volume Kendaraan pada Ruas Jalan Otista 5

Sumber: Analisis Konsultan

Tabel III-126 Volume Sibuk Pagi dan Sore pada Ruas Jalan Otista 5

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	4.646	1.162	4.488	1.122
2	LV	Sedan, Jeep, station wagon	418	570	394	494
		Kijang, Elf, Colt, Carry	105		59	
		Pick up, box kecil	39		35	
		Mikrolet, Bus kecil, Angkot	8		6	
3	HV	Bus Besar	2	5	2	6
		Truk kecil 2 as	1		2	
		Truk sedang 2 as	1		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	45		19	
Total			**5.220**	**1.736**	**4.987**	**1.622**

III.1.6.24 LHR Jalan BKR

Segmen ruas jalan BKR dimulai dari Simpang 4 Peta sampai dengan Simpang 4 BKR dengan panjang segmen 350 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 150,236 kend/hari atau 62,848 smp/hari. LHR pada jam sibuk pagi 4,439 smp/jam dan pada jam sibuk sore 3,621 smp/jam.

Gambar III-127 Grafik Volume Kendaraan pada Ruas Jalan BKR

Sumber: Analisis Konsultan

Tabel III-128 Volume Sibuk Pagi dan Sore pada Ruas Jalan BKR

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	8.333	2.083	7.631	1.908
2	LV	Sedan, Jeep, station wagon	1.643	2.234	1.199	1.666
		Kijang, Elf, Colt, Carry	436		244	
		Pick up, box kecil	133		200	
		Mikrolet, Bus kecil, Angkot	22		23	
3	HV	Bus Besar	19	121	12	48
		Truk kecil 2 as	49		23	
		Truk sedang 2 as	17		3	
		Truk sedang 3 as	10		1	
		Truk Gandeng	5		0	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	112		44	
Total			**10.668**	**4.439**	**9.336**	**3.621**

III.1.6.25 LHR Jalan Mochammad Toha 1

Segmen ruas jalan Mochammad Toha 1 dimulai dari Simpang 4 BKR sampai dengan Simpang 4 Ibu Inggit Garnasih dengan panjang segmen 500 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 65,011 kend/hari atau 27,174 smp/hari. LHR pada jam sibuk pagi 1,877 smp/jam dan pada jam sibuk sore 1,716 smp/jam.

Gambar III-129 Grafik Volume Kendaraan pada Ruas Jalan Mochammad Toha 1

Sumber: Analisis Konsultan

Tabel III-130 Volume Sibuk Pagi dan Sore pada Ruas Jalan Mochammad Toha 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.759	940	3.256	814
2	LV	Sedan, Jeep, station wagon	589	879	737	874
		Kijang, Elf, Colt, Carry	225		80	
		Pick up, box kecil	52		46	
		Mikrolet, Bus kecil, Angkot	13		12	
3	HV	Bus Besar	13	58	3	27
		Truk kecil 2 as	27		16	
		Truk sedang 2 as	7		3	
		Truk sedang 3 as	2		1	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		0	
4	NMT	Sepeda, Gerobak, Becak, Delman	41		12	
Total			**4.687**	**1.877**	**4.153**	**1.716**

III.1.6.26 LHR Jalan Mochammad Toha 2

Segmen ruas jalan Mochammad Toha 2 dimulai dari Simpang 4 Ibu Inggit Garnasih sampai dengan Simpang 4 Pungkur dengan panjang segmen 620 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 31,791 kend/hari atau 14,264 smp/hari. LHR pada jam sibuk pagi 905 smp/jam dan pada jam sibuk sore 794 smp/jam.

Gambar III-131 Grafik Volume Kendaraan pada Ruas Jalan Mochammad Toha 2

Sumber: Analisis Konsultan

Tabel III-132 Volume Sibuk Pagi dan Sore pada Ruas Jalan Mochammad Toha 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	1.714	429	1.110	278
2	LV	Sedan, Jeep, station wagon	292	462	399	509
		Kijang, Elf, Colt, Carry	127		77	
		Pick up, box kecil	32		24	
		Mikrolet, Bus kecil, Angkot	11		9	
3	HV	Bus Besar	5	14	3	7
		Truk kecil 2 as	5		2	
		Truk sedang 2 as	2		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	14		4	
Total			**2.188**	**905**	**1.625**	**794**

III.1.6.27 LHR Jalan Pungkur

Segmen ruas jalan Pungkur dimulai dari Simpang 4 Pungkur sampai dengan Simpang 3 Dewi Sartika dengan panjang segmen 120 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 54,690 kend/hari atau 21,794 smp/hari. LHR pada jam sibuk pagi 1,449 smp/jam dan pada jam sibuk sore 1,714 smp/jam.

Gambar III-133 Grafik Volume Kendaraan pada Ruas Jalan Pungkur

Sumber: Analisis Konsultan

Tabel III-134 Volume Sibuk Pagi dan Sore pada Ruas Jalan Pungkur

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.439	860	4.019	1.005
2	LV	Sedan, Jeep, station wagon	386	572	570	703
		Kijang, Elf, Colt, Carry	130		103	
		Pick up, box kecil	46		24	
		Mikrolet, Bus kecil, Angkot	10		6	
3	HV	Bus Besar	4	18	3	6
		Truk kecil 2 as	9		1	
		Truk sedang 2 as	2		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	20		9	
Total			**4.026**	**1.449**	**4.727**	**1.714**

III.1.6.28 LHR Jalan Dewi Sartika 1

Segmen ruas jalan Dewi Sartika 1 dimulai dari Simpang 3 Dewi Sartika sampai dengan Simpang 3 Kepatihan dengan panjang segmen 430 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 57,321 kend/hari atau 26,382 smp/hari. LHR pada jam sibuk pagi 1,680 smp/jam dan pada jam sibuk sore 1,448 smp/jam.

Gambar III-135 Grafik Volume Kendaraan pada Ruas Jalan Dewi Sartika 1

Sumber: Analisis Konsultan

Tabel III-136 Volume Sibuk Pagi dan Sore pada Ruas Jalan Dewi Sartika 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.934	734	2.343	586
2	LV	Sedan, Jeep, station wagon	639	902	672	855
		Kijang, Elf, Colt, Carry	160		141	
		Pick up, box kecil	94		32	
		Mikrolet, Bus kecil, Angkot	9		10	
3	HV	Bus Besar	7	45	3	7
		Truk kecil 2 as	30		3	
		Truk sedang 2 as	1		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	32		7	
Total			**3.873**	**1.680**	**3.203**	**1.448**

III.1.6.29 LHR Jalan Dewi Sartika 2

Segmen ruas jalan Dewi Sartika 2 dimulai dari Simpang 3 Kepatihan sampai dengan Simpang 3 Dalem Kaum dengan panjang segmen 110 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 55,458 kend/hari atau 27,380 smp/hari. LHR pada jam sibuk pagi 1,777 smp/jam dan pada jam sibuk sore 1,664 smp/jam.

Gambar III-137 Grafik Volume Kendaraan pada Ruas Jalan Dewi Sartika 2

Sumber: Analisis Konsultan

Tabel III-138 Volume Sibuk Pagi dan Sore pada Ruas Jalan Dewi Sartika 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.930	733	2.541	635
2	LV	Sedan, Jeep, station wagon	793	1.007	831	1.016
		Kijang, Elf, Colt, Carry	135		135	
		Pick up, box kecil	70		42	
		Mikrolet, Bus kecil, Angkot	8		8	
3	HV	Bus Besar	4	38	2	12
		Truk kecil 2 as	28		9	
		Truk sedang 2 as	-		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	33		25	
Total			**3.969**	**1.777**	**3.567**	**1.664**

III.1.6.30 LHR Jalan Dalem Kaum

Segmen ruas jalan Dalem Kaum dimulai dari Simpang 3 Dalem Kaum sampai dengan Simpang 3 Alun – Alun Timur dengan panjang segmen 130 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 59,258 kend/hari atau 29,005 smp/hari. LHR pada jam sibuk pagi 1,777 smp/jam dan pada jam sibuk sore 2,014 smp/jam.

Gambar III-139 Grafik Volume Kendaraan pada Ruas Jalan Dalem Kaum

Sumber: Analisis Konsultan

Tabel III-140 Volume Sibuk Pagi dan Sore pada Ruas Jalan Dalem Kaum

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.930	733	3.141	785
2	LV	Sedan, Jeep, station wagon	793	1.007	1.031	1.216
		Kijang, Elf, Colt, Carry	135		135	
		Pick up, box kecil	70		42	
		Mikrolet, Bus kecil, Angkot	8		8	
3	HV	Bus Besar	4	38	2	12
		Truk kecil 2 as	28		9	
		Truk sedang 2 as	-		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	33		25	
Total			**3.969**	**1.777**	**4.367**	**2.014**

III.1.6.31 LHR Jalan Alun – Alun Timur

Segmen ruas jalan Alun -Alun Timur dimulai dari Simpang 3 Alun – Alun Timur sampai dengan Simpang 3 Asia Afrika dengan panjang segmen 140 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 44,882 kend/hari atau 22,873 smp/hari. LHR pada jam sibuk pagi 1,310 smp/jam dan pada jam sibuk sore 1,360 smp/jam.

Gambar III-141 Grafik Volume Kendaraan pada Ruas Jalan Alun – Alun Timur

Sumber: Analisis Konsultan

Tabel III-142 Volume Sibuk Pagi dan Sore pada Ruas Jalan Alun – Alun Timur

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	1.982	495	1.940	485
2	LV	Sedan, Jeep, station wagon	636	781	734	861
		Kijang, Elf, Colt, Carry	87		81	
		Pick up, box kecil	51		39	
		Mikrolet, Bus kecil, Angkot	7		7	
3	HV	Bus Besar	4	34	2	13
		Truk kecil 2 as	25		9	
		Truk sedang 2 as	-		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	17		24	
Total			**2.791**	**1.310**	**2.813**	**1.360**

III.1.6.32 LHR Jalan Banceuy 1

Segmen ruas jalan Banceuy 1 dimulai dari Simpang 3 Banceuy sampai dengan Simpang 3 ABC dengan panjang segmen 244 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 39,172 kend/hari atau 19,724 smp/hari. LHR pada jam sibuk pagi 1,251 smp/jam dan pada jam sibuk sore 1,137 smp/jam.

Gambar III-143 Grafik Volume Kendaraan pada Ruas Jalan Banceuy 1

Sumber: Analisis Konsultan

Tabel III-144 Volume Sibuk Pagi dan Sore pada Ruas Jalan Banceuy 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.046	512	1.318	329
2	LV	Sedan, Jeep, station wagon	544	707	693	794
		Kijang, Elf, Colt, Carry	102		71	
		Pick up, box kecil	42		20	
		Mikrolet, Bus kecil, Angkot	19		11	
3	HV	Bus Besar	15	32	3	14
		Truk kecil 2 as	11		9	
		Truk sedang 2 as	-		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	15		7	
Total			**2.780**	**1.251**	**2.123**	**1.137**

III.1.6.33 LHR Jalan Banceuy 2

Segmen ruas jalan Banceuy 2 dimulai dari Simpang 3 Banceuy sampai dengan Simpang 3 ABC dengan panjang segmen 396 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 28,807 kend/hari atau 14,178 smp/hari. LHR pada jam sibuk pagi 865 smp/jam dan pada jam sibuk sore 895 smp/jam.

Gambar III-145 Grafik Volume Kendaraan pada Ruas Jalan Banceuy 2

Sumber: Analisis Konsultan

Tabel III-146 Volume Sibuk Pagi dan Sore pada Ruas Jalan Banceuy 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	1.500	375	1.119	280
2	LV	Sedan, Jeep, station wagon	335	470	542	608
		Kijang, Elf, Colt, Carry	91		43	
		Pick up, box kecil	32		18	
		Mikrolet, Bus kecil, Angkot	12		6	
3	HV	Bus Besar	9	20	-	7
		Truk kecil 2 as	8		6	
		Truk sedang 2 as	-		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	12		5	
Total			**1.987**	**865**	**1.733**	**895**

III.1.6.34 LHR Jalan ABC

Segmen ruas jalan ABC dimulai dari Simpang 3 ABC sampai dengan Simpang 3 Cikapundung Barat dengan panjang segmen 210 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 34,232 kend/hari atau 15,053 smp/hari. LHR pada jam sibuk pagi 921 smp/jam dan pada jam sibuk sore 1,093 smp/jam.

Gambar III-147 Grafik Volume Kendaraan pada Ruas Jalan ABC

Sumber: Analisis Konsultan

Tabel III-148 Volume Sibuk Pagi dan Sore pada Ruas Jalan ABC

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	1.795	449	1.973	493
2	LV	Sedan, Jeep, station wagon	412	465	557	597
		Kijang, Elf, Colt, Carry	22		26	
		Pick up, box kecil	26		10	
		Mikrolet, Bus kecil, Angkot	4		4	
3	HV	Bus Besar	3	7	2	3
		Truk kecil 2 as	3		1	
		Truk sedang 2 as	0		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	13		6	
Total			**2.266**	**921**	**2.572**	**1.093**

III.1.6.35 LHR Jalan Naripan 1

Segmen ruas jalan Naripan 1 dimulai dari Simpang 3 Cikapundung Barat sampai dengan Simpang 4 Tamblong dengan panjang segmen 200 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 45,672 kend/hari atau 22,236 smp/hari. LHR pada jam sibuk pagi 1,497 smp/jam dan pada jam sibuk sore 1,263 smp/jam.

Gambar III-149 Grafik Volume Kendaraan pada Ruas Jalan Naripan 1

Sumber: Analisis Konsultan

Tabel III-150 Volume Sibuk Pagi dan Sore pada Ruas Jalan Naripan 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.460	615	1.965	491
2	LV	Sedan, Jeep, station wagon	795	867	712	768
		Kijang, Elf, Colt, Carry	31		29	
		Pick up, box kecil	37		27	
		Mikrolet, Bus kecil, Angkot	4		0	
3	HV	Bus Besar	2	15	0	4
		Truk kecil 2 as	10		2	
		Truk sedang 2 as	0		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	14		8	
Total			**3.339**	**1.497**	**2.736**	**1.263**

III.1.6.36 LHR Jalan Naripan 2

Segmen ruas jalan Naripan 2 dimulai dari Simpang 4 Tamblong Barat sampai dengan Simpang 3 Naripan dengan panjang segmen 590 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 19,649 kend/hari atau 8,251 smp/hari. LHR pada jam sibuk pagi 579 smp/jam dan pada jam sibuk sore 540 smp/jam.

Gambar III-151 Grafik Volume Kendaraan pada Ruas Jalan Naripan 2

Sumber: Analisis Konsultan

Tabel III-152 Volume Sibuk Pagi dan Sore pada Ruas Jalan Naripan 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	1.228	307	1.022	256
2	LV	Sedan, Jeep, station wagon	235	269	244	283
		Kijang, Elf, Colt, Carry	24		24	
		Pick up, box kecil	9		14	
		Mikrolet, Bus kecil, Angkot	0		0	
3	HV	Bus Besar	2	3	0	2
		Truk kecil 2 as	0		0	
		Truk sedang 2 as	-		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	5		3	
Total			**1.500**	**579**	**1.307**	**540**

III.1.6.37 LHR Jalan Sunda

Segmen ruas jalan Sunda dimulai dari Simpang 3 Naripan sampai dengan Simpang 3 Veteran dengan panjang segmen 73 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 74,236 kend/hari atau 37,345 smp/hari. LHR pada jam sibuk pagi 2,190 smp/jam dan pada jam sibuk sore 2,182 smp/jam.

Gambar III-153 Grafik Volume Kendaraan pada Ruas Jalan Sunda

Sumber: Analisis Konsultan

Tabel III-154 Volume Sibuk Pagi dan Sore pada Ruas Jalan Sunda

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.648	912	3.039	760
2	LV	Sedan, Jeep, station wagon	988	1.245	1.194	1.408
		Kijang, Elf, Colt, Carry	156		153	
		Pick up, box kecil	95		60	
		Mikrolet, Bus kecil, Angkot	7		1	
3	HV	Bus Besar	6	33	9	14
		Truk kecil 2 as	20		3	
		Truk sedang 2 as	2		-	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	31		87	
Total			**4.921**	**2.190**	**4.459**	**2.182**

III.1.6.38 LHR Jalan Vetaran

Segmen ruas jalan Sunda dimulai dari Simpang 3 Veteran sampai dengan Simpang 3 Ahmad Yani dengan panjang segmen 170 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 61,552 kend/hari atau 28,786 smp/hari. LHR pada jam sibuk pagi 1,780 smp/jam dan pada jam sibuk sore 1,896 smp/jam.

Gambar III-155 Grafik Volume Kendaraan pada Ruas Jalan Veteran

Sumber: Analisis Konsultan

Tabel III-156 Volume Sibuk Pagi dan Sore pada Ruas Jalan Veteran

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	2.418	605	3.469	867
2	LV	Sedan, Jeep, station wagon	1.049	1.147	932	1.013
		Kijang, Elf, Colt, Carry	54		46	
		Pick up, box kecil	42		33	
		Mikrolet, Bus kecil, Angkot	2		1	
3	HV	Bus Besar	4	28	3	16
		Truk kecil 2 as	18		9	
		Truk sedang 2 as	1		0	
		Truk sedang 3 as	-		0	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	10		5	
Total			**3.589**	**1.780**	**4.495**	**1.896**

III.1.6.39 LHR Jalan Ahmad Yani 1

Segmen ruas jalan Ahmad Yani 1 dimulai dari Simpang 4 Supratman sampai dengan Simpang 3 Cicadas dengan panjang segmen 1,120 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 128,148 kend/hari atau 60,472 smp/hari. LHR pada jam sibuk pagi 3,665 smp/jam dan pada jam sibuk sore 3,483 smp/jam.

Gambar III-157 Grafik Volume Kendaraan pada Ruas Jalan Ahmad Yani 1

Sumber: Analisis Konsultan

Tabel III-158 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ahmad Yani 1

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	5.364	1.341	6.591	1.648
2	LV	Sedan, Jeep, station wagon	1.487	2.236	1.396	1.761
		Kijang, Elf, Colt, Carry	602		311	
		Pick up, box kecil	117		41	
		Mikrolet, Bus kecil, Angkot	29		12	
3	HV	Bus Besar	5	89	2	74
		Truk kecil 2 as	63		49	
		Truk sedang 2 as	4		3	
		Truk sedang 3 as	2		4	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		3	
4	NMT	Sepeda, Gerobak, Becak, Delman	18		8	
Total			**7.673**	**3.665**	**8.414**	**3.483**

III.1.6.40 LHR Jalan Ahmad Yani 2

Segmen ruas jalan Ahmad Yani 2 dimulai dari Simpang 4 Supratman sampai dengan Simpang 4 Laswi dengan panjang segmen 542 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 113,217 kend/hari atau 48,871 smp/hari. LHR pada jam sibuk pagi 2,348 smp/jam dan pada jam sibuk sore 3,208 smp/jam.

Gambar III-159 Grafik Volume Kendaraan pada Ruas Jalan Ahmad Yani 2

Sumber: Analisis Konsultan

Tabel III-160 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ahmad Yani 2

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	4.130	1.033	6.534	1.634
2	LV	Sedan, Jeep, station wagon	1.061	1.234	1.433	1.514
		Kijang, Elf, Colt, Carry	87		73	
		Pick up, box kecil	80		4	
		Mikrolet, Bus kecil, Angkot	6		4	
3	HV	Bus Besar	11	81	7	60
		Truk kecil 2 as	53		40	
		Truk sedang 2 as	1		1	
		Truk sedang 3 as	2		2	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	30		14	
Total			**5.432**	**2.348**	**8.098**	**3.208**

III.1.6.41 LHR Jalan Ahmad Yani 3

Segmen ruas jalan Ahmad Yani 3 dimulai dari Simpang 4 Laswi sampai dengan Simpang 3 Gudang Selatan dengan panjang segmen 300 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 85,632 kend/hari atau 34,666 smp/hari. LHR pada jam sibuk pagi 2,138 smp/jam dan pada jam sibuk sore 2,011 smp/jam.

Gambar III-161 Grafik Volume Kendaraan pada Ruas Jalan Ahmad Yani 3

Sumber: Analisis Konsultan

Tabel III-162 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ahmad Yani 3

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	4.452	1.113	4.541	1.135
2	LV	Sedan, Jeep, station wagon	500	981	442	857
		Kijang, Elf, Colt, Carry	413		371	
		Pick up, box kecil	60		37	
		Mikrolet, Bus kecil, Angkot	9		6	
3	HV	Bus Besar	9	44	4	19
		Truk kecil 2 as	19		9	
		Truk sedang 2 as	8		2	
		Truk sedang 3 as	0		1	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	1		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	19		25	
Total			**5.470**	**2.138**	**5.414**	**2.011**

III.1.6.42 LHR Jalan Ahmad Yani 4

Segmen ruas jalan Ahmad Yani 4 dimulai dari Simpang 3 Gudang Selatan sampai dengan Simpang 3 Baranang Siang dengan panjang segmen 700 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 61,961 kend/hari atau 26,689 smp/hari. LHR pada jam sibuk pagi 1,658 smp/jam dan pada jam sibuk sore 1,512 smp/jam.

Gambar III-163 Grafik Volume Kendaraan pada Ruas Jalan Ahmad Yani 4

Sumber: Analisis Konsultan

Tabel III-164 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ahmad Yani 4

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.317	829	2.655	664
2	LV	Sedan, Jeep, station wagon	683	808	687	830
		Kijang, Elf, Colt, Carry	71		70	
		Pick up, box kecil	49		72	
		Mikrolet, Bus kecil, Angkot	5		1	
3	HV	Bus Besar	9	21	4	18
		Truk kecil 2 as	6		7	
		Truk sedang 2 as	3		4	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	29		24	
Total			**4.142**	**1.658**	**3.500**	**1.512**

III.1.6.43 LHR Jalan Ahmad Yani 5

Segmen ruas jalan Ahmad Yani 5 dimulai dari Simpang 3 Baranang Siang sampai dengan Simpang 3 Veteran dengan panjang segmen 300 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 66,129 kend/hari atau 24,609 smp/hari. LHR pada jam sibuk pagi 1,438 smp/jam dan pada jam sibuk sore 1,715 smp/jam.

Gambar III-165 Grafik Volume Kendaraan pada Ruas Jalan Ahmad Yani 5

Sumber: Analisis Konsultan

Tabel III-166 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ahmad Yani 5

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.673	918	3.483	871
2	LV	Sedan, Jeep, station wagon	428	505	728	833
		Kijang, Elf, Colt, Carry	49		76	
		Pick up, box kecil	25		26	
		Mikrolet, Bus kecil, Angkot	3		3	
3	HV	Bus Besar	5	15	2	12
		Truk kecil 2 as	7		5	
		Truk sedang 2 as	-		3	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	56		19	
Total			**4.191**	**1.438**	**4.325**	**1.715**

III.1.6.44 LHR Jalan Ahmad Yani 6

Segmen ruas jalan Ahmad Yani 6 dimulai dari Simpang 3 Veteran sampai dengan Simpang 5 Asia Afrika dengan panjang segmen 230 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 55,216 kend/hari atau 30,615 smp/hari. LHR pada jam sibuk pagi 2,044 smp/jam dan pada jam sibuk sore 1,620 smp/jam.

Gambar III-167 Grafik Volume Kendaraan pada Ruas Jalan Ahmad Yani 6

Sumber: Analisis Konsultan

Tabel III-168 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ahmad Yani 6

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	3.090	773	1.565	391
2	LV	Sedan, Jeep, station wagon	1.126	1.263	1.115	1.213
		Kijang, Elf, Colt, Carry	43		44	
		Pick up, box kecil	88		52	
		Mikrolet, Bus kecil, Angkot	5		1	
3	HV	Bus Besar	5	9	1	16
		Truk kecil 2 as	2		11	
		Truk sedang 2 as	1		1	
		Truk sedang 3 as	-		-	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	12		3	
Total			**4.360**	**2.044**	**2.791**	**1.620**

III.1.6.45 LHR Jalan Ibrahim Adjie

Segmen ruas jalan Ibrahim Adjie dimulai dari Simpang 3 Cicadas sampai dengan Simpang 4 Jakarta dengan panjang segmen 560 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 130,739 kend/hari atau 58,081 smp/hari. LHR pada jam sibuk pagi 4,174 smp/jam dan pada jam sibuk sore 3,880 smp/jam.

Gambar III-169 Grafik Volume Kendaraan pada Ruas Jalan Ibrahim Adjie

Sumber: Analisis Konsultan

Tabel III-170 Volume Sibuk Pagi dan Sore pada Ruas Jalan Ibrahim Adjie

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	6.854	1.713	7.054	1.763
2	LV	Sedan, Jeep, station wagon	2.198	2.396	1.973	2.096
		Kijang, Elf, Colt, Carry	133		69	
		Pick up, box kecil	56		51	
		Mikrolet, Bus kecil, Angkot	9		3	
3	HV	Bus Besar	6	64	3	20
		Truk kecil 2 as	42		11	
		Truk sedang 2 as	4		2	
		Truk sedang 3 as	2		0	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	-		-	
4	NMT	Sepeda, Gerobak, Becak, Delman	13		6	
Total			**9.303**	**4.174**	**9.167**	**3.880**

III.1.6.46 LHR Jalan Jakarta

Segmen ruas jalan Jakarta dimulai dari Simpang 4 Jakarta sampai dengan Simpang 4 Supratman dengan panjang segmen 1,100 m, arus lalu lintas didominasi oleh kendaran sepeda motor dengan volume kendaraan 146,289 kend/hari atau 73,383 smp/hari. LHR pada jam sibuk pagi 5,232 smp/jam dan pada jam sibuk sore 3,645 smp/jam.

Gambar III-171 Grafik Volume Kendaraan pada Ruas Jalan Jakarta

Sumber: Analisis Konsultan

Tabel III-172 Volume Sibuk Pagi dan Sore pada Ruas Jalan Jakarta

Sumber: Analisis Konsultan

NO	Golongan	Jenis Kendaraan	Sibuk Pagi (07:00 - 09:00)		Sibuk Sore (17:00 - 19:00)	
			Kend/jam	Smp/jam	Kend/jam	Smp/jam
1	MC	Sepeda Motor (Roda 2 dan 3)	7.536	1.884	5.438	1.359
2	LV	Sedan, Jeep, station wagon	2.731	3.283	1.923	2.248
		Kijang, Elf, Colt, Carry	449		180	
		Pick up, box kecil	88		136	
		Mikrolet, Bus kecil, Angkot	15		9	
3	HV	Bus Besar	7	64	3	38
		Truk kecil 2 as	34		20	
		Truk sedang 2 as	9		8	
		Truk sedang 3 as	1		0	
		Truk Gandeng	-		-	
		Truk Peti kemas/ kontainer	3		1	
4	NMT	Sepeda, Gerobak, Becak, Delman	13		6	
Total			**10.873**	**5.232**	**7.717**	**3.645**

III.1.6.47 LHR Sp.1 A. Yani – Santo Yusuf

Proporsi kendaraan di simpang A.Yani-Santo Yusuf didominasi oleh sepeda motor dengan proporsi 76,59% (hari Senin) dan 72,45% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 19,96% (hari Senin) dan 23,15% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Gambar III-173 Proporsi Kendaraan dan Pola Arus di Simpang A. Yani – Santo yusuf

Sumber: Analisis Konsultan

III.1.6.48 LHR Sp.2 Kiara Condong

Proporsi kendaraan di Simpang Kiaracondong didominasi oleh sepeda motor dengan proporsi 71,59% (hari Senin) dan 66,07% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 25,56% (hari Senin) dan 29,72% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	3748	0.23	1953	0.15
2	3048	0.19	3411	0.27
3	1942	0.12	1123	0.09

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	772	0.05	363	0.03
5*	7993	0.33	3323	0.21
6	1171	0.07	908	0.07
9	331	0.02	161	0.01

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
7	1962	0.12	1813	0.14
8	3088	0,19	3098	0.24

Gambar III-174 Proporsi Kendaraan dan Pola Arus di Simpang Kiara Condong

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 2 hingga 2,5 menit dengan panjang antrian rata-rata tertinggi (sisi C) adalah 47 meter (pada hari Senin) dan 35 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar di bawah ini.

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	61	46	75	41
C	33	28	30	13
B	58	91	54	47
Total	152	165	159	
Sunday				
A	61	54	77	34
C	33	29	24	12
B	53	46	59	35
Total	147	129	160	

Gambar III-175 Fase Sinyal di Simpang Kiara Condong

Sumber: Analisis Konsultan

III.1.6.49 LHR Sp.3 Jakarta

Proporsi kendaraan di simpang Jakarta didominasi oleh sepeda motor dengan proporsi 71,90% (hari Senin) dan 67,85% (hari Minggu), diikuti oleh kendaraan sedan, jeep dan station wagon dengan proporsi 19,83% (hari Senin) dan 27,10% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	71.90%	19.83%	5.64%	1.00%	0.15%	0.29%	0.68%	0.05%	0.02%	0.00%	0.01%	0.42%
Sunday	67.85%	27.10%	2.01%	1.29%	0.24%	0.15%	0.08%	0.07%	0.01%	0.00%	0.00%	1.19%

]

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	444	0.03	120	0.02
2	3263	0.20	1351	0.20

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
6	3336	0.20	1185	0.18
7	232	0.01	1185	0.18

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	2554	0.15	381	0.06
4*	8803	0.35	2245	0.25
5	3618	0.22	1113	0.17

*% from total movement

% from total movement Without movement no.4

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
8	3236	0.19	1410	0.21

Gambar III-176 Proporsi Kendaraan dan Pola Arus di Simpang Jakarta

Sumber: Analisis Konsultan

III.1.6.50 LHR Sp.4 Laswi

Proporsi kendaraan di simpang Laswi didominasi oleh sepeda motor dengan proporsi 74,54% (hari Senin) dan 64,96% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 13,95% (hari Senin) dan 29,25% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	74.54%	13.95%	8.76%	1.19%	0.16%	0.20%	0.58%	0.16%	0.03%	0.00%	0.00%	0.43%
Sunday	64.96%	29.25%	3.18%	0.94%	0.14%	0.24%	0.24%	0.15%	0.03%	0.00%	0.02%	0.85%

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	407	0.03	110	0.01
2	1077	0.09	3019	0.33
3	964	0.08	394	0.04

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
10	332	0.03	463	0.05
11	1491	0.12	1100	0.12
12	186	0.01	181	0.02

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
7	1094	0.09	878	0.09
8	1934	0.16	1244	0.13
9	1519	0.12	658	0.07

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	356	0.03	267	0.03
5	2791	0.22	775	0.08
6	303	0.02	158	0.02

% from total movement

Gambar III-177 Proporsi Kendaraan dan Pola Arus di Simpang Laswi

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 2,5 sampai 3 menit dengan panjang antrian rata-rata tertinggi (sisi B) adalah 75 meter (pada hari Senin) dan 16 meter sisi D (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	31	30	32	56
C	31	30	32	39
B	51	51	50	75
D	24	25	26	44
Total	137	136	140	
Sunday				
A	30	58	57	15
C	23	55	64	13
B	44	50	66	15
D	54	60	54	16
Total	151	223	241	

Gambar III-178 Fase Sinyal di Simpang Laswi

Sumber: Analisis Konsultan

III.1.6.51 LHR Sp.5 Asia Afrika

Proporsi kendaraan di Simpang 5 Simpang Asia Afrika didominasi oleh sepeda motor dengan proporsi 65,57% (hari Senin) dan 60,85% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 31,61% (hari Senin) dan 35,43% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up, suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	65.57%	31.61%	0.76%	1.46%	0.08%	0.02%	0.26%	0.02%	0.00%	0.00%	0.00%	0.22%
Sunday	60.85%	35.43%	1.21%	0.51%	0.15%	0.05%	0.17%	0.02%	0.00%	0.00%	0.00%	1.62%

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	402	0.03	230	0.03
2	1832	0.14	1551	0.23
3	1734	0.13	1316	0.20

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	1041	0.08	550	0.08
5	2965	0.23	665	0.10

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
6	4691	0.36	2247	0.34
7	259	0.02	94	0.01

% from total movement

Gambar III-179 Proporsi Kendaraan dan Pola Arus di Simpang Asia Afrika

Sumber: Analisis Konsultan

III.1.6.52 LHR Sp.6 Lengkong Besar

Proporsi kendaraan di Simpang Lengkong Besar didominasi oleh sepeda motor dengan proporsi 69,61% (pada hari Senin) dan 69,70% (pada hari Minggu), diikuti oleh sedan, jeep & station wagon dengan proporsi 22,53% (pada hari Senin) dan 22,88% (pada hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Sunday	69.61%	22.53%	4.77%	0.47%	0.63%	0.15%	0.07%	0.08%	0.00%	0.00%	0.00%	1.70%
Monday	69.70%	22.88%	5.34%	0.78%	0.53%	0.10%	0.23%	0.13%	0.02%	0.01%	0.00%	0.29%

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	492	0.03	894	0.13
2	2520	0.15	2339	0.34

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
3	13245	0.79	3376	0.48
4	471	0.03	353	0.05

Gambar III-180 Proporsi Kendaraan dan Pola Arus di Simpang Lengkong Besar

Sumber: Analisis Konsultan

III.1.6.53 LHR Sp.7 Karanganyar

Proporsi kendaraan di Simpang Gardujati didominasi oleh sepeda motor dengan proporsi 74,76% (hari Senin) dan 66,17% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 21,43% (hari Senin) dan 24,58% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	1261	0.08	458	0.06
2	3599	0.24	3066	0.42

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	7349	0.50	2192	0.30
4	2600	0.17	1557	0.21

% from total movement

Gambar III-181 Proporsi Kendaraan dan Pola Arus di Simpang Karanganyar

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 1,5 sampai 2 menit dengan panjang antrian rata-rata tertinggi (sisi A) adalah 47 meter (pada hari Senin) dan 38 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	50	50	60	47
B	40	40	60	38
Total	90	90	120	
Sunday				
A	50	50	54	38
B	38	39	42	29
Total	88	89	96	

Gambar III-182 Fase Sinyal di Simpang Karanganyar

Sumber: Analisis Konsultan

III.1.6.54 LHR Sp.8 Gardujati

Proporsi kendaraan di Simpang Gardujati didominasi oleh sepeda motor dengan proporsi 73,63% (hari Senin) dan 64,68% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 20,79% (hari Senin) dan 31,51% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	628	0.06	290	0.05
2	1417	0.13	983	0.16

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
3	867	0.08	601	0.10
4	2228	0.20	1808	0.29
5	177	0.02	284	0.05

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
6	5238	0.48	2019	0.33
7	385	0.04	166	0.03

Gambar III-183 Proporsi Kendaraan dan Pola Arus di Simpang Gardujati

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 4 - 4,5 menit dengan panjang antrian rata-rata tertinggi (sisi C) adalah 135 meter (pada hari Senin) dan 92 meter pada sisi B (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar di bawah ini.

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	102	103	105	107
C	70	67	67	135
B	87	78	81	90
Total	259	248	253	
Sunday				
A	58	60	34	83
C	120	56	48	69
B	28	120	59	92
Total	206	236	141	

Gambar III-184 Fase Sinyal di Simpang Gardujati

Sumber: Analisis Konsultan

III.1.6.55 LHR Sp.9 Jamika

Proporsi kendaraan di Simpang Jamika didominasi oleh sepeda motor dengan proporsi 68,90% (hari Senin) dan 74,80% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 16,03% (hari Senin) dan 16,31% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Gambar III-185 Proporsi Kendaraan dan Pola Arus di Simpang Jamika

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 1 sampai 1,5 menit dengan panjang antrian rata-rata tertinggi (sisi B) adalah 48 meter (pada hari Senin) dan 27 meter pada sisi C (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar 33.

*C&D moving together

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
B	50	60	89	48
C*	45	48	55	27
D*	45	48	55	33
Total	95	108	144	
Sunday				
B	65	68	65	21
C*	50	45	48	27
D*	115	113	113	23
Total	65	68	65	

Gambar III-186 Fase Sinyal di Simpang Jamika

Sumber: Analisis Konsultan

III.1.6.56 LHR Sp.10 Garuda

Proporsi kendaraan di Simpang Garuda didominasi oleh sepeda motor dengan proporsi 68,81% (hari Senin) dan 66,30% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 19,23% (hari Senin) dan 25,07% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	68.81%	19.23%	5.33%	4.14%	0.38%	0.21%	0.83%	0.40%	0.31%	0.02%	0.04%	0.30%
Sunday	66.30%	25.07%	4.24%	1.86%	0.56%	0.12%	0.74%	0.22%	0.01%	0.00%	0.01%	0.88%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	1207	0,15	618	0,18
2	2049	0,25	776	0,23
3	2627	0,32	845	0,25

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
4	1155	0,14	587	0,17
5	1153	0,14	612	0,18

Gambar III-187 Fase Sinyal di Simpang Garuda

Sumber: Analisis Konsultan

III.1.6.57 LHR Sp.11 Cibereum Roundabout

Proporsi kendaraan di Bundaran Cibeureum didominasi oleh sepeda motor dengan proporsi 70,33% (pada hari Senin) dan 67,16% (pada hari Minggu), diikuti oleh kendaraan sedan, jip dan station wagon dengan proporsi 14,44% (pada hari Senin) dan 20,42% (pada hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	292	0.02	222	0.02
2	2823	0.16	1841	0.18

Mov.1 297	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
8	1694	0.10	1297	0.12
9	1055	0.06	1086	0.10

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	581	0.03	357	0.03
4	3757	0.22	1930	0.19
5	318	0.02	37	0.004
6	4807	0.28	2997	0.29
7	1893	0.11	616	0.06

Gambar III-188 Fase Sinyal di Simpang Cibereum roundabout

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 3 sampai 6 menit dengan panjang antrian rata-rata tertinggi (sisi B) adalah 255 meter (pada hari Senin) dan 75 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	130	135	135	222
C*	125	135	128	123
B (left) *	125	135	128	
B	110	125	112	255
Total	365	395	375	
Sunday				
A	30	56	82	70
C	65	67	84	70
B (left) *	65	67	84	
B	57	67	84	75
Total	152	190	250	

* C & B (left) moving together

Gambar III-189 Fase Sinyal di Simpang Cibereum Roundabout

Sumber: Analisis Konsultan

III.1.6.58 LHR Sp.12 Cibereum

Proporsi kendaraan di Simpang Cibeureum didominasi oleh sepeda motor dengan proporsi 75,43% (hari Senin) dan 75,82% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 12,03% (hari Senin) dan 12,08% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	75.43%	12.03%	4.40%	3.99%	0.42%	0.19%	2.23%	0.92%	0.19%	0.04%	0.06%	0.11%
Sunday	75.82%	12.08%	6.66%	1.74%	0.79%	0.29%	1.31%	0.44%	0.19%	0.02%	0.02%	0.64%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	6328	0.49	7340	0.63

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
2	2316	0.18	1731	0.15
3	4323	0.33	2534	0.22

Gambar III-190 Fase Sinyal di Simpang Cibereum

Sumber: Analisis Konsultan

III.1.6.59 LHR Sp.13 Nurtanio

Proporsi kendaraan di simpang Nurtanio didominasi oleh sepeda motor dengan proporsi 74,53% (hari Senin) dan 56,55% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 15,93% (hari Senin) dan 30,24% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up, suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small bus	Big bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	74.53%	15.93%	4.19%	3.53%	0.40%	0.18%	0.63%	0.26%	0.05%	0.02%	0.01%	0.26%
Sunday	56.55%	30.24%	7.56%	3.84%	0.26%	0.08%	0.17%	0.02%	0.01%	0.00%	0.00%	1.25%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	3707	0.22	2396	0.22
2	2775	0.17	1735	0.16

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	2200	0.13	963	0.09
4	3046	0.18	3379	0.31
5	4931	0.30	2488	0.23

Gambar III-191 Fase Sinyal di Simpang Nurtanio

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 1 sampai 1,5 menit dengan panjang antrian rata-rata tertinggi (sisi D) adalah 67 meter (pada hari Senin) dan 33 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon	Avg. queue length (m)
Monday				
B*	30	30	27	28
D*	30	30	27	67
C	40	40	32	25
Total	70	70	59	
Sunday				
B*	30	30	40	28
D*	30	30	40	33
C	35	40	40	16
Total	65	70	80	

Gambar III-192 Fase Sinyal di Simpang Nurtanio

Sumber: Analisis Konsultan

III.1.6.60 LHR Sp.14 Pasir Kaliki

Proporsi kendaraan pada simpang Pasir Kaliki didominasi oleh sepeda motor dengan proporsi 71,75% (hari Senin) dan 73,83% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 23,42% (hari Senin) dan 19,53% (hari Minggu). Komposisi kendaraan dan pola arus masing-masing lengan dapat dilihat pada gambar dibawah ini.

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1*	1414	0.11	-	-
2	1645	0.12	1694	0.25

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
5	584	0.04	214	0.03
6	3491	0.26	1576	0.24
7	1864	0.14	979	0.15

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
3	943	0.07	611	0.09
4*	3249	0.25	1619	0.09

Gambar III-193 Fase Sinyal di Simpang Pasir Kaliki

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 2,5 sampai 3 menit dengan panjang antrian rata-rata tertinggi (sisi D) adalah 45 meter (pada hari Senin) dan 116 meter (pada hari Minggu). Siklus dan fase APILL pada persimpangan ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon	Avg. queue length (m)
Monday				
A	48	71	71	24
D	70	70	58	45
C	52	45	54	51
Total	170	186	183	
Sunday				
A	50	road closure		56
D	54	66	77	116
C	69	121	118	115
Total	173	187	195	

Gambar III-194 Fase Sinyal di Simpang Pasir Kaliki

Sumber: Analisis Konsultan

III.1.6.61 LHR Sp.15 Pasar Baru

Proporsi kendaraan di Simpang Pasar Baru didominasi oleh sepeda motor dengan proporsi 59,15% (hari Senin) dan 64,53% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 30,91% (hari Senin) dan 26,79% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Pasar Baru pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up, suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Sunday	59.15%	30.91%	4.65%	2.35%	0.65%	0.63%	0.20%	0.04%	0.00%	0.00%	0.00%	1.41%
Monday	64.53%	26.79%	4.84%	1.97%	0.34%	0.37%	0.66%	0.04%	0.00%	0.00%	0.00%	0.46%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	2808	0.34	1325	0.19
4	2017	0.25	1990	0.28

% from total movement

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	913	0.11	1640	0.23
2	2431	0.30	2068	0.29

Gambar III-195 Fase Sinyal di Simpang Pasar Baru

Sumber: Analisis Konsultan

III.1.6.62 LHR Sp.16 Suniaraja

Proporsi kendaraan pada simpang Suniaraja didominasi oleh sepeda motor dengan proporsi 71,30% (hari Senin) dan 67,63% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 23,65% (hari Senin) dan 27,97% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Suniaraja pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	71.30%	23.65%	2.11%	1.57%	0.17%	0.16%	0.30%	0.04%	0.00%	0.00%	0.00%	0.62%
Sunday	67.63%	27.97%	2.67%	0.28%	0.19%	0.09%	0.02%	0.00%	0.00%	0.00%	0.00%	1.15%

% from total movement

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	2494	0.55	1974	0.52
2	2057	0.45	1836	0.48

Gambar III-196 Fase Sinyal di Simpang Suniaraja

Sumber: Analisis Konsultan

III.1.6.63 LHR Sp.17 ABC

Proporsi kendaraan di simpang ABC didominasi oleh sepeda motor dengan proporsi 70,18% (hari Senin) dan 64,97% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 24,76% (hari Senin) dan 28,86% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang ABC pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	70.18%	24.76%	1.85%	1.78%	0.28%	0.16%	0.25%	0.02%	0.00%	0.00%	0.00%	0.72%
Sunday	64.97%	28.86%	2.29%	0.89%	0.42%	0.17%	0.03%	0.00%	0.00%	0.00%	0.00%	2.38%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	71	0.01	42	0.01
2	1610	0.33	1044	0.31

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	977	0.20	804	0.24
4	2167	0.45	1526	0.45

% from total movement

Gambar III-197 Fase Sinyal di Simpang ABC

Sumber: Analisis Konsultan

III.1.6.64 LHR Sp.18 Naripan - Braga

Proporsi kendaraan pada simpang Naripan - Braga didominasi oleh sepeda motor dengan proporsi 72,64% (hari Senin) dan 64,80% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 24,29% (hari Senin) dan 28,91% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Naripan - Braga pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Gambar III-198 Fase Sinyal di Simpang Naripan - Braga

Sumber: Analisis Konsultan

III.1.6.65 LHR Sp.19 Naripan - Sunda

Proporsi kendaraan di Simpang Naripan - Sunda didominasi oleh sepeda motor dengan proporsi 65,47% (hari Senin) dan 71,12% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 25,18% (hari Senin) dan 25,80% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Naripan - Sunda pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Gambar III-199 Fase Sinyal di Simpang Naripan - Sunda

Sumber: Analisis Konsultan

III.1.6.66 LHR Sp.20 Veteran – Ahmad Yani

Proporsi kendaraan pada simpang Veteran - A. Yani didominasi oleh sepeda motor dengan proporsi 79,11% (hari Senin) dan 76,14% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 17,52% (hari Senin) dan 20,11% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Veteran - A. Yani pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
6	33	0.004	41	0.01
7	173	0.02	154	0.04
8	894	0.11	310	0.08

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	1773	0.21	762	0.20
2	562	0.07	300	0.08
3	533	0.06	819	0.22

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
4	3321	0.39	1373	0.37
5	1214	0.14	146	0.04

Gambar III-200 Fase Sinyal di Simpang Veteran – Ahmad Yani

Sumber: Analisis Konsultan

III.1.6.67 LHR Sp.21 Banceuy

Proporsi kendaraan di Simpang Banceuy didominasi oleh sepeda motor dengan proporsi 71,42% (hari Senin) dan 70,94% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 23,69% (hari Senin) dan 24,44% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Banceuy pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	2954	0.22	1691	0.17
2	10701	0.78	8148	0.83

% from total movement

Gambar III-201 Fase Sinyal di Simpang Banceuy

Sumber: Analisis Konsultan

III.1.6.68 LHR Sp.22 Alun – Alun Bandung

Proporsi kendaraan di Simpang Alun-alun Bandung didominasi oleh sepeda motor dengan proporsi 74,48% (hari Senin) dan 73,91% (hari Minggu), kemudian diikuti oleh kendaraan sedan, jeep dan station wagon dengan proporsi 21,72% (hari Senin) dan 21,49% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Alun-alun Bandung pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	2726	0.23	2273	0.26

% from total movement

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	8447	0.73	6138	0.71
2	474	0.04	263	0.03

Gambar III-202 Fase Sinyal di Simpang Alun – Alun Bandung

Sumber: Analisis Konsultan

III.1.6.69 LHR Sp.23 Dalem Kaum

Proporsi kendaraan pada simpang Dalem Kaum didominasi oleh sepeda motor dengan proporsi 75,31% (hari Senin) dan 73,09% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 17,74% (hari Senin) dan 19,41% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Dalem Kaum pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	166	0.03	965	0.17
4	1882	0.35	1085	0.20
5	2084	0.39	2839	0.51

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	857	0.16	490	0.09
2	316	0.06	168	0.03

Gambar III-203 Fase Sinyal di Simpang Dalem Kaum

Sumber: Analisis Konsultan

III.1.6.70 LHR Sp.24 Pungkur

Proporsi kendaraan di simpang Pungkur didominasi oleh sepeda motor dengan proporsi 66,55% (pada hari Senin) dan 62,44% (pada hari Minggu), diikuti oleh kendaraan sedan, jeep & station wagon dengan proporsi 15,34% (pada hari Senin) dan 16,82% (pada hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Pungkur pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
5	2564	0.37	1001	0.23

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	416	0.06	227	0.05
4	213	0.03	44	0.01

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	2573	0.37	2415	0.57
2	2235	0.16	576	0.14

Gambar III-204 Fase Sinyal di Simpang Pungkur

Sumber: Analisis Konsultan

III.1.6.71 LHR Sp.25 Balonggede

Proporsi kendaraan di Simpang Balonggede didominasi oleh sepeda motor dengan proporsi 77,67% (hari Senin) dan 69,08% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 15,98% (hari Senin) dan 23,59% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Balonggede pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	972	0.16	437	0.11
2	842	0.14	374	0.09

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	1350	0.23	1291	0.32

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
4	508	0.08	403	0.10
5	2306	0.39	1548	0.38

Gambar III-205 Fase Sinyal di Simpang Balonggede

Sumber: Analisis Konsultan

III.1.6.72 LHR Sp.26 Inggit Garnasih – Moh. Toha

Proporsi Kendaraan pada Simpang Inggit Garnasih-Moh. Toha didominasi oleh sepeda motor dengan proporsi 71,96% (hari Senin) dan 67,50% (hari Minggu), diikuti oleh kendaraan sedan, jip dan station wagon dengan proporsi 16,32% (hari Senin) dan 21,38% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Inggit Garnasih-Moh. Toha pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
7	504	0.07	364	0.08
8	365	0.05	769	0.17
9	324	0.04	200	0.04

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	353	0.05	165	0.04
2	742	0.10	501	0.11
3	941	0.13	429	0.10

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	953	0.13	218	0.05
5	2724	0.37	1355	0.30
6	390	0.05	510	0.11

Gambar III-206 Fase Sinyal di Simpang Inggit Garnasih – Moh. Toha

Sumber: Analisis Konsultan

Simpang Toha Simpang ini memiliki APILL dengan siklus rata-rata 1 sampai 1,30 menit dengan panjang antrian rata-rata tertinggi (sisi D) adalah 67 meter (pada hari Senin) dan 33 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

*B&D moving together

Side	Morning	Noon	Afternoon	Avg. queue length (m)
Monday				
B*	30	30	27	28
D*	30	30	27	67
C	40	40	32	25
Total	70	70	59	
Sunday				
B*	30	30	40	28
D*	30	30	40	33
C	35	40	40	16
Total	65	70	80	

Gambar III-207 Fase Sinyal di Simpang Inggit Garnasih – Moh. Toha

Sumber: Analisis Konsultan

III.1.6.73 LHR Sp.27 Moh. Toha

Proporsi kendaraan pada simpang BKR-Moh. Toha didominasi oleh sepeda motor dengan proporsi 78,12% (hari Senin) dan 70,95% (hari Minggu), disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 14,93% (hari Senin) dan 20,80% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang BKR-Moh Toha pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	1332	0.08	147	0.02
2	770	0.04	302	0.04
3	711	0.04	599	0.07

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
10	917	0.05	482	0.06
11	3460	0.20	1341	0.16
12	1221	0.08	1563	0.18

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
7	1350	0.08	312	0.04
8	1406	0.08	910	0.11
9	3017	0.17	540	0.06

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
4	280	0.02	301	0.04
5	1951	0.11	1392	0.16
6	1246	0.07	615	0.07

% from total movement

Gambar III-208 Fase Sinyal di Simpang Moh. Toha

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 5 sampai 6 menit dengan panjang antrian rata-rata tertinggi (sisi C) adalah 137 meter (pada hari Senin) dan 139 meter (pada hari Minggu). Pada hari Senin sore, pengaturan APILL

dilakukan secara manual oleh Dinas Perhubungan dengan waktu siklus rata-rata 7,5 menit. Siklus dan fase APILL pada persimpangan ini dapat dilihat pada Gambar dibawah ini.

* On Monday Afternoon, APILL is carried out manually by Dishub

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	40	48	30	75
C	85	94	120	137
B	90	117	180	85
D	100	126	120	120
Total	315	385	450	
Sunday				
A	30	37	63	52
C	44	70	44	139
B	50	60	36	62
D	50	67	52	141
Total	174	234	195	

Gambar III-209 Fase Sinyal di Simpang Moh. Toha

Sumber: Analisis Konsultan

III.1.6.74 LHR Sp.28 BKR - Tegalega

Proporsi kendaraan di simpang BKR-Tegalega didominasi oleh sepeda motor dengan proporsi 81,65% (Senin) dan 78,18% (Minggu), disusul oleh kendaraan sedan, jeep & station wagon dengan proporsi 11,16% (Senin) dan 13,77% (Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang BKR-Tegalega pada hari Senin dan Minggu disajikan pada Gambar di bawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	81.65%	11.16%	3.06%	1.84%	0.30%	0.13%	0.33%	0.09%	0.04%	0.02%	0.00%	1.37%
Sunday	78.18%	13.77%	3.28%	0.72%	0.09%	0.12%	0.10%	0.04%	0.00%	0.00%	0.00%	3.70%

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	6585	0.28	1327	0.13
2	3593	0.15	589	0.06
3	1262	0.05	1343	0.13

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
10	665	0.03	222	0.02
11	4558	0.19	2505	0.24
12	695	0.03	322	0.03

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
7	258	0.01	173	0.02
8	567	0.02	249	0.02
9	202	0.01	241	0.02

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	1167	0.05	930	0.09
5	3091	0.13	2196	0.21
6	855	0.04	180	0.02

Gambar III-210 Fase Sinyal di Simpang BKR - Tegalega

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 4,5 hingga 5 menit dengan panjang antrian rata-rata tertinggi adalah 137 meter (pada hari Senin) dan 103 meter (pada hari Minggu). Pada hari Senin sore, pengaturan APILL dilakukan secara manual oleh Dinas Perhubungan dengan waktu siklus rata-rata 7 menit. Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon*	Avg. queue length (m)
Monday				
A	85	100	240	75
C	27	30	20	137
B	60	68	180	85
B&D	81	85	120	120
Total	253	283	560	
Sunday				
A	55	97	76	90
C	30	41	35	93
B	47	69	48	47
B&D	97	109	111	103
Total	229	316	270	

Gambar III-211 Fase Sinyal di Simpang BKR - Tegalega

Sumber: Analisis Konsultan

III.1.6.75 LHR Sp.28 Inggit Garnasih – Otto Iskandar Dinata

Proporsi kendaraan di Simpang Inggit Garnasih-Otto Iskandar Dinata didominasi oleh sepeda motor dengan proporsi 76,53% (hari Senin) dan 71,01% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 14,64% (hari Senin) dan 19,29% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Inggit Garnasih-Otto Iskandar Dinata pada hari Senin dan Minggu disajikan pada Gambar diibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	76.53%	14.64%	5.35%	1.67%	0.07%	0.14%	0.71%	0.13%	0.02%	0.00%	0.00%	0.74%
Sunday	71.01%	19.29%	6.73%	0.71%	0.13%	0.16%	0.06%	0.03%	0.00%	0.00%	0.00%	1.87%

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	982	0.13	459	0.06
2	4657	0.62	5549	0.72
3	1229	0.16	1017	0.13

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	653	0.09	735	0.09

Gambar III-212 Fase Sinyal di Simpang Inggit Garnasih – Oto Iskandar Dinata

Sumber: Analisis Konsultan

III.1.6.76 LHR Sp.30 Pasir Koja

Proporsi kendaraan di simpang Pasir Koja didominasi oleh sepeda motor dengan proporsi 75,04% (hari Senin) dan 70,51% (hari Minggu), kemudian diikuti oleh kendaraan sedan, jeep dan station wagon dengan proporsi 15,70% (hari Senin) dan 21,88% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Pasir Koja pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	2719	0.37	2707	0.47
2	430	0.06	230	0.04

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	971	0.13	846	0.15
5	1326	0.18	1201	0.21

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
3	1915	0.26	836	0.14

% from total movement

Gambar III-213 Fase Sinyal di Simpang Pasir Koja

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 1,5 menit dengan panjang antrian rata-rata tertinggi (sisi D) adalah 45 meter (pada hari Senin) dan 54 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon	Avg. queue length (m)
Monday				
A	54	56	54	39
D	46	43	40	45
Total	100	99	94	
Sunday				
A	40	40	38	50
D	50	50	48	54
Total	90	90	86	

Gambar III-214 Fase Sinyal di Simpang Pasir Koja

Sumber: Analisis Konsultan

III.1.6.77 LHR Sp.31 Tamblong

Proporsi kendaraan di Simpang Tamblong didominasi oleh sepeda motor dengan proporsi 69,06% (hari Senin) dan 67,70% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 24,28% (hari Senin) dan 27,69% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Tamblong pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	666	0.11	231	0.05
2	2633	0.45	2736	0.59
3	388	0.07	383	0.08

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
6	727	0.12	258	0.06
7	381	0.07	59	0.01

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
4	215	0.04	157	0.03
5	842	0.14	797	0.17

Gambar III-215 Fase Sinyal di Simpang Tamblong

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 1,5 sampai 2 menit dengan panjang antrian rata-rata tertinggi (sisi A) adalah 114 meter (pada hari Senin) dan 50 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon	Avg. queue length (m)
Monday				
A	50	34	62	114
B*	49	34	49	25
D*	49	34	49	59
Total	99	68	111	
Sunday				
A	42	41	43	50
B*	38	38	38	5
D*	38	38	38	15
Total	80	79	81	

*B&D moving together

Gambar III-216 Fase Sinyal di Simpang Tamblong

Sumber: Analisis Konsultan

III.1.6.78 LHR Sp.32 Gudang Utara – Ahmad Yani

Proporsi kendaraan di Simpang Gudang Utara – A.Yani didominasi oleh sepeda motor dengan proporsi 71.51% (hari Senin) dan 72.64% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 22.93% (hari Senin) dan 22.23% (hari Minggu). Komposisi kendaraan pada masing-

masing pergerakan di Simpang Tamblong pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	71.51%	22.93%	2.18%	1.44%	0.09%	0.06%	0.21%	0.09%	0.00%	0.00%	0.00%	1.49%
Sunday	72.64%	22.23%	2.17%	0.54%	0.09%	0.05%	0.07%	0.03%	0.00%	0.00%	0.01%	2.17%

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
3	877	0.15	325	0.07
4*	85	0.01	35	0.01
5	2700	0.47	2079	0.43

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
1	360	0.06	439	0.09
2	484	0.08	299	0.06

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
6*	5	0.001	26	0.01

Mov.	Monday Volume (veh/hour)	Monday %	Sunday Volume (veh/hour)	Sunday %
7	1163	0.20	1618	0.33
8	22	0.004	10	0.002

Gambar III-217 Fase Sinyal di Simpang Gudang Uttara – Ahmad Yani

Sumber: Analisis Konsultan

Simpang ini memiliki APILL dengan siklus rata-rata 1,5 sampai 2 menit dengan panjang antrian rata-rata tertinggi (sisi D) adalah 68 meter (pada hari Senin) dan 78 meter (pada hari Minggu). Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Morning	Noon	Afternoon	Avg. queue length (m)
Monday				
A	35	67	26	65
B	40	42	54	48
D	32	30	47	68
Total	107	139	127	
Sunday				
A	12	46	33	70
B	18	44	19	55
D	20	16	52	78
Total	50	106	104	

Gambar III-218 Fase Sinyal di Simpang Gudang Utara – Ahmad Yani

Sumber: Analisis Konsultan

III.1.6.79 LHR Sp.33 Ciroyom

Proporsi kendaraan di Simpang Ciroyom didominasi oleh sepeda motor dengan proporsi 74.82% (hari Senin) dan 66.75% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 13.15% (hari Senin) dan 16.09% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Ciroyom pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Gambar III-219 Fase Sinyal di Simpang Ciroyom

Sumber: Analisis Konsultan

III.1.6.80 LHR Sp.34 Andir

Proporsi kendaraan di Simpang Andir didominasi oleh sepeda motor dengan proporsi 76.89% (hari Senin) dan 75.39% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 11.70% (hari Senin) dan 10.37% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Andir pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Gambar III-220 Fase Sinyal di Simpang Andir

Sumber: Analisis Konsultan

III.1.6.81 LHR Sp.35 Rajawali

Proporsi kendaraan di Simpang Rajawali didominasi oleh sepeda motor dengan proporsi 78.70% (hari Senin) dan 82.08% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 14.24% (hari Senin) dan 11.67% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Rajawali pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	1997	0.13	1085	0.18
2	8833	0.57	3498	0.59

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	4725	0.30	1311	0.22

Gambar III-221 Fase Sinyal di Simpang Rajawali

Sumber: Analisis Konsultan

III.1.6.82 LHR Sp.36 Asia Afrika

Proporsi kendaraan di Simpang Braga – Asia Afrika didominasi oleh sepeda motor dengan proporsi 77.70% (hari Senin) dan 79.95% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 17.68% (hari Senin) dan 13.84% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Braga – Asia Afrika pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Opiet, pick-up, suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axel	Truk 3 axel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Sunday	77.70%	17.68%	2.16%	0.27%	0.21%	0.06%	0.03%	0.00%	0.00%	0.00%	0.00%	1.88%
Monday	79.95%	13.84%	0.60%	0.50%	0.09%	0.03%	0.20%	0.04%	0.00%	0.00%	0.00%	4.71%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	2186	0.13	1220	0.21
2	504	0.03	301	0.05
3	13737	0.84	4250	0.74

Gambar III-222 Fase Sinyal di Simpang Asia Afrika

Sumber: Analisis Konsultan

III.1.6.83 LHR Sp.37 Veteran - Sunda

Proporsi kendaraan di Simpang Veteran - Sunda didominasi oleh sepeda motor dengan proporsi 68.67% (hari Senin) dan 62.42% (hari Minggu), kemudian disusul oleh kendaraan sedan, jeep dan station wagon dengan proporsi 27.04% (hari Senin) dan 33.07% (hari Minggu). Komposisi kendaraan pada masing-masing pergerakan di Simpang Veteran - Sunda pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	68.67%	27.04%	2.11%	1.30%	0.15%	0.11%	0.26%	0.06%	0.00%	0.00%	0.00%	0.31%
Sunday	62.42%	33.07%	2.00%	0.68%	0.09%	0.14%	0.09%	0.03%	0.00%	0.00%	0.00%	1.49%

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
3	2794	0.33	1881	0.31
4	549	0.07	377	0.06

Mov.	Monday		Sunday	
	Volume (veh/hour)	%	Volume (veh/hour)	%
1	2042	0.24	960	0.16
2	3033	0.36	2759	0.46

Gambar III-223 Fase Sinyal di Simpang Veteran - Sunda

Sumber: Analisis Konsultan

Persimpangan ini mempunyai APILL dengan siklus rata-rata 94 detik dengan rata-rata panjang antrian tertinggi (sisi C) adalah 92 meter (pada hari Senin) dan 122 meter (pada hari Minggu). Ada simpang Naripan-Sunda yang berjarak 85 meter di dekat simpang ini. Antrian dari sisi C juga sampai di simpang Naripan-Sunda. Siklus dan fase APILL pada simpang ini dapat dilihat pada Gambar dibawah ini.

Side	Pagi	Siang	Sore*	Avg. queue length (m)
Monday				
C	45	66	55	88
D	38	35	42	92
Total	83	101	97	
Sunday				
C	43	42	46	122
D	51	40	43	66
Total	94	82	89	

Gambar III-224 Fase Sinyal di Simpang Veteran - Sunda

Sumber: Analisis Konsultan

III.1.6.84 LHR Sp.38 Malabar

Proporsi Kendaraan pada simpang ABC didominasi oleh sepeda motor dengan proporsi sebesar 78,30% (pada hari Senin) dan 75,17% (pada hari Minggu), diikuti oleh kendaraan sedan, jeep & station wagon dengan proporsi sebesar 15,53% (pada hari Senin) dan 19,94% (pada hari Minggu). Komposisi kendaraan pada setiap pergerakan di Simpang Malabar pada hari Senin dan Minggu disajikan pada Gambar dibawah ini.

	Motorcycle	Sedan, Jeep & station wagon	Oplet, pick-up,suburban, combi, mini bus	pick-up mikro truk & delivery cars	Small Bus	Big Bus	Light truck 2 axels	Medium truck 2 axcel	Truk 3 axcel	Trailer truck	Semi-trailer truck	Non-motorized vehicles
Monday	78.30%	15.53%	3.11%	1.15%	0.03%	0.03%	0.40%	0.11%	0.00%	0.00%	0.00%	1.03%
Sunday	75.17%	19.94%	1.38%	0.83%	0.07%	0.06%	0.07%	0.00%	0.00%	0.00%	0.00%	2.48%

Gambar III-225 Fase Sinyal di Simpang Malabar

Sumber: Analisis Konsultan

III.1.7 Analisis *Parking on Street*

Parking on Street atau parkir di tepi jalan umum di atur dalam keputusan Walikota Bandung No:551/Kep.890-Dishub/2021 tentang Penetapan Lokasi Dan Posisi Parkir Di Tepi Jalan Umum Dan Tempat Khusus Parkir Di Kota Bandung. Berdasarkan keputusan tersebut lokasi parkir di tepi jalan umum diklasifikasikan menjadi 3 zona yaitu zona pusat kota yang tersebar di 55 ruas jalan dan 8 tempat khusus di pusat kota, zona penyangga kota tersebar di 139 ruas jalan dan 16 tempat khusus dan zona pinggir kota tersebar di 32 ruas jalan dan 8 tempat khusus.

Gambar III-226 Lokasi Parkir di Kota Bandung

Sumber: Rencana Induk Transportasi Kota Bandung 2024

Parking on street pada Jalur Khusus BRT

Pada rencana jalur khusus BRT terdapat beberapa Lokasi parkir pada jalan umum yang terdampak karena minimalnya kapasitas jalan yang ada. Beberapa ruas jalan yang terdampak adalah sebagai berikut dan ditunjukan pada gambar di bawah ini:

a. Jl A Yani
b. Jl ABC
c. Jl Banceuy
d. Jl Dewi Sartika
e. Jl Jend Sudirman
f. Jl Kebon Jati
g. Jl Moch Toha
h. Jl Naripan
i. Jl Otista
j. Jl Rajawali Timur
k. Jl Rajawali Barat
l. Jl Suniaraja

Gambar III-227 Lokasi *Parking on Street* Terdampak Jalur Khusus BRT

Sumber: PMC 2024

Untuk mendapatkan data dan informasi detail mengenai parkir on-street di sepanjang Koridor BRT BBMA maka dilakukan survei parkir di beberapa lokasi seperti yang ditunjukkan pada gambar di bawah ini. Survei berlangsung 16-20 Januari 2024 dimulai dari pukul 5.30 pagi hingga 10 malam dengan total 859 pengamatan.

Gambar III-228 Lokasi Survei *Parking on Street* Terdampak Jalur Khusus BRT

Sumber: PMC 2024

Karakteristik *Parking on street* pada Jalur Khusus BRT

Beberapa ciri parkir yang dapat diamati dari data survei adalah:

a. **Parking Turnover:** adalah tingkat penggunaan fasilitas. Ini ditentukan dengan membagi jumlah tempat parkir yang tersedia menjadi jumlah kendaraan yang diparkir di ruang tersebut dalam jangka waktu tertentu.
b. **Parking Load:** memberikan luas di bawah kurva akumulasi. Hal ini dapat diperoleh hanya dengan mengalikan jumlah kendaraan yang menempati area parkir pada setiap interval waktu dengan interval waktu. Ini dinyatakan sebagai jam kendaraan.
c. **Average Parking Duration**: Ini adalah rasio total jam kendaraan dengan jumlah kendaraan yang diparkir.
d. **Parking Efficiency**: Ini didefinisikan sebagai rasio jumlah teluk yang ditempati dalam durasi waktu terhadap total ruang yang tersedia.
e. **Parking Occupancy:** berarti penggunaan, atau hak penggunaan, tempat parkir di dalam atau di fasilitas parkir untuk parkir,
f. **Parking Index**: Ini didefinisikan sebagai rasio jumlah teluk yang ditempati dalam durasi waktu tertentu.
g. **Parking Capacity**: Ini adalah jumlah tindakan parkir kendaraan yang direalisasikan di tempat parkir M dalam periode waktu T0.
h. **Peak Hour Morning**: Periode jam untuk volume parkir maksimum pada pagi hari
i. **Peak Hour Afternoon**: Periode jam untuk volume parkir maksimum pada sore hari

Berikut karakteristik *parking on street* pada masing – masing ruas jalan yang terdampak jalur khusus BRT:

a. Jl. Jenderal Ahmad Yani

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl A Yani	Mixed	1170	30	190	30	198	69.2%	10.00-11.00
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		5.5	549	86	93	9.5	137	12.30-13.30

Gambar III-229 Karakteristik *Parking on Street* Pada Jl. Jenderal Ahmad Yani

Sumber: PMC 2024

b. Jl. ABC

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl ABC	Mixed	100	50	16	50	29	185.7%	09.00-10.00
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		8.6	125	19	39	3.5	54	12.00-13.00

Gambar III-230 Karakteristik *Parking on Street* Pada Jl. ABC

Sumber: PMC 2024

c. Jl. Banceuy

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Banceuy	CAR	360	0	81	0	81	84.0%	09.30-10.30
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		5.6	225	33	49	4.0	68	13.00-14.00

Gambar III-231 Karakteristik *Parking on Street* Pada Jl. Banceuy

Sumber: PMC 2024

d. Jl. Dewi Sartika

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Dewi Sartika	Mixed	100	50	30	50	43	219.2%	11.00-12.00
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		17.2	371	47	109	8.5	94	15.30-16.30

Gambar III-232 Karakteristik *Parking on Street* Pada Jl. Dewi Sartika

Sumber: PMC 2024

e. Jl. Jenderal Sudirman

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Jend Sudirman	Mixed	1228	850	197	192	245	114.9%	08.30-09.30
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		10.7	1315	153	87	9.0	281	14.30-15.30

Gambar III-233 Karakteristik *Parking on Street* Pada Jl. Jenderal Sudirman

Sumber: PMC 2024

f. Jl. Kebon Jati

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Kebon Jati	Mixed	520	1030	109	1030	367	57.7%	08.30-09.30
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		3.3	597	71	72	7.0	212	12.30-13.30

Gambar III-234 Karakteristik *Parking on Street* Pada Jl. Kebon Jati

Sumber: PMC 2024

g. Jl. Moch Toha

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Moch Toha	CAR	330	0	61	0	61	165.7%	09.30-10.30
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		13.9	425	49	72	13.0	101	12.00-13.00

Gambar III-235 Karakteristik *Parking on Street* Pada Jl. Moch Toha

Sumber: PMC 2024

h. Jl. Naripan

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY			
		CAR	MC	CAR	MC	Unit Parking Space	Parking Capacity (Veh /30 min)
Jl Naripan	CAR	1180	0	194	0	194	129
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy /30 minutes	Average Parking Volume /30 minutes	Ave. Parking Duration (minutes)	Max. Parking Duration (hour)
		3.365979	326.5	16.8%	33	90	6

Gambar III-236 Karakteristik *Parking on Street* Pada Jl. Naripan

Sumber: PMC 2024

i. Jl. Otista

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Otista	CAR	1362	0	284	0	284	116.9%	08.00-09.00
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		11.4	1614	191	105	15.0	332	16.30-18.30

Gambar III-237 Karakteristik *Parking on Street* Pada Jl. Otista

Sumber: PMC 2024

j. Jl. Rajawali Timur

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Rajawali Timur	Mixed	455	115	79	115	108	185.2%	11.00-12.00
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		10.8	582	72	56	8.0	200	15.00-16.00

Gambar III-238 Karakteristik *Parking on Street* Pada Jl. Rajawali Barat

Sumber: PMC 2024

k. Jl. Rajawali Barat

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY			
		CAR	MC	CAR	MC	Unit Parking Space	Parking Capacity (Veh /30 min)
Jl Rajawali Barat	CAR	125	20	20	0	20	23
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy /30 minutes	Average Parking Volume /30 minutes	Ave. Parking Duration (minutes)	Max. Parking Duration (hour)
		14.85	148.50	48%	9.6	53.00	7.50

Gambar III-239 Karakteristik *Parking on Street* Pada Jl. Rajawali Timur

Sumber: PMC 2024

l. Jl. Suniaraja

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY				Peak Hour Morning
		CAR	MC	CAR	MC	Unit Parking Space	Efficiency (Veh / hour)	
Jl Suniaraja	CAR	415	0	92	0	92	134.7%	11.00-12.00
		Turn-Over Rate	Parking Load (veh-hour)	Average Occupancy	Ave. Parking Duration	Max. Parking Duration	Max Parking Volume(PCU /hr)	Peak Hour Afternoon
		7.7	45	45	53	3.5	124	14.30-15.30

Gambar III-240 Karakteristik *Parking on Street* Pada Jl. Suniaraja

Sumber: PMC 2024

Tabel III-241 Ringkasan Karakteristik *Parking on Street* Pada Jalaur Khusus BRT

Sumber: PMC 2024

ROAD NAME	Vehicle Type	Length (meter)		CAPACITY			Turn-Over Rate	Efficiency	Total Parking Load (veh-hour)	Average Occupancy / hr	Ave. Parking Duration (minutes)	Max. Parking Duration (hour)	Maximum Parking Volume (pcu/ hour	Peak Hour Morning	Peak Hour Afternoon
		CAR	MC	CAR	MC	Unit Parking Space									
Jl A Yani	Mixed	1170	30	160	30	196	5.5	69.2%	548.6	86.0	93.0	9.5	137.0	10.00-11.00	12.30-13.30
Jl ABC	Mixed	100	50	16	50	29	8.6	185.7%	124.7	19.1	39.0	3.5	53.9	09.00-10.00	12.00-13.00
Jl Banceuy	CAR	360	0	81	0	81	5.6	84.0%	225.2	32.8	49.0	4.0	68.1	09.30-10.30	13.00-14.00
Jl Dewi Sartika	Mixed	100	50	30	50	43	17.2	219.2%	370.7	47.2	109.0	8.5	94.3	11.00-12.00	15.30-16.30
Jl Kebon Jati	Mixed	520	1030	109	1030	367	3.3	57.7%	596.8	70.7	72.0	7.0	211.6	08.30-09.30	12.30-13.30
Jl Moch Toha	CAR	330	0	61	0	61	13.9	165.7%	425.0	49.5	72.0	13.0	101.1	09.30-10.30	12.00-13.00
Jl Naripan	CAR	1180	0	194	0	194	4.5	90.3%	439.0	67.3	71.0	5.5	175.3	08.30-09.30	14.30-16.30
Jl Otista	CAR	1362	0	284	0	284	11.4	116.9%	1614.0	190.7	105.0	15.0	332.0	08.00-09.00	16.30-18.30
Jl Rajawali Timur	Mixed	455	115	79	115	108	10.8	185.2%	582.0	71.7	56.0	8.0	200.0	11.00-12.00	15.00-16.00
Jl Rajawali Barat	CAR	125	0	20	0	20	1.2	94.2%	18.1	9.1	33.0	1.0	28.3	0.0	19.00-20.00
Jl Jend Sudirman	Mixed	1228	850	197	192	245	10.7	114.9%	1315.4	153.0	87.0	9.0	281.4	08.30-09.30	14.30-15.30
Jl Suniaraja	CAR	415	0	92	0	92	7.7	134.7%	45.4	45.4	53.0	3.5	124.0	11.00-12.00	14.30-15.30

Berdasarkan karakteristik *Parking On Street* parkir di jalur khusus BRT, dapat disimpulkan bahwa:

a. Parkir di jalan juga digunakan sebagai "garasi" bagi pemilik kendaraan karena beberapa pemilik kendaraan memarkir kendaraan mereka 9-15 jam seperti yang dapat dilihat di Jl Moch Toha dan Jl Otista di mana banyak pemilik usaha swasta / toko juga tinggal di tempat usaha / toko mereka.

b. Jl Dewi Sartika, Jl Moch Toha, dan Jl Rajawali Timur memiliki tingkat Turn-Over yang tinggi karena lokasinya yang dekat dengan pusat aktivitas lokal seperti pasar, tempat wisata, area bisnis, dll.

c. Jl Kebon Jati sebagian besar ditempati oleh parkir sepeda motor karena ada banyak tempat bisnis dan pusat perbelanjaan.

d. Jam sibuk parkir biasanya terjadi sekitar pukul 09.00-10.00 pagi dan pukul 15.00-16.00 sore. Beberapa jalan juga memiliki jam sibuk selama waktu makan siang.

Penanganan *Parking On Street* pada Jalur Khusus BRT

Beberapa ciri parkir yang dapat diamati dari data survei adalah:

- **Hitam;** Parkir di jalan harus dihilangkan / dipindahkan sebagai kebutuhan.
- **Merah;** Parkir di jalan harus dipindahkan / dibatasi area tersebut dalam beberapa keadaan.
- **Kuning:** Parkir di jalan tidak harus dipindahkan, namun dibeberapa Lokasi perlu dimodifikasi atau perlu adanya perbaikan jalan.

- **Hijau;** Parkir di jalan tidak perlu dipindahkan / dibatasi dengan beberapa dampak diterapkan pada arus lalu lintas atau menyebabkan beberapa penundaan dalam parameter yang dapat diterima.

Gambar III-242 Rekomendasi Penanganan *Parking on Street* Pada Jalur Khusus BRT

Sumber: PMC 2024

Tabel III-243 Rekomendasi Penanganan *Parking on Street* Pada Jalur Khusus BRT

Sumber: PMC 2024

No	Rekomendasi Parkir pada Koridor BRT BBMA	
	Penanganan Parkir di Jalan	Nama Jalan
1	Parkir di jalan yang harus dihilangkan / dipindahkan	- Jl. Dewi Sartika
		- Jl. Kebon Jati
		- Jl. Naripan
		- Jl. Jend. Sudirman
2	Parkir di jalan yang harus dikurangi / dibatasi	- Jl. A. Yani
		- Jl. Banceuy
		- Jl. Moch Toha
		- Jl. Otto Iskandar Dinata
		- Jl. Rajawali Timur
		- Jl. Suniaraja
3	Parkir di jalan tidak harus dipindahkan tetapi harus di modifikasi	- Jl. Rajawali Barat - Jl. Ibrahim Adjie
4	Parkir di jalan yang tidak perlu dipindahkan dan dibatasi	- Jl. ABC

Rekomendasi Area Relokasi *Parking on Street*

Berdasarkan data yang disajikan di atas, sulit untuk memindahkan parkir di jalan yang terdampak Proyek BRT BBMA ke jalan lain karena situasi lalu lintas di Kota Bandung sudah padat dan kompleks.

Alternatif yang memungkinkan adalah memindahkan parkir di jalan umum ke area atau struktur parkir terpusat dan mendapatkan manfaat tambahan untuk pendapatan pemerintah daerah.

Berdasarkan diskusi sebelumnya dengan BLUD Parkir Kota Bandung, ada beberapa area potensial yang dapat diusulkan sebagai area / gedung parkir seperti:

1) Jl Jend Sudirman
2) Mayapada Tower
3) Jl Balong Gede
4) Jl ABC 1
5) Jl ABC 2
6) Jl Asia Africa
7) Station Hall
8) Sanitation Agency Land
9) Bandung Banceuy Center
10) ITC Kebon Kalapa

Gambar III-244 Lokasi Rekomendasi Relokasi *Parking on Street* Pada Jalur Khusus BRT

Sumber: PMC 2024

Lokasi A – Jl. Jend Sudirman

Kondisi : konstruksi yang belum selesai

Status Terbaru : Digunakan sebagai parkir sementara selama akhir pekan

Total luas : 1850 m2 setara dengan 90 unit tempat parkir (1 lantai)

Gambar III-245 Lokasi *Parking off Street* Jl. Jend. Sudirman

Sumber: PMC 2024

Lokasi B – Jl Jend Sudirman [Mayapada Tower]

Kondisi : Kantor Bertingkat Tinggi

Status Terbaru : Parkir di lantai dasar dan ruang bawah tanah, perkiraan parkir mobil

Total luas : Kapasitas 80 Mobil/ Unit Tempat Parkir (1 lantai)

Gambar III-246 Lokasi *Parking off Street* Gedung Mayapada

Sumber: PMC 2024

Lokasi C – Lapangan di Jl. Balong Gede

Kondisi : Tanah kosong tanpa bangunan

Status Terbaru : Sekarang digunakan sebagai tempat parkir bagi penduduk setempat.

Total luas : 8000m2 (perkiraan) setara dengan 380 unit tempat parkir (1 lantai)

Gambar III-247 Lokasi *Parking off Street* Lapangan di Jl. Balong Gede

Sumber: PMC 2024

Lokasi D – Jl. ABC

Kondisi : Tanah kosong tanpa bangunan

Status Terbaru : Sekarang digunakan sebagai tempat parkir bagi penduduk setempat.

Luas total : 1000m2 (perkiraan) setara dengan 50 unit tempat parkir (status tanah dalam sengketa keluarga)

Gambar III-248 Lokasi *Parking off Street* Lapangan D di Jl. ABC

Sumber: PMC 2024

Lokasi E – Jl. ABC

Kondisi : Tanah kosong tanpa bangunan

Status Terbaru : Sekarang digunakan sebagai tempat parkir bagi penduduk setempat.

Luas total : 1100m2 (perkiraan) setara dengan 50 unit tempat parkir (1 lantai)

Gambar III-249 Lokasi *Parking off Street* Lapangan E di Jl. ABC

Sumber: PMC 2024

Lokasi F – Jl. Asia Afrika

Kondisi : Ruang terbuka dengan lantai beton

Status Terbaru : Sekarang digunakan sebagai tempat parkir wisatawan di sekitar Asia Afrika. Pintu masuk sempit tetapi dapat menampung bus besar.

Luas total : 5000 m2 (perkiraan) setara dengan 240 unit tempat parkir (1 lantai)

Gambar III-250 Lokasi *Parking off Street* Lapangan E di Jl. ABC

Sumber: PMC 2024

Lokasi G – Station Hall

Kondisi : Ruang terbuka dengan jalan akses

Status Terbaru : Sekarang digunakan sebagai terminal angkot dan terhubung ke stasiun kereta api. Pintu masuk sempit tetapi dapat menampung bus besar.

Luas total : 4000 m2 (estimasi) setara dengan 180 unit tempat parkir (1 lantai)

Gambar III-251 Lokasi *Parking off Street* di Terminal Sta. Hall

Sumber: PMC 2024

Lokasi H – Tanah Dinas Sanitasi

Kondisi : Lahan kosong terbuka

Status Terkini : Dimiliki oleh Dinas Kebersihan Kota Bandung

Luas total : 7000 m2 (estimasi) setara dengan 320 unit tempat parkir (1 lantai)

Gambar III-252 Lokasi *Parking off Street* di Tanah Dinas Sanitasi

Sumber: PMC 2024

Lokasi I – Bandung Banceuy Center

Kondisi : Ex-Shopping Center

Status Terbaru : Gedung kosong bertingkat yang dapat digunakan sebagai gedung parkir.

Luas total : 1300 m2 (perkiraan) setara dengan 80 unit tempat parkir (1 lantai)

Gambar III-253 Lokasi *Parking off Street* di Bandung Banceuy Center

Sumber: PMC 2024

Lokasi J – ITC Kebon Kalapa

Kondisi : Pusat Perbelanjaan

Status Terbaru : Berjuang untuk menjadi populer lagi.

Luas total : 8000 m2 (perkiraan) setara dengan 380 unit tempat parkir

Gambar III-254 Lokasi *Parking off Street* di ITC Kebon Kelapa

Sumber: PMC 2024

Relokasi *Parking on Street* Untuk Kebutuhan lajur Khusus BRT

Denga nada nya rencana Pembangunan jalur khusus BRT, maka diperlukan relokasi *parking on-street* ke area parkir Gedung/ struktur yang diusulkan. Peta di bawah ini menunjukkan gedung / struktur parkir yang diusulkan yang dapat mencakup lokasi parkir di jalan dalam radius 500m* dari area *parking on street*.

Radus 500m ditentukan berdasarkan jangkauan pengguna kendaraan pribadi untuk dapat berparkir dan melanjutkan jalan kaki untuk mencapai Lokasi tujuannya.

Gambar III-255 Lokasi *Parking off Street* Berdasarkan Radius 500 m

Sumber: PMC 2024

Berdasarkan peta di atas, kita dapat melihat bahwa *parking on-street* di tengah jalur koridor dapat dipindahkan ke Gedung / struktur parkir yang diusulkan dengan mempertimbangkan kapasitas parkir yang optimal dari masing-masing lokasi karena sebagian besar lokasi sudah dimanfaatkan sebagai tempat parkir.

Pada penjelasan sebelumnya dapat dilihat bahwa Gedung / struktur parkir yang diusulkan tidak dapat menampung semua volume parkir sekitar radius 500m lokasi yang diusulkan, belum lagi volume parkir eksisting yang ada di lokasi yang diusulkan. Analisis lebih lanjut terhadap lokasi tambahan untuk merelokasi parkir di jalan diperlukan seiring dengan diskusi dengan pemerintah setempat.

Tabel III-256 Rekomendasi Manajemen Parkir di Jalan Ahmad Yani

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
JL AHMAD YANI									
JL A Yani	Mobil	6	20	40	Titik Putih Kopi	0+150	0,175		1) Ada kebutuhan mendesak untuk memindahkan bagian parkir di jalan ini karena lebar jalan sempit dan akan ada Bus BRT di jalan ini yang dapat menghalangi lalu lintas. 2) Lebar bus dan manuver parkir kendaraan yang masuk dan keluar dari tempat parkir akan menghambat lalu lintas dan membuat kemacetan lalu lintas, sehingga lebih baik untuk menghapus/memindahkan parkir di jalan. 3) Parkir di jalan diusulkan untuk dipindahkan ke area parkir terdekat yang diusulkan karena ini adalah area bisnis dan membutuhkan area parkir.
JL A Yani	Mobil	5	250	41	Barcelona Sport	0+300	0+550		
JL A Yani	Mobil	4	30	67	The Hallway Space	0+580	0+610		
JL A Yani	Mobil	78	150	43	Buana Gold Shoop	0+700	0+840		
JL A Yani	Motor	3	30	43	Toko Emas Jelita	0+850	0-880		
JL A Yani	Mobil	2	280	45	RKM Ahmad Yani	2+300	2+580		
JL A Yani	Mobil	1	440	46	RM Manado Wenang	2+600	3+050		

Tabel III-257 Rekomendasi Manajemen Parkir di Jalan ABC

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
JL ABC									
JL ABC	Motor	43	50	58	Orion Car Audio	0+185	0+225		1) Tidak ada kebutuhan mendesak untuk memindahkan/membatasi bagian ini dari parkir di jalan ini karena jalur BRT adalah lalu lintas campuran di bagian jalan ini. 2) Ada 3 rute BRT menggunakan jalan ini. 3) Diusulkan untuk mengurangi panjang parkir di jalan karena ada penyempitan jalan di bagian ini seperti yang ditunjukkan pada gambar di bawah ini yang dapat menghalangi lalu lintas.
JL ABC	Mobil	44	100	57	Gg. Danaatmaja	0+016	0+115		

Tabel III-258 Rekomendasi Manajemen Parkir di Jalan AhmaBAnceuyd Yani

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL BANCEUY								
Jl Banceuy	Mobil	45	360	56	Jl ABC to Jl Sunlaraja	0+250	0+612		1) Ada kebutuhan mendesak untuk memindahkan bagian parkir di jalan ini karena lebar jalannya sempit dan akan ada Bus BRT yang melewati jalan ini yang dapat menghalangi lalu lintas. 2) Lebar bus dan manuver parkir kendaraan yang masuk dan keluar dari tempat parkir akan menghambat lalu lintas dan membuat kemacetan lalu lintas. 3) Parkir di jalan diusulkan untuk dipindahkan ke area parkir terdekat yang diusulkan karena ini adalah area bisnis dan membutuhkan area parkir

Tabel III-259 Rekomendasi Manajemen Parkir di Jalan Dewi Sartika

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL DEWI SARTIKA								
Jl Dewi Sartika	Mobil	47	100	63	Monohotel	0+260	0+360		1) Seperti yang ditunjukkan pada gambar di sebelah kiri, jalur BRT akan menjadi jalur khusus yang terletak di tengah jalan sehingga akan mengurangi kapasitas jalan secara signifikan. Parkir di jalan harus dipindahkan/dibatasi. Salah satu saran adalah memindahkan parkir di jalan ke area parkir yang diusulkan di Balong gede. 2) Ada parkir sepeda motor di jalan di depan Yogya Kepatihan dan perlu dilepas untuk mengakomodasi pergerakan tenun ke terminal bus.
Jl Dewi Sartika	Motor	46	35	64	Yogya Kepatihan	0+385	0+420		

Tabel III-260 Rekomendasi Manajemen Parkir di Jalan Jenderal Sudirman

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL JENDERAL SUDIRMAN								
Jl Jend Sudirman	Mobil	7	25	36	Warteg Simpang Sudirman	0+025	0+050		1) Pada ruas jalan yang ditunjukkan pada gambar A, akan menjadi lalu lintas campuran dan ada jalur sepeda di sisi kanan jalan, sehingga parkir di jalan perlu dipindahkan/dipindahkan terutama di bagian jalur sepeda dari jalan. 2) Pada lokasi B, C dan D, akan ada pembongkaran tempat parkir dan digunakan sebagai jalur BRT khusus dengan marka jalan dengan 3 stasiun bus di sisi kiri di sepanjang jalan sepanjang Jl Jend Sudirman. 3) Parkir di jalan di sepanjang Jl Jend Sudirman perlu dihapus/dipindahkan untuk memastikan tidak ada penghalang pada jalur BRT dan jalur sepeda.
Jl Jend Sudirman	Mobil	8	110	35	Lestari Mainan	0+010	0+140		
Jl Jend Sudirman	Mobil	9	60	35	RM Gang Sempit	0+100	0+160		
Jl Jend Sudirman	Mobil	10	45	34	Pasona Textile	0+155	0+200		
Jl Jend Sudirman	Mobil	11	35	34	Ava Stationary	0+175	0+210		
Jl Jend Sudirman	Mobil	12	16	33	Phoenix Rasturant	0+229	0+245		
Jl Jend Sudirman	Mobil	13	11	32	Ayam & Ikan Goreng Capitol	0+254	0+265		
Jl Jend Sudirman	Mobil	14	50	32	Bubur Ayam Kang Dedi	0+240	0+290		
Jl Jend Sudirman	Mobil	15	160	31	Samitex	0+320	0+480		
Jl Jend Sudirman	Mobil	16	70	31	Sudirman Street Day & Night Market	0+380	0+450		
Jl Jend Sudirman	Mobil	17	40	30	Hongkong Restaurant	0+520	0+560		
Jl Jend Sudirman	Mobil	18	90	29	Lab Gigi Ait Dental	0+495	0+585		
Jl Jend Sudirman	Mobil	19	16	29	PD Hasil; Toko Sandal	0+574	0+590		

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
[redacted]	JL JENDERAL SUDIRMAN								
Jl Jend Sudirman	Mobil	20	30	28	TB Pusaka Jaya	0+660	0+690		
Jl Jend Sudirman	Mobil	21	85	26	Makmur Sandal Store	0+675	0+760		
Jl Jend Sudirman	Mobil	22	15	27	Phoenix 56 Restaurant	0+700	0+715		
Jl Jend Sudirman	Mobil	23	10	26	Salon Mobil FR Autosports	0+745	0+755		
Jl Jend Sudirman	Mobil	24	70	25	Jaya Agung Toyota	0+770	0+840		
Jl Jend Sudirman	Mobil	25	100	25	Basal AS	0+770	0+870		
Jl Jend Sudirman	Mobil	26	30	24	Apotek Sudirman Farma	0+895	0+925		
Jl Jend Sudirman	Mobil	27	20	23	Cinta Rasa Bakery	0+990	0+970		
Jl Jend Sudirman	Mobil	28	35	22	9dbit-Video Game Store	1+015	1+050		
Jl Jend Sudirman	Mobil	29	200	21	Kuang Ming Vehetarian Restaurant	1+130	0+915		
Jl Jend Sudirman	Mobil	30	130	20	Sate DJ	1+090	1+220		
Jl Jend Sudirman	Mobil	31	50	20	PT Hara Gema Dharma	1+175	1+225		

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
[redacted]	JL JENDERAL SUDIRMAN								
Jl Jend Sudirman	Mobil	32	30	19	Bank BNI Jend Sudirman	1+265	1+295		
Jl Jend Sudirman	Mobil	33	35	18	Psikotes Ateja	1+335	1+350		
Jl Jend Sudirman	Mobil	34	400	17	Martabak NU Nikmat Andir	1+430	1+830		
Jl Jend Sudirman	Mobil	35	50	16	SDN 060 Raya Barat	2+310	2+260		
Jl Jend Sudirman	Mobil	36	60	16	Mie Kocok H. Amsar	2+315	2+255		

Tabel III-261 Rekomendasi Manajemen Parkir di Jalan Kebon Jati

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL KEBON JATI								
Jl Kebon Jati	Mobil	68	135	5	TB Agung Jaya	0+015	0+150		1) Seperti yang ditunjukkan pada gambar di sebelah kiri, jalur BRT akan menjadi jalur khusus yang terletak di tengah jalan dengan jalur sepeda di pinggir jalan sehingga akan mengurangi kapasitas jalan secara signifikan. Parkir di jalan harus dihapus/dipindahkan. 2) Pada gambar D akan ada terminal bus di tengah jalan depan RS Kebon Jati. Ada juga tata letak serupa di terminal bus Trinity dan Stasiun Hall
Jl Kebon Jati	Mobil	67	200	6	Waringin Junior High School	0+100	0+300		
Jl Kebon Jati	Motor	74	360	7	ABS Pasko Pskal Hypersquare	0+175	0+535		
Jl Kebon Jati	Motor	66	460	8	Bubur Ahong	0+330	0+790		
Jl Kebon Jati	Motor	75	160	9	RS Kebon Jati	0+575	0+735		
Jl Kebon Jati	Mobil	65	85	10	GKI Kebonjati	0+910	0+995		Seperti yang ditunjukkan pada gambar di sebelah kiri, jalur BRT akan menjadi jalur khusus yang terletak di tengah jalan dengan jalur sepeda di pinggir jalan sehingga akan mengurangi kapasitas jalan secara signifikan. Parkir di jalan harus dihapus / dipindahkan.
Jl Kebon Jati	Motor	64	150	11	Santoso Hospital	1+015	1+165		
Jl Kebon Jati	Mobil	63	50	12	Yokotel Hotel	1+200	1+250		
Jl Kebon Jati	Mobil	76	50	13	Sumber Mandiri AC	1+200	1+250		

Tabel III-262 Rekomendasi Manajemen Parkir di Jalan Moch Toha

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL MOCHAMAD TOHA								
Jl Moch Toha	Mobil	50	110	62	Sate Acong Hubdam	0+665	0+765		Lebar jalannya cukup lebar tetapi ada jalur BRT khusus dengan trotoar dan jalur sepeda di pinggir jalan sehingga parkir di jalan harus dilepas/dipindahkan agar tidak menghalangi jalur.
Jl Moch Toha	Mobil	49	110	61	Kaca Film Cool Plus	1+040	1+150		
Jl Moch Toha	Mobil	48	110	60	Plaza Parahyangan	1+310	1+420		

Tabel III-263 Rekomendasi Manajemen Parkir di Jalan Naripan

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL NARIPAN								
Jl Naripan	Mobil	41	45	37	Sate Braga Taichan dan Yakitori	0+220	0+265		
Jl Naripan	Mobil	40	35	38	Warung Nasi C'Mar	0+255	0+290		
Jl Naripan	Mobil	38	550	39	Ny. Liem Restaurant	0+290	0+835		1) Ada Jalur BRT khusus dengan marka jalan dan jalur sepeda di sisi lain jalan. Parkir di jalan dan relokasi untuk jalan ini diperlukan untuk mengakomodasi Jalur BRT dan jalur sepeda khusus.
Jl Naripan	Mobil	39	550	39	PT TataPusaka Sentosa Textile	0+300	0+850		

Tabel III-264 Rekomendasi Manajemen Parkir di Jalan Otista

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL OTTO ISKANDAR DINATA								
Jl Otista	Mobil	59	100	47	Pasar Baru Shooping Mall	0+240	0+340		
Jl Otista	Mobil	58	240	48	Toko Barokah Textile	0+400	0+640		1) Di bagian Jl Otista ini jalur BRT akan berada di sisi kiri jalan dan jalur sepeda di sisi kanan, sehingga parkir di jalan harus dihapus/dipindahkan.
Jl Otista	Mobil	57	240	49	Toko Mas Tandjung	0+680	0+920		
Jl Otista	Mobil	56	400	50	Bank BJB KCP Otista	0+935	1+335		
Jl Otista	Mobil	55	17	51	SPBU Pertamina Otista	1+693	1+710		
Jl Otista	Mobil	54	75	52	BRI KCP Otista	1+745	1+820		
Jl Otista	Mobil	53	150	53	Oppo Store Otista	1+870	2+020		1) Di bagian Jl Otista ini, parkir di jalan juga perlu dihapus/dipindahkan karena ada jalur khusus BRT dan jalur sepeda.
Jl Otista	Mobil	52	40	54	Toko Sinar Bintang	2+095	2+055		
Jl Otista	Mobil	51	100	55	Bintang Fajar Kimia	2+175	2+275		

Tabel III-265 Rekomendasi Manajemen Parkir di Jalan Rajawali Timur

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL RAJAWALI TIMUR								
Jl Rajawali Timur	Motor	72	115	2	Servis Radiator Dua Saudara	0+745	0+860		1).Lebar jalan tidak begitu lebar dan akan ada jalur bus khusus di tengah jalan dan juga stasiun bus, sehingga area parkir di jalan harus dipindahkan/dibatasi.
Jl Rajawali Timur	Mobil	73	160	1	Toko Juana	0+750	0+910		
Jl Rajawali Timur	Mobil	70	125	3	Baja Sakti Utama	0+955	1+080		2). Parkir di jalan masih dapat menggunakan sisi kiri jalan tetapi perlu dikonsentrasikan di beberapa lokasi dan bukan di sepanjang jalan.
Jl Rajawali Timur	Mobil	71	80	3	Bubur Ayam Aline	0+970	1+050		
Jl Rajawali Timur	Mobil	69	90	4	Toko Central Timbangan	1+360	1+450		

Tabel III-266 Rekomendasi Manajemen Parkir di Jalan Suniaraja

Sumber: PMC 2024

NAMA JALAN	KENDARAAN	ID1	PANJANG (m)	Foto No.	Tempat Ramai	KILOMETER		Gambar	Manajemen Parkir
						Mulai	Selesai		
	JL SUNIARAJA								
Jl Suniaraja	Mobil	61	200	15	Hong Lie Tool Store	0+370	0+170		1).Bus BRT akan bercampur dengan lalu lintas umum tetapi ada banyak rute yang melintasi jalan ini sehingga untuk memastikan tidak ada penghalang lalu lintas, parkir di jalan perlu dibatasi di sepanjang jalan ini. 2).Manuver kendaraan parkir juga akan menyebabkan hambatan lalu lintas yang belum disebutkan karena dimensi bus, pasti akan menghalangi lalu lintas.
Jl Suniaraja	Mobil	60	90	65	Martabak Sari Sunda	0+910	0+950		
Jl Suniaraja	Mobil	62	175	14	PT Sari Amandamai	1+365	1+540		

III.1.8 Analisis Fasilitas Pejalan Kaki (*Non-Motorized Transportation*)

Program peningkatan lingkungan pejalan kaki di Bandung, yang dikenal sebagai "Panca Trotoar" difokuskan pada empat tujuan utama dan kegiatan terkait:

1. Merevitalisasi trotoar;
2. Mengembangkan jalur pejalan kaki baru;
3. Meningkatkan keselamatan pejalan kaki; dan
4. Meningkatkan daya tarik visual trotoar.

Program ini bertujuan untuk mencapai tujuan ini dengan memastikan semua trotoar memiliki bangku untuk beristirahat; bola batu untuk mencegah lalu lintas di trotoar; pot bunga untuk dekorasi; tong sampah untuk kebersihan; dan penerangan jalan umum untuk keselamatan.

Pada tahun 2015, Kota Bandung menetapkan kriteria berikut untuk penyediaan dan atau pengembangan trotoar:

- Pada daerah dengan kepadatan penduduk tinggi;
- Pada sepanjang jalan dengan rute angkutan umum tetap;
- Pada area yang memiliki pergerakan pejalan kaki berkelanjutan yang tinggi (seperti jalan perbelanjaan dan pasar);
- Pada tempat-tempat yang memiliki arus pejalan kaki yang tinggi pada waktu-waktu tertentu dalam sehari (seperti stasiun bus dan kereta api, sekolah, rumah sakit, atau fasilitas olahraga); dan
- Pada Tempat-tempat yang memiliki arus pejalan kaki yang tinggi pada hari-hari tertentu (seperti stadion dan masjid).

Berdasarkan kriteria tersebut, Kota Bandung menetapkan empat strategi untuk meningkatkan trotoar:

- Meningkatkan kualitas trotoar yang ada (terutama di sekitar pusat kegiatan atau di CBD) dengan langkah-langkah peningkatan dan penambahan fasilitas pejalan kaki seperti penerangan jalan, tempat duduk, dll;
- Penambahan fasilitas pejalan kaki pada trotoar yang sudah ada seperti lampu jalan, tempat duduk, tempat sampah, dan zebra cross. penyeberangan, dll;
- Menambahkan trotoar ke jalan yang hanya memiliki trotoar di satu sisi jalan;
- Menambahkan trotoar ke jalan yang tidak memiliki fasilitas pejalan kaki.

Meskipun telah terjadi perbaikan yang cukup besar pada trotoar di dalam dan sekitar CBD, hanya 15% dari jaringan jalan Kota Bandung yang memiliki trotoar. Diperkirakan terdapat 177 kilometer trotoar di sepanjang jaringan jalan yang mencakup sekitar 1.200 kilometer. Kurangnya trotoar terkonsentrasi di kecamatan Ciwastra dan Kecamatan Ujung berung.

Fasiltas Pejalan Kaki di Koridor Jalur Khusus BRT

Perbaikan fasilitas pejalan kaki pad akoridor jalur khusus BRT dilakukan dalam radius 300 m disetiap halte dan simpang – simpang yang dilalui jalur khusus tersebut, hal ini dilakukan untuk dapat memberikan fasilitas kepada pengguna BRT agar mudah mengakses halte BRT.

Fasilitas pejalan kaki pada koridor jalur khusus BRT ditingkatkan berdasarkan kriteria berikut:

- Memprioritaskan Pemasangan Trotoar pada Jalan dengan lebar mencukupi
- Meningkatkan Infrastruktur Pejalan Kaki di Dekat Titik Bangkitan
- Memperluas Akses Jalan Kaki hingga di Luar Radius 300 Meter menuju Titik Bangkitan
- Mengatasi Tantangan pada Bagian Jalan yang Sempit.

Beriku adalah rekomendasi perbaikan fasilitas pejalan kaki pada koridor jalur khusus BRT yang telah di validasi.

Gambar III-267 Rekomendasi Perbaikan Fasilitas Pejalan Kaki di Koridor Jalur Khusus BRT

Sumber: PMC 2024

Bagian ini dapat dikecualikan dari desain saat ini. Revitalisasi pasar harus dilakukan terlebih dahulu, karena saat ini tidak ada cukup ruang untuk memasang trotoar, dan mengatasinya akan membutuhkan upaya pemukiman kembali yang signifikan karena keberadaan "pasar tumpah".

Gambar III-268 Rekomendasi Perbaikan Fasilitas Pejalan Kaki Bagian 1

Sumber: PMC 2024

Peningkatan umumnya berada dalam radius 300 m, tetapi beberapa bagian memanjang lebih dari 300 meter untuk mengakomodasi akses ke tempat-tempat menarik yang signifikan.

Gambar III-269 Rekomendasi Perbaikan Fasilitas Pejalan Kaki Bagian 2

Sumber: PMC 2024

Peningkatan umumnya berada dalam radius 300 m, tetapi beberapa bagian memanjang lebih dari 300 meter untuk mengakomodasi akses ke tempat-tempat menarik yang signifikan.

Gambar III-270 Rekomendasi Perbaikan Fasilitas Pejalan Kaki Bagian 3

Sumber: PMC 2024

Tabel III-271 Rekomendasi Fasilitas Pejalan Kaki di Koridor Jalur Khusus BRT

Sumber: PMC 2024

No	Nama Jalan	Panjang	Kondisi Eksisting	DEDC		PMC	
				Rekomendasi	Catatan	Rekomendasi	Catatan
1	Jl. Pecinan Lama	216	Sudah ada trotoar; tetapi dengan lebar yang tidak mencukupi, mereka penuh sesak dengan pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Trotoar yang rusak sebagian membutuhkan pelapisan ulang dan penambahan blok pemandu.
2	Jl. ABC	272	Sudah ada trotoar, sebagian rusak, hanya perlu merelokasi pedagang kaki lima.	*Included*	Perbaiki trotoar dengan desain asli, dan pindahkan pedagang kaki lima	*Included*	
3	Jl. Kepatihan	260	Sudah ada trotoar, hanya perlu merelokasi pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu
4	Jl. Pasirkoja	364	Sudah ada trotoar, ada yang rusak parah, perlu merelokasi beberapa tiang, memperbaiki pintu masuk toko, ramai pedagang kaki lima.	*Included*	Perbaiki trotoar, pindahkan tiang listrik, potong pohon & relokasi pedagang kaki lima	*Included*	
5	Jl. Pungkur	250	Sudah ada trotoar, sangat rusak, perlu memindahkan beberapa tiang, penuh sesak dengan pedagang kaki lima.	*Included*	Perbaiki trotoar yang rusak / diet jalan & potong pohon / pembebasan lahan	*Included*	
6	Jl. Ciateul	660	Tidak ada trotoar, dan lebarnya sangat tidak mencukupi untuk pejalan kaki, membutuhkan diet jalan.	*Included*	Perbaiki trotoar yang rusak / diet jalan & potong pohon / pembebasan lahan	*Included*	
7	Jl.Peta	112	Sudah ada trotoar, sangat rusak, perlu memindahkan beberapa tiang, penuh sesak dengan pedagang kaki lima.	*Included*	Perbaiki ruas trotoar yang rusak, dan pindahkan pedagang kaki lima	*Included*	
8	Jl. Moh Toha	269	Sudah ada trotoar, satu sisi perlu diperbaiki, sisi kiri, dan merelokasi beberapa tiang & relokasi pedagang kaki lima.	*Included*	Pindahkan beberapa tiang, perbaiki, dan pindahkan pedagang kaki lima	*Included*	
9	Jl. BKR	282	Sudah ada trotoar, bisa diperlebar dengan menutup parit drainase.	*Included*	Tutup saluran drainase dan perlebar jalur pejalan kaki dengan desain asli	*Included*	
10	Jl. Cikapundung Barat	190	Sudah ada trotoar, hanya perlu merelokasi pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu

No	Nama Jalan	Panjang	Kondisi Eksisting	DEDC		PMC	
				Rekomendasi	Catatan	Rekomendasi	Catatan
11	Jl. Sukarno/Cikapundung Timur	182	Sudah ada trotoar.	*Excluded*		*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu
12	Jl. Braga	583	Sudah ada trotoar.	*Excluded*		*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu
13	Jl. Tamblong	183	Sudah ada trotoar.	*Excluded*	Perbaiki trotoar yang rusak / diet jalan & potong pohon / pembebasan lahan	*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu. Trotoar yang rusak membutuhkan pelapisan ulang dan penambahan blok pemandu.
14	Jl. Veteran	99	Sudah ada trotoar, ada yang rusak, perlu diperbaiki terutama di sisi kiri, beberapa bangunan yang menonjol ke trotoar perlu diatur.	*Included*	Buat yang baru, Membutuhkan Diet Jalan	*Included*	
15	Jl. Sunda	184	Ada yang memiliki trotoar, rusak, lebar tidak memenuhi persyaratan, perlu makan jalan, merelokasi tiang listrik, dan merelokasi pedagang kaki lima.	*Included*	Pindahkan pedagang kaki lima saja	*Included*	
16	Jl. Gandapura	388	Sudah ada trotoar, lebar tidak memenuhi persyaratan, tidak bisa memiliki diet jalan, karena jalan dua arah yang sempit + parkir di satu sisi + merelokasi pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Trotoar yang terhalang oleh pedagang kaki lima memerlukan pelapisan ulang, penambahan blok pemandu, dan menutupi area drainase.
17	Jl. Gudang Utara		Sudah ada trotoar, lebar tidak memenuhi persyaratan, tidak bisa memiliki diet jalan, karena jalan dua arah yang sempit + parkir di satu sisi + merelokasi pedagang kaki lima.	*Excluded*		*Included*	Trotoar yang terhalang oleh pedagang kaki lima memerlukan pelapisan ulang, penambahan blok pemandu, dan menutupi area drainase.
18	Jl. Riau (LLRE Martadinata)	310	Sudah ada trotoar.	*Excluded*		*Included*	
19	Jl. Supratman	119	Sudah ada trotoar.	*Excluded*		*Included*	Saat ini tidak ada trotoar di bagian ini. Konstruksi hanya layak di sisi kiri karena keterbatasan ruang; pelapisan ulang diperlukan.
20	Jl. Terusan Jakarta	145	Sudah ada trotoar, hanya perlu merelokasi pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu

No	Nama Jalan	Panjang	Kondisi Eksisting	DEDC		PMC	
				Rekomendasi	Catatan	Rekomendasi	Catatan
21	Jl. Ibrahim Adjie-Kiaracondong	248	Sudah ada trotoar, tidak memenuhi persyaratan, perlu diet jalan, dan merelokasi tiang listrik, dan tiang lainnya, merelokasi pedagang kaki lima.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu.	*Included*	
22	Jl. Laswi	357	Sudah ada trotoar, rusak, tidak memenuhi persyaratan, perlu menutup drainase, merelokasi tiang listrik, dan pedagang kaki lima.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu.	*Included*	
23	Jl. Sukabumi	200	Sudah ada trotoar, rusak, tidak memenuhi persyaratan, perlu diet jalan, menutup drainase, merelokasi tiang listrik, dan pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Melapisi ulang dan menutupi drainase sangat penting untuk meningkatkan ruang trotoar.
24	Jl. Kembang Sapatu	141	Tidak ada trotoar, perlu diet jalan dan merelokasi pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Excluded*	
25	Jl. Gatot Subroto	362	Beberapa trotoar sudah ada, tidak memenuhi persyaratan, sempit membutuhkan diet jalan, perlu memindahkan tiang listrik, posisi telepon zigzag.	*Included*	Bangun yang baru, dengan pemangkasan pohon parsial	*Included*	
26	Jl. Karapitan	154	Beberapa trotoar sudah ada, tidak memenuhi persyaratan, sempit membutuhkan diet jalan, perlu memindahkan tiang listrik, posisi telepon zigzag.	*Included*	Bangun yang baru, dengan pemangkasan pohon parsial	*Included*	
27	Jl. Dulatip	509	Trotoar sudah ada, tidak memenuhi persyaratan, sempit, perlu diet jalan, kemacetan, banyak aktivitas PKL di trotoar.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu.	*Included*	
28	Jl. Gardujati	428	Sudah ada trotoar, tidak memenuhi persyaratan, perlu merelokasi tiang listrik, merelokasi pedagang kaki lima, banyak kusen pintu yang terputus.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu.	*Included*	
29	Jl. Astana Anyar	353	Sudah ada trotoar, tidak memenuhi persyaratan, perlu merelokasi tiang listrik, merelokasi pedagang kaki lima, banyak kusen pintu yang terputus.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu, dan diperpanjang	*Included*	
30	Jl. Cibadak	205	Sudah ada trotoar di bawah Arcade di properti pribadi, hanya banyak pedagang kaki lima, hanya perlu memindahkan pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu

No	Nama Jalan	Panjang	Kondisi Eksisting	DEDC		PMC	
				Rekomendasi	Catatan	Rekomendasi	Catatan
31	Jl. Kelenteng	334	Trotoar sudah ada, hanya perlu merelokasi pedagang kaki lima.	*Excluded*	Pindahkan pedagang kaki lima saja	*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu
32	Jl. Waringin	330	Tidak ada trotoar, jalan sempit, padat.	*Excluded*	Pindahkan pedagang kaki lima saja	*Excluded*	
33	Jl. Jamika	107	Sudah ada trotoar, tidak memenuhi persyaratan, sempit kebutuhan untuk menutup drainase & diet jalan, banyak aktivitas warga di trotoar.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu	*Included*	
34	Jl. Andir	315	Tidak ada trotoar, jalan sempit, padat, hanya satu sisi trotoar, perlu diet jalan dan menutup lubang drainase.	*Excluded*		*Excluded*	
35	Jl. Garuda (Abdurahman Saleh)	590	Sudah ada trotoar, sempit, bisa diperlebar dengan menutup parit drainase.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu	*Included*	
36	Jl. Elang Raya	486	Sudah ada trotoar, sempit, satu sisi bisa diperlebar dengan menutup parit drainase.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu	*Included*	
37	Jl. Elang	238	Sudah ada trotoar, tidak perlu perawatan lebih lanjut.	*Excluded*		*Included*	Sertakan dalam gambar meskipun perawatan lebih lanjut tidak diperlukan. Pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu
38	Jl. Soekarno Hatta	122	Beberapa trotoar sudah ada, tidak memenuhi persyaratan, sempit membutuhkan diet jalan, banyak aktivitas penghuni di trotoar.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu	*Included*	
39	Jl. Ciroyom Baru	773	Jalan kecil, tidak ada trotoar, Banyak pedagang kaki lima sulit untuk dipindahkan.	*Excluded*	Pindahkan pedagang kaki lima saja	*Excluded*	
40	Jl. Coroyom		Jalan kecil, tidak ada trotoar, Banyak pedagang kaki lima sulit untuk dipindahkan.	*Excluded*	Pindahkan pedagang kaki lima saja	*Excluded*	
41	Jl. Ardjuna	332	Jalan kecil, tidak ada trotoar, Banyak pedagang kaki lima sulit untuk dipindahkan.	*Excluded*	Pindahkan pedagang kaki lima saja	*Excluded*	
42	Jl. Pasirkaliki	161	Trotoar sudah ada, tidak memenuhi persyaratan, sempit, perlu diet jalan, kemacetan, banyak aktivitas di trotoar.	*Included*	Lengkapi desain dengan infrastruktur yang ada, pastikan semua elemen trotoar diperiksa secara menyeluruh dan didesain ulang jika perlu	*Included*	

III.1.9 Identifikasi Permasalahan Lalu Lintas Eksisting

Untuk dapat mengetahui dan memahami permasalahan transportasi dan lalu lintas di kawasan studi, survey pengumpulan data primer dan pengamatan di lapangan telah dilakukan, yang meliputi survey pencacahan lalu lintas, serta pengamatan kondisi lapangan untuk melakukan identifikasi terhadap hal-hal yang diperkirakan berpotensi akan menimbulkan masalah lalu lintas secara umum, khususnya masalah lalu lintas akibat pembangunan. Sesuai dengan karakteristik permasalahan lalu lintas yang dibangkitkan oleh suatu pengembangan yaitu pengaruh yang terjadi dapat meluas jauh dari lahan pengembangan, maka cakupan wilayah kajian termasuk identifikasi masalah jauh lebih luas daripada sekedar daerah pengembangan pembagunan itu sendiri.

Selanjutnya identifikasi masalah yang telah dirangkum oleh konsultan dan akan diuraikan sebagai berikut. Dari pengamatan survey Simpang dan Ruas yang dilakukan pada jam sibuk pagi, jam sibuk siang dan jam sibuk sore telah diidentifikasi permasalahan sebagai berikut:

Tabel III-9 Kondisi Fisik dan Permasalahan Lalu Lintas Pada Ruas Jalan yang dilalui Jalur Khusus BRT

Sumber: Hasil Analisa Konsultan

No	Nama Jalan	Tipe Jalan	Tata Guna Lahan	Kondisi	
				Fisik	Lalu Lintas
1	Jl. Asia Afrika	4/1 UD	Area Komersil, Perkantoran & Kawasan Heritage	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada saat pagi dan sore hari, jalan merupakan akses utama dari timur menuju ke pusat kota
2	Jl. Jend. Sudirman (Sisi Timur)	2/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal baik, marka dan rambu msih cukup jelas	Volume ramai pada saat pagi dan sore hari
3	Jl. Jend. Sudirman (Tengah)	4/2 D	Area Komersil, Sekolah & Perkantoran	Secara umum kondisi aspal baik, marka dan rambu masih cukup jelas	Volume ramai pada saat pagi dan sore hari

No	Nama Jalan	Tipe Jalan	Tata Guna Lahan	Kondisi	
				Fisik	Lalu Lintas
4	Jl. Jend. Sudirman (Sisi Barat)	4/1 D	Area Komersil, Sekolah, Masjid & Perkantoran	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada pagi, siang maupun sore hari. Antrian panjang terjadi disekitar simpang cibereum karena terdapat pemberhentian angkot, jalan merupakan akses utama menuju ke luar daerah kota sisi barat
5	Jl. Rajawali Barat	3/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada saat pagi hari, jalan merupakan akses utama dari sisi barat menuju kota
6	Jl. Rajawali Timur	3/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada saat pagi hari, jalan merupakan akses utama dari sisi barat menuju kota
7	Jl. Kebon Jati	4/1 UD	Area Komersil, Rumah Sakit, Gereja, Sekolah & Perkantoran	Secara umum kondisi aspal baik, namun marka dan rambu sudah tidak terlalu jelas	Volume ramai pada pagi, siang maupun sore hari, Antrian panjang terjadi disekitar pasar
8	Jl. Suniaraja	3/1 UD	Area Komersil, Terminal & Perkantoran	Secara umum kondisi aspal baik, namun marka dan rambu sudah tidak terlalu jelas	Volume ramai pada pagi, siang maupun sore hari, Antrian panjang terjadi disekitar terminal
9	Jl. Banceuy	2/1 UD	Area Komersil, Perkantoran dan kawasan Heritage	Secara umum kondisi aspal baik, marka dan rambu cukup jelas	Volume ramai pada pagi, siang dan sore hari, antrian terjadi hampir di sepanjang jalan karena kapasitas jalan yang berkurang akibat adanya parking on street
10	Jl. ABC	2/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal baik, namun marka dan rambu sudah tidak terlalu jelas	Volume ramai pada pagi dan sore hari
11	Jl. Naripan (Sisi Barat)	2/1 UD	Area Komersil, Area Publik & Perkantoran	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada pagi dan sore hari

No	Nama Jalan	Tipe Jalan	Tata Guna Lahan	Kondisi	
				Fisik	Lalu Lintas
12	Jl. Naripan (Sisi Timur)	2/2 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal baik, namun marka dan rambu sudah tidak terlalu jelas	Volume ramai pada pagi dan sore hari
13	Jl. Ahmad Yani A1 (SW-NE)	4/2 UD	Area Komersil, Rel Kereta Api, & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada pagi dan sore hari, jalan merupakan salah satu akses menuju dan dari arah timur
14	Jl. Ahmad Yani A2 (SW-NE)	3/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada pagi dan sore hari, jalan merupakan salah satu akses menuju dan dari arah timur
15	Jl. Ahmad Yani B1 (NE-SW)	4/2 UD	Area Komersil, Rel Kereta Api, & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada pagi dan sore hari, jalan merupakan salah satu akses menuju dan dari arah timur
16	Jl. Ahmad Yani B2 (NE-SW)	4/1 UD	Area Komersil & Area Publik	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada pagi dan sore hari, karena merupakan salah satu akses dari arah timur menuju ke kota
17	Jl. Ibrahim Adjie	4/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada pagi dan sore hari
18	Jl. Jakarta	4/1 UD	Area Komersil, Perguruan Tinggi, Rutan, & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada pagi dan sore hari
19	Jl. Otto Iskandar Dinata	3/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume ramai pada sepanjang pagi sampai sore hari, karena jalan ini merupakan akses yang berada di salah satu pusat komersil
20	Jl. BKR	4/2 D	Area Komersil, Perkantoran, & Area Publik	Secara umum kondisi aspal baik, marka dan rambu masih cukup jelas	Volume ramai pada pagi, siang dan sore hari
21	Jl. Moch. Toha (Sisi Selatan)	2/2 UD	Area Komersil, Perkantoran, & Area Publik	Secara umum kondisi aspal baik, marka dan rambu masih cukup jelas	Volume kendaraan tidak terlalu ramai pada area ini
22	Jl. Moch. Toha (Sisi Utara)	4/1 UD	Area Komersil	Secara umum kondisi aspal baik, marka dan rambu masih cukup jelas	Volume tidak terlalu ramai, namun terdapat parking on street pada area tersebut

No	Nama Jalan	Tipe Jalan	Tata Guna Lahan	Kondisi	
				Fisik	Lalu Lintas
23	Jl. Pungkur	3/1 UD	Area Komersil & Perkantoran	Secara umum kondisi aspal cukup baik, namun marka dan rambu sudah tidak jelas	Volume tidak terlalu ramai, namun terdapat parking on street pada area tersebut
24	Jl. Dewi Sartika (Sisi Selatan)	4/1 UD	Area Komersil & Gereja	Secara umum kondisi aspal baik, marka dan rambu masih cukup jelas	Volume tidak terlalu ramai namun terdapat parking on street di jalan tersebut
25	Jl. Dewi Sartika (Sisi Utara)	3/1 D	Area Komersil & Perkantoran	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada pagi dan sore hari, antrian terjadi karena adanya Alun – alun Bandung yang hampirselalu ramai pengunjung
26	Jl. Dalem Kaum	4/1 D	Area Publik, Bank, & Masjid	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada pagi dan sore hari, antrian terjadi karena adnya pemberhentian bis tour pada pintu masuk Alun – alun Bandung
27	Jl. Alun - alun Timur	3/2 D	Area Publik	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada pagi, siang dan sore hari, karena terdapat pemberhentian angkot dan bis di depan Alun – alun Bandung
28	Jl. Sunda	3/1 UD	Area Komersil	Secara umum kondisi aspal baik, marka dan rambu jelas	Volume ramai pada saat pagi dan sore hari
29	Jl. Veteran	2/1 UD	Area Komersil	Secara umum kondisi aspal baik, namun marka dan rambu sudah tidak terlalu jelas	Volume ramai pada saat pagi dan sore hari

Tabel III-10 Permasalahan Lalu Lintas Eksisting di Simpang

Sumber: Analisis Konsultan

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
1	A. Yani - Santo Yusuf	344	Simpang ini tidak memiliki APILL dan marka jalan yang sudah mulai hilang	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
2	Kiaracondong (APILL)	444	Simpang ini terdapat jembatan layang *(flyover)* yang mengakses dari Antapani menuju Jl. Jakarta. Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
3	Jakarta - A Yani	544	Di persimpangan ini terdapat jembatan layang *(flyover)* yang mengakses dari Antapani menuju jalan Sudirman. Simpang ini tidak memiliki APILL, marka dan rambu sudah mulai hilang.	Volume kendaraan pada simoang ini tidak terlalu padat
4	Laswi (APILL)	444	Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
5	Simpang Lima (APILL	534	Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
6	Lengkong Besar (APILL)	444	Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
7	Karanganyar (APILL)	424	Simpang ini memiliki APILL serta marka dan rambu masih terlihat jelas.	Volume kendaraan pada simoang ini tidak terlalu padat

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
8	Gardujati (APILL)	423	Simpang ini memiliki APILL namun marka dan rambu sudah mulai hilang.	Volume kendaraan pada simoang ini tidak terlalu padat
9	Jamika (APILL)	344	Simpang ini memiliki APILL namun marka dan rambu sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
10	Garuda	334	Simpang ini tidak memiliki APILL, marka dan rambu sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk sore
11	Bundaran Cibeureum (APILL)	444	Simpang ini memiliki APILL serta rambu jelas namun marka sudah mulai menghilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
12	Cibeureum	334	Simpang ini tidak memiliki APILL tetapi marka dan rambu masih jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
13	Nurtanio (APILL)	444	Simpang ini memiliki APILL , rambu masih cukup jelas namun marka sudah mulai menghilang.	Volume kendaraan pada simoang ini tidak terlalu padat
14	Simpang Paskal (APILL)	444	Simpang ini memiliki APILL , rambu masih cukup jelas namun marka sudah mulai menghilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
15	Simpang Pasar Baru	424	Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
16	Suniaraja	334	Simpang ini tidak memiliki APILL tapi rambu dan marka masih jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
17	ABC	424	Simpang ini memiliki APILL , rambu dan marka masih cukup jelas.	Kondisi lalu lintas pada simpang ini sibuk pada hari jumat, sabtu dan minggu
18	Naripan-Braga	444	Simpang ini memiliki APILL yang hanya memberikan rambu peringatan waspada, rambu dan marka sudah mulai hilang.	Kondisi lalu lintas pada simpang ini sibuk pada hari jumat, sabtu dan minggu
19	Naripan-Sunda	424	Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai menghilang serta banyak kabel yang melintang di simpang tersebut.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
20	Veteran - A Yani	423	Simpang ini tidak memiliki APILL tapi rambu dan marka masih jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
21	Banceuy	324	Simpang ini tidak memiliki APILL tapi rambu dan marka masih jelas serta memiliki sinyal penyeberangan bagi pejalan kaki pada ruas jl. Asia Afrika.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
22	Alun-alun Bandung	324	Simpang ini tidak memiliki APILL tapi rambu dan	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
			marka masih jelas.	
23	Dalemkaum	423	Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk sore
24	Pungkur	444	Simpang ini memiliki APILL , rambu dan marka masih cukup jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk siang
25	Balonggede	424	Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai menghilang serta banyak kabel yang melintang di simpang tersebut.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk siang
26	Inggit Ganarsih - Moh.Toha (APILL)	444	Simpang ini memiliki APILL , rambu dan marka masih cukup jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk sore
27	BKR - M.Toha (APILL)	444	Simpang ini memiliki APILL , rambu dan marka masih cukup jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
28	BKR - Tegalega (APILL)	424	Simpang ini memiliki APILL , rambu dan marka masih cukup jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
29	Inggit - Otista	424	Simpang ini memiliki APILL namun tidak lagi, rambu dan marka sudah mulai menghilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
30	Jl.Pasirkoja (APILL)	424	Simpang ini memiliki APILL , rambu dan marka sudah mulai menghilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
31	Tambolong (APILL)	423	Simpang ini memiliki APILL , rambu dan marka sudah mulai menghilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi, siang dan sore
32	Gudang Utara - A.Yani (APILL)	424	Simpang ini memiliki APILL , rambu dan marka sudah mulai menghilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
33	Ciroyom	344	Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
34	Andir	323	Simpang ini tidak memiliki APILL, rambu dan marka sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
35	Rajawali	344	Simpang ini tidak memiliki APILL , rambu dan marka masih cukup jelas.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore
36	Braga - Asia Afrika	423	Simpang ini tidak memiliki APILL tapi rambu dan marka masih jelas serta memiliki sinyal penyeberangan bagi pejalan kaki pada ruas jl. Asia Afrika.	Kondisi lalu lintas pada simpang ini sibuk pada hari jumat, sabtu dan minggu
37	Veteran - Sunda	444	Simpang ini memiliki APILL, rambu dan marka sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore

No	Nama Simpang	Jenis Simpang	Kondisi	
			Fisik	Lalu Lintas
38	Malabar	324	Simpang ini memiliki APILL namun tidak difungsikan, rambu dan marka sudah mulai hilang.	Volume kendaraan pada simpang ini cukup padat pada jam sibuk pagi dan sore

Tabel III-11 Permasalahan Lalu Lintas Eksisting di Terminal & *End Station*

Sumber: Analisis Konsultan

No	Nama End Station	Tipe End Station	Land Use	Kondisi	
				Fisik	Lalu Lintas
1	Antapani	Terminal Tipe B	Terdapat Kantor Dishub, musholah, toilet, dan kios	Secara Umum kondisi fisik terminal ini masih cukup baik.	Kondisi Lalu lintas pada terminal ini tergolong sepi karena hanya sekitar ±50 kendaraan yang masuk ke terminal ini. Kebnyakan angkot parkir di luar terminal
2	Banjaran	Terminal Tipe C	Terdapat Kantor Dishub, toilet, dan kios	Secara umum kondisi fisik terminal sudah kurang baik.	Kondisi Lalu lintas pada terminal ini tergolong sepi karena hanya sekitar ±50 kendaraan yang masuk ke terminal ini. Kebnyakan angkot parkir di luar terminal

No	Nama End Station	Tipe End Station	Land Use	Kondisi	
				Fisik	Lalu Lintas
3	Ledeng	Terminal Tipe B	Terdapat Kantor Dishub, Kios, dan Kanopi	Secara Umum kondisi fisik terminal ini masih cukup baik.	Kondisi Lalu lintas pada terminal ini tergolong sepi karena hanya sekitar ±50 kendaraan yang masuk ke terminal ini. Kebnyakan angkot parkir di luar terminal
4	Soreang	Terminal Tipe C	Terdapat PKL dan Toko		Kondisi Lalu lintas pada terminal ini tergolong sepi karena hanya sekitar ±50 kendaraan yang masuk ke terminal ini. Kebnyakan angkot parkir di luar terminal
5	Cicaheum	- Terminal Tipe C - Terminal Tipe A	Terdapat JPO disisi barat laut, Kantor Dishub, Toilet, Loket, dan Kios	Secara Umum kondisi fisik terminal ini masih cukup baik.	
6	Cibaduyut		1. Pada Lay Over (Terdapat 1 Bangunan ATM)	Tanah Kosong	
			2. Pada End Point 1 (Terdapat Halte, PKL, dan Kios)	Secara Umum kondisi halte eksisiting sudah tidak layak karena tidak ada lagi tempat duduk dan tiangnya sudah mulai terkelupas.	

No	Nama End Station	Tipe End Station	Land Use	Kondisi	
				Fisik	Lalu Lintas
			3. Pada End Point 2 (Belum di Survey)	Lokasi Baru	
7	Cibiru		Taman / Median Jalan	Tidak ada bangunan	
8	Cimahi				
9	Ciroyom		Taman Jalan namun sudah di serobot warga, di pagar dan ditanami jagung serta terdapat posko pilkada	Tidak ada bangunan	
10	Dago		1. Pada Layover (Terdapat Taman, Pos Jaga, dan Papan Pengumuman)		
			2. Pada End Point (Terdapat area Trotoar dan Tembok signage Taman)		
11	Dipatiukur		1. Pada Layover (Terdapat Area Parkir Monumen Juang Bandung)	Tidak Ada Bangunan	
			2. Pada End Point (Terdapat area Trotoar dan PKL)	Tidak ada bangunan	
12	Elang Cibereum		Terdapat Halte, Box Container, dan PKL	Halte tidak terawat	Volume Lalu Lintas Pada sekitar area ini tidak terlalu ramai dan kebanyakan hanya di gunakan untuk berbalik arah karena area ini nyambung

No	Nama End Station	Tipe End Station	Land Use	Kondisi	
				Fisik	Lalu Lintas
					ke bundaran cibereum.
13	Jatinangor				
14	Lembang				
15	Leuwipanjang		1. End Poit Utara (Terdapat Area Trotoar, Halte, Taman Main Anak, dan Landscape	Secara umum infrastruktur masih cukup baik	
			2. End Point Selatan (Terdapat Area Trotoar)	Tidak Ada Bangunan	
16	Majalaya	Terminal Tipe C	Terdapat Pasar tradisional, Musholah, toilet, dan area duduk.	Secara umum kondisi fisik terminal sudah kurang baik.	Volume Lalu lintas masih tergolong sepi
17	Riau		Terdapat Taman Tugu Tunas Kelapa, Area duduk dengan perkerasan, dan landscape	Secara umum Kondisi Taman Masih Cukup Baik	
18	Sarijadi		Terdapat Trotoar dan Pos Parkir Plaza Sentrasari	Trotoar	
19	BEC		Terdapat PKL	Tidak Ada Bangunan	
20	ST. Padalarang		Platform berada didalam area st. Padalarang (stasiun akhir whoosh)	Tidak Ada Bangunan	

No	Nama End Station	Tipe End Station	Land Use	Kondisi	
				Fisik	Lalu Lintas
21	ST. Tegalluar		Platform berada didalam area st. Tegalluar (stasiun akhir whoosh)	Tidak Ada Bangunan	Volume Lalu lintas masih tergolong sepi

III.2 Analisis Kinerja Dampak Lalu Lintas

Analisis yang dimaksud dalam bab ini adalah analisis kinerja jaringan jalan baik pada kondisi awal atau sesuai dengan eksisting sebelum dilakukan pembagunan koridor jalur khusus BRT dan halte, maupun kinerja jaringan jalan saat konstruksi dan setelah terbangun.

Untuk memahami permasalahan aktual transportasi dan menghasilkan penanganan yang baik di ruas jalan dan simpang, maka perlu serangkaian analisis yang sistematis. Analisis dijabarkan dalam bentuk pengembangan skenario yang dapat mengefektifkan kapasitas jalan sekaligus membenahi manajemen lalu lintasnya.

Secara garis besar pada tahap awal dilakukan tinjauan dan survei lapangan. Pada tahap selanjutnya dilakukan pendataan guna validasi model. Setelah itu dilakukan analisis kinerja jalan dengan menggunakan alat bantu program komputer makro dan mikro.

III.2.1 Asumsi Dasar

Mengingat kajian tidak mencakup pendataan rinci yang diperlukan untuk pengembangan suatu model transportasi perkotaan, maka pada kajian ini dikembangkan pendekatan area terbatas disekitar rencana pembangunan halte BRT BBMA dengan kriteria mencakup ruas-ruas jalan yang mendukung rute-rute alternatif yang mempengaruhi kinerja lalu lintas di sekitar area pembangunan halte tersebut. Pada kawasan yang ditetapkan sebagai wilayah studi ini kemudian dikembangkan sistem zona lalu lintas. Dengan ditetapkannya semua ruas jalan masuk dalam model jaringan, maka zona-zona lalu lintas ditetapkan

dengan memperkirakan suatu wilayah cakupan (*Catchment Area)* tertutup oleh suatu jaringan jalan dan titik berat bangkitan lalulintas ditetapkan sebagai pusat zona.

Besaran bangkitan lalu lintas untuk masing-masing zona diperkirakan dari tata guna lahan di ambil dari studi sebelumnya. Secara prinsip bangkitan lalu lintas diturunkan dari survei wawancara rinci (Home Interview Survey / HIS), namun pada kajian ini dilakukan pendekatan perbandingan relatif antar zona satu dengan lainnya, dengan perkataan lain bahwa nilai mutlak bangkitan perjalanan dari tiap zona tidak diperlukan. Konsekuensi dari perbandingan relatif bangkitan perjalan zona antara satu zona dengan zona lainnya harus divalidasi dan dikalibrasi dengan beberapa data survei *Traffic Count* yang dilakukan. Hasil dari proses ini diperoleh matriks asal tujuan sintetis (tiruan) yang relatif sangat dekat dengan kondisi lapangan.

III.2.2 Model Zona dan Jaringan Jalan

Mengingat bahwa kajian Pembangunan koridor jalur khusus BRt dan halte ini memiliki ruang lingkup tinjauan terbatas, maka untuk dapat dilakukan analisis pada kawasan yang lebih luas dibuatlah model transportasi sintetis yang didasarkan pada asumsi sistem zona dan model jaringan jalan dari studi terdahulu. Pola perjalanan di BBMA dikembangkan oleh para peneliti di Institut Teknologi Bandung. Model tersebut mencakup seluruh wilayah BBMA dan juga seluruh Kabupaten Sumedang seperti yang ditunjukkan pada Gambar dibawah ini.

Gambar III-272 Cakupan Model

Sumber: BBMA UMS 2020

III.2.3 Distribusi Perjalanan

Untuk menetapkan besarnya bangkitan (Produksi dan Tarikan) perjalanan yang akan ditimbulkan oleh pembangunan koridor jalur khusus BRT dan halte, dilakukan estimasi angka bangkitan perjalanan (*trip rate*) secara klasifikasi silang terhadap angka bangkitan perjalanan pada aktifitas-aktifitas tata guna lahan lain yang serupa atau mendekati sama dengan rencana peruntukan kawasan di sekitar koridor jalur khusus BRT.

Untuk maksud tersebut, dilakukan kompilasi data karakteristik bangkitan perjalanan dari aktifitas-aktifitas sejenis yang telah dimiliki saat ini yang merupakan hasil-hasil survei dari kajian-kajian serupa sebelumnya. Kesamaan/kemiripan yang dimaksud adalah dalam hal kelas/tingkat pelayanan; KDB; fasilitas parkir; dan sistem akses. Penentuan trip rate pada studi ini dilakukan dalam satuan jumlah satuan mobil penumpang/jam (smp/jam) masuk dan keluar peruntukan pada hari dan waktu jam sibuk.

Sekitar 12,3 juta perjalanan dilakukan setiap hari di BBMA. Rata-rata sepertiga perjalanan dilakukan dengan angkutan umum. Penggunaan tertinggi ada di Bandung Barat (60%) dan Sumedang (55%). Penggunaan terendah ada di Kota Bandung (13%) dan Cimahi (15%) serta di Kabupaten Bandung (20%). Perjalanan dengan angkutan non-umum sebagian besar dilakukan dengan sepeda motor yang mencakup 60% kendaraan pribadi. Distribusi perjalanan dengan angkutan umum dan kendaraan pribadi menurut unit pemerintah daerah disajikan pada Gambar dibawah ini.

Gambar III-273 Distribusi Moda BBMA

Sumber: BBMA UMS 2020

Gambar III-274 Distribusi Moda Kota Bandung

Sumber: BBMA UMS 2020

Dari segi biaya, tarif angkutan umum sangat mirip dengan jumlah uang yang dihabiskan untuk bahan bakar sepeda motor. Operator angkutan umum, terutama operator angkot, semakin kesulitan bersaing dengan pemilik sepeda motor.

III.2.4 Bangkitan Perjalanan

Model ini menggunakan zona analisis lalu lintas (zona) sebagai dasar untuk menghitung karakteristik perjalanan. Di Kota Bandung, setiap zona berhubungan dengan wilayah Kelurahan, sementara di area lainnya ukuran zona yang lebih besar digunakan sesuai dengan batas Kecamatan. Dalam model ini terdapat 228 zona internal. Model ini juga mencakup zona eksternal yang menghubungkan area studi dengan wilayah sekitarnya. Kelima zona eksternal ini, dan tautan ke BBMA ditunjukkan oleh garis merah pada gambar di atas.

Jaringan transportasi dalam model ini mencakup jaringan jalan raya dan jaringan transportasi umum:

- Untuk jaringan jalan digunakan sebagai model permintaan karena model permintaan berfokus pada perjalanan bermotor, dan penilaian terperinci tentang pola berjalan yang digunakan untuk mengakses layanan transportasi umum tidak diperlukan. Jaringan jalan atau "link" mencakup Jalan Tol, Jalan Nasional, Jalan Provinsi, dan Jalan Kabupaten/Kota.
- Jaringan transportasi umum dalam model telah dimodifikasi agar sesuai dengan jaringan transportasi umum dalam model aksesibilitas, rute bus Damri, TMP, Buratas dan TMB, serta layanan Angkot dan Kobantar. Serta Proyek-proyek yang direnanakan juga disertakan, seperti Jalur Kereta Cepat dari stasiun Tegalluar dan juga jalur Kereta Api Komuter yang ada.

Jumlah perjalanan orang ke dan dari setiap zona, yang masing-masing disebut “tarikan” dan “bangkitan” diperbarui dari model sebelumnya untuk mencerminkan estimasi populasi dan lapangan kerja yang dikembangkan dalam fase pemodelan aksesibilitas seperti yang ditunjukkan pada gambar berikut.

Gambar III-275 Pola Tarikan & Bangkitan Berdasarkan Zona

Sumber: BBMA UMS 2020

Tarikan dan bangkitan untuk setiap zona didistribusikan untuk perjalanan antar zona menggunakan distribusi panjang perjalanan yang ada dan model distribusi perjalanan terkalibrasi yang tersedia dari pemodelan pada studi sebelumnya.

Perjalanan yang dialokasikan untuk setiap kombinasi zona asal dan tujuan dibagi antara angkutan umum dan moda kendaraan pribadi menggunakan model pembagian moda yang dikembangkan dalam versi model sebelumnya.

Validasi Data

Jumlah kendaraan yang ditetapkan oleh model pada jaringan jalan dan penumpang yang ditetapkan pada layanan angkutan umum divalidasi terhadap hasil survei volume lalu lintas yang dilakukan pada tahun 2024 untuk Pekerjaan teknis rinci Koridor Jalur khusus BRT BBMA, untuk mengetahui volume kendaraan di setiap ruas jalan pada jam sibuk pagi hari. Penghitungan ini dinyatakan dalam Satuan Mobil Penumpang per jam (smp/jam) yang

memperhitungkan dampak kemacetan kendaraan yang lebih besar sesuai dengan kondisi eksisting.

Gambar III-276 Validasi Data Model

Sumber: BBMA UMS 2020

Pola perjalanan yang dihasilkan dari matriks OD disederhanakan untuk tujuan mudah dimengerti dengan menggabungkan hasilnya ke dalam beberapa area, dan hasilnya ditunjukkan pada gambar dibawah ini.

Pola pergerakan yang sangat radial terlihat menuju pusat Kota Bandung, dari arah barat, selatan dan timur.

Gambar III-277 *Desire Line* Per moda (Penumpang/Jam)

Sumber: BBMA UMS 2020

Matriks OD untuk setiap moda ditetapkan ke jaringan jalan atau angkutan yang sesuai. Kalibrasi matriks Asal-Tujuan (OD), seperti yang ditunjukkan pada Gambar dibawah ini, dianggap cukup memadai karena koefisien korelasi antara arus lalu lintas yang dimodelkan dengan arus lalu lintas yang diamati adalah 0,74 untuk kendaraan pribadi dan penumpang angkutan umum.

Gambar III-278 Hasil Kalibrasi Matriks Asal Tujuan

Sumber: BBMA UMS 2020

III.2.5 Pembebanan Lalu Lintas

Dengan telah ditetapkan sistem zona, sistem jaringan dan matriks perjalanan, maka pada tahap ini dilakukan proses pembebanan (*assignment*) matriks pergerakan perjalanan pada model jaringan jalan yang ditinjau. Pembebanan ini dimaksudkan untuk mengetahui volume lalu lintas disetiap ruas jalan model jaringan di wilayah kajian pada jam sibuk. Adapun kinerja yang dihasilkan oleh model ditahap pembebanan ini adalah: kinerja ruas (Vol, V/C, Kecepatan ruas) dan kinerja jaringan (smp.km/jam, smp.jam/jam. Kecepatan. Jaringan). Untuk pembebanan perjalanan digunakan metode pembebanan bertahap dengan batasan kapasitas (*incremental assignment on capacity restraint condition*). Pada tahap selanjutnya, dimana alternatif–alternatif penanganan diuji, hasil pembebanannya dapat memperlihatkan pengaruh/dampak lalu lintas yang terjadi.

Pada gambar dibawah ini dapat dilihat bahwa apabila tidak dilakukan penanganan yang cukup serius untuk bisa mengakomodir tingginya pergerakan kendaraan dan mengintervensi penggunaan kendaraan pribadi, maka mayoritas

ruas jalan di sekitar koridor BRT BBMA akan mengalami kejenuhan dan dampaknya akan sangat terasa untuk Masyarakat.

Nama Jalan	Sibuk Pagi
Jl. Asia Afrika 4	0,75
Jl. Asia Afrika 5	0,71
Jl. Jend Sudirman 1	0,97
Jl. Jend Sudirman 2	0,90
Jl. Jend Sudirman 3	0,90
Jl. Jend Sudirman 4	0,93
Jl. Jend Sudirman 5	0,72
Jl. Jend Sudirman 6	0,77
Jl. Rajawali Barat	0,89
Jl. Rajawali Timur 1	0,93
Jl. Rajawali Timur 2	0,96
Jl. Kebon Jati 1	0,97
Jl. Kebon Jati 2	0,92
Jl. Sumiasja 1	0,88
Jl. Otista 1	0,96
Jl. Sumiasja 2	0,93
Jl. Banceuy 2	0,78
Jl. Ahmad Yani 1	0,83
Jl. Ibrahim Adjie	0,94
Jl. Jakarta	1,03
Jl. Ahmadyani 2	0,71
Jl. Ahmadyani 3	0,88
Jl. Ahmadyani 4	0,86
Jl. Ahmadyani 5	0,87
Jl. Ahmadyani 6	0,99
Jl. Asia Afrika 1	0,75
Jl. Asia Afrika 2	0,90
Jl. Asia Afrika 3	0,96
Jl. Otista 2	0,83
Jl. Otista 3	0,71
Jl. Otista 4	0,93
Jl. Otista 5	0,80
Jl. BKR	0,89
Jl. Moch Toha 1	0,95
Jl. Moch Toha 2	0,83
Jl. Pungkur	0,80
Jl. Dewi Sartika 1	0,89
Jl. Dewi Sartika 2	0,87
Jl. Dalem Kaum	0,75
Jl. Alun Alun Timur	0,75
Jl. Banceuy 1	0,83
Jl. ABC	0,81
Jl. Naripan 1	0,88
Jl. Naripan 2	0,76
Jl. Sunda	0,88
Jl. Veteran	0,88

Gambar III-279 Hasil Pembebanan Lalu Lintas Pada Jam Sibuk Pagi 2024

Sumber: Hasil Analisis Konsultan

Nama Jalan	Sibuk Sore
Jl. Asia Afrika 4	0,71
Jl. Asia Afrika 5	0,73
Jl. Jend Sudirman 1	0,90
Jl. Jend Sudirman 2	0,87
Jl. Jend Sudirman 3	0,93
Jl. Jend Sudirman 4	0,91
Jl. Jend Sudirman 5	1,01
Jl. Jend Sudirman 6	0,92
Jl. Rajawali Barat	0,89
Jl. Rajawali Timur 1	0,94
Jl. Rajawali Timur 2	0,79
Jl. Kebon Jati 1	0,83
Jl. Kebon Jati 2	0,81
Jl. Sumiasja 1	0,76
Jl. Otista 1	0,96
Jl. Sumiasja 2	0,97
Jl. Banceuy 2	0,81
Jl. Ahmad Yani 1	0,79
Jl. Ibrahim Adjie	0,92
Jl. Jakarta	0,72
Jl. Ahmadyani 2	0,97
Jl. Ahmadyani 3	0,91
Jl. Ahmadyani 4	0,73
Jl. Ahmadyani 5	1,03
Jl. Ahmadyani 6	0,79
Jl. Asia Afrika 1	0,72
Jl. Asia Afrika 2	0,90
Jl. Asia Afrika 3	0,97
Jl. Otista 2	0,80
Jl. Otista 3	0,77
Jl. Otista 4	0,86
Jl. Otista 5	0,75
Jl. BKR	0,73
Jl. Moch Toha 1	0,87
Jl. Moch Toha 2	0,73
Jl. Pungkur	0,94
Jl. Dewi Sartika 1	0,73
Jl. Dewi Sartika 2	0,93
Jl. Dalem Kaum	0,85
Jl. Alun Alun Timur	0,78
Jl. Banceuy 1	0,77
Jl. ABC	0,96
Jl. Naripan 1	0,75
Jl. Naripan 2	0,71
Jl. Sunda	0,94
Jl. Veteran	0,94

Gambar III-280 Hasil Pembebanan Lalu Lintas Pada Jam Sibuk Sore 2024

Sumber: Hasil Analisis Konsultan

BAB IV ANALISIS PENANGANAN DAMPAK LALU LINTAS

IV.1 Analisis Penanganan pada Masa Konstruksi

IV.1.1 Rencana Konstruksi

Dengan kondisi lalu lintas yang padat hampir merata di seluruh area, maka perlu dilakukan mitigasi strategi dalam pelaksanaan konstruksi. Beberapa strategi yang disarankan adalah sebagai berikut:

- Mempersingkat waktu pelaksanaan pekerjaan di lokasi jalan dengan cara membuat area fabrikasi *workshop* untuk merakit halte terlebih dahulu, sehingga ketika di lokasi waktu pekerjaan dapat lebih efektif dan efisien.
- Pekerjaan harus dilakukan secara bertahap dan tidak bersamaan khususnya pada ruas jalan yang sama agar kapasitas jalan tidak berkurang secara signifikan yang dapat menyebabkan antrian kendaraan menjadi sangat panjang.
- Pekerjaan akan dilakukan dengan membagi tim pelaksana pekerjaan menjadi dua yaitu tim A dan tim B dengan area yang berbeda untuk mengerjakan pembangunan koridor jalur khusus BRT dan halte.

Pembagian area kerja dan jadwal rencana konstruksi untuk jalur khusus BRT adalah sebagai berikut:

Tim A	Tim B
BS10	BS16
BS20	BS34
BS21	BS17
BS22	BS15
BS23	BS14
BS24	BS13
BS25	BS18
BS26	BS19
BS27	BS03
BS28	BS04
BS29	BS05
BS30	BS06
BS31	BS07
BS32	BS08
BS01	BS09
BS02	BS11
BS33	BS12

Tim A	Tim B
Jl. Asia Afrika 4	Jl. Ahmad Yani 1
Jl. Asia Afrika 5	Jl. Ibrahim Adjie
Jl. Jend Sudirman 1	Jl. Jakarta
Jl. Jend Sudirman 2	Jl. Ahmad yani 2
Jl. Jend Sudirman 3	Jl. Ahmad yani 3
Jl. Jend Sudirman 4	Jl. Ahmad yani 4
Jl. Jend Sudirman 5	Jl. Asia Afrika 1
Jl. Jend Sudirman 6	Jl. Asia Afrika 2
Jl. Rajawali Barat	Jl. Asia Afrika 3
Jl. Rajawali Timur 1	Jl. Otista 2
Jl. Rajawali Timur 2	Jl. Otista 3
Jl. Kebon Jati 1	Jl. Otista 4
Jl. Kebon Jati 2	Jl. Otista 5
Jl. Suniaraja 1	Jl. BKR
Jl. Otista 1	Jl. Moch Toha 1
Jl. Suniaraja 2	Jl. Moch Toha 2
Jl. Banceuy 2	Jl. Pungkur
	Jl. Dewi Sartika 1
	Jl. Dewi Sartika 2
	Jl. Dalem Kaum
	Jl. Alun Alun Timur
	Jl. Banceuy 1
	Jl. ABC
	Jl. Naripan 1
	Jl. Naripan 2
	Jl. Sunda
	Jl. Veteran

Gambar IV-1 Rencana Tahapan Konstruksi

Sumber: Analisis Konsultan

Tabel IV-1 Jadwal Pelaksanaan Konstruksi Jalur Khusus BRT

Sumber: Analisis Konsultan

IV.1.2 Analisis Penanganan pada Masa Konstruksi

IV.1.2.1 Penerapan Zona Keselamatan Kerja

Penerapan zona lalu lintas selama konstruksi sangat dieprlukan untuk dapat memitigasi dan mencegah terjadinya kecelakaan saat pekerjaan dilakukan, penentuan zona lalu lintas disusun berdasarkan Spesifikasi Umum Tahun 2018 untuk Pekerjaan Konstruksi Jalan dan Jembatan (Revisi 2).

Konsep Zona adalah metode pembagian lokasi pekerjaan menjadi lima zona terpisah berdasarkan fungsi, sebagai berikut:

- Zona Peringatan Dini - adalah segmen jalan di mana pengguna jalan diinformasikan tentang pekerjaan jalan yang akan datang dan apa yang harus dilakukan.
- Zona Panduan Transisi (Taper) - di zona ini pengemudi/pengendara diarahkan ke luar jalur perjalanan normal. Zona ini digunakan untuk memandu pengemudi/pembalap ke dalam lintasan yang benar dan pada kecepatan yang benar.

- Zona Kerja - Area Kerja, tempat pekerjaan dilakukan secara fisik dan di mana terdapat pekerja, peralatan, dan material.
- Zona Kerja - Area Penyangga Keselamatan, area keselamatan sebelum area kerja untuk meningkatkan perlindungan dan keselamatan pekerja. Area ini umumnya memiliki panjang minimal 20 meter.
- Zona Pengakhiran - zona di mana lalu lintas kembali normal setelah melewati lokasi kerja. Zona ini digunakan untuk mengingatkan pengemudi/pengendara akan akhir dari lokasi kerja dan apa yang diperlukan setelah meninggalkan lokasi kerja.

Gambar IV-2 Pembagian Zona Konstruksi

Sumber: Analisis Konsultan

Pada konstruksi koridor jalur khusus BRT BBMA dan halte, berdasarkan tipe jalannya terdapat dua jenis Zona pekerjaan jalan yang dapat diterapkan yaitu Zona 4 dan gabungan antara Zona 2 & 4.

Zona 2

Gabungan Zona 2 & 4

Gambar IV-3 Penggunaan Zona Konstruksi untuk Koridor Jalur Khusus BRT & Halte.

Sumber: Analisis Konsultan

Rambu-rambu yang perlu disiapkan harus mengacu pada Peraturan Menteri Perhubungan No:13 Tahun 2014 tentang Rambu Lalu lintas, kebutuhannya berdasarkan Teknik Rekayasa Keselamatan Jalan dan rencana pelaksanaan konstruksi maka kebutuhan rambu dapat ditetapkan sebagai berikut:

Tabel IV-2 Kebutuhan Rambu Lalu Lintas

Sumber: Analisis Konsultan

ID	Name	Bus Stop Type	Panjang Halte	Area Penyangga Keselamatan	Zona Pekerjaan Jalan	Rambu Tetap			Rambu Peringatan Sementara:			Alat Lainnya:		
						Rambu batas Kecepatan	Rambu Perintah Mengikuti Lajur	Rambu Pengarah Tikungan	Rambu Peringatan Dengan Kata - Kata	Rambu Peringatan Pekerjaan di jalan	Traffic Cone	Lampu Putar (Rotary Lamp)	Lampu Selang Lalu Lintas	Peralatan komunikasi dan Lainnya .....
BS10	Alun-alun	Type A	72	20	Zona 4	4	2	3	4	2	19	4	92	10
BS20	Dulatip	Type A	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS21	GKI Anugerah	Type A	22	20	Zona 4	4	2	3	4	2	9	4	42	10
BS22	Andir	Type A	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS23	Jamika	Type D	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS24	Suryani	Type D	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS25	Bundaran Cibeureum	Type C	34	20	Zona 4	4	2	3	4	2	11	4	54	10
BS26	Batas Kota	Type C	46	20	Zona 4	4	2	3	4	2	14	4	66	10
BS27	RS Rajawali	Type A	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS28	YWKA	Type A	12	20	Zona 4	4	2	3	4	2	7	4	32	10
BS29	Rajawali Timur	Type B	24	40	Zona 2 & 4	8	4	6	8	4	26	6	128	10
BS30	Ciroyom	Type B	24	40	Zona 2 & 4	8	4	6	8	4	26	6	128	10
BS31	Trinitas	Type B	24	40	Zona 2 & 4	8	4	6	8	4	26	6	128	10
BS32	RS Kebon Jati	Type B	72	40	Zona 2 & 4	8	4	6	8	4	46	6	224	10
BS1	Stasiun Hall	Type B	27	40	Zona 2 & 4	8	4	6	8	4	28	6	134	10
BS2	Pasar Baru	Type B	72	40	Zona 2 & 4	8	4	6	8	4	46	6	224	10
BS33	Banceuy Center	Type A	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS16	Cicadas	Type C	28	20	Zona 4	4	2	3	4	2	10	4	48	10
BS34	BTM	Type A	33	20	Zona 4	4	2	3	4	2	11	4	53	10
BS17	Kebon Waru	Type A	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS15 B	IBCC	Type D	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS15 A	Santa Maria	Type D	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS14 A	Stadion Sidolig	Type D	15	20	Zona 4	4	2	3	4	2	7	4	35	10
BS14 B	Stadion Sidolig	Type D	33	20	Zona 4	4	2	3	4	2	11	4	53	10
BS13 A	Pasar Kosambi	Type D	33	20	Zona 4	4	2	3	4	2	11	4	53	10
BS13 B	Pasar Kosambi	Type D	18	20	Zona 4	4	2	3	4	2	8	4	38	10
BS18	Simpang Lima	Type A	24	20	Zona 4	4	2	3	4	2	9	4	44	10
BS19	Asia-Afrika	Type A	18	20	Zona 4	4	2	3	4	2	8	4	38	10
BS3	Dalam Kaum	Type A	72	20	Zona 4	4	2	3	4	2	19	4	92	10
BS4	Pasir Koja	Type A	15	20	Zona 4	4	2	3	4	2	7	4	35	10
BS5	Tegallega	Type A	33	20	Zona 4	4	2	3	4	2	11	4	53	10
BS6 A	Taman Tegallega	Type D	72	20	Zona 4	4	2	3	4	2	19	4	92	10
BS6 B	Taman Tegallega	Type D	18	20	Zona 4	4	2	3	4	2	8	4	38	10
BS7	Ciateul	Type F	28	20	Zona 4	4	2	3	4	2	10	4	48	10
BS8	ITC - Kebon Kalapa	Type A	18	20	Zona 4	4	2	3	4	2	8	4	38	10
BS9	Kepatihan	Type A	72	20	Zona 4	4	2	3	4	2	19	4	92	10
BS11	Cikapundung	Type A	15	20	Zona 4	4	2	3	4	2	7	4	35	10
BS12	Naripan	Type E	15	20	Zona 4	4	2	3	4	2	7	4	35	10
					Tim A	16	8	12	16	8	92	12	224	20
					Tim B	8	4	6	8	4	38	8	92	20
						24	12	18	24	12	130	20	316	40

Tabel IV-3 Ringkasan Kebutuhan Rambu Lalu Lintas

Sumber: Analisis Konsultan

Rambu - Rambu Konstruksi dan Pengalihan	Bentuk Rambu	Kuantitas Minimum		Total Kebutuhan	Satuan	Keterangan
		TIM A	TIM B			
Rambu Tetap:						
Rambu Batas Kecepatan		16	8	24	buah	Kecepatan diseusaikan dengan kebutuhan
Rambu Perintah Mengikuti Lajur		8	4	12	buah	
Rambu Pengarah Tikungan		12	6	18	buah	
Rambu Peringatan Sementara:						
Rambu Peringatan Dengan Kata - Kata		16	8	24	buah	
Rambu Peringatan Pekerjaan di jalan		8	4	12	buah	
Traffic Cone		92	38	130	buah	
Alat Lainnya:						
Lampu Putar (Rotary Lamp)		12	8	20	buah	
Lampu Selang Lalu Lintas		224	92	316	m'	
Peralatan komunikasi dan Lainnya		20	20	40	set	

Ketentuan Rangka Rambu Lalu Lintas

Rangka untuk rambu terbuat dari logam ringan dan didesain untuk berdiri dengan kokoh tanpa tiang. Setiap rangka harus dapat menyangga pelat rambu berikut ini:

- Dua rambu 600 x 600 mm dan satu rambu 1200 x 300 mm; atau Satu rambu 1200 x 600 mm dan satu rambu 1200 x 300 mm.
- Rangka harus dapat menyangga pelat rambu yang dipasang bolak-balik sehingga rangka dapat melayani dua arah jika perlu. Biasanya rangka dicat dengan warna hitam yang tidak mengkilat.

Pelat rambu harus memenuhi persyaratan berikut ini:

- Jika menggunakan papan flat plastik, ketebalan minimal adalah 6 mm.
- Muka rambu dilapisi material retro reflektif yang sesuai atau melebihi standar material Kelas 2 yang ditentukan dalam AS/NZS 1906.1-2007: Bahan dan Perangkat Retro reflektif untuk Pengaturan Lalu Lintas Jalan, Bagian 1: Pelapis Retro reflektif.
- Ukuran simbol dan kata pada pelat rambu harus sama dengan rambu yang berdiri sendiri. Namun, jika perlu, ukuran legenda dapat sedikit dikurangi agar cukup dalam ukuran pelat yang digunakan.

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- Gambar IV-4 Rangka untuk Penyangga Rambu Lau Lintas
- *Sumber: Analisis Konsultan*

IV.1.2.2 Relokasi Halte Eksisting

Berdasarkan hasil survei bersama Dinas Perhubungan Kota Bandung, terdapat 17 halte eksisting yang sudah tidak lagi terpakai dan perlu dibersihkan sebelum pembangunan halte BRT baru dilaksanakan. Lokasinya diantaranya adalah sebagai berikut:

Tabel IV-4 Lokasi Halte Eksisting yang perlu DIbersihkan

Sumber: Analisis Konsultan

No	Lokasi Halte	Foto
1	Halte TMB Dinas Pendidikan Jl. Ahmad Yani	
2	Halte TMB Stadion Persib Jl. Ahmad Yani	
3	Halte Angkutan Umum Dinas Pendidikan Jl. Ahmad Yani	
4	Halte (TMB) Jl. Asia Afrika	

No	Lokasi Halte	Foto
5	Halte (TMB) Jl. Jakarta	
6	Halte Angkutan Umum Kampus Amik Jl. Jakarta	
7	Halte Angkutan Umum GOR KONI Jl. Jakarta	
8	Halte (TMB) Plaza Teklom Jl. Lembong	
9	Halte (TMB) PT. Inti Jl. Moch Toha	

No	Lokasi Halte	Foto
10	Halte (TMB) RS. Kebonjati	
11	Halte (TMB) Pos Giro Kosambi	
12	Halte Angkutan Umum Depan Segitiga Mas	
13	Halte Angkutan Umum Jl. Otista	
14	Halte Angkutan Umum Depan Taman Tegalega Jl. BKR	

No	Lokasi Halte	Foto
15	Halte Angkutan Umum Samping Kolam Renang Tegalega Moch. Toha	
16	Halte Angkutan Umum Halte Depan SD/Gereja Moch Toha	
17	Halte Angkutan Umum Depan BCA Dewi Sartika	

IV.1.2.3 Mitigasi Lalu Lintas

Pada masa konstruksi mitigasi lalu lintas perlu diterapkan agar dapat mengurai kemacetan pada ruas jalan di koridor jalur khusus BRT BBMA.

Rekayasa Lalu lintas pada masa konstruksi dilakukan dalam dua skema, yaitu:

- Mitigasi lalu lintas di level kawasan: Mengalihkan kendaraan melalui jalan alternatif sebelum memasuki area konstruksi koridor BRT yang mengakses melalui arah Barat, Utara, Selatan dan Timur.
- Mitigasi lalu lintas di area konstruksi: Mengalihkan kendaraan di setiap Lokasi konstruksi halte dan jalur khusus BRT apabila memungkinkan.

Dari Arah Barat:

Kendaraan dapat dialihkan melalui jalan alternatif:

- Jl. Padjajaran untuk yang menuju ke pusat kota atau arah utara
- Jl. Elang Raya dan Jl. Soekarno Hatta untuk yang menuju pusat kota atau arah Selatan.

Gambar IV-5 Pengalihan Arus Lalu Lintas dari Arah Barat

Sumber: Analisis Konsultan

Dari Arah Utara:

Kendaraan dapat dialihkan melalui jalan alternatif:

- Jl. Astana Anyar untuk yang menuju ke pusat kota atau arah Selatan.

Gambar IV-6 Pengalihan Arus Lalu Lintas dari Arah Utara

Sumber: Analisis Konsultan

Dari Arah Selatan:

Kendaraan dapat dialihkan melalui jalan alternatif:

- Jl. Raya Kopo untuk yang menuju ke pusat kota atau arah Barat.
- Jl. H. Samsudin untuk yang menuju ke pusat kota atau arah utara.
- Jl. Moch. Ramdhan untuk yang menuju ke pusat kota atau arah timur.

Gambar IV-7 Pengalihan Arus Lalu Lintas dari Arah Selatan

Sumber: Analisis Konsultan

Dari Arah Timur:

Gambar IV-8 Pengalihan Arus Lalu Lintas dari Arah Timur

Sumber: Analisis Konsultan

Kendaraan dapat dialihkan melalui jalan alternatif:

- Jl. Surapati untuk yang menuju ke pusat kota Alun – Alun atau arah Barat.
- Jl. Ibrahim Adjie & Jl. Gatot Subroto untuk yang menuju ke Alun - Alun atau arah Barat.

Mitigasi lalu lintas di area konstruksi pada masing – masing lokasi rencana pembangunan halte di koridor jalur khusus BRT adalah sebagai berikut:

1. BRT Corridor Design – BS 10 ALUN-ALUN & Jl. Asia Afrika 4

Gambar IV-9 Rekayasa Lalu Lintas pada BS 10 ALUN-ALUN & Jl. Asia Afrika 4

Sumber: Analisis Konsultan

2. BRT Corridor Design – JL. Asia Afrika 5

Gambar IV-10 Rekayasa Lalu Lintas pada Jl. Asia Afrika 5

Sumber: Analisis Konsultan

3. BRT Corridor Design – BS 20 Dulatip & Jl. Jend. Sudirman 1

Gambar IV-11 Rekayasa Lalu Lintas pada BS 20 Dulatip & Jl. Jend. Sudirman 1

Sumber: Analisis Konsultan

4. BRT Corridor Design – BS 21 GKI Anugerah, BS 22 Andir, Jl. Jend. Sudirman 2 & 3

Gambar IV-12 Rekayasa Lalu Lintas pada BS 21 GKI Anugerah, BS 22 Andir, Jl. Jend. Sudirman 2 & 3

Sumber: Analisis Konsultan

5. BRT Corridor Design – BS 23 Jamika, BS 24 Suryani & Jl. Jend. Sudirman 4.

Gambar IV-13 Rekayasa Lalu Lintas pada BS 23 Jamika, BS 24 Suryani & Jl. Jend. Sudirman 4

Sumber: Analisis Konsultan

6. BRT Corridor Design – BS 25 Bundaran Cibeuereum & Jl. Jend. Sudirman 5.

Gambar IV-14 Rekayasa Lalu Lintas pada BS 25 Bundaran Cibeuereum & Jl. Jend. Sudirman 5

Sumber: Analisis Konsultan

7. BRT Corridor Design – BS 26 Batas Kota & Jl. Jend. Sudirman 6.

Gambar IV-15 Rekayasa Lalu Lintas pada BS 26 Batas Kota & Jl. Jend. Sudirman 6

Sumber: Analisis Konsultan

8. BRT Corridor Design – BS 27 RS Rajawali, BS 28 YWKA & Jl. Rajawali Barat.

Gambar IV-16 Rekayasa Lalu Lintas pada BS 27 RS Rajawali, BS 28 YWKA & Jl. Rajawali Barat *Sumber: Analisis Konsultan*

9. BRT Corridor Design – BS 29 Rajawali Timur & Jl. Rajawali Timur.

Gambar IV-17 Rekayasa Lalu Lintas pada BS 29 Rajawali Timur & Jl. Rajawali Timur *Sumber: Analisis Konsultan*

10. BRT Corridor Design – BS 30 Ciroyom & Jl. Rajawali Timur

Gambar IV-18 Rekayasa Lalu Lintas pada BS 30 Ciroyom & Jl. Rajawali Timur

Sumber: Analisis Konsultan

11. BRT Corridor Design – BS 31 Trinitas, BS 32 RS Kebon Jati dan Jl. Gardu Jati.

Gambar IV-19 Rekayasa Lalu Lintas pada BS 31 Trinitas, BS 32 RS Kebon Jati dan Jl. Gardu Jati.

Sumber: Analisis Konsultan

12. BRT Corridor Design – BS 01 Station Hall & Jl. Kebon Jati

1. Menutup 1 lajur di tengah di Jl. Kebon jati secara bertahap per 50 meter.
2. Menutup 1 lajur di Tengah di Jl. Suniaraja di Lokasi halte BS 01 Station Hall secara bertahap.
3. Merelokasi Terminal St. Hall ke terminal Tegalega.

Gambar IV-20 Rekayasa Lalu Lintas pada BS 01 Station Hall & Jl. Kebon Jati

Sumber: Analisis Konsultan

13. BRT Corridor Design – BS 02 Pasar Baru & Jl. Otista 1

1. Menutup 1 lajur di tengah di Jl. Otista 1 di Lokasi halte BS 02 Pasar Baru secara bertahap.
2. Mengalihkan arus kendaraan dari Jl. Kebon Jati /Jl. Suniaraja yang menuju ke Selatan melalui Jl. Pasar Barat dan Jl. Pasar Selatan.
3. Mengalihkan arus kendaraan dari Jl. Kebon Jati /Jl. Suniaraja yang menuju ke Barat melalui Jl.Dulatip.

Gambar IV-21 Rekayasa Lalu Lintas pada BS 02 Pasar Baru & Jl. Otista 1

Sumber: Analisis Konsultan

14. BRT Corridor Design – BS 33 Banceuy Center & Jl. Jl. Banceuy

Gambar IV-22 Rekayasa Lalu Lintas pada BS 33 Banceuy Center & Jl. Jl. Banceuy

Sumber: Analisis Konsultan

15. BRT Corridor Design – BS 16 Cicadas

Gambar IV-23 Rekayasa Lalu Lintas pada BS 16 Cicadas

Sumber: Analisis Konsultan

16. BRT Corridor Design – BS 34 BTM & Jl. Ibrahim Adjie

1. Menutup 1 lajur kiri di Jl.Ibrahim adjie di Lokasi BS 34 BTM.

Gambar IV-24 Rekayasa Lalu Lintas pada BS 34 BTM & Jl. Ibrahim Adjie

Sumber: Analisis Konsultan

17. BRT Corridor Design – BS 17 Kebonwaru

Gambar IV-25 Rekayasa Lalu Lintas pada BS 17 Kebonwaru

Sumber: Analisis Konsultan

18. BRT Corridor Design – BS 15A IBCC

Gambar IV-26 Rekayasa Lalu Lintas pada BS 15A IBCC

Sumber: Analisis Konsultan

19. BRT Corridor Design – BS 14A & 14BStadion Sidolig dan Jl. Ahmad Yani 3

Gambar IV-27 Rekayasa Lalu Lintas pada BS 14A & 14BStadion Sidolig dan Jl. Ahmad Yani 3

Sumber: Analisis Konsultan

20. BRT Corridor Design – BS 13A & BS13B Pasar Kosambi & Jl. Ahmad Yani 4.

Gambar IV-28 Rekayasa Lalu Lintas pada BS 13A & BS13B Pasar Kosambi & Jl. Ahmad Yani 4

Sumber: Analisis Konsultan

21. BRT Corridor Design – BS 18 Simpang Lima & Jl. Asia Afrika 1.

Gambar IV-29 Rekayasa Lalu Lintas pada BS 18 Simpang Lima & Jl. Asia Afrika 1

Sumber: Analisis Konsultan

22. BRT Corridor Design – BS 19 Asia Afrika & Jl. Asia Afrika 2

Gambar IV-30 Rekayasa Lalu Lintas pada BS 19 Asia Afrika & Jl. Asia Afrika 2

Sumber: Analisis Konsultan

23. BRT Corridor Design – BS 03 Dalem Kaum & Jl. Otista 2

Gambar IV-31 Rekayasa Lalu Lintas pada BS 19 Asia Afrika & Jl. Asia Afrika 2

Sumber: Analisis Konsultan

24. BRT Corridor Design – Jl. Otista 3

Gambar IV-32 Rekayasa Lalu Lintas pada Jl. Otista 3

Sumber: Analisis Konsultan

25. BRT Corridor Design – BS 04 Pasir Koja & Jl. Otista 4

Gambar IV-33 Rekayasa Lalu Lintas pada BS 04 Pasir Koja & Jl. Otista 4

Sumber: Analisis Konsultan

26. BRT Corridor Design – BS 05 Tegallega & Jl. Otista 5

Gambar IV-34 Rekayasa Lalu Lintas pada BS 04 Pasir Koja & Jl. Otista 4

Sumber: Analisis Konsultan

27. BRT Corridor Design – BS 06A & BS 06B Taman Tegallega & Jl. Otista 5

Gambar IV-35 Rekayasa Lalu Lintas pada BS 06A & BS 06B Taman Tegallega & Jl. Otista 5

Sumber: Analisis Konsultan

28. BRT Corridor Design – BS 07 Moch. Toha

1. Menutup 1 lajur di tengah di Jl. Moch. Toha secara bertahap per 50 meter.
2. Menutup 1 lajur kiri Jl. Moch. Toha di Lokasi BS 07 Moch. Toha secara bertahap.

Gambar IV-36 Rekayasa Lalu Lintas pada BS 07 Moch. Toha

Sumber: Analisis Konsultan

29. BRT Corridor Design – BS 08 ITC-Kebon Kalapa

1. Menutup 1 lajur di tengah di Jl. Moch. Toha secara bertahap per 50 meter.
2. Menutup 1 lajur kiri Jl. Moch. Toha di Lokasi BS 07 Moch. Toha secara bertahap.

Gambar IV-37 Rekayasa Lalu Lintas pada BS 08 ITC-Kebon Kalapa

Sumber: Analisis Konsultan

30. BRT Corridor Design – BS 09 Dewi Sartika

Gambar IV-38 Rekayasa Lalu Lintas pada BS 09 Dewi Sartika

Sumber: Analisis Konsultan

31. BRT Corridor Design – BS 11 Cikapundung

Gambar IV-39 Rekayasa Lalu Lintas pada BS 11 Cikapundung

Sumber: Analisis Konsultan

32. BRT Corridor Design – BS 12 Naripan

Gambar IV-40 Rekayasa Lalu Lintas pada BS 12 Naripan

Sumber: Analisis Konsultan

IV.1.2.4 Meningkatkan Kapasitas Simpang dan Meminimalisir Hambatan Samping

Peningkatan kapasitas dapat dilakukan dengan beberapa cara diantaranya adalah dengan meningkatkan kinerja waktu siklus APILL dan meminimalisir hambatan samping pada masing – masing Simpang Sepanjang Koridor jalur khusus BRT BBMA, berikut adalah rekomendasinya.

1. **Simpang Kiara Condong**

Berdasarkan hasil pemodelan kondisi eksisting, simpang Kiara condong pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-5 LOS Simpang Kiara Condong 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
6591,54	0,64	40,80	E

Gambar IV-41 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Kiaracondong

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-42 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Kiaracondong

Sumber: Analisis Konsultan

Perbandingan Kondisi Persimpangan Tanpa dan Dengan Peningkatan Simpang Kiaracondong.

Tabel IV-6 LOS Simpang Kiara Condong 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	5895,93	0,81	50,30	E	52,80	E	55,60	E	58,50	E	75,30	F	97,80	F
With Improvement	5928,04	0,75	39,83	D	41,33	E	43,01	E	44,94	E	57,16	F	74,52	F

2. Simpang Laswi

Berdasarkan hasil pemodelan kondisi eksisting, simpang Laswi pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) F.

Tabel IV-7 LOS Simpang Laswi 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
4122,98	0,84	69,20	F

Gambar IV-43 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Laswi

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah

mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-44 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Laswi

Sumber: Analisis Konsultan

Tabel IV-8 LOS Simpang Laswi 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	4122,98	0,96	85,60	F	90,30	F	95,10	F	100,20	F	130,60	F	174,80	F
With Improvement	4167,31	0,89	54,95	E	57,06	E	59,72	E	62,84	F	85,92	F	121,93	F

3. Simpang Lima

Berdasarkan hasil pemodelan kondisi eksisting, simpang Lima pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) F.

Tabel IV-9 LOS Simpang Lima 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
3557,272	0,94	225,100	F

Gambar IV-45 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Lima

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-46 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Lima

Sumber: Analisis Konsultan

Tabel IV-10 LOS Simpang Lima 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	3557,27	1,07161	286,700	F	304,600	F	323,000	F	342,500	F	452,1	F	583,4	F
With Improvement	4318,712	0,77	71,171	F	73,175	F	75,634	F	78,753	F	102,959	F	142,39	F

4. Simpang Lengkong Besar

Berdasarkan hasil pemodelan kondisi eksisting, simpang Lengkong Besar pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-11 LOS Simpang Lengkong Besar 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
5510,35	0,81	42,90	E

Gambar IV-47 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Lengkong Besar

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah

mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-48 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Lengkong Besar

Sumber: Analisis Konsultan

Tabel IV-12 LOS Simpang Lengkong Besar 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	4809,53	1,32	148,90	F	161,20	F	175,30	F	192,50	F	585,80	F	*	F
With Improvement	3949,26	1,01	52,84	E	57,69	E	63,50	F	70,54	F	237,14	F	*	F

5. Simpang Karanganyar

Berdasarkan hasil pemodelan kondisi eksisting, simpang Karanganyar pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) D.

Tabel IV-13 LOS Simpang Karanganyar 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
5845,24	0,65	31,20	D

Gambar IV-49 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Karanganyar

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-50 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Karanganyar

Sumber: Analisis Konsultan

Tabel IV-14 LOS Simpang Karanganyar 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	4335,84	1,07947	89,000	F	94,900	F	101,200	F	108,000	F	153,3	F	275,2	F
With Improvement	3859,74	0,94	44,825	E	47,951	E	51,351	E	55,100	E	82,635	F	159	F

6. Simpang Gardujati

Berdasarkan hasil pemodelan kondisi eksisting, simpang Gardujati pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) F.

Tabel IV-15 LOS Simpang Gardujati 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
2643,50	0,85	193,20	F

Gambar IV-51 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Gardujati

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah

mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-52 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Gardujati

Sumber: Analisis Konsultan

Tabel IV-16 LOS Simpang Gardujati 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	2272,46	1,15529	359,000	F	390,200	F	422,600	F	456,500	F	645,4	F	875,1	F
With Improvement	2109,27	1,05	206,80	F	278,13	F	310,78	F	345,14	F	542,91	F	784,01	F

7. Simpang Jamika

Berdasarkan hasil pemodelan kondisi eksisting, simpang Jamika pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-17 LOS Simpang Jamika 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
4034,09	0,67	52,99	E

Gambar IV-53 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Jamika

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-54 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Jamika

Sumber: Analisis Konsultan

Tabel IV-18 LOS Simpang Jamika 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	3513,41	0,87596	64,500	F	67,500	F	71,400	F	75,900	F	109,5	F	160,4	F
With Improvement	3599,23	0,85	62,923	F	65,820	F	69,299	F	73,408	F	105,17	F	155,9	F

8. Bundaran Cibereum

Berdasarkan hasil pemodelan kondisi eksisting, Bundaran Cibereum pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) F.

Tabel IV-19 LOS Bundaran Cibereum 2023

Sumber: Analisis Konsultan

Existing Condition (2023)			
C (PCU/hour)	DJ	Delay	LOS
3463,89	0,87	168,50	F

Gambar IV-55 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Bundaran Cibereum

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah

mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-56 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Bundaran Cibereum

Sumber: Analisis Konsultan

Tabel IV-20 LOS Bundaran Cibereum 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	3065,403	1,13466	269,500	F	886,893	F	378,100	F	409,400	F	604,1	F	848,1	F
With Improvement	3929,25	0,87	217,58	F	285,75	F	315,12	F	346,55	F	532,35	F	759,51	F

9. Simpang Nurtanio

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Nurtanio pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) D.

Tabel IV-21 LOS Simpang Nurtanio 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
3496,32	0,84	35,00	D

Gambar IV-57 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Nurtanio

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-58 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Nurtanio

Sumber: Analisis Konsultan

Tabel IV-22 LOS Simpang Nurtanio 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	2574,675	1,19568	57,100	E	62,000	F	67,200	F	72,900	F	108,7	F	192,7	F
With Improvement	2621,501	1,19	55,957	E	60,778	F	67,184	F	71,444	F	106,451	F	181,712	F

10. Simpang Pasir Kaliki

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Pasir Kaliki pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) D.

Tabel IV-23 LOS Simpang Pasir Kaliki 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
3496,32	0,84	35,00	D

Gambar IV-59 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Pasir Kaliki

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-60 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Pasir Kaliki

Sumber: Analisis Konsultan

Tabel IV-24 LOS Simpang Pasir Kaliki 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	3120,867	1,32385	180,900	F	192,800	F	206,300	F	220,900	F	311,9	F	438,4	F
With Improvement	3388,391	1,15	129,83	F	142,11	F	155,20	F	169,38	F	259,52	F	360,95	F

11. Simpang Inggit Ganarsih – Moch. Toha

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Inggit Garnasih pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-25 LOS Simpang Inggit Garnasih 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
2605,21	0,82	52,30	E

Gambar IV-61 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Inggit Garnasih

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-62 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Inggit Garnasih

Sumber: Analisis Konsultan

Tabel IV-26 LOS Simpang Inggit Garnasih 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	1970,41	1,24361	120,100	F	130,200	F	140,800	F	152,100	F	219,8	F	311,3	F
With Improvement	2005,548	1,02	67,674	F	72,873	F	78,437	F	84,388	F	121,89	F	181,11	F

12. Simpang BKR – Moch. Toha

Berdasarkan hasil pemodelan kondisi eksisting, Simpang BKR – Moch. Toha pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-27 LOS Simpang BKR – Moch. Toha 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
6478,01	0,58	45,90	E

Gambar IV-63 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang BKR – Moch. Toha

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-64 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang BKR – Moch. Toha

Sumber: Analisis Konsultan

Tabel IV-28 LOS Simpang BKR – Moch. Toha 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	6478,01	0,66306	48,400	E	49,400	E	50,700	E	52,400	E	65,7	F	86,3	F
With Improvement	6485,9	0,65	47,937	E	48,568	E	49,313	E	50,182	E	58,869	F	76,627	F

13. Simpang Otista - BKR

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Otista - BKR pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-29 LOS Simpang Otista - BKR 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
6478,01	0,58	45,90	E

Gambar IV-65 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Otista – BKR

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-66 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Otista - BKR

Sumber: Analisis Konsultan

Tabel IV-30 LOS Simpang Otista - BKR 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	4825,98	1,07975	147,800	F	157,200	F	167,200	F	178,100	F	243,9	F	334,1	F
With Improvement	4876,351	0,99	125,691	F	134,727	F	144,457	F	154,800	F	215,49	F	296,847	F

14. Simpang Pasir Koja

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Pasir Koja pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) C.

Tabel IV-31 LOS Simpang Pasir Koja 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
6312,10	0,38	22,90	C

Gambar IV-67 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Pasir Koja

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-68 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Pasir Koja

Sumber: Analisis Konsultan

Tabel IV-32 LOS Simpang Pasir Koja 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	5519,15	0,48693	24,300	C	24,500	C	24,700	C	25,000	D	26,6	D	29	D
With Improvement	5461,91	0,4898	23,531	C	23,738	C	23,989	C	24,234	C	25,808	D	28,096	D

15. Simpang Naripan - Tamblong

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Naripan - Tamblong pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) E.

Tabel IV-33 LOS Simpang Naripan - Tamblong 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
3647,957	0,58	52,500	E

Gambar IV-69 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Naripan - Tamblong

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-70 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Naripan - Tamblong

Sumber: Analisis Konsultan

Tabel IV-34 LOS Simpang Naripan - Tamblong 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	3647,96	0,66389	55,300	E	56,200	E	57,200	E	58,400	E	69,7	F	95,1	F
With Improvement	3791,779	0,55	48,486	E	48,978	E	49,505	E	50,053	E	53,963	E	61,67	F

16. Simpang Gudang Utara – A. Yani

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Gudang Utara – A. Yani pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) D.

Tabel IV-35 LOS Simpang Gudang Utara – A. Yani 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
2694,36	0,39	33,70	D

Gambar IV-71 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Gudang Utara – A. Yani

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-72 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Gudang Utara – A.. Yani

Sumber: Analisis Konsultan

Tabel IV-36 LOS Simpang Gudang Utara – A. Yani 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	2693,07	0,46011	35,700	D	34,400	D	34,800	D	35,200	D	38,5	D	47,2	E
With Improvement	2501,31	0,38	29,568	D	29,073	D	29,236	D	29,395	D	30,38	D	31,753	D

17. Simpang Veteran - Sunda

Berdasarkan hasil pemodelan kondisi eksisting, Simpang Veteran - Sunda pada tahun 2023 memiliki tingkat pelayanan (*Level of Service / LOS*) C.

Tabel IV-37 LOS Simpang Veteran - Sunda 2023

Sumber: Analisis Konsultan

Existing Condition			
C (PCU/hour)	DJ	Delay	LOS
5804,89	0,37	22,20	C

Gambar IV-73 Waktu Siklus Lampu Lalu-lintas Eksisting Pada Simpang Veteran - Sunda

Sumber: Analisis Konsultan

Dengan mempertimbangkan lokasi persimpangan, geometrik, dan kondisi lalu lintas, maka peningkatan yang dapat dilakukan pada simpang ini adalah mengurangi hambatan samping (sedang hingga rendah). Berikut ini adalah perbandingan kondisi persimpangan tanpa dan dengan peningkatan.

Gambar IV-74 Peningkatan Waktu Siklus Lampu Lalu Lintas pada Simpang Veteran - Sunda

Sumber: Analisis Konsultan

Tabel IV-38 LOS Simpang Veteran - Sunda 2027

Sumber: Analisis Konsultan

	Condition with BRT													
	2027				2028		2029		2030		2035		2040	
	C	DJ	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Without Improvement	5807,99	0,42216	22,900	C	23,100	C	23,300	C	23,500	C	24,7	C	26,5	D
With Improvement	5842,55	0,419	22,654	C	22,832	C	23,046	C	23,238	C	24,477	C	26,199	D

IV.1.3 Analisis Kinerja Dampak Lalu Lintas pada Masa Konstruksi

Analisis kinerja dampak lalu lintas pada masa konstruksi dpat dilakukan dengan menganlisa VC Ratio pada masing – masing ruas jalan yang dilalui koridor jalur khusus BRT. Skenario yang dibandingkan adalah seperti yang dijelaskan sebelumnya dengan melakukan variasi – variasi probabilitas berdasarkan skenario – skenario yang memungkinkan terjadi dilapangan.

Berikut adalah beberapa kondisi pembebanan lalu lintas berdasarkan kemungkinan – kemungkinan yang terjadi di lapangan:

- Kondisi 1: Pelaksanaan konstruksi dilaksanakan tanpa adanya penerapan Manajemen Rekayasa Lalu Lintas (MRLL) hanya menginformasikan melalui rambu – rambu lalu lintas di lokasi konstruksi;
- Kondisi 2: Pelaksanaan konstruksi dilaksanakan dengan menerapkan Manajemen Rekayasa Lalu Lintas (MRLL) dalam bentuk mitigasi lalu lintas kawasan dan juga mitigasi lalu lintas di area konstruksi;
- Kondisi 3: Pelaksanaan konstruksi dilakukan setelah menertibkan dan merelokasi pedagang kaki lima sesuai dengan peraturan Walikota yang berlaku untuk meminimalkan hambatan samping dan menerapkan Manajemen Rekayasa Lalu Lintas (MRLL) dalam bentuk mitigasi lalu lintas kawasan dan juga mitigasi lalu lintas di area konstruksi;
- Kondisi 4: Pelaksanaan konstruksi dilakukan setelah menertibkan dan merelokasi pedagang kaki lima sesuai dengan peraturan Walikota yang berlaku untuk meminimalkan hambatan samping, meningkatkan kapasitas simpang melalui perbaikan fase sinyal dan menerapkan Manajemen Rekayasa Lalu Lintas (MRLL) dalam bentuk mitigasi lalu lintas kawasan dan juga mitigasi lalu lintas di area konstruksi.

IV.2 Analisis Penanganan pada Masa Operasional

IV.2.1 Rencana Implementasi BRT

Sistem transportasi angkutan massal BRT BBMA rencananya akan dioperasikan secara bertahap dan akan beroperasi penuh di tahun 2027 setelah

seluruh fasilitas infrastrukturnya terbangun. Beberapa paramater yang digunakan untuk perencanaan operasionalnya adalah sebagai berikut:

Tabel IV-39 Paramater Rencana Operasional BRT BBMA

Sumber: PMC 2024

Parameter Perencanaan	Ukuran	Standar	Sumber
Headway di luar jam sibuk (durasi antar bus selama periode tidak terlalu ramai)	10 menit	Waktu tunggu penumpang: Maks 7 menit (jam sibuk) Maks 15 menit (di luar jam sibuk)	Peraturan Menteri Nomor 10 Tahun 2012
Faktor beban maksimal	100%	100%	Peraturan Menteri Nomor 27 Tahun 2015
Waktu singgah	10 menit di setiap terminal* 15 menit di satu sisi terminal**	Waktu istirahat pengemudi: Min. 30 menit setelah 4 jam berkendara berturut-turut	Peraturan Menteri Nomor 27 Tahun 2015
Cadangan bus	10% dari armada yang beroperasi	10% dari armada yang beroperasi	Berdasarkan pengalaman SYSTRA
Jam operasional	16 jam	Tidak Ada Standar yang Berlaku	Berdasarkan pengalaman SYSTRA
Periode jam sibuk (jam tersibuk dalam sehari)	4 jam	Tidak Ada Standar yang Berlaku	Berdasarkan pengalaman SYSTRA
Periode di luar jam sibuk (periode paling tidak sibuk pada hari itu	12 jam	Tidak Ada Standar yang Berlaku	Berdasarkan pengalaman SYSTRA
Hari operasional per tahun	365 hari	Tidak Ada Standar yang Berlaku	Berdasarkan pengalaman SYSTRA

Secara umum jenis layanan BRT terbagi menjadi dua jenis, yaitu (1) layanan *trunk* dan *feeder*; dan (2) pelayanan langsung. Pada layanan *trunk* dan *feeder*, bus hanya akan beroperasi pada koridor utama BRT (disebut *trunk service*) dan dilengkapi dengan jalur *feeder* yang menghubungkan koridor utama dengan tujuan awal dan akhir penumpang. Sedangkan layanan langsung artinya bus akan beroperasi di dalam dan di luar koridor BRT.

Layanan BBMA BRT dikembangkan berdasarkan konsep layanan langsung. Dibandingkan dengan layanan *trunk* dan *feeder*, kelebihan penerapan layanan langsung pada BBMA BRT adalah sebagai berikut:

- Lebih sedikit transfer. Karena layanan ini dapat beroperasi di dalam dan di luar koridor BRT, penumpang dapat mengakses destinasinya dari titik asal hingga tujuan tanpa memerlukan transfer. Lebih sedikit perpindahan, dapat mengurangi total waktu perjalanan, dan meminimalkan kebutuhan untuk merancang stasiun perpindahan yang biasanya memerlukan ruang besar.
- Standardisasi armada. Dibandingkan dengan layanan trunk dan feeder yang memerlukan ukuran bus berbeda, standardisasi armada dapat diterapkan pada layanan langsung, karena bus harus dapat beroperasi di dalam dan di luar rute. Selain itu, pintu di kedua sisi armada umumnya diperlukan untuk layanan ini, karena stasiun dapat terletak di tengah atau di tepi jalan.
- Efisiensi operasional. Dengan jenis armada standar, kompromi antara kapasitas armada dan tingkat permintaan di wilayah dengan kepadatan rendah akan mengurangi efisiensi operasional secara keseluruhan. Dibandingkan dengan layanan trunk dan feeder, layanan ini biasanya memerlukan armada yang relatif lebih kecil pada jam-jam sibuk.

Namun perlu diperhatikan bahwa pada layanan langsung, keterlambatan mungkin terjadi ketika bus beroperasi di luar koridor BRT (bercampur dengan lalu lintas lain).

Rute BRT

Dengan menggunakan rute BRT BBMA terbaru yang diusulkan oleh Pemerintah BBMA dan disetujui oleh Kementerian Perhubungan, PMC telah mengkaji dan mengusulkan penyesuaian rute tersebut dan telah dibahas secara erat dengan Pemerintah BBMA. Secara umum, peninjauan menyeluruh terhadap rute-rute telah dilakukan dan diselaraskan dengan desain perencanaan BRT, dan kondisi BBMA saat ini, terutama dalam hal pengaturan lalu lintas dan pembangunan infrastruktur. Berikut adalah rute akhir BRT BBMA yang telah disesuaikan oleh PMC.

Tabel IV-40 Rute BRT BBMA

Sumber: PMC 2024

No	Rute	Asal - Tujuan	Panjang (km)	Total Panjang Perjalanan Pulang Pergi (km)
1	BRT 01	Cibiru - Kalapa	17.4	33.7
		Kalapa - Cibiru	16.3	
2	BRT 02	Ledeng - Kalapa	9.8	19.0
		Kalapa - Ledeng	9.2	
3	BRT 03A	Leuwipanjang - Dago	14.5	25.1
		Dago - Leuwipanjang	10.6	
4	BRT 03B	Leuwipanjang - Dago via Dipatiukur	14.0	25.3
		Dago - Leuwipanjang via Dipatiukur	11.3	
5	BRT 04	Elang - Riau	13.6	26.1
		Riau - Elang	12.5	
6	BRT 05*	Ciroyom - Pajajaran - Antapani	14.1	30.0
		Antapani - Pajajaran - Ciroyom	15.9	
7	BRT 06	Cibaduyut - Alun Alun	5.7	11.0
		Alun Alun - Cibaduyut	5.3	
8	BRT 07	Padalarang - Alun Alun	18.9	45.5
		Alun Alun - Padalarang	26.6	
9	BRT 08	Cimahi - Cicaheum	18.1	36.9
		Cicaheum - Cimahi	18.8	
10	BRT 09	Ledeng - Antapani	15.2	31.2
		Antapani - Ledeng	16.0	
11	BRT 10	Cibereum - Leuwipanjang - Tegalluar	26.3	53.6
		Tegalluar - Leuwipanjang - Cibeureum	27.3	
12	BRT 11	Tegalluar - St. Hall	23.3	48.1
		St. Hall - Tegalluar	24.8	
13	BRT 12	Soreang - Leuwipanjang	15.4	29.5
		Leuwipanjang - Soreang	14.1	
14	BRT 13	Jatinangor - Leuwipanjang	21.9	42.6
		Leuwipanjang - Jatinangor	20.7	
15	BRT 14	Majalaya - Baleendah - Leuwipanjang	30.7	61.8
		Leuwipanjang - Baleendah - Majalaya	31.1	
16	BRT 15	Banjaran - Baleendah - BEC	28.1	53.6
		BEC - Baleendah - Banjaran	25.5	
17	BRT 16	Sarijadi - Antapani	13.2	28.6
		Antapani - Sarijadi	15.4	
18	BRT 17	Ledeng - Lembang	8.4	16.3
		Lembang - Ledeng	7.9	
19		Sarijadi - Cicaheum	10.0	20.8

No	Rute	Asal - Tujuan	Panjang (km)	Total Panjang Perjalanan Pulang Pergi (km)
	BRT 18	Cicaheum - Sarijadi	10.8	
20	BRT 19	Majalaya - Derwati - Tegalluar	16.8	33.5
		Tegalluar - Derwati - Majalaya	16.7	
21	BRT 20	Jatinangor - Dipatiukur via Tol	34.6	66.6
		Dipatiukur - Jatinangor via Tol	32.0	

* Rute yang dituju Pemerintah pada tahun 2023 adalah Lanud Husein – Antapani namun mengingat layanan operasional saat ini di Lanud Husein, karena sebagian besar penerbangan komersial di bandara ini telah dialihkan ke Bandara Internasional Kertajati sehingga mengurangi permintaan penumpang di Bandara Husein Sastranegara secara signifikan. PMC merekomendasikan untuk memindahkan rute akhir ke Pasar Ciroyom yang mungkin lebih banyak peminatnya, namun jalurnya tetap melalui akses bandara. Usulan ini telah diterima oleh Pemerintah; dengan demikian jalur terakhir adalah Ciroyom – Antapani.

Gambar IV-75 Rute BRT BBMA

Sumber: PMC 2024

Kebutuhan Armada dan km Perjalanan.

Seiring bertambahnya cakupan area dan km perjalanan dari rute yang diperbarui, jumlah bus untuk BRT BBMA juga bertambah. Jumlah bus bertambah dari 455 bus (studi SYSTRA) menjadi 578 bus yang perlu pengadaan BBMA BRT. Jumlah ini sudah termasuk 10% armada cadangan. Untuk bus operasional, dibutuhkan 525 bus yang terdiri dari 114 bus besar untuk empat (4) rute, dan 411 bus sedang untuk 17 rute yang melayani 21 rute layanan langsung BBMA. Pergantian bus dari bus ukuran besar ke bus sedang yang disesuaikan dengan kondisi jalan pada rute BRT 07 (Padalarang – Alun-alun) dan BRT 08 (Cimahi – Cicaheum) turut berkontribusi terhadap peningkatan jumlah total armada pada keseluruhan pelayanan.

Untuk pengoperasian BRT secara penuh di BBMA, hal ini didasarkan pada analisis multikriteria dari studi SYSTRA. Karena rute BRT telah diperbarui, pemerintah daerah telah mengusulkan rencana implementasi, sebagai berikut:

- Fase 1 (2024):
  - BRT 07: Padalarang – Alun-alun
  - BRT 15: Banjaran – Baleendah – BEC.
- Fase 2 (2025):
  - BRT 01: Cibiru – Kalapa
  - BRT 02: Ledeng - Kalapa
  - BRT 03A: Leuwipanjang - Dago
  - BRT 03B: Leuwipanjang - Dago via Dipatiukur
  - BRT 11: Tegalluar – St. Hall
  - BRT 12: Soreang – Leuwipanjang
  - BRT 20: Jatinangor – Dipatiukur via Tol
- Fase 3 (2026):
  - BRT 04: Elang – Riau
  - BRT 05: Ciroyom – Pajajaran – Antapani
  - BRT 08: Cimahi – Cicaheum
  - BRT 09: Ledeng – Antapani
  - BRT 10: Cibeureum (Elang) – Leuwipanjang – Tegalluar
  - BRT 14: Majalaya – Baleendah – Leuwipanjang
  - BRT 18: Sarijadi – Cicaheum
- Fase 4 (2027):
  - BRT 06: Cibaduyut – Alun Alun
  - BRT 13: Jatinangor – Leuwipanjang
  - BRT 16: Sarijadi – Antapani
  - BRT 17: Ledeng – Lembang
  - BRT 19: Majalaya – Derwati – Tegalluar

Berdasarkan fase rencana ini, jumlah bus yang akan diimplementasikan pada setiap fase adalah seperti yang ditunjukkan pada tabel di bawah ini.

Tabel IV-41 Jumlah Bis BRT Berdasarkan Tahapan Rencana Implementasinya

Sumber: PMC 2024

Fase Implementasi	Jumlah Bis Besar (L)	Jumlah Bis Medium (M)	Total
Fase 1(2024)	38	142	180
Fase 2 (2025)	44	65	109
Fase 3 (2026)	-	172	172
Fase 4 (2027)	43	74	117
Total			**578**

Tabel IV-42 Kebutuhan Armada dan KM Perjalanan BRT BBMA

Sumber: PMC 2024

No	Rute	Nama	Jenis Bus	Panjang Total (km)	Perjalanan Pulang Pergi (menit)	Jalur Maks PPHPD (pax)	Frekuensi (bus/jam)	Kemajuan (menit)	Armada Operasional (bus)	Jumlah Armada (bus)	BRT Kendaraan Harian Km per Rute (km)*	Jarak Perjalanan Harian per Bus (km)	Jarak Perjalanan Tahunan per Rute (km)	Jarak Perjalanan Tahunan per Bus (km)
1	BRT 01	Cibiru - Kalapa	L	33.7	110.34	564	10	6.00	23	25	4.893,24	212.75	1.786.032,60	77.653,59
2	BRT 02	Ledeng - Kalapa	M	19.0	69.43	188	9	6.67	14	15	2.482,92	177.35	906.265,80	64.733,27
3	BRT 03A	Leuwipanjang - Dago	M	25.1	85.33	330	9	6.67	15	17	3.280,07	218.67	1.197.224,82	79.814,99
4	BRT 03B	Leuwipanjang - Dago via Dipatiukur	M	25.3	89,99	271	7	8.57	13	14	2.571,49	197.81	938.594,58	72.199,58
5	BRT 04	Elang - Riau	M	26.1	91.35	298	9	6.67	16	18	3.410,75	213.17	1.244.923,02	77.807,69
6	BRT 05	Ciroyom - Pajajaran - Antapani	M	30.0	121.77	169	9	6.67	21	23	3.920,40	186.69	1.430.946,00	68.140,29
7	BRT 06	Cibaduyut - Alun Alun	M	11.0	39.63	764	20	3.00	20	22	3.194,40	159,72	1.165.956,00	58.297,80
8	BRT 07	Padalarang - Alun Alun	M	45.5	165.61	1009	26	2.31	82	90	17.177.16	209.48	6.269.663,40	76.459,31
9	BRT 08	Cimahi - Cicaheum	M	36.9	122,99	246	7	8.57	16	18	3.750,52	234.41	1.368.938,34	85.558,65
10	BRT 09	Ledeng - Antapani	M	31.2	108,85	372	10	6.00	22	24	4.530,24	205.92	1.653.537,60	75.160,80
11	BRT 10	Cibeureum (Elang) - Leuwipanjang - Tegalluar	M	53.6	172,85	169	5	12.00	17	19	3.891,36	228.90	1.420.346,40	83.549,79

No	Rute	Nama	Jenis Bus	Panjang Total (km)	Perjalanan Pulang Pergi (menit)	Jalur Maks PPHPD (pax)	Frekuensi (bus/jam)	Kemajuan (menit)	Armada Operasional (bus)	Jumlah Armada (bus)	BRT Kendaraan Harian Km per Rute (km)*	Jarak Perjalanan Harian per Bus (km)	Jarak Perjalanan Tahunan per Rute (km)	Jarak Perjalanan Tahunan per Bus (km)
12	BRT 11	Tegalluar - St. Hall	M	48.1	166.38	290	8	7.50	25	27	5.587,30	223.49	2.039.363,04	81.574,52
13	BRT 12	Soreang - Leuwipanjang	L	29.5	95.38	539	9	6.67	17	19	3.855.06	226.77	1.407.096,90	82.770,41
14	BRT 13	Jatinangor - Leuwipanjang	L	42.6	144,89	824	14	4.29	39	43	8.659,73	222.04	3.160.800,72	81.046.17
15	BRT 14	Majalaya - Baleendah - Leuwipanjang	M	61.8	103.00	249	9	6.67	45	50	8.076.02	179.47	2.947.748,76	65.505,53
16	BRT 15	Banjaran - Baleendah - BEC	M	53.6	182.67	0**	9	6.67	40	44	7.004,45	175.11	2.556.623,52	63.915,59
17	BRT 16	Sarijadi - Antapani	M	28.6	98.13	335	9	6.67	17	19	3.737,45	219,85	1.364.168,52	80.245.21
18	BRT 17	Ledeng - Lembang	M	16.3	48.84	222	9	6.67	11	12	2.130,08	193.64	777.480,66	70.680,06
19	BRT 18	Sarijadi - Cicaheum	M	20.8	100,00	0**	9	6.67	18	20	2.718.14	151.01	992.122,56	55.117,92
20	BRT 19	Majalaya - Derwati - Tegalluar	M	33.5	106.60	0**	9	6.67	19	21	4.377,78	230.41	1.597.889,70	84.099,46
21	BRT 20	Jatinangor - Dipatiukur via Tol	L	66.6	209.10	0**	9	6.67	35	38	8.703,29	248.67	3.176.700,12	90.762,86

* = km yang ditempuh termasuk km mati. Diasumsikan km mati adalah 10% dari total km perjalanan, berdasarkan analisis dengan lokasi depo yang tersedia untuk BRT BBMA saat ini. Dead km yang lebih tepat akan diperoleh ketika semua lokasi dan kapasitas depo telah ditentukan.

** = Estimasi permintaan termasuk PPHPD Line Max akan diupdate pada kajian selanjutnya.

Berikut adalah penambahan volume kendaraan dengan beroperasinya BRT pada masing-masing ruas jalan.

Tabel IV-43 Penambahan Volume Kendaraan BRT Pada Masing – Masing Ruas Jalan

Sumber: PMC 2024

No	Nama Jalan	PENAMBAHAN VOLUME BRT	
		KEND/JAM	SMP/JAM
1	Jl. ABC	27	32,4
2	Jl. Ahmad Yani 1	36	43,2
3	Jl. Ahmad yani 2	36	43,2
4	Jl. Ahmad yani 3	24	28,8
5	Jl. Ahmad yani 4	24	28,8
6	Jl. Ahmad yani 5	24	28,8
7	Jl. Ahmad yani 6	40	48
8	Jl. Alun Alun Timur	66	79,2
9	Jl. Asia Afrika 1	40	48
10	Jl. Asia Afrika 2	40	48
11	Jl. Asia Afrika 3	40	48
12	Jl. Asia Afrika 4	100	120
13	Jl. Asia Afrika 5	73	87,6
14	Jl. Banceuy 1	27	32,4
15	Jl. Banceuy 2	38	45,6
16	Jl. BKR	50	60
17	Jl. Dalem Kaum	66	79,2
18	Jl. Dewi Sartika 1	66	79,2
19	Jl. Dewi Sartika 2	66	79,2
20	Jl. Ibrahim Adjie	36	43,2
21	Jl. Jakarta	36	43,2
22	Jl. Jend Sudirman 1	30	36
23	Jl. Jend Sudirman 2	30	36
24	Jl. Jend Sudirman 3	30	36
25	Jl. Jend Sudirman 4	30	36
26	Jl. Jend Sudirman 5	30	36
27	Jl. Jend Sudirman 6	30	36
28	Jl. Kebon Jati 1	30	36
29	Jl. Kebon Jati 2	30	36
30	Jl. Moch Toha 1	36	43,2
31	Jl. Moch Toha 2	36	43,2
32	Jl. Naripan 1	27	32,4

No	Nama Jalan	PENAMBAHAN VOLUME BRT	
		KEND/JAM	SMP/JAM
33	Jl. Naripan 2	27	32,4
34	Jl. Otista 1	63	75,6
35	Jl. Otista 2	70	84
36	Jl. Otista 3	44	52,8
37	Jl. Otista 4	36	43,2
38	Jl. Otista 5	36	43,2
39	Jl. Pungkur	36	43,2
40	Jl. Rajawali Barat	22	26,4
41	Jl. Rajawali Timur 1	30	36
42	Jl. Rajawali Timur 2	30	36
43	Jl. Sunda	27	32,4
44	Jl. Suniaraja 1	38	45,6
45	Jl. Suniaraja 2	72	86,4
46	Jl. Veteran	27	32,4

IV.2.2 Intervensi Penggunaan Kendaraan Pribadi

Sama halnya dengan kota – kota besar lainnya, kemacetan selalu juga menjadi salah satu permasalahan yang di hadapi oleh kota Bandung. Pendekatan penambahan fasilitas untuk kendaraan bermotor, seperti jalan dan ruang parkir, untuk mengatasi kemacetan ini sering kali tidak membuahkan hasil, dan malah menyebabkan lingkaran setan yang tidak pernah berakhir. Untuk memutus siklus ini, harus ada pergeseran pendekatan menuju intervensi yang berorientasi pada pengendalian dan pembatasan penggunaan kendaraan bermotor. Pendekatan ini dikenal sebagai Manajemen Pengendalian Lalu Lintas (*Transportation Demand Management* / TDM) yang bertujuan untuk mengurangi ketergantungan terhadap kendaraan pribadi dan mendorong peralihan ke moda transportasi yang lebih berkelanjutan. Pendekatan ini membutuhkan kombinasi penerapan insentif untuk penggunaan transportasi publik ("*pull strategy*") dan disinsentif untuk penggunaan kendaraan bermotor pribadi ("*push strategy*"), yang sering kali tidak ada dalam strategi transportasi kota. Selain pendekatan holistik ini telah terbukti lebih efektif dalam mengalihkan orang untuk menggunakan transportasi publik, berjalan kaki, dan bersepeda serta mendorong penggunaan lahan yang efisien dengan menciptakan tata ruang kota yang padat dan dinamis, penerapan

kebijakan *push* juga dapat menjadi solusi kebijakan yang lebih hemat biaya karena membuka sumber pendapatan baru untuk meningkatkan layanan transportasi publik. Berikut adalah strategi push and pull yang dapat dilakukan untuk mengintervensi penggunaan kendaraan pribadi.

Tabel IV-44 Strategi *Push and Pull* (Broaddus, 2006)

Sumber: ITDP

	PUSH	PULL
Intervensi Kebijakan/Peraturan/ Ekonomi	**Pembatasan Kendaraan Bermotor Pribadi** • Penerapan jalan berbayar • Penerapan pajak kemacetan • Pengaturan pajak penjualan/pajak impor kendaraan • Biaya pendaftaran kendaraan/pajak jalan • Sistem kuota kendaraan • Manajemen tarif parkir • Manajemen ruang parkir • Pembatasan plat nomor kendaraan • Zona rendah emisi • Zona pembatasan kecepatan	**Peningkatan Layanan Transportasi Publik** • Infrastruktur dan sistem tarif yang terintegrasi • Jaringan atau koridor angkutan prioritas **Insentif bagi komuter** • *Parking spot cashout*[10] • Pengurangan pajak untuk tiket transportasi publik • Pengurangan pajak untuk bersepeda atau berjalan kaki
Intervensi Fisik/Teknis	**Pengurangan Mobilitas Kendaraan Bermotor Pribadi** • Pembatasan ruang parkir • Modifikasi lalu lintas menerus (*through traffic*) • Pembatasan kecepatan kendaraan **Realokasi Ruang Jalan** • Pengubahan fungsi ruang kendaraan menjadi fasilitas pejalan kaki, pesepeda, dan transportasi publik **Pembatasan Zona Lalu Lintas Terbatas** • Zona khusus pejalan kaki	**Peningkatan Kualitas Layanan Transit** • Sistem *Bus Rapid Transit* (BRT) • Jalur khusus untuk bus • *Light rail* • Layanan kereta api komuter • Transportasi publik massal **Memperbaiki Infrastruktur Sepeda** • Jalur khusus sepeda dan tempat parkir **Meningkatkan Infrastruktur Pejalan Kaki** • Trotoar dan penyeberangan yang aman • Zona pejalan kaki **Meningkatkan Opsi Bermobilitas** • Layanan berbagi mobil (*car-sharing*) dan taksi yang terkelola dengan efektif • Layanan *bike-share* • Layanan *feeder* dan mikrobus yang lebih baik

Intervensi Perencanaan/Desain	**Perencanaan Penggunaan Lahan Terpadu** • Perencanaan tata ruang dalam lingkup regional • Pembangunan Berorientasi Transit (*Transit Oriented Development*) • Standar penyediaan ruang parkir (contoh: parkir maksimum)	**Perencanaan Transportasi Tidak Bermotor** • Desain jalan untuk lalu lintas sepeda/pejalan kaki • Konektivitas trotoar dan jalur sepeda • Peta dan penunjuk jalan
Intervensi Pendukung	**Penegakan hukum** • Denda • Tiket • Sanksi tilang atau derek kendaraan	**Kesadaran Publik** • Meningkatkan kesadaran penggunaan transportasi publik • Peningkatan kapasitas dan kompetensi mengenai transportasi publik • Hari Bebas Kendaraan Bermotor

Untuk menekan penggunaan kendaraan pribadi dan kepadatan lalu lintas di ruas – ruas jalan utama di Kota Bandung dan juga untuk mendorong masyarakat agar menggunakan angkutan massal dalam beaktifitas sehari-hari. Pemerintah Kota Bandung berencana menerapkan kebijakan pemberlakuan jam operasional kendaraan pribadi, dimana kendaraan pribadi tidak diijinkan melewati jalan – jalan tertentu di Kota Bandung pada saat jam sibuk. Untuk mengetahui efektifitas dari kebijakan ini maka perlu dilakukan studi lebih lanjut yang lebih mendetail berdasarkan kebutuhan prioritas di masing-masing ruas jalan, dalam rekomendasi teknis ini di asumsikan kebijakan pemberlakuan jam operasional kendaraan pribadi akan di implementasikan disaat BRT beroperasi full sepenuhnya yaitu di tahun 2027 dengan asumsi pengurangan penggunaan kendaraan pribadi sampai dengan 20%.

IV.2.3 Analisis Kinerja Dampak Lalu Lintas pada Masa Operasional

Berikut merupakan alternatif yang akan diuji dan akan dijelaskan pada masa operasional / setelah konstruksi. Berikut adalah hasil dari pembebanan lalu lintas berdasarkan 2 skenario yaitu:

- Skenario1 (*Do Nothing)*: Wilayah studi diasumsikan tidak terbangun atau tidak menimbulkan bangkitan-tarikan baru ke jaringan jalan di tahun 2027, dalam hal ini belum terbangun halte BRT BBMA. Kondisi jalan masih sama dengan keadaan eksisting, terjadi penumbuhan jumlah lalu lintas kendaraan per tahunnya.

- Skenario 2 *(Do Something)* Setelah Konstruksi: Wilayah studi sudah selesai masa konstruksi, sehingga pembangunan halte BRT BBMA menimbulkan bangkitan-tarikan baru ke jaringan jalan di tahun 2027. Kondisi jalan mengalami rekayasa dan diterapkan beberapa asumsi yang akan diuji pada analisis.

Asumsi – asumsi yang digunakan pada skenario *Do Something* diantaranya adalah sebagai berikut:

- Terbangunnya halte BRT BBMA di tahun 2025;
- Perbaikan fase APILL di Simpang – simpang sepanjang koridor BRT BBMA pada tahun 2025;
- Beroperasinya fase 1 BRT BBMA di tahun 2024, terdapat 2 rute yang beroperasi dan mengakibatkan bertambahnya volume kendaraan di jalan sekitarnya;
- Beroperasinya fase 2 BRT BBMA di tahun 2025, terdapat 7 rute yang beroperasi dan mengakibatkan bertambahnya volume kendaraan di jalan sekitarnya;
- Beroperasinya jalur khusus BRT sepanjang 21 km dan 34 stasiun BRT dan stasiun *Off-Corridor* BRT lainnya termasuk Perbaikan Alinyemen Jalan, Sinkronisasi Simpang, Pembangunan halte, Pembangunan terminal dan Depo selesai ditahun 2027;
- Beroperasinya fase 3 pada tahun 2026 sebanyak 7 rute dan fase 4 di tahun 2027 sebanyak 5 rute, sehingga mengakibatkan bertambahnya volume kendaraan di ruas jalan yang dilalui yang mengakibatkan pengguna angkutan umum meningkat menjadi 15%;
- Diberlakukannya kebijakan pemberlakuan jam operasional kendaraan pribadi diruas – ruas jalan utama kota Bandung dan mengakibatkan penurunan volume kendaraan pribadi sebesar 20%.
- Nilai pertumbuhan kendaraan yang digunakan adalah berdasarkan Manual Desain Perkerasan Jalan PUPR 2024, untuk jalan diperkotaan sebesar 4,83%.

Hasil pembebanan lalu lintas pada koridor jalur khusus BRT dapat dilihat pada gambar dibawah ini.

Gambar IV-76 Pembebanan Lalu Lintas 2027 Skenario *Do Nothing*

Sumber: Analisis Konsultan

Nama Jalan	Sibuk Pagi
Jl. Asia Afrika 4	0,58
Jl. Asia Afrika 5	0,54
Jl. Jend Sudirman 1	0,72
Jl. Jend Sudirman 2	0,68
Jl. Jend Sudirman 3	0,66
Jl. Jend Sudirman 4	0,76
Jl. Jend Sudirman 5	0,54
Jl. Jend Sudirman 6	0,58
Jl. Rajawali Barat	0,60
Jl. Rajawali Timur 1	0,63
Jl. Rajawali Timur 2	0,73
Jl. Kebon Jati 1	0,74
Jl. Kebon Jati 2	0,62
Jl. Suniaraja 1	0,66
Jl. Otista 1	0,74
Jl. Suniaraja 2	0,71
Jl. Banceuy 2	0,61
Jl. Ahmad Yani 1	0,62
Jl. Ibrahim Adjie	0,70
Jl. Jakarta	0,76
Jl. Ahmad yani 2	0,59
Jl. Ahmad yani 3	0,66
Jl. Ahmad yani 4	0,60
Jl. Ahmad yani 5	0,65
Jl. Ahmad yani 6	0,75
Jl. Asia Afrika 1	0,57
Jl. Asia Afrika 2	0,67
Jl. Asia Afrika 3	0,71
Jl. Otista 2	0,64
Jl. Otista 3	0,54
Jl. Otista 4	0,70
Jl. Otista 5	0,60
Jl. BKR	0,68
Jl. Moch Toha 1	0,72
Jl. Moch Toha 2	0,64
Jl. Pungkur	0,61
Jl. Dewi Sartika 1	0,66
Jl. Dewi Sartika 2	0,67
Jl. Dalem Kaum	0,58
Jl. Alun Alun Timur	0,59
Jl. Banceuy 1	0,65
Jl. ABC	0,62
Jl. Naripan 1	0,67
Jl. Naripan 2	0,59
Jl. Sunda	0,66
Jl. Veteran	0,68

Nama Jalan	Sibuk Sore
Jl. Asia Afrika 4	0,56
Jl. Asia Afrika 5	0,55
Jl. Jend Sudirman 1	0,67
Jl. Jend Sudirman 2	0,66
Jl. Jend Sudirman 3	0,63
Jl. Jend Sudirman 4	0,95
Jl. Jend Sudirman 5	0,76
Jl. Jend Sudirman 6	0,69
Jl. Rajawali Barat	0,73
Jl. Rajawali Timur 1	0,71
Jl. Rajawali Timur 2	0,60
Jl. Kebon Jati 1	0,61
Jl. Kebon Jati 2	0,61
Jl. Suniaraja 1	0,58
Jl. Otista 1	0,74
Jl. Suniaraja 2	0,75
Jl. Banceuy 2	0,63
Jl. Ahmad Yani 1	0,59
Jl. Ibrahim Adjie	0,65
Jl. Jakarta	0,53
Jl. Ahmad yani 2	0,72
Jl. Ahmad yani 3	0,62
Jl. Ahmad yani 4	0,55
Jl. Ahmad yani 5	0,77
Jl. Ahmad yani 6	0,60
Jl. Asia Afrika 1	0,55
Jl. Asia Afrika 2	0,69
Jl. Asia Afrika 3	0,73
Jl. Otista 2	0,62
Jl. Otista 3	0,58
Jl. Otista 4	0,63
Jl. Otista 5	0,57
Jl. BKR	0,54
Jl. Moch Toha 1	0,66
Jl. Moch Toha 2	0,57
Jl. Pungkur	0,71
Jl. Dewi Sartika 1	0,57
Jl. Dewi Sartika 2	0,63
Jl. Dalem Kaum	0,65
Jl. Alun Alun Timur	0,61
Jl. Banceuy 1	0,59
Jl. ABC	0,73
Jl. Naripan 1	0,57
Jl. Naripan 2	0,56
Jl. Sunda	0,66
Jl. Veteran	0,70

Gambar V-1 Pembebanan Lalu Lintas 2027 Skenario *Do Something*

Sumber: Analisis Konsultan

BAB VI KESIMPULAN DAN REKOMENDASI PENANGANAN DAMPAK LALU LINTAS

VI.1 KESIMPULAN

Sesuai dengan amanat UU Nomor 22 tahun 2009 tentang Lalu Lintas dan Angkutan Jalan, pasal 138 ayat 1 menyebutkan bahwa Pemerintah dan pemerintah daerah wajib menjamin ketersediaan angkutan umum yang aman, nyaman, dan terjangkau, Peraturan Pemerintah Nomor 74. Tahun 2014 tentang Angkutan Jalan menegaskan pentingnya penyediaan angkutan umum massal sebagai bagian dari pelayanan transportasi yang efisien dan ramah lingkungan dan mendorong penggunaan moda transportasi massal untuk mengurangi kepadatan lalu lintas dan emisi serta Peraturan Menteri Perhubungan No. 17 Tahun 2021 tentang Penyelenggaraan Angkutan Orang dengan Kendaraan Bermotor Umum Dalam Trayek. Peraturan ini mengatur terkait penyelenggaraan angkutan massal dengan tujuan untuk Meningkatkan aksesibilitas dan keterjangkauan transportasi umum, meningkatkan kualitas pelayanan angkutan umum untuk mendukung mobilitas masyarakat dan mengurangi ketergantungan terhadap kendaraan pribadi dan mengurangi kemacetan.

Pemerintah Indonesia melalui Kementerian Perhubungan sedang mengimplementasikan Indonesia Mass Transit Project (MASTRAN) demi meningkatkan kualitas hidup perkotaan di Indonesia. Proyek pembangunan angkutan massal berbasis jalan dengan sistem Bus Rapid Transit (BRT) di wilayah metropolitan Cekungan Bandung mencakup koridor jalur khusus (*on-corridor)* BRT sepanjang 21 km di Kota Bandung, pengembangan halte, terminal, depo, serta pembangunan halte *off-corridor* pada 21 rencana rute *direct service* BRT yang menjangkau wilayah Kota Bandung, Kota Cimahi, Kabupaten Bandung, Kabupaten Bandung Barat, dan Kabupaten Sumedang.

Dimana tujuan umum yang di bahas dalam Kajian studi ini memfokuskan pada Analisa Dampak Lalu Lintas terkait Pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station* yang intinya adalah:

1) Mengkonsepkan manajemen dan rekayasa lalu lintas di wilayah pembangunan selama dan setelah konstruksi proyek Pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station*.
2) Memprediksi titik-titik lokasi yang akan berdampak paling besar akibat Pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station* selama dalam tahap konstruksi maupun setelahnya.
3) Mempersiapkan jalur-jalur lalu lintas alternatif, memberikan alternatif pengaturan pola operasi angkutan umum yang bersinggungan dengan operasi Pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station* selama dan setelah konstruksi.

VI.2 Rekomendasi

VI.2.1 Rekomendasi pada Masa Pra Konstruksi

Berikut merupakan rekomendasi masa pra- konstruksi di sepanjang koridor pada setiap titik pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station*:

- Merencanakan rambu-rambu peringatan atau pemberitahuan hindari ruas jalan karena terdapat pekerjaan konstruksi jalur khusus BRT termasuk halte, terminal dan *End Station*. Dampak yang timbul para pengguna jalan mencari alternatif jalur yang digunakan untuk menuju tujuan mereka masing - masing.
- Memperjelas marka jalan yang ada sehingga kondisi lalu lintas lebih teratur, karena pada kondisi eksisting marka yang ada kurang jelas.
- Merelokasi 17 halte eksisting yang terletak di jalur khusus BRT termasuk halte, terminal dan *End Station*. Diantaranya adalah sebagai berikut:
    - Halte TMB Dinas Pendidikan Jl. Ahmad Yani
    - Halte TMB Stadion Persib Jl. Ahmad Yani
    - Halte Angkutan Umum Dinas Pendidikan Jl. Ahmad Yani
    - Halte (TMB) Jl. Asia Afrika
    - Halte (TMB) Jl. Jakarta
    - Halte Angkutan Umum Kampus Amik Jl. Jakarta

- Halte Angkutan Umum GOR KONI Jl. Jakarta
- Halte (TMB) Plaza Teklom Jl. Lembong
- Halte (TMB) PT. Inti Jl. Moch Toha
- Halte (TMB) RS. Kebonjati
- Halte (TMB) Pos Giro Kosambi
- Halte Angkutan Umum Depan Segitiga Mas
- Halte Angkutan Umum Jl. Otista
- Halte Angkutan Umum Depan Taman Tegalega Jl. BKR
- Halte Angkutan Umum Samping Kolam Renang Tegalega Moch. Toha
- Halte Angkutan Umum Halte Depan SD/Gereja Moch Toha
- Halte Angkutan Umum Depan BCA Dewi Sartika

- Merencanakan perbaikan fasilitas pejalan kaki pada ruas -ruas jalan berikut:
  - Jl. ABC
  - Jl. Pasir Koja
  - Jl. Pungkur
  - Jl. Ciateul
  - Jl. Peta
  - Jl. Moh. Toha
  - Jl. BKR
  - Jl. Veteran
  - Jl. Sunda
  - Jl. Ibrahim Adjie
  - Jl. Laswi
  - Jl. Gatot Subroto
  - Jl. Karapitan
  - Jl. Dulatip
  - Jl. Gardujati
  - Jl. Astana Anyar
  - Jl. Jamika
  - Jl.Garuda (Abdurahman Saleh)
  - Jl. Elang Raya
  - Jl. Soekarno Hatta
  - Jl. Pasir Kaliki
- Menambah rambu larangan berhenti di titik–titik sepanjang jalan dan sanksi yang tegas untuk kendaraan yang melanggar rambu lalu lintas tersebut, karena walaupun sudah banyak rambu yang terpasang di kondisi eksisting, namun tindakan tegas di lapangan masih kurang efektif. Dampak yang terjadi akibat pemasangan rambu ini terdapat peraturan yang jelas dan tegas sehingga kendaraan yang berhenti disembarang tempat terutama angkutan kota lebih tertib.
- Menertibkan parkir di sisi jalan dengan beberapa mekanisme diantaranya:

- Memindahkan / Meniadakan parkir di sisi jalan pada ruas:
    - Jl. Dewi Sartika
    - Jl. Kebon Jati
    - Jl. Naripan
    - Jl. Jenderal Sudirman
- Mengurangi / membatasi parkir di sisi jalan pada ruas:
    - Jl. Ahmad Yani
    - Jl. Banceuy
    - Jl. Moch. Toha
    - Jl. Otto Sikandar Dinata
    - Jl. Rajawali Timur
    - Jl. Suniaraja
- Memodifikasi parkir disisi jalan pada ruas:
    - Jl. Rajawali Barat
    - Jl. Ibrahim Adjie

- Menertibkan pedagang kaki lima yang memanfaatkan lahan trotoar untuk berjualan khususnya pada zona merah pedagang kaki lima. Dampak yang timbul dari usulan ini adalah meningkatnya kapasitas pejalan kaki dan para pejalan kaki tidak menggunakan ruas jalan untuk berjalan kaki karena hal tersebut sangat berbahaya.
- Meminimalisir inlet-outlet kendaraan gedung-gedung dengan cara menempatkan petugas pada inlet-outlet gedung-gedung sepanjang jalan.
- Membuat rencana fasilitas penyeberangan untuk pejalan kaki pada pada saat pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station* berlangsung, dampak yang terjadi pada usulan ini adalah para pejalan kaki tidak menyeberang sembarang tempat dan menyatu pada satu titik.
- Meningkatkan kapasitas simpang dengan meningkatkan kinerja waktu siklus APILL dan meminimalisir hambatan samping pada simpang - simpang sebagai berikut:
    - Simpang Kiara Condong
    - Simpang Laswi

    - Simpang Lima
    - Simpang Lengkong Besar
    - Simpang Karanganyar
    - Simpang Gardujati
    - Simpang Jamika
    - Bundaran Cibereum
    - Simpang Nurtanio
    - Simpang Pasir Kaliki
    - Simpang Inggit Garnasih – Moch. Toha
    - Simpang BKR – Moch. Toha
    - Simpang Otista – BKR
    - Simpang Pasir Koja
    - Simpang Naripan – Tamblong
    - Simpang Gudang Utara – Ahmad Yani
    - Simpang Veteran – Sunda
- Pembuatan zebra cross di setiap mulut simpang (pejalan kaki) adalah upaya yang dilakukan untuk meminimalisir konflik *crossing* yang terjadi pada mulut simpang. Dampak dari usulan ini adalah lebih tertatanya pergerakan baik kendaraan maupun orang sehingga konflik yang ada dapat diminimalisir.
- Melakukan reformasi angkutan kota yang terdampak dengan adanya layanan BRT BBMA ini, diantaranya adalah sebagai berikut:
    - Mengintegrasikan dengan rute layanan BRT karena adanya tumpang tindih rute yang signifikan, terdapat 44 trayek diantaranya:
        - 5 trayek Trans Metro Pasundan
        - 6 trayek Trans Metro Bandung
        - 4 trayek DAMRI
        - 1 trayek Buratas
        - 12 trayek Angkot Kota Bandung
        - 16 trayek AKDP
    - Memodifikasi rute sebagai feeder BRT, Terdapat 31 rute eksising diantaranya sebagai berikut:

    - 1 trayek Trans Metro Bandung
    - 1 trayek DAMRI
    - 25 trayek Angkot Kota Bandung
    - 4 trayek AKDP
- Pengurusan perizinan pada instansi teknis terkait rencana pelaksanaan pekerjaan konstruksi yang dilakukan pada badan jalan.

VI.2.2 Rekomendasi pada Masa Konstruksi

Berikut merupakan rekomendasi pada masa konstruksi pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station*:

- Menyusun rencana strategi konstruksi yang dapat meminimalkan waktu pekerjaan di lapangan, yaitu dengan cara melakukan persiapan instalasi pada workshop, sehingga di lokasi konstruksi tinggal melakukan perakitan dan tidak lagi membutuhkan waktu yang lama untuk menutup sebagian area jalan;
- Menginformasikan kepada masyarakat pengguna jalan tentang kegiatan/proyek yang sedang dilaksanakan melalui spanduk atau media digital lainnya termasuk informasi dalam yang juga memuat informasi tentang lama waktu pekerjaan selama masa konstruksi, termasuk mmemutahkirkan informasi di peta digital (*Google Map*) sehingga pelaku perjalanan mendapatkan pertimbangan informasi yang valid sebelum melalui area konstruksi tersebut;
- Menutup area kerja yang terletak ditengah ruas jalan dengan pagar kerja. Ini dimaksudkan agar arus lalu lintas lainnya tidak terganggu oleh proses pelaksanaan pekerjaan konstruksi;
- Memberikan rambu-rambu peringatan atau pemberitahuan hindari ruas jalan karena terdapat pekerjaan konstruksi pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station*. Dampak yang timbul para pengguna jalan mencari alternatif jalur yang digunakan untuk menuju tujuan mereka masing – masing;
- Memberikan rambu petunjuk rute-rute alternatif sebelum memasuki kawasan jalur khusus BRT termasuk halte, terminal dan *End Station*.

Dampaknya pengguna ruas sudah tersosialisasi dengan baik sebelum pekerjaan dilaksanakan.

- Menambah rambu larangan berhenti di titik–titik sepanjang jalur khusus BRT termasuk halte, terminal dan *End Station* pada titik-titik pembangunan halte BRT dan memberikan sanksi yang tegas untuk kendaraan yang melanggar rambu lalu lintas tersebut karena rambu pada kondisi eksisting dirasa belum memadai. Dampak yang terjadi akibat pemasangan rambu ini terdapat peraturan yang jelas dan tegas sehingga kendaraan yang berhenti disembarang tempat terutama angkutan kota menjadi lebih tertib;
- Menertibkan pedagang kaki lima yang memanfaatkan lahan trotoar untuk berjualan. Dampak yang timbul dari usulan ini adalah meningkatnya kapasitas pejalan kaki dan para pejalan kaki tidak menggunakan ruas jalan untuk berjalan kaki karena hal tersebut sangat berbahaya;
- Melakukan Manajemen rekayasa lalu lintas melalui mitigasi lalu lintas kawasan dan juga mitigasi lalu lintas di area konstruksi.
- Kendaraan berat selama masa konstruksi diperbolehkan beroperasi pada waktu yang telah disepakati, direkomendasikan dimalam hari yaitu pukul 22.00 – 04.00.

Mitigasi Lalu Lintas ditingkat Kawasan:

- Mitigasi lalu lintas ditingkat kawasan dilakukan untuk mengalihkan kendaraan melalui jalan alternatif sebelum memasuki area konstruksi koridor BRT yang mengakses melalui arah Barat, Utara, Selatan dan Timur.
- Dari arah Barat Kendaraan dapat dialihkan melalui jalan alternatif:
    - Jl. Padjajaran untuk yang menuju ke pusat kota atau arah utara
    - Jl. Elang Raya dan Jl. Soekarno Hatta untuk yang menuju pusat kota atau arah Selatan.
- Dari arah Utara Kendaraan dapat dialihkan melalui jalan alternatif Jl. Astana Anyar untuk yang menuju ke pusat kota atau arah Selatan.
- Dari arah Selatan Kendaraan dapat dialihkan melalui jalan alternatif:

    - Jl. Raya Kopo untuk yang menuju ke pusat kota atau arah Barat.
    - Jl. H. Samsudin untuk yang menuju ke pusat kota atau arah utara.
    - Jl. Moch. Ramdhan untuk yang menuju ke pusat kota atau arah timur
- Dari arah Timur Kendaraan dapat dialihkan melalui jalan alternatif:
    - Jl. Surapati untuk yang menuju ke pusat kota Alun – Alun atau arah Barat.
    - Jl. Ibrahim Adjie & Jl. Gatot Subroto untuk yang menuju ke Alun - Alun atau arah Barat.

Mitigasi Lalu Lintas di Area Konstruksi :

- Mitigasi lalu lintas di area konstruksi dilakukan dengan tujuan untuk Mengalihkan kendaraan di setiap Lokasi konstruksi halte dan jalur khusus BRT apabila memungkinkan;
- Pekerjaan konstruksi di ruas jalan sebaiknya tidak dilakukan secara bersamaan diruas jalan yang sama, karena akan mengakibatkan penyempitan di beberapa lokasi dalam satu ruas jalan / *bottle neck* yang dapat menyebabkan antrian kendaraan yang cukup panjang mengingat VC ratio di masing-masing ruas pada jam sibuk sudah cukup tinggi;
- Pengalihan kendaraan harus dilakukan apabila memungkinkan, khususnya untuk sepeda motor mengingat jumlahnya yang mencapai 72% dari total arus kendaraan eksisting yang lewat;
- Pemasangan papan informasi pembangunan konstruksi halte BRT dan peringatan dini pada jarak ± 50 meter atau kurang sebelum lokasi konstruksi untuk mengarahkan pengguna jalan keluar dari lintasan perjalanan normal menuju lintasan yang disediakan dengan menyesuaikan tingkat kecepatan sesuai kondisi penyempitan atau perubahan arah pergerakan arus kendaraan yang ditetapkan.
- Pemasangan rambu penyempitan ruas jalan pada jarak ± 50 meter (elektronik maupun non elektronik) dan marka jalan sementara untuk informasi terkait pelaksanaan konstruksi jalur khusus BRT termasuk halte, terminal dan *End Station*.

- Menyediakan halte sementara dilokasi yang memungkinkan, apabila di kondisi eksisitngya sudah terdapat halte sebelumnya;
- Pemasangan fasilitas *barrier* untuk kebutuhan ruas isolasi dengan lebar ± 1,5 meter dari sisi kanan kiri garis terluar rencana jalur khusus BRT termasuk halte, terminal dan *End Station* untuk rencana kebutuhan ruang pelaksanaan konstruksi yang dapat dimodifikasi dengan penambahan seng serta lambang pengarah lalu lintas atau penutup dari bahan lain yang ditambah dengan penerangan agar terlihat pada malam hari.
- Pemasangan papan informasi dan kerucut lalu lintas (*traffic cone*) pada area keluar masuk kendaraan proyek.
- Pemasangan lampu peringatan pada awal dan akhir lokasi pekerjaan serta lokasi pintu keluar masuk kendaraan proyek.
- Penyediaan petugas pemberi isyarat adanya pekerjaan (*Flagman*) pada lokasi pintu keluar masuk.

VI.2.3 Rekomendasi pada Masa Operasional

Berikut merupakan rekomendasi pada masa operasional di sepanjang koridor pada setiap titik pembangunan jalur khusus BRT termasuk halte, terminal dan *End Station*:

- Pembongkaran rambu-rambu informasi semantara mengenai jalur alternatif untuk menghindari ruas jalan yang terkena area konstruksi, agar pengendara tahu bahwa pengalihan sementara sudah selesai.
- Melakukan pemutahkiran data di peta digital (Google Map) agar Masyarakat mendapatkan informasi yang mutahkir terkait kondisi jaringan jalan;
- Menindak tegas pelanggar rambu larangan baik kendaraan berhenti, pedagang kaki lima, dll;
- Penertiban secara intensif hambatan samping oleh petugas sehingga fungsi jalan dan fasilitasnya menjadi lebih baik dari kondisi awal dimana banyak terdapat hambatan samping di mulut simpang;
- Implementasi penataan ruang manfaat jalan baru dengan implementasi BRT;

- Penerapan *transport demand management* (manajemen permintaan pergerakan) yang berfokus untuk peralihan atau *shifting* dari angkutan pribadi menuju angkutan umum, dalam hal ini untuk mengurangi volume kendaraan pribadi di Kota Bandung. Pemerintah Kota Bandung berencana menerapkan kebijakan pemberlakuan jam operasional kendaraan pribadi, dimana kendaraan pribadi tidak diijinkan melewati jalan – jalan tertentu di Kota Bandung pada saat jam sibuk.

VI.3 Mitigasi dan Penanggung Jawab Pelaksanaan Rekomendasi

Tabel berikut mencakup mitigasi dalam rekomendasi, serta instansi yang bertanggung jawab.

Tabel VI-1 Mitigasi dan Penanggung Jawab Pelaksana Rekomendasi

Sumber: Analisis Konsultan

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
REKOMENDASI MASA PRA – KONSTRUKSI			
1	Merencanakan rambu-rambu peringatan atau pemberitahuan hindari ruas jalan karena terdapat pekerjaan konstruksi jalur khusus BRT termasuk halte, terminal dan End Station. Dampak yang timbul para pengguna jalan mencari alternatif jalur yang digunakan untuk menuju tujuan mereka masing - masing.	Kementerian Perhubungan (DEDC)	Dishub Bandung, Dishub Jabar
2	Memperjelas marka jalan yang ada sehingga kondisi lalu lintas lebih teratur, karena pada kondisi eksisting marka yang ada kurang jelas.	Dishub Bandung, Dishub Jabar, P2JN	Kementerian Perhubungan
3	Merelokasi 17 halte eksisting yang terletak di jalur khusus BRT termasuk halte, terminal dan End Station. Diantaranya adalah sebagai berikut: o Halte TMB Dinas Pendidikan Jl. Ahmad Yani o Halte TMB Stadion Persib Jl. Ahmad Yani o Halte Angkutan Umum Dinas Pendidikan Jl. Ahmad Yani	Dinas Perhubungan Kota Bandung	Kementerian Perhubungan (DEDC, PMC)

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
	o Halte (TMB) Jl. Asia Afrika o Halte (TMB) Jl. Jakarta o Halte Angkutan Umum Kampus Amik Jl. Jakarta o Halte Angkutan Umum GOR KONI Jl. Jakarta o Halte (TMB) Plaza Teklom Jl. Lembong o Halte (TMB) PT. Inti Jl. Moch Toha o Halte (TMB) RS. Kebonjati o Halte (TMB) Pos Giro Kosambi o Halte Angkutan Umum Depan Segitiga Mas o Halte Angkutan Umum Jl. Otista o Halte Angkutan Umum Depan Taman Tegalega Jl. BKR o Halte Angkutan Umum Samping Kolam Renang Tegalega Moch. Toha o Halte Angkutan Umum Halte Depan SD/Gereja Moch Toha o Halte Angkutan Umum Depan BCA Dewi Sartika		
4	Merencanakan perbaikan fasilitas pejalan kaki pada ruas -ruas jalan berikut: o Jl. ABC o Jl. Pasir Koja o Jl. Pungkur o Jl. Ciateul o Jl. Peta o Jl. Moh. Toha o Jl. BKR o Jl. Veteran o Jl. Sunda	Kementerian Perhubungan (PMC, DEDC)	Dishub Jabar, DIshub Bandung

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
	o Jl. Ibrahim Adjie o Jl. Laswi o Jl. Gatot Subroto o Jl. Karapitan o Jl. Dulatip o Jl. Gardujati o Jl. Astana Anyar o Jl. Jamika o Jl.Garuda (Abdurahman Saleh) o Jl. Elang Raya o Jl. Soekarno Hatta o Jl. Pasir Kaliki		
5	Menambah rambu larangan berhenti di titik–titik sepanjang jalan dan sanksi yang tegas untuk kendaraan yang melanggar rambu lalu lintas tersebut, karena walaupun sudah banyak rambu yang terpasang di kondisi eksisting, namun tindakan tegas di lapangan masih kurang efektif. Dampak yang terjadi akibat pemasangan rambu ini terdapat peraturan yang jelas dan tegas sehingga kendaraan yang berhenti disembarang tempat terutama angkutan kota lebih tertib.	Dishub Bandung, Dishub Jabar	Kepolisian Lantas
6	Menertibkan parkir di sisi jalan dengan beberapa mekanisme diantaranya: o Memindahkan / Meniadakan parkir di sisi jalan pada ruas: □ Jl. Dewi Sartika □ Jl. Kebon Jati □ Jl. Naripan □ Jl. Jenderal Sudirman	Dishub Bandung (BLUD Parkir)	Walikota Bandung

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
	o Mengurangi / membatasi parkir di sisi jalan pada ruas: Jl. Ahmad Yani Jl. Banceuy Jl. Moch. Toha Jl. Otto Sikandar Dinata Jl. Rajawali Timur Jl. Suniaraja o Memodifikasi parkir disisi jalan pada ruas: Jl. Rajawali Barat Jl. Ibrahim Adjie		
7	Menertibkan pedagang kaki lima yang memanfaatkan lahan trotoar untuk berjualan khususnya pada zona merah pedagang kaki lima.	Satpol PP	Walikota Bandung
8	Meminimalisir inlet-outlet kendaraan gedung-gedung dengan cara menempatkan petugas pada inlet-outlet gedung-gedung sepanjang jalan.	Kepolisian Lalu Lintas, Dishub Bandung	Walikot Bandung
9	Meningkatkan kapasitas simpang dengan meningkatkan kinerja waktu siklus APILL dan meminimalisir hambatan samping pada simpang -simpang sebagai berikut: o Simpang Kiara Condong o Simpang Laswi o Simpang Lima o Simpang Lengkong Besar o Simpang Karanganyar o Simpang Gardujati o Simpang Jamika o Bundaran Cibereum o Simpang Nurtanio	Dishub Bandung	Kementerian Perhubungan (DEDC, PMC)

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
	o Simpang Pasir Kaliki o Simpang Inggit Garnasih – Moch. Toha o Simpang BKR – Moch. Toha o Simpang Otista – BKR o Simpang Pasir Koja o Simpang Naripan – Tamblong o Simpang Gudang Utara – Ahmad Yani o Simpang Veteran – Sunda		
10	Pembuatan zebra cross di setiap mulut simpang (pejalan kaki) adalah upaya yang dilakukan untuk meminimalisir konflik crossing yang terjadi pada mulut simpang.	Dishub Bandung, Dishub Jabar, P2JN	Kementerian Perhubungan (PMC, DEDC)
11	Melakukan reformasi angkutan kota yang terdampak dengan adanya layanan BRT BBMA ini, diantaranya adalah sebagai berikut: o Mengintegrasikan dengan rute layanan BRT karena adanya tumpang tindih rute yang signifikan, terdapat 44 trayek diantaranya: □ 5 trayek Trans Metro Pasundan □ 6 trayek Trans Metro Bandung □ 4 trayek DAMRI □ 1 trayek Buratas □ 12 trayek Angkot Kota Bandung □ 16 trayek AKDP o Memodifikasi rute sebagai feeder BRT, Terdapat 31 rute eksising diantaranya sebagai berikut: □ 1 trayek Trans Metro Bandung □ 1 trayek DAMRI □ 25 trayek Angkot Kota Bandung □ 4 trayek AKDP	Dishub Jabar, Dishub Bandung	Kementerian Perhubungan (PMC)

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
12	Pengurusan perizinan pada instansi teknis terkait rencana pelaksanaan pekerjaan konstruksi yang dilakukan pada badan jalan.	Kementerian Perhubungan (DEDC, PMC)	Gubernur, Walikota Bandung, Bupati Kab. Bandung, Bupati Kab. Bandung Barat, Bupati Sumedang, Walikota Cimahi
REKOMENDASI MASA KONSTRUKSI			
13	Menyusun rencana strategi konstruksi yang dapat meminimalkan waktu pekerjaan di lapangan, yaitu dengan cara melakukan persiapan instalasi pada workshop, sehingga di lokasi konstruksi tinggal melakukan perakitan dan tidak lagi membutuhkan waktu yang lama untuk menutup sebagian area jalan	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar , Dishub Bandung
14	Menginformasikan kepada masyarakat pengguna jalan tentang kegiatan/proyek yang sedang dilaksanakan melalui spanduk atau media digital lainnya termasuk informasi dalam yang juga memuat informasi tentang lama waktu pekerjaan selama masa konstruksi, termasuk mmemutahkirkan informasi di peta digital (Google Map) sehingga pelaku perjalanan mendapatkan pertimbangan informasi yang valid sebelum melalui area konstruksi tersebut	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Diskominfo Jabar, , Diskominfo Bandung
15	Menutup area kerja yang terletak ditengah ruas jalan dengan pagar kerja. Ini dimaksudkan agar arus lalu lintas lainnya tidak terganggu oleh proses pelaksanaan pekerjaan konstruksi	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung, Kepolisian Lalu Lintas

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
16	Memberikan rambu-rambu peringatan atau pemberitahuan hindari ruas jalan karena terdapat pekerjaan konstruksi pembangunan jalur khusus BRT termasuk halte, terminal dan End Station.	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
17	Memberikan rambu petunjuk rute-rute alternatif yang rencananya memakan badan jalan ruas jalan pada saat konstruksi dilaksanakan	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
18	Memberikan rambu petunjuk rute-rute alternatif sebelum memasuki kawasan jalur khusus BRT termasuk halte, terminal dan End Station. Dampaknya pengguna ruas sudah tersosialisasi dengan baik sebelum pekerjaan dilaksanakan..	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
19	Menambah rambu larangan berhenti di titik–titik sepanjang jalur khusus BRT termasuk halte, terminal dan End Station pada titik-titik pembangunan halte BRT dan memberikan sanksi yang tegas untuk kendaraan yang melanggar rambu lalu lintas tersebut karena rambu pada kondisi eksisting dirasa belum memadai.	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
20	Menertibkan pedagang kaki lima yang memanfaatkan lahan trotoar untuk berjualan.	Satpol PP	Walikota, Kecamatan, Kelurahan
21	Melakukan Manajemen rekayasa lalu lintas melalui mitigasi lalu lintas kawasan dan juga mitigasi lalu lintas di area konstruksi.	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
22	Kendaraan berat selama masa konstruksi diperbolehkan beroperasi pada waktu yang telah disepakati, direkomendasikan dimalam hari yaitu pukul 22.00 – 04.00.	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
23	Mitigasi lalu lintas ditingkat kawasan dilakukan untuk mengalihkan kendaraan melalui jalan alternatif sebelum memasuki area konstruksi koridor BRT yang mengakses melalui arah Barat, Utara, Selatan dan Timur. - Dari arah Barat Kendaraan dapat dialihkan melalui jalan alternatif: o Jl. Padjajaran untuk yang menuju ke pusat kota atau arah utara o Jl. Elang Raya dan Jl. Soekarno Hatta untuk yang menuju pusat kota atau arah Selatan. - Dari arah Utara Kendaraan dapat dialihkan melalui jalan alternatif Jl. Astana Anyar untuk yang menuju ke pusat kota atau arah Selatan. - Dari arah Selatan Kendaraan dapat dialihkan melalui jalan alternatif: o Jl. Raya Kopo untuk yang menuju ke pusat kota atau arah Barat. o Jl. H. Samsudin untuk yang menuju ke pusat kota atau arah utara. o Jl. Moch. Ramdhan untuk yang menuju ke pusat kota atau arah timur - Dari arah Timur Kendaraan dapat dialihkan melalui jalan alternatif: o Jl. Surapati untuk yang menuju ke pusat kota Alun – Alun atau arah Barat. o Jl. Ibrahim Adjie & Jl. Gatot Subroto untuk yang menuju ke Alun - Alun atau arah Barat.	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
24	Mitigasi lalu lintas di area konstruksi dilakukan dengan tujuan untuk Mengalihkan kendaraan di setiap Lokasi konstruksi halte dan jalur khusus BRT apabila memungkinkan;	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
	- Pekerjaan konstruksi di ruas jalan sebaiknya tidak dilakukan secara bersamaan diruas jalan yang sama, karena akan mengakibatkan penyempitan di beberapa lokasi dalam satu ruas jalan / bottle neck yang dapat menyebabkan antrian kendaraan yang cukup panjang mengingat VC ratio di masing-masing ruas pada jam sibuk sudah cukup tinggi; - Pengalihan kendaraan harus dilakukan apabila memungkinkan, khususnya untuk sepeda motor mengingat jumlahnya yang mencapai 72% dari total arus kendaraan eksisting yang lewat; - Pemasangan papan informasi pembangunan konstruksi halte BRT dan peringatan dini pada jarak ± 50 meter atau kurang sebelum lokasi konstruksi untuk mengarahkan pengguna jalan keluar dari lintasan perjalanan normal menuju lintasan yang disediakan dengan menyesuaikan tingkat kecepatan sesuai kondisi penyempitan atau perubahan arah pergerakan arus kendaraan yang ditetapkan. - Pemasangan rambu penyempitan ruas jalan pada jarak ± 50 meter (elektronik maupun non elektronik) dan marka jalan sementara untuk informasi terkait pelaksanaan konstruksi jalur khusus BRT termasuk halte, terminal dan End Station. - Menyediakan halte sementara dilokasi yang memungkinkan, apabila di kondisi eksisitngya sudah terdapat halte sebelumnya; - Pemasangan fasilitas barrier untuk kebutuhan ruas isolasi dengan lebar ± 1,5		

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
	meter dari sisi kanan kiri garis terluar rencana jalur khusus BRT termasuk halte, terminal dan End Station untuk rencana kebutuhan ruang pelaksanaan konstruksi yang dapat dimodifikasi dengan penambahan seng serta lambang pengarah lalu lintas atau penutup dari bahan lain yang ditambah dengan penerangan agar terlihat pada malam hari. - Pemasangan papan informasi dan kerucut lalu lintas (traffic cone) pada area keluar masuk kendaraan proyek. - Pemasangan lampu peringatan pada awal dan akhir lokasi pekerjaan serta lokasi pintu keluar masuk kendaraan proyek. - Penyediaan petugas pemberi isyarat adanya pekerjaan (Flagman) pada lokasi pintu keluar masuk.		
REKOMENDASI MASA OPERASIONAL (PASCA KONSTRUKSI)			
25	Pembongkaran rambu-rambu informasi sementara mengenai jalur alternatif untuk menghindari ruas jalan yang terkena area konstruksi, agar pengendara tahu bahwa pengalihan sementara sudah selesai.	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
26	Melakukan pemutahkiran data di peta digital (Google Map) agar Masyarakat mendapatkan informasi yang mutahkir terkait kondisi jaringan jalan	Kementerian Perhubungan (Kontraktor, PMC, CSC)	Dishub Jabar, Dishub Bandung
27	Penindakan tegas dan penertiban secara intensif hambatan samping (pelanggar rambu larangan baik kendaraan berhenti, pedagang kaki lima, dll.) oleh petugas.	Walikota, Kecamatan, Kelurahan, Satpol PP, Dinas Perhubungan Kota Bandung,	

No	Mitigasi dan Rekomendasi	Instansi	
		Penanggung Jawab	Instansi Terkait
		Kepolisian Lalu Lintas	
28	Penertiban secara intensif hambatan samping oleh petugas sehingga fungsi jalan dan fasilitasnya menjadi lebih baik dari kondisi awal dimana banyak terdapat hambatan samping di mulut simpang	Satpol PP, Dihub Bandung	Walikota Bandung
29	Implementasi penataan ruang manfaat jalan baru dengan implementasi BRT	Dishub Bandung,	Walikota Bandung
30	Penerapan transport demand management (manajemen permintaan pergerakan) yang berfokus untuk peralihan atau shifting dari angkutan pribadi menuju angkutan umum, dalam hal ini untuk mengurangi volume kendaraan pribadi di Kota Bandung. Pemerintah Kota Bandung berencana menerapkan kebijakan pemberlakuan jam operasional kendaraan pribadi, dimana kendaraan pribadi tidak diijinkan melewati jalan – jalan tertentu di Kota Bandung pada saat jam sibuk.	Dishub Bandung	Walikota Bandung

VI.4 Rencana Pemantauan dan Evaluasi

Pemantauan dan evaluasi dilakukan dimasa konstruksi dan operasi, seperti yang dijelaskan pada tabel dibawah ini.

Tabel VI-2 Pemantuan dan Evaluasi Masa Konstruksi

Sumber: Analisis Konsultan

No	DAMPAK PENTING YANG DIPANTAU	SUMBER DAMPAK	PARAMETER YANG DIPANTAU	TUJUAN RENCANA PEMANTAUAN	METODE PEMANTAUAN	LOKASI PEMANTAUAN	WAKTU DAN PERIODE PEMANTAUAN	INSTANSI		
								PELAKSANA	PENGAWAS	PELAPORAN
1	Kerawanan kecelakaan lalu lintas	- Kendaraan keluar masuk proyek - Tercecernya material proyek di jalan - Penerangan proyek dan areal sekitar kurang - Petugas pengatur lalu lintas keluar masuk kendaraan proyek	- Distribusi material proyek - Tatacara pengangkutan material proyek - Penerangan lokasi proyek - Kelengkapan peralatan petugas proyek	Mengetahui aktivitas pengangkutan material proyek	- Pemantauan secara visual dan pengamatan langsung - Uji petik kendaraan pengangkut material proyek - Pengukuran tingkat penerangan lokasi proyek	Lokasi proyek pembangunan	- Pemantauan dan pengamatan per bulan - Sidak langsung ke lokasi proyek	Kementerian Perhubungan (Kontraktor, PMC, CSC)	- Kepolisian Lalu Lintas - Dinas Perhubungan Kota Bandung	- Kepolisian Lalu Lintas - Dinas Perhubungan Kota Bandung
2	Kemacetan Lalu Lintas	Jam operasi, waktu tunggu kendaraan pada pintu masuk proyek, parkir kendaraan proyek dan kecakapan petugas pengatur	- Jadwal pengangkutan material - Rambu lalu lintas dan papan informasi proyek	- Melihat efektifitas jadwal pengangkutan - Mengukur efektifitas ketersediaan rambu lalu	- Survei kecepatan perjalanan - Pemantauan secara visual dan pengamatan langsung	Kawasan Proyek	- Survei secara periodik setiap bulan	Kementerian Perhubungan (Kontraktor, PMC, CSC)	- Kepolisian Lalu Lintas - Dinas Perhubungan Kota Bandung	- Kepolisian Lalu Lintas - Dinas Perhubungan Kota Bandung

No	DAMPAK PENTING YANG DIPANTAU	SUMBER DAMPAK	PARAMETER YANG DIPANTAU	TUJUAN RENCANA PEMANTAUAN	METODE PEMANTAUAN	LOKASI PEMANTAUAN	WAKTU DAN PERIODE PEMANTAUAN	INSTANSI		
								PELAKSANA	PENGAWAS	PELAPORAN
		lalu lintas kendaraan proyek		lintas serta papan informasi proyek - Mengukur kinerja petugas pengatur lalu lintas						
3	Keresahan masyarakat sekitar	- Kebisingan suara kendaraan proyek - Parkir kendaraan keluar masuk proyek	- Keluhan masyarakat sekitar proyek - Keluhan masyarakat pengguna jalan	Mengetahui efektivitas lokalisasi atau pemagaran lokasi proyek	Survei wawancara	Daerah sekitar lokasi proyek	Survei secara periodik setiap bulan	Kementerian Perhubungan (Kontraktor, PMC, CSC)	- Kepolisian Lalu Lintas - Dinas Perhubungan Kota Bandung	- Kepolisian Lalu Lintas - Dinas Perhubungan Kota Bandung

Tabel VI-3 Pemantauan dan Evaluasi Masa Operasi

Sumber: Analisis Konsulta

No	DAMPAK PENTING YANG DIPANTAU	SUMBER DAMPAK	PARAMETER YANG DIPANTAU	TUJUAN RENCANA PEMANTAUAN	METODE PEMANTAUAN	LOKASI PEMANTAUAN	WAKTU DAN PERIODE PEMANTAUAN	INSTANSI		
								PELAKSANA	PENGAWAS	PELAPORAN
1	Kerawanan kecelakaan lalu lintas	- Konflik lalu lintas kendaraan keluar masuk lokasi - Pejalan kaki yang menyeberang jalan - Jumlah pejalan kaki per meter per menit	- Volume kendaraan dengan gerakan membelok di sekitar lokasi	Mengetahui tingkat kerawanan lokasi terhadap kecelakaan lalu lintas	- Survei gerakan membelok - Survei pejalan kaki - Pengukuran desain geometric jalan keluar masuk	Pintu keluar masuk kawasan sekitar	- Survei gerakan membelok secara periodic setiap tahun - Survei pejalan kaki setiap tahun - Pengukuran desain geometric jalan keluar masuk saat operasional	Dinas Perhubungan Kota Bandung	- Kepolisian Lalu Lintas - Kementerian Perhubungan	- Kepolisian Lalu Lintas - Kementerian perhubungan
2	Kemacetan Lalu Lintas	Aktivitas kendaraan keluar masuk kendaraan penghuni dan pengunjung pada jam puncak	- Volume kendaraan yang keluar masuk lokasi - Volume kendaraan di	- Melihat efektivitas rekomendasi penanganan dampak lalu lintas yang telah ditetapkan	- Survei volume lalu lintas - Survei kecepatan perjalanan	Koridor BRT	- Survei secara periodik setiap bulan	Dinas Perhubungan Kota Bandung	- Kepolisian Lalu Lintas - Kementerian Perhubungan	- Kepolisian Lalu Lintas - Kementerian perhubungan

No	DAMPAK PENTING YANG DIPANTAU	SUMBER DAMPAK	PARAMETER YANG DIPANTAU	TUJUAN RENCANA PEMANTAUAN	METODE PEMANTAUAN	LOKASI PEMANTAUAN	WAKTU DAN PERIODE PEMANTAUAN	INSTANSI		
								PELAKSANA	PENGAWAS	PELAPORAN
			sepanjang Koridor BRT - Travel time pada ruas sepanjang Koridor BRT							
3	Keresahan masyarakat sekitar	Parking on Street	- Keluhan masyarakat sekitar proyek - Keluhan masyarakat pengguna jalan	Mengetahui rasio penyediaan parkir park and ride maupun kantong parkir lainnya	Survei pengamatan parkir kendaraan bermotor	Daerah sekitar lokasi proyek	Survei secara periodik setiap bulan	Dinas Perhubungan Kota Bandung	- Kepolisian Lalu Lintas - Kementerian Perhubungan	- Kepolisian Lalu Lintas - Kementerian perhubungan

Annex C: Minutes of Public Consultation Already Conducted

ESIA Public consultation were conducted together with LARAP socialization to community surrounding project location and authorize government in some district offices at Astana Anyar, Bandung Wetan, Andir, Bandung Kulon and also Terminal Cicaheum and Terminal Leuwipanjang, on August and October 2024

BRT socialization to authorize regional government in Bandung City as well as socializae ESIA, UKL/UPL and LARAP on Augut 2025

Berikut adalah beberapa pertanyaan sebagai dialog bersama warga dan pemerintah daerah (Camat, Lurah, RT/RW) didalam sesi konsultasi publik yang dijalankan bersama ssialisasi LARAP.

Pertanyaan mengenai Isu Lingkungan

No	Kegiatan	Waktu dan Tempat	Pertanyaan	Tanggapan
1	PKM Update Land Acquisition and Livelihood Restoration Action Plan	Rabu, 10 Juli 2024 Hotel nexa Bandung	**Roslina** **DPKP Kota Bandung** 1. Diketahui sebelumnya sudah dilakukan survey mengenai pohon terdampak di sepanjang jalur BRT, apakah ada update perubahan data pohon yang terdampak (berkurang/bertambah)?Untuk pohon yang akan direplace kompensasinya seperti apa? Karena untuk pohon besar harus ditebang, untuk hal ni ada perhitungan kompensasinya. 2. Untuk penebangan pohon berdasarkan kewenangan jalan (kota, propinsi, nasional) dan ini berkaitan dengan kompensasi responsiblity berdasarkan kewenangan tersebut, harus diperjelas hitam ditas putih.	**Ibu Raina** **DED** 1. Pohon terdampak sedang dikalkulasikan, dan team sosial akan berdiskusi dengan dinas terkait mengenai kompensasinya. 2. Terkait kewenangan jalan (kota, propinsi, nasional) hal ini sudah diingatkan sebelumnya, dan pohon terdampak sudah diplotting sesuai kewenangan jalan tersebut. **Ibu Febrina** **PMC** Dampak lingkungan dan andalalin ini masuk dalam cakupan pekerjaan kami, maka hat ini akan disampaikan dan difollow up oleh team lingkungan OED dan PMC.
2	Sosialisasi Pemutakhiran LARAP DED BRT beserta sosialisasi UKL/UPL	Kamis, 13 Juni 2024 Aula Rapat Kecamatan Andir	Peserta 3 Perwakilan Asosiasi PKL Mohon dikaji ulang agar tidak dibuat rumit, misal harus menebang pohon	Untuk pohon yang ditebang, tldak semua pohon akan terdarnpak dari rencana BRT ini, harrya pada titiK tertentu saja yang akan dilakukan

No	Kegiatan	Waktu dan Tempat	Pertanyaan	Tanggapan
	Cekungan Bandung (Kecamatan Andir)		perlu diperhatikan juga nanti Bandung makln sedikit pohon yang ada, penertiban PKL juga pertu memperhatlKan nasib mereka kedepannya. Banyak PKL di Bandung menjadi mata pencaharian utama sang kepala keluarga.	penebangan. Pohon yang ditebang tersebut akan dig anti kem bali oleh pohon sesuai dengan aturan dari DPKP3 Kata Bandung.
3	Sosialisasi Pemutakhiran LARAP DED BRT beserta sosialisasi UKL/UPL Cekungan Bandung (Kecamatan Andir)	Kamis, 13 Juni 2024 Aula Rapat Kecamatan Andir	Peserta 4 Bank Artha Graha 1. Keberadaan pohon didepan Artha Graha mengganggu, mohon apabila proyek berjalan bisa ditebang 2. Masalah parkir di Sudirman juga menjadi dampak yang harus dipertimbangkan	Tanggapan: 1. Penggantian pohon sudah dikomuniaksikan dengan dinas terkait dengan adanya rencana BRT yang pada berberapa titik akan menebang pohon yang saat ini sudah ada 2. Parkir saat ini masih dikoordinasikan dengan UPT Parkir Dinas Perhubungan Kota Bandung, untuk mencari solusi kantung-kantung parkir pengganti
4	Sosialisasi Pemutakhiran LARAP DED BRT Cekungan Bandung beserta sosialisasi UKL/UPL (Kecamatan Astana Anyar)	Kamis, 10 Juli 2024 Hotel Mercure, Bandung	Denny H Peserta Rencana BS 20 dikhawatirkan menimbulkan kemacetan, karena posisinya biasa dijadikan crossing dari Jl. Dulatip ke Gang Sutur dan Gang Atim	Ibu Ratna DED BS 20 posisinya di depan Bank UOB, bukan di pintu masuknya tapi bagian pagar. Desain BS terbuka, sehingga took-toko di bagian belakang tidak tertutup. Sementara untuk took, bangunan atu rumah yang nantinya akan tertutup BS akan dikomunikasikan dan dissialisasikanoleh tim Sosial DED

No	Kegiatan	Waktu dan Tempat	Pertanyaan	Tanggapan
5	Sosialisasi Pemutakhiran LARAP DED BRT Cekungan Bandung beserta sosialisasi UKL/UPL (Kecamatan Astana Anyar)	Kamis, 10 Juli 2024 Hotel Mercure, Bandung	M. Rafifudin PLN 1. Mengenai utilitas PLN, dimana kabel yng di udara dan underground, bagaimana penangnannya 2. Dibutuhkan jadwal konstruksi BRT untuk pengoperasian listrik dan kebtuhan listriknya	Ibu Ratna DED 1. Sesuai arahan WB, Proyek BRT akan menggunakan system ducting untuk kabel 2. Kebutuhan listrik sudah dikalkulasikan berikut sesuai system yang didesain: ▪ Bu station listrik menggunakan sitem hybrid ▪ Beberapa End Station membutuhkan SPKL ▪ Depo chargingmembutuhkan SPKL ▪ Terminal membutuhakan SPKL
6	Sosialisasi Pemutakhiran LARAP DED BRT Cekungan Bandung beserta sosialisasi UKL/UPL Batununggal	Aula Rapat, Batunuggal Kota Bandung	Peserta 2 RW 04 Kebon Waru 1. Adanya BRT pasti akan menambanh crowded, karena ada pembatas 2. Perlu invoasi lain, untuk mengatur kemacetan	1. Untuk pembatas mulai dari Jl. Kiara Artha Utara sd Jl. Rangkas Bitung 2. Unutk saat ini Kota Bandung dan kota besar lainnya di Indonesia hanya mendapatkan bantuan berupa moda transportasi
7.	Sosialisasi Pemutakhiran LARAP DED BRT Cekungan Bandung beserta sosialisasi UKL/UPL Gedebage	Kantor Kecamatan Gedebage.	Forum masyarakat Apabila musim hujan dilokasi sekitar (rencana depo gedebage) sering terjadi banjir, yaitu RW01,02,03, 04 an 05. Untuk itu diharapkan rencana pembangunan depo dapat memikirkan solusi banjir di wilayah tersebut, dikarenakan sawah yang akan dijadikan depo merupakan salah satu reapan dan pengendali banjir.	