

Indonesia Mass Transit Project (MASTRAN)

**Preliminary Environmental and Social Assessment of the Bandung Metropolitan Bus Rapid Transit (BRT) Project**



December 2021

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## Acronyms

AMDAL	<i>Analisa Mengenai Dampak Lingkungan</i> (Environmental Impact Assessment)
ANDAL	<i>Analisa Dampak Lingkungan</i> (Environmental Impact Analysis—an in-depth study of the major and significant impacts of the planned business/activity)
ANDALALIN	Traffic Impact Assessment
<i>Angkot</i>	<i>Angkutan Kota</i> (means ‘urban transportation’—usually in the form of minivans operated by private companies as common Indonesian public)
Bappeda	Regional Development Planning Agency
Bappenas	Ministry of National Development Planning
BBMA	Bandung Basin Metropolitan Area
BBUMA	Bandung Basin Urban Management Authority <sup>[L-1]</sup> <sub>[SEP]</sub>
BLUD	Regional Public Service Unit <sup>[L-1]</sup> <sub>[SEP]</sub>
BPKAD	Provincial/City Asset Agency
BRT	Bus Rapid Transit
BUMD	Regional Owned Enterprise
BUMD	Regional Owned Enterprise
COVID-19	Coronavirus disease
DBMTR	Provincial/City Road Public Works and Land Use Affairs Agency
DDAVA	Due Diligence and Value Analysis
DGR	Directorate General of Rail, MoT
DISHUB	Provincial/City Transport Agency
DLH	Provincial/City Environmental Agency
E&S	Environmental and Social
EBC	Early Business Case
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan

ESS	Environmental and Social Standards
GBV (SEA/SH)	Gender-Based Violence (Sexual Exploitation and Abuse/Sexual Harassment)
GCA	Government Contracting Agency
GESI-AP	Gender Equality and Social Inclusion Action Plan
GHG	greenhouse gas
GOI	Government of Indonesia
IBE	Implementing Business Entity
KA ANDAL	Term of Reference (the boundary and methodology of the ANDAL)
LRT	Light Rail Transit
MASTRAN	Indonesia Mass Transit Project
MoF	Ministry of Finance <sup>[1]</sup> <sub>SEP</sub>
MoT	Ministry of Transport <sup>[1]</sup> <sub>SEP</sub>
PPP	Public-Private Partnership
PSN	National Strategic Project <sup>[1]</sup> <sub>SEP</sub>
PSO	Public Service Obligation <sup>[1]</sup> <sub>SEP</sub>
RKL-RPL	Environmental Management Plan (RKL), Environmental Monitoring Plan (RPL)
SEAH	Sexual Exploitation, Abuse, and Harassment
SEP	Stakeholder Engagement Plan
TOD	Transit-Oriented Development
ToR	Terms of Reference
UKL-UPL	Environmental Management and Monitoring Plan (for business/activities that do not require AMDAL/EIA)
WB	World Bank

## Executive Summary

The Government of Indonesia (GOI), through the Ministry of Transport (MoT), with support from the World Bank (WB), has developed the Indonesia Mass Transit Project (MASTRAN) to increase financial, technical, and institutional capacities of subnational government (SNGs) to plan, implement and manage public transport. This project is in line with the Medium-Term National Development Plan (RPJMN) for 2020-2024, which has targeted mass transit development in six metropolitan areas, including Bandung.

The Feasibility Study (FS) for the Bandung Metropolitan BRT system was completed in January 2021. It assessed a project concept which consists of 23 km of special bus lines, 12 direct service routes, and 27 bus stops. The BRT upgrade assessed in the study includes bus stops outside the corridor, an integrated ticketing system, information systems, good pedestrian facilities/access facilities, good intermodal facilities, etc.

According to government regulation No.22 of 2021, every business or activity that causes significant environmental and social (E&S) impacts must have an AMDAL (*Analisis Mengenai Dampak Lingkungan*) or UKL-UPL (*Upaya Pengelolaan Lingkungan Hidup - Upaya Pemantauan Lingkungan Hidup*). The government of Indonesia confirmed that BRT Bandung will require an AMDAL. Bandung BRT will also need to adhere to the WB ESF requirements. The diagram below summarises the process of preparation and implementation of necessary E&S documents.

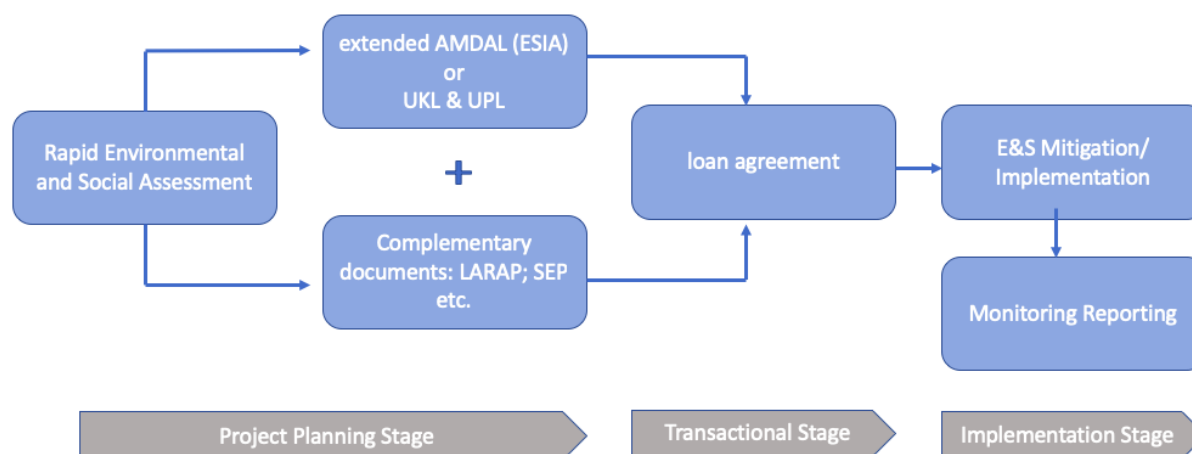


Figure 1: Overview of necessary documents and Project phases

Reflecting on the legal analysis, it may be concluded that the Indonesian AMDAL requirements focus on environmental aspects primarily and thus some social ESS issues will need to be added to comply with the requirements of ESF. The important areas to pay attention to are:

- Community safety and health during construction
- Impact on livelihoods such as local businesses and transport providers
- Land acquisition process
- the preservation of cultural heritage

Some important environmental and social baseline data have been established via a feasibility study of GIZ in 2020. However, missing data regarding the baseline for the project are:

- 1) Noise level modelling;
- 2) Water quality measurements.
- 3) Survey of the impacts to public utilities.
- 4) Detailed information on the required land for the BRT construction and operation.

The specific data requirement as per the ESF has been included in the preliminary TOR for an ESIA in Annex 3.

The potential environmental and social impacts identified for the BRT System in Bandung to date are summarised in Tables 1 and 2.

*Table 1: Potential environmental and impacts of the BRT System in Bandung*

Environmental Components	Pre-Construction Phase	Construction Phase	Operation Phase
<b>Air quality</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS3 Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]		v	v
<b>Traffic level and it cumulative impact</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS4 Community Health & Safety]		v	v
<b>Noise level</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS3 Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]		v	v
<b>Groundwater</b>		v	

[ESS3 Resource Efficiency & Pollution Prevention & Management]			
<b>Surface water</b> [ESS3 Resource Efficiency & Pollution Prevention & Management]		v	v
<b>Biodiversity (including vegetation)</b> [ESS6 Biodiversity Conservation & Sustainable Management of Living Natural Resources]		v	v
<b>Urban landscape</b> [ESS6 Biodiversity Conservation & Sustainable Management of Living Natural Resources]		v	v
<b>Waste management</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS3 Resource Efficiency & Pollution Prevention & Management;		v	v
<b>Resource efficiency</b> [ESS3 Resource Efficiency & Pollution Prevention & Management]		v	v
<b>Utilities and infrastructure</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS4 Community Health & Safety;	v	v	v
<b>GHG</b> [ESS3 Resource Efficiency & Pollution Prevention & Management;			v

Table 2: Potential social impacts for the BRT System in Bandung

Social Components	Pre-Construction Phase	Construction Phase	Operation Phase
<b>Community health and safety</b> [ESS4 Community Health & Safety]		v	v
<b>Occupational health and safety</b> [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety]		v	v
<b>Impact on livelihoods</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS2 Labor & Working Conditions; ESS5 Land Acquisition, Restrictions on Land Use &	v	v	v

Involuntary Resettlement; ESS10 Stakeholder Engagement & Information Disclosure]			
<b>Land acquisition and involuntary resettlement</b> [ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement;	v	v	
<b>Influx of workers</b> [ESS2 Labor & Working Conditions]	v	v	v
<b>Cultural heritage</b> [ESS8 Cultural Heritage]		v	v
<b>Gender and disability</b> [ESS4 Community Health & Safety]	v	v	v
<b>Sexual exploitation, abuse &amp; harassment (SEAH)</b> [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety; ESS10 Stakeholder Engagement & Information Disclosure]	v	v	v
<b>Traffic</b> [ESS4 Community Health & Safety]		v	v

Further, cumulative impacts have been identified, such as contribution to climate change; improved access to economic, social, and educational facilities, traffic congestions, and affected businesses due to parallel running mass transport projects (LRT and BRT); increased river pollution, and broader gender impacts.

However, to complete the impact analysis, more detailed analysis is needed, especially around the census of affected livelihoods and businesses. These have been included in the TOR for the ESIA, in Annex 3 of this report.

Preliminary mitigation actions for the environmental and social impacts were identified and presented in Chapter V. But the still missing analyses and plans include mitigations and actions related to:

- Detailed grievance mechanism for the affected community members and relevant stakeholders;
- Detailed institutional arrangement to manage the environmental and social issues in the PIU;
- Work safety, conditions and grievance mechanism for labor issues, as part of labor-management plans;
- Traffic flow analysis during construction;

- Hazardous waste management
- Accessibility measures for people with different abilities;
- Degree of impact on education, health facilities, and businesses;
- Census on trees that need to be felled;
- The exact heritage buildings map needs to be established for the whole BRT system upgrade network; and
- Vendors and small businesses that will be affected.

Detailed assessment and planning for appropriate mitigation measures will be conducted and developed during the implementation stage to ensure that WB ESF requirements are met. Necessary action to fulfil the requirements of the government of Indonesia, either development of AMDAL or UKL-UPL will also be undertaken once the requirement has been confirmed. Most importantly, consultations, training, and engagement with all relevant stakeholders regarding the ESF will be part of the mitigation measures throughout the project cycle.

## I - INTRODUCTION

### 1.1 Background

The Government of Indonesia (GOI), through the Ministry of Transport (MoT), with support from the World Bank (WB), intends to develop an Indonesia Mass Transit Project (MASTRAN) to increase financial, technical, and institutional capacities of subnational government (SNGs) to plan, implement and manage public transport. This project is in line with the Medium-Term National Development Plan (RPJMN) for 2020-2024, which has targeted mass transit development in six metropolitan areas, including Bandung.

MASTRAN has two components (1) institutional development, capacity building, and technical assistance which will provide support to MoT and sub-national governments to roll out MASTRAN in Bandung Basin Metropolitan Area (BBMA) and Medan Binjai Deliserdang (Mebidang) and fine-tune and operationalize the national program based on the experience with the implementation of the demonstration mass transit projects; (2) Demonstration Mass Transit Systems in Selected Urban Areas.

As part of component 2, the project will support the development of a bus improvement project to enhance connectivity between the east-west urban corridors of BBMA. The project will finance the following:

- a. Goods, works, and services for the construction of the BRT core infrastructure and to ensure BRTs' adequate integration with the existing transport networks. This will include, among others, road infrastructure and its drainage system, enhancement of main corridor and adjacent streets including road safety provisions, landscaping, depot, terminals, stations, intersections, corridor traffic management systems, sidewalks, pedestrian crosswalks, and some bike lanes along the corridors. Clearance of the right-of-way (RoW) will be financed by GoI through an approved resettlement plan.
- b. Provision of ITS including fleet management, vehicle tracking, passenger information, grievance management and automatic fare collection system which will enable a centralised control of bus operations, fare management and customer interface; traffic signalling and management systems.
- c. The BRT fleet provision, operation and maintenance will be the responsibility of the sub-national government in the urban areas and they will contract the private sector to finance, operate and maintain the BRT fleet. The funding for this sub-component will be from counterpart funds.

The Urban Mobility Plan for the Bandung Metropolitan Area/Bandung Basin was completed in October 2020, and the BRT upgrade was identified as the priority activity. A feasibility study of the BRT scheme was finalised in June 2020.

## 1.2 Objective of Study

By law (government regulation No.22 of 2021), every business or activity that causes significant impacts on the environment must have an Environmental Impact Assessment (EIA-AMDAL) or UKL-UPL to get the Environmental Permit prerequisite for obtaining a business or activity permit. In addition, to meet the World Bank Environmental and Social Framework (ESF) requirements, an environmental and social impact assessment (ESIA) is required as per Environmental and Social Standard 1- Assessment and Management of Environmental and Social Risks and Impacts.

This document aims to provide a preliminary ESIA for the Bus Rapid Transport in Bandung Basin Metropolitan Area (BRT Bandung) based on the available data to date and additional assessment to be completed during the project implementation.

## 1.3 BRT Project Description

Several mass transit proposals are currently under consideration by the provincial and city authorities of the Greater Bandung area. The Urban Mobility Plan for the Bandung Metropolitan Area/ Bandung Basin was completed in October 2020, and the BRT upgrade was identified as the priority activity. Another World Bank analysis in September 2021 analysed eight alternative routes looking at the aspect of traffic, land requirement and others. The no-project alternative would mean increased traffic, pollution, health and safety issues due to increased accidents. Alternative 4 was selected to facilitate the underserved West-East connection, in addition to being the most cost-effective option, as well as limited impact via road widening or purchase of land (See Table 3).

*Table 3: Specifications for the different BRT alternatives for the Greater Bandung area*

Main Features			
	Alt. 3	Alt. 4	Alt. 5
Demand	7074	8636	8875
Demand inside corridor	7%	11%	12%
Demand one end inside corridor	28%	32%	34%
BRT segregated lane length	14.22	18.74	20.92
Speed	17.3	17.5	17.6
Investment Million USD	65.79	87.48	97.83
Time savings (% over time)	0.32	0.34	0.34
Social Benefit MUSD/year	4.00	5.55	5.64
Cost benefit (MUSD/year)	2.01	2.48	2.67
Total benefit	6.01	8.03	8.31
IRR	7.56%	7.62%	6.62%

his

Preliminary ESIA uses the following descriptions of areas:

Project Area: The Project Area is the physical footprint of all the BRT line infrastructure, including the corridors, stations, terminals, and depots.

Project Area of Influence: The Indicative Project Area of Influence comprises the area beyond the project area where project activities potentially have direct and indirect Environmental & Social impacts, such as off-site construction facilities (workers camp, material sources quarries), material and equipment storage areas, and haulage routes to the construction site. Some more detailed specifications on the project area can be seen in the Figure below:

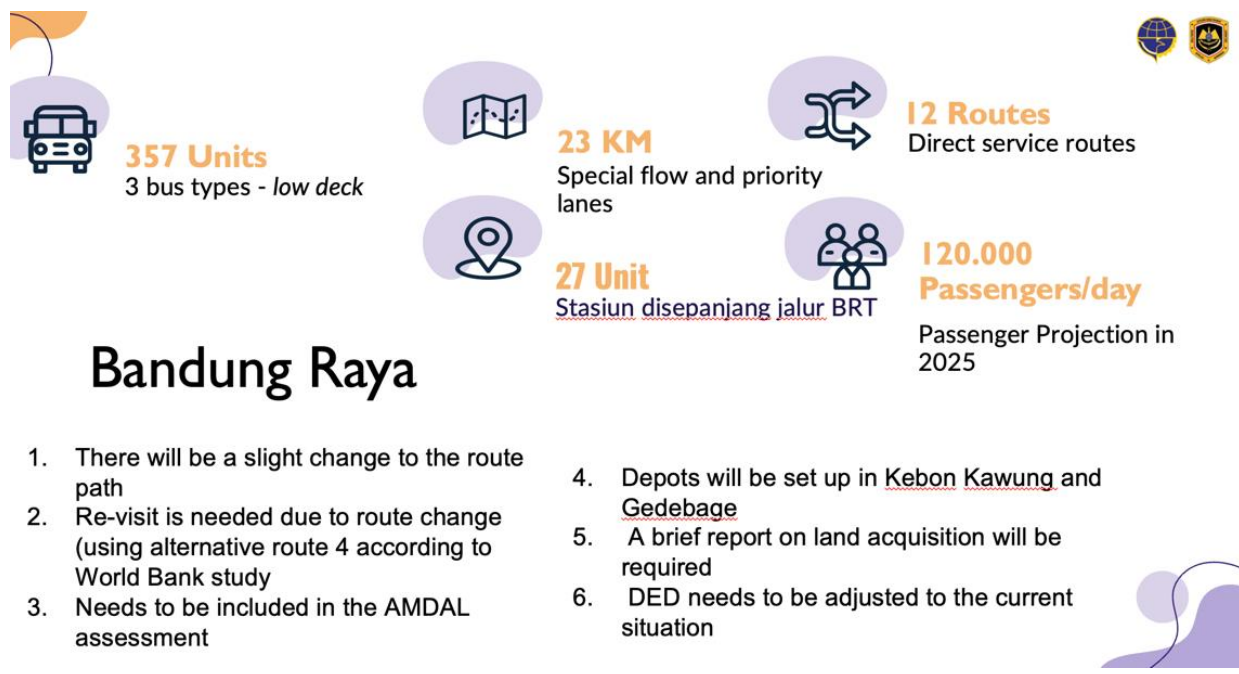


Figure 1: Description of the main characteristics of the chosen BRT route



Figure 2: Map of the chosen BRT route (green means designated Bus lane and pink means mixed traffic)

The BRT route crosses Bandung City and surrounding regencies. The West-Northeast city corridor with the central GIZ proposed option seems to be the most likely to be implemented. The BRT will run on different types of traffic conditions: segregated BRT lanes, BRT and motorcycle lanes, and mixed traffic lanes. The green line in figure 2 above represents the BRT-specific corridor with segregated lanes, while the pink line represents mixed traffic lanes.

Moreover, the security systems for buses, stations, and terminals are designed to monitor and quickly react to secure the assets from any form of theft, robbery, vandalism, riots, harassment, fire, or flood. A BRT Control Centre will monitor the passenger flow at stations and terminals, manage the traffic movements along the BRT corridors, and respond to any operational incidents that arise (GIZ, 2020).

The summary of the project area and the indicative project area of influence are included in Annex 4: Strip Map Corridor of BRT Bandung Raya but needs to be confirmed later in the ESIA study.

## II - LEGAL FRAMEWORK

This chapter will give a summary of the regulations regarding environmental and social aspects of the BRT provision, both from the Indonesian government and the World Bank policy perspectives.

### 2.1. Indonesian Policies on Environmental and Social Management

GOI has mandated national and local governments to develop transportation network infrastructures inside or inter cities/provinces in its Spatial Plans (Law No. 26 of 2007). As stated in the National Long-Term Development Plan (RPJPN 2005-2025), mass transportation development has been prioritised in many development planning documents, as one of the long-term directions in regional development. Furthermore, the mass transportation development in connecting several metropolises in Indonesia has been allocated in RPJMN 2020-2024. This priority has also been adopted by many cities/provinces through its regional development plan (RPJPD, RPJMD), including the city of Bandung, to reduce traffic congestion in the city. The national government also pays attention to the carrying capacity of natural resources and the capacity of the environment, and the economic-socio-cultural development and environmental improvement through a low carbon development framework (RPJMN 2020-2024). For a full list of the Indonesian regulations please consult with Annex 3 . . .

In planning and implementing development programs, the National and Local Governments are required to prevent pollution and environmental damage (Law No. 11 of 2020) and implement some instruments, including Strategic Environmental Assessment (KLHS), Environmental Impact Assessment (EIA/AMDAL), Environmental Management and Monitoring Efforts (UKL-UPL), and environmental approval. These regulations assess and reduce the potential environmental impacts/risks, including climate change, damage, deterioration/biodiversity extinction, increasing the intensity and coverage of areas affected by floods, landslides, or droughts.

By law, Government Regulation No. 22 of 2021, every business or activity that causes significant impacts on the environment must have an EIA (AMDAL or UKL-UPL) to get the Environmental Approval prerequisite for obtaining a business and/or activity approval. Based on the Minister of Environment and Forestry Regulation No. 4 of 2021

Based on a letter from the Head of Environment service of West Java Provincial on 2 Sep 2021 it was decided that the construction of the Bandung Raya BRT and its supporting facilities included the mandatory AMDAL criteria.

The analysis of Indonesian regulation with regards to an EIA (AMDAL) for a BRT system is summarised in the table below.

*Table 4: List of EIA -requiring Activities Relevant to BRT projects*

No KBBLI	Type of Business/ Activity	Scale of AMDAL	Scale of UKL-UPL	Scale of SKPPL	AMDAL Scientific Reason	Category AMDAL & UKL-UPL
Sector of Land Transportation (MoT)						
5221	Support Activities Land Transport: Vehicle Depot/ Pool Vehicle	a. land area 3 ha; b. Building area 3,000 m <sup>2</sup> ; c. total capacity vehicle 300 SRP	a. 3 ha > Land area > 0.5 ha; b. 3,000 m <sup>2</sup> > Area building > 1000 m <sup>2</sup> ; c. total capacity vehicle 100-300 SRP (Space Unit Parking)	a. Land area < 0,5 ha; b. Building area < 1.000 m <sup>2</sup> ; c. Total capacity vehicle <100 SRP (Space parking )	Potentially caused congestion, deterioration of quality of water, increase of noise, conflict, social and public anxiety	Category C
Sector of Ministry of Public Works and Housing (PU)						
42101	Road construction and/or improvement at metropoli	≥ 5 Km with land acquisition ≥ 10 Ha	≤ 5 Km with land acquisition ≤ 10 Ha	< 5 Km with land acquisition < 10 Ha	Potentially caused congestion, deterioration of quality of water, increase	Category A

	tan city with length $\geq$ 5 Km				of noise, conflict, social and public anxiety	
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Source: Summarised from the Minister of Environment and Forestry Regulation No.4 of 2021

Apart from an EIA (AMDAL) process, some environmental aspects are regulated through other regulations, as summarised in the table below.

Table 5: Summary of Environmental-Related Indonesia Policies

Environmental Aspects	Regulations
Environmental Assessments*	<p>Law No 11 of 2020 elaborated on the instruments to protect environmental damage, such as <b>required Environmental Impact Assessment EIA (AMDAL), Environmental Management and Monitoring Plan (UKL-UPL), for business/activities that do not require EIA, and environmental approval.</b></p> <p>Government Regulation No. 22 of 2021 required business/activity to have an EIA (AMDAL) or UKL-UPL and <b>environmental approval</b> as a prerequisite for obtaining a business/activity approval. In detail, the Minister of Environment and Forestry Regulation No. 4 of 2021 A new Government Regulation No. 22 of 2021 updated the environmental management and protection regulation, including EIA and its criteria and implementation procedures. The implementation regulation (the minister regulation) is still being drafted.</p> <p>Furthermore, Regulation 22 of 2021, appendix 2 explained the <b>guidelines for preparing EIA (AMDAL)</b>, which consist of the ToR, Environmental Impact Analysis (AMDAL), Environmental Management Plan (RKL), and Environmental Monitoring Plan (RPL); guidelines for UKL-UPL, for the business/activity that don't require EIA; and Declaration Letter of Environmental Management and Monitoring (SPPL). <u>For environmental aspects</u>, EIA impact assessment covers:</p> <p>a) Geo-physical-chemical components, such as climate, geological resources, hydrology, spatial planning, soil, surface water, underground water, air, traffic, noise, etc.; and</p> <p>b) Biological components, such as vegetation/flora, fauna, aquatic biota, ecosystem types, the presence of endangered/endemic species and their habitats, etc.</p>
Pollution Prevention and Management (including waste)	<p>Law No. 11 of 2020 and regulation No.22 of 2021 elaborated on <b>instruments for preventing pollution and environmental damage</b> (please see Environmental Permit part for further information about the instruments). Every person who pollutes/damages the environment is obliged to act to tackle the pollution/damage they made.</p> <p>The EIA (AMDAL) covers geo-physical-chemical components, such as climate, spatial planning, geological resources, hydrology, spatial planning, soil, surface water, underground water, air, traffic, and noise (Regulation No.22 of 2021).</p> <p>Minister of Environment and Forestry Regulation No.4 of 2021 specified the types of businesses/activities that require EIA (AMDAL), including activities that potentially</p>

	<p>cause impacts in the form of emissions, noise, and air pollution.</p> <p>Government Regulation No. 22 of 2021 regulated the management of <b>hazardous and toxic waste</b> (B3), controlling the <b>waste handling</b> originating from public facilities.</p> <p><b>National noise level standards</b> for public facilities based on Decree of the State of Minister for Environment No. Kep-48/MENLH/11/1996 concerning Quality Standards for Noise.</p> <p>Minister of Manpower and Transmigration Regulation No. PER.13/MEN/X/2011 regulated that noise-limit in the working area is 85 dBA for a max of 8 hours per day; the value can be exceeded with a reduction in exposure time, e.g. 94 dBA for an hour or 100 dBA for 15 minutes.</p>
Resource Efficiency	<p>An EIA (AMDAL) covers geo-physical-chemical components, such as climate, spatial planning, geological resources, hydrology, soil, surface water, and underground water (regulation No.22 of 2021)GOI regulation on <b>energy conservation</b>: users with energy consumption <math>\geq 6,000</math> tons of oil equivalent per year are required to conduct an Energy Management, while the users with less energy consumption could do energy management or energy savings (Minister of Energy and Mineral Resources Regulation No. 14 of 2012).</p>
Biodiversity Conservation	<p>Law No.11 of 2020 stated every person who pollutes/damages the environment is obliged to take action to tackle the pollution/damage they made. KLHS, as one of the <b>instruments for preventing pollution/environmental damage</b>, consists of studies on carrying capacity and carrying capacity, the environment for development, estimates of environmental impacts and risks, ecosystem service performance, efficient use of natural resources, and biodiversity potential.</p> <p>EIA (AMDAL) covers the biological component, such as vegetation/flora, fauna, aquatic biota, ecosystem types, the presence of <b>endangered/endemic species</b>, and their habitats (regulation No.22 of 2021, appendix 2).</p>

\*Environmental in the Indonesian regulatory context partly includes social as well, as social, economic, and cultural aspects are addressed as part of the EIA/AMDAL. See also Table 6 below.

Besides environmental considerations, social aspects are seen as important and regulated differently by various ministries. This includes gender mainstreaming in development planning (Presidential Instruction No. 9 of 2000, Minister of Home Affairs Regulation No. 15 of 2008) and Indigenous Peoples (IP) and participation in the development process (Minister of Home Affairs Regulation No. 18 of 2018). EIA (AMDAL) also covers some social elements in it, such as demographics, livelihoods, and local culture. More specifically, some social aspects are regulated through the regulations summarised in the table below.

*Table 6: Summary of Social-Related Indonesia Policies*

Social Aspects	Regulations
Social Assessments	<p>Regulation No.22 of 2021 explained the <b>guidelines for preparing EIA (AMDAL)</b>, whereas covers some <u>social aspects</u> in the impact assessment:</p> <p>a) Socio-economic-cultural components, such as income levels, demographics, livelihoods, local culture, archaeological sites, cultural sites, and so on; and</p> <p>b) components of public health, such as changes in the level or aspects of public health.</p>

	Disturbances from traffic include social considerations, as described further below in this table.
Labor and Working Conditions	<p>Law No. 11 of 2020, Government Regulation No. 5 of 2018, and Minister of Public Works and Housing Regulation No. 21/PRT/M/2019; the service <b>providers must apply Construction Safety Management system</b>, focused on: a. safety engineering construction, b. OHS, c. public safety, and d. environmental safety. More application of OHS Management Systems is explained in Government Regulation No. 50 of 2012.</p> <p>Minister of Public Works Regulation No. 05/PRT/M/2014 and Minister of Public Works and Housing Regulation No. 02/PRT/M/2018 regulated that projects above IDR 100 Billion and 100 workers need <b>a construction OHS expert</b>.</p> <p>Minister of Manpower and Transmigration Regulation No. PER.13/MEN/X/2011 regulated that noise-limit in the working area is 85 dBA for a max of 8 hours per day; the value can be exceeded with a reduction in exposure time, e.g. 94 dBA for an hour or 100 dBA for 15 minutes. However, the noise must not exceed 140 dBA even for a moment. Furthermore, the regulation standardised the threshold value of:</p> <ul style="list-style-type: none"> <li>a) Physical factors including working climate, noise, vibrations, microwaves, ultraviolet rays, and magnetic fields; and</li> <li>b) Chemical factors include the form of solids (particles), liquids, gases, mists, aerosols, and vapours derived from chemicals.</li> </ul> <p>Human rights legislation: Law No. 39 of 1999; Law No. 11 of 2005, and Law No. 11 of 2009; <b>the right to fair and decent working conditions; right to complaint, and grievance mechanisms</b>.</p>
Community Health and Safety	<p>Government Regulation No. 56 of 2009 states that railways should aim to facilitate the mass movement of people/goods in a safe, comfortable, fast, precise, orderly, and efficient manner.</p> <p>Law No. 8 of 2016; persons with disabilities have the right to access public services. The <b>government must guarantee that infrastructure and services such as public transportation services are accessible for disabled users</b>.</p> <p>Besides EIA (AMDAL), a <b>traffic impact analysis (Analisis Dampak Lalu Lintas—Andalalin)</b> also needs to be prepared, as regulated in the Government Regulation No. 32 of 2011. Traffic management and engineering are required as one of the permits' requirements for planned developments that have the potential to cause a disturbance in road transportation security, safety, and traffic.</p> <p>An EIA (AMDAL) covers components of <b>public health</b>, such as changes in the level of public health (Regulation No.22 of 2021).</p> <p>Minister of Environment Decree No. KEP-48/MENLH/11/1996 regulated the noise limit for settlement area, hospital, and school to be 55 dBA.</p> <p>Law No. 11 of 2020 regulated Spatial Planning, including the infrastructure of transportation network systems; spatial planning is conducted by <b>considering: the physical condition—vulnerability to disasters</b> and security.</p> <p>Presidential Instruction No. 9 of 2000 instructed <b>gender mainstreaming</b> in development planning through gender analysis that includes <b>participation in the development process</b> and the benefits they enjoy. The Minister of Home Affairs Regulation No. 15 of 2008 regulated the gender mainstreaming implementation at the local level.</p>

	<p>Ministry of Social Affairs Law No. 8 of 2016 on the national commission of disability (KND) states that a <b>person with disabilities</b> has the right to the accessibility of public services.</p> <p>West Java Provincial Regulation No. 13 of 2013 concerning Buildings.</p> <p>West Java Provincial Regulation No. 7 of 2013 concerning the Implementation of Protection for People with <b>Disabilities</b>.</p> <p>West Java Governor Regulation No. 97 of 2015 concerning Accessibility for People with Disabilities.</p> <p>Bandung City Regulation No. 15 of 2019 concerning Protection and Fulfilment of the Rights of People with Disabilities.</p>
<p>Land Acquisition and Involuntary Resettlement</p>	<p>Law No. 26 of 2007 clearly stated that <b>proper compensation for losses arising from the implementation of development activities under the spatial plan</b> needs to be provided. Law No.2 of 2012 stated that if development is of public interest, the party entitled to the land must release it after fair compensation. Presidential Regulation No. 71 of 2012 and its amendment Presidential Regulation No. 40 of 2014 provide detailed procedures.</p> <p>EIA also covers socio-economic-cultural components, such as income levels, demographics, and <b>livelihoods</b> (Minister of Environment Regulation No. 16 of 2012). For the communities that occupied the state land used (in a good way/<i>beritikad baik</i>; &gt;10 years), the government will give <b>compensations</b> that are considered the cleaning fee of everything that was on over land; mobilisation; house rental for up to 12 months; and allowances for income losses from land use (Presidential Regulation No. 62 of 2018).</p> <p>Government Regulation Number 19 of 2021 regarding National Land Procurement for Public Interest. The guidelines on acquiring land for the public interest:</p> <ul style="list-style-type: none"> <li>- Land acquisition process</li> <li>- Land acquisition sources of funds (some possibilities for funding land acquisition activity: <b>advance payment</b> by Business Entity and BUMN/D)</li> <li>- <b>Tax incentive</b> for affected entities who agree to release their rights on land for public projects</li> <li>- Land procurement for National Strategic Projects (<b>PSN</b> (National Government can facilitate the entire land procurement process. Other advantages of PSN: the ability to convert agricultural land use in the zone affected by the project; direct approval from the Minister of site determination (shorter approval chain); the Governor is allowed to take over the Mayor and Regent’s role in land procurement; a BUMN/D can be assigned to deliver land procurement and allowed to pay in advance).</li> </ul>
<p>Cultural Heritage</p>	<p>Law No. 26 of 2007, Minister of Home Affairs Regulation No. 52 of 2007, and the joint regulation of the Minister of Home Affairs and the Minister of Culture and Tourism No. 42/40 of 2009 confirmed that the government should pay attention to the <b>cultural site in spatial planning, preserve cultural heritage in the regions</b>, including the customs and socio-cultural values in communities.</p> <p>EIA (AMDAL) also covers socio-economic-cultural components, such as <b>local culture, archaeological sites, and cultural sites</b> (Minister of Environment Regulation No. 16 of 2012).</p> <p>Indonesia ratified the Convention for the Safeguarding of the <b>Intangible Cultural Heritage</b> through Presidential Regulation No. 78 of 2007, which was regulated further in the Minister of Education and Culture Regulation 106 of 2013; the national and local</p>

	governments are obliged to guarantee the preservation of Indonesia's intangible cultural heritage.
Community Participations	<p>Law No. 14 of 2008 on Information Disclosure; requires that <b>public information is available and transparent</b>.</p> <p>Government Regulation No. 45 of 2017; the community has the <b>right to participate in regional development planning</b>. Law No. 32 of 2009 Environmental Protection and Management is carried out based on the <b>participatory principle</b>; its implementation is regulated in the Minister of Environment Regulation No. 17 of 2012 on <b>Community involvement in EIA</b>; a) provide transparent and complete information; b) equality of position between parties; c) fair and wise problem solving, and d) coordination, communication. Furthermore, Government Regulation No. 27 of 2012 emphasised that EIA (AMDAL) needs to involve the impacted communities. The communities have the right to submit suggestions, opinions, and <b>responses within ten days after the announcement</b>.</p> <p>Minister of Home Affairs Regulation No. 18 of 2018; <b>village community institution (Lembaga Kemasyarakatan Desa— LKD)</b>, is used as a partner institution to <b>increase community participation in the development process</b>. LKD consists of neighbourhood associations (RT, RW), family welfare empowerment organisations, youth organisations (<i>Karang Taruna</i>), health service posts (<i>Pos Pelayanan Terpadu</i>), community empowerment organisations.</p> <p>Presidential Instruction No. 9 of 2000 instructed <b>gender mainstreaming</b> in development planning, also in its implementation and evaluation; it is done by gender analysis that includes <b>participation in the development process</b> and the benefits they enjoy. The Minister of Home Affairs Regulation No. 15 of 2008 regulated the gender mainstreaming implementation at the local level.</p>

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

The key reference for the environmental and social assessment is the WB's Environmental and Social Framework (ESF)<sup>1</sup>, which enables the Bank and the borrowers to manage environmental and social risks of projects better and improve development outcomes. It was launched on 1 October 2018; the ESF offers broad and systematic coverage of environmental and social risks. The Rapid Assessment follows the ESF as its guide for format and content and, particularly, the ESS.

The ESF consists of:

- the WB's Vision for Sustainable Development<sup>2</sup>;

<sup>1</sup> <http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf>. The ESF makes important advances in areas such as transparency, non-discrimination, public participation, and accountability—including expanded roles for grievance mechanisms. It brings the WB's environmental and social protections into closer harmony with those of other development institutions.

<sup>2</sup> <http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf#page=15&zoom=80>

- the WB’s Environmental and Social Policy for Investment Project Financing (IPF)<sup>3</sup> sets out the requirements that apply to the Bank;
- the ten ESS<sup>4</sup>, which set out the requirements that apply to borrowers;
- Bank Directive: Environmental and Social Directive for IPF<sup>5</sup>; and
- Bank Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups<sup>6</sup>.

The WB’s Environmental and Social Policy for Investment Project Financing (IPF) states that the Bank is committed to supporting borrowers in developing and implementing projects that are environmentally and socially sustainable. Moreover, the Bank helps to enhance the capacity of borrowers’ environmental and social frameworks to assess and manage the environmental and social risks and impacts of projects. To this end, the Bank has defined specific ESS, which is designed to avoid, minimise, reduce, or mitigate the adverse environmental and social risks and impacts of projects. The Bank will assist borrowers in applying the ESS to projects supported through IPF following this Environmental and Social Policy for IPF.

The ESF consists of its 10 ESS, which set out the requirements related to risks outlined above. The WB has evaluated those aspects of the borrower’s policy, applicable laws, regulations, rules, and procedures to determine compatibility and may utilize that country’s system as deemed compatible. If an evaluation identifies gaps in the borrower’s environmental and social laws and systems, the borrower will work with the WB to identify measures and actions to address such gaps. A gap analysis of regulations is presented in the following section, with a discussion of findings on GOI readiness to implement ESF requirements.

*Table 7: The WB’s Environmental and Social Standards (ESS)*

Standard	Concerning
ESS1	Assessment and management of environmental and social risks and impacts
ESS2	Labor and working conditions
ESS3	Resource efficiency and pollution prevention and management
ESS4	Community health and safety

<sup>3</sup> <http://pubdocs.worldBank.org/en/360141554756701078/World-Bank-Environmental-and-Social-Policy-for-Investment-Project-Financing.pdf>

<sup>4</sup> <https://www.worldBank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards>

<sup>5</sup> <https://policies.worldBank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=4299690b-e96c-44a1-9117-8c7bc51dde70&ver=current>

<sup>6</sup> <https://policies.worldBank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=e5562765-a553-4ea0-b787-7e1e775f29d5&ver=current>

ESS5	Land acquisition, restrictions on land use, and involuntary resettlement
ESS6	Biodiversity conservation and sustainable management of living natural resources
ESS7	Indigenous peoples/Sub-Saharan African historically underserved traditional local communities
ESS8	Cultural heritage
ESS9	Financial intermediaries (FIA)
ESS10	Stakeholder engagement and information disclosure in the preparation of ESMF for this project

## 2.3 Environmental and Social Assessment Requirements for the World Bank Funding

The table below summarises relevant Indonesian regulations, their differences to the WB’s safeguards relevant for the BRT Bandung, and the required actions/documents in closing the identified gaps.

Table 8: Summary of Gaps between Indonesian Regulations and WB’s ESF

Standard	Indonesian Regulation	WB’s ESF	Gap	Required Actions/Documents
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	<ul style="list-style-type: none"> <li>Every business/activity is required to have an EIA (AMDAL) or UKL-UPL and environmental permit to protect environmental damage and as a prerequisite for obtaining a business/activity permit;</li> <li>The EIA (AMDAL) consists of the ToR, Environmental Impact Analysis (ANDAL), RKL, and RPL; or UKL-UPL for the business/activity that is not required in the EIA (AMDAL); and Declaration Letter of Environmental Management and Monitoring (SPPL); and</li> <li>A planned development that could potentially cause a disturbance in road transportation security, safety, and traffic, requires a traffic impact analysis (<i>Andalalin</i>).</li> </ul>	<ul style="list-style-type: none"> <li>The Borrower will carry out an environmental and social assessment of the project to assess the project’s environmental and social risks and impacts throughout the project life cycle;</li> <li>The Borrower, in consultation with the Bank, will identify and use appropriate methods and tools (will include, as appropriate, a combination of the following): ESIA; environmental audit; a hazard or risk assessment; social and conflict analysis; ESMP; ESMF; regional or sectoral EIA; strategic environmental and social assessment (SESA); and</li> <li>The environmental and social assessment will consider environmental risks and impacts (incl. climate change, biodiversity, ecosystem services) and social risks and impacts (incl. impacts on livelihoods, social conflicts, disadvantaged/vulnerable groups, land tenure, OHS, cultural heritage).</li> </ul>	ESIA could include the socio-economic-cultural component in the analysis, such as income levels, demographics, livelihoods, local culture, archaeological sites, cultural sites, and the potential social impacts/risks as results of community participation in the analysis process. However, the emphasis of the analysis is more on the environmental side, while the social analysis is rarely addressed in detail. Gaps exist for socio-economic analysis and compensation of affected livelihoods (e.g., income loss or via business disturbance).	<p>Despite it not yet being determined if an AMDAL is required, below are some suggestions for an ESIA that meets WB criteria.</p> <p>Suggested TOR for the extended AMDAL is available in Annex 1 to provide a more comprehensive environmental and social management assessment that is typical in an ESIA TOR; to address social issues such as OHS management, land acquisition, gender, disadvantaged/vulnerable groups, and the grievance mechanism primarily related to the</p>

				land acquisition process.
ESS2: Labor and Working Conditions	<ul style="list-style-type: none"> <li>• The service providers must apply Construction Safety Management system;</li> <li>• For projects above IDR 100 Billion and 100 workers are required to have a construction OHS expert;</li> <li>• Working area condition threshold values for Physical factors (incl. working climate, noise, vibrations, microwaves, ultraviolet rays, and magnetic fields) and chemical factors (incl. the form of solids, liquids, gases, mists, aerosols, and vapors derived from chemicals); and</li> <li>• Rights to fair and decent working conditions; right to complaint and grievance mechanisms.</li> </ul>	<ul style="list-style-type: none"> <li>• The Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers fairly and providing safe and healthy working conditions;</li> <li>• The employment of project workers will be based on equal opportunity and fair treatment. There will be no discrimination to any aspects of the employment relationship;</li> <li>• The Borrower will provide appropriate measures of protection and assistance to address the vulnerabilities of project workers, including specific groups of workers, such as women, people with disabilities, migrant workers, and children (of working age following this ESS);</li> <li>• A child under the minimum age established will not be employed or engaged in connection with the project;</li> <li>• A grievance mechanism will be provided for all direct workers and contracted workers;</li> <li>• OHS measures will be applied to the project and set out in the legal agreement and the ESCP; and</li> <li>• The Borrower will require the relevant primary supplier to introduce procedures and mitigation measures to address safety issues.</li> </ul>	The primary supply workers are not brought to attention (potential risks of child labor, forced labor, and serious safety issues may arise in relation to primary suppliers).	<p>The ESF provides more detail regarding labor and working conditions. A labor-management procedure needs to be prepared before implementation, especially concerning the issues of child labor, forced labor, and safety.</p> <p>Worker grievance mechanism also needs to be addressed. with potable water</p> <p>adequate sanitation facilities</p>

<p>ESS3: Resource Efficiency and Pollution Prevention and Management</p>	<ul style="list-style-type: none"> <li>• Every person who pollutes/damages the environment is obliged to take action to tackle the pollution/damage they made;</li> <li>• Some instruments for preventing pollution and environmental damage are KLHS, EIA (AMDAL), UKL-UPL, environmental permits, environmental risk analysis, environmental audits, and other instruments;</li> <li>• Businesses/activities that potentially cause impacts in the form of emissions, noise, and air pollution requires ESIA;</li> <li>• The management of hazardous and toxic waste (B3) and Minister waste handling originating from public facilities are regulated; and</li> <li>• Energy conservation: energy management for users with energy consumption <math>\geq 6,000</math> tons of oil equivalent per year and energy savings for users with less energy consumption.</li> </ul>	<ul style="list-style-type: none"> <li>• ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle;</li> <li>• The Borrower will improve the efficient consumption of energy, water, raw materials, and other resources;</li> <li>• The Borrower will assess the potential cumulative impacts of water use upon communities and identify and implement appropriate mitigation measures;</li> <li>• The Borrower will avoid the release of pollutants or minimise and control the concentration and mass flow of their release using the performance levels and measures specified in national law or the EHSGs, whichever is most stringent; and</li> <li>• The Borrower will avoid the generation of hazardous and non-hazardous waste and minimise and control the release and use of hazardous materials.</li> </ul>	<p>Some gaps were identified regarding material efficiency and green construction guidelines.</p>	<p>Environmental health and safety guidelines (EHSg) should be by construction firms. Environment tests (noise, air and water quality, and aquatic biota) should be included in the BOQ and the ESMP contains these specifications for the contract documents.</p> <p>Need to include GHG emissions as one selection criteria in the technical analysis; also, during operational, the positive impacts due to reduced GHG caused by the new transportation system are included.</p> <p>Efficient and environmentally friendly material sourcing should be included (such as Green procurement in the BRT project).</p>
<p>ESS4: Community Health and Safety</p>	<ul style="list-style-type: none"> <li>• The spatial planning is conducted by considering the physical condition— vulnerability to disasters and security;</li> <li>• BRT operations should take the environmental function preservation into</li> </ul>	<ul style="list-style-type: none"> <li>• The Borrower will evaluate the risks and impacts of the project on the health and safety of the affected communities during the project life cycle, including those who may be vulnerable because of their</li> </ul>	<p>Community safety, especially with extreme weather and potential emergency events have not been identified yet.</p>	<p>Ensure that hazards and the inclusion of minority groups are considered for the BRT system designs.</p>

	<p>account;</p> <ul style="list-style-type: none"> <li>● EIA (AMDAL) assesses the changes in the public health level;</li> <li>● Public transportation services should be accessible to disabled users;</li> <li>● Gender mainstreaming in development planning, including participation in the development process; and included into design onward to BOQ</li> <li>● The noise limit for settlement, hospital, and school is 55 dBA.</li> </ul>	<p>particular circumstances;</p> <ul style="list-style-type: none"> <li>● The Borrower will design, construct, operate, and decommission the project's structural elements according to national legal requirements, the EHSs, and other GIIP, taking into consideration safety risks to third parties and affected communities;</li> <li>● When structural elements or components of a project are situated in high-risk locations, including those with risks of extreme weather, and their failure or malfunction may threaten the safety of communities, the Borrower will engage independent experts to conduct a review;</li> <li>● The Borrower will establish and implement appropriate quality management systems to anticipate and minimise risks and impacts that such services may have on community health and safety;</li> <li>● The Borrower will identify and monitor the potential traffic and road safety risks to workers, affected communities, and road users throughout the project life cycle;</li> <li>● The Borrower will identify the project's potential risks and impacts on ecosystem services that may be exacerbated by climate change;</li> <li>● The Borrower will avoid or minimise the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases. And also, communicable and non-communicable</li> </ul>	<p>Further, the inclusiveness of services is not addressed. The impact assessment towards women and vulnerable groups is not specified in the regulation.</p>	<p>Accessibility for women and people with disabilities should be addressed.</p> <p>Traffic analysis during construction should be included.</p> <p>Conduct a risk hazard assessment (RHA). GBV (SEA/SH) assessment and action plan to be developed and implemented during implementation.</p>
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		<p>diseases that could result from project activities, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups; and</p> <ul style="list-style-type: none"> <li>• The Borrower will identify and implement measures to address emergency events; projects having the potential to generate emergency events will conduct a risk hazard assessment (RHA).</li> </ul>		
<p>ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement</p>	<ul style="list-style-type: none"> <li>• Proper compensation for losses arising from the implementation of development activities under the spatial plan needs to be provided; if development is of public interest, the party entitled to the land must release after fair compensation. A detailed procedure is regulated;</li> <li>• Compensation can be given in the form of money, replacement land, resettlement, shareholding, or other forms agreed by both parties (Presidential Regulation No. 71 of 2012);</li> <li>• Especially for the parties that occupied state land (in a good way/<i>beritikad baik</i>; &gt;10 years) could receive the compensation in the form of money or relocation. The government will give compensations to cover demolition costs; mobilisation; house rental for up to 12 months; and allowances for income losses from land use (Presidential Regulation No. 62 of 2018);</li> <li>• Feasibility studies in the land acquisition planning document cover:</li> </ul>	<ul style="list-style-type: none"> <li>• The requirements are including eligibility classification, project design, compensation and benefits for affected persons, community engagement (incl. ensure that women’s perspectives are obtained and their interests factored into all aspects of resettlement planning and implementation), grievance mechanism, planning and implementation, physical-economical displacement, collaboration with other responsible agencies or subnational jurisdictions, and technical and financial assistance; and</li> <li>• ESS5 requirements will be met by developing Involuntary Resettlement Instruments, which consist of: <ul style="list-style-type: none"> <li>a. Process Framework; and</li> <li>b. land acquisition and resettlement plan (LARAP or RAP).</li> </ul> </li> </ul>	<p>AMDAL covers direct-indirect impacts; however, the indirect impacts are often less/not paid attention to during the environmental and social impact study.</p> <p>The planned land compensation has been assessed based on the value of the land, and anything related to the land (e.g., buildings, plants), has not yet been sufficiently elaborated on the aspects related to relocation assistance and livelihood restoration measures.</p>	<p>Both direct and indirect impacts due to land acquisition will be covered by the Environment and Social Management Plan for the program, specifically through the Land Acquisition and Resettlement Plans.</p> <p>LARAP needs to be prepared, including the provision of sufficient resources for the development of resettlement sites, where necessary; together with the provision of relocation assistance and for planning and implementation of income rehabilitation</p>

	<ul style="list-style-type: none"> <li>a. socioeconomic survey;</li> <li>b. location eligibility;</li> <li>c. analysis of development costs and benefits for the region and the community;</li> <li>d. estimated land value;</li> <li>e. environmental and social impacts that may arise as a result of Land Acquisition and development; and</li> <li>f. other studies needed.</li> </ul> <ul style="list-style-type: none"> <li>● Notification of development plans is conveyed to the public at the development location plan for Public Interest, either directly or indirectly; and</li> <li>● Parties that object to the development location plan could have second public consultation. Any objections afterward will be handled by a special team established by the governor to inventory the problems of objections, conduct discussions, and give recommendations to the governor to accept/reject the objections.</li> </ul>			<p>measures for those affected by the loss of incomes and livelihood, consistent with the requirements of ESS7.</p> <p>As per the Pre Feasibility Study (PF) and ESCP, an independent monitor will be mobilised to provide third-party assessments of the implementation of the RAP or LARAP.</p>
<p>ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</p>	<ul style="list-style-type: none"> <li>● Every person who pollutes/damages the environment is obliged to act to tackle the pollution/damage they made;</li> <li>● KLHS is one of the instruments for preventing pollution/environmental damage. It consists of studies on carrying capacity and carrying capacity the environment for development, estimates of environmental impacts and risks,</li> </ul>	<ul style="list-style-type: none"> <li>● The environmental and social assessment set out in ESS1 will consider direct, indirect, and cumulative project-related impacts on habitats and the biodiversity they support;</li> <li>● Where the environmental and social assessment has identified potential risks and impacts on biodiversity or habitats, the Borrower will manage those risks and</li> </ul>	<p>Identification of risks is part of the EIA (AMDAL), but possible mitigation options might not be as explicit (e.g., tree replanting requirements).</p>	<p>Outline specific mitigation options that satisfy the regulations of both institutions. Estimation of the number of large trees that will have to be felled (for example by the position of BRT</p>

	<p>ecosystem service performance, efficient use of natural resources, and biodiversity potential; and</p> <ul style="list-style-type: none"> <li>● EIA (AMDAL) covers the biological component, such as vegetation/flora, fauna, ecosystem types, the presence of endangered/endemic species, and their habitats.</li> </ul>	<p>impacts following the mitigation hierarchy; and</p> <ul style="list-style-type: none"> <li>● This ESS addresses all habitats, categorised as ‘modified habitat’, ‘natural habitat’, and ‘critical habitat’, along with ‘legally protected and internationally and regionally recognized areas of biodiversity value’.</li> </ul>		<p>stations) and a compensation mechanism should be identified.</p> <p>Replanting trees at the station surrounding. It will be based on their age, productivity, and present commercial value, per recommendation by local environmental or mayor’s office</p>
<p>ESS8: Cultural Heritage</p>	<ul style="list-style-type: none"> <li>● Government should pay attention to the cultural site in spatial planning, preserve cultural heritage in the regions, incl. the customs and socio-cultural values in communities;</li> <li>● EIA (AMDAL) also covers socio-economic-cultural components, such as local culture, archaeological sites, cultural sites; and</li> <li>● Indonesia ratified the Convention for the Safeguarding of the Intangible Cultural Heritage.</li> </ul>	<ul style="list-style-type: none"> <li>● The environmental and social assessment, as set out in ESS1, will consider direct, indirect, and cumulative project-specific risks and impacts on cultural heritage;</li> <li>● Stakeholder consultation and identification of cultural heritage, incl. confidentiality, stakeholders’ access;</li> <li>● Legally protected cultural heritage areas;</li> <li>● Provisions for specific types of cultural heritage, incl. archaeological sites and material, built heritage, natural features with cultural significance, and movable cultural heritage; and</li> <li>● Commercial use of cultural heritage.</li> </ul>	<p>Gaps are in the enforcement of the regulation and the inclusion of risks and impacts on cultural heritage from project activities.</p>	<p>Include risks and impacts to cultural heritage from project activities in the ESIA.</p> <p>Cultural heritage sites/structures in Bandung are in Jl. Asia Afrika, Jl. Ahmad Yani, Jl. Braga (including Cikapundung River Park area), and Balai Kota Area.</p> <p>A full Heritage Impact Assessment (HIA) needs to be conducted for the BRT routes and stations proposed.</p> <p>Depending on the findings, a Cultural Heritage Management</p>

				<p>Plan might be needed to ensure proper treatment of any sites that are near the new BRT line.</p> <p>Bidding documents shall include a provision that will require construction activities to be stopped immediately upon discovery of any archaeological and cultural relics; the local government needs to be informed immediately.</p>
<p>ESS10: Stakeholder Engagement and Information Disclosure</p>	<ul style="list-style-type: none"> <li>● EIA (AMDAL) covers socio-economic-cultural components, such as income levels, demographics, and livelihoods;</li> <li>● By law, public information is required to be available and transparent;</li> <li>● The community has the right to participate in regional development planning;</li> <li>● Community involvement in EIA (AMDAL) is regulated, i.e.: (a) provide transparent and complete information; (b) equality of position between parties; (c) fair and wise problem solving, and d) coordination, communication. The impacted communities have the right to submit suggestions, opinions, and responses within ten days after the announcement;</li> <li>● Village community institution (<i>Lembaga Kemasyarakatan Desa</i> — LKD), is used as a partner institution to increase community</li> </ul>	<ul style="list-style-type: none"> <li>● Borrowers will engage with stakeholders throughout the project life cycle, incl.: <ul style="list-style-type: none"> <li>a. Engagement during project preparation (stakeholder identification and analysis, SEP at metropolitan level, information disclosure, meaningful consultation);</li> <li>b. Engagement during project implementation and external reporting;</li> <li>c. Grievance mechanism; and</li> <li>d. organisational capacity and commitment.</li> </ul> </li> </ul>	<p>Gaps exist for socio-economic analysis and compensation of affected livelihoods (e.g., for income loss or via business disturbance).</p>	<p>Mass transport project implementation might highly affect the livelihood of the existing formal/informal transportation service providers; thus, the direct-indirect impacts need to be more assessed and managed. SEP will guide more on stakeholder engagement and information disclosure for this project.</p> <p>Stakeholder participation (incl. Project Affected Persons, women, and</p>

	<p>participation in the development process. LKD consist of neighbourhood associations (RT, RW), family welfare empowerment organisation, youth organisation (<i>Karang Taruna</i>), health service post (<i>Pos Pelayanan Terpadu</i>), community empowerment organisations; and</p> <ul style="list-style-type: none"> <li>● Gender mainstreaming in development planning is done by gender analysis that includes women's and men's participation in the development process and the benefits they receive; it is regulated to be implemented at the local level also.</li> </ul>			<p>other vulnerable groups as identified in SEP) needs to be ensured.</p> <p>Formal and informal grievance platforms need to be provided.</p>
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### III - ENVIRONMENTAL AND SOCIAL BASELINE

Prehistorically a lake, Bandung has now become 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). In 2018, the city had 2.5 million people (BPS 2019a). Bandung is famous for its education; there are at least 100 universities and institutes that are visited by up to 100,000 students from all over Indonesia (BPS 2019a).

Bandung also has historical value for Indonesia, as it formed an autonomous area already in 1906, which was far before Indonesia's independence. It is marked by various heritage buildings, such as *Kantor Pos Besar* (main post office) and *Asia Afrika Conference Museum*, reflecting the historical development and giving the city its unique character (BPS 2019a). Besides its architectural beauty, Bandung has also been named Flower City (*Kota Kembang*), the *Paris van Java*, and 'fashion city' because of its clothing manufacturing industry and outlet stores (Elyanta 2019).

This city is located in West Java Province. In the transportation sector, Bandung has suffered from heavy congestion; with the absence of mass rapid transport modes, the number of trips per day has shown to increase 66% from 1995 to 2010, and it is estimated to become 193% by 2030 following the growth of urban population (Lubis et al. 2003 in Tarigan et al. 2016).

A street survey was carried out in December 2021 and some results can be seen in the figure below and attached in Annex 1. Further environmental and social aspects of the baseline will be described.



Figure 3: Map of the summary of Potential Environmental and Social Impact on Bandung BRT

### 3.1 Environment

On 11 December 2021, PT UNILAB Perdana Laboratory took samples for air quality and noise level measurement at three different locations along the Bandung BRT route. The results will be used as a baseline for continuous monitoring.

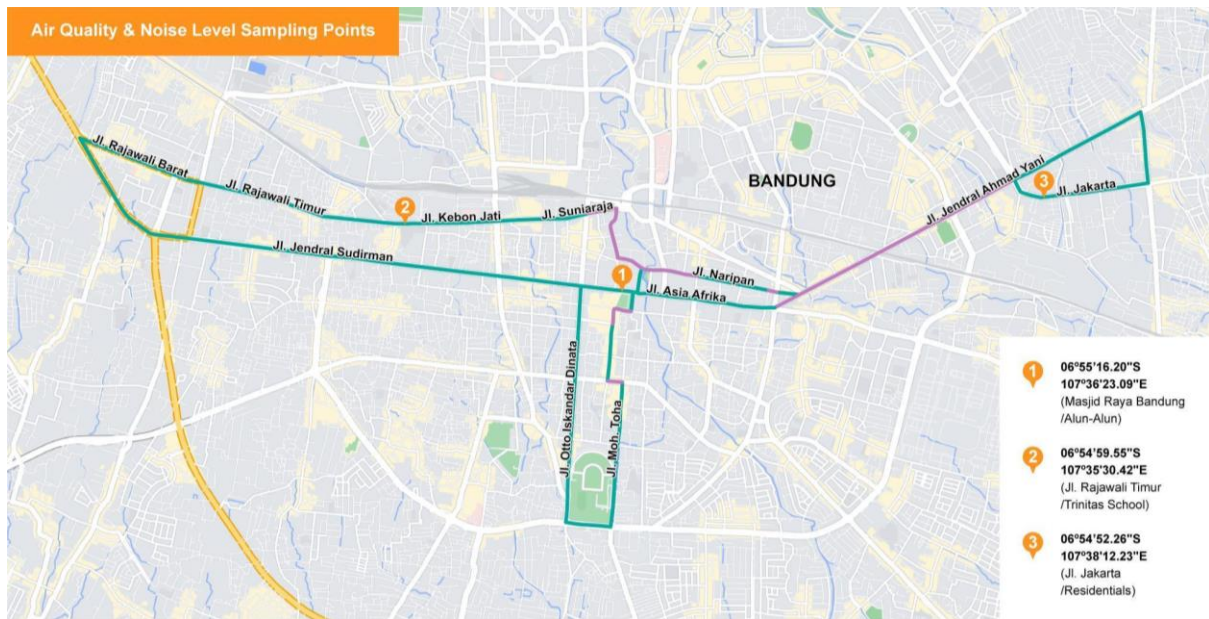


Figure 4: Map of air quality and noise level sampling locations

Table 9: Sampling Points for Air Quality and Noise Level

Date	Type of sample	Sampling Points	Coordinates	Parameters & Threshold
11 Dec 21	Air quality	Masjid Raya Bandung /Alun-alun	06°55'16.20"S 107°36'23.09"E	PP No. 22/2021, Appendix VII
		Jl. Rajawali Timur (Trinitas School)	06°54'59.55"S 107°35'30.42"E	
		Jl. Jakarta (residential)	06°54'52.26"S 107°38'12.23"E	
11 Dec 21	Noise level	Masjid Raya Bandung /Alun-alun	06°55'16.20"S 107°36'23.09"E	Kepmen LH No 48/1996
		Jl. Rajawali Timur (Trinitas School)	06°54'59.55"S 107°35'30.42"E	

		Jl. Jakarta (residential)	06°54'52.26"S 107°38'12.23"E	

Source: PT. UNILAB Perdana Laboratory, 2021

### 3.1.1 Geographical Location

Bandung City is in the West Java region and it is the capital city of West Java Province; which is geographically located at 107°36' East Longitude and 60°55' South Latitude. Based on its geographical position, Bandung City has boundaries as follows:

- North: Bandung Regency and West Bandung Regency
- South: Bandung Regency
- West: Cimahi City
- East: Bandung Regency

Bandung City is located at an altitude of 700 metres above sea level. The total area of Bandung City is 167.31 km<sup>2</sup> which is divided into 30 sub-districts covering 151 villages.

The Bandung BRT route generally has an average altitude of 690 to 700 metres above sea level, so that BRT vehicles will operate on relatively flat roads. This condition allows for less burden on vehicle maintenance.

### 3.1.2 Climate

The climate of Bandung City is affected by the humid and cool mountainous climate. In 2019, the rain occurred throughout the year with varying intensities each month. The highest rainfall occurred in December, which amounted to 313.5 mm. While the lowest rainfall is in August where the rainfall only reached 0.2 mm. During 2019, the average temperature in Bandung City was around 23.71 °C. The highest temperature reached 32.4 °C in October, and the minimum temperature was 17.9 °C in August.

*Table 10: Climate data in Bandung City for 2019*

Month	Temperature Average (°C)	Humidity Average (%)	Wind Velocity Average (m/sec)	Rainfall (mm)	Number of Rainy Days (day)
January	23.7	79	6	231.6	24
February	23.8	81	4	269.1	24
March	23.6	80	5	222.7	25
April	23.9	80	4	298.9	25
May	23.9	79	5	245.7	23
June	23.3	72	5	26.5	4
July	22.7	69	4	13.4	4
August	23.0	66	4	0.2	4
September	23.8	64	5	55	3
October	24.9	64	5	84.2	0.46
November	24.2	74	3	270.7	0.96
December	23.7	83	3	313.5	1.08

Source: Bandung City in Numbers, 2020.

### 3.1.3 Air Quality

The following air quality data was measured by the Bandung Environmental Agency in 2020. Based on the data, the air quality is still in relatively good condition, because there were no parameters that exceeded the threshold in accordance with Government Regulation No. 41 of 1999 concerning Air Pollution Control. The following table provides the air quality at the roadside measurement points in Bandung City which is periodically measured by Bandung Environmental Agency.

Table 11: Bandung City Roadside Ambient Air Quality Measurement for 2020

No.	Location	Parameter ( $\mu\text{g}/\text{Nm}^3$ )																	
		SO <sub>2</sub>	*)	CO	*)	NO <sub>2</sub>	*)	O <sub>3</sub>	*)	PM <sub>10</sub>	*)	PM <sub>2.5</sub>	*)	TSP	*)	Pb	*)	HC	*)
21.	Tegallega Street (In front of Pendopo)	<29.24		2,290		15.24		<21.3 2		44.21		26.18		58.26		0.04		3.80	
22.	BKR Street (In front of Alifa)	<29.24		3,435		23.17		22.12		98.25		26.26		168.92		0.09		4.90	
23.	Buah Batu Street	<29.24		3,057		29.15		21.8		76.58		58.66		92.61		0.05		4.40	
24.	Buah Batu Street (In front of STSI/ISBI Building)	42.09		7,820		36.08		33.78		106.5 2		60.12		192.66		0.07		6.90	
25.	Ahmad Yani Street (In front of Siliwangi Stadium)	<29.24		3,630		18.53		27.1		72.60		21.90		145.10		0.07		3.90	
26.	Arcamanik Street	<29.24		4,008		19.00		<21.3 2		74.26		31.22		94.26		0.04		2.80	
27.	Ciganitri Street	<29.24		3,240		15.22		<21.3 2		64.27		27.88		81.65		0.05		3.00	

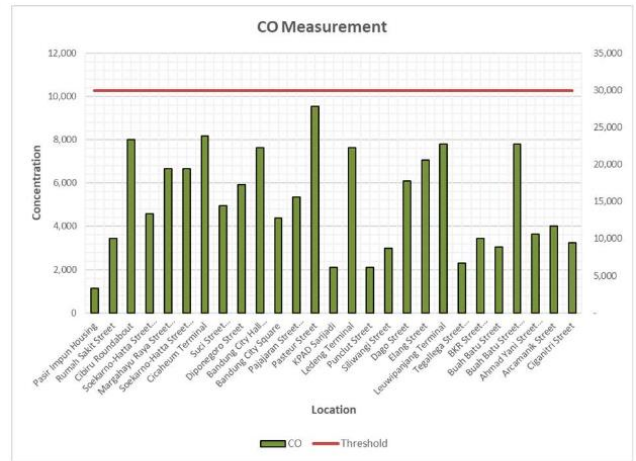
Source: Bandung Environmental Agency, 2020

Note: In red are the road names that are included in the Bandung BRT route.

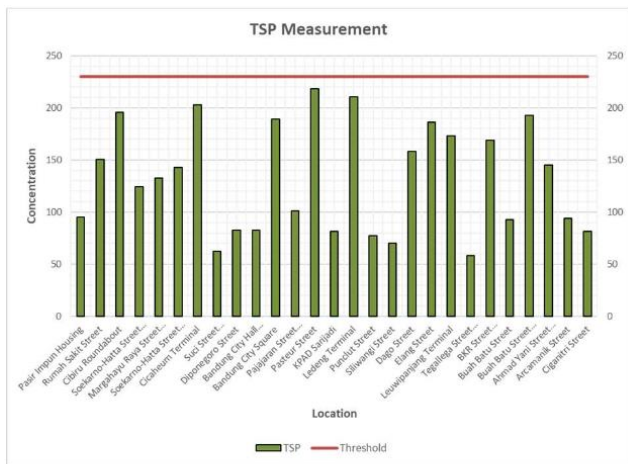
\*) National ambient air quality standards based on Government Regulation No. 41 of 1999 concerning Air Pollution Control



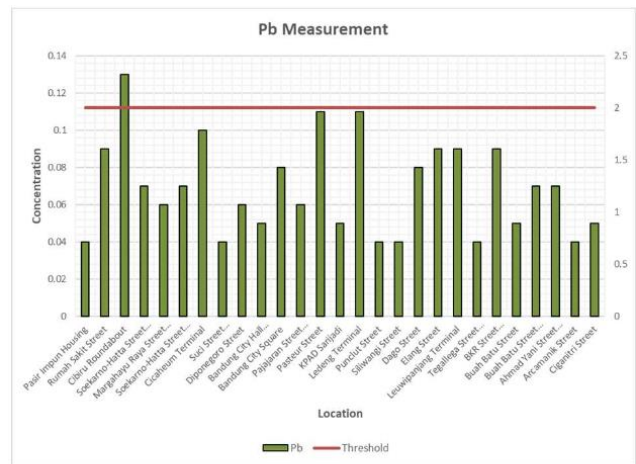
2020 Measured Concentration of SO<sub>2</sub>



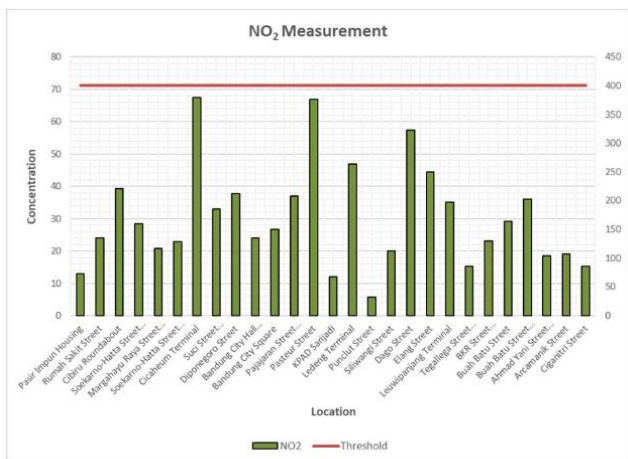
2020 Measured Concentration of CO



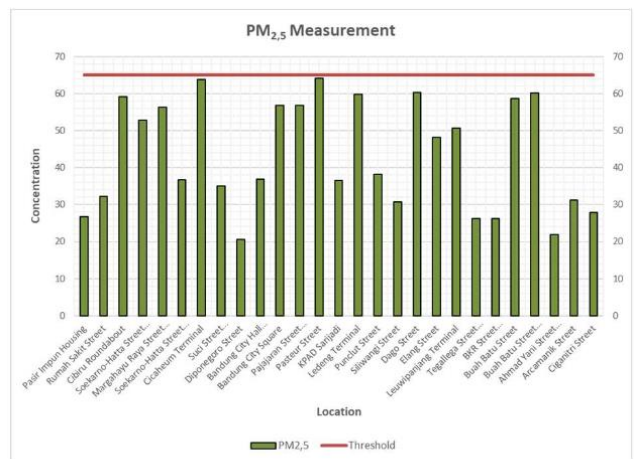
2020 Measured Concentration of TSP



2020 Measured Concentration of Pb



2020 Measured Concentration of NO<sub>2</sub>



2020 Measured Concentration of PM<sub>2.5</sub>

Figure 5: Air Quality Data Available for 2020 (Data Analysis, 2021)

Among the locations of air quality measurement above in table 11 and figure 4, Bandung City Hall, Bandung City Square (Alun-alun), BKR Street and Ahmad Yani Street are included in the

planned Bandung BRT route. Based on the data, the air quality is still in relatively good condition, because no parameters were exceeded.

Air quality measurements were carried out at the end of November 2021 in three different locations along the Bandung BRT route. The results will be used as a baseline for continuous monitoring.

#### *3.1.4 Noise*

Noise level, which was measured by the Bandung Environmental Agency in 2020 at the Bandung City roadside (in red are the roads included into the planned BRT system), shows that the noise along the roadside generally exceeds the threshold of 60 dBA based on the Ambient Noise Quality Standard (Ministry of Environment Decree No. 48/MENLH/VI/1996 for Public Facilities). The noise level was around 56.7 – 75.71 dBA, which is estimated to be caused by the noise from transportation activities (private vehicles) around the area.

Table 12: Bandung City Roadside Noise Level Measurement for 2020

No.	Location	Noise Level dB(A)	Threshold <sup>*)</sup> dB(A)
1.	Pasir Impun Housing	56.7	60
2.	Rumah Sakit Street	73.43	
3.	Cibiru Roundabout	71.04	
4.	Soekarno-Hatta Street (In front of Aria Graha Building)	66.08	
5.	Margahayu Raya Street (Metro Roundabout)	63,21	
6.	Soekarno-Hatta Street (In front of Astra Bizz Building)	70.86	
7.	Cicaheum Terminal	75.71	
8.	Suci Street (Cimuncang Crossroad)	69.72	
9.	Diponegoro Street	62.83	
10.	Bandung City Hall (In front of Vanda Garden)	71.71	
11.	Bandung City Square	78.24	
12.	Pajajaran Street (In front of Wiyata Guna Building)	63.21	
13.	Pasteur Street	74.36	
14.	KPAD Sarijadi	57.78	
15.	Ledeng Terminal	74.26	
16.	Punclut Street	57.11	
17.	Siliwangi Street	59.28	
18.	Dago Street	70.26	
19.	Elang Street	74.61	
20.	Leuwipanjang Terminal	71.58	
21.	Tegallega Street (In front of Pendopo)	54.21	
22.	BKR Street (In front of Alifa)	74.36	
23.	Buah Batu Street	71.56	
24.	Buah Batu Street (In front of STSI/ISBI Building)	72.22	
25.	Ahmad Yani Street (In front of Siliwangi Stadium)	66.36	
26.	Arcamanik Street	69.41	
27.	Ciganitri Street	61.37	

Source: Bandung Environmental Agency, 2020

Note: \*) National noise level standards for public facilities based on the Decree of the State Minister for Environment No. Kep-48/MENLH/11/1996 concerning Quality Standards for Noise

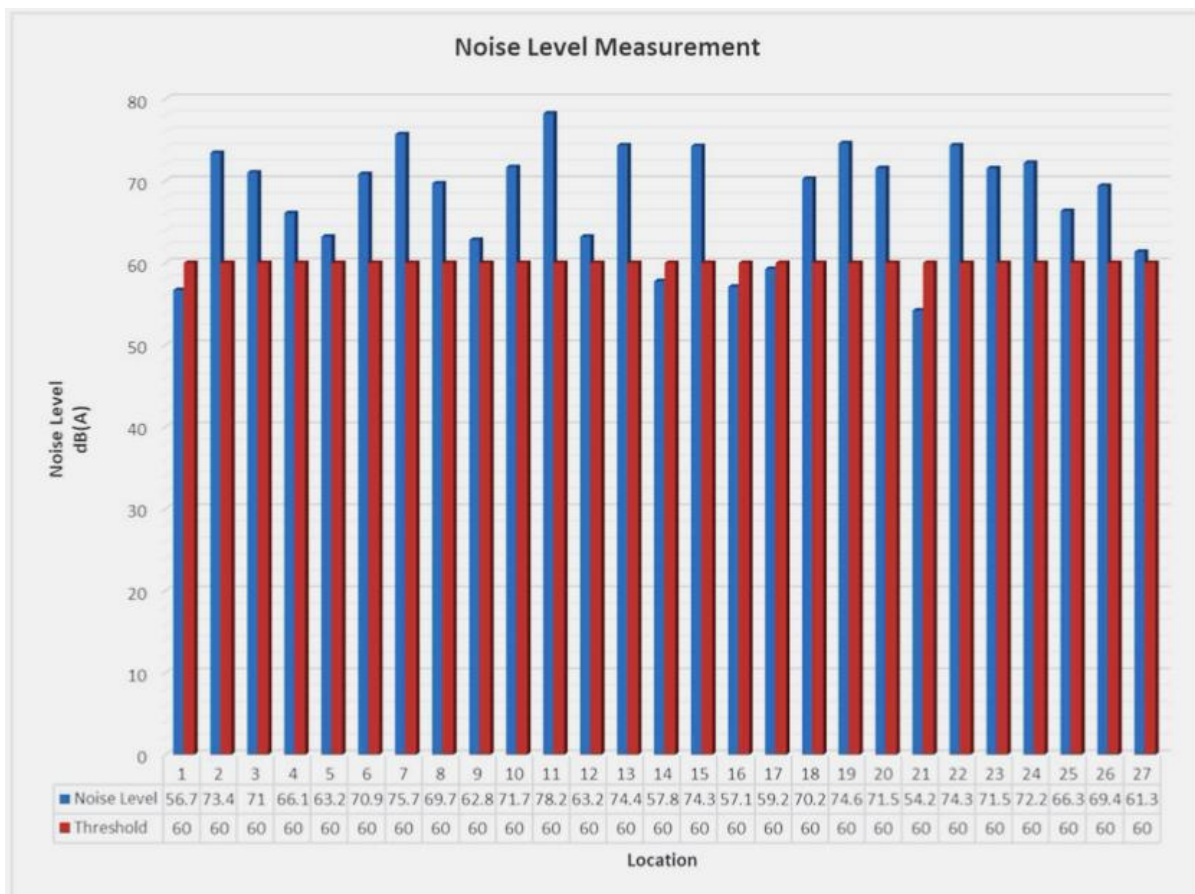


Figure 6: Noise Level Data Available for 2020 (Data Analysis, 2021)

In December, noise measurements were taken in three different locations along the Bandung BRT route. The result will be used as a baseline for continuous monitoring.

### 3.1.5 Water Quality

Two rivers will cross with the BRT line, the Cikapundung and the Citepus River (see Figure below).

#### Cikapundung River

The **Cikapundung River** divides the city of [Bandung](#), in [West Java](#), [Indonesia](#). The river flows from its headwaters in Lembang on the northern edge of the city, to the south, where it empties into the Citarum River. Despite being one of the main sources of Bandung's water supply,<sup>[3]</sup> the river is polluted. Domestic waste, including human waste and detergents, is the main source of pollution as more people are living along the river banks. Other sources of pollutants are industry agriculture and farming.

## Citepus River

**Citepus** is one of the urban rivers that passes through Bandung. Visually it can be found the river has poor water quality and research is confirming it. One study of 2021 showed that at all sample sites the river exceeds above the maximum water quality standards of government regulation no. 82 2011 concerning water quality management and pollution control.<sup>7</sup>

*Table 13: Rivers By Name, Water Quality, and Sub-Districts that crosses the Bandung BRT, 2019*

No	River Names	Status of Water Quality	Crossed districts
(1)	(2)	(3)	(4)
1	Citepus river	lightly polluted (inlet & outlet) moderately in middle of the rivers	Cicendo, Astanaanyar, Andir, North of Bojongloa
15.	Cikapundung river	lightly polluted	Coblong. Cidadap, Sumur Bandung, Bandung wetan, Cicendo

Source: Environment and Cleanliness of Bandung City 2019

On 12 December 2021, PT UNILAB Perdana Laboratory also took samples for water biota and quality measurement at two different rivers by the Bandung BRT Route. The measurements will be used to form the baseline and will be integrated into the AMDAL for the environmental and monitoring plan RKL-RPLL.

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[https://www.researchgate.net/publication/356272678\\_Water\\_quality\\_and\\_management\\_of\\_Citepus\\_River\\_Bandung\\_Indonesia](https://www.researchgate.net/publication/356272678_Water_quality_and_management_of_Citepus_River_Bandung_Indonesia)

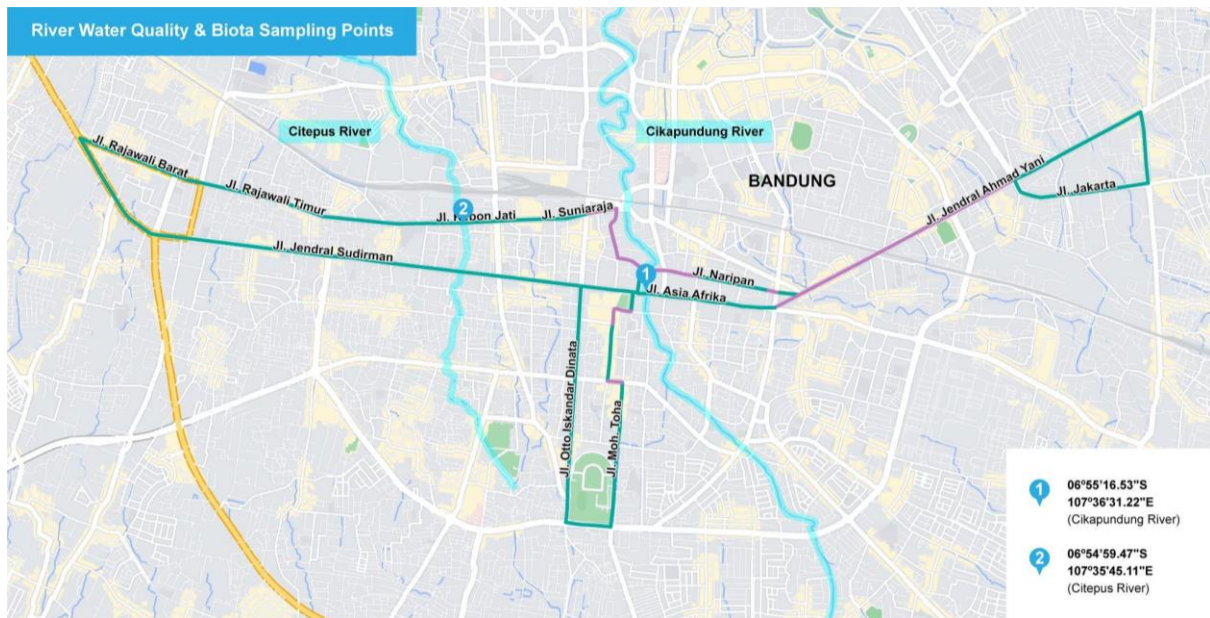


Figure 7: Map of the two rivers crossing the Bandung BRT line

Table 14. Sampling points for water quality and biota

Date	Type of sample	Sampling Points	Coordinates	Parameters & Threshold
12 Dec 21	Water quality	Cikapundung River	06°55'16.53"S 107°36'31.22"E	PP No 22/2021, Appendix VI Table 1 class 1
		Citepus River	06°54'59.47"S 107°35'45.11"E	
12 Dec 21	Water biota	Cikapundung River	06°55'16.53"S 107°36'31.22"E	Plankton and Benthos
		Citepus River	06°54'59.47"S 107°35'45.11"E	

Sources: PT. UNILAB Perdana Laboratory 12 Dec 2021

### 3.1.6 Soil

Bandung City has 2 (two) types of soil as follows:

1) Latosol. Latosol is a type of soil formed from weathering of sedimentary and metamorphic rocks. Most of Indonesia has a latosol soil type. Latosol has a solum layer that is 130 cm – 5 metres thick. This soil type has a clay texture, which is red, brown, and slightly yellowish in colour, and has a pH of 4.5 – 6.5.





*Figure 9: Old large trees along a water drain on Jl. Moh. Toha*

Another park that will be passed by BRT routes is Tegallega Park. It is a green open space where a Bandung historical monument is located, *Bandung Lautan Api* monument (literal translation: Bandung Sea of Fire). There are three BRT stations surrounding Tegallega Park (Figure 10 ).

*Figure 10: BRT Routes near Tegallega Park and the Satellite Photo of Tegallega Park (Source: GIZ 2020, Google Map, 2021).*

The results of the survey conducted by the consultant in Aug 2011 on the proposed BRT corridor show that the species of trees along the roadsides of Jl. Padjadjaran, Jl. Cicendo, Jl. Wastu Kencana, Jl. Kebon Kawung, Jl. Jakarta, Jl. Ahmad Yani, and Jl. Rajawali are identified as *Acacia mangium* (Akasia), *Swietenia mahagoni* (Mahoni), *Acacia auriculariformis* (Angsana), *Lagerstromia speciosa* (Bungur), and *Bougenvilia* sp (kembang kertas). Meanwhile, the trees on the median strip of Jl. BKR, Jl. Sudirman (boundary city) are *Palmae* sp (Palem), *Ixora javanica* (Soka), *Bougenvilia* sp (Kembang kertas), *Cana Hibrida* (Kana), and *Plucea indica* (Beluntas).

Cutting down existing trees could potentially disturb the land vegetation. Only 4 stations (Cikapundung, Kebun Kawung, Simpang Lima, and Kiara Artha) will potentially need tree removal and the number is not significant (see Figure 3-29). Based on the survey in December 2021, the only locations with potential tree removal include 4 large trees on the median of Jl. Sudirman and trees on the road side of Jl. Jakarta for station construction. More trees on medians and the road side might be impacted once all station locations are determined.



Figure 11: Trees on the side of Jl Jakarta (left) and old large trees on the median of Jl Sudirman

There are 10 potential locations for the construction of the BRT depot, including Soekarno Hatta, Kebon Kawung, Gedebage, and Soreang. The first 2 locations are currently used for DAMRI bus depots while those in Gedebage and Soreang are used for a government office and ricefield, respectively. Therefore, it could be considered as a minor negative impact. The contractor is recommended to replace the removed trees by planting new trees along the BRT corridor as compensation.

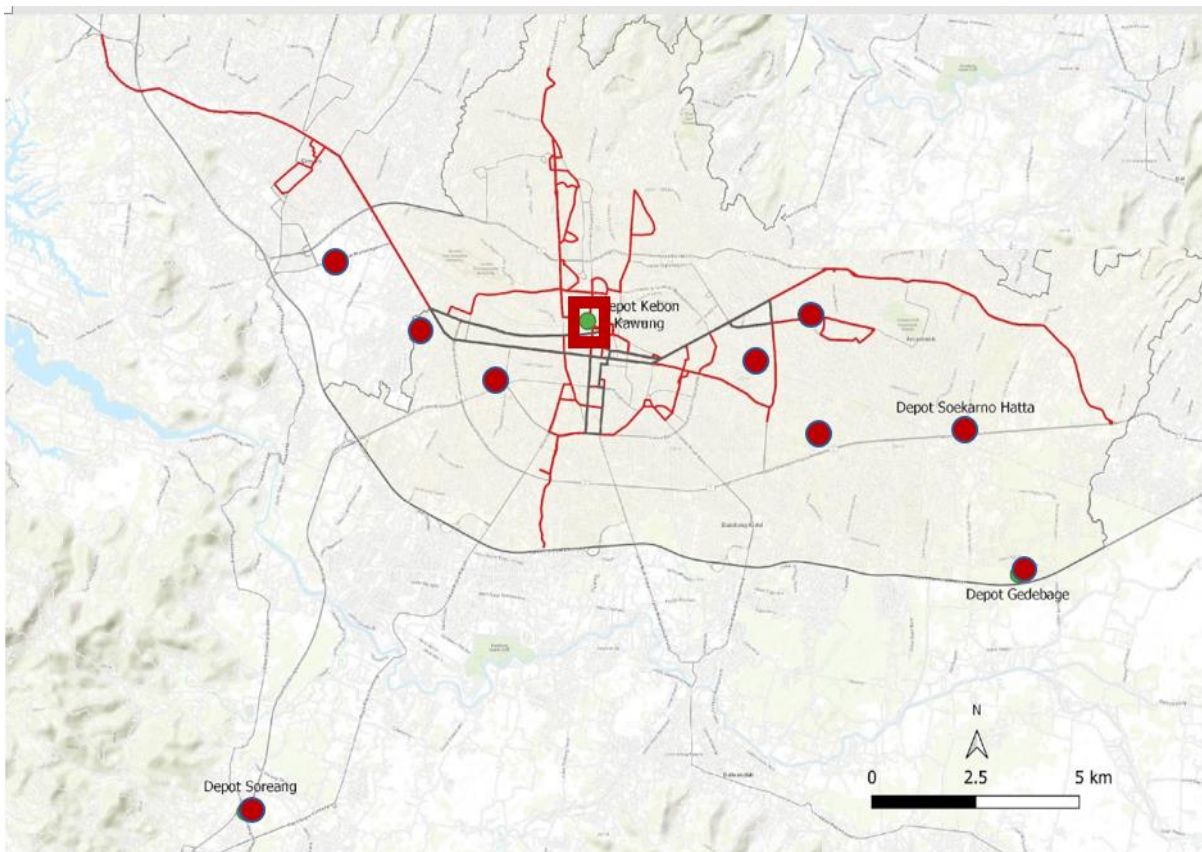


Figure 12: Map of potential locations for Bandung BRT Depots

Table 15: List of potential locations for Bandung BRT Depots

Depot	Total Area (ha)	Land Owner
1. Kebon Kawung	1.1	PT. KAI/DAMRI
2. Soekarno Hatta	0.9	PT. DAMRI
3. Gedebage	3.6	Dinas Perhubungan
4. Soreang	0.5	Perorangan
5. Jl. Mahar Martanegara	5.7	Perorangan
6. Jl. Sukasari	2.4	Perorangan
7. Jl. Terusan Pasir Koja	1.6	Perorangan
8. Jl. Sukabumi	5.7	PT. KAI
9. Jl. Sekajati	9.5	Perorangan
10. Jl. Terusan Jakarta	8.6	Perorangan

### 3.1.8 Utilities

Whilst this assessment has not obtained detailed information regarding utilities, it is assumed that there are various existing utilities that may be impacted by the construction and operation of a new urban transport system.

It is recommended that a **full utilities survey** is completed to ensure all impacts are identified on water pipes, gas pipes, electricity, telecommunications, stormwater drainage, traffic controls, and street lighting.

### 3.1.9 Greenhouse Gas (GHG) Emissions

Bandung City in particular has experienced rapid urbanisation and motorization with vehicle growth of 10% per annum or more, a situation which has generated significant increases in GHG emission.

However, Bandung has plans to change this situation. Bandung has adopted a low-carbon strategy through the concept of 'leapfrog development', through which Indonesia aims at developing without the environmental degradation experienced by developed countries in the past. Bandung is very interested in green technology and there are six components to Bandung City's plan:

- Urban green/open space;
- Public street lighting;
- Sustainable solid waste management;
- Wastewater treatment;

- Clean water supply; and
- Sustainable transportation.

Some figures from the previous studies conducted by Kimoanh et al. (2018) and Dewanto (2020) can be used for calculating the GHG emissions from passenger cars (PC), motorcycles (MC), paratransit, buses, taxis, and trucks, as seen on the table below.

Table 16: Fleet Characteristics in Bandung 2019

Parameter	MC	Paratransit	Taxi	Bus	PC	Truck <sup>a</sup>
Average age (years)	3.6 (1-12)	5 (1-17)	7.5 (1-10)	6.4 (1-22)	5.2 (1-15)	11.1
Fuel type (%)	Petrol : 100	Petrol : 85 Diesel : 15	Petrol : 100	Diesel : 100	Petrol : 93 Diesel : 7	Diesel: 63 Petrol:37
Exhaust system (%)	Euro 3 : 84,1 Euro 2 : 13,9 Pre-Euro : 1,9	Euro 2 : 47,1 Pre-Euro : 52,9	Euro 2 : 72,2 Pre-Euro : 27,8	Euro 5 : 2,2 Euro 4 : 2,9 Euro 3 : 26,1 Euro 2 : 50,7 Pre-Euro : 18,1	Euro 3 : 3,2 Euro 2 : 75,3 Pre-Euro : 21,5	Pre Euro: 32% Euro 2: 66% Euro4: 2%
Average speed (km/hour)	11,2	15,8	13,5	16,5	17	10.8
Number of start up (start/day)	9	11	12	11	5	16
Daily VKT (km)	25	91	70	117	37	40.7
NV (registration numbers in 2019) <sup>b</sup>	1,328,783	5,521	1,387	7,251	388,420	76,098

Source: Kimoanh et al (2018), a Dewanto (2020), b Dinas Perhubungan Kota Bandung (2019), in GIZ (2020)

The composite emission factors (EFs) for Bandung are calculated using the emission model of International Vehicle Emission (IVE) presented in the table below.

Table 17: Composite emission factors for GHGs

Type of fleet	Emission	CO2	N2O	CH4
MC	Start (g/start)	1.86	0.0005	0.0005
	Running (g/km)	69,4	0	0.41
PC	Start (g/start)	11.9	0.004	0.42
	Running (g/km)	434	0.01	0.43
Paratransit	Start (g/start)	4.79	0.001	0.15
	Running (g/km)	406	0.01	0.58
Taxi	Start (g/start)	8.93	0.002	0.28
	Running (g/km)	288	0.01	0.54
Bus	Start (g/start)	37.8	0.01	0
	Running (g/km)	1,789	0.09	0
Truck*	Start (g/start)	15.4	0.001	0.067
	Running (g/km)	1,330	0.015	0.375

Source: Kimoanh et al (2018), \* Dewanto (2020), in GIZ (2020)

In 2019, the GHG emissions of road-based transport in Bandung were dominated by personal cars (PC) by 43% for CO<sub>2</sub> emissions and 55% for N<sub>2</sub>O emissions. While motorcycles contribute to 61% of CH<sub>4</sub> emissions. The calculations of GHG emissions in this sub-sector can be seen on the figure below.

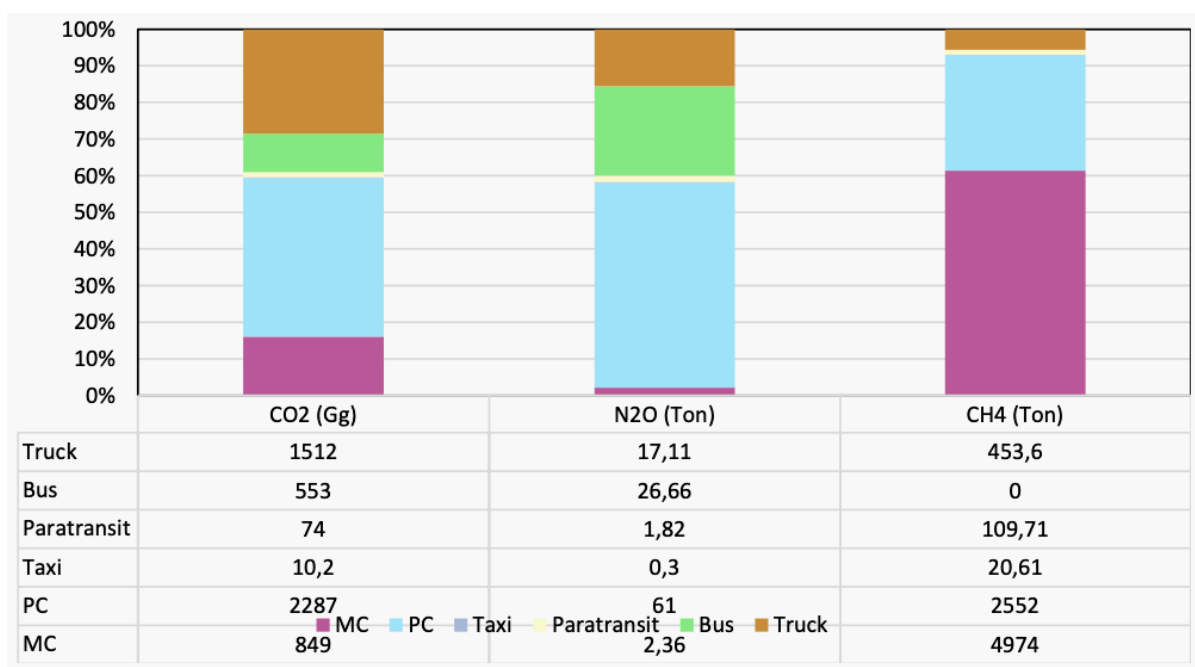


Figure 13: GHG Emissions in 2019 (GIZ, 2020)

### 3.1.10 Disaster Risk Profiles

Indonesia is one of the most disaster-prone countries in the world. With funding from the Global Facility for Disaster Reduction and Recovery (GFDRR), the World Bank has been working to develop guidelines for mass transit operators, planners, and engineers to incorporate climate change adaptation and disaster risk mitigation into the planning, design, and operation of mass transit systems. As part of this work, assessments were made of the natural hazards in the Bandung area. These hazards were quantified using published data on the topography, location, intensity, and frequency. Based upon these assessments, a series of Geographic Information System (GIS) maps were produced showing areas of Greater Bandung that are susceptible to each type of hazard. The segregated elements of the proposed BRT network in Bandung were then overlaid onto these maps, highlighting areas of the network that are at risk because of different natural hazards. Although, it should be noted that the study was based on an outdated version of the planned BRT network, so it only covers half of the current route.

Many types of natural hazard occur in Bandung, with flooding, earthquakes, and landslides being the most frequent, as shown in the figure below. However, the location of Bandung in the shadow of Tangkuban Perahu means that some volcanic risk exists. However, the topography and layout of Greater Bandung mean that different hazards occur in different places.

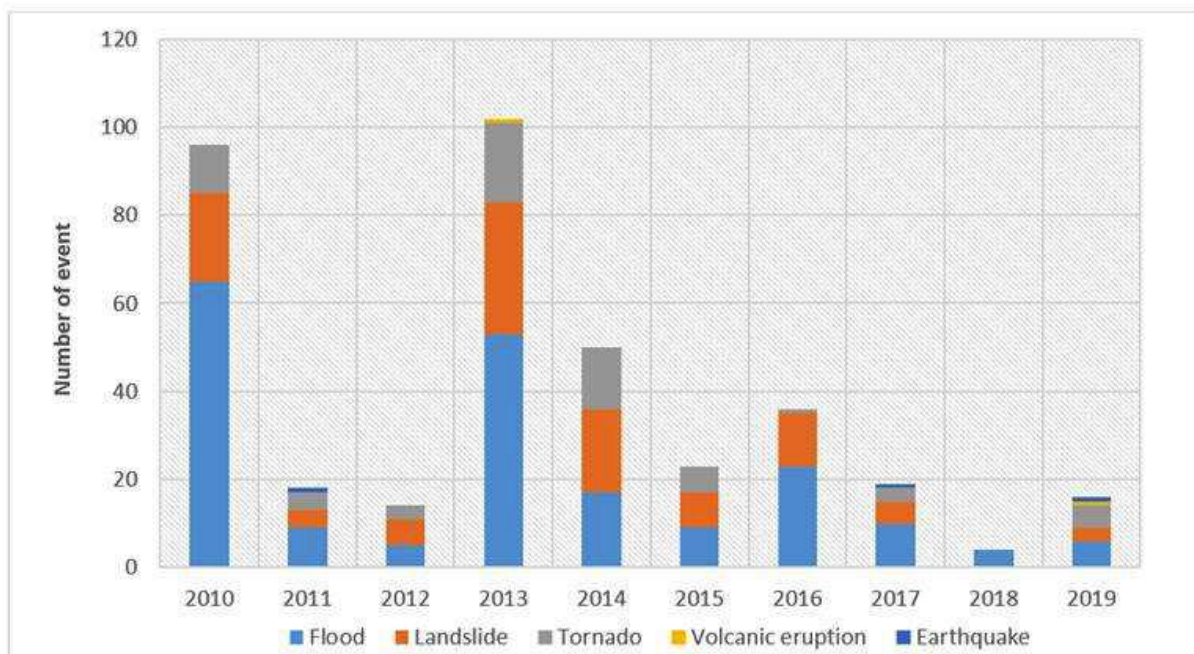


Figure 14: Occurrences of Natural Disasters in Bandung

Because the centre of Bandung lies in a bowl created by mountains to the north and south and the patterns of rivers running through the area, this area is most likely to experience

flooding, both flash flooding resulting from extreme rainfall, but also flooding resulting from accumulations of more normal rainfall. This means that much of the centre of the city and key elements of the proposed mass transit systems, lie within areas that are likely to flood regularly.

Landslides occur regularly in Greater Bandung, but because of their nature tend to occur on slopes and more raised areas. These tend to be on the outskirts of the city of Bandung, particularly to the south and west, in areas that are generally not affected by flooding. Whilst earthquakes can be a significant cause of landslides, in themselves they can create significant damage and disruption. Much of Greater Bandung is at high risk of earthquake damage, although the area to the south is less affected. Much of Greater Bandung is at high risk of earthquake damage, although the area to the south is less affected.

The impacts of volcanic eruption are two-fold, flows of lava along relatively well-known gullies and rivers, and the effect of ashfall, which can occur anywhere depending upon wind direction. The former risk is most prevalent relatively close to the volcano itself, meaning that in Bandung the risk is greatest in small parts of the north of the city (related to Tangkuban Perahu) and to the far south (related to Mount Wayang and Mount Galunggung). The city centre itself is generally unlikely to be affected. All of Greater Bandung is potentially at risk of ashfall.

The hazard exposure of the BRT network is summarised in the Table below. This shows the exposure to each type of hazard separately, as the locations are different, and the mitigation measures need to be considered independently.

*Table 18: Exposure Assessment for BRT Line*

<i>Proposed</i> Station Name	Exposure			
	Volcanic eruption	Landslide	Earthquake	Flood
Cikaso	Low	Low	High	Medium
Cicadas	Low	Low	High	Medium
Kiara Artha	Low	Low	High	Medium
Jl Jakarta	Low	Low	High	High
Bandung Juara	Low	Low	High	Medium

Kosambi	Low	Low	High	Medium
Simpang Lima	Low	Low	High	Low
Asia Afrika	Low	Low	High	Low
Naripan	Low	Low	High	Low
Panjunan	Low	Low	High	Medium
Cibadak	Low	Low	High	Medium
Kalipah Apo	Low	Low	High	Low
Kepatihan	Low	Low	High	Low
Alun-alun	Low	Medium	High	Low
Cikapundung	Low	Medium	High	Medium
Banceuy	Low	Low	High	Low

Source: ITP for World Bank, 2021

On 11-12 December 2021, a team did a street survey along the Bandung BRT route during heavy rain. Based on observations, there are relatively no flooded roads on the BRT line. However, during prolonged high rainfall, there can be temporary road flooding/puddles due to the sparse placement of the water outlet (from the road surface towards the channel); the distance from one channel outlet to the next is too far. In addition, the garbage problem also often hampers the flow of rainwater and causes puddles of water. The road surfaces around Andir Market, particularly Jl. Rajawali Timur and Jl. Sudirman, has a potential for surface flooding during a downpour. Other surface floodings are also observed in Jl. Otista/Kalipah Apo and Kiara Artha station.

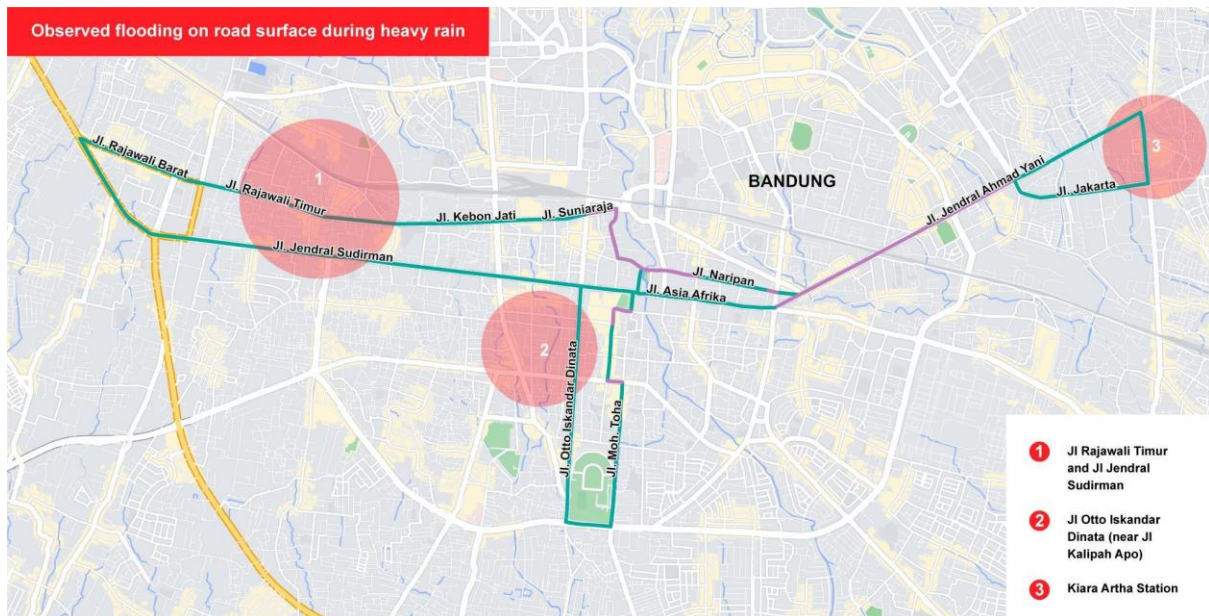


Figure 15: Map of observed road flooding/puddles location

The problem of flooding and road puddles in Bandung is caused by:

- Population growth and distribution, increasing demand of water for agriculture, households, and industry.
- Watershed damage: deforestation, agricultural practices, housing, etc
- Erosion and sedimentation
- Floods and droughts
- Water pollution (industry, agriculture practices, housing, etc)
- Soil degradation, land subsidence (exploitation of groundwater)
- Adaptation of institutional arrangements: role sharing, stakeholder participation

The Bandung city government efforts to reduce the risk of flooding and road puddles include:

1. Building a retention pool to ensure water does not immediately flow into the sea and fills groundwater instead.
2. Mapping flood areas every 2, 5, 25 and 50 years in the watershed that passes through the city of Bandung
3. Conducting assessment on river boundaries for any flood plain areas
4. Developing a strategy for implementing river border policies and regional spatial planning based on flood plain areas to realise river benefits and river protection to maintain the sustainability of river functions.

## 3.2 Social

This section describes the current socio-economic situation in the IMTSP area, namely Bandung City and Bandung Regency. The assessment is carried out based on secondary data from the previous rapid assessment, government statistics, and other relevant guidelines.

### 3.2.1 Demographics

Based on Statistics of Indonesia in 2020, of the 9 million population of BBMA, about 70% of the population live in Bandung City and Bandung Regency. The proportion of women and girls is around 49% in Bandung City and Bandung Regency. The population density in Bandung City is higher than Bandung Regency. Most of the population are in the productive age group of 15- 64 years old, respectively around 72% in Bandung City and 66% in Bandung Regency. The age dependency ratio (% of working-age population) in Bandung City and Bandung Regency is around 38% and 49%, respectively. The percentage of poor people in Bandung City has increased, from 3.38% in 2019 to 3.99% in 2020, and the percentage of the poor in Bandung Regency increased from 5.94% in 2019 to 6.91% in 2020. Significant work is still needed to accelerate the reduction of poverty in relation to achieving sustainable development goal 1 (no poverty) in 2030. Demographics are summarised in the table below.

*Table 19: Demographic of Bandung City and Bandung Regency*

Demographic	Year	Statistics	Bandung City	Bandung Regency
Population	2020	people	2,510,103	3,831,505
Female population	2019	% of population	49.61	49.38
People with disabilities	2018	people	1,571	1,531
Population density	2020	People per sq.km	14,970	2,167
Population growth	2019	annual %	0.09	1.49
Age structure				
0-14 years	2020	% of population	male 22.32 / female 21.71	male 28.71 / female 28.33
15-64 years	2020	% of population	male 72.49 / female 72.18	male 66.89 / female 66.58
65+	2020	% of population	male 5.19 / female 6.11	male 4.41 / female 5.1
Dependency ratio	2019	%	38.25	49.27
Percentage of poor people	2020	% of population	3.99	6.91
Regional minimum wage	2021	Rp per month	3,742,276.48	3,241,929.67

Source: Statistics of Bandung City and Bandung Regency

The Bandung City and Bandung Regency are located in West Java Province dominated by Sundanese ethnic groups (please see Figure 16).

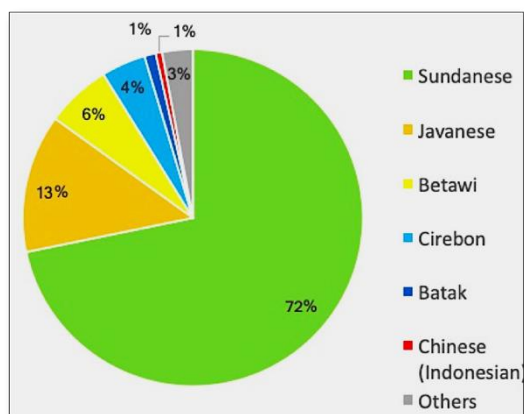


Figure 16: Ethnic Groups in West Java Province (Author's construct based on BPS 2011)

### 3.2.2 Education and Health

The table below provides a snapshot of the education and health status of the population in Bandung City and Bandung Regency. In Bandung City, the average years of schooling for the over 25s is 10.39 years for women and 11.09 years for men. Gender inequality in education also exists in the Bandung Regency. The average years of schooling for the over 25s in Bandung Regency is 8.35 years for women and 9.21 years for men. More efforts are required to eliminate gender disparities in education (Goal 4.5) by 2030.

Life expectancy at birth in Bandung City is 71.14 years for males and 75.75 years for females. Meanwhile, the average life expectancy in Bandung Regency was 73.40 years (71.04 for males and 74.98 for females). The under-five mortality rate for Bandung City and Bandung Regency is 0.36 and 2.96 deaths per 1,000 live births, respectively. The maternal mortality ratio for Bandung City and Bandung Regency was at 53 and 64 deaths per 100,000 live births, respectively.

Table 20: Education and Health Profiles of Bandung City and Bandung Regency

	Year	Statistics	Bandung City	Bandung Regency
Average years of schooling, male	2019	years	11.09	9.21
Average years of schooling, female	2019	years	10.39	8.35
Life expectancy at birth				
total population	2019	years	74.14	73.40
male	2017	years	71.78	71.04
female	2017	years	75.75	74.98
Under-five mortality rate	2017	per 1,000 live births	0.36	2.96
Maternal mortality rate	2017	per 1,000 live births	53	64

Source: Statistics of Bandung City, Bandung Regency, and West Java Province

The Ministry of Education has set the maximum number of students per classroom: 32 students for SD/MI and SMA/MA/SMK, and 36 for SMP/MTs.<sup>8</sup> Table 21 shows that the average number of students per class at primary level in Bandung City and Bandung

Regency is slightly higher than the National Education Standards. Also, the number of senior high school students per class in Bandung Regency slightly exceeds the maximum class size.

Table 21: Number of Schools, Average Students per Classroom, and Student-Teacher Ratio by Level of Education in Bandung City and Bandung Regency in 2019

	<b>Bandung City</b>	<b>Bandung Regency</b>
<b>Primary school</b>		
Number of primary school ( <i>SD+MI</i> )	525	1,622
Average student per classroom, excluding <i>MI</i>	37	38
<b>Middle school</b>		
Number of junior high school ( <i>SMP+MTs</i> )	300	538
Average student per classroom, excluding <i>MTs</i>	28	34
<b>High school</b>		
Number of senior high school ( <i>SMU+MA</i> )	175	229
Average student per classroom, excluding <i>MA</i>	28	33
<b>Vocational high school (<i>SMK</i>)</b>		
Number of vocational high school ( <i>SMK</i> )	125	179
Average student per classroom	29	31
<b>Number of Universities</b>	<b>107</b>	<b>5</b>

Source: Statistics of West Java and Dapodik, Education Office of West Java, 2019

Official statistics provide the number of health facilities in Bandung City and Bandung Regency (Table 22 ). Based on the 2019 Health Profile of Bandung City, the total number of hospital beds was around 5,421, equivalent to approximately 2.12 beds per 1,000 population.<sup>9</sup> Meanwhile, Bandung Regency requires at least 3,700 hospital beds, but only 1,200 beds are available currently.<sup>10</sup> Hospital beds are used to indicate the availability of inpatient services. There is no data for the number of beds in Puskesmas and Clinic. Although there is no global norm for the density of hospital beds in relation to population, the WHO's recommended standard of 5 beds per 1,000 population.

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

<sup>8</sup> 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.

<sup>9</sup> Dinas Kesehatan Kota Bandung. (2019). Profil Kesehatan Kota Bandung. <https://dinkes.bandung.go.id/wp-content/uploads/2020/09/Profil-Kesehatan-Kota-Bandung-Tahun-2019.pdf>

<sup>10</sup> Rizka, M. (2019). Pasien Membludak Buat RS di Bandung Kekurangan Tempat Tidur. <https://jabarnews.com/read/75223/pasien-membludak-buat-rs-di-bandung-kekurangan-tempat-tidur>

Table 22: Number of Health Facilities in Bandung City and Bandung Regency in 2018

	<b>Bandung City</b>	<b>Bandung Regency</b>
Health Center ( <i>Puskesmas</i> )	80	62
Clinic ( <i>Balai Pengobatan</i> )	212	56
Integrated Service Post ( <i>Posyandu</i> )	1,983	4,294
Hospital	35	8

Source: Statistics of West Java, 2018

Based on the survey conducted in December 2021, there are around 5 hospitals observed near the Bandung BRT route in Jl.Rajawali Timur, Jl.Kebon Jati, and Jl.Lembong, and there is only one school in Jl.Rajawali Barat, which may experience direct impact such as to their access due to the construction of BRT.

### 3.2.3 Employment and Livelihood

In Bandung City, jobs are mainly in the 'Trade, Restaurant and Hotel' sector (43%, further detail please see Figure 17). The poverty rate in the city is 3.57% (BPS 2019a).

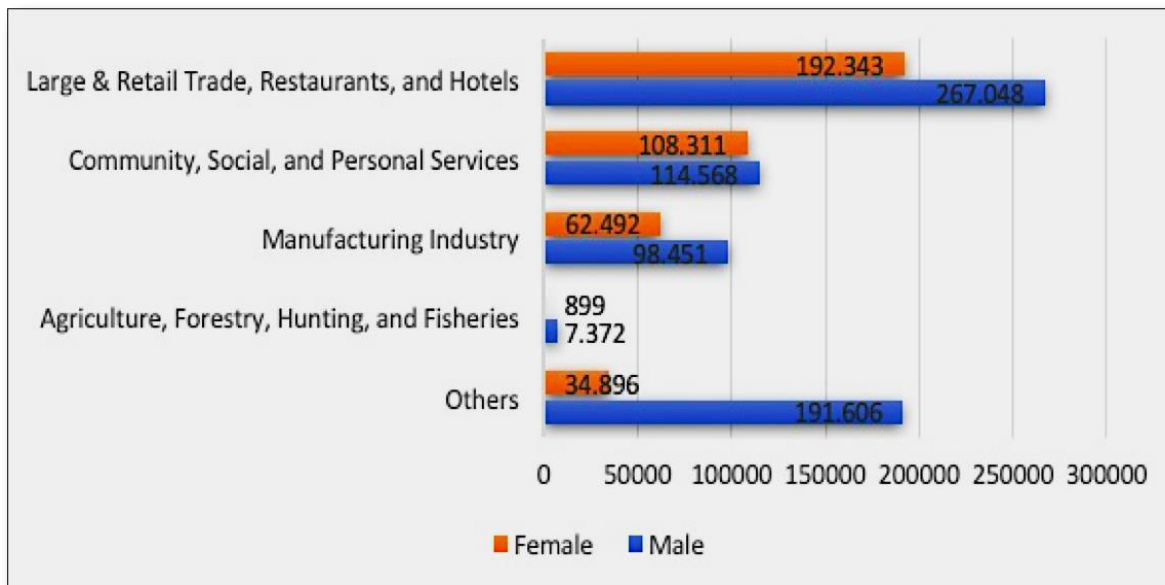


Figure 17: The Main Occupations in Bandung City 2018 (Author's construct based on BPS 2019a)

The table below shows that in 2019 the labor force participation rate in Bandung City and Bandung Regency was estimated at 65.98% and 65.38% respectively. In the same period, the majority of employees in Bandung City and Bandung regency were active in the services sector, followed by industry and agriculture. Meanwhile, the open unemployment rate was estimated at 11.19% in Bandung City and 8.58% in Bandung Regency. The minimum wage in Bandung City and Bandung Regency is higher than the provincial minimum wage (IDR

1,810,350 per month). Informal employment in the Bandung Regency was highest in the agriculture sector.

*Table 23: Labor Force Employment of Bandung City and Bandung Regency*

	<b>Year</b>	<b>Statistics</b>	<b>Bandung City</b>	<b>Bandung Regency</b>
Labor force participation rate	2019	years	65.98	65.38
Open unemployment rate	2020	%	11.19	8.58
Formal labor	2020	%	N/A	44.41
Labor force, by occupation				
Agriculture	2019	%	0.5	8.7
Industry	2019	%	22.8	42.9
Services	2019	%	76.7	48.4
Informal agriculture sector employment	2020	%	N/A	88.86
Non-agriculture sector informal employment	2020	%	N/A	48.82
Regional minimum wage	2021	Rp per month	3,742,276.48	3,241,929.67

Source: Statistics of Bandung City, Bandung Regency, and West Java Province

The spread of the commercial facilities can be seen in the figure below.

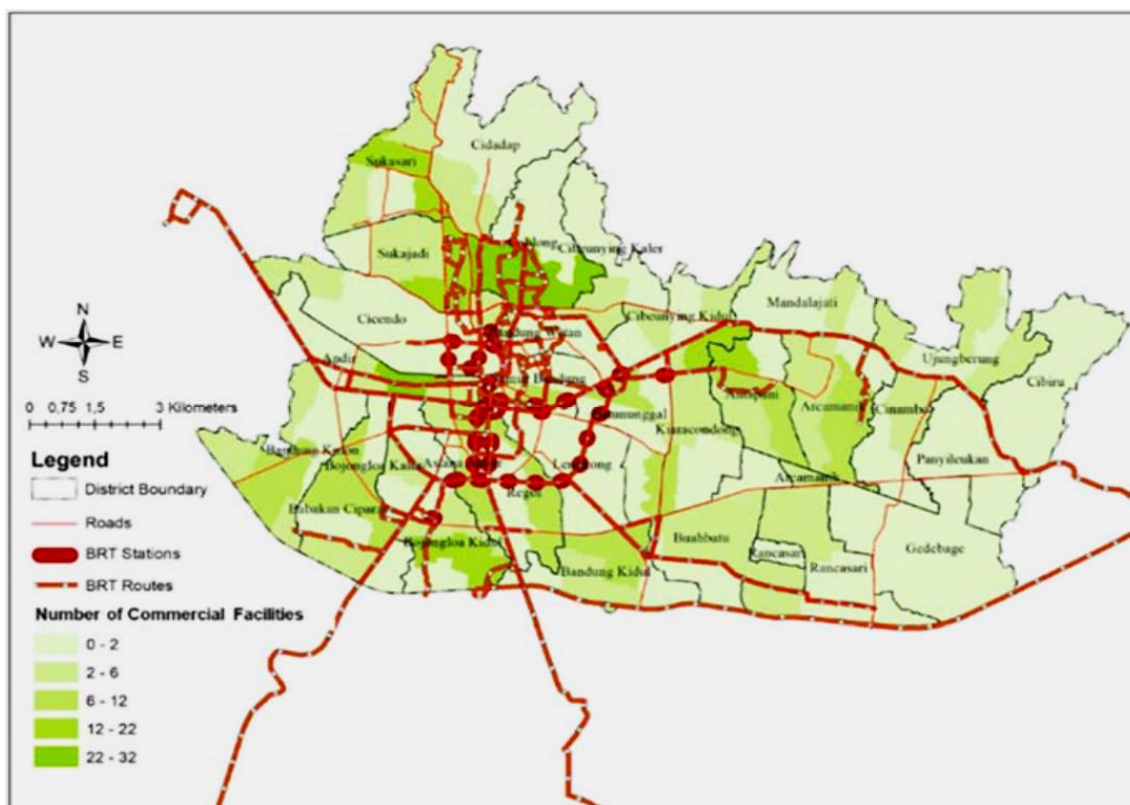


Figure 18: Distribution of commercial facilities across sub-districts. (BPS, 2019 in GIZ, 2020)

### 3.2.4 Access to Employment, Community Facilities, Education

In the form of trips to work, to education, to health and recreational facilities, there are 3,273 activities that are mobility generators within the BBMA. The majority are to educational facilities (32%), cafes/restaurants (23%), and offices (19%). Most are located in Bandung City. The following table is a general picture of citizen mobility by type of activity within the BBMA.<sup>11</sup>

Table 24: Mobility Generators within the BBMA

Type of Activity	Number of Activities	%
Shopping Malls	48	1%
Shopping Centers	44	1%
Convenience Stores	365	11%
Traditional Markets	78	2%
Offices	614	19%
Educational Facilities	1,060	32%
Health Facilities	255	8%
Tourist Attractions	64	2%
Cafes and Restaurants	745	23%
<b>Total</b>	<b>3,273</b>	<b>100%</b>

Source: The

World Bank, 2020

<sup>11</sup> The World Bank. (2020). Op. cit

However, it is noted that the accessibility to employment in the BBMA by public transportation is poor. Of the 3.77 million jobs in the BBMA only 1 million jobs (27%) can be reached by walking and public transport within 60 minutes from Bandung Station; 1.5 million jobs (40%) can be reached within 90 minutes; and 1.75 million jobs (46%) can be reached within 120 minutes.<sup>12</sup> The poor quality of public transport service poses a challenge for Bandung citizens in accessing employment opportunities in BBMA because of the relatively long travel time. A study in Southern Sweden revealed that car and public transport commutes exceeding 30 min are associated with increased everyday stress, lower vitality, and perceived poor sleep quality.<sup>13</sup>

The accessibility of public facilities also can be seen from the average travel time from a sub-district to other sub-districts as seen in Figure 19 . Based on the BRT Feasibility Report (GIZ, 2020), the average travel times between sub-districts in Bandung are within 7–21 minutes, with the highest accessibility sub-districts located in the centre of the city and within the area of influence. However, this estimation does not consider congestion effects. Furthermore, the potential accessibility for each facility type (schools, health facility, commercial facility) can be seen in the BRT Feasibility Report (GIZ, 2020).

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<sup>12</sup> The World Bank. (2020). Op. cit

<sup>13</sup> Hansson, E., Mattisson, K., Björk, J., Östergren, P. O., & Jakobsson, K. (2011). Relationship between commuting and health outcomes in a cross-sectional population survey in southern Sweden. *BMC Public Health*, 11(1), 834. DOI: 10.1186/1471-2458-11-834

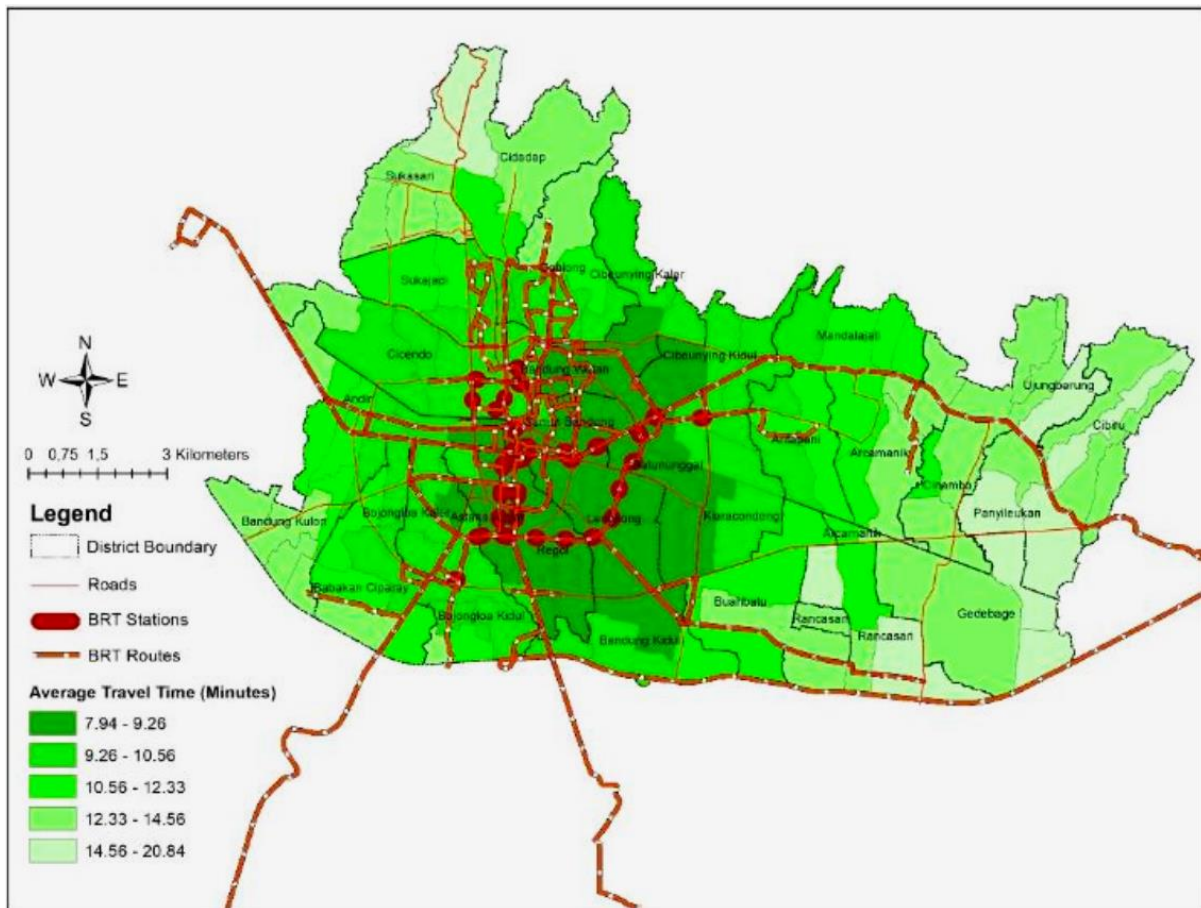


Figure 19: Average travel time between sub-districts by road transport. (GIZ, 2020)

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.<sup>14</sup>

In relation to the public policy for street vendors, 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:<sup>15</sup>

- Structuring street vendors by relocating them to designated locations;
- Coaching of 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.

<sup>14</sup> Tarigan, Ari K.M., Saut Sagala, D. Ary A. Samsura, Dika F. Fiisabilillah, Hendricus A. Simarmata, Mangapul Nababang. 2016. City Profile: Bandung City, Indonesia, Cities 50 (2016) 100–110 Elsevier B.V., Amsterdam.

<sup>15</sup> Salim, W., Drenth, M., An Nisaa’ Siti Humaira, Rifai, A., Handayani, R. and Histiraludin, S. 2018. Access to Urban Services for Inclusive Development in Asia. Country Monograph: Indonesia. The East-West Center

The Corridor is on grade and the Stations will be constructed on the median or shoulders of the road. On several routes, the BRT Buses will mix with other vehicles. The construction will have a temporary impact on street vendors at Jl. Otto Iskandar Dinata ( $\pm$  50 street vendors); at Jl. Sudirman and Jl. Rajawali Barat (Andir and Ciroyom Traditional Market) where the vegetable street vendors open between 8.00 PM-7.00 AM (about  $\pm$  50-60 vendors spill onto the streets outside the market)

### Specifics on the BRT Route

During the construction, the planned renovation of several pavements along the route will negatively impact and potentially displace local business activities currently occupying those pavements and roadsides, such as street vendors and street parking. Road vendors in Bandung are commonly categorised as mobile road vendors (*'gerobak dorong'* so they can move around) and ones in a small shop/ stall (*'warung/ toko kecil'*). As the activity of the project involves road widening and construction of bus station, there will be impact on road vendors during and post-construction (operation of BRT). It is expected that overall, shops along the routes are more likely to be positively impacted during BRT operations (as BRT would allow more shoppers to visit the areas). For mobile road vendors who may need to be relocated as BRT rail would be built where they operate, the city of Bandung will provide alternative locations for mobile vendors to continue their vending activities and raise income and avoid installing BRT tracks on existing road curb parking spots to avoid impact, or provide alternative locations. For permanent shops along the routes, no negative impact other than loss of assets is expected, which will be mitigated with compensation at replacement value. During DED processes, all potential mitigation measures including avoidance of BRT tracks where existing businesses operate would be explored and consulted with the affected business entities. Detailed impact assessment on road vendors will be conducted as the Detailed Engineering Design is finalised. The final impact assessment on road vendors and options for mitigation measures will be presented in the final ESIA.





Figure 20: Street vendors and street parking currently occupying pavements and roadsides along the BRT route

### 3.2.5 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.

As noted in Chapter 2, there are several regulations and policies requiring consideration of public facilities' accessibility for those with specific needs, such as people with disabilities and the elderly. These are intended to provide a clear vision and guidance as to how national and subnational bodies ought to conduct their activities whilst having regard for inclusive development. The first step in the implementation of national-level regulations and policies

is typically through the enactment of mirroring local regulations. The Regional Government (West Java Province and Bandung City) shows their 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 Fulfilment of the Rights of People with Disabilities.

The World Bank acknowledges that Bandung City has adopted Universal Design concepts that addresses these needs by employing tactile, visual, and audible design elements together to guide people of all abilities through the urban environment. Consistently using detectable surfaces, color contrast, and audible warnings assists all users, enhancing safety and accessibility. For the design of pedestrian facilities, Bandung City has developed a network of Universal Design based footpaths throughout the Central Business District.<sup>16</sup>

The Bandung City Government has reported that Trans Metro Bandung has two buses that are friendly to People with Disabilities (PwD), which have been operating since 2018.<sup>17</sup> In 2020, Damri started operating 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.<sup>18</sup>

### **3.2.6 Townscape**

Bandung is the capital of West Java province and the third-largest city in Indonesia after Jakarta and Surabaya. Bandung has a strategic location 150 km southeast of Jakarta, Indonesia's capital, and is part of the south Java main transportation route. It has an area of 168 km<sup>2</sup> and a population of 2,510,103 inhabitants bringing the density of Bandung to 14,970 people/km<sup>2</sup>.

Bandung is recognized for its large number of old Dutch architecture buildings. Gedung Sate is an iconic and historic building in the city centre. The building is used as the centre of the activity of the West Java Province Government.

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<sup>16</sup> The World Bank. (2020). Bandung Basin Metropolitan Area Urban Mobility Strategy and Action Plan: Volume 1. Unpublished.

<sup>17</sup> Humas Kota Bandung. (2019). Bus Ramah Disabilitas Segera Beroperasi di Kota Bandung. <https://humas.bandung.go.id/layanan/bus-ramah-disabilitas-segera-beroperasi-di-kota-ba>

<sup>18</sup> Sesper. (2020). Damri Operasikan Bus Scania Low Deck Ramah Lansia, Difabel dan Lingkungan. <https://damri.co.id/artikel/damri-operasikan-bus-scania-low-deck-ramah-lansia-difabel-dan-lingkungan.html>

According to Bandung Mayor's Decree No. 648/Kep.286-DisTarCip/2015 concerning the establishment of informal settlements and housing environment locations, the slums areas in Bandung in Bandung City is around 1,457.45 ha (8.7% of Bandung total area), which are sporadically spread among different areas, such as Terminal Cicaheum, Kiara Condong, Cicadas, Tegallega, and Astana Anyar. A total of 121 out of 151 urban villages (kelurahan) are classified as slums.<sup>19</sup> The density of buildings in the slum area is more than 50 units/ha. More than 70% of the buildings are residential.<sup>20</sup> This high density may decrease the environmental quality.

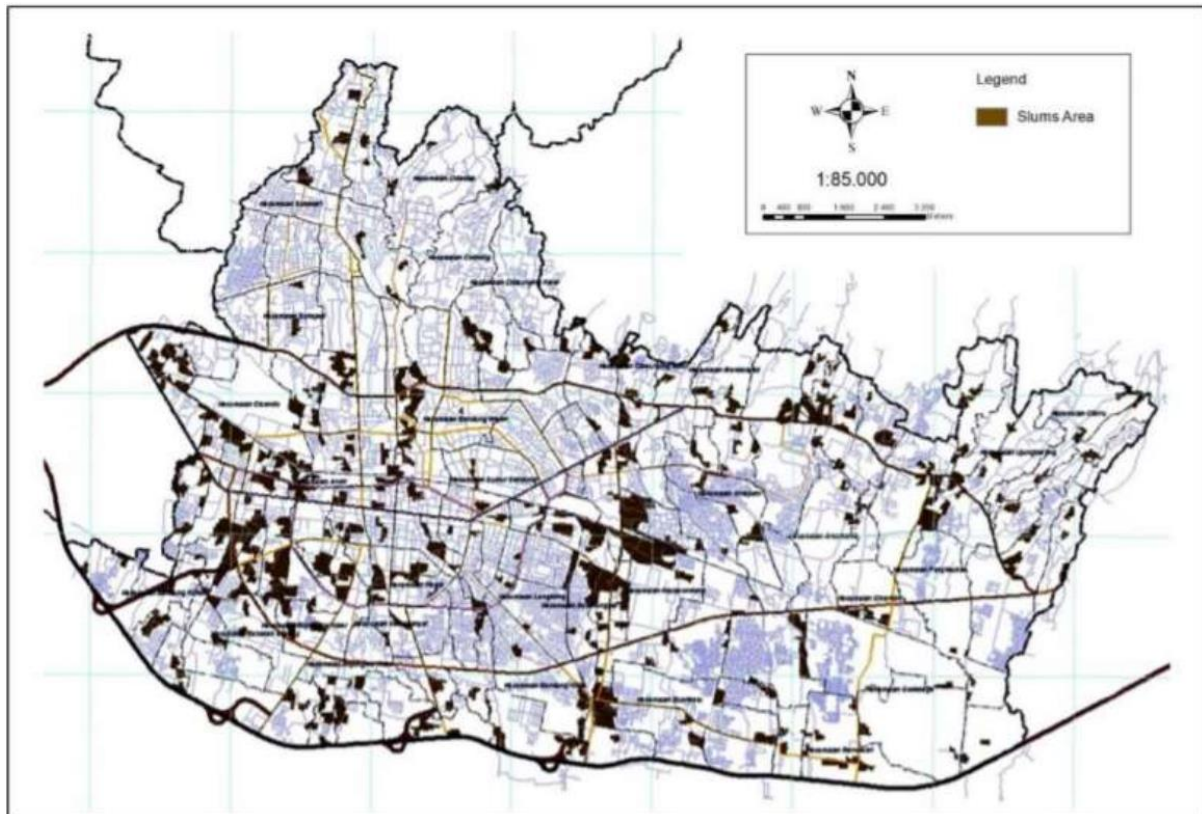


Figure 21: Slum Area in Bandung City (Housing and Settlement, Land and Landscaping Agency of Bandung City, 2017)

Based on the 2015 data from the Garden and Funeral Office of Bandung, Bandung has 14.42% (2,077.82 Ha) green open space of the total area of Bandung.<sup>21</sup> Even though the Law of Spatial

<sup>19</sup> Perkim.id. (2020). Profil Perumahan dan Kawasan Permukiman Kota Bandung. <https://perkim.id/pofil-pkp/profil-kabupaten-kota/profil-perumahan-dan-kawasan-permukiman-kota-bandung/4/>

<sup>20</sup> Maula, F.K., Choerunnisa, D.N & Akbar, R. (2019). Mapping Informal Settlements Using Geospatial Method. IOP Conference Series: Materials Science and Engineering, Volume 385. Doi: :10.1088/1755-1315/385/1/012035

<sup>21</sup> Fidowaty, T., Nazsir, N., Suwaryo, U & N.A, Deliarnoor. (2017). Policy Implementation of Green Space in Bandung City Seen From Power, Interest and Strategies of Actor Involved Factor (Study About Park and City Forest). Advances in Social Science, Education and Humanities Research, vo. 141. Doi: 10.2991/icoposdev-17.2018.17

Planning No. 26 of 2007 of the Republic of Indonesia stipulates that 30% of urban areas must consist of green open space (public green space by 20% and private green space by 10%).

The west of Bandung City is mainly used for industrial and residential uses. Husein Sastranegara International Airport and the aircraft industry are here. This region is also connected to the industries in Cimahi and Padalarang, and the residential area in Kota Baru Parahyangan. Meanwhile, the east of Bandung contains middle-class residential areas in the vast area.

Northern Bandung contains residential areas, universities, and malls such as Paris Van Java mall and Bandung Trade Center. There are multiple attractive recreation sites such as Dusun Bambu, Vila Istana Bunga, Lembang, Maribaya Waterfall, The Peak, Kafe Bunga, Curug Tilu Waterfall, Ciwangun Indah Camp, and Curug Pelangi Waterfall. Several spots, cafes, and restaurants have mountainous tropical rainforest views here.

The South of Bandung is dense with residential, business, and industrial areas. The majority of the area is not a tourist area except for select attractions like the shoe production centre in Cibaduyut. The area houses a sizable textile and garment industry and this is the main industry in the Bandung area.

Bandung downtown is located at the intersection of the area between Cibeunying, Karees, Tegallega, and Bojanegara. The most overcrowded area is found in Cibeunying Subdistrict, while the highest population is in Tegallega Subdistrict, and the densest area is in Karees Subdistrict.<sup>22</sup> More than half of the land is used for residential purposes.

Bandung is also well-known as the Paris Van Java (Paris of Java). Jalan Braga, Cibaduyut, Cihampelas, and R.E Martadinata (formerly Jalan Riau) are popular with plenty of factory outlets or distros and are major commercial areas in Bandung.

In 2017, Bandung City Government has developed Cihampelas Terrace (or also called Skywalk Cihampelas) with the aim to overcome traffic jams that often occur in Cihampelas Bandung street. Before it was built, the area of Cihampelas Highway was congested because of the many street vendors selling by the roadside. But since the introduction of Cihampelas Terrace, the street vendors have been relocated up on the pedestrian path. Cihampelas Terrace has a height of 4.6 meters from the Cihampelas Highway and 450 meters long and 9 meters wide.<sup>23</sup> The proposed routes do not run along the Cihampelas Highway but this provides an example

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<sup>22</sup> Paramita, B. (2016). The land-use of Bandung, its density, overcrowded area and public facility toward a compact city. IOP Conference Series: Materials Science and Engineering, Volume 128. Doi: 10.1088/1757-899X/128/1/012034

<sup>23</sup> Explore Bandung Barat.com. (n.d). Teras Cihampelas – Ikon Baru Kota Bandung. <http://explorebandungbarat.com/teras-cihampelas-ikon-baru-kota-bandung/>

of how the government is alleviating traffic on some other roads in the area.



Figure 22: Cihampelas Terrace (<https://fourstar-holiday.com/> and @jamil\_sunda on instagram)

### 3.2.7 Cultural Heritage

Cultural heritage is an integral part of a peoples' and 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 utilisation of cultural heritage in Indonesia.

At the regional level, Bandung City Regulation No. 7 of 2018 on Cultural Heritage Management clearly states that cultural heritage buildings are prohibited from being demolished and/or changed, particularly cultural heritage building type A (article 44). The cultural heritage building type B is prohibited from being demolished, meanwhile, rehabilitation and revitalization are allowed without changing the character of the building (article 45). Only cultural heritage building type C can be changed for other functions according to the spatial plan (article 46). In total, 1,759 cultural heritage buildings and 70 sites are spread across 24 areas in Bandung City.<sup>24</sup> Therefore, any alternative that would result in cultural heritage buildings being demolished and/or changes would need to be identified as early as possible.

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<sup>24</sup> <https://www.pikiran-rakyat.com/bandung-raya/pr-01321609/birokrasi-buruk-jadi-kendala-penyelamatan-cagar-budaya-di-kota-bandung#:~:text=Berdasarkan%20Perda%20Kota%20Bandung%20No,26%20struktur%20di%2024%20kawasan>

No specific or official heritage map has been created for assessment as part of the BRT project routing yet. There are several cultural heritage sites/structures near the BRT corridor in Jl. Asia Afrika, Jl. Sudirman, Jl. Braga (including Cikapundung River Park Area), and Balai Kota area. However, the planned corridor will be on grade while the stations' design could be adjusted as to not disturb/minimize any disturbances to the cultural heritage sites/structures.

### **3.2.8 Indigenous Peoples**

The Indonesian Government considers most Indonesians to be indigenous, there are also distinct communities with the same ancestral lineages who inhabit a certain geographical area and have a distinctive set of ideological, economic, political, regulatory, cultural, and social systems and values. In Bahasa Indonesia they are referred to as *Masyarakat Adat* or *Masyarakat Hukum Adat* (communities governed by custom).

The existence of indigenous peoples is recognized in the Constitution, namely in Article 18 and its explanatory memorandum. It states that in regulating a self-governing region and *adat* communities, the government needs to respect the ancestral rights of those territories. After amendments, recognition of the existence of *adat* communities was provided in Article 18 B Para. 2 and Article 28 I Para. 3. Indonesia has not yet ratified ILO Convention 169 on Indigenous Peoples.

There are some identified indigenous people or historically marginalised ethnic groups in the West Java Province. Based on the Tourism and Culture Agency of West Java Province, there are at least eight indigenous villages<sup>25</sup> spread in the province. Among them, two villages are in Bandung Regency, which is Kampung Cikondang (in Pengalengan District) and Kampung Mahmud (in Margaasih District). More detailed analysis showed that the IPs are living in regencies of Garut and Tasikmalaya (Desa Adat Pulo and Kampung Naga), about 75 Km and 130 Km from Bandung city. So, it is not relevant for this project.

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<sup>25</sup> West Java Province data for the Indigenous villages 2009 is available at <http://www.disparbud.jabarprov.go.id/wisata/fupload/Data%20Kampung%20Adat%20di%20Jawa%20Barat.pdf>



Figure 23: Kampung Mahmud and Kampung Cikondang locations (Mitchell, L & Streitferdt, V., 2020)

### 3.2.9 Gender and Social Inclusion

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 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 Figure 24 highlights, 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.

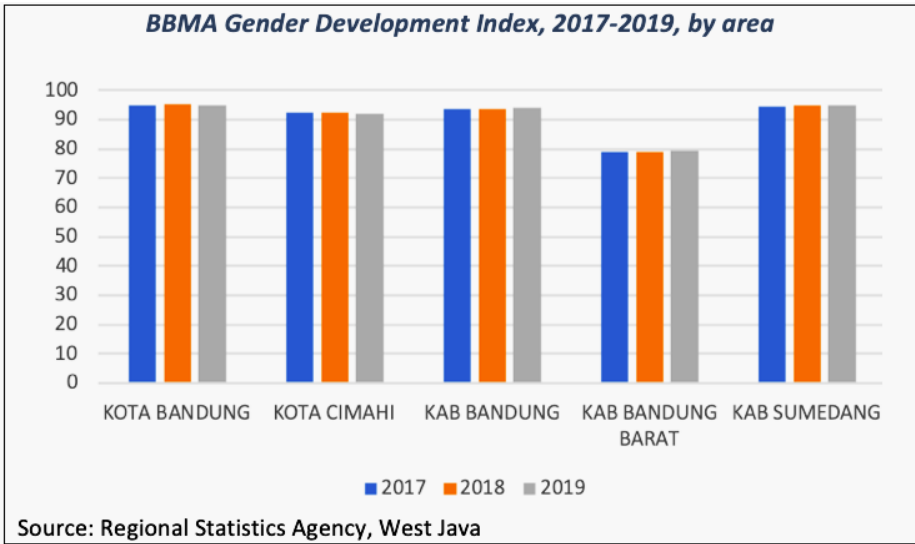


Figure 24: BBMA Gender Development Index 2017–2019 (Source: Regional Statistics Agency, West Java, in GESI report, 2021)

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, 2,738 women in West Java were victims of violence.

**3.2.10 Sexual Exploitation, Abuse & Harassment**

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, WB, 2021, p. 7).

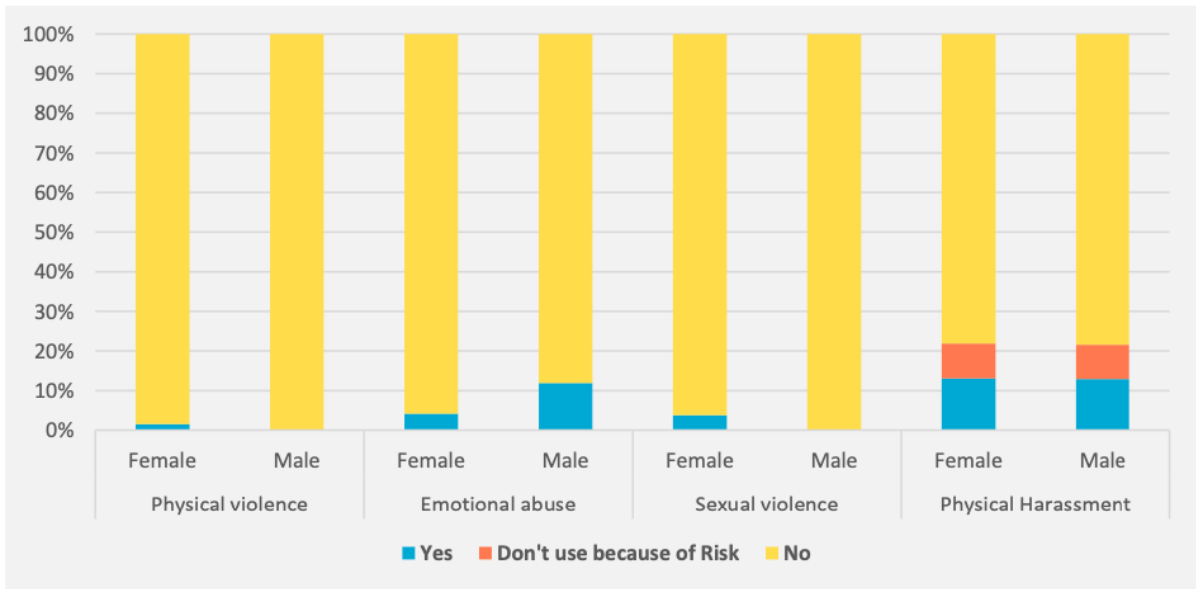


Figure 25: GESI Survey Results—Experience when using Public Transportation—By Gender (GESI Report, WB, 2021, p. 16)

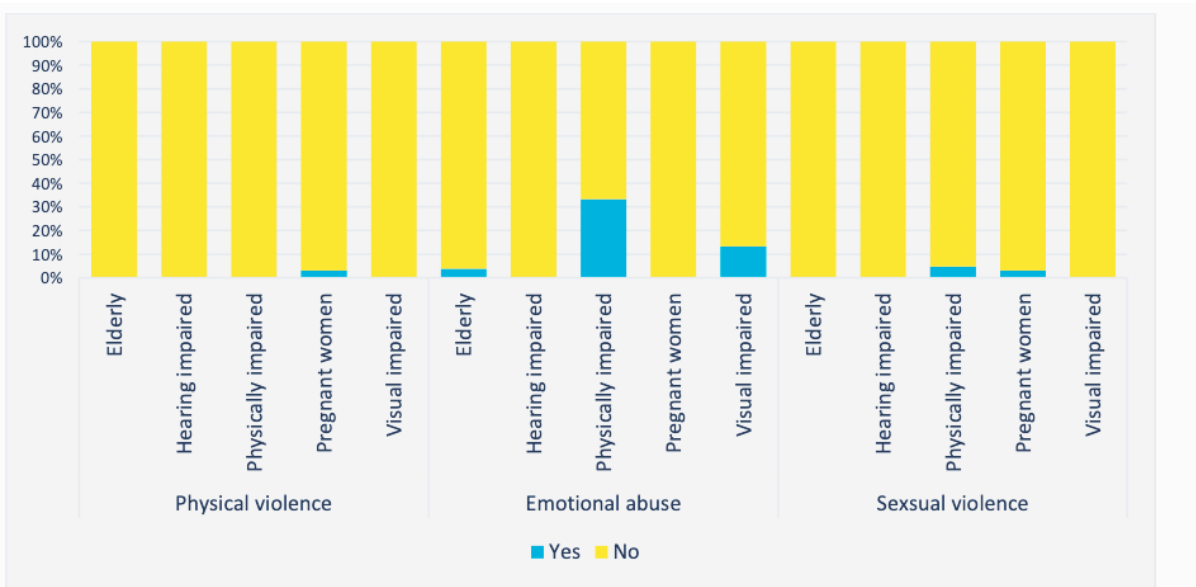


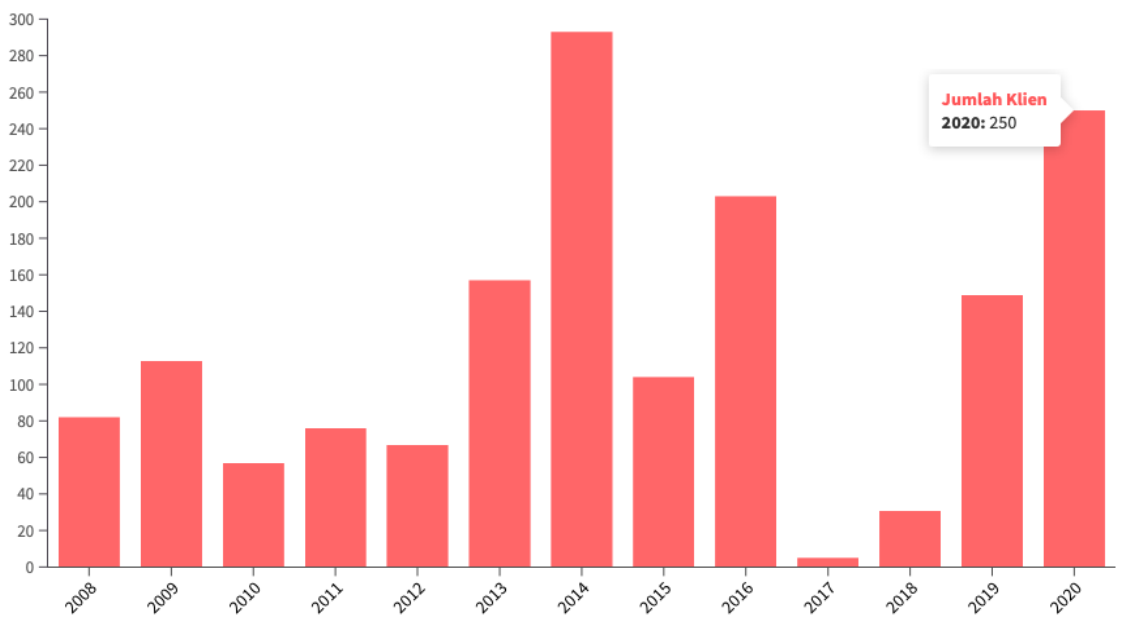
Figure 26: GESI Survey Results—Experience when using Public Transportation—By Mobility Impaired Respondents (GESI Report, WB, 2021, p. 17)

Moreover, 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 indicate a high level of feeling of safety during daytime activities. Females feel less safe than males in most situations. Similarly, people feel less safe during nighttime activities (two to three times more). It seems that safety should be a primary concern of government and civil authorities as the share of individuals feeling unsafe at night is substantial (GESI Report, WB, 2021, p. 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) 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.



Source: Open Data Kota Bandung Diskominfo, Dok. Dinas Pemberdayaan Perempuan dan Anak (DP3A) Kota Bandung, BPS Kota Bandung, Dok. Kota Bandung Dalam Angka 2020-2021 **BandungBergerak.id** Memhat indomedia dari Ibu Kota Asia Afrika

Figure 27: Number of GBV cases from 2008 -2020 from Open Data Kota Bandung Diskominfo, Women empowerment and Child Protection of Bandung City.

### 3.3 Conclusions

Some important environmental and social baseline data have been established. However, still missing are 1) Noise level modelling; 2) Water quality measurements; 3) Utilities survey; 4) Census of affected businesses and households during construction and operation; and 5) Updated indigenous village mapping.

## IV - POTENTIAL IMPACTS

Impact identification was conducted by taking an inventory of the various impacts that are expected to occur. This inventory was conducted by considering the activities' stages, environmental conditions, and previous related studies.

The potential impacts during the construction phase of the BRT include an influx of project workers from outside, traffic/project incidents, and conflict between local people and project workers, while the potential impact during BRT operation includes traffic incidents and manner/conditions.

The final design will be the result of the supervision consultant, including the review from an E&S specialist. The supervision consultant will be hired before any activity commences, including procurement. The activity components for construction and operation stages are presumed to be as shown below.

*Table 25: List of Development Phases*

Pre-Construction Phase	Construction Phase	Operation Phase
<ul style="list-style-type: none"> <li>Land clearing</li> </ul>	<ul style="list-style-type: none"> <li>Construction permitting</li> <li>Land preparation</li> <li>Manpower mobilisation</li> <li>Equipment and materials mobilisation</li> <li>Construction of bus stations, dedicated bus lanes, and supporting facilities</li> </ul>	<ul style="list-style-type: none"> <li>Operational manpower recruitment</li> <li>Operation of the infrastructure and facilities</li> <li>Maintenance of the infrastructure and facilities</li> </ul>

The BRT development impacts will be identified according to environmental and social variables, as described below. Some cumulative impacts generated from several impacts will also be discussed in this chapter.

### 4.1 Potential Environmental Impacts

Table 26 presents an overview of the types of potential environmental impacts that could result from the BRT upgrade works during each phase of the project. It serves as a preliminary screening of impact issues for each stage of activity, and is a basis for further analysis, which also informs the GOI and WB as to what additional data and analyses are required.

Table 26: List of Environmental aspects affected in each of the Project Phases

Environmental Aspects	Pre-Construction Phase	Construction Phase	Operation Phase
<b>Air quality</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS3 Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]		v	v
<b>Noise level</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS3 Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]		v	v
<b>Groundwater</b> [ESS3 Resource Efficiency & Pollution Prevention & Management]		v	
<b>Surface water</b> [ESS3 Resource Efficiency & Pollution Prevention & Management]		v	v
<b>Biodiversity (including vegetation)</b> [ESS6 Biodiversity Conservation & Sustainable Management of Living Natural Resources]		v	v
<b>Urban landscape</b> [ESS6 Biodiversity Conservation & Sustainable Management of Living Natural Resources]		v	v
<b>Waste management</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS3 Resource Efficiency & Pollution Prevention & Management;		v	v
<b>Resource efficiency</b> [ESS3 Resource Efficiency & Pollution Prevention & Management]		v	v
<b>Utilities and infrastructure</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS4 Community Health & Safety;	v	v	v
<b>GHG</b> [ESS3 Resources efficiency & Pollution prevention and Management and	v	v	v

ESS 4 on Community Health and Safety]			
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Table 27: Environmental Risk Matrix for Bandung BRT Development

Environmental Aspects	Description of Identified Risks and Potential Impacts		
	Pre-Construction Phase	Construction Phase	Operation Phase
Air quality		Minor and temporary impacts will occur on local air quality during construction. Ambient air quality might be worsened by construction equipment and heavy machinery for the track's work. Dust from powered mechanical equipment supplies crushed rock and asphalt. Fumes from asphalt chemicals such as phenol compounds from bitumen could cause breathing issues.	The operation of transportation modes is expected to generate a reduction in air pollutant emissions; since it is expected that many people will switch to using mass transportation, thereby reducing private vehicles usage and traffic congestion which is based on fossil fuel consumption.
		The use of machines during the construction phase such as generators, backhoes, etc. will emit air pollutants (i.e. NO <sub>x</sub> , SO <sub>2</sub> , PM, CO). Earth surface disturbance activity will likely emit particulates (PM <sub>10</sub> ) which may affect the local visibility and health.	BRT maintenance activity centralised at Depots will affect the environment. Painting activity will affect air quality due to the solvent used and volatile organic compounds that will be emitted to the air.
Noise level		Minor and temporary impacts will occur during construction. Increased noise level due to the operation of equipment and heavy machinery, for road cutting, excavation, demolition of permanent structures along the route and as pylons for stations are drilled into the ground, will cause noise pollution around the project location.	The operation of transportation modes will generate increased noise levels in the surrounding area.
		The BRT noise might affect nearby schools, hospitals, and mosques.	Shifting from private transport to BRT will affect the noise level (reduce) in the areas along the BRT routes due to the changes in fleet distribution.
Groundwater		Temporary pumping of groundwater and/or large-scale open cut by the construction activities for underground fuel tank storage (especially at the locations of underground line/station/piling required for elevated structures), may result in a lowering of the groundwater table that may disturb the domestic usage of	

		groundwater and/or may lead to a land subsidence and local flooding.	
Surface water		Land preparation and construction activities will generate sedimentation due to the run-off (particularly during the rainy season) that could carry out soil particles to the surface water around the project location. There are five BRT platforms are identified as located close to rivers in the current BRT plan; four platforms are located close to the Cikapundung River, and one platform is located close to the Cidurian River.	The operation activities of the transportation modes could generate surface water degradation, particularly that caused by the oil or other material spills.
		The sensitive receptors of soil erosion and runoff are waterways, drainages, etc. However, since Bandung has highly polluted waterways due to limited coverage of waste water treatment plants, where the rivers become open sewers of grey and black water (wastewater from toilets), sensitive receptors are not expected, except potentially, organism.	BRT maintenance activity centralised at Depots will affect the environment. Engine tune-ups will generate lube oil waste which is considered to be a hazardous waste material (B3).
			BRT maintenance activity centralised at Depots will affect the environment. BRT bus cleaning will generate wastewater which needs to be treated before discharge to the nearby watercourse. It can affect the native animal and aquatic biota when the wastewater is being discharged to a water body.
		Surface run-off due to more cemented infrastructure and roofed platforms could increase flooding in neighbourhood areas (during the rainy season) and need to be drained to nearby street inlets or the primary drainage system.	

Biodiversity (including Vegetation)		<p>The route only crosses modified urban areas. The works will not be carried out in or near any of the identified protected areas and natural habitats. The alignment of the BRT Bandung Metropolitan has been decided after considering a few alternatives provided in the feasibility study. Based on the evaluation of the information above, it can be stated that there will negligible impacts on biodiversity. However, given that in most roads of the planned BRT corridor trees are growing, some urban flora and fauna will be lost during the project construction.</p> <p>There will be four platforms (Cikapundung, Kebun Kawung, Simpang Lima and Kiara Artha) that potentially require trees cutting but the number is not significant.</p> <p>The ESIA/ESMPs will propose standard mitigation measures related to the indirect impact on critical habitats and protected areas, if relevant.</p>	<p>Enhancements of plants and greening activities around major stations.</p> <p>The evaluation will include off-site impacts of quarries and construction material sources, as identified under ESS3. Noting that cutting one tree will require planting a minimum of five trees.</p>
		<p>With the vegetation loss around the location, will cause a degradation to the environmental aesthetic.</p>	
Urban landscape		<p>The existing urban landscape of Bandung will be changed whilst the urban transport system is being constructed with large construction vehicles and construction hoarding.</p>	<p>The existing urban landscape of Bandung will be changed with the introduction of infrastructure such as BRT stations.</p>
Waste management		<p>The construction processes generate a significant volume of construction waste (such as soil, asphalt and rocks due to road cutting concrete debris); which will need to be disposed of in line with national regulations.</p>	<p>Waste generated by passengers and workers during BRT operations (at the bus and the stations).</p>
		<p>Material packaging waste will have some impact on the environment.</p>	

Resource efficiency		<p>The BRT system will require large amounts of materials such as cement, steel, rock-based materials, and asphalt will be necessary.</p> <p>Release of oil and other hazardous materials. The presence of oil products and other hazardous materials are expected at the station &amp; for the construction of the pedestrian paths. Other sources of hazardous materials might be: maintenance of equipment at base camp, these include fuel oil grease paints, and solvents. These materials are associated with the operation of the construction of heavy equipment and vehicles and various construction activities. Some of these materials may accidentally be released into the environment.</p>	
		Some amounts of electricity needed for the construction and operation of the BRT might impact the local electricity distribution networks.	
Utilities and infrastructure	Risk of impact to and/or required relocation of existing utilities such as water supply, electricity lines, fiber network, street lighting, traffic control, communication cables, electricity supply, water lines, and sewage systems.		
		Flood risk during construction phase caused by changes to existing stormwater drainage systems near the BRT stations.	
		Excavation and drilling activities might further influence the urban water drainages.	
	Some amounts of electricity needed for the construction and operation of the BRT might impact the local electricity distribution networks.		
GHG		The use of machines during the construction phase such as generators, backhoes, etc. will emit greenhouse gases (i.e. CO <sub>2</sub> , N <sub>2</sub> O, and CH <sub>4</sub> ).	Type of technology will determine energy consumption and GHG emissions. Buses could produce more or less GHG depending on the technology.

		<p>During the design and construction phases, climate change considerations could be incorporated in flood risks prevention to be more resilient to Climate Change. Those considerations include a wider drainage dimension, addressing safety concerns such as the prevention of electric shock during flooding, and the potential of GHG calculation emitted from equipment during construction – this was done during MRT construction in Jakarta by JICA.</p>	<p>The BRT operation is expected to reduce GHG emissions; since it is expected that many people will switch to using mass transportation, thereby reducing private vehicle usages and traffic congestion which is based on fossil fuel consumption.</p> <p>The BRT system will run more efficiently than conventional public transport and reduce traffic congestion. Therefore, GHG emissions will be reduced due to reduced fossil fuels used.</p>
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Source: Authors' estimations; GIZ (2020).

## 4.2 Potential Social Impacts

Table 28 presents an overview of the types of potential social impacts that could result from the BRT upgrade works during each phase of the project. It serves as a preliminary screening of impact issues for each stage of activity, and is a basis for further analysis, which also informs the GOI and WB as to what additional data and analyses are required.

*Table 28: List of Social aspects affected in each of the Project Phases*

Social Aspects	Pre-Construction Phase	Construction Phase	Operation Phase
<b>Community health and safety</b> [ESS4 Community Health & Safety]	v	v	v
<b>Occupational health and safety</b> [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety]	v	v	v
<b>Impact on livelihoods</b> [ESS1 Assessment & Management of Environmental & Social Risks & Impacts; ESS2 Labor & Working Conditions; ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS10 Stakeholder Engagement & Information Disclosure]	v	v	v
<b>Land acquisition and involuntary resettlement</b> [ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement;	v		
<b>Influx of workers</b> [ESS2 labor & Working Conditions]	v	v	v
<b>Cultural heritage</b> [ESS8 Cultural Heritage]		v	v
<b>Gender and disability</b> [ESS4 Community Health & Safety]	v	v	v
<b>Sexual Exploitation, Abuse &amp; Harassment (SEAH)</b> [ESS2 labor & Working Conditions; ESS4 Community Health & Safety; ESS10 Stakeholder Engagement & Information Disclosure]	v	v	v
<b>Traffic</b> [ESS4 Community Health & Safety]		v	v

The elaboration of potential social impacts identified can be seen in the table below. However, the impacts' significance will vary, depending on what final route will be chosen.

Table 29: Social Risk Matrix for Bandung BRT Development

Social Components	Description of Identified Risks and Potential Impacts		
	Pre-Construction Phase	Construction Phase	Operation Phase
Community health and safety (ESS4)		Community health risks relating to traffic accidents and increased dust, air, and noise pollution during construction and operation.	
		Construction will temporarily cause disturbances regarding traffic flows, noise, air pollution, and dust coming from the construction will affect business owners, residents, and public facilities. Furthermore, some short-term utility service disruptions can be expected.	Health and safety risks from the coronavirus disease (COVID-19) pandemic can cause an additional burden to public transportation users.  Increased number of visitors to the area which may lead to increased crime and violence
		The construction involves heavy equipment and working at heights using electricity, which may introduce some safety risks to nearby public or residents/businesses (temporarily). OHS risks may occur—e.g., the material might fall from the construction site onto public areas/roads.	The new public transport will have a positive impact on the mobility of people; reduce travel time and upgrade the safety of current public transport. Furthermore, the safer and more orderly loading and unloading system will increase the mobility of women in the city.
		The labor influx implication could increase the risk of incidents of sexual activity between workers and the nearby community.	BRT operation will improve access to basic social services (e.g. health or educational facilities), also the changes in personal safety, and security for the users, as well as in the users' behavior and attitude toward public transport.
			The reduced travel time and cheaper transport fares will have a positive impact on the citizens of the regions.
			The BRT might pose a safety risk in earthquake and flood-prone regions. Earthquake and flooding

			events have been recorded in the proposed project area. Thus, the BRT system might face endurance challenges and thus face a safety risk to the public who will use it.
Labor and working conditions (including occupational health and safety) (ESS2)		Health and safety risks from the coronavirus disease (COVID-19) pandemic can cause an additional burden to all stakeholders (e.g.: workers, local communities, employers, etc).	
		The BRT might pose a safety risk in earthquake and flood-prone regions. Earthquake and flooding events have been recorded in the proposed project area. Thus, the BRT system might face endurance challenges and thus face a safety risk for construction and operational workers.	
		Possibly inappropriate hiring process risk including unfair working terms, and child and forced labor.	
Impact on livelihoods (ESS1 and ESS5)	Selection of routes may be considered unfair, politically motivated, or favor only certain groups.	Businesses, restaurants, and services will experience temporary economic impacts (e.g.: loss of business or clients) due to reduced access particularly during the construction stage.	There are currently 5,200 local transport ( <i>angkot</i> ) units (3,000 of them are licensed) in Bandung. Those <i>angkot</i> drivers will lose business once the new transport facility is in place and thus might oppose the construction plans.
		Based on existing routes and bus depot plan, the project anticipates a low to moderate risk of economic displacement for small business owners, street vendors and street parking lots associated with BRT construction. This is partially because first, the designs will be adjusted to minimize such impacts, and second, BRT infrastructure will mostly be built within the existing roads and only in several spots along the routes will housing and commercial structures be affected and private lands be acquired. As for mobile street vendors and parking, alternative locations will be identified by	Detailed preliminary impact assessment on <i>angkot</i> drivers in presented in <b>Annex 2</b>
			BRT operations might create displacement of paratransit workers, such as Angkot, Grab/Gojek, and taxi drivers, or the demand reduction of paratransit modes which can threaten livelihoods.
			Conflicts/disagreements with those businesses far away from the project built BRT who may lose business once the new rapid transport systems are in place.

		Bandung subnational government and allocated to them through participatory processes when detailed designs are prepared and which vendors need to be moved become known. Temporary access will be installed during construction to minimize disruption in business.	From a car-users perspective, the BRT operation will increase their travel time as the bus and the stations will reduce road capacity.
			Increase in crime and violence due to increase in the number of visitors.
		Construction will temporarily cause disturbances regarding noise, air pollution, and dust coming from the construction will affect business owners.	Changes in land use or property prices might happen. Gentrification that may break down community cohesion.
		Increase income for businesses nearby the construction sites/BRT stations, such as <i>warung</i> (food stalls) and <i>kos</i> (rental rooms).	
		Job opportunities for local laborers, such as construction workers and the employees of the BRT entities (e.g. drivers, maintenance, or management employees).	
Land acquisition and involuntary resettlement	The BRT Bandung project aims to avoid impacts resulting from land acquisition by optimizing the existing road as the corridor and utilizing government's land for the bus depot and station as much as possible. While economic displacement is anticipated, no physical displacement is expected. Initial impact assessment associated with land acquisition is provided in the Preliminary LARAP document of Bandung BRT. Detailed		

	assessment of the impacts associated with land acquisition will be undertaken during the implementation phase once the DED is finalized.		
Influx of workers	Job opportunities and local labor impacts.		
		Given the total length of the BRT upgrade of 23 km, about 721 people might be needed for the construction. The availability of labor with suitable expertise will be available in local universities or in Indonesia and the population size and accommodation opportunities of the cities can absorb the temporary workforce.	Due to the 23 km length, approx. 365 permanent staff for the operation might be needed, including unskilled laborers such as for cleaning service, ticketing, and bus attending/security. Unskilled laborers would be prioritized for local peoples (within the city/district where the bus is operating).
		During the construction and operation phases workers often come from outside the project area. It may increase competition for use of community infrastructure, facilities, and services.	
		GESI assessment identified that the project might have some degree of influx of workers, although the number is yet to be confirmed, that may increase the demand for sex work, (discussed further in the 3.2.10 on SEAH).	
Cultural heritage		Risk of damage to heritage buildings, which are located near Jl. Asia Afrika, Jl. Braga (including Cikapundung River Park Area), Jl. Sudirman, and Balai Kota area.	Long-term impact on the visual amenity of the heritage buildings.
		Changes in the overall visual impression and atmosphere.	

		Access to heritage buildings may be restricted during the construction period.	During operations, access to historical areas may be improved and facilitate tourism and local business revenues.
Indigenous Peoples	There are no indigenous peoples' settlements near the planned BRT routes, as the identified indigenous villages lie outside of the project area. <sup>26</sup>		
Gender and disability			Women and people with disabilities could be excluded from the new public transport if entry is difficult/inaccessible or waiting areas are crowded and do not provide appropriate facilities.
			The inaccessible facilities might challenge people with specific needs (e.g: pregnant women, people with disabilities, the elderly). Disabled people might not be able to access the BRT due to difficult entry and exit modes and terminals.
	Inclusive stakeholder consultations during all project stages, including if extra means need to be taken (separate focus group discussions with people with disabilities, etc).		
Sexual Exploitation, Abuse & Harassment (SEAH)	Based on the World Bank's SEA/SH Risk Assessment, the Project's SEA/SH risk rating is assessed as "substantial".		
		The labor influx implication could increase the risk of incidents of SEA/SH between workers and the nearby community, such as the high demand for sex work, and early forced marriage. The construction will also inevitably lead to greater mobility of peoples which could also contribute to raising several social problems:	

<sup>26</sup> The indigenous village locations can be seen in Chapter 3.

		<p>greater exposure to sexually transmitted diseases including HIV/AIDS due to influx of outsiders; social tensions among the local communities, including increased domestic violence triggered by jealousy.</p> <p>The construction work may lead to the recruitment of Child labor.</p> <p>When land redistribution occurs, women may be extremely vulnerable to GBV, especially where the legal systems preclude women from holding land titles.</p>	
		<p>GESI/SEAH assessment identified that the project might have some degree of influx of workers, although the number is yet to be confirmed, that may increase the demand for sex work. The risk of incidents of sexual activity between workers and nearby communities could be increased.</p>	<p>Women might not feel safe using the BRT due to inadequate lighting or the lack of separate toilet facilities.</p>
Traffic		<p>Activities during the construction phase will generate an increase in traffic volume from construction vehicles and construction workers, which may cause an increase in traffic congestion and risk to pedestrian safety.</p>	<p>The operation of mass transportation has the potential to generate traffic disruption around stations with an accumulation of passengers disembarking from the modes and impacting surrounding streets.</p>

			The operation of mass transportation may lead to an increase in public transport modal share and therefore a decrease in the use of private vehicles (cars and motorbikes) thereby resulting in a reduction of traffic on the roads.
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Source: Authors' estimations; GIZ (2020).

### **4.2.1 Specific Analyses**

#### **Economic displacement**

Based on existing routes and bus depot plan, the project anticipates a low to moderate risk of economic displacement for small business owners, street vendors and street parking lots associated with BRT construction. This is partially because first, the designs will be adjusted to minimize such impacts, and second, BRT infrastructure will mostly be built within the existing roads and only in several spots along the routes will housing and commercial structures be affected and private lands be acquired. As for mobile street vendors and parking, alternative locations will be identified by Bandung subnational government and allocated to them through participatory processes when detailed designs are prepared and which vendors need to be moved become known. Temporary access will be installed during construction to minimize disruption in business.

#### **Risk of gentrification**

The risk of gentrification is relatively low as the area along the BRT routes are mostly occupied by established, large to medium-scale businesses or public service/ government offices or facilities such as hospitals and schools. Private entities along the route may benefit from an increase in land value but will unlikely face risk of eviction without due compensation. No low-income residential structures or commercial entities are observed in the immediate neighbourhood of the new BRT line.

### **Land Acquisition and Resettlement**

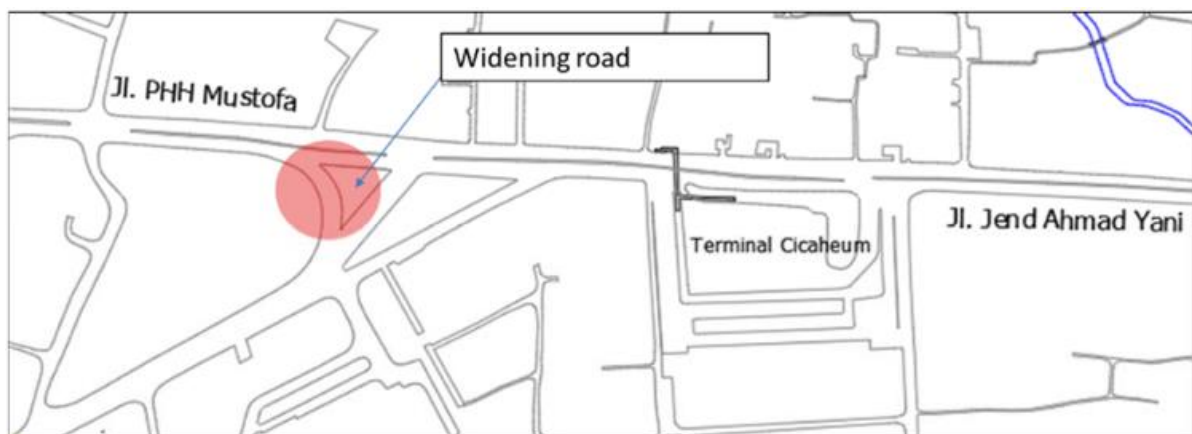
The project will not involve the resettlement of project affected persons (PAPs). The land to be used for the BRT Corridor, Stations, and Depots are owned by the State (government land as road/bus depot/park). There are about 1,875 m<sup>2</sup> of land to be affected. However, the DED can be readjusted by the field condition to avoid/minimize land acquisitions.

Initial impact assessment has been conducted via the BRT feasibility study prepared by GIZ in 2020. The BRT system is designed in such a way as to minimize land acquisition and involuntary resettlement; In the FS at the least impactful route is proposed. However, also with this option, some small-scale land acquisitions are still needed. So far, the GIZ study identified two locations for road widening and six locations where additional space is needed to accommodate the BRT stations and platform. A total of 1,855 m<sup>2</sup> will be necessary to accommodate the space needed for the stations. However, the FS does not provide any detailed information regarding the land required for the depots to support the BRT system.

Further detail is provided below:

Road widening:

- At Jl. BKR where road width is limited (local boarding demand currently low, but with potential for future increases in densification, especially with the improved linkages the BRT provides and as the BRT network expands). If later on the station is expanded into ‘directional stations with two substops’, then one of the mixed traffic lanes will need to be converted to a BRT lane, and this will require some road widening at the station area. However, this road widening is only needed if the two mixed traffic lanes are retained (GIZ, 2020, p. 12); and
- At Jl. Ahmad Yani, near Cicaheum station, a road widening might need to be considered to increase bus stop’s capacity . Currently, Jl A. Yani is a traffic blackspot with six bus routes passing this location that should be considered for improvement (GIZ, 2020, p. 37).



No	Parameters	Proposed
1	Width	10 m
2	Radius	30 m
3	Bus bay	35 m
4	Maximum size fleet bus	Medium Bus (width 2,2 m)

For the BRT platform construction, some impacts are identified below (GIZ, 2020, p.101-102),:

- Kebun Kawung: the front part of the Bandung train station with a length of 100 m and width of 2.2 m;
- Banceuy: a pedestrian area in front of a shopping mall with a total length of approximately 120 m and width of 2 m;
- Alun-Alun: the pedestrian area between the park and current bus station with a total length of 100 m and width of 2 m;

- Simpang Lima: requires an additional land area over an existing street-side park, the total length is 47 m with a width of 5 m;
- Pasar Kosambi: an acquisition area with a total length of 120 m, 4 m width, is required for the construction of the Pasar Kosambi platform; and
- Kiara Artha Antapani: some grass surface area with a total length of 160 m and 3 m width will be affected.



Simpang Lima



Kiara Artha, Antapani



Jalan ABC



Banceuy

Figure 28: Examples of land acquisition at several BRT stations (Source: GIZ, 2020, p. 102)

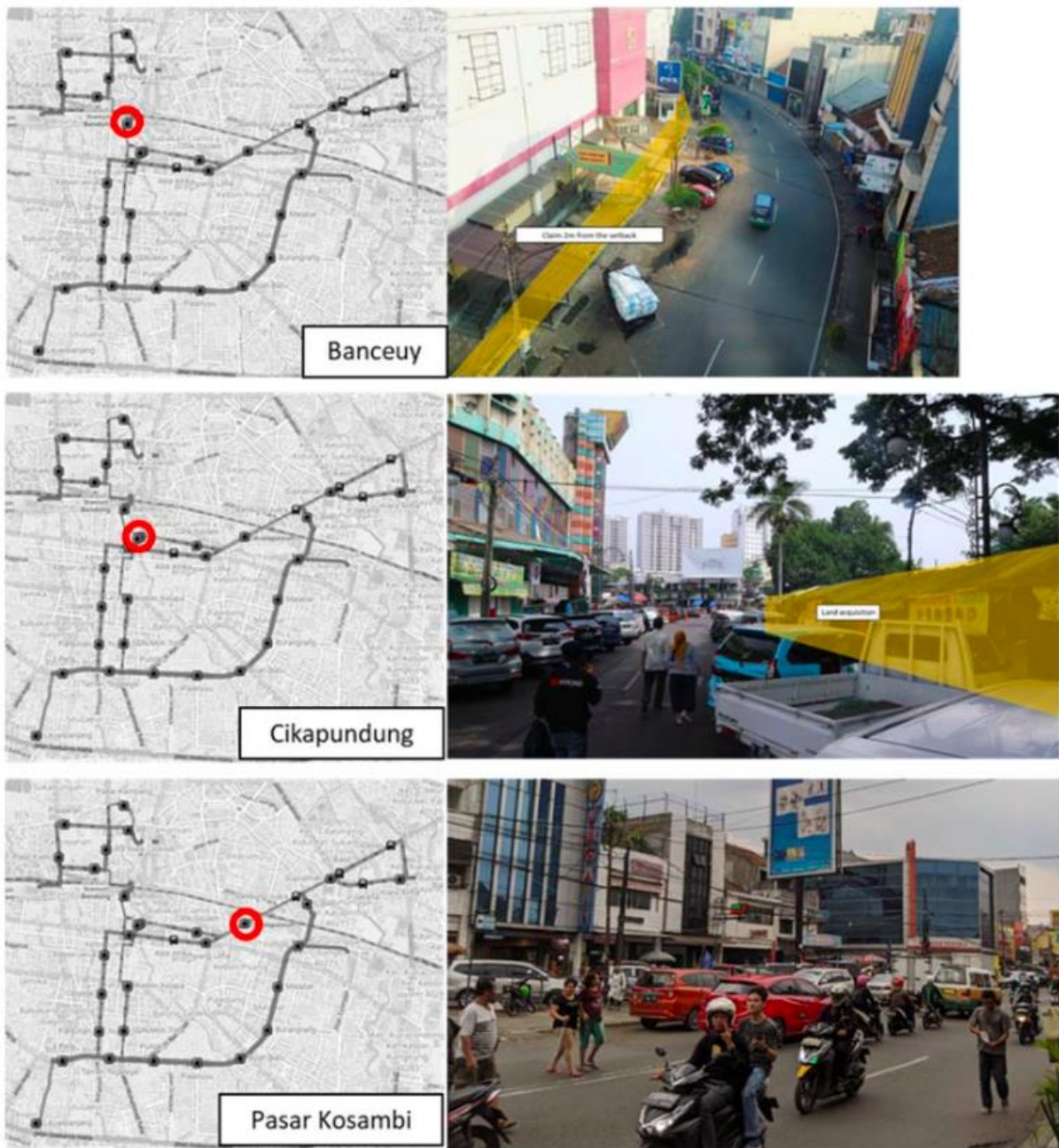


Figure 29: Station layouts, road cross-sections, and land issues, Far East Mobility (2020), in GIZ, (2020, p. 127).

A census of the properties and populations that would be affected has not been undertaken, so the extent of impacts is not quantified, other than for the platforms at the six locations specified above. However, given the fact that two extensive public transport systems may be developed in parallel or close timing with one another (BRT and LRT), these impacts may be even more significant and also become cumulative in nature.

## Heritage Buildings

Cultural heritage provides continuity in tangible and intangible forms between the past, present, and future. Cultural heritage, in its manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice.

There are several cultural heritage sites/structures near the BRT corridor in Jl. Asia Afrika, Jl. Sudirman, Jl. Braga (including Cikapundung River Park Area), and Balai Kota area. However, the planned corridor will be on grade while the stations' design could be adjusted as to not disturb/minimize /minimize any disturbances to the cultural heritage sites/structures.

For example, Jalan Asia-Afrika is the oldest main road segment in Bandung. Previously, Jalan Asia-Afrika was named Groote Postweg or Jalan Raya Pos based on the presence of Gedung Raya Pos or the Great Post Office from the colonial era. As one of the heritage buildings of colonial times, the function of the Bandung Post Office has not changed until now. Jalan Asia-Afrika is one of the historical areas and centre of the Old City in Bandung. Besides the potential damage and influence on access and usage of these sites during the construction there will also be a potentially negative visual impact through the operation of the BRT.



Figure 30: Jalan Asia-Afrika (left) and Bandung Post Office (right).

For the impacts and risks related to the cultural heritage for the BRT corridor, the following mitigation measures should be considered:

- **Project Design and Planning.** The cultural heritage value of sites/structures near Jl. Asia Afrika, Jl. Braga, Jl. Sudirman, and Balai Kota should be preserved. Therefore, the to-be-formed Working Group will need to consult with key stakeholders in the heritage area and the Tourism agency to determine an acceptable route and aspects that affect the visual impression of the area for the long term. Based on that, a plan for how to construct with minimal impact can be developed. Possibly, special architecture for the stations that could resemble the historical buildings, could be a way to mitigate the negative visual impact and even turn it into a positive asset for the area, for example, encouraging tourism and recreational visitors;

- **Stakeholder Consultation/Engagement.** Engagement with the agency responsible for cultural heritage preservation and with local experts from Bandung regarding the final identification of heritage buildings and discussion on mitigations for impacts in the relevant areas (ESS10) will be key to handling impacts. The borrower might be asked to include a Cultural Heritage Management Plan to ensure proper treatment of any sites are near the new BRT corridor; and
- **Excavations – Chance Finds.** The potential for an encounter of unknown cultural heritage during the construction stage, in particular excavation activities, is considered minor however a Chance Finds Procedure should be developed and conveyed to stakeholders, especially to contractors for the project construction stage, to guide the handling of any potential heritage objects or remains found during excavation.

### 4.3 Cumulative Impacts

Some cumulative impacts can be drawn from accumulative of several impacts identified above (including cross-cutting impacts from environmental and social aspects) or from other transportation projects that will be implemented in parallel, as Bandung also plans for LRT development. The overlapping routes of these two systems can escalate both environmental and social impacts. The main cumulative impacts stems from environmental aspects, particularly during construction and operation are related to the potential decrease of air quality, increase of noise and traffic congestion, all these potential negative impacts will lead to social unrest. Potential cumulative impacts and Indicative mitigation measures are provided in ANNEX 8 and it needs to be detailed during the ESIA. Below are some cumulative impacts identified for further assessment in the extended AMDAL (ESIA).

#### 4.3.1 Climate Change

Climate Change has two sides of the coin, mitigation and adaptation sides. Mitigation-wise, the operation of the BRT system will reduce Bandung's carbon footprint from the transportation sector since it is expected to increase the use of public transport and reduce private vehicle usages and traffic congestion based on fossil fuel consumption. A more integrated public transportation (the existing *angkot*/buses/taxis and the planned BRT and LRT system) will be the key to maximizing public transport and mitigating GHG emissions.

On the other hand, the accumulated GHG emissions from the combustion of cars (and so other fossil-fuelled combustions) all around the world can cause climate change and affect all cities globally, unexceptionally Bandung. One of the climate change impacts is an intensification of extreme precipitation and flood that also affect Bandung significantly<sup>27</sup>. This condition can affect transportation systems, including the BRT operation.

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<sup>27</sup> <http://floodlist.com/asia/indonesia-floods-bandung-march-2021>

### 4.3.2 Better Access to Economic, Social, and Education Facilities

The BRT operation also potentially enhances public access to economic, social, and education facilities. Various people would benefit from the improved public transportation system, as the current land use of nearby BRT stations is dominated by commercial facilities, service facilities, and settlements (please see Figure 31). Moreover, the passengers would travel in a shorter time and at a cheaper cost. At the same time, the local businesses, such as *warung*, *kos*, stores, near bus stations would get more potential customers from the increased ridership of the bus.

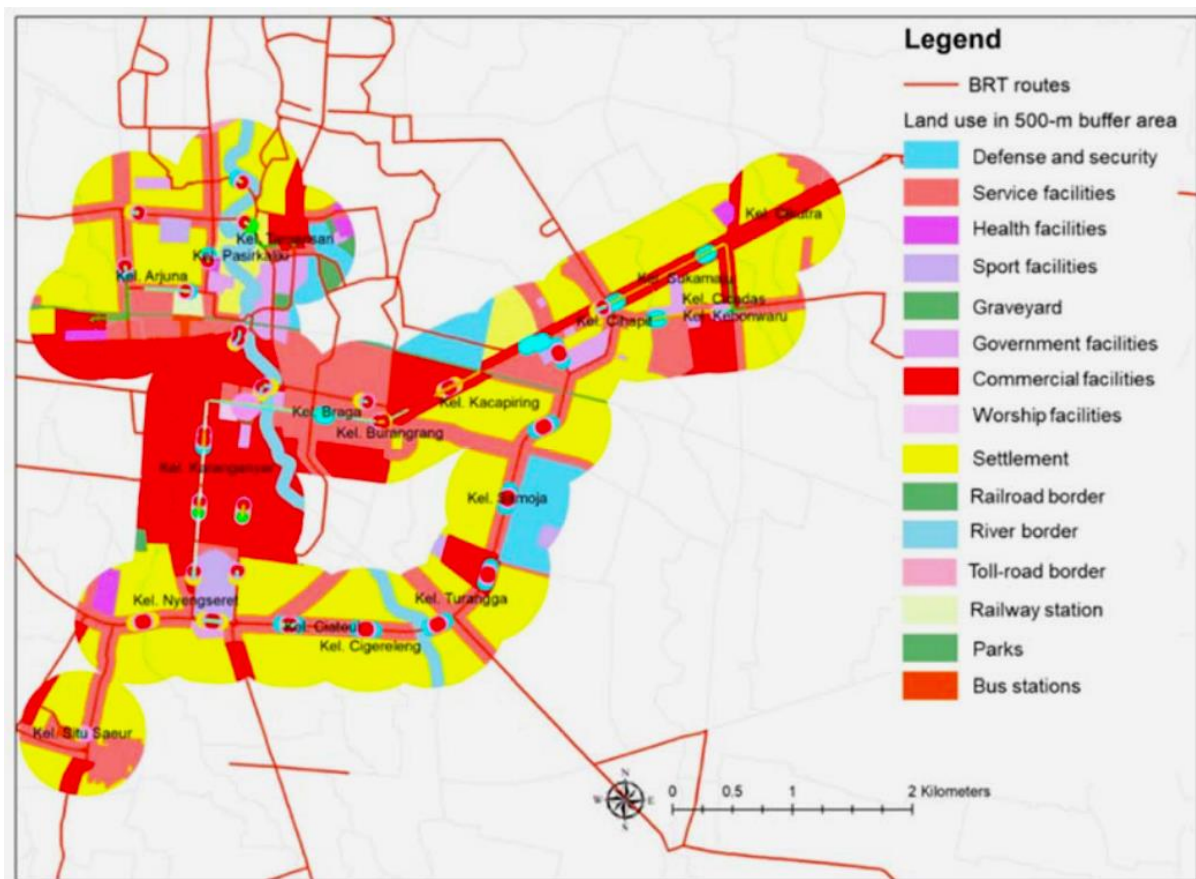


Figure 31: Land use in the area of project influence (GIZ, 2020, p. 128).

### 4.3.3 Economic Impacts for Transport Drivers

BRT development will highly impact the existing public transport system than run by private sectors. GIZ (2020, p. 125) mentioned in the Feasibility Study for Bandung BRT, that *angkot* drivers will be the most affected groups with the operation of Bandung BRT. The proposed BRT routes will overlap with 31 *angkot* routes and eight of them are highly overlapped, as shown in the table below. There are 1,539 vehicles on overlapped routes that will impact the *angkot* cooperatives, *angkot* drivers, and also the families who rely on them for income.

Based on the discussion with Organda and Dishub Bandung, there are about 5,200 angkot units currently operating in Bandung Area and 2,500 at Cimahi City. The BRT operation will have an impact on the livelihood of the Angkot Drivers/Owners. 1 Angkot can support 1 family. If 1 family has about 4 members, then about 32,800 persons will potentially be affected. The detailed preliminary impact assessments on angkot drivers are presented in Annex 2 on section **Potential impacts on Angkot drivers**.

Table 30: Angkot Routes Highly Overlapped

No.	Angkot Route No.	Angkot Route	No. of Fleets (2017)
1	2	Abdul Muis (Kebon Kelapa) - Dago	273
2	9	Stasiun Hall - Dago	52
3	18	Panghegar Permai - Dipatiukur	155
4	22	Sederhana - Buah Batu - Cipagalo (Kebon Kelapa - Buah Batu)	276
5	26	Cisitu - Tegalega	82
6	27	Cijerah - Ciwastra - Derwati	200
7	31	Antapani - Ciroyom	300
8	35	Cibaduyut - Karang Setra (Cibaduyut - Kebon Kelapa)	201

Source: Institutional Arrangement Report, GOPA Infra (2020) in GIZ (2020, p. 125-126).

The other private sector might be affected is paratransit (Grab/Gojek) drivers. A traffic count survey done on 23 January 2020 over 17-hours (5:30-22:30) reported that generally they are in a 10–15% average range of all 2-wheelers in three busy roads in Bandung, as shown on table below.

Table 31: Share Traffic of Online-Ojek Drivers on the Project Corridors

Road corridors	Grab/Gojek Motorcycle	Share of Traffic
Jl. Asia Afrika	9,065	11.8%
Jl. Banceuy	3,906	15.3%
Jl. PETA	6,209	10.0%

Source: Bandung all-day traffic video outputs, Consultant (2020) in GIZ (2020, p. 126).

#### 4.3.4 Broader Gender Impacts

The project might have a large influx of workers that may increase the demand for sex work. The risk of incidents of sexual activity between workers and nearby communities could be increased—e.g. the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl. This influx of

worker effects might escalate when both BRT and LRT projects are constructed at the same time.

## V - ENVIRONMENTAL AND SOCIAL IMPACT MITIGATION APPROACH

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 strategies, which are to be developed in detail through consultation with affected stakeholders, as part of, and after, the extended AMDAL (ESIA) is completed<sup>28</sup>.

Furthermore, some cumulative impacts from several identified impacts or accumulation from another mass transport project, LRT, need to be anticipated too.

The Environmental and Social Management Plan (ESMP) is the main mechanism for E&S management and mitigation during the construction and operations of the BRT Bandung. The purpose of the ESMP is to guide the implementation of mitigation measures and monitoring requirements identified through the final ESIA which complies with the World Bank Environmental and Social Standards (ESS1 – ESS10) of the Environmental and Social Framework.

This chapter discusses indicative management or mitigation efforts that can be carried out to minimise and prevent impacts that will be identified in the ESIA document. Mitigation strategies suggested in this section should be detailed in the ESMP document (Environmental and Social Management Plan). There are several sub-plans to deliver specific environmental and social management activities. The ESMP document will, at minimum, include details regarding the following:

- Roles and responsibilities of parties involved in the project.
- Important environmental and social risks.
- Mitigation, management, and monitoring of all key risks during the activity phase of BRT Bandung.
- Report responsibilities and methods.
- ESMP updating process.

### 5.1 Possible Mitigation Actions for the Environmental Impacts

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

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<sup>28</sup> Suggested for ESIA TOR can be seen in Annex 3

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 strategies, which are to be developed in detail through consultation with affected stakeholders, as part of, and after, the extended AMDAL (ESIA)<sup>29</sup>. Based on the identified impacts in every environmental aspect, some mitigation and management measures are proposed in the Table below, to be considered and detailed further during the ESIA development.

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<sup>29</sup> Suggested TOR for ESIA can be seen in Annex 3

Table 32: Environmental Risks and Possible Mitigation Actions

Environmental Components	Description of Identified Risks and Potential Impacts	Phase	Recommended Mitigation and Management Measures
Air quality	<p>Minor and temporary impacts will occur on local air quality during construction. Ambient air quality might be worsened by construction equipment and heavy machinery for the track's work. Dust from powered mechanical equipment to supply crushed rock and asphalt. Fumes from asphalt chemicals such as phenol compound from bitumen could cause breathing issues.</p> <p>The use of machines during the construction phase such as generators, backhoes, etc. will emit air pollutants (i.e. NO<sub>x</sub>, SO<sub>2</sub>, PM, CO). Earth surface disturbance activity will likely emit particulates (PM<sub>10</sub>) which may affect the local visibility and health.</p>	Construction	<p>ESIA includes a baseline of air quality and during construction, it needs to be monitored that the increase of air pollution remains below the NAAQS.</p> <ul style="list-style-type: none"> <li>● Implementation of dust mitigation measures such as covering construction areas and stockpiles to minimize the dust distribution to the surrounding areas, use of dust dampening techniques such as sprinkling, covering of transported materials, washing of wheels prior to leaving construction areas.</li> <li>● Reduce material mobilization during peak hours to reduce fugitive dust.</li> <li>● Periodic conducted sampling of air quality at construction site near public facilities area (mosque, church, school, and houses)</li> </ul>
	<p>The operation of transportation modes is expected to generate a reduction in air pollutant emissions; since it is expected that many people will switch to using mass transportation, thereby reducing private vehicles usage and traffic congestion which is based on fossil fuel consumption.</p>	Operation	<ul style="list-style-type: none"> <li>● Implementation of Stakeholder Engagement Plan.</li> <li>● Increasing publics' interest to use public transportation, so that the transportation modes will be optimally operated by carrying passengers to achieve its maximum capacity.</li> <li>● Considering the use of alternative fuels, such as biodiesel and CNG, or even electric vehicles.</li> </ul>

	BRT maintenance activity centralized at Depots will affect the environment. Painting activity will affect air quality due to the solvent used and volatile organic compounds that will be emitted into the air.	Operation	<ul style="list-style-type: none"> <li>● Plan the possible mitigation measures to manage the air pollution.</li> <li>● New fuel-efficient (Euro 4 at least) buses and shift of transport behavior towards the BRT system.</li> </ul>
Noise level	Minor and temporary impacts will occur during construction. Increased noise level due to the operation of equipment and heavy machinery, for road cutting, excavation, demolition of permanent structures along the route, and as pylons for stations are drilled into the ground, will cause noise pollution around the project location. The BRT noise might affect nearby schools, hospitals, and mosques.	Construction	<p>Conduct traffic noise impact assessment, including the noise modeling, and also define what and where proper mitigation measures are needed (e.g. traffic management such as lane closures or reduced speeds, pavement types and surfaces that can affect traffic noise, noise buffer zones, noise barriers, or other possible measures).</p> <ul style="list-style-type: none"> <li>● Proper scheduling of high noise-generating construction activities. Use of temporary or permanent noise barriers, as needed.</li> <li>● Install barriers to reduce noise emission from source to sensitive receptor.</li> <li>● A barrier can be a temporary building cover that can reduce noise level up to 10-20 dBA.</li> <li>● Consider restrictions on noisy work during night time in close proximity to sensitive receptors.</li> <li>● Implement a Construction Management Plan which recommends contractors switch off idling machinery and carry out regular maintenance of machinery to ensure full functionality.</li> <li>● Periodically controlled and ensured to meet the regulated noise threshold.</li> <li>● Regular maintenance of heavy equipment and construction machinery might avoid unnecessary noise disturbance.</li> </ul>
	The operation of transportation modes will generate increased noise levels in the surrounding area. The BRT noise might affect nearby schools, hospitals, and mosques.	Operation	<p>Indicate the noise provided by different technologies of the BRT system (selective design).</p> <ul style="list-style-type: none"> <li>● Conduct traffic noise impact assessment, including noise modeling, and also define what and where proper mitigation measures are needed (e.g. traffic management such as lane closures or reduced speeds, pavement types and</li> </ul>

			<p>surfaces that can affect traffic noise, noise buffer zones, noise barriers, or other possible measures).</p> <ul style="list-style-type: none"> <li>● Install barriers on the BRT corridor tracks in certain sensitive areas against noise. A barrier can reduce noise levels up to 15-25 dBA.</li> <li>● Apply noise attenuation measures on the railroad ballast in accordance with manufacturing specifications.</li> <li>● Periodically controlled and ensured to meet the regulated noise threshold.</li> </ul>
	Shifting from private transport to BRT will affect the noise level (reduce) in the areas along the BRT routes due to the changes in fleet distribution.	Operation	No required.
Groundwater	Pumping of groundwater and/or large-scale open-cut by the construction activities (especially at the locations of underground line/station/piling required for elevated structures), may result in a lowering of the groundwater table that may disturb the domestic usage of groundwater and/or may lead land subsidence and local flooding.	Construction	Detailed Groundwater & Ground Condition Surveys required to ensure Construction Management Plan (especially for cut and fill) reduces impact to groundwater and risk of land subsidence and flooding.
Surface water	Land preparation and construction activities will generate sedimentation due to the run-off (particularly during the rainy season) that could carry out soil particles to the surface water around the project location. There are five BRT platforms are identified as located close to rivers in the current BRT plan; four platforms are located close to the	Construction	<ul style="list-style-type: none"> <li>● Preparation and implementation of a Soil Erosion Management Plan for the construction area include measures to prevent/minimize soil runoff into the surface water surrounding the project area.</li> <li>● Plan a settling pond; to collect and precipitate materials/soil particles carried by the water flow.</li> <li>● Settling ponds must be periodically cleaned and dredged.</li> </ul>

	Cikapundung River, and one platform is located close to the Cidurian River.		
	Surface run-off due to more cemented infrastructure and roofed platforms could increase flooding in neighborhood areas (during the rainy season) and need to be drained to nearby street inlets or the primary drainage system.	Construction; Operation	Ensure suitable culverts and other infrastructure for drainage are included in design and construction plans with a Flood Risk Management Plan.
	The operation and maintenance activities of the transportation modes could generate surface water degradation, particularly that caused by oil or other material spills.	Operation	<ul style="list-style-type: none"> <li>• Preparation of SOP for storage and treatment of wastewater (both for domestic and maintenance activities) in the operation of transportation facilities and its associated infrastructure.</li> <li>• Storage and handling of oil/other hazardous materials to be clearly demarcated and handled by experienced personnel.</li> </ul>
	BRT maintenance activity centralized at Depots will affect the environment. Engine tune-ups will generate lube oil waste which is considered to be a hazardous waste material (B3).	Operation	Plan the waste management for the B3.
	BRT maintenance activity centralized at Depots will affect the environment. BRT bus cleaning will generate wastewater that needs to be treated before discharge to the nearby watercourse. It can affect the native animal and aquatic biota when the wastewater is being discharged to a water body.	Operation	Plan and build the wastewater treatment. The wastewater should meet the wastewater quality standards before discharging to water bodies.
Biodiversity (including Vegetation)	The route only crosses modified urban areas. However, given that in most roads of the planned BRT corridor trees are	Construction	<ul style="list-style-type: none"> <li>• Map the location and types of mature trees and ensure that the trees will be protected during construction by including this specifically in ESMP/RKL-</li> </ul>

	<p>growing, some urban flora and fauna will be lost during the project.</p> <p>There will be 4 platforms (Cikapundung, Kebun Kawung, Simpang Lima, and Kiara Artha) that potentially require tree cutting but the number is not significant.</p> <p>The vegetation loss around the location will cause degradation to the environmental aesthetic.</p>		<p>RPL, with tree demarcation/barriers installed during construction. Checking the 'collective attachment' of the IP to the project area.</p> <ul style="list-style-type: none"> <li>● Preparation of a Landscape Management Plan prior to construction start.</li> <li>● Every loss of tree should be compensated by replantation elsewhere.</li> <li>● Revegetation with the provisions of 1:10 (1 tree felled is replaced with 10 trees).</li> <li>● Plant young trees around the platforms.</li> </ul>
	<p>Enhancements of plants and greening activities around major stations.</p> <p>Wastewater from maintenance might affect native animals and aquatic biota, especially in the water body.</p>	Operation	Waterbody quality needs to be regularly monitored and wastewater minimization measures taken, especially close to the depots of the BRT system.
Urban landscape	The existing urban landscape of Bandung will be changed whilst the urban transport system is being constructed with large construction vehicles and construction hoarding.	Construction	<ul style="list-style-type: none"> <li>● Preparation of a Landscape Management Plan prior to construction start.</li> <li>● Sensitive design of site hoarding to minimize the visual impact of the construction activities on neighboring sensitive receptors.</li> </ul>
	The existing urban landscape of Bandung will be changed with the introduction of infrastructure such as BRT stations.	Operational	<ul style="list-style-type: none"> <li>● Preparation of a Landscape Management Plan prior to construction start.</li> <li>● The overall design is considered at Project Preparation Stage, with regard to BRT stations and their facilities.</li> </ul>
Waste management	The construction processes generate a significant volume of construction waste (such as soil, asphalt, and rocks due to road-cutting concrete debris); which will need to be disposed of in line with	Construction	<ul style="list-style-type: none"> <li>● Tender documents to construction companies need to include cleaner production concepts.</li> <li>● Include in the tender documents efficient and environmentally friendly use of materials. Material life cycle costs should be considered in the choice of material.</li> </ul>

	<p>national regulations. Material packaging waste will have some impact on the environment.</p>		<ul style="list-style-type: none"> <li>● Preparation of a Waste Management Plan prior to construction starts in compliance with local requirements and best practices for reducing, reusing, and recycling also ensures that GOI regulations regarding waste handling need to be followed.</li> <li>● Address the management of excavated and construction materials, including addressing possible material spills.</li> </ul>
	<p>BRT bus cleaning at the depots will generate wastewater which needs to be treated before discharge to the nearby watercourses. Engine tune-ups will generate lube oil waste which is considered hazardous waste materials (B3). Waste generated by passengers and workers during BRT operations (at the bus and the stations).</p>	Operation	<p>Preparation of a Waste Management Plan for the BRT operational stage, in compliance with local requirements and best practices for reducing, reusing, and recycling also ensures that GOI regulations regarding waste handling need to be followed.</p>
Resource Efficiency	<p>The BRT system will require large amounts of materials such as cement, steel, rock-based materials, and asphalt will be necessary.</p>	Construction	<ul style="list-style-type: none"> <li>● Tender documents to construction companies need to include cleaner production concepts.</li> <li>● Include in the tender documents efficient and environmentally friendly use of materials. Material life cycle costs should be considered in the choice of material.</li> <li>● Indicate material/resource efficiency by different technologies of BRT system (selective design).</li> <li>● Address the management of excavated and construction materials in accordance with the EHS and GIIP.</li> </ul>
	<p>Some short-term utility service disruptions can be expected: influence of existing urban infrastructure and utility services regarding communication cables, electricity supply, water lines and sewage</p>	Construction	

	systems.		
	Some amounts of electricity needed for the construction and operation of the BRT might impact the local electricity distribution networks.	Construction; Operation	Conduct discussions with local authorities regarding electricity necessary to run the BRT.
Utilities and infrastructure	Risk of impact to and/or required relocation of existing utilities such as water supply, electricity lines, fiber network, street lighting, and traffic control.	Pre-Construction;  Construction	<ul style="list-style-type: none"> <li>• Utilities &amp; Infrastructure Survey and Relocation Plan is prepared during design development and prior to construction.</li> <li>• Work closely with Government regulatory bodies and affected providers.</li> </ul>
	Flood risk during construction phase caused by changes to existing stormwater drainage systems near the BRT stations. Excavation and drilling activities might further influence the urban water drainages.	Construction	Ensure suitable culverts and other infrastructure for drainage are included in design and construction plans with a Flood Risk Management Plan.
	Some amounts of electricity needed for the construction and operation of the BRT might impact the local electricity distribution networks.	Construction; Operation	Conduct discussions with local authorities regarding the electricity necessary to run the BRT.
GHG	The use of machines during the construction phase such as generators, backhoes, etc. will emit greenhouse gases (i.e. CO <sub>2</sub> , N <sub>2</sub> O, and CH <sub>4</sub> ).	Construction	<ul style="list-style-type: none"> <li>• Plan the possible GHG emissions mitigation measures.</li> <li>• Accurate detailing of the components of the adopted BRT and station technology to ensure zero GHG emission to incorporate green open space requirement/vegetation barriers (landscaping).</li> </ul>
	Type of technology will determine energy consumption and GHG emissions. Buses could produce more or less GHG depending on the technology.	Operation	Indicate the GHG emissions provided by different technologies of the BRT system (selective design).

	<p>The BRT operation is expected to reduce GHG emissions; since it is expected that many people will switch to using mass transportation, thereby reducing private vehicle usages and traffic congestion which is based on fossil fuel consumption.</p> <p>The BRT system will run more efficiently than conventional public transport and reduce traffic congestion. Therefore, GHG emissions will be reduced due to reduced fossil fuels used.</p>	<p>Operation</p>	<p>A study should establish the BAU Baseline of GHG emissions in the current traffic sections, the changes in GHG with the introduction of the LRT system, and provide suggestions for a GHG monitoring system.</p>
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## **5.2 Possible Mitigation Actions for the Social Impacts**

Based on the identified impacts in every social aspect, some mitigation and management measures are proposed in Table below, to be considered and detailed further during the full ESIA development.

Table 33: Social Risks and Possible Mitigation Actions

Social Components	Description of Identified Risks and Potential Impacts	Phase	Recommended Mitigation and Management Measures
Community health and safety	Community health risks and safety of pedestrians relating to traffic accidents, pedestrian safety, and increased dust, air, and noise pollution during construction and operation.	Construction; Operation	A health and safety (H&S) management system with a Construction H&S expert needs to be put in place.
	Construction will temporarily cause disturbances regarding noise, air pollution, and dust coming from the construction will affect business owners, residents, and public facilities. Further, some short-term utility service disruptions can be expected.	Construction	
	The construction involves heavy equipment and working at heights and with electricity, which may introduce some safety risks to nearby public or residents/businesses (temporarily). OHS risks may occur—e.g., the material might fall from the construction site onto public areas/roads.	Construction	<ul style="list-style-type: none"> <li>● An H&amp;S management system and an H&amp;S expert need to be appointed both by the Contractor and the Supervision Consultant. Draft ToRs for the Contractor and the Supervision Consultant should be developed.</li> <li>● Prepare and implement CHS aspects as part of H&amp;S Management Plan including initial and periodic hazard assessment, risk management plan, risk register, roles and responsibility of H&amp;S officers, traffic safety plan, training for all workers on all relevant aspects associated with their daily work, including emergency arrangements, working at height, etc.</li> <li>● During construction Include access considerations into the construction plans and operating hours.</li> </ul>
	The labor influx implication could increase the risk of incidents of sexual activity between workers and the nearby community.	Construction	Address the GBV (SEA/SH) risks identified; implement and monitor the suggested mitigation measures in the GBV action plan in the project area; set up the grievance system.

	Health and safety risks from the coronavirus disease (COVID-19) pandemic can cause an additional burden to public transportation users.	Operation	Prepare and implement a COVID-19 Response Plan, including suitable procedures such as physical distancing, hand hygiene, cleaning and disinfection, and respiratory etiquette.
	Potential risks due to an increase in the number of visitors in local areas might increase crime and violence.	Operation	Monitoring of activities throughout the operation.
	The new public transport will have a positive impact on the mobility of people; reduce travel time and upgrade the safety of current public transport. Further, the safer and more orderly loading and unloading system will increase the mobility of women in the city.	Operation	Not required.
	BRT operation will improve access to basic social services (e.g. health or educational facilities), also the changes in personal safety, and security for the users, as well as in the users' behavior and attitude toward public transport.	Operation	Not required.
	The reduced travel time and cheaper transport fares will have a positive impact on the citizens of the regions.	Operation	Not required.
	The BRT might pose a safety risk in earthquake and flood-prone regions. Earthquake and flooding events have been recorded in the proposed project area. Thus, the BRT system might face endurance challenges and thus face a safety risk to the public who will use it.	Operation	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Prepare and implement an OHS management plan including training for all workers on emergency arrangements, emergency arrangements for passengers.</li> </ul>
Labor and working conditions (including occupational)	Health and safety risks from the coronavirus disease (COVID-19) pandemic can cause an additional burden to all stakeholders (e.g.: workers, employers, etc).	Construction; Operation	<ul style="list-style-type: none"> <li>• Prepare and implement a COVID-19 response plan, including suitable procedures such as physical distancing, hand hygiene, cleaning and disinfection, and respiratory etiquette.</li> <li>• Prepare and implement OH&amp;S management plan.</li> </ul>

<p>health and safety)</p>	<p>Construction involves heavy equipment and working at heights and with electricity, which may introduce some safety risks to workers and nearby public or residents/businesses (temporarily).</p>	<p>Construction</p>	<ul style="list-style-type: none"> <li>● An OHS management system and a Construction OHS expert need to be appointed both by the Contractor and the Supervision Consultant. Draft ToRs for the Contractor and the Supervision Consultant should be developed.</li> <li>● Labor management procedure (LMP) at program level and labor management plan at BRT project level should be developed.</li> <li>● Contractors' environment and social management plan should be developed in compliance with the LMP.</li> <li>● Prepare and implement an OH&amp;S Management Plan including training for all workers on all relevant aspects associated with their daily work, including emergency arrangements, working at height, etc.</li> <li>● Include access considerations into the construction plans and operating hours.</li> <li>● Address the management of excavated and construction materials, including OHS plan during construction which addresses possible material spills. Annex 5 Annex 5: Environmental Management Procedures for Construction Activity and WBG General EHS and Infrastructure Sector Guidelines. includes the Environmental Management Procedures for Construction Activity and WBG General EHS and Infrastructure sector Guidelines that should be followed.</li> </ul>
	<p>The BRT might pose a safety risk in earthquake and flood-prone regions. Earthquake and flooding events have been recorded in the proposed project area. Thus, the BRT system might face endurance challenges and thus face a safety risk for construction and operational workers.</p>	<p>Construction; Operation</p>	<ul style="list-style-type: none"> <li>● 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.</li> <li>● Prepare and implement an OHS management plan including training for all workers on all relevant aspects associated with their daily work, including emergency arrangements.</li> </ul>

	Possibly inappropriate hiring process risk, unfair working terms Child, and forced labor.	Construction; Operation	Age verification and fair hiring principles should be applied. Has to be ensured by the project manager.
Impact on livelihoods	Selection of routes may be considered unfair, politically motivated, or favor only certain groups.	Pre-Construction	<ul style="list-style-type: none"> <li>• The GoI with the support of the World Bank is currently undertaking a study on “Mainstreaming Angkot operators into Mass Rapid System”. The objective of the study is to take lessons learnt from other cities in Indonesia and other countries on how to integrate the existing transport operators into the BRT system. The methods include consultation with the angkot drivers, workshop/ FGD, and exchange (if needed). The study will propose an appropriate livelihood restoration plan for angkot driver in Bandung BRT. The proposed mitigation measures will be consulted and agreed with the relevant parties before its implementation.</li> <li>• Opinion/perception surveys and media analysis should be conducted and part of the to be ongoing stakeholder engagement and in monitoring plans.</li> <li>• Stakeholder engagement plan (SEP) has been developed and will be implemented to manage expectations of the local population and important stakeholders, including the grievance mechanism.</li> </ul>
	Businesses, restaurants, and services will experience economic impacts (e.g: loss of business or clients) due to reduced access. Construction also will temporarily cause disturbances regarding noise, air pollution, and dust coming from the construction will affect business owners.	Construction	<ul style="list-style-type: none"> <li>• Analyze in detail the affected parties (<i>angkot</i>, land, and business owners) interests and influence, and develop a specific consultation process for these groups.</li> <li>• Ensure women are represented in the consultations and negotiations for any economic displacement mitigation agreements, e.g: gender and social safeguard.</li> <li>• Opinion/perception surveys and media analysis should be conducted and part of the to be ongoing stakeholder engagement and in monitoring plans.</li> <li>• Provide temporary access wherever possible?</li> </ul>

	<p>Local transport (<i>angkot</i>) drivers will lose business once the new transport facility is in place and thus might oppose the construction plans.</p> <p>BRT operations might create displacement of paratransit workers, such as Grab/Gojek and taxi drivers, or the demand reduction of paratransit modes which can threaten livelihoods.</p> <p>Conflicts/disagreements from those businesses far away from built transport systems may lose business once the new rapid transport systems are in place, which might happen.</p>	Operation	<ul style="list-style-type: none"> <li>● Implement a Stakeholder Engagement Plan.</li> <li>● Analyze in detail the affected parties (<i>angkot</i>, paratransit workers, and land and business owners) interests and influence, and develop a specific consultation process for these groups. Offer employment opportunities to drivers in the new rapid transport systems. As an initial quick estimation, there would be around 100 drivers needed for both Medan metropolitan and Bandung metropolitan (Approx. 50 drivers needed for operational BRT Bandung metropolitan).<sup>30</sup></li> <li>● Carry out a detailed survey with <i>angkot</i> drivers and develop appropriate mitigation measures in consultation and agreement with the affected <i>angkot</i> drivers. Possible interventions include offering priority employment to the <i>angkot</i> drivers in the new system. The Gol with the support of the World Bank is currently undertaking a study on “Mainstreaming Angkot operators into Mass Rapid System”. The objective of the study is to take lessons learnt from other cities in Indonesia and other countries on how to integrate the existing transport operators into the BRT system. The methods include consultation with the <i>angkot</i> drivers, workshop/ FGD, and exchange (if needed). The study will propose an appropriate livelihood restoration plan for <i>angkot</i> driver in Bandung BRT. The proposed mitigation measures will be consulted and agreed with the relevant parties before its implementation</li> </ul>
	<p>From a car-users perspective, the BRT operation will increase their travel time as the bus and the stations will reduce road capacity.</p>	Operation	<p>Implement a Stakeholder Engagement Plan. Consider planning a mixed media campaign for the good of the BRT system for the social, economic, and environmental shakes.</p>

<sup>30</sup> As reference, TransJakarta bus rapid service operating in Jakarta metropolitan serves 80 routes and hires 204 drivers in 2014 (<https://finance.detik.com/industri/d-2496296/wow-gaji-sopir-transjakarta-rp-77-jutabulan>)

	Increased income for businesses nearby the construction sites/BRT stations, such as <i>warung</i> (food stalls) and <i>kos</i> (rental rooms).	Construction; Operation	Not required.
	Job opportunities for local laborers, such as construction workers and the employees of the BRT entities (e.g. drivers, maintenance, or management employees).	Construction; Operation	Not required.
Land acquisition and involuntary resettlement	Widening of roads might be necessary for some places to accommodate the BRT depots, stations/platforms. Platform construction requires land acquisition at 6 locations (Kebun Kawung, Banceuy, Alun-Alun, Simpang Lima, Pasar Kosambi, and Kiara Artha Antapani).	Pre-Construction	<ul style="list-style-type: none"> <li>• Conduct a detailed analysis of affected locations, size and businesses involved.</li> <li>• Prepare and implement a Land Acquisition and Resettlement Action Plan (LARAP) in close consultation with PAPs and local government in line with the ESS5 and the GoI regulations.</li> </ul>
	Land acquisition will have an impact on economic activities along the rapid transport routes. Economic disruption and displacement could happen due to land acquisition.	Pre-Construction	<ul style="list-style-type: none"> <li>• Provide compensation that will be at full replacement cost in line with the ESS5.</li> <li>• measures which are in accordance with the Bank's ESS5.</li> <li>• Prepare grievance mechanisms for affected communities.</li> </ul>
Influx of workers	Job opportunities for local labor.	Pre-Construction; Construction; Operation	Contractors should be required to offer preferential recruitments for local ID cardholders.
	The exact number of laborers is yet to be defined , however some degree of labor influx is expected.. The availability of labor with suitable expertise will be available in local universities or in Indonesia and the population size and accommodation opportunities of the cities can absorb the temporary workforce.	Construction	Contractors should be required to offer preferential recruitments for local ID cardholders.
	During the construction and operation phases workers often come from outside the project area. It may increase	Construction; Operation	It will be difficult to restrict influx into the project area during the construction and operational phases. However, regular

	competition for use of housing, community infrastructure, facilities, and services.		communication between project management/contractor and the stakeholders will be implemented to ensure that project management/contractors are aware of challenges faced by the communities.
	The project might have some degree of influx of workers that may increase the demand for sex work (further impacts are discussed in the SEAH part).	Construction	<ul style="list-style-type: none"> <li>Contractor's environment and social management plan should be developed in compliance with the program Labor Management Procedure which includes provision for prevention of SEA/SH incidents.</li> <li>Implementation of the GBV (SEA/SH) action plan; select the mitigation measures to ensure the safety of female workers at the working place and nearby living places.</li> </ul>
Cultural heritage	Risk of damage to heritage buildings could happen. The historical buildings are located in Jl. Asia Afrika, Jl. Braga (Including Cikapundung River park area), Jl. Sudirman, and Balai Kota Bandung. The determination of material and proper methodology of construction is important to minimize/avoid damage to public structures, including historical buildings.	Construction	<ul style="list-style-type: none"> <li>At a later stage of design, analyse alternative route options to avoid these heritage buildings. Analysis of alternative route options in the detailed engineering documents.</li> <li>Carry out a heritage impact assessment (HIA) for the routes proposed which map all heritage buildings and verify their distance to the track.</li> <li>Within the HIA, consider that the design of stations could reflect heritage values (architectural style).</li> </ul>
	Access to heritage buildings may be restricted during the construction period.	Construction	
	Changes in the overall visual impression and atmosphere.	Construction	
	Long-term impact on the visual amenity of the heritage buildings.	Operation	<ul style="list-style-type: none"> <li>Carry out a heritage impact assessment (HIA) for the routes proposed which map all heritage buildings and verify their distance to the track.</li> <li>Within the HIA, consider that the design of stations could reflect heritage values (architectural style).</li> </ul>
Gender and disability	Demand for a safety design for people with specific needs (e.g.: pregnant women, people with disabilities, the elderly).	Pre-Construction	<ul style="list-style-type: none"> <li>Review the BRT design for its accessibility and safety (user-friendly design).</li> </ul>

			<ul style="list-style-type: none"> <li>● Following Indonesian regulation, the new public Rapid Transport systems should be made accessible for all.</li> </ul>
	Women could be excluded from the new public transport if entry is difficult or the areas for waiting are crowded and do not provide appropriate facilities.	Operation	<ul style="list-style-type: none"> <li>● Ensure women, people with disabilities, and other vulnerable groups are represented in the specific consultations.</li> </ul>
	The inaccessible facilities might challenge people with specific needs (e.g: pregnant women, people with disabilities, the elderly). Disabled people might not be able to access the BRT due to difficult entry and exit modes and terminals.	Operation	<ul style="list-style-type: none"> <li>● In the design and construction, safety aspects for women and accessibility for people with disabilities and the elderly to the facilities should be considered, e.g: enough light at night, secure public toilet facilities, and universal design are aspects to be considered in the design.</li> </ul>
	Inclusive stakeholder consultations during all project stages.	Pre-Construction; Construction; Operation	Implement the gender equality and social inclusion action plan (GESI-AP).
Sexual Exploitation, Abuse & Harassment (SEAH)	SEAH risk during land acquisition and resettlement, construction, and operation stages. It may happen when community members would come into physical contact with project staff.	Pre-Construction; Construction; Operation	<ul style="list-style-type: none"> <li>● Contractors' environment and social management plans should be developed in compliance with the LMP which includes provision for preventing/addressing SEA/SH incidents.</li> <li>● Implementation of the GBV (SEA/SH) action plan; select the mitigation measures to ensure the safety of female workers at the working place and nearby living places.</li> <li>● Background checks for all workers.</li> <li>● Increase representation of women in the decision-making levels of the project.</li> <li>● Address the GBV (SEA/SH) risks identified; implement and monitor the suggested mitigation measures in the project area; set up the grievance system.</li> <li>● In GBV (SEA/SH) consultations, safety and ethical principles should be applied to prevent inadvertently causing harm when consulting with community members. If there is child</li> </ul>

			involvement, the consultations should be carried out by a person trained in child consultations and who understands the local culture.
	The project might have a large influx of workers that may increase the demand for sex work. The risk of incidents of sexual activity between workers and nearby communities could <sup>[1]</sup> <sub>[SEP]</sub> be increased—e.g., the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl.	Construction	Same as above
	Women might not feel safe using the BRT due to inappropriate lighting or the lack of separate toilet facilities.	Operation	<ul style="list-style-type: none"> <li>● Review the BRT design for its accessibility and safety (user-friendly design).</li> <li>● Safety for women at the bus stations, particularly at night, and secure public toilet facilities at central stations are aspects to be considered in the design.</li> <li>● In consultations, safety and ethical principles should be applied to prevent inadvertently causing harm when consulting with community members. If there is child involvement, the consultations should be carried out by a person trained in child consultations and who understands local culture.</li> </ul>
Traffic	Activities during the construction phase will generate an increase in traffic volume from construction vehicles and construction workers, which may cause an increase in traffic congestion and risk to pedestrian safety	Construction	<ul style="list-style-type: none"> <li>● Preparation of Traffic Management Plan.</li> <li>● Control of traffic lanes for heavy equipment.</li> <li>● Instruction for ANDALALIN is required.</li> <li>● Close coordination with local authorities regarding road closure and traffic rerouting;</li> <li>● Use of construction methods that are right for constructing the BRT station</li> </ul>
	The operation of mass transportation has the potential to generate traffic disruption around stations with an accumulation of passengers disembarking from the modes	Operation	Comply with ANDALALIN recommendations (if required).

	and impacting surrounding streets.		
	The operation of mass transportation may lead to an increase in public transport modal share and therefore a decrease in the use of private vehicles (cars and motorbikes) thereby resulting in a reduction of traffic on the roads.	Operation	Not required.

## VI - IMPLEMENTATION ARRANGEMENT

### 6.1 Existing Local Institutional Structure

Based on the analysis in BRT Feasibility Study (GIZ, 2020), some authorities involved in the BRT system could be the same as the one for road-based mass transport, specifically for the transport system and road traffic (*sistem lalu lintas dan angkutan jalan*) as regulated in Law No. 22 of 2009. The table below summarized the roles of each authority.

Table 34: Matrix of the Implementing Authorities

Subject	Covered Authority
Road— Public Works Ministry/Agency	<ul style="list-style-type: none"> <li>a) inventorying road service levels and issues;</li> <li>b) preparing plans and implementation programs, including determining the road service level that is expected;</li> <li>c) planning, developing, and optimizing roads;</li> <li>d) road geometric repairs and/or road intersections;</li> <li>e) stipulation of road classifications;</li> <li>f) road functional tests in accordance with the road traffic health and safety standard; and</li> <li>g) developing information systems and communications for road infrastructure.</li> </ul>
Infrastructure and Facility of Road Traffic and Transport— Transportation Ministry/Agency	<ul style="list-style-type: none"> <li>a) stipulating general plans of road traffic and transport;</li> <li>b) road traffic engineering and management;</li> <li>c) technical and roadworthy requirements of motor vehicles;</li> <li>d) public transport licenses;</li> <li>e) developing information systems and communications for infrastructure and facilities for road traffic and transport;</li> <li>f) coaching human resources who implement the infrastructure and facilities of road traffic and transport; and</li> <li>g) investigations of violations of public transport licenses, technical and worthiness requirements of motor vehicles.</li> </ul>
Industry— Industry Ministry/Agency	<ul style="list-style-type: none"> <li>a) preparing the plan and implementation program of motor vehicles industrial development;</li> <li>b) development of industry for motor vehicles equipment which guarantees the safety of road traffic and transport; and</li> <li>c) development of industry for road equipment which guarantees the safety of road traffic and transport.</li> </ul>
Technology— Ministry of Education/Ministry of Research, Technology, and Higher Education	<ul style="list-style-type: none"> <li>a) preparing plans and implementation programs of motor vehicle technology development;</li> <li>b) technology development of motor vehicle equipment for the safety of road traffic and transport; and</li> <li>c) technology development of road equipment for the safety or road traffic and transport.</li> </ul>
Registration and Identification of Transport and Driver, The	<ul style="list-style-type: none"> <li>a) testing and issuance of driving licenses for motor vehicles;</li> <li>b) implementing registrations and identification of motor vehicles;</li> <li>c) collecting, supervising, managing, and providing data for road traffic and</li> </ul>

Enforcement of Law, Operational and Management of Road Traffic Engineering, and Road Traffic Training—Indonesia National Police	transport; d) managing control centers for information systems and communications for road traffic and transport; e) arranging, protecting, guarding, and patrol of road traffic; f) enforcement of the law which covers enforcement of violations and handling of road traffic accidents; g) road traffic training; h) road traffic engineering and management implementation; and i) road traffic management implementation.
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Source: Law No. 22 of 2009, summarized in GIZ (2020, p. 138-139).

As a result of decentralization, responsibility for transport services and networks is divided based on the jurisdiction boundary. In the Bandung BRT project, the routes will be located in Bandung City, Cimahi Regency, Bandung Regency, West Bandung Regency, and Sumedang Regency (please see the project description in Chapter 1), so it becomes a provincial public transport route and falls within the responsibility of the Government of West Java Province. The graph below shows the existing local institutional structure for transport provision.

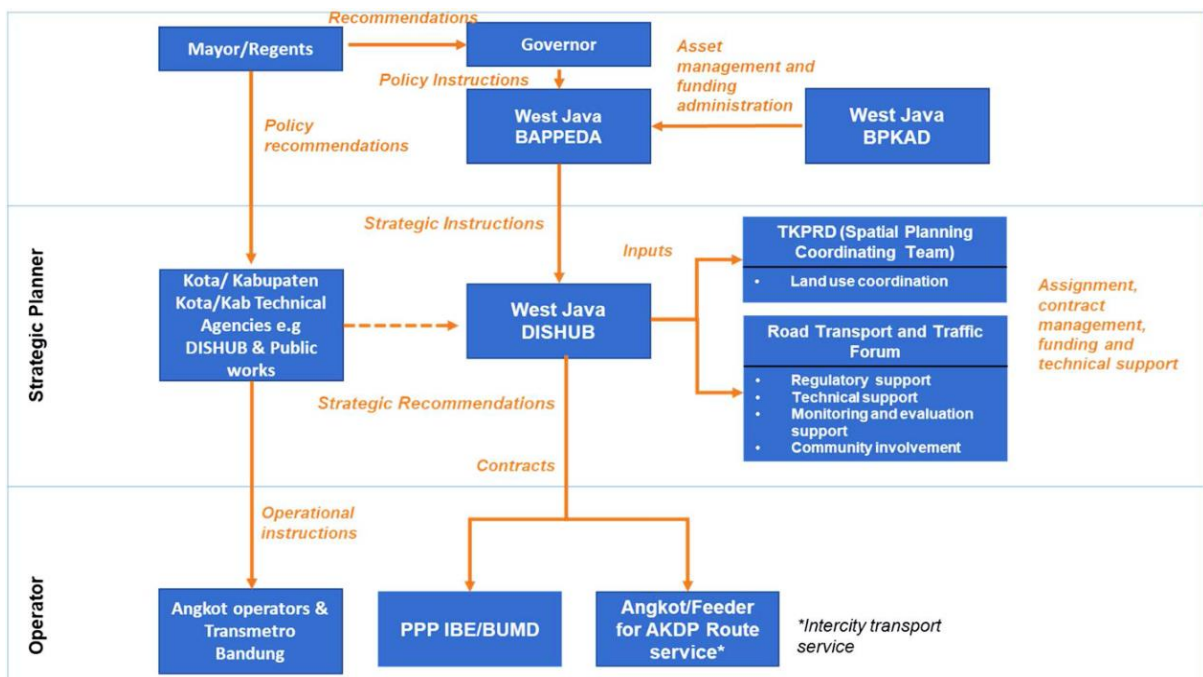


Figure 32: Existing Institutional Structure in West Java Transport Provision (DDAVA Vol. 2, 2021)

Table 35: Existing Institutional Roles in Bandung Basin Metropolitan Area (BBMA) Transport Provision

Level	Institutions	Roles/Set-Up Characteristics
Coordinator	West Java BAPPEDA (Provincial Planning Agency)	<ul style="list-style-type: none"> <li>set policies and targets which refer to the Province's RPJMD (Regional Medium-Term Development Plan);</li> <li>coordinate inter-sectoral tasks, e.g. transport, road infrastructure, spatial planning, etc.;</li> </ul>

		<ul style="list-style-type: none"> <li>integrate transport policy with other policy areas, such as economic development and spatial planning;</li> <li>be responsible for PPP project development<sup>31</sup>, which is led by the PPP node (<i>Simpul KBPU</i>);</li> <li>facilitate the city/regency governments in developing regional infrastructure.</li> </ul>
	West Java BPKAD (Financial and Asset Management Board)	<ul style="list-style-type: none"> <li>manage the local assets (BMD) under West Java's jurisdiction<sup>32</sup>;</li> <li>collaborate with DISHUB to manage the local assets (in the case of Bandung BRT, DISHUB can act as the manager and BPKAD will record and execute the asset management. Alternatively: DISHUB will allocate the budget and BPKAD will manage the assets);</li> </ul>
	BBUMA Managing Board <sup>33</sup>	<ul style="list-style-type: none"> <li>provide public services in the spatial planning, transportation, water resource, and waste management sectors;</li> <li>focus area: (i) public works and spatial planning affairs, (ii) transport, (iii) environmental management, and (iv) forestry;</li> <li>optimize the governance system and enhance the synergy in cross-administrative, cross-functional, and cross-impact governance services;</li> <li>assigned to planning, managing, developing, building, and leading cross-city/regency coordination and controlling land use plans;</li> <li>Steering Committee: the Governor of West Java, the Regent of West Bandung, the Regent of Bandung, the Regent of Sumedang, the Mayor of Bandung City; and the Mayor of Cimahi.</li> </ul>
Strategic Planner	West Java DISHUB (Provincial Transportation Agency)	<ul style="list-style-type: none"> <li>receives recommendations from West Java BAPPEDA;</li> <li>involves the Traffic Forum<sup>34</sup> for public consultation, usually for traffic impact assessment (ANDALALIN) as part of the extended AMDAL (ESIA); also for consultation on strategic projects;</li> <li>does not have direct power to instruct the Railway Operators<sup>35</sup>;</li> <li>shares its responsibility with City/Regency DISHUB in regulating <i>angkots'</i> performance, but the role is limited merely to operating license issuance;</li> <li>regulates intercity route services within the province; develop technical policies on the transportation sector; manage transport policy implementation; monitor and evaluate transport service performance and report to the Governor;</li> </ul>

<sup>31</sup> West Java Governor Decree Number 80 of 2018 regarding BAPPEDA assignment

<sup>32</sup> West Java Governor Decree Number 67 of 2017 regarding BPKAD assignment

<sup>33</sup> West Java Governor Decree No. 86 of 2020 regarding BBUMA

<sup>34</sup> As mandated by Law No. 22 of 2009.

<sup>35</sup> E.g. PT KAI, as the national railway network concession is managed directly by the DGR of the MoT.

		<ul style="list-style-type: none"> <li>has the main task of dealing with environmental affairs in the transportation sector<sup>36</sup>.</li> </ul>
	West Java DBMTR (Provincial Road Public Works and Land Use Affairs Agency)	<ul style="list-style-type: none"> <li>the main task: dealing with governmental affairs in the public works and spatial planning sectors under West Java jurisdiction, including road and bridge works, and construction-related development<sup>37</sup>;</li> <li>manage road assets and perform spatial planning and land use monitoring;</li> <li>collaborate with DISHUB and BPKAD for the transport integration planning.</li> </ul>
	West Java DLH (Environmental Agency)	<ul style="list-style-type: none"> <li>formulating and developing technical policies related to local environmental management<sup>38</sup>;</li> <li>responsible for the implementation and capacity building of ESIA in West Java<sup>39</sup>;</li> <li>facilitating the city/regency governments in developing regional land and environment, forestry, and water resource policies.</li> </ul>
	Bandung City DISHUB	regulate inner-city route services.
	Bandung Regency DISHUB	regulate inner-regency route services.
Operator	IBE/BUMD/BUMN/Co-operatives	Angkot: operates minivan services on a traditional basis, where the licensed cooperatives assign individual drivers to operate the fleet on an ad-hoc basis (not controlled by certain KPI or contracts).

Source: Summarized from DDAVA Vol. 2, 2021

In conclusion, there are several transport regulators in BBMA with overlapping responsibilities. The current institutional structure results in a transport service in the BBMA area that is not well integrated due to complex decision-making and asset management processes. Thus, there is a need for significant changes if the Project (and the MT Project at its heart) are to be realized effectively. Therefore, the West Java Government established Bandung Basin Urban Management Authority (BBUMA)<sup>40</sup> as a multi-sector coordinating body covering the whole BBMA to address this issue and improve integration arrangements. Its role will be limited to that of coordinator/facilitator rather than regulator—it will not be able to make binding decisions. Currently, BBUMA is still at the initiation stage and so has not yet had any impact.

<sup>36</sup> West Java Governor Decree No. 56 of 2016 regarding DISHUB Assignment

<sup>37</sup> West Java Governor Decree No. 51 of 2016 regarding DBMTR assignment

<sup>38</sup> West Java Governor Decree No. 15 of 2009 regarding DLH assignment

<sup>39</sup> DLH West Java Strategic Plan (2019)

<sup>40</sup> Governor Decree No. 86 of 2020 regarding Bandung Basin Urban Management Authority (BBUMA)

In addition, learning from the BRT operation in the capital city of Jakarta<sup>41</sup>, the Governor of DKI Jakarta is the ultimate responsible party for managing the BRT. The Governor then delegates the authority to the Transportation Agency (*Dinas Perhubungan*) for the BRT system, Public Works Agency (*Dinas Bina Marga*) for roads and bridges, and BRT business entity for operating the BRT (GIZ, 2020, p. 140).

### 6.1.1 Proposed Institutional Set-Up

Based on the Due Diligence Assessment/Value Analysis for Proposed Bandung Mass Transit System Project document, an integrated governance approach needs to be implemented in developing transport policy and policy. However, the authority has been divided based on statutory regulations. Jurisdiction boundaries have been generally determined many years ago and do not correspond to today’s travel and economic activity patterns. Furthermore, the hierarchical allocation of responsibilities makes it difficult to plan integrated multi-modal transport networks. Therefore, the delegation of responsibility for transport services within cities to the local government results in discontinuity, inconsistency, and lack of synchronization of infrastructure and services. Thus, some changes in institutional structure are proposed as below.

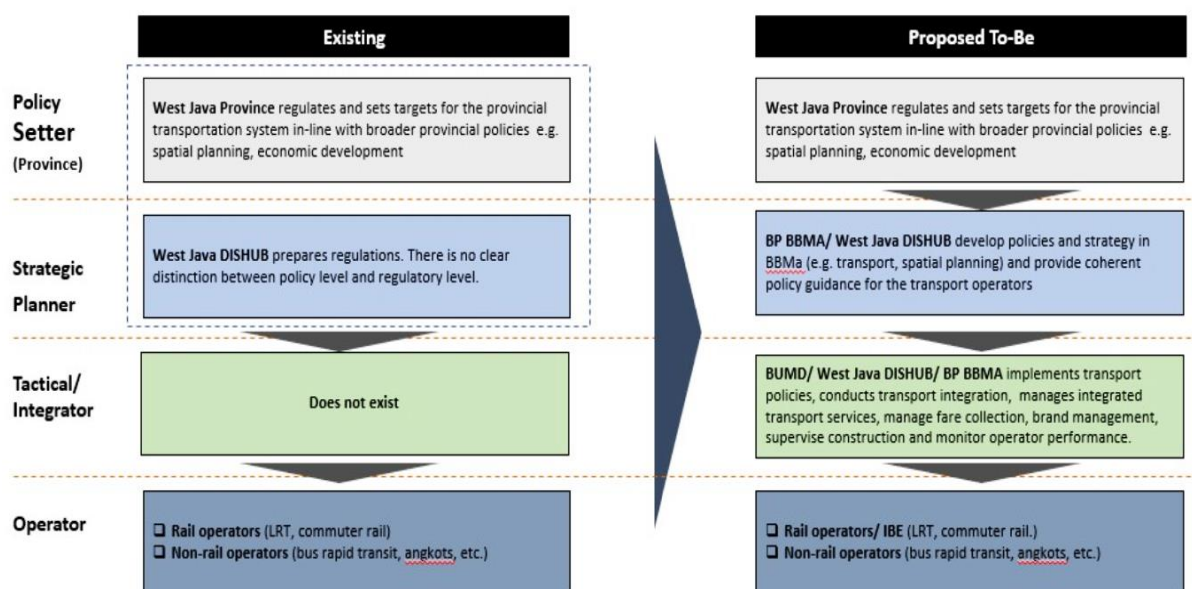


Figure 33: Existing Institutional Structure and the Proposed (To Be) Structure (DDVA Vol. 2, 2021)

Table 36: Proposed ‘As Is’ vs ‘To Be’ institutional roles

Function	Existing function allocation (“As Is”)	Proposed function allocation (“To Be”)

<sup>41</sup> Based on the DKI Jakarta Regional Regulation No. 10 of 2014

(Policy and Target Setter) Set transport and inter-sectoral policies consistent with wider policy objectives for economic, social, and spatial development.	West Java BAPPEDA and other municipalities' BAPPEDAs based on their jurisdiction  While Bappeda will lead the policy objectives and spatial development in general, Sekda will also be involved as a 'co-coordinator together with Bappeda.	West Java BAPPEDA to take responsibility from BBMA
(Policy and Target Setter) Set development targets e.g. mode share; greenhouse gas emission reduction.	West Java BAPPEDA and other municipalities BAPPEDA based on its jurisdiction	West Java BAPPEDA and other municipalities BAPPEDA based on its jurisdiction
(Policy and Target Setter) Implement legislation and regulation.	West Java BAPPEDA	West Java BAPPEDA
(Policy and Target Setter) Prepare allocation of funding to meet operation, maintenance, and system expansion costs.	West Java BPKAD	West Java BPKAD
(Strategic Planner) Develop metropolitan spatial and transportation network planning.	City/Regency DISHUB develop transport plan based on its jurisdiction	West Java DISHUB to develop BBMA integrated transport plan supported by BBUMA for strategies alignment with City/Regency DISHUB
(Strategic Planner) Develop transport regulation e.g. transport demand management.	West Java DISHUB and other City/Regency DISHUB	West Java DISHUB supported by BBUMA for BBMA transport strategies alignment with City/Regency DISHUB
(Strategic Planner) Identifies implementation and route priorities.		
(Strategic Planner) Plan infrastructure and network development.		
(Strategic Planner) Set performance and quality standards.		
(Strategic Planner) Monitor network system performance.		
(Strategic Planner) Set fare levels and annual revisions.	West Java DISHUB and other City/Regency DISHUB	West Java DISHUB (if there will be APBN support of the PSO subsidies, then it will involve MoT and MoF)
(Strategic Planner) Define the type of ticket and fare collection system.	West Java DISHUB and other City/Regency DISHUB	West Java DISHUB
(Tactical/Integrator) Develop and deliver	n. a.	BUMD/BLUD

Intermodal transport initiatives, including multimodal brand management.		
(Tactical/Integrator) Operational design of routes, timetables, and vehicles design.	n. a.	BUMD/BLUD
(Tactical/Integrator) Provision of civil, information technology, mechanical and electrical infrastructure.	n. a.	BUMD/BLUD (this task will be subject to the Commercial Case of EBC. This function may allocate to designated IBE)
(Tactical/Integrator) Deliver procurement, management, and monitoring of suppliers for the operation of services.	n. a.	BUMD/BLUD (this task will be subject to the Commercial Case of EBC. This function may allocate to designated GCA)
(Tactical/Integrator) Deliver fare collection and revenue management.	n. a.	BUMD/BLUD
(Tactical/Integrator) Manage non-farebox revenue including retail gas stations and TOD property development.	n. a.	BUMD/BLUD
(Operator) Provide services in accordance with the requirement defined by the Integrator.	Rail operator and non-rail operators	IBE or BUMD
(Operator) Develop operation management including safety and security implementation.	Rail operator and non-rail operators	IBE or BUMD
(Operator) Manage and maintain the fleet and assets.	Rail operator and non-rail operators	IBE or BUMD
(Operator) Operate supporting business e.g. ticketing, real-time passenger information, and customer service.	Rail operator and non-rail operators	IBE or BUMD

Source: DDVA Vol. 2, 2021

### ***6.1.2 Institutional Set-Up for the Environmental and Social Management Plan***

The MASTRAN project will be managed through three layers of management: Steering Committee, Central Project Management Unit, and Project Implementation Unit (Figure 3 4). The general responsibility of implementing related safeguard instruments lies with the Project Manager and the joint Executing Agency with DGs Land and Railways Transport of MoT. Environmental and social specialists were on board from the preparation phase and will continue to the construction and operational phases, depending on the company awarded to operate the BRT. The Project Implementation units in Bandung will be responsible for the day-to-day implementation of the measures for managing environmental and social impacts. The Project Manager of Bandung projects will regularly report to the national Project Manager.

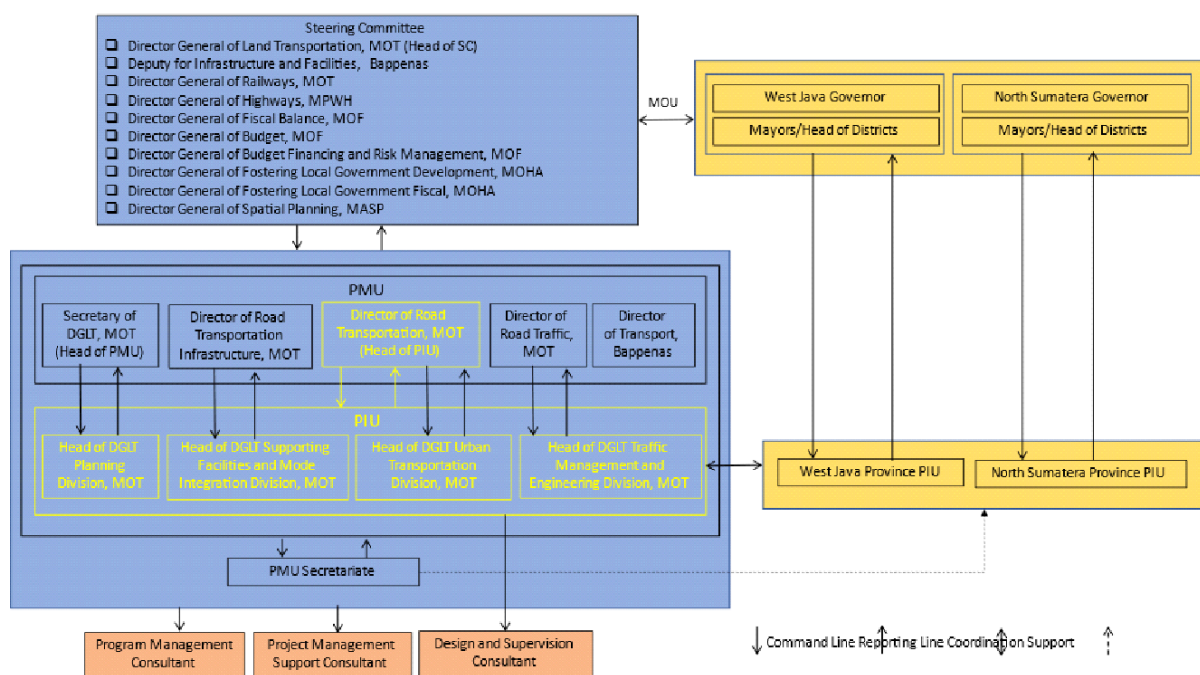


Figure 34: Organization Structure of BRT Project

At the subnational level, the working group (Satuan Kerja/Satker) comprises of agencies at provincial and Bandung metropolitan areas will lead Project implementation under its jurisdiction. Some responsibilities of the PIU (Satuan Kerja/Working Group in West Java) are:

- Ensuring that potential land tenure issues and competing claims are identified through review of existing grievances and GRM implementation during the pre-inception phase;
- Ensuring, in close collaboration with the National, Project Manager that E&S screening is carried out for each sub-Project/activity prior to implementation;
- Closely coordinating with the National Project Manager for review and approval of screening decisions and recommendations;
- Ensuring, in close collaboration with the National Project Manager, the timely preparation of ESMP, baseline data collection, depending on the screening outcome;
- Closely coordinating with the National Project Manager and Environmental Agencies to obtain any necessary clearances and environmental permits (e.g. AMDAL);
- Ensuring that relevant ESMP provisions are included in the design and in tender documents and in contractor/supplier agreements;
- Ensuring ESMF compliance during planning, construction, and operation;
- In charge of ESHS related issues.
- Preparing and submitting regular E&S Monitoring and Progress Reports to the National Project Manager;

- Closely coordinating with the National Project Manager to plan and deliver training and workshops on the Project’s E&S standard requirements and procedures to staff and contractors;
- Developing a GRM in close collaboration with the National Project Manager, as well as ensuring that grievances are addressed at the appropriate level;
- Raising awareness and disseminating and disclosing information on the GRM and the associated procedures at the Regional level; and
- Ensuring adequate public consultation during E&S screening, ESMP development, and encouraging community participation during sub-Project planning, management, and monitoring in close collaboration with the National Project Manager.

Institutional arrangement for the implementation of environmental and social management activities is as follows.

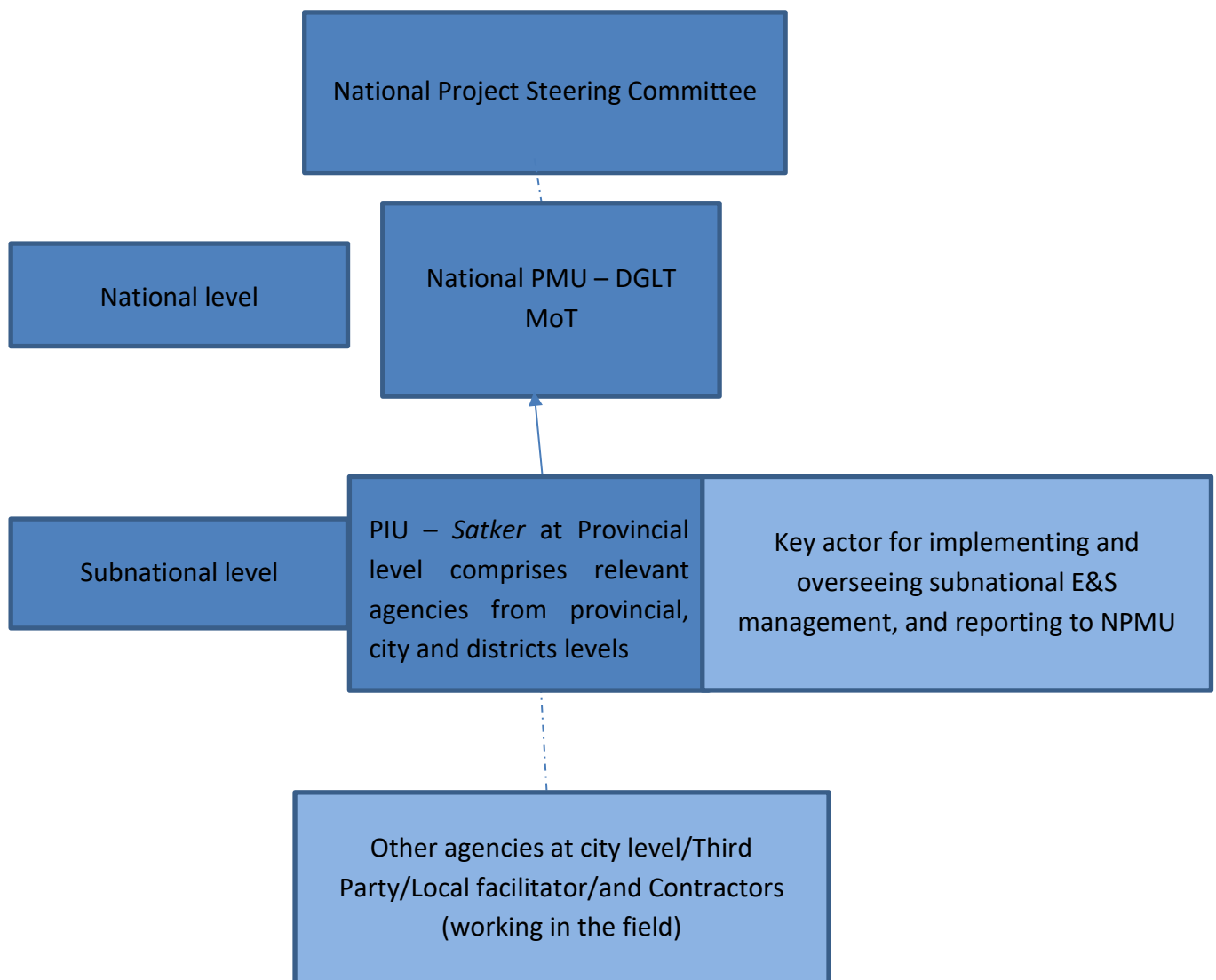


Figure 35: Institutional arrangement for the implementation of environmental and social management

**Key Note:**

PIU at provincial level, henceforth called 'Satuan Kerja/Satker', consists of all relevant agencies at provincial, city, and district levels. This should be legalized through *Surat Keputusan Gubernur*, which is substantiated by the Memorandum of Understanding (MoU)/Nota Perjanjian between DGLT and subnational governments (provincial and city/district level agencies). The head of PIU ought to be joint-Bappeda-Sekda and Dishub government Province of West Java (to be confirmed once all settled).

## VII - DISCLOSURE AND NEXT STEPS

This preliminary ESIA was socialised in combination with the public consultation of the ESMF and the SEP on 13th of December 2021. The minutes can be found in Annex 6: Minutes of the Public Consultations held on the 13th of December 2021. . Next, the preliminary ESIA will need to be updated with the AMDAL including supplementary documents required from the WB ESF. The full ESIA will be utilized to develop a robust Environmental and Social Management Plan (ESMP) to mitigate the identified risks and impacts. ToR to complete the ESIA is presented in the Annex 3. Table 37 presents key tasks related to environmental and social issues management to be undertaken during project implementation:

Table 37: Timeline for Environmental and Social Management Activities

No.	Aspects	E&S Related Activities/Documents	Involved Parties	Timeline
1.	E&S Assessment	ESIA (KA, ANDAL, RKL-RPL) <sup>42</sup>	Governments (national, provincial, city, regency); Consultants	Prior to construction
		AMDAL including ANDALALIN (Traffic Impact Assessment)	Governments (national, provincial, city, regency); Consultants	Prior to construction
		LARAP	Governments (national, provincial, city, regency); Consultants	Upon finalization of the DED
		GHG emission BAU baseline study & potential reduction through BRT development <sup>43</sup>	Governments (national, provincial, city, regency); Consultants	Inception Phase
2.	E&S Mitigation Implementation	Implementation of SEP & GRM.	Governments (national, provincial, city, regency); Implementing Business Entity (IBE)	Pre-Construction; Construction; and Operational phase
		Implementation of mitigation measures—ESMP and RKL-RPL (including Construction Management Plan, noise reduction plan, COVID-19 Response Plan, ANDALALIN, GESI-AP, GBV (SEA/SH) Risk Assessment). <sup>44</sup>	Governments (national, provincial, city, regency); Implementing Business Entity (IBE)	Pre-Construction; Construction; and Operational phase
		Implementation of LARAP	Governments (national, provincial, city, regency); Consultants	Prior to construction

<sup>42</sup> Suggested ESIA TOR could be seen in Annex 2, including some complementary studies/plans to be integrated into ESIA.

<sup>43</sup> TOR of International Greenhouse Gas (GHG) Specialist available in Annex 3.

<sup>44</sup> Initial mitigation measures could be seen in Chapter 5 and 6 of these documents, and will be developed further in the ESMP and RKL document according to the final BRT route.

3.	E&S Mitigation Monitoring & Reporting	Monitoring and Reporting of the ESMP and RPL (including periodic air quality monitoring and reporting, noise monitoring and reporting, GHG emission reduction reporting). <sup>45</sup>	Implementing Business Entity (IBE)	Construction & operational phase; daily/monthly (monitoring); annually (reporting).
4.	Technical Training	Training on WB E&S standards specifically linked to the MASTRAN project.	Target audience: Governments (national, provincial, city, regency)	Inception Phase
		Technical guide on green procurement in the transport sector.	Target audience: Governments (national, provincial, city, regency)	Inception Phase
		Training on Grievance Mechanisms.	Target audience: Governments; Directly affected stakeholders	Inception Phase
		Training on data monitoring and analysis.	Target audience: Governments	Inception Phase
		Training on Environmental and Social Code of Practice as well as guidelines for green procurement to construction firms.	Target audience: Contractors	Prior to bidding process
		Training on greening initiatives in public transport.	Target audience: Governments	Prior to bidding process
		Initiation workshop on the establishment of monitoring systems and monitoring task force for regional institutions to survey the BRT system.	Target audience: Governments	Construction Phase

<sup>45</sup> Mitigation monitoring and reporting measures will be developed further in the RPL document according to the mitigation measures planned in the RKL.

		Gender training. <sup>46</sup>	Target audience: Internal Team	Construction Phase
		Training on stock assessment.	Target audience: Governments	Annually
		GHG emission, air and noise pollution monitoring training	Target audience: Sub-project permanent institutions	Annually
		Training capacity building for important stakeholders on E&S standards for the MASTRAN project. This would target main stakeholder groups of sub-project locations to provide community monitoring on the implementation and fulfilment of the E&S standards.	Target audience: Communities	Annually

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<sup>46</sup> Please see the detailed action plan in the GESI Report, 2021.

## REFERENCE

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2020, Mitchell, L. and Streitferdt, V. Bandung—Rapid Environmental and Social Assessment of the Indonesian Mass Transit Program Support (MASTRAN).

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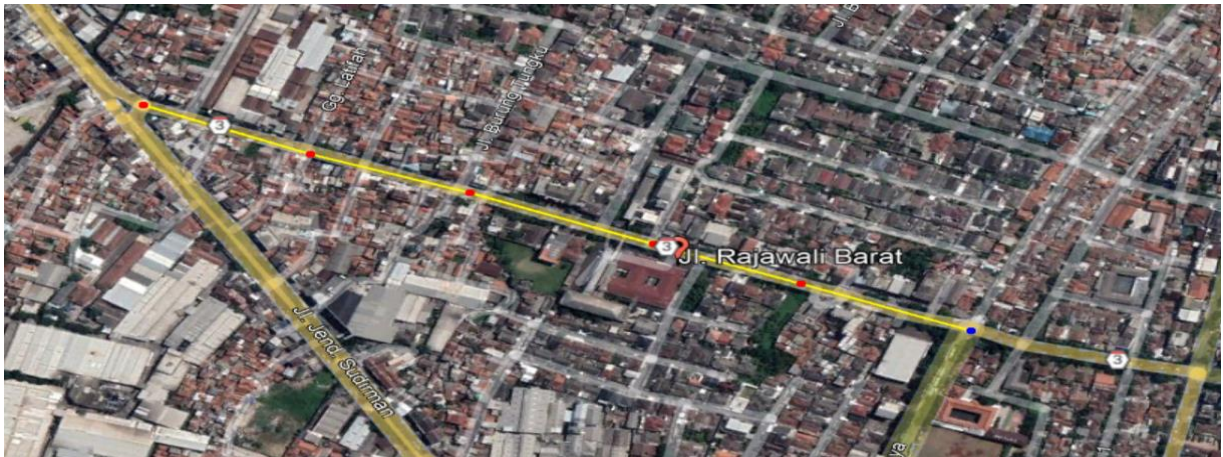
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2021, World Bank. Gender Equality and Social Inclusion (GESI) Assessment of Bandung Basin Metropolitan Area (BBMA) Mass Transit.



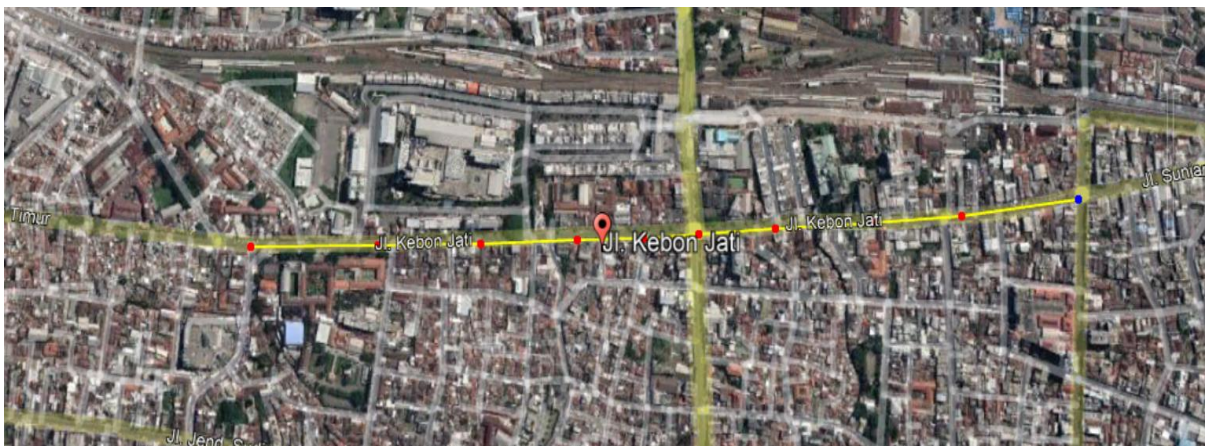
### 3. Jl.Rajawali Barat



### 4. Jl.Rajawali Timur



### 5. Jl. Kebon Jati



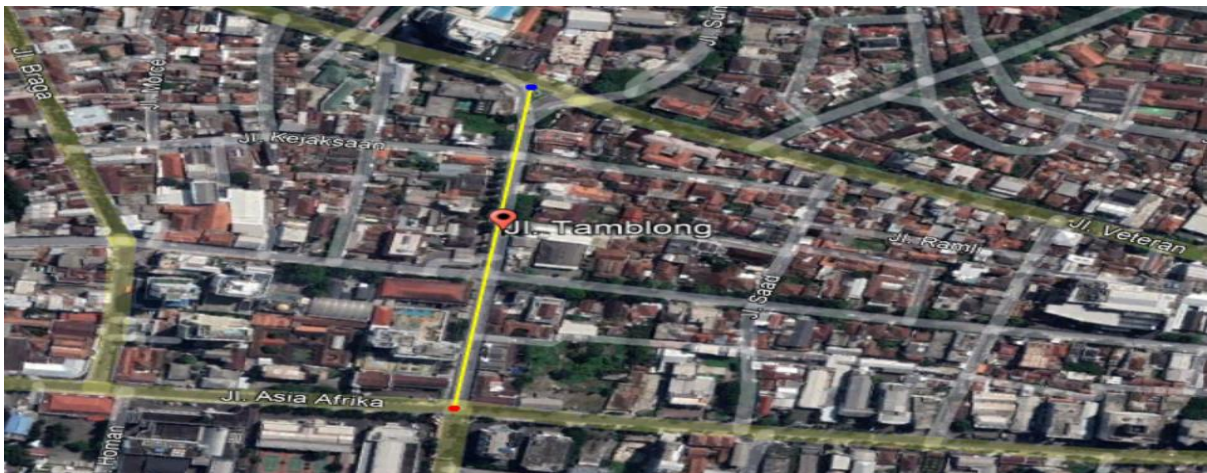
6. Jl.Stasiun Timur



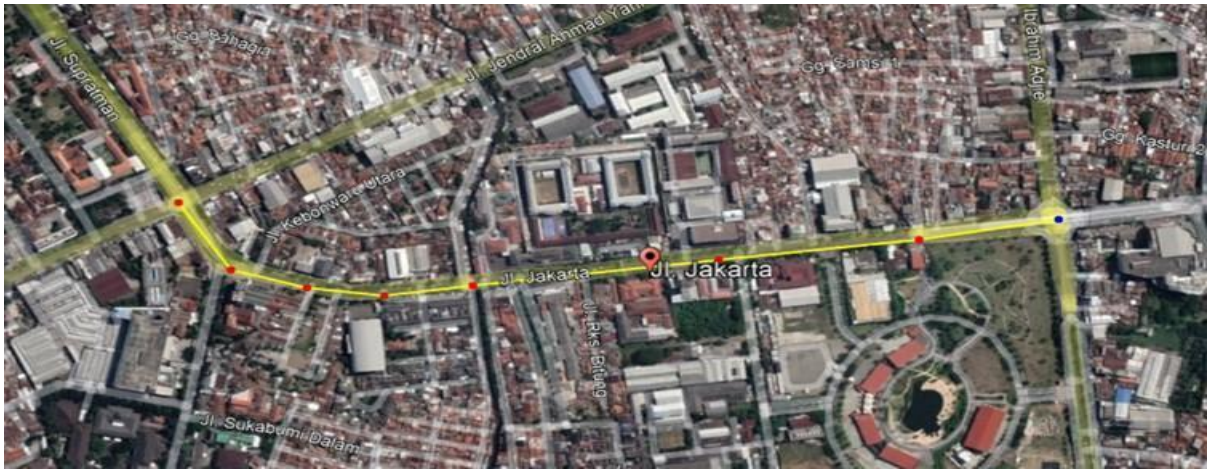
7. Viaduct



8. Jl. Tamblong



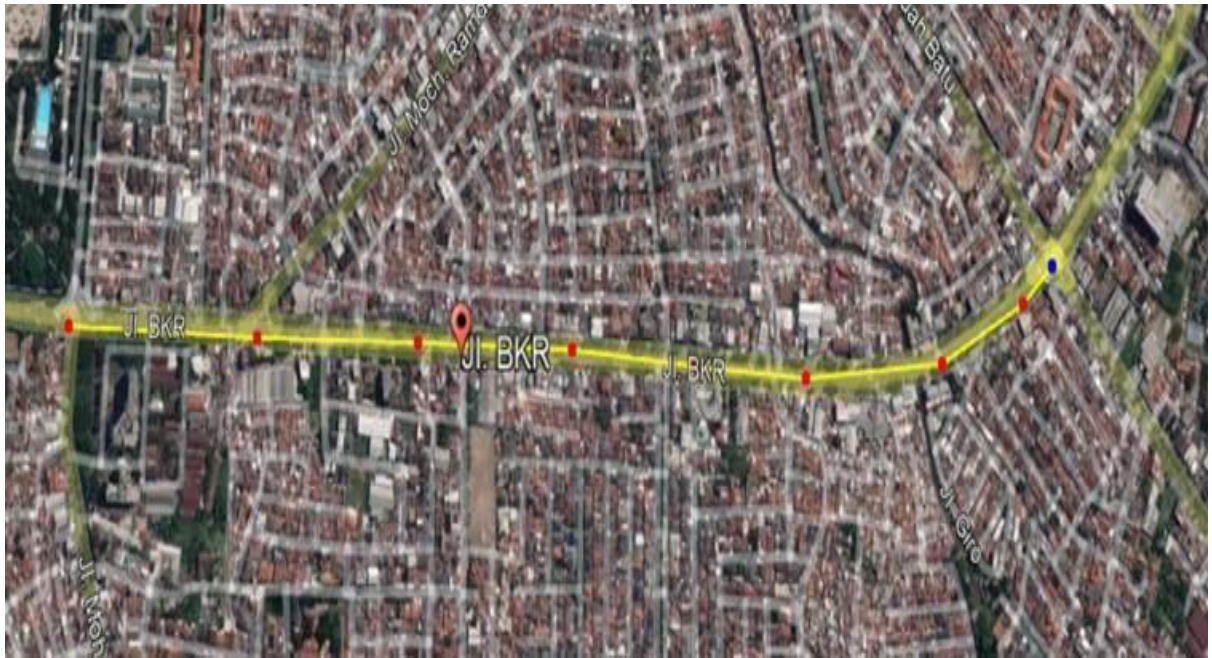




13. Jl. Otista



14. Jl. BKR





						construction activities
<b>II</b>	<b>Construction Phase</b>					
1	Jl.Asia Aprika; Station L=18 m.W =2,5 m, on road side, pedestrian plan.	3300 / ROW 19 & 11 m	Houses shop, store, Pos office, hotel, bank,restaurant,trade center,parking place	Workforce recruitment	Social unrest	Recruitment of workers is carried out transparently Wages according to the Provincial minimum wage (UMP) and included National health care (BPJS)
	Alun Alun; Station on road side L=79* m. W =5,	ROW 27,5 &17 m	Mosque, park, store,bank,shelter			Prioritise local workers by 30% of the local population, the number proportional as the needs and expertise
2	Jl.Sudirman Station to be decided, pedestrian plan	1230 (national road & prov 3300) ROW 22& 14	Parking area, trees store,market, hotel,bank etc	<ul style="list-style-type: none"> <li>▪ Mobilisation equipment and heavy vehicle</li> <li>▪ Station construction</li> <li>▪ BRT Corridor pavement</li> <li>▪ Civil work</li> <li>▪ Pedestrian construction</li> <li>▪ Base camp operational</li> <li>▪ Civil work</li> </ul>	Job Opportunities and business	Provide opportunities for the growth of the informal sector for the community such as stalls, kiosks, restaurants around the project location
3	Jl.Rajawali Timur Station to be decided, pedestrian plan	ROW 25 &14 m	Parking area, trees houses, hospital, shops etc		Traffic disturbance	Implement traffic management and install road sign and traffic corn, light signs at the start and end project, and flagman at the construction site so it will not disturb existing traffic
4	Jl.Rajawali Barat Station to be decided, pedestrian plan	970 (national) ROW 25 &14 m	Parking place,vendor, store market, school, bank, houses, trees		Installation of information boards for BRT shelter construction and warning signs of construction work at a distance of 50 m before the construction site	
5	Jl. Kebon Jati Station to be decided, pedestrian plan	ROW 25 &14 m	Hospital, vendor, parking on street, Shop, station etc		- Diversion of traffic flow on carriageway less than 5 m - Coordinate with the Bandung City Transportation Service or with the traffic police (Polantas)	
6	Jl. Stasiun	ROW 24 &14 m	Store, office, sport shop, terminal & railway station etc		Setting the duration of the transportation of material and equipment to construction site not simultaneously so as not to cause traffic jams	
7	Jl. Station Timur Station to be decided, pedestrian plan	ROW 14 &7 m	Store,trees,house		Transportation of construction garbage to the disposal area is carried out directly using a dump truck	
8	Viaduct Station on the river; L=50*m. W 5 m,	ROW 15 – 7 m	Park, office, bank, river, house,trees		Restricted access to the shop/business	Provide temporary access to shops and houses to facilitate access by the pedestrians, buying public and shop owners
9	Jl. Lembong Station to be decided, pedestrian plan	ROW 25 &14 m	Restaurant,hospital ,office, houses, shop		Provide signages that inform the public and motorists on safety precautions and rerouting schemes	
10	Jl. Veteran Station to be decided, pedestrian plan	ROW 25 &14 m	Shop, hotel,houses restaurant, parking		Loss of parking space and street	- Local government provides new parking areas near parking areas existing and priority for short term parking

1 1	Jl.Ahmad yani, Pasar Kosambi; Station L=93* m. W = 3,5 m, Station in median, pedestrian plan	13,3 m ROW=20,1 m,	Shop, market, jewelry, parking on street, pos,bank etc		vendors at the station construction site	- Provide a representative place of business, government partnerships and street vendors
	Jl. Ahmad Yani Station to be decided, pedestrian plan	ROW=33 & 17 m	Railway track, houses, store,office, bank, trees, otomotif, electronic store, trading etc		Loss of trees Affected trees along median & road side for station location	- Replanting trees at the station surrounding will be based on their age, productivity and present commercial value, per recommendation by local environmental/mayor office.
1 2	Bandung Juara; Station in road side L=18*m. W =2,5 m*4, pedestrian construction plan	ROW 33 &17 m	Football stadium, food vendor, shop, houses, office, parking on street etc		Temporary loss of land for temporary work stations storage	- Lease or rent to the owner on the agreed period of using the land based on prevailing rental cost and agreement with the land owner. - Restoration of the land to its original condition, or better, prior to its return to the land owner
1 3	Kiara Artha; Station on side road L=89,4*m.W =5 m, pedestrian construction plan	ROW 30,6 & 14m Fly over carriageway 7 m	Fly over, park, office, shop. Houses, trees, etc			create a sedimentation pond/silt barrier with a depth of 0.50 x 0.50 at base camp location to accommodate mud/soil aggregates carried by rain water to the receiving water body domestic wastewater management by using mobile latrine,
1 4	Jl. Jakarta; station in road side L=33,5*m. W= 5 & pedestrian construction plan	ROW 19 & 14 m,	Shop houses, restaurant,office, housing, fashion store, vendor, bank parking on street			Provide organic, non-organic and B3 waste bins at construction sites and base camps
1 5	Jl.Simpang Lima; Station in median L=47 m. W = 5 m, pedestrian construction plan	ROW 19 & 14 m	Hotel, bank, office, shop, fashion store,etc			Conduct regularly watering in the dry season at construction site
1 6	Jl.Otista / Cibadak Station in median; L=50*m.W = 4,5 m,	2470 m ROW 22 & 20 m	Parking on street, vendors, food shop, shop, bakery etc		Air pollution	Use of masks for workers and Covering truck of material with tarpaulin
1 7	Jl. Otista /Kalipah Apo; Station in median; L=52*4 m. W = 4,5 m, pedestrian construction plan	2470 m ROW 39 & 32 m	Shop house, store, vendor, parking on street, bakery food			Clean the tires of material transport vehicle before exit from base camp
1 8	Taman Tegalega; station in road side; L=50*2m W = 5 m, pedestrian construction plan	1200 ROW=25 &20 m	Park, trees, food shop, furniture, restaurant,etc			Using a vehicle of transporting materials and equipment that has passed emission test

1 9	Jl. BKR ; station in median ;L=50*2m. W = 4,5 m, pedestrian construction plan	1440 ROW 22 & 20	Store, houses, office, vendor, parking, tree's			Regular maintenance of vehicle engines and not using noisy exhausts and has passed the emission test
	Terminal Kebon Kalapa; station in median; L=50*5m W=4,5, pedestrian construction plan	1440 ROW 22 & 20	Terminal, store, restaurant, vendor, parking on street, market, etc		Soil Contamination	provide a temporary storage place (TPS) of hazardous waste at the base camp location, this hazardous waste temporary storage place should be completed with licensed hazardous waste such as ex oil, ex batteries, accu, TL lamps etc. are stored in TPS for a maximum of 90 days to be sold to third parties Storage of fuel tank completed with oil trap and roop also drainage from fuel tank do not mixed with rainwater drainage Organise a housekeeping campaign for all working areas involving all workers to improve site environmental performance. Behaviour change is the key. An opportunity to apply reward and punishment Follow the requirements in environmental documents (RKL- RPL/UKL-UPL/SPPL) for toxic and hazardous waste management (temporary storage permit and disposal).
					Potential increase hazards due to Construction activities and Worker Health	Implement of ten golden rules to prevent work accidents such work permit required; No permit..No work minimal standard of Personal protective equipment (PPE/APD); helmet, safety shoes and vest Work safety at height (more than 1.8 m full body harness required) Life Jacket required; working on and near water (min 1 m from the edge) Does not approach the heavy equipment in operation Does not stand and walk under lifting area Electrical work tools are inspected and labeled Conduct daily toolbox meeting/prestart briefing Scaffolding according to inspection procedures and labeled Housekeeping improvement; kept clean and tidy
					Water pollution & Hydrology / flood	stations: the design of BRT routes has been considered for the flood-prone areas/points therefore necessary street inlet and drainage system will be included. At depots: pre-treatment of wastewater (grease trap and dissolved air flotation) should be installed to treat wastewater before discharge to the surface water

						<ul style="list-style-type: none"> <li>- Transport the residual of construction materials from the work site immediately and Clean up spilled soil at the construction site</li> </ul>
					Road damage	<ul style="list-style-type: none"> <li>Road restored to original condition or better after finishing construction</li> <li>The load of vehicles carrying materials does not exceed the roads capacity</li> </ul>
					Public unrest	<ul style="list-style-type: none"> <li>Conduct socialisation with the community before construction start and contractor will inform all about the project purpose and benefits, impacts and mitigation</li> <li>Provide a public complaint handling mechanism on BRT construction activities</li> </ul>
					Disruption of business	In consultation with the APs, the Local government will assist in locating for temporary small business operation and facilitate for their transfer before the started construction
<b>III</b>	<b>Operational Phase</b>					
	BRT Corridors and Depot Plan (Jl.Asia Aprika, Jl.Sudirman, Jl.Rajawali Timur, Jl,Rajawali Barat, Jl.Kebon Jati, Jl.Stasiun Timur, Viaduct, Jl,Tamblong, Jl,Veteran, Jl.Ahmad Yani, Jl,Jakarta, Jl, Otista, Jl.BKR, Jl,Pungkur)	23 Km	Office, Mal, Houses shop, trading centre, Bank, store, bakery, food shop, restaurant Drugstore, school, mosque, church, market and parking on street, vendors, houses, Jail, Furniture Hotels, hospital, railways station, rivers, terminal etc	BRT and Depo operational	Job Opportunities and business	<ul style="list-style-type: none"> <li>Prioritise local workers by 60% of the local population, the number proportional as the needs and expertise</li> <li>Provide opportunities for the growth of the informal sector for the community such as stalls, kiosks, restaurants around the project location</li> </ul>
					Environmental aesthetic degradation	<ul style="list-style-type: none"> <li>Provide organic, non-organic and hazardous waste (B3) trash bins for employers and visitors and transported by a 3rd party, (City Cleanliness Agency)</li> <li>Replacement of used batteries, oil and oil filters is carried out at the depot then keep at the storage of hazardous waste (TPS B3) to be transported in cooperation with a licensed 3rd party</li> </ul>
					Public health and occupational health	<ul style="list-style-type: none"> <li>Regular maintenance/cleaning of BRT bus air-conditioning systems</li> <li>Regular medical check-up for BRT drivers and co-drivers</li> <li>Full operation of air conditioning will create higher pressure inside cabin thus when the door is opened then the air will move from inside to the outside</li> </ul>

					Community Health, Safety and Security Criminal actions around the stations and inside the vehicle (e.g. robbery or sexual harassment).	Promotion of shifting from private transport to BRT
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## Annex 2: Preliminary impact assessment on *angkot* drivers

### 1. Project description

Bandung suffers from heavy congestion; 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 urban population (Lubis et al. 2003 in Tarigan et al. 2016). Several mass transit proposals are presently under consideration by the provincial and city authorities of the Greater Bandung area.

Bandung City has prepared and taken to market PPP projects comprising a North-South Monorail line within the Central Business District (CBD). However, these projects failed to proceed beyond the bidding process due to, inter-alia, requirements from the preferred bidder for government to provide public revenue as supplementary. However, the city was unable to fulfill such requirements.

The project, through sub-component 2A, will finance the construction of a Bus Rapid Transit (BRT) line to enhance connectivity between the east-west urban corridors in Bandung Basin Metropolitan Area (BBMA). It will have an approximate length of 20.4 km running through the central area of BBMA. The system will include 17.3 km of segregated bus lanes, 3.1 km of mixed traffic lanes, and 36 stations.

#### Text Box 1 What entails in BRT Bandung Metropolitan

##### What entails in BRT Project for Bandung City

The BRT Bandung Metropolitan will have 20.4 km of special bus lines, 17 segregated (bus) lane, up to 12 direct service routes, and 27 bus stops. BRT route will serve the metropolitan area of the city. The BRT upgrade includes bus stops outside the corridor, an integrated ticketing system, information systems, good pedestrian facilities/ access facilities, good intermodal facilities, and others.

### 2. Baseline information

The Government of Indonesia, both at the national (Ministry of Transport) and local Transport Agency, regulates the operation of public transport provisions as stipulated in the Transport

Minister' Regulation No. 15 of 2019 on the Provision of Public Transport Services<sup>47</sup>. The local Transport Agency (*Dinas Perhubungan*) must grant a permit for routes (*Trayek*) of the public transport operators, and all fleets (*'Armada'*) must be registered as an operator. As such, the market entry, bureaucracy and permitting-wise, is relatively high. In terms of monitoring and reinforcement, an annual registry-check (a reality check on database and on-site whether the routes are still active/ operating or already inactive) is conducted. On the street level, on-site police check is regularly conducted to see if the fleets have permit as public transport operator in coordination with local traffic police officers.

**The existing public minibus transport service, called *Angkots*, are an important mode of transport for low-income groups and also an important source of employment/ means of livelihoods.** To be an *Angkot* driver, individual just required to have a driving license (called "SIM A") for *angkot*/regular-vehicle under 3500kg gross weight<sup>48</sup>, and without requirement of educational background. Hence, *Angkot* operation provide a means of livelihoods to low-income households with relatively low educational attainments. In Bandung, *angkot* drivers are not commonly the owners of the fleet. One fleet can be used by three drivers on different shifts (i.e. afternoon shift, evening shift, and night shift).

**There are at least three typologies of *angkots-drivers***<sup>49</sup>. First, regular drivers with no-ownership of vehicle. Majority of *angkot* drivers fall into this category. These types of drivers have to pay for the vehicle' rent to the vehicle owners on an daily basis. Regular drivers can be working under contractual arrangement with the operators, or they can be hired individually without clear contractual arrangement (informal mutual trust that the driver will pay the rent as agreed). Most regular drivers rent vehicles on a daily basis from vehicle owners, and each driver retains his revenues and pays daily rental, fuel, administrative fees (legal and illegal) from them. The second arrangement is the substitute drivers. Substitute drivers do not work every day, instead they just work when being called to substitute the regular *angkot* drivers. It is difficult to know the social baseline of substitute drivers as there are no clear arrangement nor data available on how many of them operate in this capacity and how they work. Substitute drivers are usually hired/ phone-called by a regular driver to fill in, and the retainment is based on social relationships, i.e., kindship, friends, neighbors, or someone the regular drivers/ operators know personally. Substitute drivers will pay vehicle

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<sup>47</sup> [https://jdih.dephub.go.id/assets/uudocs/permen/2019/PM\\_15\\_TAHUN\\_2019\\_Update.pdf](https://jdih.dephub.go.id/assets/uudocs/permen/2019/PM_15_TAHUN_2019_Update.pdf)

<sup>48</sup> <https://dpmptsp.bandung.go.id/izin/index.php/lovinformasi/persyaratan/067> requirements to register fleet as a public transport fleet in Bandung: identity card (KTP), driving license (SIM), the Tax-numbers (NPWP), and a referral letter of no record of drunk driving issued by the policy office.

<sup>49</sup> In Indonesia, majority of *angkot* drivers are male. While the age group of *angkot* drivers are ranging from young adult (18 years old) to almost elderly (60 years), majority are male and graduated from primary, junior or senior high school (using proxy from Dishub Bandung data on driving licence issued for SIM A).

rent for the day that they work, just like regular drivers, and are not necessarily attached to one operator or one regular driver. Their employment is dynamic in nature and the demand for work fluctuates day by day, while also providing flexible means of income supplement for low income groups. Third type is driver-owner, which drives the *angkot* him/oneself that he/one owns. From on-site interviews/ brief survey conducted with 13 drivers in August and a follow up survey in December, 2021, and based on technical discussions with staffs of the Transport Agency of Bandung, owner-driver is relatively limited in number in Bandung compared to regular drivers, although the exact number of owner-drivers of *angkot* fleets is unknown.

**Aside of *angkot* drivers, the other player is the *angkot* owners which lease their vehicles to regular (and substitute) drivers and earn money from leasing their assets.** The *angkot* trade is fragmented, vehicles are licensed individually and owned individually or in small cooperatives/ operators. Owners are responsible for maintenance of the vehicles. A small group of owners have more than one vehicle, and they formed cooperatives/ formal public transport operators. While the rest lease their vehicles in an informal way i.e., based on trust to the regular drivers. Access to individual *angkot* routes and terminals is controlled by 'agents' (usually private firms). No-one is accountable for service standards in terminals/ bus depots. Membership of a cooperative is required. Cooperatives provide some services for their members, such as negotiation with local governments, bus depot management and maintenance. However, participation of regular and substitute drivers in decision making is very limited.

**While *angkot* has been one of the main public transports in Bandung metropolitan, their popularity is declining because of poor service<sup>50</sup> and competition from DAMRI (state-owned enterprises transport operators)<sup>51</sup> and *ojeks* (motorcycle taxi).** An increasing traffic congestion in Bandung leads to a worsening travel time and reliability of transport services by 4-wheel vehicles such as *angkot*, favoring *ojeks* and public transport operates by state-owned enterprise DAMRI of which the demand is increasing. The COVID-19 pandemic has worsened

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<sup>50</sup><https://www.gridoto.com/read/222719218/kasus-angkot-maut-bandung-menguak-fakta-semrawutnya-angkutan-umum-di-bandung-dari-sopir-tak-punya-sim-a-hingga-izin-trayek-yang-mati> (local media title: Bandung *angkot* deadly accident revealed the messy-public transports management: from drivers did not renew its driving license to unregistered route, April 2021)

<sup>51</sup><https://www.ayobandung.com/bandung/pr-79718373/dilema-sopir-angkot-bandung-penumpang-hilang-hingga-bersaing-dengan-damri?page=all> (local media: The dilemma of Bandung *angkot* drivers, losing passengers and competing with DAMRI)

*angkot* situation, and thus the drivers' welfare, as less people use *angkots* to avoid the spread of corona virus, while mobility restriction policies are imposed by the local government<sup>52</sup>.

Based on a study conducted in 2019 by AFD, **there are approximately 5,337 vehicles operated by *angkot* drivers in the Bandung metropolitan area.** In Bandung administrative city area, there are 75 *angkot* routes with 3,881 units (approximately 73% of the total in Bandung metropolitan area) are officially registered. However, the size of actual *angkot* fleet in operation is estimated to be smaller: based on peak hour speeds and frequencies assessment conducted in 2019, some 1945 vehicles (around half of the licensed to operate in Kota Bandung) were estimated to be in operation in Bandung administrative city area.

**Initial socioeconomic assessment shows *angkot* drivers gain meager income.** Based on data from Transport Agency of Bandung, *angkot* drivers' net income is approximately IDR 50.000 (USD3.3) to IDR 100.000 (USD6.7) per day after deduction of fuel, meals and daily rent. Following the construction of BRT, they are more likely to either lose their jobs (cooperatives decide to reduce number of *angkot* that operates) or experience significant income reduction. They work approximately 7-8 hours per day for 6-7 days a week.

*Angkot* drivers and crews typically have limited formal educational attainments and lack skillsets in other jobs. While many of them are very familiar with basic mechanics for small/medium-sized 4-wheels vehicles, many do not have any formal trainings nor experience as professional/ paid mechanics. Based on on-site interviews with 15 *angkot* drivers and Transport Agency of Bandung data, majority of *angkot* drivers have no formal trainings nor formal capacity development activities, and they have been relying on their ability to drive a vehicle, navigate the route and surrounding environments, and fix vehicles/ mechanical small problems. At the same time, based on the interview with 15 drivers in Bandung city, 14 of them are not the owner of the vehicles, and still live on rented apartments (not owning a house), and thus have limited productive assets. Thus, their adaptive capacity to (the proposed) change is constrained and thus mitigation measures need to be prepared and implemented with their meaningful participation.

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<sup>52</sup><https://www.pikiran-rakyat.com/bandung-raya/pr-012279768/supir-angkot-menjerit-ppkm-level-4-berlanjut-susah-penghasilan-turun> (local media: *angkot* drivers scream for help: losing passengers due to strict mobility restriction in Bandung in place)

Figure 2. Angkot in Bandung<sup>53</sup>



Figure 3 Inside the Angkot



### 3. Potential impacts on Angkot drivers

It is expected that **48 existing angkot routes would be impacted by the BRT operation with total of estimated 1320 angkot operators including drivers, ticketing, timers and maintenance staffs.** The impact of the BRT operation on the job of angkot operators will depend on the overlap with the BRP line to be constructed – those angkot routes that significantly overlap with the BRP line will likely be cancelled, while those routes with smaller overlap will only be shortened, modified into feeder routes, or maintained, depending on the degree or overlap.

Under this preliminary assessment, potential job impact on routes with 60% or higher overlap with the proposed BRT lines was assessed, because they have a higher chance of routes cancellation or modification. It is assumed that routes with 80% or higher overlap will be cancelled, leading to a job loss of *angkot* operators working on these routes, while routes with 60-80% overlap would see a loss of 50% of *angkot* operation jobs as many workers will be able to continue to work under modified routes though under a smaller fleet size. This is a conservative assumption since it is expected that, based on the experience in other cities, 30-50% of *angkot* jobs would be lost on routes with 60-80% overlap. Job impact of routes with a smaller overlap was not assessed under this preliminary stage because the exact impact will depend on whether such routes will be modified or cancelled, and if the former, on how they will be modified. Project impact on the job of *angkot* operators will be more thoroughly assessed when the decision is made on which angkot routes would be cancelled, modified or

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<sup>53</sup> Photos were retrieved from local newspaper, Radar Bandung (2019).

maintained based on the detailed technical and demand assessment. Such a decision is expected to be in February, 2022.

As Table 1 shows, it is expected that the BRT construction will affect the job of approximately 1,176 *angkot* drivers in Bandung. It is to note that the actual number of *angkot* drivers whose jobs would be affected will be larger because more than one driver – including main driver and substitute driver – may gain income from driving an *angkot* unit. As for support staff, like ticketing person, timers, and maintenance workers, the ‘ratio/ factor’ is applied to estimate the number of support staff per an *angkot* vehicle who may be affected. For instance, the ratio of 0.2 for maintenance referring to 1 individual worker maintaining five fleets. The similar ratio is applied to Timers and Ticketing staffs. **Under this calculation, approximately 1,320 workers will be affected by BRT operation in Bandung.** This calculation is based on the assumption that no mitigation measure is in place. It is noteworthy that the actual number of *angkot* operators who will lose job depends on how many routes are maintained and how many routes are modified under the 60-80% impact category, and on the way routes are modified. At the same time, income of *angkot* operators may decline even where jobs are maintained due to a higher competition among *angkot* operators and against the BRT. It is expected that the project impact on jobs and income of *angkot* operators will be limited to those that directly arise from the BRT construction financed under the project because the project does not plan to undertake a city-wide reform or restructuring of the *angkot* industry.

Table 1. Preliminary impact assessment in Bandung

	Factors / Ratio	Impact
Total Fleet		3100
Number of Fleet impacted in 60% and greater overlap with BRT		392
Number of routes impacted over 80% overlap		16
Number of routes impacted 60%-80 overlap		33
Drivers+ticketing staff impacted (per fleet)	3	1176
Maintenance staffs (per fleet)	0.2	79
Timers (per affected route)	2	65
<b>Total workers will be impacted</b>		<b>1320</b>

NB: a factor of 1.02, 0.2 and 2 are applied to Drivers+ticketing staff, Maintenance staff

and Timers, respectively.

#### **4. Assessment of impact under similar projects**

New BRT lines were recently built in two urban contexts in Indonesia, namely Jakarta BRT (in Jakarta) and Semarang BRT (in Central Java). These case studies are assessed to inform the assessment of job loss impact under the projects.

##### TransJakarta Case

In Jakarta, *angkot* owners merged to a cooperative. There are 10 cooperatives established in 2019 and worked as the subcontractor under PT TransJakarta, using gross-cost contract, to provide first and last miles service for TransJakarta passengers. In other words, the cooperatives provide feeder bus service to extend the reach of TransJakarta BRT. The *angkots* are integrated with TransJakarta in term of service and payments. The Provincial DKI Jakarta government, through TransJakarta (a provincial state-owned enterprise), subsidize the *angkots*.

In 2020, TransJakarta, Jakarta MRT, Jakarta Propertindo (property company of Jakarta government), and PT Moda Integrasi Transportasi Jabodetabek (holding company between Jakarta MRT and Greater Jakarta commuter rail) established a holding company called JakLingko. JakLingko integrates service and payment of TransJakarta buses (including *angkots*), Jakarta MRT, Jakarta LRT, airport rail, and greater Jakarta commuter rail.

The chosen routes as priority routes for JakLingko system are minibus routes which overlap with TransJakarta corridor below 20%. From approximately 150 minibus routes in Jakarta, the DKI Jakarta Transport Agency prioritized 90 routes with a total of 8000 fleets which will be gradually integrated into the JakLingko system until 2022. Fleets under 5 years was prioritized to join, then those under 10 years old, Another criteria to choose priority routes (and thus integration of existing public transport operators) is the number of fleets for those routes, which indicate the business and passengers demand.

##### Semarang BRT Case

Scraping policy applied where existing public transport operator with at least 50% of overlapping were scraped and merged into a consortium. The consortium was then contracted (using gross cost contract) by BLU TransSemarang.

**Both in Jakarta and Semarang, negotiation processes with operators are deemed to be crucial stage in the public transport reform.** City-level governments in both locations formed task force to implement the integration plan and highly recommend not to rush the process,

which potentially will lead to protest from the operator side.<sup>54</sup> During negotiation, there might be a deadlock and mediator is needed to try to find middle path for both parties. In JakLingko and TransSemarang cases, ITDP worked as the mediator and technical consultants that were worked with both parties to reach agreement. The report documented that the consultation and negotiation process were occurred intensively for approximately 1 to 2 years in Jakarta, Medan (still ongoing) and Semarang. The processes are including discussion with ORGANDA and operators, one on one meeting with operators, presentation of detailed integration plan to ORGANDA, and workshop to assist the Owners Estimate Calculation simulation.

A more thorough analysis of the relevant experience including in particular consultation processes that led to the development of solutions agreeable to angkot drivers and lesson learned during the integration process will be conducted during the early stage of project implementation and the result be presented in the final ESIA.

#### **5. Potential mitigation measures**

The Project will cause income and/or job loss to *angkot* drivers an informal-supporting workers (i.e. ticketing, maintenance and timers) as described above. To mitigate this impact, the government plans to 1) integrate angkot operators to be Feeder operators 2) consolidate *angkot* operators to support operation of BRT and 3) to provide employment opportunities and capacity development for *angkot* drivers to work for the BRT, either as driver or other technical/in site support. It is expected that, based on the experience in other cities, the BRT operation in Bandung may create approximately **908 jobs** (drivers, security officers, ticketing officers, maintenance officers, etc.). It is planned that, as is done in other cities, *angkot* drivers will be offered this opportunity, particularly for ones that loss their jobs. **The concrete mitigation measures will be developed in consultation with *angkot* drivers and public transport operators during early stage of project implementation.**

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<sup>54</sup> Public Transport Reform Guideline for Indonesian Cities (2019), International Transport and Development Institute (ITDP).

Table 2. Potential job opportunities under BRT Bandung

	BRT fleet	Number of drivers	Maintenance	Fleet management	Administrative	Fare collection	Station/terminal operations	Workers
Factor		2.1	0.4	0.12	0.1	0.35		
Bandung	225	473	90	27	23	79	216	<b>908</b>

## 6. Engagement and Consultations to Date

To communicate the plan and potential risk and impacts on *angkot* drivers, we have conducted several engagement activities with potential project affected persons, including:

Table 3. Engagement and Consultation to December 2021

Engagement/ Consultation activities	Key stakeholders engaged	General feedback
Consultation with the <i>angkot</i> cooperatives during pre-feasibility study and feasibility study in 2016	Existing Angkot cooperatives	<p>Concerns on loss/ reduction of income has been raised since the beginning (pre-feasibility study).</p> <p>The <i>angkot</i> cooperatives and owners of the <i>angkot</i> basically agree with the idea of integration of <i>angkot</i> to BRT system. They wish to be involved in developing the detailed arrangement and wish to be consulted to ensure that BRT operation.</p> <p>They wish to receive compensation to buffer the</p>

		<p>immediate financial loss/reduction during construction and/or</p> <p>They also wish the BRT will provide employment opportunities for the impacted <i>angkot</i> owners, drivers, and other related workers (<i>angkot</i> maintenance workers, timers, ticketing, etc.).</p>
<p>Consultation with the <i>angkot</i> cooperatives in August 2021, seeking for feedback for the draft preliminary ESIA, especially potential risks on <i>angkot</i> drivers</p>	<p>Existing <i>Angkot</i> cooperatives</p>	
<p>Consultation with the <i>angkot</i> cooperatives during the study of Bandung Angkot Reform 2021 under the Global Future Cities Program.</p>	<p>Existing <i>angkot</i> cooperatives</p>	
<p>Public consultation inviting <i>angkot</i> drivers, public transport operators (ORGANDA) of Bandung City and West Java Province, and street vendors, local government agencies, cultural heritage expert, GESI expert, aside of other key stakeholders. Public consultation was conducted on 13 December 2021 in Bandung. The consultation was also livestreamed to virtual room (via Zoom).</p>	<p>Key government agencies at provincial and city levels, public transport operators in West Java and Bandung city, <i>angkot</i> drivers, and street vendors.</p>	<p>The <i>angkot</i> cooperatives and owners of the <i>angkot</i> basically agree with the idea of potential integration of <i>angkot</i> to BRT system. They wish to be involved in developing the detailed arrangement and wish to be consulted to ensure that BRT operation.</p>

<p>In-site interviews with 15 angkot drivers in Bandung city on week third December 2021</p>	<p>Angkot drivers who are not owners of the vehicles, and substitute drivers</p>	<p>A small sample of Net income, working hours, ownership of fleet to indicate vulnerabilities and adaptive capacity that were received.</p> <p>Insights have been incorporated on this preliminary impact assessment and concerns on losing jobs and/or income reduction has been factored in on the mitigation measures/ strategic-level planning.</p>
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## 7. Next Steps Planning

The development and implementation of mitigation measures will be implemented in close consultation with and participation of *angkot* operators, *angkot* cooperatives, and *angkot* drivers. Several key next steps are identified as follows:

1. **During project preparation stage:** The Government of Indonesia (Gol) with the support of AFD is currently undertaking an impact assessment of the routes and *angkot* operators and crew impacted by the proposed BRT. Preliminary results of the study will be available in December 2021 and final inventory in February 2022. Among the data collected are the estimated total number of *angkot* drivers who will be affected following the determination of the changes in *angkot* routes and the scale of impacts from complete job loss as a result of route cancellation to reduction of income due to change of *angkot* routes to where ridership is expected to be smaller. This impact assessment data will be presented on the final ESIA and other relevant documents.
2. **During project implementation:** After knowing the more precise impact on *angkot* drivers, there would be a follow up study on “Re-organisation and Integration Plan for Angkot operators into Mass Rapid System”, which will **generate options for mitigation plans, including integration plans of *angkot* to BRT system and employment opportunities**. This study will be conducted by the Project Management Consultant, which will be hired once the loan is effective. The objective of the study is to take lessons learnt from other cities in Indonesia and other countries on how to integrate the existing transport operators into the BRT system and how to potentially provide employment opportunities to affected drivers. The methods include consultation with the *angkot* drivers, *angkot* operators, and public transport

operators' associations (ORGANDA), including through sequence of workshop and Focus Group Discussions (FGDs). Detailed experience in *angkot* integration in other cities will also be collected. The study will propose an appropriate livelihood restoration plan for *angkot* drivers in Bandung BRT. This mitigation plan should also consider employment opportunities for affected *angkot* drivers. Further, discussions with BRT operators and local government will be conducted to find potential mitigation measures for the *angkot* drivers that were not covered by the proposed mitigation measures (i.e. employment opportunities, integration to BRT system, etc.). The proposed mitigation measures will be consulted and agreed with the relevant parties before its implementation. These options for mitigation measures and feedback from consultation processes will be presented in the final ESIA.

3. **Throughout the project cycle:** The project will develop and operate a Grievance Redress Mechanism (GRM) designated to *angkot* drivers throughout project implementation. Specific GRM for *angkot* drivers will be designed in partnership with their cooperatives.

## ANNEX 3: TOR for the ESIA

### Description

The Government of Indonesia (GOI), through the Ministry of Transport (MoT), with support of the World Bank (WB), intends to create an Indonesian Mass Transit Project (MASTRAN) to increase financial, technical, and institutional capacities of subnational government (SNGs) to plan, implement, and manage public transport. This project is in line with the Medium-Term National Development Plan (RPJMN) for 2020-2024, which has targeted mass transit development in six metropolitan areas, namely Jakarta, Surabaya, Medan, Bandung, Makassar, and Semarang. All projects supported by WB financing are subject to the policies on environmental and social risk management.

The MASTRAN will support preparation of environmental and social assessment documents along with preparation of Feasibility Study (FS) as described in component 1. This annex provides a simple framework that will help project implementers to conduct an environmental and social assessment and mainstream environmental and social considerations early in the project.

By law, Government Regulation No. 27 of 2012, every business and/ or activity that creates significant impacts on the environment must have an EIA (AMDAL or UKL-UPL) which also includes an Environmental management and monitoring plan RKL/RPL, to get the Environmental Permit prerequisite for obtaining a business and/ or activity permit. Based on the Minister of Environment and Forestry Regulation No. P.38/MENLHK/SETJEN/KUM.1/7/ 2019, some transportation development might require AMDAL. From the MASTRAN project specifications, it is concluded that the projects will require AMDAL for the environmental permit process.

The project will support preparation of the ESMF for MASTRAN suggests some criteria and inclusions that need to be considered to complete the assessment.

#### a. Scope

Following the Minister of Environment Regulation No. 16 of 2012 and the WB ES requirements, the ESIA work will include at least the four following documents:

Indonesian Specification	WB ESIA requirements
<b>Reference Framework (KA-ANDAL—the boundary and methodology of the study and scoping),</b>	Includes project description and individuals/organisations who contributed to the social and environmental assessment;
<b>Environmental Impact Analysis (ANDAL—the in-depth study of the major and significant impacts of the planned activity, impacts assessment, management, and mitigation measures),</b>	Includes Project Description, Baseline Data, Legal and institutional framework, environmental and social risks and impacts, Mitigation measures, Analysis of Alternatives and Design measures. References; record of meetings, consultations, FGDs; tables of data that might be summarized in the main text.
<b>Environmental Management Plan (RKL—the plan of efforts to handle the major and significant impacts),</b>	Measures and actions for the environment and social commitment Plan (ESCP)
<b>Environmental Monitoring Plan (RPL—the monitoring plan of the environmental components that are affected by the major and significant impacts).</b>	Measures and Actions for the environmental and social commitment Plan (ESCP)

-	Social and economic assessment and proposed mitigation measures for the identified socio-economic impact on Project Affected Peoples (PAPs)
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To ensure that the supplementary ESIA covers both the Indonesian and WB requirements for ESIA below criteria are highlighted that go above the required AMDAL and describe where this additional information would sit in a supplementary ESIA or as part of the AMDAL:

### 1. Introduction

- Objectives: in addition to the regulated AMDAL objective, include the positive social benefits for the inhabitants that live and/ or work in the area, besides the environmental and economic benefits. (ESS2 Labor and working condition) and [ESS4 Community Health & Safety]; and
- Study implementation: involve a social specialist in the research team, to expand the social assessment conducted on angkot operators (presented in preliminary Assessment on Angkot drivers in Annex 2) and finalize mitigation measures in consultation with angkot operators affected by the project (ESS1 Assessment and Management of Environmental and Social Risks and Impacts); involve an HSE expert in the researcher team, to have a detailed examination of the safety aspect of the planned activities. [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety]; involve a local social-cultural expert in the researcher team, to have a detailed examination on the social implications of the planned activities, including impacts on gender and indigenous peoples. [ESS4 Community Health & Safety; ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS7 Indigenous People; ESS8 Cultural Heritage; ESS10 Stakeholder Engagement & Information Disclosure]
- Cover data collection methodologies for impacts mentioned in the ANDAL part suggestions.

### 2. In the Study Boundary section

- There must be careful social boundary determination since this will affect the identification of affected groups and the communities that need to be consulted. An IP location map will be needed; to be overlaid with the project activity map [ESS4 Community Health & Safety; ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS7 Indigenous People; ESS8 Cultural Heritage; ESS10 Stakeholder Engagement & Information Disclosure];
- **Existing condition and social economic impact assessment:** further refining the data from preliminary social assessment on socio-economy-cultural existing conditions and the impact from the project to PAPs (e.g. *angkot/ becak/ bentor* drivers, timers, ticketing and maintenance of *angkots*, informal vendors/wet market, cultural heritages, indigenous people, gender, other vulnerable groups). [ESS4 Community Health & Safety; ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS7 Indigenous People; ESS8 Cultural Heritage; ESS10 Stakeholder Engagement & Information Disclosure]. This includes the determination of the scale and scope of impact on angkot operators (including drivers, timers, ticketing and maintenance workers) due to the project based on the assessment conducted in the preliminary ESIA's;

- Community concerns and aspirations: be attentive to the feedback related to occupational/ economic concerns, esp. current transportation service providers. [ESS10 Stakeholder Engagement & Information Disclosure]; This include consultations in the proposed mitigation measures with PAPs. This includes concerns and aspirations of angkot operators as a result of BRT constructions under the project.

### 3. Analysis of alternatives and of hypothetical/cumulative impacts:

Final ESIA should include the assessment of social economic impact of the Project on PAPs. Project Affected Persons on final ESIA should cover *angkot/ becak/ bentor* drivers, timers, ticketing and maintenance of *angkots*, informal vendors/wet market, and other informal economic sector workers. All alternatives proposed to mitigate the socio-economic impacts on PAPs, such as *angkot* drivers, informal workers within, and public transport operators, should be presented and consulted with the respective PAPs. Further, cumulative impacts as outlined in Annex 8 should be expanded and mitigation management plans to be discussed, especially for the implementation and operations stage.

### 4. Environmental and Social Risks and Impact Section

Ensuring that the ESIA contains the following studies/ assessments to meet not only Indonesian but also WB safeguard standards.

The contractor will have to provide a **strip map** with detailed mitigation measures at interval of 100m, the map must be approved by the supervision consultant prior to civil work commencement. Strip map of Bandung BRT is included in ANNEX 4.

Environmental Assessments: in addition to the regulated AMDAL scope, ensure inclusions as follows:

*Baseline:*

- GHG emission before the project implementation) of the related cities/regencies, and/or provinces, in each project site. [ESS3 Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]
- Traffic baseline analysis [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety; ESS8 Cultural Heritage]
- Identification of opportunities for greening: Identify areas for creating green spaces along the corridors and feasibility to have bicycle lanes.
- Detailed hazard map around the project sites. [ESS3 Resource Efficiency & Pollution Prevention & Management]

*Construction stage:*

- A traffic flow analysis for the construction stage. [ESS4 Community Health & Safety]

Social Impact Assessments:

## Baseline

- Mapping of sensitive receptors: a detailed mapping of sensitive receptors along corridors and surround areas of all ancillary and associated facilities. The sensitive receptors include: Schools, hospitals and clinics, temples and other religious buildings, historical buildings, green areas, informal economic activities, safety hotspots. For each sensitive receptor assess significance of impacts and propose site specific mitigation measures.
- Economic and social conditions of the potential Project Affected People (PAPs), for instance *angkot* drivers operators' net income, working hours and working conditions, ownership of productive assets, household structure, and capacity to find new employment (i.e. educational backgrounds, skill sets background, etc).
- Modelling on how the proposed project activities may impacted the above-mentioned groups on their socioeconomic conditions (how many will lose jobs? How many will likely to have less earnings do to significant overlapped with BRT system? How many will likely to be employed in the BRT service operation?) and what are the mitigation options and plans.
- Mitigation options and plans must be discussed and consulted with *angkot* drivers and other PAPs. The final mitigation plan will be presented in ESIA.

## Construction and Operation

### Socio-economic analysis:

- Identify who are the vulnerable groups and emphasize also the socio-economic-cultural conditions (e.g. *angkot/ becak/ bentor* drivers, informal sellers/ market, cultural heritages, indigenous people, gender, other vulnerable groups): net income, working conditions, adaptive capacity (i.e. to what extent these groups are able to tap into employment opportunities from the BRT system and/or from outside?); impact on jobs and income depending on the modified *angkot* routes and the size of operating fleets.
- labour aspects including a potential influx of migrants and gender context t[ ESS2 Labor & Working Conditions; ESS4 Community Health & Safety; ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS7 Indigenous People; ESS8 Cultural Heritage; ESS10 Stakeholder Engagement & Information Disclosure]
- COVID-19 related impacts. [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety]
- Specifically on Community Health and Safety, pedestrian safety issues need to be addressed along the corridor and reporting structure in case of fatalities.
- Land acquisition and resettlement, incl. building demolition risks, consultations processes [ESS5: Land Acquisition, Restrictions on Land Use & Involuntary Resettlement], and Induced impact analysis: changes in land use, gentrification, and required adjustment in any urban land use plan

- Indigenous Peoples Assessment: If indigenous communities are within the project boundaries, an IP location map will be needed to be overlaid with the project activity map. Further, it should include an in-depth assessment of the nature and degree of the expected direct and indirect economic, social and cultural impacts on indigenous people regarding the BRT corridor construction. [ESS7 Indigenous People]
- Heritage Analysis: Impacts on cultural heritage from project activities. [ESS8 Cultural Heritage]
- Include the positive social benefits for the inhabitants that live and/ or work in the area, besides the environmental and economic benefits. [ESS4 Community Health & Safety]
- Social and economic impact assessment of *angkot* drivers, women from low income households who are relying livelihoods from the street/ wet market/ *angkot* operation and other vulnerable groups. [ESS4 Community Health & Safety; ESS5 Land Acquisition, Restrictions on Land Use & Involuntary Resettlement]
- Potential risk of Sexual Exploitation, Abuse & Harassment (SEAH) and its mitigation measures and the proposed fast-(survivor centred) response if incident occurs [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety; ESS10 Stakeholder Engagement & Information Disclosure]

Besides Social and Environmental impacts also cumulative impacts should be assessed, according to the IFC/ World Bank Group criteria.

*Social Impact Assessments:*

Social Components	Pre- Construction Phase	Construction Phase	Operation Phase
Community health and safety		v	v
Occupational health and safety		v	v
Impact on livelihoods (socio economic conditions)	v	v	v
Land acquisition and involuntary resettlement	v		
Influx of workers		v	v
Cultural heritage		v	v
Indigenous People	v		
Gender and disability	v		v

Sexual Exploitation, Abuse & Harassment (SEAH)	v	v	v
Traffic		v	v

**5. Develop inputs for the Environmental Management Plan (RKL):**

- GHG emission mitigation measures. [ESS3 Resource Efficiency & Pollution Prevention & Management]
- Development and implementation of Construction Management Plan; reduces impact to groundwater and risk of land subsidence and flooding; reduces noise and vibrations as well as traffic. [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety]
- Run-flow and drainage plan. [ESS4 Community Health & Safety]
- Development and implementation of Stakeholder Engagement Plan (SEP). [ESS10 Stakeholder Engagement & Information Disclosure]
- Development and implementation of Land Acquisition and Resettlement Action Plan (LARAP), incl. Livelihood Restoration Plans (LRP) for income loss of roadside population (without angkot operators). [ESS5: Land Acquisition, Restrictions on Land Use & Involuntary Resettlement]
- Development and implementation of a Livelihood Restoration Plans (LRP) for Angkot operators.
- Development and implementation of grievance mechanisms. [ESS5: Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS10 Stakeholder Engagement & Information Disclosure]
- Development and implementation of Heritage Impact Assessment (HIA) measures. [ESS8 Cultural Heritage]
- Traffic management plan during construction. [ESS3: Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]
- Development and implementation of a labor-management plan. Check on the primary supply workers to avoid potential labor problems (risks of child labor, forced labor, and serious safety issues may arise in relation to primary suppliers). [ESS2 Labor & Working Conditions]
- Include plans on how to avoid sexual exploitation, abuse & Harassment [ESS2 Labor & Working Conditions; ESS4 Community Health & Safety]

**6. Inputs for Environmental Monitoring Plan (RPL):**

- GHG emission inventory (after the project implementation) of the related cities/ regencies, and/ or province, in each project site; to compare it with the baseline data for measuring the impact of the project implementation. [ESS3 Resource Efficiency & Pollution Prevention & Management; ESS4 Community Health & Safety]

- LARAP monitoring, incl. LRP monitoring. [ESS5: Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS10 Stakeholder Engagement & Information Disclosure]
- Grievance mechanisms monitoring. [ESS5: Land Acquisition, Restrictions on Land Use & Involuntary Resettlement; ESS10 Stakeholder Engagement & Information Disclosure]

#### **7. Inputs for social mitigation plan for angkot operators.**

- In close partnership with the Consultant team who carries out a broader study on angkot operation, expand the social assessment included in the preliminary ESIA to include:
  - Detailed description of angkot routes to be cancelled, modified or maintained during the BRT operation phase and expected fleet size based on demand estimation.
  - Detailed description of the scale and scope of impact on the job and income of angkot operators. The impact should be quantified to the extent possible.
  - Impact mitigation measures developed in consultation with angkot operators.
  - Consultative processes conducted with angkot operators for risk assessment and development of mitigation measures
  - Monitoring mechanisms and feedback loop.

#### **8. Information Disclosure, Consultation, and Participation as part of AMDAL/ESIA process**

- Stakeholder engagement.

More attentive to the feedbacks related to social and occupational/ economic concerns and impacts, esp. current transportation service providers and *angkot* drivers. [ESS10 Stakeholder Engagement & Information Disclosure] Particular attention will be paid to engagement with angkot operators.

- All proposed mitigation measures should be consulted with *angkot* drivers and/or other PAPs that will be significantly negatively affected by the Project (both construction and output).
- Consultations with PAPs should be recorded and be reflected on the final ESIA
- The assessment team will initiate consultations as early as possible. For Category A projects, the assessment team, on behalf of GOI, will consult these groups at least twice (a) during environmental scoping, as stated in Section 3.1, and before the terms of reference for the ESIA are finalized; and (b) once a draft ESIA report is prepared. Each of the two public consultation meetings will be advertised, in the national newspaper(s), and the Consultant should include in his financial offer the cost of two newspaper announcements, and two venues for the meetings. Serious consultations with the people in the project area and others that may be affected are an essential part of the ESIA and should be documented in the report. The process of consultation will cope with the requirements of the World Bank ESS 10.

## **b. Coordination**

The Assessment team will coordinate with the client, the Ministry of Transport (MoT), the World Bank, and the engineering design team hired by the client to ensure fulfillment of the ToR requirements as outlined above. The client will facilitate initial contacts with each agency and should be invited to all subsequent meetings with MoT and the Bank so that they have the opportunity to attend. It is anticipated that the MoT will assist the consultants in identifying appropriate permit requirements.

Coordination with the engineering team is extremely important to ensure that the environmental and social impacts and risks are considered in the final road designs. This coordination is also necessary to ensure that ESIA contains detailed information on the designs. The ESIA Consultant also needs to communicate with the consultants undertaking the involuntary resettlement work.

### *Selection Criteria- Team of experts*

This assignment is expected to require around 6 staff/months of key staff and to be delivered over a 12 months' period. It is expected that the assessment team would establish a strong core team of specialists. It is envisaged that an experienced environmental or social specialist would serve as the ESIA Project Team Leader. The assessment team should complement the skills of the core team with other social, environmental, technical, and institutional specialists with experience in Romania and/or internationally. Ideally, the social specialists will have previous experience working with the World Bank's social safeguards requirements and prior experience in developing a RAP. The team is expected to provide pragmatic and insightful planning to complete the above scope of work. Furthermore, based on the Minister of Environment Regulation No. 16 of 2012, the AMDAL team should have AMDAL certification (KTPA for the team leader and minimum of two members certified).

The assessment team shall propose and justify the range of disciplines to be included in the core Project team and the complementary skills of other short-term specialists. The inputs of all specialists shall be clearly indicated as it is anticipated that the majority of the work program would be carried out by individuals highly experienced in their professional fields and aligned with the tasks assigned.

### *Primary skills and specialties of the team are suggested below:*

1. Team Leader (Senior Environmental or Social Scientist / Road Engineer / Civil works engineering / Hydrotechnical engineer) - with at least 10 years of international professional experience in environmental and/or social assessment of projects, with proven records of managerial experience in projects of a similar nature and magnitude; ability to work with government officials, transport/road and environmental specialists, familiarity with environmental and social assessments for equivalent size projects, and a proven track record in managing and coordinating a diverse group of professionals; and AMDAL certified (KTPA).

The team shall include specialists who are highly familiar with specifying detailed mitigation measures, focused training programs, and structured monitoring programs. The entire proposed Project Team should be able to cover the areas listed below:

### *List of Suggested Specialists:*

### Key Specialists

- Environmental specialist;
- Road/ Bus engineering;
- Biologist
- Environmental health and safety;
- Social Development Specialist.

### Non-key specialists

- Emissions and dispersion specialist;
- Terrestrial ecology/ natural habitats/ forest habitats specialist;
- Biologist;
- Geologist;
- Hydrotechnical engineer.

The Consultant team could include other specialists.

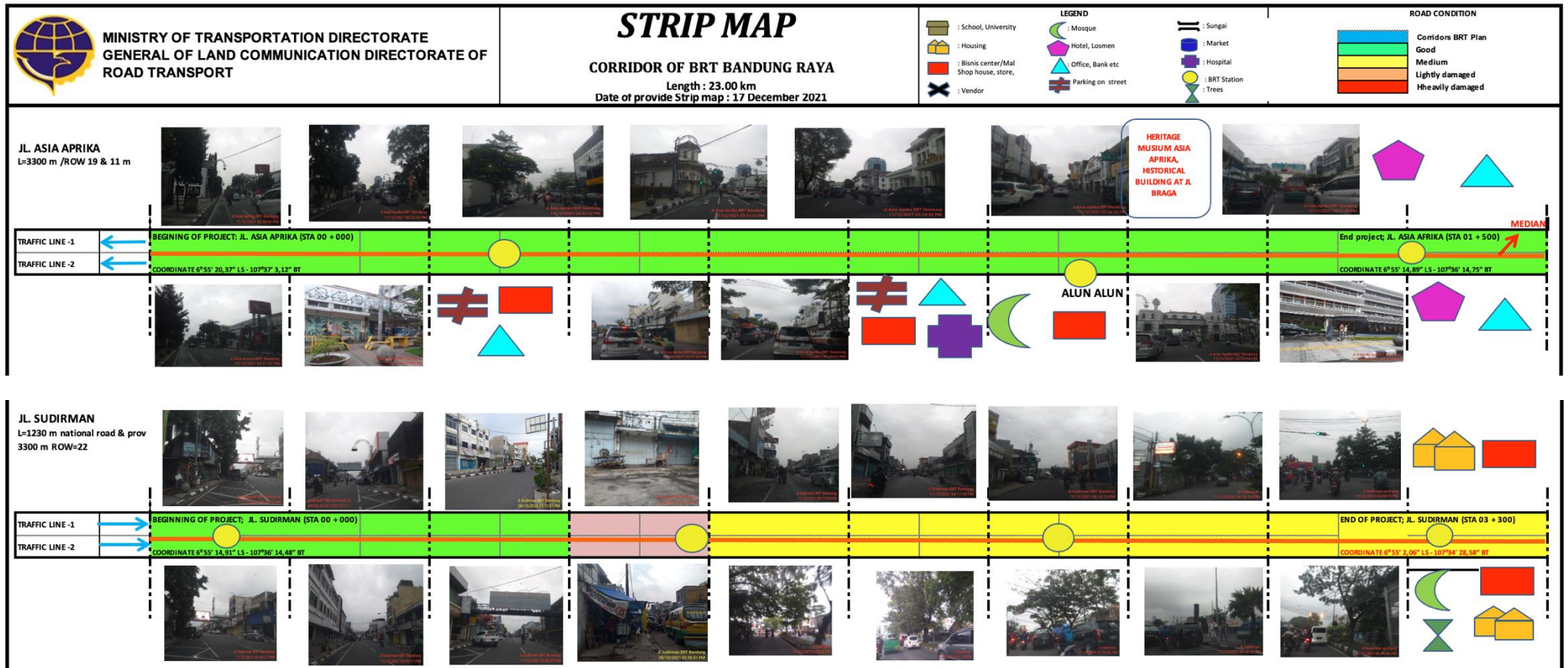
The assessment team shall layout individuals to participate in specified roles within the Project Team and provide full curricula vitae and any other information considered relevant by the Assessment team. The assessment team shall name the Project Leader, and the other core team members, and key short-term specialists, and provide an assurance that all members of the proposed team will be made available as specified in the proposal. The team members should have experience in the environmental assessment of large-scale infrastructure projects, preferably in Indonesia, and must have familiarity with the World Bank requirements and guidelines. The assessment team should have experience in social and environmental studies and be fully familiar with World Bank E&S policies , as well as other related guidelines and procedures. The key specialists should have at least 5 years of experience in complex ESIA's (EIA for similar projects will be an advantage), and the short-term key specialist should have at least 3 years of experience in the field study required.

No	Key Expert	Minimum qualification and experience
1	Team Leader	The candidate should have a master degree or upper-level degree in environmental or social science, engineering sciences (road construction, civil works, or hydrotechnical) with minimum of 10 years of international professional experience in environmental and/ or social assessment of projects, with proven records of managerial experience in projects of a similar nature and magnitude; AMDAL certified (KTPA) is a must.
2	Bus engineering	The candidate should have a bachelor's degree in engineering sciences (road and public transport construction) and have 5 years of experience in complex ESIA's (EIA for similar projects will be an advantage); preferable AMDAL experience.

3	Environmental risk assessment	The candidate should have a bachelor's degree, be registered for EIA study, and to have 5 years of experience in complex ESIA (EIA for similar projects will be an advantage); AMDAL/ESIA certified.
5	Environmental health and safety	The candidate should have a bachelor's degree and have 5 years of experience in complex ESIA (EIA for similar projects will be an advantage); Preferable AMDAL Experience.
6	Local social-cultural expert	To join the researcher team, candidates should have the capability to conduct a detailed examination of the social implications of the planned activities in West Java and North Sumatra; preferably AMDAL certified.
7	Social Development and Safeguards Specialist	The candidate should have a bachelor's degree in Social Science and have 5 years of experience in complex ESIA (EIA for similar projects will be an advantage); AMDAL experience.
8	Assistant	The candidate should have taken AMDAL training in institutions registered in the Ministry of Environment; AMDAL experience will be an advantage.

The duration of the services by the individual experts should be clearly defined in the assessment teams' proposal and verified in the Inception Report. The assessment team is expected to make full use, where possible, of appropriately qualified local staff, and work closely with and transfer knowledge to the Client staff. The assessment team will be required to provide its own computers, printers, and office supplies.

# ANNEX 4: Strip Map Corridor of BRT Bandung Raya

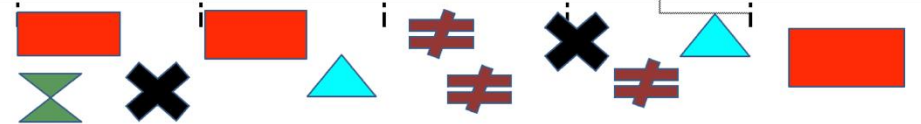
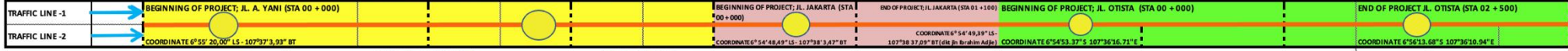




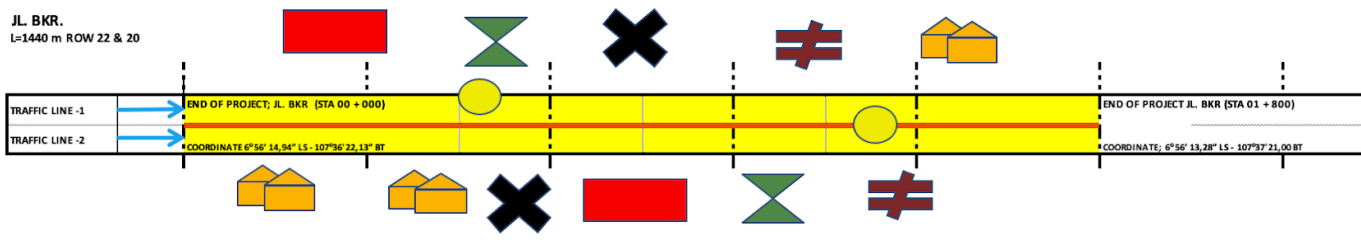
JL. AHMAD YANI.KOSAMBI  
ROW=33 & 17 m



JL. AHMAD YANI.  
ROW=33 & 17 m  
JL. JAKARTA.  
ROW 19 & 14 m,  
JL. OTISTA.  
2470 m ROW 39 & 32 m



JL. BKR.  
L=1440 m ROW 22 & 20



Description		Jl.Asia Aprika	Jl.Sudirman	I.Rajawali Timu	Jl.Rajawali Brt	Jl.Kebon Jati	Jl.Stasiun	Viaduct	Jl.Tamblong	Jl.Veteran	Kosambi	Jl.Ahmad Yani	Jl.Jakarta	Jl.Otista	Jl.BKR
Pedestrian / sidewalk	Left	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist
	Right	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist
Side ditch	Left	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist
	Right	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist	Exist
River	Left	Exist	Exist	None	None	Exist	None	Exist	None	None	None	None	Exist	None	None
	Right	Exist	Exist	None	None	Exist	None	Exist	None	None	None	None	Exist	None	None
Trees	Left	None	Exist in median in Batas Kota	Exist	Exist	Exist	None	None	Exist	Exist	None	Exist	Exist	None	Exist in median
	Right	None		Exist	Exist	None	None	Exist	None	None	None	None	Exist	Exist	
Remarks	Impacts	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest	Traffic congestion, Restricted access, Loss of parking space and street vendors, Road damage, Air pollution, Noise increased, safety issues, Social unrest
	Mitigation	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures	See in Summary of Mitigation measures

## Annex 5 : Overview of E&S relevant Indonesian policies

ESS Standards	Indonesian Policies							
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	<p>Law No. 11 of 2020 and Government Regulation No 22 of 2021 elaborated on the instruments to protect environmental damage, such as required AMDAL, UKL-UPL, SPPL and environmental permits.</p> <p>The Minister of Environmental and Forestry Regulation No.04 of 2021 required business/activity to have an EIA (AMDAL/UKL-UPL/SKPP) and environmental approval as a prerequisite for obtaining a business/activity approval. For the BRT development, two sectors are considered to be relevant, i.e. transportation and public works :</p>							
	No	KBB LI	Type of Business/Activity	Scale for AMDAL	Scale for UKL-UPL	Scale for SPPL	Rationale for AMDAL	Category AMDAL & UKL-UPL
	Sector of Land Transportation (MoT)							
	1	5221	Support Activities Land Transport: Vehicle Depot /Pool Vehicle	a. Land area 3 ha; b. Building area 3,000 m <sup>2</sup> ; c. Total capacity vehicle 300 SRP	a. 3 ha > Land area > 0.5 ha; b. 3,000 m <sup>2</sup> > Area building > 1000 m <sup>2</sup> ; c. Total capacity vehicle 100-300 SRP (Space Unit Parking )	a. Land area < 0,5 ha; b. Building area < 1.000 m <sup>2</sup> ; c. Total capacity vehicle <100 SRP (Space parking )	Potentially caused congestion, Quality decrease water, increase of noise, conflict social and public anxiety	Category C
	Sector of Ministry of Public Works and Housing (PU)							

2	42101	Road construction and/or improvement at metropolitan city with length $\geq 5$ Km	$\geq 5$ Km with land acquisition $\geq 10$ Ha	$\leq 5$ Km with land acquisition $\leq 10$ Ha	$< 5$ Km with land acquisition $< 10$ Ha	Potentially caused congestion, Quality decrease water, increase of noise, conflict social and public anxiety	Category A
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Furthermore, the Government Regulation No.22 of 2021 concerning the implementation of Environmental Protection and Management in Appendix 2 explained the guidelines /Formatting for preparing EIA (AMDAL), which consist of the ToR – KA-ANDAL, Environmental Impact Analysis (ANDAL), Environmental Management Plan (RKL), and Environmental Monitoring Plan (RPL); guidelines for UKL-UPL, for the business/activity that not required AMDAL) (Government Regulation No.22 of 2021 Appendix 3); and Declaration Letter of Environmental Management and Monitoring (SPPL).

AMDAL impact assessment covers:

a) Geo-physical-chemical components, such as climate, regional spatial, archeological culture, geological resources, hydrology, traffic aspects, soil, surface water, clean and well water air, noise, waste-water, aesthetics disturbance, hazardous waste, soil contamination, residual impact; then environment test included in the bill of quantity of contract documents, such as vegetation/flora, fauna, ecosystem types, the presence of endangered/endemic species and their habitats, etc.;

b) Socio-economic-cultural components, such as income levels, demographics, livelihoods, local culture, archeological sites, cultural sites and, so on; and Involvement of local workers with wages according to the Provincial minimum wage (UMP) and included National health care (BPJS) is included in the employment contract

c) components of public health, such as changes in the level of public health, and include Environmental, Social, Health, and Safety (ESHS), labor influx and Gender-Based Violence (GBV), and violence against children (VAC) provision.

Beside EIA (AMDAL), a traffic impact analysis (Analisis Dampak Lalu Lintas—Andalalin) also needs to be prepared, as regulated in the Government Regulation No. 22 of 2011. The traffic management and engineering are required as one of the permits' requirements, for the new development planned that potentially cause a disturbance in road transportation security, safety, and traffic.

ESS2 Labor and

Law No. 11 of 2020, Government Regulation No. 22 of 2021, and Minister of Public Works and Housing Regulation No. 21/PRT/M/2019; the service providers must

<p>Working Conditions</p>	<p>apply Construction Safety Management system, focused on: i) safety engineering construction, ii) OHS, iii) public safety, and iv). environmental safety. More application of OHS Management Systems is explained in the Government Regulation No. 50 of 2012.</p> <p>Minister of Public Works Regulation No. 05/PRT/M/2014 and Minister of Public Works and Housing Regulation No. 02/PRT/M/2018 regulated that projects above IDR 100 Billion and 100 workers need a construction OHS expert.</p> <p>Minister of Manpower and Transmigration Regulation No. PER.13/MEN/X/2011 regulated that the noise limit in the working area is 85 dBA for max 8 hours per day; the value can be exceeded with reduction in exposure time, e.g. 94 dBA for an hour or 100 dBA for 15 minutes. However, the noise must not exceed 140 dBA. Furthermore, the regulation standardized the threshold value of:</p> <ul style="list-style-type: none"> <li>● Physical factors including working climate, noise, vibrations, microwaves, ultraviolet rays, and magnetic fields; and</li> <li>● Chemical factors including the form of solids (particles), liquids, gases, mists, aerosols and vapors derived from chemicals.</li> </ul> <p>Human rights legislation: Law No. 39 of 1999; Law No. 11 of 2005, and Law No. 11 of 2009; the right to fair and decent working conditions; right to complaint, and grievance mechanisms.</p>
<p>ESS3 Resource Efficiency and Pollution Prevention and Management</p>	<p>Law No. 11 of 2020 on Job Creation and Government Regulation No 22 of 2021 on Implementation of Environmental Management and Protection elaborates on instruments to prevent pollution and environmental damage. Important instruments are the Strategic Environmental Assessment (KLHS), AMDAL, UKL-UPL, environmental approval, environmental risk analysis, environmental audit, and other instruments. Every person who pollutes/damages the environment is obliged to tackle the pollution/damage they made.</p> <p>The AMDAL impact assessment covers geo-physical-chemical components, such as climate, spatial planning, archeological culture, geological resources, hydrology, traffic aspects, soil, surface water, clean and well water air, noise, wastewater, hazardous waste, soil contamination, aesthetics disturbance, residual impact (Government Regulation No.22 of 2021 and WB ESS3)</p> <p>Minister of Environment and Forestry Regulation No. 4 of 2021 specified the list of businesses/activities that require EIA (AMDAL), Environmental Management Effort (UKL) and Environmental Monitoring Effort (UPL),and/or Statement of Commitment to Environmental Management and Monitoring (SPPL).</p> <p>Government Regulation No. 22 of 2021 regulated the management of hazardous and toxic waste (B3).</p> <p>GOI regulation on energy conservation: users with energy consumption &gt;6,000 tons of oil equivalent per year are required to conduct an Energy Management, while the users with less energy consumption could do energy management or energy savings (Minister of Energy and Mineral Resources Regulation No. 14 of 2012).</p>
<p>ESS4 Community Health and Safety</p>	<p>Government Regulation No. 22 of 2021; the inventory and analysis of the traffic impacts (Andalalin) of the new development planned that potentially cause a disturbance in security, safety, traffic, and road transportation.</p> <p>Government Regulation (PP) 50/2012 concerns the Implementation of Occupational Safety and Health Management Systems. The Decree of the Minister of Public Work No. 05/PRT/M/2014 are guidelines for occupational safety and health systems (SMK3) that increase the effectiveness of planned, measured,</p>

	<p>structured and integrated occupational safety and health protection, preventing and reducing work accidents and occupational diseases.</p> <p>AMDAL impact assessment covers components of public health, such as changes in the level of public health (Regulation No. 22 of 2021).</p> <p>Law No. 11 of 2020 regulated Spatial Planning, incl. the infrastructure of the transportation network system; the spatial planning is conducted by considering: the physical condition—vulnerability to disasters and security and gender mainstreaming.</p> <p>Presidential Instruction No. 9 of 2000 instructed gender mainstreaming in development planning through gender analysis that includes participation in the development process and the benefits they enjoy. The Minister of Home Affairs Regulation No. 15 of 2008 regulated the gender mainstreaming implementation at the local level.</p> <p>Ministry of Social Affairs Law No. 8 of 2016 on the national commission of disability (KND) states that a person with disabilities has the right to the accessibility of public services.</p> <p>Government Regulation No 22 of 2021 regulated the noise limit for settlement areas, hospitals, and schools as 55 dBA.</p>
<p>ESS5 Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement</p>	<p>Law No. 26 of 2007 clearly stated that proper compensation for losses arising from the implementation of development activities under the spatial plan needs to be provided. Law No.2 of 2012 stated that if development is of public interest, the party entitled to the land must release after fair compensation by independent appraisal. Presidential Regulation No. 71 of 2012 and its amendment Presidential Regulation No. 40 of 2014 provide detailed procedures. The Law No. 11/2020 is summarized above in the Article no 121.</p> <p>The AMDAL also covers socio-economic-cultural components, such as income levels, demographics, and livelihoods (Minister of Environment Regulation No. 16 of 2012).</p> <p>For the communities that occupied the state land used (in a good way/beritikad baik; &gt;10 years), the government will give compensation. The compensations are considered a “resettlement assistance” of everything on the land, mobilization, house rental for up to 12 months, and allowances for income losses from land use (Presidential Regulation No. 62 of 2018). The support will be eligible when the following requirements are met: a) possessing valid IDs or civil documentation, b) having occupied the land in question over ten years consecutively, c) being sanctioned/recognized by heads of villages/wards and land owners. However, the regulation is silent in terms of replacement costs for these groups. In addition, the timeframe requirements of at least ten years may limit the eligibility of some groups. Law No. 11/2020 also states that the object of the land acquisition included in the forest area, village treasury land, wakf land, customary land, and/or land assets of the central government, provincial government, city/regency government, state-owned enterprise. The process of identification of land status is important. The government regulation on land acquisition for public interest stated that the entitled parties consist of land right holders, land management right holders, Nasr/Wakf land, parties who control land with good faith, basic holder of land tenure and/or owner of building, plants and other object related to the land (para 18).</p>

<p>ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources</p>	<p>Law No. 11 of 2020 stated every person who pollutes/ damages the environment is obliged to take action to tackle the pollution/damage they made. KLHS, as one of the instruments for preventing pollution/ environmental damage, consists of studies on carrying capacity and carrying capacity the environment[1] for development, estimates of environmental impacts and risks, ecosystem service performance, efficient use of natural resources, and biodiversity potential. AMDAL covers the biological component, such as vegetation/flora, fauna, ecosystem types, the presence of endangered/endemic species, and their habitats (Regulation No.22 of 2021</p>
<p>ESS7 Indigenous Peoples</p>	<p>The 1945 Constitution (UUD 45) Article 18B clause 2, 28I clause 3, and 32 clauses 1-2, mentioning about the state recognition on IPs; the cultural identity and rights of the community traditional respected in harmony with civilization development; the state guarantee the freedom of the people in maintaining and developing their cultural values. Furthermore, the procedure to get acknowledgment and protection for IP communities (identified–verified–regulated) is regulated in the Minister of Home Affairs Regulation No. 52 of 2014 on Recognition and Protection Guidelines for Indigenous People.</p> <p>Law No. 23/2014 on Local Government defined IP as Masyarakat Adat as a group of people who have long settled in certain geographical areas of Indonesia. They have collective ties to ancestral origins, strong relationships with land, territory, natural resources, customary government institutions, and customary law in its customary territory following the provisions of the legislation.</p> <p>Ministry of Agrarian and Spatial Planning Regulation No. 9 of 2015 on Communal Rights on Indigenous Land; rights on land can be given communally to the IP communities that meet the requirements, and communities located in certain areas.</p> <p>Minister of Home Affairs Regulation No. 18 of 2018; IP institution at village level (Lembaga Adat Desa — LAD) is in charge of assisting the Village Government in preserving customs, protecting cultural identity, and as a partner in increasing community participation in the development process.</p> <p>AMDAL also covers socio-economic-cultural components, such as local culture, archeological sites, and cultural sites (Minister of Environment Regulation No. 16 of 2012)</p>
<p>ESS8 Cultural Heritage</p>	<p>Law No. 11 of 2020, Minister of Home Affairs Regulation No. 52 of 2007, and the joint regulation of the Minister of Home Affairs and the Minister of Culture and Tourism No. 42/40 of 2009 confirmed that the government should pay attention to the cultural site in spatial planning, preserve cultural heritage in the regions, incl. the customs and socio-cultural values in communities.</p> <p>AMDAL also covers socio-economic-cultural components, such as local culture, archeological sites, and cultural sites (Government Regulation No. 22 of 2021 and WB Environmental and Social Management Framework (ESMF). Indonesia ratified the Convention for the Safeguarding of the Intangible Cultural Heritage through Presidential Regulation No. 78 of 2007, which is regulated further in the Minister of Education and Culture Regulation 106 of 2013; the national and local governments are obliged to guarantee the preservation of Indonesia's intangible cultural heritage.</p>

ESS9 Financial Intermediar ies	(not applicable for this project)
ESS10 Stakeholde r Engagemen t and Information Disclosure	<p>Law No. 14 of 2008 on Information Disclosure; requires that public information is available and transparent.</p> <p>Government Regulation No. 45 of 2017; the community has the right to participate in regional development planning. Law No. 11 of 2020 Implementation Environmental Protection and Management is carried out based on the participatory principle; its implementation is regulated in the Government Regulation No.22 of 2021 on Community involvement in AMDAL; a) provide transparent and complete information; b) equality of position between parties; c) fair and wise problem solving, and d) coordination, communication. Furthermore, Government Regulation No. 22 of 2021 emphasized that AMDAL needs to involve the impacted communities. The communities have the right to submit suggestions, opinions, and responses within ten days after the announcement.</p> <p>Minister of Home Affairs Regulation No. 18 of 2018; village community institution (Lembaga Kemasyarakatan Desa—LKD), is used as a partner institution to increase community participation in the development process. LKD consists of neighborhood associations (RT, RW), family welfare empowerment organization, youth organization (Karang Taruna), health service post (Pos Pelayanan Terpadu), community empowerment organizations.</p> <p>Presidential Instruction No. 9 of 2000 instructed 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. The Minister of Home Affairs Regulation No. 15 of 2008 regulated the gender mainstreaming implementation at the local level.</p>

## **Annex 6 : Environmental Management Procedures for Construction Activity and WBG General EHS and Infrastructure Sector Guidelines**

The contractor performing construction during MASTRAN Project period is responsible for compliance with laws and regulations and effective management of all OHS-related issues.

Specifically, the IMTSP project requires the contractor company to follow IFC 'The Environmental, Health, and Safety (EHS) Guidelines'. They are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). As sector-specific guidelines for bus systems and LRT are not available, sector-specific guidelines on construction material extraction, railways, and toll roads were used to complement this guidance.

General OHS requirements include:

1. Complying with all relevant environmental regulations in Indonesia; When the regulations differ from the levels and measures presented in the EHS Guidelines references below, projects are expected to achieve whichever is more stringent.
2. Monitoring implementation throughout the project;
3. Reporting the monitoring results to CPMU;
4. Recruiting and training qualified staff to be responsible for the project;
5. Complying with physical resource protection and opportunity procedures; and
6. Terminating construction activities when receiving instructions from CPMU, and proposing and/ or applying either corrective or alternative methods for construction, if necessary to minimize the environmental impacts.

A brief summary of sector-specific OHS requirements include:

1. Environment:

Environmental issues during the road construction are similar to those of other large infrastructure projects involving significant earthmoving and civil works and their prevention and control recommendations are presented in the General EHS Guidelines. These sector-specific impacts include, among others:

### Avoid habitat alteration and fragmentation

Disruption of terrestrial and aquatic habitats can occur both during the construction of a road and during maintenance of right-of-way.

Management requirements: 1) Design native plants around the public transport stations; 2) siting roads and support facilities to avoid critical terrestrial and aquatic habitat (e.g. old-growth forest, wetlands, and fish spawning habitat); 3) Design and construction of wildlife

access; 4) avoid construction activities during the breeding season; 5) prevent short and long-term impacts on the quality of aquatic habitats; 6) minimize to remove native plant species; 7) explore opportunities for habitat enhancement (e.g. nesting boxes, vertical plant walls)

#### Emissions, especially fugitive dust

Air emissions are typically related to dust during construction and exhaust from vehicles.

Management requirements include: 1) Prevention and control of dust emissions; 2) Operation and maintenance of vehicle fleet; 3) Considering design options for reduction of traffic congestion

#### Noise from heavy equipment and truck traffic

Noise is generated by vehicle engines, emission of exhaust, aerodynamic sources, and tire/pavement interaction. Traffic noise can be a significant nuisance and may be loud enough to interfere with normal conversation and can cause stress in children and raise blood pressure, heart rates, and levels of stress hormones.

Management requirements include 1) Consider noise impacts during road design; 2) Design and implement noise control measures during construction

#### Stormwater

Construction or widening of sealed roads increases the amount of impermeable surface area, which increases the rate of surface water runoff. High stormwater flow rates can lead to stream erosion and flooding.

Management requirements include 1) General stormwater management; 2) Measures for road paving;

#### Wastewater

Management requirements include 1) Connect to centralized wastewater collection and treatment system or transport to such a site.

#### Waste management

Solid waste may be generated during the construction and maintenance of roads and associated structures. Significant quantities of rock and soil materials may be generated from earthmoving during construction activities. Hazardous Material waste might be generated (e.g. oil spills associated with heavy equipment operation and fuelling activities).

Management requirements include:

Follow EHS guidelines for construction materials extraction and general guidelines. Maximize recycling of road surfacing waste. Manage removed paint materials.

## 2. Occupational Health and Safety

Constructors are obliged to implement all reasonable precautions to protect the health and safety of workers. Occupational health and safety issues associated with the construction of roads primarily include the following:

- Respiratory
- Noise
- Physical hazards
- Chemical hazards

### Respiratory Hazards

Occupational exposure to dust and fine particulates is associated with all phases of quarrying activities (e.g. shoveling, ripping, drilling, blasting, flame-jet cutting, transport, crushing, grinding, screening, and stockpiling operations).

Management requirements include: 1) Equipment should have dustproof cabins; 2) Use of personal breathing protection.

### Noise:

Workers may be exposed to excessive noise levels during quarrying activities (e.g. shoveling, ripping, drilling, blasting, flame-jet cutting, transport, crushing, and grinding, among others). Guidance on the management of noise is provided in the general EHS guidelines.

Management requirements Include:

1) Selecting equipment with lower sound levels; 2) installing silencers; 3) Installing acoustic barriers also during construction; 4) limiting the hours of operation; 5) Developing a mechanism to record and respond to complaints.

### Physical Hazards:

Road construction and maintenance personnel, as well as landscaping workers maintaining vegetation in the rights-of-way, can be exposed to a variety of physical hazards, principally from operating machinery and moving vehicles but also working at elevation on bridges and overpasses.

Management requirements include: 1) develop transportation management plan; 2) Establish of work zones; 3) Reduction of max. vehicle speeds in work zones; 4) Training of workers in safety issues; Working at heights: 1) Are should be barricaded; 2) Hoisting and lifting equipment need to be rated and maintained; 3) Ladders should be used to pre-established

safety procedures; 4) Training on climbing techniques; 5) Establishment of a fall protection system; 6) Safety belts min. of 16 millimeters.

#### Chemical Hazards:

Chemical hazards in road construction, operations, and maintenance activities may be principally associated with exposures to dust during construction and paving activities; exhaust emissions from heavy equipment and motor vehicles during all construction and maintenance activities (including during work in tunnels or in toll collection booths); potentially hazardous dust generated during bridge paint removal; herbicide use during vegetation management; and diesel fuel used as a release and cleaning agent for paving equipment.

Management requirements include 1) Milers and pavers should have exhaust ventilation systems; 2) Use of correct asphalt product; 3) Maintenance of work vehicles; 4) Reduction of engine idling time; 5) Ventilation of indoor areas where vehicles and vehicles are operated; 6) Use of protective clothing when working with cutbacks; 7) use of dustless sanding and blasting equipment.

### 3. Community Health and Safety

Community health and safety issues during the construction of roads are common to those at most large construction sites and are discussed in the general EHS guidelines. These impacts include, among others, dust, noise, traffic, and vibration from construction vehicle transit, and communicable disease associated with the influx of temporary construction labor. Significant community health and safety issues associated with road projects may also include:

- Pedestrian safety
- Traffic safety
- Water
- Emergency preparedness

#### Pedestrian Safety

Pedestrians and bicyclists are at the greatest risk of serious injury from collisions with moving vehicles.

Management requirements include 1) Provision of safe corridors along the road alignment and construction areas; 2) Installation of barriers; 3) Installation and maintenance of speed control; 4) Installation and maintenance of all signs, signals and markings to regulate traffic.

#### Traffic safety:

Collisions and accidents can involve a single or multiple vehicles, pedestrians or bicyclists, and animals. Management requirements include 1) Installation and maintenance of all signs, signals, markings to regulated traffic; 2) Setting of speed limits appropriate to the road and traffic conditions; 3) Design of roadways; 4) Maintenance of the road; 5) Construction of roadside rest area; 6) Installation of measures to reduce collision between animals and vehicles; 7)targeting usage of real-time warning systems of congestions, accidents, etc.

#### Water

Construction materials extraction projects can significantly alter surface and groundwater regimes that are used by local communities for portable water supplies, raising of fish and other edible materials, irrigation, stock watering, and source water for small businesses and industries.

Management requirements include: 1)Understand the usage of water in the area; 2) identify potential impacts of the water quality and take dewatering or hydraulic diversion activities

#### Emergency Preparedness:

Emergency situations most commonly associated with road operations include accidents involving single or multiple vehicles, pedestrians, and/or the release of oil or hazardous materials.

Management requirements include: 1)Prepare an emergency preparedness and response plan in coordination with the local community.

#### 4. Decommissioning

Extraction site reclamation and closure activities should be considered as early in the planning and design stages as possible.

Management requirements Include: 1) Structures should stay stable and do not move due to extreme events or disruptive forces; 2) Physical hazards should be permanently blocked from all access to the public; 3) Surface and groundwater should be protected against adverse environmental impacts; 4) Habitat that has been altered should be replaced for future ecological use.

For further specific indicators, please consult with IFC guidelines as described above.

## Annex 7 : Minutes of the Public Consultations held on the 13th of December 2021

Prepared by: the Ministry of Transportation of the Republic of Indonesia, Directorate General of Land Transport.

Date and time	:	Monday, 13 December 2021, 10.00 – 12.30 WIB
Location	:	Pullman, Bandung
Number of participants	:	(42 offline and 10 online participants)  Women: Men: People with disability: -  Participants are from: Transport Agency of Cimahi district, Development Planning Agency of Cimahi (Bappeda), Public Transport Regional Governing Body ( <i>Balai Transporasi Publik Daerah/BTPD Wilayah IX of West Java</i> ), Development Planning of Bandung City, Environmental Agency of Bandung City (DLH), West Bandung Transport Agency, Public Transport Operators of West Java and Bandung (ORGANDA DPC and DPP), the Land Transport Operator (a state-owned company, DAMRI), the Indonesian Railway Operator (a state-owned company, PT KAI), taxi driver, <i>angkot</i> drivers, Global Future Cities Program (GFCP).
Hosts	:	DG Land Transport, Ministry of Transport Transport Agency of West Java Transport Agency of Bandung City
<p><b>Summary of key findings:</b></p> <ul style="list-style-type: none"> <li>• ORGANDA (public transport operators) of West Java Province concerns with their members businesses and welfare: What will happen with the <i>angkots'</i> owners and <i>angkot</i> drivers with these new proposed routes and "new" public transport arrangement in Bandung metropolitan? ORGANDA wishes to be engaged in the future.</li> <li>• DAMRI (state-owned company for public land transport): what is the government plan to involve DAMRI in the project, and not to "kill its dying business"?</li> <li>• Cimahi district government and West Bandung district government wish to get involved on further meetings for discussing 1) impacts and technical routes, and 2) suggest to have the plan considered others' local government on-going/near future infrastructural projects on the roads, esp. on traffic management</li> <li>• Concern on the line of coordination among government agencies, both vertical and horizontal, and lack of consensus within the "local governments" (which are beyond transport agency). Despite having a legal agreement of roles and responsibilities, local agencies seem to have different understandings on what to contribute to the project. Also, to have a clear and accessible information for all related stakeholders.</li> <li>• Concerns on economic impact due to disturbance to livelihoods for <i>angkot</i> drivers, street vendors, and small business due to construction (and output of the project/ the BRT existence later on).</li> </ul>		

**Q&A sessions:**

*Public Transport Operators Association (ORGANDA) of West Java (two times speaking from two different people):*

- We generally support the program, but we need to hear more about the detailed plan, and want to be involved for the integration plan development in the future.
- We are concern about the future livelihoods of our members and *angkot* drivers i.e. economic impacts of BRT on *angkot* drivers.
- We wish to see more tangible technical plan for integration of existing public transport system to the new BRT system, and to provide employment or business opportunities for operators and *angkot* drivers.

*City of Cimahi government:*

- We support the program as it's aligned with the connectivity goal of Greater Bandung area
- Please to look at the existing infrastructural plan in Cimahi, and work with that to avoid severe traffic jam, including developing and implementing road traffic management

*State-owned company for public transport (DAMRI):*

- We support BRT program in Bandung metropolitan. However, how to lessen the harm to our 'dying' businesses?
- We wish the project design to include us as part of the service providers and/or operators
- To include DAMRI in future project detailed plan consultation

*Transport Agency of West Bandung district:*

- To have a better line of coordination among government agencies involved in this project and to build the shared understanding on the expectation of roles and responsibilities of each party, both at local and national level, on this project
- To have a more accessible information about the project
- To develop a more detailed stakeholder engagement plan so all key stakeholders are included and no one felt left behind

*Bandung Development Planning Agency (Bappeda)*

- The affected micro businesses, such as street vendors along the proposed routes and wet market vendors in Pasar Andir and Pasar Ciroyom, are more likely to be concerned and interested with the mitigation plan for livelihood restoration
- Please consider ways to compensate them economically/ financially so it would be easier for government to implement the project, and fairer for them

*Response from government:*

We are developing plan for options of integration of existing public transport to BRT, in terms of routes and vehicles (*armada*). We have plan to include DAMRI in the system.

We are still finalising the design plan, and we will inform you and seek for your feedback in the future. We have developed engagement plan with stakeholders, and please look forward to it.

*Closing remarks by*

Thanking for everyone's feedback and time, government takes notes of all concerns and aspirations, and ask all key stakeholders attending the consultation to support the program implementation in Bandung metropolitan area.

Photos and list of attendees:

*In person consultation*





*Due to regulation to limit number of people for indoor forum, several people participated in the forum and/or observed it via Zoom:*



### Identifikasi Dampak Pembangunan BRT Bandung

Dokumentasi	Jenis Dampak dan Mitigasinya
	<b>Jenis Dampak:</b> <ul style="list-style-type: none"> <li>• Kemacetan Lalu Lintas</li> <li>• Gangguan akses ke bisnis area</li> <li>• Perurunan pendapatan</li> <li>• Penyempitan jalan</li> <li>• Polusi Udara/Debu</li> <li>• Peningkatan kebisingan</li> <li>• Gangguan Keselamatan lalu lintas &amp; Kecelakaan Kerja</li> <li>• Gangguan estetika di lokasi konstruksi</li> <li>• Kerusakan jalan eksisting</li> </ul>
	<b>Jenis Dampak:</b> <ul style="list-style-type: none"> <li>• Kemacetan Lalu Lintas</li> <li>• Gangguan akses ke fasum, permukiman &amp; kegiatan bisnis</li> <li>• Perbaikan pohon</li> <li>• Penyempitan jalan</li> <li>• Polusi Udara/Debu</li> <li>• Peningkatan kebisingan</li> <li>• Gangguan Keselamatan lalu lintas &amp; Kecelakaan Kerja</li> <li>• Gangguan estetika di lokasi konstruksi</li> <li>• Kerusakan jalan eksisting</li> </ul>



### Koridor yang sudah di lelang. 100% Bus Ramah Wheelchair



**Koridor 2 :**  
Alun- Alun Bandung - Stasiun Cimahi - Kota Baru Parahyangan

**Koridor 3 :**  
Baleendah - BEC







Photographs of list of attendees:

No	Nama	Instansi	No. HP	Email	TTD
9.	Yenni N.	OPD ORGANDA JAWA Barat	082120429993	yenniudin@ gmail . com	
10.	Nur C. Aditya	OPD ORGANDA JAWA Barat	0821 2221 1062	adityanurc @ gmail . com	
11.	HARDIKA P	BPTD IX JAWA Barat	08215126665	Hardika.priyanto@ gmail . com	
12.	Teviani	Dishub Jabar	08119161188	tevani.wiliasari@ gmail . com	
13.	Anwar. S.	Organda Kab. BGS	0819473056800	anwar.kompas @ gmail . com	
14.	Dewi Iman	Propeda bali bali	0821 1574 3786		
15.	Opi Sugilar	"	0822 2 935275		
16.	Emin Rivaldi	"			
17.	Yudi Gumelar	DPC. Brganda Cml	082118108918	yudigumelar @ gmail . com	
18.	Taryat	"	081320525964		
19.	Adita	GFCP	08562419304	adita.p.m @ nottara . com	
20.	Bugur	GFCP	-	bugur.gultra @ gmail . com	
21.	Dede Dede	DISHUB Jabar	0812 861 601		

No	Nama	Instansi	No. HP	Email	TTD
22.	ASSY HERMAN	DISHUB KB			
23.	MARY AN TO	-/-			
24.	Landra	Taksi			
25.	Wilman. S	Bappeda Cml	081320099594	wilman.sugianty @ gmail . com	
26.	Lina P. S	PLH Jabar	081221763512	linahayuwandi @ yahoo . com	
27.	A DARONI	DAMRI BDG	083848498199	daroni @ rocketmail . com	
28.	Rudu Satrisn	MTD W/ IX Jabar	08119581999		
29.	AGUNG SARITA	BPTD IX Jabar	081305244898	Saputra . agung @ gmail . com	
30.	DIMAS	DISHUB ANTA BGS	081225141456	mikaildimas @ yahoo . com	
31.	DIKI	ORGANDA	085315953711		
32.	Kenny H	Global Future CIGAS	0812225811037		
33.	Risa Maulia	Dshub Prov Jabar	081312611959	Risamaulias @ gmail . com	
34.	DEPHI NOVINDY	PT kai	082118260002	61594 @ kai . id	

No	Nama	Instansi	No. HP	Email	TTD
34.	Dishub Prov. Jabar	M. Mardudin	08588811929		<i>[Signature]</i>
35.	Dishub Kota Bdg	E. M. Ricky G			<i>[Signature]</i>
36.	Supan to	Dishub Cimahi	081222711881		<i>[Signature]</i>
37.	RAMBAT SAKWAN	Konsultin Fisik	<del>081222711881</del>		<i>[Signature]</i>
38.	LETI Herma Wah	Konsultin lingkungan	081381889009		<i>[Signature]</i>
39.	CRISTIAN ARLIANDO	KEMENHUB	085691388075	cristian.arliando@gmail.com	<i>[Signature]</i>
40.	JUANITA RAHMAFYRA	KEMENHUB	<del>081222711881</del> 081313438611	juanita rahmafyraru@gmail.com	<i>[Signature]</i>
41.	DANESYA A. RAHMAT	KEMENHUB	081294643156	DANESYA.39@GMAIL.COM	<i>[Signature]</i>
42.	MAULID HESTU P.	KEMENHUB	081235653013		<i>[Signature]</i>

## Annex 8: Potential cumulative impact to be detailed during project implementation (Cumulative Impact Assessment)

The main cumulative impacts stems from environmental aspects, particularly during construction and operation are related to the potential decrease of air quality, increase of noise and traffic congestion, all these potential negative impacts will lead to social unrest, indicative mitigation measures are provided in the table below and it needs to be detailed during ESIA. A separate cumulative impact assessment study should be carried out to ensure proper (and probably legal binding) mitigation measures will be implemented.

On the social aspect, cumulative impacts stem from land acquisition and job and business opportunities, continuous public consultations and transparency in labour recruitment are key to manage these cumulative impacts.

Main Activities	Potential Source of Environmental and Social Impacts	Activity stage			Source or type of impact and duration	Indicative mitigation measures
		Pre-Cons	Cons	Ops		
Land acquisition and other social issue						
	Social unrest		S		Cumulative impact from unsatisfied project affected people on compensation	Public consultation, publish cut-off date, transparency
Job acceptance						
	Job and business opportunities					Allow informal/temporary business

	Social unrest	S			Limited people that can be accepted	Public consultation and continuous publish labor vacancy and maximize local labor recruitment
Equipment and material mobilization						
	- Air quality		S		Decreased air quality during this activity is considered cumulative considering the number equipment in this stage	Equipment and vehicles regular maintenance, cover the dump truck with tarpaulin when transporting excavated material
	- Noise					
	- Traffic		S		Equipment and material mobilization occur continuously during this stage	Mobilization during off peak hours
	- Road damage					
	- Social unrest		S		Continuous during this stage as it is related to labor recruitment	Public consultation and continuous publish labor vacancy and maximize local labor recruitment
	- Community health		S		As the result of negative other impacts (e.g. air pollution)	Minimize all source of potential negative impacts resulting air pollution, increase noise and traffic congestion
Earth work and Basecamp operation						

	- Air quality		S		Although impact is temporary, yet it is accumulated due to other negative impacts with existing corridor	Equipment and vehicles regular maintenance
	- Noise		S		Continuous impact during this stage	Noise barrier is necessary, and civil work time management
	- Surface Water Quality		S		Due to Earth work at this stage	Proper containment to minimize erosion and runoff to waterways
	- Loss of Flora and Fauna					
	- Water biota		S		Due to earth work	Proper containment to minimize erosion and runoff to waterways
	- Community health		S		Due to earth work causing decrease air quality and increased noise	Minimize all sources of potential negative impacts resulting air pollution, increase noise and traffic congestion
Civil Work						
	- Air quality		S		Continuous impact during this stage	
	- Noise		S		Continuous impact during this stage	Noise barrier is necessary, operate latest fleet with low noise
	- Decrease Environmental Esthetic					
	- Traffic		S		Continuous impact during this stage	Traffic management package to re-arrange the traffic in order to minimize the traffic

	- Community health		S		Continuous impact as the result of accumulative of other negative impacts	Minimize all sources of potential negative impacts resulting air pollution, increase noise and traffic congestion
Labor Recruitment						
	- Business and job opportunities					
	- Community unrest			S	Continuous impacts during this stage as the result of business and job opportunities	Public consultation and continuous publish labor vacancy and maximize local labor recruitment
Fleet operation						
	- Air quality			S	As the result of road maintenance and fleet operation	Maintenance during traffic off hours
	- Noise			S	Continuous impact both from road maintenance work	Good management or road maintenance work, avoid pray time
	- Surface water quality			S	Cumulative impact from untreated wastewaters (if untreated) from total employee	All station, terminal and other source shall be equipped with wastewater treatment facility
	- Decrease Environmental Esthetic				Cumulative impact from solid waste and wastewater (if untreated)	Ensure number of waste bins is adequate and place in locations where people gather, noting that the BRT will not allow eating and drinking in the bus

	- Social unrest			S	continuous impact Due to other negative impact, air pollution, noise and traffic congestion	Minimize all sources of potential negative impacts resulting air pollution, increase noise and traffic congestion
	- Community health			S	continuous impact Due to other negative impact, air pollution, noise and traffic congestion	Minimize all sources of potential negative impacts resulting air pollution, increase noise and traffic congestion
	- Existing Angkot driver			S	Income of existing angkot drivers may get affected, especially those operating on the BRT corridors	Separate study on Angkot driver

\*. S : Significant