INITIAL ENVIRONMENTAL EXAMINATION

Status: Draft

Project Number: 51157-001
July 2023

Indonesia: Flood Management in North Java Project

Serang River Flood Risk Management Subproject

Prepared by the Ministry of Public Work and Housing for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 6 July 2023)

Currency unit	–	rupiah (Rp)
Rp1.00	=	$0.000067
$1.00	=	Rp15,015

ABBREVIATIONS

ADB	–	Asian Development Bank
AMDAL	–	*Analisis Mengenai Dampak Lingkungan Hidup* (environmental impact assessment process in Indonesia)
ANDALALIN	–	Environmental Impacts Assessment on Traffic
BAPPENAS	–	*Badan Perencanaan Pembangunan Nasional* (Ministry of National Development Planning of the Republic of Indonesia)
BBWS	–	*Balai Besar Wilayah Sungai* (river basin organization of larger watershed management body)
BPBD	–	*Badan Penanggulangan Bencana Daerah (Regional Disaster Management Agency)*
BWS	–	*Balai Wilayah Sungai* (river basin organization of smaller watershed management body)
COVID	–	Corona Virus Disease
CPMIU	–	Central Project Management Implementation Unit
DAS	–	*Daerah Aliran Sungai (*watershed)
DED	–	Detailed Engineering Design
DELH	–	*Dokumen Evaluasi Lingkungan Hidup*
DGWR	–	Directorate General of Water Resources (Ditjen *Sumber Daya Air* - SDA)
DLH/DLHK	–	*Dinas Lingkungan Hidup/Dinas Lingkungan Hidup dan Kehutanan (*provincial and district environmental protection agencies)
DPLH	–	*Dokumen Pengelolaan Lingkungan Hidup*
EA	–	Executing Agency
EARF	–	Environmental Assessment and Review Framework
ECC	–	Environmental Complaint Committee
EHS	–	Environment, Health, and Safety
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management and Monitoring Plan
ESP	–	Engineering Services Project
EWSIP	–	Enhanced Water Security Investment Project
FMNJP	–	Flood Management in North Java Project
FRM	–	Flood Risk Management
GHG	–	Greenhouse Gas
GOI	–	Government of Indonesia
GRM	–	Grievance Redress Mechanism
IA	–	Implementing Agency
IBAT	–	Integrated Biodiversity Assessment Tool
IEE	–	Initial Environmental Examination
IFC	–	International Financing Corporation
IUCN	–	International Union for Conservation of Nature
KBA	–	Key Biodiversity Areas

LARP	–	Land Acquisition and Resettlement Plan
MOEF	–	Ministry of Environment and Forestry
MPWH	–	Ministry of Public Work and Housing (PUPR)
NBS	–	Natural-Based Solution
OHSP	–	Occupational Health and Safety Plan
OSS	–	Online Single Submission
PAM	–	Project Administration Manual
PCO	–	Public Complaints Officer
Permen LH/LHK	–	MOE Regulation/ MOEF Regulation (after the merger of Ministry of Environment and Ministry of Forestry)
PIPPIB	–	*Peta Indikatif Penundaan Pemberian Izin Baru* (Indicative Map for Moratorium of New Permit)
PIU	–	Project Implementation Unit
PMC	–	Project Management Consultant
PPC	–	Project Preparation Consultant
PPE	–	Personal Protective Equipment
PUPR	–	*Pekerjaan Umum dan Perumahan Rakyat* (Ministry of Public Works and Housing)
REA	–	Rapid Environmental Assessment
ROW	–	Right of Ways
RPJMN	–	*Rencana Pembangunan Jangka Menengah Nasional* (GOI National Medium-Term Development Plan)
SDA	–	*Sumber Daya Air (*Directorate General of Water Resources, DGWR)
SPPL	–	*Surat Pernyataan Pengelolaan Lingkungan Hidup*
SPS	–	Safeguard Policy Statement
TCLP	–	Toxicity Characteristic Leaching Procedure
TRTA	–	Transaction Regional Technical Assistance
UKL-UPL	–	*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup* (Environment Permit)
UNFCCC	–	United Nations Framework Convention on Climate Change

GLOSSARY

desa	– village (administrative division)
kabupaten	– District or regency
kecamatan	– sub-district

NOTE

In this report, “$” refers to United States dollars.

CONTENTS

EXECUTIVE SUMMARY

1. **Background.** The proposed Flood Management in North Java Project (FMNJP) will strengthen climate resilience of the people and the economy in the Cimanuk-Cisanggarung (CimanCis) and the Seluna river basins.[1] It will help in reducing the risk to people, agricultural crops, and assets from flooding, in the rapidly urbanizing and industrializing northern coast of Java Island.[2] The project will operationalize the flood risk management (FRM) approach by (i) establishing earth observation services (EOS) and flood forecasting early warning and flood evaluation systems (FFEWFES) to enhance flood preparedness of communities; (ii) improving planning and land zoning to reduce exposure to floods; and (iii) increasing climate resilience of flood protection infrastructure and their operation and maintenance (O&M). The project is aligned with the following impact: climate resilience enhanced to support economic growth. It will have the following outcome: flood risk in North Java Coast reduced and will have two outputs: Output 1: Flood risk management operationalized; and Output 2: Climate resilient infrastructure and O&M enhanced.

2. The Directorate General of Water Resources (DGWR) under the Ministry of Public Works and Housing (MPWH) will be the executing agency. River Basin Organizations (RBOs) will be implementing agencies to deliver civil works. DGWR will be responsible for overall coordination, policy directions and administration, including those related to environmental safeguards. The Central Project Management Unit (CPMU) will have a designated environmental safeguards expert. The RBO will appoint an environmental safeguards focal person to support activities for compliance with environmental safeguards. The detailed structure of institutional/implementation arrangements is documented in Section X.

3. The project will finance the construction of selected flood risk management (FRM) subprojects in the Cimanuk-Cisanggarung river basins that have been designed under Loan 3455-INO: Accelerating Infrastructure Delivery through better Engineering Services Project (ESP).[3]

4. The Initial Environment Examination (IEE) provides necessary details to eliminate or reduce the environmental risks associated with the subprojects such as loss of biodiversity, long-term damage to ecosystems, pollution, climate change, damage to aquatic ecosystems, land degradation, improper use and disposal of chemicals, and depletion of non-renewable resources. Specific safeguards seek to preserve sensitive natural areas (e.g., wetlands and critical habitats), areas of importance to indigenous peoples, and historical or cultural sites. This IEE has been prepared based on the feasibility study, rapid environmental assessment (REA), Environmental Survey and Assessment, and public consultations with affected people, local communities, and local authorities. The objectives are to ensure the environmental soundness and sustainability of the project, and to support the integration of environmental considerations into the project decision-making process.

5. In particular the IEE will, (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible, and practical working tool to enable the

[1] The CimanCis river basin territory is in West Java province, where Cirebon City is located. The Seluna river basin territory is in Central Java province, adjacent to Semarang City.

[2] The North Java Coast is a strategic corridor with (i) a population of 63.2 million in 2020 - a third of the Java island population – which is projected to reach 97.2 million by 2045; and (ii) more than 20% of the national gross domestic product. National Statistic Agency 2010-2022. BAPPENAS. 2020. National Medium Development Plan 2020-2024.

[3] Asian Development Bank (ADB). 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Technical Assistance Loan to the Republic of Indonesia for the Accelerating Infrastructure Delivery through Better Engineering Services Project*. Manila. (Loan 3455-INO)

measurement and monitoring of environmental performance on-site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject, and (v) ensure that occupational health and safety recommendations are complied with.

6. **Screening and Categorization.** Screening and categorization for the Serang River system FRM subproject (the subproject) have been based on ADB's Rapid Environmental Assessment (REA) Checklist for Ports and Harbor. The results of the assessment indicate that the subproject and its components are unlikely to cause significant adverse environmental impact. Thus, the subproject is categorized as environmental category B as per ADB SPS, 2009 and this draft IEE has been prepared in accordance with ADB SPS requirements for environment category B projects.

7. **Environmental Management Plan (EMP).** The EMP forms part of this IEE. It will guide the environmentally sound construction of the subproject and ensure efficient lines of communication among the parties involved in the project. The EMP identifies three phases of development as i) pre-construction phase; ii) construction phase; and iii) post-construction (operation phase).

8. The purpose of the EMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of i) providing a pro-active, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on- site; ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the subproject; iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the subproject, and iv) ensuring that safety recommendations are complied with.

9. **Consultation, Disclosure, and Grievance Redress**. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information on the subproject; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns); giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation.

10. The subproject's Grievance Redress Mechanism provides with a platform for redressal of their grievances and describes the informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance.

11. **Monitoring and Reporting.** The RBO supported by consultants will undertake internal monitoring. The CPMU will prepare semi- annual safeguards monitoring reports.

12. **Recommendations and Conclusions**. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and incorporation or application of recommended mitigation measures and procedures.

13. The mitigation measures have been developed to reduce all negative impacts to acceptable levels. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure

measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

14. Based on the findings of this IEE, the subproject's environmental category "B" is confirmed.

I. INTRODUCTION

A. Project Background

1. The proposed Flood Management in North Java Project (FMNJP) will strengthen climate resilience of the people and the economy in the Cimanuk-Cisanggarung (CimanCis) and the Seluna river basins.[1] It will help in reducing the risk to people, agricultural crops, and assets from flooding, in the rapidly urbanizing and industrializing northern coast of Java Island.[2] The project will operationalize the flood risk management (FRM) approach by (i) establishing earth observation services (EOS) and flood forecasting early warning and flood evaluation systems (FFEWFES) to enhance flood preparedness of communities; (ii) improving planning and land zoning to reduce exposure to floods; and (iii) increasing climate resilience of flood protection infrastructure and their operation and maintenance (O&M). The project is aligned with the following impact: climate resilience enhanced to support economic growth. It will have the following outcome: flood risk in North Java Coast reduced and will have two outputs: Output 1: Flood risk management operationalized; and Output 2: Climate resilient infrastructure and O&M enhanced.

2. The Directorate General of Water Resources (DGWR) under the Ministry of Public Works and Housing (MPWH) will be the executing agency. River Basin Organizations (RBOs) will be implementing agencies to deliver civil works. DGWR will be responsible for overall coordination, policy directions and administration, including those related to environmental safeguards. The Central Project Management Unit (CPMU) will have a designated environmental safeguards expert. The RBO will appoint an environmental safeguards focal person to support activities for compliance with environmental safeguards. The detailed structure of institutional/implementation arrangements is documented in Section X.

3. The project will finance the construction of selected flood risk management (FRM) infrastructure subprojects in the Seluna and Cimanuk-Cisanggarung river basins that have been designed under Loan 3455- INO: Accelerating Infrastructure Delivery through better Engineering Services Project (ESP).[3] The project will promote natural based solutions for river works where technically, socially, economically feasible.

4. The Serang River system Flood Risk Management (FRM) Subproject (the subproject) will normalize the river, upgrade the river banks, upgrade river channeld to increase flow capacity, and integrate nature-based solutions in the context of enhanced FRM measures.

B. Extent and Scope of IEE Study

5. The Rapid Environmental Assessment (REA) for the subproject is in Appendix 1. The results of the screening show that the subproject and its components with mitigation measures are unlikely to cause significant adverse environmental impact. Thus, the subproject is categorized as environmental category B as per ADB SPS, 2009. This draft IEE has been prepared in

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[1] The CimanCis river basin territory is in West Java province, where Cirebon City is located. The Seluna river basin territory is in Central Java province, adjacent to Semarang City.

[2] The North Java Coast is a strategic corridor with (i) a population of 63.2 million in 2020 - a third of the Java island population – which is projected to reach 97.2 million by 2045; and (ii) more than 20% of the national gross domestic product. National Statistic Agency 2010-2022. BAPPENAS. 2020. National Medium Development Plan 2020-2024.

[3] Asian Development Bank (ADB). 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Technical Assistance Loan to the Republic of Indonesia for the Accelerating Infrastructure Delivery through Better Engineering Services Project*. Manila. (Loan 3455-INO).

accordance with ADB SPS requirements for environment category B projects.

6. All works are subject to environmental assessment and approval as required under the ADB Safeguard Policy Statement and Indonesian law, as applicable.

C. Approach and Methodology

7. The IEE study was carried out using reconnaissance survey (as per the findings documented in several appendices), review of previous studies, field visits, consultation with stakeholders and non-government organizations (NGOs), review of existing data, assessment to identify adverse impacts, and the preparation of EMP. Secondary data, available published literature, documents and maps (e.g., topographic, geological maps, forest, satellite imagery, and Google image maps) related to the influence areas were reviewed. The existing policies, legislation, guidelines and manuals related to water resources and environment in Indonesia and ADB's policies and guidelines were also reviewed. The project concept and other project documents were also considered when preprating this IEE. The IEE will be updated in case there is major changes.

D. IEE Contents

15. This IEE (i) provides information on the subproject and its environmental requirements; (ii) provides necessary baseline conditions of the physical, ecological, physical cultural and socio economic environments and/or resources in and surrounding of project's area of influence; (iii) identifies and assesses potential impacts arising from the implementation of the project on these environments and/or resources; (iv) recommends measures to avoid, mitigate, and compensate for the adverse impacts; (v) presents information on stakeholder consultations and participation during project preparation; (vi) recommends a mechanism to address grievances on environmental performance of the project; and (vii) provides an EMP which includes an environmental monitoring plan, and the responsible entities for mitigation and monitoring.

8. In particular, the EMP will, (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. The IEE will be made as a binding document for all contractors and a copy is required to be kept on site as a reference.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

9. All projects supported by ADB must comply with ADB's SPS (2009), which sets out the policy objectives, scope and triggers, and principles for environmental safeguard areas to be followed across all aspects of its operations. ADB adopts a set of specific safeguard requirements that borrowers/clients are required to meet in addressing environmental impacts and risks. Borrowers/clients must comply with these requirements during the project preparation and implementation phases. ADB's environmental safeguard requirements are defined in ADB's SPS, Appendix 1 (Safeguard Requirements 1: Environment. Pages 30-40).

10. All environmental safeguard principles and requirements of ADB's SPS are reflected in

this IEE.

11. **International good practice.** ADB's SPS requires that during the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards including the IFC / World Bank Group's *Environment, Health and Safety Guidelines* (EHS Guidelines)[4], and ADB Environment Safeguards: A Good Practice Sourcebook (Draft Working Document)[5]. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent.

12. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact are assigned to one of the following four categories:

(i) **Category A**. Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.
(ii) **Category B**. Projects could have some adverse environmental impacts, but of lesser degree or less significant than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
(iii) **Category C**. Projects are unlikely to have adverse environmental impacts. Neither EIA nor IEE is required, although environmental implications are reviewed.
(iv) **Category FI**. Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

13. **Environmental Management Plan.** An environmental management plan (EMP) which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

14. **Public Disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) Final or updated EIA and/or IEE upon receipt; and
(iii) Environmental Monitoring Reports submitted by Implementing/Executing Agencies during project implementation upon receipt.

[4] http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines
[5] https://www.adb.org/documents/environment-safeguards-good-practice-sourcebook.

B. Indonesia's Environmental Safeguard Policy and Regulatory Framework

15. Indonesia laws and regulations generally cover all items of environmental safeguards and related sector regulation on Occupational Health and Safety (OHS), employment conditions/labor, hazardous waste management, biodiversity and climate change. A more complete list of Indonesian environmental Laws, Presidential Decrees, Sector Regulations, and MPWH Decrees relevant to environmental safeguards are presented in Appendix 2.

1. Regulations on Environmental Assessment

16. Besides, ADB's SPS (2009), the subprojects shall also comply with the Government of Indonesia's environmental laws, standards, rules, and requirements which impose restrictions on activities to avoid, minimize, or mitigate likely impact on the environment. It is the responsibility of the executing and implementing agencies to ensure that all activities under the project are in accordance with the legal framework, both national and local regulations. Compliance is required in all stages of the subprojects' implementation, including design, construction, operation and maintenance. The key laws and regulations that apply to this IEE include, but may not be limited to, those presented below.

17. **Law No 11/2020[6].** As the promulgation of Law No. 11/2020 on Jobs Creation (Omnibus Law) and Law No 32 of 2009 on Protection and Management of Environment law has been diluted, several clauses of the environmental law have been changed, deleted, or new clauses inserted into Law No. 11/2020.

18. AMDAL Article 22 of the Law states that any business and activity that has a significant impact on the environment shall have an environmental impact assessment (AMDAL), and article 34 specifies that any business and activity that has no significant impact shall meet the standard of UKL-UPL. While Article 35 mentions low-risk activities that do not require a UKL-UPL, shall prepare a statement of ability to undertake environmental management and monitoring, *Surat Pernyataan Pengelolaan Lingkungan* (SPPL). In case the project causes significant traffic impacts, the proponent shall prepare ANDALALIN (Environmental Impacts Assessment on Traffic).[7]

19. **Government Regulation No. 22/2021[8]** on Implementation of Environmental Protection and Management and **Government Regulation No. 5/2021** on Risk-Based Commercial Business Permitting, it is stated that the construction of water resource infrastructure buildings is an activity with a high-medium risk level.

20. **Decree of Minister of Environment and Forestry No. 4/2021.** The Government's screening procedure is presented in the Minister of Environment Decree No. 4/2021 on List of Business Plans and/or Activities Requiring AMDAL, UKL-UPL, or SPPL (Attachment 1 of the Decree provides a list of business and/or activities that need environmental impact assessment). The screening considers potential **significant** impacts as well as the magnitude or size of business or activities. The decree mentions that the types of business and/or activities that are required to have an Environmental Impact Assessment (AMDAL) are determined based on: (i) potential significant impact, and (ii) uncertainty of technological capabilities available to overcome significant negative impacts that will arise. Flood control activities including the normalization of

[6] As the approval of newly issued Omnibus Law, this law was diluted in the Omnibus Law with some changes, deletion and insertion of new clauses.

[7] Stipulated further in regulations of minister of transport and local regulations (Ministerial Regulation *No.* 17/2021 on Traffic Impacts Assessment).

[8] Closing Clause of Government Regulation No. 22/2021 withdrawn Government Regulation No. 27/2012.

rivers in large or medium cities with a certain amount of dredging and embankment requires AMDAL documents.

21. Article 8 of Government Regulation No. 22/2021 set criteria for the business and/or activities with significant impact to the environment and requiring AMDAL:

(i) Changes of land and natural landscape;
(ii) Exploitation of natural resources, both renewable and non-renewable resources;
(iii) Process and activity which potentially cause pollution and/or environmental deterioration and wasting and depletion of natural resources and their utilization;
(iv) Process and activity which results may affect the natural environment, built-up environment, and social-cultural environment;
(v) Process and activity which results will affect the preservation of natural resource conservation area and/or protection of cultural heritage protection;
(vi) Introduction of plants species, animals, and, microorganisms;
(vii) Preparation and use of biological and non-biological materials;
(viii) High-risk activities and/or affect state defense; and/or
(ix) Application of technology that potentially affects the environment.

22. All project or business proposals will undergo screening to classify whether a project proposal would require AMDAL, or UKL-UPL, or SPPL. Using criteria set forth in the regulation and recommendation of the respective environmental agency, the project will be screened as shown in Figure 1.

Table 1: AMDAL, UKL-UPL, SPPL Categorization Based on Project Scale

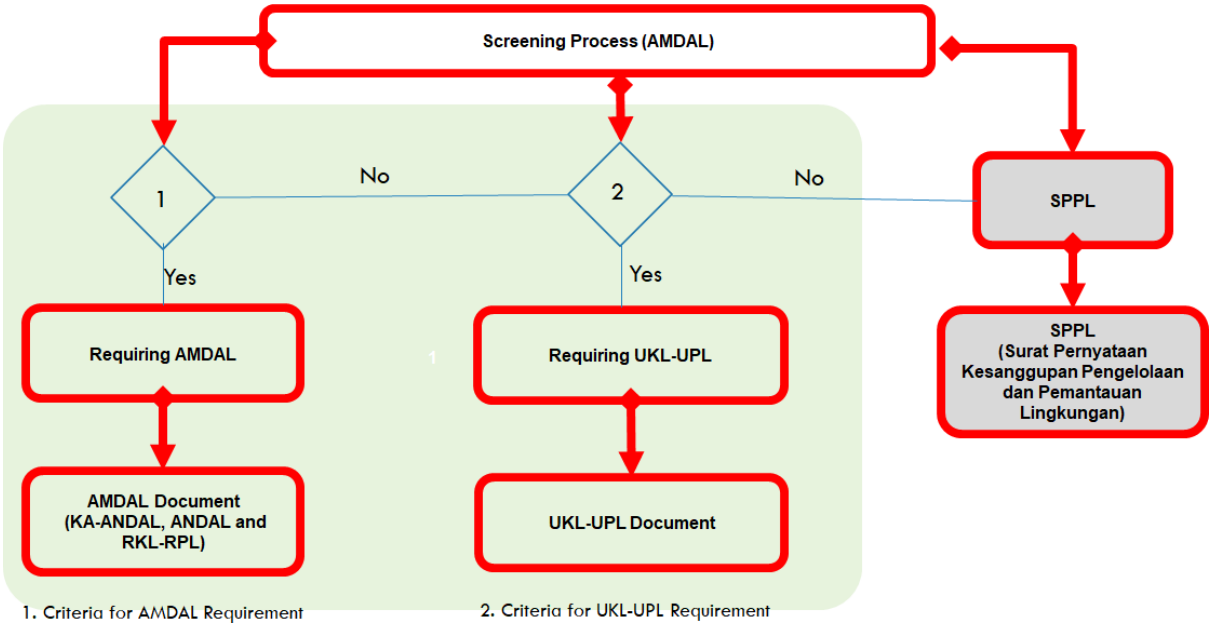
Project	Scale		
	AMDAL	UKL-UPL	SPPL
River Normalization			
Metropolitan City	River length ≥ 5 km; dredging volume ≥500.00 m^3	5 km > river length ≥ 1 km; 50.000 m^3 > dredging volume ≥ 50.00 m^3	River length <1 km; dredging volume <50.000 m^3
Large or medium city	River length ≥ 10 km; dredging volume ≥500.00 m^3	10 km > river length ≥ 1 km; 50.000 m^3 > dredging volume ≥ 50.00 m^3	River length <1 km; dredging volume <50.000 m^3
Small city or rural area	River length ≥ 15 km; dredging volume ≥500.00 m^3	15 km > river length ≥ 1 km; 50.000 m^3 > dredging volume ≥ 50.00 m^3	River length <1 km; dredging volume <50.000 m^3

Source: MoEF Regulation No. 4/2021.

23. The regulation of Minister of Environment and Forestry No. 4/2021 on List of Business and/or Activity Requiring AMDAL, UKL-UPL, or SPPL (Attachment 1) provides a list of business and/or activities that require environmental impact assessment, including public work (water resources and flood). All project or business proposals will undergo screening to classify whether a project proposal would require AMDAL, or UKL-UPL, or SPPL.[9] The process is shown in Figure 1.

[9] The project screening procedure for both according to ADB SPS and Indonesia regulation is discussed and shown in EARF.

Figure 1: Environmental Screening and Environmental Documentation (Indonesian Regulation)



Source: Presentation of PDLUK (Ministry of Environment).

2. Regulations on Occupational Health and Safety

24. Relevant requirements with respect to workers' health and safety include Law No.1/1970 on Workers' Safety and Decree of Minister of Workforce No. 5/2018 on Safety and Occupational Health.

25. Ministry of Public Work and Housing (MPWH) Instruction No. 02/IN/M/2020 on Coronavirus Disease 2019 (Covid-19) Prevention on Construction Work guides worker health and safety.

26. In addition to the requirements on worker safety through the national law on Labor, Ministry of Public Work and Housing (MPWH) has issued its internal K3 (occupational health and safety) policy[10] requiring MPWH projects and its workers to be provided with safe and healthy working conditions and measures to be defined and implemented to prevent accidents, injuries, and occupational disease. This decree applies to employees and laborers in all units of the ministry (including DGWR and RBO). Additionally, national laws on disaster management also provide for the protection of communities through disaster risk management measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.

3. Regulations on Labor and Employment

27. Law No. 11/2020 on Job Creation provides that every worker has equal right and opportunity to get appropriate employment and livelihood regardless of gender, ethnic, race, religion, and political orientation as their interest and competence, including equal treatment of

[10] Regulation of Minister of Public Work and Housing No. 02/PRT/M/2018 on Revision of PUPR Regulation No. 05/PRT/M/2014 on Guidance of Occupational Health and Safety for Public Work Construction.

disabled people.

28. Ministry of Workforce regulation derived from the law covers other items related to labor and employment, among others working hours, safety and occupational health, wage, layoff, compensation for work termination and leave, etc.

4. Regulations on Hazardous Wastes Management

29. The Indonesian legal framework on the environment requires cleaner production processes and good energy efficiency practices, avoidance of pollution, or, when avoidance is not possible, minimizing or controlling the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gas emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage.

30. This regulation (as stipulated in Government Regulation No. 22/2021) applies in the case of removal and transportation of hazardous sediments and other hazardous materials and wastes from river or flood works. The planned activities are not expected to produce significant amounts of Hazardous and Toxic Materials (B3) waste. Thus, there is no need to do a B3 waste test (Toxicity Characteristic Leaching Procedure or TCLP) as shown in Appendix 5.

31. The details of the hazardous wastes management described in MOEF Regulation No. 6/2021. The regulation set the procedure and requirement for (i) status of hazardous wastes, (ii) reduction of hazardous wastes, (iii) storage of hazardous wastes, (iv) collection of hazardous wastes, (v) transport of hazardous wastes, (vi) treatment of hazardous wastes, (vii) piling of hazardous wastes, (viii) dumping of hazardous wastes, (ix) trans-boundary transport of hazardous wastes, and (x) application and issuance of technical approval for hazardous waste management (PLB3) and operational feasibility certificate (SLO-PLB3).

5. Regulations on Protected Areas and Biodiversity

32. **MOEF Regulation No. 76/MenLHK-Setjen/2015 on Protected Forest Zoning**. This regulation sets forth the criteria for zoning of national parks and management block of natural sanctuary, wildlife sanctuary, wilderness park, and natural tourism park. Management zones of national park consist of (i) core zone, (ii) wilderness zone, (iii) utilization zone, and/or (iv) other zones as applicable. The other zones consist of (i) marine protection zone; (ii) traditional zone; (iii) rehabilitation zone; and (iv) religious, cultural and historical zone, and/or special zone. The zones are set forth for each national park through a ministerial decree and supported with maps.

33. The regulation describes the criteria for each zone. Especially for core zone in national park, the following criteria apply:

(i) Has ecosystem or represent original and natural ecosystem type or natural phenomenon and geological formation;
(ii) Represent concentration of plant/biotic community and/or represent area with high biodiversity value;
(iii) Represent mating and nesting area of target fauna/animal and/or breeding and growing area for the target fauna/animal; and/or
(iv) Transit area for periodical migrant animals.

34. **MOEF Regulation No. 7/2021** on Forestry Planning, Change of Forest Areas Allocation and Function, and Use of Forest Area. Under this regulation, use of forest area for other than forestry activities are only allowed in production forest and protected areas with certain criteria,

as follows:

(i) Production Forest Conversion (HPK) function as set forth in laws and regulations;
(ii) Not charged for Approval of Forest Area Use, Commercial Permit for Forest Use and/or other approval from Minister (MOEF), and not located in Forest Area set forth as Forest Area with Special Purpose (KHDTK) and Forest Area for Food Security (KHKP);
(iii) Nonproductive, except at province which nonproductive HPK is not available; and
(iv) Criteria for nonproductive forest is set forth based on dominance of non-forested land cover which is not greater 70% consisting among other shrubs, open space, and mixed farms.

35. The exception for the above criteria includes the following activities:

(i) National Strategic Project;
(ii) National economic recovery;
(iii) Land acquisition for *Food Estate* and energy;
(iv) Land acquisition for natural disaster;
(v) Procurement of Agrarian Reform Land Object (TORA; *Tanah Objek Reforma Agraria*); and
(vi) Commercial activities built and permitted in the forest areas before enactment of Law No. 11/2020 on Jobs Creation (Omnibus Law).

36. The development of reservoir and dam, agricultural cultivation, fishery, livestock, and plantation are some of activities other than forestry that are allowed in the forest area. The minimum distance of proposed facilities or building is also regulated under Government Regulation No. 16/2021, which requires that every building shall comply and acquire Approval of Building Permit (PBG). The permit granted to the proponent to develop new buildings, replace, expand, reduce, and/or maintain the building according to the technical standard.

37. MOEF Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018 on Second Revision of MOEF Regulation No. P.20/MENLHK/SETJEN/KUM.1/6/2018 on Types of Protected Flora and Fauna. The regulation also refers to IUCN and other international conventions. Chapter III (Section III.B.1) and Appendix 7 presents the protected flora and fauna in the respective districts and provinces.

38. In addition to two regulations above, there are some other regulations related to biodiversity and protected areas, as follows:

(i) Government Regulation No. 7/1999 on Preservation of Flora and Fauna Species;
(ii) Government Regulation No. 8/1999 on Utilization of Flora and Fauna Species;
(iii) Government Regulation No. 45/ 2004 on Forest Protection;
(iv) Government Regulation No. 28/ 2011 on Management of Natural Sanctuary and Natural Conservation Areas and revised with Government Regulation No. 108/2015;
(v) Government Regulation No. 71/2014 on Protection and Management of Peatland Ecosystem and revised with Government Regulation No. 57/2016;
(vi) Government Regulation No. 32/1990 on Management of Protected Areas;
(vii) MOE Regulation No. 29/2009 on Biodiversity Conservation at Local Level;
(viii) MOE Regulation No. 03/2012 on Biodiversity Parks;

(ix) MOEF Regulation No. P.94/MENLHK/SETJEN/KUM.1/12/2016 on Types of Invasive Species;
(x) Regulation of DG Natural Resource Conservation and Ecosystem No. P.8/KSDAE/BPE2/ KSA.4/9/2016 on Guideline for Determining Wildlife Corridor as Essential Ecosystem; and
(xi) Regulation of DG Natural Resource Conservation and Ecosystem No. P.5/KSDAE/SET/ KUM.1/9/2017 on Technical Guidance on Determination of High Biodiversity Areas Beyond Natural Sanctuary Area, Natural Preservation Area, and Hunting Park .

6. Indonesia Environmental Standards

39. Standards issued by the MOEF generally consist of environmental quality (ambient) standards applicable to the receiving environment and emission standards applicable to the pollution source. The standards for ambient air quality, noise, and vibration are presented in Appendix 3, while water quality is presented in Appendix 4.

Table 2: Indonesia Environmental Standards

Aspect	Regulation
National Water Quality Standard	Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management, Appendix VI on National Water Quality Standard
Ambient Air Quality Standard	Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management, Appendix VII on Ambient Air Quality Standard
Noise Level Standard	State of Ministry of Environmental No. 48/1996 on Noise Level Standard
Vibration Level Standard	State of Ministry of Environmental No. 49/1996 on Vibration Level Standard

Source: Government Regulation No. 22/2021.

40. **Ambient Air Quality and Noise Standard.** Previous regulation on ambient air quality standards has been replaced with Government Regulation No. 22/2021. The former regulation still referred to the period when the sampling and measurement were carried out during the period. To compare with international standard, the latest regulation is compared with WB-IFC EHS Guidelines (2007), as presented in Table 3.

Table 3: Ambient Air Quality Standard and International Standards

No.	Parameters	Measurement Time	Air Quality Standard, µg/m^3	
			GR No. 22/2021	WB – IFC EHS Guidelines 2007
1.	Sulfur Dioxide (SO_2)	10-Minutes	-	500
		1 hour(s)	150	
		24 hour(s)	75	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
		1 year	45	
2.	Carbon Monoxide (CO)	1 hour(s)	10000	
		8 hour(s)	4000	
3.	Nitrogen Dioxide (NO_2)	1 hour(s)	200	200
		24 hour(s)	65	

No.	Parameters	Measurement Time	Air Quality Standard, µg/m^3	
			GR No. 22/2021	WB – IFC EHS Guidelines 2007
		1 hour(s)	50	
		1 year	50	40
4.	Photochemical Oxidant (O_2) as Ozone (O_3)	1 hour(s)	150	
		8 hour(s)	100	
		1 year	35	
5.	Non-Methane Hydrocarbon (NMHC)	3 hour(s)	160	
6.	Dust particulate < 100 µm (TSP)	24 hour(s)	230	
	Dust particulate < 10 µm (PM_{10})	24 hour(s)	75	150 (interim target 1) 100 (interim target 2) 75 (interim target 3)
		1 year	40	70 (interim target 1) 50 (interim target 2) 30 (interim target 3)
	Dust particulate < 2.5 µm ($PM_{2.5}$)	24 hour(s)	55	75 (interim target 1) 50 (interim target 2) 37.5 (interim target 3)
		1 year	15	35 (interim target 1) 25 (interim target 2) 15 (interim target 3)
7.	Lead (Pb)	24 hour(s)	2	

µg/m^3 = concentration in microgram per cubic meter, at normal atmosphere condition, namely pressure (P) 1 atm and temperature (T) 25^{o}C

Notes:

1. Concentration which reported for measurement period for 1 (one) hour is concentration of measurement result which carried out for each 30 (thirty) minute (in 1 hour carried twice measurement) and carried between 11.00 – 14.00 local time

2.Cconcentration which reported for measurement period for 8 (eight) hours is concentration from measurement time carried out between 06.00 – 18.00 local time

3. Concentration which reported for measurement period for 3 (three) hours is concentration which carried out for measurement time for 3 (three) hours is concentration from measurement time which carried out between 06.00 – 10.00 local time

Source: Government Regulation No. 22/2021 and WB – IFC EHS Guidelines 2007.

41. As shown in the above table, Indonesia air quality standard values are the same for one-hour measurement time of Nitrogen Dioxide (NO_2), but less strict than WB – IFC EHS for one-year measurement time. The thresholds value for sulfur dioxide and dust particulate is still in the range as targeted in WB – IFC EHS Guidelines (2007). The rest of the parameters (for example, lead, Non-Methane Hydrocarbon (NMHC) and Photochemical Oxidant (O_2) are regulated in the Government regulations, but not in WB – IFC EHS Guidelines (2007). Considering this, Indonesia standard for air quality standard prevails for the project.

42. Similar comparison also carried with Indonesia noise level standard (Regulation of Ministry of Environment No. 48/1999), as shown in Table 4. Indonesia noise standard values are same as WB – IFC EHS Guidelines 2007, except that Indonesia regulation does not differentiate noise

level of daytime and nighttime and no measurement of background level of noise. Considering its comparability, Indonesia standard for noise level prevails for the project.

Table 4: Noise Level Standard and Its Comparison with International Standard

Receptor	Unit	National Noise Level Limits[a]	WB – IFC EHS Guidelines 2007	
			Daytime (7:00-22:00)	Nighttime (22: – 7)
Residential, educational, hospital, institutional, and religious	One hour LAeq (dBA)	55	55	45
Industrial andcommercial		70	70	70
Office and trade		65	70	70
Green open space		50	Background level + 3dB at the nearest receptor location offsite	Background level + 3dB at the nearest receptor location offsite
Government andpublic space		60	Same as above	Same as above
Recreation		70	Same as above	Same as above
Cultural heritage		60	Same as above	Same as above

Source: Government Regulation No. 22/2021.

43. **Water Quality Standard.** Surface Water (Rivers and Lakes). Water quality standard surface water covers key parameters of physical, chemical, and biological aspects, including radioactivity as presented below. The parameters and threshold values for both surface water types (i.e., river and lake) is presented in Table 5.

44. Based on its utilization, there are 4 classes of surface water quality as mentioned in Appendix VI of GR No. 22/2021. For irrigation water it shall meet at least Class III (raw water provided for irrigation purpose). In case the water is also used as raw water for domestic use, it shall meet Class II requirement. The requirement for irrigation is less stringent than one for domestic use. The quality standard for Class III (for irrigation/agricultural purpose) is less stringent than one for domestic use (Class II).

Table 5: Quality Standard for Rivers, and Similar Water Bodies

Parameters (All Max limit in mg/L except noted otherwise.)	Class II (raw water for domestic use)		Class III (raw water for Irrigation use)	
	Lake	River	Lake	River
Temperature (℃)	Dev 3	Dev 3	Dev 3	Dev 3
Total Dissolved Solids (TDS)	1000	1000	1000	1000
Total Suspended Solids (TSS)	50	50	100	100
Transparency (Pt-Co)	4		2.5	
Color (Pt-Co)	50	50	100	100
Acidity Level (pH)	6-9	6-9	6-9	6-9
Biological Oxygen Demand (BOD)	3	3	6	6
Chemical Oxygen Demand (COD)	25	25	40	40
Dissolved Oxygen (DO, >)	4	4	3	3
Sulfate (SO_4^{2-})	300	300	300	300
Chloride (Cl^{-1})	300	300	300	300

Parameters (All Max limit in mg/L except noted otherwise.)	**Class II (raw water for domestic use)**		**Class III (raw water for Irrigation use)**	
	Lake	**River**	**Lake**	**River**
Nitrate (as N)		10		20
Nitrite (as N)		0.06		0.06
Ammonia (as N)		0.2		0.5
Total Nitrogen	0.75	15	1.90	25
Total Phosphate (as P)	0.03	0.2	0.1	1.0
Fluoride (F^-)	1.5	1.5	1.5	1.5
Sulfur as H_2S	0.002	0.002	0.002	0.002
Cyanide (CN^{-1})	0.02	0.02	0.02	0.02
Free chlorine	0.03	0.03	0.03	0.03
Barium (Ba) dissolved	-	-	-	-
Boron (B) dissolved	1.0	1.0	1.0	1.0
Mercury (Hg) dissolved	0.002	0.002	0.002	0.002
Arsenic (As) dissolved	0.05	0.05	0.05	0.05
Selenium (Se) dissolved	0.05	0.05	0.05	0.05
Iron (Fe) dissolved	-	-	-	-
Cadmium (Cd) dissolved	0.01	0.01	0.01	0.01
Cobalt (Co) dissolved	0.2	0.2	0.2	0.2
Mangan (Mn) dissolved	0.4	-	0.5	-
Nickel (Ni) dissolved	0.05	0.05	0.05	0.05
Zinc (Zn) dissolved	0.05	0.05	0.05	0.05
Copper (Cu) dissolved	0.02	0.02	0.02	20
Lead (Pb) dissolved	0.03	0.03	0.03	0.06
Hexavalent Chromium (Cr-(VI))	0.05	0.05	0.05	0.5
Oil and Grease	1	1	1	1000
Total Detergent	0.2	0.2	0.2	1.0
Phenol	0.005	0.005	0.01	1.5
Aldrin/ Dieldrin	-	-	-	-
BHC	210	210	201	210
Chlordane	-	-	-	-
DDT	2	-	2	-
Endrin	4	2	4	2
Heptachlor	-	4	-	4

Parameters (All Max limit in mg/L except noted otherwise.)	Class II (raw water for domestic use)		Class III (raw water for Irrigation use)	
	Lake	River	Lake	River
Fecal Coliform (MPN/100 mL)	1000	1000	2,000	2,000
Total Coliform (MPN/100 mL)	5000	5000	10,000	10,000
Chlorophyll-a (mg/m3)	50	-	100	
Solid waste	None	-	None	nil
Radioactivity				
Gross- A (Bq/L)	0.1	0.1	0.1	0.1
Gross- B (Bq/L)	1	1	1	1

Source: Appendix VI of Government Regulation No. 22/2021.

45. Rivers and lakes are similar as surface water, but some specific parameters are only required for lakes, among others: transparency, (dissolved) manganese, DDT, and Chlorophyll-a. In addition, threshold values for Total Nitrogen and Total Phosphate for lake are less than those of river, as shown in Table 16. Such standard for river and lake water apply to the project's requirements once the freshwater taken from one or both sources for irrigation or as raw water for domestic use in the farm site or its facilities, agro-processing facility, agribusiness terminal/sub terminal, or laboratory. Measurement for the water quality in this project only covers key parameters (excluding radioactivity and specific organic chemicals that are not relevant).

46. **Groundwater Standard.** Referring to Regulation of Minister of Health No. 32/2017, the groundwater standard for hygiene and sanitation use (including water supply for domestic use, i.e., equal to drinking water standard) comprising of three parameters, as shown in Table 6. Such standard for groundwater applies to the project's requirements once the freshwater abstracted as raw water for domestic use. According to the law, water especially groundwater is prioritized for basic human needs over other uses, even though groundwater is allowed for other uses such as irrigation, once basic community needs are met, as per regulation of Ministry of Public Works and Housing.

Table 6: Groundwater Standard for Hygiene-Sanitation Purpose

No	Parameters	Unit	Quality Standard (Minimum Value)
A.	**Physical Parameters**		
1.	Turbidity	NTU	25
2.	Color	TCU	50
3.	TSP (Total Dissolved Solid)	mg/l	1000
4.	Temperature	ºC	air temperature ± 3
5.	Taste		No taste
6.	Smell		No smell
B	**Biological Parameters**		
1.	Total coliform	CFU/100ml	50
2.	E. coli	CFU/100ml	0
C	**Chemical Parameters**		
1.	pH	mg/l	6,5 - 8,5
2.	Iron	mg/l	1
3.	Fluoride	mg/l	1,5
4.	Hardness (CaCO3)	mg/l	500
5.	Manganese	mg/l	0,5

No	Parameters	Unit	Quality Standard (Minimum Value)
6.	Nitrate, as N	mg/l	10
7.	Nitrite, as N	mg/l	1
8.	Cyanide	mg/l	0,1
9.	Detergent	mg/l	0,05
10.	Total Pesticide	mg/l	0,1

Source: Regulation of Minister of Health No. 32/2017).

7. Local Regulations on Environmental Management

47. **Local Regulation and Permitting Requirements.** Relevant local regulations (both at provincial and district level) related to environmental protection and management were also consulted, among others those related to environmental protection and management, mangrove protection and restoration, spatial plan, coastal areas and small islands spatial plan, coastal area zoning, etc. As applicable the necessary permits and related legislation at national and local level shall be complied with.

8. Indonesia Country Safeguard System

48. The Indonesia AMDAL system generally conforms to the intent of ADB's environmental policy principles, requirements, and management guidelines. According to the regulation, all projects should undergo environmental clearance before proceeding to implementation. Table 7 shows the relationship between the ADB environmental categorization and those under Indonesia's regulations/policies. Essentially, an AMDAL study corresponds to an EIA, and a UKL-UPL corresponds to an IEE. The Statement of Environmental Management and Monitoring undertaking (*Surat Pernyataan Kesanggupan Pengelolaan dan Pemantauan Lingkungan Hidup* - SPPL) generally corresponds to the environmental implication review of Category C projects as per the ADB SPS 2009. Several studies have been carried out to study the alignment of the Indonesia safeguard system and ADB SPS.[11]

(i) **AMDAL** and EIA correspond to a certain extent, though the criteria used for categorization under the Government of Indonesia's AMDAL procedure and ADB SPS 2009 requirements differ. Indonesia regulation provides quite rigid quantitative criteria, while ADB rely on qualitative criteria (significance). For example, Indonesia's AMDAL procedure classifies projects based on specific magnitude (length, depth, width, size, or other physical dimensions), whereas ADB's SPS 2009 categorizes projects based on the "significance of impacts". Not all activities requiring AMDAL per Indonesia's AMDAL procedure may categorize as category A per ADB SPS 2009.

(ii) **UKL-UPL** is required for certain business activities which unlikely to have significant impacts on the environment, but still require environmental assessment and approval. There is no specific certification for the team required for the preparation of a UKL-UPL.

(iii) **SPPL** requires the proponent to monitor and manage the environmental impact of low- risk businesses and/or activities that are not required to prepare AMDAL or UKL-UPL.

[11] Aligning Asian Development Bank and Country Systems for Improved Project Performance (https://www.adb.org/projects/documents/aligning-asian-development-bank-and-country-systems-improved- project-performance-tar) and https://www.adb.org/sites/default/files/project-document/185257/43220-014-pssa- 01.pdf.

Table 7: ADB and Indonesia Project Categorization Systems

ADB Project Categories	GOI Project Categories
Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.	**AMDAL**: Projects with significant impact that according to the law require an Environmental Impact Assessment (AMDAL). The detailed criteria that trigger an AMDAL are defined in the Decree of Minister of Environment and Forestry No. 4/2021.
Category B: A proposed project is classified as category B if its potentially adverse environmental impacts are less adverse than those of Category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases, mitigation measures can be designed more readily than for Category A projects. An initial environmental examination is required.	**UKL-UPL**: Projects with no significant impact that according to the law requires Environmental Management and Environmental Monitoring Measures (UKL-UPL).
Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed	**SPPL**: Projects that do not require AMDAL or UKL-UPL are obliged to submit a 'statement on commitment for management and environmental monitoring' or SPPL**.**

Source: Compiled from ADB SPS and Indonesia Regulation on AMDAL.

C. International Environmental Agreements

49. Indonesia has ratified several international conventions, and some are relevant to the subproject. The list of international conventions ratified by the Government of Indonesia related to the environment includes, among others:

(i) Convention on Biological Diversity, for parties to require the environmental assessment of their proposed projects that are likely to have significant adverse impacts on biological diversity with a view of avoiding or minimizing such impacts. Indonesia is obliged to respect and protect traditional knowledge related to sustainable utilization of biodiversity, including promoting fair benefit sharing of the use of traditional knowledge. Based on this convention, the Nagoya Protocol was established, which was also ratified by the Government of Indonesia.

(ii) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1972). Indonesia follows an international agreement to control the continuous encroachment of wetlands in the present and future, to recognize the basic ecological functions of wetlands follows the economic, cultural, scientific, and recreation.

(iii) Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (1972). Indonesia follows an international agreement to control marine pollution due to the accumulation of waste and other materials and to encourage regional agreements to complement the Convention; the London Convention came into effect in 1996.

(iv) Vienna Convention for the Protection of the Ozone Layer, in 1998, and subsequent protocol and amendments, for parties to take appropriate measures to protect human health and the environment against adverse impacts likely to arise from human activities that will/likely modify the ozone layer.

(v) Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL). Indonesia has ratified the international agreement to conserve the marine environment/marine pollution by banning oil and other hazardous substances and disposal of hazardous substances to suppress levels that do inadvertently (e.g., due to accidents).

(vi) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989). Indonesia has ratified the international agreement to reduce cross-country movement of waste in accordance with the minimum limit of the Convention to create environmentally friendly waste management and efficiency; reduce the toxicity of waste generated and ensuring that environmental management is the basis for resource development.

(vii) United Nations Framework Convention on Climate Change (1992). Indonesia has ratified the international agreement to achieve stabilization of greenhouse gas concentrations in the atmosphere as low as possible to prevent dangerous anthropogenic interference with the climate.

(viii) Kyoto Protocol to the United Nations Framework Convention on Climate Change. Indonesia has ratified the international agreement to reduce greenhouse gas emissions by promoting national programs in developed countries aimed at reducing greenhouse gas emissions and determining the percentage of reduction targets for developed countries.

(ix) Indonesia has ratified the Paris Agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with greenhouse gases emissions mitigation, adaptation, and finance in October 2016.

(x) Convention on Fishing and Conservation of Living Resources of the High Seas (Marine Life Conservation). Objectives: Solve the problem of preservation of biological resources in the high seas through international collaboration with the consideration that the use of modern technology for the exploitation of resources in excess will cause harm to these resources.

III. DESCRIPTION OF SUBPROJECTS

50. The Serang River System is one of the rivers or sub-watersheds in the Seluna Watershed System. The Serang River originates at Mount Merbabu and is accommodated in the Kedungombo Reservoir in Boyolali Regency. The downstream of the Serang River is in the flooded lane that connects the downstream of the Serang River to the upstream of the Wulan River at the Wilalung sluice. The catchment area of the Serang River is 937 $km^{2,}$ with a river length of 128.70 km. The proposed subproject reduces riskof the flood events. The subprpoject will reduce the causes of flooding with the following components:

(i) Reducing sediment by constructing a Sediment Trap upstream of the Kedung Ombo Reservoir.

(ii) Increase the capacity of the Serang River by normalization (dredging the riverbed and widening of the river) and raising the earth embankment.

(iii) Protect and improve the riverbanks from scouring the river flow with gabion/gabion materials on several parts of the Serang riverbank.

51. The subproject components incluse controlling the Juana River flood by building sediment traps, retention ponds, rubber weirs, and river normalization.

A. Subprojects Location

52. The proposed subproject components will be located in the districts of Boyolali, Grobogan, Kudus, and Demak. The location of each component is shown in Table 8 below.

Table 8: Location of Proposed Subprojects

Proposed Sub Projects	Location		
	District	Sub-District	Village
Kedung Ombo Sediment Trap	Boyolali	Kemusu	Kemusu
Normalization of the Serang River	Grobogan	Klambu	Jenengan
			Wandankemiri
	Demak	Dempet	Merak
			Karangrejo
			Brakas
			Sidomulyo
		Gajah	Wilalung
	Kudus	Undaan	Lambangan
			Kalirejo

Source: Engineering Detail Data, 2023.

B. Subprojects Detailed Description

53. The Seluna River Basin Territory (RBT) covers the Serang, Lusi and Juana River systems in Central Java Province. The Serang River originates in the Merbabu Mountain in the southwest corner of the RBT, while the upstream of Lusi River is located in the limestone highlands in the western part of the RBT on the Kendeng Mountains (Pegunungan Kapur Utara). Both rivers meet at Penawangan area (Purwodadi) and flow downstream as Lower Serang for a distance of about 30 km up to Wilalung Sluice Gate. Thereafter, the river is known as Wulan which flows northwards for a distance of about 49.8 km before emptying into the Java Sea. The catchment area of Serang River at its confluence with Lusi is 937 sq km while that of the Lusi River is 2,057 sq km.

54. The Seluna RBT is highly prone to flooding due to its climate and topography. Serang and Lusi rivers are first-order streams that contribute to floods in the Grobogan, Demak, Kudus, and Pati districts. Flooding, which occurs seasonally in the basin, has increased frequently and intensively due to climate change and land-use change. The floods disrupt economic activities, accentuate economic inequalities, and disproportionately affect women. Agriculture is one of the main economic activities in the low-lying plains and reclaimed swamps. Sea level increasing and population growth will increase the risk of frequent flooding, saline intrusion, and coastal erosion affecting livelihoods and food security.

55. A flood risk management is needed to accommodate all actions required, from identification, assessment, mitigation to flood risk evaluation. Flood risk management is an activity to evaluate schemes to reduce flood risk but not to eliminate all risks. Flood events cannot be controlled in absolute terms, but only for a certain level of security or maximum flood discharge, called a planned flood discharge. Thus, Flood Risk Management requires a holistic and scientific approach to addressing issues of climate change, rainfall, rivers, flooding, environmental and socio-economic issues.

56. The occurrence of sediment charge in the river body begins with the release of soil particles due to exposure to rain. The soil particles that collect into the sediment are carried by the flow of water into the river towards the lower regions. Some sediment can settle at the bottom of the reservoir, others can pass through the dam along with water. Sediment carried by the river flow can lead to reduced river capacity. Examples of sedimentation in river bodies as shown in Figure 2 below.

Figure 2: Sedimentation of Serang River at the upstreams of Kedung Ombo Reservoir

Source: Ministry of Public Works and Housing.

57. Proposed sub-projects are: Kedung Ombo sediment trap and normalization of Serang River. Kedung Ombo sediment traps were built to reduce the sediment that entered the Kedung Ombo reservoir. The objective is to extend the life of the reservoir and indirectly reduce the sediment that enters the Serang River. The normalization of the Serang River objective is to increase the capacity of the Serang River body. The shape parameters of each subproject are shown in Table 9 below.

58. **Kedung Ombo Sediment Traps**. Kedung Ombo Reservoir is a water storage building that provides irrigation water, raw water for clean water, fisheries, tourism and flood control. The Kedung Ombo Reservoir dams two rivers, namely the Serang River, which flows to the northeast and the Uter River, which flows to the north. The main constraint at the Kedong Ombo catchment is the loss of active storage due to the large amounts of sediment (875,000 tons/year) carried during storms and periods of high flow. Thus a sediment catcher is needed to reduce sedimentation downstream. The Kedung Ombo Reservoir Trap Sediment is planned to be made in the upstream part of the Kedung Ombo Reservoir in the Serang River located in Boyolali Regency. The sediment catcher building is planned from reinforced concrete material. The typical design of sediment traps is presented in Figure 2.

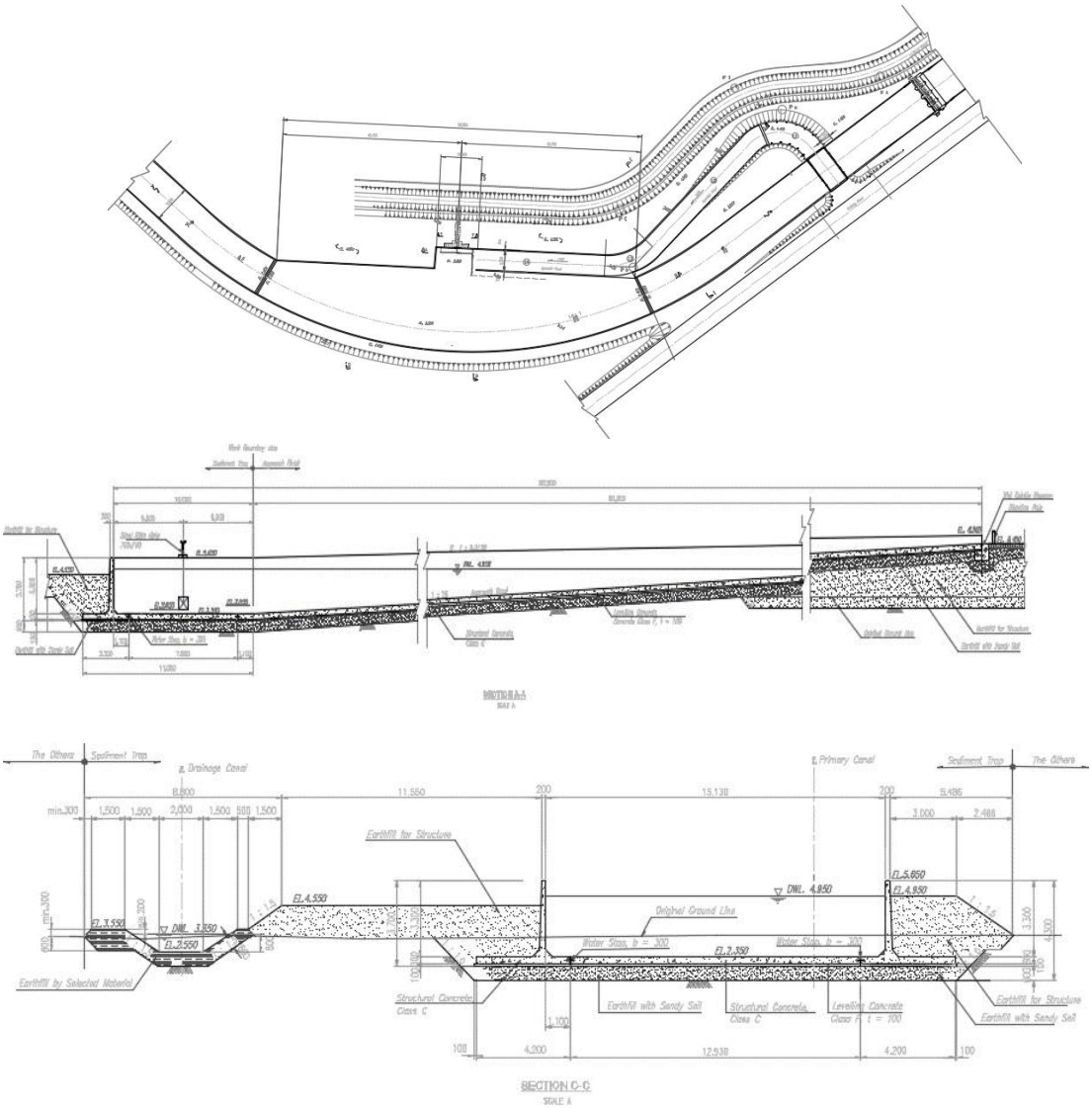
Table 9: Subprojects Shape Parameters

Subproject	Shape Parameters
Kedung Ombo Sediment Traps	Consists of buildings: a. Main Dam (reinforced concrete) Height: 2m Spill Base Width: 50 m b. Sub Dam (reinforced concrete) Height: 1m Spill Base Width: 30 m Total capacity: 4,082 m^3

Normalization of the Serang River	• Location : Channel of the Serang River from the Klambu Reservoir to the confluence with the Wulan River near the Wilalung sluice • Amount of normalization: Normal length: 22.8 km Normalized sediment volume: 13,972,723.81 m^3 • Embankment elevation: Length: 17.3 km Height: 0.8 m – 1.8 m • Embankment reinforcement with gabions Length: 3,300 m divided into several segments

Source: Engineering Detail Data, 2023.

Figure 3: Sediment Trap Typical Design



Source: Engineering Detail Data, 2023.

59. **Serang River Normalization**. Normalization is the dredging of the riverbed and river cross-section widening in certain segments to expand the river cross-section area to increase the

capacity of the river.

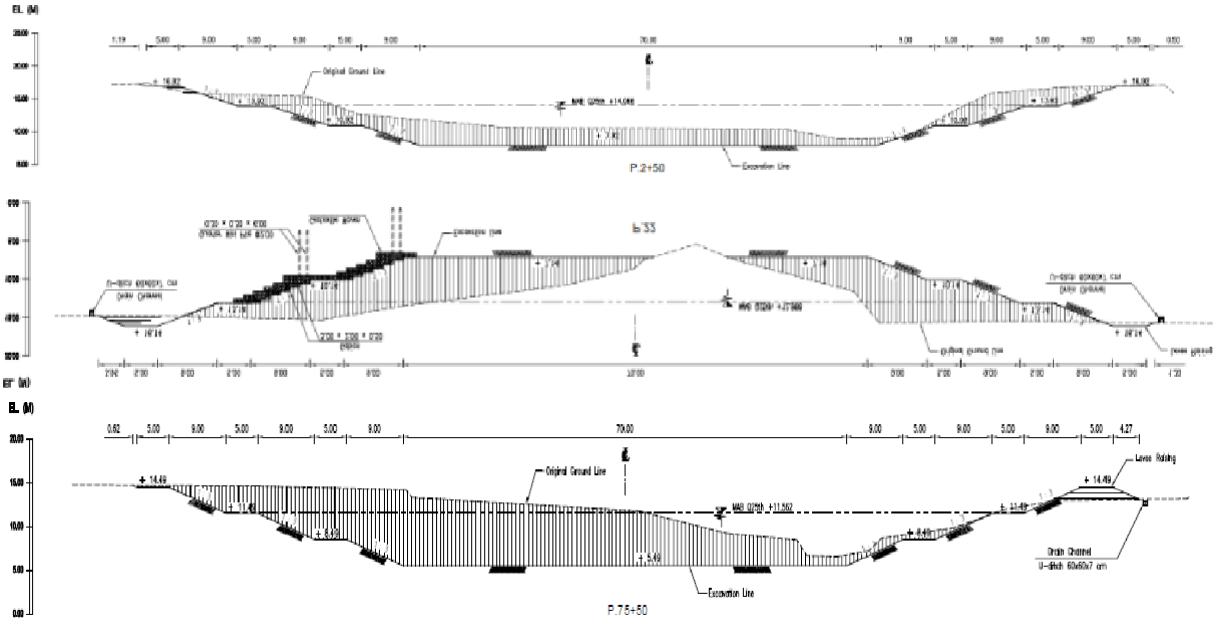
60. In addition, it is planned to improve the river embankment in several segments. Construction is planned using concrete material with a pile foundation in certain segments to prevent erosion on the banks or river embankments. A typical design of normalization is presented in Figure 3.

Table 10: Serang River Normalization Component

Subproject	Shape Parameters
Kedung Ombo Sediment Traps	Consists of buildings: a. Main Dam (reinforced concrete) Height: 2m Spill Base Width: 50 m b. Sub Dam (reinforced concrete) Height: 1m Spill Base Width: 30 m Total capacity: 4,082 m^3
Normalization the Serang River	• Location : Channel of the Serang River from the Klambu Reservoir to the confluence with the Wulan River near the Wilalung sluice • Amount of normalization: Normal length: 22.8 km Normalized sediment volume: 13,972,723.81 m^3 • Embankment elevation: Length: 17.3 km Height: 0.8 m – 1.8 m • Embankment reinforcement with gabions Length: 3,300 m divided into several segments

Source: Engineering Detail Data, 2023.

Figure 4: Normalization of the Serang River



Source: Engineering Detail Data, 2023.

IV. DESCRIPTION OF ENVIRONMENT (BASELINE DATA)

A. Physical Resources

1. Climate

61. The Serang River is located in Central Java which belongs to the category of wet tropical climates. The air temperature in Central Java on average north region ranges from 21.7°C–35.8°C with humidity of air at 63%-99%. While a high level of humidity exists in most low-lying parts of the province, it drops significantly in the uplands. The predominant winds are monsoon and trade winds. The northeast monsoon occurs from November to March, and the weather is normally cloudy and rainy. The southeast wind system prevails from June to September during the dry season. The river basin is particularly susceptible to El Nino events causing long dry seasons.

62. Daily maximum and minimum temperature recorded at Semarang city (2018) is downloaded from the website of Meteorology Climatology and Geophysics Council (BMKG) of Indonesia, It is observed that the temperature moved between a minimum of 18.2ºC to 36.6 ºC with an annual mean of 28.6 ºC. The hottest day was in October while the coldest day was in August.

63. Rainfall recorded by BMKG (2020) shows the highest monthly rainfall maximum of 380.10 mm and the lowest of 3.10 mm. Average monthly rainfall of 205.48 mm. Wet months where rainfall above 200 mm occurs for 7 months, from January to May and November to December. Dry months where rainfall of less than 100 mm occurs during 4 months from June to September. The rainfall of the rest 2 months (October and December) is in between dry and wet months.

2. Geology

64. The formation of the Serang River Valley is divided into 2 based on the nature of its formation, firstly the valley that is mostly formed due to erosion and the other part due to sedimentation, and secondly the valley that is mostly formed due to sedimentation and partly due to erosion.

65. In the upstream part of the Seluna watershed is an area with rocks that are generally low-winded, such as the central part of the west is a breakthrough rock consisting of microdiorites, diorite, andesite, dacite, and gabbro. In the middle of the watershed extending upstream is a series of mixtures of volcanic deposits (breccia, tufa, and lava) with marine sediment deposits. The downstream of the watershed to coastal areas is composed of alluvium sedimentary rocks in the plains and rivers, especially in the form of sand, gravel, silt, and clay with moderate to high porosity, and also beachfront alluvium, mainly composed of sand.

3. Water Quality

66. The water quality referred to secondary data of the measurement carried by Environmental Agency of Boyolali in 2019.

67. The water quality referred to secondary data of the measurement carried by Environmental Agency of Boyolali in 2019. Result of the measurement for both Monitoring I (wet season) and Monitoring II (dry season) compared against the river water quality standard Class III as outlined in Government Regulation No. 82/2001 (now replaced by Government Regulation No. 22/2021). The class was chosen as the target in the environmental performance in Boyolali District RPJMD 2016-2021. Under this class, the water is suitable to use for water tourism,

freshwater fish farming, livestock, and irrigation. The result of the measurement is presented in Table 11 below.

Table 11: Water Quality Measurement and Water Quality Status (Serang River)

No	Parameters	Results [a]		Quality Standard[b] (Class III)	Unit
		1	2		
1	Total Suspended Solids, TSS	2.5	5	100	mg/L
2	Total Dissolved Solids, TDS	162	202	1000	mg/L
3	Biochemical Oxygen Demand, BOD_5	3.3	4.3	6	mg/L
4	Chemical Oxygen Demand, COD	8.9	8	40	mg/L
5	Dissolved Oxygen, DO**	7.9	8.4	3	mg/L
6	Nitrite	0.085	0.229	0.06	mg/L
7	Nitrate	0.1	0.2	20	mg/L
8	Ammonia	0	0.01	0.5	mg/L
9	pH	8.8	8.61	6 – 9	

[a] Remarks: 1) Mid of Serang River and 2) Downstream of Serang River.
[b] Appendix VI of Government Regulation No. 22/2021 on Water Quality Standard.
Source: IKPLHD Kabupaten in Central Java, 2019.

68. Compared to the water quality standard as outlined in Appendix VI of Government Regulation No. 22/2021, the water quality of Serang River is the water appropriate for freshwater fish farming, livestock, and irrigation.

69. Similar measurement carried out for the water of Kedung Ombo reservoir, which also meet the Class III water quality standard. Under this class, the reservoir water is suitable to use for water tourism, freshwater fish farming, livestock, and irrigation. Detailed results of the water quality measurement of the Kedung Ombo reservoir are presented in Table 12.

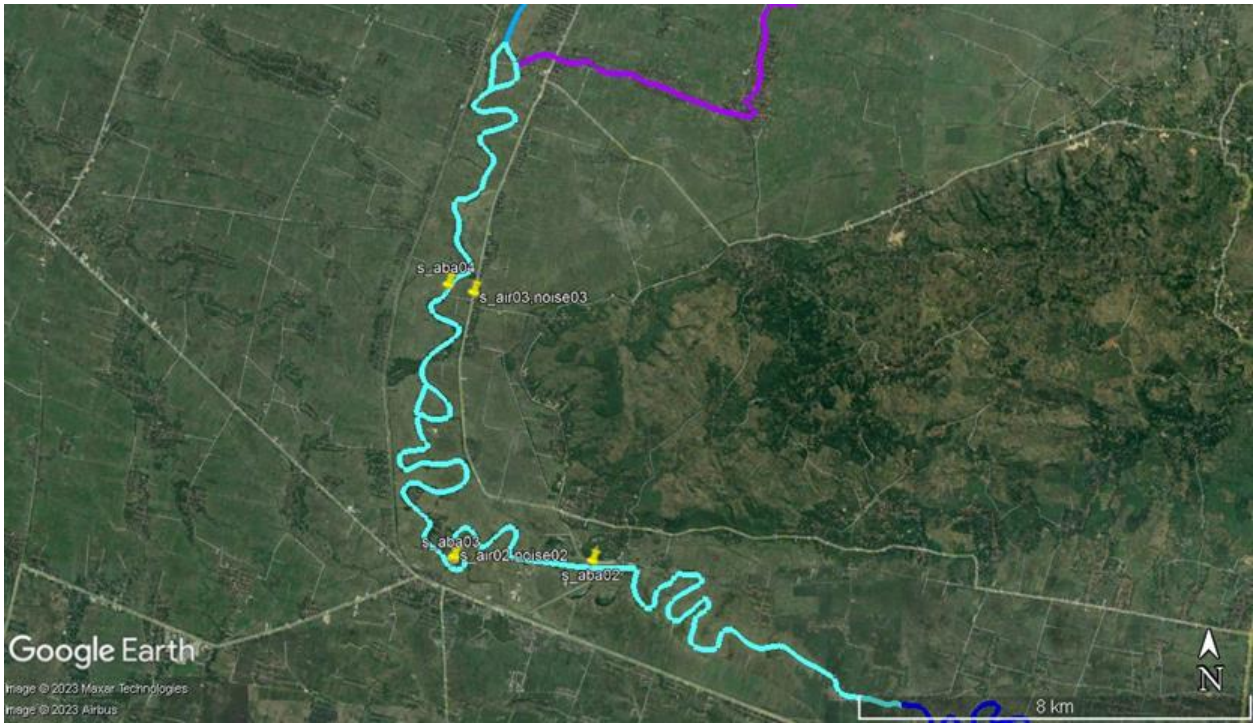
Table 12: Water Quality of Kedung Ombo Reservoir (2019)

No	Parameter	Analysis Results[a]		Quality Standard*	Unit
		1	2	Class III	
1	*Biochemical Oxygen Demand*, BOD5	2.8	2.4	6	mg/L
2	*Chemical Oxygen Demand*, COD	21.9	29.7	40	mg/L
3	*Dissolved Oxygen*, DO**	7.2	6.5	3	mg/L
4	pH	8.27	8.26	6 – 9	
5	Cyanide	<0.001	0.002	0.002	mg/L
6	Free Chlorine	0.04	0.02	0.03	mg/L
7	Oil and Fat	0.4083	5.6554	1	mg/L
8	Fecal Coliform	0	0	20.00	MPN/ 100 mL
9	Total Coliform	1,000	400	10,000	MPN/ 100 mL

[a] Quality Standard (Appendix VI of Government Regulation No. 22/ 2021 on Implementation of Environmental Protection and Management.
Source: IKPLHD Kabupaten Jawa Tengah, 2019.

70. To complete the secondary data, a laboratory testing conducted for the water quality and noise and air quality. The sampling points for the measurement are presented in the following table and figure.

Figure 5: Map of Sampling Points for Air Quality, Water Quality and Noise Measurement



Code	Type of Sampling	Sub-District	District	Coordinate	
s_aba01,air01,noise01	Water, Air, Noise	Kemusu	Boyolali	7°17'38.80"S	110°43'30.18"T
s_aba02	Water	Klambu	Grobogan	7° 1'8.18"S	110°47'54.32"T
s_air02, noise02	Air, Noise	Klambu	Grobogan	7° 1'5.37"S	110°46'22.39"T
s_aba03	Water	Klambu	Grobogan	7° 1'6.68"S	110°46'21.51"T
s_air03, noise03	Air, Noise	Klambu	Grobogan	6°58'11.04"S	110°46'35.39"T
s_aba04	Water	Klambu	Grobogan	6°58'5.90"S	110°46'18.53"T

Source: Google Earth and Ministry of Public Works and Housing.

B. Biological Resources

1. Aquatic Biota

71. The nekton found in the Seluna river consists of various types of fish, among others: Wader/ Spotted Barb (Barbodes Binotatus), Tawes/ Java Barb (Barbonymus Gonionotus), Mujair/ Mozambique tilapia (Oreochromis mossambicus), Nila/ Nile Tilapia (Oreochromis Niloticus) and Beunteur (Puntius Binotatus). Those are types of fishes commonly cultivated. No protected aquatic biota under the Indonesia regulations[12] identified at the project area (see Appendix 7).

2. Terrestrial Flora and Fauna

72. Vegetation along the riverbanks generally consists of grass and cultivated plants such as calabashes, long beans, cassavas, bananas, papayas. The ecosystem around the proposed subprojects are riparian areas, rice fields, fields, and settlements. No protected flora identified at

[12] Law No. 05 / 1990 on Conservation of Natural Resources and Ecosystems, Government Regulation No. 07 / 1999 on The Preservation of the Type of Plant and Animal, and Regulation of the Minister of Environment and Forestry P.106 / MENLHK / SETJEN / KUM.1 / 12 / 2018 on the Types of Protected Plants and Animals.

the project area as refers to Indonesia regulations[13].

73. The type of fauna found in the watershed consisting of mammals, Aves, and insects. The mammals found were livestock. Insects found are butterflies, dragonflies, and others. It is shown that no protected fauna species identified as refers to the Indonesia regulations.[14]

3. Protected and Conservation Area

74. The location of the proposed subprojects is entirely within the riparian zones. In reference to the Local Regulation No. 7 of 2012 on Grobogan Spatial Plan of 2011-2031, Local Regulation No. 6 of 2011 on Demak Spatial Plan of 2011-2031, Local Regulation Number 9 of 2011 on Boyolali Spatial Plan of 2011-2031, Local Regulation No. 16 of 2012 on Kudus Spatial Plan of 2012-2032, the location of the proposed subprojects complied with regional spatial plan.

75. In reference to the Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number: SK. 7594/MENLHK-PKTL/IPSDH/PLA.1/9/2022 on Indicative Maps of the New Permit Moratorium, the location of the proposed subproject is not located in the area prohibited for granting new permits.

76. From the above assessment concluded that the subproject location complies with national, provincial and district's spatial plan.

C. Social Economy

77. Central Bureau of Statistics (BPS) has reported Grobogan's economic structure for over last five years (2015-2019) was dominated by five categories of business in a row: Agriculture, Forestry, and Fishery; Wholesale and Retail Trade; Repair of Vehicles and Motorcycles; Manufacturing Industry; and Construction Services. The highest share in 2019 was generated by Agriculture, Forestry, and Fishery sectors. The share of the sector accounted for 27.84% or more than a quarter of the regency's GRDP (although this figure decreased from 32.77% in 2015). The role of Agriculture, Forestry, and Fisheries gradually decreased since 2016. Instead, the role of the Manufacturing industry increased gradually since 2015. While the role of the other three categories tends to be stable. One of the causes of the decline was the reduction of productive agricultural land. The regency's economic growth in 2019 amounted to 5.37%, lower than the last economic growth which reached 5.83%. All of 16 economic categories show positive growth, except for Agriculture, Forestry, and Fishing which negative growth.

78. Central Bureau of Statistics (BPS) has reported Boyolali's economic structure for over last five years (2015-2019) was dominated by five categories of business in a row: Manufacturing Industry; Agriculture, Forestry, and Fishery; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; and Construction services. The highest share in 2019 was generated by the manufacturing industry. The share of the sector accounted for 30.84% or more than a quarter of the regency's GRDP (although this figure was decreased from 32.77% in 2015). The role of the manufacturing industry has gradually increased since 2015. Among those five dominant sectors, only the manufacturing industry and construction services increased gradually since 2015. Meanwhile, the contribution of the other three categories gradually declined. One of the causes of the decline of the Agriculture, Forestry, and Fishery sector was the reduction of productive agricultural land. The district's economic growth in 2019 amounted to 5.96%.

[13] See footnote 16.
[14] See footnote 16.

79. Central Bureau of Statistics (BPS) has reported Demak's economic structure for over last five years (2015-2019) was dominated by five categories of business in a row: Manufacturing Industry; Agriculture, Forestry, and Fishery; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; and Construction services. The highest share of GRDP is produced by the Manufacturing Industry, which reached 30.01%. From 2016 to 2019, the share of this category is increasing. However, in 2020 its contribution has decreased. On the other hand, Agriculture, Forestry, and Fishery tends to decline. The district's economic growth in 2019 amounted to 5.36%.

80. Central Bureau of Statistics (BPS) has reported Kudus's economic structure for over last five years (2016-2020) was dominated by five categories of business in a row: Manufacturing Industry; Wholesale and Retail Trade, Repair of Vehicles and Motorcycles; Construction services; and Agriculture, Forestry and Fisheries. The highest share of GRDP is produced by Manufacturing Industry, which reached 80.97% (this figure is the same as in 2016). Among the five sectors, Agriculture, Forestry, Fisheries and Manufacturing have increasing contribution. On the contrary, Construction, Wholesale and Retail Trade, Repair of Vehicles and Motorcycles have gradually decreased. The contribution of other businesses, although most of them tend to be stable, their contribution is less than 2%. In general, the main cause of the change is the COVID-19 pandemic.

D. Social Culture

1. Population

81. Based on BPS data, the population of Grobogan in 2021 recorded as 1,380,198 people. This number increased by 0.33% compared to the previous year which was recorded as 1,375,969 people. With an area of about 2,023.85 sq km, the population density of Grobogan is 682 people per sq km. In line with the increasing population, this population density increased compared to the previous year, which recorded as 680 people per sq km. The composition of the population by gender indicates that the Grobogan is still dominated by the female population. This is evident from the sex ratio which ranged from 97.98 to 98.00 in the last six years. In 2021, the Sex Ratio is recorded at 98.00 meaning, for every 100 women, there are as many as 98 men. In absolute terms, the female population in 2021 is 697,060, while the male population is 683,138. Grobogan's population structure is transitioning to an elderly population. This is characterized by a decrease in the population of the young age group (0-14 years) and the increasing population in the productive age group (15-64 years) and old age groups (65 years and above). Population distribution by age in 2021 shows 22.02% of the population is young, 68.53% of the population is productive group and only 9.45% of the population is the elderly group.

82. Based on the 2020 Population Census, the population of Boyolali in 2020 is 1,062,713 people. The sex ratio is 101.25. This means that out of every 100 women there are as many as 101 male residents. The female population in Boyolali is 528,055 people and the male population is 534,658 people. The age structure of the Boyolali population is still dominated by the productive age. The dependency ratio is 45.94%. Thus, every 100 productive ages bears the burden of 46 unproductive people. Since 2016, the number of young people groups has increased. Meanwhile, the number of elderly people groups continues to decline.

83. According to the 2020 Population Census, the population of Demak was recorded as 1,203,956 people. This number continues to increase from year to year. The gender ratio in 2020 amounted to 101.96. This means that for every 100 female residents there are 102 male residents. In other words, the number of women in the Demak is less than the number of male residents. The dependency ratio during the period of 2010 to 2020 tends to decrease until 2020 which is 45.87. Over the past five years, the decline in dependency ratio has resulted from a decrease in the proportion of the young population groups (0-14 years) because of the declining rate of

population growth. Meanwhile, the proportion of the elderly population groups (65 years and above) is increasing.

84. The population of Kudus in 2020 recorded as 849,184 people. On average, the population growth rate in the period 1990-2000 was 1.46% per year, while for the period 2000- 2010 it was 0.97% per year. The population composition in 2020 consisted of 428,815 male or 49.21% and 442,496 female or 50.79%. Sex ratio is 96.91, in other words, for each 100 female there are 97 male. The dependency ratio is 40.92%, in other words, for each 100 productive age group (ages 15-64 years) must bear 41 unproductive age population groups (under 15 years of age and over 65 years). From this indicator it is seen that the working-age population in Kudus is still burdened with the responsibility of the young population which is more than the responsibility for the elderly population.

2. Historical or Cultural Sites

85. There are no historical sites or cultural sites located near the subproject which is officially registered to the Ministry of Education and Culture of the Republic of Indonesia. The nearest officially cultural site is Masjid Wali located in Prawoto Village, Sukolilo Subdistrict, Pati Regency (6°57'25.40"S 110°49'44.80"E). There are tombs of respected figures around the mosque, including the tombs of Sunan Prawoto, Syeh Khalifah, and Syeh Abdurrahman. The distance to the nearest subproject location is approximately 6 km, thus it is not expected to be affected by subproject activity.

3. Indigenous People

86. One of the indigenous people in Central Java Province is the Samin or *Sedulur Sikep* community. They live in the districts of Blora, Kudus, and Pati. The Samin community has special characteristics that become their identity in a daily appearance that is different from the other community. The identity shows their character in accordance with the teachings of Saminism that they maintain over time, especially the older generation. They feel the truth and strong belief in the teachings of Samin Surosentiko. The attitudes and deeds of the Samin people are always followed by concrete and consequential evidence according to accepted teachings. Samin community settlement is in Baturejo Village, Sukolilo Subdistrict (which is 13 km away from the subproject location) and in Karangrowo Village, Undaan Subdistrict (which is 11 km away from the subproject location). Thus, it is considered the subproject does not affect such indigenous people. Separate screening assessment on Indigenous People Safeguard prepared under FMNJP.

E. Health

87. Based on BPS data, in the Grobogan, there was an increase in public health status indicated from a decrease in the percentage of the sick population from 39.30% in 2019 to 36.44% in 2020. It is known that more women are sick than men. In 2020, the male population who disrupted their activities due to illness was 16.77%. While the female population that disrupted her activities due to illness as much as 19.31%. Recorded in 2020 as many as 47.7% of the population are sick and undergoing outpatient treatment. The percentage of women who seek more outpatient treatment. In general, there is still 52.3% of the population who are sick and do not seek outpatient treatment. Usually, they do self-medication or do not seek any treatment at all. The majority of residents who undergo outpatient treatment choose to seek treatment at health facilities served by medical professionals. The population that chooses treatment to a private medical doctor/midwife is as much as 59.04% by 2020. The population of outpatient treatment in Puskesmas/Pustu increased from 15.10 percent in 2019 to 20.52% in 2020. Likewise, the number

of sick people who choose to go to the medical clinics increased from 11.36% in 2019 to 13.88% in 2020. There is only about 0.79% of the population who undergo treatment to traditional/alternative medical practices.

88. Statistic Data (2020) showed the morbidity of Boyolali residents reached 15.43%, decreasing compared to 2019 which reached 17.82%. Life expectancy at birth from 2016-2020 tends to increase. For 2020, the life expectancy at birth reaches 75.95 years. For residents who seek outpatient treatment in 2020, about 45.97% choose private medical doctors/midwives, 23.50% choose to seek treatment at medical health clinics, and 14.15% seek treatment at Puskesmas/Pustu. Nevertheless, 66% of sick people chose to self-medicate rather than seek treatment in a health facility. About 31% felt no need for treatment. Less than 5% of the rest chose not to use health facilities for outpatient treatment for various reasons, including no medical expenses, no transportation costs, no means of transportation, and long service waiting times.

89. Statistic Data (2020) showed the morbidity of Demak residents is 17.20%. The morbidity of rural areas is higher than that of urban areas. The morbidity in the rural area is 18.35%, while urban area is 15.67%. The practice of medical doctors/midwives is the goal of the majority of the community in treatment, reaching 62.57%. Or to say, about six out of ten residents choose this facility both in rural and urban areas. The choice of this facility is because it is more widely spread throughout the region and the procedure is easier than in the hospital.

90. BPS data shows the life expectancy in Kudus in the period of 2012-2019 shows a trend that continues to rise. Life expectancy in 2012 was 76.37, while in 2020 it increased to 76.68. The morbidity in 2020 is 40.85, which more women are sick than men. If they are sick, the most chosen outpatient treatment is the private medical doctors/midwives which is as much as 55.31%. Then the next place of treatment that is widely used is medical clinics of 19.03%.

F. Public Sanitation

91. BPS data shows that 86.29% of Grobogan residents in 2020 already have their own defecation facilities. For drinking water, they use bottled water/refillable water (0.67%), water from clean water pipes (17.61%), water from bored wells (41.42%), water from protected wells/springs (22.47%), and water from unprotected wells/springs (17.38%).

92. BPS data shows that 84.31% of Boyolali residents in 2020 already have their own defecation facilities. For drinking water, they use bottled water / refillable water (0.12%), water from clean water pipes (11.84%), water from bored wells (30.53%), water from protected wells/springs (51.18%), and water from unprotected wells/springs (5.3%).

93. BPS data shows that 86.84% of Demak residents in 2020 already used their own defecation facilities. However, at the end of 2019, there were 149 villages out of 249 villages that still do open defecation. For drinking water, they use water derived from clean water pipelines (20.3%), bored wells (56.16%), and protected wells/springs (18.52%).

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Project Area of Influence

94. ADB SPS (2009) requires that impacts and risks are analyzed for the conditions reflecting pre-construction, construction, and operational stages within the subproject's area of influence. As such, this section reviews potential subproject-related impacts to identify issues requiring further attention and to screen out issues of no relevance. A similar scoping process was carried

out for the Indonesia AMDAL system.

95. All proposed subprojects are located in the Serang River basin, but the distance among the subprojects location is very far, thus, it is expected that there is no interaction of impact among the subprojects during the construction phase. Negative impacts on the environment are expected to occur when excavation and embankment works are carried out during the construction phase. While main positive impact is expected to occur during the post-construction phase in the form of reduced flood potential in the affected area. The locations of subprojects are far from the protected areas, so it is not expected to have a direct effect on the protected areas. The subprojects will be within the properties held by the local government and access to the subproject locations is through the public rights-of-way and existing roads.

96. Impacts and risks were analyzed in the context of the project's area of influence with associated facilities including affected upstream and downstream areas and offsite works such as borrow areas, quarries, spoil disposal areas, waste disposal, transport routes, work camps, and storage areas. The IEE's area of influence for assessing potential impacts on air, water and noise is about 100-200m from their boundary or median. For biodiversity and eco-system assessment, the coverage however is much wider, covering all vegetation communities and fauna habitats of several kilometers.

97. There are no sensitive receptors such as schools, hospitals, or religious facilities in the area of influence, except some temporary and semi permanent houses as reported and assessed in LARP document of this project.

B. Assessment of Potential Environmental Impacts

16. Anticipated potential impacts resulting from the construction and operation:

(i) Sediment dredging and removal (transportation and disposal areas);
(ii) Potential disturbance to biodiversity (at the project site and proposed sediment disposal area);
(iii) Impact resulting from construction activities and traffic generation (water pollution, soil erosion and sedimentation, air pollution and noise, occupational health and safety, traffic safety, and local people access);
(iv) Loss of riverine and riparian habitat and changes in water quality due to dredging; and
(v) Potential disruption to community comfort and negative perceptions of society arising from the construction works that interferes with the sacred cultural place.

98. Subsequently, the potential impacts have been summarized and grouped based on the development phases, namely, pre-construction phase, construction phase, and post- construction (operation and maintenance) phase.

C. Anticipated Impacts and Mitigation Measures

1. Design/Pre- Construction Phase

99. Impacts arise from the decisions and actions taken during the design/pre-construction stage described below.

100. **Overall Mitigation Measures.** Mitigation measures during the design/pre-construction phase include planning the project to minimize impacts in site selection and design, and planning

the implementation of mitigation measures specified for the construction and operation phases including (i) ensuring all approvals and permits in place, (ii) ensuring environmental requirements are incorporated in contract documents, (iii) Contractor to prepare a construction Environmental Management Plan (including Dredging Management Plan, Appendix 9) describing how the Contractor will ensure the work complies with the environmental requirements, (iv) Community consultation and project information disclosure, (v) establish Grievance Redress Mechanism, (vi) Contractor to prepare Occupational Health and Safety Plans, and (vii) Plan the project so as to maximize local labour and business participation (enhancing for positive impacts of social-economic aspects).

a) Climate Change Vulnerability

101. Climate change adaptation considerations have been included in the design of proposed subprojects. Climate changes and increasing rainfall intensity will generate frequent flooding. Changes in the intensity of extreme weather events as well as gradual changes in climate parameters such as precipitation can be damaging to the proposed project.

102. Inadequate attention to this impact can increase the long-term costs of sedimentation management and to the subproject. It can increase the likelihood that such investments will fail to deliver the benefits as intended.

103. As shown in the screening (Table 2: Climate Screening, Appendix 1), this subproject is categorized as high score to climate change effects.

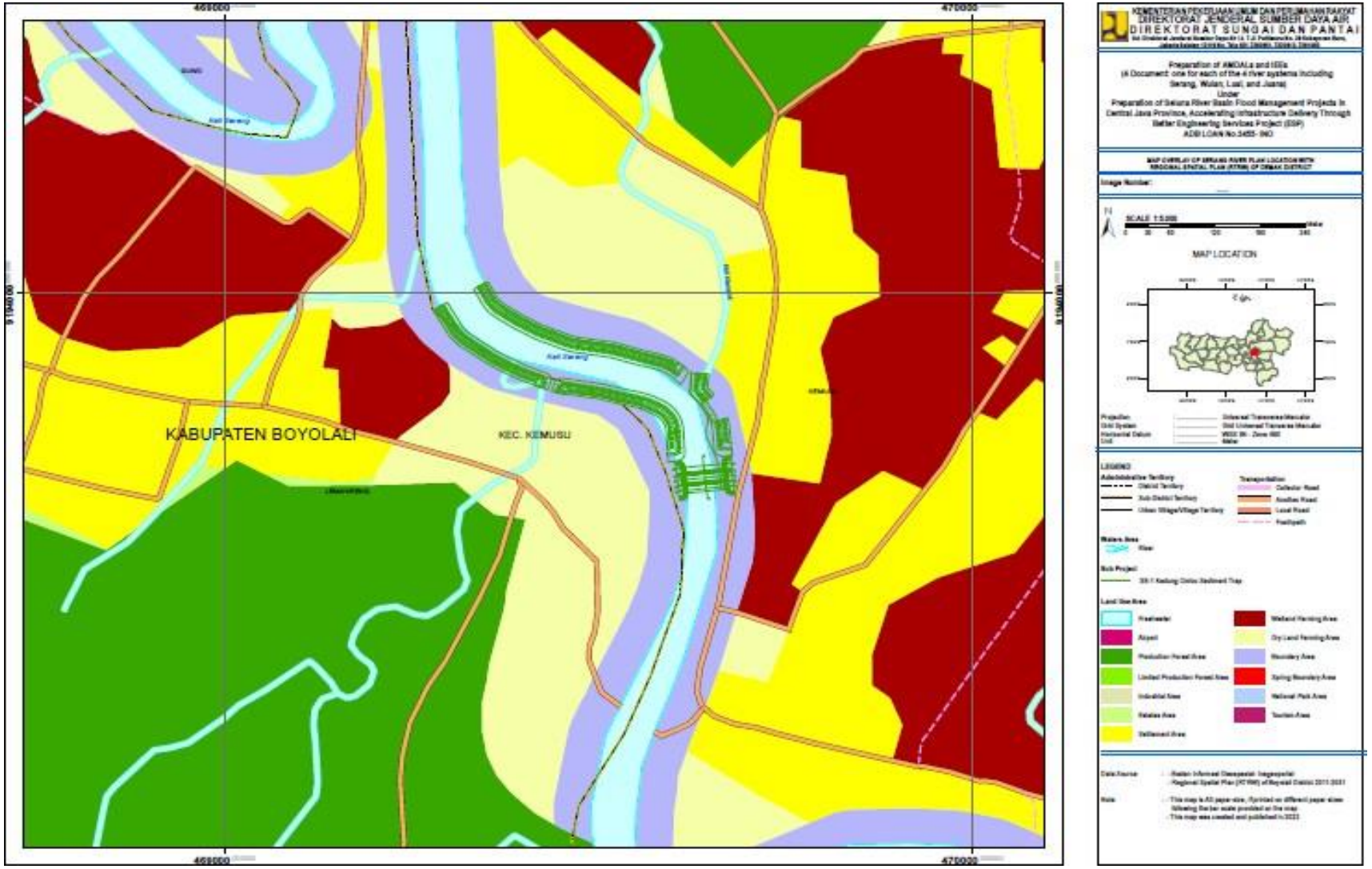
104. To appropriately address this impact, hydrology and hydraulic models were developed for the proposed subproject (during the design phase by considering extreme weather events).[15]

b) Sites Selection

105. **Land Use Change (Site's Conformity to Spatial Plan)**. The subproject site complies with spatial plan (RTRW) of Boyolali, Grobogan, Demak, and Kudus District and riparian zone, as shown in Figure 6 to Figure 9. The project area is already plotted in each district's spatial plan map (*Rencana Tata Ruang Wilayah*) for each district for the development of flood structural measures.

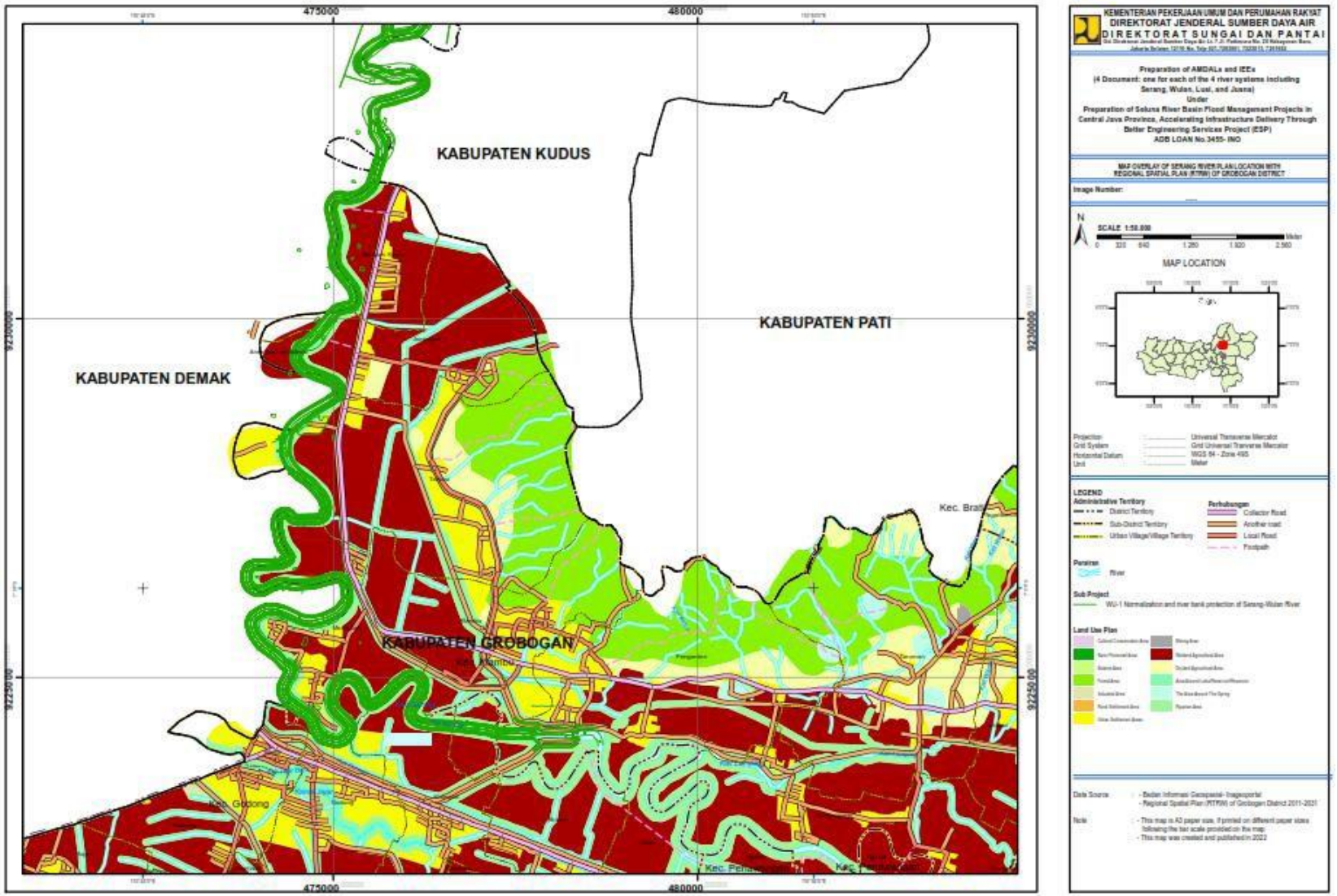
[15] Climate change projections of GOI's Climatology Meteorology and Geophysics Agency, the Dinas Meteorologi, Klimatologi, dan Geofisika (BMKG) were considered.

Figure 6: Regional Spatial Plan (RTRW) of Boyolali District



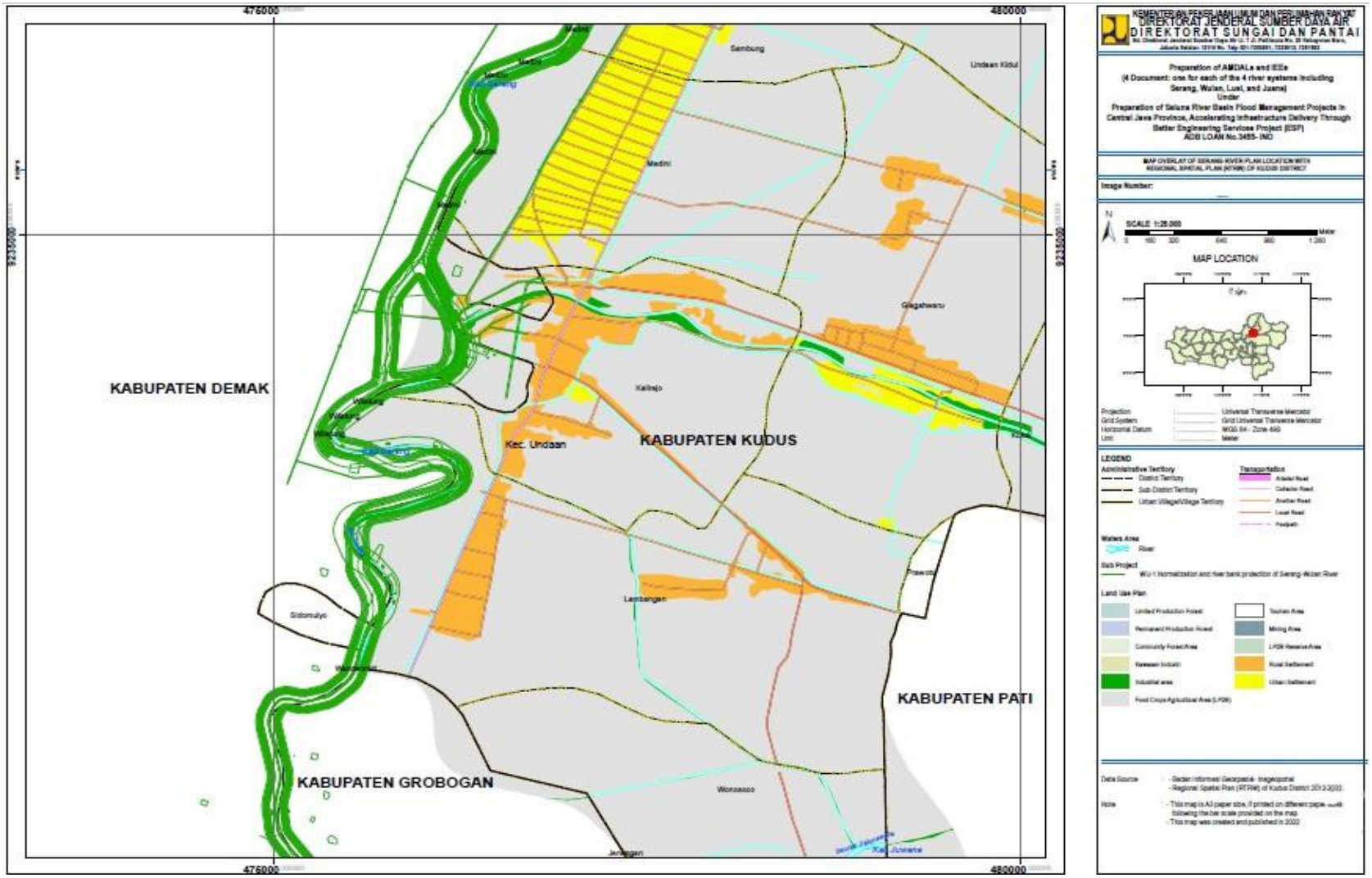
Source: Perda Kab. Boyolali No. 9/2011.

Figure 7: Regional Spatial Plan (RTRW) of Grobogan District



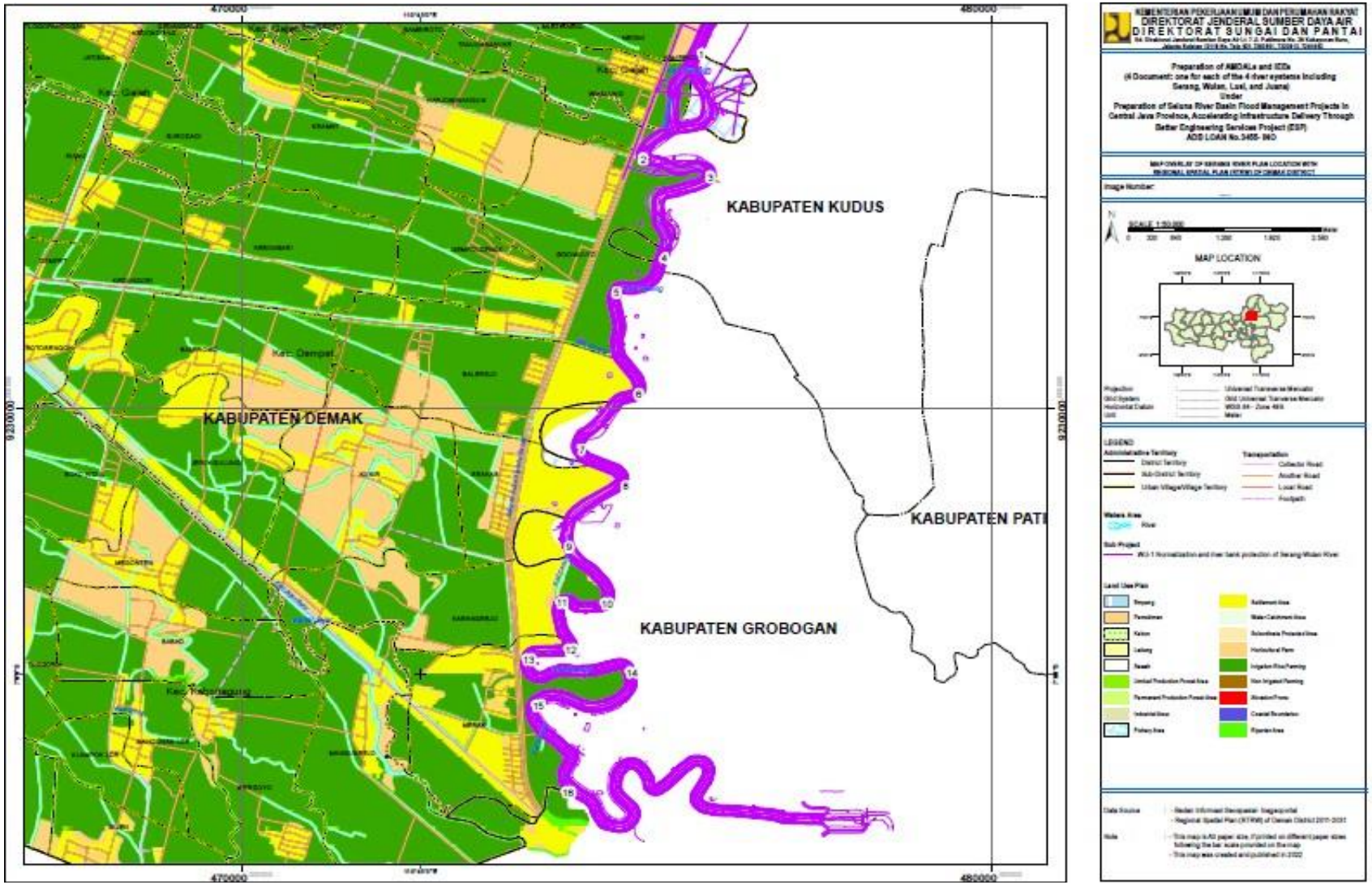
Source: Perda Kab. Grobogan No. 7/2012.

Figure 8: Regional Spatial Plan (RTRW) of Kudus District



Source: Perda Kab. Kudus No. 16/2012.

Figure 9: Regional Spatial Plan (RTRW) of Demak District



Source: Perda Kab. Demak No. 6/2011.

106. **Encroachments to Environmentally Sensitive Areas.** There will be no encroachments to environmentally sensitive areas affected by the subproject. The subproject sites are not within undisturbed landscapes. The PIPPIB (Indicative Map for Moratorium of New Permit) shows that the project area is not at the border or within a protected forest and wetland (Figure 10). The map, which is regularly updated by the Ministry of Environment and Forestry[19], indicates that no protected areas are affected along the proposed subproject. The nearest protected areas of Mt. Merapi National Park and Mt. Merbabu National Park are located at approximately 46 km and 41 km upstream, respectively. This finding is also supported by the Integrated Biodiversity Assessment Tool (IBAT) map generated as part of rapid environmental assessment (REA).

107. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these facilities near the subproject locations. However, if it is deemed necessary to locate them elsewhere, sites to be considered shall not result in the destruction of property, vegetation, and public facilities. High density residential areas will not be considered for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposal to the forest, water bodies, or areas that will inconvenience the community.

108. **Site selection of materials sources.** Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and waterlogging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be included in the design specifications and on plan drawings. Local Mineral Resources and Energy Agency (*Dinas Pertambangan dan Energi*) approved sites would be selected first. If other sites are necessary, these would be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage system, and in structurally stable areas even if some distance from construction activities. It will be the contractor's responsibility to verify the suitability of all material sources and to obtain the approval of an authorized agency. If additional quarries are be required during construction, the construction contractor shall use the mentioned criteria to select new quarry sites, with the written approval of CPMU.

109. **Dredged Materials and Disposal Areas.** Dredging and excavation generates significant quantities of earth spoil. Management of spoil and disposal of excess spoil has the potential for impact on land use, ecology and water quality. For each subproject involving dredging and generation of excess spoil, the detailed design has been optimized to reuse spoil as much as possible in levee bank construction and other earthworks.

110. The proposed disposal area for the dredged materials (during operational phase of sediment trap or during construction for river normalization) has been part of DED activities, which shall include a quantitative analysis of spoil volumes and capacity of disposal sites. For the disposal, it shall be confirmed that the sediment is not categorized as hazardous waste (determined through TCLP method, as presented in Appendix 5).

111. The contractor shall prepare a dredging management plan as part of the contractor's EMP to be submitted for review by relevant agency or ADB as necessary. Each dredging management plan must highlight: key dredging processes; environmental considerations; potential impacts, mitigation and management; adaptive management strategies; and stakeholder consultation

[19] Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number: SK.5446/MENLHK- PKTL/ IPSDH/PLA.1/8/2021 on The Establishment of Indicative Map on The Termination of Licensing of The Use of New Forest Areas in Primary Natural Forests and Peatlands in 2021 Period II (PIPPIB).

(where applicable). A sample template for the dredging management plan is presented in Appendix 9.

112. **Impacts and risks to biodiversity conservation**. The subproject is not located in areas that have a designation for biodiversity conservation. The site is located in the riparian zones of rural area type. As indicated in Section IV.B.3, the biodiversity survey also indicated that there are no concerns about the biodiversity or protected forest around the proposed site and its surroundings.

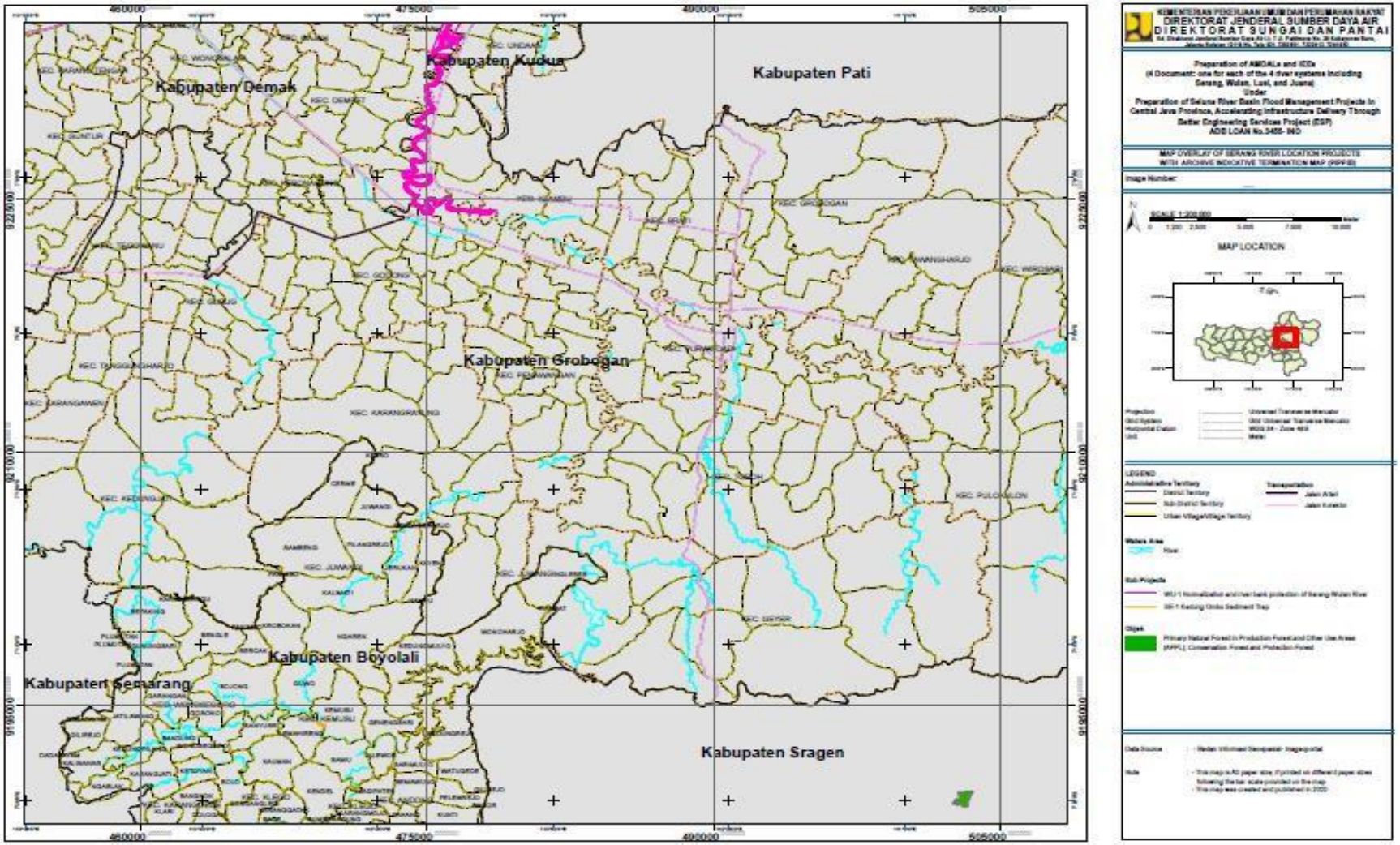
c) Nuisance and Problems to the Public

113. The tender documents for the proposed sediment trap shall include provisions addressing potential nuisances and problems to the public during construction. These shall be reflected in the bidding and construction contracts of the proposed subproject works.

114. During detailed design, construction methods have been chosen by evaluating their applicability (with consideration also to cost implications) and considered areas that are prone to traffic congestion and area with high-density housing and population.

115. The DED also review areas for quarry of construction material, borrow area for soil embankment, and disposal area for sediments. For the sediment testing (if required), the RBO shall also cooperate with a certified third-party service provider to comply with Indonesia's environmental regulations.

Figure 10: Map of PIPPIB over Proposed Subproject Overlay



Source: Ministry of Public Works and Housing.

116. **Damage to Archaeological and Cultural Assets**. There are 3 tomb sites that were sacred by the community near the subproject sites, namely: the Tomb of Mbah Kadut in Kalirejo Village, Undaan Subdistrict, Kudus Regency (6°55'44.66"S 110°47'17.12"E) which is 350 meters away from the subproject location; the tomb of Mbah Wandan Sari in Wandankemiri Village, Klambu Subdistrict, Grobogan Regency (6°57'24.41"S 110°46'36.60"E) is 300 meters away from the subproject location; and The Tomb of Mbah Kaki Kemiri in Wandankemiri Village, Klambu Subdistrict, Grobogan Regency (6°57'23.37"S 110°46'39.05"E) which is 350 meters away from the subproject location. These tombs are still often visited by the community, especially on the 1st of Suro (Javanese calendar). Pictures of the 3 tombs are presented in Figure 11.

117. During the construction phase, the contractor will avoid interference with the place that is respected by the community. The contractor will coordinate with the caretaker or figure who has authority over the tombs.

118. Precautions will be taken to avoid potential damage to any archaeological and cultural assets by the inclusion of provisions in tender and construction documents requiring the contractors to immediately stop excavation activities and promptly inform the local authorities if archaeological and cultural assets are discovered. A “chance finds” procedure will be prepared and included in the construction method.

Figure 11: Cultural Sites Nearest to Subprojects Location

The Tomb of Mbah Kadut

The Tomb of Mbah Wandansari

The Tomb of Mbah Kaki Kemiri

Source: Ministry of Public Works and Housing.

119. If a cultural heritage object is found during construction activities, then the work must be stopped, and immediately report the findings to the competent authorities responsible for protection of cultural objects, police, and/or other related agencies as stipulated in the Law of the Republic of Indonesia Number 11 of 2010 on Cultural Heritage. The Article 23 Paragraph (1) states that anyone who finds objects suspected of being Cultural Conservation Objects, buildings suspected of being Cultural Conservation Buildings, buildings suspected of being Cultural Conservation Buildings, and/or locations suspected of being a Cultural Conservation Site must report it to the competent agency in the field of culture, Police, and/or related agencies no later than 30 (thirty) days after it is found.

2. Construction Phase

120. Construction activities will introduce a range of environmental, social and safety impacts and risks through the activities including land clearing, excavation, filling, disposal of spoil, and civil works. These impacts can be managed through the good practices including IFC EHS Guidelines, and *ADB Environment Safeguards: A Good Practice Sourcebook*.

121. Such temporary, localized impacts only occur during construction and manageable through proper mitigation measures set forth in EMP and subsequently made operational in Construction Environmental Management Plan (CEMP), as appropriate. The impacts include but are not limited to the following.

a) Water Pollution

122. Construction activities at and/or around water areas (such as clearing of vegetation, dredging, earthworks, and construction of infrastructure) can have a significant impact on water quality such as increased turbidity via suspension of sediment in the water column. The introduction of pollutants can have adverse impacts on aquatic flora and fauna (including benthic communities), and human health, for example, excessive nutrient loading leading to eutrophication, oxygen depletion, and toxic algal blooms in the dam.

123. **Soil Erosion and Sedimentation.** Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earthmoving, and excavation activities. The mobilization and transport of soil particles may, in turn, result in sedimentation of surface drainage networks, which may affect on the quality of natural water systems and ultimately the biological systems that use these waters.

124. **Waste and wastewater from Construction Camps**. The contractor is expected to establish temporary workers' camps during construction. Depending on the number of the workers and their origin. If there is only a small number of workers employed and most of them locally hired, there is no need to establish permanent construction camps.

125. Improperly managed silt runoff and sanitary wastes from these camps may reach nearby areas. Poor sanitation and lack of proper solid waste management at the worker's camp will provide the conditions for vermin and other disease vectors that will easily multiply and infect the workers. This may lead to the transmission of diseases from the workers camp to other areas. These conditions will increase public health risk.

b) Air Pollution and Noise

126. **Dust and Other Air Pollutants**. Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality in the

construction sites. Anticipated impacts include dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons).

127. During dry periods, dust may be generated from activities associated with the construction such as trenching, earthworks, and soil preparation. Other potential sources of air pollution are large stockpiles of construction materials such as soil and aggregates. Without any mitigating measures, dust generation could be problematic during dry periods.

128. During the construction phase, there will be two main sources of air emissions, i.e., mobile sources and stationary sources. Mobile sources are mostly vehicles involved in construction activities, whereas emissions from stationary sources include construction equipment and machinery, diesel generator sets, excavation/ grading activities etc. It would not be possible to distinguish between the emissions from project construction vehicles and equipment and emissions from non-project vehicles.

129. Construction-related airborne dust can arise from both vehicular traffic generating fugitive dust on paved and unpaved roads (and especially where there are spillages of soil from construction transport vehicles to the public roads and soil/aggregate material handling and processing). The tender and contract documents will require the Contractor to identify via the Contractor's EMP/ Work Plan methods to control dust and compliance monitoring will be carried out by the Supervising Engineer.

130. **Noise**. Noise will occur during construction due to use of vehicles and equipment, movement of materials and various construction activities. Trucks/material mobilization and construction equipment, which can generate noise of 80 dB(A) from a distance of 30 meters are among the potential sources of noise. The issue is mostly applicable to the excavation activities.

131. During construction phase, noise will be generated from various activities such as site clearing, excavation, erection, and finishing. For example, the operation of heavy earth moving equipment and machineries installation potentially generate noise up to 100 dB(A) at the work sites. It is also to be noted that manual labor will significantly contribute to the works during construction of the sediment trap. Therefore, the noise will be lower.

132. The noise impact would be localized, temporary in nature and occurs during working hours only. This impact will be discussed with communities during public consultation.

133. During construction activities, a range of standard mitigation measures will be applied to meet the IFC EHS and GOI standard (whichever is stricter). Nuisance from equipment noise can be mitigated with the use of sound suppression devices for the equipment. In areas near houses/settlements or noise-sensitive sites, noisy equipment shall not be operated during night to early morning (19:00H – 06:00H). Noise levels due to construction activities should not exceed the objective of 55 dB(A) near schools and residential areas as mandated by the Decree of the Minister of State for the Environment No. 48 of 1996 on Noise Levels Standard and IFC EHS Guidelines. Temporary noise barriers may be used in areas of high noise impact. Workers using or working near noisy equipment shall be provided with suitable hearing protection.

134. The Contractor shall be responsible for properly maintaining noise-generating machines. The Contractor will be required to produce operational Environmental Management Plans (including methods to control noise) to accompany normal Work Plans for approval by the Supervising Engineer. The Supervising Engineer will be responsible for immediate monitoring of compliance of environmental conditions and under Contract Conditions will be able to enforce

immediate remedial action.

c) Occupational Health and Safety

135. Construction activities may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms. Vehicular traffic and lifting equipment use in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Slips and falls associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction sites.

136. Special precautions on water-related risks shall be implemented. Occupational health and safety planning and procedures shall be implemented in accordance with national standards and IFC EHS Guidelines.

137. **Community Health and Safety.** Impacts may arise from a vehicular traffic accident, nuisance from air pollution, decreasing water quality for public use (washing, bathing, and drinking), disturbance to public access to rivers, and impact to public safety related to excavation, and other construction activities. Community health and safety planning and procedures shall be implemented in accordance with IFC EHS Guidelines. However, as the construction occur mainly in rural areas such impacts might be minimum.

138. **Traffic Safety**. Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment which increases the risk of traffic-related accidents and injuries to workers and local communities. Narrow rural roads might be used for the transport of materials and sediment, which may increase the risk. As the volume of traffic generated below the criteria and the traffic impacts only occurs during construction, no ANDALALIN study required. The incidence of road accidents involving project vehicles during construction should be minimized through sound temporary traffic management planning in consultation with local traffic control authorities, as provided in EMP.

139. **Occupational Health and Safety at Work Sites**. Occupational health and safety planning and procedures shall be implemented in accordance with IFC EHS Guidelines.[20] Hazards may exist in all construction sites in many different forms such as sharp edges, falling objects, flying sparks, chemicals, noise and various potentially dangerous situations. Good practices in construction occupational health and safety requires that employers protect their employees from workplace hazards that can cause injury.

140. Implementation of the works shall refer to construction safety standard and Occupational Health and Safety Plan (OHSP), including health protocol for COVID-19, as applies in Indonesia and ADB requirement. The Contractor will train, direct, monitor and control the contractors' staff on how good work practices are complied with to prevent accidents to the workers and the general public. This shall include, among others, emergency procedures with the required resources, clear description of responsibilities and management, specific requirements of occupational health and safety policies and regulations, training requirements, and site safety rules.

d) Access of Local People

141. **Reduced Access to the Riparian Area.** Access to the river and other works areas will be

[20] http://documents.worldbank.org/curated/en/966921468765606279/Occupational-health-and-safety-guidelines.

restricted during construction due to public safety requirements. This may affect local activities of local people who use river floodplains as agricultural land, livestock, or other economic activities. LARP report (as complementary to this draft IEE) already identified and proposed the handling of the social related issues of the people occupying the riparian area. Local communities will be consulted about this during construction and mitigation measures shall be put in place to address any concerns, where feasible.

e) Biodiversity (Flora and Fauna)

142. Construction of the subproject will require the clearing of riparian vegetation at several spots. During the field survey, the areas were assessed and found that they are farmland/garden with vegetation in the form of grass and cultivated crops. No flora or fauna was found that was protected, threatened, or had conservation value. Therefore, it is expected that there will be no significant impacts on biodiversity.

143. All works are required to avoid natural/critical vegetation and habitats, including for the proposed disposal areas. For modified habitats, any loss of biodiversity shall be avoided but if ti is not feasible, then the subproject shall ensure no net loss of biodiversity through minimizing, mitigating, and offsetting impacts.

144. It was also found out that there will be no impacts on listed, rare, endangered, vulnerable, or threatened species of flora or fauna or communities as there are none potentially affected by the project, as per the secondary data and field survey conducted by the AMDAL's subcontractor. This includes the IUCN Red List or as defined in any national legislation.

145. The project will manage potential impacts on other fishes captured by local people for consumption, especially at the down stream.

146. There are no areas of "Critical Habitats" that might be impacted[21]:

147. The project will not significantly convert or degrade "Natural Habitats"[22] as a result of the project, as defined in the *Asian Development Bank Safeguards Policy Statement*, 2009.[23]:

148. There will be no impacts on the ecological components as identified in the national,

[21] "Critical Habitat: A subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities."

[22]

[23] *Natural Habitat: Land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions."* The significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long- term change in land or water use; or (ii) the modification of a habitat that substantially reduces the habitat's ability to maintain viable populations of its native species. Significant conversion may include, for example, land clearing; replacement of natural vegetation (for example, by crops or tree plantations); permanent flooding (by a reservoir for instance); drainage, dredging, filling, or canalization of wetlands; or surface mining (SPS, Appendix 1, Section VIII).

provincial or district requirements.[24]

f) Impact on physical cultural resources

149. **Potential Damage to Archaeological and Cultural Assets**. Although at present there is no significant archaeological and cultural assets that identified during this IEE, this potential impact requires precautionary measures.

150. The consultation will be carried out with authorities, experts, local organizations, and local people to identify the likely presence of archaeological and cultural assets potentially affected by the works. Construction contract documents will include provisions requiring the contractors to immediately stop excavation activities and promptly inform the local authorities if archaeological and cultural assets are discovered. Anticipating the possible finding, a "chance finds" procedure is included in CEMP.

g) Construction Wastes and Closure

151. **Non-Hazardous and Hazardous Waste.** The non-hazardous solid waste generated during construction activities includes inert debris from damaged facilities, excess fill materials from grading and excavation activities, scrap wood, and metals. Other non-hazardous solid wastes include office, kitchen, and workcamp wastes. Hazardous solid waste includes asbestos-containing demolition waste, contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill clean- up materials from oil and fuel spills. Waste management measures to be considered in the EMP.

152. **Oil and other hazardous materials are released**. The presence of oil products and other hazardous materials is expected in the construction, which includes fuel, oil, grease, paints, and solvents. These materials are associated with the operation of heavy equipment and vehicles and various construction activities. Some of these materials may accidentally be released into the environment.

153. The Contractors will be required to raise awareness for all workers regarding the prevention and management of spills and proper disposal of used containers. Fuel and oil shall be stored in a designated secured area provided with an impermeable liner to prevent accidental spills from seeping into the ground. The hazardous waste management will refer to Government Regulation No. 22/2021 (Appendix IX).

h) Social Economic Impacts

154. **Increased Employment Opportunities at Work Sites**. The impacts are expected to be beneficial and significant since employment opportunities in the area will increase during the construction period.

155. Whenever possible, the Contractor shall be required to use available local labor for these

[24] As per the regulations including Law No. 11/2013 on Ratification of Nagoya Protocol on Access to Genetic Resources and Fair and Balanced Benefit Sharing of Its Utilization upon Biodiversity Convention; Law 18/2013 on Prevention and Eradication of Forest Destruction; Decree of Minister of Environment No. 62/2013 on Managing Agency for the Reduction of Emissions from Deforestation and Degradation of Forests and Peatlands; Government Regulation No. 7/`1999 on Preservation of Flora and Fauna; Government Regulation No. 8/1999 on Utilization of Wild Flora and Fauna; Decree of Minister of Environment No. P.20/ Menlhk/Setjen/Kum.1/6/2018 on Types of Protected Flora and Fauna.

construction activities. The recruitment of workers shall be coordinated with the local officials. Referring to baseline data (Section IV.B), there are enough qualified workers/labor in the area and some of them are unemployed. The community also expressed during public consultation to be involved as a construction workforce.

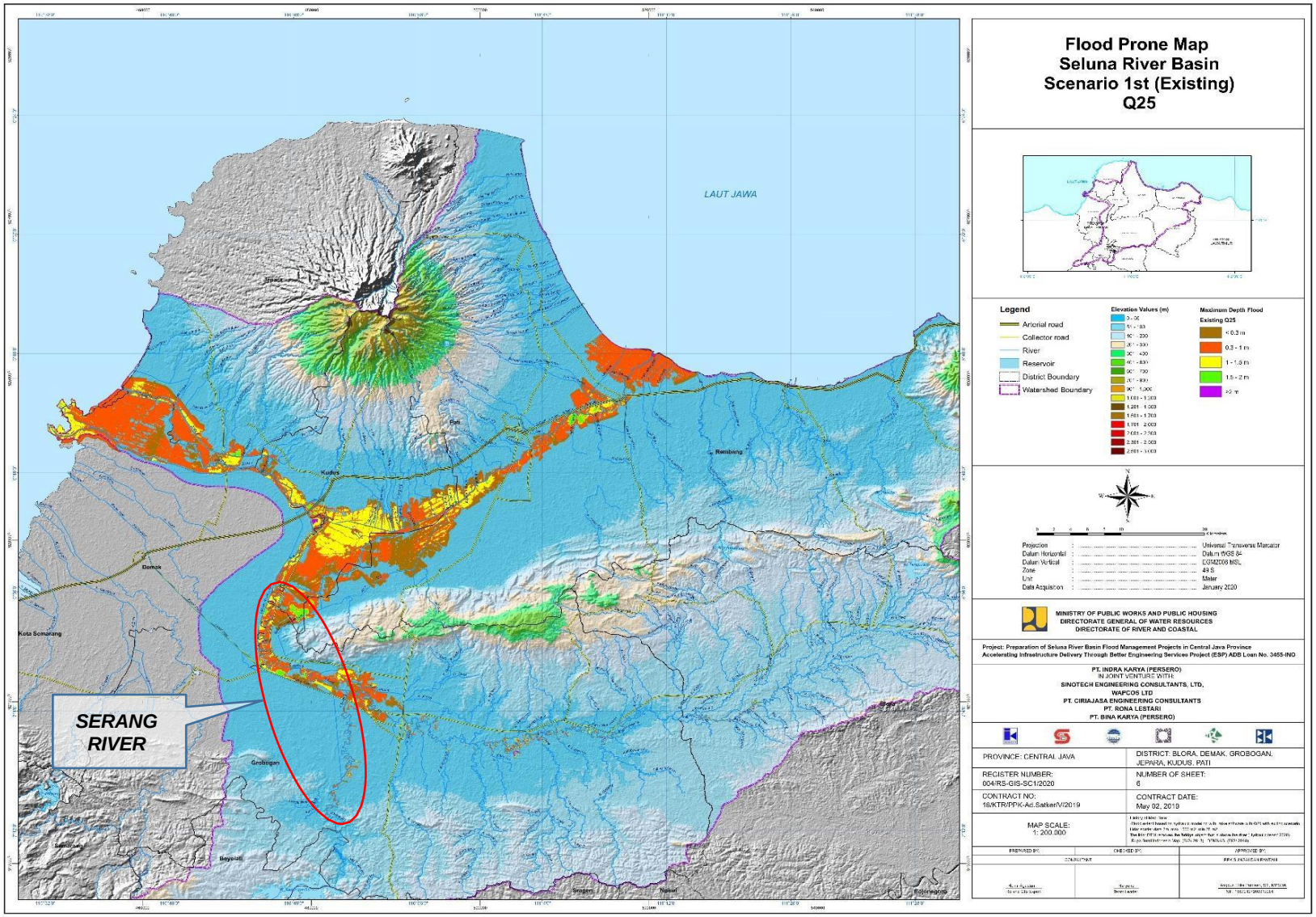
156. **Maintaining Labor Standard**. The Contractor and PMU are responsible for ensuring that international labor standards– as reflected in national labor laws and regulations are adhered to. PMU is ultimately responsible for monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with international labor standards. PMU or PIU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS and COVID-19 to employees and local communities surrounding the project sites. These will be monitored as part of the project's safeguards reporting requirements.

3. Operation and Maintenance Phase

a) Flood Control Infrastructure Operations

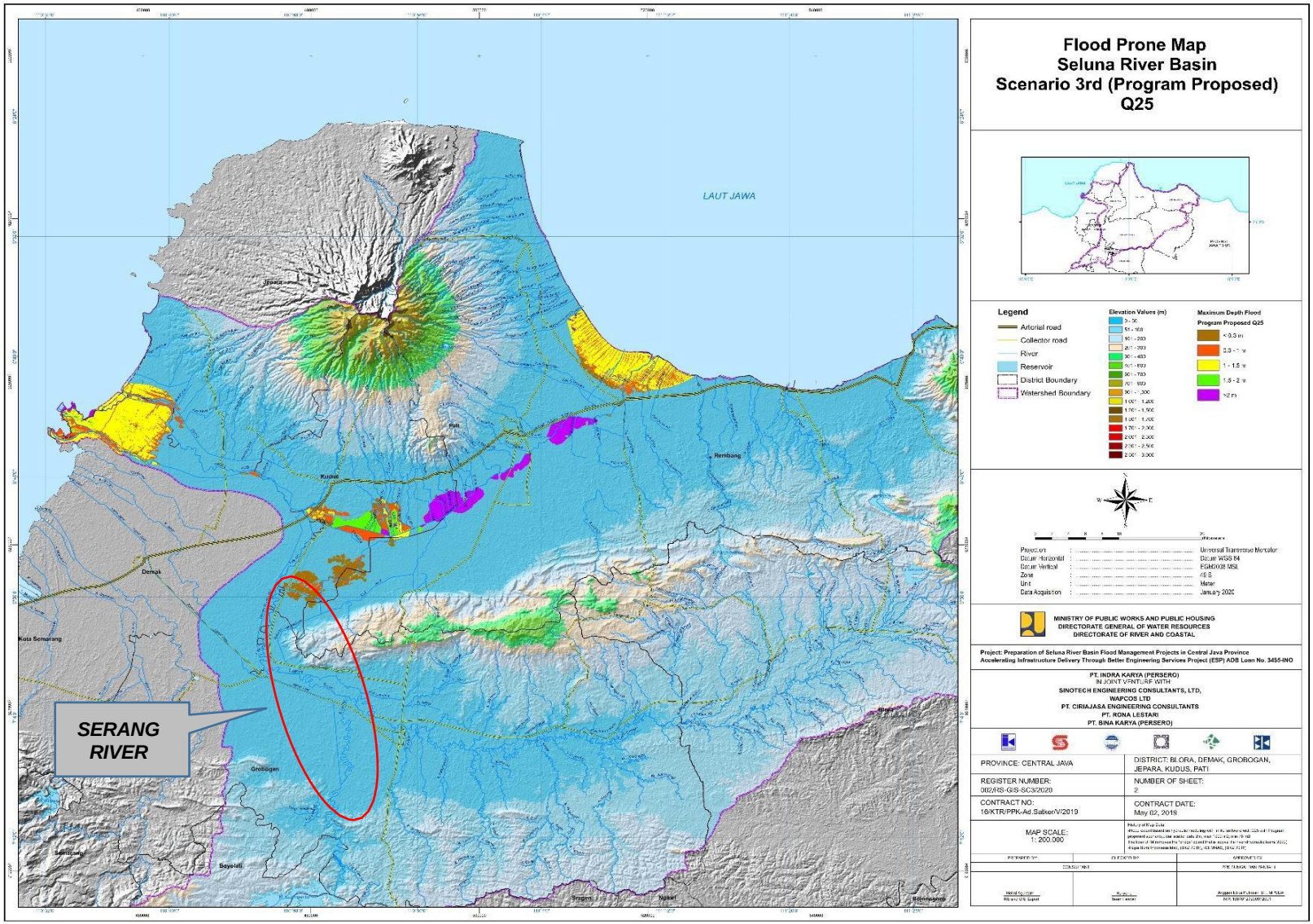
157. Before project intervention, most of the areas around the Serang River flow during the rainy season, are exposed to floods with a height of 0.3 to 1 meter and there are even some points where the flood reaches 2 meters. After project intervension, there will be a reduction in flood discharge, the area of inundation, and the length of inundation time.The project has simulated flood scenarios based on Q25 in before and after handling conditions, as shown in Figure 12 and Figure 13 below.

Figure 12: Flood Prone Map Seluna River Basin Existing Q25



Source: Ministry of Public Works and Housing.

Figure 13: Flood Prone Map Seluna River Basin Program Proposed Q25



Source: Ministry of Public Works and Housing.

158. Operation and maintenance of flood management infrastructure will generate a range of potential environmental impacts and risks which are identified and mitigated in EMP, including:

(i) Loss or reduction of lateral connectivity between the main river channel and floodplains;
(ii) Loss of riverine and riparian habitat and changes in water quality due to dredging;
(iii) Spillage during transport of dredged materials (if it is not at the river right of way);
(iv) Loss of biodiversity at the disposal area of dredged materials; and
(v) Aesthetic and safety issues of dumping dredged materials at areas nearby people residents.

D. Cumulative Environmental Impacts

159. **Cumulative Effects**. The cumulative effects would be the increasing volume of sediment to be disposed of, and the difficulty finding suitable areas for disposal areas.

160. Indirect impacts are adverse and/or beneficial environmental impacts that cannot be immediately traced to a subproject activity but can be causally linked. Induced impacts are adverse and/or beneficial impacts on areas and communities from unintended but predictable developments caused by a subproject that may occur later or at a different location.

161. Other activities that would potentially add cumulative impacts of sedimentation, especially agriculture. As refer to the study in the Upper Cimanuk watershed the agricultural activities contribute to the increase of BOD, N, P, TSS, and pesticides. In addition, the dryland farming also contribute as a source of pollutant load in BOD parameter amounts to 15143.66 kg/day ; N parameter at 4,85 kg/day; P parameter at 34924.91 kg/day; TSS parameter at 1,17 kg/day; and pesticide parameter at 558.80 kg/day.[25]

E. Climate Impacts

162. In reference to REA (Checklist for Preliminary Climate Risk Screening), the subproject is categorized as Medium to High. The subprojects has been designed to accommodate potential water level increase, and by considering associated hydro-meteorological parameters and future climate change conditions.

VI. ANALYSIS OF ALTERNATIVES

163. An analysis of subproject alternatives was undertaken during the pre-feasibility phase to determine the most financially and technically feasible way of achieving the project objectives while minimizing environmental and social impacts. For example, the sediment trap which initially proposed at Klewor has been relocated to Lemahireng to anticipate the high tidal of the reservoir.

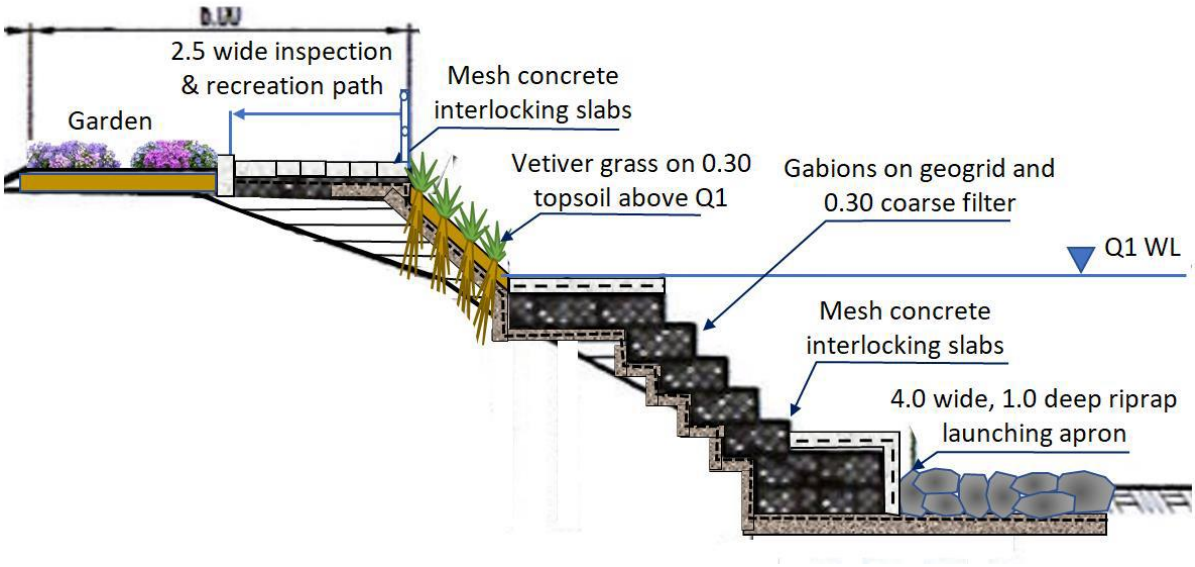
164. The consequences of the “no-project” alternative are a continuation of current conditions, which was identified in the TRTA pre-feasibility report as Scenario 1. Without the subproject, the existing condition of poor flood management will continue. With the subproject, as proposed by RBO (identified in the TRTA pre-feasibility report as Scenario 2), and enhancements proposed by the project (identified in the TRTA pre- feasibility report as Scenario 3), the area will be protected from the severe flood.

[25] Hatmoko, et al, “The Impact of Agricultural Activities on Load Capacity in the Upper Cimannuk”, Indian Journal of Research, Volume VI/ December 2017.

165. The Seluna Assessment Report (PFS) and the Seluna FRM Master Plan of FMNJP recommended to incorporate NBS solutions in the designs. This was particularly stressed in replacing hard surfaces with NBS designs and in particular the use of vetiver grass, other vegetation and gabions rather than concrete to stabilise slopes and resist river erosion and scour. The selection of NBS has several advantages, among others:

(i) they are normally less expensive;
(ii) they are regenerative and can be used as basic material for future works;
(iii) they facilitate bioremediation to improve water quality;
(iv) they support biodiversity;
(v) they can be of use to local communities as fodder crops and enhance aquaculture if properly managed;
(vi) they generally look better; and
(vii) they absorb carbon dioxide whereas steel production and transport per ton creates 1.5 tons of CO_2 and concrete 0.24 tonnes of CO_2 per cubic meter of concrete.

Figure 14: Typical NBS river protection on medium slope



Source: Ministry of Public Works and Housing.

166. There is some excavation, bank strengthening and protection at bends using hybrid NBS protection by combining vetiver grass bank strengthening mainly above water levels with gabions below. NBS has been considered and combined with structural measures.

VII. INFORMATION OF DISCLOSURE, CONSULTATION, AND PARTICIPATION

167. The Implementing Agency (IA) works with the district, province, and national agencies and local communities on a regular basis.

168. The RBO met with provincial representatives, local organizations, and community representatives in all locations proposed for the project also including relevant agencies, and NGOs. This included identification of suitable alternative sites, land ownership, and other local issues.

169. Further consultation and participation will continue through the design, construction and operation phase. This includes keeping local communities and stakeholders informed of the project and establishing a Grievance Redress Mechanism to receive and address complaints and concerns.

170. **Information Disclosure**. The project documents will be published on the ADB website. Environmental assessment documents will be made available to the public as part of the Indonesia approval process.

171. The public consultation was carried on September 14th 2021, which was intended to inform people on the proposed projects. Summary of target group, agenda of the public consultation are documented in Appendix 10.

172. Before the public consultation, coordination was carried out with local environmental agencies and also authorized officials in the local area. Due to a Restriction on Community Activities (PPKM) in the local area, public consultation was carried out in several sessions complied with health protocols for the prevention of coronavirus disease (COVID-19) transmission.

173. Suggestions, inputs, and opinions from the community in public consultation, are outlined below:

(i) People's main concern is about land acquisition. This is because some private-owned land is exposed to subproject areas. In addition, some of the riparian areas have been used by the community for agricultural activities that sustain their income. The community expects commensurate compensation for the land affected by the subproject.
(ii) People concerned on impacts of construction activities, including heavy equipment operations which will disrupt community activities, cause road congestion, and increase noise levels.
(iii) People worried that construction activities on river bodies will cause turbidity and disrupt river biota, thus disrupting fishing activities in the river.
(iv) People worried that the mobilization of heavy equipment and construction materials will cause damage to access roads and no road repairs.
(v) There are several buildings for water intake from Serang River that are used for community-based water supply and sanitation facilities (PAMSIMAS) and irrigation. People worried that construction activities in river bodies will disrupt clean water supplies and agricultural irrigation.
(vi) Several floodway channels have been built but currently not working and causing flooding. The people expected the construction activities are carried out properly for its proper function.

(vii) People worried that the waste soil from excavation activities is dumped in the riparian area so that the land in those area can no longer be planted. Soil from excavation activities is expected to be reused as an embankment.

174. **Future Disclosure and Consultations**. Public consultation and participation activities will be conducted in the future during construction and operation phase. The RBO will host public consultations and information disclosure throughout the construction phase on an area-by-area basis to sort out any potential problems. In these construction consultations, specific concerns of the people such as the disturbance associated with the excavations in their area shall be discussed in detail. The records of environmental and social complaints, received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues shall be kept.

VIII. GRIEVANCE REDRESS MECHANISM

175. In compliance with ADB SPS (2009), the project will establish a Grievance Redress Mechanism (GRM) for receiving and resolving grievances including complaints and concerns from affected people and stakeholders about environmental and socioeconomic issues in relation to the project. Complaints are to be resolved promptly with a process that can readily be understood and accessed by all segments of affected people and is responsive to gender and cultural aspects.

176. The RBO and the Contractor will inform and consult each community about the GRM and how it will work via a community meeting held before construction commences. Signs at the sites and notices on community notice boards will give the contact details for lodging complaints.

177. Grievances, complaints, and concerns can be lodged with the RBO or the Contractor on site. A GRM Register will be kept on-site in which complaints are recorded. The grievance will be assessed by the RBO to confirm that it is related to the project. If it is urgent or can be immediately resolved, action will be taken and recorded in the GRM Register and the complainant informed. The complaints to be responded within one week. Where this cannot occur, the complainant will be advised on what action is to be taken. If a complainant approaches the Contractor directly, the Contractor will receive the information and pass it onto the RBO. The Contractor will take any immediate action necessary to resolve the issue if practical and appropriate. Where there is urgency in terms of safety, damage to property, or environment, then this will be acted on urgently manner. The proposed .timeline for the GRM as follows.

Table 13: Proposed Timeline for GRM

Stage	Activities/Responses	Timeline (Maximum Working Days)
1	Submission of Complaints	1
2	Registration, Eligibility Assessment, and Confirmation of Eligibility	3
3	Assessment and Identification of Action	10
4	Confirmation by Affected Person, or First Appeal	10
5	Review, Eligibility Assessment and Confirmation of Appeal by City Level GRC	3
6	Assessment and Identification of Action by City Level GRC	10
7	Confirmation by Affected Person, or Second Appeal	10
	Implementation of Action, Monitoring, Reporting	as defined in the Decision and time-bound action plan
	Closure of Complaint	

Source: LARP - FMNJP (2022).

178. Regular meetings between the Contractor and RBO will review the complaints register as part of regular meetings and reporting. A brief summary of complaints will be given in regular

reports and any outstanding grievances identified. The RBO Environmental Officer will review the GRM Register for complaints and confirm that they are resolved satisfactorily. Any outstanding complaints will be investigated. The RBO and Contractor will work together proactively to ensure grievances are satisfactorily resolved.

179. Where complaints cannot be resolved by the GRM process the complainant will be able to take their complaint to normal legal processes.

180. Training in awareness of the GRM will be provided to the RBO and Contractor staff. There will be no fees or charges made in relation to lodging complaints or otherwise accessing the GRM.

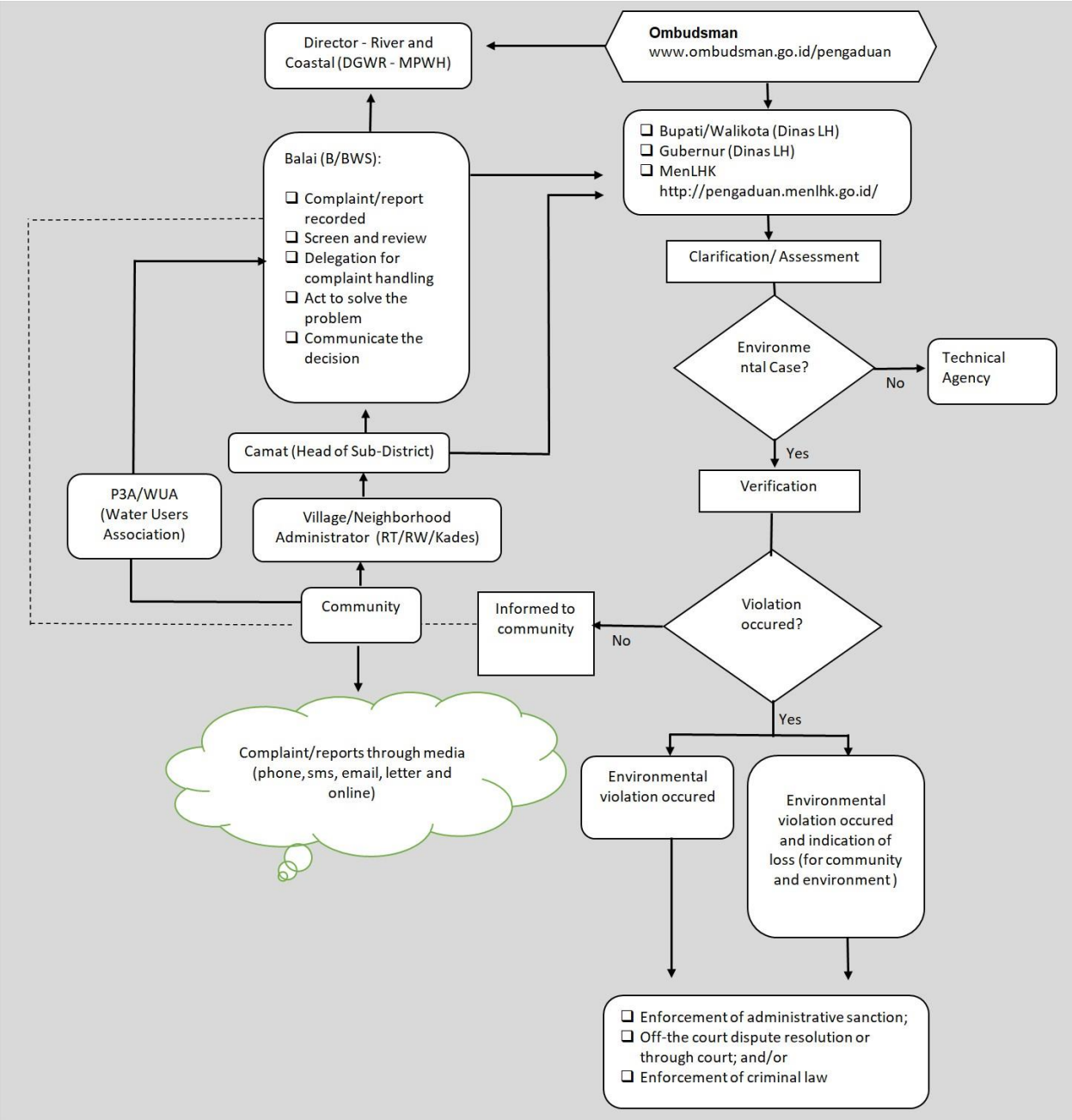
181. Typical grievances that may occur in projects of this nature may include (but not limited to) damage to or use of public or private property or communal resources, safety risks or incidents, noise, dust, fumes, water pollution, litter, rubbish dumping, unauthorised land use, unauthorised tree cutting or vegetation removal, hunting, antisocial or criminal behaviour and harassment.

182. Any complaints and concerns of the affected people must be addressed promptly at no costs to the complainant and without retribution. There will be two GRMs for this Subproject. The first one shall address the grievances associated directly with the construction activities, while the second one shall address the grievances on land acquisition, compensation and resettlement (this will be covered under Social Safeguard). The GRM for the construction activities shall be explained fully to the various areas where construction activities are expected prior to the start of construction when Contractors are already selected at that time. This is appropriately done during public consultations in the detailed design phase when actual alignments will have been made for the proposed works.

F. Complaints to Environmental Agency

183. Complaints on environmental performance of projects can also be brought to the local agency responsible for enforcing the AMDAL system. The Agency is also involved in monitoring the water quality of the rivers.

Figure 15: Typical Flowchart for GRM in DGWR – MPWH



Source: Ministry of Public Works and Housing.

IX. ENVIRONMENT MANAGEMENT PLAN

184. This section addresses the need for mitigation and management measures for the subprojects, which include: (i) mitigating measures to be implemented, and (ii) required monitoring associated with the mitigating measures. The institutional setup, as presented in the implementation arrangement (in section X) discusses the roles during implementation and the required monitoring. It also outlines the requirements and responsibilities during pre-construction, construction, and operation phases.

A. Environmental Mitigation and Management Plan

185. Table 14 presents the information on EMP including (i) required measures for each environmental impact that requires mitigation, (ii) locations where the measures apply, (iii) associated cost, and (iv) responsibility for implementing the measures. The details of mitigating measures were discussed in Section 5, where the need for mitigation of each impact was determined in the scoping process.

186. **Budget for Environmental Mitigation Measures of Construction**. During the pre-construction phase, the RBO will prepare tender documents with provisions for the required environmental measures conduct meetings for stakeholders' consultations. During construction, all costs of environmental mitigation measures shall be borne by the contractor and are considered part of their contracts as specified in the technical specifications. For budgetary purposes, this can be estimated at 1 - 3% of the total direct cost of the FRM works. The tender documents shall include a lump sum bid item in the bill of quantities to be titled "Environmental Mitigation Measures". During the operation phase, all cost of mitigation measures are part of the operation and maintenance costs of flood control infrastructure, while some were already included in the construction of particular items. The project will provide capacity building including environment

187. **Tender Documents and Construction Contracts**. The EMP of the subproject shall form part of the bidding and contract documents. This includes the contractor's submittal of a Construction's EMP (CEMP) within a month prior to the construction. Tender documents and construction contracts shall therefore include environmental management provisions on the following issues: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) construction camps, (vii) public safety and convenience, (viii) occupational health and safety, (ix) proper closure of construction sites, and (x) potential damage to any archaeological and cultural assets.

188. **Construction's EMP**. During construction, each contractor shall be guided by its detailed CEMP. This shall be based on the subprojects EMP with details on staff, resources, implementation schedules, and monitoring procedures. It shall include specifications on requirements for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, pollution from oil, grease, fuel spills, and other materials due to the operation of construction machinery, safety and traffic management, avoidance of inconveniences to the public, air, and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, and vehicles and machinery. The agreed CEMP will be the basis for monitoring by CPMU, RBO and other monitoring parties. The CEMP will allow construction supervision engineer to focus on what are specific items expected from the contractor regarding environmental safeguards on a day-to-day basis.

189. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts

become apparent during project implementation, the RBO shall prepare a supplementary environmental assessment and EMP to assess the potential impacts and outline mitigation measures and resources to address those impacts.

Table 14: Environmental Management Plan

Impact	Activities	Mitigating measures	Implementer	Supervisor
Pre-Construction				
Design (DED)	Finalization of DED	Update the IEE and EMP, in case major change in the DED	RBO/IA	PMU/PMO
Construction EMP (CEMP)	CEMP (including Sediment Management Plan)	1. Assign environmental officer and/or EHS officer at the site 2. Prepare construction EMP (including a spoil management plan/ sediment management plan as part of the contractor's EMP' for sites requiring dredging	Contractor	PMU/PMO
Risk of unexploded object (UXO)		1. Conduct site investigation and consult local authority and community 2. Offsite area such as borrow pits or disposal sites can have UXO risks.	Contractor	PMU/PMO
Administrative issue (Permit and Approval)	Bidding and contracting	1. Comply with all statutory requirements set out by Government. 2. Confirm Government approval and secure requisite permits etc. 3. PMUs ensure the EMP be included in bidding docs thus in contracts. 4. The bidding documents shall include a lump sum bid item in the bill of quantities to be titled "Environmental Mitigation Measures" that the environmental mitigating measures identified in the Environmental Code of Practice (ECOP) and EMP..	Contractor	PMU/PMO
Encroachment of protected areas	Select suitable Quarry, borrow pits and disposal sites, areas for equipment, site offices, and storage areas	1. Quarry, borrow pits and disposal sites, areas for equipment, site offices, and storage areas selection criteria considering both technical and environmental aspects: 2. Select locations of quarry site/s (for loose material other than stones) as included in the design specifications and on plan drawings to avoid disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. 3. Local Mineral Resources and Energy Agency (Dinas Pertambangan dan Energi) approved sites would be selected first. 4. If other sites are necessary, these would to be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage system, and in structurally stable areas even if some distance from construction activities 5. If additional quarries will be required after construction is started, then the	Contractor	PMU/PMO

Impact	Activities	Mitigating measures	Implementer	Supervisor
		construction contractor shall use the mentioned criteria to select new quarry sites 6. Located beyond of right-of-way/demarcation of riparian zone: at least 5 (five) meters from the foot of river with embankment; at least 100 (one hundred) meters from the riverbank of large river without embankment; at least 50 (fifty) meters from the riverbank for tributary without embankment outside of settlement area 7. Alternatively, outsource of quarry, borrows pits and disposal with competent and certified third parties		
Site selection of supporting facilities	Site selection of construction work camps and other supporting facilities.	1. Avoid location which promote instability and result in destruction of property, vegetation, and public facilities. 2. Avoid thickly populated residential areas for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). 3. Extreme care will be taken to avoid disposals to the forest, water bodies or in areas which will inconvenience the community.	Contractor	PMU/PMO
Construction				
Air Pollution: Dust	Earthworks and movement of vehicles can pose nuisance to nearby communities	1. Require the contractor to cover materials with tarpaulin or other suitable materials while in transit to avoid spillage of materials. 2. Moisten earthen roads during dry and dusty conditions, particularly roads near residences and through the town core area. 3. Impose speed limits on construction vehicles. 4. Conduct regular maintenance on construction equipment and vehicles to control air emissions during vehicle operation. 5. Sites of borrow pits and spoil disposal must be at least 300 m from residential areas so as to reduce dust from these sites. 6. Effective dust suppression measures will be implemented near sensitive receptors such as schools, hospitals, or housing.	Contractor	PMU/PMO
Nuisance Noise: Affect workers and community health	Operation of construction equipment will cause excessive noise	1. Limit construction activities, particularly operation of noise generating equipment at night. 2. Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors.	Contractor	PMU/PMO

Impact	Activities	Mitigating measures	Implementer	Supervisor
		3. Erect temporary barriers around construction sites especially near schools, hospitals, and houses. 4. Install noise suppression devices to noise generating equipment. 5. Require drivers to minimize blowing of horn and to comply with speed limits. 6. Provide information to community on schedule of construction activities through billboard/signs. 7. Set appropriate working time limitations as refers to domestic regulations and IFC/WB EHS guidelines and consultation with the affected community		
Water Quality	From camp and digging	1. Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. 2. Provide adequate water supply and temporary toilet facilities at the worker's camp. 3. Cooperate with local cleansing agency or private sector for the desludging of temporary toilets and dispose the sludge	Contractor	PMU/PMO
	Maintenance Dredging	1. Prepare Sediment Management Plan as part of the CEMP for the sites requiring dredging 2. Apply Seasonal restrictions (or Environmental Windows) on dredging operations and should be determined in the early stages of the assessment by consultation 3. Schedule the dredging work during dry season	Contractor	PMU/PMO
Soil Erosion/ Contamination	Earth moving work Loss of valuable topsoil	1. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. 2. Avoid cutting trees as much as possible and minimize damage to native vegetation. 3. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities. 4. Soil erosion management plan to be prepared by the contractor and to be approved by the responsible authority before construction starts. 5. Maintain slope stability at cut faces by implementing erosion protection measures. 6. Construction in erosion and flood-prone areas should be mainly restricted to the dry season. 7. Control silt runoff and cover soil stockpiles; 8. Locate temporary soil stockpiles in areas where runoff will not induce sedimentation of waterways. 9. Establish protection measures for river embankment works, cut slopes, material stockpiles and other areas at risk of soil erosion prior to periods of heavy rainfall	Contractor	PMU/PMO

Impact	Activities	Mitigating measures	Implementer	Supervisor
Construction debris and spoil;	Solid wastes, inert construction wastes, and hazardous wastes during construction	1. Surplus excavated material/cut soil will be used as backfill material for low-lying areas that have been identified by the village authority. 2. Provide appropriate segregation bins or areas for construction wastes. 3. Secure and control storage of all hazardous materials including fuels. 4. Reuse recyclable construction wastes such as wood, steel, and scaffoldings or sell to junk shops. 5. Solid waste to be collected and disposed in approved disposal site of the districts. 6. The contractors will prohibit activities such as cutting wood for cooking, hunting, or wildlife trade.	Contractor	PMU/PMO
Clearing of Vegetation	Poor planning and execution of tree clearing vegetation removal a loss of vegetation	1. Prior to tree felling, ensure onsite inspections of trees by a suitably qualified expert, to ensure no nests are present. Any requirements for nest removal will be conducted by relevant agencies, or NGOs, and any actions recorded/ reported 2. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid cutting trees as much as possible and minimize damage to native vegetation. 3. Roads and paths will only be sufficiently wide to accommodate construction vehicles/equipment to minimize land take. 4. Manual labor will be utilized in sloping terrain where use of heavy equipment would cause unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion. 5. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities. 6. Consider the need for the development of a tree planting schedule to strengthen and rehabilitate areas that have been impacted by construction activities (i.e., riparian zone) 7. Select the most suitable species (for example, under NBS the project propose vetiver species) to maintain bank stability once the riparian zone and associated vegetation has been stripped	Contractor	Supervision (resident) Engineers
Social disturbance	Community access to areas, schools, religious buildings, village offices, market affected	1. Walking access will be maintained to affected properties and access routes will be temporarily lined with timber or similar material. Particular attention will be given to ensuring safety along roads and paths used by pedestrians. 2. Install barriers and safety warning signs on road sections and if necessary, deploy traffic aides/ flag persons at affected locations. Information boards at	Contractor	Supervision (resident) Engineers

Impact	Activities	Mitigating measures	Implementer	Supervisor
		blocked roads will provide information about the temporary closure of roads, schedule of works and the traffic-rerouting plan. 3. Require the contractor to immediately rehabilitate the excavated areas and any damaged road and path sections. 4. Enclose construction site perimeters so that pathway use, and access remains unimpeded.		
Damage Physical Cultural resources (PCR)	Uncover relics and artifacts during civil works.	1. Chance-find procedure: 2. in the event of accidental finds relics, should immediately cease any works in the area and protect the site 3. Promptly report the find to their supervisor who immediately report local authority for PCR, e.g., cultural relic bureau. 4. Contractor will ensure that the workforce is briefed on this procedure during prior training on EMP/ECC.	Contractor	Supervision (resident) Engineers
Community Health & Safety	open excavation etc	1. Install barricades/barriers and sturdy plate covers in open excavations during non-working time. 2. Install warning signs in the area. before works commencement. 3. Conduct consultation and dialogue to and update local community members of possible disruption due to construction activities 4. Details of works that will disrupt access should be placed as signs.	Contractor	Supervision (resident) Engineers
Increased Volume of Traffic	Increased traffic volumes and higher speeds may lead to accidents	1. Prepare a traffic control and management plan together with the local traffic police prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning. 2. In case of lane closures, deploy workers to direct traffic. 3. Signage and other appropriate safety features will be installed to indicate construction works are being undertaken 4. Speed limits shall be established in the work sites to minimize the risk of accidents.	Contractor	Supervision (resident) Engineers
Sanitation	Workers camps	1. Provide Sanitation Facilities 2. One toilet, one tap / basin, one toilet for every 6 people, Fresh cold running water 3. Convenient location to accommodation; Provision of soap, Ventilation to open air 4. Separate facilities for men and women, Clean and hygienic 5. Septic tank/sewage treatment facility, or pit latrines located at least 200m from surface waters, and in areas of suitable	Contractor	Supervision (resident) Engineers

Impact	Activities	Mitigating measures	Implementer	Supervisor
		soil profiles and above the groundwater levels 6. Separate area for sick workers to prevent transmission of disease 7. Detail on the sanitation of the workers camps and other requirements refers to IFC / EBRD guidelines https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation)		
Occupational Health and Safety	may pose hazards to workers because of the use of heavy equipment, lifting of heavy loads, and exposure to open excavations and chemicals.	1. Require the contractor to implement the construction health and safety plan in accordance with the World Bank EHS Guidelines (http://www.ifc.org/ehsguidelines) as a minimum standard. The contractor will appoint an environment, health and safety officer to ensure implementation of the plan. The plan will at minimum include: 2. Provision of first-aid facilities readily accessible by workers. 3. Provision of personal protective equipment (PPEs) such as hard hats, gloves, and rubber boots. 4. Provide PPE for working near water bodies and a safety plan to ensure construction workers are trained on the dangers and risks of working near water bodies 5. Wearing of PPEs while working onsite will be a mandatory requirement for workers. 6. Posting of safety signs/reminders in strategic areas within the construction area. 7. Installation of sufficient lighting at night. 8. Ensure that vehicle and equipment operators are properly licensed and trained. 9. Provide staff with COVID 19, communicable disease and HIV-related awareness training. 10. The contractor will be required to provide priority hiring of qualified construction workers from the villages and to consult with the local authorities to avoid conflict if migrant workers brought in.	Contractor	Supervision (resident) Engineers
	Construction site working conditions	1. Form a joint team to plan and organize commencement and/or return to work 2. Develop or convene a joint occupational safety and health committee with members representing the employer and workers 3. Train team members on the basic principles for the formulation and implementation of occupational safety	Contractor	Supervision (resident) Engineers

Impact	Activities	Mitigating measures	Implementer	Supervisor
		and health preventive and control measures. 4. Ensure preventative measures are in place before resuming or beginning construction work 5. Adopt engineering, organizational and administrative measures 6. Promote personal hygiene 7. Provide personal protective equipment (PPE) and inform workers of its correct use 8. Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient number, along with instructions, procedures, training and supervision 9. Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper hand washing 10. Health surveillance and insurance 11. Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms 12. Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that: 13. Promote a safe and healthy working environment free from violence and harassment. 14. Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work life balance 15. Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19 16. Review emergency preparedness plans		
Operation and Maintenance				
Flood Risk	Reduction of Flood Risk	1. Perform regular inspections of levees and flood control buildings 2. Maintaining river channel, riverbank, and riparian zones 3. Carry out regular inspections and supervision along the river channel 4. Perform regular dredging to maintain the dimensions of the river trough 5. Maintaining the stability of the riverbank 6. Cooperate with authorized institutions in controlling development plans and activities in floodplains	Balai (RBO)	DGWR

Impact	Activities	Mitigating measures	Implementer	Supervisor
		7. Prepare flood risk management plans and emergency response for the detention basins		
Soil and Sediment	Erosion and sedimentation	1. Undertake dredging and works on river channels and banks during the dry season when river levels are at a minimum 2. Use dredging methods that minimize sediment suspension such as cutter suction dredge, use of silt curtains 3. sites for disposal areas shall not promote instability and result in the destruction of property, disturbance to vegetation and fauna (biodiversity) and public facilities (see Pre-Construction Measures) 4. Minimizing the area of vegetation clearing and land disturbance at any one time 5. Stabilising and revegetate disturbed areas as soon as possible 6. Undertaking and completing works in smaller sections in order to minimise the time for which disturbed areas are left exposed. 7. Monitoring work areas and changing work methods if sediment is entering river or sediment plumes are observed in river. 8. Carrying out earthworks during dry weather. 9. Carrying out soil erosion and sediment control measures in accordance with good construction practices.	Balai (RBO)	DGWR

Source: Ministry of Public Works and Housing.

B. Environmental Monitoring Plan

190. Table 15 presents the information on (i) aspects or parameter to be monitored, (ii) location where monitoring is applicable, (iii) means of monitoring, (iv) frequency of monitoring, (v) responsibility of compliance monitoring, and (vi) cost of monitoring.

191. The RBO Environment Officer shall provide the CPMU with its monthly environmental monitoring reports. The CPMU shall consolidate all monthly environmental monitoring reports of all subprojects and prepare a monthly and quarterly environmental monitoring report. Using the quarterly reports, the CPMU shall prepare the semi-annual environmental safeguards progress report which shall be submitted to ADB and detailing the status of mitigating measures implementation. The Environmental Monitoring Plan is presented in Table 15. Roles of the CPMU and the PIU are outlined in the succeeding section for institutional arrangement.

192. **Environmental Monitoring Cost**. Monitoring cost for pre-construction is minimal cost to CPMU since this is simply verification by the CPMU on whether the EMP is included in tender and contract documents. Construction monitoring cost is minimal cost to PIU since it will be their personnel who will do checking/inspections of the construction activities and its part of their operational costs. Monitoring cost of construction supervision consultants are also minimal costs since this is checking/inspections cost and part of their contracts. The cost to PMU for the GRM is also minimal cost since these are only meetings for resolving the complaints and it is included in the contractor's contract.

Table 15: Environmental Monitoring Plan

Aspects/ Parameters	Indicators		Location	Means of Monitoring	Frequency	Responsibility	Supervision	Cost
Water quality (with key standard parameters)	pH, BOD, COD, TSS, E-Coli (Key parameters of Water Quality for Irrigation Water- Gov Regulation No. 22/2021)		At river (or canals) and/or water body likely polluted by the project	Visual observation and by laboratory when there is complaints, dispute or deemed necessary by PMU and its experts	As required in AMDAL document	Contractor	PMU/ PIU	Included in construction cost
Erosion and sedimentation	Heavy metals in the sediment (*Gov Regulation No. 22/2021)*		At the location of earth work and excavation	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision
Dust, cover of stockpiles	Dust, SO2, NO2, and others *(Gov Regulation No. 22/2021)*		At the location of stockpiles	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision
Noise levels not to exceed 55 dB(A) near schools and residential areas;	Noise Level (Decree of MOE No. *KEP-48/MENLH/11/1996*)		At the construction site and nearby areas	Use of sound meter	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Same as above
Accident and incident related to hazard condition and hazard actions to occupational health and safety	• Fatality Rate • Near miss Rate • PPE, Signs/Warnings		Project area and associated area (road and workshop) and nearby areas (public areas)	Observation, documentation and reporting	Routinely	Contractor	PMU/ PIU	Included in construction cost
Solid and hazardous wastes	Volume of wastes and/or spill (if any)		At the construction site and nearby areas	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision
Flora and fauna	Number of trees cut and fauna disturbed (if any)		At the construction site and nearby areas	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, PMU/ PIU	Part of consultant's construction supervision

Source: Ministry of Public Works and Housing.

193. **Project Performance Monitoring**. Project performance monitoring presents the desired outcomes as measurable events by providing parameters or aspects that can be monitored and verified (Table 16). Bidding process advocating environmentally responsible procurement is a desired outcome during the pre-construction phase. This can easily be verified by checking if EMP requirements are incorporated in construction contracts. Construction phase desired outcomes include effective management of environmental impacts and reduce risk to the public.

Table 16: Project Performance Monitoring

Desired Outcomes	Aspects / Parameters to be monitored	Means of Monitoring	Monitoring Frequency	Implementation	Compliance Monitoring	Monitoring Cost
PRE-CONSTRUCTION PHASE						
Detailed design is environmentally responsive	EMP requirements incorporated in detailed design	Verify detailed design documents	Two reviews: (i) draft detailed design documents and (ii) prior to approval of final	Design consultants/ PPIU	CPMU	Part of project management in detailed design (minimal cost)
			documents			
Tendering process advocates environmentally responsible procurement	EMP requirements incorporated in construction contracts	Verify construction contract documents	Prior to finalization of construction contract documents	Design consultants/ PPIU	CPMU	Part of project management in tendering (minimal cost)
CONSTRUCTION PHASE						
Effective management of environmental impacts during construction	Number of public complaints on construction activities	Verification of contractor's records; PIU/ PMU's coordination with local officials	Once a month	Contractor	Construction supervision consultants, CPMU/ PPIU	Part of consultant's construction supervision contract; minimal cost to CPMU/PIU
Reduce risk to workers and the public during construction	Number of accidents involving construction activities	Verification of contractor's records; PIU/ PMU's coordination with local officials	Once a month	Contractor	Construction supervision consultants, CPMU/ PIU	Part of consultant's construction supervision contract; minimal cost to CPMU/ PIU
Post CONSTRUCTION PHASE						
(Not applicable – Monitoring during project phase only)						

Source: Ministry of Public Works and Housing.

X. IMPLEMENTATION ARRANGEMENT

194. **Institutional Setup**. The DGWR is the Executing Agency responsible for overall subproject including environment, while the subproject implementation unit (PIU) is the Pemali-Juana River Basin Organization (RBO) which will establish a PIU headed by a manager (PIU head) with experience in the externally financed subproject. PIU will be responsible for the day-to-day implementation of the Subproject and will be accountable for technical, safeguards and financial reporting. A summary of the implementation organizations and corresponding management roles and responsibilities is documented below (Table 17).

Table 17: Role and Responsibilities of Project Stakeholders

Project Implementation Organizations	Management Roles and Responsibilities
National Steering Committee Ministry of National Development Planning/ BAPPENAS Ministry of Public Works and Housing	• Oversee progress and provide guidance on the project implementation • Monitor and evaluate the overall project performance and outcomes • Review and endorse annual work plans

Project Implementation Organizations	Management Roles and Responsibilities
Executing Agency Ministry of Public Works and Housing through the Directorate General of Water Resources	• Overall responsible for implementation of subprojects • Will establish a Central Project Management Unit (CPMU) within the Directorate General of Water Resources (DGWR) to consolidate activities and reporting from Project Management Units (PMUs) and Project Implementing Units (PIUs) • Supported by a secretariat consisting of representatives of concerned Directorates. The CPMU secretariat will be headed by the Director of System and Strategy for Water Resources Management (DSSWRM), DGWR and staffed with financial management, monitoring and reporting, procurement, social and environmental safeguards, gender, and technical personnel. • Ensure that loan covenants are complied with • Maintain project accounts, monitor financial and physical progress, and report such progress to ADB • Prepare withdrawal applications (WA) including retention of supporting documents and submit the WAs (through MOF) to ADB. • Lead and coordinate activities related to financial management and financial audit • Consolidate quarterly and annual reports, including safeguards and audited annual project financial statements and submit to ADB.
Project Management Units Directorate General of Water Resources	• Establish PMUs headed by a project director and staffed with social and environmental safeguards, gender, procurement, financial management and technical personnel • Provide quarterly and annual reports including audited annual financial statements as required under the loan agreement • Provide operational support for project activities • Coordinate with the government and partner agencies for successful implementation of the project • Prepare annual contract awards and disbursement projections, requesting budgetary allocations for counterpart funds;
Project Implementing Units <u>Output 1:</u> - Directorate of Technical Guidance; Directorate of Operation and Maintenance; River Basin Organizations (RBOs); DGWR - Ministry of Home Affairs - Indonesia Space Agency (LAPAN) <u>Output 3:</u> Directorate of River and Coastal; RBOs; DGWR	• Establish PIUs headed by a project director and staffed with social and environmental safeguards, gender, procurement, financial management and technical personnel • Responsible for implementation of all subprojects under each implementing agency's purview • Recruit design and supervision consultant for all subprojects under its purview • Prepare safeguards planning documents, implement environmental and social safeguards plans, and monitor safeguards-related activities for ADB and government requirements. • Undertake day-to-day implementation activities • Supervise design, supervision and management consultants • Manage the procurement process (prepare bidding documents, manage bidding process, submit required documents to ADB for required clearances) in coordination with Regional Procurement Agencies • Implement procurement, safeguards activities and gender action plan • Manage financial management including prepare budget, annual projections, process invoices and withdrawal applications, etc.
Ministry of Finance	• Establishment of advance account on behalf of the executing agency. • Allocation and timely release of counterpart funds • Authorize withdrawal application submitted by the executing agency. • Communicate with ADB for any amendments in the reallocation of the loan amount. • Administer advance account
Regional Procurement Agencies (MPWH)	• Conduct procurement for packages under the CPMU and PIU authorities
Provincial and Local governments	• Facilitate land clearance

Project Implementation Organizations	Management Roles and Responsibilities
	• Ensure issuing of relevant permits • Integration of activities
Asian Development Bank	• Undertake regular project reviews and facilitate implementation of the project, including compliance by the executing agency and implementation agencies to obligations and responsibilities

Source: Asian Development Bank and Ministry of Public Works and Housing.

195. **At the National Level** - the DGWR with Directorate of WRM System and Strategy (SSPSDA) will function as Central Project Management Unit (CPMU), supported by the Ministry of Finance, that will provide technical advice and coordination to the provincial and district Bappeda planning agencies. The CPMU will appoint a designated environmental safeguard consultant to ensure the principle of environmental safeguard in the project, from planning to implementation.

196. The CPMU shall appoint a staff acted as Environment Officer for FMNJP, to oversee the implementation and monitoring of environmental safeguards requirements. With assistance from the Environmental Specialists of the PPC team, the PMC shall be responsible for the following activities related to environmental safeguards: (i) confirm that the IEEs are updated in accordance with ADB's SPS based on detailed designs and submit to ADB for review and approval prior to contract award; (ii) confirm that the required AMDAL, a GOI requirement, has been prepared during detailed design and approved by the respective environment agency, the Ministry of Environment and Forestry; (iii) confirm that the EMP is included in the bidding documents and civil works contracts; (iv) ensure Construction's EMPs (CEMPs) are prepared by contractors prior to actual construction; (v) establish a system to monitor environmental safeguards of the subprojects including monitoring the indicators set out in the monitoring plan of the EMP; (vi) supervise the implementation of environmental mitigating measures required for the construction activities; (vii) review, monitor and evaluate the effectiveness of the implemented CEMPs, and recommend necessary corrective actions; (viii) prepare monthly and quarterly environmental monitoring reports and submit semi-annual environmental monitoring report to ADB; (ix) ensure timely disclosure of final IEE and EMP in locations and form accessible to the public; and (x) address, record, and report on any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner.

197. The executing and implementing agencies are required to retain adequate staff and consultants with relevant qualifications and experience, to be able to adequately design and deliver the environmental safeguards plans for the subproject. They remain responsible for reviewing and if necessary updating the environmental safeguards plans at the time of each scheduled bi-annual report, particularly with regards to potential changes in subproject scope, location, timing, that might require additional resources.

198. **At the Regional level**, The RBO will collaborate with both national level agency and regional agency stakeholders. In addition to coordinating with the DGWR and the Directorate of River and Coast, the RBO authorities shall also work closely with local governments, and the key regional technical agencies (Water Resources/Irrigation, Bappeda, Agriculture, Environment and Forestry), both provincial and district level. The RBO shall also appoint an environmental safeguard focal person to ensure the application of safeguard principles and processes (from planning to preparatory and implementation stage), as per ADB and national standards. The environmental safeguard focal person must have a good understanding of ADB SPS 2009 and related GOI regulations regarding environmental regulations.

199. The following are the role of environmental safeguard focal person that will be appointed at the RBO level:

(i) Work in coordination with contractor for the day-to-day implementation and monitoring of safeguards plans, including implementation of IEE activities; and
(ii) Supporting the functioning of the GRM. The environmental safeguard staff will be members of the Grievance Redress Committee.

200. **Provincial Government**. The Central Java Provincial Government will be responsible to address complaints and objections (grievances) at provincial level.

201. **District/City Local Government.** District governments will play an important role at the site level, including implementing IEE to ensure that the subproject is in line with the *Rencana Tata Ruang dan Wilayah* (spatial plan) (RTRW).

202. **Subdistrict and village governments** - and their leaders will be directly involved in facilitating, planning, preparing and implementing the IEE activities.

203. At the bottom of this institutional setup are the contractors which are responsible for implementing the required environmental mitigation measures as defined by their respective approved CEMP. Close coordination between the contractors and the Environment Officer of PIU is needed to ensure good planning for mitigation measures and ensure the timely implementation. The contractors are also directly involved in addressing grievances during the construction period since their activities will cause disturbances to the public. Oftentimes complaints can easily be resolved between the contractors and the complainants. The contractor's highest official at the site such as the Construction Manager or Construction Superintendent, shall be a member of Environmental Compliance Committee (ECC).

204. External environmental monitoring will be done by Dinas Lingkungan Hidup as required by its mandate. DLH is tasked to prepare and implement regional policies and rules to promote environment protection and conservation. It reports to the Regent through the Regional Secretary. Its function is to: (a) formulate and recommend policies on environmental management and (b) prepare and carry out work plans and programs on environmental management and monitoring and AMDAL (Indonesia EIA system). It is their responsibility for enforcing the AMDAL system. It is also involved in monitoring the water quality of rivers in respective districts and provinces.

205. **Implementation Schedule**. As presented in the project description, construction of the subproject is scheduled to start in 2023, CPMU shall ensure that construction contract provisions related to the contractor's EMP shall be included in the tendering stage.

206. **GOI Approval.** Under GOI's Environmental Regulation (No. 22/2021)[26], the RBO shall apply for AMDAL approval from the Ministry of Environment and Forestry.

207. **Capacity Building**. The project will recruit consulting services for: (i) project management advisory services, including detailed engineering designs, preparation of contract documents, support to PIUs on construction supervision and quality control; and (ii) institutional development and capacity building. During pre- construction and construction period, it shall be necessary to provide an Environmental Advisor to the CPMU.

XI. CONCLUSION AND RECOMMENDATION

208. Based on the screening for potential environmental impacts and risks of the proposed

[26] Recently GR No. 27/2012 has been diluted into GR No. 22/2021 on Implementation of Environmental Protection and Management, as mandated in Law No. 11/2020 on Job Creation.

subproject, there are no significant negative environmental impacts and risks that cannot be mitigated. With the EMP, the proposed subproject can be implemented in an environmentally acceptable manner. There is no need for further environmental assessment study. A full EIA is not warranted and the subproject's environmental classification as Category B is deemed appropriate.

Appendix 1. Screening and Rapid Environmental Assessment (REA)

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: Indonesia: Flood Management in North Java (FMNJP)

Sector Division: SEER

A. Flood Risk Management[27]

Table 1: Rapid Environment Assessment (REA) Checklist

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			Subprojects located in or adjacent to environmentally sensitive areas will not be eligible. Screening and eligibility criteria will be defined in the Environmental Assessment and Review Framework (EARF).
▪ Cultural heritage site		X	
▪ Protected Area		X	Based on PIPPIB map and spatial plan (RTRW), project areas are not located in protected areas. This will be confirmed with respective DLH (Kabupaten Boyolali)
▪ Wetland		X	
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	

[27] The template for "Ports and Harbors" is used to cover the impact of land transformation of water area, especially dredging.

Screening Questions	Yes	No	Remarks
B. Potential Environmental Impacts Will the Project cause…			
▪ encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds?		X	
▪ short-term increase in turbidity and sunlight penetration as well as changes in sediment pattern and flows at dredging site?		X	Avoidance or mitigation measures will be applied such as dredging in dry season, use of cutter suction dredge and/or turbidity curtains.
▪ removal and disturbance of aquatic flora and fauna at dredging site?	X		Dredging activities may impact both aquatic flora and fauna. Mitigation measures will be proposed and implemented in EMP
▪ deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		X	Mitigation measures will be proposed and implemented in EMP for construction camp
▪ alteration of bottom surface and modifications to bathymetry, causing changes in tidal bore, river circulation, species diversity, and salinity?		X	Not applicable
▪ changes in sediment pattern and littoral drift that may cause beach erosion of neighboring areas?		X	Not applicable
▪ modification of terrestrial habitat by upland disposal of dredged material or covering of potential archaeological sites with dredge spoil?		X	Dredged sediment will preferably be placed on the adjacent levee banks or used for bank construction. Spoil locations if required will be selected away from habitats or archaeological sites
▪ short-term air quality degradation due to dredging- related operations?		X	Any emissions from equipment or fugitive dust associated with dry bulk materials will be minor and minimized by appropriate dust control, equipment exhausts and maintenance
▪ noise and vibration due to blasting and other civil works?		X	No blasting is expected
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	X		Physical construction hazards will be consistent with construction projects and managed appropriately.
▪ dislocation or involuntary resettlement of people?		X	Will be studied under LARP
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ other social concerns relating to inconveniences in living conditions in the project areas?	X		Access to the river will be restricted in works areas during construction. Design will incorporate access to river in consultation with local community.

Screening Questions	Yes	No	Remarks
▪ social conflicts if construction depletes local fishery resources on which communities depend for subsistence?		X	
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations (such as STI's and HIV/AIDS)?		X	Waste management in accordance with good practice. Communicable disease awareness training will be provided to workers.
▪ social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission)?		X	[NOT RELEVANT] Port is not part of the project.
▪ deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges?		X	[NOT RELEVANT] Ships and waterfront industry not involved.
▪ increased noise and air pollution resulting from airborne emissions (e.g. gas, smoke, fumes) from maneuvering and berthing ships and the waterfront industry?		X	
▪ large population increase during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	Large workforce not anticipated
▪ social conflicts especially when workers from other areas are hired?		X	Local workers will be prioritized, as they meet requirement.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	Explosives not anticipated. Fuel and chemicals will be managed in accordance with good practice.
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	Access to the project sites will be restricted in works areas during construction. Design will incorporate access to river in consultation with local community. Safe access to public use areas will be provided during operation in consultation with local people.

Table 2: Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[28]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme	1	Siting of sediment trap will consider climate and weather- related disaster

[28] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

	weather- related events such as floods, droughts, storms, landslides?		
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	The project needs to be designed to accommodate future climate change scenarios.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered as low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned as medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): Medium

Other Comments

Appendix 2. List of Indonesia Regulations Related to Environmental Safeguard

No.	Legal Hierarchy	Laws and Regulations Referred
A	Constitution	1) UUD 1945 (Indonesia's Constitution)
B	TAP MPR	2) Article 5 TAP MPR (Decree of Supreme People Assembly) No. IX/MPR/2001 on Agrarian Reform and Natural Resource Management
C	Laws	1) Law No. 5/1960 on Basic Stipulation of Agrarian Regulation 2) Law 5/1990 on Conservation of Living Natural Resources and Ecosystems 3) Law 12/1992 on Cultivation of Plants 4) Law 7/994 on Ratification of Agreement Establishing the World Trade Organization 5) Law No. 5/1994 on Ratification of UN Convention on Biodiversity (UN-CBD) 6) Law No. 39/1999 on Human Right 7) Law No. 41/1999 on Forestry 8) Law 13/2003 on Labor 9) Law No. 31/2004 jo. UU No. 45/2009 on Fishery 10) Law 17/2004 on Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change 11) Law 24/2007 on Disaster Management 12) Law No. 26/2007 on Spatial Plan 13) Law 14/2008 on Disclosure of Public Information 14) Law 19/2009, Ratification of the Stockholm Convention on Persistent Organic Pollutants 15) Law 32/2009 on Environmental Protection and Management 16) Law 36 /2009 on Health 17) Law 11/2010 on Cultural Heritage 18) Law No. 11/2013 on Ratification of Nagoya Protocol on Access to Genetic Resources and Fair and Balanced Benefit Sharing of Its Utilization upon Biodiversity Convention 19) Law 18/2013 on Prevention and Eradication of Forest Destruction 20) Law 1/2014 (Amendment to Law of 27/2007 on the Management of Coastal Areas and Small Islands 21) Law No. 37/2014 on Soil and Water Conservation 22) Law No. 17/2019 on Water Resources 23) Law No. 11/2020 on Job Creation
D	Government Regulation	1) Government Regulation 102/2000 on National Standardization 2) Government Regulation (Minister of Agriculture) 1/2007 on Active Materials of Prohibited and Restricted Pesticides 3) Government Regulation 21/2008 on Disaster Management 4) Government Regulation 30/2009 on Implementation Procedures for Reducing Emissions from Deforestation and Forest Degradation (REDD) 5) Government Regulation 70/2009 on Energy Conservation 6) Government Regulation 1/2010 on Water Pollution Control System 7) Government Regulation 6/2010 on Norms, Standards, Procedures and Criteria for Forest Management in Protected Forest Management Units 8) Management and Monitoring Efforts and Statement of Capability to Manage and Monitor the Living Environment 9) Government Regulation 17/2012 on Guidelines for Community Involvement in the Process of Impact Assessment and Environmental Permitting 10) Government Regulation 145/2013 on Measuring, Reporting and Verifying Climate Change Mitigation Actions 11) Government Regulation No. 121/2015 on Commercialization of Water Resource 12) Government Regulation No. 24/2018 on OSS (Online Single Submission; Electronically Integrated Permitting Services) 13) Government Regulation No. 5/2021 on Implementation of Risk Based Commercial Business Permit 14) Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management

No.	Legal Hierarchy	Laws and Regulations Referred
E	Presidential Decrees and Regulations	1) Presidential Instruction 9/2000 Mainstreaming Gender in the Development Process 2) Presidential Decree 32/1990 on Management of Protected Areas 3) Presidential Decree 46/2001, Operation of the National Greenhouse Gas Inventory 4) Presidential Regulation 23/1992 on Ratification of the Vienna Convention for Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer as Adjusted and Amended by the Second Meeting of the Parties London, 27-29 June 1990 5) Presidential Decree 23/1992 on Ratification of the Montreal Protocol on Substances that Deplete the Ozone Layer 6) Presidential Decree 46/2005 Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer 7) Presidential Regulation Number 10 of 2011 on National Institution of Coordination of Agricultural, Fishery and Forestry Counseling. 8) Presidential Regulation 61/2011, on National Action Plan for Greenhouse Gas Emission Reduction
F	Ministerial Decrees	1) Minister of Labor Decree 5/1996 on Work Safety and Health Management System 2) Decree of the Head of Environmental Impact Management Agency 299/1996 on the Technical Direction of Social Assessment in EIA/AMDAL. 3) Decree of the Head of Environmental Impact Management Agency 124/1997 on the Public Health Assessment in EIA/AMDAL 4) Decree of Minister of Environmental Affairs 45/2005 on Guidelines for the Formulation of Reports on the Realization of Environmental Management Plans (RKL) and Environmental Monitoring Plans (RPL) 5) Minister of Public Works Decree 9/2008 on Management System for of Worker Safety and Health in the Construction of Public Works 6) Minister of Environment Decree 31/2009 on Direction and Control of implementation of Environmental Management, Ecolabelling, Clean Production, and Environmental Technology Use in Regions. 7) Minister of Environment Decree 9/2010 on Guidelines on Community Grievances and Handling of Grievances Caused by Pollution and/or Degradation 8) Minister of Environment Decree Number 17 of 2012 on Public Participation in AMDAL and Environmental License 9) Minister of Environment Decree Number 15 of 2013 on Measurement, Notification, and Verification of Mitigation Actions for Climate Change 10) Minister of Environment Decree Number 03/2013 on Environmental Audit 11) Decree 62/2013 on Managing Agency for the Reduction of Emissions from Deforestation and Degradation of Forests and Peat lands 12) Special assessment for traffic generation and its impacts for settlements and infrastructure projects (Decree of Ministry of Transport No. PM 75/2015) 13) Regulation of Ministry of Environment and Forestry No. P.31/MENLHK/SETJEN/SET.1/5/2017 on Guideline of Gender Mainstreaming in Environment and Forestry and Regulation of Ministry of Forestry No. P.65/Menhut-II/2011 on Guideline of Gender Responsive Planning and Budgeting in Forestry Sector 14) Decree of Minister of Environment No. P.22/Menlhk/Setjen/Set.1/3/2017 on Procedure of Complaint on Pollution and/or Environmental Deterioration and/or Forest Destruction 15) Ministerial Regulation of Environment and Forestry No. P.34/MENLHK/SETJEN/KUM.1/5/2017 on Acknowledgment and Protection of Local Wisdom in Natural Resource and Environmental Management 16) Ministerial Regulation of Environment and Forestry No. P.36/MENLHK/SETJEN/KUM.1/6/2017 on Registration and Notification Procedure of Hazardous Materials 17) Ministerial Regulation of Environment and Forestry No. 4/2021 on List of Business Plans and/or Activities Requiring AMDAL, UKL-UPL or SPPL

Appendix 3. Ambient Air Quality and Noise Standard

Ambient Air Quality

Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management

No	Parameter	Measurement Time	Quality Standard
1	SO_2 (Sulphur Dioxide)	1-hour	150 µg/m^3
		24-hours	75 µg/m^3
		1-year	45 µg/m^3
2	CO (Carbon Monoxide)	1-hour	10,000 µg/m^3
		8-hours	4,000 µg/m^3
3	NO_2 (Nitrogen Dioxide)	1-hour	200 µg/m^3
		24-hours	65 µg/m^3
		1-year	50 µg/m^3
4	O_3 (Ozone)	1-hour	150 µg/m^3
		8-hours	100 µg/m^3
		1-year	35 µg/m^3
5	HC (Hydrocarbon)	3-hours	160 µg/m^3
6	TSP (Dust)	24-hours	230 µg/m^3
7	PM_{10} (Particle < 10 µm)	24-hours	75 µg/m^3
		1-year	40 µg/m^3
	$PM_{2.5}$ (Particle < 2.5 µm)	24-hours	55 µg/m^3
		1-year	15 µg/m^3
8	Pb (Lead)	24-hours	2 µg/m^3

Parameters for Noise

Decree of State Minister of Environment No. KEP-48/MENLH/11/1996 on Noise Level Standard

No	Parameters	Standard (dB)
A.	Noise Level	
A.1	Area by Its Allocation	
1	Residential and Settlements	55
2	Commercial and Service	70
3	Office and Trade	65
4	Green Open Space	50
5	Industries	70
6	Government and Public Facilities	60
7	Recreation Area	70
8	Special Areas:	
	- Airport, Train Station, Port	70
	- Cultural Heritage	60
A.2	Surrounding of Activities	
1	Hospital or similar facilities	55
2	School or similar facilities	55
3	Worship or similar facilities	55

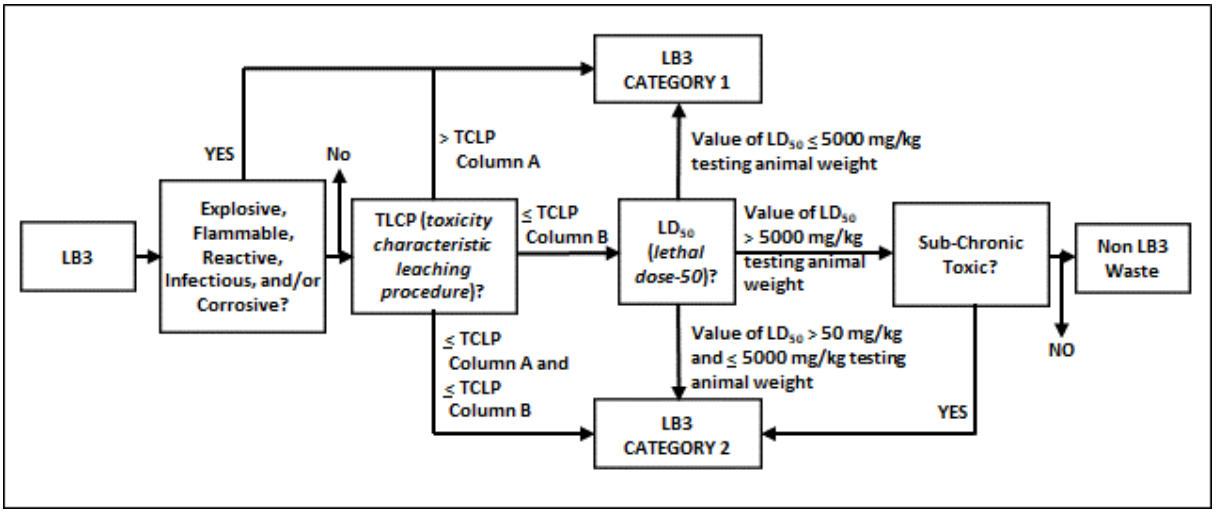
Appendix 4. Water Quality Standard

Government Regulation No. 22/2021 on Implementation of Environmental Protection and Management

PARAMETER	UNIT	CLASS				REMARKS
		I	II	III	IV	
Physical						
Temperature	°C	Deviation 3	Deviation 3	Deviation 3	Deviation 3	Temperature deviation from its natural condition
Dissolved residue	mg/L	1000	1000	1000	2000	
Suspended residue	mg/L	50	50	400	400	
Inorganic Chemicals						
pH		6 - 9	6 - 9	6 - 9	5 - 9	If naturally the range is beyond, the pH determined based on natural condition
BOD	mg/L	2	3	6	12	
COD	mg/L	10	25	50	100	
DO	mg/L	6	4	3	0	Minimum limit
Total Phosphate as P	mg/L	0.2	0.2	1	5	
NO_3 as N	mg/L	10	10	20	20	
NH_3-N	mg/L	0.5	(-)	(-)	(-)	For fishery, contents of free ammonia for sensitive fishes ≤ 0.02 mg/L as NH_3
Arsenic	mg/L	0.05	1	1	1	
Cobalt	mg/L	0.2	0.2	0.2	0.2	
Barium	mg/L	1	(-)	(-)	(-)	
Boron	mg/L	1	1	1	1	
Selenium	mg/L	0.01	0.05	0.05	0.05	
Cadmium	mg/L	0.01	0.01	0.01	0.01	
Chrome (VI)	mg/L	0.05	0.05	0.05	0.01	
Copper	mg/L	0.02	0.02	0.02	0.2	For conventional drinking water treatment, Cu ≤ 1 mg/L
Iron	mg/L	0.3	(-)	(-)	(-)	For conventional drinking water treatment, Fe ≤ 5 mg/L
Lead	mg/L	0.03	0.03	0.03	1	For conventional drinking water treatment, Pb ≤ 0.1 mg/L
Manganese	mg/L	0.1	(-)	(-)	(-)	
Mercury	mg/L	0.001	0.002	0.002	0.005	
Zinc	mg/L	0.05	0.05	0.05	2	For conventional drinking water treatment, Zn ≤ 5 mg/L
Chloride	mg/L	600	(-)	(-)	(-)	
Cyanide	mg/L	0.02	0.02	0.02	(-)	
Fluoride	mg/L	0.5	1.5	1.5	(-)	
Nitrite as N	mg/L	0.06	0.06	0.06	(-)	For conventional drinking water treatment, NO_2-N ≤ 1 mg/L
Sulfate	mg/L	0.03	0.03	0.03	(-)	
Free chlorine	mg/L	0.03	0.03	0.03	(-)	For ABAM is not required
Sulfur as H_2S	mg/L	0.002	0.002	0.002	(-)	For conventional drinking water treatment, S as H_2S ≤ 0.1 mg/L
Microbiology						
Fecal coliform	Number/ 100 ml	100	1000	2000	2000	For conventional drinking water treatment, fecal coliform ≤ 10000
Total coliform	Number/ 100 ml	1000	5000	10000	10000	

Appendix 5. TCLP of Hazardous Wastes

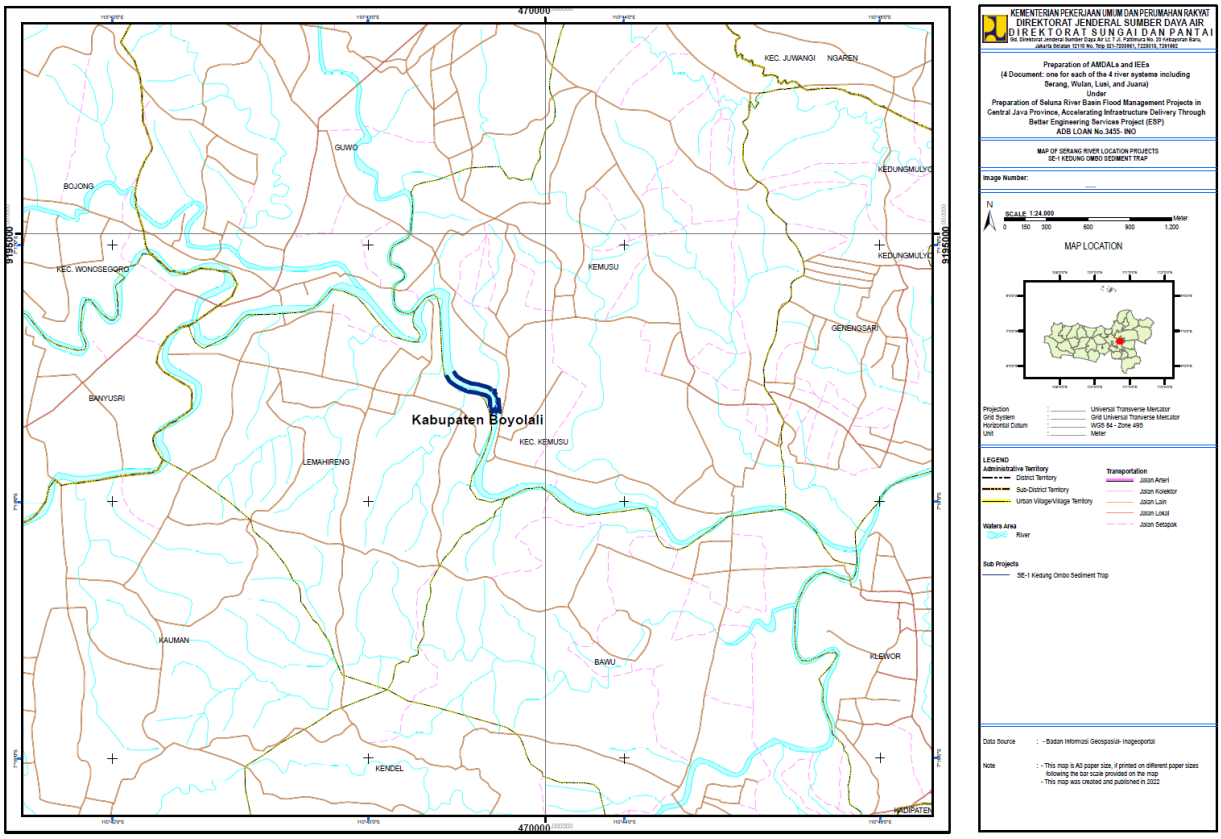
5.1 Characteristic (TCLP) Test for LB3 (Hazardous Wastes)

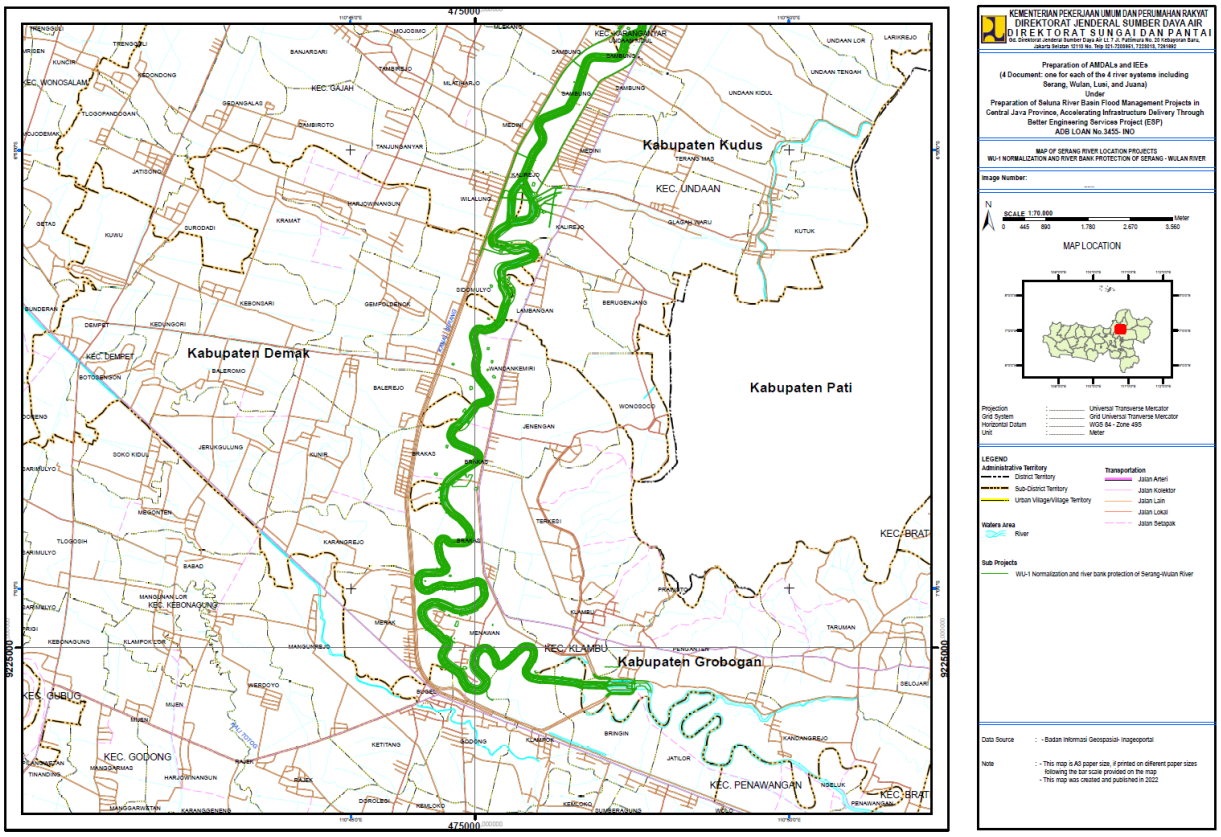


5.2 Threshold Values for Contaminants Identification

CONTAMINANT	TCLP[(1)]-A	TK[(2)]-A	TCLP-B	TK-B	TCLP-C	TK-C
Unit (Dry Weight)	(mg/L)	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)	(mg/kg)
PARAMETERS						
ANORGANIC						
Antimony, Sb	6	300	1	75	0,4	3
Arsenic, As	3	2000	0,5	500	0,2	20
Barium, Ba	210	25000	35	6250	14	160
Beryllium, Be	4	4000	0,5	100	0,2	1,1
Boron, B	150	60000	25	15000	10	36
Cadmium, Cd	0,9	400	0,15	100	0,06	3
Chrome six vallances, Cr^{6+}	15	2000	2,5	500	1	1
Copper, Cu	60	3000	10	750	4	30
Lead, Pb	3	6000	0,5	1500	0,2	300
Mercury, Hg	0,3	300	0,05	75	0,02	0,3
Molybdenum, Mo	21	4000	3,5	1000	1,4	40
Nickel, Ni	21	12000	3,5	3000	1,4	60
Selenium, Se	3	200	0,5	50	0,2	10
Silver, Ag	40	720	5	180	2	10
Tributyltin oxide	0,4	10	0,05	2,5	0,02	R*(3)*
Zinc, Zn	300	15000	50	3750	20	120

Appendix 6. Map of Serang River Subproject





Appendix 7. Inventory and Analysis of Flora and Fauna

a) Flora

From the analysis of the field survey results on the right and left of the Serang River can be seen that the existing ecosystems are riparian areas, rice fields, fields, cemeteries and residential areas. Thus, the vegetation that makes up the ecosystem is grass, and plant cultivation Public. Based on results observation and studies that have been carried out, the types of flora that exist are presented in the table below.

Table 7.1 Flora in Around Serang Watershed River

No	Name Species	Local Name	Family	Habitat	Status
1	*Imperata cylindrica*	Alas	Poaceae	Bush	Unprotected
2	*Bambusa* sp	Bamboo	Poaceae	Tree non woody	Unprotected
3	*Pluchea indica*	Beluntas	Asteraceae	Shrub	Unprotected
4	*Physalis peruviana*	Ciplukan	Solanaceae	Bush	Unprotected
5	*Chromolaena odorata*	sweaty	Asteraceae	Shrub	Unprotected
6	*Manihot utilissima*	Cassava	Eurphobiaceae	Shrub	Unprotected
7	*Lagenaria siceraria*	Pumpkin water	Cucurbitaceae	Bush	Unprotected
8	*Basella alba*	Violet	Basellaceae	Bush	Unprotected
9	*Leucaena glauca*	Petai China	Fabaceae	Tree woody	Unprotected
10	*Moses paradisiaca*	Banana	Musaceae	Tree non woody	Unprotected

Source : Results Analysis, 2020

The flora found around the river is dominated by field crops, plantations and rice fields. The flora found around the riverbanks are usually found in plants owned by inhabitant around, Among other pumpkin water, violet, cassava banana tree, papaya, and others. Based on flora data found around the Serang River watershed, it shows that there are no protected flora species found which refer to the Law of the Republic of Indonesia No. 05 of 1990 concerning Conservation of Living Natural Resources and Their Ecosystems, Government Regulation of the Republic of Indonesia No. 07 of 1999 concerning Preservation Type Plant and animal, and Regulation Minister Environment Life and Forestry of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning the Second Amendment to the Regulation of the Minister of Environment and Forestry Number P.20/MENLHK/SETJEN/KUM.1/6/2018 about Type Plant and Animals which protected.

b) **Fauna**

Connection fauna and flora very tight and related, diversity flora in something The area is present as a habitat and food source for fauna. The types of fauna found around the Serang River watershed are groups of mammals, aves and insects. The following is the fauna data found around the Serang River watershed.

Table 7.2 Fauna in Around Serang Watershed River

No	Name Species	Name Local	Family	Status
Mammals				
1	*Boss Taurus*	Cow	Bovidae	-
2	*Capra aegagrus hircus*	Goat	Bovidae	-
Avifauna				
1	*Pycnonotus aurigaster*	Grandpa finches	Pycnonotidae	LC
2	*Lonchura punctulate*	Bondol Beijing	Estrildidae	LC
3	*Prinia inornata*	Perjak ricefield	Cisticolidae	LC

No	Name Species	Name Local	Family	Status
4	*Collocalia esculenta*	Swallow cow	Apodidae	LC
5	*Collocalia linchi*	Swallow linchi	Apodidae	LC
Insecta				
1	*Oxya chinensis*	Grasshopper green	Acrididae	-
2	*Orthetrum sabina*	Dragonfly rhinoceros	Libellulidae	-
3	*Danaus plexipplus*	Butterflies butterfly sp. 1	Nymphalidae	-
4	*Ideopsis juventa*	Butterflies butterfly sp. 2	Nymphalidae	-
Reptile				
1	*eutropic multifasciata*	Lizard garden	Scincidae	-

Source : Results Analysis, 2020

The fauna found is a group of mammals, aves, reptiles and insects (insects). The mammals found were livestock belonging to residents. Insects found is butterfly, dragonfly, and other other. Based on data fauna which found around the Serang River watershed indicates that no protected fauna species were found referring to the Law of the Republic of Indonesia No. 05 of 1990 concerning Conservation of Living Natural Resources and Their Ecosystems, Government Regulation of the Republic of Indonesia No. 07 of 1999 concerning Preservation of Plant and Animal Species, and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018 about Change Second On Regulation Minister of Forestry Environment Number P.20/MENLHK/SETJEN/KUM.1/6/2018 concerning Protected Plant and Animal Species.

c) Biota Water

- **Nekton**

Nekton are organisms that can swim and move actively. Species belonging to the nekton category include fish, shrimp, and others. The number of nekton species in a waters, it can provide description of community structure in aquatic structures.

The livelihood of the people around the Serang River watershed are farmers, but they also use the Serang River to get their fishery products. Based on the results of the analysis, here are some types of fish found in the Serang River watershed.

Table 7.3 Nekton in watershed Attack River

No	Name Local	Name Species	Family	Status
1	waders	Barbodes binotatus	Cyprinidae	Unprotected _
2	Tawes	Barbonymus gonionotus	Cyprinidae	Unprotected _
3	Mujair	Oreochromis mossambicus	Cichlids	Unprotected _
4	Indigo	Oreochromis niloticus	Cichlids	Unprotected _
5	clash	Puntius binotatus	Cyprinidae	Unprotected _

Based on nekton data found in watershed Serang River shows that not found type nekton protected which refers on Invite - Invite Republic Indonesia No. 05 of 1990 concerning Conservation of Living Natural Resources and Their Ecosystems, Government Regulation of the Republic of Indonesia No. 07 of 1999 concerning Preservation of Plant and Animal Species, and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018 about Change Second Based on the Regulation of the Minister of Environment and Forestry Number P.20/MENLHK/SETJEN/KUM.1/6/2018 about Type Plant and Animals which protected.

Appendix 8. Dredging Management Plan (Template)

This is a general template of dredging management plan, and the Contractor is responsible to adjust and prepare a detailed and site specific plan.

(Source: chrome- https://www.epa.sa.gov.au/files/14229_flinders_ports_dredging_plan_2019.pdf with simplification and modifications)

Appendix 9. Public Consultation

The implementation of the public consultation is carried out before or simultaneously with the preparation of the Terms of Reference Form. Prior to conducting public consultations, coordination with relevant agencies and community leaders involved in the AMDAL process is carried out as follows.

1. Relevant agencies (Provincial Environmental Agency/DLH of Central Java, Local Environmental Agency of Grobogan, Demak, Boyolali, police office, sub-district and village goverment of affected areas)

2. Community leaders who will be involved in public consultation (head of village, women/PKK, and community leader/affected people)

Based on the coordination results, the implementation of public consultations is carried out with the following schedule.

1. Session 1 (08.00 – 12.00): Kabupaten Grobogan and Kabupaten Demak
2. Session 2 (13.00 – end): Kabupaten Boyolali and Kabupaten Grobogan

Implementation of public consultation carried out by face to face, but still comply with health protocol for avoiding transmission of Corona Virus Disease (COVID-19), as follows.

1) Keep distance among participants by arranging distance of chairs and que of registration
2) Participants shall use masks to cover nose and mouth
3) Provide washing sink with water and soap or use alcohol-based hand sanitizer
4) Each participant shall wash their hands with soap or use hand sanitizer

There are recorded 58 participants of the public consultation, representing several elements in the community as shown in the following tables.

Table 8.1 Participants of Public Consultation (Session 1: Grobogan and Demak)

No	Community Elements	Number (Person)	Percentage (%)
1	Affected People	14	42
2	Village apparatus	5	15
3	Proponent	5	15
4	Related agencies	3	9
5	Security	4	12
6	Consultant	2	6
	Total	33	100

Source: Results of Public Consultation, processed by authors, 2021

Table 8.2 Participants of Public Consultation (Session 2: Grobogan and Boyolali)

No	Community Elements	Number (Person)	Percentage (%)
1	Affected People	8	32
2	Village apparatus	2	8
3	Su-district apparatus	4	16
4	Proponent	4	16
5	Related agencies	1	4
6	Security	4	16

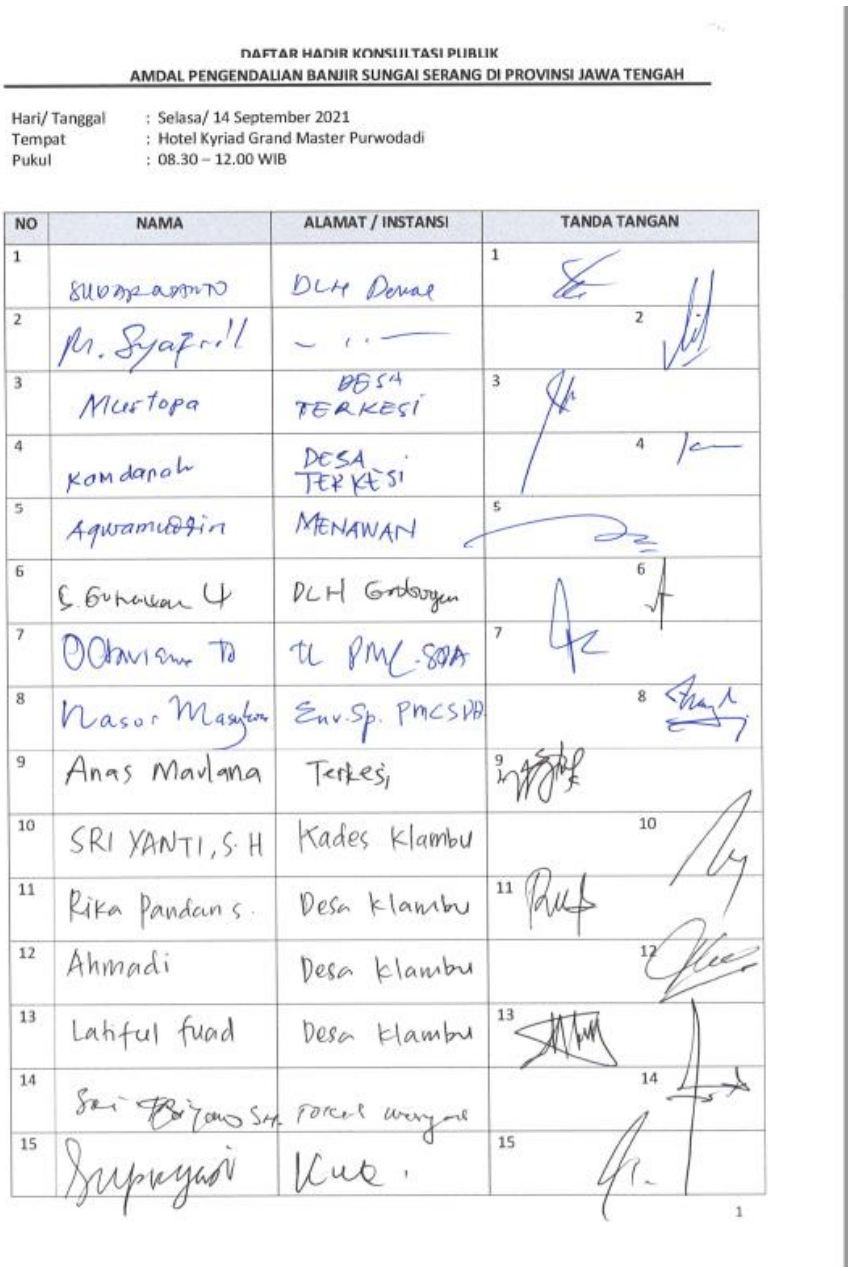
No	Community Elements	Number (Person)	Percentage (%)
7	Consultant	2	8
	Total	25	100

Source: Results of Public Consultation, processed by authors, 2021

Session 1: Documentation Consultation Public Session 1 (Grobogan District and Demak District)

Session 2: Documentation Consultation Public Session 2 (Grobogan District and Boyolali District)

List of Attendees



DAFTAR HADIR KONSULTASI PUBLIK
AMDAL PENGENDALIAN BANJIR SUNGAI SERANG DI PROVINSI JAWA TENGAH

Hari/ Tanggal : Selasa/ 14 September 2021
Tempat : Hotel Kyriad Grand Master Purwodadi
Pukul : 08.30 – 12.00 WIB

NO	NAMA	ALAMAT / INSTANSI	TANDA TANGAN
1	Sudaryanto	DLH Demak	1
2	M. Syafi'i	-	2
3	Mustopa	DESA TERKESI	3
4	Kamdaroh	DESA TERKESI	4
5	Aqwamuddin	MENAWAN	5
6	S. Gunawan	DLH Grobogan	6
7	Oktavianus Tb	TL PMC-SDA	7
8	Nasor Masykur	Env.Sp. PMCSDA	8
9	Anas Maulana	Terkesi,	9
10	SRI YANTI, S.H	Kades Klambu	10
11	Rika Pandan S.	Desa klambu	11
12	Ahmadi	Desa klambu	12
13	Lahful fuad	Desa klambu	13
14	Sri Wijayanti	Forest Management	14
15	Supriyadi	Kudus	15

1

DAFTAR HADIR KONSULTASI PUBLIK
AMDAL PENGENDALIAN BANJIR SUNGAI SERANG DI PROVINSI JAWA TENGAH

NO	NAMA	ALAMAT / INSTANSI	TANDA TANGAN
16	Ali	Ds Menawan	16
17	Fauzan	Ds Menawan	17
18	MUSLIYATUN	Ds Menawan	18
19	DARYANTO	Ds. Wilalung	19
20	Khambali	Wilalung	20
21	Nur Hamdanah	Wilalung	21
22	Ahmad Fahru	Kecamat Kalwungu	22
23	[illegible]	Kepala Kelurahan	23
24	[illegible]	[illegible]	24
25	H. Ismanto	[illegible]	25
26	Budi Santoso	Kel. Bajomulyo	26
27	Hendi K.	BBWS PJ	27
28	Tri Wahyu K	Staf BBWS PJ	28
29	[illegible]		29
30	Sandy	Ka. Cabang Dinas	30
31	UMAR	WILAYUNG	31