

Ex-Ante Evaluation (for Japanese ODA Loan)

Southeast Asia Division 5,
Southeast Asia and Pacific Department,
Japan International Cooperation Agency

1. Name of the Project

- (1) Country: The Republic of the Philippines (the Philippines)
 - (2) Project: Pasig-Marikina River Channel Improvement Project (Phase IV) (II)
 - (3) Project Site / Target Area: Metro Manila (Population: approximately 13.48 million)
- Loan Agreement: March 24, 2025

2. Background and Necessity of the Project

- (1) Current State and Issues of the Disaster Risk Reduction and Management (Flood Risk Management) Sector and the Priority of the Project in the Philippines

The Philippines is one of the countries with the highest natural disaster risk in the world (IFHV 2024). The Metro Manila area, centered on the capital city of Manila, is the political, economic, and cultural hub of the Philippines with approximately 13.48 million residents. However, due to its coastal lowland geography, it is highly susceptible to typhoons, and the region's economic and social activities have been severely impacted by flooding. For over 50 years, the Philippine government has continuously addressed this challenge through planning and implementing flood and drainage management projects. Nevertheless, measures against floods that occur with a probability of once every 100 years (100-year return period) are still under development. Additionally, recent climate change has intensified heavy rainfall, making flood management in the Metro Manila increasingly necessary. In November 2020, Typhoon Ulysses caused significant damage in Metro Manila despite long-standing flood management efforts through the development of Manggahan Floodway and river improvements that mitigated the damage; approximately 54,000 people were affected in the area, resulting in economic losses estimated at around 1.9 billion Japanese yen (1 PHP=2.67 Japanese yen) (NDRRMC 2021). Furthermore, in July 2024, a strong typhoon and monsoon struck the entire Metro Manila, including the Pasig-Marikina River basin, leading to record rainfall and widespread flooding (approximately 750,000 affected and 22 fatalities) (NDRRMC 2024). Given these circumstances, flood management in the basin has become an urgent priority for the Philippine government than before. In the Philippine Development Plan (2023-2028), reducing vulnerability to natural disasters and building safe and resilient communities are highlighted as key strategies.

The Pasig-Marikina River Channel Improvement Project (Phase IV) (hereinafter referred to as "the Project") aims to implement flood control measures through the improvement of the Pasig-Marikina River and the construction of control gate structure etc. This Project is included in the Infrastructure Flagship Project defined by the Philippine government to promote the strategic development of high-priority infrastructure, positioning it as one of the most critical projects within the government.

Furthermore, the Project aligns with the Philippines' Nationally Determined Contributions (NDC) under the Paris Agreement, which aims to address the impacts of climate change in disaster risk reduction, specifically targeting damages caused by typhoons and floods that are presumed to be exacerbated by climate change.

(2) Japan's and JICA's Cooperation Policy and Operations in the Disaster Risk Reduction and Management (Flood Risk Management) Sector

Japan's Country Assistance Policy for the Republic of the Philippines (September 2023) emphasizes "Ensuring Human Security for Inclusive and Resilient Growth" as a key area of focus. It outlines cooperation aimed at overcoming vulnerabilities, stabilizing and strengthening livelihoods, and addressing social issues such as natural disasters, environmental challenges, and climate change. Additionally, the JICA Country Analysis Paper for the Republic of the Philippines (March 2024) identifies the need to address various natural disaster risks as a critical challenge for sustainable economic growth, proposing cooperation from both structural (e.g., river improvement) and non-structural measures (e.g., strengthening disaster prevention and evacuation plans). Furthermore, the Project aligns with "Realizing Pre-disaster Investments" under the cluster strategy "20. Disaster Risk Reduction through Pre-disaster Investment and Build Back Better" in JICA Global Agenda. The Project is consistent with these policies and analyses. Moreover, from the standpoint of enhancing disaster prevention and response capabilities, and addressing climate change, the Project is positioned in a pillar "Addressing Challenges in an Indo-Pacific Way" under "Free and Open Indo-Pacific". By implementing flood management measures in rivers, the Project contributes to build a resilient society against disasters, thereby aligning with SDGs' Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) and 13 (Take urgent action to combat climate change and its impacts).

Since the 1970s, Japan has been actively engaging in providing comprehensive cooperation to the Philippines for over 50 years, utilizing three schemes: ODA Loans, ODA Grants, and Technical Cooperation. The cooperations focuses on formulating flood control master plans centered around the densely populated Metro Manila and major rivers, implementing flood control projects, introducing and improving flood warning systems, and enhancing the capabilities of central government officials in flood and sabo management and control through dispatch of experts etc.

The improvement of rivers, drainage facilities, and flood warning systems in Metro Manila has largely been supported by Japan's assistance, contributing to the reduction of flood damage. Since the Japanese yen loan project "Metro Manila Flood Control and Drainage Project" in 1973, continuous support has been provided through various projects, including the "Pasig River Flood Control Project" (construction of the Manggahan Floodway) and the "Pasig-Marikina River Channel Improvement Project (Phases I-III)," with the Project being positioned as part of those efforts. As a result of such ongoing supports, it is estimated that during Typhoon Ulysses in November 2020, which brought rainfall to Metro Manila exceeding a 50-year return period, approximately 97% of the affected population and about 85% of the estimated damage were mitigated due to those efforts (CTI Engineering International Co., Ltd. 2021). Furthermore, the "Project for Enhancement of Flood Control Strategy in Prioritized River Basins" which began in April 2024 as a Technical Cooperation for Development Planning, is conducting an update of the master plan for the Pasig-Marikina River basin aimed at achieving a 100-year return period safety level, along with a pre-feasibility study for priority projects. Additionally, long-term experts have been dispatched to the Department of Public Works and Highways (hereinafter referred to as "DPWH") since 1980 to enhance their technical capabilities. In terms of grant aid, cooperations such as the "The Project for Rehabilitation of the Flood Control Operation and Warning System in Metro Manila" (E/N signed in October 2000, grant amounting to 1.048 billion Japanese yen) have also been implemented.

(3) Other Donors' Activities

The World Bank and the Asian Infrastructure Investment Bank are currently implementing a project to update the equipment at pumping stations in the Metro Manila (scheduled from 2017 to 2026).

3. Project Description

(1) Project Description

① Project Objective

The objective of the Project is to mitigate flood damages in Metro Manila caused by channel overflow of the Pasig-Marikina River by implementing river channel improvement works together with non-structural measures in consideration with the flood risk management, and thereby contributing to the sustainable urban economic development of the said region.

② Project Components

- 1) Construction and rehabilitation of bank protection, dredging, and widening (about 8.0 km) from the lower stream of the Marikina River to the Marikina Bridge.

- 2) Construction of Control Gate (Manggahan Control Gate Structure (MCGS)¹)
- 3) Construction of two floodgates and a bridge (35 meters) in the Manggahan floodway
- 4) Consulting services: reviewing of detailed design (D/D), bidding support, construction supervision, support for formulation and implementation of non-structural measures (e.g. hazard maps), environmental management and monitoring support, support for resettlement and its monitoring, capacity building for the executing agency

③ Project Beneficiaries (Target Group)

Residents in Metro Manila (Population: approximately 13.48 million)

(2) Estimated Project Cost

150,203 million Japanese Yen (of which the present loan amount is 45,759 million Japanese Yen)

(3) Schedule

January 2019 – March 2032 (159 months). The commencement of the facility operation is considered as the completion of the Project (March 2031).

(4) Project Implementation Structure

- 1) Borrower: Government of the Republic of the Philippines
- 2) Guarantor: None
- 3) Executing Agency: Department of Public Works and Highways
- 4) Operation and Maintenance System: DPWH shall operate and maintain the two floodgates. The Metropolitan Manila Development Authority (hereinafter referred to as "MMDA") shall operate and maintain all other structures. Although operation and maintenance of the all other structures are scheduled to be transferred from DPWH to MMDA two years after the Project completion, DPWH shall continue to operate and maintain the structures until MMDA secures the necessary personnel and budget.

(5) Collaboration and Sharing of Roles with Other Donors

- 1) Japan's Activity: At downstream of the Project site, river channel improvement under Phase III of the Project was completed in March 2018. It is expected that flood damage in the central part of Metro Manila, where the economy and population are highly concentrated, will be mitigated through river channel improvement under Phase III, and river channel improvement and appropriate adjustment of flood diversion volume by the construction of the MCGS under the Project. In addition, the "Project for Enhancement of Flood Control Strategy in Prioritized River Basins", a technical cooperation for development planning that started in April 2024, will update the master plan for the Pasig-Marikina River basin and conduct pre-feasibility studies for priority

¹ The name has been changed from "Marikina Control Gate Structure" to "Manggahan Control Gate Structure" by DPWH during D/D of the Project.

projects to achieve a 100-year return period safety level, taking into consideration the effects of climate change. The Project is expected to have synergistic effects as it will contribute to the completion of the master plan to be developed under the technical cooperation. In addition, a long-term expert in “Flood Management” (dispatched from the Water and Disaster Management Bureau of Ministry of Land, Infrastructure, Transport and Tourism), who has been dispatched to DPWH, will advise on the technical aspects of the Project, which is expected to ensure smooth implementation of the Project.

2) Other Donors’ Activity: None

(6) Environmental and Social Consideration

① Category: A

② Reason for Categorization: The Project falls into the River sector (located in a sensitive area and is likely to have significant adverse impact due to its characteristic) under the JICA Guidelines for Environmental and Social Considerations (April, 2010) (hereinafter referred to as "JICA Guidelines").

③ Environmental Permit: The Environmental Impact Statement (EIS) Report on the Project was approved by the Department of Environment and Natural Resources in June 1998. DPWH prepared a supplemental EIS in August 2018; as of October 2024, this EIS is still in effect and it is not required to reobtain environmental permits under the national law.

④ Anti-Pollution Measures: Impacts on air quality, noise, and vibration during construction shall be mitigated through implementation of water sprinkling and installation of dust coverings, periodic maintenance of equipment, and the installation of temporary fencing. The impact of muddy water generated from dredging should be limited due to flowing water, however, a method to install a protector sheet is planned to be adopted when needed. Dredge soil has been reused as landfilling material for lowlands other than the Project site, after completion of contaminants tests; thus impact on the surplus soil shall be minimized. In addition, drainage discharged during processing dredged material will be disposed to meet the water quality criteria.

⑤ Natural Environment: The Project site is not located in or around sensitive areas such as national parks, and adverse impact on the natural environment is assumed to be minimal.

⑥ Social Environment: The Project will involve the land acquisition of about 38.79 hectares, relocation of seven business operators, and resettlement of 13,838 households of informal settlers. The land acquisition and resettlement for the Project has been conducted in accordance with the procedures stipulated in laws and regulations of the Philippines, the Resettlement Action Plan (RAP), and the JICA Guidelines. About 90 % and 50% of land acquisition was completed for contract

package 2, 3 and 1, respectively. As for the resettlement of informal settlers, about 289 households out of 13,838 households have been resettled, and no deviation from the JICA Guidelines has been confirmed. During the public consultation meetings on the Project, an overview of the Project, compensation and support were explained. Through the public consultation meetings, it is requested that the drainage channel between the soil dumping site and the main road not be filled in so as not to increase flood damage to the surrounding residential areas, so the Project is proceeding without filling in the current drainage channel.

⑦ Other/Monitoring: During the construction, DPWH and the contractors will monitor air quality, noise, vibration, waste quality, and dredge soil. DPWH will also monitor land acquisition, resettlement, and the livelihood and income restoration program. At the time of the commencement of the facility operation, DPWH will conduct monitoring for water, air quality, vibration, and other items associated with the operation of the floodgates, etc. For land acquisition and resettlement, DPWH will continue the internal and external monitoring that was initiated prior to and during construction.

(7) Cross-Sectoral Issues

- ① Climate Change Countermeasures: The Project contributes to flood control in an area where typhoon damage and other serious disasters are expected to increase due to the effects of climate change, therefore contributing to adaptation to climate change.
- ② AIDS/HIV and Other Infectious Diseases Countermeasures: HIV control measures will be implemented during the construction.
- ③ Disability Consideration: People with disabilities will be considered in non-structural measures.

(8) Gender Category

[Gender Cases] GI (S) (Significant)

<Details of Activities/Reason for Categorization>

The Project plans to conduct public information and awareness activities from the perspective of gender and diversity to address gender-based issues such as women's difficulty in accessing information on disasters, and to monitor the results and progress of these activities through the gender action plan agreed upon during the appraisal.

(9) Other Important Issues

Two advanced Japanese technologies are used in the Project: (1) Hat-type and H-shaped Combined Steel Sheet Piles (SSP) method with excellent transportability and reduced costs while maintaining strength compared to typical steel sheet - piles, and; (2) Vibro-Hammer Driving with Waterjet Technology that Japanese companies excel in, in order to satisfy environmental considerations such as vibration and noise control.

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicators	Return Period	Baseline (Actual value in 2018)* ³ (After completion of Phase III)	Target (2033) [2 years after project completion]
Annual maximum flow (m ³ /s)* ¹	-	1,620	-
Annual Highest Water Level (m)* ¹	-	19.7	-
Maximum damage (million Peso)* ²	5 years	22,352 (approx. 46,492 mil. JPY)	15,207 (approx. 40,603 mil. JPY)
	10 years	33,083 (approx. 68,812 mil. JPY)	19,076 (approx. 50,933 mil. JPY)
	20 years	43,115 (approx. 89,679 mil. JPY)	22,295 (approx. 59,528 mil. JPY)
	30 years	50,449 (approx. 104,933 mil. JPY)	25,153 (approx. 67,159 mil. JPY)

*1: Monitoring Indicator

*2: The damage of houses, buildings, and sales along Pasig-Marikina River

*3: Values reflected the effects of climate change and updated inundation analysis results

(2) Qualitative Effects

Expansion of private-sector investment and promotion of economic growth and employment as a result of the establishment of a disaster-prevention environment.

(3) Internal Rate of Return

Based on the assumptions listed below, the economic internal rate of return (EIRR) for the Project is 14.65%. Note that a Financial Internal Rate of Return (FIRR) is not set since no income is involved.

[EIRR]

Cost: Project Cost (excl. Tax), O&M Cost

Benefit: Mitigated damages

Project Life: 55 years

5. External Factors and Risk Control

(1) Preconditions: None

(2) External Factors: None

6. Lessons Learned from Past Projects

The ex-post evaluation of the “Metro Manila Flood Control Project-West of Mangahan” (evaluated in Japanese fiscal year 2010) identified that clarifying roles (including finance work) among the execution agency, local governments, and other related organizations from

the early stages of the Project is critical to ensure its smooth operation regarding land acquisition and operation and maintenance system.

Since the Project area spans multiple local governments and requires large-scale resettlement, a Memorandum of Understanding (MoU) was concluded with the relevant organizations and each local governments, specifying the scope of their roles. In addition, as part of the non-structural measures, the Flood Mitigation Committee, which was established in Phase III to coordinate within related organizations, has been reactivated since the detailed design phase, and continues to hold meetings via online even when actions are restricted due to the Coronavirus disease 2019, to facilitate flexible discussions among related organizations.

7. Evaluation Results

The Project aims to mitigate flood damages in Metro Manila caused by channel overflow of the Pasig-Marikina River, thereby contributing to the sustainable urban economic development of the said region. Therefore, the Project is aligned with the development policies of the Philippines, and both Japan's and JICA's cooperation policies and analysis. In addition, since it is considered that the Project will contribute to SDGs' Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) and 13 (Take urgent action to combat climate change and its impacts), there is a strong need to support the implementation of the Project.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in Sections 4.

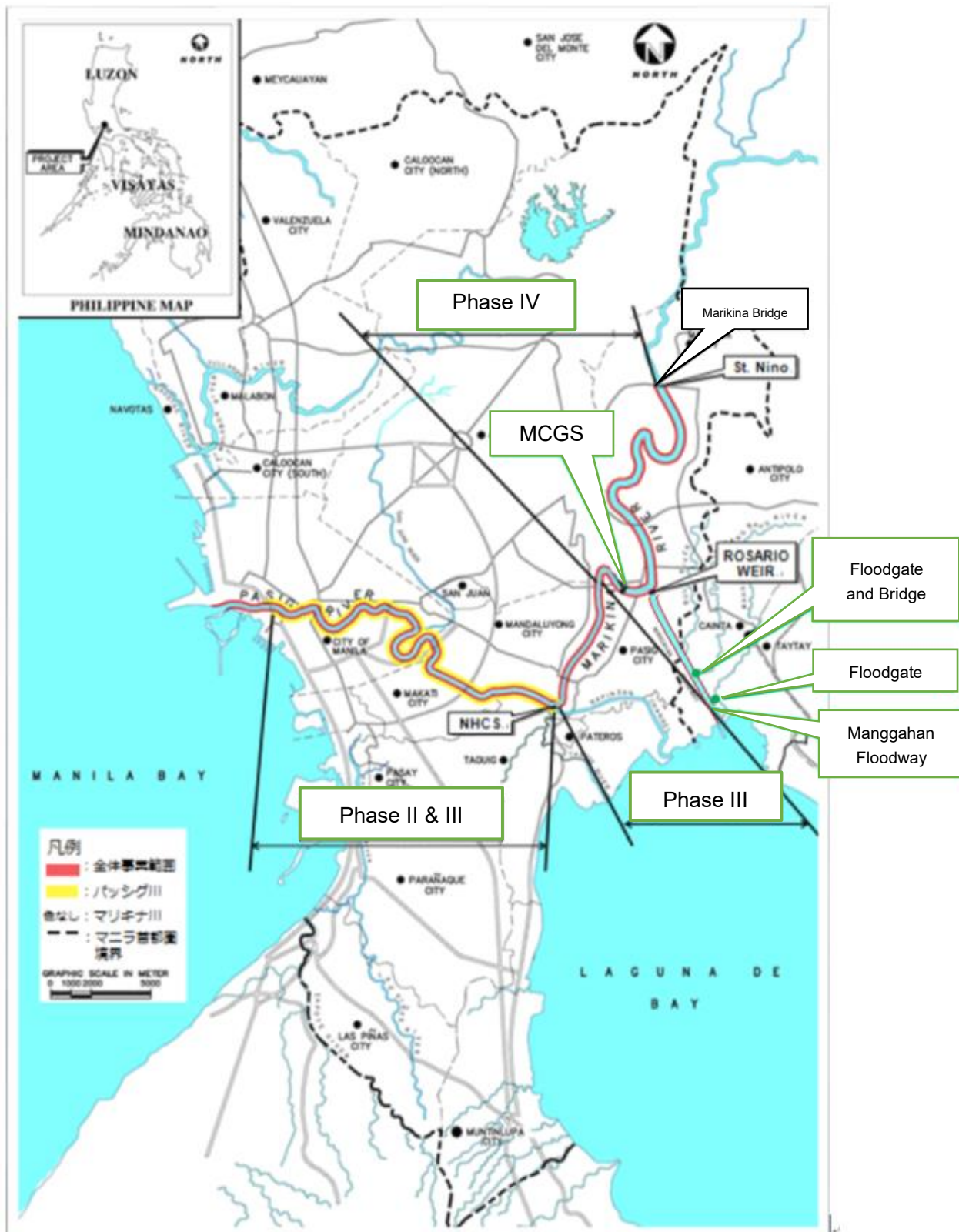
(2) Future Evaluation Schedule

Ex-post evaluation: 2 years after the project completion.

END

Attachment: Map of the Pasig-Marikina River Channel Improvement Project (Phase IV) (II)

Map of the Pasig-Marikina River Channel Improvement Project (Phase IV) (II)



Source: Pasig-Marikina River Channel Improvement Project (Phase III) Preparatory Survey Final Report