

Ex-Ante Evaluation (for Japanese ODA Loan)**1. Name of the Project**

Country: The Republic of the Philippines

Project: Metro Manila Priority Bridges Seismic Improvement Project

Loan Agreement: August 25, 2015

Loan Amount: 9,783 million yen

Borrower: The Government of the Republic of the Philippines

2. Background and Necessity of the Project

(1) Current State and Issues on Development of the Transportation Sector in Metro Manila, the Philippines

The Philippines has one of the highest occurrences of natural disasters in the world, and large-scale earthquakes are particularly frequent due to the country's location on the Pacific Ring of Fire. The Government of the Philippines identifies the lack of infrastructure due to insufficient investment as one of the factors which hinders its inclusive growth in Philippine Development Plan (2011 to 2016).

Given such circumstances, several large-scale bridges on the main road in major urban areas do not meet the seismic performance requirement in light of topographical and geological features of the country and highly likely to be destructed by a large-scale earthquake, the fact of which was revealed in "The project for study on improvement of the bridges through large scale earthquakes disaster mitigating measures" (hereinafter referred to as the "previous study"), a technical cooperation for development planning implemented by JICA. More than 40 years have passed since the construction of most of those bridges located in the course of the main road which is the base traffic network of Metro Manila where about 40% of GDP is concentrated, is used for about 90% of passenger transportation and holds about a half of cargo transportation in the country, and becomes the largest transportation means. Therefore, disaster mitigation measures including enhancement of seismic function has become an urgent issue to be addressed.

The project selects two bridges (Guadalupe and Lambingan Bridges) from major bridges along the main road in Metro Manila as priority for the following reasons: located in important routes with high traffic volume; located on an important road passing Pasig River which divides Metro Manila; important for economic activities and local residents' lives in Metro Manila; located on soft ground which have a risk of liquefaction; and available for evacuation route and emergency supply transportation at the time of disaster as well as playing an important role in early rehabilitation in post-disaster phase. This Project aims to enhance traffic and transport network inside Metro Manila by replacing and reinforcing the aforementioned two bridges based on the revised bridge seismic design standards (draft) proposed by the previous study, thereby contributing to sustainable economic activities in Metro Manila.

(2) Development Policies for the Transportation Sector in Metro Manila and the Priority of the Project

The improvement of transportation infrastructure to attract investment and accelerate economic growth is placed as an important issue in Medium-Term Philippine Development Plan (2011 to 2015). In particular, the development of infrastructure resilient against natural disaster is recognized as a prioritized issue from the perspective of improving investment climate. Moreover, it aims to develop more resilient infrastructure by incorporating disaster risk reduction measures from planning and design stage of a project, and defines the improvement and repair of existing roads and bridges, in particular, as a concrete strategy.

(3) Japan and JICA's Policy and Operations in the Transportation Sector in Metro Manila

In JICA Country Analysis Paper for the Republic of the Philippines (March 2012), infrastructure improvement in the Greater Capital Region is analyzed as one of the important issues for sustainable economic growth through promotion of investment while “achieving sustainable economic growth through further promotion of investment” is set as one of the priority areas in Country Assistance Policy for the Republic of the Philippines (April 2012). Thus, this Project is consistent with these analyses and policies. In addition, reducing earthquake damage affecting the center of Metro Manila — the political, economic, and cultural core of the Philippines, that is also noted in the above assistance policy – leads to overcoming of vulnerability to a large-scale natural disaster etc., which has a large impact on poor, in particular, and stabilization and strengthening of life and production base, thereby contributing to sustainable economic development of the country.

JICA has provided its assistance for bridge construction, etc., to the country through about 20 projects focusing on rural bridge construction including ODA Loan “Bridges along Main Road Improvement Project” (Phase I to IV) (L/A in 1990 to 1999) and Grant Aid “The Project for Construction of Bridges along Rural Roads” (Phase I to IV) (E/N in 1988 to 1993). JICA has also provided its support for capacity enhancement of DPWH through Technical Cooperation “Project for Improvement of Quality. Management for Highway and Bridge Construction and Maintenance” (Phase I and II) (3 years from February 2007 (I) and 3 years from October 2011 (II)).

(4) Other Donor's Activity

From 2012 to date, the World Bank has assisted the improvement of bridge design standards in the Philippines, mainly improving technical design process and revising the “Technical Design Standards for Road, Bridge and Flood Control Facility, etc.” of Department of Public Works and Highways (hereinafter referred to as “DPWH”). After the establishment of the standards prepared by the World Bank (scheduled in 2015), DPWH will prepare bridge design standards combining seismic design standards already prepared in the previous study.

(5) Necessity of the Project

As noted above, this Project is consistent with the development issues of the Philippines, the development policy of the Government of the Philippines, and the assistance policy of

Japan and JICA. Therefore, it is highly necessary and relevant for JICA to support this Project.

3. Project Description

(1) Project Objective

The objective of this Project is to enhance the resilience of traffic and transport network in Metro Manila as well as capacity for maintaining urban function when a disaster occurred in a large city area by replacing and reinforcing two bridges along the main road inside Metro Manila (Guadalupe and Lambingan Bridges) to improve seismic resistance, thereby contributing to vitalization of stable and sustainable economic activities in the city.

(2) Project Site/Target Area

Metro Manila (target bridge: Guadalupe and Lambingan Bridges)

(3) Project Components

- 1) Civil works (bridge replacement and reinforcement)
- 2) Consulting services (detailed design, bidding assistance, construction supervision, safety measures support, technical transfer, environmental and social consideration, etc.)

(4) Loan Amount

11,116 million yen (of which, loan amount : 9,783 million yen)

(5) Project Implementation Schedule

August 2015 to January 2022 (78 months in total). Project completion is defined as when the civil work is completed in January 2021.

(6) Project Implementation Structure

- 1) Borrower: The Government of the Republic of the Philippines
- 2) Guarantor: none
- 3) Executing Agency: Department of Public Works and Highways (DPWH)
- 4) Operation and Maintenance System: Capital Regional Office, one of the local offices of DPWH, is in charge of the bridge maintenance after the project completion. The Office has experience in operation and maintenance of ODA Loan project in the past and JICA has provided support for manual preparation and workshop organization for the improvement of bridge maintenance and management cycle through a technical cooperation "Improvement of Quality Management for Highway and Bridge Construction & Maintenance (Phase II)" (October 2011 to September 2014).

(7) Environmental and Social Consideration/Poverty Reduction/Social Development

1) Environmental and Social Consideration

- ① Category: B
- ② Reason for Categorization: This Project is not assumed to have a significant negative impact on the environment because it does not fall under the category of large-scale projects in the road, railway and bridge sectors as specified in the JICA guidelines for environmental and social considerations" (issued in April 2010) (hereinafter, the "JICA Guidelines"). Moreover, this Project does not have

sensitive characteristics nor is located in sensitive areas as defined in the Guidelines.

- ③ Environmental Permit: The Initial Environmental Evaluation (IEE) check list of this Project is expected to be approved by the Department of Environment and Natural Resources (DENR) in September 2015
- ④ Anti-Pollution Measures: To prevent river water from being contaminated during the construction period, panel will be installed to close the flow of wastewater from the construction site to river. As for measures against air pollution, antipollution muffler in exhaust port of heavy machinery will be installed, heavy machinery equipped with device preventing exhaust gas pollution will be used, and other measures will be taken. Moreover, a noise-control-type machine will be used for destructing existing structures to reduce noise and vibration effects, and, in pile installation, measures will be taken by adopting press fit construction method, cast-in-place RC pile foundation work, or other construction method.
- ⑤ Natural Environment: Since the Project is not located in or around sensitive areas such as national parks, its adverse impact on biodiversity is assumed to be minimal.
- ⑥ Social Environment: Implementation of this Project requires land acquisition of about 268 m² and involuntary resettlement of 21 households (85 residents), the process of which will be proceeded in accordance with JICA Guidelines, the laws of the Philippines and the Resettlement Action Plan. At a consultation meeting on relocation, detailed explanation was provided by related authority in response to an inquiry made about the place to be relocated. There are no specific adverse opinions of affected residents observed against the project implementation.
- ⑦ Other/Monitoring: Executing Agency (DPWH) will implement monitoring of air quality, water quality, and noise and vibration during the construction period while local governments, etc., will monitor the status of land acquisition and resettlement and livelihood recovery.

2) Promotion of Poverty Reduction: none

3) Promotion of Social Development and Measures for Infectious Disease including HVI/AIDS: Expected flow of migrant workers into the project site during the construction period may cause to develop infectious diseases (including HIV/AIDS, etc.) in the project site. The implementing organization shall require including the provision on HIV/AIDS in the bidding document and the contractor will be contractually obliged to take HIV/AIDS prevention measures for construction workers.

(8) Collaboration with Other Donors

The World Bank has provided its assistance for the improvement of bridge design standards in the Philippines since 2012, mainly improving the technical design process and revising DPWH's "Design Guidelines, Criteria and Standards" (DGCS). Upon the

completion of the standards prepared by the World Bank (scheduled to be in 2015), DPWH will combine it with the seismic design standards prepared in the previous study to establish bridge design standards. To implement capacity development (enhancement of capacity to address issues in developing countries) towards the institutionalization of the seismic design standards, the progress of the revised DGCS as noted above will be followed in this Project.

(9) Other Important Issues:

- 1) Utilization of Japanese technology: Two bridges (Guadalupe and Lambingan Bridges) targeted in this Project are located along the main road in Metro Manila and it is necessary to minimize the traffic restriction of existing roads associated with the main construction works. Thus, neighboring construction, rapid construction and other Japanese technologies may be utilized. Given such circumstances, training of DPWH engineers for introducing the above technologies will be carried out by construction supervision consultants to facilitate utilization of the technologies. In seismic reinforcement of the two bridges, this Project deems to be a model project utilizing bridge fall preventing system, seismic reinforcement of foundation, and other Japanese experience of bridge construction works.
- 2) Collaboration with other JICA project: After revised bridge seismic design standards (draft) proposed in the previous study was institutionalized, capacity enhancement for its smooth operation is to be supported through technical assistance project related to ODA Loan.

4. Targeted Outcomes

(1) Quantitative effect

(1) Outcome (Operation and Effect Indicator)

| Indicator | Baseline (Actual Value in 2015) | Target (2023 [2 years after project completion]) |
|--|------------------------------------|--|
| Seismic design standards of each bridge | None (Note) | Once in 1000 years |

(Note 1) No relevant information of those infrastructures constructed in the 1960s to 1970s was available in the previous study and the preparatory survey of the Project.

(Note 2) To confirm utilization ratio of each bridge, annual average daily traffic volume (vehicle/day) shall also be utilized in ex-post evaluation. The result in 2015 is 220,466 vehicle/day for Guadalupe Bridge while 30,255 vehicle/day for Lambingan Bridge (“Preparatory Survey for Metro Manila Priority Bridges. Seismic Improvement Project Report” (February 2015)).

(2) Qualitative effect

- Strengthening disaster resilience of traffic network where bridges in Metro Manila (Guadalupe and Lambingan Bridges) are located.

- Enhancement of capacity for maintaining urban function during a disaster occurred in a large city, vitalization of economic activities.

(3) Internal Rate of Return

Based on the conditions indicated below, the economic internal rate of return (EIRR) of the Project is 23.7%. The Project is to replace or reinforce existing bridges which is a part of free-access road without fees. Hence, the financial internal rate of return (FIRR) is not calculated as there is no income.

[EIRR]

Cost: Project cost (construction fee and maintenance fee)

Benefit: Cost saving of vehicle operation compared to the case where bridge became not accessible, time saving, and reduction of restoration expenses at the time of disaster

Project life: 50 years

5. External Factors and Risk Control

None

6. Lessons Learned from Findings of Similar Projects Undertaken in the Past

(1) Findings of Similar Projects

In “Rehabilitation and Maintenance of Bridges Along Arterial Roads Project (I)” (L/A in February 1990), the completion of construction work was significantly delayed due to repair works of those bridges under construction caused by typhoon, flood and other natural disaster. Recommendation is made in ex-post evaluation of the project to determine the relevance of the construction period from the perspective of minimizing impact of natural disaster on the project implementation taking rainy and dry seasons into consideration.

In addition, other project in the transportation sector applying Special Terms for Economic Partnership (STEP) proposing rapid construction, etc. to reduce traffic congestions, etc. suggests that thorough quality management is necessary as a problem in quality management (insufficient strength) was observed at the construction stage.

(2) Utilization of Lessons Learned to the Project

Based on the findings above, together with planning the construction schedule taking into consideration rainy and dry seasons, quality management at the construction stage should ensure: a) strict check of implementation structure including joint venture (JV) and track records of companies at the bidding stage; and b) reporting to JICA from contractors and consultants at the construction supervision stage as well as early consultation and response system when a problem occurs.

7. Plan for Future Evaluation

(1) Indicators for Future Evaluation

- 1) Seismic design standards of each bridge
- 2) Economic internal rate of return (EIRR)
- (2) Timing of Next Evaluation: 2 years after project completion