

Ex-Ante Evaluation (for Japanese ODA Loan)

**Central America and the Caribbean Division,
Latin America and the Caribbean Department,
Japan International Cooperation Agency**

1. Name of the Project

- (1) Country: The Republic of Panama
- (2) Project site / Target area: Western side of the Panama metropolitan area
- (3) Project: Panama Metropolitan Area Urban Transportation Line-3 Development Project (II)

Loan Agreement: March 16, 2023

2. Background and Necessity of the Project

(1) Current State and Issues of the Urban Transportation Sector in Panama

In the capital of the Republic of Panama (Panama), the metropolitan area's population was estimated to be around 1.9 million people in 2017 (according to the Metro de Panama, S.A.'s "Metro Panama New Master Plan") (the actual measurement in 2010 was 1.7 million people (Panama population census)), so over 40% of Panama's total population is concentrated there. The urban transportation system in the metropolitan area is underdeveloped, and the current main means of public transportation, city buses or inter-city buses, do not adequately meet the urban transportation needs. Furthermore, residential areas are expanding to the outskirts of the metropolitan area due to the soaring price of land in the center and, along with an increase in car ownership propelled by high economic growth, this is causing serious traffic congestion during the peak morning and evening hours in the areas between the center of the metropolitan area and the residential zones on the edges, and leading to a paralysis of urban functions.

The Gulf of Panama is situated on the south side of the metropolitan area, and the northern, western, and eastern parts are expanding with economic development. To the east of the Panama Canal, the Urban Transportation Line-1 connecting south to north opened in 2014, and the Urban Transportation Line-2 connecting east to west opened in 2019, in response to the growing transport demands that accompanied increased economic development. On the other hand, as you had to cross over the Panama Canal to go to the center of the city from the western part, this area lagged behind in development, but about 27% of the total population of the metropolitan area lived in this western part as of 2017,

and this population is increasing rapidly due to further recent housing developments. Especially as there is only one road with two lanes going each way from the western side of the Panama Canal eastwards to the center of the city, not only does this cause serious traffic congestion during the morning and evening peak times, centered around the Bridge of the Americas that crosses the canal, but the carbon dioxide emissions from the private cars and buses also causes air pollution, so there is a need for the introduction of an alternative and efficient mass transit public transportation system.

Under these circumstances, in January 2016, the Government of Panama and the Government of Japan regarding the implementation of the Panama Metropolitan Area Urban Transportation Line-3 Development Project (hereinafter referred to as “the Project”) agreed on the importance of introducing a monorail system that utilizes high quality Japanese technology, and has a commercial track record of being a thoroughly safe and reliable urban transportation system.

The Project aims to alleviate traffic congestion and improve transport functions, as well as mitigate air pollution by reducing carbon dioxide emissions, through the development of the Urban Transportation Line-3 (approximately 26 km) that will connect the western side of Panama’s metropolitan area to the central part, and in the “2019-2024 Strategic Government Plan for Panama” (a national strategic plan for economic and social development formulated by the government every five years, with five designated pillars of development), the implementation of the Project is mentioned prominently, so it is positioned as a high priority project.

(2) Japan and JICA’s Policies and Operations in the Urban Transportation in Panama

Japan’s Country Assistance Policy for the Republic of Panama (September 2018) designates “support for sustainable socio-economic development” as a priority area, and the Project is consistent with the policy as it will contribute to the development of eco-friendly economic infrastructure, with the aim of alleviating traffic congestion and air pollution through the development of the Urban Transportation Line-3.

The Project aims to alleviate traffic congestion and reduce carbon dioxide emissions in the Panama metropolitan area through the development of the Urban Transportation Line-3, and therefore contribute to sustainable economic development in the country. This will contribute to Goal 9 (Industry, innovation and infrastructure), Goal 11 (Sustainable cities and communities), and Goal 13

(Climate action), and is consistent with JICA's Global Agenda policies on "2 Transportation" and "16 Climate change."

(3) Other Donors' Activity

The Corporación Andina de Fomento provided financing for the development of the Urban Transportation Line-1, and the Inter-American Development Bank provided technical support for the feasibility study of the Urban Transportation Line-2 and the capacity development of the Metro de Panama, S.A..

3. Project Description

(1) Project Outline

① Project Objective

The objective of the Project is to contribute to the improvement of urban mobility and the reduction of emission of greenhouse gases, through the construction of the Urban Transportation Line-3 which connects the downtown and the western side of the Panama Metropolitan Area, introducing high-quality monorail vehicles and its system, which have sufficient robustness and reliable track record of commercial operations as an urban transportation system, thereby contributing to sustainable economic development of Panama.

② Project Components

- a) Procurement of a monorail system for the Urban Transportation Line-3
- b) Engineering and construction work for the Underground Section (approximately 5 km for the part between Albrook and Panama Pacifico), elevated structures (approximately 20 km between Panama Pacifico and Ciudad del Futuro) and station buildings, etc. for the Urban Transportation Line-3.
- c) Consulting services (for ODA Loan Projects) (the Underground Section, which includes the Tunnel Section and Balboa Station)
Basic design review, detailed design review, implementation supervision, etc.
- d) Consulting services (Special Assistance for Project Implementations) (excluding the Underground Section, which includes the Tunnel Section and Balboa Station from the Original Scope, which is expected before the scope change of the Panama Canal Crossing method)
Basic design, detailed design review, support for preparation of tender documents, support for procurement support, implementation supervision,

etc.

③ Project Beneficiaries (Target Group)

• Direct beneficiaries (customers using Line-3): Approximately 180,000 people

(estimated number of passengers getting on and off the train per day in 2030)

• Ultimate beneficiaries (local residents and overseas visitors that benefit from the alleviation of traffic congestion owing to the development of Line-3):

Over 650,000 people (predicted population of the western part in 2030, and overseas visitors)

(2) Total Project Cost: Total project cost 596,080 million yen (Loan Amount of Phase (II): 92,000 million yen)

(3) Project Implementation Schedule (Cooperation Period)

Scheduled from April 2016 to December 2029 (164 months in total). The Project completion is defined as when commercial operation in Albrook - Ciudad del Futuro, including the Underground Section, is commenced (scheduled for the second half of 2026).

(4) Project Implementation Structure

1) Borrower: The Republic of Panama

2) Executing Agency: Metro de Panama, S.A. (MPSA)

4) Operation and Maintenance Agency: Metro de Panama, S.A.

(5) Collaboration and Sharing of Roles with Other Projects and Donors

1) Japan's Assistance Activities: The technical cooperation project "Metropolitan area transportation oriented development plan implementation project" has been adopted as planned formulated support for transportation oriented development (TOD) along the route of Urban Transportation Line-3. Further development is expected in the western part of the metropolitan area from the Project, and this technical cooperation project will support development along the line while keeping in mind connectivity to the Project, as well as reflecting the demand forecast in the project plan based on this.

2) Other Donors' Assistance Activities: None in particular

(6) Environmental and Social Consideration

1) Environmental and Social Consideration

- ① Category: B
- ② Reason for Categorization: The Project does not qualify as a large-scale one as listed in the railway sector of the JICA Guidelines for Environmental and Social Considerations (published in April 2010), its undesirable impact on the environment is judged to be minimal, and it does not fall into any sensitive characteristics or sensitive areas categories according to the JICA Guidelines.
- ③ Environmental Permit: The Environmental Impact Assessment (EIA) report for the Project was prepared by Metro de Panama, S.A. in the preparatory survey for cooperation, and was approved by the Ministry of the Environment in January 2016. The EIA report for the Underground Section was approved by the Ministry of the Environment in August 2022. In addition, 7 EIA reports have been produced as the project has progressed, and 5 of these have been approved by the Ministry of the Environment, while 2 (reports on a part of a stationary area of the Underground Section and small-scale changes to a section along the line) are awaiting approval from the Ministry of the Environment.
- ④ Anti-Pollution Measures: Air quality is expected to be affected during construction by an increase in exhaust fumes and dust particles, but the impact will be limited by covering trucks transporting materials with dust-proof cloth, and spraying the access roads with water sprinklers. Countermeasures will also be taken for noise and vibrations, such as placing restrictions on working at night during the construction, informing residents in advance, and installing sound barriers. When it's in service, it is expected to conform with domestic standards due to the installation of sound barriers and regular maintenance of the railway vehicles.
- ⑤ Natural Environment: The Project will construct elevated structures alongside existing roads and will not pass through nature reserves, etc. About 77 ha of vegetation is expected to be lost as a consequence of the acquisition of the right of way (ROW), and species defined as vulnerable (VU) by the IUCN have been confirmed to be in the Project's target area, but it does not include any primary forests or essential habitats for these creatures. Mitigation measures such as afforestation to replace lost forest areas, transplantation of vegetation, and wildlife conservation measures will be carried out during the construction period.
- ⑥ Social Environment: The Project is expected to involve the acquisition

of around 45.74 ha of land, the economic relocation of 183 people from 40 households and 85 shops, and access to shops located near the route of Urban Transportation Line-3 is expected to be blocked by the construction work. Procedures for relocation and compensation are expected to be carried out based on a simplified resettlement action plan (MINI RAP) that is created in accordance with the JICA Guidelines. Furthermore, no particular objections were expressed regarding the Project. Resident relocation procedures are scheduled to be completed by around June 2025.

⑦ Other/Monitoring: In the Project, the executing agency will play a central role in monitoring the air, noise and vibrations during the construction work, and noise and vibrations when it's in service, as well as monitoring the state of progress of the land acquisition and resident relocation. If items of cultural heritage are discovered at the construction site, construction will be suspended, an investigation will be carried out, a report will be made to the Agency for Cultural Affairs, and it will be dealt with appropriately.

(7) Cross-Cutting Issues

① Climate Change Countermeasures: The Project will contribute to the promotion of a modal shift, and as it's thought that this will play a part in reducing greenhouse gases (GHG), it will contribute to climate change countermeasures (mitigation measures). The climate change mitigation effects of the Project (rough estimate of the reduction in the emission of GHG) will be approximately equivalent to 17,804 tons of CO₂ per year (estimate for 2030).

② Disability Considerations: The Project will endeavor to make the facilities barrier free (with the installation of elevators, establishment of priority boarding for wheelchairs, installation of safety belts to secure wheelchairs, etc.) in accordance with the country's domestic laws.

③ Infectious Diseases Countermeasures: It has been confirmed that preventative awareness campaigns and countermeasures against infectious diseases like COVID-19 and HIV/AIDS will be carried out in accordance with the country's domestic laws and guidance.

(8) Gender Category: GI (Gender mainstreaming needs investigation and analysis item)

<Activities/Reason for Categorization> As female drivers are operating on

the already running Line-1 and Line-2, and no gender imbalance has been seen in the passengers of those lines, at this present stage no particular issues from a gender perspective have been identified, but as there may be potential needs regarding Line-3, a survey has been scheduled to be carried out as part of the Special Assistance for Project Implementations.

(9) Other Important Issues

A Japanese company's monorail system will be used in the Project, as it was judged to be the most suitable from the results of an investigation into what system to introduce in the cooperation preparatory survey.

4. Targeted Outcomes

(1) Quantitative Effect

1) Outcomes (Operation and Effect Indicator)

Indicator	Baseline (2015 results)	Target (2028) [2 years after completion of the project]
Volume of passenger transportation (thousand people/day)	-	160
Running distance (km/day)	-	9,803
Average frequency of trains during peak times (6-car train/peak time)	-	18
Train operating rate (%)	-	90
Travel time (mins) Between Albrook and Ciudad del Futuro	104 (By bus/private car)	40
CO ₂ emissions reduction(t/year)	-	17,804 (2030)

(2) Qualitative Effects: Enhancement of urban mobility and resulting improvements in the living environment and functions of the city

(3) Internal Rate of Return

Based on the assumptions below, the economic internal rate of return (EIRR) of the Project will be 5.3%, and the financial internal rate of return (FIRR) will be negative.

【EIRR】

Costs: Project costs (excluding taxes), operation and maintenance costs

Benefits: Reduced travel costs, shorter travel times, reduction of CO₂ emissions

Project Life: 30 years

【FIRR】

Costs: Project costs, operation and maintenance costs

Benefits: Fare revenue

Project Life: 30 years

5. External Factors and Risk Control

- (1) Prerequisites
None in particular
- (2) External Factors
Deterioration of political and economic conditions or natural disasters in Panama or the surrounding areas of the Project

6. Lessons Learned from Past Projects

The result of the ex-post evaluation of the Chongqing Urban Railway Construction Project in China (evaluation in FY2009) suggested that a project plan should be developed based on potential passenger traffic estimate from a detailed analysis and examination of possible development of the transport network and its surrounding residential areas during the period between the start and end of the project.

Based on this lesson, the preparatory survey of the Project formulated a development plan for the Line-3 based on the demand forecast derived from an analysis of the existing urban transportation network, the new urban transportation development plan, and the development plans for areas along the railway network. In addition, the Consultant for Special Assistance for Project Implementations examined coordination with the development of residential and other areas along the transportation network and connections with feeder buses when confirming individual plans.

7. Evaluation Results

The Project is consistent with Panama's development issues and development policies as well as Japan's and JICA's cooperation policies and analyses. The development of Urban Transportation Line-3 will contribute to the country's sustainable economic growth by improving urban transportation functions and reducing carbon dioxide emissions, and as it is also considered to contribute to Goal 9 (Industry, innovation and infrastructure), Goal 11 (Sustainable cities and communities), and Goal 13 (Climate action) of the SDGs. Therefore, it is highly necessary to support the implementation of the project.

8. Plan for Future Evaluation

- (1) Indicators to be used:

As shown in Section 4

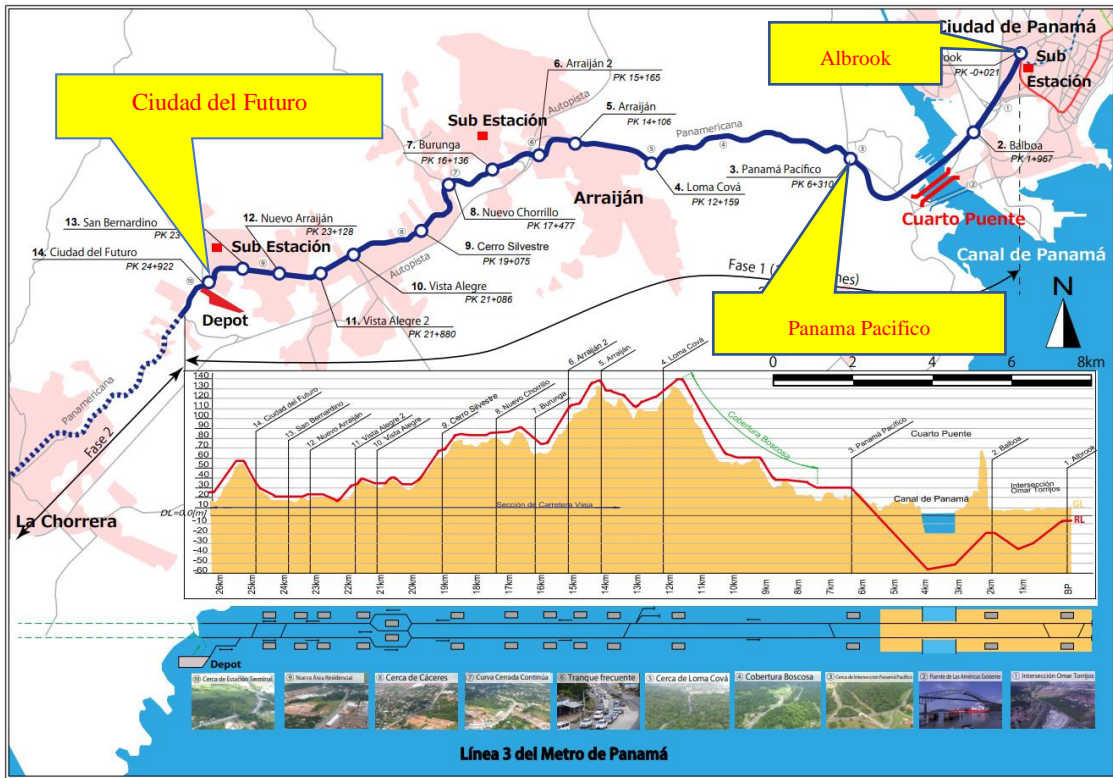
(2) Timing:

Ex-poste evaluation

Two years after the completion of the project

END

Attached document: Panama Metropolitan Area Urban Transportation Line-3 map



Attachment: Panama Metropolitan Area Urban Transportation Line-3 map