FY2023 Simplified Ex-Post Evaluation Report of Japanese Grant Aid Project

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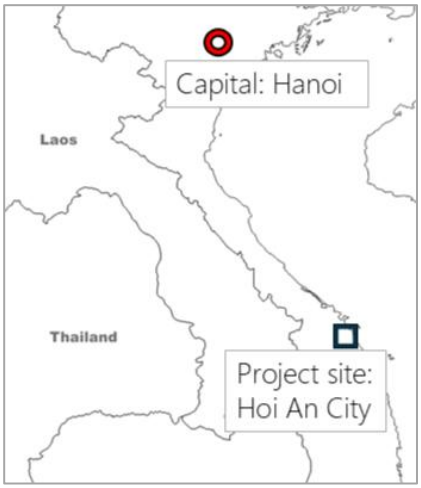
Duration of the Study: November 2023–January 2025

Duration of the Field Study: March 24, 2024–April 6, 2024

Country Name	**The Project for Water Quality Improvement for Japanese Bridge Area in Hoi An City**
Socialist Republic of Vietnam	



Location of the project site (Source: d-maps.com)

The sewage treatment plant constructed under this project (Source : photographed by the evaluator)

I. Project Outline

Background	Amid Vietnam's rapid economic growth and urbanization, the development of sewage treatment facilities has not kept pace. As a result, an increasing volume of household and commercial wastewater has been discharged untreated into rivers in urban areas, leading to deteriorating living conditions. The canal flowing directly under the Japanese Bridge (hereinafter referred to as “Japanese Bridge Canal”) —a symbol of Hoi An that is a UNESCO World Heritage Site registered as “Old Town Hoi An” and visited by 1.4 million people annually — has also been plagued by pollution from untreated wastewater. With the quality of water significantly below national standards, the canal not only tarnishes the scenery but also emits foul odors. Consequently, there are growing concerns about the potential negative impact on tourism, the city’s main industry.			
Objectives of the Project	To improve the quality of water around the Japanese Bridge in Hoi An City by constructing a sewage treatment plant and rehabilitating the canal, thereby contributing to enhancing the city's living and sanitary conditions as well as its appeal as a tourist destination.			
Contents of the Project	1. Project site: Hoi An City, Quang Nam Province, Socialist Republic of Vietnam 2. Japanese side: [Facility] Sewage treatment plant (STP). Treatment capacity: 2,000 m^3/day. Administration building (floor area: 284 m^2). Rehabilitation of the Japanese Bridge Canal: approximately 1.7 km. [Equipment supply] A canopy truck (for removing sewage sludge). [Consulting services] Detailed design, procurement supervision. [Soft component] Guidance on the operation and maintenance of the STP and the maintenance of the Japanese Bridge Canal. Support for the financial planning of sewerage operations. 3. Vietnamese side: Development of a wastewater collection system in the downstream area of the STP.			
Implementation Schedule	E/N Date	July 4, 2015		
	G/A Date	December 21, 2015	Completion Date	November 2, 2018 (Start date of service)[1]
Project Cost	E/N Grant Limit / G/A Grant Limit: : 1,100 million yen, Actual Grant Amount: 1,100 million yen			
Executing Agency	Quang Nam Provincial People’s Committee / Hoi An City People’s Committee			
Contracted Agencies	Main Contractor(s): METAWATER Co., Ltd. / Tsukishima Kikai Co., Ltd. (JV) Main Consultant(s): Nihon Suido Consultants Co., Ltd. Agent: None			

II. Result of the Evaluation

Summary

[1] The soft component was completed in May 2019. Because there was no clear definition of project completion in the ex-ante evaluation document, it was determined that the project was completed upon the start of its service, following JICA’s references for external ex-post evaluations.

This project aimed to improve the quality of water around the Japanese Bridge in Hoi An City by constructing a sewage treatment plant and rehabilitating the canal, thereby contributing to enhancing the city's living and sanitary conditions as well as its appeal as a tourist destination. The project objectives were aligned with Vietnam's development policy, development needs, and Japan's ODA policy at the time of the ex-ante evaluation. There was no collaboration planned or implemented with other JICA projects. However, in terms of collaboration with other development partners, complementarity was recognized in the collaboration with the French Development Agency (Agence Française de Développement: AFD) by avoiding any overlaps in the project target areas. On the other hand, no results of the plan to temporarily treat wastewater from the AFD project area by this project's sewage treatment plant can be observed. This is because the AFD sewage treatment facility had been completed earlier than expected, and thus no wastewater subsequently flowed into this project's treatment plant. Based on the above, the project's relevance and coherence are high. The implementation of the project has successfully met the targets for the population served by the sewage treatment plant and the treated water volume established during the ex-ante evaluation. This, in turn, has contributed to maintaining and increasing Hoi An's sewage collection and treatment rates. Additionally, there has been a significant improvement in the quality of discharged water, which has helped address odor problems in the areas around the canal, thereby enhancing living and sanitary conditions for local residents and restoring the city's appeal as a tourist destination. As a result, the project's effectiveness and impact are high. Although the project cost remained within the budget, the project period exceeded the original plan. This delay, however, was not significant enough to negatively impact the project, and thus efficiency is high. Regarding sustainability, while there are no issues observed with the policy and system, institutional/organizational aspects, or environmental and social factors, there are challenges related to technical issues, financial aspects, risk prevention measures, and the current status of operation and maintenance. Consequently, the sustainability of the project's outcomes is moderately low.

In light of the above, this project is evaluated to be satisfactory.

Overall Rating[2]	**B**	**Relevance & Coherence**	**③**[3]	**Effectiveness & Impacts**	**③**	**Efficiency**	**③**	**Sustainability**	**②**

<Special Perspectives Considered in the Ex-Post Evaluation / Constraints of the Ex-post Evaluation>

The target figures established at the time of the ex-ante evaluation considered not only the population of the new residential area (this project's target housing area for wastewater collection) but also the population and wastewater treatment volume from the on-going AFD sewage project area in Hoi An, which was expected to discharge some wastewater into the Japanese Bridge Canal in 2020. Therefore, the validity of these figures relies on the extent to which the plan to treat some wastewater from the AFD project area using this project's sewage treatment plant has been realized. This evaluation takes into account that, in reality, wastewater discharge from the AFD project area into the Japanese Bridge Canal has not occurred, except in a few isolated instances.

1 Relevance/Coherence

<Relevance>

・Consistency with the Development Policy of Vietnam at the Time of Ex-Ante Evaluation

The Prime Minister's decision on the *Sewerage Development Policy for Urban Areas and Industrial Parks by 2025 and the Vision towards 2050* (Decision No. 1930/2009/QD-TTg), which was approved in November 2009, identified the improvement of sewer systems in urban areas and the enhancement of wastewater collection and treatment rates as key objectives for promoting improved environmental and sanitary conditions. Specifically, the *Hoi An City Urban Development Master Plan* (formulated in 2011 and revised in 2013) prioritized the advancement of sewerage development projects. Because the development of a wastewater treatment plant and the canal under this project contributed to improving the quality of water and the living and sanitary conditions around the Japanese Bridge area of Hoi An City, it was well-aligned with Vietnam's development policy at the time of the ex-ante evaluation.

・Consistency with the Development Needs of Vietnam at the Time of Ex-Ante Evaluation

At the time of the ex-ante evaluation in 2015, ongoing housing development in the upstream area of the Japanese Bridge Canal flowing directly beneath the Japanese Bridge in Hoi An City, coupled with the immediate discharge of untreated domestic wastewater into the canal, made the development of a sewage system an urgent priority. In particular, water quality in the area surrounding the Japanese Bridge Canal was significantly below national standards, leading to deteriorating living and sanitary conditions, along with issues of unpleasant scenery and foul odors. These factors raised concerns about potential negative impacts on tourism, the city's main industry. Therefore, this project was consistent with Vietnam's development needs at the time of the ex-ante evaluation.

<Coherence>

・Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation

In the *Country Assistance Policy for the Socialist Republic of Vietnam* (December 2012), the Japanese Government identified "addressing vulnerability" as a priority area and expressed its commitment to supporting efforts to tackle environmental problems exacerbated by rapid urbanization and industrialization. Additionally, the *JICA Country Analysis Paper* (2014) recognized urban challenges stemming from rapid economic development and industrial clustering as a key challenge. Therefore, this project was consistent with Japan's ODA policy at the time of the ex-ante evaluation.

・Internal Coherence

At the time of the ex-ante evaluation, no specific collaborations with other JICA projects were planned, and none were implemented afterward.

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ④ : Very High, ③: High, ②: Moderately low, ①: Low

・External Coherence

Although the AFD was implementing a sewerage project in Hoi An City at the time of the ex-ante evaluation, there was no overlap between the two projects. Both this project and the AFD project were planned in accordance with the *Hoi An City Wastewater Treatment Plan* (2013) developed by the Division of Natural Resources and Environment (DONRE) of Hoi An City. Consequently, it is recognized that the two projects are mutually complementary. Initially, this project anticipated that its sewage treatment plant would be completed before the AFD project facility, and accordingly, it planned the capacity of its sewage treatment plant with the assumption that some wastewater from the AFD project area would flow into the Japanese Bridge Canal for a certain period of time. However, in reality, the AFD project was completed first (with a trial operation in June 2016 and full operation in September 2016). Following the completion of the AFD project, there has been little significant discharge of wastewater from the AFD project area into the Japanese Bridge Canal, except for a few isolated instances. As a result, the expected collaboration at the time of the ex-ante evaluation did not materialize. This discrepancy likely stems from the limited coordination with the AFD project, which was confined to indirect communication at the document level. However, this has not led to any obstacles in the development of sewage systems in Hoi An City.

<Evaluation Result>

In light of the above, the relevance and coherence of the project are high[4].

2 Effectiveness/Impacts[5]

<Effectiveness>

(Quantitative Effects)

In this project, the population served by the sewage treatment plant, the treated water volume, and the discharge BOD concentration were established as indicators of quantitative effects. At the time of the ex-post evaluation, ammonia nitrogen content was also included as an additional indicator for water quality[6].

As mentioned above, it was assumed at the time the ex-ante evaluation that some wastewater would flow into the Japanese Bridge Canal from the AFD project area. Therefore, the target figures for the population served by the sewage treatment plant and the treated water volume factored in a portion of the population and wastewater volume of the AFD project area (see Table 1). In reality, however, there has been little significant discharge of wastewater flowing from the AFD project area into the Japanese Bridge Canal, except in a few isolated instances. Taking this into account, the target figures have been revised by excluding the population and treated water volume related to the AFD project area from those set at the time of the ex-ante evaluation, thereby focusing solely on the population and treated water volume associated with this project (the bold numbers in Table 1 represent the revised target figures, while the underlined numbers, rounded to the nearest ten, indicate the target figures established at the time of the ex-ante evaluation, resulting in the population of 11,700 and the treated water volume of 1,900 m^3/day).

Table 1. Revised Target Figures for the Population Served by the Sewage Treatment Plant and the Treated Water Volume

Indicator	Area	2015	2020	2025	2030
Population served by STP (person)	The project	573	**4,870**	5,635	6,929
	AFD	7,854	6,855	4,938	1,689
	Total	8,427	<u>11,725</u>	10,573	8,618
Treated water volume (m^3/day)	The project	93	**790**	914	1,124
	AFD	1,274	1,112	801	274
	Total	1,367	<u>1,902</u>	1,715	1,398

Source: Appendices to Preparatory Survey Final Report (pp. A6-28)

Because the Public Works Joint Stock Company (PWC), responsible for the operation and maintenance of the sewage treatment plant, had not collected data on the population served by the STP, some estimates were made based on the treated water volume and other available data using the following method across two scenarios.

[Scenario 1: It is assumed that the treated water volume per capita remained constant and that a decline in treated water volume between 2020 and 2022 was caused by a decrease in the population served by the sewage treatment plant.]

As shown in Table 1, the calculation of the planned treated water volume at the time of the ex-ante evaluation presupposes a constant relationship between the population served by the STP and the treated water volume for all years and areas. Specifically, the following relationship always holds: Treated water volume ÷ Population served by the STP = 0.16222 m^3/day. In Scenario 1, therefore, it is assumed that the treated water volume per capita had remained unchanged from the time of the project completion through the ex-post evaluation and that a decrease in treated water volume from 2020 to 2022 had been caused solely by a decrease in the population served by the STP. Accordingly, the estimated population served by the STP was calculated as "Treated water volume ÷ Treated water volume per capita (i.e., 0.16222 m^3/day)" (the underlined numbers in Table 2 indicate the estimated population served by the STP under Scenario 1).

[Scenario 2: It is assumed that a decline in the treated water volume from 2020 to 2022 was due to a decrease in the treated water volume per

[4] Relevance is rated as ③, and Coherence is rated as ②.

[5] When providing the sub-rating, Effectiveness and Impacts are to be considered together.

[6] In addition to the BOD concentration of the discharged water, the BOD concentration and ammonia nitrogen content measured around the Japanese Bridge were also added as indicators of quantitative effects. However, no water quality measurements were taken in the Japanese Bridge area, and thus no relevant data could be obtained.

capita.]

On the contrary to Scenario 1's assumption that the population served by the STP decreased, however, the population in the project area had increased at an annual rate of approximately 0.79% from 2018 to 2022 (according to the *Hoi An City Statistical Yearbook 2022*). Furthermore, according to officials from the sewage treatment plant (STP), the sewage connection rate in the project area had not changed significantly and remained around 30%. In the meanwhile, it is quite possible that the treated water volume per capita had decreased due to the impact of a lockdown caused by the spread of the COVID-19 pandemic. Therefore, in Scenario 2, it is assumed that a decrease in the treated water volume from 2020 to 2022 was caused by a drop in the treated water volume per capita and that the population served by the STP was determined mainly by the population in the project area and the sewerage connection rate. Accordingly, the estimated population served the STP was calculated as "Population served by the STP in the previous year + (Population served by the STP in the previous year x Target area's population growth rate (≒0.0079))" = "Population served by the STP in the previous year x (1 + Target area's population growth rate (≒0.0079))" = "Population served by the STP in the previous year x 1.0079" (the bold numbers in Table 2 indicate the estimated population served by the STP under Scenario 2).

The estimated population served by the STP for 2023 converges to almost the same value regardless of which scenario is used for estimation. Therefore, it is likely that the actual population served by the STP between 2020 and 2022 trended closer to the figures in Scenario 2 and that a decrease in the treated water volume per capita during COVID-19 has returned to a normal level once the pandemic subsided[7].

Table 2. Quantitative Effects of The Project

Indicator	Baseline 2014 Baseline Year	Target 2020 3 Years after Completion	Target 2020 after resetting 3 Years after Completion	Actual 2018 Completion Year	Actual 2019 1 Year after Completion	Actual 2020 2 Years after Completion	Actual 2021 3 Years after Completion	Actual 2022 4 Years after Completion	Actual 2023 5 Years after Completion	Actual 2024 6 Years after Completion
Population served by STP (person)	0	11,700	4,870	8,026****	8,679	6,497 **8,748*****	3,939 **8,818**	3,754 **8,888**	9,062	9,789
Treated water volume (m3/day)*	0	1,900	790	1,302	1,408	1,054	639	609	1,470	1,588
Discharge BOD concentration (mg/L)**	--	30	n/a	--	15.6	--	19.2	23.0	27.5	--
Ammonia nitrogen content (mg/L)***	--	--	n/a	--	8.5	--	5.1	7.1	3.5	--

Source: Data provided by the O&M organization

Note: *The actual value of treated water volume is a simple average of the monthly actual values. However, for 2018, it is the average of November to December, and for 2024, it is the average of January to March.

**The actual value of BOD concentration is a simple average of the quarterly actual values. However, for 2019, it is the average of the 3rd and 4th quarters, and for 2021, it is the average of the 2nd to 4th quarters. The survey location is the STP site. The national standard value is 50 mg/L. The average BOD concentration at the planned STP construction site during the ex-ante evaluation (2012) was 220 mg/L.

***The actual value of ammonia nitrogen content is a simple average of the quarterly actual values. However, for 2019, it is the average of the 3rd and 4th quarters, and for 2021, it is the average of the 2nd to 4th quarters. The survey location is STP. The national standard value is 10 mg/L.

****Underlined numbers are estimates based on Scenario 1.

*****Numbers in bold are estimates based on Scenario 2.

Based on the above estimates, it is supposed that the population served by the STP in the project target area has exceeded the target figures in every year from 2018 to 2024. Moreover, the actual treated water volume has also significantly surpassed the target figures, except for the years 2021 and 2022, when there was a reduction in wastewater discharge from restaurants, hotels, etc., because of the COVID-19 pandemic. Consequently, it is recognized that this project has contributed to maintaining and increasing Hoi An's sewage collection and treatment rates[8]. Moreover, because the actual figures for the discharge BOD concentration and ammonia nitrogen content were well above the targets and the national water quality standards (i.e., discharge BOD concentration: 50 mg/L, ammonia nitrogen content: 10 mg/L[9]) in every year for which data was available, this project is likely to have made a significant contribution to improving the quality of water in the canal[10].

[7] The estimated value for 2023 under Scenario 2 is 8,888 × 1.0079 = 8,958, resulting in a difference of about 1% compared to the estimate of 9,062 under Scenario 1. In Scenario 1, it is assumed that a decrease in the treated water volume was caused by a reduction in the population served by the STP (with the treated water volume per capita remaining constant), whereas in Scenario 2, a decrease in the treated water volume is attributed to a drop in the treated water amount per capita (with the population served by the STP increasing in proportion to population growth). The fact that both scenarios converge to nearly the same value in 2023 suggests that the actual population served by the STP increased in proportion to population growth up to 2023, while the treated water volume per capita, which had been sluggish from 2020 to 2022, has recovered to the initial value of 0.162 m³/day in 2023. However, because population data for the project area was available only up to 2022, the estimate of the 2023 population served by the STP was based on an extrapolation of the population growth rate up to 2022. This is why the estimates of the population served by the STP from 2023 onwards under Scenario 2 are not reported in the table.

[8] Proportion of the population living in a condition where wastewater is sanitarily treated by sewage treatment plants and other similar systems.

[9] Based on the National Technical Regulation on Domestic Wastewater of Vietnam (QCVN 14:2008/BTNMT).

[10] However, data on water quality around the Japanese Bridge, an additional indicator, was not collected because the area around the Japanese Bridge is not part of the area

(Qualitative Effects)

As an indicator of qualitative effects related to effectiveness, the improvement of living conditions was established.

In addition to the construction of the sewage treatment plant, the canal was rehabilitated with a reinforced concrete structure, covered, and converted into a culvert[11]. As a result, the odor problem in the area surrounding the canal has been improved, and the canal no longer overflows during heavy rains. It is thus recognized that this project has contributed to improving the living and sanitary conditions of residents in the surrounding areas.

However, in the Japanese Bridge area, untreated wastewater from outside the project's target area flows into the reservoir (retention basin) located between the sewage treatment plant and the Japanese Bridge (see Figure 1). Furthermore, because dredging of the reservoir has not been conducted in a timely manner, overflow occurs during the rainy season, partially offsetting the effects of the project. Although the problem has improved, it remains an issue particularly in the area around the Japanese Bridge. If untreated wastewater had not been discharged, this project would have contributed more significantly to improving the quality of water around the Japanese Bridge, enhancing the living and sanitary conditions in Hoi An City as well as its appeal as a tourist destination.

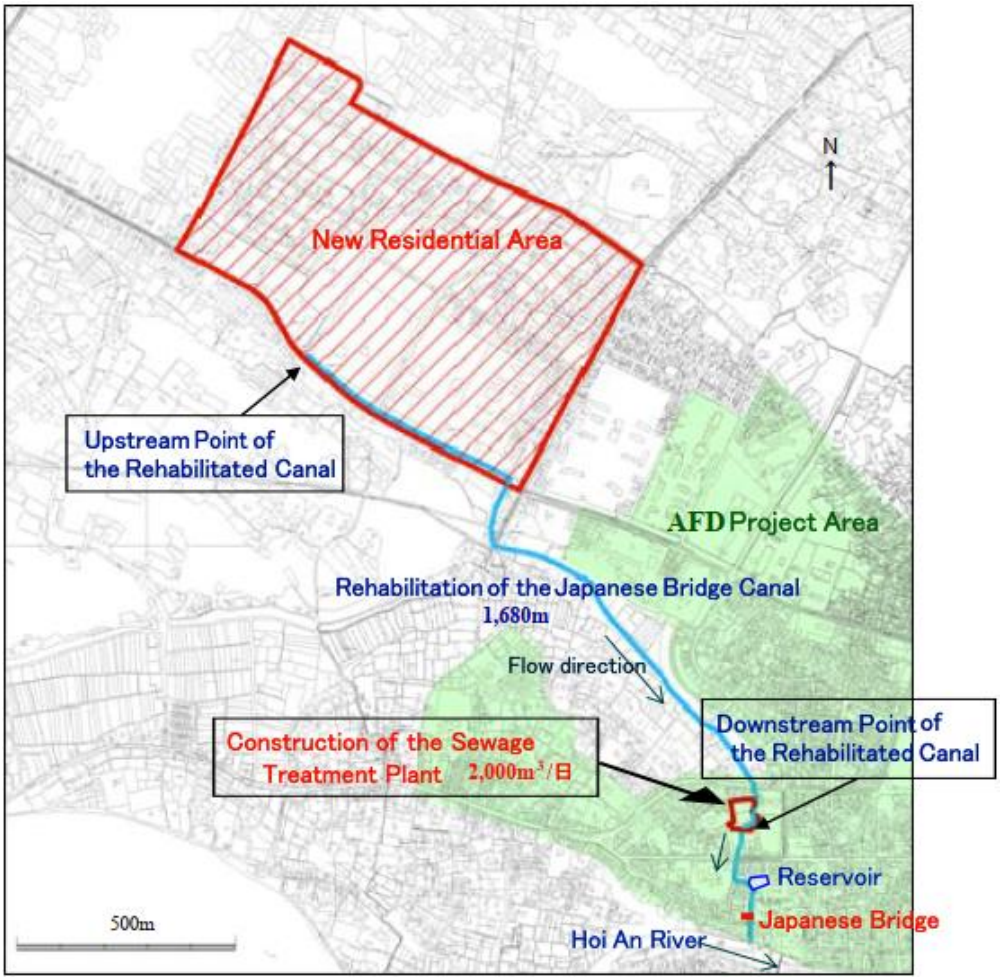


Figure 1. Project site map

<Impacts>

(Qualitative Effects)

As an indicator of qualitative effects related to impact, the promotion of regional economic development through the preservation of tourism resources was established.

Through interviews with officials from Hoi An City's DONRE and Project Management Unit (PMU), residents, and tourism and hospitality business owners, it has been confirmed that complaints about unpleasant odors, which had previously been frequently reported by tourists, have significantly decreased after the completion of this project. Because the main objective of the project was not to create new attractions for the tourist city (i.e., generating value added) but to prevent adverse effects on the tourism industry and restore its inherent appeal by improving the quality of water around the Japanese Bridge Canal, its direct contribution to promoting regional economic development has been limited. Still, it can be said that the project, through improving water quality around the Japanese Bridge area, has contributed to reducing and eliminating factors such as unpleasant odors that detract from Hoi An's appeal as a tourist city, thereby helping to restore its appeal as a tourist destination.

<Other Positive and Negative Impacts>

maintained by the PWC under its contract with the city.

[11] Covers are installed on the buried waterway.

(1) Impact on the Natural Environment

This project was classified as Category B according to the *JICA Environmental and Social Considerations Guidelines* (2010), as it did not belong to sectors, characteristics, or regions likely to have substantial impacts. Therefore, its negative effects on the environment were deemed insignificant. Interviews with officials from DONRE and PMU, along with site visits, confirmed that the environmental measures planned for the construction period and after the project began operations have been effectively implemented, and no adverse impacts on the natural environment have occurred.

(2) Impact on the Social Environment (Land Acquisition and Resident Relocation)

The construction site for the sewage treatment plant comprised both public land and privately owned agricultural land (owned by three households). The land acquisition process was conducted in accordance with Vietnam's domestic procedures and the *JICA Environmental and Social Considerations Guidelines*. Interviews with officials from DONRE, PMU, and STP, along with local residents, confirmed that no negative impacts have been observed, and there has been no relocation of residents. Furthermore, as specified in the *Regulations on the Management, Conservation, and Use of Hoi An Ancient Town* (Decision No. 2337: 2006/QD-UBND)[12], landscape measures, such as painting the roofs of work sites red, the walls yellow, and planting trees around the work areas, have been appropriately implemented during the construction period.

(3) Other Positive and Negative Impacts, Including Gender Equality, Marginalized People, Social Systems and Norms, People's Well-being and Human Rights

Interviews with officials from DONRE, PMU, and STP, along with residents and businesses in the tourism and hospitality sectors, confirmed that there have been no other positive or negative impacts that were unexpected at the time of the ex-ante evaluation. This includes aspects related to gender, people prevented from equitable social participation, social systems and norms, people's well-being, and human rights.

<Evaluation Result>

In light of the above, the effectiveness and impacts of the project are high.

3 Efficiency

The outputs of this project have been developed as planned, as described in the "Contents of the Project" of the "I. Project Outline" section above. According to interviews with officials from Hoi An City's DONRE and PMU, the Vietnamese side has fulfilled all its responsibilities as planned, including installing power lines and water supply to the sewage treatment plant, leasing land for temporary access roads during construction, installing fences and gates after the sewage treatment plant was completed, detecting and removing mines, and paying commission fees to the Japanese bank.

<Project Cost>

The planned project cost for the Japanese side was 1.11 billion yen, and the actual cost was also 1.11 billion yen, which was thus within the plan (100% of the plan). On the Vietnamese side, the planned project cost was 30 million yen. However, because reliable actual data could not be obtained, this evaluation focused exclusively on comparing the planned and actual costs for the Japanese side.

<Project Period>

The project was originally scheduled to take 40 months, from March 2015 to June 2018. However, delays caused by design changes and flooding extended the actual duration to 45 months, from March 2015 to November 2018, thus exceeding the original plan (113% of the plan).

<Evaluation Result>

Based on the above, while the project cost stayed within the plan, the project period exceeded the plan. The extension of the period, however, was not significant enough to impact the project adversely. Therefore, the efficiency of the project is high.

4 Sustainability

・Policy and System

This project was under the jurisdiction of Quang Nam Provincial People's Committee (PPC), a higher-level authority. Under its supervision, Hoi An City People's Committee (CPC) acted as the implementing agency for the project. The operation and maintenance of the sewage treatment plant built under the project are being managed by PWC under a contract with Hoi An City. In January 2024, PWC's supervising authority was shifted from DONRE to PMU. However, this transition has not affected the sustainability of the project's outcomes. The system and the division of roles necessary to ensure the project's long-term effectiveness are clearly defined, and thus the relevant policy and system are well-established.

・Institutional/Organizational Aspect

As of the end of March 2024, PWC, which manages the operation and maintenance of the STP, employs 232 staff members, only a slight decrease from 236 at the time of the ex-ante evaluation in January 2014. The organizational structure has remained largely unchanged since that evaluation. The staffing for the STP team (a sub-unit of PWC) has been consistent since operations began, ensuring there are enough personnel to effectively manage the routine operation and maintenance of the facilities developed under this project (see Table 3).

[12] Regulations regarding the management, conservation, and use of Hoi An Ancient Town, approved by the Hoi An City People's Committee in October 2006. Based on these regulations, the Hoi An Center for Cultural Heritage Management and Preservation provides guidance on landscape considerations and issues related permits and approvals.

Table 3. STP Staffing Structure (as of April 2024)

Position	Number of employees
Plant manager	1 person
Water quality tester	1 person
Operations control worker	8 persons (Four teams, with two people in each team, working three shifts of 8 hours.)
Security guard	1 person
Total	11 persons

Source: Interviews with the O&M organization

・Technical Aspect

The STP team, responsible for the operation and maintenance of the sewage treatment plant developed under this project, has maintained a largely consistent structure and staffing since it began operations. It has built up the skills and experience needed to manage routine operations effectively. However, as more equipment is approaching the end of its lifespan, there is an increasing trend in the frequency of repairs and replacements, which has made it challenging to find personnel with expertise in IT and electrical engineering. When issues arise with software or control devices (Programmable Logic Controllers: PLC), the STP team is unable to address them, leading to more frequent requests for contractors to handle repairs or replacements. At the time of the ex-post evaluation, a contractor from Ho Chi Minh City visited the STP almost every month for PLC repairs and replacements.

In the STP, there have not been sufficient opportunities for skill development, and so far, all skill acquisition has been conducted entirely through on-the-job training, except for the soft component of this project. In the meanwhile, it has been confirmed that the patrol and cleaning manuals for the Japanese Bridge Canal, developed as part of the soft component of this project, are being utilized.

Based on the above, there are some concerns about the ability to effectively manage the operation and maintenance of the facilities developed under this Project in the future, and it is considered that the chances for improvement and resolution are low.

・Financial Aspect

PWC, which was originally a public enterprise under Quang Nam PPC, was restructured into a limited liability company in 2010 and then into a joint-stock company in 2013. The majority of its shares (51%) were initially held by Quang Nam PPC, but in 2023, they were transferred to Hoi An CPC. The costs related to the operation and maintenance of the STP are paid annually by Hoi An CPC to PWC under a service contract. However, since PWC became a limited liability company in 2010, its financial data has not been disclosed. Additionally, the STP team did not have a good understanding of the annual facility management costs, including labor, electricity, chemical supplies, equipment purchases, and maintenance expenses. It seems that the annual income and expenditure statements of the sewage operation, whose compilation was supported by the soft component of the project, have not been properly prepared. The STP team is considering a maintenance service contract with a contractor, but there is currently no clear way to secure the necessary budget. Based on the above, there are some challenges in securing the budget to sustain the effectiveness of this project in the future, and it is considered that the chances for improvement and resolution are low.

・Environmental and Social Aspect

The sewage treatment plant constructed under this project is regularly inspected, cleaned, dredged, and maintained. In addition, on-site water quality tests, including discharge BOD concentration and ammonia nitrogen content, are conducted routinely, and no issues have been identified. Therefore, no significant negative impacts on environmental and social aspects are expected in the future.

・Preventative Measures to Risks

Untreated wastewater, which continues to flow into the Japanese Bridge area from outside the project's scope, partially undermines the outcome of this project. At the time of the ex-ante evaluation, it was recognized as a risk that "untreated wastewater continues to flow into the Japanese Bridge Canal from the AFD project area downstream of this project's sewage treatment plant, which may result in the water quality improvement around the Japanese Bridge not being clearly visible even if the treatment plant becomes operational" (Preparatory Survey Final Report, pp. 1-8). As a countermeasure, the Vietnamese side planned to implement a project that would redirect household wastewater flowing into the downstream reservoir to the sewage treatment plant developed under this project. In the letter dated April 4, 2014 (No. 824/UBND) submitted to the JICA survey team, Hoi An City committed to carrying out this construction project independently, and it has been confirmed that the project was completed in 2021 (Defect Inspection Report, pp. 6-7). However, for some reason, it has not yielded the expected results, and untreated wastewater continues to flow into the Japanese Bridge Canal even at the time of the ex-post evaluation. Therefore, there is a need for a new measure to address the problem.

・Current Status of Operation and Maintenance

At the time of the ex-post evaluation, the operational status of the sewage treatment plant was generally good, and no significant issues were identified. However, as mentioned above, the frequency of repairs and replacements for facilities and equipment has increased. When issues arise with software or PLCs, the STP team is unable to resolve them, leading to a growing number of cases where contractors are called in for repairs or replacements. There are also concerns about the time it takes (around one week) and the costs involved in replacing Japanese-made PLCs for spare parts. Thus, to sustain the effectiveness of this project in the future, there are some challenges in the operation and maintenance, and currently, there are no clear prospects for improvement or resolution.

<Evaluation Result>

In conclusion, while there are no issues observed with the policy and system, institutional/organizational aspects, or environmental and social factors, there are challenges related to technical issues, financial aspects, risk prevention measures, and the current status of operation

and maintenance. It can be said that the prospects for improvement or resolution in these areas are limited. Therefore, the sustainability of the project's effects is moderately low.

III. Recommendations & Lessons Learned

・Recommendations to Executing Agency
None

・Recommendations to JICA
Investigating the Causes of Untreated Wastewater Inflow from Areas Outside the Project's Scope

To prevent untreated wastewater from flowing into the Japanese Bridge from areas outside the project's scope, a sewer pipeline development project downstream of the sewage treatment plant was initiated. It has been confirmed that the project was completed in 2021[13]. However, at the time of the site survey (March 24, 2024 – April 6, 2024), untreated wastewater continues to flow into the Japan Bridge, partially offsetting the benefits realized by this project. Therefore, it is recommended that JICA promptly hold discussions with Hoi An CPC and Quang Nam PPC to investigate the causes of untreated wastewater inflow and explore measures toward maximizing the project's effects.[14]

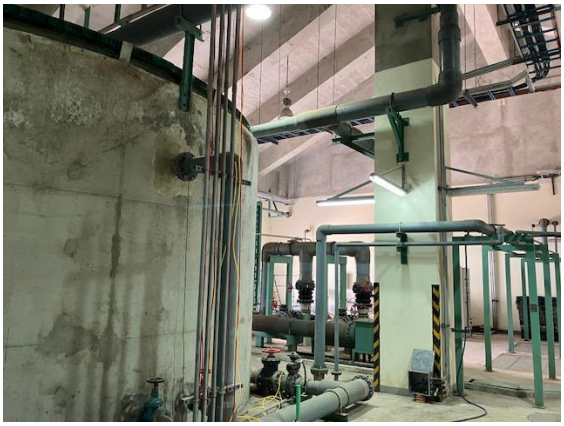
・Lessons Learned
When project outcomes depend on external conditions, it is necessary to either incorporate out-of-scope components into the main project or designate them as responsibilities of the counterpart and monitor them regularly.

The objective of this project is "to improve the quality of water around the Japanese Bridge." However, the bridge is located further downstream from the sewage treatment plant, which was built as part of this project and is situated at the canal's downstream endpoint. As a result, the Japanese Bridge falls outside the project's target area. Consequently, untreated wastewater from areas outside the project's scope continues to flow into the reservoir located between the treatment plant and the bridge, a situation the project cannot control as of the ex-post evaluation. In projects aimed at improving water quality through sewer infrastructure development, proper control of untreated wastewater inflow from outside the project area is a prerequisite for ensuring the project's effectiveness. If these conditions are not met at the time of the ex-ante evaluation, it will be necessary to either incorporate related infrastructure components into the main project or implement them as responsibilities of the counterpart. If designated as the counterpart's responsibilities, it is essential to hold regular discussions throughout the planning and implementation phases to monitor whether the related infrastructure components are being executed without issues and whether any problems are being resolved.

IV. Non-Score Criteria

・Performance
・Objective Perspective
None

・Subjective Perspectives (retrospective)
・Additionality
None



Spray bed within the facility
(Source : photographed by the evaluator)

Canopy truck
(Source : photographed by the evaluator)

[13] At the time of the ex-ante evaluation, this project proposed to the Vietnamese side the construction of a pipeline that would collect wastewater from around the reservoir through bifurcation facilities and transport it to the sewage treatment plant of this project via the pumping pipeline of the AFD project.
[14] According to the information received from Hoi An CPC on November 29, 2024, they had recognized the issue and allocated a budget of over 800 million VND to address it, resolving the problem by August 2024.

Rehabilitated canal
(Source : photographed by the evaluator)

Canal flowing directly under the Japanese Bridge
(currently under restoration)
(Source : photographed by the evaluator)

(end)