

People's Republic of Bangladesh
Local Government Division, Ministry of Local Government,
Rural Development and Cooperatives

Project for Strengthening of Solid Waste
Management in Dhaka North City,
Dhaka South City and Chittagong City
in the People's Republic of Bangladesh

Project Completion Report

May 2022

Japan International Cooperation Agency (JICA)

Yachiyo Engineering Co., Ltd.

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In this report, the following exchange rate is applied (as of May 2022)

Exchange Rate

BDT1 = JPY 1.506040 (May 2022)

Executive Summary

1 Background and Project Purpose

The capital city Dhaka¹ of the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") has been achieving significant economic growth from the 1990s onward, accompanied by a rapid increase in the Gross Domestic Product (hereinafter referred to as "GDP"). As a result, the generated waste rapidly increased both in amount and in the complexity of its components. In addition, economic growth brought a higher level of living for the residents of Dhaka City and they began to demand more of the government to improve the cleaning services. On the other hand, the City authorities could not provide sufficient cleaning services due to the expansion of the city area and failed to meet the needs of the residents and resolve their complaints, causing dissatisfaction amongst them. Under such circumstances, there has become an increased need for a cleaning service that takes into account the opinions of the citizens and meets their requirements.

Japan International Cooperation Agency (hereinafter referred to as "JICA") started to provide support for improving Solid Waste Management (hereinafter referred to as "SWM") in Dhaka City in 2003. "Clean Dhaka Master Plan" was developed with the target year of 2015, and JICA continued providing comprehensive support through a number of projects having a combination of tangible and intangible results. The timeframe of Clean Dhaka Master Plan, up to 2015 has been completed, and presently there are various issues that need to be tackled such as landfill sites shortage, aging waste collection vehicles, and vehicle management. In 2011, Dhaka City was divided into two cities: Dhaka North City Corporation (hereinafter referred to as "DNCC") (population: approx. 6.11 mil people² in 2018) and Dhaka South City Corporation (hereinafter referred to as "DSCC") (population: approx. 4.49 mil people in 2018). In response to the SWM issues the two city corporations requested the Government of Japan for technical assistance aiming to improve SWM capabilities. In addition, Chattogram City Corporation³ (hereinafter referred to as "CCC") (population: approx. 3.57 mil people in 2021) submitted a request for technical cooperation including maintenance and management of vehicles, which was planned to be carried out in parallel with the grant aid⁴ being implemented in the city. Based on these requests, JICA discussed and agreed on the design of a technical cooperation project with the Government of Bangladesh and, in June 2016, concluded a Record of Discussion (hereinafter referred to as "R/D") detailing the project activities. In 2017, the present project (hereinafter referred to as "the Project") was commenced as a technical cooperation project.

2 Project Area

¹ "Dhaka" or "Dhaka City" refers to the city before it was divided into Dhaka South City and Dhaka North City, on the area which is currently covered by the two cities.

² The population includes the number of people who live in the new city area. The administrative areas of both Dhaka North and Dhaka South Cities were expanded in July 2017 after the request of further assistance. (*Population*: Dhaka North City increased by 40%, Dhaka South City by 33%; *Area*: Dhaka North City increased by 137%, Dhaka South City by 142%)

³ As the official name of Chittagong was changed to Chattogram by the Prime Minister's announcement in 2018, this report refers to it the city as Chattogram, except for the project title which is unchanged.

⁴ "The Project for Improvement of Solid Waste Management Equipment in the People's Republic of Bangladesh." In 2018, 150 waste collection vehicles in total were procured by the grant aid project to Dhaka North City, Dhaka South City, and Chattogram City.

The target areas of the Project are Dhaka North City, Dhaka South City, and Chattogram City.

3 Project Period

The Project was implemented during the period of June 2017 to May 2022 in two phases. The consultant contract was entered into in each of the two phases. “Phase 1” and “Phase 2” in this report refer to the following periods as stated in the consultant contracts.

- Phase 1: June 2017 - September 2019
- Phase 2: December 2019 - May 2022

4 Counterpart Organization and Implementation System

- **Local Government Division, Ministry of Local Government, Rural Development and Cooperatives (LGD)**: a supervisory agency for local governments, and serves as a chairperson at the Project’s Joint Coordination Committee (hereinafter referred to as "JCC") as well as convening the 12 City Corporations (hereinafter referred to as "CCs") and nationwide information-sharing meetings of waste management under the Project. Dissemination of knowledge and experience earned by Dhaka City to other cities is one of the important roles of Local Government Division in Ministry of Local Government, Rural Development and Cooperatives (hereinafter referred to as "LGD").
- **DNCC, DSCC and CCC**: Implementing organizations of the Project. Main Counterparts (hereinafter referred to as “C/Ps”) in the city corporations are Waste Management Department (hereinafter referred to as "WMD”) in each of DNCC and DSCC, and Conservancy wing in CCC.

5 Project Purpose and Expected Outputs

(1) Overall Goal

[DNCC and DSCC]

Sustainable SWM is implemented in Dhaka North and Dhaka South City based on the revised Master Plans.

[CCC]

Sustainable SWM is implemented in Chattogram city based on a waste collection and transportation plan.

(2) Project Purpose

[DNCC and DSCC]

SWM systems are improved in Dhaka North and Dhaka South City based on the revised Master Plans.

[CCC]

SWM system is improved in Chattogram City based on the waste collection and transportation plan.

(3) Expected Outputs

- Output 1: Individual Master Plan targeting the year of 2032 is formulated separately for DNCC and DSCC.
- Output 2: WBA (Ward Base Approach) activities are improved and expanded within DNCC and DSCC.
- Output 3: A waste collection and transportation plan is developed, and a proper waste collection and transport system is implemented in CCC.
- Output 4: Sustainable workshop management systems are established in DNCC, DSCC, and CCC.
- Output 5: Information sharing for challenges and efforts of SWM among city corporations and other small local governments around Dhaka metropolitan area are conducted by LGD.
- Output 6: Public relation (PR) activities for SWM are promoted in DNCC and DSCC.
- Output 7: Lifetimes of the existing landfill sites are prolonged and new landfill area is secured in DNCC and DSCC.
- Output 8: A proper medical waste management system is established in CCC.

6 Project Activities

[Output 1: Individual Master Plan targeting the year of 2032 is formulated separately for DNCC and DSCC.]

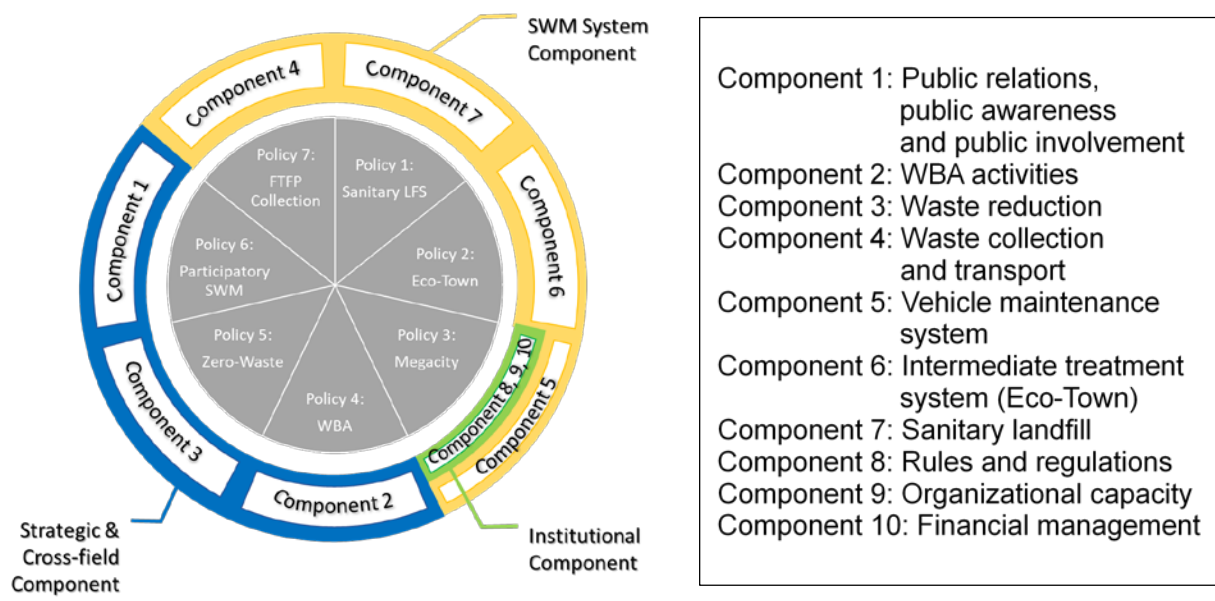
(1) (DNCC and DSCC) Revision of Clean Dhaka Master Plan [Phase-1 & Phase-2]

The present DNCC and DSCC requires a new basic plan to delineate a whole picture of the future solid waste management for the next 15 years (base year: 2017, target year: 2032). In Dhaka City, “Clean Dhaka Master Plan” (hereinafter referred to as “the first Master Plan”) was developed in 2005 targeting the period from 2005 to 2015. The Master Plans for each of DNCC and DSCC were revised separately in the Project based on the first Master Plan.

After obtaining approval from both mayors of Dhaka North and South City in 2019, discussions on the national policy regarding Waste-to-Energy (hereinafter referred to as “WtE”) were held. Although LGD faced difficulty in the approval procedure, the final approval for the plan was obtained in February 2022, and the new Clean Dhaka Master Plan (hereinafter referred to as “the New Master Plan”) was opened to the public at the websites of DNCC and DSCC in March 2022. In the Project, the seven priority projects listed in the New Master Plan were newly implemented, and the improvement measures for the waste management system were realized on a pilot basis.

(2) (DNCC and DSCC) Selection and Implementation of Priority Projects [Phase-1 & Phase-2]

The New Master Plan identifies three to five priority projects in each of the 10 components. Amongst them, the Project supported those that tackle the most urgent SWM issues, such as extending the lifespan of the landfill site, and important SWM issues, such as promoting the 3Rs (Reduce, Reuse, Recycle) so as to verify the effective improvement measures and the direction of future support. Specifically, the seven priority projects listed in the New Master Plan were newly implemented in the Project on a pilot basis, and the improvement measures for the waste management system were realized. Among the priority projects, the C/Ps strongly requested the Project’s support for “Public Relations and public awareness” and “extending the lifetime of the existing landfill site and securing new landfill site”. Accordingly, the Project delineated its support directions for these two topics through the Phase 1 activities. Consequently, these activities were newly added in PDM as new Outputs (Output 6 and Output 7).



Reference: New Clean Dhaka Master Plan of DNCC and DSCC 2018-2032

Fig. 1 Approach and 10 key components in the New Master Plan

<Priority Projects conducted during the Project>

- 1) Activities for Introduction of Eco-Town
- 2) Pre-Feasibility Study (Pre-F/S) on Introduction of Waste-to-Energy in Dhaka North City
- 3) Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services
- 4) 3R Promotion and Implementation of Waste Segregation Pilot Project
- 5) Administrative Guidance on the Waste Management Rules 2021 by the Department of Environment (DOE)
- 6) Public Relations and Public Awareness (* implemented as “Output 6” in Phase-2)
- 7) Extension of Lifetime of Existing Landfills and Securing sites for New Landfills (* implemented as “Output 7” in Phase 2)

Note: “Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services (Phase-1 and Phase-2)” and “3R Promotion and Implementation of Waste Segregation Pilot Project (Phase-2)” were implemented in 3 cities including Chattogram City.

(3) Priority Project-1: (DNCC and DSCC) Activities for Introduction of Eco-Town [Phase-1]

Currently, both Amin Bazar Landfill Site (hereinafter referred to as “LFS”) in Dhaka North City and Matuail LFS in Dhaka South City are receiving approximately 3,000 tons of waste per day. Remaining lifespan is estimated at approximately 0.64 years for Amin Bazar LFS and approximately 1.2 years for Matuail LFS.

Consequently, both CCs must secure new landfills without any delays. The Development Project Proposals (hereinafter referred to as “DPPs”) for the expansion of both LFSs have already been approved, with construction to be completed in June 2023. However, the expansion plan of Amin Bazaar LFS is not an Eco-Town plan, but a plan to construct a facility that can incinerate all waste generated in Dhaka North City and generate electricity⁵. In addition, DNCC had applied for the construction of the new Nasirabad LFS⁶, (in Dhaka North City, with a landfill area of approximately 20 ha), but the application was suspended as of May 2022. The Nasirabad LFS is expected to be in use for only 5 to 6 years, and even if it is constructed, the next LFS must be secured immediately.

Under these circumstances, JICA Project Team (hereinafter referred to as “JPT”) has proposed to DSCC and DNCC the introduction of Eco-Town as a comprehensive SWM system that incorporates a WtE facility with high reduction effect and an efficient recycling facility. DNCC, DSCC and LGD are currently coordinating to realize this Eco-Town concept, including securing financial resources.

(4) Priority Project-2: (DNCC) Pre-Feasibility Study (Pre-F/S) on Introduction of Waste-to-Energy in Dhaka North City⁷ [Phase-1 & Phase-2]

Based on the New Master Plan of Dhaka North City, the possibility of introducing a WtE facility was examined. In Phase-1, the incineration method was examined based on the field survey including the waste quality survey. In Phase-2, the feasibility of the project by the Design-Build-Operate (hereinafter referred to as “DBO”) method was additionally examined. As a result, it was revealed that: i) the combined method of incineration (stoker method) and bio-gasification is suitable in Dhaka North City, ii) the financial burden of the Government of Bangladesh (hereinafter referred to as “GoB”) is estimated at approximately 603 million US dollars, and iii) a waste treatment fee should be collected from large-dischargers of waste so as to cover the additional costs.

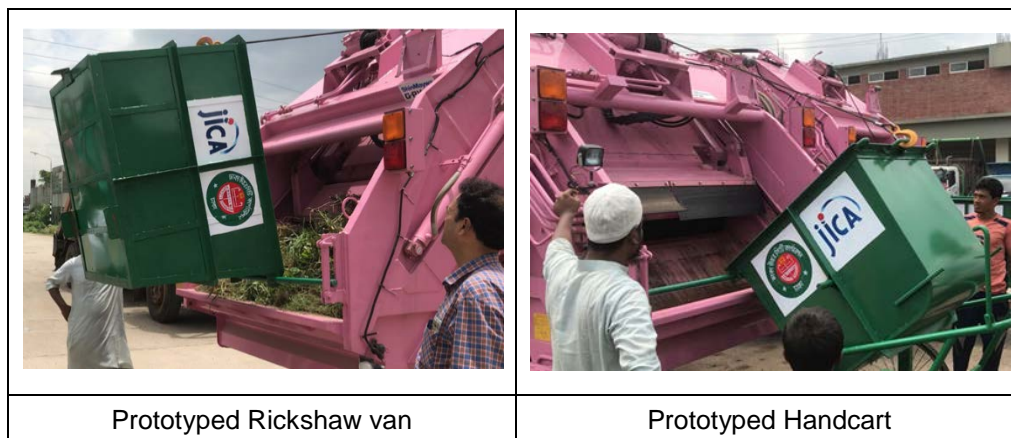
(5) Priority Project-3: (DNCC, DSCC, and CCC) Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services (In collaboration with Output-2 and Output-3) [Phase-1 & Phase-2]

⁵ LGD issued a public notice on the newspaper to solicit participants in the WtE business using waste discharged from the Dhaka North City with the aim of reducing the load on the final disposal site. As a result, 17 applicants submitted proposals, and the Ministry of Power, Energy and Mineral Resources (MoPEMR) selected China Machinery Engineering Corporation (CMEC) as the project operator. In response to this, on December 1, 2021, the Bangladesh Power Development Board (BPDB), DNCC and CMEC signed contracts necessary for project implementation.

⁶ The proposed Nasirabad new landfill site was originally outside the city boundary of Dhaka North and South City when planned, however, it was integrated into Dhaka South City in 2017 when the administrative service areas of Dhaka North and South City were expanded. Therefore, the Nasirabad new landfill site is planned to utilize for Dhaka North City, however, it is located within Dhaka South City.

⁷ The Pre-F/S was for DNCC according to the TOR of the Project. This study referred to JICA’s “Data Collection and Analysis for Guideline for Promoting Waste to Energy Facility Projects (November 2018).”

The Primary Collection Service Providers (hereinafter referred to as “PCSPs”) collect waste in Rickshaw Vans (hereinafter referred to as “RVs”) and Hand Carts (hereinafter referred to as “HCs”) but do not have a system of loading the waste directly onto collection vehicles. As shown in Photo 2-1, PCSPs unload the collected waste on the ground and the cleaners load it onto the vehicles, which is very inefficient in terms of loading time. In addition, this method scatters the waste, giving an adverse impact on the sanitary environment at and near collection points. Therefore, JPT examined the improvement of the loading method from the primary collection equipment to the secondary collection equipment, and developed improved RVs and HCs that can directly empty waste into the winch-mounted compactor. After several prototype improvements, 101 improved RVs are currently in operation in Chattogram City. As a result, the loading time was shortened from about 20-30 minutes to about 5 minutes, and the sanitary environment around the collection site was improved.



Reference: JPT (Photographs taken in October 2018)

Photo 1 Prototyped Primary Collection Equipment

(6) Priority Project-4: (DNCC, DSCC and CCC) Waste Separation Pilot Project (implemented in collaboration with Output 2 & 3) [Phase 2]

As above-mentioned, in Dhaka North City and Dhaka South City, on the one hand rapid increase in amounts of generated waste due to economic growth, and on the other hand rapid depletion in existing landfills waste disposal capacities have become urgent SWM issues. In response, waste reduction measures have been adopted as some of the most important components in the new Master Plan. In Chattogram City, the existing landfill is more severely strained than in Dhaka North City and Dhaka South City, and the need for waste reduction is particularly urgent. The Project implemented a pilot project focused on waste separation, which is one waste reduction measure that is relatively easy to garner residents’ understanding and cooperation. At the beginning of the Project, waste separation did not progress well due to the limited number of community meetings caused by the spread of Corona Virus Disease 2019 (hereinafter referred to as “COVID-19”) and being overshadowed by the concurrent WtE” project⁸ development activities. However, with the cooperation of local leaders and Housing Societies, as well as training on the Waste Management Rules 2021 by DOE, as described below, understanding of waste separation spread within the CC, and the waste separation pilot project expanded at an accelerated pace. As a result, the target population of waste separation was expanded to approximately 80,000

⁸ Refer to Footnote 6 (Summary p.5)

people (approximately 20,000 households) in the three cities, and approximately 290 tons of recyclable materials (aluminum cans, glass, plastics, electronic and electrical wastes, etc.)⁹ were recovered in a sanitary manner every month. Through the pilot project, the Project confirmed the effectiveness and social acceptability of separation of two waste types, Wet waste and Dry waste, as one of the waste reduction measures in Bangladesh.¹⁰ In addition, it accumulated effective methods of raising residents' awareness and know-how on how to cooperate with related parties. The three cities have requested additional support for the expansion of waste separation to the entire city areas.

(7) Priority Project-5: (DNCC, DSCC and CCC) Administrative Guidance on Waste Management Rules 2021 (implemented in collaboration with Output 2 & 3) [Phase 2]

The Waste Management Rules 2021” were enacted by DOE in December 2021. The rules stipulate that it is the responsibility of residents and businesses to separate and discharge the waste into three categories; organic, inorganic and hazardous. With a desire to strengthen compliance of these rules, training on “The Waste Management Rules 2021” was provided in March 2022. The training was conducted once in each of the three cities. A total of 295 people participated in the training, including the Chief Waste Management Officer (hereinafter referred to as “CWMO”), Conservancy Inspectors (hereinafter referred to as “CI”), Executive Engineers (hereinafter referred to as “EE”), and staff of the waste management relevant departments such as Engineering Department (hereinafter referred to as “ED”), Transport Department (hereinafter referred to as “TD”) and Store and Purchase Department (hereinafter referred to as “SPD”). This training deepened the understanding of decision makers in each city and was able to accelerate the ongoing waste segregation pilot project. The collaboration with DOE was expected to enhance the sustainability of solid waste management in Bangladesh after the completion of the Project.

(8) (DNCC and DSCC) Revision of WMD Directives (DNCC and DSCC) [Phase-1 & Phase-2]

The WMD Directives are intended to describe a strategic roadmap of waste management for the next 5-6 years, taking into account changes in society, and shall be approved by Mayor as an official administrative order. In DNCC and DSCC, CWMO tends to change about every 2-3 years and these changes often bring about drastic directional changes in WMD, which in turn affects the stable management of SW. The WMD Directives are a means of securing continuous SWM on the organizational level and stabilize the administration under which SW is managed, thereby ensuring stable services despite the frequent changes at the top level of the organization. The first WMD Directives were developed in 2007 and revised once in 2012. Within Phase-1 of this project, the directives were revised for the second time; WMD Directives of DSCC in February 2020 and those of DNCC in August 2021.

⁹ Dry waste is sorted out by material types at the basement of buildings or on the street by cleaners or PCSPs, and sold to buyers and recyclers. In cases where PCSP cannot segregate dry waste, the mixed dry waste is sold unsegregated and buyers or recyclers sort out by material types.

¹⁰ Waste management rules 2021 requires the waste be separated into three categories: “organic”, “non-swill (Inorganic)” and “hazardous”. In the classification of this pilot project, “Wet Waste” is the same as “Organic,” and “Dry Waste” is the same as mixture of “Inorganic” and “Hazardous.” Since these rules were enacted in December 2021 that is during the pilot project implementation period the Project could only apply two types of segregation as a demonstration.

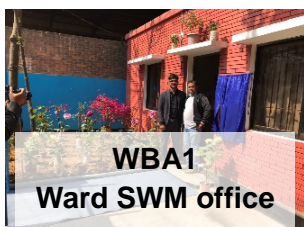
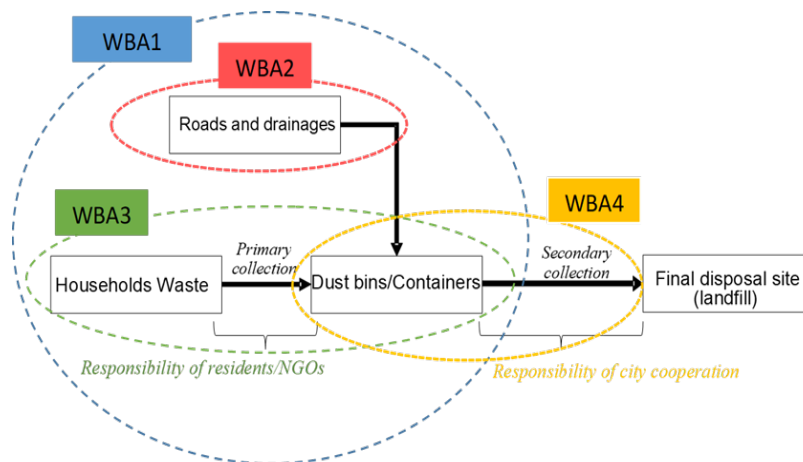
[Output 2: WBA (Ward Base Approach) activities are improved and expanded within DNCC and DSCC.]

(1) (DNCC and DSCC) Improvement and Expansion of WBA Activities [Phase-1 & Phase-2]

Ward-based Approach (hereinafter referred to as “WBA”) is a system to promote participatory Solid Waste Management (SWM) at the field level led by the ward CI stationed in a ward SWM office. Under WBA some authority is transferred to the ward SWM office, to enable the ward CI to make independent decisions on issues related to the field activities. Ward populations reach a few hundred thousand and direct decision making by the SWM ward office in some cases, as envisioned in WBA may avert unsanitary conditions for such large populations, and contribute to providing sustainable SWM in big cities such as Dhaka South City and Dhaka North City. WBA consist of four major activities: WBA 1 for construction and practical use of the ward SWM offices, WBA 2 for the cleaners’ occupational safety training and establishment of the Safety and Sanitation Committee (hereinafter referred to as “SSC”), WBA 3 for public awareness-raising activities, and WBA 4 for regional collection system improvement. Through the support of the Project, the WBA expansion rate in all 93 wards in DNCC and DSCC increased from 34% in 2017 to 82% in 2022. In addition, the amount of waste collected increased from 4,997 ton/day to 5,287 ton/day in the two respective years. Likewise, there was an increase in waste collection rate from 80% in 2017 to 82% in 2020.¹¹

What is Ward Based Approach (WBA)?

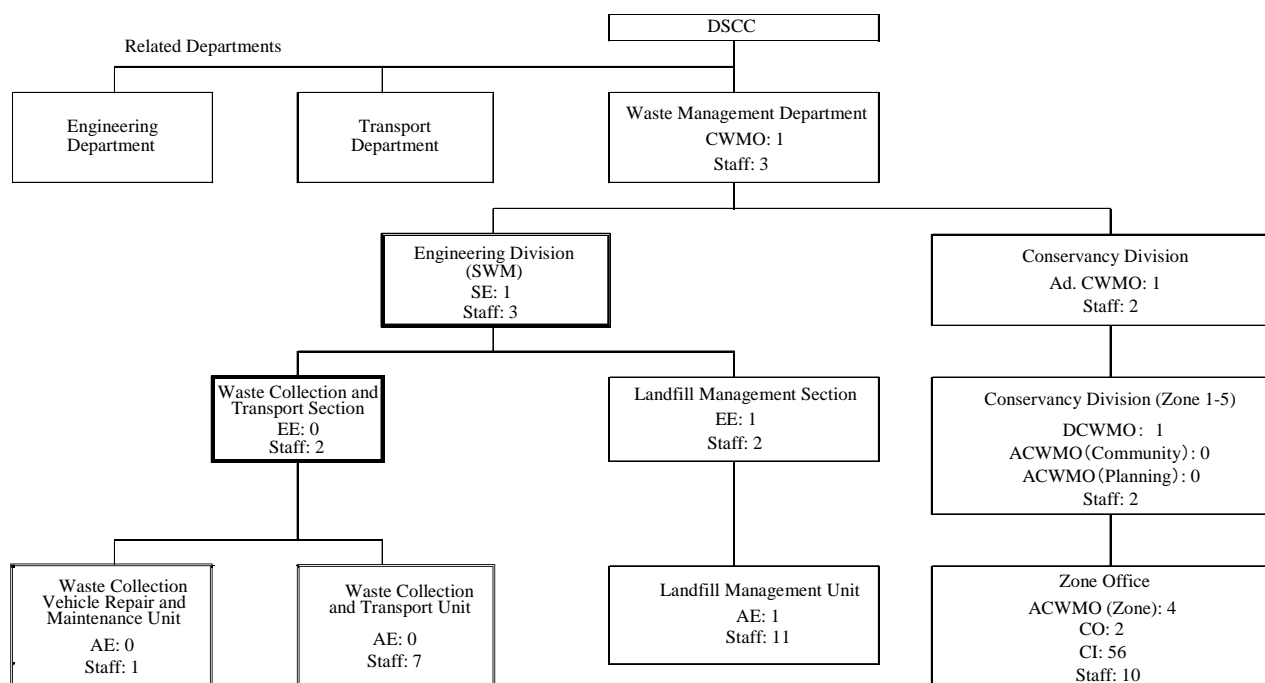
WBA activities are implemented at the ward level and consist of WBA 1: construction and management of ward SWM office, WBA 2: safety education for cleaners and establishment of a SSC, WBA 3: public awareness-raising, and WBA 4: Improvement of waste collection service in each ward. Synergistic effects are expected from the coordination of the four activities together in each ward, producing greater outcomes.



Reference: JICA Project Team (JPT)

¹¹ Extended areas of the cities are not included in this calculation.

The WBA can be flexible to changes in social conditions, and at the same time, can contribute to strengthening the foundation of the waste management system. WBA is also effective in disseminating instructions from the central government to all field workers smoothly. In the early days of the spread of COVID-19 infection, the Conservancy Inspectors (CIs) in their respective wards were the links with the Mayor and the ward cleaning staff, and through this linkage it was possible to quickly secure safety gear to all the cleaning staff as some protection against infection. Through such activities, the CIs' roles were re-evaluated positively and 19 CIs who were active as WBA core group members were promoted to the Conservancy Officer (hereinafter referred to as "CO") rank. In addition, some of the capable field staff were promoted to managerial positions in the headquarters in both DNCC and DSCC. DNCC filled three posts of Assistant Chief Waste Management Officers (hereinafter referred to as "ACWMOs") that had remained vacant for a long time. Through assigning greater responsibilities to the ward level SWM staff, many of these staff members became more confident and willing to shoulder more responsibilities thus enhancing the organization capacity of WBA as well as WMD.



Reference: JPT prepared based on "New Clean Dhaka Master Plan of DSCC 2018-2032"

Fig. 2 Organizational Structure of WMD of DSCC (as of 2017)

[Output 3: A waste collection and transportation plan is developed, and a proper waste collection and transport system is implemented in CCC.]

(1) (CCC) Introduction of Proper Waste Collection and Transportation System [Phase-1 & Phase-2]

Prior to the grant aid project, Chattogram City had approximately 80 waste collection vehicles but no compactors. In 2018, the grant aid project provided the city with a total of 38 collection vehicles including 13 compactors. The Project provided technical assistance to develop a waste collection and transportation plan and to improve operation and maintenance capacity by using these vehicles. In particular, the assistance

included the introduction of door-to-door collection with the compactors, and waste collection improvement through WBA by utilizing experiences and knowledge accumulated in DNCC and DSCC through the previous support. As a result, the Waste Management Cell (hereinafter referred to as “WMC”), the predecessor of the WMD, was established, and the WBA expanded to 90% of all 41 wards.

Through the Project, two new ward solid waste management (SWM) offices were constructed. In addition, in ward 8 and ward 27, as model wards, CIs took the lead in conducting four WBA activities. Especially in ward 8, activities related to 3R promotion through the waste segregation pilot project and improvement of medical waste management were carried out, and ward 8 was awarded by the Chief Representative of JICA Bangladesh office. CI of ward 8 was also awarded as a model CI. Concerning ward 27, the ward CI was promoted to CO in February 2022 in recognition of his efforts.

Moreover, in August 2021, a detailed waste collection and transportation plan was formulated. Based on the plan, CCC made efforts to improve waste collection by introducing 101 improved RVs. Consequently, waste collection amount increased from approximately 1,200 tons/day (2014) to approximately 2,200 tons/day (2021) through a series of improvement activities carried out in parallel, including the enhancement of collection capacity through the grant aid project.

[Output 4: Sustainable workshop management systems are established in DNCC, DSCC and CCC.]

(1) (DNCC, DSCC, and CCC) Establishment of Workshop Management System [Phase-1 & Phase-2]

Collection vehicles are repaired and managed at three workshops in DNCC, DSCC, and CCC. Under this output the operation and maintenance improvement of these vehicle workshops was conducted. Particularly, in collaboration with the grant aid project, this Project provided introductory instruction on “preventative measures” through daily and periodic vehicle inspections that were effective in avoiding future vehicle failures, as well as preparation of the workshop service regulations and Occupational Health and Safety (hereinafter referred to as “OHS) rules for workshop staff members. The Project provided 22 training programs in total, which were attended by 503 staff members (mainly drivers and mechanics) of the three CCs. As a result of the training, the number of repairs in CCC decreased from 321 in January 2022 to 252 in March 2022 (reduced by about 30%), and the repair costs also dropped from 320,000 Bangladesh Taka (hereinafter referred to as “BDT”) (approximately 481,933 Japanese Yen (hereinafter referred to as “JPY”)) in January 2022 to 290,000 BDT (approximately 436,752 JPY) in March 2022 (reduced by about 10%). In addition, in March 2022, CCC issued an office order to make the preventive maintenance monitoring sheet an official document to be used at the workshop.

[Output 5: Information sharing for challenges and efforts of SWM among city corporations and other small local governments around Dhaka metropolitan area are conducted by LGD.]

(1) (LGD) Holding of SWM Information Exchange Meetings [Phase-1 & Phase-2]

DNCC and DSCC are the two cities where the most advanced SWM activities are conducted in Bangladesh. In other cities, where economic development and population growth are progressing, a comprehensive SWM system and earnest efforts for SWM similar to DNCC and DSCC are urgently required. The SWM Information Exchange Meetings were held to provide the opportunity for the 12 CCs¹² nationwide to share knowledge and experiences, construct a network for information exchange and support each other, and discuss the future prospects of SWM throughout Bangladesh. During the Project, a total of three waste management information exchange meetings were held, with a total of 220 participants. At the meetings, participants actively discussed the important issues for consideration in the immediate future, such as the introduction of Eco-Town and WtE, 3R promotion, medical waste management, and waste management rules. At the 3rd meeting, the participants recognized the importance of such information exchange meetings, and LGD announced that the meetings would continue to be held even after the completion of the Project.

[Output 6: Public relation (PR) activities for SWM are promoted in DNCC and DSCC.]

(1) (DNCC and DSCC) Public Relations and Awareness Raising [Phase-1 & Phase-2]

WMD have done very little work on systematic public relations and awareness-raising activities mainly owing to having no staff members in charge of public relations and public awareness¹³. The New Master Plan includes intermediate treatment which is very costly in terms of project development and will require securing a high budget for operation and management. Therefore, it is vital for the CCs to deepen people's understanding of waste management, and to effectively promote public relations and awareness-raising to work together with residents. Hence, JPT repeatedly discussed with CWMO and the Public Relations Department (hereinafter referred to as "PRD") of the CC on the needs to strengthen media relations and public disclosure of the New Master Plan in Phase 1 of the project in order to develop the foundation for public awareness raising. In Phase 2, the project proceeded with information disclosure and implemented various public relations activities based on a public relations and awareness plan (draft), and organized a group in charge of planning and implementing these activities. The public relations and awareness plan was initially prepared in line with a nationwide one-year public awareness campaign "Clean Village, Clean City" that the Government of Bangladesh planned to start from March 2020¹⁴; however, owing to the COVID-19 pandemic, the campaign was postponed indefinitely. Although somewhat impacted by the fact that activities such as community meetings and mass gatherings have been restricted under COVID-19 conditions, various public relations and awareness activities, suitable for these conditions were actively implemented; with preparation and disclosure of annual waste management report; development and broadcasting of 5-episode educational documentary series (TV audience rating: 27%); and development and broadcasting of a public awareness TV spot for river clean-up (viewer on TV: 4.58 million in total, viewer on YouTube and Facebook: 673,000 (as of April 2022)). The public relations and awareness plan also incorporated an annual budgeting plan and establishment of the public relations and awareness group (DNCC: PR Planning Team, DSCC: PR Planning Taskforce) in order to provide a stable

¹² There are 12 CCs in Bangladesh. The numbers of CCs will increase in the future.

¹³ Staffing rate to approval posts for WMD is as follows: DNCC 50% (Approved posts: 257, Staff working in WMD: 128), DSCC 31% (Approved posts for WMD: 352, Staff working in WMD: 108)

¹⁴ The Prime Minister's Office issued a letter to LGD on September 18, 2019, to request and supervise each local government to prepare and implement an action plan for public awareness campaign "Clean Village, Clean City".

organizational structure for public relations and awareness, and confirmed that promotion of public relations and awareness activities was an important WMD strategy for SWM. In addition, DNCC appointed a WMD staff in charge of community awareness during the project period. It can be safely said that both CCs recognition of the importance of public relations and awareness on waste management has been increasing.

[Output 7: Lifetimes of the existing landfill sites are prolonged and new landfill area is secured in DNCC and DSCC.]

(1) (DNCC and DSCC) Extension of Lifetime of Existing Landfills and Securement of New Landfills [Phase-1 & Phase-2]

The remaining lifespans of Matuail LFS (operated by DSCC, landfill area about 19ha¹⁵) and Amin Bazaar LFS (operated by DNCC, landfill area about 20ha) are about 1.2 years and 0.64 years respectively. Securement of a new landfill site is an urgent issue for both CCs. However, due to the rapid increase of land prices¹⁶, plans for development of new LFS have hardly progressed in either city. Therefore, the Project provided technical support to prolong the lifetime of the two LFS and allow the CCs more time for developing new LFS. Examples of the support included guidance on how to accurately calculate the remaining years of the existing LFS using a drone, and implementation of a dumping platform improvement pilot project using steel plates. At the same time, the Project provided technical guidance to improve the operation of LFS by establishing a Landfill Management Unit (hereinafter referred to as “LMU”), installing a chemical treatment facility for leachate, preparation and submittal of a Development Project Proposal (hereinafter referred to as “DPP”) for securing a new landfill site, proper closure of the existing LFS, and preparation of the land use plan after proper closure of the existing LFS.

As a result, the lifespans of both existing LFS were extended by two years respectively, and the Government of Bangladesh (hereinafter referred to as “GoB”) secured the construction costs for expanding the existing LFSs, and the costs necessary for the proper closure of the existing landfill areas in both cities. Improvement work on the two existing LFS was carried out from the latter half of 2018, and from the latter half of 2021, environmental monitoring for the proper closure of the existing LFS was started. DSCC started the expansion work on the Matuail LFS from January 2022.

On the other hand, although DNCC started investigation and design in January 2022 for the expansion project at Amin Bazaar LFS, the land acquisition was not completed as of May 2022. This expansion plan is not an Eco-Town plan, but a plan to build a facility that can incinerate all waste generated in Dhaka North City and generate electricity¹⁷. For this reason, the construction project for the newly opened Nashirabad LFS (landfill area of approximately 20ha) has been suspended as of May 2022.

¹⁵ Expansion work at Matuail LFS started in January 2022, and is scheduled to be completed in June 2023 (planned expansion area: about 20ha).

¹⁶ DSCC received the budget for the expansion work of the Matuail LFS from GoB and started purchasing the land, but the land acquisition cost doubled in 10 years from the time of application for the project cost. Therefore, DSCC requested additional support from GoB. In DNCC, land prices have tripled between 2000 and 2010, and it is expected that the upward trend will continue in the future.

¹⁷ Refer to Footnote 6 (Summary p.5)

[Output 8: A proper medical waste management system is established in CCC.]

(1) (CCC) Establishment of Appropriate Medical Waste Management System [Phase 2]

In the area of CCC, the collection of medical waste generated in Health Care Establishments (hereinafter referred to as “HCEs”) has been carried out by collection companies licensed by CCC since 2005. The medical waste is rarely separated at the source, and the collected medical waste is disposed of by open burning at designated sites. In addition, there are still many small HCEs that do not have contracts for medical waste disposal.

The rapid increase in the amount of infectious waste generated from households and HCEs due to the spread of COVID-19 infection required the immediate promotion of the establishment of an appropriate medical waste management system. Accordingly, as a pilot project, the medical waste incinerator (treatment capacity: 200 kg/hour) was installed in the Haliashahar LFS (operation started in January 2022), and the medical waste management system was established in the model hospitals. JPT also supported the establishment of an appropriate medical waste collection and treatment system, and awareness raising on proper segregation and disposal of medical waste at the source.

As a result of these activities, a new system for medical waste management was decided upon and a medical waste management committee was established in November 2021 with the participation of medical waste related organizations including Ministry of Health and Family Welfare (MOHFW)¹⁸. It was also decided to establish a medical waste management unit to implement medical waste management under the supervision of the medical waste management committee, and a formal letter was issued by CCC in December 2021 in this regard. Based on the letter, personnel were assigned to operate and manage the medical waste incinerator (one foreman, two supervisors, three operators and three workers, in total 9 persons). In addition, administrative guidance from DOE, including investigations of illegal medical waste storage sites, public hearings for private contractors, and issuing official notes helped prevent the dangerous practice of materials extraction from medical waste, illegal dumping, and mixing of medical waste with general waste. As a result, the amount of medical waste incinerated increased from approximately 300 kg/day at the beginning of incinerator operation to approximately 900 kg/day as of March 2022.

[Other activities]

(1) (DNCC, DSCC, and CCC) SWM Training in Japan and Third Country Training Program [Phase-1 & Phase-2]

The Project provided the SWM training programs in Japan three times and Third Country Training Program (hereinafter referred to as “TCTP”) in Kolkata, India.

The 1st SWM training in Japan was held from May 21 to June 1, 2018 (5 trainees). The training contributed to each trainee’s capacity development on waste management as well as awareness-raising for necessity of waste

¹⁸ The Ministry of Health and Family Welfare (MOHFW) is responsible for issuing licenses to medical institutions, and after consultation with the committee, the civil surgeon office, which is a subordinate organization of MOHFW, issues a letter to medical institutions regarding the proper treatment of medical waste.

management improvement. In addition, it was an important opportunity for the trainees to consider understanding and adopting Japan's SWM technology and the management methods in Bangladesh. Upon their return to Bangladesh, the trainees reported at the JCC meeting on the achievements of the 1st training in Japan and shared their training experiences with related stakeholders.

The 2nd SWM training in Japan was held from June 9, 2019 to June 15, 2019 (3 trainees). The training contributed to gaining knowledge on intermediate treatment including WtE and Eco-Town as well as awareness-raising for integrated waste management improvement and WtE implementation. The trainees reported their achievement at the JCC meeting after their return to Bangladesh, particularly about intermediate treatment in Japan which is mostly by incineration, Eco-Town's various treatment technologies, and land reclamation landfill, and shared their training experiences with related stakeholders.

The 3rd SWM training in Japan was implemented from November 8 to 11, 2021 (6 trainees). The 3rd SWM training in Japan was conducted as online training using Zoom application, since it was difficult to invite the counterparts to Japan due to the spread of COVID-19. The training contents included "public awareness methods for sustainable waste management, Eco-Town projects, and good practices in waste management systems in neighboring countries", which provided the trainees with a broad range of knowledge. On the final day, the draft 3R action plans prepared by trainees from each city were presented, and an active discussion was held with the participants.

TCTP was held from December 3, 2019 to December 9, 2019. The training contributed to each trainee's capacity development on waste management. In addition, it was a great opportunity for the trainees to think about adopting India's technology and the management methods to Bangladesh through understanding Indian waste management and practices. The trainees reported their achievement at WBA Core Group meetings and shared the experiences with related stakeholders.

(2) (DNCC, DSCC, and CCC) Emergency Support for prevention of COVID-19 infection [Phase 2]

Following the worldwide epidemic of COVID-19, the first infection case in Bangladesh was confirmed in March 2020. Even during the capital lockdown, waste management field workers, considered as essential workers, continued their cleanup work. Under such circumstances, the Project provided the following support from May 2020 as an emergency response; (1) establishment of various guidelines and awareness tools specializing in measures against COVID-19 infection, (2) Occupational Safety and Health (hereinafter referred to as "OSH") measures and guidance for field workers such as cleaners, and (3) awareness-raising activities for residents and Health Care Establishments (hereinafter referred to as "HCEs") for proper sorting and disposal of infectious (high-risk) waste. Specifically, a total of about 70,000 safety equipment (masks, gloves, etc.) and about 330 pocket books were distributed to field workers in all three cities, and safety equipment training was held for more than 1,000 people. Six types of leaflets were prepared for citizens, cleaners, waste collectors, drivers, landfill site workers, and workshop staff (mechanics), and about 40,000 leaflets were distributed in the three cities. The contents of the leaflet were widely disseminated on TV and digital bulletin boards in collaboration with the PRD of the three cities, and also in collaboration with other JICA projects,

which enabled providing of about 46,000 leaflets to the four CCs in Bangladesh (Rangpur CC, Narayanganj CC, Gazipur CC and Cumilla CC) for distribution within these cities.

As a result of these support activities, as of January 2021 the percentage of cleaners wearing masks exceeded 70% in all three cities, confirming an improvement in OSH awareness among them. In addition, a series of guidelines and awareness tools prepared in the Project were posted on the JICA website and were used in other countries such as South Sudan, contributing to the prevention of the spread of COVID-19 infection and the improvement of OSH of field workers.

7 Achievement of Output

One or two items are set as Objectively Verifiable Indicators (hereinafter referred to as “OVIs”) for evaluating the degree of achievement for each outcome. Based on these indicators, it was confirmed that all the achievements from Output 1 to Output 8 were achieved through the activities of the Project. The details of the evaluation results are shown in the following table.

Table 1 Achievement of Outputs

OVI	Contents	Achievement
Output 1. New MP targeting the year of 2032 is formulated separately for North Dhaka City and South Dhaka City.		Achieved
(OVI 1.1) The New MP is approved by LGD	<ul style="list-style-type: none"> • New MPs were approved by the mayors (DNCC: 30th November 2019, DSCC: 23th September 2019). • The New MPs are open to the public on each city's website. • In addition, by implementing the priority projects based on the New MPs in the Project, feasible improvement measures for the waste management system were identified. 	Achieved
(OVI 1.2) WMD Directives is approved by the Mayor of each city and made available to the public	<ul style="list-style-type: none"> • [DNCC] Approved by the mayor in August 2021, and the leaflet for the public disclosure was distributed (1,000 copies). The leaflet was also posted on DNCC's Facebook in November 2021. • [DSCC] Approved by the mayor in July 2019, and the leaflet for the public disclosure was distributed and/or through SNS group. The leaflet was posted on DSCC's Facebook in July 2021. 	Achieved
Output 2. WBA activities are improved and expanded in North Dhaka City and South Dhaka City.		Achieved
(OVI 2.1) WBA Core Group is established in DNCC and DSCC, and has a meeting every month	<ul style="list-style-type: none"> • WBA core group (comprising WMD high officials and some of the field-level managers such as CIs for WBA promotion) was formulated officially based on the office order issued by CWMO (DSCC: dated on 22nd March 2018, DNCC: dated on 4th July 2018). • During the project period from June 2017 to May 2022, total 109 WBA core group meetings and zone 	Achieved

OVI	Contents	Achievement																								
	meetings were held (69 meetings in DNCC and 40 meetings in DSCC in total, including WBA core group meeting and zone-wise meeting).																									
(OVI 2.2) Ward offices are newly established and WBA activities are implemented in at least 5 wards in each city	<ul style="list-style-type: none"> WBA penetration rate among 93 wards in DNCC and DSCC is improved from 34% in 2017 to 82% in 2022. Moreover, waste collection amount is increased from about 4,997 ton/day in 2017 to about 5,287 ton/day in 2020. Waste collection rate is also increased from 80% in 2017 to 82% in 2020. WBA activity records by WBA1-4 are summarized below; <table border="1"> <thead> <tr> <th>WBA</th> <th>Total</th> <th>DNCC</th> <th>DSCC</th> </tr> </thead> <tbody> <tr> <td>Ward SWM office (WBA1)</td> <td>51 offices</td> <td>23 offices</td> <td>28 offices</td> </tr> <tr> <td>Cleaners' workshop (WBA2)</td> <td>96 times</td> <td>67 times</td> <td>29 times</td> </tr> <tr> <td>Community Meeting (WBA3)</td> <td>51 times</td> <td>32 times</td> <td>19 times</td> </tr> <tr> <td>Waste collection improvement (WBA4)</td> <td>34 areas</td> <td>18 areas</td> <td>16 areas</td> </tr> <tr> <td>WBA penetration rate</td> <td>82%</td> <td>100%</td> <td>70%</td> </tr> </tbody> </table> <p>* SWM: Solid Waste Management</p> <ul style="list-style-type: none"> <u>WBA1 (Ward SWM office management):</u> 51 ward offices are functional in DNCC and DSCC, including 18 ward SWM offices where JICA Project Team procured furniture and equipment (10 ward SWM offices in DSCC in November 2020, 8 ward SWM offices in DNCC in June 2021 respectively). The increase in the number of ward SWM offices has made it possible to visualize the spread of the WBA, which has led to the strengthening of the foundation of field activities and the placement of new CIs. <u>WBA2 (Occupational safety and health improvement and cleaners' workshop):</u> Through the cleaners' workshop, the occupational safety and health awareness of cleaners, including measures against new coronavirus infections, were enhanced. <u>WBA3 (Holding community meetings):</u> By implementing the waste segregation pilot project, about 25 tons of recyclable materials were collected every month in a sanitary manner from about 7,000 people (about 2,000 target households). <u>WBA4 (Waste collection improvement):</u> Total of 41 illegal dumping sites and/or non-collection areas (hotspots) were identified and waste collection improvement was carried out by two prototype RVs. As a result, the loading time was shortened from 	WBA	Total	DNCC	DSCC	Ward SWM office (WBA1)	51 offices	23 offices	28 offices	Cleaners' workshop (WBA2)	96 times	67 times	29 times	Community Meeting (WBA3)	51 times	32 times	19 times	Waste collection improvement (WBA4)	34 areas	18 areas	16 areas	WBA penetration rate	82%	100%	70%	Achieved
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OVI	Contents	Achievement										
	about 20-30 minutes to about 5 minutes, and the sanitary environment around the collection site was improved.											
Output 3. WCT Plan is developed, and an appropriate waste collection and transport system is implemented in Chattogram City.		Achieved										
(OVI 3.1) The WCT Plan is approved by the Mayor	<ul style="list-style-type: none"> A vehicle distribution plan, including the GAP vehicles, was completed in September 2018. Based on the guidance manual submitted to the mayor on 25th August 2019, a WCT plan was developed and approved by the mayor on August 26th, 2021. 	Achieved										
(OVI 3.2) WBA activities are implemented in 2 wards (model wards)	<ul style="list-style-type: none"> WBA core group was officially formulated based on the office order issued in March 2019, and 15 WBA core group meetings were held in total. WMC, a cross-departmental taskforce to comprehensively manage SWM, was established in accordance with an office order dated on 4th August 2019, as a predecessor of WMD. WMC meetings were held 8 times in total. WBA penetration rate among 41 wards in CCC was 90% in 2022. In addition, ward 8 and ward 27, where experienced CIs were allocated, were selected as a model ward, and WBA activities were carried out actively. Waste collection amount was increased from about 1,200 ton/day in 2014 to about 2,220 ton/day in 2021 with support of GAP implemented from 2015 to 2018. WBA activity records by WBA1-4 are summarized below; <table border="1"> <thead> <tr> <th>WBA</th> <th>CCC</th> </tr> </thead> <tbody> <tr> <td>Ward SWM office (WBA1)</td> <td>38 offices (among them, 2 ward SWM offices were constructed by the Project)</td> </tr> <tr> <td>Cleaner's workshop (WBA2)</td> <td>44 times (12 Safety and Sanitation Committees (SSCs) were established)</td> </tr> <tr> <td>Community Meeting (WBA3)</td> <td>17 times (Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI)</td> </tr> <tr> <td>Waste collection improvement (WBA4)</td> <td>101 Prototype RVs were introduced and in operation.</td> </tr> </tbody> </table> <p>* SWM: Solid Waste Management</p> <ul style="list-style-type: none"> <u>WBA1 (Ward SWM office management):</u> Ward SWM offices were constructed in 2 wards (Ward 31 and Ward 39) in June 2021, and the inauguration ceremony was held in November 2021. <u>WBA2 (Occupational safety and health</u> 	WBA	CCC	Ward SWM office (WBA1)	38 offices (among them, 2 ward SWM offices were constructed by the Project)	Cleaner's workshop (WBA2)	44 times (12 Safety and Sanitation Committees (SSCs) were established)	Community Meeting (WBA3)	17 times (Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI)	Waste collection improvement (WBA4)	101 Prototype RVs were introduced and in operation.	Achieved
WBA	CCC											
Ward SWM office (WBA1)	38 offices (among them, 2 ward SWM offices were constructed by the Project)											
Cleaner's workshop (WBA2)	44 times (12 Safety and Sanitation Committees (SSCs) were established)											
Community Meeting (WBA3)	17 times (Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI)											
Waste collection improvement (WBA4)	101 Prototype RVs were introduced and in operation.											

OVI	Contents	Achievement
	<p><u>improvement and cleaner’s workshop</u>): Through the cleaners’ workshop, the occupational safety and health awareness of cleaners, including measures against COVID-19 infections, were enhanced.</p> <ul style="list-style-type: none"> • <u>WBA3 (Holding community meetings)</u>: By implementing the waste segregation pilot project, about 265 tons of recyclable materials were collected every month in a sanitary manner from about 73,000 people (about 18,000 target households). Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI. • <u>WBA4 (Waste collection improvement)</u>: 101 improved RVs were manufactured and waste collection improvement by prototype RVs is ongoing. As a result, the loading time was shortened from about 20-30 minutes to about 5 minutes, and the sanitary environment around the collection site was improved. 	
Output 4. Sustainable workshop management system is established in DNCC, DSCC, and CCC.		Achieved
(OVI 4.1) Training for preventative maintenance is carried out	<ul style="list-style-type: none"> • From March 2021 to January 2022, 19 training courses on preventive maintenance of waste collection vehicles were conducted in DNCC, DSCC, and CCC respectively. 430 mechanics and drivers were trained in total. • As a result, the repair cost and the number of repairs were reduced in the three cities. (In CCC, the number of repairs was reduced by about 30%, and the repair cost was reduced by about 10%). 	Achieved
(OVI 4.2) Training for the occupational health and safety rules (draft) and the workshop service regulation (draft) are carried out.	<ul style="list-style-type: none"> • September 2018, three training courses on the occupational health and safety rules and the workshop service regulation were conducted in DNCC, DSCC, and CCC respectively. • As a result, the occupational safety and health awareness of the workshop staff, including measures against infection with COVID-19, was improved. The training also led to the strengthening of the preventive maintenance monitoring system. 	Achieved
Output 5. Information sharing meeting on SWM with city corporations and small local governments in Dhaka metropolitan area is held by LGD.		Achieved
(OVI 5.1) The information sharing meetings are held twice	<ul style="list-style-type: none"> • The first 12CC information sharing meeting was held on 2nd December 2018 and the proceedings were delivered to JICA, LGD and every CC in March 2019. • The second 12CC information sharing meeting was held on 23th February 2020 and the proceedings were delivered to JICA, LGD and every CC in September 2020. 	Achieved

OVI	Contents	Achievement
	<ul style="list-style-type: none"> • The third 12CC information sharing meeting was held on 20th March 2022 and the proceedings were delivered to JICA, LGD and every CC in May 2022. 	
<p>(OVI 5.2) SWM support activities by DNCC and DSCC to other city corporations and small local governments in Dhaka metropolitan area are conducted 4 times.</p>	<ul style="list-style-type: none"> • SWM support activities by DNCC and DSCC to other city corporations and small local governments in Dhaka metropolitan area have been conducted 4 times. <ul style="list-style-type: none"> - Support activity to Narayanganji City Corporation by DNCC and the Project Team (information sharing and advice) on 31st October 2018 - Support activity to Gazipur City Corporation by DNCC and the Project Team (information sharing and advice) on 20th November 2018 - DNCC's visit to Jossore Municipality (information sharing and site visit to new landfill site and compost plant) on 29th January 2020 - The COVID-19 leaflet sharing to SNS group consisting of 12CCs in June 2020. 	<p>Achieved</p>
<p>Output 6. Public relation (PR) activities for SWM are promoted in North Dhaka City and South Dhaka City.</p>		<p>Achieved</p>
<p>(OVI 6.1) PR Committee on SWM is established in DNCC and DSCC</p>	<ul style="list-style-type: none"> • PR Committee (DNCC: PR Planning Team, DSCC: PR Planning Taskforce) was established. 	<p>Achieved</p>
<p>(OVI 6.2) PR and public awareness activities are implemented based on PR Plans in North Dhaka City and South Dhaka City.</p>	<ul style="list-style-type: none"> • The following activities have commenced based on the PR Plan (preliminary draft) and the 2020 public awareness action plan for the nationwide campaign 'Clean Village Clean City Initiative': <ul style="list-style-type: none"> - Preparation of Annual Waste Report (Publicly available on each city's website) - Release of an educational TV documentary series (5 episodes, audience rate: 27%) - Release of short movies for public awareness on sorting waste - Release of TV spots of public awareness for river clean-up (Viewer on TV: 4.58 million, Number of views on YouTube and Facebook: approximately 673,000 views (as of May 2022)) - Publication of newspaper articles for local governments (25 articles, from June 2020 to February 2022) - Update of WMD information on the websites of DNCC and DSCC 	<p>Achieved</p>

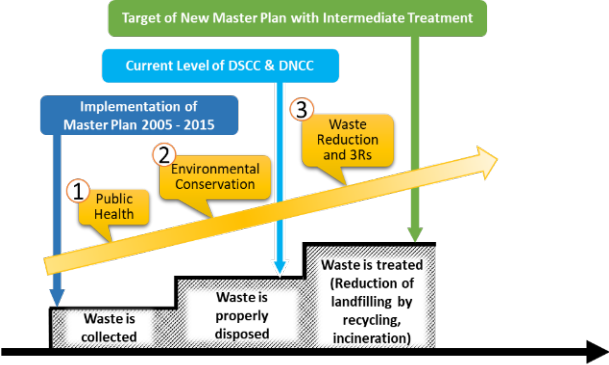
OVI	Contents	Achievement
	- Preparation of Environmental Education Manual and implementation of training programs for CI	
Output 7. Lifetime of the existing landfill sites is prolonged and new landfill area is secured by DNCC and DSCC.		Achieved
OVI 7.1 DPPs for extension of the existing landfill sites and/or for construction of new landfill sites are submitted to Government of Bangladesh (GoB).	<ul style="list-style-type: none"> · DSCC's DPP for Matuail LFS expansion was approved by ECNEC in December 2019. Extension construction work started in January 2022. · DNCC's DPP for Amin Bazar LFS expansion was approved by ECNEC in March 2020. · Through the support of the Project, the lifespan of the both existing LFSs was extended by two years, and GoB secured the construction costs for expanding the existing LFSs, and the costs necessary for the proper closure of the existing landfill areas in both cities. · DPP for construction of DNCC Nasirabad LFS was rejected by LGD because it was decided to construct a WtE facility in the expansion area of the Amin Bazar LFS, which has the capacity to incinerate all the waste generated in North Dhaka City. 	Achieved
Output 8. Medical waste management system in CCC is improved		Achieved
(OVI 8.1) The operation and maintenance section of medical waste incinerator is established in CCC.	<ul style="list-style-type: none"> · A new system for medical waste management was decided, and in November 2021, a medical waste management committee was established with the participation of medical waste-related organizations. · As a pilot project, a small-scale medical waste incinerator was installed in the Halishahar landfill site (started operation in January 2022), and medical waste treatment system was established in model hospitals. · Establishment of medical waste management unit was decided, and an official letter was issued by CCC in December 2021. Based on the official letter, the operation staff of the medical waste incinerator (1 supervisor, 2 managers, 3 operators and 3 workers) were assigned. · Incineration amount of medical waste was increased from about 300 kg/ day to about 900 kg/ day thanks to the administration guidance by DOE 	Achieved

* CC: City Corporation, CI: Conservancy Inspector, DOE: Department of Environment, Ministry of Environment, Forest and Climate Change, DPP: Development Project Proposal, ECNEC: Executive Committee of National Economic Council, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, WBA: Ward-based Approach, WMC: Waste Management Cell, WMD: Waste Management Department
Reference: JPT

Table 2 Achievement of the Project Purpose

OVI	Contents	Achievement																																																																	
	[DNCC and DSCC] SWM system in North Dhaka City and Dhaka South City is improved based on the New MPs.	Achieved																																																																	
Priority activities within the priority projects specified in the New MPs are implemented.	<ul style="list-style-type: none"> Of the 37 priority projects incorporated in the New Master Plans, 84% have already been completed or are in progress. <p>Table: Implementation status of priority projects of the New Master Plans</p> <table border="1"> <thead> <tr> <th>Component</th> <th># of Priority Project</th> <th>Completed</th> <th>In progress</th> <th>Not yet implemented</th> </tr> </thead> <tbody> <tr><td>1</td><td>4</td><td>0</td><td>3</td><td>1</td></tr> <tr><td>2</td><td>3</td><td>0</td><td>3</td><td>-</td></tr> <tr><td>3</td><td>2</td><td>0</td><td>2</td><td>-</td></tr> <tr><td>4</td><td>5</td><td>1</td><td>3</td><td>1</td></tr> <tr><td>5</td><td>3</td><td>1</td><td>2</td><td>-</td></tr> <tr><td>6</td><td>5</td><td>2</td><td>1</td><td>2</td></tr> <tr><td>7</td><td>5</td><td>0</td><td>5</td><td>-</td></tr> <tr><td>8</td><td>3</td><td>2</td><td>1</td><td>-</td></tr> <tr><td>9</td><td>3</td><td>0</td><td>2</td><td>1</td></tr> <tr><td>10</td><td>4</td><td>0</td><td>3</td><td>1</td></tr> <tr><td>Total</td><td>37</td><td>6</td><td>25</td><td>6</td></tr> <tr><td>Percentage</td><td>-</td><td>16%</td><td>68%</td><td>16%</td></tr> </tbody> </table> <ul style="list-style-type: none"> Among 37 priority projects, 31 priority projects were supported through the Project by implementing and achieving 8 outputs and 7 priority projects.¹⁹ In order to improve the waste management system (generation, waste collection and transportation, intermediate treatment, and final disposal), in addition to solving the individual problems of each component, it is necessary to have an integrated solution (example: Strengthening collaboration between primary collection and secondary collection). Based on this recognition, the Project supported the 10 components of the new master plan as a whole, and in addition to the results shown in Table 1, the results such as shortening the transshipment time from the primary collection to the secondary collection, and strengthening the data management were achieved. The New Master Plans aim to shift from environmental conservation to the formation of a sound material-cycle society. In the Project, not only the technical improvement of the waste management system, but also the organizational and institutional capacity for integrated solid waste management was enhanced by the institutionalization of public relations and information disclosure for waste 	Component	# of Priority Project	Completed	In progress	Not yet implemented	1	4	0	3	1	2	3	0	3	-	3	2	0	2	-	4	5	1	3	1	5	3	1	2	-	6	5	2	1	2	7	5	0	5	-	8	3	2	1	-	9	3	0	2	1	10	4	0	3	1	Total	37	6	25	6	Percentage	-	16%	68%	16%	Achieved
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¹⁹ i) Activities for introduction of Eco-Town, ii) Pre-F/S on introduction of WtE in Dhaka North City, iii) Introduction of new waste collection system in consideration of collaboration between Primary and Secondary collection, vi) 3R promotion and implementation of waste segregation pilot project, v) Administrative Guidance on the Waste Management Rules 2021 by DOE, vi) Public Relations and Public Awareness (“Output 6” in the phase 2 of the Project), and vii) Extension of lifetime of existing landfills and securing of sites for new landfills (“Output 7” in the phase 2 of the Project).

OVI	Contents	Achievement
	<p>management, promotion for waste reduction and 3Rs, and establishing a new unit for strengthening the operation of waste management at the field level. Active involvement from various stakeholders is also intentionally promoted so as to increase the sustainability of the waste management system after the completion of the Project.</p>  <p>Fig: Waste Management Level and in DNCC/DSCC and Goal of the New Master Plan Reference: JPT based on mundi (JICA publication, May 2018, p 6,7)</p>	
[CCC] SWM system in Chattogram City is improved.		Achieved
<p>Trainings for preventative maintenance of collection vehicles, Occupational Health and Safety (OHS), and service discipline are implemented based on the waste collection and transport plan (WCT Plan).</p>	<ul style="list-style-type: none"> • Eight training sessions on preventative maintenance of collection vehicles, OHS and service discipline have been conducted for mechanics and drivers (179 people in total). In addition, CCC issued the office order to make the monitoring sheet of preventive maintenance an official document in March 2022. • Initially, only waste collection improvement was targeted for CCC in collaboration with GAP, but the knowledge and experience of DNCC/DSCC was used efficiently and effectively. In addition, C/P was very active in CCC. Therefore, the Project was able to achieve more goals than originally planned in CCC. Specifically, the following initiatives were made: <ul style="list-style-type: none"> - WBA introduction in model ward for community participatory solid waste management - Promotion of 3Rs and waste reduction for sustainable waste management - Introduction of a new waste collection system that considers the cooperation between primary collection and secondary collection - Strengthening the medical waste treatment system • In addition, WMC that centrally manages solid waste management service in CCC was established as the 	<p>Achieved</p>

OVI	Contents	Achievement
	<p>predecessor of the WMD by the office order of CEO of Chattogram City on August 4, 2019. In the Project, eight WMC meetings have been held in total, and a system has been established in which the Engineering wing and Conservancy wing discuss important issues such as an extension of LFS lifespan and installing a small-scale medical waste incinerator.</p> <ul style="list-style-type: none"> • Through these activities, the entire waste management system in CCC was improved as well as in DNCC and DSCC which enables CCC to build the foundation of the waste management system towards a sound material-cycle society. 	

* CEO: Chief Executive Officer, C/P: Counterpart, WBA: Ward-based Approach, WMC: Waste Management Cell, WMD: Waste Management Department
Reference: JPT

8 Recommendations for Achieving the Overall Goal

Dhaka North and Dhaka South Cities and Chattogram City are undergoing a rapid economic growth, severe changes, and a major transition in the citizens' sense of values. These cities must develop organizations and human resources with which such changes can be flexibly handled with foresight. Under circumstances where landfills have a short remaining useful life and the introduction of intermediate treatment is unavoidable, in particular, it is important that the administrative public relations are enhanced to gain the trust of the citizens so that administrators and citizens can keep pace and collaborate with each other to promote SWM. Under such circumstances, for achieving the overall goal by realizing independent and sustainable solid waste management system in Bangladesh, recommendations are summarized as shown below.

[All Cities]

- Strengthening the functions of 12 City Corporations
- Promotion of waste reduction and 3Rs (Reduce, Reuse and Recycle)
- Strengthening cooperation with the Department of Environment

[DSCC and DNCC]

- Enhancement of the capacity of Waste Management Department
- Phased development of recycling facilities based on the Eco-Town concept
- Strengthening of Public Relations
- Promoting WBA in the new city area
- Continuing canal cleanup campaign and prevention measures against scattered wastes

[CCC]

- Support for Establishment of Waste Management Department
- Extending the life span of existing landfills
- Strengthening medical waste management capacity

Project Activities (including related activities)

❑ Joint Coordination Committee (JCC) and Final Completion Workshop

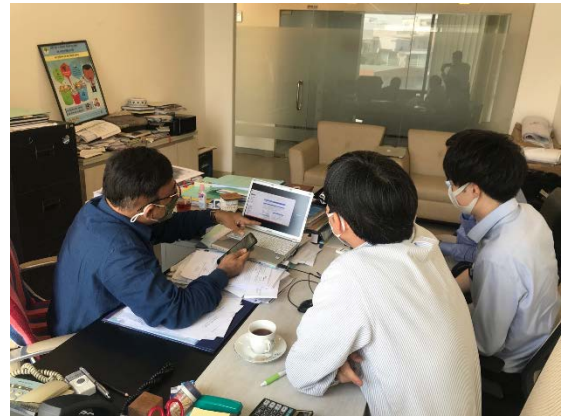
	
<p style="text-align: center;">The 1st JCC meeting (November 2017)</p>	<p style="text-align: center;">The 6th JCC meeting (December 2019)</p>
	
<p style="text-align: center;">Final Completion Workshop (1) (May 2022)</p>	<p style="text-align: center;">Final Completion Workshop (2) (May 2022)</p>

❑ Output-1: New Master Plan targeting the year of 2032 is formulated separately for Dhaka North City and Dhaka South City (Phase-1 & Phase-2)

	
<p style="text-align: center;">Explanation of a new master plan to New Project Director (Additional Secretary of LGD) (November 2021)</p>	<p style="text-align: center;">Discussion with LGD on a new master plan (November 2017)</p>



Training on the waste management rules 2021, co-organized with the Department of Environment (Dhaka North City) (March 2022)



Online meeting on F/S for Waste-to-Energy (Dhaka North City) (March 2021)

❑ Output 2: WBA activities are improved and expanded in Dhaka North City and Dhaka South City (Phase-1 & Phase-2)



WBA1: Procurement of furniture of ward solid waste management office (Dhaka South City) (November 2020)



WBA1: Morning meeting at front of ward office (Dhaka North City) (August 2020)



WBA2: Cleaners workshop (Ward 50, Dhaka South City) (December 2018)



WBA2: Cleaners workshop (Ward 20, Dhaka North City) (February 2019)



WBA3: Community meeting
(Ward 50, Dhaka South City) (April 2018)



WBA3: Community meeting
(Ward 11, Dhaka North City) (January 2019)



Monitoring of WBA4 waste collection and cleaning
status (Ward 16, Dhaka South City)
(May 2021)



Guidance on improving waste collection in WBA4
(Dhaka North City)
(June 2019)



WBA core group meeting (Dhaka South City)
(April 2018)



WBA core group meeting (Dhaka North City)
(January 2020)

❑ **Output 3: Waste Collection and Transportation Plan is developed, and an appropriate waste collection and transport system is implemented in Chattogram City (Phase-1 & Phase-2)**

	
<p>Waste Management Cell (WMC) meeting (Chattogram City) (November 2021)</p>	<p>Handover ceremony of the waste collection and transportation plan to the mayor (Chattogram City) (August 2021)</p>
	
<p>Handover ceremony of ward solid waste management office and prototype rickshaw vans (Chattogram City) (November 2021)</p>	<p>Waste segregation pilot project inauguration ceremony with the mayor (Chattogram City) (December 2021)</p>
	
<p>WBA 1: Completion of construction of the new ward solid waste management office (Ward 39, Chattogram City) (June 2021)</p>	<p>WBA1: Site visit of the new ward solid waste management office (Ward 31, Chattogram City) (November 2021)</p>



WBA2: Occupational Health and Safety (OHS) guidance for cleaners (Ward 39 of Chattogram City) (January 2022)



WBA2: Training for cleaners (Ward 27 of Chattogram City) (November 2021)



WBA3: Community meeting (Nasirabad Housing Society, Chattogram City) (December 2021)



WBA3: Community meeting (Ward 8, Chattogram City) (March 2022)



WBA4: Trial operation of prototype rickshaw vans (Chattogram City) (November 2021)



WBA core group meeting (Chattogram City) (May 2021)

❑ **Output 4: Sustainable workshop management system is established in Dhaka North City, Dhaka South City and Chattogram City (Phase-1 & Phase-2)**

	
<p>Training for drivers in Dhalpur workshop (Dhaka South City) (September 2021)</p>	<p>Training for drivers in Gabtoli workshop (Dhaka North City) (September 2021)</p>
	
<p>Training for drivers in workshops (Chattogram City) (September 2021)</p>	<p>Preventive maintenance management training in Dharpur workshop (Dhaka South City) (November 2021)</p>
	
<p>Preventive maintenance management training in Gabtali workshop (Dhaka North City) (October 2021)</p>	<p>Preventive maintenance management training in workshops (Chattogram City) (November 2021)</p>

❑ **Output 5: Information sharing meeting on solid waste management with city corporations and small local governments in Dhaka metropolitan area is held by the Local Government Division (LGD) (Phase-1 & Phase-2)**

	
<p>The 1st 12 city corporations' solid waste management information sharing meeting (December 2018)</p>	<p>The 3rd 12 city corporations' solid waste management information sharing meeting (March 2022)</p>
	
<p>Ward solid waste management office visit by participants of the 1st 12 city corporations' solid waste management information sharing meeting (December 2018)</p>	<p>Amin Bazer landfill site visit by participants of the 1st 12 city corporations' solid waste management information sharing meeting (December 2018)</p>
	
<p>Courtesy call on the mayor of Ghazipur City Corporation (November 2018)</p>	<p>Courtesy call on mayor of Narayanganj City Corporation (October 2018)</p>

❑ **Output 6: Public Relation (PR) activities for solid waste management is promoted in Dhaka North City and Dhaka South City (Phase-1 & Phase-2)**

	
<p>Activity for TV program production (September 2020)</p>	<p>Broadcast of TV program (December 25-30, 2021 (5 consecutive days))</p>
	
<p>Interview with mayor of Dhaka South City by the public awareness documentary program (October 2020)</p>	<p>Interview with mayor of Dhaka North City by the public awareness documentary program (December 2020)</p>
	
<p>Public awareness-raising activity (Dhaka South City) (January 2020)</p>	<p>Public awareness campaign for residents (Dhaka North City) (November 2018)</p>

❑ **Output 7: Lifetime of the existing landfill sites is prolonged and new landfill area is secured by Dhaka North City and Dhaka South City (Phase-1 & Phase-2)**

	
<p>Handover ceremony of gas meters and drones (Dhaka South City) (November 2021)</p>	<p>Handover ceremony of gas meters and drones (Dhaka North City) (November 2021)</p>
	
<p>Completion of construction of an additional leachate treatment facility at the Matuail landfill site (Dhaka South City) (December 2021)</p>	<p>Completion of construction of an additional leachate treatment facility at the Amin Bazar landfill site (Dhaka North City) (May 2022)</p>
	
<p>Covering soil installation at Matuail landfill site (Dhaka South City) (January 2021)</p>	<p>Covering soil installation at Amin Bazar landfill site (Dhaka South City) (August 2018)</p>



Guidance on drone operation
(Dhaka South City)
(December 2021)



Guidance on drone operation
(Dhaka North City)
(November 2022)



Landfill gas measurement at Matuail landfill site
(Dhaka South City)
(December 2021)



Landfill gas measurement at Amin Bazar landfill site
(Dhaka North City)
(December 2021)



Guidance on weighbridge data analysis
(Dhaka South City)
(December 2021)



Guidance on weighbridge data analysis
(Dhaka North City)
(December 2021)

❑ **Output 8: Medical waste management system in CCC is improved (Phase-2)**



Courtesy call for the mayor and discussion on the small medical waste incinerator (March 2021)



The 1st medical waste management committee meeting (November 2021)



Installation of the small medical waste incinerator (January 2022)



Handover ceremony of the medical waste incinerator (January 2022)



Training on medical waste segregation in hospital (November 2021)



Confirmation of medical waste segregation status of a hospital by the Department of Environment and Chattogram City Corporation (March 2022)



Confirmation of status of incinerator operation and maintenance by the Department of Environment (March 2022)

❑ Training in Japan and a third country (Phase-1 & Phase-2)

	
<p>Site visit to Ozenji Municipal Solid Waste Disposal Center during the 1st training in Japan (May 2018)</p>	<p>Final evaluation of the 1st training in Japan (May 2018)</p>
	
<p>Site visit to the compost facility in Uttarpar-Kotrung municipality during the third country training (Kolkata, India) (December 2018)</p>	<p>Site visit to the regional waste management center (RWMC) in Uttarpar-Kotrung municipality during the third country training (Kolkata, India) (December 2018)</p>
	
<p>Taring in Japan (online) (Dhaka South City) (November 2021)</p>	<p>Taring in Japan (online) (Dhaka North City) (November 2021)</p>
	
<p>Taring in Japan (online) (Chattogram City) (November 2021)</p>	<p>Awarding of certificate of training in Japan (online) (Dhaka North City) (December 2021)</p>

❑ **Other Activity-1: Site Visit of Cox’s Bazar on SWM (Phase-1)**



Rohingya refugee camps in Ukhia
(December 2018)



Waste dumping site in Teknaf
(December 2018)

❑ **Other Activity-2: Support relating prevention of COVID-19 spread (Phase-2)**



Handover ceremony of safety equipment to Dhaka South City Corporation (July 2020)



Handover ceremony of safety equipment to Dhaka North City Corporation (July 2020)



Handover ceremony of safety equipment to Chattogram City Corporation (August 2020)



Handover ceremony of enlightenment leaflet on prevention of COVID-19 infection (Chattogram City) (June 2020)



Distribution of the leaflet on prevention of COVID-19 infection and garbage bag for separating infectious waste by the mayor of Dhaka North City (June 2020)



Digital advertisement for prevention of COVID-19 infection for public (Dhaka North City) (July 2020)



Training on the use of non-contact thermometer to staff of the landfill in Dhaka South City (August 2020)



Training on safety gears for cleaners (Chattogram City) (August 2020)



Handover ceremony of COVID-19 infection prevention leaflets and pocket size manual etc. (Dhaka South City) (July 2020)

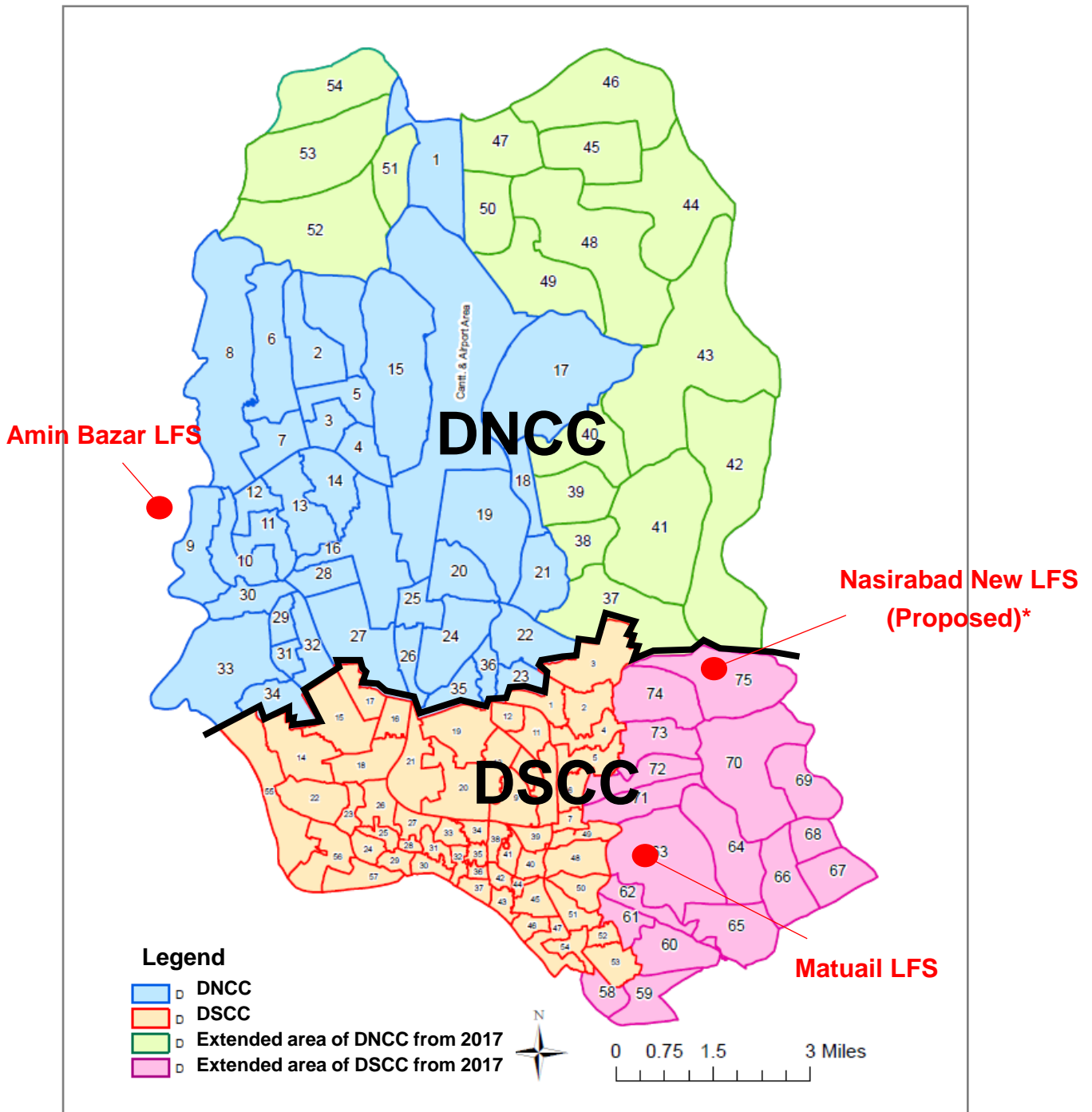


Training on safety gears for workshop staffs (Dhaka North City) (August 2020)

Project Area (1): Overview of Bangladesh



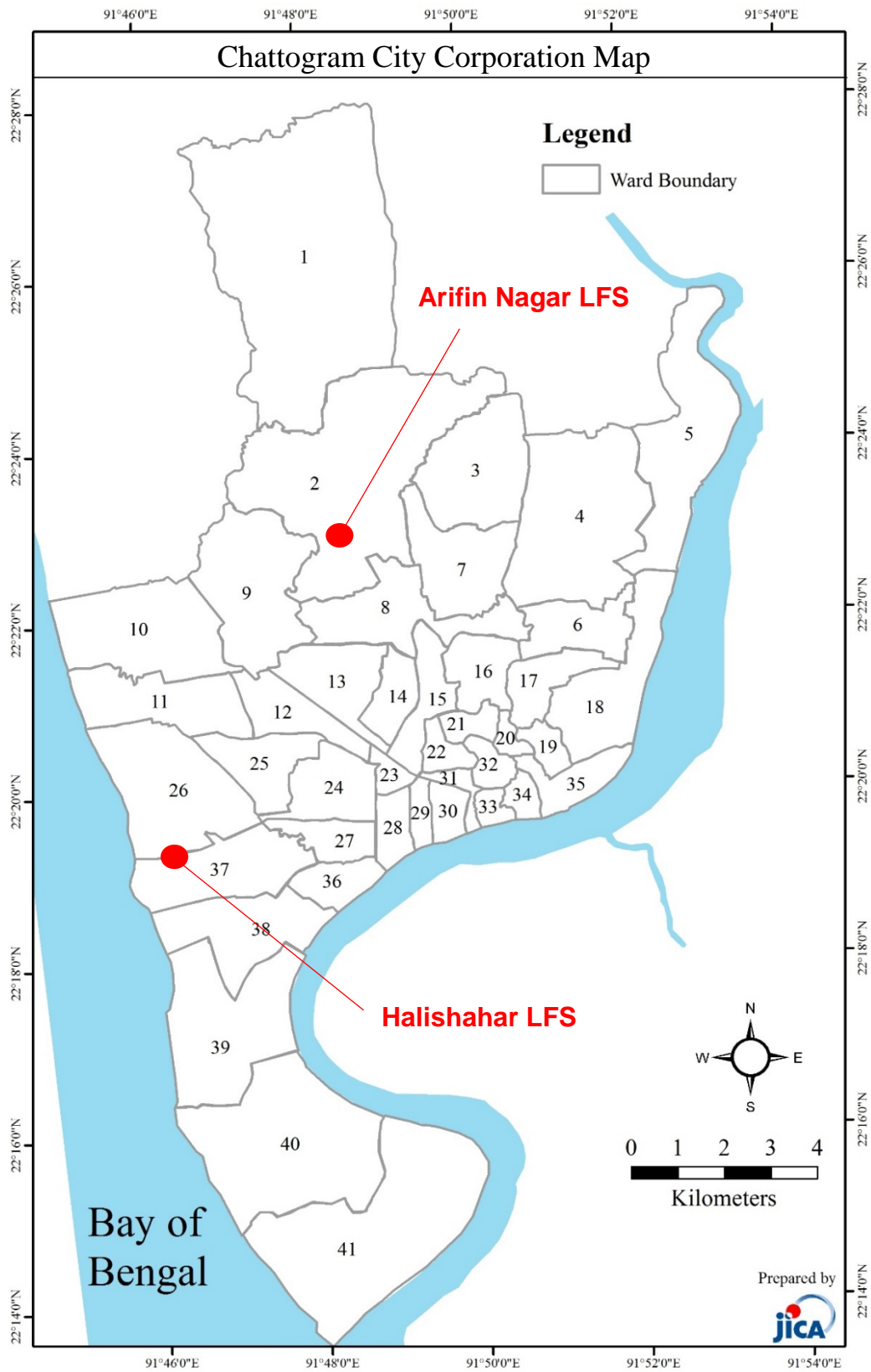
Project Area (2): Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC)



Remarks) The proposed Nasirabad new landfill site was originally outside the city boundary of Dhaka North and South City when planned, however, it was integrated into Dhaka South City in 2017 when the administrative service areas of Dhaka North and South City were expanded. Therefore, the Nasirabad new landfill site is planned to utilize for Dhaka North City, however, it is located within Dhaka South City. The construction work is currently suspended.

Reference: JICA Project Team (JPT)

Project Area (3): Chattogram City Corporation (CCC)



Reference: JICA Project Team (JPT)

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Executive Summary

Photos

Project Area Map

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Abbreviations

ACE	Additional Chief Engineer
ACWMO	Assistant Chief Waste Management Officer
Ad. CWMO	Additional Chief Waste Management Officer
ADB	Asian Development Bank
AE	Assistant Engineer
BDT	Bangladesh Taka
BERC	Bangladesh Energy Regulatory Commission
BPDP	Bangladesh Power Development Board
BUET	Bangladesh University of Engineering and Technology
CAAB	Civil Aviation Authority of Bangladesh
CC	City Corporation
CCC	Chittagong City Corporation/Chattogram City Corporation ²⁰
CCP	Chief City Planner
CCO	Chief Conservancy Officer
CEO	Chief Executive Officer
CI	Conservancy Inspector
CIRDAP	Centre on Integrated Rural Development for Asia and Pacific
CO	Conservancy Officer
COVID-19	Corona Virus Disease 2019
C/P	Counterpart
CS	Conservancy Supervisor
CSR	Corporate Social Responsibility
C4C	Capacity Development of City Corporation Project
CUWG	Community Unit Working Group
CWMO	Chief Waste Management Officer
DBO	Design-Build-Operate
DCC	Dhaka City Corporation
DCWMO	Deputy Chief Waste Management Officer
DEM	Digital Elevation Model
DPHE	Department of Public Health Engineering
DGHS	Directorate General of Health Service
DNCC	Dhaka North City Corporation
DOE	Department of Environment, Ministry of Environment, Forest and Climate Change
DPP	Development Project Proposal
DSCC	Dhaka South City Corporation

²⁰ Spelling of the city was changed from Chittagong into Chattogram in April 2018.

DWASA	Dhaka Water Supply and Sewerage Authority
ECC	Environmental Clearance Certificate
ECNEC	Executive Committee of National Economic Council
ED	Engineering Department
EE	Executive Engineer
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
ERD	Economic Relations Division, Ministry of Finance
F/S	Feasibility Study
FY	Fiscal Year
GCC	Gazipur City Corporation
GCP	Ground Control Points
GIS	Geographic Information System
GO	Government Order
HCEs	Health Care Establishments
HDPE	High Density PolyEthylene
HRD	Human Resource Department
IEE	Initial Environmental Examination
IFC	International Finance Corporation
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
JPT	JICA Project Team
JPY	Japanese Yen
LDPE	Low Density Polyethylene
LFS	Landfill site
LGD	Local Government Division, Ministry of Local Government, Rural Development and Cooperatives
LGED	Local Government Engineering Department, Ministry of Local Government, Rural Development and Cooperatives
LMU	Landfill Management Unit
MD	Mechanical Division, Engineering Department
NBR	National Board Revenue
NCC	Narayanganj City Corporation
NILG	National Institute of Local Government
NGO	Non-Governmental Organization
OHS	Occupational Health and Safety
OJT	On-the-job Training

OVI	Objectively Verifiable Indicators
PAPS	Public Awareness Planning Section
PAB	Practical Action Bangladesh
PCSP	Primary Collection Service Provider
PD	Project Director
PDM	Project Design Matrix
PETE	Polyethylene Terephthalate
PID	Press Information Department
PMU	Project Management Unit
PP	Polypropylene
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PPPA	Public Private Partnership Authority
PR	Public Relations
PRD	Public Relations Department
PRO	Public Relations Officer
PVC	Polyvinyl Chloride
PVD	Prefabricated Vertical Drain
RD	Revenue Department
R/D	Record of Discussion
RDF	Refused-derived Fuel
SCP	Secondary Collection Point
SE	Superintending Engineer
SfM	Structure from Motion
SNS	Social Networking Service
SPC	Special Purpose Company
SPD	Store and Purchase Department
SREDA	Sustainable and Renewable Energy Development Authority
SSC	Safety and Sanitation Committee
STS	Secondary Transfer Station
SWM	Solid Waste Management
SWMSC	Solid Waste Management Standing Committee
TD	Transport Department
TOR	Terms of Reference
UITS	University of Information Technology and Sciences
UNDP	United Nations Development Programme
UNHCR	United Nations Refugee Agency

UNICEF	United Nations Children's Fund
VAT	Value Added Tax
WB	World Bank
WBA	Ward-based Approach
WHO	World Health Organization
WMC	Waste Management Cell
WMD	Waste Management Department
WtE	Waste to Energy
3R	Reduce, Reuse, Recycle

Chapter 1 Outline of the Project

1.1 Background and Project Purpose

The capital city Dhaka¹ of the People's Republic of Bangladesh (hereinafter referred to as "Bangladesh") has been achieving significant economic growth from the 1990s onward, accompanied by a rapid increase in the Gross Domestic Product (hereinafter referred to as "GDP"). As a result, the generated waste rapidly increased both in amount and in the complexity of its components. In addition, economic growth brought a higher level of living for the residents of Dhaka City and they began to demand more of the government to improve the cleaning services. On the other hand, the City authorities could not provide sufficient cleaning services due to the expansion of the city area and failed to meet the needs of the residents and resolve their complaints, causing dissatisfaction amongst them. Under such circumstances, there has become an increased need for a cleaning service that takes into account the opinions of the citizens and meets their requirements.

Japan International Cooperation Agency (hereinafter referred to as "JICA") started to provide support for improving Solid Waste Management (hereinafter referred to as "SWM") in Dhaka City in 2003. "Clean Dhaka Master Plan" was developed with the target year of 2015, and JICA continued providing comprehensive support through a number of projects having a combination of tangible and intangible results. The timeframe of Clean Dhaka Master Plan, up to 2015 has been completed, and presently there are various issues that need to be tackled such as landfill sites shortage, aging waste collection vehicles, and vehicle management. In 2011, Dhaka City was divided into two cities: Dhaka North City Corporation (hereinafter referred to as "DNCC") (population: approx. 6.11 mil people² in 2018) and Dhaka South City Corporation (hereinafter referred to as "DSCC") (population: approx. 4.49 mil people in 2018). In response to the SWM issues the two city corporations requested the Government of Japan for technical assistance aiming to improve SWM capabilities. In addition, Chattogram City Corporation³ (hereinafter referred to as "CCC") (population: approx. 3.57 mil people in 2021) submitted a request for technical cooperation including maintenance and management of vehicles, which was planned to be carried out in parallel with the grant aid⁴ being implemented in the city. Based on these requests, JICA discussed and agreed on the design of a technical cooperation project with the Government of Bangladesh and, in June 2016, concluded a Record of Discussion (hereinafter referred to as "R/D") detailing the project activities. In 2017, the present project was commenced as a technical cooperation project.

¹ "Dhaka" or "Dhaka City" refers to the city before it was divided into Dhaka South City and Dhaka North City, on the area which is currently covered by the two cities.

² The population includes the number of people who live in the new city area. The administrative areas of both Dhaka North and Dhaka South Cities were expanded in July 2017 after the request of further assistance. (*Population*: Dhaka North City increased by 40%, Dhaka South City by 33%; *Area*: Dhaka North City increased by 137%, Dhaka South City by 142%)

³ As the official name of Chittagong was changed to Chattogram by the Prime Minister's announcement in 2018, this report refers to it the city as Chattogram, except for the project title which is unchanged.

⁴ "The Project for Improvement of Solid Waste Management Equipment in the People's Republic of Bangladesh." In 2018, 150 waste collection vehicles in total were procured by the grant aid project to Dhaka North City, Dhaka South City, and Chattogram City.

1.2 History of JICA's Support in SWM Sector related to this Project

JICA dispatched an expert to Dhaka City in year 2000 to formulate a detailed cooperation policy, and the Clean Dhaka Master Plan was developed in “The Study on the Solid Waste Management in Dhaka City (2003-2006).” Based on the Master Plan, JICA supported Dhaka City’s activities through a follow-up cooperation project on existing landfill site improvement (2006), landfill site expansion and rehabilitation by Japan Debt Cancellation Fund (2006-2011), and allocation of Japan Overseas Cooperation Volunteers (hereinafter referred to as "JOCV") on environmental education for public awareness-raising and promotion of participatory waste collection. Subsequently, a six-year technical cooperation project titled “Project for Strengthening of Solid Waste Management in Dhaka City” was implemented from February 2007 to March 2013 (including an extended period), for the capacity development on waste management to deal with a broad range of technical and management issues, especially on waste collection and transport. The project included activities for institutional development of Waste Management Department (hereinafter referred to as "WMD"), capacity development of Dhaka City officials, and formulation of a waste collection system in collaboration with residents and community, and occupational health improvement. In addition, the “Program for Improvement of Solid Waste Management in Dhaka City toward the Low Carbon Society” (2008-2013), implemented under the Grant Aid for Environment and Climate Change Program, provided approximately a hundred waste collection vehicles and a vehicle workshop. As a result, the waste collection rate in Dhaka City was significantly improved from 46% at the beginning of the project in 2006 to over 60% in 2013 through synergetic effects with the technical assistance.

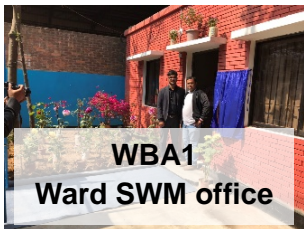
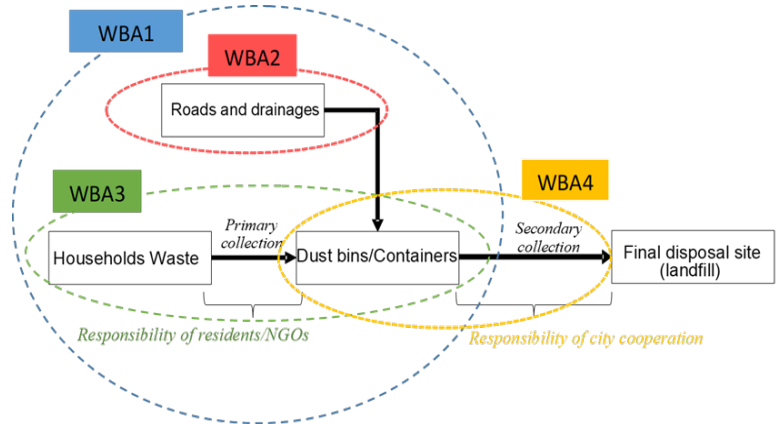
Waste treatment is often given a lower priority than economic development and only dealt with in a reactive manner. However, this aid provided by JICA enabled Dhaka City to improve the city’s poor sanitation conditions and realize an improved environment corresponding with the rapid development of Dhaka City. For example, Dhaka City reformed the institutional system in accordance with the new SWM service. In addition, a 20-hectare open dumpsite, Matuail Landfill Site (hereinafter referred to as "LFS") in the southeastern part of Dhaka City was renovated to a sanitary landfill while a new 20-hectare sanitary landfill, Amin Bazar LFS was constructed in the northeastern part of the city. Furthermore, Dhaka City closed two large illegal dumping sites. The waste collection method was also improved, and it became much more efficient by strengthening the organization for waste collection within the Waste Management Department (hereinafter referred to as "WMD") in Dhaka City. Later, resident-participatory SWM was advanced through “Ward-based Approach (hereinafter referred to as "WBA")”, a system for promoting an efficient cleaning service at the ward⁵ level under the cooperation of the citizens and service providers in a well discussed and agreed upon way. As a result, WMD and/or Ward SWM Offices became more responsive to citizens’ requests and complaints and citizens became more aware of the importance of cooperating with WMD to ensure that the city remains clean. Through such activities, SWM in Dhaka City received support and cooperation from the society. Accordingly, while the citizens’ interest in the SWM activities and participation in the practical actions increased, the pride of the Dhaka City SWM staff

⁵ Ward: the smallest jurisdictional unit of the city. A zone is made up of a number of wards. DNCC comprises 10 zones with 54 wards (including 18 new wards), and DSCC comprises 10 zones with 75 wards (including 18 new wards) (refer to Project Area maps).

members in their work was enhanced.

What is Ward Based Approach (WBA)?

WBA activities are implemented at the ward level and consist of WBA 1: construction and management of ward SWM office, WBA 2: safety education for cleaners and establishment of a Safety and Sanitation Committee (hereinafter referred to as “SSC”), WBA 3: public awareness-raising, and WBA 4: Improvement of waste collection service in each ward. Synergistic effects are expected from the coordination of the four activities together in each ward, producing greater outcomes.



Reference: JICA Project Team (JPT)

1.3 Project’s Target

Fig. 1-1 shows the position of this project among all other previous JICA support activities. This Project has developed revised master plans for Dhaka North City and Dhaka South City, and implemented waste collection systems based on WBA in Chattogram City, taking advantage of the experiences gained in the technical cooperation project from 2007 to 2013 (the previous project)⁶. This Project also aims at sharing Dhaka City’s experiences with other cities nationwide and spreading positive effects of waste management capacity development. In 2018, the grant aid project provided a total of one hundred and fifty waste collection vehicles to Dhaka North City, Dhaka South City, and Chattogram City⁷ and a construction of the vehicle repair shop (workshop) in Dhaka South City. The soft component⁸ of the grant aid project provided training for the compactor⁹ distribution, introduction of Fixed-Time Fixed-Place collection and improvement of workshop operation. In collaboration with the grant aid activities, technical support in the Project emphasized the importance of comprehensive improvement of waste management capacity including waste collection, safety

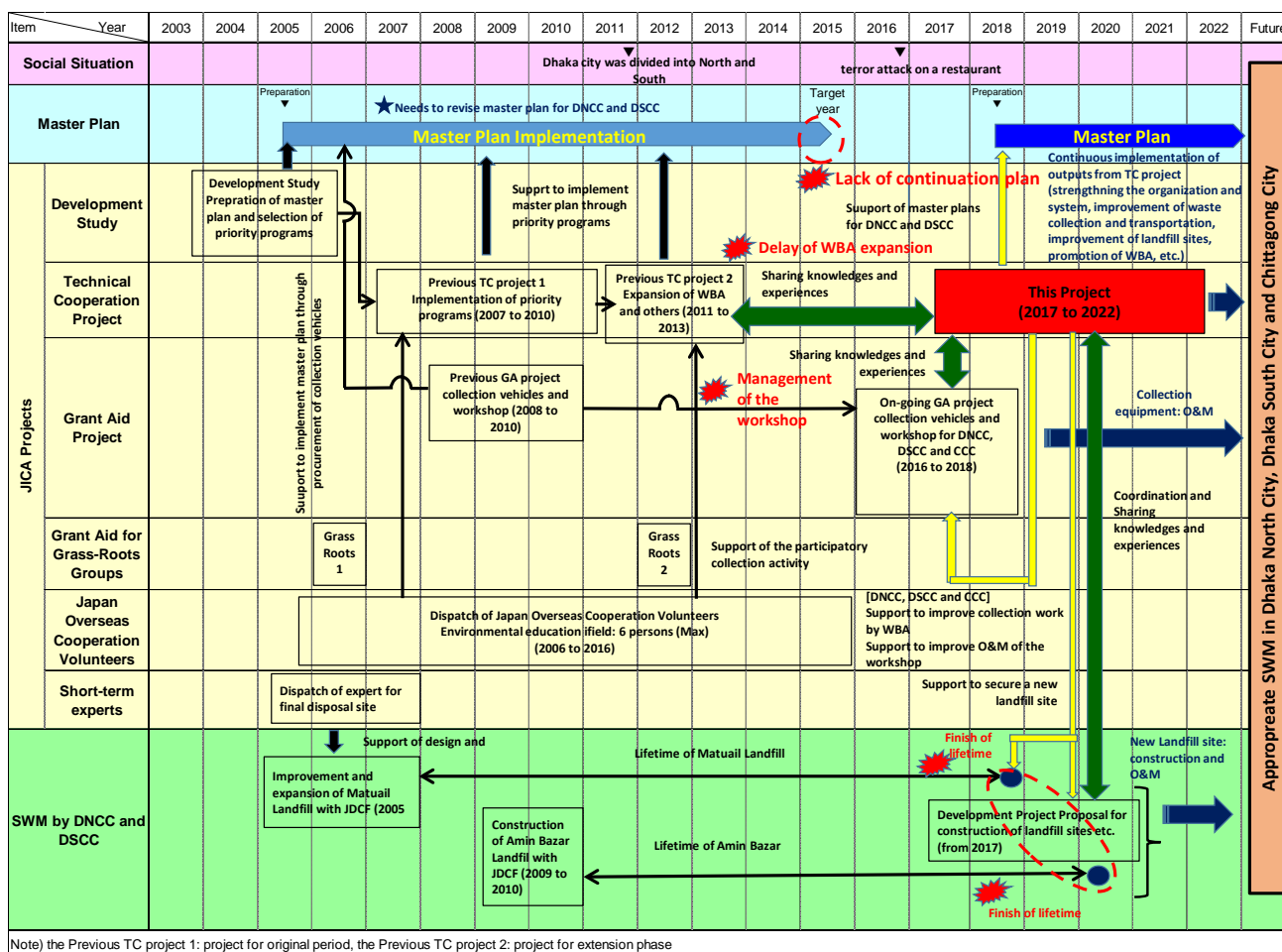
⁶ JICA “Project for Strengthening of Solid Waste Management in Dhaka City” (2007-2013)

⁷ Composition of vehicles provided by the grant aid project was as follows; DNCC 56 vehicles (23 compactors, 20 container carriers and 13 dump trucks), DSCC 56 vehicles (22 compactors, 24 container carriers and 10 dump trucks), CCC 38 vehicles (13 compactors, 13 container carriers and 12 dump trucks)

⁸ Soft component is a technical guidance for operation and maintenance of equipment and facilities, so that the facilities and other systems financed by ODA Grants are sustainably managed.

⁹ Compactor is a type of vehicle specified for waste collection and transport with a compaction function, enabling a highly efficient and sanitary waste collection.

management, public awareness, and work management for the workshop staff, and is a model for other cities.



Reference: JPT

Fig. 1-1 History of JICA's support and Project's Target

1.4 Basic Information on Dhaka North City, Dhaka South City, and Chattogram City

1.4.1 Basic Information on Dhaka North City and Dhaka South City

(1) Basic Information

Table 1-1 shows basic information related to waste management in Dhaka North City and Dhaka South City. Both cities form the capital of Bangladesh, Dhaka which is located almost at the center of country. The populations of Dhaka North and Dhaka South are over 6 million and 4 million respectively. Prior to the formation of the two cities, Dhaka City was a megacity with a population of more than 10 million. Both cities have extremely high population densities, 30,993 person/km² in Dhaka North City, and 39,051 person/km² in Dhaka South City (cf. the density in Tokyo metropolitan area as of 2018 was 6,310 people/km²). Waste generation is more than 3,000 tons per day in each city, and the waste collection rates are 80% in Dhaka North City and 89% in Dhaka South City, rates which are relatively high among Southeast Asian cities. On the other hand, both cities are threatened by the shortage of landfill capacity, and the expansion of the landfill sites and prolonging their lifetimes are very urgent issues.

Table 1-1 Basic Information on Dhaka North City and Dhaka South City

Information	DNCC	DSCC
Population (2018)	6,105,664 (1,732,471 in the extension area)	4,490,811 (1,076,706 in the extension area)
Service Area	197 km ²	115 km ²
Number of Wards	54 wards (18 wards in the extension area)	75 wards (18 wards in the extension area)
Number of Zones	10 zones (5 zones in the extension area)	10 zones (5 zones in the extension area)
Waste Generation	4,220 ton/day (FY 2018-2019)	3,319 ton/day (FY 2018-2019)
Waste Collection Rate	80% (FY2017-2018)	89% (FY2017-2018)
Landfill Site and Area	Amin Bazar Landfill site (20ha)	Matuail Landfill site (existing area: 19ha, extension area (planned): 20ha)
Waste Management Officials in WMD	128 officials and staff (Approved posts: 257 Vacant posts: 129)	108 officials and staff (Approved posts: 352 Vacant posts: 244)
Cleaner	3,914	5,348
Waste Collection Vehicle	128	281
Primary Collection Service Provider (PCSP)	454	246
Rickshaw Van ¹⁰	1,785	1,228
Hand Trolley	151	45
Van Pullers and workers	7,223	4,855
Secondary Collection Points (SCPs)	240	502
Secondary Transfer Station (STS)	48	19
Ward SWM Office	22	30
Privatization	8 wards	3 wards

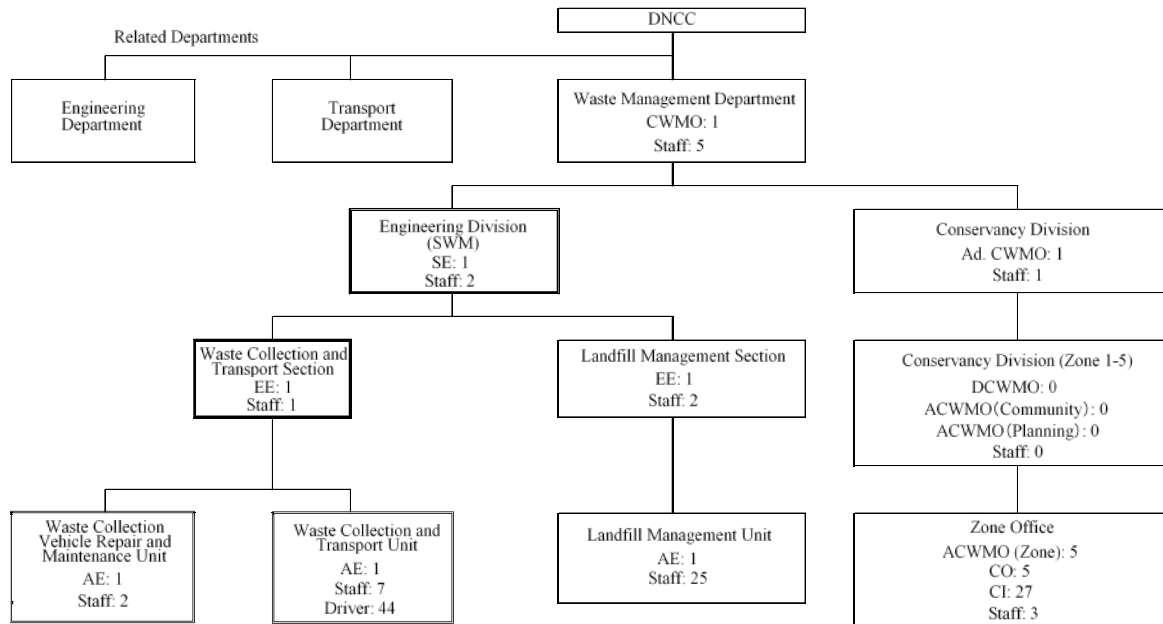
*PCSP: Primary Collection Service Provider, SCP: Secondary Collection Point, STS: Secondary Transfer Station
Reference: JPT

(2) Organizational Structure of Waste Management Department (WMD)

The organizational structure for each of DNCC and DSCC are shown in Fig. 1-2 and Fig. 1-3. In both organizations, WMD is headed by Chief Waste Management Officer (hereinafter referred to as "CWMO"), and consists of two divisions: Engineering Division (SWM) and Conservancy Division. The Engineering Division, under the supervision of the Superintending Engineer (hereinafter referred to as "SE") is divided into Waste Collection and Transport Section and Landfill Management Section. A new Landfill Management Unit (hereinafter referred to as "LMU") was established under Landfill Management Section during the Project. The Conservancy Division operates waste management under the supervision of Additional Chief Waste Management Officer (Ad. CWMO), with a Conservancy Inspector (hereinafter referred to as "CI") assigned to

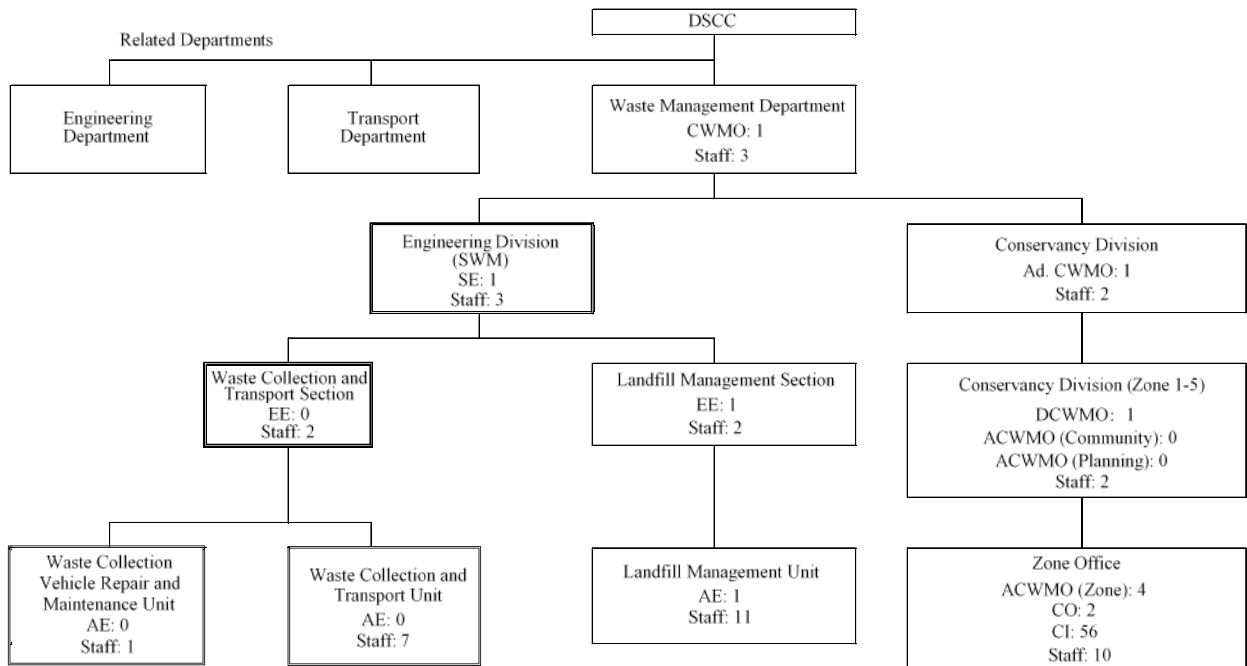
¹⁰ Rickshaw van is a type of vehicle that Primary Collection Service Provider (PCSP) uses for waste collection. Rickshaw van is a bicycle equipped with a dust bin (small container for storage of waste) and PCSP collects waste from house to house and bring waste to a transfer station (or a secondary transfer spot such as a public dust bin or container).

each ward. Assistant Chief Waste Management Officer (hereinafter referred to as "ACWMO") and Conservancy Officer (hereinafter referred to as "CO") supervise and instruct CIs. Other departments related to waste management include the Engineering Department (hereinafter referred to as "ED"), Transport Department (hereinafter referred to as "TD"), Store and Purchase Department (hereinafter referred to as "SPD") and Public Relations Department (hereinafter referred to as "PRD").



Reference: JPT prepared based on “New Clean Dhaka Master Plan of DNCC 2018-2032”

Fig. 1-2 Organizational Structure of WMD of DNCC (as of 2017)



Reference: JPT prepared based on “New Clean Dhaka Master Plan of DSCC 2018-2032”

Fig. 1-3 Organizational Structure of WMD of DSCC (as of 2017)

1.4.2 Basic Information on Chattogram City

(1) Basic Information

Table 1-2 shows basic information related to waste management of Chattogram City. Chattogram City is located in the southeast of Bangladesh, and is renowned as a center of trade with the largest port in the country. Chattogram City Corporation (hereinafter referred to as "CCC") has not yet established a WMD, however has worked actively on waste collection improvement by introducing House-to-house collection and segregated waste collection using the compactors donated by the grant aid project¹¹. The landfill site needs to be improved from the present status of open dumping.

Table 1-2 Basic Information on Chattogram City

Items	Information
Population (2021)	3,572,894
No. of Holdings	185,247
Service Area	155.4 km ²
Number of Wards	41
Number of Zones	2
Waste Generation (2021)	Approx. 3,063 t/d
Waste Collection Amount (2021)	Approx. 2,187 t/d
Landfill Site and Area	Arifin Nagar landfill site (6 ha) Haliashahar landfill site (8 ha)
Central Garage	1
Waste Management Officials	82
Drivers	167
Primary Collectors	1,818
Cleaners	1,688
Waste Collection Vehicle	250
Rickshaw Van	753
Small paddle bins	868,095
Wheel Big bins	3,370
Concrete Bin	325
Open Spot ¹²	629
Container	69
Plastic Bin Spot	52
Secondary Transfer Station	6

Reference: JPT

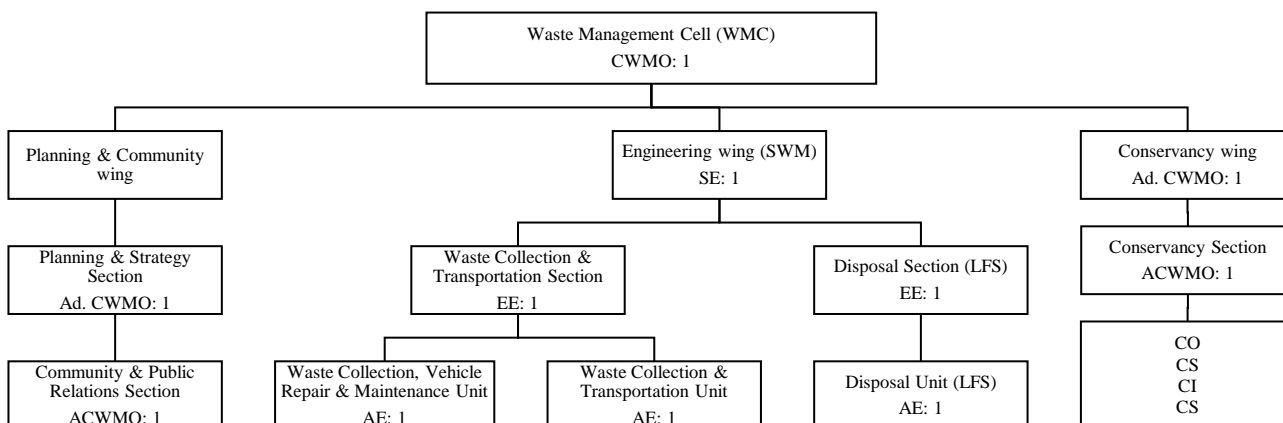
(2) Organizational Structure of Waste Management Cell (WMC)

In Chattogram City, since the Conservancy wing and the Engineering wing operate activities of waste management separately, CCC established the Waste Management Cell (hereinafter referred to as "WMC") as a tentative organization for integrated solid waste management (Notification of the Chief Executive Officer (hereinafter referred to as "CEO") of Chattogram City, dated August 4, 2019). CCC has been preparing for establishment of the Waste Management Department (WMD) while continuing to improve waste management

¹¹ "The Project for Improvement of Solid Waste Management Equipment in the People's Republic of Bangladesh." (See p.1 and p.3), which provided 38 waste collection vehicles, including 13 compactors, to Chattogram City Corporation.

¹² A waste storage space for waste transfer from primary waste collection to secondary waste collection. Open spot is a place where neither a transfer station nor a container is installed and waste is piled up on a road or open space.

through WMC. WMC consists of Planning & Community wing¹³, Engineering wing and Conservancy wing.



Reference: JPT prepared based on “CCC Waste Collection and Transportation Plan (2021)”

Fig. 1-4 Organization Structure of WMC of Chattogram City (as of 2017)

What is “primary collection” and “secondary collection”?

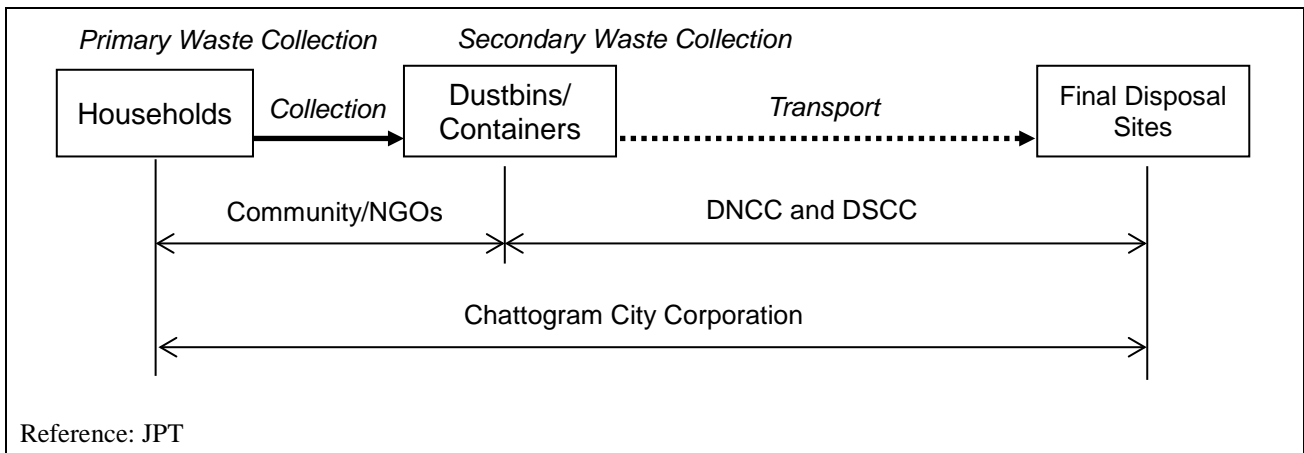
Local Government (City Corporation) Law 2009 is the basic law for road sweeping, drainage cleaning, and waste collection and transport, and describes responsibilities of citizens and City Corporations.¹⁴ According to the Local Government Law, local government (DNCC, DSCC, and CCC) may locate a dustbin or a container at an appropriate place. Citizens’ role is to bring waste from the house to the dustbin or the container (primary collection). Primary Collection Service Provider (hereinafter referred to as “PCSP”) does this primary collection on behalf of the citizens.

City Corporation’s role is to transport waste from a dustbin or a container to the landfill site (secondary collection). Installation of dustbins and containers by City Corporation is a prerequisite to provide a place for Citizens to have their waste brought to for disposal. However, it is unclear who is responsible for primary collection in an area with no dustbins or containers.

In 2012, the Local Government Law was amended to include boundaries of DNCC and DSCC and the wards’ affiliation changes, however there was no change regarding waste management. CCC directly operates primary and secondary collection on its own.

¹³ This wing is in charge of public relations and public awareness as well.

¹⁴ Local Government Law 1983 was fully amended by adding the term “City Corporation,” to Local Government (City Corporation) Law 2009 (the responsibility of City Corporation was amended again in 2011 and 2012).



1.5 Project Scope

1.5.1 Project Area

The target areas of the Project are Dhaka North City, Dhaka South City, and Chattogram City (refer to the maps in the preface). The project activities are distributed over the target areas and section 1.6 describes the target area for each output of the Project Design Matrix (hereinafter referred to as "PDM").

1.5.2 Project Period

This Project was implemented during the period of June 2017 to May 2022 in two phases. The consultant contract was entered into in each of the two phases. "Phase 1" and "Phase 2" in this report refer to the following periods as stated in the consultant contracts.

- Phase 1: June 2017 - September 2019
- Phase 2: December 2019 - May 2022

1.5.3 Counterpart Organization and Implementation System

The counterpart organization (hereinafter referred to as "C/P") in the Government of Bangladesh is the Local Government Division (hereinafter referred to as "LGD") of the Ministry of Local Government, Rural Development and Cooperatives. LGD is a supervisory agency for local governments, and serves as a chairperson at the Project's Joint Coordination Committee (hereinafter referred to as "JCC") as well as convening the 12 City Corporations (hereinafter referred to as "CCs") and nationwide information-sharing meetings of waste management under the project. Dissemination of knowledge and experience earned by Dhaka City to other cities is one of the important roles of LGD. DNCC, DSCC, and CCC are implementing organizations of the project. Main C/Ps in the city corporations are WMD in each of DNCC and DSCC, and Conservancy wing in CCC.

The implementation system of the Project is shown in Fig. 1-5. Owing to the enforced security measures such as Japanese experts' travel control and field activity constraints, it was important to effectively utilize national staff and establish a streamlined implementation system through collaboration and close contact with C/Ps. The Project, therefore, underscored the importance of fostering C/P's ownership through training-in-Japan and other

capacity development activities in order to ensure smooth project implementation under the mentioned restrictions.

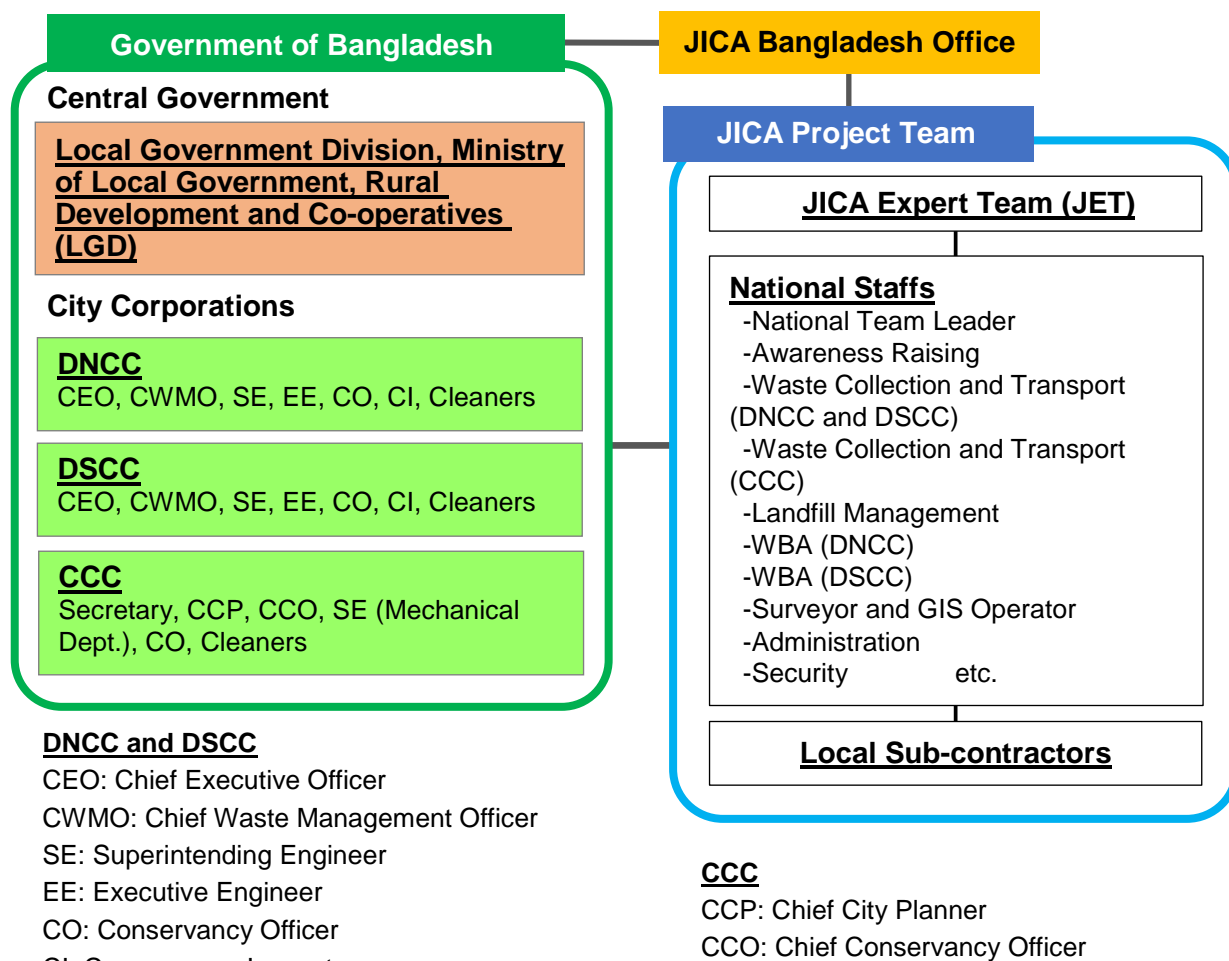


Fig. 1-5 Implementation System of the Project

1.6 Project Purpose and Expected Outputs

1.6.1 Overall Goal and Project Purpose

The Overall Goal and Project Purpose are shown in Table 1-3. Some of the Objectively Verifiable Indicators (hereinafter referred to as “OVI”) in PDM version 1 do not specify numerical targets (temporarily placed as “X” or “Y”). Initially, it was planned to set up the numerical targets after completion of the baseline surveys for the master plan development (refer to 2.1.6). However, C/Ps and JICA discussed the PDM structure and OVIs considering the difficulty of setting expected numerical targets for monitoring, and made thorough revisions as shown in PDM version 2 and PDM version 3.¹⁵

¹⁵ PDM version 3 was approved in January 2021, but the Overall Goal and Project Purpose are unchanged from PDM version 2.

Table 1-3 Overall Goal and Project Purpose

Phase 1 (PDM version 1)	Phase 2 (PDM version 2 and PDM version 3)
Overall Goal	
Proper SWM (Solid Waste Management) is implemented in Dhaka North and Dhaka South City based on the revised Master Plans and Chattogram city.	[DNCC and DSCC] Sustainable SWM (Solid Waste Management) is implemented in Dhaka North and Dhaka South City based on the revised Master Plans. [CCC] Sustainable SWM is implemented in Chattogram city based on a waste collection and transportation plan.
Objectively Verifiable Indicators	
Waste collection rate in DNCC, DSCC, CCC are improved X% in 2020 to Y% in 2023. The volume of solid waste that is carried into final landfill sites is decreased X in 2020 to Y in 2023.	[DNCC and DSCC] The field-oriented WBA (Ward-based Approach) is implemented in 50% of wards in each city. [CCC] WMD (Waste Management Department) is established in CCC.
Project Purpose	
SWM systems are improved in Dhaka North and Dhaka South City based on the Master Plans and Chattogram City.	[DNCC and DSCC] SWM systems are improved in Dhaka North and Dhaka South City based on the revised Master Plans. [CCC] SWM system is improved in Chattogram City based on the waste collection and transportation plan.
Objectively Verifiable Indicators	
The number of improved items in the SWM systems will be X.	[DNCC and DSCC] Priority projects specified in the Master Plans are implemented. [CCC] Priority projects specified in the waste collection and transportation plan is implemented.

*WBA: Ward-based Approach, WMD: Waste Management Department

Reference: JPT

1.6.2 Expected Outputs

Phase 1 of the Project (PDM version 1) set up five outputs, and related activities were implemented towards realizing the target (refer to “Appendix 1” and “Chapter 2” for PDM activities.). In addition, before the Master Plan revision, five topmost urgent and important activities were carried out as priority projects (public relations (PR) and public awareness, implementation of new collection system in coordination with primary and secondary collection, extending the lifetime of the existing landfill site and securing new landfill site, activities related to Eco-Town implementation, and feasibility survey on introduction of Waste-to-Energy (hereinafter referred to as “WtE”) (Pre-F/S study)).

Among the priority projects mentioned above, the C/Ps strongly requested the Project’s support for “PR and public awareness” and “extending the lifetime of the existing landfill site and securing new landfill site”. Accordingly, the Project delineated its support directions for these two topics through the Phase 1 activities. Consequently, these activities were newly added in PDM version 2 (Draft) as new Outputs. In addition, in the second half of the second phase (PDM version 3), assistance for medical waste management was newly added

in Chattogram City as output 8, in recognition that capacity strengthening for medical waste management had become an urgent issue due to the spread of COVID-19. In parallel, the Project provided assistance for the following priority projects under output 1: “Pre-F/S study on introducing waste-to-energy in North Dhaka (additional study was conducted)”, “Introduction of the new waste collection system considering coordination between primary and secondary collection (continuous activity from the first phase)”, “Implementation of pilot project for waste segregation through 3R promotion” and “Dissemination and guidance of waste management regulation 2021 by Department of Environment, Ministry of Environment, Forest and Climate Change (hereinafter referred to as “DOE”)

Table 1-4 Project Outputs and Target City

Output	Phase 1 (PDM version 1)		Phase 2 (PDM version 2 and PDM version 3)		Target City *		
					N	S	C
Output 1	Individual Master Plans are formulated for the next 15 years in DNCC and DSCC.		Individual Master Plan targeting the year of 2032 is formulated separately for DNCC and DSCC.				
	OVI	<ul style="list-style-type: none"> New Master Plans are approved by Local Government Division, Ministry of Local Government, Rural Development and Cooperatives (LGD). 	OVI	<ul style="list-style-type: none"> Revised Master Plan is approved by the Mayor of each city. WMD Directives are approved by the Mayor of each city and made open to the public. 	●	●	
Output 2	WBA (Ward Base Approach) activities are improved and expanded within DNCC and DSCC.		(Same as PDM ver. 1.0)				
	OVI	<ul style="list-style-type: none"> WBA improvement and expansion plan will be approved by CWMO (Chief Waste Management Officer) in DNCC and DSCC. Number of wards where WBA was implemented will be X to Y. 	OVI	<ul style="list-style-type: none"> WBA Core Group is established in each city, and holds a meeting every month. Ward offices are newly established and WBA activities are implemented in at least 5 wards in each city. 	●	●	
Output 3	Proper solid waste collection and transportation including 3R activities and awareness raising campaign is implemented in CCC.		A waste collection and transportation plan is developed, and a proper waste collection and transport system is implemented in CCC.				
	OVI	<ul style="list-style-type: none"> A plan of solid waste collection and transportation is submitted to the Mayor. A guidance manual of collection and transportation is completed. The number of 3R activities and awareness-raising campaign will be X. 	OVI	<ul style="list-style-type: none"> A waste collection and transportation plan is approved by the Mayor. WBA activities are implemented in 2 wards (model wards). 			●
Output 4	Sustainable workshop management systems are established in DNCC, DSCC, and CCC.		(Same as PDM ver. 1.0)				
	OVI	<ul style="list-style-type: none"> Workshop operation and management reports are submitted to the management department of DNCC, DSCC, and CCC monthly. A maintenance manual is revised. 	OVI	<ul style="list-style-type: none"> Training for preventative maintenance is carried out. Rules for occupational health and safety (draft) and service regulation for the workshop (draft) are developed, and the trainings are carried out. 	●	●	●

Output	Phase 1 (PDM version 1)		Phase 2 (PDM version 2 and PDM version 3)		Target City *		
					N	S	C
		• Regular maintenance is implemented by trained mechanics based on a maintenance manual.					
Output 5	Information sharing for challenges and efforts of SWM among city corporations and other small local governments around Dhaka metropolitan area are conducted by LGD.		(Same as PDM ver. 1.0)		All Cities (Implemented by LGD)		
	OVI	• Number of information sharing meetings will be X. • Number of reports that city corporations and small local governments improved SWM systems will be X.	OVI	• The information sharing meetings are held 2 times. • SWM support activities by DNCC and DSCC to other city corporations and small local governments are reported 4 times.			
Output 6 (Additional output in PDM ₂)	N/A		Public relation (PR) activities for SWM are promoted in DNCC and DSCC.				
	OVI	N/A	OVI	• PR Committee on SWM is established based on the PR plan for SWM.	●	●	
Output 7 (Additional output in PDM ₂)	N/A		Lifetimes of the existing landfill sites are prolonged and new landfill area is secured in DNCC and DSCC.				
	OVI	N/A	OVI	• Development Project Proposals (DPPs) for extension of the existing landfill sites and/or for construction of new landfill sites are submitted to Government of Bangladesh (GoB).	●	●	
Output 8 (Additional output in PDM ₃)	N/A		A proper medical waste management system is established in CCC				
	OVI	N/A	OVI	• A department to operate and manage medical waste incinerator is established in CCC			●

* N: Dhaka North City (DNCC), S: Dhaka South City (DSCC), C: Chattogram City (CCC)

Reference: JPT

1.6.3 Technical Cooperation Products

Technical cooperation products and other related documents (Appendices) developed in the Project are listed in Table 1-5.

Table 1-5 Technical Cooperation Products and Related Documents

No.	Products and Documents	Date	Content	Remark
Output-1				
1	Dhaka North City Master Plan 2018- 2032	Jul. 2019	1) Main Report 2) Summary	Refer to Section 2.1
2	Dhaka South City Master Plan 2018- 2032	Jul. 2019	1) Main Report 2) Summary	Refer to Section 2.1
3	Basic Survey Reports for the	-	Report of the Basic Survey to collect	Refer to

No.	Products and Documents	Date	Content	Remark
	Master Plan (DNCC and DSCC)		the Solid Waste Management data in DNCC and DSCC to develop the New Master Plans.	Section 2.1.6
4	Pre-Feasibility Study Report for Introduction of Waste to Energy in Dhaka North City, People's Republic of Bangladesh	Apr. 2021	Report of feasibility evaluation on Waste-to-Energy implementation based on the JICA's guidelines	Refer to Section 2.2.4
5	Drawings of the prototyped equipment for primary collection (prototyped rickshaw vans and hand carts)	1) Apr. 2018 2) Jul. 2019	Drawings of the initial design and modification of prototyped rickshaw vans and hand carts [1) Initial drawings, 2) Modification drawings]	Refer to Section 2.2.5
6	Waste Segregation Pilot Project Report including Waste Segregation Implementation Manual	May 2022	Results of waste segregation pilot project in DNCC, DSCC and CCC	Refer to Section 2.2.6
7	WMD Directives (DNCC and DSCC)	1) Aug. 2021 2) Feb. 2020	Directions describing a strategic roadmap for waste management for the next 5-6 years, taking into account changes in society [1) DNCC, 2) DSCC]	Refer to Section 2.3
Output-2				
8	SWM Administrative Procedure Book (version 1) (English and Bengali)	Jul. 2018	Manual for the administrative procedure based on laws and regulations	Refer to Section 2.4.
9	WBA Activity Expansion Manual and WBA News Letter	1) Jul. 2019 2) Jul. 2019 3) Oct. 2020 4) Aug. 2021	Document-based WBA booklet covering WBA activity improvement and expansion framework and incorporating related data	Refer to Section 2.4.3
10	WBA Core Group Meetings and Activities Record (Ward-basis) (June 2017-May 2022)	May 2022	1) List of WBA activities by ward during the Project, organized in chronological order, 2) Minutes of WBA Core Group Meetings	Refer to Section 2.4 and 2.4.3
11	Weighbridge Data Analysis Report (DNCC and DSCC) (April 2021-March 2022)	May 2022	Amount of waste delivered to Matuail Landfill (DSCC) and Amin Bazar Landfill (DNCC)	Refer to Section 2.4.3
Output-3				
12	Waste Collection and Transportation Plan and Guidance Manual including 3R Activity and Awareness-raising Campaign	1) Jul. 2021 2) Jul. 2019 (updated in Apr. 2022)	1) Detailed waste collection and transportation plan in Chattogram City, 2) Manuals and public awareness tools to improve waste collection through the introduction of WBA in Chattogram City	Refer to Section 2.5.3
Output-4				
13	Workshop Operation and Management Manual (DNCC, DSCC and CCC)	Dec. 2020	1) Manual for Preventative Maintenance, 2) Safety and Sanitation Working Rules	Refer to Section 2.6.3
Output-5				
14	Proceedings of the Solid Waste Management Information Sharing Meetings	1) Dec. 2018 2) Feb. 2020 3) Mar. 2022	Documents compiling presentations and all 12 city corporations' baseline data to share knowledge and experiences among the city	Refer to Section 2.7.3

No.	Products and Documents	Date	Content	Remark
			corporations [1) First, 2) Second, and 3) Third document]	
Output-6				
15	Public Awareness and Public Relations Plan	Feb. 2022	Implementation plan to promote PR on SWM in collaboration with the Public Relations Department (PRD)	Refer to Section 2.8
16	Environmental Education Manual	May 2022	Manual for CIs to use with children to plan and implement waste segregation and 3R promotion	Refer to Section 2.8
17	Public Awareness and Public Relations Activity Report	1) Jan. 2021 2) Sep. 2021	1) TV program for public awareness and report of the result of TV program, 2) Report for canal clean-up campaign	Refer to Section 2.8
18	Annual Solid Waste Management Reports (DNCC, DSCC and CCC)	1) 2019 2) 3) 2020 4) 5) 6) 2021	Reports to the residents on the current situation of waste management in DNCC and DSCC [1) DNCC 2017-2018*1, 2) DNCC 2018-2019, 3) DSCC 2018-2019*2, 4) DNCC 2019-2020, 5) DSCC 2019-2020, 6) CCC 2019-2020]	Refer to Section 2.8
Output-7				
19	Landfill Site Environmental Monitoring Plan (DNCC and DSCC)	Mar. 2022	Report summarizing plan and method of environmental monitoring at Matuail Landfill (DSCC) and Amin Bazar Landfill (DNCC)	Refer to Section 2.9.3(2)
20	GCP Installation Work Report (October 2021) and Permission Letter on Drone Operation	1) Oct. 2021 2) Apr. 2022	1) GCP survey result, 2) Drone flight permits to calculate the remaining lifespan through drone survey	Refer to Section 2.9.3(3)
21	Design Guideline of Liner Facility	Nov. 2021	1) Lecture materials related to the installation of impervious liner for new landfill sites, 2) Minutes of the design guidance training	Refer to Section 2.9
Output-8				
22	Medical Waste Management Model Project Report	May 2022	1) Technical materials related to incinerations for medical waste, 2) Results and public awareness tools of waste segregation at model hospitals	Refer to Section 2.10
COVID-19 Emergency Support				
23	Deliverables of Emergency Support for Prevention of COVID-19 Infection (DNCC, DSCC and CCC)	1) Jul. 2020 2) Oct. 2020 3) Oct. 2020	Guidelines and public awareness tools to prevent the spread of COVID-19 from SWM activities [1) Pocket Size Manual, 2) Guideline for Planning, Design and Operation of Landfill Sites for Medical Waste (Draft) (DSCC), 3) Monitoring report related to usage of safety gear]	Refer to Section 4.3

*1 Prepared by DNCC (JPT provided a part of data) *2 This is an undisclosed document

* GCP: Ground Control Points, PRD: Public Relations Department, WBA: Ward-based Approach, WMD: Waste Management Department

Reference: JPT

1.7 Project Management Method

1.7.1 Project Monitoring Sheet

The technical cooperation monitoring system was applied for the Project management. The monitoring items included not only activity reporting but also outputs achievement status, problems to be solved for implementation, issues and project progress, and external factors which may generate positive and/or negative impacts.

1.7.2 Joint Coordination Committee (JCC)

At the commencement of the Project, JCC was scheduled to hold a meeting once a year to make important decisions on the Project. At the first JCC meeting, however, the chairperson proposed to have a meeting every three months during the early stage of the Project so that the progress could be reported and any problems arising could be addressed without delay. In the second phase of the Project, due to the influence of COVID-19, the JCC meetings were held once a year online as required. Since the first JCC meeting in November 2017, eight meetings have been held to date. The main contents of agenda and discussions at each JCC meeting are shown in Table 1-6. Prior to each meeting, preliminary meetings were held with LGD.

Basically, matters concerning the Project were discussed at the meetings. However, discussions beyond the content of the Project were frequently conducted because the activities in this Project may affect the basis of SWM administration in Bangladesh. The focus of the Project activities in Phase 1 was the preparation of DNCC and DSCC's Master Plan, which represented an important stage that determined the future SWM of DNCC and DSCC. The issues regarding the approach to Waste-to-Energy (WtE), which was recently under review for introduction by the Bangladesh government, were widely discussed at the JCC meetings including the suitable timing to take actions toward introducing incineration. Although the introduction of solid waste incineration including WtE approach is an issue that has to be considered for large cities such as Dhaka North and Dhaka South Cities, decision-makers need to deliberate carefully on the merits and demerits of such a sensitive facility because this will be the first-time to introduce this technical system in the country. During the second phase of the Project, discussions on strengthening the medical waste management system and promoting the 3Rs were actively held to address COVID-19 infection.

Table 1-6 Summary of JCC Meetings

1st JCC meeting (November 21, 2017)	
No. of participants	13 (DNCC, DSCC, CCC, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives (LGD), JICA and JICA Project Team (JPT))
Topic	• Overview and activity policies of this Project
Discussed points	• JPT proposed a procedure in which the three City Corporations (CCs) would form a Joint Working Meeting and the results of various discussions there would be approved at a JCC meeting held once a year. However, the chairperson of JCC proposed that JCC meetings would be held several times a year to ensure that JCC would remain the main place of discussion (however, it was deemed possible to deepen the debate at the Joint Working Meetings). The participants agreed that JCC meetings will be held every three months in Phase 1 of the Project.

	<ul style="list-style-type: none"> CCC strongly requested LGD that WMD should be established at CCC to implement 3R and manage landfill sites. It was agreed that waste-related data to be collected by JPT would be shared among the various stakeholders. The participants requested that the PDM should include WtE-related items, but it was decided that the current PDM agreed upon earlier in R/D would be used for the time being. DNCC and DSCC strongly requested LGD to assign personnel required for the operation of WMD. The safety management structure during the project period was confirmed among the participants.
2nd JCC meeting (February 14, 2018)	
No. of participants	15 (DNCC, DSCC, CCC, LGD, JICA, and JPT)
Topic	<ul style="list-style-type: none"> Progress and future activity plan of the Project A result overview of feasibility study (Pre-F/S) on WtE (Result of WtE introduction pre-check list) Current problems encountered by the three City Corporations (CCs) Implementation plan of training in Japan
Discussed points	<ul style="list-style-type: none"> Chief Waste Management Officer (CWMO) of DNCC pointed out that WBA, although having enormous progress and effect, has problems in that WBA cannot be sufficiently deployed due to an insufficient number of Conservancy Inspectors (CIs) who supervise wards and that there is difficulty in securing land for construction of new ward offices. The participants also referred to the necessity of technical training for the management of landfills and WBA. Both DNCC and DSCC are examining the introduction of WtE in the Master Plan. It was pointed out that the construction of the facilities should be immediately started because the construction would take seven to eight years.
3rd JCC meeting (October 25, 2018)	
No. of participants	20 (DNCC, DSCC, CCC, LGD, JICA, and JPT)
Topic	<p>[Part 1] Presentation on WtE:</p> <ul style="list-style-type: none"> Experience of approach to waste disposal in Japan Eco-Towns and WtE technologies appropriate for DNCC and DSCC and how they can be introduced to the future SWM <p>[Part 2] Progress and future plan of the Project</p> <ul style="list-style-type: none"> Progress of activities toward the introduction of WtE Progress and future plan of the Project
Discussed points	<ul style="list-style-type: none"> JPT explained again that the major issues found as a result of WtE feasibility study are (1) construction cost, (2) securing of maintenance and management cost, and (3) awareness-raising for residents upon introduction. Both DNCC and DSCC have landfills with short remaining lifetime so that it was decided to include the introduction of Eco-Towns and WtE in the Master Plan. A participant proposed to increase the tax rate to cover the operating cost of Eco-Towns. A participant referred to the necessity of also examining SWM in small-scale municipalities (Paurashava) around CCs. It was agreed that opportunities would be provided to share information on the actual SWM administration of DNCC and DSCC with the local administrative organs in Bangladesh.
4th JCC meeting (February 17, 2019)	
No. of participants	14 (DNCC, DSCC, CCC, LGD, JICA, and JPT)
Topic	<ul style="list-style-type: none"> Progress and future plan of the Master Plan Eco-Town construction design and schedule Summary report on training in a third country (Kolkata City, India)
Discussed points	<ul style="list-style-type: none"> DSCC explained about the progress of the expansion of Matuail Landfill. The JCC chairperson urged DNCC and DSCC to start the construction of Eco-Towns promptly. The chairperson also requested DNCC and DSCC to prepare presentation material to be used for explanation to the LGD minister. The JCC chairperson requested DNCC and DSCC to prepare a draft component plan of the Eco-Towns.

5th JCC meeting (July 9, 2019)	
No. of participants	17 (DNCC, DSCC, CCC, LGD, JICA and JPT)
Topic	<ul style="list-style-type: none"> • Approval of the Master Plan and discussion of the disclosure process • Progress of the activities in CCC and a draft waste collection and transportation plan and Guidance Manual • WBA activities expansion manual and WMD Directives • Project Monitoring Sheet (ver.4.0) and a revised PDM (ver.2.0)
Discussed points	<ul style="list-style-type: none"> • The Master Plan was considered to be generally good, but needed to incorporate the WtE introducing direction and ongoing waste management program of the Government as per the report to be provided by LGD within a week of the meeting; • DNCC & DSCC to review the Master Plan and finalize it in consultation with the JET; • DNCC and DSCC to send and present the final draft of Master Plan to the Ministry for the approval • JICA Bangladesh office strongly requested that the meeting with the Minister of LGD on the Master Plan should be set soon after the final draft of Master Plan was agreed upon. • The waste collection and transportation guidance and manual in CCC, the WBA expansion manual, the 4th project monitoring sheet, the draft revised PDM (ver.2.0) and priority projects were accepted.
6th JCC meeting (December 17, 2019)	
No. of participants	17 (DNCC, DSCC, CCC, LGD, JICA and JPT)
Topic	<ul style="list-style-type: none"> • Project period extension and PDM revision • Training in Japan to be conducted in March 2020 • Approval and release of the new master plan • Progress of the WtE project through Public Private Partnership (PPP) • Work plan for the second phase of the project
Discussed points	<ul style="list-style-type: none"> • The extension of the project period until November 2021 was approved. GOB and JICA to sign the record of discussions on the extension of the project period; • In the revised PDM, the following activity and the two outcomes were approved by JCC; <ul style="list-style-type: none"> (Activity) Conduct feasibility study on the introduction of WtE (Outcome 1) Promote public awareness activities in solid waste management in DNCC and DSCC (Outcome 2) Extend the remaining life of the existing final disposal sites in DNCC and DSCC and secure a site for a new disposal site • The 2nd 12CCS meeting was proposed to be held in February 2020. • JCC agreed to conduct the training in Japan in March 2020. • JCC assured that LGD would soon present the new master plan for DNCC and DSCC to the ministry.
7th JCC meeting (January 26, 2020)	
No. of participants	20 (DNCC, DSCC, CCC, DOE, ERD, LGD, JICA and JPT)
Topic	<ul style="list-style-type: none"> • Status of approval of the new master plan • Assistance to CCC for medical waste (approval from the JCC) • Project period extension and PDM revision (approval from the JCC)
Discussed points	<ul style="list-style-type: none"> • JCC confirmed that LGD would soon submit the master plan for DNCC and DSCC for approval. • An extension of the project period until May 2022 was approved by JCC. LGD and JICA to sign the record of discussion (R/D) confirming the project period extension and PDM revision. • For the assistance to medical waste, CCC to submit a plan to LGD, to approve it and take actions.
8th JCC meeting (July 5, 2021)	
No. of participants	25 (DNCC, DSCC, CCC, ERD, LGD, JICA and JPT)
Topic	<ul style="list-style-type: none"> • Tax exemption for medical waste incinerator to be procured to CCC • Follow-up on approval of the new master plan for DNCC and DSCC • Improvement of medical waste management in CCC • Drone analysis of the landfill remaining volume in DNCC and DSCC

	<ul style="list-style-type: none"> Project progress in DNCC, DSCC and CCC after February 2021
Discussed points	<ul style="list-style-type: none"> After receiving letters from CCC and JICA, LGD to prepare a request letter to the National Board of Revenue (NBR) for tax exemption for the medical waste incinerator to be procured to CCC. JCC assured that LGD would promptly proceed with the ministerial approval process for the master plan for DNCC and DSCC.
Project Completion Workshop (May 10, 2022)	
No. of participants	Total of 124 <ul style="list-style-type: none"> Bangladesh side: 11 from LGD, 35 from DNCC, 25 from DSCC, 11 from CCC Japan side: 6 from JICA, 15 from JPT Others: 21
Topic	<ul style="list-style-type: none"> Project activities and results to date Lessons learned and recommendations from the project Future vision of solid waste management in Bangladesh
Discussed points	<ul style="list-style-type: none"> JCC confirmed that preparations for the next phase of the project, including 3R activities, to proceed. JCC discussed measures to continue the Solid Waste Management Information Sharing Meeting under the initiatives of LGD. JCC confirmed that annual solid waste management report would be prepared in each municipality in accordance with the waste management regulation 2021.

* CI: Conservancy Inspector, CWMO: Chief Waste Management Officer, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, JCC: Joint Coordination Committee, JPT: JICA Project Team, NBR: National Board of Revenue, PDM: Project Design Matrix, R/D: Record of Discussion, WBA: Ward-based Approach, WMD: Waste Management Department, WtE: Waste-to-Energy
Reference: JPT

1.8 Capacity Assessment

1.8.1 Viewpoint of Capacity Assessment

The first capacity assessment was conducted to evaluate the administrative and managerial capabilities of the staff and organization of WMD (or Conservancy Department in Chattogram City) based on the status of activities up to February 2018 from the viewpoint of how much contribution was made to establish and manage WMD in the target cities. In addition, organizational capacity was assessed by integrating the results of the individual assessments.

The second capacity assessment was conducted at the end of the project, and the same items as in the first capacity assessment were interviewed and the degree of capacity improvement through the project activities was confirmed.

1.8.2 Evaluation Method

(1) Evaluators and evaluation method

The capacity assessment was done by each of WMD's core personnel by themselves and by JICA Project Team (hereinafter referred to as "JPT"). The target staff members for the assessment are listed below.

- DNCC: CWMO, Executive Engineer (hereinafter referred to as "EE") (Transport) and EE (Landfill)
- DSCC: CWMO and EE
- CCC: CEO, EE, Chief City Planner (hereinafter referred to as "CCP") and Chief Conservancy Officer (hereinafter referred to as "CCO")

The self-evaluation of each WMD staff member was made from the viewpoint of understanding how similar or different the self-perception was from the evaluation by other persons. The organizational evaluation was made by averaging the evaluation results of individual members for each organization unit.

(2) Evaluation items

Table 1-7 shows the evaluation items. For each evaluation item, a score from 0 to 5 points was given. It was determined not to conduct evaluation according to total points of evaluation, but to give importance to the evaluation of each item.

Table 1-7 Evaluation Items for the Capacity Assessment

Assessment item		Narrative indicator	Scale
1.	Understanding of SWM in DNCC, DSCC, and CCC	<ul style="list-style-type: none"> Understands the meaning of SWM and can explain it to the public. 	0: doesn't know 1: knows about SWM in practice 2: understands waste flow 3: understands about waste collection and transfer 4: understands WMD Directives 5: has the idea of future SWM
2.	Understanding of Ward-based Approach (WBA)	<ul style="list-style-type: none"> Understands importance of WBA, and practices the activity. 	0: doesn't know about WBA 1: has heard about WBA before 2: understands a little about WBA 1 to WBA 4. 3: understands well about WBA 1 to WBA 4. 4: understands importance of WBA activity 5: has an idea of future WBA
3.	Management ability	Can discuss and coordinate a matter with: <ul style="list-style-type: none"> CWMO/CEO and CCP CO and CI. Other departments within CC. Citizens Ward councilor 	1 point per indicator
4.	Understanding of SWM-related laws and regulation	<ul style="list-style-type: none"> Has checked SWM-related laws and regulations. Has checked Office Orders. Can explain laws, regulations, and Office Orders to citizens. Understands the SWM Administrative Procedure Book. Understands WBA-related Office Orders. 	1 point per indicator
5.	Finding problems and solutions	<ul style="list-style-type: none"> Knows and understands SWM-related problems, and seeks for the solutions. 	Assess with specific problems (1 – 5)
6.	Administrative ability	<ul style="list-style-type: none"> Manages in accordance with regulations. Makes internal Bylaws and implements them properly. 	Assess with specific problems (1 – 5)
7.	Problem solving ability	<ul style="list-style-type: none"> Has ability to find fundamental problems, and develops and implements a system for problem-solving. 	Assess with specific problems (1 – 5)

Assessment item		Narrative indicator	Scale
8.	Conception and planning ability	• Makes a future plan (such as Master Plan) in accordance with strategies and plans of the government.	Assess with specific problems (1–5)
9.	Leadership	Can provide advice and support to: • CWMO/CEO • CO/CI • Citizens • Ward Councilor	1 point per indicator
10.	Documentation ability	• Prepares official documents to solve problems strategically.	Assess with specific problems (1–5)
11.	Social networking	• Can solve problems in support of social network	Assess with specific problems (1–5)
12.	Objectivity	• Can make a decision considering his own roles and responsibility.	Assess with specific problems (1–5)

Reference: JPT

1.8.3 Implementation period

The capacity assessment was conducted in February 2018 after the activities in Phase 1 were commenced to know the capacity of C/P both at baseline, and once more in April 2022 at the endline.

- The First Capacity Assessment (baseline): February 2018
- The Second Capacity Assessment (endline): April 2022

1.8.4 First Capacity Assessment (Baseline)

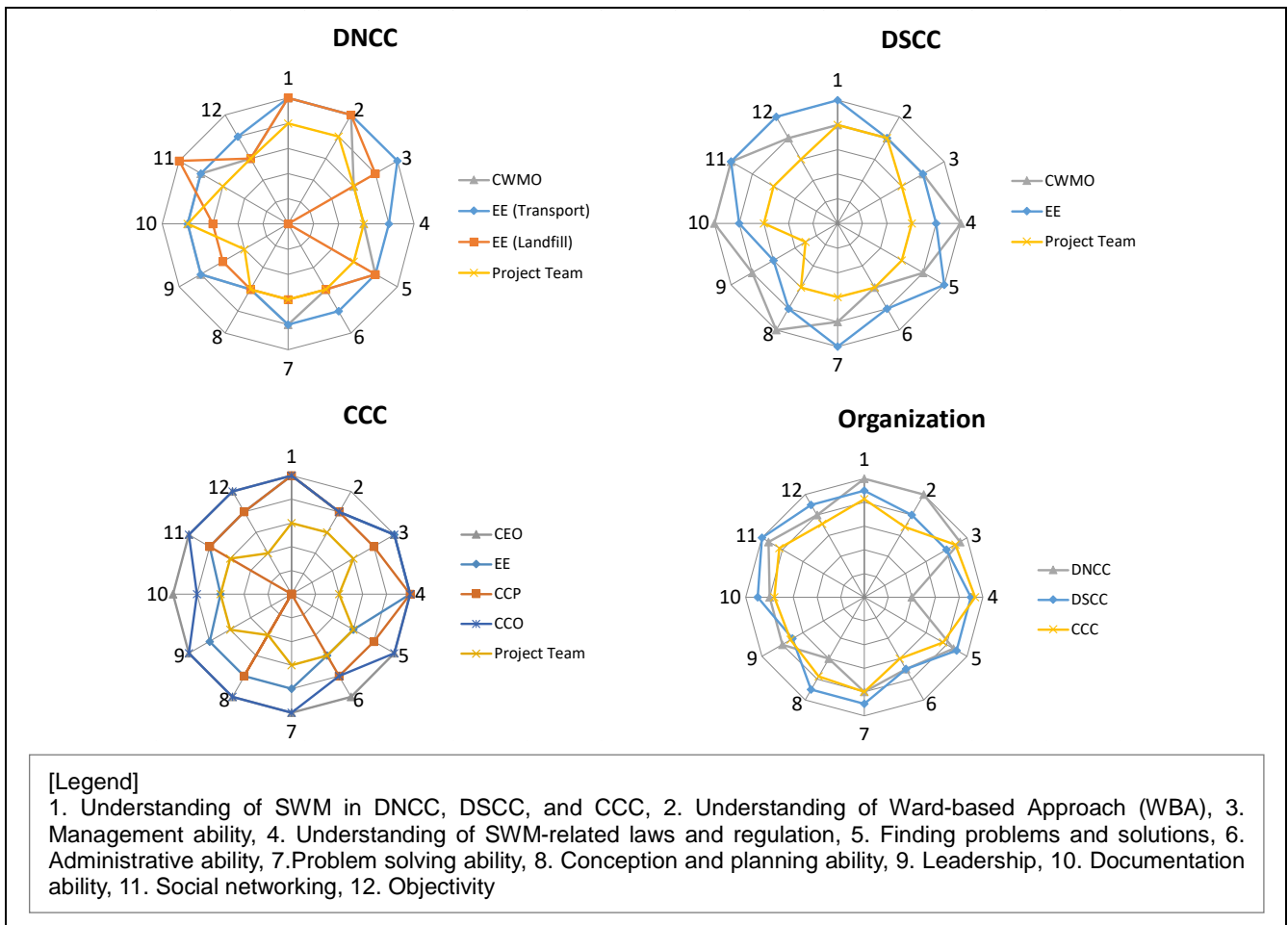
Fig. 1-6 shows the results of the evaluation conducted by the staff of DNCC, DSCC, and CCC and JPT.

(1) Individuals

In the DNCC, understanding of SWM and WBA among staff members was high and the results showed relatively little variation. This indicates that the staff members have the same views to some extent. In DSCC and CCC, on the other hand, the level of understanding varied greatly from one individual to another. For "9. Leadership," the officials of the three cities rated it highly, at 3 or above, while JPT rated it 1.5 to 3 because activities in cooperation with SWM-related stakeholders could not be confirmed very well. In the CCC, there was a discrepancy in the evaluation results between the city officials and JPT in "4. Understanding of SWM-related laws and regulations. It is important to adjust this gap in the activities of the Project in the future. The discrepancy between officials of DNCC and JPT was large in the "4. Understanding of SWM-related laws and regulations" section, as all respondents except EEs in charge of collection and transportation did not respond.

(2) Organizations

CCC, not having organized a WMD yet and gradually promoting SWM, was evaluated to have a low organizational capability as a whole, whereas DNCC and DSCC were observed to be generally in a similar state regarding organization. DNCC was evaluated to have high understanding of SWM and WBA in particular.



* CCP: Chief City Planner, CCO: Chief Conservancy Officer, CEO: Chief Executive Officer, CWMO: Chief Waste Management Officer, EE: Executive Engineer
 Reference: JPT

Fig. 1-6 Results of the 1st Capacity Assessment

1.8.5 First Capacity Assessment (Endline)

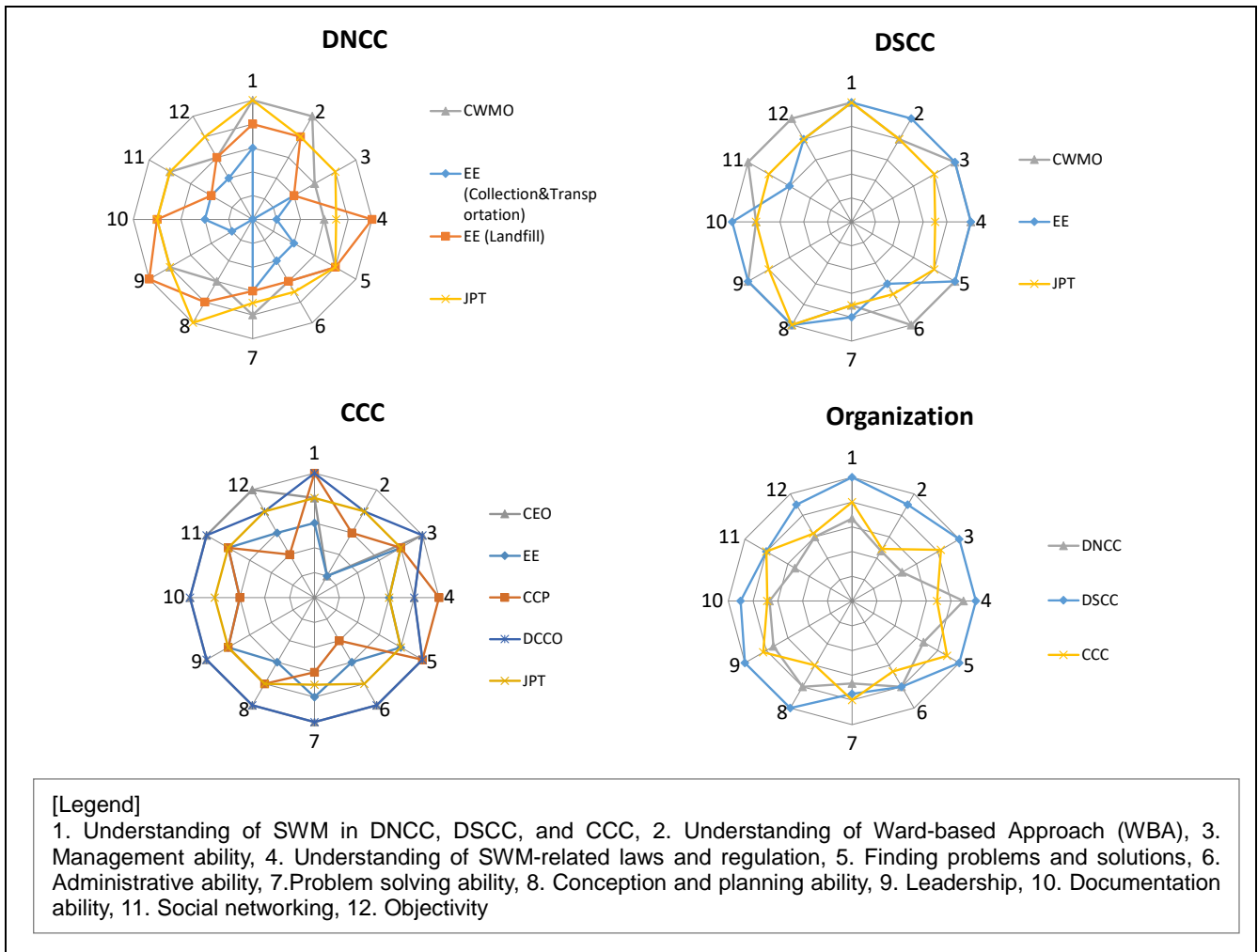
Fig. 1-7 shows the results of the evaluation conducted by the staff of DNCC, DSCC, CCC and JPT.

(1) Individuals

Among the staff members evaluated, JPT was able to confirm that respondents, who had just started in their positions, still needed to understand SWM and WBA. However, there was an overall improvement in all three cities. In DNCC and CCC, many of the staff members were new to their positions and their evaluations varied widely. In DSCC, on the other hand, there was less variation in evaluations than in the other two cities, indicating a situation of uniformity in recognition within the organization. For "9. Leadership," which was rated low by JPT at the baseline, each city made improvements, and the gap between JPT and city officials has been eliminated. The significant gap between the JPT and CCC in "4. Understanding of SWM-related laws and regulations" at the baseline has also been resolved, and the CCC now seems to have a more stable understanding of the situation.

(2) Organizations

DNCC and CCC showed generally similar organizational capacities, while DSCC scored more stable and higher results. These results showed that DSCC had a high level of capacity improvement due to the small number of staff relocation, CCC was still in the process of developing its waste management system, and DNCC was adversely affected by the large number of new staff assignments.



* CCP: Chief City Planner, CCO: Chief Conservancy Officer, CEO: Chief Executive Officer, CWMO: Chief Waste Management Officer, EE: Executive Engineer
 Reference: JPT

Fig. 1-7 Results of the 2nd Capacity Assessment

1.8.6 Implementation of Capacity Development

In this Project, it was decided to conduct capacity development of the entire organization and staff with an eye to developing a sustainable organization using the following methods.

[DNCC and DSCC]

- Prepare WMD Directives and promote integrated waste management by WMD.

- Implement SWM based on the Administrative Procedure Book to ensure orderly operations compliant with the legal system.
- Learn the methods of waste collection and transport, and plan and manage landfills while preparing the SWM Master Plan.

[Common to the three CCs]

- CIs, responsible for SWM in each ward, would receive capacity building for WBA including SWM in each ward, labor-management of cleaners, awareness-raising of residents in the area, improvement of collection, etc.
- To act in concert with the residents, press, and society, in order to construct a basis for collaborating with the residents through information distribution and administrative public relations with a focus on information disclosure.

1.9 Public Relations Activities (directed Outside the Project) and Communications with Related Organizations

1.9.1 Project-related Public Relations

By utilizing Facebook, a widely known Social Networking Service (SNS) in Bangladesh and Japan, JPT provided project information through JPT’s Facebook page and JICA Bangladesh Office’s Facebook Page to promote understanding of the purposes, activities, and achievement of the project by the peoples of Bangladesh and Japan.

In addition, recognizing the importance of public relations, JPT fostered such common understanding with C/Ps and strengthened an important foundation of the project activities in Phase 1 toward the master plan revision and Eco-Town concept promotion. In Phase 2, public relations activities were added as one of the outputs in PDM, and fully supported related activities (refer to 2.8).

(1) Project Team Facebook

In July 2017, JPT opened a Facebook page¹⁶ where information on project activities was published every week (Fig. 1-8). As of April 2022, approximately 2,200 people were following the page, and posted articles have been viewed a total of approximately 12,200 times (50-100 people each week). In addition, the 25 posted videos were viewed a total of approximately 8,400 times, with the most viewed video having been viewed approximately 1,500 times so far.

¹⁶ Project Team Facebook (<https://www.facebook.com/JICA-Project-Team-144333851240222/>)



Fig. 1-8 Articles of the Project Facebook Page (Examples)

(2) Facebook of JICA Bangladesh Office

The following project-related articles were provided on the Facebook page of JICA Bangladesh Office¹⁷ (Table 1-8).

Table 1-8 Articles for the Facebook Page of JICA Bangladesh Office

Posted	Content
March 20, 2022	Parkview Hospital and Ward 08 in Chattogram were awarded for recognition of their efforts on 3R (Reduce, Reuse, Recycle) activities
January 11, 2022	Handing over ceremony of medical waste incinerator to CCC
November 22, 2021	Handover ceremony of gas meters and drones to DNCC and DSCC
November 13, 2021	Introductory movie on Prototype Rickshaw Vans
November 11, 2021	JICA handed over Two Ward offices and Prototype Rickshaw Vans to Chattogram City Corporation
November 4, 2021	DNCC in collaboration with JICA is working on awareness raising on canal cleaning. Clean canal, clean Dhaka ¹⁸
August 25, 2021	3rd Issue of WMD Directives of DNCC & DSCC
August 23, 2021	2nd Issue of ward-based approach newsletter
August 5, 2021	"Let us stop dumping waste into the canals and let us make the future Dhaka a livable city"
June 20, 2019	Teachers visited DNCC's waste management sites ^{*1}
Feb. 28, 2019	Inauguration Ceremony of Renovated Solid Waste Management Ward Office at DNCC Ward 27
Jan. 17, 2019	1st Solid Waste Management Information Sharing Meeting among 12 CCs
Oct. 14, 2018	Waste Collection with New Compacter starts ^{*2}

*1 This article was prepared by JICA Bangladesh Office

*2 The activity was conducted as part of the grant aid project "The Project for Improvement of Solid Waste Management Equipment in the People's Republic of Bangladesh"

¹⁷ JICA Bangladesh Office Facebook (<https://ja-jp.facebook.com/JicaBangladesh/>)

¹⁸ Canal cleaning campaign video (<https://www.youtube.com/watch?v=pTwOkqesqX0>) (viewed April 6, 2022)

(3) News Coverage by Local Media

Fig. 1-9 shows a newspaper article (courtesy call on the mayor of Chattogram by JPT) published in Dainik Azadi (a local newspaper in Chattogram). Thirty (30) local media reports (i.e., newspaper etc.) on the Project were confirmed, covering inauguration ceremony of the ward cleaning office and other Project activities in Chattogram. Please refer to Appendix 8-(1) for a list of local media reports.

1.9.2 Communications with Related Organizations

JPT continuously shared information and exchanged opinion with direct counterparts in this Project, i.e., LGD, DNCC, DSCC, and CCC as well as other stakeholder organizations such as the Government of Bangladesh, foreign donors, institutions of learning and non-governmental organizations (hereinafter referred to as “NGO”) through the numerous communication channels developed by the Project. The Master Plan revision and implementation of Eco-Town were frequently discussed with related stakeholder organizations (refer to 2.8.5 and 2.2.3 (3)). Furthermore, DOE established the waste management regulations in December 2021, which stipulated that waste segregation was the responsibility of waste generators, and accordingly JPT worked to strengthen collaboration with DOE by having them lecture at 3R training programs and Solid Waste Management Information Sharing Meetings, as described below. In CCC, operational guidance and monitoring of the medical waste small incinerator were conducted in collaboration with DOE.

JPT also gave a Project briefing presentation to the Parliamentary Secretary of the Japanese Ministry of Environment, Mr. Kanke on May 30, 2019, and accompanied the Japanese Deputy Minister for Environment, Mr. Kiuchi to DNCC’s Amin Bazar landfill site visit on June 29, 2019. Furthermore ambassador extraordinary and plenipotentiary Mr. Naoki Ito, the ambassador of Japan in Bangladesh attended the ceremony for the provision of the medical waste small incinerator held in Chattogram on January 11, 2022, the 3rd Solid Waste Management Information Sharing Meeting, and the overall meeting on May 10, 2022, and delivered words of encouragement on the future of waste management in Bangladesh.



	
<p>Amin Bazar Landfill Site Visit by the Japanese Deputy Minister for Environment, Mr. Kiuchi</p>	<p>Mr. Kiuchi and DNCC Mayor Meeting</p>
	
<p>Ceremony for the Provision of the Medical Waste Small Incinerator</p>	<p>Speech by Ambassador Extraordinary and Plenipotentiary, Mr. Ito at the 3rd Solid Waste Management Information Sharing Meeting</p>

Reference: JPT (photographs taken in June 29, 2019 (upper row) and March 20, 2022 (lower row))

Photo 1-1 Site Visit by the Japanese Deputy Minister for Environment

(1) Seminar on Solid Waste Management in North and South Dhaka (April 5, 2019)

At a seminar held on April 5, 2019, overviews of the new master plan were explained to 15 participants from the International Finance Corporation (hereinafter referred to as “IFC”), the Embassy of Japan in Thailand, academia and private companies interested in solid waste management (incinerator manufacturers and trading companies). The participants exchanged opinions on the feasibility of introducing WtE facility.

In addition to questions related to technical aspects (i.e., low calorific value and facility maintenance etc.), questions addressing financial and institutional aspects (i.e., sources of funds for construction etc.) and social aspects (i.e., opposition of local residents etc.) were also raised by the participants. The seminar promoted information exchange between Bangladesh and Thailand and building of



Reference: JPT (photograph taken on April 5, 2019)

Photo 1-2 Participants in the Seminar at JICA Thailand Office

relationships among the participants.

(2) Presentation at the JICA Clean City Initiative (JCCI) Kick-off International Seminar (January 19, 2022)

In the session “Solid Waste Management in Bangladesh: Collective Actions towards Clean Cities” at the international seminar hosted by JICA on January 19, 2022, the past assistance provided by JICA in the solid waste management field and activities were introduced, including development of the new master plan, pilot project for waste segregation, data management relating to disposal site, and drone analysis for remaining capacity of the disposal sites and support for introducing medical waste incinerator.

1.10 Dispatch of Experts

Since this project started in June 2017, a total of twenty-one experts were assigned to the project activities over 113.4 man-months (phase 1: 53.12 man-months (of which 48.69 man-months in Bangladesh and 4.43 man-months in Japan) and phase 2: 59.81 man-months (of which 26.31 man-months in Bangladesh and 33.50 man-months in Japan)). Attachment 4 shows the dispatch of experts in phase 1 and phase 2 of the Project.

Chapter 2 Outputs of Activities

2.1 Output 1: (DNCC and DSCC) Revision of Clean Dhaka Master Plan [Phase-1 & Phase-2]

2.1.1 Overview

The present DNCC and DSCC requires a new basic plan to delineate a whole picture of the future solid waste management for the next 15 years (base year: 2017, target year: 2032). In Dhaka City, “Clean Dhaka Master Plan” (hereinafter referred to as “the first Master Plan”) was developed in 2005 targeting the period from 2005 to 2015. The Master Plans for each of DNCC and DSCC were revised separately in this Project based on the first Master Plan.

After obtaining approval from both mayors of Dhaka North and South City in 2019, discussions on the national policy regarding WtE were held. Although LGD faced difficulty in the approval procedure, the final approval for the plan was obtained in February 2022, and the new Clean Dhaka Master Plan (hereinafter referred to as “the New Master Plan”) was opened to the public at the websites of DNCC and DSCC in March 2022. In the Project, the seven priority projects listed in the New Master Plan were newly implemented, and the improvement measures for the waste management system were realized on a pilot basis.

2.1.2 Review of Clean Dhaka Master Plan

Prior to drafting the New Master Plan, the first Master Plan was reviewed. The contents of the New Master Plan have been prepared based on the methods and concepts actually used in the previous technical cooperation project, and taking into account more sustainability and replicability. The following describes the outline of the characteristics of the first Master Plan and contents that were reflected in the New Master Plan.

(1) Implementation of organizational structure and basis for actions

One of the most important achievements of the first Master Plan was the establishment of WMD. Thereby, the SWM system¹⁹ in which waste collection, treatment, and disposal were poorly coordinated became more comprehensive and manageable, leading to the development of a strong SWM foundation.

The New Master Plan will implement the following essential activities (priority projects) in order to continuously strengthen the organization, mainly WMD, and institutional aspects.

- To ensure continuity and stability of SWM, WMD Directives shall be prepared and revised according to changes in the society and environment and other factors every five years (refer to Section 2.3). SWM activities can be implemented in a consistent manner as long as WMD is able to conduct its duties in accordance with the said Directives.

¹⁹ In general, SWM system is composed of i) waste generation, ii) waste collection and transport, iii) intermediate treatment, and iv) final disposal. In Bangladesh, waste collection and transport activity is divided into primary waste collection and secondary waste collection. Intermediate treatment is such as incineration and recycling. “Waste treatment” is sometimes used as a general term to describe the whole process, including waste collection and transport, intermediate treatment and final disposal.

- To ensure that WMD functions under a clearly defined and understandable institutional system, the draft SWM Administrative Procedure Book, a compilation of existing laws, ordinances, and Office Orders related to SWM implementation details that has been prepared by in this Project shall be promptly authorized (refer to Section 2.4.3 (2)).

(2) Introduction of WBA

An important outcome in the first Master Plan was the introduction of WBA system for SWM implementation. WBA provides more emphasis on improving SWM at the field level with community support. WMD head office is responsible for planning and overall management of solid waste while the field activities are carried out in each ward led by the ward CI at the ward SWM office. The ward CI manages the cleaners allocated to the ward, conducts community-level awareness raising required for participatory SWM, and improves waste collection in the ward. The details provided under WBA for the SWM field activities at the ward level have facilitated the transfer of the responsibilities of these activities to the ward SWM offices and led to improvement in quality and stability of the service in the field (refer to Section 2.4).

WBA is emphasized in the New Master Plan and will be promoted continuously as a priority project to achieve a sustainable SWM based on providing stable service with flexibility for the ward SWM office to make changes at the ward level to maintain the service quality.

2.1.3 Method of Master Plan Revision

The New Master Plan period is from 2018 to 2032 (base year: 2017, target year: 2032), and covers municipal and medical wastes in the entire jurisdiction of the two cities of DNCC and DSCC including areas newly integrated into each city in 2017. The New Master Plan in the Project, unlike many conventional master plans focused on the construction of facilities, has been prepared after discussing among stakeholders and further envisioning how DNCC and DSCC would implement waste administration together with their residents in the future.

In Phase-1 of the Project, a draft of the Master Plan was created for the purpose of providing information to stakeholders, and this was planned to be finalized in 2020 during Phase 2 of the Project. The work plan developed at the beginning of Phase-1 had targeted its completion by May 2018. However, the preparation work was delayed because (i) the area of each city corporation was expanded in July 2017 and the coverage of the Master Plan became larger than the original (population increase: 40% for DNCC and 33% for DSCC, and area increase: 137% for DNCC and 142% for DSCC), (ii) consensus building for planning to include an intermediate treatment facility for the first time in either city (especially on WtE) was taking time among stakeholders, and (iii) decision-making process of the JCC had not functioned well owing to the country's complicated administrative procedure. As a result, by the end of Phase-1 LGD had not approved the public disclosure of the Master Plan.

In Phase-2, the Project continued to provide technical support to DNCC and DSCC to obtain LGD's approval

of the New Master Plan. The Project team visited LGD multiple times with the CWMO of each of DNCC and DSCC, and LGD finally approved the New Master Plan in February 2022. LGD granted the approval under the following conditions: (1) the New Master Plan is a dynamic document and should be reviewed regularly, and (2) the New Master Plan is consistent with the idea of the national policy for introducing WtE intermediate treatment as a means towards realizing the material cycle society. After approval by LGD, the New Master Plan was opened to the public on the websites of both city corporations in March 2022.

2.1.4 Structure of the New Master Plan

The current Master Plan, in consideration of the fact that the lack of remaining landfilling capacity of landfill sites operated by DNCC and DSCC were severe, strongly asserts policies of expanding these disposal sites and constructing new disposal sites as well as introducing intermediate treatment to ensure continuous and stable SWM. This situation calls for measures beyond the conventional SWM conducted in Dhaka City, and requires not only organization and capacity building for implementing the plan but also fostering of private companies, universities, consultants, and NGOs that support SWM. Furthermore, in order to secure the large budget necessary to implement projects of this scale, effective public relations and awareness-raising of residents will be needed to ensure deeper understanding of SWM on the part of residents and collaboration between municipalities and citizens. A system of fair and accurate budgeting is also required for the sake of budget and financial management. Therefore, the New Master Plan determined budget criteria to support bottom-up budgeting based on field experiences and assessment of annual budgets (refer to section 2.4.3 (4) for details).

The New Master Plan has a structure of activities focused on three major issues (Fig. 2-1). The first issue is the improvement of collection. In an area where sufficient collection is not conducted, the collection department of WMD shall be responsible for improvement. Collection improvements within each ward will be carried out mainly by the ward office, but for hotspots of scattered wastes such as huge illegal dumping sites and river cleanups²⁰, the collection section of WMD will be directly responsible for improvements. Note that both DNCC and DSCC are expanding their city areas, but the New Master Plan does not provide a clear planning policy for these new city areas because basic data is scarce and neither DNCC nor DSCC had yet established policies for dealing with them when the New Master Plan was developed. DNCC and DSCC are separately preparing Development Project Proposals (hereinafter referred to as “DPPs”) for waste collection in the new city areas (see 2.8.4), and the next revision of the Master Plan and update of the WMD Directives should include a plan for improving waste collection in the new city areas based on these DPPs.

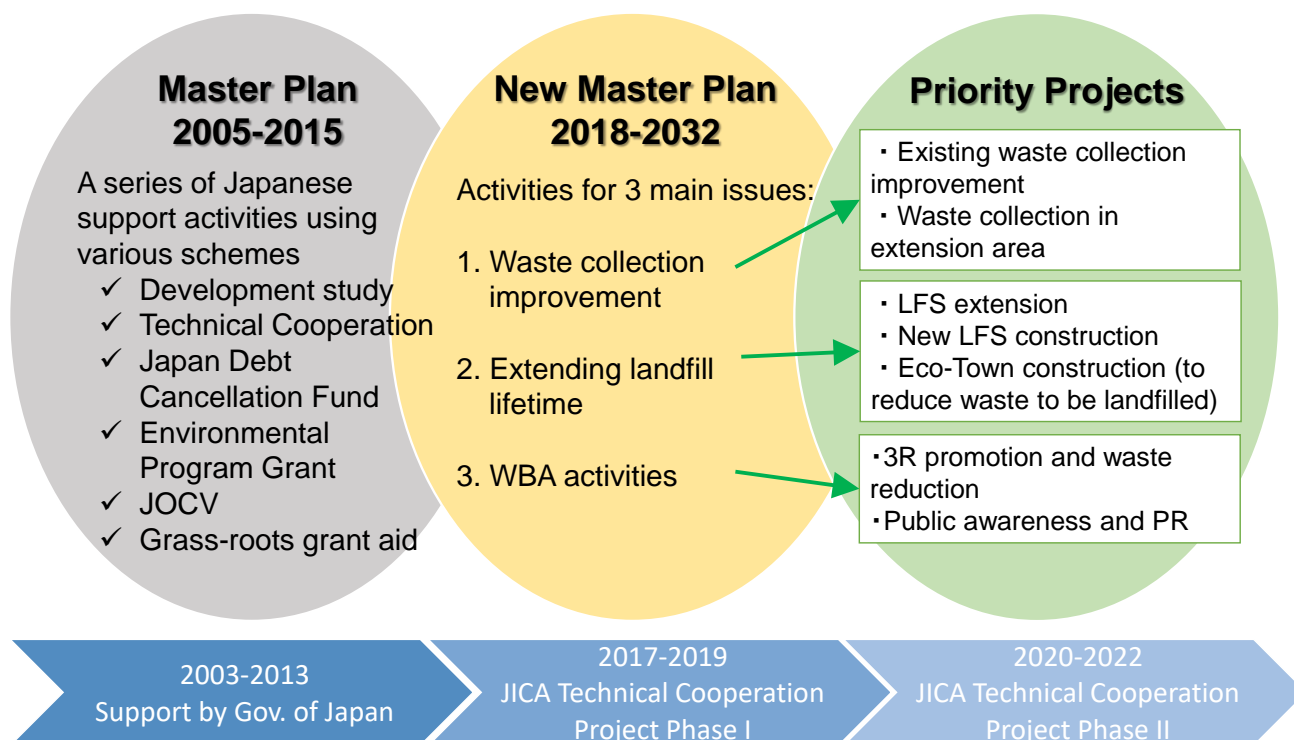
The second issue is the extension of the lifetime of landfills. The current landfills will be full in a few years to come and will not be usable thereafter. It is urgently required to expand the landfills as soon as possible and to introduce comprehensive intermediate treatment facilities (Eco-Town²¹) including WtE and recycling facilities

²⁰ In December 2020, the management of the rivers in the areas of DNCC and DSCC was transferred from Dhaka Water Supply and Sewerage Authority (hereinafter referred to as “DWASA”) to DNCC and DSCC.

²¹ LGD issued a public notice on the newspaper to solicit participants in the WtE business using waste discharged from the Dhaka North City with the aim of reducing the load on the final disposal site. As a result, 17 applicants submitted proposals, and the Ministry of Power, Energy and Mineral Resources (MoPEMR) selected China Machinery Engineering Corporation (CMEC) as the project operator. In response to this, on December 1, 2021, the Bangladesh Power Development Board (BPDB), DNCC and CMEC signed contracts

that can reduce waste effectively and thus divert waste from the landfills.

The third issue is the effort made by WBA and closely related to the above two issues. Both DNCC and DSCC shall make the most of the already established WBA activities and raise the awareness of residents to reduce waste at the generation source and promote 3R. WBA is already in place in more than half the wards in both CCs. This Master Plan shall promote further expansion and invigoration of WBA. As an activity related to all the other activities, an organizational effort of public relations (public relations administration) will be introduced to WMD.



WBA: Ward-based Approach, LFS: Landfill site, PR: Public Relations

Fig. 2-1 New Mater Plan Framework

2.1.5 Key Components of the New Master Plan

(1) Contents

Table 2-1 shows the key components of the Master Plan (common to both DNCC and DSCC). The first half of the Master Plan summarizes the current status of SWM in each CC. The second half, starting from Chapter 5 describes the course of actions taken in the Master Plan and contents of the activities based on the current status. The main text and summary of the draft New Master Plans are shown in Appendix 1 and Appendix 2.

necessary for project implementation.

Table 2-1 Contents of the New Master Plan (common to DNCC and DSCC)

Chapter	Item	Main Contents
Chap. 1	Introduction	Background, review of the first Master Plan, preparation process, target waste, target year, target area
Chap. 2	Regulatory framework and projects for SWM	The organizational structure of SWM administration in Bangladesh and regulatory framework, projects related to SWM by international donors and by Bangladesh side
Chap. 3	Overview of SWM	City Corporation profile, financial information and organizational structure, waste generation and treatment methods, waste flow, CC's waste management status (PR and public awareness, Ward-based Approach (WBA), waste reduction, collection and transport, vehicle maintenance, landfill management, medical waste treatment), issues
Chap. 4	Framework of Master Plan	Vision, goals, policy and target, scenario analysis, key components and strategies
Chap. 5	Master Plan	Planning basis (target population, waste quantity, collection rate, recycling rate), activity strategies (PR, WBA promotion, waste reduction, collection improvement, vehicle maintenance, intermediate treatment, landfill management, rules and regulations, organizational capacity, financial management)
Chap. 6	Financial requirement	Financial requirements for the Master Plan implementation
Chap. 7	Priority Projects	Priority projects based on the strategies
Chap. 8	Conclusion and recommendations	Conclusion, recommendations for future SWM (promotion of waste reduction, appropriate technology of SWM, sustainability of SWM, spatial coverage of waste management)

Reference: New Clean Dhaka Master Plan of DNCC and DSCC (Draft) 2018-2032

(2) Scenario Analysis

During the examination of scenarios that determine the policies of the Dhaka SWM in the future, two scenarios were formulated and compared: “(1) Waste disposal administration based on landfill disposal” and “(2) SWM administration in which advanced intermediate treatment (Eco-Town scheme) is introduced.” Regarding Scenario (1), the total volume of waste carried to landfills is as high as 3,000 tons or more per day at each CC in the target year and is expected to increase steadily thereafter. Therefore, Scenario (1) is not realistic considering the difficulty in securing sites for landfilling in both cities. Scenario (2) introduces intermediate treatment in the form of Eco-Towns based on WtE approach with an aim to significantly reduce the landfilled waste volume. Whereas no specific comparison was made for various technical options and combinations of these options, in general biogas facilities have a low treatment capacity and consequently limited effect on waste reduction, and RDF facilities²² are not fit for practical use when there is too much organic waste and have actually encountered many accidents in Japan. Therefore, neither of them is used much. On the other hand, WtE has a large treatment scale and little load on the environment and has been applied in many cases in SWM in the world, such as Japan, China, Europe, Singapore, and Thailand, and is considered to be highly feasible in Bangladesh. Based on the result of Pre-F/S on WtE conducted in this Project, the Master Plan recommends the introduction of Eco-Towns that have recycling and waste reduction facilities and WtE.

As an approach to realizing the Master Plan, 10 components have been proposed. Sustainable SWM can only be assured through establishing a strong basis for collaboration with residents over a long period of time and

²² RDF facility: Residue-Derived Fuel (RDF) facility produces solid fuels made from solid organic waste and plastic waste.

well into the future. In consideration of this point, this Master Plan includes activities related to; public relations administration and awareness-raising of residents; promotion of WBA activities; expansion of waste reduction; collection improvement; appropriate vehicle maintenance and management system; introduction of intermediate treatment facilities that can significantly reduce waste transported to landfills; expansion of existing landfills and securing of sites for new landfill development, and strengthening landfill management organization; operations management according to SWM rules and regulations, and implementation standards and guidelines; further strengthening of implementation organizations in the City Corporations such as WMD; and appropriate budget allocation and introduction observing budget assessment criteria.

(3) Approach to achieve the New Master Plan

The approach proposed to realize the New Master Plan and achieve a sustainable SWM together with the community, is summarized in ten (10) components, grouped into three headings as explained hereafter and shown in Fig. 2-2.

1) Strategic and Cross-field Components

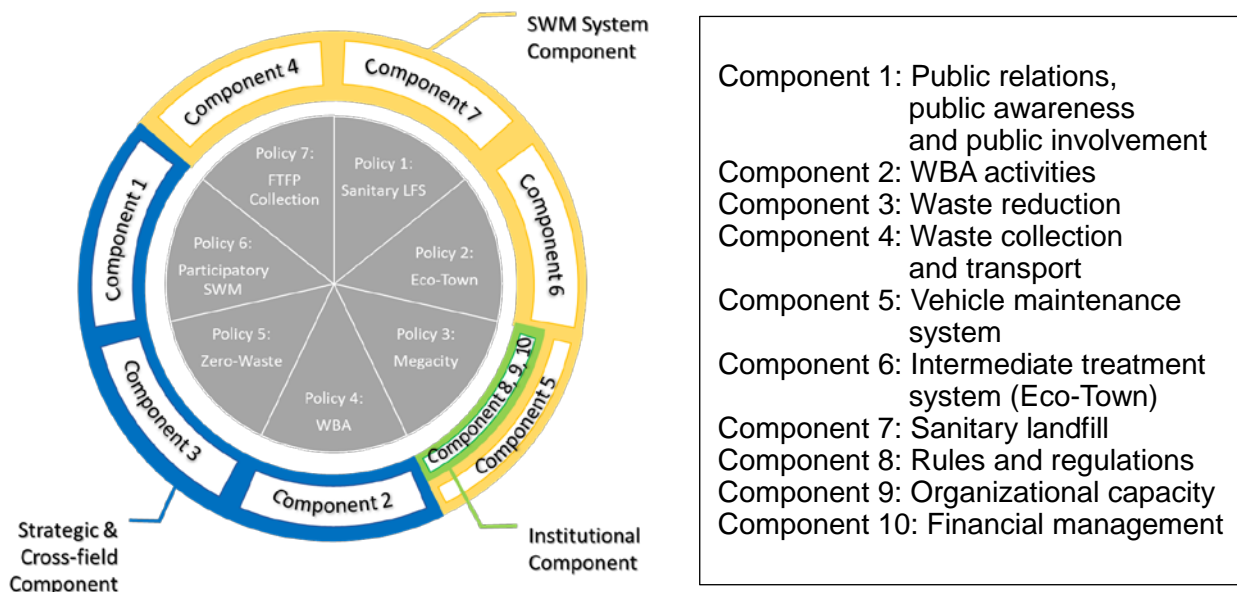
Public relations, public awareness and public involvement (Component 1), WBA promotion and expansion to strengthen field activity (Component 2), and 3R promotion and waste reduction (Component 3).

2) Solid Waste Management Components

Improvement of waste collection and transport by Fixed-Time Fixed-Place collection with compactor (Component 4), establishment of proper vehicle maintenance system (Component 5), introduction of intermediate treatment to reduce the large volume of waste (Component 6), sanitary landfill and secure new landfill site (Component 7).

3) Institutional Components

Work management in line with rules and regulations guided by the SWM administrative procedure book (Component 8), organizational capacity development for WMD and establishment of LMU (Component 9), proper and efficient financial management for SWM by budget assessment (Component 10).



Reference: New Clean Dhaka Master Plan of DNCC and DSCC 2018-2032

Fig. 2-2 Approach and 10 key components in the New Master Plan

2.1.6 Basic Surveys

The following table shows a list of surveys conducted in Phase-1 to collect basic information for preparing the Master Plan (Appendix 3). In Phase 2 these data and survey results were compiled in a data book, and included as parts of the New Master plan.

Table 2-2 Basic Surveys for the Master Plan Development

	Survey name	Date	Content
1	Waste Amount and Composition Survey	Apr. 2018	To sample solid waste generated in the city to measure waste quantity and its composition.
2	Time and Motion Survey	Apr. 2018	To follow a waste collection vehicle to observe its collection efficiency, and assess cleaners' attitude, occupational safety, and citizens' cooperation.
3	Social Survey	May 2018	To assess social acceptance and knowledge on waste collection service and waste management.
4	Medical Waste Management Survey	Sep. 2018	Baseline survey of medical waste management
5	Waste Management Organization, Law and Regulation Survey	Dec. 2018	To check organizations and regulations regarding waste management
6	Ward SWM Office Survey	Feb. 2018	To check ward office locations and working environment.
7	Illegal Dumping Survey	Feb. 2018	To check locations and conditions of illegal dumping sites in the cities.
8	Primary Collection Service Provider (PCSP) Survey	Mar. 2018	To check number of PCSPs and their areas of activity.
9	Secondary Collection Point (SCP) Survey	Feb. 2018	To check SCP locations and conditions.
10	Secondary Collection Station (STS) Survey	Feb. 2018	To check STS locations.

Survey name		Date	Content
11	Private Waste Collection Company Survey	Feb. 2018	To check private collection companies' activities.
12	Recycle Shop Survey	Jan. 2018	To check number of private recycling plants, types and amount of waste, and sale price of recyclable materials
13	Measurement of Incoming Waste Collection Vehicle's Weight and transported Waste Weight	Jan. 2018	To measure waste received at LFS.

* LFS: Landfill site, PCSP: Primary Collection Service Provider, SCP: Secondary Collection Point, STS: Secondary Collection Station

Reference: JPT

2.2 Selection and Implementation of Priority Projects [Phase-1 & Phase-2]

2.2.1 Overview

The New Master Plan identifies three to five priority projects in each of the 10 components.²³ Amongst them, the Project supported those that tackle the most urgent SWM issues, such as extending the lifespan of the landfill site, and important SWM issues, such as promoting the 3Rs so as to verify the effective improvement measures and the direction of future support.

Specifically, the seven priority projects listed in the New Master Plan were newly implemented in the Project on a pilot basis, and the improvement measures for the waste management system were realized; i) Activities for introduction of Eco-Town, ii) Pre-F/S on introduction of WtE in Dhaka North City, iii) Introduction of new waste collection system in consideration of collaboration between Primary and Secondary collection, iv) Public Relations and Public Awareness, v) Extension of lifetime of existing landfills and securing of sites for new landfills, vi) 3R promotion and implementation of waste segregation pilot project, and vii) Administrative Guidance on the Waste Management Rules 2021 by DOE.

Selection Method of Priority Projects

Table 2-3 shows the priority projects selected when preparing the Master Plan. These priority projects were implemented in collaboration with a counterpart or by a counterpart with support from JPT. The Project provided support for urgent issues such as extension of landfill sites' lifetimes and important issues such as 3R promotion, and examined effective improvement measures and the direction of future support.

<Priority Projects conducted during the Project>

(Phase-1: June 2017 – September 2019)

- (1) Activities for Introduction of Eco-Town
- (2) Pre-Feasibility Study (Pre-F/S) on Introduction of Waste-to-Energy in Dhaka North City
- (3) Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services

²³ Component 1: Public relations, public awareness and public involvement; Component 2: WBA activities; Component 3: Waste reduction; Component 4: Waste collection and transport; Component 5: Vehicle maintenance system; Component 6: Intermediate treatment system (Eco-Town); Component 7: Sanitary landfill; Component 8: Rules and regulations; Component 9: Organizational capacity; Component 10: Financial management (refer to 2.1.5(3)).

- (4) Public Relations and Public Awareness (* implemented as “Output 6” in Phase-2)
- (5) Extension of Lifetime of Existing Landfills and Securing sites for New Landfills (* implemented as “Output 7” in Phase 2)

(Phase-2: December 2019 – May 2022)

- (1) Pre-Feasibility Study (Pre-F/S) on Introduction of Waste-to-Energy in Dhaka North City (Additional survey)
- (2) Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services (continued from Phase-1) **
- (3) 3R Promotion and Implementation of Waste Segregation Pilot Project **
- (4) Administrative Guidance on the Waste Management Rules 2021 by the Department of Environment (DOE)

Note: “Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services (Phase-1 and Phase-2)” and “3R Promotion and Implementation of Waste Segregation Pilot Project (Phase-2)” were implemented in 3 cities including Chattogram City.

Table 2-3 Priority Projects in the Master Plan (Common to DNCC and DSCC)

Project and Program		Executing Body	Concerned Body	Time of Execution (FY)	Progress (as of May 2022)
Component 1: Public relations, public awareness, and public involvement					
(1)	Preparation of Public Awareness Planning Section establishment in WMD	WMD	PRD	2017-2021	on-going (Output-6)
(2)	Development of information disclosure system	WMD	PRD	2017-2021	on-going (Output-6)
(3)	Active involvement in information exchange meetings among all CCs	LGD	All CCs	2018-2032	on-going (Output-5)
(4)	Establishment of a Public Consultative Group (PCG) for SWM facilities	WMD	PRD, ED, TD	2018-2019	Not implemented yet
Component 2: WBA activities					
(1)	Improvement and expansion of WBA implementation in wards with encouragement of CO/CIs	WMD	-	2017-2032	on-going (Output-2)
(2)	Proper community budget allocation with WBA Annual Action Plan	WMD	-	2018-2032	on-going (Output-2)
(3)	Daily work practice in accordance with the administration procedures book	WMD	-	2018-2032	on-going (Output-2)
Component 3: Waste reduction					
(1)	Preparation of a waste reduction plan	WMD	DoE	2017-2021	on-going (Priority Project-4)
(2)	3R activities through WBA activities	WMD	-	2017-2032	on-going (Priority Project-4)

Project and Program		Executing Body	Concerned Body	Time of Execution (FY)	Progress (as of May 2022)
Component 4: Waste collection and transport					
(1)	Examination of collection and transport operation method for the expansion area	WMD	ED, TD	2017-2018	Completed
(2)	Introduction of a new waste collection system including harmonization of primary collection and secondary collection systems	WMD	TD	2017-2021	on-going (Priority Project-3)
(3)	Unification of waste collection management	WMD	ED, TD	2017-2021	Not implemented yet
(4)	Improvement of management for maintenance workshops	WMD	ED, TD	2017-2021	on-going (Output-4)
(5)	Capacity development of workers and drivers	WMD	ED, TD	2017-2021	on-going (Output-4)
Component 5: Vehicle maintenance system					
(1)	Formulation of workshop management rules	WMD	LGD, ED, TD	2018-2021	Completed (Output-4)
(2)	Reform of workshop and maintenance system	WMD	ED, TD	2018-2032	on-going (Output-4)
(3)	Introduction of the preventive maintenance method	WMD	ED, TD	2018-2032	on-going (Output-4)
Component 6: Intermediate treatment system (Eco-Town)					
(1)	Propose Eco-town and obtain approval from the related organization	WMD	LGD, ERD, DoE	2018-2019	Completed (Priority Project-4)
(2)	Implementation of a feasibility study for Eco-Town	WMD	LGD, ERD, DoE	2019-2020	Completed (Priority Project-1 & 2)
(3)	Preparation of construction and operation cost	WMD	LGD, ERD	2020-2021	Completed (Priority Project-1 & 2)
(4)	Establishment of Eco-Town management section in WMD	WMD	LGD, ED	2020-2021	Not implemented yet
(5)	Capacity development of Eco-Town management section	WMD	ED	2020-2024	Not implemented yet
Component 7: Sanitary landfill					
(1)	Improvement of Amin Bazar LFS	WMD	ED	2017-2018	on-going (Output-7)
(2)	Securing future LFSs	WMD	LGD, RD, UPD, DoE, RAJUK	2017-2023	on-going (Output-7)
(3)	Closure of Amin Bazar LFS	WMD	ED	2020-2021	on-going (Output-7)
(4)	Establishment of landfill management section in WMD	WMD	ED	2017-2018	on-going (Output-7)
(5)	Capacity development of the landfill management section	WMD	ED	2017-2021	on-going (Output-7)
Component 8: Rules and regulations					
(1)	Preparation and release of the administration procedures manual	WMD	-	2017-2018	on-going (Output-2)

Project and Program		Executing Body	Concerned Body	Time of Execution (FY)	Progress (as of May 2022)
(2)	Development of WMD directives through SWMSC	WMD	SWMSC	2018-2032	Completed (Output-1)
(3)	Training for rules and regulations provided to DNCC staff, and related stakeholders	WMD	-	2018-2021	Completed (Priority Project-5)
Component 9: Organizational capacity					
(1)	Reform of WMD organizational structure	WMD	ED, TD	2018-2021	Not implemented yet
(2)	Preparation of an annual activity plan in accordance with the New Master Plan	WMD	ED, TD, RD, AD	2018-2032	on-going (Output-2 & 6)
(3)	Capacity development of implementing organizations in the WMD for the New Master Plan through training and workshops	WMD	ED, TD	2018-2021	on-going (Output-6)
Component 10: Financial management					
(1)	Modification of accounting system to explicitly exhibit the actual SWM cost	WMD	AD, RD	2017-2021	on-going (Output-2)
(2)	Securing operation and maintenance cost for Eco-Town development	WMD	LGD, AD, RD	2017-2021	on-going (Priority Project-6)
(3)	Financial allocation for Master Plan implementation	WMD	AD, RD	2017-2032	on-going (Output-7)
(4)	Development of financial assessment system	WMD	AD, RD	2018-2021	Not implemented yet

*F/S: Feasibility Study, SWMSC: Solid Waste Management Standing Committee, WBA: Ward-based Approach, WMD: Waste Management Department, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, PRD: Public Relations Department, CC: City Corporation, ED: Engineering Department, TD: Transport Department, ERD: Economic Relations Division, Ministry of Finance, DoE: Department of Environment, Ministry of Environment and Forests, PCG: Public Consultative Group, UPD: Urban Planning Department, RAJUK: Rajdhani Unnayan Katripakkha: Capital City Development Authority, RD: Revenue Department
Reference: JPT

2.2.2 Priority Project-1: (DNCC and DSCC) Activities for Introduction of Eco-Town [Phase-1]

(1) Overview

Currently, both Amin Bazar LFS in Dhaka North City and Matuail LFS in Dhaka South City are receiving approximately 3,000 tons of waste per day. Remaining lifespan is estimated at approximately 0.64 years for Amin Bazar LFS and approximately 1.2 years for Matuail LFS. Consequently, both city corporations must secure new landfills without any delays. DPPs for the expansion of both LFSs have already been approved, with construction to be completed in June 2023. However, the expansion plan of Amin Bazaar LFS is not an Eco-Town plan, but a plan to construct a facility that can incinerate all waste generated in Dhaka North City and generate electricity. In addition, DNCC had applied for the construction of the new Nasirabad LFS²⁴, (in Dhaka

²⁴ The proposed Nasirabad new landfill site was originally outside the city boundary of Dhaka North and South City when planned, however, it was integrated into Dhaka South City in 2017 when the administrative service areas of Dhaka North and South City were expanded. Therefore, the Nasirabad new landfill site is planned to utilize for Dhaka North City, however, it is located within Dhaka South City.

North City, with a landfill area of approximately 20 ha), but the application was suspended as of May 2022. The Nasirabad LFS is expected to be in use for only 5 to 6 years, and even if it is constructed, the next LFS must be secured immediately.

Under these circumstances, JPT has proposed to DSCC and DNCC the introduction of Eco-Town as a comprehensive SWM system that incorporates a WtE facility with high reduction effect and an efficient recycling facility. DNCC, DSCC and LGD are currently coordinating to realize this Eco-Town concept, including securing financial resources.

(2) Concept of Eco-Town

The Eco-Town proposed in this Project is conceptualized in Table 2-4. The Project has conducted a “Pre-F/S on Introduction of WtE in Dhaka North City” described later, so this section introduces DNCC’s Eco-Town concept.

Table 2-4 Concept of Eco-Town (DNCC)

Item	Content
Location and area	(1) Amin Bazar Eco-Town: Approx. 17 hectare in Expanded area of Amin Bazar Landfill Site area (32 hectares) (2) Nasirabad Eco-Town: Approx. 20 hectare of Nasirabad New Landfill Site area (48 hectares)
Target waste	<ul style="list-style-type: none"> • WtE plant: household waste, and commercial and business waste • Biogas plant: organic waste • Recycling plant: household waste, and commercial and business waste • Construction and Demolition waste recycling plant: street waste (road cleaning waste and drainage cleaning waste), and construction waste • Composting plant: organic waste
Facility and capacity (the same for both Amin Bazar Eco-Town and Nasirabad Eco-Town)	<ul style="list-style-type: none"> • WtE plant (500 tons per day) • Biogas plant (100 tons per day) • Recycling plant (300 tons per day) • Construction and Demolition waste recycling plant (360 tons per day) • Composting plant (160 tons per day)

Reference: JPT

(3) Activities and Discussion for Introduction of Eco-Town

Currently, DNCC and DSCC are seriously considering the introduction of Eco-Town and have made a written request to the Government of Bangladesh to proceed with the plan toward its realization. See Attachment 8-(2) for a description of DNCC and DSCC's activities and discussions on the introduction of Eco-Town up to now.

2.2.3 Priority Project-2: (DNCC) Pre-Feasibility Study (Pre-F/S) on Introduction of Waste-to-Energy in Dhaka North City²⁵ [Phase-1 & Phase-2]

(1) Overview

Based on the New Master Plan of Dhaka North City, the possibility of introducing a WtE facility was examined. In Phase-1, the incineration method was examined based on the field survey including the waste quality survey. In Phase-2, the feasibility of the project by the Design-Build-Operate (hereinafter referred to as “DBO”) method was additionally examined. As a result, it was revealed that: i) the combined method of incineration (stoker method) and bio-gasification is suitable in Dhaka North City, ii) the financial burden of the Government of Bangladesh (hereinafter referred to as “GoB”) is estimated at approximately 603 million US dollars, and iii) a waste treatment fee should be collected from large-dischargers of waste so as to cover the additional costs.

(2) Purpose of Study

Since the Amin Bazar Landfill used by DNCC has a remaining useful life estimated at less than one year, it is urgently required to prepare guidelines for comprehensive SWM including landfill expansions, construction of new landfills, and waste reduction through the introduction of intermediate treatment technologies. Under such circumstances, DNCC has examined the construction of Eco-Towns during the Master Plan preparation, including WtE facilities. This study was intended to examine the feasibility of introduction of WtE (incineration facility with power generation and biogas generation facility) among the intermediate treatment facilities in the Eco-Towns planned in the Master Plan.

(3) Scope of Study

The following activities were conducted in this study:

- Identification of the actual conditions of SWM of DNCC,
- Identification of the current status around the planned construction site for WtE facility,
- Analysis of laws related to the construction of new WtE facility,
- Identification of the status of the current SWM such as the position of WtE in the Master Plan, and
- Examination of WtE introduction from the technical, environmental/social, and economic aspects.

(4) Target Facility

Target facilities in this study are listed below.

- Incineration facilities: 500 tons per day
- Biogas generation facilities: 100 tons per day
- Power generation scale: Each 5.0 MW (incineration facility) + 1.0 MW (biogas generation facility)

²⁵ The Pre-F/S was for DNCC according to the TOR of the Project. This study referred to JICA’s “Data Collection and Analysis for Guideline for Promoting Waste to Energy Facility Projects (November 2018).”

(5) Study Schedule

The first study was conducted for 5 months from July to November 2018, and included a waste quality survey and information collection and analysis to consider the incineration method. The second study was conducted from December 2019 as a supplemental study to the first study to examine the feasibility of the project under the DBO method, and a final report was submitted in April 2021 (refer to “Appendix 4”).

(6) Feasibility Pre-Checklist for Introduction of Waste-to-Energy

In order to implement a WtE project in DNCC, a survey of the legal system and organization related to waste management and power generation projects was conducted and the survey results were examined in relation to specific items of the WtE facility plan, such as the treatment method, facility layout, power transmission facilities, and the project conditions for this project were summarized. Interviews were conducted with Japanese companies regarding the project conditions. Based on the results of the interviews, a revenue and expenditure plan was examined in case this project was implemented by the DBO method, and the amount of financial burden on Bangladesh side was calculated.

1) Conditions of WtE Project

Based on the results of the survey on amount of waste generated and waste quality in DNCC, the planned waste quality was set. The conditions such as the treatment method, facility size, facility layout and utility were examined. Interviews were conducted with Japanese companies regarding the scope of work and business methods of the operators to organize the project conditions, in addition to the set waste quality. The conditions of WtE project are shown in Table 2-5.

Table 2-5 Conditions of Waste-to Energy (WtE) Project

Facility Condition			
		Incineration Plant	Biogasification Plant
Processing Methods		Stoker method	
Capacity of Facilities	Amin Bazar	500t/24h (500t/24h×1 unit)	100t/24h
	Nasirabad	500t/24h (500t/24h×1 unit)	100t/24h
Land Area	Amin Bazar	approx. 7ha	
	Nasirabad	approx. 9ha	
Utility Condition			
Electricity	Receiving Voltage	33kV	
Water	Plant Water	Well water	
	Domestic Waste	Well water	
Fuel	Liquid fuel		
Sewerage	Plant Wastewater	Transfer to nearest landfill site (including derived from waste pit)	
	Domestic Wastewater	Transfer to nearest landfill site after processing with septic tank	
Telecommunication	draw necessary lines from a public road		
Design Waste Quality			
Lower Calorific Value	kcal/kg	1,200	
	kJ/kg	5,000	
Surplus Heat Use Plan			
Surplus Heat Use for Mechanical Facility in Project Site		Power generation, air heating, reheat	
Surplus Heat Use for Building Facility in Project Site		Hot water supply facility, etc.	
Surplus Heat Use outside Project Site		None	
Project Scheme			
Conceivable Project Scheme		DBO Scheme (assuming to use Japan's ODA Loan)	
Project Period			
Design and Construction Works		3 years	
Operation Works		20 years	
Revenue			
Power Sales Revenue	DNCC	○	
	Private Entity	-	
Project Framework			
		DNCC	Private company
Design and Construction Stage		<ul style="list-style-type: none"> •Procedure for land acquisition •Procedure for Environmental Impact Assessment •Construction of access road to the proposed site •Land improvement •Design and construction of recycle plant, construction waste recycle plant and compost plant in Eco-Town 	<ul style="list-style-type: none"> •Civil works for construction of incineration plant and biogasification plant •Design and construction of incineration plant and biogasification plant •Payment for construction of transmission line to nearest substation
Operation Stage		<ul style="list-style-type: none"> •Collection and transportation of waste to be processed by incineration and biogasification plant •Operation of recycle plant, construction waste recycle plant and compost plant in Eco-Town (including ensuring of recycling manufactures) 	<ul style="list-style-type: none"> •Operation works including reception, measurement, any others of incineration plant and biogasification plant •Measurement of end-product from incineration plant and biogasification plant and transport it to nearest landfill site

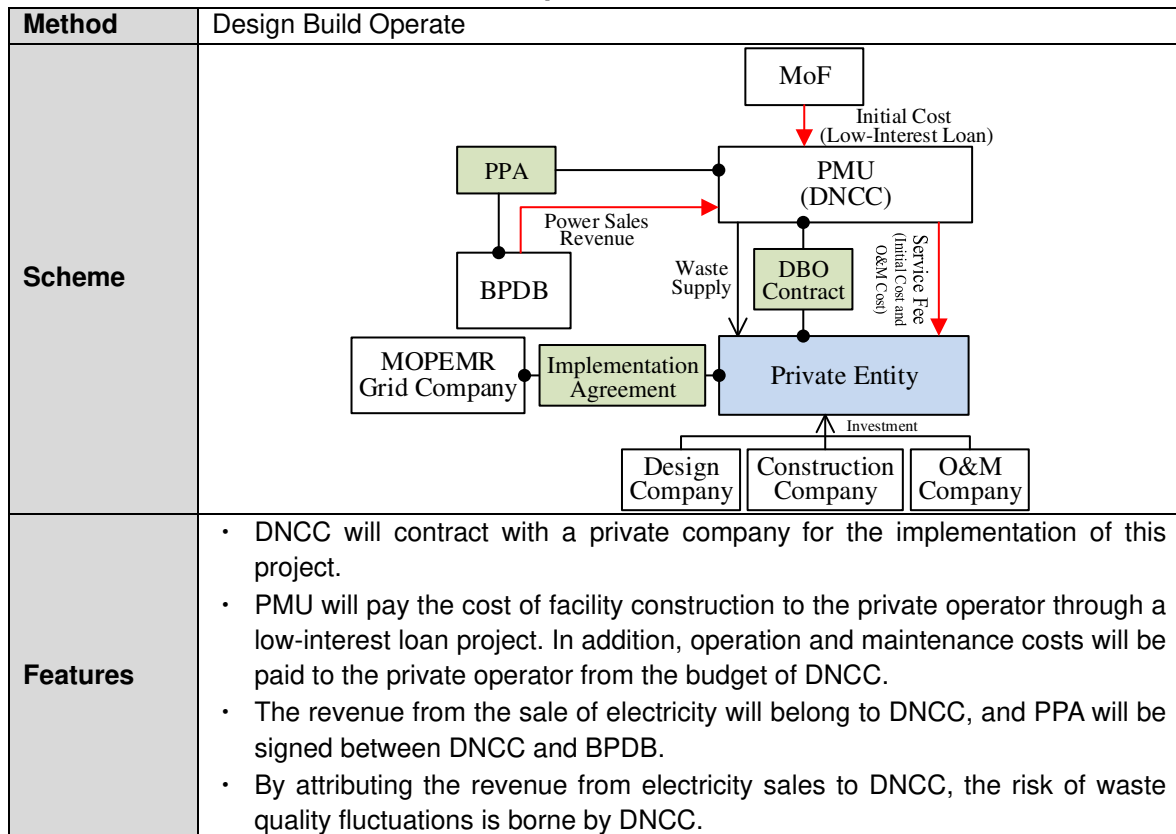
* DBO: Design-Build-Operate

Reference: JPT

2) Consideration of Project Method (DBO Method)

In addition to discussions regarding relevant laws and regulations of Bangladesh with concerned organizations and interviews with Japanese companies, a case study was conducted on WtE project in third countries and low-interest loan projects in Bangladesh, and the implementation of projects using the DBO method was examined. The result is shown in Table 2-6.

Table 2-6 Concept of Eco-Town (DNCC)



* BPDB: Bangladesh Power Development Board, DBO: Design-Build-Operate, DNCC: Dhaka North City Corporation, MoF: Ministry of Finance, PMU: Project Management Unit, PPA: Power Purchase Agreement
Reference: JPT

3) Consideration of Revenue and Expenditure of Project

The financial contribution of the Government of Bangladesh for the implementation of the project was discussed. The project cost and project revenue were set as follows.

- The design and construction cost and operation and maintenance cost of WtE facility were set based on the results of interviews with Japanese companies. The design and construction cost was assumed to be funded by a low-interest loan project.
- The project revenue of the private operator was defined as the compensation for services related to the development of the facility (design and construction cost) paid by a low-interest loan and the compensation for services related to operation and maintenance (operation and maintenance cost) paid by DNCC. In addition, the revenue from the sale of electricity was assumed to belong to DNCC.

for services related to operation and maintenance (operation and maintenance cost) paid by DNCC. In addition, the revenue from the sale of electricity was assumed to belong to DNCC.

As the result, the Government of Bangladesh was supposed to bear approximately 603 million USD during the project. On the other hand, since it is difficult for DNCC to cover the service fees for operation and maintenance to be paid to the private operator from the revenue by electricity sales, DNCC considered increasing tax revenue and collecting waste collection fee from large waste generators to cover the shortage in financial resources.

4) Feasibility Pre-Checklist for Introduction of Waste-to-Energy

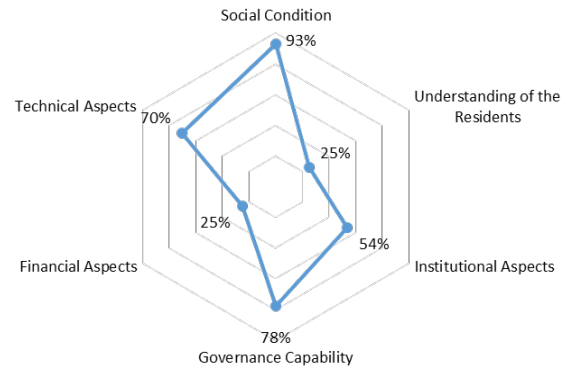
The study assessed feasibility on the introduction of WtE facility based on the feasibility pre-checklist of “Guideline for Promotion Waste to Energy Facility Projects” which JICA made publicly available on November 2018. The guideline targets an incineration plant with power generation, while this study considered a biogas plant and a waste incinerator with power generation as one combined WtE facility. This checklist was used to evaluate the introduction of a WtE facility from six aspects: (1) social aspect, (2) understanding by residents, (3) administrative governance capability, (4) technical aspect, (5) financial aspect, and (6) institutional aspect. Fig. 2-3 shows the concept and composition of this checklist.



Reference: JICA “Guideline for Promotion Waste to Energy Facility Projects” (November 2018)

Fig. 2-3 Concept and Composition of the Guideline

The following shows the evaluation result (Fig. 2-4). Social aspect received the highest score, followed by administrative governance capability and technical aspect.



Reference: JPT

Fig. 2-4 Results of WtE Pre-checklist (October 2018)

- i. The amount of waste delivered to landfill sites is more than 3,000 tons per day in each city, and is expected to continue to increase in the future. In addition, it is difficult to select a suitable candidate site for a new landfill site around the overpopulated North and South Dhaka Cities, and even if a candidate site is found, the acquisition process and the agreement of local residents is expected to take a long time. The introduction of WtE is a sufficiently appropriate and an important measure to reduce the amount of waste to be landfilled. Both the social infrastructure required for the WtE facility implementation and the legal system regarding the environment are in place. The social conditions are mostly met. In Bangladesh, WtE power generation is positioned in the upper-level plan²⁶ and the administrative heads are positive about WtE power generation. In DNCC, the introduction of WtE is expected to gain understanding by experts and support from consultants and can also receive support from external organizations. There is high administrative governance capability. Data on waste exists and is available for use. In addition, similar facilities such as thermal power stations are in operation indicating that technical capabilities are available, thereby satisfying the technical aspect. Since the organization is stable, and the staff have both a high level of education and motivation to promote the project, there is significant potential for introduction of a WtE system in terms of the social aspect, social conditions, and technical conditions.
- ii. The level of understanding of WtE by residents is still low. The intermediate treatment has not become an immediate problem yet because people’s interest has so far been focused on improvement of a sanitary living environment and intermediate treatment has been scarcely discussed. Efforts are required to improve understanding by residents. In addition, few administrative staff have knowledge of, or capability to explain WtE.
- iii. As for the institutional aspect, the laws and regulations on SWM have not been developed yet. It is inevitable that there is insufficient data for the construction of WtE facilities because WtE has never been introduced in Bangladesh before.
- iv. As for the financial aspect, the history of smooth economic growth is still short and there is no sufficient

²⁶ Modernization of solid waste management, such as promotion of 3R and intermediate treatment, is emphasized as a national policy in GoB. LGD approved DPPs for Amin Bazar Landfill extension and Nasirabad new landfill site construction, including land acquisition for WtE, in DNCC.

accumulation of financial data yet.

(7) Study Results and Future Issues

Bangladesh is generally considered to have a high potential for the introduction of WtE facilities based on the evaluation results outlined in the previous section. In DNCC, rapid urbanization and population growth caused deterioration of the living environment and shortage of landfills, resulting in exceedingly high social need for WtE power generation and requiring its prompt introduction.

Under such circumstances, Bangladesh has set as a national goal the modernization of SWM in terms of the introduction of 3R and intermediate treatment among others. The country has no problem in the positioning of WtE in the upper-level plan and the local administrative heads have shown positive attitude towards developing laws and regulations²⁷ required for WtE development and operation. On the other hand, the discussions on introducing WtE facilities have just started, and there is presently not much basic data to evaluate ease of obtaining residents' understanding on the facility, and sufficient financial sources. There are also concerns on the positive participation of reliable plant manufacturers. Another problem is the insufficient experience and knowledge of administrative staff in Bangladesh on the WtE system. Therefore, as a starting point an organization for managing intermediate treatment including WtE must be established in WMD. The land acquisition status for a candidate construction site must also be carefully researched and continuously monitored.

2.2.4 Priority Project-3: (DNCC, DSCC, and CCC) Introduction of New Collection System in Consideration of Collaboration between Primary and Secondary Collection services (In collaboration with Output-2 and Output-3) [Phase-1 & Phase-2]

(1) Overview

PCSPs collect waste in Rickshaw Vans (hereinafter referred to as “RVs”) and Hand Carts (hereinafter referred to as “HCs”) but do not have a system of loading the waste directly onto collection vehicles. As shown in Photo 2-1, PCSPs unload the collected waste on the ground and the cleaners load it onto the vehicles, which is very inefficient in terms of loading time. In addition, this method scatters the waste, giving an adverse impact on the sanitary environment at and near collection points. Therefore, JPT examined the improvement of the loading method from the primary collection equipment to the secondary collection equipment, and developed improved RVs and HCs that can directly empty waste into the winch-mounted compactor. After several prototype improvements, 101 improved RVs are currently in operation in Chattogram City. As a result, the loading time was shortened from about 20-30 minutes to about 5 minutes, and the sanitary environment around the collection site was improved.

²⁷ As per the draft “Waste Management Rules 2018”, the standard for incineration is stipulated in Section-7 of the rules. There are three kinds of standards postulated in the rules. The standards are listed below: 1) Operating Standards, 2) Emission Standards, and 3) Radioactivity. “Sustainable Renewable Energy Development Authority (SREDA) Act, 2012” defines that SREDA is authorized to propose tariff of renewable energy to Bangladesh Energy Regulatory Commission (BERC).

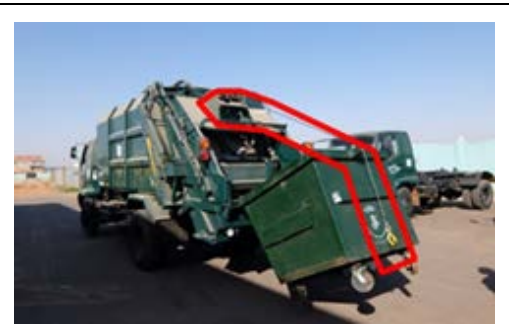


Reference: JPT (Photographs taken in February 2018)

Photo 2-1 Current Loading System from Primary Collection to Secondary Collection

(2) Contents of Test Operation

Compactors introduced in the grant aid project²⁸ are equipped with a winch-type loading system. To use this winch for direct loading of waste from primary collecting equipment to a compactor, RVs and HCs prototypes were designed with detachable waste bins, and tested in the field in DNCC, DSCC, and CCC. The designs of the prototypes are shown in Appendix 5.



Reference: JPT

Photo 2-2 Compactor equipped with a winch-type loading system

(3) Implementation Schedule

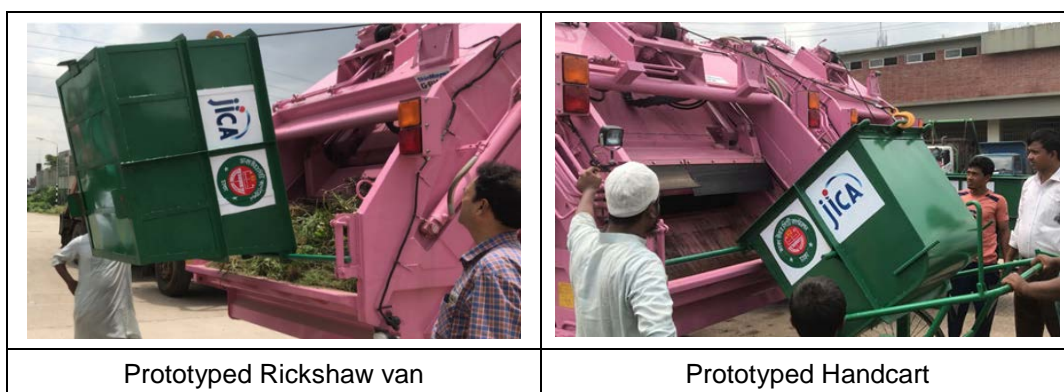
Table 2-7 shows the implementation schedule. RVs and HCs ready for direct loading from primary collection equipment to secondary collection vehicles were fabricated and tested in the field. The numbers of prototype RVs and HCs produced were 12 in total (six improved versions of rickshaw vans and six handcarts), and introduced one each in DNCC, two each in DSCC, and three each in CCC.

Table 2-7 Implementation Schedule of New Collection System

Items	2018				2019				2020	
	Mar.	Jun.	Sep	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.
Design	■									
Bidding and Contract		■								
Fabrication		■	■							
1 st Field Test (Test Operation)			■	■						
Operation Analysis					■	■				
Design Modification							■	■		
Bidding, Contract and Fabrication of Modification Equipment								■	■	
2 nd Field Test (Re-Test Operation)									■	■

Reference: JPT

²⁸ “The Project for Improvement of Solid Waste Management Equipment in the People’s Republic of Bangladesh.” (Refer to p.1 and p.3). Through this scheme, 150 compactors were procured for DNCC, DSCC and CCC in 2018.



Reference: JPT (Photographs taken in October 2018)

Photo 2-3 Prototyped Primary Collection Equipment

(4) Findings of Test Operation

The following results were obtained from the actual operation of the prototyped RVs and HCs, including the six-month field test (July 2018 to December 2018):

- The new collection system, had a higher equipment production cost than that of the conventional primary collecting equipment, shortened the time required for unloading and loading the waste from primary collection equipment to secondary collection trucks (previous system: 20–30 minutes → new system: 5 minutes), and alleviated the workload of the primary collectors and cleaners. In addition, the sanitary environment at and around the secondary collection points had improved.
- Whereas DNCC and DSCC hope for the introduction of this system, the primary collection in the field is managed by PCSP, NGOs and other organizations²⁹. These organizations, showing understanding for the improvements, are reluctant to introduce this system because the prototypes have a higher production cost than conventional equipment.
- CCC is positive about introduction because the primary collection is conducted under direct control of the city. Defects confirmed in the field test need to be corrected and a field test conducted again in preparation for introduction.

Table 2-8 Description of Defects of prototypes found in Test Operation (Common in Rickshaw Vans and Handcarts)




Description of Defects
(1) Drainage from bins: Difficulty to drain the waste water generated from food waste from the bins
(2) Cleaning of bins: Difficulty to clean waste left inside bins after loading
(3) Falling waste during loading: Waste falls to the ground through the gap between primary and secondary waste collection equipment.

²⁹ Primary collection is conducted by PCSP (Primary Collection Service Provider) as well as local NGO, Housing Society, and individuals and private entities who are not registered as PCSP.

(5) Design Improvement and Next Steps

The prototypes used in DNCC and DSCC were transported to CCC, were modified, and bidding and contracting was conducted in August 2019 (six RVs and three HCs³⁰). The second field test was conducted with the modified prototypes in Phase 2 of the Project. The following improvement was done.

Table 2-9 Improvement for Defects

(1) Drainage from bins	(2) Cleaning of bins	(3) Falling waste during loading
		
Drainage for waste water	Swing door for cleaning inside bin	Rubber part for supporting loading

Reference: JPT (Photographs taken in December 2019)

(6) Adoption of Improved Rickshaw Vans and Handcarts

After the field tests on the improved RVs and HCs was decided that the hand-pushed handcarts would not be introduced due to the limited range of operation for hand-pushed collection. CCC officially decided to introduce rickshaw vans.

JICA provided 35 improved RVs to CCC in July 2020, and CCC procured 50 improved RVs by themselves in December 2021. In addition, 8 improved RVs were procured in Ward 8 by the Corporate Social Responsibility (hereinafter referred to as “CSR”) fund in March 2022.

Improved RVs account for approximately 10% of all RVs in Chattogram City, and they are in operation in 15 of the total 41 wards (approximately 40% of the total number of wards). CCC created a promotional DVD to promote the spread of the improved RVs to other wards where the improved RVs are not in use, and CCC is also considering to procure compactors with an installed winch and expand procurement through the CSR fund.

³⁰ Modification of handcarts were made for only three out of six units due to the budget constraint.



* RV: Rickshaw Van

Reference: JPT (Photographs taken in October 2018)

Photo 2-4 Promotional DVD of Improved Rickshaw Vans and Improved Rickshaw Vans Procured by CSR Fund

2.2.5 Priority Project-4: (DNCC, DSCC and CCC) Waste Separation Pilot Project (implemented in collaboration with Output 2 and Output 3) [Phase 2]

(1) Overview

In Dhaka North City and Dhaka South City, on the one hand rapid increase in amounts of generated waste due to economic growth, and on the other hand rapid depletion in existing landfills waste disposal capacities have become urgent SWM issues. In response, waste reduction measures have been adopted as some of the most important components in the new Master Plan. In Chattogram City, the existing landfill is more severely strained than in Dhaka North City and Dhaka South City, and the need for waste reduction is particularly urgent. The Project implemented a pilot project focused on waste separation, which is one waste reduction measure that is relatively easy to garner residents' understanding and cooperation. At the beginning of the Project, waste separation did not progress well due to the limited number of community meetings caused by the spread of COVID-19 and being overshadowed by the concurrent WtE project³¹ development activities. However, with the cooperation of local leaders and Housing Societies, as well as training on the Waste Management Rules 2021 by DOE, as described below, understanding of waste separation spread within the CC, and the waste separation pilot project expanded at an accelerated pace. As a result, the target population of waste separation was expanded to approximately 80,000 people (approximately 20,000 households) in the three cities, and approximately 290 tons of recyclable materials (aluminum cans, glass, plastics, E-waste etc.)³² were recovered in a sanitary manner every month. Through the pilot project, the Project confirmed the effectiveness and social acceptability of separation of two waste types, Wet waste and Dry waste, as one of the waste reduction measures

³¹ Refer to the footnote 21 (p.39).

³² Dry waste is sorted out by material types at the basement of buildings or on the street by cleaners or PCSP, and sold to buyers and recyclers. In cases where PCSP cannot segregate dry waste, the mixed dry waste is sold unsegregated and buyers or recyclers sort out by material types.

in Bangladesh.³³ In addition, it accumulated effective methods of raising residents' awareness and know-how on how to cooperate with related parties. The three cities have requested additional support for the expansion of waste separation to the entire city areas.

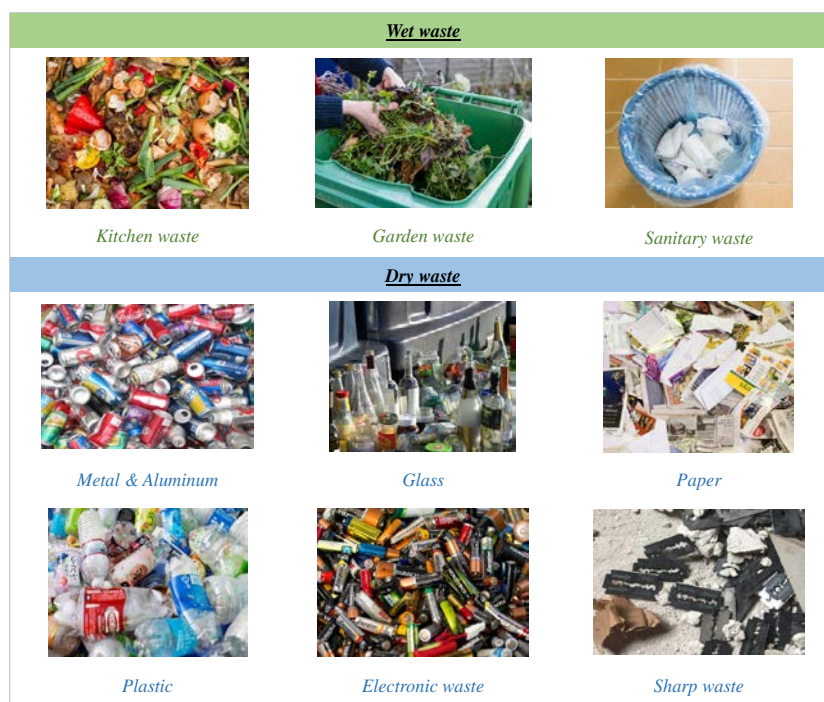
(2) Contents of Implementation

1) Objective

The main objective of this pilot project was to accumulate the data and experience necessary to develop practical and effective waste reduction measures in Bangladesh based on the new Master Plan. Specifically, the pilot project aimed to verify methods of resource recovery in harmony with the existing collection system and effective methods of raising residents' awareness by conducting a social demonstration focusing on waste separation (source separation and collection of separated wastes), which was considered to be relatively easy to garner the residents' understanding and cooperation in waste reduction measures.

2) Separation Category

Prioritizing the residents' ease of understanding, two types of waste separation categories were adopted for this pilot project: Wet waste and Dry waste. Wet waste includes food wastes, plants, and sanitary items, while Dry waste includes cans, glass, paper, plastics, e-waste, and hazardous materials.³⁴ Other possible categories include "recyclable" and "non-recyclable," but since the definition of recyclable has not been generally accepted in Bangladesh, the two categories of Wet waste/Dry waste were used here, which could be more easily understood³⁵.



Reference: JPT

Fig. 2-5 Separation Category (Wet waste & Dry waste)

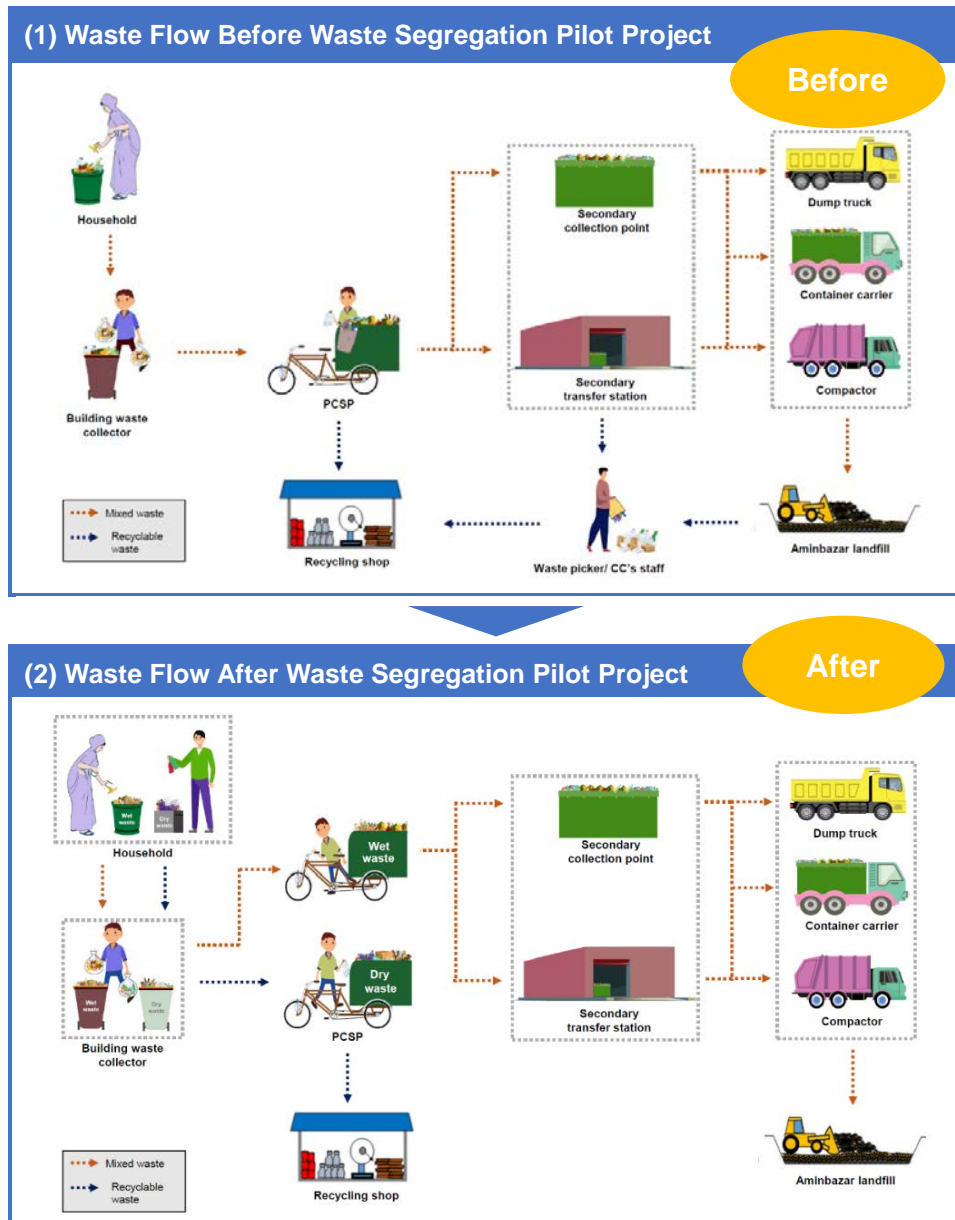
³³ Waste management rules 2021 requires the waste be separated into three categories: "organic", "non-swill (Inorganic)" and "hazardous". In the classification of this pilot project, "Wet Waste" is the same as "Organic," and "Dry Waste" is the same as mixture of "Inorganic" and "Hazardous." Since these rules were enacted in December 2021 that is during the pilot project implementation period the Project could only apply two types of segregation as a demonstration.

³⁴ Waste Management Rules 2021 mandates the separation of waste into three categories: "Organic", "Inorganic", and "Hazardous".

³⁵ Since it is planned to separate and compost food wastes (organic wastes) in the future, the category does not necessarily correspond to the separation category in this pilot project.

3) System of Separated Waste Collection

Traditionally, PCSP collected mixed wastes by door-to-door collection, and extracted recyclable materials at collection points and on the street. This led to deterioration of the sanitary environment at collection points and reduced collection efficiency. However, implementing the separated waste collection by CCs was not easy because it required additional vehicles and budget. Accordingly, this pilot project partnered with PCSPs and succeeded to start the separated waste collection without major changes to the existing collection system by allowing PCSPs to bring their recyclable materials directly to the recycling shops.



Reference: JPT

Fig. 2-6 Waste Flows Before and After Implementation of Waste Separation Pilot Project

4) Target Areas and Population of Waste Segregation Pilot Project

As shown in Table 2-10, in total 14 areas were targeted in the pilot project in the three cities, and target population was around 80,000 (equivalent to around 20,000 households).

Table 2-10 Target Areas and Population of Waste Segregation Pilot Project

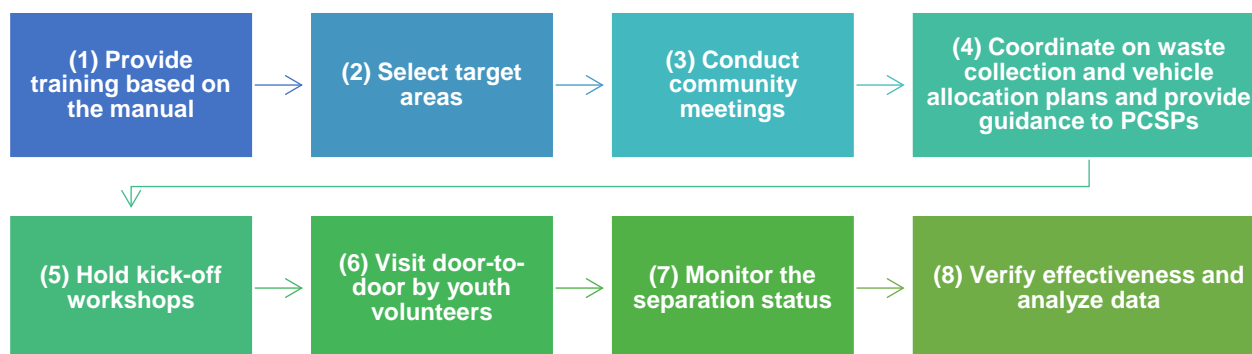
City Corporation	Community and Area Name	Number of Households	Target Population
CCC	Nasirabad Housing Society (H/S)	3,600	12,000
	Shugondha Residential Area (R/A)	1,625	6,500
	Khulshi R/A	1,500	6,000
	Cosmopolitan R/A	1,450	5,750
	Ruposhi H/S	1,000	4,000
	Arakan H/S	1,500	6,000
	Al Falah Goli	2,500	10,000
	Shantidhara R/A	1,400	5,500
	Asian H/S	2,250	9,000
	Rahman Nagar R/A	2,000	8,000
DNCC	Uttara	524	2,096
	Niketan	800	3,200
DSCC	Azimpur	76	304
	Lane-28	330	1,320
Total		20,555	79,670

Reference: JPT

(3) Implementation Flow

1) Implementation Flow of Waste Separation Pilot Project

Under this pilot project eight activities were conducted, as shown in Fig. 2-7 in order to (1) establish a system of separated waste collection, (2) raise residents' awareness for source separation, and (3) verify the effectiveness of waste separation. The details of the pilot project implementation and results are given in Appendix-6.

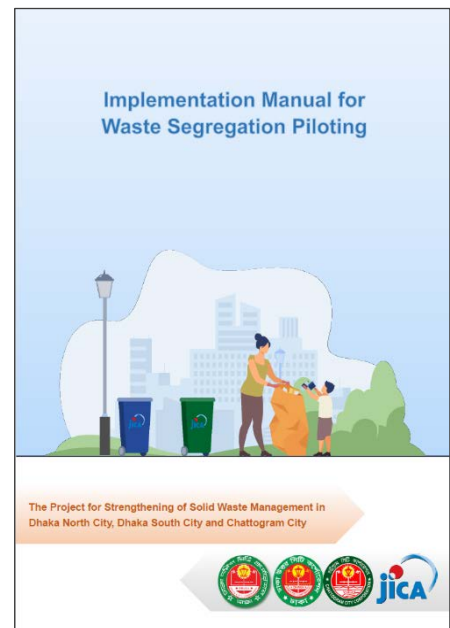


Reference: JPT

Fig. 2-7 Implementation Flow of Waste Separation Pilot Project

2) Preparing an Implementation Manual for Waste Separation Pilot Project and Providing Training for Conservancy Inspectors

Since community meetings could not be held at the beginning of the second phase of the Project due to the spread of COVID-19 infection, the Project developed an implementation manual for CIs, who lead the waste separation pilot project in the field (Fig. 2-8). This manual was designed to be used by CIs in the field and consisted of three steps: (1) preparation for implementation, (2) community mobilization, and (3) verification of effectiveness, with a list of actions and involved parties required for each step. By including the awareness-raising tools described below in the appendix of the manual, the content could be used immediately after CIs resumed their activities in the field. Based on this manual, training was provided to CIs in the pilot project areas. In addition, there were many opportunities for CIs to learn from each other, for example, CIs, who learned about the 3Rs in past training in Japan, provided training to other CIs. CIs reported the progress of the pilot project at the WBA Core Group Meetings.



Reference: JPT

Fig. 2-8 Implementation Manual for Waste

3) Selecting Target Areas for Waste Separation Pilot Project

The target areas for the pilot project were determined in consultation with the Mayors and Chief Waste Management Officers of the three cities. Communities were selected as target areas where residents had relatively high environmental awareness and educational backgrounds, understood the need for waste separation, and could serve as models for other communities.

4) Conducting Consultation with Residents and Community Meetings

After the target areas were selected, the Project explained the contents of the pilot project and its significance to community leaders, including commissioners and managers of Housing Societies. Discussions were then held at the kick-off events and specifically designed events for raising residents' awareness. The methods of raising awareness differed by community. One case involved the Housing Society gathering and explaining to building managers to raise residents' awareness and manage separation for each building, while another case involved youth volunteers and others, as described below, going door-to-door to raise awareness directly. In door-to-door visits, awareness-raising activities were conducted using a base map shown in Fig. 2-9, to make



Reference: JPT

Fig. 2-9 Example of Base Map for Waste Segregation

sure that no residents were left out.

5) Coordinating on Waste collection and Vehicle Allocation Plans and Providing Guidance to PCSPs

Basically, there was no change from the previous collection system, but in some areas, the communities made requests to CCs regarding the collection frequency and collection time of the compactors. Consequently, CIs acted as coordinators to review the waste collection and vehicle allocation plans and coordinate among the parties involved. In addition, discussions were held with PCSP leaders to ensure that PCSPs do not mix and collect wastes, which were separated at the source.

6) Holding Kick-Off Events

Kick-off events, such as the Inauguration Ceremony, were held in each community to publicize the start of the pilot project. Since it was essential that the community leaders strongly lead the mobilization of community for 3R promotion, the event was attended by the Mayor, Commissioner, and other influential people, and a relay parade marched through the community as well as other activities. The Inauguration Ceremony was covered by the local media and served as an opportunity to revitalize the pilot project and increase its recognition in the community.



Source: JPT (Left photograph taken on March 18, 2022; Right photograph taken on December 21, 2021)

Photo 2-5 Inauguration Ceremony of Waste Separation Pilot Project (DNCC and CCC)

7) Visiting Door-to-Door by Youth Volunteers (Social Mobilizers)

In order to widely inform residents about the initiation of waste separation, youth volunteers (Social Mobilizers) were recruited to visit door-to-door to all households targeted by the pilot project to explain how to separate and discharge wastes. The youth volunteers were instructed by the project and worked in pairs with name tags. They explained to residents using leaflets that illustrated the separation categories, and residents were generally cooperative in separating their waste. The main questions from residents were related to specific separation methods, and there were very few complaints about the CCs’ collection service itself or about the new waste

separation system.

8) Monitoring the Separation Status

After a series of awareness-raising activities and notification to residents in the target areas, the CIs and youth volunteers monitored the status of waste separation. The monitoring method used was to conduct random site visits to check whether separation was being implemented. If separation was not correctly conducted, the reasons were confirmed on the spot with the building manager and residents, and guidance was given for improvement. After the recruitment period of youth volunteers came to an end, monitoring was continued by the CIs and the community.



Reference: JPT (taken on December 15, 2021)

Photo 2-6 Door-to-Door visit by Youth Volunteers

9) Verifying Effectiveness and Analyzing Data

In order to verify the effectiveness of waste separation, the Project measured the amounts of recyclables that were separated and discharged. The measurement methods differed according to the method of collecting the recyclables. In the area of DSCC, PCSPs collected the separated wastes daily and brought them to the recycling shops. The Project weighed the Dry wastes separately discharged from each building before they were collected by PCSPs, and calculated the unit amount of discharged waste for each household. In the area of CCC, only one PCSP was responsible for primary collection for the entire pilot project area. This was because the recyclables were sold at a higher price if they were sold in bulk. The collected recyclables were stored in the stockyard. Therefore, the Project only needed to confirm the PCSP's measurement method the first time, and thereafter collected and analyzed data on the sale amount by type of recyclable as recorded by the PCSP.



Measurement of Separated Dry Wastes (Lane-28 DSCC)



Measurement of Recyclables at the PCSP's Stockyard (CCC)

Source: JPT (Both photographs taken on February 8, 2022)

Photo 2-7 Measurement of Separated Recyclables (DSCC and CCC)

(4) Tools and Contents to Raise Awareness about Waste Separation

Table 2-11 summarizes the main awareness-raising tools used in this pilot project and their contents. A short movie to raise awareness of separating wastes, which was produced in the activity of Output 6, was used for publicity at community meetings and on Social Networking Services (hereinafter referred to as “SNS”).

Table 2-11 Main Tools and Contents of Awareness-Raising Activities on Waste Separation

Tools	Image	Contents
Waste Segregation Leaflets		<ul style="list-style-type: none"> • Purpose: Awareness-raising on launching of the waste segregation pilot project and its segregation categories • Methods: Door-to-door distribution by Youth volunteers (Social Mobilizers) • Contents: Segregation category and examples of Wet waste and Dry waste • Number distributed: about 20,000 leaflets
Waste Segregation Short Movie		<ul style="list-style-type: none"> • Purpose: Visual awareness-raising on the importance of waste segregation. • Methods: Showing at a community meeting and uploading to the Social Networking Service (SNS) • Specifications: short-movie (around 1 min.) • Contents: Interview of the community leader (Lane-28) representing the community initiating the waste segregation pilot project, and pictures of waste segregation at home. • Note: Short movie was created through Output 6.
Eco-Bags and Eco-Bottles		<ul style="list-style-type: none"> • Purpose: Community awareness-raising on waste reduction and 3Rs • Methods: Distribution of products at awareness events such as inauguration ceremony • Specifications: <ul style="list-style-type: none"> ➢ Eco-bags (made by Jute, bags for non-single-use purposes) ➢ Eco-bottles (made by plastics, bottles for non-single-use purposes) • Number of distribution: 150 each

* SNS: Social Networking Service

Reference: JPT










(5) Demonstration Results

1) Change in Recovered Amount of Recyclables and Profit from Sale of Recyclables

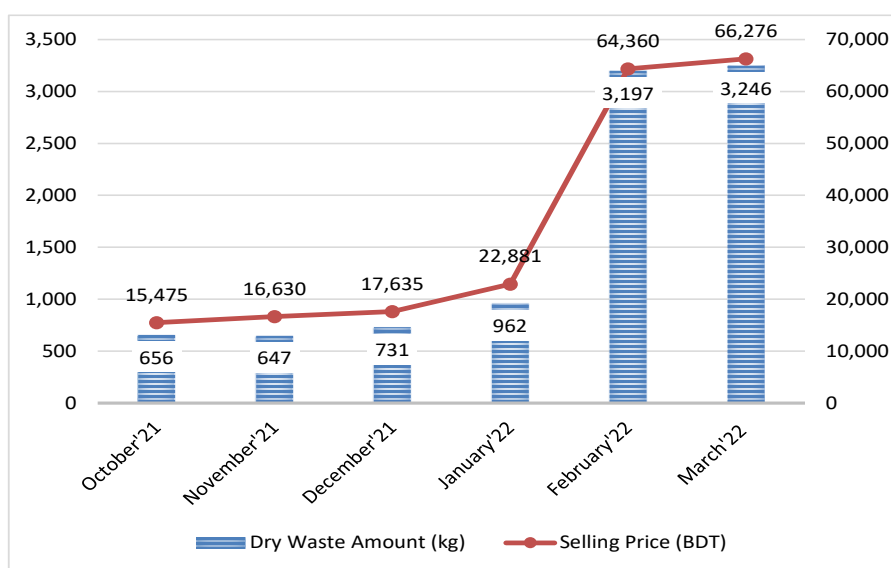
As earlier mentioned, recyclables are traded at higher prices when sold by type of material and in large quantities (in bulk), rather than when sold in small quantities with multiple materials mixed together. For reference, the results of interviews with the PCSP in CCC are shown in Table 2-12. Moreover, Fig. 2-10 shows the change in the recovered amount of recyclables and the profit from the sale of recyclables by PCSP in the Nasirabad area

from October 2021 to January 2022. Both the recovered amount of recyclables and the profit from the sale of recyclables were generally on an increasing trend. Along with the support provided by the Project, this was largely due to the PCSP’s continued efforts to raise residents’ awareness and provide guidance to the workers, and the increase in profits from the sales encouraged the PCSP to make these efforts. On the other hand, a measurement survey of Dry waste in the area of DSCC revealed that the average amount of recyclable materials discharged per household was 0.477 kg/day. Based on this result, an expanded estimate of the recovered amount of recyclables for the entire pilot project was calculated at approximately 290 tons of recyclables being recovered in a sanitary manner each month.

Table 2-12 Example of selling price of recyclable materials (CCC, as of February 2022)

Category		Price (BDT/kg)	Category		Price (BDT/kg)
Paper	 Paper & Carton	15	Glass	 Glass Bottle	7
	Books	17			
Hard Plastics	 White Plastic (HDPE)	55	Metal	 Aluminum	50
	Broken/mix plastic (PVC,PP)	39		 Tin	42
				 Iron and electrical scrap	46
Soft Plastics	 Single-use plastic (PETE, LDPE)	26	Others	 Bones	12
	Polythene (LDPE)	15		 Coconut Bowl	8

* BDT: Bangladesh Taka, HDPE: High Density Polyethylene, LDPE: Low Density Polyethylene, PETE: Polyethylene Terephthalate, PP: Polypropylene, PVC: Polyvinyl Chloride
 ** BDT1 = JPY 1.506040 (as of May 2022)
 Reference: JPT



Reference: JPT

Fig. 2-10 Collected Amount of Recyclables and their Selling Value (CCC, October 2021 – January 2022)

2) Willingness of Community and Participation Rate

In order to measure the degree of establishment of waste separation activities among residents, the Project, together with CIs, monitored the status of separation. The results of monitoring in CCC are shown in Table 2-13. 7 out of 10 areas had completed monitoring as of April 2022, and the coverage ratio was 61%. In all areas except the Ruposhi area, the coverage ratio is over 50%, indicating that collection of separated wastes is generally well established. On the other hand, there is only one PCSP in the Ruposhi area, and it was confirmed that the lack of equipment and labor for collection of separated wastes is the cause of the low coverage ratio. See 5.3 for Issues, Ideas and Lessons Learned on the Waste Segregation Pilot Project.

Table 2-13 Coverage Ratio of Waste Separation (by Region) (CCC, as of April 2022)

No.	Target Area	Population	Coverage Ratio (%)	Start Timing of Pilot Project
1	Nasirabad Housing Society (H/S)	12,000	81	December 2021 (*Partially started in 2018)
2	Shugondha Residential Area (R/A)	6,500	51	December 2021
3	Khulshi R/A	6,000	61	February 2022
4	Cosmopolitan R/A	5,750	54	February 2022
5	Ruposhi H/S	4,000	11	February 2022
6	Arakan H/S	6,000	N/A	April 2022
7	Al Falah Goli	10,000	N/A	April 2022
8	Shantidhara R/A	5,500	53	March 2022
9	Asian H/S	9,000	71	March 2022
10	Rahman Nagar R/A	8,000	N/A	May 2022

Reference: JPT

(6) 3R Model Ward Award (Waste Segregation Section)

In Ward 8 of Chattogram City, waste segregation was initiated by the Nasirabad housing society from the first stage of the Project. Although waste segregation slowed down due to the influence of the spread of COVID-19 infection, the housing society continued waste segregation on a small scale. After resumption of community gatherings in 2021, waste segregation piloting spread widely in Ward 8. Therefore, the Chief Representative of the JICA Bangladesh Office awarded Ward 8 as a model ward of 3R promotion based on the evaluation criteria as shown in Table 2-14. At the same time, the CI of Ward 8 was awarded as a model CI.

Table 2-14 Evaluation Criteria of 3R Model Ward Award (Waste Segregation Section)

Parameter	Descriptions
[P1] Participation Rate & Coverage Rate	1) More than 70% of population in the target ward are covered by waste segregation pilot project (i.e., separation collection services). 2) More than 70% of households in the pilot project areas are participating in the source segregation.
[P2] Willingness	1) Support from the City Corporation is confirmed. 2) Initiative of the community leader(s) is confirmed. (e.g., councilor/commissioner) 3) Cooperation from primary collector(s) is confirmed.
[P3] Awareness Experience	Not limited to, but including the following awareness activities on 3R were carried out in the target ward;

Parameter	Descriptions
	1) A series of community meetings
	2) Inauguration ceremony
	3) Leaflet distribution by door-to-door visit (e.g., utilizing social mobilizers)
	4) Other awareness activities
[P4] Training	1) Training for the Conservancy Inspector/Supervisor is provided properly.
	2) Training for primary collector(s) is provided properly.
[P5] Monitoring	1) Monitoring system is established.
	2) Regular monitoring is carried out.
	3) Quantitative data of collected dry waste is available.

* CI: Conservancy Inspector, PCSP: Primary Collection Service Provider

Reference: JPT

2.2.6 Priority Project-5: (DNCC, DSCC and CCC) Administrative Guidance on Waste Management Rules 2021(implemented in collaboration with Output 2 and Output3) [Phase 2]

(1) Overview

“The Waste Management Rules 2021” were enacted by the DOE in December 2021. The rules stipulate that it is the responsibility of residents and businesses to separate and discharge the waste into three categories; organic, inorganic and hazardous. With a desire to strengthen compliance of these rules, training on “The Waste Management Rules 2021” was provided in March 2022. The training was conducted once in each of the three cities. A total of 295 people participated in the training, including CWMO, CI, EE, and staff of the waste management relevant departments such as ED, TD and SPD. This training deepened the understanding of decision makers in each city and was able to accelerate the ongoing waste segregation pilot project. The collaboration with DOE was expected to enhance the sustainability of solid waste management in Bangladesh after the completion of the Project.

(2) Contents of Training

The outline of training for “The Waste Management Rules 2021” is shown below. In addition to a lecture by DOE, DNCC gave a lecture on the role of CCs under the rules, and the participants of training in Japan explained about the concept and strategy related to 3Rs.

Table 2-15 Details of Training of Waste Management Rules 2021

	DNCC	DSCC	CCC
Date	March 3, 2022	March 27, 2022	March 8, 2022
Venue	DNCC level 6 conference room	Mayor Mohammad Hanif Auditorium	CCC conference room
No. of Participants	65	110	120
Contents	<ul style="list-style-type: none"> Explanation of Waste Management Rules 2021 (Lecturer: DOE) Roles of CCs under Waste Management Rules 2021 (Lecturer: DNCC) 3R training (report of training in Japan) (Lecturer: Participants of training in Japan (CIs)) 		

*CI: Conservancy Inspector, DOE: Department of Environment, the Ministry of Environment, Forest and Climate Change

Reference: JPT



Reference: JPT (Photographs taken in March 2022)

Photo 2-8 Training for Waste Management Rules 2021

2.2.7 (DNCC and DSCC) Revision of WMD Directives (DNCC and DSCC) [Phase-1 & Phase-2]

(1) Overview

The WMD Directives are intended to describe a strategic roadmap of waste management for the next 5-6 years, taking into account changes in society, and shall be approved by Mayor as an official administrative order. In DNCC and DSCC, CWMO tends to change about every 2-3 years and these changes often bring about drastic directional changes in WMD, which in turn affects the stable management of SW. The WMD Directives are a means of securing continuous SWM on the organizational level and stabilize the administration under which SW is managed, thereby ensuring stable services despite the frequent changes at the top level of the organization. The first WMD Directives were developed in 2007 and revised once in 2012. Within Phase-1 of this project, the directives were revised for the second time; WMD Directives of DSCC in February 2020 and those of DNCC in August 2021.

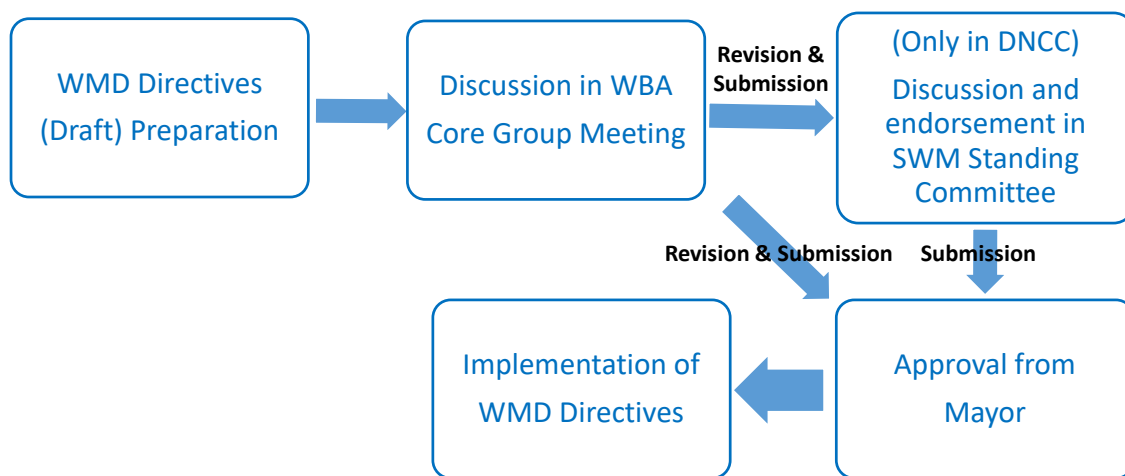
(2) Revised Contents and Method

The WMD Directives were revised based on the objectives and strategies stipulated for each of the 10 components for realizing the Master Plan. Fig. 2-11 shows the process of revising the WMD Directives (Appendix 4).

In DNCC, the SWM Standing Committee (hereinafter referred to as “SWMSC”), consisting of 11 ward counselors and executive members of WMD and established as a decision-making organ pursuant to Local Government (City Corporation) Act 2011, holds regular meetings. In the approval process of WMD Directives within DNCC, it was necessary to obtain a preliminary approval of SWMSC on the directives before their submission to the mayor for DNCC’s official approval. On the other hand, in DSCC where no SWMSC had

been established, it was decided to discuss the revised directives at the Core Group Meeting with the attendance of key stakeholders other than the members as required, before submitting the WMD Directives to the mayor for the official approval of DSCC.

Based on the objectives and strategies defined for each of the 10 components in the New Master Plan, the contents of WMD Directives were reviewed, and the procedure shown in Figure 2.11 was applied to revise WMD Directives. In DNCC, SWMSC, consisting of 11 Ward Councilors and key WMD officials, has been established as a decision-making body under the Local Government (City Corporation) Act 2011 and holds meetings regularly. DNCC's approval process for WMD Directives requires approval by this SWMSC before submitting the document to the Mayor. On the other hand, since DSCC does not have CWMO, they discussed the draft at the SWM Core Group meeting with key stakeholders other than its members invited as needed, and submitted the revised draft to the Mayor. The draft of the revised WMD Directives was initiated in January 2019 and discussed at each SWM Core Group meeting in each city. In DNCC, the draft was discussed and revised by SWMSC in March of the same year, but the approval process of SWMSC took time and final approval was obtained in August 2021. In the case of DSCC, CWMO submitted the draft of revised directives to the Mayor in June 2019 for approval, which was approved by the Mayor in July 2019.





※WBA Core Group: Chaired by CWMO, the group consists of representatives from each section in WMD, and active CIs. The group holds a monthly meeting to discuss issues for WBA improvement, and to report activities (Refer to 2.2.2.1).

Fig. 2-11 Approval Process of WMD Directives

(3) Public Disclosure through Leaflets

During the Project Phase-2, leaflets for PR of WMD Directives, shown in Fig. 2-12 were prepared and disclosed to the public on the websites of DNCC and DSCC in collaboration with the PRDs of both cities. The leaflets were translated into English and Bengali, and 1,000 leaflets were distributed to each city and to Ward Offices. This information was also widely publicized through Facebook and the other means in both cities (refer to Appendix 7 for the leaflet of DNCC in Bengali and of DSCC in English and Bengali).

<p>Waste Management Department Directives 2021 Dhaka North City Corporation (DNCC)</p>  <p>Dhaka, the capital of Bangladesh and its largest city, has been experiencing remarkable economic development since the 1990s in association with rapid GDP growth in the country. Waste generation has also accelerated, and its composition has become complicated. Economic growth increases the living standard of a people, who then pay more attention to waste cleaning services provided by local governments. It is thus vital, for understanding and cooperation, that any solution involve local governments creating a communication channel to connect their cleaning services with communities.</p> <p>Considering the critical circumstances surrounding waste management, DCC (the former local government of both the DNCC and DSCC jurisdictions) started improving its solid waste management in support of JICA in 2003, in conjunction with development and implementation of the first Clean Dhaka Master Plan.</p> <p>August 2021</p> <p>Chief Waste Management Officer Dhaka North City Corporation</p>  <p>The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chattogram City</p>	<p>Waste Management Department Directives 2021</p> <p>In 2011, the DCC was divided into two administrative areas, namely the DNCC and DSCC. A serious issue is that both the existing landfills managed by the DNCC and DSCC have very limited capacities, and there is no place to dispose of waste in the near future. Therefore, the DNCC decided a new Master Plan in 2018 for the next 10 years, which introduces an integrated waste management facility component, called "Eco-Town," as a way to solve this issue. The new Master Plan also includes accelerating essential public awareness programs, disseminating a community participatory framework, called "Ward Based Approach (WBA)," collecting waste efficiently and hygienically, extending the level of existing landfills, reforming laws and institutions, and expanding stakeholder capacity while looking toward the future of the DNCC.</p> <p>The first WMD Directives developed in 2008, which stipulates establishment of the WMD and implementation of priority activities based on the first Master Plan. In 2013, the Directives was then amended as the second Directives exclusively for DNCC in consolidation of the WMD's activities and surrounding circumstances, introducing the WBA concept.</p> <p>Recently, the Dhaka Water Supply and Sewerage Authority (Dhaka) has handed over the responsibility of Dhaka's drainage system and canals to DNCC and DSCC to eliminate waterlogging in Dhaka on December 31, 2020. DNCC is now managing waste collection at 20 canals as well as the city-wide waste management.</p> <p>This Directives, as the third Directives, lay down objectives and strategies in ten key components, which are stated in the new Master Plan to reduce adverse environmental impacts of solid waste by introducing an integrated and sustainable management system together with involving the citizens and adopting appropriate technology.</p> <p>The WMD shall take the necessary actions and measures to ensure that waste management is carried out without endangering human health or harming the environment, in accordance with following objectives in this Directives.</p> <p>Component 1: Public Relations, Public Awareness and Public Involvement</p> <p>Objective 1-1: Develop the capacity to promote public participation and engagement in waste management.</p> <ul style="list-style-type: none"> Establish the Public Awareness Planning Unit (PAU). Objective 1-2: Enhance people's knowledge and understanding to work together with DNCC. Organize and run a Public Consultative Group (PCG) for a solid waste management facility. Promote collaboration between DNCC, universities, companies and other City Corporations and municipalities. 	<p>Objective 1-3: Stimulate public participation for waste management.</p> <ul style="list-style-type: none"> Develop and implement a public relation and public awareness strategy and annual activity plan including newly added CSR activity. Develop and implement information disclosure system. <p>Component 2: WBA Activity Implementation</p> <p>Objective 2-1: Improve quality and efficiency of the field-level solid waste management through WBA activities in the existing wards, and disseminate the WBA concept in new wards.</p> <ul style="list-style-type: none"> Develop and implement a WBA Annual Activity Plan and disseminate the WBA concept in new wards. Encourage COs and CIs for the WBA activity implementation through WBA Core Group meetings and other activities. <p>Objective 2-2: Enhance ward-level institutional capacity.</p> <ul style="list-style-type: none"> Hold trainings and workshops for COs and CIs, cleaners, PSCPs, communities and other stakeholders for WBA implementation. Train the ward cleaners for occupational safety. Develop and adopt administrative procedures with a proper chain of command. <p>Component 3: Waste Reduction</p> <p>Objective 3-1: Reduce solid waste generation.</p> <ul style="list-style-type: none"> Prepare and implement a waste reduction plan. Introduce 3R activities through WBA activities. <p>Component 4: Waste Collection</p> <p>Objective 4-1: Improve the capacity of waste collection and transport.</p> <ul style="list-style-type: none"> Replace aged collection vehicles to new vehicles and procure additional vehicles. Study on waste collection and transport methods in the new wards, and introduce a scheduled collection system for efficient and sanitary waste management. Prepare a ward-wise canal waste collection plan. <p>Component 5: Collection Vehicle Maintenance</p> <p>Objective 5-1: Improve the workshop operation and management.</p> <ul style="list-style-type: none"> Systemize maintenance works at the workshop and outsourcing contractors. Introduce "preventive maintenance" method in the maintenance system. Develop the capacity of the mechanics and drivers for vehicle maintenance. 	<p>Component 6: Intermediate Treatment (Eco-Town)</p> <p>Objective 6-1: Develop Eco-Town for sustainable waste management in Dhaka.</p> <ul style="list-style-type: none"> Prepare and propose the Eco-Town development plan to pursue approvals from the governmental organizations. Conduct a feasibility study for the Eco-Town, and secure the construction and operation cost. Start construction of the Eco-Town in accordance with acquiring necessary permits. <p>Objective 6-2: Establish the Eco-Town management section.</p> <ul style="list-style-type: none"> Establish a new management section in WMD exclusively for operation and management of the Eco-Town. Provide capacity building of the operation and maintenance to the management section and related parties. <p>Component 7: Final Disposal</p> <p>Objective 7-1: Rehabilitate the Amin Bazar Landfill Site.</p> <ul style="list-style-type: none"> Improve the landfill site with repairing the embankment, and installing facilities necessary for better sanitary condition, and expand the site by acquiring the surrounding area. Develop and implement a waste disposal plan with proper operation procedures, such as dispersing waste at a designated area, covering the surface by soil, and compacting the waste layer with gentle slope. Ensure the proper landfill closure with a safe closure plan and a sufficient budget after use. <p>Objective 7-2: Establish the landfill management section.</p> <ul style="list-style-type: none"> Establish a new management section in WMD exclusively for management of landfill. Provide capacity building of the landfill management in the section staffs and related parties. <p>Objective 7-3: Develop a new landfill site for the future.</p> <ul style="list-style-type: none"> Prepare and propose the landfill development plan to pursue approvals from the governmental organizations. Conduct a feasibility study for the landfill site, and secure the construction and operation cost. Start construction of the landfill site in accordance with acquiring necessary permits. <p>Component 8: Rules and Regulations</p> <p>Objective 8-1: Enact orders and rules for solid waste management.</p> <ul style="list-style-type: none"> Develop and issue necessary orders and rules in a timely manner to prevent the WMD's activities smoothly and efficiently. 	<p>Objective 8-2: Carry out daily WMD work in compliance with the Administrative Procedure Book.</p> <ul style="list-style-type: none"> Prepare the Administrative Procedure Book in accordance with related laws and regulations. Disseminate the processes written in the Book into the staff's daily work through training. <p>Component 9: Organization</p> <p>Objective 9-1: Strengthen the capacity of WMD in planning, coordination, monitoring, and evaluation for solid waste management.</p> <ul style="list-style-type: none"> Establish the Management Division to consolidate the WMD's function of planning, coordination, monitoring, and evaluation for solid management. Develop and implement a capacity building program for the management personnel. <p>Objective 9-2: Promote the organizational reform for waste collection and transport, vehicle operation and maintenance, and landfill operation to be exclusively responsible to WMD.</p> <ul style="list-style-type: none"> Strengthen the function of Zone Offices for secondary collection and transport. Reorganize the organizational structure of the WMD to include a division for collection vehicle management, and a division for vehicle maintenance and waste operation. Develop and implement a capacity building program for the division personnel. <p>Component 10: Financial Management</p> <p>Objective 10-1: Refine the waste management accounting system for budgeting and cost control.</p> <ul style="list-style-type: none"> Modify the accounting system to explicitly exhibit actual costs. Develop and publicly disclose an annual budget report for social accountability, and proper budget planning and management. Develop and implement a financial assessment with its criteria for evaluating the WMD performance. <p>Objective 10-2: Improve the financial capability for the Master Plan realization.</p> <ul style="list-style-type: none"> Increase the revenue by reorganizing the waste tax, using the conservancy rate of the housing tax, and improving the tax collection rate and the user fee collection. Develop and implement a long-term financial plan to fully cover the cost of the Master Plan realization, and revise it periodically.
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Reference: JPT

Fig. 2-12 The Leaflet of WMD Directives (DNCC, English)

2.3 Output 2: (DNCC and DSCC) Improvement and Expansion of WBA Activities [Phase-1 & Phase-2]

2.3.1 Overview

WBA is a system to promote participatory SWM at the field level led by the ward CI stationed in a ward SWM office. Under WBA some authority is transferred to the ward SWM office, to enable the ward CI to make independent decisions on issues related to the field activities. Ward populations reach a few hundred thousand and direct decision making by the SWM ward office in some cases, as envisioned in WBA may avert unsanitary conditions for such large populations, and contribute to providing sustainable SWM in big cities such as Dhaka South City and Dhaka North City. WBA consist of four major activities: WBA 1 for construction and practical use of the ward SWM offices, WBA 2 for the cleaners' occupational safety training and establishment of the SSC, WBA 3 for public awareness-raising activities, and WBA 4 for regional collection system improvement. Through the support of the Project, the WBA expansion rate in all 93 wards in DNCC and DSCC increased from 34% in 2017 to 82% in 2022. In addition, the amount of waste collected increased from 4,997 ton/day to 5,287 ton/day in the two respective years. Likewise, there was an increase in waste collection rate from 80% in 2017 to 82% in 2020.³⁶

The WBA can be flexible to changes in social conditions, and at the same time, can contribute to strengthening the foundation of the waste management system. WBA is also effective in disseminating instructions from the central government to all field workers smoothly. In the early days of the spread of COVID-19 infection, the CIs in their respective wards were the links with the Mayor and the ward cleaning staff, and through this linkage it was possible to quickly secure safety gear to all the cleaning staff as some protection against infection. Through such activities, the CIs' roles were re-evaluated positively and 19 CIs who were active as WBA core group members were promoted to the CO rank. In addition, some of the capable field staff were promoted to

³⁶ Extended areas of the cities are not included in this calculation.

managerial positions in the headquarters in both DNCC and DSCC. DNCC filled three posts of ACWMOs that had remained vacant for a long time. Through assigning greater responsibilities to the ward level SWM staff, many of these staff members became more confident and willing to shoulder more responsibilities thus enhancing the organization capacity of WBA as well as WMD.

What is “the ward SWM office”?

The idea of the ward SWM office came from the ward offices of Tokyo Metropolitan Government (TMG). TMG has a total of 50 offices in 23 wards, i.e., approximately two offices in each ward. DNCC and DSCC have 93 wards in total (129 wards if the new city areas are included). If each ward has one ward office, the coverage population per ward office would become a bit smaller than the equivalent in Tokyo, and thus more sufficiently manageable.

In 2003, the Conservancy Inspectors (CI, currently titled Ward Office Managers) appointed in each ward were mostly unable to provide satisfactory work results. Although the CIs were generally enthusiastic about their work, owing to their working styles always on the move on their motorcycles and communicating with headquarters and other CIs by walky-talky. They had no office to keep first aid kits in case a cleaner was injured, pay the cleaners wages, maintain files, deal with paper work and prepare plans or reports, etc. Even under heavy rains CIs had to do all such work items without shelter. In addition, there was no office or system that residents can visit or utilize to convey any complaints and/or requests they may have to the CI. Most CIs were hardly attuned to the community’s voices.

The ward SWM office served as a community center where residents can talk not only about waste problems but also other daily issues. The ward SWM office served as a catalyst to promote trust and respect between the CI and cleaners on the one hand and the ward residents on the other. The CI and cleaners recognized that “we are working for the city and citizens” and “there are many things we can do.” The construction of the ward office plays a much larger role than its primary function, to build a foundation for the regional waste management culture.

Reference: JPT (Top photograph taken in 2003; bottom photograph taken in 2019)



Daily work of CI with a motorcycle in 2003



Daily work of CI at ward SWM office in 2019 (CI sits at his desk encountering with community)

2.3.2 Current State and Issues of WBA Activities

A survey on the status of activities related to WBA was conducted in January 2018 at the commencement of the Project. The survey was carried out through questionnaires to each Ward and interviews with officers including CWMO, and the current status, issues, and improvement measures were discussed within WBA Core Group.

Based on the interview results, it was confirmed that the concept "SWM by each ward" pursued in WBA had become established among both high-ranking officials and field personnel such as CIs and cleaners and that relevant stakeholders had accumulated knowledge and experience on the activities of WBA1 through 4. On the other hand, the survey also revealed that the causes for inactive WBA activities were such issues as neglect of responsibility at the organizational level and lack of ownership on the part of CIs. In consideration of these issues, the policies and measures for improvement and expansion of WBA were organized with a focus on enhancement of capabilities in organizational and institutional aspects. Table 2-16 shows the details.

Table 2-16 Issues of WBA Activities and Policies for Improvement and Expansion

A. Issue	B. Policies for improvement and expansion of WBA
<p><u>CC's organizational culture that inhibits decentralization of responsibility</u> The deeply-rooted class system and military-style management are prevalent, inhibiting decentralization of responsibility. (e.g., CIs are making strenuous efforts in the field due to sudden instructions from the mayor or CWMO. Stable and continuous WBA activities are not possible due to frequent change of CWMO or sudden transfer of CIs.)</p>	<p>[Policy 1] Institutionalize transfer of authority in the CC and clarify the scope of job duties to promote decentralization of responsibility to the ward SWM offices.</p> <ul style="list-style-type: none"> • Use an Office Order to institutionalize transfer of authority to CIs. • Organize a WBA Core Group to provide a place for discussion on equal terms between the WMD high-ranking officials and CIs to foster ownership of CIs. • Communicate widely SWM implementation details (SWM Administrative Procedure Book) within the related organizations in order to clarify the chain of command and budget authorities in the CC. • Clarify the scope of job duties of CIs and justify personnel evaluation. • Explain thoroughly about SWM to the mayor and CEO who are decision-makers in DNCC and DSCC to gain their understanding.
<p><u>Evaluation system not attaching importance to work experience</u> Since work experience is not highly regarded, core CIs were not promoted to managerial positions for many years.</p>	
<p><u>Lack of ownership on the part of CIs</u> Since CIs are demotivated due to the above two issues, the ownership expected by CIs and required for promotion of WBA has not been fostered.</p>	
<p><u>Deficiency in planning and management capabilities</u> CIs, despite being skilled in field management, are not familiar with paperwork such as making plans and writing reports so that their activities and experiences are not readily visible.</p>	<p>[Policy 2] Redefine the duties of a CI as the "Ward Office Manager" to promote awareness reform in the entire CC including CIs.³⁷</p> <ul style="list-style-type: none"> • Gain CWMO's understanding on WBA activities. • Review the content of WBA activities including waste discharge control and update the WBA booklet. (C-1)

³⁷ The designation "Conservancy Inspector (CI)" includes the nuance that management is not included in the scope of the duties (CI is not an administrative officer) as is customary in the local context. In order to clarify the role as an administrative position, the Waste Management Department (WMD) of Dhaka North and South City is considering changing the designation to "Ward Office Manager." In this report, the designation "Conservancy Inspector, CI" is used since the change has not been approved officially.

A. Issue	B. Policies for improvement and expansion of WBA
<p><u>Obscure budget execution system</u> Budgets are not applied for based on an activity plan. Administrative procedures for budget execution are also obscure. Therefore, most CIs cannot utilize budgets at their own discretion for the betterment of WBA activities even though budgets are secured.</p>	<ul style="list-style-type: none"> • Institutionalize budget execution based on an annual plan to allocate budgets to ward SWM offices. • Enhance the data management capability of each ward required to prepare a plan. • Utilize the SWM implementation details to firmly establish the budget execution as part of CI's duties.
<p><u>Lack of training opportunities</u> Due to the lack of training opportunities for young CIs, there is a large gap in knowledge and know-how between them and experienced CIs.</p>	<p>[Policy 3] Construct a system for training young personnel through practical work.</p> <ul style="list-style-type: none"> • The WBA Core Group shall assign young CIs as support persons to experienced CIs. • Construct a system for supporting less-experienced CIs in each zone³⁸ through zone meetings and zone training. (C-2)
C. Other items to be considered (such as social background and opportunities)	
<p><u>Changes in historical background and diversification of stakeholders (C-1)</u> Social needs for "waste reduction" are increasing in addition to "sanitation problems" and "landscape and beautification" and these must be reflected in the WBA activities.</p>	
<p><u>Utilization of experienced CIs (C-2)</u> Through the JICA's support from 2005, human resources who can serve as core personnel have been developed. It is possible to have the meaning of WBA understood and expand WBA with the help of these experienced CIs.</p>	

Reference: WBA Expansion Manual (July 2019)

2.3.3 Implementation of WBA Improvement and Expansion Activities in Dhaka North and Dhaka South Cities

(1) Holding of WBA Core Group Meeting [Policy 1-1]

The WBA Core Group was formally organized by Office Orders (as of July 4, 2018, for DNCC and as of March 22, 2018 for DSCC). The WBA Core Group is chaired by CWMO and consists of representatives of sections³⁹ of WMD and principal CIs. A regular meeting is held approximately once every month. The major topics include discussion for improvement of WBA and progress report of activities as shown below.

[Major Topics of WBA Core Group Meeting]

- System and role of the WBA Core Group Meeting
- Activity plan and implementation report of WBA1 to 4
- Enhancement of zone-specific support system: Plan and implementation report of zone meetings and zone training
- Creation of annual plans (activity plan and budget plan) and ward profiles

³⁸ Zone: an administrative unit of the city that consists of multiple wards (a smallest unit with population of 100,000-200,000). Dhaka North City has 10 zones with 54 wards (including 18 new wards) and Dhaka South City has 10 zones with 75 wards (including 18 new wards) (refer to the maps in the preface of this report).

³⁹ WMD has several sections: (1) Collection and Transport, (2) Landfill Management, and (3) Conservancy.

- Review SWM implementation details (clarification of administrative procedures) and coordination among relevant stakeholders toward practical utilization
- Examination on draft WMD Directives and administrative public relations
- Discussion on support for the preparation and implementation of the New Master Plan (provision of ward-specific data, etc.)

In February 2019, Terms of Reference (hereinafter referred to as “TOR”) and group structure of the Core Group were revised to establish a more autonomous implementation system. A total of 54 WBA Core Group meetings (29 in Dhaka North City and 25 in Dhaka South City) were held during the Project. The details of the meetings and the contents of discussions at each meeting are shown in Appendix 10.



Reference: JPT (left photograph taken on December 11, 2018; right photograph taken on January 21, 2019)

Photo 2-9 WBA Core Group Meeting

(2) SWM Administrative Procedure Book [Policy 1-2]

1) Outline and Purpose

The SWM Administrative Procedure Book is a document that describes the details of the administrative process regarding waste management. In Bangladesh, projects and procedures regarding waste management are regulated in Local Government (City Corporation) Law 2009 and the Office Order by WMD⁴⁰. However, the officers of WMD have low awareness of implementing projects based on the laws and regulations, and nobody understood the administrative procedures properly. As a result, even though the contents of a certain task are the same, the time to complete the whole process and the quality of results for that task are totally different depending on the officer executing the task.

Based on this situation, the current laws, regulations, rules and Office Order were reviewed in the previous project and the SWM Administrative Procedure Book (draft) was prepared in 2013. This Project provided

⁴⁰ In addition, there are “City Corporation Service Rules, 1989” regarding personnel and welfare, “Bangladesh Labor Law 2006” regarding occupational health and safety, and “Public Procurement Law 2006” regarding procurement. Solid Waste Management Rules 2021 was enacted by DOE in December 2021.

support to WMD for finalization and utilization of this Book.

2) Contents and Revision Process of SWM Administrative Procedure Book

The SWM Administrative Procedure Book empowered CIs with rights to request budgets for sick allowance and WBA activities. However, the details of the SWM Administrative Procedure Book were not well shared with the public and it continued to be a challenge to implement projects and follow the procedure to secure the budget as defined in the Book. In addition, the Book included items regarding the operation and management of WMD (such as WMD Directives and annual plan) and matters that required the cooperation of related departments so that it was necessary for WMD to involve other departments of the City Corporation (CC) in the Project.

The SWM Administrative Procedure Book in the previous project was made based on the information collected before Dhaka was divided into Dhaka North and Dhaka South Cities. In this Project, the Book was reviewed at the WBA Core Group meeting and a first edition, both in English and Bengali was finalized (Appendix 8). Table 2-17 shows the table of contents of the SWM Administrative Procedure Book (the first edition).

Table 2-17 Contents of SWM Administrative Procedure Book (the first edition)

	Contents		Contents
1.	WMD Management	6.	WBA Activities
1.1	Enactment and Amendment of WMD Rules and Regulations	6.1	WBA 1
1.2	Publicity of WMD Rules and Regulations	6.2	WBA 2
1.3	Formulating WMD Annual Plan	6.3	WBA 3
1.4	Formulation (WMD Directives)	6.4	WBA 4
2.	Waste Management Budget Preparation	7.	Special Wastes Management
2.1	Overall Waste Management Budget Preparation	7.1	Medical Waste
2.2	Budget Preparation within WMD	7.2	Industrial and Commercial Wastes
2.3	Budget Preparation of Related Departments	7.3	Construction and Demolition Wastes
3.	Budget Disbursement	8.	Penalty
3.1	Procurement Process	8.1	CC Executive Magistrate
3.2	Purchased through Store and Purchase Department	8.2	Court of Metropolitan Judicial Magistrate
3.3	Request by each Official	8.3	Enforcement Wing - DOE
3.4	Repair and Maintenance of Heavy Cleaning Equipment	9.	Landfill operation and management
3.5	Improvement of SWM work	9.1	Management of weighbridge
4.	Staffing	9.2	Management of leachate treatment facility
4.1	Direct recruitment	9.3	Operation and maintenance of landfill site
4.2	Promotion	9.4	Heavy equipment operation and maintenance with fuel
4.3	Deputation	9.5	Staff Allocation
4.4	Outsourcing, Temporary	9.6	Waste picker
5.	Benefit Package	9.7	Maintenance of civil works such as road, embankment, car washing facility, and office
5.1	Allowance	9.8	New Landfill acquisition and improvement of

	Contents		Contents
			LFS
5.2	Leaves	10.	Privatization
5.3	Transport Facilities	11.	Introduction of new technology
5.4	Accommodation Facilities		

*SPD: Store and Purchase Department

Reference: JPT prepared based on SWM Administrative Procedure Book (the first edition) (July 2018)

The SWM Administrative Procedure Book is an operation manual based on the existing laws, regulations, and rules, and does not necessarily require a legal approval process. Since the approval procedure for a law-related formal document is not easy in Bangladesh and the final approval of the Book is expected to take several years, the SWM Administrative Procedure Book (the first edition) was finalized by the WBA Core Group meetings without undergoing an official approval process. Hereafter, the first edition is adopted as dynamic document in the daily operation while being revised from time to time.

3) SWM Administrative Procedure Book Review Committee

The SWM Administrative Procedure Book Review Committee (committee members shown in Table 2-18), which was supposed to be established in DNCC and DSCC respectively, was supposed to launch the Book for review with an aim to strengthen the relationship between the related departments of DNCC and DSCC. However, due to difficulties in the approval process for the establishment of the committee, SWM Administrative Procedure Book was only distributed to the parties concerned and its contents were confirmed individually. A summary of SWM Administrative Procedure Book was also provided with the distributed Book.

Table 2-18 Members of the Administrative Procedure Book Review Committee

(No particular order)

No.	Position	Member
1	Additional CWMO (Ad. CWMO)	1
2	Coordinator of WBA Core Group	1
3	WBA1 sub-group member of WBA Core Group	3
4	Revenue Department (RD)	1
5	Estate Department	1
6	PR Department (PRD)	1
7	Human Resource Department (HRD)	1
8	Landfill Management Unit (LMU)	1
9	Supply and Procurement Department (SPD)	1
10	Law Department	1
11	Transport Department (TD)	1
12	Engineering Department (ED)	1
13	Other Officials if necessary	-

*Ad. CWMO: Additional Chief Waste Management Officer, ED: Engineering Department, HRD: Human Resource Department, LMU: Landfill Management Unit, PRD: Public Relations Department, RD: Revenue Department, SPD: Store and Purchase Department, TD: Transport Department

Reference : JPT

(3) WBA Activity Expansion Manual [Policy 2-1]

The WBA Activity Expansion Manual (WBA Booklet) was updated (Appendix 6) to improve and expand the WBA activities. In the updated manual five viewpoints were added, namely (1) mindset that a "Ward Office Manager" should have (opening message), (2) information disclosure required to enhance waste-related data management, (3) contents that reflect social need for "waste reduction" in addition to "sanitation problem" and "landscape and beautification," (4) clarification of administrative procedures related to plan formulation and budget execution, and (5) archive function for effective use of past activity achievements and good examples. The structure of the updated manual is shown in Table 2-19. In addition, as part of public relations activities, some of the contents of WBA Activity Expansion Manual were distributed as a newsletter.

Table 2-19 Contents of WBA Activity Expansion Manual (WBA Booklet)

No.	Content
1	Opening message: a mindset of a "Ward Office Manager"
2	Waste management overview of CC
3	Waste management data by ward
4	Objectives, methods, and activity briefings of WBA
5	Activities of WBA1 to 4
6	Waste reduction strategy, policy, and activities
7	Overview of the Administrative Procedure Book
8	Preparation of Annual Activity Plan
9	Results of previous WBA activities
10	Activity support tools (Cleaners' Manual ⁴¹ , PCSP* training manual, community meeting documents, etc.)

* PCSP: Primary Collection Service Provider

Reference: JPT prepared based on WBA Activity Expansion Manual (July 2019)

(4) Introduction of Annual Plan and Financial Assessment [Policy 2-2]

The budget for community meetings is posted by both DNCC and DSCC as a WBA-related budget. At present, the budget is not allocated to each ward but permission for budget execution must be obtained from CWMO every time according to the objective for budget request. However, budgets are not applied for based on an activity plan. Administrative procedures for budget execution are also obscure. Therefore, most CIs cannot utilize budgets at their own discretion although budgets are secured.

In the Project, requests for approval of budget execution regarding cleaners' workshop (WBA2) and community meetings (WBA3) were first made to identify the current budget execution process. Although the WBA Core Group prepared and submitted the necessary documents from ACWMO to CWMO, the subsequent procedures made slow progress. After frequent visits were made to the CEO and other high officials for the sake of explanation, the request was finally approved. Since the time required from request of budget until the budget execution was several months or, in some cases, more than one year, it became evident that there were issues regarding the need for improvement of the approval procedure efficiency and transfer of authority according to

⁴¹ Cleaners' Manual: a booklet, developed in the previous technical assistance project, which compiles cleaners' occupational safety, accident prevention, and emergency response.

the purpose of budget execution. Based on this recognition, the WBA Core Group and CWMO discussed possible measures for improvement.

As a result of discussion, DNCC determined to (1) create an annual activity plan for each ward, integrate such plans into a plan for each zone, and submit it to CWMO, (2) manage budget execution for each zone, and (3) permit budget execution for WBA activities up to 25,000 Tk. per month as the upper limit, which is allocated to ACWMO at present. Based on this decision, DNCC is providing guidance on creating an annual activity plan for each ward and organizing ward-specific basic data that serves as the grounds for activity plans (creating ward profiles).

(5) Enhancement of Zone-specific Support System (Zone Meetings and Zone Training) [Policy 3]

To expand WBA, it is necessary to provide training and support to less-experienced CIs. Since the project activities and others so far have already fostered experienced CIs who are familiar with WBA, zone meetings and zone training were held to construct a system in which they play a central role in providing training and support to less-experienced CIs in each zone. Especially, after the pandemic of COVID-19, it was difficult to hold meetings of WBA Core Group due to the restriction of holding meetings by lockdown. Hence many small group zone meetings were held to supplement the functions of WBA Core Group meetings. During the Project, a total of 56 zone meetings and zone training programs were held (DNCC: 40 meetings and training programs and DSCC: 16 meetings and training programs). The details of the meetings and training programs are shown in Appendix 10.

[Major topics of WBA zone meetings (zone training)]

- Communication of content of discussion at WBA Core Group meetings
- Explanation and communication of WBA
- Activity plan and implementation guidance of WBA 1 to 4
- Summary of issues by each zone and discussion of policies

(6) Construction and Management Enhancement of Ward SWM offices (WBA 1)

Table 2-20 shows the numbers of ward SWM offices as of May 2022. DNCC and DSCC have constructed 23 and 28 ward SWM offices, respectively.

Table 2-20 Numbers of Ward SWM Offices (As of May 2022)

Item		DNCC	DSCC
Total Number of Wards in CC		54 wards	75 wards
Ward with the SWM office		23 wards	28 wards
Furniture provision to the office (2018-19)	New (after 2017)	13	-
	Renovated (2018-2019)	2	-
	Phase-1	4	6
	Phase-2	8	10

Reference: JPT prepared based on the results of interviews with C/P organizations of DNCC and DSCC



Reference: JPT (Left photograph taken in February 14, 2019, Right photograph taken in July 3, 2019)

Photo 2-10 Ward Solid Waste Management Offices (WBA1)

(7) Safety Education for Cleaners and Establishment of Safety and Sanitation Committee (WBA 2)

In the cleaners’ workshop, CIs gave guidance on safety and sanitation based on the Cleaners’ Manual. In some wards, cleaners received safety gear such as masks and gloves on the day of training, learned how to use the first-aid kit, and were given information on nearby hospitals in case of accidents. The costs of training were paid by the budget of each CC. In addition, DNCC started to provide cleaners with free health checkup once a year as welfare benefits after WMD negotiated with various quarters. The participants were cleaners of wards as well as CWMO, ACWMO, and CIs from WMD. In 2020, safety gear was provided to the workers as emergency assistance, together with monitoring and training on use of safety gear to all the workers. As a result, 71 training programs (DNCC: 48 training programs and DSCC: 18 training programs) were conducted, and approximately 4,800 workers⁴² attended the programs. These activities have significantly contributed to improvement of the cleaners’ work environment. The details of training programs are shown in Appendix 10.



Reference: JPT (Left photograph taken on November 26, 2018, and the right photograph taken on February 16, 2019)

Photo 2-11 Cleaners’ Workshop on Occupational Health and Safety (WBA2)

⁴² There are 3,914 cleaners at DNCC and 5,348 at DSCC (as of July 2019, excluding daily cleaners).

(8) Training and Monitoring for Prevention of COVID-19 Infection to Cleaners

As mentioned above, during the Project, safety gear such as face masks and gloves were provided to 3 cities for prevention of infection of COVID-19, and the training program for occupational health and safety was conducted from July to August 2020. The details are shown in section 4.3.

(9) Holding of Community Meetings (WBA 3)

The Master Plan calls for waste reduction through WBA activities and, therefore, awareness-raising activities for waste reduction and separation are conducted through the community meetings (referred to 2.2.6). At the community meetings, furthermore, the WBA4 activity (improvement of collection service in each ward) is also explained. The community meetings were held by the budget of each ward or support from commissioners.

CI, CWMO, ACWMO and EE from City Corporations, and commissioners, local councilors, Imam (local leaders of Islam), teachers and residents from communities joined community meetings. During the Project Phase-1, community meetings were held 7 times (5% of all wards) with a total of 275 people participating. Since organization of meetings requires coordination with local leaders and resident representatives, the less experienced CIs were unable to successfully coordinate with the community to hold the community meetings, while the experienced CIs managed to have community meetings. However, one good practice observed was that the experienced CIs and ACWMOs supported the less experienced CIs to hold their community meetings in Zone 5 of DNCC. During the Project Phase-2, community meetings were held 44 times (DNCC: 26 times and DSCC: 18 times) with total attendance of 1,491 people mainly from target areas where pilot projects were being conducted for sorting waste. The results of community meetings are shown in Appendix 10.



Reference: JPT (left photograph taken on November 22, 2018, and right photograph taken on January 30, 2019)

Photo 2-12 Promotion of 3R and Waste Reduction at Community Meetings (WBA3)

(10) Improvement of Collection Service in Each Ward (WBA 4)

1) Collection improvement by introduction of compactors (WBA 4a)

In preparation for introduction of new compactors procured in the grant aid project⁴³ being implemented

⁴³ “The Project for Improvement of Solid Waste Management Equipment in the People’s Republic of Bangladesh” (refer to p.1 and p.3).

simultaneously with this Project, two wards in DNCC planned and notified the residents about Fixed-Time Fixed-Place collection⁴⁴ and held kickoff meetings. Table 2-21 shows the details of the activities.

Table 2-21 Activities for Improvement of Collection Service (WBA4a) (DNCC)

No	Date	Ward	Activities
1	19/07/2018	DNCC W22	<ul style="list-style-type: none"> • Meeting with community representatives to decide: <ul style="list-style-type: none"> ➤ Area for compactor implementation (Block-A & B) ➤ Collection route and time • Preparation and distribution of a leaflet to announce the new collection route and collection time • Kick-off meeting
2	29/09/2018	DNCC W11	<ul style="list-style-type: none"> • Explanation to local leaders • Decision of compactor implementation area • Explanation to housing society • Preparation and distribution of a leaflet to announce the new collection route and collection time • Kick-off meeting



Kick-off Ceremony of Fixed-time Fixed-Place Waste Collection with Compactor (Ward 11, DNCC)

Reference: JPT (left photograph taken on November 22, 2018, right photograph on January 30, 2019)

Photo 2-13 Waste Collection improvement by introduction of compactors (WBA4a)

2) Improvement of existing waste collection method (WBA 4b)

With an aim to improve collection in wards with poor collection service, the WBA Core Group meeting identified the wards needing improvement. Table 2-22 and Table 2-23 show the wards under the jurisdiction of DNCC and DSCC, respectively, for which collection service should be improved. DNCC mobilized heavy machines and human resources in an effort involving not only WMD but also the entire CC, and the status of improvement was monitored at WBA Core Group meetings.

Table 2-22 Target Areas for Waste Collection Improvement (WBA4b) (DNCC)

No.	Category	Zone	Ward	Area
1	Drainage	1	1	Adjacent to sector 4, 6 & 8 (Beside Rail line)
2	Drainage	2	7	In front of zone 2 office (both sides of the road)
3	Drainage	2	4	Behind Harmain Mainer college
4	Lake and pond	1	17	Nikonjo 1&2 lake

In 2018, 150 waste collection vehicles in total were procured.

⁴⁴ Household discharges waste at the designated place in a designated day and time. City Corporation collects waste from that point and transports it to a final disposal site.

No.	Category	Zone	Ward	Area
5	Drainage	2	-	Ceramic road to Kalshi via mirpur 12
6	Drainage	2,4	-	Mirpur 12 to Taltola (metro rail area)
7	Waterway	4	10 & 12	Tolarbagh Khokhal
8	Waterway	2	-	Rup nagar khal
9	Waterway	4,5	-	Kollanpur box culvert
10	Riverside	5	47 & 48	Haji camp, Ashkona (extension area)
11	Drainage	4	24	Tejgaon link road
12	Waterway	4	13	Uttor Piner bagh canal, mirpur
13	Drainage	3	19	Beside Banani rail gate (old dohs)
14	Dam	5	33	Adjacent to Dhaka Uddhan
15	Park and playground	4	9	Buddhijibi Shohid Minar Park
16	Illegal dumping site (roadside)	4	13	Mirpur 60 feet road (3 spots: paka moshjid, bhanga bridge, west Monipuri)
17	Dust bin and container	2	4	Near police convention (from Mirpur 13 to Mirpur 14)
18	Road	3	21 & 23	Rampura bridge to Malibagh bridge

Table 2-23 Target Area for Waste Collection Improvement (WBA4b) (DSCC)

No.	Category	Zone	Ward	Area
1	Roadside	1	15	Beside Abahoni Playground
2	Roadside	1	20	The opposite site of the Press Club
3	Roadside	1	20	Segunbagicha (Ex. Jatio party office)
4	Roadside	2	1	Culvert road graveyard
5	Roadside	2	8	Kamlapur Railway Station
6	Roadside	2	8	TT para
7	Roadside	3	24	Soshan Ghat
8	Roadside	3	24	Balur Ghat
9	Roadside	3	22	Kalunagar
10	Roadside	3	55 & 56	Matador More
11	Roadside	4	36	Sakhari Bazar
12	Roadside	4	34	North-South road under the footover bridge
13	Roadside	4	38	Tipu Sultan Road
14	Roadside	5	7	Maniknagar
15	Roadside	5	40	Dayagonj Cleaners' Colony
16	Roadside	5	51	Ghulighar Area



Reference: JPT (left photograph taken in April 2019, right photograph taken in June 2019)

Photo 2-14 Target Areas of Waste Collection Improvement (Illegal Dumping Hotspot) (WBA4)

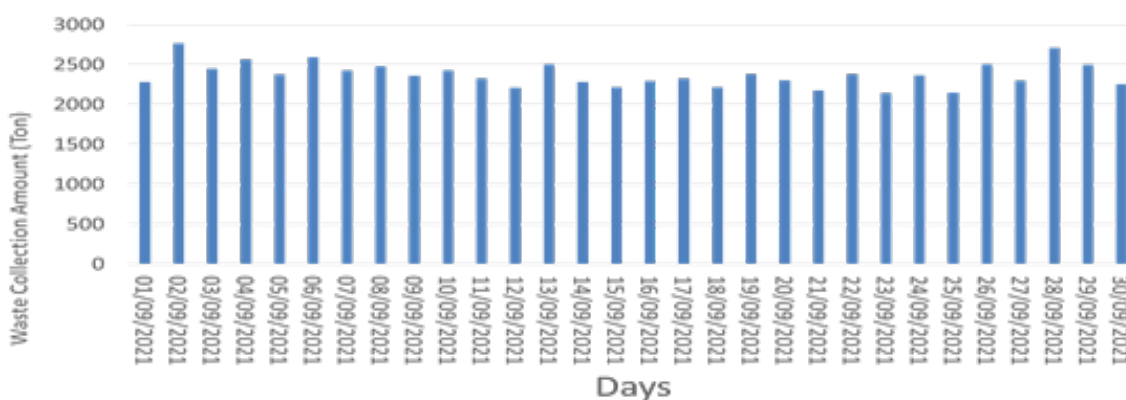
(11) Analysis of Weighbridge Data

At the commencement of the Project, the drivers of waste collection vehicles in DNCC and DSCC rarely used weighbridges since it took long time to weigh. After the Project started, the importance of weighbridge data was repeatedly explained to the Chief Officer of TD that supervises waste collection vehicles and CWMO. By the end of the Project Phase-1, all the drivers were using the weighbridges. The analysis of weighbridge data started with C/P from April 2021 during the Project Phase-2. Since the weighbridges were not equipped with data analysis software, the weighbridge data was converted to data in Excel format for analysis. However, this data conversion process required much work. The C/P of DSCC developed a program in December 2021 to convert weighbridge data to Excel data, which significantly reduced the time to convert and analyze the data. The Chief Officer of TD and CWMO have since been managing the performance of each vehicle as well as drivers by using the weighbridge data. DSCC discloses the details of weighbridge data on their website (Appendix 11). The details of analysis of weighbride data is shown in Table 2-24 and the daily amount of waste collected in DSCC in September 2021 is shown in Fig. 2-13

Table 2-24 Details of Analysis of Weighbridge Data (DNCC and DSCC)

Item	Daily Total	Daily Average	Monthly Total	Monthly Average	Annual Total	Annual Average
Total Amount of Waste Collected in the City	○	○	○	○	○	○
Amount of Waste Collected by Ward	○	○	○	○	○	○
Amount of Waste Collected by Vehicles	○	○	○	○	○	○
Number of Trips by Vehicles	○	○	○	○	○	○
Amount of Waste Collected by Type of Vehicles	○	○	○	○	○	○
Number of Trips by Type of Vehicles	○	○	○	○	○	○
Amount of incoming Waste per Hour	○	—	○	—	○	—

Reference: JPT



Reference: JPT

Fig. 2-13 Daily Amount of Waste Collected (DSCC, September 2021)

(12) Activities of WBA by Ward

At the commencement of the Project, the coverage rate of WBA was 34% in all 93 Wards of DNCC and DSCC in 2017. As the result of the activities during the Project Phase-1, the coverage rate of WBA was improved up to 71% (average of the rate in Dhaka North and Dhaka South Cities excluding Extension areas, DhakaNorth City: 29 out of 36 total Wards (81%); Dhaka South City: 37 out of 57 total Wards (65%)). As a result of the activities during the Project Phase-2, the coverage rate of WBA finally reached 82% (Dhaka North City: 36 out of 36 total Wards (100%); Dhaka South City: 40 out of 57 total Wards (70%)). The results of activities of WBA are shown in Appendix 10.

2.3.4 Personnel Transfers in DNCC and DSCC

The important persons in promoting the WBA activities in DNCC and DSCC are the management staff in WMD and CIs who manage the ward SWM offices. After the commencement of this Project, DNCC and DSCC conducted many personnel transfers and promotions. In fact, at the Core Group meeting, the issue of not promoting field staff such as CIs for many years and their demotivation as a result was discussed. This situation came to the attention of the CWMO and resulted in the promotion of staff such as CIs. However, many CIs are promoted as acting or temporary or concurrent officers, and it is necessary to encourage LGD and each Mayor, as decision makers to deal with this issue in a more resolute manner to improve the stability and sustainability of those responsible for SWM. The personnel relocation details for each city after June 2017 are shown in Appendix 8-(3).

2.4 Output 3: (CCC) Introduction of Proper Waste Collection and Transportation System [Phase-1 & Phase-2]

2.4.1 Overview

Prior to the grant aid project, Chattogram City had approximately 80 waste collection vehicles but no compactors. In 2018, the grant aid project provided the city with a total of 38 collection vehicles including 13 compactors. The Project provided technical assistance to develop a waste collection and transportation plan and to improve operation and maintenance capacity by using these vehicles. In particular, the assistance included the introduction of door-to-door collection with the compactors, and waste collection improvement through WBA by utilizing experiences and knowledge accumulated in DNCC and DSCC through the previous support. As a result, WMC, the predecessor of WMD, was established, and the WBA expanded to 90% of all 41 wards. Through the Project, two new ward SWM offices were constructed. In addition, in ward 8 and ward 27, as model wards, CIs took the lead in conducting four WBA activities. Especially in ward 8, activities related to 3R promotion through the waste segregation pilot project and improvement of medical waste management were carried out, and ward 8 was awarded by the Chief Representative of JICA Bangladesh office. CI of ward 8 was also awarded as a model CI. Concerning ward 27, the ward CI was promoted to Conservancy Officer (CO) in February 2022 in recognition of his efforts.

Moreover, in August 2021, a detailed waste collection and transportation plan was formulated. Based on the plan, CCC made efforts to improve waste collection by introducing 101 improved Rickshaw vans (RVs). Consequently, waste collection amount increased from approximately 1,200 tons/day (2014) to approximately 2,200 tons/day (2021) through a series of improvement activities carried out in parallel, including the enhancement of collection capacity through the grant aid project.

2.4.2 Current State of Waste Collection and Transportation

(1) Primary Collection

In CCC, the primary collection system was introduced in 2016⁴⁵. The primary collectors appointed by CCC are collecting waste from households and transporting it to collection vehicles that conduct the secondary collection. CCC does not charge households for the primary collection and distributes plastic bins to some households and shops to be used for the primary collection free of charge. As a result of survey, the main primary collection resources are as follows:

- Rickshaw vans: 753
- Primary collectors: Approx. 1,700
- The number of bins used for primary collection: 868,195 bins for households and shops
- Large containers (metal, and installed at houses and roadside): 3,370 containers



Reference: JPT (Photographs taken in September 2017)

Photo 2-15 Primary Collection by Rickshaw Van

(2) Secondary Collection

There are six secondary stations used for secondary collection (where waste collected by primary collectors is transferred to collection vehicles). At other areas, waste is transferred at open spaces. Waste is often scattered at many places whereas some open spaces have concrete bins and containers. After secondary collection, waste is transferred to the two LFSs (Arifin Nagar LFS and Halishahar LFS).

⁴⁵ Before primary collection service by CCC, dust bins (public dust bins contained by concrete wall) were used, and illegal dumping was often practiced. Some housing societies implemented primary collection service.

- Transfer facilities (secondary collection): 6 facilities
- Open spaces: 629 places
- Concrete bins : 325 bins
- Container installation locations : 69 places



Reference: JPT (Photographs taken in September 2017)

Photo 2-16 Secondary Collection Point

(3) Issues in Current Waste Collection and Transport

CCC does not have any exclusive department or organization for waste management. Waste collection, including primary and secondary collection, is conducted by the Conservancy wing whereas repair and maintenance of waste collection vehicle is the responsibility for Mechanical Division (hereinafter referred to as “MD”).

The primary collectors start collecting waste from households at 11:00 but the secondary collection vehicles start around 12:00. The primary collectors carry collected waste to a secondary collection point but drop waste on streets on the way. Near a secondary collection point, too, waste is scattered, giving off offensive smells and causing an undesirable condition in terms of sanitation. As the primary and secondary collections are not coordinated in terms of time, the primary collectors unload waste at a secondary collection point, where the waste is loaded onto collecting vehicles later, resulting in accumulation of waste at the secondary collection point and generation of more serious sanitation problems. Even at a secondary collection point where container collection is placed, similarly waste is left a long time in the container and concrete bin points until secondary collection vehicle arrives, causing problems such as foul odors. Some wards have areas where primary collection from households is not properly conducted due to shortage of rickshaw vans and collectors. In such areas, waste was dumped in irrigation canals, roadside, etc. As such, waste collection did not function well due to insufficient collaboration between primary collection and secondary collection.

2.4.3 Overview of Waste Collection and Transportation Plan and Guidance Manual (Draft) including 3R Activity and Awareness-raising Campaign Tools

(1) Outline of Guidance Manual

CCC has faced some challenges of waste collection such as deterioration of sanitation around secondary collection points, lack of vehicles and equipment and lack of organizational coordination. In addition, two of the landfill sites (Arifin Nagar LFS and Halishahar LFS) in Chattogram City do not have enough waste disposal capacities, and it is necessary to extend the lifespan and reduce the amount of waste being disposed at the sites. Under these circumstances, a waste collection and transportation plan and Guidance Manual including 3R activity and awareness-raising campaign tools were developed (Appendix 8). The draft Guidance Manual adopted the WBA concept for the first time in Chattogram City based on experiences of DNCC and DSCC. Before the implementation of WBA, there were discussions with CCC on the introduction of Fixed-time and Fixed-place collection with new compactors. Awareness-raising and 3R activities and separation at generation sources were also discussed by relevant stakeholders including the community. The following table shows the contents of the Guidance Manual.

Table 2-25 Contents of Guidance Manual for Waste Collection and Transportation in Chattogram City Corporation (2019)

No.	Contents
1	Introduction and background
2	Objectives and Target Group of the Manual
3	Waste Collection Improvement Plan with Ward-based Approach (WBA)
4	WBA Guidance Manual (WBA1-4)
5	Role and Responsibility of WBA Core Group
6	Attachment: 3R Activities and Awareness-raising Campaign Tool (3R and Waste Reduction Campaign Leaflets, Fixed-Time Fixed-Place Promotion Leaflets)
7	Reference: SWM Data book (Population by wards, Distribution Plan of Waste Collection Vehicle, List of CI and CS)

Reference: JPT prepared based on the Guidance Manual for Waste Collection and Transportation in CCC (July 2019)



Reference: JPT (Photographs taken in June 2019)

Photo 2-17 Landfill Site in Chattogram City

(2) Outline of Detailed Waste Collection and Transportation Plan

During the Project Phase-2, based on the above guidance manual, the detailed waste collection and transportation plan was established. Chattogram City had enough basic information for establishment of the plan since a similar study was conducted in parallel with Dhaka North and Dhaka South Cities during the Project Phase-1, when a basic study was conducted for the development of new Master Plan for Dhaka North and Dhaka South Cities. Therefore, based on the results of the surveys, the current situation was analyzed and a plan was developed (Fig. 2-14). The plan has a target year of 2030, and covers collection and transportation for the next 10 years, with future waste amount estimates and identification of issues. While mainly focusing on collection and transportation, the plan also covers an overall waste management system from discharge to disposal, and can be considered as a master plan in Chattogram City. This plan was finalized by WMC in July 2021, and handed over to the Mayor of Chattogram City in August 2021.

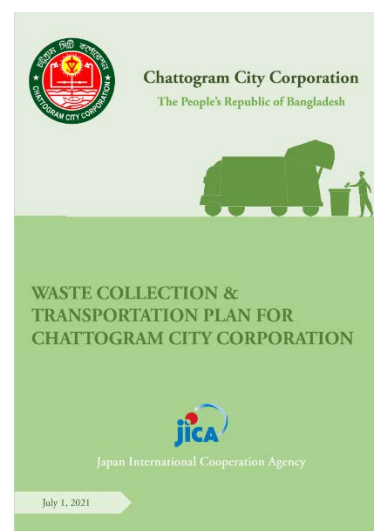


Fig. 2-14 Waste Collection and Transportation Plan for Chattogram City Corporation 2021

Table 2-26 Table of Contents of Waste Collection and Transportation (WCT) Plan for Chattogram City Corporation 2021

Contents		Contents	
1.	Introduction	3.	Plan of Collection and Transportation
1.1	Background	3.1	Preconditions for planning
1.2	The objectives of the WCT Plan	3.2	Issues for planning
1.3	Target Year and Waste for WCT Plan	3.3	Strategies for Planning of WCT
1.4	Regulatory Information on SWM	3.4	Plan for Public Awareness and Involvement
2.	Present Situation and Issues on Waste Collection and Street Sweeping	3.5	Plan for Primary Collection Service
2.1	Actual amount and composition of solid waste	3.6	Plan for Secondary Collection Service
2.2	Organization & Administration	3.7	Planning For Waste Collection Vehicle Management & Maintenance
2.3	Budget and Finance	3.8	Plan for Street Sweeping
2.4	The present situation of waste collection and transportation	3.9	Plan for Organization and Management
2.5	Present Situation of Street Sweeping	3.10	Financial Management
2.6	Public Awareness	4.	Implementation Plan
2.7	Issues on SWM	4.1	Implementation schedule
2.8	Summary of Identified Issues	4.2	Financial plan
2.9	Other SWM facilities related to collection, transportation, and street sweeping		

Reference: JPT prepared based on Waste Collection and Transportation Plan for Chattogram City Corporation (July 2021)

2.4.4 Implementation of Improvement Activities based on Guidance Manual and Waste Collection and Transportation Plan

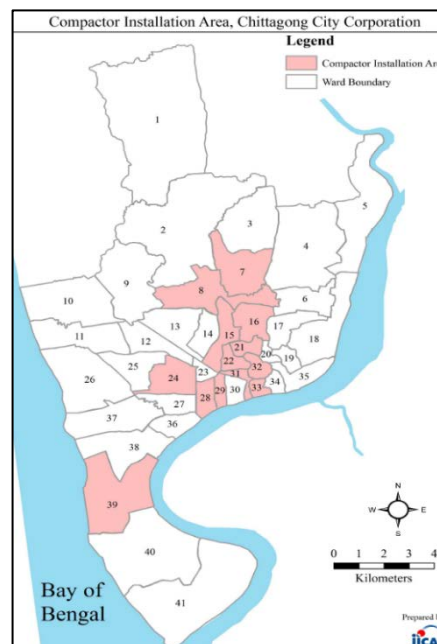
(1) Implementation of Waste Collection and Transport Improvement Activities⁴⁶

Since there is little comprehensive information on waste collection in Chattogram City, JPT collected and organized information, created a GIS map of secondary collection points, and used the data and map to create a collection improvement plan. Areas of compactor collection are shown in Fig. 2-15 and Table 2-27. In Ward 8 and Ward 28 where collection using new compactors had been introduced, meetings with residents were repeatedly held to deepen understanding about compactor collection.

Table 2-27 Area of Compactor Collection in CCC

Compactor	Ward
3.5 t size	Ward 16 (Chawkbazar), Ward 22 (Enayet Bazar), Ward 24 (North Agrabad), Ward 28 (Pathantuli), Ward 32 (Anderkill), Ward 33 (Firingi Bazar)
7.5 t size	Ward 7 (West Sholoshohor), Ward 8 (Shulokbohor), Ward 15 (Bagmoniram), Ward 21 (Jamalkhan), Ward 27 (South Agrabad), Ward 31 (Alkaran), Ward 39 (South Haliashahar)

Reference: JPT



Reference: JPT

Fig. 2-15 Area of Compactor Collection



Reference: JPT

Fig. 2-16 Public Awareness Leaflet (Ward 8) (CCC)



⁴⁶ This activity was conducted in collaboration with “The Project for Improvement of Solid Waste Management Equipment in the People’s Republic of Bangladesh”. In 2018, 38 waste collection vehicles, including 13 compactors, were procured in Chittagong City Corporation by the grant aid project.



Reference: JPT (Photographs taken in September 2018)

Photo 2-18 Leaflet Distribution and Compactor Implementation Campaign

In Wards 8, 16, and 28 where compactors have been introduced, two types of tools were distributed: blue tarpaulins to be laid over the road to prevent contamination and bowls to be used to scoop up waste when the primary collectors unload waste from the rickshaw vans.



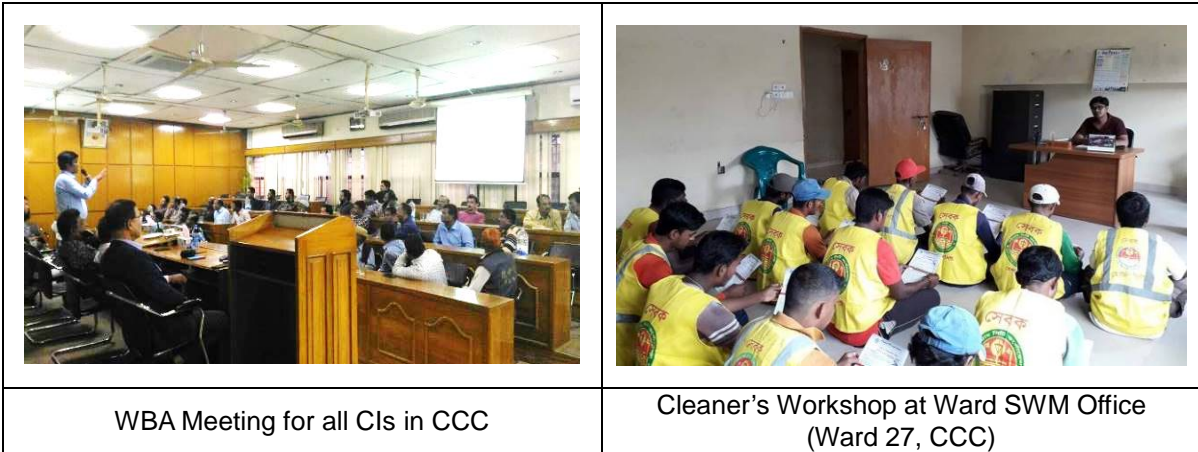
Reference: JPT (Photographs taken in September 2018)

Photo 2-19 Transferring Waste to Compactor

(2) Establishment of WBA Core Group

CCC officially established WBA Core Group by an Office Order dated March 7, 2019. The WBA Core Group, which aims at promoting WBA activities, consisted of 15 members: CEO as leader, CCO as sub-leader, CO as coordinator, CIs, and Conservancy Supervisors (hereinafter referred to as “CSs”).

WBA Core Group meetings were held 16 times in Chattogram City. As part of WBA Core Group activities, a SSC was formulated at Ward 8, and the first cleaners’ workshop (WBA 2) in CCC was held at Ward 40 in June 2019, followed by a second workshop in Ward 27 in July 2019. The results of WBA Core Group meetings in Chattogram City are shown in Appendix 10.



Reference: JPT (left photograph taken on February 3, 2019, right photograph taken on July 30, 2019)

Photo 2-20 WBA activities in Chattogram City Corporation

(3) Community Meetings

CCC and JPT selected Ward 8⁴⁷ as the pilot project area where WBA activities of CCC were being carried out since September 2017 with particular focus on “separation at discharge sources”, “introduction of compactors”, and “collection from each household”. The pilot project area, Nasirabad Housing Society and the CCC manager discussed the introduction of compactors and distributed leaflets to residents to request their cooperation. Later, the residents were also requested to cooperate in separation of the waste at discharge source into two categories; “Wet waste” and “Dry waste”. For each apartment house, separation at discharge source was introduced and meetings were held repeatedly to deepen the understanding of the residents. During the Project Phase-2, a pilot project for sorting waste was launched officially in Ward 8 and the Ward was awarded as a 3R model Ward. The WBA model ward was expanded to Ward 27. The community meetings were held 17 times in total during the Project. The results of community meetings are shown in Appendix 10.



Reference: JPT (left photograph taken on December 6, 2019, and right photograph taken on July 17, 2019)

Photo 2-21 Community Meetings in Chattogram City Corporation

⁴⁷ Chattogram City has 6 zones with 41 wards.

2.4.5 Establishment of Waste Management Cell

As a predecessor of WMD, CCC established WMC to reinforce cross-departmental integration of waste management (CCC Office Order dated August 4, 2019). Through WMC, activities for the preparation of the WMD establishment and the waste management improvement were performed. WMC consists of Planning & Community wing⁴⁸, Engineering wing, Public relations wing and Conservancy wing. Composition of WMC is shown in Table 2-28. The WMC meetings were held 8 times in total during the Project.

Table 2-28 Composition of Waste Management Cell in CCC

No.	Role in WMC	Current Position
1	CWMO	Secretary
2	Additional CWMO (Planning and Strategy)	Chief City Planner (CCP)
3	Additional CWMO / Conservancy Officer (Conservancy Division)	Chief Conservancy Officer (CCO)
4	ACWMO (Community and Public Relations)	Public Relations Officer (PRO)
5	ACWMO (Conservancy)	Deputy Chief Conservancy Officer (Deputy CCO)
6	Engineering Division Officer	Superintending Engineer (SE)
7	Engineering Division (Collection and Transport)	Executive Engineer (EE)
8	Engineering Division (Collection and Transport)	Assistant Engineer (AE)
9	Engineering Division (Collection and Transport)	Assistant Engineer (AE)
10	Engineering Division (Vehicle Repair and Maintenance)	Assistant Engineer (AE)
11	Engineering Division (Landfill)	Superintending Engineer (SE)
12	Conservancy Division	CIs and CSs

Reference: Office Order of Chattogram City Corporation (dated on August 4, 2019)

2.5 Output 4: (DNCC, DSCC, and CCC) Establishment of Workshop Management System [Phase-1 & Phase-2]

2.5.1 Overview

Collection vehicles are repaired and managed at three workshops in DNCC, DSCC, and CCC. Under this output the operation and maintenance improvement of these vehicle workshops was conducted. Particularly, in collaboration with the grant aid project⁴⁹, this Project provided introductory instruction on “preventative measures” through daily and periodic vehicle inspections that were effective in avoiding future vehicle failures, as well as preparation of the workshop service regulations and Occupational Health and Safety (hereinafter referred to as “OHS”) rules for workshop staff members. The Project provided 22 training programs in total, which were attended by 503 staff members (mainly drivers and mechanics) of the three CCs. As a result of the training, the number of repairs in CCC decreased from 321 in January 2022 to 252 in March 2022 (reduced by about 30%), and the repair costs also dropped from 320,000 Bangladesh Taka (hereinafter referred to as “BDT”) (about 481,933 Japanese Yen (hereinafter referred to as “JPY”)) in January 2022 to 290,000 BDT (about 436,752

⁴⁸ Including activities of Public Relations and awareness-raising for residents.

⁴⁹ “The Project for Improvement of Solid Waste Management Equipment in the People’s Republic of Bangladesh.” In 2018, 150 waste collection vehicles in total were procured by the grant aid project to Dhaka North City, Dhaka South City, and Chattogram City. Soft component of the grant aid project provided the following assistance: (i) Assistance to facilitate the introduction of compactors and guidance on their safe operation, and (ii) Assistance to the establishment of a sustainable maintenance system.

JPY) in March 2022 (reduced by about 10%). In addition, in March 2022, CCC issued an office order to make the preventive maintenance monitoring sheet an official document to be used at the workshop.

2.5.2 Current State and Issues of Workshop Management

Workshop management was discussed with the persons in charge in each CC. Discussion topics covered the number of registered waste collecting vehicles, current maintenance and management system, division of work duties, and budgets. As a result, current status and issues were identified as shown in Table 2-29.

Table 2-29 Current State and Issues of Workshop Management

CC	Issues
DNCC and DSCC	<ul style="list-style-type: none"> • Management of waste collection vehicles is done by WMD and Engineering Department and there is no authorized vehicle procurement policy in either department. • Job descriptions of workshop staff are unclear and the operation system is inefficient. • Occupational health and safety rules and service regulations are required in consideration of the working conditions of workshop staff. • The operation rate of waste collection vehicle is low because of long repair period once a vehicle breaks down.
CCC	<ul style="list-style-type: none"> • Job descriptions of workshop staff are unclear and the operation system is inefficient. • Occupational health and safety rules and service regulations are required in consideration of the working conditions of workshop staff. • The operation rate of waste collection vehicle is low because of long repair period once a vehicle breaks down. • Human resource development, and in particular training is necessary for specialists of workshop management in order to strengthen the workshop functions.

Reference: JPT

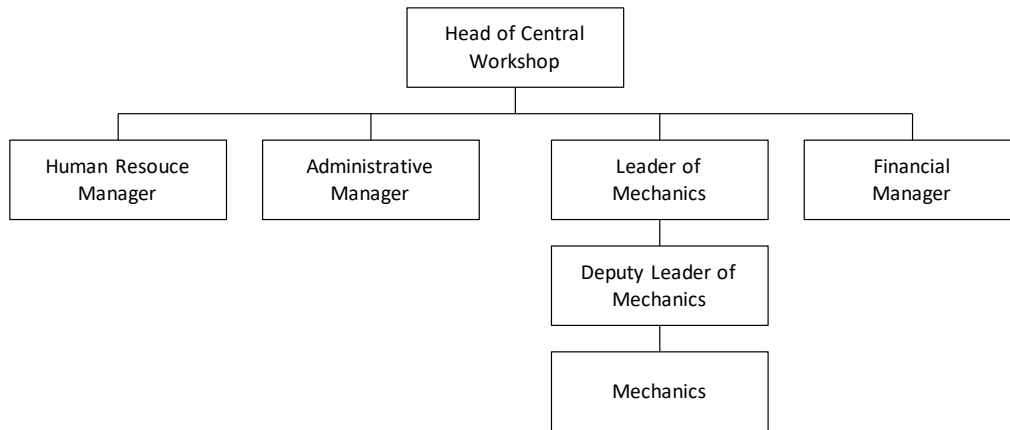
2.5.3 Workshop Management Improvement in Dhaka North and Dhaka South Cities and Chattogram City

(1) Preparation of Comprehensive Workshop Management Plan

The Project prepared a draft comprehensive workshop management plan that included; 1) proposed workshop organization chart and job descriptions, 2) proposed service regulations and OHS Rules for workshop staff members, and 3) workshop operation manual. The developed management plan received the consensus of the relevant departments of the three cities.

(2) Workshop organizational chart (draft) and job descriptions (draft)

The assignment of workshop staff members was basically as shown in the organizational chart in Fig. 2-17.



Reference: JPT

Fig. 2-17 Workshop Organizational Chart (Draft)

The job descriptions (draft) of staff members shown in the above organizational chart are described below.

Head of Central Workshop

- Responsible for all the functions of the workshop (comprehensive responsibility for all the range of job descriptions of the managers).

Human Resource Manager

- Matters regarding personnel management and salaries of staff members in this organization.
- Annual identification of staffing positions requirements for the next fiscal year with the Head of the Central Workshop, and after receiving the necessary approvals from the concerned department(s) of the CC, filling the approved positions following the set administrative procedure.

Administrative Manager

- Matters regarding document management and public property management.
- Matters regarding contracts, article management, liaison and coordination of administrative work and projects, and matters not belonging to other departments.
- Matters regarding training plans for staff members.

Leader of Mechanics

- Matters regarding O&M of waste collection vehicles and landfill heavy equipment.
- Matters regarding repair of waste collection vehicles and landfill heavy equipment, management of repair and spare parts, disinfection work and delivery of materials, and management of articles and materials for work and fuel.
- Matters regarding statistics of work and safety of workers.
- Matters regarding training of staff members and other matters regarding repair work.

Deputy Leader of Mechanics

- Working as an assistant to the Leader of Mechanics. Deputizing for the Leader of Mechanics when the Leader is absent.

Mechanics

- Matters regarding repair of waste collection vehicles and landfill heavy equipment.
- Matters regarding the management of repair and spare parts, disinfection work and delivery of materials, and management of articles and materials for work and fuel.
- Matters regarding statistics of work, the safety of workers, and other matters regarding repair.

Financial Manager

- Matters regarding budget, book closing, and accounting.

(3) Preparation of Occupational Health and Safety Rules and Service Regulations for Workshop Staff Members

1) Occupational Health and Safety Rules

The Occupational Health and Safety Rules included the establishment of a Safety and Sanitation Committee (SSC), establishment and education of safety managers, and introduction of a system for compensation for labor accidents during work. The requirement for suitable protective gear to be used by workshop staff (safety helmets, protective footwear, dust masks, protective gloves, protective goggles, and face shields) was confirmed.

2) Service Regulations

Based on the existing work status, the framework of the Service Regulations was developed as shown below. The Service Regulations shall be prepared based on this framework.

i) Items regarding the services:

- Principles of the Service Regulations
- Submission of curricula vitae
- Staff ID cards
- Time of appointment at a post
- Working record
- Work rules
- Business trip
- What to do when leaving the office
- Notice of absence
- Succession of works
- Resignation
- Accident report
- Emergency measures

ii) Items regarding working hours and recess:

- Objective
- Working hours (days per week)
- Recess
- Working hours of staff members having two or more duties at the same time
- Working hours during work on holidays
- Working hours during work elsewhere than at an ordinary work department
- Working hours during the training period
- Authority of department director in charge

(4) Training on Workshop Management and Rules

Under the soft component of the grant aid project, a work (operation) manual training was held for workshop staff members according to the following schedule:

Table 2-30 Summary of Work (Operation) Manual Training for Workshop Staff Members

	DNCC	DSCC	CCC
Date	Sept. 5, 2018	Sept. 6, 2018	Sept. 11, 2018
Venue	DNCC workshop (Gabori)	DSCC Headquarter conference room	CCC workshop (Sagorika)
Participants	34	15	24
Contents	<ul style="list-style-type: none">▪ Workshop management and rules▪ Occupational health and safety▪ Lectures by officials of each CC's		

Reference: JPT

(5) Introduction of Preventive Maintenance Methods

Guidance training was conducted for introducing preventive maintenance, which is different from breakdown maintenance where repairs are done after a vehicle or heavy equipment breaks down. DNCC and DSCC had already introduced the concept of preventive maintenance through the past assistance project, and both CWMO and EE confirmed their intention to strengthen preventive maintenance in their respective workshops. In DNCC, a training session was conducted for the workshop staff by the SE. In CCC, preventive maintenance was introduced for the first time in a meeting held with the C/P and followed by a training session for the workshop staff.

Preventive maintenance is conducted through daily inspection and periodical inspection. Daily inspection is implemented by the TD, and periodical inspection is done by the ED. If necessary repair work is identified during the daily or periodical inspections that repair work will be implemented either in the workshop or a specialized repair shop outside the workshop.

1) Inspection Contents of Preventive Maintenance

- Daily Inspection: Daily inspection before and after work carried out by vehicle driver.
- Periodical Inspection: Inspection implemented by auto mechanics in the workshop every defined period; weekly, monthly, annual and two-year inspection, or mileage; every 5,000 km or 10,000 km.

2) Steps of Inspection

- The standard interval for replacement of parts is determined on the basis of inspection records, and replacement will be implemented periodically.
- Inspection is based on a check sheet, which includes the previous replacement times.
- Necessity of repair is considered based on the inspection results with reference to a repair record which should be kept for every vehicle being managed in the workshop.
- If it is necessary to repair a vehicle, repair work will be conducted in the workshop or private workshop after the application form, Job card, is filled. Any necessary spare parts will be purchased or procured through the procurement department.
- After the repair work is completed, the description of the repair work and any maintenance or operational requirements resulting from the repair work will be confirmed with the driver.

3) Training for Preventative Maintenance




During Phase-2, the Project provided training on the manual for preventive maintenance to drivers and mechanics of waste collection vehicles belonging to DSCC, DNCC and CCC. Since the training was held during the COVID-19 pandemic, it was divided into several sessions with no more than 25 participants per session. In addition, CWMOs of the three cities requested that the manual should be pocket-size and in Bengali so that drivers and others could carry it with them at all times. Accordingly, the Project prepared a pocket-sized manual as shown in Fig. 2-18 and the training was held using the pocket-sized manual. The implementation summary of the preventive maintenance training is shown in Table 2-31.



Fig. 2-18 Pocket Size Manual for Preventative Maintenance

Table 2-31 Details of Training Programs for Preventative Maintenance

	DNCC	DSCC	CCC
Implementation Period	August 2021 - November 2021	August 2021 - November 2021	September 2021 - January 2022
Number of sessions	6 times	6 times	7 times
Venue	Workshop of DNCC (Gabtori)	Workshop of DSCC (Dhalpur)	Workshop of CCC (Sagorika)
Participants	132	143	155

	DNCC	DSCC	CCC
Photos of training			
Training contents	<ul style="list-style-type: none"> • Explanation of preventative maintenance details • Explanation of preventive maintenance monitoring sheet • Explanation of current vehicle maintenance status 		

Reference: JPT

4) Use of Preventive Maintenance Monitoring Sheet and Improvements in Vehicle Maintenance

Daily and weekly vehicle inspections are important for preventive maintenance. The details and importance of the monitoring sheet for these inspections were explained to drivers and mechanics during the training. Drivers and mechanics commenced using monitoring sheets from the following month after the training. Table 2-32 and Table 2-33 show the status of their use.

The monitoring sheet was being used less and less on a monthly basis. The Project discussed with CWMOs making the monitoring sheet an official document and penalizing drivers and mechanics who did not use them. CCC decided to make the monitoring sheet an official document in March 2022. DSCC and DNCC were considering this matter. It was estimated that use of the monitoring sheet would increase once the monitoring sheet was became an official record. The status of vehicle maintenance after the training is shown in Table 2-34, where the number of repairs in CCC decreased from 321 in January 2022 to 252 in March 2022 after the training (reduced by about 30%), and the repair cost fell from 320,000 BDT (approximately 481,933 JPY) in January 2022 to 290,000 BDT (approximately 436,752 JPY) in March 2022 (reduced by about 10%).

Table 2-32 Usage of Monitoring Sheets (DNCC and DSCC)

Name of City	Number of Target Persons	1 st Submission (December 2021)	2 nd Submission (January 2022)	3 rd Submission (February 2022)	4 th Submission (March 2022)
DNCC	132	101 (77%)	91 (69%)	76 (58%)	74 (50%)
DSCC	143	83 (58%)	78 (55%)	47 (33%)	70 (49%)

Numbers in parentheses represent submission rates.

Reference: JPT

Table 2-33 Usage of Monitoring Sheets (CCC)

Name of City	Number of Targets	1 st Submission (January 2022)	2 nd Submission (February 2022)	3 rd Submission (March 2022)
CCC	155	107 (69%)	91 (59%)	95 (61%)

BDT1 = JPY 1.506040 (as of May 2022)

Reference: JPT

Table 2-34 Status of Vehicle Maintenance After Training

CC	January 2022		February 2022		March 2022	
	Cost	Frequency	Cost	Frequency	Cost	Frequency
CCC	3,200,000	321	3,000,000	298	2,900,000	252

Reference: JPT

5) Workshop Operation and Management Manual for DNCC, DSCC and CCC

Based on the “Workshop Management Rules, Safety and Sanitation Working Rules” and the “Preventative Maintenance Manual for Waste Collection Vehicles and Workshop Management”, the “Workshop Operation and Management Manual for DNCC, DSCC and CCC” was prepared for use in internal training at the workshops (Appendix 13).

2.6 Output 5: (LGD) Holding of SWM Information Exchange Meetings [Phase-1 & Phase-2]

2.6.1 Overview

DNCC and DSCC are the two cities where the most advanced SWM activities are conducted in Bangladesh. In other cities, where economic development and population growth are progressing, a comprehensive SWM system and earnest efforts for SWM similar to DNCC and DSCC are urgently required. The SWM Information Exchange Meetings were held to provide the opportunity for the 12 CCs⁵⁰ nationwide to share knowledge and experiences, construct a network for information exchange and support each other, and discuss the future prospects of SWM throughout Bangladesh. During the Project, a total of three waste management information exchange meetings were held, with a total of 220 participants. At the meetings, participants actively discussed the important issues for consideration in the immediate future, such as the introduction of Eco-Town and WtE, 3R promotion, medical waste management, and waste management rules. At the 3rd meeting, the participants recognized the importance of such information exchange meetings, and LGD announced that the meetings would continue to be held even after the completion of the Project.

2.6.2 Activities Related to SWM Information Exchange Meetings

Prior to the first SWM Information Exchange Meeting⁵¹, JPT visited Narayanganj City (hereinafter referred to as “NCC”) and Gazipur City (hereinafter referred to as “GCC), two cities adjacent to DNCC and DSCC, to survey and provide advice on the interests and needs of CCs at the Information Exchange Meeting, status of affairs elsewhere than at the target CCs of this Project, and possibility of wide-area waste treatment in the future. Both the two CCs exhibited a keen interest in the Information Exchange Meeting and expressed an intention to improve SWM in their own areas, making the most of experiences in DNCC and DSCC. CWMO of DNCC accompanied JPT on the visits to the two CCs, and explained to the officials there on the importance of having a WMD and a landfill management department, effects of establishing the WMD Directives, introduction of

⁵⁰ There are 12 City Corporations (CCs) in Bangladesh. The numbers of CCs will increase in the future.

⁵¹ Although SWM Information Exchange Meetings have been held in the past, the number of meetings held during the Project period is shown here.

WBA and awareness-raising of residents, examples of DNCC, etc. The following summarizes the discussions with the two CCs.

Table 2-35 Overview of Survey on SWM States in other CCs

CC	Date	Contents
Narayanganj City Corporation (NCC) (709,381 capita)	October 14, 2018 October 31, 2018	<p><u>Current state</u></p> <ul style="list-style-type: none"> • Although WMD had not been established yet, an organization chart and a proposal for WMD establishment was submitted to LGD. • There was no formal landfill designated by NCC yet. At each factory or settlement, waste was dumped randomly in vacant lots and at roadsides on a daily basis. • Factory effluent was constantly discharged to rivers, causing serious water pollution. <p><u>Advice from the study team</u></p> <ul style="list-style-type: none"> • Establishment of a landfill management team (to be included in the organization chart) • Preparation of WMD Directives • Introduction of WBA (particularly ward SWM offices and awareness-raising of residents) <p><u>Measures to be taken in the future by NCC</u></p> <ul style="list-style-type: none"> • Implement WBA on a pilot basis in Ward 13, the largest populated ward. • Obtain advice from DNCC regarding the establishment of ward SWM offices and landfills. • Acquire the organization chart and the Master Plan for reference from DNCC.
Gazipur City Corporation (GCC) (about 4,000,000 capita)	November 20, 2018	<p><u>Current state</u></p> <ul style="list-style-type: none"> • GCC had a large population and was one of the major cities in Bangladesh. • Although WMD had been established, no sufficient activities were conducted due to a serious shortage of personnel, equipment, and budget. Apart from CWMO, there was only one ACWMO, one CI, and five supervisors in addition to cleaners. • Mechanical Division (MD) owned collection vehicles and WMD specified collection points. There were no compactors. • There was no formal landfill designated by GCC yet. Roads and land owned by other ministries and agencies were used as waste dumping sites. • There was a large amount of industrial waste. Chemical waste accounted for approximately 10% of industrial waste amount. <p><u>Advice from the study team</u></p> <ul style="list-style-type: none"> • Establishment of DPP for fundraising
Jashore City Corporation (JCC) (298,000 capita)	January 29, 2020	NDCC and JPT visited Jashore City to share information on waste management in general and to inspect the new landfill site and composting plant supported by the Asian Development Bank (ADB).

*ACWMO: Assistant Chief Waste Management Officer, ADB: Asian Development Bank, CI: Conservancy Inspector, CWMO: Chief Waste Management Officer, DPP: Development Project Proposal, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, JPT: JICA Project Team, MD: Mechanical Division, WBA: Ward-based Approach
Reference: JPT

2.6.3 First SWM Information Exchange Meeting

On December 2, 2018, the First SWM Information Exchange Meeting⁵² was held. Table 2-36 shows a summary of the meeting. This was the first meeting during the Project where CCs shared information on SWM. From all CCs, SWM senior officials participated in the meeting and engaged in active debate. LGD hosted this meeting. JPT provided LGD with various support for holding the meeting. The results of the meeting were summarized in the proceedings of the First SWM Information Exchange Meeting (Appendix 14-(1)).

Table 2-36 Summary of the First SWM Information Exchange Meeting

Date	December 2, 2018 10:00 – 16:00 (AM: meeting, PM: Site tour)
Venue	National Institute of Local Government (NILG) ¹
Participants	Total of 30 <ul style="list-style-type: none"> • Bangladesh side: 3 from LGD, 1 from LGED, and 2 from NILG • 12CCs: 14 • Japanese side: 3 from JICA, 2 from C4C Project², 5 from JPT
Contents	<p><u>Meeting (Facilitator: CWMO of DNCC)</u></p> <ul style="list-style-type: none"> • Waste Management in DNCC and DSCC • WBA activities and WMD • Landfill site management <p><u>Site tour (DNCC area)</u></p> <ul style="list-style-type: none"> • Ward SWM office of DNCC (Ward 9): Briefing about the office management and WBA activities • Amin Bazar Landfill Site: Briefing about the facilities and landfill management
Remarks	<ul style="list-style-type: none"> • The preparation was done in support with a JICA expert stationed at LGD and C4C Project. • Transportation and other costs were borne by each CC.

1 NILG, located in Dhaka North City, is a training center for local government officers under LGD.

2 C4C Project, the Capacity Development of City Corporation Project, is JICA's ongoing project.

*CI: Conservancy Inspector, CWMO: Chief Waste Management Officer, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, LGED: Local Government Engineering Department, Ministry of Local Government, Rural Development and Co-operative, NILG: National Institute of Local Government, JPT: JICA Project Team, WBA: Ward-based Approach

Reference: JPT

In the meeting, it was discovered that only 3 of the 12 CCs, namely DNCC, DSCC and GCC had established WMDs responsible for comprehensive SWM such as landfill management, 3R, and waste reduction in their CCs. Nine (9) CCs had only Conservancy Departments. Many CCs recognized the necessity of a department devoted to implementing SWM such as WMD. Some CCs were discussing with LGD about establishing a new WMD. At the end of the meeting, it was agreed to construct an SNS group, hold a SWM conference to include experts, and continue holding the 12CC SWM information exchange meetings. In fact, an LGD-hosted meeting on SWM was already held several times after the first meeting.

It is ideal that a meeting such as this one will continue even after the completion of this Project and become established while fostering a relationship of collaboration between the CCs, and together with universities and

⁵² Although SWM Information Exchange Meetings have been held in the past, the number of meetings held during the Project period is shown here.

private companies. Based on the result of the meeting, JPT resolved to hold further meetings during the Project to provide a place for sharing best practices and information among CCs while respecting the autonomy of the Bangladeshi counterparts and emphasizing that future continuation of such meetings would in principle depend on the initiatives of the concerned Bangladeshi organizations.

2.6.4 Second SWM Information Exchange Meeting

On February 23, 2020, the Second SWM Information Exchange Meeting was held. Table 2-37 shows a summary of the meeting. Not only 12 CCs but also Jassore which constructed an intermediate treatment facility with the support of Asian Development Bank (hereinafter referred to as “ADB”) and Cox’s Bazar which constructed a landfill site with support from United Nations Development Program (hereinafter referred to as “UNDP”) joined the meeting. Current situation, issues and future plans of waste management were shared and actively discussed. In addition, the Minister of LGD joined the opening session and JPT explained the overview of Master Plan. The results of the meeting were summarized in the proceedings of the Second SWM Information Exchange Meeting (Appendix 14-(2)).

Table 2-37 Summary of the Second SWM Information Exchange Meeting

Date	February 23, 2020 10:00 – 16:25
Venue	Centre on Integrated Rural Development for Asia and Pacific (CIRDAP), Dhaka
Participants	Total of 70 <ul style="list-style-type: none"> • Bangladesh side: 3 from LGD, 5 from LGED, and 1 from NILG, 1 from PID, 1 from Dhaka University, 30 from all 12 CCs, 3 from Municipalities • Japanese side: 3 from JICA, 13 from C4C Project¹, 10 from JPT • Others: 10 from media
Contents	<p><u>First Session (Opening session joined by the Minister of LGD)</u></p> <ul style="list-style-type: none"> • New Clean Dhaka Master Plans 2018-2032 in DNCC and DSCC • Explanation of the New Master Plan and hand-over to the Minister of LGD <p><u>Second Session (Information sharing on policy and institutional development)</u></p> <ul style="list-style-type: none"> • Importance of decentralizing waste management governance system <p><u>Third Session (Information sharing on the current situation of activities and issues of waste management)</u></p> <ul style="list-style-type: none"> • The establishment of network for waste management among the relevant organizations was proposed to share the information, issues and practices of waste management regularly.

¹ C4C Project, the Capacity Development of City Corporation Project, is JICA’s ongoing project.

* CCs: City Corporation(s), LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, LGED: Local Government Engineering Department, Ministry of Local Government, Rural Development and Cooperatives, NILG: National Institute of Local Government, JPT: JICA Project Team, PID: Press Information Department

Reference: JPT

In the information sharing sessions among CCs, it was reported that large and middle-sized CCs were facing difficulties in developing and managing landfill sites, while small-sized CCs were struggling with waste collection issues. In addition, almost all the CCs pointed out that waste reduction was the priority issue. In response to these problems, JPT explained that decentralization of the waste management governance system was essential for the improved functioning of public services and administrative tasks related to waste

management, and that the establishment and strengthening of WMD together with introduction of WBA were the basis for this decentralization. After the meeting, a group of the meeting participants was created on an SNS format (WhatsApp) to share information.

2.6.5 Third SWM Information Exchange Meeting

On March 20, 2022, the Third SWM Information Exchange Meeting was held. Table 2-38 shows a summary of the meeting. This meeting was held under the COVID-19 pandemic, and not only the Minister of LGD but also the Ambassador of Japan to Bangladesh joined as special guests. In addition to representatives from the 12 CCs, other organizations deeply involved in waste management such as DOE and Bangladesh Power Development Board (hereinafter referred to as “BPDB”) were invited to this meeting to share their activities on waste management. The results of the meeting were summarized in the proceedings of the Third SWM Information Exchange Meeting (Appendix 14-(3)).

Table 2-38 Summary of the Third SWM Information Exchange Meeting

Date	March 20, 2022 10:00 - 16:00
Venue	Centre on Integrated Rural Development for Asia and Pacific (CIRDAP), Dhaka
Participants	<p>Total of 107</p> <ul style="list-style-type: none"> • Bangladesh side: 11 from Local Government Division, Ministry of Local Government, Rural Development and Cooperatives (LGD), 1 from Local Government Engineering Department, Ministry of Local Government, Rural Development and Cooperatives (LGED), 4 from Bangladesh Power Development Board (BPDP), 2 from Department of Public Health Engineering (DPHE), 1 from Press Information Department (PID), 1 from Department of Environment, Ministry of Environment, Forest and Climate (DOE), 1 from Sustainable and Renewable Energy Development Authority (SREDA), 31 from 12 City Corporations (12 CCs) • Japan side: 2 from Embassy of Japan, 5 from JICA, 4 from C4C project¹, 5 from JICA Project Team (JPT) • Others: 39 from NGO and media
Contents	<p><u>First Session (Opening session joined by Minister of LGD and the Ambassador of Japan to Bangladesh)</u></p> <ul style="list-style-type: none"> • Explanation of the New Master Plan and hand-over to the Minister of LGD • Explanation of the Waste Management Regulation 2021 by the Department of Environment, Ministry of Environment, Forest and Climate (DOE) <p><u>Second Session (Information sharing on the current situation of activities and issues of 12 CCs)</u></p> <ul style="list-style-type: none"> • It was proposed by LGD that a Social Networking Service (SNS) group would be used to share information, including activity reports from each CC, and that an information exchange meeting would be held annually to consolidate annual reports in accordance with the Waste Management Regulation 2021.

¹ C4C Project, the Capacity Development of City Corporation Project, is JICA's ongoing project.

* BPDP: Bangladesh Power Development Board, CC: City Corporation, CIRDAP: Centre on Integrated Rural Development for Asia and Pacific, DOE: Department of Environment, Ministry of Environment, Forest and Climate, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, LGED: Local Government Engineering Department, Ministry of Local Government, Rural Development and Cooperatives, JPT: JICA Project Team, PID: Press Information Department, SNS: Social Networking Service, SREDA: Sustainable and Renewable Energy Development Authority

Reference: JPT

In the opening session of the meeting the latest information on waste management was shared: JPT explained the New Master Plan approved in February 2022, and DOE outlined the Waste Management Regulations established in December 2021. In the session for information sharing among CCs, the CCs decided to introduce WtE shared information within the status of their activities, and several CCs reported about the disposal of medical waste which had increased due to COVID-19. Many other new activities were also reported, including waste management using digital technology such as the introduction of surveillance cameras to prevent illegal dumping and digitization of bins' locations information, waste collection at night, and the construction and closure of disposal facilities.

2.6.6 Impact of SWM Information Exchange Meetings and Identified Support Needs

SWM Information Exchange Meetings had a strong impact in increasing interaction and mutual support among the officers in charge of waste management. Narayananj City, Gazipur City, Comilla City and Rangpur City requested support on waste management under COVID-19 pandemic conditions, and approximately 46,000 leaflets for public awareness were provided to them. The identified support needs for local municipalities included establishment of Master Plans and improvement of medical waste management. The details of the impacts of SWM Information Exchange Meetings and identified support needs have been summarized separately (Appendix 4).

2.7 Output 6: (DNCC and DSCC) Public Relations and Public Awareness [Phase-1 & Phase-2]

2.7.1 Overview

WMD have done very little work on systematic public relations and awareness-raising activities mainly owing to having no staff members in charge of public relations and public awareness⁵³. The New Master Plan includes intermediate treatment which is very costly in terms of project development and will require securing a high budget for operation and management. Therefore, it is vital for the CCs to deepen people's understanding of waste management, and to effectively promote public relations and awareness-raising to work together with residents. Hence, JPT repeatedly discussed with CWMO and the PRD of the CC on the needs to strengthen media relations and public disclosure of the New Master Plan in Phase 1 of the project in order to develop the foundation for public awareness raising. In Phase 2, the project proceeded with information disclosure and implemented various public relations activities based on a public relations and awareness plan (draft), and organized a group in charge of planning and implementing these activities. The public relations and awareness plan was initially prepared in line with a nationwide one-year public awareness campaign "Clean Village, Clean City" that the Government of Bangladesh planned to start from March 2020⁵⁴; however, owing to the COVID-19 pandemic, the campaign was postponed indefinitely. Although somewhat impacted by the fact that activities such as community meetings and mass gatherings have been restricted under COVID-19 conditions, various

⁵³ Staffing rate to approval posts for Waste Management Department (WMD) is as follows: DNCC 50% (Approved posts: 257, Staff working in WMD: 128), DSCC 31% (Approved posts for WMD: 352, Staff working in WMD: 108)

⁵⁴ The Prime Minister's Office issued a letter to LGD on September 18, 2019, to request and supervise each local government to prepare and implement an action plan for public awareness campaign "Clean Village, Clean City".

public relations and awareness activities, suitable for these conditions were actively implemented; with preparation and disclosure of annual waste management report; development and broadcasting of 5-episode educational documentary series (TV audience rating: 27%); and development and broadcasting of a public awareness TV spot for river clean-up (viewer on TV: 4.58 million in total, viewer on YouTube and Facebook: 673,000 (as of April 2022)). The public relations and awareness plan also incorporated an annual budgeting plan and establishment of the public relations and awareness group (DNCC: PR Planning Team, DSCC: PR Planning Taskforce) in order to provide a stable organizational structure for public relations and awareness, and confirmed that promotion of public relations and awareness activities was an important WMD strategy for SWM. In addition, DNCC appointed a WMD staff in charge of community awareness during the project period. It can be safely said that both CCs recognition of the importance of public relations and awareness on waste management has been increasing.

2.7.2 Current State of Public Relations in SWM Sector

At the start of the Project, it was clear that all the stakeholders concerned with SWM such as the WMD staff, the residents themselves, and related organizations recognized the importance of public relations and awareness-raising. On the other hand, the public relations activities in each WMD at the time consisted only of community awareness-raising conducted by CIs through WBA at the field level and irregular activities conducted by WMD at the CC level. No strategic public relations and awareness-raising activities for SWM were being conducted. Therefore, it was decided to work within the present framework of public relations and awareness-raising activities implemented at the two CCs level in the short term, and not wait for support from other governmental organizations or develop new institutional structure within WMD which would be promoted in the long term. The immediate focus of DNCC and DSCC would be on the following points:

- Construction of a system that enables spontaneous planning and implementation of public relations and awareness-raising activities in the SWM sector,
- Promotion of strategic public relations and awareness-raising activities with an eye toward the future, and
- Active information provision to residents and improvement of the information disclosure system

2.7.3 Capacity Development of WMD Staff

To allow WMD staff to acquire basic knowledge on public relations and awareness-raising activities for creating the Master Plan and promoting the plan’s contents, JPT delivered a lecture and held discussions on public relations and awareness-raising activities at the following WBA Core Group meetings:

Table 2-39 Lectures on Public Relations and Awareness Raising for WMD staffs

CC	Date	Contents
DSCC	October 24, 2018	<ul style="list-style-type: none"> • Principles of PR and public awareness-raising • Gaps in PR and awareness-raising for CC’s proper SWM • Measures (the necessity of PR and public awareness-raising in line with the Master Plan)
DNCC	October 28, 2018	
DSCC	November 19, 2019	<ul style="list-style-type: none"> • Explanation on the public relations and awareness plan (draft) based on the “Clean Village, Clean City” initiative

CC	Date	Contents
DNCC	December 12, 2019	<ul style="list-style-type: none"> · Explanation on the public relations and awareness plan (draft) based on the “Clean Village, Clean City” initiative · Report from CI on the environmental education program at the Japanese School

Reference: JPT

2.7.4 Collaboration with Public Relations Department (PRD)

In each of DNCC and DSCC, there is a PRD which conducts public relations and awareness-raising activities for all services provided by the city. In the public relations activities in the SWM sector also, collaboration and cooperation with PRD are exceedingly important. The Master Plan calls for establishing a Public Awareness Planning Section (hereinafter referred to as “PAPS”) in WMD. Under these circumstances and prior to the establishment of a PAPS, this Project established a PR committee in the SWM sector while involving PRD and other related departments, to examine policies and make plans on CC-level awareness-raising, information disclosure, and media relations in SWM sector, and implement an organizational system to proceed with the public relations and awareness-raising activities in the SWM sector.

In connection with the establishment of the PR committee, discussions were held with PRD during the Project Phase-1 on preparation of a draft notification to set up the committee as well as the plan for human resources for the committee. It was decided that the committee should include not only WMD but also other departments, and that the approval by Mayor was necessary to establish the committee. In DNCC, ACWMO was appointed in January 2021 to be in charge of public awareness for community and to strengthen the organization for PR and public awareness. Hence the PR Planning Team led by ACWMO was established instead of establishing a new committee. In DSCC, a PR Planning Taskforce was launched in collaboration with the WBA Core Group.

2.7.5 Public Relations Activities at the City Corporation Level

(1) Preparation of Public Relations and Awareness-Raising Plan (Draft)

At the start of the Project the WMD post of ACWMO (Community) in charge of public relations and awareness-raising was vacant in both DNCC and DSCC, and therefore no actions were being implemented in a systematic way. As mentioned earlier, ACWMO of DNCC was finally appointed in January 2021 and the system for SWM was strengthened. However, except for public relations and occasional awareness-raising campaigns held by WMD, the activities were being conducted only by PRD, WMD staff and CIs independently. In order to coordinate and expand these irregular and independent efforts, the public relations and awareness-raising plan (draft) for promoting CC-level SWM was prepared. The plan was based on the Master Plan while also taking into account the conventional awareness-raising activities conducted so far by WMD. The plan was expected to create a strategic and more effective system of public relations and awareness-raising activities and promote the systematic activities it had identified.

It is required to build a relationship of trust between the CC and residents to create changes in the residents’ behaviors, which occur in units of years. One of the reasons that the residents do not discharge waste properly

is their dissatisfaction with the services provided by the CC. Another reason is that they probably do not understand the following basic information:

- Relationship between SWM including the collection service provided by the CC and their manner of waste discharge,
- Negative impact of improper SWM,
- Roles and efforts of the CC in SWM, and
- High cost required for suitable SWM.

In addition, it is important that residents understand that the CC is facing the following urgent issues:

- Expanded service area due to the expanded city area,
- Higher amount of generated waste due to economic development and population growth, and
- Shortage of landfill space (with a remaining useful life of a few years)

An Annual Activity Plan (draft) regarding public relations and awareness-raising was prepared through discussion with the WMD, PRD, and WBA Core Group members in consideration of the above issues.

(2) Activities of PR and Public Awareness based on the Plan of PR and Public Awareness

The following activities were conducted based on the draft plan of PR and public awareness on SWM and the implementation plan of “Clean Village Clean City Initiative”, one of the public awareness campaigns. As a result of these activities, in addition to raising residents’ awareness on SWM, the CC officers in charge of public awareness were officially assigned. The results of PR in the prevention of COVID-19 is shown in Appendix 8-(1).

- Preparation of Environmental Education Manual and implementation of training programs for CI (Attachment 16)
- Release of an educational TV documentary series (5 episodes, audience rate: 27%) (Attachment 17-(1))
- Release of short movies for public awareness on sorting waste (Attachment 17-(2))
- Release of TV spots of public awareness for river clean-up (Viewer on TV: 4.58 million, Number of views on YouTube and Facebook: approximately 673,000 views (as of May 2022)) (Attachment 17-(3))
- Publication of newspaper articles for local governments (25 articles, from June 2020 to February 2022)
- Preparation of Annual Waste Report (Publicly available on each city's website) (Attachment 18)

<p>Waste Report 2019-20 DHAKA NORTH CITY CORPORATION WASTE MANAGEMENT DEPARTMENT</p>	<p>ENVIRONMENTAL EDUCATION MANUAL Technical Support: JICA Solid Waste Management Project Team</p>	<p>Let's stop throwing garbage into the canals and build a habitable Dhaka.</p>
<p>Annual Waste Report of North Dhaka City Corporation (2019-2020)</p>	<p>Environmental Education Manual for CI</p>	<p>TV spot to raise public awareness of canal clean-up</p>

Reference: JPT

Fig. 2-19 Tools and Manuals for PR and Public Awareness

<p>Clean-up Campaign by Mayor of DNCC (Mayor of DNCC is in the center of the left photo) (the left photo taken on October 23, 2021 and the right photo taken on March 31, 2021)</p>	
<p>Signboard to ban littering waste to rivers prepared by the Project (the left photo taken on September 30, 2021 and the right photo taken on February 28, 2021)</p>	

Reference: JPT

Photo 2-22 Clean-up Campaign by Mayor of DNCC

1) Development of Environmental Education Manual and training

As part of the “Clean Village, Clean City” campaign, the environmental education program at elementary schools was scheduled to start from March 2020. However, owing to COVID-19 restrictions, all schools in Bangladesh were temporarily closed⁵⁵. JPT therefore prepared the Environmental Education Manual together with knowledgeable CIs who had experience on environmental education, so that any CIs of DNCC and DSCC would be able to implement the environmental education by themselves when the schools reopened. The manual was distributed to CIs of DNCC and DSCC and zone-level training courses were held.

2) Release of an educational TV program (5 episodes, TV audience rate: 27%)

The 22-minute TV program series on public relations and awareness of waste management for DNCC and DSCC were developed with the following themes.

Theme 1: Footprint of Clean Dhaka – History of Clean Dhaka

Theme 2: Development of Master Plan

Theme 3: Citizens’ Cooperation through WBA

Theme 4: Solid Waste Management Technology – Landfill Sites and Waste-to-Energy

Theme 5: Waste Management Policy in Bangladesh

The program consisted of interviews with not only the C/P of the project but also a variety of people from DoE, NGOs, universities, lawyers, and senior JOCV, while discussing with a review committee organized in DNCC and DSCC. The program was broadcast on RTV, one of the major TV stations in Bangladesh, from December 25 for 5 consecutive days, late in the afternoon when relatively high viewer rate was expected. The program advertisement was posted on Facebook page a few days before the broadcast. As a result, the TV audience rate was 27% in total for the 5 episodes which represented a relatively high viewer rate for a documentary program compared with the audience rate of regular TV drama airing during peak time. The program was posted on Facebook pages of DNCC and DSCC, JICA Bangladesh, and JPT, and distributed with DVD to other CCs for their training use.

3) Release of a short movie for public awareness for sorting waste

As one of the public awareness tools for the waste segregation pilot project, a short movie was developed with the community people at Lane-28, DSCC where the pilot project was being implemented (short version: 1 min, long version: 5 min). This short movie was used for community meetings of the waste segregation pilot project, and also the QR code of the movie was attached on the waste segregation leaflet.

4) Release of a TV spot on public awareness for river clean-up

As requested by DNCC and DSCC, a TV spot on public awareness raising for river clean-up was developed to support the two CCs’ canal cleaning activities, and released in August 2021 for a one-month public awareness

⁵⁵ The school closure in Bangladesh had been gradually lifted since September 2021. However, owing to the Omicron variant of COVID19, the closure again intermittently continued until February 2022.

campaign on TV, 2 times a day, and on social media as a boosting post. The total viewer number reached 4.58 million on TV, and 673,000 on YouTube and Facebook (as of September 2021). Together with the TV spot, posters, stickers, and billboards for no waste discharge and littering into rivers were prepared and used at the CC’s community awareness campaigns.

5) Publication of newspaper articles for local governments

Articles of the project activities were published on newspapers for local governance, “Shololar Kotha” and “JIGO Newsletter” in total 25 times (from June 2020 to February 2022) in order to promote understanding on the project activities and as reference for other local governments’ waste management activities.

6) Preparation of Annual Waste Report

The CC’s annual waste reports were prepared as one of the public relations tools, to enhance citizens’ understanding on waste management. DNCC and DSCC prepared their annual waste reports 2017-2018 by themselves, but DSCC was not able to disclose the document. JPT supported preparation of the annual reports 2018-2019 for both DNCC and DSCC, and the annual reports 2019-2020 for DNCC, DSCC and CCC. The reports were available to the public on each CC’s website.

(3) Disclosure of the New Master Plan

Based on DNCC and DSCC discussion with LGD, during the Project Phase-1, the implementation plan for disclosure of the New Master Plan was established. Disclosure of the New Master Plan was limited to the relevant organizations. During Phase-2, after the approval of the New Master Plan by LGD, it was opened to the public on the websites of Dhaka North and Dhaka South City Corporations in March 2022.

1) Limited Disclosure to Relevant Organizations and Public Comments

During the Project Phase-1, the following organizations were consulted regarding the New Master Plan (Table 2-40) using the Master Plan summary (Draft) report.

Table 2-40 Information Disclosure on the New Master Plan (DNCC and DSCC)

	Organization	Date	Content
Government organization	Department of Environment, Ministry of Environment, Forest and Climate Change (DOE)	(1) August 14, 2018 (2) August 7, 2019	(1) Overview of the Project and the draft Master Plan (2) Consultation for the overview of the draft Master Plan
	Urban Management, Local Government Engineering Department (LGED)	(1) August 14, 2018	(1) Overview of the Project and the draft Master Plan
	Embassy of Japan in Bangladesh	(1) July 4, 2018 (2) March 5, 2019	(1) Overview of the Project and the draft Master Plan (2) Current situation of SWM in DNCC and DSCC, and Eco-town concept

	Organization	Date	Content
	Ministry of Health	(1) August 2019	(1) Consultation for the overview of the draft Master Plan
International financial agencies	World Bank (WB)	(1) December 2, 2018 (Bangkok) (2) April 7, 2019 (DNCC) (3) May 31, 2019 (Tokyo) (4) August 2019	(1)(2)(3): Overview of the Project and the draft Master Plan (4) Consultation for the overview of the draft Master Plan
	Asia Development Bank (ADB)	(1) January 28, 2019 (TV conference)	(1) Overview of the Project and the draft Master Plan
NGO	Environmental and Social Development Organization (ESDO)	(1) August 16, 2018	(1) Overview of the Project and the draft Master Plan
	Practical Action Bangladesh (PAB)	(1) August 16, 2018	(1) Overview of the Project and the draft Master Plan
	World Vision	(1) December 5, 2018	(1) Overview of the Project, Ward-based Approach (WBA) and the draft Master Plan
Others	Bangladesh University of Engineering and Technology (BUET)	(1) August 6, 2019	(1) Consultation for the overview of the draft Master Plan

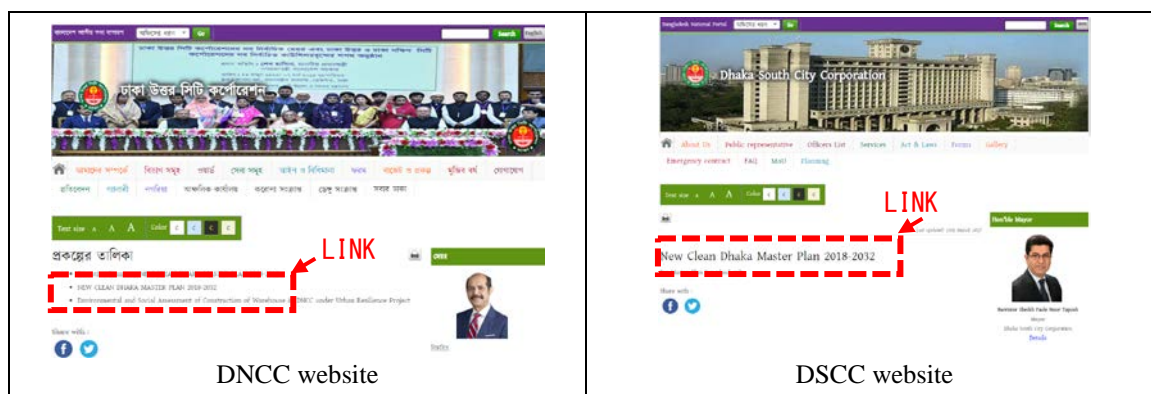
* ADB: Asia Development Bank, BUET: Bangladesh University of Engineering and Technology, DOE: Department of Environment, Ministry of Environment, Forest and Climate Change, LGED: Local Government Engineering Department, WB: World Bank
Reference: JPT

2) Publication of the overview of the draft Master Plan

A booklet providing an overview of the draft Master Plan was published in English and Bengali and distributed to the stakeholders in Phase-1. In Phase 2, the summary document of the Master Plan was prepared for public disclosure, and distributed to participants in the SWM information sharing meeting.

3) Public Disclosure of the Master Plan

After the Master Plan approval by LGD in February 2022, both DNCC and DSCC uploaded the Master Plans on their websites for public viewing.



Reference: DNCC & DSCC website (accessed on April 24, 2022)⁵⁶

Fig. 2-20 Website of the Master Plan Disclosure

4) Press Conference

The New Master Plan was approved in February 2022, and it has been confirmed with CWMOs of both CCs that WMD and PRD will hold a press conference together to announce the New Master Plan. The press conference implementation plan is shown in Table 2-41. The content of this plan has been determined through discussion with WMD and PRD.

Table 2-41 Press Conference Implementation Plan

Objectives	<ul style="list-style-type: none"> - The draft Master Plan disclosed to the media representatives - Promotion of CC's efforts on SWM to the media and citizens - Comment exchange for Dhaka's healthy future - Cooperation building with mutual understanding
Date	To be determined (After approval of the Master Plan by LGD)
Place	DNCC and DSCC
Implementation	<ul style="list-style-type: none"> - Planning and facilitation: WMD and PRD - Presentation: Mayor, CEO, CWMO
Participants	- Media representatives
Contents	<ul style="list-style-type: none"> - Presentation <ul style="list-style-type: none"> i. Summary of the Master Plan ii. Issues on SWM and future plan - Questions and answers session
Remark	- Send an invitation letter to each media agencies

Reference: JPT

(4) Collaboration with Japanese School

A site tour to Amin Bazar LFS and Ward office (Ward 12) was arranged for teachers at Japanese School of Dhaka, a total of 13 participants, as well as the ward office visit at Ward 19 in DNCC on July 31, 2019. In addition, environmental education classes on SWM were held at the school with a demonstration of the

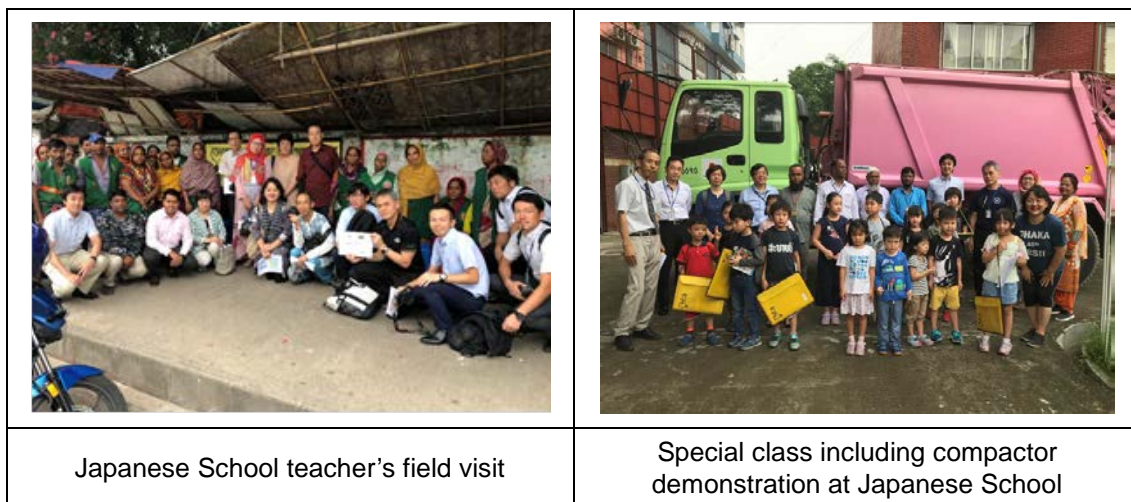
⁵⁶ DNCC website

(http://www.dncc.gov.bd/sites/default/files/files/dncc.portal.gov.bd/project/15c19c7b_3028_45cf_84d1_f8096e95eabd/2022-03-02-09-56-054bad8bb2b11fce6560d9cc181babe3.pdf, accessed on April 24, 2022)

DSCC website

(http://dsccl.portal.gov.bd/sites/default/files/files/dsccl.portal.gov.bd/page/2e47d9dc_77a3_40c9_a095_7ff6d98c2b98/2022-03-15-12-22-b0904d34a281d77a58279e62b4c665d8.pdf, accessed on April 24, 2022)

compactor operation on July 16, 2019.

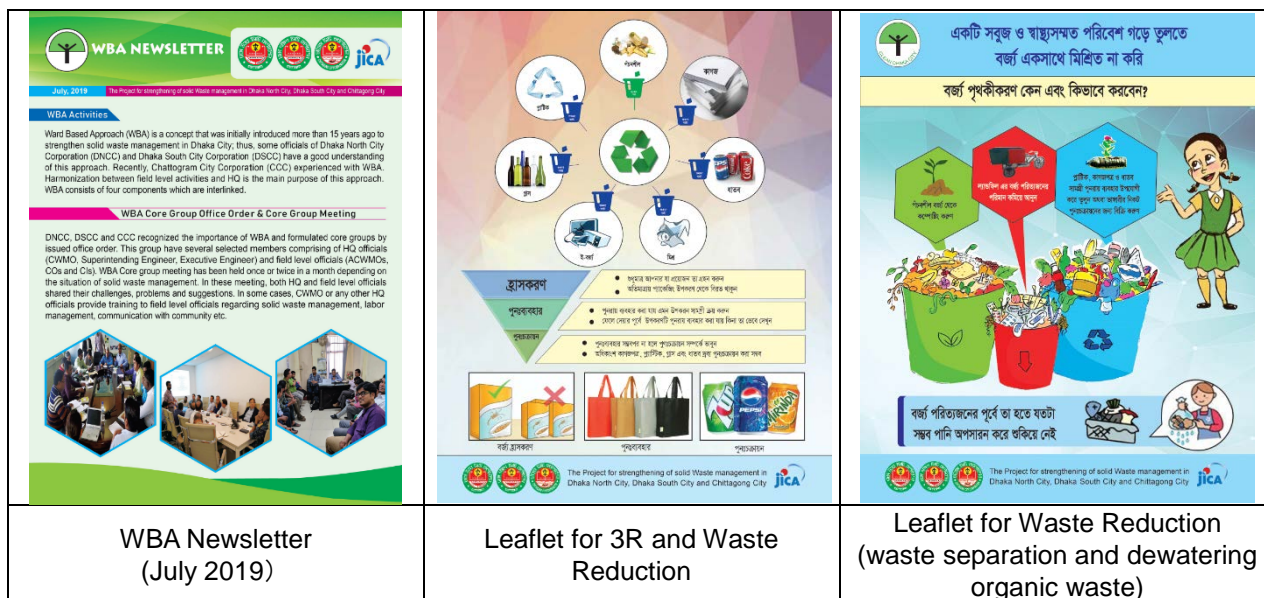


Reference: JPT (left photograph taken on June 15, 2019, right photograph taken on July 16, 2019)

Photo 2-23 Environmental Education Class at the Japanese School of Dhaka

(5) Creation of WBA Newsletter and 3R and Waste Reduction Promotion Leaflet

A newsletter for public relations and promotion/awareness-raising of WBA activities and leaflets for promotion of 3R and waste reduction were prepared. Activities with these public awareness tools are detailed in Sections 2.2.6 and 2.4.



Reference: JPT

Fig. 2-21 WBA Newsletter and Leaflets for 3R and Waste Reduction

2.8 Output 7: (DNCC and DSCC) Extension of Lifetime of Existing Landfills and Securement of New Landfills [Phase-1 & Phase-2]

2.8.1 Overview

The remaining lifespans of Matuail LFS (operated by DSCC, with landfill area about 19ha⁵⁷) and Amin Bazaar LFS (operated by DNCC, with landfill area about 19ha⁵⁸) and Amin Bazaar LFS (operated by Dhaka North City Corporation (DNCC), landfill area about 20ha) are about 1.2 years and 0.64 years respectively. Securement of a new landfill site is an urgent issue for both CCs. However, due to the rapid increase of land prices⁵⁹, plans for development of new LFS have hardly progressed in either city. Therefore, the Project provided technical support to prolong the lifetime of the two LFS and allow the CCs more time for developing new LFS. Examples of the support included guidance on how to accurately calculate the remaining years of the existing LFS using a drone, and implementation of a dumping platform improvement pilot project using steel plates. At the same time, the Project provided technical guidance to improve the operation of LFS by establishing a Landfill Management Unit (hereinafter referred to as “LMU”), installing a chemical treatment facility for leachate, preparation and submittal of a Development Project Proposal (hereinafter referred to as “DPP”) for securing a new landfill site, proper closure of the existing LFS, and preparation of the land use plan after proper closure of the existing LFS.

As a result, the lifespans of both existing LFS were extended by two years respectively, and the Government of Bangladesh (hereinafter referred to as “GoB”) secured the construction costs for expanding the existing LFSs, and the costs necessary for the proper closure of the existing landfill areas in both cities. Improvement work on the two existing LFS was carried out from the latter half of 2018, and from the latter half of 2021, environmental monitoring for the proper closure of the existing LFS was started. DSCC started the expansion work on the Matuail LFS from January 2022.

On the other hand, although DNCC started investigation and design in January 2022 for the expansion project at Amin Bazaar LFS, the land acquisition was not completed as of May 2022. This expansion project of Amin Bazaar LFS is not an Eco-Town plan, but a plan to construct a facility that can incinerate all waste generated in Dhaka North City and generate electricity⁶⁰. Consequently, the construction work of the new Nasirabad LFS (landfill area of approximately 20 ha) was suspended as of May 2022.

⁵⁷ Expansion work at Matuail LFS started in January 2022, and is scheduled to be completed in June 2023 (planned expansion area: about 20ha).

⁵⁸ Expansion work at Matuail LFS started in January 2022, and is scheduled to be completed in June 2023 (planned expansion area: about 20ha).

⁵⁹ DSCC received the budget for the expansion work of the Matuail LFS from GoB and started purchasing the land, but the land acquisition cost doubled in 10 years from the time of application for the project cost. Therefore, DSCC requested additional support from GoB. In DNCC, land prices have tripled between 2000 and 2010, and it is expected that the upward trend will continue in the future.

⁶⁰ Refer to Footnote 24 (p.39)

2.8.2 Improvement of Existing Landfills

(1) Implementation Contents

1) Amin Bazar LFS (DNCC)

At the commencement of this technical cooperation project, Amin Bazar Landfill was not properly operated or managed and the waste collection vehicles were disposing the transported waste outside the landfill site because they could not do so in the landfill. This situation was widely reported in newspapers under the headlines: “illegal dumping of waste by DNCC.” Accordingly, and based on the request of the CEO of DNCC improvement of the operation and management of the Amin Bazar Landfill was included in the Project activities.

2) Matuail LFS (DSCC)

The Project provided support to the proper closing of the Matuail Landfill, and facility planning of the dumping platform, and leachate treatment in the expanded area.

(2) Schedule and implementation status

1) Amin Bazar LFS (DNCC)

The following activities were implemented to support the improvement of Amin Bazar Landfill. Table 2-42 shows the implementation schedule.

- a) Examination of landfill operation and management procedures,
- b) Securement of heavy equipment for operation,
- c) Repair of peripheral roads,
- d) Improvement of dumping platform⁶¹ and hauling road,
- e) Installation of leachate treatment facilities, and
- f) Installation of a weighbridge

⁶¹ In the Amin Bazar LFS, the hauling road was damaged by rainfall during the rainy season, which made it impassable, and wastes were dumped outside the landfill, causing serious problems for the surrounding environment. Accordingly, a brick paved road and platform were constructed using steel plates, which are less expensive than concrete pavement. The steel plates are 3m x 1.5m x 20mm in size, and 85 plates are laid. The steel plates are numbered, and the quantity and number are checked periodically by the staff of the landfill.

Table 2-42 Implementation Schedule of Landfill Site Improvement (DNCC)

Items	2017		2018				2019	
	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.
a) Examination of landfill operation and management procedures								
b) Securement of heavy equipment for operation								
c) Repair of peripheral roads								
d) Improvement of dumping platform and access road								
e) Installation of leachate treatment facilities								
f) Installation of a weighbridge								

Reference: JPT

DNCC has decided to outsource the operation and maintenance of LFS to the private sector, and has assigned staff to supervise the private sector. Other improvement work was completed as planned. By improving the dumping platform and roads inside the site, it was able to properly manage waste in LFS, which has extended the lifespan of LFS by two years. The following photographs show the improvements at the landfill.

	
Heavy equipment purchased by the city corporation	Repair of peripheral roads
	
Repair of hauling road	Improvement of dumping platform



Reference: JPT (photographs taken on March 12, 2019)

Photo 2-24 Improvement of Amin Bazar Landfill Site (After Rehabilitation Work)

2) Matuail LFS (DSCC)

The following activities were implemented to support the proper closing of Matuail Landfill and improvement of the expanded area. Table 2-43 shows the implementation schedule.

- a) Preparation of an improvement plan for Matuail LFS including dumping platform, hauling roads and additional leachate treatment facilities,
- b) Improvement of dumping platform and hauling road, and
- c) Additional installation of leachate treatment facilities.

Table 2-43 Implementation Schedule of Closing of Existing Landfill Site and Improvement of Expanded Landfill Site (DSCC)

Item	2017		2018		2019		2020		2021	
	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.
a) Preparation of an improvement plan for the Matuail LFS including dumping platform, hauling roads and additional leachate treatment facilities		■								
b) Improvement of dumping platform and hauling road			■							
c) Additional installation of leachate treatment facilities					■					

Reference: JPT

The improvement of the dumping platform and hauling road in the expanded area of the Matuail Landfill has already been completed. At present, the proper closing work and the additional installation work of leachate treatment facilities in the expanded area are in progress. Both works are scheduled for completion around September 2020. The following photographs show the improvements at the landfill.



Reference: JPT (photographs taken on December 20, 2021)

Photo 2-25 Improvement and Closure of Matuail Landfill Site (After Rehabilitation Work)

2.8.3 Proper Closure of Existing Landfill Site

(1) Proper Closure Procedure of Landfill Site

1) Implementation Details

As both Matuail LFS in DSCC and Amin Bazar LFS in DNCC will reach their full waste disposal capacities within a few years it will be necessary to properly close these sites at that time and stabilize the waste disposed there in order to reduce the impact of the closed landfills on the surrounding environment. Possible impacts from the landfill on the surrounding environment include odors, scattering of waste, fires, and leachate runoff. Since Bangladesh has no experience in planning and implementing construction work related to proper closure of landfills, the Project has provided guidance on these matters.

2) Schedule and Status of Implementation

The activities supported by the Project for the proper closure of both Matuail LFS and Amin Bazar LFS were implemented as shown in Table 2-44 and are described below.

- a) Preparation of the proper closure plan
- b) Installation of the final soil cover for prevention of waste scattering and odors, and reduction of leachate generation
- c) Installation of the rainwater drainage facility for reduction of leachate generation
- d) Installation of leachate collection and gas vent pipes for prevention of fire, and stabilization of waste.

Table 2-44 Construction Implementation Schedule for Proper Closure of Matuail LFS and Amin Bazar LFS

Item	2017		2018		2019		2020		2021		2022	
	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.
a) Preparation of the proper closure plan		█										
b) Installation of the final soil cover			█	█	█	█	█	█	█	█	█	█
c) Installation of the rainwater drainage facility			█	█	█	█	█	█	█	█	█	█
d) Installation of leachate collection and gas vent pipes			█	█	█	█	█	█	█	█	█	█

Reference: JPT

DNCC and DSCC developed the proper closure plan over a six-month period from July to December 2017. Installation of the final soil cover, rainwater collection and drainage facilities, and gas vent pipes were implemented in accordance with the progress of waste landfilling. Photographs of the progress of these activities are shown below.



	
<p>Installation of Leachate Collection Pipes (DSCC)</p>	<p>Installation of Gas Vent Pipes (DSCC)</p>
	
<p>Installation of Final Soil Cover (DNCC)</p>	<p>Installation of Rainwater Drainage Facility (DNCC)</p>
	
<p>Installation of Leachate Collection Pipes (DNCC)</p>	<p>Installation of Gas Vent Pipes (DNCC)</p>

Reference: JPT (Photographs taken on December 5, 2021)

Photo 2-26 Proper Closure of Existing Landfill Sites in DNCC and DSCC

(2) Guidance on Environmental Monitoring for Proper Closing of Landfill Site

1) Overview



Leachate and gases generated from landfill sites impose strong risks of causing adverse effects on the surrounding environment and residents, and it is important to confirm through environmental monitoring that

the operation and management of landfills is of sufficient standards to mitigate these risks. JPT stressed to the counterparts of DNCC and DSCC on the importance of environmental monitoring at LFS, and procured specialized equipment for checking various parameters related to landfill gas and water quality as stipulated in the Environmental Monitoring plan prepared for Matuail and Amin Bazar landfill sites. An additional purpose of this activity was to train the counterparts on the operation of the measurement equipment so that they can carry out landfill gas measurement and surface and ground water quality monitoring by themselves. Both Matuail LFS and Amin Bazar LFS will be closed after 1 to 2 years and regular environmental monitoring after safe closure will help the authorities in DSCC and DNCC respectively to decide on the future land use of the closed LFS based on the monitoring results of environmental parameters.

2) Procurement of Environmental Monitoring Equipment

JPT procured the equipment described in Table 2-45 for use by DNCC and DSCC in order to measure the initial levels of monitoring of gas, leachate, groundwater and surface water quality in the vicinity of the landfill sites.

Table 2-45 Environmental Monitoring Equipment procured to DNCC and DSCC

Item		Equipment	Procured to
Landfill gas Analyzer			
Measure % of different landfill gases (CH ₄ , CO ₂ , CO, H ₂ S and O ₂) at a time			DNCC, DSCC
Parameters	Range		
CH ₄	0-100%		
CO ₂	0-100%		
CO	0-2,000PPM		
H ₂ S	0-500PPM		
O ₂	0-25%		
Water quality testing equipment			
Checking ground water, surface water and leachate quality in and around landfill			DSCC
Parameter	Range		
pH	-2.00 - 20.00 pH		
Conductivity	0.000µS/cm - 2000mS/cm		
Dissolved Oxygen	0 - 20 mg/l		

*Notes: Water quality testing equipment was not procured for DNCC because their leachate treatment plant is being operated by private organization and all the water quality parameters testing is included in the private organization's scope of work.

Reference: JPT

3) Implementation Schedule

One Assistant Engineer (hereinafter referred to as "AE") from each of DNCC and DSCC were appointed as training directors of the environmental monitoring training program. The Environmental Expert from JPT implemented the environmental monitoring activity over three trips as shown in the implementation schedule

in Table 2-46.

Table 2-46 Implementation Schedule of Environmental Monitoring

	Schedule	Description of Main Activities	
		DSCC	DNCC
1st Trip	19th November, 2021 to 13th December 2021 (25 Days)	<ul style="list-style-type: none"> Teaching counterparts (C/P) on contents and importance of Environmental Monitoring Teaching C/Ps on operation of landfill gas Analyzer equipment Preparing Draft Environmental Monitoring plan (EMP) for Matuail LFS 	<ul style="list-style-type: none"> Teaching counterparts (C/P) on contents and importance of Environmental Monitoring. Teaching CPs on operation of landfill gas Analyzer equipment Preparing Draft Environmental Monitoring plan (EMP) for Amin Bazar LFS
2nd Trip	19th February 2022 to 11th March 2022 (21 days)	<ul style="list-style-type: none"> Working together with C/P to carryout landfill gas monitoring Teaching C/P about operation of water quality equipment Carrying out Environmental Monitoring of surface water, ground water and leachate Finalization of EMP for Matuail LFS Presentation of EMP to Authorities 	<ul style="list-style-type: none"> Working together with C/P to carryout landfill gas monitoring Finalization of EMP for Amin Bazar LFS Presentation of EMP to Authorities
3rd Trip	9th April, 2022 to 22nd April 2022 (14 days)	<ul style="list-style-type: none"> Landfill gas Monitoring at Matuail Monitoring of ground water and surface water quality at Matuail LFS Finalization of Environmental Monitoring report 	<ul style="list-style-type: none"> Landfill gas Monitoring at Amin Bazar LFS Finalization of Environmental Monitoring report

Reference: JPT

4) Results of Environmental Monitoring

i) Monitoring in Matuail Landfill (DSCC)

✧ Gas Monitoring

The Matuail Landfill has a total of 51 gas vent pipes (30 pipes in the old dumpsite area to the south and 21 pipes in the new landfill to the north). The C/P and JPT checked the landfill gas readings at all the pipes and found that 20 of the vent pipes were working properly but for the remaining pipes no landfill gas was detected indicating that the pipes might be filled with waste. A total of 10 gas vent pipes were selected for monitoring to cover the entire landfill site. The gas measurement results for the gas vent pipes were as follows.



Reference: JPT

Fig. 2-22 Gas Monitoring Location in Matuail Landfill

Table 2-47 Gas monitoring results in the Matuail Landfill

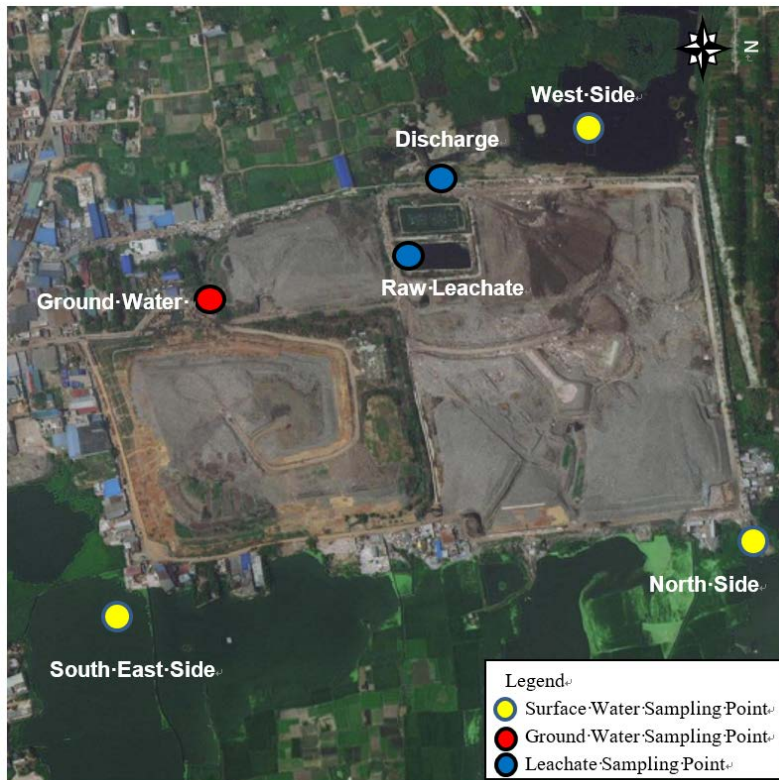
Gas Vent pipe no	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Other gases	H ₂ S (ppm)	CO (ppm)
A2, A16, A6, A12, A14, B3, B10, B7 and B19	0.5-10	0.5- 15	6-20	65-80 (78.60)	0-6	0-2
A7	25-35	18-26	6-10	30-45	1-2	0-1

Reference: JPT

The monitoring results indicated that the generated landfill gas composition (CH₄, CO₂, H₂S, CO etc.) was almost identical except for pipe A7. The landfill gas composition in the disposal area surrounding pipe A7 suggested that the waste disposed there was filled with highly degradable animal-derived waste. In general, landfill gas continues to be generated for 15 to 20 years after the waste was disposed, however based on the gas composition in Table 2-47, it was predicted that most of the waste on the south side of Matuail LFS had already decomposed.

✧ **Water Quality Monitoring**

DSCC staff implemented water quality monitoring of ground water and surface water around the landfill and leachate treatment plant. The water quality test results are shown below.



Reference: JPT

Fig. 2-23 Leachate and Water Sampling Location in Matuail Landfill

Table 2-48 Water quality monitoring results in the Matuail Landfill

Date	Parameter	Ground water collected from bore hole near car wash facility	Sample collected from West side	Sample collected from North side	Sample collected from South East side	Raw Leachate	Treated water Discharge point	Effluent Discharge Standard
March 2, 2022	pH	8.08	8.1	8.36	7.84	7.86	8.43	6-9
	Dissolved Oxygen, DO (mg/L)	7.83	5.1	7.94	2.75	3.07	7.83	4.5-8
	Electric Conductivity, (µS/cm)	264	3,840	5,980	5,670	11,520	1,071	1,200
April 11, 2022	pH	6.78	7.93	7.98	7.82	-	-	6-9
	Dissolved Oxygen, DO (mg/L)	7.04	0.37	0.56	0.32	-	-	4.5-8
	Electric Conductivity, (µS/cm)	283	7,070	6,710	5,500	-	-	1,200
April 18, 2022	pH	7.07	7.82	8.03	8.0	-	-	6-9
	Dissolved Oxygen, DO (mg/L)	6.39	0.2	0.31	0.59	-	-	4.5-8
	Electric Conductivity, (µS/cm)	232	4,160	7,180	7,130	-	-	1,200

Reference: JPT

The monitoring results confirmed that the groundwater quality had met the pH standards established in the Bangladesh SWM rules 202. On the other hand, the dissolved oxygen concentration was less than normal effluent discharge standard and E.C. was beyond the permissible limit which clearly indicated seepage of leachate into nearby water bodies. Samples collected from the leachate treatment facility were also tested, but since the treatment facility is not currently in operation, an evaluation of the facility operation was not possible. After the treatment facility is back in operation, C/P plans to collect water samples to check the dissolved oxygen concentration and electrical conductivity of each unit.

ii) Monitoring in Amin Bazar Landfill (DNCC)

✧ Gas Monitoring

DNCC installed only one gas vent in Amin Bazar LFS, in November 2021. Landfill gas measurements were made at that vent as indicated in Table 2-49 and it was observed that no significant amount of gas was being emitted. Since there is only one gas vent pipe, it was difficult to evaluate the current status of the landfill gas. However, training was provided to the C/P on the operation of the landfill gas meter and analysis of gas measurement results which will be helpful DNCC staff in the future.



Reference: JPT

Fig. 2-24 Gas Sampling Location in Amin Bazar Landfill

Table 2-49 Gas monitoring results in Amin Bazar Landfill

Gas Vent Pipe (No.)	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Other (%)	H ₂ S (ppm)	CO (ppm)
①	December 7, 2021	0.20	1.50	19.80	78.50	1.00	1.00
①	February 23, 2022	0.10	0.80	19.90	79.30	0.00	0.00
①	March 31, 2022	0.10	0.60	19.8	78.50	0.00	0.00
①	April 19, 2022	0.20	0.40	19.9	79.50	0.00	0.00

Reference: JPT

✧ Water Quality Monitoring

As the leachate treatment plant is being operated by a private organization, therefore no training was provided to DNCC staff on water quality monitoring.

5) Achievement of Guidance on Environmental Monitoring

The achievements of the three separate environmental monitoring training sessions were as follows

- DNCC and DSCC C/P understood the importance of Environmental Monitoring.
- C/P learned how to use gas and water quality measuring equipment.
- Periodical monitoring of gas and water quality from the landfill was conducted for three months from January to March 2022.
- Leachate leaks discovered during the monitoring process were repaired.
- DSCC posted the gas and water quality measurements on the city's website.

6) Finalization of Environmental Monitoring Plan

Based on the above, the environmental monitoring plan was finalized in March 2022 and handed over to DNCC and DSCC (refer to Appendix-19).



Reference: JPT (Photographs taken on April 21, 2022)

Photo 2-27 Handover of the Environmental Monitoring Plan

(3) Guidance on Calculating the Remaining Lifespans of Existing Landfills with a Drone

1) Purpose of Guidance

The remaining lifespans of both existing landfill sites in DNCC and DSCC were estimated to be several years. On the other hand, the construction of a new landfill site in both cities had been delayed. It was therefore required to calculate the remaining lifespans of the existing landfill sites with some accuracy and determine when new landfill sites should be constructed. Prior to this activity, the remaining landfill capacities and remaining lifespans were calculated based on the progress of the landfill work, which was confirmed by visual

observation. Since this method was not accurate enough to calculate the remaining capacity and remaining lifespan, the Project introduced a landfill management system using a drone and provided guidance on the operation of this system.

2) Obtaining Flight Permits for Drones

DSCC and DNCC submitted applications to the Civil Aviation Authority of Bangladesh (hereinafter referred to as “CAAB”) in September 2021 and December 2021, respectively, for flight permits for drones, which are important for the new system. The flight permits for a year from March 20, 2022 was obtained on April 5, 2022 (refer to Appendix-20). DSCC, through the assistance of the CWMO, who was seconded from the Air Force, obtained permission from CAAB to fly the drone at Matuail LFS on a per-flight basis. Since DNCC was unable to make a similar arrangement, a drone flight training for C/Ps was conducted at Matuail LFS in DSCC. Eventually drone flights could be made at the Amin Bazar LFS in April 2022.

3) Contents of Guidance

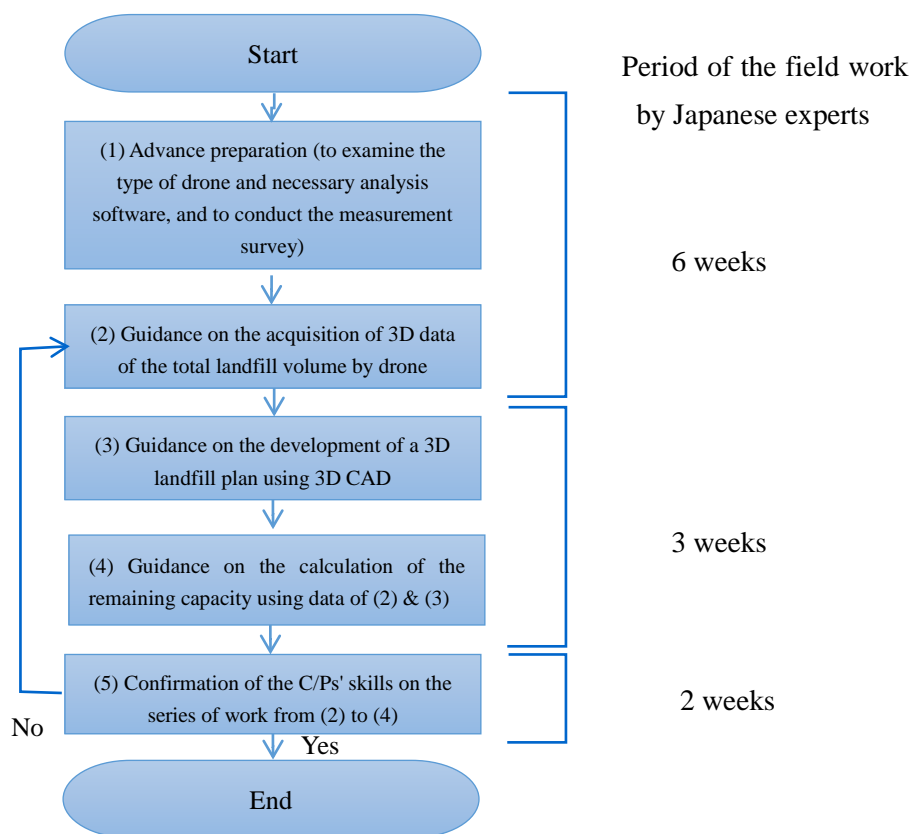
i) Selection of Persons for Guidance (C/Ps)

The Project explained the details of this activity to CCOs of DNCC and DSCC, and the following C/Ps were appointed as the persons in charge of this activity.

- DNCC: ACWMO
- DSCC: AE

ii) Work Flow

The work flow was as shown in Fig. 2-25. Japanese experts, in contact with local staff, examined the type of drone and necessary analysis software, and conducted the measurement survey remotely from Japan. In the first field work (38 days), the Japanese experts mainly provided guidance on the acquisition of 3D data of the total landfill volume by drone. In the second field work (22 days), the Japanese experts mainly provided guidance on the development of a 3D landfill plan using 3D CAD and the calculation of the remaining capacity. In the third field work, the Japanese experts confirmed the C/Ps’ skills of the series of work using the drone survey data obtained more than a dozen times so far.



Reference: JPT

Fig. 2-25 Work Flow

iii) Contents of Guidance

The Project provided drone operation training, Structure from Motion (hereinafter referred to as “SfM”) analysis, and 3D CAD operation to C/Ps in DNCC and DSCC. A summary of the drone flight training, SfM analysis, and 3D CAD instruction is shown in Table 2-50 and Photo 2-28.

Table 2-50 Summary of Guidance on Calculation of Remaining Lifespan of Existing Landfills (DNCC and DSCC)

Item		Equipment and Software	Outline of Guidance
Drone flight training	Takeoff and Landing Training	Small and medium sized training drones Phantom4pro v2: 1 unit each	(1) To become familiar with drone operation, training in takeoff/landing, turning, and manual landing was repeatedly conducted. (2) Training in setting flight paths, flight heights, and filming density, etc., and in automatic flight was repeatedly conducted over the entire landfill site area.
	Autopilot and auto-photo training	Tablet for control settings: 1 unit each DJI GO 4 and GSPro (drone piloting application)	
SfM analysis	Creation of high density point cloud data, DEM, OrthoPhoto data, etc.	Metashape: 1 license for each (Various analytical guidance was provided on lens correction, high-density point cloud data	(1) License management and lens correction (2) Photo placement settings (3) GCP correction method (4) Creation of high-density point cloud data

Item		Equipment and Software	Outline of Guidance
		creation methods, etc., using approximately 1,000 landfill photographs)	(5) Creation of DEM and OrthoPhoto data (6) Generation of contours, creation of cross sections, and calculation of volumes
Analysis training for 3D CAD, etc.	Training on how to display on Google Earth, QGIS, etc., and how to convert coordinate systems	1 license each Google Earth: How to view and share OrthoPhoto image data QGIS: View Civil3D CAD	(1) Learning how to share drone image data using Google Earth (2) Learning how to use DEM and OrthoPhoto with QGIS
	Creation of land development plans and calculation of remaining capacity using the land development function of 3D CAD	Civil3D CAD 1 license each Utilizing and learning the land development function and setting up the slope of the completed form.	(1) Setting of coordinate system (2) Setting of DEM and OrthoPhoto loading (3) Setting method of grading function and slope (4) Calculation method for remaining capacity

* DEM: Digital Elevation Model, GCP: Ground Control Points, GIS: Geographic Information System, SfM: Structure from Motion, 3D CAD: Three-Dimensional Computer Aided-Design
Reference: JPT

	
Training in drone piloting and photographing	Training in SfM analysis with Metashape
	
Training in Metashape and GIS work	Training in land development planning with Civil3D

Reference: JPT (photographs taken on November 30, 2021)

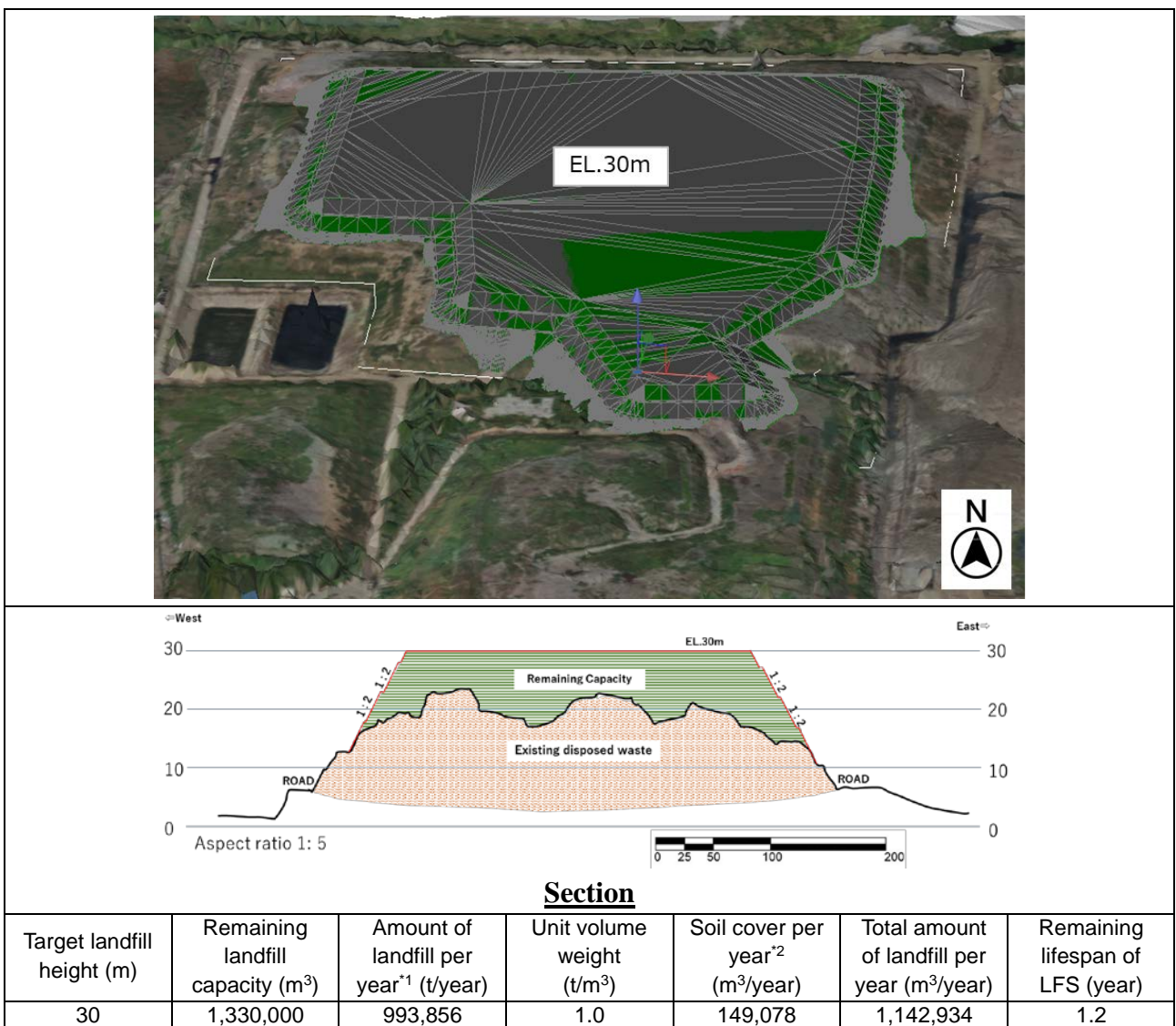
Photo 2-28 Drone Flight Training, SfM Analysis and 3D CAD Instruction

4) Results on Calculation of Remaining Lifespan of an Existing Landfill (Matuail LFS)

Using the drone survey data (current topography), the Project created a future land development plan and calculated the remaining lifespan of the landfill. The remaining years were calculated by dividing the remaining landfill capacity by the total amount of landfill per year. The total annual landfill amount was calculated by dividing the weight of waste carried into LFS measured by the weighbridge by the unit volume weight and converting it into volume, taking into account the amount of soil covered. The calculation was as follows:

$$\text{Remaining Lifespan of LFS} = \frac{\text{Remaining landfill capacity}}{\frac{\text{total amount of landfill per year}}{\text{unit volume weight}} + \text{amount of soil covered per year}} \quad (1)$$

As a result, the remaining lifespan of the landfill is 1.2 years; thus, a new landfill should be constructed by then.



*1: Since there were many times when the weighbridge failed from 2020 to 2022, the annual landfill capacity was calculated from the weighbridge data from 2019 to 2020.

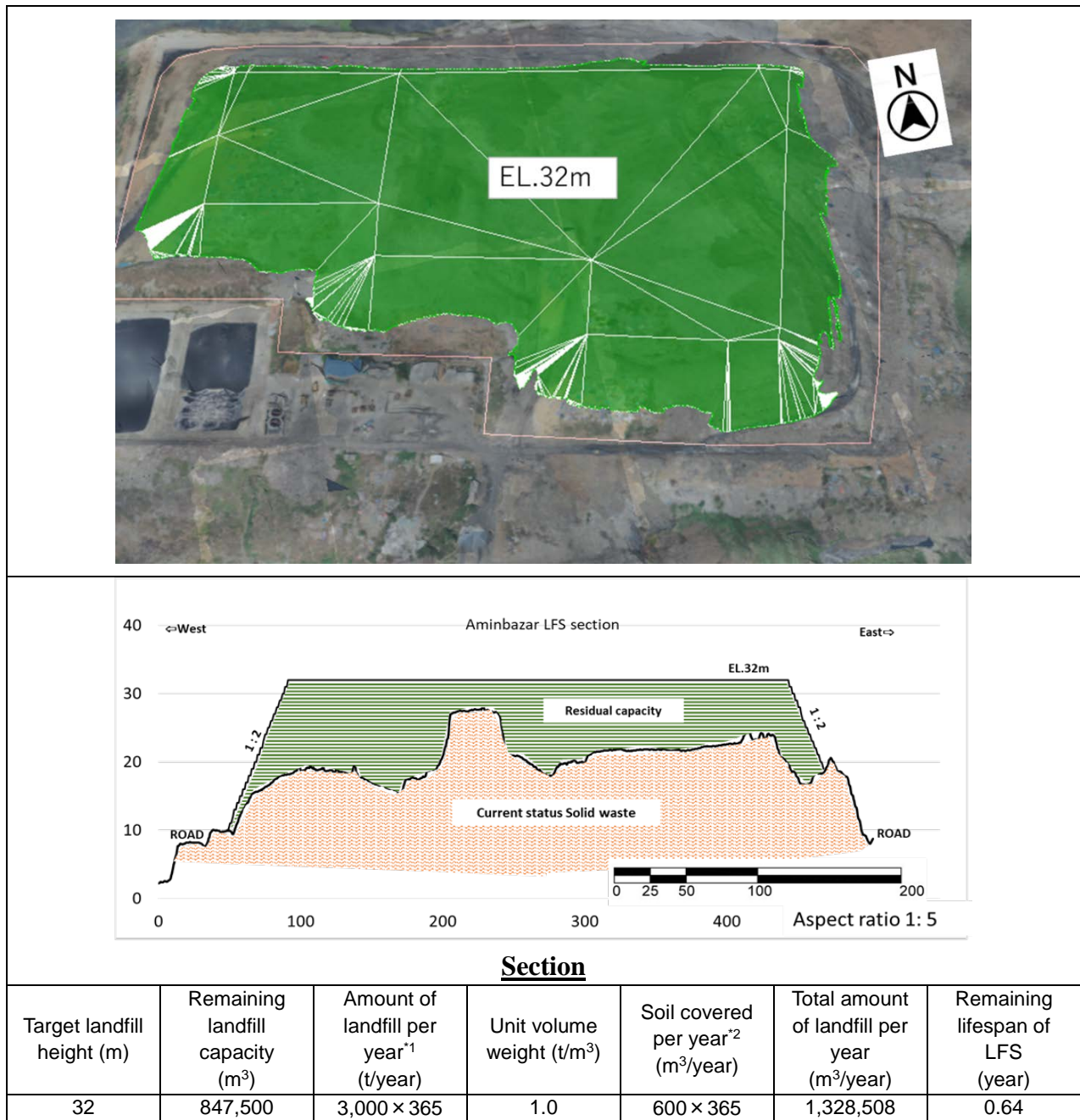
*2: 15% of annual landfill amount

Reference: JPT

Fig. 2-26 Calculation of Remaining Lifespan of Matuail LFS

5) Results of Calculation of Remaining Lifespan of an Existing Landfill (Amin Bazar LFS)

Using the drone survey data (current topography), a plan for the future plan was created and the remaining capacity of landfill was calculated. The lifespan of LFS were calculated using the same formula (formula (1)) used for Matuail LFS. As a result, the remaining lifespan was 0.64 year. It is necessary to construct a new LFS within 0.64 years (7 to 8 months).



*1: Since there were many times when the weighbridge failed from 2020 to 2022, the annual landfill capacity was calculated from the weighbridge data from 2019 to 2020.

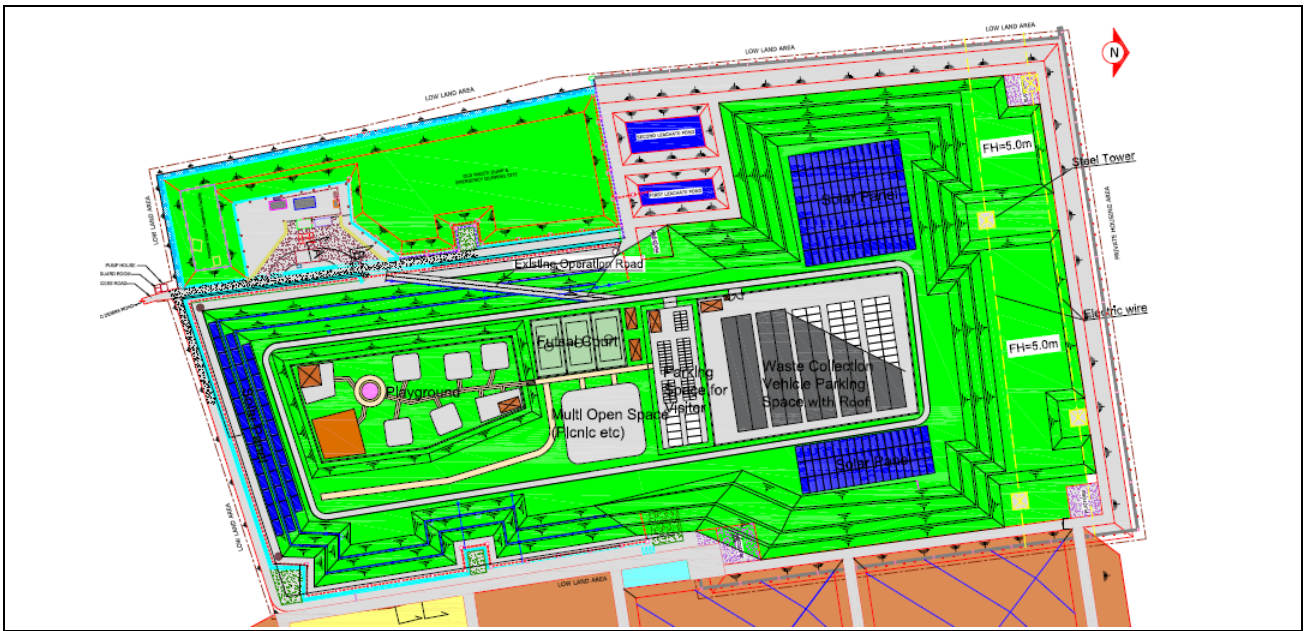
*2: 15% of annual landfill amount

Reference: JPT

Fig. 2-27 Calculation of Remaining Lifespan of Amin Bazar LFS

(4) Site Utilization Plan after Completion of Operation

Japanese experts and C/Ps discussed on the use of Matuail and Amin Bazar landfill sites after completion of their operations. Both DNCC and DSCC were considering the use of the landfill sites as (1) parks and/or (2) parking spaces for waste collection vehicles and solar panel sites. They expect to use the electricity generated by the solar panels to power streetlights on the site and a leachate treatment facility until the landfill closes. The site utilization plans of DNCC and DSCC are shown in Fig. 2-28 and Fig. 2-29, respectively.



Reference: JPT

Fig. 2-28 Matuail LF Site Utilization Plan after Operation Completion



Reference: JPT

Fig. 2-29 Amin Bazar LF Site Utilization Plan after Operation Completion

2.8.4 Securement of New Landfills

(1) Contents of Implementation

Both DSCC and DNCC have followed the necessary governmental procedures to receive subsidies from the Central Government for the construction of new landfill sites. In order to obtain a national grant from the Central Government, a DPP⁶² must be prepared and submitted to LGD. DSCC had been planning to expand Matuail LFS, and DNCC had been planning to expand Amin Bazar LFS and construct a new Nasirabad LFS. Details of these current situation are described later. The Project supported the preparation of DPPs for these plans.

(2) Implementation Schedule and Status

The Project provided support to DNCC in preparing the DPP for expansion of Amin Bazar LFS and construction of the new Nasirabad LFS, in calculating construction costs and facilitating the DPP process. The implementation schedule for developing new landfills in both cities is shown in Table 2-51.

Table 2-51 Implementation Schedule to Develop a New Landfill Site (DSCC and DNCC)

Item	Year 2017		Year 2018		Year 2019		Year 2020		Year 2021		Year 2022	
	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.
[DSCC]												
1. Expansion of Matuail LFS												
(1) Revision of DPP				=====								
(2) Approval by LGD					=====							
(3) Approval by ECNEC						=====						
(4) Land acquisition							=====					
(5) Execution of survey and design										=====		
(6) Construction implementation											=====	
[DNCC]												
1. Expansion of Amin Bazar LFS												
(1) Preparation of DPP	=====											
(2) Approval by LGD			=====									
(3) Approval by ECNEC						=====						
(4) Land acquisition							=====					
(5) Execution of survey and design											=====	
2. Construction of a new landfill (Nasirabad LFS)												
(1) Revision of DPP		=====										
(2) Approval by LGD			=====									
(3) Approval by ECNEC					=====							

* DPP: Development Project Proposal, ECNEC: Executive Committee of National Economic Council

Reference: JPT

⁶² Budget of GoB is composed of revenue income and development income. Public works are mostly covered by the development income. Public works projects have two types: investment project and technical assistance project. The implementing organization submits a Development Project Proposal (DPP) or Technical Assistance Project Proposal (TPP) to its supervisory organization. GoB has the authority to evaluate the proposal through planning committee and approve it. When total budget of DPP or TPP is more than 250 million BDT, approval by the Executive Committee of National Economic Council (ECNEC) is mandatory.

The DPP submitted by DSCC for the expansion of Matuail LFS, and which included an additional land acquisition cost, was approved by the ECNEC in December 2019. Land was then acquired and construction began in January 2022. The completion of construction was targeted for June 2023. The DPP submitted by DNCC for the expansion of Amin Bazar LFS was approved by ECNEC in March 2020, and land acquisition is on schedule to be completed by June 2022. However, DNCC reported that progress had been slow. In parallel with the land acquisition process, the survey and design work began in January 2022. The construction was scheduled to be completed by June 2023. The expansion work of the Amin Bazar LFS is not an Eco-town, but a plan to construct an incineration facility capable of incinerating all waste generated in the DNCC jurisdiction. For this reason, the construction of the new Nasirabad LFS has been suspended as of May 2022.⁶³



Reference: JPT (Photographs taken on April 13, 2022)

Photo 2-29 Construction Work of Matuail LFS Extension Area

(3) Contents of Development Project Proposals (DPP)

The contents of DPPs related to SWM, which were prepared or have been submitted to GoB are shown in Table 2-52.

⁶³ See footnote 57 (p. 109).

Table 2-52 On-going Development Project Proposals (DPPs) (DNCC and DSCC) (as of May 2022)

CC	Proposal Title	Contents and Status of Approval
DNCC	Extension of Amin Bazar Landfill Site	<ul style="list-style-type: none"> Land acquisition, land preparation, extension construction (leachate pipe, leachate pond, dumping platform, etc.), safety closure of existing landfill site, procurement of heavy equipment, etc. New landfill area (approx. 13ha) and Eco-Town area (approx. 17ha) out of 32 ha in total.⁶⁴ Total budget: approx. 8.27 billion BDT (approx. 9.35 billion JPY) DPP was submitted in December 2017 and approved by Executive Committee of National Economic Council (ECNEC) in March 2020. On December 1, 2021, the Bangladesh Power Development Board (BPDB), DNCC and a private company signed a Waste-to-Energy (WtE) project implementation contract. In response to this, the Amin Bazaar LFS Expansion Project is proceeding together with a development plan for a facility that can incinerate all the waste generated in DNCC, instead of Eco Town.
	Construction of Nasirabad Landfill Site	<ul style="list-style-type: none"> Land acquisition, land preparation, landfill site construction, procurement of heavy equipment etc. New landfill area (approx. 20ha) and Eco-Town area (approx. 20ha) out of 48 ha in total.⁶⁵ Total budget: approx. 13.81 billion BDT (approx. 15.62 billion JPY) DPP was submitted to ECNEC in March 2018, but the process has been suspended because the development plan for WtE project was underway in the Amin Bazaar LFS expansion project (as of May 2022).
	Developing the city extended area waste collection (1)	<ul style="list-style-type: none"> Development of a waste collection system in the extended DNCC area (18 wards). This development project was abandoned during the preparation of DPP and was taken over by the development project (2).
	Developing the city extended area waste collection (2)	<ul style="list-style-type: none"> DPP was approved in December 2019 and procurement is expected to be completed by December 2022. Eleven compactors and two backhoe loaders were purchased from Japan. In addition, two bulldozers and two high-pressure washing vehicles are under procurement.
DSCC	Extension of Matuail Landfill Site	<ul style="list-style-type: none"> Land acquisition, land preparation, extension construction, 3R promotion, and awareness-raising Total budget: approx. 7.48 billion BDT (approx. 8.46 billion JPY) Although DPP was approved in March 2017, it was resubmitted in December 2018 to acquire the additional budget for land acquisition (land price had doubled during the approval process that took two years). Finally it was approved again by ECNEC in December 2019. The construction work began in January 2022.
	Developing the city extended area waste collection (1)	<ul style="list-style-type: none"> Development of a waste collection system by privatization in the extended DSCC area (18 wards) (2 years). Total budget: approx. 500 million BDT (approx. 560 million JPY) DPP was submitted, waiting for the approval of the head of LGD.
	Developing the city	<ul style="list-style-type: none"> Procurement of waste collection vehicles for the development of waste

⁶⁴ Remaining area (approx. 6 ha) is planned to be used for purposes other than landfill and Eco-Towns such as access road and afforestation around the landfill site.

⁶⁵ Remaining area (approx. 8 ha) is planned to be used for purposes other than landfill and Eco-Towns such as access road and afforestation around the landfill site.

CC	Proposal Title	Contents and Status of Approval
	extended area waste collection (2)	<ul style="list-style-type: none"> collection system in the extended DSCC area (18 wards). • Total budget: approx. 8.9 billion BDT (approx. 10.1 billion JPY) • DPP was submitted. • Improvement of waste collection equipment in the extended DSCC area (18 wards) (including procurement of waste collection vehicles and heavy equipment such as compactors and container carriers, and construction of ward offices and a secondary transfer station (STS)) • Total budget: approximately 8.90 BDT (approximately 10.1 billion JPY) • DPP was submitted but rejected by LGD due to the high project cost. • DPP is being prepared again with reduced project cost, including purchase of 30 compactors at own expense.

* DPP: Development Project Proposal) , ECNEC: Executive Committee of National Economic Council

Reference: JPT

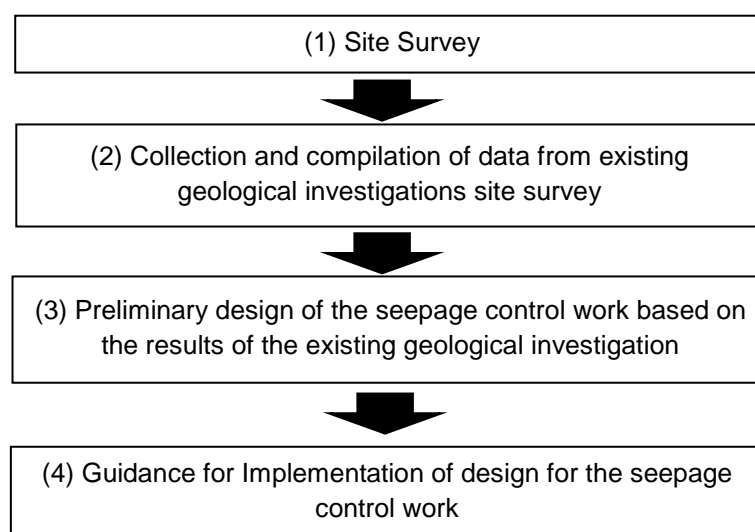
(4) Guidance for Seepage Control Work

1) Purpose of Guidance

DSCC and DNCC are planning to construct new landfills adjacent to their existing disposal sites of Matuail LFS and Amin Bazar LFS, respectively as the remaining lifespan of each landfill is 1 to 2 years. The seepage control work in a landfill is a very important for preventing groundwater contamination. However, technical assistance on how to design the seepage control work was required because no landfill seepage control work including liner sheets had been installed in landfills in Bangladesh so far. Therefore, the purpose of this guidance was to reduce the risk of groundwater contamination in new landfills by providing technical knowledge on how to design the seepage control work including liner sheets.

2) Contents of Guidance and Implementation Schedule

The design guidance for seepage control work was conducted according to the following flow chart.



Reference: JPT

Fig. 2-30 Flow of Guidance for Design of Seepage Control Work

3) Site Survey

The Japanese experts and the C/Ps together conducted site surveys for the proposed new landfill sites on November 8, 2021 for DNCC and November 9, 2021 for DSCC. Based on the site survey results, JPT provided technical advice to the C/Ps on the following points:

- Survey items and locations in the new landfill area to confirm any occurrences of land subsidence, ground collapse, and groundwater contamination due to landfilling of waste.
- Importance to monitor groundwater level which was estimated to be high as the new landfill area was a pond.
- Understanding extent of groundwater contamination in the vicinity of the existing landfill in operation in order to consider the need for seepage control work.



Reference: JPT (Left photograph taken on 8 November 2021, Right photograph taken on 9 November 2021)

Photo 2-30 Current Situation of New Landfill Areas in DSCC and DNCC (as of November 2021)

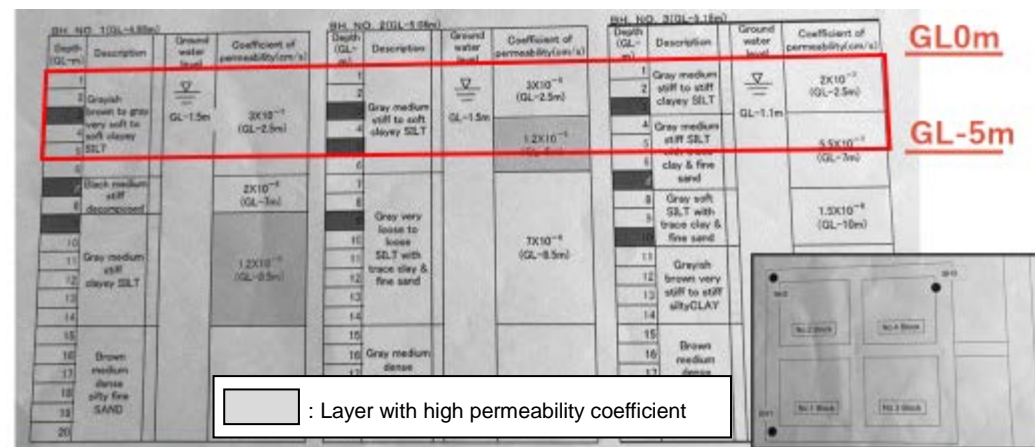
4) Collection and Compilation of Data from Existing Geological Investigations

The Project collected and compiled existing geotechnical data from the C/Ps of DSCC and DNCC. The data for both cities were originally collected at the planning stage for the existing landfills. For DNCC, a geological survey was conducted in 2020 by a Chinese company for the design of a WtE facility at a site adjacent to the proposed site of the new landfill. However, that data was not available. After compiling the collected data, the following findings were obtained.

i) DNCC (Amin Bazar LFS)

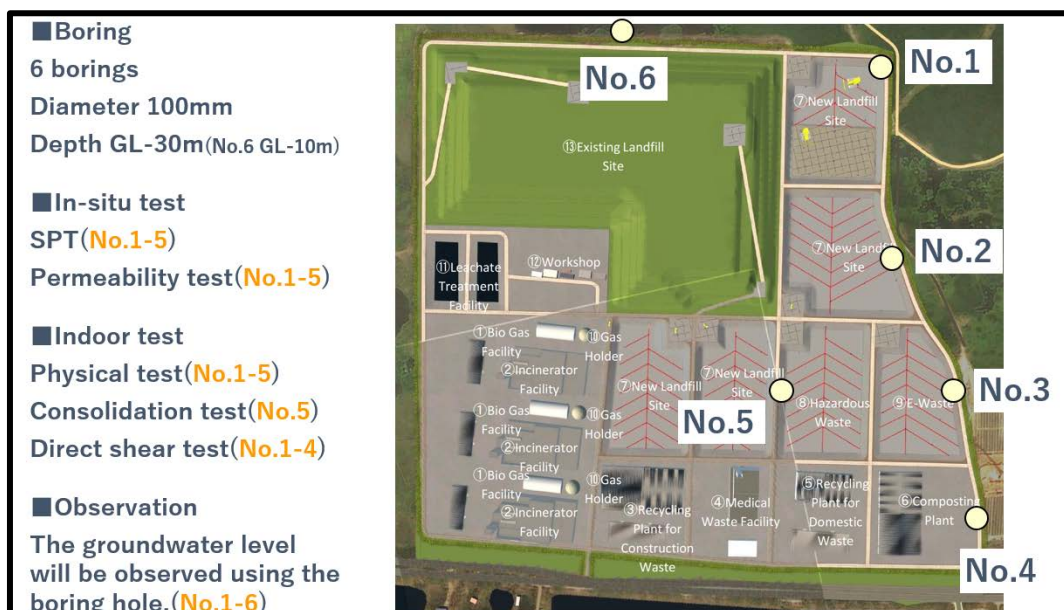
- A total of three borings, as well as groundwater level observations and in-situ permeability tests were conducted. As a result, it was found that the foundation soil had a soft clay soil bed with a layer thickness of approximately 15 m, and was generally a good soil layer with low permeability.
- However, there is some highly permeable layer within an area of approximately 5 m below the ground surface, which may lead to increased contamination when leachate seeps through it.

- In addition, since the waste is planned to be landfilled to a height of approximately 30 m above the ground, it was necessary to consider the amount of consolidation settlement of the soil foundation and the risk of waste and foundation layer collapse. Accordingly, a soil investigation was deemed to be required for this purpose.
- Based on the above, the Project proposed the following plan for soil investigation items and locations in order to understand the condition of the foundation soil for the entire new landfill area.
 - ✧ In-situ testing (standard penetration test, in-situ permeability test)
 - ✧ Laboratory tests (physical tests (density, grain size, water content ratio), consolidation tests, direct shear tests)
 - ✧ Groundwater level observation
 - ✧ Numerical analysis (consolidation settlement analysis, stability analysis)



Reference: Existing geological data of Amin Bazar LFS

Fig. 2-31 Existing Geological Columnar Map in Amin Bazar LFS

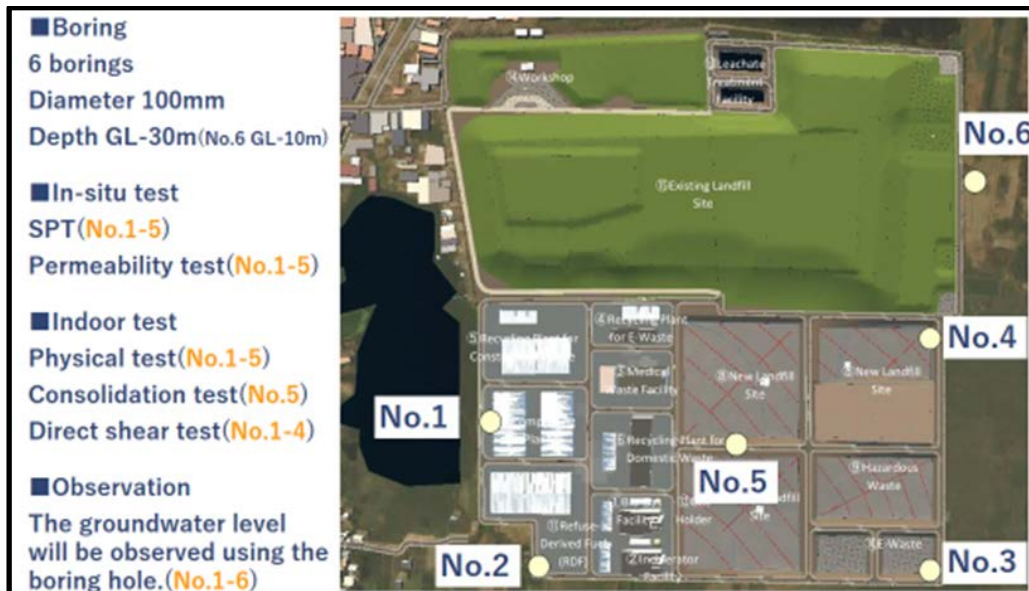


Reference: JPT

Fig. 2-32 Geological Investigation Plan for New landfill Site in DNCC

ii) **DSCC (Matuail LFS)**

- The results of a total of 10 boring holes and laboratory soil tests indicated that the foundation soil consisted of a soft cohesive bed with a layer thickness of approximately 15 m, and was generally good soil with low permeability.
- However, the evaluation of leachate seepage was not possible because the groundwater level and the soil permeability within the range of 5 m below the ground surface could not be confirmed.
- As in the plan of DNCC, since the waste was planned to be landfilled to a height of approximately 30 m above the ground, the Project proposed the following plan for soil investigation items and locations in order to understand the condition of the foundation soil of the entire new landfill area.
 - ◇ In-situ testing (standard penetration test, in-situ permeability test)
 - ◇ Laboratory tests (physical tests (density, grain size, water content ratio), consolidation tests, direct shear tests)
 - ◇ Groundwater level observation
 - ◇ Numerical analysis (consolidation settlement analysis, stability analysis)



Reference: JPT

Fig. 2-33 Geological Investigation Plan for New landfill Site in DSCC

5) Preliminary Design of Seepage Control Work Based on Results of Existing Geological Investigation

Based on the current geological survey data, a preliminary study was conducted to determine the need for the seepage control work. As a result, the following directions were obtained.

i) **Foundation Soil conditions and the need for seepage control work**

The permeability of the foundation soil at the site is low indicating that seepage control work is hardly necessary, according to the seepage control work design criteria in Japan. However, a geological survey of the entire new landfill area should be conducted to reconfirm the permeability of the soil. If a highly permeable layer is found, then seepage control work should be installed.

ii) Methods to reduce the risk of groundwater contamination

Even if the seepage control work is not installed, the following measures should be taken to reduce the risk of groundwater contamination from leachate

- ✧ To avoid storing leachate in a landfill.
- ✧ To reduce the amount of leachate generated by using sectional landfilling, reducing the area of landfilling waste, and reducing the contact between rainwater and waste.
- ✧ To monitor groundwater quality to determine if there is contamination from the landfill.

iii) Design of the seepage control work

The consolidation settlement of the foundation soil is estimated to be approximately 1.5 m due to the landfilled wastes with a height of approximately 30 m. If a liner sheet is installed under this condition, there is a risk that the liner sheet may become damaged. Consequently, measures to prevent subsidence are required. The Prefabricated (Paper) Vertical Drains (hereinafter referred to as “PVD”) Method is the preferred method for preventing consolidation settlement since the Soil Cement Mixing Pile Method is expensive.

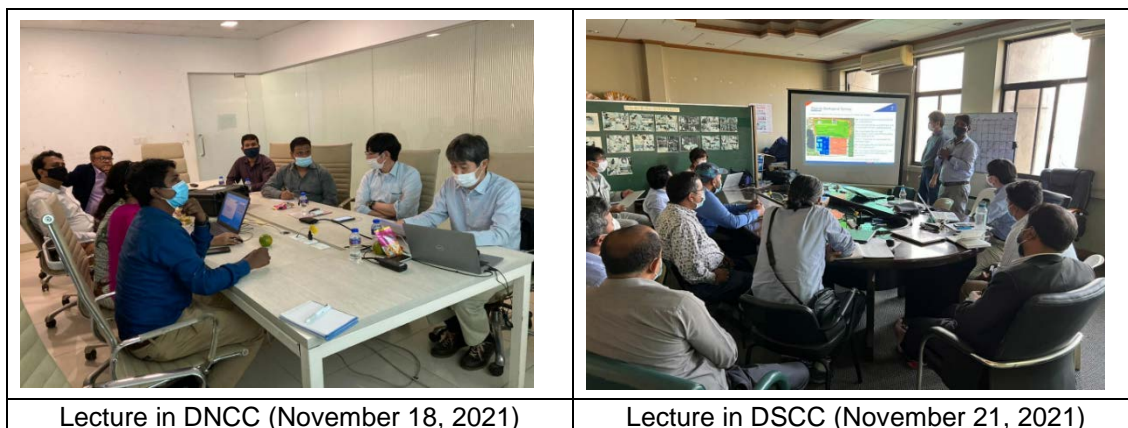
6) Design Guidance for Seepage Control Work

The Project conducted lectures on the installation of the seepage control work in the new landfills that covered geotechnical issues and solutions, future geotechnical investigation plans, and the seepage control work design, according to the schedule in Table 2-53 (for details refer to Appendix-21).

Table 2-53 Lecture Schedules and Participants in DSCC and DNCC

Date and Time	Venue	Participants
November 18, 16:30-18:30	Meeting room in DNCC	<ul style="list-style-type: none"> • Additional Chief Engineer (ACE) • Superintending Engineer (SE) • Assistant Engineer (AE)
November 21, 2021, 14:30-16:30	Meeting room in DSCC	<ul style="list-style-type: none"> • Superintending Engineer (SE) • Executive Engineer (EE) • Assistant Engineer (AE)

Reference: JPT



Reference: JPT (photographs taken in November 2021)

Photo 2-31 Lectures on Seepage Control Work Design in DSCC and DNCC

The lectures on seepage control work design mainly covered the following contents.

i) Geological investigation plan for the foundation soil under the landfill

The following two items are important in the geological investigation of foundation soils.

- The first is to determine the permeability of the ground, which is related to the spread of groundwater contamination. According to Japanese standards, a layer may be considered impermeable if it has a permeability coefficient (k) of less than or equal to 1×10^{-7} m/s and is more than 5m thick and continuous. It is required to determine the permeability of the foundation soil at the site.
- The second is to predict the amount of consolidation settlement of the foundation soil due to the landfilled waste. If the consolidation settlement is large, the liner sheet will be damaged, which may lead to groundwater contamination.

Accordingly, the Project confirmed the results of previous geological investigations and provided guidance on the status of the foundation soil and future geological investigation plans.

ii) Selection of the seepage control work suitable for the local foundation soil conditions

In Japan, the types of seepage control work include the surface seepage control work, the vertical seepage control work, and a combination of these methods. The types of liner sheets include low, medium, and high elasticity synthetic rubber types, fiber-reinforced types, and asphalt types. The Project provided guidance on the seepage control work pattern, liner sheet specifications, structures, construction methods, etc., as assumed by the local foundation soil conditions.

iii) Prediction of consolidation settlement of foundation soil due to landfilled waste and verification of stresses in liner sheet

The Project provided guidance on how to predict the amount of consolidation settlement of the foundation soil due to landfilled waste and the results of the estimation considering local soil conditions. The estimation of the tensile stress in the liner sheet based on the above consolidation settlement and the risk of liner sheet damage were also explained.

iv) Selection of measures to control soil settlement in the case of large settlement of the foundation soil.

As a result of the estimation in iii) above, there is a possibility that the liner sheet may be damaged, so the Project provided guidance on measures to control the amount of consolidation settlement. Examples of landfills in Japan and Vietnam were explained, and two possible types of countermeasures for the sites in DSCC and DNCC discussed: the Soil Cement Mixing Pile Method and the PVD Method.

v) Groundwater collection and drainage system to prevent groundwater contamination from spreading and excessive water pressure under the landfill

If groundwater is stagnant under the landfill, once groundwater contamination occurs it can easily spread. In addition, excessive water pressure acting on the liner sheet may cause damage to the sheet. Consequently, groundwater under the landfill needs to be drained regularly, and the Project provided guidance on the

construction of drainage facilities for this purpose.

vi) Monitoring system for groundwater contamination

The Project provided guidance on groundwater monitoring methods to manage the risk of groundwater contamination even with adequate measures in place.

(5) Guidance Results

DSCC started the geological investigation in January 2022 at the site where the new landfill is to be constructed, considering the investigation contents required for the design of seepage control work as explained in the lecture. It is expected that DSCC will properly design the seepage control work based on the results of this investigation. DNCC has not yet acquired the land for the new landfill, and will conduct a geological survey according to the geological investigation contents provided in the lecture after the land is acquired.

2.9 Output 8: (CCC) Establishment of Appropriate Medical Waste Management System [Phase 2]

2.9.1 Overview

In the area of CCC, the collection of medical waste generated in Health Care Establishments (hereinafter referred to as “HCEs”) has been carried out by collection companies licensed by CCC since 2005. The medical waste is rarely separated at the source, and the collected medical waste is disposed of by open burning at designated sites. In addition, there are still many small HCEs that do not have contracts for medical waste disposal. The rapid increase in the amount of infectious waste generated from households and HCEs due to the spread of COVID-19 infection required the immediate promotion of the establishment of an appropriate medical waste management system. Accordingly, as a pilot project, the medical waste incinerator (treatment capacity: 200 kg/hour) was installed in the Hali Shahar LFS (operation started in January 2022), and the medical waste management system was established in the model hospitals. JPT also supported the establishment of an appropriate medical waste collection and treatment system, and awareness raising on proper segregation and disposal of medical waste at the source.

As a result of these activities, a new system for medical waste management was decided upon and a medical waste management committee was established in November 2021 with the participation of medical waste related organizations including Ministry of Health and Family Welfare (hereinafter referred to as “MOHFW”)⁶⁶. It was also decided to establish a medical waste management unit to implement medical waste management under the supervision of the medical waste management committee, and a formal letter was issued by CCC in December 2021 in this regard. Based on the letter, personnel were assigned to operate and manage the medical waste incinerator (one foreman, two supervisors, three operators and three workers, in total 9 persons). In addition, administrative guidance from DOE, including investigations of illegal medical waste storage sites, public hearings for private contractors, and issuing official notes helped

⁶⁶ MOHFW is responsible for issuing licenses to HCEs. Following the committee's discussion, a letter was issued to HCEs by the civil surgeon office, a subordinate body of MOHFW, regarding the proper disposal of medical wastes.

prevent the dangerous practice of materials extraction from medical waste, illegal dumping, and mixing of medical waste with general waste. As a result, the amount of medical waste incinerated increased from approximately 300 kg/day at the beginning of incinerator operation to approximately 900 kg/day as of March 2022.

2.9.2 Introduction of a Small Medical Waste Incinerator for Appropriate Medical Waste Management

(1) Overview of the Medical Waste Incinerator

Since CCC did not have a medical waste incinerator, one small medical waste incinerator was installed in the Halishahar LFS. As shown in Table 2-54, the incinerator installed meets the Japanese emission standards and is equipped with a smokeless and water-cooled incinerator chamber.

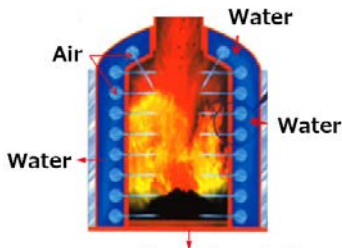
Two types of wastes were targeted for incineration: infectious wastes and sharp medical wastes collected from HCEs in the area of CCC. Currently, these medical wastes are collected by private companies assigned by CCC. However, only approximately 60% of the HCEs in the city have contracts with these collection companies.

CCC plans to expand the number of HCEs entering into contracts with collection companies, and will be required to cope with the increase in incineration amount associated with the increase in the number of contracts. Consequently, there is a need to promote efforts such as waste separation at the discharging source of each HCE and extension of incinerator operation hours.

(2) Support for EIA

According to “the Environmental Conservation Act, 1995” and “the Environmental Conservation Rules, 1997”, which regulate the Environmental Impact Assessment (hereinafter referred to as “EIA”) process for development projects, the construction of a waste incinerator is classified as “Red”, which requires the strictest EIA procedures. In accordance with the regulations, the Project provided support for preparation of the following documents required for the application procedure.

Table 2-54 Overview of the Medical Waste Incinerator

Item	Overview
Incineration Target	Infectious waste and Sharp waste from HCEs in Chattogram City
Capacity	200kg/hour (4.8t/day)
Size	Width 3.5m × Length 3.0m × Height 8.95m, Weight 11.0t
Specification	Burning Temperature : 800°C or more Ignition Loss : 10% or less
Emission standards *	Dust / Soot : 150mg/Nm ³ SOx : — HCl : 700mg/Nm ³ NOx : 250ppm Dioxins : 5ng-TEQ/Nm ³
Features	<ul style="list-style-type: none"> • Smoke-less incinerator • Water-cooled combustion chamber  <p>Reference : Chuwa Industrial Co., Ltd. Web site http://www.chuwastar.co.jp/en/</p>

* Notation based on Japanese emission standards
Reference: JPT

Application Documents to DOE

- 1) Feasibility Report
- 2) Initial Environmental Examination (hereinafter referred to as “IEE”) / EIA Study Report, Terms of Reference (hereinafter referred to as “TOR”) for EIA
- 3) EIA Report and Environmental Management Plan (hereinafter referred to as “EMP”)
- 4) No Objection Certificate from the ward council members of the target area (Ward 37 in this case)
- 5) Pollution Prevention Plan
- 6) Emergency Plan

On July 27, 2021, CCC applied to DOE for approval of a TOR for the EIA study and an IEE exemption for the construction of a medical waste incinerator. As a result, DOE approved the TOR for EIA together with an IEE exemption on September 1, 2021. CCC submitted its EIA application to DOE in November 2021 and received approval on January 3, 2022. While waiting for the Environmental Clearance Certificate (hereinafter referred to as “ECC”) approval from DOE, CCC received temporary permission to begin partial operation of the incinerator and began operating it on January 12, 2022. The ECC was issued on March 14, 2022 marking the final step of the EIA process.

(3) Implementation Schedule and Status

The implementation Schedule for installation of the medical waste incinerator is shown in Table 2-55.

Table 2-55 The Implementation Schedule for Installation of the Medical Waste Incinerator

Contents	2021							2022				
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1) Vendor Contract		★										
2) Tax Exemption Procedures		■										
3) Incinerator Manufacturing		■										
4) Surveying, Geological Survey and Design			■									
5) Environmental Impact Assessment	■											
6) Construction of Incinerator Foundation and Fencing						■						
7) Transportation of Incinerator *1						■						
8) Installation, test operation and operation guidance								■				
9) Handover								★				
10) Online Operation Guidance								■				

*1 Transportation from Japan to Chattogram City
Reference: JPT

In early July 2021, CCC and the incinerator manufacturer signed a contract, and towards the end of December a small incinerator manufactured in Japan was shipped to the site of CCC. The original plan was for the small incinerator to arrive at the site in mid-November, but it arrived there a month and a half later due to delays in

tax exemption procedures at LGD and in ocean transport caused by the COVID-19 infection. Tax exemption was not applied for customs duties and other taxes, which were finally paid by CCC. During the manufacture and transportation of the small incinerator, the topography and soil investigation surveys were conducted at the site, and the foundation and fence were designed. Construction of the foundation and fence took place from November 2021 to early January 2022. Installation, test operation, and technical support for the operation of the small incinerator were conducted during the first and second weeks of January 2022, with engineers from the incinerator manufacturer staying in the area of CCC for face-to-face meetings. The handover ceremony of the medical waste incinerator was held on January 11, 2022, and the incinerator started operation on January 12. Photos taken during these activities are shown below.

	
<p>Landfill for incinerated ash (2. January, 2022)</p>	<p>Installation of small incinerator (4. January, 2022)</p>
	
<p>Operation Guidance (8. January, 2022)</p>	<p>Operation of Incinerator (11. January, 2022)</p>
	
<p>Handover ceremony (11. January, 2022)</p>	<p>Handover ceremony (11. January, 2022)</p>

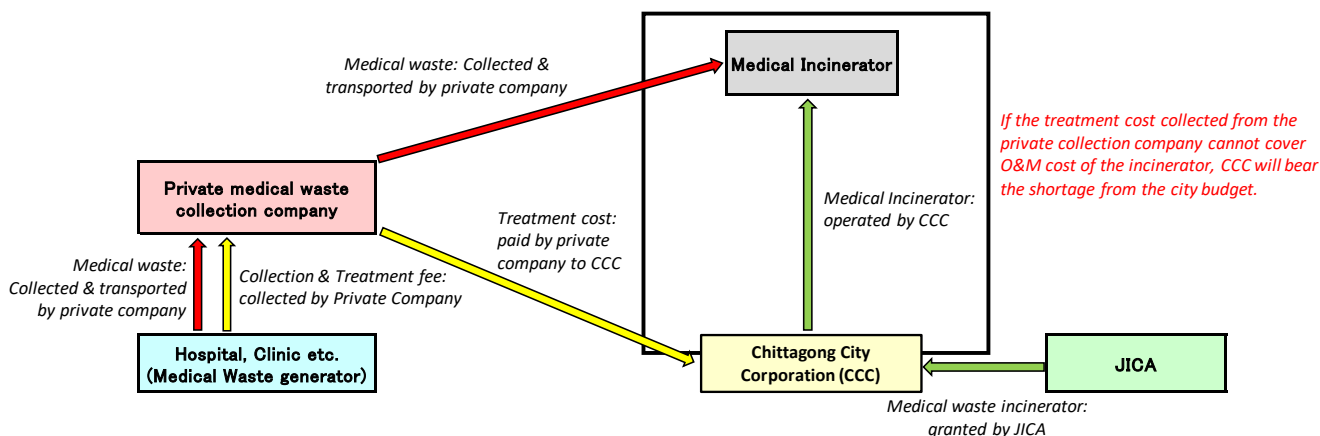
Reference: JPT (photographs taken in January 2022)

Photo 2-32 Introduction of Small Incinerator for Medical Waste

(4) Operation System

Fig. 2-34 shows the basic operation system after the introduction of the medical waste incinerator.

- HCEs outsource the collection, transportation, and treatment of medical waste to collection companies contracted by CCC, and pay an outsourcing fee.
- The collection companies transport the collected medical waste to the medical waste incinerator for incineration. They also pay a treatment fee to CCC.
- CCC operates and maintains the medical waste incinerator and bears the maintenance costs.



Reference: JPT

Fig. 2-34 Operation System in Medical Waste Management

(5) Outsourcing Fees to Collection Companies (collection, transportation and treatment)

In 2015, the Medical Waste Management Board set the outsourcing fees for collection, transportation, and treatment as shown in Table 2-56. HCEs pay fees to collection companies according to the type of hospital and the number of hospital beds. However, it was revealed that currently, collection companies collected municipal solid waste (hereinafter referred to as “MSW”) as well as medical waste, and prices were set through negotiations between the collection companies and HCEs. Consequently, at the November 2021 meeting of the Medical Waste Management Board, setting of outsourcing fees for medical wastes was once again confirmed.

Table 2-56 Outsourcing Fees for Medical Wastes (monthly)

Name of HCEs, Scale of HCEs	Price (BDT)
1. Government Hospital rates	
1) Chittagong Medical College Hospital	80,000
2) Chittagong Medical of Shishu Hospital	40,000
3) Chattogram General Hospital	20,000
4) Chattogram Bandar Hospital	20,000
5) Bangabandhu Memorial Hospital	35,000
6) Southern Medical College Hospital	20,000
2. Private Hospital fees rates	
Hospitals consisting of 1 to 100 beds for patients	5,000
If more than 100 beds, then per bed (BDT/bed)	100

Name of HCEs, Scale of HCEs	Price (BDT)
3. Lab, Diagnostic centers, Dental clinic fees rates	
Monthly fees divided into three categories	
1) Small Category	300
2) Medium Category	500
3) Big Category	700

* BDT: Bangladesh Taka

Reference: JPT

(6) Operation and Maintenance Cost for small incinerator

The operation and maintenance costs for the small medical waste incinerator operating 7.5 hours per day and incinerating 1.5 tons of medical waste were calculated as explained hereafter.

1) Operation Cost

Typical monthly operation cost for utilities (electricity, water, fuel, chemicals) and labor was 426,750 BDT (14,225 BDT/day (approximately 21,423 JPY) x 30 days). The cost breakdown is shown in Table 2-57.

Table 2-57 Operation Cost (Daily Basis)

Item	Unit	Incinerator (Estimated volume: 1.5 ton)	
		Quantity	Cost (BDT/day)
Electricity	12.36 BDT/kw	142.5 kw	1,761
Water	0.0303 BDT/L	4125 L	124
Diesel fuel	65 BDT/L	157.5 L	10,237
Chemicals	100 BDT/kg	6.33 kg	633
Operator	62.5 BDT/person/hour	7.5 person/hour	468
Worker 1	44.625 BDT/person/hour	7.5 person/hour	334
Worker 2	44.625 BDT/person/hour	7.5 person/hour	334
Worker 3	44.625 BDT/person/hour	7.5 person/hour	334
Total	—	—	14,225

* BDT: Bangladesh Taka

Reference: JPT

2) Maintenance Cost

The standard maintenance cost per year was 35,300 BDT (approximately 53,163 JPY). The details are shown in Table 2-58.

Table 2-58 Maintenance Cost (Yearly Basis)

Item	Replacement Frequency	Cost (BDT/year)
I. Burner parts replacement cost		
1) Nozzle	Once a year	3,400
2) Ignition rod	Once a year	2,200
3) Peep window	Once a year	400
4) Frame eye	Once every two years	2,200
5) Motor	Once every four years	7,200
6) Tranceformer	Once every four years	4,800
7) Fan	Once every four years	2,000

Item	Replacement Frequency	Cost (BDT/year)
8) Electromagnetic pump	Once every four years	4,300
9) Pressure gauge	Once every four years	700
10) Barcon relay	Once every four years	5,700
II. Air hole nozzle		
1) Drill rod	Once a year	2,400
Total	—	35,300

* BDT: Bangladesh Taka
Reference: JPT

3) Waste Collection Cost

The total monthly operation and maintenance cost of the small incinerator was 429,691 BDT (approximately 647,132 JPY) as shown in Table 2-59. The collection Service Provider shall pay CCC a fixed commission fee to treat the medical waste collected by the Service Provider and transported to the incinerator. In April 2022, CCC entered into a contract with the collection service provider setting the commission fee at 400,000 BDT (approximately 602,416 JPY)/month (\approx 429,691 BDT/month).

Table 2-59 Basis for Estimation of Commission Fee

Item	Formula	Cost (BDT/month)
Operation Cost	14,225BDT/day × 30day	426,750
Maintenance Cost	35,300 BDT/year ÷ 12 month	2,941
Total		429,691

* BDT: Bangladesh Taka
Reference: JPT

2.9.3 Establishment of Appropriate Medical Waste Collection and Treatment System

(1) Establishment of Medical Waste Treatment System in CCC

In order to appropriately and continuously carry out medical waste treatment, 15 persons, positions as shown in Table 2-60, were selected from the staff of the Machinery Department of CCC to be in charge of the operation and maintenance of the small incinerator. This notice was issued by the Machinery Department of CCC on December 23, 2021 as “Personnel Assignment for Operation and Maintenance of Medical Waste Incinerator”. The operation and maintenance of the small incinerator is conducted in three shifts consisting of one foreman, two supervisors and three operation teams (each operation team consists of one operator and one worker).

Table 2-60 Notice of Personnel Assignment for Incinerator Operation and Maintenance

No	Position
1	Medical Waste Incinerator Foreman x 1
2	Medical Waste Incinerator Supervisor x 2
3	Medical Waste Incinerator Operator x 3
4	Medical Waste Incinerator Worker x 3

Reference: JPT

(2) Identification and Improvement of HCEs (clinics)

1) Utilization of WBA

In CCC, community-based waste management was being implemented by CIs and CSs assigned to each ward. Medical waste was not included in the scope of this management, but in May 2019, the WBA Core Group was formed to strengthen waste management, and the strengthening of monitoring system to prevent improper discharge of medical waste was added as one of the issues under the Core Group’s consideration. The issues and activities of the WBA Core Group are shown in Table 2-61.

Table 2-61 Issues and Activities of WBA Core Group

	Preliminary Screening	Scope Identification	Plan and Do	Check and Action
1	Confirm all medical facilities' list	Identify non-contracted HCEs and pass the list to CI/CS in charge	Discuss the approach to non-contracted HCEs through WBA core group and implement it	Develop the future plan on expansion of the contract of medical waste treatment
2	Discuss the good practice of HCEs on medical waste management	Identify the model HCEs for pilot project	Implement the pilot project	Develop the future plan on spreading the good practice
3	Discuss the bad practice of HCEs and hotspots of untreated medical waste	Identify the model ward for awareness-raising activities	Discuss the method of how to monitor and supervise medical waste treatment of HCEs through WBA core group and implement it	Develop the future plan on monitoring and supervision of medical waste treatment in HCEs

* HCEs : Health Care Establishments

Reference: JPT

2) Identification of HCEs (clinics) without Outsourcing Contracts

HCEs that do not have medical waste treatment facilities are required to enter into outsourcing contracts with collection companies to treat their medical waste appropriately. But the actual situation was that 119 HCEs (42% of the total) did not have outsourcing contracts. The WBA activities shown in Table 2-61 identified HCEs without outsourcing contracts and examined a plan to expand the number of HCEs with outsourcing contracts. The detailed description of this activity is described in section 2.10.4.

(3) Proper Monitoring of Incinerator Operations and Collection Companies (including safety and sanitation guidance)

1) Proper Monitoring of Incinerator Operations

i) Guidance on Operation Records and Establishment of Record Management System

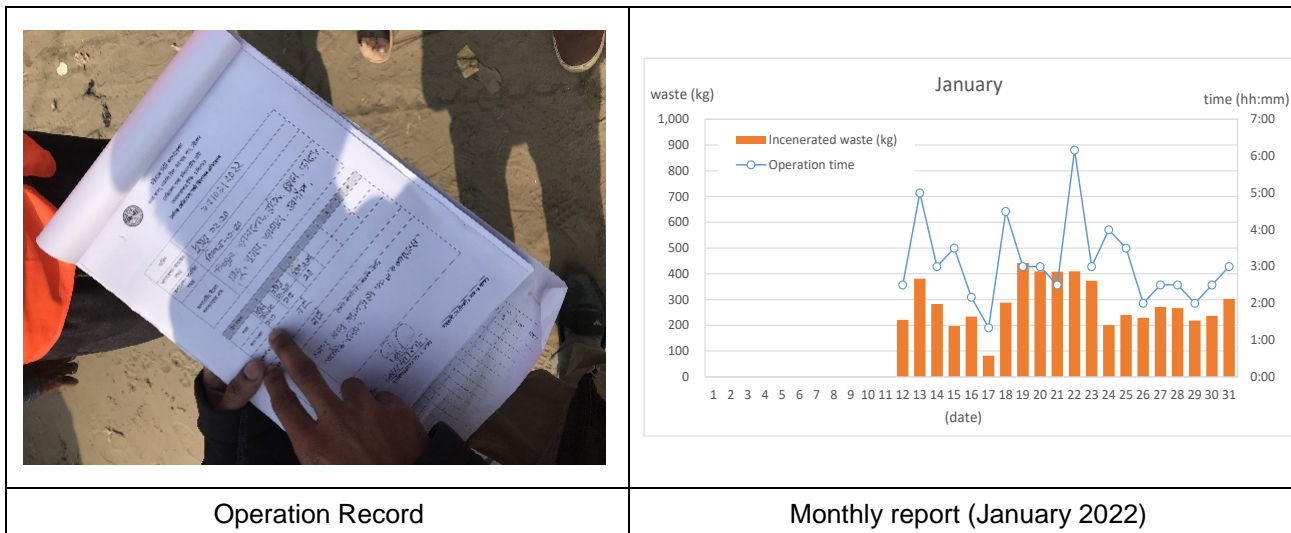
The Project provided guidance to supervisors and operators on maintaining a daily incineration operation record (daily report). The

Table 2-62 Recording Item

Date	
Operation Start Time	
Operation Finish Time	
Collection Vehicle	Time Carried Amount (No. of Bags & Weight)
Incinerated volume	
Residue volume	
Electricity usage	
Fuel Usage	
Notes	

Reference: JPT

format of the daily report was revised according to actual conditions. The latest daily report in use is shown in Table 2-62. The recorded contents are photographed and shared daily in the SNS group of the medical waste unit in CCC using WhatsApp. In addition, various records in the daily report are input into Excel, and a system was established in CCC to analyze and report the data in monthly reports.



Reference: JPT (Photographs taken on 16 January, 2021)

Photo 2-33 Management of Operation Records

ii) Provision of Safety Gear

Operators and workers are working in a dangerous working environment, as they handle sharp objects such as needles and infectious wastes, and work near the inlet where the waste is burning while feeding and mixing the waste. Consequently, the Project provided safety gear (masks, glasses, boots, gloves, helmets, and antiseptic solution) to the operators and workers, as well as safety training.



Reference: JPT (Left photograph taken on 20 February 2022, Right photograph taken on 16 January 2022)

Photo 2-34 Provision of Safety Gear

iii) **Guidance on Incinerator Operation and Maintenance**

In total, six online operation and maintenance training sessions were conducted for supervisors, operators, and workers of the incinerator. The details of the guidance were as follows.

Table 2-63 Guidance on Operation and Maintenance

No	Date	Number of Participants	Contents
1	7 March 2022	11	<ul style="list-style-type: none"> ▪ Name of equipment and description of functions ▪ Operational issues
2	16 March 2022	11	<ul style="list-style-type: none"> ▪ Scale and sludge in the water jacket ▪ Condition of burners
3	16 March 2022	11	<ul style="list-style-type: none"> ▪ Confirmation of daily operation
4	27 April 2022	13	<ul style="list-style-type: none"> ▪ Explanation and actual operational test of exhaust gas treatment equipment ▪ Operational issues
5	28 April 2022	14	<ul style="list-style-type: none"> ▪ Technical guidance on burners, Q&A
6	12 May 2022	11	<ul style="list-style-type: none"> ▪ Final confirmation of daily operation, Q&A

Reference: JPT

2) **Medical Waste Management Board**

CCC and the collection Service Provider established the Medical Waste Management Committee. The first committee meeting was held in November 2021 for monitoring purpose and attended by the Waste Management Task Force, WBA Core Group, leader of the incinerator operation team, and the collection service provider. The committee meeting details are shown in Table 2-64.

Table 2-64 Meeting Record of Medical Waste Management Board

No	Date	Number of Participants	Agenda
1	23 November 2021	20	<ul style="list-style-type: none"> - Introduction of JICA Project (Installation of small incinerator, Source Segregation of Medical Waste) - Confirming the current waste collection system and sharing the issues - Necessity of strengthening monitoring system - Establishing the Medical Waste Management Unit
2	26 April 2022	24	<ul style="list-style-type: none"> - Contract between CCC and Collection Service Provider - Current Medical Waste Management status in Chattogram City - Sustainable Monitoring System of MWM - Presentation about good practice in model hospital - Site visit tour to medical waste incinerator plant

Reference: JPT



Reference: JPT (Left photograph taken on 23 November, 2021, Right photograph taken on 26 April, 2022)

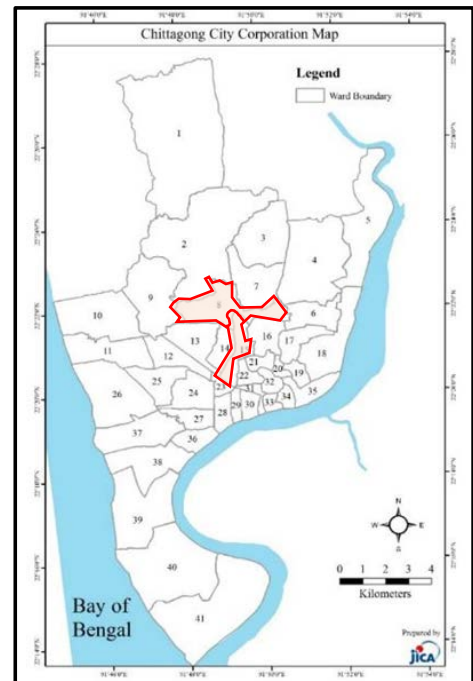
Photo 2-35 Scenes of Medical Waste Management Board Meetings

2.9.4 Promotion of Raising Awareness on Source Separation and Proper Disposal of Medical Waste

(1) Modeling of Awareness-Raising for Source Separation and Proper Disposal at HCEs

With the aim of establishing an appropriate medical waste management system in CCC, a public awareness pilot project on waste separation and proper discharge in HCEs was implemented. As a result of discussions with CC, Ward 8, where CI had been very active, was selected as a model ward, and Parkview Hospital (Ward 8) and Max Hospital (Ward 15) were selected as model hospitals. The results of the activities to raise awareness of proper waste management in each model hospital were compiled as good practice models for horizontal deployment to other HCEs in the ward.

In addition to WBA mentioned earlier, the Project also included large hospitals in CCC, which are expected to be highly effective in raising awareness, and provided in-hospital training and assistance in formulating improvement plans. A large hospital is defined here as a hospital with more than 100 beds.

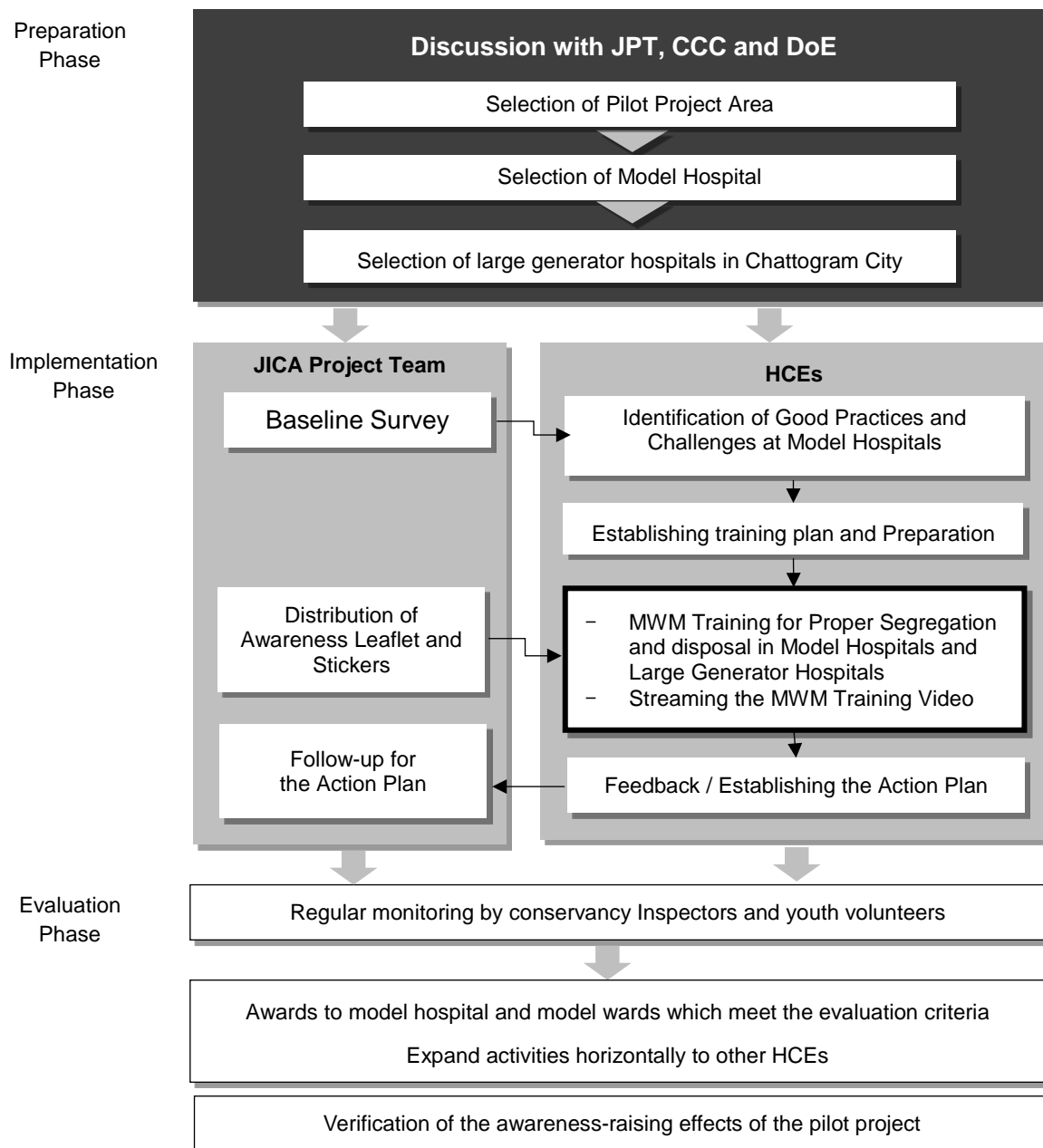


Reference: JPT

Fig. 2-35 Location of Model Wards

1) Implementation Flow

The pilot project for raising awareness on source separation and proper discharge in HCEs was implemented according to the following flow.



Reference: JPT

Fig. 2-36 Implementation Flow of Raising Awareness on Source Separation and Proper Discharge

2) Baseline Survey

The purpose of this survey was to understand the current status of waste management in HCEs in the target area, and to identify outstanding initiatives that could be expanded to other HCEs, as well as issues that should be improved.

i) Survey Targets

The baseline survey was conducted in model hospitals in August 2021, and in the model Ward from October to December 2021. There were seven HCEs in Ward 8, the model ward, and all were under contract with private

collection companies.

ii) **Survey Method**

Local staff interviewed each HCE based on a prepared questionnaire. The results were compiled together with the observation results of waste separation and management. For HCEs other than model hospitals, a simplified version of the questionnaire was used, excluding the items in bold letters and underlined in Table 2-65 (details in Appendix 20).

Table 2-65 Main Questions in Baseline Survey

Item	Contents
Basic Information	Hospital Name, Contact, Established Year, Field of medical care, Staff number, Number of beds
Waste Management System	Representative Department, MWM rules, Contract status with collection service provider, Status of Waste Collection
Status of Waste Collection	Waste categories, Color code, Changes due to COVID-19 pandemic, Distinction between infectious and non-infectious waste, Special Treatment before disposal, Daily waste amount, Basic information of Waste storage, <u>Availability of in-house incinerator, Knowledge about final disposal site</u>
Waste Treatment Flow	General description of in-hospital waste disposal flow
Waste Segregation at source and Storage condition	Based on the results of the site visit, JPT summarized current conditions at each stage of the process from the source to the storage.
Internal Training	Experience of internal training on waste management, Requests for training, and Awareness Raising Activities

*Notes : **Bolded and underlined items** are not included in the simplified questionnaire

Reference: JPT

iii) **Survey Results**

Based on the results of the baseline survey at the model hospitals, the Project identified good practices and issues related to the separation of medical wastes, and summarized requests for in-hospital training.

Table 2-66 Baseline Survey Results of Model Hospitals

Good Practices (Only in the Parkview Hospital)	<ul style="list-style-type: none"> Using 4 types of proper color code After the outbreak of COVID-19, infectious and non-infectious wastes were managed separately Needles were properly treated with special equipment before disposal Trolleys and bins with lids were used to transport wastes in the hospital.
Issues	<p><u>Parkview Hospital</u></p> <ul style="list-style-type: none"> The number of bins and containers was not enough. Proper color code was adopted, but the segregation condition was poor <p><u>Max Hospital</u></p> <ul style="list-style-type: none"> Incorrect color code was being used The outdoor waste storage had no gate or roof, with the collected waste scattered around the area, and exposed to rain, wind, and birds.
Requests for MWM training	<p><u>MWM Training for managerial class</u></p> <ul style="list-style-type: none"> Explanation of medical waste disposal guideline, MWM method <p><u>MWM Training for doctors and nurses</u></p> <ul style="list-style-type: none"> Awareness of proper waste segregation at the source, Safety management

	<p><u>MWM Training for cleaners</u></p> <ul style="list-style-type: none"> Explanation of waste segregation rules, Waste collection and transportation method, Safety management
--	---

Reference: JPT

(2) Implementation of Training on Proper Separation and Discharge of Medical Waste

1) Objective

The objective of the training for managers was to have participants recognize the current situation and issues related to medical waste disposal in the hospital, and to acquire knowledge to establish an appropriate waste management system. The training for cleaners aimed to help them understand the necessity of waste separation and acquire basic knowledge for safe waste separation, collection, and transportation.

2) Training Contents

Table 2-67 shows the contents of training for each target group. For doctors and nurses, it was difficult to conduct group training during working hours, so posters introducing waste separation methods were displayed in the hospital. The contents of the posters are shown in Table 2-68.

Table 2-67 Training Contents on Appropriate Medical Waste Management

Training for Managerial Class	
<p>The first session was a lecture using PowerPoint presentation on regulations and rules related to medical waste management and basic knowledge for safe and appropriate waste management. In the second session, after conducting individual work using the worksheet shown in the figure on the right, participants discussed about the issues related to waste management in hospitals.</p>	<div style="text-align: center;"> <p>WORK SHEET</p> </div>
Training for Cleaners	
<p>In the first session, the necessity of proper waste management, waste management methods, and proper use of safety gears were explained in a lecture using PowerPoint material prepared in the local language. In the second session, participants were quizzed on what color code corresponded to the illustration of waste on the screen, using colored paper that was distributed to them. The percentage of correct answers was low at first, but after repeated questioning and explanation, the percentage of correct answers eventually reached close to 100%.</p>	

Reference: JPT

Table 2-68 Contents of Awareness-Raising for Doctors, Nurses and Administrative Staff

Awareness raising Leaflets for doctors and nurses	
<p>(Left) Introduction of color code and applicable waste types</p> <p>(Right) The waste treatment steps from the source of waste generation, collection and transportation within the hospital, and transport to the final disposal site were introduced, and also the importance of segregation was described.</p> <p>*550 copies of leaflets were distributed to all HCEs (Health Care Establishments, HCEs) where the training was conducted by JPT.</p>	

* HCEs : Health Care Establishments
Reference: JPT

3) Training Results

The names, locations by ward and number of beds of the HCEs that were provided with training on proper separation and discharge of medical waste are shown in Table 2-69. Initially, the training was planned to be conducted only at the two model hospitals, Parkview Hospital and Max Hospital, but in order to achieve greater awareness-raising effects, the same training was conducted at hospitals with more than 100 beds.

Table 2-69 HCEs Provided with Training on Proper Separation of Medical Waste

No.	Name of Hospital	Ward	No. of Beds	Date	No. of Participants
Private Hospital					
1	Parkview Hospital (Model Hospital)	8	< 100	17-18 November, 2021	136
2	Max Hospital (Model Hospital)	15	< 100	22-23 November, 2021	73
3	Chattogram Medical of Shishu Hospital	27	< 450	7 December, 2021	15
4	Chattogram International Medical College Hospital	4	< 250	8, 15 December, 2021	248
5	Chattogram National Hospital	15	< 100	9 December, 2021 23 February, 2022	68
6	Bangabandhu Memorial Hospital	13	< 350	14 December, 2021	37
7	Islami Bank Hospital	36	< 100	22 December, 2021	50
Government Hospital					
8	Chattogram Medical College Hospital	16	< 1,000	16 January, 2022	160

Reference: JPT

As shown in Table 2-70, the questionnaire results after the training at the model hospitals indicated that the majority of participants responded positively to the content and duration of the training. In the free comment section of the questionnaire, participants expressed opinions such as “I hope the training will be held regularly,” “I would like to share the knowledge I learned with my colleagues,” and “Proper waste management practices will contribute to the attractiveness of the hospital for people to want to visit”. Especially in the free discussion during the training for managers, there was a meaningful exchange of opinions, including a proposal for

collaboration among departments to establish a new waste management system within the hospital.

Table 2-70 Questionnaire Results after Training at Model Hospitals

Training for Managerial Class					Training for Cleaners			
Training session design	Poor	Average	Good	Excellent	Poor	Average	Good	Excellent
(1) The training in general	0	1	30	26	0	2	18	150
(2) Training contents	0	0	19	37	0	0	25	144
(3) Materials available	1	7	30	20	0	3	20	146
(4) Your understanding of medical waste segregation	1	8	28	20	2	0	20	145
Training session duration	Too long	Too short	Normal	Excellent	Too long	Too short	Normal	Excellent
(5) The training sessions were not too long, or short?	2	0	20	35	2	1	26	125

Reference: JPT

4) Follow-up of Training

After the training on proper separation and discharge of medical waste, the Project implemented follow-up on improvement of the in-hospital waste management system. In order to enable HCEs to improve their waste management conditions at each level, the results were divided into items (1) through (5), and an action plan was developed with individual achievement targets shown in Table 2-71. The action plan sheet actually utilized is shown in Fig. 2-37. Target achievement deadlines were determined in consultation with each HCE, and HCEs began their activities in order of priority. Experts and staff from the Project followed up with them by visiting them on a regular basis. In particular, “reviewing the arrangement of color bins” and “measures for identifying waste types in the collection process” were improved relatively quickly. On the other hand, “establishing separate sections in the storage rooms” and “establishing a system of recording and monitoring” took time to be approved and decided within the hospital. Consequently, it was difficult to make improvements within the achievement deadlines, but HCEs have begun to take steps toward improvement.

Table 2-71 Individual Goals for Improving Waste Management Conditions

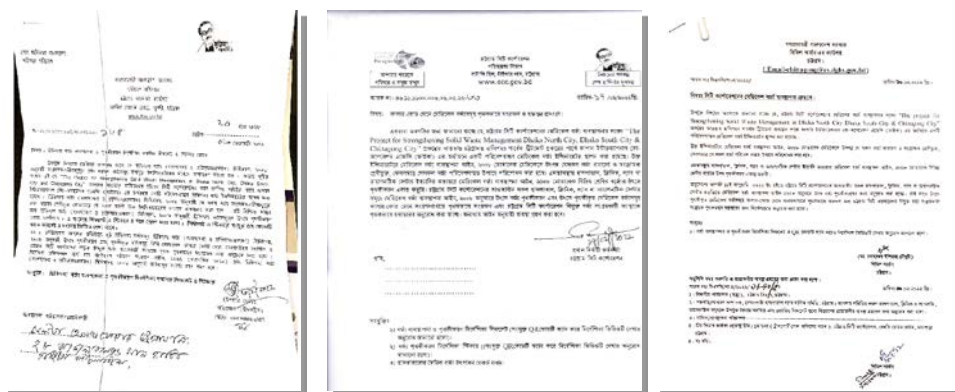
Achievement 1: Improvement of Waste Segregation at Source	1) Adopting proper Color Code. (Black: General, Green: Recyclable, Yellow: Infectious, Red: Sharp) 2) Introduce sufficient number of Color Bins. (Putting stickers of different colors on bins is good as a temporary measure) 3) Distribute the Color-Coded Bins depending on the purpose of room usage
Achievement 2: Improvement of Waste Collection and Transportation	1) Using the color polybags / Putting the color tags on polybags to identify the waste type. 2) Determining the waste collection route (It is desirable to avoid the pathways/ corridors which visitors & patients use) 3) Cleaners divided into a group by waste type and collect waste separately / Instruct cleaners not to mix different types of waste together
Achievement 3: Improvement of Storage Room	1) Establishing separate sections for each waste category in the storage room. 2) Establishing proper gate and roof for protection from rain, wind, sunlight and animals

5) Appeal for Proper Waste Separation to all HCEs in CCC

Since it was difficult to provide training on proper separation and discharge of medical waste to all HCEs in the area of CCC, the Project created an educational video, approximately 5 minutes in duration, summarizing the training content. The contents included (1) the need for waste separation; (2) rules for waste separation; and (3) points to remember in waste collection, transportation, and storage. The video was publicized on the Facebook page, and awareness-raising leaflets with QR codes linking to the video were distributed. In order to strengthen the monitoring system for medical waste separation, DOE (on February 3, 2022), CCC (February 17, 2022), and Civil Surgeon (February 19, 2022) issued letters to all HCEs in the area of CCC requesting proper separation of medical waste. Each letter stated that, in accordance with the Medical Waste Rules (2008), infectious waste and sharp medical waste should be incinerated after proper separation at the source. In particular, DOE stated that non-compliance with these instructions would result in legal action under the Environmental Conservation Act, (1995) and the Medical Waste Rules (2008). Along with these letters, the awareness-raising leaflets with QR codes shown in Fig. 2-38 were distributed to all HCEs in the area of CCC. In particular, the awareness-raising activities in Ward 8 were reported as a newspaper article shown in Fig. 2-39, as the Ward Commissioner took the initiative to participate in these activities, resulting in a significant awareness-raising effect.



Reference: JPT
Fig. 2-38 Awareness Raising Leaflet with QR code



DOE CCC Civil Surgeon



Newspaper article about the MWM awareness activity by Ward Commissioner

Reference: JPT
Fig. 2-39 Letters Issued by DOE, CCC and Civil Surgeon and Newspaper Articles

(3) Assessment of Proper Separation and Discharge of Medical Waste in Target HCEs

1) Regular Monitoring by CIs

The HCEs of Wards 8 and 16 where in-person training had been conducted, were regularly monitored by the CIs. Prior to the start of monitoring, group training was conducted to improve CIs' knowledge of proper separation and discharge of medical waste. The training was held in Ward 8 and Ward 16 on February 8, 2022

and February 20, 2022, respectively.

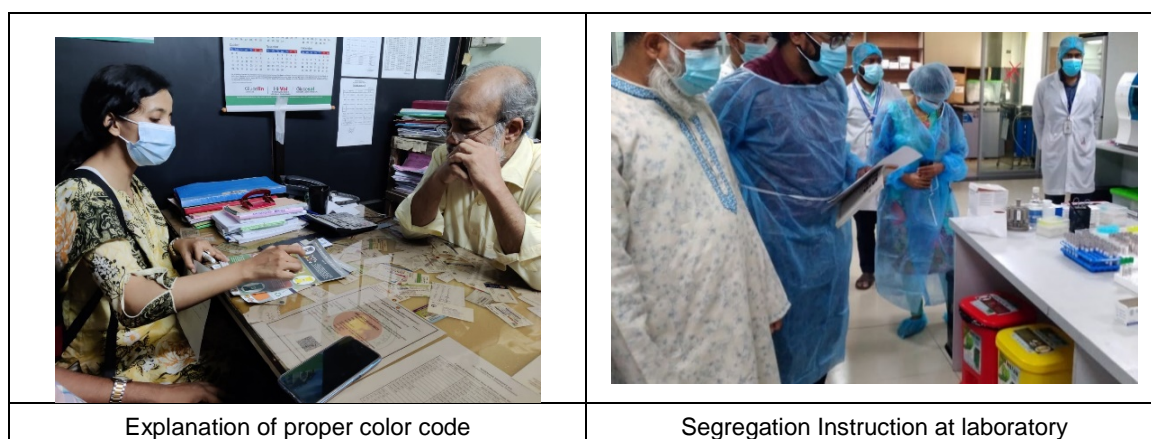
The CIs reported on the current status of each HCE being monitored and provided guidance for improvement based on the following checklist. Their activities are listed below.

Table 2-72 Confirmation Items in Regular Monitoring of HCEs (among 30 HCEs in total)

No.	Check List	Answer
1	Do they have contract with Collection Service Provider appointed by CCC?	Yes (95.0%) No (5.0%)
2	Do they use color code properly?	Yes (22.5%) No (77.5%)
3	Do they segregate the waste in the storage room/area? (Example: Using color polybags, color tags, Area sorting)	Yes (37.5%) No (62.5%)
4	Do they record the collected waste amount every day?	Yes (35%) No (65%)
5	Do they hang a poster or leaflet to educate on the proper waste segregation in the hospital?	Yes (30%) No (70%)

*The results as of 22 April, 2022

Reference: JPT



Explanation of proper color code

Segregation Instruction at laboratory

Reference: JPT (Photographs taken in March, 2022)

Photo 2-36 Regular Monitoring by CIs

JPT distributed awareness raising leaflets and action plan sheets regarding the proper medical waste management to model hospitals and large waste generating hospitals. The regular monitoring results showed that some hospitals had adopted and/or developed good practices. The following images are examples of good improvement.

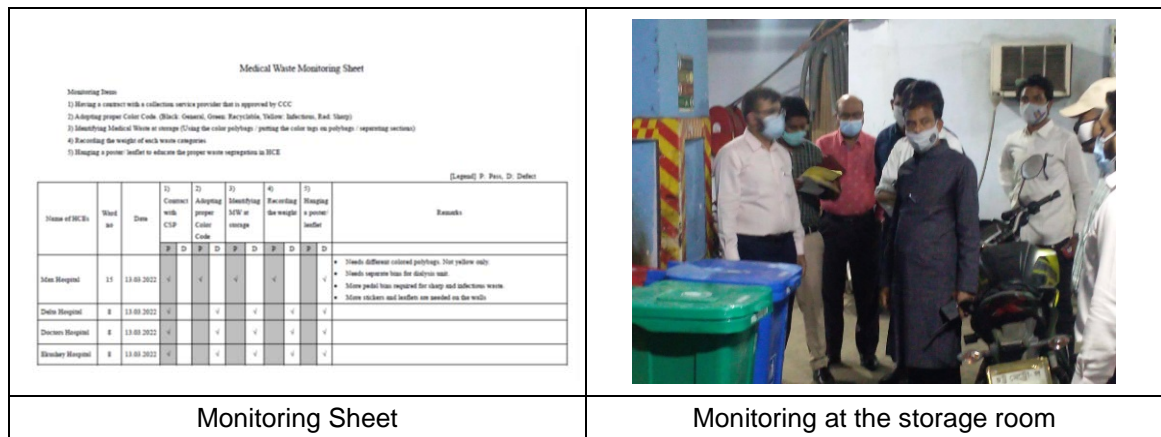
Relocated Color Bin (Max Hospital)	
	
Before the training (3 November, 2021)	After the training (17 January, 2021)
Area sorting at the storage (Parkview Hospital)	
	
Before the training (3 November, 2021)	After the training (17 January, 2022)
Area sorting at storage room (Chattogram International Medical College Hospital)	
	
Before the training (15 December, 2021)	After the training (13 January, 2022)

Reference: JPT

Photo 2-37 Examples of Improvements in Medical Waste Management

2) Monitoring of Separation Status of Medical Waste in Each HCE by CCC

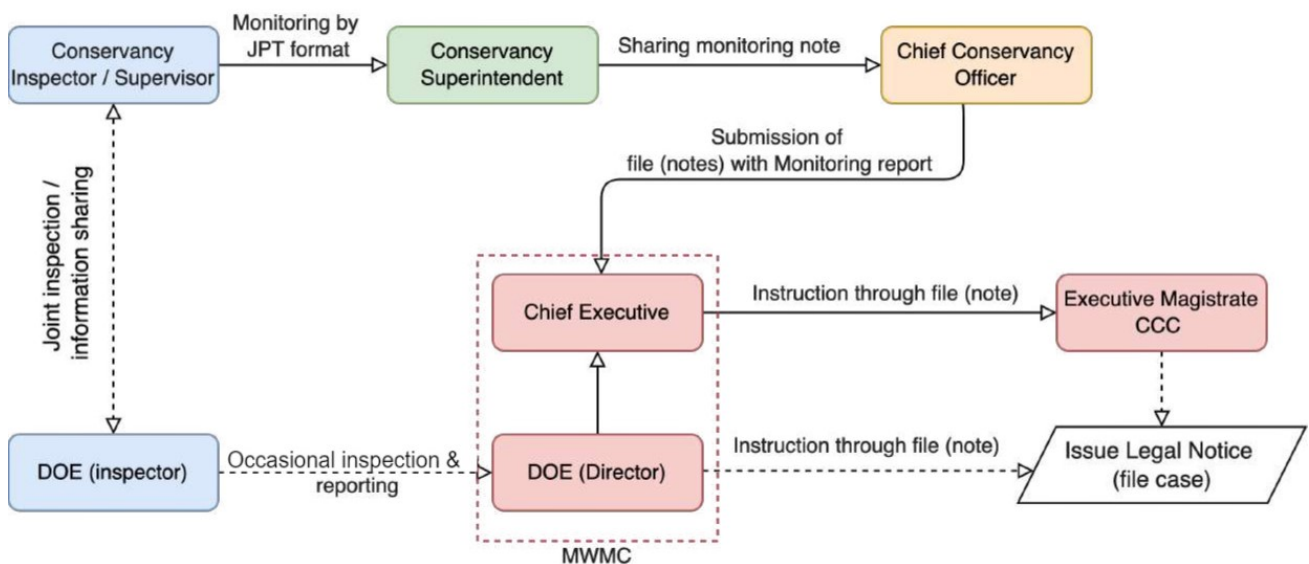
A monitoring system was established to monitor the waste separation status of each HCE under the leadership of CCC after the Project ends. The first survey by the monitoring team was conducted two months before the Project was scheduled to end, on March 7, 2022. The sheet shown in the lower left figure was used to assess the separation status, and it was decided that regular monitoring would be conducted once a week thereafter.



Reference: JPT (Taken in 20 February, 2022)

Photo 2-38 Monitoring of Separation Status of Medical Waste by CCC and DOE

The 2nd Medical Waste Management Committee was held on 26 April, 2022 and the Sustainable Medical Waste Monitoring System by CCC and DoE was proposed and committee members agreed it. The CI/CS assigned to each ward monitor the medical waste segregation condition using by the monitoring sheet which JPT prepared, and report the monitoring results weekly to the Chief Conservancy Officer in CCC. Monthly report of the medical waste monitoring also be submitted to the CEO of CCC and the Director of DOE and the administrative guidance is implemented for HCEs where segregation situation had not improved, and also occasional inspection are conducted by DOE inspectors.



*CI: Conservancy Inspector, CS: Conservancy Supervisor, DOE: Department of Environment, CCO: Chief Conservancy Officer

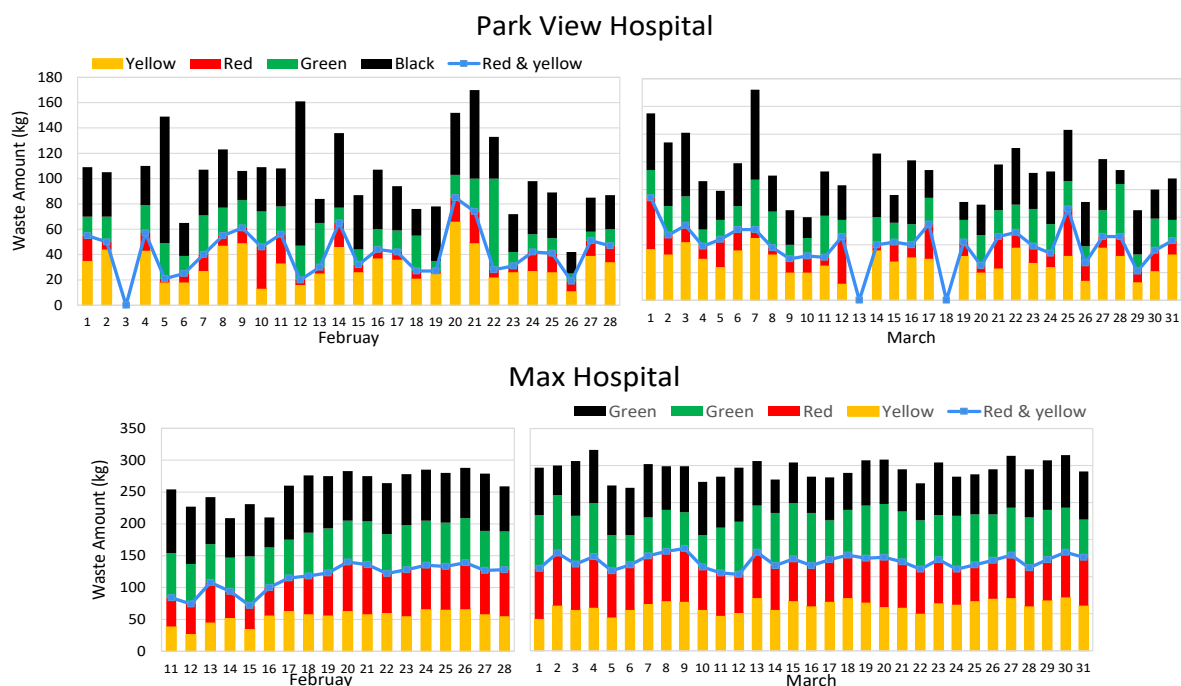
Reference: JPT

Fig. 2-40 Proposed MWM Monitoring System in CCC and DoE

3) Waste Separation and Incineration at Model Hospitals

The following table shows the daily discharge amount (kg) by the waste category at the model hospitals, Parkview Hospital and Max Hospital. At Parkview Hospital, the monthly average amount of infectious waste

generated in February 2022 was 40 kg/day, while at Max Hospital, the monthly average amount from mid-February to March was 118 kg/day.

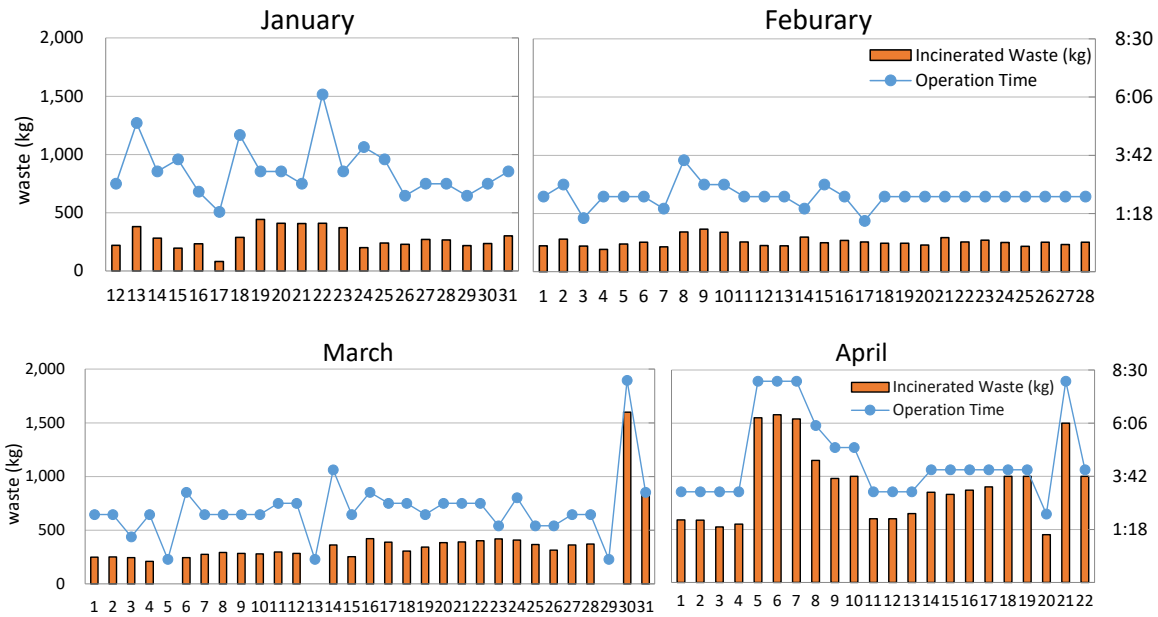


*Yellow (Infectious Waste), Red (Sharp Waste), Green (Recyclable Waste), Black (General Waste)
Reference: JPT

Fig. 2-41 Daily Discharge amount by Waste Category at Model Hospitals (kg)

The figure below shows the deviations in amounts of infectious waste from 12 January to 22 April, 2022 transported to the small incinerator installed in the Project. Since February 2022, regular monitoring has been conducted by CIs, and public awareness activities were widely promoted, including issuing of official letter from DoE, CCC and Civil Surgeon calling for proper waste segregation for all HCEs. However, the amount of medical waste transported from HCEs showed a flat trend, averaging only 268 kg/day from January to February.

On March 30, 2022, an investigation by DoE into the activity of illegal extraction site of medical waste near the Halishahar LFS and extensive administrative action to end this illegal activity led to an increase in the amount of medical waste incinerated to an average of 922 kg/day in April 2022.



Reference: JPT

Fig. 2-42 Deviations in Infectious Waste Amount Transported to the Small Incinerator

4) Awards to Ward and HCE satisfying the Evaluation Criteria

Based on the evaluation results of the regular monitoring, awards were given to the model hospital, Parkview Hospital, which had satisfied the standard points of each evaluation item, and to the Ward Mayor and CI of Ward 8, where positive improvement was observed in the entire ward. The award ceremony was held at Parkview Hospital on March 8, 2022, and was attended by the Mayor, the Ward Mayor and CI from Ward 8, and employees of Parkview Hospital.



Reference: JPT (Photographs taken in March, 2022)

Photo 2-39 Award Ceremony for Model Ward, Model Hospital and CI

5) Site visit tour to study proper segregation and discharge of medical waste

Together with holding of the 2nd meeting of MWMC, a site visit tour was scheduled to Parkview Hospital to inspect their good practices and to the small incinerator but it was canceled due to unavoidable reasons. Instead,

committee members continued opinion exchange. At that time, in addition to the committee members, representatives from HCEs, the collection service provider, and high officials from CCC gathered to exchange opinions on current issues and their causes from their respective viewpoints. Of particular interest was a response to a comment made by one HCE that the waste segregation system had not been improved due to lack of equipment because of financial problems, other hospitals suggested ways to improve the system while using existing equipment. CCC will conduct another site visit tour of the small incinerator after the project completion by themselves. In the site visit tour, the specifications of the incinerator and the changes in the amount of medical waste incinerated since the incinerator started operation in January 2022 up to date will be explained from operation staff to CEO of CCC.

Table 2-73 Overview of site visit tour

Date	26 April, 2022 *Cancelled
Place	Small Incinerator Plant (Halishahar Dumping Site)
Participants	MWMC, MWM Sub Committee, Directors in CCC, CCC Solid Waste Management Standing Committee, Waste collection service provider, Representatives from Parkview Hospital, JPT

Reference: JPT (Taken in March, 2022)



Reference: JPT (Taken on April 26, 2022)

Photo 2-40 Medical Incinerator Plant Site Visit Tour

(4) Awareness Raising on Medical Wastes to Households and Small HCEs by Utilizing WBA

Most of the medical waste generated from households and small HCEs in CCC is discharged as MSW. Accordingly, the Project conducted activities to raise awareness on proper waste separation among visitors at each HCE and to provide guidance on proper waste discharge for small-scale HCEs.

1) Raising Awareness among Visitors to Hospitals on Proper Waste Separation

In the HCEs where training was conducted on proper separation and discharge of medical waste, the Project instructed each discharge point in the hospital to place a colored bin for each use. Proper separation was also required at reception areas and hospital buildings, which are mainly used by visitors to the hospital. In these

places, it was essential to raise awareness and knowledge related to proper separation among visitors to the hospital as well as among the staff working in the hospital.

Accordingly, JICA Project Team discussed methods that were simple for each HCE to follow, and introduced measures that were visually easy for users to understand, such as “placing stickers on colored bins indicating the type of waste to be separated” and “displaying waste separation posters with illustrations of the types of waste that could be disposed of”. For Ward 8 and Ward 16, CIs also conducted awareness-raising activities for hospital staff as well as users during the CIs regular monitoring.

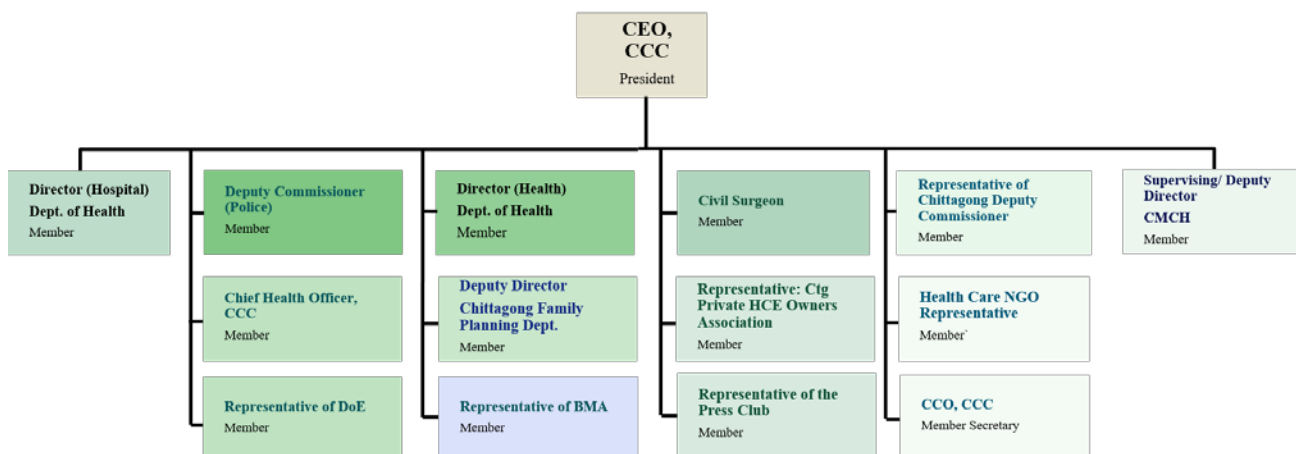
2) Guidance on Proper Discharge for Small HCEs

As earlier mentioned, in February 2022, letters on proper separation of medical waste were issued by DOE, CCC, and the Civil Surgeon and distributed to all HCEs in CCC. The letters and the leaflet with QR code for proper discharge were distributed to large hospitals as well as small HCEs, and helped to promote the expansion of contracts between HCEs and private collection companies.

2.9.5 Establishment of Future Medical Waste Management System

(1) Role of Medical Waste Management Committee

In order to continue medical waste management under the leadership of CCC, a new Medical Waste Management Committee was established in November 2021 with the participation of organizations involved in medical waste. This committee was chaired by the Chief Executive Officer (hereinafter referred to as “CEO”) of CCC and included members from the Ministry of Health, DOE, Non-Governmental Organizations (hereinafter referred to as “NGOs”), HCEs, as well as others. The organizational chart of the committee is shown below.



Reference: JPT

Fig. 2-43 Organizational Chart of Medical Waste Management Committee

The medical waste management committee received reports on regular monitoring by CCC and CIs, and mainly discussed agendas related to “operation and maintenance of medical waste incinerator by CCC”, “collection and transportation of medical waste by private companies”, and “medical waste separation and discharge at the

hospitals”. The first committee meeting on incinerator operation and maintenance was held on November 23, 2021 and was attended by the Waste Management Cell, WBA Core Group, incinerator operation team leader, and collection companies. The second MPMC was held on 26 April, 2022 and was attended by not only the committee members but also MPM Subcommittee members, directors from CCC, waste collection service provider, and representatives from private hospitals. The agenda of the meeting was explained in section 2.9.3.

(2) Implementation of Monitoring in Cooperation with DOE

As DOE had jurisdiction over medical waste disposal, DOE was encouraged to actively participate in the activities of the Project and manage medical waste in cooperation with CCC after the Project is completed.

DOE has been active in confirming the operation of the medical waste incinerator on March 30, 2022, as well as investigating the site of illegal extraction of medical waste near the Halishahar LFS. As a result of interviews with DOE, it was found that part of the medical waste was being illegally extracted for commercial purposes and processed by workers in an unsafe and dangerous manner. Thereafter, approximately 3 tons of waste was seized by DOE and properly treated in the incinerator.

At the hearing held on the following day, March 31st, the private collection companies and companies who had practiced illegal extraction were notified that they were prohibited from illegally extracting and illegally dumping resources. After the administrative guidance from DOE, the amount of medical waste incinerated increased from approximately 300 kg/day to approximately 900 kg/day.

In addition, DoE assistant director reported to the Civil Surgeon about the regular monitoring results and submitted the names of HCEs where no improvement was observed after the instruction. The Civil Surgeon convened members of the Private Hospitals Committee of Chattogram City to discuss the proper segregation of medical waste. In addition, six HCEs were subjected to unannounced inspections by the Assistant Director of the DOE and others.



Reference: JPT (Photographs taken on March 30, 2022)

Photo 2-41 Site Survey by DOE for Illegal Extraction of Medical Waste

Chapter 3 Training

3.1 1st SWM Training in Japan [Phase-1]

3.1.1 Objectives

The objective of the 1st training in Japan was to acquaint the trainees from Bangladesh with the SWM practices in Japan, covering institutional framework of related laws and regulations, as well as operational aspects of waste collection, treatment, and disposal methods for each waste type. The training program included both field visits and lectures, aiming at developing each participant's capacity on waste management. The participants also discussed the New SWM Master Plans 2018–2032 supported by this project, with various SWM officials, operators, service providers, as well as JICA and JPT.

3.1.2 Outline of the Training

(1) Participants

The participants of the 1st training in Japan are shown in Table 3-1.

Table 3-1 Participants of the 1st SWM Training in Japan

No.	Organization	Position
1	LGD	Deputy Secretary
2	WMD, DNCC	CWMO
3	WMD, DSCC	CWMO
4	WMD, DNCC	ACWMO (Zone 5)
5	WMD, DSCC	Executive Engineer (EE)

(2) Program

The 1st SWM training in Japan was held from May 21st to June 1st, 2018. Contents of the training are shown in Table 3-2.

Table 3-2 Program Contents of the 1st SWM Training in Japan

Date	Place	Purpose
Site Visit		
May 22 (Tue)	Ozenji Intermediate Treatment Center	To learn the technology of a solid waste incineration plant and recycling facility in Japan, aiming at the introduction of intermediate treatment in Bangladesh.
May 22 (Tue)	South branch office, Resources and Waste Recycling Bureau, City of Yokohama	To learn SWM operations at the branch office (collection vehicle allocation and management, driver management, public awareness for waste separation, and complaint management, etc.), aiming to gain knowledge to strengthen ward-based approach waste management in Bangladesh.
May 24 (Thu)	Central Breakwater Outer Landfill Site, Tokyo Metropolitan Government	To learn about improvement and management of LFS in Japan, aiming at the improvement of LFS management, and introduction of new LFS in Bangladesh.

Date	Place	Purpose
May 24 (Thu)	Tokyo Waterfront Recycle Power Co., Ltd.	To learn about medical waste collection, treatment, and disposal in Japan, aiming at improvement of medical waste management in Bangladesh.
May 25 (Fri)	Eco-System Chiba Co., Ltd.	To learn about industrial waste incineration in Japan, and to gain some idea of open-air (no built-up structure) facility, aiming at the introduction of intermediate treatment in Bangladesh.
Lecture		
May 23 (Wed)	History of Clean Dhaka Project	To understand the background of Dhaka's waste management, including technical cooperation and the grant aid projects from Japan.
May 24 (Thu)	Eco-Town	To learn the history of Japan's Eco-Town implementation and issues, aiming at Eco-Town implementation in Bangladesh.
May 25 (Fri)	Waste management in Japan (Laws and Regulations, plans, etc.)	To learn the history and overview of Japanese laws and regulation, and plans on SWM, aiming at developing laws and regulations in Bangladesh.
May 29 (Tue)	Future Waste Management Plan in Dhaka South City and Dhaka North City (Collection Vehicles and Organizational Structure)	To discuss detail planning for numbers of collection vehicles registered in each city corporation by type, and organizational structure review, for input necessary for future waste management plans.
May 29 (Tue)	Japanese yen loan	To learn details on the procedures of yen loan, aiming at introducing intermediate treatment facilities.
May 29 (Tue)	Future Waste Management Plan in Dhaka South City and Dhaka North City (Expansion area)	To discuss waste management (collection) strategy at the expansion areas, for incorporation in the future waste management plans.
May 30 (Wed)	Future Waste Management Plan in Dhaka South City and Dhaka North City (Eco-Town Planning)	To discuss development planning and target waste of Eco-Town, for the future waste management plans.

3.1.3 Achievement

The training contributed to each trainee's capacity development on waste management as well as awareness-raising for necessity of waste management improvement. In addition, it was an important opportunity for the trainees to consider understanding and adopting Japan's SWM technology and the management methods in Bangladesh. Upon their return to Bangladesh, the trainees reported at the JCC meeting on the achievements of the 1st training in Japan and shared their training experiences with related stakeholders. Photo 3-1 shows some events during the 1st training in Japan.



Reference: JPT (Photographs taken in May 2018)

Photo 3-1 1st SWM Training in Japan

3.2 2nd SWM Training in Japan [Phase-1]

3.2.1 Objectives

The 2nd SWM training in Japan aimed to teach the trainees from Bangladesh about Japanese waste management regulations, collection and treatment, disposal method, LFS rehabilitation method, as well as to provide them with the opportunity to obtain knowledge on intermediate treatment including incineration, Eco-Town and sea reclamation in order to consider the future waste management organization and systems.

3.2.2 Outline of the Training

(1) Participants

The participants are listed below. At the beginning, in addition to DNCC personnel, one official each from LGD and LGED, and three officials each from DSCC and CCC were also nominated as participants to the training. However, these candidate participants could not travel to Japan owing to Bangladesh’s late internal administration process and the DNCC officials were the only participants to join the training program.

Table 3-3 Participants of the 2nd SWM Training in Japan

No.	Organization	Position
1	DNCC (Zone 2)	Ward Councilor (Ward 7)
2	DNCC	Assistant CEO
3	ED, DNCC	Superintending Engineer (SE)

(2) Program

The 2nd SWM training in Japan was held from June 9, 2019 to June 15, 2019. Contents of the training are shown in Table 3-4.

Table 3-4 Program Contents of the 2nd SWM Training in Japan

Date	Place	Purpose
Site Visit		
June 10 (Mon)	Bio Energy Corporation (Tokyo Super Eco-Town)	To learn the technology of a biogas facility using food waste in Japan, with an aim at introducing intermediate treatment in Bangladesh.
June 10 (Mon)	Re-Tem Corporation (Tokyo Super Eco-Town)	To learn the technology of a recycling facility in Japan, aiming at introducing intermediate treatment in Bangladesh.
June 11 (Tue)	Katsushika Transfer Station	To learn the function of a solid waste transfer station and its operation, aiming at introducing a full-scale waste transferring system with compactors in Bangladesh.
June 11 (Tue)	Suginami Incineration Plant	To learn WtE technology for solid waste management in Japan, aiming at introducing intermediate treatment in Bangladesh.
June 12 (Wed)	Alfo Ltd. (Tokyo Super Eco-Town)	To learn the technology of a recycling and biogas facility using food waste in Japan, aiming at introducing intermediate treatment in Bangladesh.
June 12 (Wed)	Sea Reclamation Landfill Site	To learn the development of sea reclamation landfill site and its operation method in Japan, aiming at the development of landfill improvement and its operation in Bangladesh.
June 13 (Thu)	South branch office, Resources and Waste Recycling Bureau, City of Yokohama	To learn about SWM operation at the branch office level (collection vehicle allocation and management, driver management, public awareness for waste separation, and complaint management etc.), aiming to replicate similar activities in ward-based approach waste management in Bangladesh.
June 14 (Fri)	Itabashi Incineration Plant	To learn about WtE technology for solid waste management in Japan, aiming at introducing intermediate treatment in Bangladesh.
Lecture		
June 13 (Thu)	Interview with an incineration plant manufacturer (Mitsubishi Heavy Industries, Ltd.)	To interview a Japanese incineration plant manufacturer, aiming at introducing an incineration plant in Bangladesh.

3.2.3 Achievement

The training contributed to gaining knowledge on intermediate treatment including WtE and Eco-Town as well as awareness-raising for integrated waste management improvement and WtE implementation. The trainees reported their achievement at the JCC meeting after their return to Bangladesh, particularly about intermediate treatment in Japan which is mostly by incineration, Eco-Town's various treatment technologies, and land reclamation landfill, and shared their training experiences with related stakeholders. Photo 3-2 shows some events during the 2nd training in Japan.



Reference: JPT (Photos taken in June 2019)

Photo 3-2 2nd SWM Training in Japan

3.3 3rd SWM Training in Japan (Online) [Phase-2]

3.3.1 Objectives

The 3rd SWM training in Japan was held online and focused on discussions with the trainees to examine waste management in their own country through learning about advanced waste management practices in Japan and India.

The first half of the training program consisted of lectures on basic knowledge for 3R promotion, case studies of residents' awareness surveys, and waste reduction, while the second half focused on the preparation of 3R action plans by the trainees, under the program's overall aim of acquiring knowledge that can be applied at a practical level.

3.3.2 Outline of the Training

(1) Participants

The participants list for the 3rd SWM training in Japan is shown in the following table. A total six of participants from DNCC, DSCC and CCC attended.

Table 3-5 The participants list of 3rd SWM training in japan

No.	Organization	Position
1	DNCC	Assistant Chief Waste Management Officer (Community)
2	DNCC	Conservancy Inspector (Ward#19,20)
3	DSCC	Conservancy Officer (Zone#2)
4	DSCC	Conservancy Inspector (Ward#15)
5	CCC	Conservancy Inspector (Ward#27)
6	CCC	Conservancy Supervisor (Ward#18)

Reference: JPT

(2) Program

The 3rd SWM training in Japan was implemented from November 8 to 11, 2021. The contents of the training are shown in Table 3-6.

Table 3-6 Contents of the 3rd SWM Training in Japan

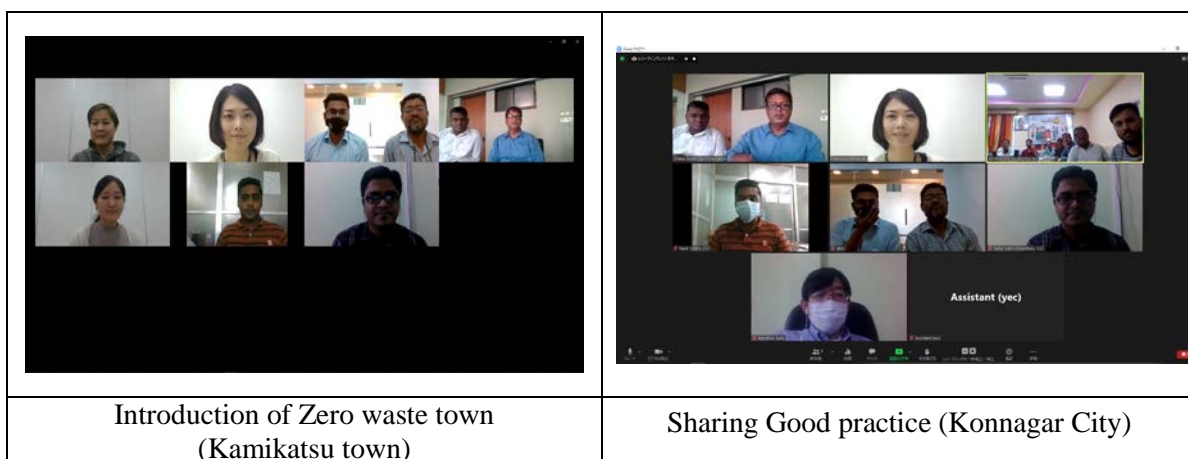
Date	Program	Contents
Day 1 11/8 (Mon)	Opening Remarks, Self-Introduction, Training Orientation	Introduction of the aim of the training course / Program / Housekeeping rules
	Sharing / discussing the current SWM situation / problem of each city	15 minutes presentation by DNCC, DSCC and CCC
	Kawasaki City's waste reduction plan and residents' awareness activities Kawasaki City, Japan	History and current status of waste management, basic plan and action plan for waste management, waste power generation, environmental education and public awareness
Day 2 11/9 (Tue)	Kitakyushu City Environmental Industry Promotion Policy (Kitakyushu Eco-Town Project) City of Kitakyushu, Japan	Introduction of the Eco-town, Recycling system / Industry-academia-government collaboration / Residents awareness / PR
Day 3 11/10 (Wed)	Introduction of Zero waste town, Residents' awareness and consensus building Kamikatsu Town, Japan	Introduction of efforts toward zero-waste in Kamikatsu Town, waste disposal volume and waste disposal costs (benefits of waste reduction and recycling)
	Good practice in neighboring country (Waste management system in the city of Konnagar) SWM Nodal Officer, Konnagar Municipality, India	Outline of the municipality's waste management system, operation and maintenance of transfer station, intermediate treatment facilities and Landfill sites
Day4 11/11 (Thu)	Presentation and discussion of 3R action plan	Presentation by DNCC, DSCC and CCC
	Closing Remarks JICA Global Environment Department	

Reference: JPT

3.3.3 Achievement

The 3rd SWM training in Japan was conducted as online training using Zoom application, since it was difficult to invite the counterparts to Japan due to the spread of COVID-19. The training contents included “public awareness methods for sustainable waste management, Eco-Town projects, and good practices in waste management systems in neighboring countries”, which provided the trainees with a broad range of knowledge. On the final day, the draft 3R action plans prepared by trainees from each city were presented, and an active discussion was held with the participants.

Unfortunately, the 3rd SWM training was held as online training but nevertheless trainees expressed positive opinions about the ease of participation (convenience) and the low cost to join the training. On the other hand, there were some negative opinions about problems with the internet connection and the lack of practical knowledge due to the absence of on-site training. Photo 3-3 shows the 3rd SWM online training in Japan.



Reference: JPT (Left photograph taken on November 10, 2021, Right photograph taken on November 11, 2021)

Photo 3-3 3rd SWM training in Japan (Online)

3.4 Third Country Training Program (TCTP) in Kolkata, India [Phase-1 & Phase-2]

3.4.1 Objectives

The objective of the third country training Program (hereinafter referred to as “TCTP”) was to provide an opportunity for the Bangladesh trainees to learn about waste management (waste separation, transfer, recycling, and final disposal etc.) not only in Japan but also in Kolkata, where JICA had provided technical assistance projects on waste management for years, in order to develop their capacities for solving the related issues.

3.4.2 Outline of the Training

(1) Participants

Participants of the e TCTP in Kolkata are shown in Table 3-7.

Table 3-7 Participants of the Third Country Training Program in Kolkata, India

No.	Organization	Position
1	WMD, DNCC	ACWMO (Zone 5)
2	WMD, DNCC	AE-Landfill
3	WMD, DNCC	AE-Landfill
4	WMD, DNCC	CI (Ward 10)
5	WMD, DSCC	ACWMO (Zone 5)
6	WMD, DSCC	ACWMO (Zone 4)
7	WMD, DSCC	CI (ward 31)
8	CCC	CCO
9	CCC	CI (Ward 27)
10	CCC	CS
11	CCC	CS

(2) Program

TCTP was held from December 3, 2019 to December 9, 2019. Contents of the training are shown in Table 3-8.

Table 3-8 Program Contents of the Third Country Training Program in Kolkata, India

Date	Place	Purpose
Site Visit		
Dec. 3 (Mon)	Compost Plant and Transfer Station in Uttarpara-Kotrung	To learn roles, operation methods, and how to manufacture high-quality compost at the compost plant which was constructed by Japanese Yen loan and to learn roles and operation methods of the transfer station, aiming at introducing intermediate treatment in Bangladesh.
Dec. 3 (Mon)	Regional Waste Management Center (RWMC)	To learn construction, operation and maintenance of a sanitary landfill at the landfill site constructed by Japanese Yen loan, aiming at the construction of new landfill site in Dhaka.
Dec. 4 (Tue)	Temporary Collection Site in Uttarpara-Kotrung	To learn waste separation methods in the municipality, aiming at waste reduction including 3R.
Dec. 4 (Tue)	Environmental Education Activities in Uttarpara-Kotrung	To learn about environmental education for waste separation in the municipality, aiming at waste reduction including 3R.
Dec. 5 (Wed)	Waste Collection Site, Transfer Station, and Landfill Site in Kolkata (in operation)	To learn about waste separation methods in big cities such as Kolkata, aiming at waste reduction including 3R, to learn construction, operation and maintenance of a sanitary landfill at the landfill site managed by Kolkata City, aiming at the construction of new landfill site in Dhaka, and to learn roles and operation methods of the transfer station.
Dec. 6 (Thu)	Waste Landfill Site in Kolkata (closed)	To learn an example landfill closure and management methods in a big city such as Kolkata, aiming at proper landfill closure of landfills in Bangladesh.
Lecture		
Dec. 4 (Tue)	Waste Management System in Uttarpara-Kotrung	To learn waste management activities at the municipality level in accordance with Solid Waste Management Rules 2016.
Dec. 5 (Wed)	Waste Management System in Kolkata	To learn waste management activities at the city level in accordance with Solid Waste Management Rules 2016.
Dec. 6 (Thu)	Waste Management System in Waste Bengal State	To learn waste management activities at the state level in accordance with Solid Waste Management Rules 2016.

3.4.3 Achievement

The training contributed to each trainee’s capacity development on waste management. In addition, it was a great opportunity for the trainees to think about adopting India’s technology and the management methods to Bangladesh through understanding Indian waste management and practices. The trainees reported their achievement at WBA Core Group meetings and shared the experiences with related stakeholders. Photo 3-4 shows some events during the TCTP.



Reference: JPT (Photographs taken on December 3, 2018)

Photo 3-4 Third Country Training Program in Kolkata, India

Chapter 4 Other Activities

4.1 Field Visit in Cox's Bazar

4.1.1 Schedule

A field visit was made to Cox's Bazar on December 3 and 4, 2018 in order to identify the SWM conditions there. Table 4-1 shows the schedule of field visit.

Table 4-1 Schedule of the Field Visit in Cox's Bazar

Date	Time	Program	Location
December 3, 2018 (Mon)	8:15 ~ 9:20	Dhaka-Cox's Bazar by Novo Air (VQ-931)	-
	10:00 ~ 12:00	Visit Cox's Bazar Paurashava, Solid Waste Dumping Site	Cox's Bazar
	12:00 ~ 13:00	Move to Ukhia	-
	13:00 ~ 15:30	Visit Kutupalong/Balukhali Camp Site (Solid waste management in camps UNHCR Oxfam prepared landfill site, JICA Deep Tube-well, Japan RC, etc.)	Ukhia
	15:30 ~ 16:00	Visit Ukhia Upazila UNO/UDF, Community Clinic site visit	Ukhia
	16:00 ~ 17:30	Ukhia to Hotel	-
December 4, 2018 (Tue)	8:30 ~ 10:00	Move from Hotel to Teknaf	-
	10:00 ~ 11:00	Teknaf Upazila UNO/UDF Meeting	Teknaf
	11:00 ~ 13:00	Visit Leda Camp and Nayapara Camp	Teknaf
	13:00 ~ 15:00	Move from Teknaf to Hotel	-

Reference: JPT

4.1.2 Results

(1) Cox's Bazar Paurashava

Cox's Bazar City Corporation Paurashava⁶⁷ does not have a Waste Management Office and has a low interest in SWM. The landfill, located close to a residential area is an open dumping site without cover soil, etc., which poses concerns over scattering of waste to nearby houses. Extending on the waterfront (riverside), the landfill poses an environmental risk of polluting the waterfront by leachate generated from landfilling operation as well as a public health risk. Preventive measures are needed to mitigate against



Reference: JPT (Photograph taken on December 3, 2018)

Photo 4-1 Dumping site in Cox's Bazar

these risks. Since the relocation of the landfill requires time and money, JPT proposed immediate solutions and

⁶⁷ Paurashava is a local government smaller than City Corporation.

gave guidance on improvement through simple civil engineering work (hand-dug ditch and/or embankments).

(2) Ukhia Upazila

The SWM in the refugee camp in Ukhia was observed. Under UNHCR coordination, multiple support groups and NGOs were implementing support projects. Regarding SWM, JPT inspected the human-waste retention facilities and small waste separation platforms operated by Oxfam. The NGOs provided support by organizing sanitation volunteers. The main roads in the camp were kept sanitary but the waste was scattered behind the market, etc.



Reference: JPT (Photographs taken on December 3, 2018)

Photo 4-2 Field Visit in the Refugee Camp in Ukhia

(3) Teknaf Upazila

The staff of Teknaf Upazila Office expressed strong concern for the poor SWM conditions in their area and asked for technical guidance on improvement. Teknaf Upazila did not have a landfill, and waste was dumped illegally along roads. The illegal dumping sites were on the riverside. Although a dam was set up in the river, it was doubtful that environmental pollution could be easily prevented. Since the SWM administration was quite limited, it was desirable to improve the administrative capabilities of Teknaf Upazila through intercity exchange with Dhaka North and Dhaka South Cities.

Although the refugee camp had sorting bins supplied by UNICEF, their effective use was not confirmed at the time of the inspection. While it is evidently clear that a landfill site must be secured for the sake of proper disposal of waste, JPT provided guidance on measures to be taken by the Bangladeshi side by doing gradual improvements through, for example, digging holes in vacant lots near the refugee camp and burying waste in them to prioritize securing of a sanitary environment in the living area because, the more distant from a discharge source the landfill will become, the more difficult it will be to collect and transport waste.



Reference: JPT (Photos taken on December 4, 2018)

Photo 4-3 Field Visit in Teknaf

(4) Direction of Technical Support

Based on the results of the field visit, the priority items in the examination of technical support were organized as follows:

[Priority items]

- i. Continuous support systems, such as visiting facilities in Dhaka North and Dhaka South Cities, and information exchange with related officials of the two cities were important in providing the Upazila offices and CCs the opportunity to understand the requirements of proper SWM.
- ii. Both in host communities and refugee camps, priority should be given to creating a system for adequately collecting waste from target areas.
- iii. The establishment of a temporary SWM unit within the CCs should be the premise for providing support to facilities' development. A SWM organization was indispensable to receive basic knowledge on SWM and landfills and enhance the capability of maintenance and management of facilities by, for example, enhancing an intangible component (technical support).

Table 4-2 shows the details of the technical guidance provided in the target areas.

Table 4-2 Technical Guidance Provided in Field Inspection at Cox's Bazar

Inspection target	Technical guidance
Cox's Bazar (Open landfill)	<ul style="list-style-type: none"> • Prevent complaints from nearby residents by, for example, making sure that waste does not get scattered around the landfill. Pay attention to maintenance and management by, for example, creating hand-dug ditches around the landfill and building embankments for access roads as measures against leachate flow outside the site, so that the landfill can be used for as long as possible before closing it. • Make good use of the former landfill by, for example, planting trees in it after closure. • Basic knowledge of SWM and landfills must be provided. It is advisable to provide opportunities for inspecting landfills of DNCC and DSCC and exchanging information with WMD.

Inspection target	Technical guidance
Refugee camp in Ukhia	<p>[Human-waste retention facilities and small human-waste treatment facilities]</p> <ul style="list-style-type: none"> For the human-waste retention facilities, guidance must be provided on maintenance and management so that anaerobic treatment is performed (use as an anaerobic human-waste retention facility). Retain human-waste in the 24 retention tanks installed in the camp for as long as possible to use them as digester tanks. Pay attention to the danger of methane gas explosions. <p>[Separation]</p> <ul style="list-style-type: none"> A small waste separation platform that has been installed is contributing little to waste disposal. Sorting bins (two classifications) that have been supplied are not fully functioning. Awareness-raising of residents through sanitation volunteers, etc. is required. <p>[Other]</p> <ul style="list-style-type: none"> Basic knowledge of SWM and landfills must be provided to NGOs that manage the camp. They can come to DNCC and DSCC to learn.
Teknaf (Open landfill)	<ul style="list-style-type: none"> Although a dam has been constructed, environmental pollution is unavoidable. Since waste has already been dumped, restoration to the original state is extremely difficult. Basic knowledge of SWM and landfills must be provided. It is advisable to provide opportunities for inspecting landfills of DNCC and DSCC and exchanging information with WMD.
Refugee camp in Teknaf	<ul style="list-style-type: none"> Sorting bins for two classifications that have been provided are not used. Look for a temporary landfill (vacant lot where holes can be dug to bury waste) because, the more distant it is from the camp, the more difficult it becomes to transport waste to it.

Reference: JPT

4.2 Cooperation Related to Implementation of Mid-Term Project Evaluation

The first Mid-Term Project Evaluation was conducted from February 14 to 20, 2019. JPT made advance preparation such as coordination for field inspection, accompanied the evaluation team, and provided materials as required. Table 4-3 shows the details of the major activities.

Table 4-3 Outline of the 1st Mid-Term Project Evaluation

Date	Activities	Contents
Feb. 14, 2020	Arrival at Dhaka of Evaluation Team	-
Feb. 15, 2020	Meeting with JICA Bangladesh Office	JCC, PDM, activities in Phase 2, PR activities and achievement, the organizational structure of the workshop improvement activities, trainee selection for training-in-Japan, monitoring sheet, future activities in CCC, future plan for 12CC meeting, staff relocation in each CC, etc.
Feb. 16, 2020	DNCC site visit	WBA2 (DNCC W2)、WBA1 (DNCC W27 & W32), Amin Bazar LFS
Feb. 17, 2020	The 4 th JCC meeting	<ol style="list-style-type: none"> (1) Project progress (2) Master Plan preparation schedule (3) Importance of Eco-Town implementation and decision making (4) Japanese ODA loan process and procedures

Date	Activities	Contents
Feb. 18, 2020	Meetings with DNCC and DSCC	DNCC: Effects of WBA, WBA and waste collection plan in the expansion area, Eco-Town, improvement of LFS, etc. DSCC: Effects of WBA, Eco-Town (without WtE implementation), WBA and waste collection plan in the expansion area, training-in-Japan, etc.
Feb. 19, 2020	DSCC site visit, trip to Chattogram	WBA3 (DSCC W50), Matuail LFS
Feb. 20, 2020	Courtesy visit to Mayor and CEO, trip to Dhaka	-
Feb. 21, 2020	Waste collection site visit, depart from Dhaka	Workshop visit (constructed by JICA grant aid), container removed are at Danmondi (DNCC W12), fixed-place fixed-time collection with a compactor by PCSP

Reference: JPT

4.3 Emergency Support for prevention of COVID-19 infection

4.3.1 Overview

Following the worldwide epidemic of COVID-19, the first infection case in Bangladesh was confirmed in March 2020. Even during the capital lockdown, waste management field workers, considered as essential workers, continued their cleanup work. Under such circumstances, the Project provided the following support from May 2020 as an emergency response; (1) establishment of various guidelines and awareness tools specializing in measures against COVID-19 infection, (2) OHS measures and guidance for field workers such as cleaners, and (3) awareness-raising activities for residents and HCEs for proper sorting and disposal of infectious (high-risk) waste. Specifically, a total of about 70,000 safety equipment (masks, gloves, etc.) and about 330 pocket books were distributed to field workers in all three cities, and safety equipment training was held for more than 1,000 people. Six types of leaflets were prepared for citizens, cleaners, waste collectors, drivers, landfill site workers, and workshop staff (mechanics), and about 40,000 leaflets were distributed in the three cities. The contents of the leaflet were widely disseminated on TV and digital bulletin boards in collaboration with PRD of the three cities, and also in collaboration with other JICA projects, which enabled providing of about 46,000 leaflets to the four CCs in Bangladesh (Rangpur CC, Narayanganj CC, Gazipur CC and Cumilla CC) for distribution within these cities.

As a result of these support activities, as of January 2021 the percentage of cleaners wearing masks exceeded 70% in all three cities, confirming an improvement in OHS awareness among them. In addition, a series of guidelines and awareness tools prepared in the Project were posted on the JICA website⁶⁸ and were used in other countries such as South Sudan, contributing to the prevention of the spread of COVID-19 infection and the improvement of OHS of field workers.

⁶⁸ JICA "Support for COVID-19 infection control in the field of waste management" (in Japanese, with some parts in English) (viewed April 5, 2022)
https://www.jica.go.jp/activities/issues/env_manage/corona.html

4.3.2 Contents of Assistance

Fig. 4-1 shows a list of COVID-19 infection prevention measures in the waste sector, organized according to the waste flow. Among these, five components in the red boxes were implemented with the emergency assistance. Three components in the blue boxes were implemented under Output 8 of this Project, which was added in January 2021. Both emergency and Project assistance covered the entire waste flow from discharge to final disposal and strengthening of the implementation system (refer to Attachment 23).

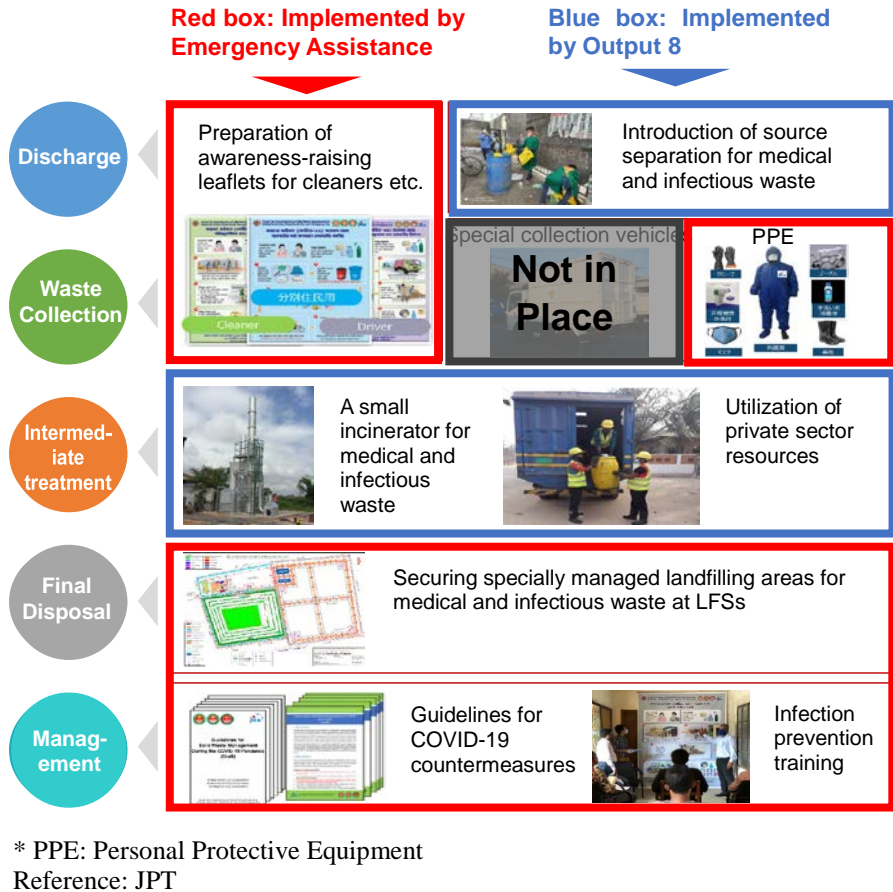


Fig. 4-1 Emergency Assistance for COVID-19 Infection Prevention (including Output 8)

(2) Leaflets and Pocket-Sized Manuals for COVID-19 Infection Prevention

The Project prepared and distributed leaflets in Bengali with illustrations to provide basic measures for COVID-19 infection prevention in an easy-to-understand manner. There were six types of leaflets, targeting: residents, cleaners, collection workers, drivers of collection vehicles, LFS workers, and staff of vehicle repair facilities (workshops). Approximately 40,000 leaflets were distributed in the 3 cities to raise awareness. The contents of the leaflet were widely disseminated through TV and digital bulletin boards in cooperation with the public relations departments of the three cities. Approximately 46,000 leaflets were also distributed in four regional cities in Bangladesh (Rangpur, Narayanganj, Gazipur, and Comilla) in collaboration with other JICA projects underway there.

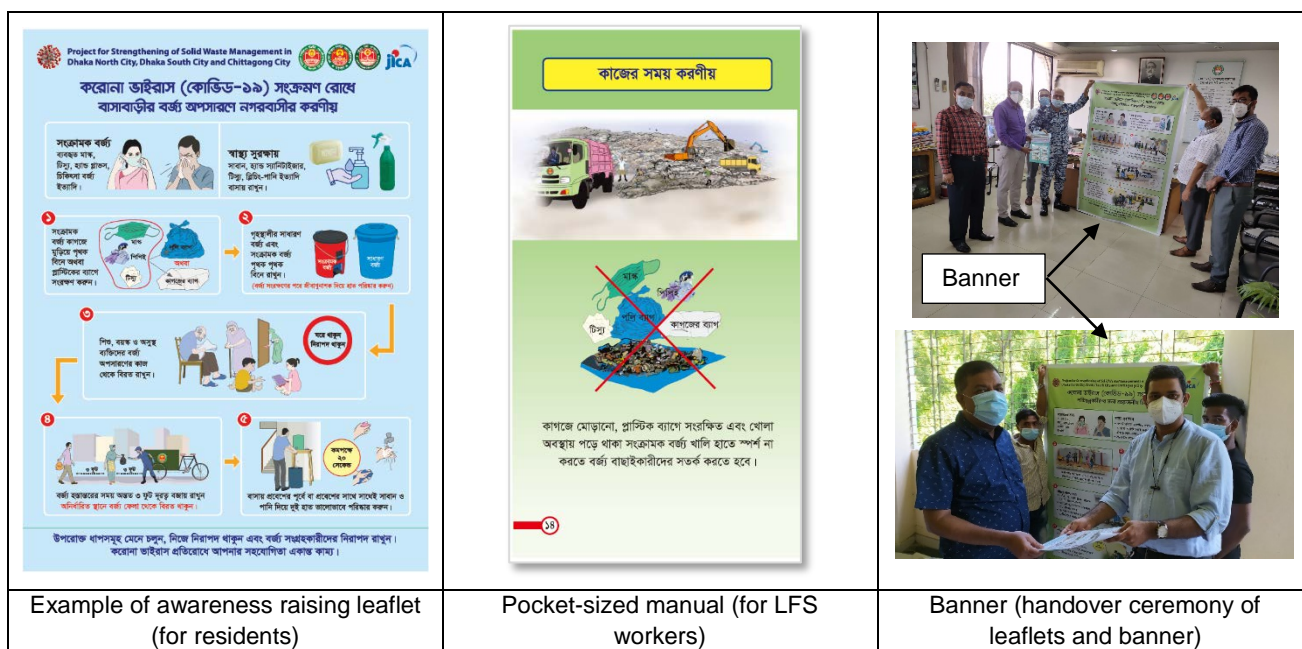
In addition, 330 pocket-sized manuals containing more detailed preventive measures were distributed to CIs

and LFS workers, and guidance was provided. The pocket-sized manual for CI was designed to be more practical, with a checklist of necessary measures, including the contents of guidance for each ward's cleaning workers and items to be informed at the time of roll call. The banners were enlarged printouts of the same contents as the leaflets, and the ward cleaning offices, LFS administration offices, and workshops in the 3 cities received one copy respectively.

Table 4-4 Distribution of COVID-19 Infection Prevention Leaflets and Pocket-Sized Manuals

Item		DNCC	DSCC	CCC	Others (4CC)	Total	
Leaflet	Citizen	10,000	10,000	10,000	45,500	84,550	
	Cleaner	4,000	3,000	2,050			
	Waste collector						
	Waste collection Driver	200	300	167		667	
		Landfill staff	50	50	40		140
		Workshop worker	50	50	30		130
Pocket size Manual	Cleaner	60	75	55		190	
	Landfill staff	50	50	40		140	
Banner	Cleaner (Ward SWM Office)	61	60	41		162	
	Landfill staff	2	2	2		6	
	Workshop worker	2	2	2		6	

Reference: JPT



Reference: JPT (upper right photograph: July 16, 2020; lower right photograph: July 15, 2020)

Fig. 4-2 Example of COVID-19 Infection Prevention Leaflet and Pocket-Sized Manual

(3) Distribution of Safety Gear and Non-Contact Thermometers

To prevent COVID-19 infection, the Project provided DSCC, DNCC and CCC with approximately 70,000 sets

of safety gear and non-contact thermometers as shown in Table 4-5 (DNCC: July 28, 2020; DSCC: July 29, 2020; CCC: August 4, 2020). Safety gear were distributed to cleaners, LFS workers, and workshop staff, and fabric masks were distributed to road sweepers. Protective clothing, boots, protective glasses (goggles), gloves, and cloth masks were distributed to drain cleaners, LFS workers, and workshop staff. One set of alcohol disinfectant and non-contact thermometers were distributed to each ward cleaning office.

Table 4-5 Distribution Records of Safety Gears and Non-Contact Thermometers

Item		DNCC	DSCC	CCC	Total
Safety gear distribution	Coverall suit	190	190	190	570
	Gum Boot	190	190	190	570
	Goggles	190	190	190	570
	Gloves	790	790	790	2,370
	Washable masks	14,700	28,650	19,800	63,150
Alcohol-based hand rub		38	59	44	141
Infrared Thermometers		39	60	45	144

Reference: JPT



Reference: JPT (left photograph: July 29, 2020; right photograph: August 4, 2020)

Photo 4-4 Safety Gear Supply Ceremony (DSCC and CCC)

(4) Assistance in Designing a Landfill for Medical Waste

1) Objective

In the area of DSCC, each Health Care Establishment (hereinafter referred to as “HCE”) is responsible for the management of medical waste within the hospital, and the local government is responsible for collection and transportation to the landfill. DSCC and DNCC have outsourced medical waste collection and transportation services to PRISM Bangladesh Foundation (hereinafter referred to as “PRISM”) since 2006. PRISM sterilized and recycled the medical wastes collected from each HCE or disposed them with ash in a dedicated cell for medical waste in Matuail LFS after incineration. However, due to the recent expansion of COVID-19 infection, the discharge amount of medical waste had increased rapidly, and the remaining capacity of Matuail LFS was approaching its limit. Accordingly, in order to meet the urgent need for the construction of a new medical waste landfill, the Project prepared a new draft guideline for the planning, design, construction, and operation of

medical waste landfill in the Matuail LFS.

2) Guideline for Medical Waste Landfill in Matuail LFS (draft)

In order for DSCC to promote proper management of medical waste and provide basic policies and technologies for planning, design, construction, and operation of medical waste landfill in Bangladesh, the Project provided assistance to DSCC in preparing a draft guideline for medical waste landfill. The structure of the draft guideline and a set of reference drawings are shown in Table 4-6 (Attachment 21-(5)).

Table 4-6 Structure of Technical Guideline for Medical Waste Landfill (draft)

Technical Guideline (Main Part)		Reference drawing of Medical Waste Landfill Site
Part I: General Information		General
Part II: Introduction and Basic Design of Medical Waste Landfill Site		- List of Drawings
Chapter 1	Landfill Concept	- Layout Plan of Matuail Landfill Area
Chapter 2	Scope of Application	Landfill
Chapter 3	Planning of Medical Waste Landfill System	- Layout Plan of Medical Waste Landfill Facility
Chapter 4	Formulation of Controlled Landfill System	- Typical Section of Medical Waste Landfill Site
Part III: Technical Guidelines on Controlled Landfill System		- Detail Plan of Waste Filling (After Completion)
Chapter 1	General	- Detail Plan of Land Development
Chapter 2	Waste Retaining Facility	- Detail Plan of Groundwater Collection Facility
Chapter 3	Underground Water Drainage Facility	- Layout Plan of Liner Facility
Chapter 4	Liner Facility	- Detail of Liner Facility
Chapter 5	Leachate Collection Facility	- Layout Plan of Leachate Collection Facility and Gas Control Facility
Chapter 6	Gas Venting Facility	- Detail of Leachate and Gas Collection Facility
Chapter 7	Leachate Treatment Facility	- Structural Drawing of leachate and Groundwater Collection Pit
Chapter 8	Storm water Drainage Facility	- Detail Plan of Operation Road
Chapter 9	The Landfilling Process	- Layout Plan of Groundwater Monitoring Well
Chapter 10	Landfill Control Facilities	- Detail of Groundwater Monitoring Well
Chapter 11	Other Related Facilities	
Chapter 12	Capital Costs for Construction of New Landfill Sites	

Reference: JPT

(5) “Guideline for COVID-19 Control in Waste Management” and “Emergency Measures for COVID-19 Expansion Control in Medical Waste Management (draft)”

In Bangladesh, in July 2020, the Ministry of Health was in the process of developing guidelines for medical waste disposal for COVID-19 infection control, but the increasing amount of infectious waste required rapid implementation of infection control measures. For this reason, DSCC, DNCC and CCC developed their own guidelines prior to the national guideline. There were two types of guidelines: “Guideline for COVID-19 Control in Waste Management,” which summarized infection prevention measures needed in the process of on-site work

of waste management from the perspective of the Waste Management Department, which was C/P of the Project; and “Emergency Measures for COVID-19 Expansion Control in Medical Waste Management,” which summarized basic infection control measures for medical waste and emergency measures to reduce the risk of infection expansion at landfills. In developing these guidelines, the guidelines of the World Health Organization (hereinafter referred to as “WHO”) and other agencies of the United Nations were used as references.

By providing guidelines in the early stages of COVID-19 infection expansion, JPT and C/Ps were able to share a common understanding even under the remote assistance situation, and C/Ps could ensure infection control measures at the sites.

Table 4-7 Distribution Records of COVID-19 Infection Prevention Leaflets and Pocket-Sized Manuals

Item	DNCC	DSCC	CCC	Total
Guidelines for Solid Waste Management During the COVID-19 Pandemic (draft)	15	15	12	42
Technical Guidance Medical Waste Management Response to COVID-19 (draft)	15	15	12	42

Reference: JPT

(6) Training and Monitoring on Safety Gear Use

1) Training on Safety Gear Use

Along with the provision of safety gear, training on the use of safety gear and non-contact thermometers was implemented in July and August 2020 for a total of more than 1,000 on-site workers, cleaners, LFS workers, and workshop staff, as shown in Table 4, in order to inform them about how to use safety gear and non-contact thermometers and prevention measures against COVID-19 infection.

Table 4-8 Training Record on Safety Gear Use

Participants	DNCC	DSCC	CCC	Total
Field-level officials	50	28	41	119
Cleaner	298	286	272	856
Landfill staff	35	30	20	85
Workshop worker	35	20	40	95
Total	368	364	373	1,155

Reference: JPT



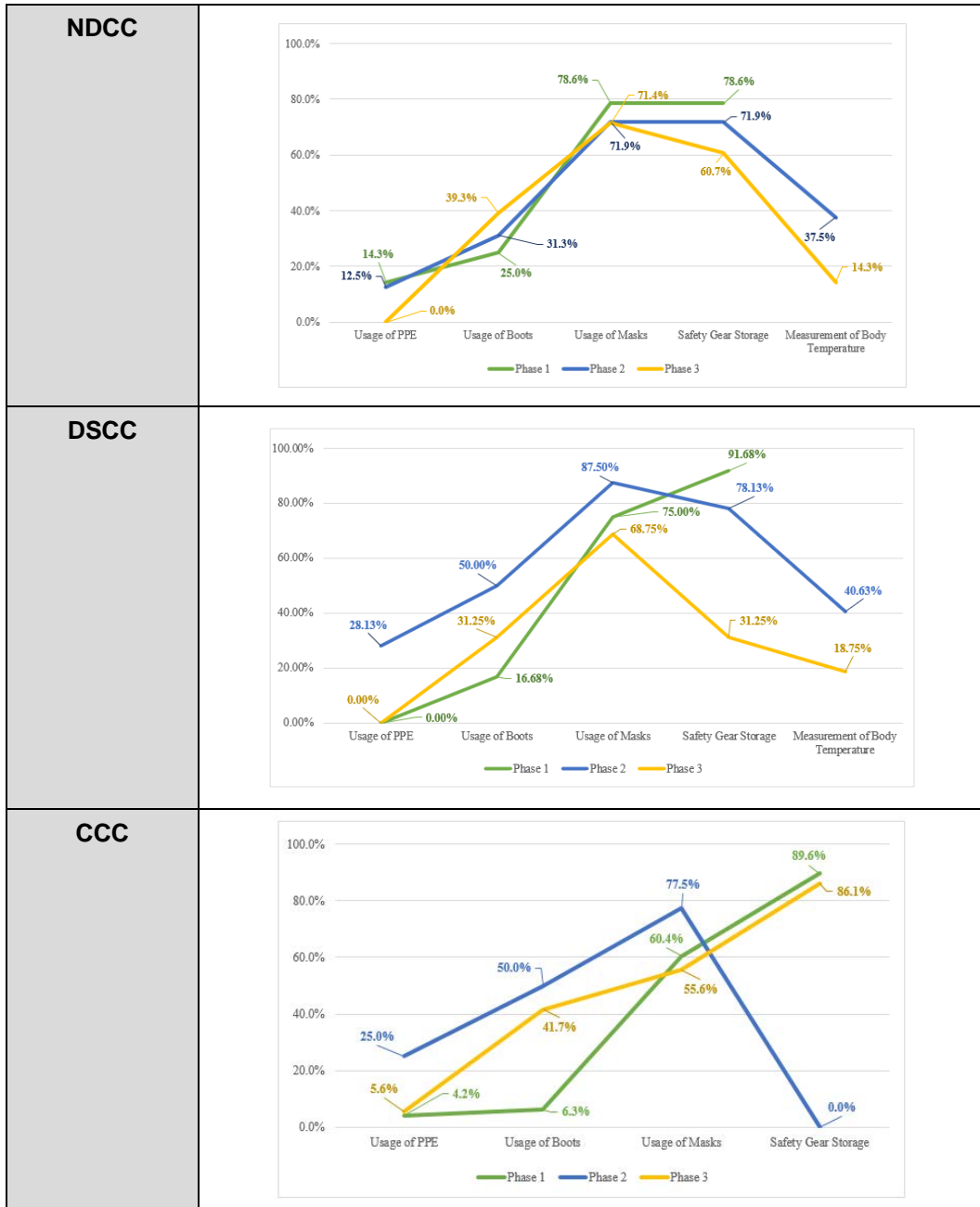
Reference: JPT (Upper left photograph: August 25, 2020; upper right photograph: August 27, 2020; lower left photograph: August 15, 2020; lower right photograph: July 29, 2020)

Photo 4-5 Safety Gear Supply Ceremony

2) Monitoring of Safety Gear Use

Monitoring of safety gear use was carried out for one year over three phases. The results of the monitoring showed that the wearing rate of masks remained relatively high. However, there were negative opinions about wearing other safety gear because it was not a custom to wear them and they were uncomfortable while working on the sites in summer due to the high temperature and humidity. The storage rate of safety gear had decreased over time in all three cities, but this may be caused by the durability of the safety gear itself, in addition to management issues. Although the use period differed depending on the safety gear, they were basically consumable items and should be replaced every six months or so, depending on the C/Ps' budgets.

- Phase 1: August 2020 to October 2020
- Phase 2: November 2020 to January 2021
- Phase 3: February 2021 to August 2021



Reference: JPT

Fig. 4-3 Record of Monitoring on Safety Gear Use (DSCC, DNCC and CCC)

Chapter 5 Issues, Ideas and Lessons Learned in Implementation and Management of the Project

5.1 Issues, Ideas and Lessons Learned from the Project Management

The COVID-19 pandemic that occurred during the Project, had a great influence on the Project's progress. On the other hand, the strong foundation of SWM established by Bangladesh with the backing of a series of JICA support activities over the past twenty years, facilitated the speedy distribution of the safety gear and safety training sessions provided by JICA emergency support against COVID-19 to Bangladesh in 2020. In addition, and thanks to JICA's appreciation of the gravity of the pandemic and flexible project management attitude, the Project was able to provide new support for strengthening medical waste management capabilities that were not included in the original project scope.

Table 5-1 summarizes the issues, ideas and lessons learned through the Project implementation and management.

Table 5-1 Issues, Ideas and Lessons Learned on the Project Management

Issues	<ol style="list-style-type: none"> 1) <u>Delay of activities due to COVID-19:</u> Activities were delayed due to lockdowns and voluntary ban on leaving home. Especially, most activities that required gathering of people such as WBA activities and events for raising citizens' awareness were postponed. [General] 2) <u>Functions of JCC:</u> Although the MP contents and Eco-Town concepts were frequently discussed in JCC meetings, LGD Minister announced a policy on Waste-to-Energy different from what was discussed in JCC; which indicated that JCC decisions were not properly reported to LGD Minister, i.e., no actions were taken on decisions made by JCC. In addition, the New Master Plans had still not been approved at the completion of the Project, after more than two years of continuous coordination with C/Ps and LGD to arrange the explanatory meeting with the Minister and expedite the approval procedure. Lack of approval of the New MPs has resulted in delays in project progress and implementation of the New MPs. [Related to Output 1] 3) <u>Delay of Administration Process regarding Japan and Third Country Training Visits:</u> Counterparts from LGD, DSCC and CCC were not able to participate in the Japan training visit in June 2019 due to delays in the administration process such as the Government Order (GO) preparation and visa application. Similar issues occurred for the application of the Japan visit in May 2018 and the third country visit in December 2018. [General]
Ideas and Lessons Learned	<ol style="list-style-type: none"> 1) <u>Review of work plans and addition of experts in response to changes in support needs due to the spread of COVID-19:</u> While field activities were not possible, the impact on the progress of the project was minimized by implementing the project activities remotely. In addition, thanks to JICA's generous support and flexible project management attitude, the Project could change the project scope in response to changes in C/P's needs, which enabled to provide emergency support for COVID-19 infection prevention measures in a timely manner. Moreover, the Project was able to appropriately support new activities, such as strengthening of medical waste management capacity, by adding specialized experts to the Project team. 2) <u>Increased frequency of contact with LGD:</u> To overcome the issues of insufficient follow-up on JCC decisions and delayed approval of the new master plans, JPT visited LGD very frequently and continuously reported on the project status. For example, since the Deputy Secretary of LGD was newly appointed before the 6th JCC meeting, JPT directly explained to the Deputy Secretary

	<p>before the JCC meeting about the outline of the Project, past activities and the role and importance of JCC so as to promote better understanding on the project.</p> <p>3) <u>Strengthening follow-up of approval procedures before training in Japan:</u> Depending on the progress of the approval procedure of the C/P organization, JPT visited decision makers such as CWMO, CEO or the Mayor every day to accelerate the approval procedure before the start of training.</p>
Recommendations	<p>1) <u>Strengthening medical waste management capacity:</u> Through the Project, the experience and know-how related to strengthening the capacity of medical waste management in Bangladesh has been accumulated. It is expected that the experience of Chattogram City will be spread horizontally to other CCs in the future.</p> <p>2) <u>Promotion of JCC as a place for decision-making and decentralization:</u> In the Record of Discussion (R/D), JCC is defined as a place for decision-making related to the implementation of the Project, but in reality, most of the meeting time was spent for debriefing and JCC's decision-making role was not functioning. It is necessary for the C/Ps to fully recognize the role and significance of JCC and the approval process. It is required that high officials who can make decisions on-site attend the JCC. Unfortunately, not only the approvals of the new master plans, there are many other cases where the approval procedure is delayed in LGD. Therefore, it is recommended to simplify and speed up of the approval procedure, and to promote decentralization of administrative procedure in Bangladesh.</p> <p>3) <u>Securing the training preparation period:</u> Although it is the responsibility of the C/P side, the experience of this Project has shown that the approval system of the Government of Bangladesh is quite complicated and slow. Therefore, considering the prolonged approval procedure for participants to the Japanese training courses, the project should set a long preparation period of 3-6 months. It is strongly recommended to start preparations in advance together with JICA headquarters and JICA Bangladesh office, and strengthen follow-up of approval procedures before the start of training.</p>

* DPP: Development Project Proposal, JCC: Joint Coordination Committee, R/D: Record of Discussion, WBA: Ward-based Approach
Reference: JPT

5.2 Issues, Ideas and Lessons Learned on the Implementation of the Project Activities

Table 5-2 summarizes the cases in which the Bangladesh side took the initiative in solving the problems faced in the process of implementing the Project. All of these were issues caused by the slow approval procedure of LGD, and it is essential to improve the administrative capacity of LGD. However, even under such circumstances, C/Ps devised solutions and worked on improvement activities.

Table 5-2 Issues, Ideas and Lessons Learned on the Implementation of the Project Activities

Issues	<p>1) <u>Expansion of Service Area of DNCC and DSCC:</u> The service area of DNCC/DSCC was expanded in September 2017 (2.5 times the original area, and 1.4 times the original population). DPP for waste collection improvement in the expansion city area of DNCC is under preparation (integrated with the Naziabad new LFS DPP). DSCC has withdrawn the DPP for the expansion area although it was in the process of approval, and instead decided to allocate the existing resources (staffs and vehicles) to the new area. Appropriate waste collection is vital, and prompt</p>
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	<p>approval of DPP is required. [Related to Outputs 1 & 2]</p> <p>2) <u>Establishment of the Waste Management Department (WMD) in CCC:</u> CCC is initiating the establishment of WMD and formed WMC as a first step. CCC has submitted the request for reform of organizational structure more than one year ago. LGD has already approved it, and now CCC is waiting for further approval from other ministries. [Related to Output 3]</p>
Ideas and Lessons Learned	<p>1) <u>Start of private consignment in the new city area:</u> In DNCC, DPP for procuring waste collection equipment was prepared to start collection service in the new city area (unified with DPP for construction of Nasirabad LFS), but the process has been suspended because the development plan for WtE project was underway in the Amin Bazaar LFS expansion project. Therefore, DNCC decided to outsource the waste collection of the new city area to the private sector. In DSCC, the DPP was also in the process of being approved, but the new mayor withdrew the DPP in July 2020, and for the time being, the current resources (human resources and waste collection vehicles) were allocated.</p> <p>2) <u>Establishment of Waste Management Cell (WMC) in Chattogram City:</u> CCC has officially organized the Waste Management Cell (WMC), the predecessor of WMD, to unify waste management, and is steadily preparing for the establishment of WMD.</p>
Recommendations	<p>1) <u>Formulation of Waste Management Plan in New City Area:</u> DNCC and DSCC have submitted DPPs for the expansion of LFSs in advance, and it took more than a year to complete the approval procedure. Since the approval procedure of DPP for the LFS expansion and DPP for the waste collection improvement in the new city area could not be processed at the same time, the approval procedure of DPP for the new city area collection could proceed only after the previously submitted DPP (for LFS) was approved. In order to prevent such delays, DNCC and DSCC will each formulate DPP respectively on the comprehensive waste management for their respective new city areas to secure enough budget. The Project also requested LGD to continue to simplify and expedite the DPP approval procedure.</p> <p>2) <u>Indirect support for establishing the Waste Management Department (WMD) in CCC:</u> CCC is actively engaged in improvement activities through the Project, and its waste management capacity has improved dramatically. It is important to continue striving to build a system within CCC through WMC, and to continuously follow up through LGD to accelerate the approval procedures within the relevant ministries and agencies.</p>

* WMC: Waste Management Cell, WMD: Waste Management Department
Reference: JPT

5.3 Issues, Ideas and Lessons Learned on the Waste Segregation Pilot Project

Through implementation of the waste separation pilot project, the dissemination and expansion of waste separation has progressed in various areas, and the effectiveness of the Project has been verified. This result led to a request from the Bangladesh side for additional support to expand waste separation from the three cities to all cities, taking advantage of the experience and know-how gained from the pilot project. On the other hand, not all things went smoothly during the implementation process of the pilot project. The following is a summary of the issues faced, lessons learned, and recommendations for the future through the implementation of the pilot project.

Table 5-3 Issues, Ideas and Lessons Learned on the Waste Segregation Pilot Project

Issues	<ol style="list-style-type: none"> 1) <u>Establishment of a system acceptable to residents:</u> The understanding and cooperation of residents are essential for achieving complete source separation. However, collection of separated wastes is not common in Bangladesh, and in particular, servants responsible for waste management in households do not always have high levels of education. Consequently, it is required to establish a system in which separation and classification is easy to understand and less of a burden on the residents. 2) <u>Lack of understanding of PCSPs:</u> Bangladesh has made several previous efforts to introduce separate wastes collection, but none of them were sustained. One of the causes was a lack of understanding by PCSPs. Cases occurred in which PCSPs mixed waste that residents had separated, and transported in one rickshaw, resulting in unsuccessful efforts to separate the waste, etc. Such negative experiences have also been a factor that hindered the building of trust between residents and the city. 3) <u>Absence of key persons:</u> At the beginning of the pilot project, except for a few cooperative residents, waste segregation did not firmly take hold and the significance of the activity was not fully understood by C/Ps. The pilot project was also affected by the limitation of local activities due to the spread of COVID-19 infection. Consequently, it took more than two years from the first start of waste separation in the Nasirabad area of CCC in 2018 until the pilot project was well advanced. This could be attributed to the lack of key persons to strongly promote waste separation in C/Ps or communities. 4) <u>Effective methods of raising awareness in the COVID-19 pandemic:</u> In the COVID-19 pandemic, it was difficult to hold community meetings and mass gatherings, which are traditional methods of raising public awareness, and it was required to consider alternative methods of raising awareness.
Ideas and Lessons Learned	<ol style="list-style-type: none"> 1) <u>Simple waste separation:</u> In recognition of the above-mentioned issues, residents were required to separate only two types of waste: Wet Waste and Dry Waste. This classification was easy for residents to accept and cooperate with. 2) <u>Mechanism for collection of separated waste based on the existing collection system:</u> In this pilot project, it was possible both for collection of separated waste without major change to the existing collection system, and expansion of the target area in a short period of time. In particular, PCSPs hired by the housing society in Nasirabad were cooperative and took the initiative in demonstrating that the pilot project would also lead to increased profits for PCSPs, which was a persuasive factor in requesting cooperation from other PCSPs. One key factor in considering the feasibility of expanding the target areas in the future will be whether or not it is possible to obtain the understanding and cooperation of PCSPs. However, it is important to consider a variety of collection forms and practices, since the size and capacity of PCSPs, as well as politics in some areas, may be involved. 3) <u>Coordination with community leaders and DOE:</u> At the beginning of the project, waste separation did not make much progress because attention directed to the WtE scheme developing in parallel with the Project as the only waste reduction effort required, and the limited number of community meetings due to the spread of COVID-19 infection. However, with the cooperation of local influential persons and Housing Societies, and the training conducted by DOE on the Waste Management Rules 2021, understanding within the CC became widespread, and the waste separation pilot project expanded at an accelerated pace. 4) <u>Use of Student Volunteers (Social Mobilizers) and Media:</u> The door-to-door awareness-raising

	<p>activities by mobilizing student volunteers and the coverage by local media, such as the Inauguration Ceremony, greatly contributed to increasing the understanding and recognition of the local residents.</p>
Recommendations	<ol style="list-style-type: none"> 1) <u>Addition of separation category:</u> Based on Waste Management Rules 2021, in addition to the two types of separation categories of Wet Waste and Dry Waste, Hazardous will be added and the pilot area will be expanded. 2) <u>Expansion of collection of separated waste in cooperation with the private sector:</u> In expanding the pilot areas, it is required to consider the ease of obtaining cooperation from PCSPs, as well as the maturity level of residents. It is also important to consider the possibility of cooperation with CSR activities by private companies (e.g., provision of waste separation bins, etc.). 3) <u>Enhancement of implementation system:</u> Continued efforts will be made to strengthen cooperation with community leaders and DOE. In addition, CCs will need to assign a full-time public awareness officer within the Waste Management Department and develop a system to proactively expand the target areas. 4) <u>Proactive use of student volunteers (Social Mobilizer) and media:</u> Awareness-raising events and tools that were confirmed to be effective through this pilot project will continue to be actively utilized. It is also important to systematically create opportunities for CIs who have accumulated experience and know-how through this pilot project to take the lead in providing continuous guidance and training to other CIs.

Chapter 6 Achievement of Project Purpose

6.1 Achievement of Output

One or two items are set as Objectively Verifiable Indicators (OVIs) for evaluating the degree of achievement for each outcome. Based on these indicators, it was confirmed that all the achievements from Output 1 to Output 8 were achieved through the activities of the Project. The details of the evaluation results are shown in the following table.

Table 6-1 Achievement of Outputs

OVI	Contents	Achievement												
Output 1. New MP targeting the year of 2032 is formulated separately for North Dhaka City and South Dhaka City.		Achieved												
(OVI 1.1) The New MP is approved by LGD	<ul style="list-style-type: none"> New MPs were approved by the mayors (DNCC: 30th November 2019, DSCC: 23th September 2019). The New MPs are open to the public on each city's website. In addition, by implementing the priority projects based on the New MPs in the Project, feasible improvement measures for the waste management system were identified. 	Achieved												
(OVI 1.2) WMD Directives is approved by the Mayor of each city and made available to the public	<ul style="list-style-type: none"> [DNCC] Approved by the mayor in August 2021, and the leaflet for the public disclosure was distributed (1,000 copies). The leaflet was also posted on DNCC's Facebook in November 2021. [DSCC] Approved by the mayor in July 2019, and the leaflet for the public disclosure was distributed and/or through SNS group. The leaflet was posted on DSCC's Facebook in July 2021. 	Achieved												
Output 2. WBA activities are improved and expanded in North Dhaka City and South Dhaka City.		Achieved												
(OVI 2.1) WBA Core Group is established in DNCC and DSCC, and has a meeting every month	<ul style="list-style-type: none"> WBA core group (comprising WMD high officials and some of the field-level managers such as CIs for WBA promotion) was formulated officially based on the office order issued by CWMO (DSCC: dated on 22nd March 2018, DNCC: dated on 4th July 2018). During the project period from June 2017 to May 2022, total 109 WBA core group meetings and zone meetings were held (69 meetings in DNCC and 40 meetings in DSCC in total, including WBA core group meeting and zone-wise meeting). 	Achieved												
(OVI 2.2) Ward offices are newly established and WBA activities are implemented in at least 5 wards in each city	<ul style="list-style-type: none"> WBA penetration rate among 93 wards in DNCC and DSCC is improved from 34% in 2017 to 82% in 2022. Moreover, waste collection amount is increased from about 4,997 ton/day in 2017 to about 5,287 ton/day in 2020. Waste collection rate is also increased from 80% in 2017 to 82% in 2020. WBA activity records by WBA1-4 are summarized below; <table border="1"> <thead> <tr> <th>WBA</th> <th>Total</th> <th>DNCC</th> <th>DSCC</th> </tr> </thead> <tbody> <tr> <td>Ward SWM office (WBA1)</td> <td>51 offices</td> <td>23 offices</td> <td>28 offices</td> </tr> <tr> <td>Cleaners' workshop</td> <td>96 times</td> <td>67 times</td> <td>29 times</td> </tr> </tbody> </table>	WBA	Total	DNCC	DSCC	Ward SWM office (WBA1)	51 offices	23 offices	28 offices	Cleaners' workshop	96 times	67 times	29 times	Achieved
WBA	Total	DNCC	DSCC											
Ward SWM office (WBA1)	51 offices	23 offices	28 offices											
Cleaners' workshop	96 times	67 times	29 times											

OVI	Contents				Achievement
	(WBA2)				
	Community Meeting (WBA3)	51 times	32 times	19 times	
	Waste collection improvement (WBA4)	34 areas	18 areas	16 areas	
	WBA penetration rate	82%	100%	70%	
	<p>* SWM: Solid Waste Management</p> <ul style="list-style-type: none"> • WBA1 (Ward SWM office management): 51 ward offices are functional in DNCC and DSCC, including 18 ward SWM offices where JICA Project Team procured furniture and equipment (10 ward SWM offices in DSCC in November 2020, 8 ward SWM offices in DNCC in June 2021 respectively). The increase in the number of ward SWM offices has made it possible to visualize the spread of the WBA, which has led to the strengthening of the foundation of field activities and the placement of new CIs. • WBA2 (Occupational safety and health improvement and cleaners' workshop): Through the cleaners' workshop, the occupational safety and health awareness of cleaners, including measures against new coronavirus infections, were enhanced. • WBA3 (Holding community meetings): By implementing the waste segregation pilot project, about 25 tons of recyclable materials were collected every month in a sanitary manner from about 7,000 people (about 2,000 target households). • WBA4 (Waste collection improvement): Total of 41 illegal dumping sites and/or non-collection areas (hotspots) were identified and waste collection improvement was carried out by two prototype RVs. As a result, the loading time was shortened from about 20-30 minutes to about 5 minutes, and the sanitary environment around the collection site was improved. 				
Output 3. WCT Plan is developed, and an appropriate waste collection and transport system is implemented in Chattogram City.					Achieved
(OVI 3.1) The WCT Plan is approved by the Mayor	<ul style="list-style-type: none"> • A vehicle distribution plan, including the GAP vehicles, was completed in September 2018. • Based on the guidance manual submitted to the mayor on 25th August 2019, a WCT plan was developed and approved by the mayor on August 26th, 2021. 				Achieved
(OVI 3.2) WBA activities are implemented in 2 wards (model wards)	<ul style="list-style-type: none"> • WBA core group was officially formulated based on the office order issued in March 2019, and 15 WBA core group meetings were held in total. • WMC, a cross-departmental taskforce to comprehensively manage SWM, was established in accordance with an office order dated on 4th August 2019, as a predecessor of WMD. WMC meetings were held 8 times in total. • WBA penetration rate among 41 wards in CCC was 90% in 2022. In addition, ward 8 and ward 27, where experienced CIs were allocated, were selected as a model ward, and 				Achieved

OVI	Contents	Achievement										
	<p>WBA activities were carried out actively.</p> <ul style="list-style-type: none"> Waste collection amount was increased from about 1,200 ton/day in 2014 to about 2,220 ton/day in 2021 with support of GAP implemented from 2015 to 2018. WBA activity records by WBA1-4 are summarized below; <table border="1"> <thead> <tr> <th>WBA</th> <th>CCC</th> </tr> </thead> <tbody> <tr> <td>Ward SWM office (WBA1)</td> <td>38 offices (among them, 2 ward SWM offices were constructed by the Project)</td> </tr> <tr> <td>Cleaner's workshop (WBA2)</td> <td>44 times (12 Safety and Sanitation Committees (SSCs) were established)</td> </tr> <tr> <td>Community Meeting (WBA3)</td> <td>17 times (Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI)</td> </tr> <tr> <td>Waste collection improvement (WBA4)</td> <td>101 Prototype RVs were introduced and in operation.</td> </tr> </tbody> </table> <p>* SWM: Solid Waste Management</p> <ul style="list-style-type: none"> <u>WBA1 (Ward SWM office management):</u> Ward SWM offices were constructed in 2 wards (Ward 31 and Ward 39) in June 2021, and the inauguration ceremony was held in November 2021. <u>WBA2 (Occupational safety and health improvement and cleaner's workshop):</u> Through the cleaners' workshop, the occupational safety and health awareness of cleaners, including measures against COVID-19 infections, were enhanced. <u>WBA3 (Holding community meetings):</u> By implementing the waste segregation pilot project, about 265 tons of recyclable materials were collected every month in a sanitary manner from about 73,000 people (about 18,000 target households). Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI. <u>WBA4 (Waste collection improvement):</u> 101 improved RVs were manufactured and waste collection improvement by prototype RVs is ongoing. As a result, the loading time was shortened from about 20-30 minutes to about 5 minutes, and the sanitary environment around the collection site was improved. 	WBA	CCC	Ward SWM office (WBA1)	38 offices (among them, 2 ward SWM offices were constructed by the Project)	Cleaner's workshop (WBA2)	44 times (12 Safety and Sanitation Committees (SSCs) were established)	Community Meeting (WBA3)	17 times (Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI)	Waste collection improvement (WBA4)	101 Prototype RVs were introduced and in operation.	
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Community Meeting (WBA3)	17 times (Ward 8 was awarded as the model ward and CI of ward 8 was also awarded as a model CI)											
Waste collection improvement (WBA4)	101 Prototype RVs were introduced and in operation.											
Output 4. Sustainable workshop management system is established in DNCC, DSCC, and CCC.		Achieved										
(OVI 4.1) Training for preventative maintenance is carried out	<ul style="list-style-type: none"> From March 2021 to January 2022, 19 training courses on preventive maintenance of waste collection vehicles were conducted in DNCC, DSCC, and CCC respectively. 430 mechanics and drivers were trained in total. As a result, the repair cost and the number of repairs were reduced in the three cities. (In CCC, the number of repairs was reduced by about 30%, and the repair cost was reduced by about 10%). 	Achieved										
(OVI 4.2) Training for the occupational health and safety rules (draft) and the workshop service	<ul style="list-style-type: none"> September 2018, three training courses on the occupational health and safety rules and the workshop service regulation were conducted in DNCC, DSCC, and CCC respectively. As a result, the occupational safety and health awareness of 	Achieved										

OVI	Contents	Achievement
regulation (draft) are carried out.	the workshop staff, including measures against infection with COVID-19, was improved. The training also led to the strengthening of the preventive maintenance monitoring system.	
Output 5. Information sharing meeting on SWM with city corporations and small local governments in Dhaka metropolitan area is held by LGD.		Achieved
(OVI 5.1) The information sharing meetings are held twice	<ul style="list-style-type: none"> • The first 12CC information sharing meeting was held on 2nd December 2018 and the proceedings were delivered to JICA, LGD and every CC in March 2019. • The second 12CC information sharing meeting was held on 23th February 2020 and the proceedings were delivered to JICA, LGD and every CC in September 2020. • The third 12CC information sharing meeting was held on 20th March 2022 and the proceedings were delivered to JICA, LGD and every CC in May 2022. 	Achieved
(OVI 5.2) SWM support activities by DNCC and DSCC to other city corporations and small local governments in Dhaka metropolitan area are conducted 4 times.	<ul style="list-style-type: none"> • SWM support activities by DNCC and DSCC to other city corporations and small local governments in Dhaka metropolitan area have been conducted 4 times. <ul style="list-style-type: none"> - Support activity to Narayanganji City Corporation by DNCC and the Project Team (information sharing and advice) on 31st October 2018 - Support activity to Gazipur City Corporation by DNCC and the Project Team (information sharing and advice) on 20th November 2018 - DNCC's visit to Jossore Municipality (information sharing and site visit to new landfill site and compost plant) on 29th January 2020 - The COVID-19 leaflet sharing to SNS group consisting of 12CCs in June 2020. 	Achieved
Output 6. Public relation (PR) activities for SWM are promoted in North Dhaka City and South Dhaka City.		Achieved
(OVI 6.1) PR Committee on SWM is established in DNCC and DSCC	<ul style="list-style-type: none"> • PR Committee (DNCC: PR Planning Team, DSCC: PR Planning Taskforce) was established. 	Achieved
(OVI 6.2) PR and public awareness activities are implemented based on PR Plans in North Dhaka City and South Dhaka City.	<ul style="list-style-type: none"> • The following activities have commenced based on the PR Plan (preliminary draft) and the 2020 public awareness action plan for the nationwide campaign 'Clean Village Clean City Initiative': <ul style="list-style-type: none"> - Preparation of Annual Waste Report (Publicly available on each city's website) - Release of an educational TV documentary series (5 episodes, audience rate: 27%) - Release of short movies for public awareness on sorting waste - Release of TV spots of public awareness for river clean-up (Viewer on TV: 4.58 million, Number of views on YouTube and Facebook: approximately 673,000 views (as of May 2022)) - Publication of newspaper articles for local 	Achieved

OVI	Contents	Achievement
	governments (25 articles, from June 2020 to February 2022) <ul style="list-style-type: none"> - Update of WMD information on the websites of DNCC and DSCC - Preparation of Environmental Education Manual and implementation of training programs for CI 	
Output 7. Lifetime of the existing landfill sites is prolonged and new landfill area is secured by DNCC and DSCC.		Achieved
OVI 7.1 DPPs for extension of the existing landfill sites and/or for construction of new landfill sites are submitted to Government of Bangladesh (GoB).	<ul style="list-style-type: none"> • DSCC's DPP for Matuail LFS expansion was approved by ECNEC in December 2019. Extension construction work started in January 2022. • DNCC's DPP for Amin Bazar LFS expansion was approved by ECNEC in March 2020. • Through the support of the Project, the lifespan of the both existing LFSs was extended by two years, and GoB secured the construction costs for expanding the existing LFSs, and the costs necessary for the proper closure of the existing landfill areas in both cities. • DPP for construction of DNCC Nasirabad LFS was rejected by LGD because it was decided to construct a WtE facility in the expansion area of the Amin Bazar LFS, which has the capacity to incinerate all the waste generated in North Dhaka City. 	Achieved
Output 8. Medical waste management system in CCC is improved		Achieved
(OVI 8.1) The operation and maintenance section of medical waste incinerator is established in CCC.	<ul style="list-style-type: none"> • A new system for medical waste management was decided, and in November 2021, a medical waste management committee was established with the participation of medical waste-related organizations. • As a pilot project, a small-scale medical waste incinerator was installed in the Haliashahar landfill site (started operation in January 2022), and medical waste treatment system was established in model hospitals. • Establishment of medical waste management unit was decided, and an official letter was issued by CCC in December 2021. Based on the official letter, the operation staff of the medical waste incinerator (1 supervisor, 2 managers, 3 operators and 3 workers) were assigned. • Incineration amount of medical waste was increased from about 300 kg/ day to about 900 kg/ day thanks to the administration guidance by DOE 	Achieved

* CC: City Corporation, CI: Conservancy Inspector, DOE: Department of Environment, Ministry of Environment, Forest and Climate Change, DPP: Development Project Proposal, ECNEC: Executive Committee of National Economic Council, LGD: Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, WBA: Ward-based Approach, WMC: Waste Management Cell, WMD: Waste Management Department
Reference: JPT

6.2 Achievement of the Project Purpose

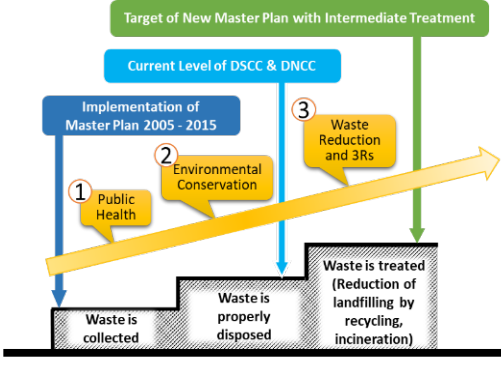
Project purposes are set for DNCC/DSCC and CCC, respectively, and an index is set for each to evaluate the degree of achievement. Based on these indicators, it was confirmed that the project purposes were achieved

through the activities of the Project. The details of the evaluation result are shown in the following table.

Table 6-2 Achievement of the Project Purpose

OVI	Contents	Achievement																																																																	
	[DNCC and DSCC] SWM system in North Dhaka City and Dhaka South City is improved based on the New MPs.	Achieved																																																																	
Priority activities within the priority projects specified in the New MPs are implemented.	<ul style="list-style-type: none"> Of the 37 priority projects incorporated in the New Master Plans, 84% have already been completed or are in progress. <p>Table: Implementation status of priority projects of the New Master Plans</p> <table border="1"> <thead> <tr> <th>Component</th> <th># of Priority Project</th> <th>Completed</th> <th>In progress</th> <th>Not yet implemented</th> </tr> </thead> <tbody> <tr><td>1</td><td>4</td><td>0</td><td>3</td><td>1</td></tr> <tr><td>2</td><td>3</td><td>0</td><td>3</td><td>-</td></tr> <tr><td>3</td><td>2</td><td>0</td><td>2</td><td>-</td></tr> <tr><td>4</td><td>5</td><td>1</td><td>3</td><td>1</td></tr> <tr><td>5</td><td>3</td><td>1</td><td>2</td><td>-</td></tr> <tr><td>6</td><td>5</td><td>2</td><td>1</td><td>2</td></tr> <tr><td>7</td><td>5</td><td>0</td><td>5</td><td>-</td></tr> <tr><td>8</td><td>3</td><td>2</td><td>1</td><td>-</td></tr> <tr><td>9</td><td>3</td><td>0</td><td>2</td><td>1</td></tr> <tr><td>10</td><td>4</td><td>0</td><td>3</td><td>1</td></tr> <tr><td>Total</td><td>37</td><td>6</td><td>25</td><td>6</td></tr> <tr><td>Percentage</td><td>-</td><td>16%</td><td>68%</td><td>16%</td></tr> </tbody> </table> <p>Among 37 priority projects, 31 priority projects were supported through the Project by implementing and achieving 8 outputs and 7 priority projects.⁶⁹</p> <ul style="list-style-type: none"> In order to improve the waste management system (generation, waste collection and transportation, intermediate treatment, and final disposal), in addition to solving the individual problems of each component, it is necessary to have an integrated solution (example: Strengthening collaboration between primary collection and secondary collection). Based on this recognition, the Project supported the 10 components of the new master plan as a whole, and in addition to the results shown in Table 6-1, the results such as shortening the transshipment time from the primary collection to the secondary collection, and strengthening the data management were achieved. The New Master Plans aim to shift from environmental conservation to the formation of a sound material-cycle society. In the Project, not only the technical improvement of the waste management system, but also the organizational and institutional capacity for integrated solid waste management was enhanced by the institutionalization of public relations and information disclosure for waste management, promotion for waste reduction and 3Rs, and establishing a new unit for strengthening the operation of waste management at the field level. Active 	Component	# of Priority Project	Completed	In progress	Not yet implemented	1	4	0	3	1	2	3	0	3	-	3	2	0	2	-	4	5	1	3	1	5	3	1	2	-	6	5	2	1	2	7	5	0	5	-	8	3	2	1	-	9	3	0	2	1	10	4	0	3	1	Total	37	6	25	6	Percentage	-	16%	68%	16%	Achieved
Component	# of Priority Project	Completed	In progress	Not yet implemented																																																															
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Percentage	-	16%	68%	16%																																																															

⁶⁹ Component 1: Public relations, public awareness and public involvement; Component 2: WBA activities; Component 3: Waste reduction; Component 4: Waste collection and transport; Component 5: Vehicle maintenance system; Component 6: Intermediate treatment system (Eco-Town); Component 7: Sanitary landfill; Component 8: Rules and regulations; Component 9: Organizational capacity; Component 10: Financial management (refer to 2.1.5(3)).

OVI	Contents	Achievement
	<p>involvement from various stakeholders is also intentionally promoted so as to increase the sustainability of the waste management system after the completion of the Project</p>  <p>Fig: Waste Management Level and in DNCC/DSCC and Goal of the New Master Plan Reference: JPT based on mundi (JICA publication, May 2018, p 6,7)</p>	
[CCC] SWM system in Chattogram City is improved.		Achieved
<p>Trainings for preventative maintenance of collection vehicles, Occupational Health and Safety (OHS), and service discipline are implemented based on the waste collection and transport plan (WCT Plan).</p>	<ul style="list-style-type: none"> • Eight training sessions on preventative maintenance of collection vehicles, OHS and service discipline have been conducted for mechanics and drivers (179 people in total). In addition, CCC issued the office order to make the monitoring sheet of preventative maintenance an official document in March 2022. • Initially, only waste collection improvement was targeted for CCC in collaboration with GAP, but the knowledge and experience of DNCC/DSCC was used efficiently and effectively. In addition, C/P was very active in CCC. Therefore, the Project was able to achieve more goals than originally planned in CCC. Specifically, the following initiatives were made: <ul style="list-style-type: none"> - WBA introduction in model ward for community participatory solid waste management - Promotion of 3Rs and waste reduction for sustainable waste management - Introduction of a new waste collection system that considers the cooperation between primary collection and secondary collection - Strengthening the medical waste treatment system • In addition, Waste Management Cell (WMC) that centrally manages solid waste management service in CCC was established as the predecessor of the Waste Management Department (WMD) by the office order of CEO of Chattogram City on August 4, 2019. In the Project, eight WMC meetings have been held in total, and a system has been established in which the Engineering wing and Conservancy wing discuss important issues such as an extension of LFS lifespan and installing a small-scale medical waste incinerator. 	<p>Achieved</p>

OVI	Contents	Achievement
	<ul style="list-style-type: none"> Through these activities, the entire waste management system in CCC was improved as well as in DNCC and DSCC which enables CCC to build the foundation of the waste management system towards a sound material-cycle society. 	

* CEO: Chief Executive Officer, C/P: Counterpart, WBA: Ward-based Approach, WMC: Waste Management Cell, WMD: Waste Management Department
Reference: JPT

6.3 Preparation of Gov. of Bangladesh in anticipation of Completion of the Project

The overall goals are set in consideration of a mid-term to long-term effects and impacts expected from the implementation of the Project. In other words, overall goals are expected to be achieved after the Project is completed. The efforts to achieve the overall goals through the Project are shown below. In addition, the personnel transfer in DNCC/DSCC/CCC shown in Attachment 8-(3) have a great influence on the achievement of the overall goals. Although the current PDM did not cover the personnel transfer of C/P's organization, it should be monitored as an important assumption.

Table 6-3 Preparation of Gov. of Bangladesh in anticipation of the Completion of the Project

OVI	Contents
[DNCC and DSCC] Sustainable Solid Waste management (SWM) is implemented in North Dhaka City and South Dhaka City based on new SWM Master Plans (New MPs).	
The field-oriented Ward-based Approach (WBA) is implemented in 50% of wards in each city by 2032.	<ul style="list-style-type: none"> The total number of wards in both cities is 129 wards including the new city area (about 1.4 times extended compared with the old city area) (DNCC: 36 wards to 54 wards, DSCC: 57 wards to 75 wards). The WBA penetration rate at the end of the project, including the new city area, is 59%. Toward 2032, while continuing activities in the existing ward, it is important to systematically implement the guidance from experienced CIs to newly appointed CIs, training of trainers (ToT), and internal training for the expansion of WBA in the new city area. In DNCC, 16 new CIs have been assigned to the new city area, and 3R training has already been conducted for all new CIs in February 2022. In addition, information and knowledge are shared with other CCs through the 12 CC solid waste management information exchange meeting, and a mechanism is being established with the aim of strengthening the waste management capacity nationwide.
[CCC] Sustainable SWM is implemented in Chattogram City.	
Waste Management Department (WMD) is established in CCC.	<ul style="list-style-type: none"> In 2017, CCC applied to LGD to establish a Waste Management Department (WMD), but LGD has not yet responded. It is necessary to continue to follow up the approval process through LGD. On August 4, 2019, CCC established Waste Management Cell (WMC), as the predecessor of WMD. The chief of WMC is CWMO, and representatives of Planning & Community wing, Engineering wing, and public relations are the members. Currently, WMC centrally manages waste management services in CCC.

Chapter 7 Recommendations for Achieving the Overall Goal

Dhaka North and Dhaka South Cities and Chattogram City are undergoing a rapid economic growth, severe changes, and a major transition in the citizens' sense of values. These cities must develop organizations and human resources with which such changes can be flexibly handled with foresight. Under circumstances where landfills have a short remaining useful life and the introduction of intermediate treatment is unavoidable, in particular, it is important that the administrative public relations are enhanced to gain the trust of the citizens so that administrators and citizens can keep pace and collaborate with each other to promote SWM. Under such circumstances, for achieving the overall goal by realizing independent and sustainable solid waste management system in Bangladesh, recommendations are summarized as shown in Table 7-1.

Table 7-1 Efforts for Achieving the Overall Goal Made by the Project

Target City	Activity	Activity Contents
All Cities	Strengthening the functions of 12 CCs	<ul style="list-style-type: none"> For sustainable and independent development, it is important that DSCC, DNCC and CCC take the initiative in promoting city-to-city cooperation under the leadership of LGD. As a platform for this purpose, regularization and strengthening of the functions of the 12 CCs is expected. In addition, a forum for information sharing and discussion with universities, research institutes, companies, and NGOs, which are indispensable for the promotion of waste management projects and technological development, has not yet been established. Especially in introducing new technologies such as WtE, the appointment of external experts is inevitable. It is desirable to collaborate with a more diverse range of stakeholders through forums for discussion of 12 CCs and cleaning project guidelines.
	Promotion of waste reduction and 3R	<ul style="list-style-type: none"> It is necessary to reduce the amount of waste generated with the cooperation of residents and businesses by strengthening the waste reduction campaign. Refer to section 5.3 for lessons and recommendations learned through the Project. In DSCC, construction of a composting plant is underway and segregation of kitchen waste will be required. As such, proper segregation items and target areas of piloting should be reconsidered depending on the operation of treatment facility.
	Strengthening cooperation with DOE	<ul style="list-style-type: none"> DOE issued the New Solid Waste Management Rule in December 2021. The strategies of this Rule and the Master Plan are very similar, such as discharge of separated waste, recycling by type of waste, and preparation of annual waste management reports. It is important to establish a sustainable waste management system in Bangladesh by strengthening cooperation with DOE.
DSCC and DNCC	Enhancement of WMD	<ul style="list-style-type: none"> To enhance the organization and establish the activities, appropriately assign personnel to the vacant posts of WMD and ensure that they are engaged in the posts for a long term by promoting understanding of the mayor and other persons. At the same time, develop human resources through OJT such as WBA activities, administrative public relations, renovation of landfills, improvement of collection and transportation to stabilize the

Target City	Activity	Activity Contents
		<p>headquarters function of WMD.</p> <ul style="list-style-type: none"> • Increase the communication channels with citizens and experts such as information disclosure, resident council, and public consultation to activate discussions on matured SWM in the future. • To foster close ties between the WMD headquarters and the WBA activities in the field, establish an organization with consistency and continuity based on the WMD Directives that is the backbone of the waste management system in CC. To strengthen the waste management system in accordance with the WMD Directives, in addition, enhance human resource management and budget management.
	Phased development of recycling facilities	<ul style="list-style-type: none"> • Since there is no experience in operation and maintenance of intermediate treatment facilities, including recycling facilities, it is important to establish a department to operate and maintain intermediate treatment facilities and to strengthen the capacity of its staff at the same time as constructing the facilities. • Although WtE facilities are mainly being promoted as intermediate treatment facilities to reduce the disposal waste amount, some materials, such as food waste and construction waste, are not suitable for incineration, and WtE facilities are expensive and take a long time to construct. Accordingly, it is desirable to develop recycling facilities that take into account waste quality and construction time. • It is also required to promote the construction of the various intermediate treatment facilities as soon as possible, such as composting facilities to recycle market food waste, and construction waste recycling facilities to recycle construction and road waste.
	Strengthening of Public Relations	<ul style="list-style-type: none"> • The degree of understanding of society is still low regarding the problem of shortage of landfill sites, promotion of waste reduction and the importance of introducing intermediate treatment. In the future, the number of projects that must be promoted with the consent of the residents will increase, so it is important to strategically promote administrative public relations. • Discussion for future mature SWM is activated by increasing communication channels such as disclosure of information, resident council, public debate, etc., between residents and experts.
	Promoting WBA in the new city area	<ul style="list-style-type: none"> • The new Master Plan does not mention any specific measures in the new city area. It is required to develop a comprehensive waste management plan for the new city area using the basic survey data at the time of the development of the new Master Plan and the waste collection records from the recent outsourced private companies. • It is also important to promote WBA in the new city area and strengthen the capacity of newly appointed CIs. The training of CIs who are managers of ward cleaning offices needs to be strengthened so that they can conduct appropriate ward-based waste management activities.
	Continuing canal cleanup	<ul style="list-style-type: none"> • Large-scale cleanup activities of drainage channels, river cleanup campaigns, and hotspot measures for scattered waste require

Target City	Activity	Activity Contents
	campaign and prevention measures against scattered wastes	heavy equipment and personnel, but cannot be handled by the Waste Management Department alone. A comprehensive approach that extends beyond the departments is needed.
CCC	Support for Establishment of WMD	<ul style="list-style-type: none"> • Until WMD is established, temporarily set up a Waste Management Cell (WMC) that conducts the same activities as WMD to conduct SWM while forming the basis of WMD.
	Extending the life span of existing landfills	<ul style="list-style-type: none"> • Since there is no organization to operate and maintain the landfill, it is necessary to establish an operation and maintenance organization to manage landfilling wastes appropriately. • In order to understand the accurate amount of waste delivered to the landfill, it is desirable to install a weighbridge as soon as possible, which is currently under procedure. • In order to determine the progress of landfill operation, CCC will measure the existing conditions, prepare a landfill plan, calculate the remaining capacity from the existing conditions and landfill plan, and then calculate the remaining lifespan of the landfill based on the delivered amount measured by the weighbridge. • CCC will implement lifespan extension measures to match the remaining lifespan, such as adjusting the amount of loading to the two landfills currently in operation.
	Strengthening medical waste management capacity	<ul style="list-style-type: none"> • Capacity building and monitoring should be continued for proper medical waste management. In particular, as the separation of wastes improves in the future, there is a possibility that medical waste will be discharged in excess of the current incineration capacity. For large hospitals, it should be considered to install a small incinerator for medical waste on the hospital property. • In addition to this, it is expected that CCC will impart its experience and know-how in medical waste management to other local cities through LGD. • Currently, there is no system to collect medical waste (injection needles, etc.) from households, and they are discharged as MSW. From the viewpoint of infection prevention, it is required to establish a collection system of medical waste at hospitals and to raise awareness among residents.

Reference: JPT

ATTACHMENT

Attachment 1

PDM (the latest version and change of PDM)

(1) PDM version 3 (January 2021) (the latest version)

Project Design Matrix (Version 2.0)

Version 2.0
Dated 31th May, 2021

Project Title: Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City
Implementing Agency: Local Government Division, Ministry of Local Government, Regional Development and Cooperatives (LGD), Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC), Chittagong City Corporation (CCC)
Target Group: LGD, DNCC, DSCC, CCC, Residents of Dhaka North, Dhaka South, and Chittagong
Period of Project: 5 years

Narrative Summary		Objectively Verifiable Indicators	Model Site:	Means of Verification	Important Assumption
Overall Goal Proper SWM (Solid Waste Management) is implemented in North Dhaka and South Dhaka City based on the revised Master Plan and Chittagong City.	[DNCC and DSCC] The field-oriented Ward-based Approach (WBA) is implemented in 50% of wards in each city by 2032.	[DNCC and DSCC] Priority activities within the priority projects specified in the New MPs are implemented. [CCC] Trainings for preventative maintenance of collection vehicles, occupational health and safety, and service discipline are implemented based on the waste collection and transport plan (WCT Plan).	[DNCC and DSCC] WBA activity records in WMD and at each ward [CCC] CCC's organogram	Political, social and economic condition in the Project site is not deteriorated.	
Project Purpose [DNCC and DSCC] SWM system in North Dhaka City and South Dhaka City is improved based on the New MPs. [CCC] SWM system in Chittagong City is improved.	[DNCC and DSCC] Priority activities within the priority projects specified in the New MPs are implemented. [CCC] Trainings for preventative maintenance of collection vehicles, occupational health and safety, and service discipline are implemented based on the waste collection and transport plan (WCT Plan).	[DNCC and DSCC] Priority activities within the priority projects specified in the New MPs are implemented. [CCC] Trainings for preventative maintenance of collection vehicles, occupational health and safety, and service discipline are implemented based on the waste collection and transport plan (WCT Plan).	Records of the priority project implementation	LGD's Policy to support DNCC, DSCC, and CCC does not change. Necessary budget based on the New MPs is allocated by DNCC and DSCC. Necessary budget based on the WCT Plan is allocated by CCC.	
Outputs 1. New MP targeting the year of 2032 is formulated separately for North Dhaka City and South Dhaka City. 2. WBA activities are improved and expanded in North Dhaka City and South Dhaka City. 3. WCT Plan is developed, and an appropriate waste collection and transport system is implemented in Chittagong City. 4. Sustainable workshop management system is established in DNCC, DSCC, and CCC. 5. Information sharing meeting on SWM with city corporations and small local governments in Dhaka metropolitan area is held by LGD. 6. Public relation (PR) activities for SWM is promoted in North Dhaka City and South Dhaka City.	1.1 The New Master Plans are approved by LGD 1.2 WMD Directives is approved by the Mayor of each city and made it available to the public. 2.1 WBA Core Group is established in DNCC and DSCC, and has a meeting every month. 2.2 Ward offices are newly established and WBA activities are implemented at least 5 wards in each city. 3.1 The WCT Plan is approved by the Mayor. 3.2 WBA activities are implemented in 2 wards (model wards). 4.1 Training for preventative maintenance is carried out. 4.2 Trainings for the occupational health and safety rules (draft) and the workshop service regulation (draft) are carried out. 5.1 The information sharing meetings are held twice. 5.2 SWM support activities by DNCC and DSCC to other city corporations and small local governments in Dhaka metropolitan area are conducted 4 times. 6.1 PR Committee on SWM is established in DNCC and DSCC. 6.2 PR and public awareness activities are implemented based on PR Plans in North Dhaka City and South Dhaka City.	1.1 The New Master Plans are approved by LGD 1.2 WMD Directives is approved by the Mayor of each city and made it available to the public. 2.1 WBA Core Group is established in DNCC and DSCC, and has a meeting every month. 2.2 Ward offices are newly established and WBA activities are implemented at least 5 wards in each city. 3.1 The WCT Plan is approved by the Mayor. 3.2 WBA activities are implemented in 2 wards (model wards). 4.1 Training for preventative maintenance is carried out. 4.2 Trainings for the occupational health and safety rules (draft) and the workshop service regulation (draft) are carried out. 5.1 The information sharing meetings are held twice. 5.2 SWM support activities by DNCC and DSCC to other city corporations and small local governments in Dhaka metropolitan area are conducted 4 times. 6.1 PR Committee on SWM is established in DNCC and DSCC. 6.2 PR and public awareness activities are implemented based on PR Plans in North Dhaka City and South Dhaka City.	New MPs, discussion records, survey reports and summaries, and the WMD Directives WBA activity records (activity reports to Zone office by Conservancy Inspector (CI), minutes of WBA meeting, WBA training reports, and community meeting records etc.), WBA Expansion Manual 3R Activity and Awareness-raising Campaign Tools, WCT Plan and Guidance Manual, discussion records, and survey reports, and WBA activity records Training materials (the workshop operation, maintenance, and management manual etc.), training records, the occupational health and safety rules (draft), the service regulation (draft), and discussion records The information sharing meeting reports, and discussion records Documents related to establishment of PR Committee, discussion records, and PR plan DPPs and discussion records, and discussion records Office Orders, discussion records, training records, financial plan of the section		
7. Lifetime of the existing landfill sites is prolonged and new landfill area is secured by DNCC and DSCC. 8. Medical waste management system in CCC is improved.	7.1 DPPs for extension of the existing landfill sites and/or for construction of new landfill sites are submitted to Government of Bangladesh (GoB). 8.1 The operation and maintenance section of medical waste incinerator is established in CCC.				

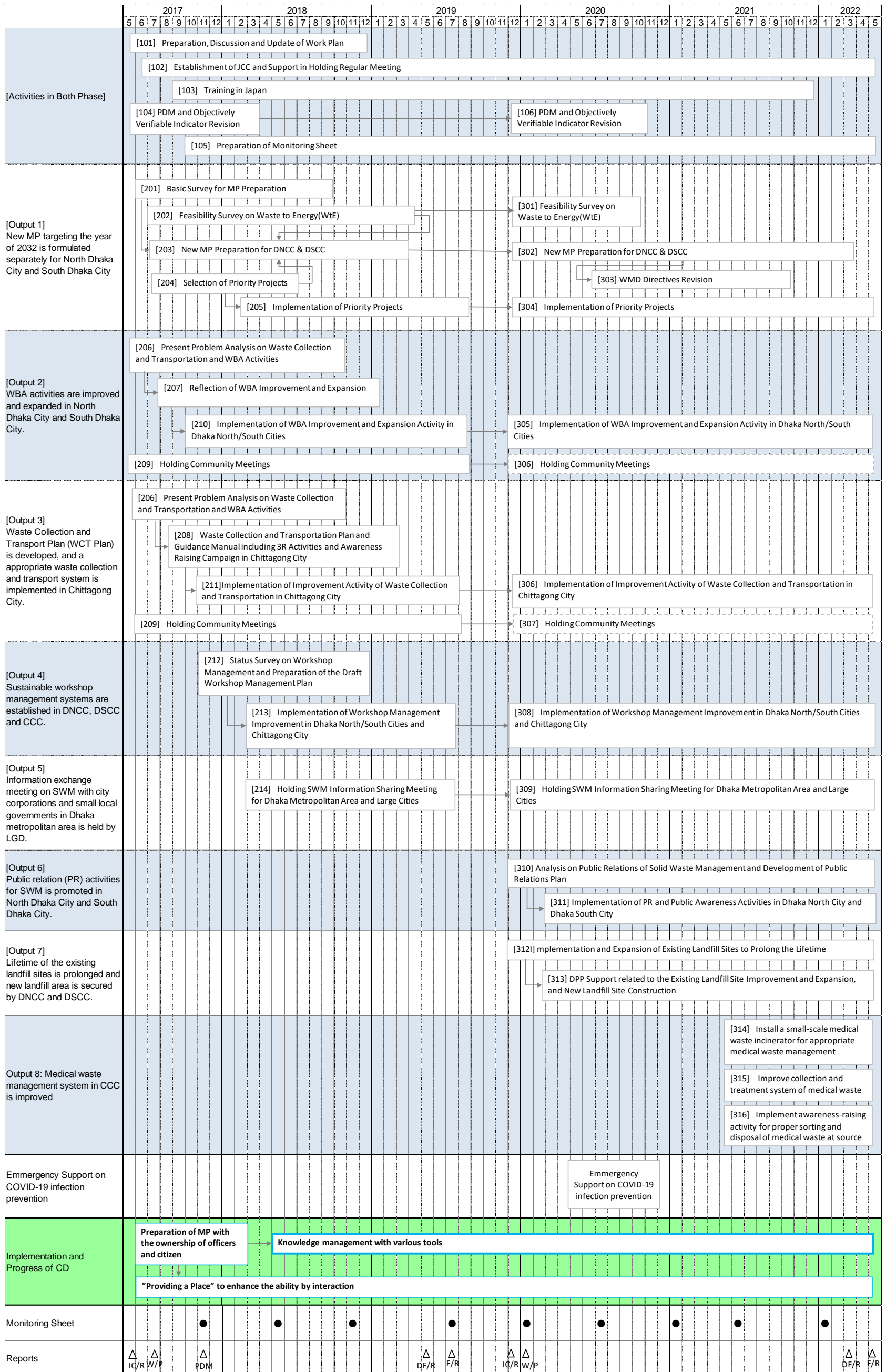
Activities	The Japanese Side	Bangladesh Side	Pre-Conditions
<p>1-1. Conduct surveys on current situation of DNCC and DSCC and on reviewing achievement of the Clean Dhaka Master Plan.</p> <p>1-1-1. Review status of the past and on-going development projects, and other data related to SWM.</p> <p>1-1-2. Conduct capacity assessment of individuals and institutions.</p> <p>1-1-3. Survey the present conditions such as</p> <ul style="list-style-type: none"> i) Social and economic analysis ii) Review of Existing laws, regulations, policies iii) Financial and management condition review <p>1-1-4. Field survey and investigation</p> <ul style="list-style-type: none"> i) Social condition survey ii) Time and motion study iii) Measurement of waste volume / waste collection vehicle weight. <p>1-1-5. Survey the final disposal sites (operation, maintenance and management status review, and the remaining landfill capacity inspection).</p> <p>1-1-6. Conduct a pre-feasibility study for introduction of Waste-to-Energy.</p> <p>1-2. Draft New MP separately for DNCC and DSCC.</p> <p>1-2-1. Set up the future socio-economic framework.</p> <p>1-2-2. Forecast future waste generation, resources, equipment and machinery, human resource, and disposal methods.</p> <p>1-2-3. Formulate New MPs (draft).</p> <p>1-3. Select and implement priority activities within the priority projects specified in the New MPs (draft)</p> <p>1-4. Revise WMD Directives.</p>	<p>Dispatch of experts</p> <ol style="list-style-type: none"> 1. Chief advisor / SWM Planning / Landfill Site Management 2. Deputy Chief Advisor / Public Awareness and PR 3. Workshop Management / Waste Collection Planning 4. WBA Promotion 1 / Collection Vehicle Operation and Maintenance 5. WBA Promotion 2 / Waste Collection Equipment Improvement 6. WBA Promotion 3 7. Training Planning / Landfill Site Improvement 8. Business Feasibility Study 9. Waste-to-Energy 10. Landfill Site Design / Geotechnical Survey 11. Medical Waste Segregation 12. Medical Waste Incinerator Survey and Design 13. 3D CAD and Drone Analysis of Landfill Capacity <p>Equipment</p> <ul style="list-style-type: none"> - Small-scale medical waste incinerator <p>Cost for hiring local consultants Cost for in-country trainings Training-in-Japan Third-country training</p>	<p>Project Personnel [LGD] Additional Secretary (Urban Development) (Project Director): Maran Kurnar Chakraborty Joint Secretary (Urban Development) (Project Manager): Mohammad Nora Alam Siddique</p> <p>(DNCC) CEO: Md. Selim Reza CWMO (as Project Coordinator): Navy Commodore M Saidur Rahman</p> <p>(DSCC) CEO: A. B. M. Amin Ullah Nuri CWMO (as Project Coordinator): Air Commodore Badrul Amin [CCC] CEO: Kazi Md. Mozammel Hoque Project Coordinator: Abu Shahed Chowdhury</p> <p>Land, Building and Facilities - Office space in DNCC Office - Office space in DSCC Office - Office space in CCC Office</p>	<p>A. Furnished offices for Japanese Expert Team are secured by DNCC, DSCC, and CCC.</p> <p>B. DNCC, DSCC, and CCC assign project personnel for the implementation.</p>
<p>3-1. Analyze current issues of waste collection and transport system in CCC.</p> <p>3-2. Prepare a WCT plan and guidance manual (draft) including 3R activity and awareness-raising campaign.</p> <p>3-3. Implement activities for improvement of the waste collection and transport based on the plan and guidance manual (Draft).</p> <p>3-4. Hold community meetings.</p>	<p>Coat for hiring local consultants Cost for in-country trainings Training-in-Japan Third-country training</p>		<p style="text-align: center;">→</p> <p style="text-align: center;">-Issues and countermeasures-</p>
<p>4-1. Analyze current issues on the workshop management for collection vehicle repair and maintenance.</p> <p>4-2. Develop a workshop operation, maintenance, and management manual and implement the activities for the workshop improvement.</p> <p>4-3. Prepare occupational health and safety rules (draft) and service regulation for the workshop (draft).</p> <p>4-4. Implement training for the occupational health and safety rules, and the service regulation.</p> <p>4-5. Implement training on preventative maintenance for the collection vehicles.</p>			
<p>5-1. Hold information exchange meetings led by LGD.</p> <p>5-2. Summarize the result of the meetings.</p>			
<p>6-1. Analyze current issues on PR for SWM.</p> <p>6-2. Prepare a PR plan for SWM (draft).</p> <p>6-3. Implement PR and public awareness activities based on the PR plan.</p>			
<p>7-1. Implement technical assistance for improvement of existing landfill sites.</p> <p>7-2. Prepare DPPs for the existing landfill site expansion and improvement work.</p> <p>7-3. Support DNCC's DPP preparation for the new landfill site construction (Nasirabad).</p>			
<p>8-1. Install a small-scale medical waste incinerator for appropriate medical waste management.</p> <p>8-2. Improve collection and treatment system of medical waste.</p> <p>8-3. Implement awareness-raising activity for proper sorting and disposal of medical waste at source.</p>			

(2) Change of PDM

Output	PDM version 1 (Approved in June 2016)	PDM version 2 (Approved in December 2019)	PDM version 3 (Approved in January 2021)
Output 1	Individual Master Plans are formulated for the next 15 years in DNCC and DSCC.	Individual Master Plan targeting the year of 2032 is formulated separately for DNCC and DSCC.	(Same as PDM version 2)
	OVI <ul style="list-style-type: none"> New Master Plans are approved by Local Government Division, Ministry of Local Government, Rural Development and Cooperatives (LGD). 	OVI <ul style="list-style-type: none"> Revised Master Plan is approved by the Mayor of each city. WMD Directives are approved by the Mayor of each city and made open to the public. 	(Same as PDM version 2)
Output 2	WBA (Ward Base Approach) activities are improved and expanded within DNCC and DSCC.	(Same as PDM version 1)	(Same as PDM version 2)
	OVI <ul style="list-style-type: none"> WBA improvement and expansion plan will be approved by CWMO (Chief Waste Management Officer) in DNCC and DSCC. Number of wards where WBA was implemented will be X to Y. 	OVI <ul style="list-style-type: none"> WBA Core Group is established in each city, and holds a meeting every month. Ward offices are newly established and WBA activities are implemented at least 5 wards in each city. 	(Same as PDM version 2)
Output 3	Proper solid waste collection and transportation including 3R activities and awareness raising campaign is implemented in CCC.	A waste collection and transportation plan is developed, and a proper waste collection and transport system is implemented in CCC.	(Same as PDM version 2)
	OVI <ul style="list-style-type: none"> A plan of solid waste collection and transportation is submitted to the Mayor. A guidance manual of collection and transportation is completed. The number of 3R activities and awareness-raising campaign will be X. 	OVI <ul style="list-style-type: none"> A waste collection and transportation plan is approved by the Mayor. WBA activities are implemented in 2 wards (model wards). 	(Same as PDM version 2)
Output 4	Sustainable workshop management systems are established in DNCC, DSCC, and CCC.	(Same as PDM version 1)	(Same as PDM version 2)
	OVI <ul style="list-style-type: none"> Workshop operation and management reports are submitted to the management 	OVI <ul style="list-style-type: none"> Training for preventative maintenance is carried out. 	(Same as PDM version 2)

Output	PDM version 1 (Approved in June 2016)		PDM version 2 (Approved in December 2019)		PDM version 3 (Approved in January 2021)	
		<ul style="list-style-type: none"> department of DNCC, DSCC, and CCC monthly. A maintenance manual is revised. Regular maintenance is implemented by trained mechanics based on a maintenance manual. 		<ul style="list-style-type: none"> Rules for occupational health and safety (draft) and service regulation for the workshop (draft) are developed, and the trainings are carried out. 		
Output 5	Information sharing for challenges and efforts of SWM among at city corporations and other small local governments around Dhaka metropolitan area are conducted by LGD.		(Same as PDM version 1)		(Same as PDM version 2)	
	OVI	<ul style="list-style-type: none"> Number of information sharing meetings will be X. Number of reports that city corporations and small local governments improved SWM systems will be X. 	OVI	<ul style="list-style-type: none"> The information sharing meetings are held 2 times. SWM support activities by DNCC and DSCC to other city corporations and small local governments are reported 4 times. 	(Same as PDM version 2)	
Output 6 (additional)	N/A		Public relation (PR) activities for SWM is promoted in DNCC and DSCC.		(Same as PDM version 2)	
	OVI	N/A	OVI	<ul style="list-style-type: none"> PR Committee on SWM is established based on the PR plan for SWM. 	(Same as PDM version 2)	
Output 7 (additional)	N/A		Lifetime of the existing landfill sites is prolonged and new landfill area is secured in DNCC and DSCC.		(Same as PDM version 2)	
	OVI	N/A	OVI	<ul style="list-style-type: none"> Development Project Proposals (DPPs) for extension of the existing landfill sites and/or for construction of new landfill sites are submitted to Government of Bangladesh (GoB). 	(Same as PDM version 2)	
Output 8 (additional)	N/A		N/A		Medical waste management system in CCC is improved.	
	OVI	N/A	OVI	N/A	OVI	<ul style="list-style-type: none"> The operation and maintenance section of medical waste incinerator is established in CCC.

Attachment 2 Work Flow Chart



Attachment 4 Expert Dispatch Schedule (Actual)

(1) Phase-1

Name	Title	# of Trip	Work in Bangladesh	Work in Japan
ISHII Akio	Chief Advisor / SWM Planning	17	9.42	0.55
SAITO Masahiro	Deputy Chief Advisor / Landfill Management 1	20	9.03	1.35
SEINO Akinori	Workshop Management	4	1.80	-
KAWAUCHI Komei	Workshop Management	2	0.93	-
MIWA Shinji	Collection Vehicle Maintenance	4	1.90	-
YAO Kazuya	Collection Vehicle Maintenance	8	4.20	-
KUDO Yuriko	Public Awareness	13	6.37	-
SHIMADA Daisuke	Landfill Management 2	2	0.90	-
ITO Eri	Landfill Management 2	5	2.33	-
KODANI Rikae	WBA Promotion	11	5.40	0.50
ITO Eri	Environmental Management	-	-	0.60
ITO Eri	Project Administration / Training Planning	4	1.87	0.25
NAGAHIRA Kozo	Project Administration / Training Planning	10	4.53	1.18
Total		100	48.69	4.43
			53.12	

(2) Phase-2

Name	Title	# of Trip	Work in Bangladesh	Work in Japan
SAITO Masahiro	Chief Advisor / SWM Planning / Landfill Management	4	4.30	4.64
KUDO Yuriko	Deputy Chief Advisor / Public Awareness / PR	5	3.93	6.01
KAWAUCHI Komei	Workshop Management / Waste Collection and Transportation	1	0.47	-
SAITO Masahiro	Waste Collection and Transportation 2	2	1.57	1.41
ISHII Akio	WBA promotion 1 / Collection Vehicle Maintenance	2	0.90	-
SAITO Masahiro	Collection Vehicle Maintenance 2 / Workshop Management 2	2	0.87	0.88
KUDO Yuriko	WBA promotion 3	1	0.50	1.02
KODANI Rikae	WBA Promotion 2 / Waste Collection Equipment Improvement	2	1.63	4.22
NAGAHIRA Kozo	Landfill Improvement Guidance / Training Planning	1	0.47	3.95
KOSHIYAMA Risa	Landfill Improvement Guidance 2 / Training Planning 2	0	0.00	0.96
YAMANAKA Chikako	Landfill Improvement Guidance 3 / Training Planning 3	2	1.17	1.05
UEHATA Naoki	Project Development Evaluation	1	0.70	2.50
KUNIYASU Hiroyuki	Waste to Energy	1	0.40	1.71
YOSHIKAWA Shuichi	Landfill Design Guidance and Geological Survey	1	0.93	-
TANAKA Mai	Medical Waste Segregation	2	1.97	1.00
YAMANAKA Chikako	Medical Waste Treatment Organization Improvement	2	2.00	-
FURUSHI Hisashi	3D CAD and Drone Analysis of Landfill Capacity	3	2.50	-
KAWAUCHI Komei	Waste Collection and Transportation	-	-	1.20
ISHII Akio	WBA promotion 1 / Collection Vehicle Maintenance / Waste Collection and Transportation	-	-	0.95
KATO Atsushi	Basic Design of Medical Waste Incinerator	-	-	1.50
Ajeet Kumar Singh	Environmental Monitoring Guidance	3	2.00	0.50
Total		35	26.31	33.50
			59.81	

Attachment 5 Acceptance of Trainees (JICA Training)

(1) Participants of 1st SWM Training in Japan (May 21, 2018 to June 1, 2018, 5 trainees)

No.	Name (honorifics omitted)	Organization	Position
1	HAQUE A N M Foyzul	LGD	Deputy Secretary
2	RAZZAK Mohammad Abdur	WMD, DNCC	CWMO
3	ZAHID Md Zahid Hossain	WMD, DSCC	CWMO
4	BHUIYAN Md Mafizur Rahman	WMD, DNCC	ACWMO (Zone 5)
5	HARUN A H M Abdulla	WMD, DSCC	Executive Engineer (EE)

(2) Participants of 2nd SWM Training in Japan (June 9, 2019 to June 15, 2019, 3 trainees)

No.	Name (honorifics omitted)	Organization	Position
1	Md. Mobashwer Chowdhury	DNCC (Zone 2)	Ward Councilor (Ward 7)
2	Hasan Mehedi	DNCC	Assistant CEO
3	Md. Ashraful Alam Abul Hasnat	ED, DNCC	Superintending Engineer (SE)

(3) Participants of 3rd SWM Training in Japan (November 8, 2021 to November 11, 2021, 6 trainees)

No.	Name	Organization	Position
1	S.M. Shibli Mahmud	DNCC	Assistant Chief Waste Management Officer (Community)
2	Md. Bengir Ahmed	DNCC	Conservancy Inspector (Ward#19,20)
3	Md. Shafiqul Islam	DSCC	Conservancy Officer (Zone#2)
4	Md. Ariful Islam	DSCC	Conservancy Inspector (Ward#15)
5	Md. Saiful Islam Chowdhury	CCC	Conservancy Inspector (Ward#27)
6	Md. Nasir Uddin	CCC	Conservancy Supervisor (Ward#18)

(4) Participants of the Third Country Training Program in Kolkata, India (December 3, 2018 to December 9, 2018, 11 trainees)

No.	Name (honorifics omitted)	Organization	Position
1	Md. Mafizur Rahman Bhuiyan	WMD, DNCC	ACWMO (Zone 5)
2	Md. Faridul Islam	WMD, DNCC	AE-Landfill
3	Md. Shahin Sadat Siddiqui	WMD, DNCC	AE-Landfill
4	Muhammad Anwar Hossen	WMD, DNCC	CI (Ward 10)
5	Md. Abdur Rahman	WMD, DSCC	ACWMO (Zone 5)
6	Md. Selim Mia	WMD, DSCC	ACWMO (Zone 4)
7	Md. Imran Hossain Jitu	WMD, DSCC	CI (ward 31)
8	Sheikh Mohammad Shofiqul Mannan Siddique	CCC	CCO
9	Md. Saiful Islam Chowdhury	CCC	CI (Ward 27)
10	Khorshed Alam	CCC	CS
11	Md. Abdus Sattar	CCC	CS

Attachment 6 Inputs of Equipment (including the list of property handed over to the Counterpart)

貸与物品リスト									
List of Property Lending									
業務名称 (Name of Project) : バングラダッシュ人民共和国 南北ダッカ市及びチッタゴン市廃棄物管理強化プロジェクト (Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City) (2022年5月現在) (As of May 2022)									
対象国 (Country) : バングラダッシュ (Bangladesh)									
物品名称 (Name of Property)	規格・品番 (Standard, Part Number)	個数 (Quantity)	取得価格 (Purchase Price)		検査合格日 (Date of Inspection Passed)	配置場所 (Location)	現況 (Current State)	備考 (Remarks)	事業終了後の 取扱い (After Completion of Project: Handover/Return)
			取得価格 (Purchase Price)	通貨 (Currency)					
複合機 (all-in-one printer)	CAJONIK Z5555 DIGITAL MULTIFUNCTIONAL IMAGING SYSTEM Part No:1441C001AA	1	383,391.75	BDT	2017/7/26	DSCC	稼働中 (Working)	事業用物品 (Office Equipment)	実施機関に譲与 (handed over to C/P) (2022/5/13)
ノートパソコン (Laptop)	HP PRODESK 400 G4 I7-7700 Part No:1NU88PA SL No:SGH721Q9NW	1	75,885.25	BDT	2017/7/26	DSCC	稼働中 (Working)	事業用物品 (Office Equipment)	実施機関に譲与 (handed over to C/P) (2022/5/13)
デスクトップパソコン (Desktop Computer)	HP ENVY 15-AS106TU Part No:Y4G01PA SL No:5CG715181Q	1	90,125.00	BDT	2017/7/26	DSCC	稼働中 (Working)	事業用物品 (Office Equipment)	実施機関に譲与 (handed over to C/P) (2022/5/13)
リキシャバン(Rickshaw Vans, RV) & ハンドカート (Hand Cart, HC)	For big size compactor	RV×3 HC×3	3664.00	USD	2018/7/8	CCC	稼働中 (Working)		実施機関に譲与 (handed over to C/P) (2019/8/25)
リキシャバン(Rickshaw Vans, RV) & ハンドカート (Hand Cart, HC)	For big size compactor	RV×3 HC×3	4989.00	USD	2018/7/10	DNCC DSCC	稼働中 (Working)		実施機関に譲与 (CCCで利用することになったのでCCCに贈与) (handed over to CCC) (2019/8/25)
医療系廃棄物小型廃却炉 (Small-scale medical waste incinerator)	中和機工株式会社 CX-200K Capacity: 200kg/hour	1	14,950,000	JPY	2022/1/19	CCC	稼働中 (Working)	予備品一式含む (Including spare parts)	実施機関に譲与 (handed over to C/P) (2022/1/20)
ガス測定器 (Gas measuring instrument)	QED社 GASKAA00-110 (CH4, H2S, CO, H2)	2	1,996,000	JPY	2021/11/16	DSCC, DNCC	稼働中 (Working)		実施機関に譲与 (handed over to C/P) (2021/11/17)
水質測定器 (Water quality measuring instrument)	梅堀マルチデジタル水質計 WQ-330PCD-S、(PH, EC, DO)	1	261,000	JPY	2022/2/19	DSCC	稼働中 (Working)		実施機関に譲与 (handed over to C/P) (2022/2/20)
スチールプレート (Steel Plate)	Width: 1.5 meter, Length: 3 meter, Thickness 20 mm	85	3,770,536	BDT	2020/9/30	DNCC	稼働中 (Working)	フック及びチェーン (フック and chains (2 sets))	実施機関に譲与 (handed over to C/P) (2020/10/1)
リキシャバン (Rickshaw Vans, RV)	For small size compactor	6	338,078	BDT	2021/5/14	DSCC, DNCC, CCC	稼働中 (Working)	格付2格ずつ (2 for each city)	実施機関に譲与 (handed over to C/P) (2021/5/15)
リキシャバン (Rickshaw Vans, RV) (35 units)	For small size compactor	35	2,058,050	BDT	2021/6/30	CCC	稼働中 (Working)	鉄網12本含む (including 12 Steel bars)	実施機関に譲与 (handed over to C/P) (2021/7/1)
3次元CADソフト (3D CAD Software)	Civil 3D 2022 annual subscription license	2	313,600	BDT	2022/2/22	DSCC, DNCC	稼働中 (Working)		実施機関に譲与 (handed over to C/P) (2022/2/23)
写真測量ソフト (Photogrammetry software)	Agisoft Metashape professional Edition Node-locked license	2	6,998	USD	2021/10/28	DSCC, DNCC	稼働中 (Working)		実施機関に譲与 (handed over to C/P) (2021/10/29)
ドローン (Drone)	DJI Drone-DJI-Phantom 4 pro V2	2	360,000	BDT	2021/11/16	DSCC, DNCC	稼働中 (Working)		実施機関に譲与 (handed over to C/P) (2021/11/17)
【以下、JICAから貰われている物品 (Property Lent by JICA)】									

Attachment 7 Minutes of Meetings on the Joint Coordinating Committee (JCC)

(1) 1st JCC meeting (November 21, 2017)

উন্নয়নের গণতন্ত্র
শেখ হাসিনার মূলমন্ত্র

বিদেশী সংস্থা কর্তৃক বিধায় ইংরেজিতে লিখা হল।

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -1

Meeting Minutes of 1st Joint Coordination Committee of the Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City

Chairperson : Md. Mahbub Hossain
Additional Secretary (Urban Development), Local Government Division
Venue : Seminar Room, Local Government Division, Bangladesh Secretariat,
Dhaka
Time and date : 21st November 2017, 3.30 PM
Attendees : Annex-I

1. Presentation:

The Chairperson commenced the meeting by welcoming all and requested JICA Expert to present the outline of the Project.

The team leader of the JICA Expert Team, Mr. Akio Ishii presented the Project details output by output and explaining each activity. The outputs of the Project would be (1) Formulation of solid waste management Master Plan for DNCC and DSCC, (2) Improvement and expansion of WBA in DNCC and DSCC, (3) Proper solid waste collection and transportation system including 3R activities and awareness raising in CTGCC, (4) Sustainable workshop management system in DNCC, DSCC and CTGCC, (5) Information sharing for challenges and efforts for solid waste management in all city Corporation and small local governments around Dhaka metropolitan areas.

JICA Expert, Mr. Akinori Seino, presented the progress of the Project using Monitoring format set up by JICA.

The Chairperson requested to the participants for sharing their opinions and comments on the Project and progress.

2. Discussion:

- 2.1 Mr. Koji Mitomori, senior representative, JICA Bangladesh Office emphasized the three issues of the project: security of the JICA Expert at office and field visits. He urged to DNCC, DSCC and CTGCC to provide security squads. He also proposed to prepare monitoring sheet jointly by JICA Expert and Project counterpart
- 2.2 CTGCC Official and Chairperson briefly shared the progress of forming WMD for CTGCC
- 2.3 Chairperson and other member discussed to increase the frequency of the JCC meeting in the first year of the Project.
- 2.4 Formation of additional working committee or group was discussed but not considered. However, the concept of working of Joint Working Meeting to be continued with the help of focal person or counterpart without formation of additional committee or group and without such naming.

- 2.5 CTGCC, DNCC and DSCC all discussed to provide security protection of the expert while working at offices and fields.
 - 2.6 Based on the request of the Chairperson, JICA Expert shared the surveys and data collection would be the next three months activities
 - 2.7 Mr. Abul Hasnat mentioned the necessity of the Waste to Energy in the Project Design Matrix(PDM), however, Chairperson suggested try to follow the signed record of discussion containing PDM.
 - 2.8 WMD of DNCC and DSCC is necessary to prepare all the necessary staff as according to the organogram
 - 2.9 Vehicles management and maintenance system should be reformulated
- 3. Decision: After detailed discussion following decisions have been taken by having the consents of the all participants**
- 3.1 The frequency of the Joint Coordination Committee (JCC) Meeting is to quarterly for the first year of the Project and date would be decided based on the JICA Expert Team-Leader's schedule.
 - 3.2 JCC proposed to present the list activities to be implemented (Action Plan) in the next one year in the next JCC meeting
 - 3.3 City Corporations will have to make counterpart or focal persons for each out puts of the Project. Most relevant officials to be identified accordingly.
 - 3.4 JCC decided to invite Department of Environment and Directorate General of Health Services
 - 3.5 Security must be given priority and all city corporation was instructed to provide all the possible support as per desire to the JICA Expert Team
 - 3.6 JICA emphasized the security of the staff at offices and field visits. DNCC, DSCC, CTGCC and LGD agreed to provide all sorts of possible security measures as the team needs to have.
 - 3.7 JICA Experts cannot stay more than 14 days in Bangladesh at a time and cannot work at an office whole day
 - 3.8 Next 3 months activities would survey and field data collection to support direction of Master Plan.
 - 3.9 Chairperson proposed to present a draft outline Master Plan or Table of Contents (TOC) in the next JCC meeting
 - 3.10 The Project Design Matrix (PDM) should be printed in the more readable format by splitting the PDM in output by output in each page
 - 3.11 Formation of Waste Management Department in Chittagong City Corporation will be follow up by LGD as it on the process
 - 3.12 Institutional Strengthening will be covered in the Master Plan

Signed:.....

Date: 23/11/2017

(Md. Mahbub Hossain)

Additional Secretary (Urban Development)

Local Government Division

Annex-I: List of Attendees

JICA'র কারিগরী সহায়তায় এ বিভাগ কর্তৃক বাস্তবায়নধীন "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City" শীর্ষক প্রকল্পের কার্যক্রম পর্যবেক্ষণ করার জন্য গঠিত Joint Coordination Committee এর ২১/১১/২০১৭ তারিখ বেলা ০২:০০ ঘটিকায় অনুষ্ঠিত ১ম সভায় উপস্থিত কর্মকর্তাদের হাজিরাঃ

ক্রমিক	কর্মকর্তার নাম ও পদবী	দপ্তর/সংস্থা	ফোন/মোবাইল ও ইমেইল	স্বাক্ষর
	Hd. Lickot Ali' Joint Chief	LAD	01718419431 lickotali1965@gmail.com	
	Commodore M # Kozzale	CWMO	01711030382 safara09@yahoo.com	
	Md. Shamul Hossain CEO	Chittagong city corporation	01711196658 shamulhossain@gmail.com	
	Md. Shorif Razak Khan Chief City Planner	CCU	01715070708	
	Abn Saleh Md. Masin Superintending Engr	DSCC	01552582011	
	Yuriko Kudo	JICA Team		
	Md. Shoriful Alam Mondal	JICA Expert Team	01819 289806	
	AKIHORI SEINO	JICA Expert Team	017998820752	
	Air Commodore Md Shabigul Alam	CWMO DSCC	01730321089	
	Zaki Md. Ziaul Islam Program Manager	JICA	01713032203	
	Koji MITOMORI	JICA	01713-06113	
	Abul Hasnat	DNCC	01700695805	
	Akiro ISHII	JICA Expert team leader	017-8585-1919	

Distribution for kind information and take necessary steps (not according to seniority)

1. Chief Executive Officers, DNCC/DSCC/CTGCC
2. Chief Waste Management Officers, DNCC/DSCC
3. Chief City Planner, CTGCC
4. Joint Secretary (Urban Development-1), Local Government Division
5. Joint Secretary (Planning), Local Government Division
6. Mr. Koji Mitomori, Senior Representative, JICA Bangladesh Office
7. Mr. Zaki Md. Ziaul Islam, Program Manager, JICA Bangladesh Office
8. Mr. Akio Ishii, Team Leader, JICA Project Team
9. Mr. Akinori Seino, JICA Project Team
10. Mr. Yoriko Kudo, JICA Project Team
11. Mr. Md. Shoriful Alam Mondal, JICA Expert Team
12. Personal Secretary of Additional Secretary (Urban Development), Local Government Division (for kind information of additional secretary)

Md. Mahmudul Alam
Deputy Secretary
Phone: +88 02 9573625

(2) 2nd JCC meeting (February 14, 2018)

বর্দিশৌ সংস্হা জড়তি বর্ধিয় ইংরজেতিে লখিা হল।

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -1

Subject: Meeting Minutes of 2nd Joint Coordination Committee of the Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City

Chairperson : Md. Mahbub Hossain
Additional Secretary (Urban Development), Local Government Division
Venue : Seminar Room, Local Government Division, Bangladesh Secretariat,
Dhaka
Time and date : 14th February 2018, 4.00 PM
Attendees: Annex-I

1. Presentation and Sharing:

The Chairperson started the meeting by welcoming all and requested JICA Project Team Leader, Mr. Akio Ishii to present the Project Progress and Issues according to the agenda.

Mr. Akio Ishii presented and shared: (1) Project Progress, (2) Activities of the next year, (3) Japan Training, (4) Feasibility survey for waste-to-energy and concept of waste-to-energy guidelines, (5) issues of 3 CCs, (6) Security Measures.

The Chairperson requested to the participants for sharing their opinions and comments.

2. Discussion:

- 2.1 Along with Mr. Akio Ishii, Mr. Mitomori discussed about the importance of Ward Based Approach (WBA) as soft component of solid waste management.
- 2.2 DNCC Chief Waste Management Officer (CWMO) shared the continuation of Ward Based Approach (WBA) was not successful after that last Project phase out and DSCC,

CWMO shared the necessary efforts to be taken to sustain and continuation of WBA such as training of staff and monitoring.

- 2.3 DNCC CWMO shared that there is huge shortage of human resources against the officially approved organogram (official positions) that hinders the continuation of WBA and near-future more officials will be retired like Asst. CWMOs, COs etc.
- 2.4 DNCC and DSCC CWMO shared about the construction of Ward Solid Waste Management Offices under WBA-1, could not be succeeded well into all the wards due to unavailability of spaces (land).
- 2.5 JCC members shared about the importance of skill development training under this Project such as Landfill Planning and Construction, Refreshers Training for WBA etc.
- 2.6 JCC discussed about Three-week-long Japan Training on Waste-to-Energy schedule, participants and seat numbers (1 seat for Bangladesh in 2018)
- 2.7 Mr. Mitomori, JICA Official shared some examples of inputs of experts such as development of prototype rickshaw vans for new compactors, helping to design and drawing of Amin Bazar dumping platforms and roads, Nasirabad Landfill Site as New Landfill and support to prepare DPP, Post Closure of Matuail Landfill etc.
- 2.8 Mr. Akio Ishii emphasized on the conceptualization and scenario development of the Master Plan. And after feasibility, incineration plant operation may take 8 to 10 years from now on, however, at the same time 4500 tons of waste would be generated daily. Therefore, Plan should cover to tackle this daily generation waste until the incineration commissions operation.

3. Decision: After detailed discussions following decisions have been taken by having the consents of all participants:

3.1 3rd JCC Meeting:

Next JCC Meeting (3rd JCC Meeting) will be held around at the end of June 2018 or beginning of July 2018

3.2 Japan Training and Learning Sharing:

JICA Group Training Course 2018 (3-week-long):

DNCC participants will join this year JICA Group Training. And in next year DSCC and CTGCC participants will join.

Counterpart Training 2018 (1st to 12th May 2018):

The participants from DNCC for JICA Waste-to-Energy training should carry out training as TOT to disseminate the learnings among the staffs of DNCC, DSCC and CTGCC soon after coming back from Japan.

3.3 Continuation and Sustaining WBA:

Continuous skill development of the staffs for WBA is needed (TOT) and efforts to be given to continue and sustain WBA by each city corporation.

3.4 Staffing of Waste Management Department:

Follow up would be continued to recruit the officials against vacant posts of Waste Management Departments of DNCC and DSCC following the organizations' recruitment rules.

3.5 Local Training on Incineration:

JICA Project Team leader, Mr. Akio Ishii will hold local training for incineration technology and plant in Dhaka.

Signed:.....

Date: XX/02/2018

(Md. Mahbub Hossain)

Additional Secretary (Urban Development)

Local Government Division

Reference: 46.070.007.00.00.012.2011 (part xx), -10xx

Date: xx/02/2018

Distribution for kind information and take necessary steps (not according to seniority)

1. Chief Executive Officers, DNCC/DSCC/CTGCC
2. Chief Waste Management Officers, DNCC/DSCC
3. Chief City Planner, CTGCC
4. Joint Secretary (Urban Development-1), Local Government Division
5. Joint Secretary (Planning), Local Government Division
6. Mr. Koji Mitomori, Senior Representative, JICA Bangladesh Office
7. Mr. Akio Ishii, Team Leader, JICA Project Team
8. Ms. Rikae Kodani, JICA Project Team
9. Ms. Yoriko Kudo, JICA Project Team
10. Mr. Md. Shoriful Alam Mondal, JICA Project Team
11. Personal Secretary of Additional Secretary (Urban Development), Local Government Division (for kind information of additional secretary)

Md. Mahmudul Alam
Deputy Secretary
Phone: +88 02 9573625

(3) 3rd JCC meeting (October 25, 2018)

বিদেশী সংস্থা জড়িত বিষয় ইংরেজিতে লিখা হল।

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -1

Meeting minutes of 3rd Joint Coordination Committee of the Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City (draft)

Chairperson : Md. Mahbub Hossain
Additional Secretary (Urban Development), Local Government Division
Venue : Seminar Room, Local Government Division, Bangladesh Secretariat, Dhaka
Time and date : 25th October 2018, 10.30 AM
Attendees : Annex-I

1. Presentation and Sharing:

The meeting presentation and opinion sharing were in two parts as follows:

First Part of the Meeting (Waste to Energy presentation and sharing)

The Chairperson started the meeting by welcoming all and requested JICA Project Team to present the progress following the agenda.

Mr. Soichi Hayami presented the experience of Japan and future of waste in Dhaka. He shared the changes of Waste Management Law and Practices in last 100 years in Japan. He covered era of Public Cleansing Law, Era of Law for Waste Management and Public Cleansing, Sound Material-Cycle Society and thereby waste reduction trend etc in Japan .

Mr. Shoriful Alam Mondal briefly described the Waste to Energy Model for Dhaka City as progress of system development by JICA Project Team .

Commodore MA Razzak, Chief Waste Management Officer, DNCC explained the Nasirabad Eco Town Model along with current and future waste generation, management issues. CWMO emphasized on Eco-town model for DNCC is waste volume reduction. He proposed to consider zone-based model with all the facilities of solid waste management for new 18 wards of DNCC.

Air Commodore Md. Zahid Hossain, Chief Waste Management Officer, DSCC had presented Matuail Eco Town Idea. He also highlighted the future severity of the problem unless waste volume reduction is not adopted. He also explained how the existing and newly added land would be insufficient unless new technology is adopted.

Second Part of the Meeting (Joint Coordination Committee meeting presentation and sharing)

Mr. Akio Ishii, Team Leader of the JICA Project Team explained the progress on the findings of the Waste to Energy prefeasibility study. He covered 6 (six) aspects in the prefeasibility of WtE study such as (1) Social Condition, (2) Understanding the Residence, (3) Institutional Aspects, (4) Governance Capability, (5) Financial Aspects and (6) Technical Aspects. He had

emphasized to increase the governance capability to make the project successful. He mentioned that Eco-town concept that is shared by CWMO will accommodate waste to energy facility.

Mr. Ishii also described the outline of the Master Plan, experience of the other City Corporations and the future plan of the project.

The Chairperson requested to the participants for sharing their opinions and comments.

2. Discussion:

- Municipal Solid Waste Management is to be considered as top most priority for urban development
- Master Plan is going to be shared by JICA Expert Team as three drafts in October, November and December 2018 respectively. The finalization of MP will be done by the beginning of February 2019. JICA office explained that though JICA had been supporting for the preparation of the MP, however, JICA had not yet committed any cooperation to realize the proposed plan or activities of the MP.
- Existing Amin Bazar and proposed Nasirabad would be used for old 36 wards of DNCC. CWMO of DNCC shared that zone-based model to be used for new 18 wards of DNCC with the facility of waste treatments.
- It was discussed that the operation cost of the Eco-town model to be borne by City Corporation and one option might be to increase the conservancy tax from 2 to 4 % as said by Executive Engineer of DNCC, Mr. Shafiqur Rahman. However, Chairperson mentioned that there may be big change in future of revenue collection because of growth and tentative reformation of tax system.
- It has been tentatively decided to prepare projects to generate electricity from Waste. And those projects may be formulated with Power Division. It may take less time than the project proposing Eco-town model comprising waste to energy facility. However, both plans may run simultaneously, and it was discussed to sit 3 (three) city corporations together on this issue.
- Chairperson requested to prepare documents on how much waste would be generated after 10 (ten) years or onwards and match the expertise and challenges.
- Mr. Akira Munakata, JICA Advisor emphasized on thinking to incorporate or consider other municipalities and Paurashava for municipal solid waste management, especially experience sharing with CC and the chairperson of the meeting agreed on that.
- Experience sharing meeting among the participation of other city corporations to be held together with JICA Experts. JICA team proposed 4 (four) city corporations which are under the coverage of C4C project. However, based on the request of Chairperson, JICA team agreed to welcome all City Corporations to experience sharing.
- Since the urbanization is very rapid, chairperson encouraged to make priority projects to acquire lands for solid waste management and other facilities otherwise it might be tough to acquire land in future.

3. Decisions :

- Chairperson instructed 3 (three) city corporations (DNCC, DSCC, CCC) to prepare plan/model for solid waste management very shortly considering all aspects of management along with current and future issues. He also proposed to make presentation and share with LGD (urban development) by 4th November 2018 which is expected to be shared with the honorable minister of LGD near future.
- Chairperson instructed to make comparative analysis and show comparisons of time and resource requirement of various plans or proposal for solid waste management.
- Mr. Ashraf, joint secretary was instructed to communicate with Mr. Shoriful Alam of JICA team to coordinate the experience sharing meeting of 12 (twelve) City Corporations.
- Next JCC will be held in Feb. 2019 at the time of finalization of MP.

Signed.....
Date: XX/XX/2019
(Md. Mahbub Hossain)
Additional Secretary (Urban Development)
Local Government Division

Annex-I: List of Attendees

List of attendees of meeting on JICA's Technical Assistance Project, "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City", held on 25th October 2018 at LGD (Urban Development)

Sl. No.	Name & Designation	Department / Organization	Phone, Email	Signature
1				
2	Chief Commodore Md Zahid Hossain	CWMO DSCC	01715 012762 mzhossain70@ yahoo.com	
3	Kazi Ashraf Uddin Joint Secy	MULARD LGD	01716093428	
4	Bashir Ahamed Joint Secy.	ERD MOF	01717145057 bashirahamedsa @gmail.com	
5	Commodore M A Razzak	CWMO DNCC	01711030332	 25/10/2018
6	Md. Shamsuddoha CEO	CCC	01711196663	 25/10/18
7	Abu Saleh Md. Mainuddin SE	WMD DSCC	01552542211	 25/10/18
8	Arch-Plnr. Resan Karim Chief City Planner.	CCC	01715070708	
9	S.M. Shahjahan Rahman XEN (WMD)	DNCC	01711287957	
10	KHONDOKER MAHBUB ALAM SE, WMD	DNCC	01556-377 355	 25/10/18
11	MD. TOWHID SIAPU EX WMD	DSCC	01717 -058977	 25/10/18
12	A.H.M. Abdullah Hansen	Ex. Exp. DSCC	01614989777	 25/10/2018
13	Eri Ito	JET	01706215751	
14	Akira Munakata	JICA	0171308637	
15	A.N.M. Fajzullah	LGD Qty-1	01711576667	
16	Zakaria Hossain	CCC	017133283	

Reference: 46.070.007.00.00.012.2011 (part xx), -10xx

Date: xx/xx/2019

Distribution for kind information and take necessary steps (not according to seniority)

1. Chief Executive Officers, DNCC/DSCC/CTGCC
2. Chief Waste Management Officers, DNCC/DSCC
3. Chief City Planner, CTGCC
4. Joint Secretary (Urban Development-1), Local Government Division
5. Joint Secretary (Planning), Local Government Division
6. Mr. Koji Mitomori, Senior Representative, JICA Bangladesh Office
7. Mr. Akio Ishii, Team Leader, JICA Project Team
8. Mr. Soichi Hayami, JICA Project Team
9. Ms. Eri Ito, JICA Project Team
10. Ms. Yoriko Kudo, JICA Project Team
11. Mr. Md. Shoriful Alam Mondal, JICA Project Team
12. Personal Secretary of Additional Secretary (Urban Development), Local Government Division (for kind information of additional secretary)

A. N. M. Foyzul Haque
Deputy Secretary
LGD (Urban Development)
Phone: +88 02 9573625

(4) 4th JCC meeting (February 17, 2019)

(বিদেশি সংস্থা ও ব্যক্তি সংশ্লিষ্ট থাকায় পত্রটি ইংরেজিতে লেখা)

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation-1 Section
www.lgd.gov.bd

উন্নয়নের গণতন্ত্র
শেখ হাসিনার মূলমন্ত্র

Meeting Minutes of 4th Joint Coordination Committee of the JICA's Technical Assistance Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City Corporation.

Chairperson : Md. Mahub Hossain, Additional Secretary (Urban Development),
Local Government Division
Venue : Conference Room, Local Government Division, Bangladesh Secretariat,
Dhaka
Time and date : 17th February 2019, 4:00 PM
Attendees : Annex-I

1. Presentation:

The Chairperson commenced the meeting by welcoming all and requested JICA Experts to present the Presentation following the agenda.

As per the agenda, Ms. Yuriko Kudo has briefly presented the progress of Masterplan & Schedule of finalization of the Masterplan. After her brief presentation, the team leader of the JICA Expert Team, Mr. Akio Ishii presented the construction of Eco-town concept including the outline of Eco-town, Facility development concept etc.

The Chairperson requested the participants for sharing their opinions and comments.

2. Discussion:

- 2.1 Chairperson talked about the extension of the period of the Master Plan (MP) focusing the year 2041 as well as asked for preparing a brief presentation of the Prepared Master Plan. Chairperson would like to share the presentation with Honorable Minister. However, Team leader of JICA Project Team shared current Master Plan's design period is 15 years, that is from 2018 to 2032.
- 2.2 The progress of the Matuail new extension landfill sites have been discussed in the meeting.
- 2.3 Mr. Ishii discussed about the decision of the construction of the Eco-town for the DNCC & DSCC. In this regard, CWMOs of both the City Corporations had discoursed the concepts, ideas and necessity of the adoption of incineration plant, biogas plant, recycle plant etc. Chairperson of the meeting expresses his interest for establishing Eco-town with incineration and wanted to know the process of application of ODA loan. Chairperson also wanted to share the concept to Honorable Minister.
- 2.4 Mr. Md. Zahid Hossain, Chief Waste Management Officer of DSCC shared the India visit experience on the Solid waste Management. Chairperson requested Mr. Zahid and Mr. Shorif to share the summary report of the India Visit to their colleagues.
- 2.5 Mr. Shorif of JICA Project Team briefly explained the output of the prefeasibility study of the Eco-town projects.
- 2.6 Chairperson requested JICA Expert team for discussing the probable schedule of the construction of the Eco-town project in Bangladesh. Mr. Koji Mitomori (Sr. Representative, JICA Bangladesh Office) shared that from now on at least four years would take to construct an Eco-town project in Bangladesh. Mr. Mitomori also discussed about the breakdown of the timeline mentioning a year for loan approval processing with agreement, a year for DPP approval with consultant appointment, a year for procurement and construction of Eco-town etc.

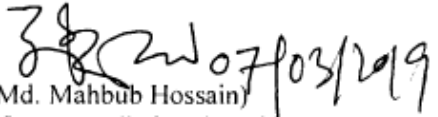
Page 1 of 4



- 2.7 Mr. Mitomori and Mr. Zia from JICA Bangladesh Office have briefly shared the process and functional steps of the Eco-town project under Japanese Assistance (ODA loan) including the tentative tasks of both Bangladesh and Japanese sides.

3. Decision:

- 3.1 A short presentation on the Master Plan to be prepared that is to be presented to the Honorable Minister.
- 3.2 A summary report of the India study visits by the officials from DNCC, DSCC and CTGCC to be prepared and reported to LGD (Urban Development Wing)
- 3.3 A short report on the detailed description of the components of the Eco-town project should be prepared.

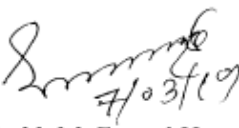

(Md. Mahbub Hossain)
Additional Secretary (Urban Development)
Local Government Division

Memo No. 46.00.0000.070.014.007.2017-197

Date: 23 Falgun 1425
07 March 2019

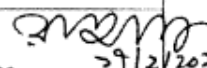
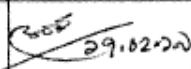
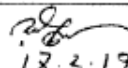
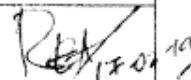

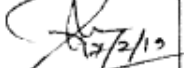
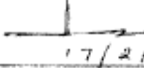
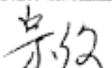
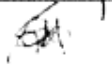
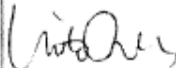
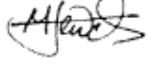


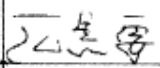
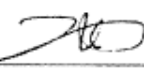
Distribution for kind information and take necessary steps (not according to seniority)

1. Chief Executive Officers, Dhaka North City Corporation/Dhaka South City Corporation/ Chattogram City Corporation.
2. Chief Waste Management Officers, Dhaka North City Corporation/Dhaka South City Corporation.
3. Joint Secretary (Urban Development-1), Local Government Division.
4. Joint Chief (Planning), Local Government Division.
5. Superintendent Engineer, DNCC/DSCC.
6. Executive Engineer, DNCC/DSCC.
7. Chief City Planner, Chattogram City Corporation.
8. Mr. Mitomori Koji, Sr. Representative, JICA Bangladesh Office.
9. Mr. Zaki Md. Ziaul Islam, Program Manager, JICA Bangladesh Office.
10. Mr. Akira Munakata, Local Government Advisor at NILG (JICA).
11. Mr. Kaname Ishiguro, Global Environment Department, JICA, Tokyo, Japan.
12. Mr. Akio Ishii, Team Leader, JICA Project Team.
13. Ms. Yuriko Kudo, JICA Project Team.
14. Mr. Kazuya Yao, JICA Project Team.
15. Md. Shoriful Alam Mondal, JICA Project Team.
16. Mohammad Nurul Alam Siddique, JICA Project Team.
17. Office Copy.


A. N. M. Foyzul Hoque
Deputy Secretary
Phone: 02 9573625
Email: lgcc1@lgd.gov.bd

Annex-I: List of Attendees

List of attendees: Meeting on JICA's Technical Assistance Project, "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City", held on 17th February 2019 at LGD (Urban Development)

Sl. No.	Name & Designation	Department / Organization	Phone, Email	Signature
1.	Commodore M A Razzan	CWMO DNCC	0171030332 safena690@yahoo.com	 29/2/2019
2.	Hq Commodore Md Zahid Hossain	CWMO DSCC	01709940183 mehossain70@yahoo.com	 29.02.2019
3	Rabin Chandra Barman Joint Chief	LGID	01819421363	 17.2.19
4	Work. Pr. Rozul CCP, Karam	CCP	01715070108	 17/2/19
5.	KHONDOKER MAHBUB ALAM SE	DNCC	01556-377 355	 17/2/19
6.	S.M. Shafiqur Rahman Jt. Chief CWMO	DNCC	01711207937	 17/2/19
7	MD. TOWHID SIRAJ EX WMD	DSCC	01717 -058913	 17/2/19
8	Akira Nunakota	JICA Advisor	0171304637	
9	MD. NURUL ALAM SIDDIQUE JICA Expert team member	YEC	01819463345	
10	Yuniko Kudo	JICA Project Team (YEC)		
11	Md. Shariful Alam Mondal	JICA Project Team (YEC)	01919289806	
12	Zaki Md. Ziaul Islam	JICA Proj. Man.	01713032208	
13	Koji Mitomo	JICA Bangladesh S Rep	01713043163	
14	ISHIGURO KANAME	JICA HQ Tokyo		
15	AKIO ISHII	JICA project Team	0178885469	

(5) 5th JCC meeting (July 9, 2019)

বর্দিশৌ সংস্হা জড়তি বর্ধিয় ইংরজেতি লখিা হন।

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -1

Meeting Minutes of 5th Joint Coordination Committee of “the Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City”

Chairperson : Md. Mahbub Hossain
Additional Secretary (Urban Development), Local Government Division
Venue : Seminar Room, Local Government Division, Bangladesh Secretariat,
Dhaka
Time and date : 9th July 2019, 10:00 AM
Attendees: Annex-I

4. Presentation:

The Chairperson started the meeting by asking the last meetings decisions with their updates. After having discussion on (i) presentation for briefing of the Master Plan for the Minister, (ii) a short report on the India visit and (iii) a short report on Eco-town detailing, the meeting proceeded to the presentation session.

Mr. Akio Ishii has briefly presented the Master Plan outline and priority projects, the waste collection and transportation guidance and manual for Chattogram City Corporation (CCC), the WBA expansion manual, the 4th project monitoring sheet, the revised Project Design Matrix (PDM) and office space request and security measures of JICA Project Team (JPT).

The Chairperson requested to the participants for sharing their opinions and comments.

5. Discussion:

- 2.1 At first, the Chairperson discussed on the security issues of the JPT. In this aspect, he advised the JPT to directly communicate with the Ministry without delaying for any formal meeting.
- 2.2 Mr. Zahid, CWMO, DSCC reported the latest status of the waste management of DSCC including the updates of the DPPs of Matuail Extension landfill site project and waste collection implementation project at the expanded area.
- 2.3 Mr. Manzur, CWMO, DNCC also reported the current status of the DPPs of Aminbazar extension Landfill Site and Nasirabad Landfill Site.
- 2.4 The Chairperson mentioned that the draft Master Plan should be comprehensively adhering to and aligning with the ongoing waste management planning and activities of the City Corporations and the Government. In this connection, he informed that under his supervision a team is working for introducing incineration projects by the PPP model/framework for the last four months. Since last month, the working team has almost materialized the Waste to Energy Project (PPP model) into a more understandable state. He also added, tentatively within a week, working document for securing Waste to Energy Project would be disclosed to city corporations.
- 2.5 Mr. Zahid, CWMO, DSCC explained that Eco-town concept includes the construction of incineration plant and there was no contradiction between the policy of the Government and the Master Plan.
- 2.6 The Chairperson instructed that components of the Eco-town, including the incineration plant and waste to energy should be mentioned more clearly (may be in brackets).
- 2.7 The Chairperson mentioned to develop consensus with the government officials before public disclosure of the Master Plan.
- 2.8 Mr. Manzur, CWMO, DNCC informed that DNCC has formed a committee for reviewing the Master Plan document under the instruction of the Hon'ble mayor of DNCC.
- 2.9 The Chairperson advised a road map of the Master Plan approval, which would be:
 - i. DNCC will review the master plan based on meeting discussion (inclusion on ongoing planning and activities) with the involvement of JICA Project Team.
 - ii. DSCC will review the master plan based on meeting discussion (inclusion on ongoing planning and activities) with the involvement of JICA Project Team.
 - iii. DNCC & DSCC will prepare and give a presentation of the Master Plan to the Ministry for approval with the support of JICA Project Team.

- 2.10 Mr. Ishii shared the slight revision of the Project Design Matrix (PDM), in which output for Public Relation (PR) activities and landfill related activities were added. He also shared WBA initiatives of Chattogram City Corporation.
- 2.11 Mr. Shorif explained the WBA components and promotion strategy along with the WBA expansion manual.
- 2.12 Mr. Karim, Chief City Planner, Chattogram City Corporation reported that they have taken initiative for the formulation of Waste Management Wing, and initiated the door-to-door collection system instead of dustbin collection system under the WBA etc. Introduction and expansion of WBA is underway in Chattogram City Corporation.

6. Decision:

- 3.6 The Master Plan is generally good, but it shall incorporate the WtE introducing direction and ongoing waste management program of the Government as per the report which will be provided by LGD within a week;
- 3.7 DNCC & DSCC will review the Master Plan and finalize it in consultation with the JICA Expert Team;
- 3.8 DNCC and DSCC will send and present the final draft of Master Plan to the Ministry for the approval
- 3.9 JICA Bangladesh office strongly requested that the meeting with the Minister of LGD on the Master Plan should be set soon after the final draft of Master Plan was consented.
- 3.10 The waste collection and transportation guidance and manual in CCC, the WBA expansion manual, the 4th project monitoring sheet, the draft revised PDM and priority projects were accepted.

Signed:.....

Date: 17/02/2018

(Md. Mahbub Hossain)

Additional Secretary (Urban Development)

Local Government Division

Annex-I: List of Attendees

Attendance sheet of The 5th Joint Coordination Committee meeting under the ongoing JICA's Technical Assistance Project, "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City":

Chairperson : Md. Mahbub Hossain, Additional Secretary (Urban Development), Local Government Division.

Date and time : 09 July, 2019, 10:00 A.M.

Venue : Conference Room, LGD




SI	Officer's Name & Designation	Organization/Office	Email & Mobile	Signature
1.	Shohrab Hossain Joint Secretary.	LGD.	shohrabhq@gmail.com	
2.	Offin Commadore Md Zahid Hossain	DSCC, CWMO	mzhossain70@yahoo.com 01709940189	
3.	Captain Manzur Hossain	CWMO, DNCC	manzurbn@yahoo.com 01552344358	
4.	Rabin dakinath Barman, JC	LGD	01819421363	
5.	A.N.M. Fajgul Haque DS	LGD.	01711576667	
6.	SM Shafiqul Islam	DNCC	01711207357	
7.	Arshi, Plar. Rezwan Karim .ccp	CCU	01715070708	
8.	Salam Sarwar. Waste Collection System Engr.	JICA Project Team	01722248000	
9.	Mohammad Wrool Alam Siddique National deputy Team Leader	JICA project Team	01819463345	
10.	Rikae Kodani, WBA promotion	JICA Project Team	017-06215758	
11.	Yuriko Kudo	JICA Project Team	071-06228239	
12.	Md. Shoriful Alam Mondal	JICA Project Team	01819-269-806	
13.	Masahiro Saitsu	JICA Project Team		
14.	Md. Emdadul Haq Chy. DS, cc-2	LGD	01711152328 emdadhq@gmail.com	

Attendance sheet of The 5th Joint Coordination Committee meeting under the ongoing JICA's Technical Assistance Project, "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City":

Chairperson : Md. Mahbub Hossain, Additional Secretary (Urban Development), Local Government Division.

Date and time : 09 July, 2019, 10:00 A.M.

Venue : Conference Room, LGD

SI	Officer's Name & Designation	Organization/Office	Email & Mobile	Signature
15.	Akio Ishii	JICA project team	01785851469	
16.	Zaki Md. Ziaul Islam	JICA	01713032703	
17.	Koji Mitomori	JICA	01713043163	

Reference: 46.070.007.00.00.012.2011 (part xx), -10xx

Date: 19/02/2019

Distribution for kind information and take necessary steps (not according to seniority)

12. Chief Executive Officers, DNCC/DSCC/CTGCC
13. Chief Waste Management Officers, DNCC/DSCC
14. Chief City Planner, CTGCC
15. Joint Secretary (Urban Development-1), Local Government Division
16. Joint Secretary (Planning), Local Government Division
17. Superintendent Engineer, DNCC/DSCC
18. Executive Engineer, DNCC/DSCC
19. Mr. Mitomori Koji, Sr. Representative, JICA Bangladesh Office
20. Mr. Zaki Md. Ziaul Islam, Program Manager, JICA Bangladesh Office
21. Mr. Akira Munakata, Local Government Advisor at NILG (JICA)
22. Mr. Kaname Ishiguro, Global Environment Department, JICA, Tokyo, Japan
23. Ms. Okuyama Etsuko, South Asia Department, JICA, Tokyo, Japan
24. Mr. Akio Ishii, Team Leader, JICA Project Team
25. Ms. Yuriko Kudo, JICA Project Team
26. Mr. Kazuya Yao, JICA Project Team
27. Md. Shoriful Alam Mondal, JICA Project Team

28. Mohammad Nurul Alam Siddique, JICA Project Team

A. N. M. Foyzul Haque

Deputy Secretary

Phone: +88 02 9573625

(6) 6th JCC meeting (December 17, 2019)

উন্নয়নেরগণতন্ত্র
শেখহাসিনারদলমন্ত্র

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -I

Meeting Minutes of 6th Joint Coordination Committee of "the Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City"

Chairperson : Mr. Maran Kumar Chakraborty
Additional Secretary (Urban Development), Local Government Division
Venue : Seminar Room, Local Government Division, Bangladesh Secretariat,
Dhaka
Time and date : 17th December 2019, 11:00 AM
Attendees : Annex-I

1. Presentation:

The Chairperson welcomed the participants in the meeting and requested the JICA project team to brief the project details and the ongoing program before getting into meeting agenda. Mr. Mitomori has briefly shared the project background and ongoing activities of JICA Project Team in Dhaka North, Dhaka South and Chattogram City Corporation.

The Chairperson requested JICA Team to start the presentation and discuss accordingly among the participants.

2. Discussion:

- 2.1 Ms. Kudo addressed the meeting agenda before the participants comprising the following discussion points:
 - i. Project period extension;
 - ii. Project Design Matrix (PDM) revision;
 - iii. Japan Training in March 2020;
 - iv. Approval and public disclosure of Master Plans;
 - v. Existing Status of WtE Project by PPP (if any) and
 - vi. Work Plan of second phase of the Project.
- 2.2 Chairperson asked about the necessity of incineration and Waste-to-Energy (WtE) of both Dhaka City Corporations.
- 2.3 Mr. Zahid, CWMO, DSCC and Mr. Manzur, CWMO, DNCC had replied on the Chairperson's inquiry, mentioning the short lifespan of the existing landfill site as well as scarcity of available land for new landfill area.

- 2.4 Chairperson asked about the feasibility study of WtE instead of a prefeasibility study. Mr. Shafiq, ACWMO, DNCC replied on the asking of the Chairperson.
- 2.5 During the discussion of the Project Design Matrix (PDM), both the CWMOs of DNCC and DSCC shared their future planning of waste management and all agreed on the inclusion of three new activities in the PDM.
- 2.6 Chairperson asked Chattogram CC (CCC) representatives to share about their waste management systems. Mr. Rezaul Karim, Chief City Planner shared their present scenario of Waste Management by mentioning that they have just developed Waste Management Cell (WMC) in CCC instead of conservancy wing, aiming at future WMD establishment. In his briefing, he has mentioned the excellent technical assistance of JICA in this project as well as requested to JICA for supporting with more compactors in future. He also informed that CCC is running a composting plant by the collected organic waste those are segregated from the collected waste.
- 2.7 Mr. Sohrab, Additional Secretary has suggested for adopting awareness program through Audio-video programs i.e. TVC (Television commercial). Regarding the awareness program, Mr. Rezaul Karim opined that in CCC 19 schools could be considered under this program.
- 2.8 Mr. Zahid, CWMO, DSCC and Mr. Manzur, CWMO, DNCC has shared that they had submitted the short-listed proposals on WtE facility project by PPP to the LGD.
- 2.9 Chairperson emphasized on the mental changes of the citizens for making big scale transformation of waste management system.
- 2.10 Mr. Mitomori has opined about the experts patterns of work in terms of supporting the ongoing or intended activities of City Corporation and for that he requested CCs to support the experts by regular discussion, updating by providing required documents etc.
- 2.11 Chairperson in consultation with participants has agreed project extension.
- 2.12 JICA Project team shared several important activities' schedule while sharing 'Work Plan' such as 12 CCs meeting, counterpart training in Japan etc. and participants agreed upon the activity schedules.

3. Decision:


- 3.1 The project period extension till November 2021 has been approved by JCC. GOB and JICA will sign the revised Record of Discussion that confirms the project period extension.
- 3.2 Inclusion of the following one activity and 2 outputs of the revised PDM have been accepted by JCC:
 - [Activity] Conduct a pre-feasibility study for introduction of Waste-to-Energy;
 - [Output] Public relation (PR) activities for SWM is promoted in North Dhaka City and South Dhaka City;
 - [Output] Lifetime of the existing landfill sites is prolonged and new landfill area is secured by DNCC & DSCC.



- 3.3 The proposed second 12 CCs meeting schedule of February 2020 has been accepted in the JCC meeting.
- 3.4 The proposed schedule of counterparts training of Japan in March 2020 has been agreed in JCC meeting. and
- 3.5 JCC assured that LGD will arrange Presentations on both DNCC & DSCC Master Plans for approval in the Ministry very shortly.

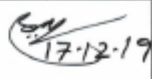

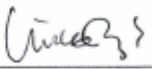
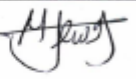




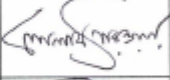
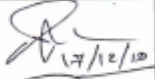

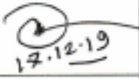

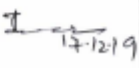

Memo No.

46.00.000.070.014.007.2017.764


(Maran Kumar Chakraborty)
Additional Secretary (Urban Development)
Local Government Division

Annex-I: List of Attendees

List of attendees: 6th JCC Meeting on JICA's Technical Assistance Project, "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City", held on 17th December 2019 at LGD (Urban Development)

Sl. No.	Name & Designation	Department / Organization	Phone, Email	Signature
01	Air Cdre Md Zahid Hossain, CWO	DSCC	01709940189	 17.12.19
02.	Cdr M Nazim Hossain CWO.	DNCC	01984123892	 17/12/19
03.	YUKIO Kudo	JICA (JET)		
04.	Md. Shariful Alam Mondal	JICA (JET)	01919269806	
05	Akio Ishii	JICA project	01785851469	
06	Kozo Nagahira	JICA		
07	A.H.M Abdulla Harun	XEN/DSCC	01671498977	
08	Md. Nurul Alam Siddique	JICA	01819463345	
09	Giulam Sarwar	JICA PROJECT TEAM	01722248000	
10	S.M. Shafiqur Rahman	ADD. C.W.MO DNCC	01711207037	 17/12/19
11.	Arshad Faruk Rozarul Karim Chief City Planner.	CCC	01715070708	
12.	Abu Shahed Chowdhury Secretary. CCC & C.W.MO	CCC	01816354248	 17.12.19
13.	Kichay Yamamoto Mammun Advisor, Local Government	JICA	0173-064637	
14	Shohrab Hossain Addl Sec.	LGD	01552364104	 17.12.19
15.	Mitomori Koji Sen. Representative	JICA	0171304363	

(7) 7th JCC meeting (January 26, 2020)

উন্নয়নের পথতন্ত্র
শেখ হাসিনার মুখাম্বর

Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -1

Meeting Minutes of 7th Joint Coordination Committee (JCC) of "The Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City"

Chairperson : Mr. Maran Kumar Chakraborty
Additional Secretary (Urban Development), Local Government Division
Venue : Online Zoom Platform
Time and date : January 26, 2021, 11:30 AM
Attendees : Annex-I

1. Presentation:

The Chairperson welcomed everyone in the online meeting and requested participants to introduce themselves. After introduction the chairperson requested JICA project team to make presentation following the agenda. Mr. Koji Mitomori of JICA Bangladesh has briefly presented the agenda and status on the approval of the Master Plans. After his presentation, the team leader of the JICA expert team, Mr. Masahiro Saito presented the medical waste support for Chattogram City Corporation and project extension issues.

The chairperson requested the participants for sharing their opinions and comments on each agenda.


2. Discussion:

- 2.1 Mr. Mitomori addressed the meeting agenda comprising the following discussion points:
 - a) Status on the approval of the Master Plans
 - b) Medical waste support activity to CCC (for JCC's approval)
 - c) Project period extension and revision of the PDM (for JCC's approval)
- 2.2 Mr. Mitomori requested the chairperson to share the update on the master plan approval of DNCC and DSCC from the Honorable Minister.
- 2.3 The chairperson replied that JICA, if necessary, may further present the master plan matter to the top management of LGD. The chairperson asked concerned persons of LGD to take initiatives for the Master Plan approval process promptly.
- 2.4 The chairperson asked DNCC and DSCC whether the master plan was approved by respective CC or not. In reply Mr. Badrul, CWMO, DSCC mentioned that the master plan was vetted by DSCC officials and approved by DSCC Honorable Mayor before submitting to the Ministry. Mr. Badrul also described that they have started working following the master plan and requested for faster approval from the Ministry.
- 2.5 Mr. Saidur, CWMO, DNCC opined that DNCC has achieved the target of previous master plan with the help of JICA project team and they want to implement the new master plan as soon as possible and he requested for formal approval from the Ministry.
- 2.6 Upon opinions from both CWMOs, the chairperson asked Deputy Secretary of LGD to accelerate the approval process.

- 2.7 Mr. Mitomori asked Mr. Saito, JICA project team leader to present the support for the improvement of medical waste management system in Chattogram city corporation. Mr. Saito also explained the details of the small-scale medical incinerator to be installed through the project in CCC.
- 2.8 The chairperson asked CCC representative about their opinion on medical waste support from JICA. Mr. Abu Shahed Chowdhury, Secretary of CCC described the necessity of medical waste incinerator for CCC and agreed for the support from JICA. For medical incinerator installation, CCC needs to provide land and secure O&M cost.
- 2.9 Considering the land scarcity and financial involvement of CCC, the chairperson asked CCC representative to perform feasibility analysis on the medical incinerator and submit the report to LGD. Mr. Saito informed that for such a small-scale medical incinerator, land requirement is very less, and he opined that a planning document which describes the activity with technical issues will be prepared instead of a feasibility study. The chairperson expressed that he basically agreed with this activity, and asked CCC to submit such a document to LGD for formality and LGD will take decision and necessary actions.
- 2.10 Mr. Saito explained the necessity of project period extension considering the global COVID-19 pandemic situation and new activity for the medical waste support to CCC. Mr. Mitomori informed that due to COVID-19 pandemic situation Japanese experts are working remotely from Japan.
- 2.11 The chairperson in consultation with participants has agreed one year project extension instead of current 6 months extension proposal by JICA. JICA said that the revised Minutes of Meetings for extension after confirmation and approval of Head Quarters.

3. Decision:

- 3.1 JCC assured that JICA, if necessary, in collaboration with LGD will present the master plan of DNCC and DSCC in front of the top management of LGD for their better understanding very shortly.
- 3.2 The project period extension till May 2022 has been approved by JCC. LGD and JICA will sign the Minutes of Meetings which that confirms the project period extension and PDM revision after JICA's internal coordination.
- 3.3 For the medical waste support, CCC will submit a planning document to LGD for formality, and LGD will take decision and necessary actions.


(Maran Kumar Chakraborty) 8-2-21
Additional Secretary (Urban Planning)
Local Government Division

Annex -1: List of Attendees

(8) 8th JCC meeting (March 20, 2022)



Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives
Local Government Division
City Corporation -1



শেখ হাসিনার মূলনীতি
গ্রাম শহরের উন্নতি

Meeting Minutes of 8th Joint Coordination Committee (JCC) of "the Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City, and Chittagong City"

Chairperson : Mr. Maran Kumar Chakraborty
Additional Secretary (Urban Development), Local Government Division
Venue : Online Zoom Platform
Time and date : July05, 2021, 3:30 PM
Attendees : Annex-I

1. Presentation:

The Chairperson welcomed and appreciated everyone attending the online meeting during this pandemic situation. After the welcome speech, the chairperson requested the JICA project team for presentation following the agenda. Mr. Masahiro Saito, the team leader of the JICA expert team has briefly presented the agenda. After his brief presentation, the Chairperson requested Mr. Saito to discuss in detail each agenda step by step and the chairperson also requested the participants for sharing their opinions and comments on the respective agenda.

2. Discussion:


- 2.1 Mr. Saito addressed the meeting agenda before the participants comprising the following discussion point:
 - a) Tax Exemption for Medical Waste incinerator for CCC
 - b) Follow-up the approval of the Master Plans for DNCC and DSCC
 - c) Medical Waste Management Improvement activity for CCC
 - d) Remaining landfill capacity analysis by Drone for DNCC and DSCC
 - e) Project progress activity in DNCC, DSCC & CCC from February 2021
- 2.2 The chairperson asked to start the discussion on the first agenda. In reply, Mr. Saito explained the Medical Waste Incinerator (MWI) implementation status and informed that the equipment would arrive at Chattogram Port in October, and he emphasized finishing the TAX exemption process by LGD & CCC beforehand.
- 2.3 The chairperson requested the participants from CCC to explain the customs Duty & TAX-related issues associated with MWI. Mr. Sudip Bashak, Superintendent Engineer (Mechanical) explained that previously for JICA provided waste collection vehicle importing, based on the TAX exemption request letter from CCC, LGD helped to get exemption on customs duty and TAX from NBR. He informed that for MWI, CCC would like to send a TAX exemption request letter to LGD and in case LGD failed to get TAX exemption from NBR, CCC may bear the associated cost following the LGD decision.
- 2.4 Then Chairperson asked CCC & JICA to send the TAX exemption request to LGD so that LGD can forward the letter to NBR and pursue NBR for getting the TAX exemption for importing MWI.

- 2.5 Mr. Saito requested the chairperson to share the update on the master plan approval of DNCC and DSCC from the Honorable Minister and asked for his guidance to close the approval process as it is taking a long time.
- 2.6 The chairperson explained the Master plan approval issue and informed that as the chairperson of this JCC, he will raise the approval issue to the Honorable Senior Secretary of LGD. He requested JICA to issue a request letter to the Senior Secretary of LGD and make an appointment with him to expedite the Master plan approval. The chairperson also asked the Deputy Secretary (City Corporation-2) of LGD to take the initiative and emphasize the approval process from Honorable Minister.
- 2.7 Mr. Saheki, Senior Representative of JICA Bangladesh Office thanked the chairperson for his assurance and informed that from JICA, he will try to fix a meeting with the Senior Secretary of LGD as suggested by the chairperson.
- 2.8 Mr. Saito then explained the new upcoming activities especially Medical Waste Management improvement in CCC and remaining Landfill capacity analysis by Drone in DNCC & DSCC. He described the details of each activity with a schedule. The chairperson asked participants from DNCC and DSCC to put their comments on the Landfill capacity analysis activity.
- 2.9 Mr. S.M. Shafiqur Rahma, Additional CWMO of DNCC explained the present status of Amin Bazar Landfill and countermeasure taken to expand the lifespan with the help of JICA technical assistance. He also informed the meeting participants about the land acquisition status and development planning for the new landfill site and he appreciated JICA's initiatives for lifespan analysis planning by drone.
- 2.10 Dr. Md. Sufi Ullah Siddik Bhuiyan, Executive Engineer of DSCC explained the Matuil Landfill status, as well as the planning for the extension area development and he requested JICA's technical support for the development of the existing and extension landfill at Matuail. In response, Mr. Saito & Ms. Kudo assured JICA's cooperation towards landfill management for the rest project periods.
- 2.11 Mr. Saito requested the respective representatives of each City corporation to explain the project activity from Feb 2021. Mr. Shafiq from DNCC explained the achievements of the project in different aspects. Then Commodore M Saidur Rahman, CWMO requested JICA's technical support to enhance the capacity of the utilization of the waste collection vehicles and public awareness activity for canal cleaning works. JICA project team assured their support towards the mentioned problem.
- 2.12 Mr. Sufi from DSCC and Mr. Sudip from CCC then described the achievements and contributions of the project from February 2021 in the different parts of waste management.
- 2.13 After the presentation from the CCC participant, the chairperson emphasized the medical waste management in CCC through proper coordination among different stakeholders and waste generators.
- 2.14 Mr. Saito requested DNCC and DSCC that a new final disposal site should be built as soon as possible because the remaining lifespan is less than 1.5 years.
- 2.15 Mr. Saheki thanked the chairperson for his valuable suggestion regarding meeting with the Senior Secretary for the approval of the master plan for DNCC and DSCC, as well he thanked every participant from different agencies.
- 2.16 The chairperson concluded the meeting thanking everyone for participating and wished for successful implementation of the decision made in the meeting.



3. Decision:

- 3.1 LGD will send a TAX (Customs Duty & TAX) exemption request letter and pursue NBR to get TAX exemption for the Medical Waste Incinerator importing for CCC upon getting letters from CCC & JICA.
- 3.2 JCC is assured of getting the approval of the master plan of DNCC & DSCC from LGD and again made a request to the Senior Secretary of LGD to do the needful in this regard.

 14.7.2021



(Maran Kumar Chakraborty)
Additional Secretary (Urban Planning)
Local Government Division

Annex -1: List of Attendees

Attachment 8 Other Activity Records

(1) Records of Public Relations (Publication by local media) (as of May 2022)

1) Public Relations on COVID-19 infection prevention to citizens (digital advertising on digital screen)

Photo	Period and number of times
DNCC	
	Digital advertising 1 2 months x 72 times per day
	Digital advertising 2 2 months x 72 times per day
DSCC	
	Digital advertising 2 month x 72 times per day
CCC	
	Digital advertising 2 months x 20 times per day
	TV advertising 1.5 months x 12 times per day

2) Publishing articles on the project activities in newspapers targeting local government officials

i. Newspaper for local governments “Shokolar Kotha” (in collaboration with JIGO project & SHASTO (Health and Sanitation) project)

	<p>About 300 papers/times (From June 2020 to November 2020, published twice a month)</p>
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ii. JIGO Newsletter (in collaboration with JIGO Project)

	<p>(1) About 2,000 papers/times (From January 2021 to March 2021, published once a month)</p> <p>(2) Uploaded on JICABD Facebook page</p>
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3) Facebook & Website (COVID-19 infection prevention leaflet to citizens)

JICA	https://www.facebook.com/JicaBangladesh/posts/3043438295744976
DNCC	1. http://dncc.gov.bd 2. https://www.facebook.com/dncc.gov.bd/photos/a.956056261082258/3154499207904608/
DSCC	https://www.facebook.com/officialpage.dsccl/photos/a.776095315844871/3057584921029221/
CCC	1. https://www.facebook.com/101642398050473/posts/182424529972259 2. https://www.facebook.com/101642398050473/posts/186902082857837 3. https://www.facebook.com/101642398050473/posts/187283446153034 4. https://m.facebook.com/story.php?story_fbid=3396593013693322&id=218875761465079

4) TV Broadcasting of Documentary on SWM (5 series)

RTV	AV 01: https://www.youtube.com/watch?v=yYb5eTqoRhk AV 02: https://www.youtube.com/watch?v=p2-Y13Dtrdw AV 03: https://www.youtube.com/watch?v=UTEnoU_waFI AV 04: https://www.youtube.com/watch?v=RnNLFZxiQ4Y AV 05: https://www.youtube.com/watch?v=dIOO15wXntA
JICA	Available on JICABD YouTube channel
DNCC	To be uploaded on DNCC Facebook page
DSCC	Available on DSCC Facebook page

- TV Audience rating (average of 5 series): 27%
- Total number of views through You Tube & Facebook: About 8,400 views

5) TV Spot on Canal Cleaning Campaign Awareness (1 min. CM)

JICA	Available on JICABD YouTube channel
DNCC	https://www.facebook.com/949260798428471/videos/366560061610148
DSCC	https://www.facebook.com/762184130569323/videos/208699401272064

- Total number of views through You Tube & Facebook: about 673,000 views

6) Record of news related to SWM by local media

Date	CC	Title	News media	Link
16-Jan-20	CCC	JICA Team Meets Mayor	edainikazadi	http://edainikazadi.net/index.php?page=1&date=2020-01-16&fbclid=IwAR0TFcuJZmjbYh8b9wasSKqHyxgDZLIwUcizk115WS8Stb-9paWsd2OEfGE
23-Feb-20	DNCC/ DSCC/ CCC	বর্জ্য ব্যবস্থাপনা আধুনিকায়ন হচ্ছে: স্থানীয় সরকার মন্ত্রী Modernization of waste management: Local Government Minister	Bangla Tribune	https://www.banglatribune.com/610795/%E0%A6%AC%E0%A6%B0%E0%A7%8D%E0%A6%9C%E0%A7%8D%E0%A6%AF-%E0%A6%AC%E0%A7%8D%E0%A6%AF%E0%A6%AC%E0%A6%B8%E0%A7%8D%E0%A6%A5%E0%A6%BE%E0%A6%AA%E0%A6%A8%E0%A6%BE-%E0%A6%86%E0%A6%A7%E0%A7%81%E0%A6%A8%E0%A6%BF%E0%A6%95%E0%A6%BE%E0%A7%9F%E0%A6%A8-%E0%A6%B9%E0%A6%9A%E0%A7%8D%E0%A6%9B%E0%A7%87-%E0%A6%B8%E0%A7%8D%E0%A6%A5%E0%A6%BE%E0%A6%A8%E0%A7%80%E0%A7%9F-%E0%A6%B8%E0%A6%B0%E0%A6%95%E0%A6%BE%E0%A6%B0

Date	CC	Title	News media	Link
28-Jul-20	DNCC	জাইকার পক্ষ থেকে করোনায় স্বাস্থ্য সুরক্ষা সামগ্রী. ডিএনসিসির মেয়রকে হস্তান্তর Corona on behalf of JICA .Health protection materials. Handed over to the Mayor of DNCC	Durbin News24	https://durbinnews24.com/%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%B0-%E0%A6%AA%E0%A6%95%E0%A7%8D%E0%A6%B7-%E0%A6%A5%E0%A7%87%E0%A6%95%E0%A7%87-%E0%A6%95%E0%A6%B0%E0%A7%8B%E0%A6%A8%E0%A6%BE%E0%A7%9F-%E0%A6%B8/
28-Jul-20	DNCC	ডিএনসিসিকে করোনা সুরক্ষা সামগ্রী দিলো জাইকা JICA provided corona protection materials to DNCC	dailyjanakant ha.com	https://www.dailyjanakantha.com/details/article/514418/%E0%A6%A1%E0%A6%BF%E0%A6%8F%E0%A6%A8%E0%A6%B8%E0%A6%BF%E0%A6%B8%E0%A6%BF%E0%A6%95%E0%A7%87-%E0%A6%95%E0%A6%B0%E0%A7%8B%E0%A6%A8%E0%A6%BE-%E0%A6%B8%E0%A7%81%E0%A6%B0%E0%A6%95%E0%A7%8D%E0%A6%B7%E0%A6%BE-%E0%A6%B8%E0%A6%BE%E0%A6%AE%E0%A6%97%E0%A7%8D%E0%A6%B0%E0%A7%80-%E0%A6%A6%E0%A6%BF%E0%A6%B2%E0%A7%8B-%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE/
28-Jul-20	DNCC	JICA gives safety equipment for DNCC cleaners	Daily sun	https://www.daily-sun.com/post/496480/JICA-gives-safety-equipment-for-DNCC-cleaners
4-Aug-20	CCC	চসিক পরিচ্ছন্ন কর্মীদের জন্য জাইকার সুরক্ষা উপকরণ JICA's safety equipment for Chasik cleaners	cplustv	https://cplusbd.net/%e0%a6%9a%e0%a6%b8%e0%a6%bf%e0%a6%95-%e0%a6%aa%e0%a6%b0%e0%a6%bf%e0%a6%9a%e0%a7%8d%e0%a6%9b%e0%a6%a8%e0%a7%8d%e0%a6%a8-%e0%a6%95%e0%a6%b0%e0%a7%8d%e0%a6%ae%e0%a7%80%e0%a6%a6%e0%a7%87%e0%a6%b0/
1-Oct-20	DNCC	Electricity production from waste without survey	Prothom Alo English	https://en.prothomalo.com/bangladesh/electricity-production-from-waste-without-survey
22-Nov-20	DNCC/ DSCC	DNCC, DSCC plan to introduce new waste management system	Financial Express	https://today.thefinancialexpress.com.bd/metro-news/dncc-dscc-plan-to-introduce-new-waste-management-system-1605971827
21-Mar-21	CCC	মেডিকেল বর্জ্য ব্যবস্থাপনায় দ্রুত সহায়তা চাই : জাইকাকে চসিক মেয়র Want quick help in medical waste management: JICA to Chasik Mayor	abnews24.com	http://www.abnews24.com/country-news/123166/%E0%A6%AE%E0%A7%87%E0%A6%A1%E0%A6%BF%E0%A6%95%E0%A7%87%E0%A6%B2-%E0%A6%AC%E0%A6%B0%E0%A7%8D%E0%A6%9C%E0%A7%8D%E0%A6%AF-%E0%A6%AC%E0%A7%8D%E0%A6%AF%E0%A6%AC%E0%A6%B8%E0%A7%8D%E0%A6%A5%E0%A6%BE%E0%A6%AA%E0%A6%A8%E0%A6%BE%E0%A7%9F-%E0%A6%A6%E0%A7%8D%E0%A6%B0%E0%A7%81%E0%A6%A4-%E0%A6%B8%E0%A6%B9%E0%A6%BE%E0%A7%9F%E0%A6%A4%E0%A6%BE-%E0%A6%9A%E0%A6%BE%E0%A6%87-%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%95%E0%A7%87-%E0%A6%9A%E0%A6%B8%E0%A6%BF%E0%A6%95-%E0%A6%AE%E0%A7%87%E0%A7%9F%E0%A6%B0
21-Mar-21	CCC	চসিক মেয়রের সাথে জাইকা বর্জ্য ব্যবস্থাপনা প্রকল্প দলের সৌজন্য সাক্ষাত Courtesy meeting of JICA Waste Management Project Team with Chasik Mayor	Chattala Tv	https://www.youtube.com/watch?v=gQU_4vx4MGs
21-Mar-21	CCC	জাইকাকে চসিক মেয়রের তাগিদ মেডিকেল বর্জ্য ব্যবস্থাপনায় দ্রুত সহায়তা চাই Chasik Mayor urges JICA to provide speedy assistance in medical waste management	Ctg Tribune	https://ctgtribune.com/2021/03/21/%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%95%E0%A7%87-%E0%A6%9A%E0%A6%B8%E0%A6%BF%E0%A6%95-%E0%A6%AE%E0%A7%87%E0%A6%AF%E0%A6%BC%E0%A6%B0%E0%A7%87%E0%A6%B0-%E0%A6%A4%E0%A6%BE%E0%A6%97/
14-Aug-21	DNCC/ DSCC	3R method yet to be implemented	Daily sun	https://www.daily-sun.com/amp/post/570577
8-Nov-21	CCC	'বর্জ্য ব্যবস্থাপনায় নতুন মাত্রা যোগ করবে মেডিকেল ওয়াস্ট ইন্সিনেরাটর' Medical waste incinerator to add new dimension to waste management	ctg News	https://www.ctgnews.com/2021/11/110585/#

Date	CC	Title	News media	Link
11-Nov-21	CCC	জাইকা প্রতিনিধিদলের সাথে সাক্ষাতে মেয়র "অত্যাধুনিক ও প্রযুক্তিগত পদ্ধতি প্রয়োগে পরিচ্ছন্নতায় নতুন দ্বার উন্মোচিত হলো" The mayor met with the JICA delegation "New doors have opened in cleanliness with the application of sophisticated and technological methods"	Nagornews	https://nagornews.com/অত্যাধুনিক-ও-প্রযুক্তিগ/
11-Nov-21	CCC	জাইকা চসিকের অনেক উন্নয়নকাজে সহযাত্রী: মেয়র রেজাউল JICA Chasik's many development partners: Mayor Rezaul	Banglanews	https://www.banglanews24.com/daily-chittagong/news/bd/891852.details
11-Nov-21	CCC	জাইকা প্রতিনিধিদলের সাথে সাক্ষা করলেন চসিক মেয়র Chasik Mayor met with JICA delegation	Alokitobangladesh	https://www.alokitobangladesh.com/country-news/90108/জাইকা-প্রতিনিধিদলের-সাথে-সাক্ষা-করলেন-চসিক-মেয়র
11-Nov-21	CCC	জাইকা চসিকের অনেক উন্নয়নকাজে সহযাত্রী: মেয়র রেজাউল JICA Chasik's many development partners: Mayor Rezaul	Banginews	http://www.banginews.com/web-news?id=0d9d4164737563019f554106c2089e3ba3ee9abc
14-Nov-21	DSCC	Will procure modern equipment, set up treatment facility to upgrade waste management: Taposh	The Daily Star	https://www.thedailystar.net/news/bangladesh/governance/news/will-procure-modern-equipment-set-treatment-facility-upgrade-waste-management-taposh-2225726
18-Nov-21	DSCC	ডিএসসিসিকে ড্রোন উপহার জাইকার JICA presents drone to DSCC	Samkal	https://samkal.com/capital/article/211185561/%E0%A6%A1%E0%A6%BF%E0%A6%8F%E0%A6%B8%E0%A6%B8%E0%A6%BF%E0%A6%95%E0%A7%87-%E0%A6%A1%E0%A7%8D%E0%A6%B0%E0%A7%8B%E0%A6%A8-%E0%A6%89%E0%A6%AA%E0%A6%B9%E0%A6%BE%E0%A6%B0-%E0%A6%9C%E0%A6%B%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%B0
18-Nov-21	DSCC	মাতুয়াইলের ভাগাড়ে 'মিথেন গ্যাসের' সংবাদ স্রেফ অপপ্রচার: ডিএসসিসি সিইও News of 'Methane Gas' in Matuail Landfill site is just propaganda: DSCC CEO	Samkal	https://samkal.com/capital/article/211185538/%E0%A6%AE%E0%A6%BE%E0%A6%A4%E0%A7%81%E0%A7%9F%E0%A6%BE%E0%A6%87%E0%A6%B2%E0%A7%87%E0%A6%B0-%E0%A6%AD%E0%A6%BE%E0%A6%97%E0%A6%BE%E0%A7%9C%E0%A7%87-%E0%A6%AE%E0%A6%BF%E0%A6%A5%E0%A7%87%E0%A6%A8-%E0%A6%97%E0%A7%8D%E0%A6%AF%E0%A6%BE%E0%A6%B8%E0%A7%87%E0%A6%B0-%E0%A6%B8%E0%A6%82%E0%A6%AC%E0%A6%BE%E0%A6%A6-%E0%A6%B8%E0%A7%8D%E0%A6%B0%E0%A7%87%E0%A6%AB-%E0%A6%85%E0%A6%AA%E0%A6%AA%E0%A7%8D%E0%A6%B0%E0%A6%9A%E0%A6%BE%E0%A6%B0-%E0%A6%A1%E0%A6%BF%E0%A6%8F%E0%A6%B8%E0%A6%B8%E0%A6%BF%E0%A6%87%E0%A6%93
18-Nov-21	DSCC	গ্যাস এনালাইজার-ড্রোন দিল জাইকা JICA provided gas analyzer and drone	Somoy News	https://www.somoynews.tv/news/2021-11-18/%E0%A6%B8%E0%A7%83%E0%A6%B7%E0%A7%8D%E0%A6%9F-%E0%A6%97%E0%A7%8D%E0%A6%AF%E0%A6%BE%E0%A6%B8-%E0%A6%AA%E0%A6%B0%E0%A6%BF%E0%A6%AE%E0%A6%BE%E0%A6%AA%E0%A7%87-%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%B0-%E0%A6%97%E0%A7%8D%E0%A6%AF%E0%A6%BE%E0%A6%B8-%E0%A6%8F%E0%A6%A8%E0%A6%BE%E0%A6%B2%E0%A6%BE%E0%A6%87%E0%A6%9C%E0%A6%BE%E0%A6%B0-%E0%A6%A1%E0%A7%8D%E0%A6%B0%E0%A7%8B%E0%A6%A8-%E0%A6%AA%E0%A7%8D%E0%A6%B0%E0%A6%BE%E0%A6%A8
18-Nov-21	DNCC/DSCC	দুই সিটিকে জাইকার গ্যাস এনালাইজার ও ড্রোন হস্তান্তর Transfer of JICA gas analyzer and drone to two cities	Banglanews	https://www.banglanews24.com/national/news/bd/893496.details

Date	CC	Title	News media	Link
18-Nov-21	DSCC	ভাগাড়ে সৃষ্ট গ্যাস পরিমাপে এনালাইজার ও ড্রোন দিল জাইকা JICA provided analyzers and drones to measure the gas generated in Bhagar	Kalerkantho	https://www.kalerkantho.com/amp/online/national/2021/11/18/1093467
18-Nov-21	DNCC	ডিএনসিসিকে গ্যাস অ্যানালাইজার ও ড্রোন উপহার দিল জাইকা JICA presents gas analyzer and drone to DNCC	Dhaka Post	https://www.dhakapost.com/national/77711
19-Nov-21	DSCC	ময়লার ভাগাড়ে উৎপন্ন গ্যাস পরিমাপ করতে ডিএসসিসিকে যন্ত্র দিল জাইকা JICA provided an instrument to DSCC to measure the gas produced in the garbage dump	Prothom Alo	https://cutt.ly/9TEMnMe
19-Nov-21	DSCC	ডিএসসিসিকে জাইকার গ্যাস এনালাইজার ও ড্রোন প্রদান JICA providing gas analyzers and drones to DSCC	The Daily Inqilab	https://m.dailyinqilab.com/article/436280/%E0%A6%A1%E0%A6%BF%E0%A6%8F%E0%A6%B8%E0%A6%B8%E0%A6%BF%E0%A6%B8%E0%A6%BF%E0%A6%95%E0%A7%87-%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%B0-%E0%A6%97%E0%A7%8D%E0%A6%AF%E0%A6%BE%E0%A6%B8-%E0%A6%8F%E0%A6%A8%E0%A6%BE%E0%A6%B2%E0%A6%BE%E0%A6%87%E0%A6%9C%E0%A6%BE%E0%A6%B0-%E0%A6%93-%E0%A6%A1%E0%A7%8D%E0%A6%B0%E0%A7%8B%E0%A6%A8-%E0%A6%AA%E0%A7%8D%E0%A6%B0%E0%A6%A6%E0%A6%BE%E0%A6%A8
19-Nov-21	DSCC	মাতুয়াইল ভাগাড়ে সৃষ্ট গ্যাস পরিমাপে দক্ষিণ সিটিকে জাইকার গ্যাস এনালাইজার ও ড্রোন প্রদান JICA's gas analyzers and drones given to South City for gas measurement caused by Matuail Vagare	DSCC FB page	https://www.facebook.com/officialpage.dscc/posts/4554260741361624
23-Nov-21	CCC	চট্টগ্রামে মেডিকেল বর্জ্য ব্যবস্থাপনা বিষয়ক সেমিনার on Medical Waste Management in Chittagong	NTV	https://www.ntvbd.com/bangladesh/%E0%A6%9A%E0%A6%9F%E0%A7%8D%E0%A6%9F%E0%A6%97%E0%A7%8D%E0%A6%B0%E0%A6%BE%E0%A6%AE%E0%A7%87-%E0%A6%AE%E0%A7%87%E0%A6%A1%E0%A6%BF%E0%A6%95%E0%A7%87%E0%A6%B2-%E0%A6%AC%E0%A6%B0%E0%A7%8D%E0%A6%9C%E0%A7%8D%E0%A6%AF-%E0%A6%AC%E0%A7%8D%E0%A6%AF%E0%A6%AC%E0%A6%B8%E0%A7%8D%E0%A6%A5%E0%A6%BE%E0%A6%AA%E0%A6%BF%E0%A6%B7%E0%A7%9F%E0%A6%95-992233
23-Nov-21	CCC	নাগরিক স্বাস্থ্য সুরক্ষায় মেডিকেল বর্জ্য ভস্মীভূত করার উদ্যোগ Initiatives to incinerate medical waste to protect public health	Mohanagar News	https://www.mohanagarnews.com/metropolis/news/9342
23-Nov-21	CCC	চসিক এলাকার মেডিকেল বর্জ্য ব্যবস্থাপনা কমিটির সভা অনুষ্ঠিত Meeting of Medical Waste Management Committee held in Chasik area	Abnew24	https://www.abnews24.com/country-news/162404/%E0%A6%9A%E0%A6%B8%E0%A6%BF%E0%A6%95-%E0%A6%8F%E0%A6%B2%E0%A6%BE%E0%A6%95%E0%A6%BE%E0%A6%B0-%E0%A6%AE%E0%A7%87%E0%A6%A1%E0%A6%BF%E0%A6%95%E0%A7%87%E0%A6%B2-%E0%A6%AC%E0%A6%B0%E0%A7%8D%E0%A6%9C%E0%A7%8D%E0%A6%AF-%E0%A6%AC%E0%A7%8D%E0%A6%AF%E0%A6%AC%E0%A6%B8%E0%A7%8D%E0%A6%A5%E0%A6%BE%E0%A6%AA%E0%A6%A8%E0%A6%BE-%E0%A6%95%E0%A6%AE%E0%A6%BF%E0%A6%9F%E0%A6%BF%E0%A6%B0-%E0%A6%B8%E0%A6%AD%E0%A6%BE-%E0%A6%85%E0%A6%A8%E0%A7%81%E0%A6%B7%E0%A7%8D%E0%A6%A0%E0%A6%BF%E0%A6%A4
23-Nov-21	CCC	চট্টগ্রামে মেডিকেলের বর্জ্য ব্যবস্থাপনা অত্যন্ত দুর্বল Medical waste management in Chittagong is very weak	Dhaka Post	https://www.dhakapost.com/national/78806

Date	CC	Title	News media	Link
21-Dec-21	CCC	উৎস থেকে বর্জ্য পৃথক করা হলে পরিবেশবান্ধব নগর গড়া সম্ভব : চসিক মেয়র It is possible to build an eco-friendly city by separating waste from sources: Chasik Mayor	Bangladesh News Agency	https://www.bssnews.net/bangla/national/23682
21-Dec-21	CCC	পরিচ্ছন্ন ও স্বাস্থ্যকর নগরী গড়তে নগরবাসীর সহযোগিতা চেয়েছেন, চট্টগ্রাম সিটি করপোরেশনের মেয়র এম রেজাউল করিম চৌধুরী। Mayor of Chittagong City Corporation M Rezaul Karim Chowdhury has sought the cooperation of city dwellers to build a clean and healthy city.	Bijoy TV	https://www.facebook.com/watch/?v=221503503476827
21-Dec-21	CCC	সংক্রমণজনিত বর্জ্যের পরিমাণ বৃদ্ধি নগরবাসীর উদ্বেগের কারণ An increase in the amount of infectious waste is a cause for concern for city dwellers	Banglanews 24	https://www.banglanews24.com/daily-chittagong/news/bd/900737.details?fbclid=IwAR0Iza8NSknZkg1bETeZBuCRAzGRAe1nGU0JfNaXpfe6IFn1bzqDshW6QWA
21-Dec-21	CCC	চসিকের বাস্তবায়নে জাইকার সহযোগিতায় উৎসে বর্জ্য কার্যক্রমের উদ্বোধন... Inauguration of waste activities at source in collaboration with JICA for implementation of Chasik	ChattalaTv	https://www.facebook.com/watch/?v=624386441948112
21-Dec-21	CCC	'যার ঘরের সামনে ময়লা পাওয়া যাবে, তাকে জরিমানা করা হবে' 'Whoever finds dirt in front of their house will be fined'	ctg news	https://www.ctgnews.com/2021/12/120578/
11-Jan-22	CCC	Transfer of JICA incinerator unit to Chittagong City Corporation	Bangla Insider	http://www.banglainsider.com/en/inside-bangladesh/101603/Transfer-of-JICA-incinerator-unit-to-Chittagong-City-Corporation
12-Jan-22	CCC	CCC installs its first incineration plant for medical wastes	The Business Standard	https://www.tbsnews.net/bangladesh/ccc-installs-its-first-incineration-plant-medical-wastes-356173
12-Jan-22	CCC	CCC mayor: Incinerator plant opens new horizon in waste management	Dhak Tribune	https://www.dhaktribune.com/chittagong/2022/01/11/ccc-mayor-incinerator-plant-opens-new-horizon-in-waste-management
21-Feb-22	CCC	চসিক ও জাইকার প্রতিনিধি দলের বিভিন্ন হাসপাতাল পরিদর্শন Chasik and JICA delegation visited different hospitals	dainikazadi	https://dainikazadi.net/%E0%A6%9A%E0%A6%B8%E0%A6%BF%E0%A6%95-%E0%A6%93-%E0%A6%9C%E0%A6%BE%E0%A6%87%E0%A6%95%E0%A6%BE%E0%A6%B0-%E0%A6%AA%E0%A7%8D%E0%A6%B0%E0%A6%A4%E0%A6%BF%E0%A6%A8%E0%A6%BF%E0%A6%A7%E0%A6%BF-%E0%A6%A6/
9-Mar-22	CCC	নগর পরিষ্কার রাখতে বর্জ্য ব্যবস্থাপনা কর্মকর্তাদের কর্মশালা সম্পন্ন Workshops for waste management officers completed to keep the city clean	Mohanagar News	https://www.mohanagar.news/metropolis/news/12504?fbclid=IwAR224LSXV2qGBRSIILYQCp4mcZOQGrktglc3ysII9UBBZxL2gRqg8KcLAng

(2) Content of Activities for Introduction of Eco-Town (DNCC and DSCC)

Date	Discussion partner	Activities and Content of Discussion
January 24, 2018	DNCC and DSCC (C/P)	<ul style="list-style-type: none"> • An Eco-Town refers to an industrial park in which residues generated in waste treatment and recycle in the facilities in the park is efficiently used in other facilities in pursuit of zero waste disposal in the park. When this Eco-Town scheme was explained to DNCC and DSCC, both the CCs showed interest in it. • The waste treatment and recycle facilities to be installed in an Eco-Town shall start to be examined.
March 8, 2018	DNCC and DSCC (C/P)	<ul style="list-style-type: none"> • The waste treatment and recycle facilities to be installed in an Eco-Town shall be determined. • DSCC and DNCC answered that they will examine construction in PPP and construction in a Japanese ODA-loan project, respectively.
May 10, 2018	Japan Waste Research Foundation (Japan)	<ul style="list-style-type: none"> • The Eco-Town scheme in Dhaka North/South Cities was explained and information was exchanged on the state of overseas activities of incinerator manufacturers of Japan. • It was decided to periodically exchange information on the Eco-Town scheme of DNCC.
May 11, 2018	General Affairs Division, Environment Regeneration and Resource Circulation Bureau, Ministry of the Environment	<ul style="list-style-type: none"> • The Eco-Town scheme in Dhaka North/South Cities was explained. • JPT requested the division to provide a presentation on introduction to an Eco-Town in Japan on the occasion of CP training in Japan and gained consent on it. • It was decided to periodically exchange information on the Eco-Town scheme in Dhaka North/South Cities in the future.
May 24, 2018	General Affairs Division, Environment Regeneration and Resource Circulation Bureau, Ministry of the Environment	<ul style="list-style-type: none"> • In CP training in Japan, the division delivered a presentation on the overseas SWM support states utilizing the Eco-Town scheme of Japan. • CP expressed the intention of constructing an Eco-Town in Dhaka and hoped for support from Japan.
July 10, 2018	-	<u><i>The Pre-F/S survey (including Eco-Town) was commenced in this Project.</i></u>
July 11, 2018	Re-Tem Corporation (E-waste treatment company)	<ul style="list-style-type: none"> • Although the company was asked to apply for F/S of planned E-waste treatment facilities in the planned Eco-Town construction site in DSCC using the CO2 reduction project support scheme of the Ministry of the Environment, it replied that it would rather not apply at present, considering security issues (It is willing to consider application once the security issues are resolved appropriately).
July 20, 2018	DOWA ECO-SYSTEM Co., Ltd. (industrial waste treatment company)	<ul style="list-style-type: none"> • Although the company was asked to apply for F/S of planned medical waste treatment facilities in the planned Eco-Town construction site in DNCC and DSCC using the CO2 reduction project support scheme of the Ministry of the Environment, it replied that it would rather not apply at present, considering security issues (It is willing to consider application once the security issues are resolved appropriately).
August 14, 2018	Department of Environment, Government of Bangladesh (DoE)	<ul style="list-style-type: none"> • DoE, when asked for opinions on WtE introduction, replied that 3R and waste reduction was the most important and that, as the next candidate, WtE introduction should be considered (Basically against the introduction of an incinerator and considered it desirable to introduce a gasification melting furnace).

Date	Discussion partner	Activities and Content of Discussion
August 14, 2018	Local Government Engineering Department (LGED)	<ul style="list-style-type: none"> When the Eco-Town scheme of DNCC and DSCC was explained, LGED said that the introduction of an Eco-Town was unavoidable but expressed their apprehensions about its maintenance and management and financing of construction costs.
August 16, 2018	Environmental and Social Development Organization (ESDO) ※1	<ul style="list-style-type: none"> When the Eco-Town scheme of DNCC and DSCC was explained, ESDO said that, if it was to be introduced, more communications must be exchanged on this matter with citizens so that the community would gain adequate information on it and that awareness-raising was important.
August 16, 2018	Practical Action Bangladesh (PAB) ※1	<ul style="list-style-type: none"> PAB asked, if an Eco-Town was introduced under a Design Build Operate (DBO) contract, how Bangladeshi private companies can participate in it and requested the introduction under a scheme that allows local private companies to participate in it.
October 3, 2018	DNCC (CEO)	<ul style="list-style-type: none"> An interim report on the Pre-F/S survey including an Eco-Town was made to DNCC.
October 4, 2018	DSCC (CEO)	<ul style="list-style-type: none"> An interim report on the Pre-F/S survey including an Eco-Town was made to DSCC.
October 7, 2018	-	<ul style="list-style-type: none"> JPT wrote a letter that recommended the construction of an Eco-Town and submitted it to DNCC and DSCC.
November 1, 2018	Trade Finance Division, Trade and Economic Bureau, Ministry of Economy, Trade and Industry	<ul style="list-style-type: none"> The Eco-Town scheme in Dhaka North/South Cities was explained. The Ministry of Economy, Trade and Industry, currently promoting the overseas expansion of incineration technologies of Japan, commented that it would give support if the said Eco-Town project is included in the list of Japanese ODA-loan projects.
November 9, 2018	JICA, development consultants	<ul style="list-style-type: none"> Before disclosing a checklist created in the "Project of Information Collection and Issue Analysis for Enhancement of Issue Handling Capability for Waste Incineration and Power Generation," an explanatory meeting for JICA staff and development consultants was held, taking up Dhaka North City as an example of applying the checklist.
November 20, 2018	National Board of Revenue (NBR)	<ul style="list-style-type: none"> NBR confirmed the tax exemption for a Special Purpose Company (SPC) that ran the facilities when WtE facilities were constructed and run in Design Build Operation (DBO). NBR also provided information that the Public-Private Partnership (PPP) project was in charge of the Public-Private Partnership Authority (PPPA).
November 22, 2018	Public Private Partnership Authority (PPPA)	<ul style="list-style-type: none"> PPPA confirmed the tax exemption for an SPC that ran the facilities when WtE facilities were constructed and run in DBO. PPPA provided information that DBO, like PPP, was exempted from corporate tax for ten years but needed to pay approximately 20% corporate tax after ten years and was exempted also from VAT.
November 26, 2018	Sustainable and Renewable Energy Development Authority (SUREDA)	<ul style="list-style-type: none"> SUREDA confirmed the selling price of electric power generated at WtE facilities to SUREDA. At present, SUREDA purchases renewable energy for 13 ¢ /kw at the maximum. SUREDA said that the purchasing price was negotiable if the project implementation is determined.
November 30, 2018	—	<ul style="list-style-type: none"> <u>Submission of the Final Report of Pre-F/S</u>
January 8, 2019	General Affairs Division, Environment Regeneration and	<ul style="list-style-type: none"> The progress of the Eco-Town scheme in Dhaka North/South Cities was explained. At the same time, JPT proposed to the Ministry of the Environment the holding of a Japan-Bangladesh seminar on business matching regarding waste treatment.

Date	Discussion partner	Activities and Content of Discussion
	Resource Circulation Bureau, Ministry of the Environment	<ul style="list-style-type: none"> The Ministry replied that it would positively consider whether the Japan Waste Research Foundation could hold such a seminar.
January 17, 2019	-	<p><u>The result of the Pre-F/S survey including an Eco-Town was reported and finalized.</u></p>
January 28, 2019	Asia Development Bank (ADB)	<ul style="list-style-type: none"> The Master Plan including the Eco-Town scheme was explained to ADB by teleconference. ADB agreed to continue exchanging information because it was interested in waste incineration and power generation in Dhaka.
January 29, 2019	Japanese Embassy in Bangladesh	<ul style="list-style-type: none"> The progress of the Eco-Town scheme in Dhaka North/South Cities was explained. A secretary of the Japanese Embassy proposed to set up a meeting to explain the Master Plan and Eco-Town to the ambassador.
February 4, 2019	DNCC (Deputy mayor and CEO)	<ul style="list-style-type: none"> The result of the Pre-F/S survey including an Eco-Town was reported. It was determined to promote the Eco-Town scheme with the next mayor because the deputy mayor and CEO were going to be transferred.
February 6, 2019	DSCC (C/P)	<ul style="list-style-type: none"> Support was given to the creation of a material that explained the Eco-Town scheme to LGD. According to the mayor's intention, it was determined not to include incineration and power generation in the Eco-Town scheme.
March 1, 2019	DNCC (Mayor)	<ul style="list-style-type: none"> The Eco-Town scheme and economic efficiency were explained.
March 5, 2019	Japanese Embassy in Bangladesh	<ul style="list-style-type: none"> JPT explained the SWM state in Bangladesh, the necessity of an intermediate treatment such as WtE, and DNCC's intention to cover the construction cost with Japanese ODA loan. The necessity of strategic awareness-raising of residents was also explained because they had insufficient understanding on WtE introduction.
March 8, 2019	DNCC (Advisor to Mayor)	<ul style="list-style-type: none"> JPT explained to the advisor to the new mayor, who took up his post at the end of February, about the JICA support provided so far and the necessity of WtE.
March 8, 2019	DNCC (CEO)	<ul style="list-style-type: none"> The Eco-Town scheme was explained. JPT proposed to promote the construction of an Eco-Town in a Japanese ODA-loan project. C/P are preparing a Japanese ODA-loan request for an Eco-Town construction project in Bangladesh.
May 12, 2019	DSCC (C/P)	<ul style="list-style-type: none"> Prior to Bangladesh's Prime Minister, Ms. Hashina's visit to Japan, ERD^{*2} sent a request letter to C/P via LGD to list up expecting support from the Government of Japan (ERD notice dated April 2, 2019, and LGD notice on April 10). DSCC officially responded accordingly on May 12 in written form to request "Eco-Town construction with Japan's support."
June 10, 2019	DNCC (C/P)	<ul style="list-style-type: none"> DNCC decided to request in written form as well, following the DSCC's action.
June 19, 2019	LGD (Additional Secretary) DNCC and DSCC (C/P)	<ul style="list-style-type: none"> DNCC and DSCC explained to LGD regarding the request documents LGD explained the GoB's direction (WtE implementation by PPP).
June 22, 2019	DNCC (C/P)	<ul style="list-style-type: none"> Organized by LGD, the WtE working group meeting was held in Dhaka North City.
June 27, 2019	DNCC (C/P)	<ul style="list-style-type: none"> DNCC officially sent a letter to the GoB on June 10 to request

Date	Discussion partner	Activities and Content of Discussion
July 9, 2019	LGD etc.	<p>“Eco-Town construction with Japan’s support.”</p> <ul style="list-style-type: none"> <li>· In the 5th JCC meeting, it was agreed among the participants that the GoB’s direction (WtE implementation by PPP) would be reflected in the MP and that DNCC and DSCC would explain their MP directly to the Minister of LGD.

※1 Local NGO, ※2 ERD : Economic Relations Division, Ministry of Finance

(3) Major Personnel Transfer in DNCC, DSCC and CCC (Since June 2017)

Date	DNCC	DSCC	CCC
Feb. 2018	<ul style="list-style-type: none"> Ad. CWMO has left the position and became vacant. Mr. Arifur appointed as EE (Civil/ME) at WMD (additional Charge) 	—	—
Mar. 2018	<ul style="list-style-type: none"> 1 CO and 7 CIs were relocated to other wards. 	<ul style="list-style-type: none"> AE (Mr. Harun) was appointed as EE (Additional Charge). Core group established in WMD by office order. 	—
Apr. 2018	—	<ul style="list-style-type: none"> CWMO Mr. Shafiqul released from his duty and send back to Airforce. New CWMO (Mr. Zahid) was appointed from the Air Force. 	—
Jun. 2018	<ul style="list-style-type: none"> SWMSC was established. 	—	—
Jul. 2018	—	<ul style="list-style-type: none"> Project Director (PD) of the grant aid project¹ (Mr. Mainudin) retired, and EE (Mr. Tohid) was appointed as new PD. 	—
Aug. 2018	<ul style="list-style-type: none"> SE (ME) (Mr. Hasnat) was appointed as Ad. CWMO (A/C) SE (Civil) (Mr. Mahub) was appointed as EE at WMD (A/C) 	<ul style="list-style-type: none"> The previous PD (Mr. Mainudin) was appointed as SE. 	—
Oct. 2018	<ul style="list-style-type: none"> Ad. CWMO (Mr. Hasnat) was transferred to SE in ED. 	<ul style="list-style-type: none"> 9 CIs were promoted to COs. New SE Mr. Khairul appointed at WMD. 	—
Nov. 2018	—	<ul style="list-style-type: none"> Appointment of SE (Mr. Mainudding) was cancelled. New SE was appointed (Mr. Khairal). 	—
Dec. 2018	<ul style="list-style-type: none"> EE-Disposal (Mr. Shafiqur) appointed as EE-C&T at WMD concurrently 	<ul style="list-style-type: none"> Deputy CWMO was appointed from TD (Mr. Mahaboob). 	—
Jan. 2019	<ul style="list-style-type: none"> EE- Disposal (Mr. Shafiqur) was appointed as Add. CWMO concurrently. 	<ul style="list-style-type: none"> 2 CO (Mr. Zafar & Mr. Selim) promoted as ACWMO. 1 CO & 2 CI were relocated. 	—
Feb. 2019	<ul style="list-style-type: none"> The new mayor (Mr. Atiqul) was appointed by election. New CEO was appointed (Mr. Abdul Hai). EE-Transport (Mr. Siddique) was on sick leave. 	<ul style="list-style-type: none"> Ad. CWMO (Mr. Mizanur who was seconded from LGD, the former Deputy Secretary in LGD) was appointed. 	—
Mar. 2019	<ul style="list-style-type: none"> EE-Landfill (Mr. Shafiqur) was temporarily suspended. 	—	WBA core group established
Apr. 2019	<ul style="list-style-type: none"> AE (Mr. Ekramul) was appointed as EE-Transport. New CWMO was appointed from ED (Mr. Tariq who used to be in WMD) by mayor but the appointment was canceled. 	—	Mr. Morshadul Alam(CO) has been promoted to DCCO

¹ “The Project for Improvement of Solid Waste Management Equipment in the People’s Republic of Bangladesh”

Date	DNCC	DSCC	CCC
	<ul style="list-style-type: none"> New CWMO (Mr. Manzur) was appointed from Navy. 		
May 2019	<ul style="list-style-type: none"> EE-Disposal (Mr. Shafiqur) came back on duty from suspension. EE-Disposal (Mr. Shafiqur) released from the additional charge of Add.CWMO & EE-Collection & Transport. 	—	Mr. Mirza Fazlul Kader(AE,Mechanical) has been promoted to Executive Engineer
Jun. 2019	<ul style="list-style-type: none"> SE (Mr. Ariful) was appointed from ED (concurrent with ED) 	—	—
July. 2019	<ul style="list-style-type: none"> UDA (Mr. Johirul) appointed as ACWMO concurrently. SAE-ME (Mr. Monir) Appointed as AE-ME concurrently. 	—	—
August 2019	<ul style="list-style-type: none"> SE-ME (Mr. Hasnat) appointed as SE-Civil/ME at WMD concurrently. 	—	Establishment of Waste Management Cell
Oct. 2019	—	<ul style="list-style-type: none"> CEO (Mr. Mostafizur) returned to LGD. Secretary (Mr. Mostofa) was appointed CEO (Additional Charge). 	—
Nov. 2019	<ul style="list-style-type: none"> EE-Disposal (Mr. Shafiqur) appointed as Add. CWMO concurrently. CI Mr. Iqbal appointed as ACWMO of Zone-3 concurrently. 	—	—
Jan. 2020	<ul style="list-style-type: none"> ACWMO (Z#2) Mr. Basudeb transferred as ACWMO-community at Head office & ACWMO (Z#3) concurrently. 	—	—
Feb. 2020	<ul style="list-style-type: none"> CI (Z#01) Mr. Asad transferred to Landfill as CI. 	<ul style="list-style-type: none"> New Mayor (Mr. Taposh) appointed through Election. 	—
Apr. 2020	—	<ul style="list-style-type: none"> New CWMO Mr. Badrul appointed from Airforce. 	—
Jun. 2020	—	<ul style="list-style-type: none"> SE Mr. Khairul Transferred from WMD. New SE Mr. Borhan appointed at WMD with additional charge. 	—
Jul. 2020	<ul style="list-style-type: none"> EE-Civil/ME Mr. Mahbub promoted as SE of WMD. CI (Z#2) Mr. Habibur promoted as CO. 	<ul style="list-style-type: none"> 6 ACMO & 35 CI relocated to different wards. 	—
Aug. 2020	—	—	<ul style="list-style-type: none"> New Administrator (Mr. Khorshed) appointed from Govt. in place of Mayor,

Date	DNCC	DSCC	CCC
Sep. 2020	—	• CO Mr. Motalib promoted as WMO.	1) Joint Secretary Kazi Mozammel Haque joined as CEO 2) Dr. Afia Akter joined as Regional Executive Officer
Oct. 2020	—	• EE (Civil) Mr. Saiful relocated to WMD from ED replace of Mr. Siraj (EE) • AE Mr. Nuruzzaman relocated to WMD from TD. • AE Mr. Bikash relocated to WMD from Planning.	—
Nov. 2020	—	• Add. CWMO Mr. Mizanur relocated to LGD from DSCC. • EE Mr. Harun transferred from WMD to Z#4. • New EE Mr. Dr. Sufi appointed at WMD.	—
Dec. 2020	• EE-ME of WMD Mr. Ekramul retired. • CO Mr. Habibur retired. • EE-ME Mr. Maksud appointed as EE-C&T at WMD concurrently.	—	—
Jan. 2021	• 3 ACWMO (Community, Planning & Central) newly appointed.	—	—
Feb. 2021	• AE-ME Mr. Anowarul appointed as EE-C&T at WMD concurrently.	• 2 New SAE (CE) appointed in WMD.	New Mayor (Mr. Rezaul) appointed through election. 2) Abu Shahed transferred on 3/2/21 3) Newly appointed Khaled Mahmud as a Secretary on 9/3/21
Apr. 2021	—	• CEO Mr. Amin relocated to LGD from DSCC.	• 6 Nos Conservancy Supervisor were relocated to other wards
May. 2021	—	• New CEO Mr. Farid appointed from LGD.	1) Shahidul Alam appointed as a CEO 2) Chief Engineer L.Coln Shohel Khan transferred
Jun. 2021	—	• SE Mr. Borhan relocated to TEC. • New SE Mr. Ashik appointed in WMD.	Add. Chief Engineer Rafiqul Islam has been promoted as a Chief Engineer
Aug. 2021	• SE-TEC Mr. Arifur appointed as Add. CWMO at WMD concurrently. • EE-Disposal Mr. Shafiqur promoted as SE (Civil/ME) at WMD.	• CWMO Mr. Badrul relocated to Airforce from WMD. • New CWMO Mr. Nayeem appointed from Airforce.	—
Sep. 2021	—	—	• 3 Nos Conservancy Supervisor were relocated to other wards
Nov. 2021	—	• 31 New CI appointed and distributed in different wards • SAE Mr. Helal relocated to WMD from Zone#4.	—

Date	DNCC	DSCC	CCC
Jan. 2022	<ul style="list-style-type: none"> • 10 CI was allocated additional charge of CO of 10 Zone. • AE-Electrical Mr. Saiful appointed as EE-C&T at WMD concurrently. 	<ul style="list-style-type: none"> • 1 AE & 2 SAE newly appointed at WMD. 	<ul style="list-style-type: none"> 1) Newly promoted 3 Conservancy Superintendent to Conservancy Officer 2) Newly promoted 9 CI to Conservancy Superintendent
Feb. 2022	—	—	<ul style="list-style-type: none"> • 7 Nos Conservancy Supervisor were relocated to other wards
Mar. 2022	—	—	<ul style="list-style-type: none"> 1) Executive Engineer (Mech) Mr. Akbor Ali from LGED joined as a Superintendent Engineer on 1.3.22 2) Executive Engineer (Mech) Sudip Basak transferred to Gazipur City Corporation on 27.3.22

Reference: JPT based on the information from C/Ps

(4) Needs and Response for additional support after 12CC

12CC	Impact of the meeting	Needs and Response for additional support after 12CC
First (Dec.2, 2018)	<ul style="list-style-type: none"> ● A SNS (Whatapp) group for 12CC SWM activities has been created, and activity information for each CC is now shared. ● It was an opportunity for SWM staff of each CC to get to know each other (there was almost no interaction by then). 	<ul style="list-style-type: none"> ● Landfill operation and management support <ul style="list-style-type: none"> ➢ 12CC members visit the site of the Amin Bazaar disposal site in North Dhaka ● Comprehensive waste management support including WBA and collection and transportation ● Provision of waste collection trucks
Second (Feb. 23, 2020)	<ul style="list-style-type: none"> ● With the participation of the Minister, it has become recognized as a more important opportunity. ● Exchange and mutual support between SWM staff became active. 	<ul style="list-style-type: none"> ● Support for creating a master plan ● Waste management support in the Corona Whirlpool (Narayanganj, Gazipur, Cumilla, Rangpur City Corporation) <ul style="list-style-type: none"> ➢ Providing leaflets for preventing corona infection of workers ➢ Dispatch DSCC cleaning supervisor (explanation of leaflet, etc.) ● Support for creating technical cooperation request form (Narayanganj, Gazipur, Cumilla, Rangpur City Corporation, July 2021) <ul style="list-style-type: none"> ➢ Providing requests for North and South Dhaka City and Chattogram City for reference
Third (Mar. 20, 2022)	<p>The following points were agreed at the JCC.</p> <ul style="list-style-type: none"> ● Create an Annual Report for each CC based on Waste Management Rule 2021 and submit it to the DOE. ● 12 Continue to hold CC meetings and share the contents of the Annual Report before submitting the DOE. ● Continue to share information with SNS groups. ● Promote the separation of emission sources based on the Waste Management Rule 2021. ● Collaborate with DOE on building a waste management platform. 	<ul style="list-style-type: none"> ● Continue JICA's technical cooperation projects to all CCs and large local governments (Local Government Bureau, Senior Secretary). ● Receive support for improving knowledge and skills for improving SWM (Local Government Bureau, Senior Secretary). ● Support the same improvement of medical waste management as in Chattogram City to other cities (LGD, Senior Secretary). ● Landfill survey support by drone ● DSCC C/P for surveying at Harishahar landfill site in Chattogram ● 3R promotion support ● Introduction and guidance of 3R successful cases to DNCC&DSCC by C/P of CCC

* CC: City Corporation, DOE: the Department of Environment, SWM: Solid Waste Management

