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資料－1： PDM（Version 5最新版、変遷経緯）

1. Records of Project Design Matrix (PDM)

PDM Version 0

Project Name : The Project for Improvement of Water Supply Management of YCDC
Executing Agency Yangon City Development Committee (hereinafter referred as "YCDC")
Project Sites : Greater Yangon
Target Group : Staff of YCDC
Direct beneficiaries : Staff of YCDC
Indirect Beneficiaries: People living in the water supply areas of YCDC

Duration of the project: 5 years
PDM Version 0 (May 2014)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The performance indicators (PIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from xx% to xx% in the water supply area of YCDC 3. The ratio of water quality test results which satisfy water quality standards is increased from xx% to xx%.	Reports prepared by YCDC	
[Project Purpose] Capacity of YCDC on the management of water supply service is improved.	1. Evaluation of PIs is conducted periodically 2. NRW is decreased from xx% to xx% in the pilot area 3. The ratio of water quality test results which satisfy water quality standard is increased from xx% to xx%. in the pilot treatment plants[2]	Reports prepared by YCDC	Fund for YCDC to enable it to execute construction and rehabilitation of facilities such as water treatment plants, disinfection equipment and pipelines is available.
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for institutional management is approved by Yangon Region Government. 1-2 Plan for human resources development is approved by Yangon Region Government. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by Yangon Region Government	Reports prepared by YCDC	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 2-2 Information of customers and pipes for the pilot areas is compiled and updated 2-3 xx% of YCDC staff participates training on NRW 2-4 Plan for NRW reduction is approved by YCDC	Reports prepared by YCDC	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 3-2 Result of the water quality test at the pilot treatment plants is recorded and monitored periodically 3-3 xx% of YCDC staff participates training on water quality 3-4 Plan for improvement of water quality is approved by YCDC	Reports prepared by YCDC	
[Activities]	**[Inputs]**		

1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Establish the Planning Section (1-1-1) Establish the Planning Section in Department of Water and Sanitation (1-1-2) Define the division of duties of the Planning Section (1-2) Develop and Monitor Performance Indicators (PIs) (1-2-1) Review the current method of calculation and monitoring of performance data (1-2-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-2-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-2-4) Develop calculation method, manuals and monitoring system of Performance Indicators (1-2-5) Calculate the Performance Indicators (1-2-6) Update and monitor the Performance Indicators periodically (1-3) Formulate regulations, standards and guidelines (1-3-1) Review the existing rules, regulations, standards and guidelines (1-3-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-3-3) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-4) Enhance understanding on financial management (1-4-1) Analyze the current financial management system (1-4-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-4-3) Conduct OJT on development of asset ledger (1-5) Strengthen Public Relations (1-5-1) Analyze the effective public relations on water service of YCDC (1-5-2) Conduct awareness raising of YCDC staff (1-5-3) Conduct OJT on the public relations activities (1-6) Strengthen human resources development (1-6-1) Review the existing human resources development system (1-6-2) Identify necessary improvement on structure and materials of the trainings (1-6-3) Conduct trainings of trainers for planning and organizing the trainings (1-6-4) Develop 5-year and 10-year human resources development plans (1-6-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-7) Develop and support implementation of the institutional management plans (1-5-1) Develop 5-year and 10-year institutional management plans (1-5-2) Launch priority activities as a part of implementing the 5-year institutional management plan 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit	**Japanese side** 1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management - NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	**Myanmar side** 1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities	**[Pre-condition]** 1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

(2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop and support implementation of the NRW management plans (2-5-1) Develop 5-year and 10-year NRW management plans (2-5-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved. (3-1) Review current situation and formulate phased countermeasures (3-2) Conduct training of trainers on water quality management (3-2-1) Conduct training of trainers on the water quality management (3-2-2) Prepare the training plan and training materials by the trainers (3-2-3) Conduct Off-JT by the trainers (3-3) Develop SOP for water quality management (3-3-1) Develop SOP on water quality test and monitoring			

(3-3-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility (3-4) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility (3-4-1) Conduct OJT on water quality test and monitoring (3-4-2) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility (3-4-3) Verify SOP for water quality management (3-5) Develop and support implementation of the water quality management plans (3-5-1) Develop 5-year and 10-year water quality management plans (3-5-2) Launch priority activities as a part of implementing 5-year water quality management plan			

1 PIs and their baseline data will be set approximately 6 months after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.
2 The pilot water treatment plants will be existing Nyaunghnapin Water Treatment Plant and Lagunbyin Water Treatment Plant under construction

PDM Version 1

Project Name : **The Project for Improvement of Water Supply Management of YCDC (PDM Ver.1)**
Executing Agency : **Yangon City Development Committee (hereinafter referred as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5 years (5th July to 4rd July 2020)
PDM Version 1 (February 2016)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The performance indicators (PIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from xx% to xx% in the water supply area of YCDC 3. The ratio of water quality test results which satisfy water quality standards is increased from xx% to xx%.	Reports prepared by YCDC	
[Project Purpose] Capacity of YCDC on the management of water supply service is improved.	1. Evaluation of PIs is conducted periodically 2. NRW is decreased from xx% to xx% in the pilot area 3. The ratio of water quality test results which satisfy water quality standard is increased from xx% to xx%. in the pilot treatment plants[1]	Reports prepared by YCDC	Fund for YCDC to enable it to execute construction and rehabilitation of facilities such as water treatment plants, disinfection equipment and pipelines is available.
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for institutional management is approved by Yangon Region Government. 1-2 Plan for human resources development is approved by Yangon Region Government. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by Yangon Region Government 1-4 New organization structure is approved by Mayor.	Reports prepared by YCDC	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 2-2 Information of customers and pipes for the pilot areas is compiled and updated 2-3 xx% of YCDC staff participates training on NRW 2-4 Plan for NRW reduction is approved by YCDC	Reports prepared by YCDC	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 3-2 Result of the water quality test at the pilot treatment plants is recorded and monitored periodically 3-3 xx% of YCDC staff participates training on water quality 3-4 Plan for improvement of water quality is approved by YCDC	Reports prepared by YCDC	
[Activities]	**[Inputs]**		

1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-4-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically (1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system (1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings (1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans	**Japanese side** 1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management- NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	**Myanmar side** 1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities • Distribution flow monitoring ➢ To design and construct chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other accessories) ➢ To supply electricity to the site • Water quality monitoring ➢ To secure space for provisional equipment in laboratory in Head Office. ➢ To allocate space for equipment in reservoir site for equipment. ➢ To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) • Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) • Collection of computerized data for Performance indicators ➢ To deliver and installation of all provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs	**[Pre-condition]** 1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

(1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop and support implementation of the NRW management plans (2-5-1) Develop 5-year and 10-year NRW management plans (2-5-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved.		➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the training ➢ To update anti-virus software periodically ● Civil work (construction of flow meter chamber), Safety fence for flow meters and panels, and electricity supply for flow meter installation	

(3-1) Establish Water Treatment Section (3-1-1) Establish Water Treatment Section in Department of Water and Sanitation (3-1-2) Define the division of duties of the Water Treatment Section (3-1-3) Hold a series of seminar for basic water treatment technology with study tours (3-2) Review current situation and formulate phased countermeasures (3-3) Conduct training of trainers on water quality management (3-3-1) Conduct training of trainers on the water quality management (3-3-2) Prepare the training plan and training materials by the trainers (3-3-3) Conduct Off-JT by the trainers (3-4) Develop SOP for water quality management (3-4-1) Develop SOP on water quality test and monitoring (3-4-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility (3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility (3-5-1) Procure water quality analysis and water quality management equipment (3-5-2) Conduct OJT on water quality test and monitoring (3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant (3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin (3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant (3-5-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility (3-5-7) Verify SOP for water quality management (3-6) Conduct OJT on improvement of water quality supplied from reservoirs (3-6-1) Review water quality problems in reservoir water (3-6-2) Research water quality improvement measure of reservoir suppled water (3-7) Develop and support implementation of the water quality management plans (3-7-1) Develop 5-year and 10-year water quality management plans (3-7-2) Launch priority activities as a part of implementing 5-year water quality management plan			

1: The pilot water treatment plants will be existing Nyaunghnapin Water Treatment Plant and Lagunbyin Water Treatment Plant under construction.

PDM Version 2

Project Name : **The Project for Improvement of Water Supply Management of YCDC**
Executing Agency : **Yangon City Development Committee (hereinafter referred as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5 years (5th July to 4rd July 2020)
PDM Version 2 (May 2017)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The performance indicators (PIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from xx% to xx% in the water supply area of YCDC 3. The ratio of water quality test results which satisfy water quality standards is increased from xx% to xx%.	Reports prepared by YCDC	
[Project Purpose] Capacity of YCDC on the management of water supply service is improved.	1. Evaluation of PIs is conducted periodically 2. NRW is decreased from xx% to xx% in the pilot area 3. The ratio of water quality test results which satisfy water quality standard is increased from xx% to xx%. in the pilot treatment plants[1]	Reports prepared by YCDC	Fund for YCDC to enable it to execute construction and rehabilitation of facilities such as water treatment plants, disinfection equipment and pipelines is available.
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for institutional management is approved by Yangon Region Government. 1-2 Plan for human resources development is approved by Yangon Region Government. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by Yangon Region Government 1-4 New organization structure is approved by Mayor.	Reports prepared by YCDC	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 2-2 Information of customers and pipes for the pilot areas is compiled and updated 2-3 xx% of YCDC staff participates training on NRW 2-4 Plan for NRW reduction is approved by YCDC	Reports prepared by YCDC	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 3-2 Result of the water quality test at the pilot treatment plants is recorded and monitored periodically 3-3 xx% of YCDC staff participates training on water quality 3-4 Plan for improvement of water quality is approved by YCDC	Reports prepared by YCDC	

[Activities]	**[Inputs]**		
1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division	**Japanese side** 2. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management- NRW (Physical Loss) - NRW (Commercial Loss)	**Myanmar side** 5. Counterpart personnel 6. Office space and facilities 7. Necessary data/ information 8. Local cost for implementation of the activities ● Distribution flow monitoring ➢ To design and construct	**[Pre-condition]** 1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

(1-3-3) Establish operation system of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-4-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically (1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft water supply regulation and run a trial (1-5-4) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system (1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings (1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans (1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW	- GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other accessories) ➢ To supply electricity to the site • Water quality monitoring ➢ To secure space for provisional equipment in laboratory in Head Office. ➢ To allocate space for equipment in reservoir site for equipment. ➢ To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) • Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) • Collection of computerized data for Performance indicators ➢ To deliver and installation of all provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs ➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the	

(2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop training yard for NRW management (2-5-1) Prepare training plan for training yard (2-5-2) Design training yard (2-5-3) Prepare equipment and materials for training yard (2-5-4) Construct training yard (2-5-5) Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard (2-5-6) Conduct Off-JT by the trainers in training yard (2-6) Develop and support implementation of the NRW management plans (2-6-1) Develop 5-year and 10-year NRW management plans		training ➢ To update anti-virus software periodically ● Civil work (construction of flow meter chamber), Safety fence for flow meters and panels, and electricity supply for flow meter installation	

(2-6-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved. (3-1) Establish Water Treatment Section (3-1-1) Establish Water Treatment Section in Department of Water and Sanitation (3-1-2) Define the division of duties of the Water Treatment Section (3-1-3) Hold a series of seminar for basic water treatment technology with study tours (3-2) Review current situation and formulate phased countermeasures (3-3) Conduct training of trainers on water quality management (3-3-1) Conduct training of trainers on the water quality management (3-3-2) Prepare the training plan and training materials by the trainers (3-3-3) Conduct Off-JT by the trainers (3-4) Develop SOP for water quality management (3-4-1) Develop SOP on water quality test and monitoring (3-4-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility (3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility (3-5-1) Procure water quality analysis and water quality management equipment (3-5-2) Conduct OJT on water quality test and monitoring (3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant (3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin (3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant (3-5-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility (3-5-7) Verify SOP for water quality management (3-6) Conduct OJT on improvement of water quality supplied from reservoirs (3-6-1) Review water quality problems in reservoir water (3-6-2) Research water quality improvement measure of reservoir suppled water (3-7) Develop and support implementation of the water quality management plans (3-7-1) Develop 5-year and 10-year water quality management plans (3-7-2) Launch priority activities as a part of implementing 5-year water quality management plan			

[1] PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.

PDM Version 3

Project Name : **The Project for Improvement of Water Supply Management of YCDC (PDM Ver.3)**
Executing Agency : **Yangon City Development Committee (hereinafter referred to as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5 years (5th July 2015 to 4rd July 2020)
PDM Version 3 (August 2018)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from OO % to OO % in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	1. S/C2 activity record, MKPIs monitoring sheets. 2. S/C1 activity record, MKPIs monitoring sheets. 3. Water quality monitoring report, MKPIs monitoring sheets.	
[Project Purpose] Capacity of YCDC on the management of water supply service is improved.	1. Steering Committees (S/C) are organized and improvement actions are implemented.	1. Appointment letter for S/C members, S/C1, 2, 3 activity record.	YCDC will obtain external funds for construction and rehabilitation of water treatment plant, disinfection facility and distribution pipes, etc.
	2. Mid-term management plan is approved by EDWS.	2. Approval of Mid-term management plan in S/C2, or approval letter of the Head of Department (CE).	
	3. The implementation of mid-term management plan is monitored based on MKPIs.	3. MKPIs monitoring sheets.	
	4. The NRW ratio is grasped in the water supply service area of YCDC and monitored.	4. NRW management report.	
	5. Plan for NRW reduction is approved by EDWS.	5. Approval of Plan for NRW reduction in S/C1, or approval letter of CE.	
	6. Water quality is grasped in the water supply service area of YCDC and monitored.	6. Monthly water quality monitoring report.	
	7. Plan for improvement of water quality is approved by EDWS.	7. Approval of Plan for improvement of water quality in S/C2, or approval letter of CE.	
[Outputs] 1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for improvement of water bill collection is approved by EDWS.	1-1 Approval in S/C2, or approval letter of CE.	
	1-2 Plan for human resources development is approved by EDWS.	1-2 Approval in S/C2, or approval letter of CE.	
	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.	1-3 Approval in S/C3, or approval letter of CE.	
	1-4 New organization structure is approved by Mayor.	1-4 Approval letter, or approval process confirmed by the Experts.	
	1-5 2 Full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-5 Evaluation by JICA Experts based on duties of Management Planning Unit in Planning Section in Report on Institutional Reorganization.	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials on NRW management are utilized by YCDC staff.	2-1 Manuals in relevant offices and training record.	
	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 Pilot project activity report.	
	2-3 The number of trainers for NRW management becomes 8.	2-3 S/C1 activity record, Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	2-4 EDWS staff participates in training based on training plan for NRW management.	2-4 Training attendance record, HRD report (HRD Section)	

	2-5 NRW ratio is decreased to 25% in the pilot area.	2-5 S/C1 activity record, Pilot project activity report.	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials on water quality management are fully utilized by YCDC staff.	3-1 S/C3 monitoring report, manuals in relevant offices, training record.	
	3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	3-2 Monthly water quality monitoring report.	
	3-3 The number of trainers for water quality management becomes 4.	3-3 Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	3-4 EDWS staff participates in training based on training plan for water quality management.	3-4 Training attendance record, HRD report (HRD Section).	
	3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	3-5 Activity report of Taskforce team.	
	3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	3-6 Operation and maintenance organization structure of Lagunbyin water treatment plant.	
	3-7 The operation and maintenance system of chlorination facilities is prepared.	3-7 Operation and maintenance organization structure of chlorination facilities.	

[Activities]	**[Inputs]**		
	Japanese side	**Myanmar side**	**[Pre-condition]**
1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division (1-3-3) Establish operation system of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-4-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically (1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft water supply regulation and run a trial (1-5-4) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system	1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management-NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the	1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities • Distribution flow monitoring ➢ To design and construct chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other accessories) ➢ To supply electricity to the site • Water quality monitoring ➢ To secure space in laboratory in Head Office for equipment procured. ➢ To allocate space for equipment in water	1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

(1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings (1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans (1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and	pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	treatment plant、pump station, and reservoir site. ➢ To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) ● Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) ● Collection of computerized data for Performance indicators ➢ To deliver and installation of all provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs ➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the training ➢ To update anti-virus software periodically ● Civil work (construction of flow meter chamber), Safety fence for flow	

human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop training yard for NRW management (2-5-1) Prepare training plan for training yard (2-5-2) Design training yard (2-5-3) Prepare equipment and materials for training yard (2-5-4) Construct training yard (2-5-5) Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard (2-5-6) Conduct Off-JT by the trainers in training yard (2-6) Develop and support implementation of the NRW management plans (2-6-1) Develop 5-year and 10-year NRW management plans (2-6-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved. (3-1) Establish Water Treatment Section (3-1-1) Establish Water Treatment Section in Department of Water and Sanitation (3-1-2) Define the division of duties of the Water Treatment Section (3-1-3) Hold a series of seminar for basic water treatment technology with study tours (3-2) Review current situation and formulate phased countermeasures (3-3) Conduct training of trainers on water quality management (3-3-1) Conduct training of trainers on the water quality management (3-3-2) Prepare the training plan and training materials by the trainers (3-3-3) Conduct Off-JT by the trainers (3-4) Develop SOP for water quality management (3-4-1) Develop SOP on water quality test and monitoring (3-4-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility (3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility (3-5-1) Procure water quality analysis and water quality management equipment (3-5-2) Conduct OJT on water quality test and monitoring (3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant (3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin (3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant		meters and panels, and electricity supply for flow meter installation	

(3-5-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility (3-5-7) Verify SOP for water quality management (3-6) Conduct OJT on improvement of water quality supplied from reservoirs (3-6-1) Review water quality problems in reservoir water (3-6-2) Research water quality improvement measure of reservoir suppled water (3-7) Develop and support implementation of the water quality management plans (3-7-1) Develop 5-year and 10-year water quality management plans (3-7-2) Launch priority activities as a part of implementing 5-year water quality management plan			

[1] PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.

PDM Version 4

Project Name : **The Project for Improvement of Water Supply Management of YCDC (PDM Ver.4)**
Executing Agency : **Yangon City Development Committee (hereinafter referred to as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5.5 years (5th July 2015 to the end of December 2020)
PDM Version 4 (June 2020)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from OO % to OO % in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	1. S/C2 activity record, MKPIs monitoring sheets. 2. S/C1 activity record, MKPIs monitoring sheets. 3. Water quality monitoring report, MKPIs monitoring sheets.	
[Project Purpose]			YCDC will obtain external funds for construction and rehabilitation of water treatment plant, disinfection facility and distribution pipes, etc.
Capacity of YCDC on the management of water supply service is improved.	1. Steering Committees (S/C) are organized and improvement actions are implemented.	1. Appointment letter for S/C members, S/C1, 2, 3 activity record.	
	2. Mid-term management plan is approved by EDWS.	2. Approval of Mid-term management plan in S/C2, or approval letter of the Head of Department (CE).	
	3. The implementation of mid-term management plan is monitored based on MKPIs.	3. MKPIs monitoring sheets.	
	4. The NRW ratio is grasped in the water supply service area of YCDC and monitored.	4. NRW management report.	
	5. Plan for NRW reduction is approved by EDWS.	5. Approval of Plan for NRW reduction in S/C1, or approval letter of CE.	
	6. Water quality is grasped in the water supply service area of YCDC and monitored.	6. Monthly water quality monitoring report.	
	7. Plan for improvement of water quality is approved by EDWS.	7. Approval of Plan for improvement of water quality in S/C2, or approval letter of CE.	
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for improvement of water bill collection is approved by EDWS.	1-1 Approval in S/C2, or approval letter of CE.	
	1-2 Plan for human resources development is approved by EDWS.	1-2 Approval in S/C2, or approval letter of CE.	
	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.	1-3 Approval in S/C3, or approval letter of CE.	
	1-4 New organization structure is approved by Mayor.	1-4 Approval letter, or approval process confirmed by the Experts.	
	1-5 2 Full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-5 Evaluation by JICA Experts based on duties of Management Planning Unit in Planning Section in Report on Institutional Reorganization.	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials on NRW management are utilized by YCDC staff.	2-1 Manuals in relevant offices and training record.	
	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 Pilot project activity report.	
	2-3 The number of trainers for NRW management becomes 8.	2-3 S/C1 activity record, Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	

	2-4 EDWS staff participates in training based on training plan for NRW management.	2-4 Training attendance record, HRD report (HRD Section)	
	2-5 NRW ratio is decreased to 25% in the pilot area.	2-5 S/C1 activity record, Pilot project activity report.	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials on water quality management are fully utilized by YCDC staff.	3-1 S/C3 monitoring report, manuals in relevant offices, training record.	
	3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	3-2 Monthly water quality monitoring report.	
	3-3 The number of trainers for water quality management becomes 4.	3-3 Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	3-4 EDWS staff participates in training based on training plan for water quality management.	3-4 Training attendance record, HRD report (HRD Section).	
	3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	3-5 Activity report of Taskforce team.	
	3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	3-6 Operation and maintenance organization structure of Lagunbyin water treatment plant.	
	3-7 The operation and maintenance system of chlorination facilities is prepared.	3-7 Operation and maintenance organization structure of chlorination facilities.	

[Activities]	**[Inputs]**		
1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division (1-3-3) Establish operation system of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-4-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically (1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft water supply regulation and run a trial (1-5-4) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting)	**Japanese side** 1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management-NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment	**Myanmar side** 1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities • Distribution flow monitoring ➢ To design and construct chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other accessories) ➢ To supply electricity to the site • Water quality monitoring ➢ To secure space in laboratory in Head Office for equipment procured. ➢ To allocate space for equipment in water treatment plant、pump station, and reservoir site. ➢ To procure reagents for	**[Pre-condition]** 1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

(1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system (1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings (1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans (1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan (1-10) Conduct the support activities in response to the COVID-19 emergency 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area	Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) • Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) • Collection of computerized data for Performance indicators ➢ To deliver and installation of all provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs ➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the training ➢ To update anti-virus software periodically • Civil work (construction of flow meter chamber), Safety fence for flow meters and panels, and electricity supply for flow meter installation	

(2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop training yard for NRW management (2-5-1) Prepare training plan for training yard (2-5-2) Design training yard (2-5-3) Prepare equipment and materials for training yard (2-5-4) Construct training yard (2-5-5) Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard (2-5-6) Conduct Off-JT by the trainers in training yard (2-6) Develop and support implementation of the NRW management plans (2-6-1) Develop 5-year and 10-year NRW management plans (2-6-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved. (3-1) Establish Water Treatment Section (3-1-1) Establish Water Treatment Section in Department of Water and Sanitation (3-1-2) Define the division of duties of the Water Treatment Section (3-1-3) Hold a series of seminar for basic water treatment technology with study tours (3-2) Review current situation and formulate phased countermeasures (3-3) Conduct training of trainers on water quality management (3-3-1) Conduct training of trainers on the water quality management (3-3-2) Prepare the training plan and training materials by the trainers (3-3-3) Conduct Off-JT by the trainers (3-4) Develop SOP for water quality management (3-4-1) Develop SOP on water quality test and monitoring (3-4-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility			

(3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility (3-5-1) Procure water quality analysis and water quality management equipment (3-5-2) Conduct OJT on water quality test and monitoring (3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant (3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin (3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant (3-5-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility (3-5-7) Verify SOP for water quality management (3-6) Conduct OJT on improvement of water quality supplied from reservoirs (3-6-1) Review water quality problems in reservoir water (3-6-2) Research water quality improvement measure of reservoir suppled water (3-7) Develop and support implementation of the water quality management plans (3-7-1) Develop 5-year and 10-year water quality management plans (3-7-2) Launch priority activities as a part of implementing 5-year water quality management plan			

[1] PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.

PDM Version 5

Project Name : **The Project for Improvement of Water Supply Management of YCDC (PDM Ver.5)**
Executing Agency : **Yangon City Development Committee (hereinafter referred to as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5 years and 11 months (5th July 2015 to 4th June 2021)
PDM Version 5 (November 2020)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from OO % to OO % in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	1. S/C2 activity record, MKPIs monitoring sheets. 2. S/C1 activity record, MKPIs monitoring sheets. 3. Water quality monitoring report, MKPIs monitoring sheets.	
[Project Purpose]			YCDC will obtain external funds for construction and rehabilitation of water treatment plant, disinfection facility and distribution pipes, etc.
Capacity of YCDC on the management of water supply service is improved.	1. Steering Committees (S/C) are organized and improvement actions are implemented.	1. Appointment letter for S/C members, S/C1, 2, 3 activity record.	
	2. Mid-term management plan is approved by EDWS.	2. Approval of Mid-term management plan in S/C2, or approval letter of the Head of Department (CE).	
	3. The implementation of mid-term management plan is monitored based on MKPIs.	3. MKPIs monitoring sheets.	
	4. The NRW ratio is grasped in the water supply service area of YCDC and monitored.	4. NRW management report.	
	5. Plan for NRW reduction is approved by EDWS.	5. Approval of Plan for NRW reduction in S/C1, or approval letter of CE.	
	6. Water quality is grasped in the water supply service area of YCDC and monitored.	6. Monthly water quality monitoring report.	
	7. Plan for improvement of water quality is approved by EDWS.	7. Approval of Plan for improvement of water quality in S/C2, or approval letter of CE.	
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for improvement of water bill collection is approved by EDWS.	1-1 Approval in S/C2, or approval letter of CE.	
	1-2 Plan for human resources development is approved by EDWS.	1-2 Approval in S/C2, or approval letter of CE.	
	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.	1-3 Approval in S/C3, or approval letter of CE.	
	1-4 New organization structure is approved by Mayor.	1-4 Approval letter, or approval process confirmed by the Experts.	
	1-5 2 Full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-5 Evaluation by JICA Experts based on duties of Management Planning Unit in Planning Section in Report on Institutional Reorganization.	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials on NRW management are utilized by YCDC staff.	2-1 Manuals in relevant offices and training record.	
	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 Pilot project activity report.	

	2-3 The number of trainers for NRW management becomes 8.	2-3 S/C1 activity record, Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	2-4 EDWS staff participates in training based on training plan for NRW management.	2-4 Training attendance record, HRD report (HRD Section)	
	2-5 NRW ratio is decreased to 25% in the pilot area.	2-5 S/C1 activity record, Pilot project activity report.	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials on water quality management are fully utilized by YCDC staff.	3-1 S/C3 monitoring report, manuals in relevant offices, training record.	
	3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	3-2 Monthly water quality monitoring report.	
	3-3 The number of trainers for water quality management becomes 4.	3-3 Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	3-4 EDWS staff participates in training based on training plan for water quality management.	3-4 Training attendance record, HRD report (HRD Section).	
	3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	3-5 Activity report of Taskforce team.	
	3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	3-6 Operation and maintenance organization structure of Lagunbyin water treatment plant.	
	3-7 The operation and maintenance system of chlorination facilities is prepared.	3-7 Operation and maintenance organization structure of chlorination facilities.	

[Activities]	**[Inputs]**		
	Japanese side	**Myanmar side**	**[Pre-condition]**
1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division (1-3-3) Establish operation system of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-4-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically	1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management-NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering,	1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities ● Distribution flow monitoring ➢ To design and construct chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other accessories) ➢ To supply electricity to the site ● Water quality monitoring ➢ To secure space in laboratory in Head Office	1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

(1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft water supply regulation and run a trial (1-5-4) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system (1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings (1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans (1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan (1-10) Conduct the support activities in response to the COVID-19 emergency 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-3-3) Prepare training plan and training materials by the trainers	Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	for equipment procured. ➢ To allocate space for equipment in water treatment plant、pump station, and reservoir site. ➢ To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) ● Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) ● Collection of computerized data for Performance indicators ➢ To deliver and installation of all provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs ➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the training ➢ To update anti-virus software periodically ● Civil work (construction of flow meter chamber), Safety fence for flow meters and panels, and electricity	

(2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop training yard for NRW management (2-5-1) Prepare training plan for training yard (2-5-2) Design training yard (2-5-3) Prepare equipment and materials for training yard (2-5-4) Construct training yard (2-5-5) Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard (2-5-6) Conduct Off-JT by the trainers in training yard (2-6) Develop and support implementation of the NRW management plans (2-6-1) Develop 5-year and 10-year NRW management plans (2-6-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved. (3-1) Establish Water Treatment Section (3-1-1) Establish Water Treatment Section in Department of Water and Sanitation (3-1-2) Define the division of duties of the Water Treatment Section (3-1-3) Hold a series of seminar for basic water treatment technology with study tours (3-2) Review current situation and formulate phased countermeasures (3-3) Conduct training of trainers on water quality management (3-3-1) Conduct training of trainers on the water quality management		supply for flow meter installation	

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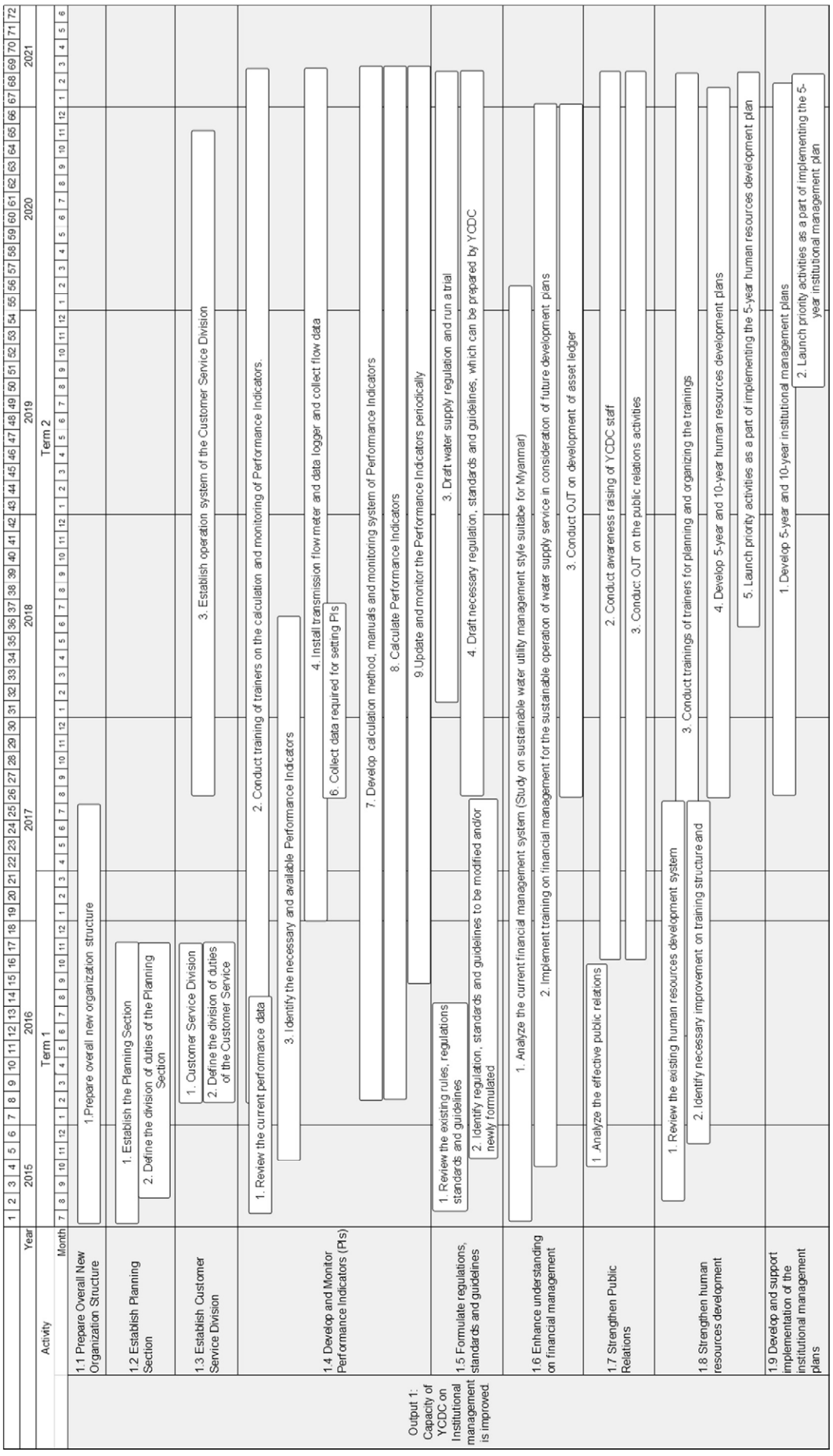
[1] PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.

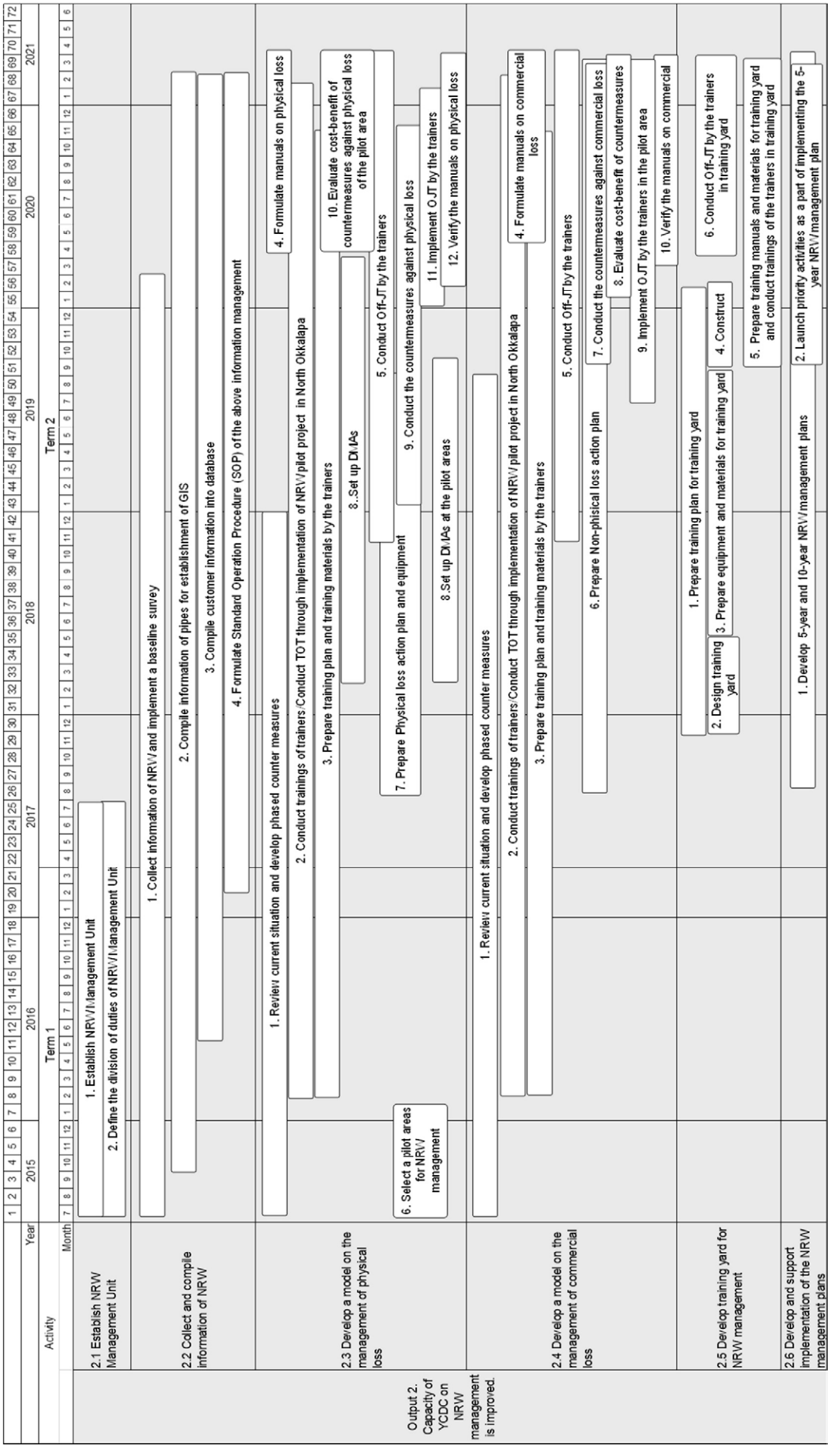
資料 - 2： 業務フローチャート

2. Work Flowsheet

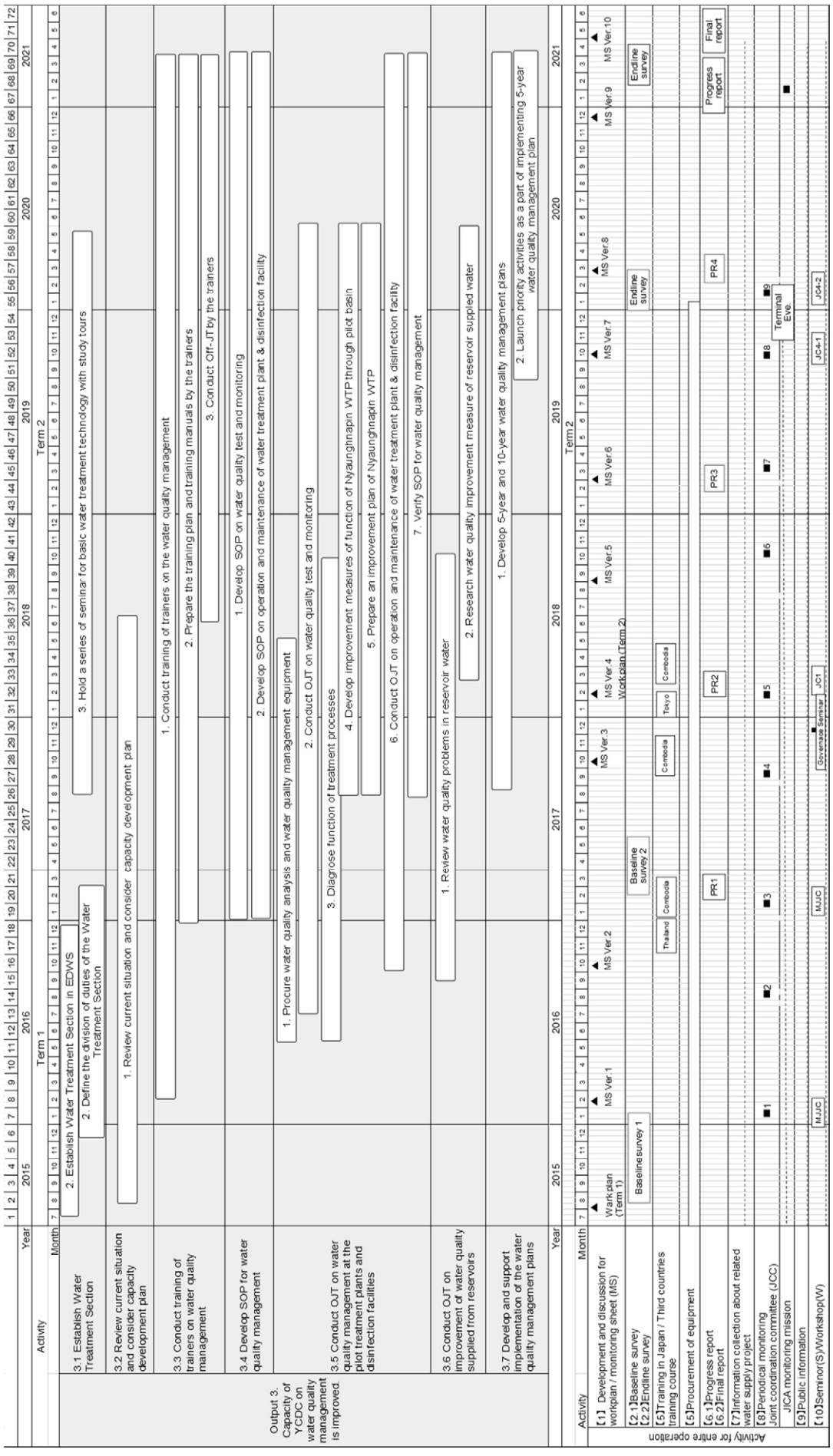
(1) Output 1



(2) Output 2


Year
Month
Activity
2015
2016
2017
2018
2019
2020
2021
Term 1
Term 2
Output 2. Capacity of YCDC on NRW management is improved.
2.1 Establish NRW Management Unit
1. Establish NRW/Management Unit
2. Define the division of duties of NRW/Management Unit
2.2 Collect and compile information of NRW
1. Collect information of NRW and implement a baseline survey
2. Compile information of pipes for establishment of GIS
3. Compile customer information into database
4. Formulate Standard Operation Procedure (SOP) of the above information management
2.3 Develop a model on the management of physical loss
1. Review current situation and develop phased counter measures
2. Conduct trainings of trainers/Conduct TOT through implementation of NRW/pilot project in North Okkalapa
3. Prepare training plan and training materials by the trainers
4. Formulate manuals on physical loss
5. Conduct Off-JT by the trainers
6. Select a pilot areas for NRW management
7. Prepare Physical loss action plan and equipment
8..Set up DMAs
8.Set up DMAs at the pilot areas
9. Conduct the countermeasures against physical loss
10. Evaluate cost-benefit of countermeasures against physical loss of the pilot area
11. Implement OJT by the trainers
12. Verify the manuals on physical loss
2.4 Develop a model on the management of commercial loss
1. Review current situation and develop phased counter measures
2. Conduct trainings of trainers/Conduct TOT through implementation of NRW/pilot project in North Okkalapa
3. Prepare training plan and training materials by the trainers
4. Formulate manuals on commercial loss
5. Conduct Off-JT by the trainers
6. Prepare Non-phisical loss action plan
7. Conduct the countermeasures against commercial loss
8. Evaluate cost-benefit of countermeasures
9. Implement OJT by the trainers in the pilot area
10. Verify the manuals on commercial
2.5 Develop training yard for NRW management
1. Prepare training plan for training yard
2. Design training yard
3. Prepare equipment and materials for training yard
4. Construct
5. Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard
6. Conduct Off-JT by the trainers in training yard
2.6 Develop and support implementation of the NRW management plans
1. Develop 5-year and 10-year NRW/management plans
2. Launch priority activities as a part of implementing the 5-year NRW/management plan

(3) Output 3 and Common Activities



資料 - 3： セミナー・研修の実施実績

3. Records of Seminars and Trainings

Table of Contents

I. List of Seminars

No	Date	Contents	Participants
Output 1-3 Customer Service			
Customer Service Management			
1.	03/07/2017	Customer Service Management, case in Tokyo	9
2.	06/12/2018	Head Office Duties in billing, collection and customer services	50
3.	07/12/2018	Making work-manuals	47
4.	04/03/2019	Creating procedure of water charge collection work manual	11
5.	07/03/2019	The survey method of T / S work related to water charge collection work manual creation	11
6.	04/06/2019	Procedure for creating work manual and SOP	7
7.	05/06/2019	Specific examples of meter reading work manual	7
8.	11/06/2019	Specific examples of unpaid charges collection manual	7
9.	29-30/10/ 2019	Tokyo Metropolitan Bureau of Waterworks Collection Operation Manual	11
10.	31/10/2019	Procedure for transition to bimonthly meter reading	10
11.	23/1/2020	About the role of the meter reading route code	7
12.	29/1/2020	Creating a manual for the customer service department	7
13.	15/9/2020	Overview of Customer Service Management Section Future Vision (Draft)	5
14.	8/12/2020	Toward the examination of the water supply smart meter introduction policy	5
15.	28/12/2020	Examining policies for diversifying payment methods	5
16.	28/1/2020	Monthly work report and setting of support target numerical values	55
Billing & collection system			
17.	15/12/2017	RFP for new billing & collection system	11
Promotion of computerization			
18.	07/03/2018	How to computerize YAPA-forms	12
19.	22/06/2018	Utilization of excel tools for meter reading management and bill collection management	15
Output 1-4 Monitoring			
20.	23/12/2019	Seminar on Data Entry for PIs datasheet for all T/S offices	
Output 1-5 Regulation			
Regulation			
21.	31/08/2018	Laws and Regulation System - Water Supply in Japan –	17
22.	05/09/2018	Water Tariff, Billing and Collection in YCDC Regulation	17
23.	07/09/2018	Water Service Connection in YCDC Regulation	8
24.	12/12/2018	YCDC Water Supply Regulation (Comment for 1st Draft)	15
Output 1-6 Financial Management			
Series of seminar: Sustainable management and organization in water supply			
25.	17/08/2015	Why independent and self-sufficient	32
26.	24/08/2015	How independent and self-sufficient in other water utilities	54
27.	31/08/2015	How water supply in Yangon city be independent and self-sufficient	57
Series of Lectures “What is Capital Expenditure”			
28.	02/10/2017	Capital Expenditure at Budget, P/L and B/S	15
29.	03/10/2017	Capital Expenditure in Water Tariff Setting	15
30.	13/10/2017	Capital Expenditure and Financial Plan	15

No	Date	Contents	Participants
31.	19/10/2017	Capital Expenditure and Profit and Cost of service	15
Series of Lectures “Workshop for making Guidelines”			
32.	06/03/2018	How to make Guidelines for Fixed Asset Accounting in EDWS	10
33.	07/03/2018	How to make Guidelines for Water Tariff Setting in EDWS	10
Fixed Asset Management			
34.	27/08/2018	Fixed Asset Management in EDWS -How to set categories and useful life	18
PPP			
35.	30/08/2016	PPP	18
36.	2/09/2016	PPP	13
37.	26/06/2018	Private Sector Involvement (PPP, Outsourcing, etc.)	23
38.	13/09/2019	Expert’s Perspective on the PPP project	35
Water Tariff Setting			
39.	16/08/2016	Tariff Setting	10
40.	16/08/2016	Tariff Setting	10
41.	19/08/2016	Tariff Setting	11
42.	08/03/2019	How to set Water Tariff	33
43.	19/06/2019	Discuss new Water Tariff (Task-Force kick-off meeting)	23
44.	29/08/2019	How to prepare for Water Tariff Revision (Task-Force + CE meeting)	11
Water Utility Management and Organization			
45.	30/11/2015	Characteristics of water supply utilities	58
46.	8/12/2015	Regulation for water supply utilities	40
47.	14/12/2015	Asset management and accounting for water supply utilities	45
48.	12/08/2016	How to cope financial difficulties in near future	52
49.	21/12/2015	Rate making of water tariff	40
50.	28/03/2019	Reorganization on Water Supply Entity (to /05/or of Yangon city)	10
51.	22/05/2019	Sustainable Scheme for Water Supply in Yangon (to Chief Minister of YRG)	12
Output 1-7 Strengthen Public Relations			
52.	07/02/2019	Review of PR responsibility and check future plan	6
Output 1-8 Human Resource Development			
53.	31/08/2018	Seminar for studying abroad	116
Seminars for formulation of HRD Plan			
54.	02, 16/05/2017	Vision and Mission of HRD Plan	8
55.	06/07/2017	Present situation & approaches to improve Efficiency of training; staff number and trainees number	13
56.	13/07/2017, 21/08/2017	Concept and characteristics of OJT	7
57.	12, 15/09/2017	Concept and characteristics of Motivation management and performance	7
58.	19, 21/03/2018	Concept and characteristics of Personnel appraisal	8
59.	07/05/2018	Concept and characteristics of Self-learning and HRD	8
60.	28/05/2018	Long-term Training Program and training needs survey	59
Workshops for developing trainers			
61.	1/09/2016	Overview of HRD	20
62.	31/03/2016	What is good training?	23
63.	28/06/2016	Feedback to trainers	16
64.	8/09/2016	Achievement Test	17
65.	3/10/2016	Results and ideas for Achievement test	20
66.	6/01/2016	Achievement Test 2	18
67.	7/03/2017	Lesson structure	17
68.	14/03/2017	Basic Concepts of HRD (New comer training)	20
69.	04, 11/05/2017	For PC Trainers: Workshop for formulation of training program	14
70.	18/05/2017	For PC Trainers: Simulation teaching workshop	14
71.	07/03/2018	For trainers of O&M of pump: Workshop for formulation of training program	28
72.	01, 08/06/2018	Training effectiveness (for PC trainers)	18
73.	10/10/2018	Tips for better understanding; visual aid	29
74.	03/05/2019	Senior OJT Instructor Seminar	10
75.	07,14/02/2020	Senior OJT Instructor Seminar	10
Output 1-9 Mid-term Management Plan			
76.	28/01/2019	Mid-term Management Plan of EDWS (2018/19-2020/21) • Outline of MTP • Outline of Financial Projection • Key Targets and Next Activities Q&A	73

No	Date	Contents	Participants
Output 2 Non-Revenue Water Management			
77.	2/11/2016 (3days)	Basic knowledge about waterworks	101
78.	26/07/2017	Uniform style of water leakage repair record (How to utilize records)	34
79.	31/08/2017	Hydraulic analysis seminar including utilization and operation of GIS	8
80.	21/03/2018	Design drawing seminar	27
81.	28/03/2018	Completed construction inspection (Examples of Japan)	20
82.	09, 11/05/2018	Countermeasures to reduce commercial loss (ex. How to utilize survey of damaged meter to the measures.)	28
83.	03-14/08/2018 (5days)	Formulation of (draft) short-mid-long term plan for NRW reduction	12
84.	04, 05/12/2018	Design for house connection including house tank	34
85.	06-19/12/2018 (6days)	Countermeasures to reduce NRW ➢Cause of occurrence of NRW ➢Need to make as-built drawings ➢Capacity assessment for C/Ps	19
86.	18/12/2018	Kick off seminar for the pilot works in Yankin T/S ➢ Each C/Ps' roles ➢ Permission for construction	22
87.	10, 21/12/2018	Seminar for the pilot works in Yankin T/S ➢ Procedure for making of daily report ➢ Confirmation of result of the past survey	22
88.	21/03/2019	Seminar for pressure test by C/P ➢ C/P lecture about pressure test to T/S staffs	15
89.	24-26/04/2019	Seminar for understanding of physical loss, commercial loss and water balance ➢ What is NRW ➢ Water usage category and procedure making of water balance sheet ➢ Method of leakage survey and counter measure	10
90.	03/05/2019	Hydraulic analysis ➢ A general outline of hydraulic analysis ➢ How to use software for hydraulic analysis (EPA-net)	8
91.	15/05/2019	Tapping under pressure ➢ How to use drilling machine under pressure	22
92.	21/05/2019	EF joint for HDPE ➢ Mechanism of EF joint ➢ How to EF joint	20
93.	10/07/2019	/12/ision method of diameter	8
94.	05,06/09/2019	Completion drawing ➢ Necessary data for completion drawing ➢ How to survey and measure for completion drawing	6
95.	13/3/2020	Discuss with T/S officers about Guideline for design and construction of water supply equipment	49
Output 3 Water Quality Management			
96.	23/12/2015	About the Seminar Basic Design Parameters Coagulation - Jar test - Coagulant (ACH: Aluminum Chloro Hydrate) - Control of coagulant(ACH) dosage - G Value	33
97.	9/02/2016	Quick Review of the First Seminar - Basic Design Parameters - Coagulation Answer to the Questions shown in the Presentation Material of the First Seminar - Presentation by Staff of Water Treatment Plant and Reservoir Section Answer to the Questions from YCDC staff in the First Seminar - Removal of Iron - Removal of Manganese - Reduction capacity of Coagulation-Sedimentation Treatment for Turbidity Flocculation - Gt Value	27
98.	17/03/2016	Requests and Questions from YCDC Staff through Questionnaire of the Second Seminar - Chemistry of Coagulant	23

No	Date	Contents	Participants
		- Rapid Mixing, Slow mixing and Flocculation - Necessity of Coagulant Flow Meter Control of Coagulant dose - Manual control - Automatic Control Sedimentation - Surface loading - Average Water Flow Velocity in a Sedimentation Basin	
99.	21/03/2016	Coagulation, Flocculation and Sedimentation process in a beaker (Jar-Test) Coagulation - Rapid Mixing, - G Value calculation of Rapid Mixing, - Chemistry of Coagulant Control of Coagulant dose Flocculation - Slow mixing - Gt Value calculation of Slow Mixing Sedimentation - Surface loading - Average Water Flow Velocity in a Sedimentation Basin - Removal of Iron	17
100.	16/05/2016	Water Treatment and Disinfection - Mills-Reincke Phenomenon Dosing of Chlorine and Residual chlorine - Shape of chlorine concentration /12/rease Requirement of Disinfection and Water Quality Test - Disinfection Process in Water Supply System - Coliform test vs. Residual Chlorine Advantage and Disadvantage of Chlorination New Chlorine Generator in Yegu Pumping Station - Chlorine Dose and Dosage Control - Operation and Maintenance Manuals	47
101.	17/05/2016	Water Treatment and Disinfection - Mills-Reincke Phenomenon Advantage and Disadvantage of Chlorination Chemistry of Chlorine Consumption of Chlorine in Various Water Residual chlorine - Shape of chlorine concentration /12/rease New Chlorine Generator in Yegu Pumping Station - Chlorine Dose and Dosage Control - Operation and Maintenance Manuals Reaction of Chlorine and Ammonia - Breakpoint Chlorination - Old Chlorine Generator in Yegu Pumping Station	35
102.	8/07/2016	Requests and Questions from YCDC Staff through Questionnaire of the Third and Forth Seminar Rapid Sand Filtration - Structure of a Rapid Sand Filter - Functions Required for Filters - Removal of Cryptosporidium - Basic Design Parameters for Rapid Sand Filter - Filtration Velocity and Media Size - Single Layer and Double Layer - Particle Size and Depth of Filter Media	38
103.	6/09/2016	Requests and Questions from YCDC Staff through Questionnaire of the seventh seminar Questions in the seventh seminar from JICA expert Rapid Sand Filtration - Standard Particle Size and Depth of Filter Media - Under Drain System - Filter Backwash - Sieve Analysis - Check of the Rapid Sand Filters	35
104.	1/11/2016	Requests and Questions from YCDC Staff through Questionnaire of the Eighth	23

No	Date	Contents	Participants
		seminar - Aluminium Coagulant The difference of PAC and ACH. Preparatory Study for Understanding of Aluminium Chemistry Their chemical properties and physical properties. Ozonation - Ultra Violet Treatment	
105.	28/06/2017	Reservoir water improvement (JICA Expert) ➢What (what parameter) should be improved? ➢Which reservoir(s) should be the target to improve? ➢Could the treatment facility of Gyobyu be useful for intended improvement? ➢What (numerical target) is the goal of the improvement? ➢To make improvement research plan ➢Schedule ➢Contents of the research Duties of Water Treatment Section (EDWS staff) ➢To make periodical check regulation for all facilities belong to the reservoir division ✧ Basic principles ✧ Guideline of the selection of instrument for periodical check ✧ Type of check ✧ Principles of making and keeping records ➢To make a regulation of long term facility maintenance and renewal plan of WTP and reservoirs. ✧ Basic principle of making facility and instrument management ledger at every sites ✧ Basic principle of periodical maintenance, overhaul and renewal of facilities and instruments ✧ Basic principle of record making and keeping ➢Drawing of design and document keeping ✧ To make basic principle for making design drawing records ✧ To make system for keeping and inheriting of design drawings and documents Documents need to be store or made related to the Filter Improvement Activity (JICA Expert) ➢Designs of the pilot filter basins. ➢Completion drawings. ➢Parameter /12/ision and their calculation ➢Filter media and their particle sizes ➢Depth of the both filter media. ➢Making procedure of filter sand ➢Sieve test result of the raw sand. ➢Selection of mesh size (opening) of sieves ➢Size and depth of supporting gravel ➢Filter wash condition ➢Backwash rate and surface wash rate ➢Backwash time and surface wash time ➢Filter wash sequence of backwash and surface wash. ➢Size of the wash water drainage valve ➢Position of the surface wash nozzle (Phase 1 & Phase 2) ➢Height of the weir height at filtrate side ➢Repair of the false flow Repair of the underdrain system	11
106.	23/08/2017	Activities of TFT(EDWS staff) ➢Total plan of pilot filter basins ➢What will be remodeled? (Anthracite, Sand, Drainage valve, Wash water rate, Ware height of effluent and so on) ➢Evidences of all remodeling plans ➢Research plan using pilot basins ➢Total schedule of the research plan Study and research about sludge removal method (EDWS staff) ➢Research plan ➢Result of the research Duties and their schedule of Water Treatment Section (EDWS staff) ➢Periodical check regulation	16

No	Date	Contents	Participants
		➢Facility maintenance and renewal regulation Drawing of design and document keeping	
107.	03/10/2017	Technological information about ACH and PAC (EDWS staff) ➢Jar-Test and Most appropriate dosage (MAD) ➢Coagulation Efficiency of ACH and PAC ➢Relation between Raw water turbidity and MAD ➢Advantage and disadvantage of using ACH and PAC Study and research about sludge removal (EDWS staff, JICA Expert) ➢Sludge pilling up speed in Phase1& 2 sedimentation basins. ➢Water flow speed (rate) to scour deposited sludge in a sedimentation basin. ➢Flocks (Sedimentation speed is used as a parameter of flock size.) intended to be removed in Phase1& 2 sedimentation basins. ➢Relation between sludge depth/height and water flow speed. ➢How deep/height of sludge pilling up in Phase1& 2 sedimentation basins is allowed. Reservoir water quality improvement (EDWS staff) Plan of a pilot plant.	15
108.	28/11/2017	Progress of the filter improvement TFT (EDWS staff) ➢Improvement plan of the pilot filters ➢Basic design parameter ➢Comparison of the new and old parameter ➢Drawing of the new pilot filters ➢Process and procedures of the improvement ➢Photos of improvement work ➢Plan of the new pilot filters experiment ➢Purpose ➢Monitoring parameter ➢Schedule Study and research about sludge removal (EDWS staff) ➢Sum/03/y of the research result ➢Laying of desludging pipes ➢Future plan of desludging research Reservoir water quality improvement (EDWS staff) ➢Plan of a pilot plant. ➢Water quality of Gyo byu reservoir in the past. Schedule	16
109.	23/01/2018	Progress of the filter improvement TFT (EDWS staff) ➢Progress of the improvement of the pilot filters ➢All the process should be recorded ➢All the process should be checked ➢Making filter sand, laying down filter materials, rise of weir, wash water drainage valve, surface wash pipe, size of filter sand and anthracite and etc. ➢Drawing of the new pilot filters ➢Plan of the new pilot filters experiment ➢Purpose ➢Monitoring parameter ➢Water level in the filter ➢Frequency of backwash ➢Filtrate water quality ➢Schedule Reservoir water quality improvement (EDWS staff) ➢Final plan of a pilot plant. Schedule	14
110.	16/03/2018	Rapid Filter Improvement TFT; Pilot basin of Phase 2. ➢Repair of water leak from pressure chamber wall at the point of backwash water pipe connection. ➢Set a countermeasure not to be involved air in backwash water. Or a countermeasure to remove air before backwash. ➢Procedure of the filter washing. ✧ How many backwash pumps you will use after leak repair. ✧ Procedure to set appropriate surface wash rate (10~20cm/min), opening degree of the valve. ✧ Procedure to set appropriate backwash rate (40~45cm/min), opening degree of the valve, a countermeasure not to open the valve excessively. ✧ Research plan	4

No	Date	Contents	Participants
		● Purpose. ● Monitoring parameter. ➢ Water level in the filter ➢ Frequency of backwash ➢ Filtrate water quality ● Schedule. Rapid Filter Improvement TFT; Pilot basin of Phase 1 ➢Production of the filter sand of which specification is as same as the Phase 1 pilot basin. ➢Repair and replacement of false floor and strainer. ➢Replacement of wash water drainage. ➢Schedule of the improvement of Phase 1 pilot filter basin. Sludge management in Nyaunghnapin WTP ➢Long term cleaning plan and schedule ✧ Phase 1 ● Schedule, procedure ✧ Phase 2 ● Plan, procedure, Research plan of No. 1 basin of Phase 1.	
111.	22/05/2018	Meeting about chlorination & disinfection (JICA Expert) ➢Introduction of Chlorine Disinfection Facility. ➢Introduction Schedule of the Chlorination (Disinfection) Facility. ➢Basic plan of chlorination (disinfection) of EDWS. ➢Sum/03/y and object of chlorination facility. ➢Details of chlorination facility ➢Necessary information and plan for using sodium hypochlorite. ➢Water quality control of chlorination (disinfection). ✧ To make daily check of residual chlorine concentration at all facilities. ✧ Monitoring of residual concentration and bacteria count in the distribution area. ✧ To clarify a route of water supply and to illustrate it on a map. ✧ Prevention and reduction of chlorine consumption in reservoirs and tanks in the distribution area. ✧ Prevention and reduction of chlorine consumption in water pipes. ➢Requirement of Disinfection and Water Quality Test in Drinking Water Supply System	8
112.	27/08/2018	Things necessary for the Chlorination WG Discussion and Activity (JICA Expert) ➢ Introduction Schedule of the Chlorination (Disinfection) Facility ➢ Details of chlorination facility ✧ To prepare necessary plans for O&M of facilities and water quality control ➢ To clarify a route of water supply and to illustrate it on a map. ✧ To determine retention time (water age) of water in the distribution area. ➢ Basic plan of chlorination (disinfection) of EDWS. ➢ Control method of Chlorine dosing ➢ Water quality management of chlorination (disinfection). ➢ To prevent reduction of chlorine concentration ➢ To clean the inside of pipes ➢ To eliminate area where water/05/stagnate.	16
113.	27/08/2018	Agenda for Nyaunghnapin WTP: Rapid Filter Improvement TFT and Procedure when power failure happens (JICA Expert) ➢ Pilot basin of Phase 2 ✧ Performance result ✧ filter backwashing ➢ Pilot basin of Phase 1. ✧ Improvement of No.27 filter pilot basin To determine retention time (water age) of water in the distribution area. ➢ Observe the present procedures at power failure and power recovery.	16
114.	17/10/2018	Chlorine dosing house (JICA Expert) ➢Chlorine Dosing House ➢Plain Drawing of Chlorine Dosing Facility ➢Dosing Room and Dosing pumps ➢Example of dike in dosing house Basic policy of chlorination in Japan (JICA Expert)	16

No	Date	Contents	Participants
		➢Basic policy of chlorination in Japan. Water Supply Act of Japan ✧ Water Supply Act of Japan ✧ Enforcement Regulations of the Water Supply Act ✧ Drinking Water Quality Standards in Japan ✧ MHLW Ordnance of Water Supply Facility Standards based on the Water Supply Act ✧ Notice of the director of the Water Supply Division, Health Service Bureau, MHLW (No. & place of sampling points for water quality test)	
115.	17/10/2018	Relation between Amount of Water Supply, Amount of Raw Water Intake and WTP Capacity (JICA Expert) ➢Basic Parameter of Flocculation Basin ➢Basic Parameter of Sedimentation Basin ➢Basic Parameter of Filter	16
116.	13/12/2018	Selection of water treatment process (JICA Expert) ➢Factors Influencing Process Design ➢Evaluating Process Options at Expansion or New Water Source of WTP ➢Examples of Treatment Process Selection ➢Available Water Quality Information	17
TFT Seminar			
117.	27/08/2016	Basic Design Parameters and Design Standard Functions Required to Filters Rapid Sand Filtration - Structure of filter - Filtration Velocity and it's control - Filter wash - Filter media - Underdrain system	18
118.	2, 6/09/2016	How to get yield, minimum and maximum diameter of a filter media from a sieve analysis	8
119.	26/10/2016	Review of the last TFT mini seminar Exercise Requirements to be considered in the filter improvement plan - Wash water drainage valve - Particle size of filter media - Quality test methods of anthracite - Thickness of filter media layers - Filter wash (Backwash) condition - Countermeasures to prevent filter sand outflow - Repair and improvement of filters	14
Output 3 Water Quality Analysis			
120.	1/02/2016	Schedule of seminar Concept of Monitoring plan development - Scheme of water quality monitoring in Japan - Purpose of monitoring plan - Monitoring plan development Case Example of Monitoring Plan in Japan (Osaka City and Fukuoka City): Review of existing monitoring plan of YCDC	19
121.	10/02/2016	Proposal of New Water Quality Monitoring Plan by Expert - Sampling point of Waterworks facility - Sampling point of Tap water - Water quality monitoring item	19
122.	3rd 25/05/2016	Safety Handling of Sodium Hypochlorite - Characteristics - Effect to Human - Dos and Don'ts - Maintenance of Facilities - Safety Facilities - Emergency Response	35
123.	9/06/2016	Validation of Analysis Method Example of DPD Residual Chlorine Analysis Method Based on the experimental result of YCDC laboratory - Accuracy and Precision - Quality control of water quality monitoring	11

No	Date	Contents	Participants
		- Validation of DPD method	
124.	10/06/2016	□□Practical training: Statistic calculation of water quality monitoring data □□Case study using Kokkowa water quality data	11
125.	25/10/2016	Preparation of Small laboratory - Background of small laboratory - Equipment - Roll of small laboratory staff - Schedule of small laboratory installation	20
126.	27/12/2016	Operation training of small laboratory equipment - Introduction of small laboratory equipment - Sampling location of each small laboratory - Operation training of small laboratory equipment (Trainee: YCDC Central Lab. staff)	21
127.	28/12/2016	Operation training of SS measurement	11
128.	15/02/2017	Water quality monitoring item - Kind of pollution source - Relationship among monitoring items	11
129.	12/10/2017	New Chlorination facility (JICA Expert) ➢Introduction of new chlorination facility ➢Location and specification of new chlorination facility ➢Planned chlorinated water service area ➢Roll of chlorination facility ➢Handling of sodium hypochlorite Preparation of O&M system of chlorination facility	21
130.	04/12/2017	WQ monitoring item (Training for small laboratory staff) ➢Monitoring equipment in small laboratory ➢Importance of calibration ➢Water quality monitoring item in small laboratory ➢SOPs of small laboratory ➢Water quality monitoring item Water quality data analysis	20
131.	29/03/2018	Review small laboratory data ➢Water quality data analysis tool ✧ Long term WQ change ✧ Correlation between differing WQ item ✧ Calculation of rejection ratio ➢Training and work shop of data analysis ✧ Review Gyobyu, Phugyi, Hlawga and Yegu data Review WQ change from upstream	20
132.	20/7/2018	Introduction QA / QC system ➢ Introduction ISO and GLP system ➢ Key component of GLP ➢ Introduce GLP to EDWS Test method of internal quality control ➢ Data collection ➢ Calculate and assessment Introduction Accuracy control chart and Precision control chart	11
133.	24/7/2018	Training about accuracy control chart and precision control chart ➢ Preparation of accuracy control chart and precision control chart ➢ Data quality assessment using accuracy control chart and precision control chart	11
134.	26/7/2018	Training about accuracy control chart and precision control chart (Part2) ➢ Utilize EXCEL to calculate parameters for accuracy control chart and precision control chart Chart drawing and assessment of data quality	11
135.	19/1/2019	Simple mathematical tool for data quality management ➢ Introduction simple mathematical tool ➢ Training of calculation Introduction data quality management structure suitable for EDWS central laboratory Introduction Quality control manual for EDWS central laboratory ➢ TOC of WQ laboratory Quality Control Manual	11
136.	17/09/2019 Seminar for Central lab.	Introduction QA/QC system: Practical method of Data quality management ➢ CAPA cycle and tool ➢ Accuracy check of monitoring equipment	9

No	Date	Contents	Participants
		➢ Precision check of measurement data ➢ Procedure of Daily accuracy / Precision control Practical training using YCDC data	
137.	19/09/2019 – 23/09/2019 Seminar for mini lab (travel to each mini lab., 4 times)	Introduction QA/QC system: Practical method of Data quality management ➢ CAPA cycle and tool ➢ Accuracy check of monitoring equipment ➢ Precision check of measurement data ➢ Procedure of Daily accuracy / Precision control Practical training using YCDC data	10
138.	29/01/2020 Seminar and training for mini lab. (travel to Nyaunghnapin)	Data quality management (Part2) and Improvement of color measurement ➢ CAPA cycle and tool (RPD index and Recovery ratio) ➢ Accuracy check of monitoring equipment (Recovery ratio) ➢ Precision check of measurement data (RPD index) ➢ Procedure of Daily accuracy / Precision control ➢ Improvement of color measurement to eliminate "minus data" (Cleaning of equipment, Zero adjust) Practical training using Mini lab. Equipment and data	3
139.	28/02/2020 – 04/03/2020 Seminar and training for mini lab. (travel to Yegu, Hlawga, Phugyi and Gyobyu)	Data quality management (Part2) and Improvement of color measurement ➢ CAPA cycle and tool (RPD index and Recovery ratio) ➢ Accuracy check of monitoring equipment (Recovery ratio) ➢ Precision check of measurement data (RPD index) ➢ Procedure of Daily accuracy / Precision control ➢ Improvement of color measurement to eliminate "minus data" (Cleaning of equipment, Zero adjust) Practical training using Mini lab. Equipment and data	10
Overall Project			
Governance			
140.	01/09/2017	Governance (Sustainable utility) Seminar	22
141.	13/12/2017	YCDC Governance Seminar	100
Seminars and Workshops on 5S・Kaizen			
142.	30/09/2016	5S seminar	80
143.	27, 28/10/2016	5S workshop (presentation of achievement)	120
144.	29, 30/05/2017	The 2nd presentation by all offices; 5S application in each office	50
145.	12. 19/06/2017	Workshop to formulate a monitoring check sheet of 5S activities	21
146.	30/08/2017	Presentation by all offices; Utilization of computer	35
147.	11/09/2017	The 3rd Seminar: 5S patrol and method to identify key issues	110
148.	19/01/2018	The 4th seminar: Formulation of Kaizen action plan by all offices	120
Discussions and Seminars with Advisory Committee Members			
149.	02-06/02/2018	Discussions on Output 2	33
150.	05/02/2018	Discussions on Output 1: PR	9
151.	21, 22/02/2018	Discussions on Output 1: Planning and regulations	20
152.	23/02/2018	Discussions on Output 1: Financial management	8
153.	21, 22/02/2018	Discussions on Output 1: Customer services	12
154.	23/02/2018	Discussions on Output 1: Human resource development	10
155.	22/03/2018	Discussions on Output 3: Water treatment and water quality management	130
156.	23/03/2018	Discussions on Output 3: Water quality monitoring	130

II. List of Trainings

No.	Date	Target	Contents	Participants
Output 1-1 New organization				
Transmission and Distribution Management				
1.	1/08/2019	Transmission and Distribution Management Team (NRW management Section, Water Supply Section, GIS Section, Pipe Sections, District Office)	Kick-off meeting for Transmission and Distribution Management ➢Construction of hydraulic model for Transmission system ➢Simulation of the problem areas by the model ➢Identification of improvement measures for flow management by modification of the system and operation ➢Estimation of monthly NRW ratio in the entire system ➢Establishment of Transmission and Distribution Management Section ➢Milestones	18
2.	07/08/2019	Same as above	Construction of EPANET model. ➢Establish TDM team ✧ Operation team ✧ Water demand estimation team ✧ Network modeling team ✧ NRW estimation team ➢How to construct TD model ✧ Procedure of EPANET model ✧ Preliminary setting up C-value of pipeline ✧ Allocation of water demand (flow) in transmission system in EAPNET ✧ Input operational method (pump and valve) ✧ Construction of basic model ✧ Monitored Data	About 13
3.	18/11/2019	Same as above	Progress of data collection and model construction Understanding monitored flow data	About 10
4.	18/12/2019	Same as above	Understanding monitored flow data NRW ratio calculation	About 10
5.	02/04/2020	Same as above	Utilization of hydraulic model Discharge estimation of Hlawga PS and understanding of pump curve	15
Output 1-3 Customer Service				
Promotion of computerization				
6.	03/12/2018	Customer Service Sec. Computer Sec. Kyauktada T/S office	Utilization of excel tools for meter reading management and bill collection management	15
7.	06/12/2018	PC skills trainer; HRD sec., Computer Sec., etc.	Intermediate Excel skills - Graphs	14
8.	07/12/2018	PC skills trainer; HRD sec., Computer Sec., etc.	Intermediate Excel skills - Functions	13
Output 1-4 Monitoring				
Data input for PIs				
9.	Jul.2016	-	□ Training of data input (Basic of Data input) Using PI data sheet (Jan. to Mar 2016), 1) enhancement of strictness and accuracy of data, 2) homogenization of data (unification of definition, source and calculation) were trained. Appropriate data handling method including unification of definition, source and calculation was trained. Trainee corrected PI existing data sheet reflecting actual performance of YCDC through question and answer with T/S office and related section / department. Then trainee asked T/S office and related section / department to confirm and correct PI data base.	48
10.	Sep.2016	-	□ Training of data input (ratio calculation) Using newly introduced PC, following training was implemented; 1) Improve understanding of the meaning of PI and data input method, 2) Training of calculation of PI (Calculation of ratio), 3) Optimization of data sheet using a function of EXCE	155

No.	Date	Target	Contents	Participants
11.	Dec.2016	-	□ Follow-up training (Part1) 1) Explain about revised datasheet (T/S office Ver.) 2) Capacity development of appropriate data collection of T/S office staff	30
12.	04/01/2017	-	□ Follow-up training (Part2) Reduction of fault of data input work and improvement of quality of data base	61
13.	29/04/2017	T/S office District office, etc.	PI datasheet, installation of Sub-Format and its preparation method	30
14.	14/09/2017	Planning Sec. C/P	Preparation of Mid-term Management Plan (Preparation of a draft proposal by the relevant sec.)	5
15.	07-21/12/2017 (4 times)	T/S office District office, etc.	PI datasheet, Confirmation of data submitted, modification, guidance	24
16.	31/05-06/06 2019	Planning Sec. C/P	● Brainstorming and discussion on "SOP for PIs data collection and monitoring" ● PI data check on FY2016-FY2018 and correction ● Guidance to Township officer and other relevant sections	30
17.	23/07-25/07/ 2019	Planning Sec. C/P	● PI data check on FY2016-FY2018 and correction on inappropriate data ● Guidance to Township officer and other relevant sections	9
18.	26/07-30/07 2019	Planning Sec. C/P	● Continuing the brain storming on"SOP for PIs data collection and monitoring" ● Listing up the necessary items for the SOP ● Considering the procedure and discussion on the detail contents of the procedure	8
19.	2/09-6/09 2019	Planning Sec. C/P	● PI data check on FY2016-FY2018 and correction on inappropriate data ● Guidance to Township officer and other relevant sections ● Optimization of PI data format	15
20.	09/09-10/09/ 2019	Planning Sec. C/P	● Finalization of the draft on "SOP for PIs data collection and monitoring"	6
21.	05/11-22/11/ 2019	Planning Sec. C/P	● PI data check on FY2016-FY2018 and correction on inappropriate data ● Guidance to Township officer and other relevant sections ● PI data analysis on FY2018 for Distribution and NRW sheet, Finance sheet, HRD sheet and understanding the trend ● Confirmation and data collection for FY2018/19 in Mid-term Plan and its enhancement	42
22.	09/12-20/12/ 2019	Planning Sec. C/P	● PI data check on FY2016-FY2018 and correction on inappropriate data ● Discussion on countermeasure to prevent inappropriate data entry and planning on Township guidance by each district-base ● Training of trainer (young staffs) on PI datasheet and data entry ● Confirmation and data collection for FY2018/19 in Mid-term Plan and its enhancement	40
23.	09/12-20/12/ 2019	Planning Sec. C/P	● PI data check on FY2016-FY2018 and correction on inappropriate data ● Discussion on countermeasure to prevent inappropriate data entry and planning on Township guidance by each district-base ● Training of trainer (young staffs) on PI datasheet and data entry ● Confirmation and data collection for FY2018/19 in Mid-term Plan and its enhancement	40
24.	14/1/2020 – 28/1/2020 (7 days)	Planning Sec. C/P	● Training of trainer (young staffs) on PI datasheet management and data entry ● Confirmation of PIs for FY2018/19 for Mid-term Management Plan ● Estimation on the performance value of MKPIs ● Preparation of chart for MKPIs for FY2018/19	28

No.	Date	Target	Contents	Participants
			• Preparation on progress presentation for Advisory Committee visit	
25.	18/5/2020, 26/5/2020	Planning Sec. C/P	• Training on the contents of PIs Monitoring manual • Explanation on the manual to the C/Ps • Discussion on the modification points	10
26.	12,26/11/2020 1/12/2020	Planning Sec. C/P	• Consultation and guidance on township performance and its evaluation • Setting of evaluation indicators • Evaluation methods with rating	15
Ultrasonic flow meter				
27.	28/6/2019	EDWS HQ (Electrical and Pipe3 Sec) Yegu PS, Hlawga PS, Byaubwesu PS Gyobyu reservoir Nyaunghnapin WTP	Operation of flowmeter (at Yegu PS) Instructor: Mr. Maeda (Tokyo Keiki Ink.) ➢ Practical training of UFL30 flow meter using Yegu kiosk	12
28.	13/7/2019	EDWS HQ (Electrical Sec.) Yegu PS, Hlawga PS, Byaubwesu PS Gyobyu reservoir, Phugyi reservoir Nyaunghnapin WTP	Operation of data logger (at Yegu PS) Instructor: Mr. Toda (Delairco Japan) ➢ Practical training of data logger system using Yegu kiosk	18
29.	15/7/2019	EDWS HQ (Computer, Customer service, GIS, Design, and Electrical Sec.)	Operation of flow monitoring system, Part1 (at EDWS-HQ) Instructor: Mr. Toda (Delairco Japan) ➢ Practical training of flow monitoring system operation	6
30.	23/8/2019	EDWS HQ (Customer service, GIS, Design, and Electrical Sec.) Yegu PS	Operation of flow monitoring system, Part2 (at EDWS-HQ) Instructor: Mr. Toda (Delairco Japan) ➢ Operation of flow monitoring system ➢ Report function ➢ Error report	9
31.	30/10/2019	EDWS HQ (Electrical Sec.) Yegu PS	Maintenance of flowmeter kiosk (at Yegu PS) Instructor: Mr. Toda (Delairco Japan) and Mr. Maeda (Tokyo Keiki Ink.) ➢ Maintenance of kiosk ➢ Maintenance of flowmeter, RTU, power supply	6
32.	1/11/2019	EDWS HQ (Customer service, GIS, Design, and Electrical Sec.) Yegu PS, Hlawga PS	Operation of flow monitoring system, Part3 (at EDWS-HQ) Instructor: Mr. Toda (Delairco Japan) ➢ Operation of flow monitoring system ➢ Report function ➢ Error report	11
Output 1-5 Regulation, Standards, Guideline and Manuals (RSGM)				
33.	29/3/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	68
34.	5/4/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	52
35.	10/5/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	75
36.	24/5/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	66
37.	31/5/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	50
38.	7/6/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	30
39.	14/6/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	45
40.	21/6/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	41
41.	28/6/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	48

No.	Date	Target	Contents	Participants
42.	5/7/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	49
43.	12/7/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	39
44.	26/7/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	46
45.	2/8/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	40
46.	9/8/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	51
47.	16/8/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	46
48.	23/8/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	47
49.	30/8/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	45
50.	6/9/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	37
51.	13/9/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	64
52.	20/9/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	34
53.	27/9/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	27
54.	4/10/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	35
55.	18/10/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	33
56.	1/11/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	27
57.	15/11/2019	Planning Sec. C/P, WG for SOP	Presentation of the draft SOP, modification and finalization by the relevant sec.	28
58.	12/3/2019	Steering Committee-3	Preparation of the draft of Water Supply Regulation of EDWS	24
59.	6/7/2019	Steering Committee 3 (WG – 3.1, SG A&B Meeting)	Preparation of the draft of Water Supply Regulation of EDWS	12
60.	26/8/2019	Steering Committee 3 (SG A&B Meeting)	Preparation of the draft of Water Supply Regulation of EDWS	16
61.	12/9/2019	Steering Committee 3 Meeting	Preparation of the draft of Water Supply Regulation of EDWS	17
Output 1-6 Financial Management				
New C/P member Training				
62.	27/1/2020	New C/P member	Presentation by Eng. (YCDC topics)	10
63.	10/3/2020	New C/P member	Presentation by Eng. (Financial topics)	9
Output 1-7 Strengthen Public Relations Training on Complaint Data Sheet Input				
64.	23-24/07/2018 (2 hours x 4 groups)	Staff in charge of complaint of District T/S offices	Training on how to input the complaint data sheet after receipt of complaint in each offices	68
Output 1-8 Human Resource Development Pilot training courses				
New Staff Training Courses				
65.	1/06/2016 (6 days)	New staff	Outline of water supply business 1	20
66.	20/09/2016 (8 days)	New staff	Outline of water supply business 2	20
67.	6/12/2016 (8.5days)	New staff	Outline of water supply business 3	20
68.	25/01/2017 (2.5 days)	New staff	Outline of water supply business 4	30
69.	7/02/2017 (2.5 days)	New staff	Outline of water supply business 5	30

No.	Date	Target	Contents	Participants
70.	14/03/2017 (7.5 days)	New staff	Outline of water supply business 6	20
71.	22/06-04/07/2017 (8.5 days)	New staff: engineers	7th New staff training on water supply overview	20
72.	15-17/08/2017 (2.5 days)	New staff: workers	8th: New staff training on water supply overview	30
73.	10-17/10/2017 (5.5 days)	New staff: clerks	9th: New staff training on water supply overview	20
74.	07-20/12/2017 (8.5 days)	New staff: engineers	10th: New staff training on water supply overview	25
75.	09-11/01/2018 (4 days)	New staff: engineers	11th: New staff training on water supply overview	37
76.	10-12/07/2018 (3 days)	New staff (workers)	New Staff Training Course 12 • Overall Concept of EDWS • Water Transmission, supply and distribution (Distribution management) • Whole Works of T/S Office • Safety Working • Ngamoeyeik WTP, Hlawga Reservoir	30
77.	15-23/08/2018 (5.5 days)	New staff (clerks)	New Staff Training Course 13 • Mission & vision of EDWS and Future Plan • Overall concept of YCDC EDWS water utility business cycle • Administration and HRD • Public Relation • Billing & Collection (Site), Customer service • GIS • Finance • production, water treatment • water quality • Water supply and distribution (Distribution management, El & Mech facilities management) • Sanitation	20
78.	24-27/12/2018 (3 days)	New staff (workers)	New Staff Training Course 14 • Overall Concept of EDWS • Water Transmission, supply and distribution (Distribution management) • Whole Works of T/S Office • Safety Working • Ngamoeyeik WTP, Hlawga Reservoir	30
79.	08-17/01/2019 (8 days)	New staff (clerks)	New Staff Training Course 15 • Mission & vision of EDWS and Future Plan • Overall concept of YCDC EDWS water utility business cycle • Administration and HRD • Public Relation • Billing & Collection (Site), Customer service • GIS • Finance • production, water treatment • water quality • Water supply and distribution (Distribution management, El & Mech facilities management) • Sanitation	30
80.	26-28/05/2019 (3 days)	New staff (workers)	New Staff Training Course 16 • Overall Concept of EDWS • Water Transmission, supply and distribution (Distribution management) • Whole Works of T/S Office • Safety Working • Lagunbyin WTP, Hlawga Reservoir	30
81.	9-17/07/2019 (5 days)	New staff (engineers)	New Staff Training Course 17 • Mission & vision, and Future Plan • Overall concept of water utility business cycle • Administration	13

No.	Date	Target	Contents	Participants
			• Billing & Collection • Finance • Electrical & Mechanical Facilities • water quality • Distribution management • Safety working, 5S+ Kaizen • Whole Works of T/S Office • Reservoir and water treatment, Lagunbyin WTP, Hlawga Reservoir	
82.	25-27/02/2020 (3 days)	New staff (workers)	New Staff Training Course 18 • Overall Concept of EDWS • Water Transmission, supply and distribution (Distribution management) • Whole Works of T/S Office • Safety Working • Water qiality • Lagunbyin WTP, Mayangone T/S office	30
83.	11-18/03/2020 (5.75 days)	New staff (engineers & clerks)	New Staff Training Course 19 • Mission & vision, and Future Plan • Overall concept of water utility business cycle • Administration • Billing & Collection • Finance • Electrical & Mechanical Facilities • water quality • Distribution management • Safety working, 5S+ Kaizen • Whole Works of T/S Office • Reservoir and water treatment; Gyobyu& Phugyi Reservoir	19
	Pre-officer Training Course			
84.	04-14/09/2018 (8.75 days)	Deputy T/S Engineers	Pre-officer Training Course 1 ・ Mission & vision of EDWS ・ Overall concept of YCDC EDWS water utility business cycle ・ Leadership & Management ・ Future Plan of EDWS ・ Admin & Regulation ・ Finance ・ HRM & HRD ・ Billing & Collection, Customer Service, PR ・ House Connection ・ Reservoir and production, water treatment ・ Water Transmission, supply and distribution (Distribution management, El & Mech facilities management) ・ Water quality ・ Safety working ・ GIS ・ Sanitation	20
85.	04-13/12/2018 (7.25 days)	Deputy T/S Engineers	Pre-officer Training Course 2 Same contents as above.	20
86.	04-13/06/2019 (7.75 days)	Sub-assistant Engineers	Pre-officer Training Course 3 Same contents as above.	18
87.	03-12/11/2020 (8.0 days)	Sub-assistant Engineers	Pre-officer Training Course 4 (online) Same contents as above.	9
	T/S Engineers Training Course			
88.	06-12/11/2018 (5 days)	T/S Engineers	T/S Engineers Training Course 1 • Mission & vision of EDWS • Overall concept of YCDC EDWS water utility business cycle • Leadership & Management • Future Plan of EDWS • Admin & Regulation • Complaint Management, PR • HRM & HRD • Reservoir and production, water treatment • Finance	20

No.	Date	Target	Contents	Participants
			• Water supply and distribution (El & Mech facilities management) • Safety Working • GIS • Water quality • Sanitation	
89.	29/01-05/02/2019 (5 days)	T/S Engineers	T/S Engineers Training Course 2 Same contents as above.	20
	Training course by duty			
90.	13-15/03/2018 (2.75 days)	Pump operators	Basic O&M of tube well pump 1 ・ Overall Concept of EDWS ・ Tube well, mechanical, electrical facilities(Lecture & practice)	20
91.	02-04/05/2018 (2.75 days)	Pump operators in T/S	Base O&M of tube well pump 2 (same as above)	20
92.	06-09/11/2018 (3 days)	Pipe Section, engineers	GIS and pipe mapping ・ Outline of GIS ・ Data input to GPS using GIS ・ Data input to GPS from Google Earth ・ Practice: data acquisition at site and input into GPS	12
93.	11-13/03/2019 (2.75 days)	Pump operators in T/S and P/S	Base O&M of tube well pump 3 (same as above)	20
	Basic PC Skill Training Course			
94.	23/05-15/06/2017 (8 times)	Staff of T/S offices	1st: Basic PC Skill	10
95.	27/06-20/07/2017 (8 times)	Staff of T/S offices	2nd: Basic PC Skill	12
96.	22/08-07/09/2017 (8 times)	Staff of site offices	3rd: Basic PC Skill	12
97.	07-30/11/2017 (8 times)	Staff of head office	4th: Basic PC Skill	12
98.	06-28/02/2018 (8 times)	Staff of T/S offices	5th : Basic PC Skill	12
99.	05/2018 (0.5 day x 8times)	Staff in head office, site offices	Basic PC Skill Training Course 6 Basic operation of Win 8, Word, PowerPoint, Excel, typing of Burmese.	12
100.	06/2018 (0.5 day x 8times)	Staff in T/S Offices	Basic PC Skill Training Course 7 Same contents as above.	12
101.	02/2019 (0.5 day x 8times)	Staff in head office, site offices	Basic PC Skill Training Course 8 Same contents as above.	12
102.	05/2019 (0.5 day x 8times)	Staff in T/S offices	Basic PC Skill Training Course 9 Basic operation of Win 8, Word, PowerPoint, Excel, typing of Burmese.	12
103.	10/2019 (0.5 day x 8times)	Staff in head office, site offices	Basic PC Skill Training Course 10 Same contents as above.	12
	Lecture and drill about basic theory of waterworks (Yangon Technological University)			
104.	6/01/2017	Young engineers	Hydromechanics (Lecture Part1)	143
105.	13/01/2017	Young engineers	Hydromechanics (Lecture Part2)	137
106.	20/01/2017	Young engineers	Hydromechanics (Lecture Part3)	108
107.	27/01/2017	Young engineers	Hydromechanics (Lecture Part4)	80
108.	3/02/2017	Young engineers	Water treatment (Lecture Part1)	75
109.	10/02/2017	Young engineers	Water treatment (Lecture Part2)	69
110.	17/02/2017	Young engineers	Hydromechanics (Drill Part1)	36
111.	24/02/2017	Young engineers	Hydromechanics (Drill Part2)	31
112.	17/03/2017	Young engineers	Demand forecast and distribution (Lecture)	31

No.	Date	Target	Contents	Participants
Output 1-9 Mid-term Management Plan				
113.	14/07/2017	Planning Sec. C/P	Preparation of Mid-term Management plan (Overall schedule and contents)	6
114.	15/01/2018	Planning Sec. C/P	Training for new staff members of Planning Sec.	3
115.	02-06/04/2018	Planning Sec. C/P	Population projection, water demand projection and management PIs (MKPIs)	27
116.	04-15/06/2018	Planning Sec. C/P	Mid-term Management plan – Selection of the Target Activities (Arrangement of activity proposal submitted by the relevant sections, Classification by activity type and mid-term policies, Selection of activities based on mid-term policies, activity type and priority)	36
117.	14-15/06/2018	Planning Sec. C/P	Mid-term Management plan – Water Demand Projection (Final estimation of water demand, Comparison the demand by M/P with that by MTP)	9
118.	24/07-01/08/2018	Planning Sec. C/P	Mid-term Management plan – Selection of the Target Activities (Continuing training No.1, Selection of activities based on Mid-term policies, Activity, Priority)	30
119.	30-31/07/2018	Planning Sec. C/P	Mid-term Management plan – Water Demand Projection (Water resources projection, Comparison demand with water resource, Preparation of graph)	10
120.	07-19/09/2018	Planning Sec. C/P	Mid-term Management plan – Target Setting (Arrangement and analysis of the data in FY2016, Target setting, Coordination with the relevant sections)	34
121.	04-14/12/2018	Planning Sec. C/P	Mid-term Management plan – Compilation of MTP (Main, Booklet)	28
122.	23, 29/01/2019	Finance Sec. C/P	Mid-term Management plan – Review of Financial Projection (Estimation conditions, Operating income and expenditure, Capital expenditure)	7
123.	17, 30/06/2020 8, 27/07/2020 3, 21/ 08/2020 2, 18/09/2020	Planning Sec. C/P	Mid-term Management Plan － Comparison of MKPIs data between FY2016 and FY2019 － Confirmation on the results of each MPIs － Explanation of the analysis － Preparation on the Monitoring Report	40
Output 2 Non-Revenue Water Management				
Pipeline design				
124.	1/02/2016	-	Usage of equipment of plane-table survey, Drawing of survey map	8
125.	2/02/2016	-	Training of plane-table survey in pilot area (until 10 Mar.)	9
126.	11/02/2016, 1/06/2016	-	Water pressure measurement, Installation of ferrule with saddle ,Training of drilling method of non-suspension water	2/11:6, 6/1: 8
127.	17/03/2016	-	Planning and designing of pipeline laying ・Planning and designing of proper pipe diameter ・Basic of hydraulic calculation (Example of head loss calculation) ・Calculation of water demand forecast －Population forecast －Forecast of water demand / capita －Hourly factor	3/17:15, 3/18:16
128.	21/03/- 31/03/2016	-	Hydraulic analysis and pipeline designing in pilot area (6 days) Training of designing for DMA construction	3/21:16 3/22:7 3/28:9 3/29:8 3/30:7 3/31:8
129.	1/04/2016	-	Pipe material (Introduction)	5
130.	14/12/2016	-	Basic of pipeline designing	25
131.	16/12/2016	-	Hydraulic analysis and pipeline designing in North Okkalapa and Mayangone TS	24
132.	01/09/2017	C/Ps of NRW	(1st) Hydraulic analysis practice (case study on North Okkalapa NRW Reduction Project)	6
133.	08/09/2017	C/Ps of NRW	(2st) Hydraulic analysis practice (case study on North Okkalapa NRW Reduction Project)	6
134.	06-08/11/2017	C/Ps of NRW	Training for measurement by ultra-sonic flowmeter on site in North Okkalapa T/S	4
135.	09-10/11/2017	C/Ps of NRW	Pipeline and DMA design practice	4
Training about water meter				

No.	Date	Target	Contents	Participants
136.	8/11/- 25/11/2016	-	Function check, Usage of test meter	9
	Leakage Measures			
137.	29/11/2016	-	Water leakage survey	14
138.	5/12/2016	-	Field training of leakage detector	9
139.	21/11/2017	C/Ps of NRW & Staffs of Research Section	Water pressure test with local pipe material (PVC, HDPE, plastic saddle)	15
140.	08/02/2018	C/Ps of NRW	Measurement of leakage volume	3
141.	04/06/2018	C/Ps of NRW & Shwepyithar T/S office	Training for measurement of minimum night flow and night step test in Shwepyithar T/S	22
142.	05/06/2018	GIS Section	Training for GIS-data correction of Shwepyithar field survey	3
143.	07, 11/12/2018 (2days)	C/Ps of NRW	Inspection of pipeline construction site (in Shwepyithar T/S, North Okkalapa T/S, Insen T/S, Lagunbyin site for GREATER YANGON WATER SUPPLY IMPROVEMENT PROJECT))	12
144.	14/02/2019	C/Ps of NRW & Yankin T/S office	Water pressure test in Yankin Pilot project	23
145.	02/2019 -03/2020	C/Ps of pilot project & NRW section	Training for NRW reduction on Yankin pilot project ➢ Survey by using plane table and Total Station ➢ Procedure making of SOP ➢ Water pressure test as an inspection in Yankin Pilot project ➢ Types of flowmeter ➢ Flow measurement ➢ Night Step Test ➢ Leak survey and repair method ➢ Proper tapping for service connection ➢ Meter Box installation ➢ Proper meter location ➢ Valve and valve box installation ➢ Recording (Daily report) ➢ Customer survey and making list ➢ Meter function check by test meter ➢ Jointing and cutting work ✧ DIP ✧ RRVP ✧ HDPE(EF) ➢ Pressure test ➢ Meter reading ➢ NRW calculation	8+14
146.	09/2019 11/2019 – 12/2019	C/Ps of pilot project & NRW section	Training for NRW reduction through training center construction ➢SGP piping & threading ➢Understanding of water storage tank (Ball tap installation) ➢Service pipe installation ➢Bulk meter installation ➢Pressure test ➢Leak detection ➢Saddle clamp installation and tapping ➢Jointing & cutting work ✧ DIP ✧ RRVP ✧ HDPE	8+14
	NRW Management Training			
147.	21-30/1/2020	SAEs	NRW management training in NRW Training Center ➢What is waterworks? ➢Water supply planning ➢Pipe jointing ➢Service pipe branch ➢Leak detection ➢Outline of NRW ➢Hydraulic analysis	20
148.	16-30/12/2020	Dy T/S officer	NRW management online training ➢Water supply planning ➢Water supply equipment	14

No.	Date	Target	Contents	Participants
			➢Issues caused by water meter ➢Meter test kit ➢Monitoring and commercial loss ➢Leakage detection ➢Minimum night flow and step test ➢Duty and responsibility of Deputy T/S officer ➢Utilization of NRW management in T/S ➢Laws, Regulation, Guideline ➢SOPs of pipe installation ➢NRW reduction project	
	GIS training			
149.	8/10/2015	-	Concept of GIS application of EDWS	9
150.	9/03/2016	-	Method of trace of field survey	5
151.	11/03/2016	-	Import of field survey GIS data	9
152.	14/03/2016	-	Training of trace of field survey	3
153.	15/03/2016	-	Training of import of pipeline, road and building data (1) 12	12
154.	16/03/2016	-	Training of import of pipeline, road and building data (1)	12
155.	2/06/2016	-	Import water pressure data to GIS database	7
156.	14/12/2016	-	Merit of GIS adoption for water supply utility	25
157.	15/12/2016	-	Operation of ArcGIS	19
Output3 O&M of water treatment plan, water quality management				
	SOPs training			
158.	5/09/2018	Staff of the WTP offices	Backwashing the pilot basin in Phase 2 using Backwashing SOP. (Trainer: EDWS C/P.)	7
159.	30/01/2019	Staff of Yegu P/S office	Explaining about O & M SOPs of No.2 pumping station in Yegu. (Trainer: EDWS C/P.)	36
160.	06/02/2019	Staff of the WTP office	Explaining about O & M SOPs of Nyaunghnapin WTP. (Trainer: EDWS C/P.)	16
161.	19/02/19	Staff of Yegu P/S office	Explaining about O & M SOPs of SCADA system. (Trainer: EDWS C/P.)	3
162.	21/02/19	Staff of Yegu P/S office	Explaining about O & M SOPs of existing chlorine disinfection facility in Yegu. (Trainer: EDWS C/P.)	6
	O&M of facilities			
163.	17/12/2019	C/Ps of Hlawga reservoir & the other chlorination facility staff	On the Job Training for Hlawga reservoir chlorination facility ➢Understanding and inspection the structure of the chlorination facility ➢Operation method of the chlorination facility ➢How to make a SOP for the chlorination facility ➢Discussion of the contents of the SOP	16
164.	03/02/2020	C/Ps & staff of Lagunbyin WTP	On the Job Training for Lagunbyin WTP ➢Chemical dosing facility ➢Rapid mixing and coagulation facilities ➢Sedimentation basins ➢Rapid sand filters ➢Operation of the chlorination facility ➢Theory and calculation of coagulation dosing rate	7

III. List of Internal Seminars within regular meetings

No.	Date	Meeting Name	Contents	Team/Section	Presentator
Planning					
1	22/12/15	Monthly mtg 5	After 5 years, Expected outcomes our department and necessary Training Plan	Planning Section	N/A
2	09/02/17	Monthly mtg 12	Report of PPWSA training	ACE	ACE U Thet Lwin
3	03/08/15	Weekly W/S 2	Problem Analysis	Planning Team & Finance Team	N/A
4	10/08/15	Weekly W/S 3	Problem & Objective Analysis Report	Planning Team	N/A
5	10/08/15	Weekly W/S 3	Objective Analysis	Planning Section	N/A
6	24/08/15	Weekly W/S 5	Bench/03/king & PI	Expert Team	TA Expert
7	24/08/15	Weekly W/S 5	Existing and Necessary Data	Planning Section	N/A
8	31/08/15	Weekly W/S 6	Planning Functions of Tokyo Metropolitan Government, Bureau of Waterworks (TMWB)	Expert Team	TA Expert
9	05/10/15	Weekly W/S 7	Performance Indicators: Example for Comprehensive PIs	Expert Team	TA Expert
10	19/10/15	Weekly W/S 9	Existing and necessary data record for PIs	Planning Team	N/A
11	19/10/15	Weekly W/S 9	Setting Performance Indicators	NRW Section	N/A
12	26/10/15	Weekly W/S 10	Performance Indicators (PI) (6)	Expert Team	TA Expert
13	14/12/15	Weekly W/S 13	PI format: Data and Performance Indicator	Expert team	N/A
14	07/09/17	JCC 4	Management KPIs	Research section	D. Yamin
15	07/09/17	JCC 4	MTP and Policy	Planning Section	D. Khin San Win
RSGM					
16	17/08/15	Weekly W/S 4	Necessary Standards&Guideline	Expert Team	N/A
17	05/10/15	Weekly W/S 7	Standards, Guideline, Manual for Waterworks in Japan	Expert Team	TA Expert
18	11/07/16	Weekly W/S 22	Agenda & Introduction of Design Criteria for Water Supply Facilities of Japan	Expert Team	Ms. Mina and Mr. Ohno
Customer Service					
19	26/02/18	JCC 5	Customer service	Customer Service Section	D. Khin Htay Win
20	26/02/18	JCC 5	New customer database	Customer Service Section	D. Aye Aye Mar
21	09/07/19	Half Monthly mtg 17	Duties and Responsibilities	Customer Service Section	D. Win Pa Pa Soe
22	28/08/19	Half Monthly mtg 19	Meter Reading & Collection Work Manual	Customer Service Section	D. Thae Su Hsu Wai
23	01/03/19	JCC 7	Customer Service Management	Customer Service Section	D. Aye Aye Mar
Finance					
24	24/03/16	Monthly mtg 6	Why and How to make Asset Accounting	Finance Section	D. Moe Moe Khine
25	14/06/16	Monthly mtg 7	Asset Accounting	Finance Team	D. Moe Moe Khine
26	10/08/15	Weekly W/S 3	Objective Analysis	Finance Section	N/A
27	17/08/15	Weekly W/S 4	Sustainable management and organization in water supply (1) - Why independent and self-sufficient	Expert Team	Mr. Yoji Matsui
28	24/08/15	Weekly W/S 5	Sustainable management and organization in water supply (2) -How independent and self-sufficient in other water utilities-	Expert Team	Mr.Yoji Matsui
29	31/08/15	Weekly W/S 6	Sustainable management and organization in water supply (3) - How independent and self-sufficient in other water utilities-	Expert Team	Mr. Yoji Matsui
30	30/11/15	Weekly W/S 11	Basics Characteristics of water supply utilities	Expert team	Mr. Yoji Matsui
31	08/12/15	Weekly W/S 12	Regulation for water supply utilities(Basics of water supply utilities (2)	Expert team	Mr. Yoji Matsui
32	14/12/15	Weekly W/S 13	Asset Management and Accounting for water supply utilities (Basics of water supply utilities (3))	Expert Team	Mr. Yoji Matsui
33	21/12/15	Weekly W/S 14	Rate making of Water tariff; Basics of water supply utilities (4)	Expert Team	Mr. Yoji Matsui
34	21/03/16	Weekly W/S 17	Why and How to make asset accounting?	Finance Section	D. Moe Moe Khine

No.	Date	Meeting Name	Contents	Team/Section	Presentator
35	04/04/16	Weekly W/S 18	Water Supply and Electricity Supply	Finance Section	D. Moe Moe Khine
36	04/04/16	Weekly W/S 18	What Finance Section doing & Importance of Finance in water supply	Finance Section	D. Moe Moe Khine
37	31/05/16	Weekly W/S 20	How to cope with accumulated Burden of capital expenditure	Expert Team	Mr. Matsui
38	05/09/16	Weekly W/S 26	YESC Report	Finance	D. Moe Moe Khine
39	31/10/16	Weekly W/S 30	Tariff Setting Study	Finance Section	D.MayThet Kyaw
40	19/12/16	Weekly W/S 30	Training in MWA and PPWSA	Finance Section	D. Moe Moe Khine
41	07/09/17	JCC 4	Accounting System & Accounting Policy, Fixed Assets Management	Finance Section	D. Moe Moe Khine
42	26/02/18	JCC 5	Objective of Finance Group	Finance Section	D.MayOo Lwin
43	14/12/18	Half Monthly mtg 12	Water Tariff Setting	Finance Section	D. Moe Moe Khine
44	18/06/19	Half Monthly mtg 16	Growing City & Accumulation of Loan	Finance Section	D.MayThet Kyaw
HRD					
45	27/08/15	Monthly mtg 2	Process of Capacity Assessment	JICA Expert	Mina Yariuchi
46	07/10/16	Monthly mtg 9	Duties of HRD Sec.	HRD Team	U Kyaw Kyaw Oo
47	03/08/15	Weekly W/S 2	Problem Analysis	HRD Section	N/A
48	10/08/15	Weekly W/S 3	Objective Analysis	HRD section	N/A
49	17/08/15	Weekly W/S 4	Framework of Capacity Development	Expert Team	N/A
50	05/10/15	Weekly W/S 7	Characteristics of HRD in WSD	Expert Team	Ms. Mina Yariuchi
51	08/08/16	Weekly W/S 25	WA turnover and analysis	HRD Section	D. Su Nandar Lin
52	12/09/16	Weekly W/S 27	Concept of HRM and HRD	HRD Section	D. Khin ZinMar Myint
53	26/12/16	Weekly W/S 32	Training report in MWA	HRD section	D. Khin ZinMarMyint
54	09/08/17	Monthly mtg 17	Mini-lecture OJT	HRD section	U Kyaw Kyaw Oo
55	09/08/17	Monthly mtg 17	OJT and proposals to improve	HRD Section	U Kyaw Kyaw Oo
56	07/09/17	JCC 4	Formulation of HRD Plan	HRD section	U Kyaw Kyaw Oo
57	26/02/18	JCC 5	Report of Japan training	HRD section	D. Khin ZinMarMyint
58	08/03/18	Half Monthly mtg 6	Vision and mission of HRD	HRD Section	N/A
59	23/05/18	Half Monthly mtg 7	Concept of Self-learning	HRD section	D. Nyo Nyo Tun Kyaw
60	17/05/19	Half Monthly mtg 15	OJT Instructor workshop	HRD Section	D. Khin ZinMarMyint
61	18/06/19	Half Monthly mtg 16	Training effectiveness to retain staff	HRD Section	N/A
62	01/10/19	Half Monthly mtg 20	Current Situation of HR	HRD section	D. Wine Htet Htet Aung
63	21/10/19	JCC 8	Overview of HRD Plan	HRD Section	D. Khin ZinMarMyint
64	21/10/19	JCC 8	HRD for Productivity Improvement	JICA TA Team	Ms. Mina Yariuchi
65	21/10/19	JCC 8	Review of HRD discussion	EDWS	D. Thwe Naing Oo
PR					
66	23/05/16	Weekly W/S 19	Future plan of PR, EDWS	Expert Team	Ms. Yamada
67	31/05/16	Weekly W/S 20	Future plan of Customer Service, EDWS	Expert Team	Ms. Yamada
68	02/08/16	Weekly W/S 24	Websites and School activities	Expert Team	Ms. Yamada
69	07/09/17	JCC 4	Development of materials for awareness raising activities	Public Relation Team	D. OhnMar
70	26/02/18	JCC 5	PR activity	Public Relation Team	U Htay Naing
71	17/12/19	Half Monthly mtg 22	Chlorine Dosage awareness	PR section	D. OhMar Aung
NRW management					
72	03/08/15	Weekly W/S 2	Causes & Effects of Problems/Issues	NRW Section	N/A
73	03/08/15	Weekly W/S 2	Problem Analysis	NRW Section	N/A
74	10/08/15	Weekly W/S 3	Objective Analysis	NRW Section	N/A
75	31/05/16	Weekly W/S 20	Lecture for Pipe Size Calculation	NRW Section	N/A
76	11/07/16	Weekly W/S 22	Preparation of Flow Meter Installation	NRW Management	U Zaw Min Htut
77	28/01/16	JCC 1	NRW Countermeasures of Tokyo Waterworks	JICA AC	Mr. Koji Nakanuma
78	26/12/16	Weekly W/S 32	GIS outline & Utilization in EDWS	GIS Section	N/A
79	07/09/17	JCC 4	Progress of NRW Management Activities	NRW Section	U Aung Min Oo
80	26/02/18	JCC 5	Progress of NRW Management Activities	NRW Section	D. Yu Yu Hla Baw U Aung Min Oo

No.	Date	Meeting Name	Contents	Team/Section	Presentator
81	26/02/18	JCC 5	PPWSA Improvement Plan	NRW Section and Customer Service Section	D. Yu Yu Hla Baw & D. Aye Aye Mar
82	23/05/18	Half Monthly mtg 7	Meter Function Test and Measuring the Leakage Volume	NRW section	D. Yu Yu Hla Baw
83	07/06/18	Half Monthly mtg 8	Minimum night flow test	NRW section	D. Win Maw
84	09/07/18	Half Monthly mtg 9	NRW Analysis in Shwe Pyi Thar	NRW Section	U Kaung Zaw Htet
85	24/08/18	Half Monthly mtg 10	Compile & Check the service coverage data	NRW Section	N/A
Water Quality Management & Monitoring					
86	15/10/15	Monthly mtg 3	Microbiological Test Results for Kyauktada Tsh	WQ Monitoring and Management	N/A
87	24/03/16	Monthly mtg 6	Seminar of Water Quality Monitoring	WQ Section (Laboratory)	D. Hsu Myat Mon
88	13/12/16	Monthly mtg 11	Residual Chlorine Monitoring	WQ Section	D. Hsu Myat Mon
89	03/08/15	Weekly W/S 2	Problem Analysis	WQ Management	N/A
90	03/08/15	Weekly W/S 2	Problem Analysis	Water Treatment Section	N/A
91	10/08/15	Weekly W/S 3	Objective Analysis	WQ Management Section	N/A
92	10/08/15	Weekly W/S 3	Objective Analysis	Water Treatment Section	N/A
93	24/08/15	Weekly W/S 5	PIs for Output 3	Planning Section	N/A
94	08/12/15	Weekly W/S 12	Water Environment Monitoring Training Report	WQ Monitoring Section	D. Zin Zin Thu
95	23/12/15	Water Treatment Technology Seminar	Water Treatment Technology	Water Treatment & Quality	U Zaw Oo, U Nyi Nyi Aung, D. Ei Khine Mon
96	23/05/16	Weekly W/S 19	CHLORINE FACILITIES AND DISINFECTION	WQ	Nyein Htet
97	31/05/16	Weekly W/S 20	WTP Management using water quality data	WQ Management Section	N/A
98	04/07/16	Weekly W/S 21	Brief Explanation of water Quality monitoring	WQ Monitoring Section	D. NweNwe Zin
99	04/07/16	Weekly W/S 21	Progress of Activities Nyaungnapin WTP	WQ Management	D.MayThawdar Oo
100	05/09/16	Weekly W/S 26	Operation And Maintenance Of Urban Water Supply System and Loss of Books & Utilization	WQ Section	D. Ei Khine Mon
101	12/09/16	Weekly W/S 27	Operation And Maintenance Of Urban Water Supply System	WQ Section	D. Ei Khine Mon
102	31/10/16	Weekly W/S 29	Water Quality Report of NNP WTP	WQ Section	D. ThidarSu Su Khin
103	31/10/16	Weekly W/S 29	Action Plan of training course	WQ	D. Ei Khine Mon
104	28/01/16	JCC 1	Transition of WQ Control and Water Purification Process & Importance of O&M	JICA AC	Mr. Noriyuki Hayashi
105	28/01/16	JCC 1	Water Safety Plan (Decision & apply)	JICA AC	Mr. Yoshinobu Kiuchi
106	28/01/16	JCC 1	Current Issues and Expected Future vision on WQ Monitoring & Management of Yangon City Water Supply System	WQ Lab	D.MayZin Oo
107	28/01/16	JCC 1	Capacity development of Water Quality Management	JICA Expert Team	Mr. Morita
108	30/01/17	JCC 3	Review of 1st JCC Transition of Water Quality Monitoring and Treatment in JAPAN and FUKUOKA City according to development of Water supply service (FCWB)	WQ Section	N/A (Fukuoka city?)
109	05/06/17	Monthly mtg 14	Activities of improvements in 2016	WQ Section	D. Ei Khine Mon
110	05/06/17	Monthly mtg 14	Mini laboratories and measuring parameters	WQ Section	D. Ei Khine Mon
111	27/07/17	Monthly mtg 16	Laboratories Inspection	WQ	D. Ei Khine Mon
112	09/08/17	Monthly mtg 17	Removing sludge in WTP	Water Treatment Section	U Thit Lwin

No.	Date	Meeting Name	Contents	Team/Section	Presentator
113	26/05/17	Monthly mtg 14	Baseline report	WQ Monitoring Section	D. Ei Khine Mon
114	26/05/17	Monthly mtg 14	Mini laboratories and measuring parameters	WQ Monitoring Section	D. Ei Khaing Mon
115	27/07/17	Monthly mtg 16	Laboratories Inspection	WQ Management Section	D. Ei Khine Mon
116	28/09/17	Half Monthlly Meeting 2	Residual chlorine monitoring results	WQ Monitoring Section	D. Ei Khine Mon
117	28/09/17	Half Monthlly Meeting 2	Report of training in Japan	WQ Monitoring Section	D. NweNwe Zin
118	07/09/17	JCC 4	Setting and Purpose of TFT	Task Force Team	U Zaw Oo
119	07/09/17	JCC 4	Analytical methods calibration within internal staffs	WQ Monitoring Section	D. Thandar Myat
120	07/09/17	JCC 4	O&M Manuals for Facilities in WTP (Cambodia)	Water Treatment Section	U Zaw Win Aung
121	07/09/17	JCC 4	Gyophu Improvement	Reservoir Division	U Zin Min Latt
122	07/09/17	JCC 4	Sludge Removing	WTP	U Thit Lwin
123	26/02/18	JCC 5	Activities of NNP Water Treatment Plant improvement	Water Treatment Section	U Zaw Oo
124	26/02/18	JCC 5	Results of experiment of direct filtration	WTP	U Zin Min Latt
125	06/12/17	Half Monthly mtg 4	Lecture about measuring water parameters	WQ Section	D. Ei Khaing Mon
126	16/01/18	Half Monthly mtg 5	On-site Residual Chlorine Monitoring	WQ Management Section	D. Ei Khaing Mon
127	16/01/18	Half Monthly mtg 5	Preparation of Chlorination in YCDC	N/A	N/A
128	08/03/18	Half Monthly mtg 6	Report of Training in PPWSA	WQ Section	D. Ei Khine Mon
129	08/03/18	Half Monthly mtg 6	Report of Training in PPWSA	Water Treatment Section	U Zaw Win Aung
130	23/05/18	Half Monthly mtg 7	ACH Jartest of Nyaungnapin WTP	Water Treatment Section	D.MayThawdar Oo
131	23/05/18	Half Monthly mtg 7	WTP Plan for Sludge Management	Water Treatment Section	U Thit Lwin
132	23/05/18	Half Monthly mtg 7	Review Small lab data	WQ Section	D. Thandar Myat
133	09/07/18	Half Monthly mtg 9	Report of training in Japan	WQ Section	D. Thandar Myat
134	24/08/18	Half Monthly mtg 10	WTP Phase one sludge level	Water Treatment Section	U Thit Lwin
135	24/08/18	Half Monthly mtg 10	QA/QC system	WQ Section	D. NweNwe Zin
136	24/08/18	Half Monthly mtg 10	Procedure of developing SOPs	Water Treatment Section	U Zaw Win Aung
137	11/10/18	JCC 6	Enhance Laboratory Capacity	WQ monitoring Section	D. Ei Khine Mon
138	11/10/18	JCC 6	Framework for Developing SOPs	Water Treatment Section	U Zaw Win Aung
139	18/01/19	Half Monthly mtg 13	Condition of Mini-Labs	WQ Section	D. Thandar Myat
140	20/02/19	Half Monthly mtg 14	SOP Framework and regulations	Water Treatment Section	U Zaw Win Aung
141	18/06/19	Half Monthly mtg 16	Capacity enhancement of Mini laboratory through improvement of PDCA cycle	WQ Section	D. Hsu Myat Mon
142	06/08/19	Half Monthly mtg 18	Report of training in Japan	WQ Monitoring Section	D. New New Zin
143	28/08/19	Half Monthly mtg 19	Full scale application of SOPs	Yegu P/S	D. Tinzar Lwin
144	17/12/19	Half Monthly mtg 22	Water Treatment TFT Final Report	Water Treatment Section	U Zaw Oo
Transmission and distribution Management					
145	03/12/15	Monthly mtg 4	Design of distribution flow management system(Flow meter installation)	JICA Advisor Office	Mr. Watanabe

No.	Date	Meeting Name	Contents	Team/Section	Presentator
146	18/06/19	Half Monthly mtg 16	Transmission and Distribution Management	JICA Expart	Mr. Koga
Project Management					
147	15/10/15	Monthly mtg 3	Process of Establishment of new section/unit	TA Team	TA Experts
148	24/03/16	Monthly mtg 6	Re-organization Chart of EDWS	ACE	D. Thwe Naing Oo
149	27/04/15	Weekly W/S 1	Process of Participatory Project Cycle Management	Expert Team	TA Experts
150	03/08/15	Weekly W/S 2	PCM Workshop Process	Expert Team	TA Experts
151	10/08/15	Weekly W/S 3	Vision Mission for YCDC	Expert Team	TA Experts
152	17/08/15	Weekly W/S 4	Framework of Capacity Development	Expert Team	N/A
153	17/08/15	Weekly W/S 4	Words in Mission and Vision	Expert Team	N/A
154	31/08/15	Weekly W/S 6	Proposal of Planning Section	Expert Team	TA Expert
155	12/10/15	Weekly W/S 8	To Achieve Targets of Water Supply Master Plan	Expert Team	TA Expert
156	19/10/15	Weekly W/S 9	How to achieve Vision/Objectives - Balance of 4 Perspectives	Expert Team	TA Expert
157	30/11/15	Weekly W/S 11	TOC - Baseline Survey & Capacity Assessment -	Expert Team	Mr. Ohno
158	27/01/16	JCC 1	Ideal Future Image: Management Style of Water Supply in Yangon City	JICA Expert Team	Mr. Yoji Matsui
159	07/09/17	JCC 4	Good Governance , Sustainable utility	Water Supply Division	D. Thwe Naing Oo
160	26/02/18	JCC 5	PDM Indicators	JICA TA Team	Mr. Sato
161	01/03/19	JCC 7	Sum/03/y of Morning Section and Discussion	EDWS	D. Thwe Naing Oo
162	01/03/19	JCC 7	Recommendations and Conclusions of 7th JCC	EDWS	U Myo Thein
Report of Training in foreign countries					
163	06/12/17	Half Monthly mtg 4	Report of training in Japan	Pipe Section 2	U Aung Ko Oo
164	08/03/18	Half Monthly mtg 6	Report of Training in Tokyo	ACE Daw Aye Pa Pa Nyo and group	Group members
165	07/09/17	JCC 4	Management Improvement Plan	Supporting Division	D. Thin Thin Soe

IV. List of training course in foreign countries

No.	Date	Implementation agencies	Contents	Participants
Output 1 Water Supply Management				
1.	20-29/11/2016	MWA, Thailand	✓ Institutional Governance and Organization of water utility ✓ Overall activities as water supply utility ✓ Actions for problem solving （such as leadership） ✓ Whole structure of standards, guidelines, and manual, SOPs. ✓ Wrap-up Discussions; toward application in Yangon ✓ Finance ✓ Business plan of water supply utility ✓ Standard, guidelines, manuals ✓ Human resource development	10
2.	15-25/01/2017	PPWSA, Cambodia	✓ Institutional Governance and Organization of water utility ✓ Overall activities as water supply utility ✓ Actions for problem solving （such as leadership） ✓ Whole structure of standards, guidelines, and manual, SOPs. ✓ Wrap-up Discussions; toward application in Yangon ✓ Finance ✓ Business plan of water supply utility ✓ Standard, guidelines, manuals ✓ Human resource development	10
3.	23-31/01/2018	Tokyo Waterworks Bureau, TMG	✓ Institutional Governance, and Financial Autonomy of Water Utility ✓ Planning System ✓ Fixed Asset Management and Corporate Accounting ✓ Laws and Regulations ✓ Rules (Duties and Right) on Water Supply ✓ Human Resource Development ✓ Actions to Materialize the Missions/Master Plan	9
Output 2 Distribution and NRW Management, and Billing and Collecting Management				
4.	25/09-17/10/2017	PPWSA, Cambodia	✓ NRW countermeasures as business strategy. ✓ Understand procedures and method of construction complete inspection. ✓ Understand importance of preventive measures against NRW. ✓ Meter reading, Billing, and Tariff collection ✓ Non-payment management ✓ Customer data management ✓ Role of Head Office and Branch	12
Output 3 O&M of Water Treatment Plant and Water Quality Management				
5.	12-23/03/2018	PPWSA, Cambodia	✓ Management of WTP and O&M with SOP ✓ Importance of preventive maintenance ✓ Planning of water quality monitoring. ✓ Monitoring water quality	5

List of participants;

Training Course	No	Name	Position
1. Water Supply Management (MWA, Thailand)	1	Mr. Myo Thein	Deputy Head of Department
	2	Mr. Khin Maung Phoo	Assistant Chief Engineer
	3	Mr. Nay Lin	Executive Engineer
	4	Mr. Zaw Min	Executive Engineer
	5	Mr. Than Han	Executive Engineer
	6	Ms. Aye Pa Pa Nyo	Executive Engineer
	7	Ms. Moe Moe Khine	Executive Officer (Finance)
	8	Ms. Khin San Win	Assistant Engineer
	9	Ms. Yamin	Sub-Assistant Engineer
	10	Ms. Khin Zin Mar Myint	Programmer
2. Water Supply Management (PPWSA, Cambodia)	1	Ms. May May Thwe	Committee Member
	2	Mr. Myint Oo	Head of Department
	3	Mr. Thet Lwin	Assistant Head of Department
	4	Ms. Thwe Naing Oo	Assistant Head of Department
	5	Ms. Thin Thin Soe	Executive Engineer
	6	Ms. Su Nandar Lin	Assistant Engineer

Training Course	No	Name	Position
	7	Ms. Khaing Khaing Soe	Sub-Assistant Engineer
	8	Ms. Ohmma Myint	Sub-Assistant Engineer
	9	Ms. Aye Pyae Aung	Sub-Assistant Engineer
	10	Ms. May Thet Kyaw	Accountant -3
3. "Overall Utility Management" in Japan	1	Ms. Aye Pa Pa Nyo	Assisttan Chief Engineer
	2	Ms. May Oo Lwin	Executive Engineer
	3	Mr. Pyi Soe	Executive Engineer
	4	Ms. Khin Khin Htwe	Executive Engineer
	5	Ms. Khin Than Oo	Sub-Assistant Engineer
	6	Ms. Yamin	Sub-Assistant Engineer
	7	Ms. Khin Zin Mar Myint	Programmer
	8	Ms. Nyo Nyo Tun Kyaw	Assistant Supervisor
	9	Ms. May Thet Kyaw	Accountant 3
4. Distribution and NRW Management, and Billing and Collecting Management (PPWSA, Cambodia)	1	Mr. Myo Thein	Deputy Head of Department
	2	Mr. Thant Zin Oo	Executive Engineer
	3	Ms. Aye Pa Pa Nyo	Executive Engineering
	4	Ms. Aye Aye Mar	Executive Engineering
	5	Ms. Yu Yu Hla Baw	Assistant Engineer
	6	Ms. Khin Htay Win	Assistant Engineer
	7	Ms. Nwe Ni Win	Assistant Engineer
	8	Ms. Lin Lin Chit	Sub Assistant Engineer
	9	Mr. Aung Min Oo	Sub-Assistant Engineer
	10	Ms. Win Sandar Oo	Assistant Supervisor
	11	Ms. Htwe Htwe Nu	Assistant Supervisor
	12	Ms. Ms. Win Pa Pa Soe	Account-3
5. O&M of Water Treatment Plant and Water Quality Management (PPWSA, Cambodia)	1	Mr. Myint Zaw Than	Deputy Head of Depart
	2	Mr. Zaw Win Aung	Assistant Engineer
	3	Ms. Tin Zar Lwin	Deputy Supervisor
	4	Ms. Ei Khine Mon	Assistant Engineer
	5	Ms. Thidar Su Su Khin	Sub-Assistant Engineer

V. Presentation materials presented by C/P in foreign seminars/conference

No	Title of presentation	Presented by	Month/Year	Name of seminar/conference	Venue
1	Challenges and Prospective View of the New YCDC	Ms. Hlaing Maw Oo (YCDC Secretary)	Aug 2017	Executive Forum for enhancing sustainability of urban water service in Asian region	Yokohama
2.	Issues and Challenges of Water Management in Myanmar (Yangon)	Mr. Myo Thein (DYCE)	Sep. 2018	IWA Water Congress	Tokyo
3.	Cooperative improvement of Water Treatment Plant function in Yangon City, Myanmar with Japan	Mr. Zaw Oo （AE）	Oct. 2018	JWWA Annual Research Conference	Fukuoka
4-1	Training effectiveness to retain staff members	Ms. Khin Zin Mar Myint (Assistant Officer)	Nov. 2019	JWWA Annual Research Conference	Hakodate
4-2	Improvement of water quality supply from reservoir	Mr. Zin Min Latt (SAE)			
5-1	Data management structure of Water Resources and Water Supply Authority	Ms. Thin Thin Soe (ACE)	Feb. 2020	P2P (Project to Project) Meeting	Phnom Penh, Cambodia
5-2	Water Supply Regulations, Standards, Guidelines, Manuals and SOPs	Ms. Yu Yu Hla Baw (EE)			

資料 - 4:　定例会議等の実施実績

4. Record of Regular Meetings

Table of Contents

I. Contents of Regular Meetings

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
Weekly Workshop 1	27/04/2015	01_TA_Process of Participatory Project Cycle Management	24
Weekly Workshop 2	03/08/2015	01_TA_PCM Workshop Problem 02_Planning & Finance_Problem Analysis 03_HRD_Problem Analysis 04_NRW_Causes & Effects of Problems/Issues 05_NRW_Problem Analysis 06_WQ_Problem Analysis 07_Water Treatment_Problem Analysis	36
Monthly Meeting 1	04/08/2015	ALL Outputs	19
Weekly Workshop 3	10/08/2015	01_TA_Vision Mission for YCDC 02_Planning_Problem & Objective Analysis Report 03_Planing, Guidelines_Objective Analysis Report 04_Finance_Objective Analysis Report 05_HRD_Objective Analysis Report 06_NRW_Objective Analysis Report 07_WQ_Objective Analysis Report 08_Water Treatment_Objective Analysis Report	59
Weekly Workshop 4	17/08/2015	01_TA_Sustainable management and organization in water supply (1) - Why independent and self-sufficient 02_TA_Framework of Capacity Development 03_TA_Words in Mission and Vision 04_TA_Necessary Standards&Guideline	37
Weekly Workshop 5	24/08/2015	01_TA_Sustainable management and organization in water supply (2) - How independent and self-sufficient in other water utilities- 02_TA_Benchmarking & PI 03_Planning_PI (Output 1&2) 04_Planning_PI (Output 3)	54
Monthly Meeting 2	27/08/2015	Annex 1 20150827 Process of Capacity Assessment Annex 2 DRAFT Organization of Non-Revenue Water management Unit Annex 3 Table of Contents of Baseline Survey and Capacity	37
Weekly Workshop 6	31/08/2015	01_TA_Sustainable management and organization in water supply (3) - How independent and self-sufficient in other water utilities- 02_TA_Transformation of PPWSA viewed from PIs 03_TA_Fukuoka Planning organization 04_TA_ Planning Functions of Tokyo Metropolitan Government, Bureau of Waterworks (TMWB) 05_TA_Proposal of Planning Section 06_Finance_Finance Accounting PIs 07_TA_Homework for Baseline survey	57

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
Weekly Workshop 7	05/10/2015	01_Expert_Japanese Business Trip on Kokkowa Feasibility Study 02_NRW_Township survey Analysis 03_TA_Proposed Location of Flow Meter 04_HRD_Analysis and Finding From Training Record 05_TA_Charactristics of HRD in WSD 06_TA_Standards, Guideline, Manual for Waterworks in Japan 07_CTA_PIs(3)_Performance Indicators .... Example for Comprehensive PIs	63
Weekly Workshop 8	12/10/2015	00_Agenda_Weekly Meeting 01_NRW_Homework and Township Survey Analysis 02_TA_Concept of GIS/CRM in YCDC 03_TA_Performance Indicators (PI) (4) 04_TA_Progress of Homework in Monthly Meeting	50
Monthly Meeting 3	15/10/2015	00_Planning_Japanese Business Trip on Kokkowa Feasibility Study 01_Planning_Homework Implementation (September) 02_HRD_Homework for September 03_NRW_Monthly Report (September) 04_WQ_Monthly Report (September) 05_TA_3rd Monthly Meeting	40
Weekly Workshop 9	19/10/2015	01_Planning_Progress of Activities 02_HRD_Progress of Activities 03_NRW_PIs_Setting Performance Indicators 04_Output 3_PI 05_TA_Performance Indicators (PI) (5)_Balance of 4 Perspectives	49
Weekly Workshop 10	26/10/2015	00_Agenda of Weekly Workshop 10 01_Water Environment Monitoring Report Presentation 02_NRW_PI_Sales & Collection 03_Finance_Finance & Accounting PI 04_NRW_Pilot Area Survey 05_HRD_List of ideas for training course 06_TA_Performance Indicators (PI) (6)	48
Weekly Workshop 11	30/11/2015	00_TA_Agenda_11th 01_TA_Basics Characteristics of water supply utilities 02_NRW_List of Equipment for NRW 03_TA_TOC - Baseline Survey & Capacity Assessment - 04_HRD_PI 05_WATER SUPPLY ADMINISTRATION FOR BETTER MANAGEMENT OF WATER SUPPLY SERVICES (B) __Training Report 06_NNZ_HORIBA's Analyzer Training Internship Program	58
Monthly Meeting 4	03/12/2015	01_TA_4th Monthly Meeting_Main 02_Planning_Montly Report 03_HRD_Activities in Oct & Nov 04_NRW_Township Survey Results and Pilot Area Survey 05_Finance_Monthly Report (Finance & Accounting) 06_Design of distribution flow management system(Flow meter installation)	50
Weekly Workshop 12	08/12/2015	00_TA_Agenda_12th 01_TA_Regulation for water supply utilities(Basics of water supply utilities (2) 02_Finance_Performance Indicator 03_WQ_Performance Indicator for October & November 04_WQ_Water Environment Monitoring Training Report 05_Planning_Report for LGOTP Training Program (Waterworks)	40
Weekly Workshop 13	14/12/2015	00_TA_Agenda_13th 01_TA_Asset Management and Accounting For water supply utilities (Basics of water supply utilities (3)) 02_TA_PI format_Data and Performance Indicator	45
Weekly Workshop 14	21/12/2015	00_TA_Agenda_14th	40

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		01_TA_Rate making of Water tariff_Basics of water supply utilities (4) 02_TA_Ideal Future of EDWS	
Monthly Meeting 5	22/12/2015	01_TA_Main_5th monthly meeting_rev 02_Planning_December Monthly Report of November Activities 03_WQ_Water Quality Monitoring	55
Weekly Workshop 15	18/01/2016	01_TA_Agenda & Program schedule 01_Finance_Current Situation of Finance 02_HRD_Ideal Future Image of EDWS/HRD 04_NRW_Leakage Control (D)	52
Weekly Workshop 16	19/02/2016	00_TA_Agenda & Program Schedule 01_NRW_Pilot Area Survey 02_HRD_Progress of activities 03_WTP_REPORT FOR 1ST SEMINAR OF WATER QUALITY MANAGEMENT	51
Weekly Workshop17	21/03/2016	01_TA_Agenda & Program Schedule 02_Planning_Progress of Activities 03_Finance_Why and How to make asset accounting? 04_HRD_Progress Report 05_WTP_Water treatment standards and technology 06_Laos Report	50
Monthly Meeting 6	24/03/2016	01_TA_6th Monthly Meeting 02_Planning_Monthly Report 03_Finance_Why and How to make Asset Accounting 04_HRD_Progress Report 05_NRW_Progressive of Activities on Yankin Pilot Project 06_WQ_Report on the 2nd Seminar of Water Quality Monitoring 07_TFT_Activities on Water Treatment Technology 08_Re-organization Chart of EDWS in YCDC	58
Weekly Workshop 18	04/04/2016	01_TA_Agenda & Program schedule 02_Finance_Water Supply and Electricity Supply 03_Finance_What Finance Section doing & Importance of Finance in water supply 04_NRW_Progressive of Activities on Yankin Pilot Project 05_DRAFT OF WATER QUALITY MONITORING PLAN	39
Weekly Workshop 19	23/05/2016	01_TA_Agenda & Program schedule 02_WQ_SUMMARY OF CHLORINE FACILITIES AND DISINFECTION 03_WTP_Water Treatment 04_HRD_Training Course Progress 05_TA_Customer Service & Public Relation (Part 1)	51
Weekly Workshop 20	31/05/2016	01_TA_Agenda & Program schedule 02_Planning_Progress of Activities 03_Finance_Progress of Activities 04_NRW_Progress of Homework 05_WTP_Water Treatment Plant Management using water quality data 06_TA_Customer Service & Public Relation (Part 2) 07_TA_How to cope with accumulated Burden of capital expenditure	62
Monthly Meeting 7	14/06/2016	01_TA_7th Monthly Meeting 02_Planning_Progress of PI Data collection 03_Finance_Progress of Homework 04_HRD_Report of New Staff Training 05_CS&PR_Establishment of Customer Service Division (Team A+B) 06_ NRW_Progress of Activities 07_WQ_Progress of Water Quality monitoring Plan and Report of WQ Analysis 08_Pipe repairing & laying works	52
Weekly Workshop 21	04/07/2016	01_TA_Agenda & Program schedule 02_NRW_Progress of NRW Activities 03_HRD_Progress of Activities	60

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		04_WQ_Brief Explanation of water Quality monitoring 05_WQM_Progress of Activities_Nyaungnapin WTP	
Weekly Workshop 22	11/07/2016	01_TA_Agenda & Introduction of Design Criteria for Water Supply Facilities of Japan 02_Planning_Progress of Activities 03_NRW_Preparation of Flow Meter Installation 04_WTP_Progress of Activity (Ngamoeyeik WTP)	46
Monthly Meeting 8	14/07/2016	01_TA_8th monthly meeting 02_Planning_Progress of PI monitoring and issues 03_ HRD_Progress of Activity 04_CS_Establishment of Customer Service Team 04_PR_Consideration of newsletter contents and improvement of EDWS website 05_NRW_Progress of NRW activities 06_WQ_Using Standard Operation Procedures (SOPs) in the laboratory and Nyaunghnapin WTP 07_TFT_Filter Improvement Plan for Ngamoeyeik WTP	63
Weekly Workshop 23	21/07/2016	01_TA_Agenda Program schedule 02_HRD_Previous Meeting Review 03_TA_Procurement of Equipment 04_Planning_Existing Design Criteria	48
Weekly Workshop 24	02/08/2016	00_TA_Agenda Program schedule 01_Finance_Review of previous meeting 02_HRD_Progress of Activities 03_PR_Improvement of Internal Communication 04_TA_Public Relation (3) 05_Planning_Progress of activities	28
Weekly Workshop 25	08/08/2016	00_TA_Agenda Program schedule 01_WQ_24th Meeting Record 02_NRW_Progress of NRW 03_HRD_Progress of Activities	52
Weekly Workshop 26	05/09/2016	00_TA_Agenda Program 01_NRW_25th Meeting Review 02_All Team_Utilization Plan of Reference Books 03_HRD_Plan of 2nd Training Course by HRD 04_Finance_YESC Report 05_TA Team_Computer training 06_TA Team_Training Plan 07_Yegu PS_Improvement of the Pipeline for Kabar Aye Pagoda Road and Yankin Township Management Guidance 08_Operation And Maintenance Of Urban Water Supply System and Loss of Books & Utilization 09_TFT_Activities of Task Force Team (Filter Improvement)	67
Weekly Workshop 27	12/09/2016	00_TA_Agenda Program 01_CS & PR Section_26th meeting Review 02_Planning_Progress of Activities 03_HRD_Progress of Activities 04_NRW_Utilization Plan of Referential books 05_Lagunpyin Rsvr_Report of Training in Japan 06_WQ_Operation And Maintenance Of Urban Water Supply System 07_TA Team_Procurement of Equipment and Back Hoe Training	74
Monthly Meeting 9	07/10/2016	00_8th Monthly Meeting review 01_TA_9th Monthly Meeting 02_Planning_Progress of Activities 03_HRD_Progress of Activities 04_NRW_Progress of NRW Activities 05_NRW_Progress of flow meter installation	54
Weekly Workshop 28	17/10/2016	00_TA_Agenda Program 01_Planning_27th meeting review 02_TA_Combined all PPs of Expert 03_HRD_Progress of Activities 04_Task Force Team_Progress of Activities 05_TA_Progress of procurement water quality equipment	52

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		(Phase 1)	
Weekly Workshop 29	31/10/2016	00_TA_Agenda Program 01_Finance_Review of Previous Meeting 02_HRD_Progress of Activities 03_Water Quality_Report of NNP WTP 04_WQ_Action Plan	40
Weekly Workshop 30	31/10/2016	00_TA_Agenda Program 01_Planning_Progress of Activities 02_Finance_Progress of Tariff Setting Study 03_HRD_Progress of Activities 04_ ComputerSection_Progress of e-Government on Water Tariff Collecting and Customer Data Management 05_NRW_Progress of NRW Activities 06_HRD_Improvement plan	49
Monthly Meeting 10	07/11/2016	00_9th monthly Meeting Review 03_Planning_Progress of Activities 04_NRW_Progress of NRW Activities 05_WQ_Progress of October Activities 06_TFT_Activities	72
Monthly Meeting 11	13/12/2016	00_10th monthly meeting Review 01_TA_11th monthly meeting All 02_Planning_Monthly Data Collection and Check List 03_CS_Progress of Activities 04_NRW_Progress of NRW Activities 05_WQ_Residual Chlorine Monitoring Activity 06_WTP_Activities of Water Treatment Section 07_Report on MWA Training, Thailand	52
Weekly Workshop 30	19/12/2016	00_TA_Agenda Program 01_CS&PR_Review of Previous Meeting 02_Finance_Activities of Progress 03_NRW_Actioin Plan 04_ Customer Service_Progress of e-Government on Water Tariff Collecting and Customer Data Management 05_NRW_Progress of NRW Activities 06_HRD_Training Report_Water Supply Administration for Better Management of Water Supply Services	49
Weekly Workshop 31	19/12/2016	00_TA_Agenda Program 01_CS&PR_Review of Previous Meeting 02_Finance_Activities of Progress 03_NRW_Actioin Plan (Training Program on Non Revenue Water Management (Leakage Control) (C)) 04_Planning_Proposal for Manual Books of Window & MS_rev 05_Proposals for PC from each section	46
Weekly Workshop 32	26/12/2016	00_TA_Agenda Program 01_NRW_Review of Previous meeting 02_Planning_Progress Activities 03_HRD_Outline of YTU Lecture 04_HRD_Review of MWA Training 05_CS_Making Guideline on Billing & Collection 06_PR_Progress Activities 07_TA_Preparation small laboratory 08_GIS_Outline of GIS Seminar & GIS Utilization in EDWS	43
Weekly Workshop 33	09/01/2017	00_33rd Agenda 20170109 01_Review of 32nd Weekly Meeting Record 02_WQ_Preparation small laboratory 03_HRD_Activities 04_Taskforce_Sieving machine Presentation 05_Report of Japan training and Action Plan	34
Monthly Meeting 12	07/02/2017	00_TA_Main_12th_agenda_rev1 01_11th monthly meeting {Record} by Customer Service Team 02_Review of PPWSA 03_Planning_Progress of Activities and Review of JCC on necessary Plans and Rules(RSGMs)	38

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		04_Finance_How to make plan, Guideline and Activities for next three months 05_HRD_Monthly Report 06_CS_Next three months activities 07_PR_Planning for PR Section	
Monthly Meeting 13	29/03/2017	00_TA_Main_13th_agenda 01_NRW_12th monthly meeting {Record} 02_NRW_Progress of Activities 03_Planning_Progress of activities 04_HRD_Progress of activities_D KZMM	64
Monthly Meeting 14	26/05/2017	01_TA_14th monthly Meeting Expert Main 02_13th Monthly meeting record by output-3(Water treatment Section) 03_Planning_Progress Activities 04_Finance_Progress of Activities 05_HRD_Progress of Activities 06_PR_Progress of Activities 07_CS_Data from Survey in Townships and D&R of New Expert 08_NRW_Progress Report 09_WT_baseline report 10_WQ_Progress of Activities 11_TFT_SLUDGE REMOVAL RECORD PP	49
Monthly Meeting 15	23/06/2017	01_TA_15th monthly Meeting Expert Main 03_Planning_Planning & Regulation progress report 04_Finance_Progress of activities 05_HRD_Progress of Activities 06_CS_Data from survey in Townships and D&R 07_PR_Progress of Activities 08_NRW_Progress of report 09_TFT_ Progress of report 10_TFT_Sludge removing 11_TFT_Gyophu Improvement 12_WQ_ACTION PLAN OF CENTRAL LABORATORY 13_WQ_Progress & Plan Activities of Water Quality Management	51
Weekly Workshop 34	05/07/2017	01_TA_34th Weekly Meeting Expert Main 02_CS_Case_in_tokyo 03_Finance_Progress of Activities	35
Weekly Workshop 35	17/07/2017	01_Meeting review_Financne 02_TA_35th Weekly Meeting Expert Main 03_Planning_Progress of Activities 04_HRD_Progress of Activities_NNTK 05_NRW_Progress of Activities_KZH	46
Monthly Meeting 16	27/07/2017	01_Finance_15th meeting review 02_TA_16th monthly Meeting Expert Main final 03_Planning_Progress of Activities 04_HRD_Progress of Activities 05_PR_Progress of Activities 06_NRW_Progress 07_WQ_Report of Progress of Activities	56
Monthly Meeting 17	09/08/2017	01. HRD_16th Meeting Review by HRD 02. TA_17th monthly Meeting Expert Main final 03. Planning_Progress 04. HRD_OJT 05. Finance_Progress of Activities 06. NRW_progress of activities and future plan 07. Gyophu Improvement_U ZML 08. Removing sludge	65
2nd Half Monthly Meeting	28/09/2017	1_1st Half Monthly Meeting Review 2_ TA_2nd monthly Meeting Expert Main 3_HRD_Progress of activities 4_WTP_Progress of Sludge Removing at NNP WTP 5_WTP_Comparison of ACH & PAC Report 6_WQM_Review the residual chlorine monitoring results	-

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		7_WQM_Japan Training Report 8_Planning_TrainingReport_Operation and maintenance of Urban Water Supply system	
3rd Half Monthly Meeting	15/11/2017	00_TA_3rd HMM Expert Main 01_Review of 2nd half monthly meeting 02_Planning_Progress of Activities_Daw Khin San Win 03_Finance_Review of Finance Seminar 04_HRD_Progress of activities 05_CS_Overdue Manag_D. LLC 06_NRW_progress of activities 07_Reservoir_direct filter 07_Reservoir_Gyophu Improvement 6_U ZML 09_Finalization of Management Plan_ACE_ DawTTSoe 10_NRW_Progress and Schedule of Steering Committee-1_Daw HHN10_NRW_Progress and Schedule of Steering Committee-1 11_Schedule of preparation, table of content of NRW MP, and Key points of Recommendation for PPWSA report 12_Reservoir_Inspection of Kiosk and Flow meter chamber	65
Monthly Meeting 10	26/11/2017	01_TA_10th monthly meeting All 02_HRD_Progress of Activities	-
4th Half Monthly Meeting	06/12/2017	00_TA_4th HMM Expert Main 1. Review of 3rd half monthly meeting 02_HRD_Progress of Activities 03_Finance_Progress of Activities 04_PR_Progress of Activities 05_NRW_Progress of Activities 06_WQ_Progress of Activities 07_Improvement Plan Presentation by U Aung Ko Oo	56
5th Half Monthly Meeting	16/01/2018	00_TA_5th HMM Expert Main_rev 01_Review of previous meeting 2.1_Planning_Progress of Activities 2.2 Customer Service_Progress of Activities 2.3_NRW_Progress of activities 2.4. Progress of RPF 2.5_WQ_Progress of Activities 03_Preparation of Chlorination in YCDC	35
6th Half Monthly Meeting	08/03/2018	00_TA_6th HMM Expert Main 01_Review of 5th half monthly meeting(TFT) 02_HRD_Progress of Activities 03_Planning_Progress of Activities 04_PR_Progress of Activities 05_Customer Service_Progress of Activities 06_CS_Complaint sheet_sample 07_TA_Issues to be share_Mr Saitou 08_Report of Training in Tokyo 09_Report of Training in PPWSA 10_Report of Training in PPWSA	39
7th Half Monthly Meeting	23/05/2018	00_TA_7th HMM Expert Main 01_Planning_Review of 6 half monthly meeting 02_Planning_Progress_Daw Khin San Win 03_HRD_Progress_Daw Nyo NYo Tun Kyaw 04_CS_Progress 04_NRW_Progress of activities 06_WTS_ACH Jartest of Nyaungnapin WTP 07_WTS_Plan for Sludge Management 08_WTS_Gyophu Filtration Procedure 09_WQ_Review Small lab data	54
8th Half Monthly Meeting	07/06/2018	00_TA_8th HMM Expert Main 01_Finance_Meeting Review 02_HRD_Progress report 03_NRW_Minimum night flow test 04_WTS_Gyophu Filtration Procedure1(Reservoir)_U ZML 05_WQ_Progress Report_ 06_TA_Residual Chlorine	63

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
9th Half Monthly Meeting	09/07/2018	00_TA_9th HMM Expert Main 01_Review_HRD 02_Planning_Progress_D KSW 03_Finance_Progress_D MTK 04_Customer Service_Progress_D WPPS 05_NRW_Progress_U Kaung Htet Zaw 06_WTP_Pilot Basin Operation_U Thit Lwin 07_RSGM_WG - 3_Daw May Myat Thaw 08_Heroshima Training_water quality_Daw Thandar Myat	45
10th Half Monthly Meeting	24/08/2018	00_TA_10th HMM Expert Main 01_CS_Review 01_WTP_Phase one sludge level_U Thit Lwin 02_WT_Gyophu Filtration Operation3 03_WQ_Progress_D. NNZ 04_WT_Making SOP_U Zaw Win Aung 06_PR_Progress_Daw Ohmar Aung 07_NRW_Progress 07_NRW_Progress	62
11th Half Monthly Meeting	20/09/2018	00_TA_11th HMM Expert Main 01_Review by NRW 02_Planning_MTP-Major activity_DKSW 03_Pipe 3_Japan Training Report_U Tun Tun Hlaing 04_TA_11th HMM Expert Main_all	61
12th Half Monthly Meeting	14/12/2018	00_TA_12th HMM Expert Main 01_Review_Water Quality 02_Planning_Progress 03_WG 3-1 (Regulations)_Progress 04_Finance_Progress 05_HRD_Progress 06_CS_New Database Management_D. WPPS 07_ NRW_Progress 08_Direct Filtration_Progress	61
13th Half Monthly Meeting	18/01/2019	00_TA_13th HMM Expert Main 01_Review of 12th HMM 02_Planning 03_Activities of Progress 04_Progress of WQ 05_Pilot Project training plan	57
14th Half Monthly Meeting	20/02/2019	00_TA_13th HMM Expert Main 01_Review of 13half monthly meeting 02_Progress of HRD 03_Progress of PR 04_Progress of activities 05_Gyophu Filtration Operation 06_SOP PRESENTATION	50
15th Half Monthly Meeting	17/05/2019	RSGM Progress of Activities TA Request to make notes for Regulation Planning Section SOP Progress HRD Progress of Activities Finance Progress of Activities	43
16th Half Monthly Meeting	18/06/2019	Planning Progress of Activities SC3 RSGM Progress of Activities Finance Growing City & Accumulation of Loan HRD Progress of Activities PR Progress of Activities NRW Progress of Yankin Pilot Project Water Quality Progress of Activities Transmission and Distribution Management Progress of Procurement Equipment	49
17th Half Monthly Meeting	09/07/2019	CS Progress of Activities NRW Progress of Activities TFT Pilot filter improvement and report (one-year research) Comparison of Turbidity Meters	35
18th Half Monthly Meeting	06/08/2019	Planning Progress of Activities Regulation Progress of Activities	46

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		CS New Customer Database HRD Progress of Activities NRW Progress of Yankin Pilot Project Water Quality Training Report	
19th Half Monthly Meeting	28/08/2019	CS Meter Reading & Collection Work Manual Yegu Full scale application of SOPs Report of Training in Japan (D Thiri Aung Latt) Report of Training in Japan (D Thida Su Su Khin) Report of Training in Japan (U Saw Sein Aye) Progress of installation of flow monitoring system	39
20th Half Monthly Meeting	01/10/2019	HRD Progress of Activities NRW Progress of Activities	33
21st Half Monthly Meeting	20/11/2019	Progress of Planning Section Conference Report; HRD Conference Report. Reservoir water treatment	33
22nd Half Monthly Meeting	17/12/2019	Overview of Task Force Team (Improvement of filtration basin in NNP WTP) PR Progress of Activities Transmission and Distribution Progress of Activities Progress of Flow Monitoring System Installation Preparation for Terminal Evaluation and AC member visit	39
23rd Half Monthly Meeting	05/03/2020	Progress of Activities (HRD, Planning, CS, Regulation, PR, NRW, GIS, WQ) New Chlorination facilities Confirmation of Recommendations – Terminal Evaluation of TA project	40
24th Half Monthly Meeting (Video Conference)	19/08/2020	Decision of JICA on the project and proposed schedule by Experts Progress of activities and impact of COVID-19 to the progress by - Planning section - Finance section - HRD section - Public Relation Section - Customer Service section - NRW management section - Water Quality Monitoring section - Taskforce team - Water Treatment Section Remaining activities and outputs (Plans, reports, etc) and schedule by Experts	38
25th Half Monthly Meeting (Video Conference)	17/09/2020	Monitoring activities of Mid-term Plan by Planning Section Progress of implementation of HRD plan by HRD section Progress of future plan of Customer Service Management section by SCMS Progress of NRW management plan by NRW management Section Progress of Water Quality Management Plan by Water Treatment Section and Central laboratory Activities of Transmission and Distribution Management Section	40
26th Half Monthly Meeting (Video Conference)	04/11/2020	Progress of Water Quality Management Plan Activities of Transmission and Distribution Management Section Status Water Supply Regulations Status of SOP for all sections Status of Sop/Manuals for NRW management Status of Sop/Manuals for WQ management Research Report of Master Course (D Ei Khai Mon) Research Report of Master Course (D Khai Khai Soe)	49
27th Half Monthly Meeting (Video Conference)	22/12/2020	Financial Results in 2019/20 FY (Finance Section) Progress of trial of new customer database and expansion plan Progress of HRD (HRD section) Progress of NRW management Plan, Online Training materials, TOT	51

Meeting Name	Meeting Date	Title of Presentation	No. of Participants
		Progress of Water Quality Management Plan Activities of Transmission and Distribution Management Section COVID-19 response activities by JICA Myanmar Office Other Business – Extension of JICA TA Project, New activities (PPP) and new expert, Next JCC	

II. Summary of the Number of Participants

（1） Weekly Workshop and Meetings

No.	Date	Number of attendance
1	27.7.2015	24
2	3.8.2015	36
3	10.8.2015	56
4	17.8.2015	37
5	24.8.2016	54
6	31.8.2015	57
7	5.10.2015	63
8	12.10.2015	50
9	19.10.2015	49
10	26.10.2015	48
11	30.11.2015	58
12	8.12.2015	40
13	14.12.2015	45
14	21.12.2015	40
15	18.1.2016	52
16	19.2.2016	51
17	21.3.2016	50
18	4.4.2016	39
19	23.5.2016	51
20	31.5.2016	62
21	4.7.2016	60
22	11.7.2016	46
23	21.7.2016	48
24	2.8.2016	28
25	8.8.2016	52
26	5.9.2016	67
27	12.9.2016	74
28	17.10.2016	52
29	31.10.2016	40
30	5.12.2016	49
31	19.12.2016	46
32	26.12.2016	43
33	9.1.2017	34
34	5.07.2017	35
35	17.07.2017	46
		1,682

（2） Summary of the Number of Participants of Monthly Meetings

No.	Date	Number of attendance	Remarks
1	4.8.2015	19	Monthly
2	27.8.2015	37	Monthly
3	15.10.2015	40	Monthly
4	4.12.2015	50	Monthly
5	22.12.2015	55	Monthly
6	24.3.2016	58	Monthly
7	14.6.2016	52	Monthly
8	14.7.2016	63	Monthly
9	7.10.2016	54	Monthly
10	7.11.2016	72	Monthly
11	13.12.2016	52	Monthly
12	9.2.2017	38	Monthly
13	28.03.2017	64	Monthly
14	25.05.2017	49	Monthly
15	21.06.2017	51	Monthly
16	27.07.2017	56	Monthly
1	09.08.2017	65	Half monthly
2	28.09.2017	53	Half monthly
3	15.11.2017	65	Half monthly
4	06.12.2017	56	Half monthly
5	16.01.2018	35	Half monthly
6	08.03.2018	39	Half monthly
7	23.05.2018	54	Half monthly
8	07.06.2018	63	Half monthly
9	12.07.2018	45	Half monthly
10	24.08.2018	62	Half monthly
11	20.09.2018	61	Half monthly
12	14.12.2018	61	Half monthly
13	18.01.2019	57	Half monthly
14	20.02.2019	50	Half monthly
15	17.05 2019	43	Half monthly
16	18.06.2019	49	Half monthly
17	09.07.2019	35	Half monthly
18	06.08. 2019	46	Half monthly
19	28.08.2019	39	Half monthly
20	01.10.2019	33	Half monthly
21	20.11.2019	33	Half monthly
22	17.12.2019	39	Half monthly
23	05.03.2020	50	Half monthly
24	19.08.2020	38	Half monthly
25	17.08.2020	40	Half monthly
26	04.11.2020	49	Half monthly
27	22.12.2020	51	Half monthly
Total (43)		2,121	

資料－５： 供与機材・携行機材実績

5. Record of Equipment and Materials Procured

Table of Contents

I. Output 1

(1) Equipment list

No.1-1 Equipment for local offices for collection of electric data and calculation of PIs (Part 1)

Place of installation: Computer section of WRAWSA

Date of handover: 24 Aug. 2016

No.	Item	Qty
1	Personal computer (Desktop)+UPS	59
2	Printer (laser, A4) for local stations	49
3	Copy machine (A3 color) for training room	1
4	MS office	59
5	Anti-virus software	59
6	USB stick	49
7	Consumable (laser A4)	49
8	Consumable (copy machine tonner, drum cartridge	1

No.1-2 Equipment for local offices for collection of electric data and calculation of PIs (Part 2)

Place of installation: Computer section of WRAWSA

Date of handover: 20 Feb. 2017

No.	Item	Qty
1	Personal computer (desktop) and UPS	5
2	Personal computer (laptop)	8
3	Printer (laser, black & white, A4) for local stations	1

No.1-3 Manuals and reference books (PC related) (Long term expert procurement)

Place of installation: Computer section of WRAWSA

Date of handover: 9 Feb. 2017

No.	Item	Qty
1	Microsoft Office Ward 2016	60
2	Microsoft Office Excel 2016	60
3	Microsoft Office Power point 2016	60
4	Using Windows 8	60

No.1-4 GIS software

Place of installation: GIS section of WRAWSA

Date of handover: 23 Feb. 2017

No.	Item	Qty
1	ArcGIS software	1

No.1-5 Auto CAD software

Place of installation: GIS section of WRAWSA

Date of handover: 21 Mar. 2017

No.	Item	Qty
1	Auto Cad 2017 LT	2

No.1-6 Flow monitoring system (JICA procurement)

Place of installation: 9 sites in Yangon waterworks facilities

Date of confirmation of package (at YCDC): 23 Aug. 2018

No.	Item	Qty
1	Fixed ultrasonic flow meter	
1-1	Flowmeter main unit (UFL-30)	21
1-2	Transducers with 5m cable (SE044040NC)	42
1-3	Mounting fixtures for transducers	21
1-4	Coaxial Cable 20m 5C-2WAE	2
1-5	Coaxial Cable 30m	4
1-6	Coaxial Cable 40m	2
1-7	Coaxial Cable 50m	2
1-8	Coaxial Cable 60m	2
1-9	Coaxial Cable 70m	2
1-10	Coaxial Cable 100m	2
1-11	Coaxial Cable 110m	2
1-12	Coaxial Cable 120m	2
1-13	Coaxial Cable 130m	4
1-14	Coaxial Cable 140m	2
1-15	Coaxial Cable 150m	4
1-16	Coaxial Cable 170m	4
1-17	Coaxial Cable 210m	2
1-18	Coaxial Cable 240m	4
1-19	Coaxial Cable 270m	2
1-20	Documents of Ultrasonic Flowmeter	1
1-21	Coaxial Cable 300m for the existing Ultrasonic Flowmeter	1
1-22	Coaxial Cable 220m for the existing Ultrasonic Flowmeter	1
1-23	Coaxial Cable 750m	1

No.	Item	Qty
1-24	Scotch Cast	40
2	Field data collection system	
2-1	Enclosure (cabinet)	9
2-2	Remote Terminal Unit (RTU)/Model: DLM	9
2-3	Uninterruptible Power Supply (UPS)/Model: APC Smart UPS RT1000	9
2-4	GPRS/GSM Router/Model: RV50	9
2-5	Automatic Voltage Regulator (AVR)/Model: SVC-234.3	9
2-6	Isolation Transformer (IT)/Model: TF425376	9
2-7	Power Supply Cables/Model: CA-1757-P001-00	23
2-8	Signal Cables/Model: CA-1757-S001-00	23
3	Central data collection system	
3-1	PC/Model: Precision Tower 3420	1
3-2	Monitor	1
3-3	Notebook PC/Model: Latitude 5580	1
3-4	Uninterruptible Power Supply (UPS)/Model: APC Smart UPS RT1000	1
3-5	Battery pack/Model: SURT48XLBP	1
3-6	GPRS/GSM Router/Model: RV50	1
3-7	Automatic Voltage Regulator (AVR)/Model: SVC-234.3	1
3-8	Color Laser Printer/Model: M552dn	1
3-9	Table	1
3-10	Chair	1

(2) Handover document

Handover document: Attachment 1

No.	Number and name of equipment procurement	Procurement by	Handover document
1-1	Equipment for local offices for collection of electric data and calculation of PIs (Part 1)	Consultant	Yes
1-2	Equipment for local offices for collection of electric data and calculation of PIs (Part 2)	Consultant	Yes
1-3	Manuals and reference books (PC related)	Long term expert	Yes
1-4	GIS software	Consultant	Yes
1-5	Arc GIS software	Consultant	Yes
1-6	Flow monitoring system	JICA	Confirmation report of package

II. Output 2

(1) Equipment list

No.2-1 Equipment related to NRW management (Excavator)

Place of installation: Yegu PS

Date of handover: 20 Sep. 2016

No.	Name of Item	Qty
1	Back Hoe	1

No.2-2 Equipment and materials for NRW management (JICA procurement)

Please of installation: site of work of NRW management

Date of hand over:

No.	Name of Item	Qty
1	Water Pipe Camera NH-40 and accessories	1
2	Water Pipe Drilling Machine A2SA2-15 and accessories	1
3	Water Leakage Survey Instrument LC-2500	1
4	Tee with Valve	
4-1	TN-65VS 10inch x 150mm	2
4-2	TN-65VS 150mm x 75mm	2
5	Gate Valve Ductile	
5-1	Flange type 150	3
5-2	Flange type 100	1
5-3	Flange type 75	3
6	Gate Valve	
6-1	Type for PVC 150	9
6-2	Type for PVC 100	15
6-3	Type for PVC 75	5
6-4	Type for PVC 50	3
7	Gate Valve Case	
7-1	Gate Valve Case NVKNS-15G-39LU	20
7-2	Bottom Plate A-1	20
8	Ductile Iron Deformed Pipe	
8-1	Type K Flanged Socket 150	4
8-2	Type K Flanged Socket 100	2
8-3	Type K Flanged Socket 75	2
8-4	Type K Flanged Spigot 150	6
8-5	Type K Flanged Spigot 100	2
8-6	Type K Flanged Spigot 75	2
8-7	Double Flanged Pipe 150 x 300L	2
8-8	Double Flanged Pipe 150 x 400L	2
8-9	Double Flanged Pipe 100 x 400L	1
8-10	Double Flanged Pipe 75 x 400L	3
8-11	Double Flanged Pipe 75 x 250L	2
8-12	Double Flanged Pipe 75 x 150L	2
9	Ductile Iron Straight Pipe	
9-1	Type K-1 150 x 5000L	80
9-2	Type K-1 100 x 4000L	3
9-3	Type K-1 75 x 4000L	8
10	Push Ring, Rubber Ring, T-bolt	
10-1	Push Ring, Rubber Ring, T-bolt set 150	90
10-2	Push Ring, Rubber Ring, T-bolt set 100	5
10-3	Push Ring, Rubber Ring, T-bolt set 75	15
11	Ductile Iron Deformed Pipe	
11-1	Type K Bend 90° 150	5
11-2	Type K Bend 45° 150	10

No.	Name of Item	Qty
11-3	Type K Bend 45° 100	4
11-4	Type K Bend 45° 75	12
11-5	Type K Bend 221/2° 150	8
11-6	Type K Bend 221/2° 75	10
11-7	Type K Bend 111/4° 150	10
11-8	Type K Bend 111/4° 75	4
11-9	Type K S-shape Bend 150 x 300	4
11-10	Type K S-shape Bend 100 x 300	2
11-11	Type K S-shape Bend 75 x 300	6
11-12	Type K Tee 150 x 100	1
11-13	Type K Tee 150 x 75	3
11-14	Type K Collar 150	4
11-15	Type K Collar 100	2
11-16	Type K Collar 75	4
12	Push Ring for Ductile Iron Pipe	
12-1	Push Ring set TN-30W 150	40
12-2	Push Ring set TN-30W 100	20
12-3	Push Ring set TN-30W 75	30
13	Ductile Iron Deformed Pipe	
13-1	Blank Flange 150	2
13-2	Blank Flange 100	1
13-3	Blank Flange 75	3
14	Flange Packing	
14-1	Flange Packing 150	15
14-2	Flange Packing 100	15
14-3	Flange Packing 75	15
15	Bolt and Nut SUS304 M16 x 75	200
16	Gate Valve Case	
16-1	Gate Valve Case NVKNS-15G-37LU	21
16-2	Bottom Plate A-1	21
17	Sluice Valve	
17-1	WN 50	8
17-2	WN 40	5
17-3	WN 30	5
17-4	WN 25	15
17-5	WN 20	600
18	Polyvinyl Chloride Pipe Joint	
18-1	Tee Type-B 150×150	1
18-2	Tee Type-B 150×100	3
18-3	Tee Type-B 150×50	1
18-4	Tee Type-B 100×100	2
18-5	Tee Type-B 100×75	4
18-6	Tee Type-B 100×50	3
18-7	Tee Type-B 75×50	4
19	Polyvinyl Chloride Pipe Joint	
19-1	VS Joint 150 x 100	1
19-2	VS Joint 100 x 75	1
20	Polyvinyl Chloride Pipe Joint	
20-1	Tee Type-F 150 x 75	1
20-2	Tee Type-F 100 x 75	1
21	Ball Lever Type Repair Valve 75 x 100	2
22	Fire Hydrant	2
23	Fire Hydrant Case	
23-1	Fire Hydrant Case H=780	2
23-2	Ductile Iron lid MR-1G-10L	2
24	Polyvinyl Chloride Pipe and Joint	
24-1	Rubber Socket Pipe HI 150 x 5m	5
24-2	Rubber Socket Pipe VP 150 x 5m	115
24-3	Rubber Socket Pipe VP 100 x 5m	225
24-4	Rubber Socket Pipe VP 75 x 5m	40
24-5	Rubber Socket Pipe VP 50 x 5m	30
24-6	Bend 45° HI 150	6
24-7	Bend 221/2° HI 150	6

No.	Name of Item	Qty
24-8	Bend 45° VP 150	10
24-9	Bend 221/2° VP 150	10
24-10	Bend 111/4° VP 150	10
24-11	Bend 45° VP 100	20
24-12	Bend 221/2° VP 100	30
24-13	Bend 111/4° VP 100	30
24-14	Bend 45° VP 75	10
24-15	Bend 221/2° VP 75	10
24-16	Bend 111/4° VP 75	10
24-17	Bend 45° VP 50	6
24-18	Bend 221/2° VP 50	6
24-19	Bend 111/4° VP 50	4
25	Metal Fitting for Joining Polyvinyl Chloride Pipe	
25-1	TH-30L 150	30
25-2	TH-30L 100	50
25-3	TH-30L 75	20
25-4	TH-30L 50	20
26	Polyvinyl Chloride Pipe Joint Bend	
26-1	Bend VK-00B 150×45°	15
26-2	Bend VK-00B 150×22 1/2°	12
26-3	Bend VK-00B 100×45°	15
26-4	Bend VK-00B 100×22 1/2°	15
26-5	Bend VK-00B 100×11 1/4°	10
26-6	Bend VK-00B 75×45°	6
26-7	Bend VK-00B 75×22 1/2°	6
26-8	Bend VK-00B 75×11 1/4°	6
26-9	Bend VK-00B 50×45°	4
26-10	Bend VK-00B 50 x 22 1/2°	4
26-11	Bend VK-00B 50 x 11 1/4°	4
27	Polyvinyl Chloride Pipe Joint VS Joint	
27-1	VS Joint 150	5
27-2	VS Joint 100	8
27-3	VS Joint 75	6
27-4	VS Joint 50	6
28	Different Pipe Joint	
28-1	SHINO Flex 150	4
28-2	SHINO Flex 100	5
28-3	SHINO Flex 75	4
28-4	SHINO Flex 50	4
29	Polyvinyl Chloride Pipe Joint VS Cap	
29-1	VS Cap 150	2
29-2	VS Cap 100	1
29-3	VS Cap 75	3
29-4	VS Cap 50	4
30	Saddle Snap Tap	
30-1	WXD150X Size20	5
30-2	WXVS150X Size20	32
30-3	WXVS150X Size25	5
30-4	WXVS100X Size20	120
30-5	WXVS100X Size25	10
30-6	WXVS100X Size30	5
30-7	WXVS100X Size40	5
30-8	WXVS75X Size20	50
30-9	WXVS75X Size25	5
30-10	WXVS50X Size20	30
30-11	WXVS50X Size25	5
31	Socket for Tap and Stop Valve	
31-1	1SS Size20	245
31-2	1SS Size25	25
31-2	1SS Size30	5
31-4	1SS Size40	5
32	Polyethylene Pipe Metal Joint	
32-1	10S Size20	250

No.	Name of Item	Qty
32-2	10S Size25	10
33	Stop Valve Case F Size25	
33-1	Stop Valve Case 125 x 400	5
33-2	Stop Valve Case 100 x 380	310
34	Check Valve	5
35	SGP-PB Pipe Joint	
35-1	PQWK Ni φ25mm	15
35-2	PQWK P φ25mm	5
35-3	PQWK L φ20mm	30
35-4	PQWK T φ20mm	10
35-5	PQWK S φ20mm	20
35-6	PQWK L φ25mm	45
35-7	PQWK RT φ25mm x 20mm	10
35-8	PQWK S φ25mm	20
35-9	PQWK L φ30mm	20
35-10	PQWK RT φ30mm x 25mm	5
35-11	PQWK RT φ30mm x 20mm	15
35-12	PQWK S φ30mm	20
35-13	PQWK L φ40mm	20
35-14	PQWK RT φ40mm x 25mm	5
35-15	PQWK RT φ40mm x 20mm	15
35-16	PQWK S φ40mm	15
35-17	PQWK L φ50mm	15
35-18	PQWK RT φ50mm x 30mm	2
35-19	PQWK RT φ50mm x 25mm	5
35-20	PQWK RT φ50mm x 20mm	10
35-21	PQWK S φ50mm	15
36	Sluice Valve Opener	2
37	Polyethylene Pipe Joint	
37-1	1S Size20	45
37-2	1S Size25	20
37-3	1S Size30	5
37-4	1S Size40	5
37-5	1L Size20	36
37-6	1L Size25	10
37-7	1L Size30	4
37-8	1L Size40	4
38	Polyethylene Pipe Joint 1VSP Size20	24
39	Polyethylene Pipe	
39-1	Double Layer Pipe 20 x 120M	8
39-2	Double Layer Pipe 25 x 30M	1
39-3	Double Layer Pipe 30 x 30M	1
39-4	Double Layer Pipe 40 x 20M	1
40	Polyvinyl Chloride Pipe	
40-1	VP13	20
40-2	VP20	150
40-2	VP25	5
41	Polyvinyl Chloride Pipe Joint	
41-1	TS S20	1200
41-2	TS S30	10
41-3	TS S40	10
41-4	TS S50	10
41-5	TS L20	1200
41-6	TS L25	20
41-7	TS L30	10
41-8	TS L40	10
41-9	TS L50	10
41-10	TS T20	50
41-11	TS T30	5
41-12	TS T40	5
41-13	TS T50	5
41-14	TS RS25 x 20	50
41-15	TS RS30 x 20	5

No.	Name of Item	Qty
41-16	TS RS40 x 30	5
41-17	TS RS50 x 40	5
42	Union Joint	
42-1	WJT-GVS Size20	900
42-2	WJT-GVS Size25	30
42-3	WJT-GVS Size30	5
42-4	WJT-GVS Size40	5
42-5	WJT-GVS Size50	16
43	Polyethylene Pipe Socket pipe WPE 75×5M	35
44	Polyethylene Pipe Joint MP-98PV Size75	2
45	Polyethylene Pipe EF Socket Size75	5
46	Polyethylene Pipe Joint MP-98P Size75	5
47	Polyethylene Pipe Tee MP-98TB Size75×75	1
48	Polyethylene Pipe Gate Valve PTC B22 φ75	1
49	Polyethylene Pipe Cap MP-98C Size75	1
50	Polyethylene Pipe Joint	
50-1	MP-98B Size75 x 45°	3
50-2	MP-98B Size75 x 22 1/2°	4
51	EF Saddle with Plug φ75 x φ20	20
52	Polyethylene Pipe Joint TP-30 Minute Faucet Socket Size20	20
53	Polyethylene Pipe Joint TP-30 Socket Size20	10
54	Polyethylene Pipe Joint TP-30 Union Socket Size20	20
55	Polyethylene Pipe Joint TP-30 Socket for PVC Size20	10
56	Polyethylene Pipe Joint TP-30 Union Elbow60° Size20	5
57	Scraper for Polyethylene Pipe PE Scraper75	1
58	Plane for Resin	
58-1	PK-01	1
58-2	PKE01(2pc／Unit)	10
59	Cutter for Polyethylene Pipe	
59-1	PEI-100	1
59-2	PEE150	10
60	EF Controller and accessories	
60-1	EF controller MSA2.0	1
60-2	Clip for 4.7mm	1
60-3	Plug WF8430	1
61	EF Saddle Drilling Machine Type-2N	1
62	Ductile Iron Flange	
62-1	Ductile Iron Flange 150 x 100	2
62-2	Ductile Iron Flange 100 x 75	2
63	Joining Fixture for Polyvinyl Chloride Pipe	
63-1	Type-100	2
63-2	Type-150	2
64	Engine Pump and accessories	
64-1	Engine pump STR-201	2
64-2	Hose φ50mm×10m	4
64-3	Hose φ50mm×5m	4
64-4	Strainer	2
64-5	Coupling	6
64-6	Hose Band	6
65	Water Meter NKDA20mm with accessories	310
66	Meter Union for Galvanized Steel Pipe WJT-MO Size20	310
67	Expansion Joint for Repairing	
67-1	Expansion Joint for Repairing φ20	20
67-2	Expansion Joint for Repairing φ30	5
67-3	Expansion Joint for Repairing φ40	5
67-4	Expansion Joint for Repairing φ50	10
68	Clamp for Repairing	
68-1	C-25ES	5
68-2	C-40ES	5
68-3	C-50ES	5
68-4	C-80ES	3
68-5	C-100ES	3
69	Water Stopper for Polyvinyl Chloride Pipe VP Stopper 50mm	5

No.	Name of Item	Qty
70	Electromagnetic Flowmeter	
70-1	ETM3070C Size150mm	2
70-2	Exam Result	2
70-3	Connecting Pipes	2
71	Lubricant V-Soap 2kg	10
72	Adhesive for Polyvinyl Chloride Pipe 500G	40
73	Draining Canvas Hose HL-250	1
74	Pulse Data Logger	
74-1	LR5061	5
74-2	LR5091	1
74-3	USB Cable	1
74-4	Software	1
75	Dust and Water Proof Case AD15-10-8（Special processed）	5
76	Color Cone	
76-1	700H Model Number8Y0129	30
76-2	Cone Rod φ34 L=1.5m Model Number8Y1067	30
77	Lubricant for Ductile Iron Pipes 2kg	10
78	Wheelbarrow	3
79	Torque Wrench	2
80	Saddle Snap Tap	4
81	Polyvinyl Chloride Pipe Joint VC joint 150	3
82	Iron Cover for Electromagnetic Flowmeter Case	3
83	Iron Cover for Electromagnetic Flowmeter Case	3
84	Portable Ultrasonic Flowmeter UFP-20 and Small / Large sensor set	
84-1	Portable Ultrasonic Flowmeter UFP-20	1
84-2	Small sensor set	1
84-3	Large sensor set	1
84-4	Silicon Grease Couplant	3
85	SGP-PB Straight Pipe	
85-1	φ20mm、L=4.0m	14
85-2	φ25mm、L=4.0m	7
85-3	φ30mm、L=4.0m	21
85-4	φ40mm、L=4.0m	10
85-5	φ50mm、L=4.0m	5
86	Check Valve F Sise20	310
87	Resin Pipe Detector NPL-100 and accessories	
87-1	NPL-100	1
87-2	Adapter	1
87-3	Exam result	1
88	Metal Detector F-90M	1
89	Resin Pipe Water Leakage Detector	
89-1	Model D305	1
89-2	Conversion Plug Type-B	2
90	Hammer Drill	
90-1	Model HM1812（200V）	2
90-2	Parts Number A-21319 29×410mm	4
90-3	Parts Number A-21375 28×410mm	6
90-4	Plug WF8430	2
91	Rammer MT-77HRL	1
92	Plate Compactor	1
93	Concrete Cutter and accessories	
93-1	Concrete cutter MCD-218CEH	1
93-2	18MW-RAC	3
94	Generator EF5500iSDE	1
96	Ductile Iron Deformed Pipe	
96-1	Type-K Flanged Socket 10k RF 150	2
96-2	Type-K Flanged Spigot 10k RF 150	2

No.2-3 Equipment and materials for NRW training yard (JICA procurement)

Site of installation: NRW training yard

Date of handover:

No.	Name of Item	Qty
1	Saddle Snap tap	
1-1	Saddle Snap Tap 75×20	5
1-2	Saddle Snap Tap 100×20	20
1-3	Saddle Snap Tap 100×25	10
1-4	Saddle Snap Tap 100×40	2
1-5	Saddle Snap Tap 150×50	2
2	Joint for Polyethylene Pipe	
2-1	Joint for Polyethylene Pipe Socketφ20mm	10
2-2	Joint for Polyethylene Pipe Socketφ40mm	5
2-3	Joint for Polyethylene Pipe elbowφ20mm	10
2-4	Joint for Polyethylene Pipe elbowφ25mm	10
2-5	Joint for Polyethylene Pipe elbowφ40mm	4
2-6	Joint for Polyethylene Pipe Tφ20mm×φ20mm	2
2-7	Joint for Polyethylene Pipe Tφ25mm×φ25mm	2
2-8	Joint for Polyethylene Pipe Tφ40mm×φ40mm	2
2-9	Joint for Polyethylene Pipe Pipe endφ20mm	5
2-10	Joint for Polyethylene Pipe Pipe endφ25mm	5
2-11	Joint for Polyethylene Pipe GPφ20mm	15
2-12	Joint for Polyethylene Pipe GPφ25mm	5
2-13	Joint for Polyethylene Pipe GPφ40mm	3
2-14	Joint for Polyethylene Pipe GPφ50mm	2
2-15	Joint for Polyethylene Pipe VPφ40mm	3
2-16	Joint for Polyethylene Pipe Tap Socketφ20mm	20
2-17	Joint for Polyethylene Pipe Tap Socketφ25mm	20
2-18	Joint for Polyethylene Pipe Tap Socketφ40mm	2
2-19	Joint for Polyethylene Pipe Tap Socketφ50mm	2
3	Snap Tap for Polyethylene Pipe φ100mm×φ20mm	30
4	EF Saddle with plug S2A	10
5	Snap Tap for Polyvinyl Chloride Pipe	
5-1	Snap Tap φ150mm×φ50mm	1
5-2	Snap Tapφ100mm×φ20mm	30
6	Meter Union for Galvanized Steel Pipe	
6-1	Meter Union φ20mm	30
6-2	Meter Union φ25mm	5
7	Union Joint for Steel Pipe	
7-1	Union Joint φ20mm	20
7-2	Union Joint φ25mm	20
7-3	Union joint φ40mm	5
8	Ball Tap φ25mm	1
9	Generator and accessories	
9-1	Generator EF5500iSDE	1
9-2	Generator Service manual book	1
9-3	Generator Parts catalog book	1
10	Lever Block LB010	2

No.	Name of Item	Qty
11	PVC Pipe Insertion Machine PIM200-R	1
12	Pipe IS-50AH	1
13	Ductile Iron Straight Pipe	
13-1	Straight Pipe φ150mm L5000mm	8
13-2	Straight Pipe φ100mm L4000mm	25
13-3	Straight Pipe φ75mm L4000mm	10
14	Ductile Iron Short Pipe	
14-1	Short Pipe 1φ150mm	4
14-2	Short Pipe 1φ100mm	18
14-3	Short Pipe 1φ75mm	4
14-4	Short Pipe 2 φ150mm	4
14-5	Short Pipe 2 φ100mm	13
14-6	Short Pipe 2 φ75mm	4
14-7	Short Pipe φ150mm L400mm	4
14-8	Short Pipe φ100mm L400mm	7
14-9	Short Pipe φ75mm L300mm	2
14-10	Short Pipe φ75mm L200mm	2
14-11	Short Pipe φ150mm L100mm	2
15	Ductile Iron Deformed Pipe	
15-1	Deformed Pipe φ150mm	3
15-2	Deformed Pipe φ100mm	10
15-3	Deformed Pipe φ75mm	4
15-4	Deformed Pipe φ150mm×φ150mm	1
15-5	Deformed Pipe T φ150mm×φ100mm	1
15-6	Deformed Pipe T φ100mm×φ100mm	3
15-7	Deformed Pipe T φ100mm×φ75mm	3
15-8	Deformed Pipe Cross φ100mm×φ100mm	1
15-9	Deformed Pipe T with flange φ150mm×φ100mm	2
15-10	Deformed Pipe T with flange φ100mm×φ100mm	2
15-11	Deformed Pipe T with flange φ100mm×φ75mm	2
15-12	Deformed Pipe φ150mm×φ75mm	3
15-13	Deformed Pipe 90°φ150mm	4
15-14	Deformed Pipe 90°φ100mm	4
15-15	Deformed Pipe 90°φ75mm	4
15-16	Deformed Pipe 45°φ150mm	6
15-17	Deformed Pipe 45°φ100mm	10
15-18	Deformed Pipe 45°φ75mm	4
15-19	Deformed Pipe 22 1/2°φ150mm	4
15-20	Deformed Pipe 22 1/2°φ100mm	6
15-21	Deformed Pipe 22 1/2°φ75mm	4
15-22	Deformed Pipe 11 1/4°φ150mm	4
15-23	Deformed Pipe 11 1/4°φ100mm	4
15-24	Deformed Pipe 11 1/4°φ75mm	4
15-25	Deformed Pipe 90°RF φ100mm	3
15-26	Deformed Pipe φ150mm×φ100mm	3
15-27	Deformed Pipe φ150mm×φ100mm	1
15-28	Deformed Pipe 45°φ100mm	4

No.	Name of Item	Qty
15-29	Deformed Pipe 22 1/2°φ100mm	4
16	Repair Valveφ75mm×H100mm	1
17	Fire Hydrant	
17-1	Fire Hydrant B103-2000 φ75mm	1
17-2	Fire Hydrant Case MR-1 H=880	1
17-3	Fire Hydrant Case MR-1G-10L	1
18	Air Valve	
18-1	Air Valve φ25mm	2
18-2	Air Valve Flangeφ25mm	2
19	Ductile Iron Pipe Joint Parts	
19-1	Pipe Joint Parts φ150mm	10
19-2	Pipe Joint Parts φ100mm	25
19-3	Pipe Joint Parts φ75mm	10
20	Ductile Iron Pipe Special Ring	
20-1	Special Ring φ150mm	15
20-2	Special Ring φ100mm	40
20-3	Special Ring φ75mm	10
21	Water Leakage Protection Hardware φ100mm	1
22	Water Leakage Repair Hardware	
22-1	Water Leakage Repair Hardware L255mm	1
22-2	Water Leakage Repair Hardware L157mm	1
23	Cap for Tap and Stop Valve	
23-1	Cap for Tap and Stop Valve φ20mm	20
23-2	Cap for Tap and Stop Valve φ25mm	20
23-3	Cap for Tap and Stop Valve φ40mm	2
23-4	Cap for Tap and Stop Valve φ50mm	2
24	Gate Valve and Case	
24-1	Gate Valve φ150mm	6
24-2	Gate Valve φ100mm	18
24-3	Gate Valve φ75mm	3
24-4	Gate Valve Case body	3
24-5	Gate Valve Case t40mm	3
25	Lubricant 2kg	5
26	Polyethylene Straight Pipe φ100mm×L5m	10
27	Polyethylene Two-layer Pipe	
27-1	Polyethylene Two-layer Pipe φ20mm×L120m	1
27-2	Polyethylene Two-layer Pipe φ25mm×L30m	1
27-3	Polyethylene Two-layer Pipe φ40mm×L30m	3
27-4	Polyethylene Two-layer Pipe φ50mm×L20m	1
28	Bend for Polyethylene Pipe	
28-1	Bend for Polyethylene Pipe φ100mm×90°	4
28-2	Bend for Polyethylene Pipe φ100mm×45°	12
29	Joint for Polyethylene Pipe	
29-1	Joint for Polyethylene Pipe φ100mm×L160mm	10
29-2	Joint for Polyethylene Pipe φ100mm	2
30	Valve for Polyethylene Pipe φ100mm	3
31	Polyvinyl Chloride Pipe	

No.	Name of Item	Qty
31-1	Polyvinyl Chloride Straight Pipe (1) φ150mm×L5000mm	6
31-2	Polyvinyl Chloride Straight Pipe (2) φ100mm×L5000mm	15
31-3	Polyvinyl Chloride Pipe (1) φ20mm×L4000mm	20
31-4	Polyvinyl Chloride Pipe (2) φ25mm×L4000mm	20
31-5	Polyvinyl Chloride Pipe (3) φ40mm×L4000mm	20
31-6	Polyvinyl Chloride Short Pipe (1) φ150mm×L300mm	4
31-7	Polyvinyl Chloride Short Pipe (2) φ100mm×L300mm	4
31-8	Polyvinyl Chloride Short Pipe (3) φ150mm×L260mm	2
31-9	Polyvinyl Chloride Short Pipe (4) φ100mm×L250mm	2
32	Bend for Polyvinyl Chloride Pipe	
32-1	Bend for Polyvinyl Chloride Pipe φ150mm×90°	2
32-2	Bend for Polyvinyl Chloride Pipe φ100mm×45°	4
33	Joint for Polyvinyl Chloride Pipe	
33-1	VK-00TF φ150mm×φ100mm	2
33-2	VK-00TF φ100mm×φ100mm	1
33-3	VK-00TB φ150mm×φ100mm	1
33-4	VK-00TB φ100mm×φ100mm	1
33-5	VK-00VS φ150mm	4
33-6	VK-00VS φ100mm	4
33-7	VK-00VS φ150mm×φ100mm	1
33-8	VK-00VS φ100mm×φ75mm	1
33-9	VK-00B φ150mm×90°	2
33-10	VK-00B φ150mm×45°	4
33-11	VK-00B φ100mm×90°	5
33-12	VK-00B φ100mm×45°	8
33-13	VK-00B φ100mm×22-1/2°	4
33-14	VP Socket φ20mm	50
33-15	VP Socket φ25mm	20
33-16	VP Socket φ40mm	20
33-17	VP Elbow φ20mm	50
33-18	VP Elbow φ25mm	20
33-19	VP Elbow φ40mm	20
33-20	Joint φ20mm	10
33-21	Joint φ30mm	10
33-22	Joint φ40mm	5
33-23	Joint φ50mm	5
33-24	MF Joint φ150mm	4
33-25	MF Joint φ100mm	4
33-26	Dresser Joint (1) φ150mm	1
33-27	Dresser Joint (2) φ100mm	1
33-28	Dresser Joint (1) φ150mm	5
33-29	Dresser Joint (2) φ100mm	15
33-30	Bag Joint φ100mm	1
34	Repair Clamp	
34-1	Repair Clamp for Plastic Pipe φ75mm	1
34-2	Repair Clamp for Plastic Pipe φ100mm	1
34-3	Repair Clamp for Plastic Pipe φ150mm	1

No.	Name of Item	Qty
35	Cap for Polyvinyl Chloride Pipe	
35-1	Cap for Polyvinyl Chloride Pipe φ20mm	10
35-2	Cap for Polyvinyl Chloride Pipe φ25mm	10
35-3	Cap for Polyvinyl Chloride Pipe φ40mm	10
36	Gate Valve for Polyvinyl Chloride Pipe	
36-1	Gate Valve φ150mm	1
36-2	Gate Valve φ100mm	2
37	Adhesive for Polyvinyl Chloride Pipe 500g	80
38	Lubricants for Polyvinyl Chloride Pipe 2kg	10
39	Polyethylene Powder Lined Steel Pipe	
39-1	φ20mm×L4000mm	10
39-2	φ25mm×L4000mm	5
39-3	φ40mm×L4000mm	5
39-4	φ80mm×L4000mm	2
39-5	φ100mm×L4000mm	4
40	Joint for Polyethylene Powder Lined Steel Pipe	
40-1	Socket φ20mm	20
40-2	Socket φ25mm	20
40-3	Socket φ40mm	10
40-4	Socket φ100mm	5
40-5	Elbow φ20mm	20
40-6	Elbow φ25mm	20
40-7	Elbow φ40mm	20
40-8	Elbow φ80mm	5
40-9	Elbow φ100mm	10
40-10	T φ20mm	20
40-11	T φ25mm	20
40-12	T φ40mm	5
40-13	T φ100mm	2
40-14	Union φ20mm	5
40-14	Union φ25mm	5
40-15	Union φ40mm	5
40-16	Nipple φ20mm	10
40-17	Nipple φ25mm	10
40-18	Nipple φ40mm	10
40-19	Nipple φ100mm	10
41	Flange for Polyethylene Powder Lined Steel Pipe	
41-1	Flange (1) φ20mm	4
41-2	Flange (2) φ25mm	4
41-3	Flange (3) φ40mm	5
41-4	Flange (4) φ100mm	5
41-5	Flange (1) φ75mm	8
41-6	Flange (2) φ100mm	10
42	Stainless Steel bolt and nut	
42-1	SUS BT.NTφ16mm x L75mm	250
42-2	SUS BT.NTφ16mm x L80mm	120
42-3	SUS BT.NTφ12mm x L55mm	20

No.	Name of Item	Qty
42-4	SUS BT.NTφ16mm x L60mm	20
42-5	SUS BT.NTφ16mm x L65mm	20
43	Flange Packing	
43-1	Flange Packing φ20mm	10
43-2	Flange Packing φ25mm	10
43-3	Flange Packing φ40mm	10
43-4	Flange Packing φ50mm	5
43-5	Flange Packing φ75mm	10
43-6	Flange Packing φ100mm	15
43-7	Flange Packing φ150mm	25
43-8	Flange Packing φ100mm 10K	10
44	Level Regulating Valve	
44-1	Level Regulating Valve φ40mm	2
44-2	Level Regulating Valve φ20mm	3
45	Check Valve	
45-1	Check Valve φ20mm	10
45-2	Check Valve φ25mm	1
45-3	Check Valve φ40mm	1
46	Sluice Valve	
46-1	Sluice Valve φ20mm	20
46-2	Sluice Valve φ25mm	10
47	Stop Valve	
47-1	Stop Valve φ40mm	3
47-2	Stop Valve φ50mm	2
47-3	Stop Valve Box L125mm×W400mm	5
48	Pipe Drilling Machine	
48-1	Pipe Drilling Machine 2N	3
48-2	Pipe Drilling Machine S2A	1
48-3	Pipe Drilling Machine φ20mm	2
49	Engine Cutter and Accessories	
49-1	Engine Cutter EK7650H	1
49-2	Engine Cutter A-36382 Cutlery	1
49-3	Engine Cutter A-36631 Cutlery	2
49-4	Engine Cutter 195599-9 filter	1
49-5	Engine Cutter 225094-6 V belt	3
50	Electromagnetic Flow Meter an Accessories	
50-1	Electromagnetic Flow Meter Set MagneW3000 FLEX	1
50-2	Electromagnetic Flow Meter Set Fastening set	1
50-3	Electromagnetic Flow Meter Set LR5061 Pulse logger	1
50-4	Electromagnetic Flow Meter Set LR5091 Communication adapter	1
51	Pump	
51-1	Pump T-100K	2
51-2	Pump PP-201T	1
52	Bulb Opener No.1721	2
53	Tamper No.5231	2
54	Torque Wrench RM-30LYNT	1
55	Chain Pipe Wrench TW150N	2

No.	Name of Item	Qty
56	Wrench	
56-1	Pipe Wrench PW-SD30	5
56-2	Pipe Wrench PW-SD60	5
56-3	Adjustable Angle Wrench H-300	5
56-4	Adjustable Angle Wrench H-450	5
56-5	Adjustable Angle Wrench H-600	5
56-6	Ratchet Wrench RWH-0924	5
56-7	Ratchet Wrench RWH-0930	5
57	Pipe Electrofusion Unit	
57-1	Pipe Electrofusion Unit MSA2.1	1
57-2	Pipe Electrofusion Unit WF8430	1
58	Pipe Cutter	
58-1	Pipe Cutter PEI-75	1
58-2	Pipe Cutter PEE75	1
58-3	Pipe Cutter PE-100	2
58-4	Pipe Cutter PEE150	2
58-5	Pipe Cutter PEI-50	5
58-6	Pipe Cutter PEE75	5
59	Water Pressure Gauge EA729GM-20	5
60	Water Meter and Accessories	
60-1	Water Meter NKDA20	4
60-2	Water Meter NFDW100	2
60-3	Water Meter Storage Case MB20SB	5

(2) Handover document

Handover document: Attachment 2

No.	Number and name of equipment procurement	Procurement by	Handover document
1	Equipment related to NRW management (Excavator)	JICA Office	Yes
2	Equipment and materials for NRW management	JICA	None
3	Equipment and materials fir NRW training	JICA	None

III. Output 3

(1) Equipment list

No.3-1 Equipment for water quality management (Part 1)

Site of installation: WRAWSA Central laboratory, Mini laboratory and Nyaunghnapin WTP

Date of handover: 27 Dec. 2016

No.	Item	Qty
1	Benchtop turbidity meter	1
2	Portable turbidity meter	5
3	Color of water portable photometer	6
4	Portable pH meter	5
5	Pocket Colorimeter 2, Chlorine model	1
6	Hot plate stirrer	1
7	Magnetic stirrer	4
8	Stirring bar	15
9	Burette stand	2
10	Grass ware	1
11	Jar tester	1
12	Sieve shaker	1
13	Test sieves	2
14	Electric balance	1
15	Interface level monitor	1
16	Desiccator	1
17	Vacuum filter holder	3
18	Bell jar	2
19	Vacuum pump	1
20	Evaporation dish	30
21	Filter paper, 47mm dia.	2
22	Gas detector*	1

*No.22 Gas detector: Equipment accompanied with dispatch

No.3-2 Equipment for water quality management (Part 2)

Site of installation: Nyaunghnapin WTP

Date of handover: 28 Mar. 2018

No.	Item	Qty
1	Desiccator	1
2	Drying oven	1

No.3-3 Equipment for water quality management (Part 3)

Site of installation: Nyaunghnapin WTP

Date of handover: 28 Mar. 2018

No.	Item	Qty
1	Portable flow meter UF801P	2
2	Extension cable 95m	2
3	Prove and support set SE1595	2

No.3-4 Standard, guideline and reference book

Site of installation: HRD section of WRAWSA

Date of handover: 9 Feb. 2017

No.	Item	Qty
1	Standard methods for the examination of water and wastewater	1
2	WHO Guidelines for drinking-water quality, 4th edition	1
3	Water quality data analysis and interpretation	1
4	Integrated design and operation of water treatment facilities, 2nd edition	1
5	MWH's water treatment principles and design, 3rd edition	1
6	Water quality & treatment: A handbook on drinking water, 6th edition	1

No.3-5 Manuals and reference books (Long term expert procurement)

Site of installation: HRD section of WRAWSA

Date of handover: 11 Sep. 2017

No.	Item	Qty
1	Standard Methods for the Examination of Water and Wastewater, 22nd Edition	1
2	Guidelines for drinking-water quality, 4th edition	1
3	Water quality data analysis and interpretation	1
4	Integrated Design and Operation of Water Treatment Facilities、2nd Edition	1
5	MWH's Water Treatment Principles and Design, 3rd Edition	1
6	Water Quality & Treatment: A Handbook on Drinking Water, 6th Edition	1
7	AWWA Manual Series, and books	
7-1	M1 Principles of Water Rates, Fees, and Charges, sixth edition (30001-6E)	1
7-2	M3 Safety Management for Utilities, seventh edition (30003-7E)	1
7-3	M29 Fundamentals of Water Utility Capital Financing, fourth edition (30029-4E)	1
7-4	M47 Capital Project Delivery, second edition (30047)	1
7-5	M7 Problem Organisms in Water: Identification & Treatment, third edition (30007)	1
7-6	M12 Simplified Procedures for Water Examination, sixth edition (30012-6E)	1
7-7	M20 Water Chlorination & Chloramination Practices & Principles, second edition (30020)	1
7-8	M37 Operational Control of Coagulation and Filtration Processes, third edition (30037)	1
7-9	M48 Waterborne Pathogens, second edition (30048)	1
7-10	M57 Algae: Source to Treatment (30057)	1
7-11	M65 On-site Generation of Hypochlorite (30065)	1
7-12	M2 Instrumentation & Control, third edition (30002)	1

No.	Item	Qty
7-13	M6 Water Meters: Selection, Installation, Testing & Maintenance, fifth edition (30006-5E)	1
7-14	M11 Steel Pipe: A Guide for Design and Installation, fourth edition (30011)	1
7-15	M22 Sizing Water Service Lines and Meters, third edition (30022-3E)	1
7-16	M23 PVC Pipe Design and Installation, second edition (30023)	1
7-17	M28 Rehabilitation of Water Mains, third edition (30028-3E)	1
7-18	M32 Computer Modeling of Water Distribution Systems, third edition (30032-3E)	1
7-19	M33 Flowmeters in Water Supply, second edition (30033)	1
7-20	M36 Water Audits and Loss Control Programs, 4th edition (30036-4E)	1
7-21	M41 Ductile-Iron Pipe and Fittings, third edition (30041)	1
7-22	M44 Distribution Valves: Selection, Installation, Field Testing & Maintenance, third edition (30044-3E)	1
7-23	M49 Butterfly Valves: Torque, Head loss and Cavitation Analysis, second edition (30029-2E)	1
7-24	M51 Air-Release, Air/ Vacuum & Combination Air Valves (30051)	1
7-25	M55 PE Pipe Design and Installation (30055)	1
7-26	M21 Groundwater, fourth edition (30021-4E)	1
7-27	M50 Water Resources Planning, second edition (30050)	1
7-28	M52 Water Conservation Programs: A Planning Manual (30052)	1
7-30	Benchmarking Water Services (20723)	1
7-31	Utility Management for Water and Wastewater Operators (20721)	1
7-32	Focus First on Service: The Voice and Face of Your Utility (20629)	1
7-33	Communications and Customer Relations (47420)	1
7-34	Communicating Water's Value: Talking Points, Tips & Strategies (20757)	1
7-35	Financial Management for Water Utilities: Principles of Finance, Accounting, and Management Controls, Softcover edition (20743-PE)	1
7-36	Cost Estimating Manual for Water Treatment Facilities	1
7-37	Water Treatment Plant Design, Fifth Edition, AWWA	1
8	AWWA WSO (Water Supply Operation) Textbook and Workbook	
8-1	WSO: Water Sources, Fourth Edition	1
8-2	WSO: Water Treatment, Fourth Edition	1
8-3	WSO: Water Transmission and Distribution, Fourth Edition	1
8-4	WSO: Water Quality, Fourth Edition	1
8-5	WSO: Basic Science Concepts and Applications, Fourth Edition	1
8-6	WSO: Water Treatment Student Workbook, Fourth Edition	1
8-7	WSO: Water Transmission and Distribution Student Workbook, Fourth Edition	1
8-9	WSO: Water Quality Student Workbook, Fourth Edition	1
8-10	WSO: Basic Science Concepts and Applications Student Workbook, Fourth Edition	1
9	Strategy and Human Resource Management -Management, Work and Organizations- (4th Edition)	1
10	Essentials of Organizational Behavior (13th Edition)	1
11	Performance Indicators for Water Supply Services: Third Edition (Hardback)	1
12	Institutional Governance and Regulation of Water Services: Second Edition (Paperback)	1
13	GIS Tutorial 1 Basic Workbook, 10.3.x edition	1
14	GIS Tutorial 2 Spatial Analysis Workbook (for 10.3.x edition)	1
15	Principles of Water Treatment	1

(2) Handover document

Handover document: Attachment 3

No.	Number and name of equipment procurement	Procurement by	Handover document
3-1	Equipment for water quality management (Part 1)	Consultant	Yes
3-2	Equipment for water quality management (Part 2)	Consultant	Yes
3-3	Equipment for water quality management (Part 3)	Consultant	Yes
3-4	Standard, guideline and reference book	Consultant	Yes
3-5	Manuals and reference books	Long term expert	Yes

Attachment 1 Handover document: Output 1

No.1-1 Equipment for local offices for collection of electric data and calculation of PIs
(Part 1)

CERTIFICATE OF HANDOVER

PROJECT TITLE: *" THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *24th August, 2016* to *Yangon City Development Committee (YCDC), Engineering Department (Water and Sanitation)*.

Attached is the certificate of completion of all equipment.

佐藤弘孝

Mr. Hirotaka SATO
Chief Adviser
The Project for Improvement of Water Supply Management of YCDC

24th August, 2016

List of Equipment

No.	Item	Quantity	Place of Delivery	Date of Handover
1	Personal computer (desktop) +UPS	59	Computer Section of Engineering Department (Water and Sanitation), YCDC, 3th Floor, Eastern side, No.390, YCDC office building, Merchant Road, Botahtaung Township	24th August, 2016
2	Printer (laser, A4) for local stations	49		24th August, 2016
3	Copy machine (A3 color) for training room	1		24th August, 2016
4	MS-office	59		24th August, 2016
5	Anti virus software	59		24th August, 2016
6	USB stick	49		24th August, 2016
7	Consumable (laser A4)	49		24th August, 2016
8	Consumable (copy machine tonner, drum cartridge)	1		24th August, 2016

Undertakings by YCDC

- To use equipment mainly for data collection for Performance Indicators (PIs) and for improvement of efficiency of work
- To deliver and install all provided equipment to each relevant office
- To secure space for installing PCs
- To procure consumables for PCs, printers and copy machine
- To do bear necessary operational costs for the PC training
- To update anti-virus software periodically
- To take security measures
- To prohibit from unintended use

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment listed below for above-mentioned project have been received properly as of *24th August, 2016* to *Yangon City Development Committee (YCDC), Engineering Department (Water and Sanitation)* from Japan International Cooperation Agency (JICA).

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation)
Yangon City Development Committee (YCDC)
Office Building,Marchant Rd. Botahtaung Township
24th August, 2016

- Name of the Equipment: shown in the Table below

No.	Item	Quantity
1	Personal computer (desktop) +UPS	59
2	Printer (laser, A4) for local stations	49
3	Copy machine (A3 color) for training room	1
4	MS-office	59
5	Anti virus software	59
6	USB stick	49
7	Consumable (laser printer, ink)	49
8	Consumable (copy machine tonner, drum cartridge)	1

- Date of Handover : 24th August 2016

Inspection and distribution sheet for PI

No		Name	Serial Code	Personal Computer (desktop),UPS	Inkjet Printer	Inkjet printer kit	MS-office	Anti virus software	USB (8 GB)	Copy Machine (A3,Color) for	Toner&Drum for Copy Machine	Inspection Date	Name/Sign
1	T/S East District	South Okkalla	WSD-1	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
2		North Okkalla	WSD-2	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
3		Thingangun	WSD-3	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
4		New Dagon (North)	WSD-4	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
5		New Dagon (South)	WSD-5	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
6		New Dagon (East)	WSD-6	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
7		New Dagon (Seikkun)	WSD-7	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
8	T/S West	Latha	WSD-8	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
9		Lanmadaw	WSD-9	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
10		Pabedan	WSD-10	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
11		Kyauktada	WSD-11	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
12		Dagon	WSD-12	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
13		Bahan	WSD-13	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
14		Sanchaung	WSD-14	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
15		Kyimyindaing	WSD-15	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
16		Alone	WSD-16	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
17		Sekkan	WSD-17	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
18	T/S South	Tharkayta	WSD-18	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
19		Dawbon	WSD-19	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
20		Tarmwe	WSD-20	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
21		Mingalartaungnyunt	WSD-21	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
22		Botahtaung	WSD-22	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
23		Yankin	WSD-23	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
24		Dala	WSD-24	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
25		Seikkyikanaungto	WSD-25	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
26		Pazuntaung	WSD-26	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
27	T/S North	Kamayut	WSD-27	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
28		Hlaing	WSD-28	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
29		Mayangone	WSD-29	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
30		Mingalardon	WSD-30	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
31		Insein	WSD-31	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
32		Hlaingtharyar	WSD-32	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
33		Shwe Pyi Thar	WSD-33	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
34	HQ	HQ	WSD-34	O	-	-	O	O	-	O	O	12/8/2016	Ms. Aye Mar & 4 Assistant
35		HQ	WSD-35	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
36		HQ	WSD-36	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
37		HQ	WSD-37	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
38		HQ	WSD-38	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
39		HQ	WSD-39	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
40		HQ	WSD-40	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
41		HQ	WSD-41	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
42		HQ	WSD-42	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
43		HQ	WSD-43	O	-	-	O	O	-	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
44	District	East District	WSD-44	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
45		West District	WSD-45	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
46		South District	WSD-46	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
47		North District	WSD-47	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
48	Other Branch Office	Gyobyu Reservoir	WSD-48	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
49		Phugyi Reservoir	WSD-49	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
50		Hlawga Reservoir	WSD-50	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
51		Nyaunghnapin WTP	WSD-51	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
52		Yegu PS	WSD-52	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
53		Pyawbwesu PS	WSD-53	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
54		NRW Section	WSD-54	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
55		Customer Service Section	WSD-55	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
56		Planning Section	WSD-56	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
57		HRD Section	WSD-57	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
58		AD Compound	WSD-58	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
59		Store sec.	WSD-59	O	O	O	O	O	O	-	-	12/8/2016	Ms. Aye Mar & 4 Assistant
Total				59	49	49	59	59	49	1	1		

This sheet certify all equipment have been inspected and all equipment is proper in working condition.

Certified by Ms. Aye Aye Mar

No.1-2 Equipment for local offices for collection of electric data and calculation of PIs (Part 2)

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the books in the attached list for above-mentioned project have been handed over properly as of *February 20th, 2017* to *Yangon City Development Committee (YCDC)*.

(Signature)

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

February 20th, 2017

List of Equipment

S.No.	Equipment Name	Remarks	Quantity
1	Personal computer (desktop) and UPS	Including: • MS-office Windows, professional software (Genuine) • Anti-Virus software (Genuine)	5
2	Personal computer (laptop)	Including: • MS-office Windows, professional software (Genuine) • Anti-Virus software (Genuine)	8
3	Printer (leaser, black & white, A4) for local stations	• Laser printer • Resolution – 600 x 600 dpi • Papre size – A4, B5, A5, etc. • Black & White	1

No.1-3 Manuals and reference books (PC related) (Long term expert procurement)

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that PC equipment listed below for above-mentioned project have been received properly as of *February 20th, 2017* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office

- Procurement Items :
  - Personal computer (desktop) and UPS
  - Personal computer (laptop)
  - Printer (leaser, black & white, A4)
- Date of Handover : February 20th, 2017

(Signature) _____

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

February 20th, 2017

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon.

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the books in the attached list for above-mentioned project have been handed over properly as of *February 9th, 2017* to *Yangon City Development Committee (YCDC)*.

(signature) 佐藤弘孝

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

February 9th, 2017

List of Equipment (Book)

No.	Name of Items	Qty.	Place of Delivery	Date of Handover
1	Microsoft Office Word 2016	60 copies	No. 390, YCDC Office Building	2017.2.9
2	Microsoft Office Excel 2016	60 copies	No. 390, YCDC Office Building	2017.2.9
3	Microsoft Office PowerPoint 2016	60 copies	No. 390, YCDC Office Building	2017.2.9
4	Using Window 8	60 copies	No. 390, YCDC Office Building	2017.2.9

No.1-4 GIS software

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the books listed below for above-mentioned project have been received properly as of *February 9th, 2017* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office

- Name of the Book : Microsoft Office Word 2016
  Microsoft Office Excel 2016
  Microsoft Office PowerPoint 2016
  Using Window 8
- General Description of the Book : Computer tutorial books for Windows, Ward, Excel and PowerPoint
- Date of Handover : February 9th, 2017

(Signature) _____

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

February 9th, 2017

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon.

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the software in the attached list for above-mentioned project have been handed over properly as of *February 23th, 2017* to *Yangon City Development Committee (YCDC)*.

(Signature) 佐藤弘隆

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

February 23th, 2017

List of Equipment

S.No.	Equipment Name	Remarks	Quantity
1	ArcGIS Software	Basic 10.5 Single Use	1

No.1-5 Auto CAD software

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that software listed below for above-mentioned project have been received properly as of *February 23th, 2017* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office

- Procurement Items : – ArcGIS Software Basic 10.5 Single Use
- Date of Handover : February 23th, 2017

(Signature)

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

February 23th, 2017

Yangon City Development Committee (YCDC) Office Building,
Marchant Rd., Botahtaung Township, Yangon.

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the software in the attached list for above-mentioned project have been handed over properly as of *March 21st, 2017* to *Yangon City Development Committee (YCDC)*.

(Signature)

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

March 21st, 2017

List of Equipment

S.No.	Equipment Name	Remarks	Quantity
1	Auto Cad 2017 LT	2D Support E License	2

No.1-6 Flow monitoring system (JICA procurement)

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that software listed below for above-mentioned project have been received properly as of *March 21st, 2017* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office

- Procurement Items : – Auto Cad 2017 LT (2D Support E License)
- Date of Handover : March 21st, 2017

(Signature)_____

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

March 21st, 2017

Yangon City Development Committee (YCDC) Office Building,
Marchant Rd., Botahtaung Township, Yangon.

YCDC における超音波流量計保管状況

TECI　守田康彦

確認日：2018 年 8 月 23 日

添付資料：YCDC-EDWS の Invoice

保管状況概要

- 超音波流量計一式は YCDC 新庁舎脇の関連施設（通称、AID Complex）で室内保管されている。保管室の状況を以下に示す。
- 外観検査を行った。合計 23 箱が保管されており、いずれの箱も破損は無かった。
- 保管室は常時施錠されており、鍵は YCDC 職員が管理している。

室内保管状況（１）

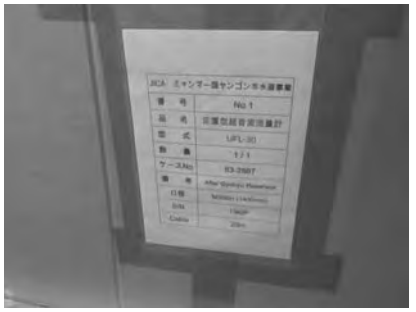
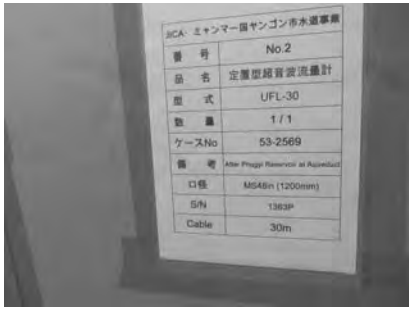
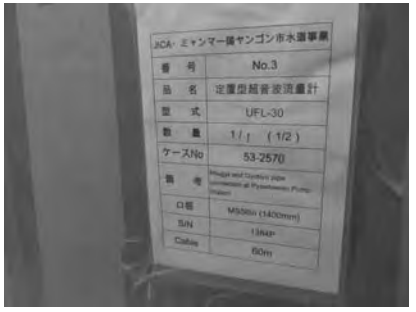
室内保管状況（２）

梱包状況確認
（外箱を開梱し、異常無いないことを確認）

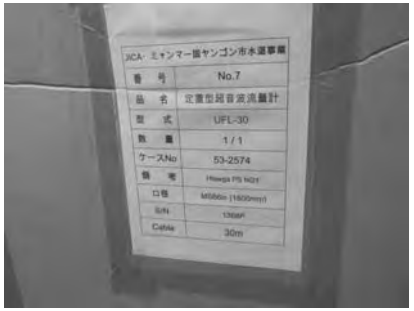
施錠の状況

AID Complex にて保管されている機材リストを以下に示す。
（ただし、箱面ラベルの確認のみ）

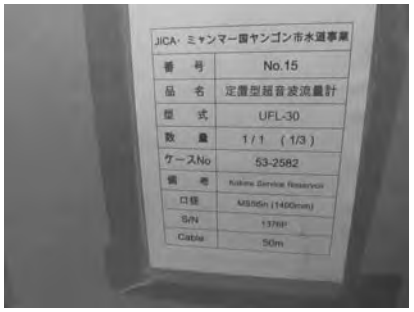
保管機材リスト

箱番号	内容品名称	写真
1	Ultrasonic flow meter UFL30 + coax. Cable 20m	
2	Ultrasonic flow meter UFL30 + coax. Cable 300m	
3	Ultrasonic flow meter UFL30 + coax. Cable 60m	

箱番号	内容品名称	写真
4	Ultrasonic flow meter UFL30 + coax. Cable 130m	
5	Ultrasonic flow meter UFL30 + coax. Cable 240m	
6	Ultrasonic flow meter UFL30 + coax. Cable 240m	

箱番号	内容品名称	写真
7	Ultrasonic flow meter UFL30 + coax. Cable 30m	
8	Ultrasonic flow meter UFL30 + coax. Cable 70m	
9	Ultrasonic flow meter UFL30 + coax. Cable 170m	

箱番号	内容品名称	写真
10	Ultrasonic flow meter UFL30 + coax. Cable 170m	
11	Ultrasonic flow meter UFL30 + coax. Cable 40m	
12	Ultrasonic flow meter UFL30 + coax. Cable 140m 連番 53-2579 から、No.12 と推定	

箱番号	内容品名称	写真
13	Ultrasonic flow meter UFL30 + coax. Cable 130m	
14	Ultrasonic flow meter UFL30 + coax. Cable 120m	
15	Ultrasonic flow meter UFL30 + coax. Cable 50m	

箱番号	内容品名称	写真
16	Ultrasonic flow meter UFL30 + coax. Cable 210m	
17	Ultrasonic flow meter UFL30 + coax. Cable 270m	
18	Ultrasonic flow meter UFL30 + coax. Cable 150m	

箱番号	内容品名称	写真
19	Ultrasonic flow meter UFL30 + coax. Cable 150m	
20	Ultrasonic flow meter UFL30 + coax. Cable 150m	
21	Ultrasonic flow meter UFL30 + coax. Cable 110m	

箱番号	内容品名称	写真
22	Coax. Cable 300m	
23	Coax. Cable 220m	

添付資料

YCDC-EDWS の Invoice（次ページ）

- YCDC-EDWS より AID Complex に対し、超音波流量計一式の保管を委託するための書類
- 署名者（左より）：EDWS チーフエンジニア、Mr. Zaw Oo（本件機材に関する YCDC 側担当者）、AID Complex 責任者

ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီ

(စတ-၁)

အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု)

ကုန်ပို့လွှာ

ကုန်ပို့လွှာအမှတ် .....

လက်ခံသည့်ရက်စွဲ ၁၆.၈.၂၁

ပစ္စည်းအမှာစာအမှတ် ..... နေ့စွဲ .....

ပစ္စည်းပို့သူအမည် ..... အဆင့် .....

ဌာန ..... လုပ်ငန်းအမှတ် .....

လုပ်ငန်းအမည် .....

ပေးပို့ရန်ခွင့်ပြုသူအမည် ..... ဌာန .....

စဉ်	ပစ္စည်းအမျိုးအမည်	ရေတွက်ပုံ	အရေအတွက်	နှုန်း		သင့်ငွေ	
				ကျပ်	ပြား	ကျပ်	ပြား
၁။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 20m						
၂။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 30m						
၃။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 60m						
၄။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 130m						
၅။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 240m						
၆။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 240m						
၇။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 30m						

ပစ္စည်းလက်ခံသူ

လက်မှတ် .....

အမည် .....

ရာထူး .....

ကိုယ်ပိုင်အမှတ် .....

ဌာန .....

ပေးပို့သူ

လက်မှတ် .....

အမည် .....

ရာထူး .....

ကိုယ်ပိုင်အမှတ် .....

ဌာန .....

ဌာနမှူး

အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု)

ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီ

(စတ-၁)

အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု)

ကုန်ပို့လွှာ

ကုန်ပို့လွှာအမှတ် .....

လက်ခံသည့်ရက်စွဲ ၁၆.၈.၂၁

ပစ္စည်းအမှာစာအမှတ် ..... နေ့စွဲ .....

ပစ္စည်းပို့သူအမည် ..... အဆင့် .....

ဌာန ..... လုပ်ငန်းအမှတ် .....

လုပ်ငန်းအမည် .....

ပေးပို့ရန်ခွင့်ပြုသူအမည် ..... ဌာန .....

စဉ်	ပစ္စည်းအမျိုးအမည်	ရေတွက်ပုံ	အရေအတွက်	နှုန်း		သင့်ငွေ	
				ကျပ်	ပြား	ကျပ်	ပြား
၈။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 40m						
၉။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 140m						
၁၀။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 140m						
၁၁။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 40m						
၁၂။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 140m						
၁၃။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 130m						
၁၄။	Ultrasonic Flowmeter	ခု	၁				
	UFI-30 + Coaxial Cable 130m						

ပစ္စည်းလက်ခံသူ

လက်မှတ် .....

အမည် .....

ရာထူး .....

ကိုယ်ပိုင်အမှတ် .....

ဌာန .....

ပေးပို့သူ

လက်မှတ် .....

အမည် .....

ရာထူး .....

ကိုယ်ပိုင်အမှတ် .....

ဌာန .....

ဌာနမှူး

အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု)

ရန်ကုန်မြို့တော်စည်ပင်သာ၊ ကာမတီ (စတ-၁)

အင်ဂျင်နီယာဌာန (ရေနုံ့သန့်ရှင်းမှု)

ကုန်ပို့လွှာ

ကုန်ပို့လွှာအမှတ် ----------

လက်ခံသည့်ရက်စွဲ ၁၆.၈.၂၃

ပစ္စည်းအမှာစာအမှတ် ---------- နေ့စွဲ ----------

ပစ္စည်းပို့သူအမည် ---------- အဆင့် ----------

ဌာန ---------- လုပ်ငန်းအမှတ် ----------

လုပ်ငန်းအမည် ----------

ပေးပို့ရန်ခွင့်ပြုသူအမည် ---------- ဌာန ----------

စဉ်	ပစ္စည်းအမျိုးအမည်	ရေတွက်ပုံ	အရေအတွက်	နှုန်း		သင့်ငွေ	
				ကျပ်	ပြား	ကျပ်	ပြား
၁၅။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 50m						
၁၆။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 210m						
၁၇။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 270m						
၁၈။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 150m						
၁၉။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 150m						
၂၀။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 150m						
၂၁။	Ultrasonic Flowmeter	စုံ	၁				
	UFI-30 + Coaxial Cable 110m						

ပစ္စည်းလက်ခံသူ ပေးပို့သူ

လက်မှတ် ---------- လက်မှတ် ----------

အမည် ---------- အမည် ----------

ရာထူး ---------- ရာထူး ----------

ကိုယ်ပိုင်အမှတ် ---------- ကိုယ်ပိုင်အမှတ် ---------- ဌာနမှူး

ဌာန ---------- ဌာန ---------- အင်ဂျင်နီယာဌာန (ရေနုံ့သန့်ရှင်းမှု)

ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီ (စတ-၁)

အင်ဂျင်နီယာဌာန (ရေနုံ့သန့်ရှင်းမှု)

ကုန်ပို့လွှာ

ကုန်ပို့လွှာအမှတ် ----------

လက်ခံသည့်ရက်စွဲ ၁၆.၈.၂၃

ပစ္စည်းအမှာစာအမှတ် ---------- နေ့စွဲ ----------

ပစ္စည်းပို့သူအမည် ---------- အဆင့် ----------

ဌာန ---------- လုပ်ငန်းအမှတ် ----------

လုပ်ငန်းအမည် ----------

ပေးပို့ရန်ခွင့်ပြုသူအမည် ---------- ဌာန ----------

စဉ်	ပစ္စည်းအမျိုးအမည်	ရေတွက်ပုံ	အရေအတွက်	နှုန်း		သင့်ငွေ	
				ကျပ်	ပြား	ကျပ်	ပြား
၂၂။	Coaxial Cable 300m	စုံ	၁				
၂၃။	Coaxial Cable 220m	စုံ	၁				

ပစ္စည်းလက်ခံသူ ပေးပို့သူ

လက်မှတ် ---------- လက်မှတ် ----------

အမည် ---------- အမည် ----------

ရာထူး ---------- ရာထူး ---------- ဌာနမှူး

ကိုယ်ပိုင်အမှတ် ---------- ကိုယ်ပိုင်အမှတ် ---------- အင်ဂျင်နီယာဌာန (ရေနုံ့သန့်ရှင်းမှု)

ဌာန ---------- ဌာန ----------

Attachment 2 Handover document: Output 2

No.2-1 Equipment related to NRW management (Excavator)

(様式 14) ①

CERTIFICATE OF HANDOVER

PROJECT TITLE: *" THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *September 20th, 2016* to *Yangon City Development Committee (YCDC) and to request YCDC to implement Undertakings attached*.

(signature) 大野敦生
Mr. Atsuo ONO
Deputy Chief Advisor
JICA Expert Team

September 20th, 2016

List of Equipment

No.	Name of Item	Qty.	Place of Delivery	Date of Handover
1	Back Hoe	1	Yegu Pumping Station,YeSal street, Word(9), Mayangone Township, Yangon, Myanmar	2016.9.20

Undertakings by YCDC

- To inform JICA Expert Team of responsible person of the equipment
- To secure space for park the equipment and take security measures
- To prepare own operation and maintenance manuals based on the manuals provided by the manufacture
- To implement regular maintenance according to the manuals
- To bear necessary operational expenses such as spare parts, fuel, etc.
- To use the equipment for project activities such as NRW management and flow meter monitoring system as the first priority

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment listed below for above-mentioned project have been received properly as of *September 20th, 2016* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office and to pledge that we implement the undertakings as stipulated in the document of Certificate of Handover.

- Name of the Facility : Back Hoe
- General Description of the Equipment :

  Horse power: more than 27 HP
  Bucket: more than 0.10 m^3
  Maximum Digging Depth: more than 3,000 mm
  Overall width: between 1,500mm and 1,800 mm
  Warranty: maintenance service more than 1 year, or more than 1,000 hours
- Date of Handover : September 20th, 2016

(signature)
Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

September 20th, *2016*

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon,

No.2-2 Equipment and materials for NRW management

No.2-3 Equipment and materials fir NRW training

Attachment 3 Handover document: Output 3

No.3-1 Equipment for water quality management (Part 1)

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *December 27th, 2016* to *Yangon City Development Committee (YCDC)*.

(signature)

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

December 27th, 2016

List of Equipment

No.	Name of Items	Qty.	Place of Delivery	Date of Handover
1-1	Bench Top Turbidity Meter	1 set	YCDC AID Complex	2016.12.27
1-2	Portable Turbidity Meter	5 sets	YCDC AID Complex	2016.12.27
1-3	Color of Water Portable Photometer	6 sets	YCDC AID Complex	2016.12.27
1-4	Portable pH Meter	5 sets	YCDC AID Complex	2016.12.27
1-5	Pocket Colorimeter II, Chlorine Model	1 set	YCDC AID Complex	2016.12.27
1-6	Hot Plate Stirrer	1 set	YCDC AID Complex	2016.12.27
1-7	Magnetic Stirrer	4 sets	YCDC AID Complex	2016.12.27
1-8	Stirring Bar	15 pcs.	YCDC AID Complex	2016.12.27
1-9	Burette Stand	2 sets	YCDC AID Complex	2016.12.27
1-10	Set of glassware	1 set	YCDC AID Complex	2016.12.27
2-1	Jar Tester	1 set	YCDC AID Complex	2016.12.27
2-2	Sieve Shaker	1 set	YCDC AID Complex	2016.12.27
2-3	Test Sieves	2 sets	YCDC AID Complex	2016.12.27
2-4	Electronic Balance	1 set	YCDC AID Complex	2016.12.27
2-5	Interface Level Monitor	1 set	YCDC AID Complex	2016.12.27
3-1	Desiccator	1 set	YCDC AID Complex	2016.12.27
3-2	Vacuum Filter Holder	3 sets	YCDC AID Complex	2016.12.27
3-3	Bell Jar	2 sets	YCDC AID Complex	2016.12.27
3-4	Vacuum Pump	1 set	YCDC AID Complex	2016.12.27
3-5	Evaporation Dish	30 pcs.	YCDC AID Complex	2016.12.27
3-6	Filter Paper, 47mm dia.	2 boxes	YCDC AID Complex	2016.12.27

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment listed below for above-mentioned project have been received properly as of *December 27th, 2016* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office

- Name of the Equipment : Water quality monitoring equipment, Jar tester, Sieving test equipment and Interface level monitor
- General Description of the Equipment : Water quality monitoring and water quality improvement equipment
- Date of Handover : December 27th, 2016

(signature) _____

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

December 27th, 2016

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon.

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *March 28th, 2018* to *Yangon City Development Committee (YCDC)*.

(signature) _____

for.

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

March 28th, 2018

List of Equipment

No.	Name of Items	Qty.	Place of Delivery	Date of Handover
1	Desiccator	1 set	YCDC AID Complex	2018.3.28
3	Drying oven	1 set	YCDC AID Complex	2018.3.28

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *March 28th, 2018* to *Yangon City Development Committee (YCDC)*.

- Name of the Equipment : Desiccator and Drying oven
- General Description of the Equipment : Experimental equipment for water treatment process improvement
- Date of Handover : March 28th, 2018

(signature) _____

Mr. Aung San Win
Chief Engineer
Head of Department of Engineering
(Water and Sanitation), YCDC

March 28th, 2018

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon.

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *March 28th, 2018* to *Yangon City Development Committee (YCDC)*.

(signature)

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

March 28th, 2018

List of Equipment

No.	Name of Items	Qty.	Place of Delivery	Date of Handover
1	Portable flow meter UF801P	2 sets	YCDC AID Complex	2018.3.28
2	Extension cable 95m	2 sets	YCDC AID Complex	2018.3.28
3	Probe and support set SE1595	2 sets	YCDC AID Complex	2018.3.28

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of *March 28th, 2018* to *Yangon City Development Committee (YCDC)*.

- Name of the Equipment : Portable flow meter
- General Description of the Equipment : Ultrasonic flow meter for water treatment process improvement
- Date of Handover : March 28th, 2018

(signature) _____

Mr. Aung San Win
Chief Engineer
Head of Department of Engineering
(Water and Sanitation), YCDC

March 28th, 2018

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon.

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the books in the attached list for above-mentioned project have been handed over properly as of *February 9th, 2017* to *Yangon City Development Committee (YCDC)*.

(signature) 佐藤弘孝

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

February 9th, 2017

List of Equipment (Book)

No.	Name of Items	Qty.	Place of Delivery	Date of Handover
1	Standard Methods for the Examination of Water and Wastewater, 22nd Edition	1 copy	No. 390, YCDC Office Building	2017.2.9
2	Guidelines for drinking-water quality, 4th edition	1 copy	No. 390, YCDC Office Building	2017.2.9
3	Water quality data analysis and interpretation	1 copy	No. 390, YCDC Office Building	2017.2.9
4	Integrated Design and Operation of Water Treatment Facilities、2nd Edition	1 copy	No. 390, YCDC Office Building	2017.2.9
5	MWH's Water Treatment Principles and Design, 3rd Edition	1 copy	No. 390, YCDC Office Building	2017.2.9
6	Water Quality & Treatment: A Handbook on Drinking Water, 6th Edition	1 copy	No. 390, YCDC Office Building	2017.2.9

No.3-5 Manuals and reference book

CERTIFICATE OF RECEIPT

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the books listed below for above-mentioned project have been received properly as of *February 9th, 2017* to *Yangon City Development Committee (YCDC)* from Japan International Cooperation Agency (JICA) Myanmar Office

- Name of the Book :
  - Standard Methods for the Examination of Water and Wastewater, 22nd Edition
  - Guidelines for drinking-water quality, 4th edition
  - Water quality data analysis and interpretation
  - MWH's Water Treatment Principles and Design, 3rd Edition
  - Water Quality & Treatment: A Handbook on Drinking Water, 6th Edition
- General Description of the Book : Tutorial books Water quality monitoring and water treatment
- Date of Handover : February 9th, 2017

(signature) _____

Mr. Myint Oo
Chief Engineer
Head of Engineering Department
(Water and Sanitation), YCDC

February 9th, 2017

Yangon City Development Committee (YCDC) Office Building, Marchant Rd., Botahtaung Township, Yangon.

List of books

Delivered on 22/03/2017

	Title	Publisher	ISBN	Copy	Price (JPY)
1. AWWA Manual Series, and books					
1	M1 Principles of Water Rates, Fees, and Charges, sixth edition (30001-6E)	AWWA	9781613001370	1	17,930
2	M3 Safety Management for Utilities, seventh edition (30003-7E)	AWWA	9781583219997	1	13,860
3	M29 Fundamentals of Water Utility Capital Financing, fourth edition (30029-4E)	AWWA	9781625760166	1	12,540
4	M47 Capital Project Delivery, second edition (30047)	AWWA	9781583217566	1	14,300
5	M7 Problem Organisms in Water: Identification & Treatment, third edition (30007)	AWWA	9781583212929	1	15,510
6	M12 Simplified Procedures for Water Examination, sixth edition (30012-6E)	AWWA	9781583219973	1	15,510
7	M20 Water Chlorination & Chloramination Practices & Principles, second edition (30020)	AWWA	9781583214084	1	14,300
8	M37 Operational Control of Coagulation and Filtration Processes, third edition (30037)	AWWA	9781583218013	1	12,870
9	M48 Waterborne Pathogens, second edition (30048)	AWWA	9781583214039	1	17,600
10	M57 Algae: Source to Treatment (30057)	AWWA	9781583217870	1	31,020
11	M65 On-site Generation of Hypochlorite (30065)	AWWA	9781625760265	1	15,510
12	M2 Instrumentation & Control, third edition (30002)	AWWA	9781583211250	1	1,584
13	M6 Water Meters: Selection, Installation, Testing & Maintenance, fifth edition (30006-5E)	AWWA	9781583218624	1	14,300
14	M11 Steel Pipe: A Guide for Design and Installation, fourth edition (30011)	AWWA	9781583212745	1	15,510
15	M22 Sizing Water Service Lines and Meters, third edition (30022-3E)	AWWA	9781625760272	1	12,540
16	M23 PVC Pipe Design and Installation, second edition (30023)	AWWA	9781583211717	1	15,510
17	M28 Rehabilitation of Water Mains, third edition (30028-3E)	AWWA	9781583219706	1	11,770
18	M32 Computer Modeling of Water Distribution Systems, third edition (30032-3E)	AWWA	9781583218648	1	14,300
19	M33 Flowmeters in Water Supply, second edition (30033)	AWWA	9781583214527	1	11,770
20	M36 Water Audits and Loss Control Programs, 4th edition (30036-4E)	AWWA	9781625761002	1	16,500

CERTIFICATE OF HANDOVER

PROJECT TITLE: *"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC"*

This is to certify that the equipment in the attached list for above-mentioned project have been handed over properly as of 11th September 2017 to Yangon City Development Committee (YCDC).

(Signature)

Mr. Hirotaka SATO
Chief Advisor
JICA Technical Cooperation Project Team

11th September 2017

	Title	Publisher	ISBN	Copy	Price (JPY)
41	WSO: Water Quality, Fourth Edition	AWWA	9781583217801	1	16,761
42	WSO: Basic Science Concepts and Applications, Fourth Edition	AWWA	9781583217788	1	25,826
43	WSO: Water Treatment Student Workbook, Fourth Edition	AWWA	9781583217948	1	25,141
44	WSO: Water Transmission and Distribution Student Workbook, Fourth Edition	AWWA	9781583218006	1	11,459
45	WSO: Water Quality Student Workbook, Fourth Edition	AWWA	9781583217986	1	10,766
46	WSO: Basic Science Concepts and Applications Student Workbook, Fourth Edition	AWWA	9781583217993	1	12,998

3. Others

47	Strategy and Human Resource Management -Management, Work and Organisations- (4th Edition)	Palgrave MacMillan	9781137407634	1	7,217
49	Essentials of Organizational Behavior (13th Edition)	Pearson	9780133920819	1	21,856
50	Performance Indicators for Water Supply Services: Third Edition (Hardback)	IWA Publishing	9781780406329	1	20,930
51	Institutional Governance and Regulation of Water Services: Second Edition (Paperback)	IWA Publishing	9781780404509	1	11,570
52	GIS Tutorial 1 Basic Workbook, 10.3.x edition	Esri Press	9781589484566	1	8,159
53	GIS Tutorial 2 Spatial Analysis Workbook (for 10.3.x edition)	Esri Press	9781589484535	1	8,159
57	Principles of Water Treatment	John Wiley & Sons	9780470405383	1	13,316
	Total: 52 books			52	¥737,927

Requested but not available

35	Water Utility Accounting: Third Edition	AWWA	ASIN: B01A0BYZBI	1	N/A
48	Foundations of Human Resource Development (2nd Edition)	ReadHowYou Want	9781459609259	1	7,475
54	Red Book MDB (Pink Book) 2010, Conditions of Contract for Construction For Building and Engineering Works Designed by The Employer	FIDIC	2-88432-023-7	1	8,510
55	Yellow book, 1999, Conditions of Contract for Plant and Design Build for Electrical and Mechanical Plant, and For Building and Engineering Works, Designed by the Contractor	FIDIC	2-88432-021-0	1	12,200
56	Silver Book, 1999, Conditions of Contract for EPC/Turnkey Projects First Edition	FIDIC	2-88432-044-X	1	12,200

	Title	Publisher	ISBN	Copy	Price (JPY)
21	M41 Ductile-Iron Pipe and Fittings, third edition (30041)	AWWA	9781583216323	1	1,584
22	M44 Distribution Valves: Selection, Installation, Field Testing & Maintenance, third edition (30044-3E)	AWWA	9781625760821	1	11,770
23	M49 Butterfly Valves: Torque, Headloss and Cavitation Analysis, second edition (30029-2E)	AWWA	9781583218792	1	11,770
24	M51 Air-Release, Air/ Vacuum & Combination Air Valves (30051)	AWWA	9781583211526	1	9,680
25	M55 PE Pipe Design and Installation (30055)	AWWA	9781583213872	1	14,300
26	M21 Groundwater, fourth edition (30021-4E)	AWWA	9781583219645	1	15,510
27	M50 Water Resources Planning, second edition (30050)	AWWA	9781583214718	1	17,600
28	M52 Water Conservation Programs: A Planning Manual (30052)	AWWA	9781583213919	1	14,300
29	Benchmarking Water Services (20723)	AWWA	9781843391982	1	19,250
30	Utility Management for Water and Wastewater Operators (20721)	AWWA	9781583218235	1	17,600
31	Focus First on Service: The Voice and Face of Your Utility (20629)	AWWA	9781583214589	1	9,900
32	Communications and Customer Relations (47420)	AWWA	N/A	1	10,450
33	Communicating Water's Value: Talking Points, Tips & Strategies (20757)	AWWA	9781583219799	1	9,020
34	Financial Management for Water Utilities: Principles of Finance, Accounting, and Management Controls, Softcover edition (20743-PE)	AWWA	9781625761101	1	14,190
36	Cost Estimating Manual for Water Treatment Facilities	AWWA	978047172997	1	14,300
37	Water Treatment Plant Design, Fifth Edition, AWWA	McGraw-Hill	9780071745727	1	16,079

2. AWWA WSO (Water Supply Operation) Textbook and Workbook

38	WSO: Water Sources, Fourth Edition	AWWA	9781583217825	1	9,407
39	WSO: Water Treatment, Fourth Edition	AWWA	9781583217771	1	9,407
40	WSO: Water Transmission and Distribution, Fourth Edition	AWWA	9781583217818	1	22,918

資料－6： 合同調整委員会議事録等

MINUTES OF MEETING
OF THE JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA has dispatched the Expert Team to Myanmar for implementation of the Project.

The 1st meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project was held on 29th January, 2016 after the 1st Myanmar –Japan Joint Workshop on 27th and 28th January, 2016.

The following agenda was presented and discussed among the JCC participants including YCDC, JICA, JICA Advisory Committee, JICA Expert Team as an attached participants list.

1. The progress of the Project covering the period from July 2015 to January 2016
2. PDM ver.1 and PO ver. 1 to be attached in Monitoring Sheet ver.1
3. Procurement of materials and equipment for the Project

In the course of discussions, the progress of the Project was confirmed on track by both sides and main points of discussion and decisions are summarized in the attachment.

Yangon, 29th ~~February~~ January, 2016

佐藤 弘孝

Mr. Hirotaka SATO
Chief Advisor
The Project for Improvement of Water Supply Management of YCDC

Mr. Soe Si
Committee Member
Yangon City Development Committee (YCDC),
The Republic of the Union of Myanmar

Attachment: Main points of discussions

1. Modifications of Project Design Matrix (PDM) and Plan of Operation (PO)

Based on the results of the Baseline Survey, both sides understood that the modifications of PDM and PO from the version 0 to the version 1 were required, and the contents of modifications were confirmed among the JCC participants and finalized. The details of modification are given in Annex-1 and modified PDM and PO as version 1 are given in Annex-2 and Annex-3.

1.1 Addition of activity of "Prepare new overall organization structure"
(1-1) Prepare overall new organization structure
Responsible person: Mr. Thet Lwin

1.2 Addition of activity of "Establish Customer Service Division"
(1-3) Establish Customer Service Division
(1-3-1) Establish the Customer Service Division in Department of Water and Sanitation
(1-3-2) Define the division of duties of the Customer Service Division
Responsible person: Ms. Thwe Naing Oo

1.3 Addition of activities related to collection of Performance Indicators (PIs)
(1-4-4) Install transmission flow meter and data logger and collect flow data
(1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training
(1-4-6) Collect data required for setting PIs
Responsible person: Ms. Aye Aye Mar

1.4 Addition of activity of "Establish Water Treatment Section"
(3-1) Establish Water Treatment Section
(3-1-1) Establish Water Treatment Section in Department of Water and Sanitation
(3-1-2) Define the division of duties of the Water Treatment Section
(3-1-3) Hold a series of seminar for basic water treatment technology with study tours
Responsible person: Mr. Myint Sein

1.5 Addition of related activities to OJT on water quality management at the pilot treatment plants
(3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility
(3-5-1) Procure water quality analysis and water quality management equipment
(3-5-2) Conduct OJT on water quality test and monitoring
(3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant
(3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin

(3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant

(3-4-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility

(3-4-7) Verify SOP for water quality management

Responsible person: Mr. Myint Sein

1.6 Addition of activity of "Conduct OJT on improvement of water quality supplied from reservoirs"

(3-6) Conduct OJT on improvement of water quality supplied from reservoirs

(3-6-1) Review water quality problems in reservoir water

(3-6-2) Research water quality improvement measure of reservoir suppled water

Responsible person: Mr. Myint Sein

Note: Bold and italic letters are added activities.

2. Other Additional Activities with Conditionality

2.1 Activity of "Construct NRW management training yard and conduct training"

In the original plan (PDM ver. 0), OJT on NRW management by trainers at pilot site is planned. However, to implement these training more efficiently and effectively for more staff, YCDC has requested to construct a training yard including water meter test bench and to prepare training text If the necessity and role of training yard in a training plan on NRW management which is going to be prepared are confirmed, construction of training yard and successive training activities will be considered by Japanese side. In this case, local equipment and materials that YCDC can routinely procure and civil work will be responsibility of YCDC.

2.2 Activity of "Establish computerized management system of water tariff billing and collection database"

The current billing and collection system is made mostly by manual works, which contains many mistakes, lead to inefficient work requiring large manpower, and cause large commercial loss. YCDC is now working to shift from the current manual billing and collection system to computerized system in e-Government. A pilot project to test software of billing and collection system is being implemented and YCDC intends to extend this system to all townships in future after the pilot project. YCDC has requested Japanese side to support this activity. If the detailed implementation plan of this activity is submitted by YCDC, Japanese side will consider adding it in activity and assigning an expert.

3. Objectively Verifiable Indicator

Corresponding to the addition of activity of "Prepare overall new organization structure", the

following objectively verifiable indicator as Output of "Capacity of YCDC on institutional management of water supply utility is improved" is added.

"1-4 New organization structure is approved by Mayor"

4. Schedule of Setting PIs and their baseline data

In the original plan, PIs and their baseline data will be set approximately 6 months after the Project commencement. However, installation of flow meter (one of the important baseline data) and its training are required for 2 years from the commencement. The other indicators and baseline data will be set approximately 1 year after the Project commencement as PIs was set up in December 2015, 6 months after commencement, and baseline values need time to collect since most of the data is recorded in handwriting. Therefore, the following revision will be made.

"PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement."

5. Schedule of PO

Based on the Baseline Survey and additional activities above, the revised schedule of PO has been set as shown in Annex-3.

6. Procurement of Materials and Equipment

Based on the results of the Baseline Survey and the activities added as above, both sides confirmed the contents of provision of equipment required for 1) Transmission and distribution flow monitoring, 2) Water quality monitoring, 3) Non-revenue water (NRW) management, and 4) Collection of computerized data for performance indicators.

Materials and equipment for construction of district metering area (DMA) for NRW management measure as pilot project in Yankin will be identified in March 2016 when the design of DMA is completed. Then a list of additional materials and equipment required for the pilot project will be provided for consideration of procurement by the Japanese side. Both sides confirmed that in principle local materials and equipment which can be locally and routinely procured by YCDC would be prepared by YCDC.

YCDC confirmed undertakings of YCDC with its implementation schedule for provision of equipment and responsible counterparts as listed below including securing necessary budget.

Both sides confirmed that chambers for flow meters should be designed with proper countermeasures

against leakage and water immersion. Japanese expert supports to confirm the design.

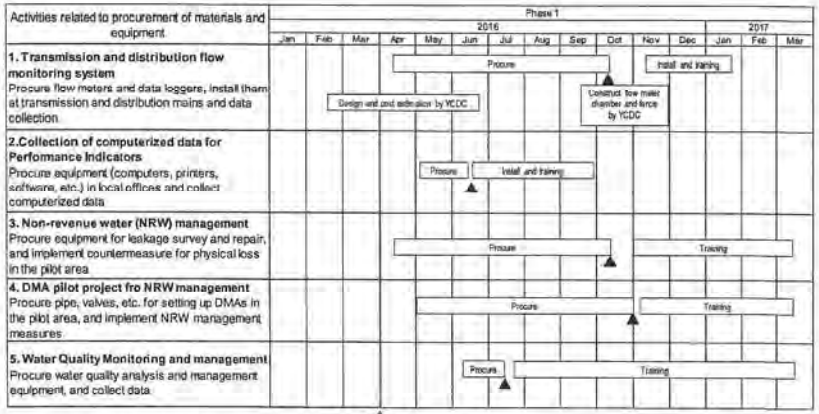
YCDC confirmed that they maintain and use the equipment and materials procured properly and effectively, and collect data, analyse data and prepare report using the equipment procured.

【List of Undertakings of YCDC】

Undertakings of YCDC	Responsible Counterparts	
	DYCE or ACE	Counterparts
Transmission and Distribution flow monitoring		
To design chambers for flow meters ※with assistance of Japanese experts on designing and supervising	Mr. Myint Sein	Mr. Zaw Min Htut
To obtain permission for digging by September 2016 (especially, at Shwedagon reservoir site etc.)		
To construct chambers for flow meters		
To take security measures for flow meters and panels (constructing gates and fences)		
To supply electricity to the site		
Collection of computerized data for Performance indicators		
To deliver and install all provided equipment (such as PCs) to each branch office.	Ms. Thwe Naing Oo	Ms. Aye Aya Mar
To secure space for installing PCs		
To procure consumables (including printer inks)		
To bear necessary operational costs for the training		
To update anti-virus software periodically		
To take security measures		
To prohibit from unintended use		
Non-revenue water management		
To procure materials which YCDC can procure locally and routinely	Mr. Thet Lwin	Mr. Zaw Min Htut
To secure storage space for the equipment and materials procured		
To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration)		
To proceed necessary procedures for approval for civil works		
Water quality monitoring		
To secure space for procured equipment in laboratory in Head Office.	Mr. Myint Sein	Ms. Ei Khine Mon
To set up site laboratories in water treatment plant and pumping stations.		
To allocate space for equipment in reservoir sites for equipment		
To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6 months after procurement and		

Undertakings of YCDC	Responsible Counterparts	
	DYCE or ACE	Counterparts
installation for training purpose)		
To assign necessary staff for C/Ps		
To conduct daily maintenance		

The planned schedule of design, procurement and construction related to procurement of materials and equipment are shown in the table below. YCDC will carry out their tasks according to this schedule, especially, of construction of chambers for flow meter. To start the procurement of materials and equipment and implement activities related to procurement of materials and equipment according to this schedule, the A4 request format is required to be submitted by the Myanmar side to the Japanese side by the end of March at latest, 2016. Otherwise, the related activities and the Project itself will be delayed. YCDC understood that the coordination and effort of the Myanmar side for expedition is required implementing the Project according to the schedule.



7. Other Materials and Equipment with Conditionality

7.1 Water Quality Monitoring

To analyze priority parameters of Myanmar water quality standards, UV-vis spectrophoto meter is required. However, reagent for this equipment is expensive in Myanmar and use of it is considered as not sustainable. Therefore, procurement of this equipment is still under the study.

7.2 NRW Management

As explained in 2.1, if construction of training yard is implemented, required yard house and local materials and equipment which YCDC can procure routinely will be procured by the Myanmar side.

8. Process for modification of PDM and PO

The necessary procedure of the modification of PDM was confirmed as below.

1) JCC proposes the amendment of the PDM and PO.
2) Amendment of Record of Discussions (R/D), including PDM and PO, is drafted and approved by JICA.
3) YCDC and JICA Myanmar Office sign Minutes of Meetings to amend R/D.

(End)

Annex-1: Contents of Modification for Additional Activities
Annex-2: PDM version 1
Annex-3: PO version 1

Annex-1: Contents of Modification for Additional Activities

1.1 Addition of activity of "Prepare overall new organization structure"

During the baseline survey, the JICA expert team found the Water and Sanitation Department lacks essential sections/divisions as waterworks. These sections/divisions include NRW Management, Planning, Customer Service, Water Treatment, and Transmission and Distribution Management. Establishment of NRW management Unit/Section and Planning Section is specified in the original PDM. If an organization structure is inadequate, adequate functions of waterworks are not served, which also jeopardize the outputs of the Project. Therefore, the activity to prepare overall new organization structure will be added in PDM ver.1. This activity includes review of existing organization, identification of required sections/divisions, and prepare overall new organization structure.

(1-1) Prepare overall new organization structure

1.2 Addition of activity of "Establish Customer Service Division"

Customer Service Division dealing with their customers deems essential as waterworks to respond to complaints, to maintain customer database, and to conduct tariff billing and collection for provision of better service to the customers. The following activities to establish this division will be added in PDM ver.1.

(1-3) Establish Customer Service Division
(1-3-1) Establish the Customer Service Division in Department of Water and Sanitation
(1-3-2) Define the division of duties of the Customer Service Division

1.3 Addition of activities related to collection of Performance Indicators (PIs)

In the course of the activity "(1-2-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.)" in PDM ver.0, it was found that production and transmission flow data and various data in local offices are essential for monitoring PIs to achieve Output 1. However, currently, almost no flow data is collected so that the essential values or indicators of water production volume and transmission flow as a waterworks are unknown. Therefore, to collect flow rate, flow meter system will be installed and flow data will be collected.

Furthermore, almost all data in all townships and local stations such as pumping station are kept in handwritten record and manually calculated. To collect values of performance indicators (PIs) and supporting data and analyse them more efficiently, computerized data will be generated and collected from local stations and townships installing computer, printer, etc.

Therefore, the following activities to collect flow data and computerized data from local offices will be added in PDM ver.1.

(1-3-4) Install transmission flow meter and data logger and collect flow data
(1-3-5) Procure equipment (computers, printers, etc.) for computerized data management system in local offices and conduct training
(1-3-6) Collect data required for setting PIs

1.4 Addition of activity of "Establish Water Treatment Section"

Previously, there is no water treatment plant in Yangon but the first water treatment plant was constructed at Nyaunghnapin in 2005 and the second phase of Nyaunghnapin was constructed in 2013. Furthermore, Lagunbyin water treatment plant is under construction and a feasibility study on Kokkowa water treatment plant is being carried out as the first river water treatment plant. The water treatment plant is going to increase in future. However, there is no section on water treatment and enough knowledge and experience on treatment technology are not accumulated. To produce safe and clean water, acquiring and developing water treatment technology and capacity of planning, designing and operation and maintenance of treatment plant is required and water treatment engineers should be developed. For these purposes, Water Treatment Section deems essential as a focal point on water treatment technology. The following activities to establish Water Treatment Section will be added in PDM ver.1.

(3-1) Establish Water Treatment Section
(3-1-1) Establish Water Treatment Section in Department of Water and Sanitation
(3-1-2) Define the division of duties of the Water Treatment Section
(3-1-3) Hold a series of seminar for basic water treatment technology with study tours

1.5 Addition of related activities to OJT on water quality management at the pilot treatment plants

Some of the design criteria of the Nyaunghnapin water treatment plant are unknown, the filter cannot perform well, and some design has defect. Therefore, the preparation of operation and maintenance manuals and standard operation procedure (SOP) which planned as activity 3-3-1 in PDM ver.0 is not possible now. To achieve proper function of the water treatment plant, improvement measures are required and, as a result, adequate manuals and SOPs can be prepared and O&M training can be possible. Therefore, the following activities in bold and italic will be added in PDM ver.1.

(3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility
(3-5-1) Procure water quality analysis and water quality management equipment
(3-5-2) Conduct OJT on water quality test and monitoring

(3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant
(3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin
(3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant
(3-4-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility
(3-4-7) Verify SOP for water quality management

1.6 Addition of activity of "Conduct OJT on improvement of water quality supplied from reservoirs"

In the activity of "(3-4) Conduct OJT on water quality management at the pilot treatment plants and disinfection facilities" in PDM ver. 0, OJT on water quality management targets the pilot treatment plants and disinfection facilities but not reservoir water quality. In the course of the baseline survey, it was found that the improvement of reservoir water is also required. Water of Gyobyu, Phugyi, and Hlawga reservoirs is supplied directly to the city without treatment so that supplied water contains foreign substances such as suspended solid (SS). Even if water from water treatment plant is safe and clean, without improvement of quality of water supplied from reservoirs, city water overall is not safe and clean. In addition, SS from reservoirs chokes customer water meter, which causes damage to water meter.

To achieve Output 3, improving reservoir water quality is essential to supply clean water and solve meter damage. For this purpose, the following activities will be added.

(3-6) Conduct OJT on improvement of water quality supplied from reservoirs
(3-6-1) Review water quality problems in reservoir water
(3-6-2) Research water quality improvement plan of reservoir suppled water

Note: Bold and italic letters are added activities.

(1-4-3) Identify the important and available Performance indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically (1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system (1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings (1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans (1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model	Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, PR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	accessories) ➢ To supply electricity to the site • Water quality monitoring ➢ To secure space for provisional equipment in laboratory in Head Office. ➢ To allocate space for equipment in reservoir site for equipment. ➢ To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) • Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) • Collection of computerized data for Performance indicators ➢ To deliver and installation of all provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs ➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the training ➢ To update anti-virus software periodically • Civil work (construction of flow meter chamber), Safety fence for flow meters and panels, and electricity supply for flow meter installation	

ANNEX-2: PDM version 1

Project Name : **The Project for Improvement of Water Supply Management of YCDC (PDM Ver.1)**
Executing Agency : **Yangon City Development Committee (hereinafter referred as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5 years (5th July to 4rd July 2020)
PDM Version 1 (February 2016)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The performance indicators (PIs) are improved compared to the data at the Project commencement[1] 2. NRW is decreased from xx% to xx% in the water supply area of YCDC 3. The ratio of water quality test results which satisfy water quality standards is increased from xx% to xx%.	Reports prepared by YCDC	
[Project Purpose] Capacity of YCDC on the management of water supply service is improved.	1. Evaluation of PIs is conducted periodically 2. NRW is decreased from xx% to xx% in the pilot area 3. The ratio of water quality test results which satisfy water quality standard is increased from xx% to xx%. in the pilot treatment plants[1]	Reports prepared by YCDC	Fund for YCDC to enable it to execute construction and rehabilitation of facilities such as water treatment plants, disinfection equipment and pipelines is available.
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for institutional management is approved by Yangon Region Government. 1-2 Plan for human resources development is approved by Yangon Region Government. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by Yangon Region Government 1-4 New organization structure is approved by Mayor.	Reports prepared by YCDC	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 2-2 Information of customers and pipes for the pilot areas is compiled and updated 2-3 xx% of YCDC staff participates training on NRW 2-4 Plan for NRW reduction is approved by YCDC	Reports prepared by YCDC	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 3-2 Result of the water quality test at the pilot treatment plants is recorded and monitored periodically 3-3 xx% of YCDC staff participates training on water quality 3-4 Plan for improvement of water quality is approved by YCDC	Reports prepared by YCDC	

[Activities]	[Inputs]		
	Japanese side	**Myanmar side**	**[Pre-condition]**
1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators.	1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management-NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of	1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities • Distribution flow monitoring ➢ To design and construct chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other	1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

[1] The pilot water treatment plants will be existing Nyaunghnapin Water Treatment Plant and Lagunbyin Water Treatment Plant under construction.

Annex-3: PO version 1

The Project for mprovement of Water Supply Management of YCDC
Plan of Operation (PO) ver.1

As of February 2016

PO Activity No.	Expected Outcomes	Necessary Duration	Schedule: Phase 1 2015 Jul-Sep	2015 Oct-Dec	2016 Jan-Mar	2016 Apr-Jun	2016 Jul-Sep	2016 Oct-Dec	2017 Jan-Mar	Phase 2 2017	2018	2019	2020	Responsible Exper/YCDC Organization: Japan	YCDC	Collaborators
Chief Advisor / Water Supply Operation (CA)																
Institutional Capacity Development / Human Resource Management (HR)																
Deputy CA/ Planning / Monitoring (DCA/Plan)																
Financial / Business Management (FBM)																
NRW (Physical Loss(PL))																
NRW (Commercial Loss(NPL))																
GIS																
O&M of Water Supply Facilities (O&M)																
Water Quality Management (WQM)																
Assistance for Water Supply Operation (AWSO)																
Project Coordination/ Assistance for Planning / Monitoring																
Preparation of Work Plan Phase 1 (Draft) and Monitoring Sheet Ver.1 and Discussion			▬		▬									CA		
Preparation of Work Plan Phase 2 (Draft) and Monitoring Sheet Ver.4 and Discussion										▬				CA		
Baseline Survey (Implementation of Capacity Assessment)			▬		▬									All	All CP	
Confirmation of Work Plan and Monitoring Sheet Ver.1					△									CA		
Preparation of Monitoring Sheet Ver.2~ Ver.8							△		△		△	△	△	CA		
Study of training in Japan and third country and implementation								▬			▬			DCA, HR		
Study of materials to be procured and their procurement			▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	CA, DCA/Plan	Relevant CP	
Preparation of project progress report (Phase 1)									▬					CA, DCA		
End line survey													▬	All		
Preparation of project completion report													▪	CA, DCA		
Output 1: Capacity of YCDC on institutional management is improved.																
1-1 Prepare overal new organization structure					▬	▬	▬	▬	▬	▬				CA, DCA, HR		
1-2 Establish Planning Section														CA, DCA/Plan	Team 1-1	
1-2-1 Establish the Planning Section in Department of Water and Sanitation			▬	▬	▬	▬	▬	▬	▬							
1-2-2 Define the division of duties of the Planning Section			▬	▬	▬	▬	▬	▬	▬							
1-3 Establish Customer Service Division														CA, DCA/Plan, FBM, New expert	Team 1-3, Team 2	
1-3-1 Establish the Customer Service Division in Department of Water and Sanitation					▬	▬	▬	▪	▪	▪						
1-3-2 Define the division of duties of the Customer Service Division							▬	▪	▪	▪						
1-4 Develop and Monitor Performance Indicators (PIs)														Plan	Team1-1, Proposed	
1-4-1 Review the current method of calculation and monitoring of performance data			▬	▬	▬											
1-4-2 Conduct training of trainers on the calculation and monitoring of Performance Indicators.					▬	▬	▬	▬	▬	▬	▬	▬	▬			
1-4-3 Identify the necessary and available Performance Indicators to be monitored				▬	▬	▬	▬	▬	▬	▪	▪	▪	▪			
1-4-4 Install transmission flow meter and data logger and collect flow data					▬	▬	▬	▬	▬	▬						
1-4-5 Procure equipment (computers, printers, software, etc.) in local offices and conduct training					▬	▬	▬	▬	▬							
1-4-6 Collect data required for setting PIs					▬	▬	▬	▬	▬	▬	▪	▪	▪			
1-4-7 Develop calculation method, manuals and monitoring system of Performance Indicators					▬	▬	▬	▬	▬	▪	▪	▪	▪			

of activities
(2-3-11) Implement OJT by the trainers in the pilot area
(2-3-12) Verify the manuals on physical loss

(2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development
(2-4-1) Review current situation and develop phased countermeasures
(2-4-2) Conduct trainings of trainers
(2-4-3) Prepare training plan and training materials by the trainers
(2-4-4) Formulate manuals on commercial loss
(2-4-5) Conduct Off-JT by the trainers
(2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area
(2-4-7) Conduct the countermeasures against commercial loss in the pilot area
(2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities
(2-4-9) Implement OJT by the trainers in the pilot area
(2-4-10) Verify the manuals on commercial loss

(2-5) Develop and support implementation of the NRW management plans
(2-5-1) Develop 5-year and 10-year NRW management plans
(2-5-2) Launch priority activities as a part of implementing the 5-year NRW management plan

3. Capacity of YCDC on water quality management is improved.

(3-1) Establish Water Treatment Section
(3-1-1) Establish Water Treatment Section in Department of Water and Sanitation
(3-1-2) Define the division of duties of the Water Treatment Section
(3-1-3) Hold a series of seminar for basic water treatment technology with study tours

(3-2) Review current situation and formulate phased countermeasures

(3-3) Conduct training of trainers on water quality management
(3-3-1) Conduct training of trainers on the water quality management
(3-3-2) Prepare the training plan and training materials by the trainers
(3-3-3) Conduct Off-JT by the trainers

(3-4) Develop SOP for water quality management
(3-4-1) Develop SOP on water quality test and monitoring
(3-4-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility

(3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility
(3-5-1) Procure water quality analysis and water quality management equipment
(3-5-2) Conduct OJT on water quality test and monitoring
(3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant
(3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin
(3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant
(3-5-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility
(3-5-7) Verify SOP for water quality management

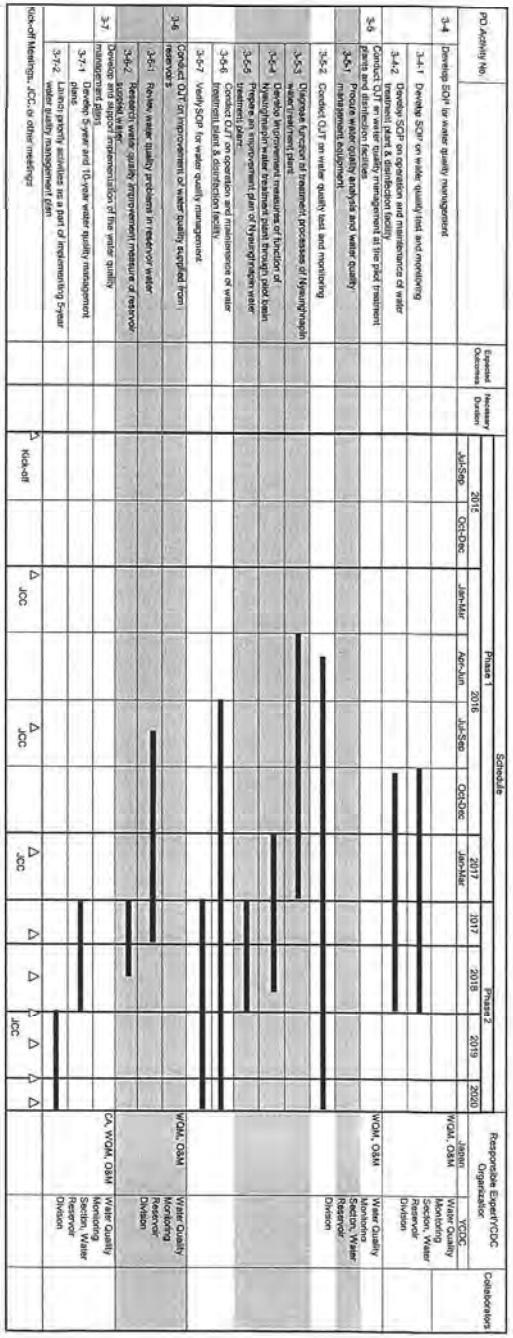
(3-6) Conduct OJT on improvement of water quality supplied from reservoirs
(3-6-1) Review water quality problems in reservoir water
(3-6-2) Research water quality improvement measure of reservoir supplied water

(3-7) Develop and support implementation of the water quality management plans
(3-7-1) Develop 5-year and 10-year water quality management plans
(3-7-2) Launch priority activities as a part of implementing 5-year water quality management plan

[1] PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.

PO Activity No.			Expected Outcomes	Necessary Duration	Schedule: Phase 1 2015 Jul-Sep	2015 Oct-Dec	2016 Jan-Mar	2016 Apr-Jun	2016 Jul-Sep	2016 Oct-Dec	2017 Jan-Mar	Phase 2 2017	2018	2019	2020	Responsible Exper/YCDC Organization: Japan	YCDC	Collaborators
	2-3-6	Select a pilot areas for NRW management activities																
	2-3-7	Prepare action plan and procurement of equipment (leakage survey and repair) for the countermeasure to be taken for physical loss in the pilot area																
	2-3-8	Set up DMAs at the pilot area (including procure materials and construct DMA)																
	2-3-9	Conduct the countermeasures against physical loss in the pilot area																
	2-3-10	Evaluate cost-benefit of countermeasures against physical loss of the pilot area and formulate the optimal mode of activities																
	2-3-11	Implement OJT by the trainers																
	2-3-12	Verify the manuals on physical loss																
2-4	Develop a model on the management of commercial (non-physical) loss (meter fault, miss reading of meter, illegal connection) and human resources development															NRW(NPL)	Team2, Yankin Township, Proposed NRW Management Section	
	2-4-1	Review current situation and develop phased countermeasures																
	2-4-2	Conduct trainings of trainers																
	2-4-3	Prepare training plan and training materials by the trainers																
	2-4-4	Formulate manuals on commercial loss																
	2-4-5	Conduct Off-JT by the trainers																
	2-4-6	Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area																
	2-4-7	Conduct the countermeasures against commercial loss in the pilot area																
	2-4-8	Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal mode of activities																
	2-4-9	Implement OJT by the trainers in the pilot area																
	2-4-10	Verify the manuals on commercial loss																
2-5	Develop and support implementation of the NRW management plans															CA, NRW	Team2, Proposed NRW Management Section	
	2-5-1	Develop 5-year and 10-year NRW management plans																
	2-5-2	Launch priority activities as a part of implementing the 5-year NRW management plan																
Output 3. Capacity of YCDC on water quality management is improved.																		
3-1	Establish Water Treatment Section															CA, DCA/Plan, FBM, New expert	Team 1-3, Team 2	
	3-1-1	Establish the Water Treatment Section in Department of Water and Sanitation																
	3-1-2	Define the division of duties of the Water Treatment Section																
	3-1-3	Hold a series of seminar for basic water treatment technology with study tours in treatment facilities																
3-2	Review current situation and formulate phased countermeasures															WQM, O&M	Team3	
3-3	Conduct training of trainers on water quality management															WQM, O&M	Water Quality Monitoring Section, Water Reservoir Division	
	3-3-1	Conduct training of trainers on the water quality management																
	3-3-2	Prepare the training plan and training manuals by the trainers																
	3-3-3	Conduct Off-JT by the trainers																

PO Activity No.			Expected Outcomes	Necessary Duration	Schedule: Phase 1 2015 Jul-Sep	2015 Oct-Dec	2016 Jan-Mar	2016 Apr-Jun	2016 Jul-Sep	2016 Oct-Dec	2017 Jan-Mar	Phase 2 2017	2018	2019	2020	Responsible Exper/YCDC Organization: Japan	YCDC	Collaborators
	1-4-8	Calculate Performance Indicators																
	1-4-9	Update and monitor the Performance Indicators periodically																
1-5	Formulate regulations, standards and guidelines															Plan	Team1-2, Proposed Planning Section	
	1-5-1	Review the existing rules, regulations, standards and guidelines																
	1-5-2	Identify regulation, standards and guidelines to be modified and/or newly formulated																
	1-5-3	Draft necessary regulation, standards and guidelines, which can be prepared by YCDC																
1-6	Enhance understanding on financial management															FBM	Team1-3 (Finance Section)	
	1-6-1	Analyze the current financial management system																
	1-6-2	Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans																
	1-6-3	Conduct OJT on development of asset ledger																
1-7	Strengthen Public Relations															AWSO	Administration Section	
	1-7-1	Analyze the effective public relations on water service of YCDC																
	1-7-2	Conduct awareness raising of YCDC staff																
	1-7-3	Conduct OJT on the public relations activities																
1-8	Strengthen human resources development															HR	Team1-4 (Administration Section)	
	1-8-1	Review the existing human resources development system																
	1-8-2	Identify necessary improvement on structure and materials of the trainings																
	1-8-3	Conduct trainings of trainers for planning and organizing the trainings																
	1-8-4	Develop 5-year and 10-year human resources development plans																
	1-8-5	Launch priority activities as a part of implementing the 5-year human resources development plan																
1-9	Develop and support implementation of the institutional management plans															CA, DCA/Plan, FBM, HR, AWSO	Team1-1, 1-2, 1-3, 1-4	
	1-9-1	Develop 5-year and 10-year institutional management plans																
	1-9-2	Launch priority activities as a part of implementing the 5-year institutional management plan																
Output 2. Capacity of YCDC on NRW management is improved.																		
2-1	Establish NRW Management Unit															CA, NRW	Team2	
	2-1-1	Establish NRW Management Unit																
	2-1-2	Define the division of duties of NRW Management Unit																
2-2	Collect and compile information of NRW															NRW	Team2, Proposed NRW Management Section	
	2-2-1	Collect information of NRW and implement a baseline survey																
	2-2-2	Compile information of pipes for establishment of GIS																
	2-2-3	Compile customer information into database																
	2-2-4	Formulate Standard Operation Procedure (SOP) of the above information management																
2-3	Develop a model on the management of physical loss (leakage, over flow) and human resources development															NRW(PL)	Team2, Yankin Township, Proposed NRW Management	
	2-3-1	Review current situation and develop phased countermeasures																
	2-3-2	Conduct trainings of trainers																
	2-3-3	Prepare training plan and training materials by the trainers																
	2-3-4	Formulate manuals on physical loss																
	2-3-5	Conduct Off-JT by the trainers																



MINUTES OF MEETING
OF THE JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 2nd meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 24th August, 2016.

The following agenda was presented and discussed among the JCC participants including YCDC counterparts, JICA, and JICA Expert Team as an attached participants list.

1. The progress of the Project covering the period from February to August 2016
2. Progress of procurement of equipment and materials and its related activities
3. Confirmation of Recommendations and Conclusions of 1st JCC
4. Progress of re-organization plan and confirmation of necessary process
5. Facilitation of Non-revenue water (NRW) management
6. Confirmation of water quality improvement plan for WTP
7. Modification of Plan of Operation (PO) and Monitoring Sheet Version 2

In the course of discussions, it was confirmed by both sides that the progress of the Project is on the track except the pilot project for NRW management. Modified PO given in Annex-1 was agreed in both sides. Main points discussed and decided are summarized in the attachment.

Yangon, 7th October, 2016

Mr. Hirotaka Sato
Chief Advisor
The Project for Improvement of Water Supply Management of YCDC

Daw May May Thwe
Committee Member
Yangon City Development Committee (YCDC),
The Republic of the Union of Myanmar

Attachment: Main points discussed and decided

1. Confirmation of Recommendations and Conclusions of 1st JCC

The following recommendations and conclusions adopted in the 1st JCC were reconfirmed as a YCDC important policy.

(1) Adopt six visions for goals of Engineering Department (Water and Sanitation) (EDWS) of YCDC

(2) Study recommendations made by JICA Advisory Committee, JICA and JICA Experts and implement it with our continuous best effort to achieve YCDC's visions

(3) Continue Capacity Building (training) based on Modified PDM version 1 and PO version 1 in cooperation with JICA Experts aiming at making a good business cycle

(4) Assure new organization structure for more efficient and effective management of EDWS

(5) Sustainable management style suitable for Myanmar will be continuously studied, with assistance of JICA Experts and further JICA assistance

2. Other Additional Activities with Conditionality

The following additional activities proposed in the 1st JCC will be further studied and discussed in the next JCC (3rd).

(1) Construction of NRW management training yard and conducting trainings utilizing the yard

(2) Establish computerized management system of water tariff billing and collection database

3. Procurement of Materials and Equipment

The current status of procurement of equipment was presented by the JICA expert and future schedule is set as follows.

No.	Item		Jul 2016	Aug	Sep	Oct	Nov	Dec	Jan 2017	Feb	Mar	Apr	May	Jun
1	Flow monitoring system		Preparing Tender docs			Tendering and procurement								
		YCDC			Design			Construction						
2	Equipment for electric data and PIs		Procurement			Set-up and operation								
3	Water quality management		Preparing Tender docs			Tendering and procurement				Water quality analysis for reservoirs Experiment in WTP				
4	NRW management	Detection	Preparing Tender docs				Tendering and procurement						Start of pilot project	
		Excavator	Procurement			Tendering and procurement								
		Pipe, valves, fittings, etc	Preparing Tender docs				Tendering and procurement							
5	Reference books													

The current status and schedule of procurement of equipment

4. Comments from chair (Secretary)

- Organization Chart

  For approval process of the Organization Reform was explained as follows:

  1) Approval from the Mayor.
  The proposal will be submitted and explained by YCDC.

  2) Approval by the Region Government.
  The proposal will be submitted and explained by YCDC.

  3) Approval by the Cabinet (Regional Cabinet)
  The proposal will be submitted and explained by the Mayor
  Recommendation letter will be attached by the Regional Government.

  4) Approval by the Union Government.
  The proposal will be submitted and explained by the Regional Government.

- Human Resources Development (HRD)

  HDR section has clarified the duties and responsibilities for enhancing staff's understanding and has conducted surveys to promote staffs' capacity development. New sections in the proposed organization chart are imperative for EDWS.

- Customer Services & Public Relation

  The new government's policy is citizens' centered policy. So the duties of Customer Service Team

and Public Relations Team are vital and need to implement systematically.

- Regulations, Standards & Guidelines
  All stakeholders should understand YCDC's regulations, standards and guidelines well. YCDC should make a clear standard and guideline for ourselves, the public and other stakeholders. Since it is essential for the YCDC, I would like to request JICA Expert Team to help us make secured and accurate standards and guidelines as early as possible.

- GIS
  Other Departments such as Urban Development Department also have GIS sections. In term of data collection, arrangement and management, there should be good coordination among the departments. Accurate and detailed data would be helpful, supportive and effective for the whole YCDC.

- Laboratory
  For preparing a laboratory, chemicals and equipment should be prioritized toward a standard laboratory. To gain sustainability, chemicals and equipment must be able to be purchased by YCDC in the future in terms of budget and procurement route.

5. Recommendations and Conclusions

The following recommendations and conclusions have been adopted as an important policy of DEWS in the meeting.

(1) New organization structure
- Mid-long term targets (future ideal image) and achievement state of the Project will be prepared for all other new sections
- New sections and division should be adapted and functionalized in the entire organization of EDWS.
- New organization structure will be reviewed and finalized, and a process to obtain approval from necessary authority will start.

(2) Sustainable management style suitable for Myanmar will be continuously studied
- Preparation will be started toward independent and financially self-sufficient utility in future

(3) NRW management is set as a top priority in the policies of EDWS and implementation of NRW reduction measures is facilitated.

(4) Water quality improvement in treatment plant and direct supply of reservoir water is facilitated.

6. Modification of Schedule of PO

Based on the delay of pilot project for NRW management, the revised schedule of PO as version 2 has been set as shown in Annex-1.

7. Process for modification of PDM and PO

It was confirmed that the modification of PDM requires amendment of R/D but the modification of only PO does not require amendment of R/D. In this time, PDM was not modified but only PO was. Therefore, modification of R/D is not required in this time.

(End)

Annex-1: Plan of Operation (PO) version 2 (Modified Schedule)

ANNEX-1: PO Version 2

The Project for Improvement of Water Supply Management of YCDC
Plan of Operation (PO) ver. 2

As of August 2016

Schedule: Phase 1 (2015 Jul-Sep, Oct-Dec; 2016 Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec; 2017 Jan-Mar); Phase 2 (2017, 2018, 2019, 2020)

PO Activity No.		Responsible Expert/YCDC Organization: Japan	Responsible Expert/YCDC Organization: YCDC	Collaborators
Chief Advisor / Water Supply Operation (CA)				
Institutional Capacity Development / Human Resource Management (HR)				
Deputy CA/ Planning / Monitoring (DCA/Plan)				
Financial / Business Management (FBM)				
NRW (Physical Loss(PL))				
NRW (Commercial Loss(NPL))				
GIS				
O&M of Water Supply Facilities (O&M)				
Water Quality Management (WQM)				
Assistance for Water Supply Operation (AWSO)				
Project Coordination/ Assistance for Planning / Monitoring				
Preparation of Work Plan Phase 1 (Draft) and Monitoring Sheet Ver.1 and Discussion		CA		
Preparation of Work Plan Phase 2 (Draft) and Monitoring Sheet Ver.4 and Discussion		CA		
Baseline Survey (Implementation of Capacity Assessment)		All	All CP	
Confirmation of Work Plan and Monitoring Sheet Ver.1		CA		
Preparation of Monitoring Sheet Ver.2~Ver.8		CA		
Study of training in Japan and third country and implementation		DCA, HR		
Study of materials to be procured and their procurement		CA, DCA/Plan	Relevant CP	
Preparation of project progress report (Phase 1)		CA, DCA		
End line survey		All		
Preparation of project completion report		CA, DCA		
Output 1: Capacity of YCDC on Institutional management is improved.				
1-1	Prepare overall new organization structure	CA, DCA, HR		
1-2	Establish Planning Section	CA, DCA/Plan	Team 1-1	
1-2-1	Establish the Planning Section in Department of Water and Sanitation			
1-2-2	Define the division of duties of the Planning Section			
1-3	Establish Customer Service Division	CA, DCA/Plan, FBM, New expert	Team 1-3, Team 2	
1-3-1	Establish the Customer Service Division in Department for Water and Sanitation			
1-3-2	Define the division of duties of the Customer Service Division			
1-4	Develop and Monitor Perfomance Indicators (PIs)	Plan	Team1-1, Proposed	
1-4-1	Review the current method of calculation and monitoring of performance data			
1-4-2	Conduct training of trainers on the calculation and monitoring of Performance Indicators.			
1-4-3	Identify the necessary and available Performance Indicators to be monitored			
1-4-4	Install transmission flow meter and data logger and collect flow data			
1-4-5	Procure equipment (computers, printers, software, etc.) in local offices and conduct training			
1-4-6	Collect data required for setting PIs			
1-4-7	Develop calculation method, manuals and monitoring system of Performance Indicators			
1-4-8	Calculate Performance Indicators			
1-4-9	Update and monitor the Performance Indicators periodically			
1-5	Formulate regulations, standards and guidelines	Plan	Team1-2, Proposed Planning Section	
1-5-1	Review the existing rules, regulations, standards and guidelines			
1-5-2	Identify regulation, standards and guidelines to be modified and/or newly formulated			
1-5-3	Draft necessary regulation, standards and guidelines, which can be prepared by YCDC			
1-6	Enhance understanding on financial management	FBM	Team1-3 (Finance Section)	
1-6-1	Analyze the current financial management system			
1-6-2	Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans			
1-6-3	Conduct OJT on development of asset ledger			
1-7	Strengthen Public Relations	AWSO	Administration Section	
1-7-1	Analyze the effective public relations on water service of YCDC			
1-7-2	Conduct awareness raising of YCDC staff			
1-7-3	Conduct OJT on the public relations activities			
1-8	Strengthen human resources development	HR	Team1-4 (Administration Section)	
1-8-1	Review the existing human resources development system			
1-8-2	Identify necessary improvement on structure and materials of the trainings			
1-8-3	Conduct trainings of trainers for planning and organizing the trainings			
1-8-4	Develop 5-year and 10-year human resources development plans			
1-8-5	Launch priority activities as a part of implementing the 5-year human resources development plan			
1-9	Develop and support implementation of the institutional management plans	CA, DCA/Plan, FBM, HR, AWSO	Team1-1, 1-2, 1-3, 1-4	
1-9-1	Develop 5-year and 10-year institutional management plans			
1-9-2	Launch priority activities as a part of implementing the 5-year institutional management plan			

Schedule: Phase 1 (2015 Jul-Sep, Oct-Dec; 2016 Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec; 2017 Jan-Mar); Phase 2 (2017, 2018, 2019, 2020)

PO Activity No.		Responsible Expert/YCDC Organization: Japan	Responsible Expert/YCDC Organization: YCDC	Collaborators
Output 2. Capacity of YCDC on NRW management is improved.				
2-1	Establish NRW Management Unit	CA, NRW	Team2	
2-1-1	Establish NRW Management Unit			
2-1-2	Define the division of duties of NRW Management Unit			
2-2	Collect and compile information of NRW	NRW	Team2, Proposed NRW Management Section	
2-2-1	Collect information of NRW and implement a baseline survey			
2-2-2	Compile information of pipes for establishment of GIS			
2-2-3	Compile customer information into database			
2-2-4	Formulate Standard Operation Procedure (SOP) of the above information management			
2-3	Develop a model on the management of physical loss (leakage, over flow) and human resources development	NRW(PL)	Team2, Yankin Township, Proposed NRW Management	
2-3-1	Review current situation and develop phased countermeasures			
2-3-2	Conduct trainings of trainers			
2-3-3	Prepare training plan and training materials by the trainers			
2-3-4	Formulate manuals on physical loss			
2-3-5	Conduct Off-JT by the trainers			
2-3-6	Select a pilot areas for NRW management activities			
2-3-7	Prepare action plan and procurement of equipment (leakage survey and repair) for the countermeasure to be taken for physical loss in the pilot area			
2-3-8	Set up DMAs at the pilot area (including procure materials and construct DMA)			
2-3-9	Conduct the countermeasures against physical loss in the pilot area			
2-3-10	Evaluate cost-benefit of countermeasures against physical loss of the pilot area and formulate the optimal model of activities			
2-3-11	Implement OJT by the trainers			
2-3-12	Verify the manuals on physical loss			
2-4	Develop a model on the management of commercial (non-physical) loss (meter fault, miss reading of meter, illegal connection) and human resources development	NRW(NPL)	Team2, Yankin Township, Proposed NRW Management Section	
2-4-1	Review current situation and develop phased countermeasures			
2-4-2	Conduct trainings of trainers			
2-4-3	Prepare training plan and training materials by the trainers			
2-4-4	Formulate manuals on commercial loss			
2-4-5	Conduct Off-JT by the trainers			
2-4-6	Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area			
2-4-7	Conduct the countermeasures against commercial loss in the pilot area			
2-4-8	Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities			
2-4-9	Implement OJT by the trainers in the pilot area			
2-4-10	Verify the manuals on commercial loss			
2-5	Develop and support implementation of the NRW management plans	CA, NRW	Team2, Proposed NRW Management Section	
2-5-1	Develop 5-year and 10-year NRW management plans			
2-5-2	Launch priority activities as a part of implementing the 5-year NRW management plan			
Output 3. Capacity of YCDC on water quality management is improved.				
3-1	Establish Water Treatment Section	CA, DCA/Plan, FBM, New expert	Team 1-3, Team 2	
3-1-1	Establish the Water Treatment Section in Department of Water and Sanitation			
3-1-2	Define the division of duties of the Water Treatment Section			
3-1-3	Hold a series of seminar for basic water treatment technology with study tours in treatment facilities			
3-2	Review current situation and formulate phased countermeasures	WQM, O&M	Team3	
3-3	Conduct training of trainers on water quality management	WQM, O&M	Water Quality Monitoring Section, Water Reservoir Division	
3-3-1	Conduct training of trainers on the water quality management			
3-3-2	Prepare the training plan and training manuals by the trainers			
3-3-3	Conduct Off-JT by the trainers			
3-4	Develop SOP for water quality management	WQM, O&M	Water Quality Monitoring Section, Water Reservoir Division	
3-4-1	Develop SOP on water quality test and monitoring			
3-4-2	Develop SOP on operation and maintenance of water treatment plant & disinfection facility			
3-5	Conduct OJT on water quality management at the pilot treatment plants and disinfection facilities	WQM, O&M	Water Quality Monitoring Section, Water Reservoir Division	
3-5-1	Procure water quality analysis and water quality management equipment			
3-5-2	Conduct OJT on water quality test and monitoring			
3-5-3	Diagnose function of treatment processes of Nyaunghnapin water treatment plant			
3-5-4	Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin			
3-5-5	Prepare an improvement plan of Nyaunghnapin water treatment plant			
3-5-6	Conduct OJT on operation and maintenance of water treatment plant & disinfection facility			
3-5-7	Verify SOP for water quality management			
3-6	Conduct OJT on improvement of water quality supplied from reservoirs	WQM, O&M	Water Quality Monitoring Reservoir Division	
3-6-1	Review water quality problems in reservoir water			
3-6-2	Research water quality improvement measure of reservoir supplied water			
3-7	Develop and support implementation of the water quality management plans	CA, WQM, O&M	Water Quality Monitoring Section, Water Reservoir Division	
3-7-1	Develop 5-year and 10-year water quality management plans			
3-7-2	Launch priority activities as a part of implementing 5-year water quality management plan			
Kick-off Meetings, JCC, or other meetings	△ Kick-off; △ JCC; △ JCC; △ JCC; △; △; △ JCC; △; △; △			

: Addition of activities in PO Version 1
: New schedule in PO Version 2

MINUTES OF MEETING
OF THE THIRD JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 3rd meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 1st February, 2017, after the 2nd Myanmar Japan Joint Seminar on 30th January to 1st February 2017. The JICA Advisory Committee members headed by Mr. Koji Nakashima, JICA, participated both in the Seminar and JCC.

The following agenda was discussed among the participants of the JCC meeting including the counterparts of Engineering Department (Water and Sanitation) (hereinafter referred to as "EDWS") of YCDC, JICA, JICA Advisory Committee, and JICA Expert Team.

1. Review of previous recommendations and conclusions in the 1st and 2nd JCC
2. Recommendations prepared in 2nd Myanmar Japan Joint Seminar
3. Progress of project covering the period from September 2016 to January 2017
4. Proposal from YCDC for the future Activities

In the course of discussions, main points discussed and decided are summarized in the attachment.

Yangon, 16th February, 2017

Mr. Hirotaka Sato	Daw May May Thwe
Chief Advisor	Committee Member
The Project for Improvement of Water Supply Management of YCDC	Yangon City Development Committee (YCDC), The Republic of the Union of Myanmar

Attachment: Main points discussed and decided

1. Progress of the Project

It was confirmed by all participants that implementation of previous recommendations and conclusions made in the 1st and 2nd JCC are in progress and facilitation by JICA expert is further required. In general, the progresses of the Project are on the track but for the following matters further implementation by YCDC were found necessary through the discussions.

1.1 New organization structure is to be reviewed for more efficient and effective management

1.2 NRW management is set as top priority in the policies of EDWS and implementation of NRW reduction measures is facilitated.

2. Additional activities proposed by Myanmar side

EDWS proposed the following additional activities in future activities of the Project to JICA. JICA will further consider them in Japan and decision will be informed to EDWS.

2.1 Construction of training yard of non-revenue water (NRW) management and implementation of training

- EDWS has suggested the necessity of a training yard. The training yard for NRW management will be utilized to train the persons related with NRW management such as YCDC staff members, private contractors and plumbers. The training yard will enable YCDC to train appropriate skills on NRW management measures periodically and in a short time and train numbers of skilled personals necessary for NRW management. EDWS will construct the training building by its own budget and requests JICA to design the yard and procure necessary equipment and materials to be procured from the outside of Myanmar. Training yard will be managed by the Human Resource Development Section and training of trainers (ToT) will be made by NRW Management Section and concerned Sections such as Design Section. This yard will be constructed as a part of future EDWS training center.

2.2 Water meter related activities

- EDWS has understood that water meter related activities are one of the most important activities to ensure sufficient revenue collection. EDWS requested JICA to assist following activities to establish a sufficient water meter system. The activities include assistance for analysis and survey of water meter status and establishment of the regulations and standards related to water meter such as responsibilities, material selection, meter accuracy check, and replacement policy. These activities will be led by full time counterparts of NRW Management Section.

2.3 Customer Service Department related activities including computerized database system for billing and collection

- In the financial point of view, revenue collection is one of the most important functions of EDWS. The current practice of revenue collection is mainly implemented by

inefficient manual work. To improve efficiency and accuracy of revenue collection, computerized revenue collection and customer database in coordination with e-Government is required. EDWS requested JICA to support this activity.

- In addition, to realize efficient and fair/equitable work of billing/collection in township (T/S) offices, it is important for newly established Customer Service Management Section to lead improvement of T/S working process as well as managing billing/revenue collection system. EDWS does not have enough experience on this field since it is established for the first time in Myanmar. EDWS requested JICA to support this activity.

2.4 NRW management pilot project in North Okkalapa

- EDWS has decided to implement NRW management pilot project in North Okkalapa by its own budget to accelerate NRW reduction in the City. The budget has been already acquired by EDWS and the project is planned to start from May, 2017. EDWS requested JICA to support this activity to firmly establish proper NRW management technologies and skills through OJT and develop trainers by repeated practice of Yankin Pilot project for NRW management assisted by JICA expert.

2.5 Continuous assistance for water quality management activities

- The following activities were added in the 1st JCC held on January 2016, for improvement of water quality in the water treatment plant and are now in progress. Continuous assistance for these activities is required.
  - ➢ Diagnose function of treatment processes of Nyaunghnapin water treatment plant by March 2018.
  - ➢ Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin by March 2019.
  - ➢ Prepare an improvement plan of Nyaunghnapin water treatment plant by June 2019.
- In addition, to implement these pilot activities, procurement of filter materials (anthracite and sand) and equipment like flow meters and dryers are required. EDWS will procure the materials and EDWS requests JICA to procure necessary equipment.
- Furthermore, the following activities also were added to improve water quality of direct water supply to the citizen. Continuous assistance for these activities is required.
  - ➢ Conduct OJT on improvement of water quality supplied from reservoirs
    - ✧ Review water quality problems in reservoir water
    - ✧ Research water quality improvement measure of reservoir suppled water

2.6 Water quality analysis based on National Standard Method

- Water Quality & Monitoring Section has established Water Quality Monitoring Plan and water quality analysis in terms of the priority items should be made based on Myanmar National Drinking Water Quality Standard, 2014. Standard methods of water quality analysis should be adopted before 2020 according to the National Standard. EDWS needs assistance of the capacity to analyse water quality using standard methods. EDWS plans to procure flame atomic absorption spectrometry and would appreciate JICA to assist other equipment such as UV-vis absorption spectrophotometer along with assistance of enhancement of testing capacity.

2.7 Preparation of water supply ordinance

- EDWS has learned, in Japan, each municipal water supply utility has its own Water Supply Ordinance, which stipulates responsibility, rights and duties of water supplier and its customers. EDWS lacks this fundamental law and regulation to carry out the duties of water supply utilities. With this ordinance, all duties of EDWS will be performed more efficient and effective. EDWS will prepare this ordinance and assistance and advise by JICA expert to make and test the prepared ordinance according to experience in Japan will be appreciated.

2.8 Water resource management and conservation

- At present, water resources for Yangon City Water Supply System mainly depends on reservoir water. In future, river water sources will be also introduced as additional water resources. Water resources are very important for water supply system, and to manage and preserve water resources sustainably is one of the main responsibilities of EDWS. Currently, EDWS is monitoring the reservoirs by measuring rainfall and reservoir water level, and also planning to measure the required meteorological and hydrological data for the analysis. EDWS also needs to formulate Water Resources Management Plan and Water Resources Conservation Plan. EDWS urgently needs to prepare Laws and Regulations for water resources conservation and also needs to propose these to the regional and national level for the confirmation. To carry out these activities efficiently, EDWS would like to request the assistance of JICA expert who has well experiences for the water resources management & conservation.

3. Recommendations and Conclusions

Following recommendations and conclusions were presented by Head of EDWS.

(1) EDWS should study more of the contents presented by Advisory Committee in the 2nd Joint Seminar and implement recommendations to achieve the visions.

(2) Sustainable management style that suits EDWS should be continuously studied.

(3) Organization structure of EDWS should be reviewed to achieve a more efficient structure and shall be authorised officially by YCDC and Regional Government.

(4) 3 Steering Committees are officially established.
- Planning and Monitoring, and Kaizen (5S+7W)
- Regulations, Standards, Guidelines and Manuals
- Non-revenue water (NRW) management

(5) Recommendations prepared in 2nd Joint Workshop were adopted as priority activities of

EDWS.

- Prioritized activities of the plans and rules set in the recommendations at the 2nd Joint Seminar will be prepared and implemented under initiative of the above-mentioned three steering committees.
- EDWS understands the importance that all duties of EDWS should be implemented based on a fundamental regulation, Water Supply Ordinance, and EDWS will start preparing the Ordinance.

(6) NRW management is set as top priority in the policies of EDWS and implementation of NRW reduction measures is facilitated.

(7) Water quality improvement in water treatment plant and direct supply of reservoir water shall be facilitated.

(End)

MINUTES OF MEETING
OF THE FOURTH JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 4th meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 7th September, 2017.

The following agenda was presented and discussed among the JCC participants including YCDC counterparts, JICA, and JICA Expert Team.

1. Review of previous recommendations and progress
2. Work Plan of Term 2
3. Progress of project, issues to be shared, and discussion
4. Concept of good Governance/ sustainable utility
5. Management Improvement Plan
6. Mid-Term Management Policies
7. Declaration of Steering Committee
8. Conclusions and recommendations

In the course of discussions, it was confirmed by both sides that the progress of the Project is on the track except procurement of materials and equipment of flow monitoring system and NRW management pilot project and their related activities. The contents of meeting were given in Appendix and Modified PO (Version 4) is given in Annex-1 as r result of meeting.

Yangon, 15th September, 2017

大野 敦王

for Mr. Hirotaka Sato
Chief Advisor
The Project for Improvement of Water Supply Management of YCDC

Daw May May Thwe
Committee Member
Yangon City Development Committee (YCDC),
The Republic of the Union of Myanmar

014

Attachment: Main points discussed

1. Review of Recommendations and Conclusions of previous JCCs (1st, 2nd and 3rd)

The current progress of recommendations and conclusions adopted in the 1st, 2nd and 3rd JCCs were reviewed and confirmed to follow up Engineering Department of Water and Sanitation (EDWS) continuously.

2. Procurement of Materials and Equipment

The current status of procurement of equipment was presented by the JICA expert and future schedule is set as follows.

The current status and schedule of procurement of equipment

No.	Equipment	Expected delivery timing in Monitoring Sheet 2	Current progress of procurement	Updated expected delivery timing in Monitoring Sheet 3
1	Flow monitoring system	May 2017 including installation	Tender documents are now under preparation JICA HQ.	Around August 2018 including installation (tentative)
2	NRW management (leakage repair and detection and DMA construction)	March 2017	Tender documents are now under preparation JICA HQ.	May 2018 (tentative)

3. Recommendations and Conclusions

The following recommendations and conclusions have been adopted as an important policy of DEWS in the meeting.

A) NRW Management
   1. Pilot Project in Yankin for NRW Management
      - Request JICA to expedite procurement of materials and equipment
      - Need rescheduling NRW management activities of Yankin pilot project
   2. Training yards for NRW Management
      - Start immediately the design and construction work
      - Request JICA to start procurement of materials and equipment

B) Toward Good Governance and Sustainable Utility
   1. Steering Committees
      - Actively participate in S/Cs, find improvement measures, share them in EDWS, establish an unified operation system for more efficient operation and service
   2. RGSM (Regulations, Guidelines, Standards and Manulas)
      - Prepare a road map for developing and enforcing of RGSM, including priority items and scheduling
   3. Management Improvement Plan
      - Finalize MIP to strengthen Governance and aim for future ideal organization

- Include activities for MIP in mid-term plan and monitor the progress of implement MIP

4. Mid-Term Plan
   - To achieve our missions and M/P, strategic plans will be continuously prepared, implemented, evaluated and improvement measures, and create PDCA cycle
   - Using PDCA cycle, to establish a good business spiral for sustainable organization
   - For management, accurate data and performance indicators (PIs) are of the most importance. Establish accurate and efficient data management system
   - We set up mid-term important management policies. Focusing on policies, we have to work to achieve for mid-term goals.

4. Comments on Head of Department (CE)

CE will deliver today's main theme: Management Improvement Plan (MIP) including good governance and the progress & improvement between 3rd and 4th JCC, to Secretary and Committee Member. CE satisfies today's all presentations and could see the improvement throughout all presentations but we also need to implement those in real. JICA Expert Team will support 5 years and has been supporting over two years. During the rest three years, CE recommends all officers and staffs of EDWS to try to catch up and gain the technology, management system and the experience from the JICA Experts as much as possible in order to be able to stand efficiently at the end of the Project.

5. Modification of Schedule of PO

Based on the delay of the procurement of materials and equipment of flow monitoring system and NRW reduction in pilot project, the revised schedule of PO as version 4 is as shown in Annex-1.

6. Process for modification of PDM and PO

It was confirmed that the modification of PDM requires amendment of R/D but the modification of only PO does not require amendment of R/D. In this time, PDM was not modified but only PO was. Therefore, modification of R/D is not required in this time.

(End)

Annex-1: Plan of Operation (PO) Version 4 (Modified Schedule) with schedule of the previous Version.

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Annex-1: PO Version 4 (Modified Schedule)

PO Version 3 → Version 4

The Project for Improvement of Water Supply Management of YCDC

Plan of Operation (PO) ver. 3

PO Activity No.		Schedule						
		Term 1			Term 2			
		2015	2016	2017	2018	2019	2020	
Preparation of Work Plan Phase 1 (Draft) and Monitoring Sheet Ver.1 and Discussion		▬	▬					
Preparation of Work Plan Phase 2 (Draft) and Monitoring Sheet Ver.4 and Discussion				▬				
Baseline Survey (Implementation of Capacity Assessment)		▬	▬	▬	▬	▬	▬	
Confirmation of Work Plan and Monitoring Sheet Ver.1			△					
Preparation of Monitoring Sheet Ver.2~Ver.8			△	△	△	△	△	△
Study of training in Japan and third country and implementation			■	■	■	■		
Study of materials to be procured and their procurement		▬	▬	▬	▬	▬		
Preparation of project progress report				△	△	△		
End line survey							▬	
Preparation of project completion report							■	
Output 1: Capacity of YCDC on Institutional management is improved.								
1-1	Prepare overall new organization structure	▬	▬					
1-2	Establish Planning Section							
1-2-1	Establish the Planning Section in Department of Water and Sanitation	▬	▬					
1-2-2	Define the division of duties of the Planning Section	▬	▬					
1-3	Establish Customer Service Division							
1-3-1	Establish the Customer Service Division in Department of Water and Sanitation		▬ ▪▪▪					
1-3-2	Define the division of duties of the Customer Service Division		▪▪▪					
1-3-3	Establish operation system of the Customer Service Division			▬	▬	▬		
1-4	Develop and Monitor Performance Indicators (PIs)							
1-4-1	Review the current method of calculation and monitoring of performance data	▬	▬					
1-4-2	Conduct training of trainers on the calculation and monitoring of Performance Indicators.		▬	▬	▬	▬	▬	
1-4-3	Identify the necessary and available Performance Indicators to be monitored		▬	▬ ▪▪▪	▪▪▪	▪▪▪	▪▪▪	
1-4-4	Install transmission flow meter and data logger and collect flow data		▬	▬	▬			
1-4-5	Procure equipment (computers, printers, software, etc.) in local offices and conduct training		▬	▬				
1-4-6	Collect data required for setting PIs		▬	▬	▬	▬	▪▪▪	
1-4-7	Develop calculation method, manuals and monitoring system of Performance Indicators		▬	▬ ▪▪▪	▪▪▪	▪▪▪	▪▪▪	
1-4-8	Calculate Performance Indicators		▬	▬ ▪▪▪	▪▪▪	▪▪▪	▪▪▪	
1-4-9	Update and monitor the Performance Indicators periodically		▪▪▪	▪▪▪	▪▪▪	▪▪▪	▪▪▪	
1-5	Formulate regulations, standards and guidelines							
1-5-1	Review the existing rules, regulations, standards and guidelines	▬	▪▪▪					
1-5-2	Identify regulation, standards and guidelines to be modified and/or newly formulated		▬					
1-5-3	Draft water supply regulation and run a trial			▬	▬	▬	▬	
1-5-4	Draft necessary regulation, standards and guidelines, which can be prepared by YCDC		▬	▬	▬	▬	▬	
1-6	Enhance understanding on financial management							
1-6-1	Analyze the current financial management system	▬	▪▪▪	▪▪▪	▪▪▪	▪▪▪	▪▪▪	
1-6-2	Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans	▬	▬	▬	▬	▬	▬	
1-6-3	Conduct OJT on development of asset ledger		▬	▬	▬	▬	▬	
1-7	Strengthen Public Relations							
1-7-1	Analyze the effective public relations on water service of YCDC	▬						
1-7-2	Conduct awareness raising of YCDC staff		▬	▬	▬	▬	▬	
1-7-3	Conduct OJT on the public relations activities		▬	▬	▬	▬	▬	
1-8	Strengthen human resources development							
1-8-1	Review the existing human resources development system	▬	▬	▬ ▪▪▪	▪▪▪			
1-8-2	Identify necessary improvement on structure and materials of the trainings		▬	▬				
1-8-3	Conduct trainings of trainers for planning and organizing the trainings		▬	▬ ▪▪▪	▪▪▪	▪▪▪	▪▪▪	
1-8-4	Develop 5-year and 10-year human resources development plans			▬	▬			
1-8-5	Launch priority activities as a part of implementing the 5-year human resources development plan				▬	▬	▬	
1-9	Develop and support implementation of the institutional management plans							
1-9-1	Develop 5-year and 10-year institutional management plans			▬	▬	▪▪▪	▪▪▪	
1-9-2	Launch priority activities as a part of implementing the 5-year institutional management plan					▬	▬	

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PO Activity No.		Schedule					
		Term 1			Term 2		
		2015	2016	2017	2018	2019	2020
Output 2. Capacity of YCDC on NRW management is improved.							
2-1	Establish NRW Management Unit						
	2-1-1 Establish NRW Management Unit						
	2-1-2 Define the division of duties of NRW Management Unit						
2-2	Collect and compile information of NRW						
	2-2-1 Collect information of NRW and implement a baseline survey						
	2-2-2 Compile information of pipes for establishment of GIS						
	2-2-3 Compile customer information into database						
	2-2-4 Formulate Standard Operation Procedure (SOP) of the above information management						
2-3	Develop a model on the management of physical loss (leakage, over flow) and human resources development						
	2-3-1 Review current situation and develop phased countermeasures						
	2-3-2 Conduct trainings of trainers						
	Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa						
	2-3-3 Prepare training plan and training materials by the trainers						
	2-3-4 Formulate manuals on physical loss						
	2-3-5 Conduct Off-JT by the trainers						
	2-3-6 Select a pilot areas for NRW management activities						
	2-3-7 Prepare action plan and procurement of equipment (leakage survey and repair) for the countermeasure to be taken for physical loss in the pilot area						
	2-3-8 Set up DMAs at the pilot area (Including procure materials and construct DMA)						
	2-3-9 Conduct the countermeasures against physical loss in the pilot area						
	2-3-10 Evaluate cost-benefit of countermeasures against physical loss of the pilot area and formulate the optimal model of activities						
	2-3-11 Implement OJT by the trainers						
	2-3-12 Verify the manuals on physicial loss						
2-4	Develop a model on the management of commercial (non-physical) loss (meter fault, miss reading of meter, illegal connection) and human resources development						
	2-4-1 Review current situation and develop phased countermeasures						
	2-4-2 Conduct trainings of trainers						
	Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa						
	2-4-3 Prepare training plan and training materials by the trainers						
	2-4-4 Formulate manuals on commercial loss						
	2-4-5 Conduct Off-JT by the trainers						
	2-4-6 Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area						
	2-4-7 Conduct the countermeasures against commercial loss in the pilot area						
	2-4-8 Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities						
	2-4-9 Implement OJT by the trainers in the pilot area						
	2-4-10 Verify the manuals on commercial loss						
2-5	Develop training yard for NRW management						
	2-5-1 Prepare training plan for training yard						
	2-5-2 Design training yard						
	2-5-3 Prepare equipment and materials for training yard						
	2-5-4 Construct training yard						
	2-5-5 Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard						
	2-5-6 Conduct Off-JT by the trainers in training yard						
2-6	Develop and support implementation of the NRW management plans						
	2-6-1 Develop 5-year and 10-year NRW management plans						
	2-6-2 Launch priority activities as a part of implementing the 5-year NRW management plan						

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PO Activity No.		Schedule								
		Term 1				Term 2				
		2015	2016		2017	2018		2019		2020
Output 3. Capacity of YCDC on water quality management is improved.										
3-1	Establish Water Treatment Section									
	3-1-1 Establish the Water Treatment Section in Department of Water and Sanitation									
	3-1-2 Define the division of duties of the Water Treatment Section									
	3-1-3 Hold a series of seminar for basic water treatment technology with study tours in treatment facilities									
3-2	Review current situation and formulate phased countermeasures									
3-3	Conduct training of trainers on water quality management									
	3-3-1 Conduct training of trainers on the water quality management									
	3-3-2 Prepare the training plan and training manuals by the trainers									
	3-3-3 Conduct Off-JT by the trainers									
3-4	Develop SOP for water quality management									
	3-4-1 Develop SOP on water quality test and monitoring									
	3-4-2 Develop SOP on operation and maintenance of water treatment plant & disinfection facility									
3-5	Conduct OJT on water quality management at the pilot treatment plants and disinfection facilities									
	3-5-1 Procure water quality analysis and water quality management equipment									
	3-5-2 Conduct OJT on water quality test and monitoring									
	3-5-3 Diagnose function of treatment processes of Nyaunghnapin water treatment plant									
	3-5-4 Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin									
	3-5-5 Prepare an improvement plan of Nyaunghnapin water treatment plant									
	3-5-6 Conduct OJT on operation and maintenance of water treatment plant & disinfection facility									
	3-5-7 Verify SOP for water quality management									
3-6	Conduct OJT on improvement of water quality supplied from reservoirs									
	3-6-1 Review water quality problems in reservoir water									
	3-6-2 Research water quality improvement measure of reservoir supplied water									
3-7	Develop and support implementation of the water quality management plans									
	3-7-1 Develop 5-year and 10-year water quality management plans									
	3-7-2 Launch priority activities as a part of implementing 5-year water quality management plan									
Kick-off Meetings, JCC, or other meetings		△ Kick-off	△ JCC1	△ JCC2	△ JCC3	△ JCC4	△ JCC5	△ JCC6	△ JCC7	△ JCC8	△ JCC9

: Main activities
: Modified from PO Version 3 (Main activity)

MINUTES OF MEETING
OF THE THIRD JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 5th meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 26th February 2018.

The following agenda was presented and discussed among the participants of the JCC meeting including the counterparts of Engineering Department (Water and Sanitation) (hereinafter referred to as "EDWS") of YCDC, JICA Myanmar Office and JICA Expert Team.

1. Review of previous recommendations and conclusions
2. Progress of the Project
3. Revision of objectively verifiable indicators in project design matrix (PDM)
4. New customer database
5. Steering Committee (S/C) activities including improvement action plans on-going

In the course of discussions, main points discussed and decided are summarized in the attachment.

Yangon, 22nd March 2018

Mr. Hirotaka Sato
Chief Advisor
The Project for Improvement of Water Supply Management of YCDC

U Aung San Win
Head of Department, Department of Engineering (Water and Sanitation), Yangon City Development Committee (YCDC), The Republic of the Union of Myanmar

Attachment: Main points discussed and decided

1. Progress of the Project

It was confirmed by all participants that implementation of previous recommendations and conclusions made in the past four JCC meetings are in progress and facilitation by JICA experts is further required. In general, the progresses of the Project are on the track but for the following matters were found to require further following-up.

1.1. EDWS will continue reviewing new organization structure for more efficient and effective management responding to the progress of the entire YCDC restructure, and assigning full-time staff to the sections which need to be strengthened.

1.2. JICA wll make necessary arrangement to accelerate the procurement procedures of the equipment for the pilot project of non-revenue water management.

2. Modifications of OVIs in PDM

Both sides in principle agreed to modify the required Objectively Verifiable Indicators (OVIs) in the Project Design Matrix (PDM) after OVIs and their structure were reviewed and OVIs system was restructured with setting their values, by which achievement of Outputs and Project Purpose would develop continuous impact on improvement of water supply service and lead to achievement of Overall Goal.

The concepts of the modification are as follows:

2.1. Overall Goal: Overall Goal will be achieved 3 to 5 years after the completion of the Project by implementing a Plan-Do-Check-Action (PDCA) cycle utilizing the capacity developed through achieving Project Purposes and Outputs. The OVIs which have not been specified yet will be set in the 4th year of the Project.

2.2. Project Purpose: Project Purpose was reviewed to be composed by the aspects of "development and operation of a monitoring system", "establishment of a periodical improvement system" and "development of a mid-term plan and other plans to achieve Overall Goal". OVIs were set to confirm the degree of the achievement from the view of those aspects in each field.

2.3. Output: Outputs were reviewed to be composed by the aspects of "establishment of responsible organizations", "improvement/establishment of internal process", and "development of leaders, managers, technical professionals, and trainers" for the activities to achieve Project Purpose and Overall Goal". OVIs were set to confirm the degree of the achievement from the view of those aspects in each field.

2.4. OVIs: The restructured OVIs sorted by Output were drafted as shown below. After further discussion on the detail modifications, the PDM will be finally revised by the amendment of the signed R/D signed on 25th November 2014 between YCDC and JICA. The comparisons with the previous version and their reasons were described in Appendix -1.

Overall Goal	Water supply services provided by YCDC are enhanced.		
	Output 1	Output 2	Output 3
	The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement.	NRW is decreased from OO % to OO % in the water supply area of YCDC.	The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).
Project Purpose	**Capacity of YCDC on the management of water supply service is improved.**		
• Monitoring system in operation	The implementation of mid-term management plan is monitored based on MKPIs.	The NRW ratio is grasped in the water supply service area of YCDC and monitored.	Water quality is grasped in the water supply service area of YCDC and monitored.
• Development of periodical improvement system	Steering Committees (S/C) are organized and improvement actions are implemented.		
	S/C2	S/C1	S/C2, 3
• Development of Mid-term plan	Mid-term management plan is approved by EDWS.	Plan for NRW reduction is approved by EDWS.	Plan for improvement of water quality is approved by EDWS.
Outputs			
• Responsible organizations are established	1-4 New organization structure is approved by Mayor.		
• Internal process are improved or established	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.		
	1-2 Plan for human resources development is approved by EDWS.		
	1-1 Plan for improvement of water bill collection is approved by EDWS.	2-1 Manuals and training materials are utilized by YCDC staff. 2-2 Information of customers and pipes for the pilot areas is compiled and updated. 2-5 NRW ratio is decreased to 25% in the pilot area.	3-1 Manuals and training materials are utilized by YCDC staff. 3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically. 3-5 The turbidity of treated water in pilot sand filter in Nyaunglunapin water treatment plant is controlled less than 1 NTU. 3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared. 3-7 The operation and maintenance system of chlorination facilities is prepared.
• Leaders, managers, technical professionals, and trainers are developed	1-5 2 full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	2-3 The number of trainers for NRW management becomes 8. 2-4 EDWS staff participates in training based on training plan for NRW management.	3-3 The number of trainers for water quality management becomes 4. 3-4 EDWS staff participates in training based on training plan for water quality management.

3. Agreements for the upcoming activities

3.1. New Customer Database

The introduction of new customer database system of EDWS, developed separately from the existing e-Government system managed by the Administration Department, was agreed, with which billing and collection works can be computerized. EDWS confirmed to bear the cost of the system development and maintenance. The EDWS made request for additional assignment of the Expert for supporting procedures to launch the new system.

3.2. NRW Training Yard

Concerning the construction of training yard for NRW was requested by EDWS in the 4th JCC Meeting, EDWS explained about its location of construction, facilities built and training courses for which the Training Yard would be utilized. The expense distribution for construction of the Training Yard between both sides were confirmed as below. EDWS made request that JICA will accelerate procurement of equipment so as not to affect the construction schedule.

YCDC: Civil work, building, storage tank, pump and other necessary work

JICA: Equipment and tools for training

4. Additional Request from EDWS

EDWS explained that there is an idea to construct new training centre, for which EDWS requested JICA to make quick support in terms of its cost, materials, or equipment.

5. Recommendations and Conclusions

Following recommendations and conclusions were presented by Head of EDWS.

5.1. Planning Section should develop its capacity to implement a PDCA cycle, with which EDWS will establish PDCA cycle of respective plans of EDWS and the Project.

5.2. Responsible offices/sections should formulate and implement the Improvement Plans/ Action Plans listed below, which Steering Committee should supervise the progress and facilitate necessary actions.

- Re-organization Plan
- Management Improvement Plan/5S Kaizen Plan
- Mid-term Management Plan
- Bill Collection Improvement Plan
- Public Awareness Plan
- HRD Plan
- NRW Management Action Plan
- Water Quality (WQ) Improvement Plan

5.3. For the formulation of Water Supply Regulation, the roadmap and its detail schedule should be set and implemented so that concrete outcomes could be promptly materialized.

5.4. The working schedule of introducing New Customer Database should be managed based on a roadmap to achieve the target.

5.5. EDWS will continue reviewing new organization structure for more efficient and effective management responding to the progress of the entire YCDC restructure, and assigning full-time staff to the sections which need to be strengthened.

5.6. JICA will make necessary arrangement to accelerate the procurement procedures of the equipment for the pilot project for non-revenue water management.

(End)

Appendix-1

THE PROJECT FOR IMPROVEMENT OF
WATER SUPPLY MANAGEMENT OF YCDC
TERM 2

Concept of Revision of Project Design Matrix (PDM) in terms of Objectively Verifiable Indicators (OVIs)

26th Feb. 2018
JICA Expert Team

1. Concept of Revision of PDM from Version 2 to Version 3

Required OVIs and their structure are reviewed and OVIs system is restructured with setting their values, by which achievement of Outputs and Project Purpose would develop continuous impact on improvement of water supply service and lead to achievement of Overall Goal.

(1) Method for achieving Overall Goals

The Overall Goal is to be achieved within 3 to 5 years after the completion of the Project by implementing a Plan-Do-Check-Action (PDCA) cycle utilizing the capacity developed through achieving Project Purposes and Outputs.

(2) Expected Achievements to be achieved in Project Purposes comprehensively

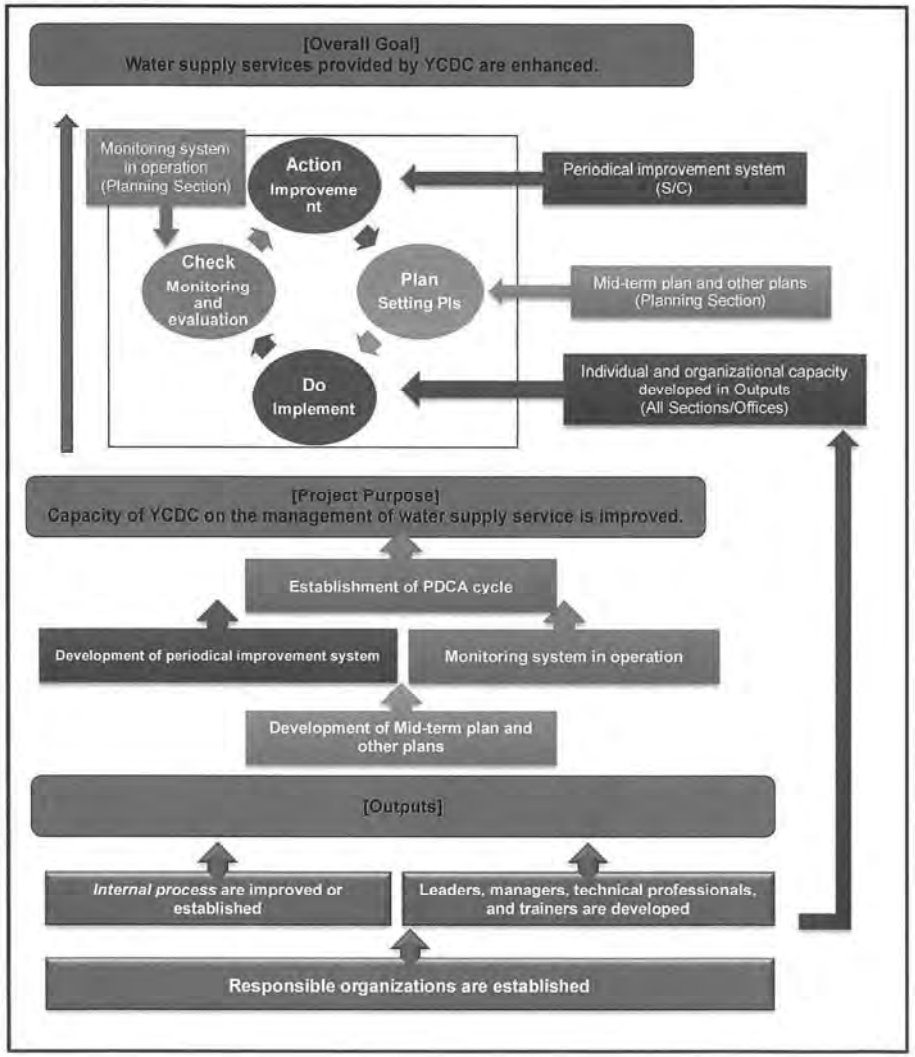
- Achieve all Outputs
- Develop and operate a ***monitoring system*** of MKPIs
  - Are the OVIs to achieve Overall Goal monitored periodically?
- Establish a ***periodical improvement system***
  - Is there driving force (improvement action) to operate PDCA cycle?
- Develop ***Mid-term plan and other plans*** to achieve the Overall Goal
  - What and how many years are required in operating in PDCA cycle to achieve Overall goal. Is a plan is developed to reach Overall Goal?

(3) Contents to be achieved in Outputs

- ***Responsible organizations*** for the activities to achieve Project Purposes and Overall Goal are established.
  - Reorganization
- ***Internal process*** for the activities to achieve Project Purpose and Overall Goal are improved or established.
  - Establishment of utilization of regulations, standards, guidelines, SOPs, and manuals and improvement of work processes
- ***Individuals with leadership, management and technical capacity, and continuous human resource development capacity*** to achieve Project Purpose and Overall Goal are developed.
  - Development of leaders, managers, technical professionals, and trainers

2. Image of Concept to Achieve Overall Goals

PDCA Cycle will be managed and coordinated by Planning Section.



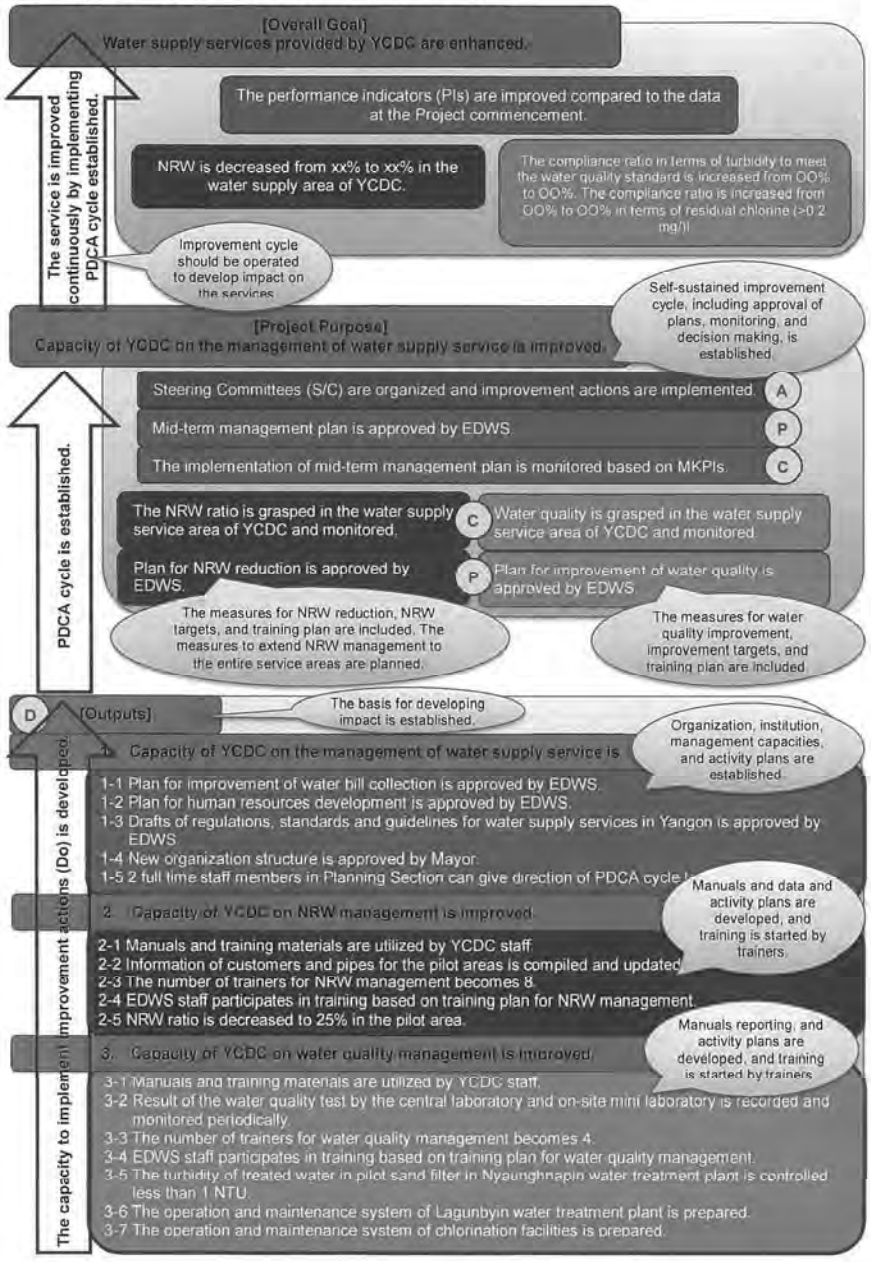
3. Required OVIs in Project Purposes and Outputs by OVIs of Overall Goals in the Project in Version 3

Overall Goal	**Water supply services provided by YCDC are enhanced.**		
	Output 1	**Output 2**	**Output 3**
	The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement.	NRW is decreased from xx% to xx% in the water supply area of YCDC.	The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).
Project Purpose	**Capacity of YCDC on the management of water supply service is improved.**		
• Development of plans	Mid-term management plan is approved by EDWS.	Plan for NRW reduction is approved by EDWS.	Plan for improvement of water quality is approved by EDWS.
• Monitoring system in operation	The implementation of mid-term management plan is monitored based on MKPIs.	The NRW ratio is grasped in the water supply service area of YCDC and monitored.	Water quality is grasped in the water supply service area of YCDC and monitored.
• Development of periodical improvement system	Steering Committees (S/C) are organized and improvement actions are implemented.		
	S/C2	S/C1	S/C2, 3
Outputs			
• Responsible organizations are established	1-4 New organization structure is approved by Mayor.		
• Internal process are improved or established	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.		
	1-2 Plan for human resources development is approved by EDWS.		
	1-1 Plan for improvement of water bill collection is approved by EDWS.	2-1 Manuals and training materials are utilized by YCDC staff. 2-2 Information of customers and pipes for the pilot areas is compiled and updated. 2-5 NRW ratio is decreased to 25% in the pilot area.	3-1 Manuals and training materials are utilized by YCDC staff. 3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically. 3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU. 3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared. 3-7 The operation and maintenance system of chlorination facilities is prepared.
• Leaders, managers, technical professionals, and trainers are developed	1-5 2 full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	2-3 The number of trainers for NRW management becomes 8. 2-4 EDWS staff participates in training based on training plan for NRW management.	3-3 The number of trainers for water quality management becomes 4. 3-4 EDWS staff participates in training based on training plan for water quality management.

4. Setting Values of OVIs in Version 3

OVIs	Values/Notes
Overall Goal	Will be decided in 4 years after the start. (after preparation of mid-term plan)
1-5 OO full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	2 professional staff (key persons in Planning Section). The section head or the equivalent level of staff in Planning Section will give the direction on PDCA to other section heads and/or township officers in Steering Committee (S/C) meeting. For this purpose, 2 professional full time staff members are required managing PDCA cycle as a manager.
2-3 The number of trainers for NRW management becomes OO.	8 trainers (key persons in NRW Section). Trainers will give training to many staff of EDWS on NRW management including township staff, so that relatively a large number of trainers are required. Following trainers by subject are expected to be developed. Trainers will be developed in NRW Management Section through North Okkalapa NRW project, Yankin NRW pilot project, NRW training yard. • NRW general: 1 (Section head level) • Physical loss: 4 • Commercial loss: 3
3-3 The number of trainers for water quality management becomes OO.	4 trainers (2 key persons in water quality & monitoring and 2 key persons in water treatment). The trainers give training to the staff related to water quality management that are technical staff and operation and maintenance (O&M) staff in treatment plant and their number is limited. For these purposes, 2 trainers on water quality and 2 trainers on water treatment are expected to be developed. The trainers will be section head or the equivalent level of staff. The training courses as follows: 1. Water quality analysis method 2. Water quality monitoring and data analysis 3. Basic water treatment technology 4. Management (O&M) of Nyaunghnapin water treatment plant
2-5 NRW ratio is decreased to xx% in the pilot area.	25% Assuming Physical loss (20%) and commercial loss (5%). Main pipe will be replaced but some of the existing branch and service pipes will be remained, so that physical loss is set as 20%. All water meters will be replaced, so that commercial loss will be minimized.

5. Image of Concept to Achieve Overall Goals in the Project



7. Comparison of OVIs in PDM Version 2 and Version 3

Narrative Summary	Version 2	Version 3	Reasons for modification
[Overall Goal]			
Water supply services provided by YCDC are enhanced.	1. The performance indicators (PIs) are improved compared to the data at the Project commencement. 2. NRW is decreased from xx% to xx% in the water supply area of YCDC 3. The ratio of water quality test results which satisfy water quality standards is increased from xx% to xx%.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement. 2. NRW is decreased from OO% to OO% in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	5. Management key performance indicators (MKPIs) in Mid-term Plan of EDWS have been prepared. These official PIs of EDWS are to be adopted as PIs for monitoring. 6. No change 7. Key water quality parameter for monitoring is specified. Turbidity and residual chlorine were chosen as these parameters are the main target parameters to be improved in the Project.
[Project Purpose]			
Capacity of YCDC on the management of water supply service is improved.	1. Evaluation of PIs is conducted periodically 2. NRW is decreased from xx% to xx% in the pilot area 3. The ratio of water quality test results which satisfy water quality standard is increased from xx% to xx%, in the pilot treatment plants.[1] Note 1: The pilot water treatment plants will be existing Nyaunghnapin Water Treatment Plant and Lagunbyin Water Treatment Plant under construction.	1. Steering Committees (S/C) are organized and improvement actions are implemented. 2. Mid-term management plan is approved by EDWS. 3. The implementation of mid-term management plan is monitored based on MKPIs. 4. The NRW ratio is grasped in the water supply service area of YCDC and monitored. 5. Plan for NRW reduction is approved by EDWS. 6. Water quality is grasped in the water supply service area of YCDC and monitored. 7. Plan for improvement of water quality is approved by EDWS.	Version 2 1. Modified to 1. and 3. in version 3 for more specific indicators. 2. Moved to Output 2-5 in version 3. 3. Moved to Output 3-5 in version 3 and modified considering the pilot project on going. Version 3 1. Added to continue improvement action. 2. 1-1 in version 2 is moved here and name of plan is modified. The approval is required by EDWS. 3. Added to continue improvement action. 4. Added to continue improvement action on NRW management 5. 2-4 in version 2 is moved here. The approval is required by EDWS. 6. Added to continue improvement action on water quality management. 7. 3-4 in version 2 is moved here. The approval is required by EDWS.

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6. Revised OVIs and equivalent Means of Verification in PDM Version 3

Narrative Summary	Objectively Verifiable Indicator	Means of Verification
[Overall Goal]		
Water supply services provided by YCDC are enhanced.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement. 2. NRW is decreased from OO % to OO % in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	1. S/C2 activity record, MKPIs monitoring sheets 2. S/C1 activity record, MKPIs monitoring sheets 3. Water quality monitoring report, MKPIs monitoring sheets
[Project Purpose]		
Capacity of YCDC on the management of water supply service is improved.	1. Steering Committees (S/C) are organized and improvement actions are implemented. 2. Mid-term management plan is approved by EDWS. 3. The implementation of mid-term management plan is monitored based on MKPIs. 4. The NRW ratio is grasped in the water supply service area of YCDC and monitored. 5. Plan for NRW reduction is approved by EDWS. 6. Water quality is grasped in the water supply service area of YCDC and monitored. 7. Plan for improvement of water quality is approved by EDWS.	1. S/C1, 2, 3 activity record 2. Approval of Mid-term management plan in S/C2 3. S/C2 activity record. 4. NRW management report 5. Approval of Plan for NRW reduction in S/C1 6. Monthly water quality monitoring report 7. Approval of Plan for improvement of water quality in S/C2
[Outputs]		
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for improvement of water bill collection is approved by EDWS. 1-2 Plan for human resources development is approved by EDWS. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS. 1-4 New organization structure is approved by Mayor. 1-5 2 full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-1 Approval in S/C2 1-2 Approval in S/C2 1-3 Approval in S/C3 1-4 Approval letter or approval process confirmed by the Experts 1-5 Evaluation based on duties in Management Planning Unit in Planning Section in Report on Institutional Reorganization.
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials are utilized by YCDC staff. 2-2 Information of customers and pipes for the pilot areas is compiled and updated. 2-3 The number of trainers for NRW management becomes 8. 2-4 EDWS staff participates in training based on training plan for NRW management. 2-5 NRW ratio is decreased to 25% in the pilot area.	2-1 S/C1 monitoring report, manuals in relevant offices, training record 2-2 Pilot project activity report. 2-3 HRD report (HRD Section) 2-4 HRD report (HRD Section) 2-5 Pilot project activity report.
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials are utilized by YCDC staff. 3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically. 3-3 The number of trainers for water quality management becomes 4. 3-4 EDWS staff participates in training based on training plan for water quality management. 3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU. 3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared. 3-7 The operation and maintenance system of chlorination facilities is prepared.	3-1 S/C3 monitoring report, manuals in relevant offices, training record 3-2 Water quality monitoring report, 3-3 HRD report (HRD Section) 3-4 HRD report (HRD Section) 3-5 Activity report of Taskforce team 3-6 Operation and maintenance organization structure of Lagunbyin water treatment plant 3-7 Operation and maintenance organization structure of chlorination facilities

7

MINUTES OF MEETING
OF THE SIXTH JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 6th meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 10th October 2018.

The following agenda was presented and discussed among the participants of the JCC meeting including the counterparts of Engineering Department (Water and Sanitation) (hereinafter referred to as "EDWS") of YCDC, JICA Myanmar Office and JICA Expert Team.

1. Review of previous recommendations and progress
2. Progress of the Project
3. Mid-term evaluation
4. Mid-term management plan
5. Progress and future schedule of Steering Committees
6. Progress, main issues and schedule to the end of the project

In the course of discussions, main points discussed and decided are summarized in Attachment 1. Monitoring Sheet Version 5 was prepared and is given in Attachment 2 as a result of the meeting.

Yangon, 16th October, 2018

Mr. Hirotaka Sato
Chief Advisor
The Project for Improvement of Water Supply Management of YCDC

U Aung San Win
Head of Department, Department of Engineering (Water and Sanitation), Yangon City Development Committee (YCDC), The Republic of the Union of Myanmar

[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for institutional management is approved by Yangon Region Government.	1-1 Plan for improvement of water bill collection is approved by EDWS.	(1-1 in version 2 is moved to 2. of Project Purpose inn version 3.) 1-1 Activity on improvement of water bill collection is added.
	1-2 Plan for human resources development is approved by Yangon Region Government.	1-2 Plan for human resources development is approved by EDWS.	1-2 The approval is required by EDWS.
	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by Yangon Region Government	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.	1-3 The approval is required by EDWS.
	1-4 New organization structure is approved by Mayor.	1-4 New organization structure is approved by Mayor.	1-4 The approval is required by Mayor. Currently, organization reform is under implementation in YCDC.
		1-5 2 full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-5 Added for PDCA cycle management.
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff	2-1 Manuals and training materials are utilized by YCDC staff.	2-1 The number of persons should be specified in NRW training plan. This indicator is similar to 2-3 in version 2.
	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 No change.
		2-3 The number of trainers for NRW management becomes 8.	2-3 Added as the development of trainers is important to extent NRW management to the entire service area.
	2-3 xx% of YCDC staff participates training on NRW	2-4 EDWS staff participates in training based on training plan for NRW management.	2-4 The number of persons should be specified in NRW training plan.
	2-4 Plan for NRW reduction is approved by YCDC		(2-4 in version 2 is moved to s moved to 5. of Project Purpose inn version 3.)
		2-5 NRW ratio is decreased to 25% in the pilot area.	2-5 This is moved from Project Purpose.
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff.	3-1 Manuals and training materials are utilized by YCDC staff.	3-1 The number of persons should be specified in water quality management training plan. This indicator is similar to 3-3 in version 2.
	3-2 Result of the water quality test at the pilot treatment plants is recorded and monitored periodically	3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	3-2 The indicator is more specified.
		3-3 The number of trainers for water quality management becomes 4.	3-3 Added as the development of trainers is important for more EDWS staff t to practice water quality management.
	3-3 xx% of YCDC staff participates training on water quality	3-4 EDWS staff participates in training based on training plan for water quality management.	3-4 The number of persons should be specified in water quality management training plan.
	3-4 Plan for improvement of water quality is approved by YCDC		(3-4 in version 2 is moved to 7. Of project Purpose in version 3.)
		3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	3-5 Moved from 3. of Project Purposes in version 2 and modified considering the pilot project on going.
		3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	3-6 Added as the O&M system set up is important for continuous operation.
		3-7 The operation and maintenance system of chlorination facilities is prepared.	3-7 Same as above.

Attachment 1: Main points discussed and decided

1. Mid-term Management Plan

The Mid-term Management Plan of EDWS for the period from FY2018/19 to 2020/21 was explained according to the main points listed below and confirmed.

(1) Planning Cycle of Mid-term Management Plan
(2) Table of Contents
(3) Long-term Vision and Mission
(4) Mid-term Management Policy and Objectives
(5) Priority Area and Major Activity for Mid-term
(6) Performance Targets
(7) Financial Projection and Key Pre-condition

2. Progress of the Project and Mid-term Evaluation

It was confirmed by all participants that implementation of previous recommendations and conclusions made in the past five JCC meetings are in progress. Regarding the overall progress of the Project and possibilities to achieve Project Purpose and Outputs were clarified based on the Objectively Verifiable Indicators specified on PDM. In general, the progress of the Project is almost on the track.

In terms of five evaluation criteria: Relevance, Effectiveness, Efficiency, Impact and Sustainability, the Project was evaluated as mid-term evaluation as table below.

Criteria of evaluation	Aspect evaluated	Evaluation
Relevance	Does Project meet actual needs and aligns with strategy?	Good, no significant change since project design.
Effectiveness	To what extent Project purpose has been achieved?	Expected to be good. Most OVIs are expected to be achieved.
Efficiency	How is cost performance?	Mostly good. NRW related activities were delayed due to late delivery of equipment.
Impact	What are positive/negative changes produced by Project?	To increase Impact, it is necessary to implement Mid-term Management Plan firmly, which contributes in improving services.
Sustainability	Will benefits continue after the project completion by self-effort?	To maximize Sustainability, PDCA cycle with utilization of Min-term Management Plan should be established and continued.

YCDC side suggested that outcomes of the Project should be measured from the wider points of view than the specified OVIs since fruits of the Project can be seen to emerge in various aspects.

Attachment 2: Project Monitoring Sheet Version 5

TO CHIEF REPRESENTATIVE OF JICA MYANMAR OFFICE

PROJECT MONITORING SHEET

Project Title : The Project for Improvement of Water Supply Management of YCDC
Version of the Sheet: Ver. 05 (Term: March - September, 2018)
Name: Mr. Aung San Win
Title: Project Director (Head of Department, Chief Engineer)
Name: Mr. Hirotaka Sato
Title: Chief Advisor
Submission Date: 16th October 2018

THE REPUBLIC OF THE UNION OF MYANMAR
YANGON CITY DEVELOPMENT COMMITTEE (YCDC)
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YCDC

MONITORING SHEET
VERSION 5

OCTOBER 2018

YCDC COUNTERPARTS TEAM
AND
JICA TECHNICAL ASSISTANCE EXPERTS TEAM

The Project for Improvement of Water Supply Management of YCDC

Monitoring Sheet Ver. 5

I. Summary

Appendix

1. Summary of Project Risk

Annex

1. **Project Monitoring Sheet**
2. Plan of Operation Version 6 (Modified Schedule)

I. Summary

1 Progress

1-1 Progress of Inputs

1-1-1 Myanmar side

Item	Contents
1. Counterpart personnel	1) Counterpart In Aug 2015, the counterparts (C/P) of Engineering Department of Water and Sanitation (EDWS) were assigned. After then, several changes have been made. The current C/P as of 26th February 2018 is as given in the Monitoring Sheet (MS) Version 4. 2) Formation of Steering Committee (S/C) Three Steering Committees (S/C) were officially launched and the members were appointed in July 2017 as given in the MS Version 4. Under the S/C No.3, which takes responsibilities for formulating regulations, sub working groups (WG) have been organized for each specific purpose such as WG3-1: Water Supply Regulation, WG3-2: Customer Service Management, WG3-3: Financial Management, WG3-4: Water Quality Management, and WG3-5: 5S + Kaizen. Furthermore, sub-groups A and B were organized in WG 3-1 to study on Water Service Connection and Water Tariff, Billing and Collection, respectively.
2. Office space and facilities	Not changed.
3. Necessary data/ information	Necessary information and data to implement this Project activity are provided by C/P. For example, documents of the existing regulations, standards, guidelines and manuals, financial data, revenue collection data, specification and drawings of existing water facilities, and flow volumes, pipeline information, water quality test data, etc. were provided by C/P.
4. Local cost for implementation of the activities	

Item	Progress by Myanmar side
No.1 Equipment costs and construction costs for the construction of flow meter chambers Costs for safety measures in construction	-Completed as informed in the MS Version 3.
No.2 Reagents costs on water quality test for water quality equipment provided	-Completed
No.3 Operation and maintenance costs of the provided PCs for monitoring PIs Updating costs by anti-virus for the above provided PCs	-Procurement and installation is finished. -Training of PC utilization is being regularly implemented. -Update of anti-virus soft is necessary (every year) -O&M costs of PCs (including printer ink) have been secured.
No.4 NRW pilot project cost	-The budget for this purpose in fiscal year 2019 has been acquired and ready to start pilot project.
No.5 Nyaughnapin WTP improvement cost	-Anthracite has been procured by EDWS. Flow meters to measure backwash flow were procured by JICA Expert team. The

		modification of the pilot sedimentation basin and filter was made by EDWS.
	No.6 Tax, commission fee etc. of delivery and registration for the equipment procured and transmitted from the Japanese side.	-Tax and commission fee for the import procedure of equipment was disbursed by YCDC.
	No.7 Electricity cost of project offices, equipment provided and construction of flow meter chambers	-Office utilities are paid by YCDC. Electricity cost will be paid by YCDC after installation.

1-1-2 Japanese side

Item	Contents
1. Expert 1) Consultant team	Planned input and actual performance of consultant expert is shown below; (1) Term 1

Site	Planned MM	Actual MM
Myanmar	77.5	72.29
Japan	3.00	3.15
Total	80.50	75.44
		The remaining MM is transferred to Term 2.
JICA long term expert		16.70

(2) Term 2 (June 2017 to July 2020)

Site	Planned MM (Term2 all)	Actual MM as of end of September, 2018
Myanmar	111.0	49.37
Japan	8.1	2.6
Total	119.1	51.97
JICA long term expert	24	17

2) Experts from waterworks in Japan (advisory committee)	Advisory committee meeting was held in Japan in 26th September. The activities of advisory committee members in Myanmar are not scheduled in FY2018.
2. Equipment	The equipment and materials to be procured in Term 2 are the following 4 items. The summary of status of procurement is as follows: (1) Flow monitoring system **(On-going in Term 2)** The tendering for flow monitoring system was carried out by JICA HQ and contractors have been selected. Flow meters were delivered in Yangon and the monitoring system will be delivered by the end of year 2018. After arriving of equipment installation and trial operation will be carried out by March 2019. (2) Equipment in local offices for collection of electric data and calculation of PIs (Completed) The procurement in Myanmar was made. The equipment was distributed to proposed offices of YCDC and now is used. (3) Equipment for water quality management (1) (Completed) The procurement from Japan was completed and the equipment was delivered by JICA Expert Team and is used. (4) Equipment related to NRW management (Excavator) (Completed) The equipment (one excavator) was procured by JICA Myanmar Office. It was delivered and handed over to YCDC, before which training was given to YCDC staff.

Item	Contents
	(5) Equipment and materials for NRW management **(On-going in Term 2)** Tendering was implemented by JICA HQ and the contractor has been selected. The equipment is under procurement by the contractor. The equipment is expected to arrive at Yangon in February 2019. (6) Manuals and reference books (Completed) Manuals and reference books including ones requested by C/P were identified and procurement was **completed.** A library has been prepared by YCDC for their management and utilization. (7) Equipment for water quality management (2) (Flow meter, desiccator and drier) **(Completed in Term 2)** The procurement was **completed.** It is delivered and is used by YCDC. (8) Equipment and materials for NRW training yard: Preparation and design were completed and the draft of preparation documents for bidding was submitted to JICA HQ. The tender will start in October 2018 and the equipment plans to deliver in May at the earliest. **(On-going in Term 2)** The status of procurement of equipment and materials is shown in the Note:
3. Overseas Training Program Training in Japan and/or neighboring countries	- The third country training in Cambodia (PPWSA) of NRW management and water quality management was implemented in Sep. to Oct. 2017 and Feb. 2018, respectively. - Training in Japan was implemented in Tokyo (Tokyo Metropolitan Government Office) in January 2018.
4. Local cost	Establishment of Expert Team office with internet connection in YCDC building.

Note: Status of Procurement of Equipment and Materials

No.	Equipment	Contents	Procure from	In charge of procurement	Quantity	Progress	Expected / completed delivery timing
1	Flow monitoring system	Ultra-sonic flow meter, RTU, communication equipment	Japan	JICA HQ	21 sets, 9 stations	Tendering was done. Flow meters have been delivered. Delivery of data collection system is under preparation.	Dec. 2018 And installation by Mar. 2019 (tentative)
2	Equipment for electric data and PIs	Computers, printers, copy machine	Myanmar	Expert	59 sets	Procurement was done.	Completed August 2016
3	Water quality management	Water quality test equipment, equipment for improve water quality, glassware	Japan	Expert	1 set	Procurement was done.	Completed December 2016
4	NRW management (leakage repair and detection and DMA construction)	Excavator	Myanmar	JICA Myanmar Office	1 set	Procurement was done.	Completed September 2016
		Internal pipe survey camera, detection equipment, leakage repair, etc.	Japan	JICA HQ	1 set	Tendering was implemented. The delivery is under arrangement by the contractor.	Feb 2019 (tentative)
		Pipes, valves, fittings and accessories	Japan	JICA HQ	1 set	Tendering was implemented. The delivery is under arrangement by the contractor.	Feb 2019 (tentative)
5	Reference books	Technical, finance, administration books	Japan/ USA	JICA long term expert	1 set	Reference books were identified and the response from C/P is awaited	Completed March 2017
6	Water quality management (2)	Flow meter (7 sets), desiccator and drier	Japan	JICA Expert	1 set	Procurement was done	Completed March 2018
7	NRW training yard	Pipes and accessories	Japan	JICA Expert	1 set	Tendering is under preparation by JICA HQ	Not yet decided

1-2 Progress of Activities

The Term 2 started in June 2017 and 1 year and 4 months has been passed. The progress of activities is almost on the track except pilot project of NRW management in Yankin. The description of progress of activities on the Plan of Operation (PO) Version 5 is given in Annex-1.

1-3 Achievement of Output

The progress of achievement of Outputs is summarized as follows.

Output	Objectively Verifiable Indicator	Progress/Achievement
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for improvement of water bill collection is approved by EDWS.	1-1 Plan for improvement of water bill collection was explained in S/C 3. It needs final approval by CE.
	1-2 Plan for human resources development is approved by EDWS.	1-2 A plan for human resources development has been under preparation.
	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS	1-3 The preparation of required regulations, standards and guidelines including water supply regulation has been started. Steering Committee (S/C) 3 has been established for this purpose. The progress should be facilitated according to the schedule prepared.
	1-4 New organization structure is approved by Mayor	1-4 New organization structure was prepared and is under process of approval of the Mayor. New organization set-up with new sections was completed and the activities are implemented by the new organization although an approval is not obtained by Mayor. Moreover, entire YCDC organization is now under restructured. The proposed plan should accord with the YCDC organization restructured.
	1-5 2 Full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-5 No full time C/P was assigned and one dedicated part-time member left the planning team because she entered a graduated university in Japan. 2 full time members at least should be assigned.
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials on NRW management are utilized by YCDC staff.	2-1 Preparation of manual and training materials has been started but final ones will be prepared after the pilot project implementation.
	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 Information of customers and pipes for the pilot areas was compiled. They will be updated after implementation of the pilot project.
	2-3 The number of trainers for NRW management becomes 8.	2-3 The related activities has been started along with several activities on NRW management. Finally, they will be trained in pilot project and training yard.
	2-4 EDWS staff participates in training based on training plan for NRW management.	2-4 It has not yet started.
	2-5 NRW ratio is decreased to 25% in the pilot area.	2-5 The pilot project has not yet started.
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials on water quality management are fully utilized by YCDC staff	3-1 Part of the manuals and SOP have been prepared and utilized. More manuals and training materials will be prepared.
	3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	3-2 Monthly water quality monitoring reports have been prepared and submitted to CE.
	3-3 The number of trainers for water quality management becomes 4.	3-3 Water quality monitoring and treatment seminars by experts are being implemented to develop trainers. Some of them have given training to EDWS staff.
	3-4 EDWS staff participates in training based on training plan for water quality management.	3-4 It has not yet started.
	3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	3-5 The pilot project has been implemented and the result of treated turbidity is satisfactory.
	3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	3-6 Lagunbyn water treatment plant system is under construction and has not yet operated.
	3-7 The operation and maintenance system of chlorination facilities is prepared.	3-7 The operation and maintenance system of chlorination facilities in Yegu pumping station has been set up but other chlorination facilities is under construction and has not yet operated.

1-4 Achievement of the Project Purpose

Gradually, the project purposes have been achieved.

Output	Objectively Verifiable Indicator	Progress/Achievement
Capacity of YCDC on the management of water supply service is improved.	1. Steering Committees (S/C) are organized and improvement actions are implemented	1. S/C1, 2 and 3 were officially organized. Improvement actions will have continued until the end of the project. S/C should become a center and driving force of PCDC cycle.
	2. Mid-term management plan is approved by EDWS	2. First Mid-term management plan will be approved in October, 2018.
	3. The implementation of mid-term management plan is monitored based on MKPIs	3. The monitoring system has been prepared and operated. Monitoring will be continued until the end of the project. Water flow data of production and transmission has not been obtained yet. The data will be available when SCADA system is introduced in March, 2019.
	4. The NRW ratio is grasped in the water supply service area of YCDC and monitored.	4. Initial NRW rate is to be estimated after introduction of flow meter and SCADA in March, 2019. Monitoring will be continued.
	5. Plan for NRW reduction is approved by EDWS.	5. The discussion for formulation of plan has begun and the plan along with priority activities will be drafted in 2018.
	6. Water quality is grasped in the water supply service area of YCDC and monitored	6. Achieved. Monthly water quality monitoring report has been submitted to CE.
	7. Plan for improvement of water quality is approved by EDWS	7. The activity has not yet started.

1-5 Changes of Risks and Actions for Mitigation

The summary of detail project risks which was prepared in the preparatory survey is shown in Appendix-1. Two risks or changes are now identified and may affect the Project. Delay of

procurement of equipment became reality. Accordingly, some of activities of Non-revenue water (NRW) management and installation of flow monitoring system will be delayed. The rescheduling of related activities will be closely watched. This has been reported since Monitoring Sheet Version 3.

1-6 Progress of Actions undertaken by JICA

Following tender actions for the procurement of equipment and materials are under implementation by JICA Headquarters.

(1) Flow monitoring system (JICA Headquarters); Completed
(2) Pilot project for NRW management (JICA Headquarters); Completed
(3) NRW Training Yard (JICA Headquarters); under tender preparation

1-7 Progress of Actions undertaken by YCDC side

Following actions was implemented by YCDC side.

(1) Construction of chambers and kiosks for flow monitoring system was completed. Flow monitoring equipment is awaited for installation by YCDC anytime.
(2) The budget for the pilot project in fiscal year 2018/2019 has been acquired and YCDC is ready to start pilot project. YCDC side is waiting for delivery of equipment from Japan.
(3) A building of NRW training yard will start constructing by YCDC in late 2018 and complete in early 2019.

1-8 Progress of Environmental and Social Considerations (if applicable)

Not applicable.

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

The Project contributes to Gender/ Peace Building/ Poverty Reduction with following measures.

- Clean and safe water supply which will be promoted through the Project will contribute to reduced health risk and stable livelihood, resulting in poverty reduction. This is related to the Project overall goal.
- In the activities of public awareness of the Project, women and children will be targeted and focused as they are prime beneficiaries of the Project. School awareness program was implemented in November 2017 and January 2018. It will be continued for the next fiscal year 2018/19.
- The Chairperson and Secretary of JCC are both women and many woman counterparts have participated in the Project so that the gender balance is kept in the Project.

1-10 Other remarkable /considerable issues related/ affect to the Project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs. etc.)

No remarkable and considerable issue has been identified. However, the following donor projects should be closely monitored and coordinated with the Project.

(1) NRW project by AFD (French Development Agency) has been started.
(2) The project for Reduction of NRW in Mayangone Township in Yangon City under Japan's Grant by Ministry of Foreign Affairs of Japan (Started in 2017 and under construction)
(3) The project for development of water supply at Dala township under Japan's Grant by Ministry of Foreign Affairs of Japan (under preparation)
(4) Constructing of water treatment plan at Hlawga by AfD (under negotiation)
(5) Greater Yangon Water Supply Improvement Project Phase I (Yen loan) (Under implementation: Constructions stage)
(6) Greater Yangon Water Supply Improvement Project Phase II (Yen Loan) (Under implementation: Detailed Design Stage)
(7) Installation of raw water conduit from Ngamoeik Reservoir to Nyaunghnapin water treatment plant by ADB (Pre-feasibility study)
(8) Replacement of concrete pipe from Hlawga to Yegu with ductile iron pipe by YCDC own budget (Preparation stage)
(9) Phase 3 of Nyaunghnapin water treatment plant by YCDC own budget is under preparation

2 Delay of Work Schedule and / or Problems

2-1 Detail

The following activities are delayed.

(1) The activities related to preparation of pilot project for NRW management
    - 2-3-7 Prepare action plan and procurement of equipment (leakage survey and repair) for the countermeasure to be taken for physical loss in the pilot area

The procurement of equipment for the countermeasure to reduce NRW in the pilot area is delayed and start and/or completion of the successive following activities related to NRW management will be delayed.

- 2-3-3 Prepare training plan and training materials by the trainers (physical loss)
- 2-3-4 Formulate manuals on physical loss
- 2-3-8 Set up DMAs at the pilot area (Including procure materials and construct DMA)
- 2-3-9 Conduct the countermeasures against physical loss in the pilot area
- 2-3-10 Evaluate cost-benefit of countermeasures against physical loss of the pilot area and formulate the optimal model of activities

- 2-4-3 Prepare training plan and training materials by the trainers (commercial loss)
- 2-4-4 Formulate manuals on commercial loss
- 2-4-6 Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area
- 2-4-7 Conduct the countermeasures against commercial loss in the pilot area
- 2-4-8 Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities

2-2 Cause

The cause of delay of procurement of equipment is that tendering process in JICA Headquarters requires more time than planned.

2-3 Action to be taken

(1) The activities related to preparation of pilot project for NRW management

The tendering of procurement of materials and equipment was completed by JICA Headquarters and the supplier was identified. JICA has requested to the supplier to facilitate the procurement and delivery of the equipment to the site. Accordingly, schedule of related activities is changed as shown in the modified Plan of Operation Version 6 in Annex-2.

2-4 Roles of Responsible Persons / Organizations

The responsible persons and organization are as follows.

(1) The activities related to preparation of pilot project for NRW management

1) Overall responsibility: Chief Advisor, and DYCE2 of EDWS
2) Output team: JICA NRW experts and NRW Management Section

The roles of each team are as follows.

1) Chief Advisor will coordinate with JICA Headquarter to expedite tendering and procurement.
2) Chief Engineer is a consignee of procured equipment and is responsible for custom clearance and duty exemption procedures.
3) JICA NRW Experts and DYCE2 will follow up the mitigation measures stated above in time so as not to affect the Project outputs and purposes.

3 Modification of the Project Implementation Plan

3-1 Project Design Matrix (PDM)

Restructuring of the Objectively Verifiable Indicators (OVIs) in the PDM have discussed in the 5th Joint Coordination Committee (JCC) Meeting on 26th February 2018 and both sides in principle agreed to modify the proposed OVIs structure with setting their values. After further discussion on the detail modifications, the PDM was finally revised by the third amendment of the signed R/D signed on 19th September 2018 between YCDC and JICA. The amendment of OVIs is shown as follows.

1. Objectively Verifiable Indicator (hereinafter referred to as "OVI") and Means of Verification for Overall Goal of PDM version 2

(1) OVI

Before (as version 2)	Amended Version (as version 3)
1. The performance indicators (PIs) are improved compared to the data at the Project commencement. 2. NRW is decreased from xx% to xx% in the water supply area of YCDC 3. The ratio of water quality test results which satisfy water quality standards is increased from xx% to xx%.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement. 2. NRW is decreased from OO% to OO% in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).
Reason: 1. Management key performance indicators (MKPIs) in Mid-term Plan of EDWS have been prepared. These official PIs of EDWS are to be adopted as PIs for monitoring. 2.No change 3. Key water quality parameter for monitoring is specified. Turbidity and residual chlorine were chosen as these parameters are the main target parameters to be improved in the Project.	

(2) Means of Verification

Before (as version 2)	Amended Version (as version 3)
Reports prepared by YCDC	1. S/C2 activity record, MKPIs monitoring sheets. 2. S/C1 activity record, MKPIs monitoring sheets. 3. Water quality monitoring report, MKPIs monitoring sheets.
Reason: Means of Verification is clarified according to OVI.	

2. OVI, Means of Verification and Important Assumption for Project Purpose of PMD version 2

(1) OVI

Before (as version 2)	Amended Version (as version 3)
1. Evaluation of PIs is conducted periodically 2. NRW is decreased from xx% to xx% in the pilot area 3. The ratio of water quality test results which satisfy water quality standard is increased from xx% to xx%. in the pilot treatment plants.[1]	1. Steering Committees (S/C) are organized and improvement actions are implemented. 2. Mid-term management plan is approved by EDWS. 3. The implementation of mid-term management plan is monitored based on MKPIs. 4. The NRW ratio is grasped in the water supply service area of YCDC and monitored. 5. Plan for NRW reduction is approved by EDWS. 6. Water quality is grasped in the water supply service area of YCDC and monitored. 7. Plan for improvement of water quality is

Note 1; The pilot water treatment plants will be existing Nyaunghnapin Water Treatment Plant and Lagunbyin Water Treatment Plant under construction.	approved by EDWS.
Reason: Version 2 1. Modified to 1. and 3. in version 3 for more specific indicators. 2. Moved to Output 2-5 in version 3. 3. Moved to Output 3-5 in version 3 and modified considering the pilot project on going. Version 3 1. Added to continue improvement action. 2. 1-1 in version 2 is moved here and name of plan is modified. The approval is required by EDWS. 3. Added to continue improvement action. 4. Added to continue improvement action on NRW management 5. 2-4 in version 2 is moved here. The approval is required by EDWS. 6. Added to continue improvement action on water quality management. 7. 3-4 in version 2 is moved here. The approval is required by EDWS.	

(2) Means of Verification

Before (as version 2)	Amended Version (as version 3)
Reports prepared by YCDC	1. Appointment letter for S/C members, S/C1, 2, 3 activity record. 2. Approval of Mid-term management plan in S/C2, or approval letter of the Head of Department (CE). 3. MKPIs monitoring sheets. 4. NRW management report. 5. Approval of Plan for NRW reduction in S/C1, or approval letter of CE. 6. Monthly water quality monitoring report. 7. Approval of Plan for improvement of water quality in S/C2, or approval letter of CE.
Reason: Means of Verification is clarified according to OVI.	

(3) Important Assumption

Before (as version 2)	Amended Version (as version 3)
Fund for YCDC to enable it to execute construction and rehabilitation of facilities such as water treatment plants, disinfection equipment and pipelines is available.	YCDC will obtain budget or funds for construction and rehabilitation of water treatment plant, disinfection facility and distribution pipes, etc.
Reason: Wording correction	

3. OVI and Means of Verification for Output 1 of PDM version 2

(1) OVI

Before (as version 2)	Amended Version (as version 3)
1-1 Plan for institutional management is approved by Yangon Region Government. 1-2 Plan for human resources development is approved by Yangon Region Government. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by Yangon Region Government 1-4 New organization structure is approved by Mayor.	1-1 Plan for improvement of water bill collection is approved by EDWS. 1-2 Plan for human resources development is approved by EDWS. 1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS. 1-4 New organization structure is approved by Mayor. 1-5 2 full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.
Reason: 1-1 in version 2 is moved to 2. of Project Purpose in version 3. 1-1 Activity on improvement of water bill collection is added. 1-2 The approval is required by EDWS. 1-3 The approval is required by EDWS. 1-4 No change. 1-5 Added for PDCA cycle management.	

(2) Means of Verification

Before (as version 2)	Amended Version (as version 3)
Reports prepared by YCDC	1-1 Approval in S/C2, or approval letter of CE. 1-2 Approval in S/C2, or approval letter of CE. 1-3 Approval in S/C3, or approval letter of CE. 1-4 Approval letter, or approval process confirmed by the Experts. 1-5 Evaluation by JICA Experts based on duties of Management Planning Unit in Planning Section in Report on Institutional Reorganization.
Reason: Means of Verification is clarified according to OVI.	

4. OVI and Means of Verification for Output 2 of PDM version 2

(1) OVI

Before (as version 2)	Amended Version (as version 3)
2-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff 2-2 Information of customers and pipes for the pilot areas is compiled and updated. 2-3 xx% of YCDC staff participates training on NRW 2-4 Plan for NRW reduction is approved by YCDC	2-1 Manuals and training materials on NRW management are utilized by YCDC staff. 2-2 Information of customers and pipes for the pilot areas is compiled and updated. 2-3 The number of trainers for NRW management becomes 8. 2-4 EDWS staff participates in training based on training plan for NRW management. 2-5 NRW ratio is decreased to 25% in the pilot area.
Reason:	

2-1 The number of persons should be specified in NRW training plan. This indicator is similar to 2-3 in version 2. 2-2 No change. 2-3 Added as the development of trainers is important to extent NRW management to the entire service area. 2-4 The number of persons should be specified in NRW training plan. (2-4 in version 2 is moved to s moved to 5. of Project Purpose inn version 3.) 2-5 This is moved from Project Purpose.

(2) Means of Verification

Before (as version 2)	Amended Version (as version 3)
Reports prepared by YCDC	2-1 Manuals in relevant offices and training record. 2-2 Pilot project activity report. 2-3 S/C1 activity record, Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance. 2-4 Training attendance record, HRD report (HRD Section) 2-5 S/C1 activity record, Pilot project activity report.
Reason: Means of Verification is clarified according to OVI.	

5. OVI and Means of Verification for Output 3 of PDM version 2

(1) OVI

Before (as version 2)	Amended Version (as version 3)
3-1 Manuals and training materials are fully utilized by more than xx persons of YCDC staff. 3-2 Result of the water quality test at the pilot treatment plants is recorded and monitored periodically 3-3 xx% of YCDC staff participates training on water quality 3-4 Plan for improvement of water quality is approved by YCDC	3-1 Manuals and training materials on water quality management are utilized by YCDC staff. 3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically. 3-3 The number of trainers for water quality management becomes 4. 3-4 EDWS staff participates in training based on training plan for water quality management. 3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU. 3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared. 3-7 The operation and maintenance system of chlorination facilities is prepared.
Reason: 3-1 The number of persons should be specified in water quality management training plan. This indicator is similar to 3-3 in version 2. 3-2 The indicator is more specified. 3-3 Added as the development of trainers is important for more EDWS staff t to practice water quality management. 3-4 The number of persons should be specified in water quality management training plan. (3-4 in version 2 is moved to 7. of project Purpose in version 3.)	

3-5 Moved from 3. of Project Purposes in version 2 and modified considering the pilot project on going. 3-6 Added as the O&M system set up is important for continuous operation. 3-7 Same as above.

(2) Means of Verification

Before (as version 2)	Amended Version (as version 3)
Reports prepared by YCDC	3-1 S/C3 monitoring report, manuals in relevant offices, training record. 3-2 Monthly water quality monitoring report. 3-3 Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance. 3-4 Training attendance record, HRD report (HRD Section). 3-5 Activity report of Taskforce team. 3-6 Operation and maintenance organization structure of Lagunbyin water treatment plant. 3-7 Operation and maintenance organization structure of chlorination facilities.
Reason: Means of Verification is clarified according to OVI.	

3-2 Plan of Operation (PO)

3-2-1 Schedule of PO

Based on the delay of activities mentioned above and other minor extension of the activities required, the revised schedule of PO was set as shown in Annex-2.

4 Preparation by YCDC side toward after completion of the Project

YCDC side should confirm to operate and continue a PDCA cycle management after completion of the Project.

Appendix

Appendix-1: Summary of Project Risk

Envisioned risk	Risk in project implementation	Risks identified	Risk increase or decrease
Overall management			
Project interruption due to the deterioration in the security situation or political condition.	Yes	At this time, deterioration in security or political condition has not identified. The results of the presidential election in 2015 have not shown any deterioration of security or change of major government policy to water supply sector.	Decreased after peaceful election.
Significant change or interruption of project due to the policy change of recipient government.	Yes	The previous government considers that water supply sector is a prioritized area. After the election such policy remains same. However, there may be a risk of significant change of contents or suspension of the Project due to the policy change by change of government or other reasons.	No change
Difficulty in continuation of Project implementation because of the lack of commitment and ownership by recipient government or project implementing agency.	Yes	There is a risk that not enough commitment by the Project implementing agency to the Project will not be obtained because of the budget cutback or personnel relocation in Yangon Regional Government (YRG) and YCDC due to policy change by change of government or other reasons.	No change
Failure to comply with related laws and regulations	Unknown	The possibility to fail to comply with local laws and regulations on the activity in the Project is not foreseen. However, the Project should be implemented by checking the consistency of newly developed scheme / regulations in the Project with local laws / regulations and responsibility and necessary process in Myanmar side on approval for several documents requested by the Project.	No change
Existence of obstructive factors of self-sustaining development after completion of the Project	Yes	Other donors or private companies are considering implementing business in water supply sector in Yangon. It is assumed that YCDC may increase investment to large extent using fund of other donors or private companies. As a result, there may be a risk that such huge investment may affect financial condition of YCDC, which may affect self-sustaining development of YCDC. For this countermeasure, technical assistance for financial management is included in the Project.	No change
Scope management			
Change of overall goal, project purpose and outputs due to policy change of recipient government.	Yes	As described in the section of "Overall management", there is a risk of the change of overall goal, project purposes and outputs due to policy change of the YRG, YCDC or Government of Myanmar (GOM).	No change
Change of overall goal, project purpose and outputs due to delay of implementation of undertakings by implementing agency.	Yes	Waterworks of YCDC is not managed by a self-supporting accounting system. Budget for waterworks is allocated through YRG and YCDC. There is the risk that appropriate budget will not be allocated to the waterworks in YCDC. Therefore, the undertakings of YCDC were confirmed in the R/D (Record of discussion). Furthermore, as for the items that require budget, the follow-up assistance should be made by the Project to allocate budget for these items in the next year's budget request in October as main budget or supplementary budget.	No change
Change of overall goal, project purpose and outputs due to an insufficient capacity of implementing agency	Yes	There are many activities in this projects which YCDC has not experienced before. Therefore, actual progress of the Project is unpredictable. It was considered in PO that main activities will start after priority activities and scope of capacity development are narrowed down based on the results of baseline survey and capacity assessment implemented in the early stage.	No change
Change of overall goal, project purpose and outputs due to delay of	Yes	If procurement of equipment was unsuccessful, the Project will delay. Therefore, measures to avoid unsuccessful bidding shall be made and procurement process should	No change

Envisioned risk	Risk in project implementation	Risks identified	Risk increase or decrease
implementation of undertakings by Japan.		have enough time.	
Change of overall goal, project purpose and outputs due to capacity of the experts.	Yes	Regular progress monitoring and follow up will be made. In addition, knowledge of waterworks of Japanese local governments (Tokyo Metropolitan and Fukuoka City) should be utilized in the Project.	No change
Change of overall goal, project purpose and outputs due to the difference between prior condition and actual condition.	Yes	YCDC is approached by many donors and private companies. Therefore, it is necessary to monitor their activities carefully. Note: AfD; French Development Agency	AfD will start NRW project. It should be watched carefully.
Schedule management			
Delay of implementation of each activity due to the delay of implementation of undertakings by implementing agency.	Yes	There is the risk. Therefore, the undertakings of YCDC should be confirmed in the R/D (Record of discussion). Furthermore, as for the items that require budget, the required cost should be estimated and the follow-up assistance should be made by the Project to allocate budget for these items in the next year's budget request in October.	No change
Delay of implementation of each activity due to the capacity of implementing agency.	Yes	There are many activities in this projects which YCDC has not experienced before. Therefore, actual progress of the Project is unpredictable. It was considered in PO that main activities will start after priority activities and scope of capacity development are narrowed down based on the results of baseline survey and capacity assessment implemented in the early stage.	No change
Delay of implementation of each activity due to the delay of undertakings implementation by Japan.	Yes	If procurement of equipment was unsuccessful, the Project will delay. Therefore, measures to avoid unsuccessful bidding shall be made and procurement process should have enough time.	No change
Delay of implementation of each activity due to an insufficient ability of expert.	Yes	Regular progress monitoring and follow up will be made. Because of the wide range of project scope, monitoring is implemented carefully to prevent a delay due to shortage of manpower of experts.	No change
Cost management			
Deficiency of budget for responsibility of implementing agency	Yes	The undertakings of YCDC should be confirmed in the R/D. Furthermore, the follow-up assistance should be made by the Project to allocate budget for these items in the next year's budget request in October a supplementary budget and next fiscal budget.	No change
Deficiency of budget for responsibility of Japan	No	-	No change
Quality management			
Decrease of output due to an insufficient capacity of implementing agency	Yes	There are many activities in this projects which YCDC has not experienced before. Therefore, actual progress of the Project is unpredictable. It was considered in PO that main activities will start after priority activities and scope of capacity development are narrowed down based on the results of baseline survey and capacity assessment implemented in the early stage. In addition, it is considered an expert of Institutional Capacity Development / Human Resources Management is assigned in the Project to support establishment and dissemination of technology acquired through the Project in YCDC.	No change
Decrease of development impact to final beneficiaries.	Yes	To supply safety and enough quantity of water to the citizen, it is necessary that the transferred technology through the Project is fully utilized by securing necessary budget by YCDC, implementing proactive facility development, NRW reduction and water quality management. In the Project, planned support to utility management will be made to realize sustainable	No change

Envisioned risk	Risk in project implementation	Risks identified	Risk increase or decrease
		development impact.	
Decrease of development impact due to absence of expert's manpower or active period.	Yes	This project is planned to assure enough amount of M/M of experts. However, if additional manpower is required, input of additional M/M should be considered.	No change
Decrease of development impact due to an insufficient capacity of expert.	Yes	This project put the right person in the right place considering the expertise of consultant and waterworks personnel (Tokyo Metropolitan and Fukuoka City). However, if the insufficient capacity of expert becomes apparent, replacement of expert is considered.	No change
Management of human resource			
Delay of assignment C/P or change of C/P	Yes	Counterparts (C/P) are assigned from existing personnel in YCDC. Therefore, new employment for this project is not assumed. The required number of C/P and technical field are agreed in the detailed planning survey.	No change
Delay of dispatch of expert	Yes	If the procurement of consultant is unsuccessful, dispatch of expert is delayed. Therefore, implementation of process management with margin and countermeasures to avoid unsuccessful tender should be considered.	No change
Difficulty of securement of appropriate expert	Yes	Based on the routine project monitoring, assignment of consultant and revision of contract are considered.	No change
Management of Communication			
Difficulty of communication among recipient government, project implementing agency and involved parties.	Yes	Currently, a number of ODA projects are implemented in Yangon city. Communication between project implementing agency and involved parties is currently satisfactory. However, YRG and GOM don't have a comprehensive responsible unit on waterworks management. Therefore, communication with YRG and GOM is limited.	No change
Difficulty of communication with Japanese concerned parties.	Yes	A Japanese concerned party is constituted of JICA, Tokyo Metropolitan, Fukuoka city and Consultant. Therefore, maintain of close communication among these entities is important.	No change
Management of procurement			
Delay of equipment procurement	No (Change to Yes)	Specialized equipment and equipment with long production period are not planned. Therefore, delay of equipment procurement is not expected.	There is a risk. Delay in procurement process of equipment.
Delay of preparation of technical training	Yes	In the Project, a schedule with enough time to select an appropriate candidate and to implement necessary procedure in Myanmar should be considered.	No change
Other risk	Not identified		

Annex

Annex-1: Monitoring Sheet Version 5

Annex-2: PO Version 6 (Modified Schedule)

PO Activity No.		Schedule						Progress and Achievement as of September 2018
		Term1		Term 2				
		2015	2016	2017	2018	2019	2020	
1-6	Enhance understanding on financial management							
	1-6-1 Analyze the current financial management system							Completed and on-going. A continuous updating and exploring the existing financial management system are being implemented.
	1-6-2 Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans							On-going. Lecture series of sustainable management and water tariff setting were implemented. Corporate accounting system, water tariff setting and asset accounting are now being exercised.
	1-6-3 Conduct OJT on development of asset ledger							Asset ledger and fixed asset accounting system is being developed by the committee newly organized.
1-7	Strengthen Public Relations							
	1-7-1 Analyze the effective public relations on water service of YCDC							Completed. Activity plan of PA was prepared.
	1-7-2 Conduct awareness raising of YCDC staff							Annual calendar was distributed for 2017 and 2018. School awareness program were implemented twice.
	1-7-3 Conduct OJT on the public relations activities							On-going. Calender distribution and school awareness program will be continued.
1-8	Strengthen human resources development							
	1-8-1 Review the existing human resources development system							Completed.
	1-8-2 Identify necessary improvement on structure and materials of the trainings							Completed.
	1-8-3 Conduct trainings of trainers for planning and organizing the trainings							On-going. Training for trainers and training management by HRD section have been conducted.
	1-8-4 Develop 5-year and 10-year human resources development plans							Under preparation. A comprehensive training program is under formulating.
	1-8-5 Launch priority activities as a part of implementing the 5-year human resources development plan							On-going. Some highly prioritized activities have been implemented such as training for new staff, PC skills, basic theory of water engineering, 5S activities and capacity development for HRD Section.
1-9	Develop and support implementation of the institutional management plans							
	1-9-1 Develop 5-year and 10-year institutional management plans							On-going. S/C2 for mid-term plan has been held and draft 1st mid-term plan for 2018-2020 has been prepared.
	1-9-2 Launch priority activities as a part of implementing the 5-year institutional management plan							Not ye started. The activities will start after finalizing mid-term plan.
Output 2. Capacity of YCDC on NRW management is improved.								
2-1	Establish NRW Management Unit							
	2-1-1 Establish NRW Management Unit							Completed and started work (Established in Jan, 2017).
	2-1-2 Define the division of duties of NRW Management Unit							Completed.
2-2	Collect and compile information o/ NRW							
	2-2-1 Collect information of NRW and implement a baseline survey							Completed and updating.
	2-2-2 Compile informaton of pipes for establishment of GIS							Completed and updating. Information regarding the past pipe improvement project was compiled. Completion drawings for new projects (Meyangone and Lagunbyin) will be prepared in a format of GIS. Procedure of updating of collected data in GIS is under examination.
	2-2-3 Compile customer information into database							Completed and updating.
	2-2-4 Formulate Standard Operation Procedure (SOP) of the above information management							On-going. SOPs are under preparation.

Annex-1: Monitoring Sheet Version 5

The Project for Improvement of Water Supply Management of YCDC
Plan of Operation (PO) ver.5

PO Activity No.		Schedule						Progress and Achievement as of September 2018
		Term 1		Term 2				
		2015	2016	2017	2018	2019	2020	
Preparation of Work Plan Phase 1 (Draft) and Monitoring Sheet Ver.1 and Discussion								Completed.
Preparation of Work Plan Phase 2 (Draft) and Monitoring Sheet Ver.4 and Discussion								Completed.
Baseline Survey (Implementation of Capacity Assessment)								Completed.
Confirmation of Work Plan and Monitoring Sheet Ver.1			△					Completed.
Preparation of Monitoring Sheet Ver.2~Ver.E			▲	▲	▲ △	△	△	The Monitoring Sheets Version 1 and 5 were prepared.
Study of training in Japan and third country and implementation			■ ■	■	■■			Completed. 2 thirc country trainings for NRW management and water quality management and 1 training in Japan were implemented in Cambodia in Term 2.
Study of materials to be procured and their procurement								Not yet completed. The equipment and materials under procurement by SCA are 1) flow monitoring system, 2) NRW pilot project, 3) NRW training yard.
Preparation of project progress report				△	△	△		Progress report o Term 1 was prepared in March 2017. 1st Progress repor of Term 2 was prepared in May 2018.
End line survey								Not yet.
Preparation of project completion report								Not yet.
Output 1: Capacity of YCDC on institutional management is improved.								
1-1	Prepare overall new organization structure							Completed.
1-2	Establish Planning Section							
	1-2-1 Establish the Planning Section in Department of Water and Sanitation							Completed (but no full time staff).
	1-2-2 Define the divisionof duties of the Planning Section							Completed.
1-3	Establish Customer Service Division							
	1-3-1 Establish the Customer ServiceDivision in Department of Water and Sanitation							Completed.
	1-3-2 Define the divisionof duties of the Customer ServiceDivision							Completed.
	1-3-3 Establish operation system of the Customer ServiceDivisio							Under implementation. Existing situation of customer service in TIS and e-Government system was studied. A new customer database has been proposed. The new billing and collection system is now under preparation. In addition, efficiency and optimization of the system are undertaking.
1-4	Develop and Monitor Performance Indicators (PIs)							
	1-4-1 Review the curren method of calculation and monitoring of performance data							Completed.
	1-4-2 Conduct training o trainees on the calculation and monitoring of Performance Indicators.							Completed. PIs of 2016 were calculated and training of PI calculation was given.
	1-4-3 Identify the necessary and available Performance Indicators to be monitored							Completed. PIs, KPIs anc MKPIs are set up and PIs monitoring system was prepared. Available PIs have been monitored and data accuracy has been improved.
	1-4-4 Install transmission flow meter and data logger and collect flow data							Flow monitoring system is now under procurement and it will be completed in March 2019.
	1-4-5 Procure equipment (computers, printers, software, etc.) in boat offices and conduct training							Completed. 72 sets of PC were procured and used for operation and PC training.
	1-4-6 Collect data required for setting PIs							Completed. Data is now collecting continuously except flow data, which will be collected from the proposed flow monitoring system.
	1-4-7 Develop calculation method, manuals and monitoring system of Performance Indicators							Completed. The monitoring system is being improving by using a new format for TIS office to collect more accurate data.
	1-4-8 Calculate Performance Indicators							Completed. PIs were calculated except NRW ratio, for which completion of flow monitoring system is required.
	1-4-9 Update and monitor the Performance Indicators periodically							MKPIs for FY2016 was calculated and those for FY2017 is under calculation. PIs, KPIs and MKPIs are periodically updated.
1-5	Formulate regulations, standards and guidelines							
	1-5-1 Review the existing rules, regulations, standards and guidelines							Completed.
	1-5-2 Identify regulation, standards and guidelines to be modified and/or newly formulated							Necessary ones are identified and started formulating.
	1-5-3 Draft water supply regulation and run a trial							The preparation o water supply regulation started in S/C3 in autumn, 2017 by establishing working group. Then, 2 subgroups were set up in summer, 2018 and detail discussion was started regarding major issues like water supply equipment and tariff collection. In September 2018, implementation schedule was set.
	1-5-4 Draft necessary regulations, standards and guidelines, which can be prepared by YCDC							Necessary ones are identified and started formulating.

PO Activity No.		Schedule: Term 1 2015	2016	Term 2 2017	2018	2019	2020	Progress and Achievement as of September 2018
Output 3. Capacity of YCDC on water quality management is improved.								
3-1	Establish Water Treatment Section							
	3-1-1 Establish the Water Treatment Section in Department of Water and Sanitation							Completed.
	3-1-2 Define the division of duties of the Water Treatment Section							Completed.
	3-1-3 Hold a series of seminar for basic water treatment technology with study tours in treatmen facilities							Completed and continuously being held.
3-2	Review current situation and formulate phased countermeasures							Completed.
3-3	Conduct training of trainers on water quality management							
	3-3-1 Conduct training of trainers on the water quality management							On-going.
	3-3-2 Prepare the training plan and training manuals by the trainers							On-going.
	3-3-3 Conduct Off-JT by the trainers							On-going.
3-4	Develop SOP for water quality management							
	3-4-1 Develop SOP on water quality test and monitoring							Completed and updating.
	3-4-2 Develop SOP on operation and maintenance of water treatment plant & disinfection facility							On-going. SOPs of "egu disinfection facility are prepared.
3-5	Conduct OJT on water quality management at the pilot treatment plants and disinfection facilities							
	3-5-1 Procure water quality analysis and water quality management equipment							Completed.
	3-5-2 Conduct OJT on water quality test and monitoring							Completed.
	3-5-3 Diagnose function of treatment processes of Nyaunghnapin water treatment plant							Completed.
	3-5-4 Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin							Almost completed. Test is continuing by pilot basin.
	3-5-5 Prepare an improvement plan of Nyaunghnapin water treatment plant							The plan is under preparation.
	3-5-6 Conduct OJT on operation and maintenance of water treatment plant & disinfection facility							On-going. OJT of O&M of Yegu chlorination facilities was completed. OJT of O&M of WTP is under implementation. OJT of O&M of chlorination facilities other than Yegu has not yet started.
	3-5-7 Verify SOP for water quality management							Not yet started.
3-6	Conduct OJT on improvement of water quality supplied from reservoirs							
	3-6-1 Review water quality problems in reservoir water							Completed.
	3-6-2 Research water quality improvement measure of reservoir supplied water							Research was completed and improvement measures are under compilation.
3-7	Develop and support implementation of the water quality management plans							
	3-7-1 Develop 5-year and 10-year water quality management plans							Not yet started.
	3-7-2 Launch priority activities as a part of implementing 5-year water quality management plan							Not yet started.
Kick-off Meetings, JCC, or other meetings		Kick-off	JCC1 JCC2 JCC3	JCC4	JCC5 JCC6	JCC7 JCC8	JCC9	

Main activities ▪▪▪▪ Monitoring or minor activities

PO Activity No.		Schedule: Term 1 2015	2016	Term 2 2017	2018	2019	2020	Progress and Achievement as of September 2018
2-3	Develop a model on the management of physical loss (leakage, overflow) and human resources development							
	2-3-1 Review current situation and develop phased countermeasures							Review of current situation was completed. Phased countermeasures are under examined in S/C1.
	2-3-2 Conduct trainings of trainers							Several seminars have been conducted. Through OJT in Yankin and North Okkalapa project and data collection and assessment, trainers are being trained.
	Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot projec in North Okkalapa							Survey, planning and design (drawing), flow measurement and NRW ratio estimation were completed through OJT. This OJT process is a kind of trainers training.
	2-3-3 Prepare training plan and training materials by the trainers							On-going. The training plan and materials has been prepared and training is under implementation. .
	2-3-4 Formulate manuas on physical loss							On-going. Manuals are being preparing in S/C1.
	2-3-5 Conduct Off-JT by the trainers							Not yet started.
	2-3-6 Select a pilot areas for NRW management activities							Completed. Yankin 13-ward was selected)
	2-3-7 Prepare action plan and procurement of equipment (leakage survey and repair) for the countermeasure to be taken for physical loss in the pilot area							Equipment was under procurement by JICA HQ and it is delayed.
	2-3-8 Set up DMAs at the pilot area (including procure materials and construct DMA)							Not yet started due to delay of procurement of equipment.
	2-3-9 Conduct the countermeasures against physical loss in the pilot area							Not yet started due to delay of procurement of equipment.
	2-3-10 Evaluate cost-benefit of countermeasures against physicalloss of the pilot area and formulate the optimal model of activities							Not yet started due to delay of procurement of equipment.
	2-3-11 Implement OJT by the trainers							Not yet started.
	2-3-12 Verify the manuals on physical loss							Not yet started.
2-4	Develop a model on the management of commercial (non-physical) oss (meter fault, miss reading of meter illegal connection) and human resources development							
	2-4-1 Review current situation and develop phased countermeasures							Review of current situation was completed. Phased countermeasures are under examined in S/C1.
	2-4-2 Conduct trainings of trainers							On-going. Meter survey (existing and condition) is under implementation in the entire city.
	Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot projec in North Okkalapa							Survey, planning and design were completed through OJT and assistance for supervision is under implementation.
	2-4-3 Prepare training pan and training materials by the trainers							On-going. The training plan and materials has been prepared and training is under implementation. .
	2-4-4 Formulate manuas on commercial loss							On-going. Manuals are being preparing in S/C1.
	2-4-5 Conduct Off-JT by the trainers							Not yet started.
	2-4-6 Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area							Equipment was under procurement by JICA HQ and it is delayed.
	2-4-7 Conduct the countermeasures against commercial loss in the pilot area							Not yet started due to delay of procurement of equipment.
	2-4-8 Evaluate cost-benefit of countermeasures against physicalloss in the pilot area and formulate the optimal model of activities							Not yet started due to delay of procurement of equipment.
	2-4-9 Implement OJT by the trainers in the pilot area							Not yet started.
	2-4-10 Verify the manuals on commercial loss							Not yet started.
2-5	Develop training yard for NRW management							
	2-5-1 Prepare training pan for training yard							Completed.
	2-5-2 Design training yard							Completed.
	2-5-3 Prepare equipment and materials for training yard							On-going. Tender documens are under preparation assisting JICA Head Office.
	2-5-4 Construct training yard							Not yet started.
	2-5-5 Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard							Not yet started.
	2-5-6 Conduct Off-JT by the trainers in training yard							Not yet started.
2-6	Develop and support implementation of the NRW management plans							
	2-6-1 Develop 5-year and 10-year NRW management plans							On-going. The plan is under formulating in S/C1.
	2-6-2 Launch priority activities as a part of implementing the 5-year NRW management plan							Not yet started.

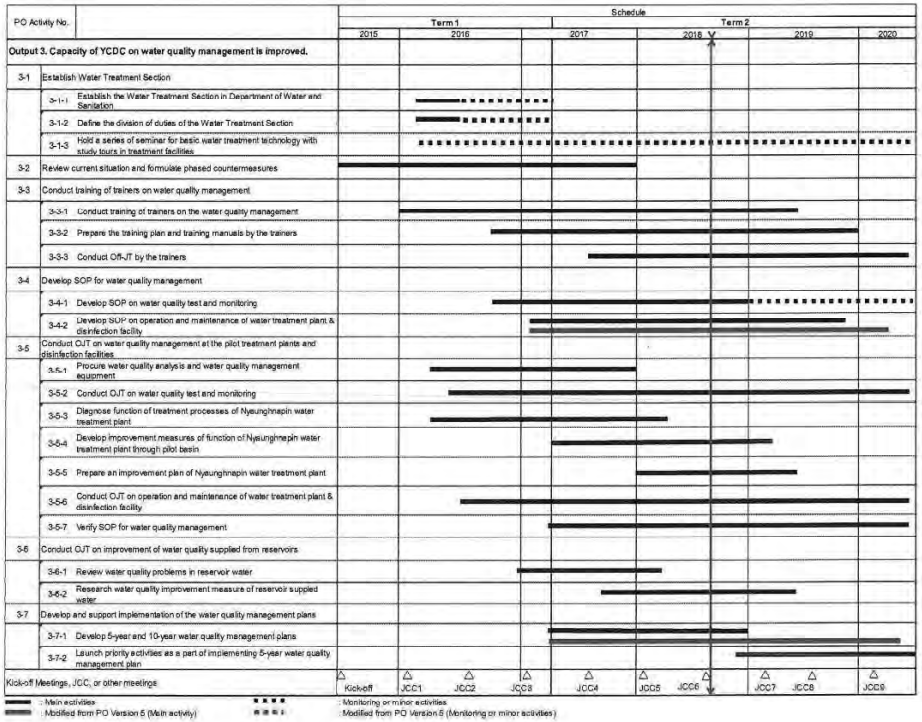
Annex-2: PO Version 6 (Modified Schedule)

The Project for Improvement of Water Supply Management of YCDC

Plan of Operation (PO) ver.6

PO Activity No.		Schedule					
		Term 1		Term 2			
		2015	2016	2017	2018	2019	2020
Preparation of Work Plan Phase 1 (Draft) and Monitoring Sheet Ver.1 and Discussion							
Preparation of Work Plan Phase 2 (Draft) and Monitoring Sheet Ver.4 and Discussion							
Baseline Survey (Implementation of Capacity Assessment)							
Confirmation of Work Plan and Monitoring Sheet Ver.1			△				
Preparation of Monitoring Sheet Ver.2 ~ Ver.8			▲	▲	▲	△	△	△
Study of training in Japan and third country and implementation							
Study of materials to be procured and their procurement							
Preparation of project progress report				△	△	△	
End line survey							
Preparation of project completion report							
Output 1: Capacity of YCDC on institutional management is improved.							
1-1	Prepare overall new organization structure						
1-2	Establish Planning Section						
1-2-1	Establish the Planning Section in Department of Water and Sanitation						
1-2-2	Define the division of duties of the Planning Section						
1-3	Establish Customer Service Division						
1-3-1	Establish the Customer Service Division in Department of Water and Sanitation						
1-3-2	Define the division of duties of the Customer Service Division						
1-3-3	Establish operation system of the Customer Service Division						
1-4	Develop and Monitor Performance Indicators (PIs)						
1-4-1	Review the current method of calculation and monitoring of performance data						
1-4-2	Conduct training of trainers on the calculation and monitoring of Performance Indicators.						
1-4-3	Identify the necessary and available Performance Indicators to be monitored						
1-4-4	Install transmission flow meter and data logger and collect flow data						
1-4-5	Procure equipment (computers, printers, software, etc.) in local offices and conduct training						
1-4-6	Collect data required for setting PIs						
1-4-7	Develop calculation method, manuals and monitoring system of Performance Indicators						
1-4-8	Calculate Performance Indicators						
1-4-9	Update and monitor the Performance Indicators periodically						
1-5	Formulate regulations, standards and guidelines						
1-5-1	Review the existing rules, regulations, standards and guidelines						
1-5-2	Identify regulation, standards and guidelines to be modified and/or newly formulated						
1-5-3	Draft water supply regulation and run a trial						
1-5-4	Draft necessary regulation, standards and guidelines, which can be prepared by YCDC						
1-6	Enhance understanding on financial management						
1-6-1	Analyze the current financial management system						
1-6-2	Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans						
1-6-3	Conduct OJT on development of asset ledger						
1-7	Strengthen Public Relations						
1-7-1	Analyze the effective public relations on water service of YCDC						
1-7-2	Conduct awareness raising of YCDC staff						
1-7-3	Conduct OJT on the public relations activities						
1-8	Strengthen human resources development						
1-8-1	Review the existing human resources development system						
1-8-2	Identify necessary improvement on structure and materials of the trainings						
1-8-3	Conduct trainings of trainers for planning and organizing the trainings						
1-8-4	Develop 5-year and 10-year human resources development plans						
1-8-5	Launch priority activities as a part of implementing the 5-year human resources development plan						
1-9	Develop and support implementation of the institutional management plans						
1-9-1	Develop 5-year and 10-year institutional management plans						
1-9-2	Launch priority activities as a part of implementing the 5-year institutional management plan						

PO Activity No.		Schedule					
		Term 1		Term 2			
		2015	2016	2017	2018	2019	2020
Output 2. Capacity of YCDC on NRW management is improved.							
2-1	Establish NRW Management Unit						
2-1-1	Establish NRW Management Unit						
2-1-2	Define the division of duties of NRW Management Unit						
2-2	Collect and compile information of NRW						
2-2-1	Collect information of NRW and implement a baseline survey						
2-2-2	Compile information of pipes for establishment of GIS						
2-2-3	Compile customer information into database						
2-2-4	Formulate Standard Operation Procedure (SOP) of the above information management						
2-3	Develop a model on the management of physical loss (leakage, over flow) and human resources development						
2-3-1	Review current situation and develop phased countermeasures						
2-3-2	Conduct trainings of trainers						
	Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa						
2-3-3	Prepare training plan and training materials by the trainers						
2-3-4	Formulate manuals on physical loss						
2-3-5	Conduct Off-JT by the trainers						
2-3-6	Select a pilot areas for NRW management activities						
2-3-7	Prepare action plan and procurement of equipment (leakage survey and repair) for the countermeasure to be taken for physical loss in the pilot area						
2-3-8	Set up DMAs at the pilot area (Including procure materials and construct DMA)						
2-3-9	Conduct the countermeasures against physical loss in the pilot area						
2-3-10	Evaluate cost-benefit of countermeasures against physical loss of the pilot area and formulate the optimal model of activities						
2-3-11	Implement OJT by the trainers						
2-3-12	Verify the manuals on physical loss						
2-4	Develop a model on the management of commercial (non-physical) loss (meter fault, miss reading of meter, illegal connection) and human resources development						
2-4-1	Review current situation and develop phased countermeasures						
2-4-2	Conduct trainings of trainers						
	Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa						
2-4-3	Prepare training plan and training materials by the trainers						
2-4-4	Formulate manuals on commercial loss						
2-4-5	Conduct Off-JT by the trainers						
2-4-6	Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area						
2-4-7	Conduct the countermeasures against commercial loss in the pilot area						
2-4-8	Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities						
2-4-9	Implement OJT by the trainers in the pilot area						
2-4-10	Verify the manuals on commercial loss						
2-5	Develop training yard for NRW management						
2-5-1	Prepare training plan for training yard						
2-5-2	Design training yard						
2-5-3	Prepare equipment and materials for training yard						
2-5-4	Construct training yard						
2-5-5	Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard						
2-5-6	Conduct Off-JT by the trainers in training yard						
2-6	Develop and support implementation of the NRW management plans						
2-6-1	Develop 5-year and 10-year NRW management plans						
2-6-2	Launch priority activities as a part of implementing the 5-year NRW management plan						



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MINUTES OF MEETING
OF THE SEVENTH JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), and amended on 5th May 2017 and 19th September 2018, JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 7th meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 1st March 2019.

The following agenda was presented and discussed among the participants of the JCC meeting including the counterparts of Engineering Department (Water and Sanitation) (hereinafter referred to as "EDWS") of YCDC, JICA Myanmar Office and JICA Expert Team.

1. Prospects of project success by each section
2. Review of previous recommendations and progress
3. Overall progress of the project, and issues to be shared
4. Summary of prospects of project success and discussion
5. Recommendations and conclusions

In the course of discussions, main points discussed and decided are summarized in Attachment 1.

Yangon, 6th March 2019

for

Mr. Hirotaka Sato
Chief Advisor
The Project for Improvement of Water Supply Management of YCDC

U Aung San Win
Head of Department, Department of Engineering (Water and Sanitation), Yangon City Development Committee (YCDC),
The Republic of the Union of Myanmar

Attachment 1: Main points discussed and decided

1. Review of previous recommendations and progress

The conclusions and recommendations of previous six JCCs and their progress were reviewed.

2. Progress of the project, and summary of issues and discussion

The progress of the Project and summary of prospects of project success were explained by Assistant Chief Engineers and recognized by all participants. The challenges and countermeasures were summarized below.

Output	Challenges	Countermeasures
1-1 Planning and Regulations	• Number of Planning Section Staff are not enough • PI Data and Sub-format data sheet collection are not in time regularly	• Requested for new staff of planning section to Head of Department • PI Data and Sub-format data sheet will quarterly be collected by official letter and at the half monthly meeting • Re-arrangement of PI data collection system will be considered to optimize the system • Need to collect and compile Standards and Guidelines of other working groups. • Need to know updated policies and decisions, since YCDC is transforming into new organization.
1-2 Finance and Water Tariff		• To need coordination with every division and every section to implement activities of the Project of the Finance Group
1-3 HRD		• To need to discuss and propose human resource development (HRD) plan for sustainable HRD system
1-5 Customer Service		• Need to assign the specific duties of Customer Service Section as soon as possible • Need to formulate RGSMs for Customer Services such as application acceptances, meter readings, income management, outstanding management • Need to provide continuous support for

Output	Challenges	Countermeasures
		the successfully formulation of Customer Service Section
2 NRW Management	• The Mid-Long Term Plan is absolutely the challenge against issues relating to NRW. • We will do a lot of implementation works to reach the NRW Reduction target according to JICA Master Plan 2040	• Need to have the active participation of all sectors on NRW reduction roadmaps making their sacrifice • Uncertainty to anticipate for policy transformation to practice for Public Private Partnership • Need to enhance the public awareness program and promote the public cooperation
3 Water Quality Management	• Developing SOPs for new disinfection facilities and Lagunbyin WTP (based on the project schedule of construction stage) • Designing Demonstration WTP using Direct Filtration Method & Designing 3rd Phase of Ngamoeyeik WTP (Nyaunghnapin) for surplus 45 MGD water from Ngamoeyeik Reservoir • Controlling turbidity of treated water less than 1 NTU • Sustainable Improvement of Central Lab and Mini Laboratories • Implementing Effective Chlorine Basic Plan (because of insufficient knowledge in Chlorine Basic Plan Formulation)	• Need the support of TA Experts in Designing the water treatment facilities for the improvement of water quality management • Need to construct new disinfection facilities and Lagunbyin water supply project according to the schedule to develop proper documents for O&M of these facilities in this TA project

EDWS had made requests of the additional supports from JICA as below.

(1) Designing of 3rd phase of Nyaunghnapin WTP
(2) Implementing direct filtration demonstration treatment plant
(3) Implementing water reservoirs conservation

JICA headquarters replied that is difficult to include these additional activities in the Project activities since many additional activities have been included in the Project activities and the

Project has the budget limitation. However, the assistance for transmission system improvement required for the 3rd Phase Nyaunghnapin WTP, and water reservoirs conservation can be discussed to be included in the activities of the expert from Fukuoka City. One C/P in charge commented that all three requests have come up from the achievements of the Project, and intended to expand them. JICA expert team also showed a willingness to continue to support for these requests as far as they can.

The Chief Advisor of JICA experts showed his view on the prospects that the progress was very good and the Project would be successful at the end. He commented that many activities are remained for output 2 (NRW management) due to delay of equipment procurement and all counterparts of NRW section need to tackle for these activities so that it would be successfully completed. He also recommended that PDCA cycle that is now under implementation in the Project will be utilized for managing other plans prepared including mid-term management plan, HRD plan, NRW management plan and water quality management plan.

3. Conclusions and recommendations

Deputy Head of Department showed his general impression of capacity development as the fruits of the Project that following capacity of staff has been improved very much.

- Development of Human Resources and Capacity Buildings
  - Communication Skill
  - Presentation Skill
  - Technical Skill
  - General Knowledge
- Formulating of RSGMs and SOPs
- Formulating NRW Reduction Project in Yankin and Training Yard
- Establishment of Mini Laboratories
- Function test and improvement plan in Nyaunghnapin WTP and Gyobyu WT

Following conclusions and recommendations for the Project activities were presented.

(1) Institutional management (Output-1)
- Cooperation and participation of all levels of EDWS's official are needed to draft RSGMs for water supply services.
- A new organization structure, in which the proposal by the Project is considered, should be set up and approved by Mayor.
- Full time staff members in Planning Section are necessary to give a direction of PDCA cycle to EDWS staff. They should be selected in March, 2019.

(2) NRW management (Output-2)
- Pipeline network installation in pilot project (Phase I) should be finished at the beginning of July, 2019 based on the NRW schedule. The evaluation of cost-benefit countermeasures against physical loss and commercial loss should be completed at the end of October, 2019.
- All sectors should participate in NRW reduction roadmaps actively.

(3) Water quality management (Output-3)
- O&M system of Lagunbyin WTP should be established before operation.
- O&M system of Chlorine facilities needs to be prepared before operation.

Then, further recommendations were presented for further growth toward the achievement of EDWS vision.

- The data should be accurate in formulating PIs and KPIs to evaluation water work management by PCDA management, and collected regularly.
- The executive officials need to support and participate actively, and to be sure for calculation of unit price of water production, profit and loss, and annual financial report.
- The existing HRD section should be reinforced by assigning the surplus staffs for development of workability more since there are a lot of implementation works.
- Customer Call Center is expected to conduct good communications between EDWS and the customers.
- The public campaign and Mobile Public Awareness Programs should also be formulated.
- RGSMs for Customer Services such as application acceptances, meter readings, income management should be formulated as fast as we can.
- All sectors should participate in NRW reduction roadmaps actively.
- TA Experts' support is necessary in designing the water treatment facilities for the improvement of water quality management.

(End)

MINUTES OF MEETING
OF THE EIGHTH JOINT COORDINATING COMMITTEE
FOR
"The Project for Improvement of Water Supply Management of YCDC"

Based on the Record of Discussions (R/D) on the Project for Improvement of Water Supply Management of YCDC (hereinafter referred to as "the Project") signed on 25th November 2014 between Yangon City Development Committee (hereinafter referred as "YCDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), and amended on 5th May 2017 and 19th September 2018, JICA has dispatched the Expert Team to Myanmar for implementation of the Project since 4th July 2015.

The 8th meeting of the Joint Coordinating Committee (hereinafter referred to as "JCC") for the Project chaired by the Secretary of YCDC was held on 24th October 2019.

The following agenda was presented and discussed among the participants of the JCC meeting including the counterparts of Engineering Department (Water and Sanitation) (hereinafter referred to as "EDWS") of YCDC, JICA Myanmar Office and JICA Expert Team.

1. Review of previous recommendations and progress
2. Sustainable human resource management
3. Overall progress of project, and issues to be shared and update of prospect of project success and discussion
4. Recommendations and conclusions

In the course of discussions, main points discussed and decided are summarized in Attachment 1.

Yangon, 29 November 2019

Mr. Hirotaka Sato Chief Advisor The Project for Improvement of Water Supply Management of YCDC	U Myint Zaw Tan Head of Department, Department of Engineering (Water and Sanitation), Yangon City Development Committee (YCDC), The Republic of the Union of Myanmar

Attachment 1: Main points discussed and decided

1) Review of previous recommendations and progress

The conclusions and recommendations of previous seven JCCs and their progress were reviewed. The progress of the Project was explained and recognized by all participants.

The Chief Advisor of JICA experts showed his view on the prospects that the progress was very good, and the Project would be successful at the end. However, he commented that many activities in the output 2 (Non-revenue water (NRW) management) behind schedule due to delay of equipment procurement, and all counterparts of NRW section need to tackle for these activities so that it would be successfully completed. He also recommended that PDCA cycle that is now under implementation in the Project will be utilized for managing other plans prepared including mid-term management plan, HRD plan, NRW management plan and water quality management plan.

2) Sustainable human resource management

A drafted human resource development (HRD) plan was explained by the counterparts, in which long-term HRD activities are proposed for achievement of EDWS's mission. The most critical issue "how to retain young capable staff" was discussed among participants so that participants deepened the understanding and presented countermeasures about the issue. In consideration of the measures, it is necessary to differentiate between permanent staff and non-permanent staff.

The Secretary made comments on the HRD Plan: 1) The Plan should incorporate PPP practice in it which YCDC is now proceeding, 2) the employment of permanent staff should be considered to be more competitive, such as introduction of examination, and 3) it is necessary for each staff to be responsible for self-learning to increase efficiency of the organization.

3) Conclusions and recommendations

3.1. Recommendation by JICA Consultation Team

Through site observations and a series of interviews, the Team confirmed that the progress of the most of activities were going on schedule as planned. However, some remaining risks were pointed out by the team and made recommendations as follows;

1) Human Resources Management

Acquiring younger and capable staffs and retaining the expertise staffs are critical issues for not only to sustain the effort of the Project, but also to create future waterworks management. Continuous actions are important to approach to share this issue and to discuss about the solution with YCDC top management level and Yangon Regional Government and relevant organization. In addition, YCDC should consider the way to keep younger staffs' motivation.

2) O&M of Water Treatment Facilities

Due to delay of start of operation of Lagunbyin WTP and chlorination facilities, it is making harder to conduct the activities related O&M of WTP and chlorination facilities as stated as the activities under Output 3. The team requested the Project team to clarify the schedule of the start of operation and to reconsider how much related activities can conduct within the remaining project period.

3) Continuous Monitoring and Proper Instruction in the field level

Customer service manuals, currently under drafting, should be utilized and updated continuously based on the feedback from the activities in the field level. EDWS should monitor whether the work in the field is in accordance with the manuals. The same measures should be applied to standard operation procedures (SOPs) under preparation for entire EDWS work procedure.

4) Utilized Proper Materials with the viewpoint of Life Cycle Cost

It is important to procure and utilize the proper existing materials and equipment as well as appropriate installation and construction method of the facilities. Investment to utilize the high-quality materials and equipment will increase the initial cost of EDWS, but it is high possibility to reduce the total cost of O&M of EDWS with the viewpoint of Life Cycle Cost.

3.2. Recommendation and Conclusion by Chief Engineer

Responding to the recommendations from JICA Team, some comments and recommendations for the Project activities were presented.

1) Human Resources Management
   - ✓ C/P members for Planning Section and NRW activities have been assigned.
   - ✓ For knowledge sharing, we will select the suitable person to dispatch to foreign training. After training, the knowledge and experiences should be shared and analyze for application.
   - ✓ To retain younger staff, team leader should be responsible for taking care of them more. Thus, it is necessary to review the team leader's capabilities.
   - ✓ Each staff should be aware to be more competitive by self-learning.
   - ✓ To motivate younger staff, new positions of young engineers have been presented in a proposal of the new organization.
2) O&M of Water Treatment Facilities
   - ✓ For chlorination facilities, task force team has been launched.
3) Continuous Monitoring and Proper Instruction in the field level
   - ✓ Task force team is responsible to monitor SOP preparation and application in each office.
   - ✓ After developing SOPs, we should continuously review, discuss and revise them as needed.
4) Utilized Proper Materials with the viewpoint of Life Cycle Cost
   - ✓ EDWS is now shifting to consider adapting materials of enough quality.
   - ✓ We need to set up technical standard as specification for procurement.

(End)

MINUTES OF MEETING
ON
THE NINTH JOINT COORDINATING COMMITTEE
FOR
"THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY MANAGEMENT OF YANGON CITY DEVELOPMENT COMMITTEE (YCDC)"

The Terminal Evaluation Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Dr. MATSUMOTO Shigeyuki visited Yangon from January 21st to January30th, 2020 for the purpose of conducting the terminal evaluation on the technical cooperation project, namely "the Project for Improvement of Water Supply Management of Yangon City Development Committee (YCDC)" (hereinafter referred to as "the Project").

As a results of the intensive study and analysis of the activities and achievement of the project, the Team prepared the Terminal Evaluation Report (hereinafter referred to as "the Report") attached hereto and presented it to the 9th Joint Coordinating Committee (hereinafter referred to as "the JCC") held on January 30th, 2020.

After discussions in respect of recommendations and issues for the successful implementation of the Project, the 9th JCC approved the contents of the Report and the respective representative of the Myanmar side and the Japanese side agreed to the matters referred to in the documents attached hereto.

Yangon, January 30th, 2020

Dr. MATSUMOTO Shigeyuki
Leader
The Terminal Evaluation Team
Japan International Cooperation Agency
Japan

Daw Hlaing Maw Oo
Secretary
Yangon City Development Committee
(YCDC)
Republic of the Union of Myanmar

THE ATTACHED DOCUMENT

1. Terminal Evaluation of the Project
   The Team presented the results of the terminal evaluation at the 9th JCC, and the JCC approved the Report as attached.

(End)

Attachment: Terminal Evaluation Report

Terminal Evaluation Report

on

The Project for Improvement of Water Supply Management of YCDC

in

Republic of the Union of Myanmar

30th January, 2020
The Terminal Evaluation Team

TABLE OF CONTENTS

ANNEXES

ABBREVIATIONS

Abbreviation	English
ACE	Assistant Chief Engineer
CE	Chief Engineer
C/P	Counterpart
DMA	District Metered Area
DYCE	Deputy Chief Engineer
EDWS	Engineering Department (Water and Sanitation)
EE	Executive Engineer
HRD	Human Resource Development
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
KPI	Key Performance Indicator
MCDC	Mandalay City Development Committee
MGD	Million Gallons per Day
MKPI	Major Key Performance Indicator
NRW	Non-Revenue Water
O&M	Operation and Maintenance
OJT	On-the-Job Training
PDCA	Plan-Do-Check-Action Cycle
PDM	Project Design matrix
PO	Plan of Operation
PPP	Public Private Partnership
PPWSA	Phnom Penh Water Supply Authority
PI	Performance Indicator
PO	Plant of Operation
S/C	Steering Committee
SOP	Standard Operating Procedure
T/S	Township
WTP	Water Treatment Plant
YCDC	Yangon City Development Committee

1. Outline of the Evaluation

1-1. Background

Greater Yangon is the economic center of Myanmar with the population of approximately 5.21 million (the National Census 2014). The water supply system in Yangon was established in the year of 1842 and currently provides water from 4 reservoirs and a number of wells. The water supply service ratio was 37 % in 2011. On the other hand, the rapid economic development of Yangon city had made urgent issues such as the gradual development of waterworks facility to meet the rapid increase of water demand. Moreover, approximately 90 % of distributed water came from reservoirs, and two thirds of this was distributed directly without any treatment before the Project started. In addition, non-revenue water (NRW) ratio in Yangon City was estimated 66% in 2013, and revenue of water tariff was insufficient because of lower rate of water tariff (e.g. Before the Project, the metered rate was about 88 Kyat/m3, flat rate: about 1,800 to 3,000 Kyat/month).

Under the above circumstances, JICA assisted YCDC to prepare Water Vision and of Water Supply System Master Plan (M/P) with the target year of 2040 through "The Preparatory Survey on the Project for the Improvement of Water Supply, Sewerage and Drainage System in Yangon City". Based on the M/P, Japanese ODA Loan Projects "Greater Yangon Water Supply System Improvement" (Phase1 and Phase2) are now being implemented. JICA also dispatched three long-term experts, "Advisor on Water Supply Management in Yangon City", "Advisor on Water Supply and Sanitation Improvement in Yangon City" and "Advisor for Water Service Administration and Water Supply in Yangon City" since 2012. In addition to these advisors Technical Cooperation Project "The Project for Improvement of Water Supply Management of Yangon City Development Committee (YCDC)" is being implemented since 2015 to enhance the capacity of YCDC for water supply services focusing on institutional management of water supply utility, NRW management and water quality management.

Before the project completion in July 2020, as per the third amended R/D signed on September 19, 2018, the Terminal evaluation Team (hereinafter referred to as "the Team") conducted the terminal evaluation of the Project from January 13 to January 30, 2020.

1-2. Objectives

(1) Review the activities of the project and its process of implementation based on the Record of Discussions (R/D).
(2) Analyze and discuss the achievement of the project in terms of five evaluation criteria (relevance, effectiveness, efficiency, impact and sustainability).
(3) Based on the evaluation results above, identify recommendations and lessons learned for solving issues related to the Project
(4) Discuss the activities of the Project for the rest of the cooperation period.
(5) If necessary, propose revisions to the Project Design Matrix (PDM) and Plan of Operation (PO) based on the results of discussions.

(6) Agree to the contents of the Terminal evaluation report and to exchange the Minutes of Meetings (M/M).

1-3. Outline of the Project

The Project is currently implemented based on the PDM Version 3, which was revised and approved in August 2018. The PDM is shown in Annex 1.

1) Project Duration:
From July 2015 to July 2020 (5 years)

2) Project Site:
Greater Yangon

3) Overall Goal:
Water supply services provided by YCDC are enhanced.

4) Project Purpose:
Capacity of YCDC on the management of water supply service is improved.

5) Outputs:
1. Capacity of YCDC on institutional management of water supply utility is improved.
2. Capacity of YCDC on NRW management is improved.
3. Capacity of YCDC on water quality management is improved.

1-4. Methodology

1-4-1. Method of Evaluation

The Terminal evaluation was conducted in accordance with the latest JICA Guidelines for Project Evaluations issued in May 2014. Current project status and outcomes were assessed from the aspects of the five criteria of relevance, effectiveness, efficiency, impact, and sustainability.

The Team conducted surveys at the Project sites by interviews and questionnaires to the Project counterpart personnel and the JICA experts involved in the Project.

1-4-2. Five Evaluation Criteria

Description of the five evaluation criteria that were applied in the analysis for the Terminal evaluation is given in Table 1 below.

Table 1: Description of Five Evaluation Criteria

Criteria	Definitions
Relevance	Degree of compatibility between the development assistance and priority of policy of the target group, the recipient, and the donor.
Effectiveness	A measure of the extent to attain its objectives.
Efficiency	Efficiency measures the outputs -- qualitative and quantitative – in relation to the inputs.
Impact	The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the impacts and effects resulting from the activity on the social, economic, environmental and other development indicators.
Sustainability	Sustainability is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn.

Source: JICA Guidelines for Project Evaluations, May 2014

1-4-3. Collection Methods and Data Sources

The specific methods to collect data/information and their sources are described below.

- Documents related to the Project including record of Inputs and Activities of the Project
- Answers to the questionnaire filled in by JICA experts and Myanmar counterparts
- Interviews with the Project counterpart personnel and experts
- Field Survey

1-5. Members of the Terminal evaluation Team

The evaluation was conducted by the following members.

Title	Name	Organizations & Position
Team Leader	MATSUMOTO Shigeyuki	Deputy Director General, and Group Director for Water Resources, Global Environment Department, JICA
Planning & Coordination	ARAMAKI Risa	Water Resources Team 1, Water Resources Group, Global Environment Department, JICA
Utility Management	KASE Daisuke	Director for International Affairs, General Affairs Division, Bureau of Waterworks, Tokyo Metropolitan Government
Operation and Maintenance of Water Facility	TOKUDOMI Yuki	Chief of Management and Planning Section, General Affairs Department, Fukuoka City Waterworks Bureau
Utility Management (Assistant)	SATO Masahiro	Planning and Coordination Section, General Affairs Division, Bureau of Waterworks, Tokyo Metropolitan Government
Evaluation Analysis	TOTSUKAWA Jun	Director, International Department, Sano Planning Co., Ltd

1-6. Schedule of the Terminal evaluation

The Terminal evaluation was conducted during the period between the 12th of January 2020 and the 30th of January, 2020.

2. Achievements of the Project

2-1. Records of Inputs

The following are the achievements of inputs by the time of the Terminal evaluation by both Japanese side and Myanmar side.

2-1-1 Japanese Side

1) Assignment of Experts

Since the beginning of the Project, a total of thirteen (13) experts were dispatched on a short-term basis and one (1) long-term expert. Total man-months is 174.60 until the end of November 2019. The details are shown in Annex 2.

2) Training in Japan and the third-country training

Nine (9) persons in total participated in the training course in Japan and 37 in the third-country, Thailand and Cambodia. The details are shown in Annex 4.

3) Provision of Equipment

Equipment for field work including NRW management and water quality analysis, and office work such as computers were provided. The details are shown in Annex 5.

2-1-2 Myanmar Side

1) Assignment of Myanmar Counterparts

Myanmar side assigned a Project Director responsible for the overall administration and implementation of the Project and a Project Manager. Counterparts from respective technical fields counts to 119. The details are shown in Annex 3.

2) Cost borne by Myanmar side

Myanmar side allocated the following budget, approximately 2.4 billion Kyat for the Project.

* Cost for project office (electricity, internet connection, telephone, security and cleaning)
* Cost for pilot project such as Nyaunghnapin water treatment plant improvement project, reservoir water treatment project in Hlwaga and Gyopu, and NRW management project
* Cost for development of application of customer management system
* Cost for laboratory works such as reagent

The details are shown in Annex 6.

2-2. Results of the Activities and Achievement of the Outputs

Achievement status of each Output is as follows:

Output 1: Capacity of YCDC on institutional management of water supply utility is improved.	
Indicators	Activities and Achievement Level
1-1 Plan for improvement of water bill collection is approved by EDWS.	The indicator 1-1 was already fulfilled. The Project elaborated the plan for improvement of water bill collection and already gained approval of the plan from the director of EDWS. The plan aims at developing a new customer management system on water bill collection. The new system completed in 2019 with functions of "search and registration of customers", "meter reading", and "water billing". The Project is now under process to add more functions of "collection system of water tariff", "management of unpaid customers", and other statistical data treatments. The functionality and effectiveness of the first version system was already confirmed in the pilot township. During the remaining period the guideline on customer management composed of chapters "meter reading" and "water bill collection" will be completed.
1-2 Plan for human resources development is approved by EDWS.	The indicator 1-2 is likely to be fulfilled. The Project has been working on development of an integrated plan that includes not only human resources development as well as human resources management. The plan already presented at JCC in October 2019. Several key issues including how to prevent job resignation of younger staffs and/or non-permanent staffs will be discussed. Approval of the final version is expected in February 2020 by S/C2.
1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.	The indicator 1-3 is likely to be fulfilled. Two guidelines regarding customer management and water bill setting are under development and expectedly approved by EDWS within the Project period. Standard Operating Procedures, SOPs, also have been elaborated until now at 33 divisions/sections of EDWS. As of January 2020, seven (7) of them are now being introduced after approvals, six (6) of them are waiting for trail after their approvals, twelve (12) of them completed their elaboration of final version, seven (7) of them are at completion stage of draft version, and one (1) of them is still in elaboration process. In addition, it is noted that the Project has delivered a lot of efforts in formulating Water Supply Regulation. The first draft was completed in

	November 2018, and now its status has reached the fourth draft with collaborated work with a legal advisor of YCDC. The final draft version of the regulation will be ready soon.
1-4 New organization structure is approved by Mayor.	The indicator 1-4 was virtually fulfilled already. Based on the proposals presented in the "Report on Institutional Reorganization of Engineering Department (Water and Sanitation) of YCDC" in July 2016, the following divisions/sections were newly established with fulltime and part-time staffs, namely, Water Treatment Section, NRW Management Section, Transmission and Distribution Management Section, Planning Section, Human Resource Development Section, and Customer Service Division. EDWS is now under final approval process transferring to an "Authority" body. This newly developed organizational structure is included in the proposal of Authority establishment, and already submitted to Mayor. Once its finalization process completes, it can be judged that the indicator is fulfilled.
1-5 2 Full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	The indicator 1-5 is almost fulfilled as of now. Two (2) staffs in Planning Section have participated in the Project since the beginning that included trainings how to analyze and utilize PI data and to formulate mid-term management plan. After the training period, they started instructions and trainings to other divisions/sections and township offices as internal trainers of EDWS on these planning issues in the context of PDCA cycle. Their technical capacity and knowledge are almost reaching reliable level to instruct PDCA cycle. In addition, another three (3) younger staffs were assigned in Planning Section recently. They are also candidates to be internal trainers of PDCA cycle in the mid-run perspective.
Overall assessment: The Project has almost achieved the Output 1 as of the Terminal evaluation. For the goal of the Output1 aiming at YCDC's capacity development on institutional management, the Project successfully realized the goal at various institutional management aspects. The primary aspects the Project targeted are as follows: 1) customer service, 2) mid-term plan, 3) human resource development and management plan, 4) guideline, manuals and SOP, 5) planning and monitoring by PDCA concept and PI setting with analysis, 6) financial management, and 7) Public relations. In addition, it should be highlighted that there was improvement in the institutional arrangement such as new organizational structure of EDWS and setup of Steering Committees. Some technical fields, for example, financial management and public relations are not monitored by the indicators like others. They have also shown actual improvements such as formulation of asset inventory	

in financial management, which is still in progress, understanding of tariff setting process, corporate accounting system and PPP alternatives, and analysis of customer complaint data in public relations section. It is evaluated that YCDC' capacity has "improved" at all the targeted fields in the course of the Project implementation.

Output 2: Capacity of YCDC on NRW management is improved.	
Indicators	Activities and Achievement Level
2-1 Manuals and training materials on NRW management are utilized by YCDC staff.	The Project has been progressing towards fulfillment of the indicator's requirement. Based on observations and lessons learned through the pilot project since January 2019, the Project is now making the SOPs of NRW as a technical manual and training materials. In addition, another training material specifically for The Training center for NRW management will be prepared soon as well. By March 2020 these SOPs and training materials will be finalized, and expectedly receive official approval by S/C1 in April 2020. It is noted, however, the period of utilization of SOPs and training materials by YCDC staffs will be shorter than originally planned because of belated start of the pilot project which were caused by delay in procurement of NRW equipment.
2-2 Information of customers and pipes for the pilot areas is compiled and updated.	The indicator 2-2 was already fulfilled. The Project started making the customer list in the pilot area, Yankin in January 2019 and finished in December of the same year. In parallel with making the list, information update on the list has also been conducted according to the change and/or move of customers. Information of distribution pipeline has also been compiled in EDWS. The Project is now planning to transfer corresponding information onto GIS.
2-3 The number of trainers for NRW management becomes 8.	The Project has been progressing towards fulfillment of the indicator's requirement, but it is difficult to foresee if it can fulfill or not within the Project period. A series of trainings on NRW has continued by use of the pilot project, which widely covers the training topics such as pipe construction, detection of water leakage and rehabilitation of pipe. In addition, even before the pilot project commencement, the Project had conducted trainings how to calculate service coverage rate, the mechanism of NRW

	occurrence and others. Although technical transfer has continued through such a series of trainings in integrated manner to create internal trainers, the Project have faced frequent changes and/or leaves of counterparts until now, which resulted in less counterparts as internal trainer candidates than originally expected. The Project will continuously try increasing the number of candidates, though, it cannot be sure if the number reaches the target or not, considering the current situation, which judges six (6) to seven (7) counterparts have gained enough technical capacity as internal trainers as of now.
2-4 EDWS staff participates in training based on training plan for NRW management.	The Project has been progressing towards fulfillment of the indicator's requirements, but the current status is still in the middle of its expectation/requirements. As noted in the indicator 2-3, the number of EDWS staffs participating in the NRW management training is rather limited than originally planned as of the Terminal evaluation. Trainings are initially offered to NRW section, and currently expanded through the pilot project in Yankin to the counterparts, thirteen (13) from NRW section, one (1) from Yegu pump station, and two (2) from the pilot project, sixteen (16) in total. Since the Training center for NRW management opened in January 2020, training opportunities for EDWS staffs are expectedly increased with this facility.
2-5 NRW ratio is decreased to 25% in the pilot area.	The indicator 2-5 is likely to be fulfilled. NRW ratio of the pilot project area was calculated as 86% on the basis of water flow test in February 2019. The Project is planning to renew the distribution pipes and meters at the area. Owing to these renewals, it is highly possible for NRW ratio to be lower than 25%. The figure is expectedly presented by March 2020.
Overall assessment: The achievement status of the Output 2 is moderate at the time of the Terminal evaluation, but its degree can be higher by the end of the Project. EDWS staffs have accumulated essential skills for NRW management such as how to detect water leakage, to repair pipe and to conduct water pressure tests in the context of physical loss. The aspect of commercial loss such as how to collect and manage data on water leakage, broken meters is also well trained. These skills and knowledge have been utilized in the pilot project area and other areas as well. On the other hand, development of internal trainers on NRW management has been delayed comparing	

with the original schedule due to the belated launch of the pilot project, which was caused by longer process of equipment procurement. It automatically entailed the delay in development of training materials including SOPs as well. In addition, job resignation of counterparts also gave severe challenges in developing internal trainers during the Project period. It is noted, however, that the Project has recently accelerated the activities including formulation of SOPs and training materials through sorting out lessons from the pilot project. Training plans at the Training center for NRW management at Yegu are also about to start implementing. By the end of the Project, it is prospected the achievement status of the Output 2 will be higher through these accelerated actions.

Output 3: Capacity of YCDC on water quality management is improved.	
Indicators	Activities and achievement level
3-1 Manuals and training materials on water quality management are fully utilized by YCDC staff.	The indicator 3-1 was already fulfilled. • Water quality management The Project finished elaborating SOPs on water treatment plant and on chlorination facilities as technical manuals as well as training materials on water quality management in February 2019. The SOPs has been well utilized for operation of water treatment plants. • Water quality monitoring The Project also has been conducting water quality monitoring by use of SOPs on water quality analysis, whose first version was completed in 2016. The SOPs has been effectively utilized not only at the central laboratory but also at other on-site mini laboratories.
3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	The indicator 3-2 is being fulfilled as of the Terminal evaluation. Following monthly water monitoring plan, the central laboratory has conducted water quality tests of the samples gained from the monitoring points. As for reservoirs and water treatment plants, water quality tests are conducted every morning and afternoon. The data has been recorded since 2015 at the central laboratory and 2017 at on-site mini laboratories.
3-3 The number of trainers for water quality management becomes 4.	The indicator 3-3 was already fulfilled. • Water quality management Through a variety of trainings such as classroom trainings, OJTs and seminars, the Project has transferred technical knowledge and skills to create internal trainers. According to evaluation results made at the time of trainings, two (2) staffs are now qualified as internal trainers.

	• Water quality analysis Three (3) staffs are considered as internal trainers, judging from the fact that they already conducted younger staffs trainings as trainers and are giving technical instructions to on-site mini laboratories staffs in their daily works.
3-4 EDWS staff participates in training based on training plan for water quality management.	The indicator 3-4 was already fulfilled. All the EDWS staffs working at laboratories have already participated in the trainings on water quality management. The participants are 10 from the central laboratory and 10 from on-site mini laboratories. The Project conducted trainings on the basis of the timing when the SOPs elaborated and revised, not based on the fixed training schedule and/or plan.
3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	The indicator 3-5 is being fulfilled as of the Terminal evaluation. The turbidity of treated water in Nyaunghnapin water treatment plant has been well controlled less than 1 NTU nearly all the time. The turbidity surpassed 1 NTU at only three (3) times in 11 months at Phase 1 facility and one (1) time in 16 months at Phase 2 facility until the Terminal evaluation.
3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	The Project has been progressing towards fulfillment of the indicator's requirements, but the current status is still in the middle of its requirements. Administrative order was already issued to set up Task Force Team and to allocate 19 staffs for trial operation of Lagunbyin water treatment plant. In addition, organizational structure for the plant operation and maintenance and the terms of reference at each section were also determined. After the trials, operation of the part of the plant is expected from March 2020. The picture of operation and maintenance of the plant has been well designed like this, though, it is difficult to be sure at this moment if the system will function or not without any technical challenges.
3-7 The operation and maintenance system of chlorination facilities is prepared.	The Project has been progressing towards fulfillment of the indicator's requirements, but the current status is still in the middle of its requirements. Organizational structure of the chlorination facilities was already determined, which separates into two (2) teams with four (4) engineers and five (5) operators under a facility manager. The trial operation of the facilities is expected after January 2020. In the same context of 3-6, it is difficult to be sure if the system will

	function or not without any technical challenges at this moment.
Overall assessment: The Project has almost achieved the Output 3 as of the Terminal evaluation. The capacity of YCDC staff on water quality management and monitoring have been well upgraded through a series of the Project activities. All the staffs of the central laboratory and on-site mini laboratories fully participated in the trainings and formulation/review of SOPs. The number of internal trainers on water quality management has reached the target. Pilot actions to modify design including sand filter and proper operation at Nyaunghnapin water treatment plant also steadily progressed, which enhanced technical knowledge and skills of YCDC staffs. On the other hand, it is difficult to confirm stable operation and maintenance system of Lagunbyin water treatment plant and chlorination facilities since both of their operation have not started yet.	

2-3. Achievement of Project Purpose

Project Purpose: Capacity of YCDC on the management of water supply service is improved.	
Indicators	Activities and Achievement Level
1. Steering Committees (S/C) are organized and improvement actions are implemented.	The indicator 1 was already fulfilled. The director of EDWS approved establishment of Steering Committee, S/C, with appointment of members for each S/C in July 2017. The organized S/C and the number of meetings are as follows: S/C | Primary field(s) of S/C | Number of S/C meetings as of January 2020 S/C 1 | NRW management | 5 S/C 2 | Planning and monitoring | 6 S/C 3 | Regulations, standards and guidelines | 17 In June 2018, S/C 3 additionally formed two (2) sub-groups, one of which takes care of installation of water supply equipment and another is in charge of water billing and collection.
2. Mid-term management plan is approved by EDWS.	The indicator 2 was already fulfilled. The Mid-term management plan shows the current situation/challenges and their action plans with corresponding targets for their improvements in the mid-term perspective. The plan covers the issues such as water supply services, water resource development, NRW management, water quality, water billing collection, financial management, administration and human resources development/management. The plan was approved at the S/C 2meeting in October 2018 and

	received an official letter in February 2019 from the director of EDWS.
3. The implementation of mid-term management plan is monitored based on MKPIs.	The indicator 3 is being fulfilled as of the Terminal evaluation. The Project selected 15 types of primary indicators such as service coverage rate, NRW ratio and total number of connections as "Major Key Performance Indicators" as MKPIs from Key Performance Indicators, KPI. All the data have been collected since 2016 through the data monitoring system that the Project elaborated. All the monitored figures of MKPIs for the year of 2018/19 will be presented within January 2020.
4. The NRW ratio is grasped in the water supply service area of YCDC and monitored.	The indicator 4 is likely to be fulfilled. The NRW ratio is about 50%, calculated on the basis of operation hours of pumping stations. The Project also introduced the water flow monitoring system in September 2019. The ratio of October 2019 by use of the system is 63%. The NRW section will continue to monitor the rate from now. *The rate will turn out only after three months due to necessary period to gather water billing.
5. Plan for NRW reduction is approved by EDWS.	The indicator 5 was already fulfilled. Mid-term plan for NRW reduction which has three major categories: NRW management, physical loss, and commercial loss was approved in October 2018 at JCC. NRW reduction is placed as the highest priority issue in the Mid-term management plan.
6. Water quality is grasped in the water supply service area of YCDC and monitored.	The indicator 6 is being fulfilled as of the Terminal evaluation. The water quality monitoring plan exactly specifies the monitoring points, frequency, monitoring items, and methods in the water supply service area of YCDC. Each township sends samples to the central laboratory every month, and the monitoring results are presented to the director of EDWS in monthly basis. Since the technical capacity of the laboratories has reached almost technically reliable level, it can be judged that water quality is being grasped much more accurately than before.
7. Plan for improvement of water quality is approved by EDWS.	The indicator 7 is likely to be fulfilled. The Project has already elaborated "Report for Improvement Plan on Management of Water Treatment and Water Quality Based on the Third Country Research Study in PPWSA, Cambodia" through lessons and observation from the third-country training in Cambodia. On the basis of the report, the Project is now preparing the plan for improvement of water quality. It is expected to be completed by April

	2020 and approved at JCC in May 2020.
Overall assessment: The Project purpose has been almost achieved as of the Terminal evaluation. Towards the Project purpose "capacity development of YCDC on the management of water supply service", the Project took approaches from three (3) aspects, 1) organizational and institutional aspect, 2) operational aspect, and 3) technical aspect. As the achievement status of the Outputs show, there were re-development of organizational structure, formulation of guidelines/SOPs and others. In 2) operational aspect, planning and monitoring based on the mid-term plan with analysis of PIs are now well conducted by YCDC staffs. Technical aspect also showed significant improvement in water quality management, NRW management and others as mentioned in achievement status of Outputs. Although the Project still has remaining tasks such as increase in internal trainers, dealing with facilities that are about to start operation in full scale such as chlorination facilities, it can be evaluated that the Project activities successfully led to capacity development of YCDC in general. The achievement status of the Project purpose can be higher by the end of the Project.	

2-4. Achievement prospect of Overall goal

Overall goal: Water supply services provided by YCDC are enhanced.	
Indicators	Prospects
1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement.	The target figures have not been determined yet, but the following situation and/or prospects can be pointed out. Yangon city can expect both YCDC's projects and donors' projects including Japan to improve water supply services. It is highly possible for the figures of MKPIs to improve from now on.
2. NRW is decreased from OO % to OO % in the water supply area of YCDC.	The target figures have not been determined yet, but the following situation and/or prospects can be pointed out. Replacement and/or new installation of flow monitoring system have already been progressing in the central area of Yangon city and will extend to entire city in coming years. Improvement efforts in customer management system including the modified process of meter reading and water billing are also expectedly contributing to lower NRW ratio. In addition, all other assets such as systematic training at the Training center for NRW management, SOPs, training materials and NRW management plan would expectedly contribute to fulfilling this indicator's requirements.
3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to	The target figures have not been determined yet, but the following situation and/or prospects can be pointed out. Improvement of Nyaunghnapin water treatment plant and the commencement of operation at Lagunbyin water treatment plant will

OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	contribute to improvement of turbidity. Residual chlorine is also expectedly lower owing to operation of new chlorination facilities at five (5) locations. In addition, all other assets such as SOPs, water quality management plan and internal trainers would expectedly contribute to fulfilling this indicator's requirements. However, it is noted that the effect of chlorination facilities can be influenced if distribution pipelines are not cleaned enough or replaced because chlorine may be disappeared while flowing in dirty pipeline.
Achievement prospect: Achievement of the Overall goal "improvement of water supply services by YCDC" is highly prospected, considering the YCDC's proactive development efforts with corresponding budget and the plans of donor projects. Although there are no exact target figures in indicators at this moment, the MKPIs' figures including NRW ratio are likely to proceed in the direction of improvement. *The indicators will be determined soon after the necessary data is collected at least by the end of the Project.	

2-5. Implementation Process of the Project

2-5-1 Communication

Communication among the Project experts and counterparts has been satisfactory. The Project set communication platform such as weekly/half-monthly meeting and monthly meeting where all the Project related persons shared the Project progress, challenges, and what knowledge and information they obtained. As the Project proceeded, management of each meeting gradually transferred to counterparts' side from experts. As of the Terminal evaluation, the meeting has been held in Myanmar language through counterparts' chair. This transfer has brough positive effects for the counterparts to raise their ownership mind as well.

Record of the meeting has been well shared among all including experts who were not in Myanmar. The long-term expert stationed in Yangon also contributed to bridging communication between the counterparts and the experts while they were not in Myanmar.

2-5-2 Monitoring

Monitoring of the Project activities including the pilot project has been well conducted by counterparts and experts together. Monitored information has been shared through half-monthly meetings, SC meetings and JCC. Motoring results have been also well recorded and analyzed by monthly report and annual progress report.

Monitoring by the Project has paid attention not only on the progresses of targeted technical fields but also on the progresses in accordance with PDM targets from the project management viewpoint. Well balanced monitoring on both sides is highly evaluated.

3. Evaluation by Five Criteria

Each criterion is evaluated using the following five rankings: "high", "relatively high", "moderate", "relatively low", and "low".

3-1. Relevance

Relevance of the Project is high.

The Project is consistent with the priority of development policies of Myanmar and Yangon city, the needs of YCDC, and the assistance of policy of Japan. The relevance is evaluated high.

3-1-1 Consistency with the policy and/or plan of Myanmar

The national five-year development plan as of the Project commencement had three pillars, 1) renovation in policy, economy, administration, private sector development, 2) development by initiatives of Myanmar nationals, and 3) prioritized ten (10) development fields. Water supply services is placed as one of the 10 prioritized development fields.

The Myanmar Sustainable Development Plan 2018-2030 as of the Terminal evaluation has five (5) goals, one of which is "access to safe water" as Strategy 5.3.

It is confirmed that the Project has been consistent with the national policy since the beginning of the Project until now.

As to the sector policy viewpoint, YCDC has been working on the basis of the "Yangon city water supply master plan". The Project is regarded as one of the important inputs to realize the master plan.

Overall, the Project is in line with the national policy as well as the sectoral plan of Yangon city.

3-1-2 Consistency with Japanese assistance policy/plan

The "Economic corporation direction to Myanmar" of Japan presented in April 2012 shows one of the assistance goals, which is to support infrastructure development. Assistance in water supply services in Yangon city is placed as one of representative projects towards achievement of this goal.

The Project is consistent with the policy direction of Japanese government.

3-1-3 Consistency with the needs

Before the Project started, the ratio of NRW in Yangon city had reached 66% due to improper NRW management (2013). Yangon city also faced challenges in water quality, proper operation and maintenance of various water supply facilities and equipment. Under such challenging situation, YCDC had strongly recognized the necessity to develop staffs' capacity in wide range from institutional to technical aspects including topics such as NRW and water quality management.

The Project has been providing technical assistance activities on various fields in accordance with such necessity of YCDC. The contents and targets of the activities have been determined through mutual consultation with YCDC counterparts and experts at the beginning of the Project.

The Project has been meeting with the needs of Yangon city and YCDC in this context.

3-2. Effectiveness

Effectiveness of the Project is high.

Capacity development of YCDC for water supply services has been steadily progressing at targeted technical fields. The effectiveness is evaluated high.

3-2-1 Progress of Project purpose

The Project purpose "capacity development of YCDC on management of water supply service" has been almost achieved as of the Terminal evaluation.

The Project took approaches from three (3) aspects for capacity development, which are 1) organizational and institutional aspect, 2) operational aspect, and 3) technical aspect. As the achievement status of the Outputs show, positive outcomes are observed at each aspect.

Essential knowledge and skills for water supply services, which had not been identified despite their importance, and/or had not been trained in spite of their requests before the Project, have been successfully accumulated step by step in YCDC staffs. In terms of "improvement" and "development" of capacity, the Project has been satisfactorily progressing towards full achievement of the purpose. The degree of its achievement can be higher by the end of the Project.

3-2-2 Contribution factors

The Project has been progressing owing to these contribution factors.

1) Effect of the third-country training

The Project provided the third-country trainings to Thailand and Cambodia in addition to Japan. Since both countries have development history on improvement of water supply service for relatively recently, the trainings not only gave counterparts technical knowledge but also raised their mind-set for improvement and motivation from learning their development experiences.

Looking at the tangible outputs on technical aspects, learnings from PPWSA of Cambodia were especially effective. The counterparts utilized their learnings especially on performance monitoring by PIs data, preparation of SOPs and development of various plans. The major plans they made are as follows:

- Management Improvement Plan of EDWS
- Improvement Plan for NRW Management and Customer Service
- Improvement Plan for Management of Water Treatment and Water Quality

2) Application of knowledge and skills of local governments in Japan

The Project effectively introduced knowledge and skills that have been accumulated in local governments in Japan owing to participation of experts from local government group/line companies. Their knowledge and skills contributed to enriching the Project activities particularly in water quality management, customer services, methodology and/or process to set water tariff, NRW management and others.

In addition, advisory committees comprised Tokyo metropolitan and Fukuoka city also assisted in the Project activities during the Project period. Their advises and information also enhanced the effectiveness

of the Project activities.

3) Process of designing the Project contents

The detailed planning survey of the Project in 2014 determined the basic fields to deal with in a project, but intentionally did not determine detailed activities contents as well as PDM indicators. The detailed planning survey encouraged counterparts and experts to consider and determine the activities through discussion, workshops such as problem analysis and/or capacity assessment after the Project started. Such relatively open-styled planning enabled to avoid mismatch of the technical needs and the Project plan. Also, the initial process of workshops and capacity assessment contributed to deepening mutual understanding as well as creating ownership mind in counterparts.

4) Prompt decision making and actions by top management

The top management strata of YCDC, Yangon city, and the regional government has high recognition of the importance of the Project activities. Their recognition and leadership gave support to the Project in terms of personnel assignment and necessary budget securement. They also led to commencement of their own projects and/or equipment procurement in addition to the Project's support.

5) Synergetic effects of YCDC's spontaneous and prompt actions with the Project

In the course of the Project implementation, YCDC initiated many projects with their own budget as abovementioned such as NRW management pilot project in North Okkalapa, introduction of the customer management system, and the small-scale direct pilot filter project of untreated water from Hlwaga and Gyopyu reservoirs. These YCDC's activities produced synergetic effects with the Project activities. For example, prior to the start of the pilot project in Yankin, the Project could utilize the North Okkalapa pilot project as the venue for their training.

From the viewpoint of organizational aspect, YCDC promptly introduced new organizational structure proposed by the Project. Such quick adaptation made the Project focus on the Project activities contents more clearly with more specified counterparts.

Overall, it is highly evaluated that YCDC's spontaneous and prompt actions brought synergy effects with the Project and enhance the effectiveness of the Project.

6) Assignment of a long-term expert stationed in Myanmar

The Project dispatched a long-term expert in Myanmar in addition to the expert team. Besides the original technical task, the long-term expert enhanced bridging information and relationship between the counterparts and the expert team, and contributed to improving management and follow-up of the Project activities.

3-2-3 Inhibition factors

The Project has faced these inhibition factors against achievement of the Outputs and the Project purpose.

1) Change and/or job resignation of counterparts

The Project has sometimes faced challenges of change and/or decrease in counterparts due to their job resignation, which has hampered consecutive technical transfer. The challenge was observed especially in NRW management. It influenced on developing technical capacity of entire NRW counterparts and fostering internal trainers.

2) Delay in equipment procurement

Equipment procurement for NRW pilot project was significantly delayed from the original schedule, which was caused by long time examination and approval process in Japanese side. It led to belated start of the pilot project, and automatically influenced on trainings and development of internal trainers for NRW management.

3-3. Efficiency

Efficiency of the Project is moderate.

Expert's assignment was flexibly adjusted not only in assignment timing but also in the variety of experts' assignment fields in accordance with the Project progress and necessity. Manpower input by Japanese side is evaluated efficient and effective. Component of the expert team comprising various organizational background is also highly evaluated.

Myanmar side also made an effort to assign counterparts and to keep them stay, though, there were actually frequent changes and/or leave of counterparts especially in NRW management, which gave influence on seamless technical transfer.

The delay in equipment procurement also gave influence on a series of activities of NRW management. On the other hand, the third-country training was an efficient and effective inputs contributing to the Outputs and the Project purpose.

Overall, the efficiency is evaluated moderate.

3-3-1 Manpower inputs

1) Japanese side

Japanese side flexibly adjusted experts' assignment in accordance with the Project progress and other needs identified in the course of the Project implementation. It is evaluated the manpower inputs are efficient and effective. The Project added experts on "customer services/water billing collection", "Design and supervision for flow meter chamber" responding to the necessity arisen during the Project implementation. Assignment period of experts also flexibly adjusted according to the progress of the NRW pilot project.

In addition, it should be highly evaluated that component of the expert team which are made of a consulting company, local government group/line companies, a manufacturing company, and a stationed long-term expert enabled to enrich the Project activities.

2) Myanmar side

It is highly evaluated that Myanmar side made an effort to assign counterparts as much as possible under

the strict employment rule. However, as pointed out in the inhibition factor, there were actually many cases of job resignation, which caused negative effects in technical transfer to counterparts. In addition, there was a tendency to concentrate job assignment on middle age/class staffs, which are not only the Project's but also their original tasks in their divisions. Such fully occupied working environment sometimes made them difficult to attain the Project activities.

It is, however, necessary to point out the positive prospect as well. Staffs still working as counterparts are all highly committed to the Project with ownership mind. They are expected to continue working and will play key roles of water supply services in YCDC. Focusing on only counterparts remained until now, efficiency of technical transfer was satisfactorily confirmed.

3-3-2 Physical inputs: Equipment/Facility

Equipment provided by the Project are all necessary items for the Project activities. They have been well utilized and contributed to achievement of the Outputs and the Project purpose. The variety of equipment covers not only the ones for field works but also for office work. Equipment for office work created noteworthy effects as follows. At the time of the Project started, the number of computers at township offices as well as YCDC headquarters was quite limited. A lot of works had to be done by manual basis, which brought challenges in efficiency of works and accuracy of data inputs. Owing to installation of computers and continuous training of computer skills in the newly established computer training room in the Project, they are now able to manage data on PIs, customer services and others. It is evaluated that this input contributed to achievement of the Output 1 and accordingly the Project purpose.

Selection of equipment is also evaluated reasonable. Myanmar side recognized advantage of the functions and usability of some items, for example, ultrasonic flowmeter and portable test meter. YCDC has already purchased them additionally by their own budget.

On the other hand, there was a delay in procurement of NRW equipment. The negative effects caused by this event was abovementioned in the inhibition factor.

3-3-3 Training in Japan and the third-country

Training in the third-country created immense effects as mentioned in the contribution factor. Training in Japan was also effective for counterparts to learn the water supply utility management at global standard level and to have future picture in the mid-long run perspective.

3-3-4 Budget

JICA flexibly increased budget amount allocated to the Project from the original estimate in response to additional needs recognized in the course of the Project. Though the entire request from the Project was not met due to the limitation of the JICA's budget, budget amount and the disburse timing from both YCDC and JICA did not cause major negative effects for the Project activities.

YCDC disbursed budget as planned in general, and sometimes quickly did, responding to decision by top management strata.

3-3-5 Supplementary effects and duplication activities

Mapping information made by JICA "Yangon Mapping Project" gave supplementary effects to the Project especially for development of NRW management plan of the pilot site.

Close communication with a long-term expert "water supply supervisor" in YCDC also made positive and supplementary effects in terms of information sharing especially other donors' projects. Information sharing helped the Project avoid unnecessary duplication.

3-4. Impact

Impact of the Project is high.

Achievement of the Overall goal "improvement of water supply services by YCDC" is highly prospected, considering the YCDC's proactive development efforts with corresponding budget, plans of donor projects and asset of the Project including technical knowledge and skills. Ripple effects are also observed in organizational and technical aspects as well.

The impact is evaluated high.

3-4-1 Ripple effects

The following ripple effects by the Project are observed.

Organizational and technical aspects

- Further and/or supplementary development actions by YCDC's initiative

Using technical knowledge and skills gained through the Project, YCDC is now newly promoting development efforts for better water supply services with their own budget. Primary examples are as follows:

- YCDC initiated an NRW management pilot project in North Okkalapa with their own initiative and budget, applying the skills and knowledge learned in the Project such as setup of District Metered Area, DMA, analysis and design of distribution pipeline network, and others.
- Confirming the effectiveness of the pilot project in Nyaunghnapin water treatment plant, which tested the modified design of rapid sand filter, sedimentation tank and others, YCDC determined to apply the design and the way of operation to entire Nyaunghnapin water treatment plant. Construction of hoppers and some modification has already started as of the Terminal evaluation. Necessary budget is already secured.
- Small scale pilot project of untreated water from Hlwaga and Gyopyu reservoir has shown positive results. YCDC determined to proceed the next step to enlarge the test scale.

In addition, YCDC recently opened the Training center for NRW management in January 2020, which has training yard and building for classroom training. It is expected for this center to provide trainings to not only YCDC coverage area but also to the rest of Myanmar.

Technical aspect

- Recognition as a leading laboratory in water supply organizations

The central laboratory received the visit from Mandalay City Development Committee, MCDC, and provided technical instruction in response to their requests in October 2019. YCDC laboratory staff gave introduction of analytical method of coliform bacilli, SOPs in currently use, and brief instruction of the analytical equipment. In addition, Myanmar border development committee also visited the central laboratory.

The reputation of the central laboratory has been gradually extended within Myanmar as one of leading laboratories in water supply organizations, which would entail the roles of instructors such as they did to MCDC.

- Formulation of SOPs

Divisions and sections not directly involved in the Project in EDWS have also formulated their SOPs, following the SOPs formulation exercises by counterparts.

Organizational aspect

- 5S and Kaizen

The Project invited all the divisions and sections to the seminars of 5S and Kaizen. The effect of the seminars is now observed in many divisions and sections. The environment of the offices is now much more organized in terms of document storage/sorting and others.

- Staffs moved to Wastewater and Drainage Department

Many of counterparts who received technical transfer moved to Wastewater and Drainage Department in April 2019 under reorganization process to an Authority. The staffs transferred to the Department has been working with higher quality and skills they gained through participation in the Project. The effect of the Project has been spreading to another organization through such personnel transfer.

Negative impacts are not observed.

3-5. Sustainability

Sustainability of the Project is moderate.

It is highly likely for Myanmar and Yangon local government to continuously stress importance on water supply services. The policy aspect has high sustainability. On the other hand, legal and regulation is necessary to accelerate their development and enforcement including Water Supply Regulation.

As to sustainability of organizational aspect, high sustainability is confirmed on organizational structure, while there are challenges in shortage of permanent staffs and job leave. Technical sustainability has been upgraded significantly through the Project, though, there are still untouched technical fields and shortage of internal trainers.

Financial sustainability from macro viewpoint depends on if the water tariff can increase or not as planned.

Considering these aspects, the sustainability is evaluated moderate.

3-5-1 Policy and legal/regulation aspects

Improvement of water supply services is one of the top priorities in the national and Yangon city local government. The importance is highly prospected even after the Project. Sustainability of policy aspect is evaluated high. As for legal aspect, law and regulation related with water supply services have been developing step by step until now. However, in order to realize stable and reliable water supply services, further efforts to develop law and regulation are strongly required.

3-5-2 Organizational aspect

EDWS has a reasonable organizational structure to engage in their tasks, which defines roles and responsibility that each division/section has. There are no concerns from the viewpoint of organizational structure. Contrary to the reasonable structure, challenging issues are shortage of staffs at some divisions/sections, and large portion of non-permanent staffs. Employment condition of non-permanent staffs, who may have narrow chances to promote to permanent staffs under the severe employment rule, is possibly affecting their motivation and sometimes leading to job resignation.

It is noted that transition of EDWS to Authority which is now under official approval process does not create a significant change in their roles and operation for the time being.

3-5-3 Technical aspect

It is confirmed that the skills and knowledge of EDWS/YCDC has significantly upgraded during the Project period. However, questioning if EDWS/YCDC can independently offer stable and reliable water supply services or not, their technical capacity has to be evaluated still in developing stage.

The background of this judgement is, firstly, that there are some facilities that are not yet functioned such as chlorination facilities and Lagunbyin water treatment plant. EDWS/YCDC staffs themselves expressed their concerns if they are able to deal with their technical requirements or not to these new facilities. Secondly, completely new issues may appear such as PPP, which even the Project has not addressed yet. Technical concerns from financial management, legal setup and others may need to be addressed in the near future.

Another issue of technical sustainability is securement of human resources as internal trainers. Water quality management field already has targeted number of staffs, while other fields including NRW management has not reached the target. This is another concern for technical sustainability.

However, it is also noted that enrichment of hardware aspect including the Training center for NRW management where systematic trainings can be offered and of software aspect such as training materials and SOPs formulated in all the divisions/sections is a crucial asset which can function as technical development infrastructure and/or system. Using these assets, it is expected to enhance technical sustainability.

3-5-4 Financial aspect

Myanmar's initiative and strong will to improve water supply services can be confirmed in new facilities construction including the Training center for NRW management, purchase of equipment such as ultrasonic flowmeter, and commencement of the NRW pilot project in North Okkalapa. Considering these examples of actual implementation, a certain degree of budget allocation by Myanmar side is prospected even after the Project ends.

On the other hand, looking at the financial sustainability from much more macro viewpoint, it may depend on if water tariff is able to increase or not up to the level where necessary costs can be accommodated. In order to realize necessary investment and/or budget allocation for improvement of water supply services, proper level of water tariff is one of the most important conditions. If the gradual increase in water tariff is realized, the financial sustainability would be possibly enhanced as well.

3-6. Conclusion

The Project took approaches from three (3) aspects for capacity development, which are 1) organizational and institutional aspect, 2) operational aspect, and 3) technical aspect. Steady progresses are confirmed at all the aspects, indicating the Project almost achieved the purpose including the indicators' viewpoints as of now. The degree of the achievement status can be higher by the end of the Project.

The Project faced some challenges such as development of internal trainers due to delay in equipment procurement and frequent changes/leaves of counterparts, which affected efficiency of technical transfer. On the other hand, it should be highly noted that the Project produced various impacts on organizational and technical aspects such as YCDC's proactive development efforts in water supply services.

Overall, it is evaluated that Project has satisfactorily progressed towards achievement of the purpose in line with the needs of YCDC. Implementation of the Project is judged quite meaningful and effective towards improvement of water supply services in Yangon city.

4. Recommendations

4-1. Recommendations within the Project period

The Team recommends the Project to take the following actions:

4-1-1 Completion of products and/or activities under development

a. Output 1

1) Completion of trials of the customer management system

To finalize the customer management system whose software application is now under development, and to conduct tests of its functionality and effectiveness in pilot townships.

2) Final approval and implementation of human resources development and management plan including countermeasures to job resignation challenges

Towards improvement of job resignation as YCDC's continuous challenges, not only to approve the plan but also to start implementation of whatever countermeasure ideas presented in the plan. Even if they are trivial issues, taking the first step will be quite meaningful.

3) Financial management

To complete the asset inventory within the Project period. Towards its completion, to accelerate elaboration efforts in consultation with the expert.

4) Planning

To go through all the steps of PDCA cycle at least once. The Project is now at the stage of "C", as monitored data on MKPIs has been reported at the Planning section. To conduct detailed analysis of MKPIs data at the "C" stage and then to proceed the next stage of "A" where corresponding activities are carried out.

5) Law and regulation

To complete the draft version of Water Supply Regulation as soon as possible. Towards realization of its earlier approval, to promote understandings of decision makers including Mayor and regional government regarding the importance and emergency of Water Supply Regulation.

6) Public Relations

To keep continuous efforts of public relations through multimedia including SNS especially on the changes of water quality and/or tastes, which may be caused by the launch of new chlorination system operation. Collaborative PR activities with PR section and other corresponding sections/division are also encouraged.

b. Output 2

7) Development of internal trainers of NRW management

To continue training activities for counterparts to become internal trainers of NRW management. Since the new Training center for NRW management launched in January 2020, the demand of trainings is highly likely to grow. To have internal trainers in YCDC for such growing demands is emergent needs.

8) Completion of SOPs and training materials

To complete SOPs and training materials sooner and to utilize them.

9) Concretization of NRW management plan

To determine the target NRW ratio, necessary timeline and corresponding necessary budget in the NRW management plan. It automatically can satisfy the indicator of the Overall goal of the Project's PDM, which has been blanked until now.

10) Further development of capacity of transmission and distribution management by the cross-sectional working team

After the water flow monitoring system was installed in September 2019, EDWS established the working team specifically for "Transmission and Distribution Management", composed of cross-sections of District Office, GIS, NRW, Transmission Pipe, and House Connection. The working team is now working for the following outputs:

- Ensuring proper functioning of the flow meters installed
- Construction of hydraulic model for Transmission system
- Simulation of existing system and the problem areas by the model prepared
- Identification of improvement measures for distribution management by modification of the pipeline system and operation method
- Estimation of monthly NRW ratio in the entire system
- Establishment of Transmission and Distribution Management Section

The evaluation team recommends the working team continue these study works and produce further outputs, which definitely contribute to improving water supply system in Yangon city.

c. Output 3

11) Further capacity development and/or technical countermeasures for facilities not in operation yet

Full scale operation of chlorination facilities and Lagunbyin water treatment plant are about to start. Towards their proper operation, to identify necessary skills and knowledge of which YCDC staffs are not yet confident, and to start necessary actions and/or trainings in consultation with experts.

12) Concretization of water quality management plan

To determine the target figures of water quality such as turbidity, residual chlorine or Fecal Escherichia coli, necessary timeline and corresponding necessary budget in the water quality management plan. It automatically can satisfy the indicator of the Overall goal of the Project's PDM, which has been blanked until now.

d. Common issue

It is important to audit how all the works are conducted in line with SOPs. With a leadership of Planning section, to consider feasible audit mechanisms, and to implement auditing actually. To effectuate a cycle of SOPs elaboration, application and review/improvement is quite important.

4-1-2 Equipment and materials

a. Flowmeter

To take necessary countermeasures of flowmeters which are not properly functioned.

b. Effective use of data and materials

To share and use effectively data of flowmeter, GIS, MKPIs and others in YCDC.

To make use of documents, handouts, which were distributed in the seminars and trainings in the Project, is also necessary. For this purpose, to consider how they can be stored and accessed in YCDC.

4-2. Recommendations after the Project including some in the Project period

The Team recommends Myanmar side to take the following actions:

4-2-1 Further utilization of the Project outputs

a. Application of the customer management system to all the townships

To apply the customer management system to all the townships under YCDC area, once after confirming the usability and effectiveness of the system.

b. Application of outputs from Nyaunghnapin pilot project

YCDC has already determined to apply the design and the way of operation, which the Project has confirmed the effectiveness, to entire Nyaunghnapin water treatment plant. The evaluation team recommends to proceed the application plan steadily as YCDC determined.

c. Implementation of pilot project by larger scale

Small scale pilot project of untreated water from Hlwaga and Gyopyu reservoir has shown positive results. The evaluation team recommends to proceed the next step to enlarge the test scale.

4-2-2 Assignment of full time and permanent personnel and taking countermeasures against job resignation

To promote understandings of not only YCDC but also decision makers including Mayor and regional government on the importance of full time and permanent personnel assignment and countermeasures to job resignation.

4-2-3 Leading role for other provincial cities

The new Training center for NRW management is likely to receive trainees from other provincial cities of Myanmar, and the central laboratory may also receive requests to instruct water quality analysis and monitoring from other laboratories in the country. The evaluation team recommends that YCDC will take such actions and roles as a leading organization of water supply services in the country.

4-2-4 Continuous institutional strengthening and human resources development

Even if PPP is introduced in the future, continuous efforts of YCDC on institutional strengthening and human resources development are required due to the following reasons:

a. Much works directly conducted by YCDC still remain.

b. YCDC as a public entity takes responsibility to set up entire plan and to monitor the water supply services in Yangon city.

c. YCDC needs to supervise water supply services provided by private entities in order to ensure safe, reliable, and affordable water supply services with high quality in Yangon city.

d. PPP may trigger job leaves to private entities of some staffs. Considering such events, YCDC always need to keep human resources development efforts. Such continuous efforts can avoid and/or mitigate possible risks caused by job resignation of staffs, and also the staffs who may be transferred from YCDC to the private entities are trained to be skillful to bring benefits to better water supply services.

5. Lessons learned

1. Process of designing the Project contents (description is repeated from Contribution factors)

The detailed planning survey of the Project determined the basic fields to deal with in a project, but intentionally did not determine detailed activities contents as well as PDM indicators. The planning survey encouraged counterparts and experts to consider and determine the activities and PDM indicators through workshops and/or capacity assessment after the Project started. Such relatively open-styled planning enabled to avoid mismatch of the technical needs and the Project plan. Also, the initial process of workshops and capacity assessment contributed to deepening mutual understanding as well as creating ownership mind in counterparts.

2. Devices of implementation structure of a long-term expert and expert team

As the long-term expert received the assignment as a deputy leader of the JICA expert team, the role and power became clear besides the technical assignment. Since the expert stationed in Myanmar frequently requires to deal with many technical and administrative issues instead of other shuttle style experts, the clearly determined position made the long-term expert to accommodate such requirements.

In case for a long-term expert stationed alone, determination of clear roles and power among an expert team is important.

3. Strategic implementation of the third-country training

The third-country training in Cambodia provided the Project with significant effects. Prior to the training, the Project collected from participants what they want to learn and then sent information on their expectations to a recipient organization in Cambodia. Such prior arrangement enhanced the effectiveness of the training. In other words, this third-country training was implemented with clear strategy, which had been asking the participants what to learn and what to produce after the training, which the Project called "research style" training. Such strategic training is quite effective in terms of efficiency of training as well as creation of ownership mind.

In addition, visiting a country that has development history on improvement of corresponding sector for relatively recently is also effective. The training not only gives counterparts technical knowledge but also raises their motivation from learning their development experiences.

END

	3-3 The number of trainers for water quality management becomes 4.	3-3 Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	3-4 EDWS staff participates in training based on training plan for water quality management.	3-4 Training attendance record, HRD report (HRD Section).	
	3-5 The turbidity of treated water in pilot sand filter in Nyaunghnapin water treatment plant is controlled less than 1 NTU.	3-5 Activity report of Taskforce team.	
	3-6 The operation and maintenance system of Lagunbyin water treatment plant is prepared.	3-6 Operation and maintenance organization structure of Lagunbyin water treatment plant.	
	3-7 The operation and maintenance system of chlorination facilities is prepared.	3-7 Operation and maintenance organization structure of chlorination facilities.	

[Activities]	[Inputs]		
	Japanese side	Myanmar side	[Pre-condition]
1. Capacity of YCDC on institutional management of water supply utility is improved. (1-1) Prepare overall new organization structure (1-2) Establish the Planning Section (1-2-1) Establish the Planning Section in Department of Water and Sanitation (1-2-2) Define the division of duties of the Planning Section (1-3) Establish Customer Service Division (1-3-1) Establish the Customer Service Division in Department of Water and Sanitation (1-3-2) Define the division of duties of the Customer Service Division (1-3-3) Establish operation system of the Customer Service Division (1-4) Develop and Monitor Performance Indicators (PIs) (1-4-1) Review the current method of calculation and monitoring of performance data (1-4-2) Conduct training of trainers on the calculation and monitoring of Performance Indicators. (1-4-3) Identify the important and available Performance Indicators to be monitored (e.g. water supply ratio, water supply hours, NRW, etc.) (1-4-4) Install transmission flow meter and data logger and collect flow data (1-4-5) Procure equipment (computers, printers, software, etc.) in local offices and conduct training (1-4-6) Collect data required for setting PIs (1-4-7) Develop calculation method, manuals and monitoring system of Performance Indicators (1-4-8) Calculate the Performance Indicators (1-4-9) Update and monitor the Performance Indicators periodically (1-5) Formulate regulations, standards and guidelines (1-5-1) Review the existing rules, regulations, standards and guidelines (1-5-2) Identify regulation, standards and guidelines to be modified and/or newly formulated (1-5-3) Draft water supply regulation and run a trial (1-5-4) Draft necessary regulation, standards and guidelines, which can be prepared by YCDC (e.g. design, construction and material standards for distribution pipes, service pipes and meters, tariff collection manuals, guidelines of tariff setting) (1-6) Enhance understanding on financial management (1-6-1) Analyze the current financial management system (1-6-2) Implement training on financial management for the sustainable operation of water supply service in consideration of future development plans (e.g. general financial management, accounting, asset management, budget regulation, tariff setting, PPP, etc.) (1-6-3) Conduct OJT on development of asset ledger (1-7) Strengthen Public Relations (1-7-1) Analyze the effective public relations on water service of YCDC (1-7-2) Conduct awareness raising of YCDC staff (1-7-3) Conduct OJT on the public relations activities (1-8) Strengthen human resources development (1-8-1) Review the existing human resources development system (1-8-2) Identify necessary improvement on structure and materials of the trainings (1-8-3) Conduct trainings of trainers for planning and organizing the trainings	1. Experts 1) Consultant team - Chief Advisor / Water Supply Operation - Institutional Capacity Development / Human Resources Management - Planning / Monitoring - Financial / Business Management- NRW (Physical Loss) - NRW (Commercial Loss) - GIS - Operation and Maintenance of Water Supply Facilities - Water Quality Management - Project Coordination 2) Experts from waterworks Institutional Management (Planning, Finance/Business Management, Regulation/Standard/Guideline, FR, Human Resource), NRW Management (NRW Engineering, Customer Service, Tariff Collection), Water Quality Management (Water Treatment Engineering, Water Quality Engineering) 2. Equipment Water leakage detector, Equipment and material for NRW reduction in the pilot areas, Water quality analysis equipment, Equipment for water quality management, Flow meter and data logger for flow monitoring system, Computers and printers, Software, etc. 3. Overseas Training Program Training in Japan and/or neighboring countries 4. Local cost	1. Counterpart personnel 2. Office space and facilities 3. Necessary data/ information 4. Local cost for implementation of the activities • Distribution flow monitoring ➢ To design and construct chambers for flow meters ➢ To take security measures (constructing gates and fences for flow meters and other accessories) ➢ To supply electricity to the site • Water quality monitoring ➢ To secure space in laboratory in Head Office for equipment procured. ➢ To allocate space for equipment in water treatment plant, pump station, and reservoir site. ➢ To procure reagents for the equipment procured by Japanese side (Japanese side will provide necessary amount for 6th month after procurement and installation) • Non-revenue water ➢ To procure materials which YCDC can procure locally and routinely ➢ To secure storage space for the equipment and materials procured ➢ To conduct civil works for construction of DMA (digging, piping, back-filling, and restoration) • Collection of computerized data for Performance indicators ➢ To deliver and installation of all	1. Top management of YCDC show the strong leadership and commitment to the capacity development on institutional management

Annex 1. Project Design Matrix

Project Name : **The Project for Improvement of Water Supply Management of YCDC**
Executing Agency : **Yangon City Development Committee (hereinafter referred to as "YCDC")**
Project Sites : **Greater Yangon**
Target Group : **Staff of YCDC**
Direct beneficiaries : **Staff of YCDC**
Indirect Beneficiaries : **People living in the water supply areas of YCDC**

Duration of the Project: 5 years (5th July 2015 to 4rd July 2020)
PDM Version 3 (August 2018)

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
[Overall Goal] Water supply services provided by YCDC are enhanced.	1. The management key performance indicators (MKPIs) are improved compared to the data at the Project commencement[1]. 2. NRW is decreased from OO % to OO % in the water supply area of YCDC. 3. The compliance ratio in terms of turbidity to meet the water quality standard is increased from OO% to OO%. The compliance ratio is increased from OO% to OO% in terms of residual chlorine (>0.2 mg/l).	1. S/C2 activity record, MKPIs monitoring sheets. 2. S/C1 activity record, MKPIs monitoring sheets. 3. Water quality monitoring report, MKPIs monitoring sheets.	
[Project Purpose]			YCDC will obtain external funds for construction and rehabilitation of water treatment plant, disinfection facility and distribution pipes, etc.
Capacity of YCDC on the management of water supply service is improved.	1. Steering Committees (S/C) are organized and improvement actions are implemented.	1. Appointment letter for S/C members, S/C1, 2, 3 activity record.	
	2. Mid-term management plan is approved by EDWS.	2. Approval of Mid-term management plan in S/C2, or approval letter of the Head of Department (CE).	
	3. The implementation of mid-term management plan is monitored based on MKPIs.	3. MKPIs monitoring sheets.	
	4. The NRW ratio is grasped in the water supply service area of YCDC and monitored.	4. NRW management report.	
	5. Plan for NRW reduction is approved by EDWS.	5. Approval of Plan for NRW reduction in S/C1, or approval letter of CE.	
	6. Water quality is grasped in the water supply service area of YCDC and monitored.	6. Monthly water quality monitoring report.	
	7. Plan for improvement of water quality is approved by EDWS.	7. Approval of Plan for improvement of water quality in S/C2, or approval letter of CE.	
[Outputs]			
1. Capacity of YCDC on institutional management of water supply utility is improved.	1-1 Plan for improvement of water bill collection is approved by EDWS.	1-1 Approval in S/C2, or approval letter of CE.	
	1-2 Plan for human resources development is approved by EDWS.	1-2 Approval in S/C2, or approval letter of CE.	
	1-3 Drafts of regulations, standards and guidelines for water supply services in Yangon is approved by EDWS.	1-3 Approval in S/C3, or approval letter of CE.	
	1-4 New organization structure is approved by Mayor.	1-4 Approval letter, or approval process confirmed by the Experts.	
	1-5 2 Full time staff members in Planning Section can give direction of PDCA cycle to EDWS staff.	1-5 Evaluation by JICA Experts based on duties of Management Planning Unit in Planning Section in Report on Institutional Reorganization.	
2. Capacity of YCDC on NRW management is improved.	2-1 Manuals and training materials on NRW management are utilized by YCDC staff.	2-1 Manuals in relevant offices and training record.	
	2-2 Information of customers and pipes for the pilot areas is compiled and updated.	2-2 Pilot project activity report.	
	2-3 The number of trainers for NRW management becomes 8.	2-3 S/C1 activity record, Evaluation by JICA Experts based on a check sheet indicating necessary abilities for trainers. The check list to be prepared in the project in advance.	
	2-4 EDWS staff participates in training based on training plan for NRW management.	2-4 Training attendance record, HRD report (HRD Section)	
	2-5 NRW ratio is decreased to 25% in the pilot area.	2-5 S/C1 activity record, Pilot project activity report.	
3. Capacity of YCDC on water quality management is improved.	3-1 Manuals and training materials on water quality management are fully utilized by YCDC staff.	3-1 S/C3 monitoring report, manuals in relevant offices, training record.	
	3-2 Result of the water quality test by the central laboratory and on-site mini laboratory is recorded and monitored periodically.	3-2 Monthly water quality monitoring report.	

(2-6) Develop and support implementation of the NRW management plans (2-6-1) Develop 5-year and 10-year NRW management plans (2-6-2) Launch priority activities as a part of implementing the 5-year NRW management plan 3. Capacity of YCDC on water quality management is improved. (3-1) Establish Water Treatment Section (3-1-1) Establish Water Treatment Section in Department of Water and Sanitation (3-1-2) Define the division of duties of the Water Treatment Section (3-1-3) Hold a series of seminar for basic water treatment technology with study tours (3-2) Review current situation and formulate phased countermeasures (3-3) Conduct training of trainers on water quality management (3-3-1) Conduct training of trainers on the water quality management (3-3-2) Prepare the training plan and training materials by the trainers (3-3-3) Conduct Off-JT by the trainers (3-4) Develop SOP for water quality management (3-4-1) Develop SOP on water quality test and monitoring (3-4-2) Develop SOP on operation and maintenance of water treatment plant and disinfection facility (3-5) Conduct OJT on water quality management at the pilot treatment plants and disinfection facility (3-5-1) Procure water quality analysis and water quality management equipment (3-5-2) Conduct OJT on water quality test and monitoring (3-5-3) Diagnose function of treatment processes of Nyaunghnapin water treatment plant (3-5-4) Develop improvement measures of function of Nyaunghnapin water treatment plant through pilot basin (3-5-5) Prepare an improvement plan of Nyaunghnapin water treatment plant (3-5-6) Conduct OJT on operation and maintenance of water treatment plant and disinfection facility (3-5-7) Verify SOP for water quality management (3-6) Conduct OJT on improvement of water quality supplied from reservoirs (3-6-1) Review water quality problems in reservoir water (3-6-2) Research water quality improvement measure of reservoir suppled water (3-7) Develop and support implementation of the water quality management plans (3-7-1) Develop 5-year and 10-year water quality management plans (3-7-2) Launch priority activities as a part of implementing 5-year water quality management plan			

[1] PIs and their baseline data will be set approximately 1 to 2 year(s) after the Project commencement. Considering the monitoring results of PIs, target values of respective PIs will be discussed within the Project and decided by JCC.

(1-8-4) Develop 5-year and 10-year human resources development plans (1-8-5) Launch priority activities as a part of implementing the 5-year human resources development plan (1-9) Develop and support implementation of the institutional management plans (1-9-1) Develop 5-year and 10-year institutional management plans (1-9-2) Launch priority activities as a part of implementing the 5-year institutional management plan 2. Capacity of YCDC on NRW management is improved. (2-1) Establish NRW Management Unit (2-1-1) Establish NRW Management Unit (2-1-2) Define the division of duties of NRW Management Unit (2-2) Collect and compile information of NRW (2-2-1) Collect information of NRW and implement a baseline survey (2-2-2) Compile information of pipes for establishment of GIS (2-2-3) Compile customer information into database (2-2-4) Formulate Standard Operation Procedure (SOP) of the above information management (2-3) Develop a model on the management of physical loss (leakage, over flow) and human resources development (2-3-1) Review current situation and develop phased countermeasures (2-3-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-3-3) Prepare training plan and training materials by the trainers (2-3-4) Formulate manuals on physical loss (2-3-5) Conduct Off-JT by the trainers (2-3-6) Select a pilot area for NRW management activities (2-3-7) Prepare action plan and procure equipment for the countermeasures to be taken for reducing physical loss in the pilot areas (2-3-8) Set up DMAs at the pilot areas (2-3-9) Conduct the countermeasures against physical loss in the pilot area (2-3-10) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-3-11) Implement OJT by the trainers in the pilot area (2-3-12) Verify the manuals on physical loss (2-4) Develop a model on the management of commercial loss (meter fault, miss reading of meter, illegal connection) and human resources development (2-4-1) Review current situation and develop phased countermeasures (2-4-2) Conduct trainings of trainers - Conduct trainings of trainers through implementation of Non-revenue water (NRW) pilot project in North Okkalapa (2-4-3) Prepare training plan and training materials by the trainers (2-4-4) Formulate manuals on commercial loss (2-4-5) Conduct Off-JT by the trainers (2-4-6) Prepare action plan and procurement of equipment for the countermeasures to be taken for commercial loss in the selected pilot area (2-4-7) Conduct the countermeasures against commercial loss in the pilot area (2-4-8) Evaluate cost-benefit of countermeasures against physical loss in the pilot area and formulate the optimal model of activities (2-4-9) Implement OJT by the trainers in the pilot area (2-4-10) Verify the manuals on commercial loss (2-5) Develop training yard for NRW management (2-5-1) Prepare training plan for training yard (2-5-2) Design training yard (2-5-3) Prepare equipment and materials for training yard (2-5-4) Construct training yard (2-5-5) Prepare training manuals and materials for training yard and conduct trainings of the trainers in training yard (2-5-6) Conduct Off-JT by the trainers in training yard		provided equipment (such as PCs) to each branch office. ➢ To secure space for installing PCs ➢ To procure consumables (including printer inks) ➢ To bear necessary operational costs for the training ➢ To update anti-virus software periodically • Civil work (construction of flow meter chamber), Safety fence for flow meters and panels, and electricity supply for flow meter installation	

Annex 2. Dispatch of JICA Experts

Long-Term Experts

No.	Name	Field	Duration	Days		Days	M/M	Total
1	Ms. Yariuchi Mina	Deputy Chief Advisor/ Institutional Capacity Developm	Jul. 2015 - Mar.2016			180	6.00	49.7
2	Ms. Yariuchi Mina	Deputy Chief Advisor/ Institutional Capacity Developm	Apr. 2016 - Mar. 2017			321	10.70	
3	Ms. Yariuchi Mina	Deputy Chief Advisor/ Institutional Capacity Developm	Apr. 2017 - Mar.2018			360	12.00	
4	Ms. Yariuchi Mina	Deputy Chief Advisor/ Institutional Capacity Developm	Apr. 2018 - Mar.2019			360	12.00	
5	Ms. Yariuchi Mina	Deputy Chief Advisor/ Institutional Capacity Developm	Apr. 2019 - Nov.2019			270	9.00	

Short-Term Experts

JFY	No.	Name	Field	Duration	Days	J	Days	M/M	Total
2015	1	Mr. Sato Hirotaka	Chief Adviser / Water Supply Operation	Jul. 2015 - Mar.2016	122	5	127	4.3	37.4
	2	Mr. Ohno Atsuo	Deputy Chief Advisor/ Waterworks Planning and	Jul. 2015 - Mar.2016	104	10	114	4.0	
	3	Mr. Matsui Yoji	Financial / Business Management	Jul. 2015 - Mar.2016	94	5	99	3.4	
	4	Mr. Okada Akihiro	Non-Revenue Water Management (Phisical Loss)	Jul. 2015 - Mar.2016	149	5	154	5.2	
	5	Mr. Akanuma Tadashi	Non-Revenue Water Management (Non-Phisical	Jul. 2015 - Mar.2016	169		169	5.6	
	6	Mr. Kishida Shinsuke	GIS	Jul. 2015 - Mar.2016	105		105	3.5	
	7	Mr. Terashima Katsuhiko	Operation and Maintenance of Water Supply Facilities	Jul. 2015 - Mar.2016	114		114	3.8	
	8	Mr. Morita Yasuhiko	Water Quality Management	Jul. 2015 - Mar.2016	114	5	119	4.1	
	9	Ms. Yamada Shoko	Assistant for Water Operation	Jul. 2015 - Mar.2016	16		16	0.5	
	10	Ms. Hsumon Win	Coordination / Assistant for Waterworks Planning and Monitoring	Jul. 2015 - Mar.2016	90		90	3.0	
2016	1	Mr. Sato Hirotaka	Chief Adviser / Water Supply Operation	Apr. 2016 - Mar.2017	134	10	144	5.0	38.1
	2	Mr. Ohno Atsuo	Waterworks Planning and Monitoring	Apr. 2016 - Mar.2017	127	8	135	4.6	
	3	Mr. Matsui Yoji	Financial / Business Management	Apr. 2016 - Mar.2017	161	5	166	5.6	
	4	Mr. Okada Akihiro	Non-Revenue Water Management (Phisical Loss)	Apr. 2016 - Mar.2017	120	5	125	4.3	
	5	Mr. Akanuma Tadashi	Non-Revenue Water Management (Non-Phisical	Apr. 2016 - Mar.2017	123		123	4.1	
	6	Mr. Kishida Shinsuke	GIS	Apr. 2016 - Mar.2017	45		45	1.5	
	7	Mr. Terashima Katsuhiko	Operation and Maintenance of Water Supply Facilities	Apr. 2016 - Mar.2017	126		126	4.2	
	8	Mr. Morita Yasuhiko	Water Quality Management	Apr. 2016 - Mar.2017	100	5	105	3.6	
	9	Ms. Yamada Shoko	Assistant for Water Operation	Apr. 2016 - Mar.2017	74		74	2.5	
	10	Mr. Kamioka Motohiro	Flowmeter Chamber Design and Supervision	Apr. 2016 - Mar.2017	82		82	2.7	
2017	1	Mr. Sato Hirotaka	Chief Adviser / Water Supply Operation	Apr. 2017 - Mar.2018	79	8	87	3.0	38.1
	2	Mr. Ohno Atsuo	Waterworks Planning and Monitoring	Apr. 2017 - Mar.2018	98	9	107	3.7	
	3	Mr. Matsui Yoji	Financial / Business Management	Apr. 2017 - Mar.2018	104	11	115	4.0	
	4	Mr. Saito Yutaka	Customer Management/ Tariff Collection	Apr. 2017 - Mar.2018	81		81	2.7	
	5	Mr. Okada Akihiro	Non-Revenue Water Management (Phisical Loss)	Apr. 2017 - Mar.2018	150	9	159	5.5	
	6	Mr. Akanuma Tadashi	Non-Revenue Water Management (Non-Phisical	Apr. 2017 - Mar.2018	183	4	187	6.3	
	7	Mr. Kishida Shinsuke	GIS	Apr. 2017 - Mar.2018	60	2	62	2.1	
	8	Mr. Terashima Katsuhiko	Operation and Maintenance of Water Supply Facilities	Apr. 2017 - Mar.2018	116	2	118	4.0	
	9	Mr. Morita Yasuhiko	Water Quality Management	Apr. 2017 - Mar.2018	101	7	108	3.7	
	10	Ms. Yamada Shoko	Assistant for Water Operation	Apr. 2017 - Mar.2018	53		53	1.8	
	11	Mr. Kamioka Motohiro	Flowmeter Chamber Design and Supervision	Apr. 2017 - Mar.2018	8		8	0.3	
	12	Ms. Hsumon Win	Coordination / Assistant for Waterworks Planning and Monitoring	Apr. 2017 - Mar.2018	30		0	1.0	
2018	1	Mr. Sato Hirotaka	Chief Adviser / Water Supply Operation	Apr. 2018 - Mar.2019	69		69	2.3	36.2
	2	Mr. Ohno Atsuo	Waterworks Planning and Monitoring	Apr. 2018 - Mar.2019	125		125	4.2	
	3	Mr. Matsui Yoji	Financial / Business Management	Apr. 2018 - Mar.2019	98		98	3.3	
	4	Mr. Saito Yutaka	Customer Management/ Tariff Collection	Apr. 2018 - Mar.2019	21		21	0.7	
	5	Mr. Karino Toshio	Customer Management/ Tariff Collection	Apr. 2018 - Mar.2019	21		21	0.7	
	6	Mr. Okada Akihiro	Non-Revenue Water Management (Phisical Loss)	Apr. 2018 - Mar.2019	181		181	6.0	
	7	Mr. Akanuma Tadashi	Non-Revenue Water Management (Non-Phisical	Apr. 2018 - Mar.2019	190		190	6.3	
	8	Mr. Kishida Shinsuke	GIS	Apr. 2018 - Mar.2019	64		64	2.1	
	9	Mr. Terashima Katsuhiko	Operation and Maintenance of Water Supply Facilities	Apr. 2018 - Mar.2019	135		135	4.5	
	10	Mr. Morita Yasuhiko	Water Quality Management	Apr. 2018 - Mar.2019	66		66	2.2	
	11	Ms. Yamada Shoko	Assistant for Water Operation	Apr. 2018 - Mar.2019	49		49	1.6	
	12	Ms. Shido Mayu	Coordination / Assistant for Waterworks Planning and Monitoring	Apr. 2018 - Mar.2019	67		67	2.2	
2019	1	Mr. Sato Hirotaka	Chief Adviser / Water Supply Operation	Apr. 2019 - Nov.2019	73	6	79	2.7	24.9
	2	Mr. Ohno Atsuo	Waterworks Planning and Monitoring	Apr. 2019 - Nov.2019	67	6	73	2.5	
	3	Mr. Matsui Yoji	Financial / Business Management	Apr. 2019 - Nov.2019	49	2	51	1.7	
	4	Mr. Karino Toshio	Customer Management/ Tariff Collection	Apr. 2019 - Nov.2019	28		28	0.9	
	5	Mr. Okada Akihiro	Non-Revenue Water Management (Phisical Loss)	Apr. 2019 - Nov.2019	149		149	5.0	
	6	Mr. Akanuma Tadashi	Non-Revenue Water Management (Non-Phisical	Apr. 2019 - Nov.2019	138		138	4.6	
	7	Mr. Kishida Shinsuke	GIS	Apr. 2019 - Nov.2019	0		0	0.0	
	8	Mr. Terashima Katsuhiko	Operation and Maintenance of Water Supply Facilities	Apr. 2019 - Nov.2019	74		74	2.5	
	9	Mr. Morita Yasuhiko	Water Quality Management	Apr. 2019 - Nov.2019	105		105	3.5	
	10	Ms. Yamada Shoko	Assistant for Water Operation	Apr. 2019 - Nov.2019	42		42	1.4	
					2874				174.6

Annex 3. List of counterparts

Name of Counterparts		Full time	Part time	Section	Remarks
Output 1-1: Planning (11 persons)					
1	U Zaw Min		v	Planning	
2	U Than Han		v	Planning	
3	Daw Khin San Win		v	Planning	
4	Daw Khaing Khaing Soe	v		Planning	
5	Daw Naw Ellinar		v	Yegu P.S	
6	U Tun Tun Hlaing		v	Pipe 1	
7	Daw Sandar Myint Lwin	v		Planning	
8	Daw Kyawt Kay Khine	v		Planning	
9	Daw Soe Yu New	v		Planning	
10	Daw Aye Aye Kyu		v	Pipe 1	
11	Daw Khin Eindra Htun		v	M&E	
Output 1-2: RSGM (WG - 3.1) (14 persons)					
1	Daw Thwe Naing Oo		v	EDWS	
2	Daw Thin Thin Soe		v	ACE, Supporting Section	
3	U Than Han		v	ACE, Reservoir Section	
4	U Zaw Min		v	EE, Planning Section	
5	Daw Yu Yu Hla Baw		v	EE, NRW Management Section	
6	U Tin Win Aung		v	EE, House Connection	
7	U Tint Zaw		v	AE, Pipe 1	
8	U Aung Ko Oo		v	AE, Pipe 2	
9	U Chit Ko Ko		v	EE, West District Officer	
10	U Thant Zin Oo		v	EE, South District Officer	
11	U Nay Lin		v	EE, Head of four pipe sections	
12	U Kyaw Kyaw Oo		v	EE, North District Officer	
13	Daw Su Myat Bo Bo		v	Estimate Section	New Staff of 2018. Not nominated but involved a lot.
14	Daw Seint Swe Zin		v	Estimate Section	New Staff of 2018. Not nominated but involved a lot.
Output 1-2: RSGM (Sub Group A under WG 3.1) (4 Person)					
1	U Tin Win Aung		v	House Connection	Member of WG 3-1
2	Daw Mar Mar Aye		v	Deputy District Officer (N)	
3	Daw Ye Mon		v	House Connection	
4	Daw Thin Thin Cho		v	Supporting Division	
Output 1-2: RSGM (Sub Group B under WG 3.1) (3 Person)					
1	Daw Aye Aye Mar		v	ACE, EDWS (CS & Computer)	
2	Daw Khin Khin Htwe		v	Finance Section	
3	Daw Nimar Zin		v	Tamwe Township officer	
Output 1-2 : Finance (11 persons)					
1	Daw Khin Khin Htwe	v		Finance Section	
2	Daw Thin Thin Yee	v		Finance Section	
3	Daw May Thet Kyaw	v		Finance Section	
4	Daw Hnin Mya Khine	v		Finance Section	
5	Daw Ohnmar Soe	v		Finance Section	
6	Daw Hla Hla Htwe	v		Finance Section	Not nominated but involved a lot.
7	Daw Zarni Hlaing	v		Finance Section	Not nominated but involved a lot.

8	U Khant Sithu	v		Finance Section	New Staff
9	U Zayyar Tun	v		Finance Section	New Staff
10	D Yin Min Thu	v		Finance Section	New Staff
11	Daw Thazin Wai Phyo Khine	v		Finance Section	New Staff

Output 1-3 : Human resource development (9 persons)					
1	U Tin Win Aung		v	EE, House Connection	
2	U Kyaw Kyaw Oo		v	EE, East District Officer	
3	Daw Swe Swe Win	v		EE, HRD Section	
4	Daw Su Nandar Lin		v	AE, Research Section	
5	U Aung Moe Kyaw		v	E&M Section, Reservoir	
6	Daw Khin Zin Mar Myint	v		HRD Section	
7	Daw Wine Htet Htet Aung	v		HRD Section	2018 New Staff
8	Daw May Htoo Aung		v	Office Section, Reservoir	
9	U Pai Thu Ko	v		HRD Section	2019 New Staff

Output 1-4 : Customer service (10 persons)					
1	Daw Aye Aye Mar	v		Customer Service Mngt	
2	Daw Khin Htay Win	v		Customer Service Mngt	
3	Daw Win Pa Pa Soe	v		Customer Service Mngt	
4	Daw Aye Aye Moe		v	Finance Section	
5	Daw Sanda Htay		v	Finance Section	
6	Daw Wah Wah Aung		v	Computer Section	
7	Daw Thel Su Hsu Wai	v		Customer Service Mngt	2018 New Staff
8	Daw Hnin Lae Lae Win	v		Customer Service Mngt	2018 New Staff
9	Daw Mi Mi Lay Maung	v		Customer Service Mngt	2019 New Staff
10	Daw Saw Yu Nandar	v		Customer Service Mngt	2019 New Staff

Output 1-5 : PR (5 persons)					
1	Daw Thin Thin Soe		v	ACE, Supporting Section	
2	Daw Ohmar Aung		v	House Connection	
3	Daw Nwe Ni Win		v	Supporting Section	
4	U Htay Naing		v	Deputy District Officer (East)	
5	Daw Thandar Htwe		v	House Connection	

Output 2 : NRW (16 persons)					
1	Daw Aye Pa Pa Nyo		v	ACE, Leader	
2	Daw Yu Yu Hla Baw	v		NRW Section	
3	U Aung Min Oo	v		NRW Section	
4	U Myo Thant Htun	v		NRW Section	
5	U Yan Naing Tun	v		NRW Section	
6	Daw Win Sandar Oo	v		NRW Section	
7	Daw Htwe Htwe Nu	v		NRW Section	
8	Daw Win Maw	v		NRW Section	
9	U Kaung Zaw Htet	v		NRW Section	
10	U Phyo Han Kyaw	v		NRW Section	
11	Daw Yu Khin Khin Kyaw	v		NRW Section	
12	Daw Htet Wai Hnin	v		NRW Section	
13	Daw Su May Thea Hlaing	v		NRW Section	
14	Daw Phyu Phyu Myint Myat	v		NRW Section	
15	Daw Zin Mar Htwe	v		NRW Section	
16	U Aung Hlaing Phyo	v		NRW Section	

Output 3 : Water quality management and water treatment (14 persons)					
1	U Myint Zaw Than			CE, Leader	
2	U Zaw Oo	v		WTP	
3	U Zaw Win Aung		v	Water Treatment Section	
4	Daw Ei Khaing Mon	v		Water Quality Monitoring	
5	Daw Thidar Su Su Khin	v		WTP	Not nominated but involved a lot.
6	Daw May Thawdar Oo	v		WTP (Dy Supv:)	Not nominated but involved a lot.
7	Daw Thet Htet Myat		v	WTP	Not nominated but involved a lot.
8	U Thit Lwin	v		WTP	
9	U Phone Thet Naing		v	Hlawga Reservoir	
10	Daw May Zin Oo	v		Water Quality Monitoring	
11	Daw Nwe Nwe Zin	v		Water Quality Monitoring	
12	U Zin Min Latt		v	Water treatment	
13	Daw Aye Aye Thu Zar	v		Water Quality Monitoring	
14	Daw Tinzar Lwin	v		Water treatment	

Output 2 : Yankin NRW Pilot Project (5 persons)					
1	U Myo Thant Htun	v		SAE, NRW Section (Field manager)	
2	U Phyo Han kyaw	v		Flat (NRW Section)	
3	U Kaung Zaw Htet	v		Flat (NRW Section)	
4	Daw Zin New Oo	v		Skill W - 5 (Tamwe Tsh)	
5	U Sithu Win	v		WA (Pazundaung Tsh)	

Transmission and Distribution Management Team					
1.Water Demand Estimation Team					
1	U Tin Win Aung	v		EE, House Connection	Leader
2	U Kyaw Kyaw Oo	v		EE, East District	Member
3	U Chit Ko Ko	v		EE, West District	Member
4	U Thant Zin Oo	v		EE, South District	Member
5	U Nay Lin	v		EE, Transmission Pipe Section H	Member
2.EPANET Hydraulic Modeling Team					
1	U Zaw Win Aung	v		EE, GIS Section	Leader
2	U Ye Zay Ya	v		Flat, GIS Section	Member
3	Daw May Myat Mon	v		Flat, GIS Section	Member
4	Daw Aye Myat Thu	v		Flat, GIS Section	Member
3.Transmission Flow System Analysis Team					
1	U Tint Zaw	v		AE, Pipe Section 1	Leader
2	U Aung Ko Oo	v		AE, Pipe Section 2	Member
3	U Than Win	v		SAE, Pipe Section 3	Member
4	U Aung Ko Ko Tin	v		SAE, Pipe Section 4	Member
4.NRW Estimation Team					
1	Daw Yu Yu Hla Baw	v		EE, NRW Section	Leader
2	Daw Mi Mi Khine	v		AE , NRW Section	Member
3	U Aung Min Oo	v		SAE, NRW Section	Member
4	U Yan Naing Tun	v		SAE, NRW Section	Member

Annex 4. Counterpart training in Japan and the third-country

Training in the third-countries

Training Course	No.	Name	Position	Period
Water Supply Management (MWA, Thailand)	1	Mr. Myo Thein	Deputy Head of Department	20/11/2016 ~ 25/11/2016
	2	Mr. Khin Maung Phoo	Assistant Chief Engineer	20/11/2016 ~ 25/11/2016
	3	Mr. Nay Lin	Executive Engineer	20/11/2016 ~ 25/11/2016
	4	Mr. Zaw Min	Executive Engineer	20/11/2016 ~ 25/11/2016
	5	Mr. Than Han	Executive Engineer	20/11/2016 ~ 25/11/2016
	6	Ms. Aye Pa Pa Nyo	Executive Engineer	20/11/2016 ~ 28/11/2016
	7	Ms. Moe Moe Khine	Executive Officer (Finance)	20/11/2016 ~ 01/12/2016
	8	Ms. Khin San Win	Assistant Engineer	20/11/2016 ~ 01/12/2016
	9	Ms. Yamin	Sub-Assistant Engineer	20/11/2016 ~ 29/11/2016
	10	Ms. Khin Zin Mar Myint	Programmer	20/11/2016 ~ 29/11/2016
Water Supply Management (PPWSA, Cambodia)	1	Ms. May May Thwe	Committee Member	15/01/2017 ~ 20/01/2017
	2	Mr. Myint Oo	Head of Department	15/01/2017 ~ 21/01/2017
	3	Mr. Thet Lwin	Assistant Head of Department	15/01/2017 ~ 21/01/2017
	4	Ms. Thwe Naing Oo	Assistant Head of Department	15/01/2017 ~ 21/01/2017
	5	Ms. Thin Thin Soe	Executive Engineer	15/01/2017 ~ 20/01/2017
	6	Ms. Su Nandar Lin	Assistant Engineer	15/01/2017 ~ 24/01/2017
	7	Ms. Khaing Khaing Soe	Sub-Assistant Engineer	15/01/2017 ~ 24/01/2017
	8	Ms. Ohmma Myint	Sub-Assistant Engineer	15/01/2017 ~ 25/01/2017
	9	Ms. Aye Pyae Aung	Sub-Assistant Engineer	15/01/2017 ~ 25/01/2017
	10	Ms. May Thet Kyaw	Accountant -3	15/01/2017 ~ 24/01/2017
Distribution and NRW Management, and Billing and Collecting Management (PPWSA, Cambodia)	1	Mr. Myo Thein	Deputy Head of Department	25/09/2017 ~ 03/10/2017
	2	Mr. Thant Zin Oo	Executive Engineer	25/09/2017 ~ 03/10/2017
	3	Ms. Aye Pa Pa Nyo	Executive Engineering	25/09/2017 ~ 03/10/2017
	4	Ms. Aye Aye Mar	Executive Engineering	25/09/2017 ~ 05/10/2017
	5	Ms. Yu Yu Hla Baw	Assistant Engineer	25/09/2017 ~ 07/10/2017
	6	Ms. Khin Htay Win	Assistant Engineer	25/09/2017 ~ 05/10/2017
	7	Ms. Nwe Ni Win	Assistant Engineer	25/09/2017 ~ 05/10/2017
	8	Ms. Lin Lin Chit	Sub Assistant Engineer	25/09/2017 ~ 05/10/2017
	9	Mr. Aung Min Oo	Sub-Assistant Engineer	25/09/2017 ~ 07/10/2017
	10	Ms. Win Sandar Oo	Assistant Supervisor	25/09/2017 ~ 07/10/2017
	11	Ms. Htwe Htwe Nu	Assistant Supervisor	25/09/2017 ~ 07/10/2017
	12	Ms. Ms. Win Pa Pa Soe	Account-3	25/09/2017 ~ 05/10/2017
O&M of Water Treatment Plant and Water Quality Management (PPWSA, Cambodia)	1	Mr. Myint Zaw Than	Deputy Head of Depart	12/02/2018 ~ 23/02/2018
	2	Mr. Zaw Win Aung	Assistant Engineer	12/02/2018 ~ 23/02/2018
	3	Ms. Tin Zar Lwin	Deputy Supervisor	12/02/2018 ~ 23/02/2018
	4	Ms. Ei Khine Mon	Assistant Engineer	12/02/2018 ~ 23/02/2018
	5	Ms. Thidar Su Su Khin	Sub-Assistant Engineer	12/02/2018 ~ 23/02/2018

Training in Japan

Training Course	No.	Name	Position	Period
"Overall Utility Management" in Japan	1	Ms. Aye Pa Pa Nyo	Assisttan Chief Engineer	23/01/2018 ~ 31/01/2018
	2	Ms. May Oo Lwin	Executive Engineer	23/01/2018 ~ 31/01/2018
	3	Mr. Pyi Soe	Executive Engineer	23/01/2018 ~ 31/01/2018
	4	Ms. Khin Khin Htwe	Executive Engineer	23/01/2018 ~ 31/01/2018
	5	Ms. Khin Than Oo	Sub-Assistant Engineer	23/01/2018 ~ 31/01/2018
	6	Ms. Yamin	Sub-Assistant Engineer	23/01/2018 ~ 31/01/2018
	7	Ms. Khin Zin Mar Myint	Programmer	23/01/2018 ~ 31/01/2018
	8	Ms. Nyo Nyo Tun Kyaw	Assistant Supervisor	23/01/2018 ~ 31/01/2018
	9	Ms. May Thet Kyaw	Accountant 3	23/01/2018 ~ 31/01/2018

Annex 5. Provision of Equipment

1 Equipment related to water quality management and analysis

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	Bench Top Turbidity Meter	1	Central labo (EDWS)	Dec. 27, 2016
2	Portable Turbidity Meter	5	Mini labo (Nyaunghnapin, Yagu, Hlawga, Phugyi and Gyobyu)	Dec. 27, 2016
3	Color of Water Portable Photometer	6	Central labo and mini labo	Dec. 27, 2016
4	Portable pH Meter	5	Mini labo	Dec. 27, 2016
5	Pocket Colorimeter II, Chlorine Model	1	Central labo	Dec. 27, 2016
6	Hot Plate Stirrer	1	Central labo	Dec. 27, 2016
7	Magnetic Stirrer	4	Central labo	Dec. 27, 2016
8	Stirring Bar	14	Central labo and mini labo	Dec. 27, 2016
9	Burette Stand	2	Central labo	Dec. 27, 2016
10	Set of glassware	1	Central labo	Dec. 27, 2016
11	Jar Tester	1	Central labo	Dec. 27, 2016
12	Sieve Shaker	1	Nyaunghnapin WTP	Dec. 27, 2016
13	Test Sieves	2	Nyaunghnapin WTP	Dec. 27, 2016
14	Electronic Balance	1	Nyaunghnapin WTP	Dec. 27, 2016
15	Interface Level Monitor	1	Nyaunghnapin WTP	Dec. 27, 2016
16	Desiccator	1	Nyaunghnapin WTP	Dec. 27, 2016
17	Vacuum Filter Holder	3	Central labo	Dec. 27, 2016
18	Bell Jar	2	Central labo	Dec. 27, 2016
19	Vacuum Pump	1	Central labo	Dec. 27, 2016
20	Evaporation Dish	30	Central labo	Dec. 27, 2016
21	Filter Paper, 47mm dia.	2	Central labo	Dec. 27, 2016
22	Gas detector	1		Project Epuipment
23	Drying oven	1	Nyaunghnapin WTP	Mar. 28, 2018
24	Descicator	1	Nyaunghnapin WTP	Mar. 28, 2018
25	Portable flow meter UF801P	2	Nyaunghnapin WTP	Mar. 28, 2018
26	Extension cable 95m	2	Nyaunghnapin WTP	Mar. 28, 2018
27	Probe and support set SE1595	2	Nyaunghnapin WTP	Mar. 28, 2018

2 Equipment related to flow monitaring system

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	**Fixed ultrasonic flow meter**			
1-1	Flowmeter main unit (UFL-30)	21	Flow mater site (21 sites)	Procured by JICA
1-2	Transducers with 5m cable (SE044040NC)	42	Flow mater site (21 sites)	Procured by JICA
1-3	Mounting fixtures for transducers	21	Flow mater site (21 sites)	Procured by JICA
1-4	Coaxial Cable 20m 5C-2WAE	2	Flow mater site (21 sites)	Procured by JICA
1-5	Coaxial Cable 30m	4	Flow mater site (21 sites)	Procured by JICA
1-6	Coaxial Cable 40m	2	Flow mater site (21 sites)	Procured by JICA
1-7	Coaxial Cable 50m	2	Flow mater site (21 sites)	Procured by JICA
1-8	Coaxial Cable 60m	2	Flow mater site (21 sites)	Procured by JICA
1-9	Coaxial Cable 70m	2	Flow mater site (21 sites)	Procured by JICA
1-10	Coaxial Cable 100m	2	Flow mater site (21 sites)	Procured by JICA
1-11	Coaxial Cable 110m	2	Flow mater site (21 sites)	Procured by JICA
1-12	Coaxial Cable 120m	2	Flow mater site (21 sites)	Procured by JICA
1-13	Coaxial Cable 130m	4	Flow mater site (21 sites)	Procured by JICA
1-14	Coaxial Cable 140m	2	Flow mater site (21 sites)	Procured by JICA
1-15	Coaxial Cable 150m	4	Flow mater site (21 sites)	Procured by JICA
1-16	Coaxial Cable 170m	4	Flow mater site (21 sites)	Procured by JICA
1-17	Coaxial Cable 210m	2	Flow mater site (21 sites)	Procured by JICA
1-18	Coaxial Cable 240m	4	Flow mater site (21 sites)	Procured by JICA
1-19	Coaxial Cable 270m	2	Flow mater site (21 sites)	Procured by JICA
1-20	Documents of Ultrasonic Flowmeter	1	Flow mater site (21 sites)	Procured by JICA
1-21	Coaxial Cable 300m for the existing Ultrasonic Flowmeter	1	Flow mater site (21 sites)	Procured by JICA
1-22	Coaxial Cable 220m for the existing Ultrasonic Flowmeter	1	Flow mater site (21 sites)	Procured by JICA
1-23	Coaxial Cable 750m	1	Flow mater site (21 sites)	Procured by JICA

1-24	Scotch Cast	40	Flow mater site (21 sites)	Procured by JICA
2	**Fierld data collection system**			
2-1	Enclosure (cabinet)	9	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-2	Remote Terminal Unit (RTU)/Model:DLM	9	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-3	Uninterruptible Power Supply (UPS)/Model: APC Smart UPS RT1000	9	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-4	GPRS/GSM Router/Model: RV50	9	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-5	Automatic Voltage Regulator (AVR)/Model: SVC-234.3	9	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-6	Isolation Transformer (IT)/Model: TF425376	9	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-7	Power Supply Cables/Model: CA-1757-	23	Kiosk (9 kiosks at folw meter site)	Procured by JICA
2-8	Signal Cables/Model: CA-1757-S001-00	23	Kiosk (9 kiosks at folw meter site)	Procured by JICA
3	**Central data collection system**			
3-1	PC/Model: Precision Tower 3420	1	YCDC EDWS HQ	Procured by JICA
3-2	Monitor	1	YCDC EDWS HQ	Procured by JICA
3-3	Notebook PC/Model: Latitude 5580	1	YCDC EDWS HQ	Procured by JICA
3-4	Uninterruptible Power Supply (UPS)/Model: APC Smart UPS RT1000	1	YCDC EDWS HQ	Procured by JICA
3-5	Battery pack/Model: SURT48XLBP	1	YCDC EDWS HQ	Procured by JICA
3-6	GPRS/GSM Router/Model: RV50	1	YCDC EDWS HQ	Procured by JICA
3-7	Automatic Voltage Regulator (AVR)/Model: SVC-234.3	1	YCDC EDWS HQ	Procured by JICA
3-8	Color Laser Printer/Model: M552dn	1	YCDC EDWS HQ	Procured by JICA
3-9	Table	1	YCDC EDWS HQ	Procured by JICA
3-10	Chair	1	YCDC EDWS HQ	Procured by JICA

3 PCs and accessaries

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	Personal computer (desk top) + UPS	59	EDWS	Aug. 24, 2016
2	Printer (laser, A4) for local stations	49	EDWS	Aug. 24, 2016
3	Copy machine (color, A3) for training room	1	Training Room	Aug. 24, 2016
4	MS-office	59	EDWS	Aug. 24, 2016
5	Anti virus software	59	EDWS	Aug. 24, 2016
6	USB stick	49	EDWS	Aug. 24, 2016
7	Consumable (laser, A4)	49	EDWS	Aug. 24, 2016
8	Consumable (copy machine tonner, drum cartridge)	1	Training Room	Aug. 24, 2016
9	Personal computer (desktop) and UPS	5	EDWS	Feb. 20, 2017
10	Personal computer (laptop)	8	EDWS	Feb. 20, 2017
11	Printer (leasar, black & white, A4)	1	EDWS	Feb. 20, 2017

4 PC Software

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	ArcGIS software	1	NRW section	Feb. 23, 2017
2	Auto Cad 2017 LT	1	NRW section	Mar. 21, 2017

5 Referencial books; PC related

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	Microsoft Office Ward 2016	60	Computer section of EDWS	Feb. 9, 2017
2	Misrosoft Office Excel 2016	60	Computer section of EDWS	Feb. 9, 2017
3	Microsoft Office PowerPoint 2016	60	Computer section of EDWS	Feb. 9, 2017
4	Using Windows 8	60	Computer section of EDWS	Feb. 9, 2017

6 Referencial books; technical fields

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	Standard Methods for the Examination of Water and Wastewater, 22nd Edition	1	HRD section	Feb. 9, 2017
2	Guidelines for drinking-water quality, 4th edition	1	HRD section	Feb. 9, 2017
3	Water quality data analysis and	1	HRD section	Feb. 9, 2017
4	Integrated Design and Operation of Water Treatment Facilities, 2nd Edition	1	HRD section	Feb. 9, 2017
5	MWH's Water Treatment Principles and Design, 3rd Edition	1	HRD section	Feb. 9, 2017
6	Water Quality & Treatment: A Handbook on Drinking Water, 6th Edition	1	HRD section	Feb. 9, 2017
7	**AWWA Manual Series, and books**			
7-1	M1 Principles of Water Rates, Fees, and Charges, sixth edition (30001-6E)	1	HRD Section	Nov. 9, 2017
7-2	M3 Safety Management for Utilities, seventh edition (30003-7E)	1	HRD Section	Nov. 9, 2017
7-3	M29 Fundamentals of Water Utility Capital Financing, fourth edition (30029-4E)	1	HRD Section	Nov. 9, 2017
7-4	M47 Capital Project Delivery, second edition (30047)	1	HRD Section	Nov. 9, 2017
7-5	M7 Problem Organisms in Water: Identification & Treatment, third edition	1	HRD Section	Nov. 9, 2017
7-6	M12 Simplified Procedures for Water Examination, sixth edition (30012-6E)	1	HRD Section	Nov. 9, 2017
7-7	M20 Water Chlorination & Chloramination Practices & Principles,	1	HRD Section	Nov. 9, 2017
7-8	M37 Operational Control of Coagulation and Filtration Processes, third edition	1	HRD Section	Nov. 9, 2017
7-9	M48 Waterborne Pathogens, second edition (30048)	1	HRD Section	Nov. 9, 2017
7-10	M57 Algae: Source to Treatment (30057)	1	HRD Section	Nov. 9, 2017
7-11	M65 On-site Generation of Hypochlorite (30065)	1	HRD Section	Nov. 9, 2017
7-12	M2 Instrumentation & Control, third edition (30002)	1	HRD Section	Nov. 9, 2017
7-13	M6 Water Meters: Selection, Installation, Testing & Maintenance, fifth edition	1	HRD Section	Nov. 9, 2017
7-14	M11 Steel Pipe: A Guide for Design and Installation, fourth edition (30011)	1	HRD Section	Nov. 9, 2017
7-15	M22 Sizing Water Service Lines and Meters, third edition (30022-3E)	1	HRD Section	Nov. 9, 2017
7-16	M23 PVC Pipe Design and Installation, second edition (30023)	1	HRD Section	Nov. 9, 2017
7-17	M28 Rehabilitation of Water Mains, third edition (30028-3E)	1	HRD Section	Nov. 9, 2017
7-18	M32 Computer Modeling of Water Distribution Systems, third edition (30032-	1	HRD Section	Nov. 9, 2017
7-19	M33 Flowmeters in Water Supply, second edition (30033)	1	HRD Section	Nov. 9, 2017
7-20	M36 Water Audits and Loss Control Programs, 4th edition (30036-4E)	1	HRD Section	Nov. 9, 2017
7-21	M41 Ductile-Iron Pipe and Fittings, third edition (30041)	1	HRD Section	Nov. 9, 2017
7-22	M44 Distribution Valves: Selection, Installation, Field Testing & Maintenance, third edition (30044-3E)	1	HRD Section	Nov. 9, 2017
7-23	M49 Butterfly Valves: Torque, Headloss and Cavitation Analysis, second edition	1	HRD Section	Nov. 9, 2017
7-24	M51 Air-Release, Air/ Vacuum & Combination Air Valves (30051)	1	HRD Section	Nov. 9, 2017
7-25	M55 PE Pipe Design and Installation	1	HRD Section	Nov. 9, 2017
7-26	M21 Groundwater, fourth edition (30021-	1	HRD Section	Nov. 9, 2017
7-27	M50 Water Resources Planning, second edition (30050)	1	HRD Section	Nov. 9, 2017

7-28	M52 Water Conservation Programs: A Planning Manual (30052)	1	HRD Section	Nov. 9, 2017
7-30	Benchmarking Water Services (20723)	1	HRD Section	Nov. 9, 2017
7-31	Utility Management for Water and Wastewater Operators (20721)	1	HRD Section	Nov. 9, 2017
7-32	Focus First on Service: The Voice and Face of Your Utility (20629)	1	HRD Section	Nov. 9, 2017
7-33	Communications and Customer Relations (47420)	1	HRD Section	Nov. 9, 2017
7-34	Communicating Water's Value: Talking Points, Tips & Strategies (20757)	1	HRD Section	Nov. 9, 2017
7-35	Financial Management for Water Utilities: Principles of Finance, Accounting, and Management Controls, Softcover edition (20743-PF)	1	HRD Section	Nov. 9, 2017
7-36	Cost Estimating Manual for Water Treatment Facilities	1	HRD Section	Nov. 9, 2017
7-37	Water Treatment Plant Design, Fifth Edition, AWWA	1	HRD Section	Nov. 9, 2017
8	**AWWA WSO (Water Supply Operation) Textbook and Workbook**			
8-1	WSO: Water Sources, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-2	WSO: Water Treatment, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-3	WSO: Water Transmission and Distribution, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-4	WSO: Water Quality, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-5	WSO: Basic Science Concepts and Applications, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-6	WSO: Water Treatment Student Workbook, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-7	WSO: Water Transmission and Distribution Student Workbook, Fourth	1	HRD Section	Nov. 9, 2017
8-9	WSO: Water Quality Student Workbook, Fourth Edition	1	HRD Section	Nov. 9, 2017
8-10	WSO: Basic Science Concepts and Applications Student Workbook, Fourth	1	HRD Section	Nov. 9, 2017
9	Strategy and Human Resource Management -Management, Work and Organisations- (4th Edition)	1	HRD Section	Nov. 9, 2017
10	Essentials of Organizational Behavior (13th Edition)	1	HRD Section	Nov. 9, 2017
11	Performance Indicators for Water Supply Services: Third Edition (Hardback)	1	HRD Section	Nov. 9, 2017
12	Institutional Governance and Regulation of Water Services: Second Edition	1	HRD Section	Nov. 9, 2017
13	GIS Tutorial 1 Basic Workbook, 10.3.x	1	HRD Section	Nov. 9, 2017
14	GIS Tutorial 2 Spatial Analysis Workbook (for 10.3.x edition)	1	HRD Section	Nov. 9, 2017
15	Principles of Water Treatment	1	HRD Section	Nov. 9, 2017

List of Equipment related to NRW activities

1 Heavy machinery

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	Back Hoe	1	Yegu PS	Sep.20, 2016

2 Equipment related to NRW pilot activities

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	Water Pipe Camera NH-40 and acccesories	1		Procured by JICA
2	Water Pipe Drilling Machine A2SA2-15 and	1		Procured by JICA
3	Water Leakage Survey Instrument LC-2500	1		Procured by JICA
4	Tee with Valve			
4-1	TN-65VS 10inch x 150mm	2		Procured by JICA
4-2	TN-65VS 150mm x 75mm	2		Procured by JICA
5	Gate Valve Ductile			
5-1	Flange type 150	3		Procured by JICA
5-2	Flange type 100	1		Procured by JICA
5-3	Flange type 75	3		Procured by JICA
6	Gate Valve			
6-1	Type for PVC 150	9		Procured by JICA
6-2	Type for PVC 100	15		Procured by JICA
6-3	Type for PVC 75	5		Procured by JICA
6-4	Type for PVC 50	3		Procured by JICA
7	Gate Valve Case			
7-1	Gate Valve Case NVKNS-15G-39LU	20		Procured by JICA
7-2	Bottom Plate A-1	20		Procured by JICA
8	Ductile Iron Deformed Pipe			
8-1	Type K Flanged Socket 150	4		Procured by JICA
8-2	Type K Flanged Socket 100	2		Procured by JICA
8-3	Type K Flanged Socket 75	2		Procured by JICA
8-4	Type K Flanged Spigot 150	6		Procured by JICA
8-5	Type K Flanged Spigot 100	2		Procured by JICA
8-6	Type K Flanged Spigot 75	2		Procured by JICA
8-7	Double Flanged Pipe 150 x 300L	2		Procured by JICA
8-8	Double Flanged Pipe 150 x 400L	2		Procured by JICA
8-9	Double Flanged Pipe 100 x 400L	1		Procured by JICA
8-10	Double Flanged Pipe 75 x 400L	3		Procured by JICA
8-11	Double Flanged Pipe 75 x 250L	2		Procured by JICA
8-12	Double Flanged Pipe 75 x 150L	2		Procured by JICA
9	Ductile Iron Straight Pipe			
9-1	Type K-1 150 x 5000L	80		Procured by JICA
9-2	Type K-1 100 x 4000L	3		Procured by JICA
9-3	Type K-1 75 x 4000L	8		Procured by JICA
10	Push Ring, Rubber Ring, T-bolt			
10-1	Push Ring, Rubber Ring, T-bolt set 150	90		Procured by JICA
10-2	Push Ring, Rubber Ring, T-bolt set 100	5		Procured by JICA
10-3	Push Ring, Rubber Ring, T-bolt set 75	15		Procured by JICA
11	Ductile Iron Deformed Pipe			
11-1	Type K Bend 90° 150	5		Procured by JICA
11-2	Type K Bend 45° 150	10		Procured by JICA
11-3	Type K Bend 45° 100	4		Procured by JICA
11-4	Type K Bend 45° 75	12		Procured by JICA
11-5	Type K Bend 221/2° 150	8		Procured by JICA
11-6	Type K Bend 221/2° 75	10		Procured by JICA
11-7	Type K Bend 111/4° 150	10		Procured by JICA
11-8	Type K Bend 111/4° 75	4		Procured by JICA
11-9	Type K S-shape Bend 150 x 300	4		Procured by JICA
11-10	Type K S-shape Bend 100 x 300	2		Procured by JICA
11-11	Type K S-shape Bend 75 x 300	6		Procured by JICA
11-12	Type K Tee 150 x 100	1		Procured by JICA

11-13	Type K Tee 150 x 75	3		Procured by JICA
11-14	Type K Collar 150	4		Procured by JICA
11-15	Type K Collar 100	2		Procured by JICA
11-16	Type K Collar 75	4		Procured by JICA
12	Push Ring for Ductile Iron Pipe			
12-1	Push Ring set TN-30W 150	40		Procured by JICA
12-2	Push Ring set TN-30W 100	20		Procured by JICA
12-3	Push Ring set TN-30W 75	30		Procured by JICA
13	Ductile Iron Deformed Pipe			
13-1	Blank Flange 150	2		Procured by JICA
13-2	Blank Flange 100	1		Procured by JICA
13-3	Blank Flange 75	3		Procured by JICA
14	Flange Packing			
14-1	Flange Packing 150	15		Procured by JICA
14-2	Flange Packing 100	15		Procured by JICA
14-3	Flange Packing 75	15		Procured by JICA
15	Bolt and Nut SUS304 M16 x 75	200		Procured by JICA
16	Gate Valve Case			
16-1	Gate Valve Case NVKNS-15G-37LU	21		Procured by JICA
16-2	Bottom Plate A-1	21		Procured by JICA
17	Sluice Valve			
17-1	WN 50	8		Procured by JICA
17-2	WN 40	5		Procured by JICA
17-3	WN 30	5		Procured by JICA
17-4	WN 25	15		Procured by JICA
17-5	WN 20	600		Procured by JICA
18	Polyvinyl Chloride Pipe Joint			
18-1	Tee Type-B 150×150	1		Procured by JICA
18-2	Tee Type-B 150×100	3		Procured by JICA
18-3	Tee Type-B 150×50	1		Procured by JICA
18-4	Tee Type-B 100×100	2		Procured by JICA
18-5	Tee Type-B 100×75	4		Procured by JICA
18-6	Tee Type-B 100×50	3		Procured by JICA
18-7	Tee Type-B 75×50	4		Procured by JICA
19	Polyvinyl Chloride Pipe Joint			
19-1	VS Joint 150 x 100	1		Procured by JICA
19-2	VS Joint 100 x 75	1		Procured by JICA
20	Polyvinyl Chloride Pipe Joint			
20-1	Tee Type-F 150 x 75	1		Procured by JICA
20-2	Tee Type-F 100 x 75	1		Procured by JICA
21	Ball Lever Type Repair Valve 75 x 100	2		Procured by JICA
22	Fire Hydrant	2		Procured by JICA
23	Fire Hydrant Case			
23-1	Fire Hydrant Case H=780	2		Procured by JICA
23-2	Ductile Iron lid MR-1G-10L	2		Procured by JICA
24	Polyvinyl Chloride Pipe and Joint			
24-1	Rubber Socket Pipe HI 150 x 5m	5		Procured by JICA
24-2	Rubber Socket Pipe VP 150 x 5m	115		Procured by JICA
24-3	Rubber Socket Pipe VP 100 x 5m	225		Procured by JICA
24-4	Rubber Socket Pipe VP 75 x 5m	40		Procured by JICA
24-5	Rubber Socket Pipe VP 50 x 5m	30		Procured by JICA
24-6	Bend 45° HI 150	6		Procured by JICA
24-7	Bend 221/2° HI 150	6		Procured by JICA
24-8	Bend 45° VP 150	10		Procured by JICA
24-9	Bend 221/2° VP 150	10		Procured by JICA
24-10	Bend 111/4° VP 150	10		Procured by JICA
24-11	Bend 45° VP 100	20		Procured by JICA
24-12	Bend 221/2° VP 100	30		Procured by JICA
24-13	Bend 111/4° VP 100	30		Procured by JICA
24-14	Bend 45° VP 75	10		Procured by JICA
24-15	Bend 221/2° VP 75	10		Procured by JICA
24-16	Bend 111/4° VP 75	10		Procured by JICA
24-17	Bend 45° VP 50	6		Procured by JICA
24-18	Bend 221/2° VP 50	6		Procured by JICA
24-19	Bend 111/4° VP 50	4		Procured by JICA
25	Metal Fitting for Joining Polyvinyl Chloride Pipe			
25-1	TH-30L 150	30		Procured by JICA
25-2	TH-30L 100	50		Procured by JICA
25-3	TH-30L 75	20		Procured by JICA
25-4	TH-30L 50	20		Procured by JICA
26	Polyvinyl Chloride Pipe Joint Bend			
26-1	Bend VK-00B 150×45°	15		Procured by JICA
26-2	Bend VK-00B 150×22 1/2°	12		Procured by JICA
26-3	Bend VK-00B 100×45°	15		Procured by JICA
26-4	Bend VK-00B 100×22 1/2°	15		Procured by JICA
26-5	Bend VK-00B 100×11 1/4°	10		Procured by JICA
26-6	Bend VK-00B 75×45°	6		Procured by JICA
26-7	Bend VK-00B 75×22 1/2°	6		Procured by JICA
26-8	Bend VK-00B 75×11 1/4°	6		Procured by JICA
26-9	Bend VK-00B 50×45°	4		Procured by JICA
26-10	Bend VK-00B 50 x 22 1/2°	4		Procured by JICA
26-11	Bend VK-00B 50 x 11 1/4°	4		Procured by JICA
27	Polyvinyl Chloride Pipe Joint VS Joint			
27-1	VS Joint 150	5		Procured by JICA
27-2	VS Joint 100	8		Procured by JICA
27-3	VS Joint 75	6		Procured by JICA
27-4	VS Joint 50	6		Procured by JICA
28	Different Pipe Joint			
28-1	SHINO Flex 150	4		Procured by JICA
28-2	SHINO Flex 100	5		Procured by JICA
28-3	SHINO Flex 75	4		Procured by JICA
28-4	SHINO Flex 50	4		Procured by JICA
29	Polyvinyl Chloride Pipe Joint VS Cap			
29-1	VS Cap 150	2		Procured by JICA
29-2	VS Cap 100	1		Procured by JICA
29-3	VS Cap 75	3		Procured by JICA
29-4	VS Cap 50	4		Procured by JICA
30	Saddle Snap Tap			
30-1	WXD150X Size20	5		Procured by JICA
30-2	WXVS150X Size20	32		Procured by JICA
30-3	WXVS150X Size25	5		Procured by JICA
30-4	WXVS100X Size20	120		Procured by JICA
30-5	WXVS100X Size25	10		Procured by JICA
30-6	WXVS100X Size30	5		Procured by JICA
30-7	WXVS100X Size40	5		Procured by JICA
30-8	WXVS75X Size20	50		Procured by JICA
30-9	WXVS75X Size25	5		Procured by JICA
30-10	WXVS50X Size20	30		Procured by JICA
30-11	WXVS50X Size25	5		Procured by JICA
31	Socket for Tap and Stop Valve			
31-1	1SS Size20	245		Procured by JICA
31-2	1SS Size25	25		Procured by JICA
31-2	1SS Size30	5		Procured by JICA
31-4	1SS Size40	5		Procured by JICA
32	Polyethylene Pipe Metal Joint			
32-1	10S Size20	250		Procured by JICA
32-2	10S Size25	10		Procured by JICA
33	Stop Valve Case F Size25			

33-1	Stop Valve Case 125 x 400	5		Procured by JICA
33-2	Stop Valve Case 100 x 380	310		Procured by JICA
34	Check Valve	5		Procured by JICA
35	SGP-PB Pipe Joint			
35-1	PQWK Ni φ25mm	15		Procured by JICA
35-2	PQWK P φ25mm	5		Procured by JICA
35-3	PQWK L φ20mm	30		Procured by JICA
35-4	PQWK T φ20mm	10		Procured by JICA
35-5	PQWK S φ20mm	20		Procured by JICA
35-6	PQWK L φ25mm	45		Procured by JICA
35-7	PQWK RT φ25mm x 20mm	10		Procured by JICA
35-8	PQWK S φ25mm	20		Procured by JICA
35-9	PQWK L φ30mm	20		Procured by JICA
35-10	PQWK RT φ30mm x 25mm	5		Procured by JICA
35-11	PQWK RT φ30mm x 20mm	15		Procured by JICA
35-12	PQWK S φ30mm	20		Procured by JICA
35-13	PQWK L φ40mm	20		Procured by JICA
35-14	PQWK RT φ40mm x 25mm	5		Procured by JICA
35-15	PQWK RT φ40mm x 20mm	15		Procured by JICA
35-16	PQWK S φ40mm	15		Procured by JICA
35-17	PQWK L φ50mm	15		Procured by JICA
35-18	PQWK RT φ50mm x 30mm	2		Procured by JICA
35-19	PQWK RT φ50mm x 25mm	5		Procured by JICA
35-20	PQWK RT φ50mm x 20mm	10		Procured by JICA
35-21	PQWK S φ50mm	15		Procured by JICA
36	Sluice Valve Opener	2		Procured by JICA
37	Polyethylene Pipe Joint			
37-1	1S Size20	45		Procured by JICA
37-2	1S Size25	20		Procured by JICA
37-3	1S Size30	5		Procured by JICA
37-4	1S Size40	5		Procured by JICA
37-5	1L Size20	36		Procured by JICA
37-6	1L Size25	10		Procured by JICA
37-7	1L Size30	4		Procured by JICA
37-8	1L Size40	4		Procured by JICA
38	Polyethylene Pipe Joint 1VSP Size20	24		Procured by JICA
39	Polyethylene Pipe			
39-1	Double Layer Pipe 20 x 120M	8		Procured by JICA
39-2	Double Layer Pipe 25 x 30M	1		Procured by JICA
39-3	Double Layer Pipe 30 x 30M	1		Procured by JICA
39-4	Double Layer Pipe 40 x 20M	1		Procured by JICA
40	Polyvinyl Chloride Pipe			
40-1	VP13	20		Procured by JICA
40-2	VP20	150		Procured by JICA
40-2	VP25	5		Procured by JICA
41	Polyvinyl Chloride Pipe Joint			
41-1	TS S20	1200		Procured by JICA
41-2	TS S30	10		Procured by JICA
41-3	TS S40	10		Procured by JICA
41-4	TS S50	10		Procured by JICA
41-5	TS L20	1200		Procured by JICA
41-6	TS L25	20		Procured by JICA
41-7	TS L30	10		Procured by JICA
41-8	TS L40	10		Procured by JICA
41-9	TS L50	10		Procured by JICA
41-10	TS T20	50		Procured by JICA
41-11	TS T30	5		Procured by JICA
41-12	TS T40	5		Procured by JICA
41-13	TS T50	5		Procured by JICA

41-14	TS RS25 x 20	50		Procured by JICA
41-15	TS RS30 x 20	5		Procured by JICA
41-16	TS RS40 x 30	5		Procured by JICA
41-17	TS RS50 x 40	5		Procured by JICA
42	Union Joint			
42-1	WJT-GVS Size20	900		Procured by JICA
42-2	WJT-GVS Size25	30		Procured by JICA
42-3	WJT-GVS Size30	5		Procured by JICA
42-4	WJT-GVS Size40	5		Procured by JICA
42-5	WJT-GVS Size50	16		Procured by JICA
43	Polyethylene Pipe Socket pipe WPE 75×5M	35		Procured by JICA
44	Polyethylene Pipe Joint MP-98PV Size75	2		Procured by JICA
45	Polyethylene Pipe EF Socket Size75	5		Procured by JICA
46	Polyethylene Pipe Joint MP-98P Size75	5		Procured by JICA
47	Polyethylene Pipe Tee MP-98TB Size75×75	1		Procured by JICA
48	Polyethylene Pipe Gate Valve PTC B22 φ75	1		Procured by JICA
49	Polyethylene Pipe Cap MP-98C Size75	1		Procured by JICA
50	Polyethylene Pipe Joint			
50-1	MP-98B Size75 x 45°	3		Procured by JICA
50-2	MP-98B Size75 x 22 1/2°	4		Procured by JICA
51	EF Saddle with Plug φ75 x φ20	20		Procured by JICA
52	Polyethylene Pipe Joint TP-30 Minute Faucet Socket Size20	20		Procured by JICA
53	Polyethylene Pipe Joint TP-30 Socket Size20	10		Procured by JICA
54	Polyethylene Pipe Joint TP-30 Union Socket Size20	20		Procured by JICA
55	Polyethylene Pipe Joint TP-30 Socket for PVC	10		Procured by JICA
56	Polyethylene Pipe Joint TP-30 Union Elbow60°	5		Procured by JICA
57	Scraper for Polyethylene Pipe PE Scraper75	1		Procured by JICA
58	Plane for Resin			
58-1	PK-01	1		Procured by JICA
58-2	PKE01(2pc／Unit)	10		Procured by JICA
59	Cutter for Polyethylene Pipe			
59-1	PEI-100	1		Procured by JICA
59-2	PEE150	10		Procured by JICA
60	EF Controller and accessories			Procured by JICA
60-1	EF controller MSA2.0	1		Procured by JICA
60-2	Clip for 4.7mm	1		Procured by JICA
60-3	Plug WF8430	1		Procured by JICA
61	EF Saddle Drilling Machine Type-2N	1		Procured by JICA
62	Ductile Iron Flange			
62-1	Ductile Iron Flange 150 x 100	2		Procured by JICA
62-2	Ductile Iron Flange 100 x 75	2		Procured by JICA
63	Joining Fixture for Polyvinyl Chloride Pipe			
63-1	Type-100	2		Procured by JICA
63-2	Type-150	2		Procured by JICA
64	Engine Pump and accessories			
64-1	Engine pump STR-201	2		Procured by JICA
64-2	Hose φ50mm×10m	4		Procured by JICA
64-3	Hose φ50mm×5m	4		Procured by JICA
64-4	Strainer	2		Procured by JICA
64-5	Coupling	6		Procured by JICA
64-6	Hose Band	6		Procured by JICA
65	Water Meter NKDA20mm with accessories	310		Procured by JICA
66	Meter Union for Galvanized Steel Pipe WJT-MO	310		Procured by JICA
67	Expansion Joint for Repairing			
67-1	Expansion Joint for Repairing φ20	20		Procured by JICA
67-2	Expansion Joint for Repairing φ30	5		Procured by JICA
67-3	Expansion Joint for Repairing φ40	5		Procured by JICA
67-4	Expansion Joint for Repairing φ50	10		Procured by JICA

68	Clamp for Repairing			
68-1	C-25ES	5		Procured by JICA
68-2	C-40ES	5		Procured by JICA
68-3	C-50ES	5		Procured by JICA
68-4	C-80ES	3		Procured by JICA
68-5	C-100ES	3		Procured by JICA
69	Water Stopper for Polyvinyl Chloride Pipe VP Stopper 50mm	5		Procured by JICA
70	Electromagnetic Flowmeter			
70-1	ETM3070C Size150mm	2		Procured by JICA
70-2	Exam Result	2		Procured by JICA
70-3	Connecting Pipes	2		Procured by JICA
71	Lubricant V-Soap 2kg	10		Procured by JICA
72	Adhesive for Polyvinyl Chloride Pipe 500G	40		Procured by JICA
73	Draining Canvas Hose HL-250	1		Procured by JICA
74	Pulse Data Logger			
74-1	LR5061	5		Procured by JICA
74-2	LR5091	1		Procured by JICA
74-3	USB Cable	1		Procured by JICA
74-4	Software	1		Procured by JICA
75	Dust and Water Proof Case AD15-10-8 (Special processed)	5		Procured by JICA
76	Color Cone			
76-1	700H Model Number8Y0129	30		Procured by JICA
76-2	Cone Rod φ34 L=1.5m Model Number8Y1067	30		Procured by JICA
77	Lubricant for Ductile Iron Pipes 2kg	10		Procured by JICA
78	Wheelbarrow	3		Procured by JICA
79	Torque Wrench	2		Procured by JICA
80	Saddle Snap Tap	4		Procured by JICA
81	Polyvinyl Chloride Pipe Joint VC joint 150	3		Procured by JICA
82	Iron Cover for Electromagnetic Flowmeter Case	3		Procured by JICA
83	Iron Cover for Electromagnetic Flowmeter Case	3		Procured by JICA
84	Portable Ultrasonic Flowmeter UFP-20 and Small / Large sensor set			
84-1	Portable Ultrasonic Flowmeter UFP-20	1		Procured by JICA
84-2	Small sensor set	1		Procured by JICA
84-3	Large sensor set	1		Procured by JICA
84-4	Silicon Grease Couplant	3		Procured by JICA
85	SGP-PB Straight Pipe			
85-1	φ20mm、L=4.0m	14		Procured by JICA
85-2	φ25mm、L=4.0m	7		Procured by JICA
85-3	φ30mm、L=4.0m	21		Procured by JICA
85-4	φ40mm、L=4.0m	10		Procured by JICA
85-5	φ50mm、L=4.0m	5		Procured by JICA
86	Check Valve F Sise20	310		Procured by JICA
87	Resin Pipe Detector NPL-100 and accessories			
87-1	NPL-100	1		Procured by JICA
87-2	Adapter	1		Procured by JICA
87-3	Exam result	1		Procured by JICA
88	Metal Detector F-90M	1		Procured by JICA
89	Resin Pipe Water Leakage Detector			
89-1	Model D305	1		Procured by JICA
89-2	Conversion Plug Type-B	2		Procured by JICA
90	Hammer Drill			
90-1	Model HM1812 (200V)	2		Procured by JICA
90-2	Parts Number A-21319 29×410mm	4		Procured by JICA
90-3	Parts Number A-21375 28×410mm	6		Procured by JICA
90-4	Plug WF8430	2		Procured by JICA
91	Rammer MT-77HRL	1		Procured by JICA

92	Plate Compactor	1		Procured by JICA
93	Concrete Cutter and accessories			
93-1	Concrete cutter MCD-218CEH	1		Procured by JICA
93-2	18MW-RAC	3		Procured by JICA
94	Generator EF5500iSDE	1		Procured by JICA
96	Ductile Iron Deformed Pipe			
96-1	Type-K Flanged Socket 10k RF 150	2		Procured by JICA
96-2	Type-K Flanged Spigot 10k RF 150	2		Procured by JICA

3 Equipment related to NRW training center

No.	Name of Item	Qty	Place of Installment	Date of Handover
1	**Saddle Snap tap**			
1-1	Saddle Snap Tap 75×20	5		Procured by JICA
1-2	Saddle Snap Tap 100×20	20		Procured by JICA
1-3	Saddle Snap Tap 100×25	10		Procured by JICA
1-4	Saddle Snap Tap 100×40	2		Procured by JICA
1-5	Saddle Snap Tap 150×50	2		Procured by JICA
2	**Joint for Polyethylene Pipe**			
2-1	Joint for Polyethylene Pipe Socketφ20mm	10		Procured by JICA
2-2	Joint for Polyethylene Pipe Socketφ40mm	5		Procured by JICA
2-3	Joint for Polyethylene Pipe elbowφ20mm	10		Procured by JICA
2-4	Joint for Polyethylene Pipe elbowφ25mm	10		Procured by JICA
2-5	Joint for Polyethylene Pipe elbowφ40mm	4		Procured by JICA
2-6	Joint for Polyethylene Pipe Tφ20mm×φ20mm	2		Procured by JICA
2-7	Joint for Polyethylene Pipe Tφ25mm×φ25mm	2		Procured by JICA
2-8	Joint for Polyethylene Pipe Tφ40mm×φ40mm	2		Procured by JICA
2-9	Joint for Polyethylene Pipe Pipe endφ20mm	5		Procured by JICA
2-10	Joint for Polyethylene Pipe Pipe endφ25mm	5		Procured by JICA
2-11	Joint for Polyethylene Pipe GPφ20mm	15		Procured by JICA
2-12	Joint for Polyethylene Pipe GPφ25mm	5		Procured by JICA
2-13	Joint for Polyethylene Pipe GPφ40mm	3		Procured by JICA
2-14	Joint for Polyethylene Pipe GPφ50mm	2		Procured by JICA
2-15	Joint for Polyethylene Pipe VPφ40mm	3		Procured by JICA
2-16	Joint for Polyethylene Pipe Tap Socketφ20mm	20		Procured by JICA
2-17	Joint for Polyethylene Pipe Tap Socketφ25mm	20		Procured by JICA
2-18	Joint for Polyethylene Pipe Tap Socketφ40mm	2		Procured by JICA
2-19	Joint for Polyethylene Pipe Tap Socketφ50mm	2		Procured by JICA
3	Snap Tap for Polyethylene Pipe φ100mm×φ20mm	30		Procured by JICA
4	EF Saddle with plug S2A	10		Procured by JICA
5	**Snap Tap for Polyvinyl Chloride Pipe**			
5-1	Snap Tap φ150mm×φ50mm	1		Procured by JICA
5-2	Snap Tapφ100mm×φ20mm	30		Procured by JICA
6	**Meter Union for Galvanized Steel Pipe**			
6-1	Meter Union φ20mm	30		Procured by JICA
6-2	Meter Union φ25mm	5		Procured by JICA
7	**Union Joint for Steel Pipe**			
7-1	Union Joint φ20mm	20		Procured by JICA
7-2	Union Joint φ25mm	20		Procured by JICA
7-3	Union joint φ40mm	5		Procured by JICA
8	Ball Tap φ25mm	1		Procured by JICA
9	**Generator and accessories**			
9-1	Generator EF5500iSDE	1		Procured by JICA
9-2	Generator Service manual book	1		Procured by JICA
9-3	Generator Parts catalog book	1		Procured by JICA
10	Lever Block LB010	2		Procured by JICA
11	PVC Pipe Insertion Machine PIM200-R	1		Procured by JICA
12	Pipe IS-50AH	1		Procured by JICA
13	**Ductile Iron Straight Pipe**			
13-1	Straight Pipe φ150mm L5000mm	8		Procured by JICA

13-2	Straight Pipe φ100mm L4000mm	25		Procured by JICA
13-3	Straight Pipe φ75mm L4000mm	10		Procured by JICA
14	**Ductile Iron Short Pipe**			
14-1	Short Pipe 1φ150mm	4		Procured by JICA
14-2	Short Pipe 1φ100mm	18		Procured by JICA
14-3	Short Pipe 1φ75mm	4		Procured by JICA
14-4	Short Pipe 2 φ150mm	4		Procured by JICA
14-5	Short Pipe 2 φ100mm	13		Procured by JICA
14-6	Short Pipe 2 φ75mm	4		Procured by JICA
14-7	Short Pipe φ150mm L400mm	4		Procured by JICA
14-8	Short Pipe φ100mm L400mm	7		Procured by JICA
14-9	Short Pipe φ75mm L300mm	2		Procured by JICA
14-10	Short Pipe φ75mm L200mm	2		Procured by JICA
14-11	Short Pipe φ150mm L100mm	2		Procured by JICA
15	**Ductile Iron Deformed Pipe**			
15-1	Deformed Pipe φ150mm	3		Procured by JICA
15-2	Deformed Pipe φ100mm	10		Procured by JICA
15-3	Deformed Pipe φ75mm	4		Procured by JICA
15-4	Deformed Pipe φ150mm×φ150mm	1		Procured by JICA
15-5	Deformed Pipe T φ150mm×φ100mm	1		Procured by JICA
15-6	Deformed Pipe T φ100mm×φ100mm	3		Procured by JICA
15-7	Deformed Pipe T φ100mm×φ75mm	3		Procured by JICA
15-8	Deformed Pipe Cross φ100mm×φ100mm	1		Procured by JICA
15-9	Deformed Pipe T with flange φ150mm×φ100mm	2		Procured by JICA
15-10	Deformed Pipe T with flange φ100mm×φ100mm	2		Procured by JICA
15-11	Deformed Pipe T with flange φ100mm×φ75mm	2		Procured by JICA
15-12	Deformed Pipe φ150mm×φ75mm	3		Procured by JICA
15-13	Deformed Pipe 90°φ150mm	4		Procured by JICA
15-14	Deformed Pipe 90°φ100mm	4		Procured by JICA
15-15	Deformed Pipe 90°φ75mm	4		Procured by JICA
15-16	Deformed Pipe 45°φ150mm	6		Procured by JICA
15-17	Deformed Pipe 45°φ100mm	10		Procured by JICA
15-18	Deformed Pipe 45°φ75mm	4		Procured by JICA
15-19	Deformed Pipe 22 1/2°φ150mm	4		Procured by JICA
15-20	Deformed Pipe 22 1/2°φ100mm	6		Procured by JICA
15-21	Deformed Pipe 22 1/2°φ75mm	4		Procured by JICA
15-22	Deformed Pipe 11 1/4°φ150mm	4		Procured by JICA
15-23	Deformed Pipe 11 1/4°φ100mm	4		Procured by JICA
15-24	Deformed Pipe 11 1/4°φ75mm	4		Procured by JICA
15-25	Deformed Pipe 90°RF φ100mm	3		Procured by JICA
15-26	Deformed Pipe φ150mm×φ100mm	3		Procured by JICA
15-27	Deformed Pipe φ150mm×φ100mm	1		Procured by JICA
15-28	Deformed Pipe 45°φ100mm	4		Procured by JICA
15-29	Deformed Pipe 22 1/2°φ100mm	4		Procured by JICA
16	Repair Valveφ75mm×H100mm	1		Procured by JICA
17	**Fire Hydrant**			
17-1	Fire Hydrant B103-2000 φ75mm	1		Procured by JICA
17-2	Fire Hydrant Case MR-1 H=880	1		Procured by JICA
17-3	Fire Hydrant Case MR-1G-10L	1		Procured by JICA
18	**Air Valve**			
18-1	Air Valve φ25mm	2		Procured by JICA
18-2	Air Valve Flangeφ25mm	2		Procured by JICA
19	**Ductile Iron Pipe Joint Parts**			Procured by JICA
19-1	Pipe Joint Parts φ150mm	10		Procured by JICA
19-2	Pipe Joint Parts φ100mm	25		Procured by JICA
19-3	Pipe Joint Parts φ75mm	10		Procured by JICA
20	**Ductile Iron Pipe Special Ring**			
20-1	Special Ring φ150mm	15		Procured by JICA
20-2	Special Ring φ100mm	40		Procured by JICA
20-3	Special Ring φ75mm	10		Procured by JICA
21	Water Leakage Protection Hardware φ100mm	1		Procured by JICA
22	**Water Leakage Repair Hardware**			
22-1	Water Leakage Repare Hardware L255mm	1		Procured by JICA
22-2	Water Leakage Repare Hardware L157mm	1		Procured by JICA
23	**Cap for Tap and Stop Valve**			
23-1	Cap for Tap and Stop Valve φ20mm	20		Procured by JICA
23-2	Cap for Tap and Stop Valve φ25mm	20		Procured by JICA
23-3	Cap for Tap and Stop Valve φ40mm	2		Procured by JICA
23-4	Cap for Tap and Stop Valve φ50mm	2		Procured by JICA
24	**Gate Valve and Case**			
24-1	Gate Valve φ150mm	6		Procured by JICA
24-2	Gate Valve φ100mm	18		Procured by JICA
24-3	Gate Valve φ75mm	3		Procured by JICA
24-4	Gate Valve Case body	3		Procured by JICA
24-5	Gate Valve Case t40mm	3		Procured by JICA
25	Lubricant 2kg	5		Procured by JICA
26	Polyethylene Straight Pipe φ100mm×L5m	10		Procured by JICA
27	**Polyethylene Two-layer Pipe**			
27-1	Polyethylene Two-layer Pipe φ20mm×L120m	1		Procured by JICA
27-2	Polyethylene Two-layer Pipe φ25mm×L30m	1		Procured by JICA
27-3	Polyethylene Two-layer Pipe φ40mm×L30m	3		Procured by JICA
27-4	Polyethylene Two-layer Pipe φ50mm×L20m	1		Procured by JICA
28	**Bend for Polyethylene Pipe**			
28-1	Bend for Polyethylene Pipe φ100mm×90°	4		Procured by JICA
28-2	Bend for Polyethylene Pipe φ100mm×45°	12		Procured by JICA
29	**Joint for Polyethylene Pipe**			
29-1	Joint for Polyethylene Pipe φ100mm×L160mm	10		Procured by JICA
29-2	Joint for Polyethylene Pipe φ100mm	2		Procured by JICA
30	Valve for Polyethylene Pipe φ100mm	3		Procured by JICA
31	**Polyvynil Chloride Pipe**			
31-1	Polyvinyl Chloride Straight Pipe (1) φ150mm×L500	6		Procured by JICA
31-2	Polyvinyl Chloride Straight Pipe (2) φ100mm×L500	15		Procured by JICA
31-3	Polyvinyl Chloride Pipe (1) φ20mm×L4000mm	20		Procured by JICA
31-4	Polyvinyl Chloride Pipe (2) φ25mm×L4000mm	20		Procured by JICA
31-5	Polyvinyl Chloride Pipe (3) φ40mm×L4000mm	20		Procured by JICA
31-6	Polyvinyl Chloride Short Pipe(1) φ150mm×L300m	4		Procured by JICA
31-7	Polyvinyl Chloride Short Pipe(2) φ100mm×L300m	4		Procured by JICA
31-8	Polyvinyl Chloride Short Pipe(3) φ150mm×L260m	2		Procured by JICA
31-9	Polyvinyl Chloride Short Pipe(4) φ100mm×L250m	2		Procured by JICA
32	**Bend for Polyvinyl Chloride Pipe**			
32-1	Bend for Polyvinyl Chloride Pipe φ150mm×90°	2		Procured by JICA
32-2	Bend for Polyvinyl Chloride Pipe φ100mm×45°	4		Procured by JICA
33	**Joint for Polyvinyl Chloride Pipe**			
33-1	VK-00TF φ150mm×φ100mm	2		Procured by JICA
33-2	VK-00TF φ100mm×φ100mm	1		Procured by JICA
33-3	VK-00TB φ150mm×φ100mm	1		Procured by JICA
33-4	VK-00TB φ100mm×φ100mm	1		Procured by JICA
33-5	VK-00VS φ150mm	4		Procured by JICA
33-6	VK-00VS φ100mm	4		Procured by JICA
33-7	VK-00VS φ150mm×φ100mm	1		Procured by JICA
33-8	VK-00VS φ100mm×φ75mm	1		Procured by JICA
33-9	VK-00B φ150mm×90°	2		Procured by JICA
33-10	VK-00B φ150mm×45°	4		Procured by JICA
33-11	VK-00B φ100mm×90°	5		Procured by JICA
33-12	VK-00B φ100mm×45°	8		Procured by JICA
33-13	VK-00B φ100mm×22-1/2°	4		Procured by JICA
33-14	VPSocket φ20mm	50		Procured by JICA
33-15	VPSocket φ25mm	20		Procured by JICA

33-16	VPSocket φ40mm	20		Procured by JICA
33-17	VPelbow φ20mm	50		Procured by JICA
33-18	VPelbow φ25mm	20		Procured by JICA
33-19	VPelbow φ40mm	20		Procured by JICA
33-20	Joint φ20mm	10		Procured by JICA
33-21	Joint φ30mm	10		Procured by JICA
33-22	Joint φ40mm	5		Procured by JICA
33-23	Joint φ50mm	5		Procured by JICA
33-24	MF Joint φ150mm	4		Procured by JICA
33-25	MF Joint φ100mm	4		Procured by JICA
33-26	Dresser Joint (1) φ150mm	1		Procured by JICA
33-27	Dresser Joint (2) φ100mm	1		Procured by JICA
33-28	Dresser Joint (1) φ150mm	5		Procured by JICA
33-29	Dresser Joint (2) φ100mm	15		Procured by JICA
33-30	Bag Joint φ100mm	1		Procured by JICA
34	**Repair Clamp**			
34-1	Repair Clamp for Plastic Pipe φ75mm	1		Procured by JICA
34-2	Repair Clamp for Plastic Pipe φ100mm	1		Procured by JICA
34-3	Repair Clamp for Plastic Pipe φ150mm	1		Procured by JICA
35	**Cap for Polyvinyl Chloride Pipe**			
35-1	Cap for Polyvinyl Chloride Pipe φ20mm	10		Procured by JICA
35-2	Cap for Polyvinyl Chloride Pipe φ25mm	10		Procured by JICA
35-3	Cap for Polyvinyl Chloride Pipe φ40mm	10		Procured by JICA
36	**Gate Valve for Polyvinyl Chloride Pipe**			
36-1	Gate Valve φ150mm	1		Procured by JICA
36-2	Gate Valve φ100mm	2		Procured by JICA
37	Adhesive for Polyvinyl Chloride Pipe 500g	80		Procured by JICA
38	Lubricants for Polyvinyl Chloride Pipe 2kg	10		Procured by JICA
39	**Polyethylene Powder Lined Steel Pipe**			
39-1	φ20mm×L4000mm	10		Procured by JICA
39-2	φ25mm×L4000mm	5		Procured by JICA
39-3	φ40mm×L4000mm	5		Procured by JICA
39-4	φ80mm×L4000mm	2		Procured by JICA
39-5	φ100mm×L4000mm	4		Procured by JICA
40	**Joint for Polyethylene Powder Lined Steel Pipe**			
40-1	Socket φ20mm	20		Procured by JICA
40-2	Socket φ25mm	20		Procured by JICA
40-3	Socket φ40mm	10		Procured by JICA
40-4	Socket φ100mm	5		Procured by JICA
40-5	Elbow φ20mm	20		Procured by JICA
40-6	Elbow φ25mm	20		Procured by JICA
40-7	Elbow φ40mm	20		Procured by JICA
40-8	Elbow φ80mm	5		Procured by JICA
40-9	Elbow φ100mm	10		Procured by JICA
40-10	T φ20mm	20		Procured by JICA
40-11	T φ25mm	20		Procured by JICA
40-12	T φ40mm	5		Procured by JICA
40-13	T φ100mm	2		Procured by JICA
40-14	Union φ20mm	5		Procured by JICA
40-14	Union φ25mm	5		Procured by JICA
40-15	Union φ40mm	5		Procured by JICA
40-16	Nipple φ20mm	10		Procured by JICA
40-17	Nipple φ25mm	10		Procured by JICA
40-18	Nipple φ40mm	10		Procured by JICA
40-19	Nipple φ100mm	10		Procured by JICA
41	**Flange for Polyethylene Powder Lined Steel Pipe**			
41-1	Flange (1) φ20mm	4		Procured by JICA
41-2	Flange (2) φ25mm	4		Procured by JICA
41-3	Flange (3) φ40mm	5		Procured by JICA
41-4	Flange (4) φ100mm	5		Procured by JICA
41-5	Flange (1) φ75mm	8		Procured by JICA
41-6	Flange (2) φ100mm	10		Procured by JICA
42	**Stainless Steel bolt and nut**			
42-1	SUS BT.NTφ16mm x L75mm	250		Procured by JICA
42-2	SUS BT.NTφ16mm x L80mm	120		Procured by JICA
42-3	SUS BT.NTφ12mm x L55mm	20		Procured by JICA
42-4	SUS BT.NTφ16mm x L60mm	20		Procured by JICA
42-5	SUS BT.NTφ16mm x L65mm	20		Procured by JICA
43	**Flange Packing**			
43-1	Flange Packing φ20mm	10		Procured by JICA
43-2	Flange Packing φ25mm	10		Procured by JICA
43-3	Flange Packing φ40mm	10		Procured by JICA
43-4	Flange Packing φ50mm	5		Procured by JICA
43-5	Flange Packing φ75mm	10		Procured by JICA
43-6	Flange Packing φ100mm	15		Procured by JICA
43-7	Flange Packing φ150mm	25		Procured by JICA
43-8	Flange Packing φ100mm 10K	10		Procured by JICA
44	**Level Regulating Valve**			
44-1	Level Regulating Valve φ40mm	2		Procured by JICA
44-2	Level Regulating Valve φ20mm	3		Procured by JICA
45	**Check Valve**			
45-1	Check Valve φ20mm	10		Procured by JICA
45-2	Check Valve φ25mm	1		Procured by JICA
45-3	Check Valve φ40mm	1		Procured by JICA
46	**Sluice Valve**			
46-1	Sluice Valve φ20mm	20		Procured by JICA
46-2	Sluice Valve φ25mm	10		Procured by JICA
47	**Stop Valve**			Procured by JICA
47-1	Stop Valve φ40mm	3		Procured by JICA
47-2	Stop Valve φ50mm	2		Procured by JICA
47-3	Stop Valve Box L125mm×W400mm	5		Procured by JICA
48	**Pipe Drilling Machine**			
48-1	Pipe Drilling Machine 2N	3		Procured by JICA
48-2	Pipe Drilling Machine S2A	1		Procured by JICA
48-3	Pipe Drilling Machine φ20mm	2		Procured by JICA
49	**Engine Cutter and Accessories**			
49-1	Engine Cutter EK7650H	1		Procured by JICA
49-2	Engine Cutter 195599-9 filter	1		Procured by JICA
49-3	Engine Cutter 225094-6 Vbelt	3		Procured by JICA
50	**Electromagnetic Flow Meter an Accessories**			
50-1	Electromagnetic Flow Meter Set MagneW3000 FLE	1		Procured by JICA
50-2	Electromagnetic Flow Meter Set Fastening set	1		Procured by JICA
50-3	Electromagnetic Flow Meter Set LR5061 Pulse logg	1		Procured by JICA
50-4	Electromagnetic Flow Meter Set LR5091 Communi	1		Procured by JICA
51	**Pump**			
51-1	Pump T-100K	2		Procured by JICA
51-2	Pump PP-201T	1		Procured by JICA
52	Bulb Opener No.1721	2		Procured by JICA
53	Tamper No.5231	2		Procured by JICA
54	Torque Wrench RM-30LYNT	1		Procured by JICA
55	Chain Pipe Wrench TW150N	2		Procured by JICA
56	**Wrench**			
56-1	Pipe Wrench PW-SD30	5		Procured by JICA
56-2	Pipe Wrench PW-SD60	5		Procured by JICA
56-3	Adjustable Angle Wrench H-300	5		Procured by JICA
56-4	Adjustable Angle Wrench H-450	5		Procured by JICA
56-5	Adjustable Angle Wrench H-600	5		Procured by JICA
56-6	Ratchet Wrench RWH-0924	5		Procured by JICA

56-7	Ratchet Wrench RWH-0930	5		Procured by JICA
57	**Pipe Electrofusion Unit**			
57-1	Pipe Electrofusion Unit MSA2.1	1		Procured by JICA
57-2	Pipe Electrofusion Unit WF8430	1		Procured by JICA
58	**Pipe Cutter**			
58-1	Pipe Cutter PEI-75	1		Procured by JICA
58-2	Pipe Cutter PEE75	1		Procured by JICA
58-3	Pipe Cutter PE-100	2		Procured by JICA
58-4	Pipe Cutter PEE150	2		Procured by JICA
58-5	Pipe Cutter PEI-50	5		Procured by JICA
58-6	Pipe Cutter PEE75	5		Procured by JICA
59	Water Pressure Gauge EA729GM-20	5		Procured by JICA
60	**Water Meter and Accessories**			
60-1	Water Meter NKDA20	4		Procured by JICA
60-2	Water Meter NFDW100	2		Procured by JICA
60-3	Water Meter Storage Case MB20SB	5		Procured by JICA

Annex 6. Local cost borne by Myanmar side

(as of November 2019)

No.	Item	Cost (kyat)
1	Equipment and construction costs for flow meter chambers and kiosk including costs for safety measures in construction	368,965,173
2	Reagents costs on water quality test for water quality equipment provided	524,370,205
3	Operation and maintenance costs of the provided PCs for monitoring PIs Updating costs by anti-virus for the above provided PCs	50,108,620
4	NRW pilot project (including equipment, machine, labor, materials, etc.)	725,943,716
5	NRW training yard consutruction (including equipment, machine, labor, materials, etc.)	458,703,060
6	Nyaughnapin WTP improvement pilot project	41,000,000
7	Reservoir water treatment pilot project	15,000,000
8	Tax, commission fee etc. of delivery and registration for the equipment procured and transmitted from the Japanese side.	2,401,358
9	Electricity cost of project offices, equipment provided and construction of flow meter chambers	60,877,886
10	Development of customer database and billing software	164,476,178
Total		2,411,846,196

Note; The amoung of item 2 includes all expenditures for reagents since project started.

Annex 7. Local cost borne by Japanese side (only activities cost for a long-term expert)

JFY	Air Fare	Biz Trip(Non Air Fare)	Miscellaneous	Total (USD)	Total (JPY)
2015	0	0	0	0	0
2016	1,898	3,227	35,682	40,807	4,444,896
2017	1,877	2,145	1,861	5,883	653,147
2018	5,235	2,134	8,774	16,143	1,784,096
2019	2,492	1,496	3,630	7,618	830,630
Total	**11,502.00**	**9,002.00**	**49,947.37**	**70,451.37**	**7,712,769.00**