Attached Document

In the end of Phase-1 of the Federal Capital Territory Reduction of Non-Revenue Water Project (hereinafter referred to as "the Project"), the fifth meeting of Joint Coordinating Committee (hereinafter referred to as "JCC") was held on 20th December 2016.

Implementation of the Project is divided into two phases; Phase-1 scheduled from October 2014 to December 2016 and Phase-2 scheduled from January 2017 to March 2018.

1. Remarks and Presentation

Mr. Abubakar Sani Pai, Project Director of the Project, gave welcome remarks and chaired the JCC.

Ms. Makiko Okumura, Senior Representative of Japan International Cooperation Agency (hereinafter referred to as "JICA") Nigeria Office expressed appreciation to all members and gave remarks addressing necessity of earlier release of 2017 Counterpart Fund, importance of realistic and feasible planning of Non-Revenue Water (hereinafter referred to as "NRW") reduction in terms of sustainability. She also emphasized importance of commitment of all relevant organizations such as understanding and cooperation from Federal Capital Territory Administration (hereinafter referred to as "FCTA"), Federal Capital Development Authority (hereinafter referred to as "FCDA") and Abuja Geographical Information System (hereinafter referred to as "AGIS").

Engr. A. A. Nahuche, Technical Manager of the Project made a presentation of Progress of the Project and Project Monitoring Sheet.

Mr. Akinori Miyoshi, Chief Advisor of JICA Expert Team made a presentation of observations on implementation of the Project in Phase-1, issues, challenges and suggestions.

At the end of the discussions, Mr. Hudu Bello, the Project Manager of the Project, gave closing remarks. He expressed the gratitude of the Federal Capital Territory Water Board (hereinafter referred to as "FCTWB") for the cooperation of JCC members.

2. Main Points Discussed

As a result of discussions, all JCC members confirmed the matters mentioned below.

2.1 Progress and Extension of the Project Period

As progress since the previous project monitoring, delay of activities were solved by completion of chamber construction and procurement of small materials for Pilot activities, which were taken over by the Japanese side, as well as the efforts of implementation by the Nigerian side.

However, both sides confirmed anew some activities for Output-1 need monitoring period for at least six (6) months and agreed to extend the Project period for six (6) months through official amendment of Record of Discussion (hereinafter referred to as "R/D"), and to subsequently revise Project Design Matrix (hereinafter referred to as "PDM") and Plan of Operations (hereinafter referred to as "PO").

2.2 Counterpart Fund

FCTWB reported Counterpart Fund for 2016 was eventually released to FCTWB on 15th December 2016, and FCTWB will utilize it for the Project wherever possible in the limited period before the end of a fiscal year.

2.3 AGIS Security

FCTWB reported that AGIS security has not yet been relaxed even though AGIS agreed to do it in response to the instruction of the FCTA's Permanent Secretary, and mentioned that FCTWB want to establish her own independent GIS system unless situation is improved.

Project Director suggested having a meeting among Directors of Economic Planning, Research and Statistics (hereinafter referred to as "EPRS) of FCTA, FCTWB and AGIS to discuss this issue.

FCTA and FCTWB agreed to it.

2.4 Active Cooperation between FCDA and FCTWB

FCTWB and JICA Expert Team highlighted that the Project has faced problems through implementation of the Project, particularly, discrepancy between as-built drawings and actual situation which often caused stagnation of activities.

JICA Expert Team requested improving this as well as formulating feedback channel from challenges in operation & maintenance of FCTWB to planning/designing, supervision and documentations of FCDA.

FCDA explained that FCTWB has been involved in those processes, but mentioned that challenges should be discussed and solved amicably.

FCTWB reported that, earlier than JCC meeting, FCDA had responded officially in writing to the Project for attendance in project meetings such as monthly technical meeting.

2.5 Quality Management and Fundamentals

JICA Expert Team emphasized that quality management is essential in all aspects of operation and maintenance by using quality-assured data, recording, meter reading, drawings, standard operating procedures, manuals and guidelines as fundamentals of water supply services. JICA Expert Team also mentioned that the Project needs to consider and discuss this issue in Phase 2 so that fundamentals are put into place.

FCTWB understood and accepted it.

2.6 Legal instrument (enabling law) establishing FCTWB

To carry it forward, FCTWB suggested conducting joint (FCTWB-JICA) feasibility study to bring out benefits of an autonomous FCTWB as part of the Project, of which results will be presented to FCT Minister.

JICA answered that JICA was informed of the suggestion.

2.7 Information Sharing

FCDA requested for more information on previous activities of the Project and NRW reduction operation methodologies for future development.

JICA answered that JICA is willing to share information and documents

among relevant members of FCDA.

3. Approval of Project Monitoring Sheet

JCC members approved Project Monitoring Sheet.

4. Amendment of Record of Discussion

JICA explained necessity of amendment of R/D and its description as a next step to extend project period for six (6) months, and also revision of PDM and PO in the beginning of Phase 2.

FCTA and FCTWB agreed to it.

Appendix

Appendix 1: Programme/Agenda
Appendix 2: Attendance List
Appendix 3: Project Monitoring Sheet (Draft)
Appendix 4: Results of Project Monitoring by FCTWB
Appendix 5: Observations by JICA Expert Team

Appendix 1

Federal Capital Territory Administration (FCTA)
Federal Capital Territory Water Board (FCTWB)
assisted by
Japan International Cooperation Agency (JICA)

THE FEDERAL CAPITAL TERRITORY

REDUCTION OF NON-REVENUE WATER PROJECT

PROGRAMME/AGENDA FOR 5th JOINT COORDINATING COMMITTEE

Venue: Conference Room, EPRS, FCT Administration, Abuja
Date: 10:00, Tuesday, 20th December 2016

10:00	Opening Prayer
10:00 - 10:05	Introduction of JCC Members
10:05 - 10:15	Welcome Remarks by Project Director, Mr. Sani Pai (Director, EPRS, FCTA)
10:15 - 10:25	Address by Senior Representative, Ms. Makiko Okumura (JICA Nigeria Office)
10:25 - 10:55	Presentation of Results of Project Monitoring by Technical Manager, Engr. A. A. Nahuche (HOD Distribution, FCTWB)
10:55 - 11:25	Observation by Chief Advisor, Mr. Akinori Miyoshi (JICA Expert Team)
11:25 - 11:55	Questions, Answers and Way Forward
11:55 - 12:05	Approval of Project Monitoring Sheets
12:05 - 12:15	Amendment of Record of Discussion (R/D) by Project Formulation Advisor, Mr. Takayuki Ohira (JICA Nigeria Office)
12:15 - 12:25	Closing Remarks by Project Manager, Mr. Hudu Bello (Director, FCTWB)
12:25	Closing Prayer

Appendix 2

FEDERAL CAPITAL TERRITORY REDUCTION OF NON REVENUE WATER PROJECT

FIFTH JOINT COORDINATING COMMITTEE MEETING (JCC)

20TH DECEMBER 2016

Attendance List

S/N	NAME	POSITION
1	Abubakar Sani Pai	Director EPRS
2	Makiko Okumura	Snr Representative
3	Hudu Bello	Director FCTWB
4	S.T Bello	HOD[Admin&Supply] FCTWB
5	A.A Nahuche	HOD[Distribution] FCTWB
6	Abolade R. Lawal	FCTWB
7	Muhammed Adis	HOD Commerce
8	Abbas A. Ahmed	Head PR, FCTWB
9	Takayuki Ohira	JICA Nigeria
10	M.k Rabiu	Head logistics,FCTWB
11	Sadiq A. Gulma	JICA Nigeria
12	Ogbonna K Emeka	P. Hydrologist/Water resources
13	Nwachukwu Felicia E	PCS/Water resources
14	Maxwell Ejikeme	Snr Hydrologist
15	Ademoroti Isaiah A	DD(C&P) WS/Water Resources
16	Adetunji Idowu	DD Rural water supply/Water Resources
17	Engr. N Bukar	CRE T1&6/W&S Division, DES, FCDA
18	Engr. Gambo Y.L	CE,WFS,DES FCDA
19	Lawal A. Muhammed	DD EPRS
20	Takashi Mori	JICA Expert Team
21	Akinori Miyoshi	JICA Expert Team

To Chief Representative of JICA Nigeria Office

PROJECT MONITORING SHEETS (DRAFT)

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project
Version of the Sheet: Ver. 4 (Term covered: September, 2016 - December, 2016)

Name: Akinori Miyoshi
Title: Chief Advisor
Submission Date: 20 December 2016

I. Summary

1 Progress

1-1 Progress of Inputs

[The Nigerian Side]

Project Personnel

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members have been involved in the Project.

Land, Building and Facilities

Office spaces and necessary facilities at the Federal Capital Territory Water Board (FCTWB) have been provided for the Japanese side.

Construction of chambers for bulk flowmeters was taken over by the Japanese side due to non-release of the Counterpart Fund as a result of the previous project monitoring in September 2016.

Local Costs

Prepaid meters for Pilot Metering Area (PMA) in Gudu Area Office and AMR (Automatic Meter Reading) meters for PMA in Garki I Area Office were procured by the Nigerian side, then installation of the procured water meters has been done.

[The Japanese Side]

JICA Experts

Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and members for ten areas of expertise were assigned to the works in Nigeria for 11.1 man-months between September 2016 and December 2016 (67.5 man-months from the commencement of the Project in November 2014).

Equipment

Mechanical (conventional) water meters were procured in Nigeria for PMA in Jabi Area Office. See

the Annex-1: List of Equipment for the Project.

Procurement of equipment for water distribution management such as zonal meters, data loggers, telemetric monitoring system, etc. has been in process in Japan.

Facilities

Modification of existing billing system including training to relevant staff in FCTWB was completed. Chamber construction for both bulk and zonal flow meters including cable installation was completed by the Nigerian contractor.

1-2 Progress of Activities

[Activities for Output-1: Level of NRW of both the service area of FCWTB and water distribution areas monitored regularly.]

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
1-1	Install bulk meters to water treatment plants 1 and 2	Progress: 75%, Behind: 7.5 months Delayed and suspended. Local contractors outsourced by FCTWB have constructed chambers for bulk meters. Construction of three chambers was completed while the fourth one is 50% completed. However, cable installation, ladder and fencing are pending. The construction has been suspended due to non-payment. This is due to non-release of the Counterpart Fund.	Completed. However, data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines.
1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	Progress: 0%, Behind: 7.0 months Delayed as a result of delay in Activity 1-1. After Activity 1-1, the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
1-3	Tally the above water production data monthly	Progress: 0%, Behind: 7.0 months Delayed as a result of delay in Activity 1-1 and 1-2. After Activity 1-1 and 1-2, the Project needs at least 6 months for monitoring this Activity.	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
1-4	Calculate the monthly water consumption based on the billing data	Progress: 40%, Behind: 7.5 months Delayed. FCTWB has collected information of returned bills and has deactivated them. The returned bills cause inaccuracy of calculating NRW ratio. The final specification for billing system modification was adopted. After modification, the Project needs at least 6 months for monitoring this Activity.	Completed (billing system modification only). Ready to calculate monthly water consumption, but the Project needs at least 6 months for monitoring this Activity.
1-5	Calculate monthly NRW ratio	Progress: 0%, Behind: 7.5 months	Progress: 0%, Behind: 4.5 months

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
	of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	Delayed as a result of delay in Activity 1-3 and 1-4. The Project needs at least 6 months for monitoring this Activity after obtaining the data from Activity 1-3 and 1-4.	Ready to calculate monthly NRW ratio, but the Project needs at least 6 months for monitoring this Activity.
1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	Progress: 65%, Behind: 1.5 months Being delayed. Planning/designing of zonal meters, BoQ and specifications were completed. Construction of 6 out of 8 chambers was completed by the local contractor outsourced by JICA while the remaining 2 is ongoing. Consistent rain has affected the process of excavation of rock at the chamber site. Construction will continue as soon as favorable weather condition is achievable.	Progress :90%, Behind: 4.5 months Delayed. Construction of chambers for zonal meters was completed Zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system have been procured in Japan.
1-7	Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	Progress: 0%, Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-6.	Progress: 0%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6. The Activity will be implemented after the completion of Activity 1-6.

[Activities for Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
2-1	Review existing NRW reduction operations at each pilot Area Office	Completed.	Completed.
2-2	Conduct capacity assessment of organization and the relevant staff	Progress: 50%, Behind: 7.0 months Delayed as a result of delay in Activity 2-9 to 2-15. Interim assessment will be done when pilot project terminates.	Completed.
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed.	Completed.
2-4	Prepare/update distribution network drawings for each PMA	Completed. AGIS security has still hindered data import/export and analysis.	Completed. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
2-5	Install water flow meters to each PMA and measure in/outflows monthly	Progress: 90%, Behind: 9.0 months Delayed as a result of electrical works for the ultrasonic flow meter to be installed in Garki I.	Completed, but partially and provisionally. Check/repair a PMA meter in Jabi and complete fully electricity

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
		All mechanical flow meters were procured and installed except the ultrasonic flow meter in Garki I. (Discussion with AEDC is ongoing.) FCTWB will complete electricity connection for the ultrasonic flow meter in Garki I.	connection for the ultrasonic flow meter in Garki I
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed.	Completed.
2-7	Isolate a SMA by installing valves	Completed.	Completed.
2-8	Update the distribution network drawings for each SMA	Progress: 80%, Behind: 2.0 months Delayed. All existing pipelines, valves and hydrants were captured. Locations of leakage and illegal connections will be captured. AGIS security has still hindered data import/export and analysis.	Completed.
2-9	Measure an initial level of NRW of each SMA	Progress: 75%, Behind: 5.5 months Delayed as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing. 24 hrs flow measurement, MNF survey, Step test, Meter error test and Meter reading were completed. 24hrs customer consumption survey, Unbilled authorized customer listing and consumption survey are ongoing.	Completed.
2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	Progress: 75%, Behind: 5.5 months Delayed as a result of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, units and Area Offices for reading, billing systems and automated estimate billing. Leakage detection acoustic survey and Illegal connection survey were completed.	Provisionally completed. Re-detection may be done if necessary.
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of	Progress: 30%, Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.	Provisionally completed. Revision may be done if necessary.

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
	Distribution Department		
2-12	Review and approve NRW reduction operation plan of each SMA	Progress: 30%, Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.	Provisionally completed. Revision may be done if necessary.
2-13	Implement NRW reduction operations at each SMA	Progress: 45%, Behind: 4.5 months Delayed and the Activity has been done provisionally. Repair of leakages completed in three PMAs. Meter replacement and installation is ongoing in Gudu.	Provisionally completed. Further operations may be done if necessary.
2-14	Monitor the progress of the NRW reduction operations of each SMA	Progress: 45%, Behind: 4.5 months Delayed and the Activity has been done provisionally. Repair of leakages completed in three PMAs. Meter replacement and installation is ongoing in Gudu.	Provisionally completed. Further monitoring may be done if necessary.
2-15	Measure level of NRW of each SMA at the end of the respective operations	Progress: 0%, Behind: 6.5 months Delayed and the activity follows Activity 2-14.	Provisionally completed. Detailed check and revision may be done if necessary.
2-16	Prepare a report on pilot projects, covering Activity 2-1~2-15	Progress: 0%, Behind: 2.0 months Delayed and the activity follows Activity 2-15.	Provisionally completed. Detailed check may be done if necessary.
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & meter readers), incl. audio visual materials	Progress: 0%, Behind: 2.0 months Delayed and the activity follows the above Activities.	Provisionally completed. Revision may be done if necessary.

[Activities for Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]

No	Activity	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
3-1	Establish a Working Group for NRW reduction planning	Completed, but will be reviewed in Phase-2.	Completed, but will be reviewed in Phase-2.
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Completed, but will be reviewed in Phase-2.	Completed, but will be reviewed in Phase-2.
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	To be implemented in Phase-2. AGIS security may hinder data import/export and analysis.	To be implemented in Phase-2. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	To be implemented in Phase-2.	To be implemented in Phase-2.
3-5	Develop the first medium-term strategic plan (2018-2022) for approval by FCTA	To be implemented in Phase-2.	To be implemented in Phase-2.
3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	To be implemented in Phase-2.	To be implemented in Phase-2.
3-7	Develop a planning manual for NRW reduction	To be implemented in Phase-2.	To be implemented in Phase-2.
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	Progress: 70%, Behind: 7.0 months Delayed as a result of delay in information submission from Area Offices. 6 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.	Progress: 75%, Behind: 11.0 months Delayed as a result of delay in information submission from Area Offices. 8 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.
3-9	Establish framework of water distribution management	Progress: 25%, Behind: 0.5 months Being delayed. Water Distribution Management Committee was established and concept was endorsed. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.	Progress: 25%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6 and 1-7.

1-3 Achievement of Output

[Output-1: Level of NRW of the service area of FCTWB is monitored regularly.]

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
1a	Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-1 to 1-4. In the current schedule, it is expected that monthly NRW ratio will be obtained from Dec. 2016, the first quarter of the third year.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. In the current schedule, it is expected that monthly NRW ratio will be obtained from the second quarter of the third year.
1b	Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Same as the above in Indicator 1a.	No achievement (delayed). Same as the above in Indicator 1a.
1c	Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors (*replace by "Management" in PDM2) of FCTWB from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-1 to 1-4. In the current schedule, it is expected that quarterly NRW ratio will be obtained from Mar. 2017, the second quarter of the third year.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. In the current schedule, it is expected that quarterly NRW ratio will be obtained from Mar. 2017, the second quarter of the third year.
1d	Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.	No achievement (as planned).	No achievement (as planned).

Verification of Achievement and Implementing Process

Although a critical problem particularly delay in chamber construction for bulk flowmeters under Activity 1-1 was solved by taking-over by the Japanese side and also modification of billing system was completed, monthly NRW ratio has not been ready.

So, the Project has not achieved Indicator 1a, 1b and 1c, and need monitoring period for six months.

There are no problems in the implementing process since the previous project monitoring.

[Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.]

<table>
<tr><th>No</th><th>Indicator</th><th>Previous Monitoring (as at Aug.2016)</th><th>Current Monitoring (as at Dec.2016)</th></tr>
<tr><td>2a</td><td>Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.</td><td>No achievement (delayed).
Although time frame is not specified, this indicator has not been obtained, this mean delayed.
In the current schedule, it is expected that this indicator will be obtained from Oct. 2016, the first quarter of the third year.</td><td>Most of results did not reach the target level.
Provisional NRW Ratio (%)
<table>
<tr><th></th><th>Before</th><th>After</th><th>Change</th></tr>
<tr><td>Gudu</td><td></td><td></td><td></td></tr>
<tr><td>SMA-1</td><td>52.0</td><td>62.9</td><td>+10.9</td></tr>
<tr><td>SMA-2</td><td>53.9</td><td>49.0</td><td>-4.9</td></tr>
<tr><td>Jabi</td><td></td><td></td><td></td></tr>
<tr><td>SMA-2</td><td>47.6</td><td>48.0</td><td>+0.4</td></tr>
<tr><td>SMA-3</td><td>86.4</td><td>67.2</td><td>-19.2</td></tr>
<tr><td>Garki I</td><td></td><td></td><td></td></tr>
<tr><td>SMA-1</td><td>86.6</td><td>82.9</td><td>-3.7</td></tr>
<tr><td>SMA-2</td><td>79.0</td><td>85.0</td><td>+6.0</td></tr>
<tr><td>SMA-3</td><td>68.8</td><td>41.8</td><td>-27.0</td></tr>
</table>
Detailed re-check of results and follow up activities to achieve the target level are immediately necessary by utilizing lessons and learnt.</td></tr>
<tr><td>2b</td><td>Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.</td><td>No achievement (as planned).</td><td>Technical manuals were prepared and provisionally approved.
Revision may be necessary.</td></tr>
<tr><td colspan="4">Verification of Achievement and Implementing Process
In spite of existence of different meter types, non-accessibility to meter and complexity in commercial aspects such as customer categories, water tariffs, Units and Area Offices for reading, billing systems and automated estimate billing, the Project completed all activities for Output-2.
However, some activities need to be followed up in Phase-2 of the Project because some decrease rate of NRW ratio did not reach to criteria of Indicator 2a.
There are no problems in the implementing process since the previous project monitoring.</td></tr>
</table>

[Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2.]

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
3a	By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.	No achievement (as planned).	No achievement (as planned).
3b	By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.	No achievement (as planned).	No achievement (as planned).
3c	A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.	No achievement (as planned).	No achievement (as planned).
3d	By November 2016, framework of water distribution management is established.	No achievement (as planned).	No achievement (delayed). Framework has not been ready due to delay in Activity 1-6 and 1-7.
Verification of Achievement and Implementing Process Indicator 3a, 3b and 3c and related activities for Output-3 are subject to Phase 2 of the Project, which is scheduled to be implemented from January 2017. Activities related to Indicator 3d are in progress with participation of all Area Offices; however, it has taken time to collect information.			

1-4 Achievement of the Project Purpose

[Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.]

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
a	The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.	No achievement (as planned).	No achievement (as planned).
b	NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.	No achievement (as planned).	No achievement (as planned).
c	Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with	Ongoing. Skills and knowledge necessary for NRW reduction, such as minimum night flow survey, step test, leakage detection, meter error test for water	Ongoing. Results of interim capacity assessment in Nov.-Dec. 2016 show that capacity developed has not reached to the criteria. Follow-up

No	Indicator	Previous Monitoring (as at Aug.2016)	Current Monitoring (as at Dec.2016)
	skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.	balance analysis has been developed through lectures, OJT and the second training in Japan in Jun.-Jul. 2016.	capacity development is necessary in Phase-2 of the Project.
d	NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**). Note(**):Target for each PMA is expected to be determined by the end of the first quarter of the second year.	No achievement (as planned).	No achievement (as planned).
Verification of Achievement and Implementing Process Budget constraint of the Nigerian side is a possible obstructive factor against achievement of project purpose, particularly Indicator b. Achievement in Indicator c resulted from the activities for Output-2. The Project has developed capacity but achievement is limited because the various conditions revealed and lack of counterpart fund have hindered smooth implementation expected by the Project, then the activities lacked continuity. FCTWB is willing to expand NRW reduction into the whole service area, and the necessity of cross-departmental function for NRW reduction such as task force is being recognized gradually.			

1-5 Changes of Risks and Actions for Mitigation

Due to collapse in oil prices and shrinking revenue, recent budget constraint of the Nigerian side including non-release of the Counterpart Fund has corresponded to an important assumption "A. Natural disaster / political instability / economic crisis that affect the Project activities do not occur." However, as an action discussed in the previous project monitoring, taking over chamber construction and procurement of small materials for Pilot activities by Japanese side, which response to request from the Nigerian side, has mitigated this risk.

1-6 Progress of Actions undertaken by JICA

The JICA Expert Team completed chamber construction and procured small materials for Pilot activities.

1-7 Progress of Actions undertaken by Nigerian side

FCTWB cooperated with the JICA Expert Team for smooth taking over and implementation of chamber construction. As of 15th December 2016, the Counterpart Fund was released eventually, but it was too late to make up for delay of the Project.

1-8 Other remarkable/considerable issues related/affect to the project (such as other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

(1) Legal Instrument (Enabling Law) establishing FCTWB

Legal instrument (enabling law) establishing FCTWB as an autonomous body has not yet been approved by the current National Assembly.

To carry it forward, FCTWB suggested conducting joint (FCTWB-JICA) feasibility study to bring out benefits of an autonomous FCTWB as part of the Project.

(2) Grant Aid Project by Japan

Under the further agreement between two Governments, "The Project for Introduction of Clean Energy by Solar Electricity Generation System" for Lower Usuma Water Treatment Plants has been expanded/extended with construction of additional facilities. This contributes further to stable water supply to customers of FCTWB.

(3) Situation of Actions raised in previous Monitoring in September 2016

(3)-1: Action for "Assignment of Counterparts"

Considering sustainability of implementing NRW reduction based on a NRW reduction strategic plan to be prepared through Output 3 activities, it may be necessary for the Nigerian side to enhance project management skill for working level staff such as Head of Unit for example. Such project management skill should be enhanced through the Project activities. In addition, the existing operational structure should be reviewed.

Situation: There is no change, but the Project will discuss in the beginning of Phase-2 of the Project.

(3)-2: Action for "Involvement of Relevant Organizations"

FCTA has been involved well in the Project as the chair of Joint Coordination Committee (JCC) and also has assisted and advised the Project in dealing with issues including the Counterpart Fund and AGIS security.

Situation: FCTWB has tried to involve AGIS for removal/relaxation of GIS security since FCTA's Permanent Secretary instructed to solve issues. Although AGIS agreed to relax the security, but there is no concrete action by AGIS, accordingly no improvement in GIS of FCTWB.

(4) Situation of Actions for Other Issues related to Project Implementation Process and from the Technical Aspect in previous Monitoring in September 2016

(4)-1: Action for "Communication between Distribution Department and Commerce Department"

The JICA Expert Team reported that Distribution Department and Commerce Department have to implement the cross-cutting activities for NRW reduction. Both Departments understand the importance of collaboration and active communication; however they need

to collaborate more to the success of the Project. Also, active participation of Commerce Staff (FCTWB Headquarters) particularly in the field activities is a key to success of the Project and improvement in water supply services.

Situation: FCTWB and the JICA Expert Team have discussed cross-cutting organizational structure among Distribution Department, Commerce Department and Area Offices for effective planning and implementation of NRW reduction from Phase-2 of the Project. This will be concluded in the beginning of Phase-2 based on lessons and learnt obtained from Phase-1.

(4)-2: Action for "Necessity for Strengthening Partnership between FCDA and FCTWB"

It is necessary for FCTWB to obtain the updated as-built drawings and information correctly and timely for proper operation, maintenance and implementing NRW reduction activities efficiently. However, FCWB has not been able to obtain the updated as-built drawings and information in respect of its operation and maintenance activities from FCDA that is in charge of provision of infrastructure. This is as a result of lack of feedback system between the two sister agencies. So, FCTWB is encouraged to always share its operation and maintenance experiences with FCDA while FCDA is equally advised to carry along FCTWB in its water project implementation.

Situation: The Project has communicated officially/bilaterally with FCDA for setting up further relationship and information sharing. The Project will carry on communication in Phase-2.

(4)-3: Action for "Lack of the Quality Management"

Quality of information and performance as well as quality of constructed facilities is not properly managed by FCTWB. It is very important to pay attention to quality management in order to enhance the Project outcome with adequate performance, avoid further delay of the Project and keep sustainability through proper operation and maintenance.

Situation: There is no remarkable improvement since the previous joint monitoring, but the Project will keep focusing on this issue for improvement in Phase-2.

(4)-4: Action for "Prepaid Meter"

Unless systematic cares are taken by FCTWB, use of prepaid meters is critical in terms of NRW reduction and the financial aspect of FCTWB.

Situation: The Project assembled information on different types of existing meters including prepaid meters from relevant Units and Area Offices and discussed them among project members, and will keep discussing further based on the results of Activities for Output-2.

2 Delay of Work Schedule and/or Problems (if any)

2-1 Detail

(1) Delay of the Project (Output-1)

Same as a result of the previous project monitoring, the Project has still delayed for six (6) months from the original plan of operation as of the end of Phase-1 of the Project, and also Project needs a certain time frame to monitor the monthly water production, consumption and NRW ratio. Without the monitoring of them, the Project cannot make a realistic NRW reduction strategic plan through the activities of Output 3, so that it is indispensable for securing the Project's outcome.

Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5.

(2) Data Acquisition by Bulk Flowmeters (Output-1)

Through commissioning of ultrasonic flow meters as bulk flowmeters, the Project found out that data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines and should be solved as soon as possible.

(3) Less-than-successful Results of the Project (Output-2)

A series of activities and operations for NRW reduction in PMAs/SMAs were completed, however should be followed up and monitored because decrease in NRW ratio in some SMAs resulted in less-than-successful.

Table Decrease in NRW Ratio (Provisional)

	Before (%)	After (%)	Decrease Points in NRW Ratio
Gudu			
SMA-1	52.0	62.9	+10.9
SMA-2	53.9	49.0	-4.9
Jabi			
SMA-2	47.6	48.0	+0.4
SMA-3	86.4	67.2	-19.2
Garki I			
SMA-1	86.6	82.9	-3.7
SMA-2	79.0	85.0	+6.0
SMA-3	68.8	41.8	-27.0

2-2 Cause

(1) Delay of the Project (Output-1)

The chamber construction for bulk flowmeters and procurement of necessary materials for pilot activities, which had delayed and suspended due to non-release of the Counterpart Fund in 2015&2016, were sorted out by JICA's intervention, particularly taking over chamber construction based on request from the Nigerian side. However, Activities 1-2 to 1-5 are still behind the schedule.

(2) Data Acquisition by Bulk Flow Meter (Output-1)

Possible causes are: interference by water flow from new water treatment plant (No.3&4) to water flow from old plant (No.1&2), not-well-planned operation with securing water level in clear water tanks and so on.

(3) Less-than-successful Results of the Project (Output-2)

Detailed re-check is necessary, but there are possible reasons of unsuccessful/unexpected results of decrease NRW ratio:

- Frequent change of conditions which are supposed to be not changed, during activities between baseline measurement and ex-post measurement such as:
  Late-identified additional or missing customers and major consumers,
  Late-identified existence or non-existence of pipeline and extension, malfunctioning valves,
  Late-identified difference between PMA/SMA design based on as-built drawings (if any) or information from staff and actual situation
- Difficulty in obtaining a certain number for effective data for water balance analysis, particularly water consumption by water meter reading, which may cause unreliability of analysis.
- Measurement of water flow and water meter reading for a short interval of time such as daily or weekly are sensitive to irregular situation and errors, and it affects directly calculation of NRW ratio.
- Reoccurrence of NRW (leakage, illegal connection) in the long period among baseline measurement, NRW reduction operations and ex-post measurement.

2-3 Action to be taken

(1) Delay of the Project (Output-1)

In the previous project monitoring, the Nigerian side requested to the Japanese side to extend the project period in order to secure the necessary time frame to monitor the monthly water production, consumption and NRW ratio. JICA headquarters approved the previous monitoring sheets and considered completion of chamber construction for bulk flowmeters which was taken over by Japanese side, so the Project period will be extended for six months

for monitoring the Activities 1-2 to 1-5.

(2) Data Acquisition by Bulk Flowmeters (Output-1)

The Project needs immediately to monitor water flow, investigate causes and find possible solutions through discussion among relevant Departments and Units.

(3) Less-than-successful Results of the Project (Output-2)

The Project needs immediately detailed re-check of results/data, continuous and further activities to reduce NRW to a certain degree as follow-up activities in Phase-2 of the Project by utilizing lessons and learnt in Phase-1.

However, on the condition that FCTWB improves fundamentals of water supply services such as as-built drawings and complexity in commercial aspects including various customer categories, water tariffs, Units and Area Offices for reading, NRW reduction can be an effective solution for water supply services of FCTWB.

2-4 Roles of Responsible Persons/Organization

[Nigerian Side]

(1) Delay of the Project (Output-1)

After the discussion on the draft amendment of R/D, the Nigerian side signs the amendment.

(2) Data Acquisition by Bulk Flowmeters (Output-1)

FCTWB needs immediately to monitor water flow, investigate causes and find possible solutions through discussion among relevant Departments and Units.

(3) Less-than-successful Results of the Project (Output-2)

FCTWB repeats immediately Activity 2-10 to 2-15 to reduce NRW to a certain degree as follow-up activities.

[Japanese Side]

(1) Delay of the Project (Output-1)

The Japanese side prepares the draft amendment of Record of Discussion (R/D) to extend the Project period. After the discussion on the draft amendment of R/D, the Japanese side signs the amendment.

(2) Data Acquisition by Bulk Flowmeters (Output-1)

JICA Expert Team supports FCTWB to monitor water flow, investigate causes and find possible solution through discussion among relevant Departments and Units.

(3) Less-than-successful Results of the Project (Output-2)

JICA Expert Team re-checks closely results and supports FCTWB to repeat Activity 2-10 to 2-15 to reduce NRW to a certain degree as follow-up activities.

3 Modification of the Project Implementation Plan

3-1 Plan of Operation

Now that chamber construction for bulk flowmeters was completed, as discussed in the previous project monitoring, based on the request from the Nigerian side, the extension of Project period is considered by the Japanese side to secure the necessary time frame for the monitoring period for the monthly water production, consumption and NRW ratio.

3-2 Other modifications on detailed implementation plan

Both sides will amend Record of Discussion (R/D) to extend the Project period for six (6) months. (Remarks: The amendment of R/D and PDM (title of the project, duration, project site(s), target group(s), implementation structure, overall goal, project purpose, outputs, activities, and input) should be authorized by JICA headquarters. If the Project Team deems it necessary to modify any part of R/D and PDM, the Team may propose the draft.)

4 Preparation by Nigerian side toward after completion of the Project

To be considered.

II. Project Monitoring Sheet I & II (as attached)

Annex

Annex-1: List of Equipment for the Project

Annex-2: Participants in Preparation of Project Monitoring Sheets and Photos

Project Monitoring Sheet I (Revision of Project Design Matrix)

PDM3

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project
Project Period: October 2014 to March 2018
Implementing Organization: Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)
Dicrect Beneficiaries: FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices
Project Site: FCT **Pilot Area Offices:** Jabi, Garki I and Gudu

Version 3
Dated 22 Sep. 2016

Monitoring: 20 Dec. 2016

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<Overall Goal> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB	a: Annual NRW ratio is reduced to X%(*) at the end of the year 2021 Note(*): Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA	a. Record of NRW ratio kept by Distribution Department		None.	
<Project Purpose> Capacity of FCTWB for NRW reduction is strengthened	a. The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project. b. NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB. c. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level. d. NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**). Note(**): Target for each PMA is expected to be determined by the end of the first quarter of the second year.	a. Date of approval of the plan b. Result of monitoring by NRW Management Team c. Results of joint assessment based on the criteria set by the Project d. Record of NRW ratio kept by Distribution Department	A. Policy support for NRW reduction is not discontinued Policy support for NRW reduction is not discontinued B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur C. Activities to implement the medium-tem strategic plan are not discontinued or delayed	Indicator a: None. Indicator b: None. Indicator c: Results of interim capacity assessment in Nov.-Dec. 2016 show that capacity developed has not reached to the criteria. Follow-up capacity development is necessary in Phase-2 of the Project. Indicator d: None.	
<Outputs>					
1. Level of NRW of both the service area of FCWTB and water distribution areas is monitored regularly	1a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the second year of the Project. 1b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the second year of the Project. 1c. Quarterly NRW ratio of the service area of FCTWB is reported to Management of FCTWB from the third quarter of the second year of the Project. 1d. Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.	1a. Monthly record of NRW ratio 1b&1c. Material for meetings submitted by the Distribution Department 1d. Periodic records of data on water distribution management	A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers	Indicator 1a&1b&1c: None and delayed as a result of delay in Activities 1-2 to 1-5. Indicator 1d: None	
2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (*1)	2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations. 2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.	2a. Record of NRW ratio kept by the Distribution Department 2b. Date of approval of the manuals		Indicator 2a: Most of results did not reach target level. Follow up activities to achieve the target level are necessary by utilizing lessons and learnt. Indicator 2b: Technical manuals were prepared and provisionally approved.	
3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 (*2)	3a. By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval. 3b. By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval. 3c. A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project. 3d. By November 2016, framework of water distribution management is established.	3a&3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan 3c. Date of approval of the manual 3d. Implementing structure and workflow of water distribution management		Indicator 3a: None. Indicator 3b: None. Indicator 3c: None. Indicator 3d: Framework has not been ready due to delay in Activity 1-6 and 1-7.	

Note (*1): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection
Note (*2): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (*1) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	Inputs		Important Assumption	
	The Nigerian Side	The Japanese Side	A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.	
1-1 Install bulk meters to water treatment plants 1 and 2 1-2 Measure monthly water production of water treatment plants 1, 2, 3 and 4 1-3 Tally the above water production data monthly 1-4 Calculate the monthly water consumption based on the billing data 1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4 1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system 1-7 Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	**Project Personnel** 1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA 2. Project Manager: Director of FCTWB 3. Deputy Project Manager: HoD for Administration and Supply/FCTWB 4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce /FCTWB 5. Members of NRW Management Team (FCTWB): - Head of Special Project Unit of Distribution Department (as Coordinator) - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department 6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS) 7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office 8. Other personnel mutually agreed upon as necessary	**Japanese Experts** 1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manage't / Coordinator 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring 12. Other experts mutually agreed upon as necessary	**Pre-Conditions** A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.	
2-1 Review existing NRW reduction operations at each pilot Area Office 2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office 2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*3) 2-4 Prepare/update distribution network drawings for each PMA 2-5 Install water flow meters to each PMA and measure in/outflows monthly 2-6 Zone each PMA into Sub Metering Areas (SMA) 2-7 Isolate a SMA by installing valves 2-8 Update the distribution network drawings for each SMA 2-9 Measure an initial level of NRW of each SMA 2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA 2-11 Develop a NRW reduction operation plan of each SMA ,including reduction target, for review by Head of Distribution Department 2-12 Review and approve NRW reduction operation plan of each SMA 2-13 Implement the NRW reduction operations at each SMA 2-14 Monitor the progress of the NRW reduction operations of each SMA 2-15 Measure level of NRW of each SMA at the end of the respective operations 2-16 Prepare a report on pilot projects, covering Activity 2-1~2-15 2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials	**Land, Building and Facilities** 1. Office building and facilities necessary for the implementation of the Project 2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners 3. Chambers forflow meters and valves for the selected PMAs/SMAs. 4. Electric wiring to bulk/zonal meters, loggers and pressure sensors. 5. Other facilities mutually agreed upon as necessary	**Equipment** 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s). 9. Other equipment mutually agreed upon as necessary		
3-1 Establish a Working Group for NRW planning (*4) 3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB 3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks 3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan 3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA 3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA 3-7 Develop a planning manual for NRW reduction 3-8 Review existing plans, activities and implementing structure, etc. related to water distribution management 3-9 Establish framework of water distribution management	**Local Costs** 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary	**Facilities** 1. Modification of existing billing system 2. Chambers for bulk meters for water treatment plants, zonal meters and water pressure sensors **Training of the Nigerian Project Personnel** 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria	**Issues & Countermeasures** **(1) Delay of the Project (Output-1)** Issue Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5. Countermeasures The Project period will be extended for six months for monitoring the Activities 1-2 to 1-5. **(2) Data Acquisition by Bulk Flow Meter (Output-1)** Issue The Project found out that data acquisition is not always available, which may be due to not water-filled flow inside pipelines and should be solved as soon as possible. Countermeasures The Project needs immediately to investigate causes, find possible solutions through discussion among relevant Departments and Units. **(3) Less-than-successful Results of the Project (Output-2)** Issue A series of activities for NRW reduction in PMAs/SMAs were completed, however should be followed up and monitored because decrease in NRW ratio in some SMAs resulted in less-than-successful. Countermeasures The Project needs immediately detailed re-check of results/data, continuous and further activities to reduce NRW to a certain degree as follow-up activities by utilizing lessons and learnt in Phase-1.	

Note (*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow: (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio: and (iii) NRW ratio is supposedly high.
Note (*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., Head of PRS Unit, and members of NRW Management Team.

PN Form 3-3 Project Monitoring Sheet II
PO3
Version: 3
Dated: 22 Sep. 2016
Monitoring:20 Dec. 2016

Project Monitoring Sheet II (Plan of Operations)

Plan of Schedule and Actual Work Period

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

As of the end of Dec. 2016

Activities			Remarks	Monitoring: Achievement	Monitoring: Issue & Countermeasures
Output-1 Level of NRW of both the service area of FCTWB and water distribution areas monitored regularly	1-1	Install bulk meters to water treatment plants 1 and 2		Completed.	Data acquisition seems to be not always available, which may be due to outside-filed flow noble pipelines
	1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	Delayed as a result of delay in Activity 1-1.	None.	Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
	1-3	Tally the above water production data monthly	Delayed as a result of delay in Activity 1-1.	None.	Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
	1-4	Calculate the monthly water consumption based on the billing data	Delayed. FCTWB has collected information of returned bills and has deactivated them. The returned bills cause inaccuracy of calculating NRW ratio.	Completed billing system modification only)	Ready to calculate monthly water consumption, but the Project needs at least 6 months for monitoring this Activity.
	1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	Delayed as a result of delay in Activity 1-3 and 1-4.	None	Ready to calculate monthly NRW ratio, but the Project needs at least 6 months for monitoring this Activity.
	1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	Delayed.	Construction of chambers for zonal meters was completed. Fixed meters, water pressure sensor and pilot remote monitoring (telemetry) system have been procured in Japan.	-
	1-7	Measure and collect data for water distribution management such as water flow of zonal meters and water	Delayed as a result of delay in Activity 1-6.	None.	The Activity will be implemented after the completion of Activity 1-6.
Output-2 Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices	2-1	Review existing NRW reduction operations at each pilot Area Office		Completed	-
	2-2	Conduct capacity assessment of organizations and the relevant staff		Completed(Phase-I)	-
	2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA		Completed	-
	2-4	Prepare/update distribution network drawings for each PMA		Completed	AGIS security has hindered data import/export and analysis. FCTWB has referred the challenge to FCTA's Permanent Secretary and is working closely with AGIS to solve the issue.
	2-5	Install water flow meters to each PMA and measure inflow/flow monthly		Completed but partially and provisionally	Check/repair a PMA meter in Jabi and complete fully electricity connection for the ultrasonic flow meter in Gwarinpa I
	2-6	Zone each PMA into Sub-Metering Areas (SMA)		Completed	-
	2-7	Isolate a SMA by existing valves		Completed	-
	2-8	Update the distribution network drawings for each SMA		Completed	-
	2-9	Measure an initial level of NRW of each SMA		Completed	-
	2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA		Provisionally completed.	Re-detection may be done if necessary.
	2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department		Provisionally completed.	Revision may be done if necessary.
	2-12	Review and approve NRW reduction operation plan of each SMA		Provisionally completed.	Revision may be done if necessary.

Annex2-278

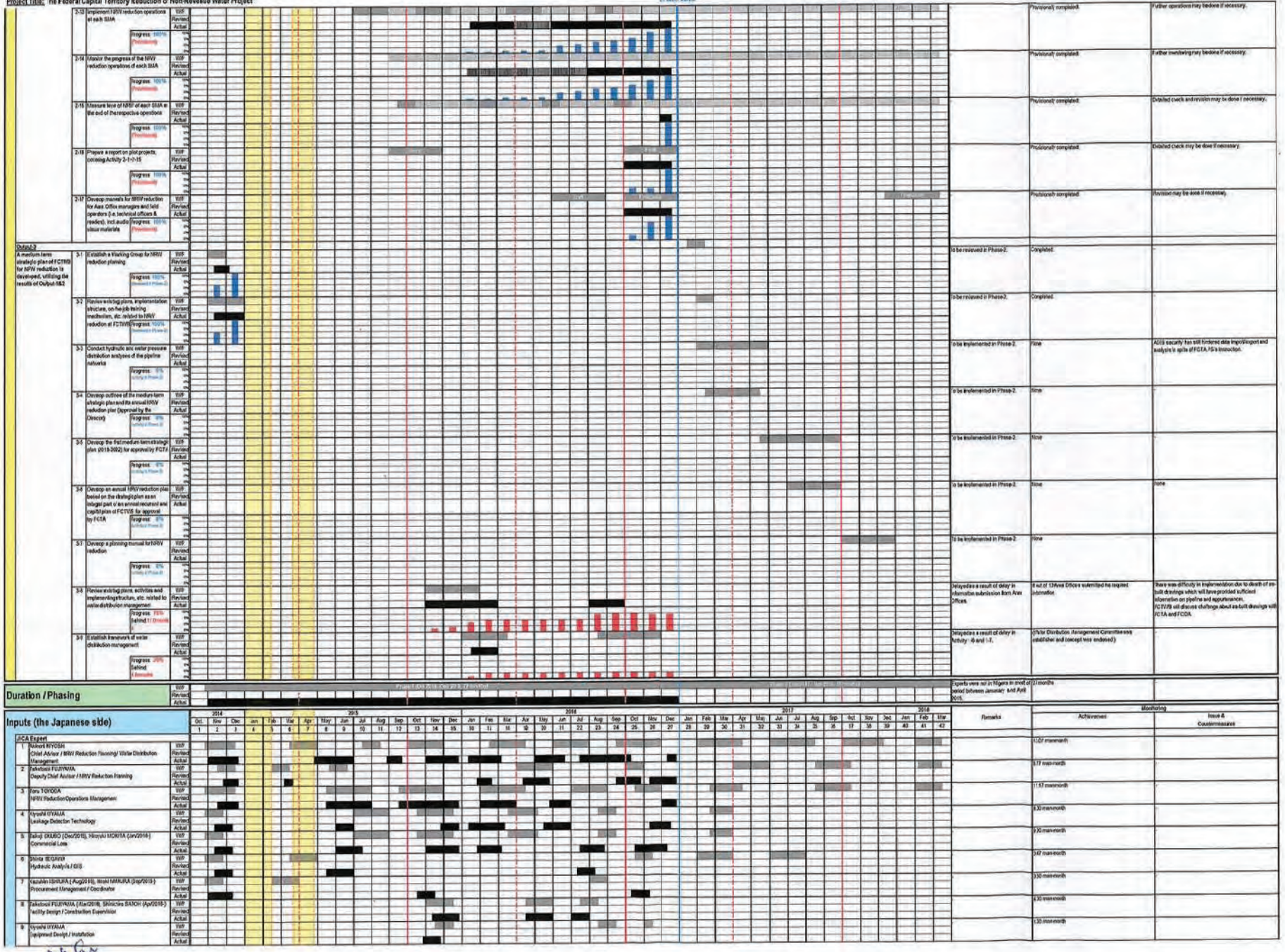
PN Form 3-3 Project Monitoring Sheet II
PO3
Version: 3
Dated: 22 Sep. 2016
Monitoring: 20 Dec. 2016

Project Monitoring Sheet II (Plan of Operations)

Plan of Schedule and Actual Work Period

Project Title: The Federal Capital Territory Reduction o' Non-Revenue Water Project

As of the end of Dec. 2016



					Remarks	Monitoring	
						Achievement	Issue & Countermeasure
3-13	Implement NRW reduction operations at each SMA	Provisional completion	Further operations may be done if necessary.				
3-14	Monitor the progress of the NRW reduction operations of each SMA	Provisional completion	Further monitoring may be done if necessary.				
3-15	Measure level of NRW of each SMA at the end of the respective operations	Provisional completion	Detailed check and revision may be done if necessary.				
3-16	Prepare a report on pilot projects, covering Activity 3-1~3-15	Provisional completion	Detailed check may be done if necessary.				
3-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & readers), incl. audio visual materials	Provisional completion	Revision may be done if necessary.				
Output-3							
A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output-1&2							
3-1	Establish a Working Group for NRW reduction planning	Completed	-	To be reviewed in Phase2.			
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Completed	-	To be reviewed in Phase2.			
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	None	ADSS security has still hindered data import/export and analysis in spite of FCTA, HS's instruction.	To be implemented in Phase 2.			
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	None	-	To be implemented in Phase 2.			
3-5	Develop the first medium-term strategic plan (2015-2022) for approval by FCTA	None	-	To be implemented in Phase 2.			
3-6	Develop an annual NRW reduction plan based on the drafting plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	None	None	To be implemented in Phase 2.			
3-7	Develop a planning manual for NRW reduction	None	-	To be implemented in Phase 2.			
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	Delayed as a result of delay in information submission from Area Offices	8 out of 13Area Offices submitted the required information	There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances. FCTWB will discuss challenge about as-built drawings with FCTA and FCDA.			
3-9	Establish framework of water distribution management	Delayed as a result of delay in activity -8 and 1-7.	(Water Distribution Management Committee was established and concept was endorsed)	-			
Duration / Phasing				Experts were not in Nigeria in most of 12 months period between January and April 2015.			

Inputs (the Japanese side)

					Remarks	Monitoring	
						Achievement	Issue & Countermeasure
JICA Expert							
1	Nahomi NIYOSHI Chief Advisor / NRW Reduction Planning/ Water Distribution Management					12.07 man-month	-
2	Takatoshi FUJIYAMA Deputy Chief Advisor / NRW Reduction Planning					9.77 man-month	-
3	Toru TOYODA NRW Reduction Operations Management					11.57 man-month	-
4	Kiyoshi UYAMA Leakage Detection Technology					8.30 man-month	-
5	Takuji OKUBO (Dec/2015), Hiroyuki MORITA (Jan/2016-) Commercial Loss					8.30 man-month	-
6	Shinta IEGAWA Hydraulic Analysis / GIS					9.47 man-month	-
7	Kazuhiro ISHIURA (-Aug/2015), Yoshi NAKURA (Sep/2015-) Procurement Management / Coordinator					8.50 man-month	-
8	Takatoshi FUJIYAMA (Mar/2016), Shinichiro SATOH (Apr/2015-) Facility Design / Construction Supervision					8.30 man-month	-
9	Kiyoshi UYAMA Equipment Design / Installation					8.30 man-month	-

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PM Form 3-3 Project Monitoring Sheet II

PO_3

Version: 3

Dated: 22 Sep. 2016

Monitoring: 20 Dec 2016

Project Monitoring Sheet II (Plan of Operations)

Plan of Schedule and Actual Work Period

As of the end of Dec. 2016

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project

Timeline: 2014 (Oc., Nov, Dec: 1–3); 2015 (Jan–Dec: 4–15); 2016 (Jan–Dec: 16–27); 2017 (Jan–Dec: 28–39); 2018 (Jan, Feb, Mar: 40–42)

No.	Item	Plan / Actual	Remarks	Monitoring: Achievement	Monitoring: Issue & Countermeasures
10	Shoria SUGAWA *Water Distribution Management 2	WP / Revised / Actual		2.30 man-month	
11	Seigo GOTO Remote Monitoring	WP / Revised / Actual		0.30 man-month	
12	Senji YOSHIDA (-Dec/2015), Takashi MORI (Jan/2016-) Procurement Management / Coordinator 2	WP / Revised / Actual		1.30 man-month	-
Equipment					
1	Leakage detection equipment *3FMAs in Japan (JICA)	WP / Revised / Actual	-	Handed over and completed	None
2	Bulk meters (ultrasonic flow meter) *WTP in Japan (JICA)	WP / Revised / Actual	-	Handed over and completed	None
3	Water meter, flow meter and valves *3FMAs in Nigeria (JICA Expert)	WP / Revised / Actual	-	Handed over and completed	None
4	Pipe repair equipment *3FMAs in Nigeria (JICA Expert)	WP / Revised / Actual	-	Handed over and completed	None
5	Vehicles (Pickup truck) *Leakage Detection in Nigeria (JICA)	WP / Revised / Actual	-	Handed over and completed	Proper use for project activities should be observed during the Project.
6	GIS software, office equipment *FCTWB HQs in Nigeria/Other (JICA Expert)	WP / Revised / Actual	-	Handed over and completed	None
7	Zonal meters, pressure sensors and remote monitoring system *Whole System in Japan (JICA)	WP / Revised / Actual	-	Procurement is ongoing.	Smooth customs clearance and tax exemption are key.
Local Consultant					
1	Modification of billing and collection system	WP / Revised / Actual	-	Completed	-
2	GIS and database training	WP / Revised / Actual	-	Completed.	-
3	Construction of chambers for zonal meter and water pressure sensor	WP / Revised / Actual	-	Completed.	-
4	Installation of standby power generation and storage battery	WP / Revised / Actual	To be implemented in Phase-2.	None	-
5	Construction of chambers for bulk meter including cable installation	WP / Revised / Actual	Taken over by JICA.	Completed	-
Training in Japan Plan: 4 trainees x 3 times = 12 trainees; Actual: 4 trainees x 1 (Management) + 1 trainee x 1 (DMO Joint) + 12 tra		WP / Revised / Actual	1st training for 4 trainees in Aug. 2015 and 2nd training for 12 trainees in Jun.–Jul. 2016.	Completed	-
Monitoring Plan					
Planning, Monitoring and Coordination					
1	Organize Joint Coordination Committee (JCC)	WP / Revised / Actual		The Fourth meeting in Sep. 2016 and the Fifth meeting in Dec. 2016	-
2	Develop Detail Plan of Operations (DPO) for review and approval by JCC	WP / Revised / Actual	-	None	-
3	Develop Annual Plan of Operations (APO) for review and approval by JCC	WP / Revised / Actual		None.	-
4	Organize monthly technical meetings	WP / Revised / Actual	Monthly progress, plan, issues, solutions and etc are discussed.	Monthly technical meetings were held mostly every months.	-
5	Organize quarterly project meetings	WP / Revised / Actual	Quarterly progress, plan, issues, solutions and etc are discussed.	None.	-
6	Conduct Joint Monitoring semi-annually	WP / Revised / Actual	Achievement of PDM and progress of PO are monitored jointly.	Joint monitoring was held twice in Sep. 2016 and Dec. 2016	Ownership and initiative of FCTWB are keys to success of the Project. Monitoring method and documentation are transferred to FCTWB gradually.
7	Submit Monitoring Sheet to JICA Nigeria Office semi-annually	WP / Revised / Actual		Monitoring sheet was submitted in Sep. 2016 and to be submitted in Dec.2016	
8	Monitoring Mission from JICA for Joint Review	WP / Revised / Actual		Monitoring mission from JICA attended joint review in Sep. 2016)	None
9	Organize information sharing seminars for FCTWB/FCTA, including Area Offices	WP / Revised / Actual		None	-
10	Collect and organize data for Indicators of PDM				
a	Develop criteria for capacity assessment for each level of the relevant staff (i.e. members of NRW Mgmt and Action Teams)	WP / Revised / Actual	-	Completed	-
b	Conduct joint capacity assessment of the relevant staff; Prepare Capacity Development (CD) Plan	WP / Revised / Actual	-	Completed (Phase-1)	-
c	Set reduction target for each FMAs by the first quarter of the second year	WP / Revised / Actual	-	Provisionally completed.	Revision may be done if necessary.
d	Collect and organize for Indicators for semi-annual Joint Monitoring	WP / Revised / Actual	-	Completed	-
Reports / Documents					
11	Work Plan	WP / Revised / Actual	Work Plans were prepared twice	Completed.	
12	Project Progress Report	WP / Revised / Actual	Progress Reports were prepared twice.	Completed.	-
13	Project Completion Report	WP / Revised / Actual	-	None.	
Public Relations					
14	Develop Project Website	WP / Revised / Actual	FCTWB will discuss PR through website.	None	
15	Preparation of public relations materials	WP / Revised / Actual	Newsletters have been issued.	None	
Monitoring and Evaluation in the Post-Project period					
16	Post Monitoring by JICA (not described here)		-	-	-
17	Post Evaluation by JICA (not described here)		-	-	-

Annex-1 Updated on 20/12/2016

List of Equipment for the Project

No.	Equipment	Specification	Procurement in		Quantity		Hand-over	Remarks
			Japan	Nigeria	Plan	Actual		
For Activity 1-2								
1	Ultrasonic flow meter (stationary, 220m)	Ultrasonic pulse transmit time difference method, sensor for 600-1,500mm, 220m	✓		2	2	✓	including installation, commissioning and training
2	Ultrasonic flow meter (stationary, 300m)	Ultrasonic pulse transmit time difference method, sensor for 600-1,500mm, 300m	✓		2	2	✓	including installation, commissioning and training
3	Data logger (stationary)	Paperless, 6 points, 1s-1h record cycle, 4-20mA, trend, bar graph and histrical trend	✓		1	1	✓	for the above No.1&2 ultrasonic flow meters
For Activity 1-6								
1	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 10m cable	✓		6	-	Not yet	including installation, commissioning and training
2	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 20m cable	✓		3	-	Not yet	including installation, commissioning and training
3	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 30m cable	✓		2	-	Not yet	including installation, commissioning and training
4	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 300-1,500mm, 40m cable	✓		2	-	Not yet	including installation, commissioning and training
5	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 25-250mm, 10m cable	✓		1	-	Not yet	including installation, commissioning and training
6	Data logger (stationary)	Paperless, 6pts, 1s-1h record cycle, 4-20mA, trend, bar graph and histrical trend	✓		13	-	Not yet	for the above No.1-5 ultrasonic flow meters
7	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		2	-	Not yet	
8	Remote Monitoring System	Telemetry with transmission, modem/router, container, interface, PC, printer, UPS,	✓		2	-	Not yet	Pilot system
9	Solar System	80VA, 1.0kW (not yet confirmed)		✓	2	-	Not yet	for the above ultrasonic flow meter
10	Solar System	80VA, 0.3kW (not yet confirmed)		✓	8	-	Not yet	for the above ultrasonic flow meter
11	Solar System	110VA, 0.4kW (not yet confirmed)		✓	1	-	Not yet	for the above ultrasonic flow meter
12	Solar System	110VA, 0.4kW (not yet confirmed)		✓	2	-	Not yet	for the above ultrasonic flow meter and telemetry system
For Activity 2-4 and 2-8								
1	GIS software	Intergraph Geomedia Essential		✓	1	1	✓	Software has been adopted by AGIS. V13.1
2	GIS software	ESRI ArcGIS Basic Version 10.3		✓	1	1	✓	Mainly for data input
3	Plotter (A0)	A0		✓	1	1	✓	
4	GPS terminal	High sensitivity, 2,000pts, 200routes, IPX7, built-in camera (5mega-pixel), USB, nickel hydride battery pack		✓	2	2	✓	Garmin
5	Personal computer	500HD, 4 GB Ram, Windows 7or8, Microsoft Office installed, Mouse		✓	2	2	✓	
6	Anti-virus software			✓	2	2	✓	for the above PCs (No.5)
7	UPS	1.2kVA		✓	2	2	✓	
For Activity 2-5								
1	Ultrasonic flow meter (stationary)	Ultrasonic pulse transmit time difference method, sensor for 450mm, 20m cable	✓		1	1	✓	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		1	1	✓	for the above No.1 ultrasonic flow meter
3	Flow meter	Dia. 50mm with fittings		✓	-	-	-	
4	Flow meter	Dia. 80mm with fittings		✓	-	-	-	
5	Flow meter	Dia. 100mm with fittings		✓	-	-	-	
6	Flow meter	Dia. 150mm with fittings		✓	0	1	✓	
7	Flow meter	Dia. 200mm with fittings		✓	1	2	✓	
8	Flow meter	Dia. 250mm with fittings		✓	0	0	✓	
9	Flow meter	Dia. 300mm with fittings		✓	3	3	✓	
For Activity 2-7								
1	Sluice valve	Dia. 50mm with fittings		✓	2	0	-	
2	Sluice valve	Dia. 80mm with fittings		✓	0	0	-	
3	Sluice valve	Dia. 100mm with fittings		✓	9	1	✓	
4	Sluice valve	Dia. 150mm with fittings		✓	12	7	✓	
5	Sluice valve	Dia. 200mm with fittings		✓	6	8	✓	
6	Sluice valve	Dia. 250mm with fittings		✓	2	0	✓	
7	Sluice valve	Dia. 300mm with fittings		✓	10	6	✓	
For Activity 2-10								
1	Ultrasonic flow meter (portable)	Ultrasonic pulse transmit time difference method, sensors (small x3, medium x6,	✓		6	6	✓	
2	Data logger (portable)	2ch (flow and pressure), 1s - 24h record cycle, 4-20mA, 5 years battery life	✓		6	6	✓	
3	Leak noise correlator	Main unit, preamplifier and piezoelectric sensor	✓		2	2	✓	
4	Water leak detector	Acoustic type, piezoelectric sensor	✓		6	6	✓	
5	Non-metal pipe locator	Electromagnetic induction type for plastic pipe (PVC, PE)	✓		3	3	✓	
6	Metal locator	Optical and acoustical output signal, 50cm depth	✓		3	3	✓	
7	Time integral water leak detector	Automatic leak noise determination method	✓		3	3	✓	
8	Acoustic rod	1.5m length	✓		9	9	✓	
9	Distance meter	Max. 10km, 10cm scale	✓		3	3	✓	
10	Hammer drill	Dia. 38mm, 270rpm, 3,000 stroke/min	✓		3	3	✓	
11	Boring bar	Dia. 16mm, 1.0m length	✓		3	3	✓	
12	Drill bit	Dia.19×800mm	✓		9	9	✓	
13	Portable residual chlorine analyzer	DPD, absorptiometry, 0.02-2.00mg/L	✓		3	3	✓	
14	Metal pipe and cable locator	5m depth	✓		3	3	✓	
15	Reference meter	Portable built-in case type, 13-25mm	✓		3	3	✓	
16	Leakage quantity measurement device	13-25mm	✓		3	3	✓	
17	Personal computer	500HD, 2GB Ram, Windows 7or8, Microsoft Office installed, Mouse		✓	3	3	✓	
18	Anti-virus software			✓	3	3	✓	for the above PCs (No.17)
19	UPS	1.2kVA		✓	3	3	✓	
20	Inkjet printer	A4, Color, All-in-one		✓	3	3	✓	
21	Digital camera	Compact type, Optical zoom, 10 mega-pixel (min), LCD		✓	3	3	✓	
For Activity 2-13								
1	Generator	200V, 6.5kVA		✓	3	3	✓	
2	Asphalt cutter	3600RPM, 13kW		✓	3	3	✓	
3	Concrete breaker			✓	3	3	✓	
4	Small-sized dewatering pump	2"		✓	3	3	✓	
5	Small-sized tamper			✓	3	3	✓	
6	Electric drum	50m		✓	3	3	✓	
7	Customer meter	Dia. 2/3" with fittings, conventional type		✓	388	0	-	
8	Customer meter	Dia. 1" with fittings, conventional type		✓	259	600	✓	
9	Customer meter	Dia. 50mm with fittings, conventional type		✓	89	0	-	
10	Customer meter	Dia. 80mm with fittings, conventional type		✓	23	0	-	
11	Customer meter	Dia. 100mm with fittings, conventional type		✓	7	0	-	
12	Compact Reciprocating Saw	Pipe cutting		✓	3	3	✓	
For Output 2								
1	Pickup truck for pilot sites			✓	2	2	✓	
For Operation of the Project								
1	Laser printer	A4, B/W		✓	1	1	✓	
2	Inkjet printer	A3, Color		✓	1	1	✓	
3	Multifunction copier	A3, B/W		✓	1	1	✓	
4	Graphic/movie editing software	Windows Movie Maker, Microsoft Powerpoint		✓	1	1	✓	Free or preinstalled softwares to be utilized.
5	Projector	3,000 Lummen, HDMI, VGA, USB port		✓	1	1	✓	

Annex 2: Participants in Preparation of Project Monitoring Sheets and Photos

Participants in Preparation of Draft Project Monitoring Sheet

Day: 19th September 2016

S/N	NAME	POSITION
1	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
2	Nahuche A.A	HOD Distribution (Technical Manager)
3	Adis Muhammed S.	HOD Commerce (Technical Manager)
4	Lawal Abolade R.	Head [Special Projects] (Coordinator)
5	Dikko Musa	Head[PL&Wc]
6	Rabiu M.Kabir	Head [Logistics]
7	Suleiman Shehu	Head [GIS]
8	Akinori Miyoshi	CA, JICA Expert Team
9	Takashi Mori	JICA Expert Team

Photos of Preparation of Draft Project Monitoring Sheet

	Preparation of Project Monitoring Sheets (Attendance: NRW Management Team members)
	Preparation of Project Monitoring Sheets (Attendance: NRW Management Team members)

Federal Capital Territory Administration
Federal Capital Territory Water Board

Japan International Cooperation Agency

The Federal Capital Territory Reduction of Non-Revenue Water Project

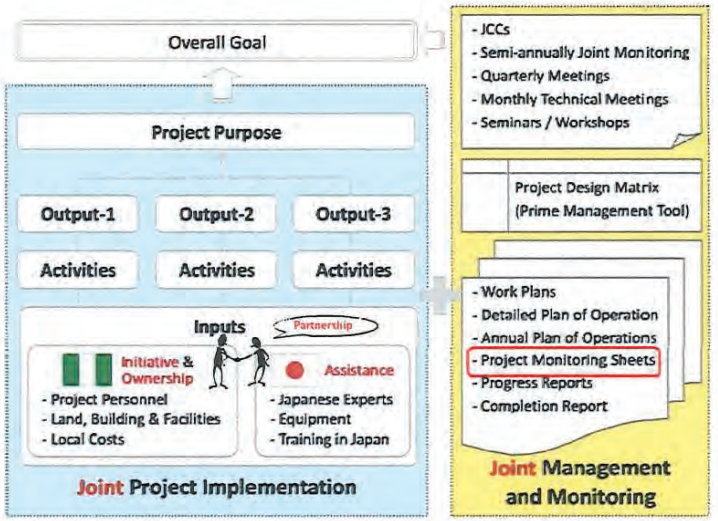
5th Joint Coordinating Committee Meeting

Results of Project Monitoring

(Period: September 2016 - December 2016)

Engr. A. A. Nahuche, HOD Distribution, FCTWB
(Technical Manager)

20th December ,2016



Contents

1. Outline of the Project

Project Name

The Federal Capital Territory Reduction of Non-Revenue Water Project

Project Period

Phase-1: October 2014 to December 2016

Phase-2: January 2017 to March 2018

We are here now.

Project Areas

Federal Capital Territory (FCT)

Pilot Areas: Gudu, Jabi and Garki I

Nigerian Counterparts

Federal Capital Territory Administration (FCTA)

Federal Capital Territory Water Board (FCTWB)

2. Overall Goal, Project Purpose and Three Outputs

Overall Goal	Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB.
▲	
Project Purpose	**Capacity of FCTWB for NRW reduction is strengthened.**
▲	
Output-1	Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly.
Output-2	Methods/operational procedures for effective NRW reduction are established though pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.
Output-3	A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2.

3. Progress of Inputs

Inputs from Nigeria

Project Personnel
- Project Director, Project Manager, Deputy Project Manager, Technical Managers, NRW Management Team, NRW Action Team.

Land, Building and Facilities
- Office spaces and necessary facilities at FCTWB

Local Cost
- Prepaid meters for Pilot Metering Area (PMA) in Gudu
- AMR (Automatic Meter Reading) meters for PMA in Garki I
- Installation of water meters
- Water meter reading

3. Progress of Inputs

Inputs from Japan

JICA Experts :
- A Chief Advisor and members

Equipment :
- Mechanical/conventional water meters for PMA in Jabi
- Procurement of equipment (zonal meters, data loggers, telemetric monitoring system, etc.) in process in Japan

Facilities
- Completion of chamber construction for bulk meters (taken over by the Japanese side)
- Completion of chamber construction for zonal meters
- Completion of modification of existing billing system

Photos

Bulk Flowmeter Chamber and Fence (Bwari)

Sensor Cable Installation

Data Logger for Bulk Flowmeters

Zonal Meter Chamber (Manhole)

Accuracy Test of Newly-Procured Meters

Interim Capacity Assessment

4. Progress of Activity for Output-1

Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly.

No	Activity	Current Monitoring (as at Dec.2016)
1-1	Install bulk meters to water treatment plants 1 and 2	Completed. However, data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines.
1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
1-3	Tally the above water production data monthly	Progress: 0%, Behind: 9.5 months Ready to measure monthly water production but the Project needs at least 6 months for monitoring this Activity.
1-4	Calculate the monthly water consumption based on the billing data	Completed (billing system modification only). Ready to calculate monthly water consumption, but the Project needs at least 6 months for monitoring this Activity.
1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	Progress: 0%, Behind: 4.5 months Ready to calculate monthly NRW ratio, but the Project needs at least 6 months for monitoring this Activity.

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4. Progress of Activity for Output-1

Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly.

No	Activity	Current Monitoring (as at Dec.2016)
1-6	Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system	Progress :90%, Behind: 4.5 months Delayed. Construction of chambers for zonal meters was completed Zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system have been procured in Japan.
1-7	Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	Progress: 0%, Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-6.)

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5. Progress of Activity for Output-2

Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.

No	Activity	Current Monitoring (as at Dec.2016)
2-1	Review existing NRW reduction operations at each pilot Area Office	Completed.
2-2	Conduct capacity assessment of organization and the relevant staff	Completed.
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed.
2-4	Prepare/update distribution network drawings for each PMA	Completed. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
2-5	Install water flow meters to each PMA and measure in/outflows monthly	Completed, but partially and provisionally. Check/repair a PMA meter in Jabi and complete fully electricity connection for the ultrasonic flow meter in Garki I

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5. Progress of Activity for Output-2

Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.

No	Activity	Current Monitoring (as at Dec.2016)
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed.
2-7	Isolate a SMA by installing valves	Completed.
2-8	Update the distribution network drawings for each SMA	Completed. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
2-9	Measure an initial level of NRW of each SMA	Completed.
2-10	Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	Provisionally completed. Re-detection may be done if necessary.
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	Provisionally completed. Revision may be done if necessary.

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5. Progress of Activity for Output-2

Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.

No	Activity	Current Monitoring (as at Dec.2016)
2-12	Review and approve NRW reduction operation plan of each SMA	Provisionally completed.
2-13	Implement NRW reduction operations at each SMA	Provisionally completed. Further operations may be done if necessary.
2-14	Monitor the progress of the NRW reduction operations of each SMA	Provisionally completed. Further monitoring may be done if necessary.
2-15	Measure level of NRW of each SMA at the end of the respective operations	Provisionally completed. Detailed check and revision may be done if necessary.
2-16	Prepare a report on pilot projects, covering Activity 2-1~2-15	Provisionally completed. Detailed check may be done if necessary.
2-17	Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers & meter readers), incl. audio visual materials	Provisionally completed. Revision may be done if necessary.

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6. Progress of Activity for Output-3

A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1&2.

No	Activity	Current Monitoring (as at Dec.2016)
3-1	Establish a Working Group for NRW reduction planning	Completed, but will be reviewed in Phase-2.
3-2	Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB	Completed, but will be reviewed in Phase-2.
3-3	Conduct hydraulic and water pressure distribution analyses of the pipeline networks	To be implemented in Phase-2. AGIS security has still hindered data import/export and analysis in spite of FCTA PS's instruction.
3-4	Develop outlines of the medium-term strategic plan and its annual NRW reduction plan (approval by the Director)	To be implemented in Phase-2.
3-5	Develop the first medium-term strategic plan (2018-2022) for approval by FCTA	To be implemented in Phase-2.
3-6	Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA	To be implemented in Phase-2.

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6. Progress of Activity for Output-3

A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2.

No	Activity	Current Monitoring (as at Dec.2016)
3-7	Develop a planning manual for NRW reduction	To be implemented in Phase-2.
3-8	Review existing plans, activities and implementing structure, etc. related to water distribution management	Progress: 75%, Behind: 11.0 months Delayed as a result of delay in information submission from Area Offices. 8 out of 13 Area Offices submitted the required information. There was difficulty in implementation due to dearth of as-built drawings which will have provided sufficient information on pipeline and appurtenances.
3-9	Establish framework of water distribution management	Progress: 25%, Behind: 4.5 months Delayed as a result of delay in Activity 1-6 and 1-7.

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7. Achievement of Three Outputs

No	Indicator	Current Monitoring (as at Dec.2016)
Output-1: Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly.		
1a	Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Monthly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. It is expected that monthly NRW ratio will be obtained from the second quarter of the third year (Jan. 2017).
1b	Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Same as the above in Indicator 1a.
1c	Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors (*replace by "Management" in PDM2) of FCTWB from the third quarter of the first (*replace by "second" in PDM2) year of the Project.	No achievement (delayed). Quarterly NRW ratio based results of Activity 1-5 has not been still obtained due to delay in Activity 1-2 to 1-4. It is expected that quarterly NRW ratio will be obtained from the second quarter of the third year (Mar. 2017).

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7. Achievement of Three Outputs

No	Indicator	Current Monitoring (as at Dec.2016)
1d	Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.	No achievement (as planned).
Output-2: Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.		
2a	Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations.	Most of results did not reach the target level. NRW Ratio (%) Detailed check of results and follow up activities to achieve the target level are necessary by utilizing lessons and learnt.
2b	Technical manuals for Area Office managers and field operators, including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce by the first quarter of the third year of the Project.	Technical manuals were prepared and provisionally approved. Revision may be necessary.

7. Achievement of Three Outputs

No	Indicator	Current Monitoring (as at Dec.2016)
Output-3: Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly.		
3a	By October 2017, draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval.	No achievement (as planned).
3b	By October 2017, an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval.	No achievement (as planned).
3c	A planning manual for NRW reduction is approved by the Director of FCTWB by the end of the Project.	No achievement (as planned).
3d	By November 2016, framework of water distribution management is established.	No achievement (delayed). Framework has not been ready due to delay in Activity 1-6 and 1-7.

8. Achievement of Project Purpose

Capacity of FCTWB for NRW reduction is strengthened.

No	Indicator	Current Monitoring (as at Aug.2016)
a	The medium-term strategic plan for NRW reduction (2018-2022) is approved by FCTA by the end of the Project.	No achievement (as planned).
b	NRW reduction operations of the first quarter of 2018 specified in the annual plan of the above plan are carried out according to the plan by FCTWB.	No achievement (as planned).
c	Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level.	Ongoing. Results of interim capacity assessment in Nov.-Dec. 2016 show that capacity developed has not reached to the criteria. Follow-up capacity development is necessary in Phase-2 of the Project.
d	NRW ratio of each PMA in the last quarter of the Project reaches its respective target (**). Note(**):Target for each PMA is expected to be determined by the end of the first quarter of the second year.	No achievement (as planned).

9. Changes of Risks

Risk recognized in the previous project monitoring

Due to collapse in oil prices and shrinking revenue, recent budget constraint of the Nigerian side including non-release of the Counterpart Fund has corresponded to an important assumption "A. Natural disaster / political instability / economic crisis that affect the Project activities do not occur."

As an action discussed in the previous project monitoring, and in response to request from the Nigerian side,

The Japanese side has taken over chamber construction and procurement of small materials.

So currently, **risk has been mitigated**.

10. Delay of Work Schedule and/or Problems

(1) Delay of the Project

Available monitoring period of Activities 1-2 to 1-5 will be insufficient due to delay in the Activities.

Cause

- The chamber construction for bulk flowmeters and procurement of necessary materials for pilot activities, which had delayed and suspended due to non-release of the Counterpart Fund in 2015&2016, were sorted out by JICA's intervention. However, Activities 1-2 to 1-5 are still behind the schedule.

Actions

- The Nigerian side requested to the Japanese side to extend the project in the previous project monitoring.
- JICA HQs approved the previous monitoring sheets and conformed completion of the chamber construction.
- So the Project period will be extended for six months for monitoring the Activities 1-2 to 1-5..

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10. Delay of Work Schedule and/or Problems

(2) Data Acquisition by Bulk Flowmeters (Output-1)

Through commissioning of ultrasonic flow meters as bulk flowmeters, the Project found out that data acquisition seems to be not always available, which may be due to not water-filled flow inside pipelines and should be solved as soon as possible.

Cause

Possible causes are:

Interference by water flow from new water treatment plant (No.3&4) to water flow from old plant (No.1&2)

Not-well-planned operation with securing water level in clear water tanks, and so on.

Actions

- The Project needs immediately to monitor water flow, investigate causes and find/conduct possible solutions through discussion among relevant Departments and Units.

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10. Delay of Work Schedule and/or Problems

(3) Less-than-successful Results of the Project (Output-2)

A series of activities and operations for NRW reduction in PMAs/SMAs were completed, however should be followed up and monitored because decrease in NRW ratio in some SMAs resulted in less-than-successful.

Decrease in NRW Ratio (Provisional)

	Before (%)	After (%)	Decrease Points in NRW Ratio
Gudu			
SMA-1	52.0	62.9	+10.9
SMA-2	53.9	49.0	-4.9
Jabi			
SMA-2	47.6	48.0	+0.4
SMA-3	86.4	67.2	-19.2
Garki I			
SMA-1	86.6	82.9	-3.7
SMA-2	79.0	85.0	+6.0
SMA-3	68.8	41.8	-27.0

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10. Delay of Work Schedule and/or Problems

(3) Less-than-successful Results of the Project (Output-2)

Cause

Detailed check is necessary, but there are possible reasons of unsuccessful/unexpected results of decrease NRW ratio:

- Frequent change of conditions which are supposed to be not changed, during activities between baseline measurement and ex-post measurement such as:
- Late-identified additional or missing customers and major consumers after customer listing,
- Late-identified existence or non-existence of pipeline and extension, malfunctioning valves,
- Late-identified difference between PMA/SMA design based on as-built drawings (if any) or information from staff and actual situation,

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10. Delay of Work Schedule and/or Problems

(3) Less-than-successful Results of the Project (Output-2)

Cause

- Difficulty in obtaining a certain number for effective data for water balance analysis, particularly water consumption by water meter reading, which may cause unreliability of analysis.
- Measurement of water flow and water meter reading for a short interval of time such as daily or weekly are sensitive to irregular situation and errors, and it affects directly calculation of NRW ratio.
- Reoccurrence of NRW (leakage, illegal connection) in the long period among baseline measurement, NRW reduction operations and ex-post measurement.

10. Delay of Work Schedule and/or Problems

(3) Less-than-successful Results of the Project (Output-2)

Actions

The Project needs immediately detailed re-check of results, continuous and further activities to reduce NRW to a certain degree as follow-up activities in Phase-2 of the Project by utilizing lessons and learnt in Phase-1.

However, unless FCTWB improves fundamental conditions of water supply services such as manuals, standard operating procedures, as-built drawings and complexity in commercial aspects including various customer categories, water tariffs, Units and Area Offices for reading, NRW reduction cannot be an effective solution for water supply services of FCTWB.

Thank you very much for your attention.

Federal Capital Territory Administration
Federal Capital Territory Water Board

Japan International Cooperation Agency

The Federal Capital Territory Reduction of Non-Revenue Water Project

5th Joint Coordinating Committee Meeting

Observations

Akinori Miyoshi, JICA Expert Team (Chief Advisor)

20th December ,2016

1. Revision of PDM and PO (PDM3/PO3 to PDM4/PO4)

1. Extension of the Project Period for Six Months

From Project Period: October 2014 to March 2018
Phase-1: October 2014 to December 2016
Phase-2: January 2017 to March 2018

To Project Period: October 2014 to September 2018
Phase-1: October 2014 to December 2016
Phase-2: January 2017 to September 2018

2. Removal of Time-Frames specified in "Objectively Verifiable Indicators"

For example, "from the third quarter of the second year of the Project" in Indicator for Output-1.

2. Supplement to Results of Project Monitoring

(1) Legal Instrument (Enabling Law) establishing FCTWB

Legal instrument (enabling law) establishing FCTWB as an autonomous body has not yet been approved by the current National Assembly.

To carry it forward, FCTWB suggested conducting joint (FCTWB-JICA) feasibility study to bring out benefits of an autonomous FCTWB as part of the Project.

(2) AGIS Security

FCTWB has tried to involve AGIS for removal/relaxation of GIS security since FCTA's Permanent Secretary instructed to solve issues. Although AGIS agreed to relax the security, but there is no concrete action by AGIS, accordingly no improvement in GIS of FCTWB.

2. Supplement to Results of Project Monitoring

(3) Organizational Reform

FCTWB and the JICA Expert Team have discussed cross-cutting organizational structure among Distribution Department, Commerce Department and Area Offices for effective planning and implementation of NRW reduction from Phase-2 of the Project with looking forward sustainability

(4) Prepaid Meter (3 Meter Types)

The Project assembled information on different types of existing meters including prepaid meters from relevant Units and Area Offices and discussed them among project members, and will keep discussing further based on the results of Activities for Output-2.

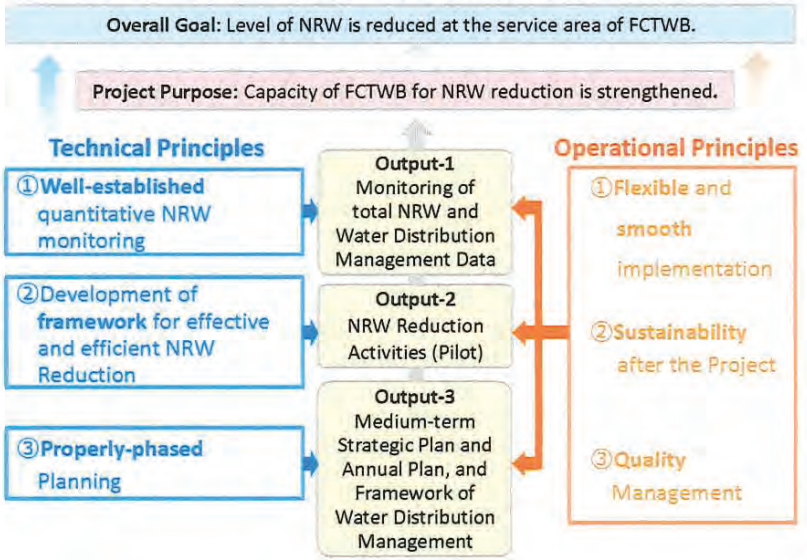
2. Supplement to Results of Project Monitoring

(5) FCDA and FCTWB

It is necessary for FCTWB to obtain the updated as-built drawings and information correctly and timely for proper operation, maintenance including effective NRW reduction.
However, It looks lacking feedback system between the two sister agencies. FCTWB is encouraged to always share its operation and maintenance experiences with FCDA while FCDA is equally advised to carry along FCTWB in its water project implementation.

The Project has communicated officially/bilaterally with FCDA for setting up further relationship and information sharing. The Project will carry on communication in Phase-2.

3. Principles of Project Implementation



4. Project Monitoring, JCC Meeting and Workshop

Project Monitoring

- 1st Joint Monitoring in November, 2014
- 2nd Joint Monitoring in June, 2015
- 3rd Joint Monitoring in November 2015
- 4th Joint Monitoring in September 2016
- 5th Joint Monitoring in December 2016

JCC meetings

- Kick-Off Meeting on 6 November, 2014
- 1st JCC Meeting on 2 December, 2014
- 2nd JCC Meeting on 23 June, 2015
- 3rd JCC Meeting on 12 November 2015
- 4th JCC Meeting on 22 September 2016
- 5th JCC Meeting on 20 December 2016

Workshops

- 1st Workshop on 4 December, 2014
- 2nd Workshop on 17 February, 2016

5. Main Topics of JCC Meetings

Title	Date	Main Topics	Attendance
Kick-off	6 Nov. 2014	- Presentation of overview of draft Work Plan including Project Monitoring Sheet Ver. 0, PDM_1 and PO_1 - Project Team members - Project budget - Office Space and Facilities for the Project	28
1st JCC	2 Dec. 2014	- Presentation and approval of the Work Plan including Project Monitoring Sheet Ver. 0, PDM_1 and PO_1 - Establishment of Working Group for NRW Reduction Planning - Security issues in the field activities	19
2nd JCC	23 June. 2015	- Insufficient of counterpart fund - Existence of duplicated/return bills, which may affect unreliable financial analysis including NRW - Customs clearance and tax exemption for equipment from Japan - Presentation of Project Monitoring Sheet Ver. 1	21
3rd JCC	12 Nov. 2015	- Insufficient of counterpart fund - Existence of duplicated/return bills, which may affect unreliable financial analysis including NRW - Issues on as-built drawings - Presentation of Project Monitoring Sheet Ver. 2 (including delay of Activities for Outpu-1&2, AGIS Security) - Presentation of revised PDM and PO, Work Plan on additional activities and inputs - Approval of Project Monitoring Sheet Ver. 2, revision of PDM (PDM_2), PO (PO_2) and concept of Work Plan on additional activities and inputs	25
4th JCC	22 Sep. 2016	- Extension of the Project period, requested by the Nigerian side - Taking over the chamber construction and procurement of small materials for Pilot activities, requested by the Nigerian side - SMA out of PMA monitoring area - Removal or relaxation of AGIS security - Challenge in as-built drawings - Technical advice on prepaid meter - Presentation of Project Monitoring Sheet Ver. 3 including revised PDM and PO - Approval of Project Monitoring Sheet Ver. 3, revision of PDM (PDM_3) and PO (PO_3) - Presentation of Action Plan by participants in the 2nd training in Japan	23

6. Main Topics of Workshop

Title	Date	Main Topics	Attendance
1st Workshop	4 Dec. 2014	Main Session - Background of the Project, and NRW situation of FCT (FCTWB) - Brief Explanation and Principles of the Project Implementation (JICA Expert) - NRW Video - Good Practices of NRW Reduction in Yokohama City (JICA Expert) - Work Plan, Schedule and Progress (JICA Expert) Supplementary Session - Group Discussion on Zoning of Pilot Metering Area by the Project Members from Distribution Department and Area Offices	80
2nd Workshop	17 Feb. 2016	Session 1: Water Distribution Management - Project Progress and Introduction (FCTWB) - Concept and Ideal of Water Distribution Management (FCTWB) - Installation of Bulk & Zonal Meters and Pilot Remote Monitoring (FCTWB) - Drawing and GIS in FCTWB (FCTWB) - Hydraulic Analysis for Diagnosis of Distribution Network (FCTWB) - Current Situation of Billing (FCTWB) Session 2: NRW Reduction Pilot Project - NRW and Procedures of Pilot Project (FCTWB) - Concept and Creation of PMA/SMA (FCTWB) - Findings in Gudu before NRW Reduction Operations (FCTWB) - Findings in Jabi before NRW Reduction Operations (FCTWB) - Meter Error Test (FCTWB) Session 3: Wrap-up - Practice of Water Balance Analysis (JICA Expert) - Action Plan by Trainees in Japan (FCTWB) - Suggestions (JICA Expert) - Clarification of Problems and Way Forward (FCTWB)	106 *External organizations were not invited.

6. Issues, Challenges and Suggestion

No	Classification		Issues and Challenges	Suggestions	Term
	Main Item	Sub-Item			
Commerce					
1	General		**Complication** and **over-segmentation** in all aspects have caused **inefficiency** of all routine works.	• **Streamlining, simplification, uniform management** and **wide-ranging approaches** as keywords.	L
2	Customer Category		Customers are categorized as **domestic, commercial** (un-coded), **major consumers** (co-operate body, mini hotel/restaurant, major consumer, petrol station/plaza, private school/ clinic), **institution** (embassy/high commission, ministry/ parastatals, liaison office, religion), **public tap/convenience & kiosk**, lifting point (bulk selling).	• **Lessening** of category for **simplified** customer management	M
3	Customer Meter Type		Customer meter types are; **conventional** including **flat-rate, AMR** and **prepaid.** This mixture makes O&M and analysis complicated. Different types of conventional meter without accuracy check exist across service area.	• Review of existing customer meter type • Decision-making on **metering policy** and strong spearhead of implementation with budget • **Meter workshop/laboratory** • **Standardization** of customer meter for FCTWB and **approval** or **licensing** by FCTWB	S M M L
4	Meter Reading	Meter reading divisions	**Many divisions** of FCTWB, such as Area Offices, AMR Unit, Prepaid Unit and 9 **Units** for major consumers in HQs are **involved** in meter reading, so data assembling is quite **troublesome.**	• Review of meter reading, roles and responsibility. • Meter reading by Area Offices in principle and **supervision by HQs**	S M
5	Meter Reading	Flat-rate	**Flat-rate** customers account for 15% of all bills as well as 18% of total billed amount. Flat-rate customers may consume water more than the expected as **excess use**, a part of NRW.	• **Elimination** of flat-rate customers by meter installation	M

6. Issues, Challenges and Suggestion

No	Classification		Issues and Challenges	Suggestions	Term
	Main Item	Sub-Item			
Commerce					
6	Meter Reading	AMR and prepaid	Although it is not necessary for meter readers to read AMR and prepaid meters manually as an advantage, AMR meters often suffer from **communication failure** by trees or other obstacles and also prepaid meters **malfunction** because of **battery lifetime.** In addition, prepaid meters cause **free water** if valve remains open or **illegal bypassing** as NRW unless customers report or FCTWB monitors properly.	• Review of actual **features** of AMR and prepaid meters • **Periodical field monitoring** with function check of AMR and prepaid meters • Monitoring of **bank statement** for prepaid meters	S M M
7	Billing	Return/ duplicated bills	Approximately 4,800 nos. of **return bills** (10% of total bills) exist widely across service areas, and amount to 75 million Naira (16% of total billed charge). Existence of return bills in billing system causes **wastefulness and unreliable financial analysis** including NRW. Causes of return bills are: disconnected, demolished, non-existing, vacant/abandoned, own water source (borehole), duplication generated from meter conversion, etc.	• Prompt countermeasures against return bills such as **deactivation** and **elimination.** • **Proper addressing** on the bills • **Proper procedures and management** of billing information	S S S
8	Billing	Estimate bills	43% of conventional meter bills and 50% of AMR bills have been generated averagely as **estimate bills**, this is, **no meter reading.** A considerable number of estimate bills **hamper** calculation of billed amount and NRW based on actual water consumption. No meter reading is caused by **absence** of customer, **inaccessibility** to customer property where meter is positioned, **limited time** for meter reading, and also maybe **dereliction** of meter reader.	To aim at billing based on **100% reading**, the following are necessary: • Staff's performance of duties with **awareness-rising,** • **Discipline** and **training** • Review of **frequency of reading**, ie. once a month to once in two months • Enhancement of **logistics** • Thorough **monitoring** of reading regardless of any types of meter. • **Meter installation** and **replacement** of malfunctioning meters • **Meter reposition** to outside of property for accessibility	S S S M M L L

6. Issues, Challenges and Suggestion

No	Classification		Issues and Challenges	Suggestions	Term
	Main Item	Sub-Item			
Commerce					
9	Billing	Billing Divisions and Billing system	**Divisions for billing** are three; Billing Unit for conventional & flat-rate, AMR Unit for AMR, Prepaid Unit for prepaid (ad-hoc). **Billing systems** are; Puma I for conventional & flat-rate, Puma III for AMR and stand-alone system for prepaid (straight to bank account). Billing system Puma I for conventional meter & flat-rate customers has been **outdated**, and does **not** have function or automated programme to **extract, tally or sort data** as for regular monitoring or analysis of billing cycle. FCTWB can obtain tallied/sorted data only by paying extra to private IT programmer, however, the data is not billed consumption based but billed amount based, and there may be **no sustainability.**	• Review of billing systems and **orientation** of FCTWB (The Project targeted this.) • **Upgrade** of billing system enabling FCWTB to **analyze** and **monitor** billing data properly and sustainably. (The Project targeted this.)	S S
10	Water tariff		**Water tariff** are, as standard, N80/m^3 or N5,500/month for domestic, N150/m^3 or N45,000/month for commercial, and N150/m^3 or various price per month for major consumers. This mixture makes analysis complicated.	• Review of water tariff • **Simplification** and **comprehensive** water tariff	S S
11	Other	Customer database	Customer information has been not necessarily updated and shared properly among relevant divisions, so FCTWB has faced difficulty in various cases.	• Update/improve customer database and management	S
12		Illegal connections	Some customers or non-customers refuse entering to their properties by FCTWB staff on the ground that they have their own water sources such as borehole.	• **Law enabling or empowering FCTWB** to act as service provider	

6. Issues, Challenges and Suggestion

No	Classification		Issues and Challenges	Suggestions	Term
	Main Item	Sub-Item			
Distribution					
13	As-built Drawing		Drawings of pipelines are supposed to be managed and stored in Pipeline Unit of FCTWB HQs and/or Area Offices. But, most of existing drawings are **not soft copies** but hard copies, and as-plan, as-design and as-built drawings are **all mixed up** together and **not well organized**. Most of drawing copies are only one set in FCTWB. For the Phase-1 Development Area where land development and construction of water supply facilities were mostly completed, FCTWB has converted manually as-built drawings into digital form in map book by GIS, and accomplished 95% of data input of pipeline information including valves, hydrants and service pipelines. However, the map book shows only location and size of pipelines but not show materials, installation year and depth. Even as-built drawings or the map books exist, **discrepancy** of information such as pipeline location, size and branching point has happened often. Also, stop cocks supposed to be on service pipelines are shown on water distribution networks by mistake, so it leads to **difficulty in distinguishing** valve from stop cock. At intersections of two pipelines, whether they are connected or crossed is unclear. For the Phase-2 and Phase-3 Development Areas and other satellite towns where land development and construction of water supply facilities are still ongoing by FCDA or private developers, the constructed facilities have been operated by FCTWB **without as-built drawings** often because of provisional transfer and other reasons. FCTWB has maintained the facilities by using as-plan or as-design drawings which is mostly different from actual situation of the constructed facilities.	• Review and improve **procedures of drawing collection** from FCDA and **feedback** issues in O&M to FCDA • Regularize **complete submission** of as-built drawings and penalize discrepancy. • Review and improve **quality management** such as existing procedures of inspection and hand-over. • Review and improve be **design criteria or standard, guideline** of supervision on particularly networks, service pipe, and meter installation • Establish **archive** of all documents with proper storing of drawings in the HQs and develop **rule** for accessing information and avoiding monopolization by individuals. • Establish **drawing management** by each Area Office for routine maintenance works and updating pipeline information • Prepare **service connection inventory** showing locations of service pipelines, customer meters, valves, size, material, year of installation and etc.	S M M M S S M

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6. Issues, Challenges and Suggestion

No	Classification		Issues and Challenges	Suggestions	Term
	Main Item	Sub-Item			
Distribution					
14	GIS		GIS Unit of FCTWB is an **interim** unit consisting of two staff selected from other units plus a casual staff. A parastatal of FCTA, Abuja Geographic Information System (AGIS) has developed GIS database of FCT by using GIS software GeoMedia since 2003, which FCTWB has adopted. Existing AGIS database has satellite image as background taken in 2010, street information, land use (residential, commercial, industrial and etc.), plot data and the number of bedroom of each plot. However, though AGIS is supposed to update these data **once in six months** based on information provision from infrastructure sectors, it has been **not done by rule**. Also, AGIS database does not have contour and altitudinal information required for hydraulic analysis. In this regards, existing AGIS database is **not necessarily useful** for practical operation and maintenance of water supply facilities. In addition, **security of AGIS** is too strict to **access to external networks as well as export/import data** through any devices. Also, all information on AGIS database including newly-input one by FCTWB **cannot be taken out by e-data** such as PDF file but paper printing. That is, FCTWB **cannot utilize GIS functions** such as visual reporting, analyzing and data coupling with Microsoft Excel and positional information obtained by GPS handy terminal. This security challenge is a major bottleneck.	• Create a **Unit or section for GIS** to input intensively in short term and update continuously in long term • Review **attribute** to be recorded and input, and create workflow and procedures of systematic update of GIS • Remove or relax **AGIS security**, or if difficult, to build up **own GIS database** of FCTWB. • Develop secured **IT network** in FCTWB	S/M S S/M M
15	Leakage Detection		NRW along at reservoirs, along trunk and distribution mains, at wash-out and air valves, etc. seems to be considerable amount in the whole water supply system.	• Focus on NRW at reservoirs, along trunk and distribution mains, at wash-out and air valves, etc. by Pipeline Unit and Area Offices	S/M

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Annex2-293

6. Issues, Challenges and Suggestion

No	Classification		Issues and Challenges	Suggestions	Term
	Main Item	Sub-Item			
Organization					
16			• GIS Unit of FCTWB is an interim unit consisting of two staff selected from other units plus a casual staff. • FCTWB does not have any units which are clearly authorized for water distribution management. • FCTWB does not have any units which take the lead in leakage detection. • FCTWB does not have any units which monitor, analyze NRW and take the lead maintenance scientifically.	• Create a **Unit or section for GIS** to input intensively in short term and update continuously in long term • Create a **Unit for water distribution management** in Distribution to monitor, analyze and make a plan together with Quality Control Department and Area Offices • Create a **Unit for leakage detection** in Distribution to expand it into the whole water service areas • Create a **Unit for NRW monitoring and maintenance** cross-organizationally in Commerce and Distribution	S/M S/M S/M S/M
17			• FCTWB does not have any plans or systems of human resources development.	• Prepare **comprehensive training programme** based on assessment fir each level of staff in accordance with business plan	S/M
18			• FCTWB does not have IT network and communication. • Office is composed of small rooms.	• Develop secured **IT network** in FCTWB • Improve **office environment and utilities**	M L

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Thank you very much for your attention.

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MINUTES OF MEETING
ON
THE SIXTH JOINT COORDINATING COMMITTEE
FOR
THE FEDERAL CAPITAL TERRITORY
REDUCTION OF NON-REVENUE WATER PROJECT

HELD IN
THE OFFICE OF DIRECTOR, ECONOMIC PLANNING RESEARCH AND STATISTICS,
FEDERAL CAPITAL TERRITORY ADMINISTRATION

16th May 2017

Mr. Abubakar Sani Pai
Project Director,
Director, Economic Planning, Research and Statistics Department,
Federal Capital Territory Administration,
Federal Republic of Nigeria

Mr. Akinori Miyoshi
Chief Advisor,
The Federal Capital Territory Reduction of Non-Revenue Water Project,
Japan International Cooperation Agency (JICA) Expert Team

Engr. A. A. Nahuche
Technical Manager,
Head of Department, Distribution
Federal Capital Territory Water Board,
Federal Republic of Nigeria

Ms. Makiko Okumura
Senior Representative,
JICA Nigeria Office

Attached Document

In the beginning of Phase-2 of the Federal Capital Territory Reduction of Non-Revenue Water Project (hereinafter referred to as "the Project"), the sixth meeting of Joint Coordinating Committee (hereinafter referred to as "JCC") was held on 16th May 2017.

Implementation of the Project is divided into two phases; Phase-1 scheduled from October 2014 to December 2016 and Phase-2 scheduled from January 2017 to September 2018.

1. Remarks and Presentation

Mr. Abubakar Sani Pai, Project Director of the Project, gave welcome remarks and chaired the JCC.

Ms. Makiko Okumura, Senior Representative of Japan International Cooperation Agency (hereinafter referred to as "JICA") Nigeria Office expressed appreciation to all members and our condolence to the late Mr. S. T. Bello and his driver. She then gave remarks addressing purpose of this meeting: reviewing the activities for common understanding and approval of Work Plan (Phase-2), also requested Federal Capital Territory Administration (hereinafter referred to as "FCTA") and Federal Capital Territory Water Board (hereinafter referred to as "FCTWB") for financial support to Non-Revenue Water (hereinafter referred to as "NRW") Unit created newly in FCTWB.

Mr. Akinori Miyoshi, Chief Advisor of JICA Expert Team made a presentation of Introduction of the Project (see the Appendix 3).

Engr. M. Kabir Rabiu, Head of Unit (NRW), Distribution, FCTWB made a presentation of Progress of the Project (see the Appendix 4).

Engr. A. A. Nahuche, Technical Manager of the Project made a presentation of Working Plan (Phase-2) and Working Group for NRW Reduction Planning (see the Appendix 5).

Engr. A. R. Lawal, Project Coordinator of the Project made a presentation of Summary Report of Workshop held on 9th May 2017(see the Appendix 6).

Mr. Akinori Miyoshi explained Project Design Matrix (hereinafter referred to as "PDM") to be revised in the near future (see the Appendix 7).

As closing remarks at the end of the discussions, Engr. A. A. Nahuche emphasized the data obtained through the Project should be utilized for FCTWB to find a path in which FCTWB should follow, and also improvement in relationship among the organizations concerned is a key. He finally expressed his expectation that FCTWB becomes center point for NRW reduction in Nigeria, eventually West Africa.

2. Main Points Discussed

As a result of discussions, all JCC members confirmed the matters mentioned below:

2.1 Discipline and Training in FCTWB

The terms "Lack of Discipline" as a current situation of FCTWB in the presentation of Progress of the Project may lead to a misunderstanding, so it should be treated carefully. However, FCTWB understood necessity to keep staff well-motivated as a key to improvement through comprehensive human resource

development including full-programme training in water supply services for them at all level from junior to senior.

2.2 Problem in Flow Measurement of Bulk Meter

As reported in the presentation of Progress of the Project, despite power supply problem for bulk meter (ultrasonic flowmeter) was solved by replacing damaged part and installing protection devices, water flow has not been measured properly possibly because of non fully-filled water inside pipe.

FCTWB, JICA Expert Team and Federal Capital Development Authority (hereinafter referred to as "FCDA") will jointly investigate the reason and work out solution technically.

2.3 Discrepancy between As-built Drawing and Actual Situation

As reported in the presentation of Progress of the Project, the Project Team has faced difficulty in implementing pilot projects due to lack of reliable information on the location of water pipes. For example, the project team realized that there are so many discrepancies between as built drawings and actual situation on the ground through the pilot activities.

FCTWB and FCDA will discuss this problem and solution for improvement and update of information.

2.4 Results of Pilot Project

In spite of efforts by pilot Area Office, pilot project in Garki I resulted in not necessarily successful because of difficulty in identifying pipeline route which lasted till the end of pilot project.

FCTWB will continue NRW reduction activities and monitor NRW ratio by self-help efforts.

2.5 Workshop

JCC regarded that the Workshop consisting of presentations remarkably by project members of FCTWB was done successfully with attendance of 120 participants. Lessons learnt and data obtained/analyzed through the Project are expected to be utilized fully for FCTWB.

2.6 Performance Management

FCTA observed that capacity and quality of FCTWB staff have been enhanced certainly through the Project, and additionally noted that the Nigerian Government is emphasizing performance management and delivery of mandate. The Project has contributed to improvement in performance of FCTWB.

2.7 Project Office's Environment

JICA requested improvement in project office's environment in FCTWB because JICA Expert Team has suffered from water leak which causes damages to project equipment stored in the office.

FCTWB answered that FCTWB has dealt with water leak but there is a possibility of reoccurrence. FCTWB promised to bring solutions for prevention of recurrence.

2.8 Project Vehicle

JICA requested investigation of conditions of the project vehicle damaged by the traffic accident in March 2017 and also asked about alternate vehicle for implementing project activities.

FCTWB answered that FCTWB will send staff in charge to the Federal Road Safety Corps in Lokoja for the investigation, and also will bring back then repair the vehicle if possible, or purchase a new vehicle by using Counterpart Fund if the conditions are critical.

3. Approval of Work Plan (Phase-2) and Working Group for NRW Reduction Planning

As a result of presentation and discussion, JCC members approved Work Plan (Phase-2) and Working Group for NRW Reduction Planning.

4. Future Revision of Project Design Matrix

In conformity to actual timeline and update situation of the Project, JICA Expert Team explained necessity of revision of PDM in the next JCC meeting before August 2017 and sentences to be deleted, replaced or added.

FCTA and FCTWB agreed to it and pointed out necessity of Counterpart Fund to be highlighted effectively for fast-track release as an input from the Nigerian side.

Appendix

Appendix 1: Programme/Agenda
Appendix 2: Attendance List
Appendix 3: Introduction of the Project
Appendix 4: Progress of the Project
Appendix 5: Work Plan (Phase-2) and Working Group for NRW Reduction Planning
Appendix 6: Summary Report of Workshop held on 9th May 2017
Appendix 7: Project Design Matrix to be revised

Federal Capital Territory Administration (FCTA)
Federal Capital Territory Water Board (FCTWB)
assisted by
Japan International Cooperation Agency (JICA)

THE FEDERAL CAPITAL TERRITORY REDUCTION OF NON-REVENUE WATER PROJECT PROGRAMME/AGENDA FOR 6th JOINT COORDINATING COMMITTEE

Venue: Conference Room, EPRS, FCT Administration, Abuja
Date: 10:00, Tuesday, 16th May 2017

10:00	Opening Prayer
10:00 - 10:05	Introduction of JCC Members
10:05 - 10:15	Welcome Remarks by Project Director, Mr. Sani Pai (Director, EPRS, FCTA)
10:15 - 10:25	Address by Senior Representative, Ms. Makiko Okumura (JICA Nigeria Office)
10:25 - 10:35	Introduction of the Project by Chief Advisor, Mr. Akinori Miyoshi (JICA Expert Team)
10:35 - 11:05	Progress of the Project by Engr. M. K. Rabiu (HOU NRW, Distribution, FCTWB)
11:05 - 11:35	Work Plan (Phase-2) and Working Group for NRW Reduction Planning by Technical Manager, Engr. A. A. Nahuche (HOD Distribution, FCTWB)
11:35 - 11:45	Summary Report of Workshop held on 9th May 2017 by Project Coordinator, Engr. A. R. Lawal (HOU Special Projects, Distribution, FCTWB)
11:45 - 12:15	Questions, Answers and Way Forward
12:15 - 12:25	Approval of Work Plan (Phase-2) and Working Group for NRW Reduction Planning
12:25 - 12:35	Proposed Amendment of Project Design Matrix (PDM) by Chief Advisor, Mr. Akinori Miyoshi (JICA Nigeria Office)
12:35 - 12:45	Closing Remarks by Project Manager, Mr. Hudu Bello (Director, FCTWB)
12:45	Closing Prayer

Appendix 2

FEDERAL CAPITAL TERRITORY REDUCTION OF NON-REVENUE WATER PROJECT

SIXTH JOINT COORDIANTING COMMITTEE (JCC) MEETING

HELD ON 16TH MAY 2017 AT FCTA/EPRS CONFERENCE ROOM

ATTENDANCE LIST

S/N	NAME	POSITION
1	Sani Pai	Project Director, Ag. Director EPRS/FCTA
2	Makiko Okumura	Snr Representative JICA Nigeria Office
3	Nahuche A.A	Acting Project Manager, DD Distribution, FCTWB
4	Muhammed Adis	DD Commerce, FCTWB
5	Pheobe Ocheja	HOD Admin &Supply, FCTWB
6	Gambo U. Lapai	CE/FCDA
7	Ezeoha F.O	DD/FCDA
8	Hasfat Ahmed Lawi	HOD F&A, FCTWB
9	Udeh E.C	AD FCDA
10	Solomon T. Udoh	PE FCDA
11	Abdullahi Ajiya	NTA(Media)
12	Ahmed A. Kabiru	International Cooperation
13	Abolade Lawal	Project Coordinator, FCTWB
14	Abbas Ahmed	Head PR, FCTWB
15	Segun Kayode	PRO, FCTWB
16	Umar Sambo	EPRS/FCTA
17	Abdullahi Masaud	Head Metering, FCTWB
18	Rabiu M.K	Head NRW, FCTWB
19	Takayuki Ohira	JICA Nigeria Office
20	Akinori Miyoshi	CA, JICA Expert Team
21	Taketoshi Fujiyama	Deputy CA, JICA Expert Team
22	Toru Toyoda	JICA Expert Team
23	Noboru Osakabe	JICA Expert Team
24	Toshinobu Kasuya	JICA Expert Team
25	Sadiq Gulma	JICA Nigeria Office
26	Otobo Deborah	JICA Expert Team Office

The Federal Capital Territory Reduction of NRW Project (Phase-2)

Introduction and Project Overview

16th May 2017

Akinori Miyoshi
Chief Advisor, JICA Expert Team

1

What is Non-Revenue Water?

NRW is an indicator of water supply management and O&M for actions to be taken, and also is supposed to be kept lower to improve efficiency of water supply services.

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non-Revenue Water (NRW)
			Unbilled Unmetered Consumption	
	Water Losses	Commercial (Apparent) Losses	Unauthorized Consumption	
			Customer Metering Inaccuracies and Data Handling Errors	
		Physical (Real) Losses	Leakage on Transmission and/or Distribution Mains	
			Leakage and Overflows at Utility's Storage Tanks	
			Leakage on Service Connections up to Point of Customer Use	

* "Un-accounted for Water (UfW)" is no longer common term.

2

Project Outline

Implementing Body

Federal Capital Territory Administration (FCTA)
Federal Capital Territory Water Board (FCTWB)
* *Collaboration with FCDA, AGIS, FMWR, FMBNP is a key to success of the Project particularly in NRW reduction strategic planning.*

Project Areas

Federal Capital Territory (FCT)
Pilot Areas: Gudu, Jabi and Garki I
* *Involvement of all Area Offices is essential for the Project.*

Project Period

Phase-1: October 2014 to December 2016 (completed)
Phase-2: January 2017 to September 2018 (ongoing)

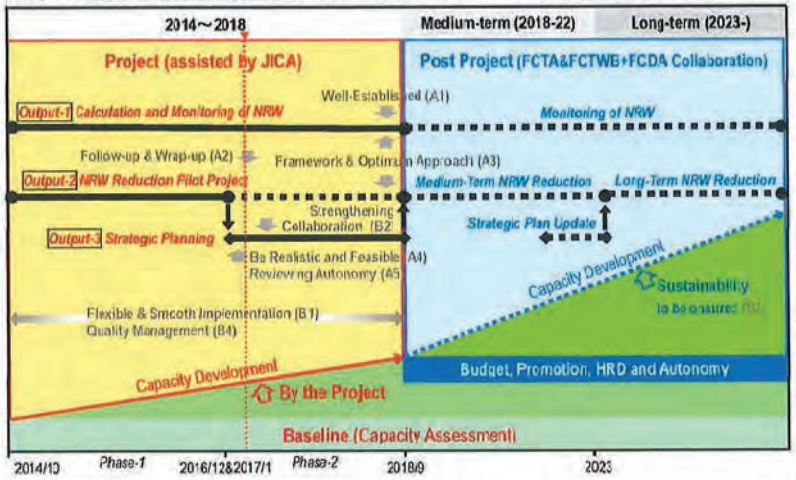
3

Project Outline (continued)

Overall Goal	Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB.
Project Purpose	**Capacity of FCTWB for NRW reduction is strengthened.**
Output-1	Level of NRW of both the service area of FCWTB and water distribution areas are monitored regularly.
Output-2	Methods/operational procedures for effective NRW reduction are established though pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices.
Output-3	A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2.

4

Project Name: The Federal Capital Territory Reduction of NRW Project (Phase-2)
Overall Goal: Level of NRW is reduced at the service area of FCTWB.
Project Purpose: Capacity of FCTWB for NRW reduction is strengthened.
Output-1: Level of NRW of both the service area of FCTWB and water distribution area is monitored regularly.
Output-2: Methodology/operational procedures for effective NRW reduction are established through pilot projects.
Output-3: A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing Output-1&2.



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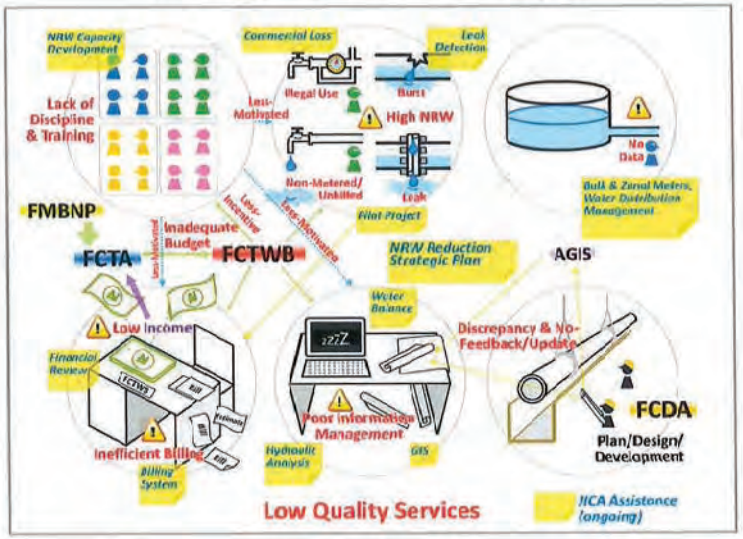
Challenges of FCTWB and the Project



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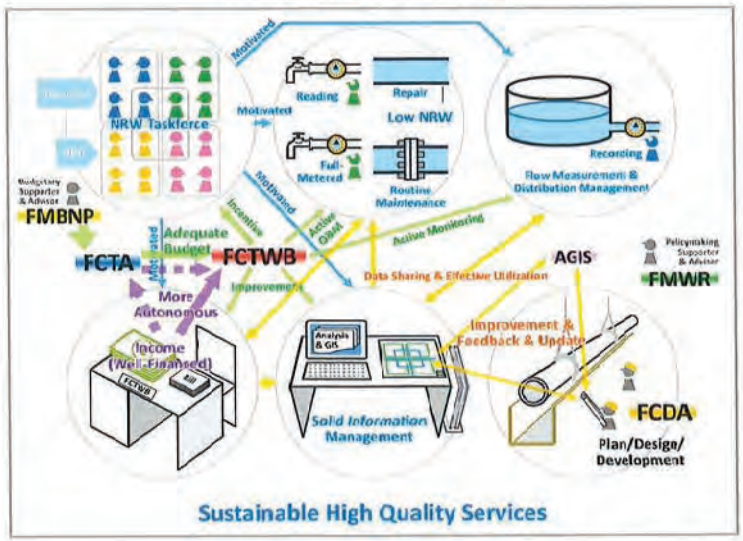
Ideal Situation of FCTWB



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Scenes of the Project in Phase-1

Chamber for Bulk Flow Meter at outlet of LUD WTP

Monitor & Logger for Bulk Flow Meter (Ultrasonic)

Chamber Location for Zonal Meter at outlet of Tanks

Checking Drawings by GIS Mapping

Flow Meter for Inflow into Pilot Metering Area

Valves for isolating Pilot Metering Area

24 hrs Flow Measurement by Ultrasonic Flow Meter

Minimum Night Flow Measurement and Step Test

Leakage Detection Survey (Ground-microphone)

Water Meter Accuracy Test

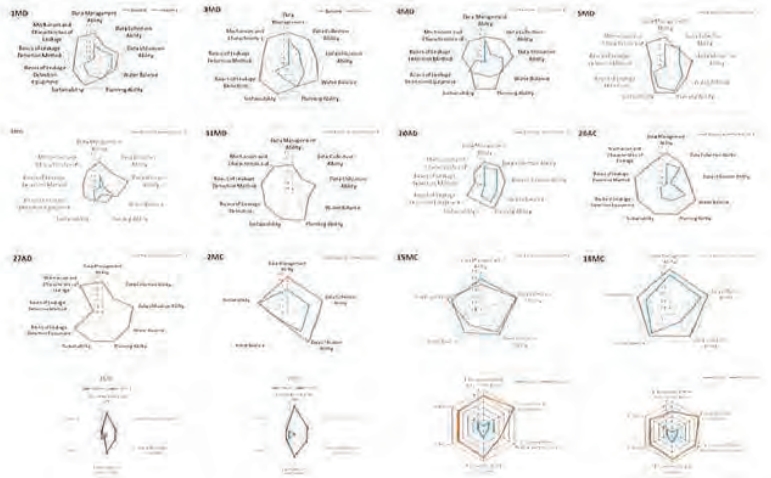
Illegal Connection Survey (Bypass)

Customer Consumption Measurement

9

Annex2-303

Capacity Development in Phase-1



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The Federal Capital Territory Reduction of NRW Project (Phase-2)

Progress of the Project

16th May 2017

Engr. Moh. Kabir Rabiu
HoU NRW, Distribution, FCTWB

1

Contents

2

1. Output-1:

Level of NRW of both the service area of FCWTB and water distribution areas are monitored regularly.

Content

3

1-1. Bulk Meters

Roles of Bulk Meters

FCTWB needs to read bulk meters, located at outlet of LUD Water Treatment Plant, **scientifically/quantitatively** for

- Calculation of **water production** or **water flow (system input volume)** into the entire FCTWB's water supply system
- Analysis of **water balance**, particularly **NRW ratio** of entire water supply system.
- Analysis of **water loss along trunk mains**, together with reading zonal meters as mentioned below.
- Analysis of **daily maximum factor** for water demand forecasting in water distribution management

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1-1. Bulk Meters

Location of Bulk Meters

See the next slide.

- No.1: Transmission Main (DN600mm) to Tank Bwari
- No.2: Transmission Main (DN1500mm) to Tank 2 & 5
- No.3: Transmission Main (DN1500mm) to Tank 3 & 4
- No.4: Transmission Main (DN1200mm) to Tank Kubwa, Airport and Gwako

Procurement and Installation

- Chamber Construction for 4 locations (completed)
- 4 Ultra-sonic Flow Meters (completed)
- 1 Data Logger (completed)

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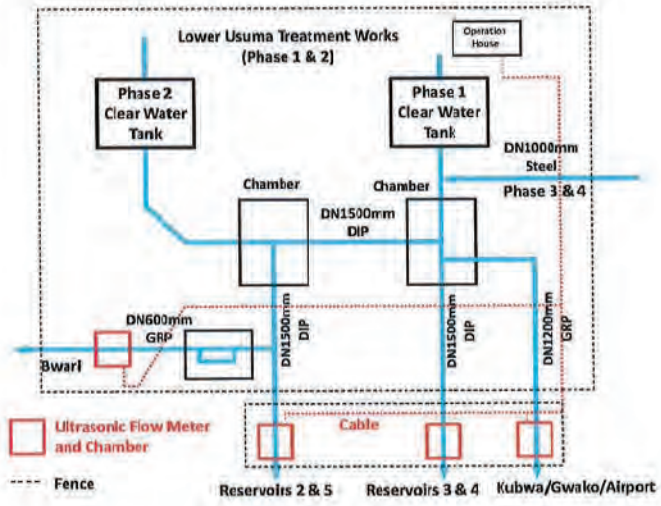
1-1 .Bulk Meters (Location)



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1-1. Bulk Meters (Works completed)

Chamber Construction

Sensor of Ultrasonic Flow Meter

Chambers constructed

Main Unit of Ultrasonic Flow Meter

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1-2. Zonal Meters

Roles of Zonal Meters

FCTWB needs to read zonal meters, to be located at outlet of the selected tanks, for

- Calculation of **water flow (system input volume)** into each water distribution zone under a tank.
- Analysis of **water balance**, particularly **NRW ratio** of each water distribution zone under a tank.
- **Prioritization** and ensuring **efficiency** of **NRW reduction operations by water distribution zone**.
- Analysis of **water loss along trunk mains**, together with reading bulk meters as mentioned above.

8

1-2. Zonal Meters

Location of Bulk Meters

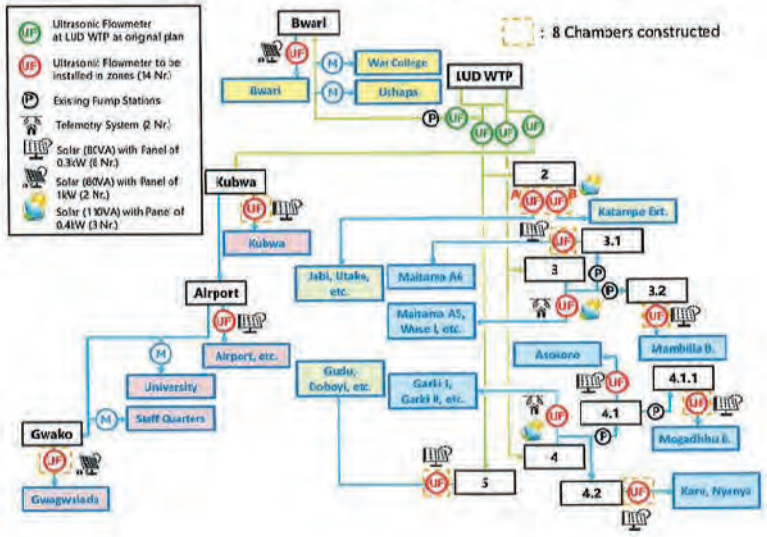
See the next slide.

- Tank 2 (x2), Tank 3, Tank 3.1, Tank 3.2, Tank 4, Tank 4.1, Tank 4.1.1, Tank 4.2, Tank 5, Tank Bwari, Tank Kubwa, Tank Airport and Tank Gwako (DN250mm to DN1500mm)

Procurement

- Chamber Construction for 8 locations (completed)
- 14 Ultra-sonic Flow Meters (in shipment from Japan)
- 13 Data Logger (in shipment from Japan)
- 2 Telemetry System as a pilot (in shipment from Japan)
- 13 Solar Power System (under procurement in Nigeria)

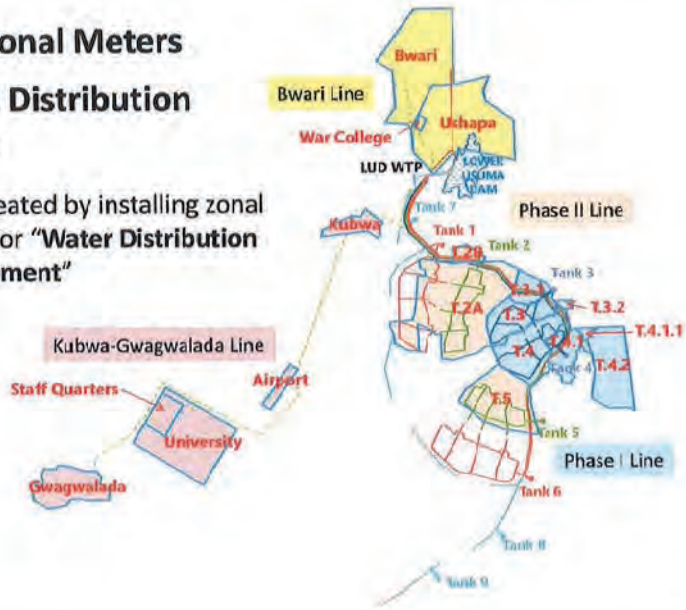
1-2 . Zonal Meters (Locations)



1-2 . Zonal Meters

Water Distribution Zones

To be created by installing zonal meters for **"Water Distribution Management"**



1-3. Upgrade of Billing System

The Project upgraded the outdated billing systems of FCTWB to provide a common user-friendly platform with **flexible analysis of billing and payment information** and to achieve 100% meter reading (**no flat-rate, no estimate and no duplicated bills** and **no unbilled customers**) as ultimate goal. This helps FCTWB to adequately manage her customers in order to ensure satisfaction and maximize revenue potential.

SCOPE

To establish a modern and flexible billing system at FCTWB which will facilitate the efficient collection, sharing, dissemination and storage of metering, payment and billing data, the scope includes:

a. Upgrade of Active-PUMA 1.0 and 3.0 software to latest Active-PUMA 4.0;
b. Merging existing Active-PUMA 1.0 and 3.0 application databases into a common Active-PUMA 4.0 repository to be simultaneously accessible by both conventional and AMR billing systems.
c. Creation of **new report templates** with a view to displaying both Naira value and water volume to enhance **analysis of Non-Revenue Water**.

1-4. Schedule of Activities in Phase-2

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1-5. Challenges in Phase-2

- To **stabilize power supply** to main units of ultrasonic flow meters.
- To analyze the situation and find solution for **data loss of bulk meters** possibly because of **non fully-filled water inside pipe**.
- To **monitor** bulk & zonal meters **regularly (monthly)** by reading, recording and analyzing.
- To **maintain** bulk & zonal meters, other equipment and devices **routinely (daily)** by visual check and tools.
- To complete **zonal coding of customer database** (see the next slides)
- To enhance **meter reading ratio** or capture consumption. quantitatively by **installing meters to flat-rate customers** as well as by **decreasing estimate bills and unbilled customers**.
- To improve **accuracy of meter reading data** by ensuring regular meter reading through **discipline** as well as by **eliminating duplicated bills** if any.
- To **relieve the complexity** of water meter types, customer types, several water tariffs, meter reading by Units and Area Offices.

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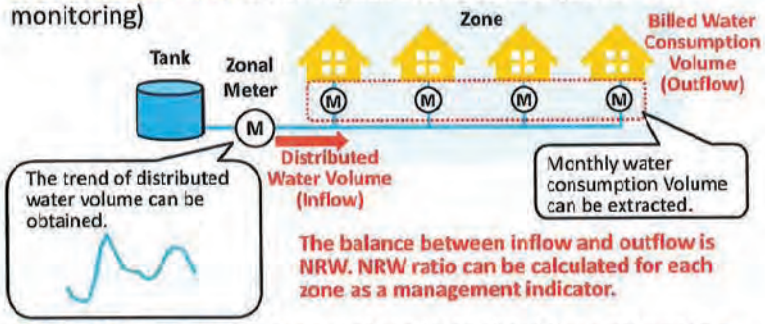
1-6 Water Distribution Management

Quantitative & Scientific Comprehensive Control (3 Pillars)

Water Volume: Water supply utilities should supply **necessary and sufficient water** even at peak and in future. (Zonal NRW monitoring)



Water Pressure: Water supply utilities should supply water **at proper water pressure** at each service point. (Pressure Map)

Water Quality: Water supply utilities should supply **safe water**, ensuring residual chlorine at each service point. (Chlorine Map)

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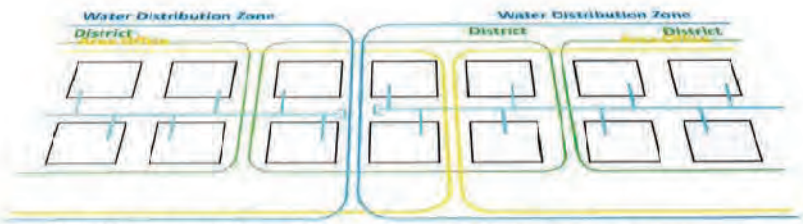
1-6 Water Distribution Management

Multi-Boundaries in FCTWB's Water Supply

Two boundaries exist:
(1) **Administrative District**
(2) **Area Office's managing area**
New boundary will be demarcated under the Project:
(3) **Water Distribution Zone** (defined by distribution network configuration and isolation)



FCTWB should find **optimum** water distribution management.

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1-6 Water Distribution Management

Zonal Coding of Customers
(Sorting out customers or its water consumption by Zone)

Schedule: May to June 2017
Coordinator: Mr. Adis, HoD Commerce
Supervisors: Mr. M. Dikko, Engr. Kabir, Mr. Shehu S., Mr. Kehinde and Mrs. Rose

Step-1: MIS Unit creates a new attribute "**Zonal Code**" in customer database. (completed)

Step-2: GIS Unit prepares **GIS maps** showing roads, cadastral data (plot no.), pipelines and district boundaries. (by 15th May)

Step-3: GIS Unit confirms and draws **zonal boundaries** on GIS maps with support of staff of **Distribution**, **Commerce** and **Area Offices**. (by 5th June)

Step-4: Based on the zonal boundaries on GIS maps, **Billing Unit** updates **customer database** by **assigning zonal code to each customer** with support of staff of **Distribution**, **Commerce** and **Area Offices.** (by 23rd June)

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Annex2-308

2. Output-2:

Methods/operational procedures for effective NRW reduction are established though **pilot projects** at Pilot Metering Areas (PMAs) under pilot Area Offices.

Content

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2-1. Status of NRW before Countermeasures in Pilot Areas

Result of NRW Ratio Before Countermeasures
(NRW Reduction Operations)

*Data: as at 2016 before countermeasures

Target Area	Metering Area	Number of Customers (connections)	Consumption(m^3/d)	NRW(%)
GUDU	SMA1	466	1,680	52.0
	SMA2	317	1,536	53.9
	PMA	**783**	**3,216**	**53.3**
JABI	SMA2	377	3,572	45.6
	SMA3	196	4,873	87.6
	PMA	**573**	**8,445**	**70.0**
GARKI I	SMA1	31	754	85.1
	SMA2	123	682	74.8
	SMA3	242	1,761	70.0
	PMA	**396**	**3,197**	**74.8**

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2-2 NRW Reduction Activities <Countermeasures>

- Action 1
  - Preparation of customer list & water consumption volume
  - Preparation of distribution pipeline drawing
- Action 2
  - Leakage detection & repair
  - Investigation of Illegal connection
  - Meter accuracy test
- Action 3 ⇨ *Result is shown in next slide*
  - Registration for non-registered customer
  - Grasping authorized unbilled customers

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2-3 Result of NRW Reduction Activities <Countermeasures>
Result of Meter Accuracy Test

【Standard Accuracy : ±10%】

1. GUDU Meter Type: Prepaid, Conventional	Range	Num.	Ratio
Within Standard	10%=>¯ >=-10%	99	74.4%
Out of standard	>10%, <-10%	34	25.6%
Total		133	100.0%

2. JABI Meter Type: Conventional	Range	Num.	Ratio
Within Standard	10%=>¯ >=-10%	34	27.2%
Out of standard	>10%, <-10%	91	72.8%
Total		125	100.0%

3. GARKI I Meter Type: AMR, Conventional	Range	Num.	Ratio
Within Standard	10%=>¯ >=-10%	30	49.2%
Out of standard	>10%, <-10%	31	50.8%
Total		61	100.0%

IN JABI, Very low level meter accuracy , 72.8% did not conform to the standard.

⇓

All meters are replaced

2-3 Result of NRW Reduction Activities <Countermeasures>
Accuracy Test of the Purchased Water Meters

- Before purchasing new meters for Jabi, sampled meters were tested. About 15% of the purchased new meters did not meet the accuracy standard.

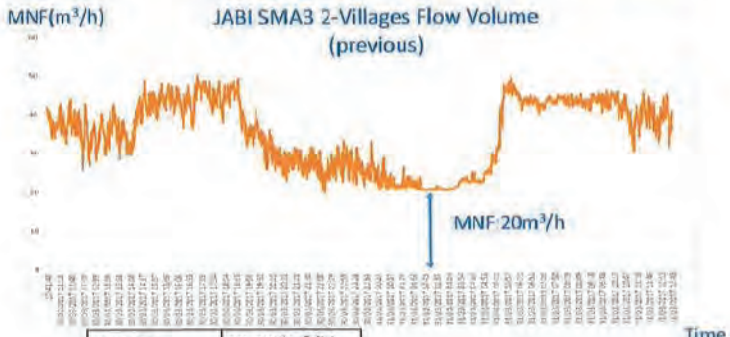
AMR meters stocked by WB were also tested and found that they conform to the standard

2-3 Result of NRW Reduction Activities <Countermeasures>
Meter Replacement after Meter Accuracy Test

1. Pilot Areas	3 Areas (GUDU, JABI, GARKI I)
2. Customers in the Pilot Areas (connections)	▪GUDU : 783 ▪JABI : 573 ▪GARKI I : 396 <Total : 1,752>
3. Number of Meter Accuracy Test (set)	Total : 319
4. Meter Replacement (places)	▪GUDU : 102 ▪JABI : about 600 ▪GARKI I : 40 or More

2-3 Result of NRW Reduction Activities <Countermeasures>
24hr Flow Measurement for Jabi Villages

Total water supply volume to the Villages in SMA3: 823m3/d



Average	34.29 (m³/h)
1 Day Volume	823.06(m³/d)

2-3 Result of NRW Reduction Activities <Countermeasures>
Metered Consumption Volume for SMA3 in Jabi Village

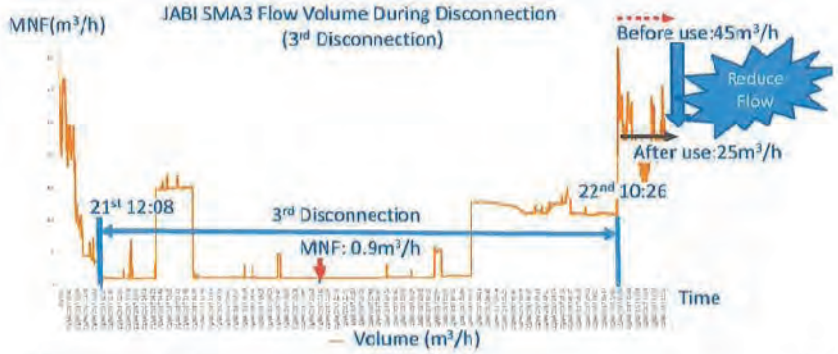
Metered Consumption of Villages in SMA3: 170m3/d

Water consumption of the Jabi Villages

S/n	NAME OF CUSTOMER	A. 1st Meter reading 22/Mar	B. 2nd Meter reading 30/Mar	C. Consumption (m3) <B-A>	D. Consumption (m3/d) <C/8days>
SMA3					
1. Jabi offstage Village					
1	Mr. Salu Ibrahim (Slow moving)	2895	3057	62	7.8
2	Mr. Sureya Usuf	2811	3070	259	32.4
3	Zila Mohammed (leakage from near tap pipe)	4131	4274	143	17.9
4	Jamilu Mohammed	576	606	30	3.8
5	Nramdi	2637	2973	336	42.0
6	Nramdi Umaha	1439	1519	80	10.0
7	Chinnakwe Intl Sch.	120	125	5	0.6
8	Ms. Mary Pure water company	1092	1172	80	10.0
	sub total (m^3/d)				116.6
2. Jabi obastage Village					
1	Saadafu Maigoro	2837	2934	97	12.1
2	Pius Okocha (tap leakage)	4696	4867	171	21.4
3	Musa Mohammed	2214	2373	159	19.9
	sub total (m3/d)				53.4
① Total (m3/d)				1 day	170.0
	Average (m3/d)				7.1
	② UFM 31/Mar/2017	Ave (m^3/h)	34.3	1 day (m3/d)	823.0
	③ - ① Difference between inflow and metered volume			1 day (m3/d)	653.0

2-3 Result of NRW Reduction Activities <Countermeasures>
Water Supply to Public Taps in Jabi Village

Result of flow measurement after disconnection of customers



2-4 Key Issues of NRW Reduction
Challenges of NRW Reduction Activities in the PMAs

GUDU : No access to many properties for meter reading

JABI : Village water supply on flat rate, meters theft, ultrasonic flow meter battery stolen

GARKI I : Uncertain existing distribution pipe location & connection to SMA2 & 3

2-4 Key Issues of NRW Reduction
Problems on PMA/SMA Creation

Pipe network isolation is difficult due to the following reasons:

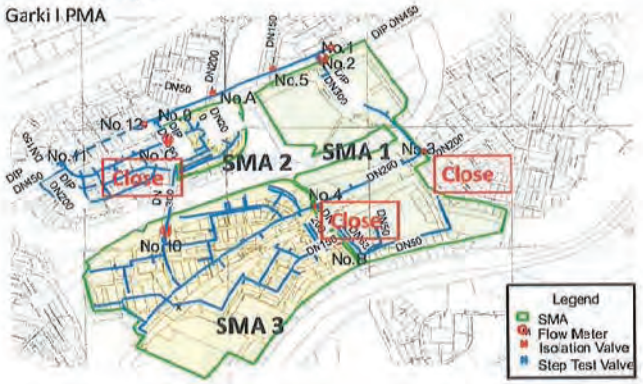
- **No comprehensive drawings**
- **Discrepancy between as built drawings and actual situation on the ground**
- **Depth of installed pipeline cause difficulty on survey of pipe location**

2-4 Key Issues of NRW Reduction

Uncertain existing pipe connection

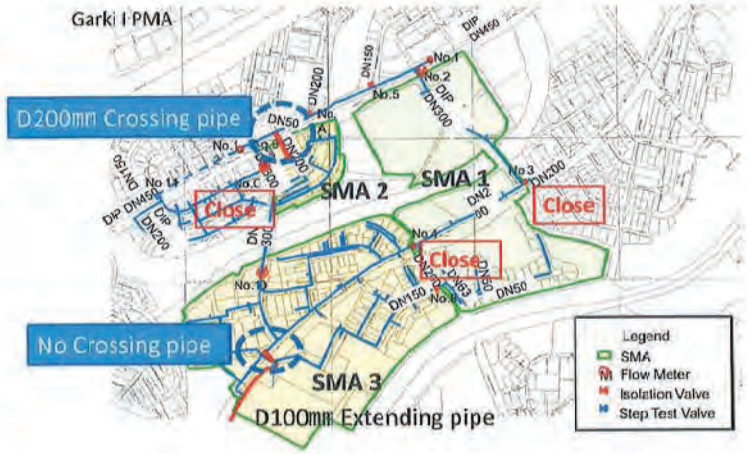
⇓

Occurred Mysterious (strange) flow measurement result (e.g.: rate of flow in the high elevation areas is larger than that of low elevation areas.)



2.4 Key Issues of NRW Reduction

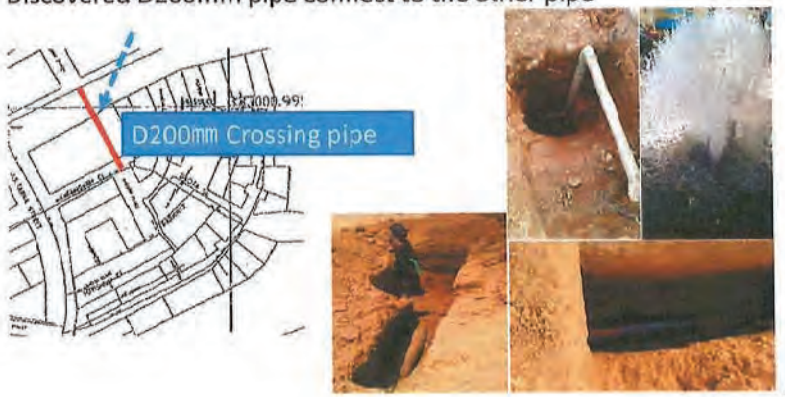
Discrepancy between as built drawings and Actual Situation on ground



2-4 Key Issues of NRW Reduction

Details of discovered Pipe Connection at Garki I SMA2

- D200mm pipe was not indicated in the existing drawing
- Carried out searching investigation & trail excavation
- Discovered D200mm pipe connect to the other pipe



2-4 Key Issues of NRW Reduction

Details of Non-crossing of Pipe Connection at Garki I SMA3

- Crossing pipe was indicated in the existing drawing
- Carried out searching investigation
- Discovered existing pipe does not connect the other pipe (to the other end)

2-4 Key Issues of NRW Reduction
Another Challenge of NRW Reduction Activities

Water supply to Villages in Jabi

2-4 Key Issues of NRW Reduction
Water Supply to the JABI Village

JABI Villages

2-4 Key Issues of NRW Reduction
Meter Theft & Battery Stolen in SMA2

Meters stolen

Battery stolen

2-4 Key Issues of NRW Reduction
Access to the Meters in PMAs

Ratio = Number of possible reading customers / Number of customers

	Meter Reading Ratio
GUDU	45%
JABI	82%
GARKI I	84%

-Gudu showed low reading ratio, because prepaid system and management is done by the developer.

-This situation cause keeping not good meter condition("Not visible" meter occupied 23% of all meters reading) and produce illegal use (number of illegal connection was 32, included suspect)

2-4 Key Issues of NRW Reduction
Access to Meter in GUDU

-Investigation of illegal use
- Difficult to enter the property make less investigation of illegal use
- Worse, Service pipe crossing under other person's property

-Prepaid system of Gudu
- Most of meter counters are not visible.
- Need to confirm customer's payment and consumed water volume, using water supply volume data by mechanical flow meter which was installed at inlet of PMA

2-5 Issues on Water Meters that the Project Team faced
Issues on Water Meters (Conventional) that the Project Team faced

Water Meters	Items	Issues
Conventional	1. Maintenance	• Manufactures seal is usually broken in the process of maintenance • Lots of staff members are required to read water meters.
	2. Operation	• Fuel for vehicle and personnel cost are more expensive than that of AMRs and Pre-paid meters. • Low work efficiency of meter reading because operator can use only one vehicle (bus) for meter reading.
	3. Procurement	• No appropriate supplier.
	4. Data Compilation	• Presence of human errors.
	5. Reading Accuracy	• Data is not accurate because water meters are not standardized. • There is no systems for checking meter reading report and bills.

2-5 Issues on Water Meters that the Project Team faced
Issues on Water Meters (Pre-paid) that the Project Team faced

Water Meters	Items	Issues
Pre-paid	1. Maintenance	• A lot of training for capacity building required.
	2. Operation	• Monitoring is required periodically to check condition.
	3. Procurement	• Funding issues (Management and Bureaucracy).
	4. Data Compilation	• Some of the applications are not flexible.
	5. Reading Accuracy	-
	6. Illegal connection	• In case that pre-paid meters are located in in the premises, it is difficult to monitor the pre-paid meter to detect illegal connection like bypass.

2-5 Issues on Water Meters that the Project Team faced
Issues on Water Meters (AMR) that the Project Team faced

Water Meters	Items	Issues
AMR	1. Maintenance	• It is not easy to maintain AMRs compared to conventional water meters because electric devices mounted. • No workshop. • Spare parts must be ordered from abroad.
	2. Operation	• Some meters can't be read because of antenna problem (easy to break)
	3. Procurement	• AMRs must be procured from only an agent from abroad. • Funding issues (Management and Bureaucracy)
	4. Data Compilation	• Some of the applications are not flexible
	5. Reading Accuracy	• It does not specify quantity of water leakage.

2-6 Status of NRW after Countermeasures in Pilot Areas
Improvement of NRW Ratio

NRW Ratio Comparison			As at December 2016		As at May 2017		
Target Area	Metering Area	Number of Customer (connections)	Consumption (m^3/d)	NRW(%)	Consumption (m^3/d)	NRW(%)	Improvement (Points)
GUDU	SMA1	466	1,680	52.0	1,631	14.3	37.7
	SMA2	317	1,536	53.9	1,471	28.7	25.2
	PMA	**783**	**3,216**	**53.3**	**3,103**	**21.0**	**32.3**
JABI	SMA2	377	3,572	45.6	3,921	21.1	24.5
	SMA3	196	4,873	87.6	3,202	16.2	71.4
	PMA	**573**	**8,445**	**70.0**	**7,119**	**30.9**	**39.1**
GARKI I	SMA1	31	754	85.1	731	62.2	22.9
	SMA2	123	682	74.8	692	78.2	-3.4
	SMA3	242	1,761	70.0	1,933	53.7	16.3
	PMA	**396**	**3,197**	**74.8**	**3,356**	**60.4**	**14.4**

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2-7 Key Actions required for Improving NRW Ratio

Eradicate situation of "Flat rate" and "Estimated" Billings

- Installation of meter to all water users
- Registration of all customer and elimination of non existing customers
- Rigorous/continuous meter reading
- Frequent updating of customer database
- Continuous leakage and illegal detection
- Plan for appropriate maintenance and replacement schedule for water meters

To ease calculation of NRW, there is need to obtain entire water consumption volume appropriately.

Simplify categorization of customers, charges and Billing system

- Unify meter type to conventional type

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3. Output-3:

A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1 & 2.

To be presented in "Work Plan (Phase-2)".

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THANK YOU FOR YOUR ATTENTION

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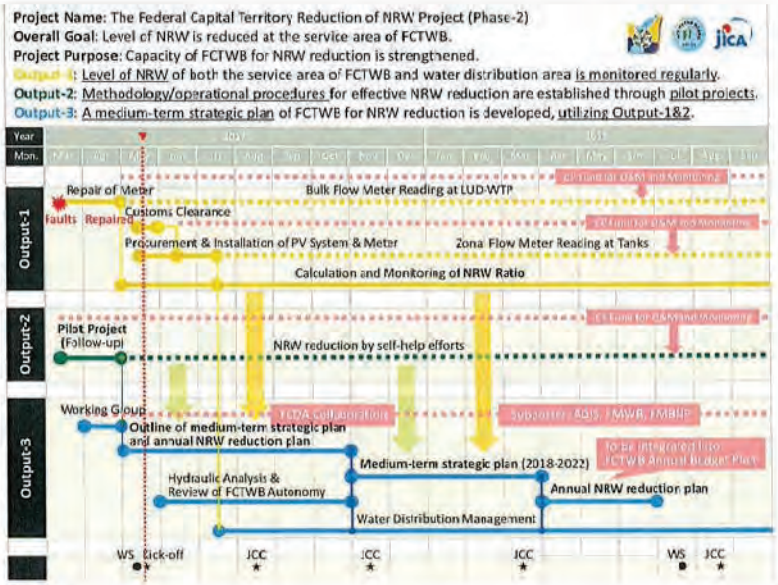
The Federal Capital Territory Reduction of NRW Project (Phase-2)

Work Plan (Phase-2) & Working Group for NRW Reduction Planning

16th May 2017

Engr. A. A. Nahuche
Technical Manager, HOD Distribution, FCTWB

1



2

Principles of Project Implementation (Phase-2)

Technical-1(A1): Well-established quantitative NRW monitoring
Technical-2(A2): Follow-up and wrap-up of the Pilot project
Technical-3(A3): Development of framework for effective and efficient NRW reduction
Technical-4(A4): Realistic and feasible strategic planning
Technical-5(A5): Review of autonomy and assistance in promotion
Operational-1(B1): Flexible and smooth implementation of the Project
Operational-2(B2): Cooperation with organizations concerned for implementing the strategic plan
Operational-3(B3): Promotion of self-sustainable development after the Project
Operational-4(B4): Quality Management of Project Implementation

3

Principles of Project Implementation (Phase-2)

Technical-1(A1): Well-established quantitative NRW monitoring

As Output-1, the Project realizes **quantitative NRW monitoring** by installing bulk flow meters and zonal flow meters at outlet of water treatment plant as well as outlet of main service reservoirs, and also modifying existing billing system for calculation of monthly water consumption data. The Project promotes the establishment of comprehensive measurements of both distribution and billed water volume by developing measuring and monitoring system, preparing standard operating procedures and manuals, etc.

Technical-2(A2): Follow-up and wrap-up of the Pilot project

Through the prompt and intensive follow-up activities in the Pilot projects, the Project wraps up the pilot projects implementation at earlier stage of Phase-2.

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Principles of Project Implementation (Phase-2)

Technical-3(A3): Development of framework for effective and efficient NRW reduction

Before the Project was launched, FCTWB had not conducted NRW reduction operations systematically and actively. Thus, the Project develops a **framework** covering command/communication system among managers and staffs in charge, practical procedures and methods of NRW reduction operations, data measurement/recording/check, water balance analysis, feedback and so on. The Project assists FCTWB to identify causes of NRW in PMAs and examine approaches to NRW reduction suitable for characteristics of service areas, then proposes **effective and efficient NRW reduction** in medium-term strategic planning.

As Output-2, the Project demonstrates effects, cost-effectiveness and importance of NRW reduction through Pilot projects. Considering conditions of FCTWB including implementing structure, service/management infrastructure, budget, etc., the Project also examines technically the balance between entire/zonal NRW monitoring in Output-1 and NRW reduction in Output-2.

Principles of Project Implementation (Phase-2)

Technical-4(A4): Realistic and feasible strategic planning

As Output-3 based on the results of Output-1 and Output-2, the NRW reduction medium-term strategic plan for five years and annual NRW reduction plan are developed by the Working Group, which should be **realistic and feasible** in consideration of cost of NRW reduction and certainty of budgetary allocation. The medium-term strategic plan includes the tactics to expand NRW reduction into the entire water service area of FCTWB drawing water from Lower Usuma Dam (LUD), review of organization structure, human resources development, infrastructure development (pipe replacement, etc.). The Project sets timeline and priority by issues in consideration of capacity and structure of each department, and then develops a implementation plan (including target values), an organization and human resources development plan and a distribution pipe replacement plan. In addition, the Project designs new department or cross-organizational taskforce on NRW reduction as a successor to the NRW Management Team and/or Action Team to be established in order to continue NRW reduction operations **routinely** and **sustainably**.

Principles of Project Implementation (Phase-2)

Technical-5(A5): Review of autonomy and assistance in promotion

Autonomy of FCTWB based on the legal framework is the key to achieve sound management of water supply services, adequate operation and maintenance, and sustainable NRW reduction. However, the FCTWB Bill for autonomy has not been approved by the Parliament since the former administration.

In the Phase-2, the Project reviews the Bill, analyzes the financial situation, conducts examination on the effect and impact of autonomy, and considers the organizational picture suitable for FCTWB. In anticipation of promoting NRW reduction, the Project prepares documents to be presented to the FCT Minister if necessary.

Principles of Project Implementation (Phase-2)

Operational-1(B1): Flexible and smooth implementation of the Project

For successful implementation of the Project, framework/approaches of activities, that is, the **Project Design Matrix (PDM)** should be modified **flexibly** according to political, social and security situations, organizational reform of organizations concerned and their performance. Thus, the Project recognizes cases early and monitors them, which may impact on implementation, and seeks solution through **close information sharing, smooth communication and coordination** with among organizations concerned.

In order to carry out the Project as planned, the Project secures a communication system that functions efficiently and timely.

Principles of Project Implementation (Phase-2)

Operational-2(B2): Cooperation with organizations concerned for implementing the strategic plan

To make the NRW reduction medium-term strategic plan be **functional** properly, **support and understanding by the organizations concerned** * and **adequate budget allocation** are the key. The Project strengthens practical cooperation among the organizations concerned for sustainable development and improvement of water supply services of FCTWB through periodical meetings, discussions and approaches.

In this process, the financial situation of FCTWB, problems and issues of operation and maintenance including NRW reduction, financial and technical effects and impact of NRW reduction, establishment of feedback system, the necessity of developing the service/management infrastructure should be shared appropriately and timely.

* FCTA, FCDA (Water & Sewage, Design & Evaluation), AGIS, FMWR, FMBNP, etc.

Principles of Project Implementation (Phase-2)

Operational-3(B3): Promotion of self-sustainable development after the Project

(1) Establishment of Cross-Organizational Unit and Task Force
In order to strongly and continuously promote the development and improvement of NRW reduction and the service/management infrastructure in the short-, medium- to long- terms, **a mandatory and dedicated cross-organizational unit or task force** (with certain discretion) is required. With consideration of this, the Project establishes "NRW Reduction Working Group" is to implement Phase-2 more effectively.

(2) Motivation and Initiative of FCTWB Staff
In the Phase-2, the Project makes **full use of the motivated staff and their initiative** based on knowledge obtained and awareness in the Phase-1.

(3) Capacity Assessment and Capacity Development Plan
Based on the **Capacity Assessment (CA)** and **Capacity Development (CD) plan** which were conducted and prepared in the Phase-1, the Project monitors status of capacity development quantitatively, conducts follow-up, and reviews CD plan.

Principles of Project Implementation (Phase-2)

Operational-4(B4): Quality Management of Project Implementation

The Project looks after various records of communication, activities, manuals and documents including reports, and then secures **quality** through review, validation and verification. Particularly, **Project Monitoring Sheet** is utilized and improved as an effective tool of progress control. The Project applies the Plan-Do-Check-Act (PDCA) cycle so that the knowledge obtained and the lessons learned through activities can be fed back to the Project during implementation for achievement of substantial results at the end of the Project.

Contents of the Medium-term Strategic Plan (Tentative)

A. **Introduction to NRW and approaches**
B. **Target and indicator**
C. **Staffing plan and their responsibilities**
D. **HRD plan**
E. **Summary of results of pilot projects**
F. **Causes of NRW and their patterns by features of areas**
G. **Workflow of NRW reduction**
H. **NRW reduction operations plan** : Network drawings and data, Design and creation of DMA or equivalent, Prioritization in NRW reduction, Replacement plan of existing pipelines, Field examination of existing valves and etc., Installation of flow meter, Measurement of Minimum Night Flow, Leakage detection, Repair of leaks and recording, Customer listing, Meter reading, Identification of illegal connections and meter inaccuracy, Data collection of billed consumption before/after NRW reduction, Measures against illegal connections and meter inaccuracy, Water balance analysis after NRW reduction operations, Safety measures
I. **Implementating schedule**
J. **Estimation of total and annual costs**
K. **Estimation of total and annual benefits**
L. **Recommendations on facility development /improvement and its model**
M. **Recommendations on autonomy and improvement in financial situation**
N. **Manual for equipment**

Timeline and Flow of the Medium-term Strategic Planning (2017)

Period	Flow	Members in charge (supported by JICA Expert Team)
May 2017	a.Draft contents / Work schedule, nomination of members in charge	◆ Project Manager, Deputy Project Manager ◆ NRW Management Team Leaders ◆ Working Group + Advisor
Jun. - Aug. 2017	b.Preparation of draft Outline	◆ Working Group + Advisor (FCDA, AGIS, FMWR) ◆ Nominated Members
	Output 1&2	
Sep. - Oct. 2017	c.Brush up and finalize Outline	◆ NRW Management Team Leaders ◆ Working Group + Advisor (FCDA, AGIS, FMWR) ◆ Nominated Members
	Pre-condition	
Nov. 2017	d.Development/ approval of Outline	◆ JCC ◆ Project Manager, Deputy Project Manager ◆ NRW Management Team Leaders ◆ Working Group + Advisor
	Recommend Improve	
Nov. - Dec. 2017	e.Preparation of draft Strategic Plan	◆ Working Group + Advisor (FCDA, AGIS, FMWR) ◆ Nominated Members
	Output 1&2	

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Timeline and Flow of the Medium-term Strategic Planning (2018)

Period	Flow	Members in charge (supported by JICA Expert Team)
	Output 1&2	
Jan. - Feb. 2018	f. Brush up and finalize Strategic Plan	◆ NRW Management Team Leaders ◆ Working Group + Advisor (FCDA, AGIS, FMWR) ◆ Nominated Members
	Pre-condition	
Mar. 2018	f. Development / approval of Strategic Plan	◆ JCC ◆ Project Manager, Deputy Project Manager ◆ NRW Management Team Leaders ◆ Working Group + Advisor
	Recommend Improve	
Mar. - Apr. 2018	g Preparation of Annual Plan	◆ Working Group + Advisor (FCTA, FMNBP) ◆ Nominated Members ◆ Finance Department
	Output 1&2 / Recommend Improve	
May 2018	h Development / approval of Annual Plan	◆ NRW Management Team Leaders ◆ Working Group ◆ Finance Department
Jun. 2018	i. Integration into Annual Budget Plan	◆ Project Manager, Deputy Project Manager ◆ NRW Management Team Leaders ◆ HoD Finance

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Working Group for NRW Reduction Planning

Sub-Group: Working-Level (Proposed)

Leader

1. Engr. Moh. Kabir Rabiu (HoU: NRW, Distribution/HQs)

Sub-Leader

2. Engr. Abdullahi Masaud (HoU: Metering General, Distribution/HQs)
3. Mrs. Rose Akpan (HoU: Billing, Commerce/HQs)

Members

4. Mr. Danjuma Isah (HoU: Monitoring and Detection, Commerce/HQs)
5. Mr. Shehu Suleiman (HoU: GIS, Distribution/HQs)
6. Mr. Habib Ahmed Kiru (A.M./Gudu)
7. Mr. Muhammed A. S. Ramat (A.M./Jabi)
8. Mr. Acesoji Adenuga (A.M./Garki I)
9. Mr. Abdulrahman Muhammed (NRW Unit, Distribution/HQs)
10. Mr. Igbinosa Courage (NRW Unit, Distribution/HQs)
11. Mr. Mohammed Dauda (Pipeline Unit, Distribution/HQs)
12. Mr. Abubakar Ubale Abubakar (AMR Unit, Distribution/HQs)
13. Mr. Abdulrahman Shehu Sani (Prepaid Unit, Distribution/HQs)
14. Mr. Abdul Ozumi (Assistant A.M., Distribution/Gudu)

FCDA

15. Engr. Solomon Udoh, Principal Engineer, Engineering Services

* **Other members:** To be co-opted when necessary.
* **Regular Meeting:** at FCTWB's Conference Rooms at least twice a month or.

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Working Group for NRW Reduction Planning

Sub-Group: Advisory-Level (Proposed)

FCTA

1. Mr. Sani Pai (Director, EPRS), Chairperson
2. Mr. Lawal Abubakar (Deputy Director, EPRS)

FCTWB

3. Mr. Hudu Bello (Director)
4. Engr. A. A. Nahuche (HoD, Distribution)
5. Mr. Adis S. Muhammad (HoD, Commerce)
6. Mrs. Hafsat Ahmed Lawi (HoD, Finance)
7. Mr. Sunday Agbonthane (HoD, Reservoir and Production)
8. Mrs. Lola Okobi (HoD, Quality Control)
9. Engr. Abolade R. Lawal (HoU, Special Projects, Distribution)
10. Mr. Dele Olatunji (HoU: Multilateral Relations)
11. Mrs. Bunmi Olowookere (HoU: Planning, Research and Statistics)
12. Mr. Musa Dikko (HoU: Pipeline/Distribution)

FCDA

13. Engr. F. C. Ezeoha (Deputy Director: Water & Sewage, Engineering Service)
14. Engr. J. U. Osayande (Deputy Director: Design, Design & Evaluation)

FMWR

15. Mr. Adebanjo Adebayo J. (Deputy Director: TSS/C&P)

* **Regular Meeting:** Once a month or on an as-needed basis.

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The Federal Capital Territory Reduction of NRW Project (Phase-2)

Summary Report of the 3rd Workshop

16th May 2017

Engr. Abolade R. Lawal
Project Coordinator, HoU (Special Project), FCTWB

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3rd Workshop

Venue: Savannah Suites Hotel, Area 3, Garki, FCT
Time: 9:30 - 15:15 on Tuesday, 9th May 2017

Attendance: 120 registered participants
- Federal Capital Territory Administration (FCTA/EPRS)
- Federal Capital Territory Water Board (FCTWB)
  * HQs, 3 Pilot Area Offices and all other Area Offices
- JICA Nigeria Office
- JICA Expert Team
- Federal Capital Development Authority (FCDA)
- African Development Bank (AFDB)
- Agence Française de Developpement (AFD)
- Lagos Water Corporation (LWC)

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Purpose and Sessions of the 3rd Workshop

Purpose of Workshop
- Formation of shared awareness of project orientation and updated progress, problems and challenges

Session 1
Output-1: NRW Calculation and Monitoring

Session 2
Output:2 NRW Reduction Pilot Project

Session 3
Output-3: NRW Reduction Strategic Planning in Phase-2

3

Session 1 Output-1: NRW Calculation and Monitoring
1-1. Bulk & Zonal Meters
1-2. Billing System
1-3. Works and Challenges

Session 2 Output-2: NRW Reduction Pilot Project
2-1. Procedures of Pilot Project
2-2. Gudu Case Study
2-3. Jabi Case Study
2-4. Garki I Case Study
2-5. Findings in Case Studies, Issues and Challenges

Session 3 Output-3: NRW Reduction Strategic Planning in Phase-2
3-1. Work Plan (Phase-2)
3-2. Working Group on Strategic Planning

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Photos

High Table

Participants

Presentation

Presentation

Presentation

Equipment displayed

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Comments and Q&A

- Decision makers are concerned about benefit of NRW reduction, particularly revenue generation in monetary value.
- FCTWB should have a plan to sustain bulk and zonal meters with respect to electricity supply problems?
- FCTWB should sustain the upgraded billing system.
- What is the acceptable NRW (leakage/loss) in design?
- What is the response time for repair/replacement?
- What happened to the customers after the repair/replacement?
- How can FCTWB assist other water supply utilities in Nigeria to embark this kind of NRW project as the lessons learnt?
- Why does FCTWB have flat-rate customers under prepaid meter system?
- What is the possibility for JICA to transfer technology to produce water meters locally so as to avoid procuring them abroad.
- Other technical comments

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Appendix 7

Project Monitoring Sheet I (Revision of Project Design Matrix)

PM Form 3-2 Project Monitoring Sheet I
PDM3

Project Title: The Federal Capital Territory Reduction of Non-Revenue Water Project
Project Period: October 2014 to ~~March~~ September 2018
Implementing Organization: Federal Capital Territory Administration (FCTA) / Federal Capital Territory Water Board (FCTWB)
Dicrect Beneficiaries: FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices
Project Site: FCT Pilot Area Offices: Jabi, Garki I and Gudu

Version 3
Dated 22 Sep. 2016

Monitoring: 20 Dec. 2016

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<Overall Goal> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB	a: Annual NRW ratio is reduced to X%(*) at the end of the year ~~2021~~ 2023 Note(*): Target value (X%), which is expected to be determined in the medium-term strategic plan for NRW reduction, shall be tentatively filled when the final draft was approved by the Director of FCTWB, which shall be finalized when the plan is approved by FCTA	a. Record of NRW ratio kept by Distribution Department		None	
<Project Purpose> Capacity of FCTWB for NRW reduction is strengthened	a. The medium-term strategic plan for NRW reduction (~~2018-2022~~) 2019-2023 is approved by FCTA by the end of the Project. b. NRW reduction operations ~~of the first quarter of 2018~~ specified in the annual plan of the above plan are carried out according to the plan by FCTWB. c. Relevant staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) become equipped with skills and knowledge necessary for NRW reduction according to the criteria set by the Project for each level. d. NRW ratio of each PMA ~~in the last quarter of the Project~~ reaches its respective target (**). Note(**): Target for each PMA is expected to be determined ~~by the end of the first quarter of the second year~~.	a. Date of approval of the plan b. Result of monitoring by NRW Management Team c. Results of joint assessment based on the criteria set by the Project d. Record of NRW ratio kept by Distribution Department	A. Policy support for NRW reduction is not discontinued Policy support for NRW reduction is not discontinued B. Natural disaster/ political instability/ economic crisis that affect the service area of FCTWB do not occur C. Activities to implement the medium-tem strategic plan are not discontinued or delayed	Indicator a: None. Indicator b: None. Indicator c: Results of interim capacity assessment in Nov.-Dec. 2016 show that capacity developed has not reached to the criteria. Follow-up capacity development is necessary in Phase-2 of the Project. Indicator d: None.	
<Outputs>					
1. Level of NRW of both the service area of FCWTB and water distribution areas is monitored regularly	1a. Record of monthly NRW ratio is kept by Distribution Department ~~from the third quarter of the second year of the Project~~. 1b. Monthly NRW ratio of the service area of FCTWB is reported to its monthly Joint Management Meeting ~~from the third quarter of the second year of the Project~~. 1c. Quarterly NRW ratio of the service area of FCTWB is reported to Management of FCTWB ~~from the third quarter of the second year of the Project~~. 1d. Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department ~~from the first quarter of the third year of the Project~~.	1a. Monthly record of NRW ratio 1b&1c. Material for meetings submittad by the Distribution Department 1d. Periodic records of data on water distribution management	A. Staff of FCTWB (i.e. members of NRW Management Team and Pilot NRW Action Teams) trained through the Project do not leave the office in large numbers	Indicator 1a&1b&1c: None and delayed as a result of delay in Activities 1-2 to 1-5. Indicator 1d: None	
2. Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (*1)	2a. Decrease rate of NRW ratio for each Sub Metering Area of a PMA reaches at least 80% of its target at the end of the respective NRW reduction operations. 2b. Technical manuals for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials, are approved by Head of Department (HoD) for Distribution and HoD for Commerce ~~by the first quarter of the third year of the Project~~.	2a. Record of NRW ratio kept by the Distribution Department 2b. Date of approval of the manuals		Indicator 2a: Most of results did not reach target level. Follow up activities to achieve the target level are necessary by utilizing lessons and learnt. Indicator 2b: Technical manuals were prepared and provisionally approved.	
3. A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 (*2) 2019-2023	3a. ~~By October 2017,~~ draft medium-term strategic plan for NRW reduction (2018-2022) is submitted by FCTWB to FCTA for review and approval 3b. ~~By October 2017,~~ an annual NRW reduction plan (2018) is incorporated in FCWTB's annual recurrent and capital plan (2018) for submission to FCTA for review and approval. 2019 3c. A planning manual for NRW reduction is approved by the Director of FCTWB ~~by the end of the Project~~. 3d. ~~By November 2016,~~ framework of water distribution management is established.	3a&3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan 3c. Date of approval of the manual 3d. Implementing structure and workflow of water distribution management		Indicator 3a: None. Indicator 3b: None. Indicator 3c: None. Indicator 3d: Framework has not been ready due to delay in Activity 1-6 and 1-7.	

Note (*1): NRW components targetec by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection
Note (*2): A medium-term strategic plan is a five-year plan, which may include medium-term target, strategies and actions, timeframe, human resource requirement, on-the-job training mechanism, cost-benefit analysis of NRW reduction, etc. It is noted that NRW components addressed by the strategic plan are not limited to the ones mentioned in (*1) above: they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

Activities	Inputs		Important Assumption	
	The Nigerian Side	The Japanese Side		
1-1 Instal bulk meters to water treatment plants 1 and 2 1-2 Measure monthly water production of water treatment plants 1, 2, 3 and 4 1-3 Tally the above water production data monthly 1-4 Calculate the monthly water consumption based on the billing data 1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4 1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system 1-7 Measure and collect data for water distribution management such as water flow of zonal meters and water pressure	**Project Personnel** 1. Project Director: Director of Economic Planning, Research and Statistic Department, FCTA 2. Project Manager: Director of FCTWB 3. Deputy Project Manager: HoD for Administration and Supply/FCTWB 4. Technical Managers (Also Leaders of NRW Management Team): HoD for Distribution and HoD for Commerce /FCTWB 5. Members of NRW Management Team (FCTWB): - Head of Special Project Unit of Distribution Department (as Coordinator) - Relevant Head of Unit (HoU) and officers of the Distribution Department, Commerce Department, and Administration and Supply Department 6. Heads of other relevant Departments and Unit of FCTWB: HoD for Finance, HoD for Production, HoU for Planning Research and Statistics (PRS) 7. Members of NRW Action Team: Area Manager, Assistant Area Manager (Distribution), Assistant Area Manager (Commerce), technical officers (Distribution) and meter readers (Commerce) of each pilot Area Office 8. Other personnal mutually agreed upon as necessary	**Japanese Experts** 1. Chief Advisor / NRW Reduction Planning / Water Distribution Management 1 2. Deputy Chief Advisor / NRW Reduction Planning 3. NRW Reduction Operations Management 4. Leakage Detection Technology 5. Commercial Loss 6. Hydraulic Analysis / GIS 7. Procurement Manage't / Coordinator 8. Facility Design / Construction Supervision 9. Equipment Design / Installation 10. Water Distribution Management 2 11. Remote Monitoring 12. Other experts mutually agreed upon as necessary	A. Natural disaster / political / instability / economic crisis that affect the Project activities do not occur.	
2-1 Review existing NRW reduction operations at each pilot Area Office 2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office 2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA(*3) 2-4 Prepare/update distribution network drawings for each PMA 2-5 Instal water flow meters to each PMA and measure in/outflows monthly 2-6 Zone each PMA into Sub Metering Areas (SMA) 2-7 Isolate a SMA by installing valves 2-8 Update the distribution network drawings for each SMA 2-9 Measure an initial level of NRW of each SMA 2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA 2-11 Develop a NRW reduction operation plan of each SMA ,including reduction target, for review by Head of Distribution Department 2-12 Review and approve NRW reduction operation plan of each SMA 2-13 Implement the NRW reduction operations at each SMA 2-14 Monitor the progress of the NRW reduction operations of each SMA 2-15 Measure level of NRW of each SMA at the end of the respective operations 2-16 Prepare a report on pilot projects, covering Activity 2-1~2-15 2-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials	"12. Remote Monitoring Device Installation / Training" and "13. Financial Analysis / Organization" to be added. **Land, Building and Facilities (to be financed by Couterpart Fund)** 1. Office building and facilities necessary for the implementation of the Project 2. Office spaces and necessary facilities for the Japanese Experts at the FCTWB Headquarters and each pilot Area Office, including internet connection and air conditioners 3. Chambers for flow meters and valves for the selected PMAs/SMAs. 4. Electric wiring to bulkzonal meters, loggers and pressure sensors. 5. Other facilities mutually agreed upon as necessary To be extracted and replaced by "9. Standby power generating facility" **Local Costs (to be financed by Couterpart Fund)** 1. Cost for installation, operation and maintenance of the provided equipment and cost for pipe repair at PMAs 2. Administration and operational costs, including cost for local travel for the Project Personnel, demurrage at local customs point, licensing cost of radio application and cost for communication of telemetric device for selected zonal meter(s) and water pressure sensor(s) 3. Other costs mutually agreed upon as necessary	**Equipment** 1. Bulk meters and loggers for water treatment plants 2. Water flow meters, valves, and customer meters for SMA 3. Leakage detection equipment for PMA 4. Pipe repair equipment for PMA 5. Vehicles (Pick-ups) 6. Generator for project office 7. Zonal meters, loggers and water pressure sensors 8. Telemetric monitoring system with standby power generating facility for selected zonal meter(s) and/or water pressure sensor(s). 9. Other equipment mutually agreed upon as necessary **Facilities** 1. Modification of existing billing system 2. Chambers for bulk meters for water treatment plants, zonal meters and water pressure sensors **Training of the Nigerian Project Personnel** 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria	**Pre-Conditions** A. Furnished offices for Japanese Experts are secured at the Headquarters and each Pilot Area Office of FCTWB. B. Project Personnel is assigned with the finalized list.	
3-1 Establish a Working Group for NRW planning (*4) 3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB 3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks 3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan 3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA 3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent and capital plan of FCTWB for approval by FCTA 3-7 Develop a planning manual for NRW reduction 3-8 Review existing plans, activities and implementing structure, etc. related to water distribution management 3-9 Establish framework of water distribution management	"in principle" to be addeded			**Issues & Countermeasures** **(1) Delay of the Project (Output-1)** Issue Available monitoring period of Activities 1-2 to 1-5 is insufficient, so the Project needs at least six months for monitoring the Activities 1-2 to 1-5. Countermeasures The Project period will be extended for six months for monitoring the Activities 1-2 to 1-5. **(2) Data Acquisition by Bulk Flow Meter (Output-1)** Issue The Project found out that data acquisition is not always available, which may be due to no water-filled flow inside pipelines and should be solved as soon as possible. Countermeasures The Project needs immediately to investigate causes, find possible solutions through discussion among relevant Departments and Units. **(3) Less-than-successful Results of the Project (Output-2)** Issue A series of activities for NRW reduction in PMAs/SMAs were completed, however should be followed up and monitored because decrease in NRW ratio in some SMAs resulted in less-than-successful. Countermeasures The Project needs immediately detailed re-check of results/data, continuous and further activities to reduce NRW to a certain degree as follow-up activities by utilizing lessons and learnt in Phase-1.

Note (*3) Selection criteria of PMA are as follows: (i) Safety for night works is secured in measuring minimum night flow; (ii) Distribution network is separated and it is easy to isolate it in measuring NRW ratio; and (iii) NRW ratio is supposedly high.
Note (*4) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Head of Production Dept., Head of PRS Unit, and members of NRW Management Team.