

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 cable	✓		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 cable	✓		2	2	✓	including installation, commissioning and training
3	Data logger (stationary)	Paperless, 6 points, 1s-1h record cycle, 4-20mA, trend, bar graph and historical trend displays	✓		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 historical trend displays	✓		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, server, etc	✓		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, large x3)	✓		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. 19x800mm	✓		9	9	✓	
13	Portable residual chlorine analyzer	DPD, absorptionmetry, 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 lamper			✓	3	3	✓	
6	Electric drum	50m		✓	3	3	✓	
7	Customer meter	Dia. 213" with fittings, conventional type		✓	(388)	-	Not yet	To be determined through baseline survey.
8	Customer meter	Dia. 1" with fittings, conventional type		✓	(259)	-	Not yet	To be determined through baseline survey.
9	Customer meter	Dia. 50mm with fittings, conventional type		✓	(89)	-	Not yet	To be determined through baseline survey.
10	Customer meter	Dia. 80mm with fittings, conventional type		✓	(23)	-	Not yet	To be determined through baseline survey.
11	Customer meter	Dia. 100mm with fittings, conventional type		✓	(7)	-	Not yet	To be determined through baseline survey.
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 Lumens, HDMI, VGA, USB port		✓	1	1	✓	

Annex 2: The Second Training in Japan

The Second Training in Japan

Course Name: The Federal Capital Territory Reduction of Non-Revenue Water Project (Distribution and Commerce)

Purpose:

1. All trainees belonging to both Distribution and Commerce understand system/outline of water supply services in Japan and Yokohama City, and then can compare them with those in Nigeria and FCTWB.
2. Through participation in common lectures, visiting and discussions, all trainees belonging to both Distribution and Commerce understand systems and efforts for operation and maintenance and NRW reduction.
3. Through participation in lectures and visiting related to each area, Distribution or Commerce separately, trainees belonging to each area understand systems, technologies, methodologies and efforts for operation and maintenance and NRW reduction.
4. In consideration of consistency to the action plan proposed by trainees participated in the 1st Training in August 2015, more practical and pragmatic action plan for realization is prepared by trainees belonging to both Distribution and Commerce jointly.
5. Eventually, the action plan and their knowledge are fully utilized for implementation of appropriate operation and maintenance and cross-organizational NRW reduction by FCTWB.

Programme:

1. Common Subject: Water Supply in Japan, Non-Revenue Water, Self-support Accounting System, Distribution Management, Mapping System (GIS), Yokohama Water Supply Museum, Water Meter, Service Connection & Inspection, Water Supply Facility Development Planning, Medium-Term Management and Financial Planning, Schoolchild Education Activity in Water Treatment Plant
2. Distribution: Facility O&M, Leakage Prevention, Leakage Detection Demonstration, Supervision & Inspection, Water Supply Operation & Management
3. Commerce: Water Tariff, Public Relations, Customer Services, Meter Reading, Human Resources Development

Period: 19th June to 2nd July 2016

Receiving Water Utility: Yokohama City Waterworks Bureau

Participants: 8 project members (Distribution: 4, Commerce: 4)

Name	Position in the Project	Position in FCTWB
Engr. Abolade Rasaki Lawal	Coordinator, NRW Management Team	Head of Special Projects Unit, Distribution
Mr. Habib Ahmed Kiru	NRW Action Team Leader	Area Manager, Gudu Area Office
Mr. Mohammed Dauda Debo	NRW Management Team member	Technical Officer, Pipeline Unit, Distribution
Mr. Abdulrahman Shehu Sani	Ditto	Senior Technical Officer / Head of Prepaid Meter Unit, Distribution
Mr. Danjumma Isah	Ditto	Chief Commercial Officer, Head of Monitoring and Detection Unit, Commerce
Mr. Shehu Sulaiman	Ditto	Head of GIS, Head of AMR Operations, Distribution / Commerce
Mr. Aliyu Muhammad Maradun	Ditto	Chief Commercial Officer, Head of Major Consumers Unit, Commerce
Mrs. Rose Aniekani Akpan	Ditto	Head of Billing Unit, Commerce

Annex 3 Location of the SMAs to be removed from PMA Monitoring

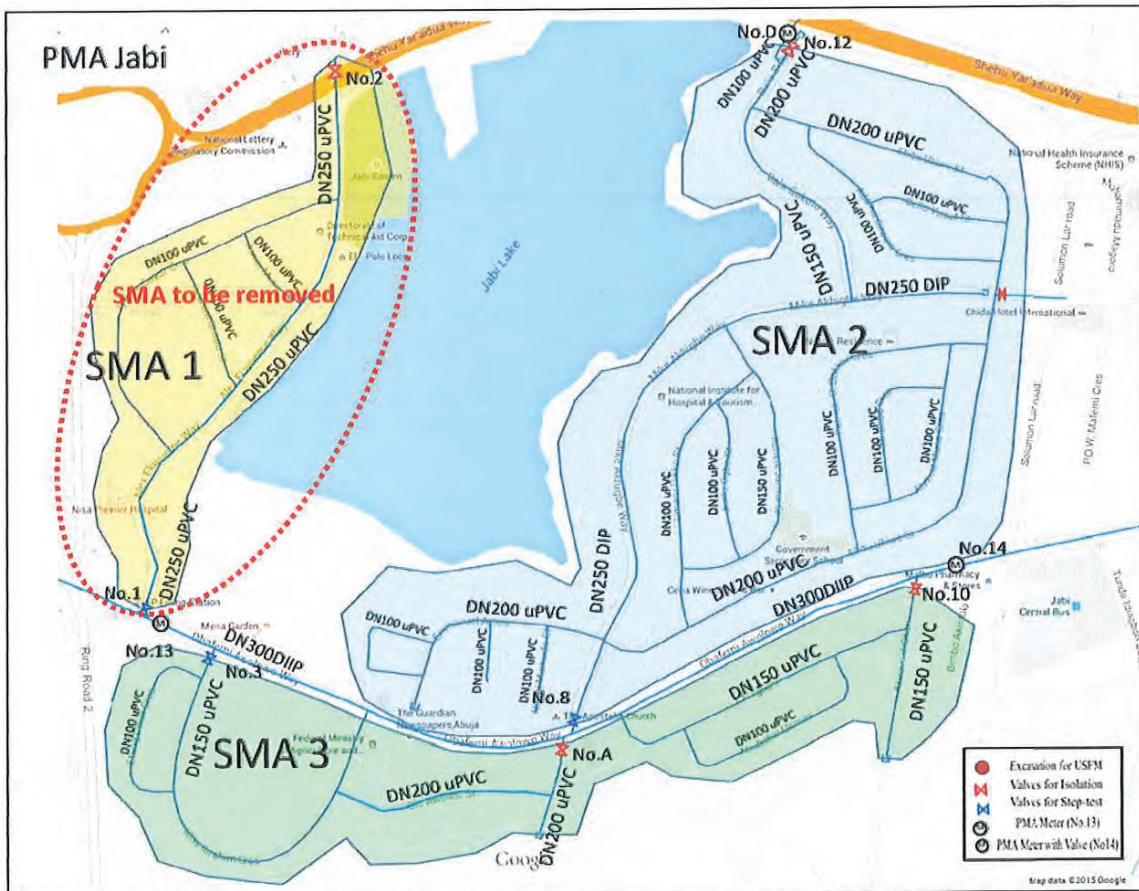


Figure: Location of the SMA to be removed from PMA Monitoring (Jabi)

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2014

Annex 3 Location of the SMAs to be removed from PMA Monitoring

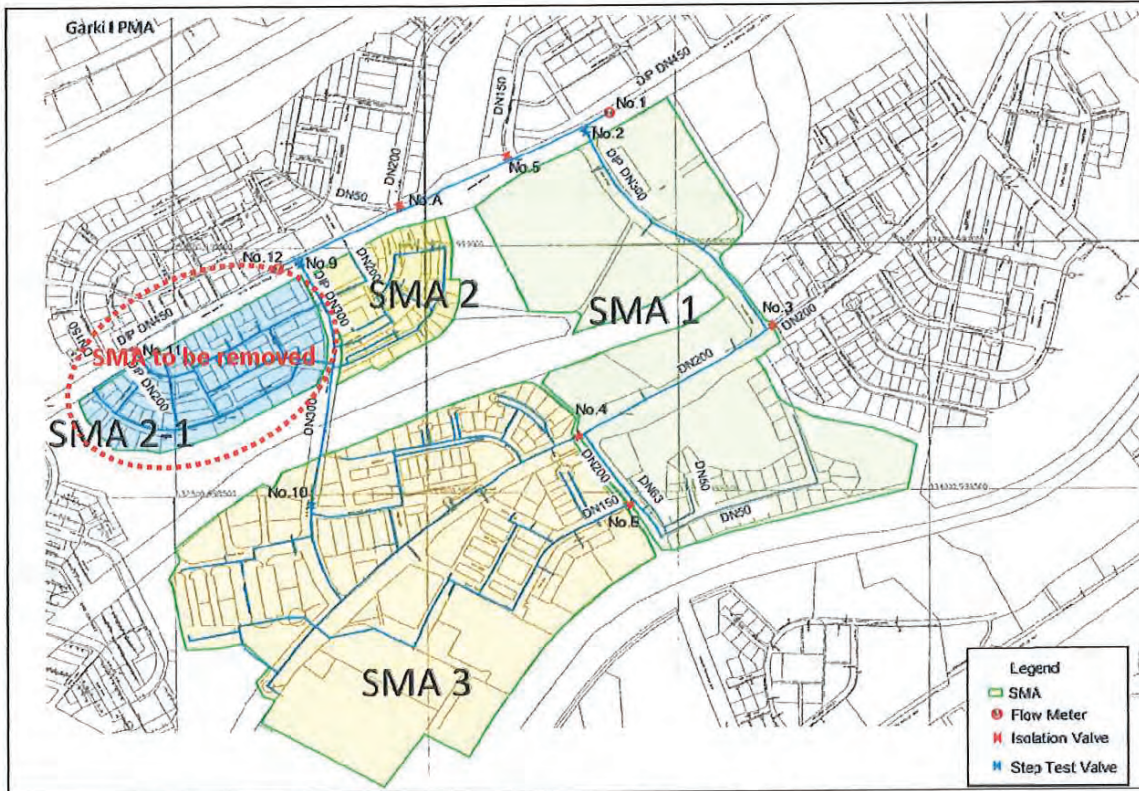


Figure: Location of the SMA to be removed from PMA Monitoring (Garki I)

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Annex 4: Participants in Preparation of Monitoring Sheet and Photos

Participants in Preparation of Monitoring Sheet

Day 1: 6th September 2016 for Project Monitoring Sheet II

S/N	NAME	POSITION
1	Nahuche A.A	HOD Distribution (Technical Manager)
2	Adis Muhammed S.	HOD Commerce (Technical Manager)
3	Lawal Abolade R.	Head [Special Projects] (Coordinator)
4	Aminu Umar B.	Head[Ops&Wm]
5	Abdul Yusuf	Sup [P&P]
6	Masaud Abdullahi	Head[metering]
7	Ozumi Abdul	AAM[Dist] Gudu
8	Muhammed A.	Ops&Wm
9	Suleiman Shehu	Head [GIS]
10	Rabiu M.Kabir	Head [Logistics]
11	Dikko Musa	Head[PL/WC]
12	Maradun Aliyu	Head [M.C.O]
13	Adenuga A.O	AM Garki
14	Owolabi I.O	Head Customer Care
15	Sulaiman A. Mulid	AAM[Comm] Jabi
16	Salihu O. Sadiq	AAM[Dist] Jabi
17	Isah Danjuma	Head[Moni/Plaza]
18	Akinori Miyoshi	CA, JICA Expert Team

Day 2: 7th September 2016 for Project Monitoring Sheet II

S/N	NAME	POSITION
1	Nahuche A.A	HOD Distribution (Technical Manager)
2	Muhammed Adis	HOD Commerce (Technical Manager)
3	Lawal Abolade R.	Head [Special Projects] (Coordinator)
4	Dikko Musa	Head[PL&Wc]
5	Aliyu Maradun	Head [MCO]
6	Adeyemi Taiwo	Head [Emb& Corp]
7	Abdul Yusuf	Sup[P&P]
8	Abdul Ozumi	AAM [Dist] Gudu
9	Shehu Sulaiman	Head GIS
10	Rabiu M.Kabir	Head Logistics
11	Mohammed A	Ops&Wm
12	Moh'd Ramat	AM Jabi
13	Aminu Umar B.	Head[Ops&Wm]
14	Owolabi Isaac	Head[Customer Care]
15	Adenuga A.o	AM Garki
16	Isah Danjuma	Head[Moni/Plaza]
17	Masaud Abdullahi	Head[Metering]
18	Akinori Miyoshi	CA, JICA Expert Team

Day 3: 8th September 2016 for Project Monitoring Sheet I

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	Muhammed A.	Ops&Wm
6	Akinori Miyoshi	CA, JICA Expert Team

Annex 4: Participants in Preparation of Monitoring Sheet and Photos

Day 4: 19th September 2016 for Project Monitoring Sheet Summary

S/N	NAME	POSITION
1	Hudu Bello	Director (Project Manager)
2	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
3	Nahuche A.A	HOD Distribution (Technical Manager)
4	Adis Muhammed S.	HOD Commerce (Technical Manager)
5	Lawal Abolade R.	Head [Special Projects] (Coordinator)
6	Rabiu M.Kabir	Head [Logistics]
7	Akinori Miyoshi	CA, JICA Expert Team

Day 5: 21st September 2016 for Project Monitoring Sheet Summary




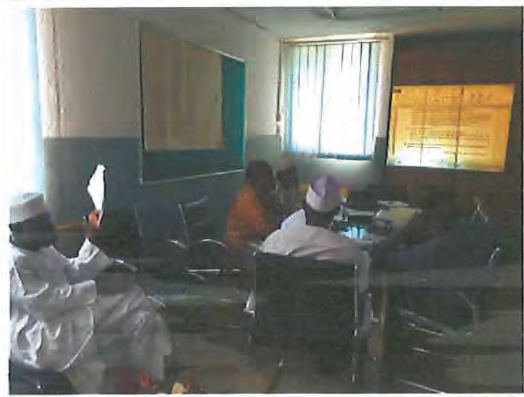
S/N	NAME	POSITION
1	S.T. Bello	HOD Admin&Supply (Deputy Project Manager)
2	Nahuche A.A	HOD Distribution (Technical Manager)
3	Adis Muhammed S.	HOD Commerce (Technical Manager)
4	Lawal Abolade R.	Head [Special Projects] (Coordinator)
5	Rabiu M.Kabir	Head [Logistics]
6	Muhammed A.	Ops&Wm
7	Akinori Miyoshi	CA, JICA Expert Team

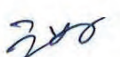
Monitoring Mission Members from JICA Headquarters (13th to 22nd September 2016)

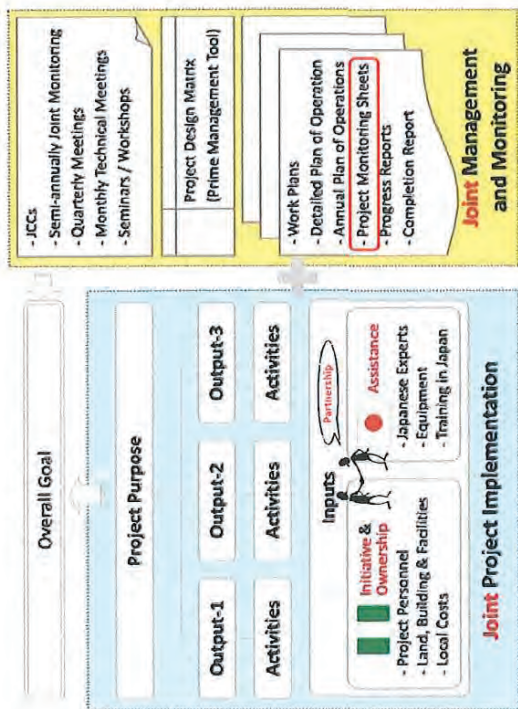
S/N	NAME	POSITION
1	Yoshiki Omura	Senior Advisor in Urban Water Supply
2	Keisuke Yamagami	Project Officer, Water Resources Group, Global Environment Department

Annex 4: Participants in Preparation of Monitoring Sheet and Photos

Photos of Preparation of Monitoring Sheet

	<p>Day 1: 6th September 2016</p> <p>Preparation of Project Monitoring Sheet II (Attendance: NRW Management Team members and Action Team Leaders)</p>
	<p>Day 2: 7th September 2016</p> <p>Preparation of Project Monitoring Sheet II (Attendance: NRW Management Team members and Action Team Leaders)</p>
	<p>Day 3: 8th September 2016</p> <p>Preparation of Project Monitoring Sheet I (Attendance: Deputy Project Manager, Technical Managers and Coordinator)</p>
	<p>Day 4: 19th September 2016</p> <p>Preparation of Project Monitoring Sheet Summary (Attendance: Project Manager, Deputy Project Manager, Technical Managers and Coordinator)</p>





Federal Capital Territory Administration
Federal Capital Territory Water Board
Japan International Cooperation Agency



**The Federal Capital Territory
Reduction of Non-Revenue Water Project**
4th Joint Coordinating Committee Meeting

Results of Project Monitoring
(Period: November 2015 - August 2016)

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

22nd September, 2016

1

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

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)

3

4

Contents

1. Outline of the Project
2. Overall Goal, Project Purpose and Three Outputs
3. Progress of Inputs
4. Progress of Activity for Output-1
5. Progress of Activity for Output-2
6. Progress of Activity for Output-3
7. Achievement of Three Outputs
8. Achievement of Project Purpose
9. Change of Risks
10. Delay of Work Schedule and/or Problems

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 through 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.

5

3. Progress of Inputs

Inputs from Nigeria

Project Personnel

- Project Director, Project Manager, Deputy Project Manager, Technical Managers, NRW Management Team, NRW Action Team. Totally more than 50 members.

Land, Building and Facilities

- Office spaces and necessary facilities at FCTWB
- Chamber construction for bulk flow (currently suspended due to non-release of the Counterpart Fund)
- Completed chambers for flow meters and valves for pilot projects.

Local Cost

- Installation, operation and maintenance of the provided equipment and leakage repair in pilot projects.

6

3. Progress of Inputs

Inputs from Japan

JICA Experts :

- A Chief Advisor and members for ten areas of expertise

Equipment :

- Flowmeters and valves for the pilot project
- Equipment for maintenance including leakage repair for the pilot project

Facilities

- Finalizing specifications of modification of existing billing system
- Ongoing chamber construction for zonal meters

Training

- GIS training on software for eight project members
- The second training in Japan for eight project members from both Dist. and Com. Dep'ts jointly in June and July 2016.

7

3. Progress of Inputs



Project Members and FCTWB Staff in Workshop



Equipment for maintenance including leakage repair



GIS Training on Software in Abuja



2nd Training in Japan (Leakage Detection Survey)



2nd Training in Japan (Meter Reading by using Handheld Device)



2nd Training in Japan (Closing Ceremony)

8

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 Aug.2016)
1-1	Install bulk meters to water treatment plants 1 and 2	Progress: 75% , Behind: 7.5 months Delayed and suspended . 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 .
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.
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.
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 final specification for billing system modification was adopted . After modification, the Project needs at least 6 months for monitoring this Activity.

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 Aug.2016)
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: 7.5 months 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.
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. Progress: 0% , Behind: 0.0 months The Activity will be implemented after the completion of Activity 1-6.)
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.)

4. Progress of Activity for Output-1

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

Chamber Construction for Bulk Meters (Activity 1-1)

Chamber Construction for Bulk Meters (Activity 1-1)

Chamber Construction for Bulk Meters (Activity 1-1)

Chamber Construction for Zonal Meters (Activity 1-6)

Chamber Construction for Zonal Meters (Activity 1-6)

Discussion about Modification of Billing System (Activity 1-4)

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 Aug.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	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.
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.
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.
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed .

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 Aug.2016)
2-7	Isolate a SMA by installing valves	Completed.
2-8	Update the distribution network drawings for each SMA	Progress: 80% , Behind: 2.0 months Delayed. Locations of leakage and illegal connections will be captured. AGIS security has still hindered data import/export and analysis.
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.

13

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 Aug.2016)
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.
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.
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.
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.

15

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 Aug.2016)
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 .
2-11	Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	Progress: 30% , Behind: 4.5 months Delayed and the Activity has been done provisionally. The plan is under preparation.
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.
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.

14

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.

Preparation of Network Drawings (Activity 2-4)

Installation of Isolating Valve (Activity 2-7)

24hrs Flow Measurement (Activity 2-9)

Minimum Night Flow Survey and Step Test (Activity 2-9)

Leakage Detection Acoustic Survey (Activity 2-10)

Result of 24hrs Flow Measurement (Activity 2-9)

16

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.



Different Types of Customer Meters (AMR, several conventional meters)



Demonstration of Meter Error Test (Activity 2-9)



24hrs Customer Consumption Survey (Activity 2-9)



Data Analysis of Meter Error Test (Activity 2-9)



Illegal Connection Survey (Activity 2-10)

17

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 Aug.2016)
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: 25% , Behind: 0.5 months Being delayed.
3-9	Establish framework of water distribution management	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.

19

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 Aug.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 may hinder data import/export and analysis.
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.
3-7	Develop a planning manual for NRW reduction	To be implemented in Phase-2.

18

7. Achievement of Three Outputs

No	Indicator	Current Monitoring (as at Aug.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 1-1 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.
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 1-1 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.

20

7. Achievement of Three Outputs

No	Indicator	Current Monitoring (as at Aug.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.	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.
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.	No achievement (as planned).

21

7. Achievement of Three Outputs

No	Indicator	Current Monitoring (as at Aug.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 FCTWB'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 (as planned).

22

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. Skills and knowledge necessary for NRW reduction, such as minimum night flow survey, step test, leakage detection, meter error test for water balance analysis has been developed through lectures, DJT and the second training in Japan in Jun.-Jul. 2016.
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).

23

9. Changes of Risks

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

Under this situation, there are:

- High possibility that FCTWB **cannot complete the chamber construction** of the bulk flowmeter (Output 1).
- High possibility that FCTWB **cannot procure smoothly necessary materials** for Output 2 activities.

This is why there is a high-risk that the Project further delays and the outcome of the Project would be reduced.

24

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

- **Delay** and **suspension** of the **chamber construction** for bulk flowmeters and **procurement** of necessary materials for pilot activities due to **non-release of the Counterpart Fund**.
- Taking **a lot of time** to obtain the correct situation due to **non-existence of the as-built drawings** and the **restriction of GIS usage**.

Actions

- The Nigerian side requests "**Extension of the project period**".
- The Nigerian side requests "**Taking over the chamber construction and procurement of small materials for Pilot activities from the Nigerian side to the Japanese side**".
- The Nigerian side **relaxes the restriction of GIS usage**.

25

10. Delay of Work Schedule and/or Problems

(2) SMA out of PMA Monitoring Area

PMA meters were **relocated** from originally-designed position to other position in Jabi and Garki I due to **difficulty in implementation**.

Cause

Jabi (SMA1): It was physically **difficult** to settle the PMA flowmeter and to monitor water flow at the original location, because the distance from the ground level to the location of pipeline was **unexpectedly deep**.

Garki I (SMA2-1): FCTWB **can not supply water** to the western area in SMA2 if an isolating valve is closed at the original location.

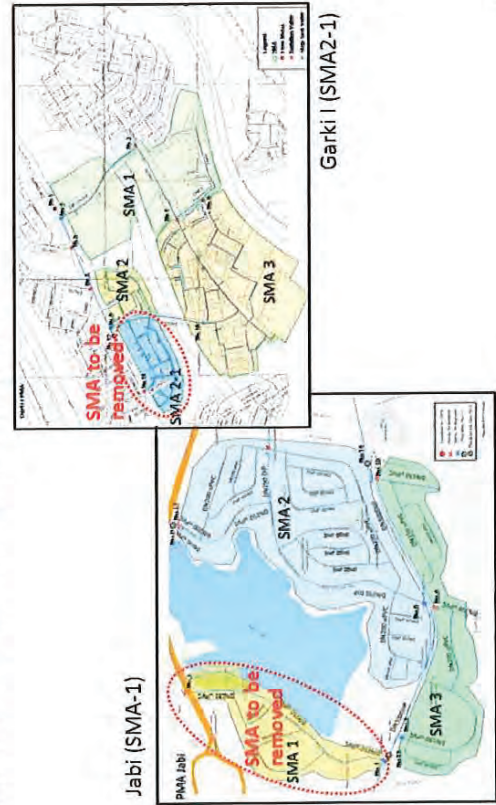
Actions

- **Removing the SMA out of PMA:** SMA 1 in Jabi and SMA 2-1 in Garki I are constrained to be out of PMA monitoring area. In order to avoid further delay, the Project Team has to remove these SMAs from the target.
- FCTWB has to **collect necessary information from FCDA**.

26

10. Delay of Work Schedule and/or Problems

(2) SMA out of PMA Monitoring Area



27



FCTWB welcomed Dr. Shinichi Kitaoka, JICA President on 16th June 2016

Thank you very much for your attention.

28

Recommendations from the monitoring mission

22 September, 2016
by JICA monitoring mission

1. Strengthening partnership between FCDA and FCTWB

(1) What is challenge?

- Lack of opportunity to feedback field information from FCTWB to FCDA.

(2) Recommendations from the monitoring mission

- FCDA and FCTWB are asked to strengthen their partnership for effective development, operation and maintenance.
- JICA Expert Team is asked to give necessary support for FCTWB to feedback its operation and maintenance experiences to FCDA.

1

2. Relaxing the Restriction for GIS use for FCTWB

(1) What is challenge?

- Restriction for Security reasons has hindered the use of GIS data by the Project.

(2) Recommendation from the monitoring mission

- FCTA is asked to relax the security restriction and allow FCTWB to use GIS data efficiently as much as possible.
- FCTWB is asked to secure the security through building the data management workflow in order to avoid abuse of GIS data, if such restriction were relaxed.

2

3. Activating the Collaboration in FCTWB

(1) What is challenge?

- Not enough collaboration and sharing information among Departments of FCTWB, particularly between Distribution and Commercial Departments.

(2) Recommendation from the monitoring mission

- Both departments are recommended to hold cross-departmental regular meetings for more active collaboration and information sharing between both Departments.

3

4. Enhancing Quality Management

(1) What is challenge?

- **Quality of information and performance as well as quality of constructed facilities is not properly managed by FCTWB.**

4

For example...

- Information such as deliverables from FCTWB has lacked often accuracy. This has led to decrease in data reliability and duplication of effort.
- There are many honeycombs on the surface of the concrete of constructed chambers for the bulk flowmeter.

5

For example...

- In Garki I Pilot area, FCTWB cannot read PMA flowmeter regularly because of mortar plastering on entire concrete slab covers.
- In Gudu Pilot area, inside of the chamber for PMA flowmeter is in muddy conditions because FCTWB has not placed concrete slab covers.

6

4. Enhancing Quality Management

(2) Recommendations from the monitoring mission

- FCTWB is recommended to pay more attention and make effort to enhance their quality management.
- In addition, the JICA Expert Team is encouraged to continue advising FCTWB staff in the quality management.

7

**5. Necessary Support
for Voluntary NRW Reduction Activities**

(1) What is "Good Example"?

- Some FCTWB staffs are highly motivated to kick off for voluntary activities of NRW reduction outside the selected Pilot Metering Area.

(2) Recommendation from the monitoring mission

- For the purpose of disseminating such a good practice in FCTWB, FCTWB is recommended to monitor such activities and report to other FCTWB staff in the monthly technical meetings.

8

Additional one: Technical Advice from JICA HQ

Suggestion:

- FCTWB is recommended to evaluate impacts of prepaid meters in terms of technical aspect such as favorable model, performance and life, and financial costs both tangible and intangible.

Please see page 14 to 16, "Other issues from the Technical Aspect" in the monitoring sheet.

9

Thank you for your attention !

10



Action Plan

By

Team of FCTWB Delegates for
The FCT Reduction of NRW Project,

The 2nd Training in Japan
(Distribution & Commerce)

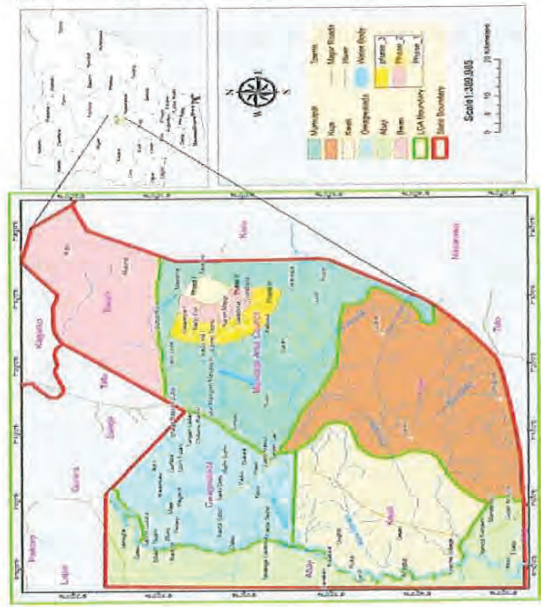
Engr. A. R. Lawal, MNSE
Team Leader

22nd September, 2016



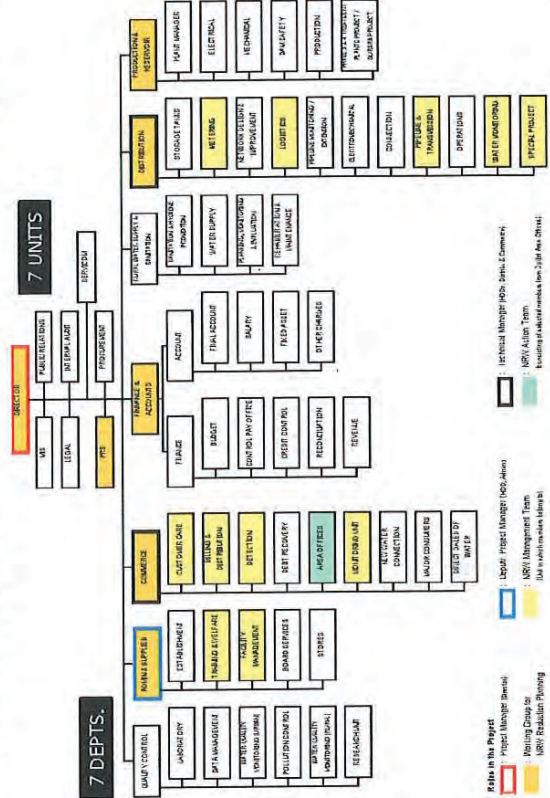
- The water sub-sector of the FCT is well documented under the support infrastructure system of the Master Plan of Abuja.
- The manner in which the water is supplied, distributed, used and disposed off in the FCT properly documented in the Abuja Water supply Master Plan.
- The Federal Capital Development Authority (FCDA) Engineering Services Department is responsible for the provision of Water Infrastructure in FCT.
- The FCT Water Board (FCTWB) is the Government Agency responsible for the provision of water supply to the residents of FCT.

1-2. Features

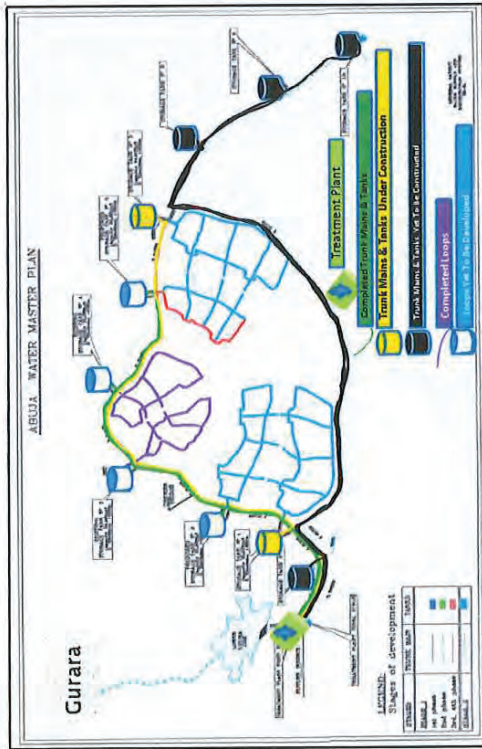


- National Population 170 million
- FCC population 3 million
- Connections 48,500
- Average actual water product. 274,000m³/day
- Non-Revenue Water (NRW): estimated at 52% of 2014

1-3. FCTWB Organization and Members Involved



1-4. Master Plan for Water Supply in the FCC



5

1-5. Water Sources & Water Infrastructure



- **Lower Usuma Dam**
Capacity: 100 mil. m³
 - **Gurara Dam**
Capacity: 880 mil. m³
 - **Treatment Plants 1 & 2**
Capacity 10,000m³/hr designed to operate 24hrs a day thus the total output of 240,000m³/day is expected
 - **Treatment Plants 3 & 4**
Designed capacity: To provide 20,000m³/hr treated water each boosting treated water supply to 480,000m³/day.
- Total Treatment Capacity: 720,000m³/day.

6

Experience from Yokohama Case

1. Leakage Detection Equipment and Training Yard
2. Standard GIS/Mapping Section
3. Standard Meter Accuracy Test (Meter Laboratory)
4. 100 % Customer Metering
5. Meter Reading: Once in Two Months (2-month Billing Cycle)

8

1-4. Master Plan for Water Supply in the FCC

TANK	LOOP	CAPACITY (m ³)	PHASE	STATUS	DISTRICTS SUPPLIED
Tank 1	1	30,000	III	Under construction	Wupa, Karimo, Bunkoro, Nbora, kafe, Gwarimpa I, Gwarimpa II, Dape, Industrial (Area 1)
Tank 2	2	45,000	II	Completed	Jahi, Utako, kalampe, Dekibiyu, Kado, Wuye, Mabushi, Kukwaba, Jabi, Recreational park
Tank 3	3	24,000	I	Completed	Maitama, Wuse I and Wuse II
Tank 4	4	24,000	I	Completed	Garki I, Garki II, Asokoro
Tank 5	5	40,000	II	Completed	Durumi, kaura, Gudu, Duboyi, Guzape, Gadowa, Duse
Tank 6	6	40,000	III	Under construction	Galamawa, Dakwo, Lokogoma, Wumba, Saraji, Kabusa, Okanje, Pyakasa, Institutional Area Industrial Area II



7

Customer Category (FCT WB)

Customer Category	No. of Bill (Nos.)	Percentage (%)
Domestic	46,900	96.7
Commercial (un-coded)	(30,700+11,100+5,100)	
Major Consumers	1,600	3.3
Institutions	(1,000+600+0)	
Total	48,500	100.0

Customer Category	Billed Charge (Mil. ₱)	Percentage (%)
Domestic	356.6	76.4
Commercial (un-coded)	(293.1+56.1+7.4)	
Major Consumers	110.2	23.6
Institutions	(104.0+6.2+0)	
Total	466.8	100.0

9

Customer Meter

Meter Type	No. of Bill (Nos.)	Percentage (%)
Conventional	24,600	50.7
AMR	11,700	24.1
Prepaid	5,100	10.5
Flat-rate	7,100	14.6
Total	48,500	100.0

Meter Type	Billed Charge (Mil. ₱)	Percentage (%)
Conventional	313.2	67.1
AMR	62.3	13.3
Prepaid	7.4	1.6
Flat-rate	83.9	18.0
Total	466.8	100.0

10

Billing Measures

Meter Type	No. of Bill (Nos.)	Percentage (%)
Conventional_Reading	11,100	35.0
Conventional_Estimate	13,500	42.6
Conventional_Flat-rate	7,100	22.4
Sub-Total	31,700	100.0
AMR_Reading	5,900	50.4
AMR_Estimate	5,800	49.6
Sub-Total	11,700	100.0
Prepaid	N/A	N/A
Prepaid_Flat-rate	N/A	N/A
Sub-Total	5,100	100.0
Total	48,500	-

11

Action Plan against

Meter Reading

Reason for inability to achieve 100% Meter Reading

1. Lack of Logistics (Utility Vehicle, meter reading devices, etc);
2. Existence of faulty meters;
3. Lack of meter fittings and spare parts (Battery, etc);
4. Existence of flat rate properties;
5. Location of water meter and poor quality of meter installation;
6. Lack of guideline and manual for the location of water meter and installation;
7. Lack of meter laboratory & standardization for quality management;

12

Action Plan against (cont.....)

Meter Reading

Reason for inability to achieve 100% Meter Reading (Cont.)

8. Lack of training & Standard Operation Procedures (SOP) for meter reading;
9. Lack of monitoring and feedback from meter readers
10. Inability of billing system to measure consumption and Existence of estimated billing;
11. Customer/Staff behavior; and
12. Unauthorized removal of meters

13

Action Plan against (cont.....)

Action needed to achieve 100% Meter Reading

- **Presentation & Fact finding (Statistical data)**
 - Presentation to FCTWB Management for approval of the plan & budget proposal;
 - Create a team & make Presentation to all relevant FCT WB Staff;
 - Incorporate comments & observations from Staff into the Proposal;
 - Collect all data & information to prepare the Plan;
- **Planning and Budget proposal**
 - Develop the plan and budget proposal base on information and data collected.
 - Presentation & follow-up for approval and release of fund for implementation of the plan.

14

Action Plan against (cont.....)

Meter Reading

Fact Finding:

1. Lack of Logistics (Utility Vehicle and meter reading devices)

Action Needed

- Collect information about current situations and any other we have to do;
- Analysis of each Area Office;
- Nos. of Meter Readers and Distribution
- Procurement

Who is in Charge

- HOD Commerce, HOD Admin & Supply

15

Action Plan against (cont.....)

Meter Reading

Fact Finding:

2. Existence of faulty meters;

Action Needed

- Identification of faulty meter by survey;
- Verification of faulty meters by meter readers and relevant units;
- Procurement, replacement of the faulty meter & possible change of location.

Who is in Charge

- HOD Commerce, HOU (Meter), Area Managers, & Meter Readers.

16

Action Plan against (cont.....)

Meter Reading

Fact Finding:

3. Lack of meter fittings and spare parts (Battery, etc);

Action Needed

- Identify the required spare parts based on historical records of the meters;
- Adopt preventive maintenance.
- Procurement

Who is in Charge

- HOD Distribution, relevant Units

17

Action Plan against (cont.....)

Meter Reading

Fact Finding:

4. Existence of flat rate properties;

Action Needed

- Identify the flat rate customers and location;
- Collect all information for the procurement;
- Procurement;
- Install new meters in a suitable location.

Who is in Charge

- HOD Commerce, HOD (Dist.), Area Manager, and other relevant HOU (Meter)

18

Action Plan against (cont.....)

Meter Reading

Fact Finding:

5. Location of water meter and poor quality of meter installation

Action Needed

- Identify all meters that were poorly installed & not accessible for reading and where customer behavior not favorable;
- Collect all information;
- Procurement;
- Install or reinstall meters in a suitable location

Who is in Charge

- HOD Commerce, HOD (Dist.), Area Manager, and other relevant HOU (Meter)

19

Action Plan against (cont.....)

Meter Reading

Fact Finding:

6. Lack of guideline and manual for the location of water meter and installation

Action Needed

- Set-up committee;
- Based on the fact finding information from Location of water meter and poor quality of meter installation Committee prepare the guideline and manual

Who is in Charge

- HOD Distribution, HOD Commerce, & Committee members,

20

Action Plan against (cont.....)

Meter Reading

Fact Finding:

7. Lack of meter laboratory & standardization for quality management

Action Needed

- Planning and setting-up of meter laboratory suitable for FCT WB
- Survey and identify all type of meters in FCT;
- Collect the samples, evaluate, assess the meters;
- Discuss about the Standardization using the three JICA pilot project

Who is in Charge

- HOD Distribution, HOD Commerce, and HOU (Meter)

21

Action Plan against (cont.....)

Meter Reading

Fact Finding:

8. Lack of training & Standard Operation Procedures (SOP) for meter reading

Action Needed

- Assess the meter readers ability and their activities;
- Identify the training needs;
- Prepare the training plan;
- Prepare the SOP

Who is in Charge

- HOD (Admin & Supply), HOD Commerce, and relevant Unit

22

Action Plan against (cont.....)

Meter Reading

Fact Finding:

9. Lack of monitoring and feedback from meter readers

Action Needed

- Identify the current situation physically and on the record;
- Set-up meter monitoring plan for all kinds of meters;
- Revise/update Feedback form;
- Set-up proper workflow for the implementation of the feedback
- Training of the personnel in conjunction with meter reading training plan

Who is in Charge

- HOD Commerce, Area Manager, and other relevant unit

23

Action Plan against (cont.....)

Meter Reading

Fact Finding:

10. Inability of billing system to measure consumption and Existence of estimated billing

Action Needed

- Fact finding of existing billing systems
- Clarification of estimated bills;
- Defining new parameters;
- Modification of billing system;
- Discussion of by-monthly meter reading

Who is in Charge

- Management Team, facilitated by HOD Commerce

24

Action Plan against (cont.....)

Meter Reading

Fact Finding:

- 11. Customer/Staff behavior

Action Needed

- Identify the customers who has un-favorable behaviors towards FCT WB Staff and Meter Reader and vice versa;
- Discussion with the PR Unit for strategic public relation;
- Customer Relations training and awareness;
- Preparation of Code of Ethics for relating with customer;
- Implementation of the Code of Ethics by FCT WB Staff

Who is in Charge

- HOD Commerce, HOU (PR), Customer Care Unit and Legal Unit.

25

Action Plan against (cont.....)

Meter Reading

Fact Finding:

- 12. Unauthorized removal of meters

Action Needed

- Identify all unauthorized removed meters;
- Replacement of the meters;

Who is in Charge

- HOD (Dist.), HOD Commerce, Area Manager, and other relevant Unit.

26

Proposed Schedule

No	Actions against	2016				2017				2018				
		3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr			
-	Presentation & Fact finding													
-	Planning and Budget proposal													
1	Lack of Logistics/Utility Vehicle and meter reading devices;													
2	Existence of faulty meters;													
3	Lack of meter fittings and spare parts (battery, vob);													
4	Existence of fair rate properties;													
5	Location of water meter and poor quality of meter installation;													
6	Lack of findings and manual for the location of water meter and installation;													
7	Lack of meter laboratory & standardization for quality management;													
8	Lack of training & standard Operation Procedures (SOP) for meter reading;													
9	Lack of monitoring and feedback from meter readers;													
10	Inability of billing system to measure consumption, Existence of estimated billing;													
11	Customer/Staff behavior;													
12	Unauthorized removal of meters													

27

List of Participants

- Engr. A. R. Lawal (Team Leader) - Danjumma Isah
- Habib Ahmed Kiru - Shehu Sulaiman
- Debo Dauda Mohammed - Aliyu Muhammad Maradun
- Shehu Abdulrahman Sani - Mrs. Akpan Rose Aniekan



Thank you for your kind Attention !!!!

28

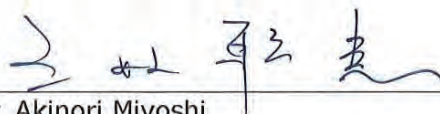
MINUTES OF MEETING
ON
THE THIRD JOINT COORDINATING COMMITTEE
FOR
THE FEDERAL CAPITAL TERRITORY
REDUCTION OF NON-REVENUE WATER PROJECT

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

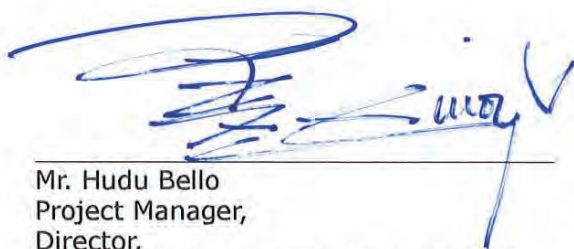
12th November 2015



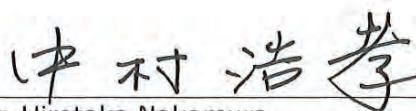
Mr. Abubakar Sani Pai
Project Director,
Director, Economic Planning, Research
and Statistics Department,
Federal Capital Territory Administration,
Federal Republic of Nigeria



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



Mr. Hudu Bello
Project Manager,
Director,
Federal Capital Territory Water Board,
Federal Republic of Nigeria



Mr. Hirotaka Nakamura
Chief Representative,
JICA Nigeria Office

Attached Document

In the stage of a year after commencement of Phase-1 of the Federal Capital Territory Reduction of Non-Revenue Water Project (hereinafter referred to as "the Project"), the third meeting of Joint Coordinating Committee (hereinafter referred to as "JCC") was held on 12th November 2015.

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.

Mr. Hirota Nakamura, Chief Representative of Japan International Cooperation Agency (hereinafter referred to as "JICA") Nigeria Office gave remarks addressing the endeavor of reduction of Non-Revenue Water (hereinafter referred to as "NRW") for improving service delivery and the need for institutional strengthening of Federal Capital Territory Water Board (hereinafter referred to as "FCTWB"). He also suggested incremental approach such as performance-based rewarding system and functional audit/monitoring mechanism, and finally requested the greater political commitment for institutional reform.

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

Mr. Akira Takagi, Member of JICA Evaluation Mission Team made a presentation of findings and recommendations from the monitoring.

Mr. Akinori Miyoshi, Chief Advisor of JICA Expert Team made a presentation of revision of Project Design Matrix (hereinafter referred to as "PDM") and Work Plan of additional activities and inputs.

At the end of the discussions, Mr. Hudu Bello, the Project Manager of the Project, gave closing remarks. He expressed the gratitude of the FCTWB for the efforts of JICA and reassured the JCC of the commitment of the FCTWB towards the success of the Project.

2. Main Points Discussed

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

2.1 Insufficient 2015 Counterpart Fund

FCTWB has recognized delay of some project activities due to insufficient 2015 Counterpart Fund and its release has been hampered by the new government policy of Treasury Single Account (hereinafter referred to as "TSA").

JICA mentioned that the Project is not grant aid or loan project but technical cooperation which is built on mutual contribution from both Nigeria and Japan sides. As part of project ownership, undertakings by Nigerian side are indispensable such as construction of chambers for flow meter and valve, which is an essential to conduct project activities and on-the-job training.

JICA also emphasized the need for FCTWB to secure the fund as soon as possible and then requested Federal Capital Territory Administration (hereinafter

referred to as "FCTA") and FCTWB to ensure allocation of Counterpart Fund.

FCTA responded that the Nigerian side should put the highest priority on JICA assistance and will draft a memo to new Permanent Secretary.

FCTWB also responded that the Nigerian side will make continuous effort to solve the problem and ensure allocation of Counterpart Fund as soon as TSA is stabilized.

2.2 Duplicated/Return Bills

FCTWB has recognized existence of duplicated/returned bills, which may have caused wastefulness and unreliable financial analysis including NRW. However, FCTWB had collated all the duplicated/returned bills, verified them and commenced the deactivation process for the bills.

FCTWB also promised that report of duplicated/returned bills will be submitted by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance and also that water connection and data creation will be centralized by Head of Departments (Distribution and Commerce) in the Headquarters to avoid duplication again.

2.3 As-Built Drawings

JICA Expert Team brought up the case that non-availability of as-built drawings has caused problems in the implementation of pilot projects, and requested improvement in appropriate information sharing between Federal Capital Development Agency (hereinafter referred to as "FCDA") and FCTWB.

The Nigerian side responded that both intend to improve this. The Department of Engineering Services of FCDA and FCTWB should meet together and produce the drawings in their possession.

2.4 Project Monitoring Sheet

Project Monitoring Sheet was prepared jointly by FCTWB and JICA Expert Team with advisory support from JICA Evaluation Mission Team.

JICA requested that the Project be implemented, and Project Monitoring Sheet be prepared continuously and utilized more effectively on the ownership and initiative of FCTWB.

FCTWB agreed with the proposal.

2.5 Revision of PDM and Work Plan of Additional Activities and Inputs

JICA explained the background and objectives of additional input for the project and requested that FCTWB make further efforts in the implementation of the Project for its success and expansion to other areas of FCTWB in the future.

FCTWB understood and agreed.

3. Approval of Project Monitoring Sheet, Revision of PDM and Concept of Work Plan

JCC members approved Project Monitoring Sheet, revision of PDM and concept of Work Plan of additional activities and inputs.

Appendix

Appendix 1: Programme/Agenda

Appendix 2: Attendance List

Appendix 3: Project Progress and Project Monitoring Sheet

Appendix 4: Findings and Recommendations from the Monitoring

Appendix 5: Revision of Project Design Matrix (PDM) and Work Plan of Additional
Activities and Inputs

Appendix 6: Project Monitoring Sheet (Draft)

Appendix 7: Revision of Project Design Matrix

FEDERAL CAPITAL TERRITORY REDUCTION OF NON-REVENUE WATER PROJECT

JOINT COMMITTEE MEETING HELD ON THE 12TH NOV 2015

ATTENDANCE LIST

S/N	NAMES	TITLE	ORGANISATION	TEL	EMAIL ADDRESS
1	Abubakar Sani Pai	Ag director	EPRS, FCTA		
2	Hiroataka Nakamura	Chief Rep	JICA Nigeria Office		
3	Chie Shimodaira	Rep	JICA Nigeria Office		
4	Hudu Bello	Director	FCTWB		
5	S.T Bello	HOD Admin& Supply	FCTWB		
6	Engr. A.A Nahuche	HOD Dist.	FCTWB		
7	Engr Usman A. Aliyu	HOD Res.& Production	FCTWB		
8	Engr Abolade R. Lawal	Coord. NRW Mag. Team	FCTWB		
9	Mohammed. Said Adis	HOD commerce	FCTWB		
10	Okobi. O.Y	Deputy Dir.	FCTWB		
11	Munirat malik	Rep.HOD F&A	FCTWB		
12	Engr. M.K Rabiu	H(logistics)	FCTWB		
13	Abbas A.A	PR	FCTWB		
14	Segun Kayode	PIO	FCTWB		
15	Amina Usman	SPO	EPRS		
16	Aisha A. Mohammed	Training	EPRS		
17	Ademowh J.A	DD(WS)	FMWR		
18	Alfa M.N	PPO (AP)	NPC		
19	Engr. Taheed A	Asst. Director	FCDA/ Dept. of Engineering		
20	Dr.Joachim Ezeji	Advisor	JICA Nigeria Office		
21	Takashi Higo	JICA MM	JICA HQs		
22	Masanobu Mayusumi	JICA Regional Advisor for Water Supply	JICA Kenya Office		
23	Akira Takagi	Consultant MM	Icons Inc.		
24	Akinori Miyoshi	C.A	JICA Expert Team		
25	Hiroki Niimura	Member	JICA Expert Team		



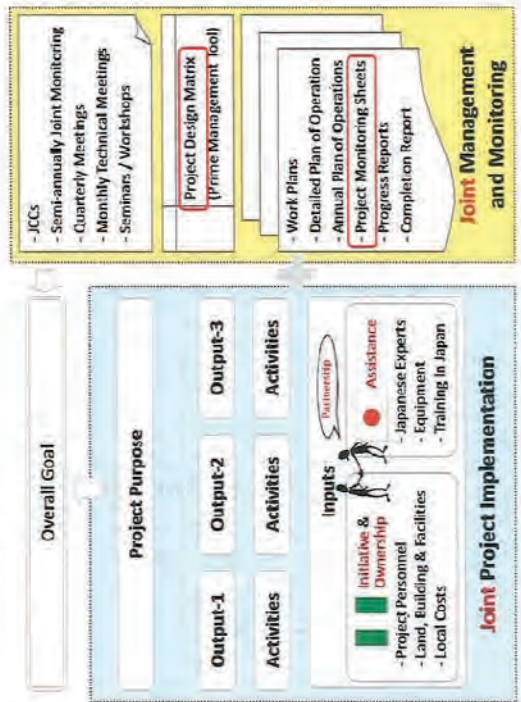
Japan International Cooperation Agency
 Federal Capital Territory Administration
 Federal Capital Territory Water Board

**The Federal Capital Territory
 Reduction of Non-Revenue Water Project**
 Third Joint Coordinating Committee Meeting

**Project Progress
 and
 Project Monitoring Sheet**

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

12th November, 2015



Contents

1. Outline of the Project
2. Overall Goal, Project Purpose & Outputs
3. Progress of Activity for Output-1
4. Progress of Activity for Output-2
5. Progress of Activity for Output-3
6. Progress of Inputs from Japan
7. Delay of Work Schedule and/or Problems
8. Photos
9. Action Plan by Trainees participated in Japan

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
- Project Areas**
 Federal Capital Territory (FCT)
 Pilot Areas: Garki I, Gudu and Jabi
Nigerian Counterparts
 Federal Capital Territory Administration (FCTA)
 Federal Capital Territory Water Board (FCTWB)

2. Overall Goal, Project Purpose & 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 the service area of FCTWB is monitored regularly.
Output-2	Methods/operational procedures for effective NRW reduction are established through 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. 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.

Activity	Monitoring		
	Progress	Achievement	Issue & Countermeasures
2-1	Review existing NRW reduction operators at each pilot Area Office	Completed	None
2-2	Conduct capacity assessment of organization and the relevant staff	Baseline assessment was done	None
2-3	Identify and select a Pilot Metering Area (PMA) for each Pilot Area Office based on the selection criteria of PMA	Completed	None
2-4	Prepare/update distribution network drawings for each PMA	Ongoing but delayed . Policy of AGIS on date restriction has hindered the use of AGIS data	FCTWB will gradually develop its own customized GIS database.

3. Progress of Activity for Output-1

Level of NRW of the service area of FCTWB is monitored regularly.

Activity	Monitoring		
	Progress	Achievement	Issue & Countermeasures
1-1	Instal bulk meters to water treatment plants 1 and 2	Delayed . Construction of chambers should be commenced as soon as 2015 Counterpart Fund is released by the end of 2015 at the latest.	Design of chambers, specification of flow meter, BOD were prepared.
1-2	Measure monthly water production of water treatment plants 1, 2, 3, and 4	Delayed . Notification of billing system will be discussed in line with treatment of duplicated/returned bills.	Construction has been postponed due to counterpart fund. FCTWB will raise closely with FCTA for quick release of the fund.
1-3	Tally five above water production data monthly	Situation of billing and is system have been partially assessed.	Duplicated/returned bills exist, which will be treated by FCTWB.
1-4	Calculate the monthly water consumption based on the billing data	Delayed.	None
1-5	Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4	None	None

Activity	Monitoring		
	Progress	Achievement	Issue & Countermeasures
2-5	Instal water flow meters to each FMA and measure in outflows monthly	Delayed , but installation will start soon.	Flow meters for Gudu and Jabl have been procured and delivered. Procurement in Garki I is ongoing.
2-6	Zone each PMA into Sub Metering Areas (SMA)	Completed	None
2-7	Install a SMA by installing valves	Delayed , but installation will start soon.	None
2-8	Update the distribution network drawings for each SMA	Delayed .	None
2-9	Measure an initial level of NRW of each SMA	Delayed . This will follow Activity 2-5 and 2-7.	None
2-10	Identify target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA	Delayed . This will follow Activity 2-9.	Theoretical findings were done and field findings are ongoing prior to field works.

6. Progress of Inputs

Inputs from Nigeria

- All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team.
- All necessary arrangement and documentation including **tax exemption** for equipment from Japan were done by FCTA and FCTWB
- **Chambers for flow meters and valves** for the selected PMAs/SMAs have been **procured**, and construction will commence in the beginning of November 2015.

Activity	Progress	Monitoring		Issue & Countermeasures
		Achievement	Issue	
Z-11 Develop a NRW reduction operation plan of each SMA, including reduction target for review by Head of Distribution Department	Delayed. This will follow Activity 2-10.	None	None	None
Z-12 Review and approve NRW reduction operation plan of each SMA	Delayed. This will follow Activity 2-11.	None	None	None
Z-13 Implement NRW reduction operations at each SMA	Delayed. This will follow Activity 2-12.	None	None	None
Z-14 Monitor the progress of the NRW reduction operations of each SMA	Delayed. This will follow Activity 2-13.	None	None	None
Z-15 Measure level of NRW of each SMA at the end of the respective operations	Delayed. This will follow Activity 2-14.	None	None	None
Z-16 Prepare a report on pilot projects, covering Activity 2-1-2-15	Delayed. interim report may be rescheduled according to actual progress.	None	None	None
Z-17 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials		None	None	None

5. 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

Activity	Progress	Monitoring		Issue & Countermeasures
		Achievement	Issue	
3-1 Establish a Working Group for NRW reduction planning	FCTA was added as an observer.	Working Group members were selected, but will be reviewed in Phase-2	None	None
3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB		Reviews done preliminarily, but will be reviewed in Phase-2	None	None
3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks	To be implemented in Phase-2	None	None	None
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	None	None	None
3-5 Develop the 1st medium-term strategic plan (2018-2022) for approval by FCTA	To be implemented in Phase-2	None	None	None
3-6 Develop an annual NRW reduction plan based on the strategic plan as an integral part of an annual recurrent end capital plan of FCTWB for approval by FCTA	To be implemented in Phase-2	None	None	None
3-7 Develop a planning manual for NRW reduction	To be implemented in Phase-2	None	None	None

Inputs from Japan

Equipment	Input	Progress	Monitoring	
			Issue	Solution
1	Leakage detection equipment (Activity 2-10 and 2-13)	Procured and delivered to FCTWB	Smooth customs clearance and tax exemption were ensured	None
2	Bulk meters (Activity 1-1)			
3	Water meter, flowmeter and valves (Activity 2-5, 2-7 and 2-13)	Delayed. Some were procured and delivered to FCTWB but other are ongoing.	None	None
4	Pipe repair equipment (Activity 2-13)	Delayed. To be procured in line with activities for Output-2	None	None
5	Vehicles / Pickup truck (Activities for Output-2)	Procured and delivered to FCTWB	Proper use for project activities should be observed during the Project	None
6	GIS software, office equipment (Activity 2-5, 2-8 and project operation)	Procured and delivered to FCTWB		None
Local Consultants				
1	Modification of billing and collection system	Delayed. To be discussed in line with treatment of duplicates returned bills	Partially reviewed	System has become published. Appropriate assessment is needed
2	GIS and database training	Delayed, but procurement is ongoing.	None	None
Training in Japan				
		Training was conducted	None	None

7. Delay of Work Schedule and/or Problems

(1) Limited Progress of Activities for Output-1

Details

Activities for Output-1 have been **delayed** or **postponed**, particularly Activity 1-1 related to bulk flow meter installation at outlet of water treatment plant, followed by Activity 1-2 and 1-5.

Cause

Insufficient 2015 Counterpart Fund has caused this. Request of 2015 Counterpart Fund to be allocated to activities for Output-1 was **approved** by FCTA, but its release has been **hindered** by the new government policy of **Treasury Single Account (TSA)**.

Action to be taken

FCTWB will **liaise closely with FCTA** for quick release of Counterpart Fund as soon as the government policy of TSA is stabilized.

13

(3) Delay in implementing Activity 2-5 and 2-7

Details

Procurement of flow meters and valves in Activity 2-5 and 2-7 has been **delayed** due to **non-existence of as-built drawings** in FCTWB, but pipe size and materials have been identified by physical verification.

Cause

Non-existence of as-built drawings has caused this. As-built drawings are supposed to be handed over to FCTWB, but actually it has **not** been done appropriately. There is **lack of information sharing** among relevant departments and other infrastructural developer such as mass housing estate developer.

Action to be taken

FCTWB, particularly GIS Unit and Pipeline Unit, will update GIS network drawings by **physical verification** during routine maintenance and capture **GPS location** for existing facilities. FCTWB will **obtain** as-built drawings of new/old facilities certainly from FCDA's Engineering Services Department and FCT Agency for Mass Housing.

15

(2) Suspension of Activity 1-4

Details

Activity 1-4 for modification of billing system has been **suspended** due to **duplicated/returned bills**. It may have caused **unreliable financial analysis** including **NRW** and therefore needs to be solved prior to the modification of billing system.

Cause

Existing **duplicated/returned bills** have caused this. FCTWB has not been able to completely and effectively treat **duplicated/returned bills**.

Action to be taken

FCTWB **collected** all the **duplicated/returned bills**, verified them and commenced the **deactivation process** for the bills. Report will be **submitted** by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance. After the deactivation and analysis, water connection and data creation will be **centralized** by HODs (Distribution and Commerce) in the Headquarters to avoid duplication.

14

(4) AGIS Security Administrative Password

Details

Policy of Abuja Geographical Information System (AGIS) on **data restriction** has **hindered** the use of AGIS data by the Project.

Cause

This is the policy of AGIS.

Action to be taken

FCTWB will **gradually develop** its own customized GIS database.

16

8. Photos



Confirmation of Pipeline Route



Physical Verification of Pipe



Devaning of Equipment from Japan



Training in Japan (Meter Laboratory)

17

Operation and Maintenance

- Create the mapping/GIS unit and procedures
- Establish leak detection unit
- Strengthening metering units and establish meter workshop
- Installation of bulk/zonal meters to manage and monitor distribution system
- Introduce strategic plan for maintenance

Planning

- Form a committee to review ongoing business plan and discuss future plan considering the NRW reduction

19

9. Action Plan by Trainees participated in Japan

Organization

- Enabling Law for FCTWB
- Restructuring the organization for more effective & efficient service delivery
- Short, medium and long-term planning for training

Customer Service

- Enhance Customer Service Center and create desk officer of each area office: manual, format, workflow, etc.
- Create more awareness – Public Relation: radio program, customer forum, suggestion box, utilize the bill, etc.

Billing

- Review mode of payment to be more flexible for customers
- Review of water tariff based on volume of water consumption: progressive water tariff
- Review of billing papers, elimination of duplicated/return bills

18

Findings and recommendations from the monitoring on “The Federal Capital Territory Reduction of Non-Revenue Water Project”

12 November 2015
JICA Monitoring Team

Voluntary efforts to share knowledge and skills

- It was observed that FCTWB makes voluntary efforts to spread the acquired knowledge and skills even to non-project members.
- Examples:
 - After having meetings at FCTWB HQ and going back to their places, area offices gather their staff including non-project members for meeting to share the information.
 - Area Offices even think about the future expansion to other areas; some managers explained an idea that they will send some project members to non-pilot-project areas after the pilot projects end.

2

Ownership

- Voluntary efforts to share knowledge/skills and the assignment of a number of FCTWB staff are highly evaluated.
- On the other hand, there has been concerns over sense of ownership. So far it seems that JICA Experts lead the project not only in skills/knowledge but also in its management.
- During this monitoring period, we have observed some progress on this management issue through the active participation of FCTWB in the monitoring process. It is expected that FCTWB will make further efforts towards the project management and demonstrate a stronger sense of ownership.

1

Project Management with Monitoring Sheet I and II

- The project needs to be monitored on the basis of its Monitoring Sheet I and II; Project Design Matrix (PDM) and Plan of Operation (PO).
- Comparing actual progress with these sheets enables you to recognize where you are now and identify any issue. It will be the first step and you can go to the following steps such as analysis of the cause of the issues and the examination of actions to be taken.
- These sheets are used not only for management purpose but also as a communication tool with relevant stakeholders such as JICA HQ/ Nigeria office and FCTA.

1

Sharing the results of Capacity Assessment and Development Plan

- The capacity assessment of FCTWB was conducted and capacity development plans were prepared.
- The results were shared mainly with the management level of FCTWB, but some members don't know the results and show their interests to know.
- To enhance abilities, we need to know the current situation and the direction to proceed.
- It is important to know where you are now and what to do for enhancing knowledge/skills not only when implementing this project but also when you will expand NRW reduction activities to other areas.



Japan International Cooperation Agency
Federal Capital Territory Administration
Federal Capital Territory Water Board



**The Federal Capital Territory
Reduction of Non-Revenue Water Project
Third Joint Coordinating Committee Meeting**

**Revision of Project Design Matrix (PDM)
and
Work Plan of Additional Activities and Inputs**

Akinori Miyoshi, Chief Advisor

12th November, 2015

1

1. Background

Based on project purpose, three outputs and related activities through inputs from both Nigeria and Japan, the Project has been implemented since October 2014.

In this process, the Project Team consisting of Nigerian personnel of FCTWB and JICA Experts raised a crucial issue on inadequacy of water distribution management in terms of existing facilities and capability of FCTWB, which may interfere with smooth implementation of Non-Revenue Water (NRW) reduction and its efficient monitoring in the future. Then, necessity of additional activities and inputs to the Project were recognized such as installation of zonal meters for water flow monitoring and establishment of framework of water distribution management.

In response to this recognition, JICA made a decision of further assistance to contribute to improvement in water supply services of FCTWB, and revision of PDM should be approved at this third Joint Coordinating Committee (JCC) meeting on 12th November 2015.

In this context, it is expected that FCTWB acts on its own initiative more actively than ever through the Project.

2

Contents

1. Background
2. Revision of PDM
3. Main Points of Revision
4. Schedule of Additional Activities and Inputs
5. Distribution Monitoring Zones (proposed)
6. Location of Proposed Zonal Meters

3

2. Revision of PDM

From existing **PDM Version 1 (PDM₁)** approved in Nov. 2014
To **PDM Version 2 (PDM₂)** to be approved in 3rd JCC meeting.

Blue words in revision of PDM

Words to be added or deleted, regardless of additional activities and inputs.

Red words in revision of PDM

Words to be newly added because of additional activities and inputs.

4

3. Main Points of Revision

Output-1. Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly

Activity 1-6. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system

Activity 1-7. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure

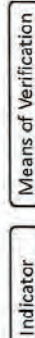
Indicator 1d. Periodic records of data on water distribution management such as water flow of zonal meters and water pressure are kept by Distribution Department from the first quarter of the third year of the Project.

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

Activity 3-8. Review existing plans, activities and implementing structure, etc. related to water distribution management

Activity 3-9. Establish framework of water distribution management

Indicator 3d. By November 2016, framework of water distribution management is established.



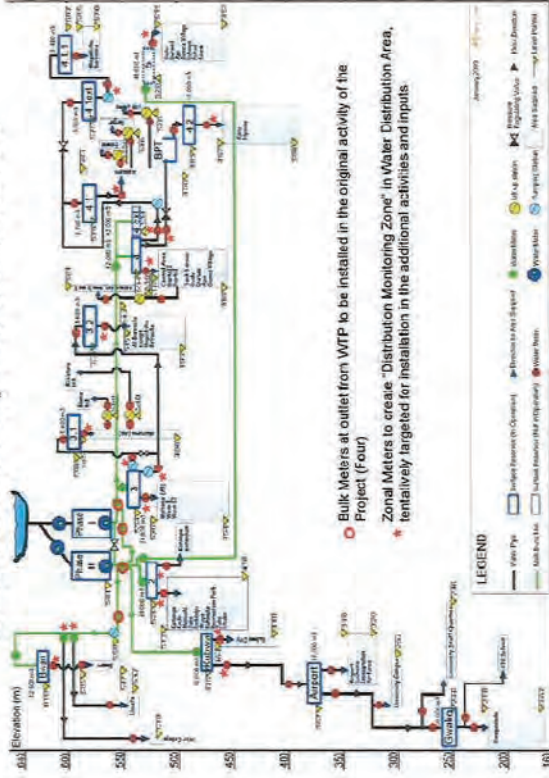
Overall Goal	Indicator	Means of Verification	Activities
<p>Overall Goal</p> <p>Reduce NRW to 10% or less by the end of the project.</p>	<p>Indicator</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Means of Verification</p> <p>Periodic records 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.</p>	<p>Activities</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>
<p>Output-1</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Indicator</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Means of Verification</p> <p>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.</p>	<p>Activities</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>
<p>Output-2</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Indicator</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Means of Verification</p> <p>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.</p>	<p>Activities</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>
<p>Output-3</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Indicator</p> <p>Level of NRW of both the service area of FCWTTB and water distribution areas monitored regularly.</p>	<p>Means of Verification</p> <p>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.</p>	<p>Activities</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>

Activities for Output-1	Activities for Output-2	Activities for Output-3	Input from Nigerian Side	Input from Japanese Side
<p>Activities for Output-1</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>	<p>Activities for Output-2</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>	<p>Activities for Output-3</p> <p>1. Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system.</p> <p>2. Measure and collect data for water distribution management such as water flow of zonal meters and water pressure.</p>	<p>Input from Nigerian Side</p> <p>1. Provide technical support and data for water distribution management.</p> <p>2. Provide financial support for the project.</p>	<p>Input from Japanese Side</p> <p>1. Provide technical support and data for water distribution management.</p> <p>2. Provide financial support for the project.</p>

4. Schedule of Additional Activities and Inputs

Additional Activities	2011												2012											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Output-1 1.6 Conduct a water stress assessment (and develop a water supply plan) of CWB and water distribution system 1.7 Measure and correlate to water distribution and water stress																								
Output-2 2.8 Review existing, utilities and proposed assets, as related to water distribution and water stress																								
Output-3 3.9 Establish formal disaster distribution management																								
Additional Inputs (the Japanese side)																								
JICA Expert																								
1. Chief Advisor (NIP/Production Planning / Water Distribution Management-1)																								
2. Chief Advisor (NIP/Production Planning / Water Distribution Management-2)																								
3. Chief Advisor (NIP/Production Planning / Water Distribution Management-3)																								
4. Chief Advisor (NIP/Production Planning / Water Distribution Management-4)																								
5. Chief Advisor (NIP/Production Planning / Water Distribution Management-5)																								
6. Chief Advisor (NIP/Production Planning / Water Distribution Management-6)																								
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11. Chief Advisor (NIP/Production Planning / Water Distribution Management-11)																								
12. Chief Advisor (NIP/Production Planning / Water Distribution Management-12)																								
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17. Chief Advisor (NIP/Production Planning / Water Distribution Management-17)																								
18. Chief Advisor (NIP/Production Planning / Water Distribution Management-18)																								
19. Chief Advisor (NIP/Production Planning / Water Distribution Management-19)																								
20. Chief Advisor (NIP/Production Planning / Water Distribution Management-20)																								
Local Consultant																								
1. Dimensional consultant for zonal meter and water																								
2. Installation of standby power generation and storage battery																								

6. Location of Proposed Zonal Meters



5. Distribution Zones Monitoring Zones (proposed)

- Zones are created for effective monitoring by installing zonal meters and isolation.
- Each zone is monitored by zonal meter reading (inflow) and billed consumption (outflow).
- Location of zonal meters is prioritized by criteria such as its roles and importance.
- Remote monitoring (telemetry) system in one or two zones is introduced on a trial basis.



To Chief Representative of JICA Nigeria Office

PROJECT MONITORING SHEETS

Project Title : The Federal Capital Territory Reduction of Non-Revenue Water Project
Version of the Sheet: Ver. 2 (Term covered: July, 2015 - October, 2015)

Name: Akinori Miyoshi

Title: Chief Advisor

Submission Date: 12 November 2015

I. Summary

1 Progress

1-1 Progress of Inputs

[The Nigerian Side]

All project members including Project Director, Project Manager, Deputy Project Manager, Technical Managers, Non-Revenue Water (NRW) Management Team members, NRW Action Team members confirmed his/her roles and responsibilities and have been involved in the Project since the beginning of the Project. But, during this monitoring period, a member of Action Team in Gudu pilot Area Office, an assistant trade officer has been moved to other Area Office, which should be rectified by FCTWB.

All necessary arrangement and documentation including tax exemption for equipment from Japan were done by Federal Capital Territory Administration (FCTA) and Federal Capital Territory Water Board (FCTWB).

Chambers for flow meters and valves for the selected PMAs/SMAs have been procured, and construction will commence in the beginning of November 2015.

[The Japanese Side]

As at the end of October 2015, Japan International Cooperation Agency (JICA) Expert Team consisting of a Chief Advisor and six members have been assigned to the works in Nigeria for 20 man-months from November 2014, except for most of the period from January to April 2015 (2015 General Election in Nigeria).

The Japanese side has procured office equipment, vehicles, flow meters and valves for the selected PMAs/SMAs locally in Nigeria, and also equipment from Japan such as bulk (ultrasonic) meter and leakage detector, which were delivered to FCTWB. See the Annex-1: List of the procured Equipment for the Project.

The first training of the following four Nigerian project personnel in Yokohama City, Japan was conducted in the period between 17th and 28th August 2015. See the Annex-2: Training Programme.

- Engr. A. A. Nahuche, Head of Department (HOD) Distribution
- Mr. Adis S. Muhammad, HOD Commerce
- Engr. Aliyu Usman, HOD Reservoir and Production
- Mr. Musa Dikko, Head of Pipeline Unit, Distribution

1-2 Progress of Activities

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

Activity 1-1: Four bulk flow meters (ultrasonic) and data logger have been procured and delivered to FCTWB by JICA. Procurement process of chamber construction is ongoing, but actual works has been suspended due to dearth of Counterpart Fund of FCTWB for implementation.

Activity 1-4: Duplicated/returned bills have been identified by all Area Offices and corresponding Units of Headquarters, and forwarded to the Committee assigned to update the records. However, the data has not yet been shared with JICA Expert Team for analysis of information related to NRW.

[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.]

Activity 2-4: Two PCs and GIS software were handed over to FCTWB. The software has been set installed into PCs. Distribution network drawings for Gudu Area Office have been completed, while Jabi and Garki I are ongoing.

Activity 2-5 to 2-7: PMAs/SMAs have been designed prior to their physical creation and NRW reduction operations. See the Annex-3: Location of Chambers for Flow Meter/Valves in each PMA.

Activity 2-5 and 2-7: Verification of pipe size and materials has been conducted in all three PMAs. Similarly excavation for installation of flow meters, valves and construction of chambers is to commence in Gudu by FCTWB in the beginning of November 2015. JICA Expert Team has procured materials (flow meters, valves and fittings) for Gudu and Jabi, while procurement of materials for Garki I is ongoing.

Activity 2-10: Collection of baseline data related to commercial loss such as water consumption of customers domiciled in the selected PMAs/SMAs is ongoing, however the progress is slow due to certain challenges, multiple billing, estimated billing, different kind of meters installed, etc. Acceleration of the data collection is crucial to avoid delay of the other activities following this.

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



No activities as planned in this period.

1-3 Achievement of Output

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

Indicator: 1a: Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first 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 first year of the Project.

1c: Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors of FCTWB from the third quarter of the first year of the Project.

Current Status: Significant progress / On track / Little progress / Delayed / To be revised,

* As stated in Section 2-1 Detail, 2 Delay of Work Schedule and/or Problems (if any), necessary data cannot be measured due to delay of activities, but actions have been taken.

Target Date of Achievement: Indicator 1a&1b will be obtained from April 2016, Indicator 1c from October 2016.

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

Indicator: 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.

Current Status: Significant progress / On track / Little progress / Delayed / To be revised,

* As stated in Section 2-1 Detail, 2 Delay of Work Schedule and/or Problems (if any), necessary data cannot be measured due to delay of activities, but actions have been taken, and theoretical lectures and preparation of drawings through OJT have been done.

Target Date of Achievement: Indicator 2a will be obtained from November 2016, Indicator 2b from June 2016.

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

Indicator: 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.

Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.

1-4 Achievement of the Project Purpose

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

Indicator: 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

Indicator cannot be obtained because of limited progress, but skills and knowledge necessary for NRW reduction has been gradually developed through lectures, OJT and the first counterpart training in August 2015 in Japan.

1-5 Changes of Risks and Actions for Mitigation

Release of the additional approved Counterpart Fund is hampered by the new government policy, namely Treasury Single Account (TSA).

Inadequate power supply and time-consuming procedures for custom clearance / tax exemption, which were captured in the previous project monitoring sheet, have been solved.

1-6 Progress of Actions undertaken by JICA

Equipment from Japan such as ultrasonic flow meter and leakage detector were procured and delivered to FCTWB by JICA. JICA provided necessary information to FCTWB in a timely manner for smooth customs clearance and tax exemption.

As mentioned in Section 1-1, Progress of Inputs, office equipment (PCs, printer, copier and etc.) and GIS software were handed over to FCTWB. Two vehicles (Toyota Hilux 4WD) and materials for pilot project implementation (flow meters, valves and fittings) have been procured and delivered to FCTWB, except that of Garki I..

JICA Expert Team issued procurement notice to consulting firms for GIS training, while the procurement of consultant for modification of billing system has been suspended due to issues of duplicated/returned bills.

The first batch of the Nigerian project personnel was trained in Japan by JICA in August 2015.

1-7 Progress of Actions undertaken by Nigerian side

Customs clearance and tax exemption were obtained by FCTWB which facilitated clearance of tools and equipment procured by JICA from Japan.

FCTWB secured the approval of 2015 Counterpart Fund for the Project. Timely release of the Fund was hampered by the government policy of TSA.

Adequate security was provided to JICA Expert Team in the field. Issue of identification card is in progress.

As mentioned in Section 1-1, Progress of Inputs, office spaces and necessary facilities including internet connection for JICA Expert Team have been provided in FCTWB Headquarters, but those in pilot Area Offices is still been in preparation.

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.)

Absence of legal instrument (enabling law) establishing FCTWB.

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

2-1 Detail

(1) Limited Progress of Activities for Output-1

Activities for Output-1 have been delayed or postponed, particularly Activity 1-1 related to bulk flow meter installation at outlet of water treatment plant, followed by Activity 1-2 and 1-5.

On the other hand, activities for Output-2, particularly Activity 2-5 and 2-7 related to PMA/SMA physical creation by installing flow meters and valves in pilot projects, which were regarded as delayed in the previous monitoring, has been addressed and progressing.

(2) Suspension of Activity 1-4

Activity 1-4 for modification of billing system has been suspended due to duplicated/returned bills. It may have caused unreliable financial analysis including NRW and therefore needs to be solved prior to the modification of billing system.

(3) Delay in implementing Activity 2-5 and 2-7

Procurement of flow meters and valves in Activity 2-5 and 2-7 has been delayed due to non-existence of as-built drawings in FCTWB, but pipe size and materials have been identified by physical verification.

(4) AGIS Security Administrative Password

Policy of Abuja Geographical Information System (AGIS) on data restriction has hindered the use of AGIS data by the Project.

2-2 Cause

(1) Limited Progress of Activities for Output-1

Insufficient 2015 Counterpart Fund has caused this. Request of 2015 Counterpart Fund to be allocated to activities for Output-1 was approved by FCTA, but its release has been hampered by the new government policy of TSA.

(2) Suspension of Activity 1-4

Existing duplicated/returned bills have caused this. FCTWB has not been able to completely and effectively treat duplicated/returned bills.

(3) Delay in implementing Activity 2-5 and 2-7

Non-existence of as-built drawings has caused this. As-built drawings are supposed to be handed over to FCTWB, but actually it has not been done appropriately. There is lack of information sharing among relevant departments and other infrastructural developer such as mass housing estate developer.

(4) AGIS Security Administrative Password

This is the policy of AGIS.

2-3 Action to be taken

(1) Limited Progress of Activities for Output-1

FCTWB will liaise closely with FCTA for quick release of Counterpart Fund as soon as the government policy of TSA is stabilized.

(2) Suspension of Activity 1-4

FCTWB collated all the duplicated/returned bills, verified them and commenced the deactivation process for the bills. Report will be submitted by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance. After the deactivation and analysis, water

connection and data creation will be centralized by HODs (Distribution and Commerce) in the Headquarters to avoid duplication.

(3) Delay in implementing Activity 2-5 and 2-7

FCTWB, particularly GIS Unit and Pipeline Unit, will update GIS network drawings by physical verification during routine maintenance and capture GPS location for existing facilities. FCTWB will obtain as-built drawings of new/old facilities certainly from FCDA's Engineering Services Department and FCT Agency for Mass Housing.

(4) AGIS Security Administrative Password

FCTWB will gradually develop its own customized GIS database.

2-4 Roles of Responsible Persons/Organization

[FCTWB]

- Liaison with FCTA for quick release of Counterpart Fund: Director of FCTWB and HOD Finance
- Update of GIS database for distribution network (ongoing): GIS Unit, Pipeline Unit and Area Offices
- Reconfirmation of pipe size and material where valves will be installed (ongoing): Pipeline Unit and pilot Area Offices under supervision of Head of Department (HOD) Distribution.
- Procurement/construction of valve casings/chambers and supervision (ongoing): Pipeline Unit, Logistics Unit and Unit in charge of procurement under supervision of HOD Administration & Supply and HOD Distribution.
- Forming a committee for duplicated/returned bills (completed): HOD Commerce.
- Deactivation of duplicated/returned bills (ongoing): relevant units and all Area Offices under supervision of HOD Commerce.
- Analysis of collected information of duplicated/returned bills for water balance: Monitoring and Detection Unit under supervision of HOD Commerce.

[JICA Expert Team]

- Support to confirmation of pipe size and material where valves will be installed (ongoing).
- Support to preparation and procurement (completed) and construction of valve casings/chambers (ongoing).
- Procurement of valves and fittings (ongoing).
- Procurement of GIS training (ongoing)
- Support to analysis of duplicated/returned bills for water balance.
- Procurement of modification of billing system

3 Modification of the Project Implementation Plan

3-1 Plan of Operation

Due to the above problems and other reasons, Plan of Operation (PO) has been rescheduled. See the Project Monitoring Sheet II as attached.

3-2 Other modifications on detailed implementation plan

(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 HQ. If the project team deems it necessary to modify any part of R/D and PDM, the team may propose the draft.)

Based on the recognition between JICA and FCTWB, JICA made the decision to enhance the Project through additional activities such as installation of zonal meters and establishment of framework of water distribution management. Accordingly, PDM will be revised in the third Joint Coordinating Committee (JCC) meeting.

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 the procured Equipment for the Project

Annex-2: Training Programme (1st Training in August 2015)

Annex-3: Location of Chambers for Flow Meter/Valves in each PMA (Plan)

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)
Direct Beneficiaries: FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices
Project Sites: FCT
Pilot Area Offices: Jabi, Garki I and Gudu

Version 1
 Dated 5 Nov. 2014

Project Monitoring Sheet I (Revision of Project Design Matrix)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p>Overall Goal Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p>a. Annual NRW ratio is reduced to X%^(*) at the end of the year 2021</p> <p>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</p>	<p>a. Record of NRW ratio kept by Distribution Department</p>	<p>Indicator cannot be obtained because of limited progress.</p>	<p>Indicator cannot be obtained because of limited progress.</p>	<p>See the Output-2 of Monitoring Sheet II</p>
<p>Project Purpose Capacity of FCTWB for NRW reduction is strengthened</p>	<p>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 ^(**)</p> <p>Note^(**): Target for each PMA is expected to be determined by the end of the first quarter of the second year</p>	<p>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</p>	<p>A. 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-term strategic plan are not discontinued or delayed</p>	<p>Indicator cannot be obtained because of limited progress, but skills and knowledge necessary for NRW reduction has been gradually developed through lectures, OJT and the first counterpart training in August 2015 in Japan.</p>	<p>See the Output-2 of Monitoring Sheet II</p>
<p>Outputs Level of NRW of the service area of FCTWB is monitored regularly</p>	<p>1a. Record of monthly NRW ratio is kept by Distribution Department from the third quarter of the first 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 first year of the Project 1c. Quarterly NRW ratio of the service area of FCTWB is reported to the Board of Directors of FCTWB from the third quarter of the first year of the Project 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</p>	<p>1a. Monthly record of NRW ratio 1b&1c. Material for meetings submitted by the Distribution Department 2a. Record of NRW ratio kept by the Distribution Department 2b. Date of approval of the manuals 3a&3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan 3c. Date of approval of the manual</p>	<p>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</p>	<p>Necessary data cannot be measured due to delay of activities, but actions have been taken.</p>	<p>See the Output-1 of Monitoring Sheet II</p>
<p>Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices ^(*)</p>	<p>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 FCTWB'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</p>	<p>3a&3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan 3c. Date of approval of the manual</p>	<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.</p>	<p>Necessary data cannot be measured due to delay of activities, but actions have been taken, and theoretical lectures and preparation of drawings through OJT have been done.</p>	<p>See the Output-2 of Monitoring Sheet II</p>
<p>A medium-term strategic plan of FCTWB for NRW reduction is developed, utilizing the results of Output 1-2 ^(**)</p>	<p>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 FCTWB'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</p>	<p>3a&3b. Date of official letter submitting draft strategic plan and annual recurrent and capital plan 3c. Date of approval of the manual</p>	<p>Indicator will be obtained in Phase-2 of the Project scheduled in 2017 and 2018, but Working Group members were selected and existing plans, etc. related to NRW reduction at FCTWB were reviewed preliminarily.</p>	<p>Necessary data cannot be measured due to delay of activities, but actions have been taken, and theoretical lectures and preparation of drawings through OJT have been done.</p>	<p>See the Output-3 of Monitoring Sheet II</p>

Note ^(*): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection
 Note ^(**): 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 ^(*) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

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Appendix 6

Activities	Inputs	The Nigerian Side	The Japanese Side	Important Assumption
<p>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</p>	<p>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), each pilot Area Office 8. Other personnel mutually agreed upon as necessary</p>	<p>Japanese Experts 1. Chief Advisor / NRW Reduction Planning 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 Management / Coordinator 8. Other experts mutually agreed upon as necessary</p>	<p>Pre-Conditions A. Furnished offices for Japanese Expert Team are secured at Headquarters and each Pilot Area Office of FCTWB B. Project Personnel is assigned with the finalized list</p>	<p>A. Natural disaster/political/instability/economic crisis that affect the project activities do not occur</p>
<p>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 (*) 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)</p>	<p>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. Other facilities mutually agreed upon as necessary</p>	<p>Equipment 1. Bulk meters 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. Other equipment mutually agreed upon as necessary</p>	<p>Issues & Countermeasures - Insufficient 2015 Counterpart Fund has caused limited progress of activities for Outfit-1. FCTWB will liaise closely with FCTA for quick release of the Fund as soon as the government policy of TSA is stabilized. - Existing duplicated/returned bills have caused suspension of Activity 1-4. FCTWB collated all the duplicated/returned bills, verified them and commenced the deactivation process for the bills. Report will be submitted by the middle of November 2015 to JICA Expert Team to analyze them jointly for water balance. - Non-existence of as-built drawings has caused delay in implementing Activity 2-5 and 2-7. FCTWB will update GIS network drawings by physical verification during routine maintenance and capture GPS locations for existing facilities. FCTWB will obtain as-built drawings of new/old facilities certainly from FCTA's Engineering Services Department and FCT Agency for Mass Housing. - Policy of Abuja Geographical Information System (AGIS) on data restriction has hindered the use of AGIS data by the Project. FCTWB will gradually develop its own customized GIS database.</p>	<p>Training of the Nigerian Project Personnel in Japan Four persons mutually agreed upon will be trained in Japan annually</p>
<p>2-7 Prepare a report on pilot projects, covering Activity 2-1-2-15 2-8 Develop manuals for NRW reduction for Area Office managers and field operators (i.e. technical officers and meter readers), including audio visual materials</p>	<p>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 costs for local travel for the Project Personnel</p>	<p>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 costs for local travel for the Project Personnel</p>		
<p>3-1 Establish a Working Group for NRW planning (*) 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</p>	<p>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 costs for local travel for the Project Personnel</p>	<p>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 costs for local travel for the Project Personnel</p>		

Note (*) 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 (*) Working Group for NRW planning would consist of Project Manager (as chair), Deputy Project Manager, Technical Managers, Head of Finance Dept., Deputy Project Manager (as chair), Deputy Production Dept., Head of Production Dept., and members of NRW Management Team.

Annex-1
List of the procured Equipment for the Project

No.	Equipment	Specification		Quantity		Remarks
		Japan	Nigeria	Japan	Nigeria	
For Activity 1-2						
1	Ultrasonic flow meter (stationary, 220m)	●	●	2		Lower Ussuma Water Treatment Plant
2	Ultrasonic flow meter (stationary, 300m)	●	●	2		Lower Ussuma Water Treatment Plant
3	Data logger (stationary)	●	●	1		Lower Ussuma Water Treatment Plant
For Activity 2-4 and 2-5						
1	GIS software	●	●	1		HQs
2	GIS software	●	●	1		HQs
3	Plotter (A0)	●	●	1		HQs
4	GPS terminal	●	●	2		HQs
5	Personal computer	●	●	2		HQs
6	Anti-virus software	●	●	2		HQs
7	UPS	●	●	2		HQs
For Activity 2-5						
1	Ultrasonic flow meter (stationary)	●	●	1		Gairiki Pilot Area Office
2	Data logger (portable)	●	●	1		Gairiki Pilot Area Office
3	Flow meter	●	●	1		To be determined through Activity 2-4, then procured additionally.
4	Flow meter	●	●	1		To be determined through Activity 2-4, then procured additionally.
5	Flow meter	●	●	2		To be determined through Activity 2-4, then procured additionally.
6	Flow meter	●	●	2		To be determined through Activity 2-4, then procured additionally.
For Activity 2-7						
1	Sluice valve	●	●	1		To be determined through Activity 2-4, then procured additionally.
2	Sluice valve	●	●	1		To be determined through Activity 2-4, then procured additionally.
3	Sluice valve	●	●	6		To be determined through Activity 2-4, then procured additionally.
4	Sluice valve	●	●	4		To be determined through Activity 2-4, then procured additionally.
5	Sluice valve	●	●	2		To be determined through Activity 2-4, then procured additionally.
6	Sluice valve	●	●	2		To be determined through Activity 2-4, then procured additionally.
7	Sluice valve	●	●	2		To be determined through Activity 2-4, then procured additionally.
For Activity 2-10						
1	Ultrasonic flow meter (portable)	●	●	6		3 Pilot Area Offices
2	Data logger (portable)	●	●	6		3 Pilot Area Offices
3	Leak noise correlator	●	●	2		3 Pilot Area Offices, to be stored in HQs.
4	Water leak detector	●	●	6		3 Pilot Area Offices
5	Non-metal pipe locator	●	●	3		3 Pilot Area Offices
6	Metal locator	●	●	3		3 Pilot Area Offices
7	Time integral water leak detector	●	●	3		3 Pilot Area Offices
8	Acoustic rod	●	●	9		3 Pilot Area Offices
9	Distance meter	●	●	3		3 Pilot Area Offices
10	Hammer drill	●	●	3		3 Pilot Area Offices
11	Boiling bar	●	●	3		3 Pilot Area Offices
12	Drill bit	●	●	9		3 Pilot Area Offices
13	Portable residual chlorine analyzer	●	●	3		3 Pilot Area Offices
14	Metal pipe and cable locator	●	●	3		3 Pilot Area Offices
15	Reference meter	●	●	3		3 Pilot Area Offices
16	Leakage quantity measurement device	●	●	3		3 Pilot Area Offices
17	Personal computer	●	●	3		3 Pilot Area Offices
18	Anti-virus software	●	●	3		3 Pilot Area Offices
19	UPS	●	●	3		3 Pilot Area Offices
20	Inkjet printer	●	●	3		3 Pilot Area Offices
21	Digital camera	●	●	3		3 Pilot Area Offices
For Activity 2-13						
1	Generator	●	●			To be procured soon.
2	Asphalt cutter	●	●			To be procured soon.
3	Concrete breaker	●	●			To be procured soon.
4	Small-sized devaluating pump	●	●			To be procured soon.
5	Small-sized tamper	●	●			To be procured soon.
6	Electric drum	●	●			To be procured soon.
7	Customer meter	●	●			To be determined through Activity 2-10, then procured.
8	Customer meter	●	●			To be determined through Activity 2-10, then procured.
9	Customer meter	●	●			To be determined through Activity 2-10, then procured.
10	Customer meter	●	●			To be determined through Activity 2-10, then procured.
11	Customer meter	●	●			To be determined through Activity 2-10, then procured.
For Output 2						
1	Pickup truck for pilot sites	●	●	2		HQs and three Pilot Area Office
For Operation of the Project						
1	Laser printer	●	●	1		HQs
2	Inkjet printer	●	●	1		HQs
3	Multifunction copier	●	●	1		HQs
4	Graphic/movie editing software	●	●	1		HQs

Title of Training Course:

The Federal Capital Territory Reduction of Non-Revenue Water Project (Water Supply Services Management and NRW Reduction)

Purpose of Training:

Necessity of comprehensive management of water supply services, and knowledge and technology about NRW reduction are shared and diffused in FCTWB. In particular,

1. Trainees understand institution and system of water supply services and various efforts in Japan and Yokohama City, and then can compare them with those in Nigeria.
2. Trainees understand a variety of skills and practical approaches about NRW reduction, and then contribute to taking appropriate response to NRW in Pilot Metering Area (PMA) and apply their know-how gained to routine works of FCTWB.
3. Trainees enhance understanding of planning and operations in water supply services, and then contribute to future improvement of management of water supply services of FCTWB.

Schedule and Contents of Training Course

Date	Contents	Description	Division/Section in charge	Place
14/8(Fri)	Traveling	(Abuja -) *Turkish Airlines TK624		
15/8(Sat)	Traveling	(- Istanbul - Abuja -) *Turkish Airlines TK050		
16/8(Sun)	Traveling	(- Tokyo - Yokohama)		
17/8(Mon)	Orientation	Briefing of Training Course		JICA Yokohama
	Courtesy Call	Director General of Yokohama Waterworks Bureau (YWWB)	International Operations Division	YWWB HQs
	Overview of Water Supply in Japan and Yokohama	To understand water supply, institutions, laws and regulations in Japan, and water supply services of YWWB.	Construction Division	JICA Yokohama
18/8(Tue)	Self-supporting Accounting System and Public-Private Partnership (PPP)	To understand self-supporting accounting system and PPP of YWWB, and challenges in their adoption.	Accounting and Finance Division	YWWB HQs
	Rehabilitation Project of Purification Plant by PFI	To understand conditions of PPP adoption and current issues and advantages through the case of YWWB.	Kawai Purification Plant	Kawai Purification Plant
	Membrane Filtration	To visit ceramic membrane filtration at purification plant rehabilitated by PPP.	Kawai Purification Plant	Kawai Purification Plant
19/8(Wed)	Water Tariff Management	To enhance understanding of water tariff management for right (customer-friendly) billing and collection through the case of YWWB including customer management, welfare-purpose exemption and systematic suspension of water supply against debtor.	Pricing Division	JICA Yokohama
	Customer Services (CS) Center	To enhance understanding of CS through the practical case of YWWB	Services Promotion Division	Customer Services Center
	Customer Services (CS) and Public Relations (PR)	To enhance understanding of CS and PR through the case of YWWB such as customer comments and education for elementary students.	Services Promotion Division	JICA Yokohama
20/8(Thu)	Mapping System	To enhance understanding of formulation of GIS, its utilization, management of inventory and drawings through the case of YWWB, in particular, Mapping System and Network Drawing Book.	Water Supply Division, Pipeline Information Section	Nishiya Purification Plant
	Water Supply Operation Management	To enhance understanding of water supply operation management through the case of YWWB, such as Water Supply Block System and SCADA covering water sources, purification plants, reservoirs and distribution network.	Water Purification Division, Water Supply Control and Management Section	Nishiya Purification Plant
21/8(Fri)	Outline of Leakage (NRW) Prevention	To understand water leakage as a part of NRW through lectures on mechanism of leakage occurrence, leakage survey planning and detection equipment.	Water Supply Division, Water Leakage Management Section	Nishiya Purification Plant
	Leakage Detection Demonstration (Training Facility)	To understand advantage of training facility owned by water supply services agency for capacity development and technology succession.	Water Supply Division, Water Leakage Management Section	Pipe Training Yard (Nishiya Purification Plant)
22/8(Sat)				
23/8(Sun)				
24/8(Mon)	Aged Pipe Replacement Plan	To enhance understanding necessity of pipe rehabilitation, its prioritization and aspects of service life (lifespan) through the case of	Water Supply Division	JICA Yokohama
	Pipe Replacement Works	To enhance understanding of supervision and safety control of construction works through site visit.	Area Construction Division	Field Site
25/8(Tue)	Water Meter Maintenance	To enhance understanding of components of water meter and its maintenance, as well as necessity of its accuracy check through metering test at laboratory of YWWB.	Maintenance Division, Water Meter Section	Nakamura Water Plaza (Meter Yard)
	Human Resources Development (HRD)	To enhance understanding of HRD through the case of YWWB, in particular, Career Build-up Programme, Personnel Relocation Programme and tools such as Achievement Check Sheet.	Personnel Affairs Division	YWWB HQs
	Technology Succession	To enhance understanding of technology succession through lecture on routine OJT and training programme.	Human Resources Development Division	YWWB HQs
26/8(Wed)	Water Supply Planning	To enhance understanding of Water Demand Forecasting, calculation of Design Water Supply and accordingly Facility Development Planning.	Planning Division	JICA Yokohama
	Asset Management	To enhance understanding of Asset Management, in particular, service life (lifespan), prioritization and inspection & maintenance.	Planning Division	JICA Yokohama
	Medium-Term Management & Financial Planning	To enhance understanding of how to set vision, long/medium-term goals and annual objectives, and progress management of them, financial planning and annual budgeting for comprehensive management of water supply services through the case of YWWB. Also, to understand the balance between income and expenditure and how to set water tariff scheme based on it for self-supporting accounting system.	Business Planning Division	JICA Yokohama
27/8(Thu)	Purification Plant	To enhance understanding of conventional purification process (receiving well, sedimentation, filtration, chemical dosing facilities such as flocculant) and appropriate operation and maintenance of purification	Kosuzume Purification Plant	Kosuzume Purification Plant
	Preparation of Action Plan	Trainees prepare Action Plan(s) for contribution to FCTWB, based on knowledge gained in training course.	YWC	JICA Yokohama
28/8(Fri)	Presentation	Presentation of Action Plan, questions and answers, discussion	YEC, YWC	
	Evaluation Meeting		JICA	JICA Yokohama
	Certificate Awarding		JICA	
29/8(Sat)	Traveling	(Yokohama - Tokyo - Istanbul - Abuja) *Turkish Airlines TK051&TK623		

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Annex-1
List of the procured Equipment for the Project

No.	Equipment	Specification		Quantity	Remarks
		Japan	Nigeria		
For Activity 1-2					
1	Ultrasonic flow meter (stationary, 220m)	●		2	Lower Usuma Water Treatment Plant
2	Ultrasonic flow meter (stationary, 300m)	●		2	Lower Usuma Water Treatment Plant
3	Data logger (stationary)	●		1	Lower Usuma Water Treatment Plant
For Activity 2-4 and 2-8					
1	GIS software		●	1	HQs
2	ESRI ArcGIS Basic V10.3		●	1	HQs
3	Plotter (A0)		●	1	HQs
4	GPS terminal		●	2	HQs
5	Personal computer		●	2	HQs
6	Anti-virus software		●	2	HQs
7	UPS		●	2	HQs
For Activity 2-5					
1	Ultrasonic flow meter (stationary)	●		1	Gairiki Pilot Area Office
2	Data logger (portable)	●		1	Gairiki Pilot Area Office
3	Flow meter		●	1	To be determined through Activity 2-4, then procured additionally.
4	Flow meter		●	1	To be determined through Activity 2-4, then procured additionally.
5	Flow meter		●	2	To be determined through Activity 2-4, then procured additionally.
6	Flow meter		●	2	To be determined through Activity 2-4, then procured additionally.
For Activity 2-7					
1	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
2	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
3	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
4	Sluice valve		●	5	To be determined through Activity 2-4, then procured additionally.
5	Sluice valve		●	4	To be determined through Activity 2-4, then procured additionally.
6	Sluice valve		●		To be determined through Activity 2-4, then procured additionally.
7	Sluice valve		●	2	To be determined through Activity 2-4, then procured additionally.
For Activity 2-10					
1	Ultrasonic flow meter (portable)	●		5	3 Pilot Area Offices
2	Data logger (portable)	●		5	3 Pilot Area Offices
3	Leak noise correlator	●		2	3 Pilot Area Offices to be stored in HQs.
4	Water leak detector	●		5	3 Pilot Area Offices
5	Non-metal pipe locator	●		3	3 Pilot Area Offices
6	Metal locator	●		3	3 Pilot Area Offices
7	Time Integral Water Leak detector	●		3	3 Pilot Area Offices
8	Acoustic rod	●		9	3 Pilot Area Offices
9	Distance meter	●		3	3 Pilot Area Offices
10	Hammer drill	●		3	3 Pilot Area Offices
11	Boiling bar	●		3	3 Pilot Area Offices
12	Drill bit	●		9	3 Pilot Area Offices
13	Portable residual chlorine analyzer	●		3	3 Pilot Area Offices
14	Metal pipe and cable locator	●		3	3 Pilot Area Offices
15	Reference meter	●		3	3 Pilot Area Offices
16	Leakage quantity measurement device	●		3	3 Pilot Area Offices
17	Personal computer	●		3	3 Pilot Area Offices
18	Anti-virus software	●		3	3 Pilot Area Offices
19	UPS	●		3	3 Pilot Area Offices
20	Inkjet printer	●		3	3 Pilot Area Offices
21	Digital camera	●		3	3 Pilot Area Offices
For Activity 2-13					
1	Generator		●		To be procured soon.
2	Asphalt cutter		●		To be procured soon.
3	Concrete breaker		●		To be procured soon.
4	Small-sized dewatering pump		●		To be procured soon.
5	Small-sized tamper		●		To be procured soon.
6	Electric drum		●		To be procured soon.
7	Customer meter		●		To be determined through Activity 2-10, then procured.
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For output 2					
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2	Inkjet printer		●	1	HQs
3	Multifunction copier		●	1	HQs
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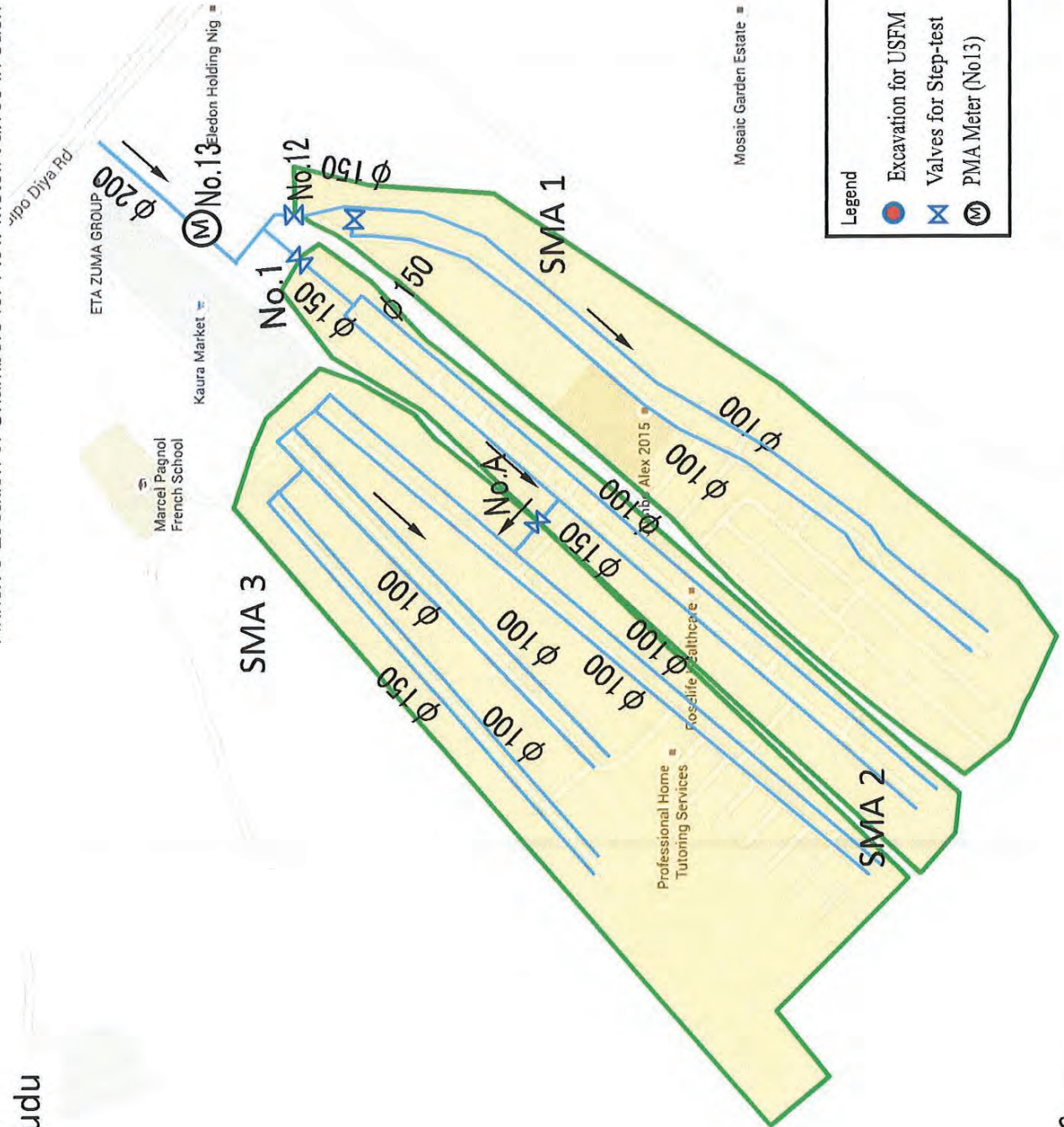
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23/8(Sun)				
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	Evaluation Meeting		JICA	JICA Yokohama
	Certificate Awarding		JICA	
29/8(Sat)	Traveling	(Yokohama - Tokyo - Istanbul - Abuja) *Turkish Airlines TK051&TK623		

Appendix 6
PMA Gudu

Annex 3 Location of Chambers for Flow Meter/Valves in each PMA (Plan)



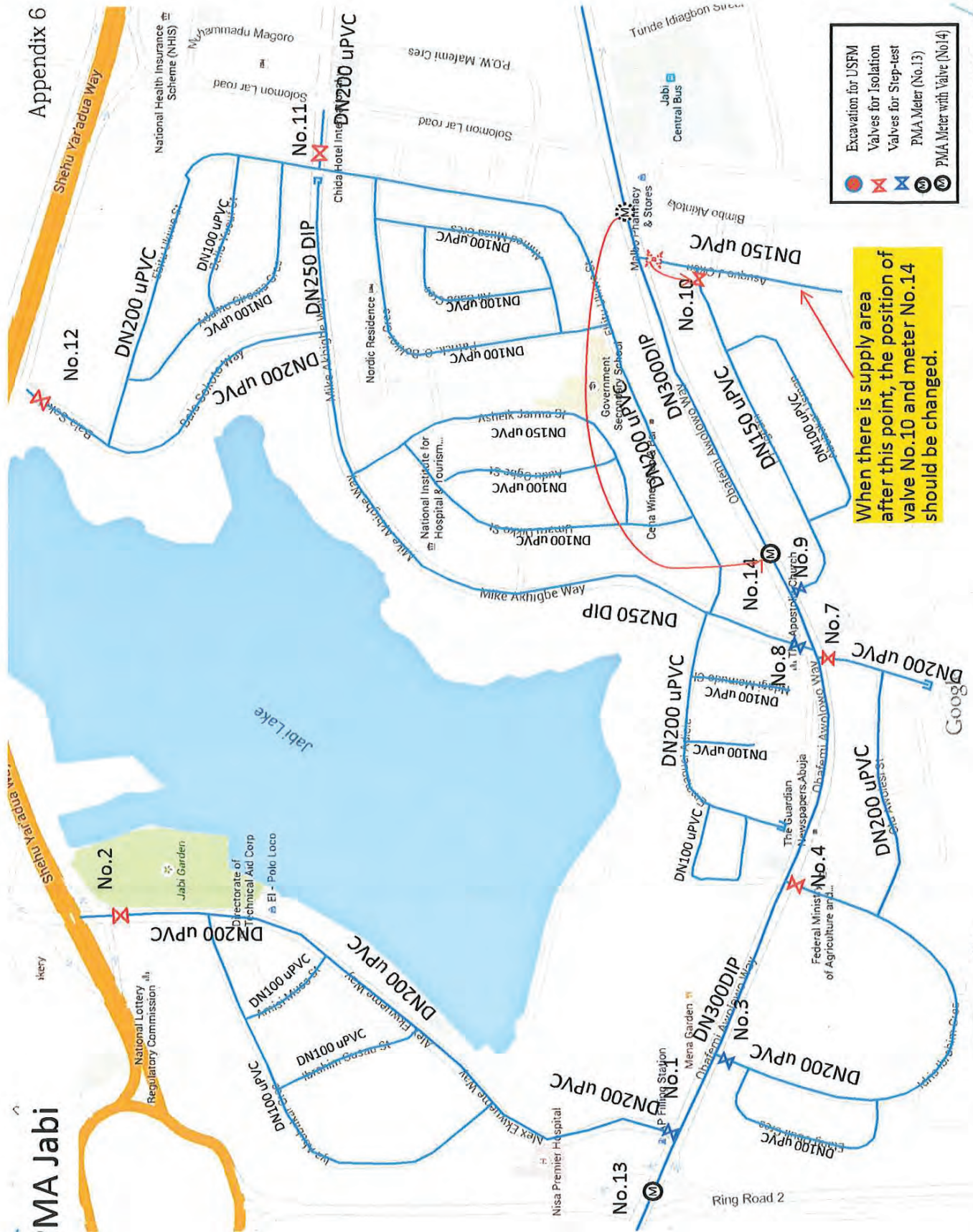
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PMA Jabi

Appendix 6



	Excavation for USFM
	Valves for Isolation
	Valves for Step-test
	PMA Meter (No.13)
	PMA Meter with Valve (No.14)

When there is supply area after this point, the position of valve No.10 and meter No.14 should be changed.

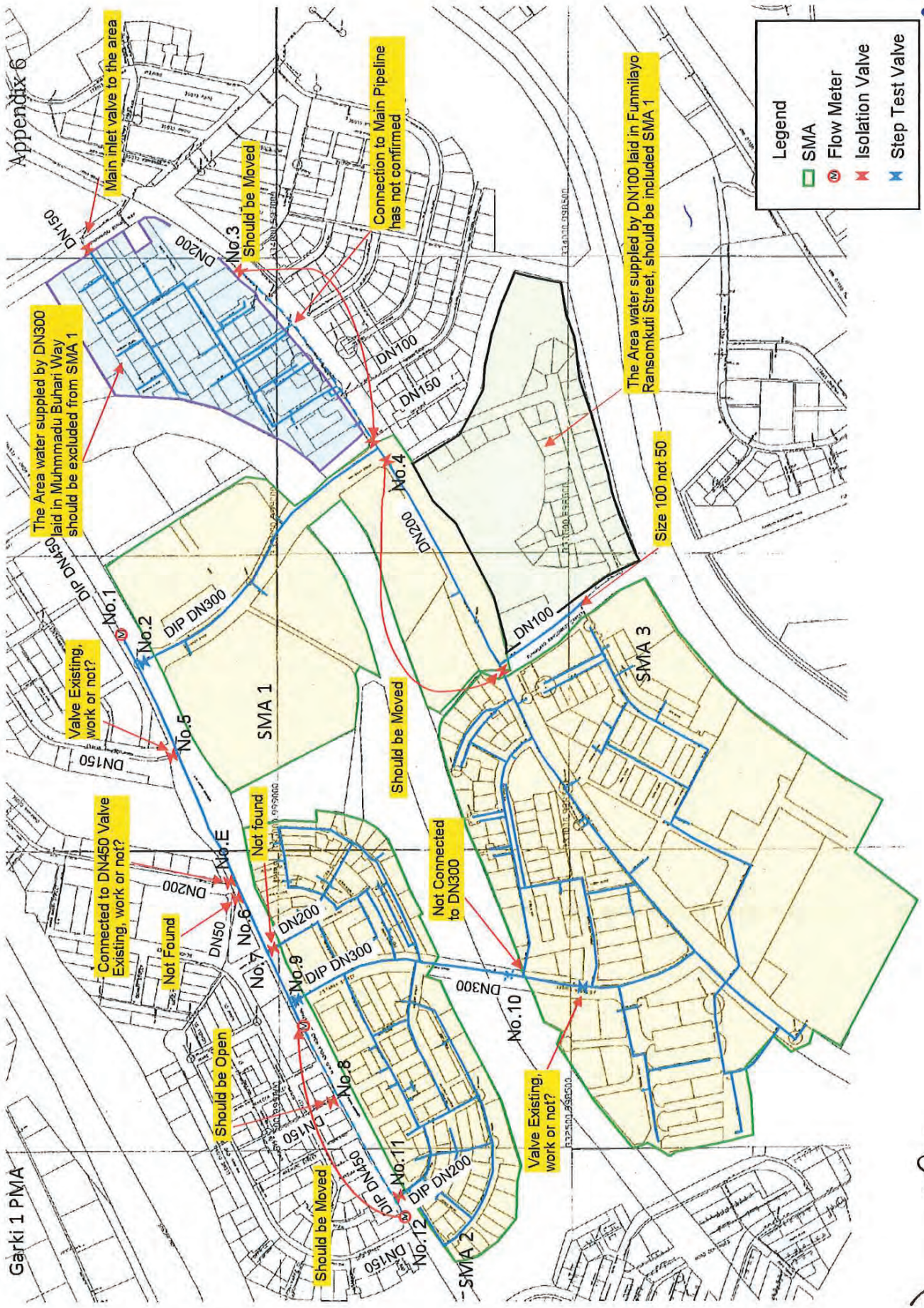
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Appendix 6

Garki 1 PMA



Legend

- SMA
- ⊗ Flow Meter
- ✕ Isolation Valve
- ✕ Step Test Valve

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Project Monitoring Sheet I (Revision of Project Design Matrix)

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)
Direct Beneficiaries: FCTWB, relevant staff of FCTWB Headquarters and pilot Area Offices
Pilot Area Offices: Jabi, Garki I and Gudu

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p><Overall Goal> Level of Non-Revenue Water (NRW) is reduced at the service area of FCTWB</p>	<p>1a. Annual NRW ratio is reduced to X% (*) at the end of the year 2021</p> <p>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</p>	<p>1a. 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 (**).</p>	<p>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</p>	<p>A. 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-term strategic plan are not discontinued or delayed</p>		
<p><Project Purpose> Capacity of FCTWB for NRW reduction is strengthened</p>	<p>Note (**): Target for each PMA is expected to be determined by the end of the first quarter of the second year.</p>	<p>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.</p>	<p>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</p>	<p>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</p>		
<p><Outputs> Level of NRW of both the service area of FCTWB and water distribution areas is monitored regularly</p>	<p>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.</p>	<p>2a. 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.</p>	<p>2a. Record of NRW ratio kept by the Distribution Department 2b. Date of approval of the manuals</p>			
<p><Methods/operational procedures for effective NRW reduction are established through pilot projects at Pilot Metering Areas (PMAs) under pilot Area Offices (*)</p>	<p>3a. A medium-term strategic plan for NRW reduction is developed, utilizing the results of Output 1-2 (*)</p>	<p>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 FCTWB'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.</p>	<p>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</p>			

Note (*): NRW components targeted by Output 2 are (i) invisible leakage; (ii) customer meter malfunction; and (iii) illegal connection
 Note (**): 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 (*) above; they shall be discussed and determined in developing the outline of the strategic plan (through Activity 3-4).

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Activities	Inputs	Important Assumption
<p>1-1 Install bulk meters to water treatment plants 1 and 2</p> <p>1-2 Measure monthly water production of water treatment plants 1, 2, 3 and 4</p> <p>1-3 Tally the above water production data monthly</p> <p>1-4 Calculate the monthly water consumption based on the billing data</p> <p>1-5 Calculate monthly NRW ratio of the service area of FCTWB using the data obtained from Activity 1-3 and 1-4</p> <p>1-6 Install zonal meters, water pressure sensor and pilot remote monitoring (telemetry) system</p> <p>1-7 Measure and collect data for water distribution management such as water flow of zonal meters and water pressure</p> <p>2-1 Review existing NRW reduction operations at each pilot Area Office</p> <p>2-2 Conduct capacity assessment of the relevant staff of each pilot Area Office</p> <p>2-3 Identify and select a Pilot Metering Area (PMA) for each pilot Area Office based on the selection criteria of PMA (*3)</p> <p>2-4 Prepare/update distribution network drawings for each PMA</p> <p>2-5 Install water flow meters to each PMA and measure in/outflows monthly</p> <p>2-6 Zone each PMA into Sub Metering Areas (SMA)</p> <p>2-7 Isolate a SMA by installing valves</p> <p>2-8 Update the distribution network drawings for each SMA</p> <p>2-9 Measure an initial level of NRW of each SMA</p> <p>2-10 Detect target NRW components (i.e. invisible leakage, customer meter malfunction, and illegal connection) of each SMA</p> <p>2-11 Develop a NRW reduction operation plan of each SMA, including reduction target, for review by Head of Distribution Department</p> <p>2-12 Review and approve NRW reduction operation plan of each SMA</p> <p>2-13 Implement the NRW reduction operations at each SMA</p> <p>2-14 Monitor the progress of the NRW reduction operations of each SMA</p> <p>2-15 Measure level of NRW of each SMA at the end of the respective operations</p> <p>2-16 Prepare a report on pilot projects, covering Activity 2-1 ~2-15</p> <p>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</p>	<p>The Nigerian Side</p> <p>Project Personnel</p> <ol style="list-style-type: none"> 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): <ul style="list-style-type: none"> - 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. 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 <p>Land, Building and Facilities</p> <ol style="list-style-type: none"> 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 bulk meters for water treatment plants, flow 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 <p>Local Costs</p> <ol style="list-style-type: none"> 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 	<p>The Japanese Side</p> <p>Japanese Experts</p> <ol style="list-style-type: none"> 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 Manager / 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 <p>Equipment</p> <ol style="list-style-type: none"> 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 <p>Facilities</p> <ol style="list-style-type: none"> 1. Modification of existing billing system 2. Chambers for zonal meters and water pressure sensors <p>Training of the Nigerian Project Personnel</p> <ol style="list-style-type: none"> 1. Four persons mutually agreed upon will be trained in Japan annually 2. GIS training in Nigeria
<p>3-1 Establish a Working Group for NRW planning (*4)</p> <p>3-2 Review existing plans, implementation structure, on-the-job training mechanism, etc. related to NRW reduction at FCTWB</p> <p>3-3 Conduct hydraulic and water pressure distribution analyses of the pipeline networks</p> <p>3-4 Develop outlines of the medium-term strategic plan and its annual NRW reduction plan</p> <p>3-5 Develop the first medium-term strategic plan (2018-2022) for approval by FCTA</p> <p>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</p> <p>3-7 Develop a planning manual for NRW reduction</p> <p>3-8 Review existing plans, activities and implementing structure, etc. related to water distribution management</p> <p>3-9 Establish framework of water distribution management</p>	<p>Issues & Countermeasures</p>	

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., and members of NRW Management Team.

