資料 5)　パイロット WSP の無収水削減計画
（レビューおよび計画テンプレート）

5) -1　Annual Review Report of Pilot WSPs for 2016/2017/2018

Table 1: Annual Review Report of NRW Activities for 2016-17-18, MERU WSP (mewass) **(Last modified on July 17, 2018)**

Review (please fill the areas enclosed with double lines)						
(1) Main Achieve-ments	◆ Mapping of pressure zones/DMAs & pressure measurement ◆ Installation of additional sectional valves ◆ Management of bursts and leaks through night flow measurement with step test, leak detection and patrolling ◆ Replacement of all the faulty zonal bulk meters ◆ Detection of illegal connections, illegal self-reconnections and failed disconnections with faulty stop cocks					
(2) Good Practices and Advices to Share with other WSPs	◆ Detection of leaks & bursts through step test at night ◆ Use of quality ISO-certified pipes and fittings (e.g. uPVC Class E) & quality workmanship (without using fire coupling) ◆ Flushing pipelines after repairs which avoid meter blockage ◆ Categorization of customers by consumption level for prioritization ◆ Follow-up of monthly abnormal consumption report ◆ Stable monthly meter reading cycle ◆ GIS leakage pattern maps for planning pipe replacement ◆ NRW Monitoring: Starting from abnormal flow monitoring if the calculation of billed consumption for each area is not ready. ◆ Use of ODK Forms: The other pilot WSPs are expected to join in the trials for the improvement of the latest version of ODK forms.					
(3) Main challenges	◆ NRW Monitoring: 1) difficulty to procure bulk meters from a good supplier, 2) lack of reliable welding machine in installing bulk meters, 3) planned improvement of meter reading / billing system has been pending due to unavailability of the software programmer in charge. ◆ Pressure Measurement: 1) hostile customers not allowing pressure measurement at their meters, 2) intermittent flows making pressure measurement difficult, and 3) faulty stop cock making pressure gauge installation difficult. ◆ Pressure Test on Service Connections: faulty talbot at saddle clamp making hand pump test difficult ◆ Use of ODK Forms: 1) many information required to fill the ODK forms, 2) difficulty to fill the ODK forms when only one worker is available at site, and 3) smartphones are required.					
(4) Performance Evaluation	**Indicators**		**Previous Financial Year 2016/17** (ref. Impact Report)	**Last Financial Year ended this June 2017/18**	**Change over the Year**	**Definition & Note**
	Size & Finance of WSP	**Total No. of Connections**	14,918	**15,974**	**1056**	Note: Include both active and inactive connections.
		Total Production (m3/year)	2,678,765	**2,746,332**	**67,567**	Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
		O&M Cost Coverage (%)	117	**115**	**-2**	Definition: (Total operating revenues / Total operating expenditures) x 100
	NRW-related Data	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	7.0	8.0	+ 1.0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
		Metering Ratio (%)	100	100	0	Definition (Total number of active metered connections /Total number of active connections) x 100
		NRW Ratio (%)	21	21	0	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
	Completion Ratio of the Planned Activities (%)		68	70	+ 2	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
	Main Incomplete Activities planned for the Last Year		**↓30%**			◆ Replacement bulk master meters were not complete and some additional DMA,s (new zone 9) were not demacated. ◆ pressure measurement activities were affected by heavy rains via pressure mapping.
	Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		20% as target in the strategic plan (2015-2019)			

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Embu WSP (EWASCO) **(Last modified on July 11, 2018)**

Review (please fill the areas enclosed with double lines)

(1) Main Achieve-ments	◆ Establishment of 6 Distribution Zones and 23 DMAs based on existing bulk meters (but not fully operational) ◆ Analysis of meter reading / billing data of all the customers to identify the scale, frequency & continuity of consumption estimation for prioritization ◆ Revenue increase after testing and replacing large customers' faulty meters ◆ Training of the staff on basics of NRW, survey equipment, smartphone use, etc. ◆ Shift of mind set towards low cost solutions (e.g. calibrated bucket, use of additional copolymer piston meter as a meter tester, etc.) ◆ Identification of the most leaking area within a problematic distribution zone with step test
(2) Good Practices and Advices to Share with other WSPs	◆ Establishment of a fully-dedicated NRW task team capable to deal with both commercial and physical loses ◆ Try to establish clear distribution zones (useful for NRW monitoring, step test, etc.) before duplicating small DMAs. ◆ Use of low-cost solutions such as calibrated buckets and free ODK forms ◆ Importance of sharing information with other WSPs (e.g. OJT with other stake holders such as WASPA, KEWI, etc.) ◆continous on job trainning for staff in nrw management and reduction. ◆step test to easily identify where the problem is for fast results and application of odk simple tests and practices..
(3) Main Obstacles	◆ Delay in the Ministry's delivery of NRW survey equipment ◆ Unreliable data of production and zonal inflow which can not guide NRW activities ◆ GIS layers not sufficiently updated (e.g. customer meters, pipelines, etc.) ◆ Reduction of the budget for NRW activities and GIS development due to the payment for a sewerage project

(4) Performance Evaluation

Indicators		**Previous Financial Year 2016/17** (ref. Impact Report)	**Last Financial Year ended this June 2017/18**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**Total No. of Connections**	31,355			Note: Include both active and inactive connections.
	Total Production (m3/year)	6,829,357	6,256,790		Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	116			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	2.0	7.0 (Officially from June 1, 2018)	+ 5.0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	41	32	+9	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Planned Activities (%)		40	50	+ 10	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
Main Incomplete Activities planned for the Last Year		↓ ◆ sub zonal clear demaction and phasing of the billing cycle to the master meter readings for easier and accurate nrw computation. ◆ accuracy test of all existing master meters large than 110mm. ◆aquisation of nrw investigation equipments.			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		Reduction of the NRW from 41% in 2017 to 20% in 2022. (Strategic Plan 2017-22)			

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Ruiru-Juja WSP (RUJWASCO) **(Last modified on July 16, 2018)**

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(1) Main Achieve-ments	◆ NRW ratio has been reduced from 40% to 28% (still including possibly a large amount of estimated billed consumption of unidentified/non-existing customers which may shoot up the NRW ratio after data cleaning) ◆ Replacement of about 1,800 faulty meters especially for large customers ◆ The percentage of the customer meters which are not read has been reduced from 70% to 40%. (A dedicated meter reading team has been established. Two meter reading cycles for each month has been established and has become operational from July 2018. ◆ 9,000 customer meters have been newly mapped on GIS in addition to the previously captured 2,000 customer meters. ◆ A mobile meter reading system (Agila) is being established by capturing meter reading routes. ◆ NRW Unit with 7 dedicated staff (including the unit head and new KEWI-trained technicians) has been established. ◆ New NRW survey equipment including electric leak detector, UFM, correlator, etc. (except for pressure gauges) have been acquired. ◆ Use of HDPE pipes for new service connections has been fully operational including the use of hired butt welding machine (40mm -160mm). ◆ Introduction of high-accuracy (R200) volumetric copolymer meters for large customers. ◆ Abnormal flow monitoring has become operational with 42 bulk meters, and monitoring of NRW ratio/volume have also become operational in 4 Zones and 24 DMAs (but still need few bulk meters to be replaced. The DMAs have not been mapped. Sorting of customers into DMAs needs to be improved.).
(2) Good Practices and Advices to Share with other WSPs	◆ Establishment of social-media-based platforms (WhatsApp, twitter, etc.) for receiving notifications from customers.
(3) Main Obstacles	◆ Insufficient trained staff in NRW Unit, Commercial Department, etc. ◆ Insufficient motorbikes for meter readers

(4) Performance Evaluation

Indicators		**Previous Financial Year 2016/17** (ref. Impact Report)	**Last Financial Year ended this June 2017/18**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**Total No. of Connections**	22,407			Note: Include both active and inactive connections.
	Total Production (m3/year)	5,359,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	115			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	2.0	7.0	+ 5.0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	+ 0	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	26	not yet calculated	- ?	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Planned Activities (%)		unknown due to the change of NRW Unit Head	30	-	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
Main Incomplete Activities planned for the Last Year		↓ ◆ Relocation of customer meters (1,800 finished out of 8,000) ◆ NRW has not started working on physical losses yet. ◆ Accuracy tests of large customer meters have not been started.			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		According to the current strategic plan, the target is 20% in 2018/19. The strategic plan and the approved tariff are expiring. New targets for NRW reduction needs to set soon.			

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Nakuru WSP (NAWASCO) **(Last modified on July 12, 2018)**

Review (please fill the areas enclosed with double lines)

(1) Main Achieve-ments	◆ 49 km of old asbestos cement pipes (distribution) were replaced with HDPE pipes. ◆ Three distribution zones (out of the 5 distribution zones) were hydraulically isolated with bulk meters previously. The separation of the remaining two zones (Eastern Zone and Northern Zone) has been going on since the last financial year. ◆ About 500 meters of large customers have been replaced after monitoring the trend of their metered consumption, which resulted in a large increase of revenue. ◆ The team focusing on illegal water uses was expanded in the last year. The number of illegal connections have been drastically reduced (by 70%) by active patrol, introduction of incentive for whistle blowers and enforcement of high penalties. ◆ Field staff engaged in NRW reduction has become aware of the importance of using listening sticks and step test for efficient detection of leakage (and illegal connections). ◆ A free GIS (QGIS) has been well utilized to organize existing GIS layers and converting / editing existing CAD files. Some preparatory trials were conducted with mobile GIS software programs for improving the GIS layers. ◆ NRW ratio has been reduced by around 3% in the last year.
(2) Good Practices and Advices to Share with other WSPs	◆ Use of listening sticks (very simple and very effective) ◆ Minimum night flow measurement with step test ◆ Use of portable meter tester or calibrated buckets for testing meter accuracy (easy and effective) ◆ Sealing of customer meters to both meter body and meter liners ◆ Addtional random meter readings targeting large customers between regular meter readings ◆ Reduction of spaghetti service connections ◆ Toll free line for customers with MajiVoice and a customer care desk in each zone ◆ Use of free GIS and related software on PCs (e.g. QGIS, EPANET2, Google Earth, etc.) and free Mobile GIS (e.g. QFiled, MAPinr, GeoODK Collect, etc.) on smartphones ◆ Prioritization of activities is important.
(3) Main Obstacles	◆ Insufficient trained staff (e.g. for use of leak detection equipment, the utilization of GIS data and data collection with mobile GIS on smartphones, etc.) ◆ Current paper-based meter reading and the old & slow existing billing system (need to be replaced with the latest version of the current meter reading and billing systems) ◆ Insufficient NRW survey equipment (e.g. around 3 listening sticks required for each of the 5 distribution zones) ◆ Insufficient transportation means ◆ Lack of smartphones and/or tablets for NRW survey and GIS data collection using free mobile GIS and data collection software programs. ◆ Conflict of responsibilities among the staff engaged in NRW reduction due to the lack of well-structured NRW task team.

(4) Performance Evaluation

Indicators		Previous Financial Year **2016/17** (ref. Impact Report)	Last Financial Year ended this June **2017/18**	Change over the Year	Definition & Note
Size & Finance of WSP	**Total No. of Connections**	57,550			Note: Include both active and inactive connections.
	Total Production (m3/year)	11,107			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	104			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Indicators	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	20 (including O&M, GIS & revenue enhancement staff)	26 (including O&M, GIS & revenue enhancement staff)	+ 6	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	96		+ ?	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	31		+ ?	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Annually Planned for the Last Financial Year (%)		82	85	+ 3	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
Main Incomplete Activities planned for the Last Year		↓ ◆ Remaining replacement of large customers' meters (another 500 meters) due to the difficult of identifying problematic meters to be replaced. (This identification has recently been speeded up based on the meter reading / billing data analysis conducted.) ◆ Delay in replacing AC pipes with HDPE pipes due to insufficient revenue. ◆ Delay in isolating of Eastern Zone due to the magnitude of work involved.			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		From 30% in 2017/18 to 25% in 2022/23 (Business Plan 2017-22)			

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Kisumu WSP (KIWASCO) **(Last modified on July 17, 2018)**

Review (please fill the areas enclosed with double lines)

(1) Main Achieve-ments

◆ Metering management: Identification of large customers and installation of 74 electromagnetic flow meters, which resulted in a significant increase of revenue (about 10% increase on average).
◆ Auditing of disconnected and domant accounts.
◆ Two strainners installed on main distribution lines (to remove silt making customer meters stalled. (15 expected
◆ in this year)
◆ Metering of fire hydraults to stop water theft by water vendors.
◆ Testing customer meters with the meter test bench and replacing faculy ones (300 meters tested within the last two months) forcusting on two books (areas) every month based on abnormalities and photos of meters.
◆ Testing of the large customers' electromaginetic flow meters with the test bench or a portable ultrasonic flow meter when consumption fluctuates.
◆ Reviewing meter replacemet policy (ongoing)
◆ 3 DMAs have been operational for NRW monitoring while other 4 DMAs (one of them is with VEI but currently interupted by a construction) are being isolated comletely by finding hidden connections with zero poressure tests.
◆ Pressure monitoring started with a limited number of gauges.
◆ Active leakage detection including invisible underground leakage was started and hot spot leakage areas have been identified and mapped on GIS for rehabilitating leaking distribtion lines
◆ Ratio of inspection of new customer (10% to 15%) workmanship with handpumps, trenches, materials, (currently company do not buy metrials)
◆ Installation of two isolation valves on major distribution pipes to make repair work easier and avoid escessive water darinage
◆ Servicing and replacement of air valve and washouts, valves (by asset management team), make history (attribute of air valves in GIS)
◆ 54 smart meters for industrial customers have been procureed and are currently being installed.
◆ 54 km of water pipes, about 3700 customer meters, 617 leakages, 5 commercial zones boundaries including 76 books (sub-zones) have been established. The se 43 preparide meters and map 55 emf meters

(2) Good Practices and Advices to Share with other WSPs

◆ Monitoring and ensuring the accuracy of large consumers' meters
◆ Inspection of new connections (because there many leakage on small pipes (one inch and less)
◆ Succrifice, integrity (no corruption) and passion.
◆ Leakage hot spot analysis on GIS
◆ Mapping of new connections with haldheld GPS
◆ GIS for Asseset management (with asset mentenance form, history of servicing)
◆ Abnormality report

(3) Main Obstacles

◆ Insufficient staff
◆ Insufficient stocks of pipe meterials for dealing with emergency and a long delivery time
◆ Insufficient leak detection equipment (battery issure with the existing equipment)
◆ Insufficient training on the use of equipment (leak detector, correlator, UFM, etc.) and data analysis
◆ Sharing capability of GIS, difficulties to fully utilize the GIS data expecially for the commercial department
◆ Insufficient GIS accuracy with handheld GPS and smartphones.

(4) Performance Evaluation

Indicators		**Previous Financial Year 2016/17** (ref. Impact Report)	**Last Financial Year ended this June 2017/18**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**Total No. of Connections**	53,296			Note: Include both active and inactive connections.
	Total Production (m3/year)	13,232,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	105			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	15.0	15.0	+ 0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	88	94	+ 6	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	41	36	- 5	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		55	60	+ 5	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓

Main Incomplete Activities planned for the Last Year

◆ Isolation and operation of DMA
◆ Installation of pressure gauges
◆ Review of metering policy and implmentation
◆ Replacement of volmeteric meters with velocity meters in the areas having a high silt concentration.
◆ Validation of the hydraulic model prepared
◆ Completion of customer identification survey

Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))

Annual NRW Reduction Plan of 2018/19: 7% reduction by the end of 2018/19 (25% by 2022/23 (Strategic Plan 2017-22)

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Nyahururu WSP (NYAHUWASCO) **(Last modified on August 14, 2018)**

Review (please fill the areas enclosed with double lines)

(1) Main Achieve-ments

◆ About 2,000 customer meters have been tested and about 60 stacked (unserviceable) meter have been replaced (most of them were small customers due to the lack of equipment (e.g. USF) to deal with large customers having meters more than 2 inch). A plan for replacing identified inaccurate meters are being prepared.
◆ Knowledge for using NRW survey equipment has been acquired.
◆ By marking of the customers with connections, meter readers have become more aware and cooperative in finding illegal connections (abou 20 illegal connections were found).
◆ Introduction of a new customer billing system. The number of customers billed based on metered consumption has been increased. The metering ratio has reached 100%. The customers' complaints and notification on leaks, etc. are well tracked now.
◆ Several baraza has been hold, and the utilization of SMS for the public to notify complaints, leaks, illegal connections, etc.
◆ Selection of pipe materials (e.g. those with higher pressure rating) has improved.
◆ A better PC was purchased for GIS, and GIS data of base map and major existing facilities have been prepared to some extent. The boundaries of distribution zones and DMAs have been planned and mapped on GIS in consideration of existing bulk meters. About 65% of the existing customers have been mapped.
◆ Data collection on NRW activities has been improved by using GeoODK.
◆ In addition to the training with JICA expert at Nyahururu WSP, 4 NRW staff have been trained in KEWI & Embu. 2 GIS staff have been trained in Kericho WSP. Around 15 staff have been trained internally regarding the use of NRW survey equipment.
◆ Residual pressure was measured at about 50 locations, and additional pressure measurement was planed for about 30 locations.
◆ Contour measures against commercial losses have been discussed based on the analysis of past meter reading and billing data.
◆ Utilization of Mobile GIS (MAPinr) for locating planned pressure measurement points and locating isolation valves.

(2) Good Practices and Advices to Share with other WSPs

◆ Introduction of a integrated system which covers customer management, meter reading, billing, stock management, task management, etc.
◆ Training of staff for NRW management (especially on the use of NRW survey equipment)
◆ Benchmarking with other WSPs.
◆ Accuracy test of both bulk and customer meters.
◆ Use of handheld devices for data collection including meter reading.

(3) Main Obstacles

◆ Financial constraints
◆ Aged pipes
◆ Identification of the location of existing pipes and other facilities (more support from field staff is required)
◆ Inadequate skills to operate equipment

(4) Performance Evaluation

Indicators		Previous Financial Year 2016/17 (ref. Impact Report)	Last Financial Year ended this June 2017/18	Change over the Year	Definition & Note
Size & Finance of WSP	Total No. of Connections	17,829			Note: Include both active and inactive connections.
	Total Production (m3/year)	2,895,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	105			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.	6.0	7.0	+ 1.0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	94	100	+ 6	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	43	42	- 1	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		70	90	+ 20	Note: Perceptional % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
Main Incomplete Activities planned for the Last Year		↓10%			◆ Completion of collecting costumers' coordinates ◆ Classification of customer data by distribution zones and DMAs ◆ Completion of digitizing pipe network in CBD ◆ Purchase of leak detection equipment
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		25% in 2020/21 (Based on National NRW Management Strategic Plan)			

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Mavoko WSP (MAVWASCO) **(Last modified on July 13, 2018)**

Review (please fill the areas enclosed with double lines)

(1) Main Achievements

- ◆ Installation of 8 bulk meters on improved distribution lines for distribution flow control.
- ◆ Installation of around 150 digital smart meters at large customers
- ◆ Replacement of 450 inaccurate customer meters based on accuracy tests of 600 meters in the town zone.
- ◆ Accuracy tests of the all large customers (> 100m3/month, C1 & C2) which experienced consumption estimation, servicing and replacement of 3 large customer meters (> 300m3/month, C1)
- ◆ Training of 5 NRW-related staff (including GIS and IT staff) by sending them to KEWI and Kericho (GIS), Muranga (WASPA), etc.
- ◆ Establishing a satellite image base map using data from a Google Earth server.
- ◆ Mapping of distribution pipelines in 4 zones (Town, Mlolongo, Kinanie and Kyumbi), boreholes, water kiosks, storage tanks, etc.
- ◆ Trial of customer meter location survey with GPS
- ◆ Detailed customer meter survey in Mlolongo (about 300 meters)
- ◆ Sharing of GIS information with O&M staff
- ◆ Significantly improved communication regarding bursts, leaks, illegal water uses, etc. between the customer care staff to all the technical staff with SMS
- ◆ SMS (low cost - 1 KSh.) number for receiving customer complaints and reports
- ◆ Acquisition of a handheld GIS, GPSs, a desktop PC for GIS, etc.

(2) Good Practices and Advices to Share with other WSPs

- ◆ Smart metering with better accuracy and anti-tampering functions (e.g. detection of meter reverse) for revenue enhancement (potentially effective against gate lock).
- ◆ Use of GIS for the planning and management of distribution network including NRW activities
- ◆ Participation in the benchmarking and peer-to-peer learning supported by WASPA, own initiatives, etc.
- ◆ Utilization of open software programmes for GIS (e.g. QGIS, PostGIS, etc.)
- ◆ Introduction of a work flow management system (including stock management, notification with SMS, tracking of customer complaints, etc.)

(3) Main Obstacles

- ◆ Insufficient budget (revenue) for procuring new meters to replace inaccurate meters, procuring a mobile meter reading system
- ◆ Difficulty of detecting hidden illegal connections, meter tampering, etc.
- ◆ Low awareness of WSP staff involved in wrong doing.
- ◆ Limitation of NRW activities under short water supply hours (e.g. difficulty to know the reason of zero readings because of water shortage).
- ◆ Remaining spaghetti connections requiring extra workload for NRW activities.
- ◆ Private borehole operators run their water supply business with improper pipes illegally connected with the WSP pipelines especially during water shortage.

(4) Performance Evaluation

Indicators		Previous Financial Year 2016/17 (ref. Impact Report)	Last Financial Year ended this June 2017/18	Change over the Year	Definition & Note
Size & Finance of WSP	Total No. of Connections	13,284			Note: Include both active and inactive connections.
	Total Production (m3/year)	1,391			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	114			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.	3.0	4.0	+ 1.0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	41	not yet calculated	-	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Planned Activities (%)		40	60	+ 20	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.

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Main Incomplete Activities planned for the Last Year

- ◆ Introduction of a mobile meter reading system
- ◆ Separation of two distribution zones (Mlolongo & Syokimau)
- ◆ Full-scale customer meter location survey with GPS (a trial has already done)
- ◆ Customer meter replacement based on meter accuracy tests (450 meters have been replaced out of the 600 tested in the town zone (i.e. 35 to 40% of all existing meters)

Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))	From 44% in 2016/17 to 25% in 2021/22 (Strategic Plan 2016-21)

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Eldoret WSP (ELDOWAS) **(Last modified on July 20, 2018)**

Review (please fill the areas enclosed with double lines)	
(1) Main Achieve-ments	◆ Cleaning up of customer data and ◆ Customer identification survey and mapping on GIS (80% completed) ◆ 90% of the pipelines which are 2 inch or above have been mapped on GIS. ◆ Introduction of customer management / meter reading / billing system ◆ Introduction of SMS, online and email-based billing ◆ Effective use of amorality report from M@jics by task team in each zone and follow-up by NRW Unit. ◆ Relocation of meters close to the boundary of customers' premises (50% completed in Zones 4 & 5 and also been conducted in Zone 6, in total 2,551 out of 8,030 planned) ◆ Two scouts patrolling visible leakages in each zone and the response time has been improved. (only the destruction by construction stay a significant problem) ◆ Reduction of illegal connections by relocating pipes going through farms to road sides. ◆ Replacement of old pipes (only procurement of materials for 2 km)
(2) Good Practices and Advices to Share with other WSPs	◆ Mapping of customers at installation. ◆ HDPE pipes for pipelines ◆ Licensing plumbers not only for the pipes before customer meters but also the pipes including those inside houses after the meters
(3) Main Obstacles	◆ Accuracy of meters with silt and at low water flow rate ◆ A significant strengthening of NRW Section is required. ◆ More resources needs to be allocated to NRW team including the procurement of new NRW survey equipment. ◆ Proper hydraulic zoning and sub zoning.

	Indicators		Previous Financial Year 2016/17 (ref. Impact Report)	Last Financial Year ended this June 2017/18	Change over the Year	Definition & Note
(4) Performance Evaluation	**Size & Finance of WSP**	**Total No. of Connections**	116,355			Note: Include both active and inactive connections.
		Total Production (m3/year)	13,359,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
		O&M Cost Coverage (%)	156			Definition: (Total operating revenues / Total operating expenditures) x 100
	NRW-related Data	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	9.0 (3 NRW team members + 6 Scouts)	9.0	+ 0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
		Metering Ratio (%)	99	99	+ 0	Definition (Total number of active metered connections /Total number of active connections) x 100
		NRW Ratio (%)	43	41	- 2	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
	Completion Ratio of the Activities Planned Annually (%)		50	60	+ 10	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
	Main Incomplete Activities planned for the Last Year		↓ ◆ Calibration of bulk meters (need to invite KEBS at site for those on plastic pipes) ◆ Procurement of NRW survey equipment ◆ Sub-zoning in Southern Zone for a DMA pilot project ◆ Relocation of customer meters in a project area (60% completed)			
	Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))				30% in 2017/18, 25% in 2018/19 , 25% in 2019/20, 20% in 2020/21 and 20% in 2021/22 (Strategic Plan 2017/18 - 2021/22)	

Note: This annual review report is supplemented by the assessment of recent conditions shown in Table 1.

Table 1: Annual Review Report of NRW Activities for 2016-17-18, Kilifi-Mariakani WSP (KIMAWASCO) **(Last modified on August 14, 2018)**

Review (please fill the areas enclosed with double lines)

(1) Main Achieve-ments	◆ Mobile meter reading with smartphones ◆ Preparation of commercial and meter management policies ◆ Establishment of NRW Section having dedicated staff (with clear job descriptions) ◆ A handmade meter test bench have been manufactured. ◆ The accuracy of large customer meters has been checked with UFM by WASPA (over 50 customers) ◆ 10 to 12 inch transmission lines (Ganze-bamba) of 21 km have been replaced. ◆ The NRW ratio has decreased from 48 to 46%. ◆ The billed amount of bulk supply (imported water from the water service board) is being corrected/reduced by installing separate bulk meters for KIWAMASCO and other WSPs. ◆ Joint bulk meter reading with the WSB to imporve the accuracy of mesusring bulk production volume. ◆ The WSP started provididing standardaized customer meters to customers. ◆ Broadcast, telephone hotline, SMS, and regular public announcement with a truck have become very active for reciving more support from customers. ◆ Enhanced engagement of local government agencies as a counter vandalism measure (especially rural areas). ◆ Enhanced engagement of roads agencies and other infrastructural planners to manage the impact of damages on water piping networks.
(2) Good Practices and Advices to Share with other WSPs	◆ Joint bulk meter reading with Costal WSB (only for costal WSPs) ◆ Accuracy test of customer meter with a handmade meter test bench, calibrated buckets, etc. ◆ Internal standardization of customer meters ◆ Annual accuracy check of bulk/large customer meters ◆ Public engagement through broadcast, telephone hotline, SMS, and regular public announcement ◆ WSP's area managers join in local gatherings held by local government administrators at grass root level
(3) Main Obstacles	◆ Aged and dilapidated water supply system including old customer meters, old pipelines, old storages tanks, etc. ◆ Limited revenue and funding (escially for replacing old & faulty customer meters, relocating meters to 1m from distribution offtake, keeping NRW Section operational) ◆ Other development works such as road construction damage the water supply system. ◆ Budgetary constraints and capacity gaps in GIS and NRW expertise including leak detection.

(4) Performance Evaluation

Indicators		**Previous Financial Year 2016/17** (ref. Impact Report)	**Last Financial Year ended this June 2017/18**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**Total No. of Connections**	28,099	29,937	+ 1838	Note: Include both active and inactive connections.
	Total Production (m3/year)	8,883,000	8,907,256	+ 24256	Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	85	112.1	+27.1	Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Task Team or are in charge of NRW reduction specifically.**	6 committee members x 10% = 0.6	1 NRW officer + 1 Meter Tester + 2 persons x 20% x 9 Stations = 5.6	+ 5.0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	96	96 (lack of new meters)	+ 0	Definition (Total number of active metered connections /Total number of active connections) x 100
	NRW Ratio (%)	48	46	- 2	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		35	60	+ 25	Note: Perceptional % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓(40%)

Main Incomplete Activities planned for the Last Year	◆ Customer meter replacement ◆ Establishment of DMAs ◆ Establishment of GIS (budgetary and technical problem) ◆ Acquisition of lacking equipment and transportantion means (i.e. two cars) ◆ 36 bulk meter lines out of the 40 lines requring import bulk meter separation with the WSB ◆ Relocation of customer meters closer to the distribution line (e.g. 1 m) ◆ Redoing of the pipeline damaged by road contractors
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))	2% reduction per year (Tariff Approval 2017/18-2019/20)

5) -2 Annual Review Report of Pilot WSPs for 2018/2019

Annual Review Report of NRW Activities for 2018-19, Meru WSP (MEWASS) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)	
(1) Main Achievements during the Fiscal Year	◆ Concentration on the large consumers which has resulted to an increase in billing. ◆ Prompt disconnections to avoid pilling of debts ◆ Re-organization of the billing and meter reading sections ◆ Checking of the disconnected and shut down connections that have overstayed. ◆ Revamping of the NRW unit to include other sections.eg, distribution,finance, billing, meter reading etc ◆ Improvement of the WSP - Customer relation with regards to debt collection (debt defaulters can now pay with an agreed upon repayment plan without being disconnected). ◆ Improved capacity building through trainings and team building activities ◆ Reduction in estimated billings ◆ Reactivation of the inactive accounts in the system but active on the ground. ◆ Customization of data collection forms for NRW activities, O&M and customer connection activites using Kobo Collect
(2) Good Practices & Knowledge to Share with other WSPs	◆ Detection of leaks & bursts through step test at night ◆ Use of quality ISO-certified pipes and fittings (e.g. uPVC Class E) & quality workmanship (without using fire coupling) ◆ Flushing pipelines after repairs which avoid meter blockage ◆ Categorization of customers by consumption level for prioritization ◆ Follow-up of monthly abnormal consumption report ◆ Stable monthly meter reading cycle ◆ GIS leakage pattern maps for planning pipe replacement ◆ Mapping of hot spots
(3) Main Obstacles	◆ Lack of enough funds to support NRW reduction activities fully ◆ Limited production to cover the earmarked service provision area ◆ On going road constructions affecting the distribution pipes ◆ An unreliable meter reading system

(4) Performance Evaluation

Indicators		**Previous Financial Year 2017/18 (ref. Impact Report 11)**	**Last Financial Year ended this June 2018/19**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**No. of Connections**	14,935	15,883	+ 948	Note: Include both active and inactive connections.
	Total Production (m3/year)	2,768,000	2,945,974	+ 177,974	Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	132	130	- 2	Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.**	8	7	- 1	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	15	19	+ 4	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		70	75	+ 5	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Improvement of the Test bench ◆ Procurement and installation of the bulk meters ◆ Pressure measurement ◆ Customer sensitization			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		20% as target in the strategic plan (2015-2019)			

Annual Review Report of NRW Activities for 2018-19, Embu WSP (EWASCO) **(Last modified on August, 2019)**

Review (please fill the areas enclosed with double lines)

(1) Main Achieve-ments

- ◆ Establishment of 5 Distribution Zones and 23 DMAs based on existing bulk meters (but not fully operational)
- ◆ Analysis of meter reading / billing data of all the customers to identify the scale, frequency & continuity of consumption estimation for prioritization
- ◆ Revenue increase after testing and replacing large customers' faulty meters
- ◆ Training of the staff on basics of NRW, survey equipment, smartphone use, etc.
- ◆ Shift of mind set towards low cost solutions (e.g. calibrated bucket, use of additional copolymer piston meter as a meter tester, etc.)
- ◆ Identification of the most leaking area within a problematic distribution zone with step test and MNF
- ◆ Pressure data collection for Zones 1 and 2. Zone 1 planning is complete.
- ◆ NRW short course trainning for key EWASCO staff at KEWI
- ◆ Adoption and procurement of new customer meters (R200).
- ◆ Adoption of use of HDPE pipes for customer connections.
- ◆ Establishment of Rapid Monitoring Unit.

(2) Good Practices and Advices to Share with other WSPs

- ◆ Establishment of a fully-dedicated NRW task team capable to deal with both commercial and physical loses
- ◆ Try to establish clear distribution zones (useful for NRW monitoring, step test, etc.) before duplicating small DMAs.
- ◆ Use of low-cost solutions such as calibrated buckets and free ODK forms
- ◆ Importance of sharing information with other WSPs (e.g. OJT with other stake holders such as WASPA, KEWI, etc.)
- ◆ Continous on job trainning for staff in NRW management and reduction.
- ◆ Step test to easily identify where the problem is for fast results and application of odk simple tests and practices.
- ◆ Testing of new meters before acceptance.
- ◆ NRW stearing commitee from both commercial and technical depertments.

(3) Main Obstacles

- ◆ Delay in the Ministry's delivery of NRW survey equipment
- ◆ Unreliable data of production and zonal inflow which can not guide NRW activities
- ◆ GIS layers not sufficiently updated (e.g. customer meters, pipelines, etc.)
- ◆ Aquired old pipelines that require replacement or rerouting.
- ◆ Vandalism and meter tampering in the rural areas for miraa irrigation.
- ◆ Illegal connections in the rural areas.
- ◆ Pipe damages leading to high water losses by other agencies contractors.

(4) Performance Evaluation

Indicators		Previous Financial Year 2017/18 (ref. Impact Report 11)	Last Financial Year ended this June 2018/19	Change over the Year	Definition & Note
Size & Finance of WSP	No. of Connections	31,786			Note: Include both active and inactive connections.
	Total Production (m3/year)	6,615,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	non credible data (n.c.d)	119		Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.	7 (Officially from June 1, 2018)	7	0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	36	36	0	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Planned Activities (%)		50	60	+ 10	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Sub zonal clear demaction and phasing of the billing cycle to the master meter readings for easier and accurate nrw computation. ◆ Accuracy test of all existing master meters large than 110mm. ◆ Aquisation of nrw investigation equipments (i.e. collerator) ◆ Change of the faulty master meters. ◆ Pressure reduction in Zone 2. ◆ Stabilization of the production data by fixing the master meters accuracy. ◆ GIS mapping and updating of remainning water facilities and meters.			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		Reduction of the NRW from 41% in 2017 to 20% in 2022. (Strategic Plan 2017-22)			

Annual Review Report of NRW Activities for 2018-19, Ruiru-Juja WSP (RUJWASCO) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year

◆ The preparatory work for the new Varsity DMA (including customer identification survey, update of GIS, installation of one bulk meter) has been done. MNF measurement, step test and leak detection with acoustic sticks have been implemented in Varsity DMA and successful. However, the electric leak detector and the correlator, which were procured by the WSB around 3 years ago, has not been utilized yet. The calculation of NRW ratio in the DMA before the leak detection is not possible because one of the two inflows has not been measured monthly due to the lack of a bulk meter.
◆ The frequent bursts at the saddle clumps on a 60mm distribution pipeline have not stopped. The following counter measures may be tried to solve the problem. (1. comparing the dimensions of the Italian saddle clump from Danco with those of other saddle clumps for 160mm.
◆ The use of smart meters has been discussed.
◆ The need of installing two additional bulk meters of 8" has been identified to improve the zoning of distribution network (other than the two planned zones in the downtown and around the existing elevated tanks near the industrial area which will be considered later).
◆ The GIS pipenetwork have been improved by digitizing the pipes in 4 more meter reading zones.
◆ The number of customer meter locations captured so far is 12,130.
◆ The use of Mapinr to locate customers for disconnection has began (using its navigation function)
◆ The fabricated meter test bench is now in use (with an average of 20-30 meters being tested in a month)
◆ Meter replacement exercise still on going and so far 600 number has been replaced.
◆ The number of accounts billed on estimate has been reduced by 8,000.
◆ Use of HDPE pipes for the large diameter (between 150mm and 250mm) pipes has been boosted by the aqiusation of the butt welding machine
◆ More (37) bulk meters were added into the system to improve on the abnormal flow monitoring
◆ Revenue collection was increased by a margin of around 48% (from an average collection of about 28 million to 50million)
◆ Most of the large consumers have now been mapped on GIS for easy identification
◆ Production meters have now been tested and callibrated (Between january and May 2019)

(2) Good Practices & Knowledge to Share with other WSPs

◆ Mapping of customer accounts
◆ Minimum Night Flow measurements
◆ Accuracy test for master meters
◆ Periodical monitoring of large consumer meters
◆ Adoption and use of HDPE pipes as a measure to control leaks and bursts in the distribution system

(3) Main Obstacles

◆ Insufficient training on the use of NRW reduction equipment amongest the staff (NRW unit members)
◆ Vandalism of bulk meters
◆ Intermittent supply oftenly affecting NRW reduction activities
◆ Insufficient transportation means
◆ Lack of awareness of NRW reduction among other units/departments
◆ Poorly designed distribution network
◆ Inadequate handheld GPS

(4) Performance Evaluation

Indicators		Previous Financial Year 2017/18 (ref. Impact Report 11)	Last Financial Year ended this June 2018/19	Change over the Year	Definition & Note
Size & Finance of WSP	No. of Connections	26,428			Note: Include both active and inactive connections.
	Total Production (m3/year)	6,704,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	124			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.	7	10	+ 3	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	34 (found to be not credible)	37	-	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		30	20	- 10	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Minimum Night Flow measurements in Juja scheme ◆ In house training for all the sections			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		According to the current strategic plan, the target is 20% in 2018/19. The strategic plan and the approved tariff are expiring. New targets for NRW reduction needs to set soon.			

Annual Review Report of NRW Activities for 2018-19, Nakuru WSP (NAWASCO) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year	◆ A meter test bench has been fabricated with support from JICA Expert Team. It is already in use.(So far 640no. meters have been tested). ◆ 3,000no. meters of relatively large customers have been replaced. Customer Identification Survey (CIS) has been conducted in Central Zone and has been extended to Eastern zone which is now in progress. The results of the CIS are utilized for the replacement of customer meters and the location data captured in this survey will be utilized for rotating meter readers. ◆ The old AC, PVC and GI distribution lines in Central Zone have been replaced with HDPE pipes. The closure of the old lines in Central Zone is about 80% complete. TMAs are being established in Central Zone while closing the old lines (old inlets to the DMAs) ◆ The bulk supply to two county estates (Flamingo and Kimathi) have been changed into individual connections with newly installed pipe networks. ◆ The intensive investigation of illegal connections has been continuing all over the service areas. ◆ The patrol for visible bursts and leaks is being conducted continuously over the entire service areas. ◆ In addition to the step test with MNF measurement, the combination of step test and direct measurement (by closing the valves on service connections) has recently been tried out at unsurveyed, Bondeni, kanyon and Manyani estates. ◆ Manyani estate in Southern zone has been isolated as a TMA (Territory Management Area) and are currently monitoring the NRW using the recently installed bulk meters given by JICA. ◆ Pipe realignment and networking has been done in all the County estates in Southern zone (Kivumbini, Paul Machanga, Nakuru Press, Shauri Yako and Abonglowea) including installation of individual connections in every household.(560no. household connections have been realized).
(2) Good Practices & Knowledge to Share with other WSPs	◆ Servicing, testing and Replacement of large consumer meters ◆ Tackling of physical losses through quick response to bursts and leakages, conducting MNF and step testing. ◆ Regular updating of the billing system through conducting CIS and mapping.
(3) Main Obstacles	◆ Intermittent water supply hindering MNF and step testing activities. ◆ Old and dilapidated network in some of the estates(Ac and GI pipes) ◆ Scarce resources to execute all the planned NRW activities

(4) Performance Evaluation

Indicators		**Previous Financial Year 2017/18** (ref. Impact Report 11)	**Last Financial Year ended this June 2018/19**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**No. of Connections**	57,694			Note: Include both active and inactive connections.
	Total Production (m3/year)	12,655,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	104			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.**	26 (including O&M, GIS & revenue enhancement staff)	23	- 3	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	36	31	- 5	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		85	90	+ 5	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Complete Re-alignment of all county estates ◆ Completion of pipe realignment at Mwariki east ◆ Decommissioning of old lines in Central zone. ◆ Replacement of the existinng meters with more accurate ones.			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		From 30% in 2017/18 to 25% in 2022/23 (Business Plan 2017-22)			

Annual Review Report of NRW Activities for 2018-19, Kisumu WSP (KIWASCO) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year	**1**. Installation of 6NO. digital pressure loggers at varous locations within the network. this has improved on real time management of pressure and response to leak and bursts. **2**.frequent bursts on the 14" distribution line (e.g. 14 bursts in April 2019) and the water losses caused by them have been reduced by disconnecting the 14" distribution line from 24" transmission line having higher pressure and installing isolation valves. **3.** The customer meters of 1" and larger diameter have been checked and replaced when found necessary. NRW Section is currently working on 3/4" customer meters. **4**. Minimum night flow measurements with step tests have recently been conducted twice (first with JICA Expert Team and then on their own). **5**. The verification of meter readings have been improved from checking 10% samples from all the customers to checking 90% samples from the suspicious meter reading areas (books) identified based on the analysis on initial meter readings. This improvement was possible because the GPS coordinates of most customers have recently become available through CIS. **6**. In order to avoid meter theft, existing customer meters are being replaced with copolymer (plastic) meters. **7**. Replacing of 998 NO. piston meters with velocity multijet meters in area prone to silt. Accounts billed on averages reduced by 73% thus an increase in billing. **8**. 6NO. DMAs are fully isolated and operational. **9**. Field verification of all the disconnected accounts and taking appropriate measures for illegalities. We intend to step it up in the next financial year.
(2) Good Practices & Knowledge to Share with other WSPs	**1**. Use of velocity multijet meters in area prone to silts will indeed reduces on static and stopped meters. **2**. Management of larger meters by testing, frequent visiting and servicing at the earliest time to avoid static meters which may result to low volume estimate. **3**. Field audit of all customer accounts. **4**. Use of electronic meters in larger accounts i.e commercial accounts.
(3) Main Obstacles	◆ Insufficient staffs to deal with metering management. ◆ Faulty leak detection equipment. ◆ Realignment of NRW section structure.

(4) Performance Evaluation

Indicators		**Previous Financial Year 2017/18** (ref. Impact Report 11)	**Last Financial Year ended this June 2018/19**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**No. of Connections**	74,972			Note: Include both active and inactive connections.
	Total Production (m3/year)	9,475,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	106			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.**	15	14	- 1	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	37	32	- 5.4	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		60	69	+ 9	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Isolation of CBD DMA ◆ Improving on reporting of leak, bursts to capture the apparent cause, material type etc ◆ Impementation of hydraulic zoning ◆ Implementation of new connection policy			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		Annual NRW Reduction Plan of 2018/19: 7% reduction by the end of 2018/19 (25% by 2022/23 (Strategic Plan 2017-22)			

Annual Review Report of NRW Activities for 2018-19, Nyahururu WSP (NYAHUWASCO) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year

◆ NRW Unit has visited almost all the customers in Nyahururu City (6,854) to check meter tampering, illegal connections and meter body seals (especially focusing on the customers previously disconnected to check whether or not they had reconnected illegally). 14 illegal connections, which are all connected above ground, have been found out of the 6,854 customers. 3 meter reverse cases were also found just before visiting them.
◆ GPS coordinates of more customers have been captured in Nyahururu Scheme by using the mobile meter reading software of ERP. The number of customer locations obtained in all the schemes has increased from around 6,000 to 10,920 recently.
◆ GeoOKD is still in use for testing customer meters with calibrated buckets. However, only 18 meters were tested in the last two months. Meanwhile, Kobo Toolbox/Collect are used for recording bursts & leaks and new connections over the entire service areas and for conducting CIS in the new pilot area.
◆ More than 1,000 multi-jet meters are still installed vertically, which are probably consuming around10m3/month per connection on average with possibly around 10% under-registration. The NRW caused by the inaccurate metering due to the vertical installation of multi-jet meters can be roughly estimated at 1,000 m3/month (i.e. 1,000 x 10 m3/month x 0.1), which is around 0.4% of the total production. The re-orientation of the vertically installed multi-jet meters has been proceeding gradually, but it needs many fittings and will take a long time to finish.

(2) Good Practices & Knowledge to Share with other WSPs

◆Need for majority of water service provider staffs to be enrolled in NRW reduction trainings and workshops
◆ Use of a strong and advanced billing systems that is able to eliminate any abnomalities in the consumer catalogue
◆ Benchmaking in other water service providers that are well established in NRW reduction activities to get ideas and a follow up of their progress
◆ Introducing a customer based toll free/low cost number that will enable the public to report any abnomality in the distribution systems
◆ use of mobile technology softwares such as kobocollect for customer survey and mapping of issues along the pipelines

(3) Main Obstacles

◆ Constraind resources for facilitation of main NRW Activities such as procurement of PRVS and rehabilitation of dilapidated pipe networks
◆ Having majority of NRW Staff being on contract which hampers the team's activities whenever their contracts expire
◆ Plastic seals for meter liners have not been introduced yet since they cost around 50 to 75 KS for each connection.
◆ More transportation is required to visit the remaining customers over the surrounding areas. There are inconsistency between ERP's data and actual situation on the ground regarding active and inactive status of existing customers.

(4) Performance Evaluation

Indicators		Previous Financial Year 2017/18 (ref. Impact Report 11)	Last Financial Year ended this June 2018/19	Change over the Year	Definition & Note
Size & Finance of WSP	No. of Connections	19,604	20,898	+ 1,294	Note: Include both active and inactive connections.
	Total Production (m3/year)	3,015,000	3,254,878	+ 239,878	Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	108	108	0	Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.	7	6	- 1	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	42	35	- 7	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		90	90	0	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ What are the remaining percentage?

(4) Performance Evaluation

Main Incomplete Activities planned for the Fiscal Year

◆ Development of standard operating procedures for NRW Section
◆ Benchmarking with kisumu water on metering and other NRW Activities
◆ Sending GIS officer for GIS training at Regional Centre for mapping of Resources for Development-kenya
◆ Determine percentages to be used to separate physical losses and commercial losses so as to estimate financial losses emanating from the respective components.
◆ Consider incorporating in the electronic bills messages on reporting of leaks
◆ Organize for school campaigns on reduction of water wastage and reporting of pipe bursts
◆ To conduct trace survey of consumer meters to determine their durability and suitability
◆ To procure a Portable Ultrasonic Flow Meter for testing and calibration of bulk meters
◆ Procurement of sufficient reliable master and bulk meters
◆ Publishing of GIS layers on QGIS Could (free online GIS platform) by using QGIS Cloud plugin (free plugin of QGIS) and viewing of the online map from web bowsers
◆ Ensure Various problems at customer points listed in the monthly abnormality / complain reports (e.g. of 12 months) from the billing / customer care system(s) (e.g. unreadable and stalled meters, locked gates, etc.) have been jointed to the customer meter layer and presented with categorized symbols.
◆ Installation of Master Meter for Rwathia scheme with proper chamber and the necessary accessories.
◆ To implement the establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required for the DMAs.
◆ To intensify proactive customer meter testing and swift replacement of small consumers
◆ Continue with customer identofication survey in all schemes
◆ Introduction of use of plastic seals and/or other type of seals over the joints between customer meters and service pipes (in addition to the wire seals on meter bodies) for new and existing customers.
◆ Reorient existing customer meters that are installed vertically to horizontal positions
◆ Ensure reliable air valves are installed in all the necessary locations on pipelines and customer connections.
◆ Rehabilitation of dilapitaed pipe networks that contribute to high physical losses
◆ Installation of Section valves for proper water control in the pipe network to avoid losses in case of burst occurrence and during pipe repairs
◆ Establish Elevation difference within each DZ and/or pressure zones. (e.g. by overlaying elevation contours and the zone boundaries and facilities on the GIS and making a table showing the elevation of storage facilities and lowest and highest customers, elevation difference between the lowest and highest customers, the range of static pressure, etc. in each zone).
◆ Procurement and use of pressure loggers

Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature	FROM 36 % IN 2018/19 TO 28% IN 2023/24 (Based on Company's strategic Plan)

Annual Review Report of NRW Activities for 2018-19, Mavoko WSP (MAVWASCO) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year

◆ Several bulk meters have been installed recently to have extra zones along Mombasa Road. The hydraulically separation of two distribution zones has been implemented but no water is supplied to these zones currently.
◆ One pilot DMA has been established at Mlolongo but no water is supplied currently.
◆ Meter testing and replacement have been continuing with newly provided 300 customer meters from the WSB (in addition to the 600 meters provided in the previous fiscal year).
◆ Around 90% of the customer meters have been mapped on the GIS. The remaining 10% have difficulties in identifying them on the ground. The GIS staff is currently working on sewer-only accounts.
◆ There have been limited progresses in NRW reduction activities in this fiscal year due to the severe scarcity of water sources.
◆ The replacement of spaghetti service connections has slowed due to the WSP's finance constraints.
◆ Mobile meter reading intrroduced and ongoing. Integration with GIS, Billing software on course
◆ Upgrading Billing system to include NRW analysis

(2) Good Practices & Knowledge to Share with other WSPs

◆ Introduction of strainers on sub-mains in progress to reduced blocked meters and increase accuracy
◆ Continued assesment of accurate new connection installation
◆ Monthly review of NRW for operational teams and quarterly for NRW planning team

(3) Main Obstacles

◆ Acute shortage of water(very short supply hours OR no supply at all in some areas)
◆ Inadequate funds
◆ Intergrating mobile meter reading with with GIS
◆ Understanding amongest staff that nrw issue is a coporate responsibility

(4) Performance Evaluation

Indicators		**Previous Financial Year 2017/18** (ref. Impact Report 11)	**Last Financial Year ended this June 2018/19**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**No. of Connections**	10,008			Note: Include both active and inactive connections.
	Total Production (m3/year)	825,984			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	101			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.**	3	3	0	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	35	34	- 1	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		60	48	- 12	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Servicing and instalation of SVs/AVs/WOs ◆ Creation of DMAs, installation of more Bulk/master meters with strainers on the Mainlines ◆ Integration of billing, GIS and mobile meter reading ◆ Increase surveillance of illegal connections, analysis and implementation of estimate billing report			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		From 44% in 2016/17 to 25% in 2021/22 (Strategic Plan 2016-21)			

Annual Review Report of NRW Activities for 2018-19, Eldoret WSP (ELDOWAS) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year

◆ Stop corks have been procured instead of gate valves.
◆ Service connections have been standardized and ELDOWAS is currently buying all the materials required for service connections, fabricating the stands and installing them under supervision on installation quality.
◆ It was decided that the use of PPR for service connections will be stopped soon and that HDPE pipes will be used instead for service connections from the fiscal year 2019-2020 .
◆ Out of 118 large consumers over 300m3/month, the proper sizing of customer meters and the proper installation of customer meters (including reinstallation of meter stands which allow the space to install a clamp-on UFM for accuracy test for flanged customer meters) have been conducted for 65 large customers so far. Around 60 customer meters are 2" or larger flanged meters and need a UFM to check their accuracy. 20 of them are going to be replaced with large ultrasonic flow meters for reliable measurement of their consumption.
◆ Leak survey equipment was on the way from Costal Industry Ltd (one correlator, two electrical leak detectors, one UFM and four portable meter testers and one pipe locator). Sufficient listening sticks for NRW Section and the branch offices need to be procured.
◆ A large scale relocation of customer meters is being conducted in Southern Area and CBD to reduce illegal water uses.
◆ Around 600 meters were tested with calibrated buckets before the organization improvement in November 2019 and 166 meters (less than 2" without flanges) were testiest with buckets after the organization improvement.
◆ The stretches of existing pipes heavily leaking (at hot spots of leaks and bursts such as tunnels where PVC pipes were vandalized and GI pipes were stolen) have been replaced with HDPE pipes.
◆ The utilization of the work orders functions of M@jics (for meter installation and general work (including the repair of bursts, leaks, etc.)) using mobile phones has started.
◆ The pilot project in a DMA was close to complete (90%).
◆ The NRW ratio in the new distributing network recently installed is around 2%. Around 100 smart meters from Danco were installed in sub zone 30-1 and around 400 ordinal meters were in sub zones 30-2 to 5. The one concentrator installed can cover 500m in radius and save the received data into a cloud system (500 KSh/month for the data connection).

(2) Good Practices & Knowledge to Share with other WSPs

◆ Smart meters at kipkorgot
◆ Standardising service connectios
◆ Use of HDPE pipes

(3) Main Obstacles

◆ Lack of leak detection equipments
◆ Utilization of web and other GIS platform
◆ Hydraulic zoning of the network

(4) Performance Evaluation

Indicators		Previous Financial Year 2017/18 (ref. Impact Report 11)	Last Financial Year ended this June 2018/19	Change over the Year	Definition & Note
Size & Finance of WSP	No. of Connections	116,666			Note: Include both active and inactive connections.
	Total Production (m3/year)	13,529,000			Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	124			Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.	9	11	+ 2	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	42	36	- 6	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		60	65	+ 5	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?			
Main Incomplete Activities planned for the Fiscal Year		◆ Zoning of the distribution network & pressure mapping ◆ Procurement of leak detection equipment & UFM ◆ Calibration of production meters and accuracy test of large customer meters ◆ Enhancement of the utilization of GIS data for NRW reduction ◆ Training and visiting other WSPs for shared leaning ◆ No effective monthly meeting yet			
Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))		30% in 2017/18, 25% in 2018/19 , 25% in 2019/20, 20% in 2020/21 and 20% in 2021/22 (Strategic Plan 2017/18 - 2021/22)			

Annual Review Report of NRW Activities for 2018-19, Kilifi-Mariakani WSP (KIMAWASCO) **(Last modified in August, 2019)**

Activity Review (please fill the cells enclosed with double lines)

(1) Main Achievements during the Fiscal Year

◆ The boundaries of subzones (including pipes in prioritized subzones) have been drawn using Google Earth.
◆ Hardware system (including a large monitor and desktop PC) have been purchased for the development of GIS. An additional laptop PC will also be purchased for the field work.
◆ The cording of the main distribution lines and branch lines are ongoing for easy identification and mapping.
◆ The engagement of UPANDE has been planned for improving the use of GIS and considering hydraulics in the pipe networks.
◆ GPS coordinates of all the customers have been captured through mobile meter readings.
◆ The patrol for illegal connections has been intensified while public engagement against vandalism of pipelines has also been intensified.
◆ Meter servicing and testing with calibrated buckets have been resulting in the replacement of around 50 to 70 meters per month. Most of the inaccurate meters are under-registering.
◆ NRW Section was officially established by appointing NRW Head around the end of 2018 but there is still no member under the head.
◆ The customers severed from Mombasa WSP have been excluded from the bulk supply billing to WIMAWASO and vice versa. This problem has been resulted in 4 areas so far.
◆ All connections tapped by Kwale Water on Mzima Supply have been marked/Mapped and plan of action drafted for implementation of corrective measure.

(2) Good Practices & Knowledge to Share with other WSPs

◆ Relocation of customer meters close to the offtake points
◆ Consolidation multiple meters at a customer into a single meter to collect more water charge.
◆ Internal standardization of customer meters
◆ Joint bulk meter reading with Costal WSB (only for costal WSPs)
◆ Annual accuracy check of bulk/large customer meters
◆ Public/stakeholders engagement through broadcast, telephone hotline, SMS, and regular public announcement
◆ WSP's area managers join in local gatherings held by local government administrators at grass root level
◆ Shifting from PVC to HDPE for new distribution pipes (2" to 4") and replacing AC lines with HDPE pipes.
◆ Dismissal of the staff engaged in illegal activities (e.g. making illegal connections for customers)

(3) Main Obstacles

◆ Aged and dilapidated water supply system including old customer meters, old pipelines, old storages tanks, etc.
◆ Limited revenue and funding (especially for replacing old & faulty customer meters, relocating meters to 1m from distribution offtake, keeping NRW Section operational)
◆ Other development works such as road construction damage the water supply system.
◆ Budgetary constraints (resulted from high electricity cost and fuel) and capacity gaps in GIS and NRW expertise including leak detection.

(4) Performance Evaluation

Indicators		**Previous Financial Year 2017/18** (ref. Impact Report 11)	**Last Financial Year ended this June 2018/19**	**Change over the Year**	**Definition & Note**
Size & Finance of WSP	**No. of Connections**	29,677	32,270	+ 2,593	Note: Include both active and inactive connections.
	Total Production (m3/year)	8,907,256	9,796,476	+ 889,220	Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.
	O&M Cost Coverage (%)	91	95	+ 4	Definition: (Total operating revenues / Total operating expenditures) x 100
NRW-related Data	**No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.**	1 NRW officer + 1 Meter Tester + 2 persons x 20% x 9 Stations = 5.6	1 NRW Head + 1 Meter Tester + Bulk Meter Reading + 2 persons x 20% x 9 Stations = 6.6	+ 1	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).
	Metering Ratio (%)	100	100	0	Definition: (Total number of active metered connections /Total number of active connections) x 100
	Annual NRW Ratio (%)	49	49.7	+ 0.7	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100
Completion Ratio of the Activities Planned Annually (%)		60	50	- 10	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ What are the remaining percentage?

Main Incomplete Activities planned for the Fiscal Year

◆ CIS could not be implemented.
◆ The replacement of stalled meters has not been sufficient (200 meters need to be replaced per month).
◆ The establishment of GIS Unit has not been done.
◆ Accuracy test of bulk meters and large customer meters were not conducted in the fiscal year.
◆ Procurement of bulk meters to replace the WSB's stalled meters.
◆ Separation of shared connections between KIWAMASCO & KWAWASCO WSP.
◆ Maping of KIMAWASCO infrastructure
◆ Deployment of staff dedicated to NRW section at head office and setlight stations.
◆ Drafting of NRW Policy and associated SOP's.
◆ Conduct NRW specific Training to all dedicated section staff.
◆ Separation of shared connections between KIWAMASCO & MOWASCO WSP.
◆ Negotiate a new Tarrif with WASREB in the course of FY2019/20.

Main NRW Reduction Targets set in WSP's 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22))	2% reduction per year (Tariff Approval 2017/18-2019/20)

Analysis Table of FY2017 and FY2018 Annual Review Report by JICA Experts Team

Table: Selected Data Mainly from the Pilot WSPs' Annual Activity Review Reports for 2017/2018 & 2018/19 (& Impact Reports for 2016/2017 & 2017/18)

Relevant Indicators of Recent Financial Years (Sources of Data)		Definition & Note	Main Targets of Phase 2						Main Targets of Phase 3		
			Meru WSP	Embu WSP	Nakuru WSP	Kisumu WSP	Nyahururu WSP	Ruiru-Juja WSP	Eldoret WSP	Mavoko WSP	Kilifi-Mariakani WSP
Size & Financial Condition of WSP (2017/18 from Impact Report 11)	**No. of Connections**	Note: Include both active and inactive connections.	**14,935**	**31,786**	**57,694**	**53,296**	**19,604**	**26,428**	**116,666**	**13,847**	**29,677**
	Ranking of Size in Kenya	Note: In tems of the No. of Connections	**33**	**12**	**5**	**4**	**25**	**17**	**2**	**35**	**15**
	Total Production (m3/year)	Note: Include and exclude the water imported and exported over the boundary of its service area, respectively.	**2,768,000**	**6,615,000**	**12,655,000**	**13,232,000**	**3,015,000**	**6,704,000**	**13,529,000**	**766,000**	**8,907,000**
	O&M Cost Coverage (%)	Definition: (Total operating revenues / Total operating expenditures) x 100	**132**	**116** (2016/17 from Impact Report 10) **& non credible data** (2017/18)	**104**	**105**	**108**	**124**	**124**	**101**	**91**
Changes in NRW-related Indicators (2016/17→ 2017/18⇒ 2018/19)	**No. of Staff who belong to NRW Section/Unit or are in charge of NRW reduction specifically.** (2016/17→ 2017/18⇒2018/19, all from Annual Activity Review)	Note: Count a person dedicated continuously and exclusively for NRW Reduction as 1.0 and count a field staff dedicated to NRW reduction for only 25%, for example, of his/her working time as 0.25 (e.g. 3.75).	**7 → 8 ⇒ 7**	**2 → 7** (by Organizational Restructure officially from June 1, 2018) ⇒ **7**	**20 → 26** (including O&M, GIS & revenue enhancement staff) ⇒ **23** (Organizational Restructure)	**15 → 15 ⇒ 14**	**7 → 7 ⇒ 6**	**2 → 7** (Organizational Restructure) ⇒ **10**	**9** (3 NRW team members + 6 ccouts) **→ 9 ⇒ 11** (Organizational Restructure)	**3 → 4 ⇒ 3**	**0.6** (6 committee members x 10%) **→ 5.6** (Organizational Strengthning: 1 NRW officer + 1 meter tester + 2 persons x 20% x 9 stations) ⇒ **6.6** (1 NRW head + 1 meter tester + 1 bulk meter reader + 2 persons x 20% x 9 stations)
	Metering Ratio (%) (2016/17 from Impact Report 10→ 2017/18 from Impact Report 11 ⇒ 2018/19 from Annual Activity Review)	Definition: (Total number of active connections with meters /Total number of active connections) x 100	**100 → 100 ⇒ 100**	**100 → 100 ⇒ 100**	**96 → 100 ⇒ 100**	**88 → 100 ⇒ 100**	**94 → 100 ⇒ 100**	**100 → 100 ⇒ 100**	**99 → 100 ⇒ 100**	**100 → 100 ⇒ 100**	**96 → 100 ⇒ 100**
	Annual Universal NRW Ratio (%) (2016/17 from Impact Report 10→ 2017/18 from Impact Report 11 (and Annual Activity Review) ⇒ 2018/19 from Annual Activity Review)	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/ System Input Volume)*100	**21** (Impact 10: not credible) **→ 15** (Impact 11: not credible) **/ 21** (Review: not credible) ⇒ **19** (Review: not credible)	**41** (Impact 10: not credible) **→ 36** (Impact 11: not credible) **/ 32** (Review: not credible) ⇒ **36** (Review: not credible)	**31** (Impact 10) **→ 36** (Impact 11) ⇒ **31** (Review)	**41** (Impact 10) **→ 37** (Impact 11) ⇒ **31.6** (Review)	**43** (Impact 10) **→ 42** (Impact 11) ⇒ **35** (Review)	**26** (Impact 10: not credible) **→ 34** (Impact 11: not credible) ⇒ **37** (Review)	**43** (Impact 10) **→42** (Impact 11) ⇒ **36** (Review)	**41** (Impact 10) **→ 35** (Impact 11) ⇒ **34** (Review)	**48** (Impact 10) **→ 49** (Impact 11) ⇒ **49.7** (Review: not credible due to some stalled bulk meters)
	Completion Ratio of the Activities planned in the Previous Annual NRW Reduction Plan (2015/16→ 2016/17⇒2017/18, all from Annual Activity Review)	Note: Perception % among the NRW task team or person(s) in charge on how much of the NRW activities annually-planned for the last financial year has been completed. If more activities than planned has been completed, enter a % more than 100.	**68 → 70 ⇒ 75** (60% or more continuously for 3 years in this project)	**40 → 50 ⇒ 60**	**82 → 85 ⇒ 90** (60% or more continuously for 3 years in this project)	**55 → 60 ⇒ 69**	**70 → 90 ⇒ 90** (60% or more continuously for 3 years in this project)	**Unknown → 30 ⇒ 20**	**50 → 60 ⇒ 65** (60% or more continuously for 2 years in this project)	**40 → 60 ⇒ 48**	**35 → 60 ⇒ 50**
Additional Info	**Main NRW Reduction Targets (NRW Ratios) set in WSP's Upper Plans such as 5-year Strategic Plan, Tariff Approval, or Those of a Similar Nature** (e.g. from 60% in 2017/18 to 50% in 2021/22 (Strategic Plan 2017-22)) **(Note: These targets include unrealistic ones.)**		**20%** (Strategic Plan 2015-19)	**41% in 2017 to 20% in 2022** (Strategic Plan 2017-22)	**30% in 2017/18 to 25% in 2022/23** (Business Plan 2017-22)	**7% Reduction by the End of 2018/19** (Annual NRW Reduction Plan of 2018/19) **& 25% by 2022/23** (Strategic Plan 2017-22)	**36 % in 2018/19 to 28% in 2023/24** (WSP's Strategic Plan)	**20% in 2018/19** (Current WSP's Strategic Plan) **To be revised soon**	**30% in 2017/18, 25% in 2018/19, 25% in 2019/20, 20% in 2020/21 & 20% in 2021/22** (Strategic Plan 2017/18 - 2021/22)	**44% in 2016/17 to 25% in 2021/22** (Strategic Plan 2016-21)	**2% Reduction per Year** (Tariff Approval 2017/18-2019/20)
	Last Regular Inter-departmental NRW Meeting held at Each Pilot WSP as of August 16, 2019		**11-Aug-19**	**1-Aug 8-19**	**30-Jul-19**	**8-Jul-19**	**13-Aug-19**	**12-Aug-19**	**Not yet regulary held.**	**10-Jul-19**	**Not yet regulary held.**

5) -3 Annual Review Report of Pilot WSPs for 2019/2020

Template: Annual Review Report of NRW Activities **Name of WSP MERU**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ A new IMS was introduced, this will entail billing (to improve effeciency), leakage Data collection, customer complaint logging and report generation this was 60% done by close of the FY 2019-2020 ◆ BPTs were repaired to reduce losses, This was a stop gap measure before replacement with PRVs this was 100% done ◆ A learning exposure programme was undertaking with leading WSPs in all aspects, This was underatken at Nyeri and Nanyuki Water companies ◆ R 160 Meters were adopted for use by the WSP
(2) Good Practices & Knowledge to Share with other WSPs	◆ Use of Steptest to isolate Pipelines with Leakage issues ◆ Collection of Data to enable Logic Loss reduction approaches ◆ Use of Free Source such as KOBO, Mapin, Google Earth and QGIS ◆ Use of NRW equipment such as UFMs and Acoustic sticks for leak detection ◆ Use of PDCA sheet for gap indetification and planning C1 and C2 consumer monitoring for preemptive loss control
(3) Main Obstacles	◆ Covid 19 ◆ Not enough money to undertake all projects

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	20	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	43	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

Main Incomplete Activities planned for the Fiscal Year

↓ **What are the remaining percentage?**

◆ Bulk Meters 0%
◆ Creation Of SOPs 0%
◆ IMS system 60%
◆ Trainings 80%
◆ PRVs 20 %

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☑	

Template: Annual Review Report of NRW Activities **Name of WSP EMBU**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ Establishment of 5 Distribution Zones and 3 new decentrized offices but not fully operational ◆ Through CIS 80% system cleanup was achieved. ◆ Revenue increase after testing and replacing large customers' faulty meters ◆ Training of the staff on basics of NRW, survey equipment, smartphone use, etc. ◆ Shift of mind set towards low cost solutions (e.g. calibrated bucket, use of additional copolymer piston meter as a meter tester, etc.) ◆ Identification of the most leaking area within a problematic distribution zone with step test and mnf in zone 1 and 2 ◆ Pressure data collection for zones 1 and 2.zone 1 planning is complete. ◆ EWASCO sucsessfully hosted OJT nrw trainning for other WSPS in kenya in conjuction with KEWI ◆ Adoption and procurement of new customer meters.-R200 ◆ Adoption of use of hdpe pipes for customer connections. ◆ Sucessful completion of RRI phase 1 which resulted to debt recovery,revenue increase,activation of domant connections (system cleanup)
(2) Good Practices & Knowledge to Share with other WSPs	◆ Establishment of a fully-dedicated NRW task team capable to deal with both commercial and physical loses ◆ Use of low-cost solutions such as calibrated buckets and free ODK forms ◆ Importance of sharing information with other WSPs (e.g. OJT with other stake holders such as WASPA, KEWI, etc.) ◆ Continous on job trainning for staff in nrw management and reduction. ◆ Step test to easily identify where the problem is for fast results and application of odk simple tests and practices.. ◆ Testing of new meters pipes and fittings before acceptance. ◆ Use of nrw detection equipments for nrw reduction. ◆ Nrw stearing commitee from both commercial and technical depertments. ◆ Information sharing through water utility regional patnership hosted by jica.
(3) Main Obstacles	◆ Unreliable data of production and zonal inflow which can not guide NRW activities ◆ GIS layers not sufficiently updated (e.g. customer meters, pipelines, etc.) ◆ Inherited old pipelines that require replacement or rerouting. ◆ Pipe vandalism and meter tampering in the rural areas for miraa irrigation. ◆ Illegal connections in the rural areas. ◆ Pipe damages leading to high water losses by other agencies contractors. ◆ Budget constrains to fund key nrw projects. ◆ Covid 19 has been a big obstacles towards operations.

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	40	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	65	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ **What are the remaining percentage?**

Main Incomplete Activities planned for the Fiscal Year	◆ Prvs installation ◆ Master meter procurement and installation ◆ Sub zonal clear demaction and phasing of the billing cycle to the master meter readings for easier and accurate nrw computation. ◆ Pressure reduction zone 2 ◆ Stabilization of the production data by fixing the master meters accuracy. ◆ Gis mapping and updating of remainning water facilities and meters. ◆ Procurement of air valves.

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☐	
Head / Staff of Internal Audit	☐	
Managing Director / General Manager	☐	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP RUIRU-JUJA**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ 12 bulk meters have been installed to establish 19 DMAs and monitor abnormal flow - 100% complete. ◆ 25 gate valves have been installed in Juja Elevated Tank DMA for step test (the step test was tried without the presence of JICA experts but was interrupted by a local conflict before Covid-19 hit Kenya). ◆ About 300 faulty meters were replaced or relocated based on customer monitoring exercise - 60% complete. ◆ The meters of 130 large customers, whose consumption was being estimated, were identified and replaced with high accuracy volumetric meters for proper billing (1/2 & 3/4 inch for large domestic customers consuming more than 50-100m3/month and 1 inch and above for industrial customers). ◆ 70% of existing customer connections have been mapped (46% one year ago) while over 60% of customer data has been interfaced into the billing system. 40% of public sanitation data was also collected. ◆ 40% of old PVC pipe were upgraded to HDPE pipes ◆ 20% of gate valves were replaced with lockable gate valves (for easier disconnection). ◆ The organizational structure of NRW Unit has been approved. ◆ Internal standards for pipes, fittings & customers meters have been developed and documented.
(2) Good Practices & Knowledge to Share with other WSPs	◆ Hydraulic zoning with DMAs helps a lot in easy identification of NRW hotspots that require more attention.
(3) Main Obstacles	◆ COVID-19 has slowed down major field activities (e.g. step tests in continuous water supply DMAs), training, school campaigns, etc.

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	38	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	68	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ **What are the remaining percentage?**

Main Incomplete Activities planned for the Fiscal Year

◆ The installation of about 30 more gate valves for the other two continuous water supply DMAs (55% left)
◆ 2 out of 3 scheduled step tests in the continuous supply DMAs (66.6% left)
◆ Daily consumption monitoring of large customers (ongoing)
◆ In-house trainings for all relevant staff and staff workshops(100% left)
◆ Establishment of a well equipped NRW workshop (the budget is not yet approved)
◆ Installation of smart meters for 100 customers in a pilot area
◆ Use of Majivoice for quick reporting of leaks, etc. from the public

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☐	
Managing Director / General Manager	☑	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP NAKURU**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ Completion of pipe realignment in western zone (49 km) and consumer connections. ◆ Upgrading of network at Hilton area from PVC to HDPE (4km) ◆ Pipe realignment at Industrial area and station area (Northen zone) i.e 2km in length ◆ Laying of service lines within Flamingo and Kimathi county estates i.e 7.5 km ◆ Replacement of over 3000 meters ◆ Meter relocation next to perimeter fence in langalanga estate (Central zone) having done ◆ Intensifying of leak detection activities in Southern zone and Eastern zone
(2) Good Practices & Knowledge to Share with other WSPs	◆ Billing analysis is major step towards addressing commercial water losses ◆ Implementation of leak detection and step testing activities is a very informative way of separating commercial and physical losses
(3) Main Obstacles	◆ Covid -19 Pandemic

(4) Performance Evaluation

Indicator	**%**	**Definition & Note**
Annual NRW Ratio	33	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	70	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
Main Incomplete Activities planned for the Fiscal Year	**↓ What are the remaining percentage?** ◆ Pipe realignment in station area of 2km 20% is still remaining	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☑	

Template: Annual Review Report of NRW Activities **Name of WSP KISUMU**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)			
(1) Main Achievements during the Fiscal Year	◆ Meter theft campaign - (KOMESHA MWIZI PATA CHAPA)		
(2) Good Practices & Knowledge to Share with other WSPs	◆ METER THEFT CAMPAIGN - (KOMESHA MWIZI PATA CHAPA) ◆ USE OF LEAK DETECTION TO IDENTIFY ILLEGAL CONNECTIONS.		
(3) Main Obstacles	◆ INADEQUATE STAFFS FOR NRW SECTION. ◆ MALFUNCTIONING OF LEAK DETECTION EQUIPMENT ◆ MOVING FROM OLD SYSTEM TO NEW BILLING SYSTEM. ◆ LACK OF TRANSPORT		
(4) Performance Evaluation	**Indicator**	**%**	**Definition & Note**
	Annual NRW Ratio	37	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
	Completion Ratio of the Planned Activities	73	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
	Main Incomplete Activities planned for the Fiscal Year	**↓ What are the remaining percentage?**	◆ PHYSICAL LEAK DETECTION - 46% ◆ SAMPLING OF QUALITY AND SPEED OF LEAK REPAIRS ◆ CUSTOMER IDENTIFICATION SURVEY ◆ SYSTEM AUDITING OF ERP BILLING SOFTWARE. ◆ LEAK DETECTION OF ALL PIPELINE WITHIN ARINA DMA

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	Weekly meeting for all staff (Tsunami)
Head / Staff of Technical Department	☑	Oversight meeting
Head / Staff of Commercial / Financial Department	☑	Oversight meeting
Head / Staff of Internal Audit	☑	Oversight meeting
Managing Director / General Manager	☑	Oversight meeting
Board of Directors	☑	Chief Technical presented in quarterly technical meeting

Template: Annual Review Report of NRW Activities **Name of WSP NYAHURURU**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ Completed customer identofication survey in one scheme(Rumuruti) out of four schemes planned. ◆ 95% of establishment of elevation difference within each DZ and/or pressure zones on GIS completed. ◆ 30 DMAs hydraulically Isolated and 6 zonal meters not yet installed. ◆ 250MM Master Meter for Marmanet scheme installed with the necessary accessories but chamber yet to be built. ◆ Publishing of GIS layers on QGIS Could and viewing of the online map from web bowsers on the PCs and smartphones of relevant staff completed. ◆ 90% of development of standard operation procedures for NRW Team done. ◆ BQ completed for pipeline rehabilitation in most burst prone areas of Marmanet scheme(35KM) and submitted to the county. ◆ 1 school visited out of the 5 planned school campaigns on reduction of water wastage and reporting of water pipe bursts.
(2) Good Practices & Knowledge to Share with other WSPs	◆ The use of stopwatch while observing zonal meters to determine the DMA flow rate where UFM is not available. ◆ The use of sealing wire used for disconnection to seal meters(avoid tampering) instead of buying the plastic seals. ◆ The use of Kobo-collect mobile tool to map leakages/bursts and new connections ◆ The use of Kobo-collect mobile tool to collect zonal meter readings with pictures for confirmation.
(3) Main Obstacles	◆ Financial constraints related to COVID-19 pandemic caused some budgeted activities to be stopped. ◆ "Work from home" government directive limited the number of staff available to undertake activities.

(4) Performance Evaluation

Indicator	**%**	**Definition & Note**
Annual NRW Ratio	38	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	70	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
	↓ What are the remaining percentage?	
Main Incomplete Activities planned for the Fiscal Year	◆ Establish Elevation difference within each DZ and/or pressure zones. - 5% ◆ Continue with customer identofication survey in all schemes. - 70% ◆ To develop standard operation procedures for NRW Team. - 10% ◆ Organize for school campaigns on reduction of water wastage and reporting of water pipe bursts. - 75% ◆ Installation of Master Meter for Rwathia scheme with proper chamber and the necessary accessories. - 10%	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	Discussed and endorsed
Head / Staff of Technical Department	☑	Discussed and endorsed
Head / Staff of Commercial / Financial Department	☑	Discussed and endorsed
Head / Staff of Internal Audit	☑	Discussed and endorsed
Managing Director / General Manager	☑	Discussed and endorsed
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP MAVOKO**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year

- Creation of 2no DMAs
- 180 meters replaced
- Introduction of mobile meter reading
- Testing large consumer meters
- Strainers
- Harmonization of master metes and consumer meters reading
- Meter servicing
- Introduction of disconnetion stickers
- Use of listening sticks
- Succesful us e of the NRW template
- Companywide monthly NRW planning
- Introduction of NRW module in the billing system

(2) Good Practices & Knowledge to Share with other WSPs

- Introduction of strainners on distribution lines
- Introduction of mobile meter readings
- Use of listening sticks which was succesful

(3) Main Obstacles

- Financial contraints(cash flow issues)
- Covid 19

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	35	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	50	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ What are the remaining percentage?

Main Incomplete Activities planned for the Fiscal Year

- Reduction of estimated bills
- Faulty meter replacement

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☑	

Template: Annual Review Report of NRW Activities **Name of WSP ELDORET**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year

- ◆ Internal standardization of pipes,fittings,customer meters,production meters and quality controll.
- ◆ Mapped atotal of 289km of pipeline and 3982 customer meters.
- ◆ Conducted MNF with assistance of Jica expert team and step test at chepkanga DMAS and resulted to identification of proplematic lines for replacement.
- ◆ Established 9 sub-DMAS at pilot area kipkorgot with 592 smart meters.NRW in the pilot area below 5%
- ◆ Carried out leak detection at pioneer,asis and elgon view which lead to identification of underground leaks and leaking meter points.
- ◆ Replaced a total of 1772 deteriorated service connections
- ◆ Elimination of atotal of 100 illegal connection at town centre(CBD) after pipe line replacement.
- ◆ Standardization of service connections
- ◆ Use of HDPE pipes for service connections instead PPR
- ◆ Formation of interdepartmental committee on NRW
- ◆ Replacement of dilapitated pipeline using HDPE a total of 28.69km.
- ◆ Permanent solutions to areas prone to frequent leaks and bursts replaced distance more than 10km.
- ◆ Procured electromagnetic meters inline and insertion for production meters
- ◆ Adoption of auto-bill and instant billing which portrays the true water consumption of the customer.
- ◆ Meter resizing, relocation, replacement of large consumer meters following the 10D and 5D rule
- ◆ Introduction of toll free line,all issues related to our service can be reported to us by our customers

(2) Good Practices & Knowledge to Share with other WSPs

- ◆ Training of artisans on proper installation of meters and pipelaying i.e good work-manship, meter resizing as per the consumption
- ◆ Use of HDPE pipes for service connections ,mains and sub-main pipelines.
- ◆ Introduction of smart metering which is accurate and real time.
- ◆ The pilot are Kipkorgot which is properly zoned NRW is below 5% on average.

(3) Main Obstacles

- ◆ Covid -19 Pandemic.
- ◆ Inacuracy of production meters.
- ◆ Road works by the County government and other roads agencies resulting in damaged pipelines
- ◆ Illegal connections and water theft

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	42	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	75	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ What are the remaining percentage?

Main Incomplete Activities planned for the Fiscal Year

- ◆ Zoning of the distribution network & pressure mapping
- ◆ Calibration of production meters and accuracy test of large customer meters
- ◆ Enhancement of the utilization of GIS data for NRW reduction
- ◆ No effective monthly meeting yet

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☐	
Head / Staff of Internal Audit	☐	
Managing Director / General Manager	☐	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP KILIFI-MARIAKANI**

Activity Review for Year 2019/20 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year

◆ Establisment of NRW Unit established with full support of the Management & all Departments with Job Description of the NRW Head Done. The SOPs are drafted and is awaiting review for adoption.
◆ Capacity Development through Trainings and Benchmarking have been done to the relevant staff(Area Managers and foremen) though not all of them e.g KEWI and Donor trainings like Redcross & JICA.
◆Sensitization of members of staff in all the sattelite Areas of Kimawasco have done.
◆ Enhancement of existing & potential customers' compliance and support is continuous with printed electronic Bills,sms,emails being done, official launched of MAJI Voice was done and frequent Barazas/Public forums/Stakeholders meetings were done. Radio adverts/talks and facebook page communication were also done.
◆ Yearly PDCA cycle was adhered to e.g all NRW activities were captured in the Strategic plan and some were implimented through the assistance of the Donors e.g WB and to a certain extend form the Revenues of the WSP. Yearly assessment,medium term updates were also done and all the reports shared to the relevant departments.
◆ Monthly PDCA cycle is adhered to with the relevant Data Collected, analysed and reports done to the relevant head of departments. The same reports are also shared to the other staff members through staff forums e.g whattsup groups, meetings etc.
◆ Quality Control- all the pipes and fittings procured are clearly specified during procurment and the rigth ones are verified and confirmed during supplies. The various procuremnet committtees at different levels were sufficiently trained. The same case applies to meters and any other items procured by the WSP.
◆ Procurement of sufficient Materials, Equipment and Transport- Procurement of meters was done and supplied through the assistance of WB though more meters are still required but at least the stalled and faulty meters can be replaced, part of GIS equipement were also procured and supplied through the WB and Transport also Boosted with two Vehicles and 15 motorcycles.
◆ Establisment of GIS & Mapping of water utilities- this has been discussed and agreed upon up to the Board level. It

(2) Good Practices & Knowledge to Share with other WSPs

◆ Meter Servicing

(3) Main Obstacles

◆ NRW- the level of NRW is high
◆ Financial Constraints- Due to the high level of NRW we are not able to meet our Budget
◆ Old and delipitated pipelines- this contribute to the high levels of NRW
◆ Lack of sufficient equipement and expertise e.g GIS

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	57	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	40	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ **What are the remaining percentage?**

Main Incomplete Activities planned for the Fiscal Year

◆ Creation of DZs and DMAs
◆ GIS-creation of the office, equipping and reccruitment of GIS expert
◆ Replacement of Dilapidated pipelines and Rerouting of mains and replacement of AC lines
◆ Installations of Sections Valves, Airvalves, PRVs and Rehabiltaion of BPTs
◆ Formation of NRW Committee & formulation of incentives to the staff and whistle blowers.
◆ CIS- it is at the tendering stage
◆ Meter replacement and relocation of customer meters to the offtake- meter replacement is ongoing.

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☐	

5) -4 Annual Review Report of Pilot WSPs for 2020/2021

Template: Annual Review Report of NRW Activities **Name of WSP MERU**

Activity Review for Year 2020/21 (Note: Please fill the cells coloured and enclosed with double lines.)			
(1) Main Achievements during the Fiscal Year	◆ Indentification of members from all sections to hold monthly meetings and discuss NRW results ◆ Creation of new DMAs ◆ Completion of new IMS system ◆ Replacement of D4-23 and sections of D4-25 ◆ Introduction of sectional valves for all long pipelines and tertiaries ◆ Replacement of leaking butterfly and sluicevalves in the New Treatment works ◆ Replacemenent of D1-03/D1-04 with HDPE pipeline material ◆ Procurement of an Exta pickup to facilitate the technical section with faster response time foe leak repair and other Activities I.E MNF ◆ Creation of new DMAs ◆ Weekly reading of all C1 customers		
(2) Good Practices & Knowledge to Share with other WSPs	◆ Desion making by use of data to make it more objective ◆ Customer categorization to enable monitoring of C1 consumers		
(3) Main Obstacles	◆Reduced billing and collection due to Covid-19		
(4) Performance Evaluation	**Indicator**	**%**	**Definition & Note**
	Annual NRW Ratio	19	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
	Completion Ratio of the Planned Activities	98% achieved	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?	
	Main Incomplete Activities planned for the Fiscal Year	◆ Creation of SOPs 60% Done	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	Conducted Monthly
Head / Staff of Technical Department	☑	Conducted Monthly
Head / Staff of Commercial / Financial Department	☑	Conducted Monthly
Head / Staff of Internal Audit	☑	Conducted Monthly
Managing Director / General Manager	☑	Conducted Monthly
Board of Directors	☐	Conducted Yearly

Template: Annual Review Report of NRW Activities **Name of WSP EMBU**

Activity Review for Year 2020/2021 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ Establishment of 5 Distribution Zones and 3 new decentralized offices. ◆ Through CIS 80% system cleanup was achieved. ◆ Revenue increase after testing and replacing large customers' faulty meters. ◆ Training of the staff on basics of NRW, survey equipment, smartphone use, etc. ◆ Shift of mind set towards low cost solutions (e.g. calibrated bucket, use of additional copolymer piston meter as a meter tester, etc.) ◆ Identification of the most leaking area within a problematic distribution zone with step test and mnf in zone 1 and 2 ◆ Pressure data collection for zones 1 and 2. Zone 1 planning is complete. ◆ EWASCO sucsessfully hosted OJT NRW training for other WSPS in kenya in conjuction with Kewi ◆ Adoption and procurement of new customer meters - R200 done ◆ Adoption of use of hdpe pipes for customer connections done ◆ Successful completion of RRI (Rapid Result Initiative) phase 1 which resulted to debt recovery, revenue increase, activation of dormant connections (system cleanup)
(2) Good Practices & Knowledge to Share with other WSPs	◆ Establishment of a fully-dedicated NRW task team capable to deal with both commercial and physical loses ◆ Use of low-cost solutions such as calibrated buckets. ◆ Importance of sharing information with other WSPs (e.g. OJT with other stake holders such as WASPA, KEWI, etc.) ◆ Continous on job training for staff in NRW management and reduction. ◆ Step test to easily identify where the problem is for fast results and application of odk simple tests and practices. ◆ Testing of new meters pipes and fittings before acceptance. ◆ Use of NRW detection equipments for NRW reduction. ◆ Information sharing through water utility regional patnership hosted by JICA.
(3) Main Obstacles	◆ Unreliable data of production and zonal inflow which can not guide NRW activities ◆ GIS layers not sufficiently updated (e.g. customer meters, pipelines, etc.) ◆ Inherited old pipelines that require replacement or rerouting. ◆ Pipe vandalism and meter tampering in the rural areas for miraa irrigation. ◆ Illegal connections in the rural areas. ◆ Pipe damages leading to high water losses by other agencies contractors. ◆ Budget constrains to fund key nrw projects. ◆ Covid 19 has been a big obstacle towards operations.

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	41	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	70	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ **What are the remaining percentage?**

Main Incomplete Activities planned for the Fiscal Year	◆ Master meter procurement and installation ◆ Sub zonal clear demaction and phasing of the billing cycle to the master meter readings for easier and accurate nrw computation. ◆ Stabilization of the production data by fixing the master meters accuracy. ◆ GIS mapping and updating of remainning water facilities and meters. ◆ Capacity development and benchmarking Imovement

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☐	
Head / Staff of Internal Audit	☐	
Managing Director / General Manager	☐	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP RUIRU-JUJA**

Activity Review for Year 2020/21 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year

- ◆ Created sub-dma for gitambaya ,ruiru east, juja farm
- ◆ Serviced 306,recommended 194 for replacement,replaced over 800 faulty meters.
- ◆ 80% of existing customer connections have been mapped total 31,526 customers.
- ◆ 20% of old pvc pipes were upgraded to HDPE- currently at 60 % hdpe coverage.
- ◆ Currently all new connections being done with lockable gate valves.
- ◆ Leakage monitoring by line patrols and keeping track of registered burst and leakage.
- ◆ Door to door monitoring (284) customers meters were found okay.
- ◆ Developed customer complaints register (648) customers
- ◆ Dfm for dormant accounts(44) illegal connections(175) accounts with anomalies(315).
- ◆ Have a total of 3 motor bikes which help in DMA monitoring bulk meter reading.
- ◆ 4 stolen,4 faulty bulk meter have been replaced.
- ◆ Able to calculate NRW per DMA.
- ◆Identified 458 large customers yet to resize and install digital meters.

(2) Good Practices & Knowledge to Share with other WSPs

- ◆ Hydraulic zoning with DMAs helps a lot in easy identification of NRW hotspots that require more attention.
- ◆ Tracking meter readers in various walk routes using GIS
- ◆ Use of sub-dma monitoring data for determining water demand for customers within walk routes

(3) Main Obstacles

- ◆ COVID-19 has slowed down major field activities (e.g. step tests in continuous water supply DMAs), training, school campaigns, etc.
- ◆ Procurement of UFM is time consuming stalling activities such as mnf
- ◆ Water losses from damaged water pipes by road construction workers and at some handwashing points installed as directed by government
- ◆ Private water suppliers interference by interconnectios within our water systems.

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	33	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	74	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ What are the remaining percentage?

Main Incomplete Activities planned for the Fiscal Year

- ◆ Benchmarking to NYEWASCO for nrw staff onhold due to covid-19
- ◆ In house training of NRW for all staff members onhold due to covid-19
- ◆ Completion of CIS
- ◆ Use of media campaign to raise public awareness on NRW and how to save water through sms
- ◆ purchase of bulk meters for Sub-DMA monitoring

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP NAKURU**

Activity Review for Year 2020/2021 (Note: Please fill the cells coloured and enclosed with double lines.)	
(1) Main Achievements during the Fiscal Year	_Isoation of 4 DMAs in Eastern zone namely; Mawanaga, Eastmore,St.Mary's and NATEWA. The NRW baseline was computed and various interventions were put in place to reduce it. Measures taken to reduce the NRW include the following; pipe repalcement and meter replacement. This has seen increase in water billing an revenue. _Procurement of 3000 meters to be use for replacement _Meter testing and inspection of 2100 large and medium consumers -Installation of 300 SMART (DIEHEL) meters for piloting. _procurement of 2 vehicles _Installation of 40 isolation valves across the entire network _Installation of 50 air valves across the entire network to improve on water flows _Reduction of global NRW from 32% to 31% FY 2019/2020 and FY 201/2021 respectively.
(2) Good Practices & Knowledge to Share with other WSPs	◆ Training of artisans on proper installation of meters and pipelaying i.e good work-manship, meter resizing as per the consumption ◆ Use of HDPE pipes for service connections ,mains and sub-main pipelines. ◆ Introduction of smart metering which is accurate and real time. ◆ The pilot area Kipkorgot which is properly zoned NRW is below 5% on average. ◆ Meter relocation to 1metre as stipulated in our metering policy. ◆ Standardization of service connections.
(3) Main Obstacles	◆ Covid -19 Pandemic.. ◆ Road works by the County government and other roads agencies resulting in damaged pipelines ◆ Illegal connections and water theft

Indicator	**%**	**Definition & Note**
Annual NRW Ratio	31	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	80	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
	↓ **What are the remaining percentage?**	
Main Incomplete Activities planned for the Fiscal Year	_Replacemnt of 2610 metersfor large and medium consumers about 87% of the target _Installation of 10 isolation valves 75% are still remaining and they are in the process of installation. _Relocated 478 meters out of the target 500 meters 95% accomplished. _21 lines out of 34 lines step tested 62% of the target achieved	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☑	

Template: Annual Review Report of NRW Activities **Name of WSP KISUMU**

Activity Review for Year 2020/21 (Note: Please fill the cells coloured and enclosed with double lines.)			
(1) Main Achievements during the Fiscal Year	◆ Acreditation of meter test bench by KENAS ◆ Reduction of meter theft by 25% ◆ Reduction in number of accounts being affected ◆ Improved interdepartmental working relationship for effective NRW reduction through oversight meetings		
(2) Good Practices & Knowledge to Share with other WSPs	◆ Installation of plastic multi-jet meters which has enhaced both reduction of meters affected by silt and meter theft cases.		
(3) Main Obstacles	◆Reduced billing and collection due to Covid-19 ◆ Inadequate staffing.		
(4) Performance Evaluation	**Indicator**	**%**	**Definition & Note**
	Annual NRW Ratio	31	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
	Completion Ratio of the Planned Activities	72	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
	Main Incomplete Activities planned for the Fiscal Year	**↓ What are the remaining percentage?**	
		◆ STAFFING OF THE NRW UNIT STILL PENDING ◆ DAILY MONITORING OF DMA BULK METERS STILL NOT ACHIEVABLE. ◆ 60% OF OLD DILAPIDATED METERS REPLACED	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP NYAHURURU**

Activity Review for Year 2020/21 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year	◆ 120% installation of sufficient sluice/gate valves on transmission and distribution pipelines to limit the volume of water losses ◆ 100% of establishment of elevation difference within each DZ and/or pressure zones on GIS completed. ◆ 88% of DMAs improved by hydraulically isolating the planned priority DMAs and 14 zonal bulk meters properly installed. ◆ 100% of development of standard operation procedures for NRW Team done. ◆ 100% of preparation of reliable GIS layers for water supply facilities, existing zones and public sanitation facilities ◆ 88% replacement of Bulk and production meters with more sufficient and accurate meters. ◆ 100% Accuracy monitoring of zonal bulk meters based on the fluctuation of its monthly flow and monthly tested using UFM ◆ 131% Conducted Customer Identification Survey (CIS) randomly in Marmanet and using billing analysis for other schemes
(2) Good Practices & Knowledge to Share with other WSPs	◆ The use of Google Sheet in Google Drive for recording the bulk meter readings and immediately getting the results of an automated analysis on abnormal flow to take actions quickly. ◆ The use of Kobo-collect mobile tool during new customer survey to map proposed location of new connections ◆ The use of universal NRW monitoring sheet for monthly NRW analysis and reporting giving monetary value to NRW.
(3) Main Obstacles	◆ Financial constraints related to COVID-19 pandemic caused some budgeted activities to be stopped. ◆ "Work from home" government directive limited the number of staff available to undertake activities.

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	37	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	80	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ **What are the remaining percentage?**

Main Incomplete Activities planned for the Fiscal Year

◆ Replacement of Bulk and production meters with more sufficient and accurate meters -12%.
◆ Continue with customer identofication survey in all schemes. - 67%
◆ Improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required .- 12%
◆ Organize for school campaigns on reduction of water wastage and reporting of water pipe bursts. -100%
◆ Construction of proper chamber for Master Meter for Marmanet scheme . - 10%
◆ Procurement and installation of 10 No. PRVs. 90%

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	Overall agreement
Head / Staff of Technical Department	☑	Agreed upon
Head / Staff of Commercial / Financial Department	☑	Agreed upon
Head / Staff of Internal Audit	☑	Agreed upon
Managing Director / General Manager	☑	Agreed upon
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP MAVOKO**

Activity Review for Year 2020/21 (Note: Please fill the cells coloured and enclosed with double lines.)			
(1) Main Achievements during the Fiscal Year	◆ Creation of 2no DMAs ◆ 180 meters replaced ◆ Introduction of mobile meter reading ◆ Testing large consumer meters ◆ 9 no Strainers installed ◆ Harmonization of master metes and consumer meters reading ◆ Meter servicing ◆ Introduction of disconnetion stickers ◆ Use of listening sticks ◆ Succesful us e of the NRW template ◆ Companywide monthly NRW planning ◆ Introduction of NRW module in the billing system		
(2) Good Practices & Knowledge to Share with other WSPs	◆ Introduction of strainners on distribution lines ◆ Introduction of mobile meter readings ◆ Use of listening sticks which was succesful		
(3) Main Obstacles	◆ Financial contraints(cash flow issues) ◆ Covid 19		
(4) Performance Evaluation	**Indicator**	**%**	**Definition & Note**
	Annual NRW Ratio	35	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
	Completion Ratio of the Planned Activities	50	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
		↓ What are the remaining percentage?	
	Main Incomplete Activities planned for the Fiscal Year	◆ Reduction of estimated bills - 50% ◆ Faulty meter replacement-50% ◆ creation of 3 more ore DMAs-10% ◆ monthly mapping of meter reading anomalies-70% ◆ mapping of leaks and bursts-70%	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☑	

Template: Annual Review Report of NRW Activities **Name of WSP ELDORET**

Activity Review for Year 2020/2021 (Note: Please fill the cells coloured and enclosed with double lines.)	
(1) Main Achievements during the Fiscal Year	◆ Internal standardization of pipes,fittings,customer meters,production meters and quality control. ◆ Conducted 3 in number NRW in-house training for artisans and staff from other departments on impacts of NRW in an organization.. ◆ Mapping and zoning of entire distribution network resulting to creation of 18 DMA'S within our service area ◆ Replaced 8 number production meters with EMF(Electromagnetic flow meters) insertion and inline in our treatment works. ◆ Replaced a total of 93.41 Km of aged water pipelines using HDPE pipes ranging from 20mm to 160mm diameter.CBD town centre pipeline replacement resulted to elimination of old connections which were still in use without meters a total of 60 illegal connections. ◆ Relocated a total of 3683 deteriorated service connections which resulted to the collection of debt amounting to Kshs 11,931,780. ◆ Replaced 21 number ultrasonic flow meters and 8 in EMF(Electromagnetic flow meters) for large consumers.. ◆ Standardization of service connections. ◆ Hired 5 no line patrollers to undertake intensive surveillance to reduce physical losses. ◆ Conducted one number interdepartmental meeting ◆ Rotation of meter readers within the service areas. ◆ Permanent solutions to areas prone to frequent leaks and bursts replaced distance more than 18.1km. ◆ Did a request for proposal for creation of DMAs through bulk smart metering which has been awarded to Upepo Technology Limited to undertake creation of DMAs and Sub DMAs in the entire Service Area. ◆ During this financial year 2020/2021 a total of 66.6 km new water pipeline was installed using HDPE pipes ranging from 20mm to 110mm diameter. ◆ Meter resizing, relocation, replacement of large consumer meters following the 10D and 5D rule ◆ Undertook proof of concept on automatic meter infrastructure(AMI)- A total of 174 (½") ultrasonic smart meters were installed in Kenya Re Estate and another 29 in number (½") ultrasonic smart meters were installed in various locations of the service area to test the signal strength of the network to relay information.which are billed remotely. ◆ Categorized meters in terms of consumption C1,C2,C3,C4,C5,C6 after working on C1 resulting to rise in average tariff. ◆ Disconnected from main a total of 171cut offs which are potential water theft points.
(2) Good Practices & Knowledge to Share with other WSPs	◆ Training of artisans on proper installation of meters and pipelaying i.e good work-manship, meter resizing as per the consumption ◆ Use of HDPE pipes for service connections ,mains and sub-main pipelines. ◆ Introduction of smart metering which is accurate and real time. ◆ The pilot area Kipkorgot which is properly zoned NRW is below 5% on average. ◆ Meter relocation to 1metre as stipulated in our metering policy. ◆ Standardization of service connections.
(3) Main Obstacles	◆ Covid -19 Pandemic.. ◆ Road works by the County government and other roads agencies resulting in damaged pipelines ◆ Illegal connections and water theft

Indicator	**%**	**Definition & Note**
Annual NRW Ratio	42	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	80	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.
	↓ What are the remaining percentage?	
Main Incomplete Activities planned for the Fiscal Year	◆ Installation of bulk meters for established DMAS ◆ Replacement of large consumer meters with ultrasonic and electromagnet meters category C1 at 80% ◆ Enhancement of the utilization of GIS data for NRW reduction ◆ Replacement of dilapitated pipelies at, Mawazo, Karatasi, Kipkaren 85% complete. ◆ Replacemet of production meters with Electromagnetic meters at 95%. ◆ Intergration of GIS and billig system(majics) ◆ Installation of smart meters 90% ◆ Sensitization of schools and general public	

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☐	
Head / Staff of Technical Department	☐	
Head / Staff of Commercial / Financial Department	☐	
Head / Staff of Internal Audit	☐	
Managing Director / General Manager	☐	
Board of Directors	☐	

Template: Annual Review Report of NRW Activities **Name of WSP KILIFI-MARIAKANI**

Activity Review for Year 2020/21 (Note: Please fill the cells coloured and enclosed with double lines.)

(1) Main Achievements during the Fiscal Year

◆ Nrw unit established with the relevant staff deployed in the unit and it is up and running. The SOPs are still in draft form awaiting the approval of the Board but the unit have the full support of all management,the Board and the entire staff.
◆ Capacity Development through Trainings and Benchmarking have been done to the relevant staff(Area Managers and foremen) though not all of them e.g KEWI and Donor trainings like Redcross & JICA.
◆Sensitization of members of staff in all the sattelite Areas of Kimawasco have done.
◆ Enhancement of existing & potential customers' compliance and support is continuous with printed electronic Bills,sms,emails being done, official launched of MAJI Voice was done and frequent Barazas/Public forums/Stakeholders meetings were done. Radio adverts/talks and facebook page communication were also done.
◆ Yearly PDCA cycle was adhered to e.g all NRW activities were captured in the Strategic plan and some were implimented through the assistance of the Donors e.g WB and to a certain extend form the Revenues of the WSP. Yearly assessment,medium term updates were also done and all the reports shared to the relevant departments.
◆ Monthly PDCA cycle is adhered to with the relevant Data Collected, analysed and reports done to the relevant head of departments. The same reports are also shared to the other staff members through staff forums e.g internal memos,whattsup groups, meetings etc.
◆ Quality Control- all the pipes and fittings procured are clearly specified during procurment and the rigth ones are verified and confirmed during supplies. The various procuremnet committtees at different levels were sufficiently trained. The same case applies to meters and any other items procured by the WSP.
◆ Procurement of sufficient Materials, Equipment and Transport- Procurement of meters was done and supplied through the assistance of WB though more meters are still required but at least the stalled and faulty meters can be replaced, part of GIS equipement were also procured and supplied through the WB and Transport also Boosted with two Vehicles and 15 motorcycles.

◆ Establisment of GIS & Mapping of water utilities- this has been discussed and agreed upon up to the Board level. It has also been incorporated in the Budget for the hiring of the GIS expert. Otherwise most of the things related to GIS has not been realised because of the absence of GIS expert but once the recruitment is completed the same will commence without any delay. However some of the key staff of WSP have recived basic training on GIS Mapping by JICA expert.
◆ Monthly monitoring of Total Billing and production is done, with the reading of Bulk meters jointly done between the Bulk Company and WSP. The calculation of NRW within SA is done and shared with the relevant Area managers and Departments.
◆ Analysis of Meter reading data and Billing Data is thoroughly done and the necessary actions taken on noted mistakes, point of weakness etc. Reports are then genearted that is used to inform on the necessary course of action e.g Meter replacement, Testing, inspections due to suspected cases of leaks and theft. Meter servicing is centralised in the HQs and site servicing is also carried out in the field. Calibrated buckets are currently used for meter testing and for big meters, they are tested by installing a test meter in series with the meter being tested.
◆ Reduction of Physical Losses has been enhanced through Weekly line patrols, customer senstization to report on leaks and reported cases recorded in OBs and acted upon with immidaite effect.
◆ Illegal water use is well stipulated and whenever an illegality is found, the penalties stipulated in the Tariff is applied.
◆ Digital Billing and Meter reading ststems are in placed and are fully utilised.
◆ Distribution systems are clearly defined,with sections with weak points,Acs sections, Sections requiring PRVs have been captured. Eventhough there is no sufficient Valves, HDPE pipes and other fittings are not in place, the WSP ensures that the one procured met the specification. The other sections that requires huge invested have been captured and some are being actioned by Donors like WB.
◆ Focus Management of Large &Medium Customers is done with frequent visual inspection, Consolidation of numerous meter connections serving one customer is contineous with several having been done, New connections are mandated to instal the meter on the offtake and CIS tender is in progress.

(2) Good Practices & Knowledge to Share with other WSPs

◆ Dedicated Nrw Day
◆ Mobile Meter Testing exercise
◆ Patronage of Zones by senior Management and Board

(3) Main Obstacles

◆ Water theft through illegal connections and By-passes
◆ Financial Constraints
◆ Delapitated pipelines
◆ Lack of meters for replacement and new connections
◆ Meter tampering
◆ Delay in GIS expert recruitment

(4) Performance Evaluation

Indicator	%	Definition & Note
Annual NRW Ratio	52	Definition: (System Input Volume (i.e. total production) - Billed Authorized Consumption Volume)/System Input Volume)*100
Completion Ratio of the Planned Activities	70	Note: Perception % among the NRW Unit/Task Team (or person(s) in charge) on how much of the NRW activities annually-planned for the last fiscal year has been completed. If more activities than planned has been completed, enter a % more than 100.

↓ **What are the remaining percentage?**

Main Incomplete Activities planned for the Fiscal Year

◆ Creation of DZs and DMAs - in advance stage
◆ Reccruitment of GIS expert- in the final stage
◆ Rerouting of mains and replacement of AC lines
◆ Installations of Sections Valves, Airvalves, PRVs and Rehabiltaion of BPTs
◆ CIS- it is at the tendering stage
◆ Meter replacement and relocation of customer meters to the offtake- meter replacement is ongoing.

Records of Presenting & Discussing the Review Results at Your WSP (Note: Please click the checkboxes below.)

Target of Internal Communication	Discussed / Presented	Note
NRW Unit / Section / Task Team	☑	
Head / Staff of Technical Department	☑	
Head / Staff of Commercial / Financial Department	☑	
Head / Staff of Internal Audit	☑	
Managing Director / General Manager	☑	
Board of Directors	☑	

5) -5 Annual and Mid-term NRW Reduction Plans of Pilot WSPs for FY2017 (Initial Trial)

MERU WATER AND SEWERAGE SERVICE

(MEWASS)

REGISTERED TRUSTEES

NON - REVENUE WATER (NRW) REDUCTION PLAN

2017/2018

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   - 4.2. Zones with High NRW
   - 4.3. Monitoring and Evaluation (including PDCA Cycle)
   - 4.4. Planning of Activity Management Measures

1. Preamble

With the growth MEWASS is experiencing, the Non-Revenue Water (NRW) component is critical in ensuring that with increased water production there is minimal water lost. The current customer connections have grown to 11,000 and still growing. For sustained growth there is need for further reducing the water lost from 20% so that there is more water available to serve more customers. Although MEWASS has been leading in NRW management there is need for continuous monitoring for improvement. There are other WSPs maintaining a lower NRW, therefore there is need for enhanced measures to manage it.

2. Review of the Implementation of NRW Reduction Plan 2016-1

Approximately 90% of the planned budget on NRW reduction plan was realized.

Challenges

- some of the challenges we faced were inaccuracy of sub zonal master meters
- During rain seasons some areas are inaccessible to read master meters and patrolling
- Water rationing resulting in delay in finding bursts and leakage and more bursts because of insufficient air valves

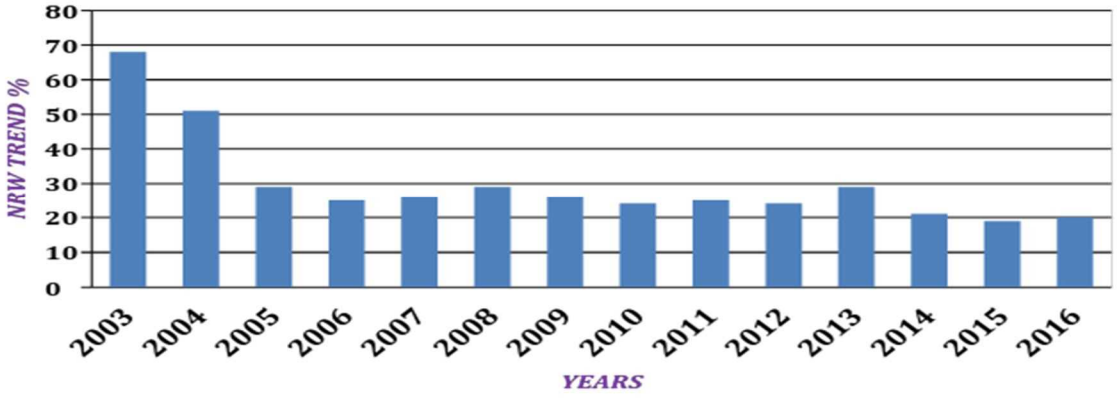
3. Mid-term Vision for the Next 5 Year

3.1. Reduction of NRW Ratio in the Past

With the growth of the service provision area, sustainability of the NRW to the lowest attainable level is key for the continued growth. The NRW team has been working since formation in 2004 and this has seen the NRW maintained to below 30% over the years. In every financial year the team has been allocated funds for undertaking various NRW monitoring activities. Tabulated below is the NRW trend since MEWASS inception.

Table 1: Reduction of NRW Ratio over Years in Meru WSP

YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
NRW %	68	51	29	25	26	29	26	24	25	24	29	21	19	20



3.2. Factors affecting NRW negatively

Japan is currently with an average leak ratio of 4%. This means that there is still more which needs to be done to lower MEWASS's NRW further. The main factors that are known to lead to both real and apparent water loss in MEWASS systems are summarized below;

1) High pressure leading to joint leaks and bursts in zone 2.
2) Consumer meters which are aged 7-10 years.
3) Long distribution lines with very few sectional valves leading to prolonged water loss in the system during repairs.
4) Meter reading and consumer billing errors
5) Illegal consumption of water
6) Consumer meter readings being estimate
7) Third party damages of pipelines

With the causes identified has reasons for persistent NRW of 20-24%, it is possible to chart way forward to handle the above mentioned factors to improve NRW performance.

3.3. Current NRW Ratio and Priority in Each Zone

The NRW team has been monitoring on monthly basis the 8 DMA's (See sub-zone map Fig. 3). These DMA's are further subdivided for more efficient management of NRW. Tabulated below is the zonal situational analysis of NRW in 2016/2017 for the eight DMAs.

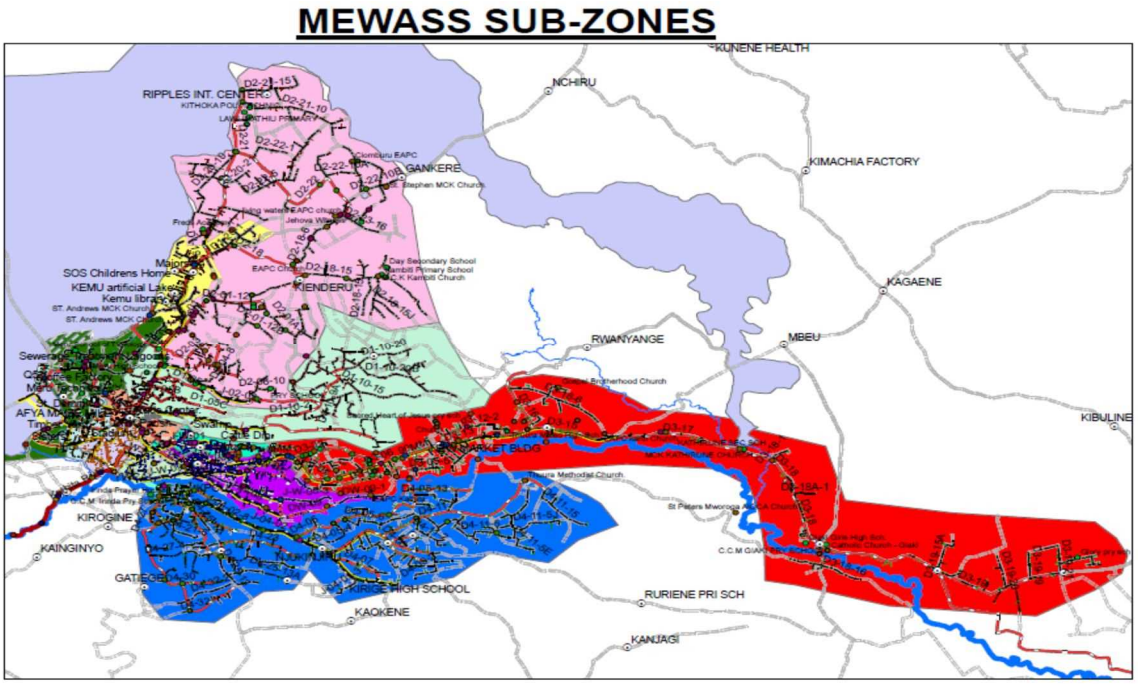


Fig 1: Distribution Zones of MEWASS

Table 2: Zonal NRW Ratio and Priority

Zone	Major Causes for High NRW	Supply	Consumption	NRW Average 2016	Priority
1	• Few section valves • Aged meters	600,552	510,922	**18%**	**6**
2	• High pressures and few Pressure Reducing Valves (PRVs) • Few sectional valves • Very large Zone • Depends on pumping • Draw down	333,452	234,953	**42%**	**1**
3	• High pressures and few PRVs • Long pipeline with fewer sectional valves	142,211	114,918	**24%**	**4**
4	• Aged meters • High pressures and few PRVs • Few sectional valves. • Very large Zone • Water rationing	295,765	230,691	**28%**	**3**
5	• Insufficient investigation of illegal use to many inactive connections. • Increased paving and construction hence difficulty in pipeline monitoring • Very large Zone	704,943	587,581	**20%**	**5**
6	• Aged meters • Low pressures with increased customer connections	177,708	153,619	**16%**	**7**
7	• Aged meters • Low pressures with increased customer connections	227,686	201,919	**13%**	**8**
8	• Aged network • Aged meters • Illegal connections through the tees from old pipeline network • Electricity for Pumping	124,253	93,863	**32%**	**2**

3.4. Participatory Mid-term Planning using Bar Chart

With the current average of 21% we have a target of 18% which will require resources and several measures be put in place. Table 3 below shows the mid-term vision of ONLY the NRW reduction activities requiring multi-year planning. Pipe replacement plan of transmission and distribution pipes are not included in this mid-term plan because the existing pipe lines were rehabilitated in 2003. The NRW reduction activities which can be planned effectively on a single year basis are shown in Table 4 (annual plan).

Table 3: Mid-term Vision for **ONLY** the NRW Reduction Activities requiring Multi-year Planning

Table 3. Mid-term Vision for the NRW Reduction Activities requiring Multi-year Planning

NRW Reduction Activities requiring Multi-year Planning		Responsible Entity and Personnel (e.g. O&M Eng.)	Mid-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
			for Annual Plan				Vision																
			2017-18				2018-19				2019-20				2020-21				2021-22				
			1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
Improvement of NRW Monitoring	Installation of 2 mechanical bulk meters to monitor the overall NRW ratio based on measured volume of production	HUM	**MWI**																				
	Installation of 7 ultrasonic bulk meters to improve zonal metering	HUM	**MWI**																				
	Monthly estimation of leakage ratio of each area using the zonal ultrasonic bulk meters	NRW																					
	Improvement of step tests using the zonal ultrasonic bulk meters	NRW																					
	Replacement of faulty master meters for existing subzones and improvement of their chambers	HUM/NRW	**MWS**																				
	Inclusion of the NRW ratios of subzones in the monthly monitoring of NRW	NRW																					
Presssure Management	Market research on different types of float valves for Break Pressure Tank (BPT) and comparison with other options of pressure management	PEO/NRW																					
	Preparation of pressure map using pressure gauges with max pointer	NRW/GIS	**JICA**																				
	Prediction of future demand increase and network expansion	PEO																					

	Proposal of suitable pressure control measures	NRW/OM																							
	Implementation of facility modifications for pressure management	NRW		M WS																					
	Confirmation of pressure improvement through field measurements	NRW/GIS																							
Reduction of leakage from service connections	Market research on different types of pipes (GI, uPVC, PPR, HDPE) and fittings (including half-meal adapters for PVC-GI connection)	PEO/NRW					M W S																		Requires budget allocation
	Improvement of new service pipe installation	CCS					M W S																		It has to be done in the next FY218/2019
	Improvement of existing service pipes	CCS/NRW					M W S																		Will require additional staff
	Introduction of a handpump for pressure test	TM/NRW	M WI																						
	Use of listening sticks by meter readers/NRW	NRW/MRS	M WI																						
Improvement of customer meter accuracy	Trial using 10 ultrasonic smart meters for large customers	NRW/WORKS	M WI																						
	Preparation of metering policy (selection, procurement, installation, replacement, relocation, etc.)	FM/TM/CCS	M WS																						
	Accuracy test and service/replacement of existing customer meters with buckets and a potable meter testers	NRW/CCS	M WI																						
		Regend:		Procurement							Implementation							.Monitoring/Usage							

4. Preparation of Annual NRW Reduction Plan 2017-18

4.1. Planned Activities and Budget

Due to the above listed NRW performance in the last year, the NRW team came up with a list of NRW activities and was allocated a budget for the same as shown below;

Table 4: NRW 2016/2017 Planned Activities and Budget

Goal/ Objective	Priority Action	Current Status	Target	Timeframe	Budget	Responsibility
[1] Pressure management	Mapping of pressure areas & analysis	35 PRVs installed & mapped	Sample & pressure map - 200 conn.	Sep-Nov 2017 Feb-Mar 2018	Kshs. 350,000	NRW Team & GIS team
	Installation of PRV's		Install additional 5 no. 1 1/4" & 5 no. 2" PRVs & map	Sep-Nov 2017 Feb-Apr 2018	Kshs. 598,000	
[2] Reduce physical losses	Install Sectional valves along distribution lines	105 Sluice Valves mapped	Install additional 10 63mm Socketed sluice valves & map	Oct 2017-Feb 2018	Kshs. 320,000	NRW & GIS team
	Minimum night flow exercises	Regular	Undertake at least 4 no. exercises in a month	Aug 2017-Jun 2018	Kshs 384,000	NRW
[3] Reduce & manage commercial losses	Meter testing using bucket	2000 conn. 2015/2016	Additional 2000 conn.	Aug 2017-Mar 2018	Kshs. 100,000	NRW & GIS team
[4] Optimizing of created DMAs	Checking and replacement of faulty/inaccurate master meters	29 subzones	Test, replace 10 faulty master meters	Aug 2017-Oct 2017	Kshs. 1,050,000	NRW /Distribution Units
	Replace TEE connections in Zone 8 with a Talbot & a saddle clamp	300 conn.	@ 400 (TALBOT)+ 650 (SADDLE) =3050/=		Kshs. 415,000/=	NRW / CCS UNITS
	Put through all the idle connections in Zone 8	60 conn.	@1500/= (Labour & materials)	Aug 2017-Feb 2018	Kshs. 90,000/=	NRW / CCS/CRO UNITS

4.2. Zones with High NRW

With the increased benchmarking activities, MEWASS has undertaken to focus on Zone 2 & 8 for its activities in the current financial year since the two zones are is exclusively served by pumping whereas its NRW is highest at 42% and 32% on average from July 2016 to June 2017 respectively. With the increased power bills due to increased demand in the two zones, there is an urgent need for ensuring NRW is maintained at the lowest possible level. This is because of the cost per cubic meter produced and distributed is higher than other zones.

The team intends to undertake the full NRW stepwise activities as indicated in NRW Standard Guidelines.
The following activities will be undertaken for the DMA;

1) Optimization of existing Zones and sub zones.
2) Undertaking of customer meter calibration using bucket and door to door analysis of the meters
3) Calibration of Master meter
4) Undertaking of pressure measurement and management activities
5) Analysis of leakage in the zones
8) Undertaking of minimum night flow measurement
6) Put through all the connection on shutdown list
7) Replace all the TEE connection with a saddle clamp & a Talbot at mewass cost in zone 8.

The NRW guideline, manual and case studies shall be used as key reference materials for the above mentioned activities.

4.3. Monitoring and Evaluation (including PDCA Cycle)

Monitoring is a very vital tool in planning and implementation. In order to achieve the desired results in this plan continuous evaluation and recording of progress is key. There is therefore need for routine gathering of information on all aspects of the plan.
Monitoring will involve giving feedback on the progress to the management and implementers of the plan.
Reporting will therefore enable gathered information to be used in making decisions for improving performance.
Monitoring will provide information that will be useful in;

1) Analyzing the situation in the implementation of the plan.
2) Determining whether the inputs in the project are well utilized.
3) Identifying problems facing the implementation of the plan and finding solutions.
4) Ensuring all activities are carried out by the right personnel and in time.
5) Using lessons one component to another.
8) Determining whether the way the plan was planned and implemented is the most appropriate way.

Monitoring and evaluation of the plan will be undertaken as follows to ensure that necessary changes in the objectives and activities. There is great need to ensure that the obtained results are sustainable.

4.4. Planning of Activity Management Measures

a) Quaternary Cycle (report for board meeting, etc.)

There shall be quarterly reports on achievements of NRW reduction plans, progress, review and actions to be taken to meet the various targets.

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

There shall be monthly data analysis of NRW in the monthly reports presented on achievements, challenges and lessons learnt.

c) Bi-weekly Cycle (based on NRW Monitoring for large customers, etc.)

There shall be bi-weekly reports to be submitted on the status of the large consumers and construction sites. The report will incorporate the status of the seals and consumption patterns.

Embu Water and Sanitation Company Ltd.

(EWASCO)

Non-Revenue Water (NRW) Reduction Plan 2017-18

July 2017

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1. Review of the Implementation of NRW Reduction Plan 2016-17

1.1 Continuity and Completion of the Planned Activities

Table 1. Status of NRW Reduction Activities

Item	Objective	Activity	Status	Comments
1	(Pressure management) Reduce the average network pressure from 10 bar to 5 bar	1. Identify points pressure logging points 2. Collect pressure data in the entire area 3. Compile pressure data and map 4. Design and redesign pipe network 5. Procure and install Pressure reducing equipment (PRV & BPT)	● Item No. 1 completed ● Item 2, 3 and 4 20% completed. ● Item 5 - 90 mm PRVs 3 No procured. ● Small diameter 10 No procured.	Incomplete activities to carried forward to next financial year 2017/2018
2	Reduction of Faulty meters	1. Data collection through meter reading reports, billing report. 2. Service all blocked meters 3. Random testing of new meters 10% of consignment 4. Replace all the defective meters	● More meter readers were hired and implementation of smart phone meter reading. ● Item 2, 3 and 4 is a continuous process done as need arises.	Hire of more personnel to service and replace fault/ defective meters. To equip metering unit.
3	(Bulk metering and DMA) Increase bulk metering ration (bulk meter : consumer meter) from 1:600 to 1:300)	1. Mapping of existing bulk meters. 2. Identify and map the proposed DMA and bulk meter locations and sizes 3. Mapping of mainline / service lines and Customer meters 4. Procure and install bulk meters as per budget	● All activities are more than 95% done for consumer meter and 80% for mainlines and services line, continuous for new areas. ● Item No 2 to be factored in the next financial year. ● Item 4 is still in progress.	JICA has plans in place to replace some of bulk and master meters.
4	Rehabilitation of old pipe network	1. Identify and prioritize areas needing rehabilitation based on analysis of existing data (index) 2. Design and develop a bill of quantities and costing for identified area 3. Commence rehabilitation of priority areas as per budget	● Priority areas have been identified (Kaunda, Market area, CBD, Kamiu, Njukiri and Majimbo with low class of pipes PN 10 and below.	To rehabilitate mugoko Areas (Prisons) as part of pilot project

5	Reduce illegal water use / vandalism	1. Conduct meter survey (door to door visit all consumer meters once per year) (operation) 2. Enhance community involvement-Conduct 6 N0. community sensitization and awareness. (Nyumba kumi initiative)	● There is a unit in place to monitor. ● Barazas have been held.	The activities to more vigorous and laws to be enforced

1.2. Acquired Skills, Good Practices and Achievements

Table 2. Records of Training/Capacity Development for NRW-related Personnel

Brief Explanation of Training/Capacity Development and Acquired Skills	Num. of Participants (and their positions or initials for identification)	Time (e.g. April - June)
There was training for all technicians through WASPA on use of various equipment including: correlator. Leak detectors, acoustic stick and portable meter testing kit	5 No. Technical officers	July 25-29, 2016 (5 days)

1.3. Difficulties and Adjustments

Difficulties

1. Vandalism and illegal connection were rampant resulting to high NRW ratios.
2. The company concentrated on expansion to new areas.
3. Financial constraints
4. After devolution, most energy have been concentrated on expansion rather than human resource capacity building
5. NRW equipment breakdown/lack of spare parts.
6. Inadequate training was done to NRW personnel.
7. Old and dilapidated pipes/ some networks passing through private land causing patrol to be difficult.

Adjustment

1. Create community awareness, impose penalties and law enforcement to offenders.
2. To create an oversight unit to ensure all systems to counter illegal activities and

vandalism are upheld.

3. Expansion resulted to increased workload but the company is in process of job evaluation to come up with ideal staff establishment and new organization structure.
4. Source for funding to rehabilitate the old and dilapidated pipes, trainings and acquire functional equipment.

2. Revised Mid-term Vision for the Next 5 Year

The current strategic plan is coming to an end i.e. 2012-2017, therefore there will be a review of the company strategic plan 2018-2022 which shall be in line with our NRW vision. Part of the strategic plan shall incorporate NRW reduction plan.

2.1. Current Level of NRW Ratio

Table 3. Recent Results of Monthly Calculation of NRW Ratio

DMA Name	Date	Total Connection Number	Total Billed Consumption (m3/month)	Total Inflow (m3/month)	NRW Ratio (%)
All Service Areas	Jul-16	22,440	285,226	632,438	55%
	Aug-16	23,625	301,908	631,341	52%
	Sep-16	23,920	452,411	654,063	31%
	Oct-16	24,004	413,469	753,258	45%
	Nov-16		280,429	589,909	52%
	Dec-16		286,188	637,149	55%
	Jan-17		370,802	599,775	38%

Notes to the table above:

1. We are unable to quantify the leakage ratio and volume because we have not come up with a water balance though some of its components are known.
2. DMA and zonal data to be realized in the 2017-2018 action plan after completion of the zoning exercise, installation of DMA meters, and accuracy test/calibration of the meters.

2.2. Discussion on Weakness and Improvement Measures

The following describes NRW-related weaknesses and required improvement measures.

a) Commercial Losses

1. Communication/coordination between commercial and technical departments → Joint monthly and quarterly discussion
2. Many estimated bill (about 15%) → Relocation of water meter to accessible sites, strict supervision of meter readers, review of billing software to provide accurate reporting and do regular service /meter replacement.
3. Unauthorized water consumptions → To create an oversight unit and maintain proper records/documents, and ensure all individual meters are well sealed. Follow-up of the same and ensure any irregularities attracts heavy penalties. To conduct community sensitization through barazas
4. Faulty meters → To carry out a survey on meter lifespan, install the best quality meters and replace faulty meters promptly.

b) Physical Losses

1. Bursts and leakages → To maintain emergency unit and quick response to reported cases
2. Overflows → To ensure appetencies like ball valves and air valves are always functional
3. Old pipes → To maintain regular patrols within the supply areas and replace the old/ obsolete pipes
4. Lack of quality materials → Proper procurement procedures to ensure quality materials.
5. Poor workmanship → On-job training and ensure compliance with laid down procedures.
6. Losses due to infrastructure development (road construction, fiber optic cable, electricity poles) → Clear policies and communications before any construction commence.

c) GIS, Zoning and Water Balance

1. Inadequate equipment → Proper facilitation of GIS equipment
2. Gaps in GIS data → To gather comprehensive data
3. Overlaps in meter zones → To have DMAs well defined
4. Old dilapidated pipes → Pipes to be replaced
5. Lack of Policy → Deal with fire hydrants (authorized unbilled water use)

d) Staffing, Awareness Raising of Staff and Training

1. Inadequate staff in the NRW unit → To maintain optimum NRW staff and regular training and benchmarking with other performing water service providers
2. Equipment → To maintain a well-equipped unit

e) Budgeting and Funding

1. Financial constraints → Mobilize funds through improving collection efficiency and donor funding.

2.3. Initial Discussion on Realistic Main Strategies for the Next 5 Years

The strategic plan of EWASCO for the next 5 years, which would include qualitative targets for NRW reduction, have not been formulated yet. The following is the results of an initial discussion held for the preparation of NRW reduction plans.

Table 4. Discussed Main Strategies and Required Actions for the Next 5 Years

Category	Main Strategies	Actions
Physical losses	Rehabilitation and Relocation (from private property) of water distribution networks	● Rehabilitation of Kamiu Area, Kaunda, Kangaru, Majengo and the market /CBD areas of the distribution system **(see Figure 1)**
	Enhance the capacity of leakage detection unit	● Acquire leak detection equipment and train staff on use of the same
	Pressure reduction	● Pressure mapping especially in lower areas of the distribution system (South West and North East) ● Establish the levels of pressures with facility improvements
Commercial losses	Identify and disconnect illegal connections	● Carry out continuous monitoring of network to identify and disconnect any illegal connections
	Improve customer metering and billing	● Develop a clear metering policy to improve efficiency and effectiveness of customer metering and billing.
	Enhance community involvement	● Carrying out training/sensitization of community members on their responsibility of taking care of water infrastructure. Also ensure customer care unit continuously report information to relevant units to mitigate on issues arising.

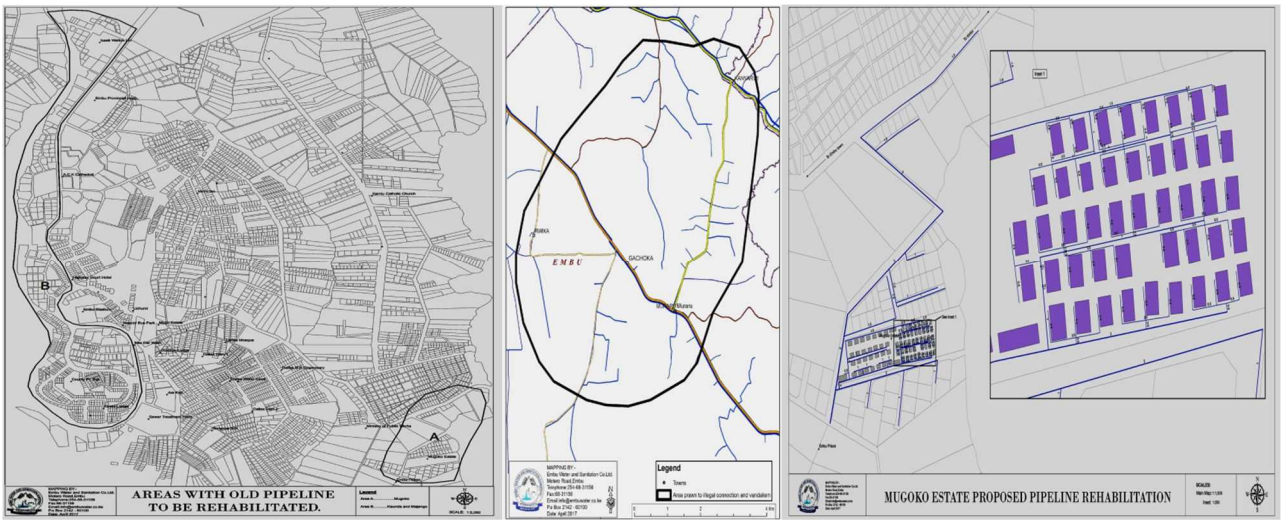

Figure 1. Results of Participatory Mapping (old pipeline change areas)

2.4. Participatory Mid-term Planning using Bar Chart

See Table 5 (Results of Participatory Annual and Mid-term Planning for NRW Reduction) prepared separately with MS Excel.

3. Preparation of Annual NRW Reduction Plan 2017-18

3.1. Annual NRW Reduction Plan Matrix

See the annual plan part of Table 5 (Results of Participatory Annual and Mid-term Planning for NRW Reduction) prepared separately with MS Excel.

3.2. Budgeting and Disbursement

All planned activities shall be financed as per the company's budget 2017/2018 (JICA is expected to support in procurement of survey equipment and meters through the Ministry of Water and Irrigation in addition to provision of training).

3.3. Expected NRW Reduction

Expected achievements from the implementation of planned activities are shown in the table below. Practicality of these expectations will be reviewed through the PDCA cycle.

Table 6. Expected NRW Reduction in the Coming Quarters

Quarterly	Expected NRW Ratio (%)	Comments
April 2017	40	Current NRW ratio
July 2017	38	Adhere to all planned activities
October 2017	36	Adhere to all planned activities
January 2018	34	Adhere to all planned activities
April 2018	32	Adhere to all planned activities

3.4. Commitment Targets

3.5. Planning of Activity Management Measures (PDCA Cycle)

a) Quaternary Cycle (report for board meeting, etc.)

- A Technical board committee is well constituted and all quarterly reports on NRW are reported

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

- Departmental and interdepartmental meetings to be held on monthly meeting (technical /commercial)
- Management reports to be prepared on monthly basis.

c) Weekly Cycle (confirmation of tasks, discussion on the progress, e.t.c.)

- NRW team to review progress after fortnight, to analyze achievements, challenges and give recommendations

MID TERM PLAN

Objective	Activity	Detailed Activities	Evaluation Measurement (Indicator)	Output	Responsible Entity and personnel Action by	Priority (1: highest to 3- lowest) in consideration of costs & easiness	Time Frame	Budget (Ksh)	MID TERM PLAN(MID AUGUST 2017 TO MID DECEMBER 2017)																					Remarks (including details of activity, challenges, etc.)
									Aug-17			Sep-17				Oct-17					Nov-17				Dec-17						
									1 WK	2 WK	3 WK	4 WK	5 WK	6 WK	7 WK	8 WK	9 WK	10 WK	11 WK	12 WK	13 WK	14 WK	15 WK	16 WK	17 WK	18 WK	19 WK				
									14-19 AUG	21-26 AUG	28-2 AUG SEP	4-9 SEP	11-16 SEP	18-23 SEP	25-30 SEP	2-7 OCT	9-14 OCT	16-21 OCT	23-28 OCT	30-4 OCT-NOV	6-11 NOV	13-18 NOV	20-25 NOV	27-2 NOV DEC	4-9 DEC	11-16 DEC	18-23 DEC				
a) Reduce Both Physical (Real) and Commercial (Apparent) Losses- Averag of 43 % to 25%	1) Check and install master meter correctly	Verification of correct positioning and installation of all master meters	Verification Report	Verification Report	Victor Njeru(Water/sup), T.Os Regions	1	1 week		→																					
		Procurement of fittings for proper installation of the meters	Timely procurement process and availed materials	Available materials and fittings for installation	Head of Finance and Commercial Services/ Procurement manager	1	3 weeks			→	→	→																			
		Proper installation of master meter at kangaru Reservoirs and Mukangu line	Standardized installation	Properly installed and functional master meters	Victor Njeru(Water/sup)T.Os Regions	1	1 week						→																		
		Verification and correct installation of zonal meters	Standardized installation	Properly installed and functional zonal meters	Victor Njeru(Water/sup)T.Os Regions	2	3 months							→	→	→	→	→	→	→	→										
	2) Master meter Accuracy test	Testing of master meter D-300	Percentage Accuracy for proper NRW Calculation (Over or Under registration)	Accuracy Report	Irungu (NRW Head)/Rita (T.O plant)	1	1 week		→																						
		Testing of master meter D-400	Percentage Accuracy for proper NRW Calculation (Over or Under registration)	Accuracy Report	Irungu (NRW Head)/Rita (T.O plant)	1	1 week		→																						
		Testing of master meter at kangaru reservoirs and zonal meters	Percentage Accuracy for proper NRW Calculation (Over or Under registration)	Accuracy Report	Irungu (NRW Head)/Rita (T.O plant) T.Os Regions	1	2 week								→	→															
	3) Night flow measurement	Installation of utrasonic flow meter on D-300 to obtain night flow measurement data	Accurate NRW calculation. Difference in commercial and physical losses (water balance)	Three weeks data and report	Irungu (NRW Head)/Rita (T.O plant)	1	3 weeks			→	→	→																			
		Installation of utrasonic flow meter on D-400 to obtain night flow measurement data	Accurate NRW calculation. Difference in commercial and physical losses (water balance)	Three weeks data and report	Irungu (NRW Head)/Rita (T.O plant)	1	3 weeks 1st series measurement			→	→	→																			
		Installation of utrasonic flow meter on master meters at Kangaru reservoir and region level to obtain night flow measurement data	Accurate NRW calculation. Difference in commercial and physical losses (water balance)	One weeks data and report	Irungu (NRW Head)/Rita (T.O plant) T.Os Regions	2	4 weeks 2nd series measurement							→	→	→	→														
	4) Refining of DMAs in the supply area	Planning for strategic zoning (flexible DMA division from large to small for tracking down) to monitor NRW ratio of different areas	Defined maps for the five regions indicating point with regional meters and valves.	Defined maps for the five regions	Chris(Ag HTS) Aphaxard(GIS)T.Os region	1	2 weeks		→	→																					
		Implementing and having Isolated DMA	Defined maps for the five regions indicating point with regional meters and	Printed maps	Chris(Ag HTS) Aphaxard(GIS)T.Os region	2	2 weeks				→	→																			
	5) Meter Survey	Property visit to inspect all meters and obtain data on current position	Survey report indicating status(Active,Inactive, domant, disconnected)	Weekly Survey report for action	Eng Karugendo(M.D) Aphaxard(GIS)	1	3 months		→	→	→	→	→	→	→	→	→	→	→	→										
		Use of data obtained to clean up and update billig system	Updated billing system	updated report to enhance data clean up	Eng Karugendo(M.D) Doris (HFC) Ruchoya(ICT)	2	weekly 1st series old supply area 2nd series				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→					
		Disconnect all domant meters and terminate physically on ground meters in the system with over six months record	Disconnected accounts	Enhanced monitoring and evaluation	Eng Karugendo(MD) Chris(Ag HTS) Victor (Wsup) T.Os	3	Continuous			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		
	6) Dormant accounts	Property visit to disconnect from the main line domant accounts	disconnection list	Terminated acoounts from mains	Eng Karugendo(M.D) Munene/ICT Ruchoya	1	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		
		Investigate where or not there is a possibility of illegal if premises has habitants with domant	Invesigation report	account owners being charged for illegal use of water	Eng Karugendo(M.D) Doris (HFC) Ruchoya(ICT) Munene HTS	1	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		
		Disconnect all domant meters and terminate physically on ground meters in the system with over six months record	Disconnected accounts	Disconnection list	Eng Karugendo(M.D) Doris (HFC) Ruchoya(ICT) Munene/ HTS	1	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		
	7) Reduction of water theft and illegal connection.	Procurement of customized meter seal (Unique with different colours for normal	Procurement process	Sealing in place	Marege(P.M) Mugendi(T.O) Doris(HFC)	1	2 weeks			→	→																			
		Establishment a clean up team to visit all meter. The team to check• Functionality of the meter • Level of accuracy –Use calibrated jerry can • Seal the meter	Reduced no of non-functional meters	All meters sealed and functioning	Chris(hts)/Victor Njeru(Water/sup), T.Os Regions	1	2 months .To follow meter reading route					→	→	→	→	→	→	→	→	→											
		System update of the meter serial numbers and connection no after clean up by stores and billing	Report	Updated data base	Dennis(billing)/mukiri(stores) ICT	2	1 month														→	→	→	→						

Objective	Activity	Detailed Activities	Evaluation Measurement (Indicator)	Output	Responsible Entity and personnel Action by	Priority (1: highest to 3: lowest) in consideration of costs & easiness	Time Frame	Budget (Ksh)	MID TERM PLAN(MID AUGUST 2017 TO MID DECEMBER 2017)																					Remarks (including details of activity, challenges, etc.)
									Aug-17			Sep-17					Oct-17					Nov-17				Dec-17					
									1 WK	2 WK	3 WK	4 WK	5 WK	6 WK	7 WK	8 WK	9 WK	10 WK	11 WK	12 WK	13 WK	14 WK	15 WK	16 WK	17 WK	18 WK	19 WK			
									14-19 AUG	21-26 AUG	28-2 AUG SEP	4-9 SEP	11-16 SEP	18-23 SEP	25-30 SEP	2-7 OCT	9-14 OCT	16-21 OCT	23-28 OCT	30-4 OCT-NOV	6-11 NOV	13-18 NOV	20-25 NOV	27-2 NOV DEC	4-9 DEC	11-16 DEC	18-23 DEC			
a) Reduce Both Physical (Real) and Commercial (Apparent) Losses- Averag of 43 % to 25%		Meter readers to give reports on condition of the meter i.e if sealed or not	Reports	continuous monitoring and evaluation	Dennis(billing)/ ICT/ HFC	2	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
	7) Reduction of water theft and illegal connection.	Adjustment of application form to include signing by client that the meter installed has both manufacturer and company seal to bear liability if found missing	Inclusion of a new clause and point to sign	Revised application form	HFC(DORIS) GIS(APHAXARD)	2	1 week				→																			
	8) Flow monitoring	Obtain data of master	Reports	Filled data sheet	HTS/Wat/Sup/T.Os /Head	2	continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
		Periodical analysis of data	Reports	Analysis and trend	HTS/Wat/Sup/T.Os /Head	2	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
		Use of data analysed to	Reports	Abnormal flow pattern	HTS/Wat/Sup/T.Os /Head	2	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
	9)Developing Staff Capacity.	Organizational improvement of NRW Unit . Dedicated staff having strength in commercial aspects and	Recruitment and appointment	Working Unit	M.D/H.R.M./HFCs/Ag HTS	1	2 weeks		→	→																				
		In house training on N.R.W reduction and also KEWI organised training	No of training conducted	Knowledgable staff hence Reduced N.R.W	HRM/HTS/,T.OS,Head N.R.W	2	2 weeks Every Quarter of Financial Year							→	→											→	→			
		Establishment of incentives for NRW reduction and fast tracking payments of rewards to staff discovering illegal connections	Staff evaluation	Rewards to staff	M.D /HFC/HTS,T.OS,Head N.R.W	3	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
		Sensitization of all WSP staff for NRW reduction	No of Sensitization conducted	Knowledgeable staff	M.D /HFC/HTS,T.OS,Head N.R.W	3	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
	10) Customer sensitization	Informing of customers of avenues of communication	Ease of communication by customers	Established platforms such as facebook,whatspp ,emails and hotlines	Andrew Musangi(Customer care) ICT	2	Continuous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
		Community barazas for education purposes	No of community barazas held	Improved communicaion and cordial working relationship with customers	Andrew Musangi(Customer care) Commercial and Technical Departments	2	1 baraza on quartely basi							→	→											→	→			
	11)Rapid Response Team	formation of committee to establish resources duties and responsibilities of the unit	working team	Formation of active team.	MD/HFC/HRM/HTS/,T.OS,Head N.R.W	3	1 month					→	→	→	→															
		Identify pilotarea to evaluate effectiveness of the team-Plito area(old town)	evaluation report of the team	Active team in place	MD/HFC/HRM/HTS/,T.OS,Head N.R.W	3	2 months monitoring effectiveness									→	→	→	→	→	→	→	→	→	→					
	12) Rationoing Program	To help in reduction of vandalism and illegal use during dry periods	Rationing program	Reduced NRW	Water sup/T.Os /Plumbers	2	Continuous during Dry periods		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			
	13) Improvement of Training ground in collaboration with KEWI	Rehabilitation and improvement of Mugoko and Section 46	Proper training ground	Rehabilitated areas installed with sectional valves and properly isolated	HTS(Chris) Procurement M. W/sup/T.Os GIS and Head NRW	1	2 months(		→	→	→	→	→	→	→	→	→	→	→	→										

Notes:
1) The mid term plan is part of the annual workplan. Its designed to achieve mid term objectives
2) Progress meeting will be held mid month to review on status(convener (Emiliy Mbangua)
3) Budget to accomplish the task is in view of approved 2017-2018 budget
4) Rapid response unit requires resources to be established by a committtee
5) NRW unit requires Head , 2 plumbers and 2 attendants

KEY NOTES ON BUDGET ALLOCATION.
1. FORMATION OF NRW UNIT
· 2 PLUMBERS @ Ksh 971 per Day for 20 Days in a month.
· 2 Attendants @ Ksh 571 per Day for 20 Days in a month.
2. FORMATION OF SUB DMAs.
· Piece work.
· Construction of Meter Chambers.
3. DEVELOPING STAFF CAPACITY.
· Training Kitty.
4. QUANTIFYING LOSSES.
· Logistics for measuring MNF.
5 Data base clean up
6 people * 20* 823 for 3 months
6 Reduction of water theft
2 plumbers 823 * 20 * 4 months
2 attendants 484 *20* 4 months

Ruiru Juja Water and Sewerage Co., Ltd.

(RUJWASCO)

Non-Revenue Water (NRW) Reduction Plan 2017-18

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b) Monthly Cycle (based on NRW Monitoring for each zone, etc.) 3

c) Weekly Cycle (confirmation of tasks, discussion on the progress, ect.) 3

1. Review of the Implementation of NRW Reduction Plan 2016-17

1.1. Continuity and Completion of the Planned Activities

Zoning and sub-zoning the company is currently operating two water supply schemes; Ruiru water supply and Juja water supply. Creation of DMA's and installation of zonal and subzonal meters is still ongoing

Infrastructure management ; The company has established renewal/rehabilitation program to address the issue of ageing and substandard pipes, replacing with HDPE Pipes which are strong, durable, non –corrosive and with few or no- joints.

Meter replacement; The company has established a strategy of replacing all large consumer water meters with DIEHL volumetric meters which are more precise in capturing low flows and the process is ongoing.

1.2. Acquired Skills, Good Practices and Achievements

- ➢ Basic knowledge on causes, reduction strategies and importances of reduction of commercial and physical water losses
- ➢ Strategic implementation of underground leakages using leak detection equipments/correlator
- ➢ Leak detection training

Table 1. Records of Training/Capacity Development for NRW-related Personnel

Time	Num. of Participants (and their positions or initials for identification)	Brief Explanation of Training/Capacity Development and Acquired Skills
27th Feb- 3rd March (5 days)	5 staff	Leak Detection training- Acquired skills on leak detection using Ultrasonic flowmeters (UFM), correlators and underground leak detectors
27th March- 31st March	5 staff	Training on Non Revenue water reduction strategies at KEWI. Acquired basic skills on reduction of physical and commercial water losses.

1.3. Difficulties and Adjustment

Note- : Please describe here the difficulties identified and adjustments made through PDCA cycles in 2016-17.

2. Revised Mid-term Vision for the Next 5 Year

Note: it is recommended to revise this chapter every year through participatory discussions to build up capacity of involved personnels and share the updated mid-term vision.

2.1. Current Level of NRW Ratio

Note: Please describe here the difficulties identified and adjustments made through PDCA cycles in 2016-17.

Table 2. Overall and Zonal NRW and Leakage Ratios

Area		Connec-tion Number (Num)	Total Inflow (m^3/ month)	Total Billed Consum-ption (m^3/ month)	NRW Ratio (%)	Estimated Leakage (m^3/ month)	Leakage Ratio (%)	Remarks
Zone Name	DMA Name							
All Service Areas								

2.2. Participatory Mapping of Problems

Note: Please insert the results of a participatory cognitive/perceptual mapping conducted to exchange opinions on the areas and pipe lines having serious meter problems, illegal water uses, leaks, bursts, high pressure, etc.

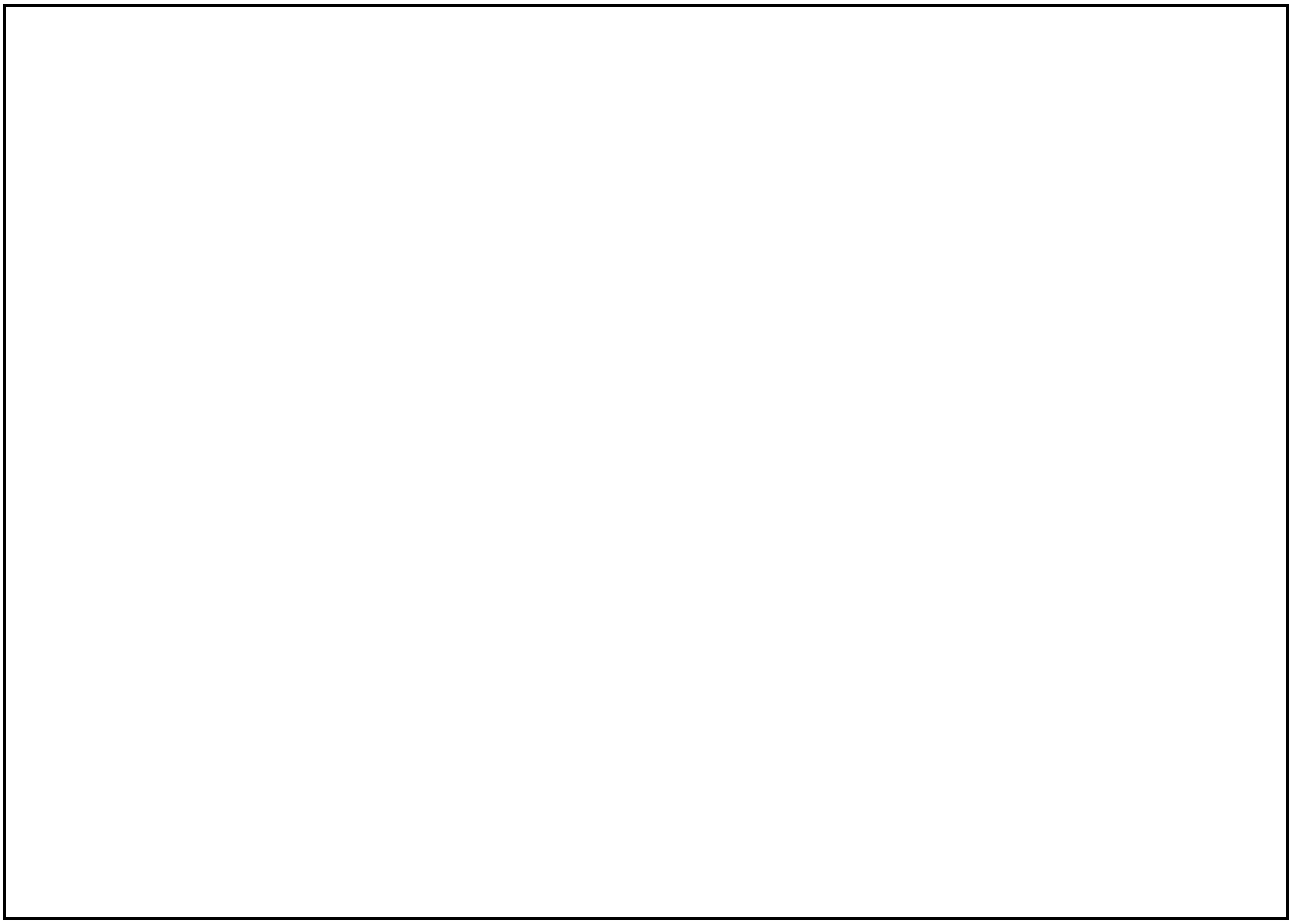

Figure 1. Results of Participatory Mapping

2.3. Discussion on Weakness and Improvement Measures

Note: Please describe related weaknesses and required improvement measures by incorporating the results of discussion.

a) Commercial Losses

b) Physical Losses

c) GIS, Zoning and Monitoring of Water Balance

d) Staffing, Awareness Raising and Training

e) Budgeting and Funding

2.4. Discussion on Realistic Target of NRW Ratio in 5 Years

Note: Please describe the contents of discussion on the realistic setting of a NRW Ratio in 5 years.

2.5. Participatory Mid-term Planning using Bar Chart

(which activities, current status, by whom, priority, etc.)

Note: Please fill in the two pages of Table 3 included in a separate file of spreadsheet (Example Template of Bar Chart for Mid-term Planning (2017-18 to 2022-23))

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (1/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or F: Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mit-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
						for Annual Plan				Vision																
						2017-18				2018-19				2019-20				2020-21				2021-22				
						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
a) Commercial (Apparent) Losses	1) Customer Meter Management	Realization of 100% customer metering	F																							customers are 100% metered
		Preparation meter strategies for accuracy test, replacement, relocation, protection, etc.	F																							implementation of some strategies in progress
		Implementation of the meter strategies	O									→	→	→	→	→	→	→								
		Focused management of large consumption customers	O																							
		Management of large residential buildings	O																							
	2) Illegal Use Management	Establishment of prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers)	N																							
		Active patrol for finding illegal connections and meter tampering (including the use of chlorine DPD tablets, detecting equipment, etc.)	O																							
		Inclusion of a penalizing mechanism against water theft in the county's water act	O	CM	2																					
		Enhancement of law enforcement against water theft with support from the county	N	CM	2							→	→	→	→	→	→	→	→	→	→	→	→	→	→	subject to approval
	3) Customer/Billing System Improvement	Customer identification survey for the inclusion of missing customers	N	CM	1																					
		Introduction of new system to support NRW reduction	F																							
		Enhancement of the utilization of existing system to support NRW reduction	N																							
	,	Establishment of insentives for informing																								
		Public forum																								
		School campaign																								
		Media campaign																								
b) Physical (Real) Losses	1) Reduction of Visible Losses	Elimination of overflow from distribution reservoirs, break pressure tanks, etc.	U		1																					N/A
		Active patrol for finding surface leakage from transmission, distribution and service pipes, broken air valves, etc.	O		1				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
		Supporting customers in stopping overflow from customers' water tanks	U		3																					
	2) Reduction of Underground Leakage	Spread of the daily use of listening sticks over many field staff against leakage	N	O &M	2																					
		Implementation of strategic track down of underground leakage (zoning→step test →listening stick→USF/leak detector/correlator)	N	NRW	1																					
		Measurement and optimization of pressure distribution as part of O&M (other than major facility improvements for zoning and pressure reduction based on hydraulic analysis with models)	N		3											→	→	→	→	→	→	→	→	→	→	
		Reduction of spaghetti service connections	O	O &M	1				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	3) Improvement of workmanship	Shortening of the time required to repair burst and leakage	O	TM	1													→	→	→	→	→	→	→	→	
		Assessment of pipe installation quality with hand pump test, etc.	U																							not applicable
		Improvement of pipe installation quality (especially service pipes)	F	O &M	1		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	4) Introduction of HDPE pipes, Replacement of Problematic Pipes, etc.	Introduction or increase of HDPE pipes	O		1									→	→	→	→	→	→	→	→	→	→	→	→	
		Replacement of asbestos cement pipes	F																							non existent
		Replacement of other problematic pipes	O		1																					
		Closure of old leaking lines in parallel to better lines	O		2																					

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (2/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mid-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
						for Annual Plan				Vision																
						2017-18				2018-19				2019-20				2020-21				2021-22				
						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
c) GIS, Zoning and Monitoring of Water Balance	1) GIS Preparation and Applications	Installation of hardware and software required for developing GIS database		GIS Officer	2																					
		Establishment or improvement of basemap and other general layers	O	GIS Officer	1																					
		Establishment or improvement of water supply facility layers	O	GIS Officer	1																					
		Establishment or improvement of sanitation/sewerage facility layers	N																							
		Systematic update of the GIS data	O	O&M	1				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
		Improvement of access to the GIS data among WSP staff (e.g. by using smartphone tablet)	N		2																					
		Use of GIS maps showing water supply pipes when patrolling to find surface leakage, underground leakage, illegal connections, etc.	N	TM	1								→	→	→	→	→	→	→	→	→	→	→	→	
		Linking GIS with customer/billing data for special analysis on meter problems and illegal connections	N		1																					
		Use of GIS for assessing pipe conditions including mapping of leaks, bursts and aged pipes.	N		1								→	→	→	→	→	→	→	→	→	→	→	→		
	2) Distribution network improvement for zoning and pressure reduction (with hydraulic model)	Planning of strategic zoning (distribution/pressure zones→flexible DMA division from large to small for tracking down) to monitor NRW ratio of different areas and control pressure based on hydraulic analysis and field measurements	N		3																					
		Construction and installation for the strategic zoning	N		3																					
		Confirmation of the hydrological isolation and inflow metering of each distribution zone and DMA and the consistency of the existing customers in each zone and DMA between GIS and billing system.	N		2																					
	3) Monitoring of Water Balance	Establishment of easy and sustainable monitoring of NRW ratio, water																								
		Periodical analysis and discussions to prioritize areas for different activities based on a table showing NRW ratio (and leakage ratio) of each distribution zone and DMA.																								
		Establishment of a water balance table beyond the estimation of leakage ratio based on minimum night flow measurement																								
d) Staffing, Awareness Raising and Training	1) Staffing	Organizational improvement of NRW Unit by making staff dedicated for NRW reduction and/or by balancing the staff having strength in commercial aspects and technical aspects	N		1																					
		Involvement of additional staff specialized in GIS, leak detection, etc.	N		1																					
		Establishment of insentives for NRW reduction	N		1																					
	2) Awareness Raising	Sensitization of WSP staff for NRW reduction	N		3																					
		Introduction of incentives to reduce NRW for WSP staff	N		2																					
	3) Training and capacity development	Internal training	N		2																					
		with JICA experts	N		2																					
		with other donors and Kenyan institutions (KEWI, WSB, WASPA, leading WSP, etc)	O		2																					
e) Plan, Budget, Report, External Funding and Procurement	1) Planning and Reporting	Annual planning including budgeting																								
		Annual and quarterly reporting																								
	2) Funds and procurement	Aquiring external funds																								
		Procurement of tools, equipment, materials and services																								

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

3. Preparation of Annual NRW Reduction Plan 2017-18

Note: The contents of this chapter should not be over ambitious but realistic so that the involved personnel of WSP can try to follow the annual plan with a sense of ownership over the plan.

3.1. Annual Plan Matrix

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
Commercial losses	Customer meter management-focused meter management through installation of volumetric meters to large commercial customers	Juja Water supply	1	NRW coordinator			
	Establishment of prevention measures against staff involvement in illegal activities	All areas	2	Technical manager			
	Updating of customer billing system	All areas	1	Billing			

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
Physical losses	Active patrol to reduce visible water losses along transmission, distribution and service lines	All areas	1	Distribution officer			
	Implementation of full network service lines to reduce spaghetti service connections by customers	All areas	2	Distribution officer			
	Improvement of workmanship during leak/bursts repairs and pipeline extensions by use of HDPE pipes and fittings	All areas	1	O & M			
	Increase use of HDPE pipes for replacement in problematic areas	All areas	2	Technical Manager			

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
GIS, zoning and monitoring of water balance	Establishment and improvement of water supply and sewerage facilities layers, integrating the GIS map with the billing data	All areas	1	GIS officer			
	Strategic hydrologic isolation and inflow metering to each zone	All areas	Juja scheme	NRW coordinator			
	Establish water balance table to monitor each water balance	All areas	3	Distribution officer			
Staffing, awareness raising and training	Establish an active NRW unit dedicated to NRW reduction activities only	All areas	2	MD			
	Establish incentives for NRW reduction	Ruiru scheme	2	MD			

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
Staffing, awareness raising and training	Staff trainings on NRW reduction in KEWI, JICA	All areas	3	MD			

3.2. Budgeting and Disbursement

Note: Please describe how to secure the budget required for the planned activities and how to disburse the budget in a timely manner.

3.3. Expected NRW Reduction

Note: Please describe expected achievements from the implementation of planned activities.

3.4. Commitment Targets

Note: Please set the completion of certain priority activities as commitment targets that should be achieved without failure.

3.5. Planning of Activity Management Measures

Note: Please describe how to realize Do, Check and Adjust of PDCA Cycles (e.g. quarterly, monthly and weekly cycles).

a) Quaternary Cycle (report for board meeting, etc.)

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

c) Weekly Cycle (confirmation of tasks, discussion on the progress, ect.)

Nakuru Water and Sanitation Services Co. Ltd.

(NAWASSCO)

Non-Revenue Water (NRW) Reduction Plan 2017-18

March 2017

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      a) Quaternary Cycle (report for board meeting, etc.) 1
      b) Monthly Cycle (based on NRW Monitoring for each zone, etc.) 1
      c) Weekly Cycle (confirmation of tasks, discussion on the progress, ect.) 1

1. Review of the Implementation of NRW Reduction Plan 2016-17

Note: this chapter can be used as main contents of the annual report on NRW reduction activities.

1.1. Continuity and Completion of the Planned Activities

Note: Please describe here the continuous efforts and completion of the activities planned for 2016-17 including the satisfaction of commitment targets.

1.2. Acquired Skills, Good Practices and Achievements

Note: Please describe here the acquired skills (through implementation and training), implemented good practices and achievements (in terms of NRW ratio and leakage ratio) of 2016-17. Then, please fill in Table 1.

Table 1. Records of Training/Capacity Development for NRW-related Personnel

Time (e.g. April - June)	Num. of Participants (and their positions or initials for identification)	Brief Explanation of Training/Capacity Development and Acquired Skills
26 - 28 Apr 17	Gilbert Mutai, Leonard Mutai, John Wachira, Peter Kimenju and Shadrack Tanui	Pressure management training

1.3. Difficulties and Adjustment

Note: Please describe here the difficulties identified and adjustments made through PDCA cycles in 2016-17.

1. Some bulk meters were stuck and their readings interfered with due to the peeling off of bitumen that coats the pipes and the storage tank. Estimates were used in this case.
2. Water shortage due to seasonal dry spells interfered with NRW activities such as leak detection.

2. Revised Mid-term Vision for the Next 5 Year

Note: it is recommended to revise this chapter every year through participatory discussions to build up capacity of involved personnels and share the updated mid-term vision.

2.1. Current Level of NRW Ratio

Note: Please describe here the difficulties identified and adjustments made through PDCA cycles in 2016-17.

Table 2. Overall and Zonal NRW and Leakage Ratios

Area		Connec-tion Number (Num)	Total Inflow (m^3/ month)	Total Billed Consum-ption (m^3/ month)	NRW Ratio (%)	Estimated Leakage (m^3/ month)	Leakage Ratio (%)	Remarks
Zone Name	DMA Name							
WESTERN		8,211	114,921	95,108	17.24			
CENTRAL		7,762	259,907	154,177	40.68			
SOUTHERN		6,724	191,344	120,757	36.89			
All Service Areas								

2.2. Participatory Mapping of Problems

Note: Please insert the results of a participatory cognitive/perceptual mapping conducted to exchange opinions on the areas and pipe lines having serious meter problems, illegal water uses, leaks, bursts, high pressure, etc.

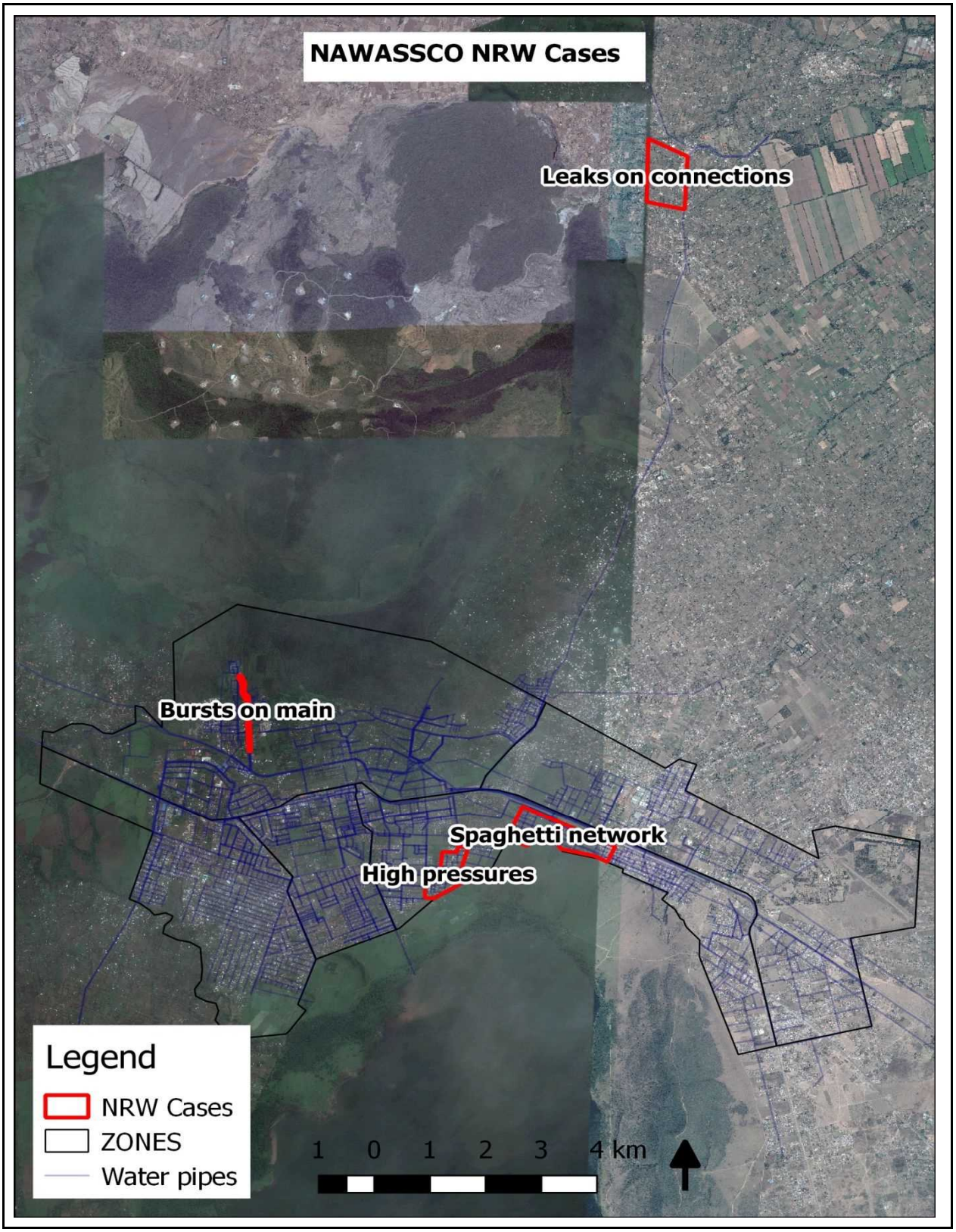

Figure 1. Results of Participatory Mapping

2.3. Discussion on Weakness and Improvement Measures

Note: Please describe related weaknesses and required improvement measures by incorporating the results of discussion.

a) Commercial Losses

1. There exists cases of meter under registration, this can be resolved by regular meter testing which requires acquisition of a meter test bench.
2. Estimated meter readings affect billed consumptions used in NRW computation. this can be resolved by implementing self meter reading and confirming the actual readings periodically.(Main cause is due to gate locks and buried meters). Strategy being used is raising the meters and meter relocation.

b) Physical Losses

1. High pressures due to air lock in the system due to intermittent water supply. the improvement discussed is the installation of air valves.
2. Existing of poor class pipe materials causing leaks. The discussed improvement involves replacement of the poor class material.
3. There exists aged water networks especially the AC pipes causing leaks and bursts. The resolution discussed is the replacement of all aged pipe networks within the CBD area and its environs. (ie Replacement of the AC pipes with HDPE).

c) GIS, Zoning and Monitoring of Water Balance

1. DMA boundary definition need update in GIS and update Bulk meter information for water balance monitoring.

d) Staffing, Awareness Raising and Training

1. Effect the proposed NRW structure and carry out training of team members.

e) Budgeting and Funding

2.4. Discussion on Realistic Target of NRW Ratio in 5 Years

Note: Please describe the contents of discussion on the realistic setting of a NRW Ratio in 5 years.

0.6% reduction every year according to WASREB's target. 3% in 5 years.

1. commercial losses
2. physical losses
3. GIS Zoning and water balance monitoring
4. staffing awareness raising and training

2.5. Participatory Mid-term Planning using Bar Chart

(which activities, current status, by whom, priority, etc.)

Note: Please fill in the two pages of Table 3 included in a separate file of spreadsheet (Example Template of Bar Chart for Mid-term Planning (2017-18 to 2022-23))

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (1/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or F: Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mit-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
						for Annual Plan				Vision																
						2017-18				2018-19				2019-20				2020-21				2021-22				
						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
a) Commercial (Apparent) Losses	1) Customer Meter Management	Realization of 100% customer metering	O	CM	1																					
		Preparation meter strategies for accuracy test, replacement, relocation, protection, etc.	O	ZM & Meter testing	2																					
		Implementation of the meter strategies	O	Meter testing unit	1																					
		Focused management of large consumption customers	O	ZM & Revenue	1																					
		Management of large residential buildings	O	ZM & Revenue	1																					
	2) Illegal Use Management	Establishment of prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers)	O	illegal use unit	1																					
		Active patrol for finding illegal connections and meter tampering (including the use of chlorine DPD tablets, detecting equipment, etc.)	O	illegal use unit	1																					
		Inclusion of a penalizing mechanism against water theft in the county's water act	O	illegal use unit	1																					
		Enhancement of law enforcement against water theft with support from the county	O	illegal use unit	1																					
	3) Customer/Billing System Improvement	Customer identification survey for the inclusion of missing customers	O	Credit control	1																					
		Introduction of new system to support NRW reduction	O	CMT	1																					
		Enhancement of the utilization of existing system to support NRW reduction	O	CMT	1																					
	4) Awareness Campaign (water theft, leakage, overflow, excess consumption, etc.)	Establishment of insentives for informing	N	MD	2																					
		Public forum	O	CM	2																					
		School campaign	N	CM	3																					
		Media campaign	N	CM	3																					
b) Physical (Real) Losses	1) Reduction of Visible Losses	Elimination of overflow from distribution reservoirs, break pressure tanks, etc.	O	production manager	1																					
		Active patrol for finding surface leakage from transmission, distribution and service	O	leak detection unit	1																					
		Supporting customers in stopping overflow from customers' water tanks	N		3																					
	2) Reduction of Underground Leakage	Spread of the daily use of listening sticks over many field staff against leakage	N	TM	1																					
		Implementation of strategic track down of underground leakage (zoning→step test →listening stick→USF/leak detector/correlator)	O	Leak detection	2																					
		Measurement and optimization of pressure distribution as part of O&M (other than major facility improvements for zoning and pressure reduction based on hydraulic analysis with models)	N	TM	1																					
		Reduction of spaghetti service connections	O	Distribution manager	1																					
	3) Improvement of workmanship	Shortening of the time required to repair burst and leakage	O	Distribution manager	1																					
		Assessment of pipe installation quality with hand pump test, etc.	N	O&M formen	2																					
		Improvement of pipe installation quality (especially service pipes)	O	Distribution manager	1																					
	4) Introduction of HDPE pipes, Replacement of Problematic Pipes, etc.	Introduction or increase of HDPE pipes	O	TM	1																					
		Replacement of asbestos cement pipes	O	TM	1																					
		Replacement of other problematic pipes	O	TM	2																					
		Closure of old leaking lines in parallel to better lines	U		3																					

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (2/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mid-term (5 years) Planning																Remarks (including details of activity, challenges, etc.)
						for Annual Plan				Vision												
						2017-18				2018-19				2019-20				2020-21				2021-22				
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c) GIS, Zoning and Monitoring of Water Balance	1) GIS Preparation and Applications	Installation of hardware and software required for developing GIS database	F	GIS Correspondent	3																					
		Establishment or improvement of basemap and other general layers	O	GIS Correspondent	1																					
		Establishment or improvement of water supply facility layers	O	GIS Correspondent	1																					
		Establishment or improvement of sanitation/sewerage facility layers	O	GIS Correspondent	1																					
		Systematic update of the GIS data	O	GIS Correspondent	1																					
		Improvement of access to the GIS data among WSP staff (e.g. by using smartphone tablet)	N	TM	1																					
		Use of GIS maps showing water supply pipes when patrolling to find surface leakage, underground leakage, illegal connections, etc.	N	TM	1																					
		Linking GIS with customer/billing data for special analysis on meter problems and illegal connections	N	TM	1																					
		Use of GIS for assessing pipe conditions including mapping of leaks, bursts and aged pipes.	N	GIS Correspondent	1																					
	2) Distribution network improvement for zoning and pressure reduction (with hydraulic model)	Planning of strategic zoning (distribution/pressure zones→flexible DMA division from large to small for tracking down) to monitor NRW ratio of different areas and control pressure based on hydraulic analysis and field measurements	N	TM	1																					
		Construction and installation for the strategic zoning	N	GIS Correspondent	2																					
		Confirmation of the hydrological isolation and inflow metering of each distribution zone and DMA and the consistency of the existing customers in each zone and DMA between GIS and billing system.	N	GIS Correspondent	1																					
	3) Monitoring of Water Balance	Establishment of easy and sustainable monitoring of NRW ratio, water	N	TM	1																					
		Periodical analysis and discussions to prioritize areas for different activities based on a table showing NRW ratio (and leakage ratio) of each distribution zone and DMA	O	NRW Eng.	2																					
		Establishment of a water balance table beyond the estimation of leakage ratio based on minimum night flow measurement	N	NRW Eng.	2																					
d) Staffing, Awareness Raising and Training	1) Staffing	Organizational improvement of NRW Unit by making staff dedicated for NRW reduction and/or by balancing the staff having strength in commercial aspects and technical aspects	N	TM	1																					
		Involvement of additional staff specialized in GIS, leak detection, etc.	N	TM	1																					
		Establishment of insentives for NRW reduction	N	MD	1																					
	2) Awareness Raising	Sensitization of WSP staff for NRW reduction	O	MD	1																					
		Introduction of incentives to reduce NRW for WSP staff	O	MD	1																					
	3) Training and capacity development	Internal training	N	HR	2																					
		with JICA experts	N	HR	1																					
		with other donors and Kenyan institutions (KEWI, WSB, WASPA, leading WSP, etc)	N	HR	2																					
e) Plan, Budget, Report, External Funding and Procurement	1) Planning and Reporting	Annual planning including budgeting	O	FM	1																					
		Annual and quarterly reporting	O	FM	1																					
	2) Funds and procurement	Aquiring external funds	N	FM	1																					
		Procurement of tools, equipment, materials and services	N	FM	2																					

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

3. Preparation of Annual NRW Reduction Plan 2017-18

Note: The contents of this chapter should not be over ambitious but realistic so that the involved personnel of WSP can try to follow the annual plan with a sense of ownership over the plan.

3.1. Annual Plan Matrix

Note: Please fill in the annual plan matrix below as the main part of annual NRW reduction plan through discussions among involved staff.

Table 4. Annual Plan Matrix

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
commercial losses	Meter testing	freehold, pangani, lakeview, langalanga	high	meter testing unit	july 17- june 18	-	-
commercial losses	Illegal water case	freehold, pangani, lakeview, langalanga	mediu m	illegal use team	july 17 - June 18	-	-
physical losses	leak detection	pangani, freehold, lake view, dog section, section 58, unsurveye d	high	leak detection unit	July 17- Dec 17	-	-
GIS	GIS mapping of leaks, burst	All the 5 Zones	high	GIS unit	July 17- June 18	-	-

Table 4 above contains the planned activities which form the commitment targets upon completion within the stipulated time frame.

3.2. Budgeting and Disbursement

Note: Please describe how to secure the budget required for the planned activities and how to

disburse the budget in a timely manner.

3.3. Expected NRW Reduction

Note: Please describe expected achievements from the implementation of planned activities.

3.4. Commitment Targets

Note: Please set the completion of certain priority activities as commitment targets that should be achieved without failure.

3.5. Planning of Activity Management Measures

Note: Please describe how to realize Do, Check and Adjust of PDCA Cycles (e.g. quarterly, monthly and weekly cycles).

a) Quaternary Cycle (report for board meeting, etc.)

Report on the initial NRW value (Baseline) before the commencement of the activities and the achievements after the first quarter period.

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

Report on the monthly improvement impacted by the activities and to quantify the activity indicator such as number of meter tested, no of illegal cases identified, no of leaks identified and mapped.

c) Weekly Cycle (confirmation of tasks, discussion on the progress, ect.)

Report on the weekly progress on the activities.

【Kisumu WSP】 Table 3. Results of Participatory Mid-term Planning for NRW Reduction (1/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or F: Finished)	Mit-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
				for Annual Plan				Vision																
				2017-18				2018-19				2019-20				2020-21				2021-22				
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a) Commercial (Apparent) Losses	1) Customer Meter Management	Realization of 100% customer metering																						
		Preparation meter strategies for accuracy test, replacement, relocation, protection, etc.																						
		Implementation of the meter strategies																						
		Focused management of large consumption customers																						
		Management of large residential buildings																						
	2) Illegal Use Management	Establishment of prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers)																						
		Active patrol for finding illegal connections and meter tampering (including the use of chlorine DPD tablets, detecting equipment, etc.)																						
		Inclusion of a penalizing mechanism against water theft in the county's water act																						
		Enhancement of law enforcement against water theft with support from the county																						
		Campaign on awareness about illegal water use among the Public																						
		Exploring alternatives to address illegal water besides punitive legal means																						
		Capacity building of staff involved in illegal water on PR & Customer relations																						
	3) Customer / Billing System Improvement	Customer identification survey for the inclusion of missing customers																						
		Introduction of new systems to support NRW reduction																						
		Enhancement of the utilization of existing system to support NRW reduction																						
		Data capture, analysis and accuracy checks																						
	4) Awareness Campaign (water theft, leakage, overflow, excess consumption, etc.)	Establishment of incentives for informing																						
		Public forum																						
		School campaign																						
		Media campaign																						
		Explore alternatives for Public Engagements																						
b) Physical (Real) Losses	1) Reduction of Visible Losses	Elimination of overflow from distribution reservoirs, break pressure tanks, level indicators, Alarm systems, etc.																						
		Active patrol for finding surface leakage from transmission, distribution and service pipes, broken air valves, etc.																						
		Supporting customers in stopping overflow from customers' water tanks																						
		Public engagement and involvement in leak reports																						
		increased accountability through speedy resolutions																						
	2) Reduction of Underground Leakage	Capacity build and spread of the daily use of listening sticks over many field staff against leakage																						
		Implementation of strategic track down of underground leakage (zoning→step test →listening stick→USF/leak detector/correlator)																						
		Measurement and optimization of pressure distribution as part of O&M (other than major facility improvements for zoning and pressure reduction based on hydraulic analysis with models)																						
		Reduction of spaghetti service connections																						
		DMA approach and component analysis																						
		Procure, deliver and train on usage of Correlator																						
	3) Improvement of workmanship	Speedy leak/burst repair (Shortening of the time required to repair burst and leakage)																						
		Assessment of pipe installation quality with hand pump test, etc.																						
		Improvement of pipe installation quality (especially service pipes)																						
		quality surveillance through back-checks																						
	4) Introduction of HDPE pipes, Replacement of Problematic Pipes, etc.	Awareness training on use of HDPE																						
		Introduction or increase of HDPE pipes																						
		Phased Replacement of asbestos cement pipes																						
		Phased Replacement of other problematic pipes																						
		Closure of old leaking lines in parallel to better lines																						
		Introduction of HDPE pipes on new connection																						
		Installation and repair/servicing network appertunances in the network																						

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (2/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or Finished)	Mid-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
				for Annual Plan				Vision																
				2017-18				2018-19				2019-20				2020-21				2021-22				
				1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
c) GIS, Zoning and Monitoring of Water Balance	1) GIS Preparation and Applications	Installation of hardware and software required for developing GIS database including internet connection																						
		Establishment or improvement of basemap and other general layers																						
		Establishment or improvement of water supply facility layers																						
		Establishment or improvement of sanitation/sewerage facility layers																						
		Systematic update of the GIS data																						
		Improvement of access to the GIS data among WSP staff (e.g. by using smartphone tablet)																						
		Use of GIS maps showing water supply pipes when patrolling to find surface leakage, underground leakage, illegal connections, etc.																						
		Linking GIS with customer/billing data for special analysis on meter problems and illegal connections																						
		Use of GIS for assessing pipe conditions including mapping of leaks, bursts and aged pipes.																						
	2) Distribution network improvement for zoning and pressure reduction (with hydraulic model)	Planning of strategic zoning (distribution/pressure zones→flexible DMA division from large to small for tracking down) to monitor NRW ratio of different areas and control pressure based on hydraulic analysis and field measurements																						
		Construction and installation for the strategic zoning																						
		Confirmation of the hydrological isolation and inflow metering of each distribution zone and DMA and the consistency of the existing customers in each zone and DMA between GIS and billing system.																						
	3) Monitoring of Water Balance	Establishment of easy and sustainable monitoring of NRW ratio, water balance (MNF), and abnormal flow due to burst using billing system, smart meters, etc.																						
		Periodical analysis and discussions to prioritize areas for different activities based on a table showing NRW ratio (and leakage ratio) of each distribution zone and DMA.																						
		Establishment of a water balance table beyond the estimation of leakage ratio based on minimum night flow measurement																						
d) Staffing, Awareness Raising and Training	1) Staffing																							
		Organizational improvement of NRW Unit by making staff dedicated for NRW reduction and/or by balancing the staff having strength in commercial aspects and technical aspects																						
		Establishment of insentives for NRW reduction																						
	2) Awareness Raising	Sensitization of WSP staff for NRW reduction																						
		Introduction of incentives to reduce NRW for WSP staff																						
	3) Training and capacity development	Internal training																						
		with JICA experts																						
		with other donors and Kenyan institutions (KEWI, WSB, WASPA, leading WSP, etc)																						
e) Plan, Budget, Report, External Funding and Procurement	1) Planning and Reporting	Annual planning including budgeting																						
		Annual and quarterly reporting																						
	2) Funds and procurement	Aquiring external funds																						
		Procurement of tools, equipment, materials and services																						

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

Nyahururu Water and Sanitation Company Ltd.

(NYAHUWASCO)

Non-Revenue Water (NRW) Reduction Plan 2017-18

(Draft ver. 1 as of 2017.4.05)

April 2017

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      a) Quaternary Cycle (report for board meeting, etc.)
      b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)
      c) Weekly Cycle (confirmation of tasks, discussion on the progress, etc.)

1. Review of the Implementation of NRW Reduction Plan 2016-17

The following activities were planned;

- Customer meter replacement
- Zoning of supply areas to be monitored
- Periodic reading of zonal meters
- Inspection and investigation of water theft in supply areas
- Establishment of pilot areas for conducting water balance activities
- Rerouting of water accounts (Classifying of accounts into their respective zones).
- Zonal metering analysis
- Customer identification survey

1.1. Continuity and Completion of the Planned Activities

The company's supply area comprises of 4 major schemes namely;

- Nyahururu town
- Igwamiti
- Marmanet
- Rumuruti town

Zoning was conducted as follows

scheme	Achievement
Nyahururu town	● 16 zones created. ● 16 master meters installed. ● 1600 customer meters replaced. ● Periodic zonal meter reading ongoing. ● Data analysis done on monthly basis. ● Continuous inspection of installations and investigation of water theft. ● Committee established to deal with water theft cases. ● 20 customer meters relocated. ● Installation of 10 check meters for large consumers. ● Random customer meter checks done.
Igwamiti	● 18 zones created and equipped with meters. ● Periodic zonal meter reading ongoing. ● Customer identification conducted and data base updated. ● Periodic lines patrols done. ● Random customer meter checks done. ● Data analysis done on monthly basis. ● Continuous inspection of installations and investigation of water theft
Marmanet	● 10 zones created and ongoing. ● Customer identification on going. ● Periodic lines patrols done. ● Customer meter replaced in 3 zones. ● 2 zones established for water balance exercise. ● Periodic zonal meter reading on going.

scheme	Achievement
	• Data analysis done on monthly basis. • Continuous inspection of installations and investigation of water theft.
Rumuruti town	• 5 zones established and ongoing. • Continuous line patrol on going. • Customer identification on going • Periodic zonal meter reading on going. • Data analysis done on monthly basis. • Continuous inspection of installations and investigation of water theft

1.2. Acquired Skills, Good Practices and Achievements

Table 1. Records of Training/Capacity Development for NRW-related Personnel

Time (e.g. April - June)	Num. of Participants (and their positions or initials for identification)	Brief Explanation of Training/Capacity Development and Acquired Skills

1.3. Difficulties and Adjustment

difficulties	adjustments
Vandalism of zonal meter by residents	Improvised protective chamber
Meter accuracy problems	Installation of check meters
Identification of illegal connections in paved areas	Installation of check meters
Frequent burst in high pressure zones	Installation of high pressure pipes
Inadequate facilitation	

2. Revised Mid-term Vision for the Next 5 Year

Company's vision is to reduce NRW from the current 40% to 25% in the next 5 years.

2.1. Current Level of NRW Ratio

Table 2. Overall and Zonal NRW and Leakage Ratios

Area		Connec-tion Number (Num)	Total Inflow (m^3/ month)	Total Billed Consum-ption (m^3/ month)	NRW Ratio (%)	Estimated Leakage (m^3/ month)	Leakage Ratio (%)	Remarks
Zone Name	DMA Name							
All Service Areas								

2.2. Participatory Mapping of Problems

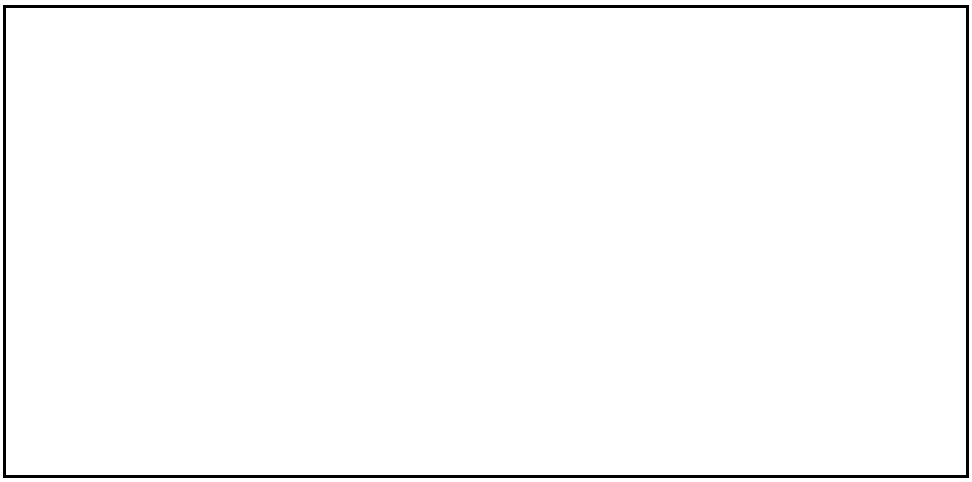

Figure 1. Results of Participatory Mapping

2.3. Discussion on Weakness and Improvement Measures

The following are the weaknesses encountered while carrying out NRW reduction and the improvements undertaken:

a) Commercial Losses

WEAKNESSES	IMPROVEMENTS
Unverified customer accounts database	Customer identification exercise including the coordinates
Meter reading and data capturing errors	Verification of meter readings and installation of new billing systems.
Difficulties in identification of illegal connections.	Need for ground pipe detectors
Faulty meters	Replacement
Unverified meter accuracy	Need for accuracy testing1

b) Physical Losses

WEAKNESSES	IMPROVEMENTS
Aged infrastructures prone to damage	replacements
Excessive pressure in some zones	Need for high pressure pipes
Unidentified leaks	Need for leak detector
Long leak repair response time	Timely facilitation
Faulty ball valves in distribution tanks	replacement
Faulty valves	replacement

c) GIS, Zoning and Monitoring of Water Balance

WEAKNESSES	IMPROVEMENTS
Lack of GIS system	QGIS provided
Lack of GIS skills	Urgent training required
Lack of computer fit for GIS	Computer with high graphic specs required
Lack of GPS reader	GPS required
Inadequate knowledge of existing old pipe network	Establishment of mapping unit
Difficulty in separation of commercial and physical losses	Skills in leak calculation required.

d) Staffing, Awareness Raising and Training

The company has established NRW team. However, due to vastness of the supply area the team is overwhelmed by work. It is recommended that each scheme should have its own NRW team.
The teams need to be trained on NRW reduction skills.
All members of staff have been sensitized about NRW.

e) Budgeting and Funding

The budget for NRW activities is done together with O&M. However, it is recommended that NRW develops its own.

2.4. Discussion on Realistic Target of NRW Ratio in 5 Years

The company endeavors to achieve an NRW Ratio of 25% in all schemes in 5 years.

2.5. Participatory Mid-term Planning using Bar Chart

Please find the attached Excel Chart.

Table 3 Mid Term NRW reduction activities Plan (2017/18-2021/22)

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (1/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or F: Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mit-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
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a) Commercial (Apparent) Losses	1) Customer Meter Management	Realization of 100% customer metering	F																						
		Preparation of meter strategies for accuracy test, replacement, relocation, protection, etc.	O	TM/OE/NRW																					
		Implementation of the meter strategies	O	TM/OE/NRW																					
		Focused management of large consumption customers	O	TM/OE/NRW																					
		Management of large residential buildings	O	TM/OE/NRW																					
	2) Illegal Use Management	Establishment of prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers)	O	HR/FM/TM																					
		Active patrol for finding illegal connections and meter tampering (including the use of chlorine DPD tablets, detecting equipment, etc.)	O	TM/OE/NRW																					
		Inclusion of a penalizing mechanism against water theft in the county's water act	N	MD																					
		Enhancement of law enforcement against water theft with support from the county	N	MD																					
	3) Customer/Billing System Improvement	Customer identification survey for the inclusion of missing customers	O	TM/OE/NRW																					
		Introduction of new system to support NRW reduction	O	MD/FM/IT																					
		Enhancement of the utilization of existing system to support NRW reduction	U																						
	4) Awareness Campaign (water theft, leakage, overflow, excess consumption, etc.)	Establishment of incentives for informing	O	FM/CRO																					
		Public forum	O	PRO																					
		School campaign	O	PRO																					
		Media campaign	O	PRO																					
b) Physical (Real) Losses	1) Reduction of Visible Losses	Elimination of overflow from distribution reservoirs, break pressure tanks, etc.	O	TM/OE/OM																					
		Active patrol for finding surface leakage from transmission, distribution and service pipes, broken air valves, etc.	O	OM/NRW																					
		Supporting customers in stopping overflow from customers' water tanks	U																						
	2) Reduction of Underground Leakage	Spread of the daily use of listening sticks over many field staff against leakage	N	TM/OE/NRW																					
		Implementation of strategic track down of underground leakage (zoning→step test →listening stick→USF/leak detector/correlator)	N	TM/OE/NRW																					
		Measurement and optimization of pressure distribution as part of O&M (other than major facility improvements for zoning and pressure reduction based on hydraulic analysis with models)	N	TM/OE/NRW																					
		Reduction of spaghetti service connections	N	OM																					
	3) Improvement of workmanship	Shortening of the time required to repair burst and leakage	O	OM/FAM																					
		Assessment of pipe installation quality with hand pump test, etc.	N	NRW/OM																					
		Improvement of pipe installation quality (especially service pipes)	O	OM																					
	4) Introduction of HDPE pipes, Replacement of Problematic Pipes, etc.	Introduction or increase of HDPE pipes	N	TM/FM/OE																					
		Replacement of asbestos cement pipes	N	TM/FM/OE																					
		Replacement of other problematic pipes	O	TM/FM/OE																					
		Closure of old leaking lines in parallel to better lines	O	OM/NRW																					

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (2/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mid-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
						for Annual Plan				Vision																
						2017-18				2018-19				2019-20				2020-21				2021-22				
						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
c) GIS, Zoning and Monitoring of Water Balance	1) GIS Preparation and Applications	Installation of hardware and software required for developing GIS database	O	FM/IT																						
		Establishment or improvement of basemap and other general layers	N	IT/NRW																						
		Establishment or improvement of water supply facility layers	N	IT/NRW																						
		Establishment or improvement of sanitation/sewerage facility layers	N	IT/NRW																						
		Systematic update of the GIS data	N	IT/NRW																						
		Improvement of access to the GIS data among WSP staff (e.g. by using smartphone tablet)	N	IT/HR																						
		Use of GIS maps showing water supply pipes when patrolling to find surface leakage, underground leakage, illegal connections, etc.	N	IT/NRW																						
		Linking GIS with customer/billing data for special analysis on meter problems and illegal connections	N	IT/NRW																						
		Use of GIS for assessing pipe conditions including mapping of leaks, bursts and aged pipes.	N	IT/NRW																						
	2) Distribution network improvement for zoning and pressure reduction (with hydraulic model)	Planning of strategic zoning (distribution/pressure zones→flexible DMA division from large to small for tracking down) to monitor NRW ratio of different areas and control pressure based on hydraulic analysis and field measurements	N	NRW																						
		Construction and installation for the strategic zoning	N	NRW/DONOR																						
		Confirmation of the hydrological isolation and inflow metering of each distribution zone and DMA and the consistency of the existing customers in each zone and DMA between GIS and billing system.	N																							
	3) Monitoring of Water Balance	Establishment of easy and sustainable monitoring of NRW ratio, water	N	OE/NRW																						
		Periodical analysis and discussions to prioritize areas for different activities based on a table showing NRW ratio (and leakage ratio) of each distribution zone and DMA.	N	OE/NRW																						
		Establishment of a water balance table beyond the estimation of leakage ratio based on minimum night flow measurement	N	OE/NRW																						
d) Staffing, Awareness Raising and Training	1) Staffing	Organizational improvement of NRW Unit by making staff dedicated for NRW reduction and/or by balancing the staff having strength in commercial aspects and technical aspects	O	HR/TM																						
		Involvement of additional staff specialized in GIS, leak detection, etc.	N	HR/TM																						
		Establishment of insentives for NRW reduction	N	HR/TM																						
	2) Awareness Raising	Sensitization of WSP staff for NRW reduction	N	NRW/HR																						
		Introduction of incentives to reduce NRW for WSP staff	N	HR/FAM																						
	3) Training and capacity development	Internal training	N	TM/FAM																						
		with JICA experts	N	DONOR																						
		with other donors and Kenyan institutions (KEWI, WSB, WASPA, leading WSP, etc)	N	DONOR																						
e) Plan, Budget, Report, External Funding and Procurement	1) Planning and Reporting	Annual planning including budgeting	O	TM/FAM																						
		Annual and quarterly reporting	O	NRW																						
	2) Funds and procurement	Aquiring external funds	N	DONOR/PPP																						
		Procurement of tools, equipment, materials and services	N	DONOR/PPP																						

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

3. Preparation of Annual NRW Reduction Plan 2017-18

The company projects to reduce NRW from the current 40% to 37% in 2017-2018 financial years.

3.1. Annual Plan Matrix

Table 4. Annual Plan Matrix

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
Customer meter management	Replacement 100 customer meters especially for large customers	ALL	1	NRW	2017-2018	400,000	Fittings and transport
	Meter accuracy testing	ALL	1	TM/FM	2017-2018	1,500,000	purchase of ultrasonic meter
Illegal use	Active patrol to find illegal connections	ALL	1	MD/FM	2017-2018	200,000	Transport
Customer billing system improvement	Installation of new billing system	ALL	1	FM	2017-JULY	3,000,000	system purchase
Awareness campaign	Hire of public address systems/media	ALL	2	HRO/FM	2017-2018	200,000	Costs of hiring
Reduction of water losses	Purchase of pipes and fittings/tools	ALL	1	TM/FM	2017-2018	6,000,000	Purchase of pipes and fittings/tools
NRW Monitoring	Zoning and installation of zonal meters	Marmanet and rumuruti	2	OE/NRW	2017-2018	300,000	Zoning and installation of zonal meters
Reduction of commercial loss	Customer identification survey	marmanet	1	OE/NRW	2017-2018	100,000	Customer identification survey
Staff training	Internal training/benchmarking	ALL	2	HRO/FM	2017-2018	400,000	Training of staff
Total						12,000,000	

3.2. Budgeting and Disbursement

The budget estimates for NRW activities will be incorporated in the company's budget of 2017/2018.

3.3. Expected NRW Reduction

The Company projects to reduce the combined NRW in all schemes to 37% from the current 40%

3.4. Commitment Targets

- Complete zoning of supply areas and installation of zonal meters
- Purchase of ultrasonic meter and meter testing equipment
- Customer identification to update database
- Installation of new billing system to facilitate NRW reduction
- Development of QGIS map of all water facilities in the area of jurisdiction
- Mapping of problematic areas
- Replacement of aged customer meters

3.5. Planning of Activity Management Measures

a) Quaternary Cycle (report for board meeting, etc.)

There shall be quarterly reports on achievements of NRW reduction and progress.

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

There shall be monthly data analysis of NRW Levels in all schemes and comprehensive reports presented on achievements, challenges and lessons learnt.

c) Weekly Cycle (confirmation of tasks, discussion on the progress, etc.)

Every week, the NRW team will be meeting to confirm the weekly tasks and agree on implementation schedule and modalities.

MAVOKO Water and Sewerage Co., Ltd. (MAVWASCO)

Non-Revenue Water (NRW) Reduction Plan 2017-18

March 2017

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b) Monthly Cycle (based on NRW Monitoring for each zone, etc.) 7

c) Weekly Cycle (confirmation of tasks, discussion on the progress, ect.) 7

1. Review of the Implementation of NRW Reduction Plan 2016-17

1.1. Continuity and Completion of the Planned Activities

1.1a. Metering policy-replacement-continuous
-servicing and testing-continuous
-relocation-relocating of customer to be 2m into their premises-ongoing

1.1b. Creation of DMAs based on GIS mapping-we've started with mlolongo zone.We are through with mapping of all the lines in mlolongo zone and we are ongoing with other zones.

1.1c. Staff sensitization and capacity building-we have monthly meetings with representatives from all departments.

1.1d. Employ meter reading technology

1.1e. Illegal connection crackdown-ongoing

1.2 Acquired Skills, Good Practices and Achievements

As a company we usually participate in WASPA benchmarking meetings on NRW whereby we share ideas from various utilities and we implement what can suit us from it.ie

-Random counterchecking of meter readings.

-Relocation of customer meters and raising of buried ones.

-DMA creation

Table 1. Records of Training/Capacity Development for NRW-related Personnel

Brief Explanation of Training/Capacity Development and Acquired Skills	Num. of Participants (and their positions or initials for identification)	Time (e.g. April - June)
Benchmarking on NRW with WASPA	JK NYAUMA-NRW-OFFICER	APRIL 2017
GIS Taskforce meeting for WSPs	GIS OFFICER - Elisha OKODE	24th-25th, May, 2016
Benchmarking program on GIS with other WSPs		11th, August, 2016
Installation of GIS open software and studying the programming associated to them.	GIS OFFICER - Elisha OKODE and ICT OFFICER – David Muendo	29th-31st, August, 2016
Practical GIS mapping using open source software	GIS OFFICER - Elisha OKODE and ICT OFFICER – David Muendo	21st,November to 2nd, Dec, 2016

1.3. Difficulties and Adjustment

- Lack of water due effects of drought causing financial planning challenges
- Challenges with meter tampering.

2. Revised Mid-term Vision for the Next 5 Year

i. Implementation of GIS
ii. Use of technology based meters
iii. Use of technology in meter reading
iv. Leak detection and management
v. Staff, customer and community sensitization
vi. Water distribution balance
vii. Continuous maintenance of water infrastructure
viii. Strengthen NRW unit to enhance enforcement
ix. Benchmarking with industry standards

2.1. Current Level of NRW Ratio

Table 2. Overall and Zonal NRW and Leakage Ratios

Remarks	Leakage Ratio (%)	Estimated Leakage (m^3/ month)	NRW Ratio (%)	Total Billed Consum-ption (m^3/ month)	Total Inflow (m^3/ month)	Connec-tion Number (Num)	Area	
							Zone Name	Zone Name
July			**51.44**	32,197	66,297		town	
			33.98	21,197	32,108		kinanie	
			47.52	39,186	74,665		mlolongo	
August			**56.62**	28,252	65,133		TOWN	
			17.99	20,094	24,501		KINANIE	
			39.65	33,376	55,305		MLOLONGO/SYOKIMAU	

Remarks	Leakage Ratio (%)	Estimated Leakage (m^3/ month)	NRW Ratio (%)	Total Billed Consum-ption (m^3/ month)	Total Inflow (m^3/ month)	Connec-tion Number (Num)	Area	
							Zone Name	Zone Name
September			**52.12**	28,904	60,365		TOWN	
			27.54	18,479	25,503		KINANIE	
			66.95	14,582	44,127		MLOLONGO/SYOKIMAU	
October			**28.47**	36,072	50,428		TOWN	
			25.23	19,629	26,253		KINANIE	
			43.57	28,730	50,909		MLOLONGO/SYOKIMAU	
November			**32.19**	40,974	60,426		TOWN	
			20.30	16,444	20,632		KINANIE	
			14.82	43,067	50,562		MLOLONGO/SYOKIMAU	
December			**24.98**	35,386	47,170		TOWN	
			41.57	15,114	25,868		KINANIE	
			42.75	35,598	62,185		MLOLONGO/SYOKIMAU	
Average NRW Ratio %			**38.71**					

2.2. Participatory Mapping of Problems

There is some cases of reversing of meters-mostly in commercial buildings and car washes. Inaccurate meters –an example of Alpharama where we tested and found we were losing around 40m^3 month.

2.3. Discussion on Weakness and Improvement Measures

a) Commercial Losses

-meter tampering and picking of wrong reading from the customer.-we are in the process of acquiring technology in meter reading.

b) Physical Losses

-some major lines in town zone do not have enough sectional valves leading to high water losses when bursts occur-we are in the process of installing additional sectional valves.

c) GIS, Zoning and Monitoring of Water Balance

Continuous zoning is inconsistent since operational staff are not available throughout to guide the NRW and GIS staff

d) Staffing, Awareness Raising and Training

The company has enough staff in terms of numbers but we lack balance in terms of quality in skill.

e) Budgeting and Funding

As a company we have big financial challenges due to lack of enough water i.e. from January to April our dam was dry.

2.4. Discussion on Realistic Target of NRW Ratio in 5 Years

-Our target is to reduce the NRW ratio to 30% by 2022.

2.5. Participatory Mid-term Planning using Bar Chart

(Which activities, current status, by whom, priority, etc.)

3. Preparation of Annual NRW Reduction Plan 2017-18

3.1 Annual Plan Matrix

Table 4. Annual Plan Matrix

Remarks (e.g. Challenges and Basis of Cost Estimate)	Estimated Costs (KSH)	Schedule	Responsible Personnel	Priority	Target Area or Location	Activity	Category
Zoning and monitoring of water balance	1,000,000	One DMA per quater	NRW-Officer	Installation of master meters	Mlolongo zone	Creation of DMAs	Commercial and physical losses
Use of technology in meter reading		From Sept 2017	FM	Acquire software and the hardware	All zones	Use of gadgets in meter reading	Commercial
Implementation of GIS		continuous	GIS-Officer	Densify mapping of pipelines	All zones	Mapping of all pipelines and consumer meters	Commercial and physical
Staff sensitization and capacity building	200,000	Monthly meetings with key select representative of all departments	TM/FM	Discuss NRW issues	All zones	Present NRW ratio perfomanc e	Commercial and physical losses
Metering policy	1,000,000	Continuous	NRW-Officer	Large consumers	All zones	Testing and replacing faulty meters	commercial

3.2. Budgeting and Disbursement

- The funds will be allocated through our annual budget. Disbursement program shall be developed by finance department

3.3 Expected NRW Reduction

- We expect the NRW to reduce to 35%.
- Average response time to leaks and burst to be minor leaks – 8hrs, major leaks 24hrs

3.4 Commitment Targets

- Completed DMAs in
- Use of technology in meter reading

3.5 Planning of Activity Management Measures

a) Quaternary Cycle (report for board meeting, etc.)

The board members meet quarterly to be briefed on the progress of NRW reduction amongst other technical initiatives

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

There is monthly meeting with representatives from all departments to discuss issues of NRW

c) Weekly Cycle (confirmation of tasks, discussion on the progress, etc.)

The Departmental/sectional reviews meets weekly to discuss on the progress and plan on the issues to be tackled.

ELDORET WATER AND SANITATION CO.LTD.

(ELDOWAS)

Non-Revenue Water (NRW) Reduction Plan 2017-18

March 2017

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1. Review of the Implementation of NRW Reduction Plan 2016-17

1.1. Continuity and Completion of the Planned Activities

1.2. Acquired Skills, Good Practices and Achievements

Table 1. Records of Training/Capacity Development for NRW-related Personnel

Time (e.g. April - June)	Num. of Participants (and their positions or initials for identification)	Brief Explanation of Training/Capacity Development and Acquired Skills
Nov, 2016	5 No.	Water balance, use of leak detection equipment, challenges encountered in NRW reduction
July, 2017	5 No.	To benchmark in at least two water companies that have worked with JICA on NRW.
July-Aug, 2017	7No.	Training of All service area Artisans 2No. from each area and 1 No. supervisor in use of GPS for data capture and check into Arcmap.

1.3. Difficulties and Adjustment

Challenges such as facilitation, No. of staff and financing.

Illegal connections

Debts by government institutions.

2. Revised Mid-term Vision for the Next 5 Year

1. Use of smart meters
2. Staff and community sensitization
3. Strengthened NRW unit for enhanced enforcement

2.1. Current Level of NRW Ratio

Table 2. Overall and Zonal NRW and Leakage Ratios

Area		Connec-tion Number (Num)	Total Inflow (m^3/ month)	Total Billed Consum - ption (m^3/ month)	NRW Ratio (%)	Estimate d Leakage (m^3/ month)	Estimated Physical Loss Ratio in NRW (%)	Remarks
Zone Name	Month							
ESA	Oct	23,517	496,438	307,247	38.11	18,919	10%	
	Nov		535,265	288,268	46.14	32,109	13%	
	Dec		491,788	269,698	45.16	26,650	12%	
WESA	Oct (4 No.)	21,886	283,905	182,559	35.7	14,188	14%	
	Nov		236,567	162,724	31.21	7,384	10%	
	Dec		259.236	169,696	34.54	10,744	12%	
SSA	Oct	15,614	350,440	151828	56.68	31,778	16%	
	Nov		323,915	134,767	58.39	34,047	18%	
	Dec		324,384	125,529	61.30			
Kesses/ Lessos	Oct	1,139	21,890	10,062	54.03	1,419	12%	
	Nov		17,020	8,301	51.23	1,221	14%	
	Dec		21,173	12946	38.86	1,316	16%	
All Service Areas			**1,090,690**	**533,150**	**51.12**			

2.2. Participatory Mapping of Problems

Western Service Area.

- Tampered meters
- Stopped meters mostly caused by water rationing.
- Illegal water consumption.

Eastern Service Area.

- Bursts and leakages
- Illegal water consumption

Southern Service Area.

- Illegal water consumption
- Stopped meters
- Buried meters
- Bursts and leakages.

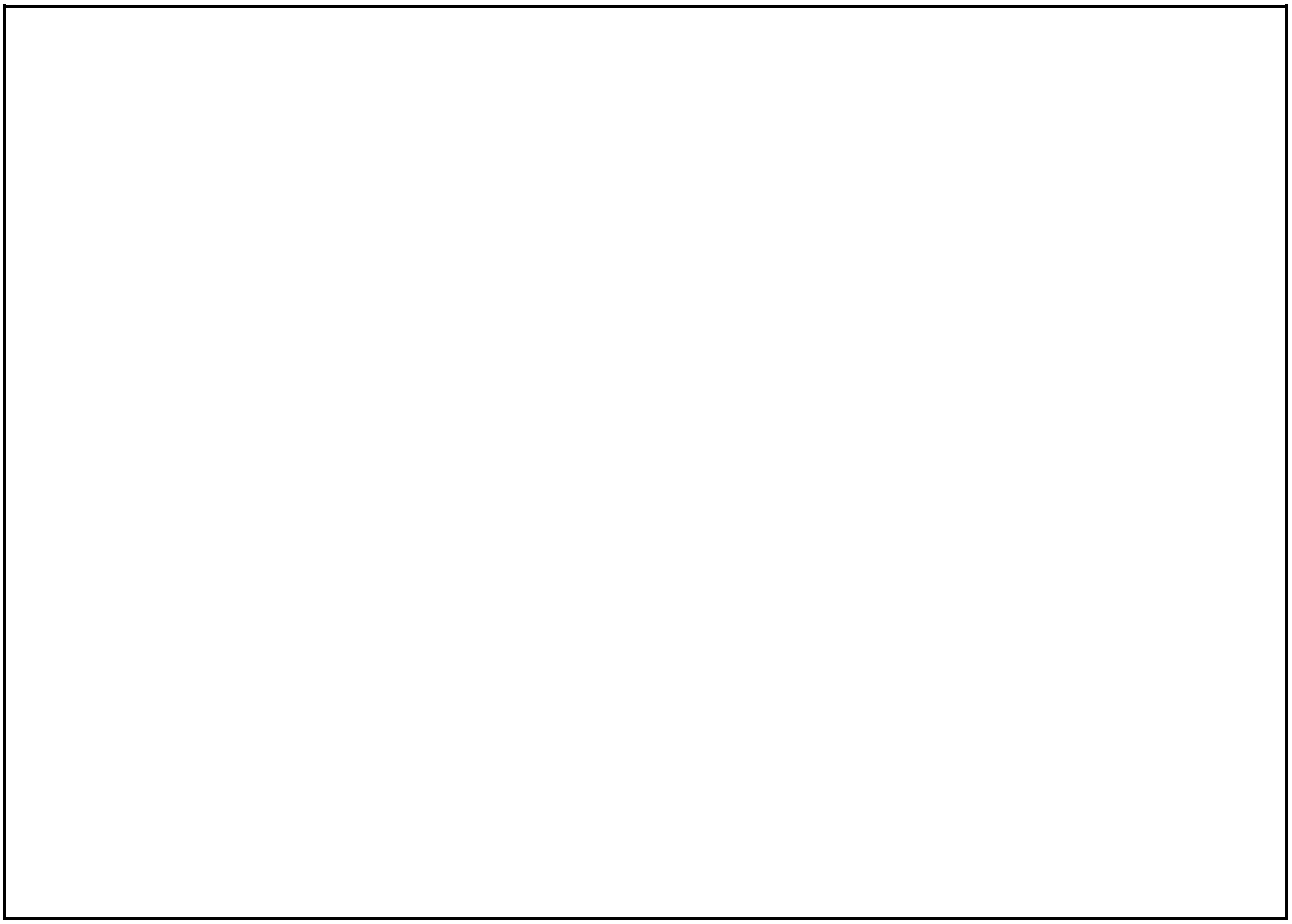

Figure 1. Results of Participatory Mapping

2.3. Discussion on Weakness and Improvement Measures

a) Commercial Losses

- Stopped meters
- Illegal connections
- Unregistered connections
- Debts from government institutions.

b) Physical Losses

- Damages to main pipes during road construction
- Suspected underground leakages.

c) GIS, Zoning and Monitoring of Water Balance

The service area is divided into three larger zones (Eastern, Western and Southern). Plans are underway to create a smaller DMA in Southern Service Area.

Identification of other smaller DMAs is ongoing and BoQ for meters to delineate the zones has been done.

A proposal for another DMA in lower Southern around Sukunanga and Annex is being developed. This is because of the possibility of metering these areas from Kapsoya treatment works.

Training of GIS and NRW team in zoning and monitoring of water balance.

d) Staffing, Awareness Raising and Training

- Training of staff and NRW team.
- Revamping of NRW team.

e) Budgeting and Funding

- Preparation of budget plans
- Development of BoQs for planned works.

2.4. Discussion on Realistic Target of NRW Ratio in 5 Years

- We are targeting to reduce NRW to 30% in 5 years

Activities to achieve the above target.

- Relocation of meters to the gates to limit before meter access.
- Meter servicing and replacement of stopped meters
- Scouting for leakages to shorten response time and timely repairs.
- Installation of DMAs to delineate water loss areas.

2.5. Participatory Mid-term Planning using Bar Chart

(which activities, current status, by whom, priority, etc.)

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (1/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or F: Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mit-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
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						2017-18				2018-19				2019-20				2020-21				2021-22				
						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
a) Commercial (Apparent) Losses	1) Customer Meter Management	Realization of 100% customer metering		HCS																						
		Preparation of meter strategies for accuracy test, replacement, relocation, protection, etc.		HCS																						
		Implementation of the meter strategies		HCS																						
		Focused management of large consumption customers		HCS																						
		Management of large residential buildings		HCS																						
	2) Illegal Use Management	Establishment of prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers)		HCS,HFS																						
		Active patrol for finding illegal connections and meter tampering (including the use of chlorine DPD tablets, detecting equipment, etc.)		NRW																						
		Inclusion of a penalizing mechanism against water theft in the county's water act		SO																						
		Enhancement of law enforcement against water theft with support from the county		SO																						
	3) Customer/Billing System Improvement	Customer identification survey for the inclusion of missing customers	O	HCS,GIS																						
		Introduction of new system to support NRW reduction		HCS																						
		Enhancement of the utilization of existing system to support NRW reduction		HCS																						
	4) Awareness Campaign (water theft, leakage, overflow, excess consumption, etc.)	Establishment of insentives for informing	O																							
		Public forum	O	CSM																						
		School campaign		CSM																						
		Media campaign		CSM																						
b) Physical (Real) Losses	1) Reduction of Visible Losses	Elimination of overflow from distribution reservoirs, break pressure tanks, etc.	F	WT&DM																						Storage tanks rarely fill up due to water shortage and
		Active patrol for finding surface leakage from transmission, distribution and service pipes, broken air valves, etc.	O	WT&DM																						Monitoring and measuring of patrol activities to be put in
		Supporting customers in stopping overflow from customers' water tanks	N	WT&DM																						
	2) Reduction of Underground Leakage	Spread of the daily use of listening sticks over many field staff against leakage	N	NRW																						
		Implementation of strategic track down of underground leakage (zoning→step test →listening stick→USF/leak detector/correlator)	N	NRW																						
		Measurement and optimization of pressure distribution as part of O&M (other than major facility improvements for zoning and pressure reduction based on hydraulic analysis with models)		WT&DM,NRW																						
		Reduction of spaghetti service connections	N	WT&DM																						
	3) Improvement of workmanship	Shortening of the time required to repair burst and leakage	O																							
		Assessment of pipe installation quality with hand pump test, etc.	N																							
		Improvement of pipe installation quality (especially service pipes)	N																							
	4) Introduction of HDPE pipes, Replacement of Problematic Pipes, etc.	Introduction or increase of HDPE pipes	N																							
		Replacement of asbestos cement pipes	O																							
		Replacement of other problematic pipes	O																							
		Closure of old leaking lines in parallel to better lines																								

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

Table 3. Results of Participatory Mid-term Planning for NRW Reduction (2/2)

NRW Reduction Activities			Current Status (U: Unnecessary, N: not started yet, S: Suspended, O: Ongoing, or Finished)	Responsible Entity and Personnel for Implementation (e.g. O&M Eng.)	Priority of Own Activities (1: highest to 3: lowest) in consideration of costs & easiness	Mid-term (5 years) Planning																				Remarks (including details of activity, challenges, etc.)
						for Annual Plan				Vision																
						2017-18				2018-19				2019-20				2020-21				2021-22				
						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr- Jun	
c) GIS, Zoning and Monitoring of Water Balance	1) GIS Preparation and Applications	Installation of hardware and software required for developing GIS database	F	HCS/HTS/GIS/IT	3																					ArcGIS 10.3 installed in all area offices. QGIS installed on
		Establishment or improvement of basemap and other general layers	O	HCS/HTS/GIS/IT	1																					Layers are available and are updated regularly
		Establishment or improvement of water supply facility layers	O	HCS/HTS/GIS/IT	1																					Layers are available and are updated regularly
		Establishment or improvement of sanitation/sewerage facility layers	O	HCS/HTS/GIS/IT	1																					Layers are available and are updated regularly
		Systematic update of the GIS data	O	HCS/HTS/GIS/IT	1																					Update ongoing
		Improvement of access to the GIS data among WSP staff (e.g. by using smartphone tablet)	O	HCS/HTS/GIS/IT	1																					GIS data is shared on user needs, there are very few staff
		Use of GIS maps showing water supply pipes when patrolling to find surface leakage, underground leakage, illegal connections, etc.	O	GIS	1																					Mapping of water pipeline is ongoing, 100 mm dia to 600mm
		Linking GIS with customer/billing data for special analysis on meter problems and illegal connections	O	IT/GIS	1																					A new billing system is currently under implementation. GIS
		Use of GIS for assessing pipe conditions including mapping of leaks, bursts and aged pipes.	O	GIS	2																					Initial mapping did not capture dates of installation, current
	2) Distribution network improvement for zoning and pressure reduction (with hydraulic model)	Planning of strategic zoning (distribution/pressure zones→flexible DMA division from large to small for tracking down) to monitor NRW ratio of different areas and control pressure based on hydraulic analysis and field measurements	O	HTS/HCS/WTDM/AM/GIS/NRW	3																					Proposals for Zoning are under development
		Construction and installation for the strategic zoning	O	HTS/HCS/WTDM/AM/NRW	3																					Areas of installation of zonal meters have been identified and
		Confirmation of the hydrological isolation and inflow metering of each distribution zone and DMA and the consistency of the existing customers in each zone and DMA between GIS and billing system.	O	HTS/HCS/WTDM/AM/GIS/NRW	3																					Not vet started
	3) Monitoring of Water Balance	Establishment of easy and sustainable monitoring of NRW ratio, water	N	HTS/HCS/WTDM/AM/GIS/NRW	1																					Not vet started
		Periodical analysis and discussions to prioritize areas for different activities based on a table showing NRW ratio (and leakage ratio) of each distribution zone and DMA	N	HTS/HCS/WTDM/AM/GIS/NRW	1																					Not vet started
		Establishment of a water balance table beyond the estimation of leakage ratio based on minimum night flow measurement	N	HTS/HCS/WTDM/AM/GIS/NRW	2																					Not vet started
d) Staffing, Awareness Raising and Training	1) Staffing	Organizational improvement of NRW Unit by making staff dedicated for NRW reduction and/or by balancing the staff having strength in commercial aspects and technical aspects	O	HCS	1																					Some members of staff have been seconded to the NRW
		Involvement of additional staff specialized in GIS, leak detection, etc.	O	HTS/HCS	1																					Additional staff are currently engaged in customer
		Establishment of insentives for NRW reduction	O	HTS/HCS	1																					There is an existing incentive structure which needs to be re-
	2) Awareness Raising	Sensitization of WSP staff for NRW reduction	O	HTS/HCS	1																					NRW is discussed in all company meetings as an agenda.
		Introduction of incentives to reduce NRW for WSP staff	O	HTS/HCS	1																					
	3) Training and capacity development	Internal training	N	HTS/HCS/HR	1																					
		with JICA experts	N	HTS/HCS/HR	1																					
		with other donors and Kenyan institutions (KEWI, WSB, WASPA, leading WSP, etc)	O	HTS/HCS/HR	1																					There are trainngs which are far apart and covers a few
e) Plan, Budget, Report, External Funding and Procurement	1) Planning and Reporting	Annual planning including budgeting	O	ALL	2																					All sections prepare their annual budgets which are included
		Annual and quarterly reporting	O	ALL	2																					
	2) Funds and procurement	Aquiring external funds	O	HTS/HCS	1																					Calls for proposals for funding are filled and submitted to
		Procurement of tools, equipment, materials and services	O	SCM	1																					Procurement of tool, equipment and all required stores is a

< Implementation Mode > **S: Study** : Direct Implementation : Outsourcing & PPP/PBC : Donor Project

3. Preparation of Annual NRW Reduction Plan 2017-18

3.1. Annual Plan Matrix

Table 4. Annual Plan Matrix

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
Comercial (CL)	Replacement of stopped meters	All Service Areas	High	HCS, HTS, All Area Managers, NRW team	Continous	20M	Metering policy
CL/PL	Relocation of meters to the gates	Southern Service Area	Zone 4 (Elgon View)	HCS, HTS, All Area Managers, NRW team	Feb - June, 2017.	5.6M	Metering policy
CL	Meter replacement	All service Areas	Identify all faulty meters	HCS, All Area Managers, NRW team		9.5M	Metering policy
CL	Meter servicing	All service Areas	Identify all faulty meters	All Area Managers, NRW team			Metering poilcy
CL	Use of mobile meter reading gadgets	All service Areas	Train in mobile meter reading	HCS,ICT,All Area Managers, NRW team	Apr-Aug, 2017		Use of new technology in billing and metering
CL/PL	DMA zoning	Southern service Areas	Meter installation	HCS,All Area Managers, NRW team		5.6M	Monitoring of water balance
PL	Mapping of all pipeline network	All service Areas	GPS mapping all pipelines	HCS/GIS Technician	April- Aug, 2017	700,000	Annual license maintenance fee
CL	Installation of ultrasonic meter		Meter installation	HTS /WTDM	Aug, 2017	1M	Volume determination
Meter testing machine		All service Area	Test meters	NRW unit	Aug, 2017	320,000	
PL/CL	Mapping of all customer meters	All service Areas	GPS capture of all meter points	HCS/GIS Technician	April- Aug, 2017	700,000 1,400,700	Annual Maintenance licenses fee and initial payment of enumerators.

Category	Activity	Target Area or Location	Priority	Responsible Personnel	Schedule	Estimated Costs (KSH)	Remarks (e.g. Challenges and Basis of Cost Estimate)
Staff training	NRW training	ALL	NRW training	HR/HCS	July, 2017-June, 2018	1.6M	
Total							

3.2. Budgeting and Disbursement

1. Annual budget
2. Sourcing from partners and other funding organizations

3.3. Expected NRW Reduction

- Improved revenue collection
- Reduced NRW
- Improve service delivery
- Customer satisfaction.

3.4. Commitment Targets

1. Complete pipeline mapping and customer meters
2. Customer meter testing and relocation (with number)
3. Implementation of new billing system
4. Monitoring of working DMAs

3.5. Planning of Activity Management Measures

a) Quaternary Cycle (report for board meeting, etc.)

NRW reports are discussed in board meeting and recommendations reached for action

b) Monthly Cycle (based on NRW Monitoring for each zone, etc.)

Departmental meetings are held every Month of which NRW is one of the main agenda

c) Weekly Cycle (confirmation of tasks, discussion on the progress, ect.)

Section meetings are held Weekly where NRW is discussed.

5) -6 Annual and Mid-term NRW Reduction Plans of Pilot WSPs for FY2018 (Template Trial)

5)-6 Annual and mid-term NRW reduction plans of Pilot WSPs for FY2018 (Template Trial)

Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, MERU WSP (MEWASS)

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	2	50	55	70	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Recruitment of 1no. technician.	budgetted	18-Dec	GM ,TM & HR&AM				
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	3	45	51	62																					62	Customer sensitization through media and open air meetings	360,000	19-Jun	GM, TM & FM				
		(3) Enhancing Support from Customers	3	45	55	68																					80	Customer sensitization through media and Public awareness in schools,		1-Jun	CRO, ICT & TM				
		(4) Capacity Development through Trainings & Trials	2	50	55	65																	→	→	→	→	68	Benchmarking field training with Leading WSPs, KEWI & JICA Trainning	400,000	2019/3/3	KEWI, KEBS & JICA				
	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(1) Participatory Review, Planning & Monitoring of NRW Activities	2	52	70	76	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	OrganizingTraining and workshop for all relevant department/sections within the organization.	200,000	2018/12/18	TM, & JICA				
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	3	45	50	65													→	→	→	→	→	→	→	→	76	Monitoring and calibration of all bulk master meters a month. Workshop/training of all relevant staffs on	budgrtted	Continuous	NRW & ICT				
	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	2	50	55	67									→	→	→	→	→	→	→	→	→	→	→	→	65	use of high density pipes eg. HDPE pipes & steel pipes	2.78 m	Continuous	NRW , TM & PM				
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	2	60	66	75					→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	67	supply of the GPS gadgets,smartphones.	budgetted	19-Jun	NRW , GIS & PM				
[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	2	62	65	80									→	→	→	→	→	→	→	→	→	→	→	→	75		bugdetted	Continuous	NRW & GIS				
		(2) Mapping of NRW-related Problems	3	45	50	60													→	→	→	→	→	→	→	→	80	Public awareness and Incentives	Budgeted	Continuous	NRW & GIS				
		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	3	45	55	70									→	→	→	→	→	→	→	→	→	→	→	→	60	Procure of smart phones & plotters	1 m	18-Mar	NRW , GIS & JICA				
	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	2	49	55	65	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70		Budgeted	Continuous	NRW & BILLING				
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	2	50	55	65									→	→	→	→	→	→	→	→	→	→	→	→	65	Installation of remaining bulk master meters,	4.5m	CONTINOUS	NRW				
		(3) District Metered Areas (DMAs)	3	35	45	55					→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	installation and replacement of bulk meters, carry out MNF and ZPT,undertake workshop on caretaker approach.	Budgetted	Mar-19	NRW, JICA, MRS & BILLING				

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[B]	(c) Authorized Unbilled Consumption & Water Balance Table	(1) Authorized Unbilled Consumption	4	30	38	55									→	→	→	→	→	→	→	→	→	→	→	→	55		budgeted	continous	NRW & BILLING				
		(2) Commercial Losses	4	35	45	60													→	→	→	→	→	→	→	→	60	public awareness on illegal activities.	budgetted	continuous	JICA, NRW & MRS				
		(3) Physical Losses & Completion of the Table	4	47	53	65									→	→	→	→	→	→	→	→	→	→	→	→	65	creats more DNA's	budgetted	Dec-18	NRW & TM				
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	2	70	75	80	→	→	→	→	→	→	→									→	→	→	→	→	80		budgetted	continuous	NRW, CCS, MRS , CRO & BILLING				
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	3	50	60	70													→	→	→	→	→	→	→	→	70		budgetted	Jun-19	NRW, MRS & BILLING				
		(3) Improvement of Meter Reading	3	46	52	63													→	→	→	→	→	→	→	→	63	Relocation of un vissible customer meters.	budgetted	continuous	CCS, MRS & GIS				
		(4) Additional Focused Management of Large Customers	4	38	48	65									→	→	→	→	→	→	→	→	→	→	→	→	70	fortnite checking of all larger consumers.	budgetted	continuous	NRW, MRS , CCS & BILLING				
		(5) Use of Other Hardware & Software Technologies for Customer Metering	2	58	62	70	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	improvement of existing meter test bench.	budgetted	Nov-18	NRW, MRS, ICT & BILLING				
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	3	42	51	59									→	→	→	→	→	→	→		→	→	→	→	68	frequent visit to customers we suspect can carry out illegal activities.monitor	budgetted	continuous	NRW, TM, MRS & CRO				
		(2) Enforcement of the Reduction of Illegal Uses on the Ground	3	35	45	55	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	frequent check up of illegal activities,	budgetted	continuous	NRW, GM,TM, CRO, HR&AM				
	(a) Active Identification of Visible Water Losses	(1) Overflow & Line Patrol	2	55	60	70			⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	⊅	60	monitorig of storage utility on daily basis.	budgetted	continous	NRW, TM & O&M				
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	2	50	55	68	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	40	use of hand pressure test on a new connection.	budgetted	Mar-19	NRW & MRS				
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	3	35	45	60									→	→	→	→	→	→	→	→	→	→	→	→	60	minimum Night flow exercise carries frequently.	budgetted	continous	GIS ,NRW & TM				

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[D] Reduction of Physical (Real) Losses	(c) Improvement of Workmanship & Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	4	35	40	60	■	■	■	■	■	■	■	■	■	■	■	■	→	→	→	→	→	→	→	→	58		budgetted	continuous	NRW, O&M,CCS, GIS & MRS				
		(2) Short-term Improvement of Pipelines & Connections	3	35	40	58	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	Lay transimission to zone 3 lower tank using HDPE pipes	2.78M	Jan-19	TM,MINOR WORKS, NRW , PM & O&M				
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	4	10	20	60	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	⊳	60		budgetted	continuous	NRW, GIS,TM & O&M				
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	2	50	55	65	■	■	■	■	■	■	■	■	■	■	■	■	→	→	→	→	→	→	→	→	60	Pressure management, measurement & Mapping.	budgetted	continous.	JICA , NRW & GIS				
		(2) Pressure Measurement over Large Areas	2	47	55	60	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	62	Pressure management, measurement & Mapping.	Budgetted	continous	TM,NRW & GIS				
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	3	40	50	62	■	■	■	■	■	■	■	■	→	→	→	→	→	→	→	→	→	→	→	→	60		JICA Expert	Jan-19	JICA,NRW, O&M & GIS				
TOTAL			-	40	55	75	-																				63	Total		-	-				

[Example Modes of Implementation]

■ : Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
■ : Intensive work period with capital investment (without donner)
⇒

Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Embu WSP (EWASCO)

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23									
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	1	10	60	100																					75								
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	3	30	50	90																					60								
		(3) Enhancing Support from Customers	3	50	60	80																					65								
		(4) Capacity Development through Trainings & Trials	2	50	70	90																					75								
	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(1) Participatory Review, Planning & Monitoring of NRW Activities	2	30	40 (review after this planning)	80																					50								
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	3	30	50	100																					75								
	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	3	55	60	100																					65								
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	2	50	60	90																					65								
[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	2	70	80	100																					95								
		(2) Mapping of NRW-related Problems	3	20	20	70																					50								
		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	2	15	20	70																					60								
	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	1	60	70	100																					85								
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	2	50	60	100																					80								
		(3) District Metered Areas (DMAs)	3	40	50	100																					70								
	(c) Authorized Unbilled Consumption & Water Balance	(1) Authorized Unbilled Consumption	4	50	60	90																					70								
		(2) Commercial Losses	4	40	50	90																					70								

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23									
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	1	85	85	98																					90								
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	2	50	70	95																					80								
		(3) Improvement of Meter Reading	4	60	70	95																					80								
		(4) Additional Focused Management of Large Customers	3	50	50	80																					60								
		(5) Use of Other Hardware & Software Technologies for Customer Metering	4	75	80	95																					82								
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	3	70	80	95																					85								
		(2) Enforcement of the Reduction of Illegal Uses on the Ground	3	75	80	95																					85								
[D] Reduction of Physical (Real) Losses	(a) Active Identification of Visible Water Losses	(1) Overflow & Line Patrol	3	60	70	95																					80								
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	2	10	20	60																					30								
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	2	5	20	100																					70								
	(c) Improvement of Workmanship & Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	2	40	50	90																					60								
		(2) Short-term Improvement of Pipelines & Connections	3	60	70	90																					80								
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	4	40	50	70																					55								
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	1	40	70	100																					80								
		(2) Pressure Measurement over Large Areas	2	30	40	80																					50								
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	3	20	30	70																					40								
TOTAL			-	35	35	80	-																				50	Total		-	-				

[Example Modes of Implementation]

: Intensive work period with operational expenditures ⇒

→ : Less intensive period with operational expenditures

: Intensive work period with capital investment (without donner)

Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Ruiru-Juja WSP (RUJWASCO)

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																				{{ AP }} Annual NRW Reduction Plan for 2018-19						{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23													
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Planned Activity Title (Required work quantity & materials) (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	1	40	70	90																					75	Recruitment of two NRW staff. Training of the staff on the use of NRW equipments	100,000	Feb-19	Management	2 additional NRW staff have been recruited.				
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	3	50	60	90																					80	Establishment of a communication chart between all company staff. Development of monthly reports for all WSP departments		Jan-19	Management					
		(3) Enhancing Support from Customers	3	30	70	90																					90	Implementation of a company hotline number.		Dec-18	Management					
		(4) Capacity Development through Trainings & Trials	2	40	60	80																					70	Learn through the trials to be conducted with JICA experts including the NRW reduction in pilot areas, testing of large customers' flanged customer meters with a ultrasonic flow meters, utilization of a handmade meter test bench, zoning of distribution network for NRW monitoring, etc.		Dec-19	Management					
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	3	40	60	80																					70	Servicing and calibration of bulk and zonal meters every three months			NRW staff					
	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	3	80	80	90																					90	Appointment of adhock committee			Management					
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	2	40	70	90																					80	1,Provision of transport facilities to the team. 2, Continuous supply of the GPS gadgets,smartphones. 3, ensure that all the equipments are well maintained and operational.		Dec-19	donor And management	support from IT and logistic department will be important				
[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	2	40	60	80																					70	1) Completion of the collection of customer meter locations with handheld GPSs. 2) Completion of the digitization of transmission and distirbution pipelines and other related facilities. 3) Preparation of detailed GIS maps for NRW reduction activities in pilot areas. GPS machines and recruitment of more GIS field data collectors to assist	1M	May-19	GIS team, Management, and donors	All customer meters should be mapped by May 2019				
		(2) Mapping of NRW-related Problems	3	0	5	80																					40	4) Transfering the CIS results to the newly corrected customer meter locations and plan the second around of the NRW reduction activities with Mobile GIS (Mapinr) GPS hand gadgets, GIS data collectors, map printer for A2, A1,A0 (or A3 size ink jet with scanner & Adbe Acrobat for printing into tiles)		Dec-19	GIS team, management					
		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	3	0	5	80																					40	5) Suport the use of Mobile GIS (MAPinr) for NRW reduction activities and customer identification, and share the printed and PDF maps with a larger number of staff. Training on the use of GIS software,smartphones, tablets		Jun-19	JICA and management					

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Planned Activity Title (Required work quantity & materials) (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[B] GIS, Zoning, NRW Monitoring & Water Balance	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	1	40	60	90																	80	Calibration of bulk meters, maintenance and servicing of bulk meters, and provision of transport		Jun-19	NRW team/ JICA					
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	2	30	40	90																	70	Purchase of zonal meters,gate valves and involvement of GIS experts		Dec-19	NRW team, GIS team, and Procurement					
		(3) District Metered Areas (DMAs)	4	30	40	90																	70	Purchase of district meters,gate valves and involvement of GIS experts		Dec-19	NRW team, GIS team, and Procurement					
	(c) Authorized Unbilled Consumption & Water Balance Table	(1) Authorized Unbilled Consumption	4	20	20	70																	20	Installation of meters on all fire hydrants (probably two)		Dec-19	NRW, procurement					
		(2) Commercial Losses	4	30	40	90																	70	Training of NRW staffs by an external person atleast once in every 3months		Dec-19	jica					
		(3) Physical Losses & Completion of the Table	4	20	30	80																	70	calibrationb of bulk meters on major distribution line,undertaking atleast 2 minimum NF,training on staff on how to fill,capture and analyse inflow measurement data.		Dec-19	jica					
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	1	40	50	80																	60	4) Installation of Meters for Unmetered Customers 5) Checking of mobile phone numbers, etc. for correct delivery of SMS-based bills. 6) Correction of the Inconsistancy regarding Disconnected (Inactive) and Active Customers (see the additional table for commercial loss reduction) require of smartphone		Dec-19	management, donors, 4) Metering Section, and 5) & 6) Billing Section					
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	2	20	30	70																	50	3) Servicing & Replacement (whole or part) of Existing Meter (see the additional table for commercial loss reduction) purchase test bench,airvalves and high accuret meter		Dec-19	Procument, management, Metering Sec. & JICA expert					
		(3) Improvement of Meter Reading	4	30	60	90																	75	1) Solving Problems around Exsiting Meters (meter replacement is probably not required) (see the additional table for commercial loss reduction)		Dec-19	Metering Sec. but also Distri. Sec. (& NRW Sec. for Extra Manpower) for follow-up					
		(4) Additional Focused Management of Large Customers	3	30	70	90																	80	7) Accuracy Test, Survicing & Replacement of Large Customers' Meters and Identification of Illegal Connections and Underground Leakage in their Premises (see the additional table for commercial loss reduction)		Dec-19	metering team & 7) NRW Section					
		(5) Use of Other Hardware & Software Technologies for Customer Metering	4	30	40	90																	70	well equiped warkshop for NRW activities		Dec-19	management and procurment					

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Planned Activity Title (Required work quantity & materials) (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	3	50	60	90																	70	6) Update the list of disconnected customers which may have reconnected illegally (purchase of meter/nrw equipment) (e.g. additional two ultrasonic flow meters to measure MNF simultainiously at multiple inlets).		Dec-19	management/ procument/jica team, 6) Billing Section					
		(2) Enforcement of the Reduction of Illegal Uses on the Ground	3	50	60	90																	70	8) Investigation of Illegal Water Uses by Other than Large Customers (see the additional table for commercial loss reduction)		Jun-19	management & 8) NRW Section					
[D] Reduction of Physical (Real) Losses	(a) Active Identification of Visible	(1) Overflow & Line Patrol	2	40	60	80																	70	2) Reduction of Visible Leakage around Existing Meters (see the additional table for commercial loss reduction)		Dec-19	Distribution Managers, 2) Metering Section, and					
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	2	20	20	80																	50	Training of relevant staffs on how to use the equipment. 2 Train atleast 10 meter readers and their supervisors on how to use listening stick.		Dec-19	Management/ Gis team					
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	3	20	20	80																	50	more training and workshops of staff on use of listening stick and other devices for leak detection. 2 Undertake atleast 2times minimum night flow(MNF) per month		Jun-19	NRW team/jica					
	(c) Improvement of Workmanship & Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	2	30	40	80																	70	Purchase of hand pump, training of staffs on how to use it. 2 All the new extended pipeline must be pressure tested before put in use. 3 Enhance use of WASSUP and other social media to report leaks		Dec-19						
		(2) Short-term Improvement of Pipelines & Connections	2	50	60	90																	70	Introducing of analytical tool for leak and bursts and implementing it.		Jun-19						
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	3	50	60	90																	70	Identifying areas prone to leaks and replacing the old pipes,appurtenances and leaking tanks. Recommend all the new extension lines be done using HDPE. 2 Incorporation of the rehabilitation plan to the WSP's strategic plan. 3 Design, preparation of a bill of quantities and costing for rehabilitating.		Dec-19	prosurement/ donors					
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	4	50	50	90																	70	Establishment of better boundaries of distribution zones based on elevation difference in each zone from GIS experts.2 Selection of pressure measurement points								
		(2) Pressure Measurement over Large Areas	4	0	0	90																	60	identification of pressuer measurement point and installation of pressure loggers, 2 weekly recording of pressure data and analysing		Dec-19	Managemnt/nrw team					
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	U																					introduction of presure breaking tunks on areas with direct pumping								
TOTAL			-	30	50	80	-																60	mapping and establishment of zone, identify zone with high water loses , embarking on line testing using NRW equipment		-	-					

[Example Modes of Implementation]

: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
⇒

Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Nakuru WSP (NAWASCO)

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19						{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23									
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Planned Activity	Required Work Volume & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	1	60	70	100																					75	●team established	●leak detection- 7 staff,illegal use-5 staff. O&M-10 staff .The three teams serve the who of nawassco service area.							
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	3	60	65	80					Indoor meetings held monthly to discuss ways of improving revenue				more resources to be channel to A.C pipes replacement												67	●sensitization donr							
		(3) Enhancing Support from Customers	3	55	60	90																					65	●toll free line has been put in place to assist in reporting leaks/ water misuse etc ●customer open days are held annually to reach out to consumers	1 telephone operator is in place to answer calls							
		(4) Capacity Development through Trainings & Trials	2	40	45	60													Put more emphasis on trainings modre so on leak detection equipments								50	●NRW section has been put in place with sufficient staffing ●Teams sent to kewi and embu for practicals	NRW staff have been attending trainings and benchmarking with other WSPs							
	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(1) Participatory Review, Planning & Monitoring of NRW Activities	2	90	90	100																					95	●billing analysis to check on meter estimation （Q1) ●meter replacement based on billing analysis carried out（Q2) ●put more emhasis on Minimum Night Flow Measurements(Q3)	replacement of Asbestos cement pipes to HDPE in central zone	Kshs.750 m	Oct-18					
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	3	60	60	100																put more emphasis on new technology to target on meter efficiency					65	●all data arequired are in place(Q1) ●Training on NRW related trainings being enhanced(Q2)							
	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	3	50	55	90																					70	●Team has been put in place to inspect all the water fitting befeore they are received in store(Q2)	3 committee in place to inspect delivered materials to ensure that they the required specifications.	n/a	continuos					
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	2	55	60	80					consideration to procure more vehicles to assist in quick reponse to leaks and bursts together with GIS activitkies.																65	●pipes, fittings and NRW equpments are in place (Q1)							
[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	2	55	60	90																					70	●with the current GIS unit priority GIS layers has been enhanced e.g meter locations,pipelines,water kiosks, customer connections locations,leaks and bursts locations.	targetting to map pipe network of eastern zone and southern zone	#VALUE!		GIS Team				
		(2) Mapping of NRW-related Problems	3	20	20	60																					30	●technical O and M staff are currently collecting bursts and leak points by use of kobocollect application.	continuos mapping of problematic areas is longoing i.e areas pronre with leaks and illegal connections			GIS team				
		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	2	20	20	60																					30	●GIS layers are being relied to make decisions baed on the information needed e.g pipeline location, frequent bursts on a certain area etc	Every NRW unit generates report based on the reports generated from kobocollect application			GIS/NRW team				
	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	1	85	90	95																					92	●All production sources are meter and meters are calibrated twice a year inorder to achieve reliable production figures.	NRW calculation are calculated monthly and calibbration of buk meters to ascertain there performance is done bianually			NRW/ Meter testing unit				
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	2	55	55	75																					60	●3 out of the 5 zones are hydraullically isolated, while the 2 zones are undergoing isolation, therefore monitoring of NRW for the 3 isolated zones is periodically being carried out.	The 3 zosnes are hydraullically isolated, while the other 2 zones are in the process of isoaltion.			NRW Team				
		(3) District Metered Areas (DMAs)	3	60	65	90																					67	●established DMAs are monitored monthly with bulk meter readings taking place every 15th day of every month.	3 DMAs are in place and there monthly NRW figures are accurately calculated based on the bulk meters.			NRW Team				

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19						{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23									
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[C] Reduction of Commercial (Apparent) Losses	(c) Authorized Unbilled Consumption & Water Balance Table	(1) Authorized Unbilled Consumption	4	83	85	92																	85	●Fire hydrants have been metered to check on monthly usage and suspicious misuse.	fire hydrants are metered and total usage is quantified in a month			NRW team				
		(2) Commercial Losses	4	45	45	80																	60	●largeconsumers very closely to check on slight drop in billing and meter reading anomalies.	inhouse meeetings are held monthly to discuss NRW progress and challenges			NRW team				
		(3) Physical Losses & Completion of the Table	4	50	50	75																	52	●more emphasis to be put in place to quantify physical and commercial losses,considering the fact that the system is experiencing intermittent water supply and huge conumer water reservoirs.	3 Minimum Night Flow measurements are required monthly to quantify the amount of physical losses			Leak Det.Team				
	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	1	60	65	75																	67	●100% metering has been accomplished, but more emphasis to be put in coming up with a metering policy which will guide on metering matters.	100% metering has been achievd, more effort is required on meter auditing.			Zone managers				
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	2	60	65	90																	70	●billing analysis contacted and based on that, meter replacement and servicing is underway, meter testing for large consumers is also being prioritise and consumers always advised to install air valves at there connection points to reduce meters being driven by air.	Any meter identified to be under performing, malfunctioninfg are replaced after subjecting it to testing.			Meter testing unit/ Illegal use unit/ zones				
		(3) Improvement of Meter Reading	4	80	80	95																	83	●meter repositioning in premises prcieved to be always gatelocked, and frequent meter readers rotation to minimise on collusion with customers.								
		(4) Additional Focused Management of Large Customers	3	77	85	95																	89	●A check meter is install to use in tallying consumer meters against the check meter, proper meter sizing is also informed by cusomer consumption, the higher the consumption the bigger the meter size.	palns have been put in palce to ensure metering connections before water gets into consumer reservoirs.			Illegal use Unit				
		(5) Use of Other Hardware & Software Technologies for Customer Metering	4	65	65	90																	75	●a locally made meter testing bench to be constructed to aid in upscaling meter testing activities with a small workshop besides for handling meter servicing.	improvise meter testing bench is being put in place			meter testing unit				
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	3	80	80	100																	87	●Illegal water use has been given priority with the laid down procedures on how to handle any water misuse, penalties, fines and recoveries	Measures to curb illegal water uasage has been put in place; penalties, and legal procedures as			Illegal use Unit				
		(2) Enforcement of the Reduction of Illegal Uses on the Ground	3	85	90	97																	92	●pro-active measures are continuosly being put in place to reduce on water malpractice e.g sealing of metrs along the liners, meters relocation, installing tamper proof meters etc.								
ses	(a) Active Identification and reduction of Visible	(1) Overflow & Line Patrol	3	70	70	95																	77	●To reduce on overflows, effective ball valves have been install and sensors have also been installed to monitor water levels in the reservoirs. Leak detection team always carry out line patrols to check on unreported leaks.								
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	2	0	30	80																	60	●leak detection team always contact leaks search within the premises with the use of listening sticks.								
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	2	30	55	85																	70	●Use of UFM continuosly to carryout step testing moreso on high pressure zones								

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																{{ AP }} Annual NRW Reduction Plan for 2018-19						{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23									
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Planned Activity	Required Work Volume & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[D] Reduction of Physical (Real) Los	(c) Improvement of Workmanship & Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	2	45	60	80																					67	●Proper workmanship is always being emphasis to minimise poor installations							
		(2) Short-term Improvement of Pipelines & Connections	3	60	75	95	with internally generated funds a policy will be put in place to allow the company procure consumer connections, in order to control the quallity of materials being install.																				80							
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	4	40	60	90																					65	●replacement of old pipes is being carried out gradually							
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	U																									●isplation valves are controlled in high pressure zones to regulate pressure.							
		(2) Pressure Measurement over Large Areas	U																									●pressure monitoring and management has recently been started with,currently pressure are being installed to carry out pressre mapping.							
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	U																									●plans are underway to install HDPE pipes inorder to accommodate areas experiencing high pressures.							
TOTAL			-	53	55	70	over the years the WSP has been gradually reducing NRW, despite challenges of aged pipenetwork and insufficient resources to tackle NRW challenges.																				58		Total		-	-				

[Example Modes of Implementation]

: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)

Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Kisumu WSP (KIWASCO)

Category L	Category M	Category S	Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
								1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun								
(a) Staffing, Awareness & Training		(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	**[A]-(a)-(1) Sum-up 1: A dedicated NRW task team having sufficient staff is fully operational** (in good coordination with other relevant commercial and technical staff) **and well motivated by a strong support from the top managers and GIS / ICT staff.**	1	65	70	90				→															75	Recruitment of 1no. leak detection technician and 2NO. Data analyst technician.		18-Dec	TM, HR	no leak detection technician recruited and only one data analyst existing.			
			1) Buy-in (strong support) **from the top managers of WSP** (e.g. MD, TM and CM/FM) **has been acquired for improving NRW reduction activities** (including the establishment or reinforcement of dedicated NRW Task Team).	3	70	85	95			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	Benchmarking field training with 4NO. Leading WSP.	0.5M	1-Dec-18	ALL HEADS	not yet			
			2) NRW Task Team (unit, section or department) **consisting of sufficient staff** (e.g. technical officer, plumbers, etc. fully-dedicated in reducing commercial and physical water losses) **has been established and is currently fully-operational.**	3	65	70	90				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Recruitment of 1no. leak detection technician and 2NO. Data analyst technician.	Budgeted	30-Jun-19	HOTs,HRM,	no leak detection technician recruited and only one data analyst existing.			
			3) Strong communication between commercial and technical staff has been sufficiently established for effective and efficient NRW reduction activities (e.g. through monthly inter-departmental meetings for NRW reduction and use of information technologies (such as WhatsApp, customized internal system for task allocation and monitoring, etc.).	3	70	80	95																			85	Workshops, frequent meetinngs	Budgeted	Continuous	HOTs, HOC, ICT,NRWE	regular meetings through tsunami meetings and atleast one workshop.			
			4) Sufficient GIS and/or ICT staff (e.g. GIS operator, administrator of meter reading / billing system, field surveyors, etc.) **have been employed and are available for supporting the NRW task team.**	2	55	60	90													→	→	→	→	→			70	-10,000 NO. customer meters to be mapped. Billing software should include GPS Coordinates	0.5M	1-Jun-19	GIS analysts,NRW, SCM, HOCs	mapping of customer meters is ongoing.			
			5) Incentives for NRW reduction (e.g. allowance for night time activities, performance-based incentives for individuals and/or groups in charge of different areas) **have been sufficiently established for motivating the NRW task team & other relevant staff and also for retaining skilled staff** (e.g. plumbers, leak surveyors, etc.) **in the WSP.**	2	50	65	80																			70	Program for awarding best performer. Provision of facilitation during night activities.	Budgeted	Continuous	HOFs, HOTs, HRM	Occassionally done but not formal/ documented			
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resources Aspects of NRW	**[A]-(a)-(2) Sum-up 2:** ***i)*** **WSP staff have been sufficiently sensitized for NRW reduction. Besides,** ***ii)*** **operational financial losses due to NRW and** ***iii)*** **additional investment** (required for additional water resource and water supply facility development) **required due to excessive NRW and** ***iv)*** **effective measures for improving revenue collection at the WSP have been sufficiently discussed among relevant staff** (i.e. not only those related to NRW - up to billing - but also those in charge of revenue collection) **based on data for enhancing their motivation & team work towards a robust financial improvement.**	3	70	80	90																			85	Customer sensitization through media, clinics,	500,000	19-Jun	ccm, PR, HR	in progress			
			1) WSP staff have been sufficiently sensitized for NRW reduction (through meetings, warning to staff for not being involved in water theft, request for active notification of surface (visible) leakage & water theft and cooperation in relevant data collection, etc.).	3	75	80	100																			85	All staff to report atleast 2NO leaks monthly.	Budgeted	continuous	ALL STAFF	being done			
			2) A recent annual NRW volume has been converted into operational financial losses (by multiplying the volume with calculated average tariff (KSh./m3) and unit production cost (KSh./m3) based on an roughly-assumed balance of commercial losses and physical losses (e.g. authorized unbilled + commercial losses = around 60%, physical losses = around 40%) **and sufficiently informed to relevant staff** (with an explanation on the higher per-m3 operational financial loss caused by commercial water losses (i.e. average tariff ((total revenue - grant revenue) / annual billed consumption) is usually about 2 times higher than unit production cost (total O&M cost / annual production)).	1	40	40	85																			60	Installation of bulk meters to acertain physical losses.				installation of bulk meters are in good progress.			
			3) The scale of the possible reduction of future development of additional water resource, water treatment and pipeline facilities and capital investment through NRW reduction (by using of the saved physical losses for prolonging water supply hours or supplying to new service areas) **has been sufficiently discussed and informed to relevant staff.**	1	25	25	80	→	→													→	→	→	→	→	→	55	Replacement of 25km dilapidated pipeline.	20M	continuous	NME, HOTS	not yet			
			4) Since NRW is calculated based on billed consumption (not consumption of collected revenue), **effective measures for improving collection efficiency of water charges by the billing / collection section have been sufficiently discussed between the staff in charge of NRW reduction and those in charge of billing / collection** (e.g. establishment of a strict procedure for intentional non-payment users through revising charge collection regulations and effective enforcement of disconnection for non-payment).	3	55	60	80				→	→	→	→	→	→	→				→	→	→	→	→	→	→	70		Budgeted	1-Jan-19	HOCs	being done			
		(3) Enhancing Support from Customers	**[A]-(a)-(3) Sum-up 3: Support from customers required for NRW reduction has been sufficiently enhanced through** ***i)*** **water bills or SMSs carrying messages, ii) toll free telephone number, low cost SMS number, etc. for customers to notify problems** (e.g. leaks, illegal uses, etc.) **,** ***iii)*** **a system(s) for receiving notifications and managing complains, and** ***iv)*** **awareness campaigns at communities** (e.g. baraza, water action group, etc.)**, at schools, through media, etc.**	3	70	70	90																			80	Customer sensitization through media, clinics. Public awareness in schools,	2M	1-Jun	CCM, PR, HOCs	in good progress			
			1) Printed or electronic water bills, SMS, etc. carry sufficient effective messages regarding NRW (e.g. asking customers for cooperation to reduce physical & commercial losses and excessive water uses) **and sufficient contact information of the WSP.**	3	70	75		→	→																	75	Intensify campaign in institution and community outreach.	1M	31-Dec-18	HOCs, CSM	not yet			
			2) Toll free telephone number, low cost SMS number, etc. have been sufficiently established to encourage the public to notify problems like leaks and illegal water uses to the WSP. (Toll free telephone number may cause problems especially in the WSPs experience sever water shortage resulting in many customer complains)	4	75	75	100	→				→	→	→				→	→	→	→	→	→	→	→	80	More sensitization of the use of code to customers	Budgeted	Continuous	PR Officer,CCM	in progress			
			3) Customer relation has been sufficiently enhanced with a software system (e.g. WASREB's MajiVoice and a customized internal customer management system, etc.) for managing complaints and receiving notifications of problems including bursts, leaks and water theft.																															
			4) Awareness campaigns for reduction of NRW (e.g. water theft, leakage before customer meters, etc.) **and water save** (e.g. overflow from customer tanks and excess consumption, etc.) **in the following forms have been sufficiently conducted.** **- 1. Public forum / open clinics** (e.g. baraza, water action group, etc.) **for community sensitization** (especially in the areas with many illegal water users)**.**	4	80	80	100																			80	More than 2NO forums per month.	3M	Continuous	PR Officer,CCM	Sensitization of meter theft and reward of Kes10,000 is done through mass media, national			
			- 2. School campaigns	2	70	70	90	→	→					→	→	→	→	→	→	→	→							75	Organizing sport competition for schools	2M	1-Mar-19	PR, HOCs	Proposed plan Awaiting approval			
			- 3. Media campaigns	3	65	80	95			→	→	→	→															82		1.5M	1-Dec-18	PR, HOCs	not yet			

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[A] Organization, PDCA Cycle, Finance and Procurement	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(4) Capacity Development through Trainings & Trials	**[A]-(a)-(4) Sum-up 4: Sufficient staff relevant to NRW reduction** (e.g. NRW task team members, zonal officers & plumbers in charge of O&M, GIS staff, etc.) **have been sent to *i)* various trainings of KEWI, *ii)* benchmarking workshops of WASPA and *iii)* other external training opportunities, as well as *iv)* being trained internally, in order to obtain sufficient knowledge and skills required for NRW reduction** (e.g. through field trials in a small DMA(s) and following discussions on how to reduce NRW over a large area efficiently)**.**	2	48	50	75				→																60	Benchmarking field training with 4NO. Leading WSP.	1M	2019/3/3	HOTs, HR, JICA	internal trainings.			
			1)-1 Sufficient relevant staff (e.g. members of the NRW task team, zone superintendents, etc.) **have been sent to KEWI's training course on NRW management.**	5	80	80	90	→	→	→	→	→	→	→															75	Benchmarking field training with 4NO. Leading WSP.		31-Dec-18	JICA, HOTs	not yet			
			1)-2 Sufficient relevant plumbers and other field staff have been sent to KEWI's other training courses relevant to NRW reduction (e.g. plumbing, metering, service connection installation, O&M of distribution system, etc.)	5	80	85	95	→			→						→												85	Training of 4NO staffs on isolation of DMA	0.25M	1-Apr-19	JICA, HOTs	yes			
			1)-3 Sufficient relevant ICT & GIS staff and other technical officers has been sent to the GIS-related trainings courses of KEWI and/or Kericho WSP.	3	70	85		→			→								→	→	→	→							90	Training of 3NO. GIS officers.	0.25M	1-Apr-19	JICA, HOTs	yes			
			2) Sufficient relevant staff have been participating in the benchmarking meetings and trainings of WASPA (supported by VEI) **for collective learning among WASPA members.**	3	70	70	90	→	→			→				→				→					→				80	Acquire knowledge and share eperiences with atleast 1NO. WSP Per year	0.2M	1-Jan-19	HRM, HOTs	yes			
			3) Sufficient staff have had opportunities of trainings held by donor organizations (e.g. JICA, VEI, SNV, WB, EU, etc.) **and other Kenyan institutions** (e.g. WSB, other prominent WSPs, etc.)**.**	3	75	75	95																						80	More training and benchmarking	Donor	Continuous	DONOR	yes			
			4) Sufficient in-house training (including on-the-job training (OJT)) **for various NRW activities has recently been conducted at the WSP.**	2	65	65	75	→			→	→			→							→	→	→					70	Train all the meter readers on EMFs, and GIS mapping	0.3M	1-Jul-19	NRWE,HRM	yes			
			5)-1 Various skills required for NRW reduction (hydraulic isolation of pipe network, testing of bulk meters, calculation of NRW ratio, preparation of drawings / GIS, customer meter servicing, testing and replacement, leak survey, identification of unauthorized consumption, step test, etc.) **have been acquired through a DMA pilot(s) and/or similar experiences focusing on field work within a limited area(s)** (with or without support from donors (e.g. VEI, SNV, JICA, etc.) and/or Kenyan institutions (e.g. WASPA, KEWI, etc.).	1	45	50	85																						60	All NRW staffs should acquire more skills in undertaking zero pressure test and minimum night flow.	8M	1-Jun-19	NRWE	in progress			
			5)-2 Practical ways of scaling-up of NRW activities over the entire water supply service area (within a reasonable time period) **have been sufficiently discussed during and/or after a DMA pilot(s) and/or similar experiences.**	2	50	60	80																→	→	→	→	→		65	More involvement of relevant staffs in comercial and technical	0.8M	Continuous	NRWE, HOTS, HOCS	yes			
		(1) Participatory Review, Planning & Monitoring of NRW Activities	**[A]-(b)-(1) Sum-up 5: In reference to relevant upper level plans of the WSP, *i)* review of the NRW activities carried out in the previous financial year, *ii)* assessment of current conditions and *iii)* preparation of medium-term and annual NRW reduction plans have been conducted in a way sufficiently participatory among relevant staff with considerations of cost requirements. Meanwhile, *iv)* the periodical monitoring of NRW activities** (e.g. quarterly) **is being conducted.**	2	55	60	80				→																		70	OrganizingTraining and workshop for all relevant department/sections within the organization.	300,000	2018/12/18	HR,HOTs, JICA	in progress			
			1) Sound strategies to reduce NRW have been sufficiently stated in the latest 5 year strategic plan of the WSP.	4	60	65	80	→	→	→	→	→	→	→															80	OrganizingTraining and workshop for all relevant department/sections within the organization.	0.5M	1-Dec-18	NRWE,HOTS	yes			
			2) Review of the activities carried out in the previous financial year has been prepared in a way sufficiently participatory among relevant staff for capacity development and reporting to WASREB, top managers and the board of directors of the WSP, etc.)	2	50	50	85																						60	Involving all relevant staffs in planning and action points well stated.	BUDGETED	1-Jun-19	ALL relevant staffs	yes			
			3-1) Assessment of recent conditions regarding NRW has been prepared in a way sufficiently participatory among relevant staff for capacity development and planning.	1	40	45	75																						55	More capacity building and development	3M	1-Dec-18	NRWE,HOTS	yes			
			3-2) Medium-term NRW reduction plan with a bar chart has recently been prepared or revised (prior to preparing an annual NRW reduction plan for this/next financial year) **in a way sufficiently participatory among relevant staff for prioritized implementation of NRW activities and reporting the plan to WASREB.**	1	40	40	90																						50	More training and capacity uilding on new wasreb annual plan tamplate	1M	30-Jun-19	NRWE	yes			
			3-3) Annual NRW reduction plan with cost implication has been prepared (based on the latest medium-term NRW reduction plan) **in a way sufficiently participatory among relevant staff for budgeting, prioritized implementation and reporting to WASREB.**	1	40	40	90																						50	More training and capacity uilding on new wasreb annual plan tamplate	1.5M	30-Jun-19	NRWE,ALL DEPARTMENTAL HEAD	in progress			
			3-4) Implementation of the planned NRW activities have been monitored at least quarterly (preferably monthly) **in a way sufficiently participatory among relevant staff for improving the activities and reporting to WASREB.**	1	35	35	90																						45	Involvement of all relevant staffs,departments,sections	BUDGETED	30-Jun-19	NRWE,ALL DEPARTMENTAL	yes			
			4) External funds for the planned activities (especially for facility improvement requiring a large investment such as construction of distribution reservoirs, replacement of pipe network, etc.) **have been sufficiently sought for realizing the investment required for NRW reduction.**	1	30	40	70																						45	More proposal to address replacement of dilapidated pipelines	0.5M	Continuous	NME,PDCE, HOTS	in progress			
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	**[A]-(b)-(2) Sum-up 6: *i)* The various data required for calculating the NRW-related key performance indicators (KPIs) prioritized at the WSP are periodically and systematically collected with ease** (e.g. monthly, quarterly and annually)**, and *ii)* changes in calculated values of the KPIs are analysed for data-based internal discussions and benchmarking with other WSPs in order to improve NRW activities of the WSP.**	3	50	60	90																						70	Monitoring and calibration of all production bulk meters twice a month. Workshop/training of all relevant staffs on use of MIS sheet and water balance.	250,000	Continuous	NRW-E,Data Analysts,	In progress			
			1) Prioritization of data to be collected periodically (monthly, quarterly and annually) **for calculating key and supplementary performance indicators (PIs) have been carefully done** (in considerations of practical aspects of data collection) **in order to assess progress, encourage internal competition between distribution zones and/or smaller areas, etc. with PIs.** (The calculated indicator values can also be used for WASPA's benchmarking activities and WASREB's Impact Report & WARIS.)	3	60	65	90																						75	Data analysts to update all the necessary data for calculation of NRW% in DMAs	Budgeted	continuous	NRWE, Data Analysts	In progress			
			2) A systematic and easy way to collect the prioritized data periodically from different department/sections and branch offices (e.g. using cloud-based software programs such as a shared folder on Google Drive, Google Sheet, ODK Aggregate, etc.) **has been fully set up** (including the assignment of responsibilities to relevant staff for providing, entering and validating various data) **and is currently fully operational.**	1	30	35	80																→	→	→				45	Train all relevant staffs on using ODK in data collection.	Donor	1-Jun-19	All relevant staffs.	not yet			
			3) Periodical analysis of the prioritized KPIs (monthly, quarterly and annually) **using the collected data for internal data-based discussions** (between different departments/sections and branch offices) **and benchmarking are being sufficiently conducted in order to improve the review, planning, adjusting and monitoring of NRW activities.**	1	30	40	85																						50	Update all the data in the system for analysis and implementing it.	Budgeted	1-Dec-19	NRWE, Data Analysts	In progress			

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						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun								
(a) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.		**[A]-(c)-(1) Sum-up 7:** ***i)*** **Based on an analysis on the types of existing pipes, fittings, meters, etc. causing NRW significantly,** ***ii)*** **suitable pipes, fittings, customer meters and other appurtenances have been selected for procurement in consideration of internal standardization. Meanwhile,** ***iii)*** **quality control mechanisms** (such as inspection & acceptance committee, accuracy tests of new meters and trace survey of meters' durability) **have been well established.**	3	70	75	100																					85	Introduction of the use of HDPE pipes,Amendment of new connection policy.	5M	Continuous	HOTs,SCM, NRWE,NME	yes			
			1) The types of existing valves, pipe fittings, etc. causing bursts and leaks frequently have been sufficiently discussed (preferably analysed based on collected data) **to identify the needs of changing the procurement of common valves, fittings, etc.**	2	60	65	95													→	→	→	→					70	Leak detection of 50km annually.	Budgeted	continuous	NRWE,	yes			
			2) Types and size of pipes, fittings and other appurtenances (e.g. saddle clamp) **have been selected for procurement in a sufficient consideration for their internal standardization** (based on relevant Kenyan standards, guidelines, etc. and first hand experiences with bursts and leaks)**.**	2	60	70	95		→	→	→		→	→	→		→	→	→								75	Introduction of HDPE pipe in the network.	10M	31-Mar-19	NME,NRWE	yes			
			3) Suitable specifications of customer meters for each size such as class (ISO Class or OIML R)**, type** (e.g. copolymer volumetric / piston)**, availability of spare parts** (e.g. internal unit)**, etc. have been decided, and their procurement is being done in accordance to the specifications.**	2	60	70	95																					75	Procure class D meter and smart meters	10M	Continuous	NRWE,MIE	yes			
			4) The inspection & acceptance committee of the WSP has been sufficiently strengthened to reject faulty and unmatched pipes, fittings, meters, etc.	5	80	80	98		→	→	→	→	→	→	→	→	→	→	→	→							85	More training on procurement and inspection policy to the team.	0.3M	1-Jan-19	HOTs, HRM	yes			
			5) Some potion (e.g. 5%) of each batch of new customer meters have been sent to a credited meter testing institution (i.e. Nyeri WSP (NYEWASCO) up to 1.5 inch meters with a meter test bench and up to 1m in diameter with a insertion type electromagnetic flow meter or potable ultrasonic flow meter, and Kenya Bureau of Standards (KEBS) up to 10 inch meters with meter test benches of different sizes) **to reject substandard meters.** (The WSPs having own water meter test bench may use it for testing all new water meters suspicious of defects especially low accuracy)	3	60	75	98			→		→	→	→														85	Accreditation of the meter test bench.	1M	31-Dec-19	NRWE,MIE ,HOTs,MD	testing is done by our meter test bench and periodic tests by KEBS			
			6) Trace survey has been sufficiently conducted to evaluate durability and actual lifespan of newly procured customer meters (the results showing a significantly limited durability may be used to reject the products from the same manufacture)**.**	1	30	30	70	→												→	→	→	→	→				50	Analysing all the meters in the network as per the age and implement metering policy replacement act	0.4M	1-May-19	MIE, NRWE	in progress			
	(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.		**[A]-(c)-(2) Sum-up 8: Pipes, fittings, meters and NRW survey equipment** (and hardware required for establishing and utilizing a GIS database including smartphones / tablets for mobile GIS, reliable internet access at office, airtime for data connection, transportation means, etc.) **are sufficiently available for continuously and efficiently implementing effective NRW activities** (including quick repair of bursts & leaks and quick replacement of faulty meters)**.**	2	40	40	80																					55	Provision of transport facilities to the team. Continuous supply of the GPS gadgets,smartphones.	5M	19-Jun	HOTs, NRWE, GIS analysts, SCM.	not yet			
			1) Sufficient pipes and fittings, repair materials, spare pats (e.g. replaceable internal units of customer and bulk meters) **and other common appurtenances** (e.g. strainer for bulk meters, sluice valves for isolating branch distribution pipes, etc.) **have been procured and stored for quick repair of bursts and leaks.**	3	60	60	85				→		→	→			→	→			→	→						70	Availability of materials	10M	Continuous	SCM,HOTS ,HOF	yes			
			2) Sufficient bulk and customer meters of different sizes with appropriate specifications (and their spare parts if available) **have been procured and stored for quick replacement and repair of faulty and degraded meters.**	3	70	75	92																					75	To ensure there are meters readily available in store.	8M	Continuous	SCM,HOTS ,HOF	yes			
			3) Sufficient NRW survey equipment (e.g. listening sticks, calibrated buckets, portable ultrasonic flow meter, electric leak detector, noise correlator, pipe locator, pressure gauges with maximum pressure pointer / pressure loggers, hand pumps, etc.) **with sufficient functions and quality have been acquired and are well maintained.**	3	65	70	80		→		→					→	→		→	→			→		→	→		75	To ensure that all the equipments are well maintained and operational.	5M	1-Oct-18	NRWE,MIE	in progress			
			4) Sufficient office appliances and specialized hardware required for establishing or improving a GIS database (e.g. A3-size inkjet printer with scanner (or plotter) with spear inks, desktop or laptop PC, handheld GPSs, large PC monitor, etc.) **have been procured and utilized and are well maintained.**	1	45	45	70						→	→	→												65	Purchase of 1NO. Pplotter	1.2M	1-Mar-19	SCM,GIS	not all procured			
			5) Sufficient official-use smartphones / tablets (Android OS) **have been procured for improving NRW activities at site.** (Free mobile GIS and interactive data collection software programs, etc. can be installed in the procured smartphones / tablets.)	1	30	30	75		⇒		⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒									50	Purchase of atleast 15NO. Smartphones	0.5M	1-Jun-19	SCM,NRWE	not yet			
			6) Reliable internet connection (e.g. WIFI) **with a reasonable speed at the WSP's offices and sufficient airtime for data connection on official-use smartphones / tablets are being provided sufficiently to the staff involved in NRW-related activities.**	4	70	70	95		→	→	→		→	→			→	→	→	→	→	→	→				75	Internet data bandles should be readily available.	Budgeted	Continuous	ICT manager	reliable internet but no sufficient airtime.			
			7) Sufficient transportation means have been secured for NRW activities.	1	15	18	50				→	→	→	→	→	→	→	→	→	→	→					40	Purchase of 1NO. Double cubine 4W Drive car	Donor	30-Jun-19	AFD	not sufficient			
(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities		**[B]-(a)-(1) Sum-up 9:** ***i)*** **Base on the various needs of using GIS discussed at the WSP, the WSP** ***ii)*** **has already established prioritized GIS layers** (e.g. base map, major water supply facilities, customer meters, etc.) **and has been continuously** ***iii)*** **preparing other layers with less priority** (e.g. service pipes, public toilets, etc.) **and** ***iv)*** **updating the established layers** (e.g. inclusion of newly installed customer meters and service pipes, etc.) (while taking backups periodically) **by** ***v)*** **sufficiently utilizing free software programs such as QGIS.**	2	87	90	96				→	→																	93	Atleast addition of more staffs to assist in mapping of all customers.	1M	Continuous	GIS analysts,NRW, SCM, HOCs				
			1) Needs for developing and fully-utilizing a GIS database have been sufficiently discussed and prioritized between different departments and sections (including branch offices covering different areas) **with help of GIS staff.**	1	10	20	80	→												→	→	→	→	→	→	→		40	Desktop server with post GIS data base. Piloting at kibuye offices.	0.2M	31-Dec-19	GIS Analysts,ICT Manager,				
			2) Free GIS-related software programs (e.g. QGIS with various plugins - GPS Tools, Open Layers Plugin, OSM Downloader, QTile, etc. - for PCs and software programs for Android smartphones - QField, Geo ODK Collect / ODK Collect, GPS Map Camera, etc. -) **have been sufficiently utilized for mapping of existing facilities and problems.** (Low-cost downloadable commercial software such as Google Map Downloader may also be required for improving GIS operation and data collection. Initiative of GIS staff may be required to shift expensive commercial GIS software programs with familiar interface to free software programs so that more staff can use GIS without spending extra money such as yearly software license free.)	3	80	85	100	→				→	→	→	→	→	→	→																	
			3) Base map - raster layers - (e.g. use of offline satellite imagery downloaded and automatically-georeferenced with a low cost commercial software such as Google Map Downloader or use of free online satellite imagery such as those set with Open Layers Plugin of QGIS if the internet connection is reliable and sufficiently fast) **and other general layers** - vector layers - (e.g. Open Street Map (OSM) data downloadable for free with OSM Downloader of QGIS, 25-interval contours downloadable at http://www.opendem.info/opendem_client.html, etc.) **have been sufficiently established for the development or improvement of GIS.**	5	100	100	100	→	→	→	→	→	→	→																					
			4) GIS layers for major water supply faculties and existing supply area boundaries (e.g. WTPs, pump stations, distribution reservoirs and tanks, intakes, transmission pipelines, primary & secondary / major distribution pipelines with gate valves, BPTs, PRVs, bulk meters, boundaries of water supply service areas, schemes, distribution zones, DMAs, etc.) **have been sufficiently prepared** (e.g. through digitization of existing drawings, importing (with data conversion and geo-referencing) of existing CAD data, importing of digitized Google Earth layers with editing, on-screen digitization with sufficient staff knowing locations of those facilities, investigation and data validation at site, etc.)**.**	4	90	95	100	→	→	→	→	→	→	→	→																				
			5) GIS layers of customer meters and kiosks (the attribute data to be collected such as meter status, size, type, etc. should at least include Connection No. to link each customer meter location to the corresponding customer's meter reading or billing information stored in other system such as a billing system) **have been sufficiently prepared** (e.g. through on-site customer identification with handheld GPS & customer information sheet, personal digital assistance (PDA) with a reliable internal GPS antenna & commercial GIS software, and/or smartphones with free GIS software)**.**	1	70	75	100	→							→	→	→	→	→	→	→													
			6) GIS layers for minor water supply faculties (e.g. tertiary / minor distribution pipelines with gate valves, service connections, air valves, hydrants, washouts, etc.) **have been sufficiently prepared.**	3	70	75	100	→	→	→	→	→	→	→																				
			7) Systematic update of the GIS data (e.g. for installation of new customer meters and service pipes, replacement of degraded distribution pipelines and faulty appurtenances) **and backup of the GIS data is being done sufficiently.**	4	90	95	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→							
			8) GIS layers for public sanitation facilities (including sewerage facilities if any) **have been sufficiently prepared.**	2	33	70	100									→	→	→	→	→	→	→	→	→	→	→							

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				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
								1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun								
[D] GIS, Zoning, NRW Monitoring & Water Balance	(a) Strategic Zoning & NRW Monitoring	(2) Mapping and NRW related Problems	**[B]-(a)-(2) Sum-up 10: Existing problems related to NRW** (e.g. areas with many illegal connections, pipelines with many bursts and leaks) **have sufficiently been mapped both based on *i)* the perception of relevant staff through participatory mapping and *ii)* the data collected at site and results of analysing the data.**	3	80	70	95	■	■	■	■															80	Public awareness, Incentives	Budgeted	Continuous	NRWE,GIS analysts,HOA, Inspection				
		(1) Entire Service Area (SA)	**[B]-(b)-(1) Sum-up 12: Monthly calculation of NRW volume and ratio** (and other prioritized KPIs related to NRW volume if any) **of the entire service area (SA) has been continuous and accurate based on *i)* the monthly readings of well-maintained reliable bulk meters sufficient to measure the total production** (including and excluding the water imported and exported over the boundary of SA, respectively) **and *ii)* the monthly total billed consumption of the entire service area. *iii)* Changes in the calculated monthly NRW volume and ratio are analysed every month for improving NRW reduction activities.**	1	80	90	100	→	→	→	→															95		Budgeted	Continuous	NRWE,Data Analysts.	yes			
			1) Bulk meters required to accurately calculate the total production of the entire service area (SA) (including and excluding the water imported and exported over the boundary of SA, respectively) **have been sufficiently and properly installed** (including the construction or improvement of meter chambers and the installation of strainers before bulk meters)**. The existing bulk meters for production are all installed in a way that air does not entered into the bulk meters** (in order to avoid overestimation by mechanical bulk meters or underestimation by ultrasonic or electromagnetic flow meters) **during intermissions of water supply or water shortage.** (The bulk meters which have difficulty to avoid air intrusion may need to be relocated to a low lying location with depression where water stay in the pipe even during the intermission of water supply.)	3	75	75	95	→	→	■		■	■	→	→	→	→	→	→	→	→					80	All production meters are calibrated and maintained.	1M	31-Mar-19	MIE,NRWE	yes			
			2) Monthly calculation of the total production of the entire SA has been continuous and accurate based on reliable monthly bulk meter readings, periodical accuracy check of the bulk meters (including an assessment on possible air intrusion into the bulk meters if required)**, quick servicing and replacement of faulty bulk meters and/or meter calibration** (e.g. adjustment of the measured volume by adding or reducing a certain percentage of the volume) **if found to be necessary.**	3	78	80	95	■	■	⇒	→	⇒	⇒		→	→	→	→	→	→	→	→	→	→	→	85	Frequently testing,calibration, sevicing of bulk meters	Budgeted	continuous	MIE,NRWE	yes			
			3) Monthly calculation of the total billed consumption for the entire SA has been continuous and accurate** (preferably done with a computerized meter reading / billing system, and should not include the misuse of the upper limit consumption of the lowest tariff bracket with a fixed charge (e.g. 6m3/month) as billed consumption of small consumers).	1	45	49	85		■	■	■	■	■	■	■	■	■	■							70	Reduce accounts billed averages below 5%	Budgeted and donor.	1-Jun-19	NRWE,HOCs,ZCs	yes			
			4) Monthly calculation of NRW volume and ratio (and other prioritized PIs related to NRW volume if any) **for the entire SA has been continuous and accurate based on synchronized bulk meter reading and customer meter reading. Meanwhile, periodical discussions based on the calculated results have been sufficiently held among relevant staff for improving NRW reduction activates.**	2	60	63	80	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	82	Ensure Water balance is filled monthly and report shared to HOTs and HOCs for action plan	Budgeted	Continuous	NRWE	yes			
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	**[B]-(b)-(2) Sum-up 13: *i)* Sufficient Distribution Zones (DZs)** (and/or large DMAs typically having multiple inlet pipelines) **have been isolated. Monthly calculation of NRW volume and ratio** (and other prioritized KPIs if any) **of each DZ has been continuous and accurate based on *ii)* synchronized zonal bulk meter reading** (for calculating the inflow into each DZ) **and *iii)* customer meter reading** (for calculating the total billed consumption of each DZ) **for improving NRW activities including the prioritization of certain DZs. *iv)* Moreover, sufficient gate valves and bulk meters have been installed** (on major and high-risk pipelines causing many bursts and leaks)**. *v)* These gate valves and bulk meters are being well maintained and sufficiently utilized for step tests and abnormal flow monitoring in each DZ.**	2																						50	Installation of bulk meters,	5M	NRWE, NME,	19-Mar	in progress			
			1) Sufficient Distribution Zones (DZs)** (and/or large District Metered Areas (DMAs) typically having multiple inlet pipelines) **has been isolated. A NRW monitoring plan for the DZs** (or large DMAs) **has been prepared** (preferably with GIS) **and all the bulk meters required for the DZs have been installed in a way that air does not come through the meter with or without air valve near the location** (including the improvement of meter chambers and the installation of strainers before bulk meters)**.** (Construction of distribution reservoirs and/or pump stations and installation of transmission and distribution pipelines are probably required for establishing new DZs.)	1	40	45	90		■	■	■	■	■	■	■	■	■	■	→	→	→	→	→	→	→	65	Identify and Installation of all bulk meters in main distribution line.	5M	NRWE,NME	1-Jun-19	in progress			
			2) Monthly measurement of the inflow into each DZ** (or large DMA typically having multiple inlet pipelines) **has been continuous and accurate through a periodical accuracy check of the bulk meters and quick servicing, replacement and/or calibration of inaccurate bulk meters.**	1	20	30	70	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	50	Operationalize of atleast 3NO. DMA	Budgeted	NRWE	1-Jun-19	in progress			
			3) Monthly calculation of the total billed consumption in each DZ** (or each large DMA) **has been continuous and accurate based on a accurate categorization of customers by DZ.** (Meter reading route assigned to each customer in the existing meter reading / billing system may be utilized in sorting the customers into the DZs, however the accurate categorization of customers usually require locations of customer meters overlaid with DZ boundaries on GIS for confirmation. Addition of new data fields to the existing meter reading / billing system may be required at this stage for assigning a DZ name/code and a DMA name/code to each customer for customer categorizations by DZ and DMA.)	1	20	25	75	■	■	■	■	■	■	■	■	■	■	■	■	→	→	→	→	→	→	50	Location of all customers within the DMA	0.5M	NRWE,ZCs	1-Jun-19	in progress			
			4) Monthly calculation of NRW volume and ratio (and other prioritized PIs related to NRW volume if any) **for each DZ** (or large DMA) **has been continuous and accurate based on synchronized bulk meter reading and customer meter reading in each DZ. Meanwhile, periodical discussions based on the calculated results have been sufficiently held among relevant staff for improving NRW reduction activates including prioritization of certain DZs.**	1	20	25	75	■	■	■	■	■	■	■	■	■	■	■	■	■						60	Report all the NRW Monthly.	Budgeted	NRWE,	1-Apr-19	in progress			
			5) Sufficient sluice valves have been installed (e.g. at the roots of each prioritized branch distributing pipelines) **and are fully operational, which can sufficiently sub-divide each DZ not only for flow control** (e.g. to limit the areas affected by pipeline repairs requiring suspension of water supply, to make water supply more even within each DZ, etc.) **but also for implementing step tests effectively in each DZ for efficient identification of the pipelines causing a significant amount of leakage.**	1	20	25	75	■		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	all valves that isolate atleast 3NO. DMAs to be installed.	5M	NRWE,NME	1-Jun-19	yes			
			6) Abnormal flow monitoring system using sufficient bulk meters (including the zonal bulk meters, bulk meters on transmission lines and major distribution lines within DZs including DMA meters, bulk meters installed on high risk pipelines having recurrent bursts, illegal connections, etc.) **has been sufficiently established and is being utilized continuously** (e.g. through manual meter reading and direct data entry into a cloud-based spreadsheet with smartphones, selective use of GSM, GPRS, AMR and SCADA for bulk meters in remote areas, etc.) **to shorten the time required for finding new bursts, large leaks and large illegal water uses.**	1	20	20	75	■	■	■	■	■	■	■	■	■	■	■	■	■						50	Undertake minimum night flow two times in a month.	0.2M	NRWE,	1-Oct-19	in progress			
		(3) District Metered Areas (DMAs)	**[B]-(b)-(3) Sum-up 14: *i)* Sufficient District Metered Areas (DMAs) have been isolated. Monthly calculation of NRW volume and ratio** (and other prioritized KPIs related to NRW volume) **in each DMA has been continuous and accurate based on *ii)* synchronized bulk meter reading and customer readings in each DMA. *iii)* The bulk meters measuring the inflow into each DMA are well maintained and read accurately every month without significant delay. *iv)* The customers have been categorized into each DMA on WSP's meter reading / billing system for calculating the total billed consumption of each DMA easily.**	4	30	40	80		■	■	■															50	installation and replacement of bulk meters, carry out MNF and ZPT,undertake workshop on caretaker approach.	3M	Mar-19	NRWE,NME,SCM,HOC	in progress			
			1) Sufficient District Metered Areas (DMAs) have been established. A detailed NRW monitoring plan down to the level of DMAs (or sub-DMAs of large DMAs typically having multiple inlet pipelines) **has been prepared** (preferably with GIS)**, and all the bulk meters required for the DMAs** (including the improvement of meter chambers and the installation of strainers before bulk meters) **have been installed in a way that air does not come through the meter with or without air valve near the location.**	4	30	40	80	■	■	■	■	■	■	■	■	→	→	→	→	→	→	→	→			65	Daily check on bulk meters and servicing if need be.	Budgeted	1-Mar-19	NRWE,MIE	75% done			
			2) Monthly measurement of the inflow into each DMA (or each sub-DMA of large DMAs) **has been sufficiently continuous and accurate through a periodical accuracy check of the bulk meters and quick servicing, replacement and/or calibration of inaccurate bulk meters.**	1	20	20	85	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			55	Taking Daily readings and calibration of meters	Budgeted	1-Dec-18	NRWE,MIE	for the isolated DMAs,the inflow is measured			
			3) Monthly calculation of the total billed consumption in each DMA (or each sub-DMA of large DMAs) **has been continuous and accurate based on an accurate categorization of customers by DMA.** (Meter reading route assigned to each customer in the existing meter reading / billing system may be utilized in sorting the customers into the DMAs, however the accurate categorization of customers usually require locations of customer meters overlaid with DMA boundaries on GIS for confirmation. Addition of new data fields to the existing meter reading / billing system may be required at this stage for assigning a DZ name/code and a DMA name/code to each customer for customer categorizations by DZ and DMA.)	1	20	20	80	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		60	Monthly reporting of NRW% of atleast 3NO. DMA and making action point	Budgeted	1-Dec-19	NRWE	yes,on the isolated DMAs			
			4) Monthly calculation of NRW volume and ratio (and other prioritized PIs related to NRW volume if any) **for each DMA has been continuous and accurate based on synchronized bulk meter reading and customer meter reading at each DMA** (or sub-DMA of large DMAs)**. Meanwhile, periodical discussions based on the calculated results have been sufficiently held among relevant personals for improving NRW activates including prioritization of certain DMAs.**	1	20	20	80	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		60	Monthly reporting of NRW% of atleast 3NO. DMA and making action point	Budgeted			yes			

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				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
								1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun								
(a) Authorized Unbilled Consumption & Water Balance Table		(1) Authorized Unbilled Consumption	**[B]-(c)-(1) Sum-up 15: The total metered and unmetered authorized unbilled consumptions of a recent year have been estimated based on metered consumption or typical flow and frequency of each consumption item. Meanwhile, the effective policies and measures have been put in place to reduce unintended, unnecessary and/or excessive consumption of authorized unbilled public and the WSP's water uses.**	4	55	60	90																			75	installation of 16 number of meter on fire hydrant	budgeted	Dec-18	NRW,NME, SCM	yes			
			1) Annual metered authorized unbilled consumption of a recent year for the entire SA has been estimated with sufficient accuracy based on metered consumption data of each metered authorized unbilled water use type.	1	20	20	100				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		85	Installation of meters in all 35NO.firehydrants and undertake monthly readings	0.4M	1-Jun-19	NRWE,	not yet			
			2) Annual unmetered authorized unbilled consumption of the same recent year for the entire SA has been estimated with sufficient accuracy based on the estimation of each unmetered authorized unbilled consumption type (e.g. quantifying via formulae (time x typical flow) based on reliable records of each occurrence measured with temporary flow meters, etc.)**.**	1																												not yet			
			3) For a sound management of authorized unbilled consumption, actual conditions and necessity of authorized unbilled public water uses (e.g. public parks, toilets, faucets, etc., fire fighting, and supply to special areas such as low income areas) **have been sufficiently grasped and relevant policies including the reduction of unbilled users have been sufficiently improved** (e.g. through the introduction of subsidy or instalment plan for connection free for low income population, etc. and identification of excessive public water uses and awareness raising)**.**	1	20	20	100				→	→	→	→	→	→	→	→	→	→	→	→	→					70	Involvement of county Government of kisumu to take responsibility of consumption at firehydrants		1-Dec-19	HOCs	yes			
			4) Actual conditions and necessity of authorized unbilled consumption for WSP's institutional uses (e.g. flushing of distribution pipes with water, cleaning of distribution basins/tanks, losses during pluming of service pipe, installation of customer meters, etc.) **have been sufficiently grasped and relevant policies have been sufficiently improved** (e.g. through identification of excessive institutional water uses and awareness raising)**.**	2	30	30	70				→	→	→	→	→	→	→											60	Formulate template for washout procedure and implement it.	budgeted	1-Dec-19	NRWE,	yes			
		(2) Commercial Losses	**[B]-(c)-(2) Sum-up 16: *i)* The relevant WSP staff understand that actively working on the reduction of commercial losses is a prerequisite for establishing a representative** (not misleading and harmful) **water balance table of the WSP. Meanwhile, the total yearly volume of each commercial loss components** (i.e. those due to data handling errors, inaccuracy of customer meters, and illegal water uses) **have been accurately estimated for the same recent year based on *ii)* a sufficient analysis of meter reading / billing data, *iii)* data collected through active meter accuracy tests to a sufficient number of customer samples of different consumption levels, and *iv)* sufficient records from active investigation of illegal water uses.**	4	40	40	90																					60	public awareness on illegal activities,reducing of average billed meters to less than 5%	budgetted	continuous	HOC,ZC,NRW,INSPECTION TEAM	in progress			
			1) It is well understood by WSP staff working for NRW reduction that the accuracy of water balance table is largely depend on the accuracy of estimating different types of commercial water losses and that the WSPs not actively trying to reduce commercial losses have a very strong tendency to underestimate their levels of commercial losses (and thus overestimating physical losses as a result) **due to limited reliable data available for estimating the commercial losses.** (Therefore, the active reduction of all component of commercial losses is prerequisites for establishing a representative (not misleading and harmful) water balance table of the WSP.)	2	20	20	80					→	→	→	→	→	→	→	→	→								50	Training of NRW staffs by an external person atleast once in every 3months	0.4M	1-Apr-19	HRM,NRWE	yes			
			2) The commercial loss of the same recent year due to data handling errors including inaccurate and/or improper estimation of customers' consumption (e.g. unmetered billed consumption, metered but not used for billing due to faulty meters, estimation without analysing past consumption data, etc.) **has been estimated with sufficient accuracy.** (Analysis of customer meter reading and billing data of 12 months and the comparison of past estimates with corresponding actual consumption metered with new customer meters after active replacement of faulty meters are recommended for the estimation of this commercial loss component.)	3	25	25	75																					50			1-Apr-19	HOCs,NRWE	yes			
			3) The commercial loss of the same recent year due to the accuracy errors of customer meters (whose metered consumptions were used for billing without being replaced with estimates) **has been estimated with sufficient accuracy.** (This components should be estimated based on the results of active meter accuracy tests to a sufficiently large number of sampled customer meters having different consumption levels (i.e. not those tested passively to deal with the complains on meter accuracy / suspected over-registration from customers). Regular meter accuracy testing gives more reliable data for quantifying the losses do to customer meter inaccuracy.)	2	25	30	90																					60	Implementation of metering policy	0.3M	1-Apr-19	NRWE,HOCd	yes			
			4) The commercial loss due to illegal water uses has been estimated with sufficient accuracy based on the records of illegal water uses identified in the past including the results of active investigation to a sufficient number of suspected customers.	2	25	25	60					→	→	→	→	→	→	→	→	→								60		1M	1-Jun-19	NRWE,HHOAR	yes			
		(3) Physical Losses & Completion of the Table	**[B]-(c)-(3) Sum-up 17: The total physical loss of the same recent year *i)* has been estimated** (by deducting the total yearly authorized unbilled consumption and the total commercial loss of the same recent year from the yearly NRW volume summed up from the monthly values) **and** ii) **cross-checked with the minimum night flow (MNF) measured at major distribution zones** (or large DMAs). (MNF measurements are difficult to conduct under intermittent supply.) **Then, *iii)* the estimated total physical loss has been further sub-divided into different physical losses categorized by facility type** (i.e. major facilities with structures, pipelines and service connections) **while completing the water balance table by entering all the calculated yearly volume of NRW components.**	4	50	50	95					→	→	→	→	→	→	→	→	→								70	installation and replacement of bulk meters on major distribution line,undertaking atleast 2 minimum NF,training on staff on how to fill,capture and analyse inflow measurement data.	budgetted	Dec-18	NRW,NME, HOC	in progress			
			1) The total yearly physical water loss of the same year in the entire SA has been estimated by deducting the estimated authorized unbilled consumption and the estimated commercial losses from the total annual NRW volume.	1	25	25	70								→	→	→	→	→	→	→	→	→	→	→			60	installation and replacement of bulk meters on major distribution line,undertaking atleast 2 minimum NF,training on staff on how to fill,capture and analyse inflow measurement data.	0.55M	1-Nov-19	NRWE,	in progress			
			2) The calculated total physical loss and the estimated volume of illegal water uses (part of it occurs at night) **have been compared with the minimum night flow (MNF) measured at the inlet points of DZs** (or large DMAs) **to understand the level of physical water loss in each DZ.** (MNF measurements are difficult to conduct under intermittent supply.)	1	25	25	65										→	→	→	→	→	→	→				55			1-Nov-19	NRWE,	in progress			
			3) The estimated total physical loss has been subdivided into a) leakage and overflow at water treatment, storage and pump facilities, b) bursts and leaks from transmission and distribution pipelines, and c) bursts and leaks from service connections (up to customer meters)**.**	1	25	25	65					→	→	→	→	→	→	→									45	Instllation of siren in all distribution tanks and pressure loggers	1.5M	1-Jun-19	MIE,EME	not yet			
			4) The annual water balance table of the recent year for the entire SA has been completed (by entering the estimated volume of each component in the table) **and shared with relevant staff as a NRW assessment tool** (which can be used for improving NRW activities in addition to the assessment/monitoring tool of monthly NRW volume and ratio in each DZ or DMA and the abnormal flow monitoring tool using frequent readings of bulk meters on major and high risk pipelines)**.**	2	25	35	80					→	→	→	→	→	→	→	→								50			NRWE		yes			
	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption		**[C]-(a)-(1) Sum-up 18: The base of sufficient and accurate metering (including *i)* 100% metering of billed customers, *ii)* preparation of effective metering policy and *iii)* sufficient cleaning and update of customer data registered in the meter reading and billing system) have been well established.**	1	75	80	100	→	→	→																		90	check up on alla new connections,follow up on company's policy	budgetted	continuous	HOC,ZC,New coonection team,NRWE	yes			
			1) 100% customer metering (including those for public fountains, stand pipes and connections of similar nature) **has been realized.**	5	92	95	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	98	implement metering policy	Budgeted	continuous	HOCs,MIE	yes			
			2) Effective metering policies for replacement, relocation, consumption estimation, etc. have been prepared to improve metering and billing practices.	3	30	50	85					→	→	→	→	→	→	→	→									· **Review meter replacement policy and start implementing it.**	Budgeted	1-Nov-19	Metering policy committee	yes			
			3) The current customer / meter reading / billing database has been sufficiently updated by cleaning data and conducting customer identification survey on ground (mainly for the inclusion of consumers missing from the system or identifying the customers registered as disconnected but actually consuming the water for free)**.** (The meter location and connection No. of each customer along with other information may be captured in the customer identification survey with handheld GPSs and/or free mobile GIS (e.g. QField) on smartphones with a accurate base map for adjusting location so that customer information to be accumulated in the customer / meter reading / billing system can be linked with a GIS later of customer meters later.)	1	40	45	90													→	→	→	→	→	→	→			· **Customer identification survey and periodic data entry in GIS 30000**	3M	1-Jun-19	HOCs,MIE NRWE	yes			

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[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	**[C]-(a)-(2) Sum-up 19: The frequency and continuity of estimating customers' consumption have been *i)* analysed and *ii)* sufficiently reduced by servicing and replacing faulty meters. *iii)* Even the accuracy of unavoidable customers' consumption estimates has been improved while *iv)* active accuracy tests of existing customer meters, *v)* replacement of identified inaccurate meters and *vi)* installation of air valves on pipelines and service connections at high points to avoid overregistaration by air are being sufficiently conducted by giving priority to larger customers** (but not only large customers).	2	70	75	100	80	review and implementing of meter policy,replacing of volumentric meters 1000 in number with velocity meters within the sealed prone ares.	budgetted	Jun-19	NRW,MIE, HOC	yes			
			1) The frequency of estimating consumption of the customers, who are supposed to be billed based on accurate metered consumption, for billing and the continuity of estimation (how many months usually passes before stopped or obviously-faulty meters get replaced) **have been analysed in a recent year for different groups of customers categorized by consumption level** (e.g. large customers consuming more than 100m3/month on average, medium customers consuming more than the upper limit of lowest tariff block charging constant such as 6 m3, and small customers consuming less than the upper limit of the constant tariff block) **based on past meter reading / billing data** (preferably at least for the last 12 months)	1	35	40	80	60	Analyse all averages and make follow ups	Budgeted	30-Jun-19	NRWE,Data Analysts	yes			
			2) The frequency and continuity of estimating customers' consumption (especially those of large customers) **have been sufficiently reduced preferably through the actions decided based on the results of the above analysis on meter reading / billing data** (e.g. servicing of all blocked meters, installation of strainers before large customer meters, replacement of all stopped and obviously-stalled meters unserviceable, etc.).	1	25	25	80	55	Analyse all averages and make follow ups	Budgeted	30-Jun-19	NRWE,Data Analysts	yes			
			3) The accuracy of estimating customers' consumption (when required) **has been sufficiently improved by estimating based on reliable past consumption data so that the NRW caused by improper estimation has become much less significant.**	1	55	60	90	70			continuous	HOCs,ZC	yes			
			4) Active & regular accuracy tests of customer meters in use (which should be done more frequently for large consumers) **are being sufficiently conducted** (e.g. by using mobile meter testers and/or calibrated buckets on site) **to guide the replacement of low-accuracy meters in a timely manner** (passive customer meter accuracy tests for complaining customers can be a small part of this active and regular accuracy tests)**.** (The costly replacement of old customer meters being used for the small customers, whose consumptions are within the lowest tariff bracket with a fixed charge, would not increase the revenue from them.)	1	45	48	85		· **Test /calibration and replacing malfunctioning meters. 3000NR per year**	Budgeted	continuous	NRWE,MIE,	yes			
			5) Air valves have been sufficiently installed on pipelines and/or service connections at high locations so that air sucked into the pipes does not go through customer meters (especially those on hills) **and does not cause over-registration and excessive internal wear-out of meters** (in case of mechanical meters) **or under-registration** (in case of ultrasonic smart meters) **especially under intermittent water supply.**	4	75	85	88	88	Installation and servicing of airvalve in main distribution pipeline	Budgeted	continuous	NME,NRWE,	yes			
		(3) Improvement of Meter Reading	**[C]-(a)-(3) Sum-up 20: In order to improve meter reading, *i)* physical measures** (such as repositioning and relocation of the customer meters which are difficult to access or read accurately) **have been sufficiently implemented. Meanwhile, *ii)* non-physical measures** (such as rotation of meter readers' routes, spot check and systematic validation of meter readings and warning & penalty to the staff involved in wrong doing) **are being implemented continuously.**	4	50	60	90	70	samplin 0f 10% average meters weekly,audit of 2 number book account per each zone monthly.	budgetted	continuous	NRWE,metering,MIE, HOC	yes			
			1) Position (i.e. height, direction such as vertical and horizontal, etc. but not location) **of installed meters have been sufficiently improved for more accurate and easy meter reading.** (Redesign of typical service connections may be required)	4	75	80	90	82	Sample all the meters and change orientation	budgeted	30-Jun-19	MIE,NRWE	yes			
			2) The installed meters at customers with locked gates, dangerous animals, etc. have been sufficiently relocated for making meter reading more easy and continuous (e.g. change to a copolymer meter that is effective against meter theft and install it outside of fencing structure)**.** (Redesign of typical service connections may be required.)	2	25	35	75	50	Give notice to all customers whose gate are ever locked	budgeted	30-Jun-19	HOCs, ZCs	in progress			
			3) Rotation of meter readers' routes (e.g. every 6 months) **is being sufficiently and effectively done to reduce corruption and inaccurate meter reading.**	1	25	25	80	40	Rotation of meter readers in selected 10NO Routes/books	budgeted	30-Jun-19	HOCs, ZCs	yes			
			4) Spot check of initial meter readings (e.g. by meter reading supervisor) **and systematic validation of meter readings** (e.g. automatically by a software system or manually by system operators) **are being sufficiently and effectively done to improve meter reading accuracy.**	1	35	40	85	50	Carry out mass spot check at given time by all managers.	budgeted	Continuous	NRWE,MIE	yes			
			5) Warning and penalty to the staff, who have purposely kept conducting wrong meter readings or unjustifiable underestimation of consumption, have been sufficiently exercised to reduce staff's involvement in wrong doing.	2	30	30	50	70	Penalty on any staff found doing illegal activities				not yet			
		(4) Additional Focused Management of Large Customers	**[C]-(a)-(4) Sum-up 21: Additional measures for managing large customers such as *i)* account integration of customers having multiple meters at the same premises, *ii)* frequent visual inspection and additional meter reading, and *iii)* proper sizing of customer meters have been sufficiently conducted and are continuing.**	3	70	75	95	85	daily checking of all larger consumers,installation/replacement 200 in number EMF	budgetted	continuous	HOC,ZC,NRWE,MIE	yes			
			2) Frequent visual inspection and additional meter reading at large consumers (e.g. every week, etc.) **are being sufficiently conducted to minimize the loss of revenue caused by the meter inaccuracy worsened in between monthly meter readings.**	2	40	55	70	60	Inspect, calibrate and test all anomalies meters and replace if need be. Undertake 10% sampled meters spot check .				yes			
			3) Sizing of customer meters (particularly those for large consumers) **has been sufficiently improved based on expected maximum flow ranges.** (It is important to avoid small customer meters with a cut-off flow rate lower than a high water flow rate often expected at the beginning of each intermittent water supply period especially in low laying areas with high water pressure.)	4	60	65	90						yes			
		(5) Use of Other Hardware & Software Technologies for Customer Metering	**[C]-(a)-(5) Sum-up 22: Hardware and software technologies related to NRW** (other than those for leak survey and GIS) **such as *i)* a well-equipped workshop for servicing and testing meters, *ii)* a robust computerized meter reading / billing system, *iii)* handheld meter reading devices (e.g. with smartphones), *iv)* copolymer meters and smart meters, etc. have been considered and utilized sufficiently to reduce NRW further.**	4	75	80	100	85	initiating certification of meter test bench,installation of smart meters 54 in number,more trainings of meter readers on the use of capturing data.	2M	Dec-18	NRWE,MIE,HOC,ZC	yes			
			1) A meter workshop with sufficient equipment and materials has been established to support regular servicing of removed bulk and customer meters and testing of new and exiting customer meters. (A water meter test bench may be installed especially at large WSPs.)	5	45	75	95	85	Accreditation of metering test bench	1M	1-Jun-19	MIE,	yes			
			2) A robust computerized meter reading / billing system with high data handling and reporting capabilities (including abnormality report) **is being used for improving work efficiency, reducing data handling errors and identifying stalled meters and possible illegal water uses.**	3	45	70	95	85			1-Jun-19	MIE,	in progress			
			3) Handheld meter reading devices (e.g. smartphones with a meter reading software program (with GPS capabilities) linked to the meter reading / billing system) **have been fully and effectively introduced to improve meter reading accuracy and reduce meter handing errors.**	1	10	10	95	40	All the mobile smartmeters should be linked to GPS	5M	1-Jun-19	GIS,ICT Managers	yes			
			4) Embracement of innovative and/or more accurate metering technologies (e.g. different type of copolymer meters which are effective against meter theft, mechanical and ultrasonic smart meters with automatic meter reading (AMR) and anti-tampering functions, etc.) **have been sufficiently considered to keep improving overall accuracy.** (Customer meters having high accuracy (e.g. ISO Class C, OMIL R200, etc.) at low flow rate may be required especially when large and medium customers use receiving water tanks into which water goes slowly in comparison to the direct connection to taps. The use of more expensive high accuracy water meters for the small customers, whose consumptions are within the lowest tariff bracket with a fixed charge, would not increase the revenue from them.)	2	20	25	70		· **Improve metering and billing in major consumers by installing of EMFs, smart meter. 200NR EMFs**	60,000,000	continuous	NRWE,MIE, HOCs, ZCs,	yes	/50	/50	/50
	[I] Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	**[C]-(b)-(1) Sum-up 23: Preparatory activities against illegal water uses** (such as *i)* analysis on occurrences and distribution of illegal uses over the service area, *ii)* preparation of policies against illegal water uses, *iii)* establishment of effective measures to deal with the legal procedure against illegal users, *iv)* improvement of quantifying illegal uses to imposing sufficient water charges and penalties, etc., *v)* prevention of unethical involvement of WSP staff, *vi)* establishment of incentives for whistle blowers, etc.) **have been sufficiently conducted.**	3	40	40	60	50	frequent inspection on the suspects carrying out illegal activities,	budgetted	continuous	NWRE,inspection team,	yes			
			1) Occurrences of illegal uses (e.g. meter tampering, meter bypass, illegal connection, Illegal reconnection, meter reversal, fetching before meter) **and the influence of informal settlements have been sufficiently analysed and discussed for prioritizing areas for reducing illegal uses.** (Note: Both the Illegal self-reconnections of disconnected customers having stopped meters and the unsuccessful disconnections with faulty stop cocks & stopped meters would cause a large amount of NRW without being noticed for a long time if special attention is not paid to them.)	3	65	70	90	75	Enhancing more efficiency in management of DMM	budgetted	Continuous	HOCs,Pro poor Coordinator,NRWE	yes			
			2) Clear and sufficient policies against illegal water uses (e.g. how to identify all known illegal water uses, how to prevent illegal water uses, etc.) **have been prepared and informed to relevant staff.**	4	60	60	88	75	Awareness of the policy to the public and staffs	0.5M	Continuous	Inspection team, CCM,HOCs, NRWE	yes			
			3) Effective measures to deal with the legal procedure against suspected and confirmed illegal water users (e.g. inclusion of a heavy penalty in the county's water act) **have been sufficiently established.**	5	75	78	92	80	More inspection staffs and more incentives to illegal cases reported.	budgetted	Continuous	Inspection team, CCM,HOCs, NRWE	yes			
			4) Each occurrence of illegal water use is quantified via formulae (time x typical flow) **or similar methods for imposing illegal users with sufficient charge for their water consumption and substantial penalties as well as for analysing the number and scale of illegal water uses.**	2	25	30	70	55	Training of inspection staffs on the use of the formular	0.4M	30-Jun-19	HRM,HOAR	not yet			
			5) Prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers) **have been sufficiently established.**	3	40	45	80	55	Awareness and punish staffs who get involved in illegall activities.	budgetted	Continuous	HRM,MD	in progress			
			6) Incentives for whistle blowers to inform illegal uses and vandalism to water supply facilities have been sufficiently established.	5	70	70	95	80	More incentives and rewards to report cases.	budgetted	Continuous		yet			

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	(b) Management of	(2) Enforcement of the Reduction of Illegal Uses on the Ground	**[C]-(b)-(2) Sum-up 24: The policies and measures against illegal water uses have been sufficiently enforced on the ground** (e.g. through *i)* an active patrol, *ii)* sufficient involvement of the county's law enforcement, *iii)* relocation of customer meters to the outside of premises or close to the distribution pipeline, *iv)* use of pipe materials and equipment effective against illegal uses, *v)* installation of a master customer meter or individual meters outside of each large residential buildings, *vi)* other measures such as disconnection at tapping points and the use of sealing over meter liners, etc.).	3	30	30	60	→	→	→	→																	40	frequent check up of illegal activities,	budgetted	continuous	NRWE,inspection team,	yes			
			1) Active patrol for finding recurring illegal connections, meter tampering, illegal self-reconnections, unsuccessful disconnections, etc. (including regular spot checks on large customers such as factories, farms and construction sites) **have been sufficiently conducted by dedicated inspectors supported by the WSP's top managers** (with the use of chlorine DPD tablets, electric conductivity meter, detecting equipment, etc.)**.**	3	40	45	75																					50	Training and use of equipments that aids in finding illegal connections	0.5M	31-Dec-19	HRM,NRWE,HOAR	yes			
			3) Installed existing meters (especially those at customers suspicious of illegal water uses such as meter bypass) **have been sufficiently relocated to limit the space available for illegal connections, meter bypass, fetching before meter, etc.** (e.g. relocation to the outside of fencing structure, relocation close to the distribution pipes but still within the premise or fencing (preferably to a location visible from the outside), etc.) (Redesign of typical service connections may be required.)	2	25	28	70																					50	All new connection should be done to allow meter to be installed near the offtake, All the meters for consumers suspected to be involved in illegal activities should be relocated.	budgeted	continuous	NRWE,MIE,Inspection team	yes			
			4) Equipment and materials effective for reducing illegal water uses (e.g. HDPE pipes which are relatively difficult to connect illegally, copolymer meters which can be put outside of premises or fencing to prevent illegal connection without having a high risk of meter theft targeting metals, etc.) **have been sufficiently used.**	2	25	30	70	Þ	Þ		Þ	Þ	Þ																	Change the policy on the use of HDPE	10M	continuous	HOTS,NME,PDCE	yes			
			5) Metering for the residents in large residential buildings (where water theft may exist inside the building) **has been sufficiently improved** (e.g. by relocating individual meters to the outside of buildings or by installing a master meter for the building owner / landlord outside and collect water charge based on master meter readings)**.**	3	25	30	75																					50	Relocate all the meters near the offtake and ensure all meters are installed before underground tank.	budgeted	continuous	NRWE,MIE,Inspection team	in progress			
	(a) Active Identification of Visible Water Losses	(1) Overflow & Line Patrol	**[D]-(a)-(1) Sum-up 25: Visible physical water losses** (such as overflow, leaks from exposed facilities, and surface leakage from underground facilities, etc.) **have been sufficiently reduced through *i)* improvement of water containing structures, *ii)* active patrol along pipelines, *iii)* relocation of pipelines to road reserves for easy patrol, *iv)* advice to the customer causing overflow from their tanks, etc.** (in addition to responding to customers' reporting of leaks and bursts).	3	70	70	90			Þ	Þ																	78	rehabilitation of major distribution tanks,intallation of serenes on the major distribution tanks	5M	Jun-19	NME,HOC,NRWE	yes			
			1) Overflow from WSP's water containing facilities such as distribution reservoirs, break pressure tanks (BPT), etc. has been sufficiently reduced (e.g. by improving the operation of transmission pumps to distribution reservoirs, by observing a water-level-change of a distribution reservoir for 24 hours with closed inlet and outlet valves after filling up the reservoir, by avoiding the tempering of float valve at BPTs for irrigation with the lids locked with keys, etc.).	4	60	70	95	→			→	→	→	→	→	→	→	→	→	→								70	rehabilitation of major distribution tanks,intallation of serenes on the major distribution tanks	1M	30-Jun-19	MIE,PDCE,EME	in progress			
			2) Active patrol along pipelines is being sufficiently done for early detection of visible / surface leaks from sluice valve, air valve, hydrant, pipes, etc. and water theft including illegal connections. (This patrol may simultaneously cover other aspects irrelevant to NRW such as sewage overflow and water quality problems for improving overall work efficiency of the WSP.)	3	70	75	92	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Replacing of worn out appertunances.	5M	Continuous	NRWE,NME,SCM	in progress			
			3) Relocation of pipelines to road reserves, etc. has been sufficiently done for effective patrols.	3	50	50	80																					55	Involvement of Authorities to allow for pipeline	2M	30-Jun-19	NME,PDCE	in progress			
		(1) Daily Use of Listening Sticks by Wide Users	**[D]-(b)-(1) Sum-up 26: Listening sticks are being used daily by many field staff** (e.g. NRW task team, O&M staff, meter readers, etc.) **at and around customer meters, along pipelines, etc. for *i)* identifying abnormal sound of underground leakage, *ii)* locating leaking points, buried valves, etc., *iii)* checking complete closure of gate valves, stop cocks, etc. and *iv)* checking whether water is being used through the possibly faulty customer meters registering zero consumption every month.**	2	30	30	70				→																	40	use of hand pressure test on a new connection,pressure pump test.	budgetted	Mar-19	NRWE,HOC,SCM,JAICA,	not yet			
			1) Listening sticks (or called sounding bars) **are being used daily by field staff** (e.g. those in charge of initial installation, servicing and replacement of customer meters, member of NRW task team, possibly meter readers, etc.) **at and around customer meters for detecting abnormal sound of invisible leakage** (and illegal connections) **on service pipes.** (Leak detection equipment may be used to confirm the existence and location of suspected leaks (and illegal connections)	2	25	30	70					→	→	→	→	→	→	→	→									40	Training of relevant staffs on how to use the equipment	DONATED	1-Jun-19	NRWE,MIE,HRM	not yet			
			2) Listening sticks are being used daily (by water distribution / O&M staff, etc.) **at appurtenances on transmission and distribution pipelines such as valves and hydrants for detecting abnormal sound hinting invisible leakage, locating buried valves and checking whether valves can be closed completely or not.** (Leak detection equipment may be used to confirm the existence and location of suspected leaks.)	2	25	30	70					→	→	→	→	→	→	→	→									40	Training of relevant staffs on how to use the equipment	DONATED	1-Jun-19	NRWE,MIE,HRM	not yet			
			3) (Commercial & Physical Losses) Listening sticks are being used by meter readers and/or their supervisors at previously-disconnected (and possibly illegally self-reconnected) **customer meters registering zero consumption, in order to easily check whether water is being used through a potentially faculty customer meters without being registered** (before disconnecting the service connection at the linier after the meter to see if water runs through the meter without being registered)**. This activity probably result in finding leaks from the service connections through hearing abnormal sound at the customer meters.** (Disconnected service connections having stopped meters may have been self-reconnected by customers illegally, which may be causing a large amount of illegal water use without being notified for a long time. Unsuccessful disconnections with faulty stop cocks and stopped customer meters may also be causing a large water loss without being noticed for a long time.)	2	10	10	60									→	→	→	→	→	→	→	→	→	→			25	Train atleast 50 meter readers and their supervisors on how to use listening stick.	1M	1-Jun-19	NRWE,MIE,HRM	not yet			
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	**[D]-(b)-(2) Sum-up 27: The areas, branch pipelines and specific locations causing significant underground leaks within the DZs and/or DMAs prioritized for leak detection are being narrowed down efficiently by conducting *i)* step test with a bulk meter or portable UFM with gate valves and/or *ii)* customer-to-customer survey with listening sticks** (depending on the structure of target distribution pipelines - tree-type or looped) **before *iii)* using more sophisticated equipment such as electronic leak detector and noise correlator to pinpoint leaks.**	2	30	30	70				→																	45	more training and workshops of staff on use of listening stick and other devices for leak detection.	3M	Jun-19	NRWE,HOC,SCM,JAICA	not yet			
			Step 1: In addition to the monthly monitoring of NRW volume & ratio in established DZs and/or DMAs, minimum night flow (MNF) measurements have been sufficiently conducted (with zonal bulk meters or portable ultrasonic flow meter (UFM) especially when abnormal flow is identified with the existing bulk meters selected for continuous abnormal flow monitoring) **to prioritize certain DZs and/or DMAs for leak survey** (and to assess their baselines of physical losses)**.** (This prioritization may also be conducted through a participatory decision making through discussions.)	1	20	40	80									→	→	→	→		→	→	→					50	Undertake atleast 2times MNF per month	0.2M	31-Dec-19	NRWE	yes			
			Step 2: Separate identification of the areas having tree-type distribution pipelines (and looped distribution pipelines which can be temporally cut with gate valves to make tree-type pipelines) **and the areas having looped distribution pipelines** (which cannot be cut temporally into tree-type pipelines) **within the prioritized zone(s) and/or area(s).**	3	10	10	70					→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	30				GIS analysts,NRWE,PDCE, NME	not yet			
			[[Tree-type Pipelines (& looped pipelines which can be temporally cut with gate valves to make tree-type pipelines) **with Sufficient Gate Valves to Control Flow into Branch Pipelines – e.g. Surrounding Areas]]** **Step 3: Step test with a bulk meter or portable ultrasonic flow meter (UFM) at night by closing the gate valves installed at the roots of branch lines one by one** (possibly done while MNF measurement is conducted and network isolation is confirmed) **to identify branch lines suspicious of causing relatively large leaks**	3	10	10	70					→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	30				GIS analysts,NRWE,PDCE, NME	not yet			
			Step 4: Customer-to-customer listening stick (abnormal sound) **survey at and around the customer meters on all the service pipes connected to the identified branch lines suspicious of causing large leaks**	3	10	10	70					→	→	→	→	→	→	→	→	→	→	→	→	→	→	30				GIS analysts,NRWE,PDCE, ZCs	not yet			

Category L	Category M	Category S	Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
								1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun								
[D] Reduction of Physical (Real) Losses	(a) Improvement of Workmanship & Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Require	**[D]-(c)-(1) Sum-up 28:** ***i)*** **Each new installation of service connections and pipelines is tested with a hand pump** (or powered pump) **for checking the existence of leaks. Meanwhile, the WSP has been** ***ii)*** **responding to the notifications on bursts and leaks from the public** (and internal communications on the bursts and leaks found by WSP staff) **very well with speedy and quality repairs and** ***iii)*** **recording them in details including their response time and GPS coordinates for analysing them later** (not only statistically but also spacially on GIS).	2	40	40	75																	50	introduce use of HDP pipes,review of new connection policies to allow the company take control over quality of materials,introducing of analytical tool for leak and bursts and implementing it.	5M	continuous	NME,NRWE,new connection incharge.	This is partially done mostly on connection suspected to be poorly done.			
			1) Assessment of service connection installation quality with hand pump tests and improvement of the installation are being sufficiently conducted.	2	20	20	60					→	→	→	→	→	→	→	→	→	→	→	→	30	Purchase of hand pump, training of staffs on how to use it	0.4M, Donor	1-Jun-19	NRWE,HRM	yes			
			2) Assessment of distribution pipeline installation quality with pressure tests using hand or powered pump and improvement of the installation are being sufficiently conducted.	2	20	30	80															40	All the new extended pipeline must be pressure tested before put in use.	Budgeted	Continuous	PDCE,NME,NRWE	Internal memo already posted to all technical staffs and ersonnel involves in installation of new pipeline on pressure testing			
			3) The speed and quality of burst and leak repairs have been sufficiently improved (e.g. with adoption of optimum leakage repair methods and a cloud-based work flow / task management system, etc.) **while burst & leak notifications from the public** (and internal communications on the bursts and leaks found by WSP staff) **have been sufficiently increased through the utilization and improvement of relevant ICT tools** (e.g. WASREB's MajiVoice) **and campaign / sensitization** (e.g. use of SMS, mass media, etc.).	3	70	73	90																	80	Enhance use of WASSUP and other social media to report leaks	Budgeted	Continuous	All staffs	yes			
			4) Detailed records of bursts and leaks that shows GPS coordinates (and pipeline number if any)**, pipe diameter, material, type of leak, date of detection, duration of repair, etc. are being accumulated for analysing them statistically with tables and graphs and spacially on GIS.**	2	40	45	75																	50		Budgeted	Continuous	NME,GIS Analyst.	yes			
		(2) Short-term Improvement of Pipelines & Connections	**[D]-(c)-(2) Sum-up 29: The improvement measures of pipelines and service connections which can be done within a relatively short period without a large capital investment (such as** ***i)*** **introduction of new pipe material effective for preventing leakage and illegal connections (e.g. HDPE) for new transmission and distribution pipelines and service connections,** ***ii)*** **replacement of spaghetti service connections,** ***iii)*** **closure of old leaking lines aligned in parallel to better lines, etc.) have been sufficiently carried out.**	3	30	30	80	→	→	→	→													50	introduce use of HDP pipes,review of new connection policies to allow the company take control over quality of materials,introducing of analytical tool for leak and bursts and implementing it.	10M	continuous	NME,HOC, SCM	not yet			
			1) Pipe materials effective for limiting leakage and illegal connections, etc. (e.g. HDPE pipes with compression fittings and/or with butt welding machine & generator) **have been fully introduced for new installation of transmission and distribution pipelines.**	3	20	25	70	Þ			Þ		Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	40	Introduce use of HDP pipes,review of new connection policies to allow the company take control over quality of materials,introducing of analytical tool for leak and bursts and implementing it.	10M	30-Jun-19	HOTs,NME	yes			
			2) Pipe materials effective for limiting leakage and illegal connections, etc. (e.g. HDPE pipes with compression fittings) **have been fully introduced for new service connections.** (The pipe materials and appurtenances for new service connections including customer meters should preferably be provided by the WSP to the customers with charges for better quality control of service connections.)	2	30	32	70																	40	All the new connection to use HDPE.		Continuous	NME, NRWE,PDCE	yes			
			3) Spaghetti service connections causing leakage have been replaced with branch / tertiary distribution pipelines and shorter service pipes.	2	30	30	70											→	→	→	→	→	→	→	40	All illegal supergetti in DMM To be removed	0.8M	30-Jun-19	NRWE,NME	not yet			
			4) Old leaking pipelines (in parallel to better pipelines having a sufficient capacity) have been removed or closed completely.	5	15	15	60	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	Þ	30	Replace atleast 10KM Per annum of dilapidated pipes	10M	30-Jun-19	NME, NRWE,PDCE	not yet			
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	**[D]-(c)-(3) Sum-up 30: The rehabilitation of problematic pipes & appurtenances, leaking tanks, etc. (including their replacement) has been planned from long-term financial and technical prospects** (based on the WSP's needs and prioritization over different pipes types, sizes and areas) **and has been / is being implemented as funds permits.**	4	10	20	60	Þ	Þ	Þ														40	identifying areas prone to leaks(hotspots) and replacing the old delapidated pipes,recommend all the new extension lines be done using HDPE.	5M	continuous	HOTs,NME,NRWE,	not yet			
			Step 1: Identify and prioritize problematic areas, problematic pipe types and sizes, etc. (e.g. asbestos cement pipes, old galvanized iron (GI) pipes, cast iron and steel pipes having corrosion holes and/or rust incrustation significantly blocking flow, pipes with low pressure rating (e.g. PN 7.5) in high pressure areas, etc.) **which need rehabilitation** (replacement, relining, etc.) **based on analysis of existing data such as locations of past bursts and leaks.**	3	50	55	80					→	→		→	→			→	→						60	Undertake 50km pipeline and share report to all relevant staffs for action.	budgeted	30-Jun-19	NRWE,NME,GIS	not yet			
			Step 2: Planning of rehabilitating the problematic pipes & appurtenances and leaking tanks.	2	20	25	85	→	→																40	3NO Leaking tanks to be rehabilitated.	5M	30-Jun-19	NME,EME, PDCE	not yet			
			Step 3: Incorporation of the rehabilitation plan to the WSP's strategic plan and/or the tariff approval to WASREB with required budgetary provision.	5	20	75	90	→				→				→				→					70		0.3M	30-Jun-19	HOTS, NME	yes			
			Step 4: Design, preparation of a bill of quantities and costing for rehabilitating prioritized problematic pipes & appurtenances and leaking tanks.					→				→				→														yes			
			Step 5: Implementation of the planned rehabilitation of prioritized pipes, etc. as funds permit.																											yes			
	(b) Improvement of Knowledge of Existing Water Supply Systems	(1) Basic Understanding of Existing Water Supply Systems	**[D]-(d)-(1) Sum-up 31: Based on the understanding of existing configurations and conditions of transmission and distribution facilities in the WSP** (e.g. boundaries of distribution zones (DZs) & pressure zones, elevation difference in each zone, occurrences of bursts and leaks, conditions of existing pressure reduction facilities, etc.)**, priority zones for pressure measurement have been selected.**	1	35	40	75				→													50	carry out pressure test,zoning of system network as per the source and nature of distribution	budgetted	Apr-19	HOTs,NME,PDCE,GIS analyst	in progress			
			Step 1: The boundaries of existing distributing zones (DZs) & smaller pressure zones (possibly DMAs) **and transmission & distribution facilities** (including distribution reservoirs / tanks, pump stations, pressure reduction facilities such as BPTs and PRVs and pipelines) **have been mapped sufficiently** (preferably on GIS) **and their interrelations are well understood.**	1	35	40	75																	50	carry out pressure test,zoning of system network as per the source and nature of distribution	2M	1-Dec-19	GIS,PDCE, NME	not yet			
			Step 2: Elevation difference within each DZ and/or pressure zones have been sufficiently understood (e.g. by first overlaying elevation contours and the zone boundaries and facilities (GIS layer of 25m-interval contours is available for free on the internet) or checking elevation with Google Earth, then making a table showing the elevation of storage facility and lowest and highest customers, elevation difference between the lowest and highest and the range of static pressure in each zone).	1	35	40	75																	50	carry out pressure test,zoning of system network as per the source and nature of distribution	2M	1-Dec-19	GIS,PDCE, NME	not yet			
			Step 3: Status (e.g. used, bypassed, etc.)**, capacity and conditions** (e.g. leak, overflow, etc.) **of existing pressure releasing or reducing facilities** (e.g. distribution reservoirs / tanks, BPTs, auto-PRVs, small buried PRVs with limited functions, etc.) **have been sufficiently known through visual observation, maintenance, etc.**																											in progress			
			Step 4: Priority zones have been selected for pressure measurement (based on the range of static water pressure calculated based on elevation differences, occurrences of bursts and leaks, types and age of existing distribution pipelines and service pipes, conditions of existing pressure reducing facilities, minimum night flow (MNF) measurements (if available), etc. in each zone).	3	54	60	80			→	→		→	→	→		→	→	→	→	→	→				65	All points be identify at all the distribution pipelines.	budgeted	1-May-19	NRWE,GIS,NME,PDCE	yes			

Category L	Category M	Category S	Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																{{ AP }} Annual NRW Reduction Plan for 2018-19					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
								1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun								
	(d) Pressure Management	(2) Pressure Measurement over Large Areas	**[D]-(d)-(2) Sum-up 32: Pressure measurement at planned locations** (where particularly high and low pressure is expected, before & after existing PRVs, etc.) **has been sufficiently conducted in the zones prioritized for pressure reduction** (and in the other zones having excessive pressure)**. The results of pressure measurement have been mapped for analysing pressure differences over the zones and their causes.**	2	30	30	75	→	→	→	→															50	installation of pressure loggers,	2M	Jan-19	NRWE,NME,MIE	in progress			
			Step 1: Pressure measurement points (e.g. fittings around customer meters to which pressure gauges can be easily installed) **especially for the areas where high and low residual pressure are expected** (e.g. near distribution reservoir, end of branch distribution pipes going up or down hills, end of long small-diameter pipelines including long service pipes) **and before & after existing PRVs and BPTs have been sufficiently planned on map** (preferably on GIS such as free QGIS) **for measuring maximum pressure** (which usually happens after midnight when the water demand become lowest)**, minimum pressure** (during highest-water-demand hours) **and running pressure** (during day time when the gauges are installed or removed) **for the prioritized zone(s).**	2	30	30	75			→				→	→	→	→	→								50	installation of pressure loggers,	2M	Jan-19	NRWE,NME,MIE	in progress			
			Step 2: The map showing the planned pressure measurement points for the prioritized zones have been shared with surveyors who measure pressure on the ground. (If the measurement is planned on GIS, this step can be done with mobile GIS software on smartphone such as MAPinr, Google Earth, QField, SW Map, etc.)	2	10	10	80					→	→	→	→	→	→	→	→							50	Share of GIS map to all the surveyors.	0.1M	31-Dec-18	NRWE,GIS Analysts	in progress			
			Step 3: The running, maximum and minimum residual pressure (at the planned pressure measurement points in the priority zones) **have been measured with pressure gauges having red maximum pressure pointer** (which can also be used for measuring minimum pressure by relocating the red maximum pressure pointer under the black running pressure pointer) **and/or pressure loggers.**	2	10	10	80					→	→	→	→	→	→	→	→							50	Share of GIS map to all the surveyors.	0.1M	31-Dec-18	NRWE,GIS Analysts	in progress			
			Step 4: Pressure data measured in the priority zones have been mapped (over zone boundaries and distribution facility locations) **and analysed spacially** (preferably on GIS) **in considerations of the influencing factors of measured high and low pressures and necessity of pressure reduction.**	3	20	25	70			→	→	→		→	→	→	→									50	weekly recording of All the pressure data and analysing them	budgeted	1-Mar-19	NRWE,GIS Analysts,Data analysts	in progress			
			Step 5: Pressure measurement and analysis have been sufficiently repeated in other zones having excessive pressure causing many bursts and leaks.	3	20	25	70			→	→	→		→	→	→	→									50	weekly recording of All the pressure data and analysing them	budgeted	1-Mar-19	NRWE,GIS Analysts,Data analysts	not yet			
			Other (Specify) **:**																															
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	**[D]-(d)-(3) Sum-up 33: Pressure reduction measures** (e.g. large-scale zoning with distribution reservoirs & pump stations, sub-zoning with PRVs & BPTs, improvement of pump selection & operation, removal of bottleneck pipes & large hidden leaks, etc.) **have been planned and implemented for the zones and areas where high pressure is causing many bursts and leaks. Meanwhile, continuity and evenness of water supply have been sufficiently improved** (by levelling out the pressure over the service area and quickly removing air sucked into the pipelines) **partly in order to avoid rapid pipe degradation in pressure-fluctuating and intermittent water supply with air intrusion.**	3	30	30	75	→	→	→	→															50	updating of pipeline networks using GIS software,installation of pressure loggers	2M	Jan-19	NRWE,NME,MIE	not yet			
			1) Facility improvements required for pressure reduction (over the zones and areas where residual pressure has been measured) **have been planned based on hydraulic considerations** (e.g. based on simple hydraulic calculation with a free software on smartphone such as Water Project Calculator, hydraulic analysis of multiple pipelines with spread sheet, schematic or scaled hydraulic modelling with a free desktop hydraulic analysis software such as EPANET 2, etc.).	3	30	30	75			→	→			→	→	→	→									50	updating of pipeline networks using GIS software,installation of pressure loggers	2M	Jan-19	NRWE,NME,MIE	not yet			
			3) Implementation of Pressure Reduction ②**: Small-scale improvement with better sub-zoning** (e.g. with facilities for pressure reduction such as PRVs and BPTs, booster pump for a limited area, change of DZ and/or pressure zone boundaries, etc.).	3	30	30	75			→	→			→	→	→	→									50	updating of pipeline networks using GIS software,installation of pressure loggers	2M	Jan-19	NRWE,NME,MIE	not yet			
			4) Implementation of Pressure Reduction ③**: Improvement of pump selection** (e.g. consideration of optimum pump curves) **and operation** (e.g. changing the number and rotation of working pumps, installation of facilities and equipment against water hammer).	4	50	52	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			60	Install 2NO. NRV on 14" and 9" main distribution line	0.5M	1-Mar-19	NME,PDCE,NRWE	not yet			
			5) Implementation of Pressure Reduction ④**: Removal of bottleneck pipes** (or capacity argumentation with additional pipes) **and/or detection & repair of hidden large leaks have been sufficiently conducted to reduce localized large pressure drops which may accelerate water rationing and use of high-head pumps.** (The removal of bottleneck pipes and large leaks makes the pressure reduction over a zone easier (by avoiding complaints due to excessively reduced residual pressure in limited areas having bottlenecks and large leaks) so that the above pressure reduction measures ① to ③ can be applied more effectively.)	3	30	40	80	→				→	→	→	→					→	→	→	→	→	→	50	Design hydraulics of pipeline affected,Replace of smaller diameter pipe.	4M	30-Jun-19	NME,PDCE,GIS analysts,	Already planned for awaiting resources			
			6) Continuity and evenness of water supply have been sufficiently improved (within the existing limitation of water availability) **to avoid the degradation of water supply facilities caused by air intrusion, pressure fluctuation, contamination, etc.** (e.g. through solving the low pressure at customers on hills, at customers near the ends of tertiary distribution lines, at customers with long service pipes, etc. in order to avoid water rationing intended to boost pressure in the low pressure areas for supplying sufficient water while suspending water supply in other areas, through solving the air lock and uneven water pressure distribution caused by the air trapped at high locations of pipelines with additional air valves, etc.).	3	60	65	85	→				→	→	→	→	→	→	→		→	→	→	→			75	Ensure minimum interuption of water supply	budgeted	continuous	Production manager, NME, SHQ	yes			
TOTAL			**TOTAL Sum-up 34: The WSP has been reducing NRW volume and ratio for the entire service area at a sufficient rate (or at least sustaining them while existing pipes and other facilities are getting old) by successfully conducting NRW activities over the year.**	-	63	65	75	-																		70	Total		-	-	yes			

[Example Modes of Implementation]

: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
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Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Nyahururu WSP (NYAHUWASCO)

Category			Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19
							2018-19				2019-20				2020-21				2021-22				2022-23									
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Activity (Required Work & Materials: quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)	Remarks on the Implementation by the End of 1st Quarter
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	**[A]-(a)-(1) Sum-up 1: A dedicated NRW task team having sufficient staff is fully operational** (in good coordination with other relevant commercial and technical staff) **and well motivated by a strong support from the top managers and GIS / ICT staff.**	1	60	70	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	See the breakdown below.					
			1) Buy-in (strong support) **from the top managers of WSP** (e.g. MD, TM and CM/FM) **has been acquired for improving NRW reduction activities** (including the establishment or reinforcement of dedicated NRW Task Team)**.**	1	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	As stated on the left.		THROUGHOUT	MANAGEMENT	TARGET ACHIEVED	ACHIEVED
			2) NRW Task Team (unit, section or department) **consisting of sufficient staff** (e.g. technical officer, plumbers, etc. fully-dedicated in reducing commercial and physical water losses) **has been established and is currently fully-operational.**	1	70	90	100	→	→	→	→	→	→	→	→													95	TRAININGS AND BENCHMARKING	400,000	Jun-19	TM, HR	BUDGETED	DEPLOYMENT OF MORE STAFF, PLANNED FOR 2ND QUARTER
			3) Strong communication between commercial and technical staff has been sufficiently established for effective and efficient NRW reduction activities (e.g. through monthly inter-departmental meetings for NRW reduction and use of information technologies (such as WhatsApp, customized internal system for task allocation and monitoring, etc.)**.**	1	40	70	100							→	→	→	→	→	→	→	→	→	→	→	→	75	FREQUENT MEETINGS	100,000	CONTINOUS	TM,CM		3 MEETINGS HELD
			4) Sufficient GIS and/or ICT staff (e.g. GIS operator, administrator of meter reading / billing system, field surveyors, etc.) **have been employed and are available for supporting the NRW task team.**	1	40	60	100	→	→	→	→	→	→	→	→													80	PURCHASE OF SURVEY EQUIPMENT.	600,000	Jun-20	TM,CM	TO BE BUDGETED	GIS AND ICT OFFICERS PRESENT
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	**[A]-(a)-(2) Sum-up 2:** ***i)*** **WSP staff have been sufficiently sensitized for NRW reduction. Besides,** ***ii)*** **operational financial losses due to NRW,** ***iii)*** **additional investment** (required for additional water resource and water supply facility development) **required due to excessive NRW and** ***iv)*** **effective measures for improving revenue collection at the WSP have been sufficiently discussed among relevant staff** (i.e. not only those related to NRW - up to billing - but also those in charge of revenue collection) **based on data for enhancing their motivation & team work towards a robust financial improvement.**	3	80	95	99																					96	See the breakdown below.					
			1) WSP staff have been sufficiently sensitized for NRW reduction (through meetings, warning to staff for not being involved in water theft, request for active notification of surface (visible) leakage & water theft and cooperation in relevant data collection, etc.)**.**	1	70	90	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	95	SENSITIZATION MEETINGS	100,000	CONTINOUS	HR		3 MEETINGS HELD
			2) A recent annual NRW volume has been converted into operational financial losses (by multiplying the volume with calculated average tariff (KSh./m3) and unit production cost (KSh./m3) based on an roughly-assumed balance of commercial losses and physical losses (e.g. authorized unbilled + commercial losses = around 60%, physical losses = around 40%) **and sufficiently informed to relevant staff** (with an explanation on the higher per-m3 operational financial loss caused by commercial water losses (i.e. average tariff ((total revenue - grant revenue) / annual billed consumption) is usually about 2 times higher than unit production cost (total O&M cost / annual production))	2	20	20	100			→	→																	100	As stated on the left.		Jun-19	OE/NRW		PLANNED FOR 3RD AND 4TH QUARTER
		(3) Enhancing Support from Customers	**[A]-(a)-(3) Sum-up 3: Support from customers required for NRW reduction has been sufficiently enhanced through** ***i)*** **water bills or SMSs carrying messages, ii) toll free telephone number, low cost SMS number, etc. for customers to notify problems** (e.g. leaks, illegal uses, etc.)**,** ***iii)*** **a system(s) for receiving notifications and managing complains, and** ***iv)*** **awareness campaigns at communities** (e.g. baraza, water action group, etc.)**, at schools, through media, etc.**	3	80	95	99																					96	See the breakdown below.					
			1) Printed or electronic water bills, SMS, etc. carry sufficient effective messages regarding NRW (e.g. asking customers for cooperation to reduce physical & commercial losses and excessive water uses) **and sufficient contact information of the WSP.**	2	10	10	100		→	→	→																	100	As stated on the left.		Jun-19	TM, CM		PLANNED FOR 2ND,3RD AND 4TH QUARTER
			2) Toll free telephone number, low cost SMS number, etc. have been sufficiently established to encourage the public to notify problems like leaks and illegal water uses to the WSP. (Toll free telephone number may cause problems especially in the WSPs experience sever water shortage resulting in many customer complains)	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	As stated on the left.		CONTINOUS	HR,PRO		CONTINUING
			3) Customer relation has been sufficiently enhanced with a software system (e.g. WASREB's MajiVoice and a customized internal customer management system, etc.) for managing complaints and receiving notifications of problems including bursts, leaks and water theft.	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	As stated on the left.		CONTINOUS	HR,PRO		CONTINUING
			4) Awareness campaigns for reduction of NRW (e.g. water theft, leakage before customer meters, etc.) **and water save** (e.g. overflow from customer tanks and excess consumption, etc.) **in the following forms have been sufficiently conducted.**	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	HIRING OF PUBLIC ADDRESS SYSTEMS	50,000	CONTINOUS	HR,PRO		CONTINUING
			- 1. Public forum / open clinics (e.g. baraza, water action group, etc.) **for community sensitization** (especially in the	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	As stated on the left.		CONTINOUS	HR,PRO		CONTINUING
			- 2. School campaigns	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	As stated on the left.		CONTINOUS	HR,PRO		CONTINUING
			- 3. Media campaigns	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	As stated on the left.		CONTINOUS	HR,PRO		CONTINUING
		(4) Capacity Development through Trainings & Trials	**[A]-(a)-(4) Sum-up 4: Sufficient staff relevant to NRW reduction** (e.g. NRW task team members, zonal officers & plumbers in charge of O&M, GIS staff, etc.) **have been sent to** ***i)*** **various trainings of KEWI,** ***ii)*** **benchmarking workshops of WASPA and** ***iii)*** **other external training opportunities, as well as** ***iv)*** **being trained internally, in order to obtain sufficient knowledge and skills required for NRW reduction** (e.g. through field trials in a small DMA(s) and following discussions on how to reduce NRW over a large area efficiently).	2	50	95	98																					96	See the breakdown below.					
			1)-1 Sufficient relevant staff (e.g. members of the NRW task team, zone superintendents, etc.) **have been sent to KEWI's training course on NRW management.**	1	50	70	100		JICA PROGRAM																		95	TRAINING FEES (need to train other staff than those in NRW Section)	250,000	Jun-20	JICA , NYAHUWASCO , KEWI		PLANNED
			1)-2 Sufficient relevant plumbers and other field staff have been sent to KEWI's other training courses relevant to NRW reduction (e.g. plumbing, metering, service connection installation, O&M of distribution system, etc.)	2	30	50	100																					90	TRAINING FEES	250,000	Jul-20	JICA , NYAHUWASCO , KEWI		PLANNED
			1)-3 Sufficient relevant ICT & GIS staff and other technical officers has been sent to the GIS-related trainings courses of KEWI and/or Kericho WSP.	2	50	60	100																					90	ALLOWANCES	100,000	Aug-20	JICA , NYAHUWASCO , KEWI		PLANNED
			2) Sufficient relevant staff have been participating in the benchmarking meetings and trainings of WASPA (supported by VEI) **for collective learning among WASPA members.**	3	40	60	100	→		→		→		→		→		→		→								100	TRAINING FEES/ALLOWANCES	200,000	Dec-18	NYAHUWASCO/WASPA		PLANNED FOR 2ND QUARTER
			3) Sufficient staff have had opportunities of trainings held by donor organizations (e.g. JICA, VEI, SNV, WB, EU, etc.) **and other Kenyan institutions** (e.g. WSB, other prominent WSPs, etc.)**.**	2	50	60	100	JICA PROGRAM				JICA PROGRAM															80	JICA EXPERTS, TRAINING EQUIPMENTS		Jun-19	JICA		MNF MEASUREMENTS, STEP TEST, PRESSURE TEST,BULK METER TEST,CUSTOMER METER TEST, LEAK DETECTION.
			4) Sufficient in-house training (including on-the-job training (OJT)) **for various NRW activities has recently been conducted at the WSP.**																															
	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(1) Participatory Review, Planning & Monitoring of NRW Activities	**[A]-(b)-(1) Sum-up 5: In reference to relevant upper level plans of the WSP,** ***i)*** **review of the NRW activities carried out in the previous financial year,** ***ii)*** **assessment of current conditions and** ***iii)*** **preparation of medium-term and annual NRW reduction plans have been conducted in a way sufficiently participatory among relevant staff with considerations of cost requirements. Meanwhile,** ***iv)*** **the periodical monitoring of NRW activities** (e.g. quarterly) **is being conducted.**	2	80	90	100	→		→		→		→		→												95	PERFORMANCE REVIEW MEETINGS		Jun-19	TM,OE,NRW TEAM		NRW REVIEW MEETINGS ARE HELD EVERY QUARTER
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	**[A]-(b)-(2) Sum-up 6:** ***i)*** **The various data required for calculating the NRW-related key performance indicators (KPIs) prioritized at the WSP are periodically and systematically collected with ease** (e.g. monthly, quarterly and annually)**, and** ***ii)*** **changes in calculated values of the KPIs are analysed for data-based internal discussions and benchmarking with other WSPs in order to improve NRW activities of the WSP.**	2	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	DAILY AND PERIODICAL METER READINGS OF BULK AND ZONAL, EXTRACTION OF BILLING DATA AND DATA	100,000	CONTINOUS	NRW TEAM		BULK METERS READ ON DAILY BASIS, NRW DATA ANALYSIS CONDUCTED MONTHLY.
	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	**[A]-(c)-(1) Sum-up 7:** ***i)*** **Based on an analysis on the types of existing pipes, fittings, meters, etc. which are causing NRW significantly,** ***ii)*** **suitable pipes, fittings, customer meters and other appurtenances have been selected for procurement in consideration of internal standardization. Meanwhile,** ***iii)*** **quality control mechanisms** (such as inspection & acceptance committee, accuracy tests of new meters and trace survey of meters' durability) **have been well established.**	2	70	90	100																					95	FORMULATION OF MATERIALS POLICY		Jun-19	TM,OE,NRW TEAM		INSPECTION AND ACCEPTANCE COMMITTEE ALREADY FORMED. HIGH QUALITY PIPES AND HIGH ACCURACY METERS IDENTIFIED AND ARE BEING PROCURD.
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	**[A]-(c)-(2) Sum-up 8: Pipes, fittings, meters and NRW survey equipment** (and hardware required for establishing and utilizing a GIS database including smartphones / tablets for mobile GIS, reliable internet access at office, airtime for data connection, transportation means, etc.) **are sufficiently available for continuously and efficiently implementing effective NRW activities** (including quick repair of bursts & leaks and quick replacement of faulty meters)**.**	2	60	90	100	JICA PROJECT						→	→	→	→	→	→	→	→	→	→	→	→	→	→	95	PROCUREMENT OF EQUIPMENT	BUDGETED	Jun-20	MINISTRY ,JICA , NYAHUWASCO		EQUIPMENT FOR UTILIZING GIS PURCHASED BY NYAHUWASCO AND OTHERS BORROWED TEMPORARILY FROM JICA TEAM

Category			Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S		Current Priority (1: highest, 2: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Activity (Required Work & Materials: quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)	Remarks on the Implementation by the End of 1st Quarter
[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	**[B]-(a)-(1) Sum-up 9:** ***i)*** **Based on the various needs of using GIS discussed at the WSP, the WSP** ***ii)*** **has already established prioritized GIS layers** (e.g. base map, major water supply facilities, customer meters, etc.) **and has been continuously** ***iii)*** **preparing other layers with less priority** (e.g. service pipes, public toilets, etc.) **and** ***iv)*** **updating the established layers** (e.g. inclusion of newly installed customer meters and service pipes, etc.) (while taking backups periodically) **with** ***v)*** **sufficiently utilization of free software programs such as QGIS.**	2	60	80	100	JICA	→	→	→	→	→															90	ESTABLISHMENT OF BASE MAPS AND LAYERS	50,000	Dec-19	GIS OFFICER		BASE MAPS MAJOR SUPPLY FACILITIES AND SOME CONSUMER METERS ALREADY ESTABLISHED IN GIS.
		(2) Mapping of NRW-related Problems	**[B]-(a)-(2) Sum-up 10: Existing problems related to NRW** (e.g. areas with many illegal connections, pipelines with many bursts and leaks) **have sufficiently been mapped both based on** ***i)*** **the perception of relevant staff through participatory mapping and** ***ii)*** **the data collected at site and results of analysing the data.**	2	40	60	100																					80	MAPPING OF PROBEMATIC AREAS IN GIS.	100,000	Jun-20	NRW TEAM, GIS OFFICER		PROBLEMATIC AREAS ALREADY IDENTIFIED.
		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	**[B]-(a)-(3) Sum-up 11: The GIS layers prepared at the WSP are** ***i)*** **being sufficiently utilized for various NRW monitoring and reduction activities at office and at site** ***ii)*** **by a wide range of staff relevant to NRW** ***iii)*** **with hard copy maps and/or free GIS-related software programs** (such as QGIS, Adobe Acrobat Reader, QField, Google Earth, MAPrir, GeoODK Collect & ODK Aggregate for field activities guided with interactive survey forms, GPS Map Camera, etc.) **on PCs, smartphones and cloud.**	3	0	50	100	JICA				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	TRAINING ON USE OF GIS DATA		CONTINUOUS	JICA ,GIS OFFICER ,NRW TEAM		GeoODK Collect & ODK Aggregate ARE CURRENTLY BEING USED.
	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	**[B]-(b)-(1) Sum-up 12: Monthly calculation of NRW volume and ratio** (and other prioritized KPIs related to NRW volume if any) **of the entire service area (SA) has been continuous and accurate based on** ***i)*** **the monthly readings of well-maintained reliable bulk meters sufficient to measure the total production** (including and excluding the water imported and exported over the boundary of SA, respectively) **and** ***ii)*** **the monthly total billed consumption of the entire service area.** ***iii)*** **Changes in the calculated monthly NRW volume and ratio are analysed every month for improving NRW reduction activities.**	1	90	90	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	95	CALCULATION OF NRW VOLUMES, TESTING OF BULK METERS		CONTINUOUS	NRW TEAM.		CALCULATION OF NRW VOLUME IS DONE MONTHLY. BULK METERS ARE BEING TESTED USING UFM BORROWED FROM JICA.
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	**[B]-(b)-(2) Sum-up 13:** ***i)*** **Sufficient Distribution Zones (DZs)** (and/or large DMAs typically having multiple inlet pipelines) **have been isolated. Monthly calculation of NRW volume and ratio** (and other prioritized KPIs if any) **of each DZ has been continuous and accurate based on** ***ii)*** **synchronized zonal bulk meter reading** (for calculating the inflow into each DZ) **and** ***iii)*** **customer meter reading** (for calculating the total billed consumption of each DZ) **for improving NRW activities including the prioritization of certain DZs.** ***iv)*** **Moreover, sufficient gate valves and bulk meters have been installed** (on major and high-risk pipelines causing many bursts and leaks)**.** ***v)*** **These gate valves and bulk meters are being well maintained and sufficiently utilized for step tests and abnormal flow monitoring in each DZ.**	2	70	80	100	→	→	→	→	JICA				→	→	→	→	→	→	→	→					85	ISOLATION OF DISTRIBUTION ZONES. INSTALLATION OF GATE VALVES AND BULK METERS		Jun-22	OE,JICA, GIS OFFICER, NRW TEAM		DEMARCATION OF DISTRIBUTION ZONES HAS BEEN DONE WITH THE HELP OF JICA EXPERTS.
		(3) District Metered Areas (DMAs)	**[B]-(b)-(3) Sum-up 14:** ***i)*** **Sufficient District Metered Areas (DMAs) have been isolated. Monthly calculation of NRW volume and ratio** (and other prioritized KPIs related to NRW volume) **in each DMA has been continuous and accurate based on** ***ii)*** **synchronized bulk meter reading and customer readings in each DMA.** ***iii)*** **The bulk meters measuring the inflow into each DMA are well maintained and read accurately every month without significant delay.** ***iv)*** **The customers have been categorized into each DMA on WSP's meter reading / billing system for calculating the total billed consumption of each DMA easily.**	2	70	80	100						→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	ISOLATION OF DMAs, SYNCHRONIZATION OF BULK AND CUSTOMER METER READINGS		Dec-19	OE, GIS OFFICER, CRO , NRW TEAM		Monthly calculation of NRW volume and ratio in some DMA is continuous
	(c) Authorized Unbilled Consumption & Water Balance Table	(1) Authorized Unbilled Consumption	**[B]-(c)-(1) Sum-up 15: The total metered and unmetered authorized unbilled consumptions of a recent year have been estimated based on metered consumption or typical flow and frequency of each consumption item. Meanwhile, the effective policies and measures have been put in place to reduce unintended, unnecessary and/or excessive consumption of authorized unbilled public and the WSP's water uses.**	3	80	90	100																			95	STAKEHOLDERS PARTICIPATION MEETING		CONTINUOUS	MD ,TM ,CM ,HR ,PRO		ONE STAKEHOLDER'S MEETING ALREADY CONDUCTED
		(2) Commercial Losses	**[B]-(c)-(2) Sum-up 16:** ***i)*** **The relevant WSP staff understand that actively working on the reduction of commercial losses is a prerequisite for establishing a representative** (not misleading and harmful) **water balance table of the WSP. Meanwhile, the total yearly volume of each commercial loss components** (i.e. those due to data handling errors, inaccuracy of customer meters, and illegal water uses) **have been accurately estimated for the same recent year based on** ***ii)*** **a sufficient analysis of meter reading / billing data,** ***iii)*** **data collected through active meter accuracy tests to a sufficient number of customer samples of different consumption levels, and** ***iv)*** **sufficient records from active investigation of illegal water uses.**	3	70	80	100	→	→	→	→	→	→	→	→	Data collection										90	ESTABLISHMENT OF WATER BALANCE TABLE. BILLING DATA ANALYSIS		CONTINUOUS	TM,OE, CRO, NRW TEAM		ANALYSIS OF BILLING DATA IS DONE MONTHLY.
		(3) Physical Losses & Completion of the Table	**[B]-(c)-(3) Sum-up 17: The total physical loss of the same recent year** ***i)*** **has been estimated** (by deducting the total yearly authorized unbilled consumption and the total commercial loss of the same recent year from the yearly NRW volume summed up from the monthly values) **and** ii) **cross-checked with the minimum night flow (MNF) measured at major distribution zones** (or large DMAs). (MNF measurements are difficult to conduct under intermittent supply.) **Then,** ***iii)*** **the estimated total physical loss has been further sub-divided into different physical losses categorized by facility type** (i.e. major facilities with structures, pipelines and service connections) **while completing the water balance table by entering all the calculated yearly volume of NRW components.**	2	60	60	100									→	→	Analysis								70	PHYSICAL LOSS CALCULATION, MNF MEASUREMENTS FOR DISTRIBUTION ZONES	50,000	CONTINUOUS	TM, OE, NRW TEAM		INHOUSE TRAINING ON INFRUSTRUCTURE LEAKAGE INDEX CONDUCTED BY JICA
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	**[C]-(a)-(1) Sum-up 18: The base of sufficient and accurate metering (including** ***i)*** **100% metering of billed customers,** ***ii)*** **preparation of effective metering policy and** ***iii)*** **sufficient cleaning and update of customer data registered in the meter reading and billing system) have been well established.**	1	90	92	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	FORMULATION OF METERING POLICY,CLEANING AND UPDATE OF CUSTOMER REGISTER		CONTINUOUS	TM, OE, CRO		METERING POLICY HAS BEEN FORMULATED
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	**[C]-(a)-(2) Sum-up 19: The frequency and continuity of estimating customers' consumption have been** ***i)*** **analysed and** ***ii)*** **sufficiently reduced by servicing and replacing faulty meters.** ***iii)*** **Even the accuracy of unavoidable customers' consumption estimates has been improved while** ***iv)*** **active accuracy tests of existing customer meters,** ***v)*** **replacement of identified inaccurate meters and** ***vi)*** **installation of air valves on pipelines and service connections at high points to avoid overregistaration by air are being sufficiently conducted while giving priority to larger customers** (but not only large customers)**.**	2	40	80	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	STAFF TRAINING ON METER TESTING. REPLACEMENT OF FAULTY/INACCURATE METERS		CONTINUOUS	OE, CRO,NRW TEAM, METER READING SECTION		CUSTOMER METER TESTING ONGOING USING SMARTPHONE ODK FORMS AND CALIBRATED BUCKET.
		(3) Improvement of Meter Reading	**[C]-(a)-(3) Sum-up 20: In order to improve meter reading,** ***i)*** **physical measures** (such as repositioning and relocation of the customer meters which are difficult to access or read accurately) **have been sufficiently implemented. Meanwhile,** ***ii)*** **non-physical measures** (such as rotation of meter readers' routes, spot check and systematic validation of meter readings and warning & penalty to the staff involved in wrong doing) **are being implemented continuously.**	2	80	90	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	METER REPOSITIONING AND RELOCATION	100,000	CONTINUOUS	OE, CRO ,NRW TEAM ,O&M		ROTATION OF METER READERS DONE QUARTERLY, METERS REQUIRING RELOCATION HAVE BEEN IDENTIFIED
		(4) Additional Focused Management of Large Customers	**[C]-(a)-(4) Sum-up 21: Additional measures for managing large customers such as** ***i)*** **account integration of customers having multiple meters at the same premises,** ***ii)*** **frequent visual inspection, additional meter reading and/or installation of two meters in series,** ***iii)*** **proper sizing of customer meters, etc. have been sufficiently conducted and are continuing.**	3	90	90	100	→	→																	100	INTEGRATION OF ACCOUNTS WITH MULTIPLE METERS		Dec-19	OE, CRO ,NRW TEAM ,O&M		INSTALLATION OF TWO METERS IN SERIES HAS BEEN ACHIEVED FOR MOST OF OUR LARGE CUSTOMERS. VISUAL INSPECTION IS DONE MONTHLY BY METER READERS
		(5) Use of Other Hardware & Software Technologies for Customer Metering	**[C]-(a)-(5) Sum-up 22: Hardware and software technologies related to NRW** (other than those for leak survey and GIS) **such as** ***i)*** **a well-equipped workshop for servicing and testing meters,** ***ii)*** **a robust computerized meter reading / billing system,** ***iii)*** **handheld meter reading devices (e.g. with smartphones),** ***iv)*** **copolymer meters and smart meters, etc. have been considered and utilized sufficiently to reduce NRW further.**	4	70	80	100	→	→	→	→	Handmade Meter Test Bench														90	ASSEMBLY OF METER TEST BENCH		Jun-20	TM , CM ,JICA		METER READING / BILLING SYSTEM IS OPERATIONAL. COPOLYMER METERS ARE BEING INSTALLED.
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	**[C]-(b)-(1) Sum-up 23: Preparatory activities against illegal water uses** (such as *i)* analysis on occurrences and distribution of illegal uses over the service area, *ii)* preparation of policies against illegal water uses which should preferably be incorporated in the county's water act, *iii)* establishment of effective measures to deal with the legal procedure against illegal users, *iv)* improvement of quantifying illegal uses to imposing sufficient water charges and penalties, etc., *v)* prevention of unethical involvement of WSP staff, *vi)* establishment of incentives for whistle blowers, etc.) **have been sufficiently conducted.**	3	80	80	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	FORMULATION OF WATER THEFT POLICY		CONTINUOUS	MD ,TM, OE ,CM ,HR ,PRO,NRW TEAM		ACTIVE PATROLS AND INSPECTIONS ARE BEING CONDUCTED.
		(2) Enforcement of the Reduction of Illegal Uses on the Ground	**[C]-(b)-(2) Sum-up 24: The policies and measures against illegal water uses have been sufficiently enforced on the ground** (e.g. through *i)* an active patrol, *ii)* sufficient involvement of the county's law enforcement, *iii)* relocation of customer meters to the outside of premises or close to the distribution pipeline, *iv)* use of pipe materials and equipment effective against illegal uses, *v)* installation of a master customer meter or individual meters outside of each large residential buildings, *vi)* other measures such as disconnection at tapping points, the use of sealing over meter liners, prevention of customers' use of suction pumps directly connected to distribution pipelines which often damage customer meters, etc.)**.**	3	80	80	100	→	→	→	→	Suport of HDPE Introduction	→	→	→	→	→	→	→	→	→	→	→	→	→	90	PROCUREMENT OF EQUIPMENT AND MATERIALS EFFECTIVE AGAINST ILLEGAL USES		CONTINUOUS	PROCUREMENT,TM ,OE, CM		

Category L	Category M	Category S	Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																				{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19
							2018-19				2019-20				2020-21				2021-22				2022-23										
				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Activity (Required Work & Materials: quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)	Remarks on the Implementation by the End of 1st Quarter
[D] Reduction of Physical (Real) Losses	(a) Active Identification of Visible Water Losses	(1) Overflow & Line Patrol	[D]-(a)-(1) Sum-up 25: Visible physical water losses (such as overflow, leaks from exposed facilities, and surface leakage from underground facilities, etc.) have been sufficiently reduced through *i)* improvement of water containing structures, *ii)* active patrol along pipelines, *iii)* relocation of pipelines to road reserves for easy patrol, *iv)* advice to the customer causing overflow from their tanks, etc. (in addition to responding to customers' reporting of leaks and bursts).	3	90	90	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	95	PATROLS	100,000	CONTINUOUS	LINE PATROLERS, NRW TEAM		PATROLS ARE CONDUCTED DAILY ALONG ALL MAIN LINES
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	[D]-(b)-(1) Sum-up 26: Listening sticks are being used daily by many field staff (e.g. NRW task team, O&M staff, meter readers, etc.) at and around customer meters, along pipelines, etc. for *i)* identifying abnormal sound of underground leakage, *ii)* locating leaking points, buried valves, etc., *iii)* checking complete closure of gate valves, stop cocks, etc. and *iv)* checking whether water is being used through the possibly faulty customer meters registering zero consumption every month.	2	0	50	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	PROCUREMENT OF LISTENING STICKS	160,000	CONTINUOUS	PROCUREMENT,TM ,OE, CM		LISTENING STICKS PROVIDED BY JICA ARE BEING UTILIZED BY NRW TEAM TO DETECT LEAKAGES
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	[D]-(b)-(2) Sum-up 27: The areas, branch pipelines and specific locations causing significant underground leaks within the DZs and/or DMAs prioritized for leak detection are being narrowed down efficiently by conducting *i)* step test with a bulk meter or portable UFM with gate valves and/or *ii)* customer-to-customer survey with listening sticks (depending on the structure of target distribution pipelines - tree-type or looped) before *iii)* using more sophisticated equipment such as electronic leak detector and noise correlator to pinpoint leaks.	2	0	50	100						→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	PROCUREMENT OF UFM FOR STEP TEST	BUDGETED		MINISTRY ,JICA , NYAHUWASCO		NRW TEAM IS USING UFM BORROWED FROM JICA TO CONDUCT STEP TEST AND QMNF.
	(c) Improvement of Workmanship & Pipe Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	[D]-(c)-(1) Sum-up 28: *i)* Each new installation of service connections and pipelines is tested with a hand pump (or powered pump) for checking the existence of leaks. Meanwhile, the WSP has been *ii)* responding to the notifications on bursts and leaks from the public (and internal communications on the bursts and leaks found by WSP staff) very well with speedy and quality repairs and *iii)* recording them in details including their response time and GPS coordinates for analysing them later (not only statistically but also spacially on GIS).	2	80	80	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	USE OF HAND PUMP TO CHECK LEAKS		CONTINUOUS	NRW TEAM ,O&M TEAM		NOTIFICATIONS ON BURSTS AND LEAKS ARE BEING ADDRESSED THROUGH OUR INTERGRATED BILLING SYSTEM.
		(2) Short-term Improvement of Pipelines & Connections	[D]-(c)-(2) Sum-up 29: The improvement measures of pipelines and service connections which can be done within a relatively short period without a large capital investment (such as *i)* introduction of new pipe material effective for preventing leakage and illegal connections (e.g. HDPE) for new transmission and distribution pipelines and service connections, *ii)* replacement of spaghetti service connections, *iii)* closure of old leaking lines aligned in parallel to better lines, etc.) have been sufficiently carried out.	3	50	50	100	→	→	→	→	→	→	→	→					⇒	⇒	⇒	→	→	→	→	→	80	replacement of spaghetti service connections, closure of old leaking lines aligned in parallel to better lines	BUDGETED	CONTINUOUS	TM , CM ,OE		CLOSURE OF OLD LEAKING AC PIPES HAS BEEN DONE IN SOME AREAS WITHIN THE CBD
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	[D]-(c)-(3) Sum-up 30: The rehabilitation of problematic pipes & appurtenances, leaking tanks, etc. (including their replacement) has been planned from long-term financial and technical prospects (based on the WSP's needs and prioritization over different pipes types, sizes and areas) and has been / is being implemented as funds permits.	4	60	60	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	rehabilitation of problematic pipes & replacement	BUDGETED	CONTINUOUS	TM , CM ,OE		REPLACEMENT OF PROBLEMATIC PIPELINE IS BEING CARRIED OUT GRADUALLY
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	[D]-(d)-(1) Sum-up 31: Based on the understanding of existing configurations and conditions of transmission and distribution facilities in the WSP (e.g. boundaries of distribution zones (DZs) & pressure zones, elevation difference in each zone, occurrences of bursts and leaks, conditions of existing pressure reduction facilities, etc.), priority zones for pressure measurement have been selected.	2	10	60	100	→	→	→	→	→	→	→	→	→	→	→	→									90	PRESSURE MEASUREMENTS AND MAPPING	50,000	Jun-21	TM ,OE, NRW TEAM		PROPOSED PRESSURE MEASUREMENT POINTS HAVE BEEN IDENTIFIED WITH THE HELP OF JICA TEAM
		(2) Pressure Measurement over Large Areas	[D]-(d)-(2) Sum-up 32: Pressure measurement at planned locations (where particularly high and low pressure is expected, before & after existing PRVs, etc.) has been sufficiently conducted in the zones prioritized for pressure reduction (and in the other zones having excessive pressure). The results of pressure measurement have been mapped for analysing pressure differences over the zones and their causes.	2	10	60	100	→	→	→	→	→	→	→	→														INSTALLATION OF PRESSUR GUAGES		Dec-19	NRW TEAM		THE NRW TEAM HAS INITIALISED THE USE OF GEODK FORM FOR PRESSURE MEASUREMENT.
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	[D]-(d)-(3) Sum-up 33: Pressure reduction measures (e.g. large-scale zoning with distribution reservoirs & pump stations, sub-zoning with PRVs & BPTs, improvement of pump selection & operation, removal of bottleneck pipes & large hidden leaks, etc.) have been planned and implemented for the zones and areas where high pressure is causing many bursts and leaks. Meanwhile, continuity and evenness of water supply have been sufficiently improved (by levelling out the pressure over the service area and quickly removing air sucked into the pipelines) partly in order to avoid rapid pipe degradation in pressure-fluctuating and intermittent water supply with air intrusion.	3	20	70	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	PROCUREMENT OF PRV		CONTINUOUS	TM , CM ,OE		THE NRW TEAM HAS INSTALLED A PRV AT RWATHIA DMA.
TOTAL			TOTAL Sum-up 34: The WSP has been reducing NRW volume and ratio for the entire service area at a sufficient rate (or at least sustaining them while existing pipes and other facilities are getting old) by successfully conducting NRW activities over the year.	1	43	42		-																				Total		-	-		

[Example Modes of Implementation]

: Intensive work period with operational expenditures

→ : Less intensive period with operational expenditures

: Intensive work period with capital investment (without donner)

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Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Mavoko WSP (MAVWASCO)

Category			Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																				{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					
				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
L	M	S						1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun						
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	**[A]-(a)-(1) Sum-up 1: A dedicated NRW task team having sufficient staff is fully operational** (in good coordination with other relevant commercial and technical staff) **and well motivated by a strong support from the top managers and GIS / ICT staff.**	1	60	80	98																					85					
			1) Buy-in (strong support) **from the top managers of WSP** (e.g. MD, TM and CM/FM) **has been acquired for improving NRW reduction activities** (including the establishment or reinforcement of dedicated NRW Task Team)**.**	1	60	75	95						●				●											80	N/A	0	immediate	CMT	
			2) NRW Task Team (unit, section or department) **consisting of sufficient staff** (e.g. technical officer, plumbers, etc. fully-dedicated in reducing commercial and physical water losses) **has been established and is currently fully-operational.**	2	50	75	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	**a**	→	→	→	→	85	internal staff (O&M - water, commercial, Sensitization	50000	quarterly	TM/FM	Section to be plnned by relevant team leaders
			3) Strong communication between commercial and technical staff has been sufficiently established for effective and efficient NRW reduction activities (e.g. through monthly inter-departmental meetings for NRW reduction and use of information technologies (such as WhatsApp, customized internal system for task allocation and monitoring, etc.)**.**	2	40	50	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	internal meetings and implemetation of activities, reports &record on NRW activites	as above	monthly & quarterly	Team leaders	Constant consultation
			4) Sufficient GIS and/or ICT staff (e.g. GIS operator, administrator of meter reading / billing system, field surveyors, etc.) **have been employed and are available for supporting the NRW task team.**	3	40	50	85	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	Harmonization of zoning regime and related activities between O&M water, NRW team and metr readers		continouos	Team leaders	
			5) Incentives for NRW reduction (e.g. allowance for night time activities, performance-based incentives for individuals and/or groups in charge of different areas) **have been sufficiently established for motivating the NRW task team & other relevant staff and also for retaining skilled staff** (e.g. plumbers, leak surveyors, etc.) **in the WSP.**	3	35	40	70			●			●				●											50	Develop a performance incentive criteria			CMT	Develop draft
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	**[A]-(a)-(2) Sum-up 2:** ***i)*** **WSP staff have been sufficiently sensitized for NRW reduction. Besides,** ***ii)*** **operational financial losses and** ***iii)*** **additional investment** (required for additional water resource and water supply facility development) **due to excessive NRW and** ***iv)*** **effective measures for improving revenue collection at the WSP have been sufficiently discussed among relevant staff** (i.e. not only those related to NRW - up to billing - but also those in charge of revenue collection) **based on data for enhancing their motivation & team work towards a robust financial improvement.**	3	40	50	80																					60					
			1) WSP staff have been sufficiently sensitized for NRW reduction (through meetings, warning to staff for not being involved in water theft, request for active notification of surface (visible) leakage & water theft and cooperation in relevant data collection, etc.)**.**	2	35	40	80		●	●			●	●		●												60	Focused group meeting and repackaging the communication on data		monthly and quarterly	HoDs/Section heads and team leaders	
			2) A recent annual NRW volume has been converted into operational financial losses (by multiplying the volume with calculated average tariff (KSh./m3) and unit production cost (KSh./m3) based on an roughly-assumed balance of commercial losses and physical losses (e.g. authorized unbilled + commercial losses = around 60%, physical losses = around 40%) **and sufficiently informed to relevant staff** (with an explanation on the higher per-m3 operational financial loss caused by commercial water losses (i.e. average tariff ((total revenue - grant revenue) / annual billed consumption) is usually about 2 times higher than unit production cost (total O&M cost / annual production)).	3	35	40	80		●					●				●											50	Focused group meeting and repackaging the communication on data		monthly and quarterly	HoDs/Section heads and team leaders	
			3) The scale of the possible reduction of future development of additional water resource, water treatment and pipeline facilities and capital investment through NRW reduction (by using of the saved physical losses for prolonging water supply hours or supplying to new service areas) **has been sufficiently discussed and informed to relevant staff.**	4	15	20	60	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	30	Sensitization in meetings	**0**	continouus	NRW officer	
			4) Since NRW is calculated based on billed consumption (not consumption of collected revenue), **effective measures for improving collection efficiency of water charges by the billing / collection section have been sufficiently discussed between the staff in charge of NRW reduction and those in charge of billing / collection** (e.g. establishment of a strict procedure for intentional non-payment users through revising charge collection regulations and effective enforcement of disconnection for non-payment)**.**	2	35	40	75	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	50	Discussion of disconnection and collection report of our disconnected accounts	20000	monthly and quarterly	Commercial & NRW officer	
		(3) Enhancing Support from Customers	**[A]-(a)-(3) Sum-up 3: Support from customers required for NRW reduction has been sufficiently enhanced through** ***i)*** **water bills or SMSs carrying messages, ii) toll free telephone number, low cost SMS number, etc. for customers to notify problems,** ***iii)*** **a system(s) for receiving notifications** (e.g. leaks, illegal uses, etc.) **and managing complains, and** ***iv)*** **awareness campaigns at communities** (e.g. baraza, water action group, etc.)**, at schools, through media, etc.**	3	45	50	80																					60					
			1) Printed or electronic water bills, SMS, etc. carry sufficient effective messages regarding NRW (e.g. asking customers for cooperation to reduce physical & commercial losses and excessive water uses) **and sufficient contact information of the WSP.**	2	25	30	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	50	Improve on NRW messaging	80000	quarterly	ICT officer/FM	Send more text messaging
			2) Toll free telephone number, low cost SMS number, etc. have been sufficiently established to encourage the public to notify problems like leaks and illegal water uses to the WSP. (Toll free telephone number may cause problems especially in the WSPs experience sever water shortage resulting in many customer complains)	3	50	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	sensitize customers on available communication channels	20000	quarterly	ICT officer/FM	
			3) Customer relation has been sufficiently enhanced with a software system (e.g. WASREB's MajiVoice and a customized internal customer management system, etc.) for managing complaints and receiving notifications of problems including bursts, leaks and water theft.	3	50	60	90																					70	audit complaint report	0	continuous	HoDs/Section Heads	
			4) Awareness campaigns for reduction of NRW (e.g. water theft, leakage before customer meters, etc.) **and water save** (e.g. overflow from customer tanks and excess consumption, etc.) **in the following forms have been sufficiently conducted.** **- 1. Public forum / open clinics** (e.g. baraza, water action group, etc.) **for community sensitization** (especially in the areas with many illegal water users)**.**	3	40	50	80			●				●														60	Enhance public sensitization though barazas/focused group meetings etc	50000	periodically	CMT	
			- 2. School campaigns	3	0	10	40				●				●												20	Enhance school campaigns	50000	annually	CMT	
			- 3. Media campaigns (Social, print, broadcast, online)	2	0	10	50		●		●		●		●												25	enhance visibility/media presence	50000	continuous	CMT	

Category			Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																			{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[A] Organization, PDCA Cycle, Finance and Procurement	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(1) Participatory Review, Planning & Monitoring of NRW Activities	**[A]-(a)-(4) Sum-up 4: Sufficient staff relevant to NRW reduction** (e.g. NRW task team members, zonal officers & plumbers in charge of O&M, GIS staff, etc.) **have been sent to *i)* various trainings of KEWI, *ii)* benchmarking workshops of WASPA and *iii)* other external training opportunities, as well as *iv)* being trained internally, in order to obtain sufficient knowledge and skills required for NRW reduction** (e.g. through field trials in a small DMA(s) and discussions on how to reduce NRW over a large area efficiently).	2	50	70	90																					80					
			1)-1 Sufficient relevant staff (e.g. members of the NRW task team, zone superintendents, etc.) **have been sent to KEWI's training course on NRW management.**	2	45	60	90			■			■				■											70	Continuous participation in benchmarking and related courses	100000	periodically	NRW team	
			1)-2 Sufficient relevant plumbers and other field staff have been sent to KEWI's other training courses relevant to NRW reduction (e.g. plumbing, metering, service connection installation, O&M of distribution system, etc.)	2	45	50	90		■		■		■		■													60	Internal and refresher training	300000	periodically	HoDs/HR officer	
			1)-3 Sufficient relevant ICT & GIS staff and other technical officers has been sent to the GIS-related trainings courses of KEWI and/or Kericho WSP.	3	55	70	90			■				■													80	Continuous participation in benchmarking and related courses	50000	periodically	GIS/ICT officer	
			2) Sufficient relevant staff have been participating in the benchmarking meetings and trainings of WASPA (supported by VEI) **for collective learning among WASPA members.**	2	60	70	90																				80	Continuous participation in benchmarking	100000	periodically	relevant staff	
			3) Sufficient staff have had opportunities of trainings held by donor organizations (e.g. JICA, VEI, SNV, WB, EU, etc.) **and other Kenyan institutions** (e.g. WSB, other prominent WSPs, etc.)**.**	3	60	70	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Continuous participation in benchmarking and related courses	100000	periodically	relevant staff	
			4) Sufficient in-house training (including on-the-job training (OJT)) **for various NRW activities has recently been conducted at the WSP.**	2	50	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Regular updating staff on new work processes	0	periodically	SHs	
			5)-1 Various skills required for NRW reduction (hydraulic isolation of pipe network, testing of bulk meters, calculation of NRW ratio, preparation of drawings / GIS, customer meter servicing, testing and replacement, leak survey, identification of unauthorized consumption, step test, etc.) **have been acquired through a DMA pilot(s) and/or similar experiences focusing on field work within a limited area(s)** (with or without support from donors (e.g. VEI, SNV, JICA, etc.) and/or Kenyan institutions (e.g. WASPA, KEWI, etc.).	2	50	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Inhouse/external training	100000	periodically	HoDs/HR officer/ Section Heads	
			5)-2 Practical ways of scaling-up of NRW activities over the entire water supply service area (within a reasonable time period) **have been sufficiently discussed during and/or after a DMA pilot(s) and/or similar experiences.**	1	40	50	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60					
			[A]-(b)-(1) Sum-up 5: In reference to relevant upper level plans of the WSP, *i)* review of the NRW activities carried out in the previous financial year, *ii)* assessment of current conditions and *iii)* preparation of medium-term and annual NRW reduction plans have been conducted in a way sufficiently participatory among relevant staff with considerations of cost requirements. Meanwhile, *iv)* the periodical monitoring of NRW activities (e.g. quarterly) **is being conducted.**	2	50	60	90																					70					
			1) Sound strategies to reduce NRW have been sufficiently stated in the latest 5 year strategic plan of the WSP.	1	90	90	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	90	Continue implementing strategies		As per strategic plan	CMT	
			2) Review of the activities carried out in the previous financial year has been prepared in a way sufficiently participatory among relevant staff for capacity development and reporting to WASREB, top managers and the board of directors of the WSP, etc.)	2	45	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	enhance the reporting through prescribed formats		Quarterly	CMT	
			3-1) Assessment of recent conditions regarding NRW has been prepared in a way sufficiently participatory among relevant staff for capacity development and planning.	3	35	40	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	Internal participatory meetings		periodic	HoDs	
			3-2) Medium-term NRW reduction plan with a bar chart has recently been prepared or revised (prior to preparing an annual NRW reduction plan for this/next financial year) **in a way sufficiently participatory among relevant staff for prioritized implementation of NRW activities and reporting the plan to WASREB.**	2	30	40	80		■			■			■												50	Develop a NRW reduction				
			3-3) Annual NRW reduction plan with cost implication has been prepared (based on the latest medium-term NRW reduction plan) **in a way sufficiently participatory among relevant staff for budgeting, prioritized implementation and reporting to WASREB.**	1	30	40	90		■			■			■												50	Hold annual NRW planning involving all key staff	20000	annual	HoDs/Section heads	
			3-4) Implementation of the planned NRW activities have been monitored at least quarterly (preferably monthly) **in a way sufficiently participatory among relevant staff for improving the activities and reporting to WASREB.**	2	25	30	80		■			■			■												50	Hold quaterly review/monitoring and evaluation	20000	quarterly	HoDs/Section heads	
			4) External funds for the planned activities (especially for facility improvement requiring a large investment such as construction of distribution reservoirs, replacement of pipe network, etc.) **have been sufficiently sought for realizing the investment required for NRW reduction.**	3	25	40	80																					45	Write ptoposals and fillow agrressively	200000	annual	CMT	
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	**[A]-(b)-(2) Sum-up 6: *i)* The various data required for calculating the NRW-related key performance indicators (KPIs) prioritized at the WSP are periodically and systematically collected with ease** (e.g. monthly, quarterly and annually), **and *ii)* changes in calculated values of the KPIs are analysed for data-based internal discussions and benchmarking in order to improve NRW activities of the WSP.**	3	55	60	90																					70					
			1) Prioritization of data to be collected periodically (monthly, quarterly and annually) **for calculating key and supplementary performance indicators (PIs) have been carefully done** (in considerations of practical aspects of data collection) **in order to assess progress, encourage internal competition between distribution zones and/or smaller areas, etc. with PIs.** (The calculated indicator values can also be used for WASPA's benchmarking activities and WASREB's Impact Report & WARIS.)	2	20	30	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	45	Develop quarterly reports based in PIs		quarterly	HoDs/SHs	
			2) A systematic and easy way to collect the prioritized data periodically from different department/sections and branch offices (e.g. using cloud-based software programs such as a shared folder on Google Drive, Google Sheet, ODK Aggregate, etc.) **has been fully set up** (including the assignment of responsibilities to relevant staff for providing, entering and validating various data) **and is currently fully operational.**		0	0	50		■		■		■		■												20	**Utilize the tools**	**0**	**Routinely**	**NRW, GIS, ICT/TM/FM**	
			3) Periodical analysis of the prioritized KPIs (monthly, quarterly and annually) **using the collected data for internal data-based discussions** (between different departments/sections and branch offices) **and benchmarking are being sufficiently conducted in order to improve the review, planning, adjusting and monitoring of NRW activities.**	3	30	40	70																					50	hold quartery meetings for review,planning and adjusting		quartery	HoDs/SHs	
			[A]-(c)-(1) Sum-up 7: *i)* Based on an analysis on the types of existing pipe, fittings, meters, etc. causing NRW significantly, *ii)* suitable pipes, fittings, customer meters and other appurtenances have been selected for procurement in consideration of internal standalization. Meanwhile, *iii)* quality control mechanisms (such as inspection & acceptance committee, accuracy tests of new meters and trace survey of meters' durability) **have been well established.**	3	40	50	80																					60					
			1) The types of existing valves, pipe fittings, etc. causing bursts and leaks frequently have been sufficiently discussed (preferably analysed based on collected data) **to identify the needs of changing the procurement of common valves, fittings, etc.**	3	40	50	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	staff sensitization,develop specifications for valves and other fittings, enhance inspection and acceptance		routine	Technical/ procurement	

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							2018-19				2019-20				2020-21				2021-22				2022-23								
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[A] Organization, PDCA Cycle, Finance and Procurement	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	**2) Types and size of pipes, fittings and other appurtenances** (e.g. saddle clamp) **have been selected for procurement in a sufficient consideration for their internal standardization** (based on relevant Kenyan standards, guidelines, etc. and first hand experiences with bursts and leaks)**.**	3	65	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	ensure enforcement of set standards		routine	Technical/ procurement	
			3) Suitable specifications of customer meters for each size such as class (ISO Class or OIML R)**, type** (e.g. copolymer volumetric / piston)**, availability of spare parts** (e.g. internal unit)**, etc. have been decided, and their procurement is being done in accordance to the specifications.**	3	65	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	ensure enforcement of set standards		routine	Technical/ procurement	
			4) The inspection & acceptance committee of the WSP has been sufficiently strengthened to reject faulty and unmatched pipes, fittings, meters, etc.	3	20	30	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	set up adhoc inspection committees for various items		routine	MD,Technical/procurement	
			5) Some potion (e.g. 5%) of each batch of new customer meters have been sent to a credited meter testing institution (i.e. Nyeri WSP (NYEWASCO) up to 1.5 inch meters with a meter test bench and up to 1m in diameter with a insertion type electromagnetic flow meter or potable ultrasonic flow meter, and Kenya Bureau of Standards (KEBS) up to 10 inch meters with meter test benches of different sizes) **to reject substandard meters.** (The WSPs having own water meter test bench may use it for testing all new water meters suspicious of defects especially low accuracy)		15	20	60																					40	**Identify an acreditated facility and sent samples for testing.procure/hire an ultrasonic flow meter**	**50000**	**routine**	**CMT,NRW, PROCUREMEENT**	
			6) Trace survey has been sufficiently conducted to evaluate durability and actual lifespan of newly procured customer meters (the results showing a significantly limited durability may be used to reject the products from the same manufacture)**.**	5	0	0	0																		→			0					
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	**[A]-(c)-(2) Sum-up 8: Pipes, fittings, meters and NRW survey equipment** (and hardware required for establishing and utilizing a GIS database including smartphones / tablets for mobile GIS, reliable internet access at office, airtime for data connection, transportation means, etc.) **are sufficiently available for continuously and efficiently implementing effective NRW activities** (including quick repair of bursts & leaks and quick replacement of faulty meters)**.**	2	40	45	80																					50					
			1) Sufficient pipes and fittings, repair materials, spare pats (e.g. replaceable internal units of customer and bulk meters) **and other common appurtenances** (e.g. strainer for bulk meters, sluice valves for isolating branch distribution pipes, etc.) **have been procured and stored for quick repair of bursts and leaks.**	1	60	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Enforce reorder levels		routinr	Procurement	
			2) Sufficient bulk and customer meters of different sizes with appropriate specifications (and their spare parts if available) **have been procured and stored for quick replacement and repair of faulty and degraded meters.**	1	60	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Enforce reorder levels		routinr	Procurement	
			3) Sufficient NRW survey equipment (e.g. listening sticks, calibrated buckets, portable ultrasonic flow meter, electric leak detector, noise correlator, pipe locator, pressure gauges with maximum pressure pointer / pressure loggers, hand pumps, etc.) **with sufficient functions and quality have been acquired and are well maintained.**	2	30	60	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	PROCURE/ACQUIRE UFM	500000	Dec-19	TM	
			4) Sufficient office appliances and specialized hardware required for establishing or improving a GIS database (e.g. A3-size inkjet printer with scanner (or plotter) with spear inks, desktop or laptop PC, handheld GPSs, large PC monitor, etc.) **have been procured and utilized and are well maintained.**	3	50	70	95													→								80	Procure a laptop for field operations	100000		GIS/PROCUREMENT	
			5) Sufficient official-use smartphones / tablets (Android OS) **have been procured for improving NRW activities at site.** (Free mobile GIS and interactive data collection software programs, etc. can be installed in the procured smartphones / tablets.)	1	0	15	80																					50	Procure smartphone and acquire/install relevant software	200000	Oct-18	FM,ICT,PROCUREMENT	
			6) Reliable internet connection (e.g. WIFI) **with a reasonable speed at the WSP's offices and sufficient airtime for data connection on official-use smartphones / tablets are being provided sufficiently to the staff involved in NRW-related activities.**	4	45	50	95		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Procure smartphone and acquire sufficient data connectivity	150000	Oct-18	FM,ICT,PROCUREMENT	
			7) Sufficient transportation means have been secured for NRW activities.	3	60	70	90																					75	Facilitate transport			HODs	
[B] GIS, Zoning, NRW Monitoring & Water Balance			**[B]-(a)-(1) Sum-up 9:** ***i)*** **Base on the various needs of using GIS discussed at the WSP, the WSP** ***ii)*** **has already established prioritized GIS layers** (e.g. base map, major water supply facilities, customer meters, etc.) **and has been continuously** ***iii)*** **preparing other layers with less priority** (e.g. service pipes, public toilets, etc.) **and** ***iv)*** **updating the established layers** (e.g. inclusion of newly installed customer meters and service pipes, etc.) (while taking backups periodically) **by** ***v)*** **sufficiently utilizing free software programs such as QGIS.**	2	35	50	85																					60					
			1) Needs for developing and fully-utilizing a GIS database have been sufficiently discussed and prioritized between different departments and sections (including branch offices covering different areas) **with help of GIS staff.**	3	20	25	80			→																		45	enriching GIS database, GIS needs assesment		continous	GIS OFFICER	
			2) Free GIS-related software programs (e.g. QGIS with various plugins - GPS Tools, Open Layers Plugin, OSM Downloader, QTile, etc. - for PCs and software programs for Android smartphones - QField, Geo ODK Collect / ODK Collect, GPS Map Camera, etc. -) **have been sufficiently utilized for mapping of existing facilities and problems.** (Low-cost downloadable commercial software such as Google Map Downloader may also be required for improving GIS operation and data collection. Initiative of GIS staff may be required to shift expensive commercial GIS software programs with familiar interface to free software programs so that more staff can use GIS without spending extra money such as yearly software license free.)	3	40	60	90	→	→	→	→																	70	Install and train relevant staff		continous	GIS OFFICER	

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[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	**3) Base map** - raster layers - (e.g. use of offline satellite imagery downloaded and automatically-georeferenced with a low cost commercial software such as Google Map Downloader or use of free online satellite imagery such as those set with Open Layers Plugin of QGIS if the internet connection is reliable and sufficiently fast) **and other general layers** - vector layers - (e.g. Open Street Map (OSM) data downloadable for free with OSM Downloader of QGIS, 25-interval contours downloadable at http://www.opendem.info/opendem_client.html, etc.) **have been sufficiently established for the development or improvement of GIS.**	3	40	65	90	→	→	→	→																	75				GIS OFFICER	
			4) GIS layers for major water supply faculties and existing supply area boundaries (e.g. WTPs, pump stations, distribution reservoirs and tanks, intakes, transmission pipelines, primary & secondary / major distribution pipelines with gate valves, BPTs, PRVs, bulk meters, boundaries of water supply service areas, schemes, distribution zones, DMAs, etc.) **have been sufficiently prepared** (e.g. through digitization of existing drawings, importing (with data conversion and geo-referencing) of existing CAD data, importing of digitized Google Earth layers with editing, on-screen digitization with sufficient staff knowing locations of those facilities, investigation and data validation at site, etc.)**.**	3	50	60	90	→	→	→	→																	70	ONSITE MAPPING		Routine	GIS OFFICER	
			5) GIS layers of customer meters and kiosks (the attribute data to be collected such as meter status, size, type, etc. should at least include Connection No. to link each customer meter location to the corresponding customer's meter reading or billing information stored in other system such as a billing system) **have been sufficiently prepared** (e.g. through on-site customer identification with handheld GPS & customer information sheet, personal digital assistance (PDA) with a reliable internal GPS antenna & commercial GIS software, and/or smartphones with free GIS software)**.**	1	20	35	85	→	→	→	→																	60	Customer point data collection				
			6) GIS layers for minor water supply faculties (e.g. tertiary / minor distribution pipelines with gate valves, service connections, air valves, hydrants, washouts, etc.) **have been sufficiently prepared.**	4	10	20	90	→	→	→	→																	50	mapping of tertiary lines		continous	GIS OFFICER	
			7) Systematic update of the GIS data (e.g. for installation of new customer meters and service pipes, replacement of degraded distribution pipelines and faulty appurtenances) **and backup of the GIS data is being done sufficiently.**	4	10	20	85	→	→	→	→																	50	Training technical staff to be able to pick GIS data, provide relevant software to enable this		continous	gIS OFFICER/TEAMLEADERS	
			8) GIS layers for public sanitation facilities (including sewerage facilities if any) **have been sufficiently prepared.**		30	40	90																			60	**Finalize on capture of data**		**continous**	**gIS OFFICER**	
			9) Other (Specify)**:**																													
		(2) Mapping of NRW-related Problems	**[B]-(a)-(2) Sum-up 10: Existing problems related to NRW** (e.g. areas with many illegal connections, pipelines with many bursts and leaks) **have sufficiently been mapped both based on *i)* the perception of relevant staff through participatory mapping and *ii)* the data collected at site and results of analysing the data.**	3	20	30	60																			40					
			1) Perception of the locations, areas and pipelines having significant NRW-related problems (e.g. high pressure, frequent bursts, recurring illegal connections, etc.) **have been sufficiently mapped on GIS with comments as labels in a participatory way.**	3	0	0	70					→	→	→	→	→	→	→	→							30	Acquire mobile GIS field operations software for data collection	100000	Jun-19	FM,GIS/ICT,PROCUREMENT	
			2) Customer / meter reading / billing-related information (e.g. the results of meter reading / billing data analysis) **have been linked or jointed to the customer meter layer of GIS for analysing aspects related to commercial losses** (e.g. distribution of large customers whose monthly consumptions have been estimated frequently without accurate metering) **over the service area for planning improvements of problems around customer meters.**		0	0	60																			20	**Collect customer points, Link with billing system**	**100000**	**Jun-19**	**FM,GIS,COMMERCIAL,ICT**	
			3) Locations recorded leaks and bursts have been mapped on GIS with sufficient attribute information (e.g. pipe material, probable cause, leak size, etc.) for assessing pipe conditions for planning pipe replacement, etc.	4	0	0	60					→	→	→	→	→	→	→	→							20	Acquire mobile GIS field operations software for data collection		Jun-19	FM,TM,GIS OFFICER,PROCUREMENT	
			4) Locations of other problems (e.g. illegal connections without customer meters, vandalism along distribution pipelines, locations requiring bulk meters, gate valves, etc.) **have been mapped on GIS for planning further improvements of water supply facilities.**		0	0	60																			20	**Acquire mobile GIS field operations software for data collection**		**Jun-19**	**FM,TM,GIS OFFICER, PROCUREMENT**	
			[B]-(a)-(3) Sum-up 11: The GIS layers prepared at the WSP are *i)* being sufficiently utilized for various NRW monitoring and reduction activities at office and at site *ii)* by a wide range of staff relevant to NRW *iii)* with hard copy maps and/or free GIS-related software programs (such as QGIS, Adobe Acrobat Reader, QField, Google Earth, MAPinr, GeoODK Collect & ODK Aggregate for field activities guided with interactive survey forms, GPS Map Camera, etc.) **on PCs, smartphones and cloud.**	2	5	20	70																			40					
			1) Utilization of free software programs on PCs, smartphones and cloud for GIS, data collection & sharing, etc. has been sufficiently discussed by relevant staff for improving NRW monitoring and reduction activities.	3	10	30	80	→	→	→	→																	40	Acquire smartphones and relevant software and staff training		Continous	GIS OFFICER	
			2) Viewing & editing functions of free desktop GIS software programs (e.g. QGIS with various plugins such as GPS Tools & Open Layers Plugin) **are being sufficiently utilized by NRW-related staff other than GIS officer for NRW activities.**	3	10	25	85	→	→	→	→																	40	On the job training		Continous	GIS OFFICER	
			3) Adobe Acrobat Reader (on PCs and Smartphones) **and QGIS's print composer** (on PCs) **are being sufficiently utilized to easily view water supply facilities on a map** (e.g. satellite imagery) **on PCs at office and on smartphones at site for NRW activities. In addition, a large PDF map showing exiting facilities** (with or without a raster base map such as a high resolution satellite imagery) **has been used for printing out as a wall map for easy daily discussions among the staff relevant to NRW** (PDF maps can be printed out into tiles of 3A-size or A4-size papers using Acrobat Reader, which is especially useful if the WSP doesn't have a functioning plotter)**.**	3	10	30	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	50			Continous	GIS OFFICER	

Category			Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																					{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19 1st Q: Jul - Sep	2018-19 2nd Q: Oct - Dec	2018-19 3rd Q: Jan - Mar	2018-19 4th Q: Apr - Jun	2019-20 1st Q: Jul - Sep	2019-20 2nd Q: Oct - Dec	2019-20 3rd Q: Jan - Mar	2019-20 4th Q: Apr - Jun	2020-21 1st Q: Jul - Sep	2020-21 2nd Q: Oct - Dec	2020-21 3rd Q: Jan - Mar	2020-21 4th Q: Apr - Jun	2021-22 1st Q: Jul - Sep	2021-22 2nd Q: Oct - Dec	2021-22 3rd Q: Jan - Mar	2021-22 4th Q: Apr - Jun	2022-23 1st Q: Jul - Sep	2022-23 2nd Q: Oct - Dec	2022-23 3rd Q: Jan - Mar	2022-23 4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[B] GIS, Zoning, NRW Monitoring & Water Balance		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	**4) QField** (for viewing and editing QGIS files on Android smartphones) **and QGIS's QTile plugin** (for reducing offline base map size if it is high-resolution satellite imagery) **are being sufficiently utilized to view and collect facility data for NRW activities.**		0	0	70																					30	**DoWnload, install and train**			**GIS OFFICER**	
			5) MAPinr (on smartphones), **QGIS's Layer2kmz plugin and Google Earth** (on PCs & smartphones) **are being sufficiently utilized for NRW Activities, especially when viewing facilities on map**. (Frist, exporting GIS layers of various facilities into separate .kmz files with Layer2kmz, then combing them with Google Earth on PC into a single .kmz file for a quick download into smartphones (e.g. from a shared Google Drive holder set by each WSP). The combined .kmz file may be utilized by relevant office and field staff in charge of customer meters, leak detection, repair, pressure management, etc. with Google Earth and/or MAPinr (a free mobile GIS software having a search function especially useful for locating customers).		0	10	85																					25	**DoWnload, install and train**		**Continous**	**GIS OFFICER**	
			6) ODK Aggregate (on cloud), **GeoODK Collect / ODK Collect** (on smartphone) **and QGIS's QTile plugin** (for reducing offline base map size if high-resolution satellite imagery is used) **are being sufficiently utilized for NRW activities based on interactive survey & data collection forms** (i.e. ODK forms prepared for various activities around customer meters, pressure measurement over a large area, pressure tests on service connections, patrol, leak detection, recording of repairs, etc.). (Google Cloud Platform which is a low-cost commercial cloud platform may be required for improving data collection with the ODK software programs)	3	0	15	80			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	40	DoWnload, install and train		Continous	GIS OFFICER	
			7) Other free software programs related to GIS, data sharing, etc. (e.g. GPS Map Camera / GPS Photo Viewer, Life360, SW Maps, etc. for smartphones, and Google Sheet on Google Drive, etc. for cloud-based operation) **are being sufficiently utilized for improving NRW monitoring and reduction activities.**		5	10	60																					30	**DoWnload, install and train**		**Continous**	**GIS OFFICER**	
	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	**[B]-(b)-(1) Sum-up 12: Monthly calculation of NRW volume and ratio** (and other prioritized KPIs related to NRW volume if any) **of the entire service area (SA) has been continuous and accurate based on *i)* the monthly readings of well-maintained reliable bulk meters sufficient to measure the total production** (including and excluding the water imported and exported over the boundary of SA, respectively) **and *ii)* the monthly total billed consumption of the entire service area. *iii)* Changes in the calculated monthly NRW volume and ratio are analysed every month for improving NRW reduction activities.**	1	50	60	80																					65					
			1) Bulk meters required to accurately calculate the total production of the entire service area (SA) (including and excluding the water imported and exported over the boundary of SA, respectively) **have been sufficiently and properly installed** (including the construction or improvement of meter chambers and the installation of strainers before bulk meters)**. The existing bulk meters for production are all installed in a way that air does not entered into the bulk meters** (in order to avoid overestimation by mechanical bulk meters or underestimation by ultrasonic or electromagnetic flow meters) **during intermissions of water supply or water shortage.** (The bulk meters which have difficulty to avoid air intrusion may need to be relocated to a low lying location with depression where water stay in the pipe even during the intermission of water supply.)	1	50	70	90	→	→	→	→	→	→															80	TEST ACCURACY, CORRECT INSTALLATION	350000	Jun-19	NRW TEAM	
			2) Monthly calculation of the total production of the entire SA has been continuous and accurate based on reliable monthly bulk meter readings, periodical accuracy check of the bulk meters (including an assessment on possible air intrusion into the bulk meters if required)**, quick servicing and replacement of faulty bulk meters and/or meter calibration** (e.g. adjustment of the measured volume by adding or reducing a certain percentage of the volume) **if found to be necessary.**	1	60	70	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Regular calibration of bulk meters		continous	NRW TEAM	
			3) Monthly calculation of the total billed consumption for the entire SA has been continuous and accurate (preferably done with a computerized meter reading / billing system, and should not include the misuse of the upper limit consumption of the lowest tariff bracket with a fixed charge (e.g. 6m3/month) as billed consumption of small consumers).	1	40	50	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	procure mobile meter reading software	500000	Oct-18	CMT,ICT,COMMERCIAL,PROCUREMENT	
			4) Monthly calculation of NRW volume and ratio (and other prioritized PIs related to NRW volume if any) **for the entire SA has been continuous and accurate based on synchronized bulk meter reading and customer meter reading. Meanwhile, periodical discussions based on the calculated results have been sufficiently held among relevant staff for improving NRW reduction activates.**	1	40	50	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Hold discussions with various teams and sections		continous	NRW TEAM	
			[B]-(b)-(2) Sum-up 13: *i)* Sufficient Distribution Zones (DZs) (and/or large DMAs typically having multiple inlet pipelines) **have been isolated. Monthly calculation of NRW volume and ratio** (and other prioritized KPIs if any) **of each DZ has been continuous and accurate based on *ii)* synchronized zonal bulk meter reading** (for calculating the inflow into each DZ) **and *iii)* customer meter reading** (for calculating the total billed consumption of each DZ) **for improving NRW activities including the prioritization of certain DZs. *iv)* Moreover, sufficient gate valves and bulk meters have been installed** (on major and high-risk pipelines causing many bursts and leaks)**. *v)* These gate valves and bulk meters are being well maintained and sufficiently utilized for step tests and abnormal flow monitoring in each DZ.**	2	30	40	80																					50					
			1) Sufficient Distribution Zones (DZs) (and/or large District Metered Areas (DMAs) typically having multiple inlet pipelines) **has been isolated. A NRW monitoring plan for the DZs** (or large DMAs) **has been prepared** (preferably with GIS) **and all the bulk meters required for the DZs have been installed in a way that air does not come through the meter with or without air valve near the location** (including the improvement of meter chambers and the installation of strainers before bulk meters)**.** (Construction of distribution reservoirs and/or pump stations and installation of transmission and distribution pipelines are probably required for establishing new DZs.)	1	20	30	70	→	→	→	→																	35	establish and try a pilot		Periodical	TM,NRW TEAM	
			2) Monthly measurement of the inflow into each DZ (or large DMA typically having multiple inlet pipelines) **has been continuous and accurate through a periodical accuracy check of the bulk meters and quick servicing, replacement and/or calibration of inaccurate bulk meters.**	1	60	80	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85	calibration	15000	Periodical	NRW team	

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							2018-19				2019-20				2020-21				2021-22				2022-23							
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[B] GIS, Zoning, NRW Monitoring & Water Balance	(b) Strategic Zoning & NRW Monitoring	(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	**3) Monthly calculation of the total billed consumption in each DZ** (or each large DMA) **has been continuous and accurate based on a accurate categorization of customers by DZ**. (Meter reading route assigned to each customer in the existing meter reading / billing system may be utilized in sorting the customers into the DZs, however the accurate categorization of customers usually require locations of customer meters overlaid with DZ boundaries on GIS for confirmation. Addition of new data fields to the existing meter reading / billing system may be required at this stage for assigning a DZ name/code and a DMA name/code to each customer for customer categorizations by DZ and DMA.)	1	40	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	participatory review of mlolongo/syokimau zone/meter reading routes	0	30.08.2018	CO/NRW team	
			4) Monthly calculation of NRW volume and ratio (and other prioritized PIs related to NRW volume if any) **for each DZ** (or large DMA) **has been continuous and accurate based on synchronized bulk meter reading and customer meter reading in each DZ. Meanwhile, periodical discussions based on the calculated results have been sufficiently held among relevant staff for improving NRW reduction activities including prioritization of certain DZs.**	1	40	45	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	participatory review of NRW results		monthly	TM/FM	
			5) Sufficient sluice valves have been installed (e.g. at the roots of each prioritized branch distributing pipelines) **and are fully operational, which can sufficiently sub-divide each DZ not only for flow control** (e.g. to limit the areas affected by pipeline repairs requiring suspension of water supply, to make water supply more even within each DZ, etc.) **but also for implementing step tests effectively in each DZ for efficient identification of the pipelines causing a significant amount of leakage.**	2	40	40	90			→	→	→	→															60	Inventory of valves and establish operational status and sufficiency	100000	30.08.2018	WS/TLs	
			6) Abnormal flow monitoring system using sufficient bulk meters (including the zonal bulk meters, bulk meters on transmission lines and major distribution lines within DZs including DMA meters, bulk meters installed on high risk pipelines having recurrent bursts, illegal connections, etc.) **has been sufficiently established and is being utilized continuously** (e.g. through manual meter reading and direct data entry into a cloud-based spreadsheet with smartphones, selective use of GSM, GPRS, AMR and SCADA for bulk meters in remote areas, etc.) **to shorten the time required for finding new bursts, large leaks and large illegal water uses.**	4	20	20	60					→		→		→		→	→	→	→	→	→	→	→	→	→	25	Ensure sufficient supply of water		2020	TM	Its difficult because of intermittent supply
			7) Other (Specify):																											
		(3) District Metered Areas (DMAs)	**[B]-(b)-(3) Sum-up 14:** ***i)*** **Sufficient District Metered Areas (DMAs) have been isolated. Monthly calculation of NRW volume and ratio** (and other prioritized KPIs related to NRW volume) **in each DMA has been continuous and accurate based on** ***ii)*** **synchronized bulk meter reading and customer readings in each DMA.** ***iii)*** **The bulk meters measuring the inflow into each DMA are well maintained and read accurately every month without significant delay.** ***iv)*** **The customers have been categorized into each DMA on WSP's meter reading / billing system for calculating the total billed consumption of each DMA easily.**	3	10	20	50																					25					
			1) Sufficient District Metered Areas (DMAs) have been established. A detailed NRW monitoring plan down to the level of DMAs (or sub-DMAs of large DMAs typically having multiple inlet pipelines) **has been prepared** (preferably with GIS)**, and all the bulk meters required for the DMAs** (including the improvement of meter chambers and the installation of strainers before bulk meters) **have been installed in a way that air does not come through the meter with or without air valve near the location.**	4	10	20	80																					40	Work on atleast 6No the planned estates	500000	30.07.2019	NRW officer/TLs	
			2) Monthly measurement of the inflow into each DMA (or each sub-DMA of large DMAs) **has been sufficiently continuous and accurate through a periodical accuracy check of the bulk meters and quick servicing, replacement and/or calibration of inaccurate bulk meters.**	4	10	20	80									→	→	→	→	→	→	→	→	→	→	→	→	40	Periodical accoracy checks/calibration		routine	NRW team	
			3) Monthly calculation of the total billed consumption in each DMA (or each sub-DMA of large DMAs) **has been continuous and accurate based on an accurate categorization of customers by DMA.** (Meter reading route assigned to each customer in the existing meter reading / billing system may be utilized in sorting the customers into the DMAs, however the accurate categorization of customers usually require locations of customer meters overlaid with DMA boundaries on GIS for confirmation. Addition of new data fields to the existing meter reading / billing system may be required at this stage for assigning a DZ name/code and a DMA name/code to each customer for customer categorizations by DZ and DMA.)	4	10	20	80									→	→	→	→	→	→	→	→	→	→	→	→	40	Linking bulk meters and customer meters		monthly	FM/TM	
			4) Monthly calculation of NRW volume and ratio (and other prioritized PIs related to NRW volume if any) **for each DMA has been continuous and accurate based on synchronized bulk meter reading and customer meter reading at each DMA** (or sub-DMA of large DMAs)**. Meanwhile, periodical discussions based on the calculated results have been sufficiently held among relevant personals for improving NRW activates including prioritization of certain DMAs.**	4	10	20	80									→	→	→	→	→	→	→	→	→	→	→	→	40	Monthly NRW review meetings		monthly	Technical and Comeercial depts	
	(c) Authorized Unbilled Consumption & Water Balance Table	(1) Authorized Unbilled Consumption	**[B]-(c)-(1) Sum-up 15: The total metered and unmetered authorized unbilled consumptions of a recent year have been estimated based on metered consumption or typical flow and frequency of each consumption item. Meanwhile, the effective policies and measures have been put in place to reduce unintended, unnecessary and/or excessive consumption of authorized unbilled public and the WSP's water uses.**	4	70	70	90																					75					
			1) Annual metered authorized unbilled consumption of a recent year for the entire SA has been estimated with sufficient accuracy based on metered consumption data of each metered authorized unbilled water use type.		80	80	95																					85	**Introduce records for metered authorised consumption**		**immediate**	**WSS/NRW officer**	
			2) Annual unmetered authorized unbilled consumption of the same recent year for the entire SA has been estimated with sufficient accuracy based on the estimation of each unmetered authorized unbilled consumption type (e.g. quantifying via formulae (time x typical flow) based on reliable records of each occurrence measured with temporary flow meters, etc.)**.**		60	60	100																					100	**Introduce meter for backwash water**	**70000**	**30.08.2018**	**NRW Officer**	
			3) For a sound management of authorized unbilled consumption, actual conditions and necessity of authorized unbilled public water uses (e.g. public parks, toilets, faucets, etc., fire fighting, and supply to special areas such as low income areas) **have been sufficiently grasped and relevant policies including the reduction of unbilled users have been sufficiently improved** (e.g. through the introduction of subsidy or instalment plan for connection fee for low income population, etc. and identification of excessive public water uses and awareness raising)**.**		50	50	90																					75	**Develop guidelines on authorized unbilled consumption**	**0**	**30.10.2018**	**MD**	
			4) Actual conditions and necessity of authorized unbilled consumption for WSP's institutional uses (e.g. flushing of distribution pipes with water, cleaning of distribution basins/tanks, losses during plumping of service pipe, installation of customer meters, etc.) **have been sufficiently grasped and relevant policies have been sufficiently improved** (e.g. through identification of excessive institutional water uses and awareness raising)**.**	3	50	50	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Introduce adequate records and policies for institutional consumption	0	30.10.2018		
		(2) Commercial Losses	**[B]-(c)-(2) Sum-up 16:** ***i)*** **The relevant WSP staff understand that actively working on the reduction of commercial losses is a prerequisite for establishing a representative** (not misleading and harmful) **water balance table of the WSP. Meanwhile, the total yearly volume of each commercial loss components** (i.e. those due to data handling errors, inaccuracy of customer meters, and illegal water uses) **have been accurately estimated for the same recent year based on** ***ii)*** **a sufficient analysis of meter reading / billing data,** ***iii)*** **data collected through active meter accuracy tests to a sufficient number of customer samples of different consumption levels, and** ***iv)*** **sufficient records from active investigation of illegal water uses.**	4	30	40	80																					50					
			1) It is well understood by WSP staff working for NRW reduction that the accuracy of water balance table is largely depend on the accuracy of estimating different types of commercial water losses and that the WSPs not actively trying to reduce commercial losses have a very strong tendency to underestimate their levels of commercial losses (and thus overestimating physical losses as a result) **due to limited reliable data available for estimating the commercial losses.** (Therefore, the active reduction of all component of commercial losses is prerequisites for establishing a representative (not misleading and harmful) water balance table of the WSP.)	4	40	50	100			→	→	→	→	→	→	→	→	→										80	Using various NRW forums		routine	FM/TM	

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							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[B] GIS, Zoning, NRW Monitoring & Water Balance	(c) Authorized Unbilled Consumption & Water Balance Table	(2) Commercial Losses	**2) The commercial loss of the same recent year due to data handling errors including inaccurate and/or improper estimation of customers' consumption** (e.g. unmetered billed consumption, metered but not used for billing due to faulty meters, estimation without analysing past consumption data, etc.) **has been estimated with sufficient accuracy.** (Analysis of customer meter reading and billing data of 12 months and the comparison of past estimates with corresponding actual consumption metered with new customer meters after active replacement of faulty meters are recommended for the estimation of this commercial loss component.)	4	20	60	95												→	→							75	Review consumption of recently replaced meters		semi-annually	NRW Officer	
			3) The commercial loss of the same recent year due to the accuracy errors of customer meters (whose metered consumptions were used for billing without being replaced with estimates) **has been estimated with sufficient accuracy.** (This components should be estimated based on the results of active meter accuracy tests to a sufficiently large number of sampled customer meters having different consumption levels (i.e. not those tested passively to deal with the complains on meter accuracy / suspected over-registration from customers). Regular meter accuracy testing gives more reliable data for quantifying the losses due to customer meter inaccuracy.)	4	10	20	70												→	→							40	Review consumption of recently tested meters	40000	periodic	ICT/NRW Oficer	
			4) The commercial loss due to illegal water uses has been estimated with sufficient accuracy based on the records of illegal water uses identified in the past including the results of active investigation to a sufficient number of suspected customers.	4	10	20	70												→	→							45	Introduce illegal use trend analysis records. Follow up on test meters	40000	periodic	NRW Oficer	
		(3) Physical Losses & Completion of the Table	**[B]-(c)-(3) Sum-up 17: The total physical loss of the same recent year *i)* has been estimated** (by deducting the total yearly authorized unbilled consumption and the total commercial loss of the same recent year from the yearly NRW volume summed up from the monthly values) **and** ii) **cross-checked with the minimum night flow (MNF) measured at major distribution zones** (or large DMAs). (MNF measurements are difficult to conduct under intermittent supply.) **Then, *iii)* the estimated total physical loss has been further sub-divided into different physical losses categorized by facility type** (i.e. major facilities with structures, pipelines and service connections) **while completing the water balance table by entering all the calculated yearly volume of NRW components.**	4	20	30	60																					40					
			1) The total yearly physical water loss of the same year in the entire SA has been estimated by deducting the estimated authorized unbilled consumption and the estimated commercial losses from the total annual NRW volume.	4	10	20	70				→				→				→			→				→	40	Introduce leak/burst water volume estimation and aggregate monthly as part of work plan	0	routine/monthly	TLs/O&M water staff	
			2) The calculated total physical loss and the estimated volume of illegal water uses (part of it occurs at night) **have been compared with the minimum night flow (MNF) measured at the inlet points of DZs** (or large DMAs) **to understand the level of physical water loss in each DZ.** (MNF measurements are difficult to conduct under intermittent supply.)	4	10	10	60										→	→	→	→	→	→	→	→	→	→	→	10				Difficult due to intermittent supply
			3) The estimated total physical loss has been subdivided into a) leakage and overflow at water treatment, storage and pump facilities, b) bursts and leaks from transmission and distribution pipelines, and c) bursts and leaks from service connections (up to customer meters)**.**	4	10	10	30														→	→	→	→	→	10				Requires investment
			4) The annual water balance table of the recent year for the entire SA has been completed (by entering the estimated volume of each component in the table) **and shared with relevant staff as a NRW assessment tool** (which can be used for improving NRW activities in addition to the assessment/monitoring tool of monthly NRW volume and ratio in each DZ or DMA and the abnormal flow monitoring tool using frequent readings of bulk meters on major and high risk pipelines)**.**	4	10	10	30														→	→	→	→	→	10				Requires investment
			5) Other (Specify)**:**																												
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	**[C]-(a)-(1) Sum-up 18: The base of sufficient and accurate metering (including *i)* 100% metering of billed customers, *ii)* preparation of effective metering policy and *ii)* sufficient check and update of customer data registered in the meter reading and billing system) have been well established.**	1	50	60	90																					70					
			1) 100% customer metering (including those for public fountains, stand pipes and connections of similar nature) **has been realized.**	1	100	100	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	100	Sustain 100% metering ratio				
			2) Effective metering policies for replacement, relocation, consumption estimation, etc. have been prepared to improve metering and billing practices.	1	50	70	100																				90	Present the draft metering policy to the board for approal		30.10.2018	MD/TM	
			3) The current customer / meter reading / billing database has been sufficiently updated by cleaning data and conducting customer identification survey on ground (mainly for the inclusion of consumers missing from the system or identifying the customers registered as disconnected but actually consuming the water for free)**.** (The meter location and connection No. of each customer along with other information may be captured in the customer identification survey with handheld GPSs and/or free mobile GIS (e.g. QField) on smartphones with a accurate base map for adjusting location so that customer information to be accumulated in the customer / meter reading / billing system can be linked with a GIS later of customer meters later.)	2	50	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	capture customer meter GPS data.improve recording of disconnection and reconnections data				
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	**[C]-(a)-(2) Sum-up 19: The frequency and continuity of estimating customers' consumption have been *i)* analysed and *ii)* sufficiently reduced by servicing and replacing faulty meters. *iii)* Even the accuracy of unavoidable customers' consumption estimates has been improved while *iv)* active accuracy tests of existing customer meters, *v)* replacement of identified inaccurate meters and *vi)* installation of air valves on pipelines and service connections at high points to avoid overregistaration by air are being sufficiently conducted by giving priority to larger customers.**	2	50	60	90																					70					
			1) The frequency of estimating consumption of the customers, who are supposed to be billed based on accurate metered consumption, for billing and the continuity of estimation (how many months usually passes before stopped or obviously-faulty meters get replaced) **have been analysed in a recent year for different groups of customers categorized by consumption level** (e.g. large customers consuming more than 100m3/month on average, medium customers consuming more than the upper limit of lowest tariff block charging constant such as 6 m3, and small customers consuming less than the upper limit of the constant tariff block) **based on past meter reading / billing data** (preferably at least for the last 12 months)**.**	1	50	60	90																					70	continuity of data analysis and work on the identified meters for replacement		routine	commercial officer/NRW	
			2) The frequency and continuity of estimating customers' consumption (especially those of large customers) **have been sufficiently reduced preferably through the actions decided based on the results of the above analysis on meter reading / billing data** (e.g. servicing of all blocked meters, installation of strainers before large customer meters, replacement of all stopped and obviously-stalled meters unserviceable, etc.)**.**	1	40	50	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	continous servicing and meter replacement and installation of strainers	500000	continous	NRW TEAM	
			3) The accuracy of estimating customers' consumption (when required) **has been sufficiently improved by estimating based on reliable past consumption data so that the NRW caused by improper estimation has become much less significant.**	2	50	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	use computer generated estimate based on actual past reading.Reduce number of meters on estimate		routine	commercial officer	
			4) Active & regular accuracy tests of customer meters in use (which should be done more frequently for large consumers) **are being sufficiently conducted** (e.g. by using mobile meter testers and/or calibrated buckets on site) **to guide the replacement of low-accuracy meters in a timely manner** (passive customer meter accuracy tests for complaining customers can be a small part of this active and regular accuracy tests)**.** (The costly replacement of old customer meters being used for the small customers, whose consumptions are within the lowest tariff bracket with a fixed charge, would not increase the revenue from them.)	2	30	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	CONTINOUS METER TESTING		continous	NRW TEAM	
			5) Air valves have been sufficiently installed on pipelines and/or service connections at high locations so that air sucked into the pipes does not go through customer meters (especially those on hills) **and does not cause over-registration and excessive internal wear-out of meters** (in case of mechanical meters) **or under-registration** (in case of ultrasonic smart meters) **especially under intermittent water supply.**		50	60	95																					75	**Installation of airvalves on pipelines**	**100000**	**continous**	**TeamLeaders/NRW Team**	

Category L	Category M	Category S	Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																			{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					
				Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	2018-19				2019-20				2020-21				2021-22				2022-23				Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
								1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun					
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(3) Improvement of Meter Reading	**[C]-(a)-(3) Sum-up 20: In order to improve meter reading, *i)* physical measures** (such as repositioning and relocation of the customer meters which are difficult to access or read accurately) **have been sufficiently implemented. Meanwhile, *ii)* non-physical measures** (such as rotation of meter readers' routes, spot check and systematic validation of meter readings and warning & penalty to the staff involved in wrong doing) **are being implemented continuously.**	4	50	60	90																					70					
			1) Position (i.e. height, direction such as vertical and horizontal, etc. but not location) **of installed meters have been sufficiently improved for more accurate and easy meter reading.** (Redesign of typical service connections may be required)		50	60	95																					70	**Follow up meter reading anomaly reports**	**0**	**routine**	**CO/WSS**	
			2) The installed meters at customers with locked gates, dangerous animals, etc. have been sufficiently relocated for making meter reading more easy and continuous (e.g. change to a copolymer meter that is effective against meter theft and install it outside of fencing structure). (Redesign of typical service connections may be required.)	3	50	60	95																					75	Take action on reported cases	0	routine	CO/WSS	
			3) Rotation of meter readers' routes (e.g. every 6 months) **is being sufficiently and effectively done to reduce corruption and inaccurate meter reading.**	2	55	65	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Circulate the meter rotation schedule monthly	0	monthly	CO	
			4) Spot check of initial meter readings (e.g. by meter reading supervisor) **and systematic validation of meter readings** (e.g. automatically by a software system or manually by system operators) **are being sufficiently and effectively done to improve meter reading accuracy.**	3	45	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Initial meter reading, routine spot checks	0	routine	CO/O&M water staff	
			5) Warning and penalty to the staff, who have purposely kept conducting wrong meter readings or unjustifiable underestimation of consumption, have been sufficiently exercised to reduce staff's involvement in wrong doing.	3	45	50	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	mobile meter reading, put it as agenda item in meetings	0	routine	CO	
		(4) Additional Focused Management of Large Customers	**[C]-(a)-(4) Sum-up 21: Additional measures for managing large customers such as *i)* account integration of customers having multiple meters at the same premises, *ii)* frequent visual inspection and additional meter reading, and *iii)* proper sizing of customer meters have been sufficiently conducted and are continuing.**	3	50	60	90																					70					
			1) Multiple customer meters serving the same customer have been sufficiently integrated into one account for each customer so that the amount of bill will increase properly in accordance with the incremental water tariff (also possibly by replacing them with a single larger customer meter).	4	50	60	90											→										75					Not high priority as the reverse(separation) is prevalent
			2) Frequent visual inspection and additional meter reading at large consumers (e.g. every week, etc.) **are being sufficiently conducted to minimize the loss of revenue caused by the meter inaccuracy worsened in between monthly meter readings.**	2	60	75	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85	Regular large consumer(s) meter spot checks	0	routine	NRW officer / O&M water/ CO	
			3) Sizing of customer meters (particularly those for large consumers) **has been sufficiently improved based on expected maximum flow ranges.** (It is important to avoid small customer meters with a cut-off flow rate lower than a high water flow rate often expected at the beginning of each intermittent water supply period especially in low laying areas with high water pressure.)		55	65	95																					75	**Size large customer meters (2'' and above)**	**0**	**routine**	**NRW officer / O&M water**	
		(5) Use of Other Hardware & Software Technologies for Customer Metering	**[C]-(a)-(5) Sum-up 22: Hardware and software technologies related to NRW** (other than those for leak survey and GIS) **such as *i)* a well-equipped workshop for servicing and testing meters, *ii)* a robust computerized meter reading / billing system, *iii)* handheld meter reading devices (e.g. smartphones), *iv)* copolymer meters and smart meters, etc. have been considered and utilized sufficiently to reduce NRW further.**	4	50	60	90																					70					
			1) A meter workshop with sufficient equipment and materials has been established to support regular servicing of removed bulk and customer meters and testing of new and exiting customer meters. (A water meter test bench may be installed especially at large WSPs.)	3	50	60	95																					70	Portable meter testing	0	routine	NRW officer	
			2) A robust computerized meter reading / billing system with high data handling and reporting capabilities (including abnormality report) **is being used for improving work efficiency, reducing data handling errors and identifying stalled meters and possible illegal water uses.**	2	50	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Enhance the utility of exisiting software and acquire mobile meter reading software	0	ongoing	FM/ICT	
			3) Handheld meter reading devices (e.g. smartphones with a meter reading software program (with GPS capabilities) linked to the meter reading / billing system) **have been fully and effectively introduced to improve meter reading accuracy and reduce meter handling errors.**	1	10	20	95																					60	implementation of mobile meter reading software	0	30.07.2019	FM/ICT	
			4) Embracement of innovative and/or more accurate metering technologies (e.g. different type of copolymer meters which are effective against meter theft, mechanical and ultrasonic smart meters with automatic meter reading (AMR) and anti-tampering functions, etc.) **have been sufficiently considered to keep improving overall accuracy.** (Customer meters having high accuracy (e.g. ISO Class C, OMIL R200, etc.) at low flow rate may be required especially when large and medium customers use receiving water tanks into which water goes slowly in comparison to the direct connection to taps. The use of more expensive high accuracy water meters for the small customers, whose consumptions are within the lowest tariff bracket with a fixed charge, would not increase the revenue from them.)	1	60	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	80	Increase use of smart and co-polymer meters	500000	quartely	FM/TM/NRW officer/O&M officers	
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	**[C]-(b)-(1) Sum-up 23: Preparatory activities against illegal water uses** (such as *i)* analysis on occurrences and distribution of illegal uses over the service area, *ii)* preparation of policies against illegal water uses, *iii)* establishment of effective measures to deal with the legal procedure against illegal users, *iv)* improvement of quantifying illegal uses to imposing sufficient water charges and penalties, etc., *v)* prevention of unethical involvement of WSP staff, *vi)* establishment of incentives for whistle blowers, etc.) **have been sufficiently conducted.**	3	30	40	70																					50					
			1) Occurrences of illegal uses (e.g. meter tampering, meter bypass, illegal connection, Illegal reconnection, meter reversal, fetching before meter) **and the influence of informal settlements have been sufficiently analysed and discussed for prioritizing areas for reducing illegal uses.** (Note: Both the Illegal self-reconnections of disconnected customers having stopped meters and the unsuccessful disconnections with faulty stop cocks & stopped meters would cause a large amount of NRW without being noticed for a long time if special attention is not paid to them.)	2	50	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Continouos staf sensitization	0	routine	CMT	
			2) Clear and sufficient policies against illegal water uses (e.g. how to identify all known illegal water uses, how to prevent illegal water uses, etc.) **have been prepared and informed to relevant staff.**	2	30	40	95																					60	Document policy and communnicate to staff	0	30.07.2019	CMT	
			3) Effective measures to deal with the legal procedure against suspected and confirmed illegal water users (e.g. inclusion of a heavy penalty in the county's water act) **have been sufficiently established.**	3	55	65	95																					80	Enhance enforcement using legal procedures	0	30.07.2019		
			4) Each occurrence of illegal water use is quantified via formulae (time x typical flow) **or similar methods for imposing illegal users with sufficient charge for their water consumption and substantial penalties as well as for analysing the number and scale of illegal water uses.**	4	40	60	95																					90	Estimate every illegal use	0	as and when	NRW officer/O&M water staff	
			5) Prevention measures against the involvement of WSP staff in water theft (especially plumbers and meter readers) **have been sufficiently established.**	4	50	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Continouos staf sensitization	0	as and when	CMT	
			6) Incentives for whistle blowers to inform illegal uses and vandalism to water supply facilities have been sufficiently established.	3	40	50	95																					65	Continue/enhance	0	as and when	CMT	

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							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[C] Reduction of Commercial (Apparent) Losses	(b) Management of Illegal Water Uses	(2) Enforcement of the Reduction of Illegal Uses on the Ground	**[C]-(b)-(2) Sum-up 24: The policies and measures against illegal water uses have been sufficiently enforced on the ground** (e.g. through *i)* an active patrol, *ii)* sufficient involvement of the county's law enforcement, *iii)* relocation of customer meters to the outside of premises or close to the distribution pipeline, *iv)* use of pipe materials and equipment effective against illegal uses, *v)* installation of a master customer meter or individual meters outside of each large residential buildings, *vi)* other measures such as disconnection at tapping points and the use of sealing over meter liners, etc.).	3	40	50	70																					60					
			1) Active patrol for finding recurring illegal connections, meter tampering, illegal self-reconnections, unsuccessful disconnections, etc. (including regular spot checks on large customers such as factories, farms and construction sites) **have been sufficiently conducted by dedicated inspectors supported by the WSP's top managers** (with the use of chlorine DPD tablets, electric conductivity meter, detecting equipment, etc.).	2	30	40	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	50	Active patrols	50000	routine	CMT	
			2) Enhancement of law enforcement against water theft has been sufficiently supported by the county and National Police.	3	20	30	60			→				→				→				→				40	Sensitize the county on their role	10000	30.01.2019		
			3) Installed existing meters (especially those at customers suspicious of illegal water uses such as meter bypass) **have been sufficiently relocated to limit the space available for illegal connections, meter bypass, fetching before meter, etc.** (e.g. relocation to the outside of fencing structure, relocation close to the distribution pipes but still within the premise or fencing (preferably to a location visible from the outside), etc.) (Redesign of typical service connections may be required.)	3	50	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85	Inspection and relocation of suspected customers	10000	routine	NRW/O&M officers	
			4) Equipment and materials effective for reducing illegal water uses (e.g. HDPE pipes which are relatively difficult to connect illegally, copolymer meters which can be put outside of premises or fencing to prevent illegal connection without having a high risk of meter theft targeting metals, etc.) **have been sufficiently used.**	4	60	70	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85	Enhance the use of effective materials	0	routine	NRW/O&M officers	
			5) Metering for the residents in large residential buildings (where water theft may exist inside the building) **has been sufficiently improved** (e.g. by relocating individual meters to the outside of buildings or by installing a master meter for the building owner / landlord outside and collect water charge based on master meter readings)**.**	3	55	65	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85	Effective evaluation of new/existing large connections	0	routine	NRW/O&M officers	
			6) Prevention measures other than those listed above (e.g. disconnection of dormant connections from the offtake / tapping point, improvement of sealing materials including those covering meter liners, etc.) **have been sufficiently conducted to reduce the occurrences of illegal water uses.**	5	55	65	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Disconnection from Mains, meter seals (with colour codes) etc	0	routine	NRW/O&M officers	
[D] Reduction of Physical (Real) Losses	(a) Active Identification of Visible Water Losses	(1) Overflow & Line Patrol	**[D]-(a)-(1) Sum-up 25: Visible physical water losses** (such as overflow, leaks from exposed facilities, and surface leakage from underground facilities, etc.) **have been sufficiently reduced through *i)* improvement of water containing structures, *ii)* active patrol along pipelines, *iii)* relocation of pipelines to road reserves for easy patrol, *iv)* advice to the customer causing overflow from their tanks, etc.** (in addition to responding to customers' reporting of leaks and bursts).	3	50	60	90																					70					
			1) Overflow from WSP's water containing facilities such as distribution reservoirs, break pressure tanks (BPT), etc. has been sufficiently reduced (e.g. by improving the operation of transmission pumps to distribution reservoirs, by observing a water-level-change of a distribution reservoir for 24 hours with closed inlet and outlet valves after filling up the reservoir, by avoiding the tempering of float valve at BPTs for irrigation with the lids locked with keys, etc.)**.**	4	70	80	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85	Use sluice valves, stop pumping when required	0	continouos	WSS/O&M Staff	
			2) Active patrol along pipelines is being sufficiently done for early detection of visible / surface leaks from sluice valve, air valve, hydrant, pipes, etc. and water theft including illegal connections. (This patrol may simultaneously cover other aspects irrelevant to NRW such as sewage overflow and water quality problems for improving overall work efficiency of the WSP.)	3	50	60	95	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	75	Implement line patrol schedule	0	continouos	WSS/O&M Staff	
			3) Relocation of pipelines to road reserves, etc. has been sufficiently done for effective patrols.		50	60	95																				75	**identify and relocate residual pipelines**	**400000**	**quarterly**	**WSS/O&M Staff**	
			4) Customers have been sufficiently advised to stop overflow from their customers' water tanks and leakage from the service pipes after customer meters while WSP staff have been patrolling along pipelines or working around customer meters.		60	80	95																				85	**Enhance customer sensitization**	**0**	**quarterly**	**WSS/O&M Staff/ICT offcer**	**Use bills/website/field visits**
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	**[D]-(b)-(1) Sum-up 26: Listening sticks are being used daily by many field staff** (e.g. NRW task team, O&M staff, meter readers, etc.) **at and around customer meters, along pipelines, etc. for *i)* identifying abnormal sound of underground leakage, *ii)* locating leaking points, buried valves, etc., *iii)* checking complete closure of gate valves, stop cocks, etc. and *iv)* checking whether water is being used through the possibly faulty customer meters registering zero consumption every month.**	2	0	10	50																					30					
			1) Listening sticks (or called sounding bars) **are being used daily by field staff** (e.g. those in charge of initial installation, servicing and replacement of customer meters, member of NRW task team, possibly meter readers, etc.) **at and around customer meters for detecting abnormal sound of invisible leakage** (and illegal connections) **on service pipes.** (Leak detection equipment may be used to confirm the existence and location of suspected leaks (and illegal connections).	3	10	20	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	40	Enhance use of listen sticks	0	routine	WSS/NRW officer/O&M staff	
			2) Listening sticks are being used daily (by water distribution / O&M staff, etc.) **at appurtenances on transmission and distribution pipelines such as valves and hydrants for detecting abnormal sound hinting invisible leakage, locating buried valves and checking whether valves can be closed completely or not.** (Leak detection equipment may be used to confirm the existence and location of suspected leaks.)	3	10	20	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	40	Enhance use of listen sticks	0	routine	WSS/NRW officer/O&M staff	
			3) (Commercial & Physical Losses) Listening sticks are being used by meter readers and/or their supervisors at previously-disconnected (and possibly illegally self-reconnected) **customer meters registering zero consumption, in order to easily check whether water is being used through a potentially faculty customer meters without being registered** (before disconnecting the service connection at the linier after the meter to see if water runs through the meter without being registered)**. This activity probably result in finding leaks from the service connections through hearing abnormal sound at the customer meters.** (Disconnected service connections having stopped meters may have been self-reconnected by customers illegally, which may be causing a large amount of illegal water use without being notified for a long time. Unsuccessful disconnections with faulty stop cocks and stopped customer meters may also be causing a large water loss without being noticed for a long time.)	3	0	10	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	30	Enhance use of listen sticks	0	routine	FM/CO/Meter readers	

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L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[D] Reduction of Physical (Real) Losses	(b) Active Detection of Invisible Underground Leaks	(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	**[D]-(b)-(2) Sum-up 27: The areas, branch pipelines and specific locations causing significant underground leaks within the DZs and/or DMAs prioritized for leak detection are being narrowed down efficiently by conducting *i)* step test with a bulk meter or portable UFM with gate valves and/or *ii)* customer-to-customer survey with listening sticks** (depending on the structure of target distribution pipelines - tree-type or looped) **before *iii)* using more sophisticated equipment such as electronic leak detector and noise correlator to pinpoint leaks.**	2	0	0	40																					10				
			Step 1: In addition to the monthly monitoring of NRW volume & ratio in established DZs and/or DMAs, minimum night flow (MNF) measurements have been sufficiently conducted (with zonal bulk meters or portable ultrasonic flow meter (UFM) especially when abnormal flow is identified with the existing bulk meters selected for continuous abnormal flow monitoring) **to prioritize certain DZs and/or DMAs for leak survey** (and to assess their baselines of physical losses)**.** (This prioritization may also be conducted through a participatory decision making through discussions.)	4	10	10	50																					25	Acquire UFM and Train staff on use	2000000	01.30.2019	TM	Belgium project
			Step 2: Separate identification of the areas having tree-type distribution pipelines (and looped distribution pipelines which can be temporally cut with gate valves to make tree-type pipelines) **and the areas having looped distribution pipelines** (which cannot be cut temporally into tree-type pipelines) **within the prioritized zone(s) and/or area(s).**	4	40	50	85																					65	Enhance valve instalation and reconstruct the interlinkages in the network	500000	30.06.2019		
			[[Tree-type Pipelines (& looped pipelines which can be temporally cut with gate valves to make tree-type pipelines) **with Sufficient Gate Valves to Control Flow into Branch Pipelines – e.g. Surrounding Areas]]** **Step 3: Step test with a bulk meter or portable ultrasonic flow meter (UFM) at night by closing the gate valves installed at the roots of branch lines one by one** (possibly done while MNF measurement is conducted and network isolation is confirmed) **to identify branch lines suspicious of causing relatively large leaks**	4	0	10	50																					25	Train in use of UFM, enhance installation of valves and do trials	30000	30.06.2019	NRW Officer,	
			Step 4: Customer-to-customer listening stick (abnormal sound) **survey at and around the customer meters on all the service pipes connected to the identified branch lines suspicious of causing large leaks**	4	0	10	60								→	→	→	→	→	→	→	→	→	→	→	25	train and enhance use of listening sticks	0	30-06-2019	NRW Officer,	
			Step 5: Use of a portable ultrasonic flow meter (UFM) with excavation (and possible closure of stop cocks at customer points for direct measurement of leaks) **and the use of a noise correlator in a way sandwiching the connections having abnormal sound suspicious of leaks.** (Pinpointing of the identified leaks can be done with an electronic leak detector/ground microphone, listening stick, etc. at the end of this step.)	3	0	10	60								→	→	→	→	→	→	→	→	→	→	→	25	Train in use of UFM		30-06-2019	TM/NRW	
			[[Looped Pipelines (which cannot be cut temporally into tree-type pipelines) **& Tree-type Pipelines without Sufficient Gate Valves to Control Flow into Branch Pipelines – e.g. Built-up Areas]]** **Step 4: Listening stick survey on all the service pipes** (at and around the customer meters) **connected to the target pipelines**		0	10	60																					25	**train and enhance use of listening sticks**		**30-06-2019**	**TM/NRW**	
			Step 5: Line survey especially on the distribution pipelines highly suspicious of causing a significant amount of leakage (selected based on the type, size and age of pipelines and the results of listening stick survey) **with electric leak detector, noise correlator and/or listening stick at night or day time**		0	10	60																					25	**train and enhance use of listening sticks**		**30-06-2019**	**TM/NRW**	
			Step 6: Recording of the identified leak points and communication with the persons in charge of repairing leaks		0	10	60																					25	**train and enhance use of listening sticks**		**30-06-2019**	**TM/NRW**	
	(c) Improvement of Workmanship & Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	**[D]-(c)-(1) Sum-up 28: *i)* Each new installation of service connections and pipelines is tested with a hand pump** (or powered pump) **for checking the existence of leaks. Meanwhile, the WSP has been *ii)* responding to the notifications on bursts and leaks from the public** (and internal communications on the bursts and leaks found by WSP staff) **very well with speedy and quality repairs and *iii)* recording them in details including their response time and GPS coordinates for analysing them later** (not only statistically but also spacially on GIS)**.**	2	40	50	90																					60				
			1) Assessment of service connection installation quality with hand pump tests and improvement of the installation are being sufficiently conducted.	2	0	20	70	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	40	Train and enforce use of hand pump		routine	WSS/O&M	
			2) Assessment of distribution pipeline installation quality with pressure tests using hand or powered pump and improvement of the installation are being sufficiently conducted.	2	0	20	70	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	40	Train and enforce use of hand pump		routine	WSS/O&M	
			3) The speed and quality of burst and leak repairs have been sufficiently improved (e.g. with adoption of optimum leakage repair methods and a cloud-based work flow / task management system, etc.) **while burst & leak notifications from the public** (and internal communications on the bursts and leaks found by WSP staff) **have been sufficiently increased through the utilization and improvement of relevant ICT tools** (e.g. WASREB's MajiVoice) **and campaign / sensitization** (e.g. use of SMS, mass media, etc.)**.**	1	40	50	85	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	65	Increase sensitizations campaigns		routine	WSS/O&M	
			4) Detailed records of bursts and leaks that shows GPS coordinates (and pipeline number if any)**, pipe diameter, material, type of leak, date of detection, duration of repair, etc. are being accumulated for analysing them statistically with tables and graphs and spacially on GIS.**	2	30	50	80				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	60	Integrate GIS with leaks and bursts reporting	100000	30-06-2019	TM/WSS/O&M/GIS	
		(2) Short-term Improvement of Pipelines & Connections	**[D]-(c)-(2) Sum-up 29: The improvement measures of pipelines and service connections which can be done within a relatively short period without a large capital investment (such as *i)* introduction of new pipe material effective for preventing leakage and illegal connections (e.g. HDPE) for new transmission and distribution pipelines and service connections, *ii)* replacement of spaghetti service connections, *iii)* closure of old leaking lines aligned in parallel to better lines, etc.) have been sufficiently carried out.**	3	45	60	90																					70				
			1) Pipe materials effective for limiting leakage and illegal connections, etc. (e.g. HDPE pipes with compression fittings and/or with butt welding machine & generator) **have been fully introduced for new installation of transmission and distribution pipelines.**	3	50	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Improve on the quality of compression fittings		routine	TM/WSS/TeamLeaders	
			2) Pipe materials effective for limiting leakage and illegal connections, etc. (e.g. HDPE pipes with compression fittings) **have been fully introduced for new service connections.** (The pipe materials and appurtenances for new service connections including customer meters should preferably be provided by the WSP to the customers with charges for better quality control of service connections.)	3	50	60	90	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	70	Improve on the quality of compression fittings		routine	TM/WSS/TeamLeaders	
			3) Spaghetti service connections causing leakage have been replaced with branch / tertiary distribution pipelines and shorter service pipes.	3	45	50	80																				60	Replace identified spangeti service lines in mlolongo and kathangaita	500000	routine	TM/WSS/TeamLeaders	
			4) Old leaking pipelines (in parallel to better pipelines having a sufficient capacity) have been removed or closed completely.	3	40	60	80																				70	replace remaining old lines in TOWN zone	400000	routine	TM/WSS/TeamLeaders	
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	**[D]-(c)-(3) Sum-up 30: The rehabilitation of problematic pipes & appurtenances, leaking tanks, etc. (including their replacement) has been planned from long-term financial and technical prospects** (based on the WSP's needs and prioritization over different pipes types, sizes and areas) **and has been / is being implemented as funds permits.**	4	50	60	90																					70				
			Step 1: Identify and prioritize problematic areas, problematic pipe types and sizes, etc. (e.g. asbestos cement pipes, old galvanized iron (GI) pipes, cast iron and steel pipes having corrosion holes and/or rust incrustation significantly blocking flow, pipes with low pressure rating (e.g. PN 7.5) in high pressure areas, etc.) **which need rehabilitation** (replacement, relining, etc.) **based on analysis of existing data such as locations of past bursts and leaks.**	4	50	60	90	→		→		→		→		→		→		→		→		→		→		70	Replace GI pipes in Site,KMC,Makadara areas		routine	TM/WSS/TeamLeaders	
			Step 2: Planning of rehabilitating the problematic pipes & appurtenances and leaking tanks.	4	50	70	90	→		→		→		→		→		→		→		→		→		80	building of valve chambers and repairing of valves	200000	routine	TM/WSS/TeamLeaders	

Category			Possible Measures / Activities as Statements of 100% Achievement [NOTE: WSPs with limited capacity (e.g. skills, manpower, etc.) may use only the shaded 34 SUM-UP statements below as a STARTER while referring the itemized statements for better understanding (you may filter the sum-up statements with ● marks on the right). Other WSPs may use the itemized statements without using the sum-up statements or use both the sum-up statements and itemized statements completely or selectively.]	{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23) ← ● marks are for limiting measures / activities to include in the plan by filtering.																{{ AP }} Annual NRW Reduction Plan for 2018-19 ← ● marks are for limiting measures / activities to include in the plan by filtering.					
							2018-19				2019-20				2020-21				2021-22				2022-23								
L	M	S		Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc. is preferable)	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost estimation, etc.)
[D] Reduction of Physical (Real) Losses			**Step 3: Incorporation of the rehabilitation plan to the WSP's strategic plan and/or the tariff approval to WASREB with required budgetary provision.**	4	70	80	95	→		→		→		→		→		→		→		→		→		→		85	sustain incorporation into budget		routine	CMT	
			Step 4: Design, preparation of a bill of quantities and costing for rehabilitating prioritized problematic pipes & appurtenances and leaking tanks.	4	70	80	95	→		→		→		→		→		→		→		→		→		→		85			routine	TM/WSS/TeamLeaders	
			Step 5: Implementation of the planned rehabilitation of prioritized pipes, etc. as funds permit.	4	50	60	90		■		■		■		■		■		■		■		■		■		■	70	Purchase of required materials		30-06-2019	TM/WSS/TeamLeaders	
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	**[D]-(d)-(1) Sum-up 31: Based on the understanding of existing configurations and conditions of transmission and distribution facilities in the WSP** (e.g. boundaries of distribution zones (DZs) & pressure zones, elevation difference in each zone, occurrences of bursts and leaks, conditions of existing pressure reduction facilities, etc.)**, priority zones for pressure measurement have been selected.**	U																												
			Step 1: The boundaries of existing distributing zones (DZs) & smaller pressure zones (possibly DMAs) **and transmission & distribution facilities** (including distribution reservoirs / tanks, pump stations, pressure reduction facilities such as BPTs and PRVs and pipelines) **have been mapped sufficiently** (preferably on GIS) **and their interrelations are well understood.**		60	70	95																					85	**resolve remaining boundary demarcation and map on GIS**		**30-10-2018**	**GIS/WSS/TEAMLEADERS**	
			Step 2: Elevation difference within each DZ and/or pressure zones have been sufficiently understood (e.g. by first overlaying elevation contours and the zone boundaries and facilities (GIS layer of 25m-interval contours is available for free on the internet) or checking elevation with Google Earth, then making a table showing the elevation of storage facility and lowest and highest customers, elevation difference between the lowest and highest and the range of static pressure in each zone)**.**		20	30	90																					50	**Measuring pressure in atleast one zone**	20000	**30-06-2019**	**NRW TEAM**	
			Step 3: Status (e.g. used, bypassed, etc.)**, capacity and conditions** (e.g. leak, overflow, etc.) **of existing pressure releasing or reducing facilities** (e.g. distribution reservoirs / tanks, BPTs, auto-PRVs, small buried PRVs with limited functions, etc.) **have been sufficiently known through visual observation, maintenance, etc.**		35	40	70																					50	**continous maintenance of flow control valves**		**routine**	**O&M Staff**	
			Step 4: Priority zones have been selected for pressure measurement (based on the range of static water pressure calculated based on elevation differences, occurrences of bursts and leaks, types and age of existing distribution pipelines and service pipes, conditions of existing pressure reducing facilities, minimum night flow (MNF) measurements (if available), etc. in each zone)**.**		0	10	50																					20			**routine**	**O&M Staff**	
		(2) Pressure Measurement over Large Areas	**[D]-(d)-(2) Sum-up 32: Pressure measurement at planned locations** (where particularly high and low pressure is expected, before & after existing PRVs, etc.) **has been sufficiently conducted in the zones prioritized for pressure reduction** (and in the other zones having excessive pressure)**. The results of pressure measurement have been mapped for analysing pressure differences over the zones and their causes.**	U																												
			Step 2: The map showing the planned pressure measurement points for the prioritized zones have been shared with surveyors who measure pressure on the ground. (If the measurement is planned on GIS, this step can be done with mobile GIS software on smartphone such as MAPinr, Google Earth, QField, SW Map, etc.)	4															■		■		■		■						
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	**[D]-(d)-(3) Sum-up 33: Pressure reduction measures** (e.g. large-scale zoning with distribution reservoirs & pump stations, sub-zoning with PRVs & BPTs, improvement of pump selection & operation, removal of bottleneck pipes & large hidden leaks, etc.) **have been planned and implemented for the zones and areas where high pressure is causing many bursts and leaks. Meanwhile, continuity and evenness of water supply have been sufficiently improved** (by levelling out the pressure over the service area and quickly removing air sucked into the pipelines) **partly in order to avoid rapid pipe degradation in pressure-fluctuating and intermittent water supply with air intrusion.**	U																												
TOTAL			**TOTAL Sum-up 34: The WSP has been reducing NRW volume and ratio for the entire service area at a sufficient rate (or at least sustaining them while existing pipes and other facilities are getting old) by successfully conducting NRW activities over the year.**	-	20	35	90	-																				45	Total		-	-	

[Example Modes of Implementation]

: Intensive work period with operational expenditures ⇒
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)

Table 2. Self-Assessment, Medium-term Plan, Annual Plan & Quarterly Monitoring for 2018-19 Onward, Eldoret WSP (ELDOWAS)

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																			{{ AP }} Annual NRW Reduction Plan for 2018-19							{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23												
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Proposed Activity	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc.	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[A] Organization, PDCA Cycle, Finance and Procurement	(a) Staffing, Awareness & Training	(1) Establishment of a Dedicated NRW Task Team and Encouraging Cooperative Environment	1	20	25	80					→	→	→	→	→												45	Increase of NRW Staff	increse of 2 person					not yet started			
		(2) Staff Sensitization including Enhancement of Motivation & Team Work through Understanding Financial & Water Resource Aspects of NRW	3	45	70	100											⇒										90							already started			
		(3) Enhancing Support from Customers	3	50	60	95						JICA - Equipment															75							going on well (found 200 illegal connections)			
		(4) Capacity Development through Trainings & Trials	2	60	70	90																					80										
	(b) PDCA Cycle (Plan-Do-Check-Adjust)	(1) Participatory Review, Planning & Monitoring of NRW Activities	2	50	60	90			→	→																	70										
		(2) Enhancement of Periodical Data-based Discussions for Improving Activities	3	50	70	95										SNV											80										
	(c) Procurement	(1) Internal Standardization of Pipes, Fittings, Customer Meters, etc.	3	60	70	90											⇒	⇒									75										
		(2) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	2	45	50	80																					65										
[B] GIS, Zoning, NRW Monitoring & Water Balance	(a) GIS Preparation & Utilization	(1) Establishment of Base Map and Mapping of Existing Facilities	2	65	75	90							⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	85										
		(2) Mapping of NRW-related Problems	3	0	20	60					⇒	⇒	⇒	⇒	⇒												30										
		(3) Enhancement of GIS Data Utilization with Printed Maps and Free Software Programs	3	40	50	80					Training																60										
	(b) Strategic Zoning & NRW Monitoring	(1) Entire Service Area (SA)	1	50	70	90																					80										
		(2) Distribution Zones (DZs) & Abnormal Flow Monitoring	2	20	20	50																	⇒	⇒	⇒	⇒	30										
		(3) District Metered Areas (DMAs)	4	10	10	30																					15										

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																				{{ AP }} Annual NRW Reduction Plan for 2018-19							{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23													
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Proposed Activity	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc.	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
[B] GIS, Zoning, NRW Monitoring & Water Balance	(c) Authorized Unbilled Consumption & Water Balance Table	(1) Authorized Unbilled Consumption	4	40	40	60											→										55										
		(2) Commercial Losses	4	55	60	80	→	→	→	→	→	→	→	→	Data collection												70										
		(3) Physical Losses & Completion of the Table	4	10	10	50					→	→	→	→			Analysis										30										
[C] Reduction of Commercial (Apparent) Losses	(a) Customer Meter Management (reduction of data handling errors, improvement of meter accuracy, etc.)	(1) Establishment of Base for Sufficient & Accurate Metering of Customers' Consumption	1	55	70	90			⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	→	→	→	→	→	→	→	→	75										
		(2) Reduction of Consumption Estimations and Improvement of Meter Accuracy	2	40	80	95			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	85										
		(3) Improvement of Meter Reading	4	50	60	95							→	→	→	→	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	70										
		(4) Additional Focused Management of Large Customers	3	40	50	90							→	→	→	→	→	→	→	→	→	→	→	→	→	→	70										
		(5) Use of Other Hardware & Software Technologies for Customer Metering	4	40	70	90							⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒							80										
	(b) Management of Illegal Water Uses	(1) Preparatory Activities against Illegal Water Uses	3	55	60	80							→	→	→	→	→	→	→	→	→	→	→	→	→	→	75										
		(2) Enforcement of the Reduction of Illegal Uses on the Ground	3	60	60	80																					70										
[D] Reduction of Physical (Real) Losses	(a) Active Identification of Visible Water Losses	(1) Overflow & Line Patrol	3	60	80	90																					85										
	(b) Active Detection of Invisible Underground Leaks	(1) Daily Use of Listening Sticks by Wide Users	2	5	5	50									⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	30										
		(2) Strategic Narrow Down of Leaks with Step Test and Customer-to-Customer Survey with Listening Sticks	2	0	0	50					zoning & DMA Creation								→	→	→	→	⇒	⇒	⇒	⇒	15										
	(c) Improvement of Workmanship & Pipe Materials	(1) Improvement of Plumbing and Quick Response to Bursts & Leaks with Quality Repairs	2	30	40	80			⇒	⇒	⇒	⇒	⇒	⇒	⇒												60										
		(2) Short-term Improvement of Pipelines & Connections	3	15	20	50																	⇒	⇒	⇒	⇒	30										
		(3) Medium / Long-term Planning & Implementation of Pipe Replacement, etc.	4	15	20	50																					30										

Category			{{ SA }} Self-Assessment of Recent Conditions (supplementary to the annual review of the pervious financial)			{{ MP }} Medium-term NRW Reduction Plan for the Next 5 Years (2018-19 to 2022-23)																	{{ AP }} Annual NRW Reduction Plan for 2018-19							{{ QM }} Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2018-19			
							2018-19				2019-20				2020-21				2021-22				2022-23										
L	M	S	Current Priority (1: highest, 2: high, 3: medium, 4: low, 5: Lowest & U: Unnecessary)	Achievement Level One Year Ago (%)	Current Achievement Level (%)	Target Achievement Level (%)	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	1st Q: Jul - Sep	2nd Q: Oct - Dec	3rd Q: Jan - Mar	4th Q: Apr - Jun	Target achievement Level (%)	Proposed Activity	Required work & materials (quantitative explanation with numbers, specific area coverage, type of target customers, etc.	Costs (KSh.)	By when	By whom	Remarks (e.g. related KIP target, countermeasures to obstacles, base of cost	Remarks on the Implementation by the End of 1st Quarter	Remarks on the Implementation by the End of 2nd Quarter	Remarks on the Implementation by the End of 3rd Quarter	Remarks on the Implementation by the End of 4th Quarter
	(d) Pressure Management	(1) Basic Understanding of Existing Water Supply Systems	5	80	80	-				⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒										-								
		(2) Pressure Measurement over Large Areas	5	0	10	-			→	→	→	→	→	→													-								
		(3) Pressure Reduction and Improvement of Water Supply Continuity & Evenness	5	-	-	-			⇒	⇒	⇒	⇒							→	→	→	→	→	→			-								
TOTAL			-	45	50	80	-																				60		Total		-	-					

[Example Modes of Implementation]

: Intensive work period with operational expenditures ⇒

→ : Less intensive period with operational expenditures

: Intensive work period with capital investment (without donner)

November 19, 2018
JICA Expert Team

（Discussion Papers with WASREB）

Evaluation of the Annual Review (2017-18), Middle-term Planning & Annual Planning (2018-19) of NRW Reduction Activities at the 9 Pilot WSPs

What went well? (Achievements)
● All of the 9 Pilot WSPs have reviewed their NRW activities conducted in the last fiscal year (2017-18) using the annual activity review report template.【All 9 WSPs】 ● All of the 9 Pilot WSPs have assessed the achievement level of one year ago and this year and have set targets in one year and five years (with shared perceptional achievement & target levels expressed in % (e.g. 100% for complete achievement)) for each of the 34 NRW-related categories listed in the other template prepared for assessment, medium-term planning, annual planning and quarterly monitoring.【All 9 WSPs】 ● 2 Pilot WSPs have prepared fully detailed middle-term & annual NRW reduction plans based on the activity breakdowns listed under each of the 34 categories in the template【Kisumu & Mavoko】 ● 4 Pilot WSPs have prepared moderately-detailed simpler middle-term & annual NRW reduction plans by planning activities for the 34 categories without using the pre-listed activity breakdowns【Meru, Nyahururu, Ruiru-Juja & Nakuru】 ● 1 Pilot WSP has prepared only simpler middle-term NRW plan (without annual plan) so far (as of Nov 18, 2018).【Eldoret】. ● 1 Pilot WSP has assessed the achievement level of one year ago and this year and has set targets in five years for each of the detailed activity breakdowns listed under the 34 NRW-related categories, but the WSP has not yet prepared plans (as of Nov 18, 2018).【Embu】. ● 2 Pilot WSPs have conducted the monitoring of their NRW reduction activities implemented in the first quarter of this fiscal year using the same template (as of Nov 18, 2018)【Kisumu & Nyahururu】. ● JICA Expert Team had conducted the analysis of meter reading and billing data for each of the 9 Pilot WSPs and shared their results in order to establish factual bases for their planning process and shift their focus more to the commercial losses at large customers in their planning. The expansion of NRW Unit/Section and involvement of commercial sections were also promoted through these supporting activities. These intentions seem

to have worked to some extent at several Pilot WSPs【Kisumu, Nakuru & Ruiru-Juja】.

- The two new templates used for 1) annual activity review and 2) capacity assessment, planning and monitoring have been recognized more user friendly compared to the ones used in the previous year because [a] they are included in a single Excel file with two sheets (no need of copying and pasting tables such as bar chart into a Word file), [b] writing up in paragraphs is not required (only bullet points), [c] the detailed breakdowns of potential activities listed in the template can guides WSPs to expand their activities further, etc.
- The preparation of annual activity review & plans and capacity assessment using the templates provided good opportunities to raise awareness and discuss NRW activities among a large number of staff relevant to NRW reduction.【especially in Mavoko WSP】
- The technical assistances provided to the majority of the Pilot WSPs during the last fiscal year has helped them to incorporate new NRW reduction activities in their middle-term and annual plans.

What did not go well? (Challenges)

- JICA experts have guided each of the 9 Pilot WSPs through their annual activity review and self-assessment of achievement levels and setting of future target levels. Most of the 9 Pilot WSPs would have not finished these tasks without the presence and facilitation of JICA experts in the discussions between various NRW-related sections and units. They are expected to conduct these processes more independently next year.
- In general, the commitment for preparing plans before implementing activities is still not sufficient in many Pilot WSPs, which has resulted in a very long period of preparing plans despite of the repeated visits of JICA Expert Team (including its Kenyan staff) to each Pilot WSP for guiding their planning process.
- Some Pilot WSPs have the heads of NRW Units/Sections whose authorities or grades in their salary scale are too low to draft a medium-term plan requiring longer perspectives or instruct the officers in charge of different zones regarding their daily NRW-related activities. Organizational strengthening is required in these Pilot WSPs not only for the implementation but also for the planning of NRW reduction activates.【e.g. Ruiru-juja & Eldoret】
- At one Pilot WSP, the person leading NRW reduction activities is also in charge of operating water distribution systems and the responsibilities related to various NRW reduction

activities are scattered over various technical and commercial sections seemingly without sufficient coordination【Nakuru】. In this WSP, further organizational improvements seem to be required for more effective planning of coordinated activities.

- Many of the Pilot WSPs seem to require better prioritization of NRW activities based on more discussions and analysis on the impacts of different types of activities.
- The template for assessment, planning and monitoring includes long descriptions of various activities which were often not clear and not easy enough for WSP staff to understand without further oral explanations from JICA experts. These written descriptions require improvements.
- The lack of example plans prepared with the new templates made the planning process at each Pilot WSP more difficult than expected. The plans prepared by some Pilot WSPs relatively earlier were shared with other WSPs for reference.

  The majority of the Pilot WSPs had difficulties to prepare detailed plans with the activity breakdowns listed in the template (due to its requirement for a longer time and more staff involvement to prepare) and decided to use only the summary activity statement for each of the 34 activity categories for this first year of using the new templates.

Way forward (Countermeasures for Improvement)

- The use of the columns for quarterly monitoring in the same template will be promoted at each Pilot WSP to help them guide their implementation by themselves in line with their plans
- The template for annual activity review would not require any significant improvement. However, the template for assessment, planning and monitoring will be improved to make it more user friendly for WSPs having different levels of capacity in NRW reaction (e.g. by [1] adding references for each of the potential activities listed in the template, [2] clearly providing two options (detailed planning and simpler planning), [3] improving the descriptions of potential activities, [4] preparing step-by-step written instructions for using the template, etc.)
- Good examples of NRW reduction plans (based on the template to be improved) will be prepared for the both options (detailed plan and simpler plan) by incorporating realistic examples of activities from those planned this year at Pilot WSPs.

- The prioritization of different activities will be assisted further next year by assessing the impact of different activities being and to be conducted in this fiscal year.
- More focus will be given to the improvements of planned activities by spending more time with Pilot WSPs to discuss each priority activity and to confirm whether or not the results of annual activity review have been adequately incorporated into their plan for the next fiscal year.
- Possibilities of expanding the use of the improved templates over other WSPs as a trial basis will be further considered around in April, 2019.

  The use of the improved templates will be re-evaluated next year in consideration of how easy and speedy these processes of assessment, planning and monitoring have become in Pilot WSPs with the improved templates.

5) -7 Annual and Mid-term NRW Reduction Plans of Pilot WSPs for FY2019 (Template 1st Use)

5)-7 Annual and mid-term NRW reduction plans of Pilot WSPs for FY2019 (Template Use)

Achievement & Obstacles of Main Annual Targets

from the NRW Reduction Plan for 2019/2020 at Each Pilot WSP

WSP	Achievement & Obstacles of Each Main Annual Target
Embu WSP	**1. Pressure management in zone 2** - This target has been delayed due to the delay in procurement of PRVs. The tender for the purchase was re-advertised. However, pressure data collection was conducted from the various identified points within the zone, points for PRV installation were identified and only 2 no. PRVs were installed and procurement of the others initiated. So far, chamber construction of the installed PRVs is on-going together with the regular maintenance and adjustment of the PRVs. **2. Replacement of master meters** - 2no. DN300 master meters were installed, procurement process of the Electromagnetic flow meters was completed and the tender award was done. Now awaiting delivery and installation of the master meters at the production points. **3. Testing and replacement of large customer meters** - Meter sizing of the large consumer meters was done, sizing, testing and replacement of the faulty or malfunctioning is on-going. 11 no. large customer meters have been tested and resized after being found to be malfunctioning. - The testing of small customer meters is also on-going, 2000 no. more accurate meters (R200) were bought and so far 1,400 no. have already been replaced after testing. - A further 1,500 no. small customer meters (R200) have been planned to be bought and replaced in the next quarter. **4. Introduction of sufficient valves and replacement of faulty valves** - Budget allocation for replacing and securing leaking air-valves and other valves was done and procurement was initiated. The tender for air-valves was non responsive and is to be re-advertised in the 4th quarter.
Meru WSP	**1. Improvement of the billing system** - This is on-going but has been delayed due to the prevailing Covid -19 pandemic. 45% **2. Installation of PRV's to replace faulty BPTs** - This activity was forwarded to the next financial year. Currently BPTs are being repaired and serviced regularly. **3. Installation of master meters in the newly created DMAs** - BOQs prepared and approved. Activity on-going but has been greatly affected by the current pandemic. **4. Replacement of faulty valves** - Activity on-going and at around 70%. Completion rate.
Nakuru WSP	**1. Pipe realignment in Western Zone i.e. 49 km** - At around 90% completion rate and now connecting the main fittings as at end of quarter 1. - Activity 100% complete now doing marketing. **2. Laying of service lines within Flamingo and Kimathi county estates i.e. 7.5 km** - Network Complete now connecting the customer connections. Completion rate is around 70% as at the end of quarter 1. - Activity 100% complete **3. intensifying of leak detection activities in Eastern zone** - Not yet started. To commence next month (October) as at end of quarter 1. - Started and on-going estimated completion level is about 50%. **4. pipe realignment at Industrial area and station area (Northern Zone) i.e. 2km in length.** - Started last month (August) and contractor is currently on site as at end of quarter 1. - On-going and estimated completion level is about 60% **5. pipe replacement from PVC to HDPE at Hilton area i.e. 4km in length** - Around 60% done as at end of quarter 1. - Activity 100% complete **6. Installation of more sectional valves** - Activity is on-going

	7. Mapping of customer meters and various problems around customer points. - Mapping complete in Eastern, Central and Western zones. Estimated completion level is about 60%.
Kisumu WSP	**1. Isolation of CBD DMA** All customers have been mapped and Isolation valves and meters have been installed. Activity can be said to be at 90% completion rate. **2. Installation of at least 1000 no. Multi-jet meters** - Over 1000 no. meters have so far been installed. **3. Testing of at least 3000 no. Customer meters** - So far over 3,000 no. customer meters have been tested and the faulty ones replaced. **4. Introduction of sufficient valves and replacement of faulty valves** - 4no. main valves on main lines have so far been replaced ie. Kibuye, Coptic and Riat 6'inch and one from Kajulu.
Nyahururu WSP	**1. Distribution Zone analysis especially on pressure management** - The process was started and is on-going and so far the progress can be estimated to be at 75% complete. Elevation maps have been created on all the zones apart from Marmanet and are pending verification. **2. Continue with customer identification survey in all schemes** - The process was started with Rumuruti scheme which was completed. So far, have started working on Marmanet Scheme. 2 no. more schemes are remaining and the progress can be estimated at 30% completion rate. **3. Establishment or improvement of DMAs by hydraulically isolating and installation of zonal bulk meters in the planned DMAs** - So far, 30 no. DMAs have been isolated or created and the only remaining activity on this is the installation of 8 no. zonal meters to complete the exercise. The activity can be estimated to be about 65% complete. **4. Installation of Master Meter for Rwathia with proper chamber and the necessary accessories.** - The Master Meter, strainer and the Sluice Valve have already been installed. The only pending activity is chamber construction but plans are under way to have it constructed. Activity can be estimated to be around 75% complete. **5. Develop of standard for operation procedures for NRW Team** - The exercise was started and is on-going. Currently doing the write up. Activity can be estimated to be about 30% complete. **6. Publishing of the GIS layers on the Internet for Easy Viewing** - Done and can now view them online. Activity is 100% complete. **7. Develop BOQ for pipeline rehabilitation in most burst prone areas of Marmanet Scheme** - Planned to rehabilitate 35km of pipeline, the Bill of Quantities was made and submitted to the County office since it is a capital development and are now awaiting feedback. The activity can be estimated to be about 80% complete.
Ruiru-Juja WSP	**1. Sufficient valves introduction** - A total of 25 gate valves have been installed in the three proposed DMAs to enable QMNF measurement. About 30 more gate valves need to be installed. **2. Straight forward reduction of commercial losses starting with the large consumers** - A total of 130 large consumer accounts that were being billed on estimates have been identified and billed appropriately. **3. Additional focused management of large and medium customers** - Daily consumption monitoring of large and medium consumers is on-going. The exercise has helped us identify about 300 faulty customer meters that were replaced.
Mavoko WSP	**1. Creation of additional DMAs (2no)** - 2no. additional DMA's have been successfully created. These are Greenpark and Kinanie A. - Activity is 100% complete. **2. Meter testing and replacements (800no)** - Meter testing exercise has been an on-going exercise though at times it is greatly affected due to lack of water as a result of the dry spell. However, over 500no. customer meters have been serviced and tested with 170no.meters being replaced after they were found to be faulty.

	3. Reduction of accounts billed on estimation - The number of accounts billed on estimate reduced from 756no.in June 2019 to 647no, in March 2020. The process is continuous but has been affected by the Corona Virus pandemic. **4. Introduction of sufficient valves and replacement of faulty valves** - So far, 2no.8" and 6" valves have been replaced and newly installed 4no.4", 1no.16" and 2no.3" valves.
Eldoret WSP	**1. Replacement of hot spot areas with HDPE pipes. (Permanent solutions)** - A total 2,500m were replaced using hdpe pipes in quarter 1. - A total 4,984m were replaced using hdpe pipes in quarter 2. - A total 3,680m were replaced using hdpe pipes in quarter 3. **2. Creation of additional 4no. DMAs** - 2no.DMAs were completed by end of quarter 2 (ie. Chepkanga and Action Estate) and 2no. - DMAs are almost complete. To be completed in quarter 4. - (ie. Mwisho wa Rami and Pioneer) **3. Testing, resizing & replacement of large consumer meters (200 meters in categories 1 & 2).** - 60% of category C1 and 40% category C2 had been dealt with as at end of quarter 1. - 90% of category C1 and 60% category C2 had been dealt with as at end of quarter 2. - 95% of category C1 and 75% category C2 had been dealt with as at end of quarter 3. 4. **Formation of an NRW interdepartmental committee.** - NRW interdepartmental committee was formed in the 2nd quarter and comprises of members drawn from all departments. - Activity 100% complete
Kilifi-Mariakani WSP	**1. DZ and DMA'S creation** - Not yet started awaiting the supply of fittings. **2. Replacement of aged asbestos pipelines** - Not yet started expected to commence in Q4. **3. Set up GIS unit** - The unit is not yet set but preparation is on course expected to be finalized in Q4. 4. **Establish NRW committee with regular monthly meetings** - Committee has been established comprising of all Senior Managers and other selected members of staff and was meeting on a weekly basis before the Corona Virus Pandemic struck.

FY2019　Self Assessment & Planning : Meru WSP

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

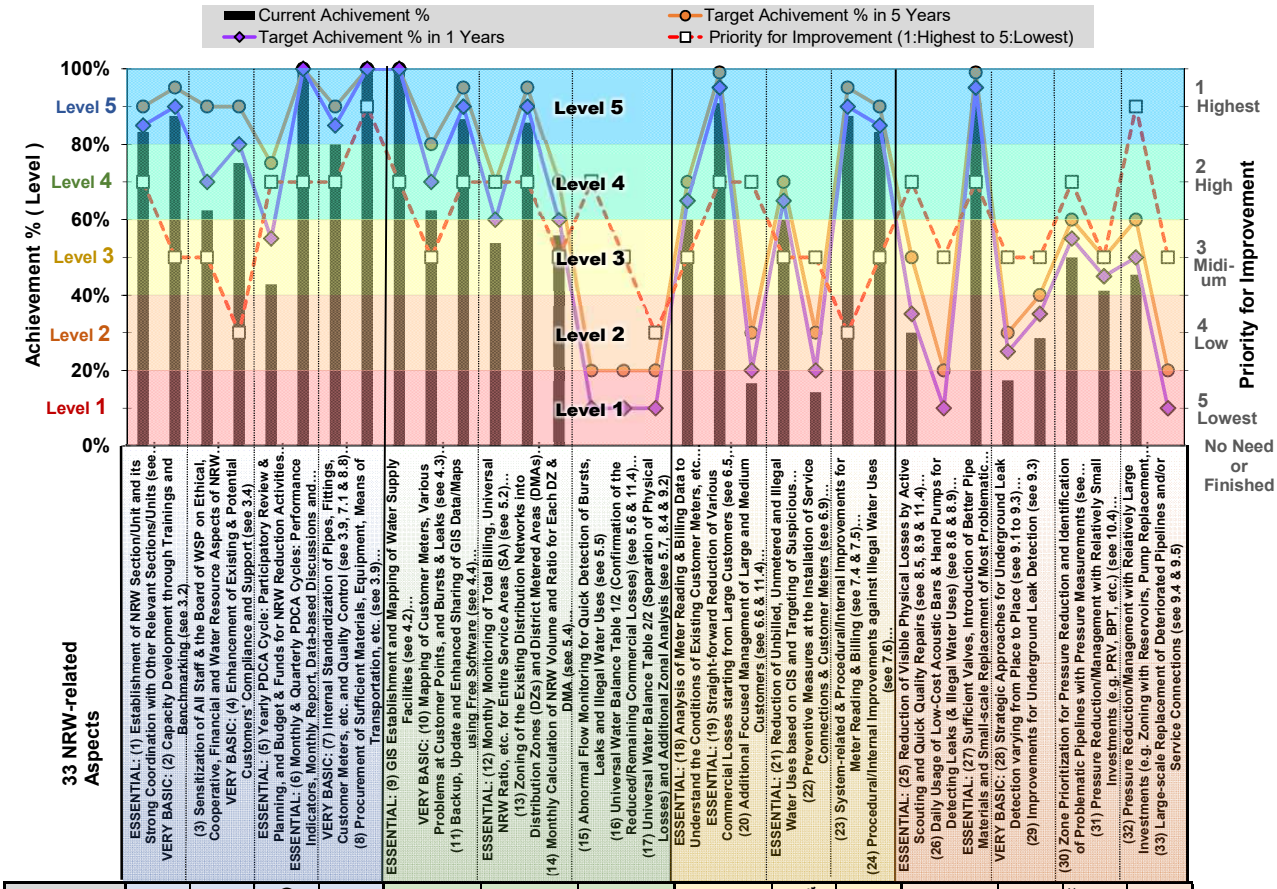
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
83 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	78 % - L 4	(a) Staffing with Essential Support & Training	84 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	83 % - L 5	24	20	83%	2	90%	85%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	88 % - L 5	8	7	88%	3	95%	90%
			(b) Sensitization & Awareness Raising for Wider Support	69 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	63 % - L 4	8	5	63%	3	90%	70%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	75 % - L 4	8	6	75%	4	90%	80%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	67 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	43 % - L 3	14	6	43%	2	75%	55%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	100 % - L 5	10	10	100%	2	100%	100%
			(d) Suitable, Sufficient & Timely Procurement	90 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	80 % - L 5	10	8	80%	2	90%	85%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	100 % - L 5	10	10	100%	1	100%	100%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	56 % - L 3	(a) Mapping/GIS Development & Utilization of Free Mapping Software	88 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	100 % - L 5	17	17	100%	2	100%	100%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	63 % - L 4	8	5	63%	3	80%	70%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	87 % - L 5	15	13	87%	2	95%	90%
			(b) Monthly NRW Monitoring & Zoning	62 % - L 4	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	54 % - L 3	13	7	54%	2	70%	60%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	86 % - L 5	7	6	86%	2	95%	90%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	56 % - L 3	9	5	56%	3	70%	60%
			(c) Abnormal Flow Monitoring & Water Balance Table	0 % - L 1	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	0 % - L 1	8	0	0%	2	20%	10%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	0 % - L 1	10	0	0%	3	20%	10%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	0 % - L 1	8	0	0%	4	20%	10%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	62 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	69 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	60 % - L 4	10	6	60%	3	70%	65%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	91 % - L 5	33	30	91%	2	99%	95%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	17 % - L 1	12	2	17%	2	30%	20%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	33 % - L 2	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	60 % - L 4	10	6	60%	3	70%	65%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	14 % - L 1	14	2	14%	3	30%	20%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	86 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	88 % - L 5	8	7	88%	4	95%	90%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	83 % - L 5	6	5	83%	3	90%	85%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	33 % - L 2	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	43 % - L 3	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	30 % - L 2	10	3	30%	2	50%	35%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	0 % - L 1	9	0	0%	3	20%	10%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	91 % - L 5	11	10	91%	2	99%	95%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	20 % - L 2	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	17 % - L 1	23	4	17%	3	30%	25%
					(29) Improvements for Underground Leak Detection (see 9.3)	29 % - L 2	7	2	29%	3	40%	35%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	44 % - L 3	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	50 % - L 3	8	4	50%	2	60%	55%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	41 % - L 3	17	7	41%	3	50%	45%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	24 % - L 2	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	45 % - L 3	11	5	45%	1	60%	50%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	0 % - L 1	10	0	0%	3	20%	10%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	84 % - L 5	69 % - L 4	67 % - L 4	90 % - L 5	88 % - L 5	62 % - L 4	0 % - L 1	69 % - L 4	33 % - L 2	86 % - L 5	43 % - L 3	20 % - L 2	44 % - L 3	24 % - L 2
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	78 % - L 4				56 % - L 3			62 % - L 4			33 % - L 2			
Overall Achivement % - Level	83 % - L 5													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Meru WSP (Updated on May 29, 2019)

[MP] Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24)

Step 5: Plan Activities

[AP] Annual NRW Reduction Plan (2019-20)

Category MAIN (Level)	SUB (Level)	Level	Priority for improvement (1:Highest-5:Lowest, N:No Need& F:Fnished)	Achievement Target (%) in 5 years	Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Target Quantity (if applicable)	Cost (KSh.)	By when to Complete	By whom	Notes
[A] Organizational Structure, Sensitization, PDCA 78 % - L 4	(a) Staffing 84 % - L 5		2	90	85	Development of Sops	SOPs	300.000	End of December	HR/TM	
			3	95	90	Enhance on staff training		500.000	End of June 2020	HR/TM	
	(b) 69 % - L 4	63 %	3	90	70	Calculation of Financial losses			Jun-20	TM/FM	
			4	90	80						
	(c) PDCA 67 % - L 4			75	55	continous review of the plans			continous	GM	
				100	100						
	(d) 90 % -			90	85						
				100	100						
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 56 % - L 3				100	100						
	(a) 88 % - L 5			80	70	conduct a comprehesive customer survey by visiting all households in the supply area					
				95	90						
	(b) Monthly NRW 62 % - L 4	54 %		70	60	Replace all master meters with smart meters					
			2	95	90						
		56		70	60						
	(c) Abnormal Flow Monitoring & Water Balance 0 % - L 1	0 % - L 1	2	20	10	introduction of smart master meters			Jun-22	TM	
		0 % - L 1	3	20	10	will be put in place after installation of smart meters		1.000.000	Jun-22	Tm & Fm	
		0 % - L 1	4	20	10						
[C] Reduction of Commercial (Apparent) Water Losses (i.e 62 % - L 4	(a) Starting from 69 % - L 4	60	3	70	65						
		91	2	99	95						
		% - L	2	30	20	Monitor C1 & C2 .carwashes . hotels and construction site and replace all large customer meters with smart meters			Jun-21	TM & FM	
	(b) Activities for New & 33 % - L 2	60 %	3	70	65	Meter all Fire hydrants in the supply area					
		14 % - L 1		30	20	Introduce anti tamper blue seals during installation of a new connection			continous	TM & FM	
	(c) 86 % -			95	90						
				90	85						
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 33 % - L 2	(a) Physical Loss 43 % - L 3	30 % -	2	50	35	installation of Automatic PRV's to replace the faulty BPTs and replace all faulty clossing valves to check over flow over storage utility and					
		0 % - L 1	3	20	10	Jica has recently donated some of this equipment and we need to train our staff on how to use the		300.000	Dec-19	KEWI Trainning	
	(b) Underground Leak 20 % - L 2	9	2	99	95						
		17 % - L 1		30	25	some Equipment have been donated by MWS , we need thorough trainning by JICA and KEWI					
		29 % - L 2	3	40	35	Active tranning by KEWI & JICA team		300.000	Jun-20	TM.NRW.JICA &	
	(c) IF REQURED: 44 % - L 3	50 % -	2	60	55	Continous exercise by GIS, O&M ,NRW		300.000	Jun-20 Dec-19	NRW team.FM & TM & FM	
		41 % - L 3	3	50	45	Install pressure loggers					
	(d) IF REQUIRED: Leak 24 % - L 2	45 % -	1	60	50	Construct storage tanks in hydraulic model to act as a BPT and a reservior		3,000,000	Jun-22	TM.GM & FM	
		0 % - L 1	3	20	10	Mewass system is totally new expect in Zone where we need to carry out pipe replacent in a year time		1.500.000	Jun-20	TM.GM & FM	
							Total Annual Cost (KSh.)	54,200,000			

Step 3: Discuss the SA

Category 83

Schedule (2019-20 by month; 2020-21 to 2023-24 by quarter):

Activity	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	2020-21 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun
Calculation of Financial losses	→	→	→	→	→	→	→	→	→	→	→	→																
continous review of the plans	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→						
Introduce anti tamper blue seals during installation of a new connection				→	→	→	→	→	→	→	→	→																
Continous exercise by GIS, O&M ,NRW				⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒																

[Example Modes of Implementation]

- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investme
- : Project with donner

TARGET ACTIVITIES FOR THE YEAR (2019/2020)
1. Improvement of the billing system
2. Installation of PRV's to replace faulty BPTs
3. Installation fof master meters in the newly created DMAs
4. Replacement of faulty valves

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

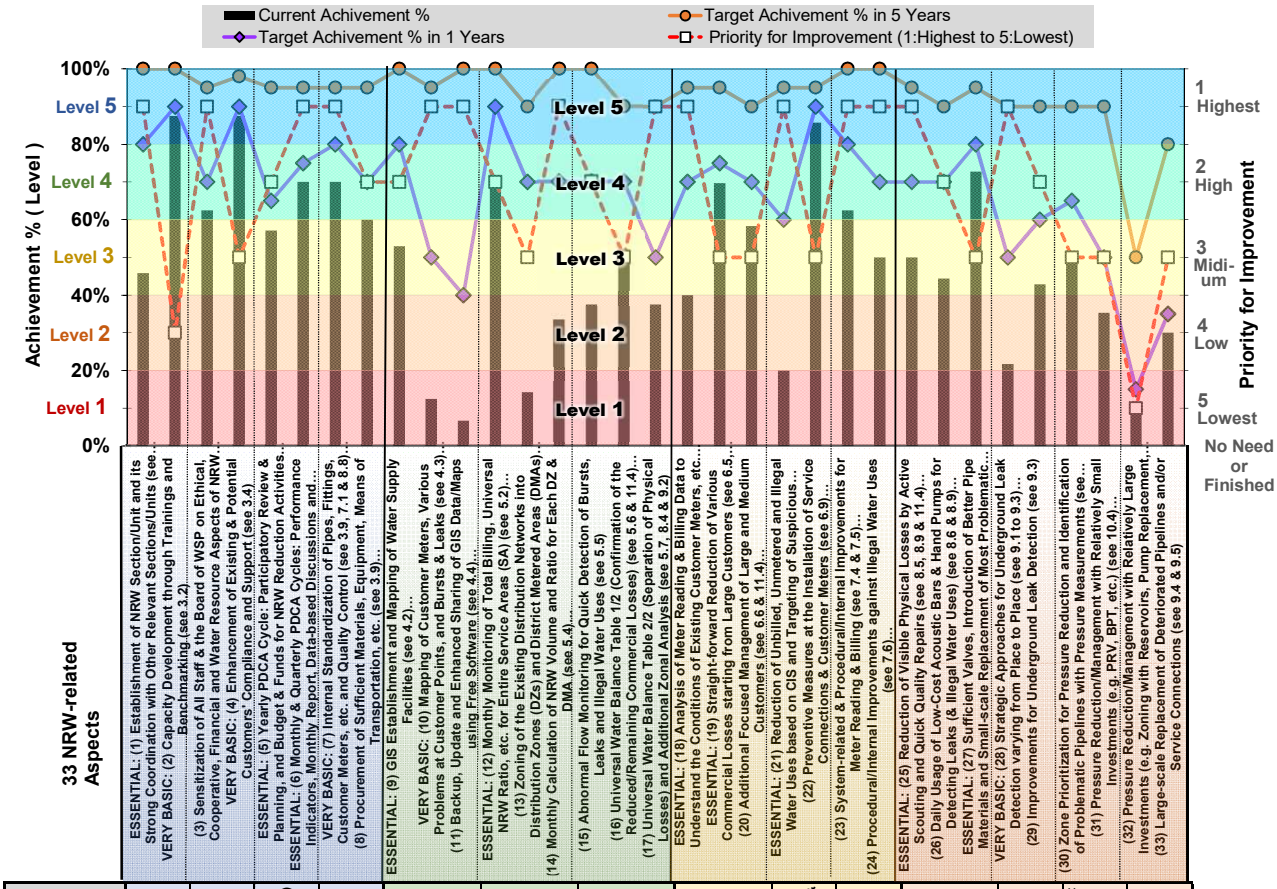
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
46 % - L 3	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	63 % - L 4	(a) Staffing with Essential Support & Training	56 % - L 3	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	46 % - L 3	24	11	46%	1	100%	80%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	88 % - L 5	8	7	88%	4	100%	90%
			(b) Sensitization & Awareness Raising for Wider Support	75 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	63 % - L 4	8	5	63%	1	95%	70%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	88 % - L 5	8	7	88%	3	98%	90%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	63 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	57 % - L 3	14	8	57%	2	95%	65%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	70 % - L 4	10	7	70%	1	95%	75%
			(d) Suitable, Sufficient & Timely Procurement	65 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	70 % - L 4	10	7	70%	1	95%	80%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	60 % - L 4	10	6	60%	2	95%	70%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	37 % - L 2	(a) Mapping/GIS Development & Utilization of Free Mapping Software	28 % - L 2	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	53 % - L 3	17	9	53%	2	100%	80%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	13 % - L 1	8	1	13%	1	95%	50%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	7 % - L 1	15	1	7%	1	100%	40%
			(b) Monthly NRW Monitoring & Zoning	45 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	69 % - L 4	13	9	69%	2	100%	90%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	14 % - L 1	7	1	14%	3	90%	70%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	33 % - L 2	9	3	33%	1	100%	70%
			(c) Abnormal Flow Monitoring & Water Balance Table	42 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	38 % - L 2	8	3	38%	2	100%	70%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	50 % - L 3	10	5	50%	3	90%	70%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	38 % - L 2	8	3	38%	1	90%	50%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	60 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	62 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	40 % - L 3	10	4	40%	1	95%	70%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	70 % - L 4	33	23	70%	3	95%	75%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	58 % - L 3	12	7	58%	3	90%	70%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	58 % - L 3	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	20 % - L 2	10	2	20%	1	95%	60%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	86 % - L 5	14	12	86%	3	95%	90%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	57 % - L 3	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	63 % - L 4	8	5	63%	1	100%	80%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	50 % - L 3	6	3	50%	1	100%	70%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	37 % - L 2	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	57 % - L 3	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	50 % - L 3	10	5	50%	1	95%	70%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	44 % - L 3	9	4	44%	2	90%	70%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	73 % - L 4	11	8	73%	3	95%	80%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	27 % - L 2	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	22 % - L 2	23	5	22%	1	90%	50%
					(29) Improvements for Underground Leak Detection (see 9.3)	43 % - L 3	7	3	43%	2	90%	60%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	40 % - L 3	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	50 % - L 3	8	4	50%	3	90%	65%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	35 % - L 2	17	6	35%	3	90%	50%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	19 % - L 1	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	9 % - L 1	11	1	9%	5	50%	15%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	30 % - L 2	10	3	30%	3	80%	35%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	56 % - L 3	75 % - L 4	63 % - L 4	65 % - L 4	28 % - L 2	45 % - L 3	42 % - L 3	62 % - L 4	58 % - L 3	57 % - L 3	57 % - L 3	27 % - L 2	40 % - L 3	19 % - L 1
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	63 % - L 4				37 % - L 2			60 % - L 4			37 % - L 2			
Overall Achivement % - Level	46 % - L 3													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, EMBU WSP (Updated on august 8, 2019)

[MP] Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24)

Step 5: Plan Activities

[AP] Annual NRW Reduction Plan (2019-20)

MAIN Level	SUB Level	Level	Priority for improvement (1:Highest-5:Lowest, N:No Need& F:Finished)	Achievement Target (%) in 5 years	Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Target Quantity (if applicable)	Cost (KSh.)	By when	By whom	Notes
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement											
63 % - L 4	56 % - L 3	46 - L 3				recruitment of 5 no staff for the unit.	recruitment of 5 no staff for	1,500,000	Jul-19	hts,hrm	5 staff *30000 per
	(a) Staffing with Essential	1	6 points	100	80	Proper hr policies and other policy documents		500,000	Dec-19	M,D/T,M/CM/FM	ie 1000 dinner for night shifts.
		4	4 points	100	90	trainning budget	4 no trainning 1 each quarter	600,000	Jul-19	HRM	as per trainning allocation by HRM
	88 % - L 5	1	no need	95	70	Proper hr policies and other policy documents		500,000	Jul-19	M,D/T,M/CM/FM	ie 1000 dinner for mnf measurements..
	(b) Sensitization &	3	1 point	98	90	community senstization/appointment of nrw steering committee/and toll freeno	monthly meetings @50000	600,000	Jul-19	cc officer/hcfs	50000 per month
	75 % - L 4	2	1 point	95	65	reports submitted to wasreb on time	quaterly	n/a	Sep-19	nrw unit and HTS	To be submitted in the 1st quarter
			1 point			document submitted to wasreb on timely basis					
	63 % - L 3	1	1 point	95	75			n/a	Sep-19	head nrw	working computation and analysis system
	(c) PDCA Cycles	1	1 point	95	80	develop a metering policy and adopt r200 meter/test 10% of new m	1	100,000	Sep-19	HTS ,Procuments	BENCHMARK WITH
			1 point			CONDUCT CIS	monthly meetings	100,000	Jul-19	ALL	
	70 % - L 4	2	2 points	95	70	TEST/REPLACE ALL BULK METERS	30	4.000.000	Jun-20	HTS /NRW/PROCUR	PROCURE IN BATCHE
			1 point			TRAINNING budget ON FREE QGIS	7	1.000.000	Jul-20	HTS/ HRM	priority to nrw key
			no need			motor cycles	2	400.000	Dec-19	HTS /NRW/PROCUR	1 each quoater
	65 % - L 4	1	3 points	100	80	implementation and local seminer/ benchmarking	1	100.000	Dec-19	gis officer	liase with hr
	(d) Suitable,		1 point			TRAINNING budget ON FREE QGIS		catered	Jun-20	gis officer	
			1 point			update (continous)		n\a	continous	gis officer	
			1 point			update (continous)		n\a	continous	gis officer	
			no need			data collection and continous update		120.000	Jun-20	gis officer	hire data collectors
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis											
37 % - L 2	28 % - L 2	4 - L 2									
	(a) Mapping/GIS Develo	1	1 point	95	50	timely collection and update of gis data		catered in othe budgets	continous	continous	frequent data audit
	53 % - L 3	1	1 point	100	40	timely collection and update of gis data apply free qgis app printables ie papers and catridges printables ie papers and catridges software update and sharing		50000	continous	gis officer	
			1 point			smartphones purchase for data collection	10	300.000	Dec-19		30000 per smartphone
	14 % - L 3	2	1 point	100	90	purchase of fittings and labour	bulk	1.000.000	Jun-20	HTS /NRW/PROCUREMENT	
			2 points			test quaterly	all	n/a	continous	nrw unit and	replacement schedule
			1 point			regular meetings	2	n/a		nrw unit and	review of activities and
	45 % - L 2	3	no need	90	70	1.well defined and separated dms with acurate nrw data. 2sustainning flow for each zone. 3indentification of priority zones for nrw reduction. 4 zones review for new managable dmas	lumpsum	100.000	iune 2020	o/m manager	audit of the existing dmas
	(b) Monitoring &	1	1 point	100	70	daily meter reading quaterly testing and replacement one off linking of the data set and regular updating conduct billing data analysis accurate data analysis upgrade the nrw module		n/a	continous continous Dec-19 continous continous Dec-19	head nrw unit	
	33 % - L 2		1 point								
	25 % - L 2		1 point								
		2	1 point	100	70	purchase of meter and fittings / labour sustainning flows monitoring every morning rapid response team application and use of kobo collect		catered for in the meter budget	continous	head nrw unit	review,share and followup on action taken
	42 % - L 3		1 point			pilot project with safaricom	50,000,000				looking for donor funds
	50 % - L 3	3	1 point	90	70	pend to the next finacial year					
			1 point			pend to the next finacial year					
	8 % - L 1	1	1 point	90	50	pend to the next finacial year					
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data											
60 % - L 4	40 % - L 3	1	1 point	95	70	undertake CIS ,billing data analysis and frequent monitoring of large customer meters	n/a		continous	nrw unit/all	need prompt action and reviews,
	(a) Starting from Large		1 point								
	62 % - L 4	3	3 points	95	75	reduce no of estimated consumption to less than 2 test on site using simple methods ie bucket use of smart meters and mapping for ease of navigation use of smart meters and mapping for ease of navigation use of smart meters for reading	bv5%		Dec-19 Dec-19 Dec-19 Dec-19 Dec-19	head nrw	
						caribrate the meter test bench	1	200.000	Jun-20		kebs
	58 % - L 3	3	1 point	90	70	planning for pilot project with patnership with donor-safaricom			2020	hts/md	50000000 upon succesful completion of the pilot projecct.
			no need								
	(b) Activities for	1	3 points	95	60	meter public water points calcurate vollume for analysis basis recruit team for cis sops on illegal indetification and debt recovery cis to the miraa farming areas.	10	n/a n/a 1.500.000 n/a n/a n/a	Sep-19	hrm	equip the team
	20 % - L 2		1 point								
	58 % - L 3	2	2 points	95	90	line simulation and use of RMI Technolgy	50	1.000.000	iune 2020	HTS	Contracted
			no need								
	(c) System-	1	3 points	100	80	data clean up section by section re introduce rotation of meter readers strict supervision of staff.	all sections all all	n/a	Sep-19	nrw head billing supervisor HRM	
	57 % - L 3		no need								
	10 % - L 1	1	1 point	100	70	md/board to intiate/push for a bill on illegal water use.					
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)											
37 % - L 2	30 % - L 2	1	1 point	95	70	maintenace and servicing of water assets. update leaks and burst in the majics system develop a leakage template.		o/m budiet n/a n/a	Sep-19 Sep-19 Sep-19	o\m manager TO OFFICERS TO OFFICERS	review monthly
	(a) Physical Loss	2	2 points	90	70	TRAIN field staff on use of acoustic sticks testing of distribution pipes with high leakage. 100% testing of new connections		n/a n/a n/a	Sep-19 Sep-19 Sep-19	nrw head To officers To officers	in house trainning
	57 % - L 3	3	no need	95	80	continous with availability of funds local or donnor					
	44 % - L 3		3 points								
	27 % - L 2	1	1 point	90	50	development of sops for the tasks			Dec-19	HTS	
	(b) Underground Leak		2 points								
	22 % - L 2	2	1 point	90	60	CHECK ON PRIORITY IN INDENTFIED HIGH NEED AREAS staff trainning on use of equipments staff trainning on use of equipments develop maintenace shedule		30.000	Dec-19 Dec-19 Sep-19	Head NRW	
	43 % - L 3		1 point								
	50 % - L 3	3	1 point	90	65	pressure management for zones 1,2 and3	zones 1,2 and3	3,000,000	june 2020 continous	Head NRW	for detailled summary reffer to the design document
	40 % - L 3		1 point								
	35 % - L 2	3	2 points	90	50	continous water lines maintenacce	whole supply area	o\m budget	june 2020 continous	o/m manager	
						review pipeline designs	whole supply area	n/a	june 2020 continous	HTS/gis/OM manager	simulation models developed
						pressure management for zones 1,2 and3	zones 1,2 and3	n/a	june 2020	Head NRW	need to revive the
	9 % - L 1	5	1 point	50	15	no budget allocation move to the next finacial year					
	(d) IF REQUIRED: Leak										
	19 % - L 1										
	30 % - L 1	3	1 point	80	35	no budget allocation move to the next finacial year					
	Step 3: Discuss the						Total Annual Cost (KSh.)	16,700,000			

[Example Modes of Implementation]

: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
: Less intensive period with capital investme
: Project with donner

FY2019 Self Assessment & Planning : Ruiru-Juja WSP

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

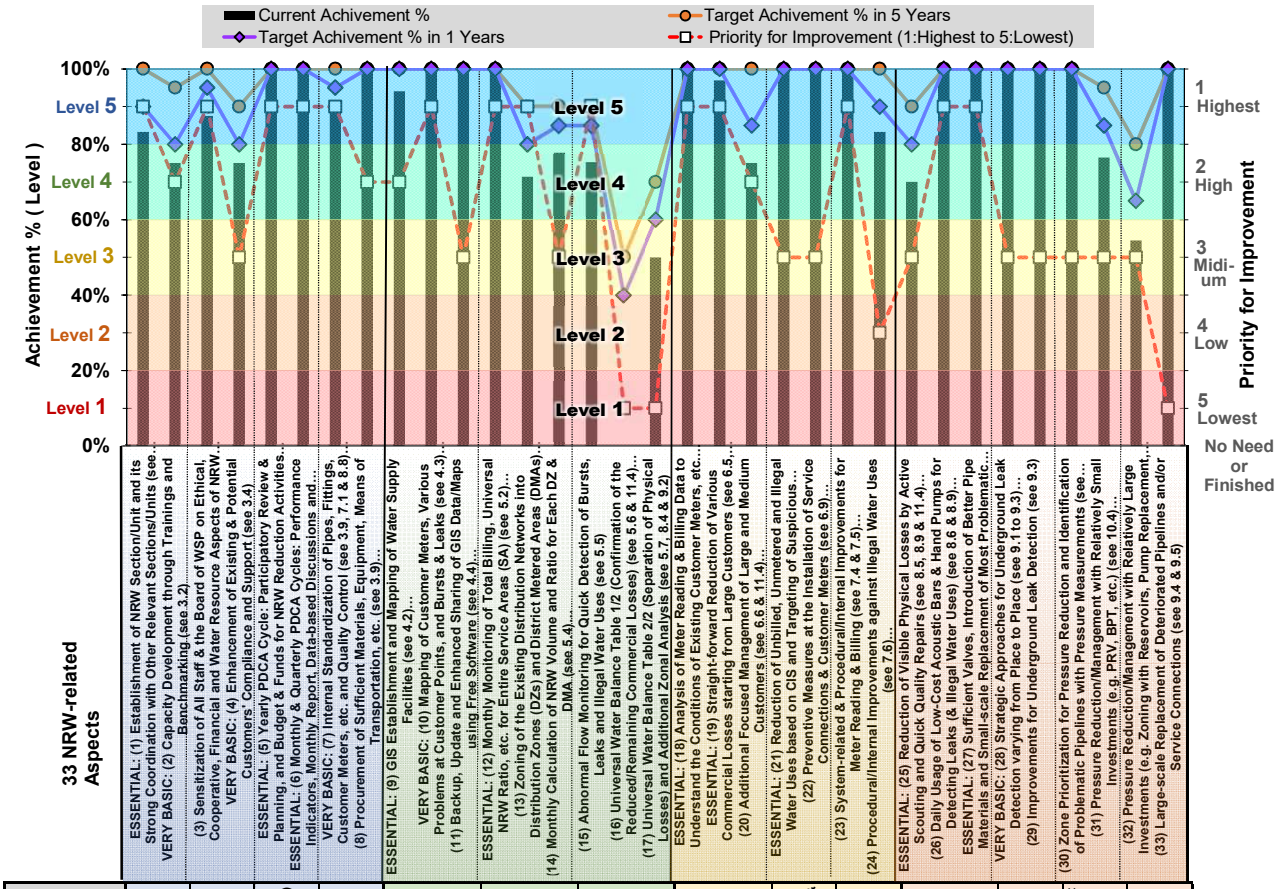
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
83 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	89 % - L 5	(a) Staffing with Essential Support & Training	81 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	83 % - L 5	24	20	83%	1	100%	90%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	75 % - L 4	8	6	75%	2	95%	80%
			(b) Sensitization & Awareness Raising for Wider Support	81 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	88 % - L 5	8	7	88%	1	100%	95%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	75 % - L 4	8	6	75%	3	90%	80%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	100 % - L 5	14	14	100%	1	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	100 % - L 5	10	10	100%	1	100%	100%
			(d) Suitable, Sufficient & Timely Procurement	95 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	90 % - L 5	10	9	90%	1	100%	95%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	100 % - L 5	10	10	100%	2	100%	100%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	78 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	98 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	94 % - L 5	17	16	94%	2	100%	100%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	100 % - L 5	8	8	100%	1	100%	100%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	100 % - L 5	15	15	100%	3	100%	100%
			(b) Monthly NRW Monitoring & Zoning	86 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	100 % - L 5	13	13	100%	1	100%	100%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	71 % - L 4	7	5	71%	1	90%	80%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	78 % - L 4	9	7	78%	3	90%	85%
			(c) Abnormal Flow Monitoring & Water Balance Table	38 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	75 % - L 4	8	6	75%	1	90%	85%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	0 % - L 1	10	0	0%	5	50%	40%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	50 % - L 3	8	4	50%	5	70%	60%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	95 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	93 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	100 % - L 5	10	10	100%	1	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	97 % - L 5	33	32	97%	1	100%	100%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	75 % - L 4	12	9	75%	2	100%	85%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	100 % - L 5	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	100 % - L 5	10	10	100%	3	100%	100%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	100 % - L 5	14	14	100%	3	100%	100%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	93 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	100 % - L 5	8	8	100%	1	100%	100%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	83 % - L 5	6	5	83%	4	100%	90%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	89 % - L 5	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	90 % - L 5	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	70 % - L 4	10	7	70%	3	90%	80%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	100 % - L 5	9	9	100%	1	100%	100%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	100 % - L 5	11	11	100%	1	100%	100%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	100 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	100 % - L 5	23	23	100%	3	100%	100%
					(29) Improvements for Underground Leak Detection (see 9.3)	100 % - L 5	7	7	100%	3	100%	100%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	84 % - L 5	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	100 % - L 5	8	8	100%	3	100%	100%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	76 % - L 4	17	13	76%	3	95%	85%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	76 % - L 4	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	55 % - L 3	11	6	55%	3	80%	65%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	100 % - L 5	10	10	100%	5	100%	100%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	81 % - L 5	81 % - L 5	100 % - L 5	95 % - L 5	98 % - L 5	86 % - L 5	38 % - L 2	93 % - L 5	100 % - L 5	93 % - L 5	90 % - L 5	100 % - L 5	84 % - L 5	76 % - L 4
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	89 % - L 5				78 % - L 4			95 % - L 5			89 % - L 5			
Overall Achivement % - Level	83 % - L 5													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Ruiru-Juja WSP (Updated on May 29, 2019)

BA Catego	Priority for improvement (1:Highest-5:Lowest, N:No Need& F:Finished)	[MP] Achievement Target (%) in 5 years	in 1 year	Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24) Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Step 5: Plan Activities [AP] Annual NRW Reduction Plan (2019-20) Target Quantity (if applicable)	Cost (KSh.)	By when	By whom	Notes
[A] Organizational Structure, 89 % - L 5	1	100	90	Establishment of SOPs Approval of organizational structure		300,000	End of December	HR	
	2	95	80	Hold in-house trainings for all relevant staff		300,000	End of October	HR	KEWI Trainings
	1	100	95	Staff workshops	70	150,000	By end of January	MD,TM	
	3	90	80	Create awareness through brochures and public forums hold school campaigns		200,000	By June 2020	HR	
	1	100	100						
	1	100	100						
	1	100	95	Develop and document internal standards for pipes, fittings,		50,000	Jan-20	TM	
	2	100	100						
[B] GIS, NRW Monitoring, Zoning & Water Balance 78 % - L 4	2	100	100	Collect public sanitation data and develop GIS layers		500,000	End of June 2020	GIS unit	
	1	100	100						
	3	100	100						
	1	100	100						
	1	90	80	tallation of bulk meters for the newly designed hydraulic DZs and DM		1.300.000	End of December 2019	NRW Unit	
	3	90	85	rting of customer data into the DMAs and interfacing GIS with the bi	20000	200.000	Jun-20	GIS and	
	1	90	85	Install pressure points on the main lines and distribution lines	20	300.000	End of June 2020	NRW Unit	
	5	50	40	development of water balance					
	5	70	60	Conduct MNF in 3 more pilot DMAs	6	400,000	End of June 2020	NRW Unit	
[C] Reduction of 95 % - L 5	1	100	100						
	1	100	100	Set up of a well equiped NRW workshop for servicing of meters	1	3,000,000	End of June 2020	MD	Subject to
	2	100	85	Identify a pilot area for smart metering	100 customers				
	3	100	100						
	3	100	100						
	1	100	100						
	4	100	90	Quantify illegal water used based on consumption history			End of December	NRW unit	
[D] Reduction of Physical 89 % - L 5	3	90	80	Introduce Majivoice for quick reporting of leaks and response					
	1	100	100						
	1	100	100						
	3	100	100						
	3	100	100						
	3	100	100						
	3	95	85						
	3	80	65						
	5	100	100						

Step 3: Discuss the SA

Total Annual Cost (KSh.)	6,700,000

2019 1st Qua. (Jul, Aug, Sep) | 2nd Quarter (Oct, Nov, Dec) | 2020 3rd Qua. (Jan, Feb, Mar) | 4th Quarter (Apr, May, Jun)

2020-21 | 2021-22 | 2022-23 | 2023-24 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

[Example Modes of Implementation]

- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investme
- : Project with donner

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

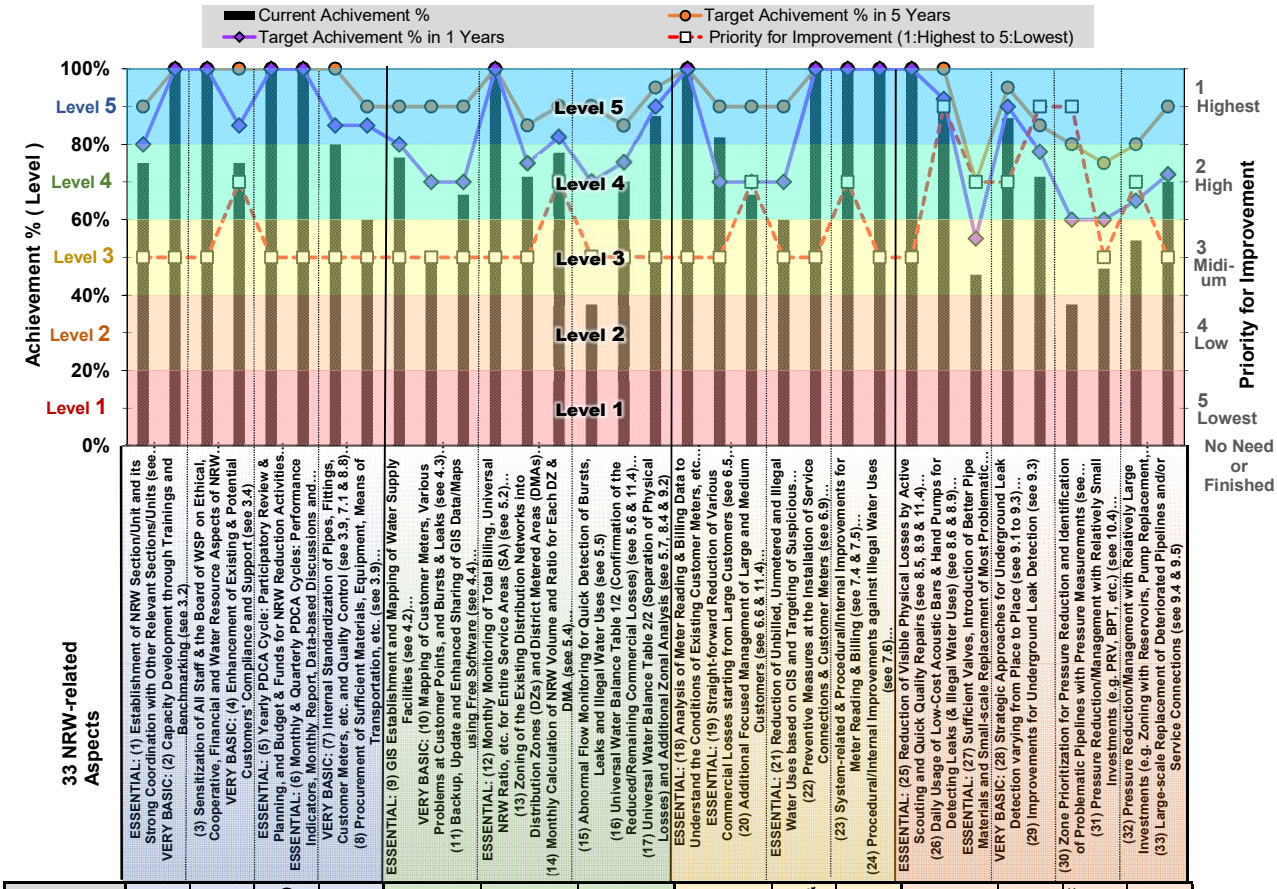
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
75 % - L 4	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	85 % - L 5	(a) Staffing with Essential Support & Training	81 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	75 % - L 4	24	18	75%	3	90%	80%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	100 % - L 5	8	8	100%	3	100%	100%
			(b) Sensitization & Awareness Raising for Wider Support	88 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	100 % - L 5	8	8	100%	3	100%	100%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	75 % - L 4	8	6	75%	2	100%	85%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	100 % - L 5	14	14	100%	3	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	100 % - L 5	10	10	100%	3	100%	100%
			(d) Suitable, Sufficient & Timely Procurement	70 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	80 % - L 5	10	8	80%	3	100%	85%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	60 % - L 4	10	6	60%	3	90%	85%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	73 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	68 % - L 4	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	76 % - L 4	17	13	76%	3	90%	80%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	50 % - L 3	8	4	50%	3	90%	70%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	67 % - L 4	15	10	67%	3	90%	70%
			(b) Monthly NRW Monitoring & Zoning	86 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	100 % - L 5	13	13	100%	3	100%	100%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	71 % - L 4	7	5	71%	3	85%	75%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	78 % - L 4	9	7	78%	2	90%	82%
			(c) Abnormal Flow Monitoring & Water Balance Table	65 % - L 4	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	38 % - L 2	8	3	38%	3	90%	70%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	70 % - L 4	10	7	70%	3	85%	75%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	88 % - L 5	8	7	88%	3	95%	90%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	85 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	82 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	100 % - L 5	10	10	100%	3	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	82 % - L 5	33	27	82%	3	90%	70%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	67 % - L 4	12	8	67%	2	90%	70%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	83 % - L 5	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	60 % - L 4	10	6	60%	3	90%	70%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	100 % - L 5	14	14	100%	3	100%	100%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	100 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	100 % - L 5	8	8	100%	2	100%	100%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	100 % - L 5	6	6	100%	3	100%	100%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	68 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	77 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	100 % - L 5	10	10	100%	3	100%	100%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	89 % - L 5	9	8	89%	1	100%	92%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	45 % - L 3	11	5	45%	2	70%	55%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	83 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	87 % - L 5	23	20	87%	2	95%	90%
					(29) Improvements for Underground Leak Detection (see 9.3)	71 % - L 4	7	5	71%	1	85%	78%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	44 % - L 3	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	38 % - L 2	8	3	38%	1	80%	60%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	47 % - L 3	17	8	47%	3	75%	60%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	62 % - L 4	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	55 % - L 3	11	6	55%	2	80%	65%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	70 % - L 4	10	7	70%	3	90%	72%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	81 % - L 5	88 % - L 5	100 % - L 5	70 % - L 4	68 % - L 4	86 % - L 5	65 % - L 4	82 % - L 5	83 % - L 5	100 % - L 5	77 % - L 4	83 % - L 5	44 % - L 3	62 % - L 4
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	85 % - L 5				73 % - L 4			85 % - L 5			68 % - L 4			
Overall Achivement % - Level	75 % - L 4													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Nakuru WSP (Updated on May 29, 2019)

MAIN Category	Level	Level	Priority for Improvement (1: Highest-5: Lowest, N: No Need& F: Finished)	[MP] Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24) Achievement Target (%) in 5 years	Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Step 5: Plan Activities Target Quantity (if applicable)	Cost (KSh.)	By when	By whom	[AP] Annual NRW Reduction Plan (2019-20) 2019 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2020 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2020-21 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun
[A] Organizational Structure,	85 %- L 5	75 % - L 5	3	90	80	Development of SOPs Introduction of Incentives		1 million	End of December 2019	HR																														
		81 % - L 5	3	100	100																																				
			5 need	100	100																																				
		88 % - L 5	2	100	85																																				
			5 point	100	100																																				
			10 points	100	100																																				
			5 need	100	85																																				
		70 % - L 4	5 point																																						
			5 points	90	85	There is a need to provide more transport to the NRW section	2	4 million	2020	HR																														
		60 % - L 4	5 need																																						
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	73 % - L 4	76 % - L 4	3	90	80																																				
		68 % - L 4	5 need																																						
			1 point	90	70																																				
		67 % - L 4	5 need																																						
			3	90	70																																				
		50 %	5 need																																						
			1	3	100	100																																				
	86 % - L 5	71 % - L 5	3	85	75	Reservoirs and dedicated lines to high altitude areas to be considered			to be considered in future implementation																																
		78 %	5 points	90	82																																				
		38 % - L 4	3	90	70	This has been considered and staff are being prepared to take up the task This will be considered after implementaion of TMAs Location of this points have marked awaiting meter installation Deeper analysis is yet to be contacted This will be considered in future when the funds permit		ksh 2.5M		NRW incharge																																
		70 %	5 points	95	90																																				
			1 point	3	100	100																																				
[C] Reduction of Commercial	82 % - L 5	82 % - L 5	3	90	70	These activities are ongoing																																				
			5 point																																						
		82 % - L 5	5 points	90	70	Not yet implemented. one meter per unit in a premise to be considered in future as one way of improving revenue	70 meters			CM																														
	85 % - L 5		5 need																																						
		83 % - L 5	3	90	70																																				
	10	60 %	5 need	100	100																																				
			5 need	100	100																																				
			5 need	100	100																																				
			1	3	100	100																																				
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks &.	68 % - L 4	77 % - L 4	5 points	1	100	92																																			
		45 % -	5 point	2	70	55	more areas have been identified to install more sectional valves		ks1.2m		OSM SUPT																														
		87 % - L 5	5 point	2	95	90	ongoing				leak Detection																														
		71 % - L 4	5 points	1	85	78																																			
		38 % - L 4	5 point	1	80	60																																			
		44 % - L 3	5 point																																						
		47 % - L 3		3	75	60																																				
		55 % - L 4	5 point																																						
		62 % - L 4	5 point	2	80	65																																			
		70 %	5 point	3	90	72																																			
			5 point																																						

Step 3: Discuss the

Total Annual Cost (KSh.) 0

[Example Modes of Implementation]

: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
: Less intensive period with capital investmen
: Project with donner

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

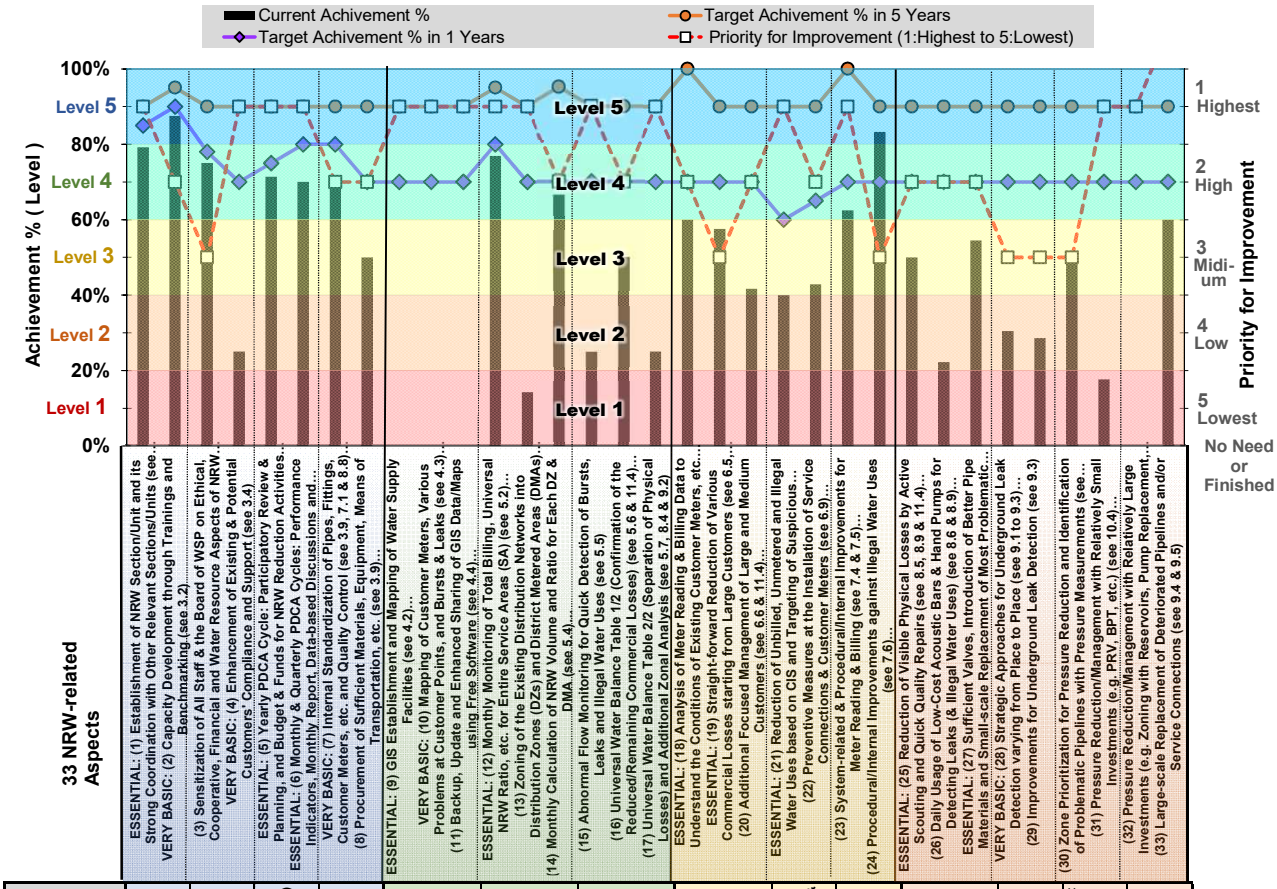
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
79 % - L 4	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	68 % - L 4	(a) Staffing with Essential Support & Training	81 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	79 % - L 4	24	19	79%	1	90%	85%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	88 % - L 5	8	7	88%	2	95%	90%
			(b) Sensitization & Awareness Raising for Wider Support	50 % - L 3	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	75 % - L 4	8	6	75%	3	90%	78%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	25 % - L 2	8	2	25%	1	90%	70%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	71 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	71 % - L 4	14	10	71%	1	90%	75%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	70 % - L 4	10	7	70%	1	90%	80%
			(d) Suitable, Sufficient & Timely Procurement	60 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	70 % - L 4	10	7	70%	2	90%	80%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	50 % - L 3	10	5	50%	2	90%	70%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	27 % - L 2	(a) Mapping/GIS Development & Utilization of Free Mapping Software	0 % - L 1	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	0 % - L 1	17	0	0%	1	90%	70%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	0 % - L 1	8	0	0%	1	90%	70%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	0 % - L 1	15	0	0%	1	90%	70%
			(b) Monthly NRW Monitoring & Zoning	59 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	77 % - L 4	13	10	77%	1	95%	80%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	14 % - L 1	7	1	14%	1	90%	70%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	67 % - L 4	9	6	67%	2	95%	70%
			(c) Abnormal Flow Monitoring & Water Balance Table	35 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	25 % - L 2	8	2	25%	1	90%	70%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	50 % - L 3	10	5	50%	2	90%	70%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	25 % - L 2	8	2	25%	1	90%	70%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	54 % - L 3	(a) Starting from Large Customers (e.g. by NRW Section)	55 % - L 3	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	60 % - L 4	10	6	60%	2	100%	70%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	58 % - L 3	33	19	58%	3	90%	70%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	42 % - L 3	12	5	42%	2	90%	70%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	42 % - L 3	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	40 % - L 3	10	4	40%	1	90%	60%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	43 % - L 3	14	6	43%	2	90%	65%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	1	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	63 % - L 4	8	5	63%	1	100%	70%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	83 % - L 5	6	5	83%	3	90%	70%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	33 % - L 2	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	43 % - L 3	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	50 % - L 3	10	5	50%	2	90%	70%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	22 % - L 2	9	2	22%	2	90%	70%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	55 % - L 3	11	6	55%	2	90%	70%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	30 % - L 2	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	30 % - L 2	23	7	30%	3	90%	70%
					(29) Improvements for Underground Leak Detection (see 9.3)	29 % - L 2	7	2	29%	3	90%	70%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	28 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	50 % - L 3	8	4	50%	3	90%	70%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	18 % - L 1	17	3	18%	1	90%	70%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	29 % - L 2	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	0 % - L 1	11	0	0%	1	90%	70%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	60 % - L 4	10	6	60%	0	90%	70%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	81 % - L 5	50 % - L 3	71 % - L 4	60 % - L 4	0 % - L 1	59 % - L 3	35 % - L 2	55 % - L 3	42 % - L 3	1	43 % - L 3	30 % - L 2	28 % - L 2	29 % - L 2
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	68 % - L 4				27 % - L 2			54 % - L 3			33 % - L 2			
Overall Achivement % - Level	79 % - L 4													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Kisumu WSP (Updated on May 29, 2019)

MAIN	Level	Level	Level	Priority for improvement (1:Highest-5:Lowest, N:No Need& F:Fnished)	[MP] Achievement Target (%) in 5 years	[MP] Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Target Quantity (if applicable)	Cost (KSh.)	By when	By whom
[A] Organizational Structure, Sensitization, PDCA Cycles &	68 % - L 4	81 % - L 5	79 %	1	90	85	Suficient support of staff Introduction of Incentives	personnel (4) All NRW staff	500.000 500.000	End of March 2020 Start of 2019/2020	HR HOTs and HOFs
			88 %	2	95	90	Regular external trainings	Relevant NRW stat	500.000	Start of 2019/2020	HOTS AND NRWE
		50 % - L 3	75 % - L	3	90	78	Internal and external staff training Internal training of staff	Relevant NRW stat Board and staff	100.000 200.000	End of September End of Second	HR and HOTS NRWE
			25 % - L 2	1	90	70	Attaching NRW reduction activities messages on water bills and send Sensitisation of the Toll free number Campaign through public forum,schools and media	customers staff and Community	100.000 200.000 500.000	By Septemnber By Septemnber By december	Customer service Customer service NRW unit and
	71 % - L 4	74 %		1	90	75					
		70 %		1	90	80					
		70 % - L 4		2	90	80					
		60 % - L	50 % - L	2	90	70	Sufficient NRW Survey equipment	Electric leak Pipe locator	2.000.000	31/6/2020	HOTs AND HOFs
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	27 % - L 2	0 % - L 1		1	90	70					
		0 % - L 1		1	90	70					
		0 % - L 1		1	90	70					
	59 % - L 3	77 %		1	95	80					
		14 % - L		1	90	70					
		67 % -		2	95	70					
	35 % - L 2	25 % - L 2		1	90	70					
		50 % - L		2	90	70					
		25 % - L 2		1	90	70	Training on estimation of physical losses Need for more staff in Leak detection	nrw staff Leak detection	500.000 500.000	Dec-19 Dec-19	HoTs and HoFs HR and HOTS
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data	54 % - L 3	60		2	100	70					
		55 % - L 3	58 % - L 3	3	90	70	Regular servicing of small meters data collection with electric forms portable meter testet	100 % registered nrw staff 4 portable meter	200.000 500.000 500.000	Oct-19 Dec-19 Dec-19	NRW Staff Hots and Hots Nrwe.HOTs and
		42 % -		2	90	70					
		40 % - L		1	90	60	Metering of all hydrants Need for improved policies on Authorised unbilled consumption	All unmetered Hvo	500.000	YR 2019-2020 YR 2019-2020	Nrwe.HOTs and HOFs NRWE AND HOTS
		42 % - L 3	43 % - L 3	2	90	65	Relocation of meters use of meter enclosers and/or meter boxes use of meter enclosers and/or meter boxes Change of meter orientation	nrw staff pdce staff pdce staff nrw staff	200.000 200.000 300.000	31/06/2020 Yr 2019/2020 Yr 2019/2020 Yr 2019/2020	NRW staff PDCE and HOTS PDCE and HOTS NRW Staff
		1	63 %	1	100	70					
			83	3	90	70	Quantifying of illegal water use	nrw staff and	200.000	YR 2019-2020	HoTs and HoFs
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks &	33 % - L 2	43 % - L 3	50 % - L	2	90	70	scouts along pipeline Advice on overflow	6 customers	500.000 200.000	31/6/2020 31/6/2020	HR and HOTS customer
			22 % - L	2	90	70	training in use of acoustic bars	30	100.000	Dec-19	NRW staff and mete
			55 % - L	2	90	70	Replacement of old pipilines with frequent bursts and leak Replacement of spaghetti lines with	deteroriated lines	10.000.000 5.000.000	31/12/2020 31/12/2020	HoTs and HoFs HoTs and HoFs
		30 % - L 2	30 % - L 2	3	90	70					
			29 % - L	3	90	70					
		28 % - L	50 % - L	3	90	70					
	29 %		60 %		90	70					

Step 5: Plan Activities

[AP] Annual NRW Reduction Plan (2019-20)

2019 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2020 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun

2020-21 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun

Step 3: Discuss the

Total Annual Cost (KSh.) 26,500,000

[Example Modes of Implementation]

: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
⇒ : Less intensive period with capital investme
: Project with donner

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

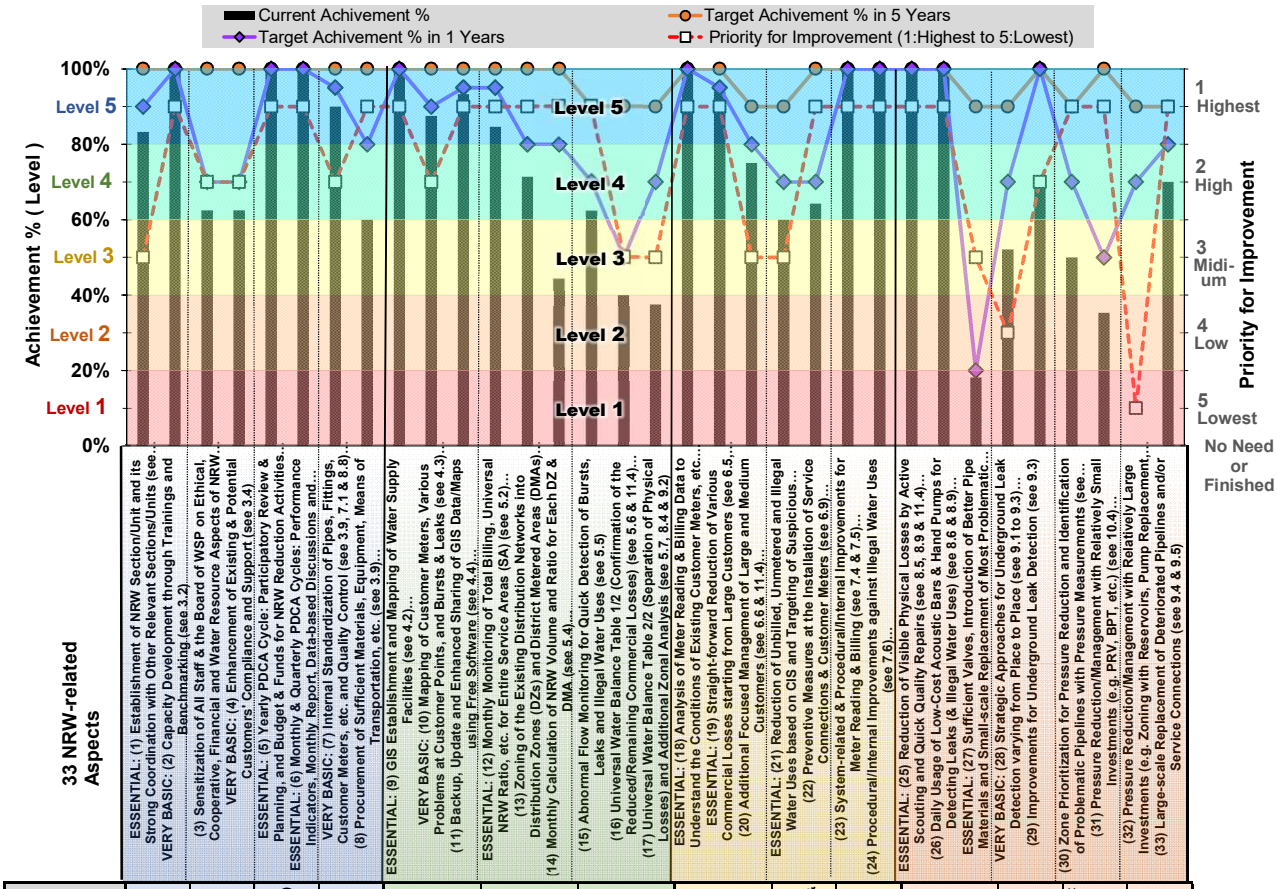
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
83 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	84 % - L 5	(a) Staffing with Essential Support & Training	88 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	83 % - L 5	24	20	83%	3	100%	90%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	100 % - L 5	8	8	100%	1	100%	100%
			(b) Sensitization & Awareness Raising for Wider Support	63 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	63 % - L 4	8	5	63%	2	100%	70%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	63 % - L 4	8	5	63%	2	100%	70%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	100 % - L 5	14	14	100%	1	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	100 % - L 5	10	10	100%	1	100%	100%
			(d) Suitable, Sufficient & Timely Procurement	75 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	90 % - L 5	10	9	90%	2	100%	95%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	60 % - L 4	10	6	60%	1	100%	80%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	74 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	95 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	100 % - L 5	17	17	100%	1	100%	100%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	88 % - L 5	8	7	88%	2	100%	90%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	93 % - L 5	15	14	93%	1	100%	95%
			(b) Monthly NRW Monitoring & Zoning	69 % - L 4	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	85 % - L 5	13	11	85%	1	100%	95%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	71 % - L 4	7	5	71%	1	100%	80%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	44 % - L 3	9	4	44%	1	100%	80%
			(c) Abnormal Flow Monitoring & Water Balance Table	46 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	63 % - L 4	8	5	63%	1	90%	70%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	40 % - L 3	10	4	40%	3	90%	50%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	38 % - L 2	8	3	38%	3	90%	70%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	85 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	91 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	100 % - L 5	10	10	100%	1	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	94 % - L 5	33	31	94%	1	100%	95%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	75 % - L 4	12	9	75%	3	90%	80%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	63 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	60 % - L 4	10	6	60%	3	90%	70%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	64 % - L 4	14	9	64%	1	100%	70%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	100 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	100 % - L 5	8	8	100%	1	100%	100%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	100 % - L 5	6	6	100%	1	100%	100%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	52 % - L 3	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	70 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	100 % - L 5	10	10	100%	1	100%	100%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	100 % - L 5	9	9	100%	1	100%	100%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	18 % - L 1	11	2	18%	3	90%	20%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	57 % - L 3	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	52 % - L 3	23	12	52%	4	90%	70%
					(29) Improvements for Underground Leak Detection (see 9.3)	71 % - L 4	7	5	71%	2	100%	100%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	40 % - L 3	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	50 % - L 3	8	4	50%	1	90%	70%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	35 % - L 2	17	6	35%	1	100%	50%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	33 % - L 2	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	0 % - L 1	11	0	0%	5	90%	70%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	70 % - L 4	10	7	70%	1	90%	80%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	88 % - L 5	63 % - L 4	100 % - L 5	75 % - L 4	95 % - L 5	69 % - L 4	46 % - L 3	91 % - L 5	63 % - L 4	100 % - L 5	70 % - L 4	57 % - L 3	40 % - L 3	33 % - L 2
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	84 % - L 5				74 % - L 4			85 % - L 5			52 % - L 3			
Overall Achivement % - Level	83 % - L 5													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, ??? WSP (Updated on May 29, 2019)+B1

BA Category	C 83	Priority for improvemen t (1:Highest-5:Lowest, N:No Need& F:Fnished)	[MP] Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24) Achievement Target (%)		Step 5: Plan Activities Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	[AP] Annual NRW Reduction Plan (2019-20) Target Quantity (if applicable)	Cost (KSh.)	By when	By whom	2019 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2020 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2020-21 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun
MAIN Level	Level	Level	in 5 years	in 1 year																																		
[A] Organizational Structure, 84 % - L 5	88 % - L 5	3	100	90	To develop standard operation procedures for NRW Team	To develop standard		31ST JULY 2020																														
	83 %	1	100	100																																		
	63 % - L 4	2	100	70																																		
	63 % - L 3	2	100	70	(ii) Organize for school campaigns on reduction of water wastage and	5 schools	100.000	31st JUNE 2020	PRO/NRW TEAM																														
	10 0	1	100	100																																		
	63 %	1	100	100																																		
	90	2	100	95																																		
	75 % - L 4	1	100	80	(i) Need to procure a Portable Ultrasonic Flow Meter for testing and (ii) Need for procurement of sufficient reliable master and bulk	1 UFM 38	1.200.000 4.540.000	30th JUNE 2020 30th JUNE 2021																																
	60 %	1	100	100																																		
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 74 % - L 4	88	2	100	90	Ensure Various problems at customer points listed in the monthly																																
	95 % - L 5	1	100	95																																		
	93	1	100	95																																		
	85	1	100	95	Installation of Master Meter for Rwathia scheme with proper	Marmanet																																
	71 % - L 4	1	100	80	To implement the establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and	2N0.-100MM																																
	69 % - L 4	1	100	80	Once the bulk meters for all the DMAs are installed the reading, analyses and other activities shall be carried out accordingly throughout the project period and beyond		AS SHOWN IN (8) ABOVE	STARTING FROM JULY 2020																																
	44 % - L 3	1	90	70	(I) Install Additional bulk meters on high-risk pipelines that are (II)Promote use of a free cloud-based online spread sheet (e.g. Google Sheet in Google Drive) for recording the bulk meter			Starting July 2020 to																																
	63 % - L 3	3	90	50																																		
	46 % - L 3	3	90	70	PREPARE WATER BALANCE TABLE			30TH JUNE 2021	FAM/TM/OE/NRW																																
	40 % - L 3	1	100	100																																		
[C] Reduction of Commercial 85 % - L 5	94 %	1	100	95																																		
	91 % - L 5	3	90	80																																		
	75 %	3	90	70																																		
	63 % - L 4	1	100	70	(I) Introduction of use of plastic seals and/or other (ii) Ensure all existing customer meters are installed horizontally (iii) Ensure reliable air valves are installed in all the necessary locations on pipelines and customer connections	5000 METERS	350.000 1.000.000	30TH June 2022 30TH June 2022	FAM/TM/OE FAM/TM/OE																																
	60 %	1	100	100																																		
	10 0	1	100	100																																		
	64 %	1	100	100																																		
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 52 % - L 3	70 % - L 4	3	90	20	(i) Consider rehabilitation of dilapitaed pipe networks that (ii) Installation of Section valves for proper water control in the pipe network to avoid losses in case of burst occurrence and during pipe repairs																																		
	48 % - L 1	4	90	70	The company is still dealing largely with visible above ground			FROM JUNE 2022	NRW TEAM																																
	57 % - L 3	2	100	100																																		
	52 % - L	1	90	70	(i) Establish Elevation difference within each DZ and/or pressure zones. (e.g. by overlaying elevation contours and the zone boundaries and facilities on the GIS and making a table showing the elevation of storage			30th June 2020	OE/NRW team/GIS																																
	40 % - L 3	1	100	50					FAM/TM/OE/NRW																																
	35 % - L 2	5	90	70	(i) Pressure management in Nyahururu does not require major																																		
	33 % - L 2																																					
	0 % - L 1																																					
	70	1	90	80																																		
Step 3: Discuss the						Total Annual Cost (KSh.)	259,375,770																																

[Example Modes of Implementation]

- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investme
- : Project with donner

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

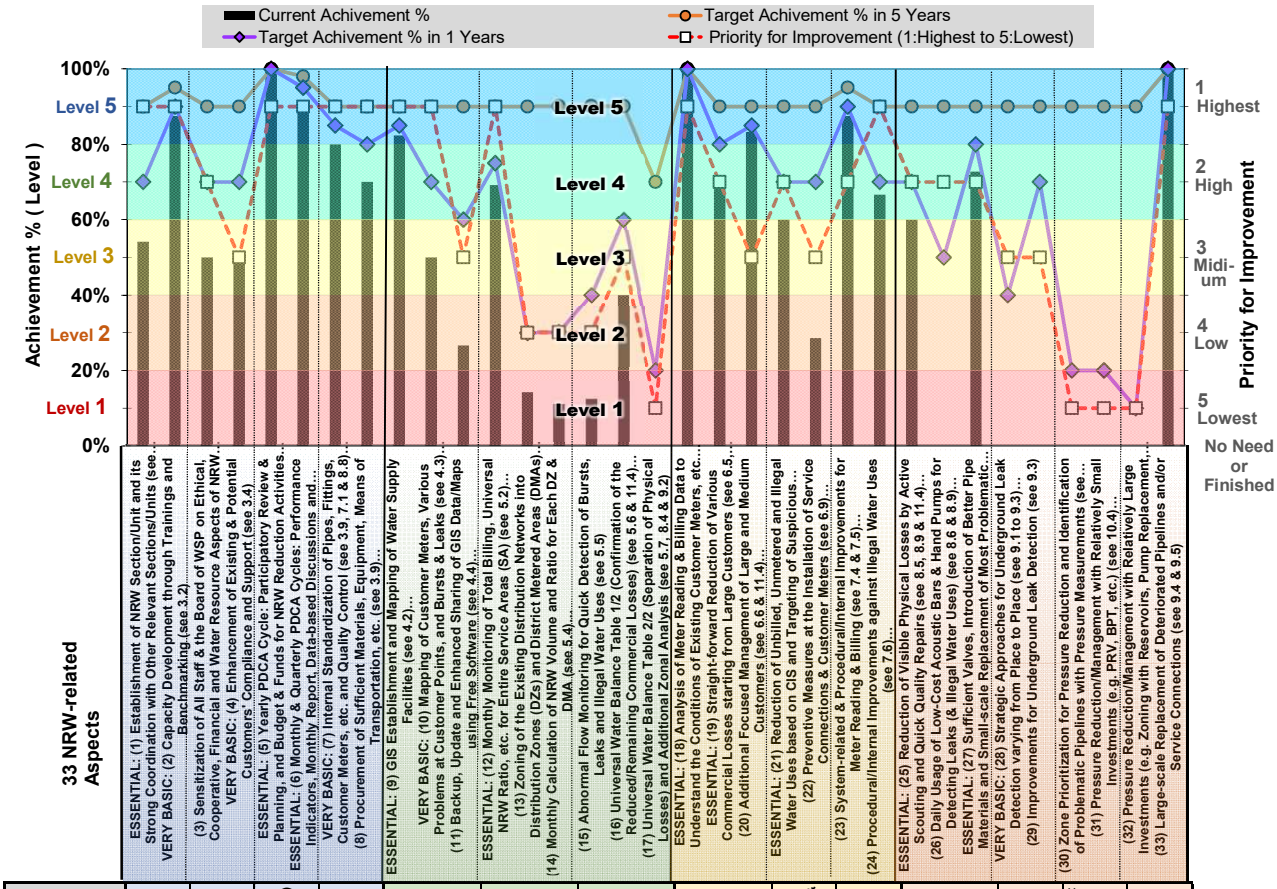
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
54 % - L 3	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	72 % - L 4	(a) Staffing with Essential Support & Training	63 % - L 4	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	54 % - L 3	24	13	54%	1	90%	70%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	88 % - L 5	8	7	88%	1	95%	90%
			(b) Sensitization & Awareness Raising for Wider Support	50 % - L 3	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	50 % - L 3	8	4	50%	2	90%	70%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	50 % - L 3	8	4	50%	3	90%	70%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	96 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	100 % - L 5	14	14	100%	1	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	90 % - L 5	10	9	90%	1	98%	95%
			(d) Suitable, Sufficient & Timely Procurement	75 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	80 % - L 5	10	8	80%	1	90%	85%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	70 % - L 4	10	7	70%	1	90%	80%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	40 % - L 3	(a) Mapping/GIS Development & Utilization of Free Mapping Software	55 % - L 3	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	82 % - L 5	17	14	82%	1	90%	85%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	50 % - L 3	8	4	50%	1	90%	70%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	27 % - L 2	15	4	27%	3	90%	60%
			(b) Monthly NRW Monitoring & Zoning	38 % - L 2	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	69 % - L 4	13	9	69%	1	90%	75%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	14 % - L 1	7	1	14%	4	90%	30%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	11 % - L 1	9	1	11%	4	90%	30%
			(c) Abnormal Flow Monitoring & Water Balance Table	19 % - L 1	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	13 % - L 1	8	1	13%	4	90%	40%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	40 % - L 3	10	4	40%	3	90%	60%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	0 % - L 1	8	0	0%	5	70%	20%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	69 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	78 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	100 % - L 5	10	10	100%	1	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	70 % - L 4	33	23	70%	2	90%	80%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	83 % - L 5	12	10	83%	3	90%	85%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	42 % - L 3	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	60 % - L 4	10	6	60%	2	90%	70%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	29 % - L 2	14	4	29%	3	90%	70%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	79 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	88 % - L 5	8	7	88%	2	95%	90%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	67 % - L 4	6	4	67%	1	90%	70%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	23 % - L 2	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	47 % - L 3	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	60 % - L 4	10	6	60%	2	90%	70%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	0 % - L 1	9	0	0%	2	90%	50%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	73 % - L 4	11	8	73%	2	90%	80%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	0 % - L 1	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	0 % - L 1	23	0	0%	3	90%	40%
					(29) Improvements for Underground Leak Detection (see 9.3)	0 % - L 1	7	0	0%	3	90%	70%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	0 % - L 1	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	0 % - L 1	8	0	0%	5	90%	20%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	0 % - L 1	17	0	0%	5	90%	20%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	48 % - L 3	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	0 % - L 1	11	0	0%	5	90%	10%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	100 % - L 5	10	10	100%	1	100%	100%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	63 % - L 4	50 % - L 3	96 % - L 5	75 % - L 4	55 % - L 3	38 % - L 2	19 % - L 1	78 % - L 4	42 % - L 3	79 % - L 4	47 % - L 3	0 % - L 1	0 % - L 1	48 % - L 3
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	72 % - L 4				40 % - L 3			69 % - L 4			23 % - L 2			
Overall Achivement % - Level	54 % - L 3													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Mavoko WSP (Updated on May 29, 2019)

MAIN Level	Level	Level	Priority for improvement (1:Highest-S:Lowest, N:No Need& F:Finished)	[MP] Achievement Target (%) in 5 years	[MP] Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Target Quantity (if applicable)	Cost (KSh.)	By when	By whom
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	72 % - L 4	63 % - L 4	1	90	70	Improvement of Job descriptions,SOPs and staffing		200.000	Bv May 2020 Bv May 2020 Bv May 2020 Bv May 2020 Bv May 2020 Bv May 2020 Bv May 2020	HR HR HR HR HR HR HR
			1	95	90			300,000	MARCH 2020	HR
		50 % - L 3	2	90	70				CONTINOUS	MANAGEMENT
				90	70			50.000	AUGUST 2019 JANUARY 2020	MANAGEMENT
				100	##					
			1	98	95				MONTHLY/QUART	NRW REVIEW
		75 % - L 4		90	85		60	10,000	MONTHLY	NRW TEAM
			1	90	80				JUNE 2020	TM
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	40 % - L 3	55 % - L 2	1	90	85				JANUARY 2020 JANUARY 2020 JANUARY 2020	GIS/NRW TEAM GIS/NRW TEAM GIS/NRW TEAM
		50 % - L 3	1	90	70			200.000	OCT 2019 OCT 2019 OCT 2019	FM/TM/GIS/IT/NRW FM/TM/GIS/IT/NRW FM/TM/GIS/IT/NRW
		55 % - L 2	2	90	60			5,000	SEPT 2019 SEPT 2019 SEPT 2019 SEPT 2019 SEPT 2019 SEPT 2019 SEPT 2019 SEPT 2019	GIS GIS GIS GIS GIS GIS GIS GIS
			1	90	75			100.000	SEPT 2019 CONTINOUS	NRW TEAM
		38 % - L 2	4	90	30		5	600.000	AUGUST 2019	NRW TEAM
		14 % - L 1	4	90	30				AUGUST 2019	NRW TEAM
	19 % - L 1	11 % - L 1	4	90	40				JANUARY 2021	TM/NRW TEAM
		40 % - L 1	3	90	60				JANUARY 2021	TM/NRW TEAM
		0 % - L 1	5	70	20				JANUARY 2021	TM/NRW TEAM
				100	##					
[C] Reduction of Commercial (Apparent) Water Losses	78 % - L 4	70 % - L 4	2	90	80	Accuracy test and GIS support			JANUARY 2020 JANUARY 2020 JANUARY 2020 JANUARY 2020 JANUARY 2020 AUGUST 2019	
				90	85				CONTINOUS	
	69 % - L 4	60 % - L 3	2	90	70				AUGUST 2019	NRW TEAM
		42 % - L 2	3	90	70			100.000	AUGUST 2019 AUGUST 2019 AUGUST 2019 AUGUST 2019 AUGUST 2019 AUGUST 2019 CONTINOUS CONTINOUS	TM/NRW NRW TEAM
				95	90				SEPTEMBER 2019	FM/COMMERCIAL/
		67 % - L	1	90	70				JAN 2022	MD
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	47 % - L 3	0 % - L 2	2	90	70				SEPTEMBER 2019	NRW TEAM
		0 % - L 1	2	90	50				SEPTember 2019 SEPTember 2019 SEPTember 2019 SEPTember 2019 SEPTember 2019	NRW TEAM
		73 %	2	90	80			200.000		TM/NRW TEAM
	23 % - L 2	0 % - L 1	1	90	40				JUNE 2020 JUNE 2020 JUNE 2020 JUNE 2020 JUNE 2020 JUNE 2020 JUNE 2020 JUNE 2020 JUNE 2020	TM/NRW TEAM
	0 % - L 1	0 % - L 1	3	90	70				JUNE 2020	TM/NRW TEAM
	48 % - L 3	0 % - L 1	5	90	10					
				100	##					

Step 5: Plan Activities

[AP] Annual NRW Reduction Plan (2019-20)

2019 1st Qua. | 2nd Quarter | 2020 3rd Qua. | 4th Quarter

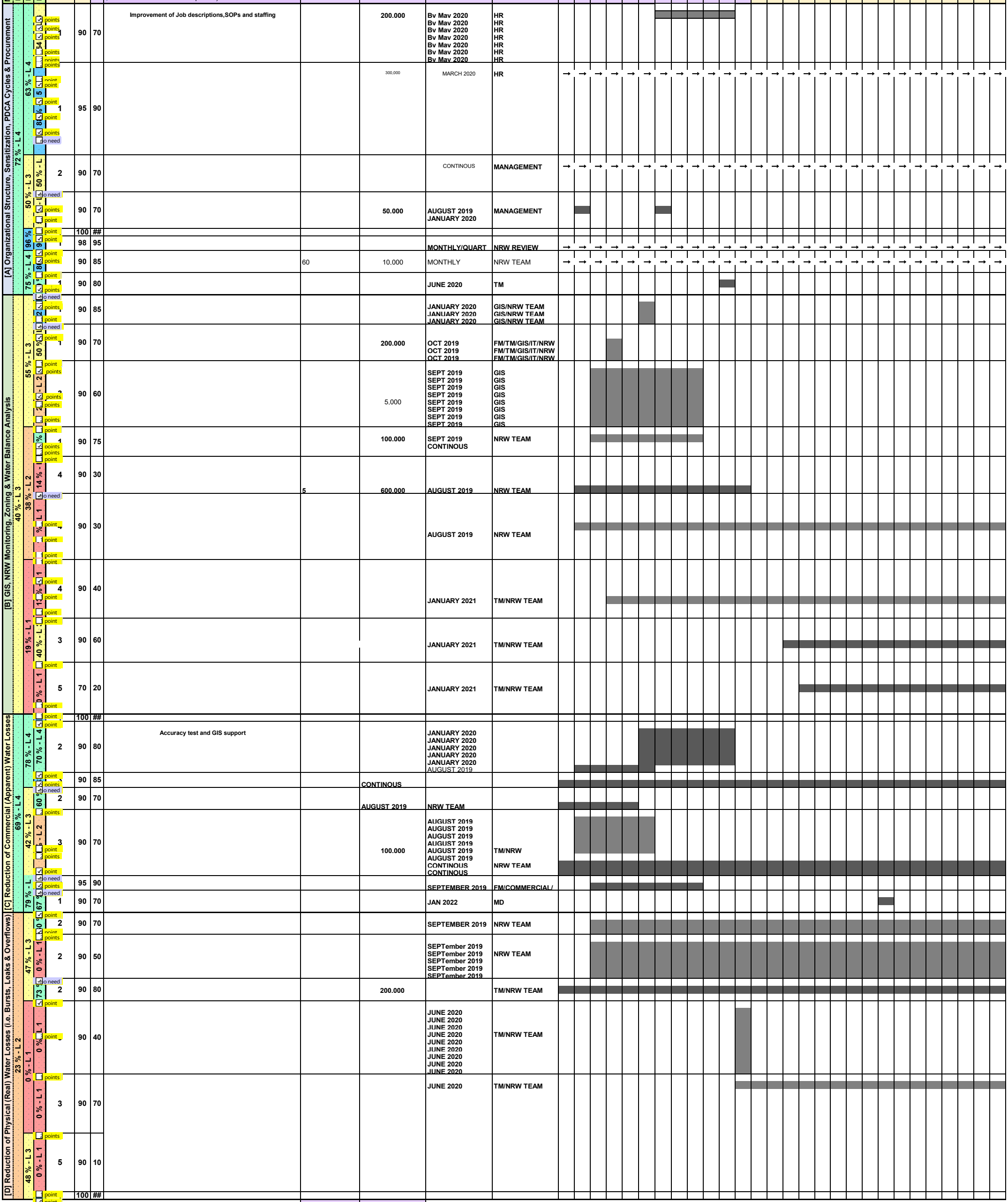
Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun

2020-21: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

2021-22: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

2022-23: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

2023-24: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun



Step 3: Discuss the

Total Annual Cost (KSh.) 2,365,000

[Example Modes of Implementation]

: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
⇒ : Less intensive period with capital investme
: Project with donner

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

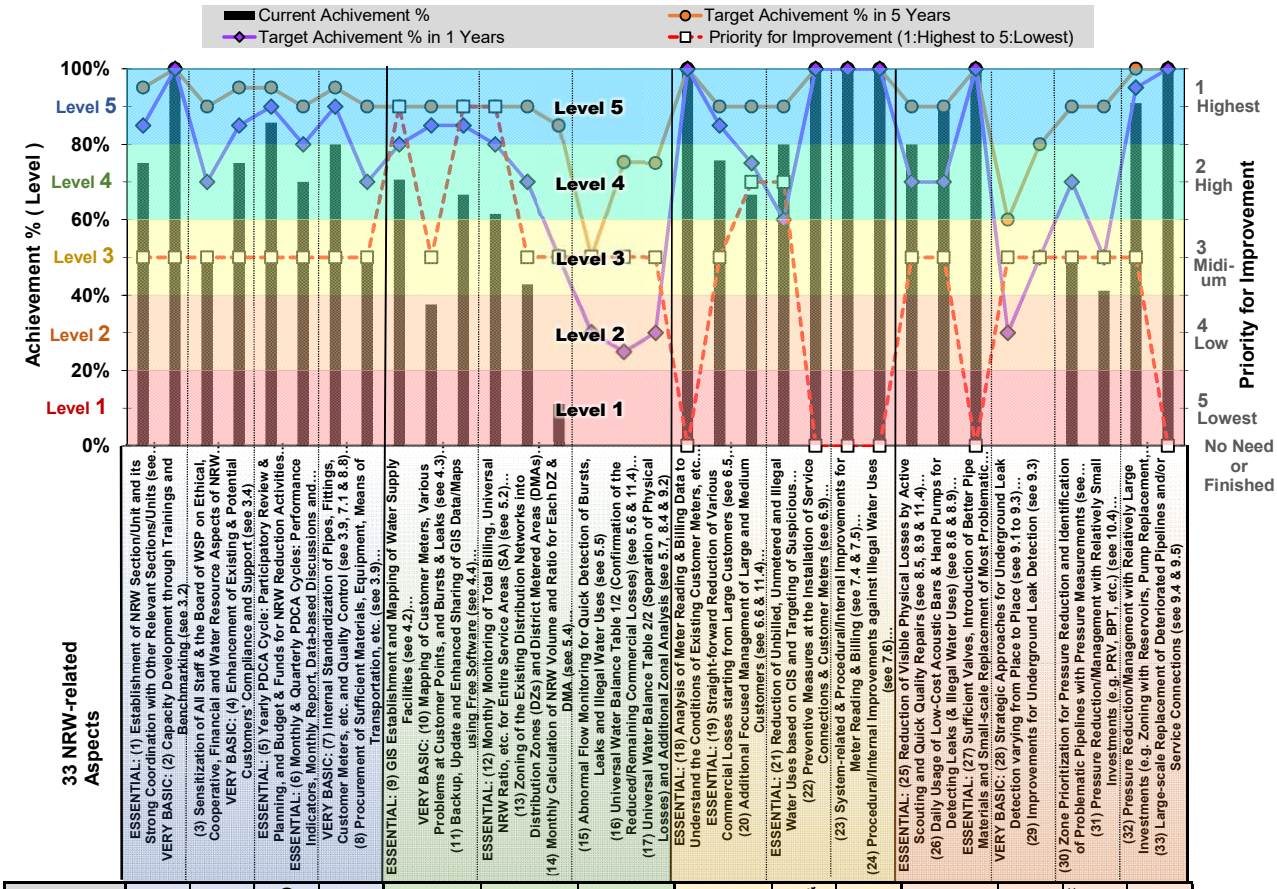
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
75 % - L 4	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	74 % - L 4	(a) Staffing with Essential Support & Training	81 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	75 % - L 4	24	18	75%	3	95%	85%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	100 % - L 5	8	8	100%	3	100%	100%
			(b) Sensitization & Awareness Raising for Wider Support	63 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	50 % - L 3	8	4	50%	3	90%	70%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	75 % - L 4	8	6	75%	3	95%	85%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	79 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	86 % - L 5	14	12	86%	3	95%	90%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	70 % - L 4	10	7	70%	3	90%	80%
			(d) Suitable, Sufficient & Timely Procurement	65 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	80 % - L 5	10	8	80%	3	95%	90%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	50 % - L 3	10	5	50%	3	90%	70%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	39 % - L 2	(a) Mapping/GIS Development & Utilization of Free Mapping Software	63 % - L 4	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	71 % - L 4	17	12	71%	1	90%	80%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	38 % - L 2	8	3	38%	3	90%	85%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	67 % - L 4	15	10	67%	1	90%	85%
			(b) Monthly NRW Monitoring & Zoning	41 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	62 % - L 4	13	8	62%	1	90%	80%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	43 % - L 3	7	3	43%	3	90%	70%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	11 % - L 1	9	1	11%	3	85%	50%
			(c) Abnormal Flow Monitoring & Water Balance Table	0 % - L 1	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	0 % - L 1	8	0	0%	3	50%	30%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	0 % - L 1	10	0	0%	3	75%	25%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	0 % - L 1	8	0	0%	3	75%	30%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	85 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	78 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	100 % - L 5	10	10	100%	5.5	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	76 % - L 4	33	25	76%	3	90%	85%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	67 % - L 4	12	8	67%	2	90%	75%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	92 % - L 5	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	80 % - L 5	10	8	80%	2	90%	60%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	100 % - L 5	14	14	100%	5.5	100%	100%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	100 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	100 % - L 5	8	8	100%	5.5	100%	100%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	100 % - L 5	6	6	100%	5.5	100%	100%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	55 % - L 3	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	90 % - L 5	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	80 % - L 5	10	8	80%	3	90%	70%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	89 % - L 5	9	8	89%	3	90%	70%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	100 % - L 5	11	11	100%	5.5	100%	100%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	0 % - L 1	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	0 % - L 1	23	0	0%	3	60%	30%
					(29) Improvements for Underground Leak Detection (see 9.3)	0 % - L 1	7	0	0%	3	80%	50%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	44 % - L 3	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	50 % - L 3	8	4	50%	3	90%	70%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	41 % - L 3	17	7	41%	3	90%	50%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	95 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	91 % - L 5	11	10	91%	3	100%	95%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	100 % - L 5	10	10	100%	5.5	100%	100%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	81 % - L 5	63 % - L 4	79 % - L 4	65 % - L 4	63 % - L 4	41 % - L 3	0 % - L 1	78 % - L 4	92 % - L 5	100 % - L 5	90 % - L 5	0 % - L 1	44 % - L 3	95 % - L 5
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	74 % - L 4				39 % - L 2			85 % - L 5			55 % - L 3			
Overall Achivement % - Level	75 % - L 4													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Eldoret WSP (Updated on May 29, 2019)

[MP] Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24)

Step 5: Plan Activities

[AP] Annual NRW Reduction Plan (2019-20)

MAIN Category	Level	Level	Priority for improvement (1:Highest-5:Lowest, N:No Need& F:Fnished)	Achievement Target (%) in 5 years	Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Target Quantity (if applicable)	Cost (KSh.)	By when	By whom	2019 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2020 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2020-21 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun
[A] Organizational Structure, Sensitization, PDCA Cycles & (74 % - L 4)	81 % - L 5	75 % -	3	95	85	To develop standard operation procedures for NRW Team	To develop standard operation procedures for NRW Team																															
		100	3	100	100																																	
	63 % - L 4	50 % -	3	90	70	1.Inhouse training of all staff on intergrity issues	All staff	0	End Decemer 2019	HR																												
		%	3	95	85	(i) Organize for school campaigns on reduction of water wastage and		500,000	Dec-19	CSM	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	79 % - L			95	90																																	
		70	3	90	80																																	
	65 % - L 4	80	3	95	90																																	
		0	3	90	70	(i) Need to procure a Portable Ultrasonic Flow Meter for testing and (ii) Need for procurement of sufficient reliable master and bulk meters	50 1 UFM	10.000.000	Decemer 2019	SCM																												
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis (39 % - L 2)	63 % - L 4	71	1	90	80																																	
		38 % - L 2	3	90	85	Continue updating the GIS Maps			Ongoing	GIS	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
		67 % - L	1	90	85																																	
	41 % - L 3	62 % - L 4	1	90	80																																	
		43 % -	3	90	70	To implement the establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly	12NO.-150MM 12N0.-100MM 15NO-90MM																															
		11 % - L 1	3	85	50	After the bulk meters for all the DMAs are installed the reading, analyses and other activities shall be carried out for the entire project period and beyond		As shown in No 8	STARTING BY JULY 2020																													
	0 % - L 1	0 % - L 1	3	50	30	(I) Install Additional bulk meters on high-risk pipelines that are frequently read to improve the abnormal flow monitoring or use of AMR (II)Promote use of a free cloud-based online spread sheet (e.g. Google Sheet in Google Drive) for recording the bulk meter readings on site with smartphones and immediately getting the results of an automated		0	December 2019 to the end of project and beyond	NRW TEAM																												
		0 % - L 1	3	75	25	Prepair Water balance table			Dec-20	WDNRWM/HTS/NWRO																												
		0 % - L 1	3	75	30																																	
[C] Reduction of Commercial (Apparent) Water Losses (85 % - L 5)				100	100																																	
	78 % - L 4	76 % - L 4	3	90	85																																	
		67		90	75	Consider introduction of smart meters and high accuracy meters (e.g.																																
	92 % - L 5	80 % -	2	90	60	Continue with customer identification survey in all service areas.	new customers	1.000.000	Jul-20	HCS/CSM													→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
		1		100	100	(iv)'Introduction of plastic seals and other type of seals over the joints																																
	100 % - L 5	100	F	100	100																																	
				100	100																																	
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) (55 % - L 3)		8	3	90	70																																	
		89	3	90	70	(2) proper use of hand pumps to test new connections to ensure no			All the time																													
	90 % - L 5	100 % - L 5	F	100	100																																	
	0 % - L 1	0 % - L 1	3	60	30	Eldowas has procured leak detection equipmets,but currently still dealing with visible ground leaks	All pipeline	5,000,000	Decemer 2019	Nrw team						→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
		0 % - L 1	3	80	50	To intensify the use of Clamp onUFM in MNF to identify leaking pipelines		600.000	Throught the period	Nrw team																												
	44 % - L 3	50 % - L	3	90	70	(i) Establish Elevation difference within each DZ and/or pressure zones. (e.g. by overlaying elevation contours and the zone boundaries and facilities on the GIS and making a table showing the elevation of																																
		41 % - L 3	3	90	50	(i) Procurement and use of pressure data loggers and pressure gauges	8	1.800.000	Jul-20	Nrw Team																												
	95 % - L 5	91 % -	3	100	95	Eldowas lies in aplateu of which we dont experience high abnormal																																
		1	F	100	100																																	

Step 3: Discuss the SA

Total Annual Cost (KSh.)	277,970,000

[Example Modes of Implementation]

- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investmer
- : Project with donner

Table: Results of the Self-Assessment of Current Conditions & Target Achievement

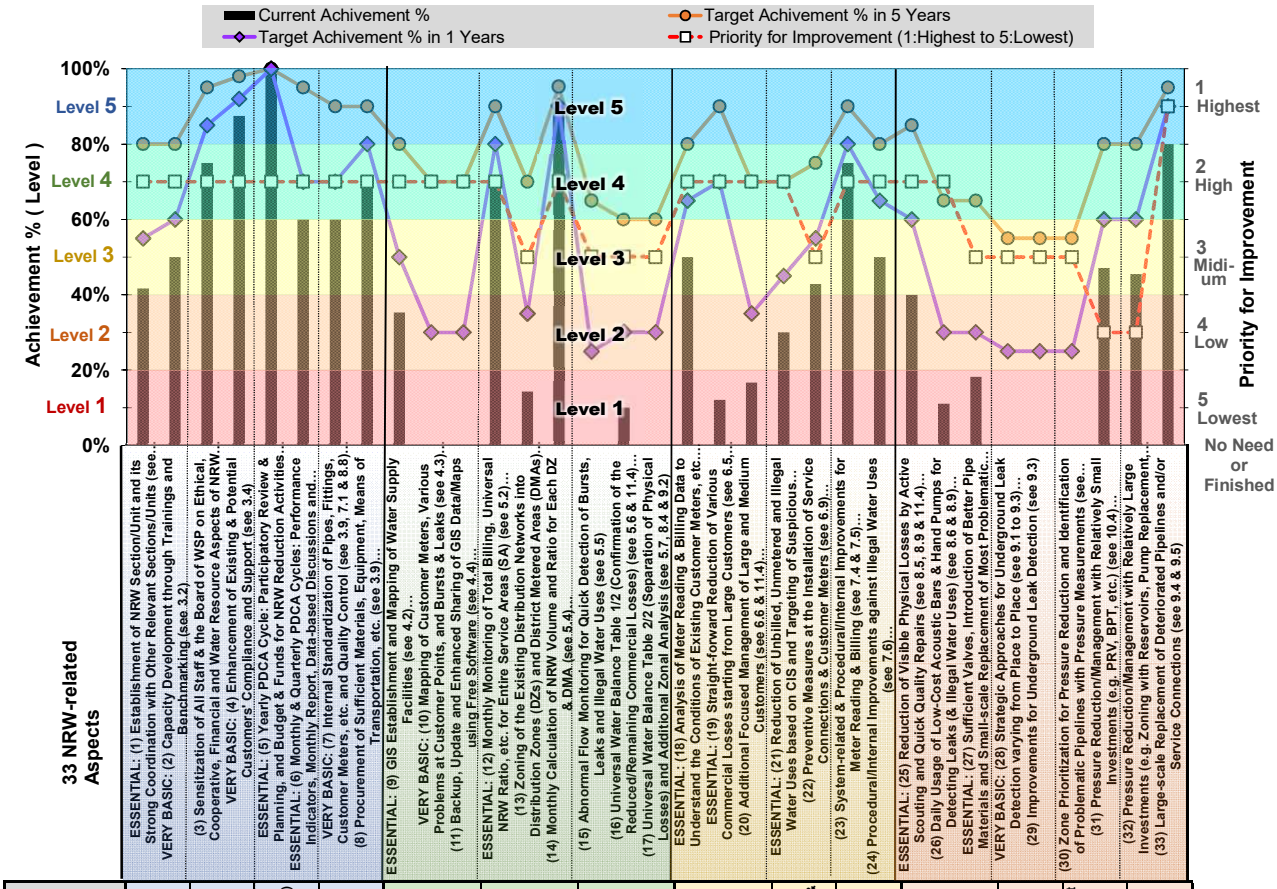
Overall Achivement % (Level)	Main Category	Achivement % (Level)	Sub Category	Achivement % (Level)	NRW-related Aspect	Achivement % (Level)	Max Pint	Current Point	Current Achivement %	Priority for Improvement (1:Highest to 5:Lowest	Target Achivement % in 5 Years	Target Achivement % in 1 Years
42 % - L 3	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	65 % - L 4	(a) Staffing with Essential Support & Training	44 % - L 3	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units (see 3.1 of the Revised	42 % - L 3	24	10	42%	2	80%	55%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking (see 3.2)	50 % - L 3	8	4	50%	2	80%	60%
			(b) Sensitization & Awareness Raising for Wider Support	81 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW (see 3.3 & 11.3)	75 % - L 4	8	6	75%	2	95%	85%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support (see 3.4)	88 % - L 5	8	7	88%	2	98%	92%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	83 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities (see 3.5 to 3.8 &	100 % - L 5	14	14	100%	2	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	60 % - L 4	10	6	60%	2	95%	70%
			(d) Suitable, Sufficient & Timely Procurement	65 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (see 3.9, 7.1 & 8.8)	60 % - L 4	10	6	60%	2	90%	70%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. (see 3.9)	70 % - L 4	10	7	70%	2	90%	80%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	26 % - L 2	(a) Mapping/GIS Development & Utilization of Free Mapping Software	15 % - L 1	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities (see 4.2)	35 % - L 2	17	6	35%	2	80%	50%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (see 4.3)	0 % - L 1	8	0	0%	2	70%	30%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software (see 4.4)	0 % - L 1	15	0	0%	2	70%	30%
			(b) Monthly NRW Monitoring & Zoning	62 % - L 4	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (see 5.2)	69 % - L 4	13	9	69%	2	90%	80%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (see 5.3)	14 % - L 1	7	1	14%	3	70%	35%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA (see 5.4)	89 % - L 5	9	8	89%	2	95%	90%
			(c) Abnormal Flow Monitoring & Water Balance Table	4 % - L 1	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (see 5.5)	0 % - L 1	8	0	0%	3	65%	25%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (see 5.6 & 11.4)	10 % - L 1	10	1	10%	3	60%	30%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis (see 5.7, 8.4 & 9.2)	0 % - L 1	8	0	0%	3	60%	30%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	31 % - L 2	(a) Starting from Large Customers (e.g. by NRW Section)	20 % - L 2	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. (see 6.4)	50 % - L 3	10	5	50%	2	80%	65%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (see 6.5, 7.2, 7.3 & 11.4)	12 % - L 1	33	4	12%	2	90%	70%
					(20) Additional Focused Management of Large and Medium Customers (see 6.6 & 11.4)	17 % - L 1	12	2	17%	2	70%	35%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	38 % - L 2	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (see 6.7 &	30 % - L 2	10	3	30%	2	70%	45%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters (see 6.9)	43 % - L 3	14	6	43%	3	75%	55%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	64 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (see 7.4 & 7.5)	75 % - L 4	8	6	75%	2	90%	80%
					(24) Procedural/Internal Improvements against Illegal Water Uses (see 7.6)	50 % - L 3	6	3	50%	2	80%	65%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	26 % - L 2	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	23 % - L 2	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (see 8.5, 8.9 & 11.4)	40 % - L 3	10	4	40%	2	85%	60%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) (see 8.6 & 8.9)	11 % - L 1	9	1	11%	2	65%	30%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes (see 8.7, 8.8 &	18 % - L 1	11	2	18%	3	65%	30%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	0 % - L 1	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (see 9.1 to 9.3)	0 % - L 1	23	0	0%	3	55%	25%
					(29) Improvements for Underground Leak Detection (see 9.3)	0 % - L 1	7	0	0%	3	55%	25%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	32 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (see Chapter 10.2 &	0 % - L 1	8	0	0%	3	55%	25%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) (see 10.4)	47 % - L 3	17	8	47%	4	80%	60%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	62 % - L 4	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (see 10.5)	45 % - L 3	11	5	45%	4	80%	60%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections (see 9.4 & 9.5)	80 % - L 5	10	8	80%	1	95%	90%

Automatically-Visualized Results of the Self-Assessment on Current Conditions from Template <2>

Step 3: Discuss the SA Results and Review the Priority and Targets

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Achievements (Full 33 Aspects)



Sub Category Achivement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	44 % - L 3	81 % - L 5	83 % - L 5	65 % - L 4	15 % - L 1	62 % - L 4	4 % - L 1	20 % - L 2	38 % - L 2	64 % - L 4	23 % - L 2	0 % - L 1	32 % - L 2	62 % - L 4
Main Category Achivement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	65 % - L 4				26 % - L 2			31 % - L 2			26 % - L 2			
Overall Achivement % - Level	42 % - L 3													

Template < 2 >: Self-Assessment, Medium-term & Annual Plans & Quarterly Monitoring for 2019-20 Onward, Kilifi-Mariakani WSP (Updated on August 16, 2019)

[MP] Medium-term NRW Reduction Plan for the Next 5 Years (2019-20 to 2023-24) — Step 5: Plan Activities — [AP] Annual NRW Reduction Plan (2019-20)

MAIN Catego	Level	Level	Level (C 42)	Priority for improvement (1:Highest-5:Lowest, N:No Need& F:Fnished)	Achievement Target (%) in 5 years	Achievement Target (%) in 1 year	Title of Selected Activity / Countermeasure (Cells may be merged to state your original titles of activities flexibly beyond the width of this column if required.)	Target Quantity (if applicable)	Cost (KSh.)	By when	By whom	Notes
[A] Organizational Structure, Sensitization, PDCA Cycles &	65 % - L 4	44 % - L 3	42 % - L 3	2	80	55	Staffing and sufficient support Job descriptions and SOPs	personnel Personnel/Consultant	1,000,000 500,000 1,000,000 1,000,000 200,000	End of June 2020 End of June 2020	HR HR	
			50 % -	2	80	60			2,000,000 2,000,000 1,000,000	End of June 2020 End of June 2020 End of June 2020	HR HR HR	
		81 % - L	75 %	2	95	85						
			88	2	98	92		Commercial	5,000,000	End of june 2020	Commercial Manager	
		83 % - L 5	100	2	100	100						
			60 % - L	2	95	70						Captured in essential1(4)
	65 % - L 4		60 % -	2	90	70						To be done after trainning, bench marking and introduction of SOPs
			70 %	2	90	80		Procurement Procurement	20,000,000 16,000,000	End of June 2020 End of June 2020	Procurement Manager Procurement Manager	
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	26 % - L 2	15 % - L 1	35 % - L 2	2	80	50		Personnel ??	1,500,000 10,000,000	End of June 2020 End of June 2020	HR Technical Manager	
			0 % - L 1	2	70	30						Covered in essential 9 (3,4,5,7,8)
			0 % - L 1	2	70	30						Covered in essential 9 (3,4,5,7,8)
		62 % - L 4	69 % -	2	90	80						Taken care of by the bulk supplier(CWWDA)
			14 % - L	3	70	35		9 Zones, 165 Sub-Zones	85,000,000	End of June 2020	Technical Manager/ Commercial Manager/HR MANAGER	The activities of will be funded jointly by Kimawasco and donor(World Bank)
			89	2	95	90						Activities and action items covered in Essential 9, 10 up to
		4 % - L 1	0 % - L 1	3	65	25		All Pipelines Identified, All Priority bulk meters for monitoring identified and listed	500,000	End of December	Technical Manager	
			10 % - L 1	3	60	30		Water Balance Table	1,000,000	End of June 2020	Commercial Manager/Technical Manager/ NRW-O	Comply by implementing the IWA recommended formula for WATER BALANCE
			0 % - L 1	3	60	30						Activitiy will be fully implementable when, exercises on earlier essentials will have created an enabling environment
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy	31 % - L 2		50 %	2	80	65				End of December 2019	Commercial Manager	
		20 % - L 2	12 % - L 1	2	90	70				Continous Activity, revied annualy	Commercial Manager/NRW-O/Commercial Officer	Currently ongoing. Costs catered for in earlier, currently ongoing and future planned activities
			17 % - L 1	2	70	35				End of June 2020	Technical and Commercial Manager/Commercial Officer/NWR-O	Budget covered in Essential 13
		38 % - L 2	30 % - L 2	2	70	45		CIS on all customer Meters	5,000,000	End of June 2020	Commercial Manager/HRA Manager/NRW-O/Commercial Officer	To be conducted gradually for each of the nine areas. All sub-items of this essential shall be covered as part of the details in the CIS survey , closely linking
			43 % - L 3	3	75	55		All customer Connections in all areas of operation			Technical, NRW and Commercial Manager/ HRA Manager	This is also a continous activity involving data field services ,data collection , monitoring and evaluation
		64 % - L 4	75 %	2	90	80		Billing System and Proceses	NA	Ongoing	Commercial Manager	Improvement of internal proceses and approaches to
			50 % - L	2	80	65				Continous Activity	Commercial Manager	1. Activities for this essential shall be covered as in E20, 21, 2. Implementation of the Illegal
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	26 % - L 2	23 % - L 2	40 % - L 3	2	85	60	Staff and Customer sensitization Effective Management of leaks and bursts using the leaks and bursts templatetemplate	All customers Data Template from all operation areas		Ongoing	Technical and Commercial Manager	Commercial Manager to up on customer sensitization, Technical Manager to effectively
			11 % - L 1	2	65	30		All new customer connection, All reconnections after having been disconnected, all networks during specific pressure measurements	0	Continous Activity	Commercial Manager/Technical Manager/ NRW-O	1. Draft and implement SOP on new Connections 2. Draft and Implement SOP on Leak detections and Pressure Management
			18 % - L 1	3	65	30	Identification of the need for gate valve in the networks Policy on materials and methods Identification of problematic pipes Identification of spaghettis and action plans Analysing performance reports of networks and leak reports	All networks	0	Continous Activity until all networks operate optimally	Commercial Manager/Technical Manager/ NRW-O	Budget covered in Essential 7, 8, 9 and 10
		0 % - L 1	0 % - L 1	3	55	25	Creation of DZ and DMA'S (Essential 13) Purchase of Equipment (Essential 8) Development of action plan on the activities of this Essential in FY 2019-20 Implementation of the action plan as from FY-2020-21			Continous Activity, revied annualy	Technical Manager/ NRW-O	Basis and Planning to be done during/after Essentials 8 and 13 and other earlier essentials activities have been carried out . Affirmitive creation of DZ/DMA'S and procurement of Equipments will proceed then action plan on activities of this essential would be embarked on. Routine works
			0 % - L 1	3	55	25	Creation of DZ and DMA'S (Essential 13) Purchase of Equipment (Essential 8) Development of action plan on the activities of this Essential in FY 2019-20 Implementation of the action plan as from FY-2020-21			Continous Activity, revied annualy	Technical Manager/ NRW-O	As explained in Essential 28 above
		32 % - L 2	0 % - L 1	3	55	25	Mapping covered in (Essential 7,8,9,10) Purchase of Equipment (Essential 8) Development of action plan on the activities of this Essential in FY 2019-20 Implementation of the action plan as from FY-2020-21			Continous Activity, revied annualy	Technical Manager/ NRW-O	As explained in Essential 28 above
			47 % - L 3	4	80	60	Purchase of Equipment (Essential 8) Other infrastructural setups done in earlier essentials Implementation of the action plan as from FY-2020-21			Continous Activity, revied annualy	Technical Manager/ NRW-O	As explained in Essential 28 above
		62 % - L 4	45 % - L	4	80	60	Development of action plan on the activities of this Essential in FY 2019-20 Implementation of the action plan as from FY-2020-21			End of June 2022	Commercial Manager/Technical Manager/ NRW-O	
			80	1	95	90	Policy on materials and methods	All networks	0	Continous Activity	Commercial	Budget covered in Essential 7, 8,
								Total Annual Cost (KSh.)	152,700,000			

Schedule columns: 2019 1st Qua. (Jul, Aug, Sep), 2nd Quarter (Oct, Nov, Dec), 2020 3rd Qua. (Jan, Feb, Mar), 4th Quarter (Apr, May, Jun); 2020-21, 2021-22, 2022-23, 2023-24 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

Step 3: Discuss the SA

[Example Modes of Implementation]

- (grey) : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- (black) : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investme
- (pink) : Project with donner

5) -8 Annual and Mid-term NRW Reduction Plans of Pilot WSPs for FY2020 (Template 2nd Use)

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan				Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
	Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1)	Indetication of members from all sections to hold monthly meetings and discuss NRW results	TM	Sep-20			Ongoing	
2)	Printing of Effects of NRW and ways to minimize for all sections and handed out to the sections (Internal Senzitization)	NRW unit	Dec-20			Ongoing	
3)	Creation of SOPs	TM, PEO	Dec-20			Ongoing	
4)	Creation of new DMAs	NRW unit	Mar-20			Ongoing	
5)	Weekly reading of all C1 customers	NRW unit	CONTINOUS			Ongoing	
6)	Customer surveys to indetify suspcious customers	NRW unit	CONTINOUS		Complete	Ongoing	
7)	Completion of new IMS system	CEO, GM	Dec-20			Complete	
8)	Introduction of sectional valves for all long pipelines and tertiaries	NRW unit	Continous			Ongoing	
9)	Procurement of an Exta pickup to facilitate the technical section with faster response time foe leak repair and other Activities I.E MNF	CEO, GM	Dec-20			Complete	
10)	Replacement of D4-23 and sections of D4-25	PEO	Dec-20			Complete	
11)	Replacement of leaking butterfly and sluicevalves in the New Treatment works	PEO	Mar-21			Complete	
12)	Replacemenent of D1-03/D1-04 with HDPE pipeline material	PEO	Mar-21			Complete	

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Meru WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS: Overall Level 76 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Main Category Level	Sub Category Level	Aspect (Sub-sub Category) Level	Priority for Improvement (1: Highest & 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)		By when	Notes	2020 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2021 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 100 % - L 5	(a) Staffing with Essential Support & Training 100 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units 100 % - L 5	F	100	100	◆ Indetification of members from all sections to hold monthly meetings and discuss NRW results ◆ ◆ ◆			TA NRW, PEO, TM	Sep-20	Indetificafy members from the commercial, technical and administration to undertake monthly meetings and discuss NRW impacts and ways to adress them	→	→	→																									Indetification of members from the commercial, technical and administration to undertake monthly meetrings have been indetified, This will be held monthly from October 2020 this is 70% Done			
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking 100 % - L 5	2	100	80	◆ ◆ ◆ ◆ ◆																																					
	(b) Sensitization & Awareness Raising for Wider Support 63 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW 75 % - L 4	2	0	0	Internal senzitization - Printing of Effects of NRW and ways to minimize for all sections and handed out to the sections ◆ ◆ ◆ ◆			TA NRW,	Dec-20						→	→	→																							The start got daleyed, at start of october, the prymary material has been prepared, we hope to roll out the finished flyers for all sections by the end of second week of january this is 60% Done	Completed Internal Meetings with all technical sectiosn acrried out. Scheduling meetings with finace section in Q4	
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support 50 % - L 3	1	0	0	◆ ◆ ◆																																					
	(c) PDCA Cycles (Plan-Do-Check-Adjust) 100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities 100 % - L 5	1	0	0	◆ ◆ ◆ ◆ ◆																																					
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring 100 % - L 5	1	0	0	◆ ◆ ◆ ◆ ◆ ◆																																					
	(d) Suitable, Sufficient & Timely Procurement 90 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control 90 % - L 5	1	0	0	Creation of SOPs ◆ ◆ ◆ ◆			TM, PEO	Dec-20						→	→	→																							All sections have already handed over their prymary SOPs plans to the PEO office. This will be consolidated and reviewed by end Q3 for all the sections.	The review of SOPS is done the WSP will engage a cosnultant to review them and disburse officialy in 2021-2022 FY	
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc. 30 % - L 2	1	0	0	◆ Procurement of an Exta pickup to facilitate the technical section with faster response time foe leak repair and other Activities I.E ---- ◆		1	5,368,809	CEO, GM	Dec-20																															One Double Cab Procured		
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 90 % - L 5	(a) Mapping/GIS Development & Utilization of Free 90 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities 100 % - L 5	1	0	0	◆ ◆ ◆ ◆																																					
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks 75 % - L 4	3	0	0	◆ ◆ ◆ ◆ ◆																																					
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software 87 % - L 4	2	100	20	◆ ◆ ◆																																					
	(b) Monthly NRW Monitoring & Zoning 100 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) 100 % - L 5	1	100	30	◆ ◆ ◆ ◆ ◆ ◆																																					
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) 100 % - L 5	1	0	0	◆ Creation of new DMAs (Indetification of DMA areas for implementation) ◆ ◆ ◆ ◆ ◆			TA NRW, PEO, GIS/MRS	Mar-20									→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→			NRW section has divided the entire WSP area into 62 DMAs this will be forwarddrd to the finace and GIS teams for further discussions and	
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA 100 % - L 5	1	0	0	◆ Continous ◆ ◆ ◆ ◆						→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→					
	(c) Abnormal Flow Monitoring & Water Balance Table 38 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses 50 % - L 3	4	100	30	◆ MNFs set for zones with high NRW ratios as a whole ◆ ◆ ◆ ◆		360,000	NRW unit Head	Continous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→					
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) 30 % - L 2	5	100	100	◆ ◆ ◆ ◆ ◆ ◆																																					
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis 38 % - L 2	4	100	10	◆ ◆ ◆ ◆ ◆ ◆																																					
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter 62 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section) 62 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. 55 % - L 3	3	100	40	◆ categorization of customer classes, Estimated reading ratios and abonormal readings ◆ ◆ ◆			NRW Unit Head	Continous		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→					
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers 61 % - L 4	3	100	20	◆ ◆ ◆ ◆ ◆ ◆																																					
		(20) Additional Focused Management of Large and Medium Customers 75 % - L 4	4	100	20	◆ Weekly reading of all C1 customers ◆ ◆ ◆ ◆			TA NRW	CONTINOUS		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		a recent customer classification has been carried out, however dur to the low consumption by C1 consumers we will redo this again after Covid Pandemic however we are reading an average of 20 meters weekly. We hope to increase this frequency to daily. This is 40% Done		
	(b) Activities for New & Various Problematic Customers (e.g. by the 63 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers 90 % - L 5	1	100	20	◆ Customer surveys to indetify suspcious customers ◆ ◆ ◆ ◆ ◆			TA NRW, MRS	CONTINOUS		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Not yet started			
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters 43 % - L 3	4	100	20	◆ ◆ ◆ ◆ ◆ ◆																																					
	(c) System-related and Procedural/Internal Improvements (e.g. by 71 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing 100 % - L 5	1	100	100	◆ Completion of new IMS system ◆ ◆ ◆ ◆ ◆		13,389,000	GM	Dec-20					⇒	⇒	⇒																												
		(24) Procedural/Internal Improvements against Illegal Water Uses 35 % - L 2	3	100	20	◆ ◆ ◆ ◆ ◆ ◆																																					

[1-3] Results of the Assessment for 2020-21

RESULTS — Overall Level: 76 % - L 4

Category: Main Level	Category: Sub	Aspect (Sub-sub Category): Level
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 80 % - L 5	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs 80 % - L 5	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs — 100 % - L 5
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) — 78 % - L 4
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes — 64 % - L 4
	(b) Underground Leak Detection in a Priority DZ(s) and/or	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place — 89 % - L 5
	Priority DZ(s) and/or 73 % - L 4	(29) Improvements for Underground Leak Detection — 43 % - L 2
	(c) IF REQUIRED: Pressure Measurement & Pressure 52 % - L 3	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements — 38 % - L 2
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) — 59 % - L 3
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. 81 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) — 64 % - L 4
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections — 100 % - L 5

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Priority for Implement (1: Highest & 4: Lowest, N: No Need & F: Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)		By when	Notes
1	0	0	◆					
1	100	20	◆					
3	100	30	Introduction of sectional valves for all long pipelines and tertiaries			PEO, TA-NRW	Continous	
			◆ Replacement of D1-03/D1-04 with HDPE pipeline material		1,191,788	PEO	Mar-21	
1	100	40	◆ Flow Measurement with UFM to determine underground leaks			NWR unit Head	Continous	Carried Out on need basis
3	100	20	◆					
4	100	10	◆					
3	100	30	◆					
3	100	30	◆					
1	100	100	◆ Replacement of D4-23 and sections of D4-25		1,820,197		Dec-20	
			◆ Replacement of leaking butterfly and sluicevalves in the New Treatment works		1,154,230		Mar-21	

Total Annual Cost (KSh.) 23,284,024

2020 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2021 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes
⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒	this has been put on hold due to constraied funds for operation
→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)

[Example Modes of Implementation]

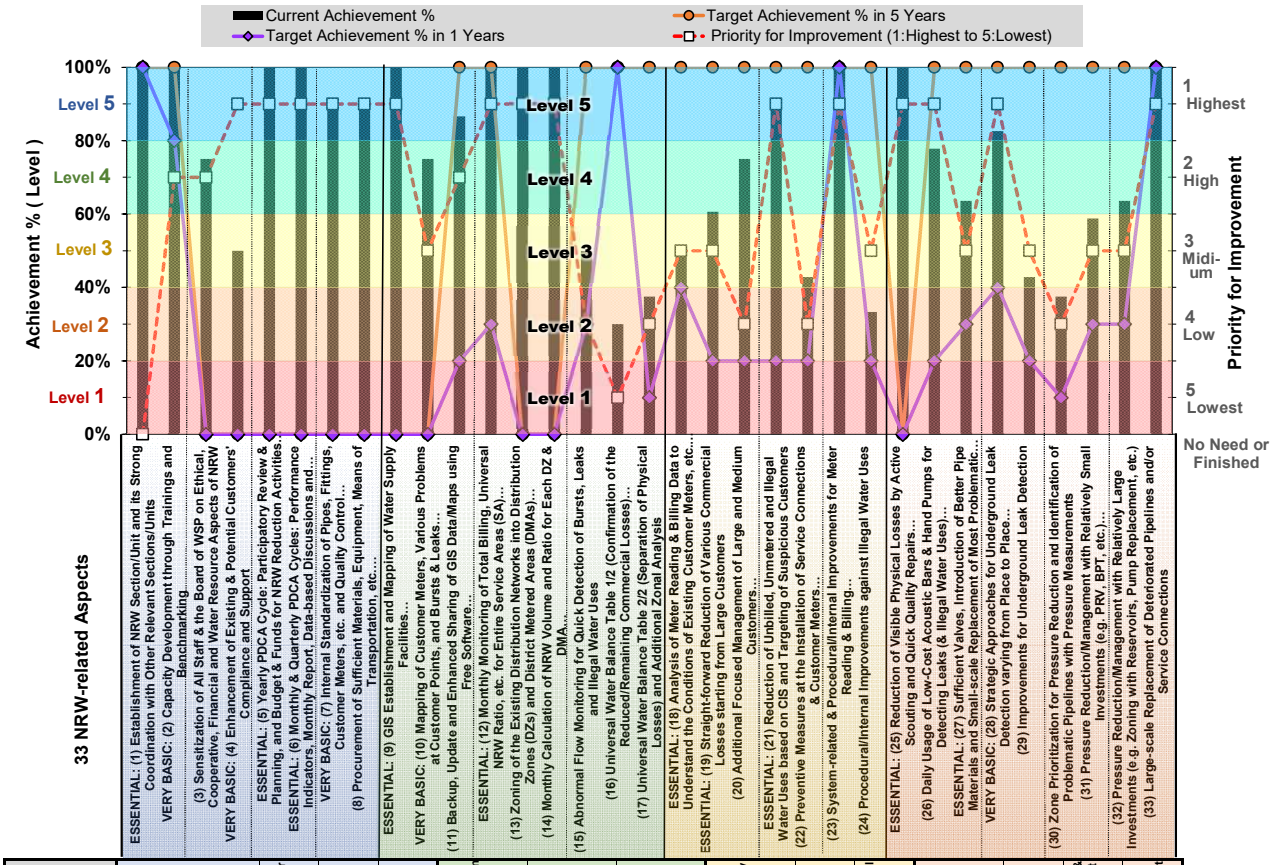
- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment (without donner)
- : Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQURED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	100 % - L 5	63 % - L 4	100 % - L 5	90 % - L 5	90 % - L 5	100 % - L 5	38 % - L 2	62 % - L 4	63 % - L 4	71 % - L 4	80 % - L 5	73 % - L 4	52 % - L 3	81 % - L 5
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	91 % - L 5				79 % - L 4			63 % - L 4			72 % - L 4			
Overall Achievement % - Level	76 % - L 4													

FY2020 Self Assessment & Planning : Embu WSP

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ **Procurement of ERP system**	**M.D/HTS/HFCS**	**Oct-20**	**no budget allocation**	the current system upgraded awaiting the budget allocation	Procurement complete	installations
2) ◆ **Data collection and update of GIS**	**GIS officer/HFCS**	**Jan-21**	**partially done**	done by the nrw staff –CIS	partially done	partially done by meter readers
3) ◆ **Undertake a billing data audit and clean up**	**HFCS / HTS**	**EVERY 2 QUARTERS**	**pending**	pending	pending	pending
4) ◆**rehabilitate Kaunda estate**	**HTS**	**Jan-21**	**tendering done**	evaluation and awardingof works ongoing	procurement on process	on–going
5) ◆ **Qis training for all technical officers**	**M.D/HTS/HFCS**	**Sep-20**	**not done due to COVID-19**	not done due to COVID–19	pending	not done due to COVID–19
6) ◆ **FINISH PRESSURE MANAGEMENT IN ZONES 1 AND 2**	**HEAD NRW**	**Aug-20**	**partially done**	prvs procured andinstalled in zone 1 and 2	prv procured and installed	partially done procured meter readers
7) ◆ **jica expert trainings and assistance**	**JICA EXPERT TEAM**	**Jan-21**	**suspended due to COVID-19 19**	suspended due to COVID–19 19	suspended	suspended due to COVID–19 19
8) ◆ **Replace all faulty master meters (with EFM)**	**HFCS / HTS/ HEAD NRW**	**AUG 2020 CONTINOUS**	**21 EMF PROCURED**	19 EMF METERS INSTALLED AWAITING ACTIVATION	partially done resaults bad	not working
9) ◆ **jica expert trainings and assistance**	JICA EXPERT TEAM	Jan-21	suspended due to COVID-19 19	suspended due to COVID–19 19	suspended	suspended due to COVID–19 19
10) ◆ **undertake leak surveys in identified high leakage zones**	HEAD NRW	Sep-20	nigh flow and step tests were conducted	nigh flow and step tests were conducted	continuous but no mnf	nigh flow and step tests were conducted flow meter readers

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Embu WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level 61 % - L 4
[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans
[2-2] Annual NRW Reduction Plan (2020-21)
[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress

Main Category (Level)	Sub Category (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (Ksh.)	By whom	By when	Notes
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 84 % - L 5	(a) Staffing with Essential Support & Training 84 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	83 % - L 5	3	100	90	◆ To hire more staff.	3 No	1,080,000	HRM/ HFCS	Dec-20	Subject improvement COVID-19 19 situation and revenue
							◆ To improve employment terms	5 No.	600,000	HRM/ HFCS	Dec-20	Increment of renumeration by 5%
							◆ To conduct interdepartmental meeting	2 meeting in a month		Head of NRW	Monthly	Minutes of meeting and reports
							◆ To develop SOPs		100,000	M.D/HTS/HFCS	Mar-21	
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	88 % - L 5	1	100	90	◆ Qis training for all technical officers	7 No	1,000,000 lumpsum	M.D/HTS/HFCS	Sep-20	Subject improvement COVID-19 19 situation
							◆ Plumbers training on use of Mpin and Offline maps through the smart phone	21 No		M.D/HTS/HFCS	Continuous	
							◆ Benchmarking with WASPA and other WSPs	All		M.D/HTS/HFCS	Continuous	
							◆ Water utility regional partnership workshops	All		M.D/HTS/HFCS	Continuous	
							◆ JICA expert trainings	All		M.D/HTS/HFCS	Continuous	
	(b) Sensitization & Awareness Raising for Wider Support 56 % - L 3	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	50 % - L 3	2	100	60	◆ To carry out sensitization workshop and seminars	All	100,000	M.D/HTS/HFCS	2 and 4 Quarter	
							◆ Replacement of leaking Airvalves	25			Third quarter	
							◆ Creation of fully functional				Jan-21	
							◆ Clibration of Mater meters	ALL			continuous	
							◆ Relocation the pipeline in	all			continuous	none done on financial year
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	63 % - L 4	1	90	70	◆ Establishment of call center		400,000	M.D/HTS/HFCS	Mar-21	
							◆ Procurement of ERP system		15,000,000	M.D/HTS/HFCS	Oct-20	
							◆ Use of social media platform		100,000	M.D/HTS/HFCS	Continuous	
	(c) PDCA Cycles (Plan-Do-Check-Adjust) 71 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	93 % - L 5	4	100	95	◆ To implement and review		100,000	Head of NRW	Continuous	
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	40 % - L 3	1	100	80	◆ Develop KPI monitoring tool			HTS/Head NRW	Oct-20	
							◆ Hold monthly meetings			HTS/Head NRW	Continuous	
	(d) Suitable, Sufficient & Timely Procurement 95 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	90 % - L 5	3	100	92	◆ Procurement of insertion		600,000	HFCS/Head NRW	Feb-20	
							◆ Approval of metering policy		50,000	M.D/	Oct-20	
							◆ Pressure management				continuous	
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	100 % - L 5	5	100	100	◆ Procurement of pressure		300,000	HFCS/Head NRW	Apr-21	
							◆ Training on Q Gis		1,000,000	HRM/HEAD NRW	Feb-21	
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 33 % - L 2	(a) Mapping/GIS Development & Utilization of Free Mapping Software 33 % - L 2	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	41 % - L 3	1	100	60	◆ Data collection		200,000	GIS officer/HFCS	Jan-21	To hire personnel to collect data
							◆ Update of GIS system					
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	13 % - L 1	1	80	30	◆ Data collection and update of GIS		1,000,000	GIS officer/HFCS	Jan-21	To hire personnel to collect data
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	33 % - L 2	1	90	50	◆ Sett targets to be achieved			HTS	Mar-21	
	(b) Monthly NRW Monitoring & Zoning 38 % - L 2	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	46 % - L 3	2	100	70	◆ To hire data management analyst		300,000	HRM	20-Aug	Hire 1 no staff
							◆ To produce reports					
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	43 % - L 3	1	90	60	◆ allocate budget for zone		500,000	HTS	Mar-21	
							◆ develop a zoning plan				20-Dec	
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	22 % - L 2	1	100	80	◆ Replace all faulty master meters (with EFM)		13,000,000	HFCS / HTS/ HEAD NRW	AUG 2020 CONTINOUS	the payments to be made on phases
							◆ manhole construction.		500,000	HFCS / HTS	AUG 2020 CONTINOUS	
	(c) Abnormal Flow Monitoring & Water Balance Table 38 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	63 % - L 4	1	100	80	◆ strengthen the rapid		60,000	HFCS / HTS/HRM	AUG 2020 CONTINOUS	to pay overtime
							◆ enhance mainline patrols					
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	1	80	40	◆ jica expert trainings and			JICA EXPERT TEAM	Jan-21	Subject improvement COVID-19 19 situation
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	1	75	40	◆ jica expert trainings and assistance			JICA EXPERT TEAM	Jan-21	Subject improvement COVID-19 19 situation
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy) 73 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section) 73 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	60 % - L 4	1	100	70	◆ Undertake a billing data audit			HFCS / HTS	EVERY 2 QUARTERS	JICA EXPERT ASSISTANCE IS HIGHLY REQUIRED
							◆ jica training to nrw staff					
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	82 % - L 5	3	100	90	◆ weekly monitoring of large			HEAD NRW	CONTINOUS	
							◆ meter sizing			HEAD NRW	CONTINOUS	
							◆ testing of large customer			HEAD NRW	CONTINOUS	
		(20) Additional Focused Management of Large and Medium Customers	58 % - L 3	3	90	70	◆ as above			AS ABOVE	AS ABOVE	
	(b) Activities for New & Various Problematic Customers (e.g. by the 63 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	50 % - L 3	2	80	60	◆ conduct CIS quarterly			HEAD NRW	QUATERLY	
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	71 % - L 4	3	90	80	◆ test 10% of all new meters			INSPECTION COMITEE	CONTINOUS	
							◆ testing of pipes and fittings				CONTINOUS	
	(c) System-related and Procedural/Internal Improvements (e.g. by the 86 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	5	100	100	◆ procure a metering and disconnection software		1,000,000	MD/ HFCS	Aug-20	
		(24) Procedural/Internal Improvements against Illegal Water Uses	67 % - L 4	3	80	67	◆ incentives for illegal		150,000	HFCS	IMMEDIETLY	PAY KSH 5000 PER EACH ILLEGAL DETECTED
							◆ hire of a legal officer to					

Schedule (2020 1st Qua. / 2nd Quarter / 2021 3rd Qua. / 4th Quarter; 2021-22; 2022-23; 2023-24; 2024-25):

Activity	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	2021-22 1st Jul-Sep	2021-22 2nd Oct-Dec	2021-22 3rd Jan-Mar	2021-22 4th Apr-Jun	2022-23 1st Jul-Sep	2022-23 2nd Oct-Dec	2022-23 3rd Jan-Mar	2022-23 4th Apr-Jun	2023-24 1st Jul-Sep	2023-24 2nd Oct-Dec	2023-24 3rd Jan-Mar	2023-24 4th Apr-Jun	2024-25 1st Jul-Sep	2024-25 2nd Oct-Dec	2024-25 3rd Jan-Mar	2024-25 4th Apr-Jun
To hire more staff	■	■	■	■	■	■							■	■	■	■												
To improve employment terms	→	→	→	→	→	→							→	→	→	→	→											
To conduct interdepartmental meeting	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
To develop SOPs									→							→	→											
Qis training for all technical officers	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Plumbers training	→	→	→	→	→	→	→	→	→	→	→	→			→	→	→											
Benchmarking with WASPA and other WSPs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Water utility regional partnership workshops	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
JICA expert trainings	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
To carry out sensitization workshop and seminars				→	→	→				→	→	→				→	→	→				→	→	→				
Establishment of call center							→	→	→	→	→	→	→															
Procurement of ERP system				■	■	■	■	■	■	■	■	■	■	■	■	■												
Use of social media platform	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
To implement and review	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Develop KPI monitoring tool				→	→	→	→	→	→	→	→	→																
Hold monthly meetings	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Procurement of insertion							■	■	■	■	■	■																
Approval of metering policy				→			→	→	→	→	→	→																
Procurement of pressure							■	■	■	■	■	■																
Training on Q Gis							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(9) Data collection							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(10) Data collection and update of GIS							→	→	→	→	→	→	→	→	→	→	→	→	→									
(11) Sett targets to be achieved									→	→	→	→	→	→	→													
To hire data management analyst		→	→	→	→	→	→	→	→	→	→	→	→	→	→													
To produce reports		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
allocate budget for zone									→			■	■	■	■	■	■											
develop a zoning plan						→	→	→	→	→	→	→	→	→	→													
Replace all faulty master meters (with EFM)		→	→	→	→	→	→	→	→	→	→	→	■	■	■	■	■											
manhole construction.			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→											
strengthen the rapid		→	→	→	→	→	→	→	→	→	→	→	→	→	→													
enhance mainline patrols		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→										
(16) jica expert trainings and							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(17) jica expert trainings and assistance							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Undertake a billing data audit				→	→	→				→	→	→				→	→	→				→	→	→				
jica training to nrw staff				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
weekly monitoring of large		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
meter sizing		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
testing of large customer		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(20) as above (1)		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(20) as above (2)		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(20) as above (3)		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
conduct CIS quarterly				→				→				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
test 10% of all new meters		→		→		→		→		→		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
testing of pipes and fittings		→		→		→		→		→		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
procure a metering and disconnection software		■						■	■	■	■	■																
incentives for illegal		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

Notes and quarterly monitoring (Remarks on the Implementation of Planned Activities):

Activity	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
To hire more staff	Subject improvement COVID-19 19 situation and revenue	5 no staff hired	unit allocated 6 more staff on short contract	unit has enough staff	Unit had adequate staff
To improve employment terms	Increment of renumeration by 5%	no budget allocation	staff salary increment	0	5%
To conduct interdepartmental meeting	Minutes of meeting and reports	nrw task force formed	less meetings held due to COVID-19 19	One departmental meeting held in boardroam	departmental meeting held
To develop SOPs		draft format in place	draft not yet adopted	draft not yet adopted	draft not approved
Qis training for all technical officers	Subject improvement COVID-19 19 situation	trainings not conducted due to COVID-19 19	trainings not conducted due to COVID-19 19 move to the next	not yet conducted	not done
Plumbers training		trainings not conducted due to COVID-19 19	trainings not conducted due to COVID-19 19	not yet conducted	notdone
Benchmarking with WASPA and other WSPs		benchmarking not conducted due to COVID-19 19	benchmarking not conducted due to COVID-19 19	not done	Done kakamega
Water utility regional partnership workshops		meetings being held online	meetings being held	meetings done online	meetings done online
JICA expert trainings		suspended due to COVID-19	suspended due to CC	1 attended waspa	none
To carry out sensitization workshop and seminars		sentezaisation done through social media	sentezaisation done through social media	done through social media and meeting with	use of social media and barazas
Replacement of leaking Airvalves		0	advertising of tender	delivery and start to install	starting of the project
Creation of fully functional		No pricise boundaries			
Clibration of Mater meters		0	0	started with NY	continuous Tender awarded
Establishment of call center		no budget allocation	no budget allocation	pending	
Procurement of ERP system		no budget allocation	the current system upgraded awaiting the budget allocation	tender advertised and awarded	process on istallation
Use of social media platform		done	hire of liaison officer	officer hired	
To implement and review		partly done	partly done	partly done	
Develop KPI monitoring tool		not done	not done	not done	
Hold monthly meetings		done	done	done	
Procurement of insertion		no funds due to COVID-19	no funds due to COVI	no funds available	
Approval of metering policy		pending	pending	pending	
Pressure management		maping the points for prv	procurement of prvs and installation	Adjusting and servicing prv and	
Procurement of pressure		no funds due to COVID-19	no funds due to COVI	not done	
Training on Q Gis		not done due to COVID-19	not done due to COVI	not done	
(9) Data collection	To hire personnel to collect data	partially done	done by the nrw staff	partially done	
(10) Data collection and update of GIS	To hire personnel to collect data	SUSPENDED	SUSPENDED	suspended ,done by smart	
(11) Sett targets to be achieved					
To hire data management analyst	Hire 1 no staff	done on part time basis	commercial nrw personnel	done	
allocate budget for zone		21 master meters procured	21 master meters proc	installed and failed	
develop a zoning plan		boundaries set	plan not complete		
Replace all faulty master meters (with EFM)	the payments to be made on phases	21 EMF PROCURED	19 EMF METERS INSTALLED AWAITING ACTIVATION	perfomance of emf poor	
manhole construction.		contract awarded	ongoing	suspended	
strengthen the rapid	to pay overtime	pending board approval	pending board approv	pending	
(16) jica expert trainings and	Subject improvement COVID-19 19 situation	suspended due to COVID-19	suspended due to CC	suspended due to covid	
(17) jica expert trainings and assistance	Subject improvement COVID-19 19 situation	suspended due to COVID-19	suspended due to CC	regional pertinership	
Undertake a billing data audit	JICA EXPERT ASSISTANCE IS HIGHLY REQUIRED	pending	pending	pending	
jica training to nrw staff		pending	pending	pending	
weekly monitoring of large		successfully done	successfully done	continuous	
meter sizing		20% done	60% done	done	
testing of large customer		ongoing 30%	ongoing 40%	on going	
conduct CIS quarterly		50% done in selected zones	done in Gachoka zone		
test 10% of all new meters		100 % achieved	100 % achieved	done	
testing of pipes and fittings		100 % achieved	100 % achieved	done	
procure a metering and disconnection software		no budget allocation	no budget allocation	billing sytem upgraded for	
incentives for illegal	PAY KSH 5000 PER EACH ILLEGAL DETECTED	implemented	implemented	implemented	
hire of a legal officer to		security officer	security officer	security officer	

(1-3) Results of the Assessment for 2020-21 — RESULTS: Overall Level 61 % - L.4

(2-1) Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Category: Main Level	Category: Sub Level	Aspect (Sub-sub Category)	Level ★	Points to Implement (Total Points in a Year = 7 Years)	Target Level (%)	Target Level (Point)	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (Ksh.)	By whom	By when	Notes
(2) Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	35 % - L.4	3	95	80	★ give requirements to be ★ ★ ★ ★ ★			WSPT / HTS	Aug-20	
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	44 % - L.2	3	80	50	★ USE ACOUSTIC STICKS WHEN NECESSARY					
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	75 % - L.4	3	90	75	★rehabilitate Kaunda estate ★ ★ ★ ★ ★		5,000,000	HTS	Jan-21	budget has been allocated
		VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	35 % - L.4	3	90	60	★ ★ ★ ★ ★ ★					
	(b) Underground Leak Detection (in a Priority DZs) and/or DMAs Combined with Pressure Management	(29) Improvements for Underground Leak Detection	35 % - L.3	3	80	60	★ undertake leak surveys in identified high leakage zones ★ conduct inhouse trainings for use of leak detectors ★ ★ ★ ★		100,000 10,000	HEAD NRW HEAD NRW	Sep-20 Jan-21	
	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction Management	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	63 % - L.4	3	80	70	★ FINISH PRESSURE MANAGEMENT IN ZONES 1 AND 2 ★ pressure planning for zone 3 ★ ★ ★ ★		50,000	HEAD NRW	Aug-20	
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	35 % - L.2	2	60	50	★ pressure data collection ★ develop a pressure map ★ allocate budget for prvs installation. ★ ★				Sep-20 Jan-21 Feb-21	
	(d) IF REQUIRED: Leak Reduction with Relatively Large Investments	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	35 % - L.3	4	50	10	★ ★ ★ ★ ★ ★					
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	50 % - L.2	5	100	100	★ prepare funding proposals / seek donor or government funding ★				Mar-21	
								Total Annual Cost (Ksh.)	41,300,000			

2020 1st Qua.			2nd Quarter			2021 3rd Qua.			4th Quarter			2021-22				2022-23				2023-24				2024-25				Notes
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	
→	→	→				→	→	→																				
→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
																												budget has been allocated
→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	→	→	→	→	→	→	→	→																				
→	→	→	→	→	→	→	→	→	→	→	→	→																
		→				→	→	→	→	→	→																	
						→	→	→	→	→	→																	

Remarks on the Implementation of Planned Activities

(3) Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress			
End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
pending	pending	procurement done	
done	used for customer leak surveys	used by field officers	
	evaluation and awarding of works ongoing	preparation of BQS	
high flow and step tests were conducted suspended	high flow and step tests were conducted suspended	mnf suspended	suspeded
partially done not done	prvs procured and installed in zone 1 ???? move to the next quot	Monitoring pressure move to next financial yr	
ongoing not done done	ongoing not done prvs for zone 2 done	suspended not done other areas pushed next financial yr	
no much funding due to COI	no much funding due to COVID-19 19	Proposal done to WSTF	

[Example Modes of Implementation]

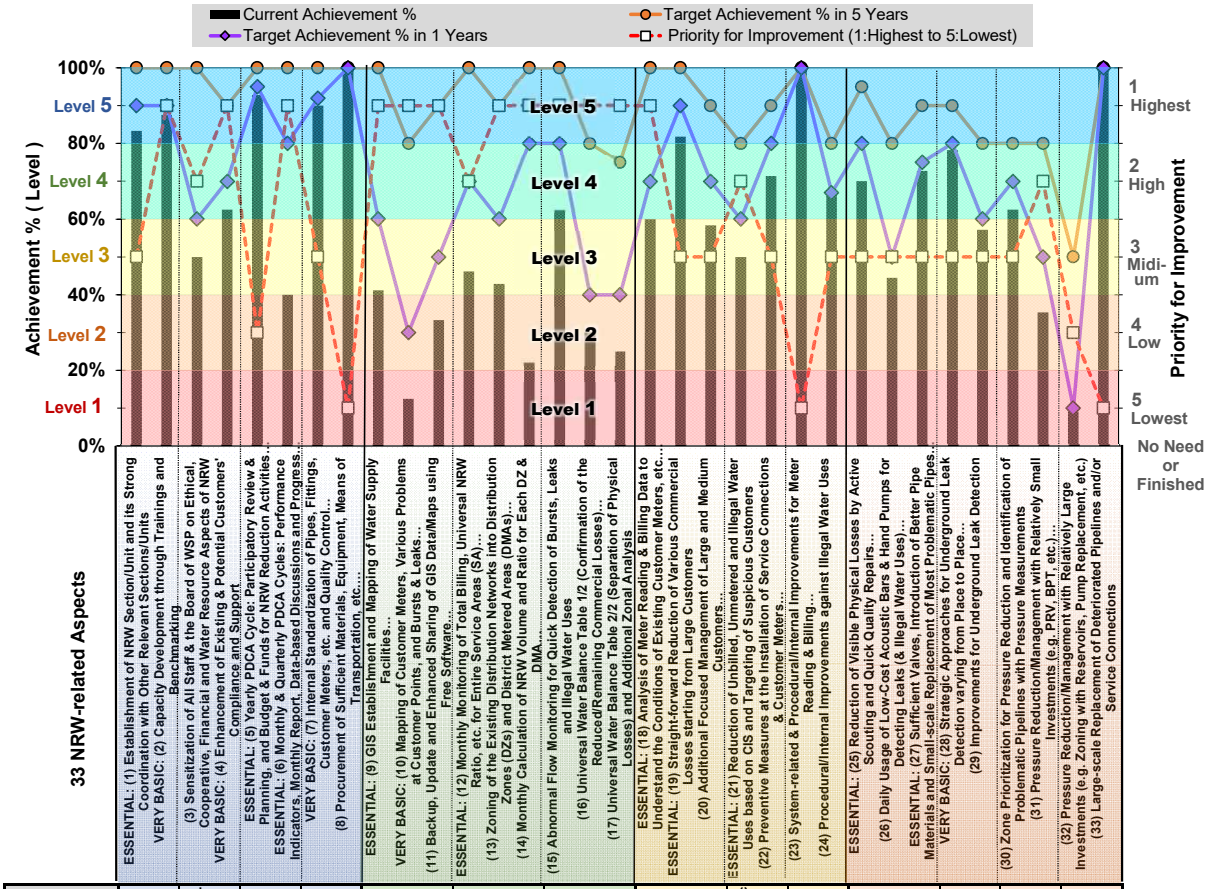
: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
: Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	84 % - L 5	56 % - L 3	71 % - L 4	95 % - L 5	33 % - L 2	38 % - L 2	38 % - L 2	73 % - L 4	63 % - L 4	86 % - L 5	63 % - L 4	73 % - L 4	44 % - L 3	52 % - L 3
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	78 % - L 4				36 % - L 2			72 % - L 4			59 % - L 3			
Overall Achievement % - Level	61 % - L 4													

FY2020 Self Assessment & Planning : Ruiru-Juja WSP

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ External Training of NRW Staff and other relevant department	HR	BY JULY 2021	on hold due to covid-19	onhold		
2) ◆ Benchmarking to NYEWASCO	HR	BY JULY 2021	on hold due to covid-20	onhold	on hold	
3) ◆Schedule and conduct inhouse training on NRW	HR	BY JULY 2021	on hold due to covid-21	on hold	on hold	
4) ◆ Use of media campaign to raise public awareness on NRW and how to save water through sms	Customer Care	BY JULY 2021	on hold due to covid-22	on going through sociologist	on going through sociologist	
5) ◆ Use of Kobo toolbox to record GPS co-ordinates of bursts and leakages	NRW	BY OCTOBER 2020	ongoing	ongoing	ongoing	
6) ◆ Calculation and tabulation of NRW in DMAs on daily and monthly basis	NRW	BY OCTOBER 2020	ongoing	ongoing	ongoing	
7) ◆ Record of action taken on commercial losses registred as per billing report	NRW & COMMERCIAL DEPT	ONGOING	ongoing	ongoing	ongoing	
8) ◆ Estimation of unmetered unbilled authorized using monthly consumption of metred authorized unbilled consumption	Procurement	BY OCTOBER 2020	meter procurement process underway to be completed by end 2nd quarter	meters installed for ruiru backwash tank,ruiru and kibendera plant staff water being monitored using readings	regular readings collected	
9) ◆ Conduct CIS	BILLING	BY JULY 2021	on hold due to covid-20	on hold due to covid	on hold due to covid	
10) ◆ Establish billing system to manage actual and estimated consumption	BILLING	BY JULY 2021	ongoing	ongoing	ongoing	
11) ◆ purchase of modern ufm and electronic undergroung leak detectors	Procurement	2022	budget not yet set	budget not yet set	tendering process underway for ufm	
12) ◆ replacement of delapidated pipes	O&M	2022	ongoing	ongoing	ongoing	
13) ◆ Have clear records of physical losses in their resp subdivisions i.e burst/leaks/overflows	NRW	ONGOING	ongoing	ongoing	useof both kobo and book-records of leakages	
14) ◆ purchase of bulk meters for Sub-DMA monitoring	Procurement	2022	ongoing	ongoing	already have sub-dmas for ruirueast and gitambaya dma.monitoring regularly.	

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Ruiru-Juja WS

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level: 83 % - L 5

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main Category (Level)	Sub Category (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement (91 % - L 5)	(a) Staffing with Essential Support & Training (91 % - L 5)	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	1	100	100	◆ ◆ ◆ ◆ ◆									
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	63 % - L 4	1	100	80	◆ External Training of NRW Staff and other relevant department ◆ Benchmarking to NYEWASCO ◆ ◆	10 STAFF MEMBERS 20 STAFF MEMBERS	200,000 39,000	HR HR	BY JULY 2021 BY JULY 2021		on hold due to covid-19 on hold due to covid-19	onhold onhold	attended 2 trainings by waspa and kiambu county onhold	
	(b) Sensitization & Awareness Raising for Wider Support (75 % - L 4)	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	75 % - L 4	1	100	90	◆Schedule and conduct inhouse training on NRW ◆ ◆ ◆ ◆	40 STAFF MEMBERS	400,000	HR	BY JULY 2021		on hold due to covid-19	on hold	on hold	
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	3	100	90	◆ Use of media campaign to raise public awareness on NRW and ◆ ◆ ◆ ◆		300,000	Customer Care	BY JULY 2021		on hold due to covid-19	on going through sociolo	on going through sociologist	
	(c) PDCA Cycles (Plan-Do-Check-Adjust) (100 % - L 5)	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	5	100	100	◆ ◆ ◆ ◆ ◆									
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	5	100	100	◆ ◆ ◆ ◆ ◆									
	(d) Suitable, Sufficient & Timely Procurement (95 % - L 5)	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	5	100	100	◆ ◆ ◆ ◆ ◆									
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	2	100	100	◆ ◆ ◆ ◆									
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis (88 % - L 5)	(a) Mapping/GIS Development & Utilization of Free Mapping Software (88 % - L 5)	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	100 % - L 5	5	100	100	◆ ◆ ◆ ◆									
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	38 % - L 2	1	100	70	◆ Use of Kobo toolbox to record GPS co-ordinates of bursts and ◆ ◆ ◆ ◆			NRW	BY OCTOBER 2020		begun in july ongoing	ongoing	ongoing	
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	100 % - L 5	5	100	100	◆ ◆ ◆ ◆									
	(b) Monthly NRW Monitoring & Zoning (97 % - L 5)	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	5	100	100	◆ ◆ ◆ ◆									
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	100 % - L 5	5	100	100	◆ ◆ ◆ ◆									
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	1	100	95	◆ Calculation and tabulation of NRW in DMAs on daily and monthly ◆ ◆			NRW	BY OCTOBER 2020		begun in january and ong	ongoing	ongoing	
	(c) Abnormal Flow Monitoring & Water Balance Table (50 % - L 3)	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	100 % - L 5	5	100	100	◆ purchase of bulk meters for Sub-DMA monitoring ◆ ◆	25	200,000	Procurement	2022		ongoing	ongoing	already have sub-dmas for ruirueast and gitambaya	
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	1	100	70	◆ Record of action taken on commercial losses registred as per ◆ Estimation of unmetered unbilled authorized using monthly ◆ ◆ ◆	2 meters(2" and 1")	20,000	NRW & Procurement	ONGOING BY OCTOBER 2020		ongoing meter procurement proce	ongoing meters installed for ruiru	ongoing ongoing	
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	1	100	60	◆ Have clear records of physical losses in their resp subdivisions ◆ ◆ ◆			NRW	ONGOING		ongoing	ongoing	useof both kobo and book-records of leakages	
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & (89 % - L 5)	(a) Starting from Large Customers (e.g. by NRW Section) (89 % - L 5)	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	5	100	100	◆ ◆ ◆ ◆									
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	91 % - L 5	1	100	100	◆ ◆ ◆ ◆									
		(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	3	100	90	◆ ◆ ◆									
	(b) Activities for New & Various Problematic (100 % - L 5)	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	100 % - L 5	5	100	100	◆ ◆ ◆ ◆ ◆									
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	100 % - L 5	5	100	100	◆ ◆ ◆									
	(c) System-related and Procedural/Internal Improvements (e.g. by (93 % - L 5)	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	5	100	100	◆ ◆ Conduct CIS ◆ Establish billing system to manage actual and estimated ◆ ◆	21 staff members	1,500,000	BILLING BILLING	BY JULY 2021 BY JULY 2021		on hold due to covid-19 begun in july and ongoing	on hold due to covid ongoing	on hold due to covid ongoing	
		(24) Procedural/Internal Improvements against Illegal Water Uses	83 % - L 5	3	100	95	◆ ◆ ◆ ◆									

Schedule (2020 1st Qua., 2nd Quarter, 2021 3rd Qua., 4th Quarter; 2021-22, 2022-23, 2023-24, 2024-25: 1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

Aspect	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	2021-22 1st	2021-22 2nd	2021-22 3rd	2021-22 4th	2022-23 1st	2022-23 2nd	2022-23 3rd	2022-23 4th	2023-24 1st	2023-24 2nd	2023-24 3rd	2023-24 4th	2024-25 1st	2024-25 2nd	2024-25 3rd	2024-25 4th
(2)	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →															
(10)	→	→	→	→	→	→	→	→	→	→	→	→	→															
(14)	→	→	→	→	→	→	→	→	→	→	→	→	→															
(15)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
(16)	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →	→ →															
(17)	→	→	→	→	→	→	→	→	→	→	→	→	→															

Notes

[1-3] Results of the Assessment for 2020-21

RESULTS — Overall Level: 83 % - L 5

Category — Aspect (Sub-sub Category)

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Main Level	Sub	Aspect Level	Priority for Improvement (1: High, 2: Middle, N: No Need & F: Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 77 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 77 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs 80 % - L 5	1	100	100	◆ ◆ ◆ ◆					
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) 44 % - L 3	2	100	70	◆ ◆ ◆ ◆					
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes 100 % - L 5	5	100	100	◆ ◆ ◆ ◆ ◆ ◆					
	(b) Underground Leak Detection in a Priority DZ(s) 80 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place 91 % - L 5	1	100	100	◆ ◆ ◆ ◆					
		(29) Improvements for Underground Leak Detection 80 % - L 5	2	100	70	◆ purchase of modern ufm and electronic undergroung leak ◆ ◆	1 ufm and 2 electronic	440,000	Procurement	2022	
	(c) IF REQUIRED: Measurement & Pressure Reduction/Management 32 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements 63 % - L 4	2	100	90	◆ ◆ ◆ ◆					
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) 18 % - L 1	3	100	50	◆ ◆ ◆ ◆ ◆ ◆					
	(d) IF REQUIRED: Leak Reduction with Large Investments 86 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) 82 % - L 5	3	100	95	◆ ◆ ◆ ◆ ◆ ◆					
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections 90 % - L 5	2	100	100	◆ replacement of delapidated pipes ◆ ◆	5km	10,000,000	O&M	2022	
							Total Annual Cost (KSh.)	13,099,000			

2020	1st Qua.		2nd Quarter			2021	3rd Qua.		4th Quarter			2021-22				2022-23				2023-24				2024-25				Notes
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	
→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	

budget not yet set | **budget not yet set** | **tendering process underway for ufm**

ongoing | **ongoing** | **ongoing**

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
budget not yet set	budget not yet set	tendering process underway for ufm	
ongoing	ongoing	ongoing	

[Example Modes of Implementation]

: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
⇒ : Less intensive period with capital investment (without donner)
: Project with donner

Data for the Graphs: Results of the Self-Assessment of Current Conditions, Priority for Improvement & Target Achievement Levels

Overall Achievement % (Level)	Main Category	Achievement % (Level)	Sub Category	Achievement % (Level)	NRW-related Aspect	Achievement % (Level)	Max Pint	Current Point	Current Achievement %	Priority for Improvement (1:Highest to 5:Lowest)	Target Achievement % in 5 Years	Target Achievement % in 1 Years
83 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	91 % - L 5	(a) Staffing with Essential Support & Training	91 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	24	24	100%	1	100%	100%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	63 % - L 4	8	5	63%	1	100%	80%
			(b) Sensitization & Awareness Raising for Wider Support	75 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	75 % - L 4	8	6	75%	1	100%	90%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	8	6	75%	3	100%	90%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	14	14	100%	5	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	100 % - L 5	10	10	100%	5	100%	100%
			(d) Suitable, Sufficient & Timely Procurement	95 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	10	10	100%	5	100%	100%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	10	9	90%	2	100%	100%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	80 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software	88 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	100 % - L 5	17	17	100%	5	100%	100%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	38 % - L 2	8	3	38%	1	100%	70%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	100 % - L 5	15	15	100%	5	100%	100%
			(b) Monthly NRW Monitoring & Zoning	97 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	13	13	100%	5	100%	100%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	100 % - L 5	7	7	100%	5	100%	100%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	9	8	89%	1	100%	95%
			(c) Abnormal Flow Monitoring & Water Balance Table	50 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	100 % - L 5	8	8	100%	5	100%	100%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	10	3	30%	1	100%	70%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	8	2	25%	1	100%	60%
	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	92 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	89 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	10	10	100%	5	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	91 % - L 5	33	30	91%	1	100%	100%
					(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	12	9	75%	3	100%	90%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	100 % - L 5	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	100 % - L 5	10	10	100%	5	100%	100%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters	100 % - L 5	14	14	100%	5	100%	100%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	93 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	8	8	100%	5	100%	100%
					(24) Procedural/Internal Improvements against Illegal Water Uses	83 % - L 5	6	5	83%	3	100%	95%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	69 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	77 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	80 % - L 5	10	8	80%	1	100%	100%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	44 % - L 3	9	4	44%	2	100%	70%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	100 % - L 5	11	11	100%	5	100%	100%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	80 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	91 % - L 5	23	21	91%	1	100%	100%
					(29) Improvements for Underground Leak Detection	43 % - L 3	7	3	43%	2	100%	70%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	32 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	63 % - L 4	8	5	63%	2	100%	90%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	18 % - L 1	17	3	18%	3	100%	50%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	86 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	82 % - L 5	11	9	82%	3	100%	95%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	90 % - L 5	10	9	90%	2	100%	100%

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan				Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
	Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1)	Isolation of TMAs in Eastern zone for NRW monitorig i.e Mawanga, Eastmored, maili sita	**NRW unit**	**July**				
2)	Network upgrading in parts of Eastern zone; Heshima area, Mawanga, Easmore, Tumsifu	**NRW unit**	**July**				
3)	Meters testing,replacement and meters sealing targeting 3000 meters FY 2020/2021	**NRW unit**	**July**				
4)	Network upgrading in Freehold area	**NRW unit**	**September**				
5)	Interconnecting overflow pipe with Distribution line to stop overflow wastage in Western tank	**NRW unit**	**August**				
6)							
7)							
8)							
9)							
10)							

PROGRESS OF NRW ACTIVITIES FOR THE 1ST QUARTER

1 Isolation of 4 DMAS in eastern zone is at 90% completion , the activity was delayed by procurement process
2 Testing of meters and replacement has been going on and 50% of the target has been accomplished
3 networking of Freehold area was not achieved due to insufficient funds
4 interconnecting overflow pipe with Distribution line to stop overflow wastage in Western tank was undetaken

PROGRESS OF NRW ACTIVITIES FOR THE 2nd QUARTER

1 4 DMA isolation namely; NATEWA, Eastmore, Mawanga and St. Mary's were completely and there NRW baseline being 49%, 52% ,62% and 44% respectively. After laying the new network and putting in other interventions to address commercial losses NRW dropped to; 28%, 31%,27% and29% respectively
2 Large consumer meter testing target is at 65% while sealing target is at 85%
3 Freehold network improvement has not been undertaken due to funds challenges
4 over flow by pass in western zone zone is still pending and is expected to be done before the end of the 3rd quarter

PROGRESS OF NRW ACTIVITIES FOR THE 3rd QUARTER

Large consumer meter testing target is at 88% while sealing target is at 90%
Monitoring of isolated DMAs as well as addressing commercial water losses in those DMAs
Interconnection of overflow by pass with reservoir outlet was succesfully completeed

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Nakuru WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level 77 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Main (Level)	Sub (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 75 % - L 4	(a) Staffing with Essential Support & Training 75 % - L 4	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	71 % - L 4	4	95	80	Distribution team currently oversee all the NRW activities ◆ ◆ ◆					
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	88 % - L 5	5	98	92	Training needs have been identified based on the nature of the job ◆ ◆	15 staff	300,000	JICA/ WASPA	WITHIN FY 2020/2021	
	(b) Sensitization & Awareness Raising for Wider 75 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	75 % - L 4	3	95	85	continuos engagement and awareness of staff on given priority NRW impact to the organisation is always communicated ◆	ALL STAFF	N/A	IN HOUSE	WITHIN FY 2020/2021	
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	4	90	85	◆ ◆ ◆					
	(c) PDCA Cycles (Plan-Do-Check-Adjust) 75 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	71 % - L 4	4	95	83	funds for network upgrading in some parts of eastern zone in this financial year have been avail ◆ ◆ ◆	7 DMAs i.e 4500	7,600,000	water wox program	Dec-20	
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	80 % - L 5	4	95	90	toolbox meetings are held periodically to discuss NRW further progress and the way forward in reducing NRW ◆ ◆ ◆	30 Staff	N/A	IN HOUSE	WITHIN FY 2020/2021	
	(d) Suitable, Sufficient & Timely Procurement 80 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	70 % - L 4	4	85	75	standard specifications have been laid down to ensure proper and quality water fittings are procured ◆ ◆ ◆	all water fiitings	N/A		continuos	
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	0	0	0	additional vehicle and 2 motor cycles have been procured to facilitate the NRW units ◆ ◆ ◆	1 more vehicle 3	4,000,000	TM	3 YEARS TIME	
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 83 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software 83 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	88 % - L 5	4	98	92	continuos updating of new facilities is carried out periodically ◆ ◆ ◆	1 more	to be determine by	GIS OFFICER		
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	63 % - L 4	0	0	0	mapping of new consumer meters has been planned to clear the be contacted before December 2020 ◆ ◆					
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	87 % - L 5	0	0	0	periodical inhouse trainings to equip staff on basic 2020/2021 GIS skills have been planned for this FY ◆ ◆ ◆	30 Staff	N/A	IN HOUSE GIS	WITHIN FY 2020/2021	
	(b) Monthly NRW Monitoring & Zoning 86 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	0	0	0	constant NRW calculation and analysis is done performance periodically with an intention for review ◆ ◆ ◆	ALL ESTABLISHED DMAs	N/A	nrw officer	continuos	
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	86 % - L 5	4	95	90	4 DMAs in Eastern zone have been established andintervenons NRW staff have started zooming in for interventions ◆ ◆ ◆	4 DMAs	captured under	water wox program	Dec-20	
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	4	98	95	new upcoming DMAs will be given closer attention to reduced global NRW figures in this FY ◆ ◆ ◆	ALL DMAs	N/A	nrw officer	continuos	
	(c) Abnormal Flow Monitoring & Water Balance Table 73 % - L 4	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	75 % - L 4	3	90	80	With closer monitoring of DMA bulk meters (taking daily readings) it will be easier to detect abnormal water flows ◆ ◆	ALL DMAs	N/A	nrw officer	continuos	
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	70 % - L 4	4	90	80	intensifying of leak detection activities and step testing to acieve areliable water balance. testing to acieve a testing to acieve areliable water balance. This activity has running in eastern zone ◆	3 ZONES		LEAK DETECTION	WITHIN FY 2020/2021	
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	75 % - L 4	4	90	82	intensifying of leak detection activities and step reliable water testing will aid in coming up with more accurate water balance ◆ ◆ ◆	3 ZONES	350,000	LEAK DETECTION	WITHIN FY 2020/2021	
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter 80 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section) 80 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	90 % - L 5	4	100	raiin g	under JICA support we expect more capacity building on billing analysis trainings ◆ ◆ ◆	30 Staff	N/A	JICA STAFF	WITHIN FY 2020/2021	
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	85 % - L 5	4	90	88	continuos closer monitoring of Large consumer meters to track on any abnormal consumption ◆ ◆ ◆	3000	3,000,000	ILLEGAL USE UNIT	WITHIN FY 2020/2021	
		(20) Additional Focused Management of Large and Medium Customers	58 % - L 3	5	90	68	plans are underway to procure few smart meters for piloting ◆ ◆	300	2,000,000	TM	WITHIN FY 2020/2021	
	(b) Activities for New & Various Problematic Customers (e.g. by the 79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	70 % - L 4	4	90	75	old meters are slowly being phased out as tamper proof meters taking the lead ◆ ◆ ◆	3000	12,000,000	CM	WITHIN FY 2020/2021	
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	86 % - L 5	4	95	90	planned trainings on meter guidelines and meter installation has been planned for this FY ◆ ◆ ◆	50STAFF	N/A	CM/TM	WITHIN FY 2020/2021	
	(c) System-related and Procedural/Internal Improvements (e.g. by 100 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	4	100	100	New technologies are continuosly introduce to aid in billing and meter readings efficiencies ◆ ◆ ◆					
		(24) Procedural/Internal Improvements against Illegal Water Uses	100 % - L 5	5	100	100	meter relocation to the perimeter fence water theft and disconnection of , back to back lines to reduce water theft ◆ ◆	500 connections	500,000	water wox program	Decemmber 2020	

Schedule columns:

2020 1st Qua.			2nd Quarter			2021 3rd Qua.			4th Quarter		
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

2021-22				2022-23				2023-24				2024-25				Notes
1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

Activity	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
(1)	The section has been coordinating with other relevant units to reduce NRW in eastern zone	The section continue coodrdinating with other relevant units to reduce NRW in eastern zone	The sections has been collaborating with zones in ensuring that NRW is address, these are in areas such as meter instalation, meter testing and DMA creation	
(2)	as a result of covid 19 breakout there has been no internal trainings	as a result of covid 19 breakout there been no training	onlines meetings are contacted with other WSPs through the support of JICA, WASPA and in house meetings, this is due to covid pandemic	
(3)	on hold though the board meet requrlaly to discuss on performance improvement	board meetings held to discuss on performance and	Recently Standard operating procedures and manuals were reviewed and presented to the board for approval of which NRW topics are included in this manuals and SOPs	
(4)				
(5)	The PDCA cycle tool has been adopted as a messure of tracking performance	PDCA cycle tool adapted as a measure of tracking performance	the PDCA cycle is continuosly used to track on performance and this has aided in reducing the NRW levels	
(6)	The PDCA cycle tool has been adopted as a messure of tracking performance	PDCA cycle tool adapted as a measure of tracking performance	the PDCA cycle is continuosly used to track on performance and this has aided in reducing the NRW levels	
(7)	HDPE materials have been adopted as a way of raising quality standards	HDPE materials PN16 ha s been adapted as way of raising quality standards	The user departments have been empowered to come up with specifications for every material required this has ensured that quality materials are procured.	
(8)	already 2 vehicles have been procured and delays on leak response has been minimise	three motor cycle has been (donation) and delays on leaks and burst response time has been minimised	The unit is at least equiped with transport facilties, currently allocated 3 vehicles and 8 motor cycles	
(9)	the activity has been continuosly going on to update on water facilities	production facilities already mapped: Kabatini,ol banita ,nairobi road, malewa and pumping stations, but it is a continuo smoving activity	production facilities already mapped: Kabatini,ol banita ,nairobi road, malewa and pumping stations, but it is a continuo smoving activity	
(10)	this activity has been running continuosly	customer loacation have been mapped and 75% has been captured in the system	customer loacation have been mapped and 75% has been captured in the system	
(11)		Q GIS free software is available	Q GIS free software is available, but basic training is required on relevant staff to utilie the software	
(12)	NRW monitoring is a continuosly running to track on the trends and take action immediately	Monthly NRW monitoring is carried out monthly with consideration the deviation of production meters	Monthly NRW monitoring is carried out monthly with consideration the deviation of production meters	
(13)	already 4dmas has been isolated in eastern zone and network upgrading is ongoing	4 DMAs in eastern zone completed namely; NATEWA, St.Mary's,Mawanga and Eastmore	3 DMAs have been listed for proper networking and isolation namely; Heshima,Barut and Soilo areas	
(14)	NRW monitoring is a continuosly running to track on the trends and take action immediately	Calculation of NRW for all DMAs are monthy with a view to monitor the trends	Calculation of NRW for all DMAs are monthy with a view to monitor the trends	
(15)	forthnigh and weekly bulk meter reading to monitor flows is regularly done	Guided by DMA meterswhich monitors abnorma flows	Guided by DMA meters which are read regularly to monitor abnorma flows	
(16)	it is carried out regularly	done regularly, still experiencing some challenges in separating real and commercial losses for the entire service area	done regularly, still experiencing some challenges in separating real and commercial losses for the entire service area	
(17)	it is carried out regularly	done regularly, still experiencing some challenges in separating real and commercial losses for the entire service area	done regularly, still experiencing some challenges in separating real and commercial losses for the entire service area	
(18)	done by utilising JICA EXPERTISE on billing analysis	done by utilising JICA EXPERTISE on billing analysis	done by utilising JICA EXPERTISE on billing analysis	
(19)	large consumer meters are always monitored meters are read weekly	large consumer meters are closely monitored, any slight drop in billing for these accounts can be notice and action is taken immediately to address the the iisues.	large consumer meters are closely monitored, any slight drop in billing for these accounts can be notice and action is taken immediately to address the the iisues.	
(20)	regularly checked	billing analysis tool has been aiding the process of managing and monitoring medium and large customers		
(21)	Illegal use team is always tracking customers with bad history	customers suspected to be misusing water are closely monitored and some large consumer meters are well secured with padlcoks which are only access by nawassco staff	customers suspected to be misusing water are closely monitored and some large consumer meters are well secured with padlcoks which are only access by nawassco staff	
(22)	relocation of water meters next to the perimeter wall has been going on	It is now a norm that any connection being install should be less than 6m from the service line to the customer premises so as to discourage illegal connections.	It is now a norm that any connection being install should be less than 6m from the service line to the customer premises so as to discourage illegal connections.	
(23)	ERP software procured and meter reading acuracies has been enhanced	ERP software and mobile meter reading has help in improving billing and meter reading	ERP software and mobile meter reading has help in improving billing and meter reading	
(24)		new connections can only be carried out when there are eneough stock of meters so as to prevent illegal connections and billing estimates		

[1-3] Results of the Assessment for 2020-21

RESULTS — Overall Level: 77 % - L 4

Category: Main Level	Category: Sub Level	Aspect (Sub-sub Category)	Level
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	90 % - L 5		
	(a) Physical Loss Reduction Measures applicable without/existing DZs		90 % - L 5
	(b) Underground Leak Detection in a Priority DZ(s) not yet Fully Addressed		73 % - L 4
	(c) IF REQUIRED: Pressure Measurement & Pressure Management		60 % - L 4
	(d) IF REQUIRED: Leak Reduction with Large Investments		38 % - L 2

Proxy for Improvement Target (= Current Level in % Need & Priority)	Target Level (%) in 1 year	Target Level (%) in 5 years
5	100	100
4	100	95
4	95	89
4	90	80
4	90	80
4	90	84
4	85	74
0	0	0
4	95	87

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
Introduction of new technolgies such as use of Kobo collect. CRM and free toll line have yielded good same is results and constant improvements on the same					
(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	30	120,000	TM	FY 2020/2021	
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	40 VALVES	1,500,000	TM	FY 2020/2021	
VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	34 LINES	N/A	LEAK DETECTION TEAM	Decemmber 2020	
(29) Improvements for Underground Leak Detection	40 VALVES	800,000	TM	FY 2020/2021	
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	30 GAUGE PRESSURES	180,000	TM	FY 2020/2021	
(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)					
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)					
(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	25 KM	70,000,000	INTERNAL FUNDS AND DONOTAION	WITHIN A PERIOD OF 5 YEARS	
	Total Annual Cost (KSh.)	102,350,000			

2020 1st Qua. | 2nd Quarter | 2021 3rd Qua. | 4th Quarter: Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun

2021-22: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

2022-23: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

2023-24: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

2024-25: 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
leak detection unit staff are patrolling the lines on daily basis	patrolling as well as use of listening stick and other leak detection has aided leak detection, and when deteected measures are taken immediately to carry out repairs	patrolling as well as use of listening stick and other leak detection has aided leak detection, and when deteected measures are taken immediately to carry out repairs	
these equipments are beinfg utilised daily to detect leaks	use of listening stick and other leak detection equipmets has aided leak detection, and when detected measures are taken immediately to carry out repairs	repairs use of listening stick and other leak detection equipmets has aided leak detection, and when detected measures are taken immediately to carry out the repairs	
upgrading of problematic pipes has been going on	currently HDPE pipes are used for extension and replacement and alomost 100km have been laid since.	currently HDPE pipes are used for extension and replacement and alomost 100km have been laid since transitionig to HDPE	
leak detection is being carried out on targeted areas with water for more than 15 hours a day	leak detection activities are undertaken with the use of some basic leak detection gadgets but the unit is challenged with mulfunctioning of some equipments due to battery depletion	leak detection activities are undertaken with the use of some basic leak detection gadgets but the unit is challenged with mulfunctioning of some equipments due to battery depletion already requisitioned and awaiting procurement	
always gaining new techniques on how to deal with underground leaks	leak detection activities are undertaken with the use of some basic leak detection gadgets but the unit is challenged with mulfunctioning of some equipments due to battery depletion	leak detection activities are undertaken with the use of some basic leak detection gadgets but the unit is challenged with mulfunctioning of some equipments due to battery depletion already requisitioned and awaiting procurement	
recently monitoring the presuere by use of pressure logger	Areas experiencing high pressures are monitored such as Manyani and other low lying areas with water more than 15 hours a day	Areas experiencing high pressures are monitored such as Manyani and other low lying areas with water more than 15 hours a day	
more air valves have been requisition to minimise on air log since rationing is a common practice	Excess pressures within the service area is rarely experienced, since water rationing is adopted in most zones and therefore rarley the pressures build to a level which can threaten the existing infrastructure	Excess pressures within the service area is rarely experienced, since water rationing is adopted in most zones and therefore rarley the pressures build to a level which can threaten the existing infrastructure	
	Rising mains from the pumps are secured from excess pressure by use of high density HDPE pipes i.e PN20 and above and air valves are installed to ensure that the pipes are protected from air logs which can cause pipes to collapse	Rising mains from the pumps are secured from excess pressure by use of high density HDPE pipes i.e PN20 and above and air valves are installed to ensure that the pipes are protected from air logs which can cause pipes to collapse	
upgrading of problematic pipes has been going on		piecemeal replacement is regularly done to improve areas with frequent leaks and bursts. So far over 80 km has been upgraded in the last 7 years	

[Example Modes of Implementation]

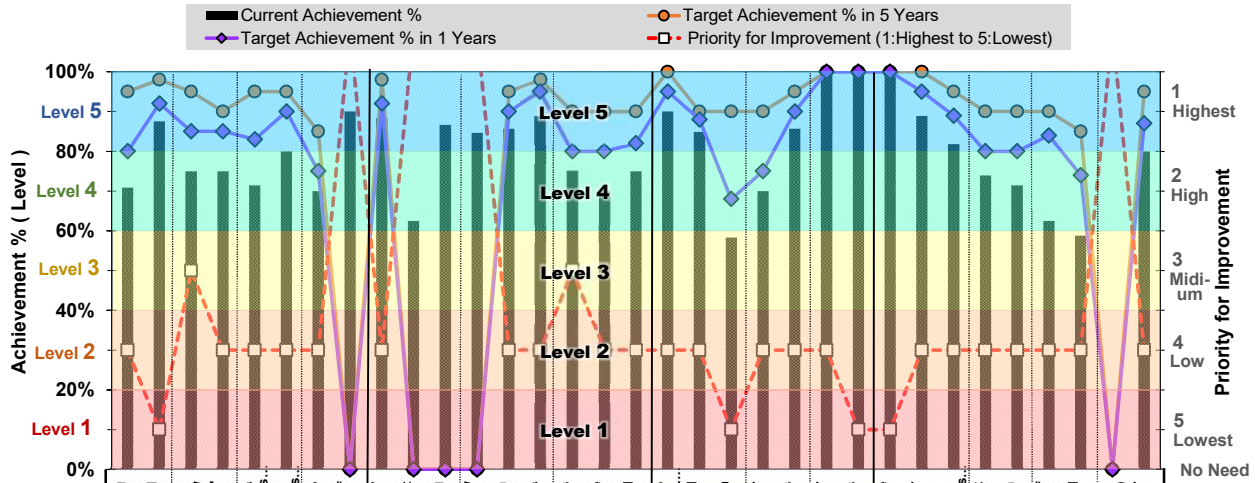
: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
: Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level	Overall Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	(a) Staffing with Essential Support & Training	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	77 % - L 4
VERY BASIC: (2) Capacity Development through Trainings and Benchmarking			
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	(b) Sensitization & Awareness Raising for Wider Support		
VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support			
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities...	(c) PDCA Cycles (Plan-Do-Check-Adjust)		
ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress...			
VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control...	(d) Suitable, Sufficient & Timely Procurement		
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc....			
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities...	(a) Mapping/GIS Development & Utilization of Free Mapping Software	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	
VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks...			
(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software...			
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)...	(b) Monthly NRW Monitoring & Zoning		
(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)...			
(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA...			
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	(c) Abnormal Flow Monitoring & Water Balance Table		
(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)...			
(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis			
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc...	(a) Starting from Large Customers (e.g. by NRW Section)	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	
ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers			
(20) Additional Focused Management of Large and Medium Customers...			
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)		
(22) Preventive Measures at the Installation of Service Connections & Customer Meters...			
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing...	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)		
(24) Procedural/Internal Improvements against Illegal Water Uses			
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs...	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	
(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)...			
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes...			
VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place...	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and its Expansion over Other Areas		
(29) Improvements for Underground Leak Detection			
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)		
(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)...			
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)		
(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections			
	75 % - L 4	76 % - L 4	
	75 % - L 4		
	75 % - L 4		
	80 % - L 5		
	83 % - L 5	81 % - L 5	
	86 % - L 5		
	73 % - L 4		
	80 % - L 5	83 % - L 5	
	79 % - L 4		
	100 % - L 5		
	90 % - L 5	68 % - L 4	
	73 % - L 4		
	60 % - L 4		
	38 % - L 2		

FY2020 Self Assessment & Planning : Kisumu WSP

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ External Training of NRW Staff and other relevant department	HR	BY JULY 2021	on hold due to covid-19	onhold	attended waspa workshop in kakamega and kiambu county	ongoing attended waspa workshop in june 30th-2nd july
2) ◆ Benchmarking to NYEWASCO	HR	BY JULY 2021	on hold due to covid-19	onhold	on hold	on hold
3) ◆Schedule and conduct inhouse training on NRW	HR	BY JULY 2021	on hold due to covid-19	on hold	on hold	on hold
4) ◆ Use of media campaign to raise public awareness on NRW and how to save water through sms	Customer Care	BY JULY 2021	on hold due to covid-19	on going through sociologist	on going through sociologist	ongoing through sociologist
5) ◆ Use of Kobo toolbox to record GPS co-ordinates of bursts and leakages	NRW	BY OCTOBER 2020	ongoing	ongoing	ongoing	ongoing
6) ◆ Calculation and tabulation of NRW in DMAs on daily and monthly basis	NRW	BY OCTOBER 2020	ongoing	ongoing	ongoing	ongoing
7) ◆ Record of action taken on commercial losses registred as per billing report	NRW & COMMERCIAL DEPT	ONGOING	ongoing	ongoing	ongoing	ongoing
8) ◆ Estimation of unmetered unbilled authorized using monthly consumption of metred authorized unbilled consumption	Procurement	BY OCTOBER 2020	meter procurement process underway to be completed by end 2nd quarter	meters installed for ruiru backwash tank,ruiru and kibendera plant staff water being monitored using readings	regular readings collected	installed 2 more meters for ruiru and juja plants backwash water.readings are taken regularly.total of 5 meters installed
9) ◆ Conduct CIS	BILLING	BY JULY 2021	on hold due to covid-20	on hold due to covid	on hold due to covid	ongoing in githurai dma under billing and gis departments
10) ◆ Establish billing system to manage actual and estimated consumption	BILLING	BY JULY 2021	ongoing	ongoing	ongoing	ongoing
11) ◆ purchase of modern ufm and electronic undergroung leak detectors	Procurement	2022	budget not yet set	budget not yet set	tendering process underway for ufm	tendering process underway for ufm
12) ◆ replacement of delapidated pipes	O&M	2022	ongoing	ongoing	ongoing	ongoing
13) ◆ Have clear records of physical losses in their resp subdivisions i.e burst/leaks/overflows	NRW	ONGOING	ongoing	ongoing	useof both kobo and book-records of leakages	use of both kobo and book-records of leakages
14) ◆ purchase of bulk meters for Sub-DMA monitoring	Procurement	2022	ongoing	ongoing	already have sub-dmas for ruirueast and gitambaya dma.monitoring regularly.	ongoing for 2 DMAs

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Kisumu WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS: Overall Level 83 % - L 5

Main Level	Sub Level	Aspect (Sub-sub Category) *)	Level	Priority for Improvement (1: Highest, 2: Second, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 Year
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 91 % - L 5	(a) Staffing with Essential Support & Training 91 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	1	100	100
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	63 % - L 4	1	100	80
	(b) Sensitization & Awareness Raising for Wider Support 75 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	75 % - L 4	1	100	90
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	3	100	90
	(c) PDCA Cycles (Plan-Do-Check-Adjust) 100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	5	100	100
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	5	100	100
	(d) Suitable, Sufficient & Timely Procurement 95 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	5	100	100
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	2	100	100
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 88 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software 88 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	100 % - L 5	5	100	100
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	38 % - L 2	1	100	70
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	100 % - L 5	5	100	100
	(b) Monthly NRW Monitoring & Zoning 97 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	5	100	100
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	100 % - L 5	5	100	100
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	1	100	95
	(c) Abnormal Flow Monitoring & Water Balance Table 50 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	100 % - L 5	5	100	100
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	1	100	70
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	1	100	60

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units					
VERY BASIC: (2) Capacity Development through Trainings and Benchmarking					
◆ External Training of NRW Staff and other relevant department	10 STAFF MEMBERS	200,000	HR	BY JULY 2021	
◆ Benchmarking to NYEWASCO	20 STAFF MEMBERS	39,000	HR	BY JULY 2021	
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	40 STAFF MEMBERS	400,000	HR	BY JULY 2021	
VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support		300,000	Customer Care	BY JULY 2021	
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities					
ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring					
VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control					
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.					
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities					
VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks			NRW	BY OCTOBER 2020	
(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software					
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)					
(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)					
(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA			NRW	BY OCTOBER 2020	
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	25	200,000	Procurement	2022	
(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	2 meters(2" and 1")	20,000	NRW & Procurement	ONGOING BY OCTOBER 2020	
(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis			NRW	ONGOING	

◆ Use of media campaign to raise public awareness on NRW and

◆ Use of Kobo toolbox to record GPS co-ordinates of bursts and

◆ Record of action taken on commercial losses registred as per

◆ Estimation of unmetered unbilled authorized using monthly

◆ Have clear records of physical losses in their resp subdivisions

2020 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2021 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes
→	→	→	→	→	→	→	→	→	→	→	→																	
→	→	→	→	→	→	→	→	→	→	→	→																	
→	→	→	→	→	→	→	→	→	→	→	→																	
→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
→	→	→	→	→	→	→	→	→	→	→	→																	
→	→	→	→	→	→	→	→	→	→	→	→																	

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
on hold due to covid-19	onhold	attended 2 trainings by waspa and kiambu county	attended waspa workshop in june 30th-2nd july
on hold due to covid-19	onhold	onhold	onhold
on hold due to covid-19	on hold	on hold	onhold
on hold due to covid-19	on going through sociologist	on going through sociologist	on going through sociologist
begun in july ongoing	ongoing	ongoing	ongoing
begun in january and ong	ongoing	ongoing	ongoing
ongoing	ongoing	already have sub-dmas for ruirueast and gitambaya	ongoing dor the 2 DMAs
ongoing meter procurement process underway to be completed by end 2nd quarter	ongoing meters installed for ruiru backwash tank,ruiru and kibendera plant staff water being monitored using readings	ongoing regular readings	ongoing installed 2 more meters for ruiru and juja plants backwash water.readings are taken regularly.total of 5 meters installed
ongoing	ongoing	useof both kobo and book-records of leakages	useof both kobo and book-records of leakages

[1-3] Results of the Assessment for 2020-21 | [2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) | Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans | [3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 | Step 5: Describe Progress Briefly

RESULTS: Overall Level 83 % - L 5

Category: Main Level	Category: Sub	Aspect (Sub-sub Category)	Level	Priority for Improvement (Higher Number = Higher Priority) N: No Need & F: Finished	Target Level (%): In 5 years	Target Level (%): In 1 year	[2-2] Annual NRW Reduction Plan (2020-21) Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy 89 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	5	100	100	◆					
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	91 % - L 5	1	100	100	◆					
		(20) Additional Focused Management of Large and Medium Customers	77 % - L 4	3	100	90	◆					
	(b) Activities for New & Various Problematic Customers (e.g. by the 100 % - L 5	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	100 % - L 5	5	100	100	◆					
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	100 % - L 5	5	100	100	◆					
	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of 93 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	5	100	100	◆ Conduct CIS ◆ Establish billing system to manage actual and estimated ◆	21 staff members	1,500,000	BILLING BILLING	BY JULY 2021 BY JULY 2021	
		(24) Procedural/Internal Improvements against Illegal Water Uses	83 % - L 5	3	100	95	◆					
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 77 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 77 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	80 % - L 5	1	100	100	◆					
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	44 % - L 3	2	100	70	◆					
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	100 % - L 5	5	100	100	◆					
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) 80 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	91 % - L 5	1	100	100	◆					
		(29) Improvements for Underground Leak Detection	43 % - L 3	2	100	70	◆ purchase of modern ufm and electronic undergroung leak detectors ◆	1 ufm and 2 electronic	440,000	Procurement	2022	
	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management 32 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	63 % - L 4	2	100	90	◆					
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	18 % - L 1	3	100	50	◆					
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure 86 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	82 % - L 5	3	100	95	◆					
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	90 % - L 5	2	100	100	◆ replacement of delapidated pipes ◆	5km	10,000,000	O&M	2022	
								Total Annual Cost (KSh.)	13,099,000			

Step 4 monthly schedule: 2020 1st Qua. (Jul, Aug, Sep); 2nd Quarter (Oct, Nov, Dec); 2021 3rd Qua. (Jan, Feb, Mar); 4th Quarter (Apr, May, Jun); 2021-22 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun); 2022-23 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun); 2023-24 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun); 2024-25 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
on hold due to covid-19 begun in july and ongoing	on hold due to covid ongoing	on hold due to covid ongoing	ongoing in githurai dma under billing and gis departments ongoing
budget not yet set	budget not yet set	tendering process underway for ufm	tendering process underway for ufm
ongoing	ongoing	ongoing	ongoing

[Example Modes of Implementation]

- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment (without donner)
- : Project with donner

Data for the Graphs: Results of the Self-Assessment of Current Conditions, Priority for Improvement & Target Achievement Levels

Overall	Main	Achiev.	Sub Category	Achiev.	NRW-related Aspect	Achievement	Max. Points	Current Points	Current	Priority	Target	Target
83 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	91 % - L 5	(a) Staffing with Essential Support & Training	91 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	24	24	100%	1	100%	100%
					VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	63 % - L 4	8	5	63%	1	100%	80%
			(b) Sensitization & Awareness Raising for Wider Support	75 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	75 % - L 4	8	6	75%	1	100%	90%
					VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	8	6	75%	3	100%	90%
			(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	14	14	100%	5	100%	100%
					ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	100 % - L 5	10	10	100%	5	100%	100%
			(d) Suitable, Sufficient & Timely Procurement	95 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	10	10	100%	5	100%	100%
					(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	10	9	90%	2	100%	100%
	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	80 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software	88 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	100 % - L 5	17	17	100%	5	100%	100%
					VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	38 % - L 2	8	3	38%	1	100%	70%
					(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	100 % - L 5	15	15	100%	5	100%	100%
			(b) Monthly NRW Monitoring & Zoning	97 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	13	13	100%	5	100%	100%
					(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	100 % - L 5	7	7	100%	5	100%	100%
					(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	9	8	89%	1	100%	95%
			(c) Abnormal Flow Monitoring & Water Balance Table	50 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	100 % - L 5	8	8	100%	5	100%	100%
					(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	10	3	30%	1	100%	70%
					(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	8	2	25%	1	100%	60%
	[C] Reduction of Commercial (Apparent) Losses (Accurate Meter Reading & Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	92 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	89 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	10	10	100%	5	100%	100%
					ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	91 % - L 5	33	30	91%	1	100%	100%
					(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	12	9	75%	3	100%	90%
			(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	100 % - L 5	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CS and Targeting of Suspicious Customers	100 % - L 5	10	10	100%	5	100%	100%
					(22) Preventive Measures at the Installation of Service Connections & Customer Meters	100 % - L 5	14	14	100%	5	100%	100%
			(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	93 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	8	8	100%	5	100%	100%
					(24) Procedural/Internal Improvements against Illegal Water Uses	83 % - L 5	6	5	83%	3	100%	95%
	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	69 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	77 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	80 % - L 5	10	8	80%	1	100%	100%
					(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	44 % - L 3	9	4	44%	2	100%	70%
					ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	100 % - L 5	11	11	100%	5	100%	100%
			(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	80 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	91 % - L 5	23	21	91%	1	100%	100%
					(29) Improvements for Underground Leak Detection	43 % - L 3	7	3	43%	2	100%	70%
			(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	32 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	63 % - L 4	8	5	63%	2	100%	90%
					(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	18 % - L 1	17	3	18%	3	100%	50%
			(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	86 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	82 % - L 5	11	9	82%	3	100%	95%
					(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	90 % - L 5	10	9	90%	2	100%	100%

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ Sufficient sluice/gate valves have to be installed on transmission and distribution pipelines and are kept accessible and operational to limit the volume of water losses	NRW/CMT	JUNE 2021	1 sluice valve installed in CBD area	1 gate valve installed in Muthaiga area	Nil installed	
2) ◆ Replacement of Bulk and production meters with more sufficient and accurate meters.	NRW/CMT	JULY 2020	4 bulk meters replaced	3 bulk meters replaced	4 no. bulk meters replaced	
3) ◆ establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required for the DMAs.	NRW/GIS	Jun-21	4 bulk meters replaced and properly installed	3 bulk meters replaced and properly installed	4 no. bulk meters replaced and properly installed	
4) ◆ Accuracy monitoring of each zonal bulk meters based on the fluctuation of its monthly flow and periodically tested with a portable clamp-on UFM for the timely servicing, replacement and/or calibration of inaccurate bulk meters.	NRW	FEB-JUNE 2021	production master meters tested on monthly basis	production master meters tested on monthly basis	3 no. zonal bulk meters tested using UFM	
5) ◆ Conducting Customer Identification Survey (CIS) to identify the unregistered consumers missing from the meter reading / billing system and illegal users, including the customers recorded as disconnected but still consuming water for free after illegal reconnection or unsuccessful disconnection	NRW/METER READERS/ DISCONNECTION UNIT	Mar-21	67 account visited in Marmanet scheme	40 account visited in Marmanet scheme	258 account visited in Nyahururu	
6)						

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Nyahururu WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level 73 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main Category (Level)	Sub Category (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement (94 % - L 5)	(a) Staffing with Essential Support & Training (94 % - L 5)	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	92 % - L 5	4	99	94	◆ NRW Section/Unit fully operational and sufficient dedicated staff ◆ ◆ ◆	5 Staff members	1,690,000	CMT	Throughout the year		5 dedicated staff already deployed	5 dedicated staff deployed	Activity completed	
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	100 % - L 5	5	100	100	◆ Inhouse trainings	40 NRW and O&M staff members	300,000	HRM	Jun-21		1 training on use of pressure pump	Nil	Nil	
							◆ Benchmarking ◆		100,000	CMT			Nil benchnarking due to COVID	Nil benchnarking due to COVID	Nil benchnarking due to COVID	
	(b) Sensitization & Awareness Raising for Wider Support (88 % - L 5)	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	100 % - L 5	4	100	100	◆Staff sensitization meetings ◆ ◆	Monthly staff meetings	25,000	CMT	Throughout the year		2 Meetings held	2 Meetings held	1 Meeting held billing section	
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	3	95	80	◆ conducting customer sensitization campaigns ◆ conducting barazas	One sensitization meeting per scheme per quarter	160,000	CMT	Jun-21		1 meeting	1 meeting	Nil meetings due to COVID	
							◆ electronic water bills/SMS, etc. carry sufficient messages asking customers for cooperation, such as notification of visible leaks and illegal water uses, to reduce NRW and excessive water uses	Elctronic bills sent every month	540,000	ICT &FAM	Throughout the year		all monthly bills sent	all monthly bills sent	all monthly bills sent	
							◆ Social Media campaigns			ICT	Throughout the year		-	-	posters provided by Jica shared on company facebook account and individual staff whatsapp statuses	
							◆ School campaigns	Once per year	20,000	PRO-POOR/NRW	DEC 2020		1 leaflet distribution exercise with payment information conducted	4 leaflet distribution exercises with payment information conducted	2 leaflet distribution exercises with payment information conducted	
	(c) PDCA Cycles (Plan-Do-Check-Adjust) (96 % - L 5)	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	93 % - L 5	5	97	94	◆ Participatory preparation of review & planning, ◆ Participatory preparation of budget & funds for NRW reduction activities ◆ ◆	NIL	NIL	ALL CMT	SEP 2020 Sep-20					
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	5	100	100	◆ Prioritization of data to be collected periodically (monthly, quarterly and annually) for calculating useful performance indicators	Data collection (various)	NIL	NRW	Throughout the year		done monthly	done monthly	done monthly	
							◆ prepares of monthly report showing the progress and submission of the reports to its supervisor/manager	Monthly & quarterly reports	NIL	NRW	Monthly		3 monthly reports prepared	3 monthly reports prepared	3 monthly reports prepared	
							◆ monthly coordination meeting for NRW reduction and discussions for improvements every month. ◆ ◆	Monthly Meeting	NIL	TM/NRW	Monthly		2 meetings held	2 meetings held	1 meetings held	
	(d) Suitable, Sufficient & Timely Procurement (95 % - L 5)	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	5	100	100	◆ procurement of pipes, fittings, valves, bulk and customer meters, etc. is being done in accordance to the suitability and specifications.	Develop specifications for tendering	NIL	TM/OE	JULY 2020		done for this financial year	-	-	
							◆ The inspection & acceptance committee has been sufficiently strengthened to reject faulty and unmatched pipes, fittings, valves, meters	Form committee		CMT	JULY 2021		done for this financial year	-	-	
							◆ Some potion of each batch of new customer meters have been sent to a credited meter testing institution.	Send meters for testing during tendering		TM/OE	JULY 2022		done for this financial year	-	-	
							◆ Trace survey has been sufficiently conducted to evaluate durability and actual lifespan of newly procured customer meters ◆	Keep record of faults found on the new type of meters being procured		NRW	Throughout the year		done monthly	done monthly	done monthly	
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	4	95	91	◆ NRW survey equipment (e.g. acoustic bars, calibrated buckets, portable ultrasonic flow meter, electric leak detector, noise correlator, pipe locator, pressure gauges with maximum pressure pointer / pressure loggers, hand pumps ◆ Office appliances and specialized hardware required for establishing or improving a GIS database (e.g. A3-size inkjet printer with scanner (or plotter) with spear inks, desktop or laptop PC, handheld GPSs, large PC monitor, etc.									
							◆ official-use smartphones/tablets have been procured for improving NRW activities at site.	Have 2 smart phones for NRW	12,000	CMT	Throughout the year		2 smartphones in use	2 smartphones in use	4 smartphones in use	
							◆ Sufficient transportation means have been secured for NRW reduction activities ◆	Have 2 operational motorcycles for NRW	96,000	CMT	Throughout the year		2 operational motorcycles in use	2 operational motorcycles in use	3 operational motorcycles in use	
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis (80 % - L 5)	(a) Mapping/GIS Development & Utilization of Free Mapping Software (80 % - L 5)	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	88 % - L 5	4	97	90	◆ Employment of sufficient GIS staff required for supporting NRW reduction activities.	Have one GIS staff	600,000	CMT	Throughout the year		I staff working on GIS	I staff working on GIS		
							◆ Preaparation of reliable GIS layers for water supply facilities,existing zones and public sanitation facilities ◆			GIS	JUNE 2021					
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	63 % - L 4	3	90	70	◆ Mapping of areas and pipelines having many problems related to NRW, based on the perception of relevant staff through participatory mapping	Use combo collect to map areas with leak problems		GIS/Line patroler	Throughout the year		128 leaks mapped using kobo toolkit	139 leaks mapped using kobo toolkit	218 leaks mapped using kobo toolkit	
							◆ Conducting Customer Identification Survey (CIS) to locate all customers	Conduct CIS in Marmanet scheme		METER READERS/ NRW	JUNE 2021		67 account visited in Marmanet scheme	40 account visited in Marmanet scheme	258 account visited in Nyahururu town,	
							◆ Preparation ofGIS layers of customer meters & kiosks ◆ Joining various problems at customer points listed in the monthly abnormality / complain reports to the customer meter layer and presented with categorized symbols ◆			GIS	JUNE 2021					
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	80 % - L 5	3	90	82	◆ GIS data is being backed up frequently into a secure data storage.	Purchase desktop computer for GIS	105,000	GIS/FAM/PO	JUNE 2021		purchase request submitted	Procurement process	Activity planned for next financial year	
							◆ Capturing GPS coordinates of customer meters on site and mapped with QGIS			METER READERS/NEW CONNECTION UNIT	JUNE 2021		coordinates captured during meter reading and new connection installation	coordinates captured during meter reading and new connection installation	coordinates captured during meter reading and new connection installation	
							◆ Newly installed and replaced facilities such as customer meters, distribution pipelines, bulk meters, valves, etc. mapping without delay on the existing GIS layers			GIS	BY DEC 2020		coordinates captured during installation	coordinates captured during installation	coordinates captured during installation	
							◆ Publishing of GIS layers on QGIS Could (free online GIS platform) by using QGIS Cloud plugin (free plugin of QGIS) and viewing of the online map from web bowsers on the PCs and smartphones of relevant staff.			GIS	BY DEC 2020		cloud GIS layers updated weekly	cloud GIS layers updated weekly	cloud GIS layers updated weekly	
							◆ Conversion of GIS layers such as customer meters into kmz files with Layer2kmz plugin (free plugin of QGIS) for viewing them with Google Earth (on PCs & smartphones) and/or MAPinr capable to search and navigate			GIS	BY DEC 2020		kmz files layers sent to relevant user sections on biweekly basis	kmz files layers sent to relevant user sections on biweekly basis	kmz files layers sent to relevant user sections on biweekly basis	
	(b) Monthly NRW Monitoring & Zoning (83 % - L 5)	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	5	94	88	◆ Bulk meters have been sufficiently installed and properly installed.	16 BULK METERS and 2000 custpomer meters	4,540,000	NRW/CMT	Jun-21		4 bulk meters replaced and properly installed	3 bulk meters replaced and properly installed	4 stalled bulk meters replaced.	
							◆ Accuracy monitoring of each bulk meter measuring production is being monitored based on the fluctuation of its monthly flow and periodically tested with a portable clamp-on UFM for the timely servicing and replacement of faulty bulk meters and/or meter calibration ◆			NRW	Throughout the year		production master meters tested on monthly basis	production master meters tested on monthly basis	production master meters tested on monthly basis	
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	86 % - L 5	4	95	87	◆ establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required for the DMAs. ◆			NRW/GIS	Jun-21		4 bulk meters replaced and properly installed	3 bulk meters replaced and properly installed	4 bulk meters replaced and properly installed	
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	78 % - L 4	3	96	80	◆ Monthly zonal bulk meter reading for each DZ and DMA are to be done without delay to accurately calculate the monthly total inflow into each DZ and DMA			NRW/O&M			Monthly zonal bulk meter reading done	Monthly zonal bulk meter reading done	Monthly zonal bulk meter reading done	
							◆ Accuracy monitoring of each zonal bulk meters based on the fluctuation of its monthly flow and periodically tested with a portable clamp-on UFM for the timely servicing, replacement and/or calibration of inaccurate bulk meters. ◆			NRW	FEB-JUNE 2021		2 zonal bulk meters tested using UFM	1 zonal bulk meters tested using UFM	3 zonal bulk meters tested using UFM	

[1-3] Results of the Assessment for 2020-21						[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25)								
RESULTS				Overall Level	73 % - L 4		Target Level (%)		[2-2] Annual NRW Reduction Plan (2020-21) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans					
Category				Aspect (Sub-sub Category)										
Main	Level	Sub	Level		Level	Priority for Improvement (1: Highest - 5 :Lowest, N: No Need & F: Finished)	In 5 years	In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	
		(c) Abnormal Flow Monitoring & Water Balance Table	23 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	75 % - L 4	4	96	89	◆ Use of free cloud-based online spread sheet (e.g. Google Sheet in Google Drive) for recording the bulk meter readings on site with smartphones and immediately getting the results of an automated analysis on abnormal flow to take actions quickly without going back to the office to report the readings and receive the result of analysis. ◆ Introduction and use of GSM, GPRS, AMR or SCADA to collect bulk meter readings and/or pressure measurements frequently for monitoring the abnormal flow increases or pressure drops ◆			ICT/NRW/GIS		
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	0 % - L 1	2	50	10	◆Preparation of an universal water balance table of IWA for the entire service areas (SA for a recent year (or recent 12 months) using World Bank EasyCalc (free Excel-based software). ◆					
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	0 % - L 1	2	50	10	◆ Minimum night flow (MNF) measurements at the inlet point(s) of a DZ(s) or a DMA(s) with zonal bulk meter(s) and/or portable UFM(s) to roughly estimate the total volume of physical water losses and illegal water uses (part of it occurs at night) in each DZ or DMA ◆ Thorough active leak detections on distribution and service pipes in a DZ(s) or DMA(s) to estimate the physical losses from distribution pipes and the physical losses from service connections separately ◆ ◆					
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal	62 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	62 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	40 % - L 3	4	90	50	◆ Analysis of inconsistency between current status of disconnected customers and their recent meter reading and billing records ◆ Analysis of frequency of estimating consumption for each customer during the recent 12 month by customer category ◆	MONTHLY Quarterly		COMMERCIAL OFFICER/NRW COMMERCIAL OFFICER/ NRW	THROUGHOUT THE YEAR THROUGHOUT THE YEAR	
				ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	70 % - L 4	3	95	80	◆ Preparation of printed GIS maps showing target customer meters to identify their locations on site ◆ ◆			GIS	Throughout the year	
				(20) Additional Focused Management of Large and Medium Customers	58 % - L 3	3	90	65	◆ Formulation of policy for multiple customer meters serving the same customer integration into one account for each customer so that the amount of bill will increase properly in accordance with the incremental water tariff ◆ ◆					
		(b) Activities for New & Various Problematic Customers (e.g. by the Section installing	79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	80 % - L 5	3	90	85	◆ Conducting Customer Identification Survey (CIS) to identify the unregistered consumers missing from the meter reading / billing system and illegal users, including the customers recorded as disconnected but still consuming water for free after illegal reconnection or unsuccessful disconnection ◆ ◆			NRW/METER READERS/ DISCONNECTION UNIT	Mar-21	
				(22) Preventive Measures at the Installation of Service Connections & Customer Meters	79 % - L 4	3	95	84	◆ Uses of plastic seals and/or other type of seals over the joints between all customer meters and service pipes ◆ Prevention or elimination of customers' illegal use of suction pumps directly connected to distribution pipelines which often damage customer meters. ◆	2000	150,000	NRW/O&M/DISCONNECTION UNIT ENFORCEMENT OFFICER	June 2021	
		(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of	79 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	5	100	100	◆ Update and cleaning of the customer data registered in the existing meter reading and billing system. ◆ Rotation of meter readers' routes to reduce corruption and inaccurate meter reading. ◆			COMMERCIAL OFFICER METER READING SUPERVISOR	JUNE 2021 JUNE 2021	
				(24) Procedural/Internal Improvements against Illegal Water Uses	50 % - L 3	90	100	0	◆ Incorporation of policies against illegal water uses (e.g. a heavy penalty) in the county water act and/or sufficiently supported by the county ◆ Enhancement of law enforcement against water theft on the ground by the county. ◆ Establishment of prevention measures against the involvement of staff such as plumbers and meter readers in illegal connections, meter bypass, meter tampering, etc. ◆ ◆			DONE CMT DONE		
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	63 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	63 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	70 % - L 4	5	97	80	◆ The improvement and utilization of relevant ICT system(s) for notifications of bursts & visible leaks from the public and a wide range of staff have been well registered and responded without being left out. ◆ Accumulation of detailed records of bursts and leaks including GPS coordinates, pipe diameter, material, type and cause of burst/leak, scale of water loss, date of detection, time taken for repair, (e.g. by using free data collection software such as Kobo Toolbox/Collect) to analyse them later with tables, graphs and GIS ◆			ICT ICT/GIS		
				(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	56 % - L 3	3	90	65	◆ With hand pumps, new distribution pipelines having a relatively small diameter are tested under pressure at their installation by installation staff to confirm the non-existence of leaks from the pipelines ◆			NEW CONNECTION UNIT		
				ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	64 % - L 4	4	90	70	◆ Sufficient sluice/gate valves have to be installed on transmission and distribution pipelines and are kept accessible and operational to limit the volume of water losses ◆ The limited part of transmission or distribution pipelines having especially-frequent bursts and many reoccurring leaks of large amount (e.g. heavily deteriorated GI pipes, low-pressure-rating PVC pipes under high pressure, etc.), to be assessed and replaced selectively with better pipes. ◆	AT LEAST 5 Sluice valves to be installed At least 200m of pipes to be replaced	500,000	NRW/O&M/PO TM/OE/PO	JUNE 2021 JUNE 2021	
		(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	53 % - L 3	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	48 % - L 3	3	85	55	◆ The customer to customer survey with acoustic bars and other selected method(s) to be sufficiently implemented in combination as well-established day to day activities for underground leak detection in the selected priority areas ◆			NRW/O&M/METER READERS		
				(29) Improvements for Underground Leak Detection	71 % - L 4	3	95	78	◆ Installation of sufficient gate valves in the target areas of Step Test and Direct Measurement Method to improve the effectiveness of Step Test ◆ Utilization of map-based ICT measures (such as the use of free online GIS (e.g. QGIS Cloud), free mobile GIS (e.g. QField, MAPinr, etc.), free data collection software (e.g. Kobo Toolbox/Collect) and low-cost handheld GPSs) for efficiently identifying target distribution pipes and service connections for leak detection, recording the results of the surveys including locations of found leaks ... ◆			NRW/O&M GIS		
		(c) IF REQURED: Pressure Measurement & Pressure Reduction/Management	76 % - L 4	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	100 % - L 5	5	100	100	◆ Understanding the elevation difference within each DZ and/or pressure zones. ◆ ◆ ◆					
				(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	65 % - L 4	4	90	70	◆ Removal of the bottleneck or long pipes causing high friction pressure loss (especially the pipelines going up hills) by replacing with larger pipes or augmenting capacity with additional pipes ◆ Installation of PRVs ◆ ◆	Procure and install 10 PRVS	500,000	CMT/NRW/PO	BY JUNE 2021	

Schedule (2020-21 monthly; 2021-22 to 2024-25 quarterly):

2020 1st Qua.			2nd Quarter			2021 3rd Qua.			4th Quarter			2021-22				2022-23				2023-24				2024-25				Notes
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Aspect	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
Remarks on the Implementation of Planned Activities				
(15)	- -	Development of online spreadsheet ongoing -	Activity completed and spreadsheet in use	
(16)	-	-		
(17)				
(18)	analysis done on monthly basis analysis done every 3 months	analysis done on monthly basis analysis done every 3 months	analysis done on monthly basis analysis done every 3 months	
(19)	digital map submitted to meter reading section on monthly basis	updated digital map submitted to meter reading section on monthly basis	updated digital map submitted to meter reading section on monthly basis	
(20)				
(21)	67 account visited in Marmanet scheme	40 account visited in Marmanet scheme	258 account visited in Nyahururu	
(22)	381 customer meters sealed using sealing wire -	264 customer meters sealed using sealing wire -	190 customer meters sealed using sealing wire	
(23)	updating done on a monthly basis -	updating done on a monthly basis rotation done after 6 months	updating done on a monthly basis -	
(24)	implementation ongoing implementation ongoing implementation ongoing	implementation ongoing implementation ongoing implementation ongoing	implementation ongoing implementation ongoing implementation ongoing	
(25)	use of sms short code,social media and kobotool box ongoing use of kobotool box and customer management module on our billing system ongoing	use of sms short code,social media and kobotool box ongoing use of kobotool box and customer management module on our billing system ongoing	use of sms short code,social media and kobotool box ongoing use of kobotool box and customer management module on our billing system ongoing	
(26)	-	-		
(27)	1 sluice valve istalled in CBD area -	1 gate valve istalled in Muthaiga area 550m of pipe replaced in Marmanet -Kwawanjiku area and PS LINE	- 0.62km of pipeline replace in Nyahururu town area	
(28)	done daily during meter reading routine	done daily during meter reading routine	done daily during meter reading routine	
(29)	- maps used on a daily basis by O&M staff	- maps used on a daily basis by O&M staff	maps used on a daily basis by O&M staff	
(30)				
(31)	-	-	-	

[1-3] Results of the Assessment for 2020-21

RESULTS	Overall Level	73 % - L 4
Category	Aspect (Sub-sub Category)	

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Main Level	Sub	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1= Highest ; 5 Lowest)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	2020 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2021 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2021-22 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure 67 % - L 4		(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	64 % - L 4	3	90	70	◆ Implementation of planned improvements as funds permit ◆ ◆ ◆ ◆			TM/FAM																														
			(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	75 % - L 4	2	95	75	◆Replacement/rehabilitation of dilapidated pipe network in Marmanet scheme ◆ ◆	35km of pipeline ranging from 63mm diameter to 280mm duameter	32,000,000	COUNTY GOVERNMENT CMT	depending on when funds will be availed by the county government																														
								Total Annual Cost (KSh.)	**41,338,000**																																	

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities			
End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
-	-	-	
-	-	-	

[Example Modes of Implementation]

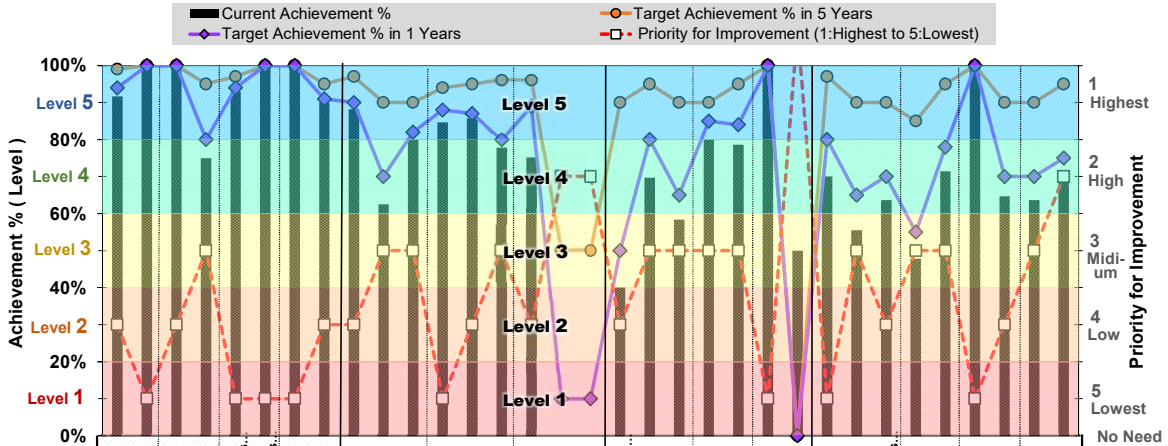
- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment (without donner)
- : Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and Its Strong Coordination with Other Relevant Sections/Units VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	(a) Staffing with Essential Support & Training 94 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 93 % - L 5
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	(b) Sensitization & Awareness Raising for Wider Support 88 % - L 5	
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	(c) PDCA Cycles (Plan-Do-Check-Adjust) 96 % - L 5	
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	(d) Suitable, Sufficient & Timely Procurement 95 % - L 5	
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	(a) Mapping/GIS Development & Utilization of Free Mapping Software 80 % - L 5	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 65 % - L 4
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	(b) Monthly NRW Monitoring & Zoning 83 % - L 5	
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	(c) Abnormal Flow Monitoring & Water Balance Table 23 % - L 2	
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (20) Additional Focused Management of Large and Medium Customers	(a) Starting from Large Customers (e.g. by NRW Section) 62 % - L 4	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc. 69 % - L 4
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (22) Preventive Measures at the Installation of Service Connections & Customer Meters	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters) 79 % - L 4	
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (24) Procedural/Internal Improvements against Illegal Water Uses	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing) 79 % - L 4	
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 63 % - L 4	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 64 % - L 4
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (29) Improvements for Underground Leak Detection	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas 53 % - L 3	
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT) 76 % - L 4	
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes) 67 % - L 4	
Overall Achievement % - Level	73 % - L 4	

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) operationalise the two DMAs	NRWO	1st quarter	2No. DMAs developed. NRW for the same done from the billing system	done	done	DONE
2) create 3 more DMAs	NRWO	one DMA per quarter starting from the second quater	2No. DMAs under development	1No. Fully developed and linked to the billing system.	1no. Remaining DMA fully developed	plans underway to develop 2 more DMA
3) all bulk meters to be calibrated	NRWO	3 meters per quarter	All Master meters tested and accuracy report filed	3 master meters were tested and report filled	2 master meters tested	4 master meters tested
4) meter testing,servicing and replacement to continue	NRWO	test 4 large consumer meters in each quarter and replae atleast 50 meters per quarter	150No. Meters tested and serviced including 4No. large customers. Lessons from the exercise noted for action	134 meters were serviced and tested.and 48 faulty meters replaced.	77 customer meters serviced and 41 faulty meters replaced	175 meters serviced and 34 faulty meters replaced
5) installation of strainners on main lines	NRW team	1 per quater	7No. strainers installed, procurement of more underway	procurement of more underway	2 more starinners installed	procurement of 2 more strainners underway
6) Monthly particpatory planning	Management		2No. Meetings held	2no. Meeting held.minutes filled		
7) Introduction of monthly NRW planing and evaluation tool	TM		In trial stage of monitoring NRW activities.	monthly plan in place	monthly monitoring plan in place	
8) Mapping of leaks and burst	TM/ICT/TECHNICAL TEAM		Processs of procurement of Mobile phones and software required for the mapping has been initiated	mobile phones given to a few technicians technicians for mapping of leaks and also estimation of physical losses on a pilot phase	pilot still going on	procurement of more mobile phones underway

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
9) **Recruitment of operations officer**	**Management**		**Done to strengthen the technical capacity besides replacement of retiring Water Superintendent**			
10) **Mapping of billing anomalies**	**GIS officer**		**Continouos mapping of billing anomalies to enhannce resolution of complaints**	**billing anomalies are being mapped monthly for various actions**	**monthly mapping of billing anomalies ongoing**	
11) **Mobile meter reading**	**Commmercial**		**Full deployment of mobile meter reading**	**continous use of moble meter reading.**	**continous use of mobile of mobile meter reading**	**enhancement of mobile meter reading with GIS codinates**

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Mavoko WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level: 47 % - L 3

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — [2-2] Annual NRW Reduction Plan (2020-21) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Category: Main	Level	Sub	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	91 % - L 5	(a) Staffing with Essential Support & Training	91 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	92 % - L 5	1	100	95	Job evaluation to be done for development of better/suitable job ◆ ◆		1,500,000	HRO		consultant already engaged	the team already in place	already in place	there is support from other teams to the unit whenever reqiured	the unit is already in place any any cordination with other units has been well enhanced
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	88 % - L 5	1	100	90	trainning quality and standards of fittigs to be done trainning on correct meter installation method and right sizing to be training on us of listening sticks and use of hand pumps ◆	1 1 2	400,000	WS(water	every quarter		no training conducted	internal training on metering	attended a NRW WASPA benchmark in Nakuru	internal training of staff on meter servicing
		(b) Sensitization & Awareness Raising for Wider Support	69 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	63 % - L 4	3	85	70	staff meetings with the management ◆ ◆ ◆ ◆	4	0	MD	ONE every quarter		no meeting held due to covid	done through meetings	we keep reminding each other on NRW issiues through whatsaap platforms since holding the physical meeting is a	we keep reminding each other on NRW issiues through whatsaap platforms since holding the physical meeting is a
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	3	90	85	public forum to be held ◆ ◆ ◆ ◆	1	100,000	MD	last quarter		there is a software in place where customer complains can be tracked	continous use of customer complain software	there is enhanced use of customer complain software for easy tracking	bronchures were distributed to the custers to update them on how they can send a complain or make any querry
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	1	100	100	◆ ◆ ◆ ◆ ◆						held a planning and review meeting to plan for the activities of the year	done	review of the 1st and 2nd quarters done	planning and budgeting for the upcoming financial year
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	1	100	100	◆ monthly meetings ◆ ◆ ◆	every month	240,000	TM/NRWO	continous		2No. Meetings held	2No. Meetings held	no meting held	one planning and review meeting held
		(d) Suitable, Sufficient & Timely Procurement	75 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	90 % - L 5	1	95	92	◆ all materials and fittings must be inspected before acceptance ◆ ◆ ◆		50,000	inspection and	continous		there is a team in place to check on standards	all fittings must meet the quality standards set by the company	ad hoc inspection commitees are in place to check the standards of fittings procured	all procured meteres must cornfirm to the set standards before being accepted to the stores
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	60 % - L 4	3	80	70	◆ procurrement of enough materials and fittings ◆ ◆			TM/procurement	continous					pipe wretnches for all the technical staff procured to replace the old ones
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	65 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	65 % - L 4	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	82 % - L 5	3	60	90	◆ update the imagery/base maps ◆ ◆ ◆		0	GISO	1st quarter		all main and distribution lines have been mapped	update on any new line is being done		all the distribution lines have been mapped and any new lines bieng layed are being captured
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	50 % - L 3	3	50	85	Finalization of mapping water customer meter points mapping of leaks and bursts ◆ ◆ ◆		0 600,000	ICT/GIS	2ND quarter		customer meters mapped up to 78%	updating of new customers is continous	introduction of maping of leaks is at trial phase	mapping of customer meters has been done up to 85% the remaining ones are in the places where we don't have current supply
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	53 % - L 3	2	60	40	continous backup ◆ ◆ ◆		0	GISO	Continous		Backup, Map and data update done continuously Sharing of data in form of printed pdf maps, shapefiles, KMZ and KML done upon request or need.			
		(b) Monthly NRW Monitoring & Zoning	66 % - L 4	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	1	95	90	all bulk meters to be calibrated ◆ ◆ ◆	10	10,000	NRWO	3 meters per quarter		this is being done monthly	monthly monitoring being done	monthly monitoring being done	montly monitoring is being done
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	43 % - L 3	3	80	50	operationalise the two DMAs create 3 more DMAs ◆ ◆	 3	150,000 300,000	NRWO	1st quarter one DMA per quarter		ongoing 2no. DMAs developed.	2NO. DMAs in the process of development	1no.DMA developed	1no. DMA developed
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	56 % - L 3	3	80	65	◆ ◆ ◆						we are able to calculate our nrw ratio for each of our DZ zones	we are able to calculate nrw ratio for the zones and the two developed	monthly calculation of NRW ratios is continous	calculation for NRW for DZs is possible and also for the four DMAs formed
		(c) Abnormal Flow Monitoring & Water Balance Table	8 % - L 1	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	13 % - L 1	4	50	20	◆ ◆ ◆						not yet	not yet	not yet	not yet
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	10 % - L 1	5	50	10	develop a policy on unbilled authorized consumption ◆ ◆ ◆ ◆		0				not yet	not yet	not yet	not yet
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	0 % - L 1	4	40	10	start estimation of the amount of physial losses ◆ ◆ ◆ ◆		0	NRWO	2nd quarter		Processs of procurement of Mobile phones and software required for the mapping has been initiated	procurement in the process		we are in the trial phase
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling &	47 % - L 3	(a) Starting from Large Customers (e.g. by NRW Section)	47 % - L 3	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	50 % - L 3	3	90	65	meter testing,servicing and replacement to continue installation of strainners on main lines ◆	15 large customer meters 200 meters for replacement 4 strainners	50,000 800,000 240,000	NRWO NRW team	4 pe quarter 50 per quarter 1 per quater		Continouos mapping of billing anomalies to enhannce resolution of complaints	Continouos mapping of billing anomalies to enhannce resolution of complaints	monthly billing anomalies is continous	billing anomalies are being mapped
				ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	39 % - L 2	1	80	50	develop an inspection schedule for large consumers ◆ ◆ ◆		0	NRWO	september					testing of 6no. large consumer meters done
				(20) Additional Focused Management of Large and Medium Customers	67 % - L 4	1	90	75	installation of smart meters on large buildings to continue ◆ ◆ ◆	40 meters	450,000	NRWO	10 METERS PER		started scheduled inspection of large consumer meters	4No. large customers tested. Lessons from the exercise noted for action	2no.large and 5no mediumconsumer meters tested	1no. Large consumer meter tested and 5no bulk meters tested
		(b) Activities for New & Various Problematic	25 % - L 2	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	40 % - L 3	3	85	50	all consumer meters to visted by meter readers with or without water ◆ ◆ ◆		0	CO						
				(22) Preventive Measures at the Installation of Service Connections & Customer Meters	14 % - L 1	2	50	20	installation of air valves on the daystar line ◆ ◆	3 air valves	400,000	TM/TL	1st quarter		all customers for new connection they pay to the office the we do the cooenction with our fitting to control the st			
		(c) System-related and Procedural/Internal Improvements (e.g. by	71 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	75 % - L 4	1	95	85	enhancement of mobile meter reading such that it takes readings ◆ ◆ ◆ ◆		0	ICT/GISO	2nd quarter		introduction of spot checks to verify reading accuracy	introduction of spot checks to verify reading accuracy	mobile meter reading is in place and a photo of the meter must accompany the readingmeters must be taken	enhancement of the mobile meter reding to incoporate GIS cordinates
				(24) Procedural/Internal Improvements against Illegal Water Uses	67 % - L 4	3	90	70	◆ ◆ ◆ ◆ ◆						penalising in accordance to our water tariff			all illegal connections are penalised in accordance to our tarrif and then legalised

Schedule columns (bar chart):

2020 1st Qua.			2nd Quarter			2021 3rd Qua.			4th Quarter			2021-22				2022-23				2023-24				2024-25				Notes
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	

[1-3] Results of the Assessment for 2020-21

RESULTS — Overall Level: 47 % - L 3

Category: Main Level	Category: Sub	Aspect (Sub-sub Category)	Level
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 40 % - L 3	(a) Physical Loss Reduction Measures applicable without Isolating DZs and/or DMAs 40 % - L 3	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	30 % - L 2
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	33 % - L 2
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	55 % - L 3
	(b) Underground Leak Detection in a Priority DZ(s) 0 % - L 1	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	0 % - L 1
		(29) Improvements for Underground Leak Detection	0 % - L 1
	(c) IF REQUIRED: Pressure Measurement & Pressure 0 % - L 1	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	0 % - L 1
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	0 % - L 1
	(d) IF REQUIRED: Leak Reduction with Large Investments 14 % - L 1	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	0 % - L 1
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	30 % - L 2

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2020-21)

Priority for Improvement (1: Highest, 2, 3, ... N: No Need to F. Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
2	90	60	developa line patrol form		0	TM/NRWO	SEPTEMBER	
2	80	50	Consistent use of listening sticks and handpumps during operations		0	TLs	september	
2	95	70	all valves to be chambered	50 chambers	750,000	WS/TLS	13 chambers in each	
0	0	0						
0	0	0						
0	0	0						
0	0	0						
0	0	0						
			Total Annual Cost (KSh.)	6,040,000				

2020 1st Qua. (Jul, Aug, Sep) | 2nd Quarter (Oct, Nov, Dec) | 2021 3rd Qua. (Jan, Feb, Mar) | 4th Quarter (Apr, May, Jun)

2021-22 | 2022-23 | 2023-24 | 2024-25 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
Mobile phones and software required for the mapping has been initiated	Mobile phones and software required for the mapping has been initiated	the software has been acquired	the mobile phones have been acquired the the trial phase started
not yet	not yet	procurement of valves in the process	a number of valves have been procured and measures have been put in place for installation and securing them
not yet	not yet	not yet	not yet
not yet	not yet	not yet	not yet
N/A	N/A	N/A	N/A
N/A	N/A	N/A	the pressures in our system are manageable
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

[Example Modes of Implementation]

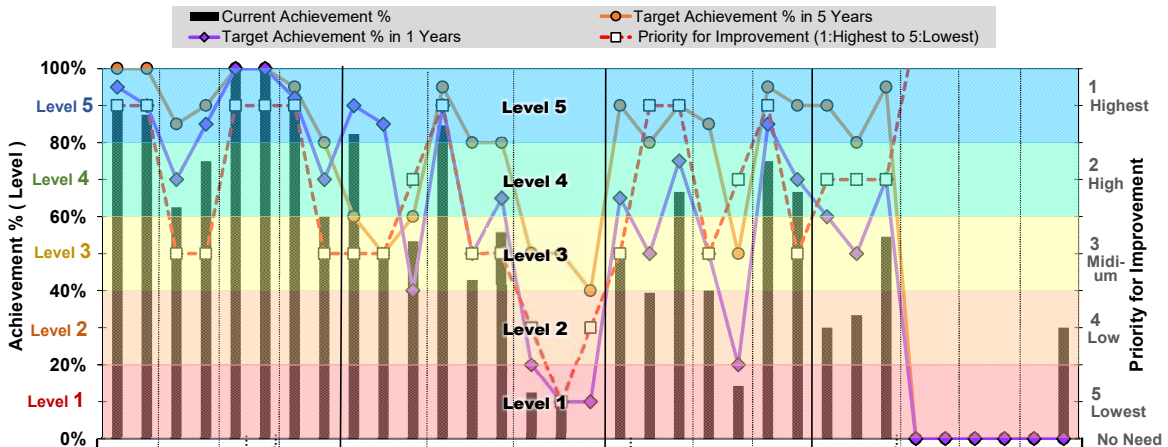
: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
⇒ : Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level	Overall Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and Its Strong Coordination with Other Relevant Sections/Units VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	(a) Staffing with Essential Support & Training 91 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 86 % - L 5	47 % - L 3
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	(b) Sensitization & Awareness Raising for Wider Support 69 % - L 4		
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	(c) PDCA Cycles (Plan-Do-Check-Adjust) 100 % - L 5		
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	(d) Suitable, Sufficient & Timely Procurement 75 % - L 4		
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	(a) Mapping/GIS Development & Utilization of Free Mapping Software 65 % - L 4	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 49 % - L 3	
VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software			
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	(b) Monthly NRW Monitoring & Zoning 66 % - L 4		
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	(c) Abnormal Flow Monitoring & Water Balance Table 8 % - L 1		
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (20) Additional Focused Management of Large and Medium Customers	(a) Starting from Large Customers (e.g. by NRW Section) 47 % - L 3	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc. 45 % - L 3	
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (22) Preventive Measures at the Installation of Service Connections & Customer Meters	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters) 25 % - L 2		
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (24) Procedural/Internal Improvements against Illegal Water Uses	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing) 71 % - L 4		
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 40 % - L 3	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 14 % - L 1	
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (29) Improvements for Underground Leak Detection	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas 0 % - L 1		
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT) 0 % - L 1		
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes) 14 % - L 1		

FY2020 Self Assessment & Planning : Eldoret WSP

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) **To deal with dormant accounts(cut offs) and disconnected accounts in order to avoid illegal water consumption from meter point(Target-3000 accounts)**	**Area managers**	**Jun-21**	done 60 in number by disconnecting from the main line	done 15 in number by disconnecting from the main line	done 24 in number by disconnecting from the main line	disconnected 99 in number cut offs from main
2) **Develop and implement illegal connection procedure**	**WD&NRWM**	**Sep-20**	done	Disconnected from main a total of 15 in number illegal water consumers arrested 2 in number	Disconnected from main a total of 24 in number illegal water consumers arrested 2 in number	18 illegal connection uprooted from main line
3) **Replacement of production meters with EMM inline and insertion(10 number)**	**WD&NRWM**	**Sep-20**	installed 2 in number insertion meters and work in progress for the remaining	Work in progress for replacement of the remaining production meters.	Installed 3 in number in Chebara, Naiberi and Lessos	Installed 8 in number production meters ranging from 600mm to 100m diameter meters
4) **Establishement of DMAS and sub-DMAS(1 &6 respectively)**	**NRWO**	**Jun-21**	Established 6 dmas in southern service area and completed 2 sub-Dmas	work in progress for DMAS Establishment in southern and western	Work in progress for establishment of Kenya service, kuinet and Munyaka sub Dmas	Completed mapping and zoning of entire service area with creation of 17 DMA'S
5) **Installation of smart meters(1000)**	**NRWO**	**Jun-21**	A total of 150 smart water meters	replaced 100 ordinary meters with smart meters and 3 EMM for large consumer meters	Replaced a total of 7 in number ultrasonic meters for large consumers and 7 in number production meters	Installed 203 smart meters from upepo and 696 smart meters from diehl for domestic consumers
6) **Replacement of defective/inaccurate meters (after every billing cycle)**	**Metering officer**	**continuos**	Replaced 317 water meters	replaced 1137 water meters	Replaced 1269 water meters	Replaced 951 aged and stopped water meters
7) **Sensitization of all staff,schools and general public on implications of nrw**	**CSM,NRWO**	**Jun-21**	schedule developed but subject to covvid 19	not yet done	not yet done	
8) **Replacement of dilapitated pipeline at ,CBD,Kipkaren and mwanzo/kampi karatasi**	**WD&NRWM**	**Jun-21**	In progress of implemantation.Mwanzo 80% complete,kambi karatasi at 50%	In progress of implemantation.Mwanzo 85% complete,kambi karatasi at 70%	Implemantation of Mwanzo 95% complete,kambi karatasi 90%' Chepkoilel junction completed Chepkanga 95%, Kenya service 80%, West Indies 90% and Kipkaren 10%	Implemantation of Mwanzo 95% complete,kambi karatasi 90%' Chepkoilel junction completed Chepkanga 95%, Kenya service 90%, West Indies 90% and Kipkaren 50%
9) **Capacity development through training and benchmarking**	HRAM	**Jun-21**	schedule developed but subject to covvid 19	schedule developed but subject to covvid 19	In House training for plumbers, meter replacement team and staff from other departments done in Feb and March 2021.	In House training for plumbers, meter replacement team and staff from other departments done in June 2021.
10) **Intergration of GIS and billing system**	GIS,ICT	**Dec-20**	not yet done	not yet done	not yet done	not yet done

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring 2020-21 onward, Meru WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level: 66 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — [2-2] Annual NRW Reduction Plan (2020-21) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction

Main Category	Level	Sub Category	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	88 % - L 5	(a) Staffing with Essential Support & Training	88 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	92 % - L 5	0	100	100	◆ To develop SOPs ◆ To conduct interdepartmental meeting	2	100,000	WD&NRWM CMT	Sep-20 Monthly	work plan , minutes and reports of the meeting
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	75 % - L 4	3	100	85	◆ Benchmarking with WASPA and other Leading WSPs in the region ◆ Inhouse training of plumbers on good practices ◆ Training of staff on the use of GIS ◆ ◆	20 All All staff	1,000,000 200,000 1,000,000	HRAM HRAM,WD&NRWM HTS	Continuos Sep-20 Sep-20	Subject to covvid 19 situation in the country
		(b) Sensitization & Awareness Raising for Wider Support	81 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water	75 % - L 4	1	100	80	◆ To carry out sensitization workshops and seminars on ethical ,cooperative,financial and water resource aspect of nrw	All staff	500,000	HRAM	Continuos	
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	88 % - L 5	3	100	95	◆ Use of social media platform for customer sensitization ◆ Enhance awareness of illegal connections and leaks on service delivery ◆ ◆	All customers	500,000	CSM,WD&NRWM	Continuos Jan-21	Subject to covvid 19 situation in the country
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	88 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	5	100	100	◆ To implement and review existing plans based on achievement			WD&NRWM	Continuos	
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	70 % - L 4	3	100	90	◆ Prepare montly reports and hold monthly meetings ◆ To develop monitoring KPIS template/tool			WD&NRWM WD&NRWM	Continuos Sep-20	
		(d) Suitable, Sufficient & Timely Procurement	90 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	80 % - L 5	3	100	90	◆ Quality control on procurement of material and customer meters	All pipes, fittings and customer meters		WD&NRWM,inspection committee	Continuos	
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	100 % - L 5	4	100	100	◆ Need for procurement of sufficient reliable master and bulk meters(emm and ultrasonic meters) ◆ procurement of meter test bench and repair existing one	30 1	5,000,000 11,000,000	WD&NRWM,SCM WD&NRWM,SCM	Jan-21 Sep-20	
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	63 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	63 % - L 4	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	71 % - L 4	1	90	85	◆ Continue updating the GIS Maps			GIS Team	Throughout the period	
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	38 % - L 2	1	70	60	◆ Data collection and continue to update GIS maps			GIS Team	Continuos	
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	67 % - L 4	1	90	80	◆ Enhance sharing of GIS Data/maps using free software	All staff		GIS Team/Nrwo	Dec-20	
		(b) Monthly NRW Monitoring & Zoning	55 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	3	100	90	◆ To produce and share reports at montly interdepartmental meetings	All section heads		NRWO,WD&NRWM	Continuos	
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	57 % - L 3	1	90	70	◆ To implement the establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required for the DMAs.	1 DMAS & 6 sub-DMAS	10,000,000	NRWO,WD&NRWM	Dec-20	
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	11 % - L 1	1	70	30	◆After the bulk meters for all the DMAs are installed the reading, analysis and other activities shall be carried out for the entire project period and beyond			NRWO,WD&NRWM	Jan-21	
		(c) Abnormal Flow Monitoring & Water Balance Table	23 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	13 % - L 1	1	70	30	◆ Install Additional bulk meters on high-risk pipelines that are frequently read to improve the abnormal flow monitoring or use of AMR	20	captured no 13	NRWO	Dec-20	
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	1	80	60	◆Prepair Water balance table			NRWO,WD&NRWM & Jica expert team	Apr-21	
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	1	70	50	◆ separation of physical losses ◆			NRWO,WD&NRWM & Jica expert team	Apr-21	

Schedule (2020 1st Qua. / 2nd Quarter / 2021 3rd Qu / 4th Quarter; 2021-22, 2022-23, 2023-24, 2024-25 by quarter: 1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

Activity	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	May	Jun	21-22 1st	21-22 2nd	21-22 3rd	21-22 4th	22-23 1st	22-23 2nd	22-23 3rd	22-23 4th	23-24 1st	23-24 2nd	23-24 3rd	23-24 4th	24-25 1st	24-25 2nd	24-25 3rd	24-25 4th	Notes
(1) SOPs			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(1) meeting	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(2) Benchmarking	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(2) Inhouse training	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(2) Training on GIS			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(3)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(4) Social media							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(4) Awareness			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(5)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(6) Monthly reports	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(6) KPIS template	→	→	→	→	→	→	→	→	→	→																	
(7)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(8) Meters							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(8) Test bench		■	■	■	■	■	■																				
(9)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(10)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(11)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(12)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(13)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(14)							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
(15)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(16)									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
(17)									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

Activity	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
(1)	Developed procedure to deal with illegal water use Held one interdepartimental meeting	Developed procedure for meter replacemt and implementation of developed procedure for illegal water use Held interdepartmental meeting on november 2020	Meeting not held due to covid 19 pandemic	Meeting not held due to covid 19 pandemic
(2)	not done trained plumbers for new meter installations not done	not done Schedule developed and training of staff to be conducted in third quarter	Did 2No in house trainings for plumbers and meter replacement teams and a few staff from other departments in Feb 2021	Did 1 No in house trainings for pipe repair artisans and meter replacement teams and a few staff from other departments in June 2021
(3)	schedule developed but affected by the covid 19 pandemic	captured in the training schedule and planned roll out in the third quarter	Invited Integrity Assurance Officers to to highlight on ethical issues during the in	Training on intergrity done by eldowas audit ad risk team
(4)	done on request not done	done on request use of whatsapp as a reporting plat form for illegal water use ad leaks ad bursts.	use of whatsapp as a reporting plat form for illegal water use ad leaks ad bursts as well as use of toll free line	developed kobo collect with assistance of JICA expert team to be rolled out entire organisation
(5)	Done by introduction of metering unit to deal zero billing of almost 13000 accounts and issues surrounding meter point	by conducting interdeparmental meetigs results to change or improvement of existing strategies to improve on NRW	Already done 2021/2021 budget and reviewed NRW activities on monthly basis.	2021/2022 budget done and reviewed NRW activities which will also be done on montly and quartely basis
(6)	done every month done by developing work plans with target kpis	Continuous progress monitoring done by analysing on target kpis eg impacts of meter replacement,permaent solutions and pipelie replacemet	progress monitoring done by analysing on target kpis eg impacts of meter replacement,permaent solutions and pipelie replacemet	Analysis by using uiversal NRW monitoring tool done each an every month to analyse key parameters
(7)	approval of materials on delivery done by inspection and acceptance commitee	Continuous process upon delivery of materials	approval of materials on delivery done by inspectio and acceptance commitee	approval of materials on arival by checking on key parameters eg pipe thickness and comparing compatibility with our fittings
(8)	Procured emm for large consumer meters thirty in numer (30) procured waiting delivery from the supplier	Installed three in number emm inline and work in progress for installation of the remaining large consumer meters procured awaiting delivery from the supplier	Installed 6 in number EMM water meters to large consumers and 6 in number production meters.	Installed 9 in number EMM water meters to large consumers and 6 in number production
(9)	mapped atotal of 39.3km of the HDPE pipes	mapped atotal of 31.25km of HDPE pipes	mapped atotal of 38.21km of HDPE pipes	
(10)	mapped a total of 1160 newly installed water meters	mapped a total of 515 newly installed water meters	mapped a total of 222 newly installed water meters	
(11)	sharing information and maps through hard copies and soft	sharing information and maps through hard copies and soft	sharing information and maps through hard copies and soft	Gis team working on sharing of GIS Data/maps using free softwares
(12)	held interdepartmental meeting and majorly analysing universal NRW ratio	monthly monitoring of billing to exstablish the cause of decrease and increase in billing and also analysing of universal nrw ratio	monthly monitoring of billing to exstablish the cause of decrease and increase in billing and also analysis of universal nrw ratio	it was done to establish the main cause of drop in total billing and there was increase in average tariff
(13)	Completed zoning of southern service area with 6 DMAs and also 3 sub-dmas	To be completed In third quarter	Completed Mapping andZonning of distribution zones of the entire network with the assistance of Jica Experts (Mr Mori)	DMAS installation, monitoring to be done in the next financial year first quarter.
(14)	not yet done	not yet done	Not Done	to be done in the next financial year after DMAS instalation
(15)	we have done intensive replacement of hotspot areas with HDPE 980m	we have done intensive replacement of hotspot areas with HDPE 1200m	we have done intensive replacement of hotspot areas with HDPE 6500m	Replacement of hotspot areas done a distace of 4800m with HDPE
(16)	After completion of zoning and istallation of bulky meters,we will e able to carry out water balance	After completion of zoning and istallation of bulky meters,we will e able to carry out water balance	After completion of zoning and istallation of bulky meters,we will e able to carry out water balance	Zoning done and complete awaiting installation of smart meters
(17)	not done	not done	Not Done	Not Done

[1-3] Results of the Assessment for 2020-21 | **RESULTS** | Overall Level: 66 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction

[2-2] Annual NRW Reduction Plan (2020-21)

Schedule: 2020 1st Qua. (Jul, Aug, Sep), 2nd Quarter (Oct, Nov, Dec), 2021 3rd Qu. (Jan, Feb), 4th Quarter (May, Jun); 2021-22, 2022-23, 2023-24, 2024-25 (1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun); Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

Main Category (Level)	Sub Category (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5:Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & ...) 75 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section) 75 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	90 % - L 5	4	100	100	◆ To maintain the status with continued improvements by doing the activities for entire period	all accounts		NRWO,Metering officer	continuous		done after every billing circle to establish the anomalies within the billing month	done after every billing circle to establish the anomalies within the billing month(continuos process)	done after every billing circle to establish the anomalies within the billing month(continuos process)	Continuos process
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	61 % - L 4	2	100	80	◆ monitoring of large customer meters weekly(meter reading) ◆ meter Resizing ◆ Testing of large customer meters / replacing the faulty ones ◆ Meter relocation			nrwo & metering officer	continuous		done each a every week	done each a every week with default meters replaced immediatetly	done each a every week with default meters replaced immediatetly	We have categorised our meters as per the consumption from C1 to C6 of which we are changing c1 and C2 to ultrasonic and EMM
		(20) Additional Focused Management of Large and Medium Customers	100 % - L 5	4	100	100	◆ Meter Relocation ◆Servicing , replacement of faulty/defective meters and replacement of aged meters	4,000 2700	8,000,000 7,349,594	NRWO MO,AM	continuous continuous		relocated a total of 659 water meters replaced atotal of 1055 domestic water meters	relocated a total of 807 water meters replaced 1137 water meters with various anomalies with impact to be analysed after 3 months	replaced 1269 water meters with various anomalies with impact to be analysed after 3 months	Relocated 1256 water meters replaced 1544 water meters with various anomalies with impact to be analysed after 3 months
	(b) Activities for New & Various Problematic Customers (e.g. by the ...) 79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	60 % - L 4	2	100	80	Conduct customer identification survey each an every quarter			CSM,HCS	Jan-21		not done	not done	Formed a water loss prevention unit to deal with Illegal water use targeting on suspicious customers and ...	Disconnected from main a total of 87 illegal and cut off connections
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	93 % - L 5	3	100	95	◆Ensure all customer meters are connected to one metre inside the perimeter.(as per the policy) ◆' Introduction of plastic seals and other type of seals over the joints btw customer meter and service conection ◆ Pressure testing of service connection before meter installation	All new connection 20000 All new connection	2,000,000	NRWO nrwo ,metering officer,AM DO	continuous Dec-20 continuous		well captured in our meterig policy and it applies to all connectios	clamping of customer meters suspected of illegal consumption eg carwashes,tree nurseries and multi dwelling	clamping of customer meters suspected of illegal consumption eg carwashes,tree nurseries and mult dwelling	continuos
	(c) System-related and Procedural/Internal Improvements (e.g. by the ...) 79 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	75 % - L 4	3	100	100	◆ Ensure continued improvement of the meter reading and billing.	All water meters		AM	continuous		adoption of auto bill and instant billing	rotation of meter readers and improvement of terms and condition of the contract.	rotation of meter readers and improvement of terms and condition of the contract.	Rotation of meter readers were done
		(24) Procedural/Internal Improvements against Illegal Water Uses	83 % - L 5	2	100	95	◆Develop and implement illegal connection procedure ◆ Incentives for illegal connection detectors and whisle blowers	60	5,821,200	WD&NRWM WD&NRWM	Sep-20 Sep-20		developed procedure for curbing illegal water use incenntives offered to whestle blowers after reporting and penalties carried out	identified and disconnected from main 60 illegal connections	Identified and disconnected from main 24illegal connections	Disconnected from main a total of 87 illegal and cut off connections
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 73 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 73 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	70 % - L 4	2	100	85	◆Conduct a robust leak detection,continued improvement on line patrols and timely leak and burst repair.		2,000,000	NRWO,DO	continuous		conducted leak detection in asis,eastern avenue pioneer eastate with recommendation of complete overhaul of distribution network hired five line patrollers	Line patrollers and territorial leaders are working closely by ensuring all reported leaks and burstsare done on time and done to satifaction.	Line patrollers and territorial leaders are working closely by ensuring all reported leaks and bursts are done on time and done to satifaction.	Monitoring and evaluation shows a reduction in leaks and bursts from 800 to 700 per month
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	44 % - L 3	3	100	70	◆Daily use of acoustic bars to detect leaks and possibility of illegal water connections ◆ Pressure testing and use of Hand pumps to test new connections			NRWO,DO	continuous		we continuosly use listening sticks to detect leaks after and before the meter and illegal connections service line before backfilling of the line	we continuosly use listening sticks and Nrw equipments to detect leaks after and before the meter and illegal connections	we continuosly use listening sticks and Nrw equipments to detect leaks after and before the meter and illegal ...	continuos
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	100 % - L 5	4	100	100	◆ Installation of Section valves in the pipe network to avoid losses in case of burst occurrence and during pipe repairs ◆ Permanent solutions to areas prone to frequent leaks and bursts using hdpe	100 10000m	4,000,000 10,000,000	NRWO,DO NRWO,DO			980m of hdpe pipes replaced in hot spot areas	replaced 1810m of pipeline as permanent solution in hot spot areas	replaced 6500m of pipeline as permanent solution in hot spot areas	Replacement of hotspot areas done a distace of 4800m with HDPE
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its ... 27 % - L 2	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	13 % - L 1	0	0	0	◆ Proper trainning on the use of NRW equipments ◆ Develop a well elaborate work plan for entire service area to conduct leak detection. ◆ Purchase of NRW customised truck	10 1	200,000 7,000,000	NRWO NRWO	Sep-20 Sep-20 SCM		following developed work plan procured waiting delivery from the supplier	following developed work plan and review is done when need arises Truck delivered and some main accessories to be installed	Sticking to developed work plan and review is done when need arises. (Eldowas pipelines as well as customer connection on request.)	Review of work plan done for leak detection
		(29) Improvements for Underground Leak Detection	71 % - L 4	2	100	85	◆ Carry out leak surveys in indentified high leakage and high pressure zones ◆'To intensify the use of Clamp onUFM in MNF to identify leaking pipelines			NRWO	Sep-20		Leak surveys done using nrw equipments ground microphone and listening sticks and recommentation for pipeline replacement done in kipkaren estate,asis lower cbd not done	Established Sub-DMAS at chepkoilel,chepkanga,west indies and mwanzo kambi karatasi will be the areas to carry out MNF	MNF to be carried out in Action, Chepkoilel junction and chepkanga sub DMAs.	Not done
	(c) IF REQUIRED: Pressure Measurement & Pressure ... 60 % - L 4	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	75 % - L 4	2	100	85	◆ Procure and install PRVS at off takes along chebara main	8	500,000	NRWO	Jan-21		procured prvs waiting delivery from supplier	procured prvs waiting delivery from supplier	Prvs supplied, installation to be completed in	Process of installation ongoing
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	53 % - L 3	1	90	65	◆ Identifification and installation of PRVS ◆ ◆	12	2,000,000	NRWO	Jan-21		procured prvs ad waitig delivery from supplier	procured prvs ad waitig delivery from supplier	PRVs delivered planning to install	Installed 3 in numer PRVS
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. ... 48 % - L 3	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	0 % - L 1	0	0	0	Eldowas lies in aplateu of which we dont experience high abnormal pressures.						N/A	N/A	N/A	N/A
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	100 % - L 5	3	100	100	◆ Replacement of dilapitated and deteriorated pipelines. ◆ replacement of deteriorated service connections	Aged pipelines All aged service conections	34,664,149 Captured no 20	WD&NRWM	Continuos		Replaced a total 10,000m of pipeline usig hdpe replaced a total1800m service connections	Replaced a total 17,400m of pipeline using hdpe pipes.	Replaced a total 10,000m of pipeline using hdpe pipes.	Replaced a total 12,000m of pipeline using hdpe pipes.
								Total Annual Cost (KSh.)	**112,834,943**							

[Example Modes of Implementation]

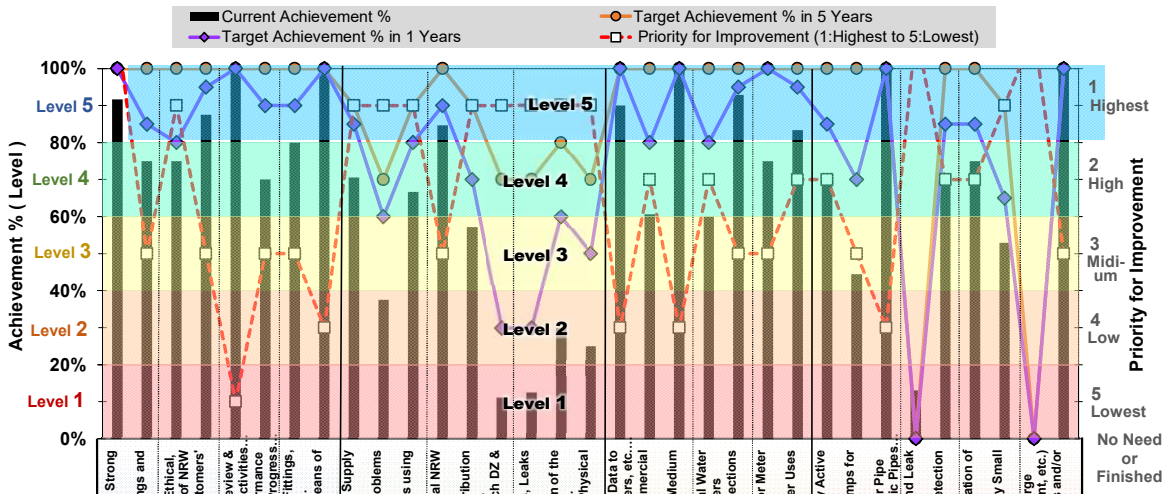
- (grey bar) : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- (black bar) : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment (without donner)
- (salmon box) : Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level	Overall Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and Its Strong Coordination with Other Relevant Sections/Units VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	(a) Staffing with Essential Support & Training 88 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 87 % - L 5	66 % - L 4
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	(b) Sensitization & Awareness Raising for Wider Support 81 % - L 5		
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities... ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress... VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control...	(c) PDCA Cycles (Plan-Do-Check-Adjust) 88 % - L 5		
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc....	(d) Suitable, Sufficient & Timely Procurement 90 % - L 5		
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities... VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks... (11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software...	(a) Mapping/GIS Development & Utilization of Free Mapping Software 63 % - L 4	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 49 % - L 3	
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)... (13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)... (14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA...	(b) Monthly NRW Monitoring & Zoning 55 % - L 3		
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)... (17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	(c) Abnormal Flow Monitoring & Water Balance Table 23 % - L 2		
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc... ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (20) Additional Focused Management of Large and Medium Customers...	(a) Starting from Large Customers (e.g. by NRW Section) 75 % - L 4	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc. 76 % - L 4	
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (22) Preventive Measures at the Installation of Service Connections & Customer Meters...	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters) 79 % - L 4		
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing... (24) Procedural/Internal Improvements against Illegal Water Uses	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing) 79 % - L 4		
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs... (26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)... ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes... VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place... (29) Improvements for Underground Leak Detection	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 73 % - L 4	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 52 % - L 3	
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)...	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas 27 % - L 2		
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT) 60 % - L 4		
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes) 48 % - L 3		

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan				Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
	Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1)	◆ Capacity Building & Benchmarking to Nrw personnel	TOM/HRM	Quarterly				Two trainings were done for the Nrw Personnel and later a two days training done for the same group, area managers,other technical staff and Ict officers on mobile meter testing Gadget.
2)	◆ Customer Identification Survey(CIS)	CBDM/CONSULTANT	Q2				Tendering stage
3)	◆ Procurement of Tools & Equipment	TOM/HR	Q1				Covid interfere with the process but it has been slated for Q1, 2021/2022
4)	◆ Procurement of Airvalves/sluice valves	TOM/AM/NRWO	Quarterly				181 meters replaced in the quarter
5)	◆ Establish & Equip GIS office	TOM/STO	Q2				DZs established, DMAs are in advance stages for piloting in Kilifi(Kiwandani Area and Mnarani classic estate and pwani university) This was halted sligthly to await the consultant who has been engaged to come to the ground.
6)	◆ Establishment of DZs and DMAs	A/M ,STO, PATRONS	Quarterly				There was no rerouting done in the quarter
7)	◆ Scouting for illegal Connections	TOM/STO/AM	0				No airvalves were installed in Q4
8)	◆ Rerouting of service lines and Burying of shallow pipelines	TOM/AM/STO	Quarterly				No replacement was done in Q4
9)	◆ Rehabilitaion of Tanks(BPTs and Storage Tanks)	TOM/STO/AM	Q2				No rehabilitaions done
10)	◆ Replacement of Delapitated pipelines	STO/AM/TOM/PM	Quarterly				Several meters were tarnsfered to the offatke during the quarter in review

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2020-21 onward, Kilifi-Mariakani WSP

[1-3] Results of the Assessment for 2020-21				Priority for Improvement (H: High, M: Middle, N: No Need & F: Finished)	Target Level (%)		[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) / [2-2] Annual NRW Reduction Plan (2020-21)	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
RESULTS	Overall Level	53 % - L 3										
Category	Aspect (Sub-sub Category)											
Main Level	Sub		Level		In 5 years	In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure					
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 84 % - L 5	(a) Staffing with Essential Support & Training	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	83 % - L 5		100	85	◆ Deploy one officer to deal with leak Detection/Meter Testing & Servicing	1		TOM/HRAM	Q2(October)	Staff already identified
							◆ Regular meetings and shairing of reports with other units/departments for actions	12		NRW Committee	Monthly	ongoing
							◆ Weekly updates reports from Nrw personnel	48		Nrw personnel	Fridays	On-going
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	84 % - L 5	1	100	100	◆ Capacity Building & Benchmarking to Nrw personnel	3	1,200,000	TOM/HRM	Quarterly	In the Budget
			88 % - L 5				◆ Training by Jica and other partners	4		JICA	Quarterly	
	(b) Sensitizati on &	VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	88 % - L 5	5	100	100						Budget and already a requisition has been done & it is in procurement stage
	(c) PDCA Cycles (Plan-Do-Check-Adjust)	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	5	100	100	◆ Proposal writing and sourcing of funds to improve on NRW reduction			TOM/AM/STO	Q1	The proposal shal also be done contineously
							◆ Nrw action plan developed and approved					
							◆ Nrw activities budgeted for in the current Budget					
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	5	100	100	◆ Monthly, Quarterly and Annual Reporting based on all KPIs			TOM/AM/STO	Contineous	
							◆ Discussions of reports and validation of data with set submission dates			TOM/AM/STO	Contineous	
							◆Monitoring and evaluation progress reports	12		M&E - O		
							◆Use of Billing analysis to act on anomalies and prioritise actions	12		Nrw	Monthly	
	(d) Suitable, Sufficient & Timely Procurement	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	60 % - L 4	4	100	100	◆ Conduct trace survey to be done to ascertain the durability of the recently procured cold water meters	2		TOM/CBDM/STO	Quarterly	
							◆Send sample of meters for certifiaction by Kebs or accredited organistaion like Nyeri Water	2		TOM/CBDM/STO	Annually	
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	65 % - L 4	1	100	100	◆ Purchase of 10 No. CRUX motorcycles for O&M Activities	10	2,500,000	TOM/PM	Q2	
			70 % - L 4				◆ Procurement of Pipes & Fittings	4		TOM/PM	Quarterly	
							◆ Procurement of Tools & Equipment	1	2,000,000	PM	Q2	By end of Q2
							◆ Procurement of Airvalves/sluice valves	4	2,500,000	TOM/PM/STO-	Quarterly	
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 3 % - L 1	(a) Mapping/GIS Development & Utilization of Free Mapping Software	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	6 % - L 1	1	100	70	◆ Establish & Equip GIS office		500,000	TOM/HR	Q1	
							◆ Train Staff on GIS		300,000	TOM/HR/GIS-O	Q2	To be done on
							◆ MappingPipelines and other Water Utilities			TOM/AM/NRW	Q2	
							◆ Pressure Mapping(purchase of data Loggers)			TOM/PM/GIS-O	Q1	
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	3 % - L 1	1	100	50	◆ Replace meters Billed on estimates	→		TOM/AM/NRWO	Quarterly	
			0 % - L 1				◆ Raise Buried meters	→		TOM/AM/NRWO	Q1	ongoing
							◆ Relocate innacessible Meters		200,000	TOM/AM/NRWO	Quarterly	
							◆ Meter Servicing and Testing of category 1 &2 Meters(Consider 50m3 and above)	2400	300,000	STO/Meters servicing officer & Nrw personnel	Monthly	ongoing
	(b) Monthly NRW Monitoring & Zoning	(11) Backup, Update and Enhanced ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	0 % - L 5	1	100	50	◆ Adopt a free software for GIS backup, update and shairing data			GIS officer/TOM	Quarter 1	
			85 % - L 5	1	100	80	◆ Meter Reading anomalies Report from MFA			STO/CBDM/TOM	Monthly	At the end of every Billing
							◆ Daily monitoring of meter readings			BO	Daily	
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	41 % - L 3	1	100	50	◆ Establishment of DZs and DMAs			TOM/STO	Q2	
			0 % - L 1				◆ Pilot of three Areas(Kilifi,Mtwapa, Mazeras,Kaloleni& Mariakani)			TOM/STO/AM	Q1&Q2	
							◆ Instal Master Meters			TOM/STO/AM	Q2	
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	11 % - L 1	1	100	50	◆ Analysis & Reports			STO	Monthly	
	(c) Abnormal Flow Monitoring & Water Balance Table	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	0 % - L 1	3	100	50	◆ Installation of level gauges in Storage Tanks and BPTs			Sn	Q2	
							◆ Installation of Pressure gauges on Pump houses and selected					
	12 % - L 1	(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	3	100	50	◆ Train and capacity build on use WB Easy Calc.			Sn	Q2	
							◆ Seperation of Commercial Losses and Physical Lossses			Engineer/TOM/S		
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	0 % - L 1	3	100	50	◆ Ref.16 above					

Step 4: Update and Prepare Medium-term & Annual NRW

2021 1st Qua. | 2nd Quarter | 2022 3rd Qua. | 4th Quarter | 2022-23 | 2023-24 | 2024-25 | 2025-26

Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | 1st Jul-Sep | 2nd Oct-Dec | 3rd Jan-Mar | 4th Apr-Jun

[1-3] Results of the Assessment for 2020-21 | **[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25)** | **Step 4: Update and Prepare Medium-term & Annual NRW**

RESULTS — Overall Level: 53 % - L 3

Category: Main Level	Category: Sub	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest, 2: Second, N: No Need, F: Finished)	Target Level (%): In 5 years	Target Level (%): In 1 year	[2-2] Annual NRW Reduction Plan (2020-21): Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling Errors & Theft) — 71 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	1	100	100	◆ Monthly Billing Analysis/Meter reading data/Reports			STO/CBDM	Monthly	Ongoing
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	61 % - L 4	1	100	80	◆ Weekly monitoring of large consumer meters with a consumption of 500m3 and above. ◆ Frequent meter accuracy check ◆ Prompt Replacement of Stalled/ inefficient meters			STO/CBDM STO/CBDM/AM STO/CBDM/AM	Weekly Quarterly Continuous	
	(b) Activities for New & Various Problematic Customers (e.g. by the Section) — 75 % - L 4	(20) Additional Focused	/ 5	1	100	80	◆ Visual Inspection of their meters weekly			TOM/STO/CBDM	Weekly	
		ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	80 % - L 5	2	100	90						
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	71 % - L 4	1	100	85	◆ Quality Cotrols of materials ◆ Suplly of new meters for new connections ◆ Meters to be instal at the offtake ◆ Construction of Chambers to secure the meters ◆ Line testing before operationalization	Ongoing across the Quarters.		STO/AM/TOM/P STO/AM/TOM/P STO/AM/TOM/P M STO/AM/TOM/P	Ongoing Quarterly	
	(c) System-related and Procedural/Internal Improvements — 93 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	88 % - L 5	1	100	100	◆ Intergated Systems in place					
		(24) Procedural/Internal Improvements against Illegal Water Uses	100 % - L 5	1	100	100	◆ Develop and adopt Illegal water use policy ◆ Enhance Legal procedures on illegal water use and Fraud ◆ Establish incentive for whistle blowers and staff			TOM/CDBM/IA/A	Q2 Q3 Q2	
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) — 70 % - L 4	(a) Physical Loss Reduction Measures applicable without — 70 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	80 % - L 5	1	100	80	◆ Carrying out schedule line patrols ◆ Scouting for illegal Connections		1,000,000	A/M A/M	Immediate Immediate	
		(26) Daily Usage of Low-Cost	4 4	2	100	100	◆ Training of NRW staff and Benchmarking			TOM/HRM/STO	Q2	
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	82 % - L 5	3	100	100						
	(b) Underground Leak Detection — 10 % - L 1	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to	13 % - L 1	3	100	50	◆ Carry out leak Detection Survey			A/M,STO	Quarterly	
		(29) Improvements for Underground Leak Detection	0 % - L 1	3	100	50	◆ Frequent leak detection Surveys ◆ Train and adopt modern detection technics		2,000,000	STO/TOM/Sn. STO/TOM/Sn.	Quarterly Q2	
	(c) IF REQUIRED: Pressure Measurement & — 0 % - L 1	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	0 % - L 1	3	100	50	◆ Installation of PRVs in Vitengeni & Baricho Areas			STO/TOM/Sn.	Q3	
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	0 % - L 1	3	100	50	◆ Installation of Air valves ◆ Istallation of Section Valves ◆ Rehabilitaion of Tanks(BPTs and Storage Tanks)		1,500,000	TOM/STO/AM TOM/STO/AM TOM/STO/AM	 Q2	
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. — 76 % - L 4	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	55 % - L 3	5	100	80	◆Installation of Standby Pump in Mazeras					
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	100 % - L 5	2	100	100	◆ Replacement of Delapitated pipelines		13,000,000	TOM/AM/STO	Quarterly	
								Total Annual Cost (KSh.)	36,000,000			

2021 1st Qua.			2nd Quarter			2022 3rd Qua.			4th Quarter			2022-23				2023-24				2024-25				2025-26			
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun

[Example Modes of Implementation]

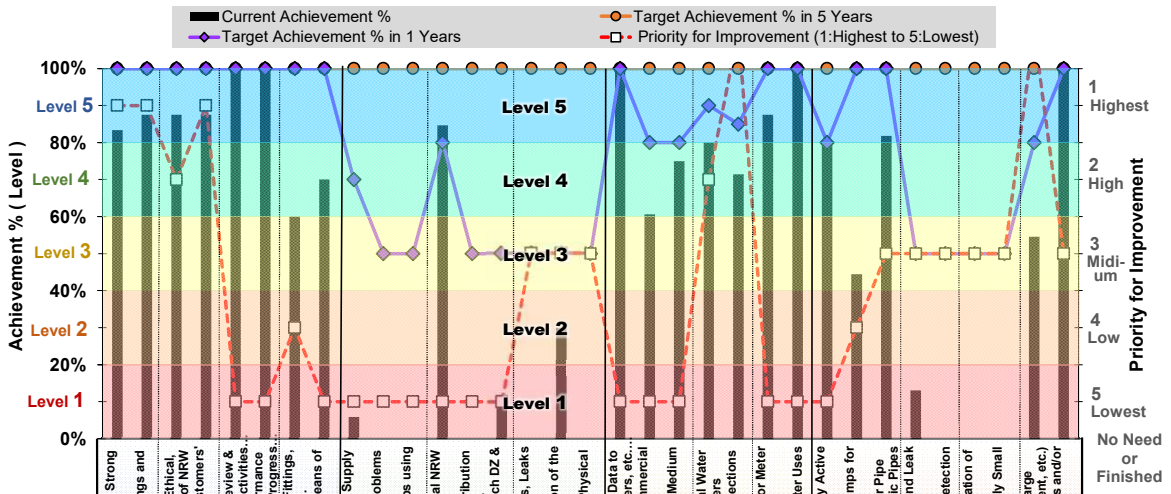
- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment
- : Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and Its Strong Coordination with Other Relevant Sections/Units	(a) Staffing with Essential Support & Training	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement
VERY BASIC: (2) Capacity Development through Trainings and Benchmarking		
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	(b) Sensitization & Awareness Raising for Wider Support	
VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support		
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities...	(c) PDCA Cycles (Plan-Do-Check-Adjust)	
ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress...		
VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control...	(d) Suitable, Sufficient & Timely Procurement	
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc....		
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities...	(a) Mapping/GIS Development & Utilization of Free Mapping Software	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis
VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks...		
(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software		
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)...	(b) Monthly NRW Monitoring & Zoning	
(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)...		
(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA		
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	(c) Abnormal Flow Monitoring & Water Balance Table	
(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)		
(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis		
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc...	(a) Starting from Large Customers (e.g. by NRW Section)	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.
ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers		
(20) Additional Focused Management of Large and Medium Customers		
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	
(22) Preventive Measures at the Installation of Service Connections & Customer Meters...		
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	
(24) Procedural/Internal Improvements against Illegal Water Uses		
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)
(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)		
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes		
VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	
(29) Improvements for Underground Leak Detection		
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	
(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)		
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	
(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections		
	84 % - L 5	85 % - L 5
	88 % - L 5	
	100 % - L 5	
	65 % - L 4	
	3 % - L 1	17 % - L 1
	41 % - L 3	
	12 % - L 1	
	71 % - L 4	75 % - L 4
	75 % - L 4	
	93 % - L 5	
	70 % - L 4	38 % - L 2
	10 % - L 1	
	0 % - L 1	
	76 % - L 4	
Overall Achievement % - Level	53 % - L 3	

5) -9 Annual and Mid-term NRW Reduction Plans of Pilot WSPs for FY2021 (Template 3rd Use)

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan				Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
	Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1	3 New team members for NRW section	HRM		Scheduled for Q3	Scheduled for Q3		
2	Buy 4 new motorbikes for the NRW unit	PM		Procurement ongoing	Complete		
3	Bulk meter testing training from WASPA	TA-NRW		Complete	Complete		
4	Creation of new DMAs in zone 4 lower	TA-NRW		Indetification of Meter location and DMAs already Done	Procurement stage		
5	Instalaltion of pressure gauges for all bulk meters	TA-NRW		Scheduled for Q3	Scheduled for Q4		
6	Changing of 1,200 consumer meters (Aged and Faulty)	TA-NRW		Ongoing	Ongoing		
7	Introduction of sectional valves for all long pipelines and tertiaries for zone 4 lower and zone 2	TA-NRW		schduled for Q2 and Q3	25 Already done		
8	Introduction of Airvalves for all long pipelines and tertiaries	TA-NRW		Scheduled for Q3	Scheduled for Q3		
9	Hydraulic Separation	TA-NRW		Scheduled for Q3 AND Q4	Scheduled for Q3 and Q4		

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Meru WSP

[1-3] Results of the Assessment for 2021-22 — RESULTS — Overall Level: 80 % - L 5

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-22)

Category: Main	Level	Sub	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By Who	By when	Notes
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	100 % - L 5	(a) Staffing with Essential Support & Training	100 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	F	100	100	◆Monthly meetings by NRW Taskforce and Management committee ◆ 3 New team members for NRW section ◆ Buy 4 new motorbikes for the NRW unit	Engagement of 3 new memebers 4 New Motorbikes for NRW section	1,200,000	TA-NRW TA-NRW TA-NRW	Continous Dec-21 Sep-21	Meet Monthlyt and produce minutes for the same Deploy 3 new team mebers to NRW unit
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	100 % - L 5	2	100	100	◆ Bulk meter testing training from WASPA ◆ Consumer meter testing form KEWI ◆ ◆ ◆	Bulk Meter Test report Ability to use UFM.	125,000	TA-NRW	Sep-21 Apr-22	Train on use of UFM and testing of Bulk Meters
		(b) Sensitization & Awareness Raising for Wider	88 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	100 % - L 5	1	100	95	◆					
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	1	100	85	◆ Deployment of a customer service app that they can check bills on and communicate with the WSP on ◆ ◆	Application uploaded on Google Palystore		FM, CEO,GM	Sep-21	Part of the IMS
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	1	100	100	◆ ◆ ◆ ◆					
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	1	100	100	◆ ◆ ◆ ◆ ◆					
		(d) Suitable, Sufficient & Timely Procurement	95 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	90 % - L 5	1	100	95	Adoption of HDPE pipes as standard material for customer connection (40 and 20 mm pipelines) ◆ Use of R Classification water meters	Use of HDPE Pipes for Customer Connection Use only R rated Meters not ABC classfication method		TM TM	Dec-21 Sep-21	CCS to use only HDPE pipes for tertiaries and Service lines use only R 160 meters for consumers
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	100 % - L 5	1	100	100	◆ ◆	1				
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	93 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software	93 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	100 % - L 5	1	100	100	◆ Hydraulic Separation (Install bulk meters for zones sharing water) ◆ ◆	Installation of Bulk Meters for all Zones. Sharing water Installation of NRV for Zone 2 Establishment of Zonal meter reading patterns	528,000	TA-NRW		install zones for all zones which are sharing a meter and change bulk meters which are operating outside the error range
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	88 % - L 5	2	100	90	◆ Continous ◆ ◆ ◆ ◆					
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	87 % - L 5	1	100	92	◆ ◆ ◆ ◆ ◆					
		(b) Monthly NRW Monitoring & Zoning	100 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	1	100	100	◆ Continous ◆ ◆ ◆ ◆					
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	100 % - L 5	1	100	100	◆ Creation of new DMAs in zone 4 lower ◆ ◆ ◆ ◆	Creation of DMAs (to be phased in implementation)	2,175,000	TA-NRW	Dec-21	Create 7 DMAs in the zone and install bulk meters
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	100 % - L 5	1	100	100	◆ Continous ◆ ◆ ◆ ◆					
		(c) Abnormal Flow Monitoring & Water Balance Table	42 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	63 % - L 4	1	100	75	◆ MNFs set for zones with high NRW ratios as a whole ◆ Steptest for all DMAS and DZ ◆ Instalaltion of pressure gauges for all bulk meters ◆ ◆	NRW reduction establishment of lekage index.	672,000	TA-NRW TA-NRW TA-NRW	continous Dec-21	
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	5	100	50	◆ ◆ ◆ ◆ ◆					
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	38 % - L 2	4	100	50	◆ ◆ ◆ ◆ ◆					
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy)	78 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	78 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	1	100	100	◆ categorization of customer classes, Estimated reading ratios and abonormal readings ◆	•List for customer meter replacement •Replacement of 1,200 customer meters •Establishment of Consumer categories and monitoring list •Establishment of a billing baseline		TA-NRW	continous	
				ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	73 % - L 4	1	100	80	◆ Changing of 1,200 consumer meters ◆ ◆ ◆ ◆		4,800,000	TA-NRW	Apr-21	Change all single jet meters
				(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	4	100	20	◆Weekly reading of all C1 customers ◆ Smartphones for NRW section ◆ ◆ ◆	3	84,000	TA-NRW	Dec-21	
		(b) Activities for New & Various Problematic Customers (e.g. by the	63 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	90 % - L 5	1	100	95	◆ Customer surveys to indetify suspcious customers ◆ ◆ ◆ ◆			TA-NRW		
				(22) Preventive Measures at the Installation of Service Connections & Customer Meters	43 % - L 3	2	100	50	◆ ◆ ◆ ◆ ◆					
		(c) System-related and Procedural/Internal	71 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	1	100	100	◆ ◆ ◆ ◆					
				(24) Procedural/Internal Improvements against Illegal Water Uses	33 % - L 2	3	100	50	◆ ◆ ◆ ◆					

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Aspect	2021 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2022 3rd Qua Jan	Feb	Mar	4th Quarter Apr	May	Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2025-26 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
(1)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Monthly meetings being carried out. Postponed to Mid Q3 On procurement Section LPOS already sent to Supplier	2 Members from Meter Reading and O/M deployed to NRW section 50% achieved Already Procured. 100% Complete		
(2)	→ →	→ →	→ →																											Completed. WASPA Already trained the NRW and Techinical section on UFM usaage	Completed. WASPA Already trained the NRW and Techinical section on UFM usaage 100% Complete		
(3)																																	
(4)	→	→	→																											Completed	Completed 100% Complete		
(5)																																	
(6)																																	
(7)	→ →	→ →	→ →	→	→	→																								Starts in mid Q3 Already adopted for entire customer base (Ongoing Process)			
(8)																																	
(9)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Scheduled for Q3	Scheduled for Q4		
(10)																																	
(11)																																	
(12)																																	
(13)							→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Scheduled for Q4	Scheduled for Q4		
(14)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→					
(15)	→	→	→	→ →	→ →	→ →	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Ongoing this is a continous activity Ongoing this is a continous activity Scheduled for Q3	Ongoing this is a continous activity Ongoing this is a continous activity Scheduled for Q3		
(16)																																	
(17)																																	
(18)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		This is a continous activity it is ongoing NRW section has complted chaning of 200 faulty consumer meters	This is a continous activity it is ongoing NRW section has complted chaning of 398 faulty consumer meters (33.2%)		
(19)																														ongoing 210 out of 973 changed	ongoing 250 out of 973 changed (26% Achieved)		
(20)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Ongoing	Ongoing		
(21)	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→		Ongoing	Ongoing		
(22)																																	
(23)				⇒	⇒	⇒																											
(24)																																	

[1-3] Results of the Assessment for 2020-21

RESULTS — Overall Level: 80 % - L 5

Category: Main Level	Category: Sub Level	Aspect (Sub-sub Category)	Level
[D] Reduction of Physical (Real) Water Losse (i.e. Bursts, Leaks & Overflows)	80 % - L 5	(a) Physical Loss Reduction Measures (Active Leakage Control) applicable within existing DZs and/or DMAs	80 % - L 5
		ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	100 % - L 5
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	75 % - L 4
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	64 % - L 4
		(b) Underground Leak Detection in Pressurized Zone(s) and/or DMA(s) and	83 % - L 5
		VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	73 % - L 4
		(29) Improvements for Underground Leak Detection	43 % - L 3
		(c) IF REQUIRED: Pressure Management & Pressure	38 % - L 2
		(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	52 % - L 3
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	69 % - L 3
		(d) IF REQUIRED: Leak Reduction with Large Investments (e.g	64 % - L 4
		(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	81 % - L 5
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	100 % - L 5

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2021-22 to 2025-26)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-22)

Priority(for Improvement) (1: Highest, 2, 3, ... N, No Need & F: Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By Who	By when	Notes
1	100	100	◆					
1	100	85	◆ Continous ◆ Continous					
1	100	70	Introduction of sectional valves for all long pipelines and tertiaries for zone 4 lower and zone 2 Introduction of Airvalves for all long pipelines and tertiaries	Install 14 Air valves Install 40 sectional valves	979,000 1,225,000	TA-NRW	Jun-21 Jul-21	section zone 4 lower according to DMAs to enanble steo test. Introduce Avs in lines with reccuring air complains and chambers
1	100	90	◆ Flow Measurement with UFM to determine underground leaks			TA-NRW	contionus	On need basis according to Water Loss.
3	100	60	◆					
1	100	50	◆					
2	100	65	◆					
3	100	75	◆					
1	100	100	◆					
				Total Annual Cost (KSh.)	11,788,000			

2021 1st Qua.			2nd Quarter			2022 3rd Qua			4th Quarter		
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

2022-23				2023-24				2024-25				2025-26			
1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun
➡	➡	➡	➡	➡	➡	➡	➡	➡	➡	➡	➡	➡	➡	➡	➡
→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
Schedlued for Q2 Scheduled for Q3	25 Sectional Valves installed Scheduled for Q3		
Continous	Continous		

[Example Modes of Implementation]

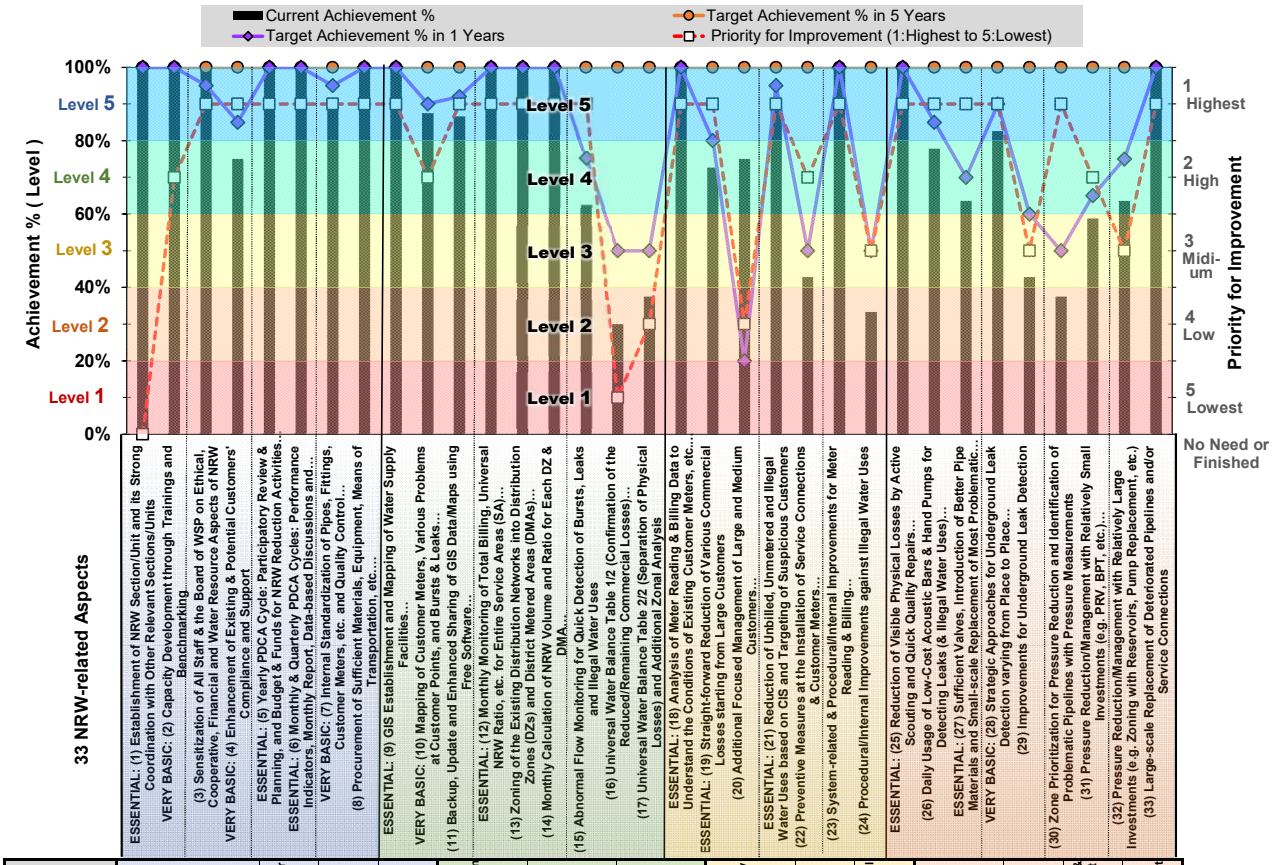
: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
➡ : Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQURED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	100 % - L 5	88 % - L 5	100 % - L 5	95 % - L 5	93 % - L 5	100 % - L 5	42 % - L 3	78 % - L 4	63 % - L 4	71 % - L 4	80 % - L 5	73 % - L 4	52 % - L 3	81 % - L 5
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	97 % - L 5				81 % - L 5			73 % - L 4			72 % - L 4			
Overall Achievement % - Level	80 % - L 5													

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ **Procurement of ERP system**	HFCS	Feb-22	PROCURED	INSTALLED		
2) ◆ **Data collection and update of GIS**	GIS	Every new	partially done			
3) ◆ **Udertake a billing data audit and clean up**	0	0	pending	PENDING		
4) ◆**rehabilitate kaunda estate**	HTS AND NRW	Quarter One	tendering done	DONE 95%		
5) ◆ **QGiS training for all technical officers**	GIS OFFICER AND NRW-S	Every quarter a training	not done due to COVID-19	NOT DONE DUE TO COVID-19		
6) ◆ **FINISH PRESSURE MANAGEMENT IN ZONES 1 AND 2**	NRWS AND GIS	Jan-00	partially done			
7) ◆ **Jica expert trainings and assistance**	JICA expert team	as per their	suspended due to			
8) ◆ **Replace all faulty master meters ()**	0	0	21 EMF PROCURED	21 EMF PROCURED		
9) ◆ **JICA expert trainings and assistance**	JICA expert team	as per their schedulle	suspended due to COVID-19 19			
10) ◆ **undertake leak surveys in identified high leakage zones**	NRWS	continous exercise but with a target of (5 staffs per quarter)	nigh flow and step tests were conducted	NIGH FLOW AND STEP TESTS WERE CONDUCTED		

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Embu WSP

[1-3] Results of the Assessment for 2021-2022 — RESULTS — Overall Level: 72 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — [2-2] Annual NRW Reduction Plan (2021-22) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main Category (Level)	Sub Category (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement (85 % - L 5)	(a) Staffing with Essential Support & Training (85 % - L 5)	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	84 % - L 5	3	100	95	◆ To hire more staff when need arises	5 No		MD AND HRM	when request is made	Subject improvement covid 19 situation and revenue		casual plumbers were hired for regions	Two plumbers hired casual basis to assist.		
							◆ To improve employment terms	5 No.		HRM,HTS AND MD	as per the contract terms	various motivation avenues.		no much			
							◆ To formulate interdepartmental nrw steering committee and have continoues meetings	Monthly meeting and plans		HTS and NRWS	MONTHLY	Minutes of meeting and reports		the committee apointed and chaired by the HTS	committee had one meeting		
							◆ To develop SOPs	sop in place		NRWS	Third quarter.			DRAFTS IN GROUPS	SOPs discussed by technical supervisors		
							◆										
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	88 % - L 5	2	100	95	◆ QGiS training for all technical officers	7 No		GIS OFFICER AND NRW-S	Every quarter a training	Subject improvement covid 19 situation		NONE	Plans to have some this quarter		
							Nrw team to have 4 benchmarkings with neighbouring wsps	10 No		NRWS and HTS	Every start of quarter.			NONE	mone done		
							◆ Benchmarking with WASPA and other WSPs	All		NRWS and HTS	When a forum is in section.			NONE	None in the period by filled waspa data		
							◆ Water utility regional partnership workshops	All		NRWS and HTS	As per the WRUP SCHEDULE.			Done via web	Done through web		
							◆ JICA expert trainings	All		NRWS and HTS	As per the schedulle			done by jica experts	Done physical and web		
	(b) Sensitization & Awareness Raising for Wider Support (63 % - L 4)	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	25 % - L 2	2	100	60	◆ To carry out sensitization workshop and seminars	All		HRM AND MD	continous				None in the period by filled waspa data		
							◆ Replacement of leaking Airvalves	100%	9,000,000	When need arises	continous	since we were able to replace major ones in the last financial year and first Quarter of this year thus it will be as need arises.	Carried forward from last year activity	all the mainlines airvalves replaced by the ARI valves	completd		
							◆ Creation of fully functional DMAS	50%	0	NRWS , HTS AND GIS OFFICER	Apr-22			not much done	preparation done and requested for zonal meters for procurement		
							◆ Clibration of Mater meters	50%	300,000	NRWS					not planned for this quarter		
							◆ rehabilatation of kaunda	New network	4,200,000	NRWS	Mar-22		Activity continuation after start last year.	on going 20% done	90% complete.		
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	100 % - L 5	3	100	100	◆ Establisment of call centre and toll free line							pending	pending		
							◆ Procurement of ERP system			HFCS	Feb-22			being impelemted	in use 100%		
							◆ Use of social media platform for customer sensitization			PRO and customer care	when need arises			done thruogh media and the social media platform	Done through the social media platform.		
							◆ customer sensitization on notification of iilegal water use			NRW,T.O AND PRO	EVERY QUARTER A BARAZA IN PRUNE AREAS.				Barazas were done in Kanyuambora region.		
							◆										
	(c) PDCA Cycles (Plan-Do-Check-Adjust) (83 % - L 5)	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	93 % - L 5	4	100	95	◆ To implement and review existing plans			NRWS	Mid term review and adjust accordingly.				Continuing with quarter two		
							◆ Analysing the billing data and take action			data analyist	end of billing cycle.						
							◆										
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	70 % - L 4	1	100	80	◆ Develop KPI monitoring tool										
							◆ Hold monthly meetings			NRWS	monthy MEETINGS			done one	Done		
							◆										
							◆										
							◆										
	(d) Suitable, Sufficient & Timely Procurement (89 % - L 5)	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	90 % - L 5	3	100	92	◆ Procurement of insertion & UFM meters		2,700,000	NRWS - HTS	Jun-22	donation of UFM by jica		Got UFM from jica	Completed		
							◆ Develop and operationalize a metering policy		150,000	NRWS - HTS							
							◆ Pressure management		500,000	NRWS - HTS							
							◆ Procurement of pipe thickness ultra-gauge		140,000	NRWS - HTS	Apr-22						
							◆ formal Adaption of HDPE PN 16 pipes in our networks			NRWS - HTS							
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	89 % - L 5	3	100	95	◆ Procurement of pressure loggers		700,000			donation of 2 by jica		Received one from Jica			
							◆ Training on QGis to all Technical officers		100,000						Training not yet done		
							◆ Allocation of a NRW vehicle			MD	DONE	KCR 523A		done kcr	Using KCR		
							◆										
							◆										
...nalysis	(a) Mapping/GIS Development & Utilization of Free Mapping Software (63 % - L 4)	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	65 % - L 4	1	100	80	◆ Data collection					To hire personel to collect data					
							◆ Update of GIS system			GIS OFFICER	CONTINOUS						
							◆ Training all T.Os on the use of QGIS			GIS AND HRM	Third quarter			1 on the intern programme	Still working with the intern		
							◆ Recruiting 2 GIS assistant officers										
							◆ Assigning one of the assistants to work closely with the NRW when needed			Etern person to assist	Jan-22						
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	75 % - L 4	1	95	85	◆ Data collection and update of GIS			GIS	Every new connection and costruction of new lines	To hire personel to collect data			Using the 3 interns and atachees		
							◆ Collaborate with the JICA team to train our staffs on QGIS			HTS	As per the schedulle						
							◆ Meter readers and plumbers to take and share real time photos on leakages & bursts			Billing Supervisor	every day readings	on going and uploaded in the billing system.					
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	53 % - L 3	1	90	70	◆ Set targets to be achived			HTS					Not done		
							◆ Have all T.Os computers installed with google maps			GIS					On process		
							earth pro linked with the majics system for easy communication										
							◆ Have all T.Os & Plumbers phones installed			ICT					Partly done		
							with google for efficiency										

Schedule (2021 1st Qua.: Jul–Sep; 2nd Quarter: Oct–Dec; 2022 3rd Qua.: Jan–Mar; 4th Quarter: Apr–Jun; then by quarter for 2022-23, 2023-24, 2024-25, 2025-26: 1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun)

Activity	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	22-23 1st	22-23 2nd	22-23 3rd	22-23 4th	23-24 1st	23-24 2nd	23-24 3rd	23-24 4th	24-25 1st	24-25 2nd	24-25 3rd	24-25 4th	25-26 1st	25-26 2nd	25-26 3rd	25-26 4th
To hire more staff when need arises																												
To improve employment terms	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→										
To formulate interdepartmental nrw steering committee	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
To develop SOPs	→	→	→																									
QGiS training for all technical officers	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→												
Nrw team to have 4 benchmarkings	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→												
Benchmarking with WASPA and other WSPs	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→												
Water utility regional partnership workshops	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→												
JICA expert trainings	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→												
To carry out sensitization workshop and seminars	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Replacement of leaking Airvalves								→	→				→															
Creation of fully functional DMAS								→	→				→	→	→	→												
Clibration of Mater meters								→	→																			
rehabilatation of kaunda								→	→				→	→														
Establisment of call centre and toll free line							→	→	→																			
Procurement of ERP system																												
Use of social media platform for customer sensitization	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→												
customer sensitization on notification of iilegal water use	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
To implement and review existing plans	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Analysing the billing data and take action			→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Develop KPI monitoring tool				→	→	→	→	→	→	→	→	→																
Hold monthly meetings	→	→	→	→	→	→	→	→	→	→	→	→																
Procurement of insertion & UFM meters								→																				
Develop and operationalize a metering policy				→																								
Pressure management								→																				
Procurement of pipe thickness ultra-gauge										→																		
Procurement of pressure loggers	→	→	→	→	→	→	→	→	→	→	→	→																
Data collection							→	→																				
Update of GIS system	→	→	→	→	→	→	→	→	→	→	→	→																
Data collection and update of GIS							→	→	→																			
Meter readers and plumbers to take and share real time photos	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Set targets to be achived									→	→	→	→																

[1-3] Results of the Assessment for 2021-2022 | [2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) | Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans | [3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 | Step 5: Describe Progress Briefly

RESULTS — Overall Level: 72 % - L 4

Category: Main Level	Sub Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1st Priority is Highest & No Need at 5th Priority)	Target Level (%) in 5 years	Target Level (%) in 1 year	[2-2] Annual NRW Reduction Plan (2021-22) — Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	2021 1st Qua. Jul	Aug	2nd Quarter Sep	Oct	Nov	2022 3rd Qua. Dec	Jan	Feb	Mar	4th Quarter Apr	May	Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2025-26 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[B] CIS, NRW Monitoring, Zoning & Water Balance A. — 63 % - L 4	(a) Monthly NRW Monitoring & Zoning — 59 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	92 % - L 5	2	100	100	◆ To hire data management analysit ◆ To produce reports ◆ Generate reports for both billed & unbilled water ◆			HRM NRW NRWS		Hire 1 no staff	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	On progress Done monthly Done monthly	1 intern Done monthly Done monthly		
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	43 % - L 3	1	90	60	◆ allocate budget for zone isolation ◆ develop a zonning plan (hydraulic) ◆ Each zone to be installed with a master meter ◆ The meters to be serviced frequently and ◆ Have readings done on daily basis	NO. OF ZONE METERS CREATED less than 10% of stalled master meter readings on	2,500,000 10,000,000	hts GIS ALL T.O ,GIS AND NRWS NRW ALL T.O	Every billing cycle DAILY	done for dma meters 30 DMA METRS BUDGET FOR				→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	Budget allocated	planning stage and requisition of meters		
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	22 % - L 2	1	90	60	◆ Replace all faulty master meters () ◆ manhole construction. ◆ Ensure the EFM are transmitting data ◆ Calculate the NRW volume per zone ◆ Act accordingly on reducing NRW per zone	NO. of Manholes done TRANSMITTED DATA NRW LEVELS PER DMA Priolity actions	Byend of third evry billing cycle	Operations manager Metering head NRWS T.Os and NRWS	CONTINOUS MONTHLY		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	dma meters requested plan to install dma meters Working on ZONE 2			
	(c) Abnormal Flow Monitoring & Water Balance Table — 50 % - L 3	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	88 % - L 5	1	100	95	◆ Establish and strengthen the rapid response team ◆ enhance mainline patrols ◆ Ensure all the bursts reported are recorded in the system or kobo ◆ Bursts to be repaired within 24hrs Large customer monitoring ◆ DMA daily meter analysis on flows	DAILY PATROL REPORTS no. of burst reported in sulis and kobo Record on burst repairs		HTS T.OS customer care and T.Os ,KOBO operations	continous as they occur	to pay overtime	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	Pick allocated and and staff paid overtime Reports done	Pick allocated and and staff paid overtime done and enforced by T.Os		
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	3	80	50	◆ JICA expert trainings and assistance ◆ Formulate water balance table ◆ ◆ ◆	Trained staff		JICA expert team	as per their schedulle	Subject improvement covid 19 situation							→	→	→	→	→	→															done both physical and online	Done on billing analysis , gis and leak detection		
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	98 % - L 2	2	90	50	◆ Jica expert trainings and assistance ◆ improve on the formulated water balance ◆ ◆ ◆			JICA expert team	as per their schedulle	Subject improvement covid 19 situation							→	→	→	→	→	→															as above	not much on this		
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	(a) Starting from Large Customers (e.g. by NRW Section) — 82 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	60 % - L 4	1	100	100	◆ Udertake a billing data audit and clean up ◆ jica training to nrw staff ◆ Use GPS enabled phones. ◆ radom customer testings. ◆ monitor customer with other water source			JICA expert team	as per their schedulle	JICA EXPERT ASSISTANCE IS HIGHLY REQUIRED Lets the gps position being	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	meter tested which are suspected of low reading	meter tested and replaced if found underrigestering		
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	61 % - L 5	2	100	95	◆ weekly monitoring of large customer meters. ◆ meter sizing ◆ testing of large customer meters / replacing the faulty ones ◆ Daily monitoring of zonal meters Sealing of customer meters. Monitor construction sites.	meters visited continous after the billing ananlysis continous after the billing ananlysis		NRWS NRWS NRWS T.OS	continous after analyzing the billing data Monthly	done by the nrw team and carwashes Not working well	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	continous activity check as above	contious activity and testing those slowing down Replacing opaque and testing faulty .		
		(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	3	90	80	◆ as above ◆ ◆ ◆ ◆						→	→	→	→	→	→	→	→	→	→	→	→																				
	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service) — 79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	70 % - L 4	2	100	80	◆ conduct CIS quaterly ◆ Monitoring of disconnected customers . ◆ sensitizing of the community on water usage. ◆ Analysis on pending accounts. ◆			NRW DRU Pro poor and T.Os	annually		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	check of disc account done sometime as estimated accounts	checked along side the estimated accounts.		
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	86 % - L 5	3	100	90	◆ test 10% of all new meters before acceptance ◆ testing of pipes and fittings before acceptance ◆ do sample on new connection pressure test. ◆ istallation and re-installation of meters ◆			NRWS AND THE ACCEPTANCE COMMITEE T.O s NRW and T.O.	When items are derivered	To ensure all meters are installed	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	Re-installation to wrongly done	Done and meters were acceptable. done and all pipes were accepted. sytentizing the plumbers on the meter installation.		
	(c) System-related and Procedural/Instmal Improvements (e.g. by the Section in Charge of) — 86 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	5	100	100	◆ Improvent of the billing software ◆ adherence to use of the above software. ◆ Limitation of estimated bills to 3 months ◆			ICTM ALL ICTM																																		
		(24) Procedural/Internal Improvements against Illegal Water Uses	67 % - L 4	3	100	80	◆ incentives for illegal detectors and whisle blowers ◆ Engage external debt collector. ◆ charge for illegal connections as per the tariff. ◆ Review the incentive procedure to motivate more reports. ◆ follow up on old illegal water users.			NRWS/HTS/HFCS MD HEAD DRU(dept recovery unit)	Continous	PAY KSH 5000 PER EACH ILLEGAL DETECTED	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	External reporters paid Done when discovered and disc	no external report but internal but no payment Done as they are discovered and disc		payment of ksh 5000 to external and 5000sh to staff.

[1-3] Results of the Assessment for 2021-2022

RESULTS — Overall Level: 72 % - L 4

Main Category	Sub Category	Aspect (Sub-sub Category)	Level	Priority for Improvement (Low / Medium & Hi-Risk)	Target Level (%) in 5 years	Target Level (%) in 1 year
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	80 % - L 5	3	100	90
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	77 % - L 4	3	90	70
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	56 % - L 3	3	100	95
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	91% - L 5	3	90	80
		(29) Improvements for Underground Leak Detection	78 % - L 4	3	100	70
	(c) IF REQUIRED: Pressure Measurement &	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	70 % - L 4	3	90	75
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	63 % - L 4	3	80	65
	(d) IF REQUIRED: Leak Reduction with Large Investments	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs,	56 % - L 3	5	70	60
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	53 % - L 3	5	100	100

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-22)

Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
◆ give requirements to be incorporated in the SOPs ◆ mapping points with recurring burst on gis. ◆ use factory made repair sockets for pvc pipes and solfix adhesive. ◆ ◆ Use of Builtfusion on hdpe pipe repair.			T.O T.O	Continous	
◆ USE ACOUSTIC STICKS WHEN NECESSARY			NRW	when need arises	
◆rehabilitate kaunda estate ◆ Orion in BV ◆ Njukiri line ◆			HTS AND NRW T.O	Quarter One	works on going
◆ USE ACOUSTIC STICKS WHEN NECESSARY ◆ use of leak detectors. ◆ Use of Data Analysis - BABE approach (step test) ◆ ◆			NRWS		
◆ undertake leak surveys in identified high leakage zones ◆ conduct inhouse trainnings for use of leak detectors and acoustic sticks	No. of staff trained(20)	100,000	NRWS NRWS	continous exercise but with a target of (5 staffs per quarter)	
◆ FINISH PRESSURE MANAGEMENT IN ZONES 1 ◆ pressure planning for zone 3 ◆ ◆ ◆	PRV installed	500,000	NRWS AND GIS		
◆ pressure data collection ◆ develop a pressure map ◆ allocate budget for prvs installation. ◆	developed pressure map allocated asa above		HTS,NRWS AND		
◆ zoning with the help of gis with clear ◆ ◆ ◆	independent zones		NRWS AND GIS		
◆ prepare funding proposals / seek donor or ◆ ◆			HTS		not done
	Total Annual Cost (KSh.)	30,890,000			

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
	SOP draft done plan to use kobo to collect data to be implemented next quarter.		
Done on need basis	done as need arises.		
works has started and 40% done	90% done Requistion of the materials done		
Identification of the area	preparation of the BQ to the araes which require replacement		

[Example Modes of Implementation]

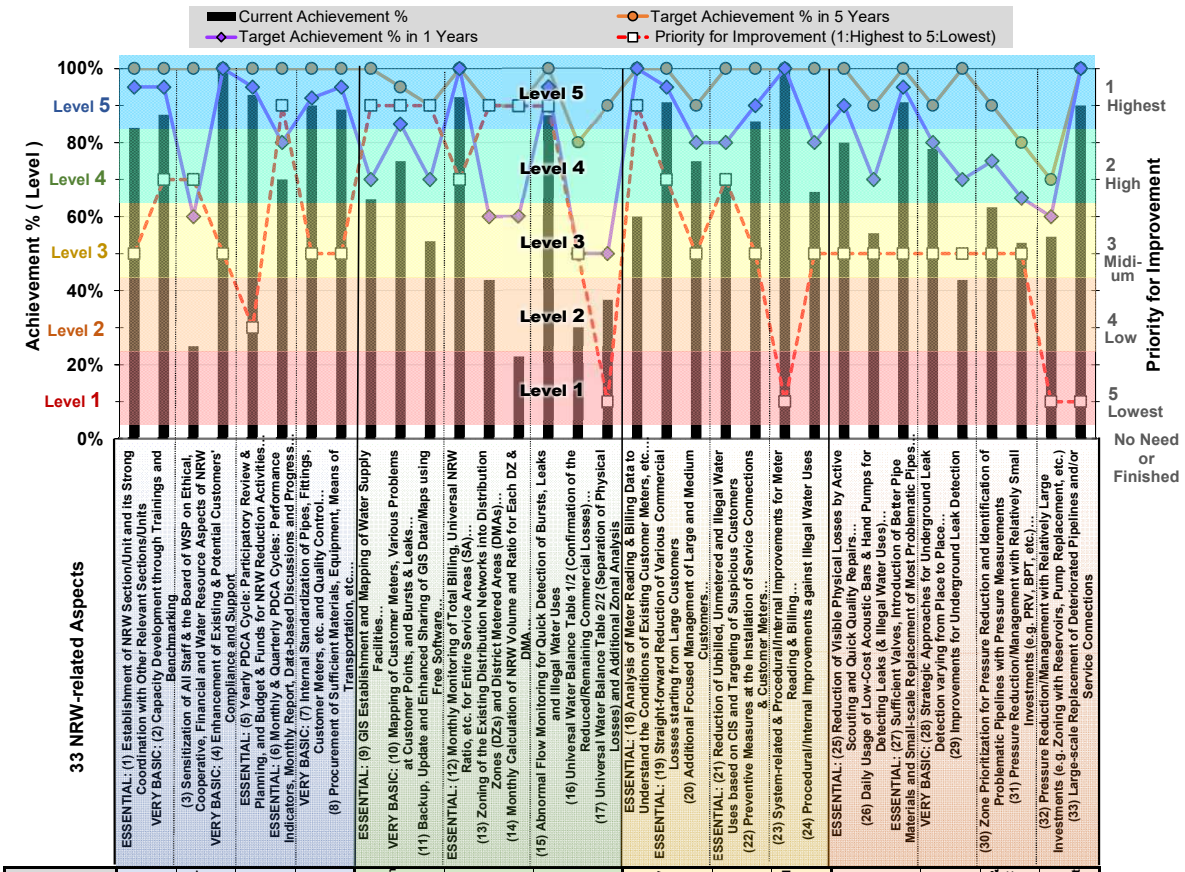
: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donor)
: Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)				
	85 % - L 5	63 % - L 4	83 % - L 5	89 % - L 5	63 % - L 4	59 % - L 3	50 % - L 3	82 % - L 5	79 % - L 4	86 % - L 5	77 % - L 4	70 % - L 4	56 % - L 3	71 % - L 4					
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)								
	82 % - L 5				58 % - L 3			82 % - L 5			69 % - L 4								
Overall Achievement % - Level	72 % - L 4																		

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2020-21

Annual NRW Reduction Plan				Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)	
1) ◆ **External Training of NRW Staff and O$M department**	HR	BY JULY 2022	slated for next quarter(0%)	7 staff members attended(35%)			
2) ◆ **Procure and install 25 bulk smart meters for DMA's**	NRW and procurement	2024	awaiting budget approval(10%)	selection of pilot area complete-ruiru & gitambaya dma(20%)			
3) ◆**Schedule and conduct inhouse training on NRW**	HR	BY JULY 2022	budget not allocated(0%)	budget not allocated(0%)			
4) ◆ **Use of media campaign to raise public awareness on NRW and how to save water through sms**	Customer Care	BY JULY 2023	on going through sociologist(40%)	on going through sociologist(40%)			
5) ◆ **Procure pipe locators**	procurement	2022	awaiting budget approval(5%)	awaiting budget approval(5%)			
6) ◆ **Procure and install 20 sub-dma meter for sub-dma monitoring**	NRW and procurement	2022	procument process underway (20%)	procument process underway (20%)			
7) ◆ **Purchase of modern UFM**	procurement	Sep-21	Acquired (100%)	Activity completed(100%)			
8) ◆ **Replacing old dilapidated UPVC pipes with HDPE pipe,**	O&M Section	2022	5 km replaced in milimaini,gachororo,kalimoni DMA(17%)	1 km replaced in juja farm,joyland(20%)			
9) ◆ **Conduct CIS**	BILLING	BY JULY 2023	completed githurai dma under billing and gis department(25%)	mugutha dma complete(50%)			
10) ◆ **conduct MNF**	NRW and HR	Jul-22	slated to begin in the next quarter (0%)	conducted in witeithie dma(33%)			
11) ◆ **Nrw training by JICA**	JICA	BY MAY 2022	Training ongoing(25%)	training ongoing(50%)			

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Ruiru-Juja WSP

[1-3] Results of the Assessment for 2021-22 — RESULTS: Overall Level 87 % - L 5

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21 — Step 5: Describe Progress Briefly

Category: Main Level	Category: Sub	Aspect (Sub-sub Category)	Level	Priority (for Improvement) (1: Highest Priority, 5: No Need & P. Problem)	Target Level (%): in 5 years	Target Level (%): in 1 year	[2-2] Annual NRW Reduction Plan (2021-22): Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	2021 1st Qua.: Jul	Aug	Sep	2nd Quarter: Oct	Nov	Dec	2022 3rd Qua.: Jan	Feb	Mar	4th Quarter: Apr	May	Jun	2022-23: 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24: 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25: 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2025-26: 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes	[3] Remarks: End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 94 % - L 5	(a) Staffing with Essential Support & Training	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	5	100	100	◆																																							
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	75 % - L 4	2	100	100	◆ External Training of NRW Staff and O&M department ◆ Nrw training by JICA	20 STAFF MEMBERS 5 STAFF MEMBERS	320,000	HR JICA	BY JULY 2022 BY MAY 2022		→	→	→	→	→	→	→	→	→	→	→	→																	slated for next quarter(0%) Training ongoing(25%)	7 staff members attended(35%) training ongoing(50%)		
	(b) Sensitization & Awareness Raising for Wider Support	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	100 % - L 5	4	100	100	◆Schedule and conduct inhouse training on NRW	40 STAFF MEMBERS	400,000	HR	BY JULY 2022		→	→	→	→	→	→	→	→	→	→	→	→																	budget not allocated(0%)	budget not allocated(0%)		
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	4	100	85	◆ Use of media campaign to raise public awareness on NRW and how to save water through sms		300,000	Customer Care	BY JULY 2023		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→													on going through sociologist(40%)	on going through sociologist(40%)		
	(c) PDCA Cycles (Plan-Do-Check-Adjust)	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	1	100	100	◆																																						
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	1	100	100	◆																																						
	(d) Suitable, Sufficient & Timely Procurement	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	2	100	100	◆																																						
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	100 % - L 5	2	100	100	◆																																						
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 95 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	100 % - L 5	3	100	100	◆																																						
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	75 % - L 4	3	100	80	◆																																						
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	100 % - L 5	2	100	100	◆																																						
	(b) Monthly NRW Monitoring & Zoning	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	1	100	100	◆																																						
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	100 % - L 5	1	100	100	◆																																						
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	100 % - L 5	1	100	100	◆																																						
	(c) Abnormal Flow Monitoring & Water Balance Table	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	100 % - L 5	1	100	100	◆ Procure and install 25 bulk smart meters for DMA's ◆ Procure pipe locators ◆ Procure and install 20 sub-dma meter for sub-dma monitoring	25 3 20	10 M 1.5M 372,000	NRW and procurement procurement NRW and	2024 2022 2022																																awaiting budget approval(10%) awaiting budget approval(5%) procument process underway (20%)	selection of pilot area complete-ruiru & oitambava dma(20%) awaiting budget approval(5%) procument process underway (20%)		
	58 % - L 3	(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	40 % - L 3	5	70	45	◆																																						
	38 % - L 2	(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	38 % - L 2	5	70	45	◆																																						
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & 89 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	1	100	100	◆																																						
	89 % - L 5	ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	91 % - L 5	3	100	95	◆																																						
		(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	3	100	80	◆																																						
	(b) Activities for New & Various Problematic Customers (e.g. by	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	100 % - L 5	1	100	100	◆																																						
	100 % - L 5	(22) Preventive Measures at the Installation of Service Connections & Customer Meters	100 % - L 5	2	100	100	◆																																						
	(c) System-related and Procedural/Inter	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	1	100	100	◆ Conduct CIS	4 DMAS	500,000	BILLING	BY JULY 2023																																completed githural dma under billing and qis department(25%)	mugutha dma complete(50%)		
	100 % - L 5	(24) Procedural/Internal Improvements against Illegal Water Uses	100 % - L 5	1	100	100	◆																																						

[1-3] Results of the Assessment for 2021-22

RESULTS Overall Level 87 % - L 5

Category Aspect (Sub-sub Category)

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)

[2-2] Annual NRW Reduction Plan (2021-22)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2020-21

Step 5: Describe Progress Briefly

Main Level	Sub Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest Priority, 2: Next Priority, 3: No Needs for Priorities)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	2021 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2022 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2025-26 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes	Remarks on the Implementation of Planned Activities: End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[D] Reduction of Physical (Real) Water Losses (i.o. Bursts, Leaks & Overflows) 83 % - L 5	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 83 % - L 5	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	100 % - L 5	2	100	100	◆																																				
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	44 % - L 3	2	100	60	◆																																							
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	100 % - L 5	1	100	100	◆																																							
	(b) Underground Leak Detection in a Priority DZ(s) 90 % - L 5	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	96 % - L 5	3	100	98	◆ conduct MNF	3	200,000	NRW and HR	Jul-22		→	→	→	→	→	→	→	→	→	→	→	→																			slated to begin in the next quarter (0%)	conducted in witeithie dma(33%)		
		(29) Improvements for Underground Leak Detection	71 % - L 4	2	100	90	◆ Purchase of modern UFM	1	320,000	procurement	Sep-21		→	→	→																												Acquired (100%)	Activity completed(100%)		
	(c) IF REQUIRED: Pressure Measurement & Pressure 32 % - L 2	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	63 % - L 4	5	100	70	◆																																					
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	18 % - L 1	5	100	36	◆																																						
	(d) IF REQUIRED: Leak Reduction with Large Investments 95 % - L 5	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	91 % - L 5	4	100	94	◆																																					
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	100 % - L 5	2	100	100	◆ Replacing old dilapidated UPVC pipes with HDPE pipe,	30km	10M	O&M Section	2022																																5 km replaced in milimaini.oachororo.kalimoni DMA(17%)	1 km replaced in juja farm,joyland(20%)		
							◆																																					
							◆	Total Annual Cost (KSh.)	2,412,000																																					

[Example Modes of Implementation]

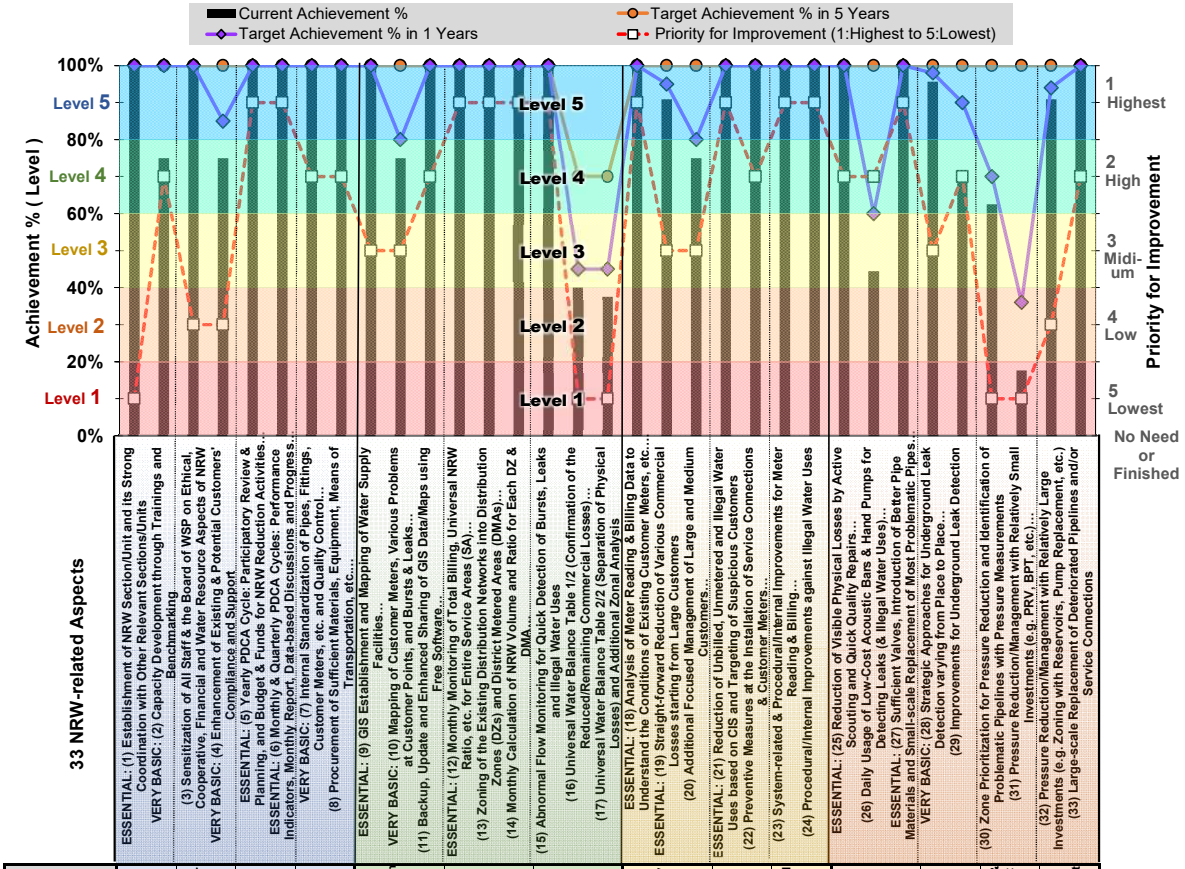
: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
⇒ : Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	94 % - L 5	88 % - L 5	100 % - L 5	100 % - L 5	95 % - L 5	100 % - L 5	58 % - L 3	89 % - L 5	100 % - L 5	100 % - L 5	83 % - L 5	90 % - L 5	32 % - L 2	95 % - L 5
Main Category Achievement % - Level	**[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement**				**[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis**			**[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.**			**[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)**			
	96 % - L 5				86 % - L 5			94 % - L 5			75 % - L 4			
Overall Achievement % - Level	87 % - L 5													

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Nakuru WSP

[1-3] Results of the Assessment for 2021-22 — RESULTS — Overall Level: 81 % - L 5

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25) — [2-2] Annual NRW Reduction Plan (2021-22) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

Step 5: Describe Progress Briefly

Category: Main	Level	Category: Sub	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5 :Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	84 % - L 5	(a) Staffing with Essential Support & Training	84 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	79 % - L 4	4	95	85	Distribution team currently oversee all the NRW activities ◆ ◆ ◆						The section has been coordinating with other relevant units to reduce NRW globllally			
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	100 % - L 5	5	100	100	Training of NRW staff and capacity building has been planned under upcoming KFW project The exististing trainings by WASPA and JICA are expected to ◆ ◆	12	300,000	KFW /	WITHIN FY 2021/2022		resumpton of internal toolbox meetings have started and NRW issues will be discussed.	Benchmarkng meetings, and trainings through donor funded projects such as JICA, Kfw has been going on		
		(b) Sensitization & Awareness Raising for Wider Support	81 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	88 % - L 5	2	100	95	continuos engagement and awareness of staff on given priority NRW impact to the organisation is always communicated ◆ ◆	ALL STAFF	N/A	IN HOUSE	WITHIN FY 2021/2022		Toolbox inter departmental meetings has been schedule to resume so as to enhance NRW coordination activities	Enhancement of senzitization trainingshas been extended to schools to help in reporting water leaks and water theft		
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	4	90	80	◆ Periodic visits to schools has been started to train young learners on the need to conserve water by reporting leaks and water wastage ◆	3 schools per year	80,000	nrw and PRO office	WITHIN FY 2021/2022			toll free lines has been provided to customers to help in reporting water issues such as leakages		
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	92 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	2	100	100	There is an upcoming project under KFW which will cover parts of southern zone in NRW reduction activities ◆ ◆	3 DMAs proposed within the zone	The amount to be confirmed	KFW	WITHIN FY 2021/2022 AND BEYOND		The PDCA cycle tool has been adopted as a messure of tracking performance	PDCA is always applied to monitor progress in activities		
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	80 % - L 5	4	95	90	toolbox meetings are held periodially to discuss NRW further progress and the way forward in reducing NRW ◆ ◆ ◆	30 Staff	N/A	IN HOUSE	WITHIN FY 2021/2022		The PDCA cycle tool has been adopted as a messure of tracking performance	PDCA is always applied to monitor progress in activities		
		(d) Suitable, Sufficient & Timely Procurement	90 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	90 % - L 5	4	100	95	standard specifications have been laid down to ensure proper and quality water fittings are procured ◆ ◆	all water fiitings	N/A		continuos		Materials and fittings acceptance team has been formed to monitor quality of supplied material	Materials and fittings acceptance team has been formed to monitor quality of supplied material		
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	0	0	0	Additional tools and materials have been budgeted geared towards NRW reduction e.g water meters, servicing of leak detection equipments, pipe wrenches,laptops and smartphones ◆	2 laptops. 18 smarth phones and 36 phones and 36 pipe wrenches	300,000	TM	WITHIN FY 2021/2022		requisition raised and it is awaiting procurement at 30% implementation after requisition	Laptops delivery still pending rating stillat 40%		
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	88 % - L 5	(a) Mapping/GIS Development & Utilization of Free Mapping Software	88 % - L 5	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	88 % - L 5	4	98	92	continuos updating of new facilities is carried out periodically ◆	1 more		GIS OFFICER	WITHIN FY 2021/2022		One intern recruited and mapping of existing and new facilities has been enhanced.	mapping of new water infrastructure is on course		
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	63 % - L 4	0	0	0	With the acquistion of smarthphones plumbers are expected to capture leaks and bursts and leaks ◆ ◆ ◆						mapping of leaks and bursts is done by booking on hard copies since the artisans are awaiting to be provided with smart phones, this means implementation is at 30%	mapping still on hard copies		
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	100 % - L 5	0	0	0	periodical inhouse trainings to equip staff on basic 2020/2021 GIS skills have been planned for this FY ◆ ◆	30 Staff	N/A	IN HOUSE training	WITHIN FY 2021/2022		periodically carried out by the unit and about 13 staff have been trained which is 45% of the target number	still at 60% the training has been enhanced to zones/ commercial section supervisors		
		(b) Monthly NRW Monitoring & Zoning	86 % - L 5	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	0	0	0	constant NRW calculation and analysis is done performance periodically with an intention for review production meters calibrated twice a year ◆	ALL ESTABLISHED DMAs and production meters	N/A	nrw officer	continuos		periodically carried out	periodically carried out		
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	86 % - L 5	4	95	90	Southern zone has been proposed to be subdived into 3 DMAs under Kfw project ◆ ◆ ◆	3	the cost to be confirmed	Kfw	WITHIN FY 2021/2022		expected to commence in january 2022 currently at 10% implementaion	mapping commenced rating at 20%		
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	4	98	95	new upcoming DMAs will be given closer attention to reduced the global NRW figures in this FY ◆ ◆ ◆	ALL DMAs	N/A	nrw officer	continuos		NRW monitoring is a continuos activity running to track on the trends and take action immediately	Nrw calculation done monthly		
		(c) Abnormal Flow Monitoring & Water Balance Table	85 % - L 5	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	88 % - L 5	3	100	90	With closer monitoring of DMA bulk meters (taking daily readings) it will be easier to detect abnormal water flows ◆ ◆	ALL DMAs	N/A	nrw officer	continuos		forthnigh and weekly bulk meter reading to monitor flows is regularly done	forthnigh and weekly bulk meter reading to monitor flows is regularly done		
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	70 % - L 4	4	90	80	intensifying of leak detection activities and step testing to acieve areliable water balance. testing to acieve a reliable testing to acieve areliable water balance. This activity has running in eastern zone Visiting disconnected customers and customers with bad history	5 zones		LEAK DETECTION and illegal use unit	WITHIN FY 2021/2022		Most parts of southern zone has been covered with reports indicating frequent leaks due to aged network	Northern zone is under focus inleak detection activites including continuation of the same in southern and eastern zone		
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	100 % - L 5	4	100	100	Minimum night flow measurements and step testing plannned to be carried out in eastern zone, Northern and Southern ◆ ◆ ◆	3 zones	350,000	LEAK DETECTION	WITHIN FY 2021/2022		in order to arived at reliable water balance, MNF measurements will be carried out in parts of southern zone and Eastern zone	Northern zone is under focus inleak detection activites including continuation of the same in southern and eastern zone to give an estimate on physical losses		
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling &	80 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	80 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	90 % - L 5	4	100	raiin g	Billing analysis concept will be used to analyse water consumption for various categories ◆ ◆ ◆	250 large consumers and 1000 medium large consumers	N/A	illegal use unit and	WITHIN FY 2021/2022		done by utilising JICA EXPERTISE on billing analysis illegal use team following up on 200 cases already identified	done by utilising JICA EXPERTISE on billing analysis illegal use team following up on 450 cases already identified		
				ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	85 % - L 5	4	90	88	large consumer and medium large consumer meters will be visited after carrying out billing analysis ◆	1500	N/A	ILLEGAL USE UNIT	WITHIN FY 2021/2022		illegal use team following up on 200 cases already identified which is 13% of the target	30% of the target that is 450 cases have been followed up		
				(20) Additional Focused Management of Large and Medium Customers	58 % - L 3	5	90	68	frequent analysis to be conducted to monitor the trends of large and medium large consumers ◆	700	N/A	illegal use and	WITHIN FY 2021/2022		illegal use team following up on 200 cases already identified which is 29% of the target	335 meters have been inspected which is 48% of the target		
		(b) Activities for New & Various Problematic Customers (e.g. by the	79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	70 % - L 4	4	90	75	replacement of tamper proof meters to curb on meter tampering is to curb on meter tampering is still taking the lead. Visiting dormant Visiting dormant and disconnected accounts will be contacted ◆ ◆	1000	N/A	illegal use and	WITHIN FY 2021/2022		300 meters already replaced and the impact of the same being closely monitored which 30% of the target	560 meters of the target have been replaced, which is 56% of he target		
				(22) Preventive Measures at the Installation of Service Connections & Customer Meters	86 % - L 5	4	95	0	Relocation of meters next perimeter wall sealing of meters along the liners ◆	500 1200	N/A	illegal use team illegal use team	WITHIN FY 2021/2022 WITHIN FY 2021/2022		100 meters already reloacted which 20% of the target number 250 meters have been sealed which is 21 % of the target number	240 meters have been relocated which is 48% of the target		
		(c) System-related and Procedural/Intern	100 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	4	100	100	◆									
				(24) Procedural/Internal Improvements against Illegal Water Uses	100 % - L 5	5	100	100	◆		250,000	illegal use team	WITHIN FY 2021/2022		Regular followups on customers with the habit of water theft and inspecting premises across the entire service area	Regular followups on customers with the habit of water theft and inspecting premises across the entire service area		

Schedule (bar chart columns):

2021 1st Qua.			2nd Quarter			2022 3rd Qua.			4th Quarter			2022-23				2023-24				2024-25				2025-26				Notes
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	

[1-3] Results of the Assessment for 2021-22

RESULTS — Overall Level: 81 % - L 5

Category — Aspect (Sub-sub Category)

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2020-21 to 2024-25)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-22)

Main Level	Sub Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (Priority 1-5 / Lowest as No. Rated & F. Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 90 % - L 5	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 90 % - L 5	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	100 % - L 5	5	100	100	leak search by use of acoustic rods and line patrolling to be intensified in areas of eastern zone	eastern zoneand Northern	N/A	leak detection team	WITHIN FY 2021/2022	
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	89 % - L 5	4	100	95	expanding the usage of acoustic rods will be enhance if more acoustic rods will be aveil this FY	30	120,000	TM	WITHIN FY 2021/2022	
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	82 % - L 5	4	95	85	More isolation valves will be procured under Kfw project project in the southern zone	56 valves	1,500,000	kfw	WITHIN FY 2021/2022	
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	74 % - L 4	4	90	80	Upscaling leak search by use of leak detection activities will be enhanced in parts of Eastern and southern zone	3 zones	N/A	LEAK DETECTION TEAM	WITHIN FY 2021/2022	
	72 % - L 4	(29) Improvements for Underground Leak Detection	71 % - L 4	4	90	80	Upscaling leak search by use of leak detection activities will be activities will be enhanced in parts of Eastern and southern zone southern zone	3 zones	N/A	leak detection team	WITHIN FY 2021/2022	
	(c) IF REQUIRED: Pressure Measurement & Pressure	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	63 % - L 4	4	90	84	Under Kfw upcomig project presure measurements will be contacted in areas with high pressures but weak network	southern zone		Kfw	WITHIN FY 2021/2022	
	54 % - L 4	(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	65 % - L 4	4	85	74	expected to be done in future when water production improve improve					
	L 3	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump	0 % - L 1	0	0	0						
	(d) IF REQUIRED: Leak Reduction with Large Investments	(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	100 % - L 5	4	95	87	Renewal of pipe network to be carried out in Southern zone under Parts of Nothern zone (Bangladesh) has been considered for network upgrading in this FY	Southern zone to be quantified in course and for Bagladesh 12km is expected tobe renewed	Bangladesh (Ksh. 16 M)	Kfw and internally		
	45 % - L 3							Total Annual Cost (KSh.)	2,900,000			

Sub Level	2021 1st Qua. Jul	Aug	Sep	2nd Quarter Oct	Nov	Dec	2022 3rd Qua. Jan	Feb	Mar	4th Quarter Apr	May	Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2025-26 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes
(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs																													
(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its																													
(c) IF REQUIRED: Pressure Measurement & Pressure																													
(d) IF REQUIRED: Leak Reduction with Large Investments																													

Step 5: Describe Progress Briefly

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
already carried out leak search activities in parts of estern zone;Mawanga, engashura and st.marys and 4 areas to be covered in the next quarter	Northern zone (tiriki avenue) is under focus in the next leak detection activities		
currently, available acoustic rods are only used by leak detection team and when there is a need from other sections the equipment can be shared	currently, available acoustic rods are only used by leak detection team and when there is a need from other sections the equipment can be shared		
proposed valves will be aveil when Kfw project commenced inJanuary 2022, so currently valve acquisition and installation for this quarter is at 0%	awaiting kick off of kfw project		
already carried out leak search activities in parts of eastern zone; Mawanga, and St. Marys with 4 other areas to be covered in the next quarter	Northern zone (tiriki avenue) is under focus in the next leak detection activities		
already carried out leak search activities in parts of estern zone;Mawanga, engashura and st.marys and 4 areas to be covered in the next quarter	Northern zone (tiriki avenue) is under focus in the next leak detection activities		
As a means of checking the condition of existing pipes. mapping has been contacted by use of pressure loggers in parts of southern zone Ranging between 2 to 4 bars	pressure mapping underway in eastern zone as more boreholes are expected to be commissoned		
Use of PRVs and BPTs not a priority due to low pressure across the entire system			
Use of PRVs and BPTs not a priority due to low pressure across the entire system			
the activity is expected to start in January 2022, under Kfw schedule, While Bangldesh zone will commenced also in Jannuary genreally project rating is at 10%	prelimenary preparation has commenced and currently at 15% rating		

[Example Modes of Implementation]

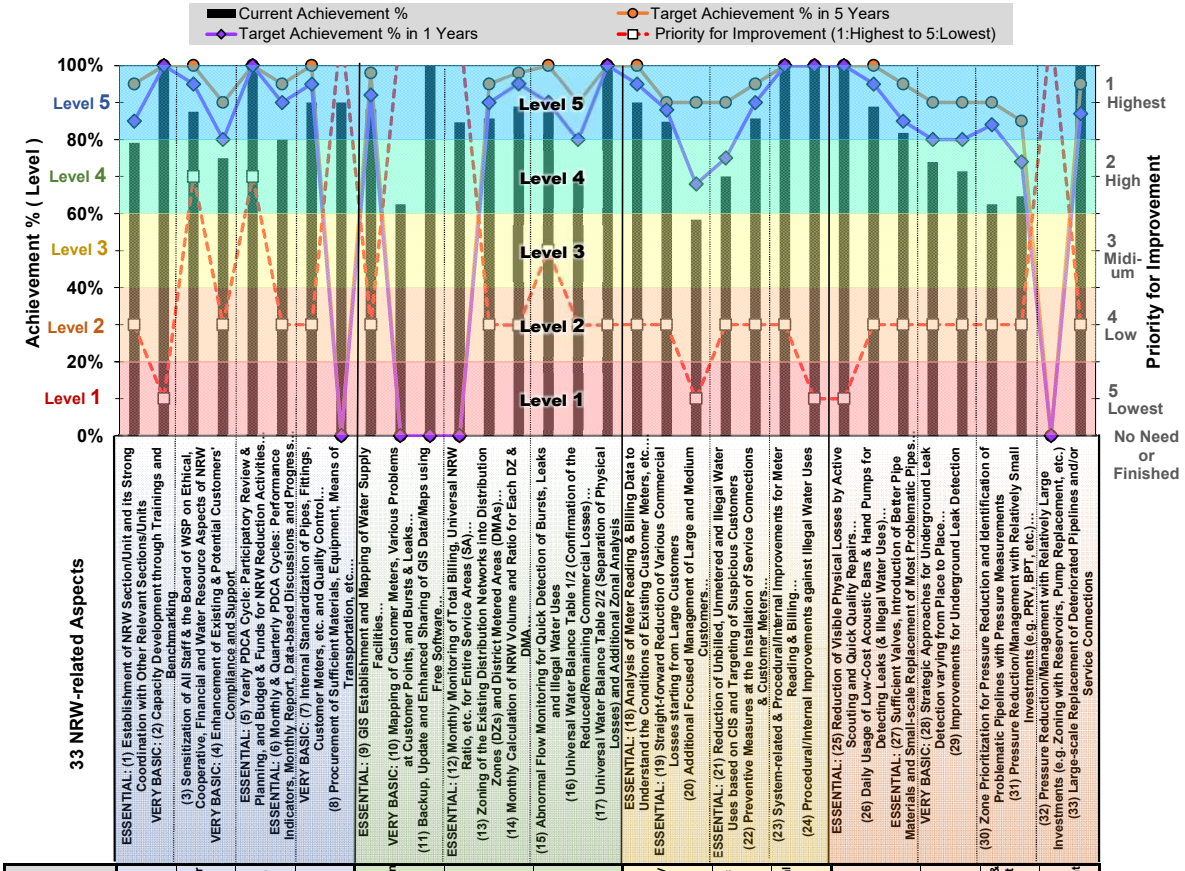
: Intensive work period with operational expenditures
: Less intensive period with operational expenditures
: Intensive work period with capital investment (without donner)
: Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	84 % - L 5	81 % - L 5	92 % - L 5	90 % - L 5	88 % - L 5	86 % - L 5	85 % - L 5	80 % - L 5	79 % - L 4	100 % - L 5	90 % - L 5	73 % - L 4	64 % - L 4	48 % - L 3
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	87 % - L 5				86 % - L 5			83 % - L 5			71 % - L 4			
Overall Achievement % - Level	81 % - L 5													

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) Customer identification survey	MD	Apr-21				Finished
2) System audit of new billing software	ICT Manager	Jan-21		To be completed		
3) Relocation of pipeline that are within road reserves to avoid	Chief Technical	Jun-21				
4) Purchase of stand by leak detection equipment	Procurement	Mar-21			Purchase done	
5) Employmentt of atleast 6 staffs to NRW Section	HR Manager	Jan-21				
6) Additional coding of DMA accounts into the billing system	ICT Manager	Dec-21		Completed		
7) Purchase of transportation facility(4W Double cab)	Procurement	Mar-21				
8)						
9)						
10)						

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Kisumu WSP

[1-3] Results of the Assessment for 2021-22 — RESULTS — Overall Level: 70 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-21-22)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-2022 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main Category	Level	Sub Category	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	59 % - L 3	(a) Staffing with Essential Support & Training	59 % - L 3	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	63 % - L 4	2	100	100	Additional staff i.e leak detection surveyor and Asset management technician	6	5,000,000	CETS,HR	3rd QUARTER		Still lacking but made proposal to Management	Proposal made and is under consideration		
									Lack of incentive especially for people working at night ◆ ◆	6	500,000	CETS,HR	3rd quarter	should be considered	No incentive yet	No incentive approved yet		
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	50 % - L 3	3	95	80	Refresher training of staff at KEWI	10	1,000,000	CETS,HR	3RD QUARTER		Proposed for 3rd quarter	Proposal made to the management		
									Bench marking to NYEWASCO	20	100,000	NRWE,CETS	3RD QUARTER		To be done in 3rd quarter	proposal made		
		(b) Sensitization & Awareness Raising for Wider Support	75 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	63 % - L 4	2	95	70	Weekly sensitization of NRW activities and internal training ◆	All staff	400,000	NRWE	Weekly		Suspended currently however there is oversight committee	Sensitization being done through oversight meeting and monthly reports		
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	88 % - L 5	0	100	100	use of Media campaign to raise public awarenes on NRW and how to save water through sms	Customers	300,000	NRWE,CETS,CORPORATE	Immediately		Not yet The customers are being informed of the free toll lines for messaging through social media On going through facebook and twitter accounts	The customers are being informed of the free toll lines for messaging through social media Sensitization through social media		
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	79 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	71 % - L 4	3	100	95	Plan of action and activities of NRW section			NRWE	Immediately		Plan put in place and implementation on going but not all activities as scheduled due inadequate staff	The action plan is in place and the activities are on going apart from leak detection survey		
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	90 % - L 5	4	100	98	Monthly reporting of nrw section analysis and the actions which needs to be taken			NRWE	Monthly		Release of the monthly analysed report to the relevant and in Oversight committee	Monthly report release highlighting the necessary action to be taken		
		(d) Suitable, Sufficient & Timely Procurement	60 % - L 4	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	70 % - L 4	0	95	70	Feedback on the quality of materials used from Field staff like foremen and plumbers			Foremen,Plumbers, NRWE,Cets	Continuosly		feedback being provided	Expected feedback from plumbers through the supervisors		
									Recommending on the suitable type of Bulk meters to be procured			NRWE,IME	Continously		Use of the best type of meters	With the continous testing and monitoring of different types of meters,the metering unit reccomends on the best type of meters to be procured.		
									Inspection and Acceptance committee task tasked to check and reject faulty materials			Inspection and Acceptance committee	Continous		Routine inspection of the procured materials	Regular sampling of procured materials by inspection committee on the quality of the materials		
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	50 % - L 3	1	100	70	Need to stock sufficient and relevant materials for Burst and leak repairs			NME,CETs,NRWE	Continously		sufficient stock	Stock is availed though at times some materials are missing for longer period,and there is need to maintain minimum stock level		
									Avail means of transport for NRW activities			MD,CETs	3rd Quarter		Needs capital investment	Capital investment required to actualize		
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	73 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	73 % - L 4	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	76 % - L 4	3	100	85	Establishing a fully-utilizing GIS database for use with different sections		2,000,000	GIS	Continueing		80 % of development	The development is at advance stage and its almost being intergrated to the mainstream system		
									Train the staff to use free Gis softawre for mapping		100,000	GIS	Immediately		Most staff have been trained on how to map	Most of the staff have been trained on the use of the GPS machine		
															Gis team are updating th boundaries on regular basis.	GIS team are collaborating with other sections to ensure any old and additional pipeline are mapped and updated		
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	50 % - L 3	2	100	70	Mapping areas with frequent leakeges		300,000	GIS	Immediately		The mapping has started though low because of lack of smart phone/gps machines and 30% of the leakages are mapped on monthly basis	All customer meters are mapped at installation but burst and leakeges mapping are at an average 20-30%		
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	80 % - L 5	3	100	90							All new customers are mapped at the point of connecetion as old custmers being added as they are found.			
									Sharing the coordinates of the mapped facilities ,pipeline and other installations			GIS	Monthly		updated in the system	the mapped facilities are updated regularly		
		(b) Monthly NRW Monitoring & Zoning	79 % - L 4	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	100 % - L 5	3	100	100	Monthly calculation of NRW ratio and billing analysis			NRWE,DATA	MONTHLY		Continous exercise	Monthly calculation of NRW of		
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)		1	85	50	Establishing of hydraulically isolated distribution zones		300,000,000	NRWE,GIS	3rd Quarter		sought for external technical assistance	sought for external technical assistance		
									Increase the number of DMAs ◆			GIS,NRWE	Quarterly		Gradual increase ,one more Dma has been created.	Proposal to make sure the crreated DMAs are working well and proposal for two more DMAs to be created.		
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	3	100	95	Calculation of NRW percentage for each DMA			NRWE	monthly		Monthly calculation of NRW of fully isolated DMAs	NRW Ratio is calculated monthly on all the working DMAs on monthly basis		
									Analysis of the fluctuation of production,consumption and NRW volume ◆			NRWE,Data Analyst	Monthly		Analysing the trend of consumption monthly and forwarding for action.	Monitoring the production and the consumption and recommending the appropriate action to be taken		
		(c) Abnormal Flow Monitoring & Water Balance Table	62 % - L 4	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	75 % - L 4	4	100	90	Installation of automatic pressure gauge ◆			Electromechanical	installed		Working in monitoring the pressure changes	The automation of the pumping system has helped to reduce burst associated with pressure		
									carrying out MNF exercise ◆ ◆			NRW team	monthly		The activity is carried in areas suspected to be loosing water	Scheduled activity in most DMAs		
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	50 % - L 3	2	100	70	Filling of the water balance ◆ ◆			Data analsyst	monthly		Monthly presentation	Monthly compilation of the		
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	63 % - L 4	4	100	70	presenting the water balance for the Whole company and for DMAs showing the different in physical losses and commercial losses			Data Analyst.NRWE	Monthly		Monthly filling of the template in each billing cycle	Monthly filling of the template in each billing cycle		

[1-3] Results of the Assessment for 2021-22 — RESULTS: Overall Level 70 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-21-22)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-2022 — **Step 5: Describe Progress Briefly**

Category: Main Level	Sub Level	Priority for improvement (1: Highest, 2: Higher, 3: Medium, 4: No Needs or Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	Notes	Remarks on the Implementation of Planned Activities: End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses). 80 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section) 80 % - L 5	3	100	100	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. 90 % - L 5			Data analyst	Monthly			Every billing cycle	Analysing the status of meters every billing cycle		
		4	100	100	ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers 91 % - L 5			IME,Meter Readers	Monthly			Monthly exercise Encourage use of calibrated buckets in the field.	Monthly profiling of large consumers with reduced consumption and recommending for testing		
		1	100	75	(20) Additional Focused Management of Large and Medium Customers 42 % - L 3			Meter Readers, Area manager,IME,NRWE	daily Quarterly			An app has been developed to help meter readers send the reading records daily tho the office and can be monitored by Supervisors Identification process on going of atleast 20accounts have been identified for relocation and 7 have been relocated	Daily meter reading to determine any deviation in consumption to enable get corrective action early enough. Proper sizing and relocation of large consumer meters to off take.And the process is on.		
	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service 54 % - L 3	1	100	70	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers 40 % - L 3			NRWE & IME Customer service,nrw team	3rd Quarter 4th Quarter			Atleast 17 hydrants have been metered and the rest are in the process of being installed. Planned to be carrired out before the end of the Financial Year	Atleast 21 hydrants have been metered and unused unmetered hydrants are reccommended for removal. Nrw section have proposed for the Customer Identification Survey before the end of the financial year		
		3	95	75	(22) Preventive Measures at the Installation of Service Connections & Customer Meters 64 % - L 4			IME,NRWE	Continous			Seals have been installed in some especially in KENYA_Re Kajulu	Use of wire strings during disconnection and special seals by inspection team in detering possible water theft		
	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of 79 % - L 4	1	95	95	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing 88 % - L 5			Data analyst Data Analyst	Monthly monthly			monthly categorizing of the anomalises and forwading for action. Identification of gaps in data management and forwarding for action.	Monthly analysis of the anomalies and forwading for appropriate action Identification of any billing gaps like missing accounts and updating for billing		
		3	95	80	(24) Procedural/Internal Improvements against Illegal Water Uses 67 % - L 4			NRW Team	Monthly			30% sample of connections checked for conformity with the standards and also the disconnections	30% sampling of disconnected accounts for verification and verification of accounts which have registered reduced consumption		
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 67 % - L 4	(a) Physical Lose Reduction Measures applicable without Isolating DZs and/or DMAs 67 % - L 4	2	90	70	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs 50 % - L 3		200,000	Installation of Tank level detectors NRW,& GIS	Contionous Quarterly			Atleast 5 tanks have tank level detectors with process on going to instal the rest in other tanks. proposed to be done quarterly though it was not perfomed in the 1st quarter	The 5 tanks have been fitted with tank level detectors and others are on procurement stage Proposal in place for quarterly scouting		
		1	95	75	(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) 56 % - L 3			Training the Disconnection team on how to use Acoustic Bars	NRWE 3RD quarter			proposed to train	Leakage survey using acoustic		
		3	95	95	ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes 91 % - L 5			Regular monitoring of pipe network in vegetation and water logged areas	NRWE Monthly			Regular spot check by NRW team	Dilapidated 6" line from Kajulu is being replaced and atleast 200meters have been replaced Nrw team ensures that all faulty valves are either serviced and/or replaced.		
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its 80 % - L 5	3	100	100	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place 91 % - L 5		1,000,000	Step Test MNF	NRWE Weekly NRWE Weekly			Monthly leak survey Monthly step test in DMAs Monthly MNF tests in the network.	Leak detection survey done on Dunaa 6" line Step test in all DMAs monthly MNF performed in Dunga and Sabuni Road DMAs		
		1	95	75	(29) Improvements for Underground Leak Detection 43 % - L 3			Underground leak detection survey	NRWE MONTHLY			Its happening though the activity has reduced due unavailability of a dedicated staff	Not performed in the second quarter due to several activity and few staff		
	(c) IF REQUIRED: Pressure Measurement & 72 % - L 4	4	100	90	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements 88 % - L 5			Pressure gauge installation in different distribution zones	Nrwe & Eletromechanical team monthly			Installed at Dunga treatment plant and occasional installation on the line for measurement at different areas	Pressure measurement is being done regularly especially on pump lines.		
		5	90	75	(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) 103 % - L			Installation of automatic pressure regulator	CETs,NRWE,ELECTROMEG 1st Quarter			One installed at Obwolo Tank	Automating pumping to regulate pressure in Dunga ,coptic and Obwolo tanks		
	(d) IF REQUIRED: Leak 57 % - L 3	5	90	65	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) 20 % - L			Installation of elevated tanks	NME,CETS			Not yet	No new elavated tanks installed		
		2	90	70	(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections 20 % - L			Planned overhaul of old asbestos lines and other problematic lines	NME 3rd Quarter			Proposed for 3rd Quarter	Being done on few areas		

Total Annual Cost (KSh.) **310,900,000**

[Example Modes of Implementation]

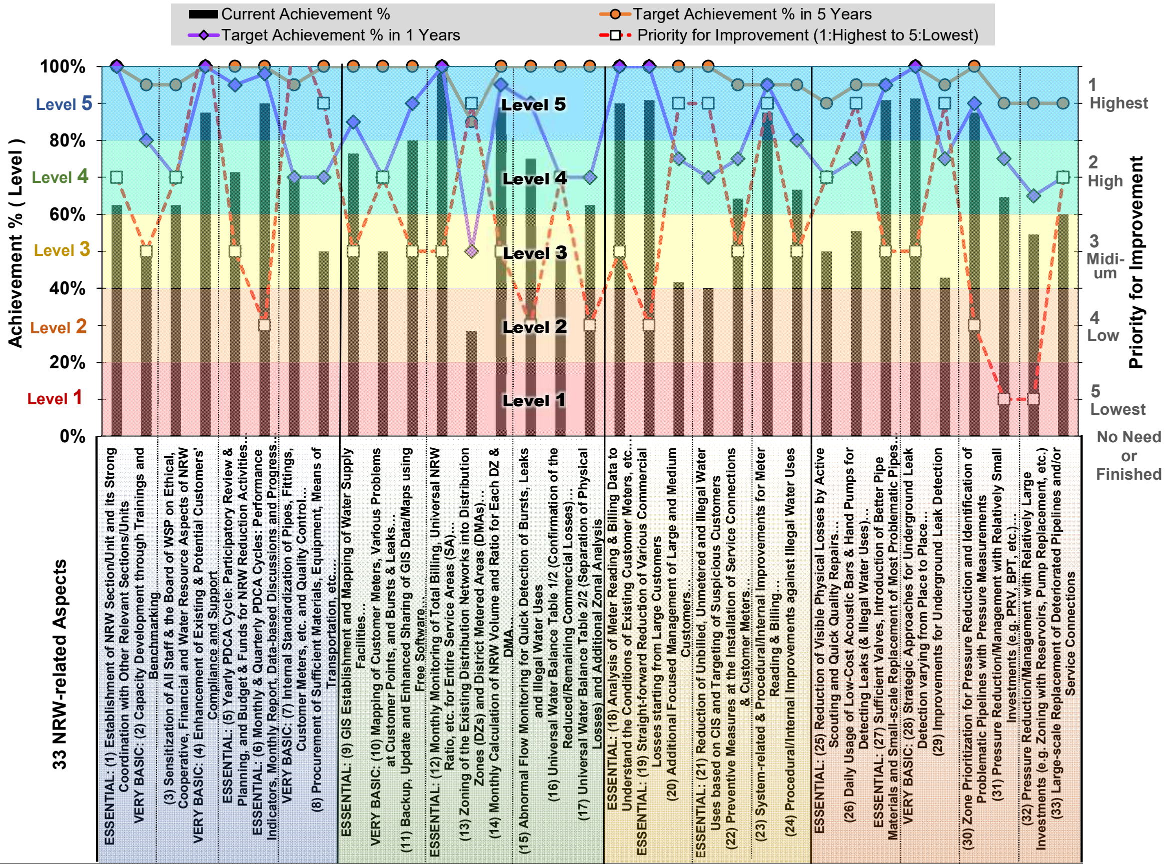
- : Intensive work period with operational expenditures
- → : Less intensive period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment (without donner)
- : Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Main Category	Main Category Achievement % - Level	Sub Category	Sub Category Achievement % - Level
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	67 % - L 4	(a) Staffing with Essential Support & Training	59 % - L 3
		(b) Sensitization & Awareness Raising for Wider Support	75 % - L 4
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	79 % - L 4
		(d) Suitable, Sufficient & Timely Procurement	60 % - L 4
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	72 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	73 % - L 4
		(b) Monthly NRW Monitoring & Zoning	79 % - L 4
		(c) Abnormal Flow Monitoring & Water Balance Table	62 % - L 4
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.	73 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	80 % - L 5
		(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	54 % - L 3
		(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	79 % - L 4
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	70 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	67 % - L 4
		(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	80 % - L 5
		(c) IF REQURED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	72 % - L 4
		(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)	57 % - L 3
Overall Achievement % - Level	70 % - L 4		

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ Conducting Customer Identification Survey (CIS) to locate all customers	ICT/GIS/METER READING	Mar-22	-	–		
2) ◆ Bulk meters have been sufficiently installed and properly installed.	NRW/CMT	Jun-22	3 bulk meters replaced and properly	4 bulk meters replaced and properly installed		
3) ◆ Inhouse trainings&Training at KEWI	HRM	Jun-22	-	20 staff trained		
4) ◆ Metering of fire hydrants to establish authorised unbilled consumption	NRW/CMT	Jun-22	-	1 hydrant metered (20%)		
5) (22) Preventive Measures at the Installation of Service Connections & Customer Meters	NRW/O&M/DISCONNECTION UNIT	Jun-22	-	-		
6) ◆ Installation of PRVs	NRW	Jun-22	-	1 PRV INSTALLED(11%)		
7)						
8)						
9)						
10)						

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Nyahururu WSP

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level: 76 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction

[2-2] Annual NRW Reduction Plan (2021-22)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main Category (Level)	Sub Category (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement (100 % - L 5)	(a) Staffing with Essential Support & Training (100 % - L 5)	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	100 % - L 5	3	100	100	◆ NRW Section/Unit fully operational and sufficient dedicated staff	5 Staff members	1,690,000	CMT	Throughout the year	Activity completed	Activity completed		
							◆								
							◆								
							◆								
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	100 % - L 5	2	100	100	◆ Inhouse trainings&Training at KEWI	60 staff	730,000	HRM	Jun-22	nil trainings	17 staff trained on leak detection		
							◆ Benchmarking	STAFF TO VISIT NYERI WATER	150,000	CMT	Jul-22	nil trainings	3 staff trained on meter reading		
							◆					-	-		
	(b) Sensitization & Awareness Raising for Wider Support (88 % - L 5)	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	100 % - L 5	1	100	100	◆Staff sensitization meetings	Monthly staff meetings	25,000	CMT	Throughout the year	3 Meetings held	2 Meetings held		
							◆								
							◆								
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	2	98	90	◆ conducting customer sensitization campaigns	One sensitization meeting per scheme per quarter	160,000	CMT	Jun-22	nil meeting	1 meeting		
							◆ conducting barazas								
							◆ electronic water bills/SMS, etc. carry sufficient messages asking customers for cooperation, such as notification of visible leaks and illegal water uses, to reduce NRW and excessive water uses	Elctronic bills sent every month	540,000	ICT &FAM	Throughout the year	all monthly bills sent	all monthly bills sent		
							◆ Social Media campaigns		nil	ICT	Throughout the year	nil	nil		
							◆ School campaigns	1 schools per quarter	20,000	PRO-POOR/NRW	Throughout the year	1 school visited	1 school visited		
	(c) PDCA Cycles (Plan-Do-Check-Adjust) (96 % - L 5)	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	93 % - L 5	1	97	95	◆ Participatory preparation of review & planning,	NIL	NIL	ALL	SEP 2021	activity in progress	activity completed		
							◆ Participatory preparation of budget & funds for NRW reduction activities			CMT	SEP 2021	activity in progress	activity completed		
							◆								
							◆								
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	1	100	100	◆ Prioritization of data to be collected periodically (monthly, quarterly and annually) for calculating useful performance indicators.	Data collection (various)	NIL	NRW	Throughout the year	done monthly	done monthly		
							◆ prepares of monthly report showing the progress and submission of the reports to its supervisor/manager	Monthly & quarterly reports	NIL	NRW	Monthly	3 monthly reports prepared	3 monthly reports prepared		
							◆ monthly coordination meeting for NRW reduction and discussions for improvements every month.	Monthly Meeting	NIL	TM/NRW	Monthly	3 meetings held	2 meetings held		
							◆								
	(d) Suitable, Sufficient & Timely Procurement (90 % - L 5)	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	90 % - L 5	1	100	95	◆ procurement of pipes, fittings, valves, bulk and customer meters, etc. is being done in accordance to the suitability and specifications.	Develop specifications for tendering	NIL	TM/OE	JULY 2021	done for this financial year	-	-	
							◆ The inspection & acceptance committee has been sufficiently strengthened to reject faulty and unmatched pipes, fittings, valves, meters	Form committee	NIL	CMT	JULY 2021	done for this financial year	-	-	
							◆ Some potion of each batch of new customer meters have been sent to a credited meter testing institution.	Send meters for testing during tendering	NIL	TM/OE	JULY 2022	done for this financial year	-	-	
							◆ Trace survey has been sufficiently conducted to evaluate durability and actual lifespan of newly procured customer meters	Keep record of faults found on the new type of meters being procured	NIL	NRW	Throughout the year	done monthly	done monthly		
							◆								
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	90 % - L 5	1	95	93	◆ NRW survey equipment (e.g. acoustic bars, calibrated buckets, portable ultrasonic flow meter, electric leak detector, noise correlator, pipe locator, pressure gauges with maximum pressure pointer / pressure loggers, hand pumps								
							◆ Office appliances and specialized hardware required for establishing or improving a GIS database (e.g. A3-size inkjet printer with scanner (or plotter) with spear inks, desktop or laptop PC, handheld GPSs, large PC monitor, etc								
							◆ official-use smartphones/tablets have been procured for improving NRW activities at site.	PROCURE 1 SMART PHONE. Have 5 smart	12,000	CMT	Throughout the year	5 smartphones in use	5 smartphones in use		
							◆ Sufficient transportation means have been secured for NRW reduction activities	Have 3 operational motorcycles for NRW	96,000	CMT	Throughout the year	3 operational motorcycles in use	3 operational motorcycles in use		
							◆								
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis (80 % - L 5)	(a) Mapping/GIS Development & Utilization of Free Mapping Software (80 % - L 5)	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	88 % - L 5	2	97	90	◆ Employment of sufficient GIS staff required for supporting NRW reduction activities.	Have one GIS staff	600,000	CMT	Throughout the year	I staff working on GIS	I staff working on GIS		
							◆ Preaparation of reliable GIS layers for water supply facilities,existing zones and public sanitation facilities		NIL	GIS	Throughout the year				
							◆								
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	63 % - L 4	3	90	70	◆ Mapping of areas and pipelines having many problems related to NRW, based on the perception of relevant staff through participatory mapping	Use combo collect to map areas with leak problems	NIL	GIS/Line patroler	Throughout the year	227 leaks mapped using kobo toolkit	125 leaks mapped using kobo toolkit		
							◆ Conducting Customer Identification Survey (CIS) to locate all customers	14000 customers	NIL	ICT/GIS/METER READING	Mar-22	-	-		
							◆ Preparation ofGIS layers of customer meters & kiosks		NIL	GIS	DONE				
							◆ Joining various problems at customer points listed in the monthly abnormality / complain reports to the customer meter layer and presented with categorized symbols								
							◆								
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	80 % - L 5	3	90	82	◆ GIS data is being backed up frequently into a secure data storage.	Purchase desktop computer for GIS	105,000	GIS/FAM/PO	JUNE 2022	NIL	purchase request submitted		
							◆ Capturing GPS coordinates of customer meters on site and mapped with QGIS		nil	METER READERS/NEW CONNECTION UNIT	Throughout the year	coordinates captured during meter reading and new connection installation	coordinates captured during meter reading and new connection installation		
							◆ Newly installed and replaced facilities such as customer meters, distribution pipelines, bulk meters, valves, etc. mapping without delay on the existing GIS layers		nil	GIS	Throughout the year	coordinates captured during installation	coordinates captured during installation		
							◆ Publishing of GIS layers on QGIS Could (free online GIS platform) by using QGIS Cloud plugin (free plugin of QGIS) and viewing of the online map from web bowsers on the PCs and smartphones of relevant staff		nil	GIS	Throughout the year	cloud GIS layers updated monthly	cloud GIS layers updated monthly		
							◆ Conversion of GIS layers such as customer meters into kmz files with Layer2kmz plugin (free plugin of QGIS) for viewing them with Google Earth (on PCs & smartphones) and/or MAPinr capable to search and navigate		nil	GIS	Throughout the year	kmz files layers sent to relevant user sections on biweekly basis	kmz files layers sent to relevant user sections on biweekly basis		
	(b) Monthly NRW Monitoring & Zoning (86 % - L 5)	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	1	94	88	◆ Bulk meters have been sufficiently installed and properly installed.	15 BULK METERS	1,728,000	NRW/CMT	Jun-22	3 bulk meters replaced and properly installed	4 bulk meters replaced and properly installed		
							◆ Accuracy monitoring of each bulk meter measuring production is being monitored based on the fluctuation of its monthly flow and periodically tested with a portable clamp-on UFM for the timely servicing and replacement of faulty bulk meters and/or meter calibration		NIL	NRW	Throughout the year	production master meters tested on monthly basis	production master meters tested on monthly basis		
							◆								
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	86 % - L 5	4	95	87	◆ establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required for the DMAs.			NRW/GIS	Jun-22	3 bulk meters replaced and properly installed	4 bulk meters replaced and properly installed		
							◆								
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	89 % - L 5	2	96	92	◆ Monthly zonal bulk meter reading for each DZ and DMA are to be done without delay to accurately calculate the monthly total inflow into each DZ and DMA			NRW/O&M	MONTHLY	Monthly zonal bulk meter reading done	Monthly zonal bulk meter reading done	Monthly zonal bulk meter reading done	
							◆ Accuracy monitoring of each zonal bulk meters based on the fluctuation of its monthly flow and periodically tested with a portable clamp-on UFM for the timely servicing, replacement and/or calibration of inaccurate bulk meters.			NRW	MONTHLY	2 zonal bulk meters tested using UFM	1 zonal bulk meters tested using UFM	3 zonal bulk meters tested using UFM	
							◆								

Schedule (2021: 3rd Quarter Jan–Mar, 4th Quarter Apr–Jun; 2022-23 to 2025-26 by quarter) — activities marked with arrows:

Activity	2021 Jan	Feb	Mar	Apr	May	Jun	2022-23 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2023-24 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2024-25 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	2025-26 1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	Notes
NRW Section/Unit fully operational and sufficient dedicated staff	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Staff sensitization meetings	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Prioritization of data to be collected periodically	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Prepares of monthly report	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Monthly coordination meeting for NRW reduction	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Trace survey	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Official-use smartphones/tablets	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Sufficient transportation means	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Employment of sufficient GIS staff	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Mapping of areas and pipelines having many problems related to NRW	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	

[1-3] Results of the Assessment for 2020-21 — RESULTS — Overall Level: 76 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction

[2-2] Annual NRW Reduction Plan (2021-22)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

(Schedule columns: 2021 3rd Quarter Jan, Feb, Mar; 4th Quarter Apr, May, Jun; 2022-23, 2023-24, 2024-25, 2025-26 each 1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun; Notes)

Main (Level)	Sub (Level)	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
	(c) Abnormal Flow Monitoring & Water Balance Table 38 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	88 % - L 5	1	96	89	◆ Use of free cloud-based online spread sheet (e.g. Google Sheet in Google Drive) for recording the bulk meter readings on site with smartphones and immediately getting the results of an automated analysis on abnormal flow to take actions quickly without going back to the office to report the readings and receive the result of analysis. ◆ Introduction and use of GSM, GPRS, AMR or SCADA to collect bulk meter readings and/or pressure measurements frequently for monitoring the abnormal flow increases or pressure drops ◆		NIL	ICT/NRW/GIS	DAILY	SPREAD SHEET IN USE -	SPREAD SHEET IN USE -		
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	0 % - L 1	2	50	10	◆Preparation of an universal water balance table of IWA for the entire service areas (SA for a recent year (or recent 12 months) using World Bank EasyCalc (free Excel-based software). ◆					-	-		
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	38 % - L 2	2	80	50	◆ Minimum night flow (MNF) measurements at the inlet point(s) of a DZ(s) or a DMA(s) with zonal bulk meter(s) and/or portable UFM(s) to roughly estimate the total volume of physical water losses and illegal water uses (part of it occurs at night) in each DZ or DMA ◆ Thorough active leak detections on distribution and service pipes in a DZ(s) or DMA(s) to estimate the physical losses from distribution pipes and the physical losses from service connections separately ◆								
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & ... 69 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section) 69 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	50 % - L 3	4	90	70	◆ Analysis of inconsistency between current status of disconnected customers and their recent meter reading and billing records ◆ Analysis of frequency of estimating consumption for each customer during the recent 12 month by customer category ◆	MONTHLY Quarterly	NIL NIL	COMMERCIAL OFFICER/NRW COMMERCIAL OFFICER/ NRW	THROUGHOUT THE YEAR THROUGHOUT THE YEAR	analysis done on monthly basis analysis done every 3 months	analysis done on monthly basis analysis done every 3 months		
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	79 % - L 4	3	95	83	◆ Preparation of printed GIS maps showing target customer meters to identify their locations on site ◆ ◆								
		(20) Additional Focused Management of Large and Medium Customers	58 % - L 3	3	90	65	◆ Formulation of policy for multiple customer meters serving the same customer integration into one account for each customer so that the amount of bill will increase properly in accordance with the incremental water tariff ◆								
	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service 79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	80 % - L 5	3	90	85	◆ Metering of fire hydrants to establish authorised unbilled consumption ◆	5	300,000	NRW/CMT	Jun-22	Activity not yet started. To commence in quarter 2	1 hydrant metered (20%)		
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	79 % - L 4	3	95	84	◆ Uses of plastic seals and/or other type of seals over the joints between all customer meters and service pipes ◆ Prevention or elimination of customers' illegal use of suction pumps directly connected to distribution pipelines which often damage customer meters. ◆ Replacement of aged service connections and installation of meter in proper orientation ◆	1822 accounts in Cosite area	2,000,000	NRW/O&M/DISCONNECTION UNIT ENFORCEMENT OFFICER TSM/NRW/O&M	June 2022	- - -	- - -		
	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of ... 86 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	100 % - L 5	5	100	100	◆ Update and cleaning of the customer data registered in the existing meter reading and billing system. ◆ Rotation of meter readers' routes to reduce corruption and inaccurate meter reading. ◆		NIL NIL	COMMERCIAL OFFICER METER READING SUPERVISOR	THROUGHOUT THE YEAR THROUGHOUT THE YEAR	updating done on a monthly basis rotation done after 3 months	updating done on a monthly basis rotation done after 3 months	-	
		(24) Procedural/Internal Improvements against Illegal Water Uses	67 % - L 4	90	100	70	◆ Incorporation of policies against illegal water uses (e.g. a heavy penalty) in the county water act and/or sufficiently supported by the county ◆ Enhancement of law enforcement against water theft on the ground by the county. ◆ Establishment of prevention measures against the involvement of staff such as plumbers and meter readers in illegal connections, meter bypass, meter tampering, etc. ◆ ◆			DONE CMT CMT	DONE DONE	COMPLETED			
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 67 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 67 % - L 4	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	80 % - L 5	2	97	85	◆ The improvement and utilization of relevant ICT system(s) for notifications of bursts & visible leaks from the public and a wide range of staff have been well registered and responded without being left out. ◆ Accumulation of detailed records of bursts and leaks including GPS coordinates, pipe diameter, material, type and cause of burst/leak, scale of water loss, date of detection, time taken for repair, (e.g. by using free data collection software such as Kobo Toolbox/Collect) to analyse them later with tables, graphs and GIS ◆		NIL	ICT ICT/GIS	THROUGHOUT THE YEAR THROUGHOUT THE YEAR	use of sms short code,social media and kobotool box ongoing use of kobotool box and customer management module on our billing system ongoing	use of sms short code,social media and kobotool box ongoing use of kobotool box and customer management module on our billing system ongoing		
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	56 % - L 3	4	90	65	◆ With hand pumps, new distribution pipelines having a relatively small diameter are tested under pressure at their installation by installation staff to confirm the non-existence of leaks from the pipelines ◆					-	-		
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	64 % - L 4	1	90	70	◆ Sufficient sluice/gate valves have to be installed on transmission and distribution pipelines and are kept accessible and operational to limit the volume of water losses ◆ The limited part of transmission or distribution pipelines having especially-frequent bursts and many reoccurring leaks of large amount (e.g. heavily deteriorated GI pipes, low-pressure-rating PVC pipes under high pressure, etc.), to be assessed and replaced selectively with better pipes. ◆	AT LEAST 15 Sluice valves to be installed At least 200m of pipes to be replaced	500,000	NRW/O&M/PO TM/OE/PO	JUNE 2022 JUNE 2022	-	-	- -	
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) 53 % - L 3	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	48 % - L 3	2	85	55	◆ The customer to customer survey with acoustic bars and other selected method(s) to be sufficiently implemented in combination as well-established day to day activities for underground leak detection in the selected priority areas ◆			NRW/O&M/METER READERS		done monthly during meter reading routine	done monthly during meter reading routine		
		(29) Improvements for Underground Leak Detection	71 % - L 4	2	95	78	◆ Installation of sufficient gate valves in the target areas of Step Test and Direct Measurement Method to improve the effectiveness of Step Test ◆ Utilization of map-based ICT measures (such as the use of free ◆			NRW/O&M GIS	Jun-22	-	-		
	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management 76 % - L 4	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	100 % - L 5	3	100	100	◆ Understanding the elevation difference within each DZ and/or pressure zones. ◆ ◆ ◆	Conduct 50 pressure measurements	NIL	NRW	Jun-22	-	3 Measurements conducted(6%)		
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	65 % - L 4	4	90	70	◆ Removal of the bottleneck or long pipes causing high friction pressure loss (especially the pipelines going up hills) by replacing with larger pipes or augmenting capacity with additional pipes ◆ Installation of PRVs ◆ ◆	install 9 PRVS	NIL	NRW	Jun-22	-	1 PRV INSTALLED(11%)	-	
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure ... 67 % - L 4	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	64 % - L 4	3	90	70	◆ Implementation of planned improvements as funds permit ◆ ◆ ◆ ◆					-	-	-	
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	70 % - L 4	2	95	75							-	-	
								Total Annual Cost (KSh.)	8,656,000						

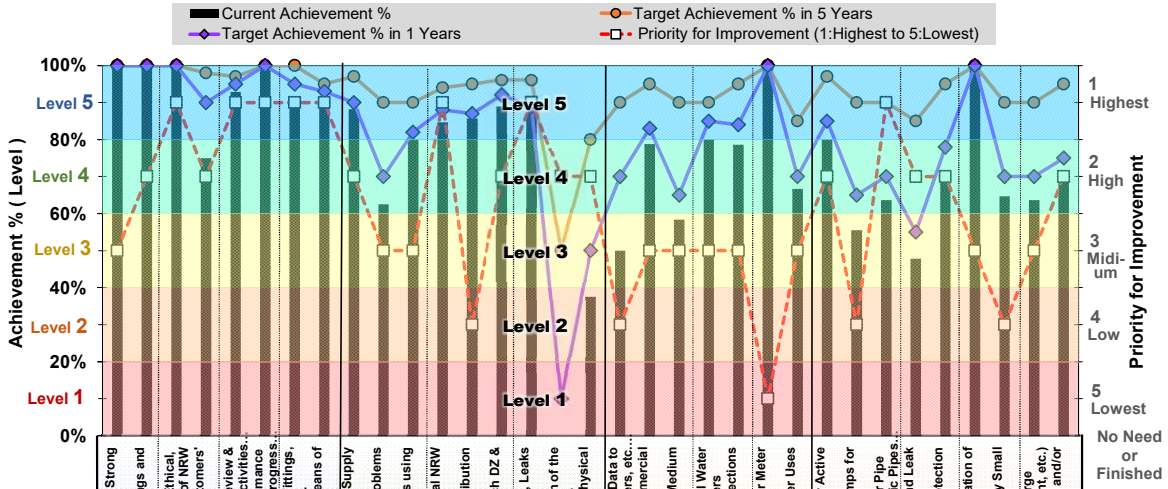
⇒ : Less intensive period with capital investment (without donner)
: Project with donner

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level	Overall Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and Its Strong Coordination with Other Relevant Sections/Units VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	(a) Staffing with Essential Support & Training 100 % - L 5	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 95 % - L 5	76 % - L 4
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	(b) Sensitization & Awareness Raising for Wider Support 88 % - L 5		
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	(c) PDCA Cycles (Plan-Do-Check-Adjust) 96 % - L 5		
(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	(d) Suitable, Sufficient & Timely Procurement 90 % - L 5		
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks (11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	(a) Mapping/GIS Development & Utilization of Free Mapping Software 80 % - L 5	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 71 % - L 4	
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs) (14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	(b) Monthly NRW Monitoring & Zoning 86 % - L 5		
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	(c) Abnormal Flow Monitoring & Water Balance Table 38 % - L 2		
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc. ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (20) Additional Focused Management of Large and Medium Customers	(a) Starting from Large Customers (e.g. by NRW Section) 69 % - L 4	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc. 74 % - L 4	
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (22) Preventive Measures at the Installation of Service Connections & Customer Meters	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters) 79 % - L 4		
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (24) Procedural/Internal Improvements against Illegal Water Uses	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing) 86 % - L 5		
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 67 % - L 4	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 65 % - L 4	
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (29) Improvements for Underground Leak Detection	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas 53 % - L 3		
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT) 76 % - L 4		
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes) 67 % - L 4		

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan			Quarterly Monitoring			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ Operationalise the three DMAs	NRWO	by december 2021	two now operational-paradise and greenpark(70%)	100% done		
2) ◆ Create 3 more DMAs	NRWO	one per quarter starting fro the second quarter	to start in the second quarter	we have installed a master meter remaining with linking the same to the billing system–25% complete		
3) ◆Meter testing,servicing and replacement to continue	nrw team	service and test 350 meters and replace 16 faulty meters per month	594 meters serviced and 90 faulty meters replaced 12 master and large consumer meters tested	a total of 920 meters have been serviced,163 faulty meters have been replaced a total of 36 large consumer meters have been tested		
4) ◆Installation of strainners on main lines	NRWO	Install one strainer per quarter	not yet started	procurement in process for installation to start from the next quarter		
5) ◆ Installation of smart meters on large buildings to continue	NRWO	install 5 meters per quarter staring from the second quarter	not yet started	we've invited suppliers to check on the available alternatives on the market and then we can procure		

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Mavoko WSP

[1-3] Results of the Assessment for 2021-22

RESULTS — Overall Level: 48 % - L 3

Category: Main	Sub	Aspect (Sub-sub Category)	Level	Target Level (%)		
				(Priority for improvement in the future & F: Finished / N: No Need & F: Finished)	In 5 years	In 1 year
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 81 % - L 5	(a) Staffing with Essential Support & Training 81 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	79 % - L 4	1	100	95
		VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	88 % - L 5	1	100	90
	(b) Sensitization & Awareness Raising for Wider Support 69 % - L 4	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	63 % - L 4	3	85	70
		VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	75 % - L 4	3	90	85
	(c) PDCA Cycles (Plan-Do-Check-Adjust) 79 % - L 4	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	79 % - L 4	1	100	100
		ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	80 % - L 5	1	100	90
	(d) Suitable, Sufficient & Timely Procurement 55 % - L 3	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	60 % - L 4	1	95	80
		(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	50 % - L 3	3	80	70
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 53 % - L 3	(a) Mapping/GIS Development & Utilization of Free 53 % - L 3	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	60 % - L 4	3	60	90
		VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	25 % - L 2	3	85	60
		(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	35 % - L 2	2	80	60
	(b) Monthly NRW Monitoring & Zoning 69 % - L 4	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	85 % - L 5	1	95	90
		(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	43 % - L 3	3	80	50
		(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	87 % - L 4	3	95	80
	(c) Abnormal Flow Monitoring & Water Balance Table 12 % - L 1	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	25 % - L 2	4	50	35
		(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	10 % - L 1	5	50	20
		(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	0 % - L 1	4	40	10
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data 47 % - L 3	(a) Starting from Large Customers (e.g. by NRW Section) 47 % - L 3	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	50 % - L 3	3	90	65
		ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	39 % - L 2	1	80	50
		(20) Additional Focused Management of Large and Medium Customers	67 % - L 4	1	90	75
	(b) Activities for New & Various Problematic 50 % - L 3	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	40 % - L 3	3	85	50
		(22) Preventive Measures at the Installation of Service Connections & Customer Meters	57 % - L 3	2	85	70
	(c) System-related and Procedural/Int 71 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	79 % - L 4	1	95	85
		(24) Procedural/Internal Improvements against Illegal Water Uses	57 % - L 3	3	90	70

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)

[2-2] Annual NRW Reduction Plan (2021-22)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
◆Implemetation of job evaluation report		600,000	HRO	continous	consultant already engaged
◆Trainning quality and standards of fittigs to be done ◆Training on correct meter installation method and right sizing to be ◆Training on use of leak detection equipment ◆Attending WASPA benchmarking to continue	1 1 2	400,000	OO/NRWO OO/NRWO OO/NRWO OO/NRWO	Qtrly Semi-annually Monthly Event driven	
◆Staff meetings with the management ◆Presentation of NRW plan & quarterly performance to the board ◆Reports of illegal connections to staff and board	4 4	100,000	CMT CMT CMT	Qtrly	
◆Senstitization on Public stakeholders forum to be held ◆Develop and distribute posters/fliers for sensitization with NRW ◆Explore use of radio spots in one of the stations widely listened to ◆Develop short video clips on NRW to post in the social media	1	100,000 200,000 100,000	MD FM/TM FM/TM FM/TM	Qtr4 Qtrly Twice a year	
◆Regular quarterly meetings	Quarterly	100,000	FM/TM		
◆Monthly meetings	Monthly	240,000	TM/NRWO	continous	
◆All materials and fittings must be inspected before acceptance ◆Training on good pipes and fittings	event driven 2	50,000	PO inspection and	continous	
◆Procurement of enough materials and fittings ◆Feedback from end users on adequacy of fittings in quality,	monthly quarterly		PO TM/procurement	continous	
◆update the imagery/base maps ◆Develop asset construction completion form for updating in GIS			GISO TM	Qtr1 Qtr3	
◆Finalization of mapping water customer meter points ◆Develop solution for mobile mapping of of leaks and bursts(assess ◆Mapping of anomalies monthly at consumer points		600,000	GISO ICT/GIS/TM GISO	Qtr3 Qtr3 Monthly	
◆Continous backup ◆Develop GIS sharing platform			GISO GISO	Continous Continous	
◆All bulk meters to be calibrated	10	10,000	NRWO	3 meters per quarter	
◆Operationalise the three DMAs ◆Create 3 more DMAs	3 3	150,000 300,000	NRWO NRWO	1st quarter one DMA per quarter	
◆Continue with monthly analysis, training more staff on the NRW			NRWO		
◆Commence training/sensitization on abnormal flow monitoring	3 DMAs		OO/NRWO		
◆Develop a policy on unbilled authorized consumption			MD/TM		
◆Start estimation of the amount of physial losses			NRWO	2nd quarter	
◆Meter testing continue ◆Installation of strainners on main lines ◆Meter servicing and replacement to continue	15 large customer meters 4 strainners 200 meters for replacement	50,000 240,000 800,000	NRWO NRWO NRWO	4 pe quarter 1 per quarter 50 per quarter	
◆ Implement an inspection schedule for large consumers			CO/NRWO	september	
◆Installation of smart meters on large buildings to continue	40 meters	450,000	FM/TM	25Meters p.a.	
◆ All consumer meters to visted by meter readers with or without			CO		
◆Installation of air valves on the daystar line	3 air valves	400,000	TM/TL	1st quarter	
◆Lockdown location in mobile meter reading ◆Spot billing			ICT/GISO FM/ICTO	2nd quarter	

2021 1st Qua. (Jul, Aug, Sep) | 2nd Quarter (Oct, Nov, Dec) | 2022 3rd Qua. (Jan, Feb, Mar) | 4th Quarter (Apr, May, Jun)

2022-23 | 2023-24 | 2024-25 | 2025-26 (1st–4th Jul-Sep / Oct-Dec / Jan-Mar / Apr-Jun)

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)

[1-3] Results of the Assessment for 2021-22

RESULTS — Overall Level: 48 % - L 3

Category: Main Level	Category: Sub Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest, 2: Second, N: No Need & F: Finished)	Target Level (%): in 5 years	Target Level (%): in 1 year
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	47 % - L 3	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	47 % - L 3			
		ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	30 % - L 2	2	90	60
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	33 % - L 2	2	80	50
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	73 % - L 4	2	95	80
		(b) Underground Leak	30 % - L 2			
		VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to	29 % - L 2	0	80	40
		(29) Improvements for Underground Leak Detection	30 % - L 2	0	80	40
		(c) IF REQUIRED: Pressure Measurement &	0 % - L 1			
		(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	0 % - L 1	0	0	0
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	0 % - L 1	0	0	0
		(d) IF REQUIRED: Leak Reduction with Large	14 % - L 1			
		(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	0 % - L 1	0	0	0
		(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	30 % - L 2	0	80	50

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)

Step 4: Update and Prepare Medium-term & Annual NRW Reduction Plans

[2-2] Annual NRW Reduction Plan (2021-22)

Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
◆ Develop a line patrol form ◆ Strengthen leak detection activities ◆ ◆ ◆	1		TM/NRWO TM/NRWO	SEPTEMBER	
◆ Consistent use of listening sticks and hand pumps during ◆ ◆ ◆ ◆		0	TLs	september	
◆ All valves to be chambered ◆ ◆ ◆ ◆	50 chambers	750,000	WS/TLS	13 chambers in each	
◆ Trials for underground leak detection for Kinanie zone ◆ ◆			NRWO		
◆ Trials for underground leak detection for Kinanie zone ◆ Training for leak detection ◆			NRWO TM		
◆ ◆ ◆ ◆ ◆					
◆ ◆ ◆ ◆ ◆					
◆ ◆ ◆ ◆ ◆					
◆ ◆					
Total Annual Cost (KSh.)		5,640,000			

2021 1st Qua. (Jul, Aug, Sep) | 2nd Quarter (Oct, Nov, Dec) | 2022 3rd Qua. (Jan, Feb, Mar) | 4th Quarter (Apr, May, Jun)

2022-23 | 2023-24 | 2024-25 | 2025-26 — each: 1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun

Notes

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22

Step 5: Describe Progress Briefly

Remarks on the Implementation of Planned Activities

End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)

[Example Modes of Implementation]

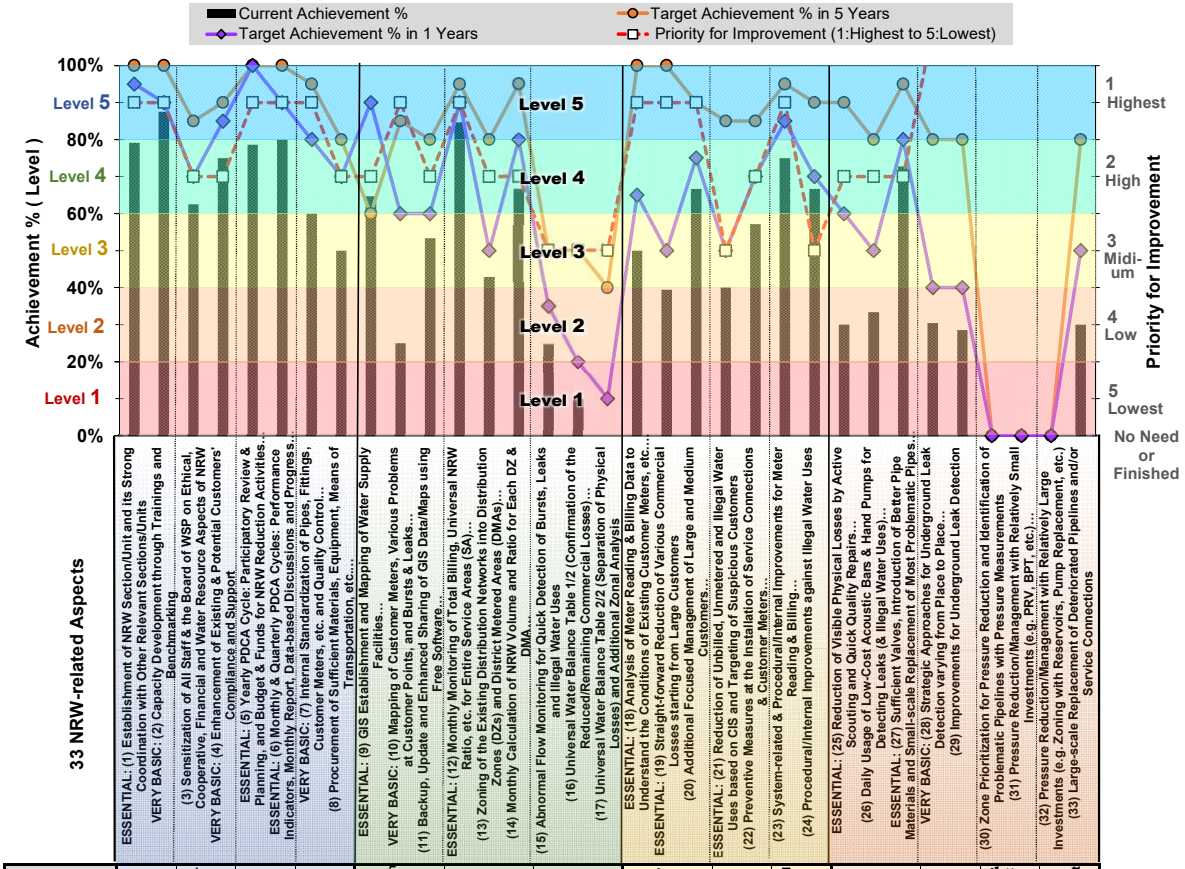
: Intensive work period with operational expenditures
→ : Less intensive period with operational expenditures
: Intensive work period with capital investment (without donor)
⇒ : Less intensive period with capital investment (without donor)
: Project with donor

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	81 % - L 5	69 % - L 4	79 % - L 4	55 % - L 3	53 % - L 3	69 % - L 4	12 % - L 1	47 % - L 3	50 % - L 3	71 % - L 4	47 % - L 3	30 % - L 2	0 % - L 1	14 % - L 1
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	73 % - L 4				46 % - L 3			52 % - L 3			25 % - L 2			
Overall Achievement % - Level	48 % - L 3													

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2021 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) To deal with dormant accounts(cut offs) and disconnected accounts in order to avoid illegal water consumption from meter point(Target-3000 accounts)	Area managers,metering officer	Jun-22	main disconnection of identified cut	disconnected 30 in number cutoffs from main.		
2) Develop and implement illegal connection procedure	WD&NRWM	Jan-22	done	done		
3) Purchase and Replacement of Large customer meters with ultrasonic water meters(1615 in number)	WD&NRWM	Jun-22	procurement ongoing	it was tendered waiting for completion of tendering process		
4) Establishment of DMA'S in number and installation of 98 ultrasonic flow meters		Jun-22	established DMAS 16 in number done	established DMAS 16 in number done		
5 Replacement of defective/inaccurate meters (after every billing cycle)-6000 in number	Metering officer	continuos	continuos	replacement at 65%		
6 Sensitization of all staff,schools and general public on implications of nrw	CSM,NRWO	Jan-22				
7 Replacement of dilapitated pipeline at ,CBD,Kipkaren and mwanzo/kampi karatasi	WD&NRWM	Jun-22	In progress	kipkaren at 60% complete,CBD 95% &Mwanzo kambi karatasi 95%		
8 Capacity development through training and benchmarking	HRAM	Jun-22	ongoing	traning done as per the schedule and planned to carry inhouse training for plumbers		

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Eldoret WSP

[1-3] Results of the Assessment for 2021-22 — RESULTS — Overall Level: 73 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — Step 4: Update and Prepare Medium-term & Annual NRW Reduction

[2-2] Annual NRW Reduction Plan (2021-22)

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main (Category)	Level	Sub	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	94 % - L 5	(a) Staffing with Essential Support & Training	94 % - L 5	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	92 % - L 5	5	100	100	◆ To conduct interdepartmental meeting ◆ To form enforcement team for arrrest of illegal water users.		100,000	CMT MD	Monthly	work plan , minutes and reports of the meeting	Developed procedure to deal with illegal water use Held one interdepartmental meeting	Enforcement team formed and working on illegal water users. Held one interdepartmental meeting chaired by the MD		
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	100 % - L 5	4	100	100	◆ Benchmarking with WASPA and other Leading WSPs in the region ◆ Inhouse training of plumbers on good practices ◆ Training of staff on the use of GIS ◆ ◆	20 All All staff	1,000,000 500,000 1,000,000	HRAM HRAM,WD&NRWM HTS	Continuos Jan-22 Jan-22	Subject to covvid 19 situation in the country	not done trained plumbers for new meter installations not done	training on GIS done with the help of jica expert team.		
		(b) Sensitization & Awareness Raising for Wider	88 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative,	88 % - L 5	1	100	80	◆ To carry out sensitization workshops and seminars on ethical ,cooperative,financial and water resource aspect of nrw	All staff	Captured in number 2	CSM	Continuos		schedule developed but affected by the covid 19 pandemic			
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	88 % - L 5	2	100	95	◆ Use of social media platform for customer sensitization ◆ Enhance awareness of illegal connections and leaks on service delivery ◆ ◆	All customers	500,000	CSM,WD&NRWM	Continuos Feb-22	Subject to covvid 19 situation in the country	done on request not done	Sensitization using linda maji mtaani done by carrying out road shows and using radio stations and television.		
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	96 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	5	100	100	◆ To implement and review existing plans based on achievement ◆ To develop aproved NRW reduction strategies			WD&NRWM MD	Continuos		Done by introduction of metering unit to deal zero billing of almost 13000 accounts and issues surrounding meter point	work in progress almost 50% done. complete and aproved by the MD		
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	90 % - L 5	3	100	90	◆ Prepare montly reports and hold monthly meetings ◆ To develop monitoring KPIS template/tool			WD&NRWM WD&NRWM	Continuos Jan-22		done every month	done every month		
		(d) Suitable, Sufficient & Timely Procurement	90 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	80 % - L 5	2	100	90	◆ Quality control on procurement of material and customer meters	All pipes, fittings and customer meters		Inspection and acceptance committee	Continuos		approval of materials on delivery done by inspection and acceptance commitee	approval of materials on delivery done by inspection and acceptance commitee		
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	100 % - L 5	4	100	100	◆ Need for procurement of sufficient reliable master and bulk meters(and ultrasonic meters) and install ◆ procurement of meter test bench and repair existing one	 1	26,000,000 11,000,000	WD&NRWM,SCM SCM	Jan-22 Jan-22		procured ultrasonic flow meters for category c1 ,c2,c3,c4 . procured waiting delivery from the supplier	instalation in progress.		
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	65 % - L 4	(a) Mapping/GIS Development & Utilization of Free Mapping Software	65 % - L 4	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	71 % - L 4	1	90	85	◆ Continue updating the GIS Maps			GIS Team	Throughout the period		mapped atotal of 39.3km of the HDPE pipes	mapped atotal of 47.8km of the HDPE pipes		
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	38 % - L 2	1	70	60	◆ Data collection and continue to update GIS maps			GIS Team	Continuos		mapped a total of 1160 newly installed water meters	mapped a total of 26 newly installed water meters		
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	73 % - L 4	1	90	80	◆ Enhance sharing of GIS Data/maps using free software	All staff		GIS Team/Nrwo	Continuos		sharing information and maps through hard copies and soft	sharing information and maps through hard copies and soft		
		(b) Monthly NRW Monitoring & Zoning	59 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	92 % - L 5	1	100	90	◆ To produce and share reports at montly interdepartmental meetings	CMT &All section heads		NRWO,WD&NRWM	Dec-22		held interdepartmental meeting and majorly analysing universal NRW ratio	Monthly meetings are done with analysis of total billing,and universal monitoring being key in our analysis		
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	57 % - L 3	1	90	70	◆ To implement the establishment or improvement of DMAs by hydraulically isolating the planned priority DMAs and properly installing all the zonal bulk meters required for the DMAs.	18 DMA'S	Captured in number 8	NRWO,WD&NRWM	Dec-22		Completed zoning of southern service area with 6 DMAs and also 3 sub-dmas	Mapping and zoning complete awaiting installation of meters 40%.		
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	11 % - L 1	1	70	30	◆After the bulk meters for all the DMAs are installed the reading, analysis and other activities shall be carried out for the entire project period and beyond			NRWO,WD&NRWM	Jan-22		not yet done	not yet done		
		(c) Abnormal Flow Monitoring & Water Balance Table	23 % - L 2	(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	13 % - L 1	1	70	30	◆ Install Additional bulk meters on high-risk pipelines that are frequently read to improve the abnormal flow monitoring or use of AMR	98	Captured in number 8	NRWO	Feb-22		we have done intensive replacement of hotspot areas with HDPE 980m	the pilot DMA Chepkanga abnormal flow monitoring will be done using abnormal flow monitoring sheet.		
				(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	30 % - L 2	1	80	60	◆Prepair Water balance table			NRWO,WD&NRWM & Jica expert team	Mar-22		After completion of zoning and istallation of bulky meters,we will e able to carry out water balance	progress is at 40%		
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	25 % - L 2	1	70	50	◆ separation of physical losses ◆			NRWO,WD&NRWM & Jica expert team	Apr-22		not done	not done		
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy	85 % - L 5	(a) Starting from Large Customers (e.g. by NRW Section)	85 % - L 5	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	90 % - L 5	4	100	100	◆ To maintain the status with continued improvements by doing the activities for entire period	all accounts		Metering officer	continuous		done after every billing circle to establish the anomalies within the billing month	developed a monthly monitoring anomaly template with assistance of jica expert team..		
				ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	79 % - L 4	2	100	80	◆ monitoring of large customer meters weekly(meter reading) ◆ meter Resizing ◆ Testing of large customer meters / replacing the faulty ones ◆ Meter relocation ◆ Replacement of 1615 water meters with ultrasonic meters	1615 1615		nrwo & metering officer	continuous		done each a every week	weekly monitoring of large customers done,procurement of ultrasonic flow meters done targeting large custommers done.		
				(20) Additional Focused Management of Large and Medium Customers	100 % - L 5	4	100	100	◆ Meter Relocation ◆Servicing , replacement of faulty/defective meters and replacement of aged meters	10,000 6000	10,000,000	NRWO Metering officer	continuous continuous		relocated a total of 659 water meters replaced atotal of 1055 domestic water meters	replaced atotal of 84 catecory c3&c4 water meters		
		(b) Activities for New & Various Problematic Customers (e.g. by the	79 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	60 % - L 4	2	100	80	Conduct customer identification survey each an every quarter Formation of reinforcement team to deal with illegal water use.			CSM,HCS	Mar-22		not done	Reinforcement team formed and working on illegal water users		
				(22) Preventive Measures at the Installation of Service Connections & Customer Meters	93 % - L 5	3	100	95	◆Ensure all customer meters are connected to one metre inside the perimeter.(as per the policy) ◆' Introduction of plastic seals and other type of seals over the joints btw customer meter and service conection ◆ Pressure testing of service connection before meter installation	All new connection 20000 All new connection	 2,000,000	NRWO nrwo ,metering officer,AM DO	continuous Dec-21 continuous		well captured in our meterig policy and it applies to all connectios	Connecting customer meters 1 metre from the premise as per the company metering policy and random checks done reguraly.		
		(c) System-related and Procedural/Internal Improvements (e.g. by	79 % - L 4	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	88 % - L 5	3	100	100	◆ Ensure continued improvement of the meter reading and billing.	All water meters		AM	continuous		adoption of auto bill and instant billing	Estimatimation of accounts currently at 2% after adoption of autobill		
				(24) Procedural/Internal Improvements against Illegal Water Uses	67 % - L 4	2	100	95	◆Improvemet of county bylaws on illegal water use. ◆ Incentives for illegal connection detectors and whisle blowers	 60		CMT WD&NRWM	Jan-22 continuous		developed procedure for curbing illegal water use incenntives offered to whestle blowers after reporting and penalties carried out	Incentives for whistle blowers enhanced from 1000 to kshs 2000 and also establishment of confidential		

[1-3] Results of the Assessment for 2021-22 | **[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)** | **Step 4: Update and Prepare Medium-term & Annual NRW Reduction** | **[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22** | **Step 5: Describe Progress Briefly**

RESULTS — Overall Level: 73 % - L 4

Category: Main Level / Sub — Aspect (Sub-sub Category): Level

[2-2] Annual NRW Reduction Plan (2021-22)

Main Level	Sub	Aspect (Sub-sub Category)	Level	Priority for Improvement (1=Highest, 2=Second, etc. No Need & P. Finished)	Target Level (%) in 5 years	Target Level (%) in 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 73 % - L 4	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	70 % - L 4	2	100	85	◆Conduct a robust leak detection,continued improvement on line patrols and timely leak and burst repair.		2,000,000	NRWO	continuous	
		(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses) 73 % - L 4	44 % - L 3	3	100	70	◆Daily use of acoustic bars to detect leaks and possibility of illegal water connections ◆ Pressure testing and use of Hand pumps to test new connections			NRWO	continuous	
		ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes	100 % - L 5	4	100	100	◆ Installation of Section valves in the pipe network to avoid losses in case of burst occurrence and during pipe repairs ◆ Permanent solutions to areas prone to frequent leaks and bursts using hdpe	100 10000m	4,000,000 15,000	NRWO,DO Bulky NRWO,DO		
	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	57 % - L 3	1	100	70	◆ Proper trainning on the use of NRW equipments ◆ Develop a well elaborate work plan for entire service area to conduct leak detection.	10	200,000	NRWO NRWO	Jan-22 Sep-21	
		(29) Improvements for Underground Leak Detection 60 % - L 4	71 % - L 4	2	100	85	◆ Carry out leak surveys in indentified high leakage and high pressure zones ◆To intensify the use of Clamp onUFM in MNF to identify leaking pipelines			NRWO	Sep-20	
	(c) IF REQUIRED: Pressure Measurement & Pressure	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	75 % - L 4	2	100	85	◆ Procure and install PRVS at off takes along chebara main	20	10,000,000	NRWO	Jul-21	
		(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.) 68 % - L 4	65 % - L 4	1	90	65	◆ Identification and installation of PRVS ◆ ◆	20		NRWO	Jul-21	
		(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) 57 % - L 3	18 % - L 1	0	0	0	Eldowas lies in aplateu of which we dont experience high abnormal pressures.					
	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g.	(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	100 % - L 5	3	100	100	◆ Replacement of dilapitated and deteriorated pipelines. ◆ replacement of deteriorated service connections	Aged pipelines All aged service conections	34,664,149 Captured no 20	WD&NRWM	Continuos	
								Total Annual Cost (KSh.)	**102,979,149**			

Step 4 timeline: 2021 1st Qua. (Jul, Aug, Sep) | 2nd Quarter (Oct, Nov, Dec) | 2022 3rd Qua. (Jan, Feb, Mar) | 4th Quarter (Apr, May, Jun) | 2022-23 | 2023-24 | 2024-25 | 2025-26 (1st–4th Jul-Sep … Apr-Jun)

[Example Modes of Implementation]

- : Intensive work period with operational expenditures
- → : Less intensive work period with operational expenditures
- : Intensive work period with capital investment (without donner)
- ⇒ : Less intensive period with capital investment (without donner)
- : Project with donner

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22

Remarks on the Implementation of Planned Activities

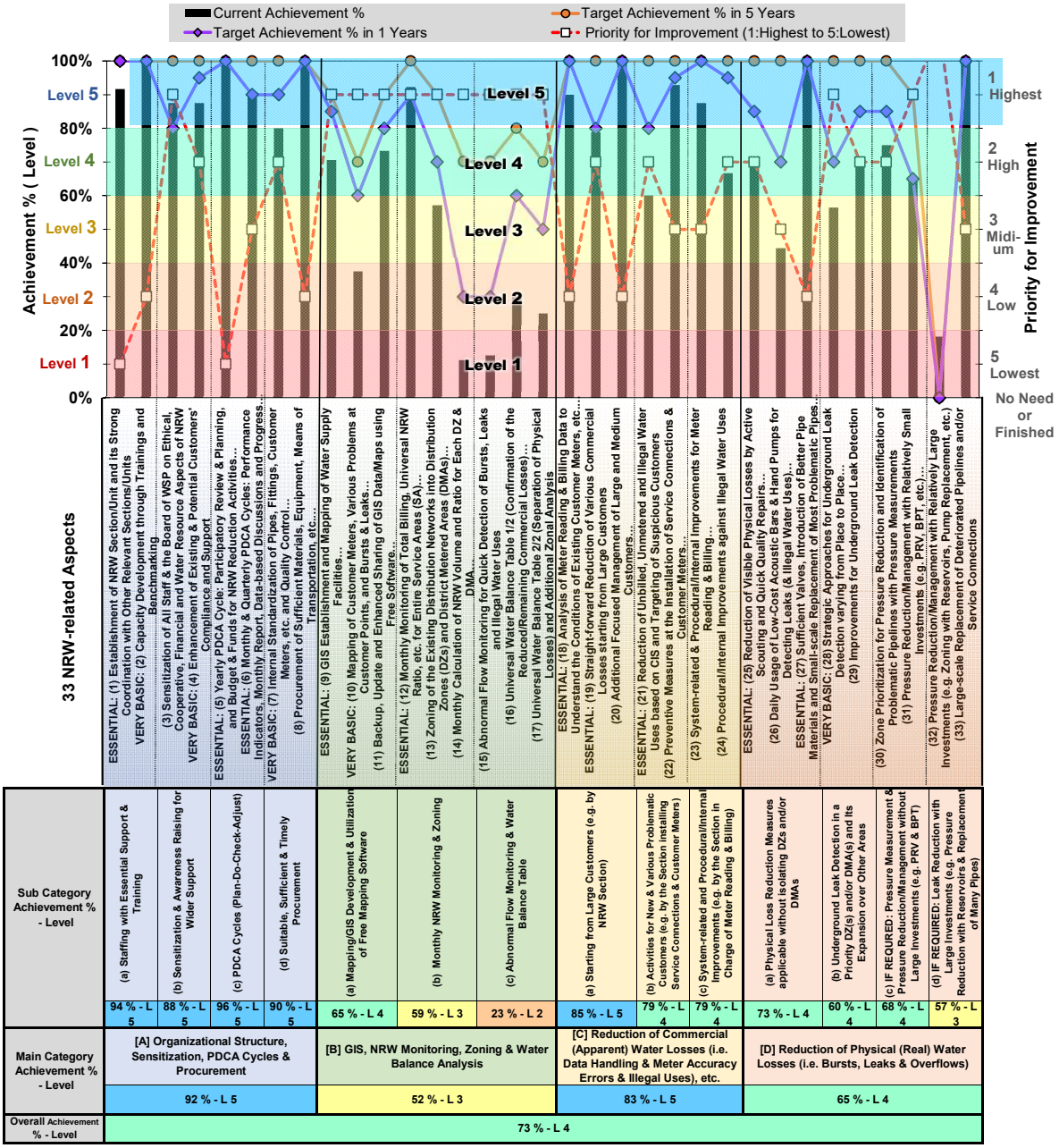
End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
conducted leak detection in asis,eastern avenue pioneer eastate with recommendation of complete overhaul of distribution network hired five line patrollers	done minimum night flow measurements at Chepkanga will result toidentification of problematic pipelines,leak detection done in the area with		
we continuosly use listening sticks to detect leaks after and before the meter and illegal connections service line before backfilling of the	we continuosly use listening sticks to detect leaks after and before the meter and illegal connections		
980m of hdpe pipes replaced in hot spot areas	1200m of hdpe pipes replaced in hot spot areas		
following developed work plan procured waiting delivery from the supplier	following developed work plan use of clamp on ufm to check on the abnormal flow in town centre and chepkanga done		
Leak surveys done using nrw equipments ground microphone and listening sticks and recommentation for pipeline replacement done in kipkaren estate,asis lower cbd not done	ongoing as per the schedule		
procured prvs waiting delivery from supplier	procured and installation progress ongoing.		
procured prvs ad waitig delivery from supplier	progress at 20%		
N/A	N/A		
Replaced a total 10,000m of pipeline usig hdpe replaced a total1800m service connections	mwanzo pipeline replacement at 90% West indies pipeline replacement at 80% Munyaka pipeline replacement at 70%		

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



Sub Category Achievement % - Level	(a) Staffing with Essential Support & Training	(b) Sensitization & Awareness Raising for Wider Support	(c) PDCA Cycles (Plan-Do-Check-Adjust)	(d) Suitable, Sufficient & Timely Procurement	(a) Mapping/GIS Development & Utilization of Free Mapping Software	(b) Monthly NRW Monitoring & Zoning	(c) Abnormal Flow Monitoring & Water Balance Table	(a) Starting from Large Customers (e.g. by NRW Section)	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters)	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas	(c) IF REQURED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT)	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes)
	94 % - L 5	88 % - L 5	96 % - L 5	90 % - L 5	65 % - L 4	59 % - L 3	23 % - L 2	85 % - L 5	79 % - L 4	79 % - L 4	73 % - L 4	60 % - L 4	68 % - L 4	57 % - L 3
Main Category Achievement % - Level	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement				[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis			[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc.			[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)			
	92 % - L 5				52 % - L 3			83 % - L 5			65 % - L 4			
Overall Achievement % - Level	73 % - L 4													

Template: Priority Activities selected from the Annual NRW Reduction Plan

[2-3] Priority Activities selected from the Annual NRW Reduction Plan and Monitoring of their Progress for 2021-22

Annual NRW Reduction Plan			Quarterly Monitoring (e.g. Finished or ='4) NRW Reduction Plans'!AV6, AW6, AX6 & AY6)			
Title (or Brief Description) **of Selected Activity / Countermeasure** (You can make links to the main sheet for NRW reduction plans to avoid re-typing the same things with formulas such as ='4) NRW Reduction Plans'!M6)	**By whom** (e.g. NRW Unit or ='4) NRW Reduction Plans'!P6)	**By when** (e.g. September 2020 or ='4) NRW Reduction Plans'!Q6)	**End of 1st Quarter** (by September)	**End of 2nd Quarter** (by December)	**End of 3rd Quarter** (by March)	**End of 4th Quarter** (by June)
1) ◆ Train staff and build capacity on NRW	JICA TEAM	Project Period	The Nrw Unit was trained by JICA in September on Leak Detection, GIS application on Nrw reduction & Billing Analysis.	The JICA trainings and support continued in Q2 and in Houes training on Nrw and sensitization was done across the areas. The community were also sensitize on Nrw activities conducted through Barazas in Chonyi area, Vitengeni and Mtwapa. The local administartion(chiefs and assistance chiefs and DOs) were also engaged on a one day sensitization seminar in Kilifi town.		
2) ◆ Customer Identification Survey(CIS)	CBDM/CONSULTANT	Q2	Not yet done, still in the procurement stage	Not yet done, still in the procurement stage		
3) ◆ Establish & Equip GIS office	TOM/HRM	Q1	Interviews of the GIS oficer was conducted. GIS office equipt with 1 no Desktop and 6 no Etrex 10 Germin GPSs.	The Gis officer was rexcruited and reported on 1st of November,2021. Orientation was done to her on the netire month and she started working on her work plan. This was done with the assistance of Mr. Mori who could link with her through Zoomand their first priority was to map all the customer meters and coming up with a route plan. The mapping of the meters commmence in December and mapping of the Kilif south piplenes with the aim of establishing DMAs also started. This is expected to be finish by the end of Q3.		
4) ◆ Replace meters Billed on estimates	TOM/AM/NRWO	Quarterly	The meters replacement is on-going though on a small pace. The number replaced in Q1 were 44 meters. Challenge is availabilty of meter for replacement.	We mange to secure 1000 meters from JICA during this quarter under review. We have planned to use them for replacement and new connections. The replacement is mainly prioritise for the big consumers.		
5) ◆ Establishment of DZs and DMAs	TOM/STO	Q3	The activity was haulted awaiting a world Bank contractor who are tasked to do the same in Mtwapa and Kilifi area. Currently the works have started in Mtwapa and Kilifi is yet to start.	The contarctors are currently on the ground in Mtwapa and Kilifi and the construction of the reticulation system is ongoing and this will culminate in the establishment of some of the DMAs. This is expected to be completed in 13 Months. On the other hand and with the help of Jica, we have established/identified some DMAs in Kilifi south which we are currently working on. The main activities being the installation of master meters, section valves and mapping of the same. We expect to finish and use the same from Q3.		
6) ◆ Rerouting of service lines and Burying of shallow pipelines	A/M ,STO, PATRONS	Quarterly	Q1- due to financial constraints, the requistion done in respect to re-routing of pipleines were defered to Q2.	The re-routing and burying of exposed pipelines was not done to availabilty of finances. The sections were however identified and the necessary quatations were done.		
7) ◆ Installation of Air valves	TOM/STO/AM	Quarterly	Assorted pipelines were installed with new airvalves across the areas.	The installation of airvalves is on going across the areas on specific lines identifed and spearheaded by the Area managers.		
8) ◆ Replacement of Delapitated pipelines	TOM/AM/STO	Quarterly	No pipeline was done	Some of the delapitated pipelines were identified and place under UTF(a program funded by world bank) for rehabilatation and re-routing. Survey works and redesigning were done and the works were started in Mtwapa and is schedule to commence in Kilifi in Q3.		
9) ◆ Rehabilitaion of Tanks(BPTs and Storage Tanks)	TOM/STO/AM	Quarterly	Quatations on the rehabilitation of Sokoke and Mavueni BPTs was done and is awaiting funding.	Quatations on the rehabilitation of Sokoke and Mavueni BPTs was done and is awaiting funding.		
10) ◆ Meters to be instal at the offtake	STO/AM/TOM/PM	Quarterly	The relocation of the meters is ongoing across the areas.	The relocation of the meters is ongoing across the areas.		

Template: Update & Preparation of Medium-term & Annual NRW Reduction Plans, and Quarterly Monitoring for 2021-22 onward, Kilifi-Mariakani WSP

[1-3] Results of the Assessment for 2021-22 — RESULTS — Overall Level: 61 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26) — [2-2] Annual NRW Reduction Plan (2021-22) — Step 4: Update and Prepare Medium-term & Annual NRW

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Category: Main	Level	Category: Sub	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)	End of 3rd Quarter (by March)	End of 4th Quarter (by June)
[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement	78 % - L 4	(a) Staffing with Essential Support & Training	78 % - L 4	ESSENTIAL: (1) Establishment of NRW Section/Unit and its Strong Coordination with Other Relevant Sections/Units	83 % - L 5	1	100	100	◆ Deployment of Relevant Staff to the Unit			TOM/HRM	Q2			Two staffs were deployed to the unit to assist in carrying out leak detections activities and also strengthens the GIS activities once the GIS expert reports	The Gis Officer was recruited and reported to the office on 1st November 2021.		
				VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	63 % - L 4	3	100	80	◆ Train staff and build capacity on NRW ◆Training on KoBoCollect data collection tool on every station ◆Use of leak detection equipment e.g listening sticks and electric leak detector ◆Accuracy test on big meters/major clients by use of ◆Refresher on mobile meter testing Gadget(JUSTUR)		1,000,000	JICA TEAM STO/M&E STO/M&E/Billing Officer STO/M&E/Billing Nrw unit	Project Period Q3 Q3 Q3 Q2	Urgent Urgent Urgent Done		JICA Nrw management training was conducted in Q1 Refresher course on mobile testing Gadget was done on the areas by the unit	Jica training program was done twice during the quarter. The main focus of the first training were Nrw management through Billing Analysis, Leak Detections and use of the various equipments like the UFM,Listening sticks and others were done. The second team lead by Sekimoto focused on DMAs establishment, step test and use of UFM.		
		(b) Sensitization & Awareness Raising for Wider Support	81 % - L 5	(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW	75 % - L 4	1	100	80	◆ Staff sensitization on NRW ◆ Community sensitization		200,000 1,000,000	NRW Committee	Q1 & Q2 Quarterly			Sensitization of all Members of staff & board was done and two areas did community sensitization through Baraza i.e Chonyi and Vitengeni	The community were also sensitize on Nrw activities conducted through Barazas in Chonyi area, Vitengeni and Mtwapa. The local administartion(chiefs and assistance chiefs and DOs) were also engaged on a one day sensitization seminar in Kilifi town.		
				VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	88 % - L 5	1	100	100	◆ Customer Identification Survey(CIS)		9,000,000	CBDM/CONSULTANT	Q2			The tendering/procurement procedure was repeated as the relevant applicants were not received. The evaluation of the new applicants have been done awaiting the offer of the tender	The tendering procedure is yet to be completed.		
		(c) PDCA Cycles (Plan-Do-Check-Adjust)	100 % - L 5	ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities	100 % - L 5	1	100	100	◆ Proposal writing and sourcing of funds to improve on ◆ Nrw action plan developed and approved ◆ Nrw activities budgeted for in the current Budget		24,500,000	TOM/AM/STO	Q1			The Nrw Work plan was done and its requirement put in the company's Budget for the FY 21/22 and it is used as a road map to the implimentation of Nrw activities. Other Nrw activities from Jica have been accomodated in the work plan.	The Nrw Work plan was done and its requirement put in the company's Budget for the FY 21/22 and it is used as a road map to the implimentation of Nrw activities. Other Nrw activities from Jica have been accomodated in the work plan.		
				ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress Monitoring	100 % - L 5	1	100	100	◆ Monthly, Quarterly and Annual Reporting based on all KPIs ◆ Discussions of reports and validation of data with set submission dates ◆Monitoring and evaluation progress reports			TOM/AM/STO TOM/AM/STO	Contineous Contineous			Monthly evaluation and monitoring of performance is done with the necessary adjustments and achievements being captured, documented and reported on monthly basis and circulated to the relevant departments	Monthly evaluation and monitoring of performance is done with the necessary adjustments and achievements being captured, documented and reported on monthly basis and circulated to the relevant departments		
		(d) Suitable, Sufficient & Timely Procurement	100 % - L 5	VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control	100 % - L 5	1	100	100	◆ Conduct trace survey to be done to ascertain the durability of the recently procured cold water meters			TOM/CBDM/STO	Contineous			All requisitions made on meters, fittings are strictly based on the specifications given and recommended by the user(Kimawasco) hence the standards are not compromised.	All requisitions made on meters, fittings are strictly based on the specifications given and recommended by the user(Kimawasco) hence the standards are not compromised.		
				(8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	100 % - L 5	1	100	100	◆Equip the Nrw personnel with working Tools for		2,000,000	TOM/PM	Q3			Requisition done in Q2 but awaiting availability of funds and probably this will be done in Q3	Requisition done in Q2 but awaiting availability of funds and probably this will be done in Q3		
[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis	35 % - L 2	(a) Mapping/GIS Development & Utilization of Free Mapping Software	35 % - L 2	ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities	59 % - L 3	1	100	60	◆ Establish & Equip GIS office ◆ Train Staff on GPS ◆ MappingPipelines and other Water Utilities ◆ Pressure Mapping(purchase of data Loggers) ◆ Development of soft copies and printing of maps		800,000	TOM/HRM GIS/NRW UNIT GIS/NRW UNIT GIS/NRW UNIT GIS/NRW UNIT	Q1 Q2 Contineous Contineous Contineous			GIS unit have been established with the start up equipments obtained and the GIS expert intervieved awaiting reporting in Q2.	The Gis Officer was recruited and reported to the office on 1st November 2021.		
				VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks	13 % - L 1	1	100	60	◆ Replace meters Billed on estimates ◆ Raise Buried meters ◆ Relocate innacessible Meters ◆ Meter Servicing and Testing		2,500,000	TOM/AM/NRWO TOM/AM/NRWO TOM/AM/NRWO STO/Meters servicing	Quarterly Q1 Quarterly Monthly	ongoin		The activities are ongoing	The activities are ongoing		
				(11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	20 % - L 2	1	100	60	◆ Adopt a free software for GIS backup, update and			GIS officer/TOM/STO	Q2			This has not been done because of the absence of GIS expert.	The GIs officer reported to the office, she had done an assesment of what is available and what is rerquired and part of the work have commence. This is possible with the utilization of the free GIS softwares.		
		(b) Monthly NRW Monitoring & Zoning	41 % - L 3	ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA)	92 % - L 5	1	100	100	◆ Monthly Monitoring of Billing Analysis and Reports for entire SA ◆ Meter Reading anomalies Report from MFA ◆ Daily monitoring of meter readings			STO/CBDM/TOM STO/CBDM/TOM/BO/ABO	Monthly Monthly Daily	At the end of every Billing		1Billing Analysis is done promptly on monthly basis immidiately the Billing is complete, NRW figures calculated and circulated to the relevant departments. 2.Daily monitoring of meter readings uploaded on the system and generation of anomalies report on monthly basis.	1Billing Analysis is done promptly on monthly basis immidiately the Billing is complete, NRW figures calculated and circulated to the relevant departments. 2.Daily monitoring of meter readings uploaded on the system and generation of anomalies report on monthly basis.		
				(13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)	0 % - L 1	1	100	50	◆ Establishment of DZs and DMAs ◆ Pilot of three Areas(Kilifi,Mtwapa, Mazeras& Mariakani) ◆ Instal Master Meters			TOM/STO TOM/STO/AM TOM/STO/AM	Q3 Q2&Q3 Q3			Distribution Zones have been established with target DMAs to be piloted in a section of Kilifi and Mtwapa. The pilot areas were placed under a consultant and world Bank program that will help the WSP on the same. The work is in progress.	Distribution Zones have been established with target DMAs to be piloted in a section of Kilifi and Mtwapa. The pilot areas were placed under a consultant and world Bank program that will help the WSP on the same. The work is in progress.		
				(14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	0 % - L 1	1	100	50	◆ Analysis & Reports			STO	Monthly			Mothly Analysis Report based on each area of supply is done. This is based on Billing analysis and production figures	Mothly Analysis Report based on each area of supply is done. This is based on Billing analysis and production figures		
		& Water Balance		(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses	13 % - L 1	1	100	50	◆ Installation of flow gauges in Storage Tanks and BPTs ◆ Installation of Pressure gauges on Pump houses and selected pipeline sections			Sn Engineer/TOM/STO/M&E-O	Q4			Monitoring is partially done on Areas with pumping stations with the help of pressure gauges and also through customer reports and Technical patrols.	Monitoring is partially done on Areas with pumping stations with the help of pressure gauges and also through customer reports and Technical patrols.		

Schedule columns (shaded bars per activity): 2021-2022 — 2021- 1st Qua.: Jul, Aug, Sep; 2021- 2nd Qua.: Oct, Nov, Dec; 2022- 3rd Qua.: Jan, Feb, Mar; 2022- 4th Qua.: Apr, May, Jun. 2023-24, 2024-25, 2025-26 — each: 1st Jul-Sep, 2nd Oct-Dec, 3rd Jan-Mar, 4th Apr-Jun.

[1-3] Results of the Assessment for 2021-22 — RESULTS — Overall Level: 61 % - L 4

[2-1] Medium-term NRW Reduction Plan for the Next 5 Years (2022-23 to 2025-26)

[2-2] Annual NRW Reduction Plan (2021-22) — Step 4: Update and Prepare Medium-term & Annual NRW

[3] Quarterly Monitoring of the Implementation of the Annual NRW Reduction Plan for 2021-22 — Step 5: Describe Progress Briefly — Remarks on the Implementation of Planned Activities

Main Category	Level	Sub Category	Level	Aspect (Sub-sub Category)	Level	Priority for Improvement (1: Highest - 5: Lowest, N: No Need & F: Finished)	Target Level (%) In 5 years	Target Level (%) In 1 year	Title (or Brief Description) of Selected Activity / Countermeasure	Target Quantity (if applicable)	Cost (KSh.)	By whom	By when	Notes	End of 1st Quarter (by September)	End of 2nd Quarter (by December)
		(c) Abnormal Flow Monitoring & Table	23 % - L 2	(16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses)	50 % - L 3	1	100	70	◆ Train and capacity build on use WB Easy Calc. ◆ Seperation of Commercial Losses and Physical ◆ Handling of major NRW contributor			Sn Engineer/TOM/STO/M	Q3		Training and capacity building is highly required on this Section.	The Jica expert team have trained us on most of the items that will help us reduce the Nrw levels especially on use of billing analysis, use of modern equipments e.g UFM, listenings sticks, separtions of commercial and physical losses, meter testing and DMAs. We however still require their expertise on use of WB easy Calc.
				(17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	0 % - L 1	1	100	50	◆ Ref.16 above						Training and capacity building is highly required on this Section.	We still require their expertise on use of WB easy Calc., step test & underground leak detections
[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors &	73 % - L 4	(a) Starting from Large Customers (e.g. by NRW Section)	73 % - L 4	ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc.	100 % - L 5	1	100	100	◆ Monthly Billing Analysis/Meter reading data/Reports			STO/CBDM	Monthly	Ongoin	Monthly report on anomalies posted after meter reading cycle is analysed and acted upon by the relevant departments & personnel	Monthly report on anomalies posted after meter reading cycle is analysed and acted upon by the relevant departments & personnel
				ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers	64 % - L 4	1	100	80	◆ Weekly monitoring of large consumer meters with a consumption of 500m3 and above. ◆ Frequent meter accuracy check ◆ Prompt Replacement of Stalled/ inefficient meters			STO/CBDM STO/CBDM/AM STO/CBDM/AM	Weekly Quarterly Continuous		This is adhered to has stated, Meter replacement of stalled meters is ongoing,Monitoring of major clients and meter testing is being done.	This is adhered to has stated, Meter replacement of stalled meters is ongoing,Monitoring of major clients and meter testing is being done.
				(20) Additional Focused Management of Large and Medium Customers	75 % - L 4	1	100	90	◆ Visual Inspection of their meters weekly ◆ Consolidation of Numerous Meters Serving one entity ◆ Accuracy test done monthly ◆ Monitoring of their monthly evarage consumptions ◆ Random Courtesy Visits			TOM/STO/CBDM/AM TOM/STO/CBDM/AM TOM/STO/CBDM/AM TOM/STO/CBDM/AM TOM/STO/CBDM/AM	Weekly Monthly Quarterly Monthly Quarterly		This is being done with minimal challenges experienced e.g sometimes inadequateTransport to various sites is a challenge	This is being done with minimal challenges experienced e.g sometimes inadequateTransport to various sites is a challenge
		(b) Activities for New & Various Problematic Customers (e.g. by the Section	67 % - L 4	ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers	60 % - L 4	1	100	90	Daily patrols and scouting of illegal connections Monthly follow of all anomalies resulting to unbilled accounts Servicing of faulty meters, accuracy test and replacement. Regulirization of accounts found with illegal connections			TOM/STO/CBDM/AM TOM/STO/CBDM/AM TOM/STO/CBDM/AM TOM/STO/CBDM/AM	Daily Monthly Daily Monthly		CIS is still on the procurement stage but strict monitoring of meter reading is being done with set time lines, spot check on illegal activities is also being doneand follow up of billing trends is monitored on each account.	CIS is still on the procurement stage but strict monitoring of meter reading is being done with set time lines, spot check on illegal activities is also being doneand follow up of billing trends is monitored on each account.
				(22) Preventive Measures at the Installation of Service Connections & Customer Meters	71 % - L 4	1	100	85	◆ Quality Cotrols of materials ◆ Suplly of new meters for new connections ◆ Meters to be instal at the offtake ◆ Construction of Chambers to secure the meters ◆ Line testing before operationalization	Ongoing across the Quarters.		STO/AM/TOM/PM STO/AM/TOM/PM STO/AM/TOM/PM STO/AM/TOM/PM	Ongoing across Quarterly		Preventive measures are being undertaken and adhere to(from the procurement stage until delivery) with all new connections being installed at the offtake and strict supervision by the unit is done.	Preventive measures are being undertaken and adhere to(from the procurement stage until delivery) with all new connections being installed at the offtake and strict supervision by the unit is done.
		(c) System-related and Procedural/Internal Improvements (e.g. by	86 % - L 5	(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing	88 % - L 5	1	100	100	◆ Intergated Systems in place						The two system are intergrated and they are working well	The two system are intergrated and they are working well
				(24) Procedural/Internal Improvements against Illegal Water Uses	83 % - L 5	1	100	90	◆ Develop and adopt Illegal water use policy ◆ Enhance Legal procedures on illegal water use and ◆ Establish incentive for whistle blowers and staff			TOM/CDBM/IA/AM	Q3 Q3 Q3		Sensitization of staff on being involved on illegal connections was done in all Areas. Development of policies on the same is pending and the reward of whistle blowers has been agreed upon but it is awaiting the approval of the Board.	Sensitization of staff on being involved on illegal connections was done in all Areas. Development of policies on the same is pending and the reward of whistle blowers has been agreed upon but it is awaiting the approval of the Board.
[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows)	53 % - L 3	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs	53 % - L 3	ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs	50 % - L 3	1	100	80	◆ Carrying out schedule line patrols	2,000,000.00		A/M/ Nrw unit/Commercial dpt	Immediate		Schedule patrols are done and monitored on station levels with the supervision of the Area Managers.Meter readers also do the same during their meter reading exercise.	Schedule patrols are done and monitored on station levels with the supervision of the Area Managers.Meter readers also do the same during their meter reading …
									◆ Scouting for illegal Connections			A/M/ Nrw unit/Commercial dpt	Immediate		Illegal Connections detected are acted upon with immediate effect and the necessary surchages are applied as stipulated in the Tariff and the affected accounts are regularised.	Illegal Connections detected are acted upon with immediate effect and the necessary surchages are applied as stipulated in the Tariff and the affected accounts are regularised.
				(26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	33 % - L 2	1	100	50	◆ Training of NRW staff and Benchmarking ◆ Use of leak detection equipment e.g listening sticks and electric leak detector	2,000,000.00		TOM/HRM/STO Nrw unit/ Technical staff	Q2 Q2		Training was done with the JICA team in Q1	Training was done with the JICA team in Q2 and also with Waspa on smart metering and meter sizing.
				ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic …	73 % - L 4	1	100	80	◆ Rerouting of service lines and Burying of shallow		2,000,000	A/M ,STO, PATRONS	Quarterly		Sections of pipelines are done in phases whenever funds are available.	Sections of pipelines are done in phases whenever funds are available.
		(b) Underground Leak Detection in a Priority DZ(s) and/or	23 % - L 2	VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place	13 % - L 1	1	100	50	◆ Carry out leak Detection Survey			A/M,STO/ Nrw unit	Quarterly		Close monitoring of water supply is done and suspected leaking sections are mapped out and investigated.	Close monitoring of water supply is done and suspected leaking sections are mapped out and investigated.
				(29) Improvements for Underground Leak Detection	57 % - L 3	1	100	70	◆ Frequent leak detection Surveys ◆ Train and adopt modern detection technics			STO/TOM/Sn. Water	Quarterly Q1		Frequent leak detection surveys are done as stated above and the adoption of new technology on the same is yet to be fully embraced.	Frequent leak detection surveys are done as stated above and the adoption of new technology on the same is yet to be fully embraced.
		(c) IF REQURED: Pressure Measurement & Pressure Reduction/Management	60 % - L 4	(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements	0 % - L 1	1	100	50	◆Upgrade of pipelines prone to busrt and leaks due to high pressures			STO/TOM/Sn. Water Engineer/AM	Quarterly		Problematic sections are upgraded in phases depending on the availability of funds and operational measures are also applied to ensure the pipelines are safeguarded from extreme pressures e.g closure of valves at nigth and trottling of some sections	Problematic sections are upgraded in phases depending on the availability of funds and operational measures are also applied to ensure the pipelines are safeguarded from extreme pressures e.g closure of valves at nigth and trottling of some sections
				(31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	88 % - L 5	1	100	90	◆ Installation of Air valves ◆ Istallation of Section Valves ◆ Rehabilitaion of Tanks(BPTs and Storage Tanks)		1,250,000 1,250,000 8,000,000	TOM/STO/AM TOM/STO/AM TOM/STO/AM	Quarterly Quarterly Quarterly		Requisitions of Airvalves, SluicedValves have been done. Rehabilitation of BPTs is yet to start because of financial constrains but the same as been slated for Q3.	Some of the AVs and sluiced valves were procured and they are being utilised. Rehabilitation of BPTs have been rescheduled to Q3.
		(d) IF REQUIRED: Leak Reduction with Large Investments (e.g.	76 % - L 4	(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.)	82 % - L 5	4	100	90	◆Installation of Standby Pump in Mazeras & Mariakani						Additional pump installed in Mazeras pumping station as a standby pump and two pumps in Mariakani with the help of County Governement.	A pump was installed in Chinyume(Lower Ribe) to boost water supply to Kaloleni area.
				(33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	70 % - L 4	1	100	80	◆ Replacement of Delapitated pipelines			TOM/AM/STO	Quarterly		The lines are identified, quatations made but awaiting funds for implimentaion. Some of the quatations have been incorporated by the world bank program in Kilifi and Mtwapa	The lines are identified, quatations made but awaiting funds for implimentaion. Some of the quatations have been incorporated by the world bank program in Kilifi and Mtwapa

Total Annual Cost (KSh.)	24,500,000

Schedule columns (shaded bar chart):

2021-2022: 2021- 1st Qua.			2021- 2nd Qua.			2022- 3rd Qua.			2022- 4th Qua.			2023-24				2024-25				2025-26				Notes
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	1st Jul-Sep	2nd Oct-Dec	3rd Jan-Mar	4th Apr-Jun	

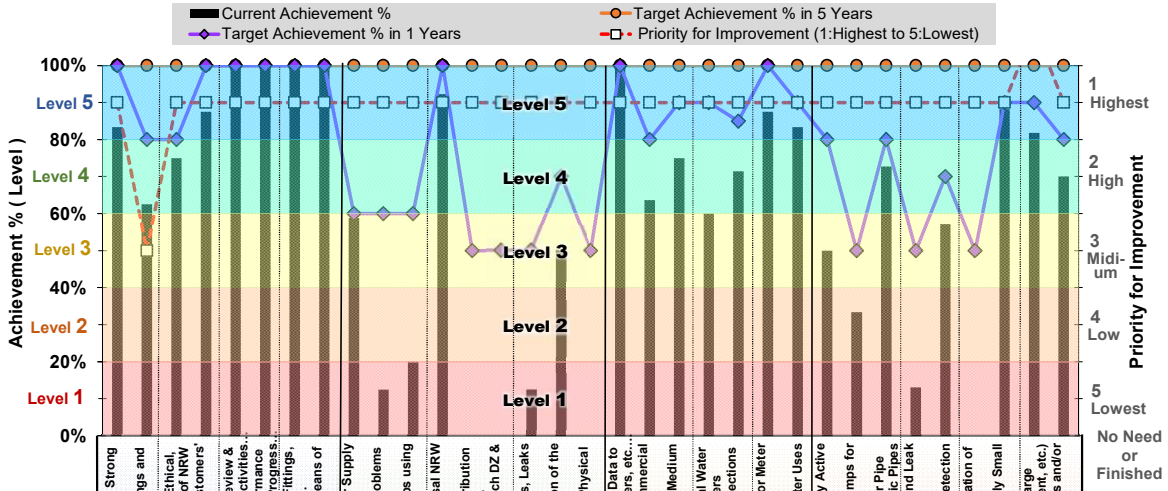
End of 3rd Quarter (by March) | End of 4th Quarter (by June)

[1-2] Automatically-Visualized Results of the Self-Assessment on Current Conditions for NRW Reduction

Step 3: Discuss the Results on the Graph and Review the Priority and Targets if required

DEFAULT: ALL 33 Aspects

Figure: Results of the Self-Assessment of Current Conditions & Target Levels (Full 33 Aspects)



33 NRW-related Aspects	Sub Category Achievement % - Level	Main Category Achievement % - Level	Overall Achievement % - Level
ESSENTIAL: (1) Establishment of NRW Section/Unit and Its Strong Coordination with Other Relevant Sections/Units VERY BASIC: (2) Capacity Development through Trainings and Benchmarking	(a) Staffing with Essential Support & Training 78 % - L 4	[A] Organizational Structure, Sensitization, PDCA Cycles & Procurement 89 % - L 5	61 % - L 4
(3) Sensitization of All Staff & the Board of WSP on Ethical, Cooperative, Financial and Water Resource Aspects of NRW VERY BASIC: (4) Enhancement of Existing & Potential Customers' Compliance and Support	(b) Sensitization & Awareness Raising for Wider Support 81 % - L 5		
ESSENTIAL: (5) Yearly PDCA Cycle: Participatory Review & Planning, and Budget & Funds for NRW Reduction Activities ESSENTIAL: (6) Monthly & Quarterly PDCA Cycles: Performance Indicators, Monthly Report, Data-based Discussions and Progress	(c) PDCA Cycles (Plan-Do-Check-Adjust) 100 % - L 5		
VERY BASIC: (7) Internal Standardization of Pipes, Fittings, Customer Meters, etc. and Quality Control (8) Procurement of Sufficient Materials, Equipment, Means of Transportation, etc.	(d) Suitable, Sufficient & Timely Procurement 100 % - L 5		
ESSENTIAL: (9) GIS Establishment and Mapping of Water Supply Facilities VERY BASIC: (10) Mapping of Customer Meters, Various Problems at Customer Points, and Bursts & Leaks... (11) Backup, Update and Enhanced Sharing of GIS Data/Maps using Free Software	(a) Mapping/GIS Development & Utilization of Free Mapping Software 35 % - L 2	[B] GIS, NRW Monitoring, Zoning & Water Balance Analysis 34 % - L 2	
ESSENTIAL: (12) Monthly Monitoring of Total Billing, Universal NRW Ratio, etc. for Entire Service Areas (SA) (13) Zoning of the Existing Distribution Networks into Distribution Zones (DZs) and District Metered Areas (DMAs)... (14) Monthly Calculation of NRW Volume and Ratio for Each DZ & DMA	(b) Monthly NRW Monitoring & Zoning 41 % - L 3		
(15) Abnormal Flow Monitoring for Quick Detection of Bursts, Leaks and Illegal Water Uses (16) Universal Water Balance Table 1/2 (Confirmation of the Reduced/Remaining Commercial Losses) (17) Universal Water Balance Table 2/2 (Separation of Physical Losses) and Additional Zonal Analysis	(c) Abnormal Flow Monitoring & Water Balance Table 23 % - L 2		
ESSENTIAL: (18) Analysis of Meter Reading & Billing Data to Understand the Conditions of Existing Customer Meters, etc... ESSENTIAL: (19) Straight-forward Reduction of Various Commercial Losses starting from Large Customers (20) Additional Focused Management of Large and Medium Customers	(a) Starting from Large Customers (e.g. by NRW Section) 73 % - L 4	[C] Reduction of Commercial (Apparent) Water Losses (i.e. Data Handling & Meter Accuracy Errors & Illegal Uses), etc. 73 % - L 4	
ESSENTIAL: (21) Reduction of Unbilled, Unmetered and Illegal Water Uses based on CIS and Targeting of Suspicious Customers (22) Preventive Measures at the Installation of Service Connections & Customer Meters...	(b) Activities for New & Various Problematic Customers (e.g. by the Section installing Service Connections & Customer Meters) 67 % - L 4		
(23) System-related & Procedural/Internal Improvements for Meter Reading & Billing (24) Procedural/Internal Improvements against Illegal Water Uses	(c) System-related and Procedural/Internal Improvements (e.g. by the Section in Charge of Meter Reading & Billing) 86 % - L 5		
ESSENTIAL: (25) Reduction of Visible Physical Losses by Active Scouting and Quick Quality Repairs (26) Daily Usage of Low-Cost Acoustic Bars & Hand Pumps for Detecting Leaks (& Illegal Water Uses)	(a) Physical Loss Reduction Measures applicable without isolating DZs and/or DMAs 53 % - L 3	[D] Reduction of Physical (Real) Water Losses (i.e. Bursts, Leaks & Overflows) 51 % - L 3	
ESSENTIAL: (27) Sufficient Valves, Introduction of Better Pipe Materials and Small-scale Replacement of Most Problematic Pipes VERY BASIC: (28) Strategic Approaches for Underground Leak Detection varying from Place to Place (29) Improvements for Underground Leak Detection	(b) Underground Leak Detection in a Priority DZ(s) and/or DMA(s) and Its Expansion over Other Areas 23 % - L 2		
(30) Zone Prioritization for Pressure Reduction and Identification of Problematic Pipelines with Pressure Measurements (31) Pressure Reduction/Management with Relatively Small Investments (e.g. PRV, BPT, etc.)	(c) IF REQUIRED: Pressure Measurement & Pressure Reduction/Management without Large Investments (e.g. PRV & BPT) 60 % - L 4		
(32) Pressure Reduction/Management with Relatively Large Investments (e.g. Zoning with Reservoirs, Pump Replacement, etc.) (33) Large-scale Replacement of Deteriorated Pipelines and/or Service Connections	(d) IF REQUIRED: Leak Reduction with Large Investments (e.g. Pressure Reduction with Reservoirs & Replacement of Many Pipes) 76 % - L 4		