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February 29, 2016

VIA ELECTRONIC MAIL

The Honorable Kathleen H. Burgess
Secretary to the Commission
New York State Public Service Commission
Agency Building 3
Albany, New York 12223-1350

SUBJECT: SUEZ Water New York Inc. – NRW 2015 Update

Dear Secretary Burgess,

Please find the attached Non Revenue Water plan in full compliance with New York NYCRR 16 § 503.8, for SUEZ Water New York. The attached plan is an update to the two comprehensive studies conducted by SUEZ Water in conjuncture with HALCROW Engineering, as well as the previously submitted report for year-end 2014. This report includes the current measures being taken to reduce NRW levels.

While no single major event impacted NRW levels in 2015, there are significant long term overall events surrounding the Municipal use of water from fire hydrants, as well as operational use of water required to meet regulatory requirements, that are further addressed in the attached.

Should you have any questions please do not hesitate to contact me at 1-845-620-3352.

Sincerely,

Chris Graziano
Vice President & General Manager

Cc: Bruce Alch
James Cagle

SUEZ Water New York

2015 Year-End Non-Revenue Water Report & Non-Revenue Water Reduction Plan

Prepared By: N Curcio

PART I: PROGRAM OVERVIEW & CRITICAL ACTIVITIES

As previously outlined in a joint Non-Revenue Water (NRW) study conducted by SUEZ Water in concert with HALCROW Engineering, NRW is an important issue to SUEZ Water New York (SWNY) and the communities it serves. SWNY is taking this issue seriously and is expending significant resources to realize a reduction in NRW. Subsequently, this update is a continuation of the strategy set forth in the joint study which has been communicated to the department through written submission, the individual company annual reports, as well as in-person meetings and verbal updates.

The ultimate goal of any sustainable and responsible NRW plan is to drive the water loss percentage to the economic level. In the medium to long term, NRW levels in the 15%-18% range will be the goal to drive towards in SWNY service area given the geographical topography, system age and composition, and the diminishing returns seen as NRW levels approach the economic level of loss. The introduction of a NRW strategy will be viewed as a long-term strategy, which will continue until an economic level of water loss is reached. Water production and consumption data are constantly monitored to drive NRW to the economic level of leakage. This practice will continue once the economic level is reached, to ensure that the level is maintained. Therefore, the most important task in reducing NRW is to establish the infrastructure, procedures, and policies, in order to accurately understand the impact of water loss indicators.

As referenced in the Company's prior annual Non-Revenue Water Report and Reduction Plan filings, SWNY has established an ongoing program to improve system efficiency, reduce the cost of service through water loss reduction, and ensure sustainability of critical water supplies. The current Non-Revenue Water program focuses on developing and utilizing critical system operating data to profile the nature of water losses occurring throughout the system in greater detail, allowing for effective actions and controls to be implemented according to the specific needs that are identified (detailed in *Part III: Ongoing NRW Reduction Strategy*) .

Numerous actions have been taken to improve the way the Company collects and validates system operating data, refine the methodologies and processes used to characterize water losses, and develop actions to resolve water loss occurrences accordingly:

1. The Company has implemented monthly meter reading and billing cycles to better correlate system consumption and production data, and improve the accuracy of mass balance and water audit calculations. 2015 was the first full year of monthly billing data, and will be used as a reference for 2016 monthly consumption patterns.

2. A *Strategic Metering Initiative* was implemented to ensure that accurate consumption data was being collected for the Company's 140 largest customer meters, accounting for approximately 20 percent of total customer usage. It was found that considerable wear and damage was occurring to compound-meter bodies which had reached or exceeded their reasonable useful life, causing significant impacts to the reported accuracy of those

meters. As part of the initiative, policies and procedures for systematic monitoring, testing, and replacement of all large (compound) customer meters were improved.

3. Engineering Design for Phase-1 of a system-wide District Metered Area (DMA) system was completed. These sectorized production zones allow for system draft calculations to be performed on manageable sized portions of the system, and allocate leak detection and other resources based on the specific needs of each district.

4. Engineering Design for an Advanced Metering Infrastructure (AMI) system was completed. The AMI system will provide high-resolution consumption information, as well as identify customer consumption patterns which deviate from typical conditions, possibly indicating tampered, removed, or malfunctioning meters.

5. Preliminary Engineering Design for Phase-1 of a system-wide pressure reduction initiative was completed. Reducing system operating pressures will assist in minimizing the economic level of losses, reduce main-break severity, and promote conservation through reduced flow rates at non-volumetric fixtures. Additional analysis on the expected impact on main break frequency is ongoing.

6. All metered customer accounts were geocoded and mapped within the Geographic Information System (GIS), and all service points were reconciled with their corresponding record within the Customer Information System (CIS) to ensure consistency with customer metering records. As part of this process, all customer metering points were assigned a DMA/Pressure Zone identifier to allocate metered consumption to specific zones within the system.

7. Production meter maintenance, testing, and repair/replacement practices and associated standards have been improved for non-source-of-supply production meters (pumping stations, PRV sites, etc.) to ensure that accurate production data is available for all Pressure Zones. Source-of-supply production meters are tested and maintained according to regulatory policy and requirements.

Additionally, specific process and best practice improvements have been made to-date to strengthen core operational activities associated with water loss control, and ensure sustainability of the Non-Revenue Water Reduction initiatives:

1. Leak and main-break Find-to-Fix times, or the time between when the Company becomes aware of a leak and when it is repaired were minimized by repair policies prioritized by leak magnitude and resulting system impacts. The Company repairs most leaks within hours of discovery and will continue this practice. Dedicated leak correlation personnel have been assigned and trained on the various equipment and methods used under best-practice techniques.

2. A strategic production data/trend monitoring policy has been implemented to minimize leak and main-break awareness times, or the time between when a leak develops and when the Company becomes aware of the leak. Some leaks that develop remain as non-surfacing leaks for a period of time before they are discovered by conventional means. This desktop analysis will improve efficiency by narrowing down the area where new leakage has likely developed. This policy will be implemented for front-line operators, as well as management level personnel.

3. New Business processes, policies, and procedures have been evaluated and improved to ensure proper tracking and handling of all new service requests, and proper sizing and configuration of new customer meters.

4. The Company is working to better characterize the nature of *avoidable real loss* occurring within the system, and identify any patterns, trends, or correlations which could help steer future leak detection surveys and associated activities, as well as identify any potential operational adjustments which could help mitigate the main-break frequency rate and severity.

5. A custom-developed Meter Data Management (MDM) program was implemented in conjunction with the AMI system, to assist with identifying customer usage patterns which could be indicative of theft or tampering.

6. The Company's continued optimization of reporting functions within its recently installed billing system has brought tighter controls on items such as estimated bills and zero read meters. The recent transition to monthly billing has further optimized use of these controls.

Critical activities associated with improving the collection and evaluation of system operating information have been identified, evaluated, and proposed within the Company's June 30th, 2015 Water Supply Report filing. These activities are needed to better align and monitor system efficiency indicators and further improve the performance of the system.

SWNY is currently in the design phase of a system-wide Sub-District Metering (DMA) program, which will reduce the current largest metered zones (PD-10/20/95/40/33) into smaller, more manageably sized sub-districts. Sub-District Metering is a proven effective way to reduce the awareness time of non-surfacing leakage, and minimize potentially recoverable real losses (burst leakage). The DMA system will also reduce the leak investigation area associated with a pipe burst and enable the operations team to quickly and efficiently identify, locate, and resolve water loss events and other operational anomalies which may occur throughout the system. It will enable the Company to continuously monitor system performance and efficiency in smaller zones, and deploy field crews in the most effective manner based on the specific needs of each DMA zone. The solution will also improve the accuracy of water loss audits within the zones, assist with planning functions, and better match production information to customer usage with higher resolution and accuracy.

The table below summarizes the breakdown of DMA meters for each of the major Pressure Districts that are being addressed. All other Pressure Zones within the system already contain less than 3,000 service connections and can be considered to be DMA equivalents at the current time.

Pressure District	Total No. of Connections in Pressure District	Proposed No. of DMA Zones	Average No. Services per DMA Zone	No. of DMA Metering Sites Required [2]
PD10 [1]	29,451	8	3,681	23
PD95	11,644	5	2,328	7
PD20	15,659	7	2,237	18
PD40	6,226	2	3,113	4
PD33	2,630	2	1,315	1
			TOTAL:	**53**

Note 1: Not including the 5 DMA Meters already installed in PD10. These meters bisected PD-10 into Northern & Southern Zones

Note 2: Total number of required metering sites could potentially be reduced by utilizing boundary valves where practical. This requires coordination with water quality and fire flow requirements.

SWNY is also in the design phase of a system-wide Advanced Metering Infrastructure (AMI) program, which will improve the frequency, resolution, and accuracy of customer consumption information, as well as reduce the level of effort needed to accomplish routine meter-reading and billing activities. The system will utilize a network of fixed-collectors (located throughout the service territory) to continuously collect data transmissions from customer billing meters, and compute the associated consumption in near-real-time.

This near real-time consumption information can be aligned with corresponding production information within each DMA zone to reveal the precise magnitude and nature of any water losses occurring within each zone. The system will also enable the Company to monitor usage patterns and metering accuracy for large consumers, as well as identify and prevent theft of service and illegal meter tampering. This high-resolution consumption data will also be used in conjunction with the *Strategic Meter Testing Policy* for large customers to ensure metering accuracy associated with those accounts.

While the DMA program is specifically intended to identify and resolve *avoidable real losses*, other measures must be taken to minimize levels of *unavoidable losses*, or leakage which cannot be reasonably detected or repaired by conventional means. The Company is proposing to reduce unavoidable losses to economic levels with pressure reduction in conjunction with targeted infrastructure replacement for under-performing assets.

Pressure reduction opportunities throughout the system have been evaluated in conjunction with the Sub-District Metering (DMA) initiative. The primary goals of the pressure reduction initiative are as follows:

- Reduce the economic level of real losses to the unavoidable level, by addressing system background leakage which cannot be reasonably detected or repaired by conventional means. Research has shown that the quantity of water lost through leakage (both avoidable and unavoidable) is proportional to the operating pressure of the system.
- Reduce main-break severity, and promote asset longevity by reducing the overall stress on system infrastructure and minimizing surge & thrust intensity.
- Promote conservation through reduced flow rates at non-volumetric fixtures. Consumption in free-flow uses can be reduced without requiring changes in water use habits by customers. SWNY's Non-Revenue Water and Water Loss Control efforts are intended to work collectively with our Conservation Strategy.

Dynamic Pressure Management practices are being examined (PRV settings modulate according to flow rate) to retain maximum system capacity and avoid impacts on available fire flow as a result of pressure reduction. Dynamic Pressure Management would allow for the maximum possible reduction in pressure across all operating conditions. In general, pressures throughout the system will be reduced as much as possible while maintaining regulatory service requirements, and avoiding impacts to critical customers, system facilities such as tanks or sources of supply, or available fire flow. A diagram illustrating the components of real-loss management is provided below.

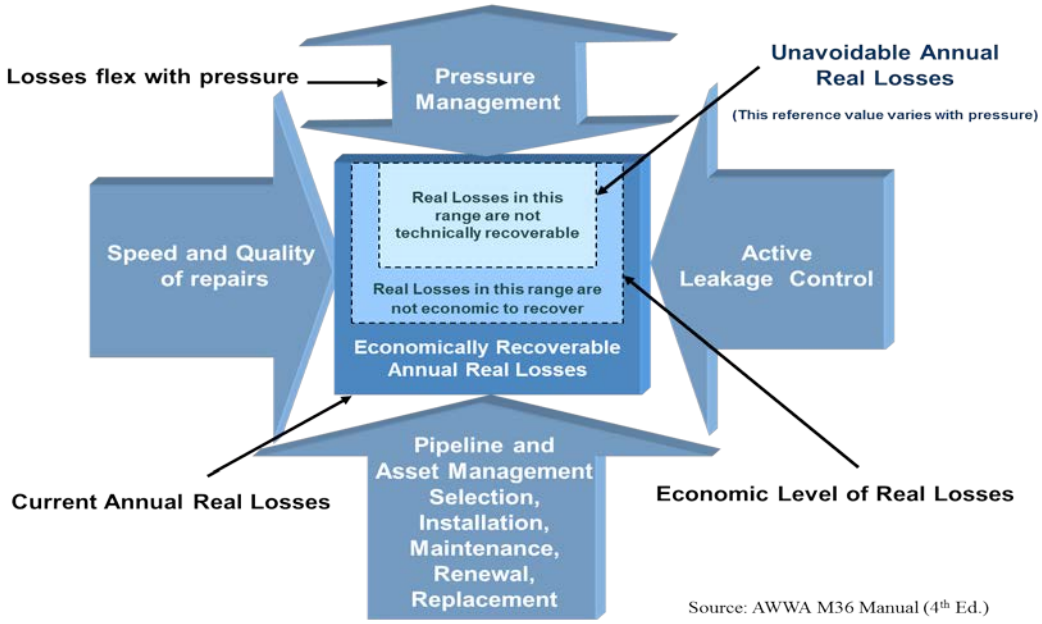


Diagram Illustrating the Real Loss Management Components

Also proposed within the Company's June 30th, 2015 Water Supply Report filings were measures to accelerate the Company's Underground Infrastructure Renewal Program (UIRP). A more aggressive program of targeted infrastructure replacement will help to reduce the unavoidable level of real losses, as well as promote sustainability of efficient water loss levels once achieved.

SWNY's below-ground infrastructure is considered young by industry standards, with a current average asset age of only 50 years. Generally, underground infrastructure demonstrates a useful life of 75-100 years or longer under typical operating conditions. As such, an infrastructure replacement program based largely on asset age would likely not deliver the maximum value per dollar of investment, especially considering that many of the Company's best performing assets are among the oldest. As a result, the Company has implemented an industry-leading capital planning and infrastructure replacement tool called *InfoMaster* to improve the sophistication of such evaluations and allow for additional metrics such as pipe failure rate and water loss profiles to be considered within the analysis.

PART II: 2015 PROGRESS UPDATE & FINDINGS

The annual AWWA Water Audit for SWNY indicates a year-over-year NRW increase of 4.6% in 2015. However, the increase is partially the result of the impacts on billed consumption associated with the transition to monthly billing cycles which occurred in September of 2014, and has accounted for approximately 3.43% of the year-over-year increase. Consecutive severe winters (2013-2014 & 2014-2015) have caused a surge in main-breaks across these time periods, which have produced a corresponding impact on real losses. Although the losses associated with these severe weather periods have already been resolved, these additional losses are reflected within the annual NRW calculation, and will not be completely factored out of the rolling-average NRW calculation for a full 12-month period (further detail provided in later sections).

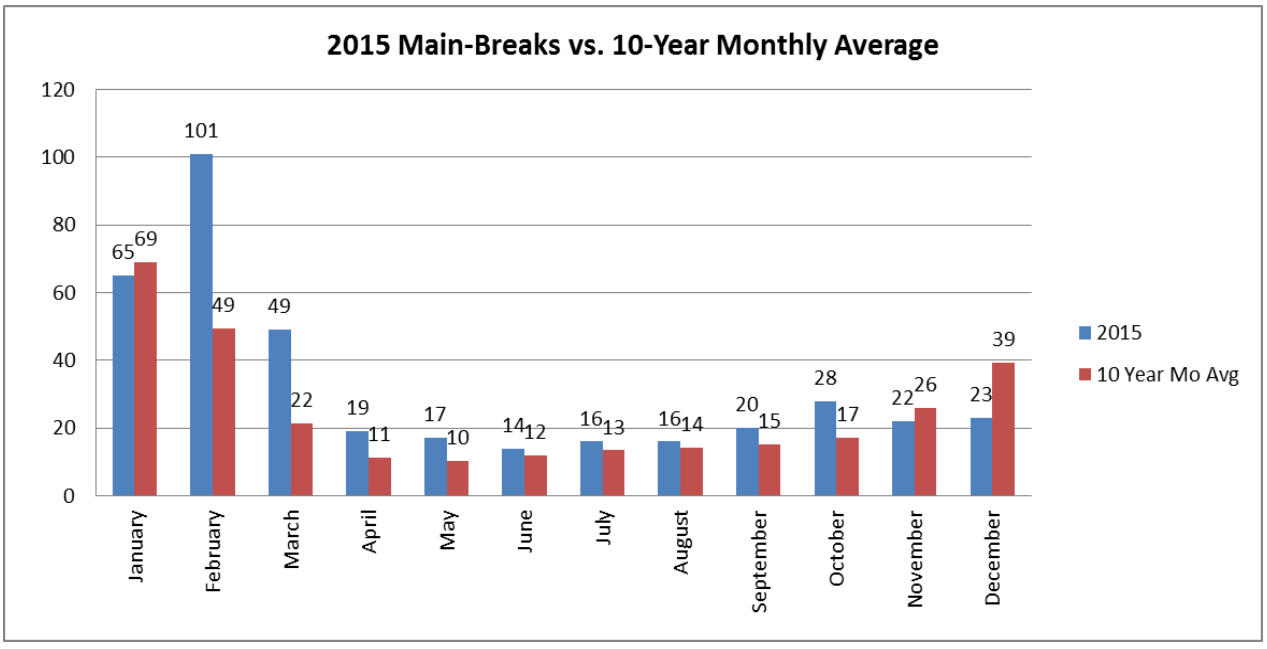
TABLE-1 below provides a four-year summary of main-breaks within the SWNY system. The data reveals a significant increase in total breaks for both 2014 and 2015 as compared to prior typical years.

YEAR	SURFACING BREAKS	NON-SURFACING BREAKS	TOTAL BREAKS REPAIRED
2012	198	16	214
2013	265	25	290
2014	330	42	372
2015	346	45	391

TABLE 1 – SWNY Main-Break Summary (2012-2015).

The increase in both surfacing and non-surfacing breaks can be attributed to weather related factors, particularly concerning the number of consecutive days below freezing temperatures. For the month of February 2015, there were 20 out of 28 total days where the high temperature remained below freezing. This extreme weather impacted water loss levels for systems across the Northeast. The impact on regional systems was so severe that the AWWA New York State Section held a panel discussion during its 2015 Edwin C. Tifft Jr. Water Supply Symposium Conference to review water main breaks across the region and discuss lessons learned from various perspectives. SWNY representatives were proud to have the opportunity to participate in the panel discussion and share experiences with other local authorities who experienced similar results.

GRAPH-1 illustrates the corresponding surge in SWNY main-breaks across the winter 2015 time period, as compared to the 10-year average. An associated increase in breaks for March can be attributed to breaks which likely developed during the deep-freeze of February, as the awareness time for many leaks is longer during the winter months due to frozen ground conditions. The Sub-District Metering project described in *Part I* will better position SWNY to locate non-surfacing leakage associated with frozen ground conditions encountered across the winter months.



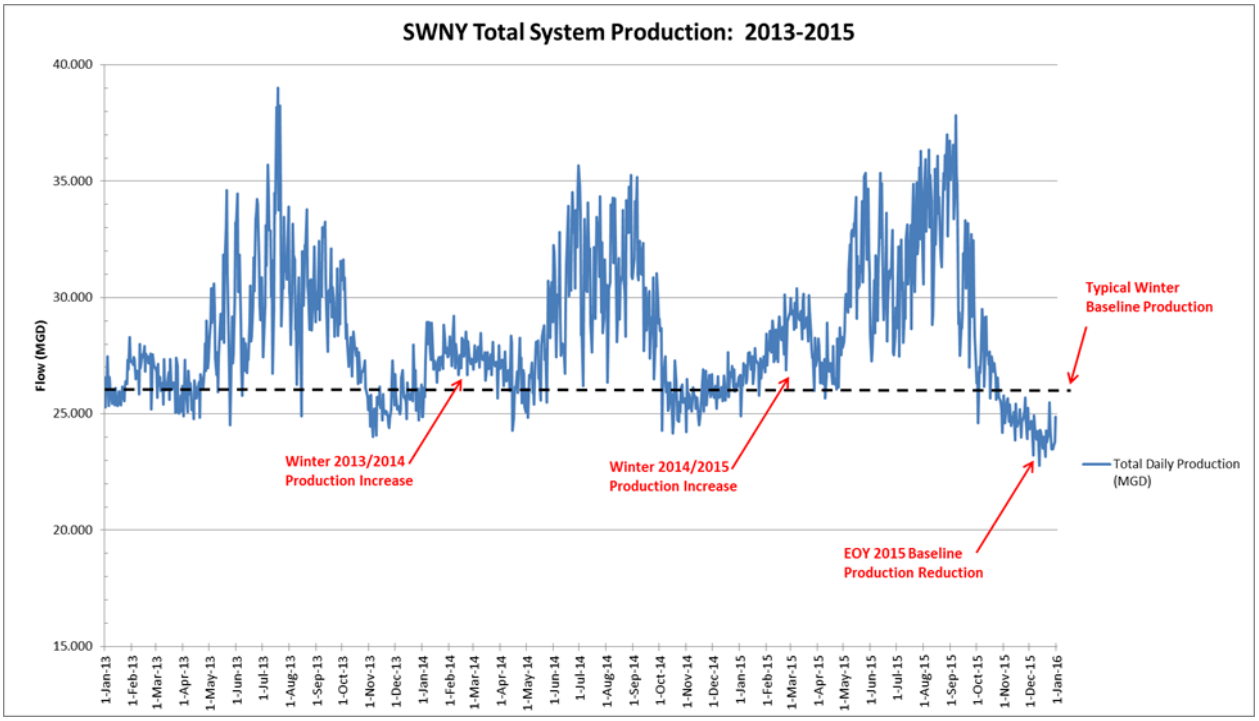
GRAPH-1: SWNY 2015 Main-Breaks vs. 10-Year Monthly Average

To properly measure and assess the water loss impacts of the additional main-breaks suffered during 2015, a production-side evaluation was conducted whereby the average winter-baseline production was calculated and compared to the winter baseline production for 2013 and 2014.

Baseline consumption and production levels are defined across the November through March time period, when typically only indoor water use occurs. Water usage patterns across this time period are generally stable year-over-year, which establishes baseline level flow rates for which current-year data can be benchmarked.

The baseline data evaluation revealed that an average daily production increase of 1.85 MGD occurred within the time period of January 1st through April 1st 2015, and resulted in a total production increase of nearly 168 MG being recorded for this time period, which can be attributed to the corresponding surge in main-breaks. This production increase across the winter time period alone accounts for over 1.5% of total annual production, and was the predominant cause for the Non-Revenue Water increases seen across 2015.

GRAPH-2 below depicts SWNY total system production across the 2013 through 2015 time period. The distinct surges in system baseline production levels can be seen across the winter 2013/2014 and 2014/2015 periods, which cannot be attributed to any significant increases in consumption.



GRAPH-2: SWNY Total Daily Production 2013-2015

Also evidenced in GRAPH-2 is a substantial decrease in system baseline production during the period of November 1st through December 31st, 2015. Production levels across this time period are averaging 1.67 MGD *below* typical winter-baseline levels. In fact, the SWNY monthly water loss calculations are showing a consistent decline over four consecutive months to end 2015.

These reductions in current system production levels are the result of water loss recovery actions taken throughout the year to assess, identify, locate, and repair damage to underground infrastructure sustained during the severe weather of the 2014/2015 winter.

The current standard NRW calculation utilizes a 12-month rolling average to better align production and consumption data, and average-out the inherent lag between water production and recorded consumption. This long-period rolling average calculation is considered to be a lagging indicator of current NRW levels, as any temporary surges in production caused by extreme or unusual circumstances remain within the calculation for a full year. Therefore, the full impact of water loss recovery efforts across 2015 will not be fully realized within the standard water audit calculations until well into the 2016 reporting year. Moving forward, the planned implementation of a system-wide AMI project will improve the resolution of consumption data and allow for shorter-period water loss and mass-balance calculations to be performed.

SWNY continues to utilize its expanded *Production Data Monitoring and Evaluation Process* to reduce the awareness time typically needed to identify and localize water loss events, as well as identify specific areas of the system (Pressure Zones) which are demonstrating higher-than-expected baseline levels of water loss.

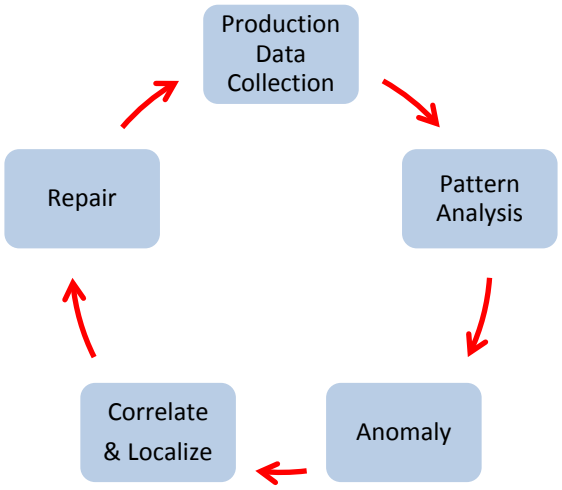


Diagram Illustrating the Production Data Monitoring and Leak Localization Process

SWNY is also expanding its real-loss evaluations in an attempt diagnose the root cause of main- breaks in the distribution system, which will better enable the Company to profile and reduce real losses as part of its Non-Revenue Water reduction efforts. Using documentation from each water main-break and AWWA recommendations for calculating water lost to main-breaks and service leaks, SWNY is able to analyze specific water loss events to establish any correlations between the number and type of main-breaks and other observed conditions.

Many factors contribute to the failure rate of below-ground infrastructure such as pipe age, pipe material, pipe cohort group (vintage), installation quality and technique, soil conditions, water temperature, and system operating pressure, as well as other operational factors related to how water is treated, supplied and pumped throughout the network. According to a Water Research Foundation (WRF) study, the average pipe-break rate for water utilities is between 21 to 27 breaks per 100 miles of pipeline per year. For the 8-year period between 2006 and 2013, the average pipe-break rate for SWNY was slightly over 26 breaks per 100 miles of pipe per year, which is consistent with industry averages. However, this number surged to nearly 37 during the 2014 and 2015 periods, further indicating the impact that exceptionally harsh winter weather has on below-ground infrastructure.

Furthermore, Real Losses in the SWNY System were overstated within the 2015 AWWA Water Audit, given the fact that metered consumption used for Company internal purposes**,** although un-avoidable, is currently considered to be water delivered to the system, and therefore is contributing to the non-revenue producing volume which the company must report. Company use water could be more accurately accounted for by removing this usage from the Non-Revenue Water calculation.

Authorized Un-Billed Consumption (Company Internal Use):

- Operational/Facility Use: 6.30 MG
- House Meters (Offices): 0.05 MG

Total Internal Use: 6.35 MG

Please refer to APPENDIX A for the complete SWNY AWWA Water Audit Report for 2015.

On the apparent loss side, a *Strategic Metering Initiative* was implemented for the Company's largest users to ensure accurate consumption metering for those accounts. Under the initiative, the Company has identified 140 meters associated with large users, which account for 20% of total billed consumption. The identified meters (predominately dual-register compound meters) will be field tested for accuracy and undergo a full meter-body and/or UME register head replacement where necessary. The initiative also provides for field testing of all compound meters whenever a standard UME register replacement would be required, to assess the condition of the meter body and proceed with full replacements accordingly. This approach accounts for wear or damage occurring to the actual moving parts of compound meter bodies as they reached or exceeded their reasonable useful life.

Phase-1 of the Strategic Metering initiative was completed in 2015 and included the first 45 meters associated with large users. Year-over-year statistics collected for these accounts indicate that approximately 40 million gallons (MG) of additional consumption was recovered for those meters in the partial year following the full-body meter replacement. Forensic analysis of the old meter bodies revealed that considerable wear and damage had occurred in many cases, resulting in significant impacts to the accuracy of those meters.

Theft of service and meter tampering investigations also continue to produce meaningful results for SWNY. For example, over the past two years SWNY has completed approximately 1,850 field investigations of locations that were identified as potential candidates for theft of service. Of these locations, 222 instances of theft were confirmed, representing approximately 12% of completed investigations. Extrapolating this sample data set across the entire customer base confirms that theft of service is a significant component of the overall Non-Revenue Water percentage.

Much like the approach taken for targeting real-losses, apparent loss investigations begin with a comprehensive desktop review to better focus field activities on the locations that most likely demonstrate theft of service or tampering issues. Desktop evaluations involve compiling service point information from various internal and external data sources to identify 'red-flag' type discrepancies, or data which is outside of expected parameters for a given service point. Lock-wing type service connections, which consist of a master service from the street serving multiple meter sets within the property, present unique challenges for both desktop and field investigations, as these meter sets are located within private property not controlled by SWNY. Denial of SWNY access by customers presents difficulty in confirming if all meter sets associated with a lock-wing type service remain in compliance with Company Tariff requirements after the initial installation. SWNY continues to work with customers and invokes the protections provided by the Tariff to address these issues. However, denial of access delays SWNY's ability to rectify meter set issues and also impacts productivity as some properties must be visited multiple times.

Service points which consist of both a private well and SWNY water service connection also present specific challenges related to benchmarking expected consumption levels and patterns for such accounts. Theft of water from fire hydrants is also an issue throughout the service territory, and presents a high risk for cross-contamination of the public water supply associated with improper or missing backflow devices. With over 6,300 hydrants throughout the County, it is not practical for SWNY to police illegal usage by municipalities, contractors, or residents at all potential theft locations. The Company continues to work with municipalities and local law enforcement to curb illegal use of hydrants. The Company also purchased additional hydrant meters to expand the hydrant meter rental program and encourage proper use of hydrants.

The transition to monthly meter-reading and billing cycles has allowed for seasonal consumption comparisons to be performed across the customer base, and has improved the quality of theft-of-service investigations particularly related to outdoor use theft. The implementation of a fully deployed AMI system will further improve the quality of such evaluations, as well as enable the Company to identify discrepancies between production and consumption trends throughout the system.

PART III: ON-GOING NRW REDUCTION STRATEGY

Going forward, the overall strategy of the Non-Revenue Water reduction program for SUEZ Water New York is to continue to monitor and characterize the nature of water loss occurring in the system within geographical or district-based regions. This information will be used to improve water-loss profiles and audit reports for various sectors of the distribution system, allowing for efficient and effective actions to be targeted according to the specific needs of each sector. Sustainability policies and procedures will be followed to ensure efficient system operation and minimize water loss.

At the current time, it is difficult to define specific targets regarding the economic level of water loss for the SWNY system, other than to refer to industry standard measures of approximately 15-18% of production. Improved data resolution on both the production and consumption side would be needed to perform an economic level of water loss evaluation with reasonable accuracy. The proposed DMA and AMI systems will provide data needed for a proper economic level of loss study. Once the individual components of NRW have been completely established and profiled for the SWNY system, the optimal efficiency point of the system will become better understood.

In general, the individual components of water loss consist of real and apparent losses, and can be further broken down as follows:

Apparent Losses – Consist of unauthorized consumption (theft & illegal use), as well as inaccuracies associated with production and billing metering.

- Production meter inaccuracies
  - Includes source of supply & purchased water interconnections.
- Customer billing meter inaccuracies
  - Losses caused by inaccuracies associated with aged or stopped billing meters.
  - Losses caused by improperly sized billing meters.
- Unauthorized or non-compliant service connections
  - Increased risk due to customer billing meters located within private property.
- Theft and unauthorized use from fire hydrants
- Tampered billing meters or reading equipment
  - Increased risk due to customer billing meters located within private property.
- Data handling errors within the meter or billing systems

Real Losses – Consist of physical water losses from the system up to the point of customer consumption.

- Un-avoidable annual real losses (UARL, or normal background leakage)
  - IWA methodology used to calculate the minimum achievable level of real losses.

- Potentially recoverable real losses (burst, joint, or outside service leakage)
    - Could exist as Surfacing or Non-Surfacing
- Storage facility overflows
- Un-metered customer service line leaks (inside service leaks)
    - Leakage on non-company owned infrastructure which contribute to non-revenue producing water losses.

Furthermore, certain authorized un-billed consumption also contributes to the volume of non-revenue producing water:

1. Water used for Company internal purposes such as:
    - Hydrant flow tests & hydrant maintenance
    - Chlorination of water mains
    - Distribution system flushing & maintenance
    - Operational use at sources of supply
    - Instrumentation use at system facilities

2. Water used by external authorities such as:
    - Fire Department activity including training/drilling

Authorized un-billed consumption is currently considered lost water, and is included in the overall NRW percentage. Fire department use is currently considered unmetered authorized usage, and Company internal use is also considered to be non-revenue water. These activities represent regulatory requirements, and are not under the direct control of SUEZ Water New York. As a result, these lost volumes of water are unavoidable, and can be better reflected by removing this usage from the calculation of the NRW percentage. Please reference the New York Uniform System of Accounts instructions under *§ 566.3* and the requirements of account 927, copied below, which describe accounting for such usage.

§ 566.3 - Water or steam used by the utility

A. If the utility desires to charge the appropriate accounts in any of its water operations with the cost of water or steam used from its own supply, the credit therefore shall not be made to operating revenue accounts, but to account 929, Duplicate Charges--Credit.

B. Water supplied by the utility from its own supply to other departments shall be accounted for in the following manner: If the water is supplied under a definite arrangement whereby the actual costs are allocated between or among the departments using the water, the credit in the accounts of the water department shall be made to the appropriate operations or maintenance account or

accounts, except that the amount of any return or interest, and the amount of depreciation and taxes charged against the other departments shall be credited to account 473, Interdepartmental Rents. If the charges are at tariff or other specified rates for the water supplied, then the entire amount charged shall be credited to account 467, Interdepartmental Sales.

§ 567 section 927- Franchise Requirements

A. This account shall include payments to municipal or other governmental authorities, and the cost of materials, supplies and services furnished such authorities without reimbursement in compliance with franchise, ordinance, or similar requirements; provided, however, that the utility may charge to this account at regular tariff rates, instead of cost, utility service furnished without charge under provisions of franchises. (See also account 302, Franchises and Consents.)

B. When no direct outlay is involved, concurrent credit for such charges shall be to account 929, Duplicate Charges-Credit.

Treatment of these un-billed usages in this manner enables the utility to account for miscellaneous authorized use without undue penalties associated with lost or unaccounted for water volumes.
In order to better understand the extent to which the various water loss components exist within the SWNY system, a process was developed to measure the individual components of water loss, beginning with the equipment and facilities necessary to collect information regarding current system operation and the corresponding systems to organize and evaluate the information. This information will be used to better allocate resources for actions and interventions aimed at maximizing system efficiency, and implement policies and procedures for best practices and sustainability. The process can generally be broken down into the following components:

1) Information Generation

   Includes facility design, equipment implementation, and system operational changes needed to divide the distribution system into sectorized production zones, and generate and record high resolution operating and customer usage information.

2) Information Handling & Management

   Includes data collection, validation, and management procedures needed to organize, store, and report on system operating and usage information.

3) Data Processing & Evaluation

Use system operating and customer usage information to measure and characterize the nature of water loss occurring in each DMA/Pressure Zone, and develop reduction strategies accordingly.

FIGURE 1 illustrates a sample Water Loss Profile for a given water system.

4) Actions & Interventions

Execute the proper corrective actions needed to reduce water loss and maximize system efficiency, based on the specific strategies developed for each sector of the system. Typical actions include targeted leak detection and repair, and customer meter installation, replacement, or verification.

5) Sustainability

Develop policies, procedures, and best practices necessary to prevent recurrence of excessive water loss, and maintain system efficiency. Newly implemented DMA and AMI systems, along with monthly billing procedures will be used to monitor system performance on a continual basis, and generate alarms to notify operators of possible anomalies or events within the system.

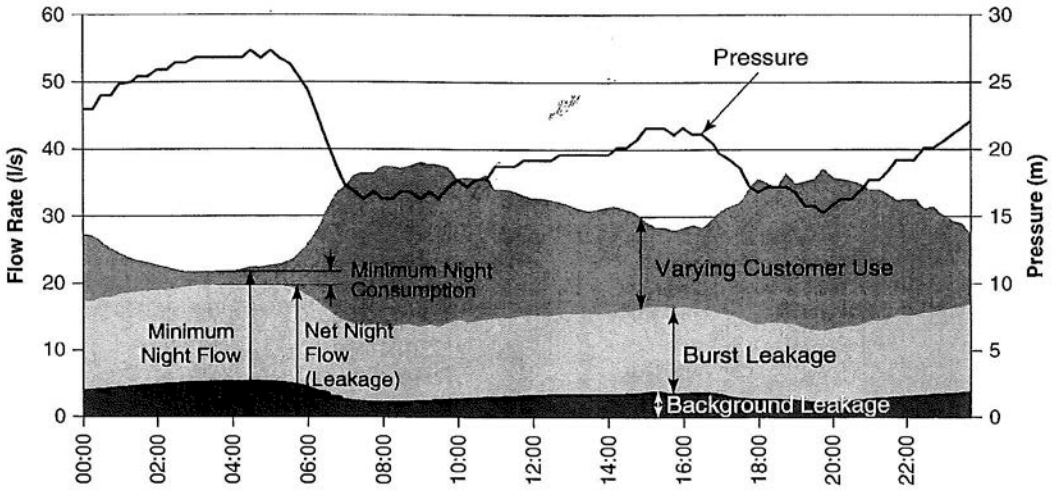


FIGURE 1 – Example Water Loss Profile

PART IV: NRW PROJECT TEAM & OBJECTIVES

In order to accomplish the goals of the NRW reduction program as outlined above, components of the program were broken down into individual, manageable task items categorized by department involvement and staff responsibility. The project team consists of the following departments and associated responsibilities:

Engineering/GIS:

Assist with facility design and implementation, hydraulic modeling & GIS updates and evaluations, and capital improvement projects as part of an overall asset management strategy.

- Plan and implement a DMA Network. The DMA network will be used as the primary flow monitoring system, and provide for accurate mass-balance and water audit calculations to be performed on each zone independently.
- Plan and implement an AMI Network. The AMI network will be used to monitor customer consumption with high-resolution, and allow for period-specific consumption reports to be generated.
- Update and maintain GIS and hydraulic modeling tools, and provide assistance with specialized evaluations using spatial analysis and modeling procedures.
- Evaluate pressure management opportunities to reduce the level of real losses within the system, in conjunction with the District Metering Project.

Customer Service & Billing:

Gather, analyze, and maintain accurate customer account and consumption information. Responsible for ensuring that every customer account within the service territory is properly maintained within the CIS system, and investigating any abnormalities.

- Implement and maintain *monthly* billing cycles for all customers to allow for more accurate water balance calculations by eliminating the need for 12-month rolling average estimates, and better align consumption and production data.
- Closely monitor customer usage reports and promptly investigate any abnormalities which could result in lost revenues.
- Review Meter Data Management (MDM) System and customer consumption patterns for abnormalities such as zero or negative consumption, or evidence of a tampered customer meter.

Metering:

Responsible for ensuring that every customer account within the service territory is properly metered and reporting consumption, and investigating any abnormalities which may result in lost consumption.

- Maintain compliance with aged meter replacement and testing requirements.
- Monitor all large and/or un-metered services to ensure accurate reporting and compliance with SUEZ Water fire/irrigation service connection policies.

Production & Distribution:

Conduct calibration of all master pay and plant meters, validate and report system production, and maintain system production structures. Operate and maintain system valves and hydrants, and manage the construction and repair policy of system infrastructure and facilities.

- Calibrate and maintain production master meters and pressure reducing valves semi-annually, and document calibration records and reports.
- Verify and maintain pressure division and DMA sectorization valves to ensure hydraulic isolation of all zones.
- Manage and administer the company's leak detection program including; targeted leak surveys, interconnection and cross-connection monitoring, hydrant and valve leak sounding, and deployment of acoustic loggers.
- Coordinate, prioritize, and manage leak and water main-break repairs, and ensure proper recording and documentation of all repairs.

Hydraulic Modeling (Engineering Department):

As part of the Engineering Department, the Hydraulic Modeling group will be responsible for calibrating and maintaining system hydraulic models, and perform specialized analyses aimed at optimizing system operation and efficiency, and identifying areas of the system which demonstrate a high likelihood of real losses.

- Ensure that the master version of the model is current and reflective of measured system conditions including DMA meter flows and pressure point monitoring values.
- Develop specialized NRW related model scenarios focusing on demand side hydraulics to study avoidable losses.
- Utilize the software's genetic algorithm to perform "hot-spot" leakage detection, whereby the system areas which demonstrate the greatest divergence from measured conditions are identified.

Water Audit & Reporting (NRW Manager):

Develop and maintain comprehensive water audit and mass balance calculations for all metered zones. Utilize high-resolution production and consumption information, in conjunction with leakage studies and hydraulic modeling results, to characterize the nature of water loss occurring in the various zones.

- Conduct UARL background leakage study by zone per IWA methodology, to establish the baseline proportion of real losses considered to be unavoidable.
- Establish standards for calculating NRW percentages on a DMA/district basis, including water audit templates and data handling procedures.
- Create workflow procedures to account for minor losses associated with internal activities such as flushing and chlorination, and authorized unmetered consumption such as fire department use.

Planning & New Business:

Responsible for all new water service requests and main extensions for connecting new customers to the system, ensuring that all new service projects are consistent with and conforming to SUEZ Water standards and policies.

- Track and manage all new service requests from the point of application for service through meter installation and bill generation.
- Determine proper sizing of new customer meters to ensure maximum meter accuracy based on anticipated usage estimates and customer classification.

Sustainability (All Departments):

Develop policies, procedures, and best practices needed to ensure optimal efficiency of the system. Create system efficiency indicators and typical operating profiles to assist in identifying and locating operational abnormalities or infrastructure failures.

- Implement capital improvement projects designed to maximize system efficiency, ensure proper service parameters are maintained, and eliminate under-performing assets from the system.
- Verify and document all boundary valve positions and possible cross-connections to ensure distribution system and DMA zone integrity.
- On-going routine leak detection surveys of transmission mains and high failure rate mains.
- On-going DMA and production meter calibration and maintenance.

- Maintain compliance with customer meter replacement and testing programs, and continuously monitor MDM system for customer usage pattern abnormalities.
- On-going high resolution water audits using DMA/Pressure Zone specific production data, along with monthly consumption data collected by Zone specific meter read cycles.
- Continually monitor and validate DMA/Pressure Zone specific production data to identify patterns and trends which could be indicative of burst leakage.

APPENDIX A – 2015 AWWA Water Audit Summary

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: SUEZ Water New York
Reporting Year: 2015 | 1/2015 - 12/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

					Pcnt:	Value:	
WATER SUPPLIED							
Volume from own sources:	9	10,785.309	MG/Yr				MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	9	72.772	MG/Yr				MG/Yr
WATER SUPPLIED:		**10,712.537**	MG/Yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

					Pcnt:	Value:	
AUTHORIZED CONSUMPTION							
Billed metered:	9	8,108.163	MG/Yr				
Billed unmetered:	n/a	0.000	MG/Yr				
Unbilled metered:	9	6.346	MG/Yr				
Unbilled unmetered:		133.907	MG/Yr		1.25%		MG/Yr
AUTHORIZED CONSUMPTION:		**8,248.416**	MG/Yr				

Click here: ? for help using option buttons below

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

					Pcnt:	Value:	
WATER LOSSES (Water Supplied - Authorized Consumption)		**2,464.121**	MG/Yr				
Apparent Losses							
Unauthorized consumption:	8	492.824	MG/Yr			492.824	MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies:	9	219.176	MG/Yr		2.63%		MG/Yr
Systematic data handling errors:	7	273.648	MG/Yr			273.648	MG/Yr
Apparent Losses:		**985.648**	MG/Yr				

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:		**1,478.473**	MG/Yr				
WATER LOSSES:		**2,464.121**	MG/Yr				

NON-REVENUE WATER

NON-REVENUE WATER:		**2,604.374**	MG/Yr				

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	1,057.0	miles				
Number of active AND inactive service connections:	8	75,956					
Service connection density:		72	conn./mile main				
Are customer meters typically located at the curbstop or property line?		No					
Average length of customer service line:	7	43.9	ft	(length of service line, beyond the property boundary, that is the responsibility of the utility)			
Average operating pressure:	9	103.3	psi				

COST DATA

Total annual cost of operating water system:	9	$25,847,945	$/Year				
Customer retail unit cost (applied to Apparent Losses):	8	$5.32	$/100 cubic feet (ccf)				
Variable production cost (applied to Real Losses):	9	$452.71	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses			

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 87 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Systematic data handling errors
3: Customer retail unit cost (applied to Apparent Losses)

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: SUEZ Water New York
Reporting Year: 2015 | 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 87 out of 100 ***

System Attributes:

	Apparent Losses:	985.648	MG/Yr
+	Real Losses:	1,478.473	MG/Yr
=	Water Losses:	2,464.121	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	823.78	MG/Yr
	Annual cost of Apparent Losses:	$7,009,736	
	Annual cost of Real Losses:	$669,320	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	24.3%	
	Non-revenue water as percent by cost of operating system:	30.0%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	35.55	gallons/connection/day
	Real Losses per service connection per day:	53.33	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.52	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,478.47	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.79	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	SUEZ Water New York
Reporting Year:	2015 (1/2015 - 12/2015)
Data Validity Score:	87

Own Sources (Adjusted for known errors)
10,785.309

Water Imported
0.000

System Input
10,785.309

Water Exported
72.772

Water Supplied
10,712.537

Authorized Consumption
8,248.416

Water Losses
2,464.121

Billed Authorized Consumption
8,108.163

Unbilled Authorized Consumption
140.253

Apparent Losses
985.648

Real Losses
1,478.473

Billed Water Exported

Billed Metered Consumption (water exported is removed)
8,108.163

Billed Unmetered Consumption
0.000

Unbilled Metered Consumption
6.346

Unbilled Unmetered Consumption
133.907

Unauthorized Consumption
492.824

Customer Metering Inaccuracies
219.176

Systematic Data Handling Errors
273.648

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Revenue Water
72.772

Revenue Water
8,108.163

Non-Revenue Water (NRW)
2,604.374