



# RIVERSIDE PUBLIC UTILITIES

## Board Memorandum

**BOARD OF PUBLIC UTILITIES**

**DATE: MARCH 9, 2026**

**SUBJECT: WATER LOSS UPDATE**

**ISSUE:**

Consider receiving and filing an update on water loss.

**RECOMMENDATION:**

That the Board of Public Utilities receive and file an update on water loss.

**BACKGROUND:**

Riverside Public Utilities (RPU) staff were requested to provide an update on water loss to the Board of Public Utilities. RPU's Water Loss Control Program is important to ensure water produced by the Utility is put to beneficial use, to adhere to California's water conservation policies, and reduce lost revenue. Reducing water loss can help build drought resilience, save energy, and delay or avoid the need for new supplies and infrastructure, if deemed economically feasible.

RPU maintains an active water loss control program and continues to evaluate further recovery measures. While staff are exploring several possible reduction strategies, a primary consideration is maintaining a favorable benefit-cost ratio, occasionally the expense of mitigating water loss can outweigh the value of the water recovered. The Water Loss Control Program incorporates measures that balance the cost of intervention for water loss reduction guided by a business case that integrates economic efficiency with long-term sustainability and regulatory compliance.

**DISCUSSION:**

**Water Loss Performance**

On October 9, 2015, the Governor signed Senate Bill 555 (SB 555) – Water Loss Management, into law. SB 555 requires all urban water suppliers in California to conduct validated annual water loss audits. The first validated water loss audit was due to the Department of Water Resources (DWR) on October 1, 2017, and annually by October 1<sup>st</sup> thereafter.

Since 2014, RPU has conducted eleven water audits following industry standards detailed in the American Water Works Association's (AWWA) M36 Water Audits and Loss Control Programs Manual. The data informing the water audit is compiled in the AWWA Audit Software, detailing

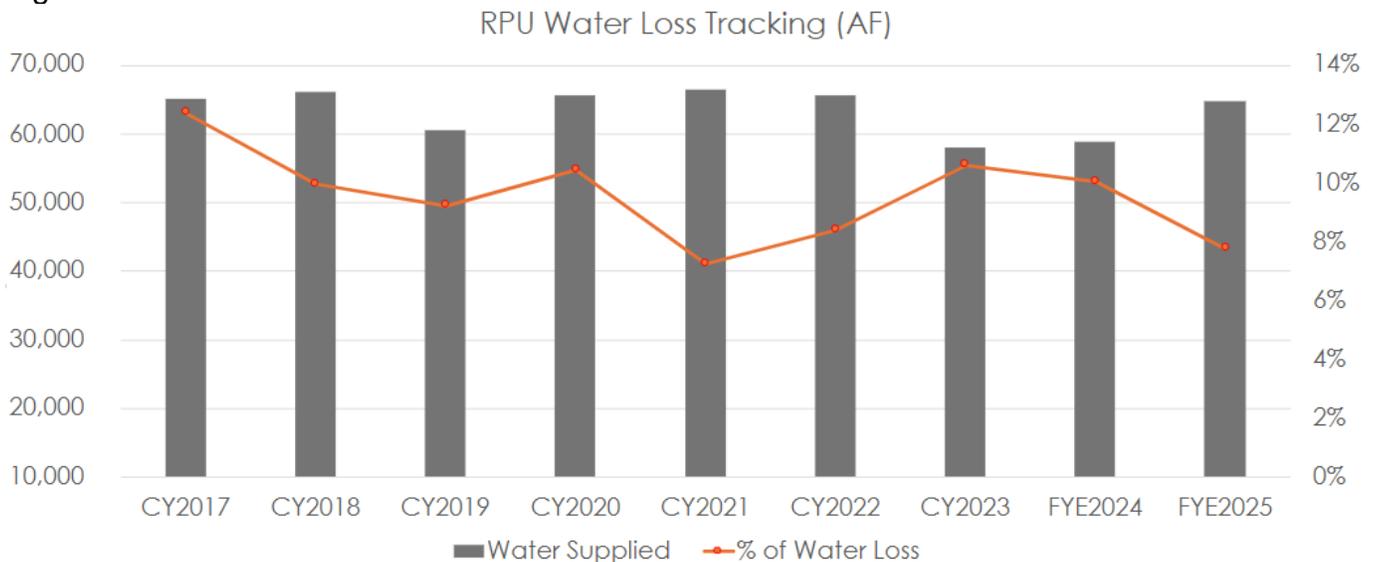
supply, consumption, and loss components in a water system. The goal is to identify and quantify real losses (i.e. leaks, main breaks) and apparent losses (i.e. meter inaccuracies, billing errors, data handling errors, unauthorized consumption) to improve and inform a utility’s water loss control practices. In other words, the water audit involves a review of records and data that trace the flow of water from its production at RPU’s Groundwater Wells through the treatment processes terminating at the Linden Evans Reservoir Complex (supply), then through the water distribution system which consists of a network of piping, valves, hydrants and service laterals, and finally delivered to customers via a metered connection (consumption).

The manual focuses on distribution system losses which are the largest measurable component of RPU’s overall water loss. For instance, in fiscal year (FY) 2025, RPU’s total system losses were approximately 7.2% of total water loss: 105 Acre-Feet (AF) in transmission mains, 348 AF in non-potable losses, and ~ 5,600 AF in the distribution system which represents 92% of the total losses. These water loss figures can vary slightly from year to year due to several factors such as system demand volume, response time, and unexpected failures, but typically more than 85% of RPU’s losses originate in the distribution system.

Complying with SB 555 requires urban water suppliers to not only compile the data that informs the water audit, but also to have the data undergo a Level 1 Validation by a certified third-party validator. A level 1 Validation is a process of reviewing a water supplier’s AWWA Water Audit Software inputs. The objectives of the water audit include confirming the accurate application of AWWA M36 Manual methodology, identifying and correcting evident macroscopic inaccuracies, and verifying the consistent selection of correct data validity grades.

Validated audits provide essential guidance for RPU, ensuring that water loss control practices are implemented that are cost-effective to maximize water loss reduction. The program strategically targets both real and apparent losses, maintaining progress through an annual water audit cycle. This iterative process begins with analyzing audit performance, followed by the application of targeted corrective actions and a reassessment of results through subsequent audits to ensure continuous improvement in water loss reduction.

Figure 1:



Benchmarks and Comparison

The FY 2025 validated water audit calculation showed that RPU’s distribution water loss was about 5,027 AF or about 8% in volume which resulted in a value loss of \$1,196,709 or 2% between the real and apparent losses. As a comparison to three other agencies, including San Bernardino Municipal Water District (SBMWD), Western Municipal Water District (WMWD), and Anaheim Public Utilities (APU) the following tables provides a benchmark for RPU as compared to these agencies:

Table 1: Water Loss by Volume (AF)

Agency	Real Loss	Apparent Loss	Total Water Loss	Water Loss %	Total Water Supplied (AF)
Riverside (2025)*	4,736	291	5,027	8%	64,735
Anaheim (2024)**	343	1,125	1,468	3%	52,803
SBMWD (2024)**	2,782	1,145	3,927	11%	36,006
WMWD (2023)***	1,089	184	1,273	7%	19,441

Table 2: Water Loss by Value (Dollars)

Agency	Real Loss	Apparent Loss	Total Value Loss	Value Loss %	Total Operating Cost
Riverside (2025)*	\$938,390	\$258,319	\$1,196,709	2%	\$55,486,242
Anaheim (2024)**	\$307,939	\$1,929,866	\$2,237,806	2%	\$105,059,347
SBMWD (2024)**	\$619,823	\$1,591,260	\$2,211,083	5%	\$42,742,799
WMWD (2023)***	\$1,741,658	\$235,297	\$1,976,955	4%	\$52,467,346

\* RPU switched its reporting from calendar year (CY) to FY after 2023 to align with the Urban Water Use Objective Report.

\*\* Anaheim and SBMWD latest data.

\*\*2025 and 2024 submittals for WMWD are not yet available.

\*\*\*WMWD includes Murrieta, Rainbow and Riverside Retail

The Data Validity Score, another key indicator of audit reliability, improved from 70 in CY 2017 to 88 in FY 2025, reflecting enhanced data collection, meter calibration, and validation practices. The higher the validity score reflects increased confidence in the accuracy of water loss reporting.

Overall, the data confirms that RPU has made measurable progress in reducing water loss, improving data reliability, and aligning system performance with State-established water loss standards. Staff continue to evaluate water loss reduction strategies using a benefit-cost framework to ensure that investments in leak detection, pipeline replacement, and meter upgrades are economically justified and consistent with prudent utility management.

## Water Loss Control Efforts

RPU is actively expanding its water loss control program, continuously identifying opportunities to recover lost water through cost-effective interventions. Recognizing that the cost of water loss mitigation can sometimes surpass the value of the water saved, RPU staff balances economic feasibility with non-economic priorities such as State regulatory requirements. This strategy relies on a continuous, iterative cycle of detailed water audits, targeted corrective actions, and rigorous performance evaluations.

Some of the water loss practices incorporated into RPU's Water Loss Program are outlined below:

### **Hydrant Meter Check Valves**

In 2011, RPU started installing hydrant meter check valves as a water loss control measure. When a hydrant is hit the water flows until the fire department or an RPU Troubleshooter arrives on scene, and the water is manually shut off. To reduce water loss from a hit hydrant check valves can be installed under the hydrant with break away bolts. When a hydrant is hit, the check valve closes allowing for a small stream of water to pass through a weep hole to act as an indicator, while holding back most of the flow. About 40% of RPU hydrants have a check valve installed.

### **Service Lateral Replacement**

Water is delivered to customers through water meters connected to the distribution system by service laterals. RPU has about 68,553 service laterals, about 97% are constructed of copper, with the remainder galvanized iron. Service laterals typically have a 30-40 year lifespan.

Since 2020, RPU has experienced an increase in after-hours emergency service lateral leaks, resulting in higher overtime costs. To address aging laterals and reduce emergency repairs, the Board approved a Service Lateral Replacement Program in December 2020, funded at \$750,000 per year. The program uses asset management data to identify neighborhoods with frequent lateral failures and replaces laterals proactively rather than on an emergency basis.

Planned replacements are significantly more efficient and cost-effective, allowing field forces to replace up to five service laterals during scheduled work compared to one during an emergency. Since 2022, an average of 570 service laterals have been replaced each year, many of which were at the end of their useful life and actively leaking. In contrast, emergency service repairs dropped to an average of 100 interventions per year. By continuing the program RPU expects to reduce water loss, emergency repairs, and overtime costs while addressing a major source of system water loss.

### **Expansion of Meter Replacement**

In 2022, the RPU Board approved a \$153,000 funding expansion for the Small Meter Replacement Program to bolster water loss control efforts. Small meters are two inches and smaller. By doubling annual replacements from 2,500 to 5,000 meters, RPU can effectively shorten the replacement cycle from 26 years to approximately 14 years. This initiative was informed by an analysis conducted by RPU Field Services, which identified significant declines in meter accuracy and high flow meter read reliability after 20 years of service. Adherence to this replacement schedule proactively addresses a projected surge in aging meters between 2027 and 2032 and will establish a sustainable framework to reduce non-revenue water.

### **Meter Calibration**

In October 2023, the Board of Public Utilities approved the purchase of a potable cold water meter test bench and recirculating system. The recirculating system reduces water loss while testing

meters. The new Test Bench replaced a model in use since the 1970s and allows up to 14 small meters to be tested at once. Testing shows meters are 96% accurate, reducing water loss due to meter inaccuracy and improving our water loss validation score.

### **Leak Detection Equipment Pilot Programs**

Another program approved by the RPU Board in 2022 was a Leak Detection Equipment Pilot Program. Under this initiative RPU conducted a 90-day pilot study deploying acoustic leak detection units on fire hydrants to monitor approximately 7.5 miles of pipeline in targeted service areas. The units collected acoustic data that were analyzed using vendor provided software to identify potential leak locations. Two pilot programs were conducted, in partnership with Muller Echologics and Fluid Conservation Systems (FCS).

In 2023, RPU partnered with Echologics to pilot the leak detection program by deploying 40 acoustic sensors capable of detecting leaks as small as 5 gallons per minute in the Ramona neighborhood with three months of managed monitoring. The pilot identified multiple leak events, including non-surfacing water main leaks, facility tailpipe leaks, irrigation valve leaks, and curb stop leaks, several of which would not have been detected visually. The estimated volume of water recovered throughout this pilot was approximately 25 AF.

In early 2025, following planning efforts and cellular coverage testing to determine optimal sensor placement, RPU launched a second pilot study in partnership with FCS. Forty acoustic detection sensors were installed, resulting in the identification of two service lateral leaks, which were repaired promptly. The estimated water lost from these leaks was about 12 AF.

Overall, data obtained from both vendors enabled RPU field staff to proactively address leaks, often with minimal or no visible surface evidence. However, broader implementation of these programs would require additional staff hours, training, and the ongoing subscription costs and software licensing would not result in a net positive financial impact given RPU's relatively low water costs.

### **Water Theft Ordinance**

In January 2022, the Water Committee reviewed proposed water loss reduction efforts, including recommendation to the Board of Public Utilities and, the Board of Public Utilities recommendation to the City Council to adopt a water theft ordinance to deter unauthorized use. Enabled by Senate Bill 427, the ordinance defines water theft, establishes penalties, and allows RPU to recover costs associated with unauthorized water use. The ordinance addresses public health and system damage risks from water theft, improves water accounting, and helps reduce non-revenue water. It also supports compliance with state water loss performance standards by imposing fines, recovering lost water costs, and codifying enforcement provisions in the Riverside Municipal Code.

### **Pump-Pod System**

In March 2025, RPU Board approved a rebate to the Riverside Fire Department to purchase a Pump-Pod device in the amount of \$15,604 to increase water use savings. The total cost of the Pump-Pod was \$118,850 with different incentives from several agencies contributing to this purchase including the Department of Water Resources (DWR), Metropolitan Water District (MWD), and WMWD. This device captures and recirculates water used during firefighting training exercises which will save an estimated 4.5 million gallons annually. RPU will be able to report the water savings resulting from Pump Pod use, and this will support RPU in meeting the guidelines set forth in the "Making Conservation a California Way of Life" regulation.

There are several other ongoing Water Loss Control efforts, proactive pipeline replacement

projects brought forward based on criticality, the use of consultant services from E-Source through funding from the WMWD, Water Loss Control Technical Assistance for desktop studies on Apparent Loss Analysis, District Metered Area (DMA) assessment, and Billing Analysis. Results of these studies are still under review and will help inform RPU's future water loss audit inputs and updates will be presented in the future. Additionally, RPU is participating in a research project led by Virginia Tech in collaboration with the USGS and hundreds of water utilities, that aim to analyze and reduce national water loss by establishing a standardized, state-of-the-art model for tracking and analyzing water pipeline performance. This collaboration relies on a data-sharing partnership via a Memorandum of Understanding, where RPU contributes existing infrastructure and water loss data in exchange for free access to advanced modeling results and performance benchmarking through 2028.

While RPU has implemented and continues to expand its water loss control efforts, further actions must be developed to recover as much water as is economically feasible. The cost of controlling leakage can exceed the economic value of the water itself, RPU must evaluate both financial and non-economic factors to maintain an optimal balance. To manage this effectively, RPU utilizes an iterative Water Loss Program that begins by analyzing water audit performance and applying targeted interventions based on those results. Once corrective measures are in place, their effectiveness is re-evaluated through subsequent audits, continuing this cycle until established water loss reduction goals are achieved.

### **FISCAL IMPACT:**

There is no fiscal impact associated with this report.

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### Attachments:

1. FY 2025 Water Loss Validation Report
2. Presentation