

# BEST PRACTICES FOR WATER LOSS PROTECTION, MEDIATION AND ASSET MANAGEMENT



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## WHEN IT COMES TO SAVING WATER AND MAKING BETTER USE OF IT, IS THERE REALLY ANYTHING TO DEBATE? WATER IS CRITICAL. IT IS BEYOND IMPORTANT; WE CAN'T SURVIVE WITHOUT IT.

In America alone, over 6 billion gallons of water are lost each day due to apparent and real loss issues. That's a shocking amount of waste, especially for a resource no one can live without. Water leaks typically occur underground and, therefore, are not always obvious. In fact, 90% of leaks are not evident without a proactive leak detection system or program. An estimated 1.7 trillion gallons of water per year is lost due to aging and leaking infrastructure. These leaks have created a \$2.6-billion issue known as non-revenue water (NRW). And NRW can no longer be ignored.

Let's begin with defining what NRW is and where the solution is hidden. Sixteen percent of water loss is "apparent" and occurs due to items such as metering inaccuracies, theft or billing inaccuracies. Utilities

across the country address this issue by installing and implementing automatic meter reading/advanced metering infrastructure (AMR/AMI) smart systems. These metering system upgrades represent the majority of capital expenditures combating NRW. While we admire these efforts and agree with the need to accurately measure and bill for water usage, the majority (84%) of water loss occurs within the transmission and distribution infrastructure. It is water that never gets to its intended point of use.

We call these losses "real loss." Monitoring infrastructure, identifying leakage, and resolving the issues on a timely basis should be the centerpiece of an effective effort to address NRW within today's utility networks. In other words, the goal should be "hunting, not hoping."

An effective NRW program must begin with the premise of "reducing leak run time." Given the fact that 90% of leaks never show themselves on the surface, permanent infrastructure monitoring is foundational to the solution. Robust technologies, combined with proven methodologies, are available to the utility in search of a proper stewardship program.



Leak repair in progress on a DMA within a large utility system in Tennessee.

## DISTRICT METERED AREAS (DMAS)

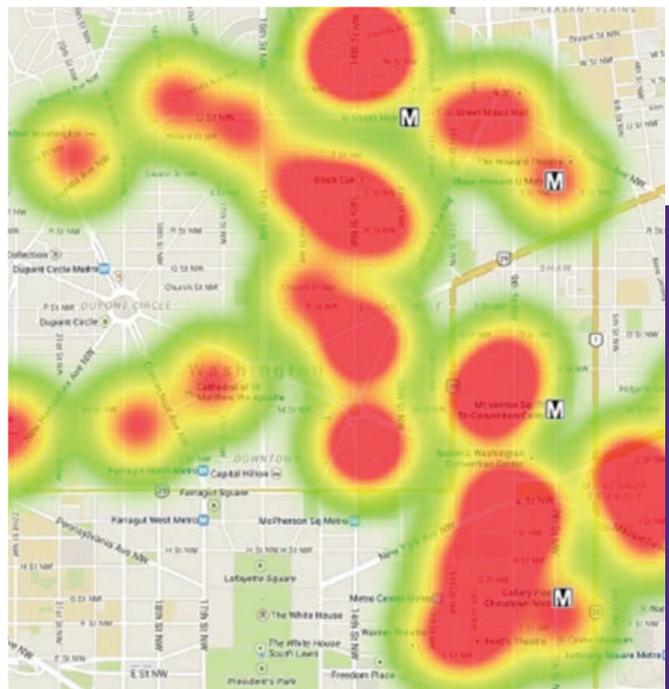
Today's best practices are grounded in validated, historical data collected from sensors throughout the utility's system. The practice is referred to as District Metered Areas (DMAs), and the knowledge derived from data empowers utilities to make quick and reliable decisions. What is measured, improves. And in this case, a water asset management program enables utilities to continuously monitor the day-to-day status of water networks as the first step to minimizing the risk of aging pipelines.

The monitoring equipment works to highlight system anomalies and generates real-time data that analyzes pipe condition and system integrity. Unfortunately, leaks are a continuous issue. They are a daily occurrence, not a yearly occurrence. And data-driven solutions like DMAs and continuous monitoring provide utilities with the knowledge and power to make informed decisions through data-backed deployment strategies. This, in turn, enables utilities to confirm the effects of operational characteristics, perform prioritized leak detection and mitigation efforts, which ultimately increases system integrity, reduces leak runtimes and drives down NRW on an ongoing basis.

## INVESTIGATIVE LEAK DETECTION: INITIAL AND PINPOINTING

Investigative leak detection services are essential to an operative water asset management program. Leak detection service offerings help utilities evaluate the integrity of their water network by locating and pinpointing leakage on an ongoing, routine basis. If the utility doesn't know where its leaks are occurring, then it can't fix them. And when those leaks aren't fixed, they add to the 1.7 trillion gallons of water leaked each year and can, in many cases, lead to catastrophic pipeline failures.

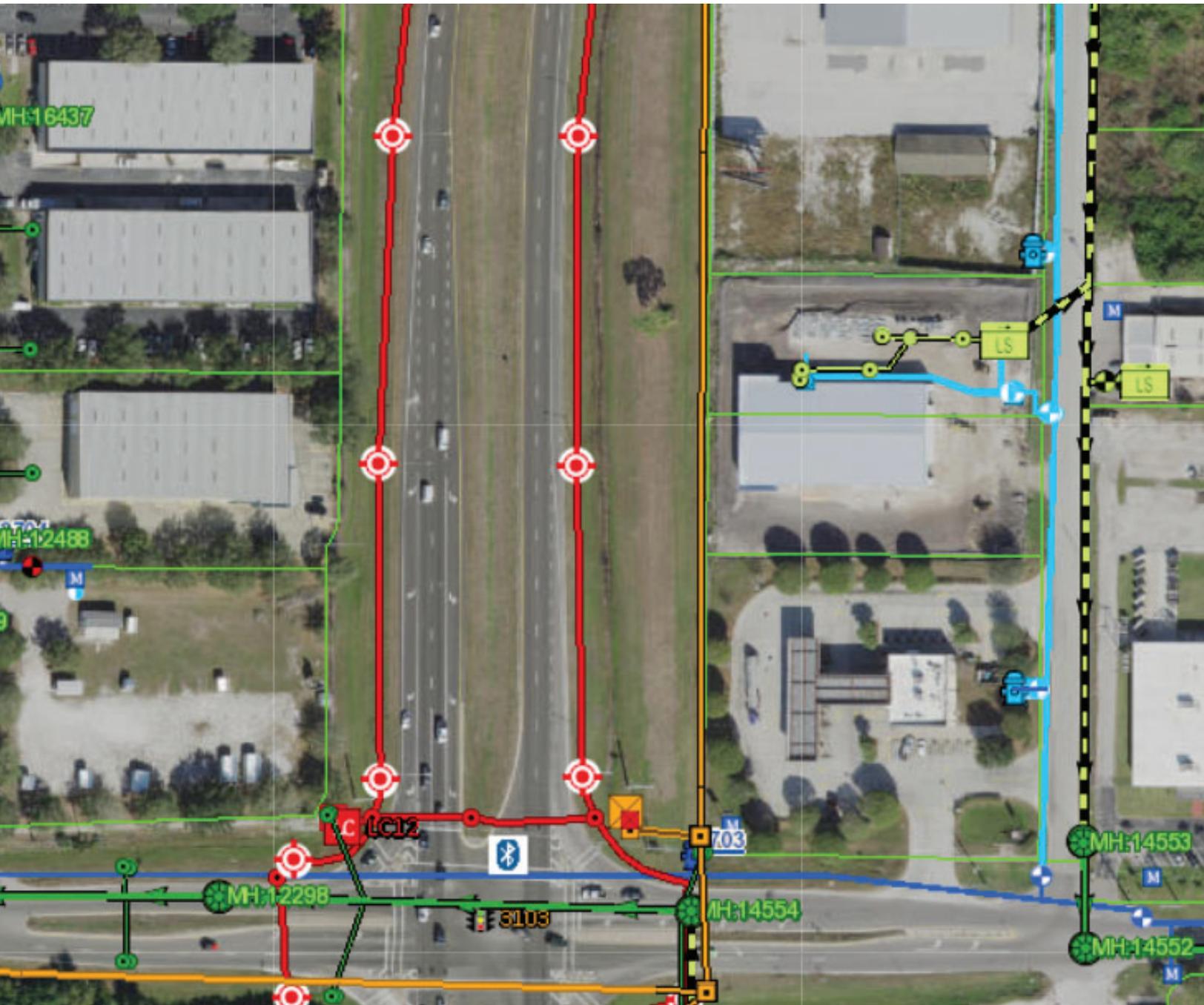
Effective water asset management programs use a combination of visual, acoustic and correlating techniques, among others, to pursue leakage. A typical leak detection survey is conducted in two phases: the initial survey and the pinpointing phase. An initial inspection of the service area determines the best approach and equipment to use for the most accurate and timely results. All valves, hydrants and service connections should be inspected as needed for adequate coverage based on pipe material and infrastructure environment. This ensures a thorough initial investigation of the suspect area for any indications of leakage.



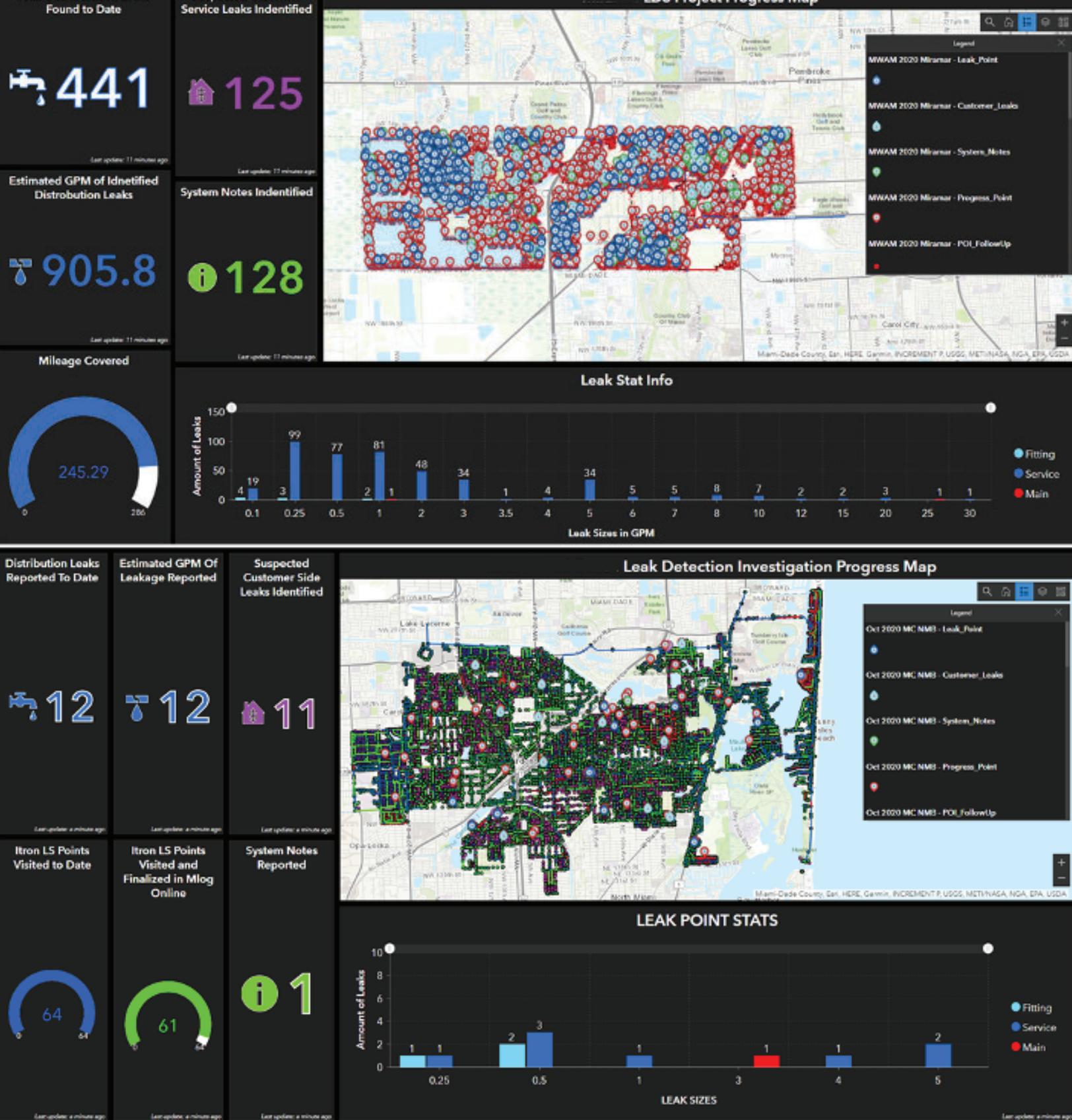
Heat map in GIS to help visualize problems across a service area.

Any “areas of interest” may be investigated initially with manual sounding equipment—like a listening stick or ground microphone technology—as well as various forms of other listening devices like acoustic noise loggers. These devices help identify areas to further investigate and narrow down the source of any potential leakage.

Once an area is initially inspected, then comes the pinpointing phase. At this time, all suspect leak locations are subjected to further detection practices. This phase of the inspection utilizes tools such as computerized acoustic noise correlators, for instance, to pinpoint suspected leaks to a precise location. Recurring and proactive investigative leak detection is the simplest, yet potentially most impactful, best practice in water asset management for reducing NRW.



Visualization of utility assets in GIS



McKim & Creed creates a custom project group interactive dashboard for each water asset management project. The dashboard is made available to utility personnel during each project for progress tracking and information. It displays the progress map of the survey areas covered as well as a few key project statistics.

