



Lower Bartlett Water Precinct truck in front of one of their AMI collectors.

Metering Modernization, Acoustic Leak Detection, and Asset Management in a Small New Hampshire Mountain Water System - Lower Bartlett Water Precinct's In-House Transition to Ultrasonic AMI

By Liam Flaherty

BACKGROUND

The **Lower Bartlett Water Precinct (LBWP)** serves a small mountain community comprised of year-round residences, seasonal homes, and short-term rentals. Like many New Hampshire water systems, LBWP operates with limited staffing and depends on long-range planning to maintain reliability, fiscal stability, and a high level of customer service.

LBWP's notable metering history dates back to 1989–1990, when the precinct completed a turnkey meter installation project with MBS, deploying touch-read technology considered high-end at the time. That system provided decades of dependable service and reflected an early commitment to full system metering.

SYSTEM REVIEW AND ASSET MANAGEMENT FOUNDATIONS

In 2012, a water audit identified elevated unaccounted-for water. LBWP responded with a system-wide review of distribution piping, customer service lines, and metering. The evaluation concluded that customer service lines were the primary contributor to losses, with only minimal issues identified in the distribution system.

Composite testing of meters showed most units remained within AWWA accuracy standards (approximately 95–101 percent); however, they were already more than 22 years old. While technically compliant, the meters no longer supported evolving operational needs.

A pivotal step occurred in 2014, when LBWP updated its Master Plan and implemented a formal Asset Management Plan, including funding non-capital reserve accounts for future meter replacement and other system components. This early financial planning ultimately enabled the precinct to pursue the correct technological fit without fiscal constraint.

TECHNOLOGY REVIEW AND THE “CORRECT FIT”

By 2023, more than 30 years after the original meter installations, LBWP initiated a structured review of its metering and reading system. The objective extended beyond meter replacement and focused on aligning technology with operational goals.

Primary drivers included:

- Real-time and near-real-time data acquisition
- Utility-side and customer-side usage monitoring
- Acoustic leak detection capabilities
- Improved customer service responsiveness



Old meters vs new.



New meter installation in a commercial setting.

It became clear during this process that AMR systems could not meet these objectives. Real-time alarming, continuous data access, and advanced analytics required the deployment of a complete AMI platform.

LBWP selected ultrasonic meters with integrated AMI and acoustic functionality from Kamstrup, with regional supply and support provided by Everett J. Prescott, Inc.

IN-HOUSE IMPLEMENTATION AND OPERATIONAL EFFICIENCY

The meter change-out project was completed entirely in-house over a single summer by:

- Two system operators
- One billing administrator
- One superintendent

Completing the project internally allowed LBWP to control scheduling, customer coordination, and quality assurance while minimizing outside labor costs. It also accelerated staff familiarity with the system, data tools, and network functionality.

CONCURRENT GIS AND SERVICE LINE INVENTORY DEVELOPMENT

A significant additional benefit of the in-house approach was LBWP's ability to conduct a systematic GIS and service line inventory project concurrently with meter replacement.

While crews were inside customer homes, LBWP collected and verified critical infrastructure data, including:

- Meter location and attributes
- Service line material, size, and configuration



Meter location in a pit.

- Customer-side plumbing connections
- Alignment between field conditions and legacy records

This effort resulted in the creation of a high-confidence GIS layer representing both the entire meter population and customer service lines. The updated GIS dataset now supports:

- Improved asset management and capital planning
- Faster leak investigation and repair response



New meter install in a residential building.

- Enhanced regulatory and reporting readiness
- More accurate modeling and system analysis

By combining meter replacement with GIS verification, LBWP avoided the cost and disruption of a separate inventory project and significantly strengthened its system knowledge base.

LICENSED AMI NETWORK AND REAL-TIME DATA

LBWP deployed a licensed AMI network, providing real-time alarming and 100 percent hourly meter reads across the system. This represents a fundamental shift from billing-cycle visibility to continuous operational awareness.

Hourly data availability has materially improved LBWP's proactive approach to customer service, allowing staff to:

- Identify abnormal usage patterns quickly
- Notify customers of potential leaks or continuous flow



SCADA Metrics on well meter with AMI Radio.

- Resolve billing inquiries with precise usage data
- Improve overall level of service and responsiveness
- Identify freezing temperatures before the line freezes

For a small utility, this level of visibility has transformed day-to-day operations.

ACOUSTIC LEAK DETECTION AS A KEY BENEFIT

One of the most valuable system features has been acoustic leak detection (ALD). Kamstrup’s ultrasonic meters sample sound in the water column every 55 minutes. These frequent samples establish a stable “noise floor” for each service connection.

Deviations from this baseline provide high confidence in identifying leaks, even on Polyethylene, PVC, and Asbestos Cement lines, which are traditionally difficult to assess using conventional methods.

PROMPT DETECTION OF A HIGH-PRESSURE LEAK

Shortly after deployment, an acoustic alert identified a service-line issue on Aspen Lane. Investigation revealed a 1/8-inch scour hole on a line operating at approximately 125 psi.

Estimated leakage was approximately 3 gallons per minute, equating to ~1.5 million gallons annually. The leak showed no surface indicators and would likely have persisted undetected without acoustic monitoring.



Damaged pipe from Aspen Lane leak.

NUT HATCH ROAD: CUSTOMER SERVICE LINE FAILURE



A second alert on Nut Hatch Road led to the discovery of a lateral crack in a poly service line. Estimated leakage was approximately 35 gallons per minute, or ~18.4 million gallons per year.

The ability to identify this failure underscores the value of frequent acoustic sampling and baseline noise modeling—particularly for service line materials where leaks are challenging to locate.

Cracked pipe causing leak on Nut Hatch Rd.

OUTCOMES AND LESSONS LEARNED

Key outcomes include:

- Immediate reductions in real water losses
- Improved billing accuracy and transparency
- Enhanced customer communication and trust
- A significantly strengthened GIS and asset inventory
- A higher overall level of service

LBWP's experience reinforces several lessons relevant to New Hampshire water systems:

- Early asset management funding enables better decisions
- Combining projects maximizes staff efficiency
- Acoustic leak detection is especially valuable on poly services
- Real-time data supports proactive, customer-focused service

CONCLUSION

The Lower Bartlett Water Precinct's in-house transition to ultrasonic AMI demonstrates that advanced metering, acoustic leak detection, and asset intelligence are achievable for small New Hampshire water systems. By aligning long-term planning with modern analytics and leveraging in-house staff, LBWP improved system reliability, reduced losses, enhanced customer service, and built a robust GIS foundation for the future.

Liam Flaherty is the New England Regional Director at EJ Prescott.