

Power of Low-Resolution Pressure Data

PRESENTED BY:

JAMES SMITH

GLOBAL DIRECTOR COMMERCIAL & INDUSTRIAL METROLOGY

Content

- Question Statement
- Methodology
- Data Correlation
- Detectable Pressure Events & Attributes
- Summary

Question Statement

Are you certain
you are delivering
water safely &
efficiently?



Can Low Resolution Pressure Data be Useful to Operators?

- Does Low Resolution Sampling correlate with Higher Resolution Sampling and represent actual Pressure Service Levels in a Water Distribution System?
- Are there Water Distribution System Pressure attributes or related events which can be measured, detected, and/or predicted reliably with Low Resolution Data?



Methodology

Sampling Methodology

- Pressure Transient Monitor
 - 64Hz Sample Rate
 - Cellular Backhaul
 - 6-12 mth Battery
 - \$4000 USD

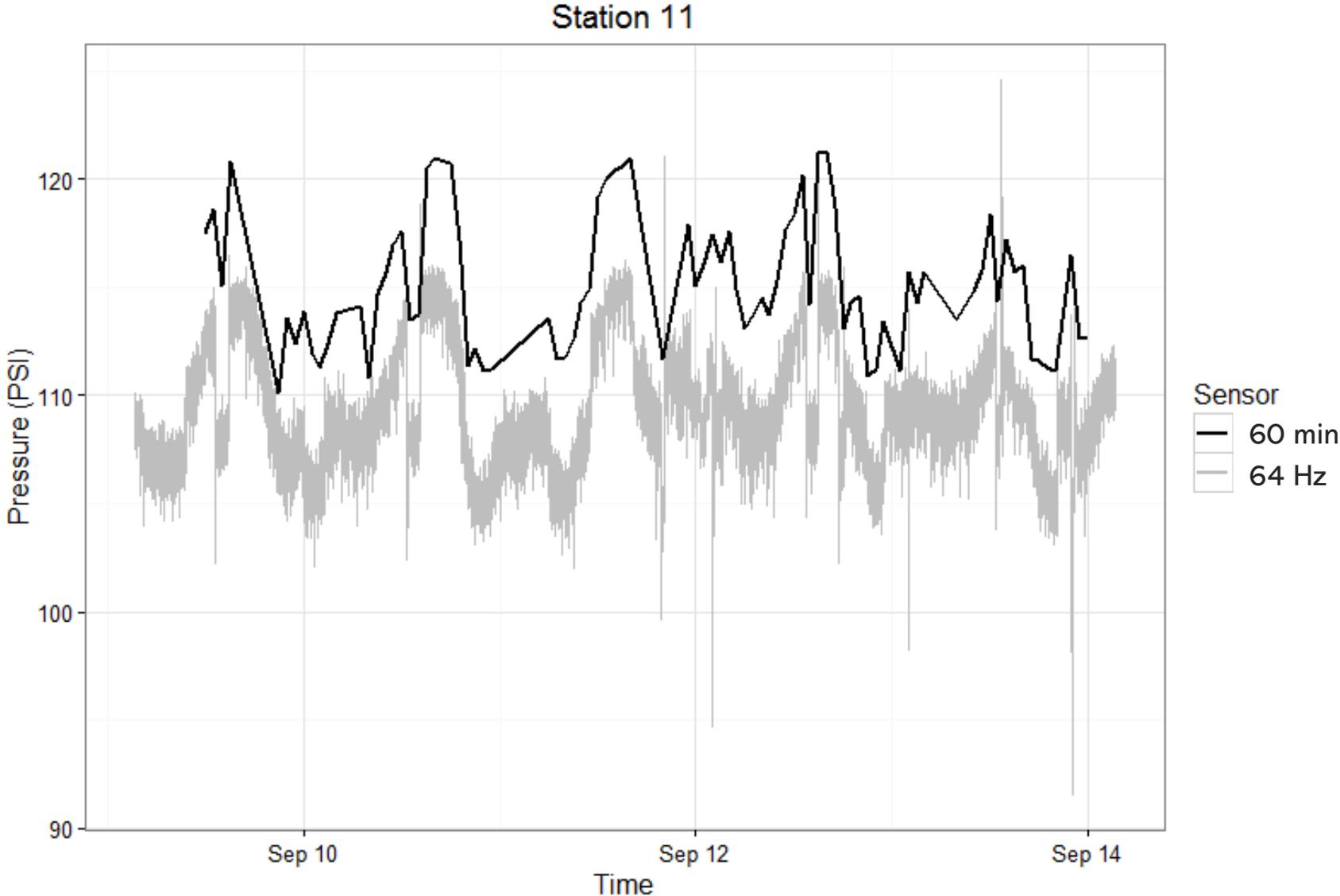


- Water Meter with Integral Pressure Sensor
 - 1 Hour Sample Rate
 - AMI Backhaul
 - 20 Yr Battery
 - \$200 USD option to meter price

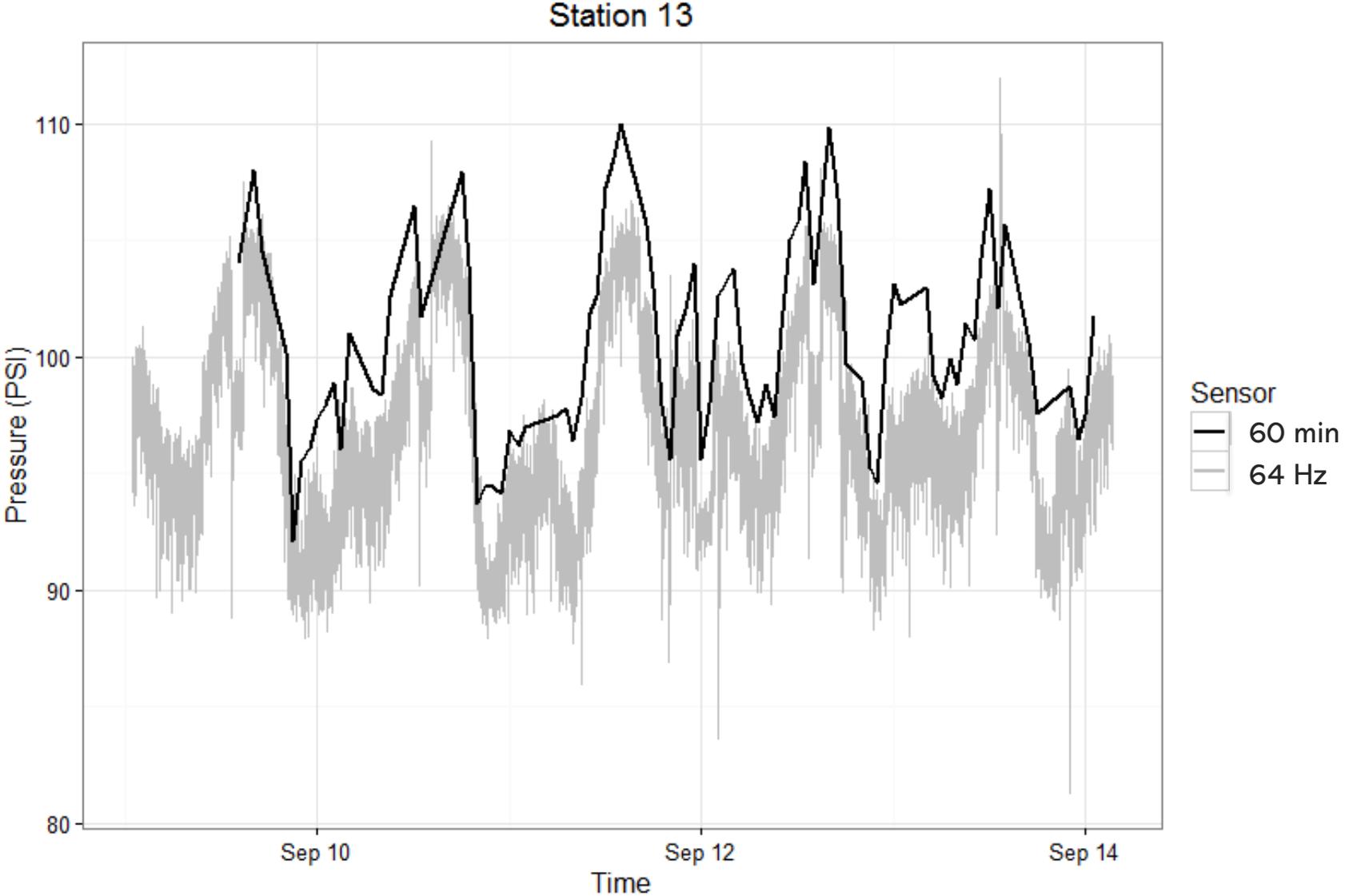


Data Correlation

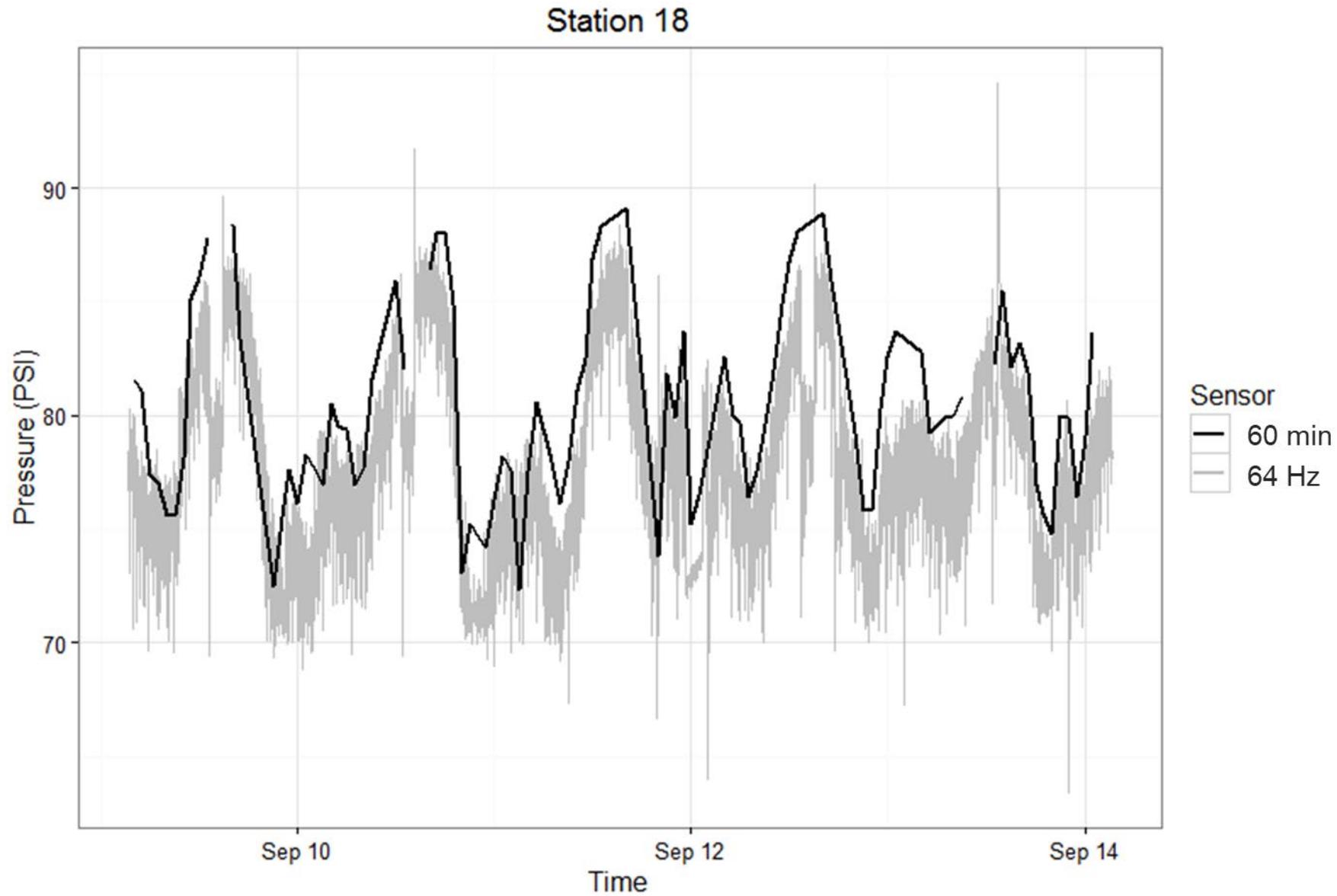
Station 11



Station 13



Station 18

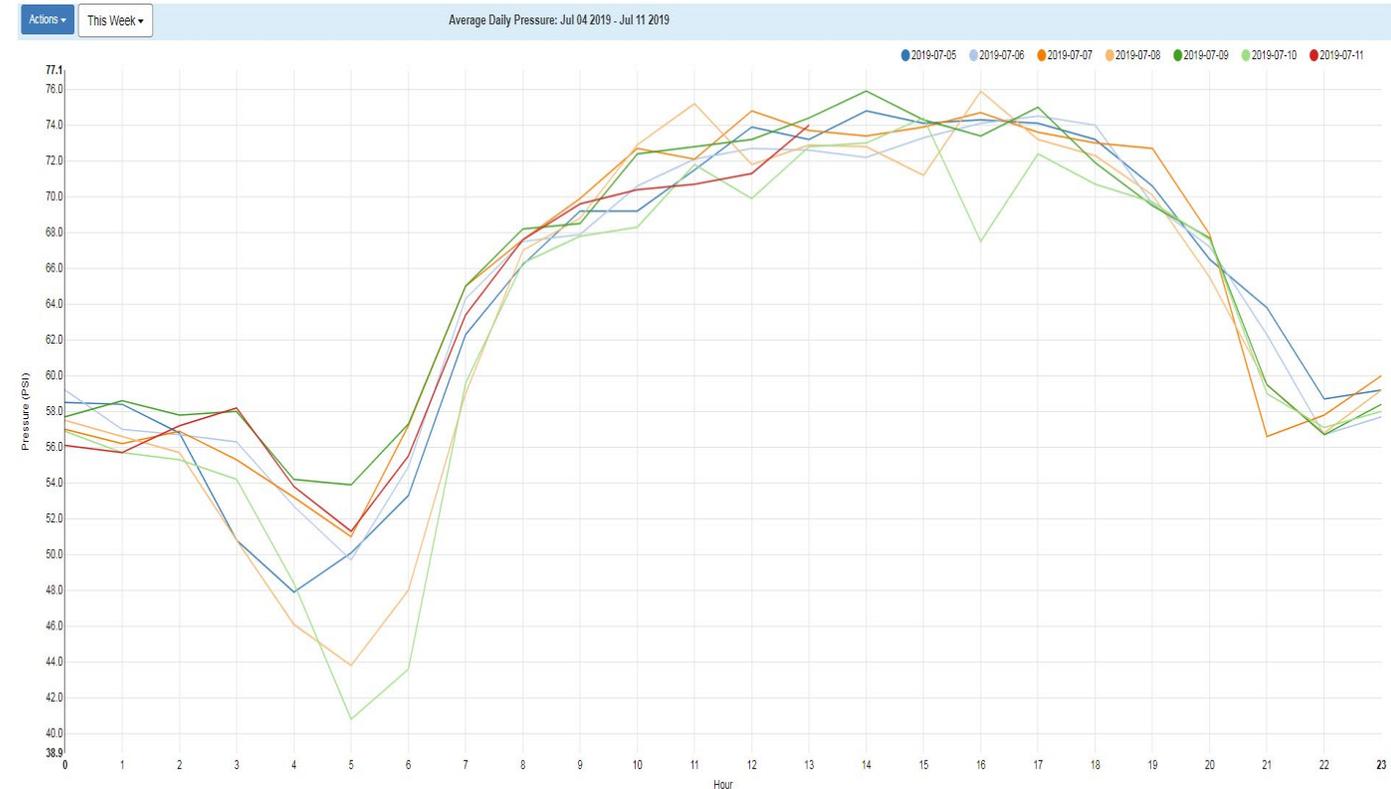


Detectable Pressure Events & Attributes

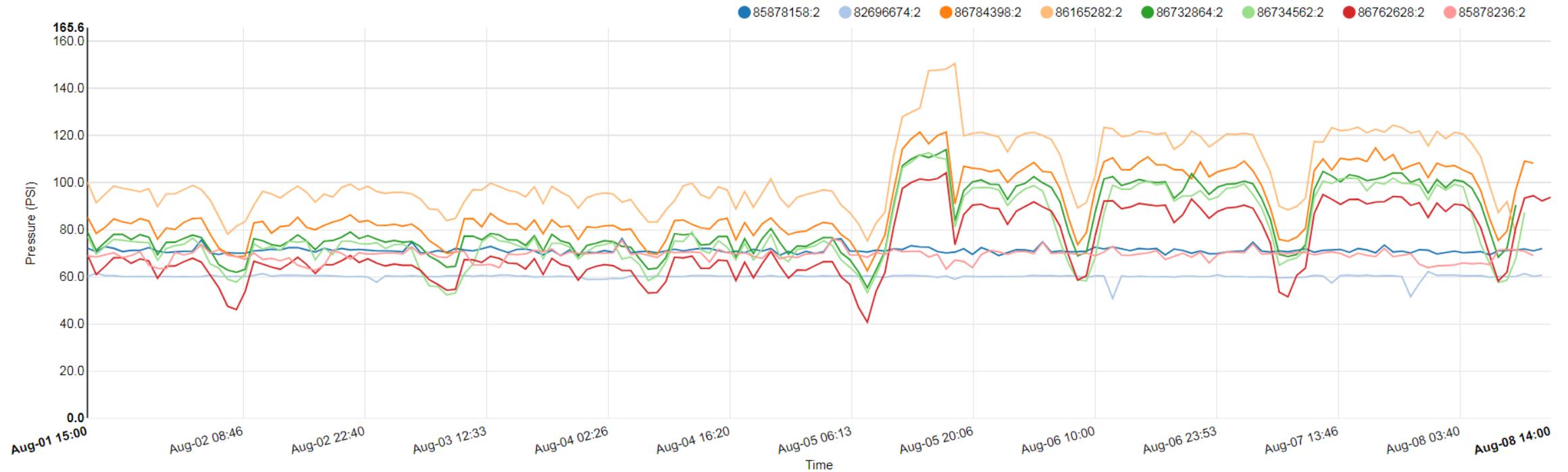
Diurnal Pattern of Pressure Service Levels

Chronic Low Pressure Area

- Repeated Customers complaints of low pressure
- Utility confirmed sub 40 PSI readings
- Mitigation:
 - Worked with customers to adjust morning irrigation schedules
 - Adjusted Pressure Sustaining Valve to prevent < 45 PSI case



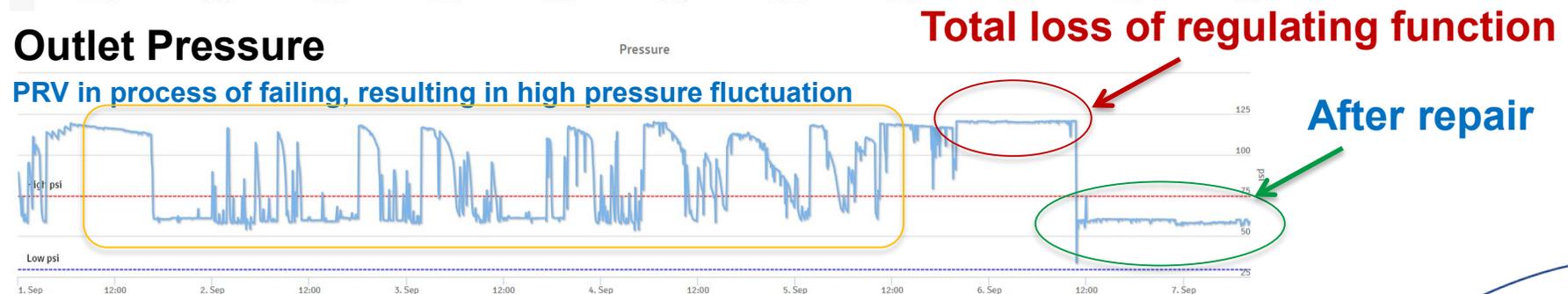
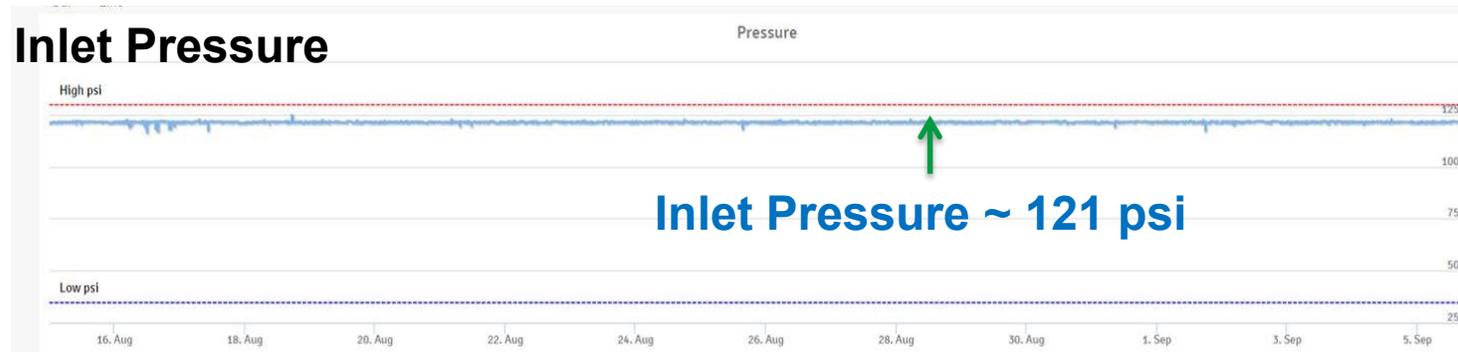
Valve Induced High Pressure



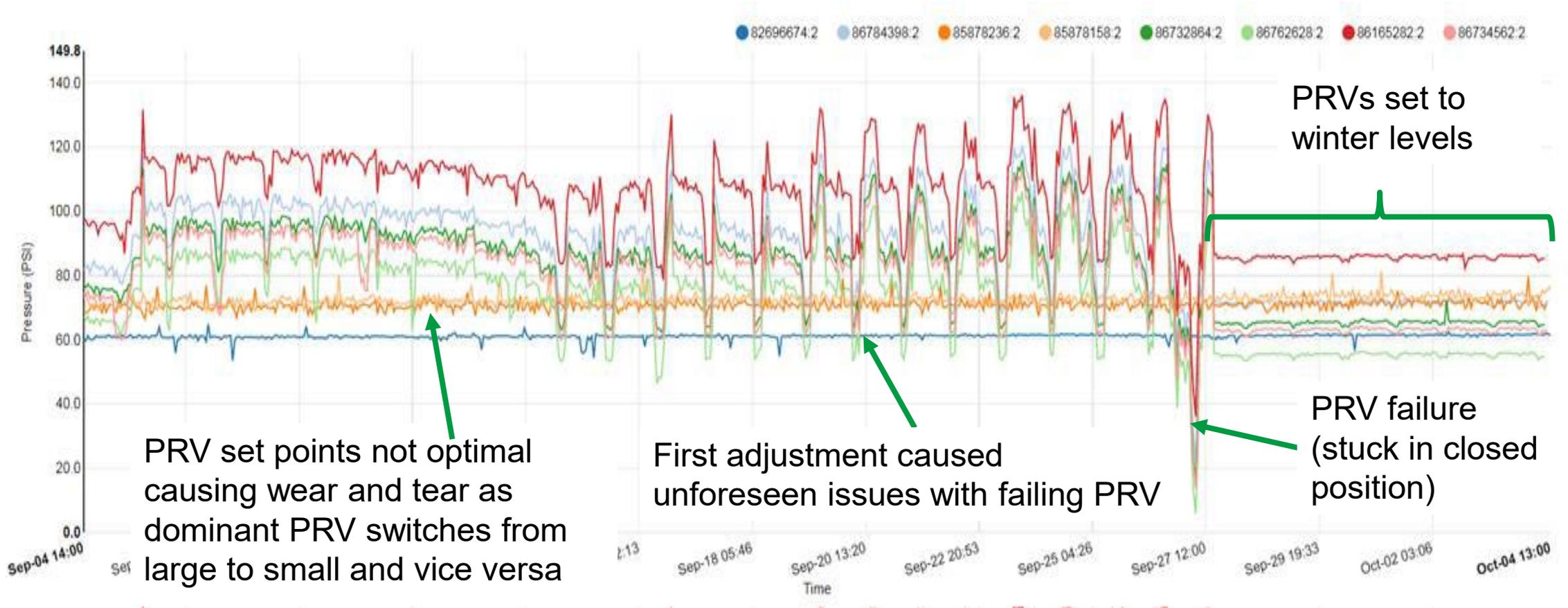
- Boundary Valve left open after maintenance event
- Operations team monitored the pressure profile of the asset and system before and after the maintenance event.

Detecting PRV Malfunction

- Outlet pressure deviating from set point around ~55 psi, jumping to inlet pressure
- Comparing both sensors isolates the issue to the PRV and not a broader system issue
- Based on the fluctuation in pressure, a site visit may have missed the issue



Pressure Reducing Valve Monitoring & Zone Optimization



Pressure Management is Leak Management

Real Losses as a Function of Pressure:

- 0.79 gallons per service connection per day per PSI (median)
- Source: EPA/WRF Water Audits in the US: A review of Water Losses and Data Validity

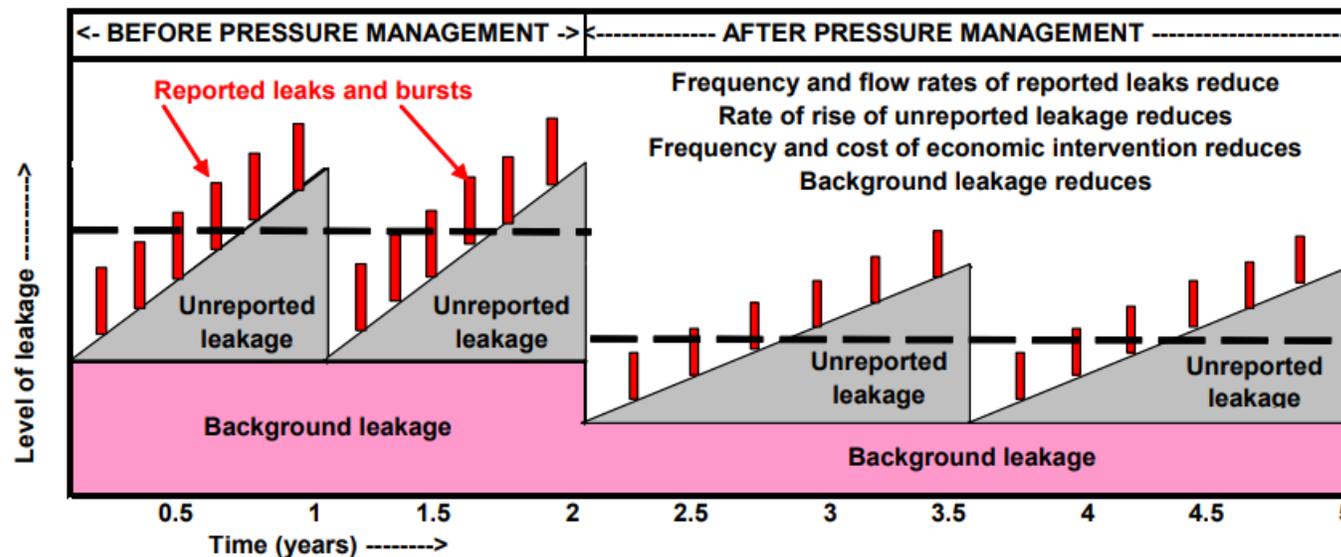


Figure 1: Influence of pressure management on BABE components of Real Losses
Source: Fantozzi & Lambert (2007)

Pressure Attributes & Events

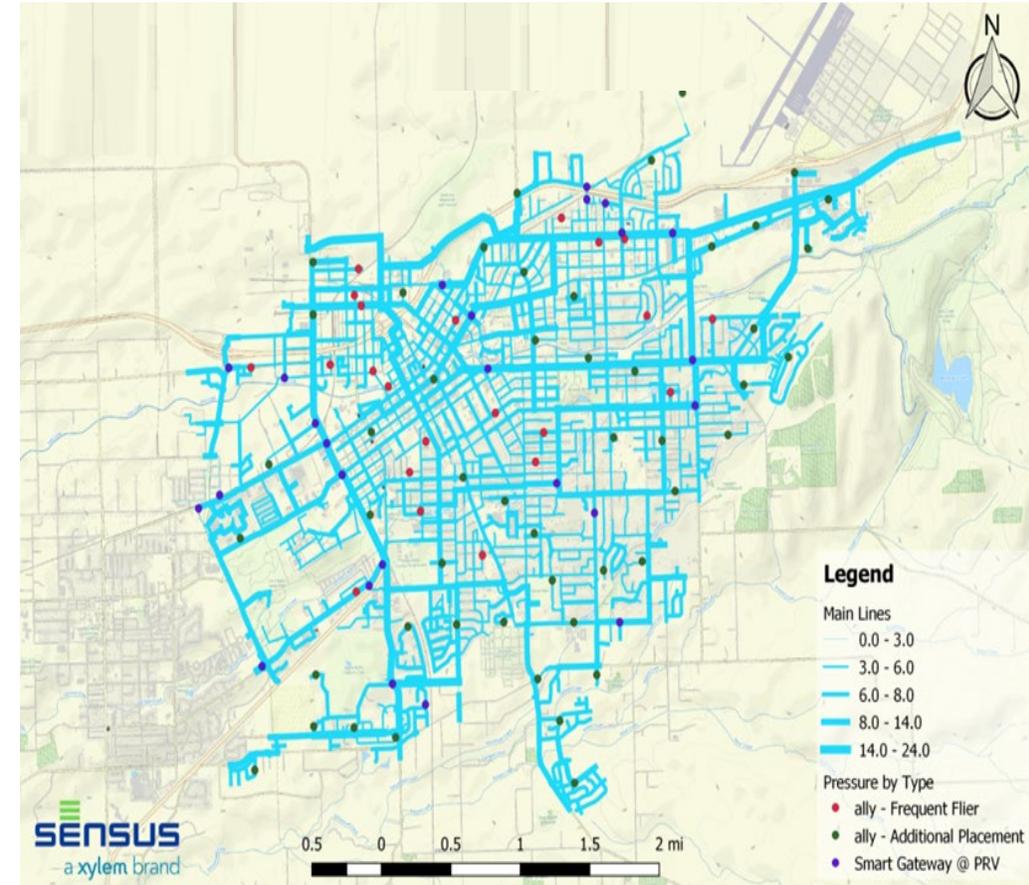
- Trend Diurnal and Seasonal Pressure Levels in System
- Determine Safety Factor for Pressure Service Levels
- Measure Effect of System Maintenance & Setting Changes
- Monitoring Operational Performance of Pressure Regulating Assets
- Determine Impact Geography of Major Incidents/Bursts
- Detect & Monitor Pressure Transients



Summary

Summary

- Low Resolution Pressure Data represents the diurnal and seasonal pressure trends in a water distribution system
- The lower cost and small footprint of these types of sensors allow system operators to gather pressure data from many more points in the distribution system
- Low Resolution Data is a powerful tool to ensure you are delivering water **Safely** and **Efficiently**



Thank you!