

Water Utility Automated Metering Infrastructure System – City of Yakima



**American Water Works Association
Pacific Northwest Section
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Gray and Osborne, Inc.
Vancouver, WA



City of Yakima AMI System

Acknowledgments

City of Yakima

- **Dave Brown, Water/Irrigation Division Manager**
- **Mike Shane, Water/Irrigation Engineer**
- **Emilio Lopez, Acting Water Distribution System Manager**
- **James Dean, Utility Service Manager**

Gray & Osborne

- **Mallory Taylor, P. E. Project Engineer for RFP/Assist w/Engr Study**
- **David VanCleve, P. E., Project Engineer for Engineering Study/
Assist with Construction Administration**

City of Yakima AMI System

Acknowledgments

Badger Meter, Inc.

- **Wade Glanek, Project Manager**
- **Torre Treece, Account Manager**

Pacific Meter Services, Inc. (Meter Installations)

- **Jack Robb, Superintendent**

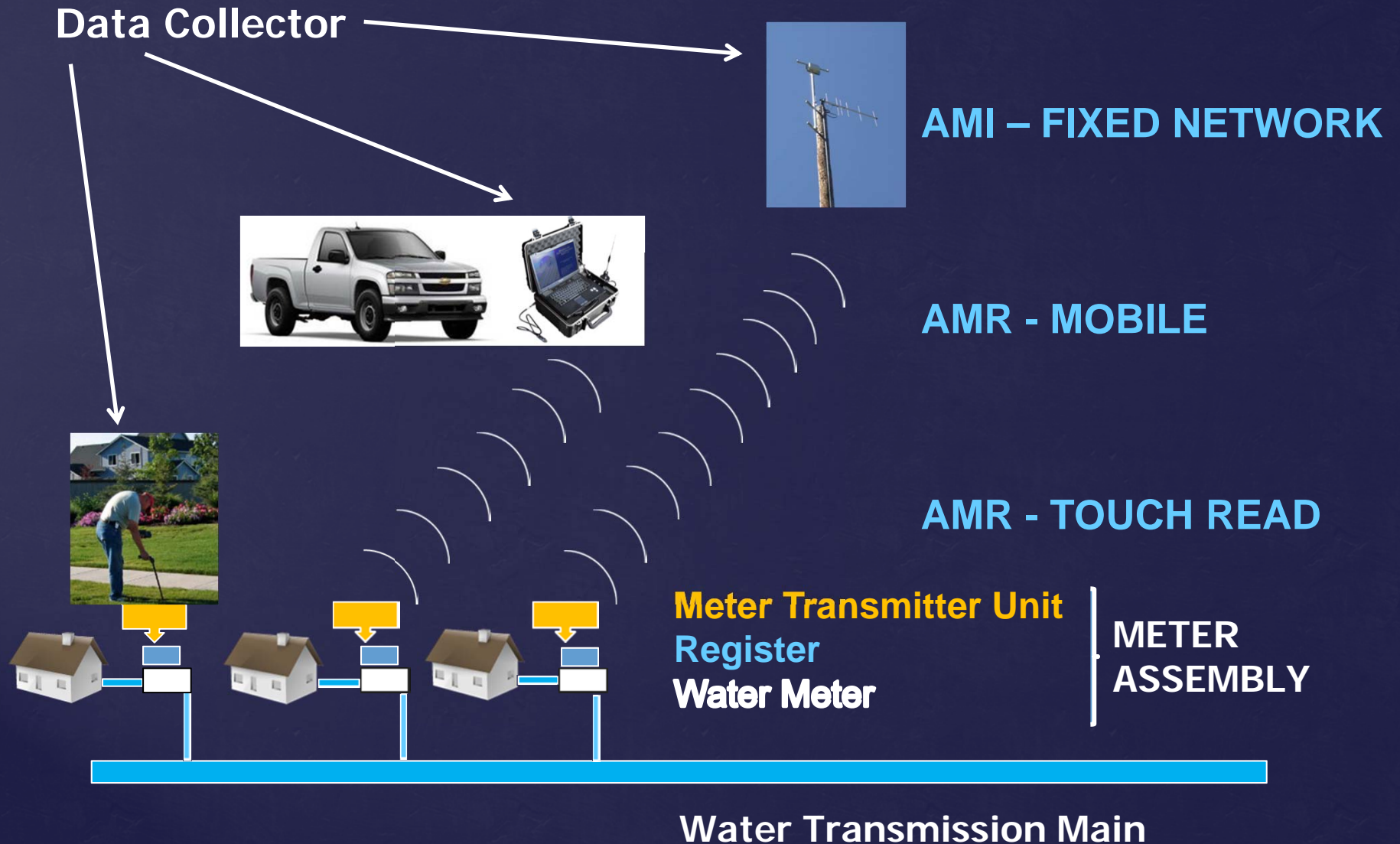
Power City Electric (Data Collection System Installation)

- **Mark Leibold**

General Pacific (Water Meter Vault Lid Modifications)

- **Lori Bryson**

AMI/AMR Concepts & Terminology



Advanced Metering Infrastructure (AMI)

- No Meter Reader
- Components



- Meter
- Register
- Meter Transmitter Unit (MTU/MXU/MIU)
- Data Collection System

Transceiver Units (Data Collection Units - DCUs)

Repeaters (if needed)

Central Data Processing System (at Utility Billing Office)



City of Yakima AMI System

Project History

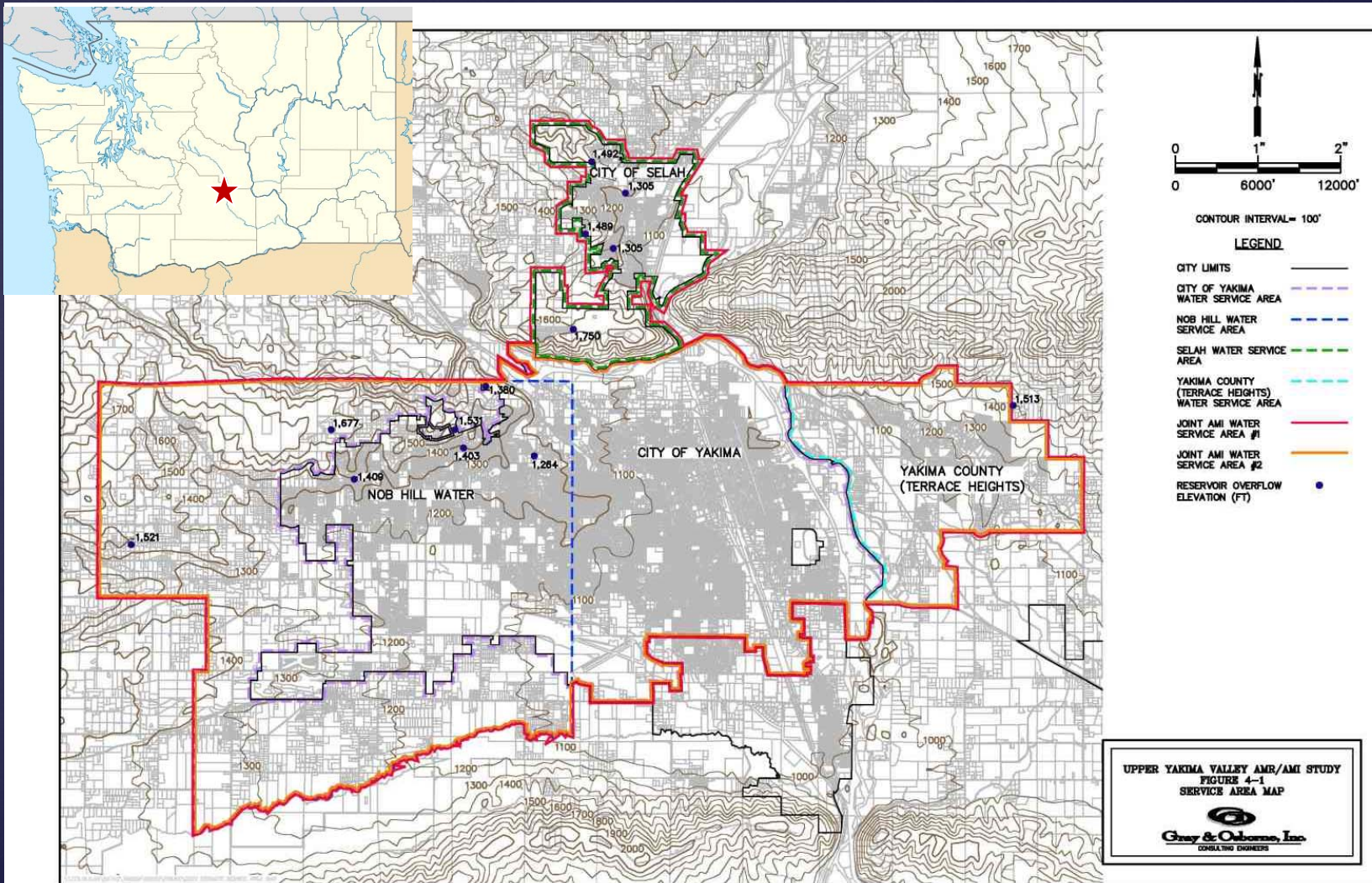
- **Late 2010 - Cities of Selah & Yakima, Nob Hill Water and Yakima County joined to study potential for AMR/AMI conversion**
 - **Nearly 32,000 water meters within study area**
 - **Evaluated stand alone AMR (mobile) for City of Selah, NHW and Yakima County**
 - **Evaluated stand alone AMI for City of Selah, City of Yakima, NHW, and Yakima County**
 - **Evaluated joint AMI for all 4 purveyors**
 - **Evaluated joint AMI for 3 purveyors (minus City of Selah)**
 - **Manufacturers Evaluated: Badger, Itron, Master Meter, Neptune, Sensus**
- **May 2010 – Initial Evaluation Completed**

City of Yakima AMI System

Project History

- **November 2011 – Completed Follow-on Study for City of Yakima, Yakima County and Nob Hill Water Association**
- **October 2012 – City of Yakima issued Request for Proposals for Water Utility AMI System**
- **January 2013 – City of Yakima awarded contract to Badger Meter**
- **April 2013 – Notice to Proceed issued to Badger Meter**
- **April 2014 – Project Substantially Complete Except Utility Billing and Customer Interfaces (transferring to Beacon)**
- **May 2014 – Anticipated project completion**

Study Area – Upper Yakima Valley, WA



Evaluation Results

Present Worth Analysis

20-yr Present Worth of Current Meter Reading Operations

- City of Yakima - **\$4,054,600**
- City of Selah - **\$379,200**
- Nob Hill Water Association - **\$1,052,400**
- Yakima County - **\$412,800**

Evaluation Results

Capital Cost Estimates

City of Yakima (19,000 Water Customers)

AMI Stand Alone: Neptune **\$8.5M** & Badger **\$8.6M**

AMI 4 Purveyors: Neptune **\$8.46M** & Badger **\$8.66M**

AMI 3 Purveyors: Neptune **\$8.45M** & Badger **\$8.7M**

City of Selah (2,000 Water Customers)

AMR Stand Alone: Neptune **\$483K** & Badger **\$512K**

AMI Stand Alone: Neptune **\$582K** & Itron **\$680K**

AMI 4 Purveyors: Neptune **\$612K** & Itron **\$644K**

Capital cost uncertainties with AMI

- Meter lid retrofit costs
- Exact number & location of data collection units
- Ancillary requirements (poles, power, fencing, land, easements)

Evaluation Results

Capital Cost Estimates

Nob Hill Water Association (10,000 Water Customers)

AMR Stand Alone: Badger **\$2.4M**

AMI Stand Alone: Badger: **\$3.57M** & Neptune **\$3.76M**

AMI 3 Purveyors: Neptune: **\$3.46M** & Badger **\$3.75M**

AMI 4 Purveyors: Neptune: **\$3.49M** & Badger **\$3.75M**

Yakima County (1,400 Water Customers)

AMR Stand Alone: Badger: **\$368K**

AMI Stand Alone: Badger **\$580K** & Neptune **\$598K**

AMI 3 Purveyors: Neptune **\$533K** & Badger **\$560K**

AMI 4 Purveyors: Neptune **\$527K** & Badger **\$560K**

Evaluation Results

Pay Back Analysis Summary

- **City of Yakima**
 - *No AMR evaluation*
 - Stand Alone AMI 14.1 years (Neptune)
 - 3 or 4 Purveyor Joint AMI 14.1 years (Neptune)
- **City of Selah**
 - AMR 8.4 years (Neptune)
 - Stand Alone AMI 9.8 years (Neptune)
- **Nob Hill Water Association**
 - Scenario #2 AMR 17 years (Badger)
 - All AMI >25 years
- **Yakima County**
 - AMR 12.8 years (Badger)
 - 4 Purveyor Joint AMI 16.6 years (Neptune)

Moving Ahead

Requests for Proposals – City of Yakima

- **RFP Issued October 2012**
 - **Competitive Negotiation per RCW 39.04.270**
 - **Modify approximately 2,600 touch read meters**
 - **Replace approximately 16,400 remaining meters**
 - **Commercial wastewater meters (27) added to project**
 - **All City water meters to be AMI capable**
 - **All equipment (meters, registers, MTUs, data collection equipment) from a single manufacturer**
 - **Potential data collection sites identified beforehand**
 - **Radio propagation study required to configure data collection system and provide a basis for proposal**
 - **Contractor to furnish, City to install larger meters to reduce installation costs**

Installation Phase

Request for Proposals Received – City of Yakima

- Proposals Received November 2012
 - Manufacturers: Sensus, Neptune, Badger, Itron, Mueller
- Proposal Evaluation based on
 - Capital Cost
 - Single-Manufacturer Criteria
 - Response to RFP Questions
 - Ability to Meet Technical/Performance Specifications
- Contract Award January 2013 to Badger Meter (**\$4,950,696** – results in 8.3 year payback period)
- Badger substantially under Engineer's Estimate mostly due to City decision to self-install 2,100 meters with most larger than 1”

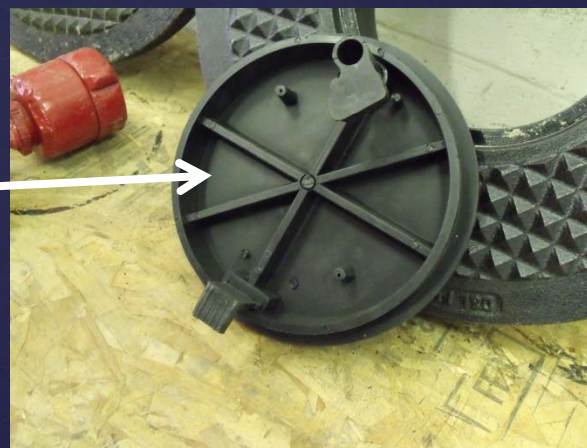
Lid Modifications

- 100% Lid Modifications Required – Replace existing cast iron inserts with H20 Load Rated, “Lockable” 10-inch polymer inserts for existing 22-inch cast iron covers

22-inch Cast
Iron Cover

5-sided
locking nut

Underside of
insert



Meter Replacements and MTU Installation

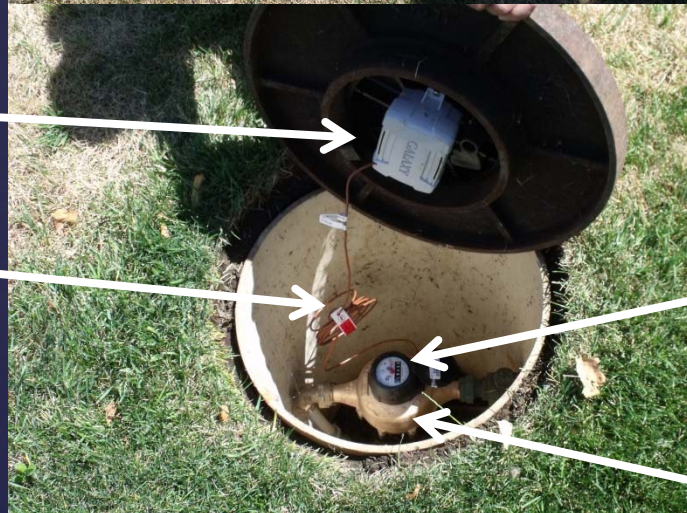
- Galaxy MTU installed on underside of lid insert

22-inch Cast Iron Cover

5-sided locking nut

Galaxy MTU

Wire Connecting MTU with Register



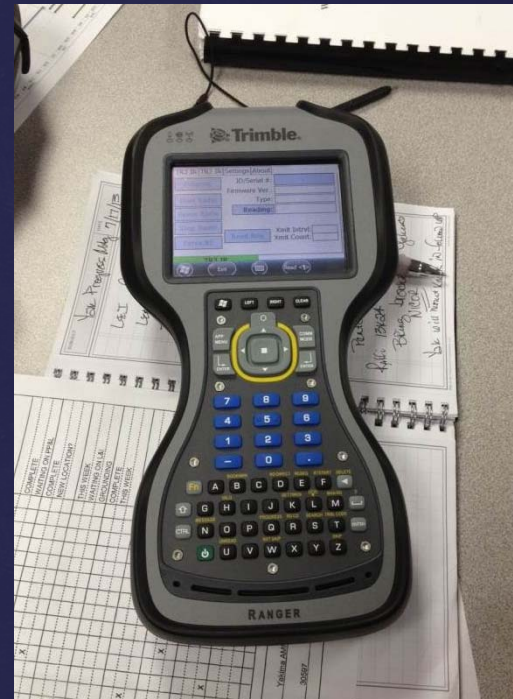
Galaxy MTU

Register

Meter

Programming the New Meter Transmitting Unit

- Initializing Galaxy MTU with New Meter using Trimble Ranger



Hand Held Trimble Ranger

Commercial Wastewater Meters

- Original plan was to use M3000 interface device between existing meters and the Galaxy MTU



Commercial Wastewater Meters

- Revised plan will connect Galaxy MTUs directly to existing wastewater meters at the flow meter indicator/transmitter



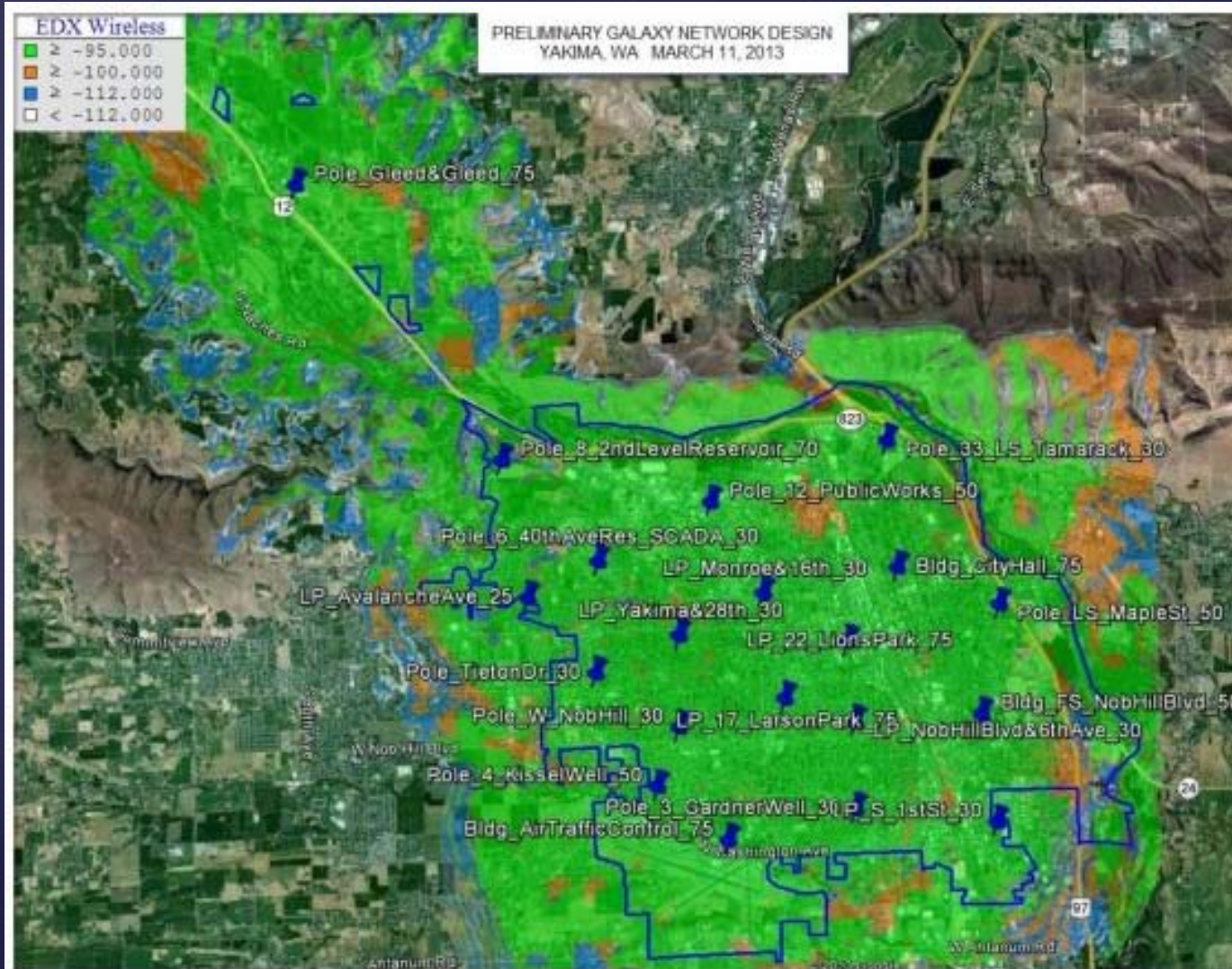
Commercial Wastewater Meters

- Finished product



Data Collection System Installation

- Propagation Study Confirms the DCU Placement



20 DCUs
Required

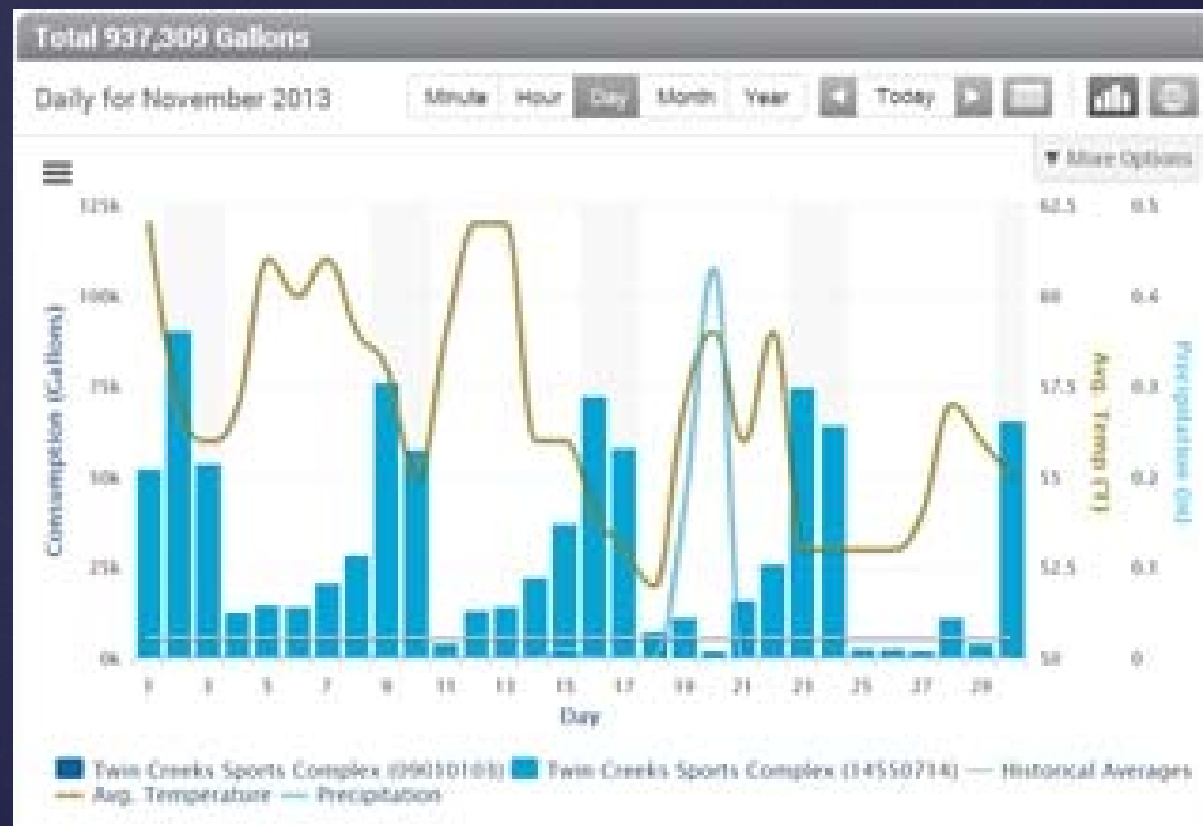
Data Collection System Installation

- **Current Status**
 - 20 Gateway DCUs installed with power
 - Testing indicates adequate coverage
 - Reprogramming needed to switch to Beacon from ReadCenter



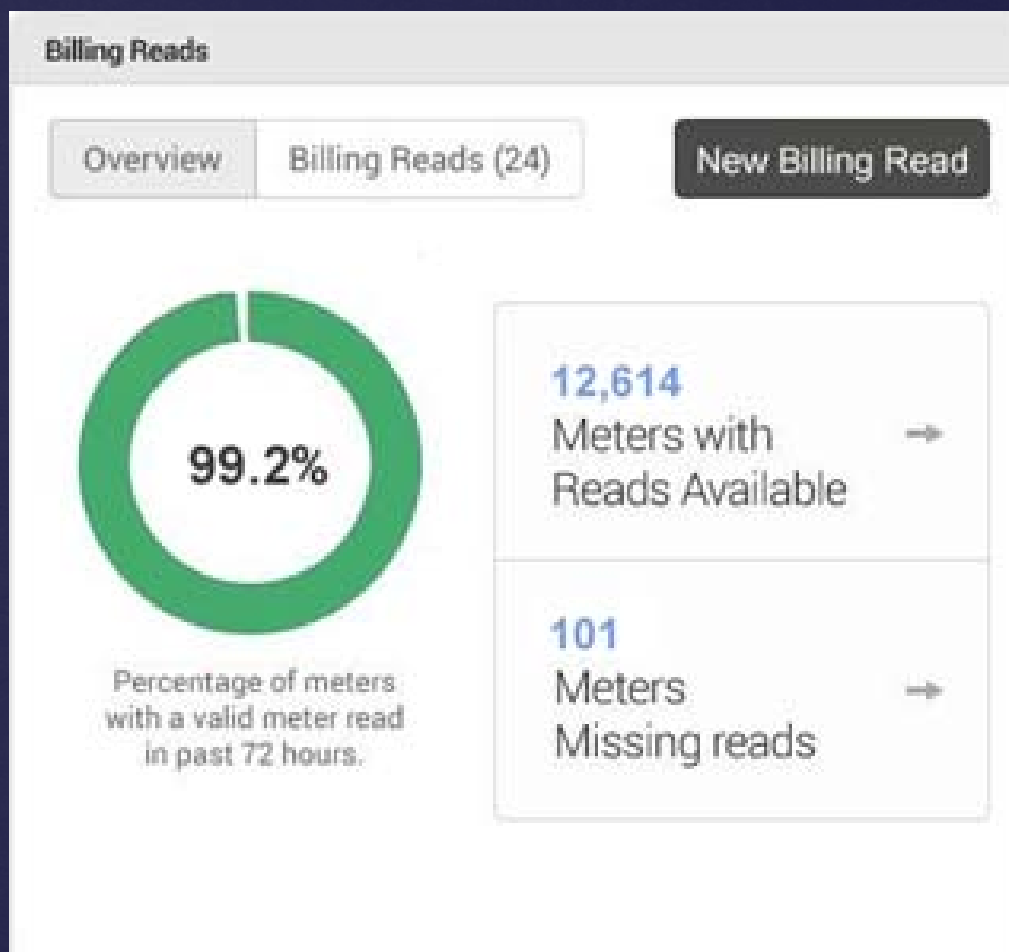
Utility Graphics Interface & Data Management

- Current Status
 - Original plan was to install ReadCenter
 - Beacon available sooner than anticipated (April 2014)



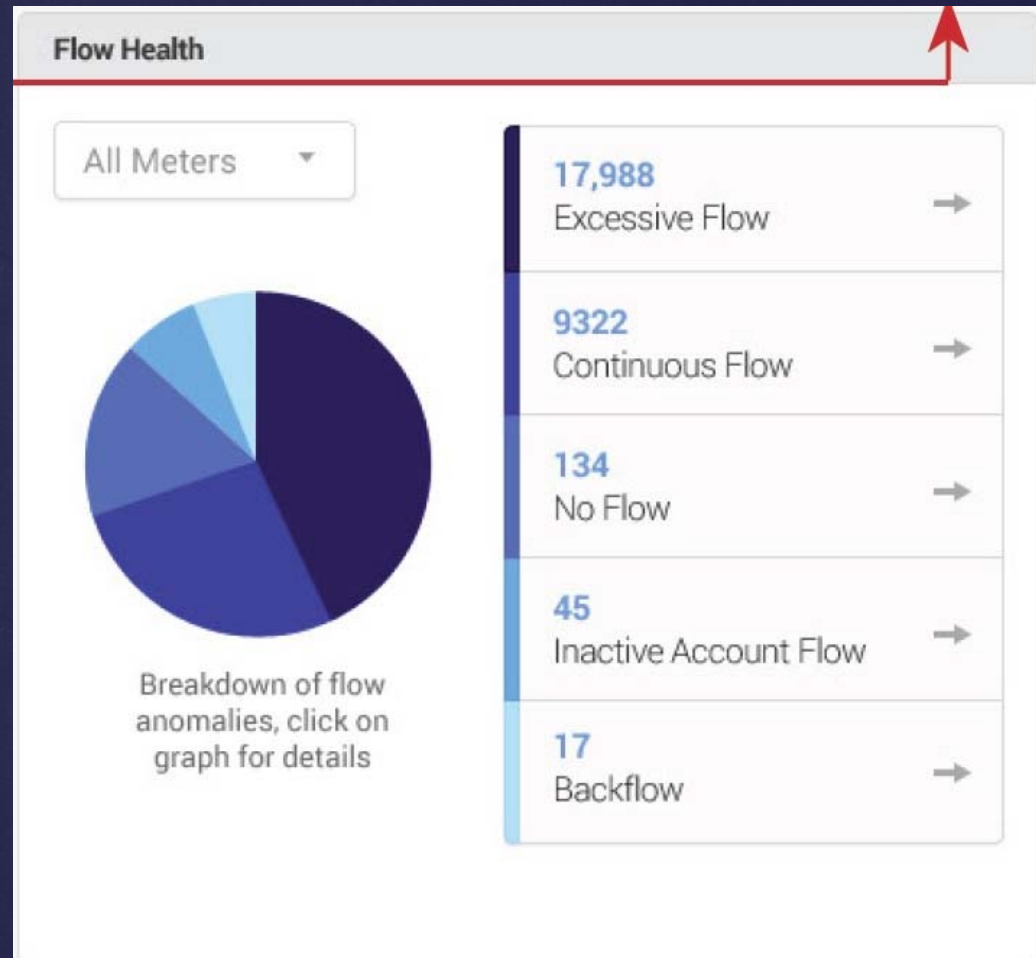
Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - Billing Reads



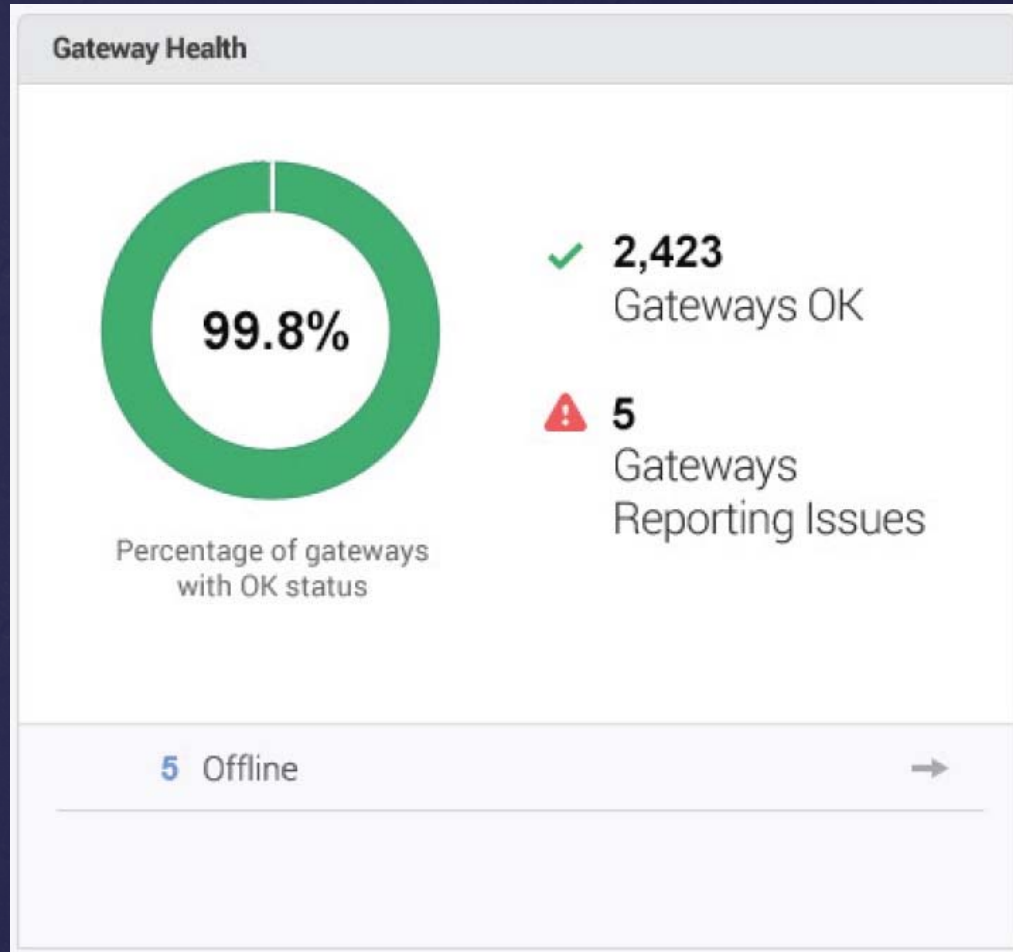
Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - “Flow Health”



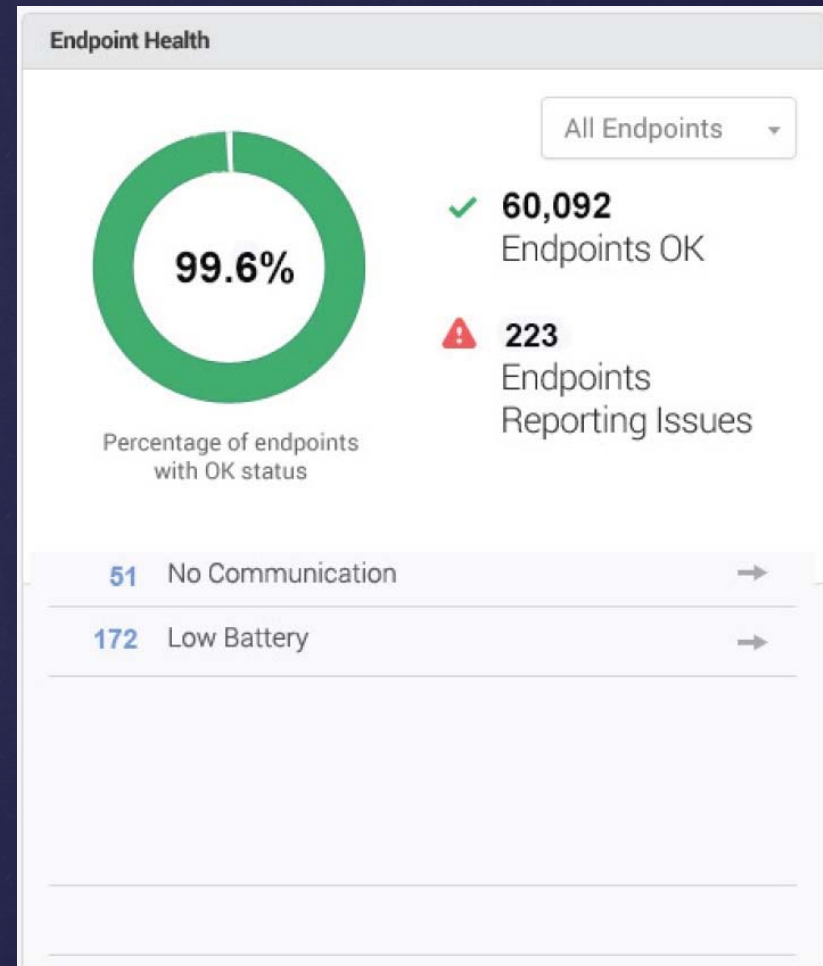
Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - “Gateway Health”



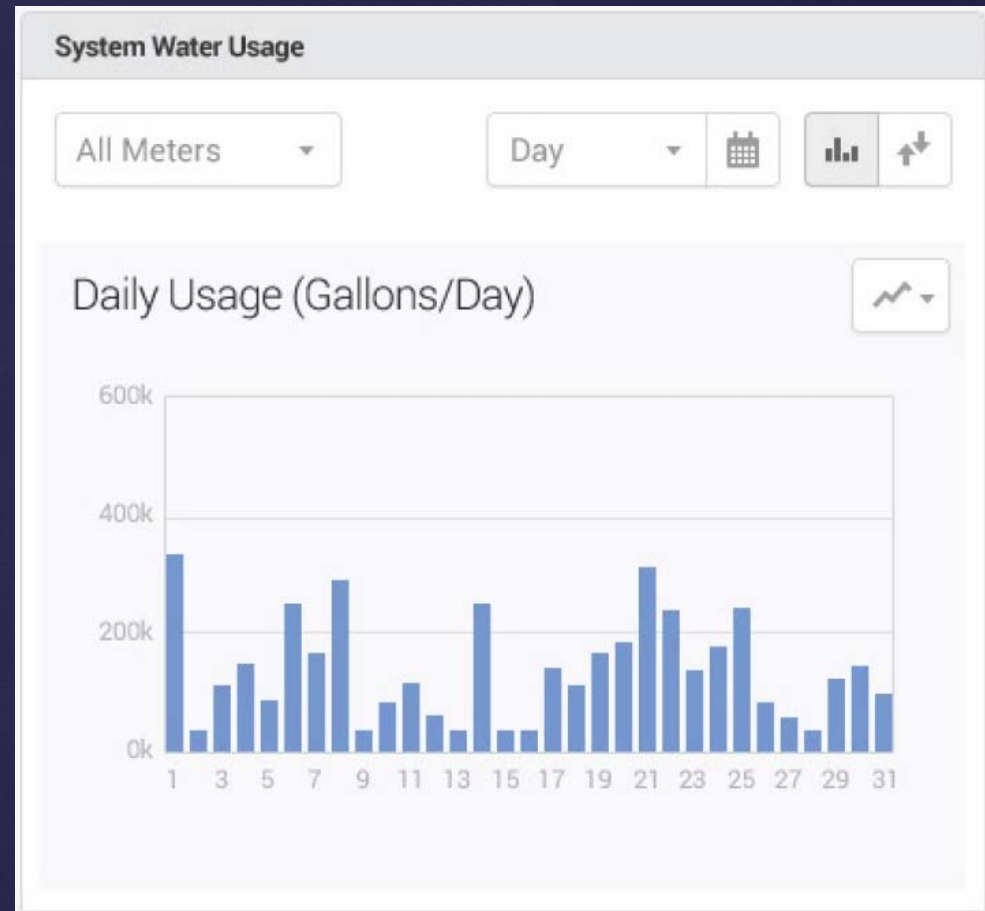
Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - “Endpoint Health”



Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - System Water Usage



Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - Top Accounts By Usage


Top Accounts By Usage				
Rank	Account Name ▼	CCF	Δ Rank	
1	Eastern College	2,123,932	▲2	→
2	East	1,200,321	▼1	→
3	Joey's Golf Course	423,763	—	→
4	Walker Restaurant	98,765	▲6	→
5	Eastern College 2	23,094	▲12	→
6	Farm Lot Irrigators	22,129	▲4	→

Utility Graphics Interface & Data Management

- Feature of Beacon Utility Interface
 - “Favorite” Accounts, Technical Support and “What’s New”

Favorites				?	⚙	×
★	Location/Site ▾	ID	CCF			
★	Calavaras Hall / Valley Terraces	234234	3,204	→		
★	Walker Restaurant / Sunnyvale	987654	1,204	→		
★	Oak Residence / Timber Shores	234553	204	→		
★	Sonny's Cafe / Downtown	442234	13,204	→		
★	Location / Site	120987	93,204	→		
★	Location / Site	120987	192,204	→		

Technical Support



800-456-5023
Technical Support Phone Number

[Connect Now →](#)

Online Technical Support Connection

What's New

10/3/13
New Modules Added
In Beacon Version 1.32 we have added 3 more modules related to flow analytics

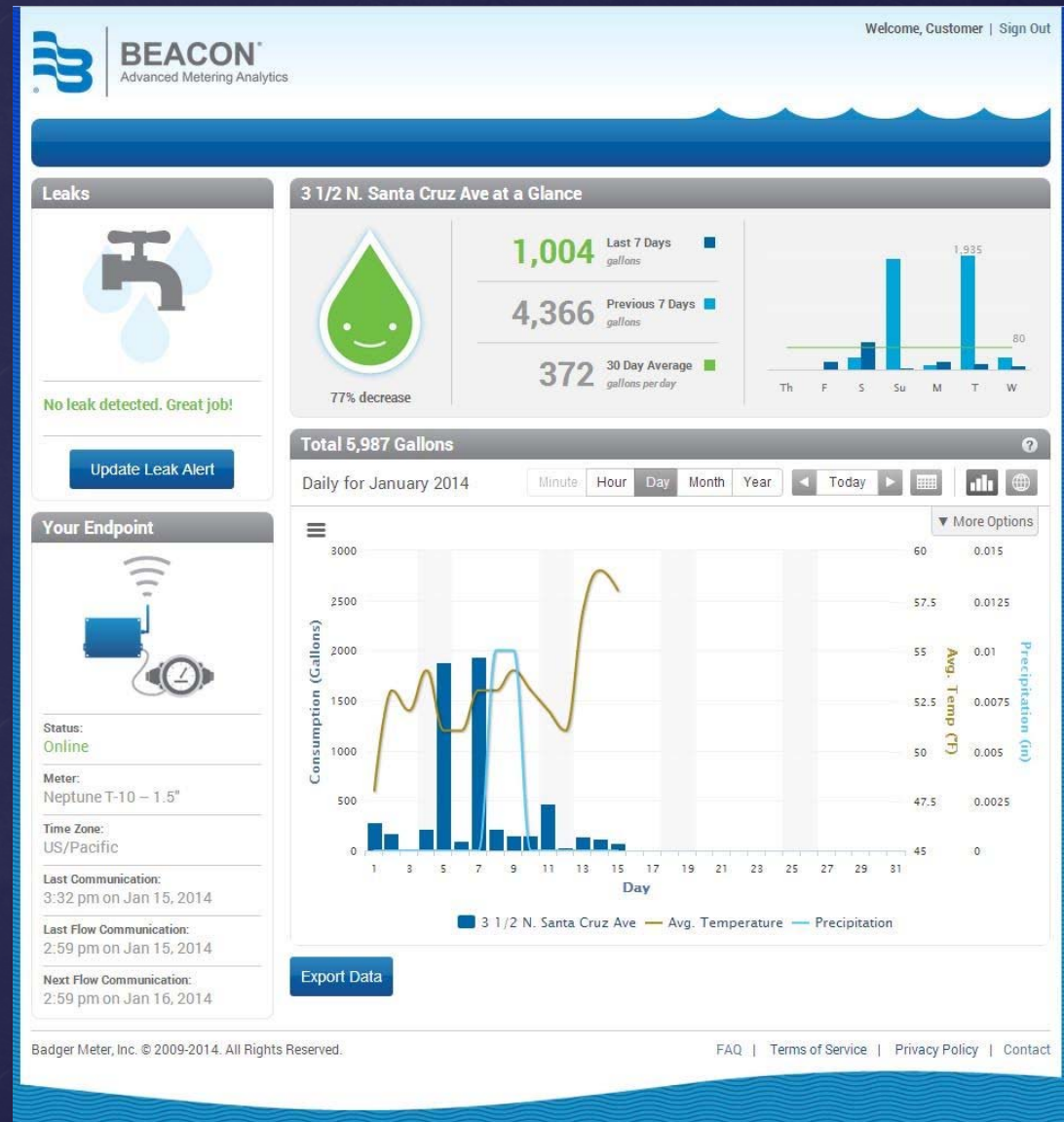
[Read More →](#)

10/9/13
New Feature Added
In Beacon Version 1.33 we have added 3 more modules related to flow analytics

[Read More →](#)

Customer Web Portal

- Current Status
 - Original plan was to have a separate customer portal
 - Beacon has a customer portal feature
 - Will implement later this year



Summary

This is a Public Works Project - all of these were required:

- Prevailing Wages (became an issue with meter installs)
- Traffic Control Plans (reviewed by City and Engineer)
- L&I inspections of Electrical Work
- Technical Submittal Reviews (by Engineer)
- Construction Inspection (mostly by City forces)
- Periodic Invoicing
- Payment with Retainage Held till Contract Close-out
- Construction Record Drawings (electrical service installs)

Summary

Key Take-Aways

- **Number of data collectors matched Badger's preliminary estimates to provide adequate coverage**
- **FCC License obtained within 45 days of NTP**
- **City purchased more meters for City-installation than anticipated**
- **Badger pitched WAN-based backhaul, cellular was eventual backhaul choice**
- **City accepted Badger's proposal prior to release of the final version of the utility billing data transfer/analytics and customer interfaces**

Summary

Key Take-Aways

- Electrical service at data collector sites had coordination issues – PUD would work only with utility not directly with contractor
- Contractor originally anticipated finishing work in ~6 months but custom lid modifications caused delays
- Meter/data collection installations completed in 360 days, data management software, utility/customer interfaces took longer
- To date project costs are within original proposal amount **(\$4,950,696)**
- City likes Beacon billing read system/data analysis tools

Questions

