Global Water Industry Business Value

June 17, 2015, Sao Paulo, Brazil

Presented by **Gary Wong ~ Principal, Global Water Industry, OSIsoft**

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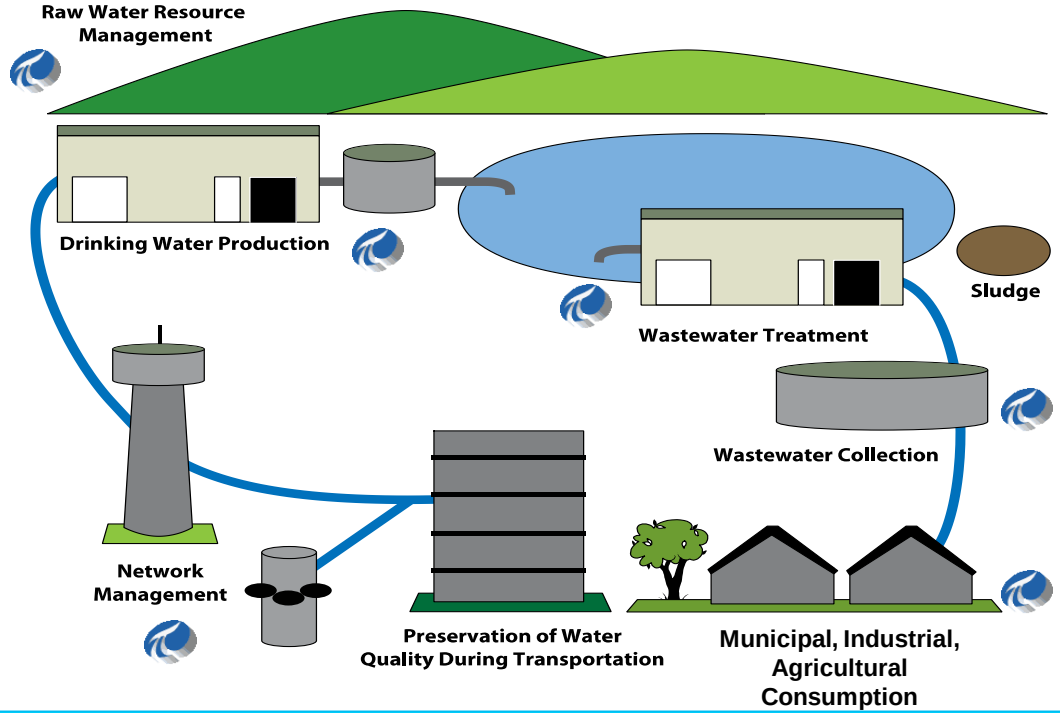
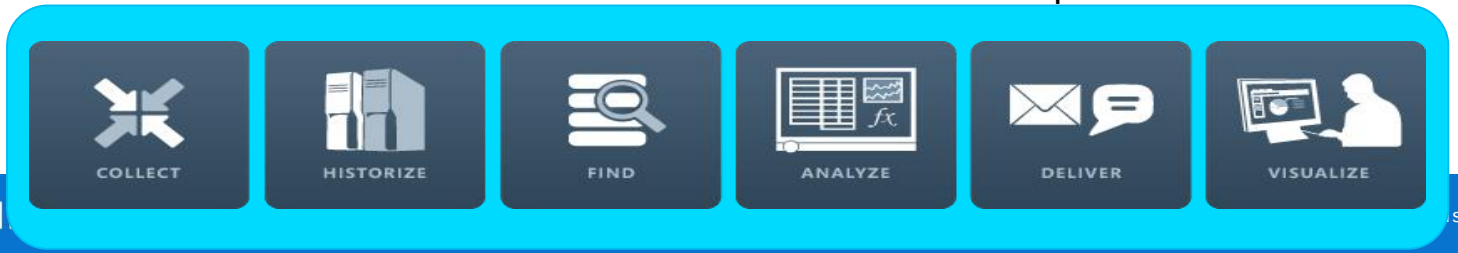
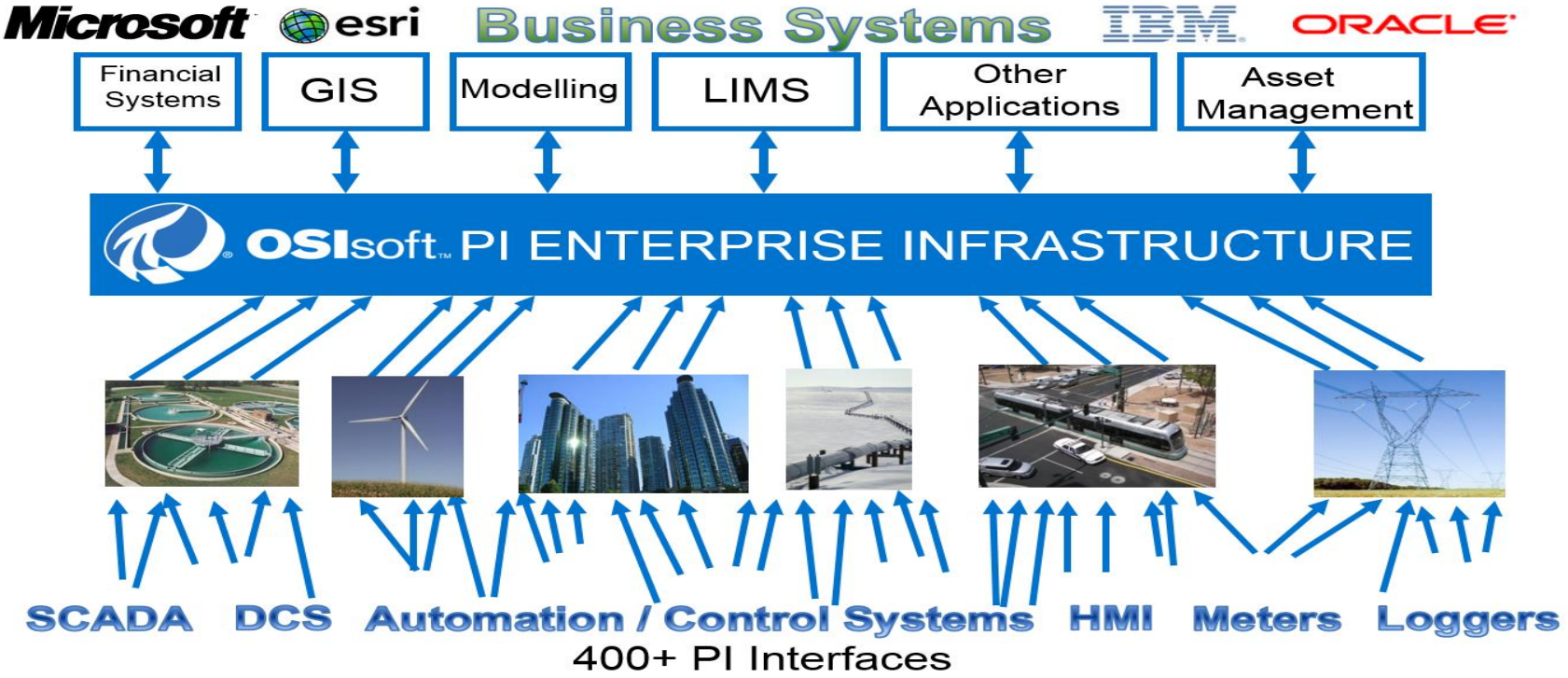
Integrated Smart Water Management





Once Source of the Truth
Common Infrastructure



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Customer Successes

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IWA LET2015 Conference, Hong Kong

Leading Trends

- Leakage
- Energy
- Demand Side Management
- Water Supply
- Water Recycling

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Veolia Eau's (Greater Paris) Goals

- Reducing consumption of electricity:
  - Operational instrumentation and optimization (of plants, networks and buildings)

  6% by 2020

- Consumption of Energy from Renewable Sources:
  - Purchase of renewable energy (green) certificates for industrial energy supplies and fitting of solar panels for office needs
  - Transportation: biofuels / electric vehicles

  100% from 2013 onwards

- Reduction in CO2 emissions
  - Initiative to reduce consumption and substitute energy from renewable sources
  - Purcahses of chemicals - green chemicals
  - Construction/maintenance works - responsible site practices

  33% by 2020

- Certification: to French NF 16001 standard or

  ISO 50 001

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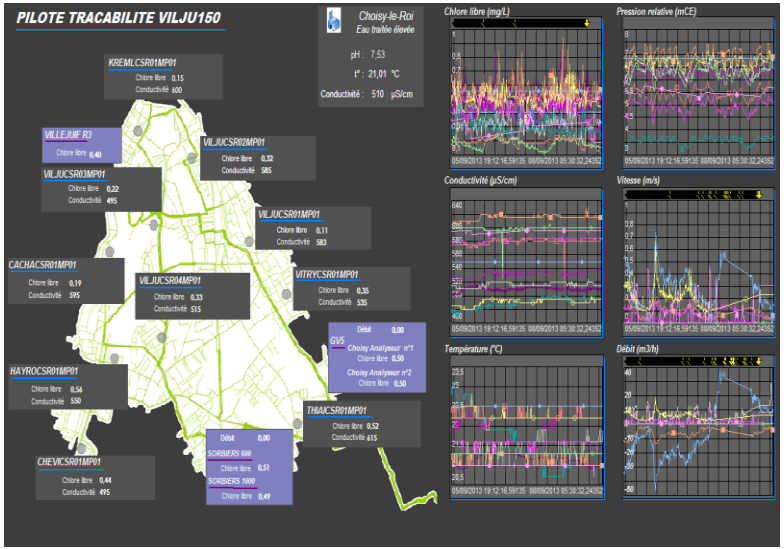
Unified Control & Visibility

A unique vision for an efficient control

Water supplies, network, customer service and data with context

- **A single control center for three territories**
- **Real-time water supply safety**
- **Found 7% more leaks**



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Real-time Energy Management

- All plants and sites are monitored.
- Energy billing data are included.
- Hydraulic configuration vs energy consumption analysis.
- 6% reduction in energy costs from baseline.

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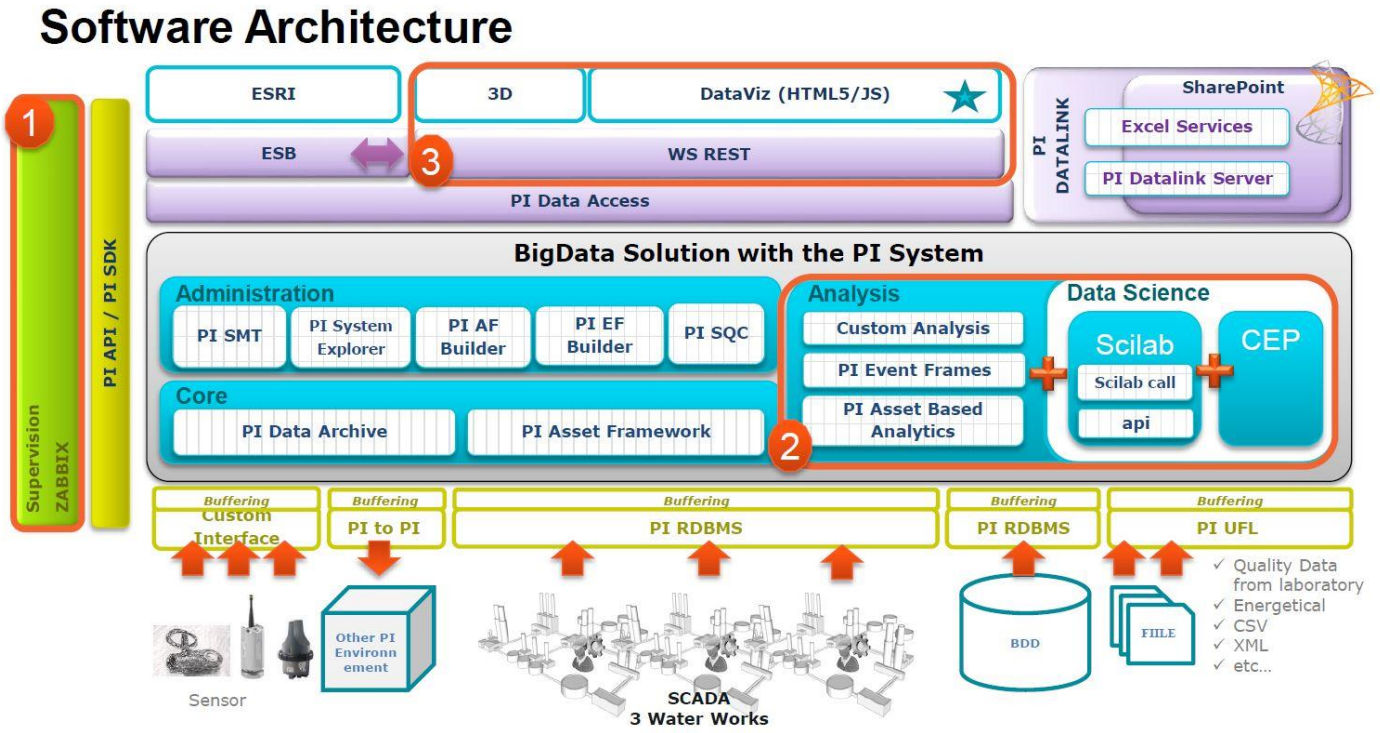
Veolia Eau



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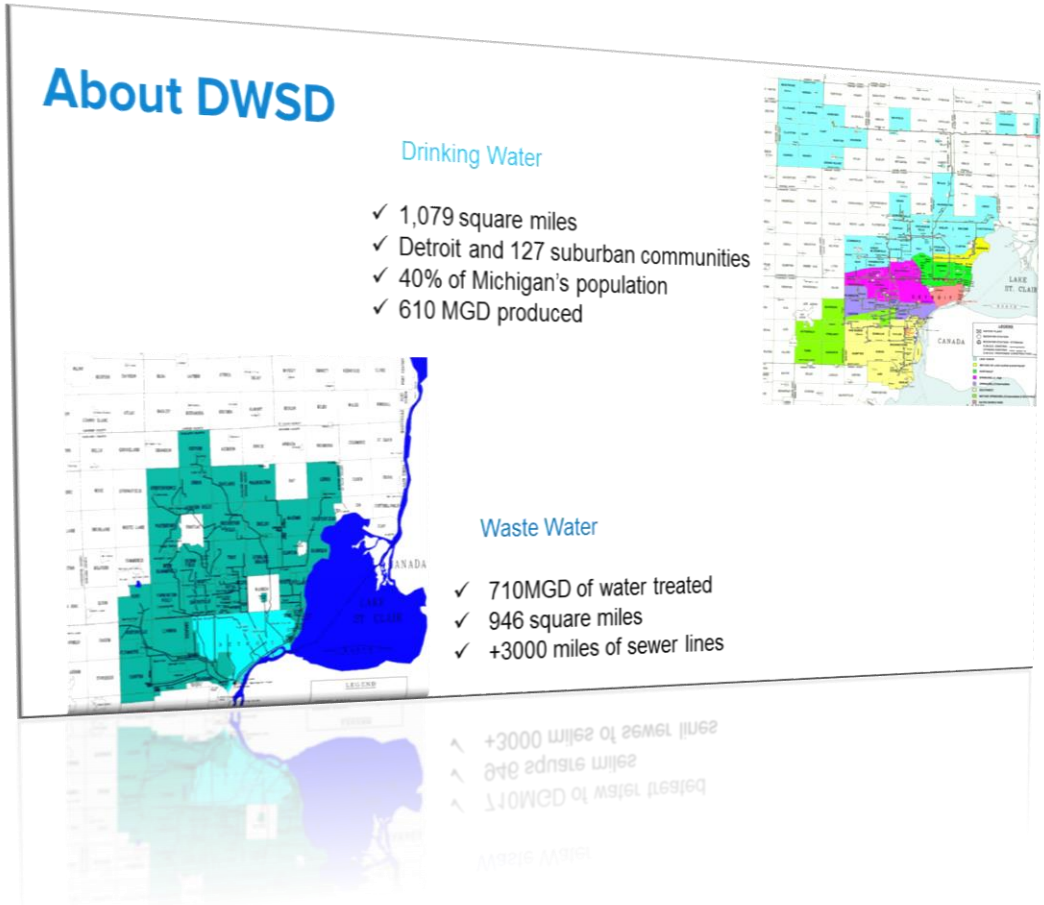

Ilfat Maatouk, Betty Thomas
Detroit Water & Sewerage

Operational Intelligence in your Water Supply

- Reaching $500,000 in savings last 3 years
- Automated reporting providing quicker insight
- Real-time dashboards for better decision making

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DWSD\CSO Outfall\B054-W.WARREN & ROUGE RIVER\ Notifications[CSO flag] generated a new notification event.

From: sharepoint@dwsd.org

To: Ilfat Maatouk

Name: CSO flag
Server: OSI-BIZ
Database: OSIBIZDB
Start Time: 5/2/2014 7:50:26 AM Eastern Daylight Time (GMT-04:00:00)
Trigger Time: 5/2/2014 7:50:26 AM Eastern Daylight Time (GMT-04:00:00)
Target: DWSD\CSO Outfall\B054-W.WARREN & ROUGE RIVER
State: OutsideControl
Priority: Normal

Actions:
Acknowledge
Acknowledge With Comment
Data was not available for attribute 'LEVEL+ OFFSET'.

DWF SM SE-S-1 20150214 09:13:00		7667.9 Minutes	2/14/2015 9:1…	2/19/2015 5:0…			DWF
DWF SM SE-S-1 20150219 17:00:57		16714.2 Minutes	2/19/2015 5:0…	3/3/2015 7:35…			DWF
DWF SM SE-S-1 20150303 20:25:03		1804.9 Minutes	3/3/2015 8:25…	3/5/2015 2:29…			DWF
DWF SM SE-S-1 20150305 10:05:00		1822.5 Minutes	3/5/2015 10:0…	3/6/2015 4:27…			DWF
OUTFALLBASIN20150129-001		67842.7 Minutes	1/29/2015 9:5…				OUTFALLBASIN
SE-S-1 STAGNANT 20150214 17:10:32		1311.8 Minutes	2/14/2015 5:1…	2/15/2015 3:0…			SM STAGNANT
SE-S-1 STAGNANT 20150215 17:17:36		2666.2 Minutes	2/15/2015 5:1…	2/17/2015 1:4…			SM STAGNANT
SE-S-1 STAGNANT 20150217 14:26:25		1084.2 Minutes	2/17/2015 2:2…	2/18/2015 8:3…	Event frame w…		SM STAGNANT
SE-S-1 STAGNANT 20150218 08:30:29		6150.8 Minutes	2/18/2015 8:3…	2/22/2015 3:0…			SM STAGNANT
SE-S-1 STAGNANT 20150222 17:18:59		2362.1 Minutes	2/22/2015 5:1…	2/24/2015 8:4…	Event frame w…		SM STAGNANT
SE-S-1 STAGNANT 20150224 08:40:56		30475.8 Minutes	2/24/2015 8:4…				SM STAGNANT
SE-S-1 STAGNANT 20150224 08:45:06		2881.2 Minutes	2/24/2015 8:4…	2/26/2015 8:4…	Event frame w…		SM STAGNANT
SE-S-1 STAGNANT 20150226 08:46:06		27590.6 Minutes	2/26/2015 8:4…				SM STAGNANT
SE-S-1 STAGNANT 20150226 08:54:26		245.7 Minutes	2/26/2015 8:5…	2/26/2015 1:0…			SM STAGNANT
SE-S-1 STAGNANT 20150226 13:58:48		2922.7 Minutes	2/26/2015 1:5…	2/28/2015 2:4…			SM STAGNANT
SE-S-1 STAGNANT 20150228 17:02:08		1322.4 Minutes	2/28/2015 5:0…	3/1/2015 3:04…			SM STAGNANT

Monitoring Flows: Notifications & Event Frames

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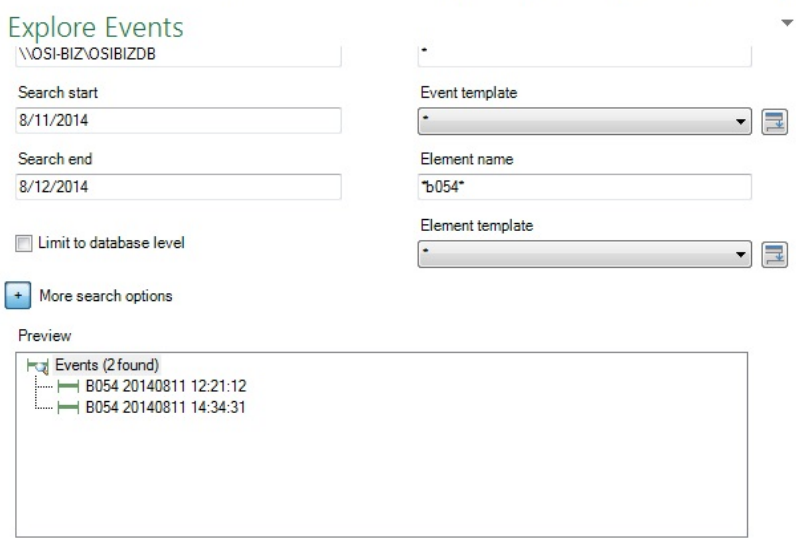
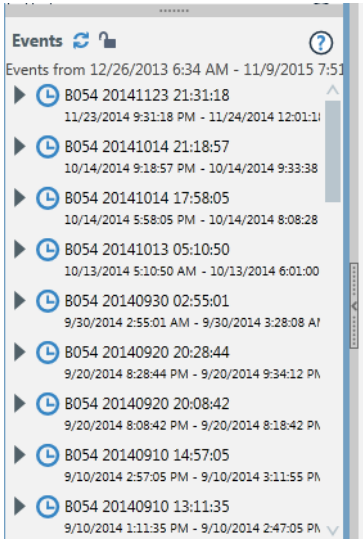
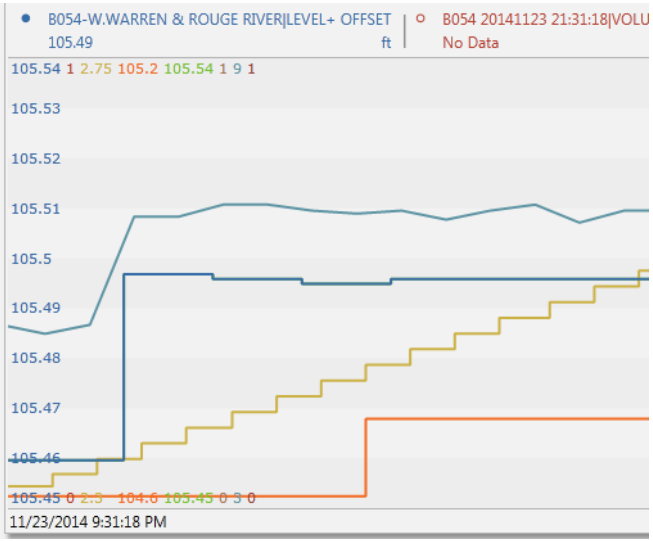
Event Frames

	A	B	C	D	E	F	G	H
1	Event name	Start time	End time	Duration	FLOWRATE	FLOWRAT	LEVEL +OFF:	RIVER LEVEL
2	B054 20140811 12:21:12	11-Aug-14 12:21:12	11-Aug-14 14:07:51	0 1:46:39	7.18	0.34	105.50	103.94
3	B054 20140811 14:34:31	11-Aug-14 14:34:31	11-Aug-14 15:17:52	0 0:43:21	9.91	0.19	105.57	104.75







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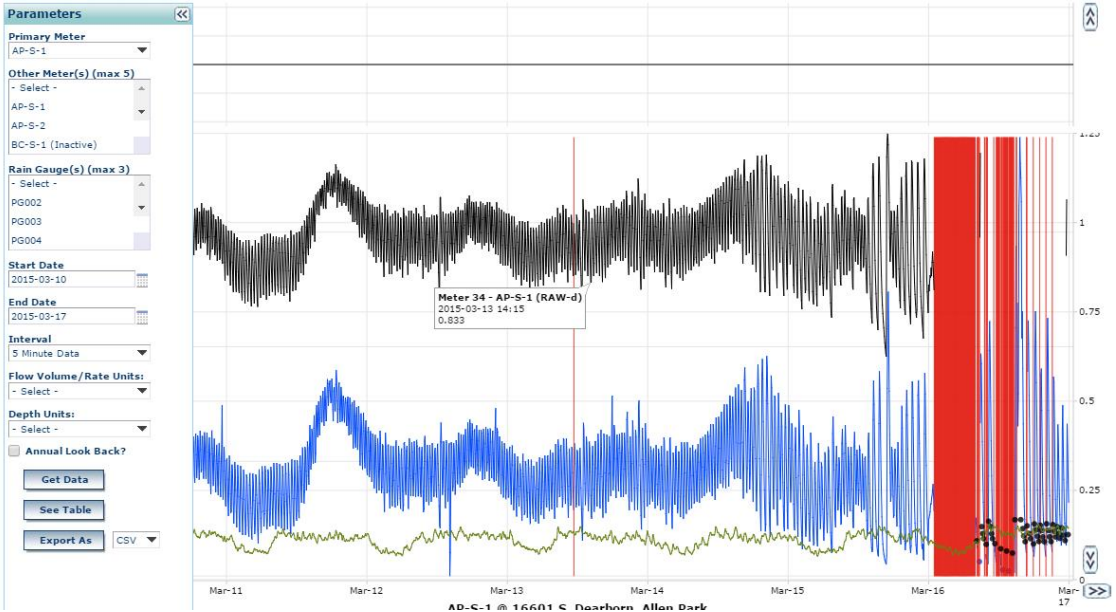
Sewer Meter Billing

PI SMT
Analyses
Notifications
Event Frames
PI Coresight
PI DataLink
Asset Framework

- Linear Interpolation
- Green line
- Correlations
- Flow calculations
- Notifications
- Replace data
- Peaks



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Financial Solutions

- 2012-2015: $500,000
  - ❖ Automating Reports
  - ❖ Notifications and Event Frames
  - ❖ Using the PI System as a back up
  - ❖ Replacing costly software with the PI system
- Savings and Improvements expected in the next 5 years: $2,000,000
  - ❖ Monitoring Real time data
  - ❖ Energy consumption tracking
  - ❖ Increasing pump efficiency
  - ❖ Predictive data

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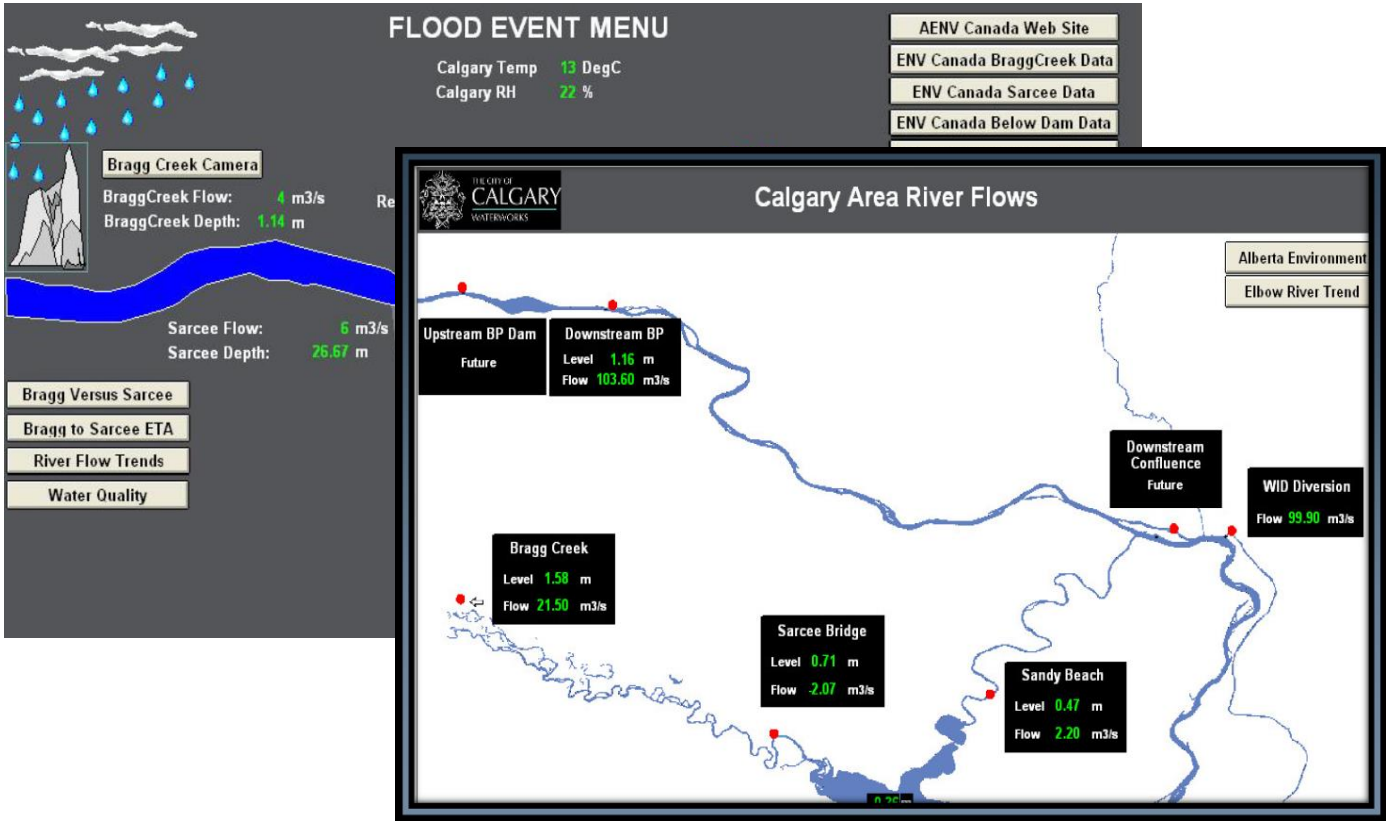
Calgary's Emergency Operations



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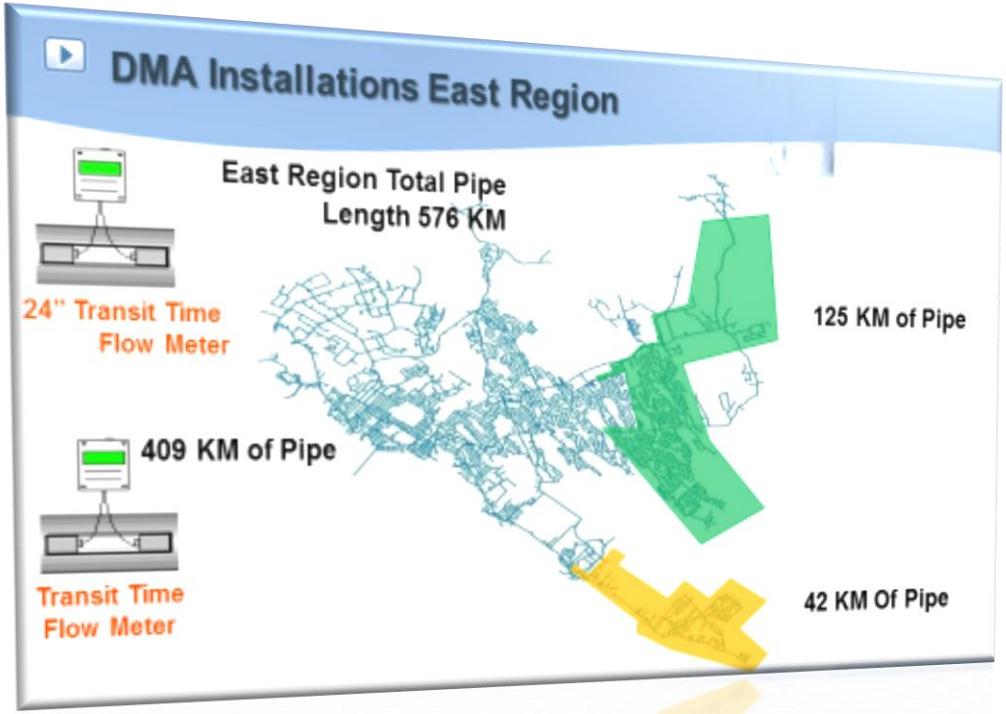

HALIFAX WATER LEAKAGE REDUCTION

Carl Yates – General Manager
Halifax Water

Real-time Water Loss Control

- Serving 325,000 people
- $600,000 / year savings

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Reduce Leaks & Non Revenue Water

Water service to 325,000 people.
$600,000 / yr savings reducing leakage (DMA Night Flows).

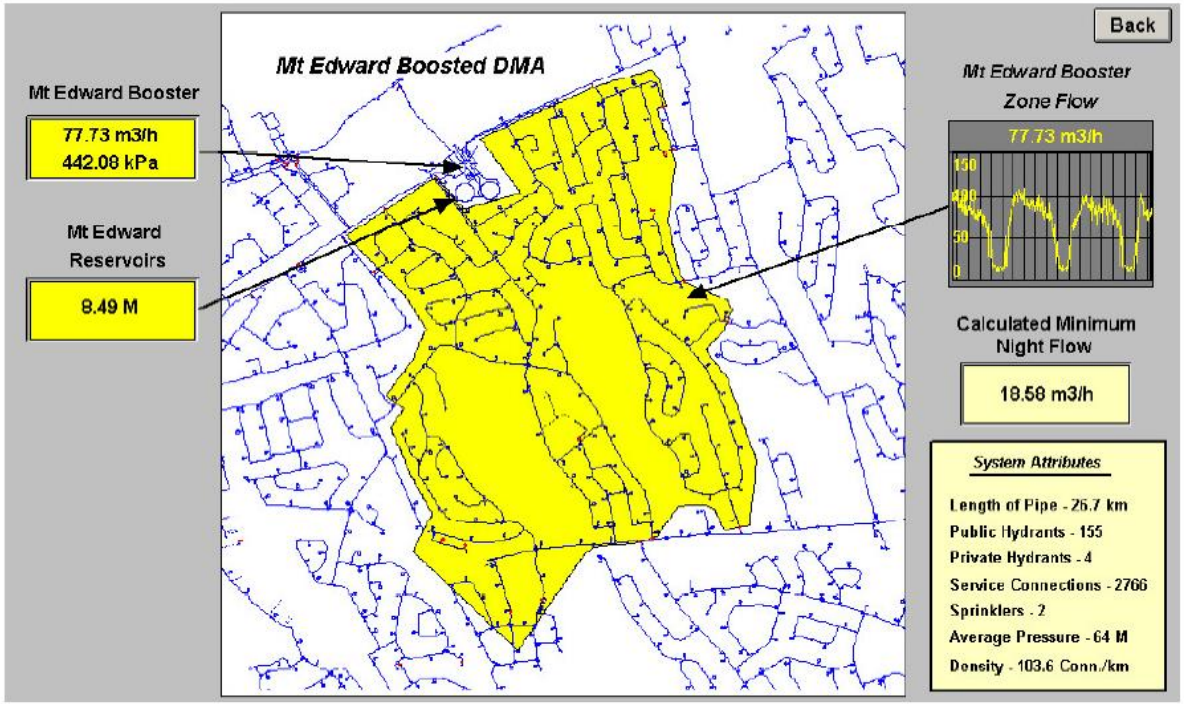

Figure 2.3 Mount Edward DMA, Dartmouth, Nova Scotia

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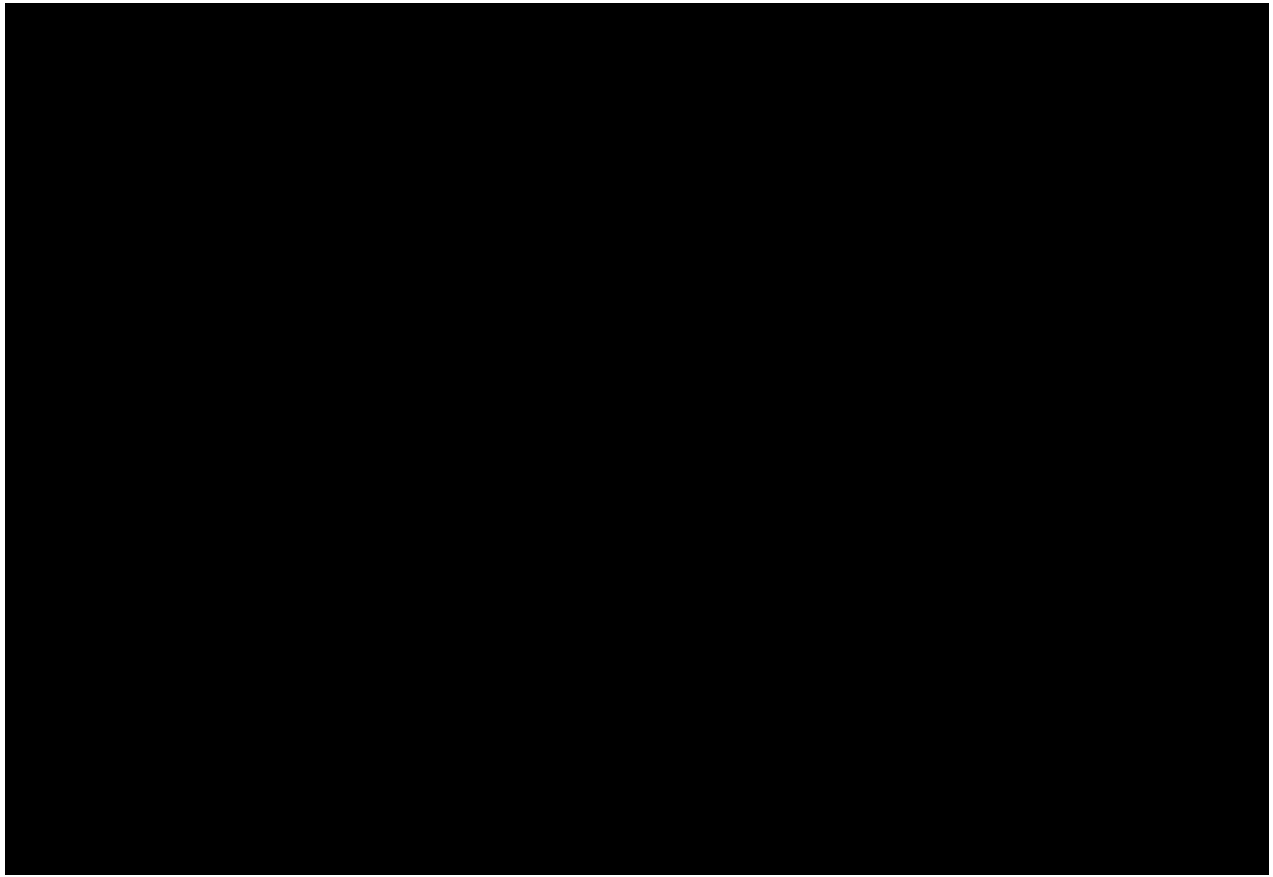
PI to Esri ArcGIS Demo



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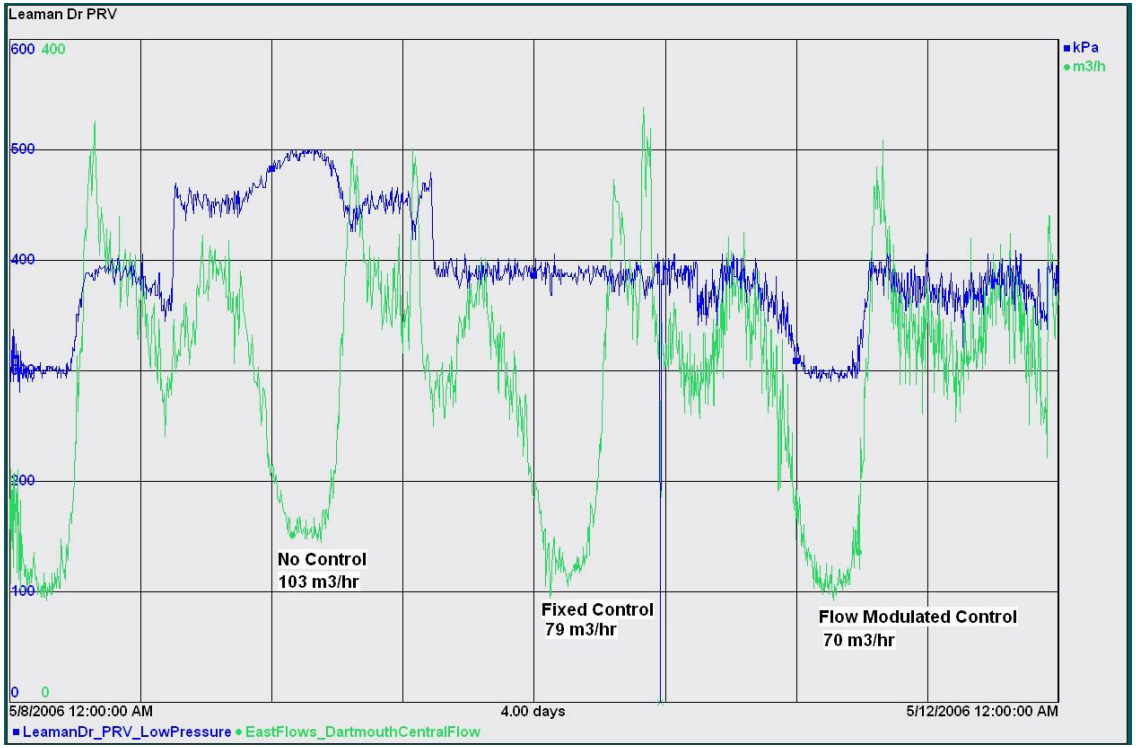
Reduce Main Breaks: Advanced Pressure Management

Average main breaks dropped from 23 / year to 12 / year (Halifax Water)



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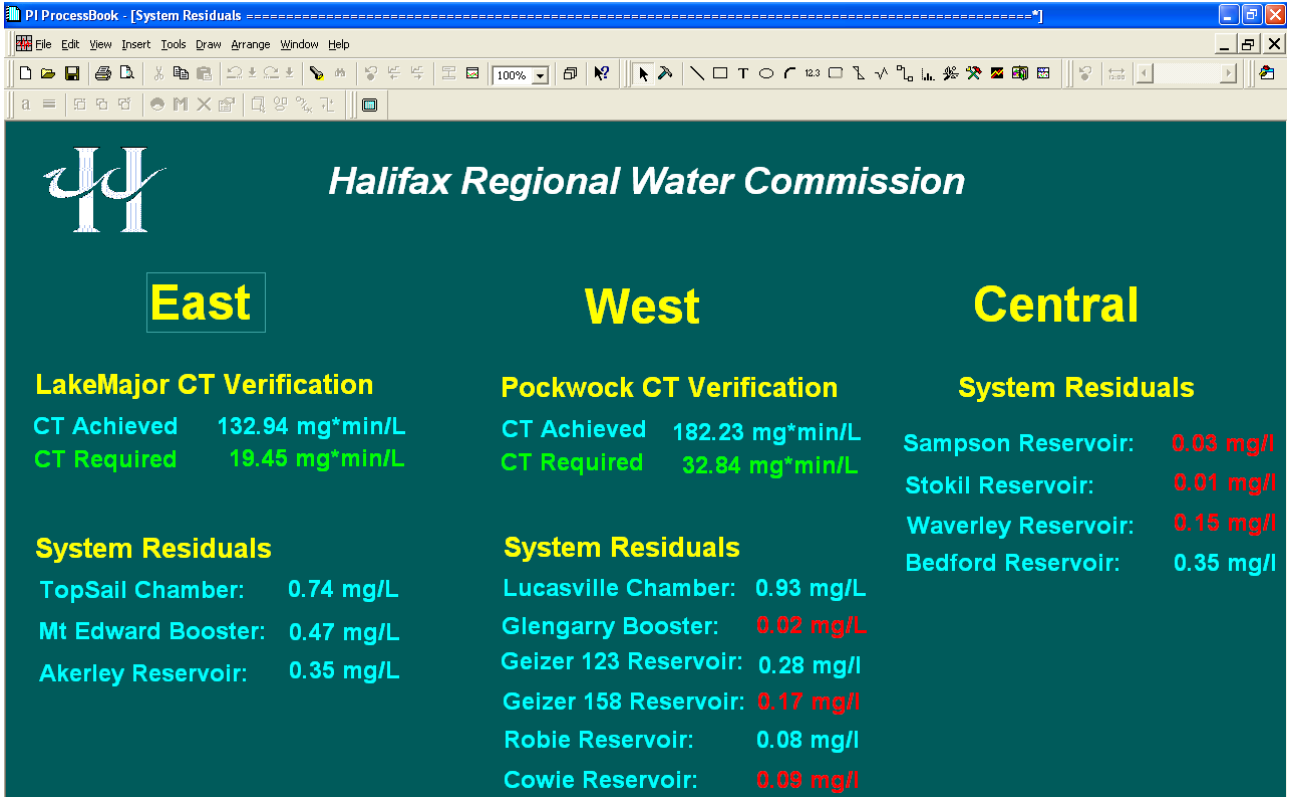
Water Quality – Chlorine Verification



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Challenge Leakage Detection

Presentation abstract:

As a supplier of drinking water, we unfortunately have to deal with leaks in our daily operations. In most cases, we are alerted by our customers. Usually because the pressure is too low, or they are not receiving any water at all. This means that we are always one step behind.

We wanted to be able to be **one step ahead** instead. Our challenge was to create business rules in OSIsoft PI that would alert us whenever an exception occurs in our distribution network. Our Central Water Distribution department can then **immediately take action**, even before we receive the first call from our customers. We have developed these business rules in a combined effort between business and IT. In our presentation, we will talk about how this functionality was developed, which parts of the PI system we use, the current operational results (hit rate) and lessons learned.

Vitens
LAAT WATER VOOR JE WERKEN

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PI Leakage Detection in practice

- Business rule
- Initial configuration of parameters based on best guess/knowledge by operator (configuration Maarn)
- Fine-tuning of parameters after real exceptions
- Hit rate => 95%

Vitens
LAAT WATER VOOR JE WERKEN

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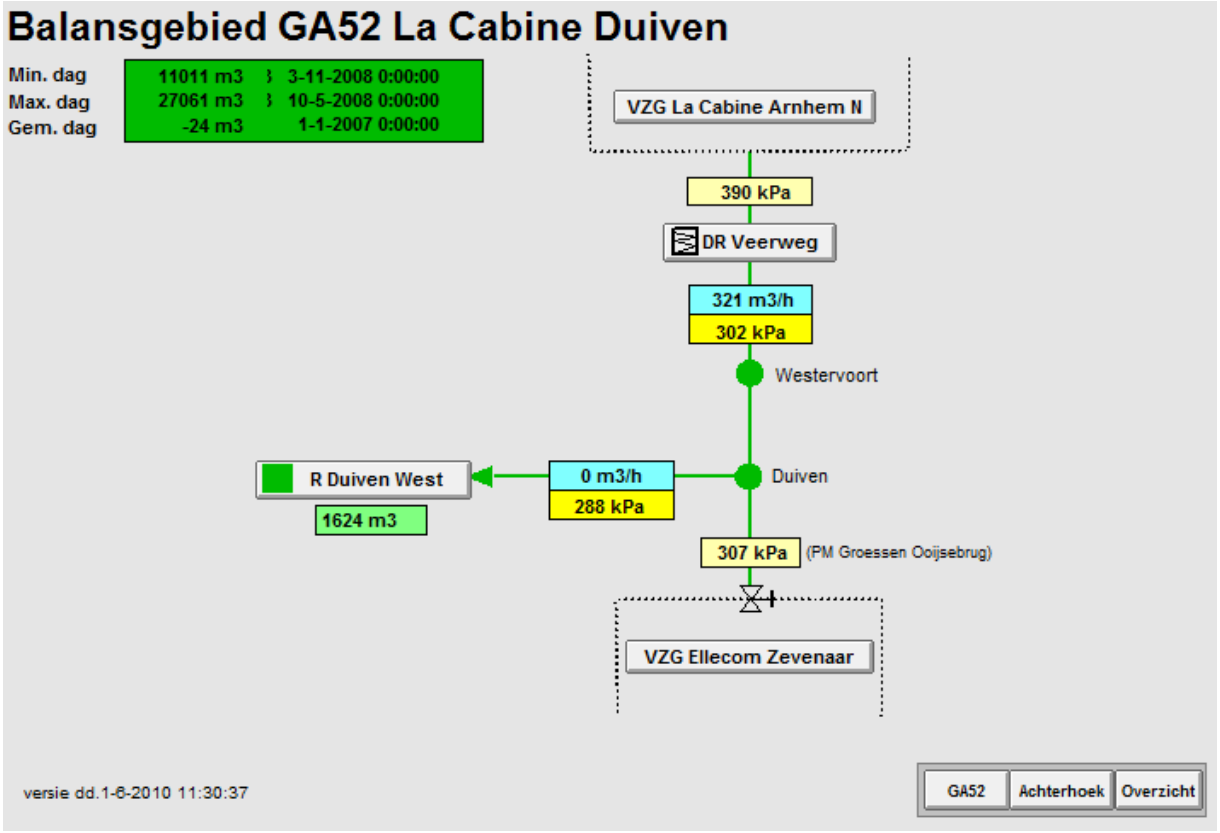
Lessons learned



Vitens
LAAT WATER VOOR JE WERKEN

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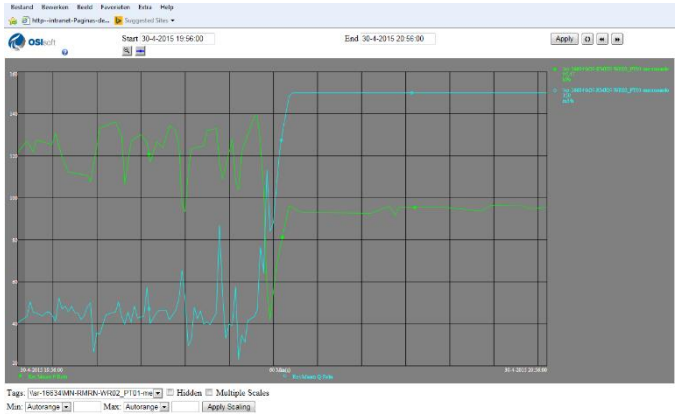
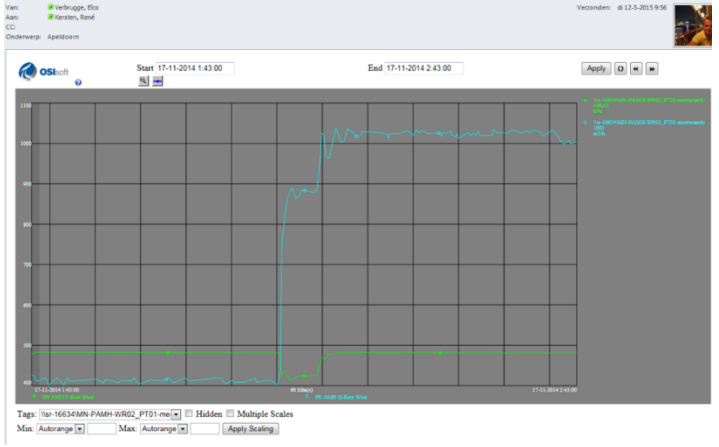
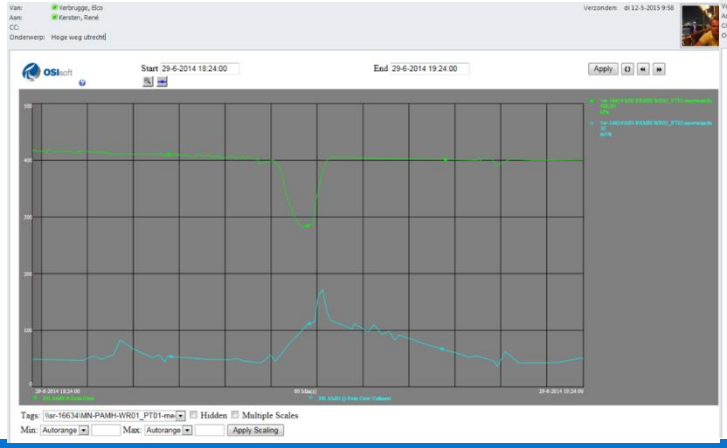
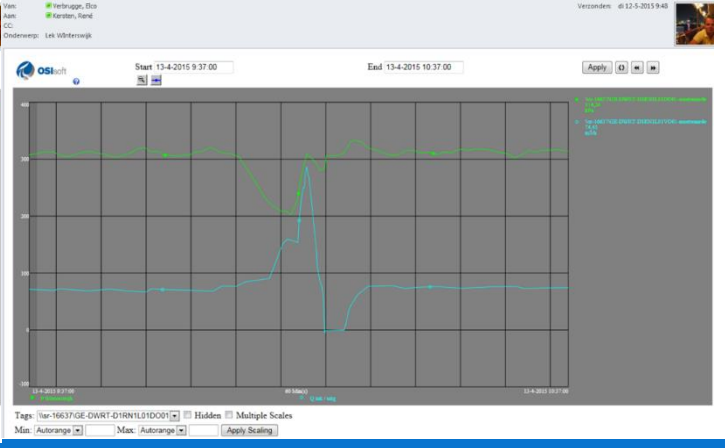
Examples









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Positive impacts

- Less leakage water
- Less energy consumption
- Less damage
- Less dewatering
- Decreasing the Mean Time To Repair (MTTR)
- The customer has faster access to drinking water

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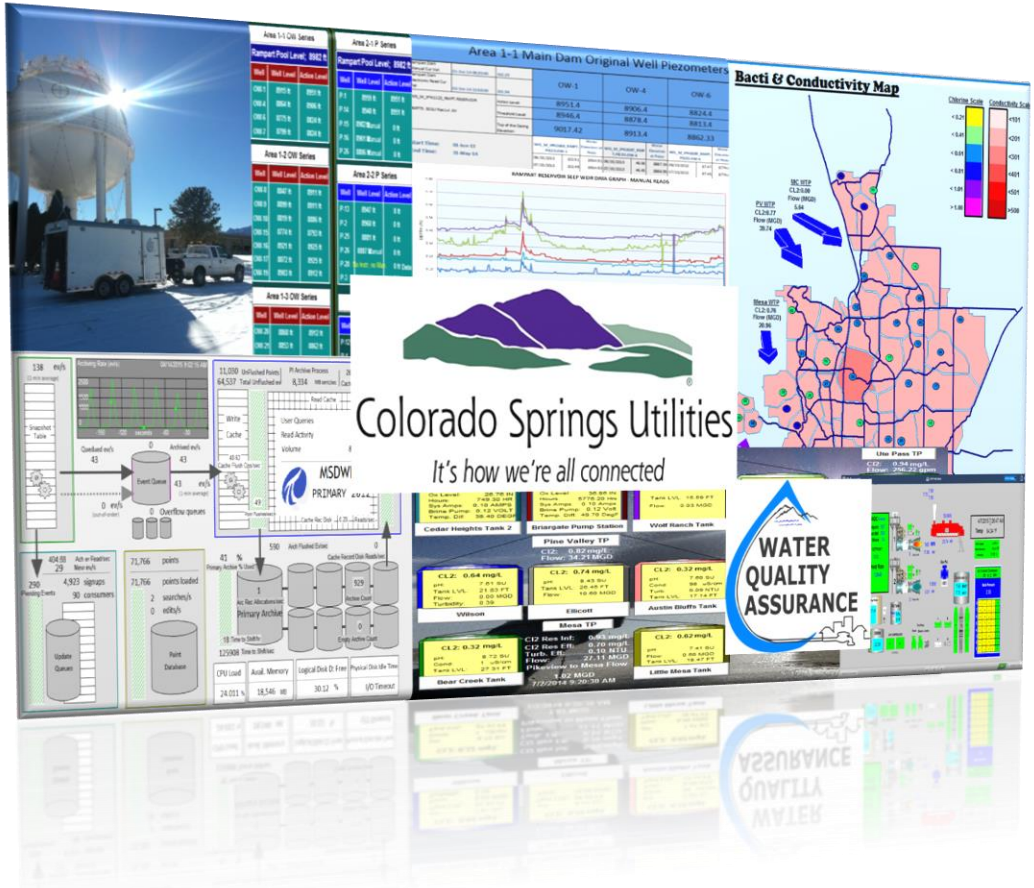

David Mora, Jeannette Ortiz
Colorado Springs

Improving Business with Operational Intelligence

- A 4-Service utility
- Ensuring water quality and optimal distribution
- Realizing 58% reduction in overtime
- Meeting FERC reporting requirements

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To Manage you must be able to Measure

To manage performance effectively all enterprise data sources must be evaluated

Communicate effectively and provide visibility

- Monitoring system health and make operational changes
- Identify and correct problems early
- Provides the ability to Manage Risk
- Make key water system trade-offs
- Defend and justify decisions based on facts
- Creates training opportunity
- Plan and optimize system performance

DYNAMIC REAL-TIME DATA PROVIDES VALUE BEYOND EXPECTATIONS

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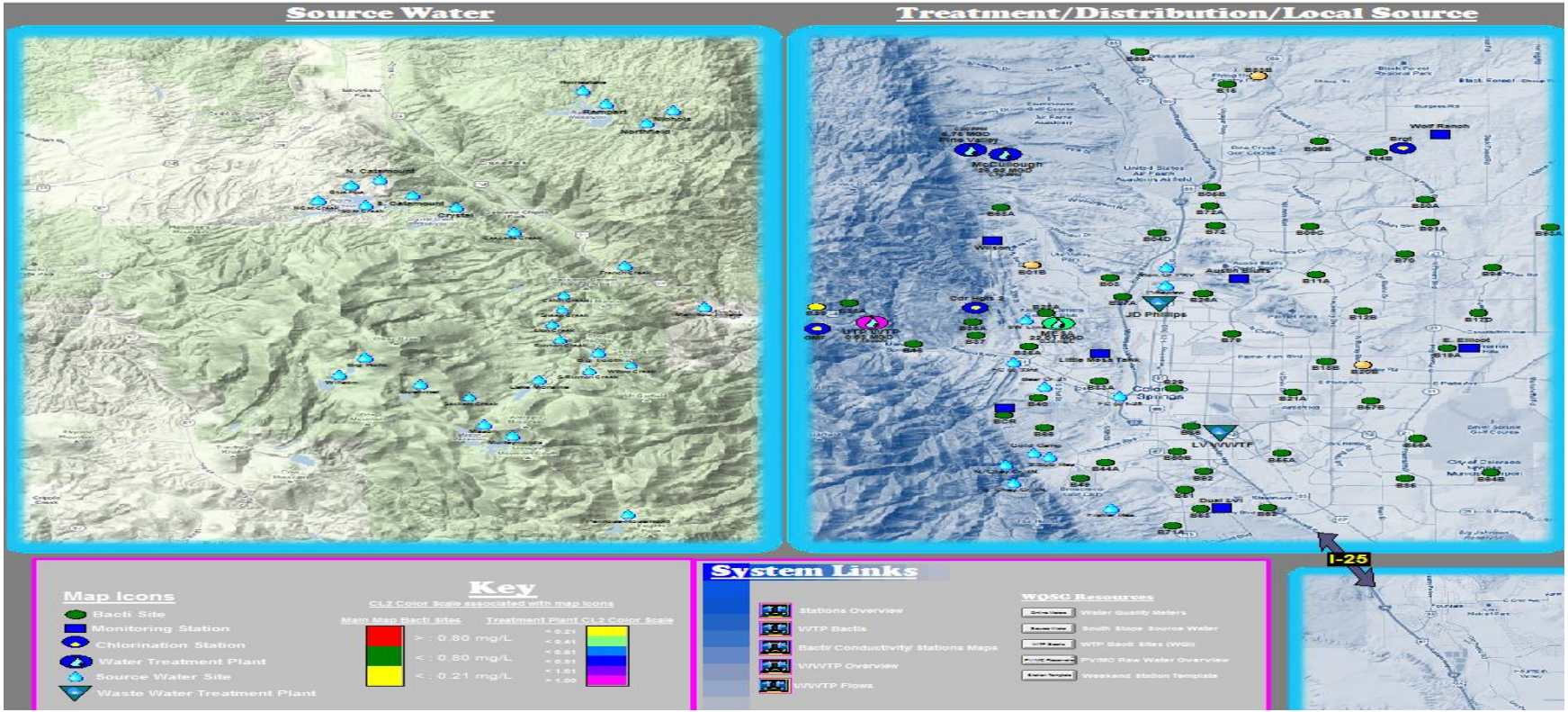
Holistic View of Water Quality Assets



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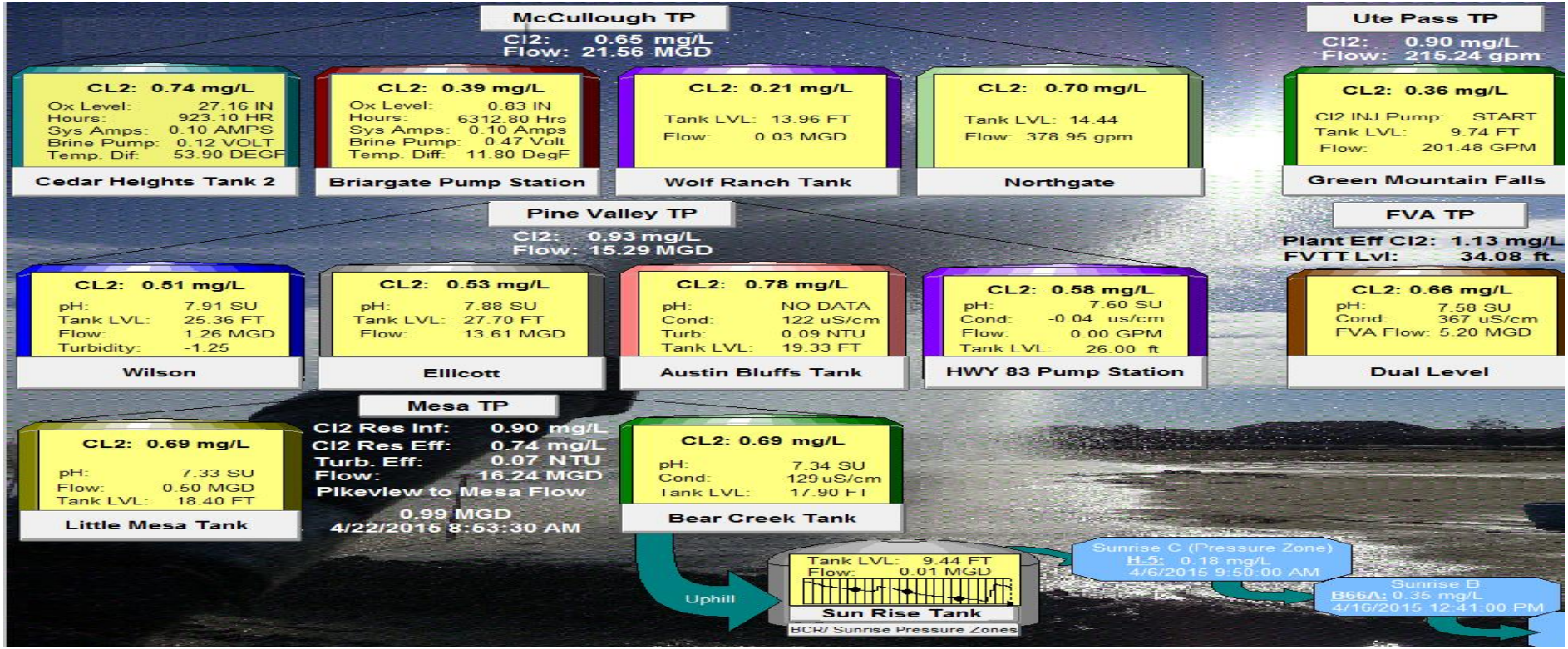
Water Quality Monitoring Dashboard



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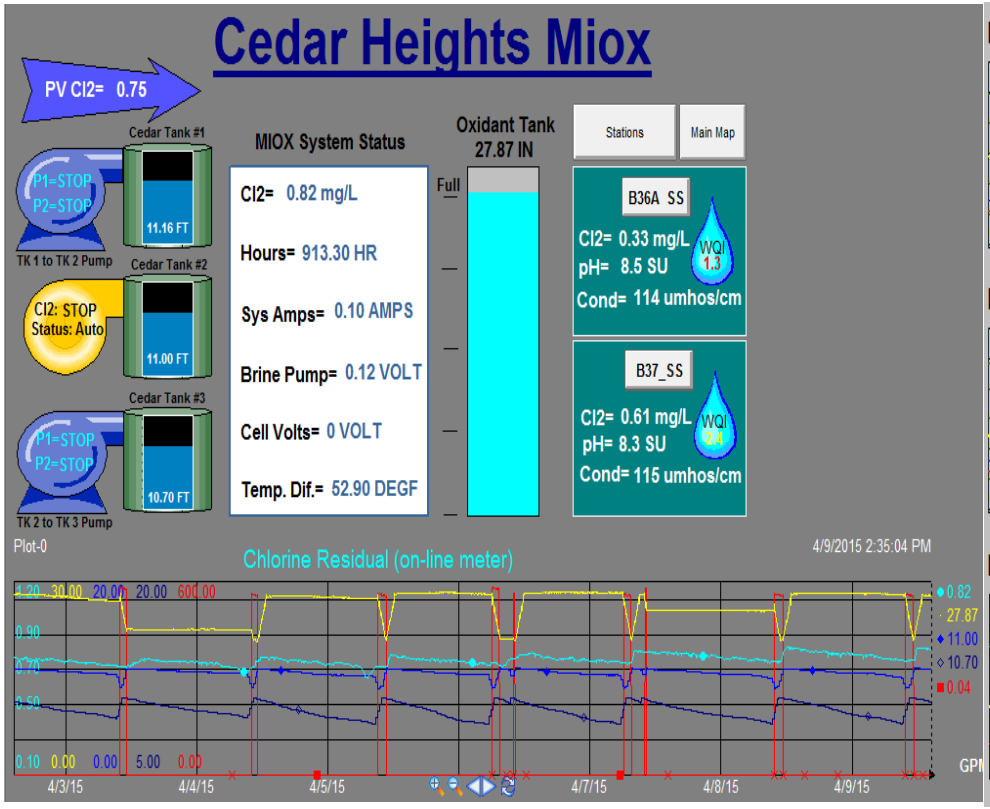
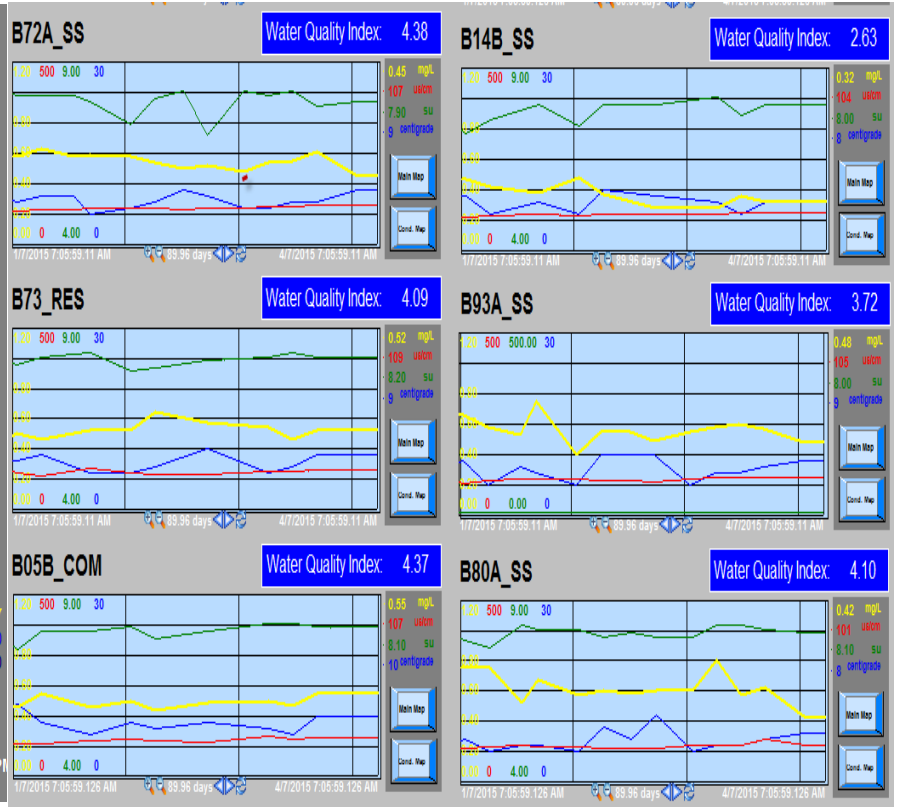
Post-Chlorination Station Dashboard





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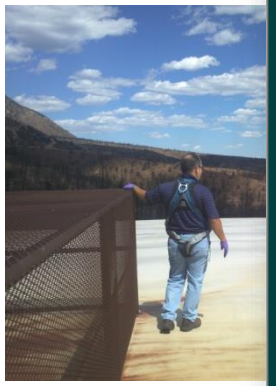
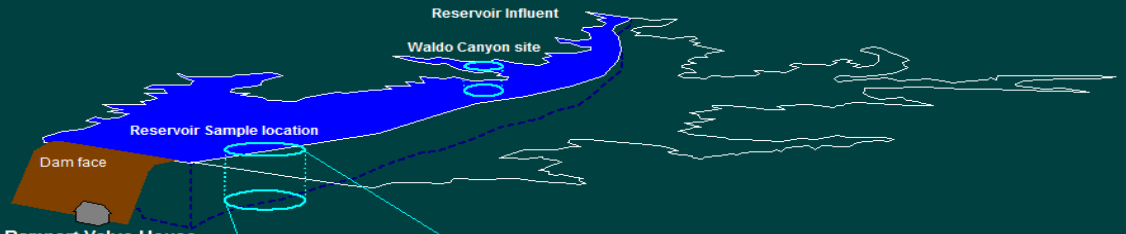
Reservoir Water Quality Display



Rampart Reservoir

Waldo Canyon Fire Study



Rampart Reservoir Burn Area

Sample Date: 10/14/2014 9:20:00 AM

	Top	Middle	Bottom	
Chlorophyll	0	2	2	ug/L
Conductivity	68	68	68	umhos/cm
DO	6.4	6.5	6.3	mg/L
pH	7.2	7.3	7.3	SU
Temperature	12	12	12	degree C
Secchi Depth	22	NA	NA	Ft

Reservoir Effluent

Sample Date	3/10/2015 8:45:00 AM
Aluminum	0 mg/L
Chlorophyll	2 ug/L
Conductivity	72 umhos/cm
E. coli	0 MPN/100mL
Fluoride	0.16 mg/L
Hardness	28.1 mg/L
Iron	62.9 ug/L
Magnesium	1500 ug/L
Manganese	44.7 ug/L
Nitrate	0 mg/L
TOC	1.86 ug/L
pH	7.3 SU
Phosphate	0 ug/L
Temp	5 degree C
Coliform	1 CFU/100mL
Organisms	30 P/ml
Turbidity	0.65 NTU

Reservoir Level: 172 FT

	pH	Temp	Turbidity	Conductivity	Alkalinity	DO	Chlorophyll	TOC	Ammonia	Fluoride	Nitrate	Nitrite	Iron	Magnesium	Manganese
TOP Secchi Depth: 22 FT	6.8	12	0.35	68	15	6.3	0	1.67	0	0.15	0	0	0	1440	0
MIDDLE	7.1	12	0.4	67	15	4.9	1	1.79	0	0.14	0	0	0	1440	0
BOTTOM	7.1	12	0.4	68	15	5.5	1	1.76	0	0.14	0	0	20.8	1450	7.82

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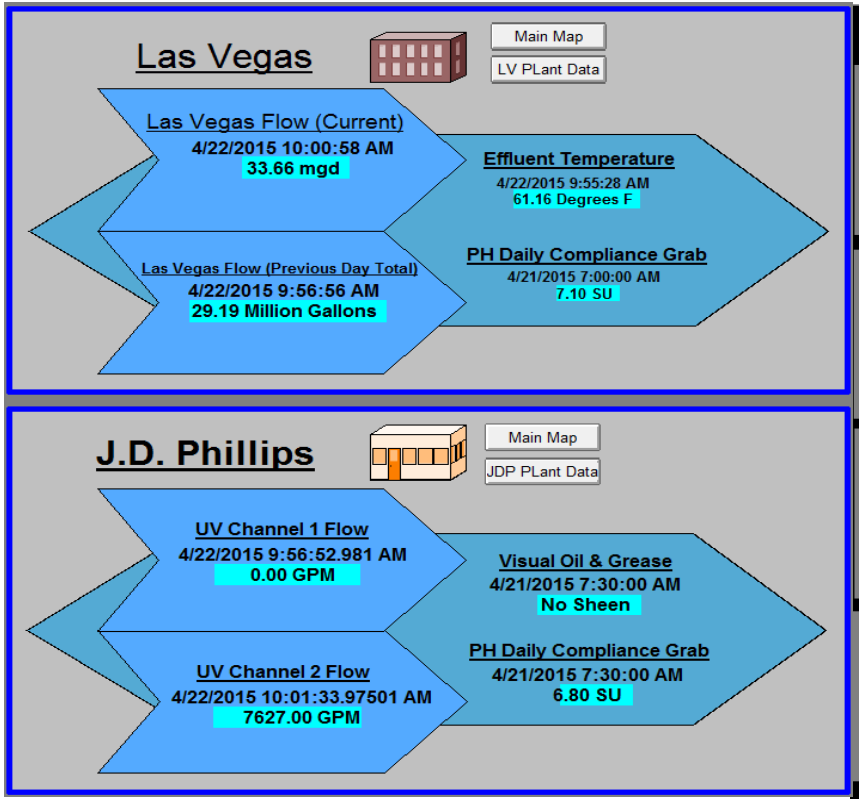
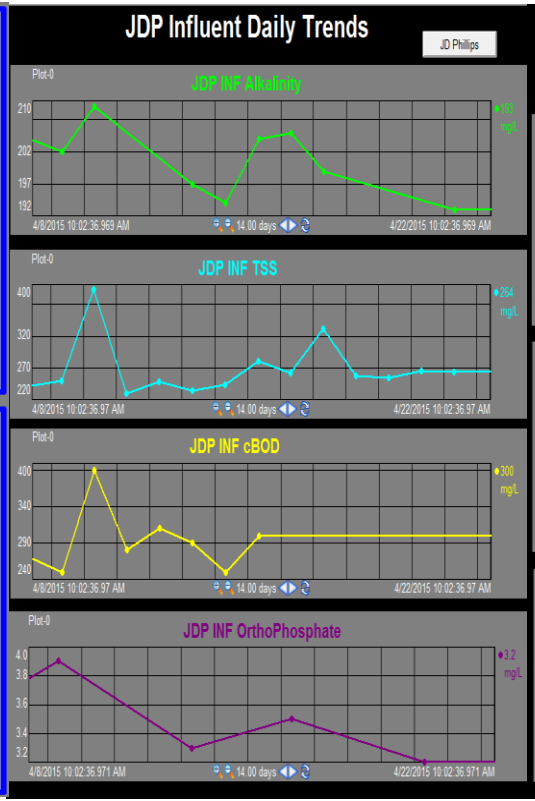
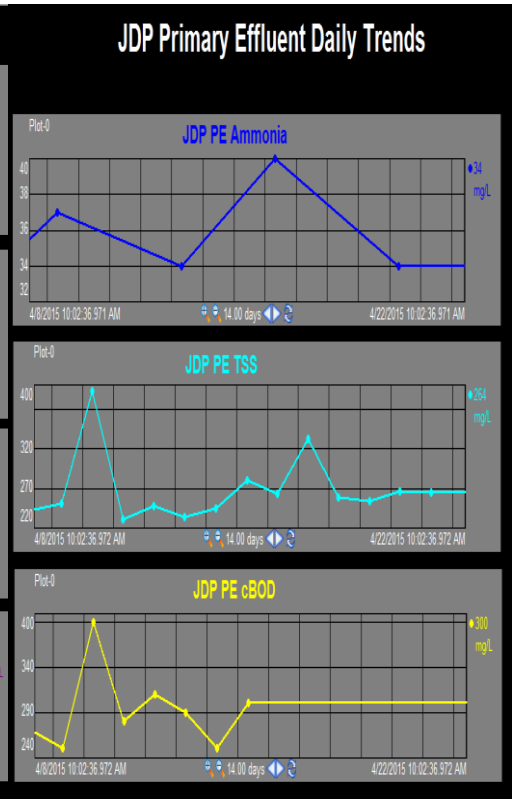
Operation Awareness for Wastewater







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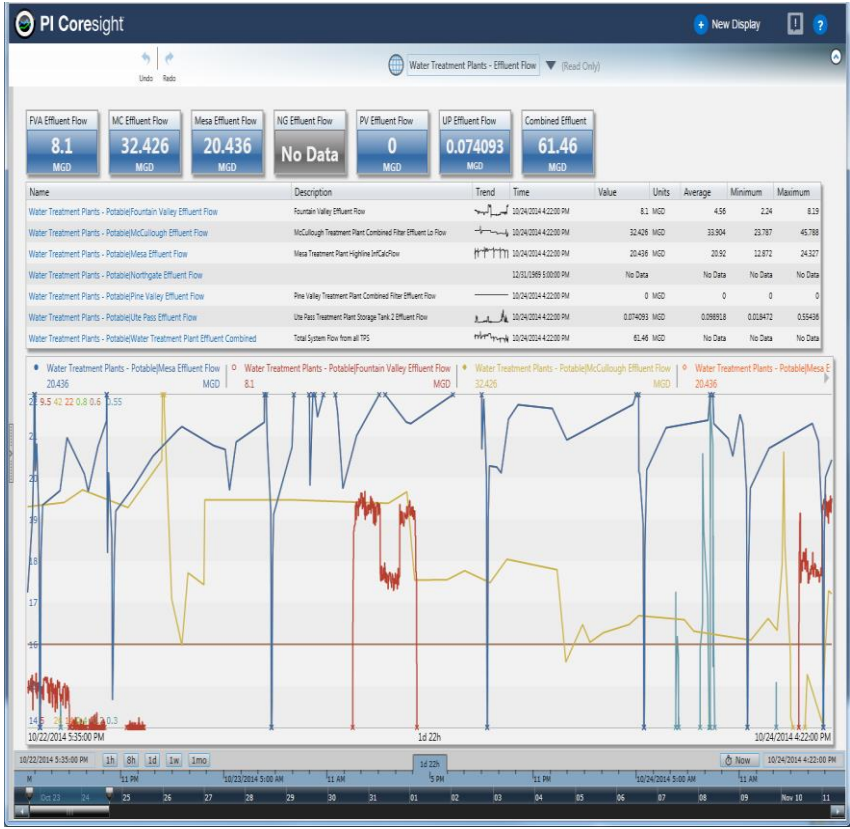
Ad-Hoc Trending using PI Coresight

- Empowering end-users
  - Increased ownership of the data and autonomy
  - It is an intuitive and interactive tool
- Creates a platform for users to have the ability to access real-time data
  - Custom views that can be designed to meet specific business needs
- Web-based client allows users to analyze enterprise data
  - Mobile accessibility and device agnostic
- Data analytical in the field improves decision quality
  - Reduces operational costs



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Gains Realized with PI System Utilization

- **Significant O&M Reduction Realized**
  - 29% Reduction in resource allocation for online Instrumentation Inspections
  - 30% Reduction in Vehicle Usage Annually
  - 58% Reduction in Overtime
- **Saving has helped with reallocation of O&M dollars**
  - To expand our Water Quality Instrumentation Program
    - Pre PI System utilization we had only 6 operating WQ systems
    - Compared to 18 installed and operational by end of year 2015

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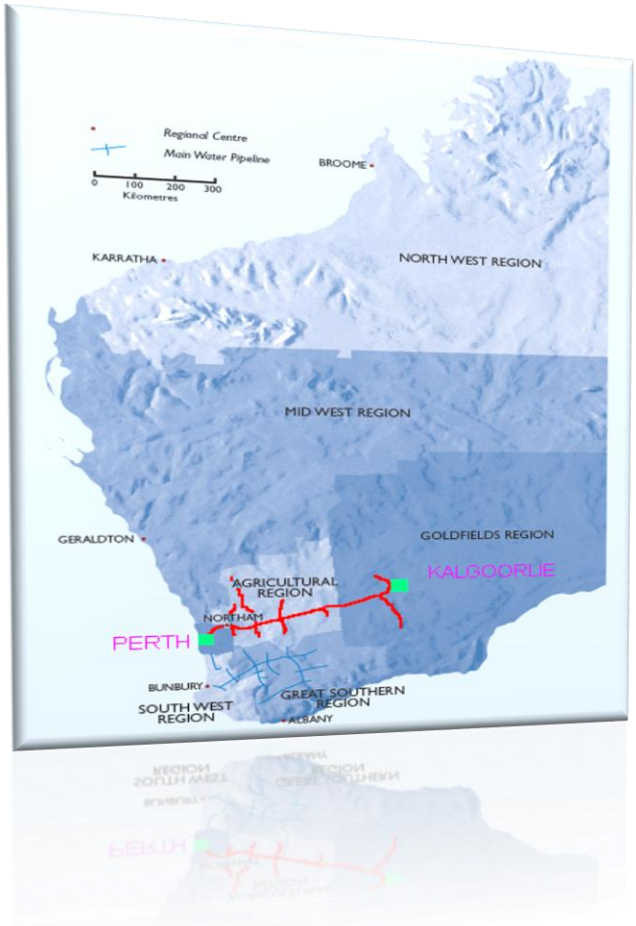

Water Corporation Transformation

Ian Scott, Asset Management
Water Corporation

By Geography, Western Australia is almost 10 times larger than the UK

UK has 25 times the population

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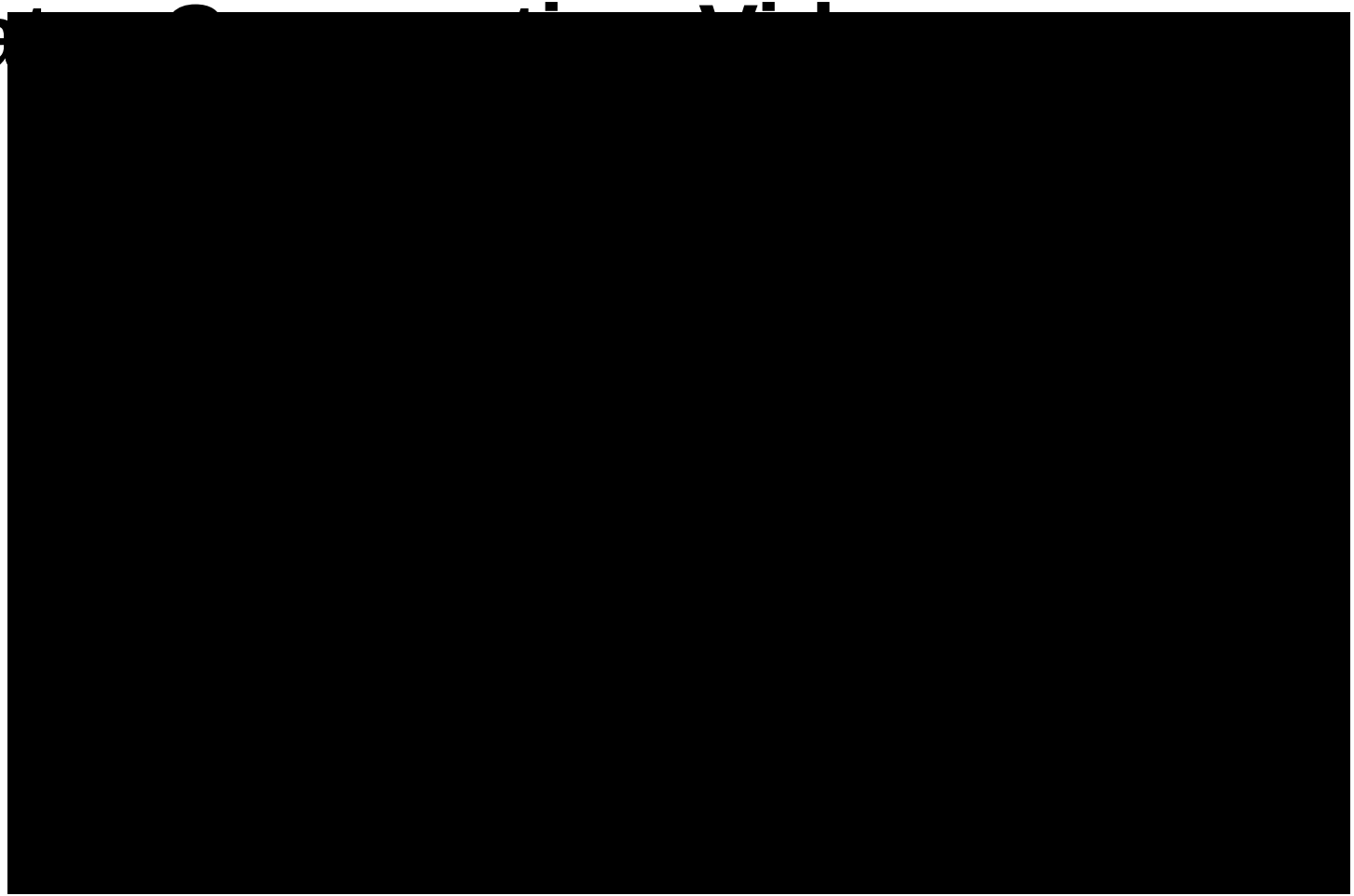

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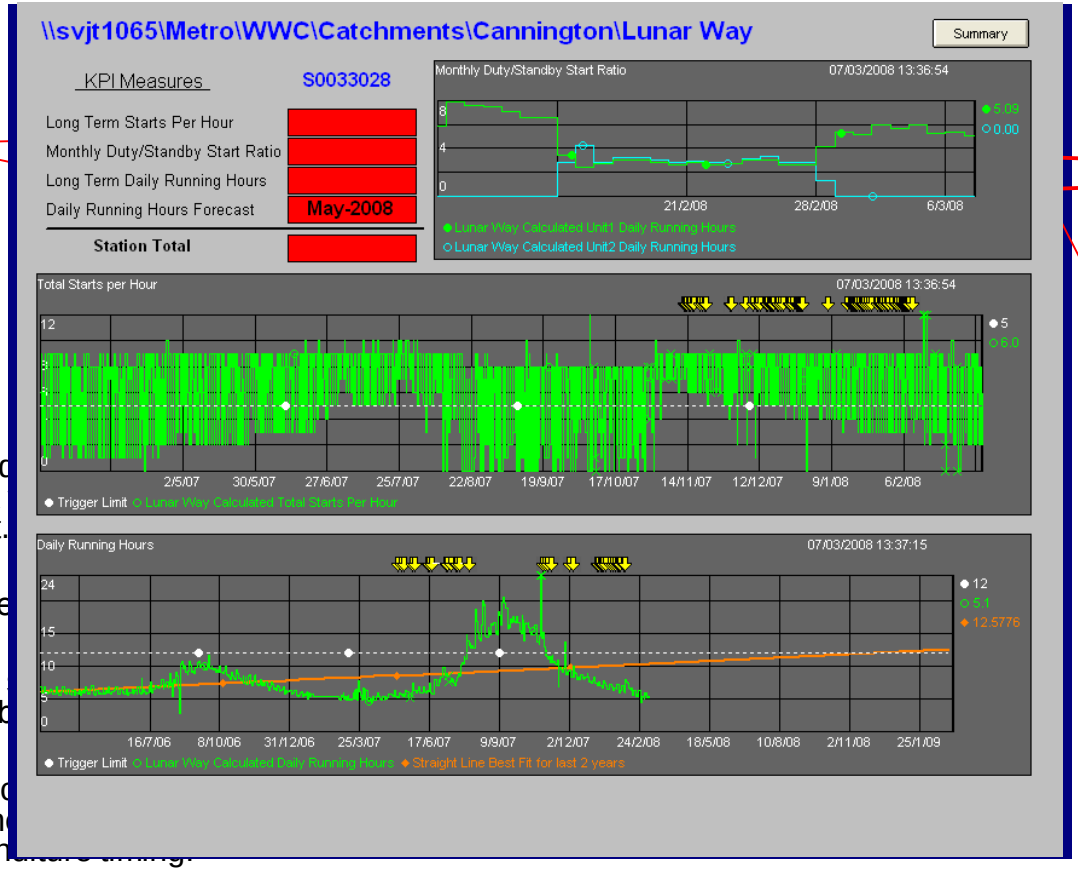
Assets: Pumpstation KPI Forecasting



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MAYNILAD WATER: A BEGINNING

Francisco Castillo – SVP-CIO
Maynilad Water

- 540 sq km
- Serving 9M people
- Meter Data Management
- Field MOUS (Monitoring User System)

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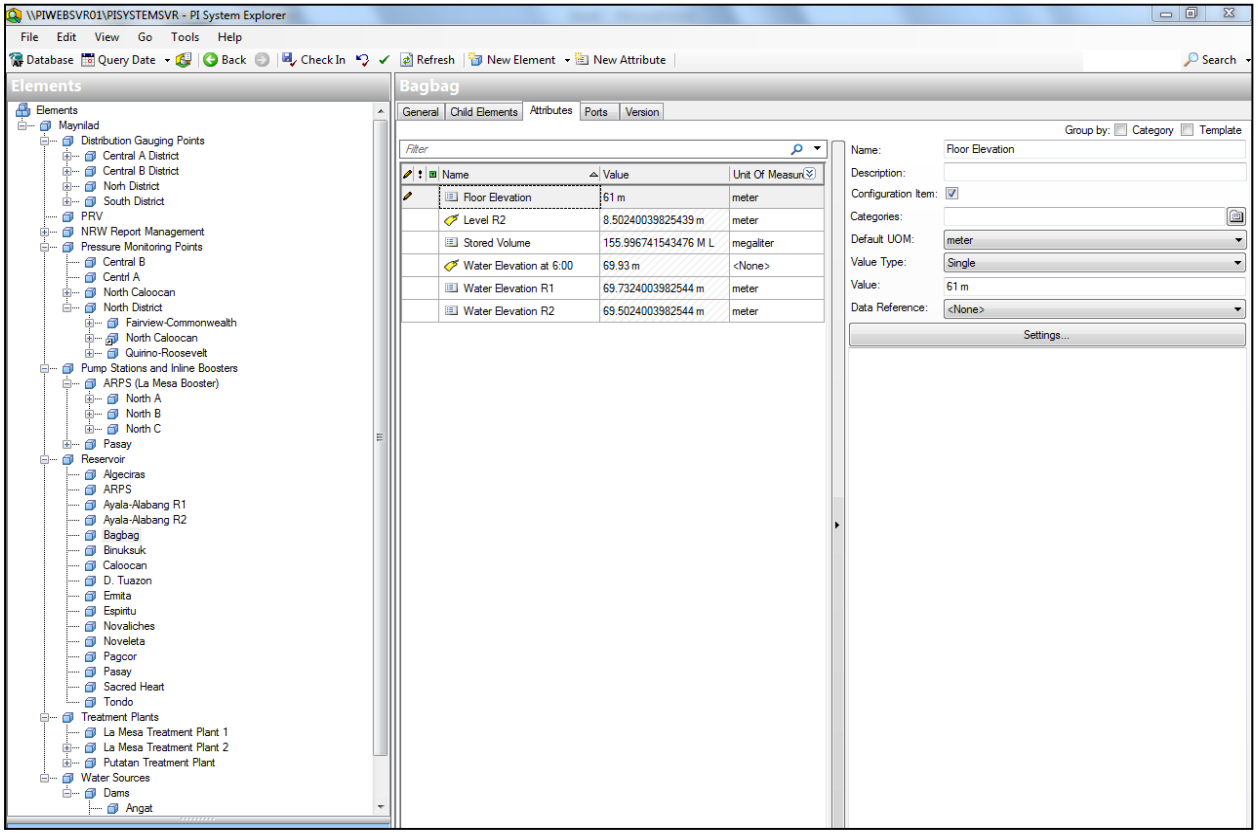
Asset Framework Hierarchy



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Benefits Realized (~6 months)

- ✓ Quick response to unusual distribution network changes
- ✓ Better asset condition management
- ✓ Faster assessment on operations efficiency
- ✓ Cost on Operations
  - ✓ Less outsourcing
  - ✓ Reduced downtime
  - ✓ Less manpower
- ✓ Secure, scalable and redundant data management system
- ✓ User friendly

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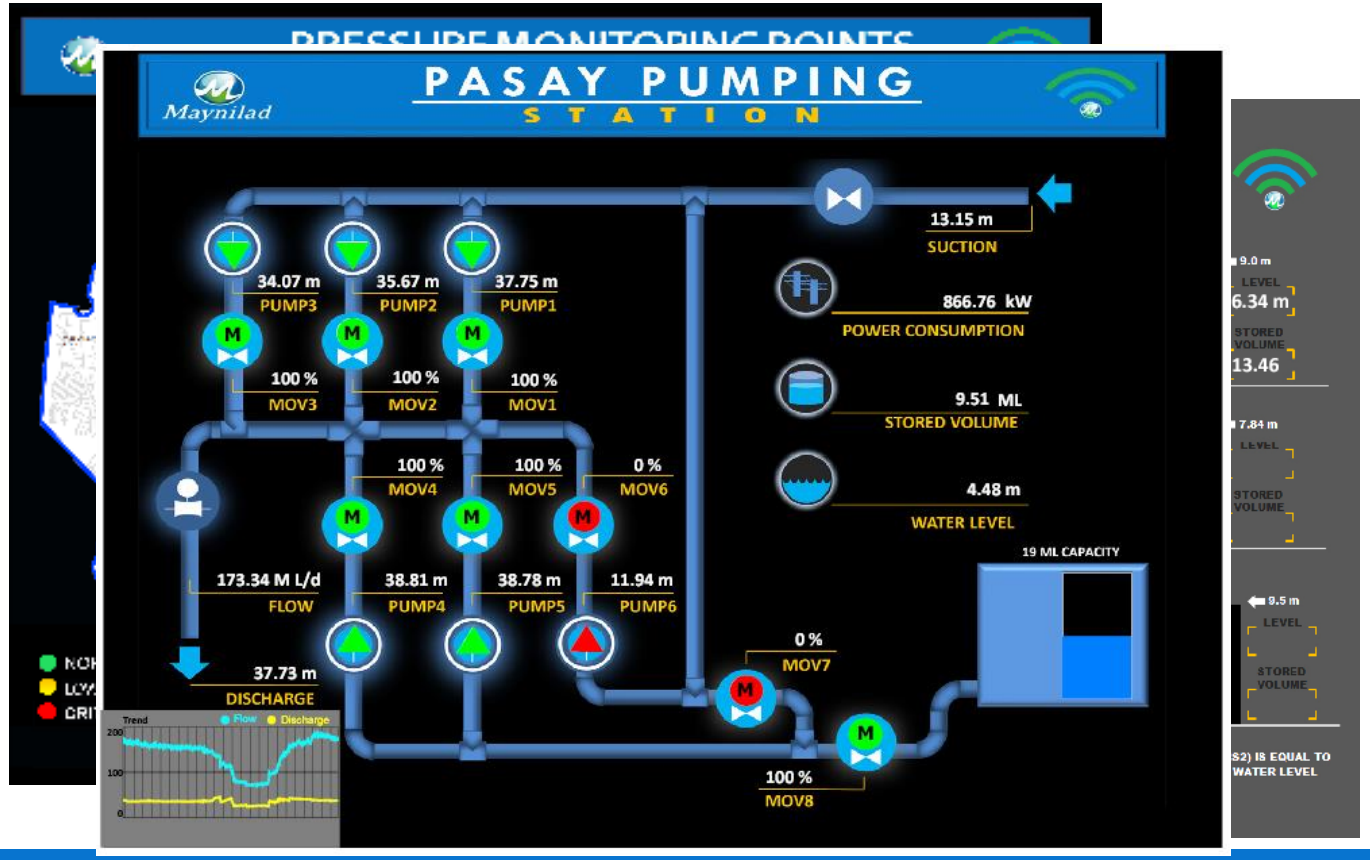
Pressure Monitoring



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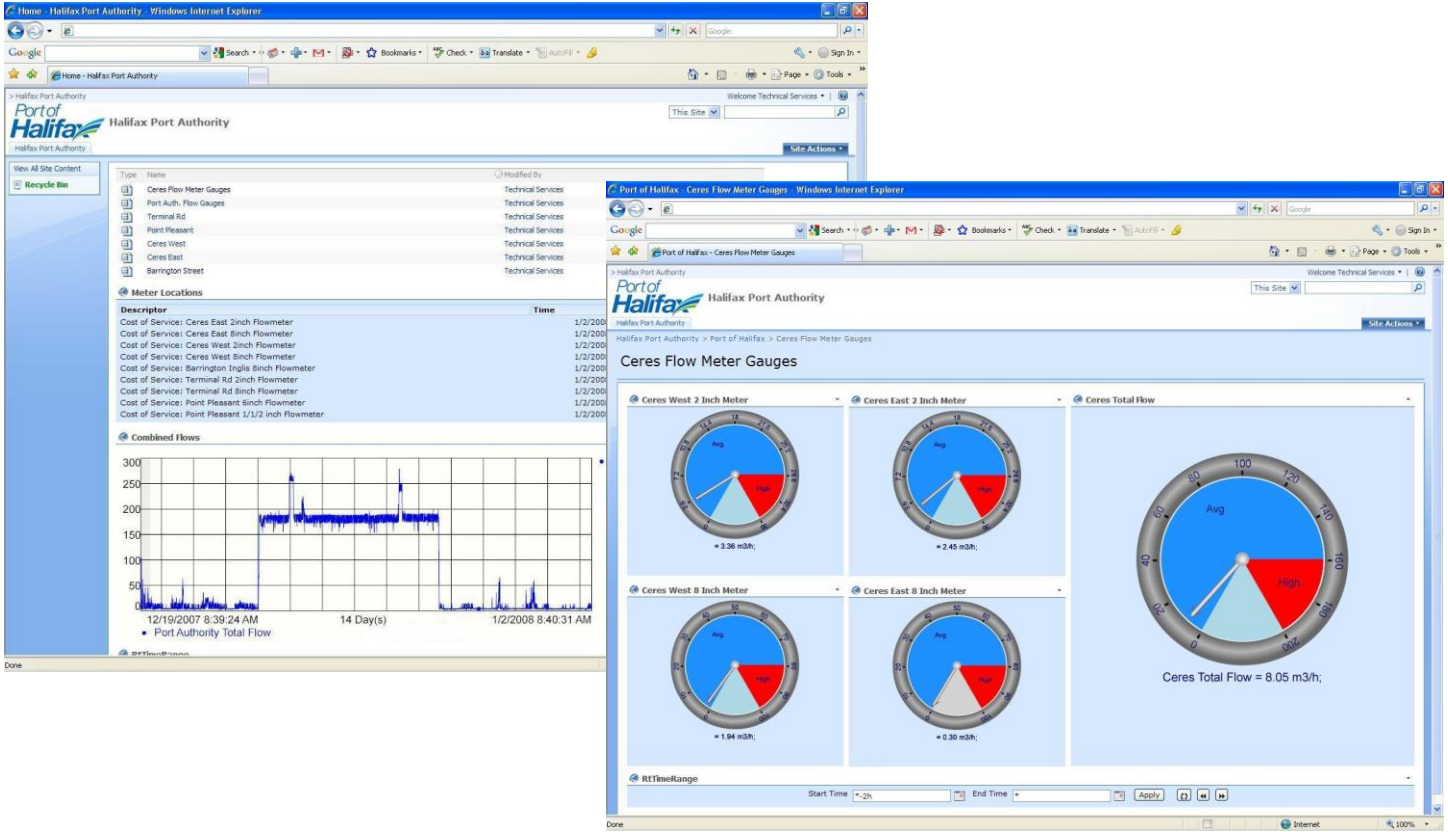
Consumer Transparency



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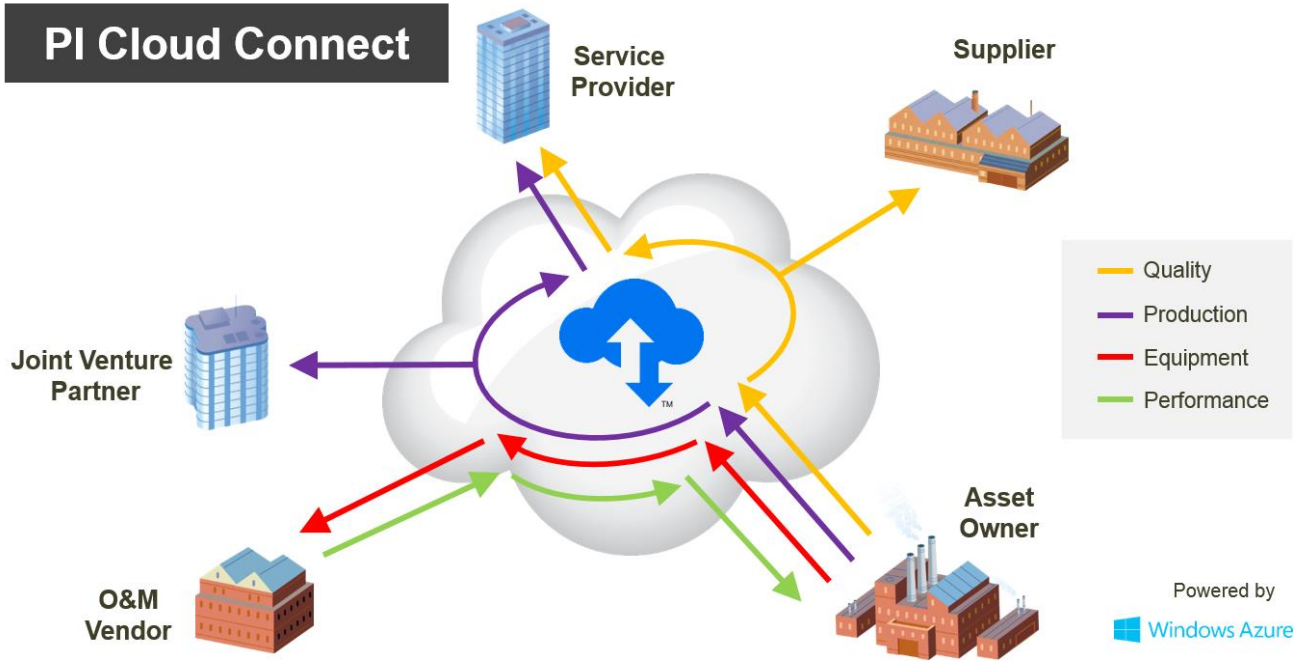
Connected Services



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THANK YOU

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