Committee on Water

NARUC Summer Policy Summit

Committee on Water

Advancing Water Technology

NARUC Summer Policy Summit

Advancing Water Technology in Nevada and the U.S.

Rebecca Shanahan, Commercialization Fund Manager

waterstart
channels for innovation

waterstart
channels for innovation

WaterStart is a cluster of global leaders in the implementation of water innovation

Nevada Governor's Office of ECONOMIC DEVELOPMENT
Empowering Success

MGM RESORTS INTERNATIONAL®

WINNEMUCCA FARMS, INC.

SOUTHERN NEVADA WATER AUTHORITY

UNLV

DRI Desert Research Institute

Reno Sparks Tahoe
ECONOMIC DEVELOPMENT AUTHORITY OF WESTERN NEVADA

DETR
Nevada Department of Employment, Training and Rehabilitation

TRUCKEE MEADOWS WATER AUTHORITY
Quality. Delivered.

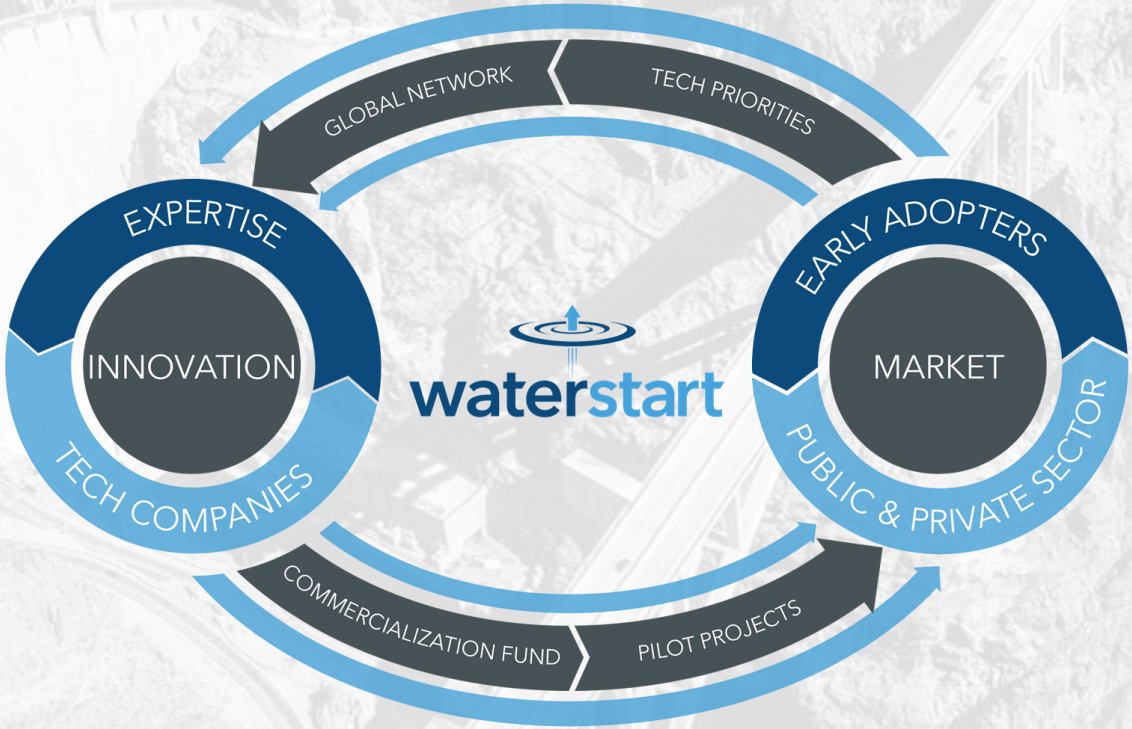
LVGEA
Las Vegas Global Economic Alliance

waterstart
channels for innovation

waterstart
channels for innovation

WATERSTART.COM

- Acts as a portal
- Delivers high-value, shared services
- Assists with commercializing and distributing expertise
- De-risks & incentivizes water innovation



Demand Driven Innovation

Drinking Water

- Technologies for maintaining distribution water quality parameters in real time
- Utility location technology
- Software for aiding in the development of accurate electrical as-built drawings
- Removal of nitrates from well water

Waste Water

- Low cost sludge handling
- Grease and odor control
- Flow and obstruction monitoring

Seeking real deployable technologies!!

- Evaluated 180 proposals from tech companies
- Funded $1,200,000 in Pilot Projects
- Recruited 11 new companies to the State
- 96 new jobs projected over the next 2-3 years

iMGeospatial

ionex SG LIMITED

WELLTODO DeNOxicated Water

STAR water solutions

echologics A Mueller Co. COMPANY

AYYEKA

RIVENTA

Syrinix Intelligent Pipeline Monitoring

REDEYE

AdEdge water technologies

carollo Engineers...Working Wonders With Water™

Tech Portfolio Highlights

echologics
A Mueller Co. COMPANY

- Canada
- Smart technology platform utilizing acoustic sensors to monitor for water leaks in real-time
- Piloted technology along 3-mile corridor of the Las Vegas Blvd
- Deferred a $30million pipe replacement project down LV Blvd.

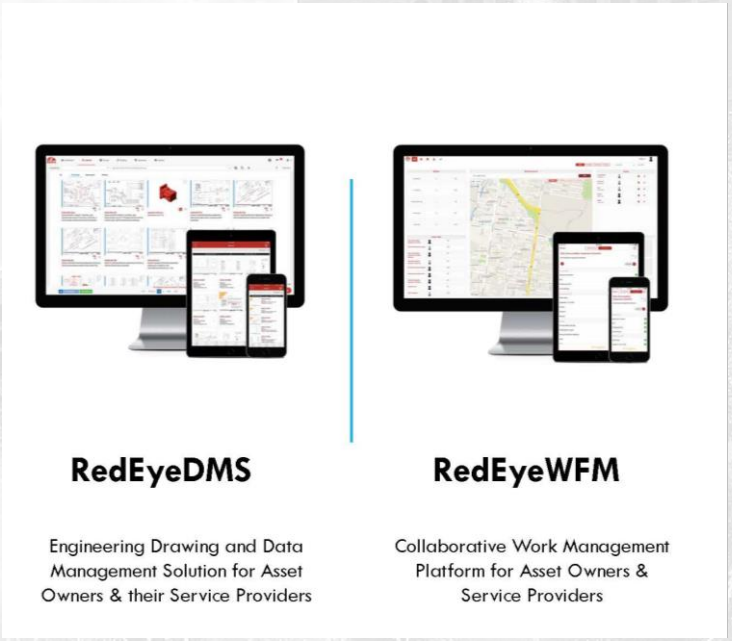
Tech Portfolio Highlights

Syrinix
Intelligent Pipeline Monitoring

- United Kingdom
- Pressure transient monitoring in water mains for leak prevention
- Testing and demo at 10 locations
- Resulted in a 50% reduction in the magnitude of transients

Tech Portfolio Highlights

- Australia
- Provides mobile and purpose-built engineering data and work mgmt. platforms in the cloud
- Providing SNWA/LVVWD a secure cloud-based engineering drawing mgmt. soln and a workforce soln for and scheduling jobs and measuring progress



Channels for Innovation Summit

waterstart
channels for innovation

isle

WHEN
FRIDAY
OCTOBER 6, 2017

WHERE
South Point Hotel and Casino
Las Vegas, Nevada

www.channelsforinnovation.com

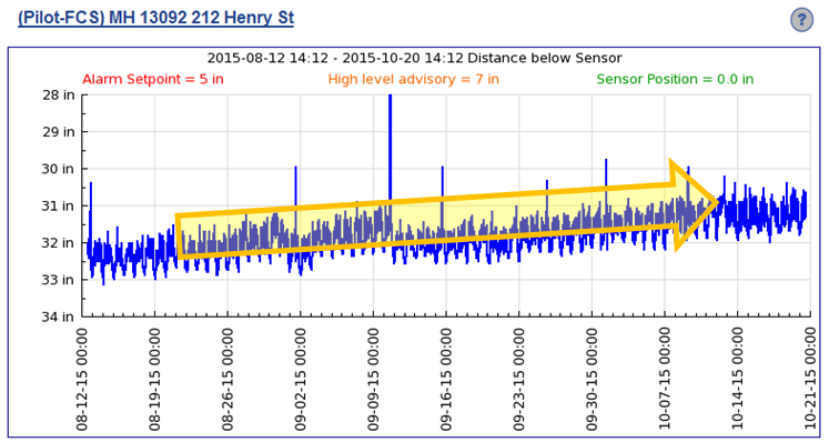
Thank You

Rebecca Shanahan
rebecca.shanahan@waterstart.com

SMARTCOVER SYSTEMS™
TURNING YOUR DATA INTO DECISIONS™

Collection System Asset Management

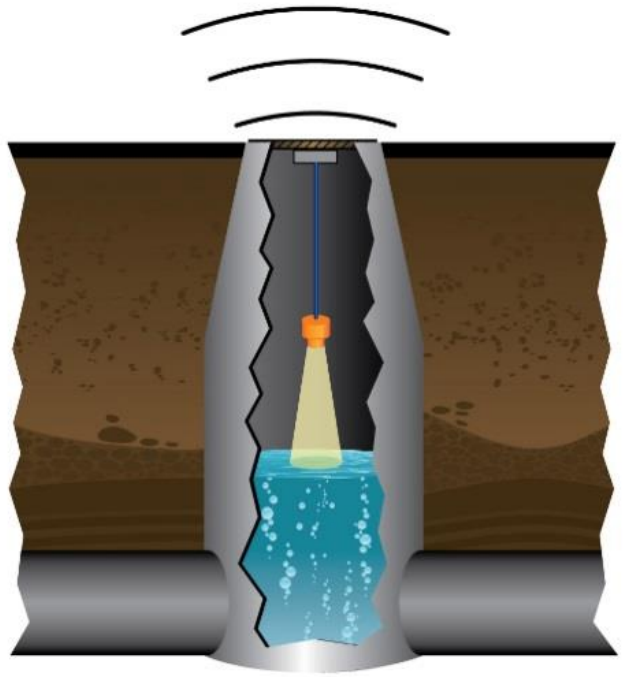
How Smart Technology Closes the Gap for Meeting Regulatory Requirements and Lowering Capital Impact



About SmartCover® Systems™

SMARTCOVER SYSTEMS™
TURNING YOUR DATA INTO DECISIONS™

- San Diego Technology Company
- Twelve years pioneering
  Smart Technology for Wastewater
- Remote Monitoring, Data & Analysis
  - SmartLevel™ - level monitoring
  - SmartFLOE™ - flow monitoring
  - SmartRain™ – rain data
  - SmartTide™ – tidal data
  - SmartTrend® – trend analysis
- 15 US and International Patents
- Performance Proven with
  - >3,000 installations
  - >150 million operating hours…



National Company

SMARTCOVER SYSTEMS™
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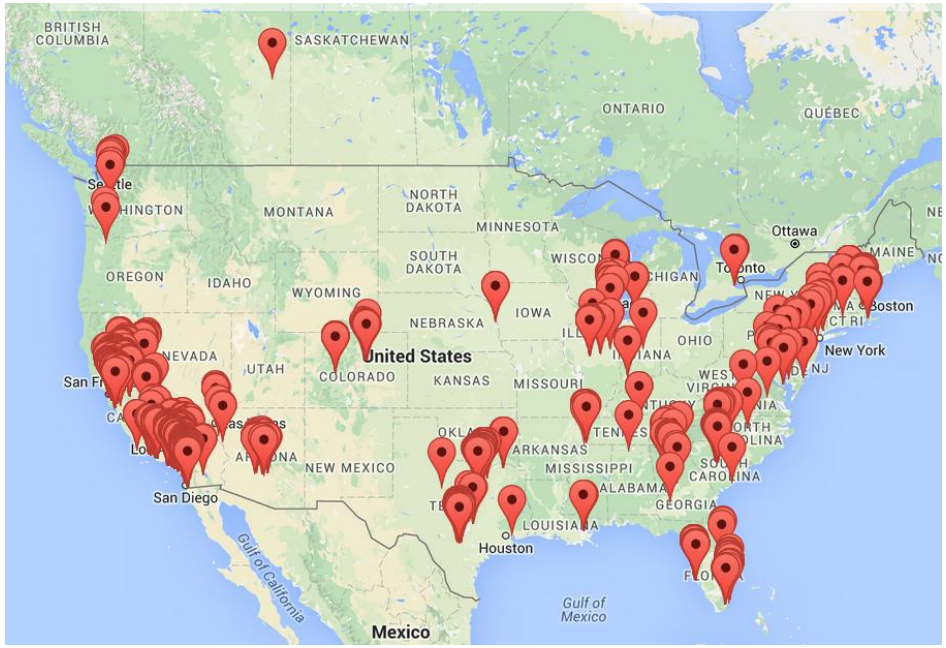
A sampling of Customers

Western
San Diego, CA
San Jose, CA
Long Beach, CA
Fresno, CA
Cupertino, CA
Sacramento, CA
Phoenix, AZ
Carson City, NV
Las Vegas, NV
Everett, WA



Central
San Antonio, TX
Ft. Worth, TX
Harlingen, TX
Baton Rouge, LA
New Orleans, LA
Memphis, TN
Lebanon, TN
Springfield, IL

Eastern
Boston, MA
Newburgh, NY
Howard County, MD
Henrico County, VA
Charlotte, NC
Columbia, SC
Charleston, SC
Henry County, GA
Miami, FL
Sarasota, FL
Severn Trent
Halton Region, ONT

Smart Technology & Asset Mgt.

SMARTCOVER SYSTEMS™
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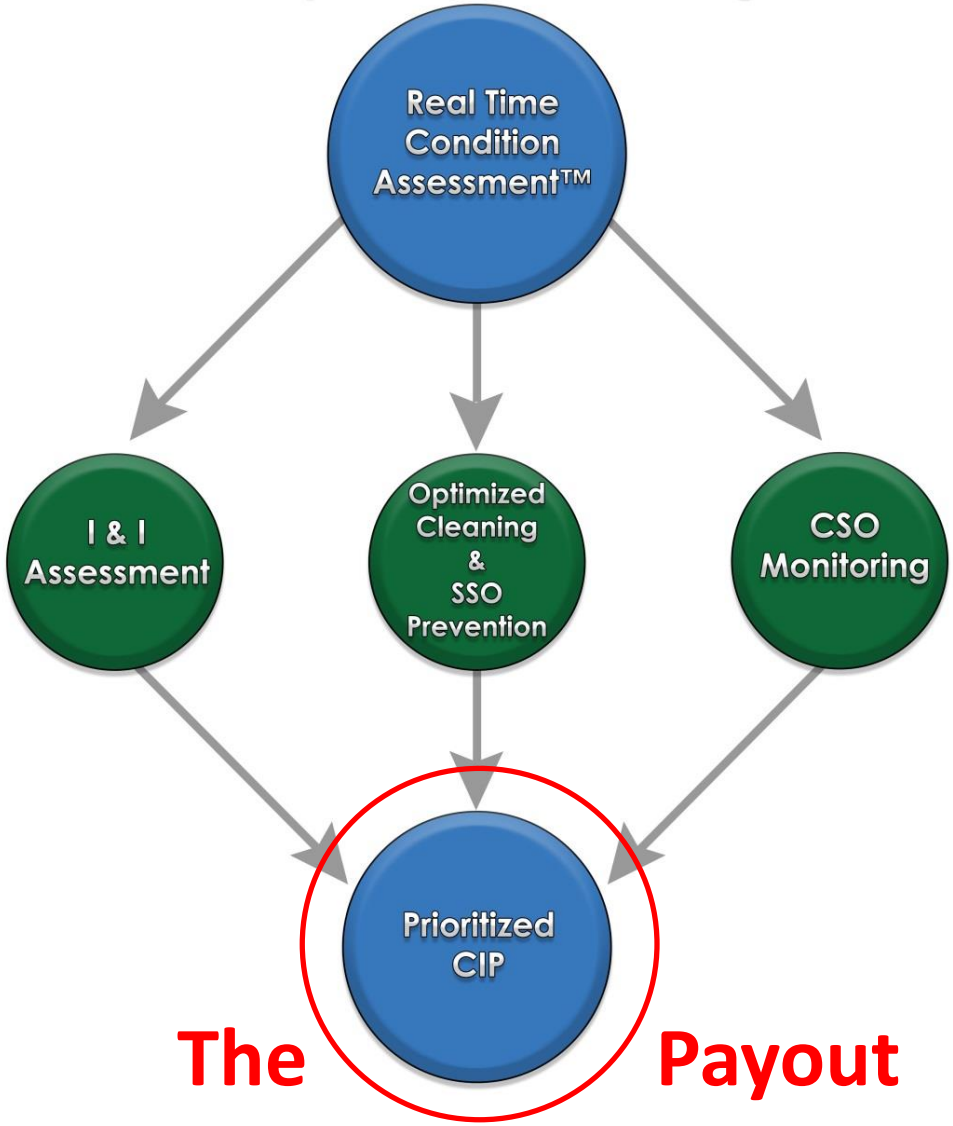
Collection System Asset Management



The Payout

Lower Costs and Better Results

Smart Technology

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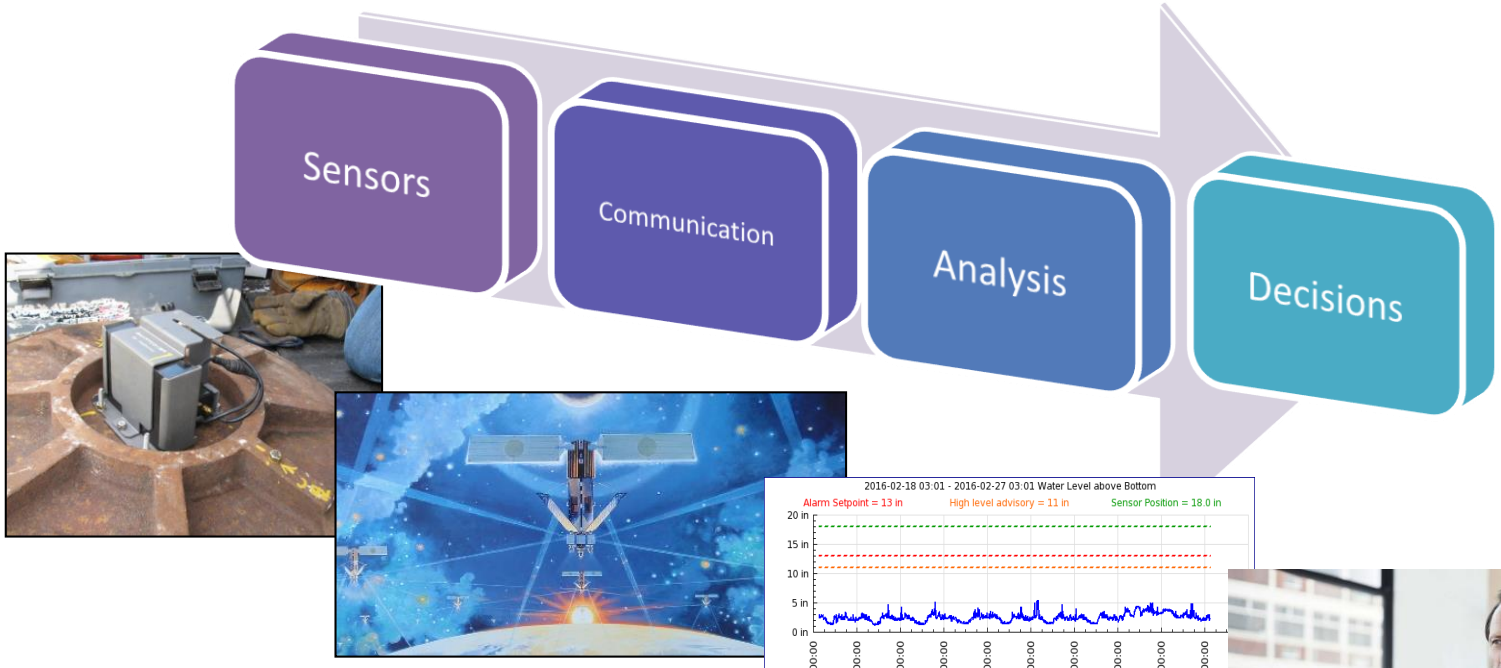
Internet of Things uses Smart Technology to Drive Informed Decisions



Smart Technology

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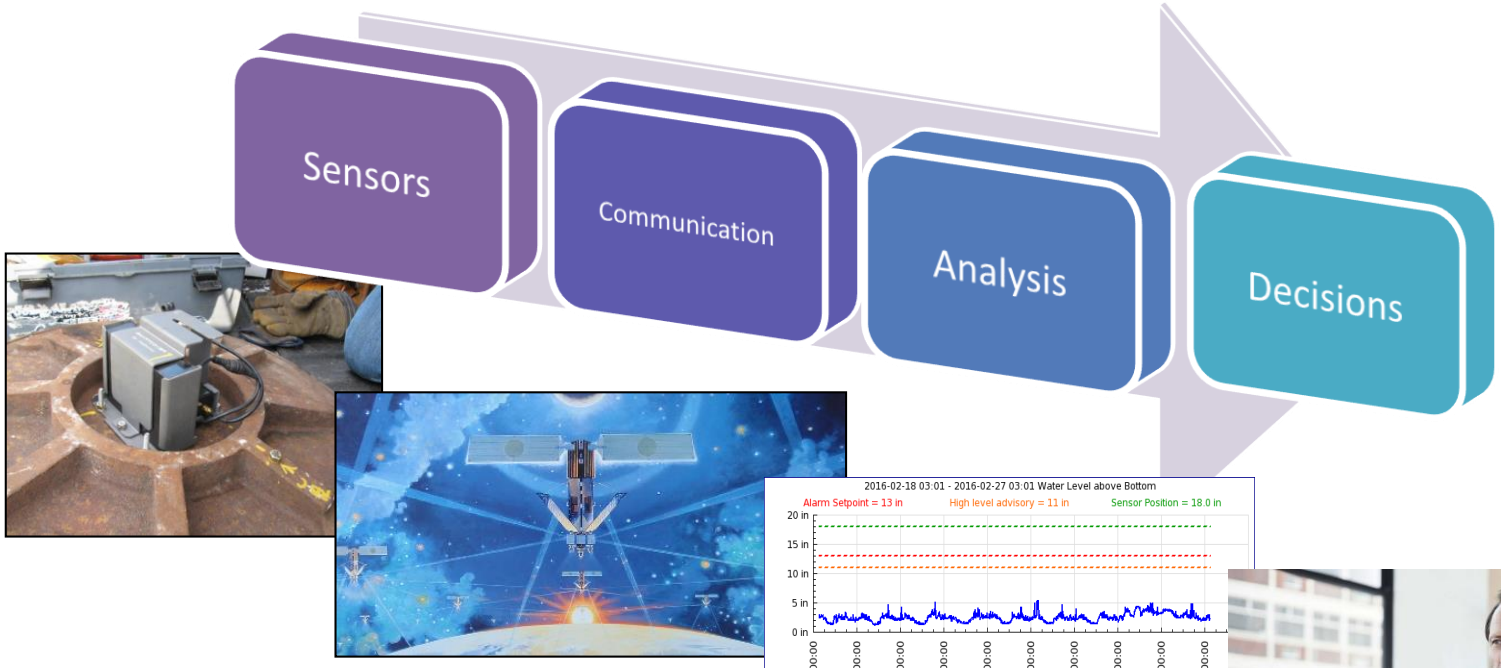
Internet of Things uses Smart Technology to Drive Informed Decisions



Water Internet of Things

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- Sanitary Sewer Systems
- Lift Stations
- Combined Sewer Systems

- Reservoirs
- Canals
- Storm Water Systems
- Tidal Structures

- Water Tanks
- Pipes

System Architecture

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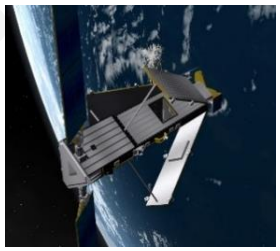
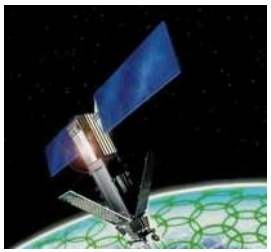
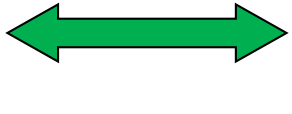
SmartCover® Monitoring Systems





Redundant Iridium Satellite Network



Redundant Ground

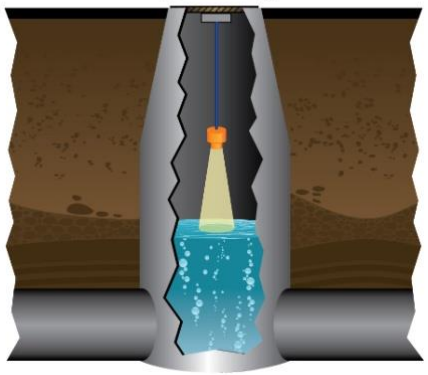
Secure network servers

Internet

Internet

Bi-Directional User Interfaces

SmartCover® : Remote Site Monitor



Data

Notifications

Secure SCS Servers

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Making Two Ends Meet?

Infrastructure vs. Clean Water

Aging Infrastructure

US EPA

"Vast majority of nation's pipeline was installed after WW-II and **has or is reaching the end** of its useful life".

ASCE

"… infrastructure gets a D+"
"…funding ***gap*** of as much as $300 billion over the next 20 years…"

Clean Water Act

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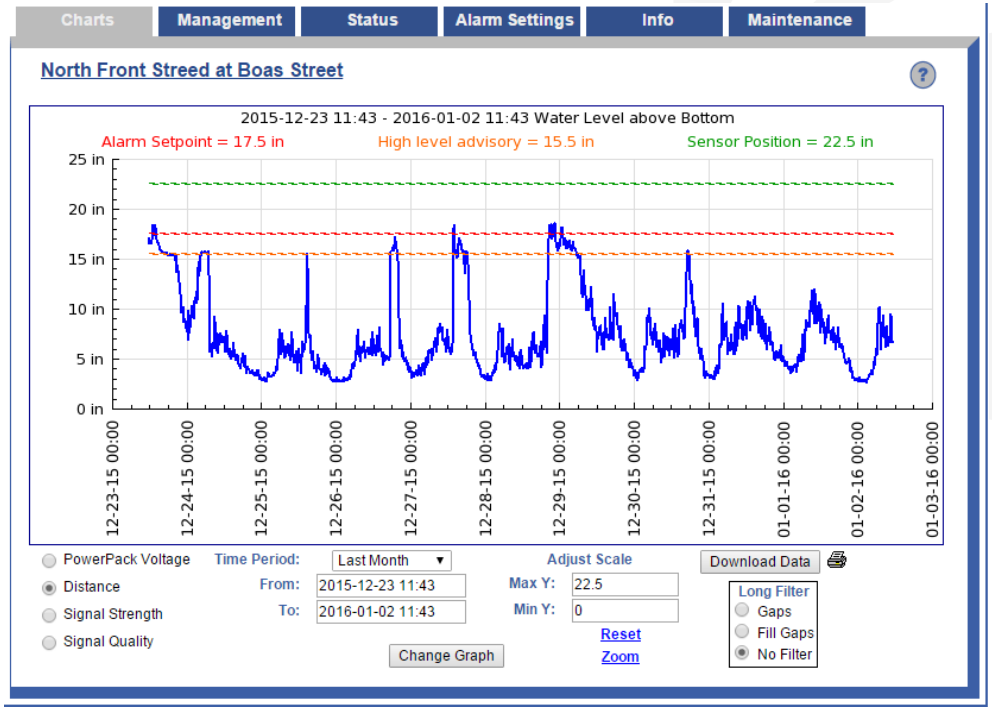
Goal of the Clean Water Act of 1972

Stop pollution of US surface waters

Implicati21on

Sanitary and Combined Sewer Overflows must be eliminated



SmartCover® Systems™ PROPRIETARY

Wastewater Pollution Impact

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- Human Health Threat
- Environmental Effects
- Bad Press
- Political turmoil
- Unplanned Cost

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The BIG Money Problem….

The Coming Tsunami

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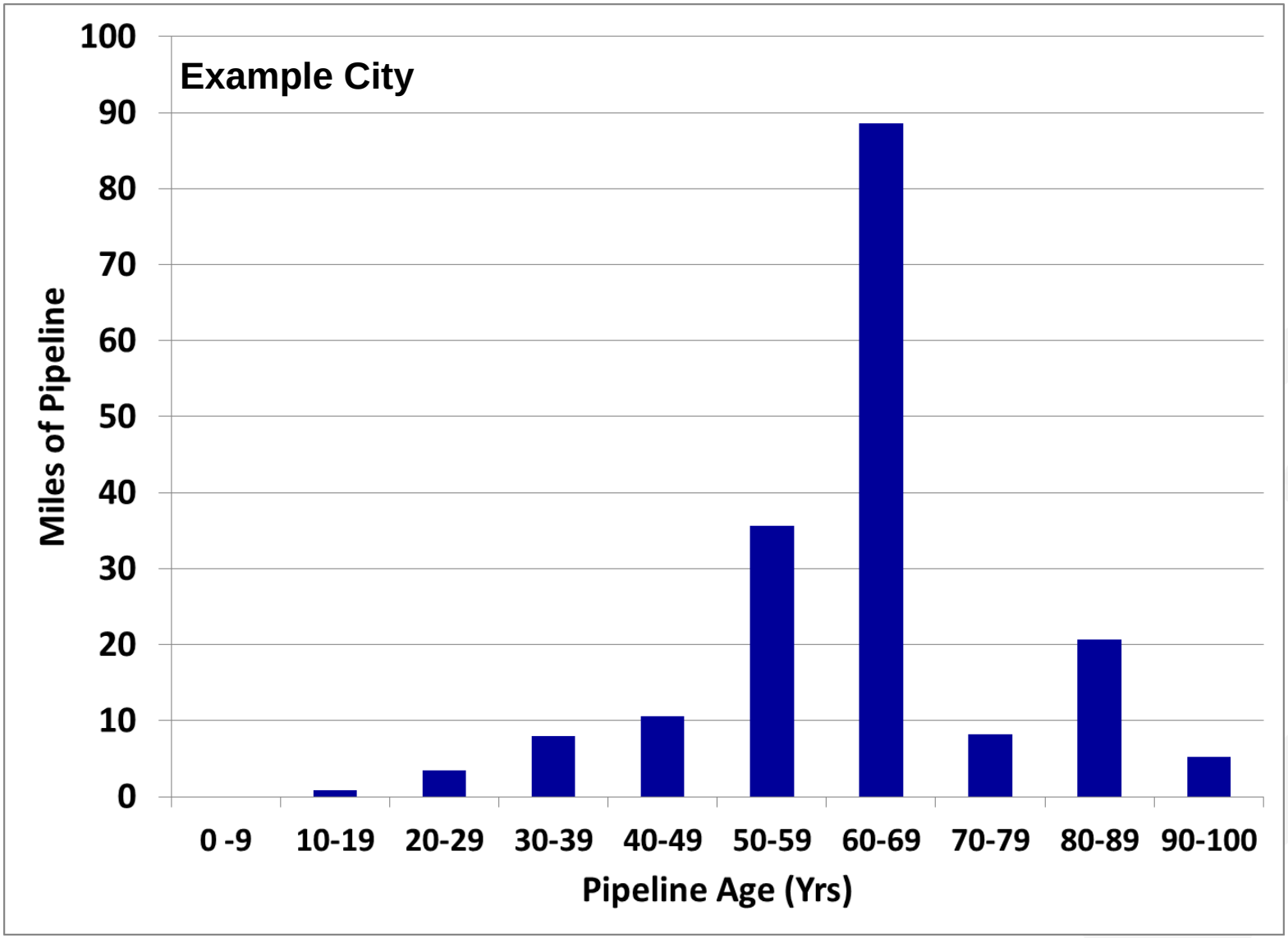

Condition Assessment

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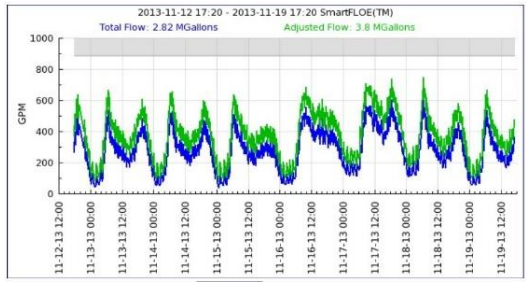
Asset Database

+

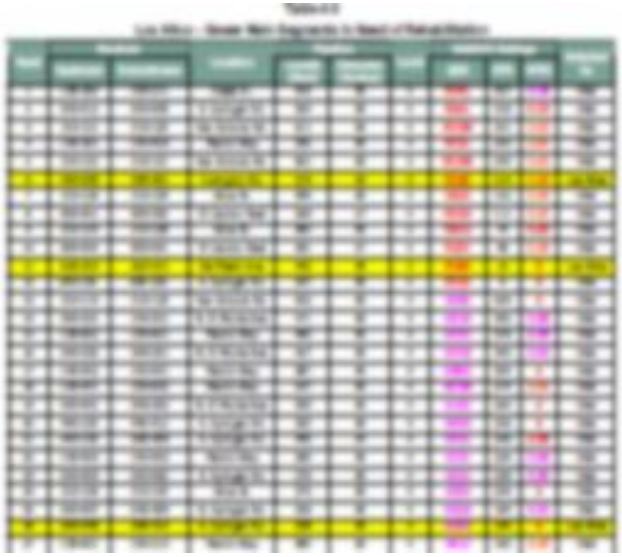


Data Collection & Inspection

+

Analysis (PACP, e.g.)

=



Risk-Based Priorities for Rehab

Condition Ranking System

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Table 8. Condition state and rehabilitation priorities

	Condition state	Implication	Impact rating	Rehabilitation priority
	5	Failed or imminent failure	1 to 5	Immediate
	4	In bad condition, high structural risk	5	Immediate
			1 to 4	High
	3	In poor condition, moderate structural risk	4 to 5	Medium
			1 to 3	Low
	2	In fair condition, minimal structural risk	5	Medium
			1 to 4	Low
	1 or 0	In good or excellent condition	1 to 5	Not required

McDonald and Zhao (2001)

Upgrade Approaches

	Option	$$/ft*	$$/mile	
LOW	Replacement	~$50	$264,000	
HIGH	Replacement	~$1,000	$5,280,000	Longer lifetime
LOW	Re-Lining	~$30	$158,400	
HIGH	Re-Lining	~$250	$1,320,000	Shorter lifetime Lower capacity

For simplicity: $1MM/mile

*Sources: various

Results of Condition Assessment

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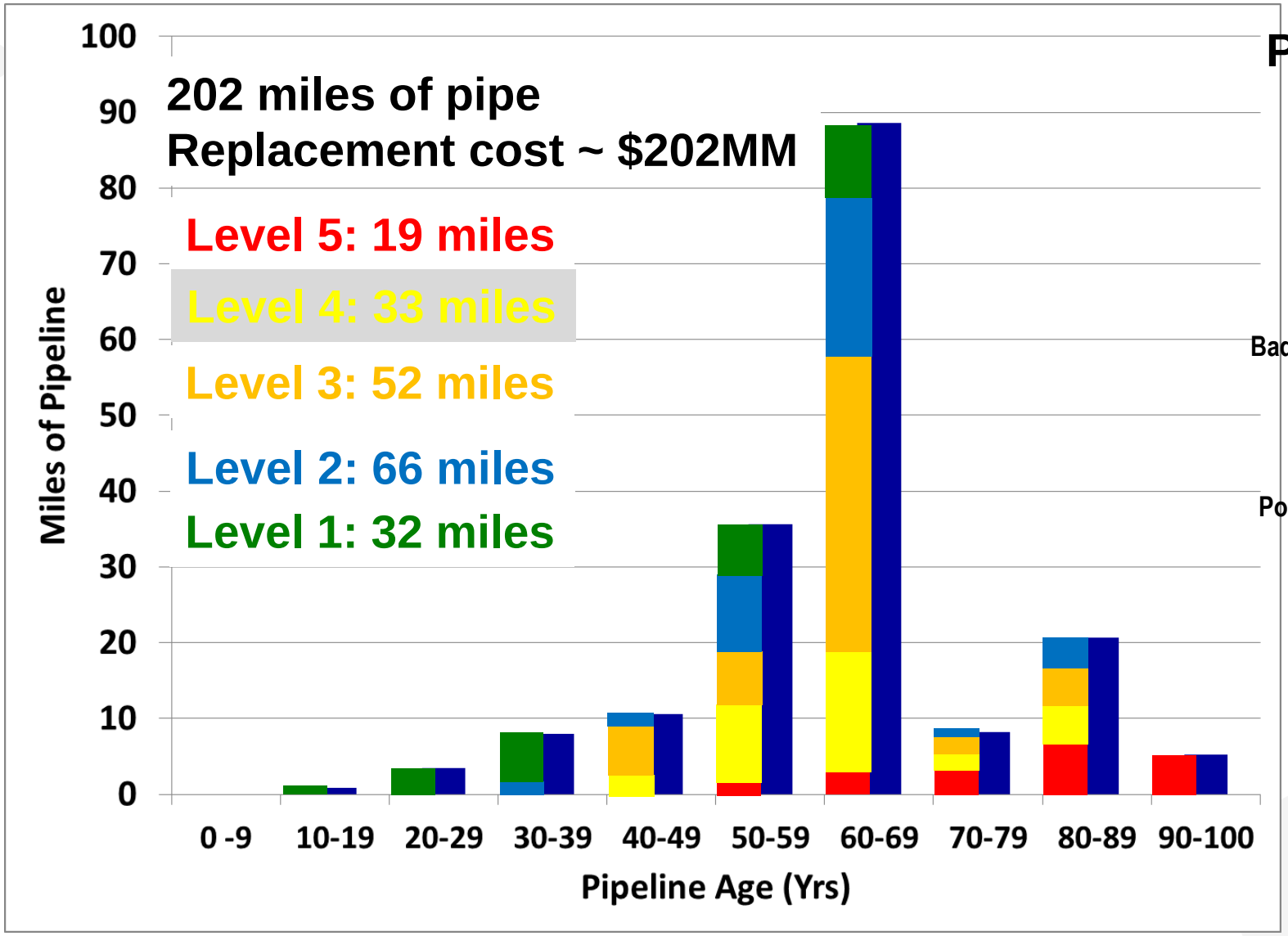

Pipe Condition

5
Really bad – fix NOW!

4
Bad and getting worse – fix soon

3
Poor condition – watch closely

2
Fair condition

1
Good condition

The Classic Solution

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- Prioritize pipelines
- Set schedule for repair
- Design, permitting, EIR
- Generate budget for repair
- Get budget approval for repairs

- Hire the contractors
- Spend the money
  - RAISE THE RATES !?!

Infrastructure Risk

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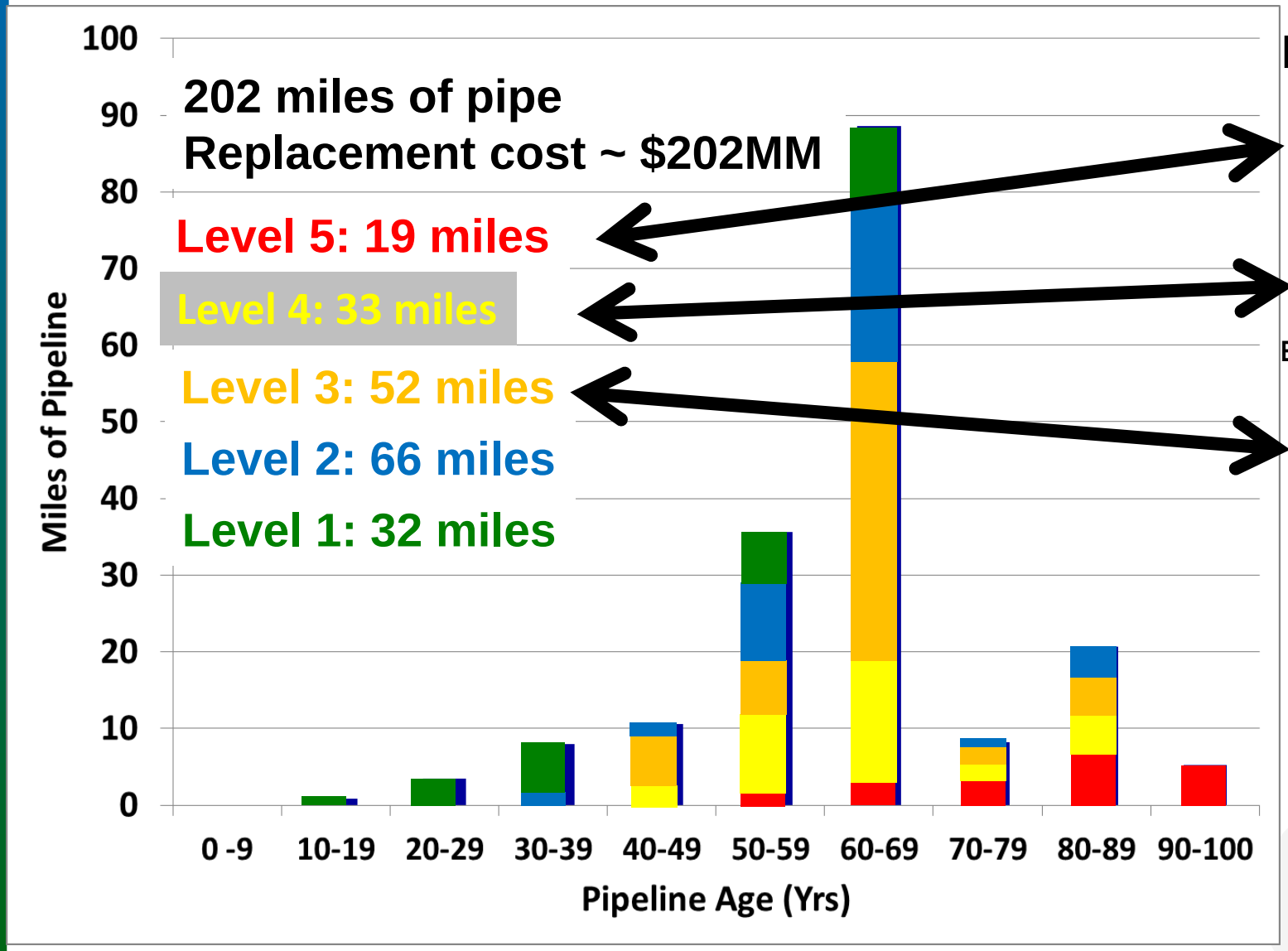

Pipe Condition

5 — Really bad – fix NOW!

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Financial Scenario

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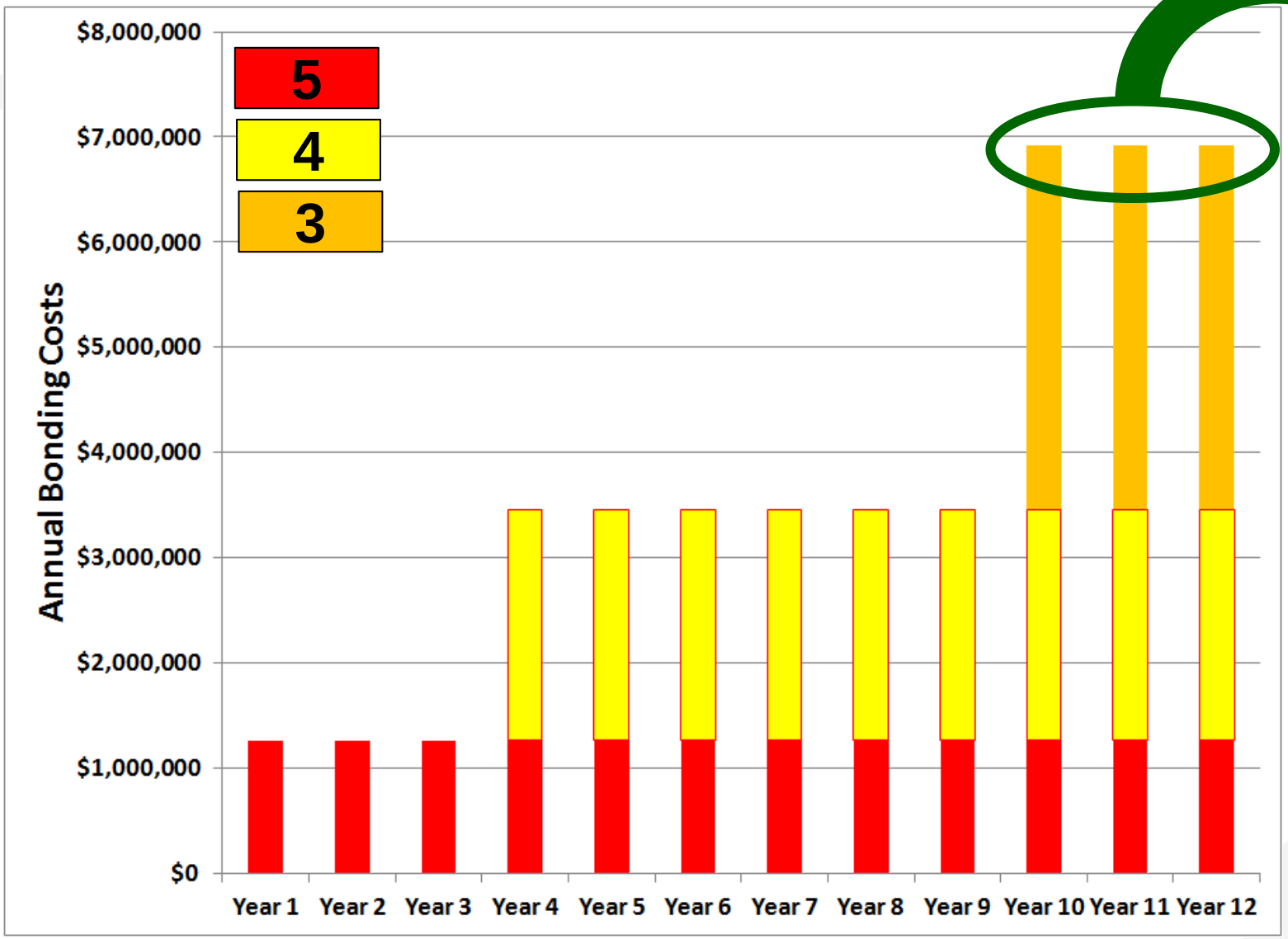

$7MM/year
28K connections
= $20/month

= DOUBLE current bill

Even Worse???

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PROBLEM #1: Financing may not be approved or is reduced

- **Smaller project or NO project**
- **Spills, maintenance GO UP, … not down**

PROBLEM #2: Condition assessment is snapshot

- **Don’t know rate of change of conditions**
- **Conditions DO NOT get better with time**

REMEMBER…

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1 **ASCE (wastewater, 2013):**

"…funding gap of as much as $300 billion over the next 20 years…"

2 **Capital costs ~ $1 million/mile**

EPA: 3

1.2 MM miles sewer pipe @ $1MM/mile

= $1.2 TRILLION in replacement costs

The Solution

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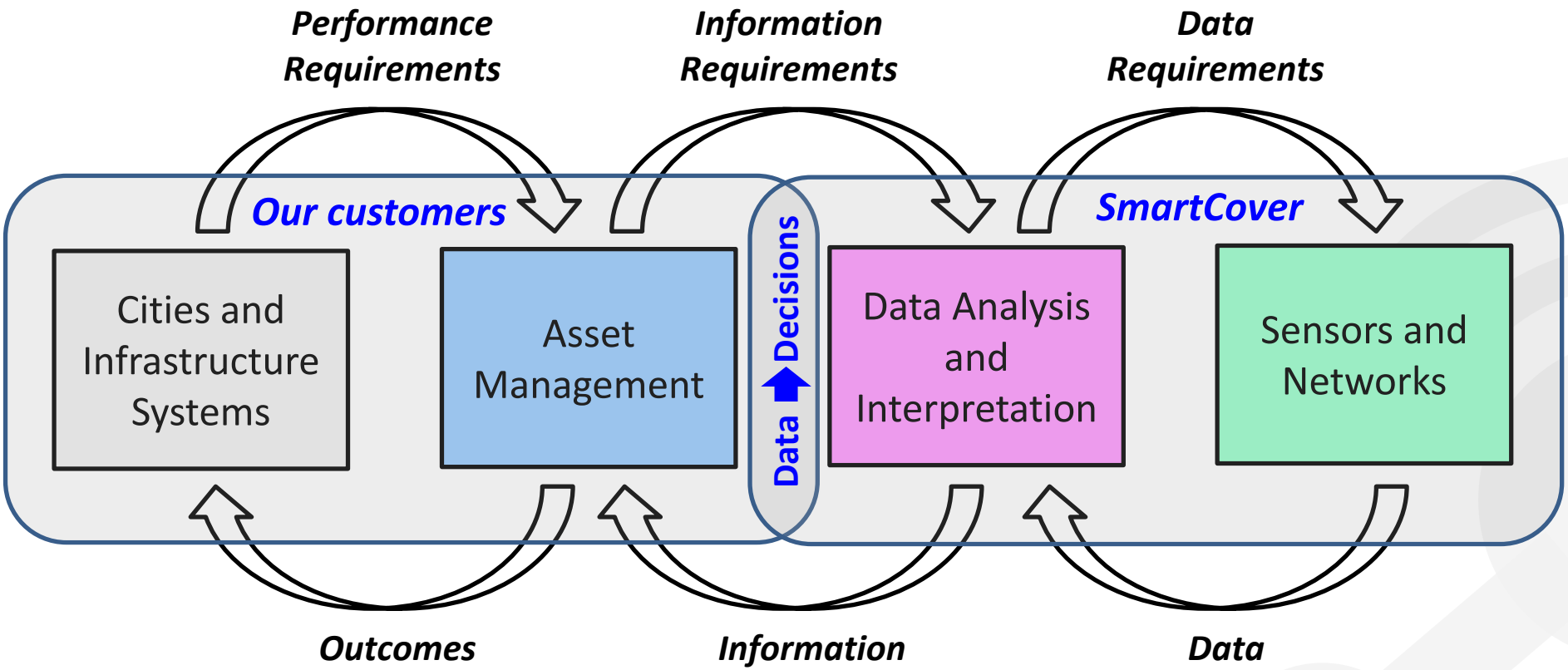
Smart Infrastructure[1]



1. University of Cambridge CSIC

Case Study 1 Monitor vs Replace

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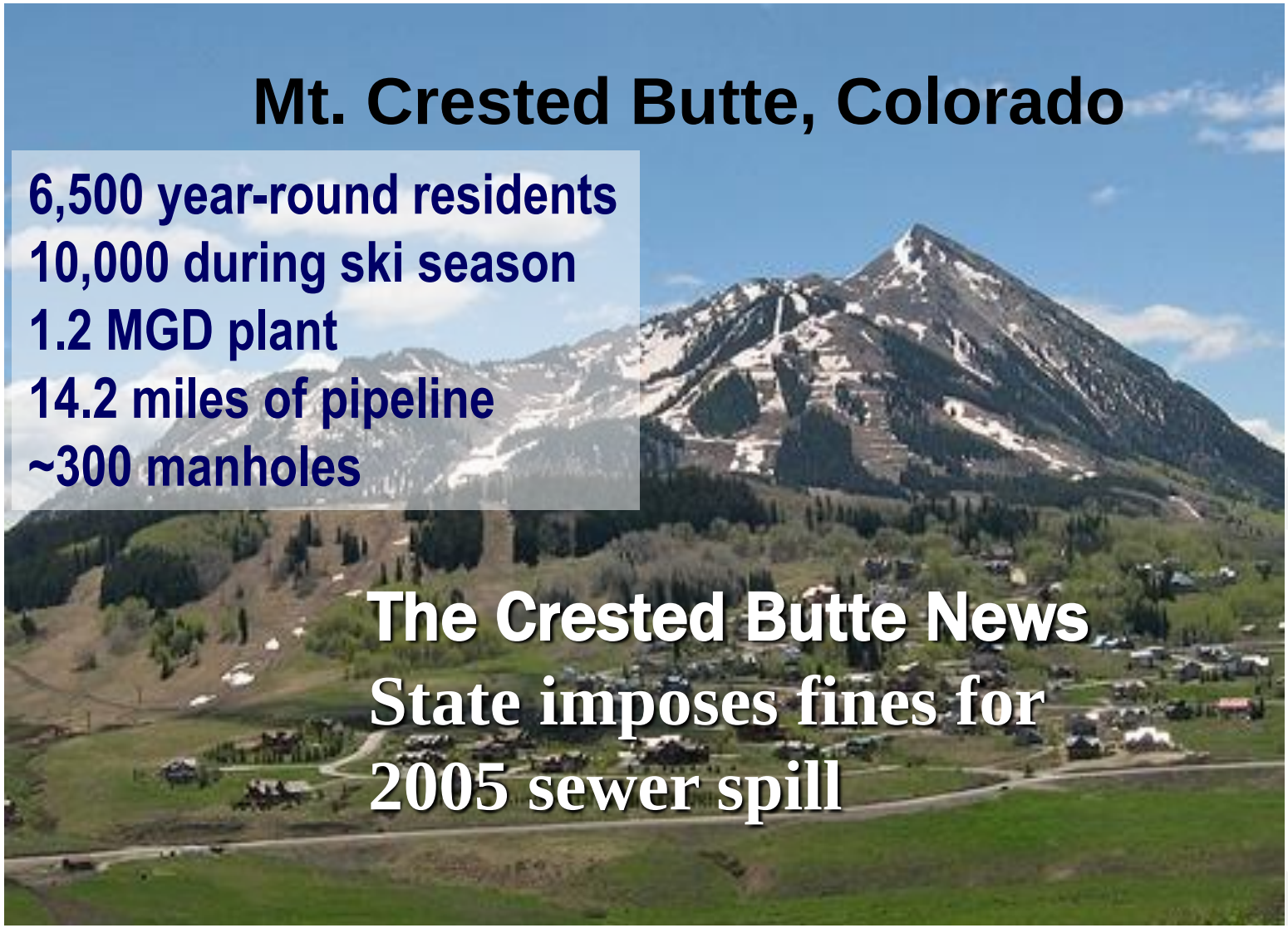

Consent order 2006: replace pipe: $10 million

Smart Infrastructure Solution

SMARTCOVER® SYSTEMS™
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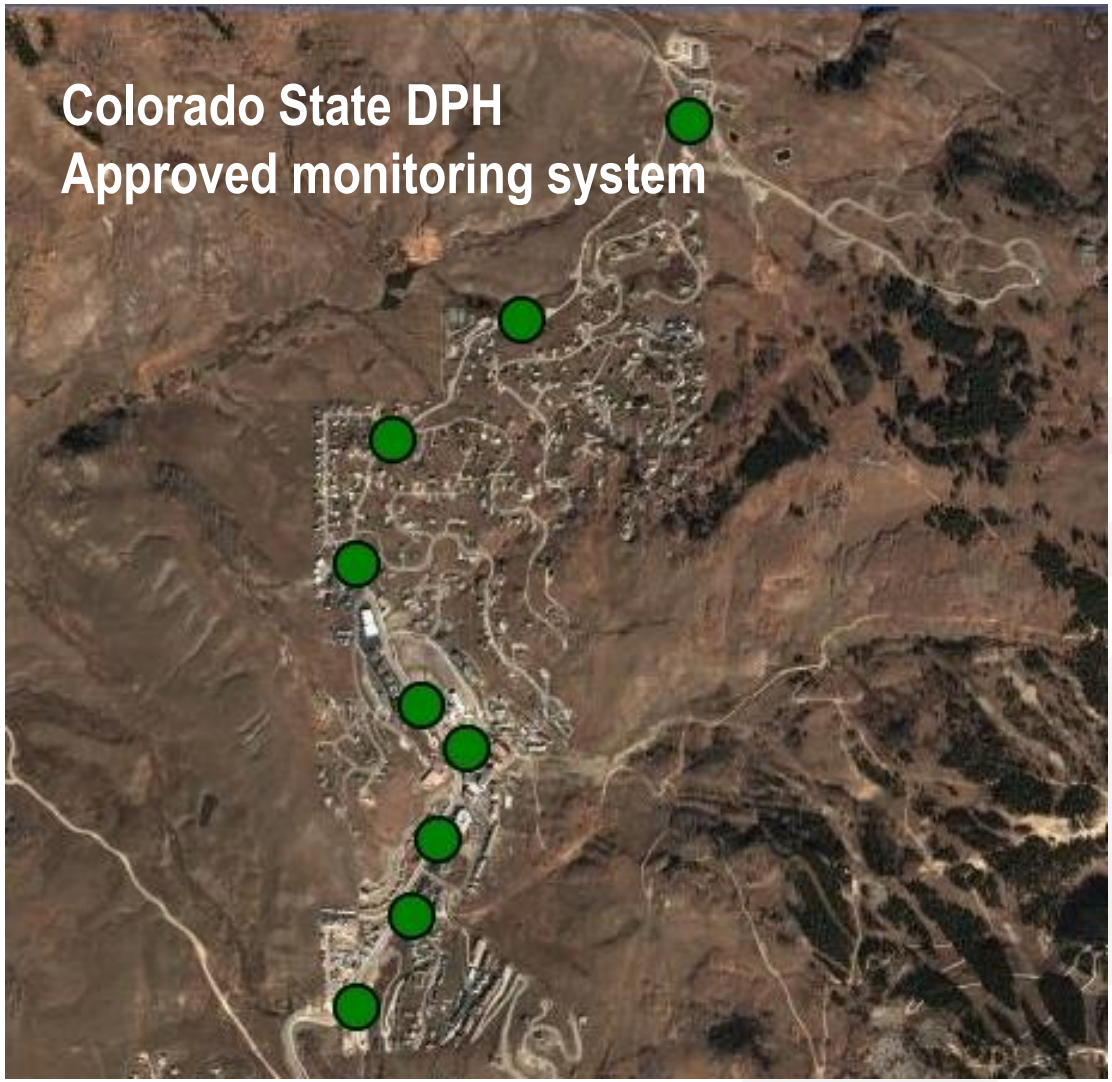
Solution:
Install & Operate Remote Level Monitoring System

Cost Savings:
Replace- $10MM
Monitors- $100K
Savings: $9.9MM and no spills



Case Study 2: Monitor & Target Capital

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Elsinore Valley Municipal Water District

Lake Elsinore, CA

35,000 connections
283 miles of sewer line
Force main: 12 miles
Lift Stations: 31

Don’t Build: Monitor

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Consulting engineering capacity study recommends up-sizing pipeline: INSUFFICIENT CAPACITY

Upgrade Cost: $29MM

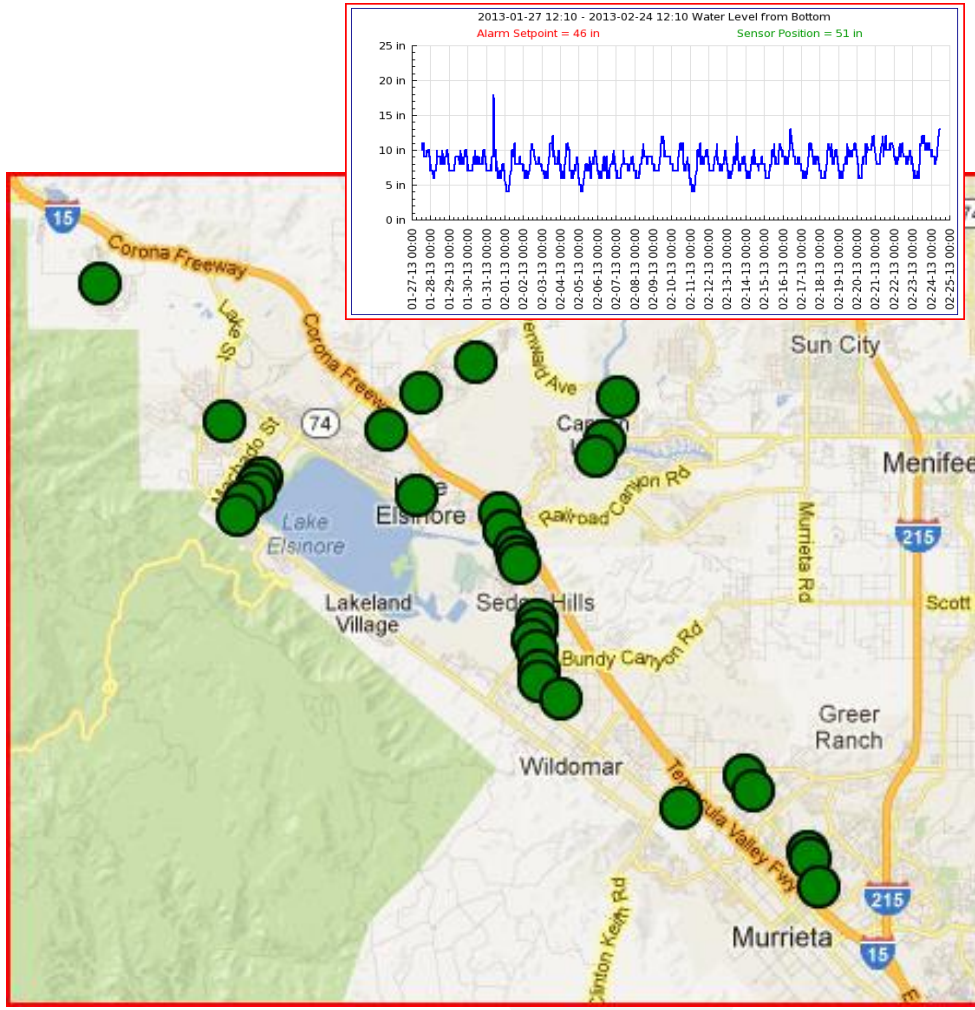
32 level monitors installed @ $120K

- Collection system data acquired
- Protect against overflows

Outcome:

- Monitors show peaking factors in model too high
- Project down-sized to $9 million

Savings: $20MM and no spills



Don’t Build: Monitor

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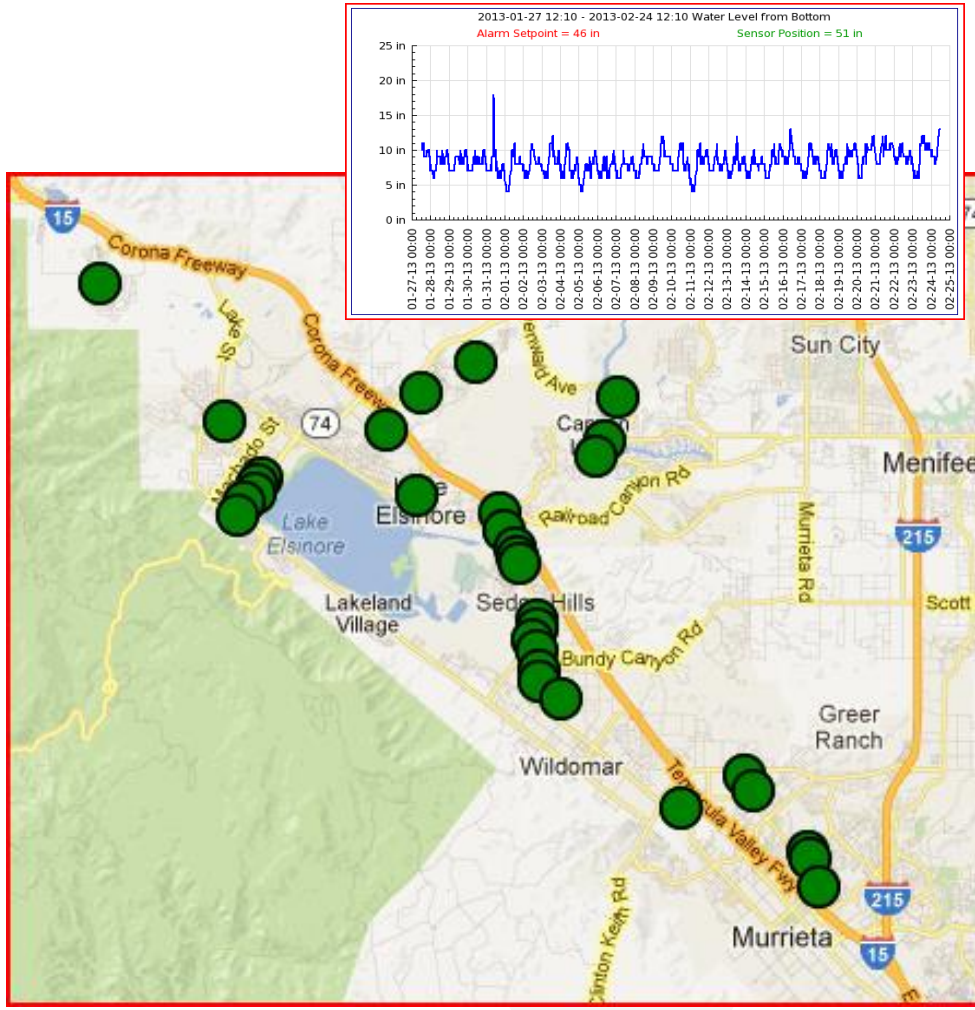

Monitor vs. Replace

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= SAVING BIG BUCKS

Agency	Capital Project Estimate	Monitoring Capital	Annual Monitoring Cost	Project Capital Spent	Capital Saved	ROI
FPUD	$240K	$4K	$1K	$0	$236K	59:1
MCBWD	$10M	$100K	$6K	$0	$9.9M	99:1
EVWD	$29MM	$120K	$3.2K	$9.1M	$19.90	166:1
⋮	⋮	⋮	⋮	⋮	⋮	⋮

Real time remote monitoring:

- **Conserves capital- delay or defer**
- **Produces real-time condition assessment**
- **Eliminates risk of overflows**

Longer Term…

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Cost/mile, $K, two project alternatives

	ALTERNATIVE A (Build Pipeline)	ALTERNATIVE B (Monitor)	SAVINGS A - B	% SAVINGS
Year 1	$67	$22	$45	66.9%
Year 2	$133	$29	$104	78.2%
Year 3	$200	$36	$164	82.0%
Year 4	$266	$43	$223	83.8%
Year 5	$333	$50	$283	85.0%

AT LEAST 67% savings

NO ADDITIONAL RISK

Transforming ‘Best’ Practices

Not-So Smart Maintenance

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- **Best Practices dictate rigorous cleaning of pipes**
- **Schedules are based on history**
  - **The past cannot predict the future**
- **The result is exaggerated action**
  - **Segments are cleaned unnecessarily**
  - **Condition assessment is subjective- visual inspection at the site**
  - **There is no “protection” between cleanings**

Case Study 3: Smart Cleaning

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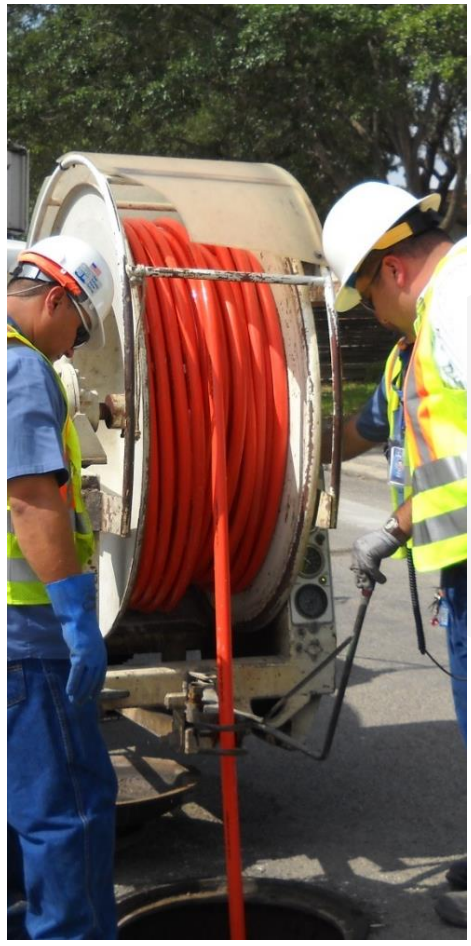
San Antonio Water System

- San Antonio Water System (SAWS) Cleaning Routine based on historical information:
  - Monthly: 204 sites
  - Quarterly: 620 sites
- Calculated cost of cleaning per site
  - $500 per site per instance
  - 2,448 ‘monthlies’ per year
  - $1,224,000 annual cost

Is there a better way?



A Smart Solution

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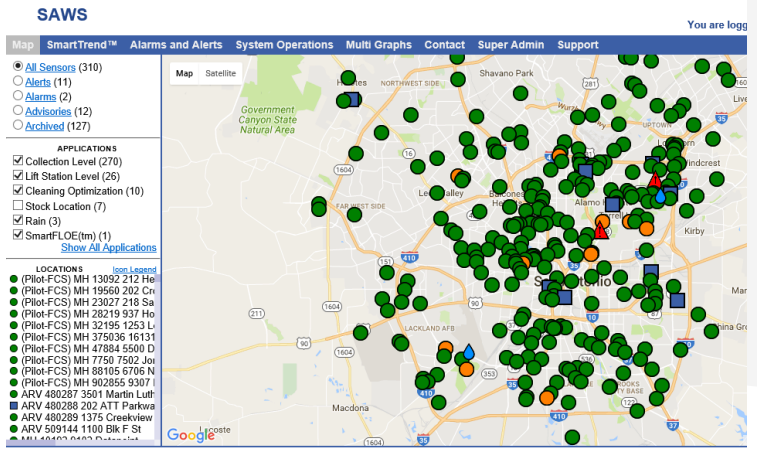
- Smart Technology Pilot Demonstration
  - Focus question: can technology reduce frequency & expense with no increased risk?
- SAWS' Pilot Set-up (Aug. '15 through Jul. '16)
  - 10 monthly cleaning sites selected
  - Sites cleaned prior to start
  - SmartCovers® installed & added to system network map
  - SmartTrend™ trend analysis performed daily
  - Crews directed to clean based on level change
  - Cleaning work order issued only when data as indicates



Detection of Small Changes

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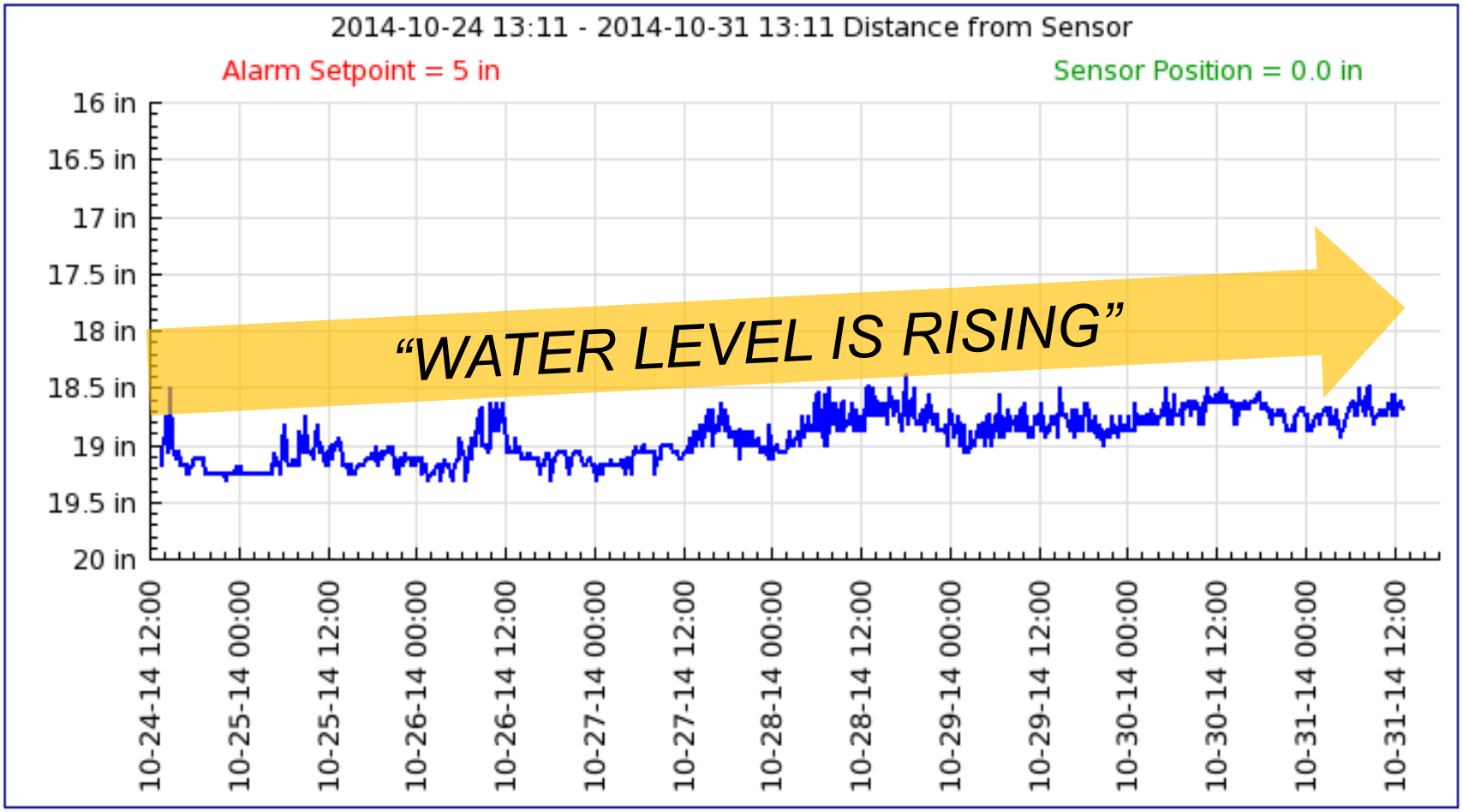
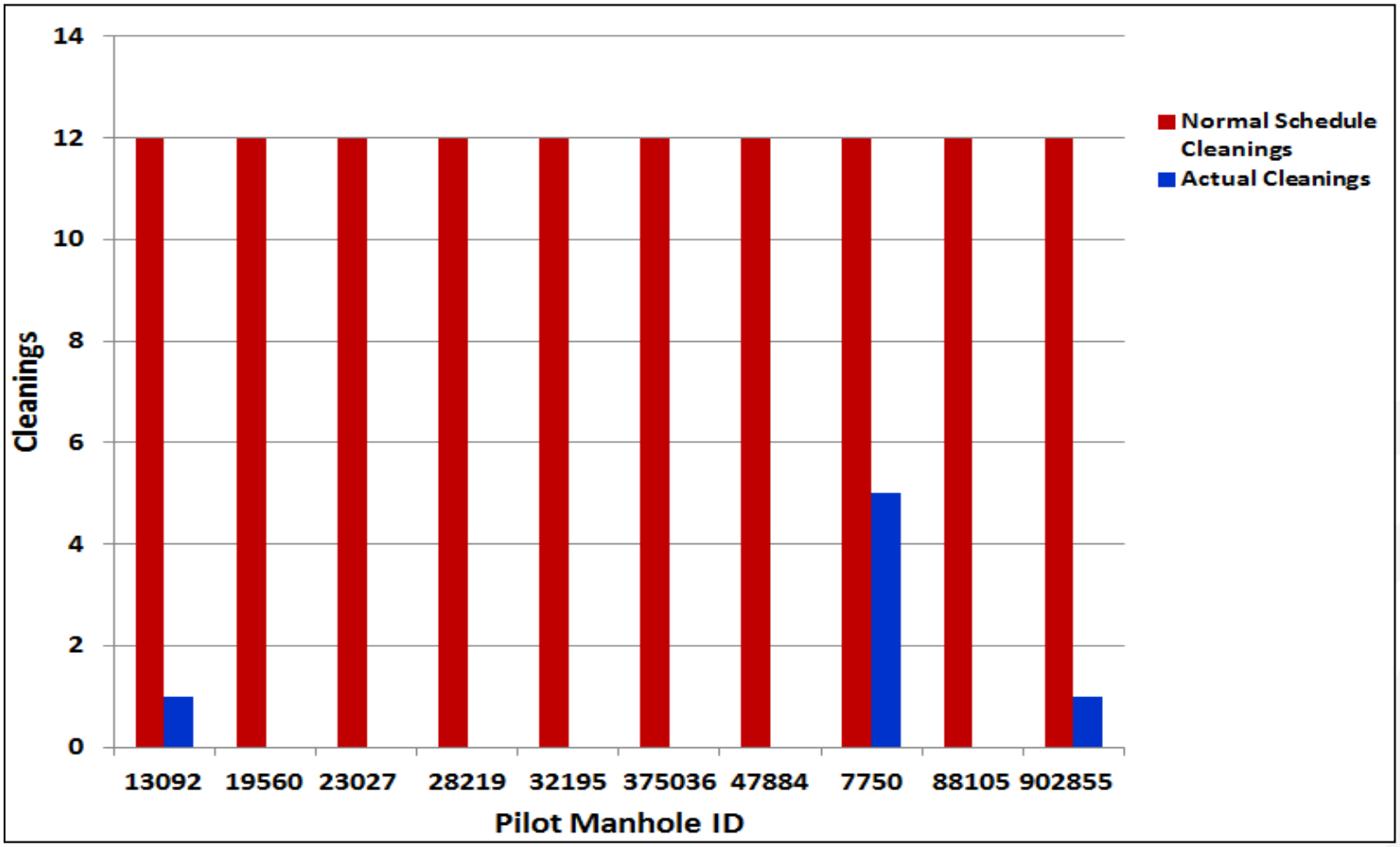
SmartTrend™: Automated data trend analysis of level change

PS 639 MH 11



Significant Cleaning Reduction



High frequency cleaning: 10 sites x 12 months = 120 instances

SmartClean™ Pilot: 7 instances

Reduction: 94.1% cleaning saved (120-7)/120

SAWS Pilot Results

SMARTCOVER SYSTEMS™
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Pilot Summary

Pilot System Tested	High Freq. Cycle (10 Sites)	Pilot Duration	High Freq. Expectation	SmartClean™ Results	% Reduction
San Antonio	Monthly	12 months	120	7	94.1%

The *Bottom Line*

- High Frequency Cleaning annual costs: $1,224,000
- Savings at 85%* reduction: $1,040,400
- Implementation Costs: $ 699,200 (start-up)
- Annual Costs Year 2 through 5 $ 590,000

Total Savings (5 Years) $ 2,142,800

* Calculation based on a lower, conservative reduction

SmartClean™ Process

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Technology Benefits Summary

- Productivity gain- personnel/equipment re-directed to more critical tasks
- Continuous SSO protection- full monitoring in between cleanings
- Lower risk- less time crews in traffic

- Lower carbon footprint

- Extended Asset Life - lower frequency cleaning reduces pipe and structure wear

Transformational Change

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TURNING YOUR DATA INTO DECISIONS™

- Smart technology brings *transformational,* not incremental, change…
- Users of smart technology gain visibility into the collection system
  - Capital demands are reduced or even eliminated
  - Operational practices are significantly improved with corresponding cost reduction
  - Management has real-time information to make decisions, this lowers risk.

The *essential* choice: Use history and models to drive decisions?

Or, do we use *Smart Technology* to let us see the road ahead

Thank You!

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Jay Boyd
Senior Vice President
760-291-1980
www.smartcoversystems.com

Committee on Water

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