

AVEVA PI WORLD

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# Connecting Platforms for Mapping Field Work

Presented By: Marc Smith & Brando Crozier

**AVEVA**

# Riverside Public Utilities

- Population - 324,000 residents
- Southern California - 60 miles east of Los Angeles
- Established in 1895
- Consumer-owned water & electric utility
- 81 square mile service territory
- 112,000 electric meters
- 65,000 water meters

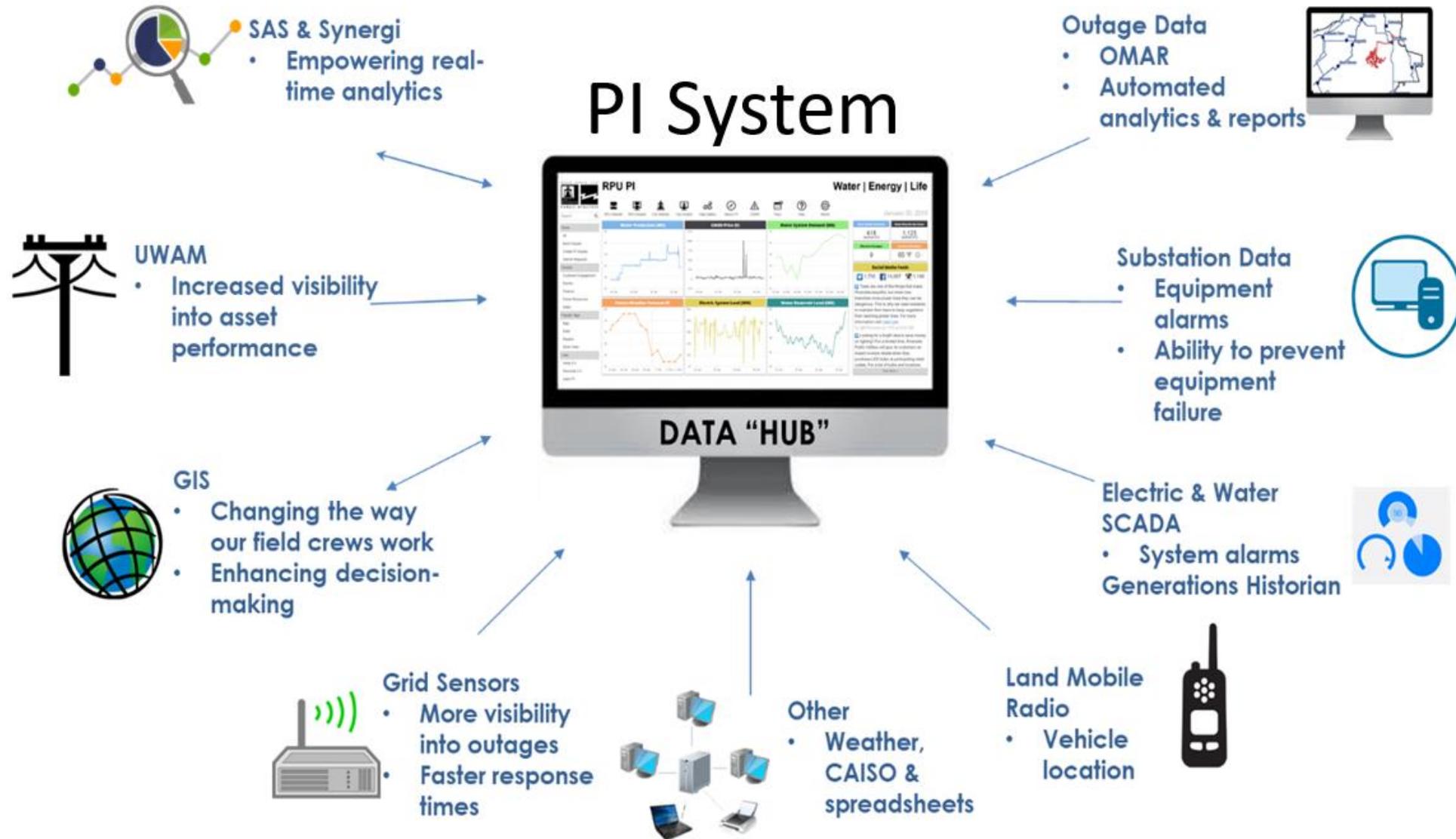




# Background

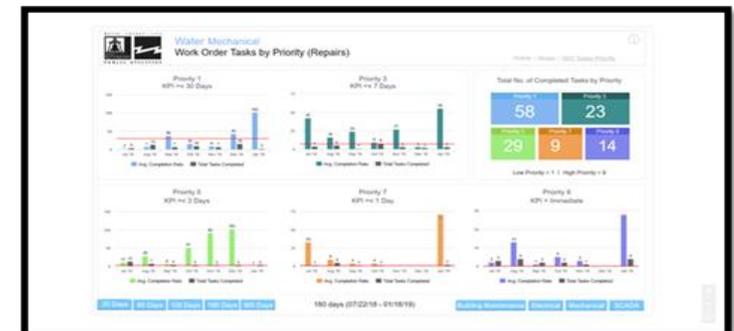
- All divisions within RPU rely on data to make operational and fiscal decisions
- Hundreds of Thousands of data points are collected daily
- RPU recognized the need to move away from storing data in various formats and disparate systems
- In response to this need, RPU implemented OSIsoft PI System in 2016

# OSIsoft PI System – Data Hub



# Examples of PI System Benefits

- Improved operational efficiencies
- Reduced staff time by automating processes
- Increased visibility into systems and assets
- Improved system reliability
- Reduced operating costs
- Advanced methods for monitoring CAISO market activity



# Status of PI Implementation

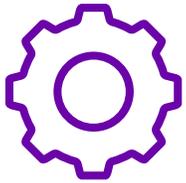
- Currently in 1<sup>st</sup> year of 2<sup>nd</sup> 5-year Enterprise Agreement with OSIsoft
  - PI Team supports entire Utility (Water, Electric, Generation)
    - 1 Analyst (75% time)
    - 1 Database Developer (100%)
    - Sr. GIS Analyst (supports GIS integration)
  - Initial 5-year project required additional staff
    - 2 full-time PI Consultants
- 
- Training / developing Super Users
    - Intro, Advanced, Advanced 2.0, and customized on-site courses
    - OSIsoft self-paced on-line courses
  - 30 integrated systems
  - Many operating dashboards, display and alerts



# Return on Investment (ROI)

- Since implementing PI, RPU has achieved a return on investment of over \$1,312,870 per year
- This far surpasses the annual enterprise service cost of the PI system
- Additionally, new development is currently underway that will continue to increase ROI

# RPU's Story – Connecting Platforms for Mapping Field Work



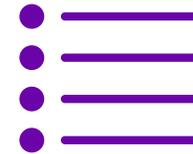
## Challenge

- Data in disparate systems
- Limited access to real-time operational data
- Field crews/work spread out over 81 mi<sup>2</sup>
- Outdated GIS system that couldn't work with modern mapping solutions



## Solution

- Use the PI Integrator for ESRI to display Service Requests and Work Orders geospatially on a map.
- This data is layered over the top of our water infrastructure, converging critical operational information into a single environment.



## Benefits

- The integration has improved our customer response and increased efficiency as field crews move from job to job, without having to report back to the office for their next assignment.

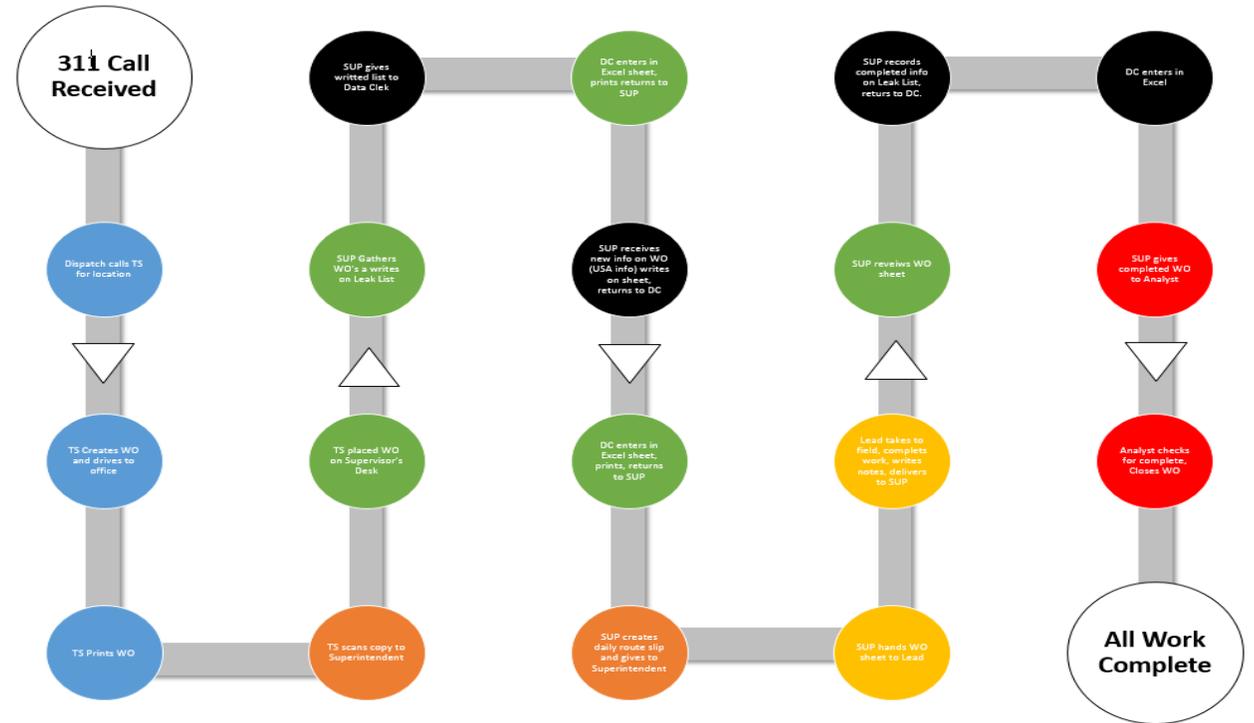
# Water Field – Leak List

- RPU Water has just over 1,000 miles of Transmission and Distribution pipelines.
- 85 Field personnel, in 12 work crews, repair and maintain the water system serving 65,000 metered customers.



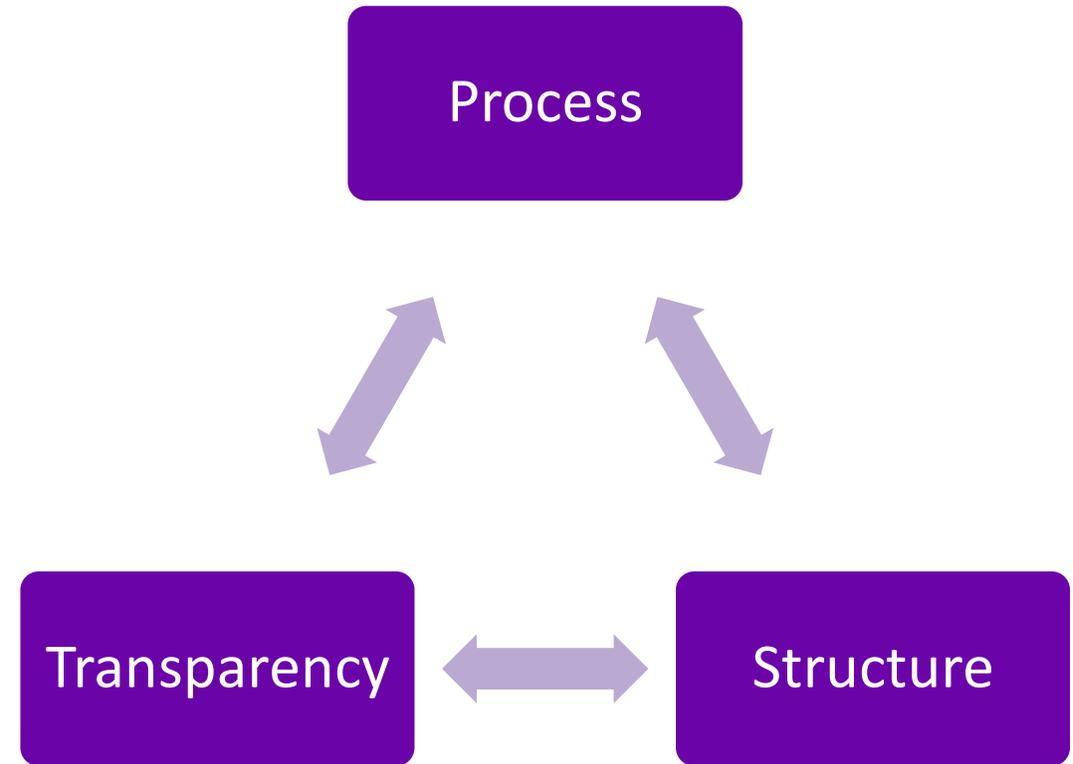
# Historical Process

- The historical process required paper to be exchanged **12 times** to complete a WO.
- This inefficient process required **\$100k/year in labor** to maintain.
- Work was consistently misplaced and duplicated, which led to collecting bad, unstructured data.



# Data Industrialization

- Modified the data collection processes to begin to leverage crucial operations data.
- Built new syntax and walkthrough documents for better data collection.
- Provided on-going training and feedback



# Leak List – v1.0

Work Order	Class	Status	Priority	Crew	Required	Asset ID	As	Approval Route
1727866	W CAPITAL	Active	7	W291		0561 DIST LTRL	W	
Desc 10359 ROBINSON AVE X TYLER ST (MP#49-7)(PR-7)(W291) REPLACE LEAK 3/4" COPPER SERVICE IN STREET.								
1727830	W MAINT	Active	9	W238		0071 DIST LTRL	W	
Desc 10571 MAGNOLIA AVE X BANBURY DR (PR 91)(W238)(MP 80-1) CONTRACTOR HIT MARKED COPPER SERVICE...								
1727825	W CAPITAL	Active	7	W238		0001 DIST LTRL	W	
Desc 3757 BEECHWOOD PL X MAGNOLIA AVE (PR 7)(W238)(MP 39-5) REPLACE LEAK COPPER SERVICE LONGSIDE...AC								
1727817	W CAPITAL	Active	7	W235		0221 DIST LTRL	W	
Desc 5688 DIVISION ST X DOMINION AVE (PR-7)(MP # 54-3)(W235) UPGRADE LEAK 2 IN. COPPER SERVICE TO 4" CL...								
1727798	W CAPITAL	Active	7	W238		0071 DIST LTRL	W	
Desc 9575 DAYTONA AVE X COMSTOCK AVE (MP#49-2)(PR-7)(W238) REPLACE LEAK 3/4" COPPER SERVICE AT END OF								
1727671	W CAPITAL	Active	7	W291		0431 DIST LTRL	W	
Desc 1112 VIA PARDAL X VIA SUSANA (MP#56-6)(PR-7)(W291) REPLACE LEAK 1" COPPER SERVICE IN STREET, SHORT								
1727632	W CAPITAL	Active	5	W238		0221 DIST LTRL	W	
Desc 5086 BERRYHILL PL X LE CONTE DR (238)(PR-5)(MP 41-7) LEAK 3/4" COPPER SERVICE COMING UP IN GRASS BY								
1727628	W CAPITAL	Active	5	W238		0072 DIST LTRL	W	
Desc 3872 TAFT ST X HAYES ST (PR-5)(MP # 65-6)(W238) REPLACE LEAK 3/4 IN. COPPER SERVICE...SHORTSIDE...6								
1727466	W MAINT	Active	7	W291		0221 DIST LTRL	W	
Desc 2835 ARLINGTON AVE X ANNA ST (PR 7)(W291)(MP 54-4) LEAK 1" COPPER SERVICE...NEAR MAIN...LONGSIDE...CI								
1724968	W MAINT	Active	5	W291		0073 DIST MAIN	W	
Desc 3045 CAMPANIA TERRACE X ARIZONA AVE (MP#80-7)(PR-5) Leak 12" MAIN IN DIRT BEHIND ABOVE ADDRESS IN								

1. Custom SQL Query to pull WO's from Oracle Database.
2. Created the first active list of work for the department.
3. Eliminated historical paper process.

# Leak List – v2.0

Home > WAMS > Production > Leak\_List

Status: ACTIVE Crew: (NULL), W204, W211, W212, W2

1 of 1 100% Find | Next

### Water Leak List

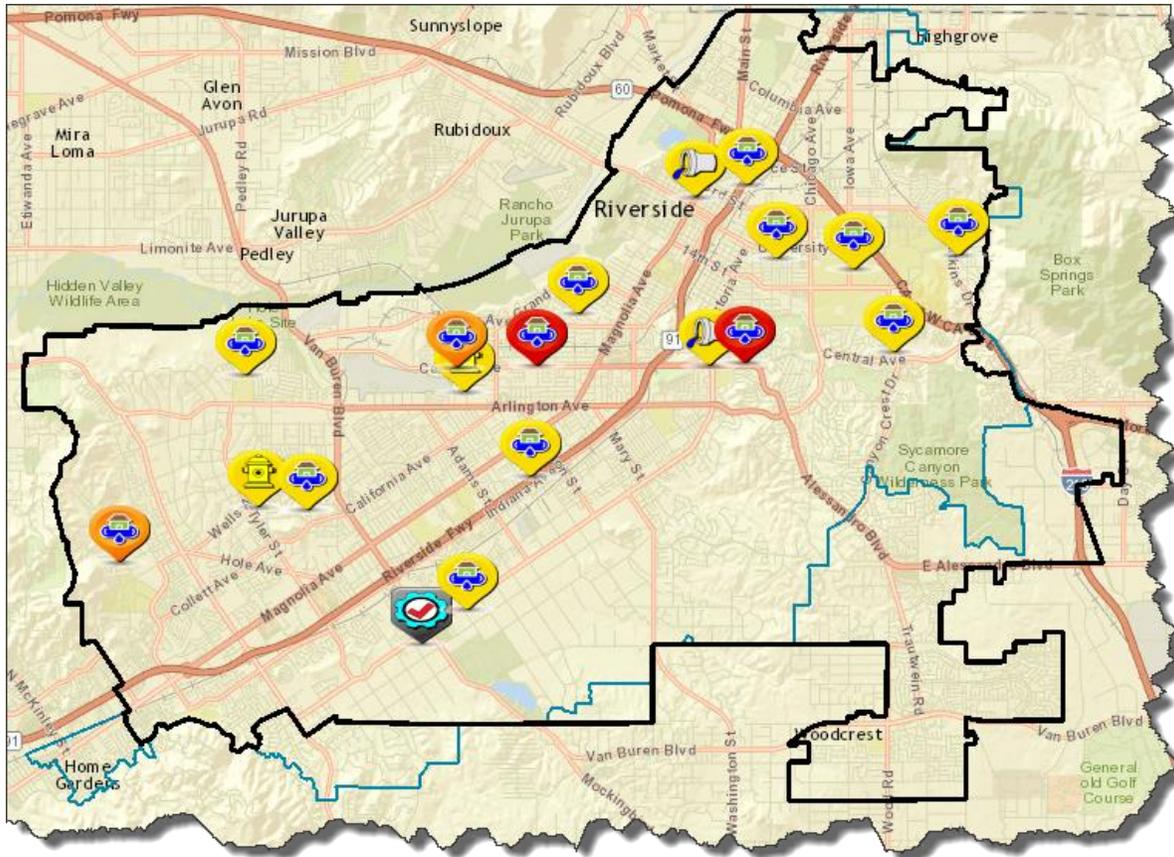
Priority	Completion Time	Criticality
9	Within 24 hrs	Emergency
7	2-5 Days	High
5	5-10 Days	Medium
3	10-30 Days	Low
1	PM Work	Preventative

Date	W.O. #	Task #	Address	Cross	PR	Description	Crew #	MP	USA #	READY	EXP DATE
5/3/2017	1727886	01	10359 ROBINSON AVE	TYLER ST	7	SVR REFL	W291	49-7			
5/3/2017	1727830	01	10571 MAGNOLIA AVE	BANBURY DR	9	SVCTO 2"	W238	80-1			
5/3/2017	1727825	01	3757 BEECHWOOD PL	MAGNOLIA AVE	7	SVR REFL	W238	39-5	# A 71230285		5/31/2017
5/3/2017	1727817	01	5688 DIVISION ST	DOMINION AVE	7	SVR REFL	W235	54-3			
5/2/2017	1727798	01	9575 DAYTONA AVE	COMSTOCK AVE	7	SVR REFL	W238	49-2	# A 71230002		5/31/2017
5/1/2017	1727671	01	1112 VIA PARDAL	VIA SUSANA	7	SVR REFL	W291	56-6	A-71220001	05/04 @ 5pm	5/30/2017
5/1/2017	1727632	01	5086 BERRYHILL PL	LECONTE DR	5	SVR REFL	W238	41-7	# A 71220002		5/30/2017
5/1/2017	1727628	01	3872 TAFT ST	HAYES ST	5	SVR REFL	W238	65-6	# A 71210961		5/28/2017
4/28/2017	1727466	01	2835 ARLINGTON AVE	ANNA ST	7	SVCTO 2"	W291	54-4	A-71210001	05/26/17	5/26/2017
4/1/2017	1724968	01	3045 CAMPANIA TERRACE	ARIZONA AVE	5	LK MAIN	W291	80-7	A-71071042	04/20	5/15/2017

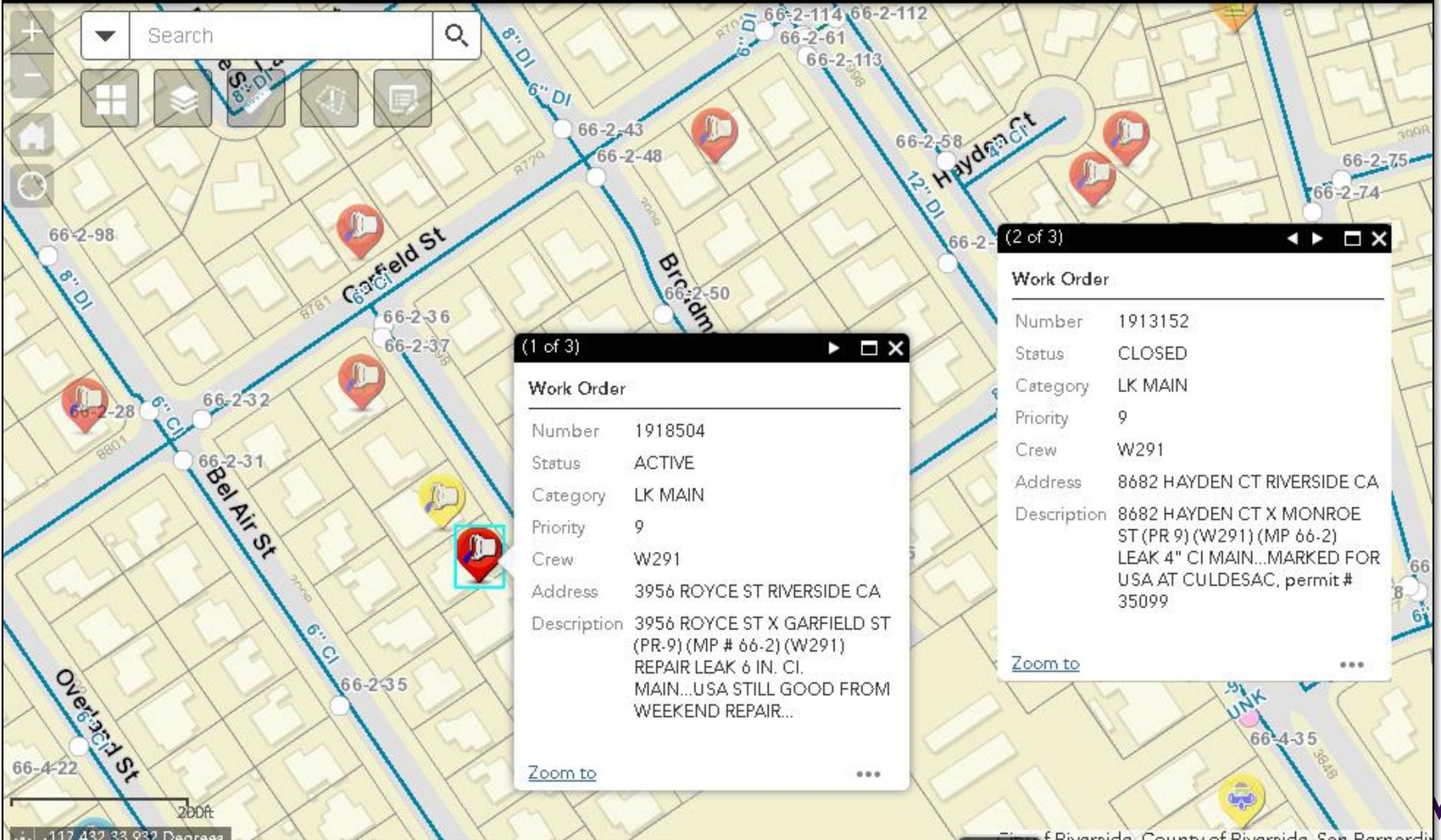
ACTIVE: 10 Page 1 of 1 Printed: 5/4/2017 1:18:06 AM

1. Custom SSRS Report, accessible via desktop shortcut.
2. 40% of report relies on custom logic, pulling specifically organized critical data.
3. Color introduced to display priority, providing immediate recognition.

# Leak List – v3.0



1. Geographically located work makes coordination much simpler.
2. Using PI, the map synthesizes data from Work Order, CIS, and GIS systems.
3. When things change, simple to see and respond.



(1 of 3)

**Work Order**

Number	1918504
Status	ACTIVE
Category	LK MAIN
Priority	9
Crew	W291
Address	3956 ROYCE ST RIVERSIDE CA
Description	3956 ROYCE ST X GARFIELD ST (PR-9) (MP # 66-2) (W291) REPAIR LEAK 6 IN. CI. MAIN...USA STILL GOOD FROM WEEKEND REPAIR...

[Zoom to](#) ⋮

(2 of 3)

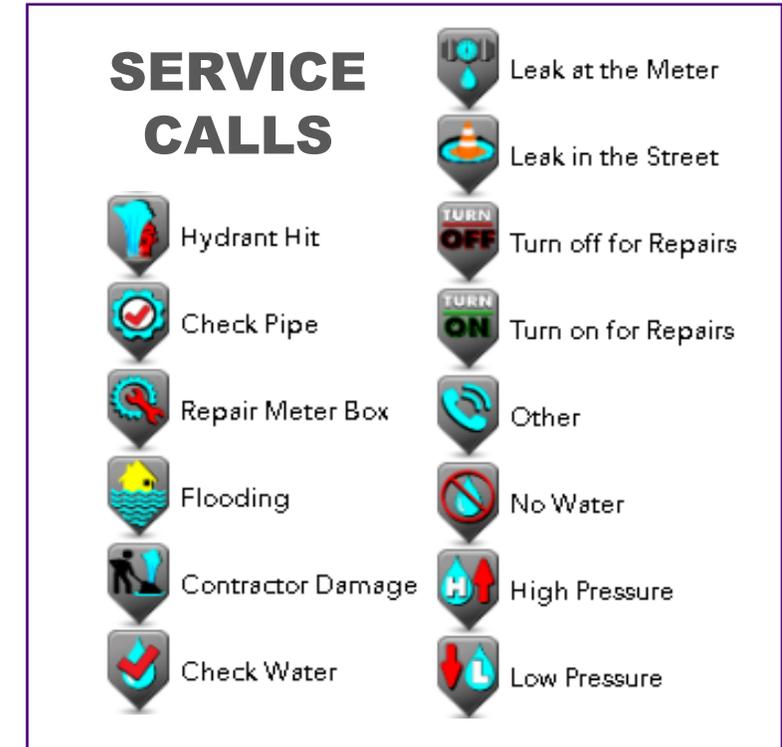
**Work Order**

Number	1913152
Status	CLOSED
Category	LK MAIN
Priority	9
Crew	W291
Address	8682 HAYDEN CT RIVERSIDE CA
Description	8682 HAYDEN CT X MONROE ST (PR 9) (W291) (MP 66-2) LEAK 4" CI MAIN...MARKED FOR USA AT CULDESAC, permit # 35099

[Zoom to](#) ⋮

# WORK ORDER GIS MAP

- Water Troubleshooters
  - Displays as 1 of 15 Service Call Types
    - CIS → Oracle
- Historical Service Calls
  - Research past call info and notes
- Automatic notification for Cancellation
- On top of ArcGIS Water infrastructure



**7,000+ Service Calls Annually**

# WORK ORDER GIS MAP

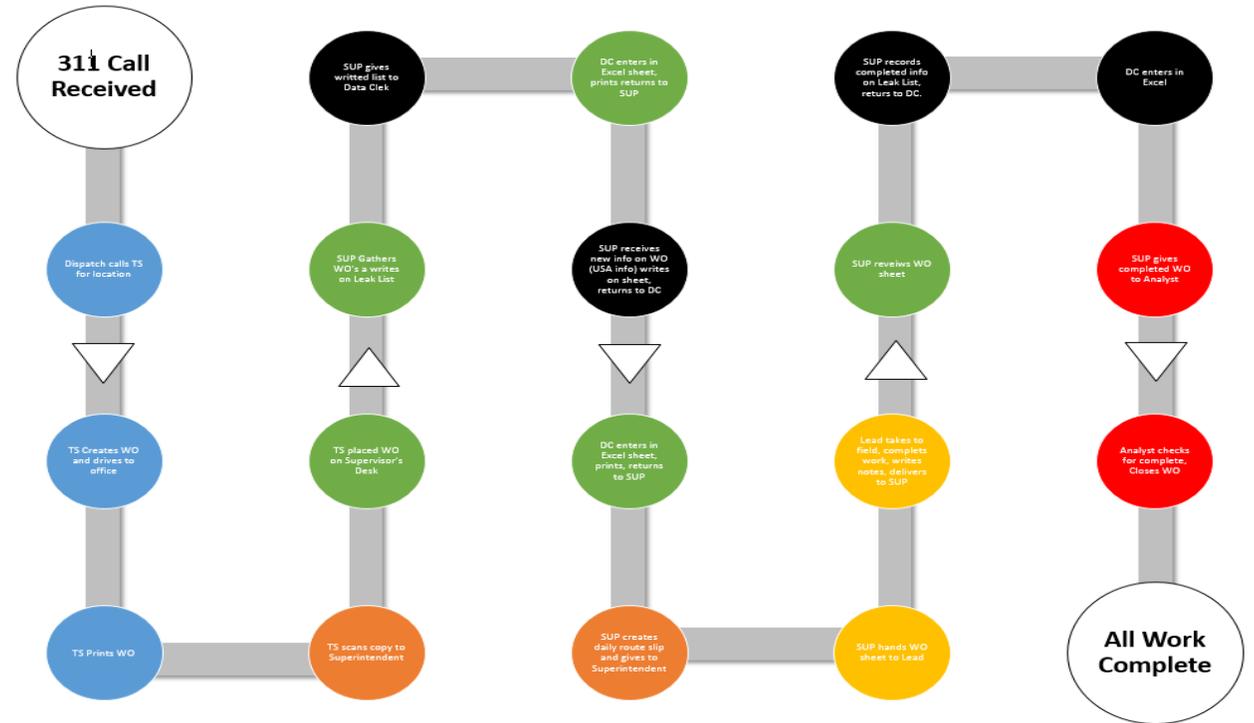
- Leak Repair Work
  - Displays 1 of 5 Work Order Types
  - Color Coded by Work Priority
  - Closed Work Orders
- Preventative Maintenance
  - Valve, Hydrants, Meters
- Development Work

<24 HOURS	2-5 DAYS	5-10 DAYS	10-30 DAYS	
				SERVICE
				MAIN
				VALVE
				HYDRANT
		PREVENTATIVE MAINTENANCE		

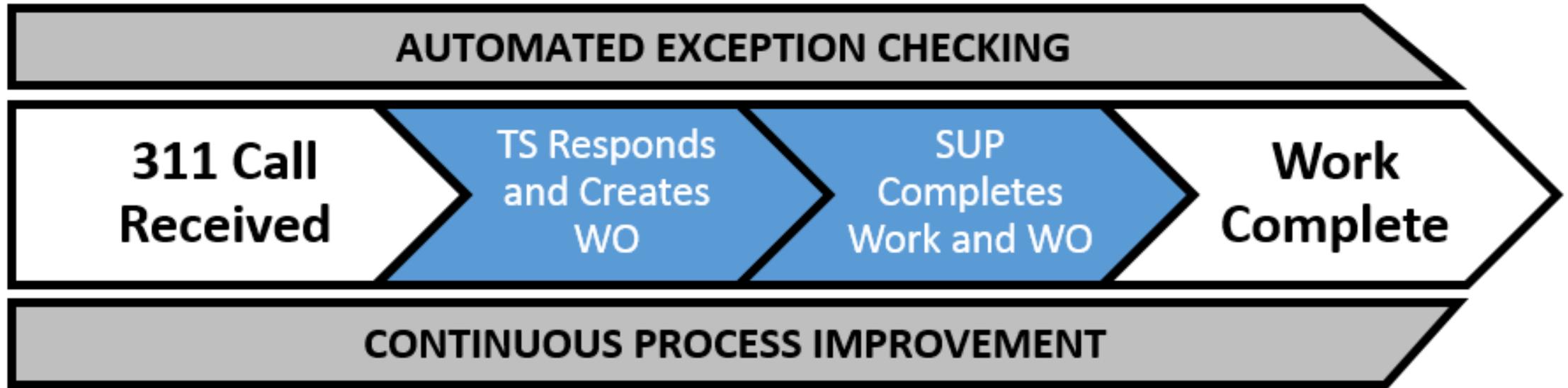
**110 MAIN LEAKS, 1400 SERVICE LEAKS**  
**12,000 PREVENTATIVE MAINTENANCE ACTIVITIES ANNUALLY**

# Historical Process

- The historical process required paper to be exchanged **12 times** to complete a WO.
- This inefficient process required **\$100k/year in labor** to maintain.
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# Current Process



Everyone is working from the same environment...

# Next Steps

- Using the map environment to record attribute data, and push it back to WO Management System
- Display hydrant and valve maintenance routes, allowing field staff to record activities without leaving the map.
- Digital as-building – recording infrastructure changes directly into the map.



“The secret of getting ahead is getting started. The secret of getting started is breaking your complex overwhelming tasks into small manageable tasks, and then starting on the first one.”

-Mark Twain



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