Asset Management for Resiliency

Presented by
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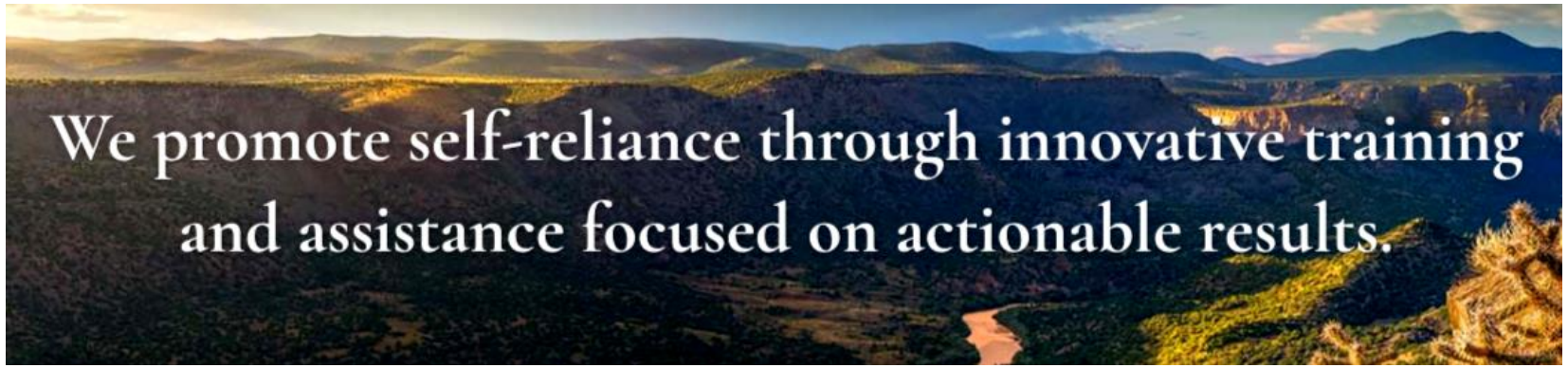
Director, Southwest Environmental Finance Center

SOUTHWEST
ENVIRONMENTAL
FINANCE CENTER

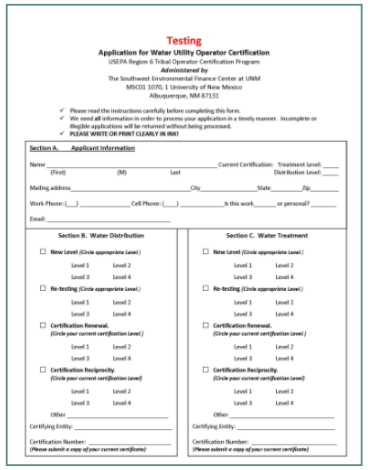
The Southwest EFC

Started in 1992



Work under contracts & agreements with federal, state, and local governments and private funders

Operator Certification EPA Region 6 Testing Application



Testing

Application for Water Utility Operator Certification

USEPA Region 6 Tribal Operator Certification Program

Administered by

The Southwest Environmental Finance Center at UNM

MSC01 1070, 1 University of New Mexico

Albuquerque, NM 87131

- ✓ Please read the instructions carefully before completing this form.
- ✓ We need all information in order to process your application in a timely manner. Incomplete or illegible applications will be returned without being processed.
- ✓ **PLEASE WRITE OR PRINT CLEARLY IN INK!**

Section A. Applicant Information

Name: _____ Current Certification: Treatment Level: ____ Distribution Level: ____

(First) (M) Last

Mailing address: _____ City _____ State _____ Zip _____

Work Phone: (___) _____ Cell Phone: (___) _____ Is this work _____ or personal? _____

Email: _____

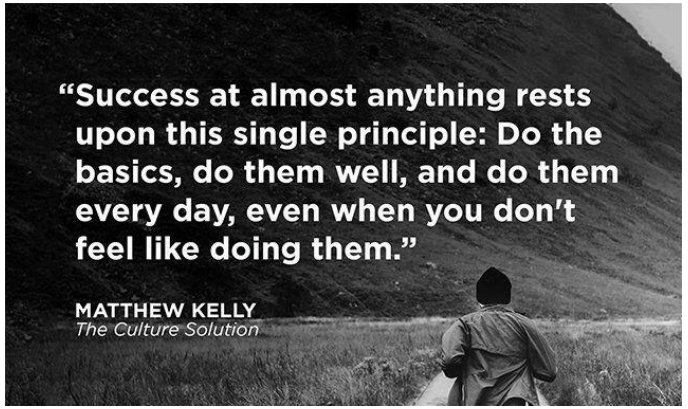
Section B. Water Distribution	Section C. Water Treatment
☐ **New Level** *(Circle appropriate Level)*	☐ **New Level** *(Circle appropriate Level)*
Level 1 Level 2	Level 1 Level 2
Level 3 Level 4	Level 3 Level 4
☐ **Re-testing** *(Circle appropriate Level)*	☐ **Re-testing** *(Circle appropriate Level)*
Level 1 Level 2	Level 1 Level 2
Level 3 Level 4	Level 3 Level 4
☐ **Certification Renewal.** *(Circle your current certification Level)*	☐ **Certification Renewal.** *(Circle your current certification Level)*
Level 1 Level 2	Level 1 Level 2
Level 3 Level 4	Level 3 Level 4
☐ **Certification Reciprocity.** *(Circle your current certification Level)*	☐ **Certification Reciprocity.** *(Circle your current certification Level)*
Level 1 Level 2	Level 1 Level 2
Level 3 Level 4	Level 3 Level 4
Other _____	Other _____
Certifying Entity: _____	Certifying Entity: _____
Certification Number: _____ *(Please submit a copy of your current certificate)*	Certification Number: _____ *(Please submit a copy of your current certificate)*

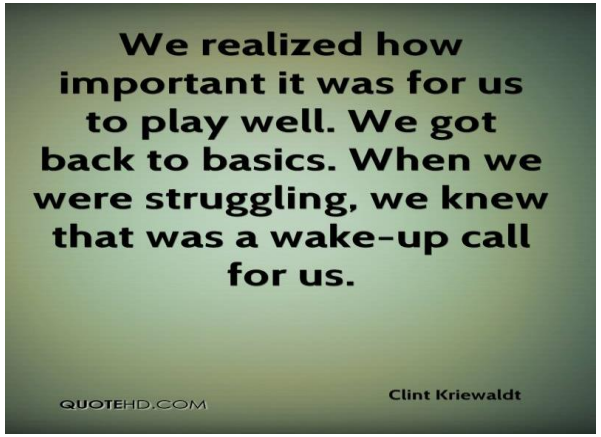
This application is used to apply to take an operator certification exam as part of the EPA Region 6 Tribal Drinking Water Operator Certification Program and must be filled out and returned each time an operator wants to test at a certification level that they have not previously tested for.

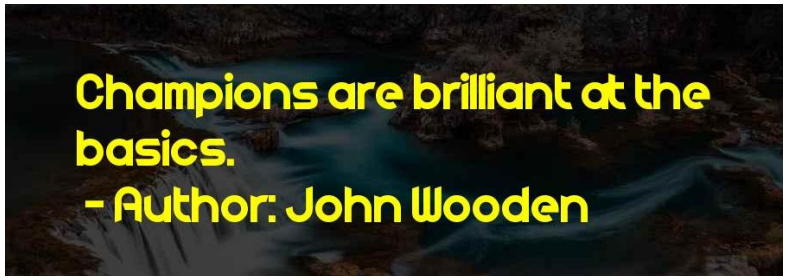
Download Here

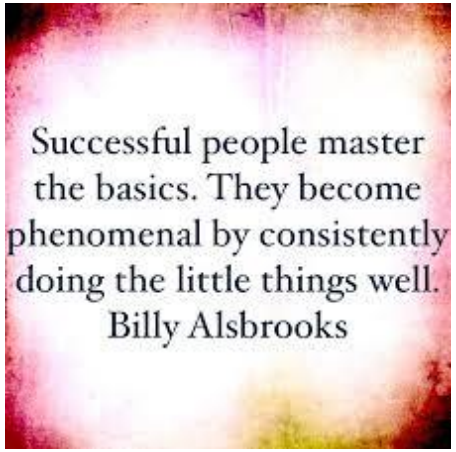
Asset Management:

At its core is a resiliency program



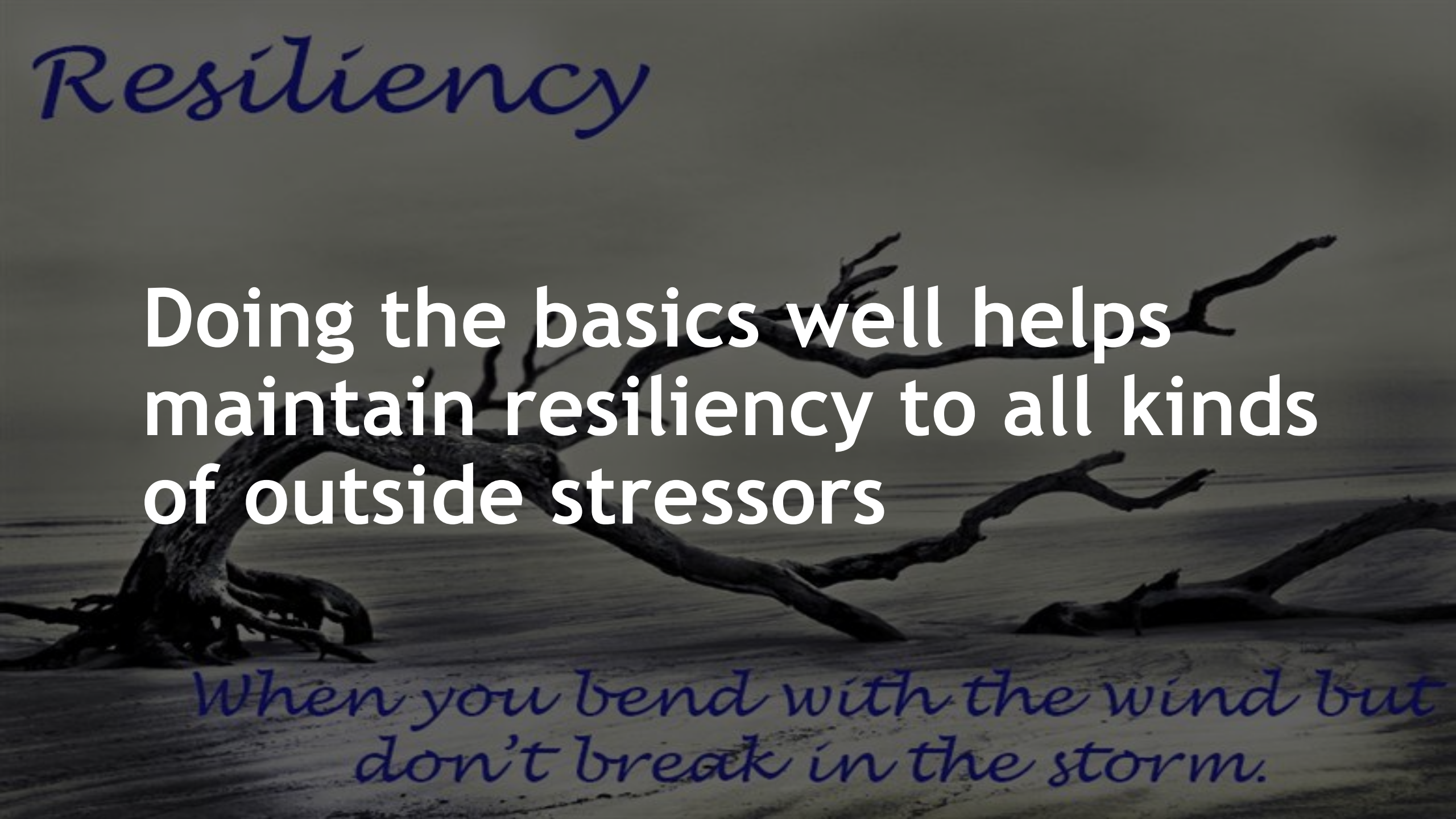






It's most important that we do the basic functions well

AM Helps us do that



Doing the basics well helps maintain resiliency to all kinds of outside stressors

Outside Stressors - Technical

STATE EDITION 50 CENTS

JANUARY 10, 2014 CHARLESTON, WEST VIRGINIA

FRIDAY

the Charleston Gazette

THE STATE NEWSPAPER — OUR 140TH YEAR

wvgazette.com

STATE OF EMERGENCY

WATER CONTAMINATED

Chemical leak into Elk River affects at least 8 counties

By Rachel Molenda

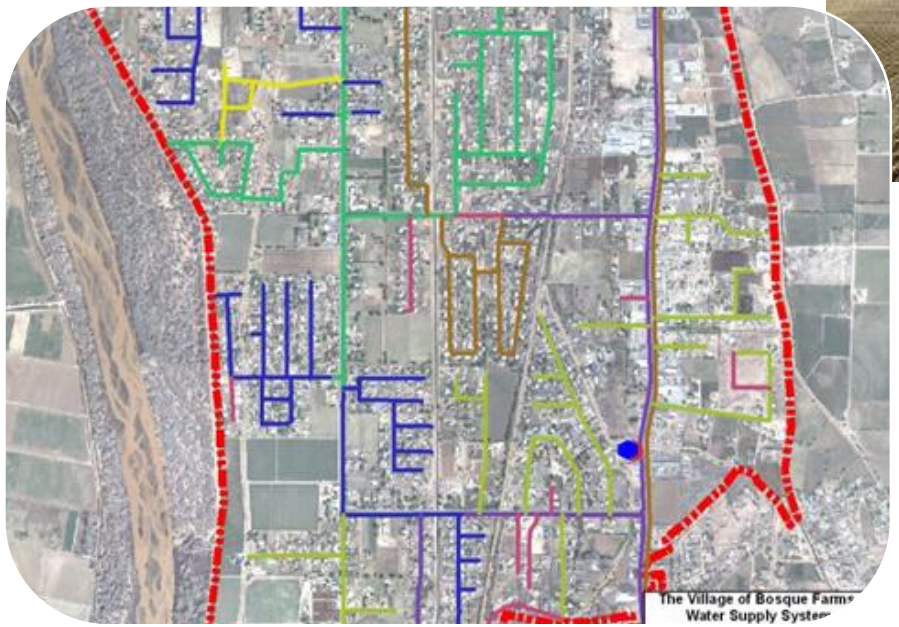
Staff writer

ter Thursday evening, and shelves were quickly depleted.

State government and water company officials did not give an estimate on when the water might be safe to drink or use.

"The state of emergency will be in place until . . . the De-

	A	B	C	D	E	F	G	H	I	J	K	L
1	System Name:											
2	Current Year	2018										
3												
4	ID Number	Asset Class or Category	Sub Asset Class or Sub Category	Asset Name	Type	Size	Length (if Pipe)	Operational Status (A = Active, I = Inactive, N = Non-Operational, S= standby/spare)	Manufacturer	Model Number	Serial Number	Supplier Name
5												
6												
7												
8												
9												
10												
11												
12												
13												



How does AM help with technical resiliency?

Outside Stressors - Managerial

STATE EDITION 50 CENTS

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STATE OF EMERGENCY

WATER CONTAMINATED

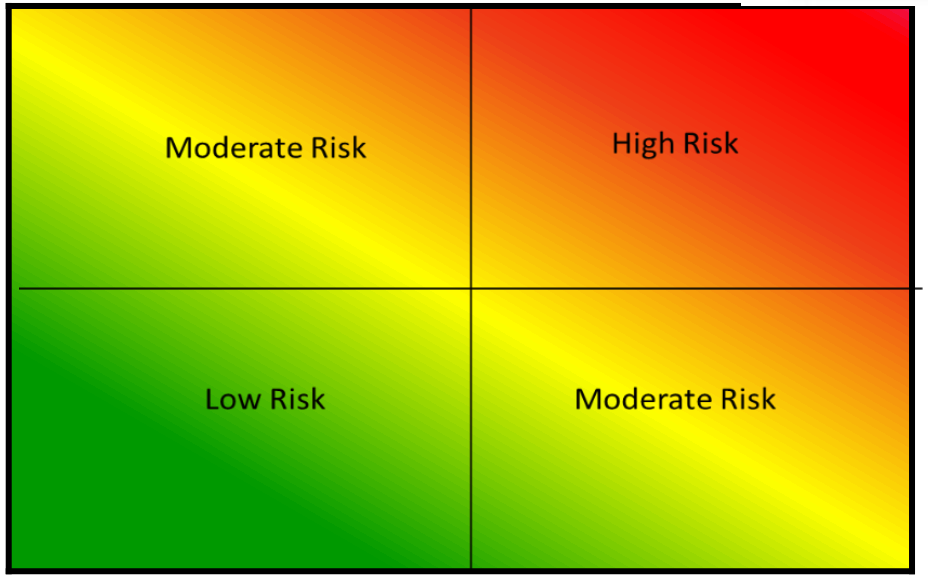
Chemical leak into Elk River affects at least 8 counties

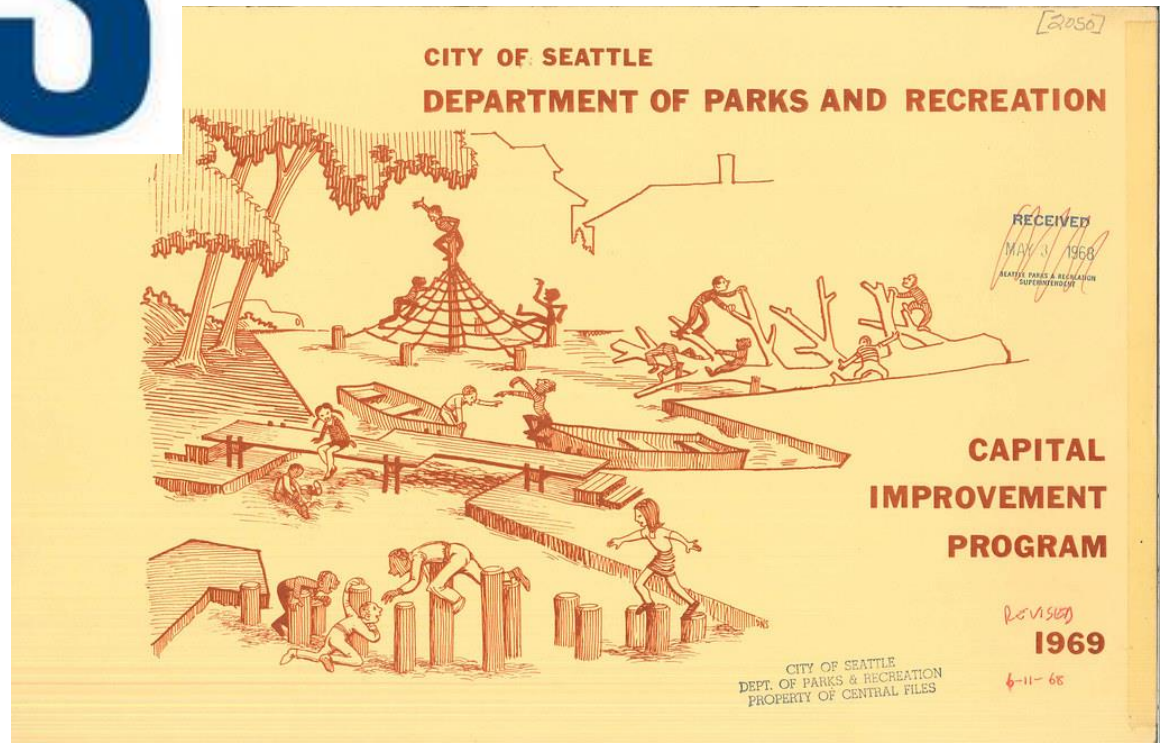
By Rachel Molenda
Staff writer

Residents in eight counties were told Thursday evening not to drink, cook with or wash with water supplied by West Virginia American Water after a leak earlier in the day at a chemical

How does AM help with managerial resilience?

LoS





Outside Stressors - Financial

Financial Impacts from COVID

- Change in Usage Patterns
- Cancellation of Shut-Offs
- Unemployment Causing Customers Inability to Pay
- Lost Investment Income
- Business Closures

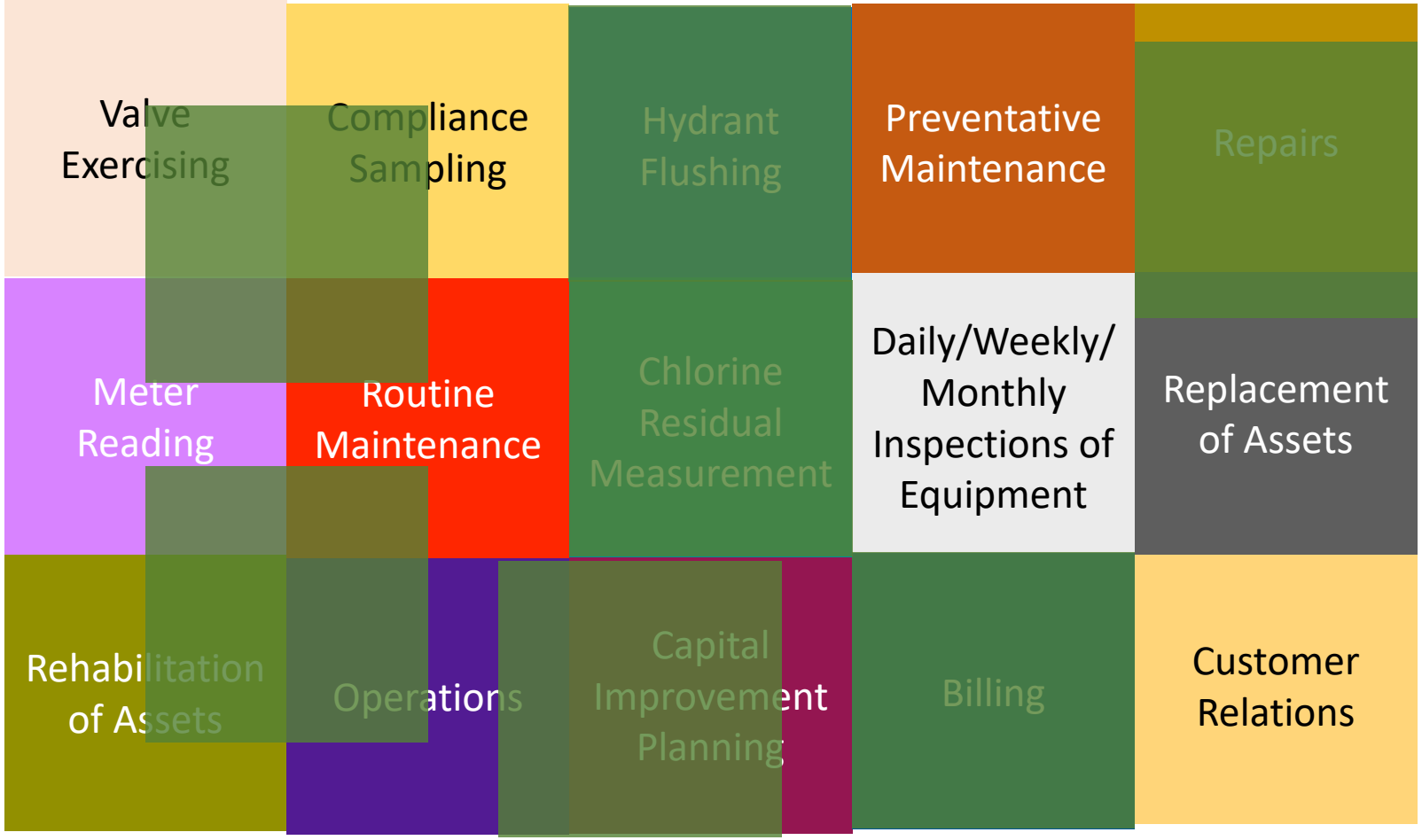
How does AM Help With Financial Resilience?

Resources (money & time) Available

Valve Exercising	Compliance Sampling	Hydrant Flushing	Preventative Maintenance	Repairs
Meter Reading	Routine Maintenance	Chlorine Residual Measurement	Daily/Weekly/ Monthly Inspections of Equipment	Replacement of Assets
Rehabilitation of Assets	Operations	Capital Improvement Planning	Billing	Customer Relations

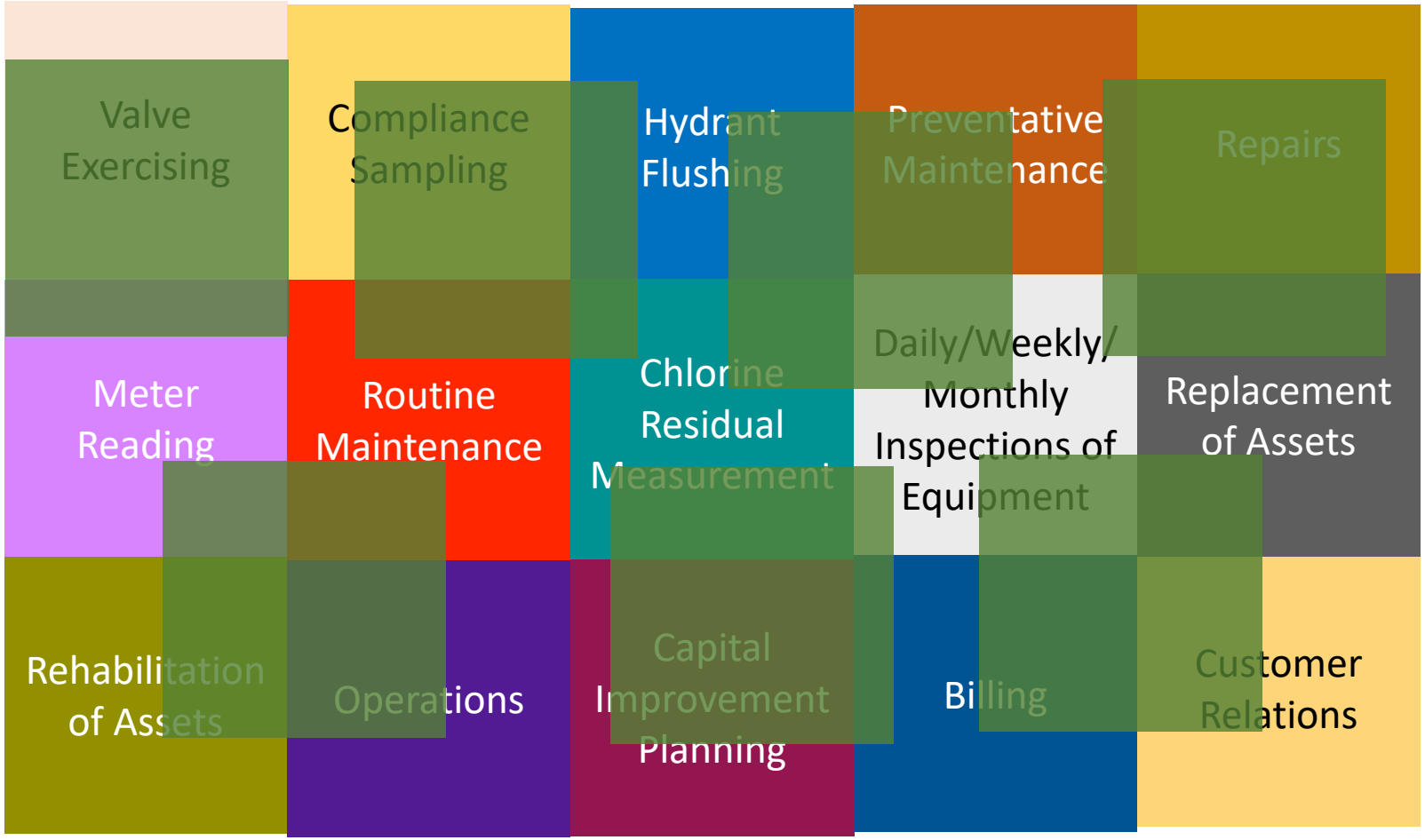
Typical Situation

Resources (money & time) Available



So what happens?

Resources (money & time) Available



Financial Resiliency Comes From AM Helping You Make th
Best Decisions About How To Spend Your Resources

WaterOne

Water District No. 1 of Johnson County

Asset Management

WaterOne

Water District No. 1 of Johnson County

We provide a safe, reliable, high-quality water supply with superior service and value.

Resources

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Start Here Resources

Asset Management Switchboard

The Southwest Environmental Finance Center has partnered with EPA to create a repository of documentation and tools related to Asset Management.

Whether you are new to the Asset Management process or just need a refresher on a specific topic, the resource you are looking for is probably here. If you're unable to find what you're looking for, reach out and tell us about it.

If you would like to contribute by having a resource added to the repository, please email the Southwest Environmental Finance Center (by clicking on the link below) and tell us about it. We welcome your feedback and strive to serve your utility and water systems at large.

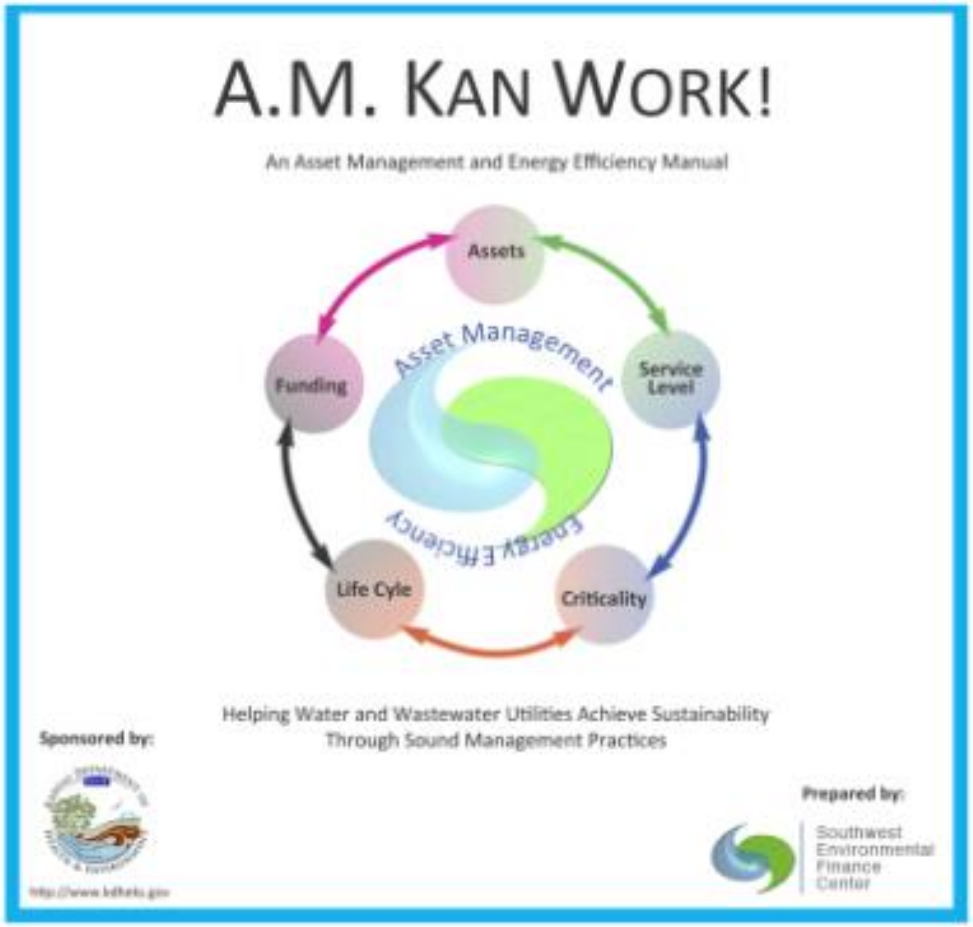
Email SW EFC

Phone (505) 277-0644

https://swefcamswitchboard.unm.edu/am/

Resources

https://swefc.unm.edu/home/



Kansas Department of Health and Environment

Appendix F

ASSET MANAGEMENT IQ

An Asset Management IQ Test is presented here in order to help you review the concepts of the various core components of Asset Management. Both the test and a scoring table are also available as a printable pdf, which may be copied for use by multiple personnel within your utility.

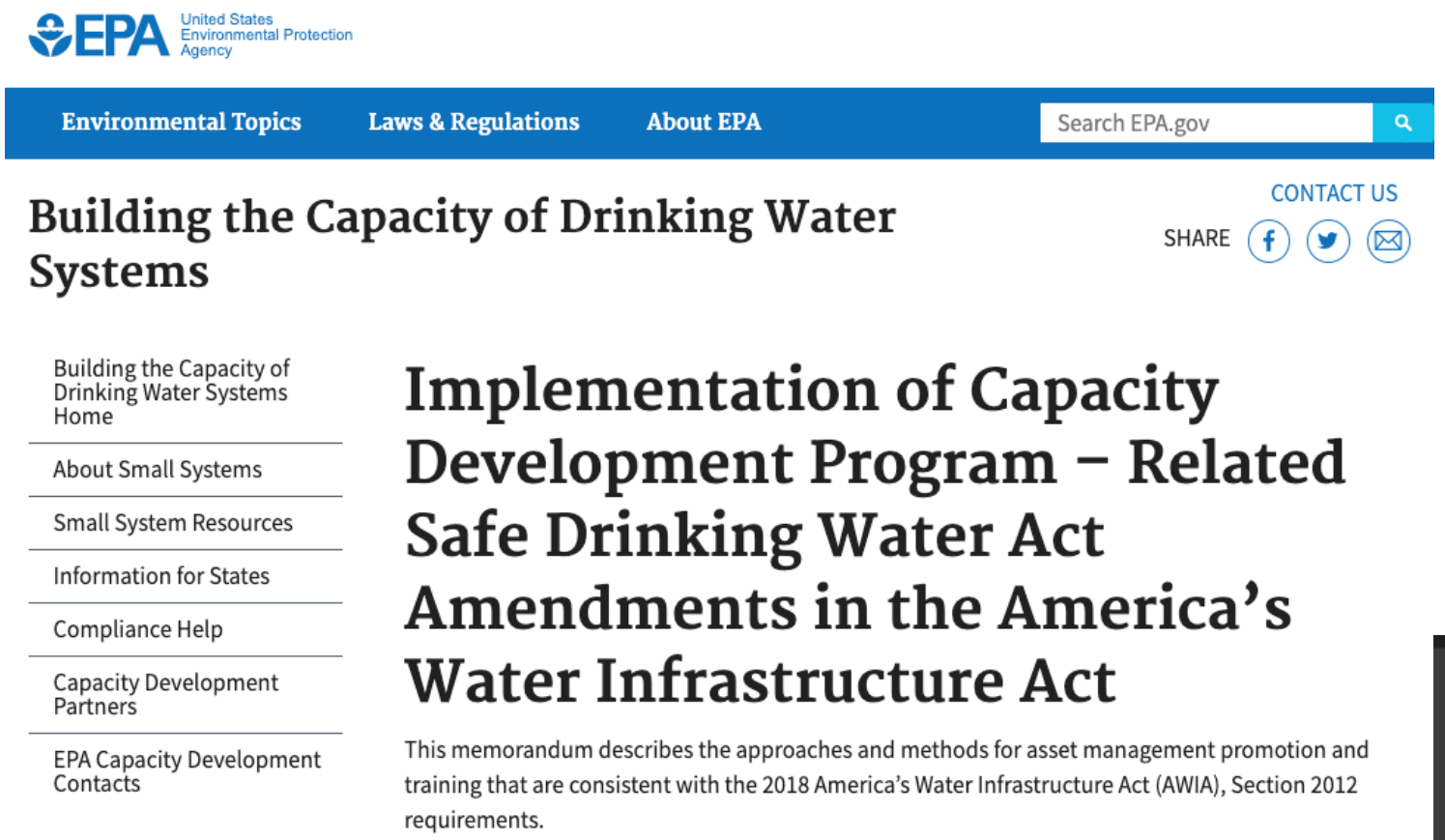
In the web version of the test, clicking on a choice will automatically enter the number of points for that option and keep track of the score for each section of the Asset Management IQ as well as the total cumulative score. If a new answer is selected, the new choice and the new points will appear and the old points will be removed.

If the user completes the entire Asset Management IQ tool (all 30 questions) before starting Asset Management, it will provide a baseline evaluation at the beginning of Asset Management. Comparing the scores of each of the six sections will show which areas have the biggest gaps in terms of Asset Management activities. These scores may provide information about where efforts should be focused. You may wish to start with areas that are the weakest, offering a large improvement with a little effort, or with areas that are strong, which would offer a chance to get started in a familiar area.

As the utility progresses, the Asset Management IQ can be repeated and the scores compared to previous scores. At a minimum, you may wish to repeat the Asset Management IQ every year.

It should be noted that a total score of 150 would represent best practice in all areas of Asset Management. Not all utilities will be interested in achieving this goal. The utility should set its own target levels. The tool is meant to help utilities gauge their progress over time.

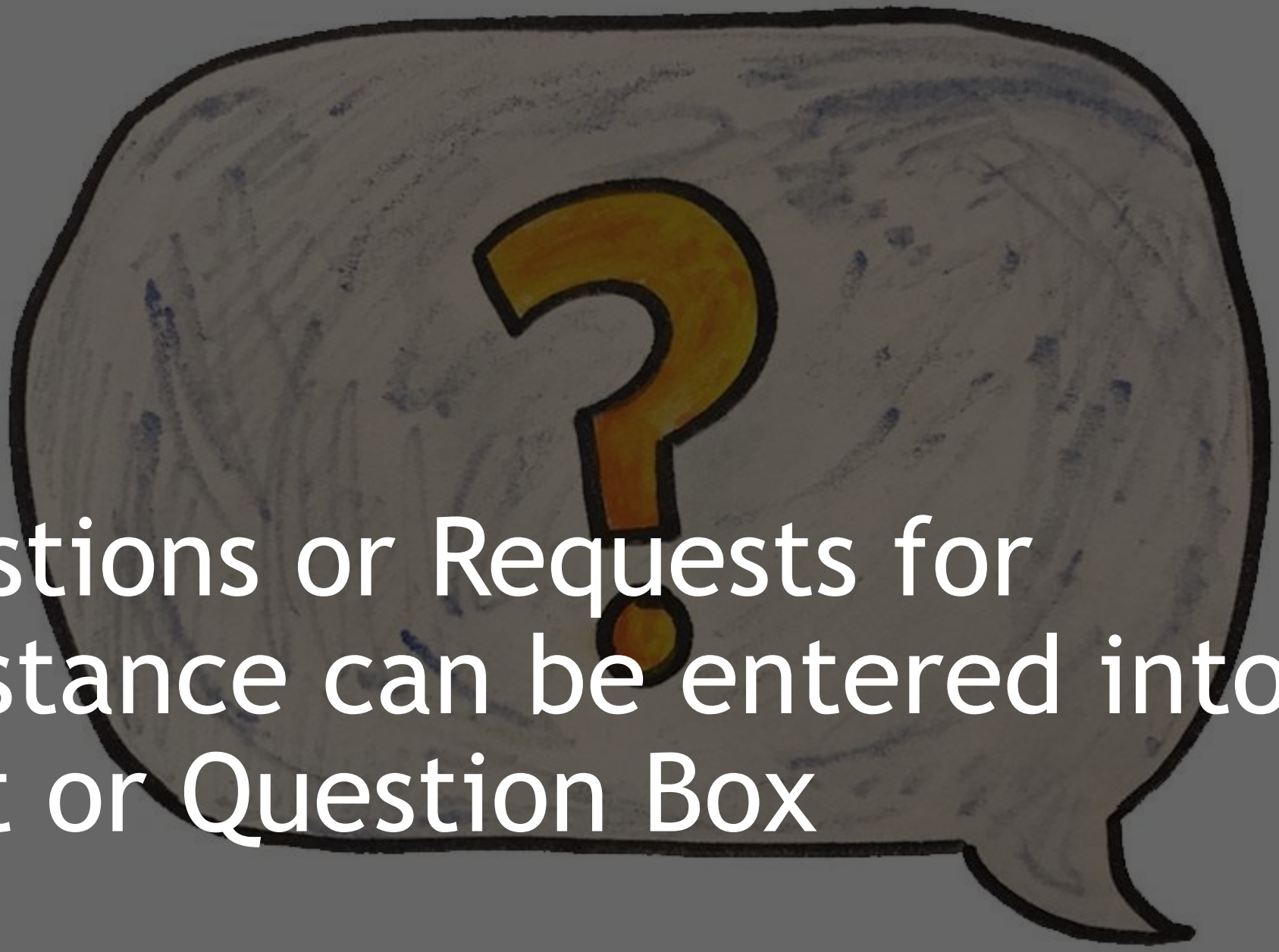
Resources



heatherh@unm.edu

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

WICHITA STATE UNIVERSITY



Questions or Requests for Assistance can be entered into Chat or Question Box

SAN JOSE WATER

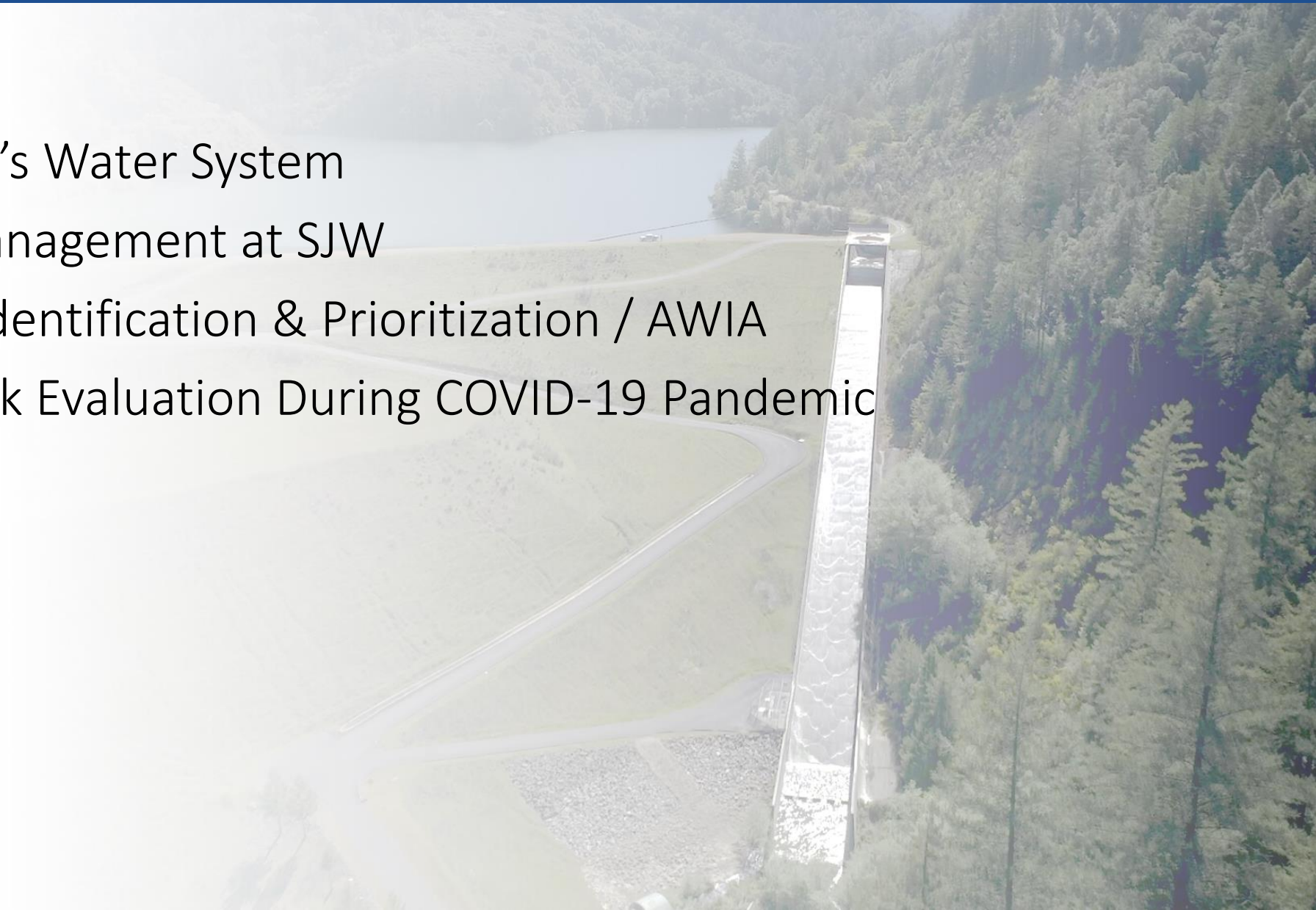
Becoming Resilient Through Asset Management

EPA Capacity Development & Operator Certification
Virtual Workshop

8/20/2020

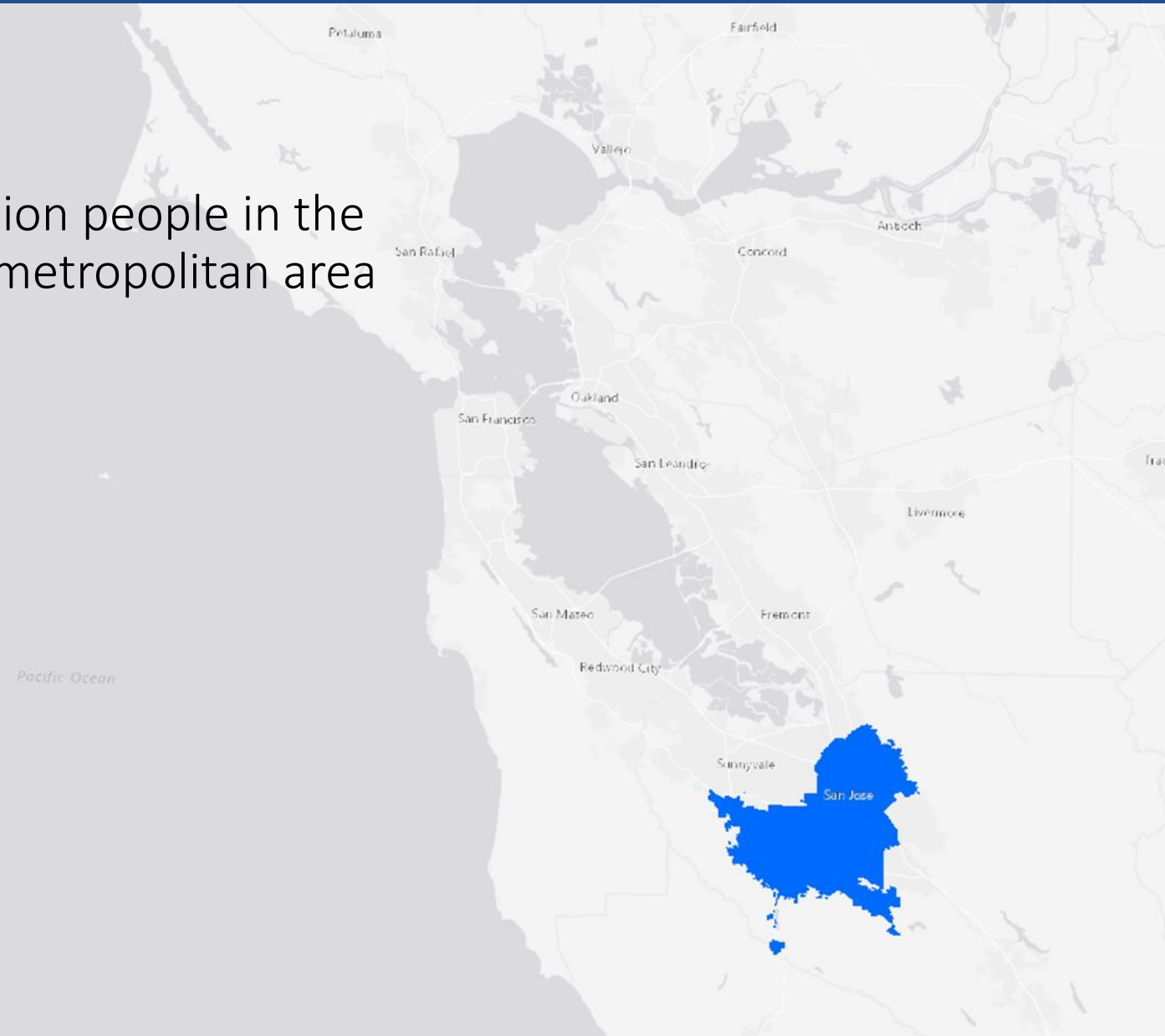
Agenda

- Overview of SJW's Water System
- Goal of Asset Management at SJW
- Enterprise Risk Identification & Prioritization / AWIA
- Work Activity Risk Evaluation During COVID-19 Pandemic



Overview of Water System

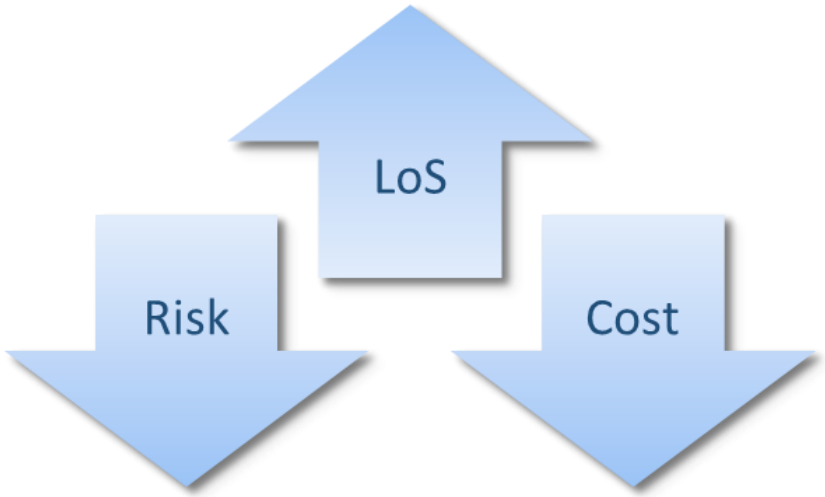
- Established in 1866
- Provide water service to over 1 million people in the Silicon Valley and greater San Jose metropolitan area
- 3 water treatment plants
- 2,400 miles of pipe
- 340 pumps and motors
- 100 wells
- 120 tanks and reservoirs
- 20,000 fire hydrants
- 34,000 valves
- 234,000 meters and service lines



Goal of Asset Management at SJW

Asset Management Program Goal:

To maximize value derived from assets by optimizing the balance between Risk, Cost, and Level of Service.

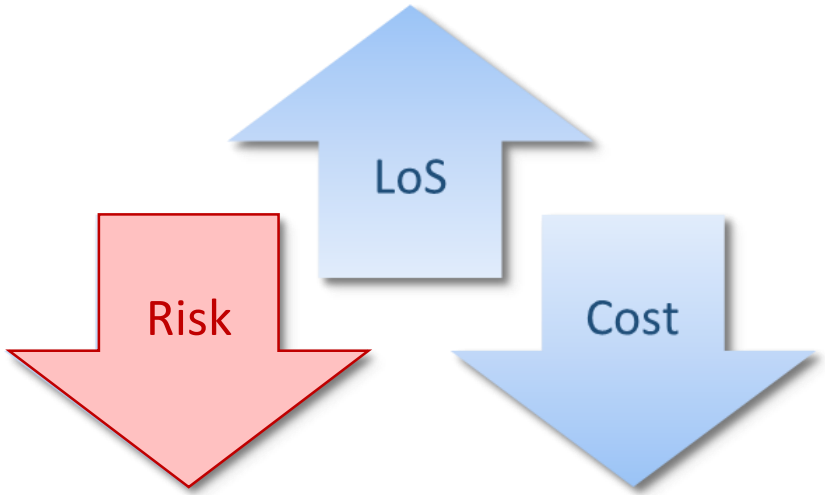


Goal of Asset Management at SJW

Asset Management Program Goal:

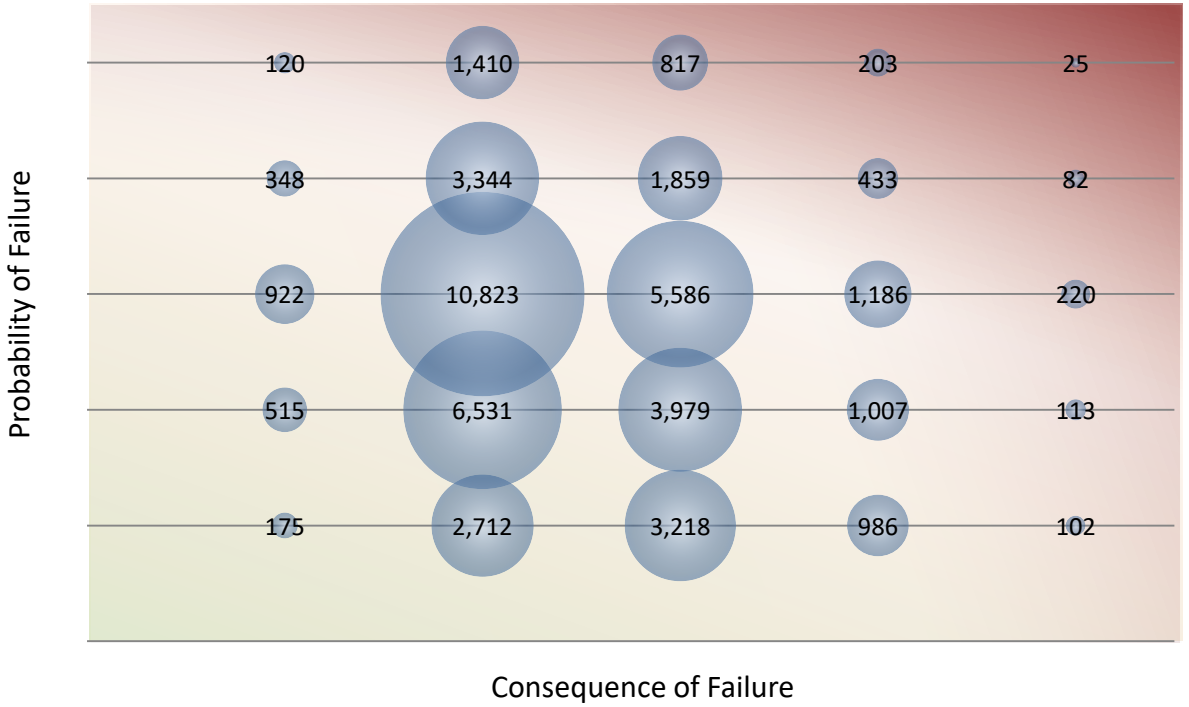
To maximize value derived from assets by optimizing the balance between Risk, Cost, and Level of Service.

Resilience, including financial resilience, falls in the category of risk



Risk

Probability of Failure x Consequence of Failure = Risk



Probability of Threat Occurrence x Consequence of Threat Impact x Vulnerability to Threat = Risk

Types of Risk Evaluations

Individual Asset Risk

In-Depth Risk Evaluation for Each Asset

Station Level Risk

Enterprise Level Risk

High-Level Risk Evaluation

Considered Various Outside Threats

Joint Effort Between Asset Management and Business Resiliency Depts

Criteria for High-Level Risk Evaluation

Consequence of Threat to the Asset (CoT)

Score	Impact Level	Social / Community	Financial	Environmental	Equivalent Dollar Amount
1	Low Impact	Can safely operate system and provide safe water service with minimal effort or coordination.	Minimal impact on business opeartions related to finance[1], on brand, and on shareholders.	Low environmental impact. Impact localized, not widespread.	< $100,000
2	Med-Low Impact	Can safely operate system and provide safe water service, but requires concerted effort and coordination.	Noticeable but low impact on business operations related to finance, on brand, and on shareholders.	Localized but moderate environmental impact	< $1 M
3	Moderate Impact	Generally able to safely operate system and provide safe water service, but requires difficult operations and puts notable strain on resources.	Moderate impact on business operations related to finance, on brand, and on shareholders.	Moderately widespread environmental impact (e.g. widespread in local creeks fishkill)	< $10 M
4	High Impact	Difficult to safely operate system and provide safe water service, and high strain on resources.	Notable impact on business operations related to finance, on brand, and on shareholders.	Widespread environmental impact	< $100 M
5	Severe Impact	Unable to safely operate system and provide safe water service. High chance of death or widespread illness.	Severe impact on business operations related to finance, on brand, and on shareholders.	Severe environmental impact (e.g. uncontained wildfire to the extent of national coverage, like PG&E Camp Fire).	>= $100 M

Likelihood of Threat Occurrence (LoT)

Score	Likelihood	Description	Notes	Equivalent Likelihood
1	Very Low Likelihood	Unlikely for threat to occur in the next 100 years	Events that have never occurred in the history of SJW, and have not come close to occurring.	<= 0.01
2	Low Likelihood	Reasonable for threat to occur in the next 100 years (e.g. 1 in 100 year storm)	Events that have occurred (or have come close to occurring) once in the history of SJW.	> 0.01
3	Moderate Likelihood	Reasonable for threat to occur in the next 50 years	Events that have occurred a few times in the history of SJW.	> 0.02
4	High Likelihood	Most likely to occur in the next 10 years	Events that occasionally occur (typically once every 10 years).	> 0.1
5	Very High Likelihood	Almost certain to occur in the next 5 years	Events that frequently occur (at least every few years).	>= 0.2

Threat-Asset Pair Analysis (Station Level)

210 Station Level "Assets"

- 31 Exemplar / Singular
- 179 Non-Exemplar

840 TAPs Analyzed
(2,520 scores)

- 124 Exemplar / Singular
- 716 Non-Exemplar

Asset(s)	Threat Priority	1				1				1				1				Threat Prioirty 1 Max Scores
	Threat Type:	Earthquakes				Wildland Fire				Long Duration Power Outage / PSPS				Confirmed Contamination				
	Assumptions:	Magnitude 7.0; station taken offline				Tanks taken offline; MCCs and panels damaged				3 days outage of nearby stations; PSPS areas LoT				CoT=4 default; CoT=5 if crit fac; accident or malevolent				
	Exemplar Facility?	CoT	LoT	Level of Concern	CoT Driver	CoT	LoT	Level of Concern	CoT Driver	CoT	LoT	Level of Concern	CoT Driver	CoT	LoT	Level of Concern	CoT Driver	Max Level of Concern
	Non-Exemplar	4	3	12	S	4	4	16	S	3	5	15	S	4	2	8	S	16
	Non-Exemplar	4	3	12	S	4	4	16	S	3	5	15	S	4	2	8	S	16
	Singular	1	3	3	S/F/E	4	4	16	S/F/E	1	4	4	S/F/E	5	3	15	S	16
	Singular	1	3	3	S/F/E	4	4	16	S/F/E	1	4	4	S/F/E	5	3	15	S	16
	Exemplar	4	3	12	S	4	3	12	S	3	5	15	S	4	2	8	S	15
	Non-Exemplar	4	3	12	S/F	4	3	12	S	3	5	15	S	4	3	12	S	15
	Non-Exemplar	5	3	15	S/F	4	1	4	S	3	3	9	S	5	3	15	S	15
	Non-Exemplar	3	3	9	S	3	3	9	S	2	5	10	S	5	3	15	S	15
	Non-Exemplar	4	3	12	S/F	3	1	3	S	3	5	15	S	5	3	15	S	15
	Non-Exemplar	5	3	15	S	4	2	8	S	3	3	9	S	5	3	15	S	15
	Non-Exemplar	4	3	12	S/F	3	2	6	S	3	5	15	S	4	3	12	S	15
	Exemplar	4	3	12	S/F	3	2	6	S	3	5	15	S	4	3	12	S	15
	Non-Exemplar	4	3	12	S	3	3	9	S	2	3	6	S	5	3	15	S	15
	Non-Exemplar	5	3	15	S/F	4	2	8	S	3	3	9	S	5	3	15	S	15
	Non-Exemplar	4	3	12	S	3	3	9	S	3	5	15	S	5	3	15	S	15
	Singular	5	3	15	S	5	1	5	S	3	3	9	S	5	1	5	S	15
	Singular	2	3	6	S	2	4	8	S/F	1	5	5	S	5	3	15	S	15
	Non-Exemplar	2	3	6	S/F	1	4	4	S/F	1	4	4	S	5	3	15	S	15
	Non-Exemplar	2	3	6	S/F	1	4	4	S/F	1	4	4	S	5	3	15	S	15
	Singular	4	3	12	F	3	4	12	S/F	1	5	5	S	5	3	15	S	15
	Singular	4	3	12	S/F	4	3	12	S/F	3	5	15	S	5	1	5	S	15
	Exemplar	2	3	6	S	1	1	1	F/E	3	3	9	S	4	3	12	S	12
	Exemplar	4	3	12	S	2	2	4	F/E	3	3	9	S	4	3	12	S	12
	Exemplar	1	3	3	S/F/E	1	3	3	F/E	2	3	6	S	4	3	12	S	12
	Exemplar	4	3	12	S	1	4	4	F/E	2	3	6	S	4	3	12	S	12
	Non-Exemplar	2	3	6	S	1	1	1	F/E	2	3	6	S	4	3	12	S	12
	Non-Exemplar	1	3	3	S/F/E	2	3	6	F/E	1	3	3	S	4	3	12	S	12

Threat-Asset Pair Analysis (Enterprise Level)

21 Enterprise Level TAPs Analyzed

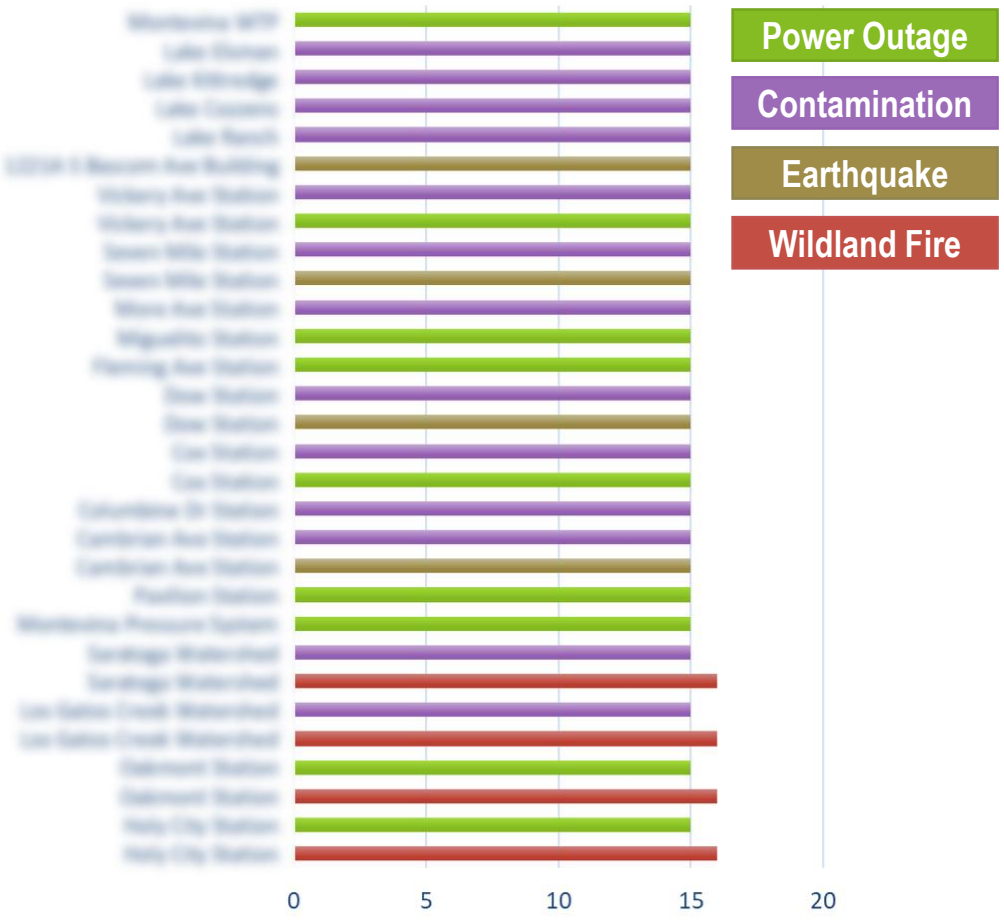
Threat	Asset	IT System If Applicable	CoT	LoT	Level of Concern	CoT Driver
Groundwater Aquifer Contamination	SJW	N/A	5	2	10	S
Fuel Shortage	SJW	N/A	4	3	12	S
Pandemic	SJW	N/A	3	4	12	S
Drought	SJW	N/A	3	4	12	S
Wildland Fire	SJW	N/A	5	4	20	S/F/E
Terrorism	Distribution System - Hydrants & Services	N/A	5	1	5	S
Cyber Attack - IT System Intrusion[1]	Accounting Data	E1	5	4	20	S/F
Cyber Attack - IT System Intrusion[1]	Meter Reading / Billing Data and System	CC&B / Itron	5	4	20	S/F
Cyber Attack - IT System Intrusion[1]	Personnel Data and System	ADP	5	4	20	S/F
Cyber Attack - IT System Intrusion[1]	Planning / Budgeting Data and System	PowerPlant / E1	4	4	16	F
Cyber Attack - IT System Intrusion[1]	Customer Profile Data and System	CC&B	5	4	20	S/F
Cyber Attack - IT System Intrusion[1]	SCADA Data and System	Wonderware	5	4	20	S/F
Cyber Attack - IT System Intrusion[1]	Asset and Work Mgt Data and System	ArcGIS / Infor EAM / WAM	3	4	12	S/F
Physical Damage to IT Systems	All IT System Servers	Multiple	5	4	20	S
Poor WQ from District	District Turnouts	N/A	4	2	8	S
Earthquake	Distribution System - Mains	N/A	5	3	15	S
Earthquake	Distribution System - Services	N/A	3	3	9	S
District Treatment Plant Outage	Penitencia WTP	N/A	2	4	8	S
District Treatment Plant Outage	Rinconada WTP	N/A	3	4	12	S
District Treatment Plant Outage	Santa Teresa WTP	N/A	3	4	12	S
District Treatment Plant Outage	All WTPs	N/A	4	4	16	S
SBWR Plant Outage	SBWR Plant	N/A	2	3	6	S

Notes:

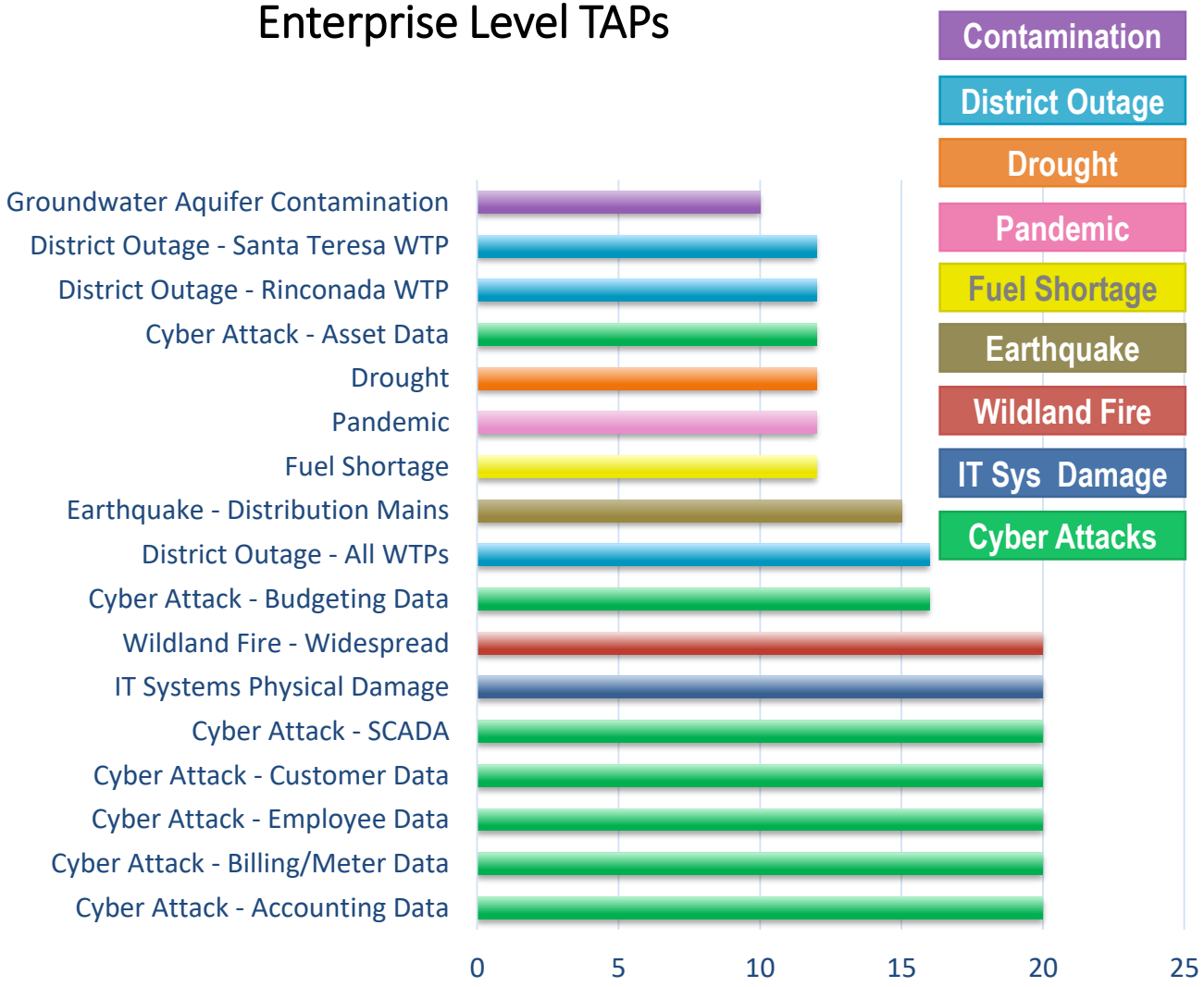
(1) IT System Intrusion includes threats such as ransomeware and malware

Threat-Asset Pairs of Highest Concern

Station Level TAPs



Enterprise Level TAPs



Work Activity During COVID-19 Pandemic

- Halted majority of field activity in March due to COVID-19; all office staff worked from home
- Only mission-essential field activity resumed with changes to procedures to ensure safety of employees and the public
- Needed a systematic and defensible way to resume work activities
- Health & Safety department led a collaborative, enterprise-wide work activity risk evaluation effort
- Risk evaluation framework was aligned with the asset management risk framework

Brief Overview of Activity Risk Evaluation

- Work activity risk assessments were conducted for all work functions
- Job Hazards Analyses conducted for work activities
- Triple bottom line considerations
- Risks evaluated:
  - Not To Do
  - To Do – Inherent
  - To Do - Residual

Consequence of Threat (CoT)	Employee and Contractor Health & Safety (1)*	Number of people adversely impacted*	Water Service	Critical Customers Affected	Environmental Health	Financial Impact (3)	Social / Customer Perceptions (4)	Legal and Compliance (5)
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Date:	Employee Health & Safety				Adversely impacted public			Water Service			Critical Customers			Environmental Health			Financial Impact			Customer Perceptions			Legal and Compliance		
5/13/2020	CoT	LoT		Risk incl. Vulnerabilities	CoT	LoT		CoT	LoT		CoT	LoT		CoT	LoT		CoT	LoT		CoT	LoT		CoT	LoT	
NOT TO DO	1	1	1	1.5	3	1	3	1	1	1	1	1	1	3	3	9	1	1	1	1	2	2	3	3	9
TO DO Inherent	3	3	9	13.5	2	1	2	4	4	16	1	1	1	2	3	6	1	1	1	4	4	16	3	1	3
TO DO Residual	3	2	6	9	2	1	2	4	2	8	1	1	1	2	2	4	1	1	1	4	2	8	3	1	3

Individuals' Health (1):	Not at high-risk	1
Public Health Indicators:	Peak and Plateau	1.5

Highest Risk(s)

Scatter Chart Zone: Zone 5 TLMT Review

Inherent = Risk in the absence of any actions taken to alter either the consequence or likelihood

Residual = Risk remaining after controls implemented

1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

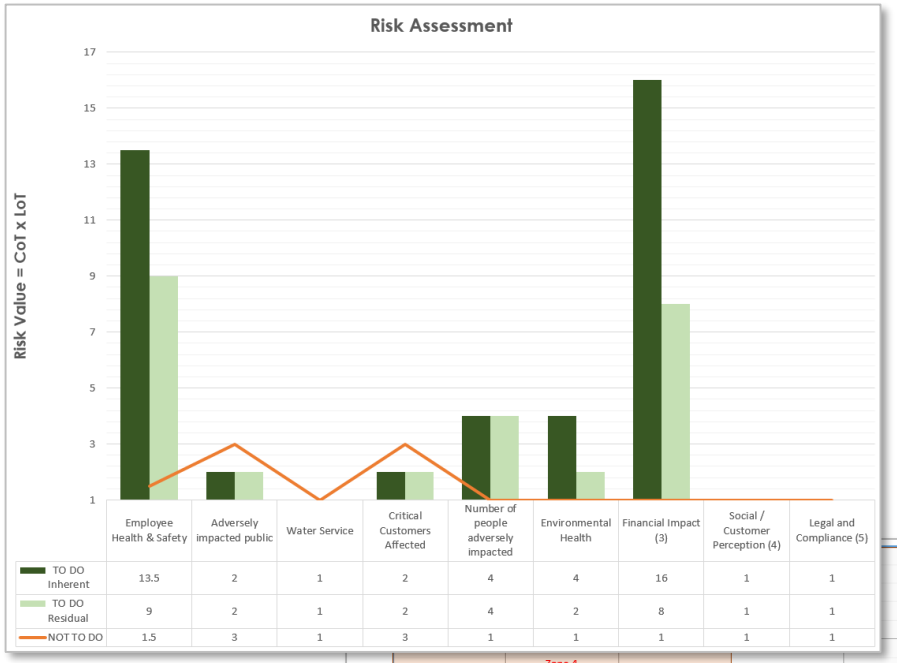
Likelihood	1	2	3	4	5
	Very Low Likelihood	Low Likelihood	Moderate Likelihood	High Likelihood	Very High Likelihood
Frequency	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
COVID-19 Specific Likelihood (Contact Intensity)*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Likelihood of Threat (LoT)

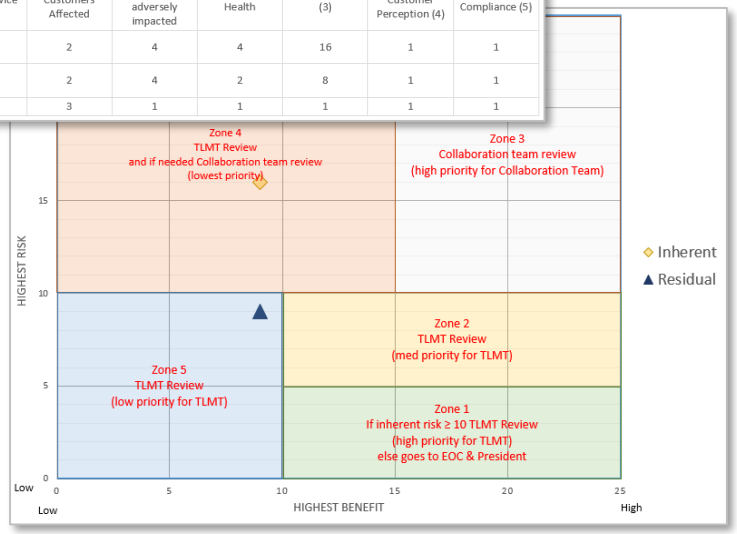
*First two "Consequence" columns correspond to the bottom "Likelihood" row

Brief Overview of Activity Risk Evaluation

- Activities with high “Not To Do” Risk were considered first
- Activities with low enough Residual Risk were implemented after approved by Threat Leveling Management Team
- Activities re-evaluated on a weekly basis



	Employee Health & Safety	Adversely impacted public	Water Service	Critical Customers Affected	Number of people adversely impacted	Environmental Health	Financial Impact (3)	Social / Customer Perception (4)	Legal and Compliance (5)
TO DO Inherent	13.5	2	1	2	4	4	16	1	1
TO DO Residual	9	2	1	2	4	2	8	1	1
NOT TO DO	1.5	3	1	3	1	1	1	1	1



Conclusion

- Asset management framework was used for identifying and prioritizing large scale risks; joint effort between Asset Management and Business Resiliency departments
- Framework for evaluating work activity risk during COVID-19 was developed by Health & Safety department in alignment with asset management framework and principles
- Cross-departmental collaboration was central to effort
- Asset management framework and principles play a critical role in ensuring operational and financial resilience

Contact

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SAN JOSE WATER

Winooski Vermont Asset Management Program

Becoming Financially Resilient through Asset Management

Winooski has ~8500 residents w/in 1 Sq Mi of fun. The demographics have changed over the years from a tight—knit mill town to a now 80% rental population, home to many new Americans speaking~20 different languages

60 Winooski Falls Way Winooski, Vermo...
ickokandboardman.com · Out of stock

City of Winooski announces n...
vtdigger.org

CEA
cea-vt.com

Winooski, Vermont (VT 05404, 054...
city-data.com

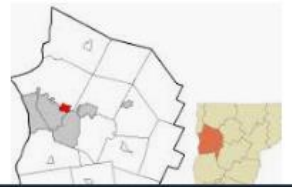
60 Winooski Falls Way #1418, Winooski ...
redfin.com

Winooski High Resolution Stock ...
alamy.com

Winooski Vermont Real Estate ...
catamountrealtygroup.com

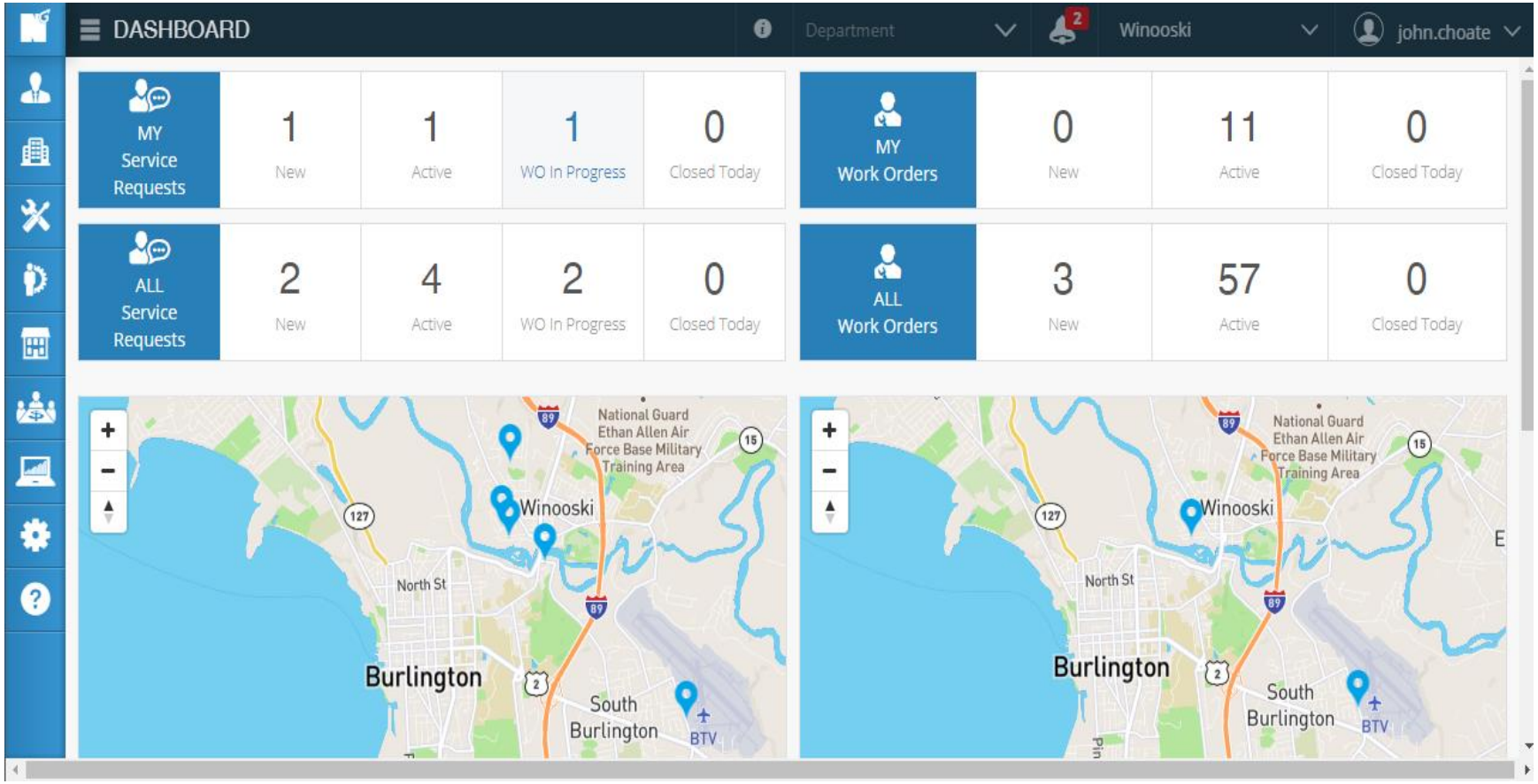
CityLights – Modern Living – Winooski, VT
citylightswinooski.com

Just a tank of gas away: Winooski, Vt ...
boston.com

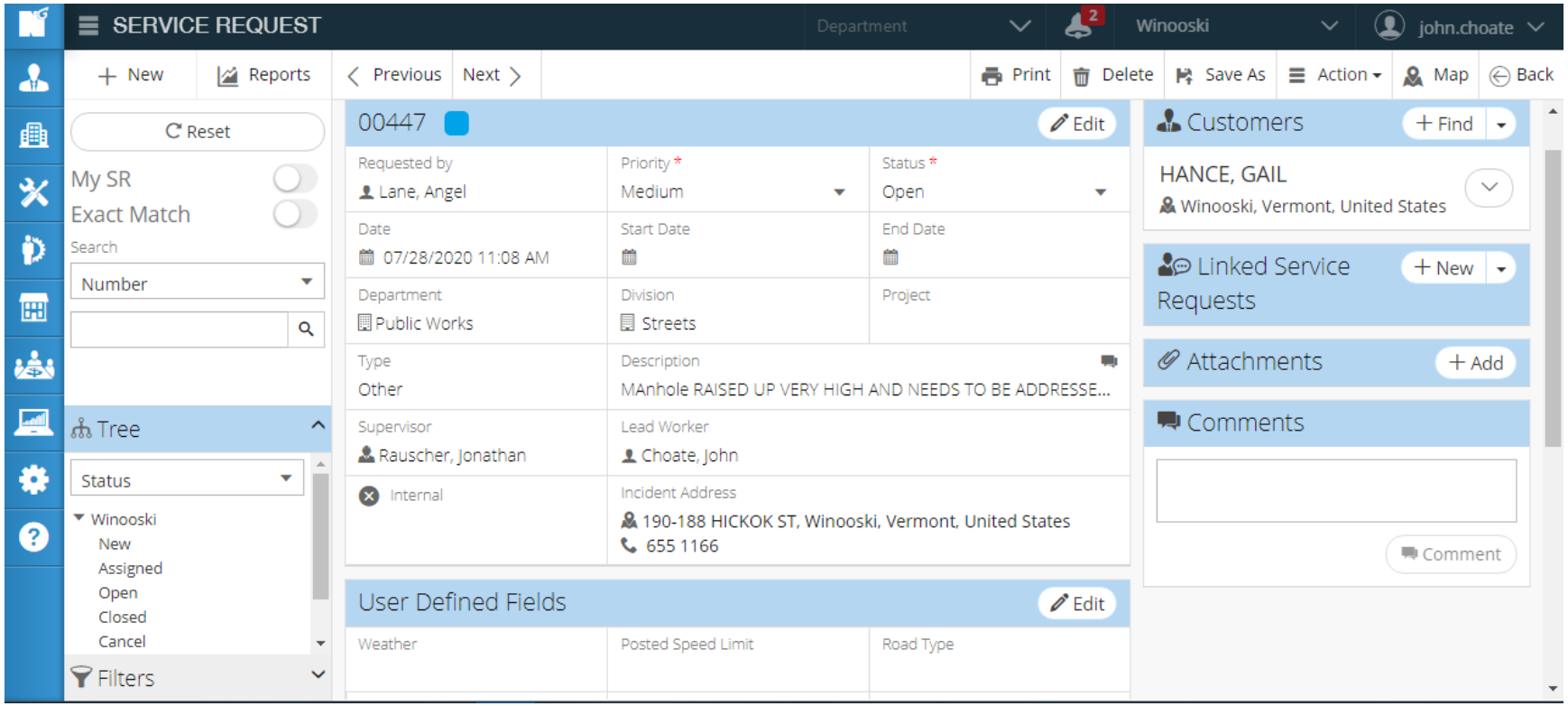


Asset Management has allowed a small DPW staff of 12 to more efficiently prioritize and financially track projects. Most communities have always had some level of asset management whether they knew it or not; but now our AMP gives us a readily accessible central location for all information relating to city-wide assets. We spend less time looking for information and less need relying on paper and institutional knowledge (ie. Ask the old guy!)

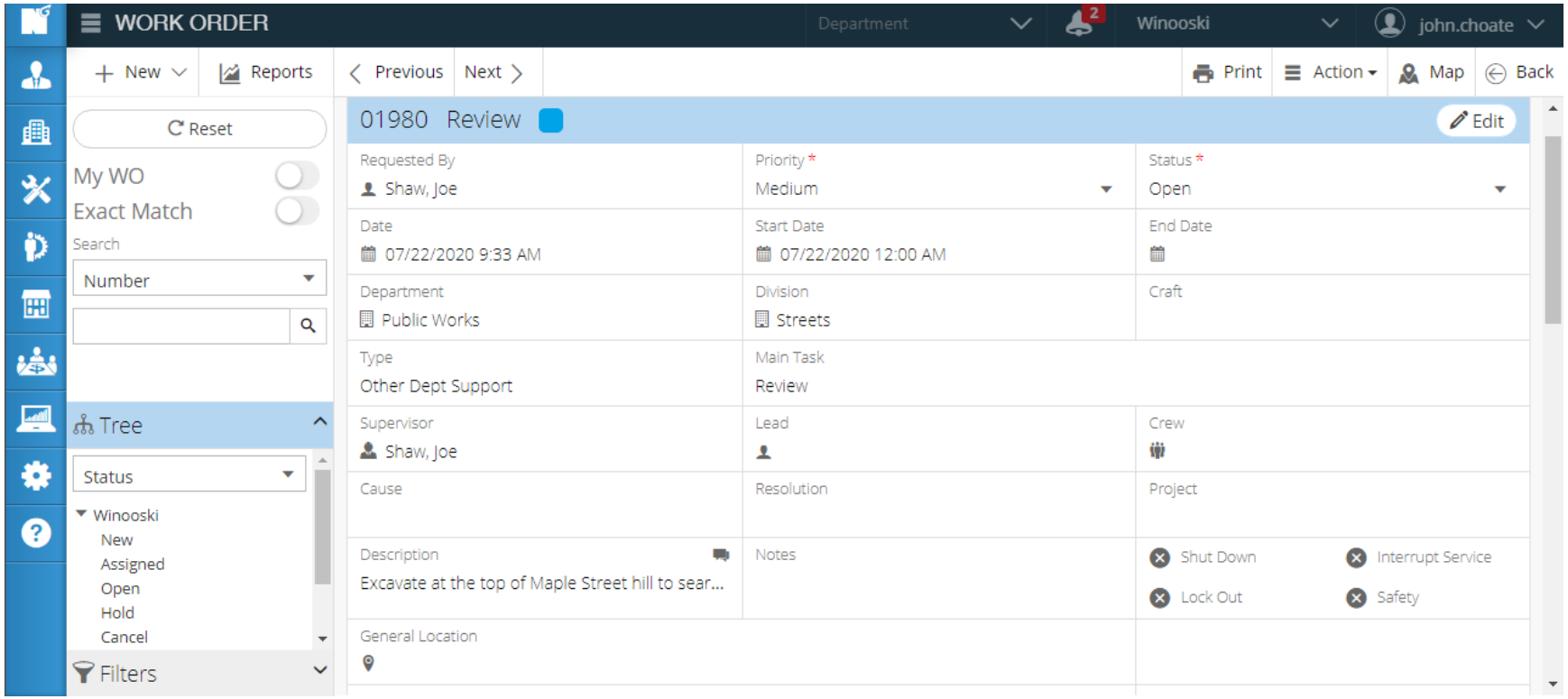
In 2016 the City competitively bid for an AMP, short-listing to three companies to present their programs. We chose Nexgen located in Sacramento, CA for many reasons but mainly their ability to provide a utility – based program not a utility program adapted from a warehousing program.



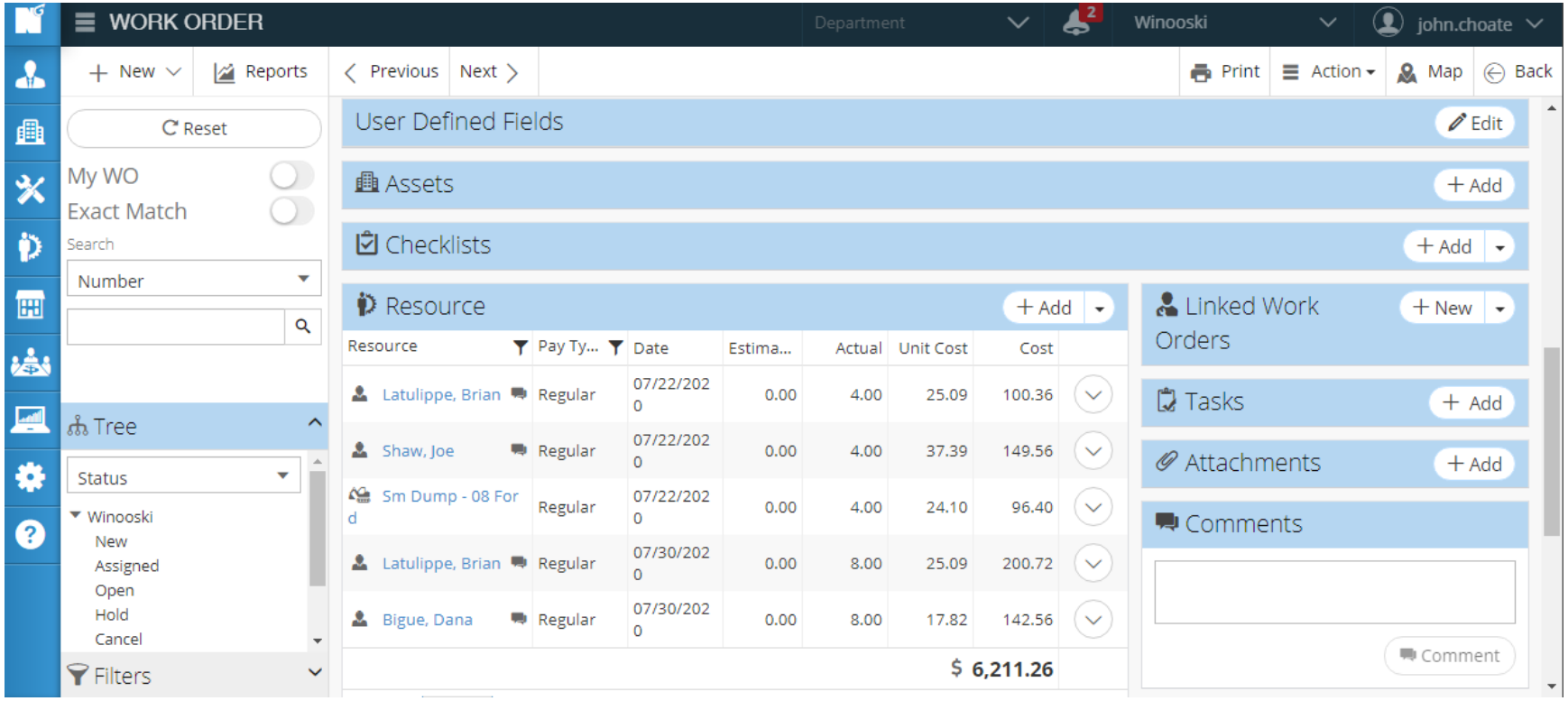
A Service Request Module allows us to offer residents/business customers easy access to city services. This is the first line of contact to DPW and allows us a means of communication and professional resolution management.



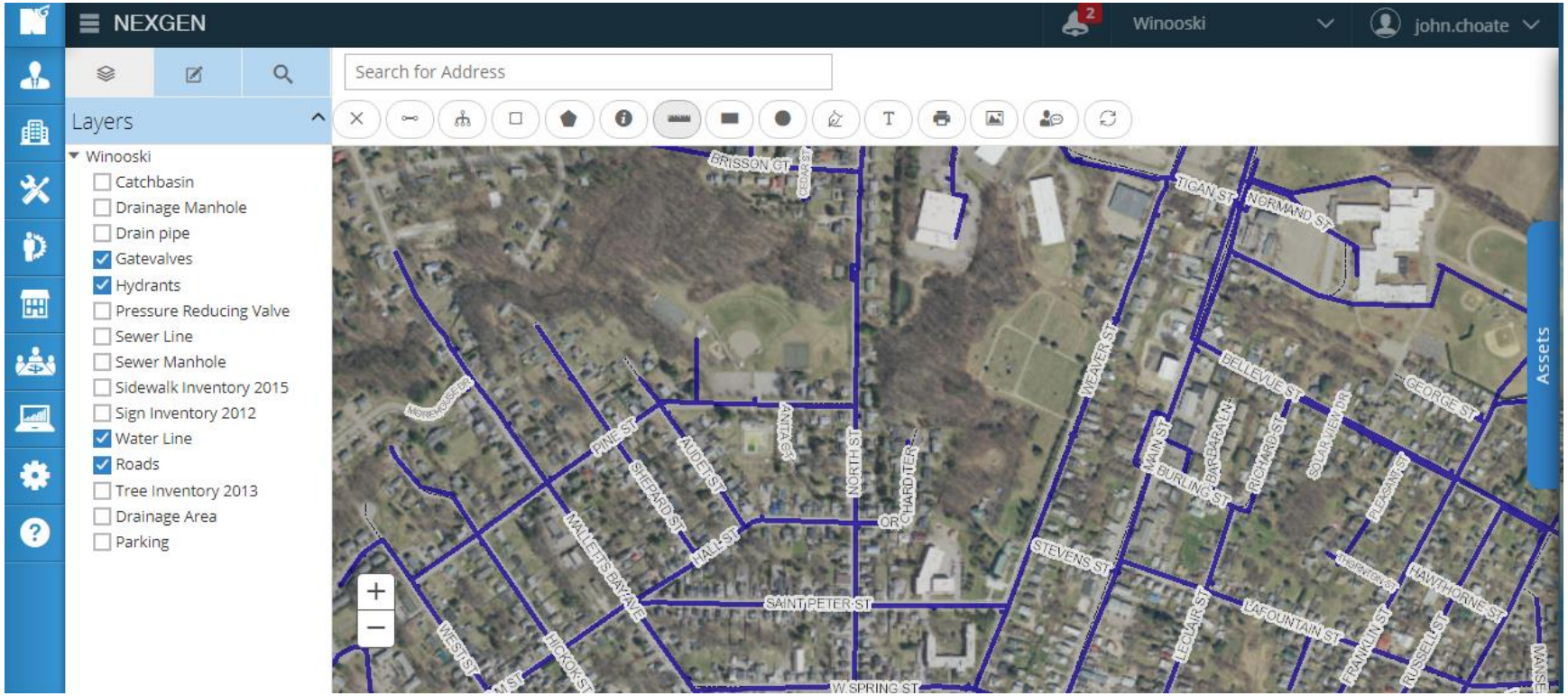
The Work Order Module allows for SRs or stand-alone projects to be scheduled with particular staff or equipment. This is the program most used by DPW on a daily basis but is becoming an important predictive tool as asset information continues to build.



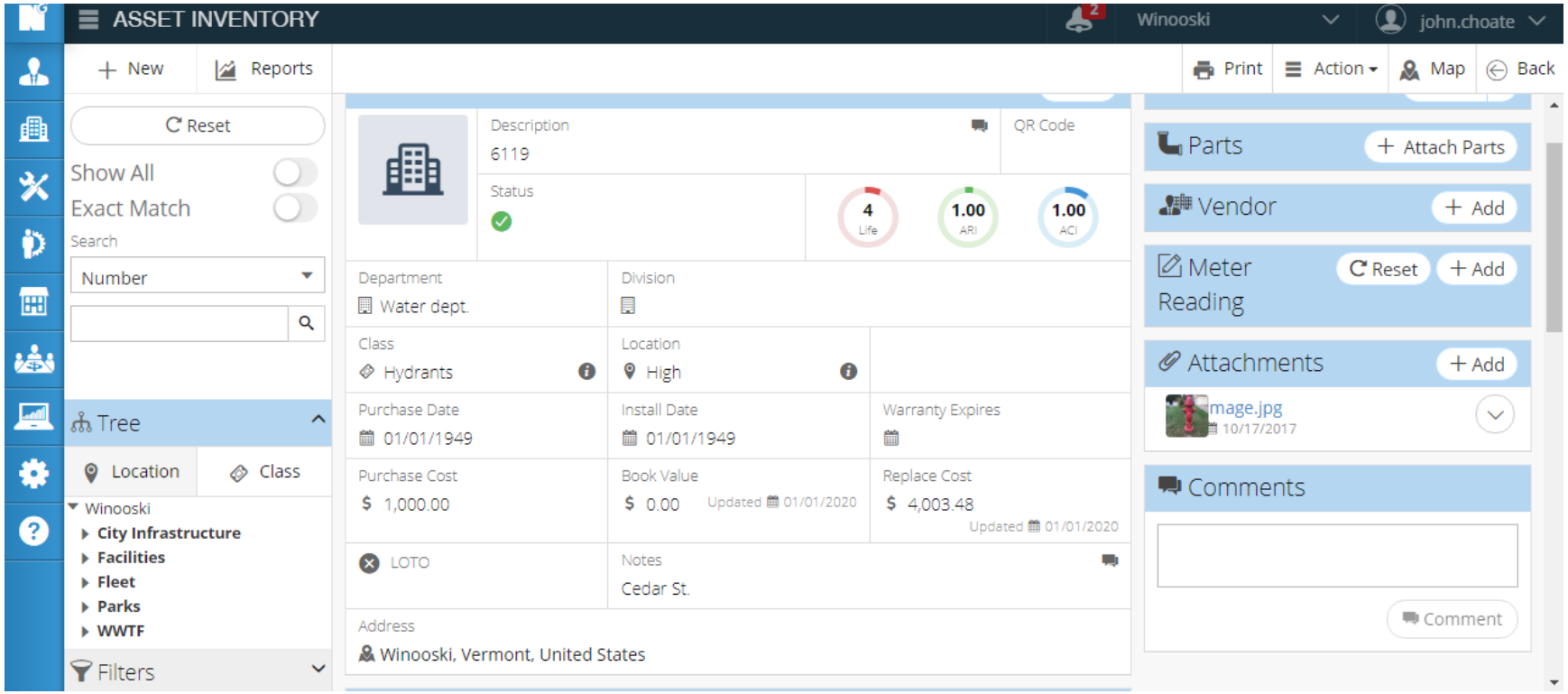
W/O's can track any project predictive or corrective maintenance required. All staff, equipment, and any materials or contractual labor used is easily added right here once rates and costs are loaded into the program. Having a true sense of what projects really cost the department and how long they take has really added value to what DPW provides the City.



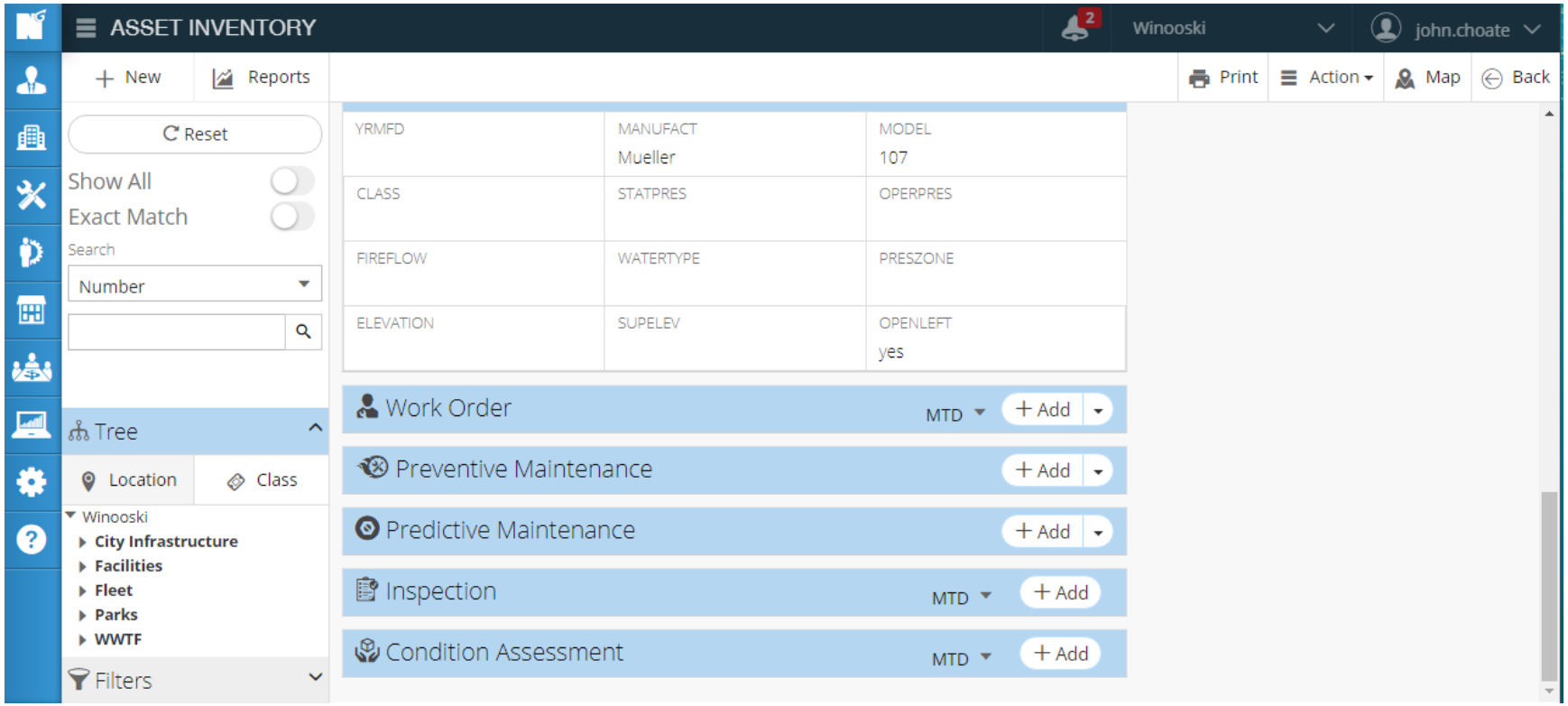
The GIS Module was the first thing we implemented; GPSing every structure associated with the three utilities. We are continually ground-truthing water valve configurations and manhole locations as well as piping connectivity. Having this pertinent and accurate asset info available to on-call staff is key for issues like quickly isolating a water leak by valve operation, for instance.



Any asset can be chosen or thumb-tacked in order to retrieve more information specific to that asset; for instance this hydrant. All pertinent data w/re to this hydrant is stored here and available to the operator on the mobile app as well. We are continually adding inspection forms for things like hydrants and valves, sewer and SW line video inspection, and manhole work.



All annual maintenance or specific work to this asset is stored here. We operate/flush each hydrant 2X/yr so that inspection info is easily updated each time.
As we populate the program with this information, prioritization of capital projects can be professionally presented to Council/Admin – not just our opinions as to what needs upgrading.



The State's 2016 AMP grant program really sped up our RFB and implementation process – allowed us to use annual expense vs going thru capital planning. Focus on GPS/GIS work that initial year evolved into further asset inventory and assessment work in the 2017 grant cycle. Having grant deadlines forced staff to adhere to the implementation schedule too. Employees have really embraced use of this asset management tool and it's now showing the benefits.