

# Showcase of Other Initiatives

WATER FOR 2060 IN ACTION ACROSS OKLAHOMA

John Rehring, P.E.

2016 Governor's Water Conference

October 11, 2016

Norman, Oklahoma



 **carollo**  
Engineers...Working Wonders With Water®

A long time ago in a conference room far,  
far away...

**Episode XI  
A NEW SUPPLY**

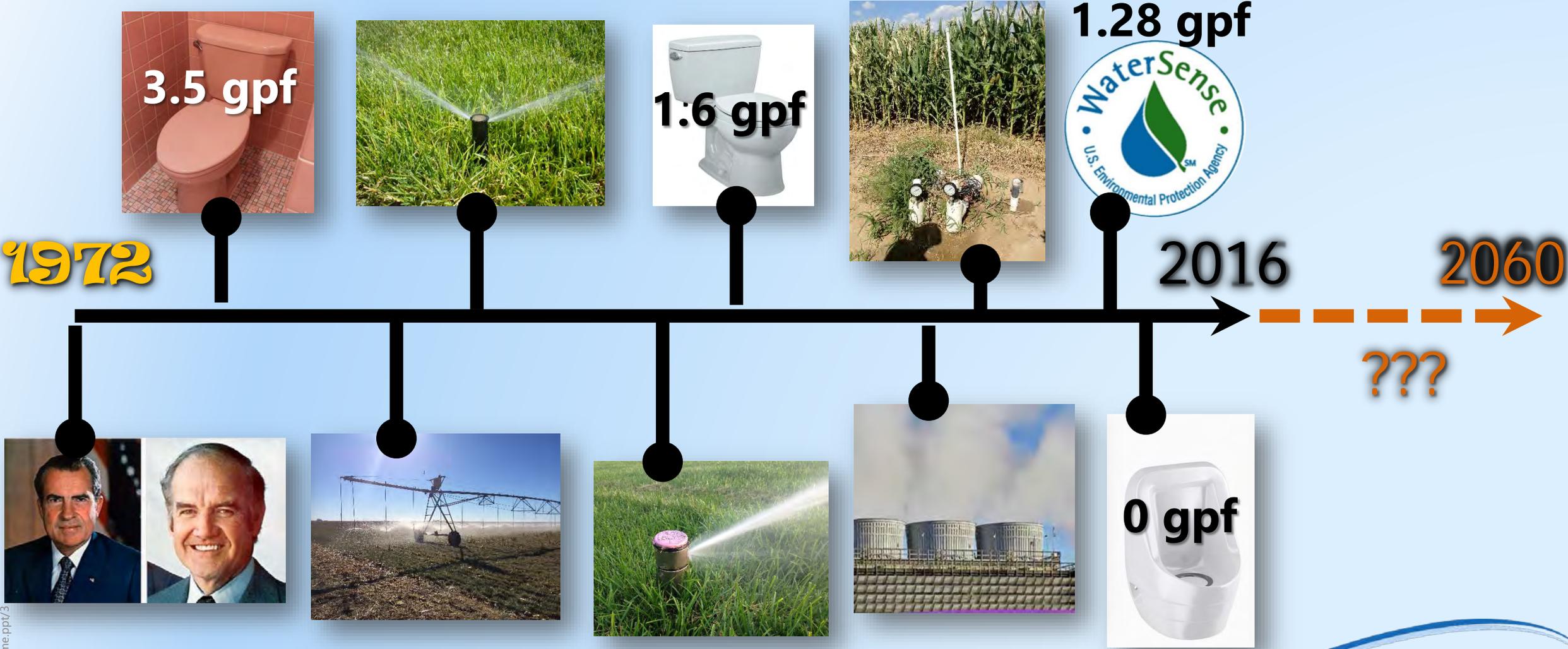
***It is a time of extreme drought. Brave  
Water Providers and Users are desperate  
to stave off crisis.***

***Banding together with regulators, they fill  
the WATER SUPPLY gap with local  
supplies.***

***conserving water, safely us***

# What's possible 44 years from now... in 2060?

## Consider the past 44 years of progress!



**SUSTAINABILITY**

**RELIABILITY**



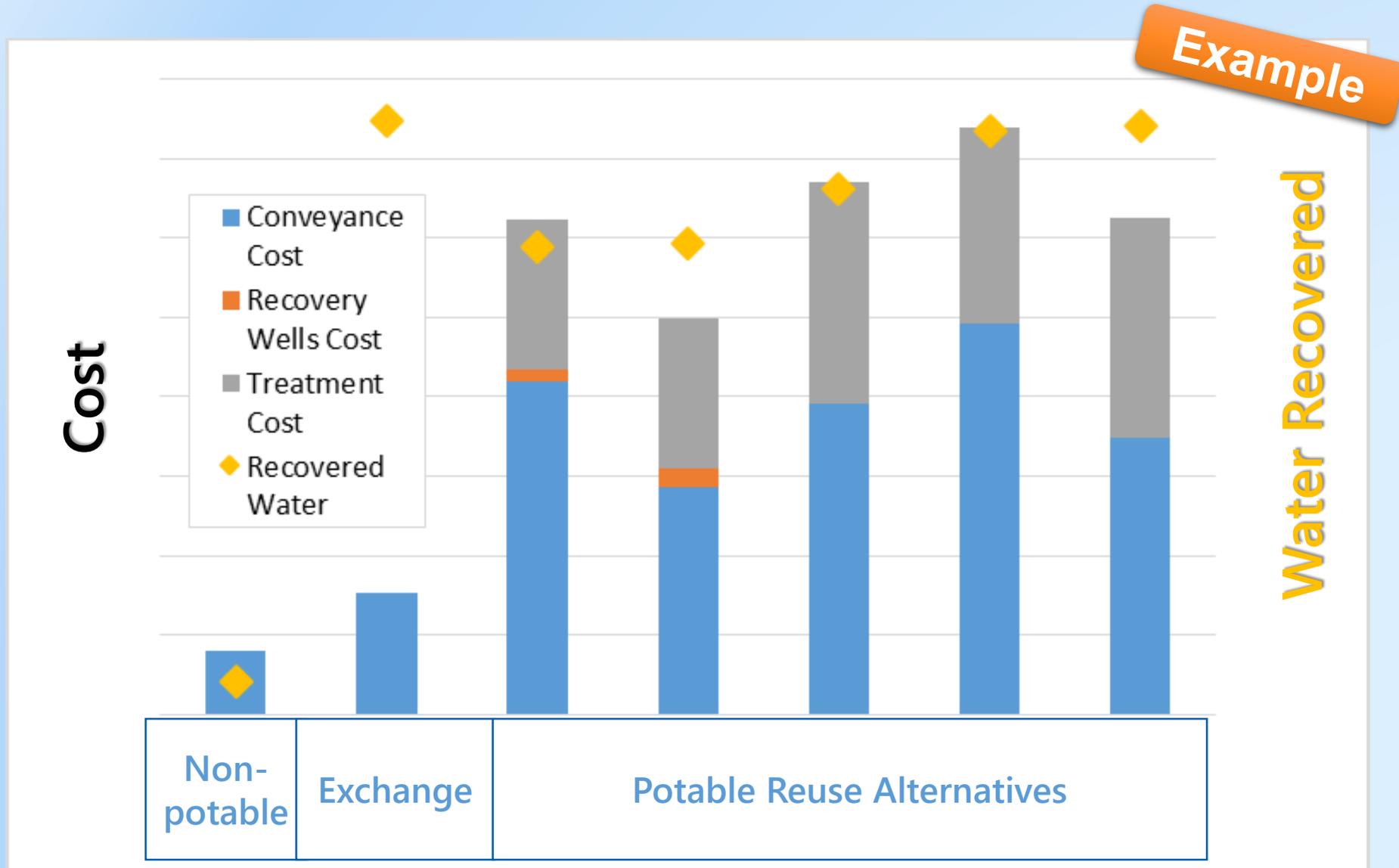
# Water Reuse “Yield” Varies with the Type of Reuse

Type of Reuse	Typical Water Supply Benefit	Considerations
 <p>Irrigation <b>Non-Potable</b></p>		<ul style="list-style-type: none"> <li>• Seasonal demand</li> <li>• Limited sites</li> <li>• Infrastructure</li> </ul>
 <p>Commercial / Industrial <b>Non-Potable</b></p>		<ul style="list-style-type: none"> <li>• Limited sites</li> <li>• Infrastructure</li> <li>• Supply/demand proximity</li> </ul>
 <p>Water Supply Augmentation <b>Potable</b></p>		<ul style="list-style-type: none"> <li>• Supply &gt; demand</li> <li>• Public outreach/acceptance</li> <li>• Regulations &amp; treatment</li> </ul>

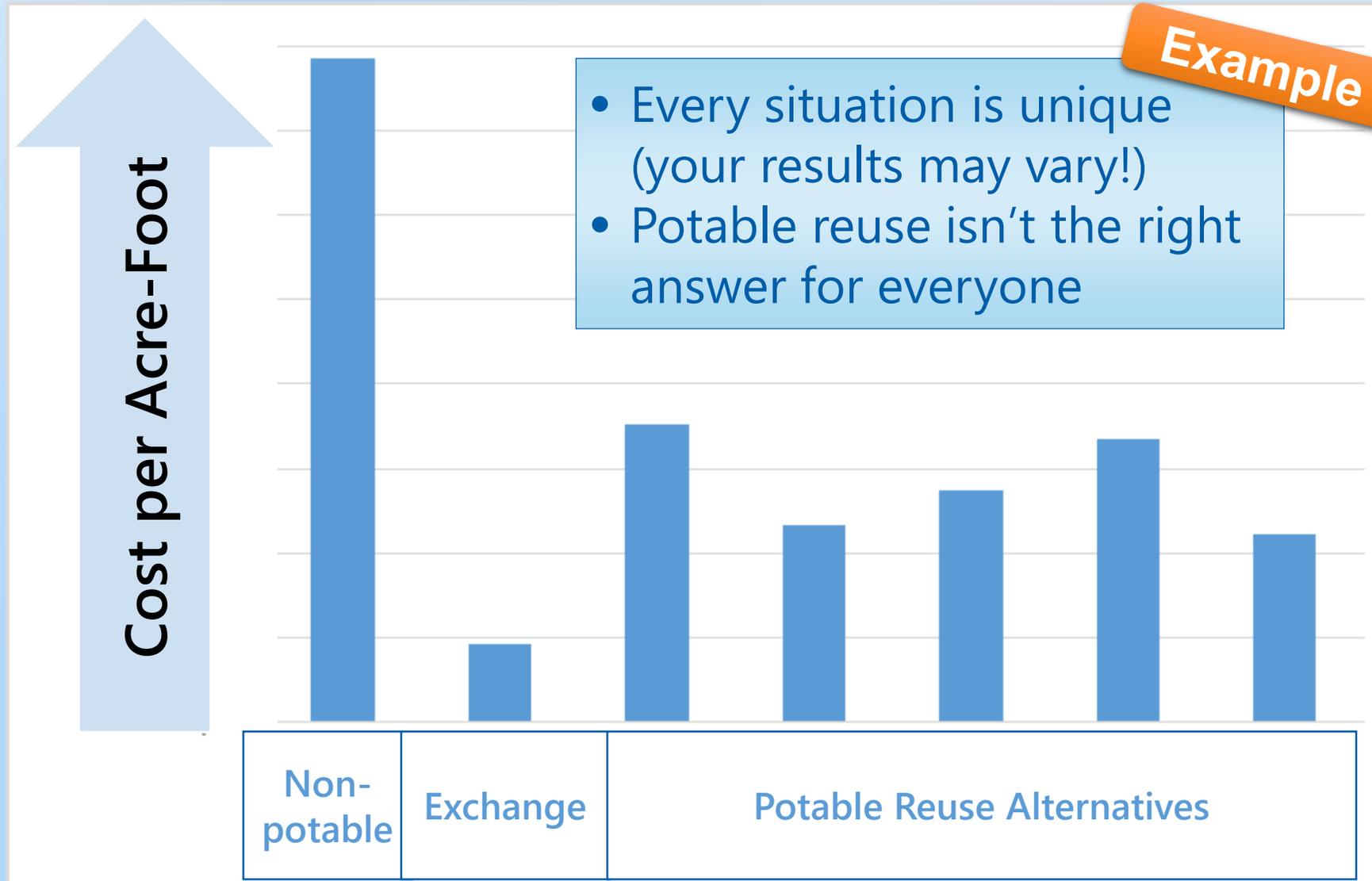
ALL CONTRIBUTE TO WATER FOR 2060 GOALS



# Water Reuse: Cost vs. Cost-Effectiveness



# Water Reuse: Cost vs. Cost-Effectiveness



# Water for 2060 Showcase



Paving the Road to Efficiency in Oklahoma

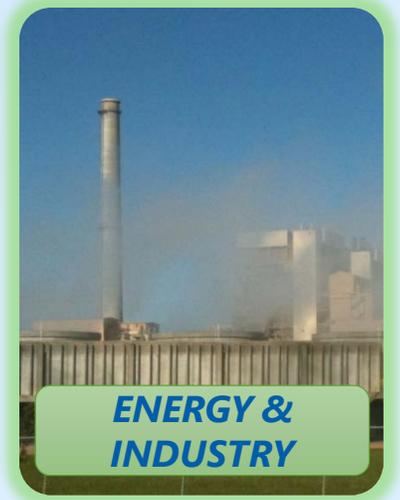
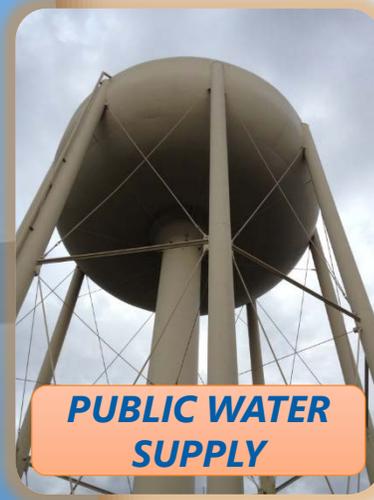
Walking the Walk

Water for 2060 Innovation



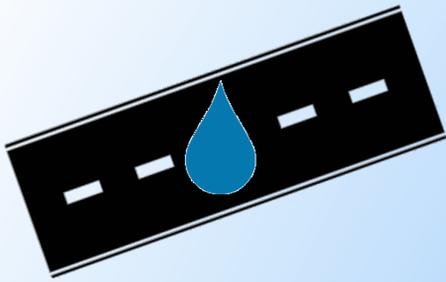
# Paving the Way for Water Efficiency in Oklahoma

Report of the  
Oklahoma Water for 2060  
Advisory Council  
October 2015

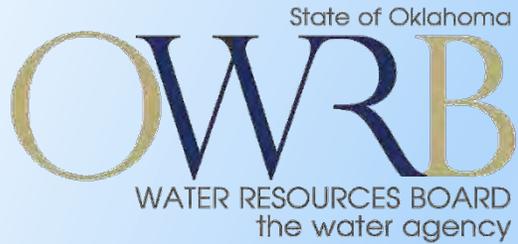


**WATER FOR 2060**  
EFFICIENCY • CONSERVATION • RECYCLING • REUSE





# Paving the Way for Water Efficiency in Oklahoma



**US Army Corps of Engineers®**



## REGIONALIZATION FACT SHEET

**WATER FOR 2060**  
EFFICIENCY • CONSERVATION • RECYCLING • REUSE

Beckham  
SDWIS ID: ...  
County: Beckham  
OCWP Basin: ...

Existing Supplies  
Groundwater  
Alluvial and ...

Existing Infrastructure  
Ongoing ...  
Carter, Rock ...

Population  
Projection  
Population  
Demand (AFY)  
Source: OCWP

Future Water  
Basins 34 are  
spots" in the  
with surface  
shortages in  
Potential

Interconnection  
Pipe Length  
Pipe Diameter  
Piping Capacity

Pipe length including ...

Groundwater  
Northern River  
from Beckham  
Thirty Wa ...

Regional  
Port Reserv  
the most vi  
Total st  
Depend  
Cost: \$  
September 2

## CONSERVATION FACT SHEET

**WATER FOR 2060**  
EFFICIENCY • CONSERVATION • RECYCLING • REUSE

City of Duncan  
SDWIS ID: ...  
County: Ste...  
OCWP Basin: ...

Existing Supplies  
Surface water  
Lake Humph...

Population and  
Projection  
Population  
Demand (AFY)  
Source: OCWP

Future Water  
Basin 26 in s...  
in the 2012 C...  
supplies, and

Reducing Water  
Conservation

2012 Update  
With enhance  
Duncan, Con...

## MARGINAL QUALITY WATER FACT SHEET

**WATER FOR 2060**  
EFFICIENCY • CONSERVATION • RECYCLING • REUSE

City of Watonga  
SDWIS ID: OK2000602  
County: Blaine  
OCWP Basin: Central Region, Basin 51

Existing Supplies  
Groundwater.

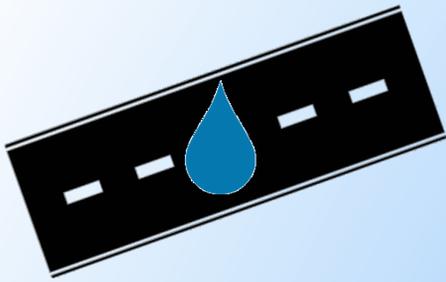
Population and Demand Projections		Projection				
		2020	2030	2040	2050	2060
Population		5,208	5,667	6,127	6,576	7,074
Demand (AFY)		1,137	1,237	1,337	1,436	1,544

Source: OCWP; AFY: acre-feet per year

Future Water Shortages  
Basin 51 along the North Canadian River northwest of Oklahoma City was identified as one of the state's water supply "hot spots" in the 2012 Oklahoma Comprehensive Water Plan. Basin 51 has fully allocated surface water supplies, and groundwater is known to have water quality issues.

Marginal Quality Water Use  
Beneficial reuse of treated wastewater is increasingly being considered and implemented in communities across Oklahoma to reduce use of fresh water supplies. Water reuse was investigated in Basin 51 for Watonga, El Reno, and Yukon, each of which has a water reclamation facility that can produce water suitable for non-potable use. Other potential marginal quality uses in Basin 51 include potable or non-potable reuse. Other potential alluvial water with high nitrates, and ...

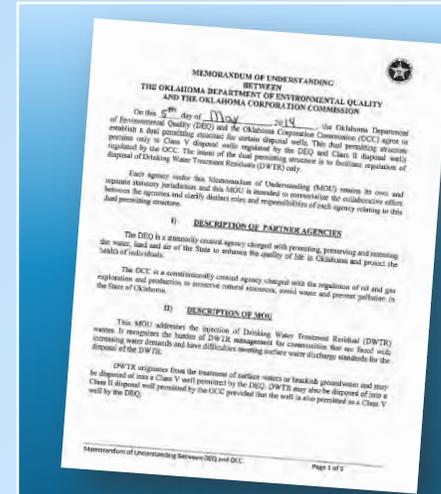
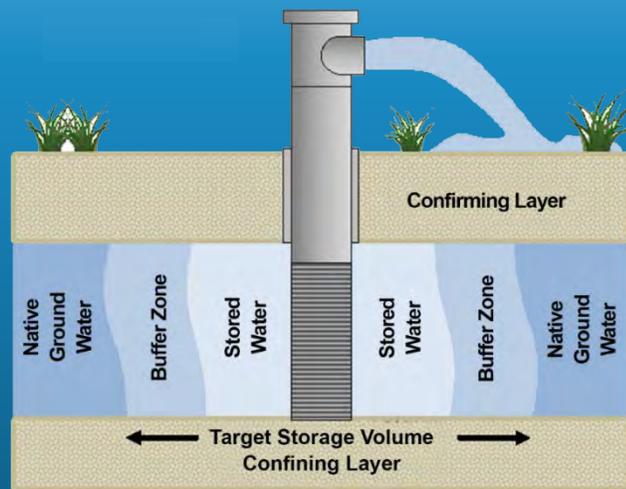




# Paving the Way for Water Efficiency in Oklahoma



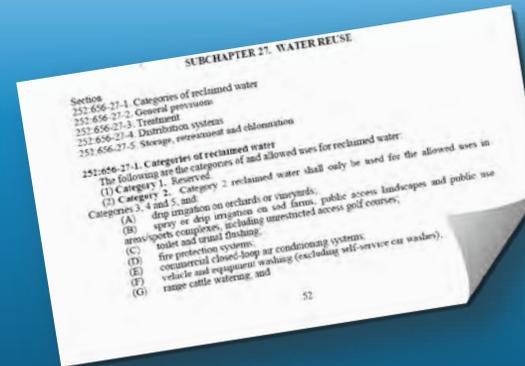
## ASR Workgroup



## ODEQ / OCC MOU

- Management of drinking water treatment residuals

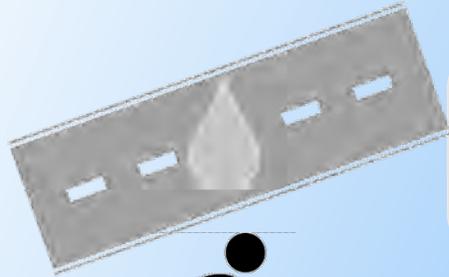
## ODEQ Reuse Regulations



- Non-potable reuse
- Category 6 and Oil & Gas Uses
- Developing potable reuse regs (Category 1)



# Water for 2060 Showcase



Paving the Road to Efficiency in Oklahoma



Walking the Walk

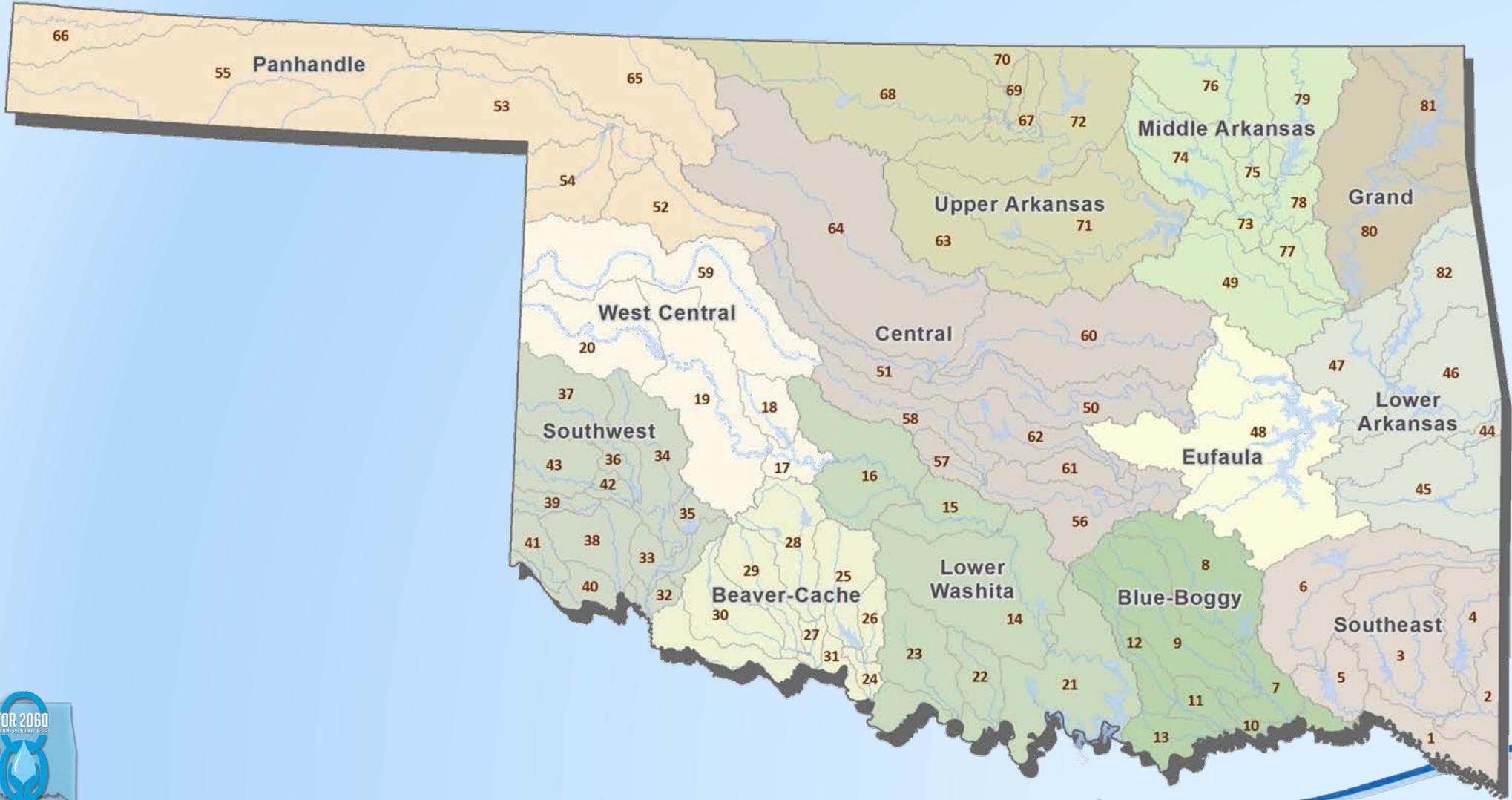


Water for 2060 Innovation



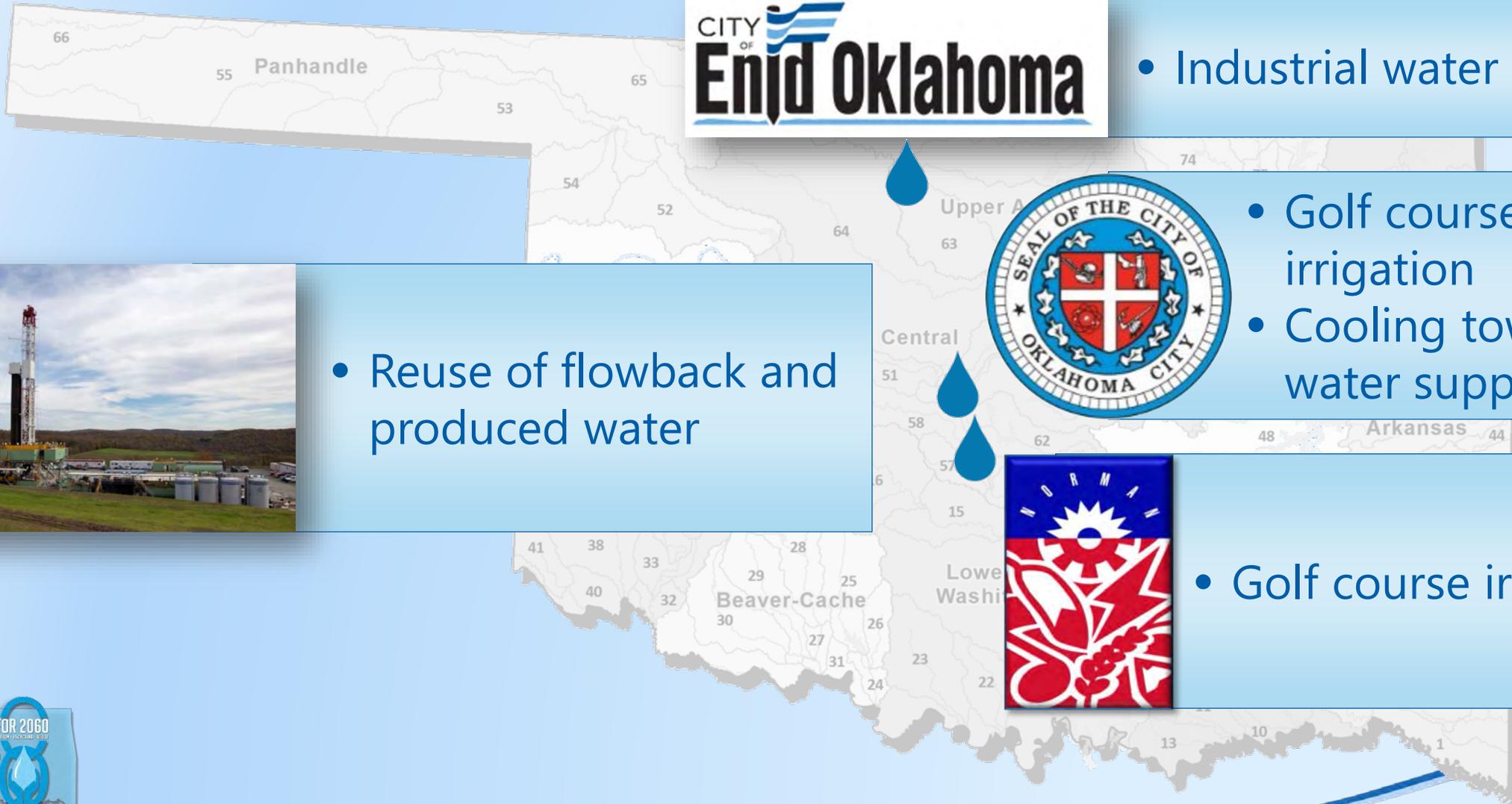


# Walking the Walk





# Walking the Walk: Water Reuse Across Oklahoma



CITY OF **Enid Oklahoma**

- Industrial water supply

- Golf course irrigation
- Cooling tower water supply

- Reuse of flowback and produced water

- Golf course irrigation





# Walking the Walk: Water Reuse and Marginal Quality Water Use Planning



- Reuse Feasibility Study



- Lake Thunderbird augmentation
- Well field water quality management



- Planning for brackish groundwater use and water reuse





# Walking the Walk: OWRB Financial Assistance Division Support and New Water Partnerships

**Drought Relief Grants  
(Guymon, Hollis, Altus, Tipton)**

**Water for 2060 Grants  
(Shattuck, Fort Supply, Boise City, Frontier DA)**

**Automated Meter Reading projects under CWSRF  
(Broken Arrow, Eufaula, Perkins, Tuttle, Porum)**

**Regional treatment plant - Flint Ridge RWD  
(to serve Flint Ridge, West Siloam Springs, Kansas, and Delaware Co. #11)**

**Support for advanced treatment facilities to use marginal quality supplies**

**Cooperative Planning Tool**





# Walking the Walk: Water Efficiencies in Agriculture



- Low-Energy Precision Application nozzles
- Technology-enabled controls



Yield per acre

"Yield per acre-foot"



Drought tolerant crop research

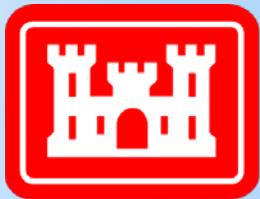
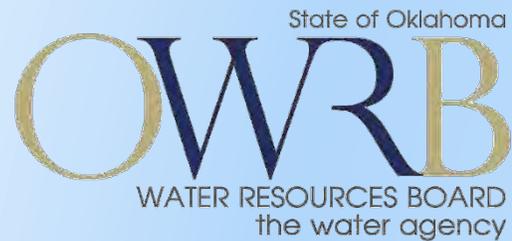


- Micro-irrigation at roots
- Demonstration and full scale
- Yield optimization

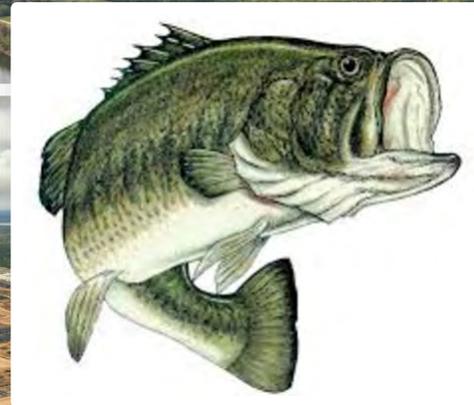
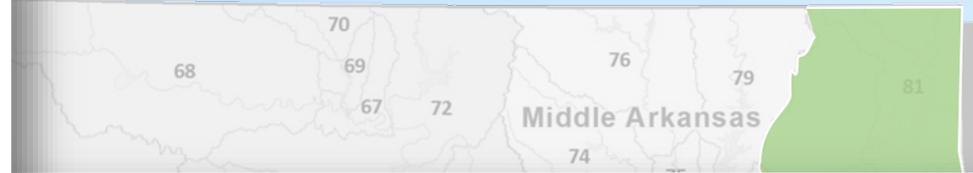




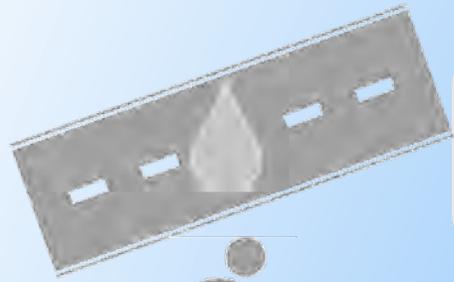
# Walking the Walk: Collaborative Planning for Multiple-Benefit Water Management



**US Army Corps  
of Engineers®**



# Water for 2060 Showcase



Paving the Road to Efficiency in Oklahoma



Walking the Walk

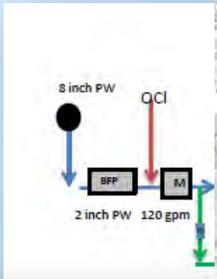


Water for 2060 Innovation





# Water for 2060 Innovation: Edmond Splash Pad Reuse



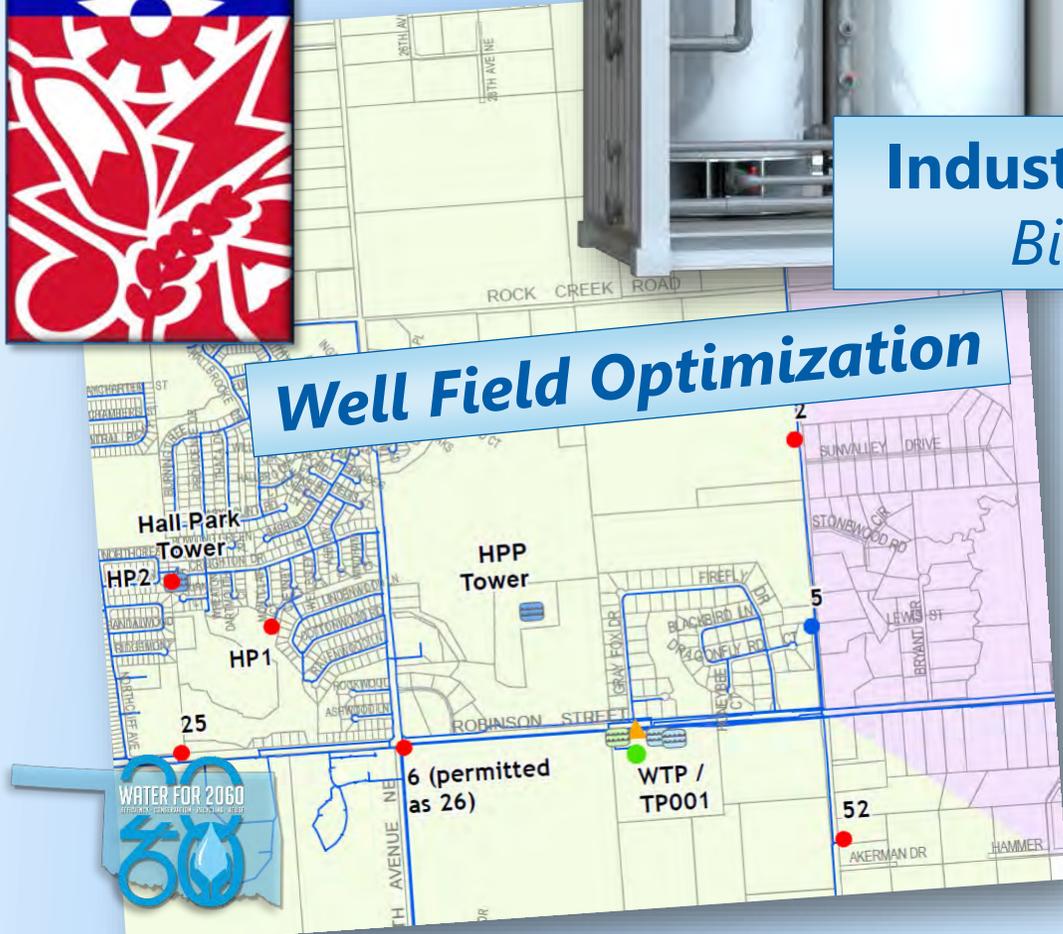


# Water for 2060 Innovation: Norman Groundwater Quality Management



**Industry-leading research on Chromium-6 removal**  
*Biological removal and two other technologies*

**Well Field Optimization**



**biottta**<sup>TM</sup>

**RECLAMATION**  
*Managing Water in the West*



# Takeaways: Water for 2060 in Action Across Oklahoma



Providing the framework to implement alternative sources and management strategies



Water providers and users are “walking the walk” like never before



Innovative ideas for ways to reuse water and employ marginal quality water supplies



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