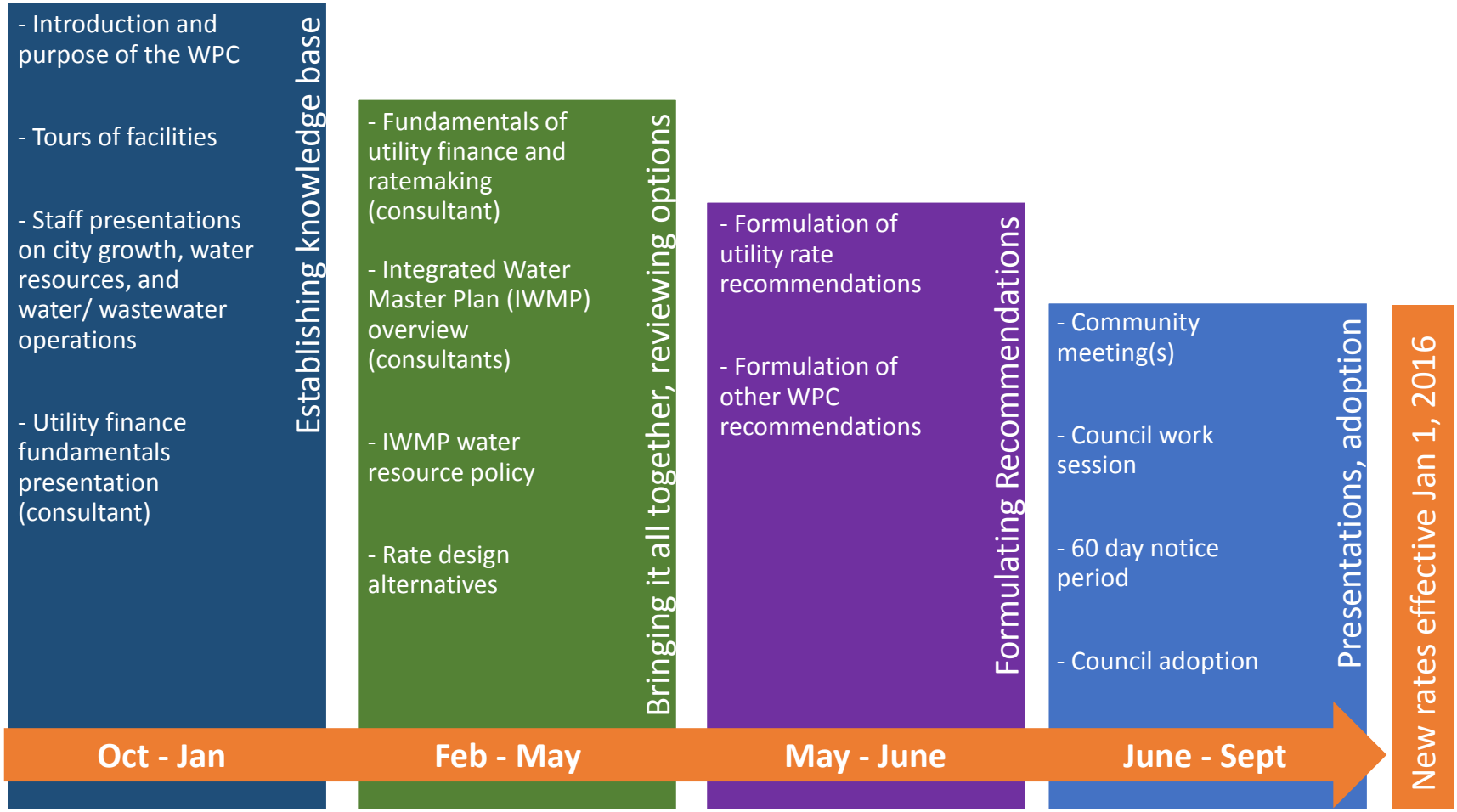
Water Planning Committee

March 10, 2016

Timeline – where we've been, where we're going



Outcomes from tonight's meeting

- Receive information on the Integrated Water Master Plan (IWMP)
  - April meeting – IWMP engineers will review costs and staff recommendations

Meeting Administration

- Write down questions/comments during presentation
- Focus questions or comments on helping you understand the information for what you need to achieve the goals of the committee
- Questions will be answered at designated stopping points throughout the presentation
- Dedicated time for committee discussion

Five-Year Water and Wastewater Capital Improvement Program

City of Goodyear Water Planning Committee

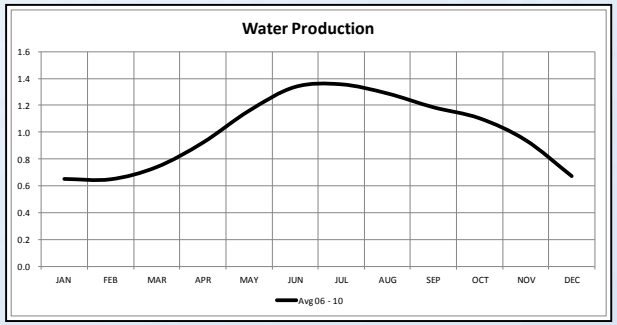
March 10, 2015

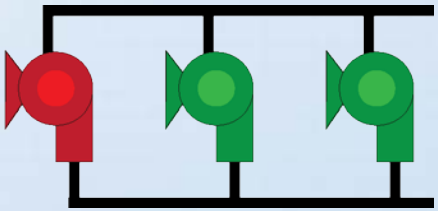
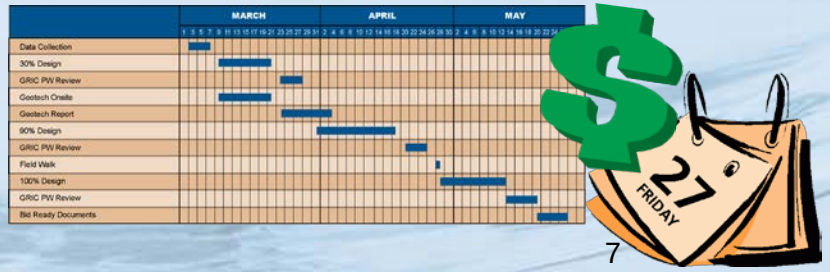
Engineers...Working Wonders With Water®

Purpose of Presentation

Describe how the
5-year Water and Wastewater CIP projects were developed

Important Terms

- **Level of Service –** 
- **Performance Criteria –** 
- **Peaking factor –** 

- **Firm Capacity –** 
- **CIP –** 

Presentation Outline

- Infrastructure Master Planning
- Levels of Service
- Performance Criteria
- Condition Assessment
- Water and Wastewater Projects
- Water Project Prioritization

?

INFRASTRUCTURE MASTER PLANNING

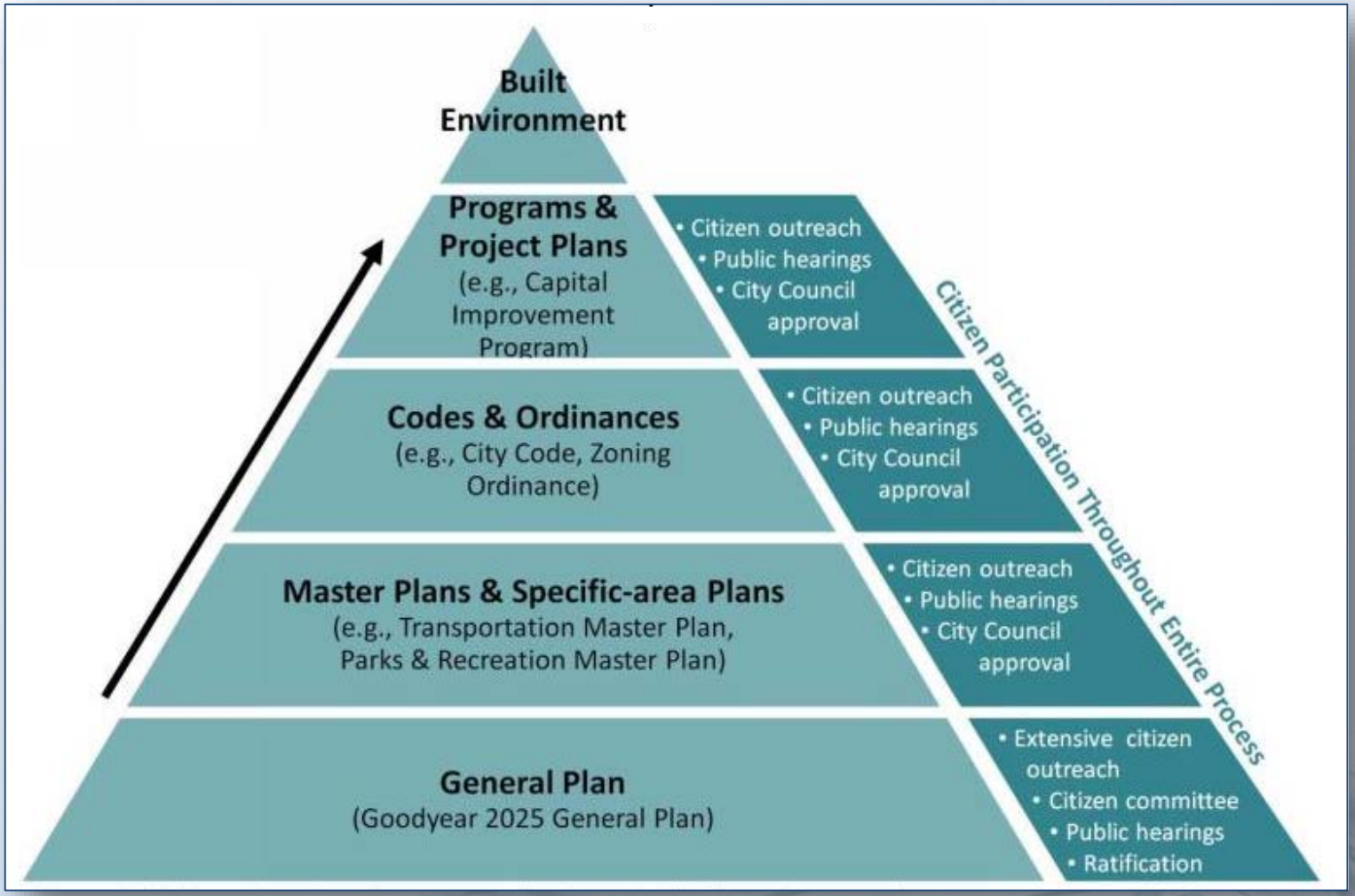
This Master Plan aligns water resources and infrastructure with Goodyear's General Plan.

Goodyear's vision:

Create a highly desirable and sustainable place for all to live, work, visit, and play.

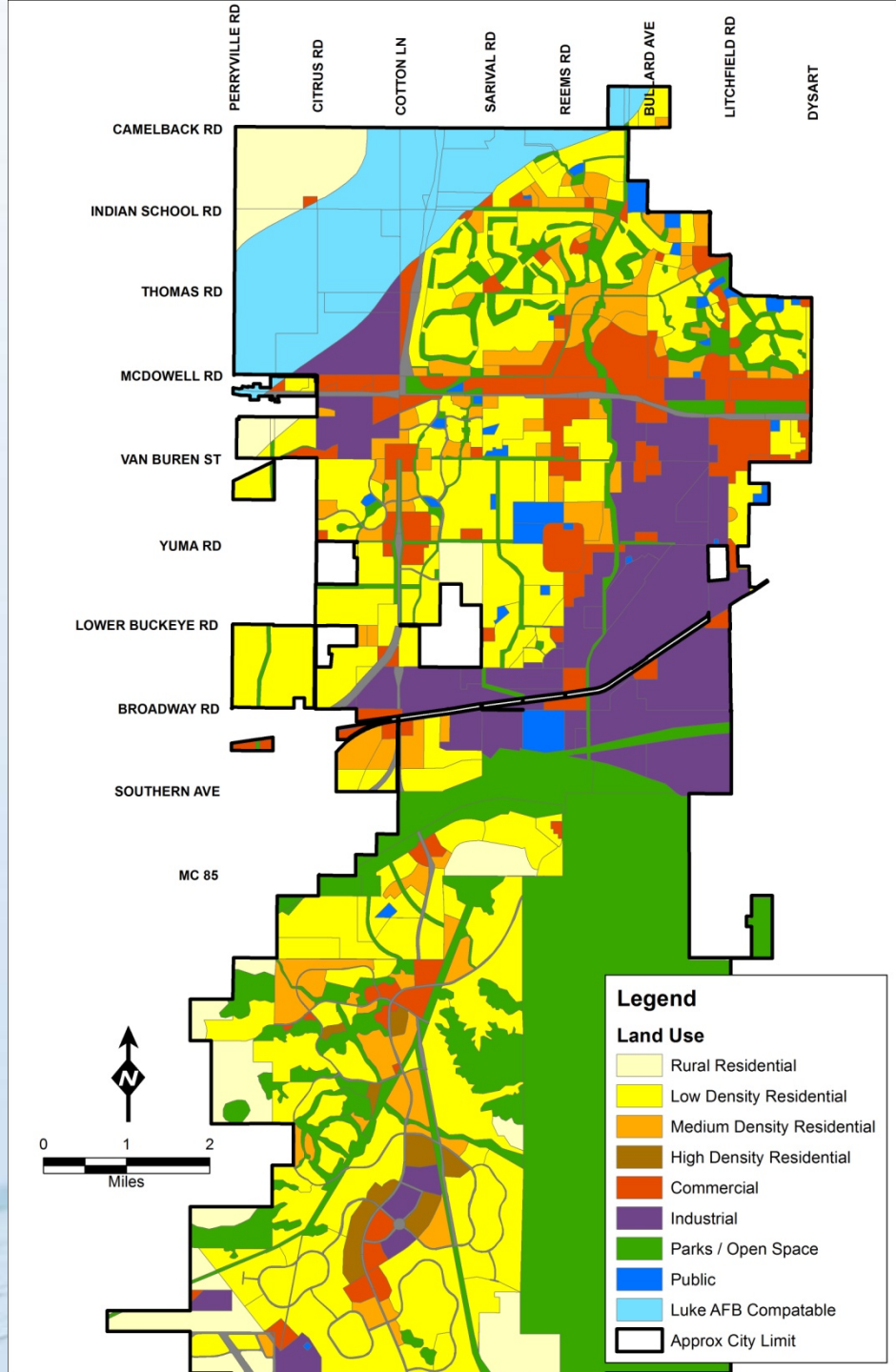
Goodyear 2025 General Plan, page 33

Infrastructure Planning fits into Goodyear's planning process:



Goodyear 2025 General Plan, Page 5

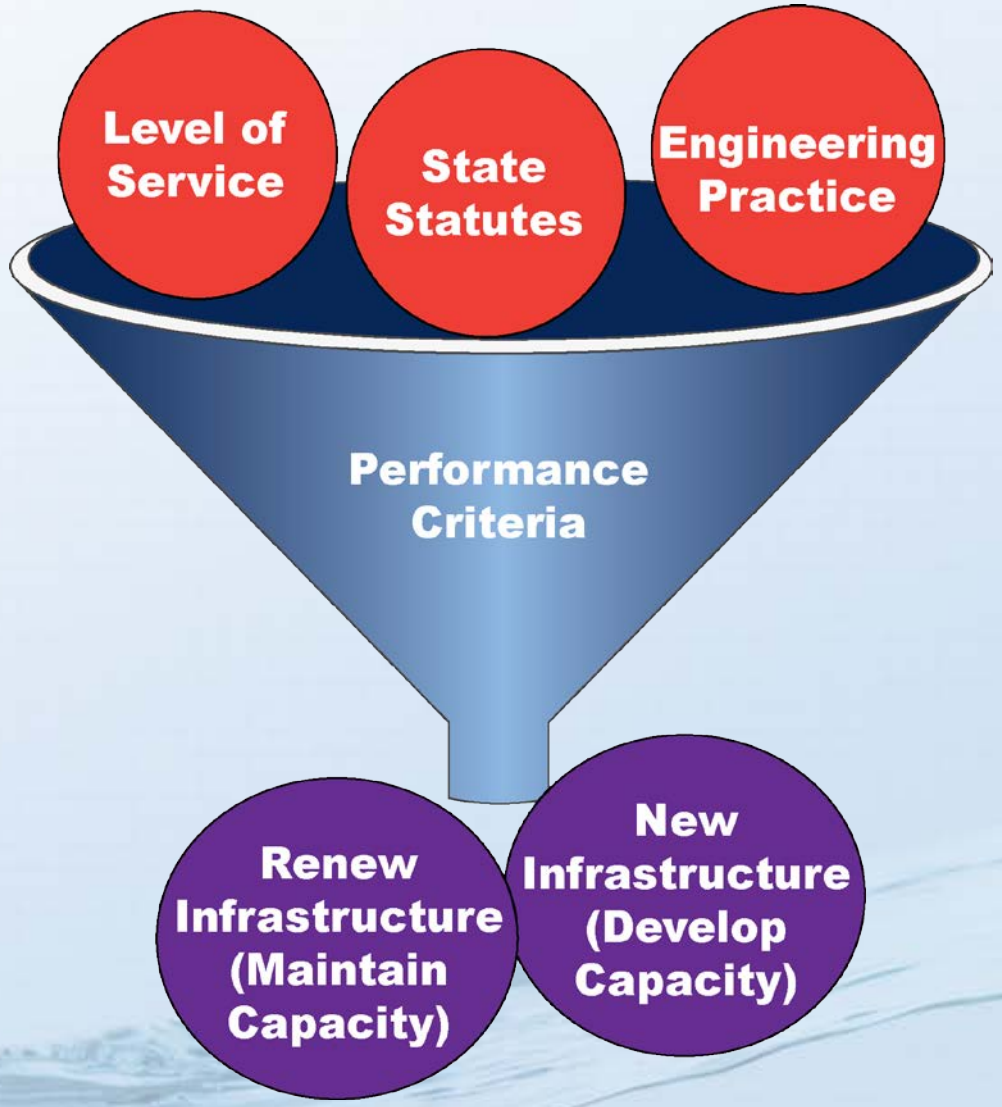
City of Goodyear Land Use Plan Defines Type of Growth



Integrated Water Resources, Water, Wastewater, and Reclaimed Water Master Plan Project Major Tasks:

- 5 year CIP and Southern Solutions Plan
- Condition Assessment Project, Phase 1
- Water Resources Master Plan Update
- Water System Master Plan Update
- Wastewater System Master Plan Update
- Reclaimed Water System Master Plan Update

What is the Basis for evaluating Infrastructure Needs?



The purpose of a capital improvement plan:

- Identify capital improvements
- Identify rehabilitation projects
- Quantify funding requirements

Questions?

LEVELS OF SERVICE

What Levels of Service do Your Customers Expect?

High

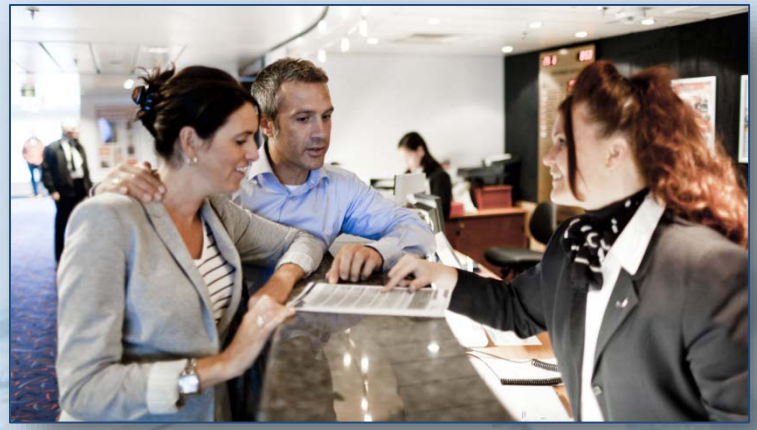
Low

Level	Supply Interruptions	Minimum Pressure Assurance	Fire Flow	Water Quality
1	None	Pressures Guaranteed	Any Time	Must Comply
2	Natural Emergencies (Haboob)	Provided Except in Emergencies	Except in Extreme Emergencies	
3	Water Delivery Component Failure	Usually Provided	Except in Emergencies	
4	During Peak Demands	Frequently Below Minimums	Limited	
5	Daily	None	None	

Level of Service Includes:

- Determines the investment a community makes to manage risk

- Customer expectations



Investments in a Water System Beyond the Absolute Minimum are Designed to Provide Safety and Reliability. Some Causes of Water Supply Interruptions:

Well Failures

Well Water Contamination

Haboob

Equipment (Pump, Motor, Control) Failures

Hazardous Material Releases

Waterborne Diseases

Extended Power Failure

Drought

Construction or Transportation Accidents

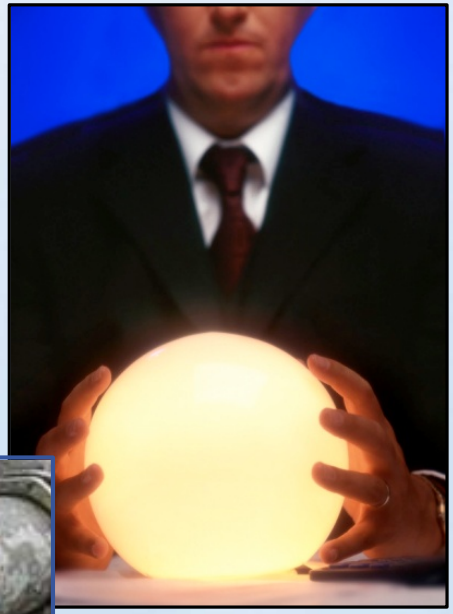
Main Failures

Vandalism

What Reliability do you Need? What are you Willing to Pay For?

Predicting Future Failure Events:

- Impossible to predict future specific failures
- Ultimate failure of most infrastructure guaranteed



All Cars Have Standard Safety and Reliability Equipment

- Spare tire
- Backup (parking) brake
- Dual latch hood
- Seat belts + air bags
- Spare electrical fuses

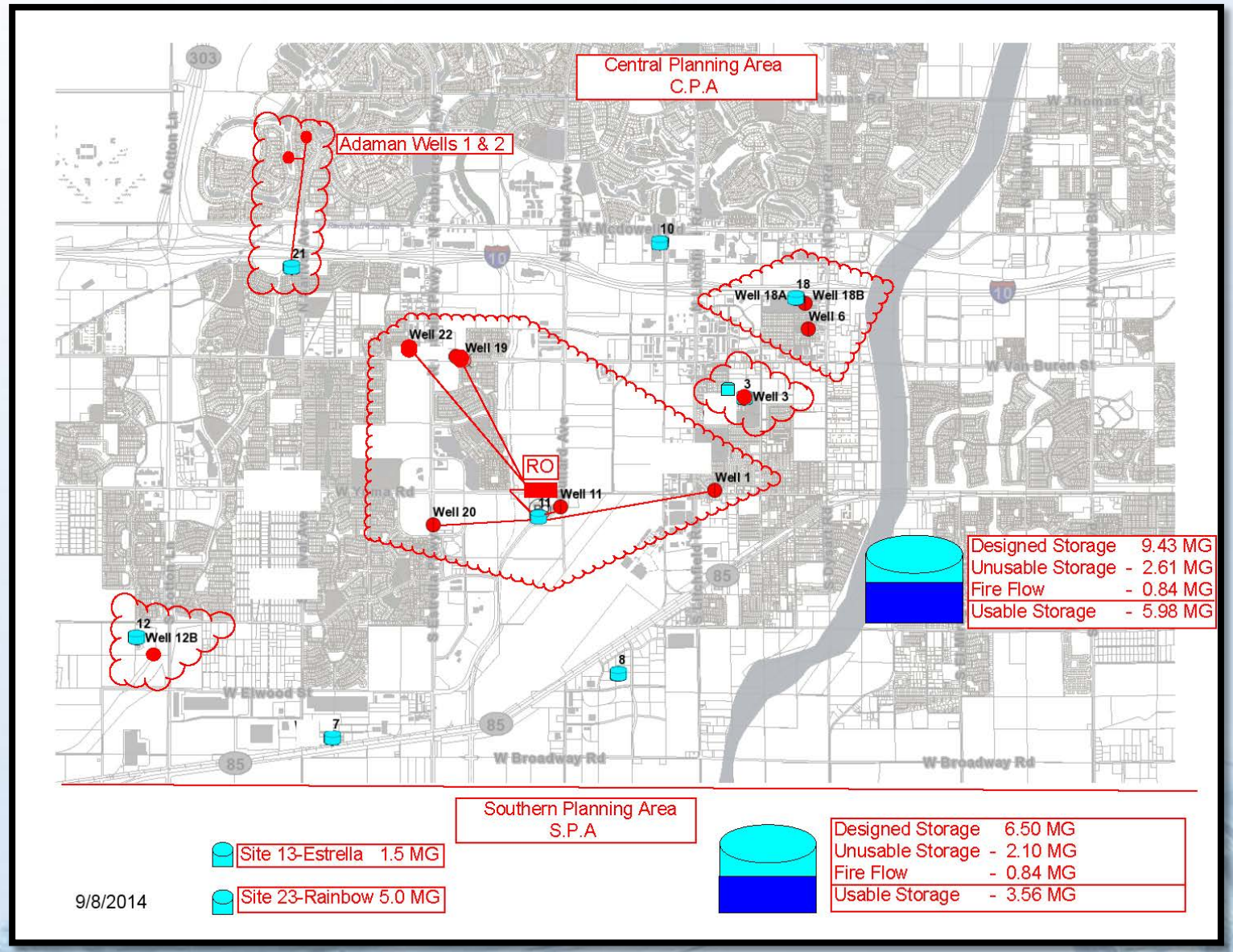
Performance Criteria Defines
Standard Redundancy for Water Systems

Case Study: Cities of Phoenix, Mesa

Val Vista Water Treatment Plant

Absolute Minimum Costs
Exposes Cities to Risks
Unacceptable to Customers

Case Study: Goodyear Perfect Storm, 2014



Case Study: Goodyear Perfect Storm, 2014

- VFD failure on well 22
- Well 20 no longer useable due to blending requirements

Central planning area useable storage excluding fire flow:	5.98 MG
Demand at time of event:	11.7 mgd
Total production:	12.9 mgd

Goodyear Perfect Storm:

Well 22 fails:	
Production:	10.9 mgd
Demand:	11.7 mgd
Supply deficit:	**-0.8 mgd**

Consequences:

1. TDS water quality limit in 24 hours
2. Water storage gone in 7.5 days
3. Stage 4 drought restrictions
4. A fire would have compounded the issues

Well 22 fails, 20 is shut down:	
Production:	8.5 mgd
Demand:	11.7 mgd
Supply deficit:	**-3.2 mgd**

Consequences:

1. Water storage gone in 1.9 days
2. Stage 4 drought restrictions
3. A fire would have compounded the issues

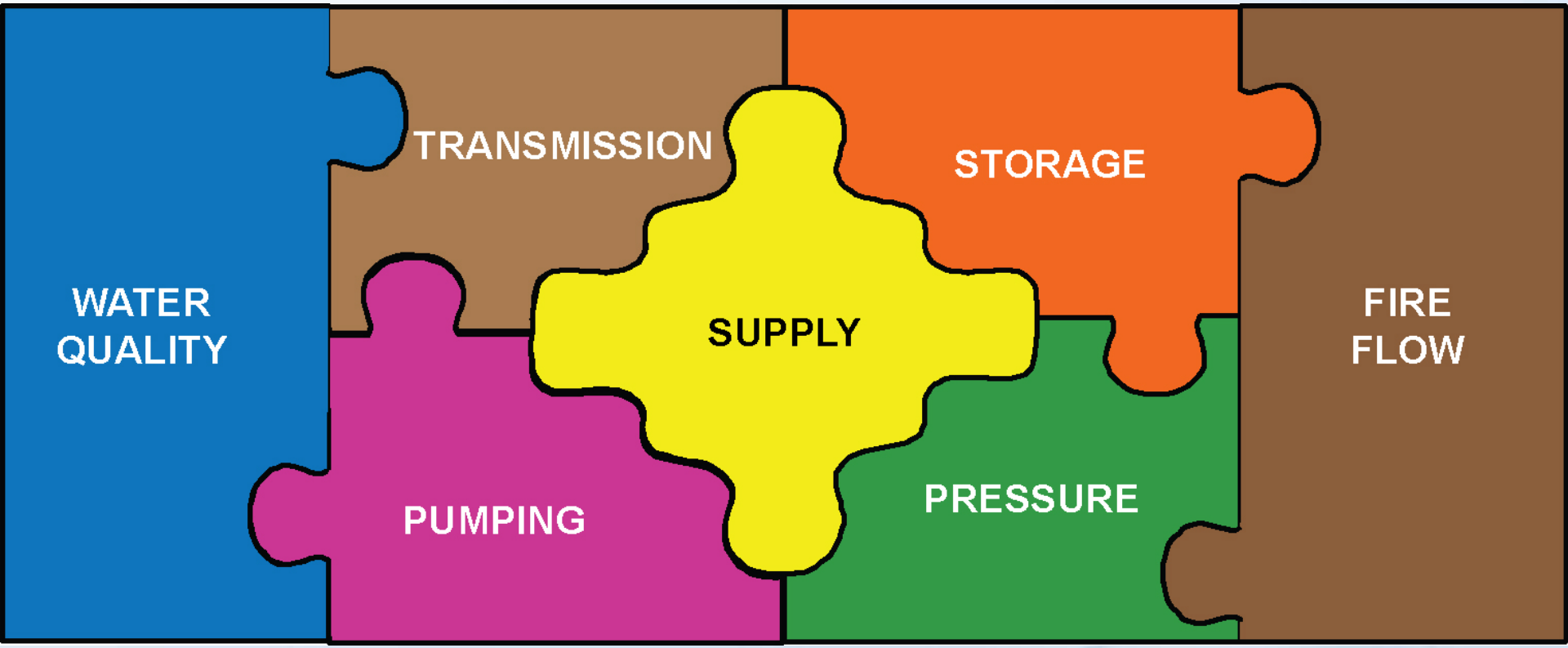
Consequences of Failure to Deliver Water:

- Loss of public trust
- Emergency repairs cost more than non-emergency repairs
- If unresolved, threat to public health
- More difficult to obtain funding with lower trust
- Growth and development constrained

Questions?

PERFORMANCE CRITERIA

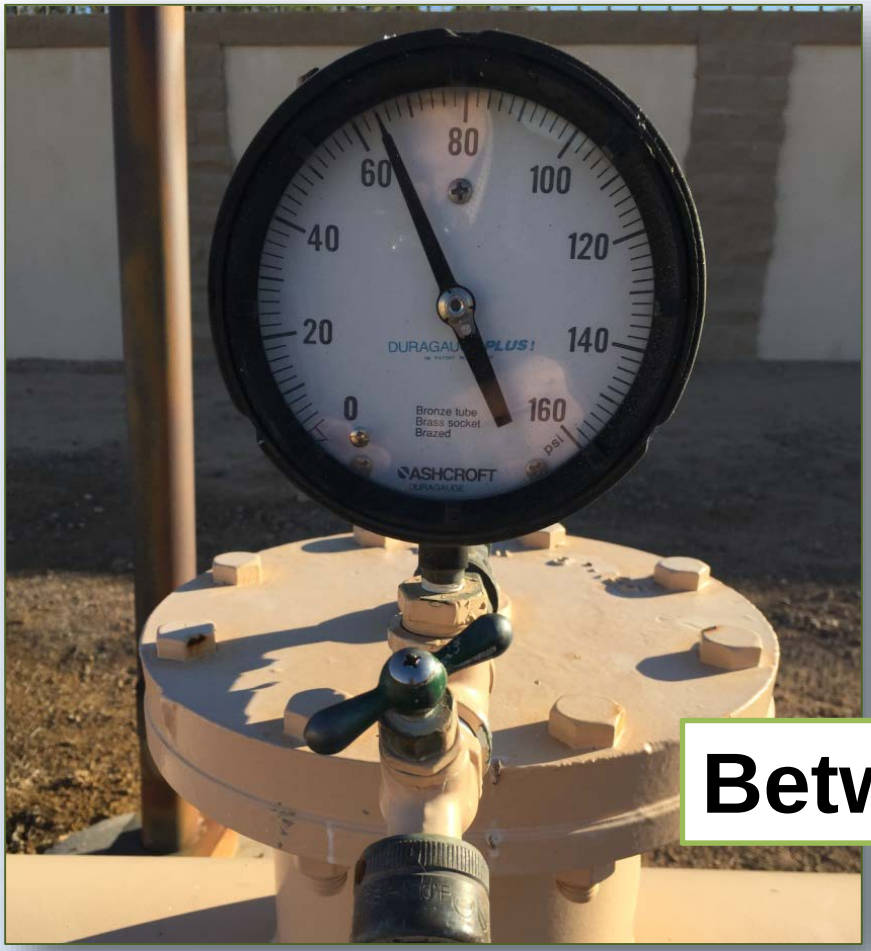
Performance Criteria Addresses Key Components of Water System Operations



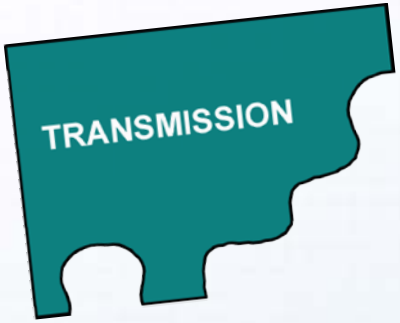
State Minimum Requirements (A.A.C. R18-5-503A, Engineering Bulletin No. 10, Guidelines for the Construction of Water Systems)

- Minimum pressure for emergencies (i.e., fire) is 20 psi in all parts of the water system
- Minimum non-emergency operating pressure is 40 psi
- Pump Station firm capacity = pumping capacity with the largest pump out of service
- Minimum water storage = average daily demand of the maximum demand month
- Fire flow according to current ISO standards
- All water quality standards

Pressure Performance Criteria:



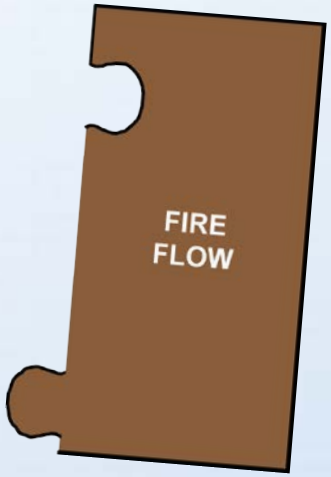
Between 40 and 80 psi



Water Transmission Performance Criteria

- Max Day Demand:
  - for pipes < 36", Velocity < 5 ft/sec.;
  - for pipes > 36", velocity < 6 ft/sec;
  - Peak Hour Demand: velocity < 7 ft/s;
  - Fire Flow Demand, velocity < 10 ft/sec.

Fire Flow Performance Criteria

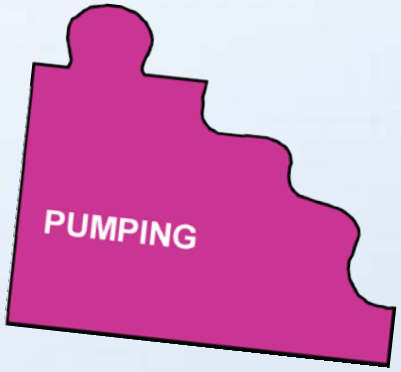


- Minimum pressure of 20 psi with flowing hydrant;
- Residential flow: 1,500 gpm for 3 hours;
- Commercial flow: 3,500 gpm for 4 hours

Water Supply Performance Criteria

- Supply maximum day demand with largest well + wells required for blending with the largest well out of service

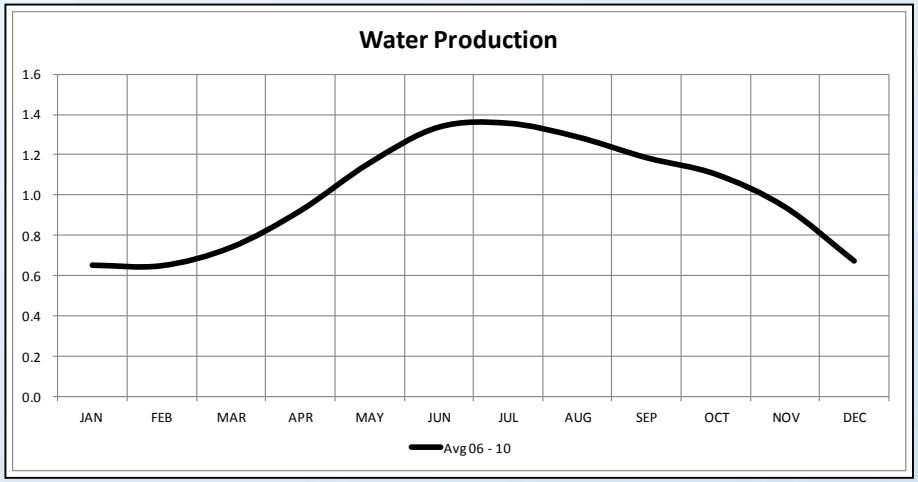
Pumping Performance Criteria

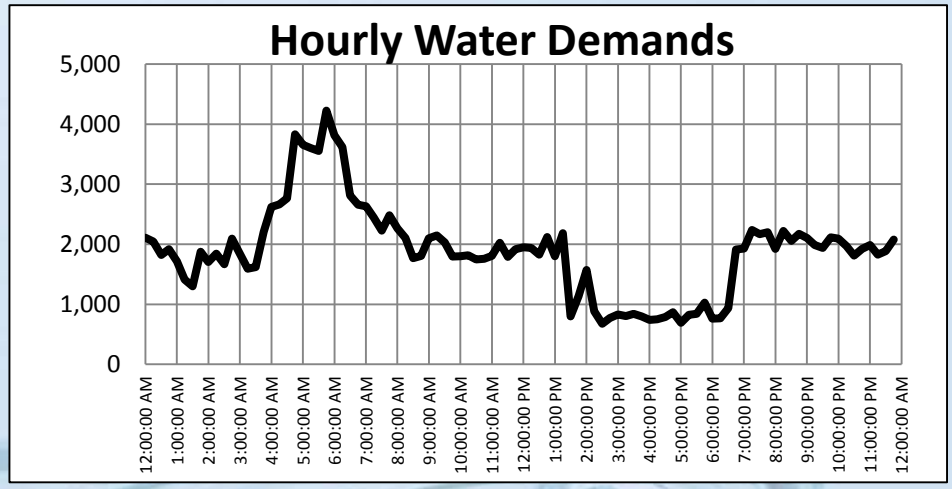


- The larger of 120% of peak hour demand or maximum day demand plus fire flow of 3,500 gpm

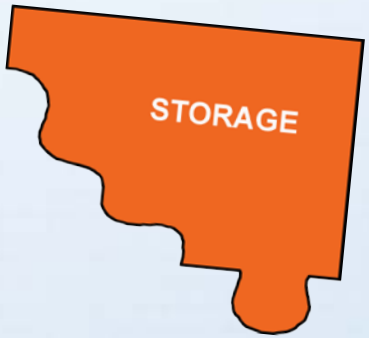
Peaking Factors

Goodyear Peaking Factors	
Max Day/Average Day	1.7
Peak hour/Max Day	1.7
Peak hour/Average Day	2.9





Water Storage Performance Criteria



- Equal to the average daily demand during the maximum demand month

Questions?

CONDITION ASSESSMENT

We all Manage Assets in Our Personal Lives

Regular Maintenance

Oil, Tires

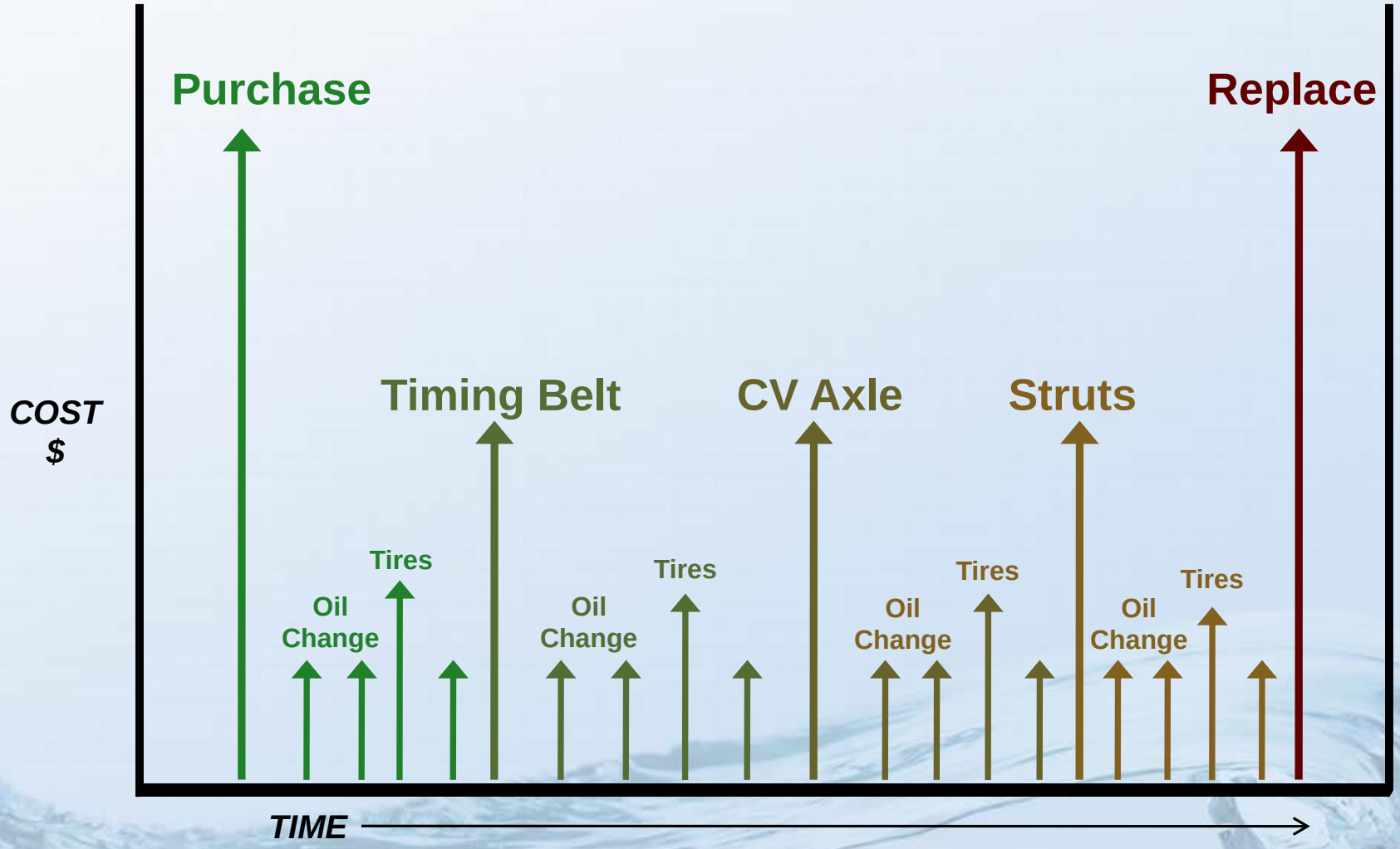
Periodic Repairs

Water Pump, Struts

Replacement

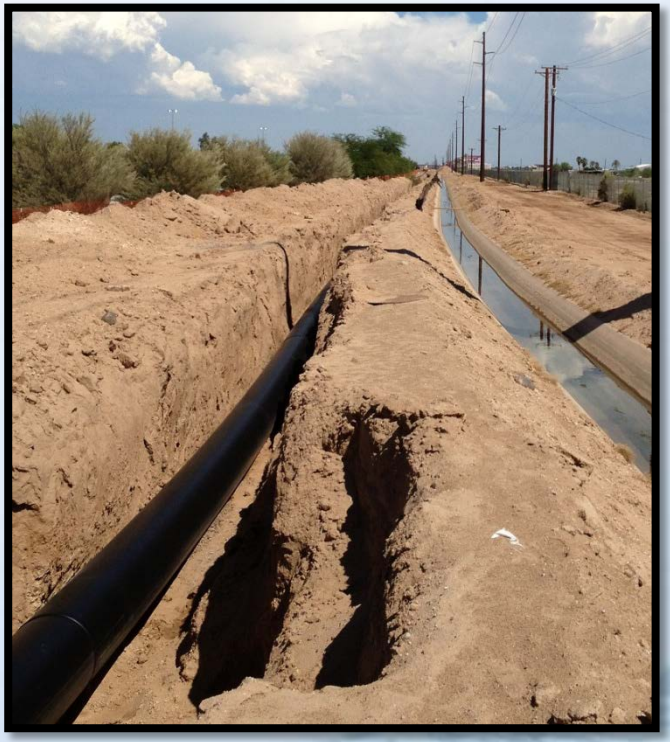
Used? New?

We Pay Automobile Repair Expenses to Extend Auto Life and Enhance Reliability



Buried Assets - Pipelines

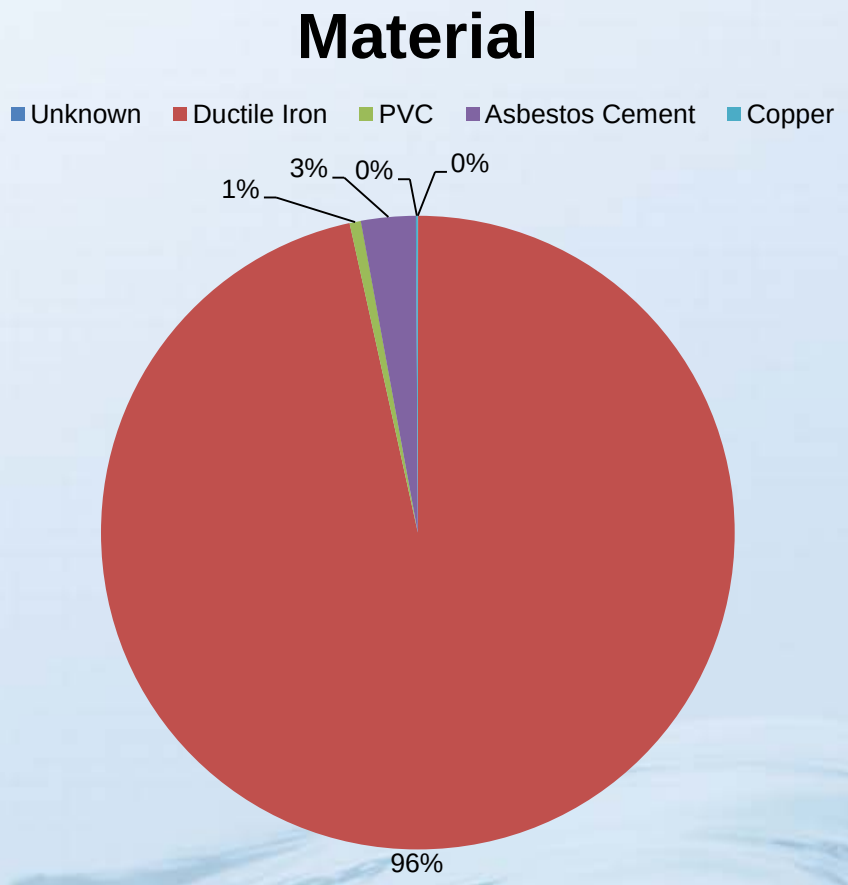
- Water Pipelines and Valves, Fire Hydrants
- Wastewater Pipelines, Manholes & Lift Stations



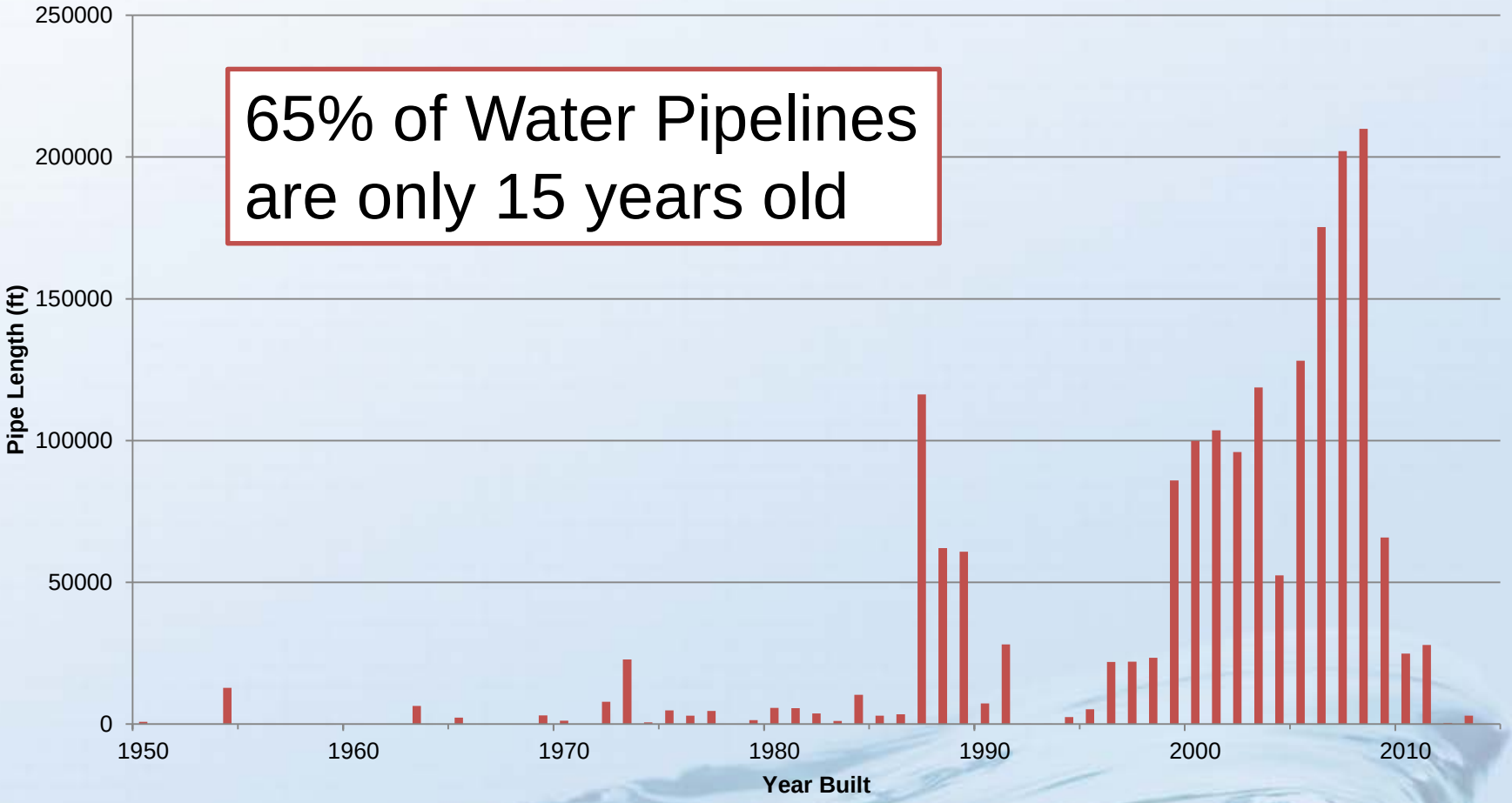
Water Pipelines
Material, Age and Useful Life

96% of Water Pipelines are Ductile Iron Pipe

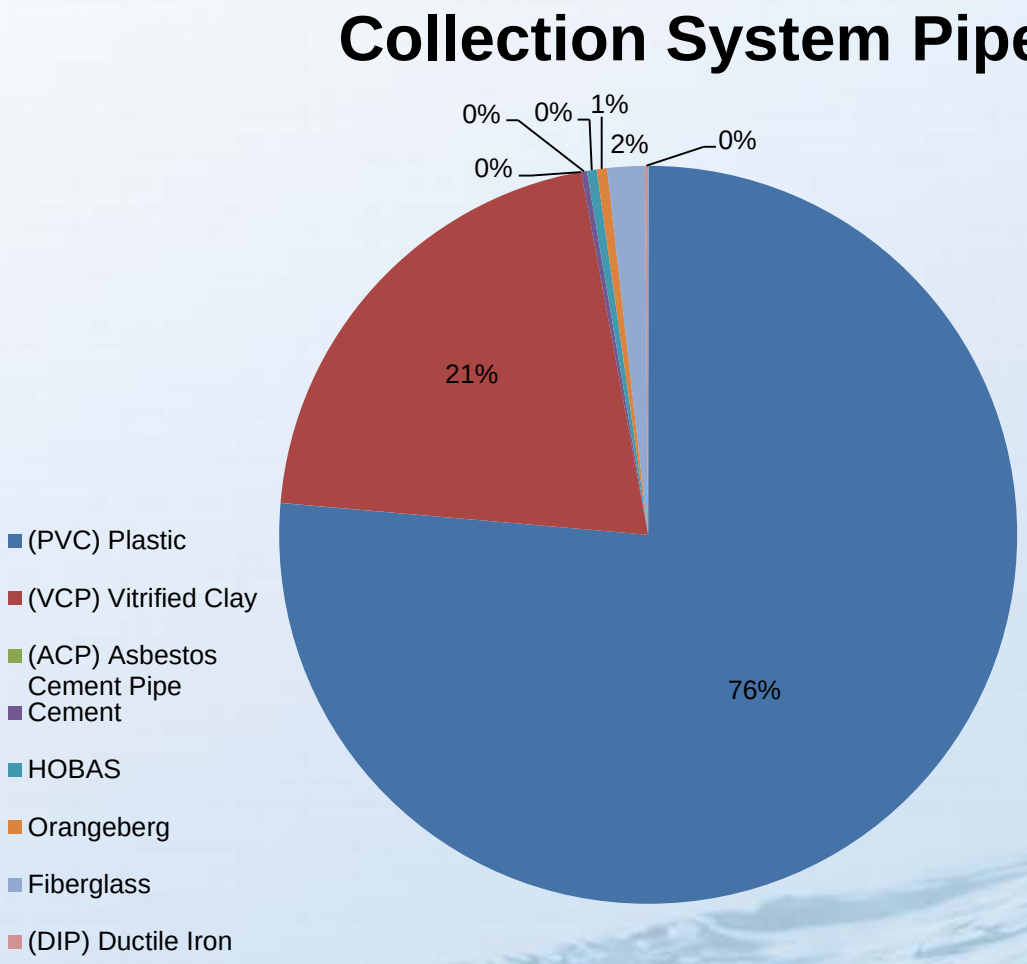
Material with 80-100 year life



Water Pipelines
Material, Age and Useful Life



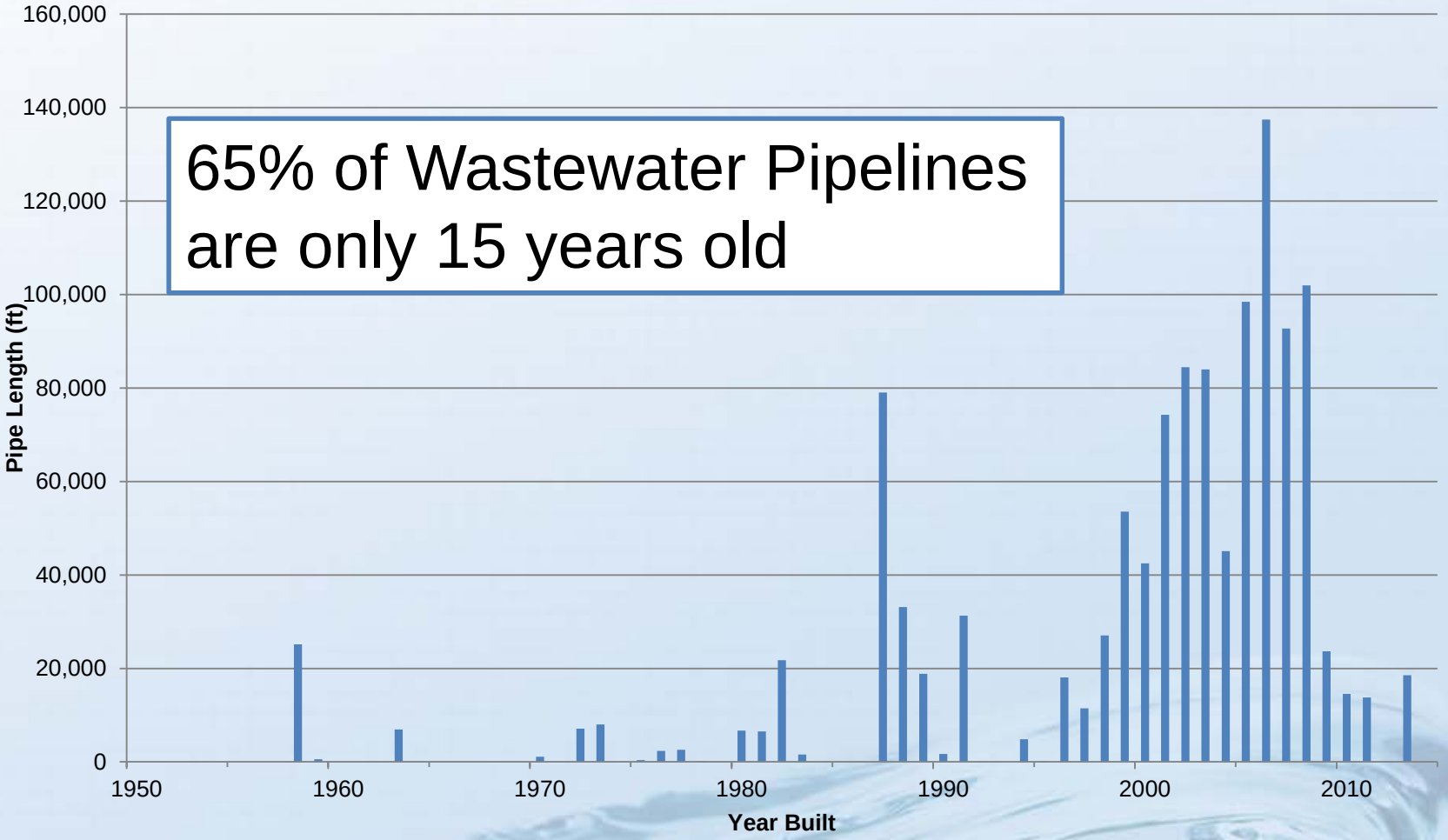
Wastewater Pipelines
Material, Age and Useful Life



97% of Wastewater Pipelines are Non-corrosive

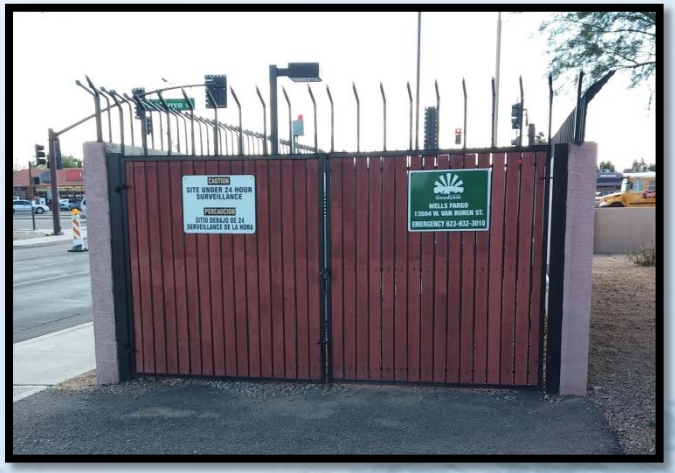
Long Service Life Expected

Wastewater Pipelines
Material, Age and Useful Life



Plant Assets - Wells, BPS, WRF

- Water wells, booster pump stations, Bullard RO Campus
- Wastewater Treatment Facilities
  - Goodyear 157th Ave WRF
  - Corgett WRF
  - Rainbow WRF



Water Production Wells - Age

Well	Install Date	Inspection Date	Delta Years	Expected Life Years	Remaining Life Years	Comments
Well 1	1940 -1970	2015	>50	40-50	0	No useful life
Well 3	1960	2015	>50	40-50	0	No useful life
Well 6	1940 - 1950	2015	>50	40-50	0	No useful life
Well 11	2010 rehab	2015	5	40-50	35-45	
Well 12	1988	2015	27	40-50	13-23	
Well 18A	1998	2015	17	40-50	23-33	
Well 18B	1998	2015	17	40-50	23-33	
Well 19	1988	2015	27	40-50	13-23	
Well 20	2006	2015	9	40-50	31-41	
Well 22	2007	2015	8	40-50	32-42	
Adaman W-1		2015		40-50		
Adaman W-2		2015		40-50		

Well Rehabilitation is Required just to Maintain Current Water Supply Capability

Well	2015 Flowrate, gpm	Status
1	500	needs replacement
3	425	needs replacement
6	455	needs replacement
11	458	
12	600	
18A	807	needs rehabilitation
18B	325	needs rehabilitation
19	540	needs rehabilitation
20	1,280	
22	1,680	
Adaman 1	1,340	
Adaman 2	500	
Total	**8,910**	
Total needing replacement or rehabilitation	**3,052**	
Percent	**34%**	

Questions?

Committee Discussion

- Discuss Integrated Water Master Plan (IWMP) and projects presented
  - April meeting – IWMP engineers will review costs and staff recommendations
- Additional questions or topics for discussion related to the WPC, IWMP, or utility rate study?

Sub-Committees

- What would WPC members see as the purpose(s) of a sub-committee(s)?
- Is the timing appropriate to discuss sub-committees?
- Would adding additional WPC meetings be a preferred option?

Water Planning Committee

March 10, 2016