



WESTMINSTER
COLORADO

Discussion of Water & Wastewater Infrastructure

Special Study Session #1

Julie Koehler

Heather Bergman

Thursday October 8, 2020

Themes in Community Comments/Concerns

- Meters (accuracy, changes to measurement, increased cost)
- Overall rates and comparison to other areas
- Tier III rate, impacts on owners of large lots
- Billing periods (variability, length, impact on monthly bills)
- PWU available financial resources, whether rate increases are needed
- Numbers of taps, how they affect rates (growth and development)
- Impacts of hot summer weather on usage and rates

Discussion of Water & Wastewater – Schedule, Tasks

Meeting Number	Date	Topics for Discussion
Special Study Session #1	10/8/20	Setting the Stage Community Participation Water and Wastewater Infrastructure – System Focus
Special Study Session #2	10/20/20	Water Costs and Rates
Special Study Session #3	11/5/20	Wastewater Costs and Rates
Special Study Session #4	11/17/20	Options and Issues

When Topics of Concern

Infrastructure – October 8

- ▶ Meters – as part of the overall infrastructure

Rates – October 20

- Overall rates and comparison to other areas
- Tier III rate in particular
- Billing periods (meters will come in again here, too)
- PWU resources and the \$100M
- Numbers of taps affecting rates (growth and development)

Policy and Options Discussion (November 5 / November 11)

- Rates generally (and relationship to all the above topics)
- Impacts of weather on usage and rates - whether/how to address

Community Engagement Options

Consult – 1 Option:

One rate option for public review and comment.

Process:



Community Engagement Options

Consult-3 Options:

Three rate options for public review and comment.

Process:



Community Engagement Options

Engage:

Items that impact rate options are open for public review and comment. Rates options are then developed based on this feedback and shared again with the public.

Process:

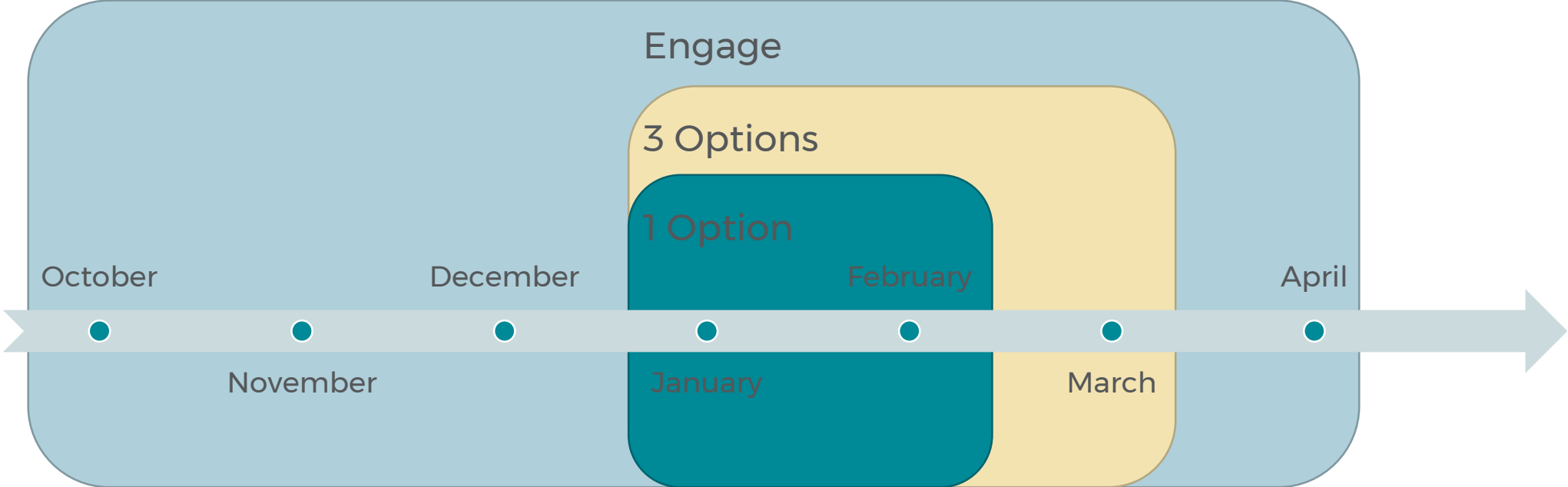


Community Engagement Options

Trade Offs:

	Community Effort / Involvement	Impact on Decision Timeline
Consult-1 Option	X	X
Consult-3 Options	XX	XX
Engage	XXX	XXX

Community Engagement Options



Community Engagement Options

Assumptions:

- Broad notification (Press release, bill insert, social media, etc)
- Online engagement for small and large groups (Webinars, webpage, online engagement platforms, general public, HOAs, community orgs.)
- Documentation for City Council review (Feedback, engagement methods, engagement stats)
- Adapt based on State COVID-19 Dial Dashboard status

New Water Meters

- \$14 million project to replace 30,000+ residential meters
- Lower maintenance costs
- Better access to data for customers



Setting the Stage

Heather Bergman

New Approach for This Conversation

Unpacking	Unpacking information and assumptions
Understanding	Understanding interests and priorities
Identifying	Identifying choices and tradeoffs
Communicating	Communicating more fluidly
Outlining	Outlining some options
Engaging	Engaging the community

POSITIONS VS INTERESTS

POSITIONS

- **What** I need or want
- Describes outcome / answer
- Creates win/lose dynamics
- Allows for only one outcome
- YES/NO

EASY TEST QUESTION: How many ways are there to achieve my idea?

- Just one (Vote yes, agree with me, etc.) = POSITION
- More than one (This or that, this and that) = INTEREST

INTERESTS

- **Why** I want or need it
- Describes motivations
- Creates win/win dynamics
- Allows for multiple solutions
- YES/AND or YES/IF

INTERESTS VS. POSITIONS



POSITIONS: Surface-level statements or demands

INTERESTS: Underlying needs or motivations

Interest or
Position?





Interest or Position?

Public policy making requires choices and tradeoffs.



If we do X, we don't do Y.



If we do X now, we have to do Y later.



If we pay more or less for X, we have more or less to invest in Y.

Policy making involves grappling with differences in:

- Needs of current residents / needs of future residents
- Needs of majority / needs of minority
- Levels of comfort with risk
- Levels of comfort with change, new approaches, departure from tradition
- Levels of comfort with the unknown / ability to adapt to new things on the fly
- Preferences around services and needs
- Perspectives on the role of government
- Visions / expectations for the community

Here's the Path for Our Discussion

Staff presentation on evening's topics

- Answering Council questions from interviews
- New approach to sharing the information
- Unpacking of assumptions and expectations

Council questions

- Clarifying questions to ensure we all have the same understanding
- Identification of questions that weren't answered for staff to circle back

Council discussion

- Have your questions on this topic (if you had them) been answered?
- What thoughts do you have about this information?
- ***We aren't making policy recommendations or decisions at this time.***

A WORKSHOP

DISCUSSION!

- **Use first names:** Let's talk to each other as people, not jobs, titles, and positions.
- **Assume good intentions:** Everyone wants to do what's right for the city and its residents.
- **Acknowledge the range of views:** Reasonable people can disagree about how to solve a problem.
- **Be optimistic:** People who disagree can (and regularly do) solve problems anyway!
- **Ask questions:** Work to understand the issue and how others understand it, not to convince anyone of your own opinion.
- **Disagree with civility:**
 - "That's not how I understand it." vs "That's wrong."
 - "I remember that differently." vs "That's not what happened."
- **Be open and creative.**
 - What if?
 - Could we?
 - Yes, if!
 - ~~No, because...~~



BRIEF DISCUSSION
OF INTERESTS

POSITIONS VS INTERESTS

POSITIONS

- **What** I need or want
- Describes outcome / answer
- Creates win/lose dynamics
- Allows for only one outcome
- Right/wrong
- YES/NO

INTERESTS

- **Why** I want or need it
- Describes motivations
- Creates win/win dynamics
- Allows for multiple solutions
- Right/right
- YES/AND or YES/IF

EASY TEST QUESTION: How many ways are there to achieve my idea?

- Just one (Vote yes, agree with me, etc.) = POSITION
- More than one (This or that, this and that) = INTEREST

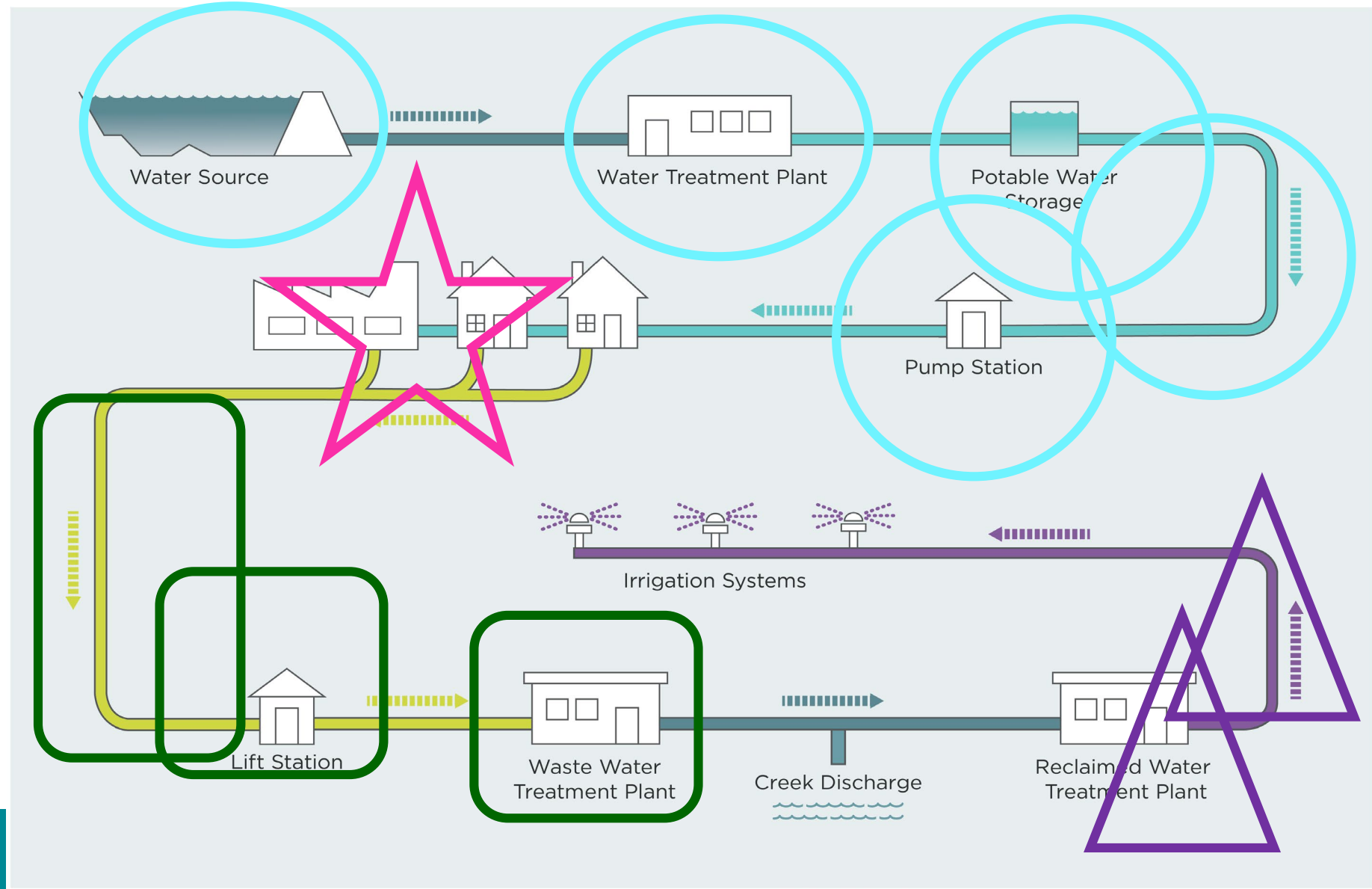
What Are YOUR Interests?

Meeting #1, Part B – Water & Wastewater Infrastructure Focus

Meeting #1 Covers Water and Wastewater Infrastructure from a System Focus

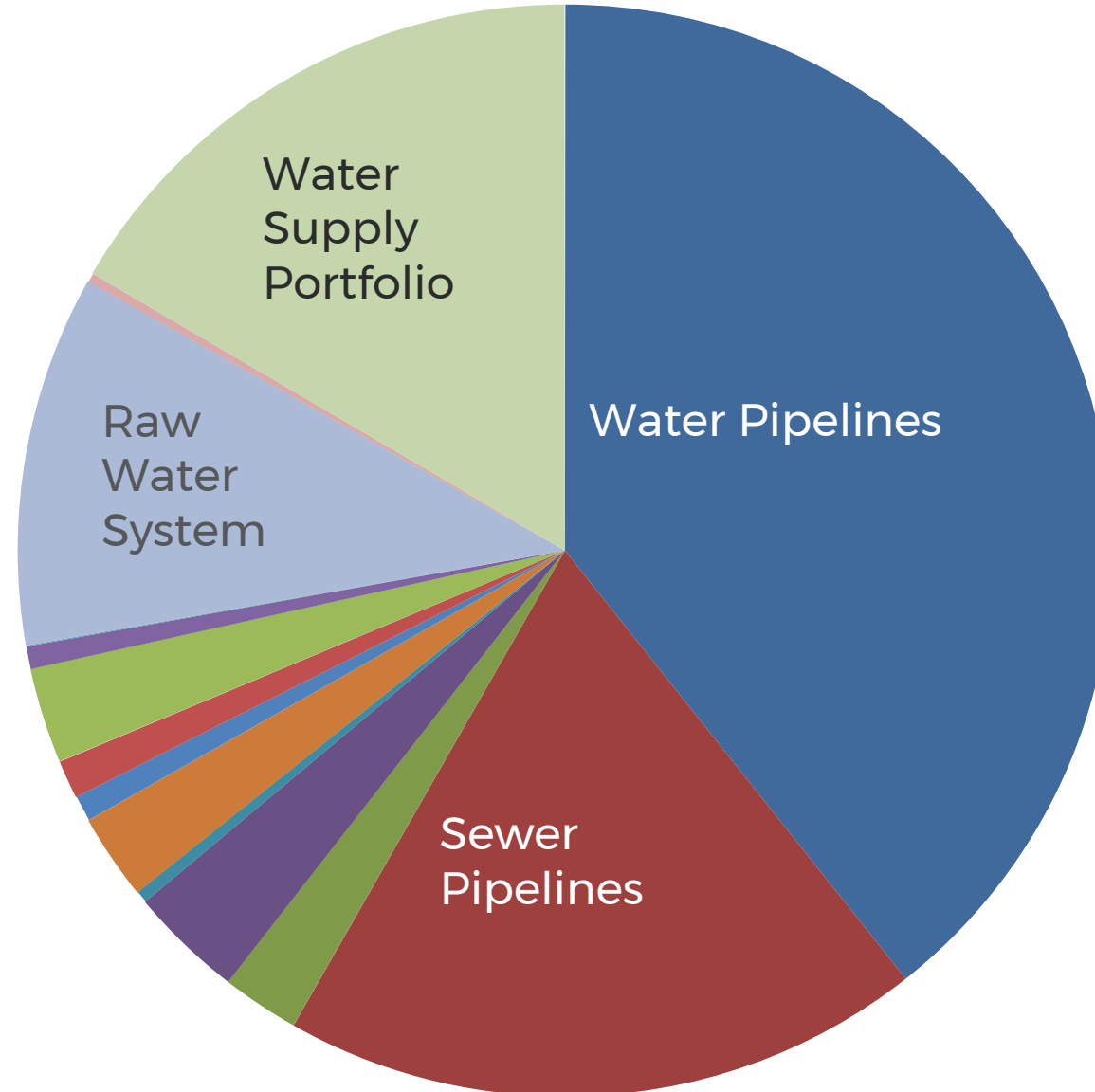
- Format is to respond to the 6 Questions identified in the Process Proposal
- System Focus – water and wastewater infrastructure go together
- Ask questions and provide comments – after each question we will pause for questions and discussion

PRE Question 1: What infrastructure is included when we talk about rates?



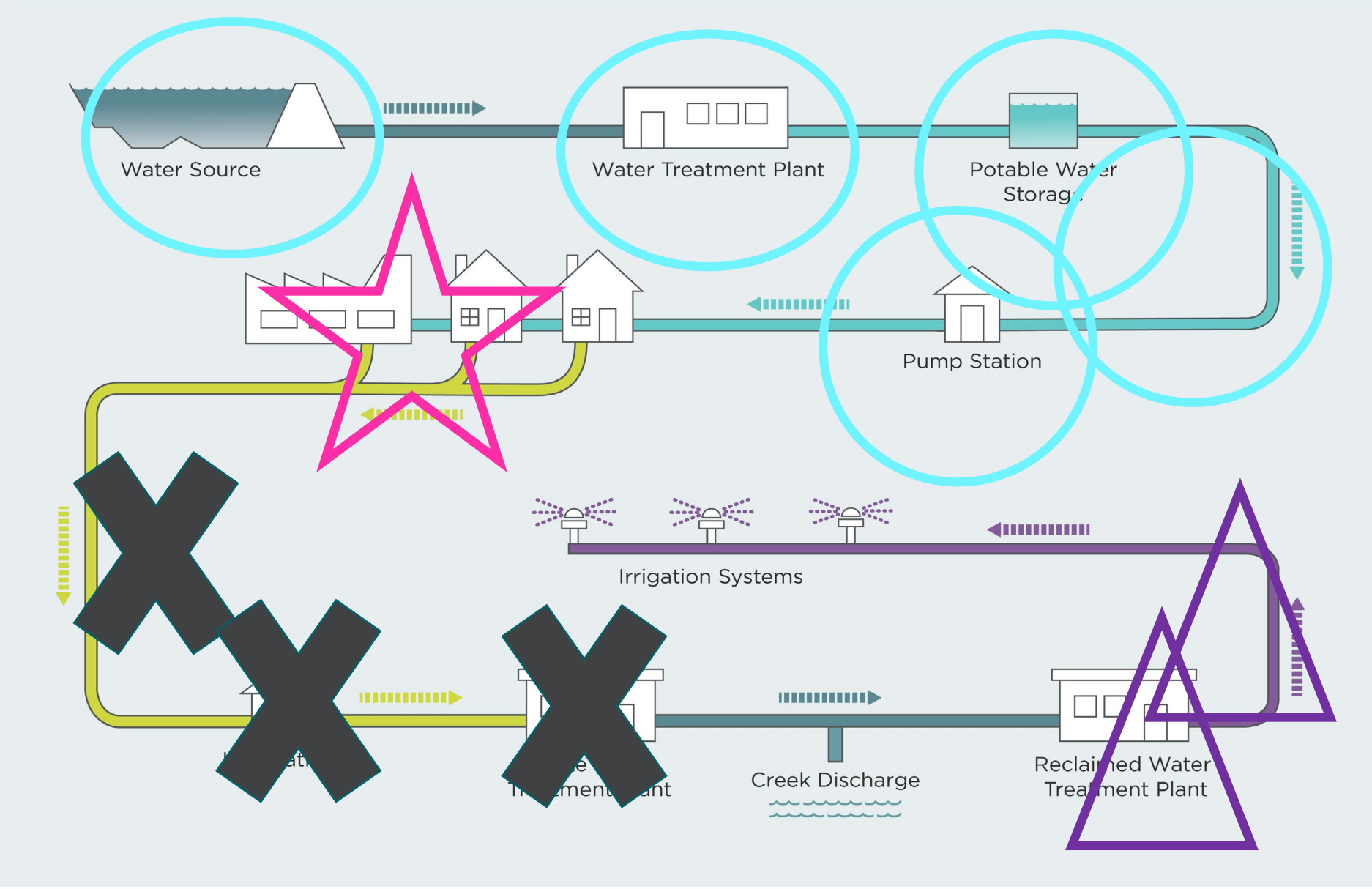
PRE Question 1: What infrastructure is included ?

The 4 Largest Utility Areas represent 86% of the \$4B value of the Utility

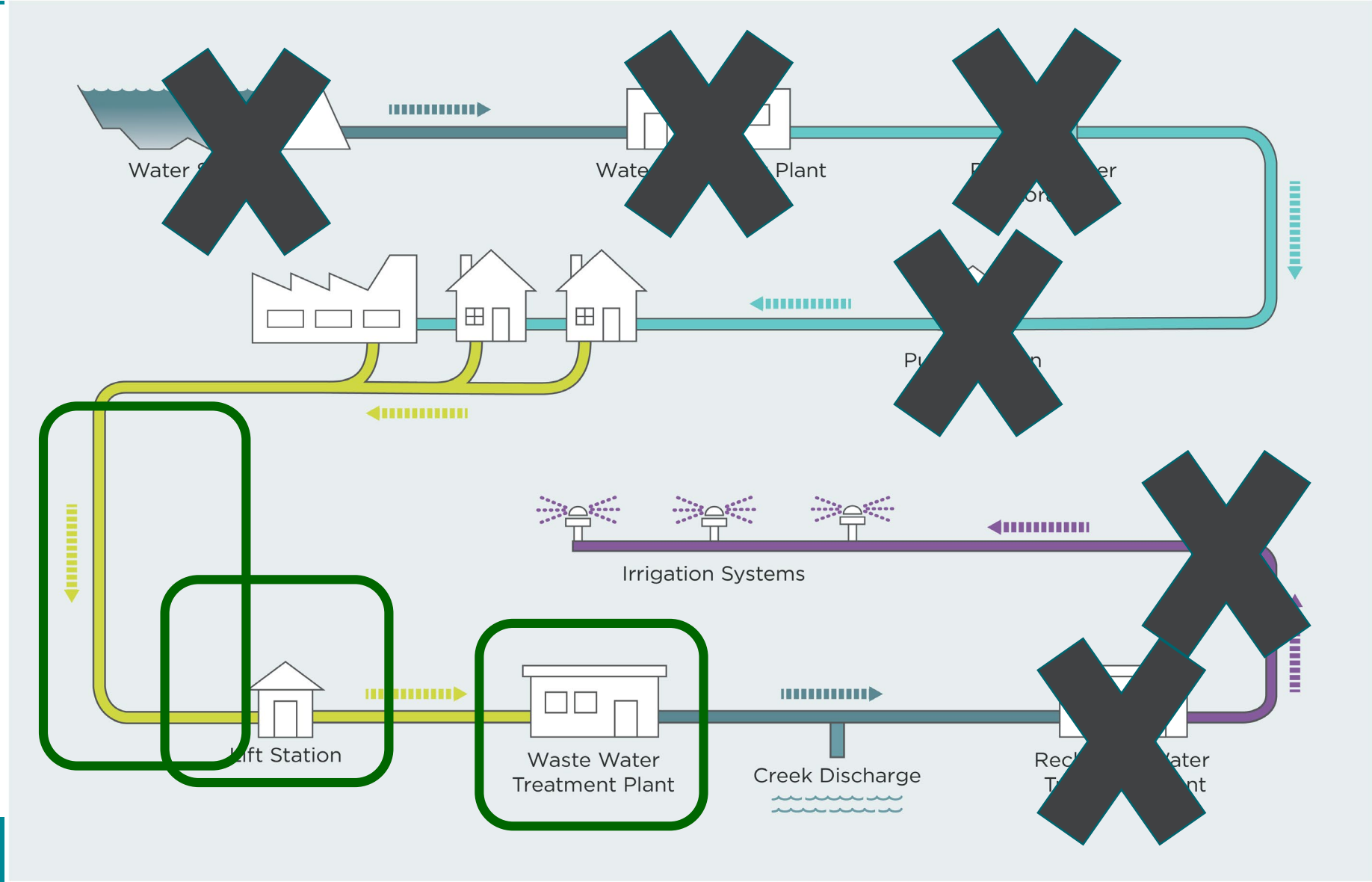


The 11 remaining Utility Areas represent all the rest: reclaimed pipeline, meters, pumping stations, 4 different treatment facilities, water quality labs, and communications system

Question 1: What infrastructure is included with water rates?



Question 1: What infrastructure is included when we talk about wastewater rates?



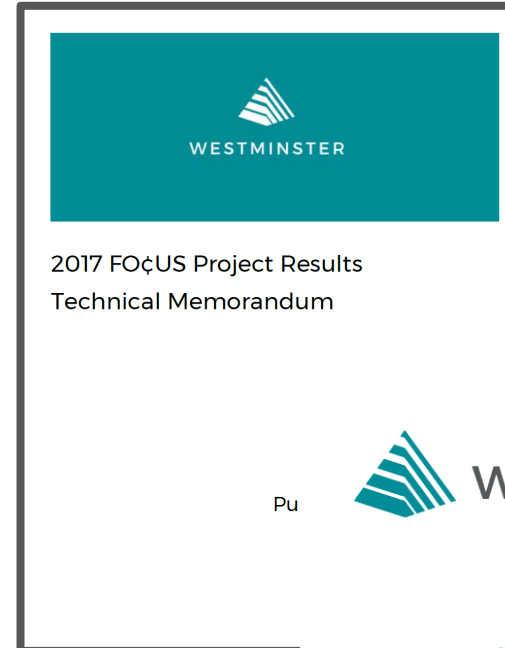
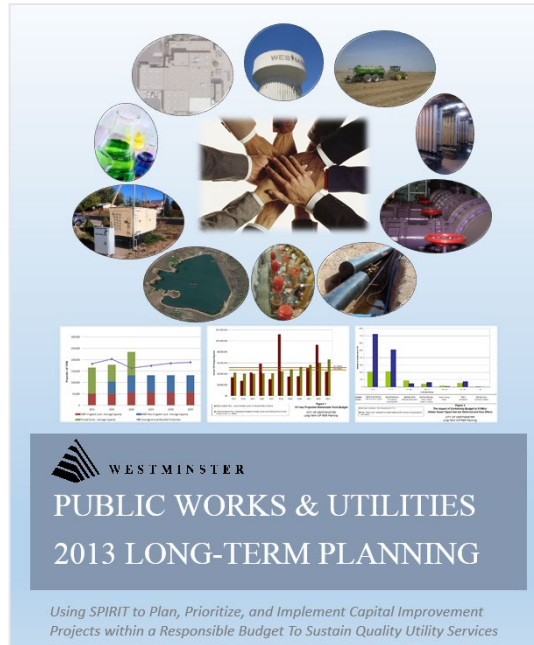
Comments, Questions, Discussion about Response to Question #1?

Question 2: What is the age, rate of decline, and history of repair/upgrade/replacement of water and wastewater infrastructure?

Long Term Planning

Asset Database

In 2010 Utilities Engineering Initiated Long-Term Planning for Capital Improvements Projects



2020 LONG TERM PLANNING

When I say Asset Database, please think about a Car



Asset Database is the Core of Long Term Planning

Utility Area Number	Water / Wastewater	Utility Area Description	Asset Number	Treatment Process / Basin / Line	Major Component / Subbasin / Subzone	Discipline	Discipline Installation Year	Significant Rehabilitation Year	Codes for Useful Life Multiplier	Original Useful Life	Useful Life Multiplier (always 1.0 if criticality > 13)	Stretched Useful Life using Useful	Calculated Replacement Year	Stretched Replacement Year	Remaining Useful Life	Stretched Remaining Useful Life	Portion of Stretched Useful Life Remaining
1	W	W Dist Sys & PR															
1	W	W Dist Sys & PR															
First Available Budget Year=												2023					
Current Year												2020					
			1959		160	60	1.0		60	2023	2023	0	0	0%			
			1965		160	60	1.0		60	2025	2025	2	2	3%			



Asset Database is the Core of Long Term Planning

Utility Area Number	Water / Wastewater	Utility Area Description	Capital Replacement Value	Design Contingency (35%)	General Conditions (12%)	Contractor O&P (8%)	ELAC (30%)	Total Replacement Project Cost (includes ELAC)
1	W	W Dist Sys & PRVs	\$3,616,800	35%	12%	8%	30%	\$6,692,000
1	W	W Dist Sys & PRVs						
Value			\$3,616,800	\$1,265,880	\$434,016	\$289,344	\$1,085,040	\$6,692,000

Asset Database is the Core of Long Term Planning

Utility Area Number	Water / Wastewater	Utility Area Description	Asset Numbering
1	W	W Dist Sys & PRVs	Potable Dis Sys - 100
1	W	W Dist Sys & PRVs	Potable Dis Sys - 110



Criticality						Vulnerability	Stretched Vulnerability	Risk	Stretched Risk
Public Health & Safety	Effect on Operations	Environment Violations	Cost of Repair	Overall [Σ]					
5	5	4	6	20	0.9	0.9	18.0	18.0	

Year	Remaining Useful Life	Stretched Remaining Useful Life	Portion of Stretched Useful Life Remaining
3	0	0	0%
5	2	2	3%

The Asset Database Can Be Organized To Provide Different Snap-Shots of Information

	B	C	D	E	F	G	H	K
	Utility Area Number	Water/Wastewater	Utility Area Description	Asset Numbering	Treatment Process/Basin/Zone	Major Component/Subbasin/Subzone	Discipline	Discipline Installation Year
4								
5								
6								
7	1	W	W Dist Sys & PRVs	Potable Dis Sys - 200	Potable Distribution	Distribution Line (<=12") Prior to 1959 48572 LF at \$785/LF	Mech/Elec/Instru/Piping	1959
8	1	W	W Dist Sys & PRVs	Potable Dis Sys - 100	Potable Transmission	Transmission Line (> 12") Prior to 1959 6576 LF at \$1020/LF	Mech/Elec/Instru/Piping	1959
9	2	WW	WW Collection Sys	WW Collection -005	City-Wide Sewer	Unlined Interceptor (> 15") - Prior to 1959 0 feet at \$715/LF	Mech/Elec/Instru/Piping	1959
10	2	WW	WW Collection Sys	WW Collection - 006	City-Wide Sewer	Interceptor (> 15") - Prior to 1959 - Lined 0 feet at \$715/LF	Mech/Elec/Instru/Piping	1959
11	2	WW	WW Collection Sys	WW Collection - 016	City-Wide Sewer	Lined Interceptor (> 15") - 1970-1979 27235 feet at \$715/LF	Mech/Elec/Instru/Piping	1975
12	2	WW	WW Collection Sys	WW Collection - 050	City-Wide Sewer	Unlined Collection (<= 15") - Prior to 1959 13340 feet at \$525/LF	Mech/Elec/Instru/Piping	1959
13	2	WW	WW Collection Sys	WW Collection - 055	City-Wide Sewer	Unlined Collection (<= 15") - 1960-1969 8601 feet at \$525/LF	Mech/Elec/Instru/Piping	1965
14	2	WW	WW Collection Sys	WW Collection - 060	City-Wide Sewer	Unlined Collection (<= 15") - 1970-1979 509689 feet at \$525/LF	Mech/Elec/Instru/Piping	1975
15	2	WW	WW Collection Sys	WW Collection - 85	City-Wide Sewer	Unlined Collection (<= 15") Age Unknown 105460 feet at \$525/LF	Mech/Elec/Instru/Piping	1975
16	4	W	Master Meters & Shop	Master Meters - 600	100th & Federal Blvd	Piping, 8" meter	Mech/Elec/Instru/Piping	1994
17	4	W	Master Meters & Shop	Master Meters - 200	85th & Zuni	Piping, 10" meter	Mech/Elec/Instru/Piping	1994
18	4	W	Master Meters & Shop	Master Meters - 745	Potable Interconnect - Arvada 82nd & Sheridan	Meter	Mech/Elec/Instru/Piping	1996
19	4	W	Master Meters & Shop	Master Meters - 735	Potable Interconnect - Broomfield North 132nd & Zuni	Meter	Mech/Elec/Instru/Piping	1995
20	4	W	Master Meters & Shop	Master Meters - 740	Potable Interconnect - Broomfield South 118th & Gray	Meter	Mech/Elec/Instru/Piping	1995
21	4	W	Master Meters & Shop	Master Meters - 705	Potable Interconnect - CW&SD 74th & Zuni	Meter	Mech/Elec/Instru/Piping	1996
22	4	W	Master Meters & Shop	Master Meters - 730	Potable Interconnect - Denver	Vault structure	Structural/Architectural	1976

When PWU says “25% of assets that are at or beyond their useful life”, we get this information from the asset database.

Asset Database Uses Industry Standard Useful Life for Consistency

Estimated Useful Life Based on Asset Type (This data is referenced in the database and can be changed here if desired)				
Asset Type - Description of Typical Type of Asset	Code	Typical Standard Useful Life	Useful Life Multiplier**	COW Remaining Useful Life
Tank Interior Coatings	5	8	1.0	8
Harsh Duty Pumps and Equipment and/or Small <25 Hp	10	10	1.2	12
WQ Lab Equipment 1 of 2 - Short Life	15	10	1.0	10
SCADA, Instrumentation & Control, Comm and High Tech	20	12	1.0	12
Steel Tank Exterior Coatings	30	14	1.0	14
Medium Duty Pumps and Equipment and/or 25-100 Hp	40	15	1.2	18
PLCs	50	15	1.0	15
VFDs, Soft Starts and Outdoor Electrical	60	17	1.0	17
HVAC (General Building Whole System)	65	20	1.0	20
Mechanical and Process Equipment (i.e., bar screens, floc)	70	20	1.2	24
Roofs 1 of 3 - Standard and/or Membrane	80	20	1.0	20
WQ Lab Equipment 2 of 2 - Long Life	85	20	1.0	20
Valves, Piping and Headers	90	25	1.0	25
Fiber Optics, Electrical and Generators	100	30	1.2	36
Force Mains, and IMS CAP Underdrains	105	30	1.2	36
Roofs 2 of 3 - Metal or Extra Built-up	110	35	1.0	35
Sewer - 12-inch and smaller and All CIPP Lined Sewers	112	40	1.0	40
PRV Vault - Life Span	115	40	1.3	52
Tank Structure	120	40	1.2	48
Pipeline 1 of 2 - Short Life (yard piping, siphons)	125	40	1.0	40
Structural	130	50	1.4	70
Roofs 3 of 3 - Clay Tile	140	50	1.0	50
Site/Civil	150	55	1.0	55
Pipeline 2 of 2 - Long Life (Dist. System, Interceptors)	160	60	1.0	60
Generic Reservoir (not Standley Lake)	170	100	1.0	100
Raw Water-Style Long-Life Structures	180	100	1.0	100
Standley Lake Earthen Dam	190	150	1.0	150
Earthen Canal or Canal System	200	200	1.0	150

**All Assets with Criticality >13 were forced via excel formula to remain at a useful life multiplier of 1.00

We Use The Asset Database in Many Ways

AGE **CONDITION** **RECOMMENDATIONS** **DESCRIBE** **PROJECTS** **LOOK** **ORGANIZE** **INFORMATION** **DECISIONS** **TOOL**

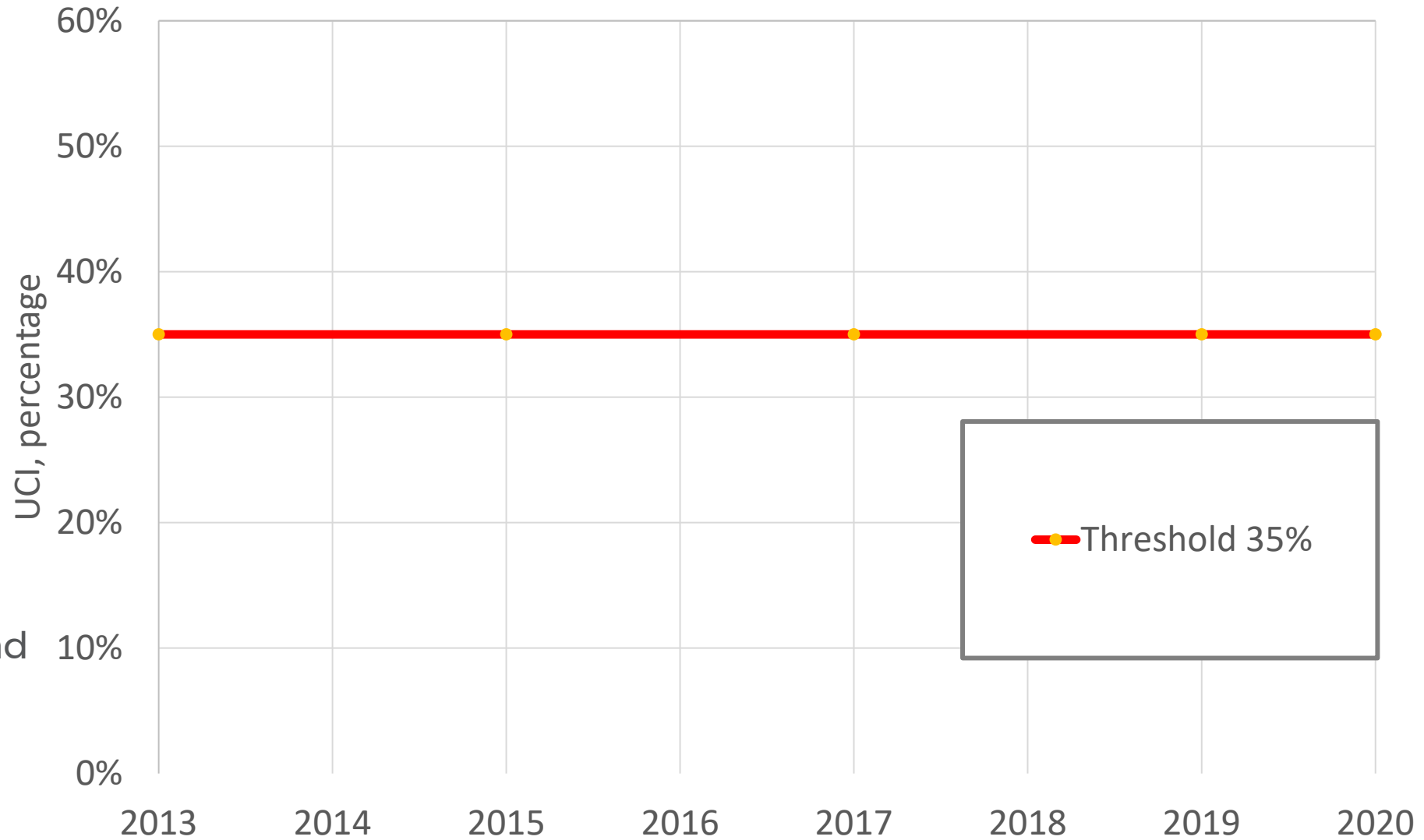
Another Way to View Age/Decline/R&R is the Utility Condition Index (UCI)

- Calculated from information in the asset database
- Measure of depreciation : $\text{Depreciated Value} / \text{Replacement Value}$
- A way of asking “How is the Infrastructure Doing?”
- We use the UCI to describe the infrastructure but not as a direct method to identify projects or calculate rates
- Utility Condition Index concept borrowed from the Pavement Condition Index (PCI) used by Streets.
- American Society of Civil Engineers uses report of grades like A, B, C, D, F



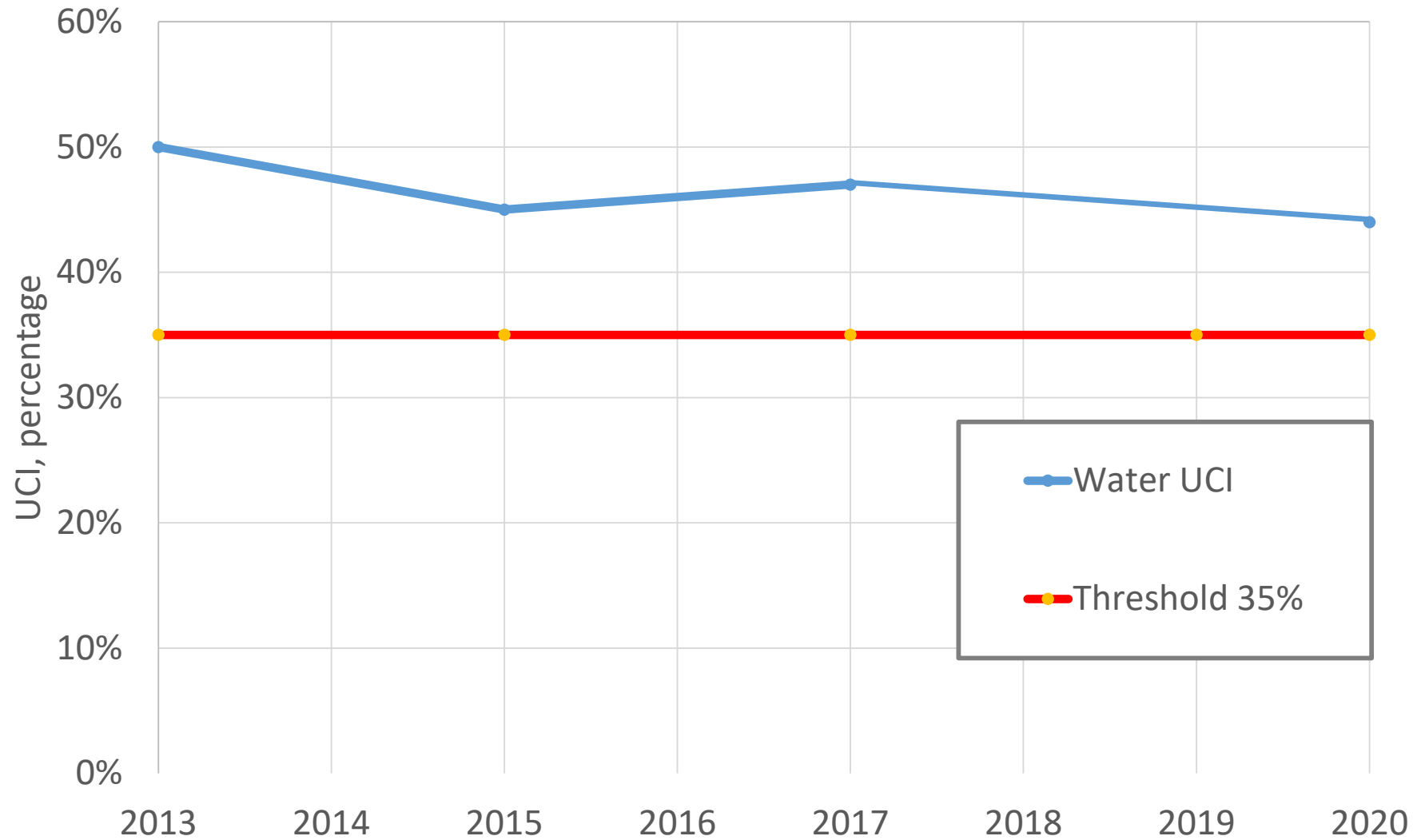
100% = new

Utility Condition Index

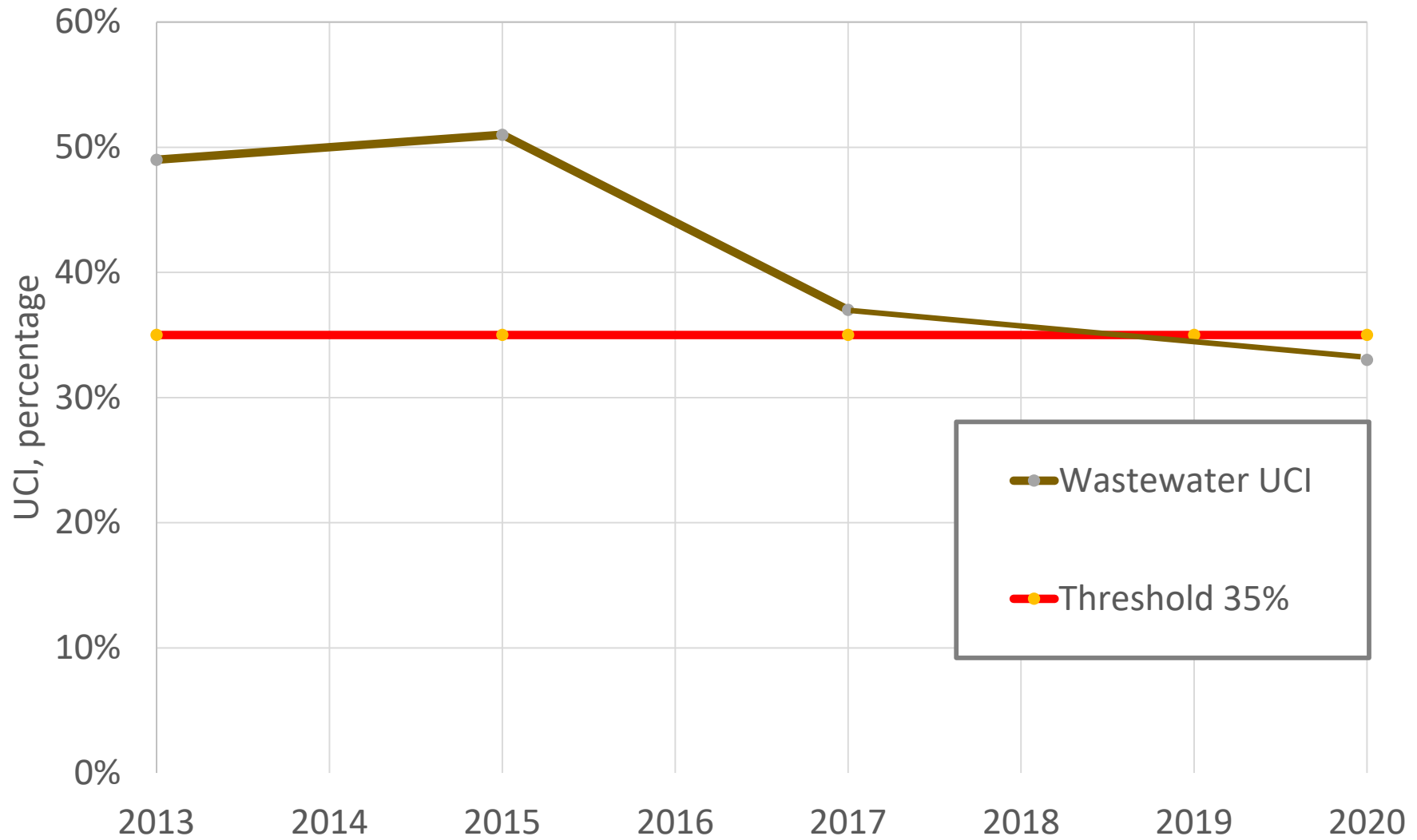


10% = end of useful life

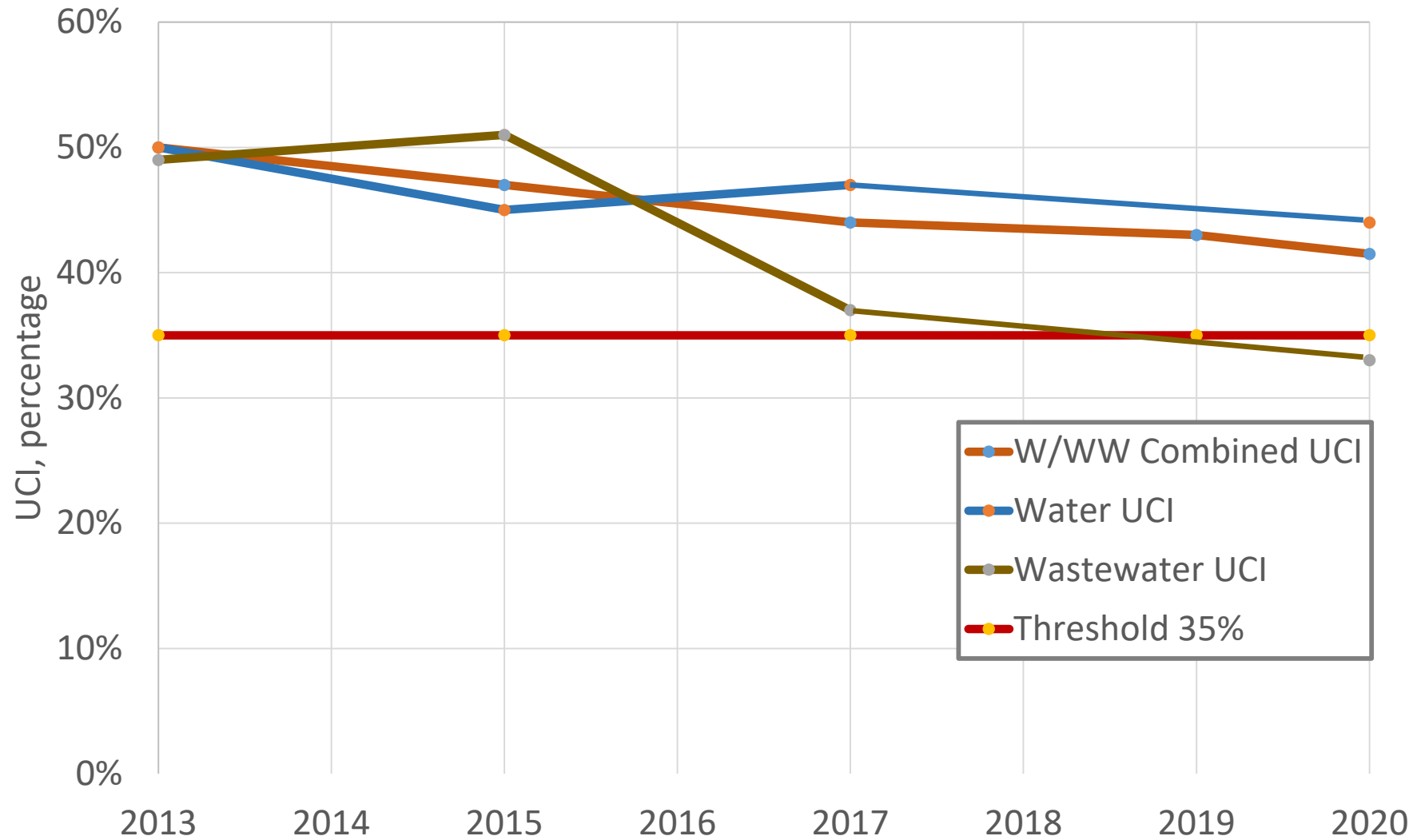
Utility Condition Index - Water



Utility Condition Index - Wastewater

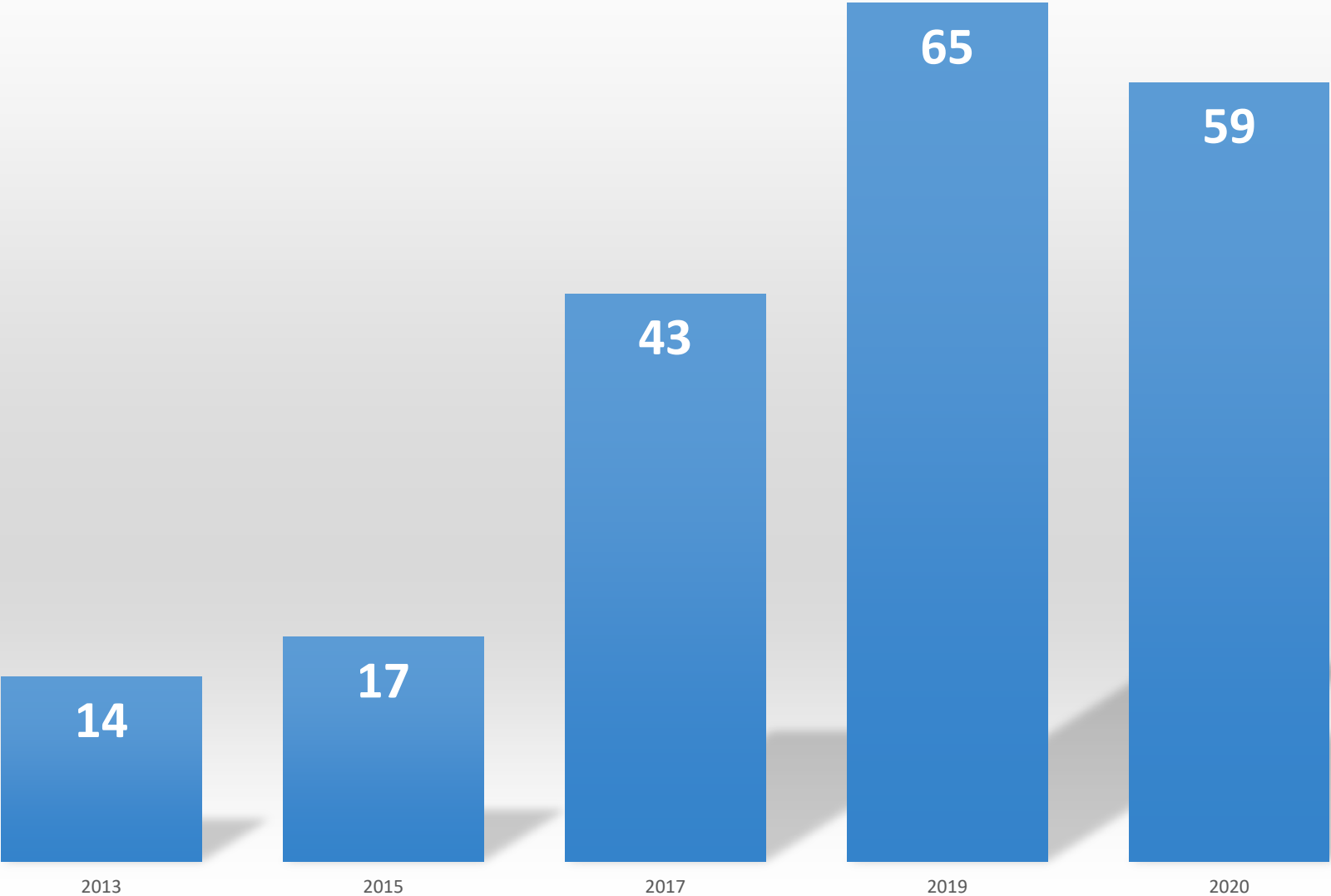


Utility Condition Index



Water Storage Tanks

Utility Condition Index, Percentage



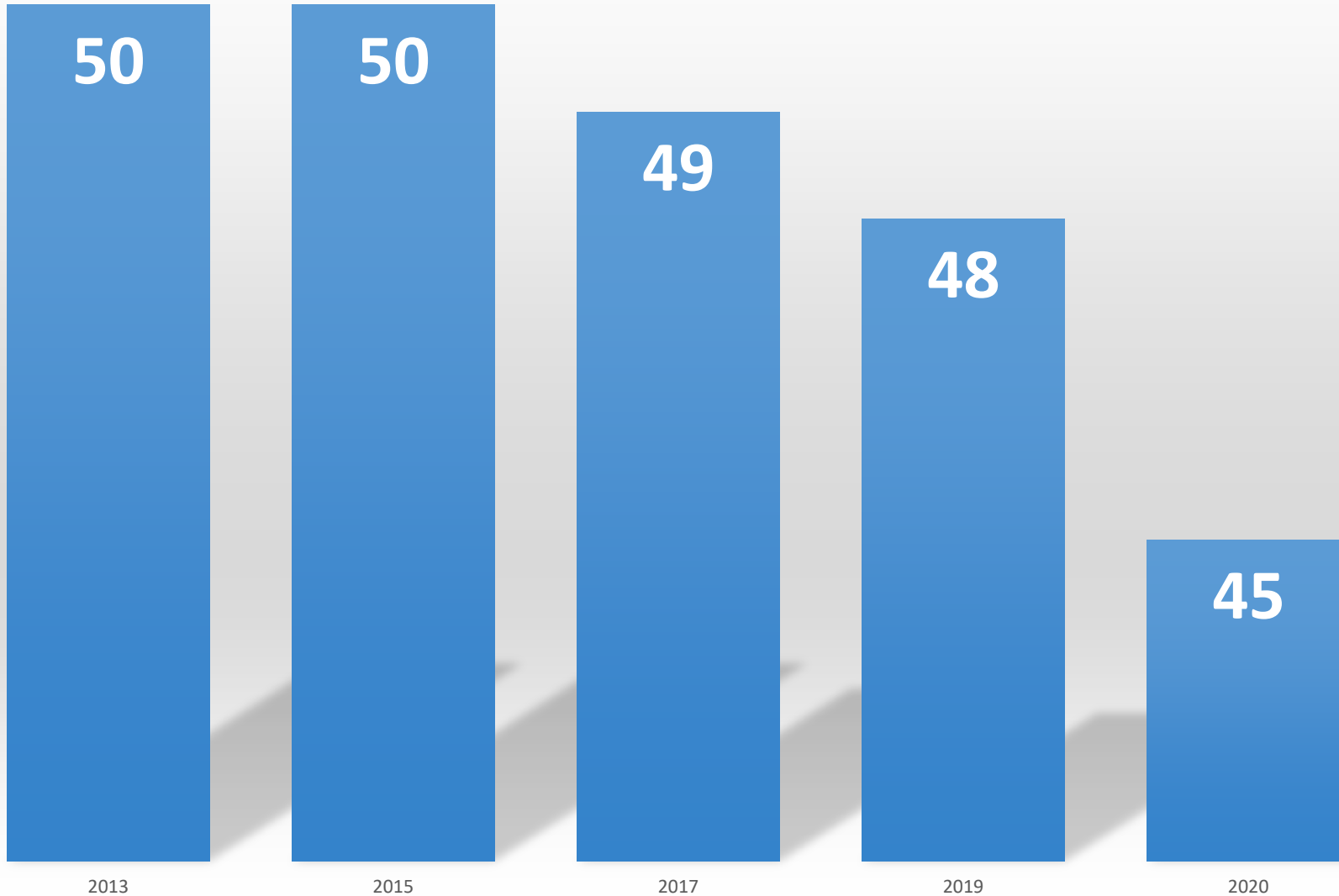
In 2013 the City's water storage tanks were basically used up, the UCI is very low.

Since 2013, the City has invested in water storage tanks.

The UCI for tanks has improved dramatically.

Water Pipelines

Utility Condition Index, percentage



In 2013 the UCI for the City's water pipelines was 50%

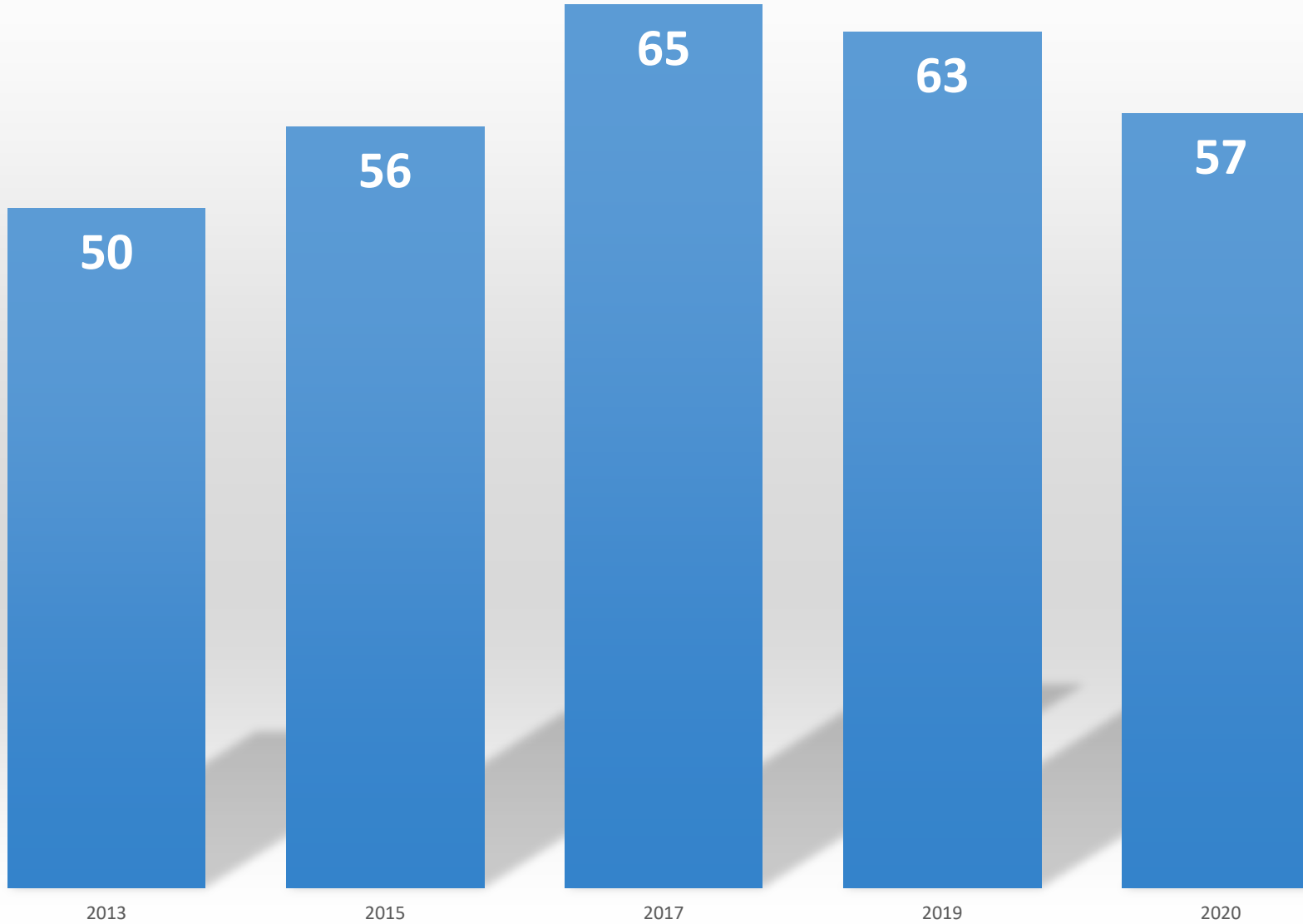
Since 2013, the City has invested in water pipelines however, this is a \$2B utility area.

It is difficult to show UCI improvement.

The UCI has declined in big chunks because some existing pipe from the 1960s is in the ground and needs to be replaced.

Lift Stations

Utility Condition Index, Percentage



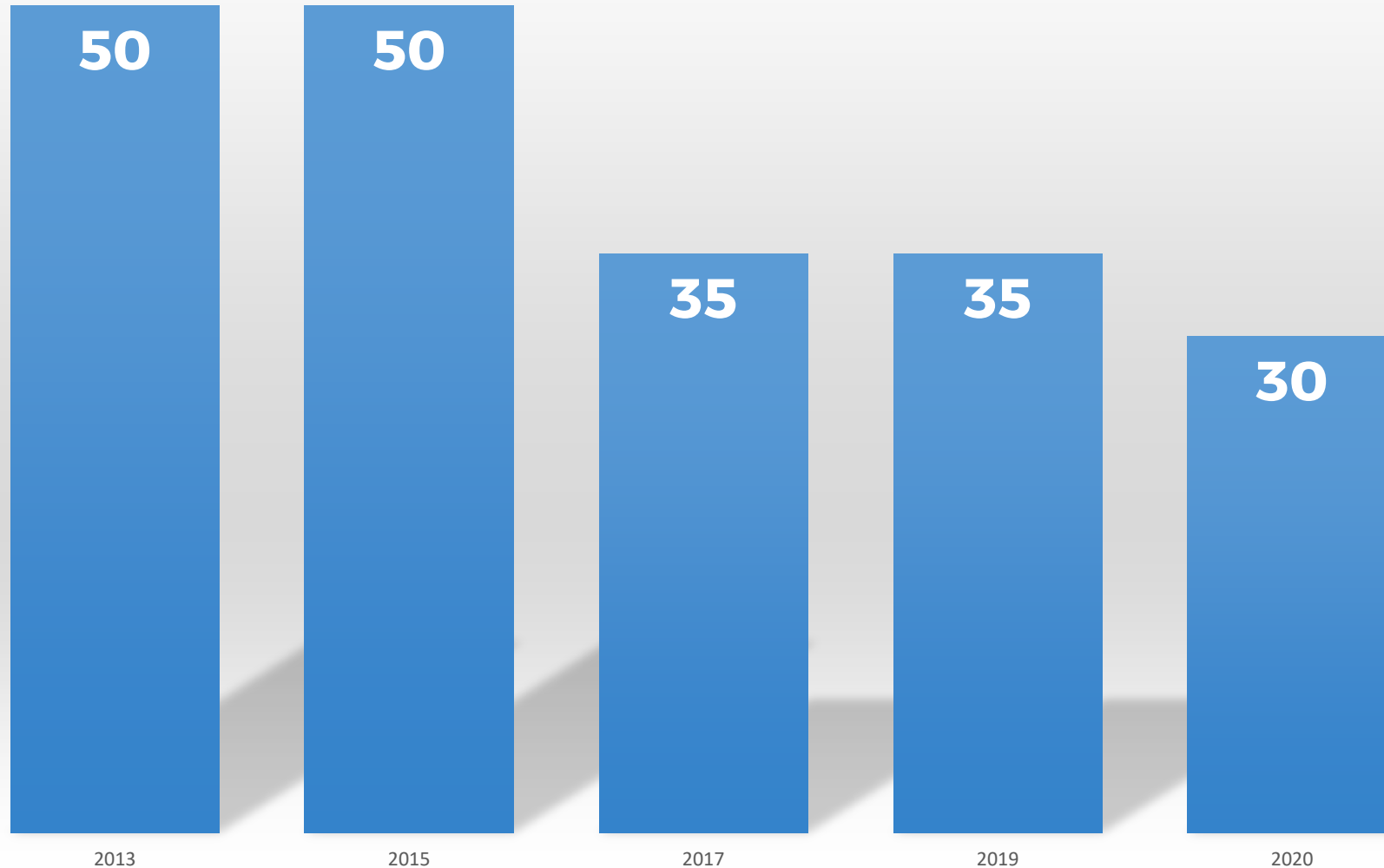
In 2013 the UCI for the City's lift stations was 50%

Since 2013, the City has systematically invested in lift stations.

The UCI has improved

Wastewater Pipe Sytem

Utility Condition Index, Percentage



In 2013 the UCI for the City's wastewater pipe system was 50%

In 2017 sewer pipe hit the end of useful life based on industry standard. The UCI dropped to 35.

Since 2013, the City has systematically invested in lift stations.

It is difficult to show UCI improvement.

The UCI has declined in big chunks because some existing pipe from the 1960s is in the ground and needs to be replaced.

Questions, Comments, Discussion about Response to Question #2?

Question 3: What drives the decline in water and wastewater infrastructure? (Age? Use? Materials? Location?)

Water Pipelines

Reclaimed Pipelines

Wastewater Pipelines

Water Meters

Pumping Stations (water & sewage)

Storage Tanks

Water Treatment & Reclaimed Facilities

Wastewater Treatment Facility

Raw Water System

Age / Use :

motors, moving parts,

software obsolete,

parts obsolete,

industry standard useful life

Materials / Location :

harsh duty environment,

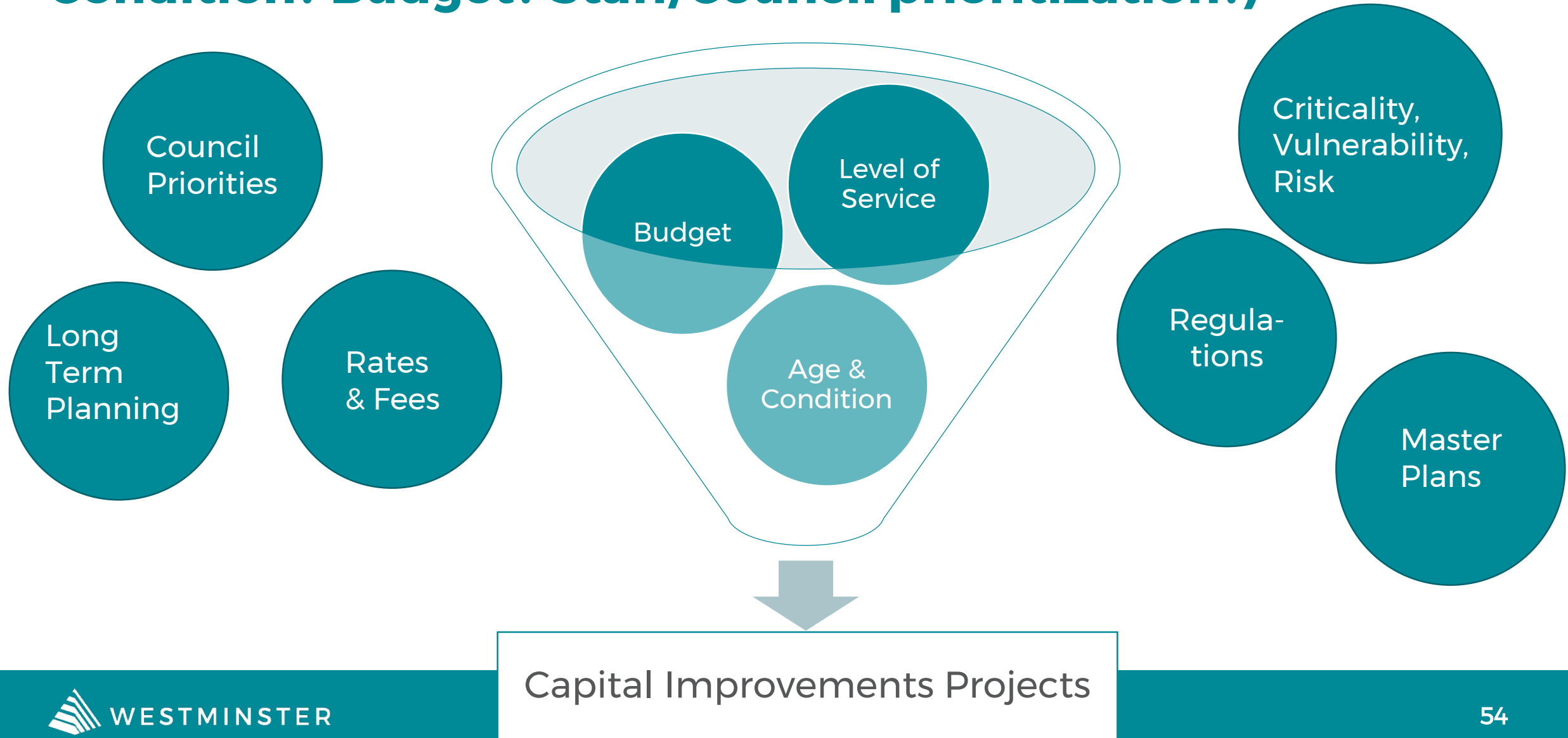
UV light degradation, outdoors

corrosive soils



Questions, Discussion, Comments about the Response to Question #3?

Question 4: What drives the schedule for repairs, upgrades, replacement for infrastructure? (Age? Condition? Budget? Staff/Council prioritization?)



Question 4: In 2017 PWU developed Level of Service Goals for each Utility Area



Assumptions Behind Level of Service Goals

PWU thinks our Customers Want

- Turn on the tap for clean, safe, reliable drinking water every time and environmentally compliant wastewater treatment.
- Expedient commute on City streets
- Limited service interruptions

PWU Must Meet Regulatory Drivers

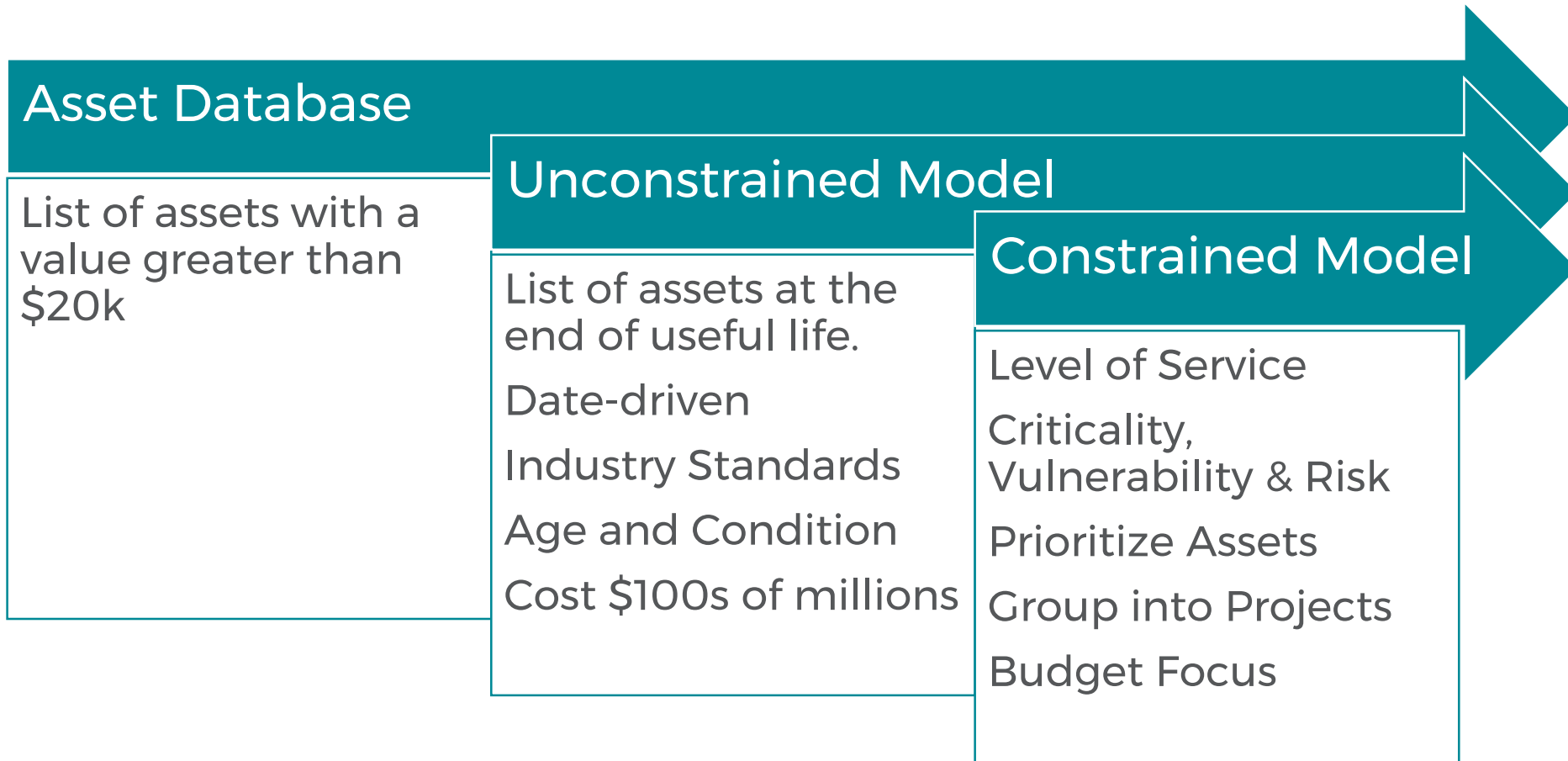
- Must meet State and Federal requirements for Drinking Water and Wastewater.



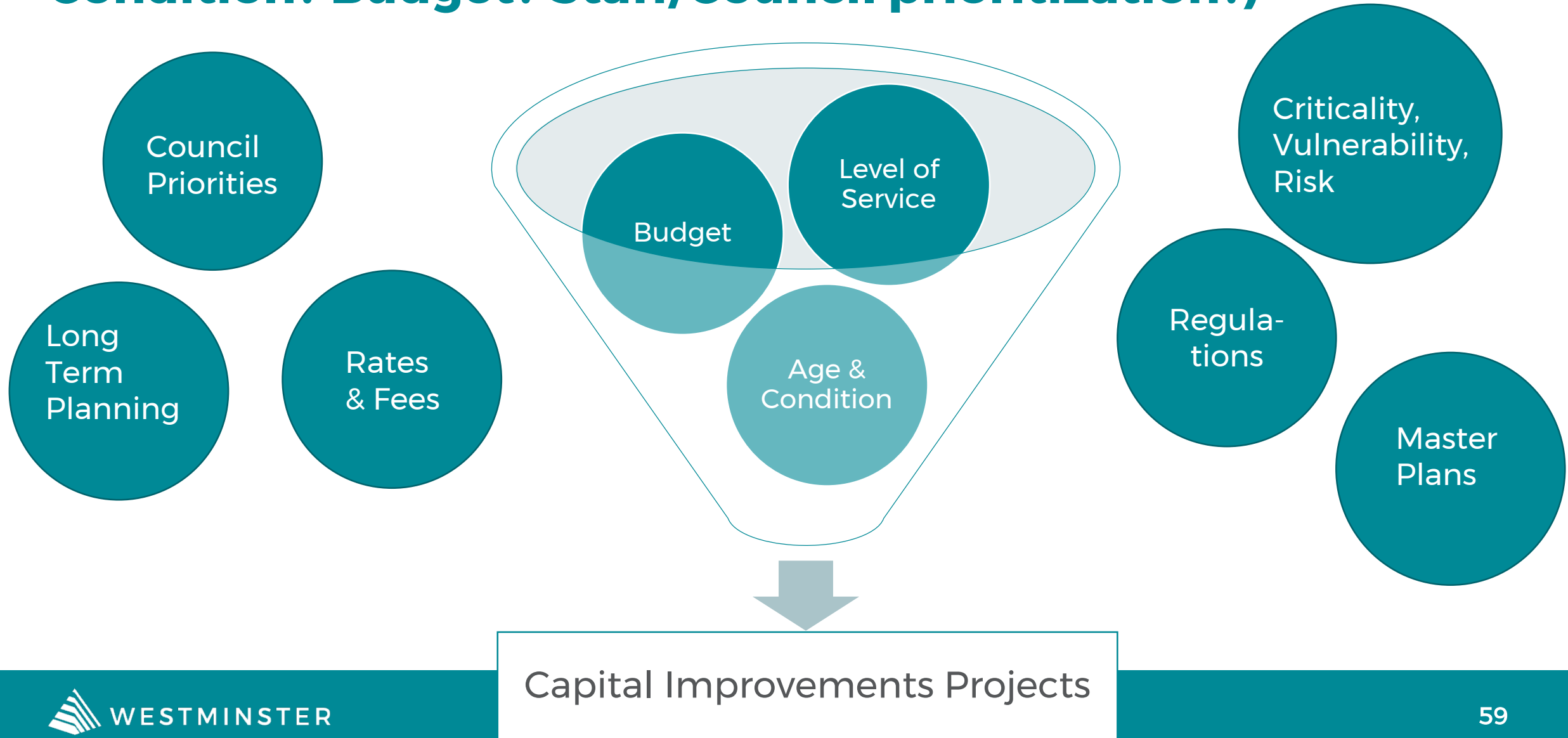
Rate-payer Experience With Relaxed Level of Service Goals Could Include:

- More frequent service interruptions
- Longer lasting service interruptions
- Increased inconvenience during the commute due to pipeline breaks
- Possible harm to the environment due to sewage spills

Question 4: What drives the schedule for repairs/upgrades/replacement for infrastructure? (Age? Condition? Budget? Staff/Council prioritization?)



Question 4: What drives the schedule for repairs, upgrades, replacement for infrastructure? (Age? Condition? Budget? Staff/Council prioritization?)



Discussion, Comments, Questions on Response to Question #4?

Question 5: What Creates Need for New Water and Wastewater Infrastructure?



Age and Condition



Capacity – growth & non-growth



Regulatory



Environmental



Contract

Lack of Capacity Drives the Need for New Infrastructure

Growth Requires New Infrastructure in Some Cases

- New, larger sewer interceptors
- Water supply limits some growth
- Evaluate development proposals case by case
- Investment in raw water reservoirs (growth + non-growth)

Non-Growth Requires New Infrastructure in Some Cases

- Hydraulic modeling for a system-wide view reveals capacity issues compared to a development by development approach

Question 5: What Creates Need for New Infrastructure?

Regulations



Question 5: What Creates Need for New Infrastructure?

Environmental

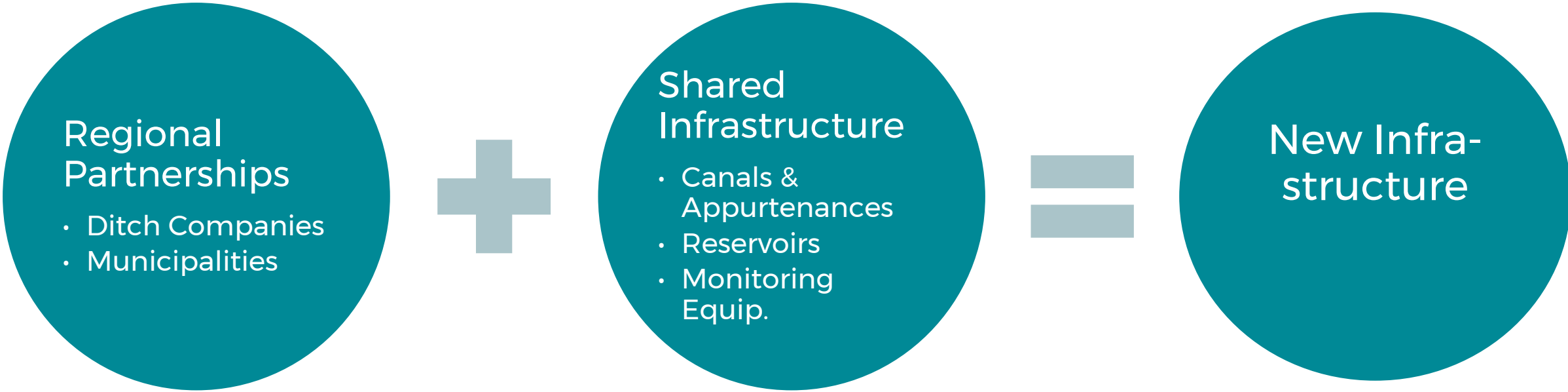
Changes in the environment that compromise water quality

Examples: Fire in the watershed, Compromised water quality in Standley Lake

Wastewater Treatment Facilities – Discharge Permits – receiving water's water quality from a system perspective drive more stringent permit requirements, downstream users

Question 5: What Creates Need for New Infrastructure?

Contract



Questions, Discussion, Comments to the Response to Question #5?

Question 6: What are the consequences if we delay some of the proposed near-term repairs or upgrades or replacements for infrastructure?

- The thing will still need to be done
- Delay means the thing will cost more in the future
- Delay means that if the thing fails we will pay a premium to have it repaired and we will pay for damages to others (if relevant)



Question 6: What are the consequences of delay...will there be catastrophic failure?

Short Answer:

- Maybe

a mechanical or electrical failure that is likely to happen. Typically require less than a week to correct

Long Answer

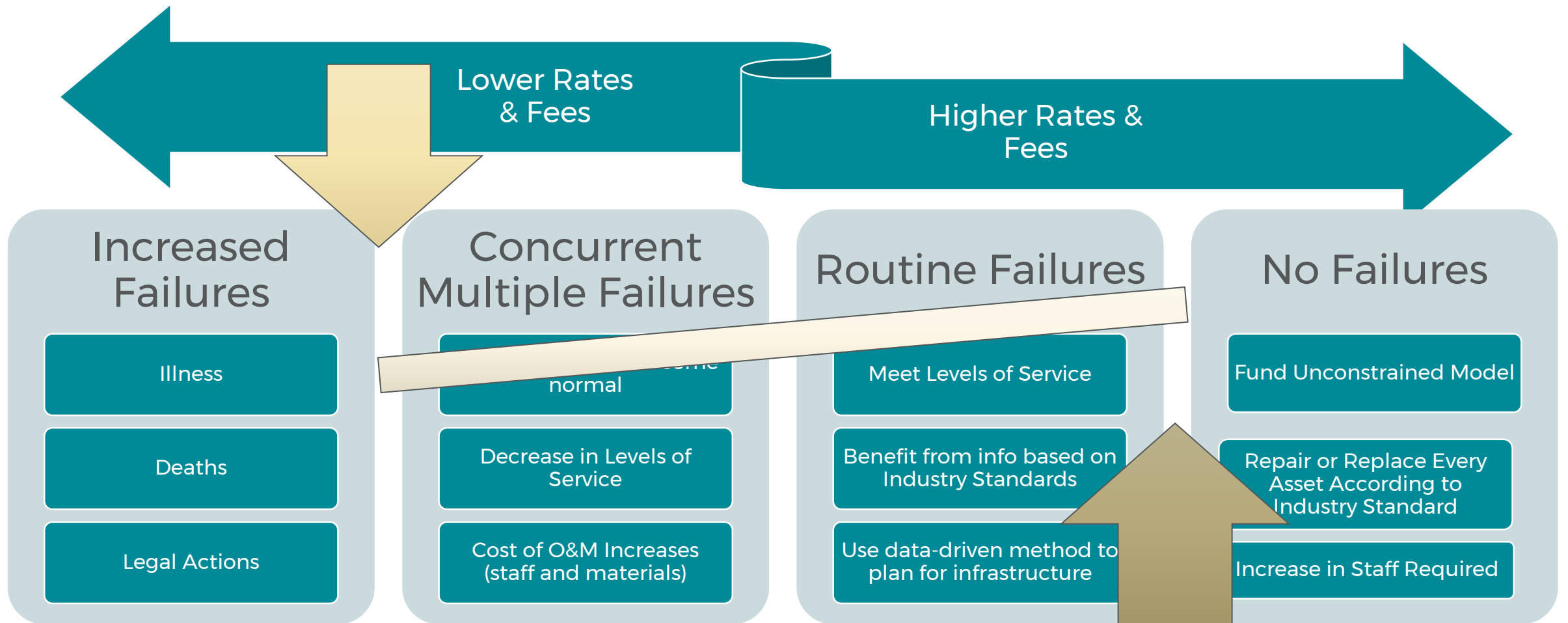
- Routine Failure
- Unlikely Failure

simultaneous and multiple mechanical and/or electrical failures that will require more than a week to correct and results in long-term interruptions of service to water and / or wastewater.

Question 6: **Will it kick the can down the road for a future council or generation to sort out?**

Yes.

Question 6: What are the best-case and worst-case scenarios? Utility perspective



Questions, Discussion, Comments to the Response to Question #6?

Tracking assumptions for future discussion:

- Levels of service