

# PROJECT 2030

WATER MAIN REPLACEMENT



CITRUS  
HEIGHTS  
WATER  
DISTRICT

**PROJECT 2030**  
WATER MAIN REPLACEMENT



# Customer Advisory Committee Meeting 4

FEBRUARY 5, 2019



# PLEDGE OF ALLEGIANCE



# MEETING AGENDA

**Public Comment**

**Approve Meeting #3 Summary**

**Spending Overview**

**Funding Overview**

**Spending/Funding Alternatives**

**Q & A Activity**

**Answer Questions and Group Dialogue**

**Public Comment**

**Preview of CAC Meeting #5 on February 26, 2019**

**Meeting Take Away's**



# PUBLIC COMMENT



# PUBLIC COMMENT





# **APPROVE MEETING #3 SUMMARY – DECEMBER 11, 2018**

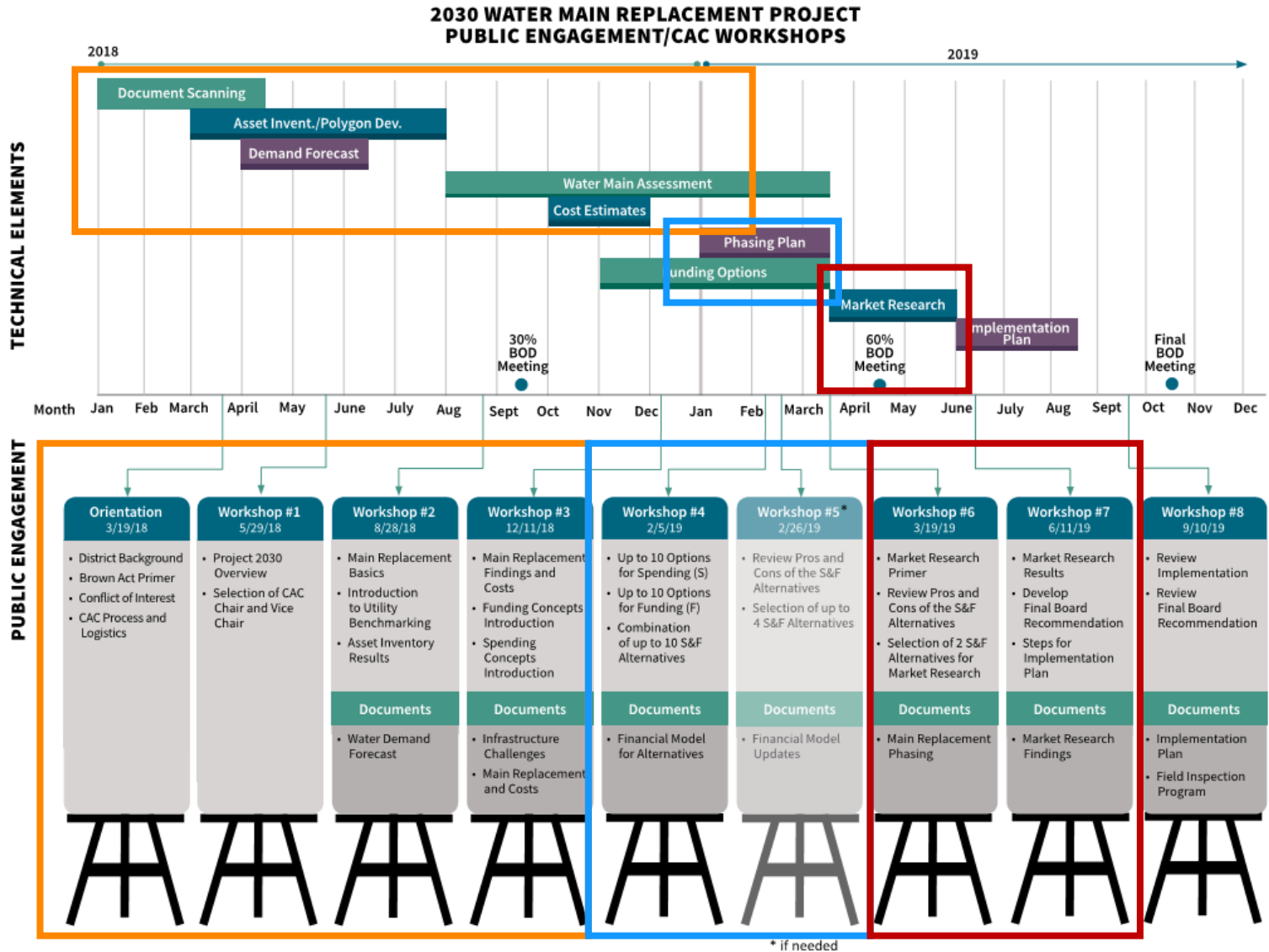


# WHERE WE ARE & WHERE WE ARE GOING





# PROJECT OVERVIEW



# PROJECT 2030 SCOPE





# SPENDING OVERVIEW & OPTIONS



# REMEMBER THIS?

## HOW WILL RISK-BASED APPROACH BE USED?

- Using sophisticated risk assessment software
  - Evaluate multiple LOF and COF risk factors
  - Develop prioritized main replacement list
- Short-Term Planning (by CHWD staff)
  - Develop and update capital improvement plan (annually and 5-year intervals)
  - Revisit LOF and COF factors and weighting
- Long-Term Planning (by CHWD staff and CAC)
  - Understand key risk factors
  - Develop multi-decade spending and funding strategy



# RISK FACTORS AND INITIAL RELATIVE WEIGHTING

Likelihood of Failure (LOF)		Consequence of Failure (COF)	
LOF #1: Pipe Age / Survival Probability	50%	COF #1: Pipe Diameter	20%
LOF #2: Pipe Material	25%	COF #2: Pipe Flow	20%
LOF #3: Historical Main Breaks	15%	COF #3: Transmission Pipelines	25%
LOF #4: Creek Crossings (Vulnerability)	10%	COF #4: Critical Facilities	10%
		COF #5: Creek Crossing (Environmental Impact)	10%
		COF #6: High Traffic Areas	10%
		COF #7: Difficult Access Areas (Backyard Mains)	5%
LOF Total	100%	COF Total	100%



## LOF #1

# WHAT DOES “SURVIVAL PROBABILITY” MEAN?

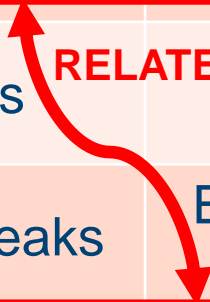
- Likelihood that a pipe won't experience a “failure”.
- “Failures” can be repaired and returned to service.
- Everyday examples: car repairs/replacement
  1. *How do you decide when to replace with new?*



# COMMON UTILITY WATER DISTRIBUTION BENCHMARKS

Benchmark	How We Measure	Indicator Of
Mains Replaced	Percent per Year	Pace of Replacement
Water Loss	Percent, GPD/Connection	Integrity of System
Breaks and Leaks	Events per 100 miles of Main	Integrity of System

**RELATED**





# TOTAL PIPELINE REPLACEMENT COSTS

Pipe Classification	Total Miles	Cost (million)
Distribution Mains (<=12 inch diameter)	235	\$ 317
Transmission Mains (>12 inch diameter)	15	\$ 54
Appurtenances (e.g. fire hydrants)	n/a	\$ 61
Total Construction Cost	n/a	\$ 432
Engineering, Management and Permitting	n/a	\$ 108
Total	250	\$ 540

## Notes:

- Costs are planning level estimates and should be reevaluated regularly based on recent construction project data

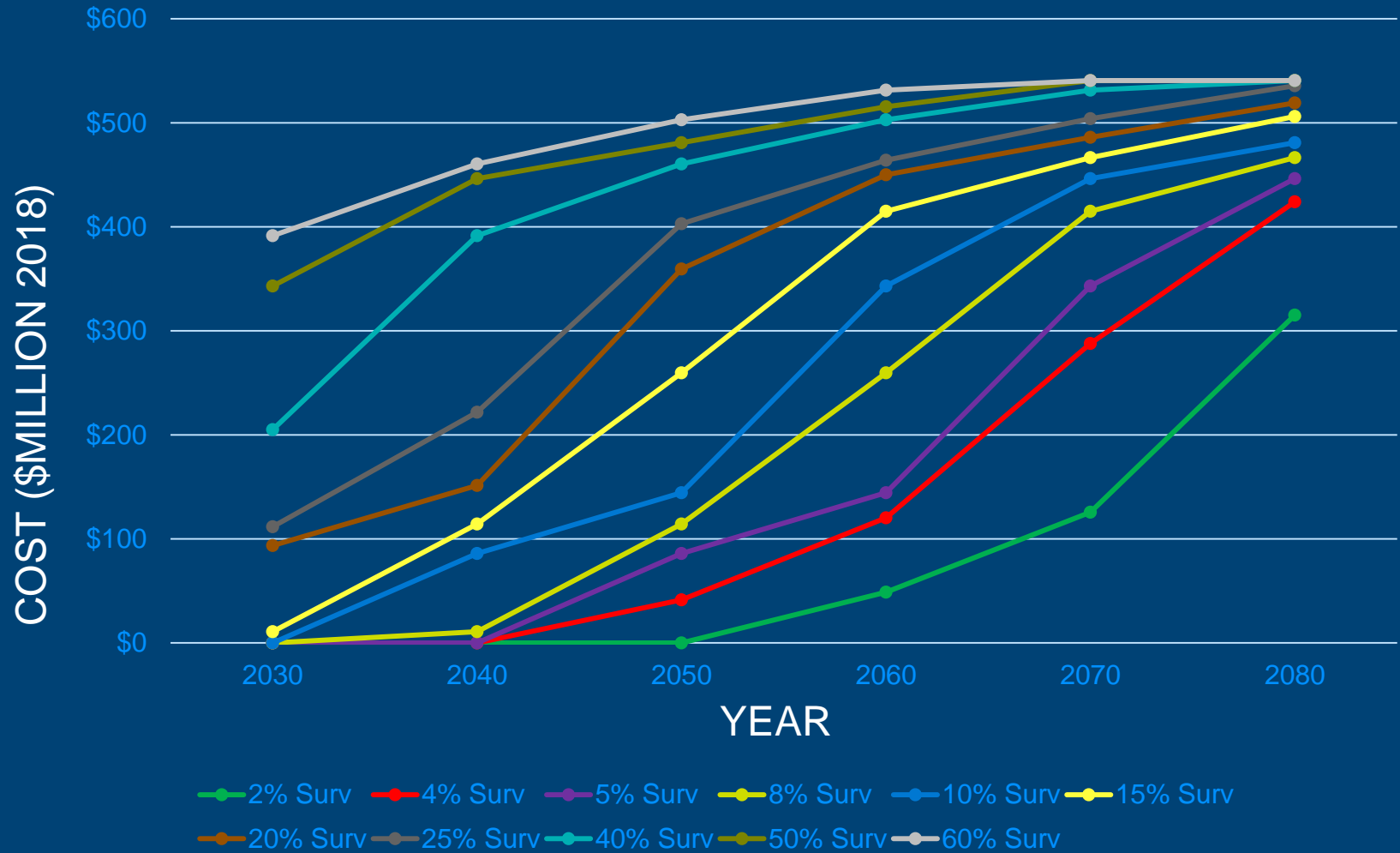


# SPENDING ASSUMPTIONS

- All total and average annual spending costs in this section are expressed in 2018 dollars.
- The planning period of all spending options is a 50-year period between 2030 and 2080.
- Baseline spending on water main replacement is \$2 million per year.



# SURVIVAL PROBABILITY CURVES



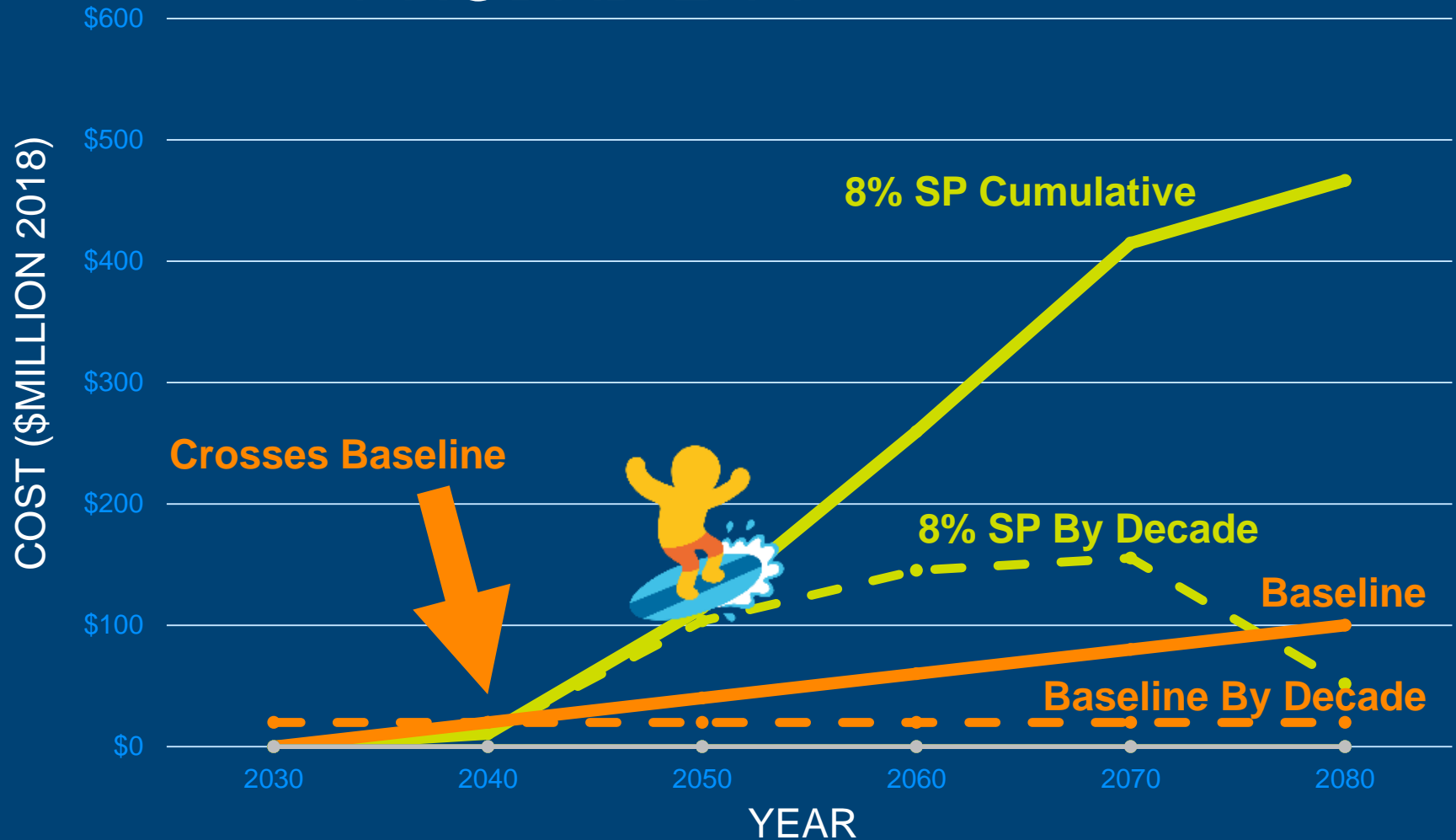
# SURVIVAL PROBABILITY CURVES

Baseline →



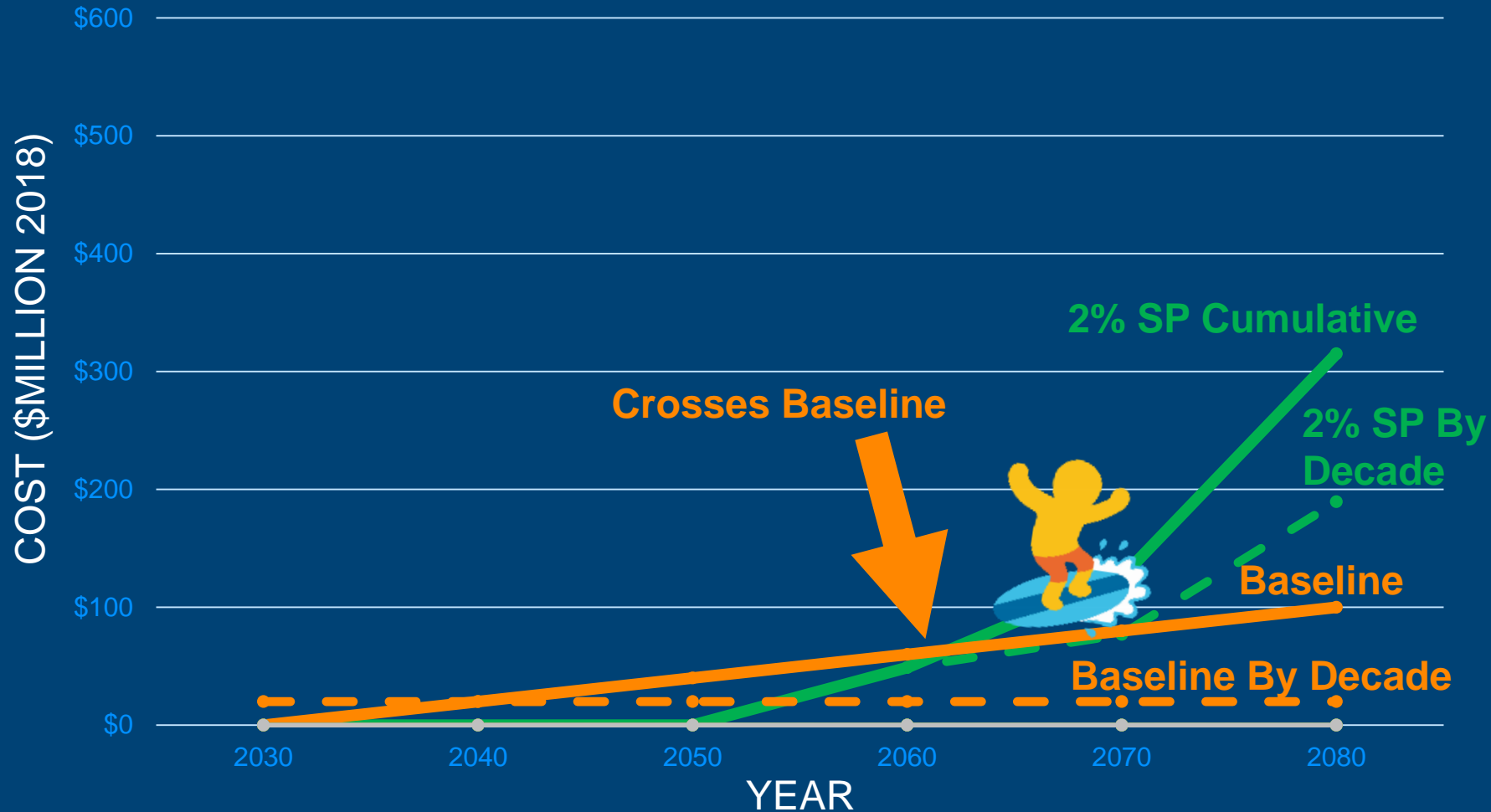


# CUMULATIVE AND DECADE SPENDING – 8% SURVIVAL PROBABILITY



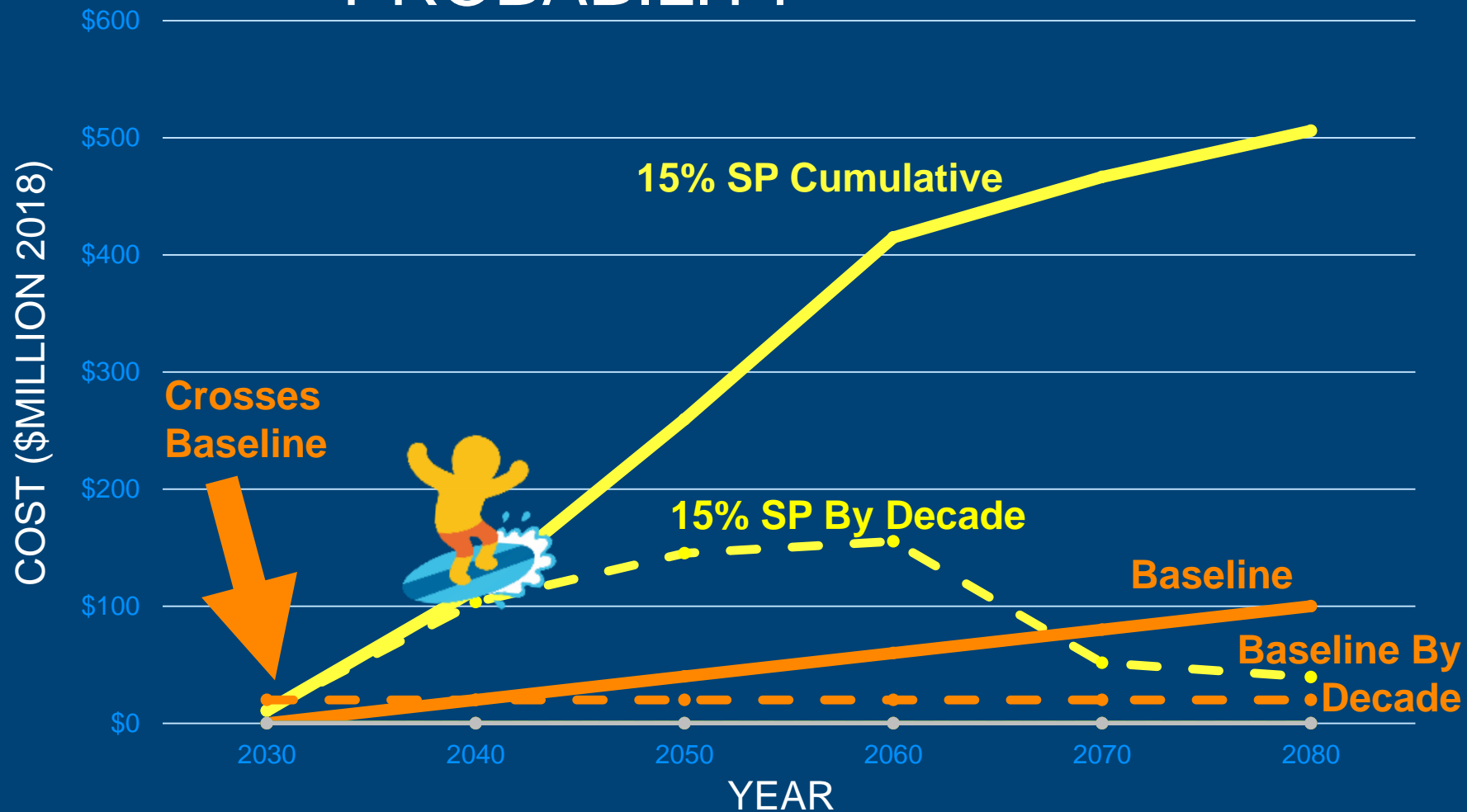


# CUMULATIVE AND DECADE SPENDING – 2% SURVIVAL PROBABILITY





# CUMULATIVE AND DECADE SPENDING – 15% SURVIVAL PROBABILITY



# SPENDING OPTIONS

Option	Average Annual Spending (\$2018 million)	Water Mains Replaced (Percent per Year)	Total Spending by 2080 (\$2018 million)	Calculated Survival Probability in 2060
Option 1 (Baseline)	\$2.0	0.4%	\$100	2.1%
Option 2 (1.5x Baseline)	\$3.0	0.6%	\$150	2.4%
Option 3 (2x Baseline)	\$4.0	0.8%	\$200	3.9%
Option 4	\$6.4	1.2%	\$320	6.4%
Option 5	\$7.8	1.4%	\$390	7.3%
Option 6	\$9.6	1.8%	\$480	8.2%
Option 7 (~5x Baseline)	\$10.2	1.9%	\$510	8.6%

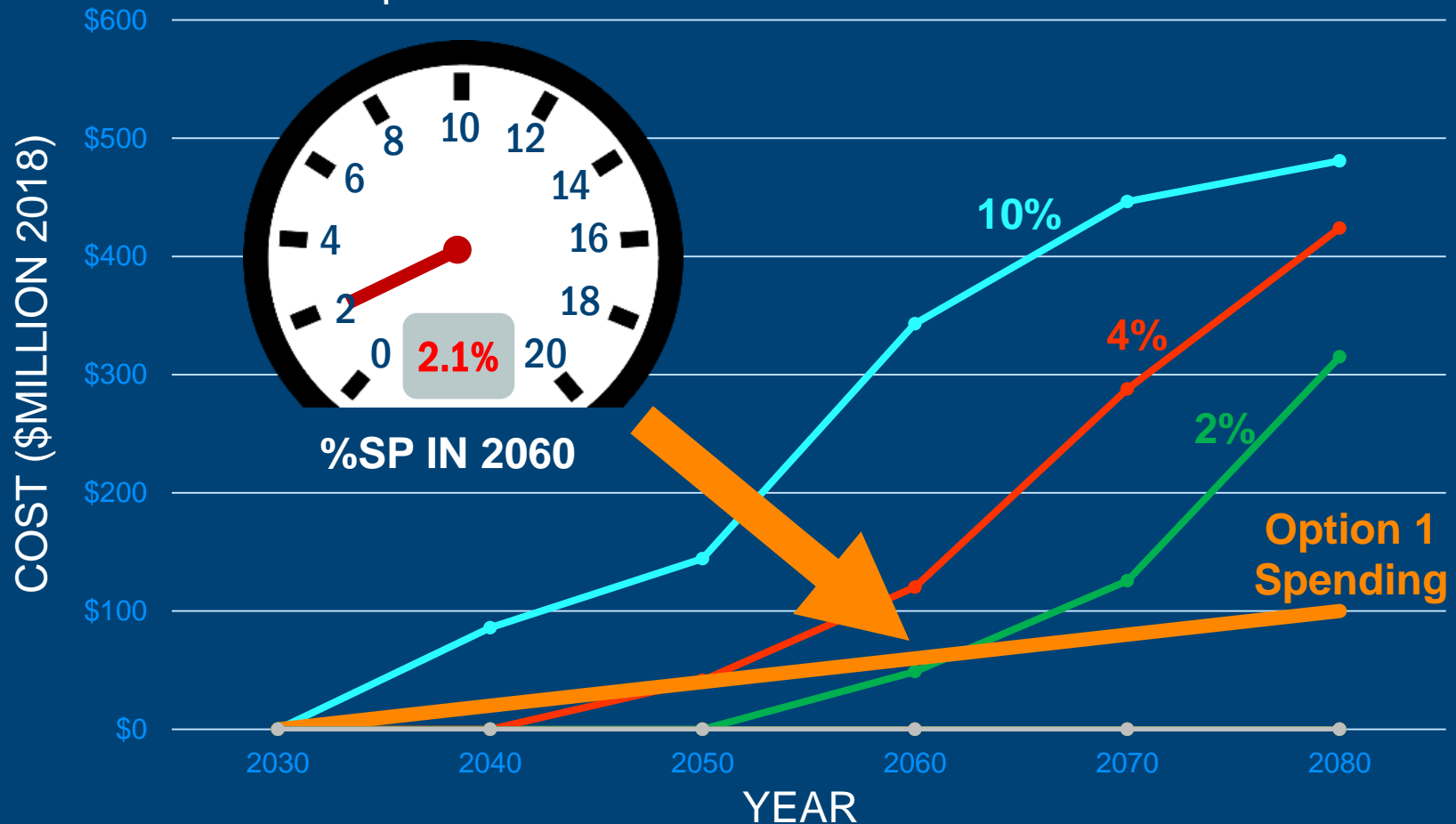
**Decreased Likelihood  
of Failure**





# OPTION 1 – BASELINE

\$2M / 0.4% PER YEAR  
\$100M TOTAL

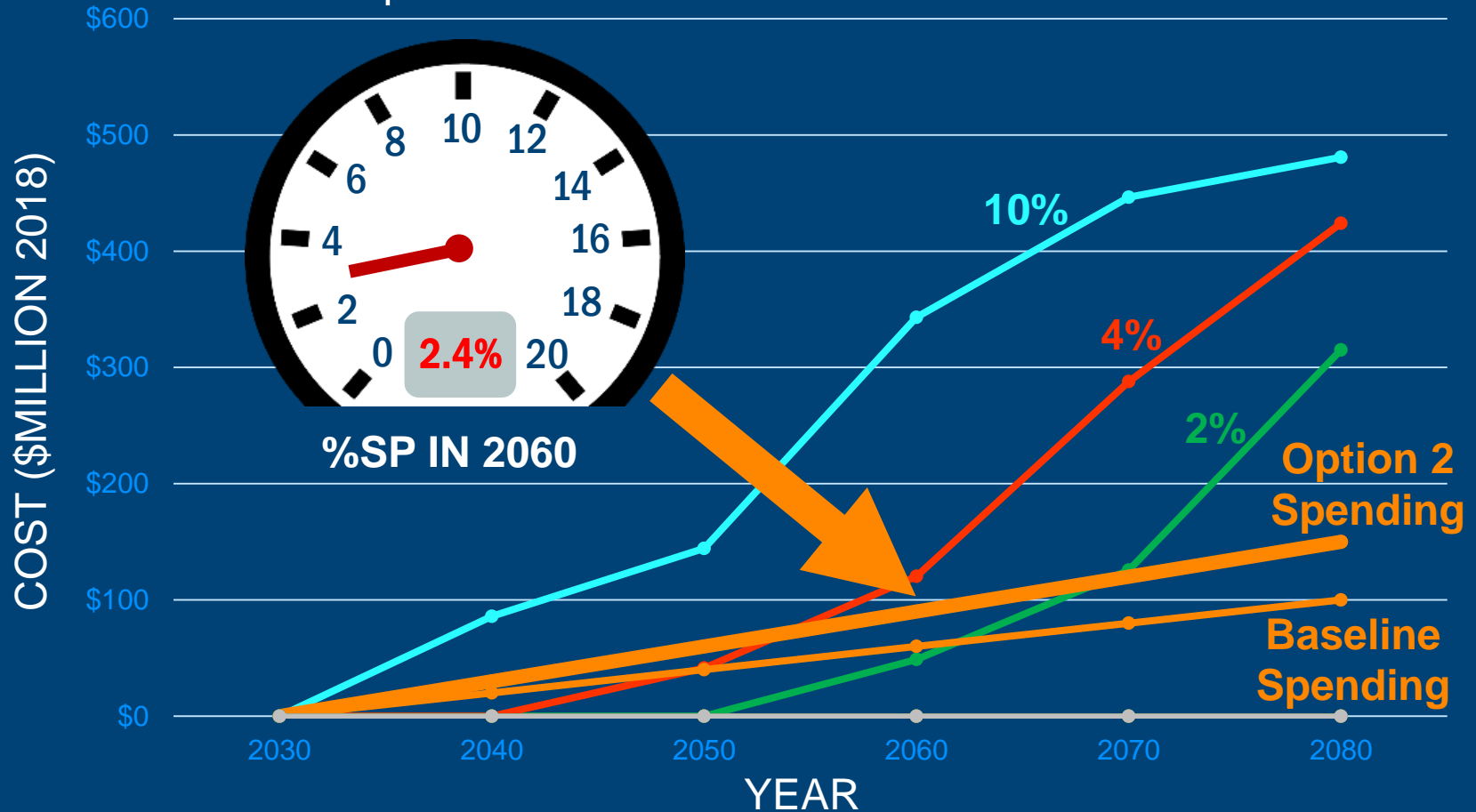






# OPTION 2 – 1.5x BASELINE

\$3M / 0.6% PER YEAR  
\$150M TOTAL

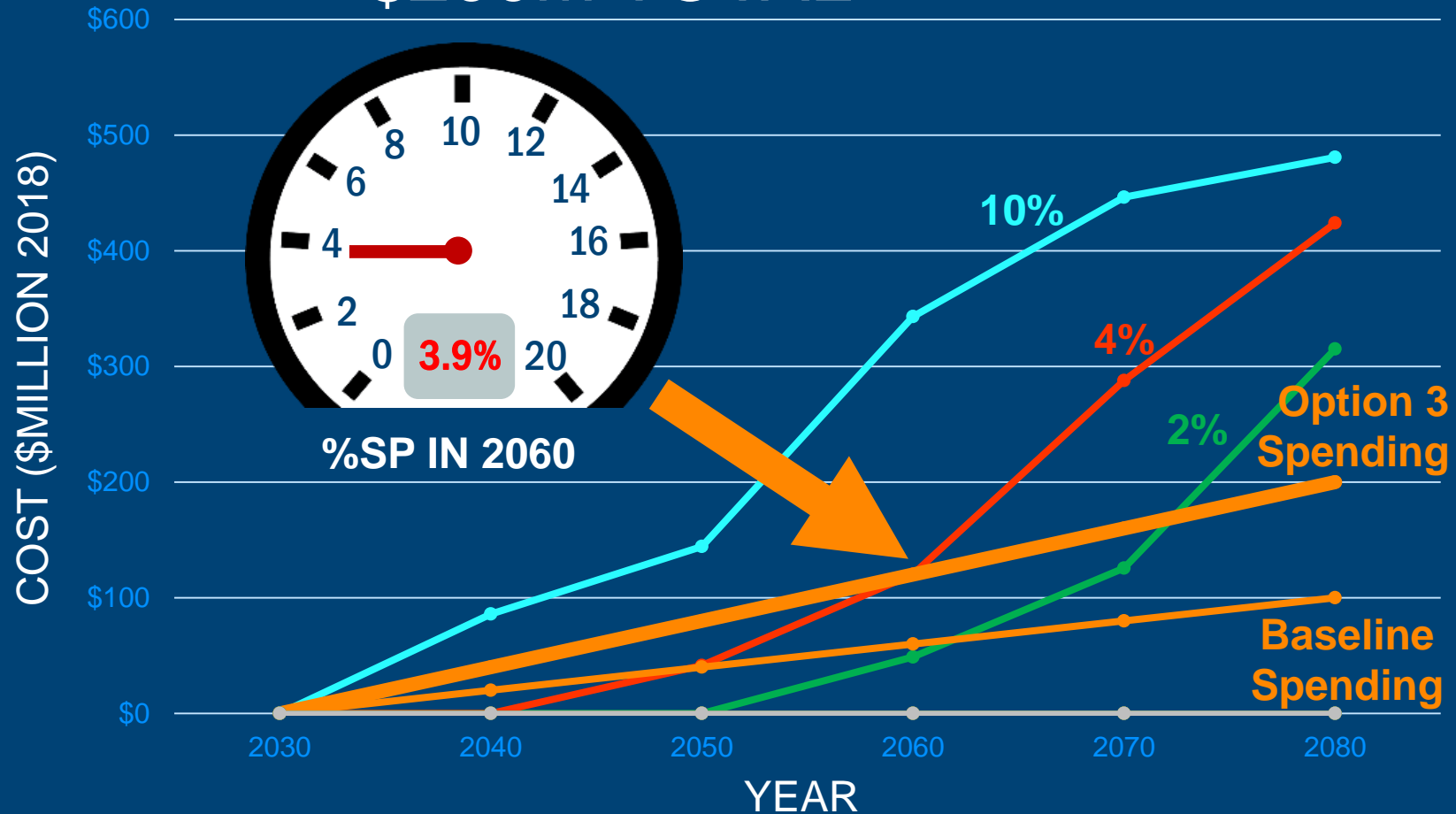




# OPTION 3 – 2x BASELINE

\$4M / 0.8% PER YEAR

\$200M TOTAL

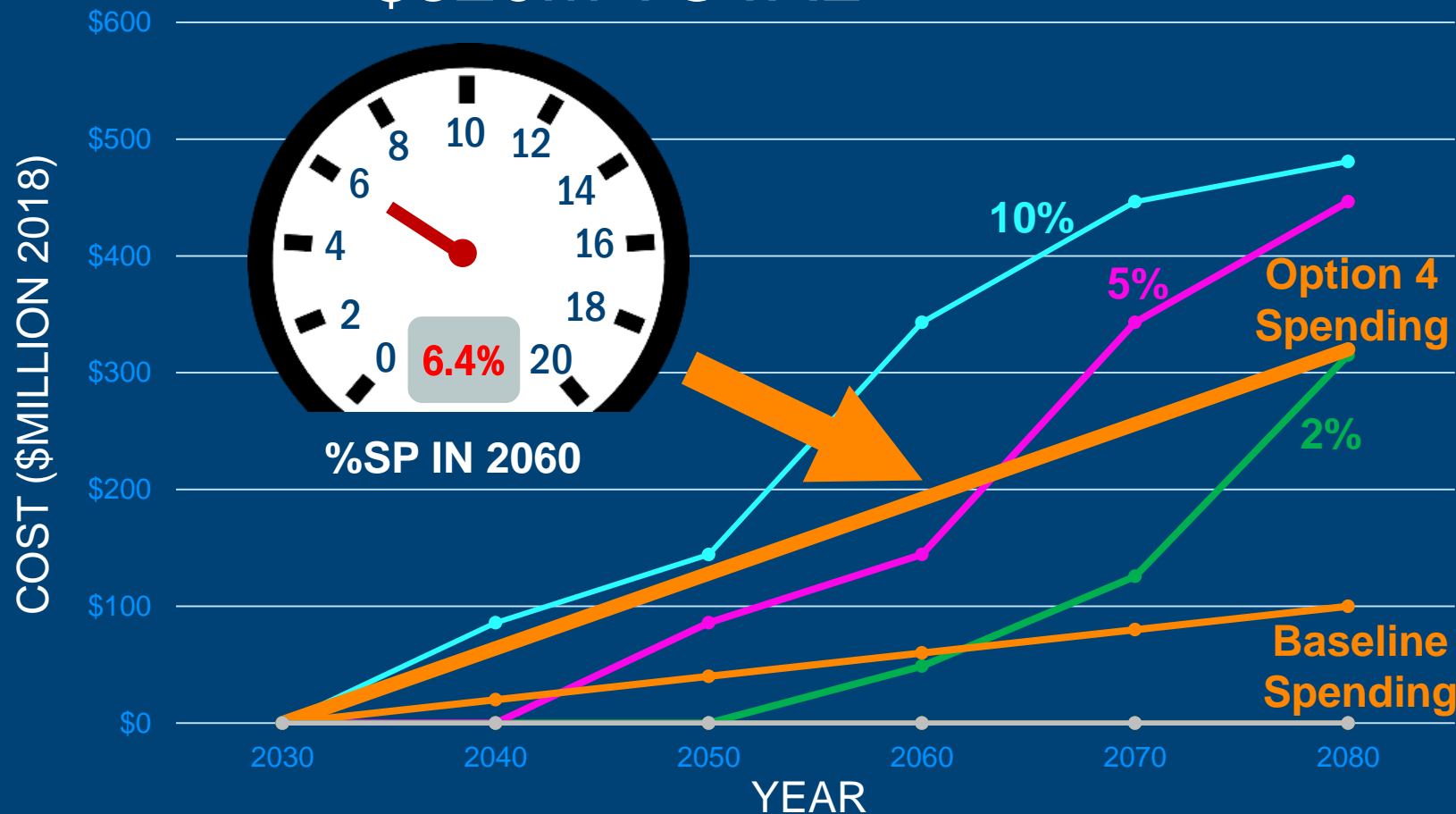




# OPTION 4

\$6.4M / 1.2% PER YEAR

\$320M TOTAL

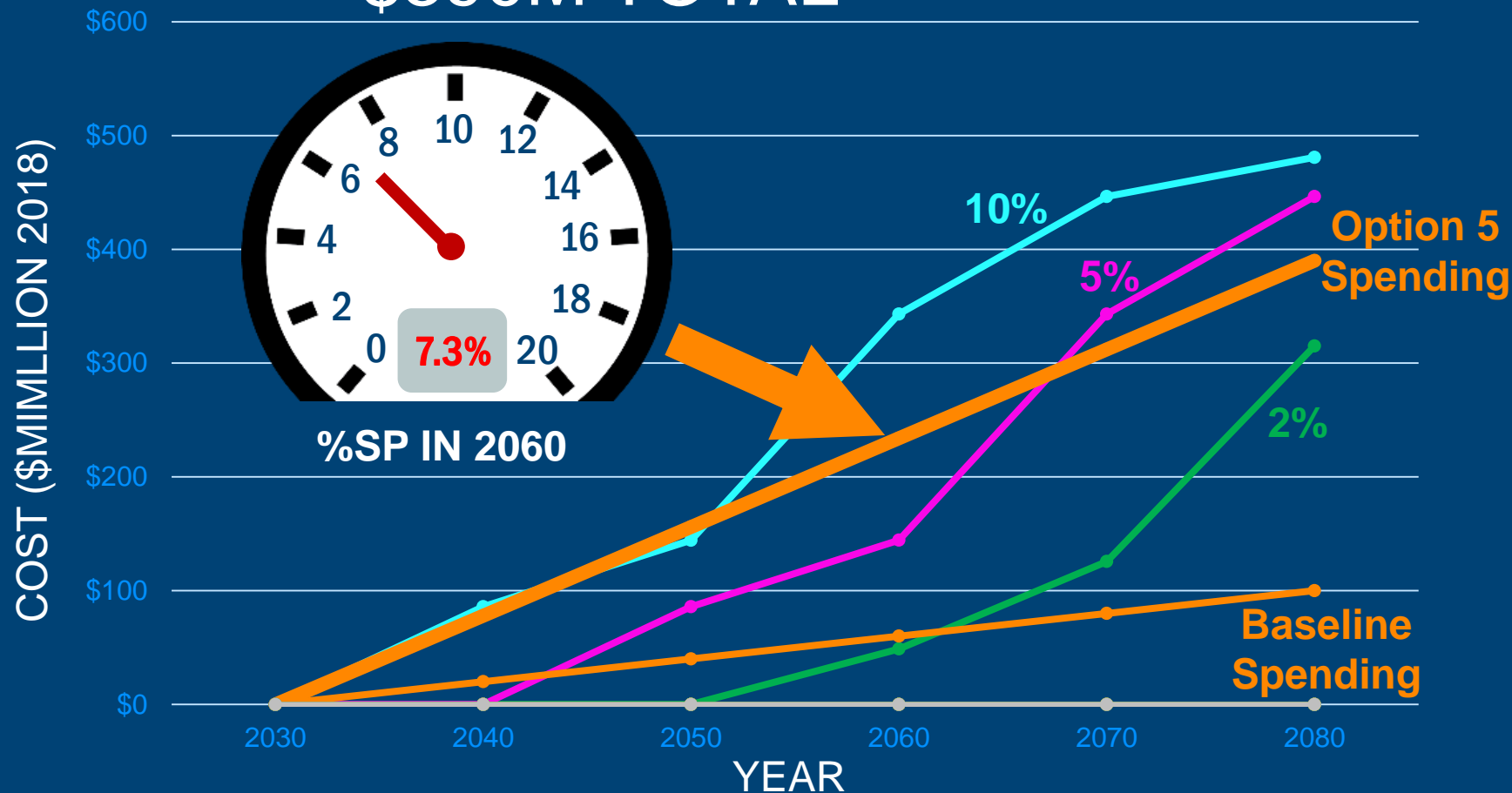




# OPTION 5

\$7.8M / 1.4% PER YEAR

\$390M TOTAL

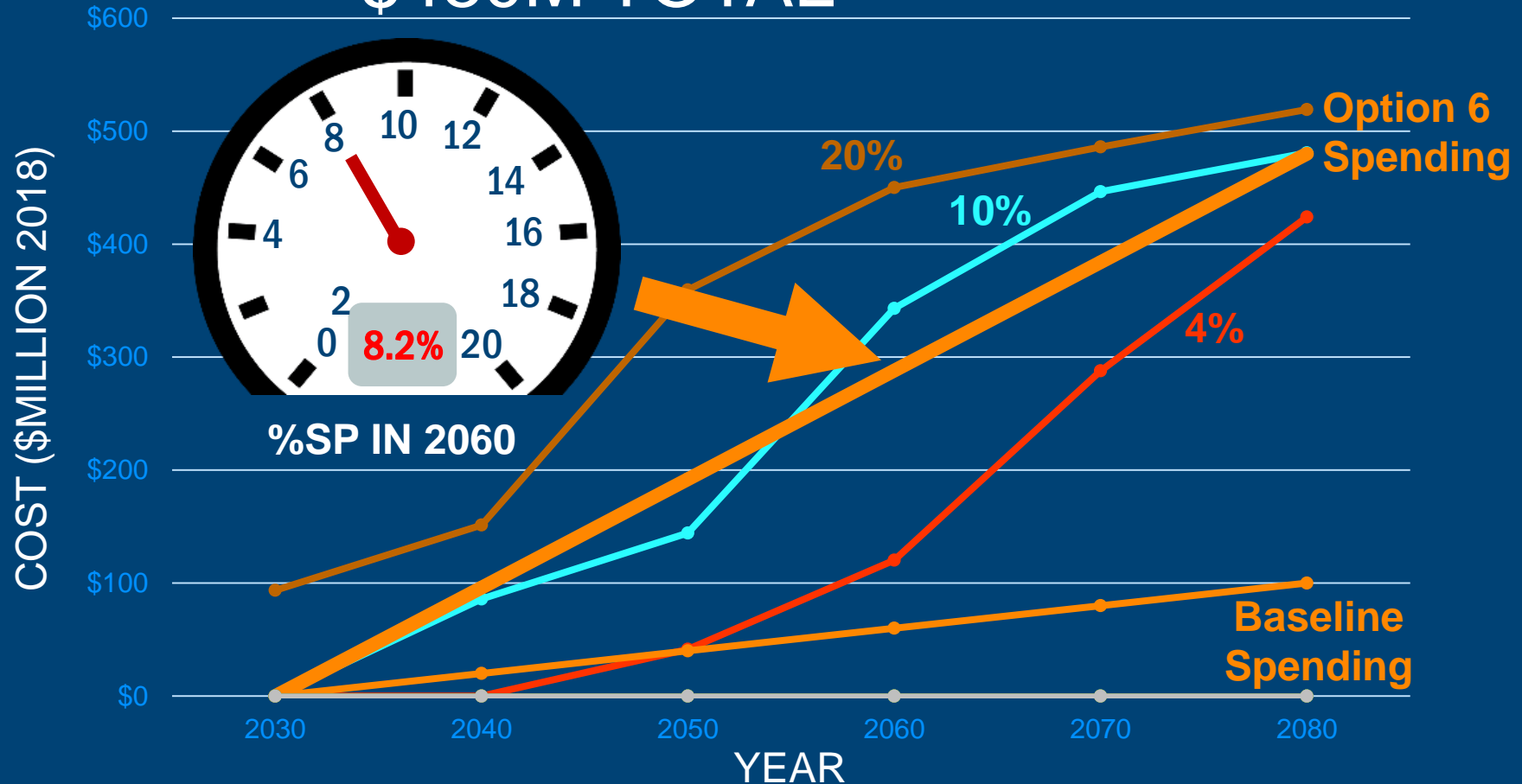




# OPTION 6

\$9.6M / 1.8% PER YEAR

\$480M TOTAL

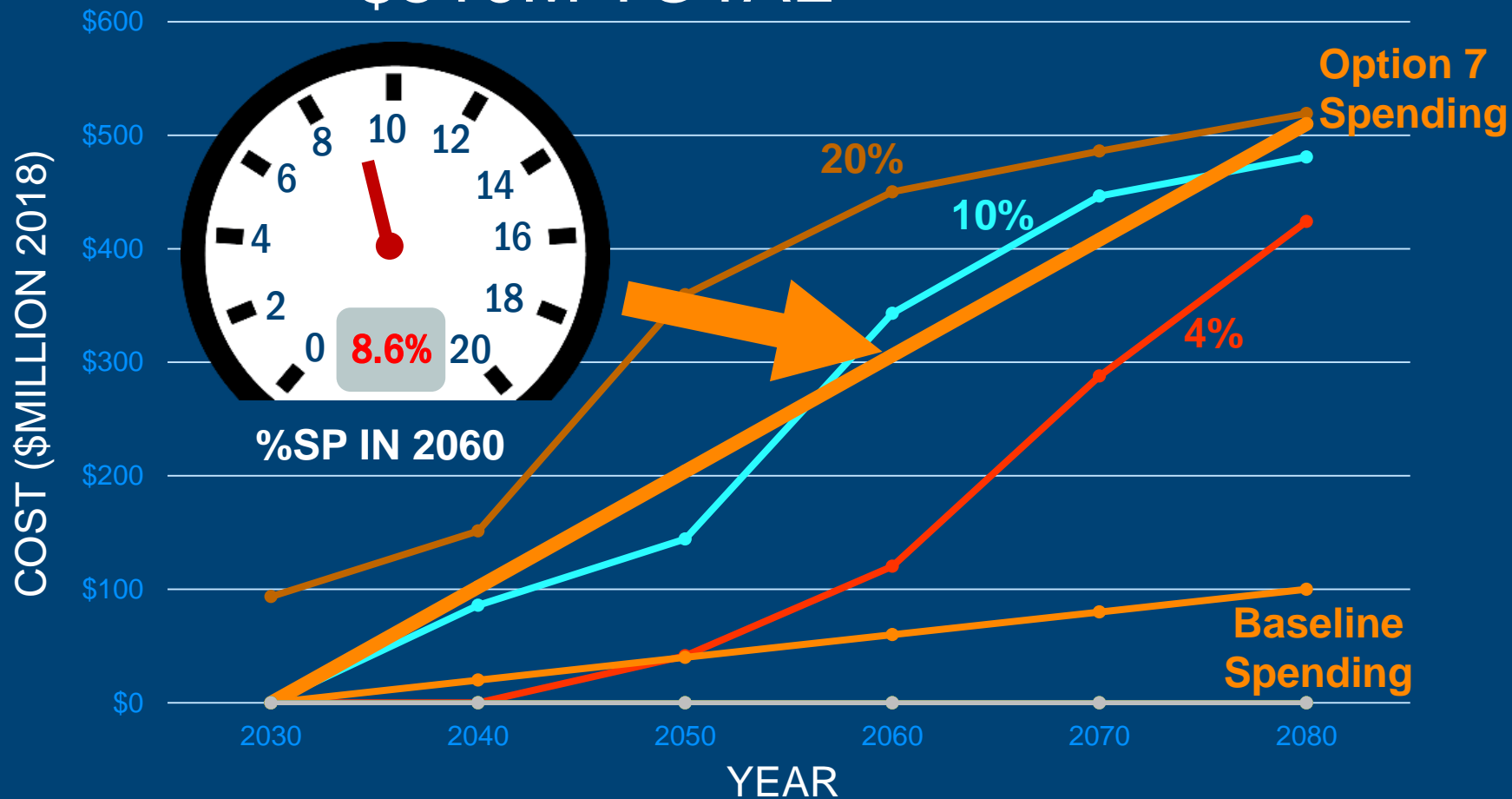




# OPTION 7

\$10.2M / 1.9% PER YEAR

\$510M TOTAL





# FUNDING OVERVIEW



# Agenda

**01**

**Funding 101 Review**

**02**

**General Funding Example**

**03**

**Funding Options**

**04**

**Funding Applied to Spending**

**05**

**Review Matrix Handout**





# FUNDING 101

## Develop Funding Strategy for Water Main Replacement:

### 1. Financial sufficiency

- Generates adequate revenues for labor, Operations & Maintenance (O&M), and planned capital costs
- Operating costs will also increase over time

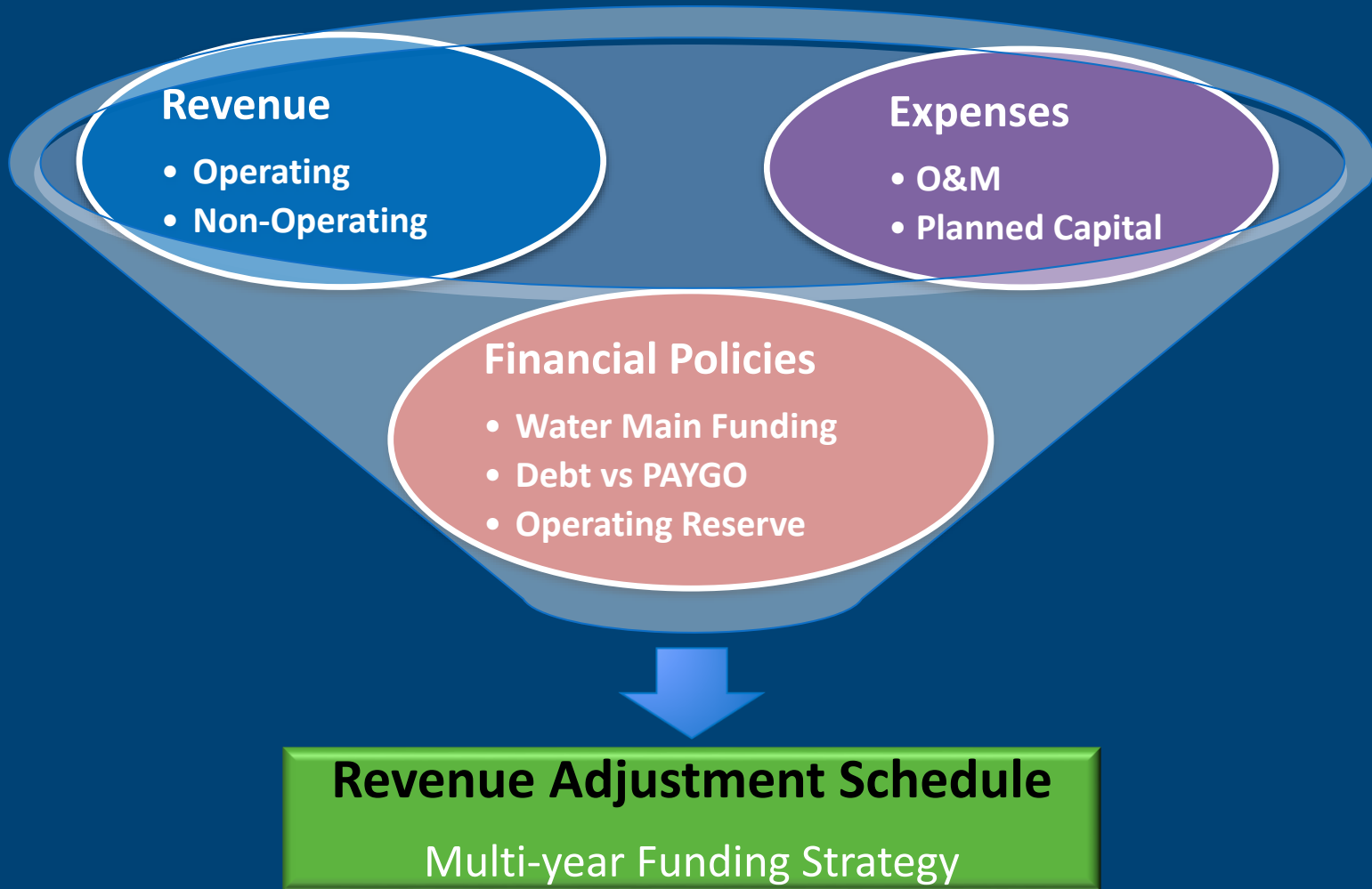
### 2. Evaluate benefits and impacts with debt-financing

- Level of capital funding
- Impacts to reserves
- Net income for debt coverage
- Identify total increase needed

### 3. Funding strategy should compliment District's Mission

- Responsible management of capital assets

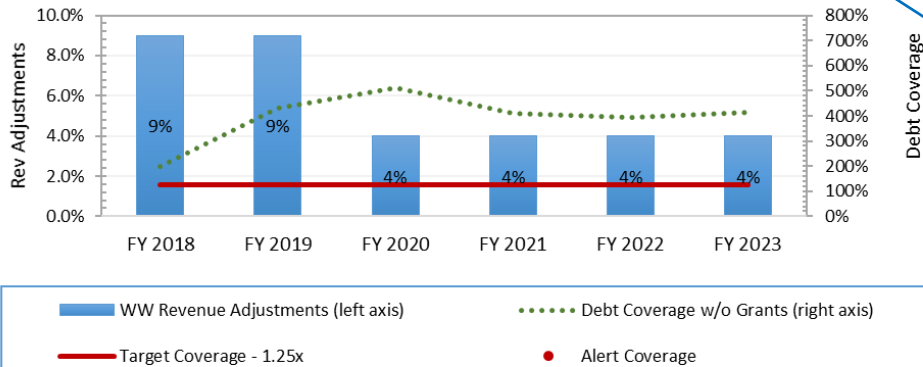
# FINANCIAL PLAN DEVELOPMENT





# GENERAL FUNDING EXAMPLE

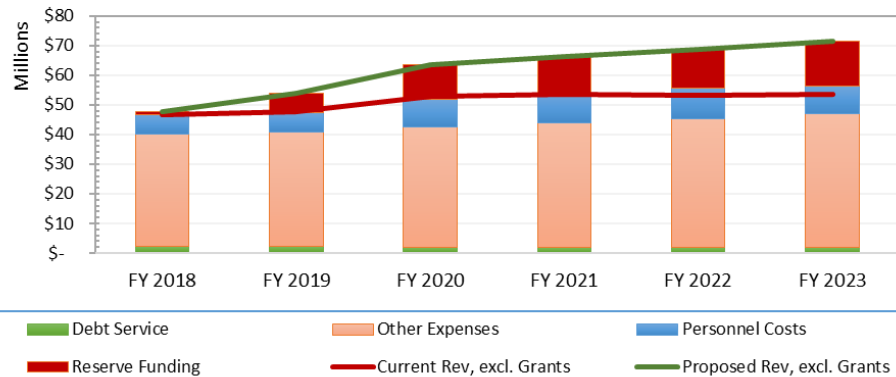
**WW Rev Adjustments and Debt Coverage**



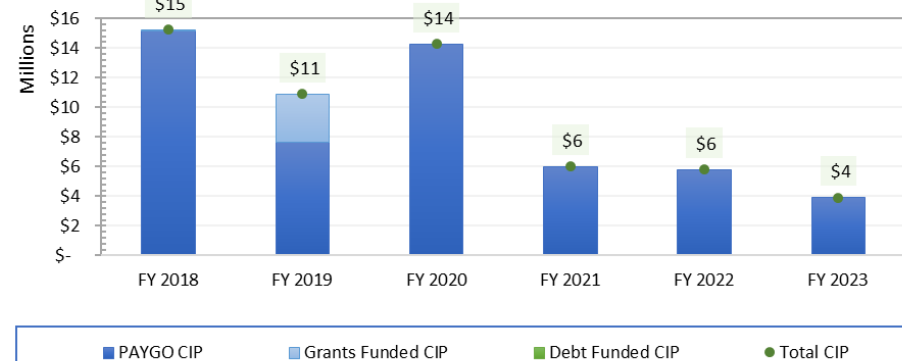
## Revenue Adjustment and Debt Coverage

- **Blue bars:** Proposed Revenue Adjustment
- **Red line:** Target Debt Coverage 1.25x (right axis)
- **Dotted green line:** Projected Debt Coverage
- **Red dot:** Alert Debt Coverage Below Target

**WW Operating Financial Plan**



**CIP and Funding Sources**

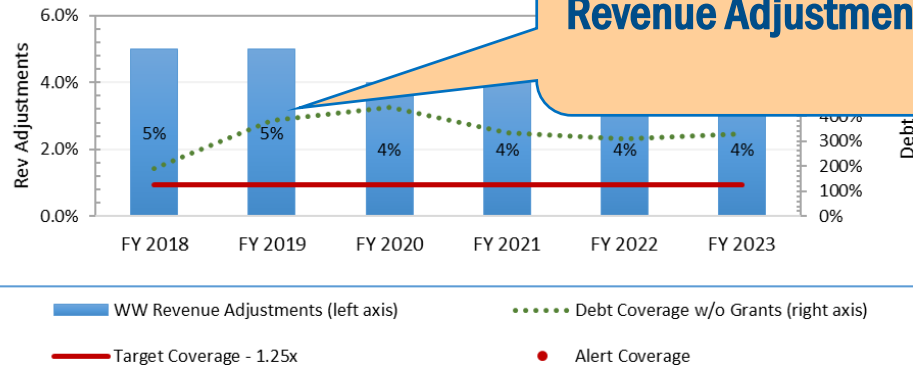




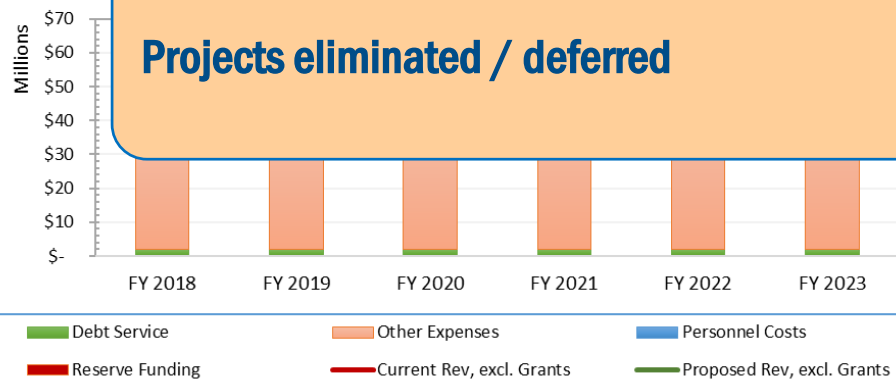
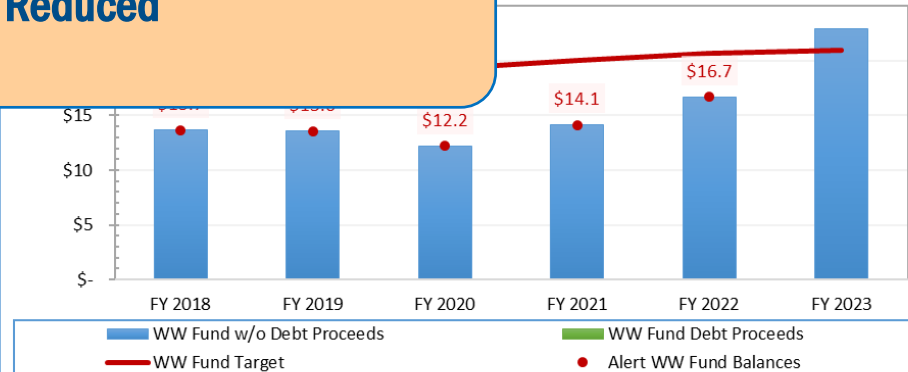
# GENERAL FUNDING EXAMPLE

## Lower Increases; Requires Reduction in CIP

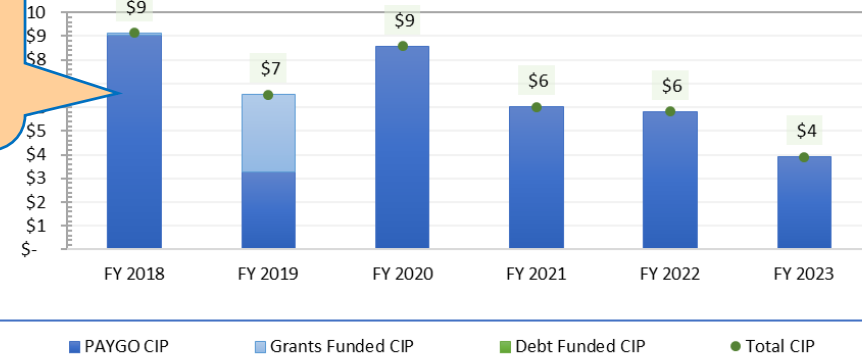
WW Rev Adjustments and



ing Balances



CIP and Funding Sources

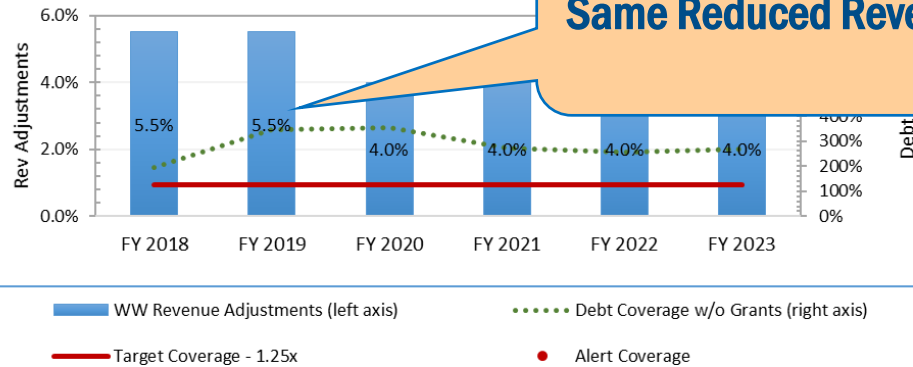




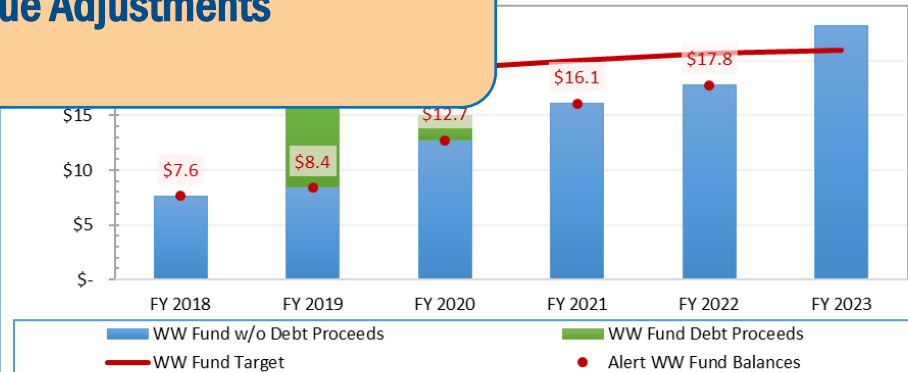
# GENERAL FUNDING EXAMPLE

## Lower Increases with Debt

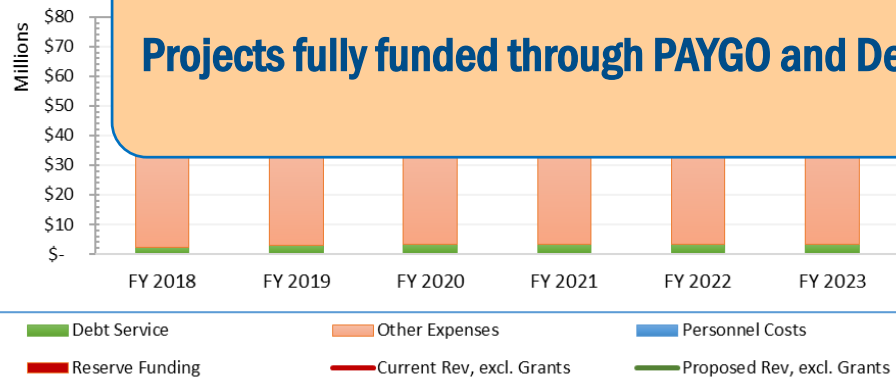
WW Rev Adjustments and



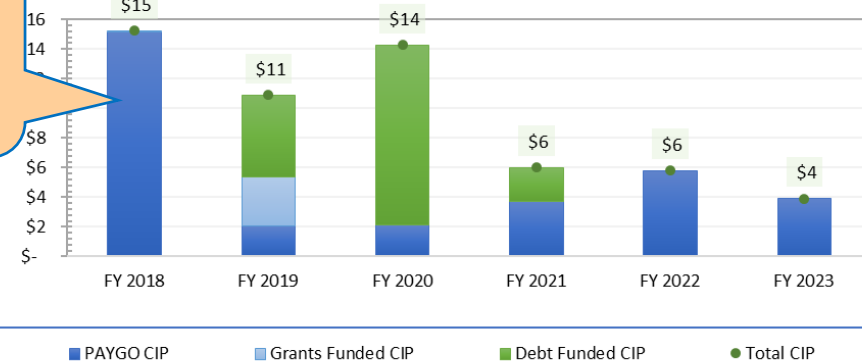
ing Balances



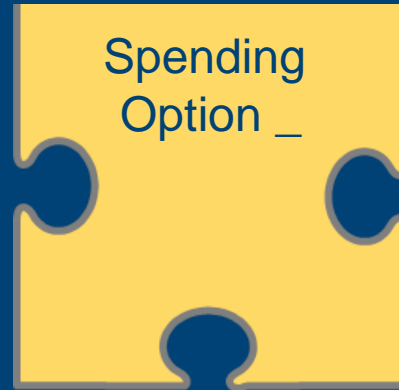
**Projects fully funded through PAYGO and Debt**



CIP and Funding Sources



# FUNDING



## Three Primary Funding Options



# FUNDING OPTIONS SCENARIOS

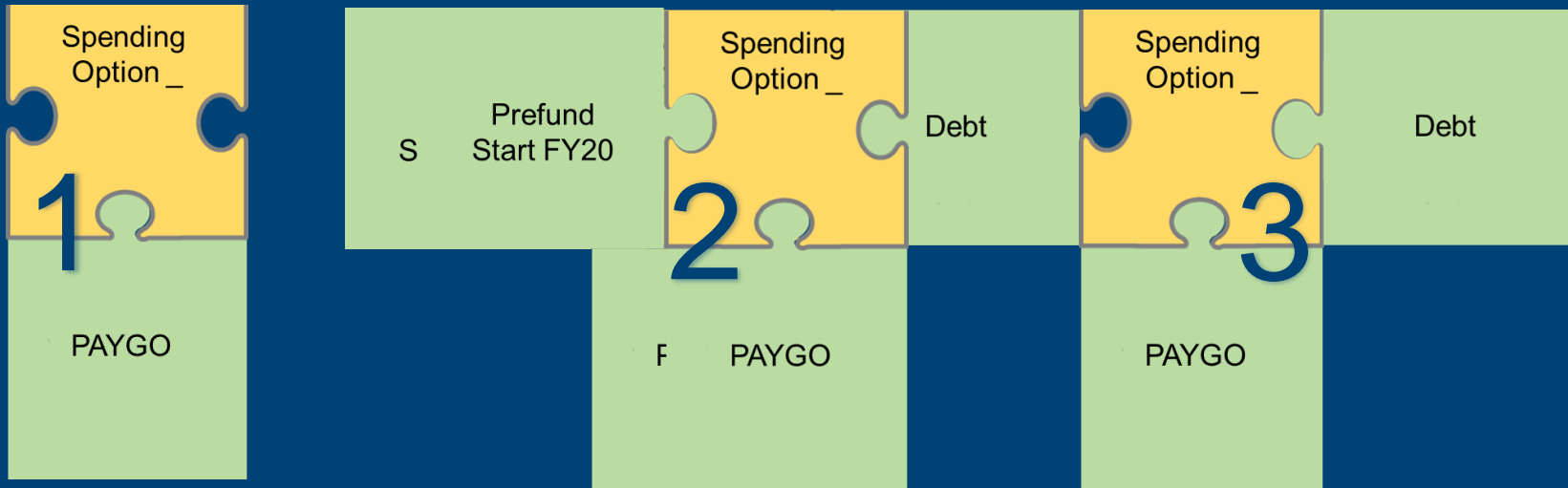
- All Funding Options includes a PAYGO Component
  - Can't prefund entire project before 2030
  - 100% debt funding is not possible



Funding Options

# FUNDING OPTIONS SCENARIOS

- Funding Variations
  1. No Prefunding; No Debt
  2. Prefunding; No Debt
  3. No Prefunding with Debt
  4. Prefunding with Debt





# SPENDING AND FUNDING

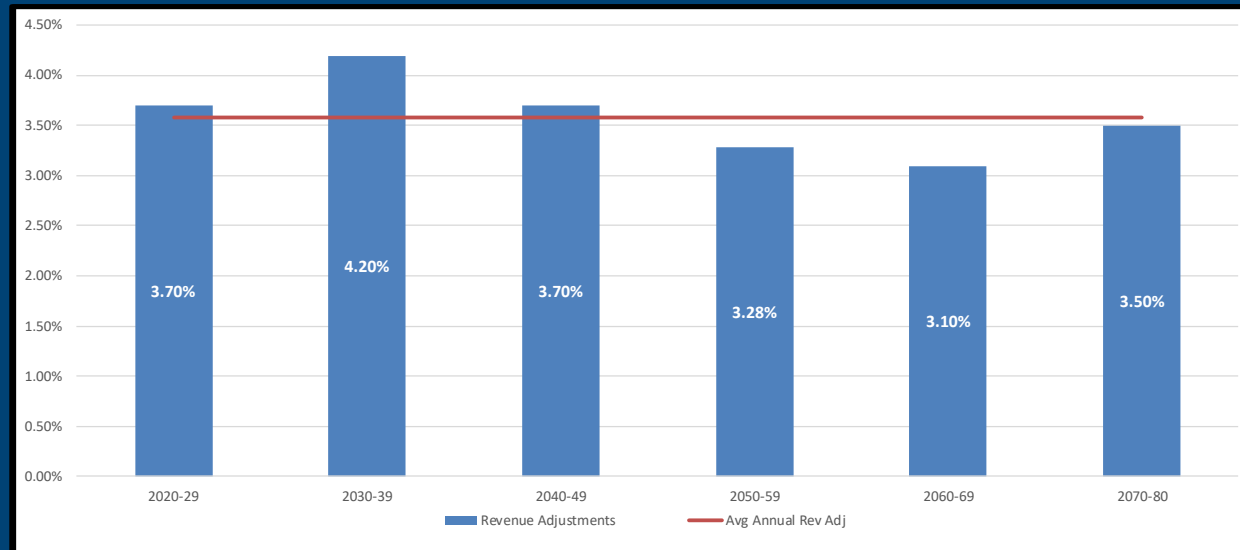
Spending	PAYGO	Prefunding	Debt
\$100M; \$2M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$150M; \$3M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$200M; \$4M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$320M; \$6.4M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$390M; \$7.8M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$480M; \$9.6M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\$510M; \$10.2M / Yr	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Generates 21 different spending / funding options



# SPENDING/FUNDING ALTERNATIVES

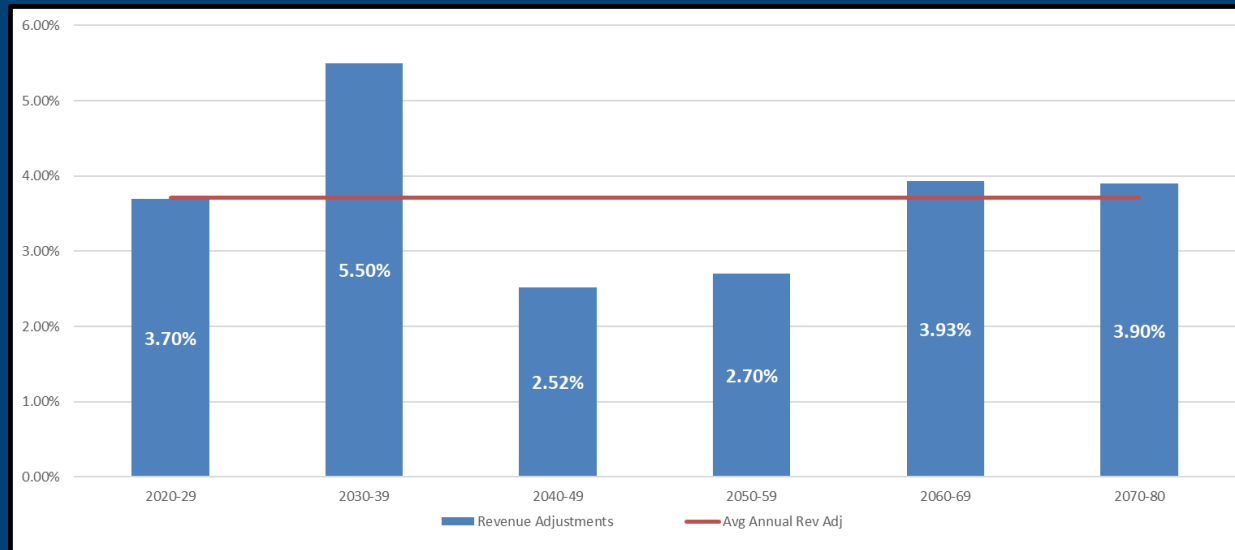
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$100M	18%	less than 1%	3.58%	No	N/A



- Reflects current investment.
- Replaces 18% of water mains by 2080.
- Generates low survivability with inherent high risk.

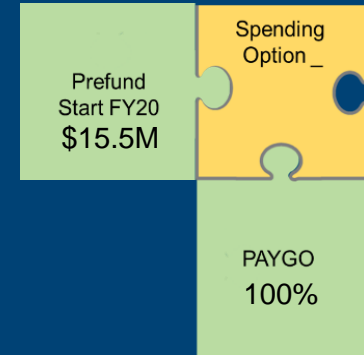
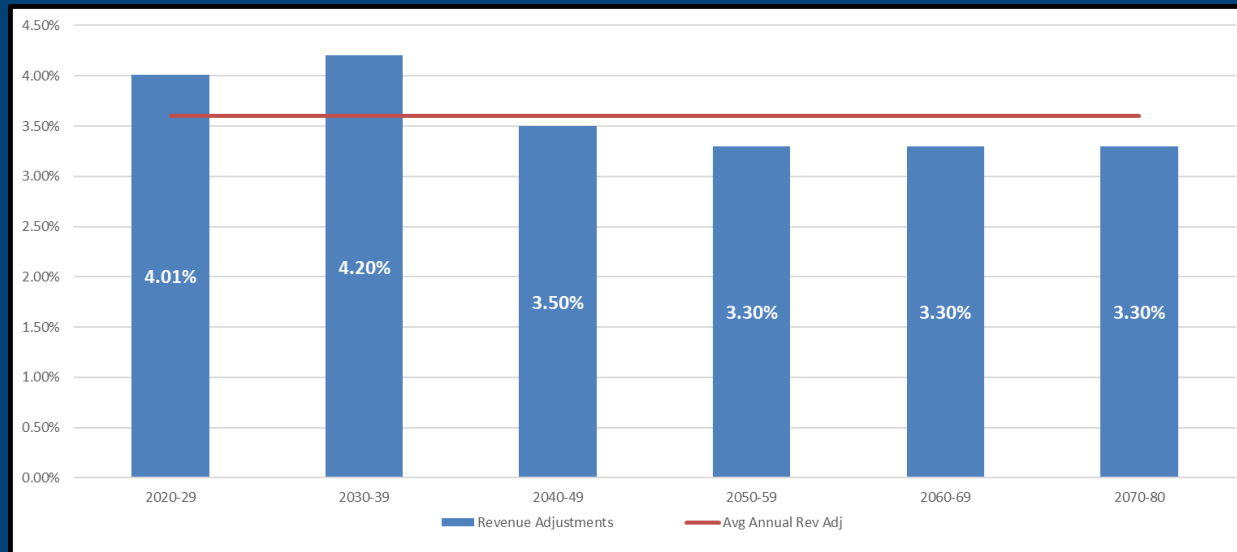


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$150M	28%	1%	3.71%	No	No



- No Prefunding requires higher revenue adjustments in FY 2030-39.
- Revenue adjustments fluctuate due to ramping up in early years.
- Replaces 28% of water mains by 2080.
- Survival probability low, generating a high relative risk.

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$150M	28%	1%	3.60%	No	Yes

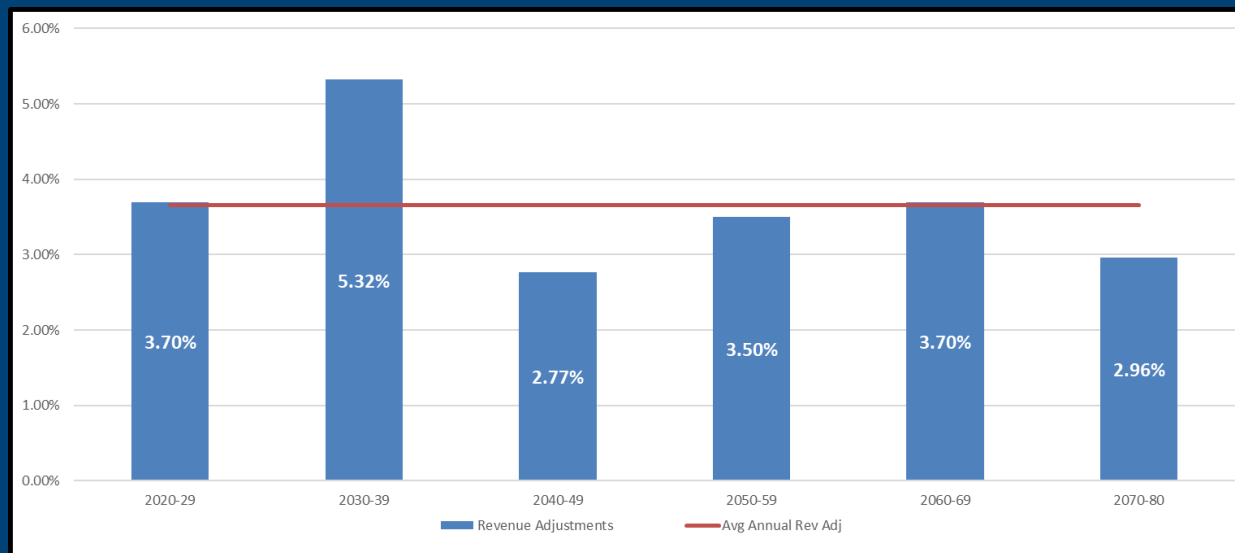


- Prefunding reduces higher revenue adjustments between FY 2030-39.
- Overall average annual revenue adjustments reduced to 3.60% from 3.71%.
- Replaces 28% of water mains by 2080.
- Survival probability low, generating a high relative risk.



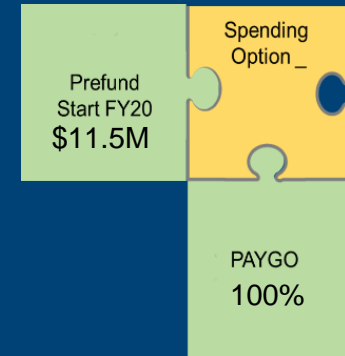
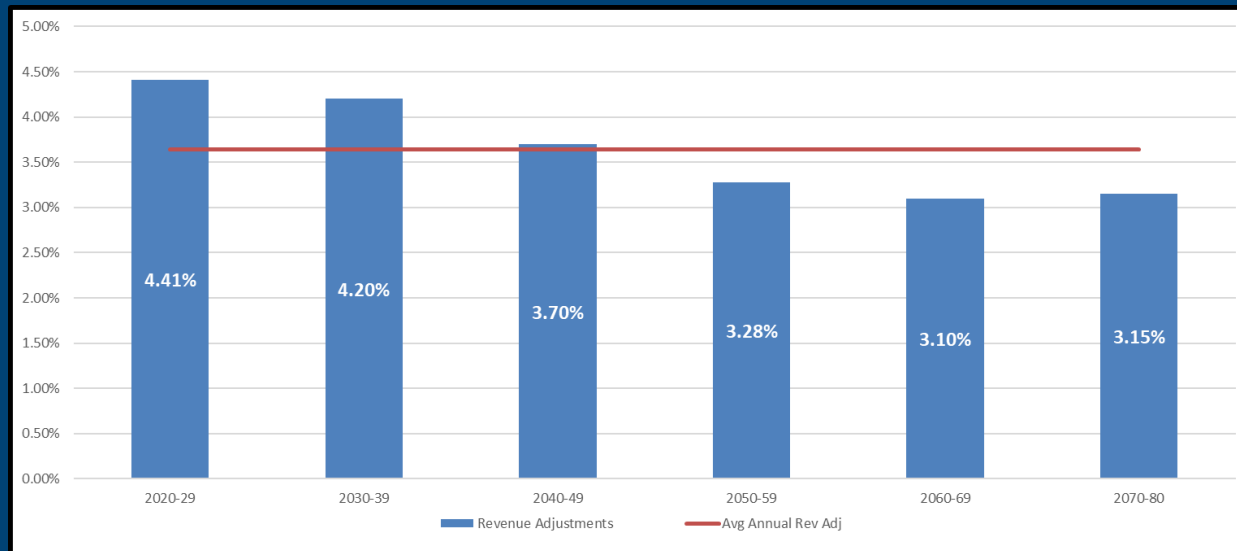
## ALTERNATIVE 3.1: \$200M – 2X BASELINE

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$200M	37%	1.4%	3.66%	No	No



- No prefunding requires a spike in revenue adjustments between 2030-2039.
- 9% increases in FY 2030, FY 2031 and FY 2032.
- Revenue adjustments fluctuate due to ramping up in early years of project.
- Approximately 20% more water main replacement when compared to Baseline.
- Survival probability is low with level of reinvestment, generating a high relative risk.

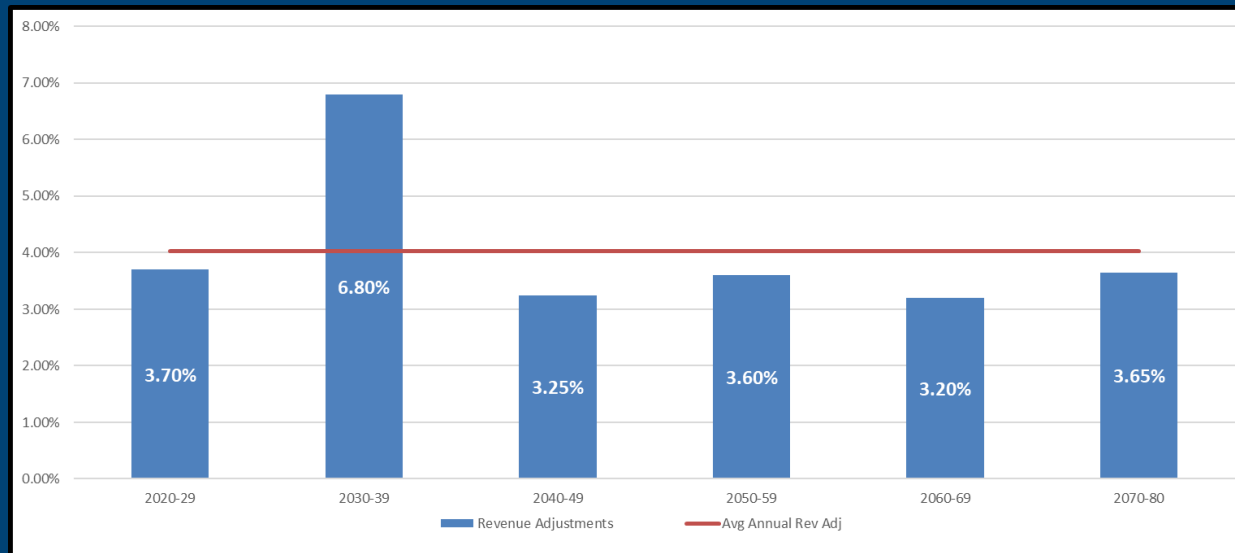
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$200M	37%	1.4%	3.64%	No	Yes



- Prefunding smooths out required revenue adjustments between 2030-2039.
- Revenue adjustments are also more leveled throughout project.
- Approximately 20% more water main replacement when compared to Baseline.
- Survival probability is low with level of reinvestment, generating a high relative risk.



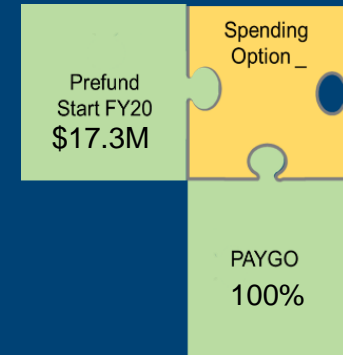
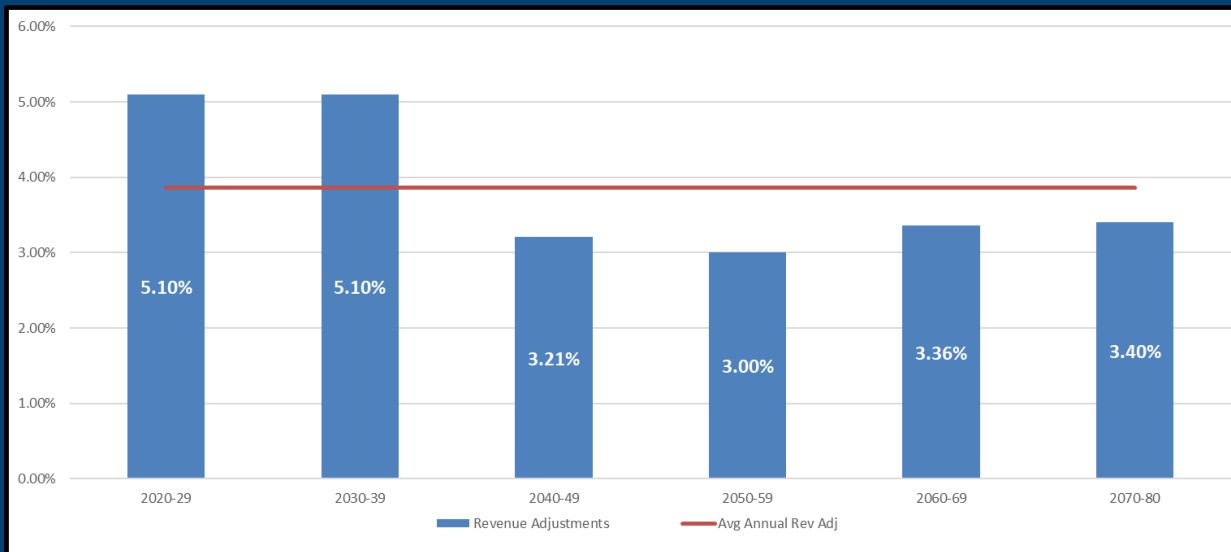
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	4.03%	No	No



- No prefunding requires higher revenue adjustments between 2030-2039.
- 50% increase revenue required in FY 2030 to meet spending needs.
- Future revenue increases from FY 2040 and beyond average 3.43% due to the ramp up in revenue during the first 10 years of construction.
- Revenue needs generate inter-generational inequity.
- Revenue adjustments fluctuate due to ramping up in early years of project.
- More than 50% of water mains replaced.



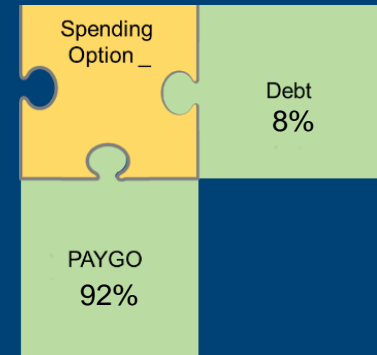
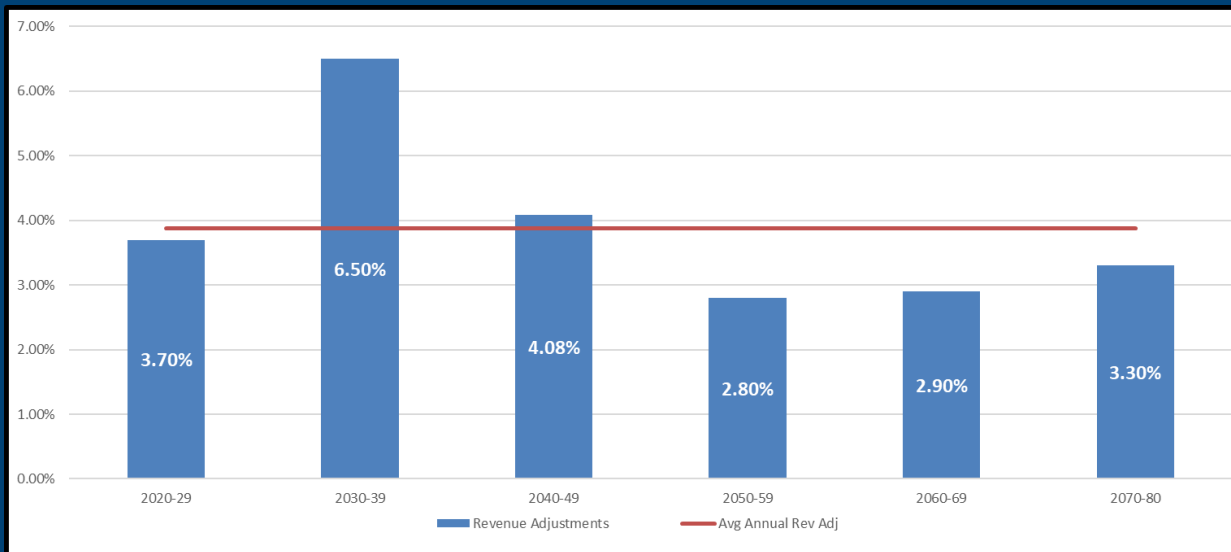
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	3.86%	No	Yes



- Prefunding smooths out revenue adjustments during first 10 years of project.
- Annual revenue adjustments equal 5.10% for next 20 years.
- Future revenue increases from FY 2040 and beyond average 3.24% due to the ramp up in revenue during the first 20 years of planning period.
- Revenue needs generate inter-generational inequity.
- More than 50% of water mains replaced.

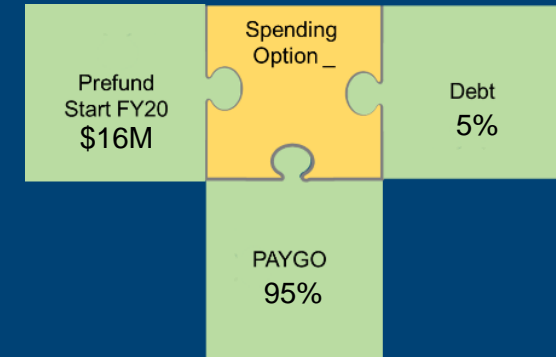
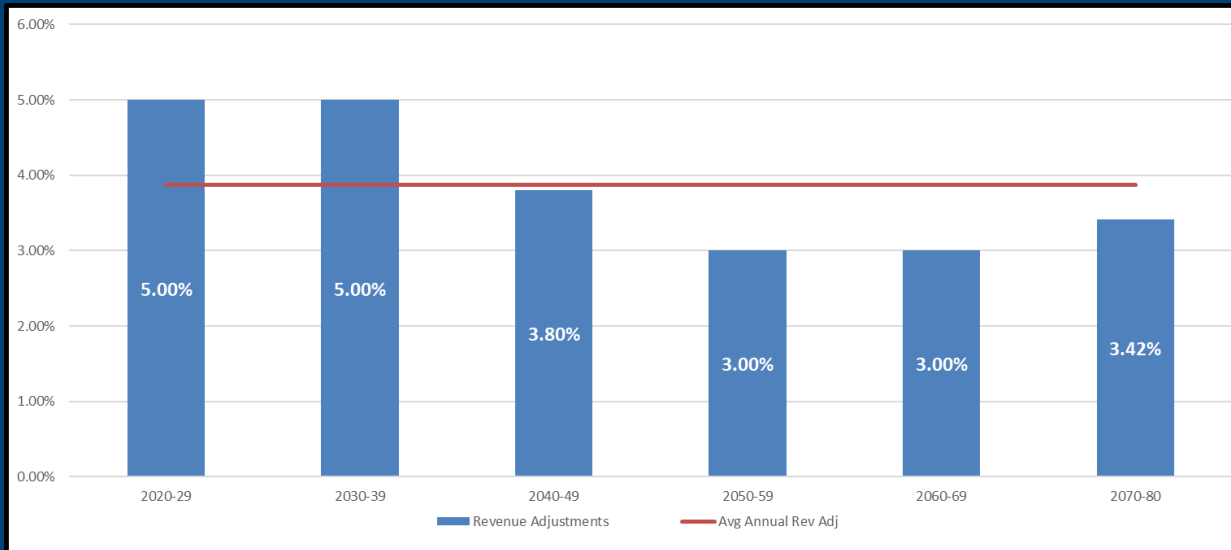


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	3.60%	8%	No



- Debt represents 8% of funding.
- Slight reduced revenue needs during first 10 years of project when compared to Option 4.1.
- Interest on bonds adds \$78M to project cost assuming no early redemption on bonds.
- More than 50% of water mains replaced.

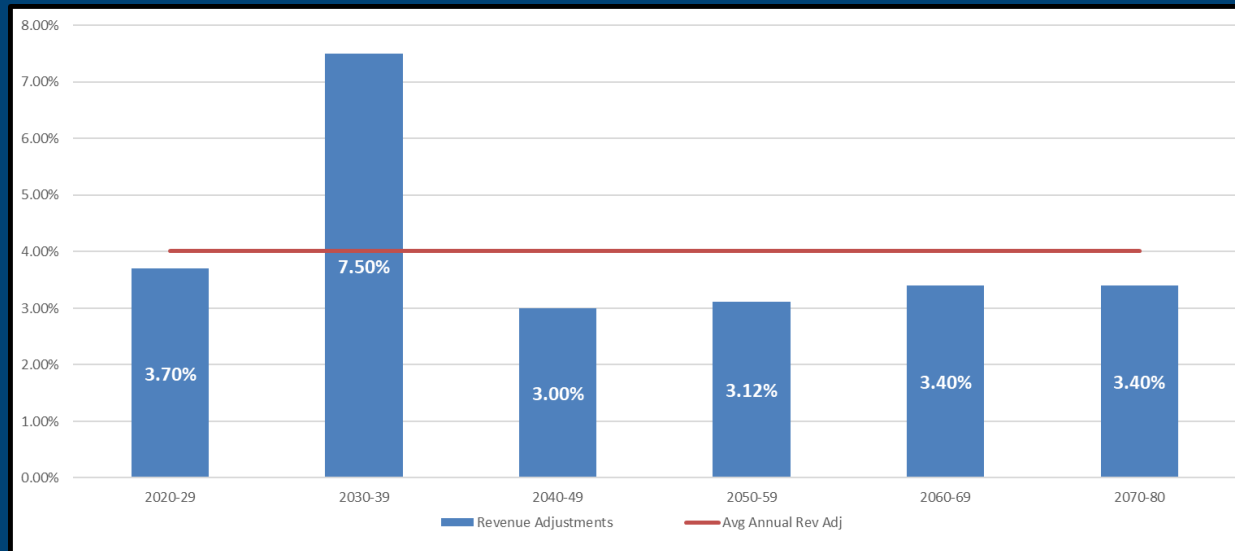
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$320M	59%	2.10%	3.87%	5%	Yes



- Average annual revenue increase is slightly higher than Alternative 4.3, but interest reduced by \$30M.
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$48M to project cost assuming no early redemption on bonds.
- More than 50% of water mains replaced.

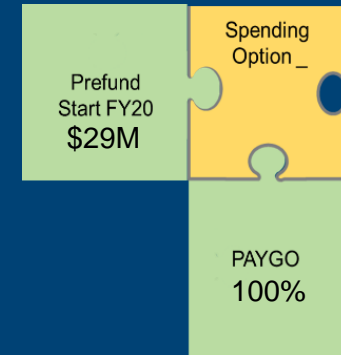
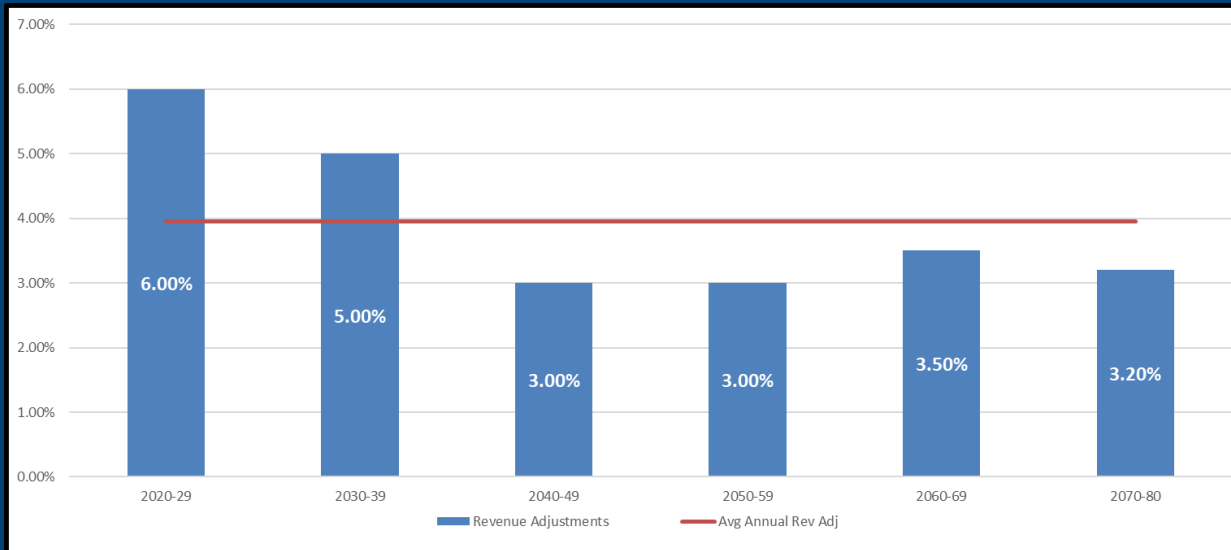


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	4.02%	No	No

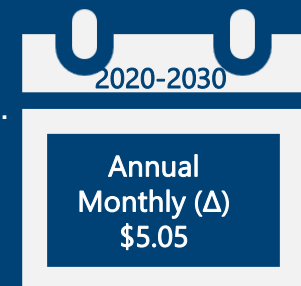


- No prefunding requires higher revenue adjustments between 2030-2039.
- 30% increase in revenue required in FY 2030 followed by 20% increase in FY 2031.
- Revenue needs generate inter-generational inequity with existing customers primarily impacted.
- Revenue adjustments significantly fluctuate due to need to ramp up in early years of project.
- Approximately 72% of water mains replaced.

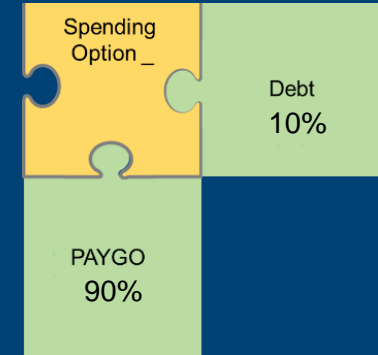
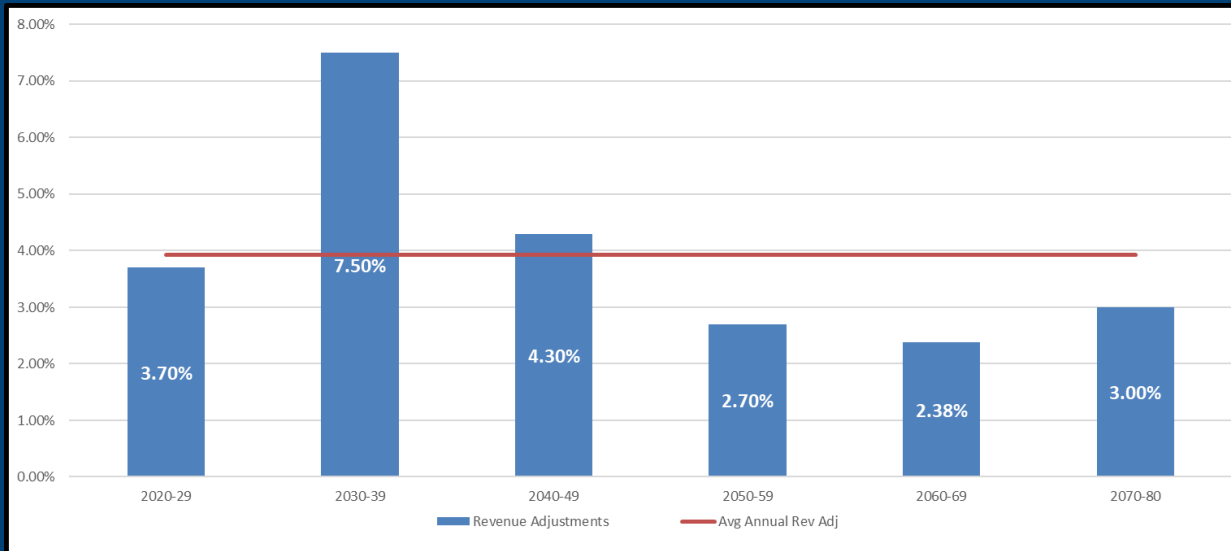
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	3.95%	No	Yes



- Prefunding smooths out revenue adjustments during first 10 years of project.
- Eliminates significant revenue increases in FY 2030 and FY 2031 identified in Option 5.1.
- Annual average revenue adjustments equal 3.95% over project completion.
- Future revenue increases from FY 2040 and beyond average 3.18% due to the ramp up in revenue during the first 20 years of planning period.
- Approximately 72% of water mains replaced.

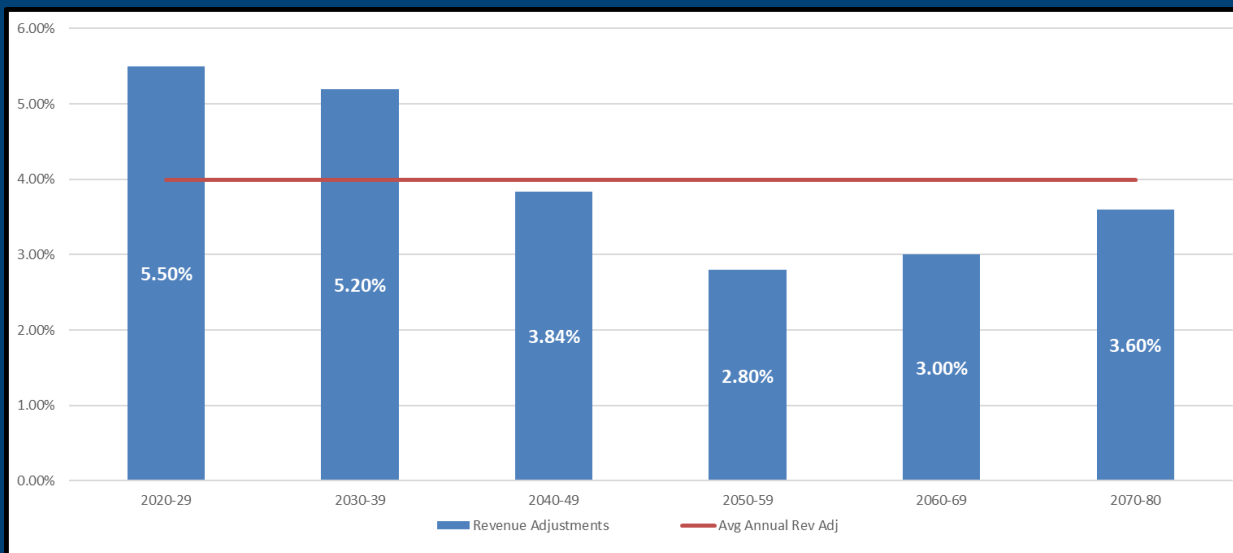


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	3.93%	10%	No

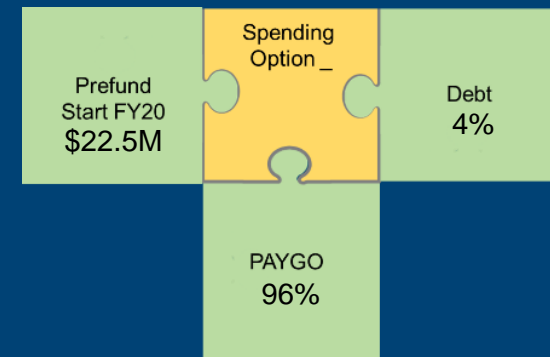


- Inclusion of debt eliminates revenue spikes in FY 2030 and FY 2031 as shown in Option 5.1.
- Debt represents 10% of funding.
- Interest on bonds adds \$122M to project cost assuming no early redemption on bonds.
- Approximately 72% of water mains replaced.

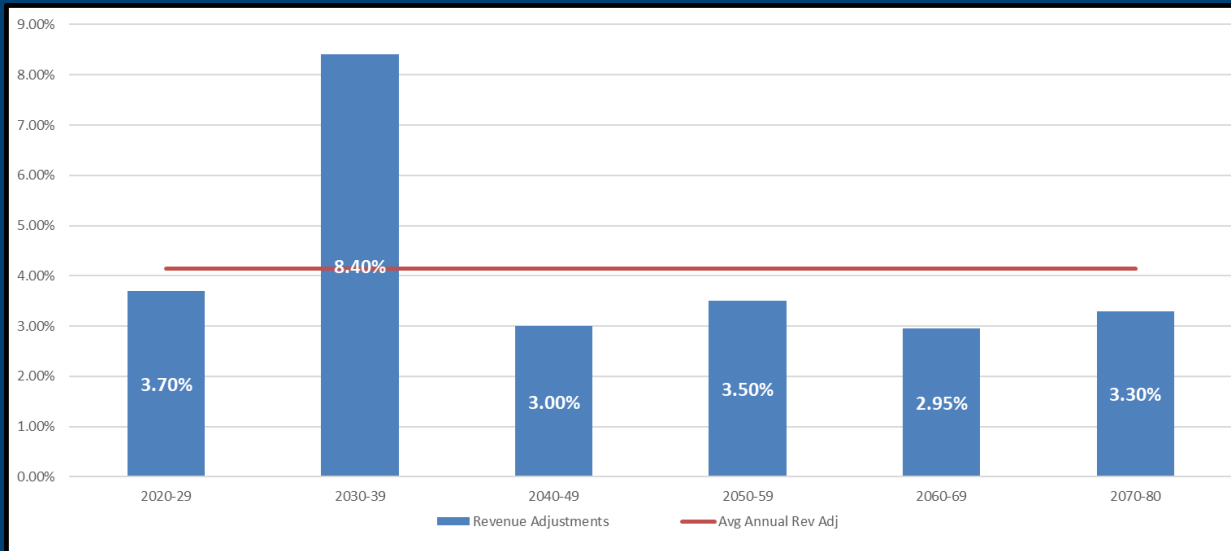
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$390M	72%	3.10%	3.99%	4%	Yes



- Average annual revenue increase is slightly higher than Option 5.3, but interest reduced by \$74M.
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$48M to project cost assuming no early redemption on bonds.
- Approximately 72% of water mains replaced.



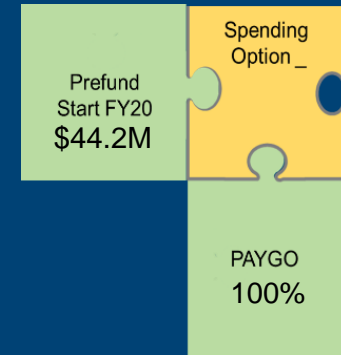
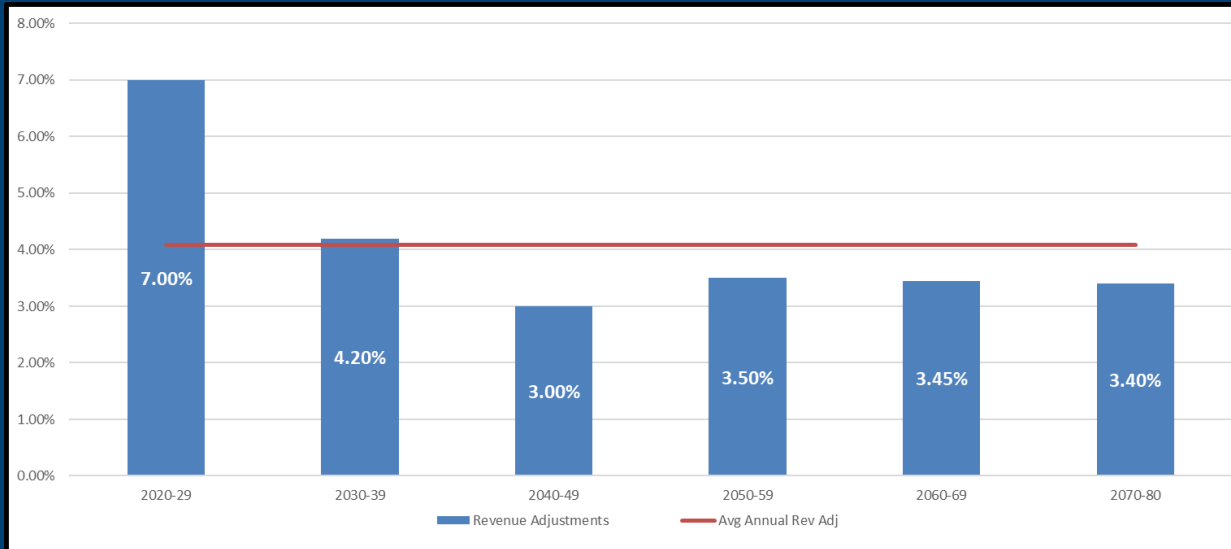
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	3.60%	No	No



- No prefunding requires higher revenue adjustments between 2030-2039.
- 30% revenue increase required in FY 2030 and FY 2031.
- Revenue adjustments significantly fluctuate due to need to ramp up in early years of project.
- Revenue needs generate inter-generational inequity with existing customers primarily impacted.
- Approximately 89% of water mains replaced.



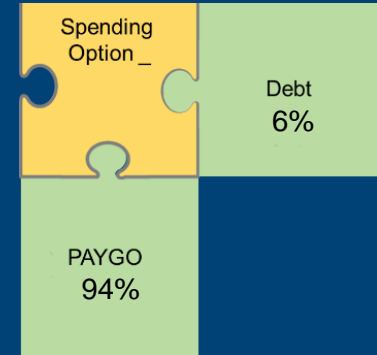
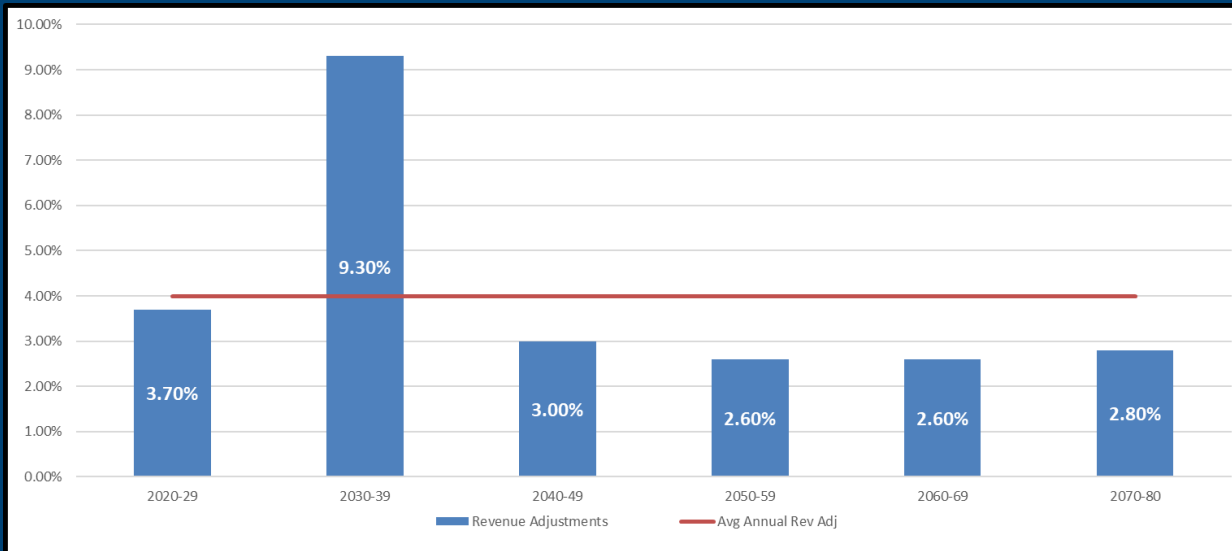
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	4.09%	No	Yes



- Prefunding smooths out revenue adjustments during first 10 years of project.
- Eliminates significant revenue increases in FY 2030 and FY 2031 identified in Option 6.1.
- Annual average revenue adjustments equal 4.09% over project completion.
- Future revenue increases from FY 2040 and beyond average 3.34% due to the ramp up in revenue during the first 20 years of planning period.
- Approximately 89% of water mains replaced.

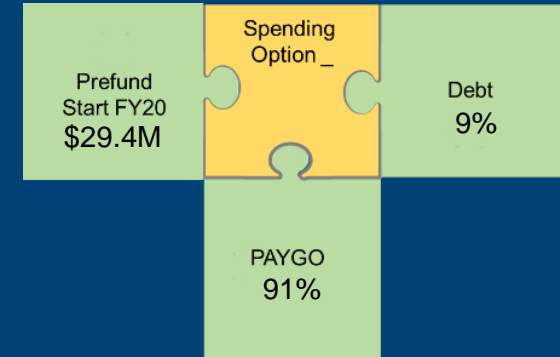
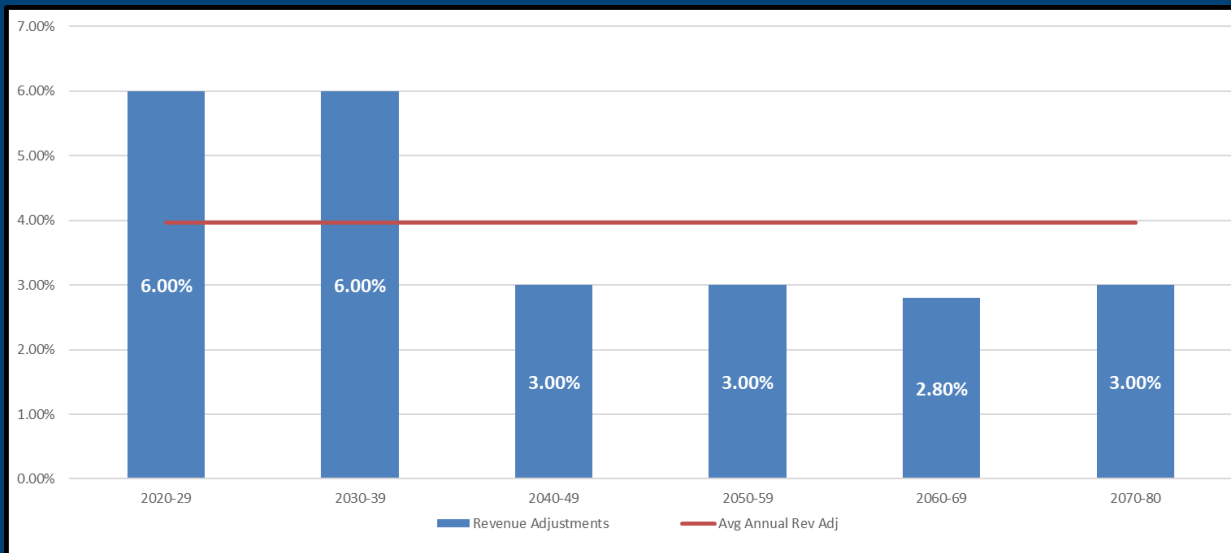


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	4.00%	6%	No



- Inclusion of debt eliminates revenue spikes in FY 2030 and FY 2031 as shown in Option 6.1.
- Revenue adjustments are still high for first 10 years due to no Prefunding.
- Debt represents 6% of funding.
- Interest on bonds adds \$96M to project cost but extends over 34 years.
- Approximately 89% of water mains replaced.

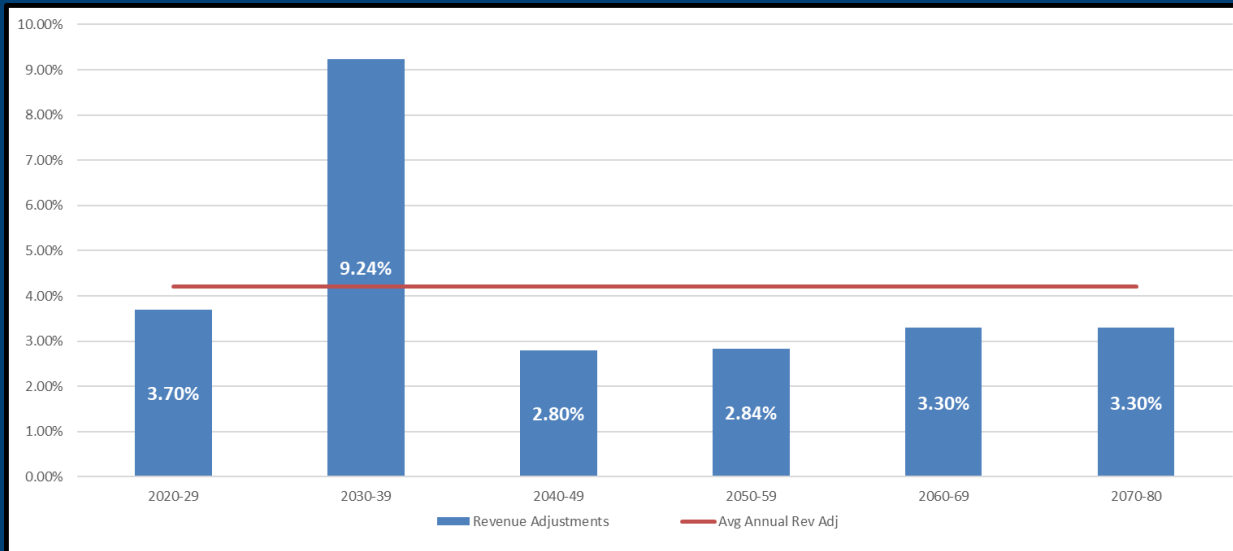
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$480M	89%	10%	3.97%	9%	Yes



- First 20 years, average annual revenue increase limited to 6%.
- Future years, average annual revenue increase limited to 3%.
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$132M to project cost but extends over 72 years.
- Approximately 89% of water mains replaced.

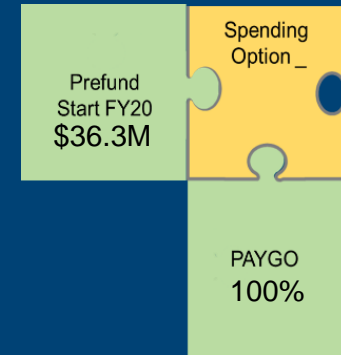
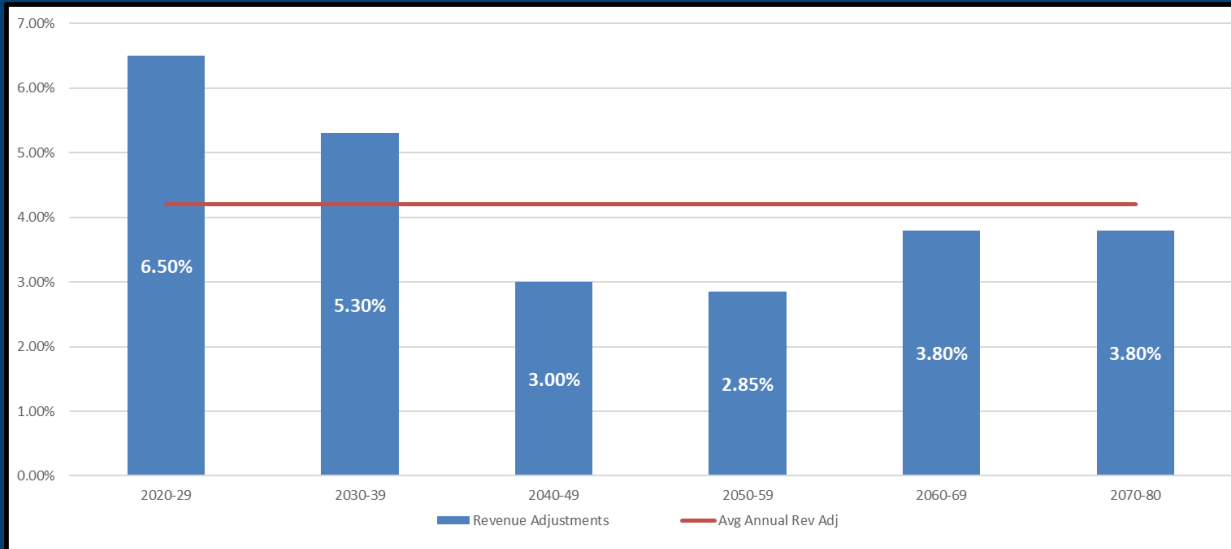


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.20%	No	Yes

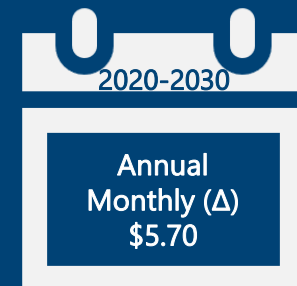


- No prefunding requires significant revenue adjustments between 2030-2039.
- 35% revenue increase required in FY 2030 followed by 20% increase in FY 2031.
- Revenue needs generate inter-generational inequity with existing customers primarily impacted.
- Revenue adjustments significantly fluctuate due to need to ramp up in early years of project.
- Approximately 94% of water mains replaced.

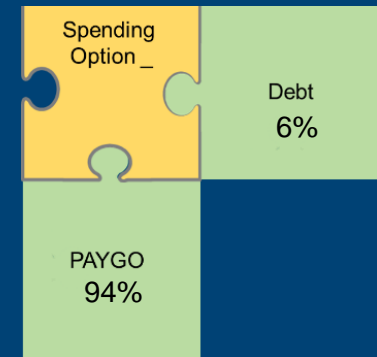
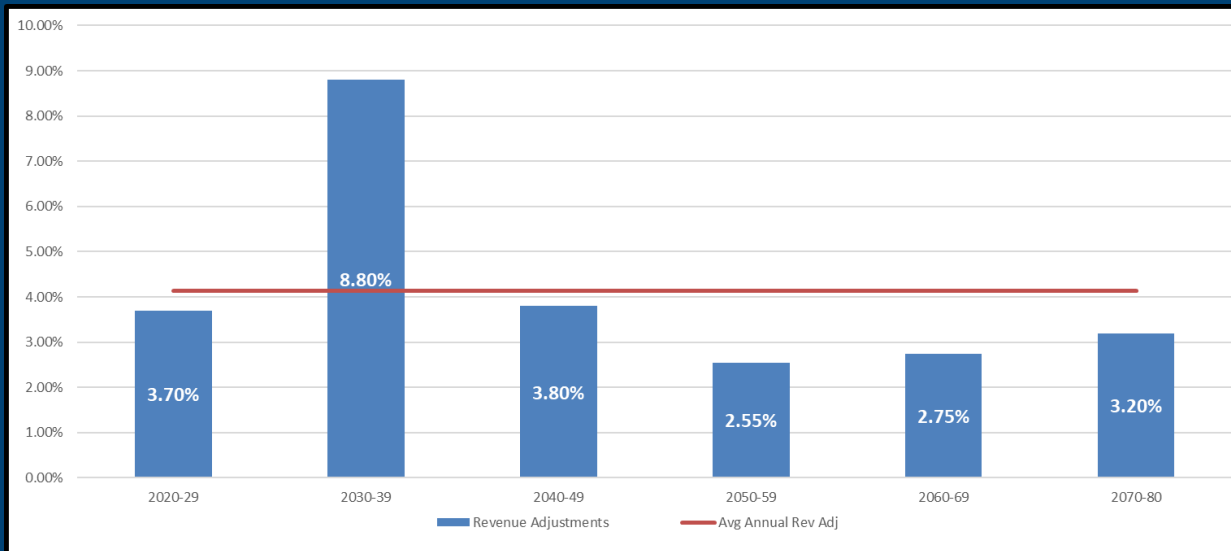
Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.21%	No	Yes



- Prefunding smooths out revenue adjustments during first 10 years of project.
- Eliminates significant revenue increases in FY 2030 and FY 2031 identified in Option 7.1.
- Revenue needs front loaded during first 20 years.
- Future revenue increases from FY 2040 and beyond average 3.36% due to the ramp up in revenue during the first 20 years of planning period.
- Approximately 94% of water mains replaced.

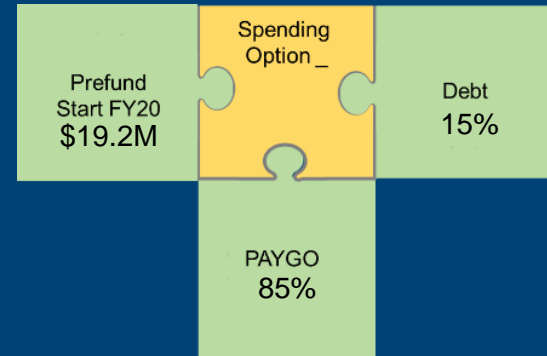
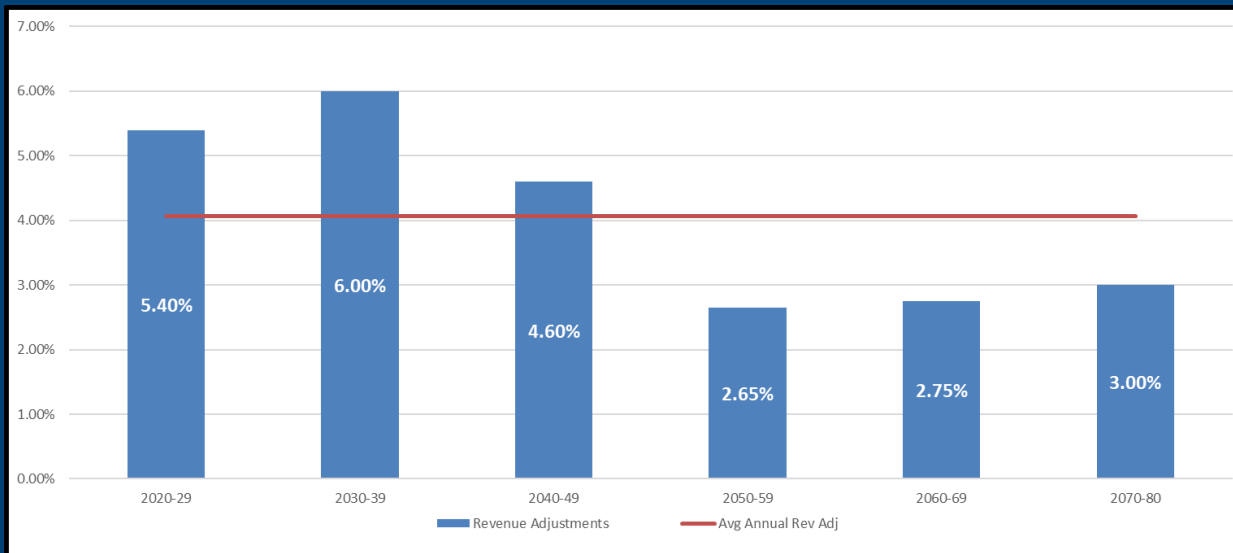


Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.13%	6%	No



- Inclusion of debt eliminates revenue spikes in FY 2030 and FY 2031 as shown in Option 7.1.
- Debt represents 6% of funding.
- Interest on bonds adds \$96M to project cost but extends over 34 years.
- Approximately 94% of water mains replaced.

Spending	Total Cost	Water Main % Replaced	2080 Survival Probability	Annual Rev Increase	Debt	Prefund
Baseline	\$510M	94%	16.50%	4.07%	15%	Yes



- First 20 years, average annual revenue increase limited to 5.7%.
- Future years, average annual revenue increase limited to 3.25%.
- Revenue needs in first 10 years of project reduced by prefunding.
- No significant revenue spikes in a specific year.
- Interest on bonds adds \$249M to project cost but extends over 74 years.
- Approximately 94% of water mains replaced.





# Q & A ACTIVITY





# BREAK



# ANSWER QUESTIONS



# PUBLIC COMMENT



# PUBLIC COMMENT

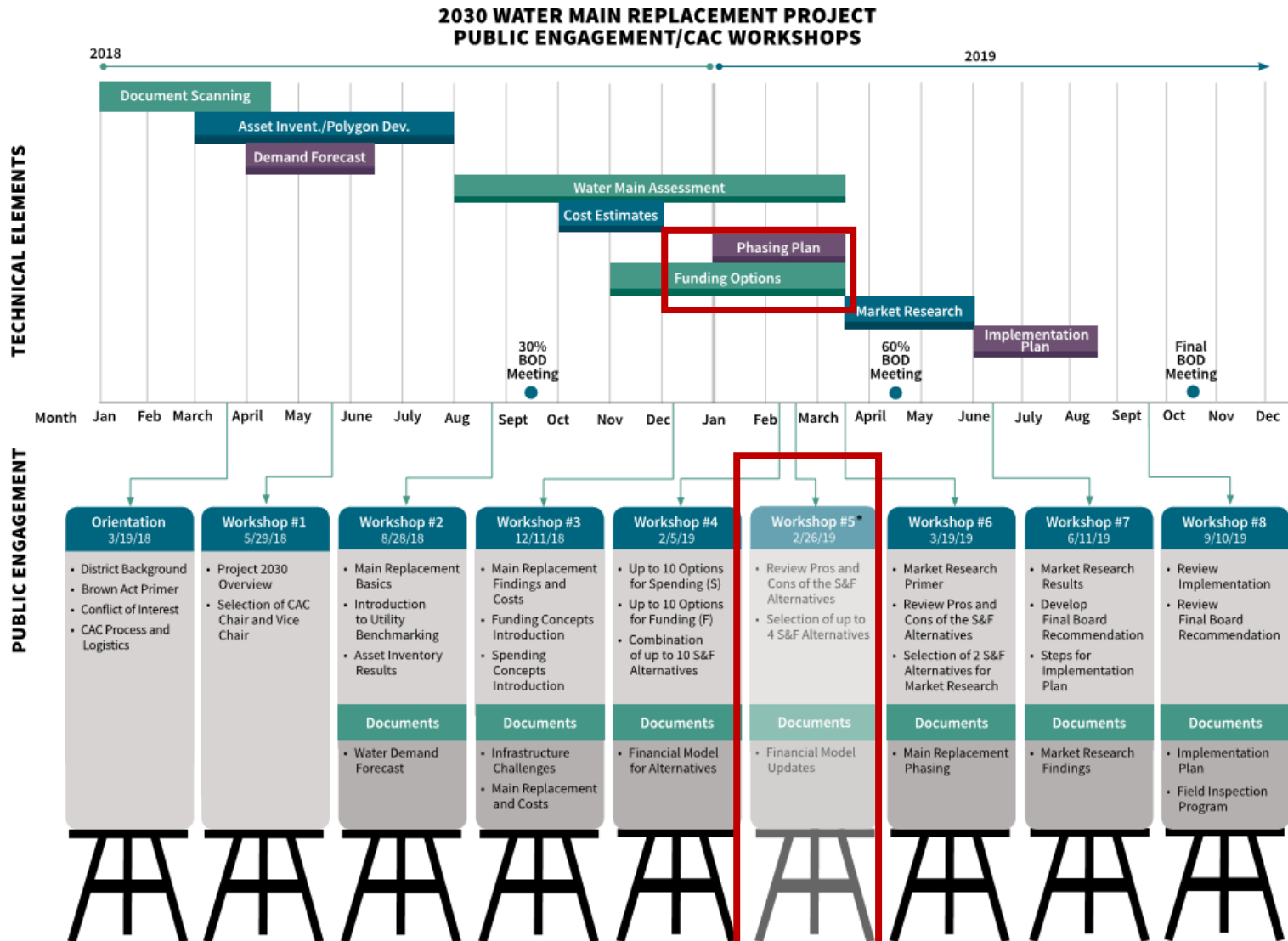


# TOPICS FOR MEETING 5

- Review the Key Considerations for each Spending/Funding Alternative
- Narrow down Spending/Funding Alternatives to 2-3 Alternatives
- Market Research on the 2-3 Alternatives



# PREVIEW OF CAC MEETING 5



**Next Meeting: Tuesday, February 26<sup>th</sup>, 2019**

**Time:** 6:30 pm – 9:15 pm

**Location:** Citrus Heights Community Center, Hall A



**VISIT THE CAC WEBPAGE**  
**[chwd.org/customer-](http://chwd.org/customer-advisory-committee/)**  
**[advisory-committee/](http://chwd.org/customer-advisory-committee/)**





# PARTICIPANT TAKE- AWAY'S



# CLOSING