

Forecasting the Wastewater Treatment Division (WTD) Capital Improvement Program (CIP)

Presented to the Metropolitan Water Pollution Abatement Advisory
Comprehensive Engineering and Planning Subcommittee

February 2, 2023



King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Contents

- From Problem/Need to CIP Forecast
- Forecast Uncertainty and Contingency Management
- Evolution of CIP Forecasts Over Time
- Delivery and Financial Strategies to Manage Growing CIP
- Application of Accomplishment Rates
- How Capital Spending Impacts the Sewer Rate



From Identifying a Problem/Need to Inclusion in CIP Forecast

Project Request Process

- All capital projects begin with a request - subject matter expert submits and a sponsor accepts.
- Projects are generally requested when funding is required in the near to medium term (<6 years out).
- When projects are requested, the scope may not be well-developed, and the cost estimate may be uncertain.

The screenshot displays the 'Project Details' page for 'WPTP Widget Replacement' (REQ-2399) in the PRISM system. The page includes a header with the King County logo and 'Crystal Fleet' user information. Key project metrics are shown: Estimated Total Cost of \$14,782,000.00, a Duration of 6 Years, and a Portfolio Status of Pending. The page is divided into several sections: Project Summary, Objective, Potential Consequences, and Preliminary Scope Statement. The Project Summary section contains a table with the following data:

Project Name	Project Type	Portfolio Category	Estimated Project Duration
WPTP Widget Replacement	Standalone Capital Project	Asset Management - Plants	6 Years

Est. Construction Costs	Est. Non-Construction Costs	Est. Contingency Costs	Est. Total Project Costs
\$7,643,000	\$3,739,000	\$3,400,000	\$14,782,000.00

The Project Location(s) is listed as WEST POINT TP OVERALL. The Objective section states: 'The objective of this project is to provide a continued high level of service by replacing aged widgets at West Point Treatment Plant.' The Potential Consequences section notes: 'If this project is not approved, widgets may fail unexpectedly, resulting in permit non-compliance and disruption to operations.' The Preliminary Scope Statement section is currently empty.



Project Prioritization Process



- Project requests are categorized by the main business driver, then evaluated against the category criteria.
- Prioritization is the first point at which the potential timing of a project is understood.



Capital Project Formulation

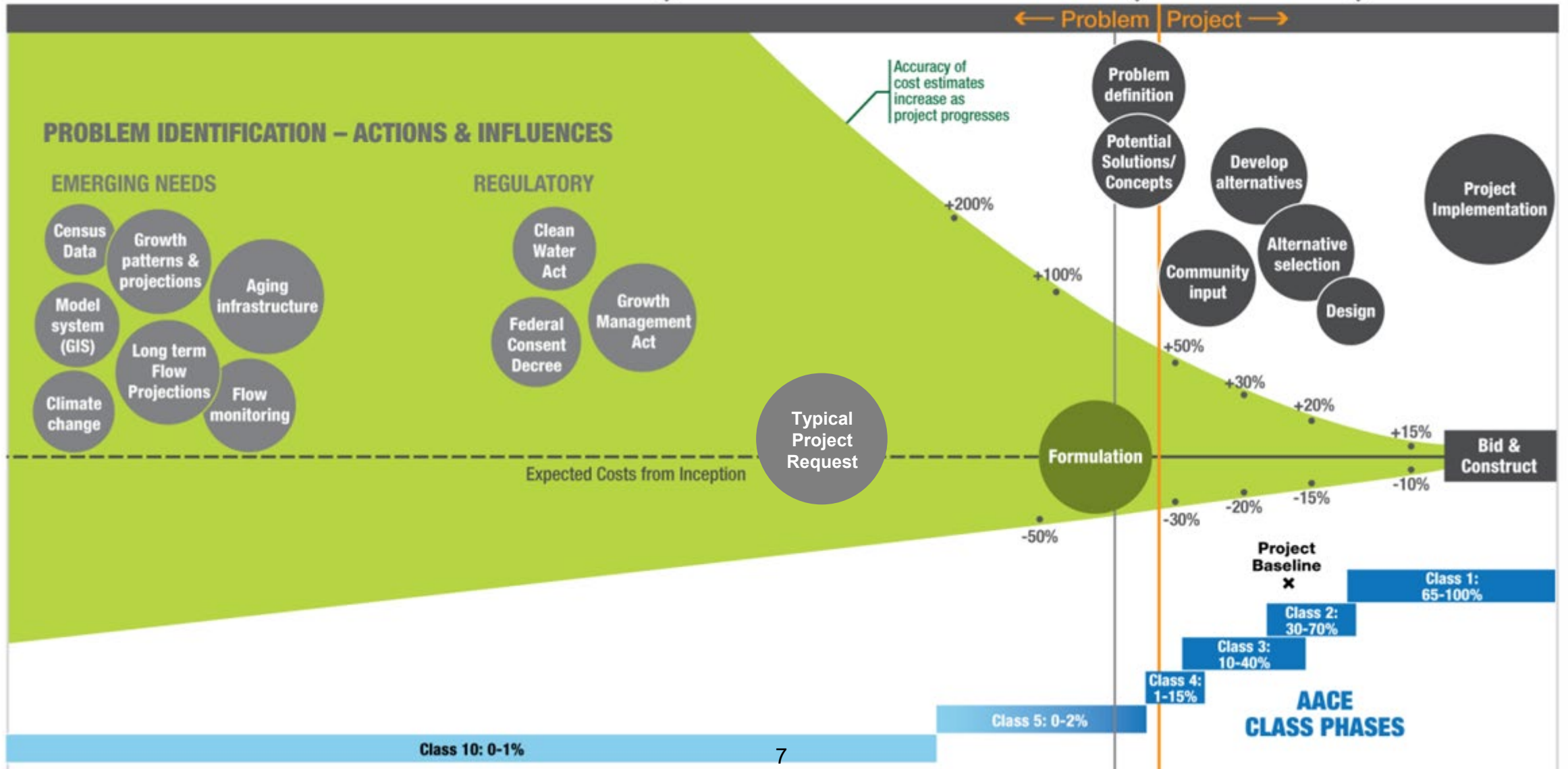
- Since 2017, WTD has used the Capital Project Formulation program to develop conceptual needs to conceptual projects.
- The highest priority project requests are assigned to teams who investigate the problem, develop conceptual scope options to address the need/problem, and develop Class 5 cost estimates for the most likely scope options.



Long Term System Planning

Concept Definition
 Budget authorization

Capital Project Delivery



Cost Estimating – Estimating Tool

	A	B	C	D	E	F	G	H	I
1	Estimate - AACEI Class 5								
2	Project Name:				Date:			Base Year	Estimate Year
3	Location:				Estimator:			2023	2023
4	Description:				Version:				
5	DIRECT: SUBTOTAL CONSTRUCTION COSTS								
6	Item No.	Item Description	Quantity	Units	Unit Cost	Item Cost			
7	1					\$ -			
8	2					\$ -			
9	3					\$ -			
10	4					\$ -			
11	5					\$ -			
12	6					\$ -			
13	7					\$ -			
14	8					\$ -			
15	9					\$ -			
16	10					\$ -			
32	<i>Subtotal Construction Costs</i>						\$ -		
33	Allowance for Indeterminates (Design Allowance)						\$ -		
34	Street Use Permit						\$ -		
35	ESTIMATED PROBABLE COST OF CONSTRUCTION BID						\$ -		
36	DIRECT: SUBTOTAL ADDITIONAL CONSTRUCTION COSTS								
37	Mitigation Construction Contracts						\$ -		
38	Construction Change Order Allowance						\$ -		
39	Construction Pricing Uncertainty Allowance						\$ -		
40	<i>Subtotal Primary Construction Amount</i>						\$ -		
41	Construction Sales Tax						\$ -		
42	Owner Furnished Equipment						\$ -		
43	Outside Agency Construction						\$ -		
44	<i>Subtotal KC Contribution to Construction</i>						\$ -		
45	DIRECT: SUBTOTAL OTHER CAPITAL CHARGES								
46	KC/WTD Direct Implementation						\$ -		
47	Misc. Capital Costs						\$ -		
48	TOTAL DIRECT CONSTRUCTION COSTS						\$ -		
49	INDIRECT: NON-CONSTRUCTION COSTS								
50	Design and Construction Consulting						\$ -		
51	Other Consulting Services						\$ -		
52	Permitting & Other Agency Support						\$ -		
53	Right-of-Way						\$ -		
54	Misc. Service & Materials						\$ -		
55	Non-WTD Support						\$ -		
56	WTD Staff Labor						\$ -		
57	<i>Subtotal Non-Construction Costs</i>						\$ -		
58	Project Contingency						\$ -		
59	Initiatives						\$ -		
60	TOTAL INDIRECT NON-CONSTRUCTION COSTS						\$ -		
61	TOTAL PROJECT COST						\$ -		
--									



Estimate - AACEI Class 5						
Project Name:	WPTP Widget Replacement			Date:	2/2/2023	
Location:	West Point Treatment Plant - Overall			Estimator:	P. Requester	
Description:	This project will replace all widgets located at WPTP			Version:	1	
DIRECT: SUBTOTAL CONSTRUCTION COSTS						
Item No.	Item Description	Quantity	Units	Unit Cost	Item Cost	
1	Widget Replacement Per Attached Asset List	500	EA	\$ 10,000	\$ 5,000,000	
2					\$ -	
3					\$ -	
4					\$ -	
5					\$ -	
6					\$ -	
7					\$ -	
8					\$ -	
9					\$ -	
10					\$ -	
Subtotal Construction Costs					\$ 5,000,000	
Allowance for Indeterminates (Design Allowance)					\$ 1,250,000	
Street Use Permit					\$ -	
ESTIMATED PROBABLE COST OF CONSTRUCTION BID					\$ 6,250,000	
DIRECT: SUBTOTAL ADDITIONAL CONSTRUCTION COSTS						
Mitigation Construction Contracts					\$ -	
Construction Change Order Allowance					\$ 625,000	
Construction Pricing Uncertainty Allowance					\$ 50,000	
Subtotal Primary Construction Amount					\$ 6,925,000	
Construction Sales Tax					\$ 704,688	
Owner Furnished Equipment					\$ -	
Outside Agency Construction					\$ -	
Subtotal KC Contribution to Construction					\$ 7,629,688	
DIRECT: SUBTOTAL OTHER CAPITAL CHARGES						
KC/WTD Direct Implementation					\$ -	
Misc. Capital Costs					\$ 13,750	
TOTAL DIRECT CONSTRUCTION COSTS					\$ 7,643,000	
INDIRECT: NON-CONSTRUCTION COSTS						
Design and Construction Consulting					\$ 2,338,231	
Other Consulting Services					\$ -	
Permitting & Other Agency Support					\$ 34,375	
Right-of-Way					\$ -	
Misc. Service & Materials					\$ 123,750	
Non-WTD Support					\$ 17,188	
WTD Staff Labor					\$ 1,225,810	
Subtotal Non-Construction Costs					\$ 3,739,354	
Project Contingency					\$ 3,399,837	
Initiatives					\$ -	
TOTAL INDIRECT NON-CONSTRUCTION COSTS					\$ 7,139,000	
TOTAL PROJECT COST					\$ 14,783,000	

Base Year	Estimate Year
2023	2023

Construction Cost: Per construction cost estimator. The tool allows for detailed construction estimates that can be rolled up to this summary page.

Allowance for Indeterminates (AFI): Used to accommodate minor changes in the design that ultimately impact the cost of construction. Related to accomplishing the original scope of work, expected to be spent. % applied to Construction Cost Subtotal.

Change Order Allowance: Used to cover unforeseen events in construction that will require changes to the contractual scope or work. Per KC policy 10% applied to Estimated Cost of Construction Bid (which includes AFI).

Construction Pricing Uncertainty Allowance: Per the construction cost estimator. Used during times of highly volatile material pricing. This allowance is a stand-alone cost and does not contribute to any of the other standard contingency factors.

Indirect Non-Construction Costs: For conceptual projects, consultant and in-house labor are calculated by a model based on historical data. As projects progress through design – this should be progressively estimated by the project manager based on level of effort instead of using a model.

Project Contingency: Accommodate elements of risk, degree of uncertainty, lack of design definition, desired confidence levels directly attributable to the overall scope of work, or the possibility that execution may not go as expected. Not intended to cover items outside the scope of the project. % applied to all above, not including Construction Pricing Uncertainty Allowance.

Cost Estimate to Annualized Forecast – Conceptual Project Requests - Calculator

King County Crystal Fleet

Download Excel

Duration

1 Months Years

Start Date: 2023-01-26

Construction Spend: \$ 0

Non-Construction Spend: \$ 0

Contingency Spend: \$ 0

Escalation Rate: 0.00

Project Duration

Phase	Duration
Total Duration	12 mo
Phase 1: Planning	1 mo
Phase 2: Preliminary Design	2 mo
Phase 3: Final Design	3 mo
Phase 4: Implementation	5 mo
Phase 5: Closeout	1 mo

6 Year Cashflow

Year	Spend
5 Year Spend	\$0
5 Year Average	\$0
2023	\$0
2024	\$0
2025	\$0
2026	\$0
2027	\$0
2028	\$0

Project Overview

Total Duration: 1 Years | Start Date: 2023-01-26 | Total Budget: \$0

[Clear Calculator](#)

Project Cashflow

Project Data: Spending by Year | Distribution of Spending by Phase | Annual Spend by Phase

Spend Type: Cumulative | Annual

Graph Type: Area | Bar

Project Cashflow Graph Legend: Construction (Red), Contingency (Green), Non-Construction (Blue)

Cashflows

Cashflows By: Total Actuals + Forecasted: \$0 | 0 Yr Avg: 2023-2028: \$0

Cash Flow	2023	Total EAC
Construction Forecast	\$0	\$0
Non-Construction Forecast	\$0	\$0
Contingency Forecast	\$0	\$0
Total Forecast	\$0	\$0

Cost Estimate to Annualized Forecast – Conceptual Project Requests – Calculator Input

Duration: If no schedule estimate exists, use a rule of thumb based on cost estimate and assumed complexity.

Cost Estimates: From Estimating Tool, user must escalate to the presumed start year.

Escalation Rate: Standard 3% Annual Escalation applied automatically; this can be adjusted by user.

King County
Crystal Fleet

[Download Excel](#)

Duration

🕒 Months **Years**

Start Date

📅 📅

Construction Spend

\$

Non-Construction Spend

\$

Contingency Spend

\$

Escalation Rate

📈

Project Duration

Phase	Duration
Total Duration	60 mo
Phase 1: Planning	4 mo
Phase 2: Preliminary Design	11 mo
Phase 3: Final Design	15 mo
Phase 4: Implementation	23 mo
Phase 5: Closeout	7 mo

6 Year Cashflow

Year	Spend
6 Year Spend	\$18,057,802
6 Year Average	\$3,009,634
2027	\$573,892
2028	\$1,604,470
2029	\$3,411,218
2030	\$8,091,319
2031	\$4,355,482
2032	\$21,422

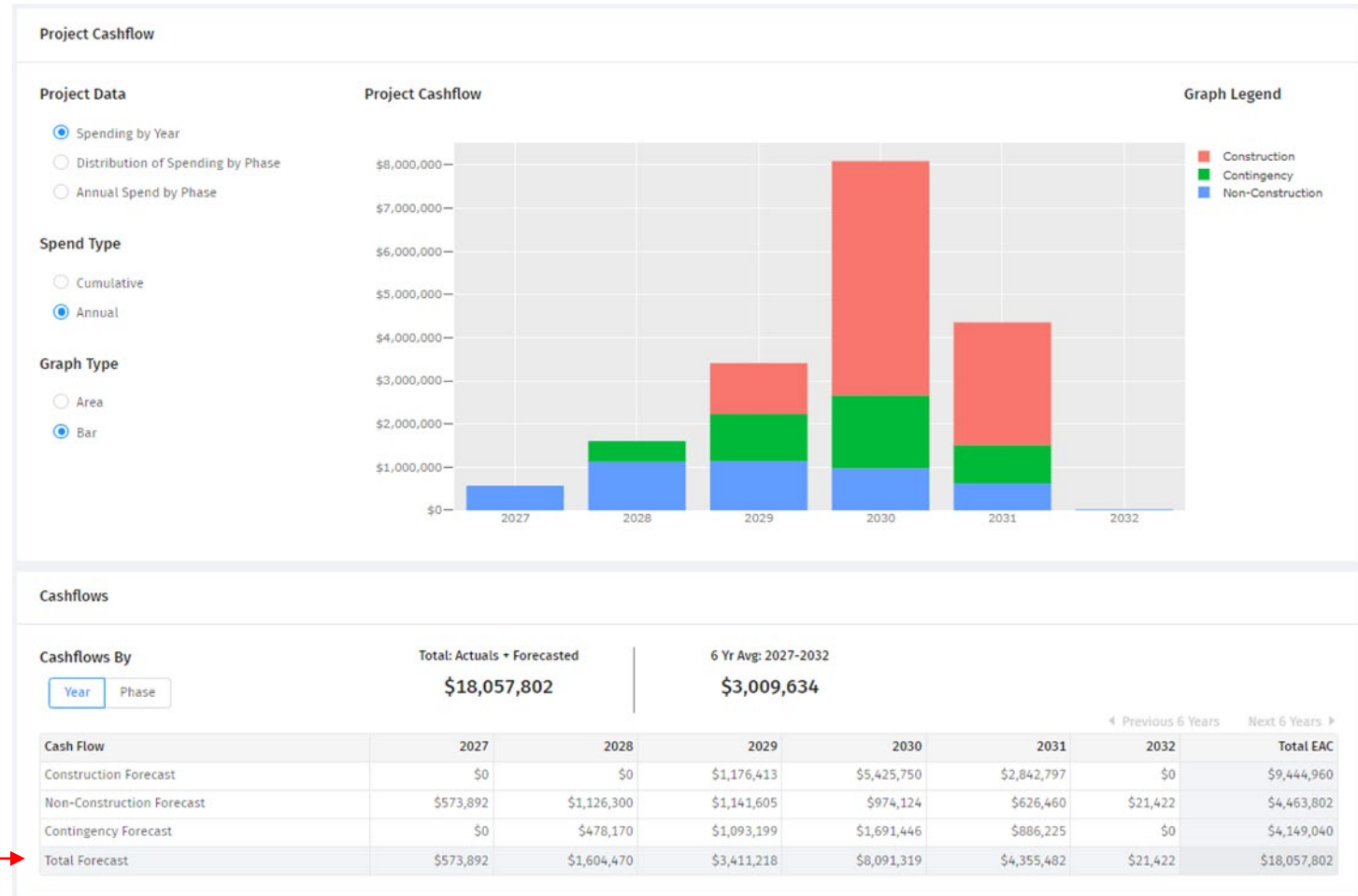
Project Overview

Total Duration	Start Date	Total Budget
5 Years	2027-02-22	\$18,057,802

[Clear Calculator](#)



Cost Estimate to Annualized Forecast – Conceptual Project Requests – Calculator Output



Total Annualized Forecast: Used in sewer rate model



Cost Estimate to Annualized Forecast – Projects in Delivery – Project Information System (PRISM)

WP Treatment Plant Disinfection (1037591)
Crystal Fleet, Project Manager
Dionnie Dionisio, Project Control Engineer

Grid State: Escalated: Primary Dataset: Gate 3-Baseline (06/15/2009) Comparison Dataset: Gate 3-Baseline (06/15/2009)

INACTIVE PROJECT AM COMPLETE IN-HOUSE IN-HOUSE
1-5M 0

Group	2010 <	2011 <	LTD ACTU... Thru Dec 2009	FORECAST E... Gate 3-Baseline (06/15/2009)
CONSTRUCTION	1,650,150			1,650,150
> Construction Contracting	1,490,150			1,490,150
> Owner Furnished Equipment	160,000			160,000
> Outside Agency Construction				
> Other Capital Charges				
> Construction Pricing Uncertainty Allowance				
NON-CONSTRUCTION	397,279	8,240	485,418	890,936
> Design and Const Consulting	4,060		31,616	35,676
> Other Consulting Services			15,384	15,384
> Permitting & Local Agency	1,500			1,500
> Right-of-Way				
> Misc. Service & Materials	200		15,694	15,894
> Non-WTD Support				
> WTD Staff Labor	381,452	8,240	411,036	800,729
> Indirect Burden	10,066		11,687	21,753
PROJECT RESERVE		216,300		216,300
> Project Contingency		216,300		216,300
SETTLEMENTS, REIMBURSEMENTS, & LDs				
> Settlements, Reimbursements & LDs				
INITIATIVES				
> Sustainability				
> 1% for Art				
Uncommitted/Adjustment	0	0	0	0
	2,047,429	224,540	485,418	2,757,386



Cost Estimate to Annualized Forecast – Projects in Delivery – Project Information System (PRISM)

Crystal Fleet - Export Help Feedback

Grid State: Escalated: Comparison Dataset:

WP Treatment Plant Disinfection (1037591)

Crystal Fleet, Project Manager
Dionnie Dionisio, Project Control Engineer

INACTIVE PROJECT AM COMPLETE IN-HOUSE IN-HOUSE

1-5M 0

Tier 0 > Tier 1 > Tier 2 >

Group	FIRST YEAR		2022 <	FORECAST ETC	LTD ACTU...	FORECAST E...	MODEL	Variance (EAC - Model)
	Closed Actuals (Jan - Jun)	Forecast Remaining (Jul - Dec)	Current Forecast	Current Forecast	Thru Jun 2022	Current Forecast	Model (Calculat...	
> 461151 RESOURCE RECOVERY								
> 461160 COMM SVCS					941	941	1,600	-658
> 461161 ENVIRONMENTAL					4,961	4,961	1,600	3,360
> 461170 PERMIT/REAL ESTATE					3,392	3,392	3,495	-103
> 461191 MODELING								
> 461201/2 PLANNING - ASSET MGMT								
> 461181 CONSTRUCTION MGMT					256,747	256,747	132,537	124,210
> 461200 FLOW MONITORING & ANALYSIS					578	578	577	
> 461192 ENGINEERING					476,184	476,184	187,972	288,211
> 461182 PROGRAM MGMT					77,163	77,163	55,251	21,911
4880 Project Management					77,163	77,163		
> 461183 PROJECT CONTROLS					40,572	40,572	21,701	18,869
> 461184 PORTFOLIO MGMT								
> Indirect Burden					337,433	337,433	493,695	-156,262
PROJECT RESERVE								
Uncommitted/Adjustment	0	0	0	0	0	0	0	0
	0	0	0	0	3,048,343	3,048,343	2,510,883	537,460

DISTRIBUTOR MONTHS LOG PROJECT MODEL PROJECT DATASETS ACTUALS

NON-CONSTRUCTION > WTD Staff Labor > 461182 PROGRAM MGMT > 4880 Project Management Last Modified by Tamir Hasan on January 18, 2013 8:48 AM

NUMBER NAME DATES LOCK YEARS

4880 Project Management -
 Start Finish

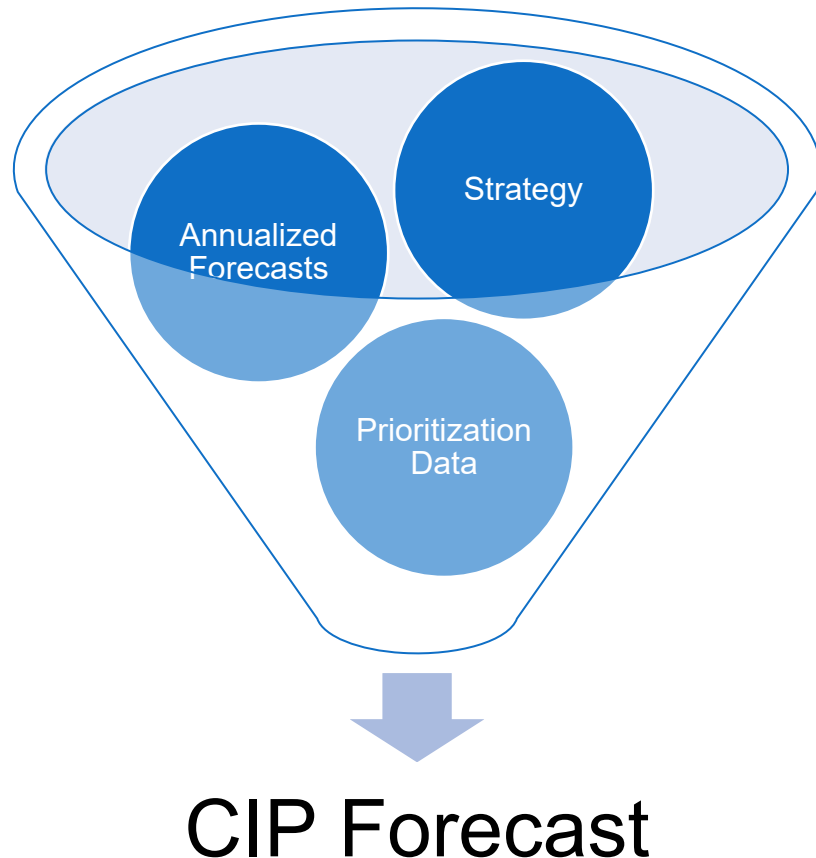
FORECAST 1

Dollars + = - =
 Estimate to Completion (ETC) LTD Actuals (thru Jul 2022) Estimate at Completion (EAC) Model (Similar Projects) Variance (EAC - Model)

Hours



How Project and Conceptual Project Forecasts are Combined into one CIP Forecast



Strategy

- Sets goals and assumptions

Prioritization Data

- Determines sequencing and how project fits into strategy

Annualized Forecast

- Individual Project and Project Request Cost Projections



King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Important Things to Remember

- Our Portfolio Management processes are primarily geared toward helping leadership make near-term decisions like the biennial budget request.
- The assumptions used in the 10-Year Sewer Rate Forecasts rely on portfolio forecast data to project a probable future, but they are **not formal plans**.
- The 10-Year CIP Sewer Rate Forecasts try to approximate what those potential futures may be, but there will always be changes from those assumptions due to future decisions, new data, risk, uncertainty, and changed conditions.



Example CIP Sewer Rate Model Input

	Category	Common Portfolio		Notes	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
		Criteria Score	Criteria Score												
Ongoing Programs (funds smaller subprojects)	Cog Replacement Program	10	10		\$ 320,000	\$ 110,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000
	Teapot Refurbishment	10	10		\$ 1,640,000	\$ 1,610,000	\$ 1,230,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Window Replacements	10	10		\$ 4,870,000	\$ 6,310,000	\$ 7,480,000	\$ 7,670,000	\$ 6,890,000	\$ 7,090,000	\$ 7,300,000	\$ 7,520,000	\$ 7,750,000	\$ 7,980,000	\$ 8,220,000
	System-wide Sprocket Program	10	10		\$ 2,330,000	\$ 2,430,000	\$ 2,430,000	\$ 2,520,000	\$ 2,620,000	\$ 2,720,000	\$ 2,800,000	\$ 2,880,000	\$ 2,970,000	\$ 3,060,000	\$ 3,150,000
Projects in construction/closeout	Crossroads PS Upgrade	10	10		\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	WPTP Valve Upgrade	10	10		\$ 360,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Projects in design	Arboretum PS Storage	8.9	6.4		\$ 6,860,000	\$ 15,280,000	\$ 15,410,000	\$ 20,050,000	\$ 710,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Lakeside Interceptor Rehab	8.7	8.8		\$ 1,590,000	\$ 1,970,000	\$ 20,780,000	\$ 7,380,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Conceptual Projects / Project Requests	West Point Bottling Conveyor	8.4	4.3		\$ -	\$ 100,000	\$ 1,020,000	\$ 5,260,000	\$ 16,850,000	\$ 12,430,000	\$ 860,000	\$ -	\$ -	\$ -	\$ -
	SP Donut Making Machine	8.2	6.6		\$ -	\$ 750,000	\$ 870,000	\$ 1,420,000	\$ 4,190,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -
	BWTP Solids Concentrator	7.9	5.5		\$ -	\$ -	\$ -	\$ 780,000	\$ 1,350,000	\$ 2,510,000	\$ 3,700,000	\$ 800,000	\$ -	\$ -	\$ -
	Roegner Park PS Upgrade	7.9	8.1		\$ -	\$ -	\$ 1,470,000	\$ 5,150,000	\$ 13,560,000	\$ 12,035,000	\$ 48,000,000	\$ 33,480,000	\$ 1,560,000	\$ -	\$ -
	WPTP Water Pipe Replacement	7.7	6.9		\$ -	\$ -	\$ -	\$ 530,000	\$ 1,600,000	\$ 3,690,000	\$ 8,600,000	\$ 360,000	\$ -	\$ -	\$ -
	WPTP Underground Water Tank	7.6	0.5		\$ -	\$ -	\$ -	\$ 1,030,000	\$ 3,190,000	\$ 7,820,000	\$ 5,823,000	\$ 630,000	\$ -	\$ -	\$ -
	Brightwater Soup Canner	7.0	6.5		\$ -	\$ -	\$ -	\$ -	\$ 240,000	\$ 710,000	\$ 2,030,000	\$ 8,000,000	\$ 730,000	\$ -	\$ -
	Space Needle Treatment Plant Upgrade	6.9	8.4		\$ -	\$ -	\$ -	\$ -	\$ 2,030,000	\$ 6,440,000	\$ 12,000,000	\$ 18,020,000	\$ 25,360,000	\$ 42,090,000	\$ 85,900,000
	South Plant Sludge Pump	6.8	5.7		\$ -	\$ -	\$ -	\$ -	\$ -	\$ 720,000	\$ 2,160,000	\$ 3,026,500	\$ 12,890,000	\$ 863,500	\$ -
	WPTP Paper Press	6.0	3.4	Push Button Rehab Predecessor	\$ -	\$ -	\$ 1,050,000	\$ 3,310,000	\$ 5,080,600	\$ 6,600,000	\$ 14,056,000	\$ 26,850,000	\$ 1,236,800	\$ -	\$ -
	WPTP Push Button Rehab	6.5	8.3		\$ -	\$ -	\$ -	\$ -	\$ -	\$ 210,000	\$ 879,000	\$ 1,257,830	\$ 3,800,000	\$ 12,986,500	
	Teapot Refurb 2026-2032	9.0	8.2	After current program sunset	\$ -	\$ -	\$ -	\$ 1,270,000	\$ 1,310,000	\$ 1,350,000	\$ 1,390,000	\$ 1,430,000	\$ 1,470,000	\$ 1,510,000	\$ 1,560,000
Placeholder	Aging Inventory Placeholder	N/A	N/A								\$ 10,000,000	\$ 20,000,000	\$ 40,000,000	\$ 50,000,000	
Total	Total Asset Management Category				\$ 17,980,000	\$ 28,560,000	\$ 51,860,000	\$ 56,490,000	\$ 59,740,600	\$ 64,745,000	\$ 109,059,000	\$ 114,005,500	\$ 75,354,630	\$ 99,433,500	\$ 161,946,500
Goals	Category % of 6-Year CIP Goal		27%												
	Category % of 6-Year CIP Actual		27%												
	Complete Tier 1 projects (7.0 or higher category score) by 2031														



Prioritization Data: Projects are sequenced by relative priority. Sometimes prioritization data can be used in relation to a time-bound goal.

Annualized Forecasts: The total forecast is a sum of individual annualized forecasts that are arranged to meet a goal, strategic plan, and/or 6-Year allocation.

	Category	Common Portfolio Criteria Score	Notes	Annualized Forecasts											
				2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
Ongoing Programs (funds smaller subprojects)	Cog Replacement Program	10	10	\$ 320,000	\$ 110,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	\$ 130,000	
	Teapot Refurbishment	10	10	\$ 1,640,000	\$ 1,610,000	\$ 1,230,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	Window Replacements	10	10	\$ 4,870,000	\$ 6,310,000	\$ 7,480,000	\$ 7,670,000	\$ 6,890,000	\$ 7,090,000	\$ 7,300,000	\$ 7,520,000	\$ 7,750,000	\$ 7,980,000	\$ 8,220,000	
	System-wide Sprocket Program	10	10	\$ 2,330,000	\$ 2,430,000	\$ 2,430,000	\$ 2,520,000	\$ 2,620,000	\$ 2,720,000	\$ 2,800,000	\$ 2,880,000	\$ 2,970,000	\$ 3,060,000	\$ 3,150,000	
Projects in construction/closeout	Crossroads PS Upgrade	10	10	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	WPTP Valve Upgrade	10	10	\$ 360,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Projects in design	Arboretum PS Storage	8.9	6.4	\$ 6,860,000	\$ 15,280,000	\$ 15,410,000	\$ 20,050,000	\$ 710,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	Lakeside Interceptor Rehab	8.7	8.8	\$ 1,590,000	\$ 1,970,000	\$ 2,078,000	\$ 7,380,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Conceptual Projects / Project Requests	West Point Bottling Conveyor	8.4	4.3	\$ -	\$ 100,000	\$ 1,020,000	\$ 5,260,000	\$ 16,850,000	\$ 12,430,000	\$ 860,000	\$ -	\$ -	\$ -	\$ -	
	SP Donut Making Machine	8.2	6.6	\$ -	\$ 750,000	\$ 870,000	\$ 1,420,000	\$ 4,190,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	
	BWTP Solids Concentrator	7.9	5.5	\$ -	\$ -	\$ -	\$ 780,000	\$ 1,350,000	\$ 2,510,000	\$ 3,700,000	\$ 800,000	\$ -	\$ -	\$ -	
	Roegner Park PS Upgrade	7.9	8.1	\$ -	\$ -	\$ 1,470,000	\$ 5,150,000	\$ 13,560,000	\$ 12,035,000	\$ 48,000,000	\$ 33,480,000	\$ 1,560,000	\$ -	\$ -	
	WPTP Water Pipe Replacement	7.7	6.9	\$ -	\$ -	\$ -	\$ 530,000	\$ 1,600,000	\$ 3,690,000	\$ 8,600,000	\$ 360,000	\$ -	\$ -	\$ -	
	WPTP Underground Water Tank	7.6	0.5	\$ -	\$ -	\$ -	\$ 1,030,000	\$ 3,190,000	\$ 7,820,000	\$ 5,823,000	\$ 630,000	\$ -	\$ -	\$ -	
	Brightwater Soup Canner	7.0	6.5	\$ -	\$ -	\$ -	\$ -	\$ 240,000	\$ 710,000	\$ 2,030,000	\$ 8,000,000	\$ 730,000	\$ -	\$ -	
	Space Needle Treatment Plant Upgrade	6.9	8.4	\$ -	\$ -	\$ -	\$ -	\$ 2,030,000	\$ 6,440,000	\$ 12,000,000	\$ 18,020,000	\$ 25,360,000	\$ 42,090,000	\$ 85,900,000	
	South Plant Sludge Pump	6.8	5.7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 720,000	\$ 2,160,000	\$ 3,026,500	\$ 12,890,000	\$ 863,500	\$ -	
	WPTP Paper Press	6.0	3.4	Push Button Rehab Predecessor	\$ -	\$ -	\$ 1,050,000	\$ 3,310,000	\$ 5,080,600	\$ 6,600,000	\$ 14,056,000	\$ 26,850,000	\$ 1,236,800	\$ -	\$ -
	WPTP Push Button Rehab	6.5	8.3		\$ -	\$ -	\$ -	\$ -	\$ -	\$ 210,000	\$ 879,000	\$ 1,257,830	\$ 3,800,000	\$ 12,986,500	
	Teapot Refurb 2026-2032	9.0	8.2	After current program sunset	\$ -	\$ -	\$ -	\$ 1,270,000	\$ 1,310,000	\$ 1,350,000	\$ 1,390,000	\$ 1,430,000	\$ 1,470,000	\$ 1,510,000	\$ 1,560,000
	Placeholder	Aging Inventory Placeholder	N/A	N/A								\$ 10,000,000	\$ 20,000,000	\$ 40,000,000	\$ 50,000,000
	Total	Total Asset Management Category			\$ 17,980,000	\$ 28,560,000	\$ 51,860,000	\$ 56,490,000	\$ 59,740,600	\$ 64,745,000	\$ 109,059,000	\$ 114,005,500	\$ 75,354,630	\$ 99,433,500	\$ 161,946,500

Goals	Category % of 6-Year CIP Goal	27%
	Category % of 6-Year CIP Actual	27%
	Complete Tier 1 projects (7.0 or higher category score) by 2031	

Strategy: Some portfolio categories have time-bound goals or strategic plans associated with them. All have a 6-Year Allocation that we try to meet.

Dependencies: Sometimes projects have dependencies and are sequenced accordingly.

Placeholders: Portfolio inventory processes are geared toward near-term decisions (biennial budget and 6-Year CIP), sometimes placeholders are used when there is data that a conceptual need is likely but has not been requested or placed into the inventory yet. Placeholders are drawn down as conceptual projects are inventoried and prioritized.

Forecast Uncertainty and Contingency Management

Notes on Forecast Uncertainty

- Note that both time and level of scope definition have large impacts on cost certainty.
- Uncertainty in the problems/needs and their future solutions, uncertainty in future regulations, uncertainty in population, climate, flow and capacity projections, uncertainty in facility siting, and uncertainty in inflation, resources, and market conditions could all impact the final cost of the conceptual projects.

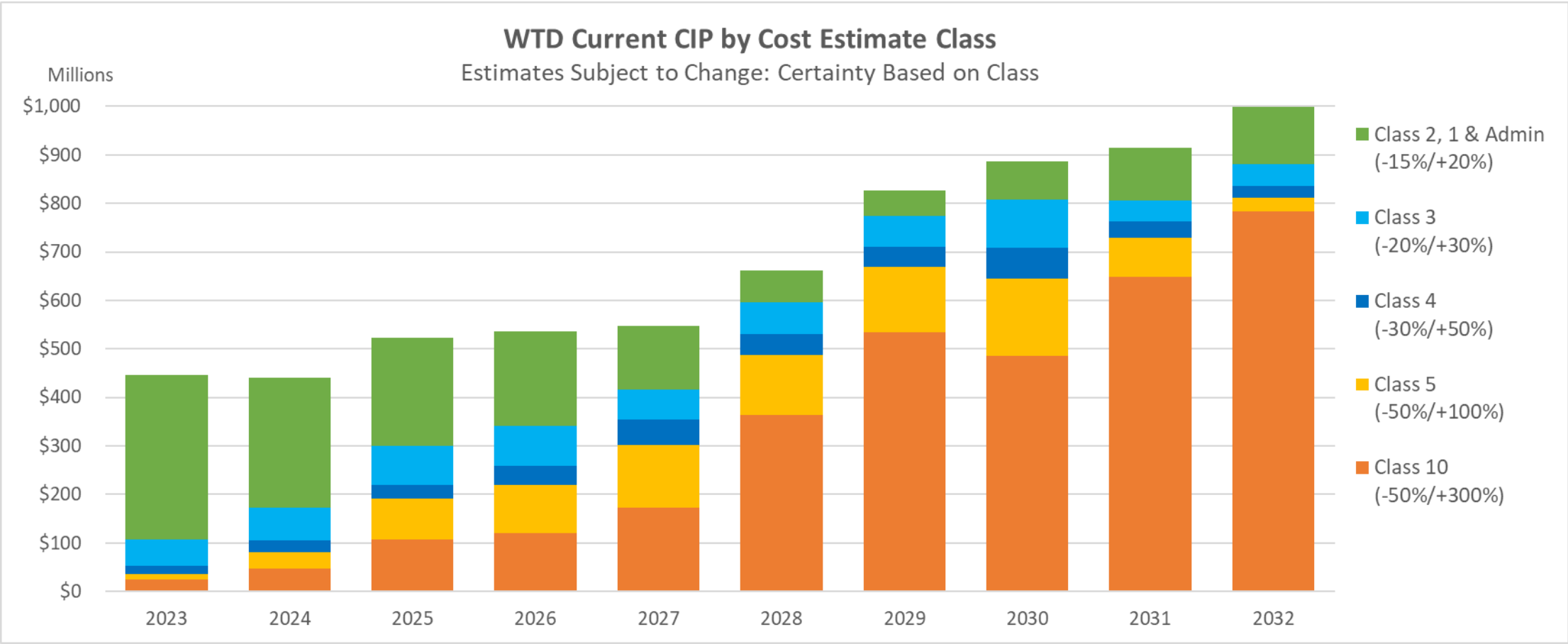
AACEi Cost Estimate Classification	WTD Cost Estimate Definition	% of Scope Definition	Expected Accuracy Range
Class 10	Long –Term System Planning	0% - 1%	-50% - +300%
Class 5	Concept Definition	0% - 2%	-50% - +100%
Class 4	Preliminary Design	1% - 15%	-30% - +50%
Class 3	Final Design	10% - 40%	-20% - +30%
Class 2	Bid for Construction	30% - 75%	-15% - +20%
Class 1	Construction Change Orders	65% - 100%	-10% - +15%



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Scope Development and Cost Estimate Classification



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Managing Contingencies

- Contingency is part of the risk management process and provides a means to mitigate the risk of known or predictable events that are inherent in capital projects.
- Contingency is part of the capital project budget and is controlled by the project manager.
- Contingency should be expected to be spent when risks materialize.
- If potential risks and uncertainties do not materialize as a project progresses, contingency should be reduced accordingly prior to proceeding to the next phase (requirement is also referenced in Ordinance 16764).
- Contingency is only intended to cover items that fall within the original project scope of work. The addition of any work beyond the chartered scope must be approved by management.
- No additional “management reserve” is included in rate forecasts. WTD does have a contingent emergent appropriation fund, but it is appropriation only, and not reflected in the sewer rate forecast.

AACEi Cost Estimate Classification	WTD Typical Contingency Amounts		
	Construction Allowance for Indeterminants	Construction Change Order Allowance	Project Reserve
Class 10	25%	10%	30%
Class 5	25%	10%	25%
Class 4	20%	10%	20%
Class 3	15%	10%	15%
Class 2	10%	10%	10%
Class 1	0%	10%	5%



Evolution of CIP Forecasts Over Time

2025-2026 Biennial Budget Process

2024 Sewer Rate Process
Engagement with MWPAAC

2025 Sewer Rate Process
Engagement with MWPAAC

2023
(Year 1)

2023
(Year 1)

2023
(Year 1)

2023
(Year 1)

2024
(Year 2)

2024
(Year 2)

2024
(Year 2)

2024
(Year 2)

Quarter 1

Quarter 2

Quarter 3

Quarter 4

Quarter 1

Quarter 2

Quarter 3

Quarter 4

Capture Prior Year
Forecast Updates
in Sewer Rate
Model

Solicit New Project
Requests

Prioritize Project
Requests

Initiate Capital
Project
Formulations

Begin Biennial
Budget
Deliberations
+
Capture Prior Year
Forecast Updates
in Sewer Rate
Model

Continue Biennial
Budget
Deliberations

Submit Biennial
Budget Request
and 6-Year CIP

Biennial Budget
Adoption

Delivery and Financial Strategies to Manage Growing CIP

Managing an Increasing CIP – Delivery Strategies



Leverage Internal Resources

- Addition of Staff
- Collaborative Delivery
- Programmatic Packaging and Delivery
- Continue Project Delivery Best Practices



Adjust to Resource Limitations

- Project Deferral



Leverage Internal Resources

- **Addition of Staff**

- 2023 Budget included about 50 new positions to support growing capital program

- **Collaborative Delivery**

- Relies less on internal resources than design-bid-build
- WTD conducted initiative to incorporate it into project delivery business process
- Two projects recently approved by Washington State Capital Projects Advisory Review Board (CPARB) Project Review Committee to use Progressive Design Build

- **Programmatic Packaging and Delivery**

- WTD piloting West Point Capital Program to coordinate and more efficiently deliver projects
- WTD is also piloting more asset-based programmatic delivery of commonly replaced assets



Leverage Internal Resources

- **Continue Project Delivery Best Practices**

- WTD has long committed to continuous improvement of its project delivery processes
- Practicing standards-based project management (PMI) processes since 2007
- Consistent governance oversight at project phased stage gates and scope/schedule/cost changes
 - Decision-making authority is assigned to the lowest appropriate level so that decisions are made effectively and efficiently
- Robust Project Information System (PRISM) that integrates project forecasting with real-time information from accounting system



Adjust to Resource Limitations

- Portfolio Management data helps leadership make tough decisions when choosing which projects to resource
- Considerations include:
 - Resource allocation
 - Existing conditions
 - Internal and external impacts of deferral

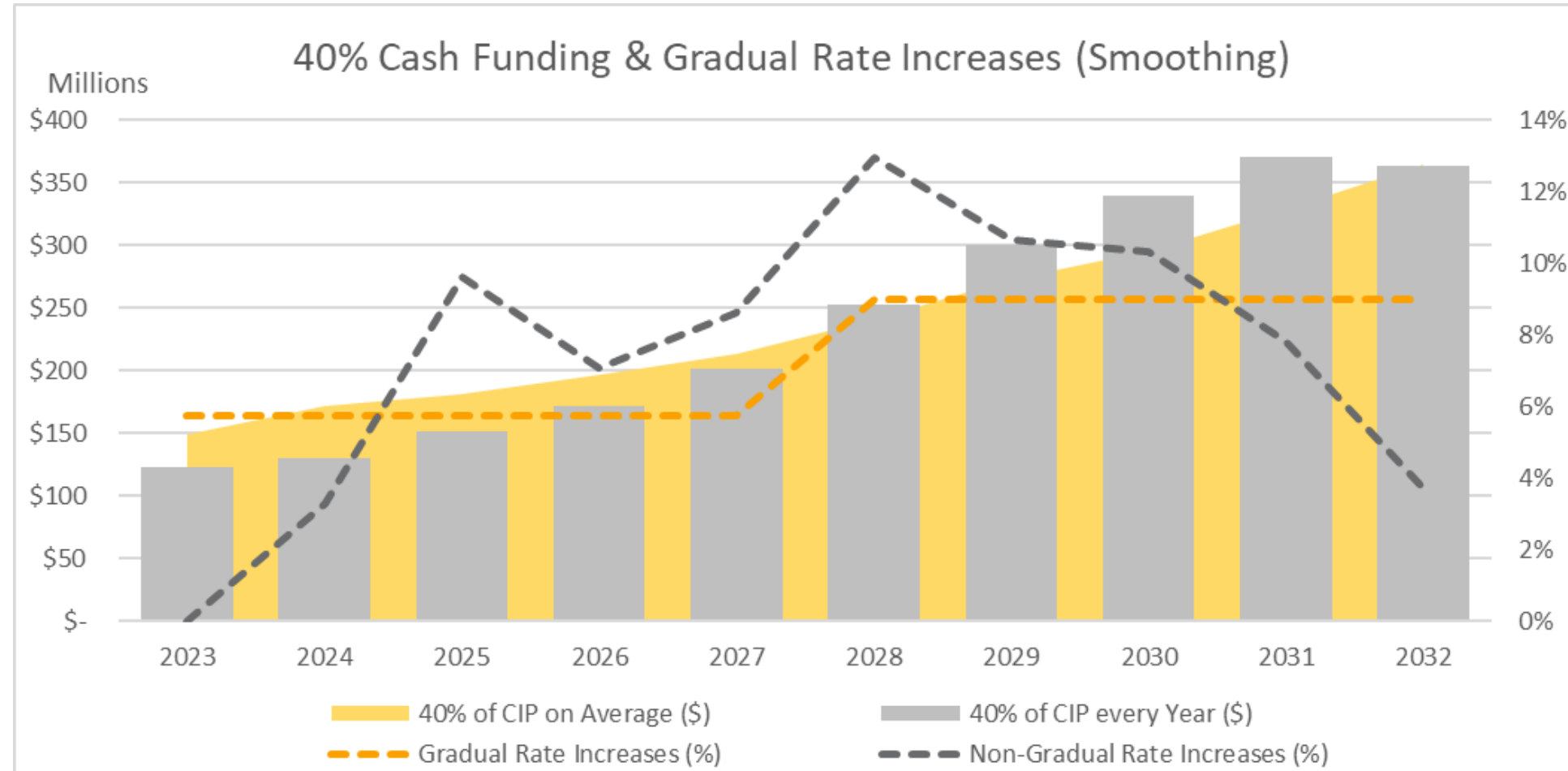


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Managing an Increasing CIP - Cash-Funding & Rate Smoothing

Annual Cash-Funding Requirements: 2023-2032 Adopted Rate Forecast

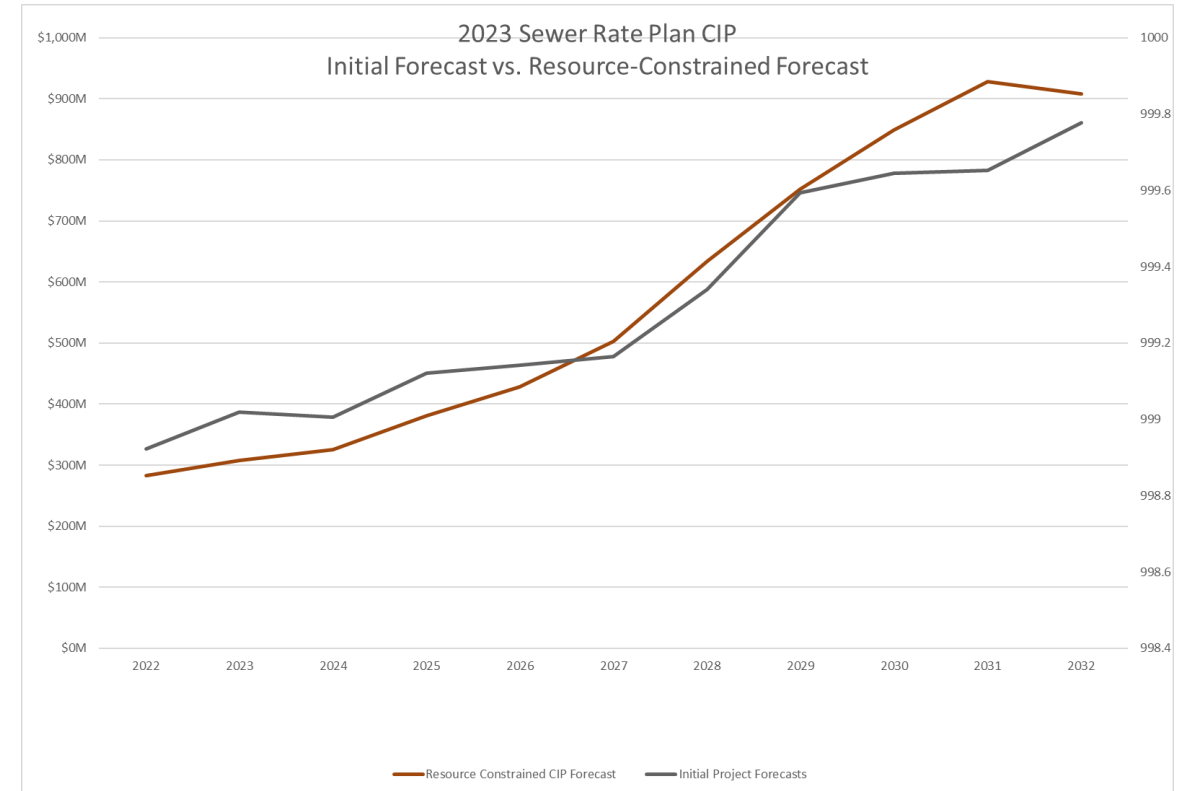


- Cash-funding requirements tied to a rapidly growing CIP result in steep, irregular rate increases (dark grey dotted line)
- WTD “smooths” the rates by averaging the 40% cash-funding requirement over 10 years (orange dotted line)
- Near-term rates become more sensitive to changes in CIP forecasts (more “volatility”)

Application of Accomplishment Rates

Accomplishment Rate – Resource-Constrained Forecast

- In early 2022, when preparing the 2023 Sewer Rate Forecast, the individual forecasts for capital projects totaled more than what historical throughput would suggest.
- Due to concern over potentially over-estimating the amount of capital expenditures early in the decade, a "resource-constraint" was applied to forecasted expenditures.
- This constrained the forecast at the beginning of the decade to what historical data suggested (based on throughput per FTE), then it redistributed expenditures to the end of the decade as resources were added, so that the total investment level represented in the forecast is the same.



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Accomplishment Rate – Resource-Constrained Forecast

- The 85% accomplishment rate was then applied on top of (i.e., after) the resource-constrained redistribution of the CIP. The assumed effective accomplishment rate fluctuates between 69% and 101% a year through 2032, and averages approximately 87% (Georgetown and Joint Ship Canal use 100% accomplishment rates)

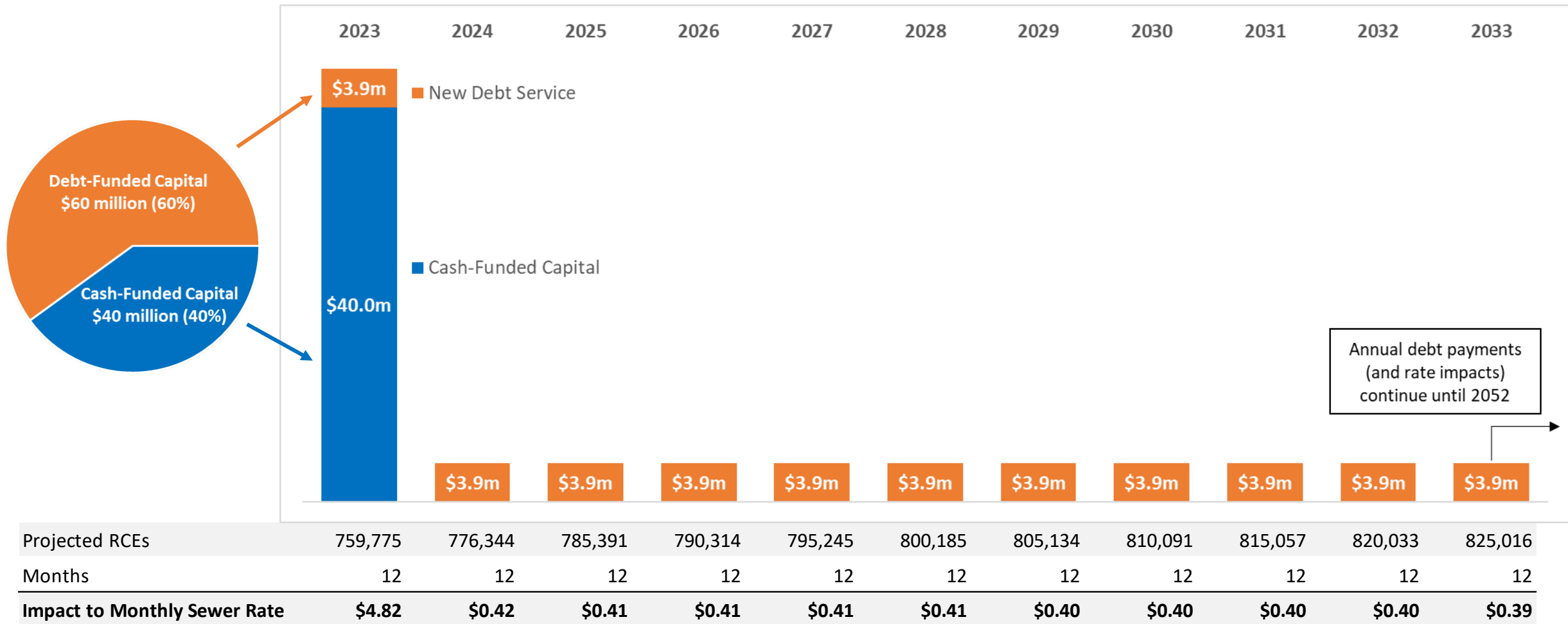
Forecast from Adopted 2023 Sewer Rate	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2023-2032
Aggregated CIP Project Forecasts	\$445	\$441	\$529	\$546	\$562	\$692	\$878	\$916	\$921	\$1,012	\$6,942
Resource-Constrained CIP Assumption	\$353	\$379	\$446	\$504	\$591	\$745	\$885	\$999	\$1,091	\$1,068	\$7,061
Adjusted to 85% AR	\$307	\$326	\$381	\$429	\$503	\$633	\$752	\$849	\$928	\$908	\$6,014
<i>Effective AR</i>	<i>69%</i>	<i>74%</i>	<i>72%</i>	<i>79%</i>	<i>89%</i>	<i>92%</i>	<i>86%</i>	<i>93%</i>	<i>101%</i>	<i>90%</i>	<i>87%</i>



How Capital Spending Impacts the Sewer Rate

CIP Spending Impact to Long-term Rates

- Example of how \$100 million of capital spending in 2023 would translate into sewer rate requirements, assuming 40% cash funding, 5% bond interest rates, 30-year level debt service, and a January 1st bond issuance



Questions and Contact Information

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