

Engineer's Report

For

City of Bishop

Inyo County, California

Recommendations On Water and Sewer Service Charge Increases



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BOYLE ENGINEERING CORPORATION

INTRODUCTION

The City of Bishop provides water and sewer service to its citizens. The operation and maintenance (O&M) and capital expenses are paid from water and sewer service charge revenues. The City ordinance setting water and sewer service charges was last amended in 1987. O&M costs have increased and some capital improvements have been made since then. Whereas the City once had water and sewer enterprise reserve funds totaling over \$2,000,000, only about \$900,000 remains. The decline in reserve funds is primarily due to the fact that water and sewer service charge revenues are no longer sufficient to meet the increasing water and sewer expenditures.

The City Council authorized retention of Boyle Engineering to assist the City in determining the need for and the amount of water and sewer service charge increases necessary to meet current expenditures. In addition, the Council appointed members of a Citizens' Advisory Committee (CAC) to review and advise the City Engineer and Boyle Engineering in their recommendations.

The water and sewer systems consist of a number of components. The ages and conditions of the components vary from 1 year to 70 years of age. Capital improvements are and will be needed to maintain satisfactory service to the citizens of Bishop and meet regulatory agency requirements. Therefore, the City Engineer and Boyle Engineering jointly developed a capital improvements program (CIP) for the water and sewer systems.

The proposed water and sewer service charges were needed to adequately fund the increasing O&M and proposed CIP costs. Several meetings were held with the CAC to solicit their input and counsel. The water and sewer service charge increases proposed in this document are the result of the CAC, the City Engineer, and Boyle Engineering working together.

HISTORICAL DATA AND PROPOSED SERVICE CHARGES NEEDED FOR O&M

The City provided 10 years of historical data for the water and sewer systems, which was used to project future O&M costs. The data showed there was a trend for increasing O&M costs. These increases are attributed to increased power costs, material costs, and labor costs. With the current billing structure, additional capital was not being generated to offset these increasing O&M costs, therefore, requiring the enterprise reserve funds to make up the shortfall. In order to eliminate the reduction of reserves in each enterprise fund, an increase in the service charges is required. Please refer to Figures 1 through 3 in the appendix.

The following table shows the proposed service charge increases necessary to offset increasing O&M costs without diminishing the combined water and sewer enterprise reserve funds. CIP costs were not included in preparing the service charges shown in the following table. Please refer to Figure 4 in the appendix.

Proposed Combined Water & Sewer Service Charges Needed to Meet O&M Costs Only

Year	Current Combined Water and Sewer Service Charge	Combined O&M Service Charge Increase	Proposed Combined O&M Service Charges
2004	\$18.66	\$7.44	\$26.10
2005	\$18.66	\$8.40	\$27.06
2006	\$18.66	\$9.36	\$28.02
2007	\$18.66	\$10.31	\$28.97
2008	\$18.66	\$11.27	\$29.93
2009	\$18.66	\$12.23	\$30.89
2010	\$18.66	\$13.19	\$31.85
2011	\$18.66	\$14.15	\$32.81
2012	\$18.66	\$15.10	\$33.76
2013	\$18.66	\$16.06	\$34.72
2014	\$18.66	\$17.02	\$35.68
2015	\$18.66	\$17.98	\$36.64
2016	\$18.66	\$18.94	\$37.60
2017	\$18.66	\$19.90	\$38.56
2018	\$18.66	\$20.85	\$39.51
2019	\$18.66	\$21.81	\$40.47
2020	\$18.66	\$22.77	\$41.43
2021	\$18.66	\$23.73	\$42.39
2022	\$18.66	\$24.69	\$43.35
2023	\$18.66	\$25.65	\$44.31

CAPITAL IMPROVEMENTS PROGRAM

The Capital Improvements Program (CIP) includes upgrades and improvements to the water and sewer systems and "other" capital projects. The cost estimates included in the CIP should be considered as preliminary estimates. Neither studies nor preliminary designs were prepared upon which to base the cost estimates. Therefore, the estimates were based on experience with similar projects. Another factor that needs to be considered is that the cost estimates are in 2003 dollars. It was assumed that the projects included in the CIP would be built over a period of 20 years. Accordingly, for purposes of this report, an annual inflation rate of 3% was assumed to determine the proposed future water and sewer service charges required to meet projected O&M costs and complete the projects listed in the CIP.

The following is a summary of the estimated CIP costs (2003 dollars). Please refer to Tables 1 through 4 in the appendix for a complete breakdown of the annual cost distribution for each system.

Water improvements	= \$ 10,800,000
Sewer improvements	= \$ 8,200,000
<u>Other improvements</u>	<u>= \$ 1,400,000</u>
Total	= \$ 20,400,000

Water System Improvements

1. Well No. 1—Seal approximately the bottom 126 feet of the well casing to eliminate fluoride-contaminated water from entering the well. This can be accomplished by pumping concrete to the required depth or packing it with gravel and capping it with concrete to contain the gravel. The well is equipped with a 125 Hp, 1,160-RPM electric motor and a 425 Hp diesel engine. The well can pump to the steel tank reservoir on West Line Street via the existing distribution system. The engine drive provides an alternate source of power in the event of a power failure.
2. Well No. ³5—The construction of a new well is proposed at the City owned site located east of Sunland Drive and south of West Line Street. The well would discharge into a 500,000 gallon storage tank at the well site. Normally, water from the tank would be boosted into the distribution system against the pressure from the existing West Line Street reservoir. In the event that the West Line Street reservoir is out of service, the booster pumps could pump directly into the distribution system thereby providing a backup water source for the City. Wellhead chlorination equipment would be included in the design.
3. Alarm and Communication System—Improvements are needed to ensure adequate communication between the City's wells and reservoirs for operational and alarm purposes. The communication system would notify the City and/or Police Department to indicate any malfunction of the equipment or instrumentation.
4. Security Improvements—It is proposed to install security improvements to protect the water facilities. The City and Police Department will be notified upon any unauthorized entry to the site. The improvements would include alarms, motion detectors, and possibly video surveillance. The improvements would also incorporate the sewer treatment facility.
5. Additional Storage at the West Line Street Reservoir Site—Two additional 1 MG tanks at the existing tank site along State Hwy 168 (West Line Street).
6. Pipelines—Installation/replacement of distribution pipelines including construction of a 20-inch diameter main from the West Line Street reservoir site to the City, looping of dead end lines, and replacement of old, small diameter pipelines with (minimum) 8-inch diameter pipe. Line replacements would be made for approximately 1,000-ft of 2-inch, 25,000-ft of 4-inch, and 5,000-ft of 6-inch pipes.

7. Maintain full pipe from Well 4 to West Line Street Reservoirs—Well 4 is at a higher elevation than the West Line Street tank. The Department of Health Services has asked the City to keep the pipe full at all times. Installing an upstream pressure sustaining valve at the West Line Street site and a standpipe at Well 4 could do this. Well 4 would discharge into the standpipe located at the well. The pressure-sustaining valve would maintain pressure at the tank site at a HGL greater than the elevation of Well 4.
8. Master Water Plan—Preparation of a Master Water Plan is needed to better define the types and costs of water system improvements needed. The last plan was prepared in 1990.
9. Water System Computer Model—Preparation of a computer model is proposed to analyze the existing distribution system and plan for future needs. The computer model will simulate the existing system and assist in planning water system improvements.

Sewer System Improvements

1. Diversion Structure—The City has unused wastewater treatment plant capacity. Eastern Sierra Community Services District's (ESCSD) plant is adjacent to the City's plant but has limited capacity. However, ESCSD has unused sewer capacity that could be used to collect wastewater flows from presently unsewered areas of the City. The proposed diversion structure would regulate the wastewater flows to the two plants so that ESCSD's plant is not overloaded. ESCSD's unused sewer capacity could then be used to carry wastewater flows from City territory to the plants for treatment in accordance with an existing agreement.
2. Alarm and Communication System—Improvements are needed to ensure adequate communication with City's wastewater treatment plant. The communication system would notify the City and/or Police Department to indicate any malfunction at the wastewater treatment plant.
3. Johnston Drive Lift Station—It is proposed to upgrade lift station including lowering the existing wet well and replacing the airlift system with a more efficient pumping system.
4. Reduce Infiltration/Inflow—Reducing infiltration/inflow into the sewers will reduce the hydraulic load on the wastewater treatment plant. An accurate quantity of pipe to be repaired cannot be determined until the pipe has been hydrocleaned and televised.
5. Treatment Plant Improvements—Proposed improvements include repair, replacement, and/or installation of;
 - a) automated sludge transfer system,
 - b) backup generator,
 - c) grit removal system
 - d) mechanical screen,
 - e) aerators, and
 - f) clarifiers.

6. Treated Wastewater Disposal Improvements—A tree farm could be instituted to make beneficial use of the treated wastewater.
7. Master Sewer Plan—Preparation of Master Water Plan to identify sewerage system improvements is included.

Other

1. Maintenance/Storage facility—The maintenance/storage building would be approximately 2,000-square feet and be used to supplement the existing maintenance/storage area.
2. Digital Aerial Survey of City—A survey is proposed to allow preparation of implement the future application of a Geographical Information System for the City.
3. Equipment Replacement—Equipment proposed for replacement includes
 - a) 1979 flat bed truck,
 - b) 1988 flat bed truck,
 - c) 1989 dump truck,
 - d) 1991 front-end loader,
 - e) 1994 1-ton pick-up, and
 - f) 1998 backhoe/loader.
4. Replace equipment not listed and/or replaced earlier in 20-year plan.

FUNDING OPTIONS TO MEET CIP AND O&M COSTS

Various options were proposed to assist in the funding of the CIP and O&M costs. After preliminary review, it was decided the primary options were the Pay-As-You-Go (cash) and Borrowing options. Federal and State grants and loans were reviewed and found to be too unreliable due to competitive requirements.

A borrow option was assumed at 5% interest and a 20-year repayment schedule. It was found that numerous loans would be required to meet the inflated costs of the CIP and would require a total of 40-years of repayment to repay the initial 20-year CIP. Approximately half of the revenue generated over the 40-year duration would be acquired for interest. The pay-as-you-go option was less costly because interest was not applicable and the 20-year CIP could be funded within the 20-year duration.

In direct comparison of the two options, the pay-as-you-go option requires an initial higher service charge, however, it demands lesser cumulative revenues over the 40-year borrow duration. The 40-year borrow option requires a lower service charge, however, it demands a greater cumulative revenue over the 20-year pay-as-you-go option. Upon review, the CAC proposed the pay-as-you-go payment option in order to save interest costs. Please refer to Figures 5 and 6 in the appendix.

PROPOSED WATER AND SEWER SERVICE CHARGE

The required revenues for the CIP and O&M were to be equally distributed among the City's residents; therefore, an equivalency equation for the type of connection was used. The same equivalency equation approved and implemented by the City and State in 1987 for single family residential equivalent (SFRE) was used for the proposed service charge increases. There were a total of 1,162 connections equaling 2,327 SFREs. The service charge per SFRE was determined by dividing the total required revenue by the total SFRE count.

The following table and Figure 7 in the appendix summarize the proposed water and sewer service charges including O&M and CIP costs for the pay-as-you-go option per SFRE. The costs have been adjusted for an annual inflation rate of 3%.

Proposed Water/Sewer Service Charges Needed to Meet O&M and CIP Costs

Year	Water Service Charge	Sewer Service Charge	Total Combined Service Charge
2004	30	15	45
2005	35	20	55
2006	40	25	65
2007	51	29	80
2008	51	32	83
2009	52	34	86
2010	52	36	88
2011	52	38	90
2012	52	40	92
2013	52	41	93
2014	52	42	94
2015	53	42	95
2016	53	43	96
2017	53	44	97
2018	53	45	98
2019	53	46	99
2020	53	47	100
2021	53	48	101
2022	53	49	102
2023	53	50	103

COMPARISON OF SERVICE CHARGES WITH NEARBY SERVICE PROVIDERS

A review of service charges in nearby districts indicates that the City has been charging considerably lower than surrounding areas. This is not meant to be a reason for increasing the water and sewer charges in Bishop. The comparison is only made to indicate that the present rates are lower than might be expected.

The following table and Figure 8 in the appendix compare the City of Bishop's service charges with the districts for which service charge data was available. It should be noted that June Lake charges are based on the average water consumption by Bishop residents calculated using the June Lake schedules.

Comparison of Water and Sewer Service Charges

Provider	Combined Water and Sewer Service Charge
June Lake	\$44.86
Sierra Highlands	\$41.58
Indian Creek	\$37.00
Meadow Creek	\$37.00
Lazy "A"	\$47.44
Bishop (current)	\$18.66
Bishop (proposed 2004)	\$45.00

RECOMMENDATIONS

The current billing structure for the water and sewer systems requires the water and sewer enterprise funds to supplement the increasing O&M costs. If service charges are not increased to offset the O&M costs, the enterprise reserve funds will eventually be depleted. The existing systems are getting older and will be subject to increased maintenance and failures. It is recommended that the City of Bishop increase their water and sewer service charges to subsidize the O&M increase and capital improvements. It is recommended that the Pay-As-You-Go payment option be implemented to reduce accumulated interest costs through borrowing. A monthly payment schedule should be initiated to assist in the financial difficulties that may arise with the increase. The CIP and payment structure should be implemented immediately to avoid further withdrawal of the reserves. The CIP should be constructed as scheduled to reduce construction cost increases due to inflation. The City should review the capital improvements and revenues annually to determine the need for adjustment.

Appendix

List of Tables

Table 1: Capital Improvements Program Summary

Table 2: Water System Improvements

Table 3: Sewer System Improvements

Table 4: Other Improvements

List of Graphs and Descriptions

Figure 1 shows historical and projected water O&M costs and the anticipated effects on the water reserve fund if water rates are not increased. The costs of the proposed capital improvements are not included. O&M costs consist of labor, power, etc., and loan payments. The projections were determined by obtaining a trend from the historical data provided by the City. .

Figure 2 is like **Figure 1** except it is for the sewerage system.

Figure 3 is like **Figure 1** and **Figure 2** except that **Figure 3** is for the water and sewer systems combined.

Figure 4 shows the combined water and sewer charge (per SFRE) necessary to meet the projected combined water and sewer O&M costs without further drawing down the water and sewer reserve funds. Capital improvement program costs are not included.

Figure 5 compares the combined water and sewer service charges for "Pay As You Go" and Borrow options. The "Pay As you Go" option shows the 20-year service charge schedule initiated at year 2004 and terminating at year 2023. At the end of the 20-year period, the charges could decrease to values shown on Graph 4 for year 2023. The Borrow option shows six (6) 20-year loans (approx. \$4-\$6 million) each taken out at various years and its effect on the service charge schedule. The total amount borrowed exceeds the \$20 million CIP because of inflation and incidentals acquired during the loan process. Due to the loan periods, the last loan is acquired in year 2022 and its final payment will be in year 2041.

Figure 6 shows the cumulative service charges for the "Pay As You Go" and Borrow options. The "Pay As You Go" option generates a cumulative revenue of \$76.3 million. The Borrow option generates a cumulative revenue of \$96.6 million. The difference of \$20.3 million is in interest.

Figure 7 shows the proposed combined water and sewer service charge for the first five years to ensure a positive reserve in both enterprise funds. The charge includes CIP and O&M costs. It is noted that the City Council may adopt rates and increases for 3 to 5 years after a review of the CIP and revenues.

Figure 8 shows the proposed combined service charge in comparison to nearby areas.

Table 1

**CITY OF BISHOP, CALIFORNIA
20 YEAR CAPITAL IMPROVEMENTS PROGRAM
SUMMARY**

	Anticipated Year Expense Occurs										Total Cost (\$)
	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022	
WATER	500,000	1,900,000	600,000	1,200,000	500,000	800,000	1,800,000	800,000	800,000	1,900,000	10,800,000
SEWER	900,000	600,000	500,000	1,100,000	500,000	1,200,000	500,000	1,300,000	500,000	1,100,000	8,200,000
OTHER	150,000	250,000	150,000	200,000	100,000	150,000	100,000	150,000	50,000	100,000	1,400,000
TOTALS	1,550,000	2,750,000	1,250,000	2,500,000	1,100,000	2,150,000	2,400,000	2,250,000	1,350,000	3,100,000	20,400,000

Table 2

CITY OF BISHOP, CALIFORNIA
20 YEAR CAPITAL IMPROVEMENTS PROGRAM
WATER SYSTEM IMPROVEMENTS

	Quantity	Units	Unit Price(\$)	Total Cost(\$)	Anticipated Year Expense Occurs							Total Cost(\$)							
					2004	2006	2008	2010	2012	2014	2016		2018	2020	2022				
1 Well No. 1--Seal Fluoride Zone/Install VSD	1		LS	100,000	100,000														100,000
2 Well No. 5																			
Construct and Equip Well	1		LS	600,000															600,000
500,000 Gallon Tank	1		LS	500,000															500,000
Booster Pump Station	1		LS	150,000															150,000
3 Alarm and Communication System	1		LS	100,000															100,000
4 Security Improvements	1		LS	100,000															100,000
5 2-1 MG Tanks at West Line Street Site	2	each	750,000	1,500,000				750,000											1,500,000
6 Pipelines																			
20" Line from West Line Street Tanks	16,000	foot	80	1,280,000															1,280,000
Interconnect Deadend Pipelines	5,000	foot	50	250,000					250,000										250,000
Replace Small Diameter Lines with 8"	31,000	foot	60	1,860,000															1,860,000
7 Full Pipe from Well No.4 to Reservoir	1		LS	100,000															100,000
8 Master Water Plan	1		LS	50,000															50,000
9 Computer Model	1		LS	50,000															50,000
10 Replacement of Existing Equipment	1		LS	1,000,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000
SUBTOTALS--CONSTRUCTION																			
ENGINEERING/CONTINGENCIES																			
SUBTOTALS																			
SUGGESTED PRELIMINARY BUDGET																			
				405,000	1,863,000	540,000	1,147,500	472,500	762,750	1,775,250	762,750	762,750	1,822,500	10,314,000					
				500,000	1,900,000	600,000	1,200,000	500,000	800,000	1,800,000	800,000	800,000	1,900,000	10,800,000					

Table 3

CITY OF BISHOP, CALIFORNIA
 20 YEAR CAPITAL IMPROVEMENTS PROGRAM
 SEWERAGE SYSTEM IMPROVEMENTS

	Quantity	Units	Unit Price (\$)	Total Cost (\$)	Anticipated Year Expense Occurs										Total Cost (\$)		
					2004	2006	2008	2010	2012	2014	2016	2018	2020	2022			
1 Diversion Structure	1	LS	100,000	100,000	100,000												100,000
2 Alarm and Communication System	1	LS	100,000	100,000	100,000												100,000
3 Johnston Drive Lift Station	1	LS	200,000	200,000	200,000												200,000
4 Reduce Infiltration/Inflow																	
4" Sewer	800	feet	20	16,000	16,000												16,000
6" Sewer	40,400	feet	25	1,010,000	200,000	200,000	200,000	210,000									1,010,000
8" Sewer	7,200	feet	30	216,000				216,000									216,000
10" Sewer	11,400	feet	35	399,000					200,000								399,000
12" Sewer	4,800	feet	40	192,000						199,000							192,000
15" Sewer	2,300	feet	45	103,500						100,000							103,500
27" Sewer	2,100	feet	90	189,000						100,000							189,000
	69,000	feet		2,125,500	216,000	200,000	200,000	210,000	216,000	200,000	299,000	192,000					2,125,500
5 Treatment Plant Improvements	1	LS	2,000,000	2,000,000			500,000			500,000							2,000,000
6 Treated Wastewater Disposal Improvements	1	LS	100,000	100,000		25,000		25,000									100,000
7 Master Sewer Plan	1	LS	50,000	50,000	50,000												50,000
8 Replacement of Existing Equipment	1	LS	1,000,000	1,000,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000
SUBTOTALS--CONSTRUCTION					666,000	400,000	325,000	800,000	335,000	816,000	325,000	899,000	317,000	792,500	5,675,500		
ENGINEERING/CONTINGENCIES					233,100	140,000	113,750	280,000	117,250	285,600	113,750	314,650	110,950	277,375	1,986,425		
SUBTOTALS					899,100	540,000	438,750	1,080,000	452,250	1,101,600	438,750	1,213,650	427,950	1,069,875	7,661,925		
SUGGESTED PRELIMINARY BUDGET					900,000	600,000	500,000	1,100,000	500,000	1,200,000	500,000	1,300,000	500,000	1,100,000	8,200,000		

Figure 1

Water O&M and Reserves Without Service Charge Increase or Capital Improvements

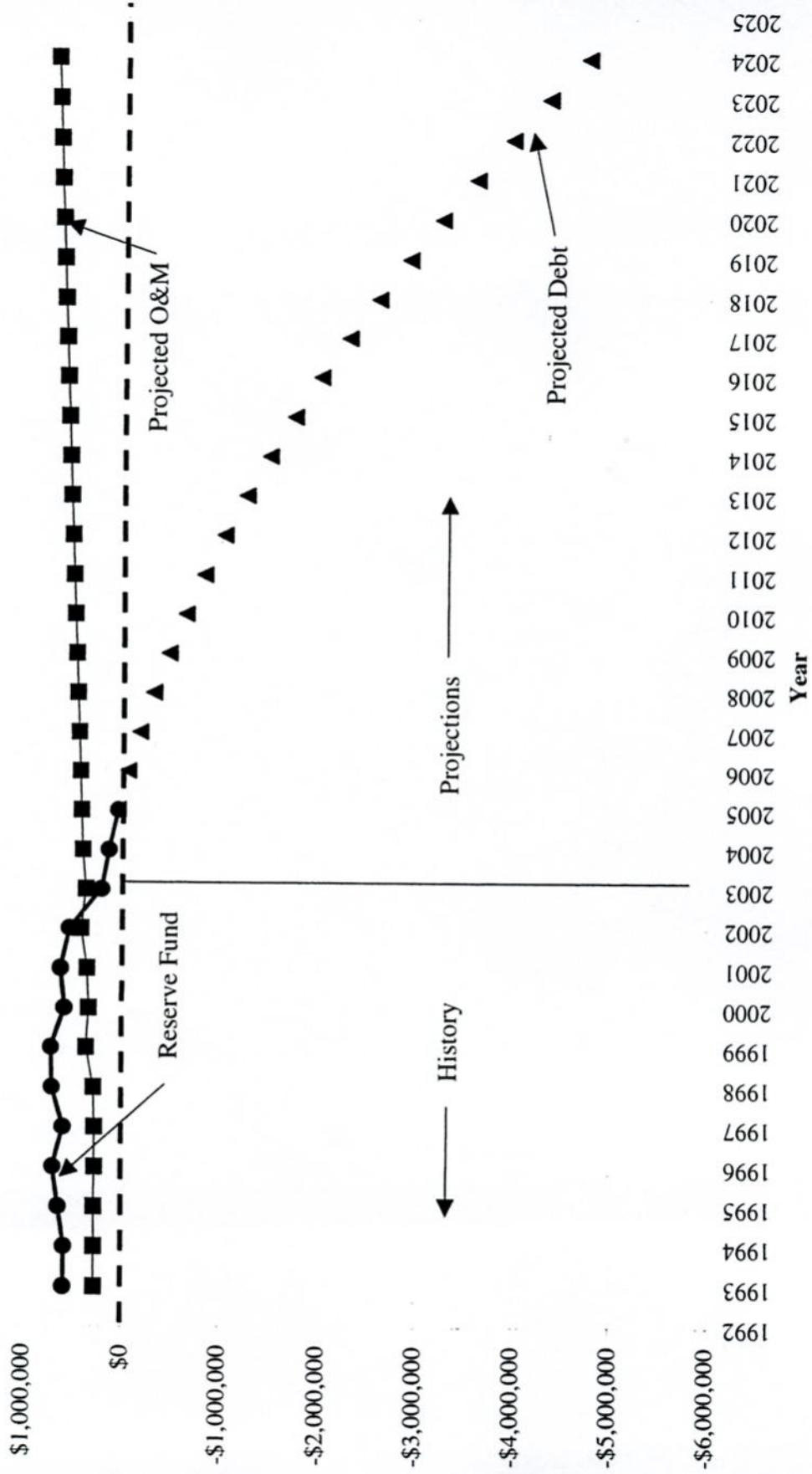


Figure 2

Sewer O&M and Reserves Without Service Charge Increase or Capital Improvements

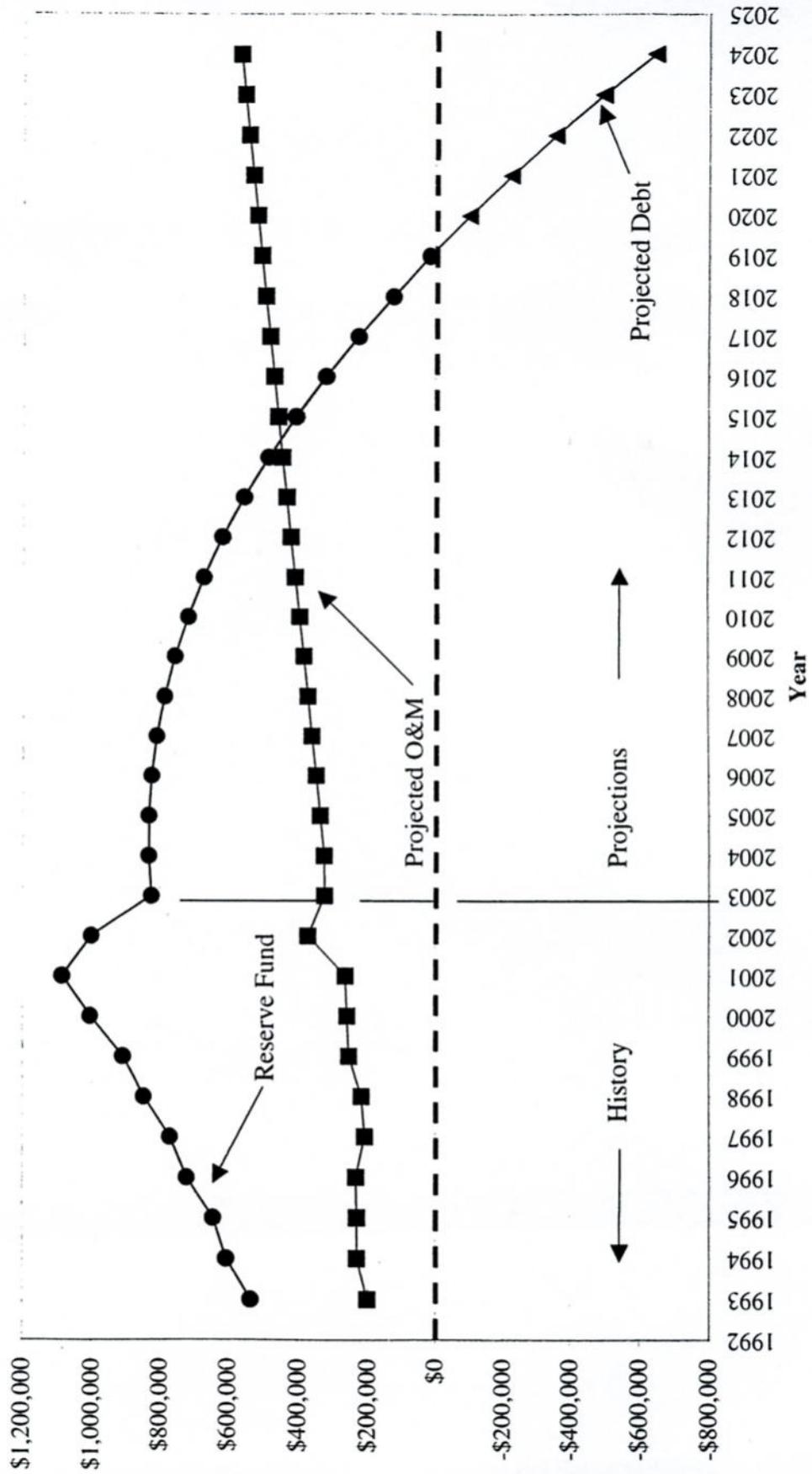
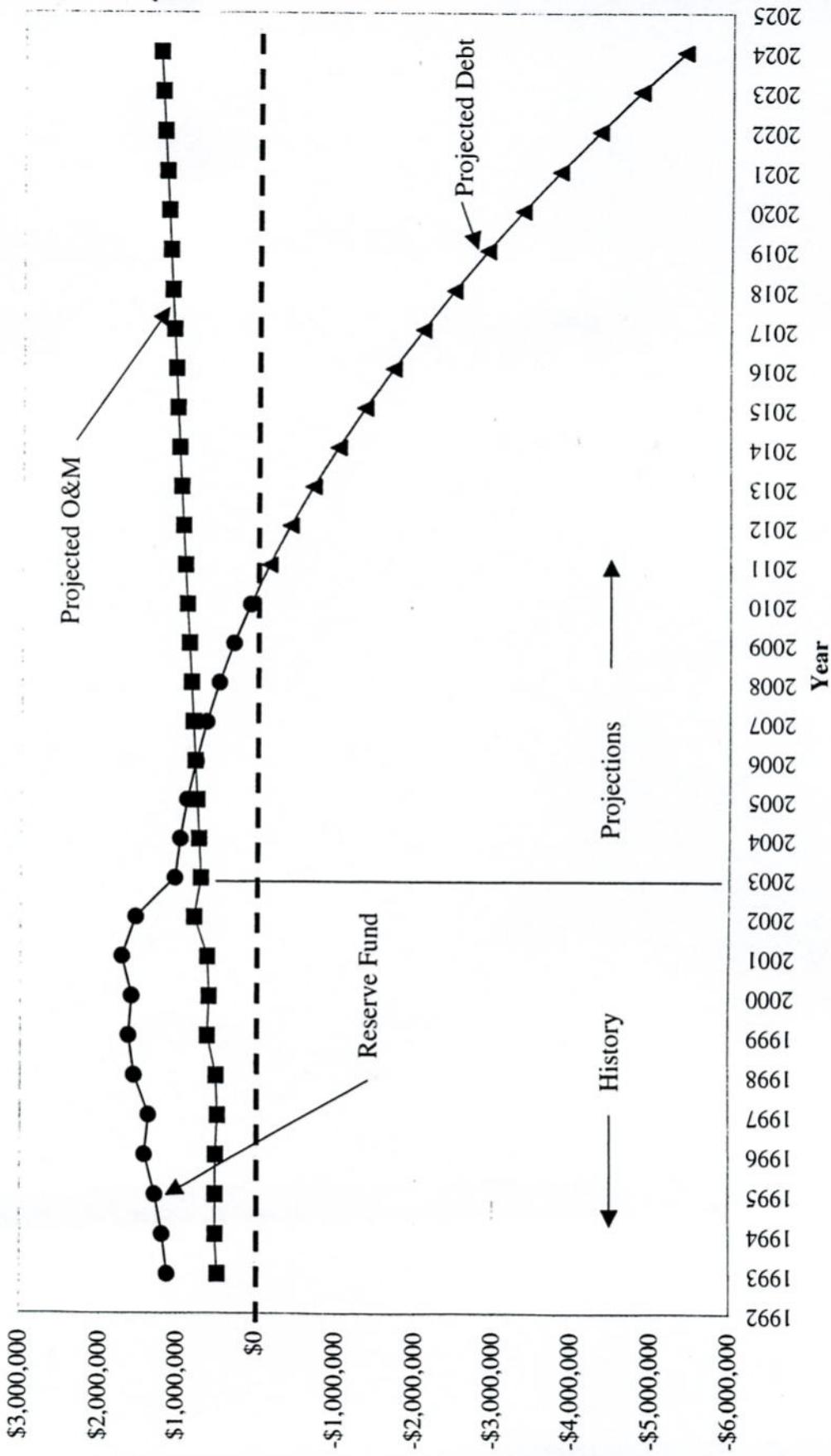


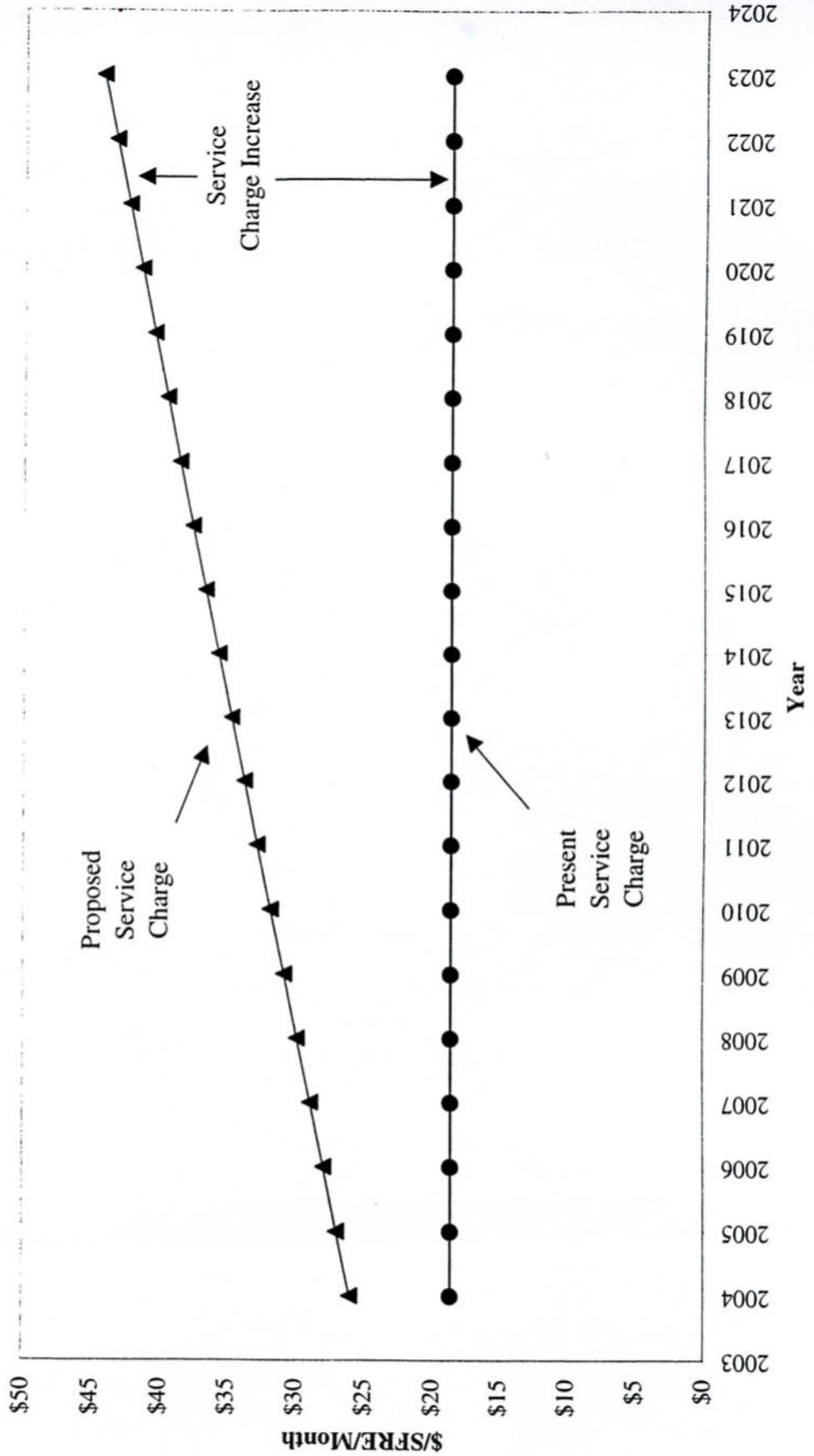
Figure 3

Combined Water and Sewer O&M and Reserves Without Service Charge Increase or Capital Improvements



Combined Monthly Water and Sewer Service Charge to Only Meet Projected O&M Costs

Figure 4



Service Charge Comparison: "Pay As You Go" versus Borrowing

Figure 5

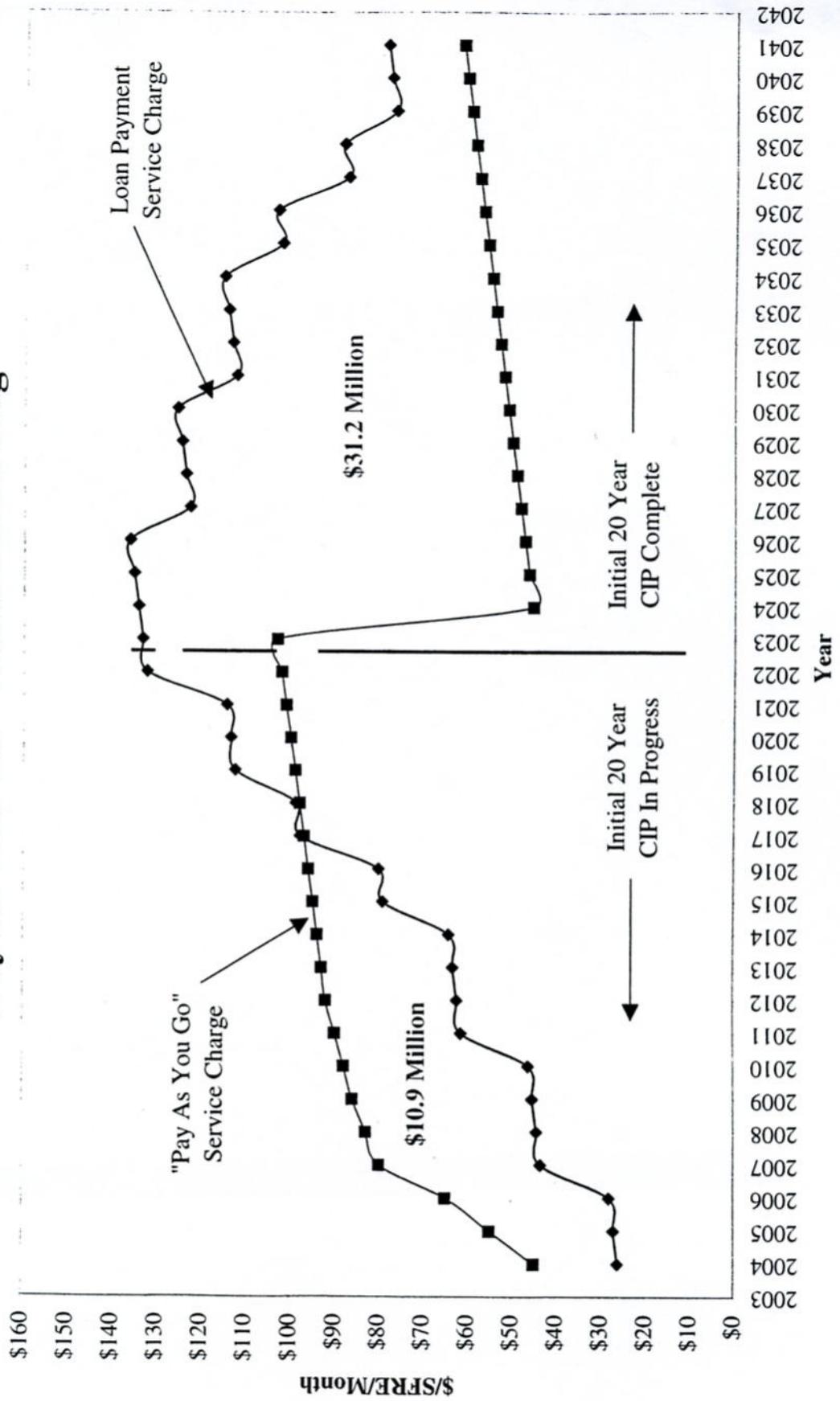


Figure 6

Cumulative Comparison of "Pay As You Go" and Borrowing Service Charges

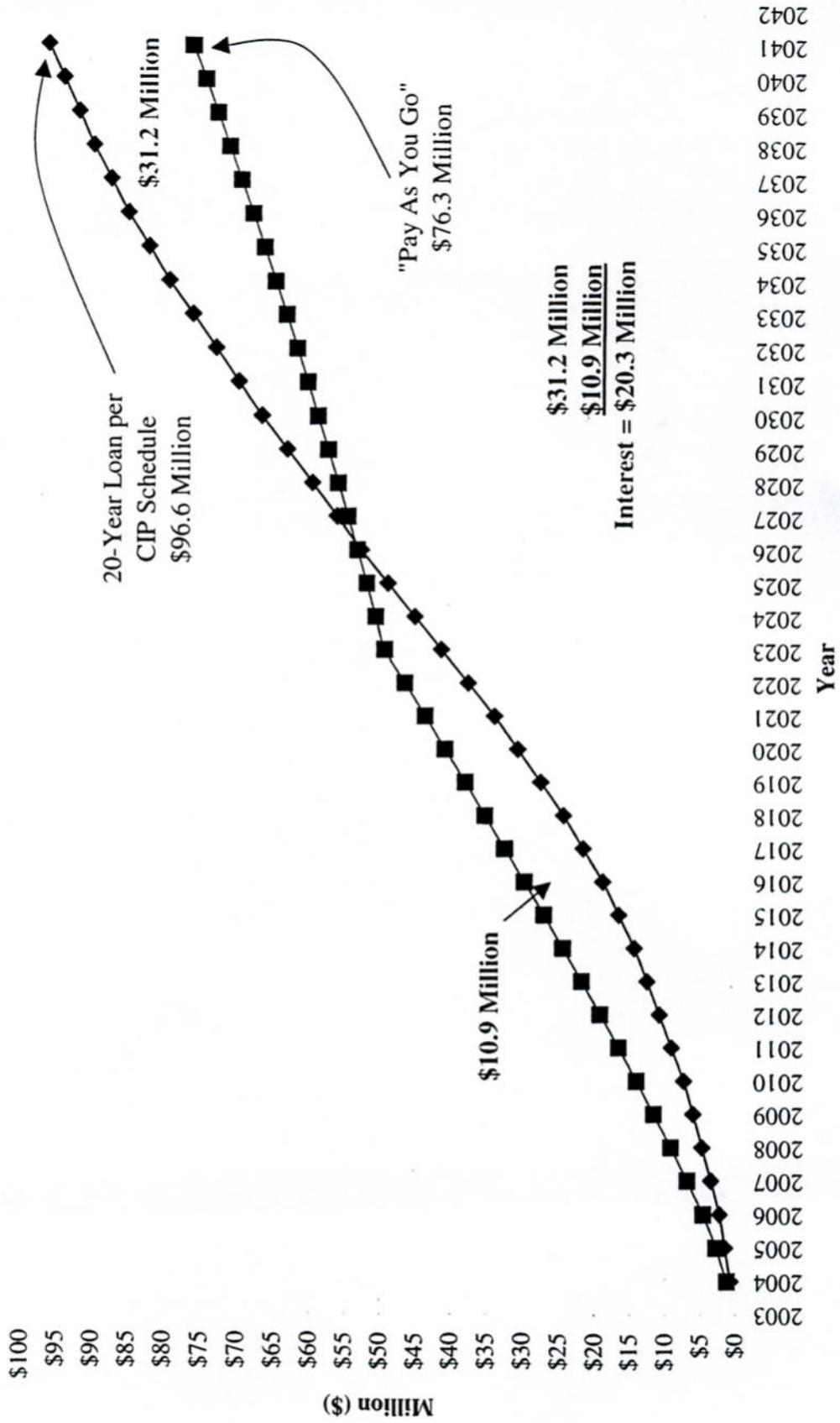


Figure 7

Proposed Combined Water and Sewer Service Charges for "Pay As You Go" Option for First 5 Years of 20 Year Projection

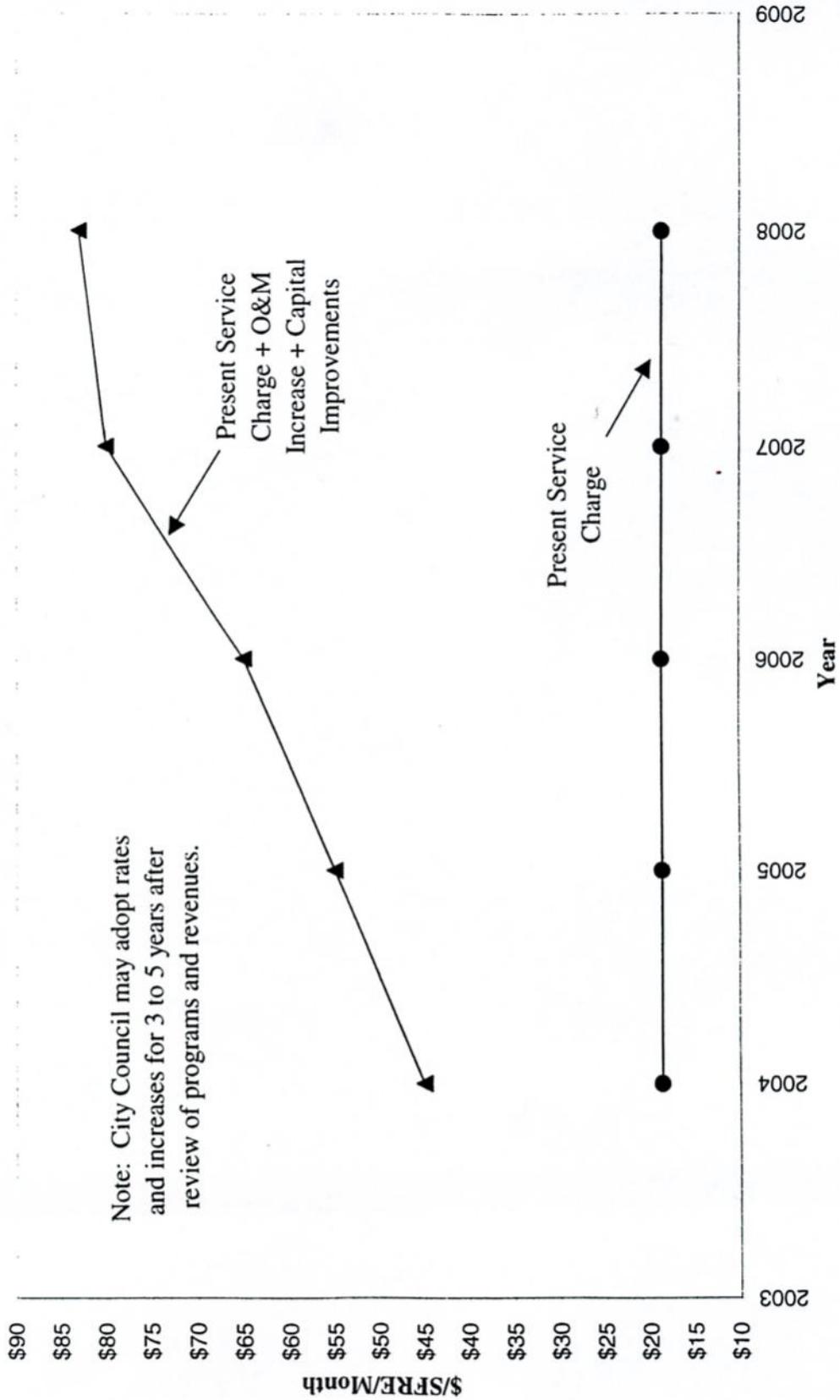


Figure 8

Combined Water and Sewer Service Charges for Nearby Areas

