City Of Charleston, West Virginia Firemen's Pension and Relief Fund

Actuarial Valuation Report for the Year Beginning July 1, 2017

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August 31, 2018

Honorable Victor Grigoraci
City Treasurer
501 Virginia Street, East
Charleston, WV 25301

Deputy Chief Robert "Scott" S. Fisher
Pension Board Secretary
City of Charleston Firemen's Pension and Relief Fund

Subject: City of Charleston Firemen's Pension and Relief Fund
Actuarial Valuation Report for the Year Beginning July 1, 2017

Dear Honorable Grigoraci and Deputy Chief Fisher:

Upon the request of the Municipal Pensions Oversight Board, we have performed an actuarial valuation as of July 1, 2017, for the City of Charleston, West Virginia Firemen's Pension and Relief Fund ("Fund" or "Plan"). This actuarial valuation has been performed in accordance with the West Virginia Code Chapter 8, Article 22, Sections 16 through 28, inclusive.

In accordance with West Virginia Code §8-22-20, this actuarial valuation report provides information on:

- The sponsor's funding requirements for the plan year ending June 30, 2019;
- The Fund's eligibility to receive an allocation of the premium tax for the plan year ending June 30, 2019; and
- The Fund's eligibility to provide supplemental benefits for the plan year beginning July 1, 2019.

West Virginia Code §8-22-20(c)(4) requires a review of the actuarial assumptions and methods at least once every five years and that the Actuary shall provide a report to the oversight board with recommendations on any changes to the actuarial process. Consequently, an experience review was performed for the period July 1, 2009, through June 30, 2014. The actuarial assumptions and methods were recommended by the actuary, in the report *2016 Experience Review for the Years July 1, 2009, to July 1, 2014*, approved by the Municipal Pensions Oversight Board, and became effective for the actuarial valuation as of July 1, 2015.

This report is based on the sponsor's election to finance benefit obligations using the Conservation funding policy as defined in West Virginia Code §8-22-20 (f)(1).

This actuarial valuation is based upon:

Plan Member Data – Data for active members and persons receiving benefits from the Fund as of June 30, 2017, was provided by the Fund's staff. We have tested this data for reasonableness.

Asset Values – A reconciliation of market value of assets during the plan years ending June 30, 2017, and June 30, 2018, and assets held as of June 30, 2017, and as of June 30, 2018, by investment category, were provided by the Fund.

Plan Provisions – A summary of the key plan provisions valued are set forth in Section VI of the report: Summary of Principal Plan Provisions.

Actuarial Methods – Fund liabilities were measured using the Entry-Age Normal Actuarial Cost Method. The actuarial valuation was based on the market value of assets. The actuarial methods used in the actuarial valuation are set forth in Section V of the report: Actuarial Assumptions and Methods.

Actuarial Assumptions – The actuarial assumptions used include a discount rate of 4.50%. The actuarial assumptions used in the actuarial valuation are set forth in Section V of the report: Actuarial Assumptions and Methods.

The actuarial valuation results disclosed in this report are based on the data and actuarial assumptions and methods described above, and upon the provisions of the Plan as of the actuarial valuation date. Based on these items, we certify these results to be true and correct.

To the best of our knowledge, this actuarial statement is complete and accurate, and has been prepared in accordance with generally accepted actuarial principles and practices.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

This report should not be relied on for any purpose other than the purpose stated.

The signing actuaries are independent of the plan sponsor.

Alex Rivera and Lance J. Weiss are members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Sincerely,

Alex Rivera

Alex Rivera, FSA, EA, MAAA, FCA
Senior Consultant

Lance J. Weiss

Lance J. Weiss, EA, MAAA, FCA
Senior Consultant

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SECTION I

ACTUARIAL VALUATION RESULTS AS OF JULY 1, 2017

Executive Summary

Upon the request of the Municipal Pensions Oversight Board, we have performed an actuarial valuation as of July 1, 2017, for the City of Charleston, West Virginia Firemen's Pension and Relief Fund ("Fund" or "Plan").

In accordance with West Virginia Code §8-22-20, this actuarial valuation report provides information on:

- The sponsor's funding requirements for the plan year ending June 30, 2019
- The Fund's eligibility to receive an allocation of the premium tax for the plan year ending June 30, 2019
- The Fund's eligibility to provide supplemental benefits for the plan year beginning July 1, 2019

This report is based on the sponsor's election to finance benefit obligations using the Conservation funding policy as defined in West Virginia Code §8-22-20 (f)(1).

The key features of the Conservation funding policy, effective for plan years beginning after April 1, 2011, are summarized below:

- The current local Plan is closed to new employees

- New employees are covered in the multiple employer statewide plan – *Municipal Police Officers and Firefighters Retirement System* ("MPFRS")

- Benefits and expenses in the closed local Plan are financed by contributions made to two asset accounts:

    - The first asset account (Benefit Payment Account) is used to finance benefits and expenses for the fiscal year on a pay-as-you-go basis. Sources to pay current year benefits and expenses include minimum employee contributions of 6.5% of pay, a portion of the premium tax allocation not assigned to the accumulation account as defined below, and employer contributions.

    - The second account (Accumulation Account) cannot be used to pay benefits and expenses until assets exceed actuarial accrued liabilities. Contributions to the accumulation account include employee contributions of 1.5% of pay and a percentage of the premium tax allocation. The percentage of the premium tax allocation is based on the amounts needed to produce 100% funding of liabilities in 35 years from the year the plan was closed when considering assets from both the Benefit Payment Account and the Accumulation Account. This account also includes the Fund's assets prior to the adoption of the Conservation funding policy.

We understand employer contributions will be made from the City's General Fund and will be used directly to pay benefits not covered by member contributions or the premium tax allocation. We also understand that the Plan's assets will accumulate in the closed Pension and Relief Fund and no benefits or expenses will be paid from this trust until the funded ratio exceeds 100%.

The following table provides the Plan's funded status as of July 1, 2017:

Assets	$17,716,222
Actuarial Liabilities	$184,198,524
Unfunded Liabilities	$166,482,302
Funded Ratio	9.62%

The following table provides the actual employer contributions, employee contributions and premium tax allocation for the plan year ended June 30, 2018. The premium tax allocation was based on the results of the July 1, 2016, actuarial valuation.

Plan year ending 2018	Benefit Payment Account	Accumulation Account	Total
Employee Contributions	$427,268	$98,602	$525,870
Premium Tax Allocations	$840,154	$894,985	$1,735,139
Employer Contributions	$6,107,953	$0	$6,107,953
Total	$7,375,375	$993,587	$8,368,962

The following table provides the estimated employer contributions, employee contributions and premium tax allocation for the plan year ending June 30, 2019. We have assumed that approximately 49.37% of the premium tax allocation of $1,781,609 is deposited into the Accumulation Account and the remainder will be used for Benefit Payments. The basis of the premium tax allocation between the Benefit Payment Account and the Accumulation Account is developed from the projection on page II-2 of the report.

Plan year ending 2019	Benefit Payment Account	Accumulation Account	Total
Employee Contributions	$426,947	$98,526	$525,473
Premium Tax Allocations	$901,973	$879,636	$1,781,609
Employer Contributions	$6,439,033	$0	$6,439,033
Total	$7,767,953	$978,162	$8,746,115

Commentary of Premium Tax Allocation

Under §8-22-19 of the West Virginia Code, the plan sponsor is required to deposit the statutory contribution on a monthly basis at a rate of one-twelfth of the annual requirement, in order to receive the premium tax allocation from Municipal Pensions Security Fund. However, revenues which are specifically collected for the Fund must be deposited within five days of receipt.

Based upon discussions with the Municipal Pensions Oversight Board ("MPOB"), we understand the annual premium tax allocation is determined by September 1st each year. Municipalities can begin invoicing the MPOB for their share of the premium tax allocation after receiving their state-provided actuarial study and after the municipality has made employer contributions to the Benefit Payment Account (for plans not using the Conservation funding policy, the employer contributions must have been paid into the Pension and Relief Fund). Each municipal treasurer shall use the invoice template provided by the MPOB to begin drawing down the state allocation for the municipal pension plan. This July 1, 2017 Actuarial Report from GRS is to be used by municipal pension plans to draw down the September 1, 2018 State Premium Tax Allocation which is allocated in Fiscal Year 2019. *The actuarial valuation and projection results assume the sponsor will make the statutory contributions on a monthly basis in accordance with statutes, and will be eligible to receive the premium tax allocation.*

Commentary on Solvency Projections and Supplemental Benefits

Under § 8-22-26a of the West Virginia Code, all retirees, surviving spouses and disabled pensioners are eligible for Supplemental Benefits that include automatic cost-of-living benefits commencing on the first day of July following two years of retirement. The benefit equals the percentage increase in the Consumer Price Index, limited to 4.0 percent (2.0 percent for certain disabled pensioners), multiplied by the sum of the allowable amount (first $15,000 of initial benefits paid) and the accumulated supplemental pensions paid in prior years.

The Court of Appeals decision requires that Supplemental Benefits be provided on "the allowable amount of the first $15,000 of the total annual pension paid in addition to the accumulated supplemental pension from the previous years." The decision implies that compound cost-of-living increases should be applied to both the allowable amount of $15,000 and the accumulated supplemental pension amounts for prior years. Additional Supplemental Benefits are payable only if the Plan satisfies the minimum standard for actuarial soundness as defined in West Virginia Code § 8-22-20. This minimum standard requires that the fund remain "solvent" over the next 15-year projection period. Based on discussions with the West Virginia Municipal Pensions Oversight Board, and our understanding of the administrative practices of other local police and fire pension funds in West Virginia, the "solvency" requirement generally means that the fund's market value of assets is projected to be greater than zero for all plan years prior to the end of the 15-year projection period. The projection is based on the most recent actuarial valuation and assumes the plan sponsor will make contributions according to the funding policy elected by the sponsor as defined by the West Virginia Code. *Although the 15-year solvency test may satisfy the minimum standard for actuarial soundness under the statutes, it is not necessarily consistent with generally accepted actuarial principles.*

The City of Charleston has elected to fund benefits using the Conservation funding policy as defined in the West Virginia Code Section 8-22-20(f)(1). Under this funding methodology, the fund's market value of assets is projected to be greater than zero for all plan years prior to the end of the 15-year projection period. Accordingly, this contribution methodology satisfies the minimum standard for actuarial soundness.

The Supplemental benefits for plan year beginning July 1, 2019 will be based on the Consumer Price Index for calendar year 2018, and the projected results of the July 1, 2017 actuarial valuation.

Additional Remarks on the Actuarial Valuation Results

Following are additional remarks on the actuarial valuation results as of July 1, 2017:

- The actuarial assumptions and methods were recommended by the actuary, in the report *2016 Experience Review for the Years July 1, 2009, to July 1, 2014*, and approved by the Municipal Pensions Oversight Board and became effective beginning with the actuarial valuation as of July 1, 2015. The key assumptions are fully disclosed in Section V of the report.

- The interest rate used to discount liabilities remained the same for the July 1, 2016 and July 1, 2017 actuarial valuations.
    - The interest rate assumption was developed by reviewing the Plan's current funded ratio, the 15-year projected funded ratio, the ratio of assets to benefits, the percentage of assets allocated to equities and the funding policy selected. The details of the methodology used to select the discount rate are presented in Section V of the report. As of July 1, 2017, the Plan's funded ratio of 11% (using a testing interest rate of 5.50% for all plans using the Conservation funding policy), ratio of assets to benefits of 2.34, equity allocation of 61%, and 15-year projected funded ratio of 36%, resulted in a discount rate assumption of 4.50%.

- The sponsor changed from the Alternative funding policy to the Conservation funding policy effective for the plan year beginning on July 1, 2011.

- The Fund experienced an approximate annualized return of 10.44% on the market value of assets during the plan year ended June 30, 2017, which compares to the expected annualized return of 4.50%. The difference in actual versus expected return produced an asset (gain)/loss of ($972,123).

- An actuarial valuation is based on the expectation of certain events such as salary increases, retirement, disability, mortality, termination and cost of living increases. Demographic or liability experience (gains)/losses are generated when the actual occurrence of such events differs from the expectation. During the plan year ending June 30, 2017, the fund experienced a net liability (gain)/loss of ($1,321,685) due to these events.

Conservation Funding

Following are additional remarks on the actuarial valuation projections under the current funding policy:

Based on the closed group projections shown in Table 1, page II-1 and assuming that the sponsor makes the statutory required contributions, if all actuarial assumptions are realized in the future, including an investment return of 4.50%:

- The funded ratio is projected to increase slowly from 10% at June 30, 2017, to 25% at June 30, 2030, 57% at June 30, 2040, and 100% at June 30, 2046.
- Employer contributions are expected to increase from $6,107,953 for the fiscal year end June 30, 2018, to $11,274,116 for fiscal year end June 30, 2037, and then decrease to $9,921,450 for fiscal year end June 30, 2046.

Please note that a funded ratio of only 10% at June 30, 2017, means that the Plan is severely underfunded. Although the Plan is projected to be 100% funded by 2046, the funded ratio is projected to grow at a very slow rate. This policy is not consistent with generally accepted actuarial principles because benefit payments are effectively financed on a pay-as-you-go basis until 2046 through the Benefit Payment Account.

This actuarial valuation assumes that the City will be able to make future contributions on a timely basis. The ability of the Plan to become fully funded is heavily dependent on the City contributing the minimum employer contribution calculated under the Conservation funding policy for each and every future year. We did not perform an analysis of the ability of the City to make future contributions. Such an analysis is not within the scope of our assignment or within our analytical skill set. Failure to receive City contributions on a timely basis could jeopardize the sustainability of the Plan.

Please understand that the minimum employer contribution calculated under the Conservation funding policy as defined in West Virginia Code 8-22-20 (f)(1) is just that – the minimum that needs to be contributed each and every year. Because this Plan is severely underfunded, we continue to recommend that the plan sponsor seriously consider making additional contributions (in excess of the minimum requirement) to ensure that there are sufficient assets available in the fund in all years to pay the promised benefits.

If the minimum employer contributions (calculated under the Conservation funding policy) are not made or the investment return is less than the assumption of 4.50%, the funded ratio will be lower and the cash flow strain could be higher. If a significant market downtown occurs or a significant number of members retire or become disabled, the sponsor's contributions are projected to increase.

Under the Conservation funding policy, the following experience could cause City contributions to change during the year:

- If the actual return on assets is *less* than the assumed return of 4.50%, then contributions will generally *increase*. Conversely, if the actual return is *greater* than the assumed return, contributions will generally *decrease*.

- If salaries *increase* by more than assumed, contributions could *increase*. If salaries *decrease* by more than assumed, contributions could *decrease.*
- If active members retire *sooner* than expected, contributions will generally *increase.* If active members retire *later* than expected, contributions will generally *decrease*.
- If active members become disabled during the year, contributions could increase.
- If retired members die *later* than expected, contributions will increase. If retired members die *sooner* than expected, contributions will decrease.
- If the general inflation is *greater* than assumed, supplemental benefits will be greater than assumed and contributions will *increase*. Conversely, if general inflation is *lower* than assumed, contributions will *decrease*.

At least once every five years, GRS performs an experience review analysis and updates the actuarial valuation assumptions. For example, if salary increases were consistently lower than assumed during the experience period, then the salary increase rate would likely be lowered. Or if more members retired than assumed, then the retirement rates would likely be increased. Any change in actuarial assumption will also impact the City's funded ratio. The objective of a change in assumptions is to reduce the level of experience gains and losses in future actuarial valuations.

However, under the Conservation funding policy, sponsor contributions depend on benefits being paid to retirees, disabled members and surviving beneficiaries and not necessarily the economic or demographic experience. The updates to the actuarial assumptions will have a greater impact on the actuarial accrued liability and funded ratio.

Schedule A: Summary of Key Valuation Results

Valuation Date		**July 1, 2016**		**July 1, 2017**
Valuation Interest Rate		4.50%		4.50%
Cost-of-Living Adjustment		2.75%		2.75%
Wage Inflation		3.75%		3.75%
Expected Payroll		$7,038,745		$6,725,992
Average Pay		$56,310		$57,000
Expected Benefit Payments		$7,400,742		$7,558,288
1. Actuarial Accrued Liability	No.		No.	
(a) Actives	125	$58,123,908	118	$58,491,075
(b) Retirees	146	$91,766,657	146	$91,479,619
(c) Survivors	51	$9,987,629	47	$9,764,180
(d) Disabled Members	40	$20,282,243	42	$23,072,881
(e) Deferred Vested Members	1	$757,793	2	$1,390,769
(f) Total	363	$180,918,230	355	$184,198,524
2. Present Value of Future Normal Costs		$31,809,948		$28,669,842
3. Present Value of Benefits (1(f) + 2)		$212,728,178		$212,868,366
4. Market Value of Assets		$14,985,518		$17,716,222
5. Unfunded Actuarial Accrued Liability (1(f) - 4)		$165,932,712		$166,482,302
6. Funded Ratio (4 / 1(f))		8.28%		9.62%
7. Net Employer Normal Cost				
(a) Normal Cost		$3,763,586		$3,634,525
(b) Administrative Expenses		$10,009		$7,774
(c) Gross Normal Cost (a + b)		$3,773,595		$3,642,299
(d) Employee Contribution Rate		8.00%		8.00%
(e) Expected Employee Contributions		$563,100		$538,079
(f) Net Employer Normal Cost (c - e)		$3,210,495		$3,104,220
(% of Compensation)		45.61%		46.15%
		FYE 2018		**FYE 2019**
8. Minimum Employer Contribution [a]		$6,107,953		$6,439,033
(% of Projected Compensation)		87%		96%
9. State Insurance Premium Tax Allocation		$1,735,139		$1,781,609
(% of Projected Compensation)		25%		26%

[a] Estimated Employer contribution for fiscal year end June 30, 2019.

Schedule B: (Gain)/Loss Analysis

Experience (Gain)/Loss for Plan Year Ended June 30, 2017

1.	(a) Actuarial Accrued Liability as of 7/1/2016	$180,918,230
	(b) Normal Cost due 7/1/2016	$3,763,586
	(c) Interest on (a) and (b) to 6/30/2017	$8,226,001
	(d) Benefit Payments with interest to 6/30/2017	$7,387,608
	(e) Effect of Assumption Changes	$0
	(f) Expected Liability at 7/1/2017 [(a) + (b) + (c) - (d) + (e)]	$185,520,209
	(g) Actual Liability at 7/1/2017	$184,198,524
	(h) Liability (Gain)/Loss [(g) - (f)]	**($1,321,685)**
2.	(a) Market Value of Assets as of 7/1/2016	$14,985,518
	(b) Interest on (a) to 6/30/2017	$700,743
	(c) Contributions with interest to 6/30/2017	$8,445,446
	(d) Benefit Payments with interest to 6/30/2017	$7,387,608
	(e) Expected Assets at 6/30/2017 [(a) + (b) + (c) - (d)]	$16,744,099
	(f) Actual Assets at 7/1/2017	$17,716,222
	(g) Asset (Gain)/Loss [(e) - (f)]	**($972,123)**
3.	Total (Gain)/Loss [1(h) + 2(g)]	**($2,293,808)**

SECTION II

ACTUARIAL PROJECTIONS

Actuarial Projections
Table 1

Valuation Plan	Number			Total Assets										
Year End 30-Jun	Active	Pay Status	Total Payroll	Assets (boy)	Benefit Payments	Expenses	Employer Contributions	Employee Contributions	Premium Tax Allocation Contributions	Investment Income	Assets (eoy)	Actuarial Accrued Liability	Unfunded Liability	Funded Ratio
2017	118	237	$7,038,745	$14,985,517	$7,238,403	$7,566	$5,974,752	$574,505	$1,710,329	$1,717,088	17,716,222	$184,198,524	$166,482,302	10%
2018	110	241	6,725,992	17,716,222	7,425,842	6,890	6,107,953	525,870	1,735,139	1,409,915	20,062,367	188,477,364	168,414,997	11%
2019	102	245	6,568,407	20,062,367	7,760,958	6,995	6,439,033	525,473	1,781,609	924,573	21,965,102	192,645,848	170,680,746	11%
2020	93	250	6,315,139	21,965,102	8,129,040	7,104	6,784,013	505,211	1,859,974	1,010,972	23,989,128	196,482,469	172,493,341	12%
2021	83	256	5,943,570	23,989,128	8,533,993	7,212	7,183,635	475,486	1,918,423	1,102,572	26,128,039	199,868,151	173,740,112	13%
2022	74	261	5,555,372	26,128,039	8,923,383	7,322	7,567,345	444,430	1,979,700	1,199,366	28,388,175	202,783,061	174,394,886	14%
2023	65	265	5,162,250	28,388,175	9,335,919	7,433	7,974,838	412,980	2,040,354	1,301,608	30,774,603	205,179,925	174,405,322	15%
2024	57	269	4,766,982	30,774,603	9,729,185	7,544	8,361,467	381,359	2,104,430	1,409,569	33,294,699	207,053,360	173,758,661	16%
2025	51	271	4,446,974	33,294,699	10,045,474	7,656	8,666,575	355,758	2,167,824	1,523,563	35,955,289	208,500,641	172,545,352	17%
2026	44	274	4,072,267	35,955,289	10,394,717	7,767	9,010,345	325,781	2,226,963	1,643,814	38,759,708	209,444,674	170,684,966	19%
2027	37	277	3,621,371	38,759,708	10,788,284	7,880	9,398,620	289,710	2,295,528	1,770,616	41,718,018	209,778,701	168,060,683	20%
2028	33	277	3,264,675	41,718,018	11,083,512	7,993	9,682,531	261,174	2,363,901	1,904,372	44,838,491	209,624,850	164,786,359	21%
2029	27	278	2,936,354	44,838,491	11,336,302	8,107	9,923,526	234,908	2,429,578	2,045,405	48,127,499	209,017,046	160,889,547	23%
2030	22	279	2,557,577	48,127,499	11,619,477	8,220	10,197,184	204,606	2,497,232	2,194,028	51,592,852	207,878,391	156,285,539	25%
2031	18	280	2,165,635	51,592,852	11,906,029	8,333	10,473,806	173,251	2,567,391	2,350,608	55,243,546	206,178,338	150,934,792	27%
2032	14	279	1,806,306	55,243,546	12,154,195	8,442	10,709,794	144,504	2,637,795	2,515,543	59,088,545	203,951,275	144,862,730	29%
2033	10	278	1,450,901	59,088,545	12,392,503	8,547	10,935,270	116,072	2,708,979	2,689,232	63,137,048	201,190,951	138,053,903	31%
2034	7	277	1,121,738	63,137,048	12,595,726	8,647	11,122,640	89,739	2,782,750	2,872,115	67,399,919	197,925,740	130,525,821	34%
2035	6	274	878,847	67,399,919	12,716,739	8,742	11,222,079	70,308	2,856,736	3,064,676	71,888,237	194,263,250	122,375,013	37%
2036	4	270	688,827	71,888,237	12,785,870	8,830	11,267,777	55,106	2,927,591	3,267,365	76,611,376	190,268,345	113,656,969	40%
2037	3	266	531,868	76,611,376	12,817,627	8,912	11,274,668	42,549	2,997,024	3,480,617	81,579,695	185,982,765	104,403,070	44%
2038	2	262	398,842	81,579,695	12,817,583	8,987	11,247,116	31,907	3,068,586	3,704,933	86,805,667	181,438,792	94,633,125	48%
2039	1	257	295,076	86,805,667	12,779,142	9,053	11,178,299	23,606	3,142,038	3,940,874	92,302,289	176,678,624	84,376,335	52%
2040	1	252	208,796	92,302,289	12,714,495	9,112	11,081,146	16,704	3,217,437	4,189,022	98,082,991	171,728,944	73,645,953	57%
2041	1	247	135,617	98,082,991	12,626,411	9,161	10,957,845	10,849	3,296,493	4,449,997	104,162,603	166,612,239	62,449,636	63%
2042	0	241	90,386	104,162,603	12,501,366	9,201	10,794,316	7,231	3,378,393	4,724,465	110,556,441	161,371,746	50,815,305	69%
2043	0	235	57,663	110,556,441	12,354,635	9,232	10,607,454	4,613	3,461,924	5,013,094	117,279,659	156,030,081	38,750,422	75%
2044	0	229	35,103	117,279,659	12,188,211	9,253	10,397,908	2,808	3,550,039	5,316,600	124,349,550	150,607,612	26,258,062	83%
2045	0	223	22,287	124,349,550	12,002,758	9,263	10,167,991	1,783	3,639,529	5,635,724	131,782,556	145,124,925	13,342,369	91%
2046	0	217	13,805	131,782,556	11,802,431	9,262	9,921,450	1,104	3,731,871	5,971,221	139,596,509	139,596,509	0	100%
2047	0	211	8,022	139,596,509	11,588,605	9,251	12,017	642	0	6,024,044	134,035,356	134,035,356	0	100%
2048	0	204	4,099	134,035,356	11,361,979	9,227	10,615	328	0	5,778,798	128,453,891	128,453,890	0	100%
2049	0	198	2,049	128,453,891	11,122,662	9,191	9,862	164	0	5,532,938	122,865,002	122,865,002	0	100%
2050	0	191	830	122,865,002	10,871,576	9,143	9,417	66	0	5,287,014	117,280,780	117,280,780	0	100%
2051	0	184	-	117,280,780	10,609,227	9,081	9,082	0	0	5,041,554	111,713,108	111,713,108	0	100%
2052	0	178	-	111,713,108	10,335,623	9,005	9,006	0	0	4,797,097	106,174,583	106,174,583	0	100%
2053	0	171	-	106,174,583	10,051,722	8,914	8,915	0	0	4,554,181	100,677,043	100,677,043	0	100%

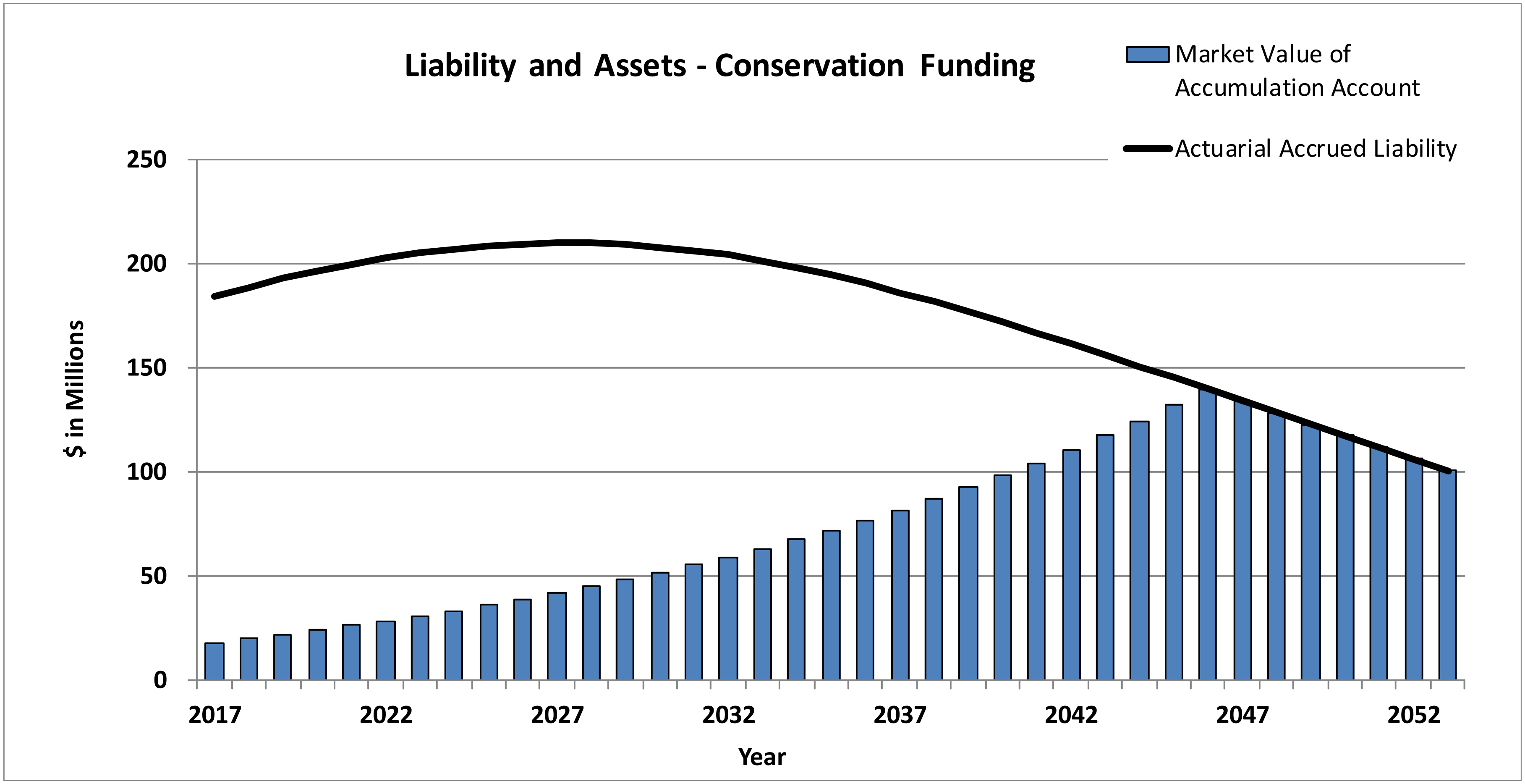
Actuarial Projections
Table 2

Plan Year End 30-Jun	Benefit Payment Account[a]: Assets (boy)	Net Benefit Pmts and Expenses	Employer Contributions	6.50% of Pay Employee Contributions	50.63% of Premium Tax Allocation	Investment Income	Transfer (To)/From Accumulation Account	Accumulation Account[b]: Assets (boy)	Net Benefit Pmts and Expenses	Employer Contributions	1.50% of Pay Employee Contributions	49.37% of Premium Tax Allocation	Investment Income
2019	($324,032)	$7,767,953	$6,439,033	$426,947	$901,973	($14,581)	$338,613	$20,386,399	$0	$0	$98,526	$879,636	$939,154
2020	0	8,136,144	6,784,013	410,484	941,647	0	0	21,965,102	0	0	94,727	918,327	1,010,972
2021	0	8,541,205	7,183,635	386,332	971,238	0	0	23,989,128	0	0	89,154	947,185	1,102,572
2022	0	8,930,705	7,567,345	361,099	1,002,261	0	0	26,128,039	0	0	83,331	977,439	1,199,366
2023	0	9,343,352	7,974,838	335,546	1,032,968	0	0	28,388,175	0	0	77,434	1,007,386	1,301,608
2024	0	9,736,729	8,361,467	309,854	1,065,408	0	0	30,774,603	0	0	71,505	1,039,022	1,409,569
2025	0	10,053,130	8,666,575	289,053	1,097,502	0	0	33,294,699	0	0	66,705	1,070,322	1,523,563
2026	0	10,402,484	9,010,345	264,697	1,127,442	0	0	35,955,289	0	0	61,084	1,099,521	1,643,814
2027	0	10,796,164	9,398,620	235,389	1,162,155	0	0	38,759,708	0	0	54,321	1,133,373	1,770,616
2028	0	11,091,505	9,682,531	212,204	1,196,770	0	0	41,718,018	0	0	48,970	1,167,131	1,904,372
2029	0	11,344,409	9,923,526	190,863	1,230,020	0	0	44,838,491	0	0	44,045	1,199,558	2,045,405
2030	0	11,627,697	10,197,184	166,242	1,264,271	0	0	48,127,499	0	0	38,364	1,232,961	2,194,028
2031	0	11,914,362	10,473,806	140,766	1,299,790	0	0	51,592,852	0	0	32,485	1,267,601	2,350,608
2032	0	12,162,637	10,709,794	117,409	1,335,434	0	0	55,243,546	0	0	27,095	1,302,361	2,515,543
2033	0	12,401,050	10,935,270	94,308	1,371,472	0	0	59,088,545	0	0	21,764	1,337,507	2,689,232
2034	0	12,604,373	11,122,640	72,913	1,408,820	0	0	63,137,048	0	0	16,826	1,373,930	2,872,115
2035	0	12,725,481	11,222,079	57,125	1,446,277	0	0	67,399,919	0	0	13,183	1,410,459	3,064,676
2036	0	12,794,700	11,267,777	44,774	1,482,149	0	0	71,888,237	0	0	10,332	1,445,442	3,267,365
2037	0	12,826,539	11,274,668	34,571	1,517,300	0	0	76,611,376	0	0	7,978	1,479,724	3,480,617
2038	0	12,826,570	11,247,116	25,924	1,553,530	0	0	81,579,695	0	0	5,983	1,515,056	3,704,933
2039	0	12,788,195	11,178,299	19,180	1,590,716	0	0	86,805,667	0	0	4,426	1,551,322	3,940,874
2040	0	12,723,607	11,081,146	13,572	1,628,889	0	0	92,302,289	0	0	3,132	1,588,548	4,189,022
2041	0	12,635,572	10,957,845	8,815	1,668,912	0	0	98,082,991	0	0	2,034	1,627,581	4,449,997
2042	0	12,510,567	10,794,316	5,875	1,710,376	0	0	104,162,603	0	0	1,356	1,668,017	4,724,465
2043	0	12,363,867	10,607,454	3,748	1,752,665	0	0	110,556,441	0	0	865	1,709,259	5,013,094
2044	0	12,197,464	10,397,908	2,281	1,797,275	0	0	117,279,659	0	0	527	1,752,764	5,316,600
2045	0	12,012,021	10,167,991	1,449	1,842,581	0	0	124,349,550	0	0	334	1,796,948	5,635,724
2046	0	11,811,693	9,921,450	897	1,889,331	0	15	131,782,556	0	0	207	1,842,540	5,971,221
2047	0	0	0	0	0	0	0	139,596,509	11,597,856	12,017	642	0	6,024,044
2048	0	0	0	0	0	0	0	134,035,356	11,371,206	10,615	328	0	5,778,798
2049	0	0	0	0	0	0	0	128,453,891	11,131,853	9,862	164	0	5,532,938
2050	0	0	0	0	0	0	0	122,865,002	10,880,719	9,417	66	0	5,287,014
2051	0	0	0	0	0	0	0	117,280,780	10,618,308	9,082	0	0	5,041,554
2052	0	0	0	0	0	0	0	111,713,108	10,344,628	9,006	0	0	4,797,097
2053	0	0	0	0	0	0	0	106,174,583	10,060,636	8,915	0	0	4,554,181

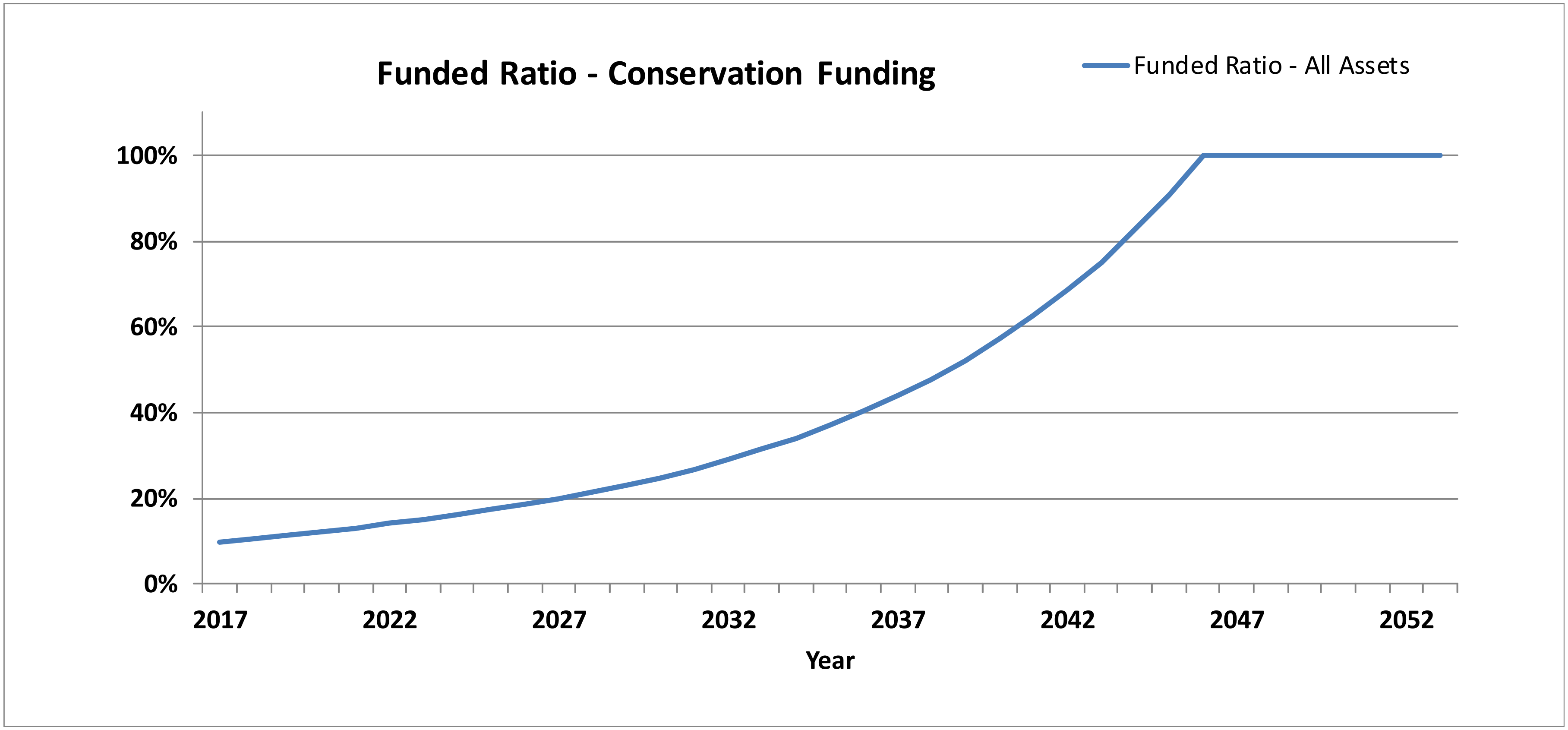
[a] *Employer contributions paid from the City's General Fund are used to finance benefits not covered by the applicable employee contributions or premium tax allocation.*

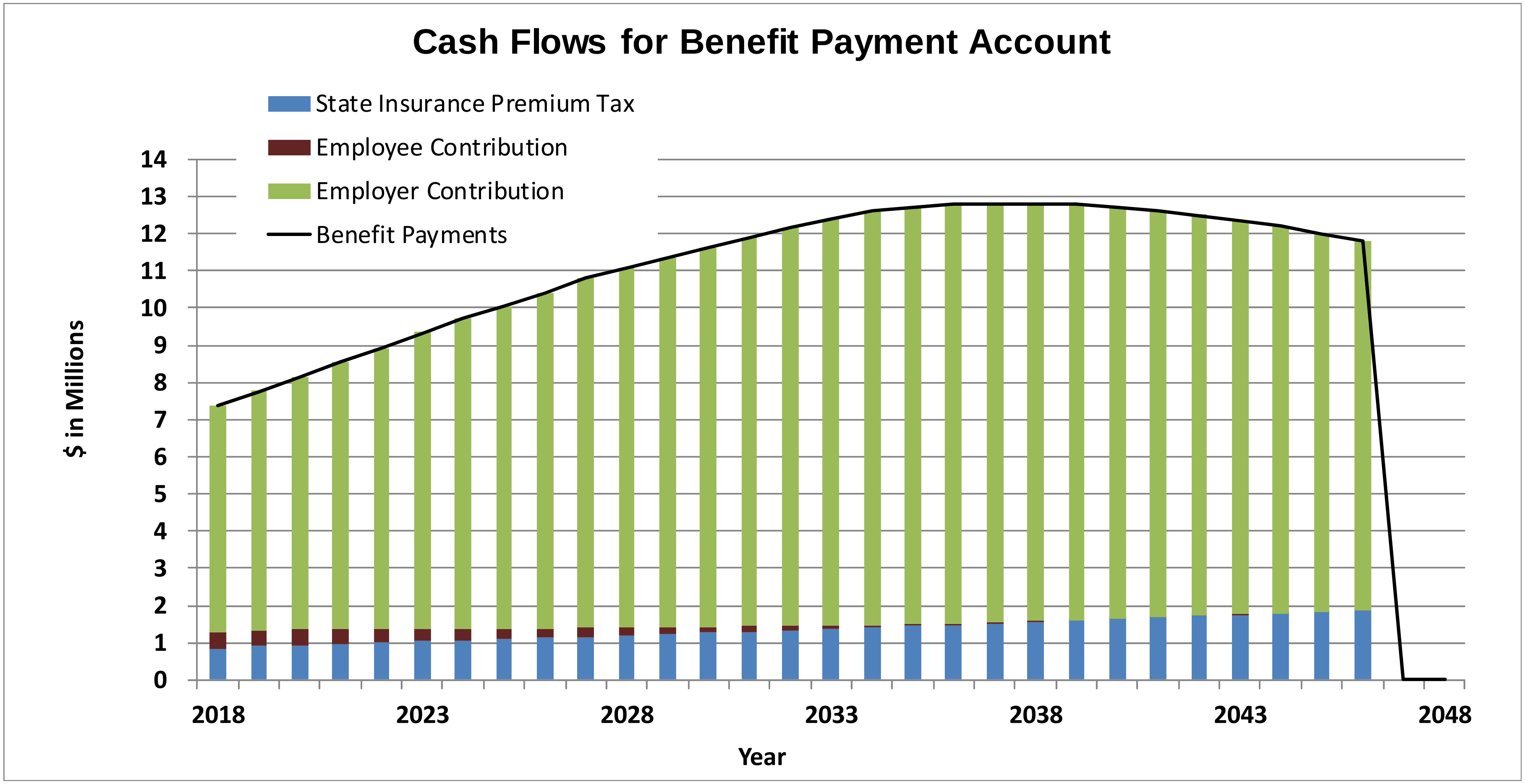
[b] *Assets accumulate in the Accumulation Account.*

Actuarial Projections
Graph 1

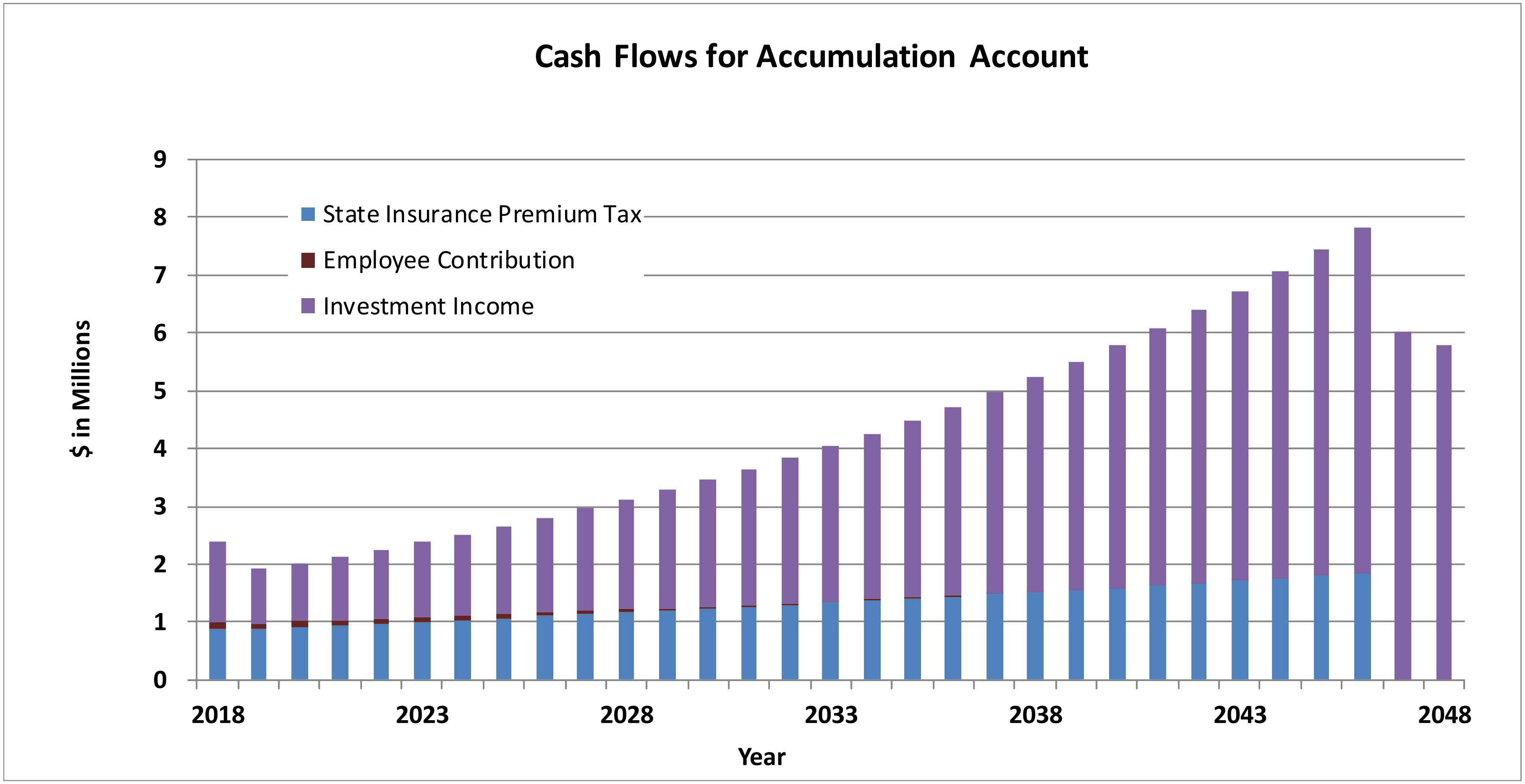


Actuarial Projections
Graph 2




Cash Flows for Benefit Payment Account
State Insurance Premium Tax
Employee Contribution
Employer Contribution
Benefit Payments
$ in Millions
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
2018
2023
2028
2033
2038
2043
2048
Year

Actuarial Projections
Graph 4



SECTION III

ACTUARIALLY DETERMINED CONTRIBUTION FOR GASB STATEMENT NOS. 67 AND 68 REPORTING

Actuarial Determined Contribution for GASB Statement for GASB Statement Nos. 67 and 68 Reporting
Schedule C: Funding Progress and Employer Contributions

	July 1, 2016	July 1, 2017
Valuation Date	**July 1, 2016**	**July 1, 2017**
Valuation Interest Rate	4.50%	4.50%
Cost-of-Living Adjustment	2.75%	2.75%
Wage Inflation	3.75%	3.75%
Actuarial Value of Assets	Market	Market
Actuarial Cost Method	Entry Age Normal	Entry Age Normal
Remaining Amortization Period [a]	24 Years, Level % of Pay	23 Years, Level % of Pay
Schedule of Funding Progress		
Actuarial Valuation Date	**July 1, 2016**	**July 1, 2017**
1. Market Value of Assets	$14,985,518	$17,716,222
2. Actuarial Accrued Liability	$180,918,230	$184,198,524
3. Unfunded Actuarial Accrued Liability (2 - 1)	$165,932,712	$166,482,302
4. Funded Ratio (1/2)	8%	10%
5. Expected Payroll	$7,038,745	$6,725,992
6. UAAL as Percentage of Covered Payroll (3/5)	2,357%	2,475%
Schedule of Employer Contributions [c]	**FYE 2017**	**FYE 2018**
1. Actuarially Determined Contribution		
(a) Employer Normal Cost	$3,210,495	$3,104,220
(b) Amortization of Unfunded Actuarial Accrued Liability	$7,501,622	$7,826,267
(c) Actuarially Determined Contribution (ADC) (a + b)	$10,712,117	$10,930,487
2. Employer Contribution [b]	$5,974,752	$6,107,953
3. Premium Tax Allocation	$1,710,329	$1,735,139
4. Percentage of ADC Contributed [(2 + 3)/1(c)]	72%	72%

[a] *Suggested amortization policy to comply with GASB Statement Nos. 67 and 68 Standards.*
[b] *Actual employer contribution for fiscal year end June 30, 2017 and June 30, 2018.*
[c] *The Conservation contribution plus premium tax allocation does not satisfy the Actuarially Determined Contribution as defined by GASB Statement Nos. 67 and 68.*

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SECTION IV

ACTUARIAL VALUATION DATA AS OF JULY 1, 2017

Actuarial Valuation Data as of July 1, 2017
Schedule D(1): Reconciliation of Assets for
Plan Year Ending June 30, 2016

Plan Year Ending	Benefit Account	Accumulation Account	Total June 30, 2016
A. Market Value of Assets End of Prior Year	($355,591)	$14,244,085	$13,888,494
Adjustment to Market Value of Assets at Beginning of Year	$14,972	($14,972)	$0
Market Value of Assets Beginning of Year	($340,619)	$14,229,113	$13,888,494
1. Revenue During Fiscal Year			
(a) Employee Contribution	$471,402	$108,786	$580,188
(b) Governmental Contribution			
(i) From Local Government	$5,300,144	$0	$5,300,144
(ii) From State Government	$1,264,882	$341,777	$1,606,659
(iii) Reallocation from State Government	$0	$0	$0
(iv) Total	$6,565,026	$341,777	$6,906,803
(c) Earnings on Investments			
(i) Net Appreciation/(Depreciation)	$0	$505,646	$505,646
(ii) Bond Interest	$53	$80,535	$80,588
(iii) Dividends	$0	$166,085	$166,085
(iv) Net Realized Gain (Loss) on Sale/Exchange	$0	$0	$0
(v) Other	$0	$0	$0
(vi) Less Investment Expense	$0	($66,234)	($66,234)
(vii) Total	$53	$686,032	$686,085
(d) Other Revenue	$0	$0	$0
(e) Net Receivable Investment Income	$0	$9,594	$9,594
(f) Receivable Contribution [a]		$0	$0
(i) From Employee Contributions	$0	$0	$0
(ii) From Local Government	$0	$0	$0
(iii) From State Government	$0	$0	$0
(iv) Total	$0	$0	$0
(g) Total Revenue (sum of (a) through (f))	$7,036,481	$1,146,189	$8,182,670
2. Expenditures During Fiscal Year			
(a) Benefits Paid	$7,018,296	$0	$7,018,296
(b) Withdrawals	$0	$57,609	$57,609
(c) Administrative Expenses	$9,741	$0	$9,741
(d) Payable Benefits and Withdrawals	$0	$0	$0
(e) Payable Administrative Expenses	$0	$0	$0
(f) Total Expenditures (sum of (a) through (e))	$7,028,037	$57,609	$7,085,646
B. Market Value of Assets End of Year [A + 1(g) - 2(f)]	($332,175)	$15,317,693	$14,985,518
C. Approximate Return on Assets			4.77%

Actuarial Valuation Data as of July 1, 2017
Schedule D(2): Reconciliation of Assets for Plan Year Ending June 30, 2017

Plan Year Ending	Benefit Account	Accumulation Account	Total June 30, 2017
A. Market Value of Assets Beginning of Year	($332,175)	$15,317,693	$14,985,518
Adjustment to Market Value of Assets at Beginning of Year	($1)	$0	($1)
Market Value of Assets Beginning of Year	($332,176)	$15,317,693	$14,985,517
1. Revenue During Fiscal Year			
(a) Employee Contribution	$466,784	$107,721	$574,505
(b) Governmental Contribution			
(i) From Local Government	$5,974,752	$0	$5,974,752
(ii) From State Government	$807,104	$903,225	$1,710,329
(iii) Reallocation from State Government	$0	$0	$0
(iv) Total	$6,781,856	$903,225	$7,685,081
(c) Earnings on Investments			
(i) Net Appreciation/(Depreciation)	$0	$1,473,160	$1,473,160
(ii) Bond Interest	$0	$75,426	$75,426
(iii) Dividends	$0	$225,577	$225,577
(iv) Net Realized Gain (Loss) on Sale/Exchange	$0	$0	$0
(v) Other	$23	$0	$23
(vi) Less Investment Expense	$0	($76,777)	($76,777)
(vii) Total	$23	$1,697,386	$1,697,409
(d) Other Revenue	$0	$0	$0
(e) Net Receivable Investment Income	$0	$19,716	$19,716
(f) Receivable Contribution [a]			
(i) From Employee Contributions	$0	$0	$0
(ii) From Local Government	$0	$0	$0
(iii) From State Government	$0	$0	$0
(iv) Total	$0	$0	$0
(g) Total Revenue (sum of (a) through (f))	$7,248,663	$2,728,048	$9,976,711
2. Expenditures During Fiscal Year			
(a) Benefits Paid	$6,613,394	$0	$6,613,394
(b) Withdrawals	$0	$17,922	$17,922
(c) Administrative Expenses	$7,566	$0	$7,566
(d) Payable Benefits and Withdrawals	$607,087	$0	$607,087
(e) Payable Administrative Expenses	$37	$0	$37
(f) Total Expenditures (sum of (a) through (e))	$7,228,084	$17,922	$7,246,006
B. Market Value of Assets End of Year [A + 1(g) - 2(f)]	($311,597)	$18,027,819	$17,716,222
C. Approximate Return on Assets			10.44%

Actuarial Valuation Data as of July 1, 2017
Schedule E: Assets Held by Category

Plan Year Ending	June 30, 2016		June 30, 2017	
1. Cash and Short-term Investments	$2,470,110	16%	$2,578,671	14%
2. Government Securities				
(a) US Treasury Bills, Notes and Bonds	$1,754,029		$2,862,582	
(b) US State and Local Governmental Debt Securities	$0		$0	
(c) Foreign Governmental Debt Securities	$0		$0	
(d) Other	$0		$0	
(e) Total Government Securities (sum of (a) through (d))	$1,754,029	12%	$2,862,582	16%
3. Corporate Fixed Income				
(a) US Bonds	$1,517,355		$2,081,390	
(b) US Mortgage or other Asset Backed Securities	$0		$0	
(c) US Mutual Fund Shares (Bonds)	$0		$0	
(d) US Exchange Traded Funds (Bonds)	$0		$0	
(e) International Bonds	$0		$0	
(f) International Mutual Fund Shares (Bonds)	$0		$0	
(g) International Exchange Traded Funds (Bonds)	$0		$0	
(h) Total Corporate Fixed Income (sum of (a) through (g))	$1,517,355	10%	$2,081,390	12%
4. Corporate Equity				
(a) US Equity	$2,805,856		$3,245,219	
(b) US Mutual Fund Shares (Equity)	$0		$0	
(c) US Exchange Traded Funds (Equity)	$7,024,715		$7,535,768	
(d) International Equity	$0		$0	
(e) International Mutual Fund Shares (Equity)	$0		$0	
(f) International Exchange Traded Funds (Equity)	$0		$0	
(g) Total Corporate Equity (sum of (a) through (f))	$9,830,571	66%	$10,780,987	61%
5. Alternative Investments				
(a) Real Estate Investment Trust	$0		$0	
(b) Private Equity Fund	$0		$0	
(c) Hedge Funds	$0		$0	
(d) Other Alternative Investments	$0		$0	
(e) Total Alternative Investments (sum of (a) through (d))	$0	0%	$0	0%
6. Other	$0	0%	$0	0%
7. Receivable Contributions	$0			
(a) From Employee Contributions	$0		$0	
(b) From Local Government	$0		$0	
(c) From State Government	$0		$0	
(d) Total Receivable Contributions (sum of (a) through (c))	$0	0%	$0	0%
8. Accruals				
(a) Receivable (other than State and Local Contributions)	$9,594		$19,716	
(b) Less Payable	($596,141)		($607,124)	
(c) Total	($586,547)	-4%	($587,408)	-3%
Market Value of Assets End of Year [sum of (1) through (8)]	**$14,985,518**		**$17,716,222**	

Actuarial Valuation Data as of July 1, 2017
Schedule F: Summary of Participant Activity

	Actives	Retirees	Disabled	Deferred Vested	Spouses and Beneficiaries	Totals
Total Participants July 1, 2016:	**125**	**146**	**40**	**1**	**51**	**363**
New Actives:						**0**
Returned to Actives Status:						**0**
Data Corrections/Other Changes:						**0**
Vested Terminations:	(1)			1		**0**
Non-Vested Terminations:						**0**
Disabled:	(4)		4			**0**
Retirements:	(2)	2				**0**
Deaths with Beneficiary:			(2)		2	**0**
Deaths w/o Beneficiary:		(2)			(6)	**(8)**
Expired Annuity or Stop Payment:						**0**
Net Changes:	(7)	0	2	1	(4)	**(8)**
Total Participants June 30, 2017:	**118**	**146**	**42**	**2**	**47**	**355**

Actuarial Valuation Data as of July 1, 2017
Schedule G: Distribution of Active Employees by Age and Length of Service

Attained Age	Less than 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 35	Totals	Valuation Payroll[a]
			Years of Service to Valuation Date								
Under 20											**$ 0**
20-24											**$ 0**
25-29			2							**2**	**$ 103,753**
30-34			6	6						**12**	**$ 572,735**
35-39			10	6	3					**19**	**$ 982,263**
40-44			2	8	10	6				**26**	**$ 1,497,923**
45-49			1	9	12	19	7			**48**	**$ 2,981,917**
50-54					4	5				**9**	**$ 534,754**
55-59						1	1			**2**	**$ 122,551**
60-64											**$ 0**
65-69											**$ 0**
Over 70											**$ 0**
Totals	**0**	**0**	**21**	**29**	**29**	**31**	**8**	**0**	**0**	**118**	**$ 6,795,895**

Averages

Age:	43.6	years
Service:	15.8	years
Annual Pay:	$57,592	[a]

[a] *Based on payroll at beginning of plan year.*

Actuarial Valuation Data as of July 1, 2017
Schedule H: Participants Summary

Active Participants	July 1, 2016	July 1, 2017
Number of Actives	125	118
Total Annual Pay	$7,038,415	$6,795,895
Average Age	42.7	43.6
Average Service	15.0	15.8

Inactive Participants	July 1, 2016		July 1, 2017[a]	
Type	No.	Annual Benefit	No.	Annual Benefit
Retirees	146	$5,428,663	146	$5,479,164
Survivors	51	$771,399	47	$755,066
Disabled Members	40	$1,022,378	42	$1,121,848
Deferred Vested Members	1	$40,190	2	$75,311

[a]Data provided includes 2 non-vested members with accumulated contributions balances of $47,540.

SECTION V

ACTUARIAL ASSUMPTIONS AND METHODS

Discount Rate

The following table outlines the factors used to determine the discount rate:

Funded Ratio as of Valuation Date [1]	Liquidity Ratio [2]	Equity Exposure [3]	Projected Funded Ratio after 15 Years [1]	Discount Rate
60% or more	10	50% or more	70% or more	6.5%
40% or more	8	40% or more	60% or more	6.0%
30% or more	6	30% or more	50% or more	5.5%
15% or more	4	n/a	40% or more	5.0%
Less than 15%	n/a	n/a	15% or more	4.5%
Less than 15%	n/a	n/a	Less than 15%	4.0%

[1]Funded ratios based on a 6.0% investment return assumption for plans using an actuarially sound policy (standard or optional) and a 5.5% investment return assumption for other plans (alternative or conservation).
[2]Liquidity ratio equals assets as of the actuarial valuation date divided by expected benefit payments for the year.
[3]Based on investment policy.

As of June 30, 2017	
Assets	$17,716,222
Liabilities using a 5.50% Discount Rate	$160,558,459
Funded Ratio	11%
Expected Benefit Payments	$7,558,288
Liquidity Ratio	2.34
Equity Exposure	61%
Projected Funded Ratio after 15 years	36%

Discount Rate	4.50%

The premium tax allocation is projected using the following methodology:

(1) The Base Allocation for all Pension and Relief Funds is a fixed amount equal to $8,709,689 in all future years. This amount is allocated to each individual Pension and Relief Fund in proportion to the number of eligible members, which includes active members covered in either the Pension and Relief Fund or the statewide plan, Municipal Police Officers and Firefighters Retirement System ("MPFRS").

(2) The Excess Allocation is equal to the excess of the current year premium tax assigned to all Pension and Relief Funds over the total Base Allocation. This amount is allocated to each individual Pension and Relief Fund in proportion to the number of eligible active and retired members covered in either the Pension and Relief Fund or the MPFRS.

(3) We have assumed all Pension and Relief Funds will make the minimum statutory contribution requirement and will receive 100% of both the Base Allocation and the Excess Allocation assigned to the individual plan. Consequently, the projections do not include any reallocation of Expired Premium Tax Allocation for plan years beginning on and after July 1, 2019.

(4) The total available premium tax allocation, net of expenses, as of September 1, 2018, includes a Base Allocation of $8,709,689, an Excess Allocation of $9,570,473, and an Expired Premium Tax Allocation of $237,031.

(5) For the plan year ending June 30, 2018, all Pension and Relief Funds reported a total of 1,717 eligible active members and 2,165 eligible retired members. The City of Charleston Firemen's Pension and Relief Fund reported 156 eligible active members and 237 eligible retired members, based on the average number of plan participants for the 12-month period ending June 30, 2018. The Fund is eligible to receive a premium tax allocation of $1,781,609 for the fiscal year ending June 30, 2019.

(6) The total premium tax allocation was assumed to increase by 2.75% in calendar years ending on and after 2019.

General Inflation	2.75%
Expected Salary Increase Service-based Increase:	General Inflation: 2.75% *plus* Wage Inflation Increment: 1.00% *plus* Years of <u>Service</u> — <u>Increase</u> 1 — 20.00% 2 — 6.50% 3 — 3.50% 4 — 2.75% 5-9 — 2.50% 10-29 — 2.00% 30-34 — 1.25% after 34 years of service — 0.00%
Post-retirement COLA	2.75% on first $15,000 of Annual Benefit and on the accumulated supplemental pension amounts for prior years. Assumed to be payable to all members receiving payments.
Increase in State Insurance Premium Tax Allocation	2.75% on and after year 1
Cost Method	Entry-Age-Normal, Level-Percentage-of-Pay
Amortization Policies:	
Alternative Plans and former Alternative Plans that selected the Conservation Policy	For GASB 67/68 Accounting: 30 – Year Closed Level-Percentage-of-Pay Amortization (from July 1, 2010 – 23 years remaining as of July 1, 2017).
Standard Plans and former Standard Plans that selected the Optional Policy	For funding and GASB 67/68 Accounting: 40-Year Closed Level-Dollar Amortization (from July 1, 1991 –14 years remaining as of July 1, 2017)
Former Alternative Plans that selected the Optional Policy	For funding: 40-Year Closed Level-Dollar Amortization (from January 1, 2010 – 32.5 years remaining as of July 1, 2017). For GASB 67/68 Accounting: 30-Year Closed Level-Percentage-of-Pay Amortization (from July 1, 2010 – 23 years remaining as of July 1, 2017)

<table>
<tr><td>Asset Method</td><td>Market Value</td></tr>
<tr><td>Turnover</td><td>Sample Rates –
<u>Age</u> <u>Rates</u>
25 9%
35 4%
45 2%
50 0%</td></tr>
<tr><td>Retirement</td><td><u>Age</u> <u>Rates[a]</u>
50 45%
51-55 30%
56-59 35%
60 100%
[a]Terminated vested participants are assumed to retire at age 50.</td></tr>
<tr><td>Mortality</td><td>Active:
RP-2014 Blue Collar Healthy Employee[b]

Post-Retirement:
RP-2014 Blue Collar Healthy Annuitant

Disabled:
RP-2014 Blue Collar Healthy Annuitant set forward four years

Tables above incorporate generational mortality improvement using MP-2014 2-dimensional mortality improvement scales
[b]Assumes 10% of deaths are duty-related and 90% are non-duty related.</td></tr>
<tr><td>Disability</td><td>Sample Rates –
<u>Age</u> <u>Rates[c]</u>
30 0.22%
40 0.50%
50 0.79%
[c] Assumes 60% duty related and 40% non-duty related. Also assumes 10% of non-duty disabled members receive a 20% reduction in benefits due to gainful employment.</td></tr>
<tr><td>Percent Married</td><td>90%</td></tr>
<tr><td>Spouse Age</td><td>Females 3 years younger than males</td></tr>
</table>

Actuarial Assumptions and Methods
Used in the Valuation as of July 1, 2017 (Continued)

Administrative Expenses	Plan year end June 30, 2018, expense based on plan year end June 30, 2017 expense increased by general inflation assumption. Future expenses assumed to increase by the general inflation assumption.
Refunds Paid	Assumes non-vested inactive members as of July 1, 2017, with accumulated member contribution balances will receive a refund of their contributions during plan year end June 30, 2018.
Data Adjustments and Assumptions	None
Child Beneficiaries	Future survivor widow benefits are loaded by 12% to estimate impact of benefits provided to survivor children. The load assumes 90% of members are married with two children at time of death, and benefits for each child are paid for approximately 8 years.
General Projection Methodology	Closed group projections assume: (i) Salaries will increase and members will decrement as specified in the actuarial assumption section. (ii) Assets grow at the assumed rate of return. (iii) The sponsor makes the statutory required contribution on a timely basis. (iv) Non-vested members with accumulated plan balances as of July 1, 2017, will receive a refund during plan year end June 30, 2018.
Decrement Timing	Mid-Year

SECTION VI

SUMMARY OF PRINCIPAL PLAN PROVISIONS

Summary of Principal Plan Provisions

Employee Eligibility — All compensated employees of the Fire Department hired before June 1, 2011 are eligible to participate in the Firemen's Pension and Relief Fund.

Average Annual Compensation — The average of any three twelve-consecutive-month periods of employment which produces the highest average annual compensation.

Each twelve-consecutive-month annual compensation is limited to 120% of the *Average Adjusted Salary* received by the member in the two consecutive twelve-consecutive-month periods immediately preceding the twelve-consecutive-month period used in determining benefits.

The *Average Adjusted Salary* is base salary (exclusive of all overtime and other pay) of the year used in determining benefits multiplied by the ratio of total salary (includes all overtime and other pay) to base salary from the respective preceding twelve-consecutive-month period.

Determining Years of Service Credit (Credited Service**)** — The number of years that the member has contributed to the employees retirement and benefit fund.

Prior Military Service — A city may provide that members who have been honorably discharged from the military shall receive up to two years prior service credit for military service prior to their employment with the city.

Current Military Service — Any current member who has been on qualified military service in the armed forces of the United States with an honorable discharge may, within six months from his or her date of discharge, be given credit for continuous service in the paid police or fire department.

Any member who has served in active duty with the armed forces of the United States, whether prior to or subsequent to becoming a member of a paid police or fire department, shall receive one additional percent for each year so served in active military duty, up to a maximum of four additional percent.

Absence from the service because of sickness or injury for a period of two years or less shall not be construed as time out of service.

Contributions — Participating employees contribute 8.0% of compensation. Participating employees hired on or after January 1, 2010, contribute 9.5% of pay. The municipality has elected to contribute the minimum employer contribution under the Conservation funding policy.

Normal Retirement — Members are eligible at the earlier of age 50 with 20 years of credited service or age 65.

Benefit Commencement — Annual retirement pension benefits commence upon retirement or upon the member attaining age fifty, whichever is later, payable in twelve monthly installments.

Accrued Benefit — The annual retirement benefit equals 60% of average annual compensation, not less than $6,000, plus an additional percentage of average annual compensation for service over 20 years equal to 2% for each year of service between 20 and 25 and 1% for each year of service between 25 and 30 years. Employees serving in the military are eligible for an additional 1% of average annual compensation for each year of military service up to four years. The maximum benefit is limited to 75% of average annual compensation. Benefits continue for life.

Disability Retirement — Members are eligible after earning five years of service. No service requirement if disability is service related.

The monthly disability benefit equals the greater of 60% of monthly salary at disability or $500. Employees serving in the military are eligible for an additional benefit of 1% of monthly salary at disability for each year of military service up to four years. Disability benefits, when aggregated with monthly state workers compensation benefits, shall not exceed 100% of the member's monthly compensation at the time of disability. Benefits continue for life or until recovery.

Death Benefits — Members are eligible after earning five years of service. No service requirement if death is service related. Retirees and terminated vested participants are also eligible.

The benefit is equal to 60% of the participant's benefit, but not less than $300 per month, payable to the spouse until death or remarriage. Other dependents (children, parents, brothers and sisters) are also eligible for death benefits. To each dependent child, 20 percent of the participant's benefit until the child attains 18 or marries; to each dependent orphaned child, 25 percent of the participant's benefit until the child attains eighteen or marries; to each dependent parent, 10 percent of the participant's benefit for life, and to each dependent brother or sister, the sum of 50 dollars per month (but a total not to exceed $100 per month) until such individual attains the age of 18 years or marries.

In no case shall the payments to the surviving spouse and children be reduced below 65 percent of the total amount paid to all dependents.

Supplemental Pension Benefits — All retirees, surviving beneficiaries and disability pensioners are eligible for automatic cost-of-living benefits commencing on the first day of July following two years of retirement. The benefits equal the percentage increase in the Consumer Price Index, limited to 4% (2% for some disability retirees), multiplied by the sum of the allowable amount which is the first $15,000 of the total annual benefits paid and the accumulated supplemental pension amounts for prior years.

Termination Benefits — Any member who terminates employment prior to retirement will be entitled to a refund of contributions without interest.

Refunds — Any member who terminates from their department without receiving a retirement pension shall be refunded all deductions made from his salary, without interest.