City of Grafton, West Virginia
Firemen's Pension and Relief Fund

Actuarial Valuation Report for the Year Beginning July 1, 2017

September 18, 2018

Mr. Larry Richman
Finance Director
1 West Main Street
Grafton, WV 26354

Retiree Richard W. Beall
Pension Board Secretary
City of Grafton Firemen's Pension and Relief Fund

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

Dear Mr. Richman and Retiree Beall:

Upon the request of the Municipal Pensions Oversight Board, we have performed an actuarial valuation as of July 1, 2017, for the City of Grafton, 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 fiscal year ending June 30, 2019;
- The Fund's eligibility to receive an allocation of the premium tax for the fiscal 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 (1) a review of the actuarial assumptions and methods at least once every five years and (2) 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 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 Optional funding policy as defined in West Virginia Code §8-22-20 (e)(1).

This 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 year ended June 30, 2017, and assets held as of June 30, 2017, by investment category, was 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 6.00%. The 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 | Lance J. Weiss

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

Lance Weiss, EA, MAAA, FCA
Senior Consultant

Contents

SECTION I

ACTUARIAL VALUATION RESULTS AS OF JULY 1, 2017

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 Grafton, 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 fiscal year ending June 30, 2019;
- The Fund's eligibility to receive an allocation of the premium tax for the fiscal year ending June 30, 2019; and
- 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 Optional funding policy as defined in West Virginia Code §8-22-20 (e)(1). The sponsor changed the funding policy used to determine contributions from the Standard funding policy to the Optional funding policy, effective March 6, 2012.

The key features of the Optional funding policy, effective for plan years beginning after January 1, 2010, for plans previously financing benefits with the Standard funding policy, 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*
- Benefits and expenses in the closed local Plan are financed by contributions made from the following sources:
    - Employee contributions of 7.0% of pay for members hired before January 1, 2010, increased by up to 2.5% of pay if elected by the Board of trustees of the Plan. Employees hired after January 1, 2010, contribute 9.5% of pay;
    - The premium tax allocation assigned to the Fund for the plan year; and
    - Employer contributions equal to the normal cost, net of employee contributions, plus a 40-year closed period amortization from July 1, 1991 (14 Years remaining as of July 1, 2017) on a level dollar basis, of the unfunded actuarial accrued liability net of premium tax allocation applicable to the plan year.

The following table provides the Plan's funded status:

Funded Status as of:	July 1, 2017
Assets	$1,608,182
Actuarial Accrued Liability	$2,668,414
Unfunded Actuarial Accrued Liability	$1,060,232
Funded Ratio	60.27%

The following table provides the estimated employer contributions for the fiscal year ending June 30, 2018, under the Optional funding policy, which was developed using the results of the actuarial valuation as of July 1, 2016:

Employer Contributions for FYE:	June 30, 2018
Estimated Payroll for PYE 06/30/2017	$68,362
Employer Normal Cost for PYE 06/30/2017	$19,604
Employer Normal Cost Rate for PYE 06/30/2017	28.7%
Amortization of Unfunded Actuarial Liability for PYE 06/30/2017	$124,020
State Insurance Premium Tax Allocation for FYE 06/30/2018	$39,167
Employer Contribution for FYE 06/30/2018 [a]	$104,457

The following table provides the estimated employer contributions for the fiscal year ending June 30, 2019, under the Optional funding policy, which was developed using the results of the actuarial valuation as of July 1, 2017:

Estimated Employer Contributions for FYE:	June 30, 2019
Estimated Payroll for PYE 06/30/2018	$36,547
Employer Normal Cost for PYE 06/30/2018	$9,548
Employer Normal Cost Rate for PYE 06/30/2018	26.1%
Amortization of Unfunded Actuarial Liability for PYE 06/30/2018	$110,790
State Insurance Premium Tax Allocation for FYE 06/30/2019	$41,156
Estimated Employer Contribution for FYE 06/30/2019 [a]	$79,182

[a] *The Employer Contribution cannot be less than the Employer Normal Cost.*

The actual minimum employer contribution for fiscal year ending June 30, 2019, will be based on the actual payroll for the plan year end June 30, 2018.

Commentary on 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 the Municipal Pensions Security Fund. Revenues which are specifically collected for the Fund, including employee payroll contributions, 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 local Plan. 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 West Virginia Code, including any additional amounts needed to satisfy the 15-year solvency test on a closed group projection basis. *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 Grafton has elected to fund benefits using the Optional funding policy of financing as defined in West Virginia Code §8-22-20 (e)(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 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 60% (using a testing interest rate of 6.00% for all plans using the Optional funding policy), ratio of assets to benefits of 11.28, equity allocation of 44%, and 15-year projected funded ratio of 100%, resulted in a discount rate assumption of 6.00%.

- The Fund experienced an approximate annualized return of 6.13% on the market value of assets during the plan year ended June 30, 2017, which compares to the expected annualized return of 6.00%. The difference in actual versus expected return produced an asset (gain)/loss of ($1,948).

- 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 ($132,769) due to these events.

Optional Funding

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

- Employer contributions to the closed local plan are expected to decrease each year from $79,182 for the fiscal year end June 30, 2019 to $45,476 for the fiscal year ending June 30, 2031.

- The funded ratio is projected to increase from 60% in 2017 to 100% in 2031. The Optional funding policy is consistent with generally accepted actuarial principles.

This actuarial valuation assumes that the City will be able to make future contributions on a timely basis. The ability of the plan to reach 100% funding by 2031 is heavily dependent on the City contributing the minimum employer contribution calculated under the Optional funding policy each and every year until 2031. 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 Fund.

Under the Optional 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 6.00%, 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.

Actuarial Valuation Results as of July 1, 2017
Schedule A: Summary of Key Valuation Results

Valuation Date		**July 1, 2016**		**July 1, 2017**
Valuation Interest Rate		6.00%		6.00%
Cost-of-Living Adjustment		2.75%		2.75%
Wage Inflation		3.75%		3.75%
Expected Payroll		$68,362		$36,547
Average Pay		$34,181		$36,547
Expected Benefit Payments		$142,681		$142,554
1. Actuarial Accrued Liability	No.		No.	
(a) Actives	2	$368,109	1	$283,399
(b) Retirees	5	$2,110,075	5	$2,091,387
(c) Survivors	0	$0	0	$0
(d) Disabled Members	1	$298,140	1	$293,628
(e) Deferred Vested Members	0	$0	0	$0
(f) Total	8	$2,776,324	7	$2,668,414
2. Present Value of Future Normal Costs		$262,379		$103,207
3. Present Value of Benefits (1(f) + 2)		$3,038,703		$2,771,621
4. Market Value of Assets		$1,536,198		$1,608,182
5. Unfunded Actuarial Accrued Liability (1(f) - 4)		$1,240,126		$1,060,232
6. Funded Ratio (4 / 1(f))		55.33%		60.27%
7. Net Employer Normal Cost				
(a) Normal Cost		$24,172		$11,904
(b) Administrative Expenses		$217		$202
(c) Gross Normal Cost (a + b)		$24,389		$12,106
(d) Employee Contribution Rate [a]		7.00%		7.00%
(e) Expected Employee Contributions		$4,785		$2,558
(f) Net Employer Normal Cost (c - e)		$19,604		$9,548
(% of Compensation)		28.68%		26.12%
8. Estimated Minimum Employer Contribution [b]		**FYE 2018**		**FYE 2019**
(a) Expected Payroll		$68,362		$36,547
(b) Estimated Employer Normal Cost		$19,604		$9,548
(c) Employer Normal Cost Rate		28.68%		26.12%
(d) Amortization of Unfunded Actuarial Liability		$124,020		$110,790
(e) State Insurance Premium Tax Allocation		$39,167		$41,156
(f) Estimated Employer Contribution[c] (b + d - e)		**$104,457**		**$79,182**

[a] *Blended rate reflecting 7.0% for members hired before January 1, 2010.*

[b] *Estimated Minimum Employer Contribution is based on Optional funding policy and is assumed to be made in plan year ending June 30, 2019. The actual Minimum Employer Contribution will be based on actual payroll for plan year ended June 30, 2018.*

[c] *The Employer Contribution cannot be less than the Employer Normal Cost.*

Actuarial Valuation Results as of July 1, 2017
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	$2,776,324
	(b) Normal Cost due 7/1/2016	$24,172
	(c) Interest on (a) and (b) to 6/30/2017	$167,305
	(d) Benefit Payments with interest to 6/30/2017	$166,618
	(e) Effect of Assumption Changes	$0
	(f) Expected Liability at 7/1/2017 [(a) + (b) + (c) - (d) + (e)]	$2,801,183
	(g) Actual Liability at 7/1/2017	$2,668,414
	(h) Liability (Gain)/Loss [(g) - (f)]	**($132,769)**
2.	(a) Market Value of Assets as of 7/1/2016	$1,536,198
	(b) Interest on (a) to 6/30/2017	$92,172
	(c) Contributions with interest to 6/30/2017	$144,482
	(d) Benefit Payments with interest to 6/30/2017	$166,618
	(e) Expected Assets at 6/30/2017 [(a) + (b) + (c) - (d)]	$1,606,234
	(f) Actual Assets at 7/1/2017	$1,608,182
	(g) Asset (Gain)/Loss [(e) - (f)]	**($1,948)**
3.	Total (Gain)/Loss [1(h) + 2(g)]	**($134,717)**

SECTION II

ACTUARIAL PROJECTIONS

Actuarial Projections
Table 1: Total Assets

Valuation Plan Year End 30-Jun	Number		Total Assets								Actuarial Accrued Liability	Unfunded Liability	Funded Ratio
	Active	Pay Status	Assets (boy)	Benefit Payments	Expenses	Employer Contributions	Employee Contributions	Premium Tax Allocation Contributions	Investment Income	Assets (eoy)			
2017	1	6	$1,536,198	$161,765	$1,347	$99,644	$4,034	$36,596	$94,822	$1,608,182	$2,668,414	$1,060,232	60%
2018	1	6	1,608,182	142,554	202	104,457	2,558	39,167	96,592	1,708,200	2,694,001	985,801	63%
2019	1	6	1,708,200	144,829	208	79,182	2,634	41,156	101,839	1,787,974	2,719,144	931,170	66%
2020	1	6	1,787,974	147,102	213	75,306	2,710	42,682	106,491	1,867,848	2,743,826	875,978	68%
2021	1	6	1,867,848	149,367	219	74,227	2,788	43,766	111,219	1,950,262	2,768,039	817,777	70%
2022	1	6	1,950,262	151,616	225	73,422	2,867	44,862	116,109	2,035,680	2,791,749	756,069	73%
2023	1	6	2,035,680	153,841	231	72,631	2,946	45,984	121,179	2,124,349	2,814,978	690,629	75%
2024	1	6	2,124,349	156,029	237	71,798	3,026	47,162	126,448	2,216,518	2,837,737	621,219	78%
2025	1	6	2,216,518	158,167	243	70,953	3,107	48,362	131,927	2,312,457	2,860,039	547,582	81%
2026	0	6	2,312,457	169,133	249	70,096	2,483	49,583	137,351	2,402,588	2,869,403	466,815	84%
2027	0	7	2,402,588	182,609	255	65,427	1,559	52,053	142,269	2,481,032	2,861,032	380,000	87%
2028	0	7	2,481,032	189,016	261	59,765	1,134	53,824	146,658	2,553,136	2,843,519	290,383	90%
2029	0	7	2,553,136	194,120	268	55,411	821	55,509	150,745	2,621,235	2,818,206	196,971	93%
2030	0	7	2,621,235	198,163	274	51,699	594	57,085	154,641	2,686,818	2,786,130	99,312	96%
2031	0	7	2,686,818	201,314	280	45,476	432	58,626	158,340	2,748,099	2,748,099	0	100%
2032	0	7	2,748,099	203,830	285	1,406	307	0	158,903	2,704,599	2,704,599	0	100%
2033	0	7	2,704,599	205,781	291	1,046	207	0	156,221	2,656,001	2,656,001	0	100%
2034	0	7	2,656,001	207,101	296	806	139	0	153,256	2,602,805	2,602,805	0	100%
2035	0	6	2,602,805	207,870	301	641	93	0	150,036	2,545,404	2,545,404	0	100%
2036	0	6	2,545,404	208,383	306	443	38	0	146,569	2,483,765	2,483,765	0	100%
2037	0	6	2,483,765	208,324	310	310	0	0	142,867	2,418,308	2,418,308	0	100%
2038	0	6	2,418,308	207,488	313	313	0	0	138,965	2,349,784	2,349,784	0	100%

Actuarial Projections
Table 2: Employer Contributions

Employer Contributions

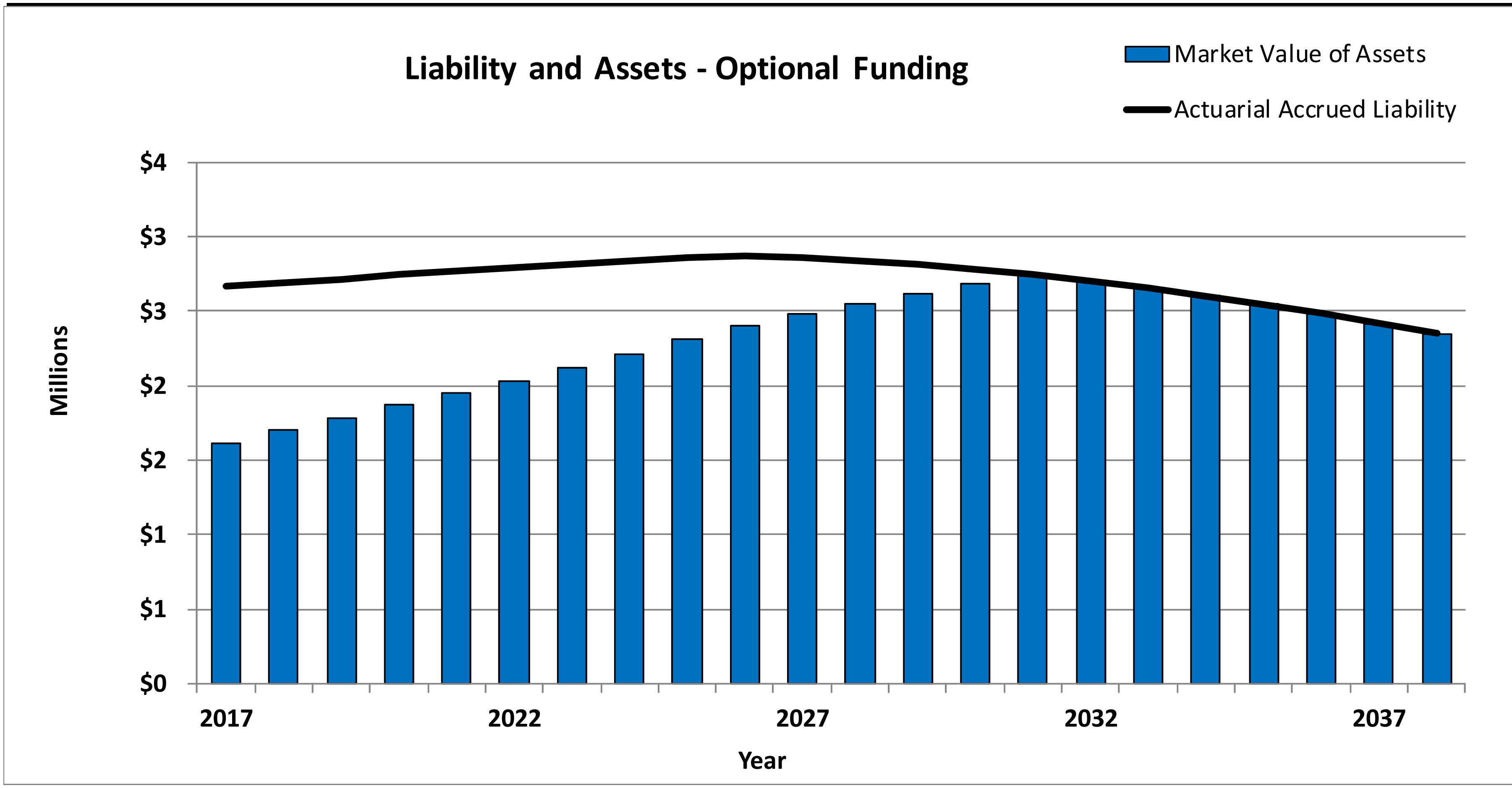
Valuation Plan Year End 30-Jun [a]	Closed Group Payroll	Employee Contributions	Gross Normal Cost	Net Employer Normal Cost	Amortization of UAAL	Premium Tax Allocation Contributions	Net Employer Amortization	Expenses	Employer Contribution Closed Plan
2018	$36,547	$2,558	$11,904	$9,346	$110,790	$41,156	$69,634	$202	$79,182
2019	37,623	2,634	12,255	9,621	108,159	42,682	65,477	208	75,306
2020	38,717	2,710	12,612	9,902	107,878	43,766	64,112	213	74,227
2021	39,828	2,788	12,974	10,186	107,879	44,862	63,017	219	73,422
2022	40,951	2,867	13,338	10,471	107,919	45,984	61,935	225	72,631
2023	42,086	2,946	13,709	10,763	107,967	47,162	60,805	231	71,798
2024	43,230	3,026	14,082	11,056	108,023	48,362	59,661	237	70,953
2025	44,382	3,107	14,456	11,349	108,087	49,583	58,504	243	70,096
2026	35,469	2,483	11,554	9,071	108,160	52,053	56,107	249	65,427
2027	22,272	1,559	7,255	5,696	107,638	53,824	53,814	255	59,765
2028	16,201	1,134	5,277	4,143	106,516	55,509	51,007	261	55,411
2029	11,731	821	3,822	3,001	105,516	57,085	48,431	268	51,699
2030	8,490	594	2,766	2,172	104,350	58,626	45,724	274	45,476
2031	6,172	432	2,009	1,577	102,248	0	42,107	280	1,406 [b]
2032	4,382	307	1,427	1,120	0	0	0	285	1,046 [b]
2033	2,961	207	964	757	0	0	0	291	806 [b]
2034	1,985	139	647	508	0	0	0	296	641 [b]
2035	1,330	93	433	340	0	0	0	301	443 [b]
2036	540	38	175	137	0	0	0	306	310 [b]
2037	0	0	0	0	0	0	0	310	313 [b]
2038	0	0	0	0	0	0	0	313	315 [b]

[a] *Assumes employer makes contributions for the applicable valuation plan year in the following fiscal year. Assumes the Premium Tax allocation is contributed in the following fiscal year.*

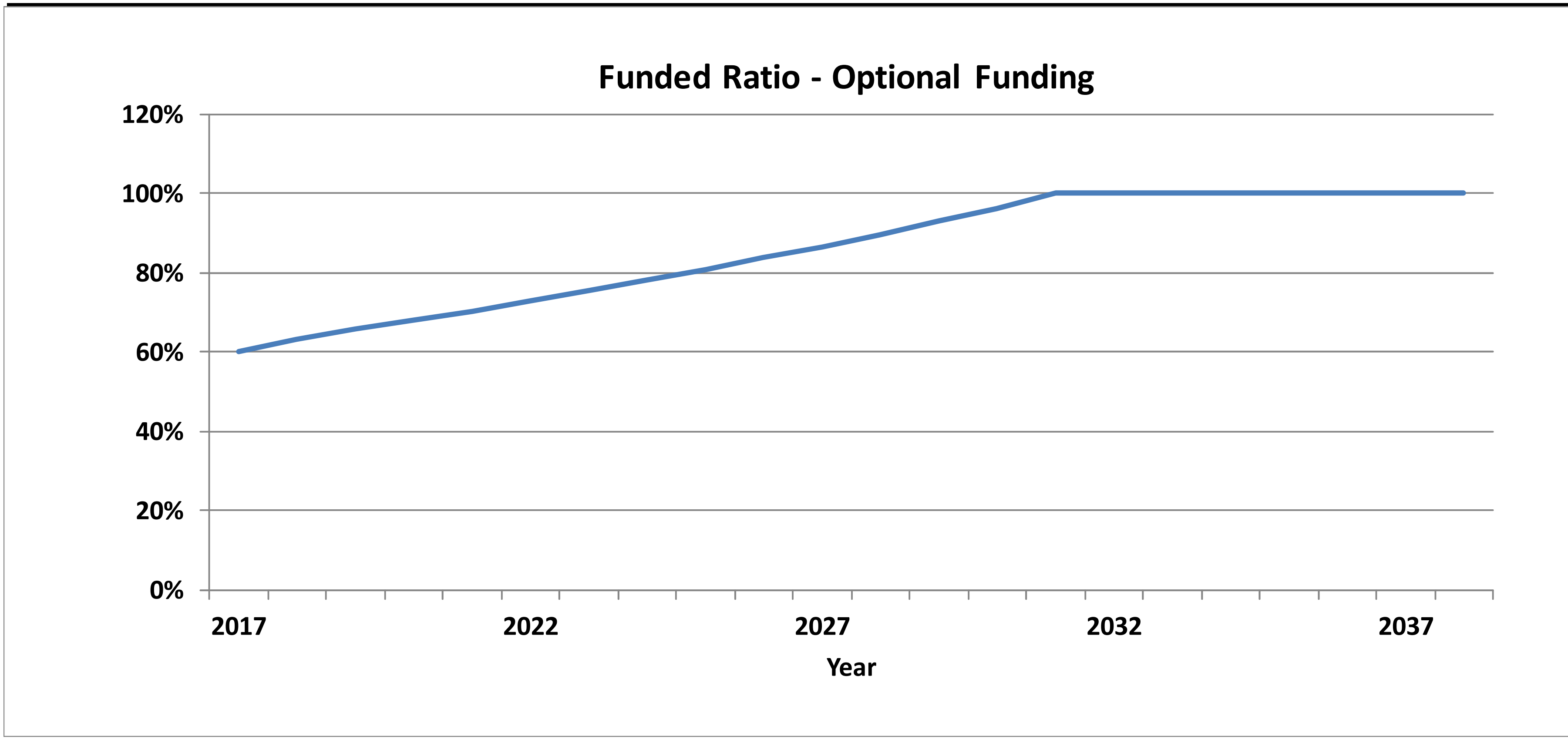
[b] *Amount required to remain at 100% funded.*

Actuarial Projections

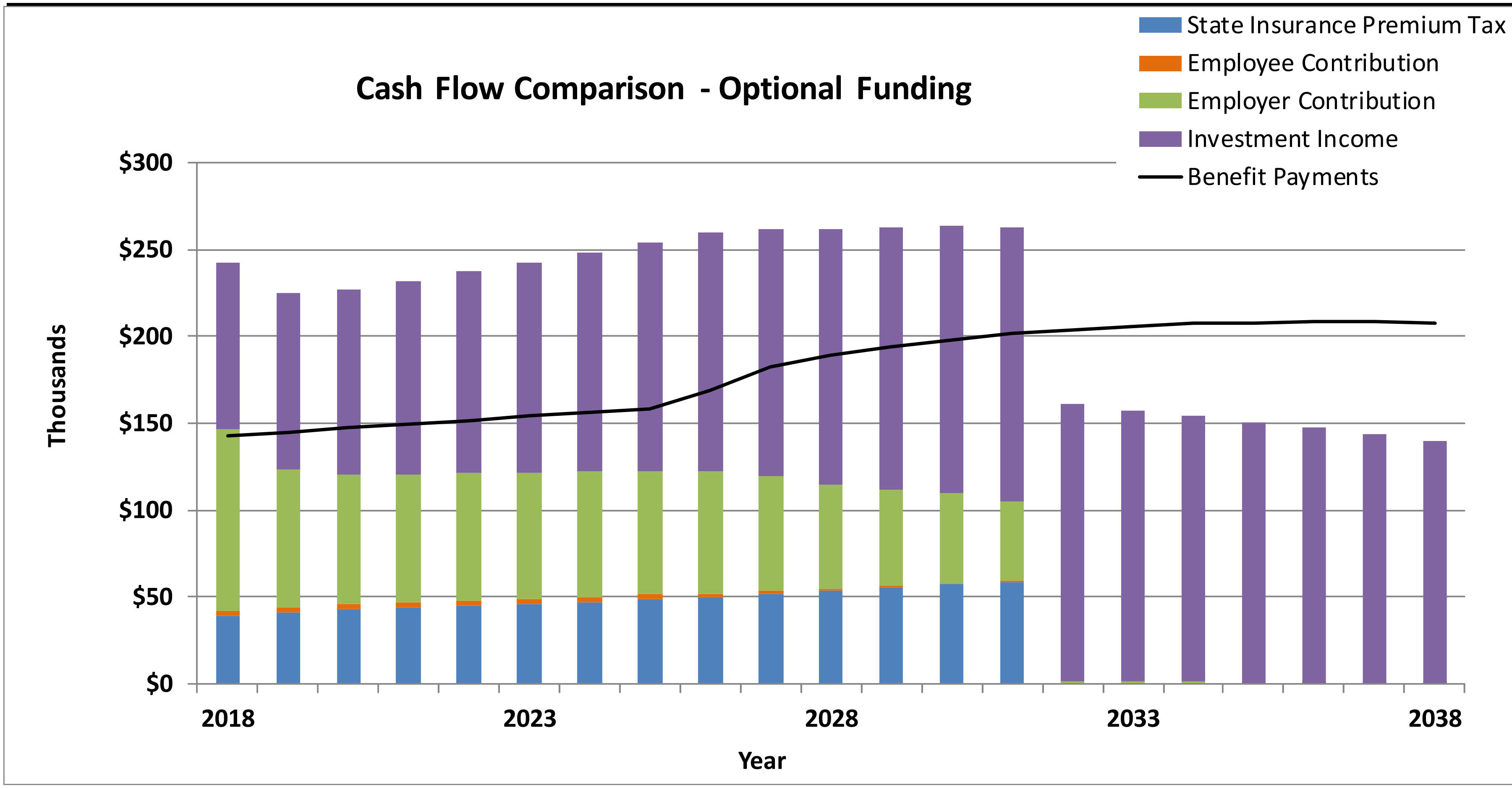
Graph 1: Liability and Assets – Optional Funding



Actuarial Projections
Graph 2: Funded Ratio – Optional Funding



Actuarial Projections
Graph 3: Cash Flow Comparison – Optional Funding



SECTION III

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

Actuarially Determined Contribution for GASB Statement Nos. 67 and 68 Reporting

Schedule C: Funding Progress and Employer Contributions

Valuation Date	**July 1, 2015**	**July 1, 2016**
Valuation Interest Rate	6.00%	6.00%
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]	16 Years, Level Dollar	15 Years, Level Dollar
Schedule of Funding Progress		
Actuarial Valuation Date	**July 1, 2015**	**July 1, 2016**
1. Market Value of Assets	$1,590,053	$1,536,198
2. Actuarial Accrued Liability	$2,802,593	$2,776,324
3. Unfunded Actuarial Accrued Liability (2 - 1)	$1,212,540	$1,240,126
4. Funded Ratio (1/2)	57%	55%
5. Expected Payroll	$75,231	$68,362
6. UAAL as Percentage of Covered Payroll (3/5)	1,612%	1,814%
Schedule of Employer Contributions [c]	**FYE 2017**	**FYE 2018**
1. Actuarially Determined Contribution		
(a) Employer Normal Cost	$22,079	$19,604
(b) Amortization of Unfunded Actuarial Accrued Liability	$116,538	$124,020
(c) Actuarially Determined Contribution (ADC) (a + b)	$138,617	$143,624
2. Employer Contribution	$99,644	$104,457 [b]
3. Premium Tax Allocation	$36,596	$39,167
4. Percentage of ADC Contributed [(2 + 3)/1(c)]	98%	100%

[a] *Suggested amortization policy to comply with GASB Statement Nos. 67 and 68 Standards.*

[b] *Estimated employer contribution for fiscal year end June 30, 2018. Employer Contribution cannot be less than net Employer Normal Cost.*

[c] *Satisfies the Actuarially Determined Contribution as defined by GASB Statement Nos. 67 and 68.*

SECTION IV

ACTUARIAL VALUATION DATA AS OF JULY 1, 2017

Valuation Data as of July 1, 2017
Schedule D: Reconciliation of Assets

Plan Year Ending	June 30, 2016	June 30, 2017
A. Market Value of Assets Beginning of Year	$1,590,053	$1,536,198
Adjustment to Market Value of Assets at Beginning of Year	$0	$0
Market Value of Assets Beginning of Year	$1,590,053	$1,536,198
1. Revenue During Fiscal Year		
(a) Employee Contribution	$4,707	$4,034
(b) Governmental Contribution		
(i) From Local Government	$64,100	$99,644
(ii) From State Government	$29,467	$36,596
(iii) Reallocation from State Government	$0	$0
(iv) Total	$93,567	$136,240
(c) Earnings on Investments		
(i) Net Appreciation/(Depreciation)	($16,697)	$94,821
(ii) Bond Interest	$0	$0
(iii) Dividends	$0	$0
(iv) Net Realized Gain (Loss) on Sale/Exchange	$0	$0
(v) Other	$3	$1
(vi) Less Investment Expense	$0	$0
(vii) Total	($16,694)	$94,822
(d) Other Revenue	$0	$0
(e) Receivable Investment Income/(Expense)	$0	$0
(f) Receivable Contribution [a]		
(i) From Employee Contributions	$0	$0
(ii) From Local Government	$0	$0
(iii) From State Government	$0	$0
(iv) Total	$0	$0
(g) Total Revenue (sum of (a) through (f))	$81,580	$235,096
2. Expenditures During Fiscal Year		
(a) Benefits Paid	$133,989	$141,851
(b) Withdrawals	$0	$19,914
(c) Administrative Expenses	$1,446	$1,347
(d) Payable Benefits and Withdrawals	$0	$0
(e) Payable Administrative Expenses	$0	$0
(f) Total Expenditures (sum of (a) through (e))	$135,435	$163,112
B. Market Value of Assets End of Year [A + 1(g) - 2(f)]	$1,536,198	$1,608,182
C. Approximate Return on Assets	(1.17)%	6.13%

[a] *Receivable contributions for each respective plan year ending.*

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	$21,063	1%	$30,559	2%
2. Government Securities				
(a) US Treasury Bills, Notes and Bonds	$371,778		$64,484	
(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))	$371,778	24%	$64,484	4%
3. Corporate Fixed Income				
(a) US Bonds	$75,035		$193,466	
(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	$428,029		$609,740	
(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))	$503,064	33%	$803,206	50%
4. Corporate Equity				
(a) US Equity	$568,293		$641,208	
(b) US Mutual Fund Shares (Equity)	$64,065		$68,725	
(c) US Exchange Traded Funds (Equity)	$0		$0	
(d) International Equity	$0		$0	
(e) International Mutual Fund Shares (Equity)	$7,935		$0	
(f) International Exchange Traded Funds (Equity)	$0		$0	
(g) Total Corporate Equity (sum of (a) through (f))	$640,293	42%	$709,933	44%
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)	$0		$0	
(b) Less Payable	$0		$0	
(c) Total	$0	0%	$0	0%
Market Value of Assets End of Year [sum of (1) through (8)]	**$1,536,198**		**$1,608,182**	

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:	**2**	**5**	**1**	**0**	**0**	**8**
New Actives:						**0**
Returned to Actives Status:						**0**
Data Corrections/Other Changes:						**0**
Vested Terminations:						**0**
Non-Vested Terminations:	(1)					**(1)**
Disabled:						**0**
Retirements:						**0**
Deaths with Beneficiary:						**0**
Deaths w/o Beneficiary:						**0**
Expired Annuity or Stop Payment:						**0**
Net Changes:	(1)	0	0	0	0	**(1)**
Total Participants June 30, 2017:	**1**	**5**	**1**	**0**	**0**	**7**

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											$ 0
30-34											$ 0
35-39											$ 0
40-44					1					1	$ 36,008
45-49											$ 0
50-54											$ 0
55-59											$ 0
60-64											$ 0
65-69											$ 0
Over 70											$ 0
Totals	0	0	0	0	1	0	0	0	0	1	$ 36,008

Averages

Age:	41.8	years
Service:	19.0	years
Annual Pay:	$36,008	[a]

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

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

Active Participants	July 1, 2016	July 1, 2017
Number of Actives	2	1
Total Annual Pay[a]	$67,242	$36,008
Average Age	38.4	41.8
Average Service	13.0	19.0

Inactive Participants	July 1, 2016		July 1, 2017	
Type	No.	Annual Benefit	No.	Annual Benefit
Retirees	5	$122,238	5	$123,018
Survivors	0	$0	0	$0
Disabled Members	1	$19,613	1	$19,808
Deferred Vested Members	0	$0	0	$0

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	$1,608,182
Liabilities using a 6.00% discount rate	$2,668,414
Funded Ratio	60%
Expected Benefit Payments	$142,554
Liquidity Ratio	11.28
Equity Exposure	44%
Projected Funded Ratio after 15 years	100%

Discount Rate	6.00%

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 Grafton Firemen's Pension and Relief Fund reported 3 eligible active members and 6 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 $41,156 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	General Inflation: 2.75% *plus* Wage Inflation increment: 1.00% *plus*
Service-based Increase:	Years of Service / Increase 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)

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

Asset Method	Market Value
Turnover	Sample Rates – Age / Rates 25 / 9% 35 / 4% 45 / 2% 50 / 0%
Retirement	Age / Rates[a] 50 / 45% 51-55 / 30% 56-59 / 35% 60 / 100% [a]*Terminated vested participants are assumed to retire at age 50.*
Mortality	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.*
Disability	Sample Rates – Age / Rates[c] 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.*
Percent Married	90%
Spouse Age	Females three years younger than males

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

Administrative Expenses	The sponsor did not appear to provide separate investment and administrative expenses. Plan year 2018 administrative expenses assumed to be equal to 15% of all reported 2017 expenses. 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 eight 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 March 6, 2012, are eligible to participate in the Firemen's Pension and Relief Fund.

Average Annual Compensation — The average of any three 12-consecutive-month periods of employment which produces the highest average annual compensation.

Each 12-consecutive-month annual compensation is limited to 120% of the *Average Adjusted Salary* received by the member in the two consecutive 12-consecutive-month periods immediately preceding the 12-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 12-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 7.0% 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 Optional 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 12 monthly installments.

Summary of Principal Plan Provisions (Continued)

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 18 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.