Segal Consulting

Town of East Hartford Pension Plan

Actuarial Valuation and Review as of July 1, 2018

8876649v1/00758.001

Segal Consulting
30 Waterside Drive, Suite 300 Farmington, CT 06032-3069
T 860.678.3000 www.segalco.com

April 5, 2019

Mr. Donald Currey
Pension Board Chairman
Town of East Hartford
740 Main Street
East Hartford, CT 06108

Dear Mr. Currey:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2018. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal year ending June 30, 2020.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement Plan. The census information and financial information on which our calculations were based was prepared by the Town of East Hartford. That assistance is gratefully acknowledged.

The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Pension Board are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: Henry P. Nearing

Henry P. Nearing, FCA, MAAA
Vice President and Consulting Actuary

8876649v1/00758.001

Table of Contents

Town of East Hartford Pension Plan Actuarial Valuation and Review as of July 1, 2018

Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of July 1, 2018. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. 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; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements No 67 and 68 as of June 30, 2018 for the Plan is provided in a separate report.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Town;
- The characteristics of covered active participants, inactive vested participants, inactive non-vested participants, and retired participants and beneficiaries as of July 1, 2018, provided by the Town;
- The assets of the Plan as of June 30, 2018, provided by the Town;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions regarding employee terminations, retirement, death, etc.

Significant Issues

1. Segal Consulting ("Segal") strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. In the short term, the funding policy adopted by the Town does not meet this standard, as the amortization payment does not cover the interest on the unfunded liability.
2. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 53.98%, compared to the prior year funded ratio of 54.85%. This ratio is one measure of funding status, and its history is a measure of funding progress. Using the market value of assets, the funded ratio is 52.08%, compared to 52.31% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.
3. The actuarially determined contribution for the upcoming year is $16,416,732, an increase of $986,294 from last year. The contribution as a percentage of payroll increased from 38.82% of payroll to 41.71% of payroll, based on a 25-year amortization of the unfunded actuarial accrued liability.
4. The actuarial loss from investment and other experience is $3,022,270, or 0.70% of actuarial accrued liability.
5. The rate of return on the market value of assets was 7.20% for the plan year ending June 30, 2018. The return on the actuarial value of assets was 5.82% for the same period due to the recognition of prior years' investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.65%. Given the low fixed income interest rate environment, target asset allocation and expectations of future investment returns for various classes, we advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments of 7.60%. A rate in the 6.75% to 7.25% range may be more appropriate.
6. The actuarial value of assets is 103.64% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net loss is recognized in future years, the cost of the Plan is likely to increase unless the net loss is offset by future experience. The recognition of the market losses of $8,245,413 will also have an impact on the future funded ratio. If the net deferred losses were recognized immediately in the actuarial value of assets, the actuarially determined contribution would increase from 41.71% to about 43.07% of payroll.
7. The following actuarial assumptions were changed with this valuation:
   - The net investment return assumption was lowered from 7.65% to 7.60% to better reflect future expectations.
   - Mortality for males was projected an additional year using Scale BB. The mortality scale used for females was updated from Scale MP-2016 to Scale MP-2017.
   - The assumption for the incidence of service-related vs. non-service-related disabilities for the Police and Fire groups was changed from 50% service-related / 50% non-service-related to 100% service-related.

- The assumption for the incidence of service-related vs. non-service-related deaths for the Police and Fire groups was changed from 75% service-related / 25% non-service-related to 100% service-related.

As a result of these assumption changes, the total normal cost decreased by $2,942 and the actuarial accrued liability increased by $5,628,240. The total impact was an increase in the actuarially determined contribution of $304,006.

8. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2018, was provided separately on September 7, 2018.
9. This actuarial report as of July 1, 2018 is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the plan.
10. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the Plan's future financial condition, but have included a brief discussion of some risks that may affect the Plan in Section 2. A more detailed assessment of the risks would provide the Board with a better understanding of the inherent risks.

Summary of Key Valuation Results

		2019	2018	2017
Contributions for fiscal year beginning July 1:	• Actuarially determined contributions	$16,416,732	$15,430,438	$13,706,771
	• Actuarially determined contributions as a percent of pay		38.82%	34.08%
Actuarial accrued liability for plan year beginning July 1:	• Retired participants and beneficiaries		$259,001,882	$250,152,536
	• Inactive vested participants		2,820,449	2,242,848
	• Active participants		172,455,771	163,216,759
	• Inactive participants due a refund of employee contributions		269,380	290,483
	• Total		$434,547,482	$415,902,626
	• Normal cost including administrative expenses for plan year beginning July 1		6,223,541	6,337,770
Assets for plan year beginning July 1:	• Market value of assets (MVA)*		$226,333,194	$217,549,656
	• Actuarial value of assets (AVA)*		234,578,607	228,138,041
	• Actuarial value of assets as a percentage of market value of assets		103.64%	104.87%
Funded status for plan year beginning July 1:	• Unfunded/(overfunded) actuarial accrued liability on market value of assets		$208,214,288	$198,352,970
	• Funded percentage on MVA basis		52.08%	52.31%
	• Unfunded/(overfunded) actuarial accrued liability on actuarial value of assets		$199,968,875	$187,764,585
	• Funded percentage on AVA basis		53.98%	54.85%
	• Amortization period		25	26
Key assumptions:	• Net investment return		7.60%	7.65%
	• Amortization increase		3.25%	3.25%
Demographic data for plan year beginning July 1:	• Number of retired participants and beneficiaries		684	689
	• Number of inactive vested participants		30	27
	• Number of active participants		504	524
	• Number of inactive participants entitled to a refund of employee contributions		64	70
	• Projected total pay		$38,122,760	$38,497,587
	• Projected average pay		75,640	73,469

* Does not include DROP assets. This amount was also excluded from the liabilities. As of July 1, 2018, the DROP account assets are $7,732,158. As of July 1, 2017, the DROP account assets were $7,093,381.

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting ("Segal") relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the Town. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by the Town. The Town uses an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Pension Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the Town or Pension Board is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Pension Board should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

Participant Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive vested participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B,* and *C*.

PARTICIPANT POPULATION: 2009 – 2018

Year Ended June 30	Active Participants	Inactive Vested Participants*	Retired Participants and Beneficiaries**	Total Non-Actives	Ratio of Non-Actives to Actives
2009	741	17	587	604	0.82
2010	727	18	592	610	0.84
2011	705	14	599	613	0.87
2012	672	20	608	628	0.93
2013	643	23	623	646	1.00
2014	620	23	650	673	1.09
2015	579	29	670	699	1.21
2016	549	27	682	709	1.29
2017	524	27	689	716	1.37
2018	504	30	684	714	1.42

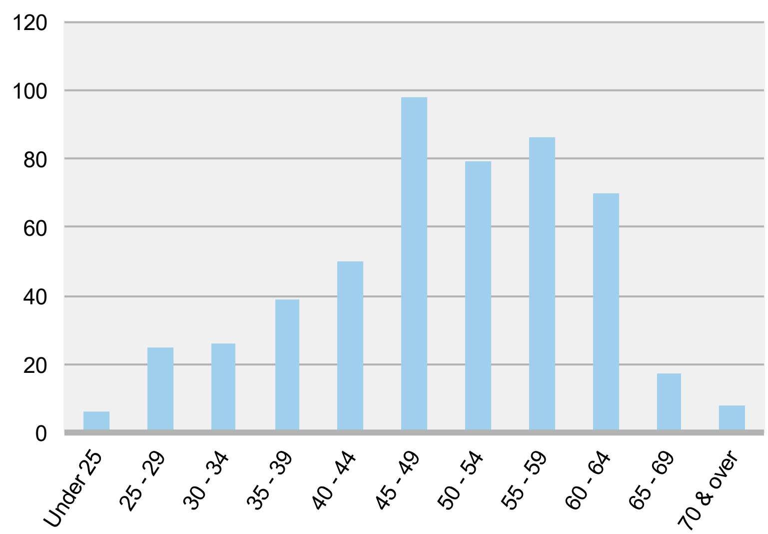
*Excludes terminated participants due a refund of employee contributions (64 as of June 30, 2018)
**Includes disabled participants (29 as of June 30, 2018)

Active Participants

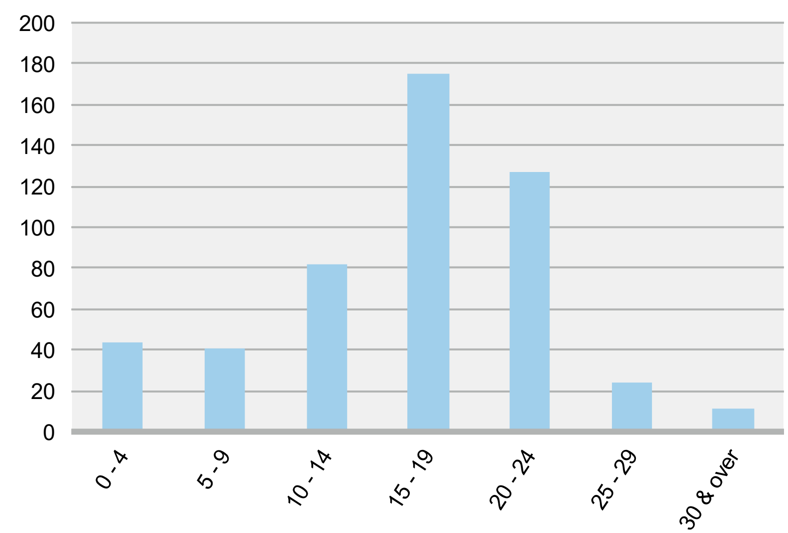
Plan costs are affected by the age, years of benefit service and pay of active participants. In this year's valuation, there were 504 active participants with an average age of 49.9, average years of benefit service of 16.3 years and average pay of $75,640. The 524 active participants in the prior valuation had an average age of 49.6, average service of 15.9 years and average pay of $73,469.

Distribution of Active Participants as of June 30, 2018

ACTIVES BY AGE



ACTIVES BY YEARS OF BENEFIT SERVICE



Inactive Participants

In this year’s valuation, there were 30 participants with a vested right to a deferred or immediate vested benefit.

In addition, there were 64 participants entitled to a return of their employee contributions.

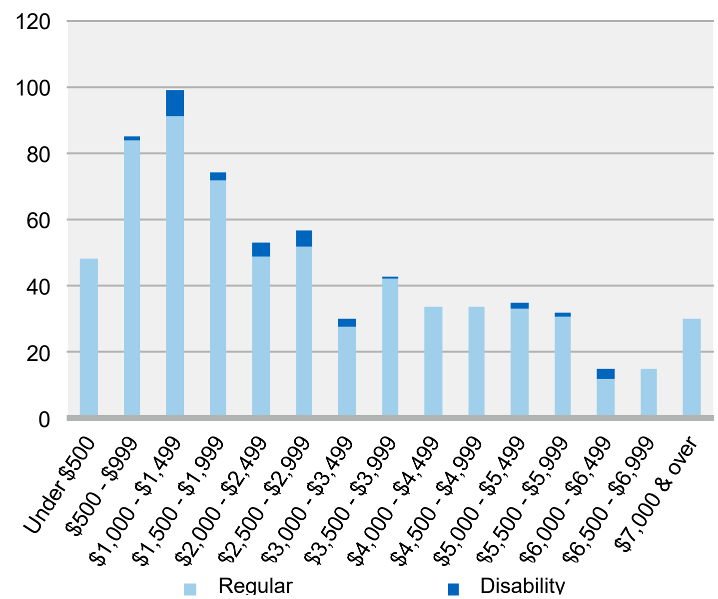
Retired Participants and Beneficiaries

As of June 30, 2018, 609 retired participants and 75 beneficiaries were receiving total monthly benefits of $1,970,108. For comparison, in the previous valuation, there were 613 retired participants and 76 beneficiaries receiving monthly benefits of $1,916,937.

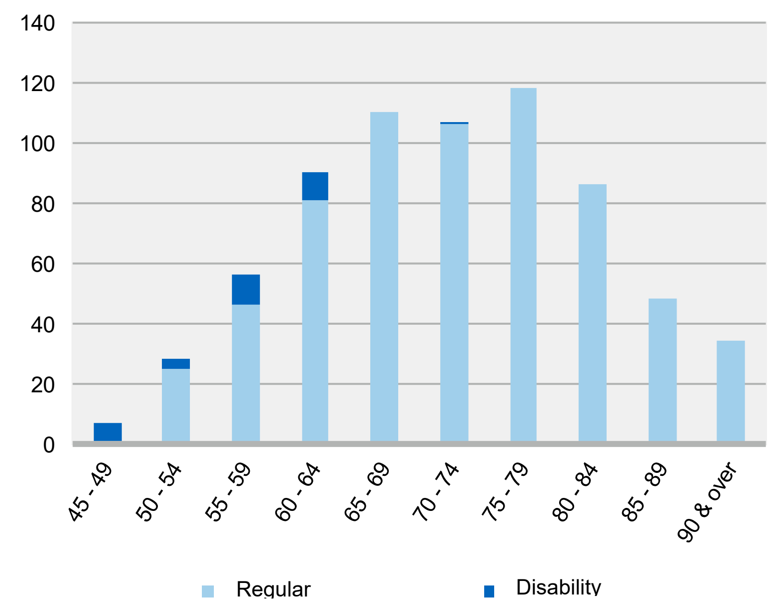
As of June 30, 2018, the average monthly benefit for retired participants is $2,880, compared to $2,782 in the previous valuation. The average age for retired participants is 71.7 in the current valuation, compared with 71.6 in the prior valuation.

Distribution of Pensioners as of June 30, 2018

PENSIONERS BY TYPE AND MONTHLY AMOUNT



PENSIONERS BY TYPE AND AGE



Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D* and *E*.

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Pension Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2018

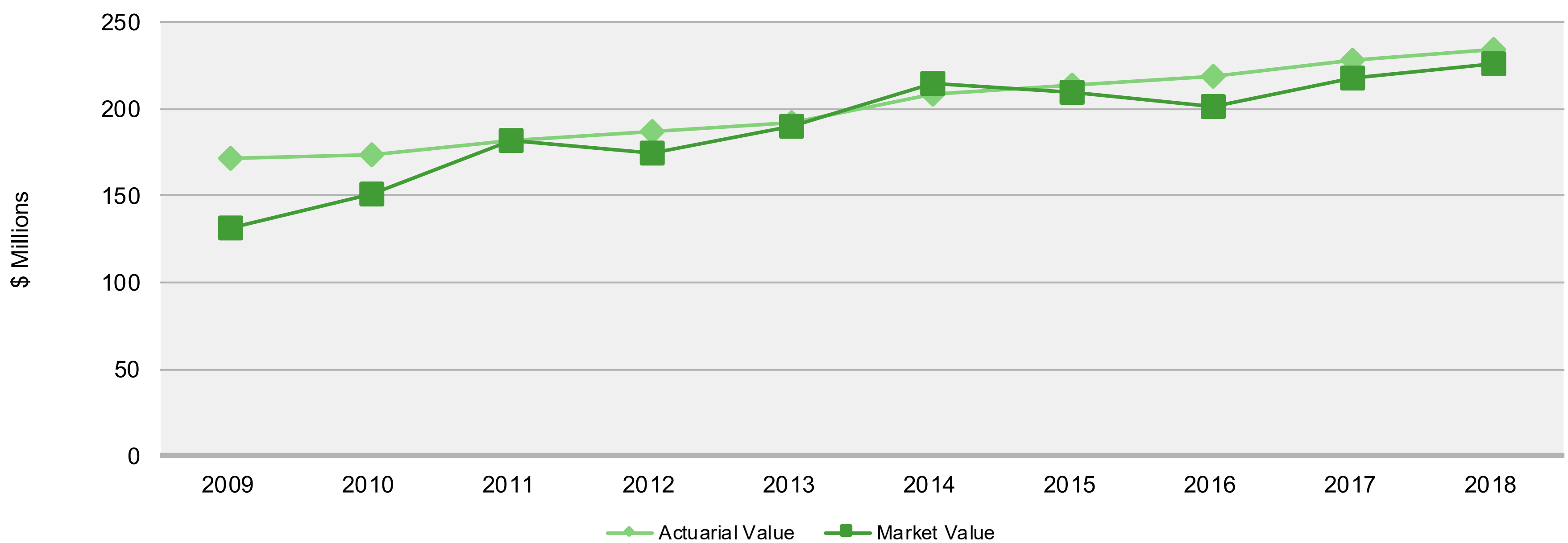
		Original Amount *	Percent Deferred	Unrecognized Amount**	
1.	Market value of assets, June 30, 2018				$226,333,194
2.	Calculation of unrecognized return				
(a)	Year ended June 30, 2018	($957,333)	80%	($765,866)	
(b)	Year ended June 30, 2017	5,384,340	60	3,230,604	
(c)	Year ended June 30, 2016	(18,457,367)	40	(7,382,946)	
(d)	Year ended June 30, 2015	(16,636,027)	20	(3,327,205)	
(e)	Total unrecognized return				(8,245,413)
3.	Preliminary actuarial value: (1) - (2e)				$234,578,607
4.	Adjustment to be within 20% corridor				- -
5.	Final actuarial value of assets as of June 30, 2018: (3) + (4)				234,578,607
6.	Actuarial value as a percentage of market value: (5) ÷ (1)				103.6%
7.	Amount deferred for future recognition: (1) - (5)				($8,245,413)

*Total return minus expected return on a market value basis

**Recognition at 20% per year over five years

Both the actuarial value and market value of assets are representations of the Plan's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF JUNE 30, 2009 – 2018



Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), any contribution requirement will decrease from the previous year. On the other hand, any contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss is $3,022,270, which includes $4,110,317 from investment losses and $1,088,047 in gains from all other sources. The net experience variation from individual sources other than investments was 0.3% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2018

1	Net (loss) from investments*	($4,110,317)
2	Net (loss) from administrative expenses	(11,865)
3	Net gain from other experience	1,099,912
4	Net experience (loss): 1 + 2 + 3	($3,022,270)

* Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the market value of assets was 7.20% for the year ended June 30, 2018.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.60% (and was 7.65% last year). The actual rate of return on an actuarial basis for the 2018 plan year was 5.82%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended June 30, 2018 with regard to its investments.

INVESTMENT EXPERIENCE

		Year Ended June 30, 2018	Year Ended June 30, 2017
		Actuarial Value	Actuarial Value
1	Net investment income	$13,087,980	$14,397,222
2	Average value of assets	224,814,334	216,400,638
3	Rate of return: 1 ÷ 2	5.82%	6.65%
4	Assumed rate of return	7.65%	7.90%
5	Expected investment income: 2 x 4	17,198,297	17,095,650
6	Actuarial (loss): 1 – 5	($4,110,317)	($2,698,428)

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the actual market value investment return for the last 10 years, including averages over select time periods.

INVESTMENT RETURN – ACTUARIAL VALUE VS. MARKET VALUE: 2009 - 2018

	Actuarial Value Investment Return		Market Value Investment Return	
Year Ended June 30	Amount	Percent	Amount	Percent
2009	($7,244,535)	-4.01%*	($26,780,198)	-16.65%
2010	8,035,980	4.77	24,076,138	18.68
2011	13,936,901	8.16	36,693,049	24.88
2012	11,562,844	6.47	(551,766)	-0.31
2013	11,850,003	6.45**	22,570,696	13.20
2014	20,707,294	10.91**	29,182,221	15.55
2015	11,044,858	5.38	305,830	0.14
2016	11,064,880	5.25	(1,933,877)	-0.94
2017	14,397,220	6.65	21,112,964	10.60
2018	13,087,980	5.82	15,430,952	7.20
Most recent five-year average return		7.11%		6.29%
Most recent ten-year average return		5.74%		6.65%

Note: Each year's yield is weighted by the average asset value in that year.

* Includes effect of widening the corridor around the market value in the actuarial asset method from 20% to 30%.

** Includes effect of change in asset method.

Administrative Expenses

Administrative expenses for the year ended June 30, 2018 totaled $211,022 compared to the assumption of $200,000. This resulted in a loss of $11,865 for the year, including an adjustment for interest. Because it is expected that these expenses will remain level, we have maintained the assumption of $200,000 for the current year.

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net gain from this other experience for the year ended June 30, 2018 amounted to $1,099,912, which is 0.3% of the actuarial accrued liability.

Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of July 1, 2018 is $434,547,482, an increase of $18,644,856, or 4.5%, from the actuarial accrued liability as of the prior valuation date. The liability is expected to grow each year with normal cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions

The assumption changes reflected in this report are:

- The net investment return assumption was lowered from 7.65% to 7.60%.
- Mortality for males was projected an additional year using Scale BB. The mortality scale used for females was updated from Scale MP-2016 to Scale MP-2017.
- The assumption for the incidence of service-related vs. non-service-related disabilities for the Police and Fire groups was changed from 50% service-related / 50% non-service-related to 100% service-related.
- The assumption for the incidence of service-related vs. non-service-related deaths for the Police and Fire groups was changed from 75% service-related / 25% non-service-related to 100% service-related.

These changes increased the actuarial accrued liability by $5,628,240 and decreased the normal cost by $2,942. Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

There were no changes in plan provisions since the prior valuation. A summary of plan provisions is in *Section 4, Exhibit II*.

Development of Unfunded/(Overfunded) Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED JUNE 30, 2018

1	Unfunded/(overfunded) actuarial accrued liability at beginning of year		$187,764,583
2	Normal cost at beginning of year		6,337,770
3	Total contributions		(16,994,784)
4	Interest		
	• For whole year on 1 + 2	$14,848,830	
	• For half year on 3	(638,034)	
	Total interest		14,210,796
5	Expected unfunded/(overfunded) actuarial accrued liability		$191,318,365
6	Changes due to:		
	• (Gain)/loss	$3,022,270	
	• Assumptions	5,628,240	
	• Funding method	0	
	• Plan provisions	0	
	Total changes		$8,650,510
7	Unfunded/(overfunded) actuarial accrued liability at end of year		$199,968,875

Actuarially Determined Contribution

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded/(overfunded) actuarial accrued liability. The actuarially determined contribution for the fiscal year ending June 30, 2020 is $16,416,732, or 41.71% of pay.

The unfunded actuarial accrued liability is amortized with 3.25% annual increases in the payments. This methodology is generally tied to payroll with the contribution expected to remain constant as a percentage of pay. However, payroll is decreasing since the Plan is partially closed to new entrants. Thus, the recommended contribution will increase as a percentage of pay over time, if all assumptions are met.

The contribution requirement as of July 1, 2019 is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

ACTUARIALLY DETERMINED CONTRIBUTION FOR YEAR BEGINNING JULY 1

		2019		2018	
		Amount	% of Pay	Amount	% of Pay
1.	Total normal cost	$6,023,541	15.80%	$6,137,770	15.94%
2.	Administrative expenses	200,000	0.53%	200,000	0.52%
3.	Expected employee contributions	(2,884,646)	-7.57%	(2,984,088)	-7.75%
4.	Employer normal cost: (1) + (2) - (3)	$3,338,895	8.76%	$3,353,682	8.71%
5.	Actuarial accrued liability	434,547,482		415,902,626	
6.	Actuarial value of assets	234,578,607		228,138,043	
7.	Unfunded/(overfunded) actuarial accrued liability: (5) - (6)	199,968,875		187,764,585	
8.	Payment on projected unfunded/(overfunded) actuarial accrued liability	12,561,088	32.95%	11,591,052	30.11%
9.	Total Town cost: (4) + (8)	$15,899,983	41.71%	$14,944,734	38.82%
10.	Total Pay	$38,122,760		$38,497,587	
11.	Actuarially Determined Contribution for plan years ending June 30, 2020 and June 30, 2019*: (9) adjusted with 3.25% interest	$16,416,732		$15,430,438	

*Actuarially determined contributions are assumed to be paid at the beginning of every year.

Reconciliation of Actuarially Determined Contribution

The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

RECONCILIATION OF ACTUARIALLY DETERMINED CONTRIBUTION FROM JULY 1, 2018 TO JULY 1, 2019

		Amount
Actuarially Determined Contribution as of July 1, 2018		$15,430,438
• Expected amortization increase	$390,000	
• Change due to mortality different than expected	90,000	
• Change due to pay increases less than expected	(220,000)	
• Change due to turnover different than expected	20,000	
• Change due to actual retirements different than expected	50,000	
• Change due to current year loss on investments (20% recognition)	10,000	
• Change due to recognition of prior years' loss on investments	200,000	
• Change due to decrease in assumed rate of return	150,000	
• Change due to other assumptions	150,000	
• Change due to other decreases in normal cost	(10,000)	
• Other Plan actuarial experience	156,294	
Total change		$986,294
Actuarially Determined Contribution as of July 1, 2019		$16,416,732

History of Employer Contributions

A history of the most recent years of contributions is shown below.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2010 – 2020

	Actuarially Determined Contribution (ADC)*	Actual Employer Contribution	
Fiscal Year Ended June 30	Amount	Amount	Percent Contributed
2010	$8,188,649	$8,180,360	99.9%
2011	8,434,252	8,450,588	100.2%
2012	9,206,982	9,206,982	100.0%
2013	9,330,687	9,371,591	100.4%
2014	10,186,709	10,251,091	100.6%
2015	11,045,908	11,045,908	100.0%
2016	11,879,286	11,856,283	99.8%
2017	12,737,344	12,738,134	100.0%
2018	13,706,771	13,706,771	100.0%
2019	15,430,438	- -	- -
2020	16,416,732	- -	- -

*Prior to 2014, this amount was the Annual Required Contribution (ARC)

Risk

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Plan.

- Investment Risk (the risk that returns will be different than expected)

  If the actual return on market value for the next Plan Year were 1% different from the assumed (either higher or lower), the projected unfunded actuarial liability would change by about $500,000 (this excludes the recognition of any historical gains/losses).

  Since the Plan's assets are much larger than contributions, investment performance may create volatility in contribution requirements. For example, for each 1% difference in return from the assumed return, the actuarially determined contribution would increase or decrease by about $30,000.

  The market value rate of return over the last 10 years has ranged from a low of -16.65% to a high of 24.88%.

- Longevity Risk (the risk that mortality experience will be different than expected)

  The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

- Contribution Risk (the risk that actual contributions will be different from actuarially determined contribution)

  The Plan's funding policy requires payment of the actuarially determined contribution. As long as this policy is adhered to, contribution risk is negligible.

- Demographic Risk (the risk that participant experience will be different than assumed)

  Examples of this risk include:

  - Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
  - More or less active participant turnover than assumed.

- Actual Experience Over the Last 5 years and Implications for the Future

  Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past five years:

  The investment gain(loss) for a year has ranged from a loss of $5,803,040 to a gain of $1,396,768.

  The non-investment gain(loss) for a year has ranged from a loss of $9,865,949 to a gain of $5,713,082.

  The funded percentage on the actuarial value of assets has ranged from a low of 54.0% to a high of 58.7% since 2014.

- Maturity Measures

  As pension plans mature, the cash need to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities.

  Currently the Plan has a non-active to active participant ratio of 1.42. For the prior year benefits paid were $6,436,392 more than contributions received. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.

Allocation of Contributions for Fiscal Year Ending June 30, 2020

		Town and Board of Education	Police	Fire	Para-professionals	Dispatchers	Total
1.	Employer normal cost						
	a) Total normal cost	1,196,120	2,085,879	2,432,253	201,116	108,173	6,023,541
	b) Administrative expenses *	90,148	40,230	42,857	23,153	3,612	200,000
	c) Projected employee contributions	756,736	788,541	1,091,810	144,109	103,450	2,884,646
	d) Employer normal cost: (a) + (b) - (c)	$529,532	$1,337,568	$1,383,300	$80,160	$8,335	$3,338,895
	e) Number of participants	549	245	261	141	22	1,218
2.	Actuarial Accrued Liability						
	a) Active	45,603,324	45,490,425	75,141,473	4,450,507	1,770,042	172,455,771
	b) Inactive vested	2,134,676	7,747	104,666	764,099	78,641	3,089,829
	c) Retirees, beneficiaries, and disabled	92,868,675	87,159,614	74,912,608	1,293,212	2,767,773	259,001,882
	d) Total Actuarial Accrued Liability	$140,606,675	$132,657,786	$150,158,747	$6,507,818	$4,616,456	$434,547,482
3.	Assets at Actuarial Value **	$75,902,679	$71,611,688	$81,059,104	$3,513,068	$2,492,068	$234,578,607
4.	Unfunded Accrued Liability: (2d) – (3)	$64,703,996	$61,046,098	$69,099,643	$2,994,750	$2,124,388	$199,968,875
5.	Payment on unfunded Accrued Liability (25-year amortization, effective interest rate 4.21%)						
	a) Payment	4,064,395	3,834,624	4,340,509	188,116	133,444	12,561,088
	b) Amortization years	25	25	25	25	25	25
	c) Interest rate (1.0760 ÷ 1.0325 – 1)	4.21%	4.21%	4.21%	4.21%	4.21%	4.21%
6.	Annual cost as of July 1, 2018 (1d) + (5a)	$4,593,927	$5,172,192	$5,723,809	$268,276	$141,779	$15,899,983
7.	Payroll	$10,767,003	$10,436,140	$12,978,860	$2,599,879	$1,340,877	$38,122,759
8.	Cost as a percent of payroll	42.67%	49.56%	44.10%	10.32%	10.57%	41.71%
9.	Actuarially Determined Contribution (ADC) for fiscal year ending June 30, 2020						
	a) Normal cost and expenses	546,742	1,381,039	1,428,257	82,765	8,606	3,447,409
	b) Amortization payment	4,196,487	3,959,249	4,481,576	194,230	137,781	12,969,323
	c) ADC payable July 1, 2019	$4,743,229	$5,340,288	$5,909,833	$276,995	$146,387	$16,416,732

* *Allocated based on number of participants (excluding inactive non-vested)*

** *Allocated based on ratio of Accrued Liability per group to total Accrued Liability*

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	As of June 30 2018	As of June 30 2017	Change From Prior Year
Active participants in valuation:			
• Number	504	524	-3.8%
• Average age	49.9	49.6	0.3
• Average years of benefit service	16.3	15.9	0.4
• Projected total pay	$38,122,760	$38,497,587	-1.0%
• Projected average pay	75,640	73,469	3.0%
• Account balances	44,571,136	43,357,924	2.8%
• Total active vested participants	412	428	-3.7%
Inactive vested participants	30	27	11.1%
Inactive non-vested participants due a refund	64	70	-8.6%
Retired participants:			
• Number in pay status	580	581	-0.2%
• Average age	71.5	71.3	0.2
• Average monthly benefit	$3,029	$2,928	3.4%
Disabled participants:			
• Number in pay status	29	32	-9.4%
• Average age	56.6	56.5	0.1
• Average monthly benefit	$2,869	$2,747	4.4%
Beneficiaries:			
• Number in pay status	75	76	-1.3%
• Average age	79.1	79.7	-0.6
• Average monthly benefit	$1,736	$1,684	3.1%

EXHIBIT B – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2018
BY AGE, YEARS OF BENEFIT SERVICE, AND AVERAGE PAY

		Years of Benefit Service								
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 & over	35 - 39	40 & over
Under 25	6	6	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	25	19	6	- -	- -	- -	- -	- -	- -	- -
	$90,160	$87,174	$99,619	- -	- -	- -	- -	- -	- -	- -
30 - 34	26	6	19	1	- -	- -	- -	- -	- -	- -
	84,261	- -	89,874	- -	- -	- -	- -	- -	- -	- -
35 - 39	39	6	5	14	13	1	- -	- -	- -	- -
	83,687	- -	- -	$85,967	$89,743	- -	- -	- -	- -	- -
40 - 44	50	2	2	10	28	8	- -	- -	- -	- -
	84,586	- -	- -	- -	85,808	- -	- -	- -	- -	- -
45 - 49	98	3	3	13	28	42	9	- -	- -	- -
	92,001	- -	- -	52,392	85,068	$106,919	- -	- -	- -	- -
50 - 54	79	1	2	10	21	29	10	6	- -	- -
	81,245	- -	- -	- -	65,363	97,006	- -	- -	- -	- -
55 - 59	86	1	3	17	37	22	4	2	- -	- -
	58,109	- -	- -	51,561	44,580	83,564	- -	- -	- -	- -
60 - 64	70	- -	1	12	32	22	1	- -	1	1
	58,890	- -	- -	64,232	48,164	66,339	- -	- -	- -	- -
65 - 69	17	- -	- -	4	9	3	- -	- -	- -	1
	51,649	- -	- -	- -	- -	- -	- -	- -	- -	- -
70 & over	8	- -	- -	1	7	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total	504	44	41	82	175	127	24	8	1	2
	$75,640	$82,053	$75,851	$60,742	$63,373	$92,008	$109,123	- -	- -	- -

EXHIBIT C – RECONCILIATION OF PARTICIPANT DATA

	Active Participants	Inactive Vested Participants	Inactive Non-Vested Participants	Disableds	Retired Participants	Beneficiaries	Total
Number as of July 1, 2017	**524**	**27**	**70**	**32**	**581**	**76**	**1,310**
• New participants	11	N/A	1	N/A	N/A	N/A	12
• Terminations – with vested rights	(7)	7	0	0	0	0	0
• Terminations – without vested rights	(3)	N/A	3	N/A	N/A	N/A	0
• Retirements	(17)	(1)	0	(3)	21	N/A	0
• New disabilities	(1)	0	0	1	N/A	N/A	0
• Died with beneficiary	0	0	0	(1)	(4)	5	0
• Died without beneficiary	0	0	0	0	(19)	(6)	(25)
• Lump sum cash-outs	(3)	(3)	(10)	0	0	0	(16)
• Data adjustments	0	0	0	0	1	0	1
Number as of July 1, 2018	**504**	**30**	**64**	**29**	**580**	**75**	**1,282**

EXHIBIT D – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

		Year Ended June 30, 2018		Year Ended June 30, 2017
Net assets at market value at the beginning of the year		$217,549,656		$201,756,326
Contribution income:				
• Employer contributions	$13,706,771		$12,738,134	
• Employee contributions	3,288,013		3,398,227	
• Less administrative expenses	(211,022)		(203,873)	
Net contribution income		*$16,783,762*		*$15,932,488*
Investment income:		$15,430,952		$21,112,964
Total income available for benefits		**$32,214,714**		**$37,045,452**
Less benefit payments		*($23,431,176)*		*($21,252,122)*
Change in reserve for future benefits		**$8,783,538**		**$15,793,330**
Net assets at market value at the end of the year		**$226,333,194**		**$217,549,656**

Note: Above figures do not include the DROP.

EXHIBIT E – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2018

Year Ended June 30	Employer Contributions	Employee Contributions	Net Investment Return*	Admin. Expenses	Benefit Payments	Actuarial Value of Assets at Year-End
2009	$7,407,017	$3,243,280	($7,244,535)	$197,387	$15,608,801	$170,922,521
2010	8,180,360	3,069,803	8,035,980	121,327	16,322,847	173,764,491
2011	8,450,588	3,202,897	13,936,902	168,672	17,226,184	181,960,021
2012	9,206,982	3,166,597	11,562,844	173,328	18,463,685	187,259,431
2013	9,371,591	3,201,993	11,850,003	169,296	19,311,391	192,202,331
2014	10,251,091	3,233,330	20,707,294	203,350	18,169,153	208,021,544
2015	11,045,908	3,284,777	11,044,858	175,370	19,519,299	213,702,418
2016	11,856,283	3,182,165	11,064,880	202,385	20,542,906	219,060,455
2017	12,738,134	3,398,227	14,397,222	203,873	21,252,122	228,138,043
2018	13,706,771	3,288,013	13,987,978	211,022	23,431,176	234,578,607

* Actuarial basis, net of investment fees

Note: Above figures do not include the DROP.

EXHIBIT F – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Fund is calculated, including: Investment return - the rate of investment yield that the Fund will earn over the long-term future;

	Mortality rates - the death rates of employees and pensioners; life expectancy is based on these rates; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates – the probability of disability retirement at a given age; Withdrawal rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; Salary increase rates - the rates of salary increase due to inflation and productivity growth.
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.
GASB 67 and GASB 68:	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.

Investment Return:	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the actuarial assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

Rationale for Demographic and Noneconomic Assumptions	The current data is reviewed in conjunction with each annual valuation. Based on professional judgment, the following assumptions were changed: ➢ The net investment return assumption was lowered from 7.65% to 7.60% to better reflect future expected experience. ➢ Mortality for males was projected an additional year using Scale BB. The mortality scale used for females was updated from Scale MP-2016 to Scale MP-2017. ➢ The assumption for the incidence of service-related vs. non-service-related disabilities for the Police and Fire groups was changed from 50% service-related / 50% non-service-related to 100% service-related. ➢ The assumption for the incidence of service-related vs. non-service-related deaths for the Police and Fire groups was changed from 75% service-related / 25% non-service related to 100% service-related.
Mortality Rates:	
Males:	RP-2000 Combined Healthy Mortality Table with Blue Collar Adjustment, projected 21 years (previously 20) with Scale BB
Females:	Separate RP-2014 Tables (adjusted back to 2006), projected generationally with Scale MP-2017 (previously, Scale MP-2016). The mortality rates were based on historical and current data, adjusted to reflect estimated future experience and professional judgment.

Termination Rates before Retirement (unisex unless otherwise noted):	(see table below)

Age	Rate (%) Disability: General Employees and Dispatchers	Disability: Police and Fire	Withdrawal: General Employees and Dispatchers	Withdrawal: Paraprofessionals
20	0.02	0.06	10.41	39.93
25	0.03	0.09	6.31	27.71
30	0.03	0.11	4.54	20.70
35	0.04	0.15	3.50	15.63
40	0.07	0.22	2.77	11.54
45	0.11	0.36	2.20	8.07
50	0.18	0.61	1.74	5.06
55	0.30	1.01	1.34	2.39
60	0.49	1.63	1.00	1.19

Note: Paraprofessionals are not eligible for disability benefits, and therefore have no disability assumption separate from the withdrawal rates.

The termination rates and disability rates were based on historical and current data, adjusted to reflect estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of terminations by age and the projected number based on the prior years' assumptions.

Withdrawal rates for Police and Fire: 3.00% per year for the first 10 years of service; none thereafter.

Service-related benefits: 100% of Police and Fire deaths and disabilities are assumed to be service-related (previously, 75% for service-related deaths and 50% for service-related disabilities). For the other groups, no service-related decrements are assumed.

Retirement Rates:	

General Employees / *Paraprofessionals*

Age	Rate*	Age	Rate*
Under 55	0%	Under 65	0%
55 – 59	2%	65 – 69	10%
60 - 61	5%	70 – 71	10%
62 – 63	10%	72 – 74	35%
64	25%	75	100%
65 – 69	45%		
70	100%		

**If age is less than 65, rates are increased to 40% upon eligibility for the Rule of 85.*

Police Employees / *Fire Employees*

Years of Service	Rate*	Years of Service	Rate*
Less than 25	0%	Less than 25	0%
25	90%	25	40%
26-29	15%	26-29	15%
30+	35%	30+	35%

**Rate increases to 100% upon attainment of age 65.*

Retirement rates for Dispatchers:	100% upon first becoming eligible for Normal Retirement, but not prior to age 62
Retirement Age for Inactive Vested Participants:	Age 62; Age 65 for Paraprofessionals The retirement rates were based on historical and current data, adjusted to reflect estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior years' assumptions.
Percent Married:	50% of the male participants and 20% of female participants are assumed to be married and electing a Joint & Survivor annuity.
Age of Spouse:	Females three years younger than males.

Net Investment Return:

7.60% (previously, 7.65%). The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment, in consultation with the Town and its asset advisors. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.

Pay Increases:

General, Dispatcher, and Paraprofessional Employees		*Police Employees*		*Fire Employees*	
Age	**Rate**	**Age**	**Rate**	**Age**	**Rate**
20	9.00%	20	20.00%	20	22.00%
25	7.38%	25	12.92%	25	14.71%
30	5.75%	30	5.83%	30	7.42%
35	4.13%	35	3.00%	35	4.50%
40	2.50%	40	3.00%	40	4.50%
45	2.50%	45	3.00%	45	4.50%
50	2.50%	50	3.00%	50	4.50%
55	2.50%	55	3.00%	55	4.50%
60	2.50%	60	3.00%	60	4.50%

Liability load for unused sick and vacation pay:

To approximate the effect of including overtime and unused sick and vacation pay in the final average salary, plan liabilities are increased by the percentages listed below:

	Retirement Liability	**Death Liability**	**Disability Liability**	**Withdrawal Liability**
General Employees and Dispatchers hired before 12/01/1996	13.0%	6.0%	6.0%	2.0%
General Employees and Dispatchers hired after 12/01/1996	3.0%	2.0%	2.0%	2.0%
Fire hired before 01/01/1995	25.0%	12.0%	12.0%	2.0%
Fire hired after 01/01/1995 (overtime only)	5.0%	0.0%	0.0%	0.0%
Police	16.0%	12.0%	12.0%	2.0%
Paraprofessionals	0.0%	0.0%	0.0%	0.0%

Administrative Expenses:	$200,000 per year, added to normal cost. The annual administrative expenses were based on historical and current data, adjusted to reflect estimated future experience and professional judgment.
Actuarial Value of Assets	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized over a five-year period further adjusted, if necessary, to be within 20% of the market value. On July 1, 2014, there was a one-time write-up to 97% of the market value of assets.
Actuarial Cost Method:	Entry Age Normal Actuarial Cost Method. Entry Age is the age at the time the participant commenced employment. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by service, with Normal Cost determined as if the current benefit accrual rate had always been in effect.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

General Employees (Town & Board of Education)	
Plan Status:	Closed to new hires effective July 1, 2006
Normal Retirement:	
Eligibility requirement	For employees hired prior to March 1, 1983, the later of age 62 and 8 years of service. For employees hired on or after March 1, 1983, the later of age 65 and the completion of 10 years of service, or age 62 and the completion of 25 years of service if earlier.
Amount	2.33% of Final Average Salary per year of service to a maximum of 70% of final average salary. Final Average Salary is defined as the average of pay earned during the highest 36 consecutive months of employment prior to termination. Final Average Salary includes a lump sum amount for unused vacation (40 days maximum) and sick leave (90 days maximum) at retirement for those hired prior to December 1, 1996. For employees hired on or after December 1, 1996, Final Average Salary includes a lump sum amount for unused vacation pay (40 days maximum) only. Minimum monthly benefit is $125 after 20 years of service.
Early Retirement:	
Age requirement	For employees hired prior to March 1, 1983: age 52. For employees hired on or after March 1, 1983: age 55.
Service requirement	For employees hired prior to March 1, 1983: 8 years. For employees hired on or after March 1, 1983: 10 years.
Amount	Normal accrued pension reduced by 0.4167% for each month of age less than normal retirement age. In addition, unreduced benefits are available upon meeting the Rule of 85
Benefit Service:	Elapsed time including years and completed months from plan entry.
Non-service connected disability:	
Age requirement	None
Service requirement	10 years
Amount	2.33% of Final Average Salary multiplied by years and full months of credited service, payable immediately.

Service connected disability:	
Age requirement	None
Service requirement	None
Amount	50% of Final Average Salary or annual pay (whichever is greater) plus 2.33% of such salary for each year of service in excess of 25 years, subject to a maximum pension of 70% of Final Average Salary, payable immediately. Payments from this benefit plus Workers' Compensation and Social Security may not exceed 100% of final average salary at disability.
Vesting:	
Age requirement	None
Service requirement	For employees hired prior to March 1, 1983: 8 years. For employees hired on or after March 1, 1983: 10 years.
Amount	For employees hired prior to March 1, 1983: normal pension accrued payable at age 62, or a reduced early retirement benefit accrued payable as early as age 52. For employees hired on or after March 1, 1983: normal pension accrued payable at age 65 or a reduced early retirement benefit payable as early as age 55.
Termination benefit	Return of contributions with interest if not vested, or if vested, employee does not elect to receive a retirement benefit.
Spouse's Pre-retirement death benefit:	
Age requirement	None
Service requirement	10 years and active participant
Amount	80% of the benefit employee would have received upon retirement with a life annuity the day before the employee died. The benefit is payable immediately.
Pre-retirement death benefit:	
Eligibility	Not eligible for Spouse's pre-retirement death benefit
Amount	Return of employee contributions
Post-retirement death benefit:	
Amount	100% of employee contributions, with interest, less benefits paid.

Employee contributions:	8% of regular compensation prior to February 1, 2016; after February 1, 2016, 8.5% of regular compensation. No contributions are required after 30 years of plan participation. Interest on employee contributions was credited at 4.00% per year prior to July 1, 2015. For the 2015 plan year, interest on employee contributions was credited at 0%. Effective July 1, 2016, the contributions are credited at 120% of the Federal Mid-Term rate as of July. Employees who terminate after becoming vested will receive interest on their contributions through their retirement date. Employees who terminate before becoming vested will only receive interest on their contributions through their date of termination.
Cost-of-Living:	Retirees and beneficiaries who retired prior to January 1, 1991 receive a 2% annual cost-of-living increase each year. Retirees and beneficiaries who retired on or after January 1, 1991 but prior to July 1, 2005 receive a 1% annual cost-of-living increase each year. Retirees and beneficiaries who retired on a Disability Pension after December 1, 1996 but prior to December 31, 2005 receive a 1% annual cost-of-living increase each year. Participants retiring after July 1, 2005 but prior to July 2, 2025 receive a 2% annual cost-of-living increase; the first increase is paid with the January payment that is five full years after retirement. Participants retiring on or after July 1, 2025 receive a 1.5% annual cost-of-living increase; the first increase is paid with the January payment that is five full years after retirement.
Participation	The plan was closed to new entrants on January 1, 2006.

Paraprofessional Employees	
Plan Status:	Closed to new hires effective July 1, 2015
Normal Retirement:	
Eligibility requirement	The earliest of the following conditions: (1) Attainment of age 65 and completion of 10 Years of Credited Service (2) Attainment of age 62 and completion of 25 Years of Credited Service; or (3) The Rule of 85.
Amount	2.2% of the employee’s Final Average Salary multiplied by the number of years and full months of his or her Credited Service, not to exceed 70% of the employee’s Final Average Salary. Final Average Salary is defined as the average of pay earned during the highest 36 consecutive months of employment prior to termination. Lump sum payouts of sick and vacation pay are not included in the calculation of Final Average Salary.

Benefit Service:	Elapsed time including years and completed months from plan entry.
Vesting:	
Age requirement	None
Service requirement	10 years
Amount	Monthly benefit payable at Normal Retirement.
Termination benefit	Return of contributions with interest if not vested, or if vested employee does not elect to receive a retirement benefit.
Pre-retirement death benefit:	Return of employee contributions with interest.
Post-retirement death benefit:	Return of employee contributions, with interest, less benefits paid.
Employee contributions:	6% of regular compensation. Contributions are no longer required after 31 years and 10 months of plan participation. Interest on employee contributions was credited at 4.00% per year prior to July 1, 2015. For the 2015 plan year, interest on employee contributions was credited at 0%. Effective July 1, 2016, the contributions are credited at 120% of the Federal Mid-Term rate as of July.
Participation	Paraprofessionals become participants in the plan upon date of hire. Participation is a condition of employment and participants are required to make contributions to the plan. Effective July 1, 2015, new hires are not eligible to participate.

Dispatchers	
Plan Status:	Ongoing
Normal Retirement:	
Eligibility requirement	The earliest of the following conditions: (1) Attainment of age 65 and completion of 5 Years of Credited Service (2) 25 Years of Credited Service; or (3) The Rule of 75.
Amount	2.2% of Final Average Salary multiplied by years an full months of Credited Service, not to exceed 70% of Final Average Salary. Final Average Salary is the average of pay during the highest 36 consecutive months of employment prior to termination. Final Average Salary includes a lump sum amount for unused vacation (40 days maximum) and sick leave (90 days maximum) at retirement for those hired prior to December 1, 1996. For employees hired on or after December 1, 1996, Final Average Salary includes only a lump sum amount for unused vacation pay (40 days maximum).

Benefit Service:	Elapsed time including years and completed months from plan entry.
Early Retirement:	
Age requirement	55
Service requirement	5 years
Amount	Normal accrued pension reduced by 0.4167% for each month of age less than normal retirement age.
Vesting:	
Age requirement	None
Service requirement	5 years
Amount	Monthly benefit payable at Normal Retirement
Termination benefit	Return of contributions with interest if not vested, or if vested employee does not elect to receive a retirement benefit.
Non-service connected disability:	
Age requirement	None
Service requirement	5 years
Amount	2.2% of Final Average Salary multiplied by years and full months of credited service, payable immediately.
Service connected disability:	
Age requirement	None
Service requirement	None
Amount	50% of Final Average Salary or annual rate of pay, whichever is greater, plus 2.2% of such salary for each year of service in excess of 25 years, subject to a maximum pension of 70% of final average salary, payable immediately. Payments from this benefit plus Workers' Compensation and Social Security may not exceed 100% of Final Average Salary at disability.

Spouse's pre-retirement death benefit:	
Age requirement	55
Service requirement	5 years, die while in active service
Amount	100% of the benefit employee would have received upon retirement with a 100% Joint and Survivor the day before death.
Pre-retirement death benefit for unmarried or non-vested participants:	Return of employee contributions with interest
Post-retirement death benefit:	
Amount	100% of employee contributions, with interest, less benefits paid.
Employee contributions:	8% of regular compensation. Contributions are no longer required after 31 years and 10 months of plan participation. Interest on employee contributions was credited at 4.00% per year prior to July 1, 2015. For the 2015 plan year, interest on employee contributions was credited at 0%. Effective July 1, 2016, the contributions are credited at 120% of the Federal Mid-Term rate as of July. Employees who terminate after becoming vested will receive interest on their contributions through their retirement date. Employees who terminate before becoming vested will only receive interest on their contributions through their date of termination.
Participation	New employees under age 45 are required to participate in the plan within three months of employment. New employees over age 45 are not required to participate, but must elect to do so within two years of their date of hire.

Police and Fire Employees	
Plan Status:	Ongoing
Normal Retirement:	
Eligibility requirement	25 years of service regardless of age, or mandatory retirement at age 65 with the completion of 10 years of service for Fire and 15 years of service for Police.
Amount	
Police Plan	2.5% of Final Average Salary per year of service, to a maximum of 75% of Final Average Salary. Final Average Salary is defined as the average of Regular Compensation (including overtime, holiday, longevity, and vacation) earned during the highest 36 consecutive months of employment prior to termination. Final Average Salary includes a lump sum amount for unused vacation and sick leave at retirement. The minimum monthly benefit is $125.
Fire Plan	Same as Police, except that a lump sum amount for unused vacation and sick leave is not included in the calculation of Final Average Salary if the employee was hired on or after January 1, 1995. For members hired on or after May 18, 2017, the multiplier is 2.33%. The annual benefit will not exceed 100% of the member's base salary (including annual stipends, annual holiday pay, and the paramedic stipend) at retirement.
Benefit Service:	Elapsed time including years and completed months from plan entry.
Deferred Retirement Option Plan:	
Eligibility requirement	Employees in service on or after July 1, 2005 with 25 or more years of service but less than 30 years of service.
Amount	96% of the participant's benefit at Normal Retirement. During the DROP period, the payments will be made to a separately designated DROP account while the member remains active. At the end of the DROP period, the monthly benefit increases to 100% and the member is eligible to receive their accumulated DROP payments.
Non-service connected disability:	
Age requirement	None
Service requirement	5 years
Amount	Normal pension based on service accrued and Final Average Salary at disability, payable immediately. The minimum benefit is 20% of Final Average Salary.

Service connected disability:	
Age requirement	None
Service requirement	None
Amount	For employees with fewer than 20 years of credited service, 50% of the greater of the employee's Final Average Salary or regular compensation. For employees with 20 or more years of credited service, this benefit is calculated in the same manner as the normal retirement benefit. Payments from this benefit plus Workers'' Compensation may not exceed 100% of Final Average Salary at disability. For *Police* only, regular compensation includes any lump sum of sick or unused vacation time.
Vesting:	
Age requirement	None
Service requirement	Police: 15 years Fire: 10 years
Amount	Normal pension accrued, payable when employee would have met normal retirement criteria if he/she had continued working.
Termination benefit	Return of contributions with interest if not vested.
Dependent's benefit – Non-service connected:	
Age requirement	None
Service requirement	5 years, die while in active service
Amount	Normal pension based on service accrued and final average salary at death. Minimum benefit is 20% of final average salary. If a participant passes away before becoming vested, return of employee contributions with interest.
Post-retirement death benefit:	
Lump-sum-benefit	100% of employee contributions, with interest, less benefits paid (if dependent's benefit is not paid).
Dependent's benefit	75% of the pension the employee was receiving with a minimum guarantee of the employee contributions with interest.

Employee contributions:	8% of regular compensation. For Fire, 9% effective May 18, 2017. No contributions are required after 30 years of plan participation. Interest on employee contributions was credited at 4.00% per year prior to July 1, 2015. For the 2015 plan year, interest on employee contributions was credited at 0%. Effective July 1, 2016, the contributions are credited at `120% of the Federal Mid-Term rate as of July. Employees who terminate after becoming vested will receive interest on their contributions through their retirement date. Employees who terminate before becoming vested will only receive interest on their contributions through their date of termination.
Cost-of-Living:	
Police	2% annual COLA for retirements prior to January 1, 1991. 1% annual COLA for retirements between January 1, 1991 and December 31, 1999. 2% per year for participants retiring after January 1, 2000. The first increase is paid in the fifth year of retirement.
Fire	2% annual COLA for retirements prior to January 1, 1991. 1% annual COLA for retirements between January 1, 1991 and June 30, 2005. 1% annual increase beginning in the fifth year of retirement, increasing to 2% annually beginning in the 9th year of retirement for participants retiring on or after July 1, 2005. For members hired on or after May 18, 2017, 1% annual increase beginning in the 7th year of retirement.
Participation:	New employees under age 45 are required to participate in the plan within three months of employment. New employees over age 45 are not required to participate, but must elect to do so within two years of their date of hire.