



THE FIREFIGHTERS' PENSION TRUST FUND OF THE CITY OF STAMFORD

ACTUARIAL VALUATION REPORT

JULY 1, 2017



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Report Prepared By:

Evan W. Woollacott, Jr.
Vice President and Consulting Actuary
860.856.2118
ewoollacott@hhconsultants.com

Yelena Pelletier
Actuary
860.856.2066
ypelletier@hhconsultants.com

Dan McCarthy
Senior Actuarial Associate
860.856.2140
dmccarthy@hhconsultants.com



Executive Summary

	July 1, 2017	July 1, 2016
Number of members		
Active employees	257	274
Terminated vested members	2	2
Retired, disabled and beneficiaries	234	227
Total	493	503
Covered employee payroll	22,040,167	22,756,531
Average plan salary	85,759	83,053
Actuarial present value of future benefits	237,379,485	226,619,694
Actuarial accrued liability	191,731,469	180,482,066
Plan assets		
Market value of assets	129,663,624	116,799,798
Actuarial value of assets	145,237,334	142,545,253
Unfunded accrued liability	46,494,135	37,936,813
Funded ratio	75.8%	79.0%
Actuarially determined employer contribution (ADEC)		
Fiscal year ending	2019	2018
ADEC	8,069,000	6,980,000



Valuation Results and Highlights

Purpose of the Valuation

The purpose of the valuation is to develop the Actuarially Determined Employer Contribution (ADEC).

The ultimate cost of a pension plan is based primarily on the level of benefits promised by the plan. The pension fund's investment earnings serve to reduce the cost of plan benefits and expenses. Thus,

$$\text{Ultimate cost} = \text{Benefits Paid} + \text{Expenses Incurred} - \text{Investment Return} - \text{Employee Contributions}$$

The actuarial cost method distributes this ultimate cost over the working lifetime of current plan participants. By means of this budgeting process, costs are allocated to both past and future years, and a cost is assigned to the current year. The current year's allocated cost, or normal cost, is the building block upon which the actuarially determined employer contribution is developed. The July 1, 2017 valuation produces the contribution for the fiscal year ending 2019.

Information Available in the Valuation Report

The Executive Summary is intended to emphasize the notable results of the valuation from the perspective of the Plan Sponsor. Supporting technical detail is documented in Results of the Valuation, Supporting Exhibits and Description of Actuarial Methods and Assumptions. A concise summary of the principal provisions of the Plan is outlined in Summary of Plan Provisions.

Changes Reflected in the Valuation

The investment rate of return assumption was lowered from 7.25% to 7.20%. This change increased liabilities by about \$1.2 million.

Cash Contribution for Fiscal Year Ending 2019

The City cost is:	2019 Fiscal Year
	\$8,069,000

Liability Experience During Period Under Review

The plan experienced a net actuarial loss on liabilities of \$3,395,189 since the prior valuation. The loss was primarily due to larger than expected salary increases and Medicare Part B reimbursement increases, and benefit increases as a result of retroactive pay increases for recent retirees.



Asset Experience During Period Under Review

	2017 Fiscal Year
Market Value Basis	14.2%
Actuarial Value Basis	4.5%

The Actuarial Value of assets, rather than the Market Value, is used to determine plan contributions. The Actuarial Value spreads the asset volatility by recognizing 20% of the difference each year, thereby smoothing out fluctuations that are inherent in the Market Value.



Certification

This report presents the results of the July 1, 2017 Actuarial Valuation for The Firefighters' Pension Trust Fund of the City of Stamford (the Plan) for the purpose of estimating the funded status of the Plan and determining the Actuarially Determined Employer Contribution (ADEC) for the fiscal year ending June 30, 2019. This report is intended to satisfy the requirements of Connecticut General Statute 7-450a. This report may not be appropriate for any other purpose.

The valuation has been performed in accordance with generally accepted actuarial principles and practices. It is intended to comply with all applicable Actuarial Standards of Practice.

I certify that the actuarial assumptions and methods that were selected by me and represent my best estimate of anticipated actuarial experience under the Plan.

In preparing this valuation, I have relied on employee data provided by the Plan Sponsor, and on asset and contribution information provided by the Trustee. I have audited neither the employee data nor the financial information, although I have reviewed them for reasonableness.

The results in this valuation report are based on the Plan as summarized in the *Summary of Plan Provisions* section of this report and the actuarial assumptions and methods detailed in the *Description of Actuarial Methods and Assumptions* section of this report.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as, but not limited to, 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. Due to the limited scope of this report, an analysis of the potential range of such future measurements has not been performed.

I have no relationship with the employer or the Plan that would impair, or appear to impair, my objectivity in performing the work presented in this report. I am a member of the American Academy of Actuaries and meet its Qualification Standards to render the actuarial opinion contained herein.

Evan W. Woollacott, Jr., FCA, MAAA
Enrolled Actuary 17-04513

February 19, 2018

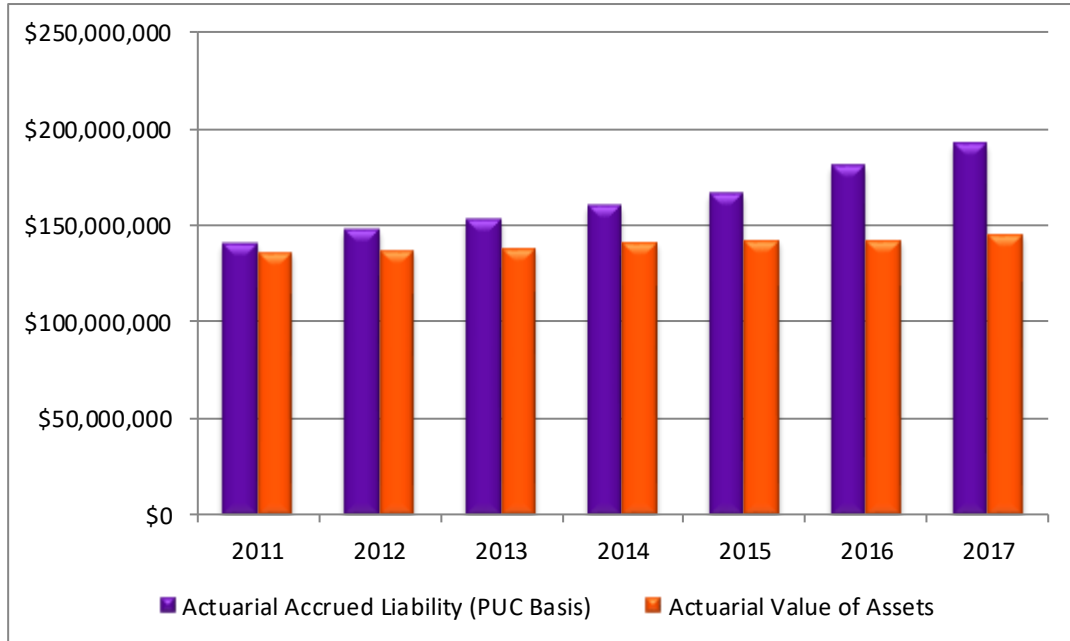


Development of Unfunded Accrued Liability and Funded Ratio

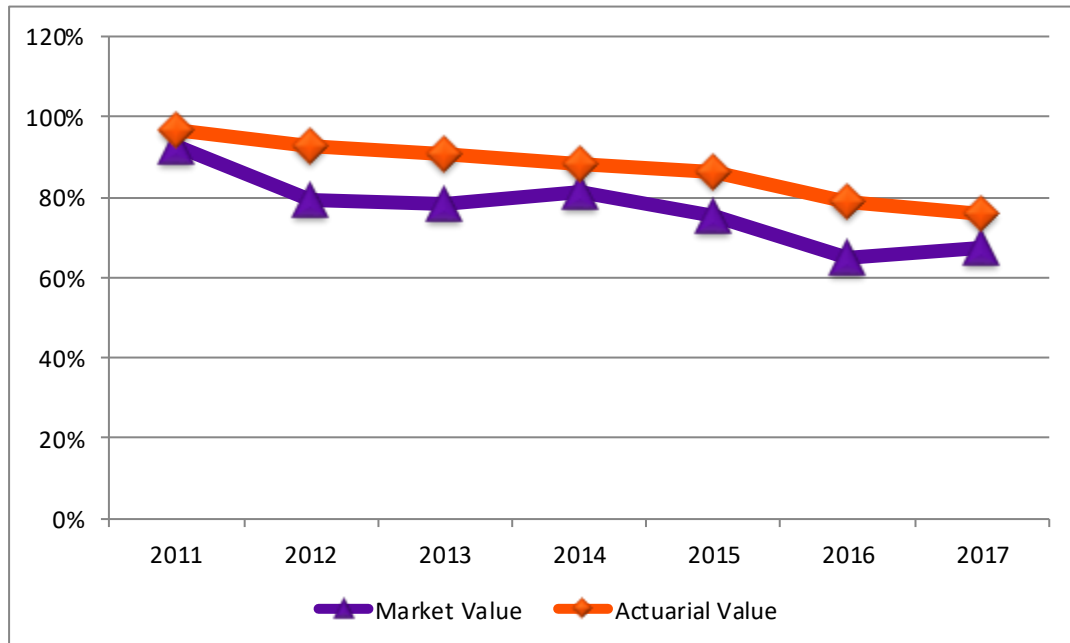
	July 1, 2017	July 1, 2016
Actuarial accrued liability for inactive members		
Retired, disabled and beneficiaries	\$108,494,058	\$95,032,487
Terminated vested members	1,115,497	1,032,742
Total	109,609,555	96,065,229
Actuarial accrued liability for active employees	82,121,914	84,416,837
Total actuarial accrued liability	191,731,469	180,482,066
Actuarial value of assets	145,237,334	142,545,253
Unfunded accrued liability	46,494,135	37,936,813
Funded ratio	75.8%	79.0%



Actuarial Accrued Liability vs. Actuarial Value of Assets



Funded Ratio





Determination of Normal Cost and Actuarially Determined Employer Contribution

	July 1, 2017		July 1, 2016	
	Cost	Percent of payroll	Cost	Percent of payroll
Gross normal cost	\$3,892,380	17.1%	\$3,938,391	16.9%
Estimated employee contributions	(1,211,840)	-5.3%	(1,240,212)	-5.3%
Estimated administrative expenses	140,000	0.6%	85,000	0.3%
City's normal cost	2,820,540	12.4%	2,783,179	11.9%
Amortization of unfunded accrued liability	5,175,010	22.7%	4,122,924	17.7%
Contribution before adjustment as of the valuation date	7,995,550	35.1%	6,906,103	29.6%
Contribution rounded to nearest \$1,000	7,996,000		6,906,000	
Estimated valuation year payroll for actives not yet at 100% assumed retirement age	22,786,567		23,337,969	
Fiscal year ending	2019		2018	
Adjustment for interest and inflation	73,000		74,000	
Actuarially determined employer contribution	8,069,000		6,980,000	

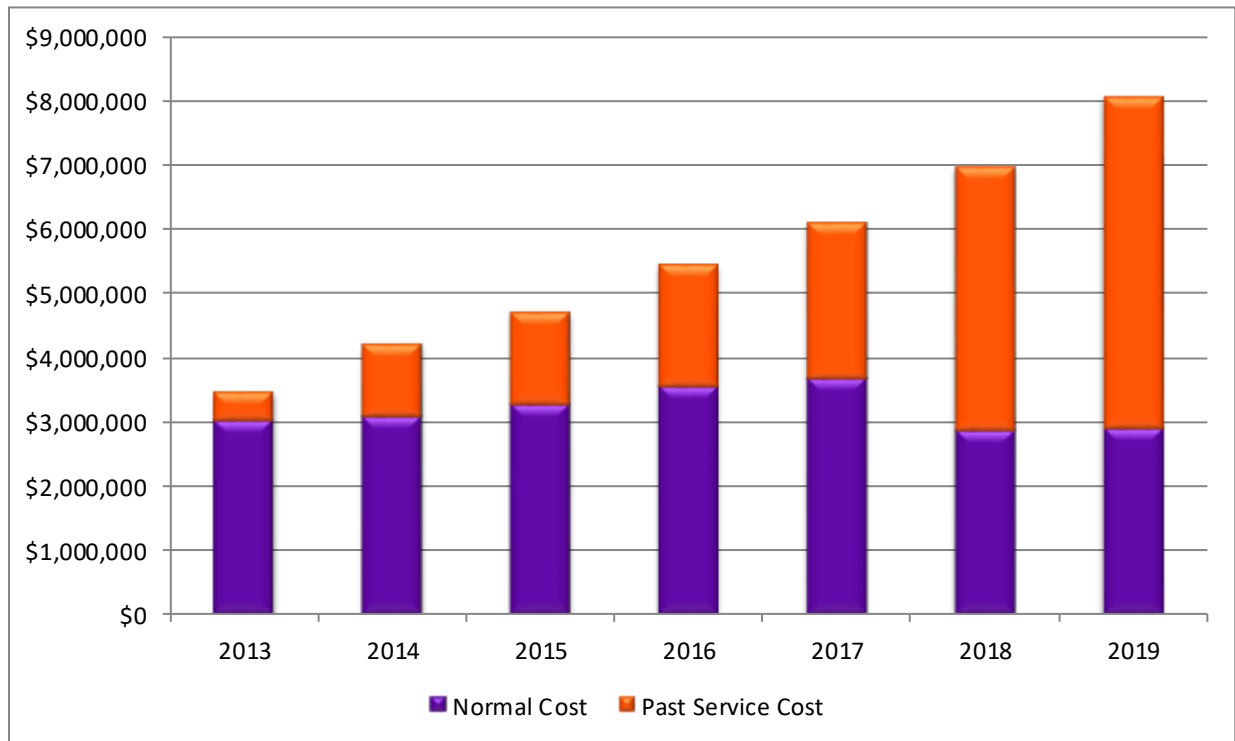


Contribution Change

Valuation Contribution Change		
Contribution before adjustment as of July 1, 2016		\$6,906,000
Increase due to actuarial return on assets	\$419,000	
Increase due to liability losses	353,000	
Expected increase in normal cost	77,000	
Increase due to assumption or method changes	162,000	
Administrative expense Increase	55,000	
Miscellaneous increase	24,000	
Total increase in contribution		1,090,000
Contribution before adjustment as of July 1, 2017		7,996,000



Actuarially Determined Employer Contribution





Determination of Actuarial Gain/Loss

Actuarial Gain / Loss	
Expected unfunded accrued liability July 1, 2017	
Expected unfunded accrued liability July 1, 2017	
Unfunded accrued liability July 1, 2016	37,936,813
Gross normal cost July 1, 2016	4,023,391
City and employee contributions for 2016-2017	(6,683,551)
Interest at 7.25% to July 1, 2017	<u>2,619,884</u>
Expected unfunded accrued liability July 1, 2017	37,896,537
Actuarial (gain) / loss July 1, 2017	<u>7,426,449</u>
Actual unfunded accrued liability July 1, 2017, prior to plan provision, assumption and method changes	45,322,986
Sources of (gain) / loss	
Assets	4,031,260
Liabilities	<u>3,395,189</u>
Total (gain) / loss	7,426,449
Assumption and method changes since prior valuation	<u>1,171,149</u>
Actual unfunded accrued liability July 1, 2017, after plan provision, assumption and method changes	46,494,135



Development of Asset Values

Summary of Fund Activity	
1. Beginning market value of assets July 1, 2016	
Trust assets	\$116,799,798
2. Contributions	
City contributions during year	5,140,000
Employee contributions during year	<u>1,543,551</u>
Total for plan year	6,683,551
3. Disbursements	
Benefit payments during year	10,278,617
Administrative expenses during year	<u>218,673</u>
Total for plan year	10,497,290
4. Net investment return	
Interest and dividends	1,029,968
Net appreciation (depreciation)	16,886,208
Investment-related expenses	<u>(1,238,611)</u>
Total for plan year	16,677,565
5. Ending market value of assets July 1, 2017	
Trust assets: (1) + (2) - (3) + (4)	129,663,624
6. Approximate rate of return	
	14.2%



Determination of the Actuarial Value of Assets	
1. Actuarial value of assets July 1, 2016	\$ 142,545,253
2. City contributions during 2016-2017	5,140,000
3. Employee contributions during 2016-2017	1,543,551
4. Benefit payments and administrative expenses during 2016-2017	(10,497,290)
5. Expected return during 2016-2017	<u>10,399,247</u>
6. Expected actuarial value of assets July 1, 2017	149,130,761
7. Market value of assets July 1, 2017	129,663,624
8. Appreciation (depreciation) recognized: 20% x [(7) - (6)]	(3,893,427)
9. Preliminary actuarial value of assets July 1, 2017: (6) + (8)	145,237,334
10. Preliminary actuarial value of assets as a percentage of market value of assets	112.0%
11. Actuarial value of assets July 1, 2017	145,237,334
2016-2017 return on actuarial value of assets	4.5%

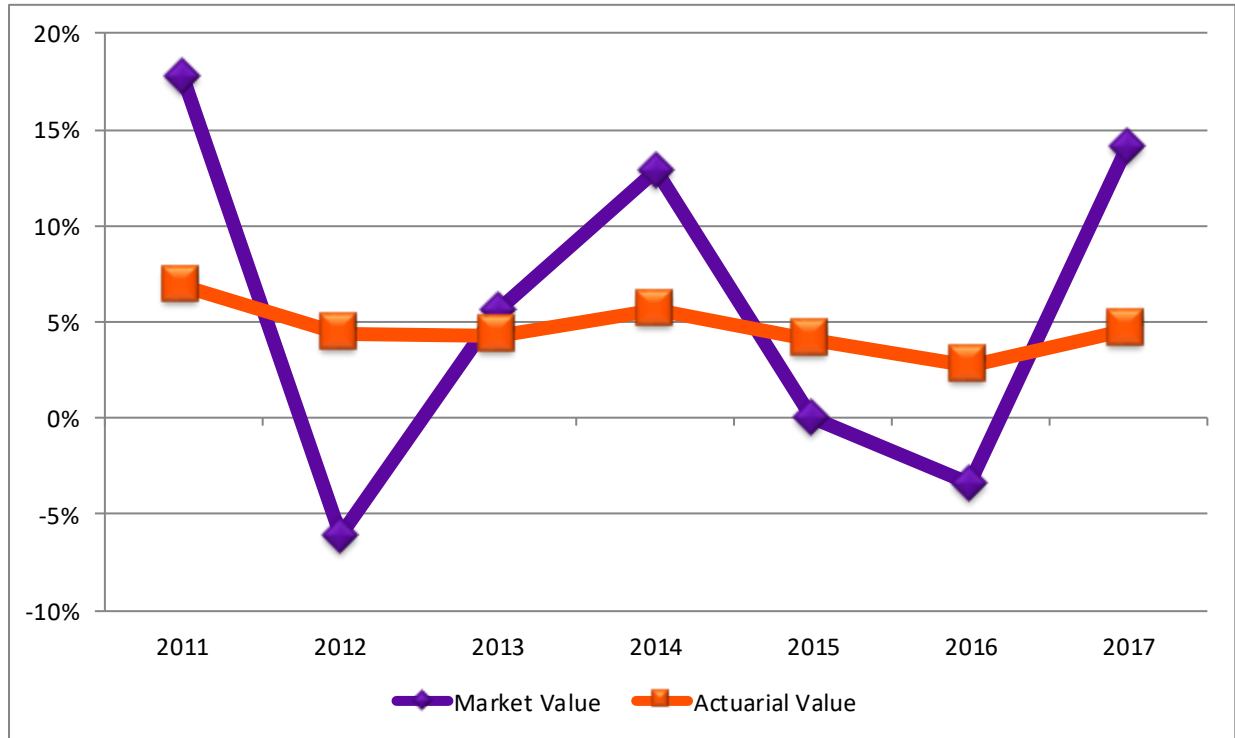


Rate of Return on Market Value of Assets				
Period Ending June 30	Average Annual Effective Rate of Return			
	1 Year	3 Years	5 Years	10 Years
2008	N/A	N/A	N/A	N/A
2009	N/A	N/A	N/A	N/A
2010	N/A	N/A	N/A	N/A
2011	17.7%	N/A	N/A	N/A
2012	-6.1%	N/A	N/A	N/A
2013	5.6%	5.3%	N/A	N/A
2014	12.9%	3.8%	N/A	N/A
2015	0.0%	6.0%	5.7%	N/A
2016	-3.4%	2.9%	1.6%	N/A
2017	14.2%	3.3%	5.6%	N/A

Rate of Return on Actuarial Value of Assets				
Period Ending June 30	Average Annual Effective Rate of Return			
	1 Year	3 Years	5 Years	10 Years
2008	N/A	N/A	N/A	N/A
2009	N/A	N/A	N/A	N/A
2010	N/A	N/A	N/A	N/A
2011	6.9%	N/A	N/A	N/A
2012	4.4%	N/A	N/A	N/A
2013	4.3%	5.2%	N/A	N/A
2014	5.6%	4.8%	N/A	N/A
2015	4.1%	4.7%	5.1%	N/A
2016	2.7%	4.2%	4.2%	N/A
2017	4.5%	3.8%	4.3%	N/A



Actual Rate of Return on Assets





Target Allocation and Expected Rate of Return July 1, 2017

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*	Weighting
Large Cap Equities	35.00%	4.65%	1.63%
International Equities	20.00%	5.50%	1.10%
Small Cap Equities	15.00%	5.50%	0.83%
High Quality Bonds	14.00%	1.95%	0.27%
International Income	2.00%	2.00%	0.04%
High Yield	2.00%	3.25%	0.07%
Emerging Markets	2.00%	3.75%	0.08%
Alternative Investments	10.00%	5.00%	0.50%
	100.00%		4.52%
Long-Term Inflation Expectation			2.75%
Long-Term Expected Nominal Return			7.27%

**Long-Term Returns are provided by HHIA. The returns are arithmetic means.*

The long-term expected rate of return on pension plan investments was determined using a building block method in which best-estimate ranges of expected future real rates of return are developed. Best estimates of the real rates of return for each major asset class are included in the pension plan's target asset allocation.

The information above is based on geometric means and does not reflect additional returns through investment selection, asset allocation and rebalancing. The results support a rate between 7.00% and 7.50%. An expected rate of return of 7.20% was used.



Amortization of Unfunded Liability

Schedule of Amortization Bases					
	Date established	Original amount	Amortization installment	Years remaining	Present value of remaining installments as of July 1, 2017
Initial base	July 1, 2014	\$18,571,239	\$1,931,316	12	\$16,270,447
2015 base	July 1, 2015	5,282,184	549,321	13	4,866,276
2016 base	July 1, 2016	15,791,978	1,642,289	14	15,213,711
2017 base	July 1, 2017	10,143,701	1,052,084	15	10,143,701
Total			5,175,010		46,494,135



Member Data

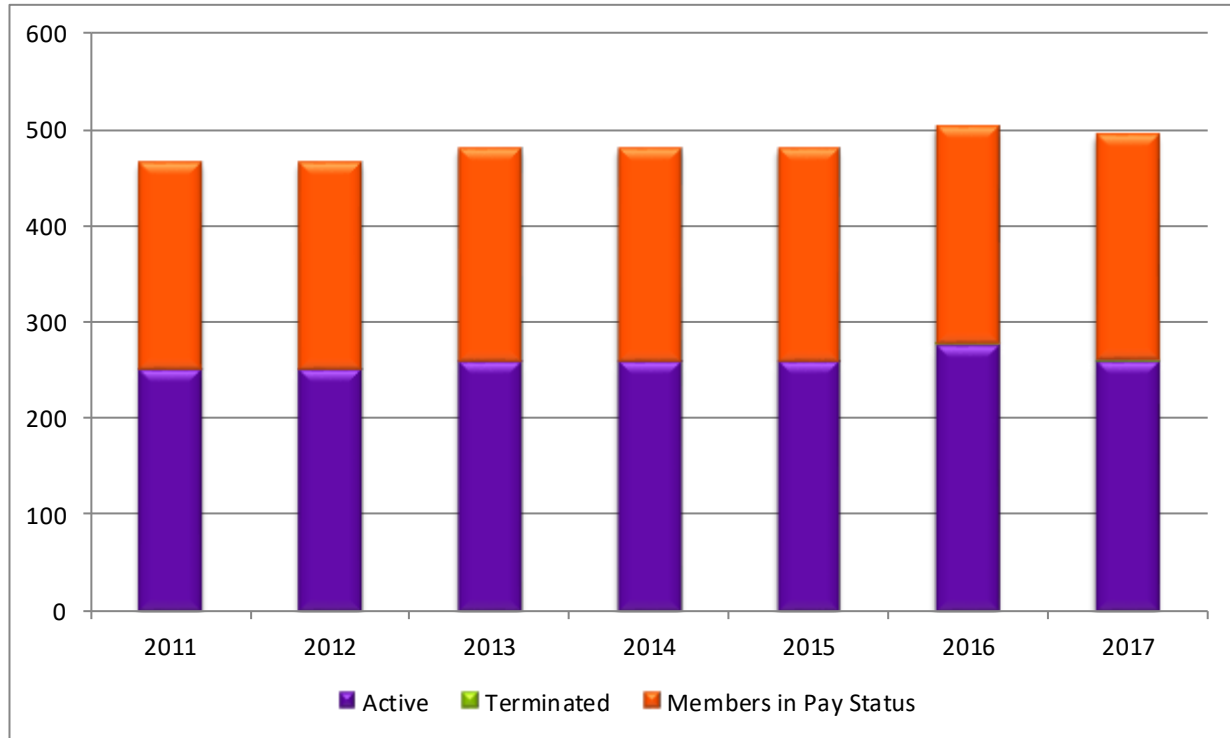
The data reported by the Plan Sponsor for this valuation includes 257 active employees who met the Plan's minimum age and service requirements as of July 1, 2017.

Member Data				
	Active	Terminated vested	Members in pay status	Total
Total members July 1, 2016	274	2	227	503
Adjustments	0	0	0	0
Retirements	-14	0	+14	0
Disabilities	-2	N/A	+2	0
Terminations				
Vested	0	0	N/A	0
Lump sum payments	0	0	N/A	0
Due contributions only	-1	N/A	N/A	-1
Deaths				
With death benefit	0	0	-1	-1
Without death benefit	0	0	-10	-10
Transfers	0	0	N/A	0
Rehires	0	0	N/A	0
New beneficiaries	N/A	N/A	+2	+2
New entrants	0	N/A	N/A	0
Total members July 1, 2017	257	2	234*	493

* Includes 1 alternate payee receiving benefits



Member Counts by Status





Member Data			
	Active	Terminated vested	Members in pay status
Average age			
July 1, 2016	45.9	41.0	73.5
July 1, 2017	45.9	42.2	73.0
Average service			
July 1, 2016	16.9	N/A	N/A
July 1, 2017	16.9	N/A	N/A
Covered employee payroll			
July 1, 2016	\$22,756,531	N/A	N/A
July 1, 2017	22,040,167	N/A	N/A
Total annual benefits			
July 1, 2016	N/A	\$95,796	\$9,477,840
July 1, 2017	N/A	95,796	10,613,602



Description of Actuarial Methods

Market Value and Expected Actuarial Value by recognizing 20% of the difference each year. The Actuarial Value is adjusted, if necessary, to be within the range of 70% and 130% of the Market Value of assets.

Actuarial Cost Method

- A. Changes in Actuarial Cost Method: None.
- B. Description of Current Actuarial Cost Method: Projected Unit Credit

Normal Cost: Under this method, the normal cost equals the total present value of the benefits accruing for all members during the upcoming year, increased to reflect salaries projected to the assumed retirement date.

Unfunded Accrued Liability: The actuarial accrued liability equals the present value of all benefits accrued to date, increased to reflect salaries for all active members. The actuarial accrued liability is reduced by plan assets to develop the unfunded accrued liability.

We have established the July 1, 2014 unfunded accrued liability as a separate base, and will amortize it to completion over 15 years. Future changes in the unfunded accrued liability will be amortized separately, assuming a fresh 15-year amortization each valuation.

Experience Gains and Losses: All experience gains and losses (the financial effect of the difference between the actual experience during the prior period and the result expected by the actuarial assumptions for that prior period) appear directly in the actuarial accrued liability and are amortized at the same rate the plan is amortizing the remaining unfunded accrued liability.



Description of Actuarial Assumptions

Changes in Actuarial Assumptions as of July 1, 2017

- Investment rate of return

Investment Rate of Return

7.20%. (Prior: 7.25%)

Inflation

2.75%.

This assumption is based on long term historical inflation numbers. While near term averages have been lower, we do not believe this trend will continue indefinitely and expect that there will be a reversion to the long-term average.

Mortality

RP-2000 Mortality Table with separate male and female rates, with blue collar adjustment, combined table for non-annuitants and annuitants, projected to the valuation date with Scale BB.

Mortality Improvement

Projected to date of decrement using Scale BB (generational mortality).

We have selected a mortality table commonly used by public pension systems (such as the State of Connecticut).

We are using Scale BB because it is the most up to date mortality improvement scale which was developed for use with RP-2000.

Salary Scale

Service	Rate
0	14.75%
1-2	9.75%
3	8.75%
4	7.75%
5	6.75%
6	5.75%
7	5.75%
8	4.75%
9	3.75%
10+	3.25%

The salary increase assumption was based on the experience study as of July 1, 2013.



Payroll Growth Assumption

2.75% annually to project normal cost only.

Medicare Part B Reimbursements

2.75% increase assumption each year.

Retirement Age

Ret Rates by Years of Service*	
Years	Rate
25	0.040
26	0.000
27	0.040
28	0.040
29	0.040
30	0.040
31	0.040
32	0.180
33	0.110
34	0.380
35	0.100
36	0.220
37	0.000
38	0.290
39	0.200
40	1.000

* Retirement rate at age 65 is 1.00

The actuarial assumptions in regards to rates of decrement shown above are based on the results of an actuarial experience study.

Turnover

The following annual rates of turnover are assumed:

Age	Probability
20	5.44%
25	4.89%
30	3.70%
35	2.35%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%

The actuarial assumptions in regards to rates of termination shown above are based on the results of an actuarial experience study.



Disability

The following annual rates of disability are assumed:

Age	Probability
20	0.05%
25	0.05%
30	0.05%
35	0.06%
40	0.09%
45	0.18%
50	0.40%
55	0.85%
60	1.74%

The actuarial assumptions in regards to rates of termination shown above are based on the results of an actuarial experience study.

Survivorship

80% of employees assumed to be married, with wives 4 years younger than husbands.

Expenses

The administrative expense is assumed to be the average of the prior two years of administrative expenses.

Vacation Bank

60% of retirees are assumed to elect additional pension credit as an annuity from the fund.

This assumption was based upon the July 1, 2013 experience study.

Payroll growth

2.75% per year.

Percent of active employees married

80%.

Spouse's age

Husbands are assumed to be 4 years older than wives.

The change in assumptions reflected in this valuation increased liabilities by 1.1%.



Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan. It is not intended to be, nor should it be interpreted as a complete statement of all plan provisions. To the extent that this summary does not accurately reflect the plan provisions, then the results of this valuation may not be accurate.

Plan identification

Single-employer pension plan

Pension Earnings

Base Salary in Final Year or Employment excluding bonuses and overtime including differential amounts.

Normal Retirement

Eligibility: 20 years of service if hired before January 1, 1981; 20 years of service and age 48 if hired after January 1, 1981.

Benefit:

Years of Service	% of Pension Earnings
20	50.00%
21	52.00%
22	54.00%
23	56.00%
24	58.00%
25	60.00%
26	62.00%
27	64.00%
28	66.00%
29	68.00%
30	70.00%
31	72.00%
32	74.00%

For those hired after July 1, 2016, the benefit is equal to 2.25% times years of service times a 3 year average pay.

Limits on Annual Benefit

Maximum: 74.00% of pension earnings. For those hired after July 1, 2016, the maximum multiplier is 100%.

Minimum: None.

Early Retirement

Eligibility: None.

Benefit: See Termination Benefit.



Disability - Non-Service Connected

Service Requirement: 20 years of service.

Benefit: 50% of salary, not less than accrued benefit.

Disability - Service Connected

Service Requirement: None.

Benefit: 100% of pay (or 75% of pay depending on extent of disability).

Pre-Retirement Death Benefit - Non Service Connected and less than 10 years of service

Service Requirement: None.

Benefit: Return of employee contributions with interest.

Pre-Retirement Death Benefit - Service Connected or more than 10 years of service

Service Requirement: None, if service connected; 10 years if non service connected.

Benefit: Greater of 100% of retirement benefit and 50% of salary.

Post-Retirement Spouse's Benefit

100% of pension retiree was receiving.

For those hired after July 1, 2016, the spouse's benefit depends on the annuity option elected by the retiree. The retiree can elect a life annuity, 50% joint and survivor annuity or a 100% joint and survivor annuity.

Post-Retirement Death Benefit

Lump sum, excess of accumulated contributions over benefits paid to member or survivors (if not eligible for spouse's benefit).

Medicare Part B

The City pays the cost of the Medicare Part B supplemental benefit from the pension trust for each retiree receiving Medicare coverage. The 2014 Medicare Part B monthly premium is \$104.90.

Vesting in Accrued Benefit

Eligibility: 15 years of service.

Benefit: 2.5% of final salary times service. Benefit is payable when the employee would have had 20 years of service but not earlier than age 48.

Termination Benefit

Accumulated contributions as lump sum, if not vested.

Employee Contributions

6.25% of salary; no contributions for those with 32 or more years of service. For those hired after July 1, 2016, 7.25% of salary.



Additional Retirement Benefits

Employees can trade in vacation leave for additional pension credit. Each 20 days grants an additional 1.5% of salary up to a maximum of 7.5%. Those hired after July 1, 2016 are not eligible for the exchange.