



THE POLICE PENSION TRUST FUND OF THE CITY OF STAMFORD

ACTUARIAL VALUATION REPORT

JULY 1, 2016





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Executive Summary

	July 1, 2016	July 1, 2015
Number of members		
Active employees	272	282 *
Terminated vested members	1	2 *
Employees in DROP	0	0 *
Retired, disabled and beneficiaries	<u>323</u>	<u>296</u> *
Total	596	580
Covered employee payroll	21,723,515	21,600,203 **
Average plan salary	79,866	76,596
Actuarial present value of future benefits	290,200,461	274,699,047
Actuarial accrued liability	254,339,167	238,471,000
Plan assets		
Market value of assets	186,944,990	195,574,732
Actuarial value of assets	206,260,036	200,353,566
Unfunded accrued liability	48,079,131	38,117,434
Funded ratio	81.1%	84.0%
Actuarially determined employer contribution (ADEC)		
Fiscal year ending	2018	2017
ADEC	8,275,000	7,903,000

* Not updated for Actuarial Valuation in interim year

** Estimated to be 3.00% higher than 2014 pay



Asset Experience During Period Under Review

	2016 Fiscal Year
Market Value Basis	-2.1%
Actuarial Value Basis	5.1%

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, 2016 Actuarial Valuation for The Police 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, 2018. 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, EA
17-04513

April 6, 2017

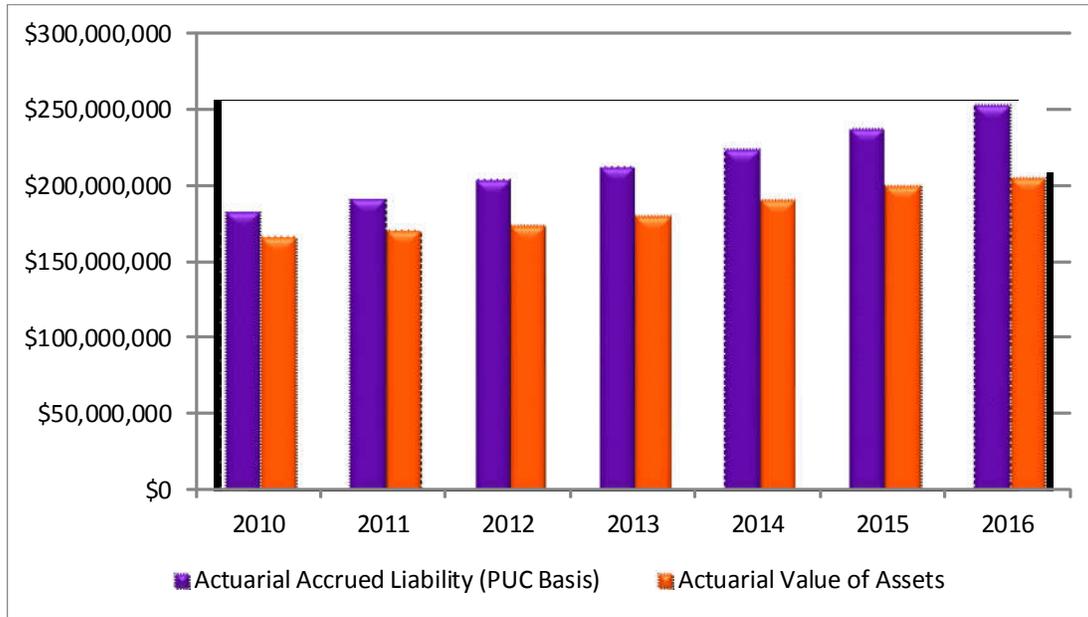


Development of Unfunded Accrued Liability and Funded Ratio

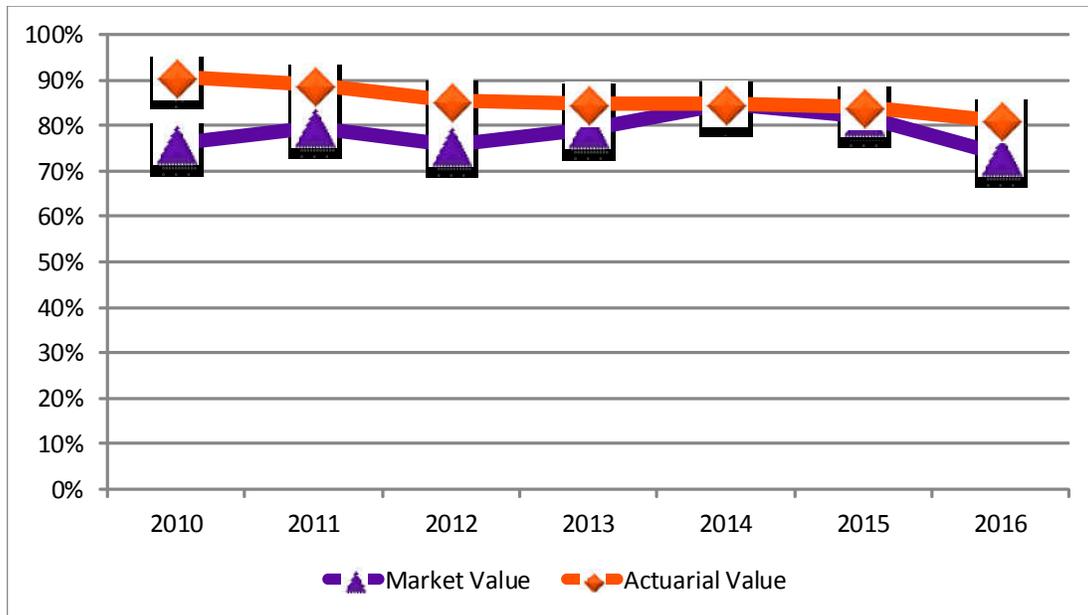
	July 1, 2016	July 1, 2015
Actuarial accrued liability for inactive members		
Retired, disabled and beneficiaries	\$145,298,458	\$122,304,000
Terminated vested members	<u>421,392</u>	<u>357,000</u>
Total	145,719,850	122,661,000
Actuarial accrued liability for employees in DROP	0	0
Actuarial accrued liability for active employees	<u>108,619,317</u>	<u>115,810,000</u>
Total actuarial accrued liability	254,339,167	238,471,000
Actuarial value of assets	<u>206,260,036</u>	<u>200,353,566</u>
Unfunded accrued liability	48,079,131	38,117,434
Funded ratio	81.1%	84.0%



Actuarial Accrued Liability vs. Actuarial Value of Assets



Funded Ratio

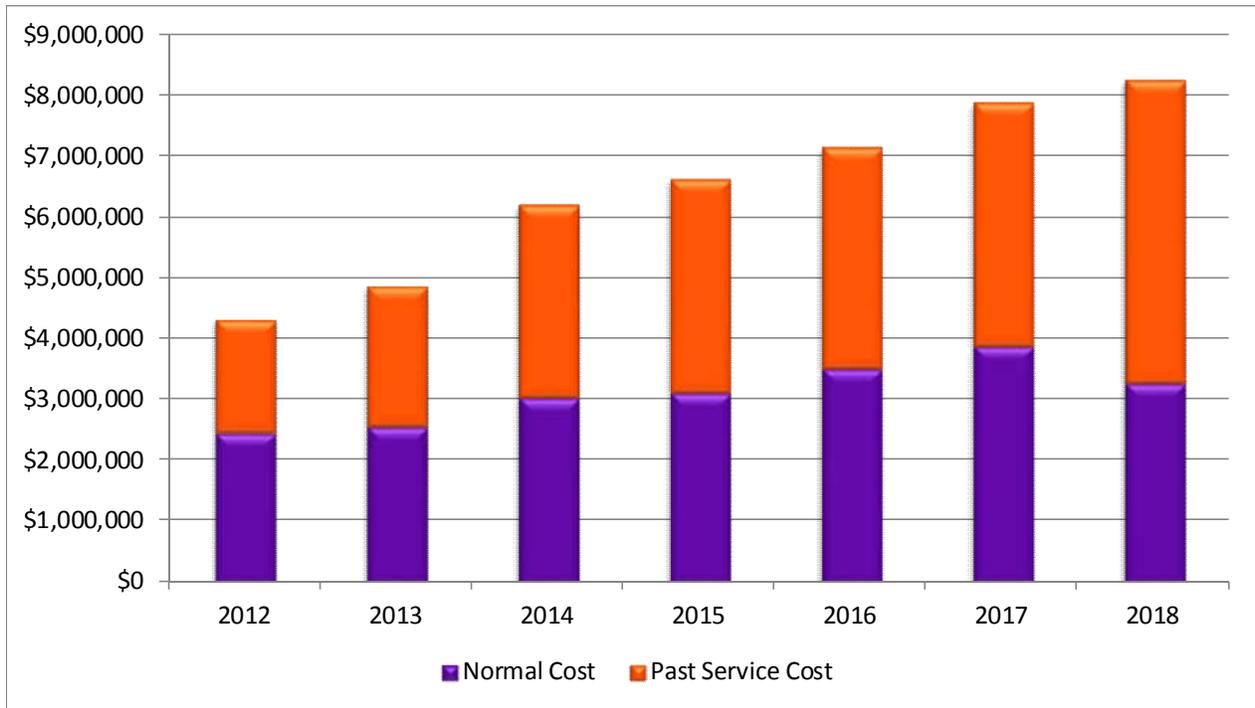




Determination of Normal Cost and Actuarially Determined Employer Contribution

	July 1, 2016		July 1, 2015	
	Cost	Percent of payroll	Cost	Percent of payroll
Gross normal cost	\$4,170,614	19.2%	\$4,884,000	23.8%
Estimated employee contributions	(1,239,509)	-5.7%	(1,263,000)	-6.2%
Estimated administrative expenses	277,000	1.3%	156,000	0.8%
City's normal cost	3,208,105	14.8%	3,777,000	18.4%
Amortization of unfunded accrued liability	4,986,669	23.0%	4,017,000	19.6%
Contribution before adjustment as of the valuation date	8,194,774	37.8%	7,794,000	38.0%
Contribution rounded to nearest \$1,000	8,195,000		7,794,000	
Estimated valuation year payroll	21,692,397		20,494,136	
Fiscal year ending	2018		2017	
Adjustment for interest and inflation	80,000		109,000	
Actuarially determined employer contribution	8,275,000		7,903,000	

Actuarially Determined Employer Contribution



Development of Asset Values

Summary of Fund Activity	
1. Beginning market value of assets July 1, 2015	
Trust assets	\$195,574,732
2. Contributions	
City contributions during year	7,158,000
Employee contributions during year	<u>1,479,977</u>
Total for plan year	8,637,977
3. Disbursements	
Benefit payments during year	12,714,828
Administrative expenses during year	<u>325,605</u>
Total for plan year	13,040,433
4. Net investment return	
Interest and dividends	2,912,941
Net appreciation (depreciation)	(5,600,583)
Investment-related expenses	<u>(1,539,644)</u>
Total for plan year	(4,227,286)
5. Ending market value of assets July 1, 2016	
Trust assets: (1) + (2) - (3) + (4)	186,944,990
6. Approximate rate of return	
	-2.1%

Determination of the Actuarial Value of Assets

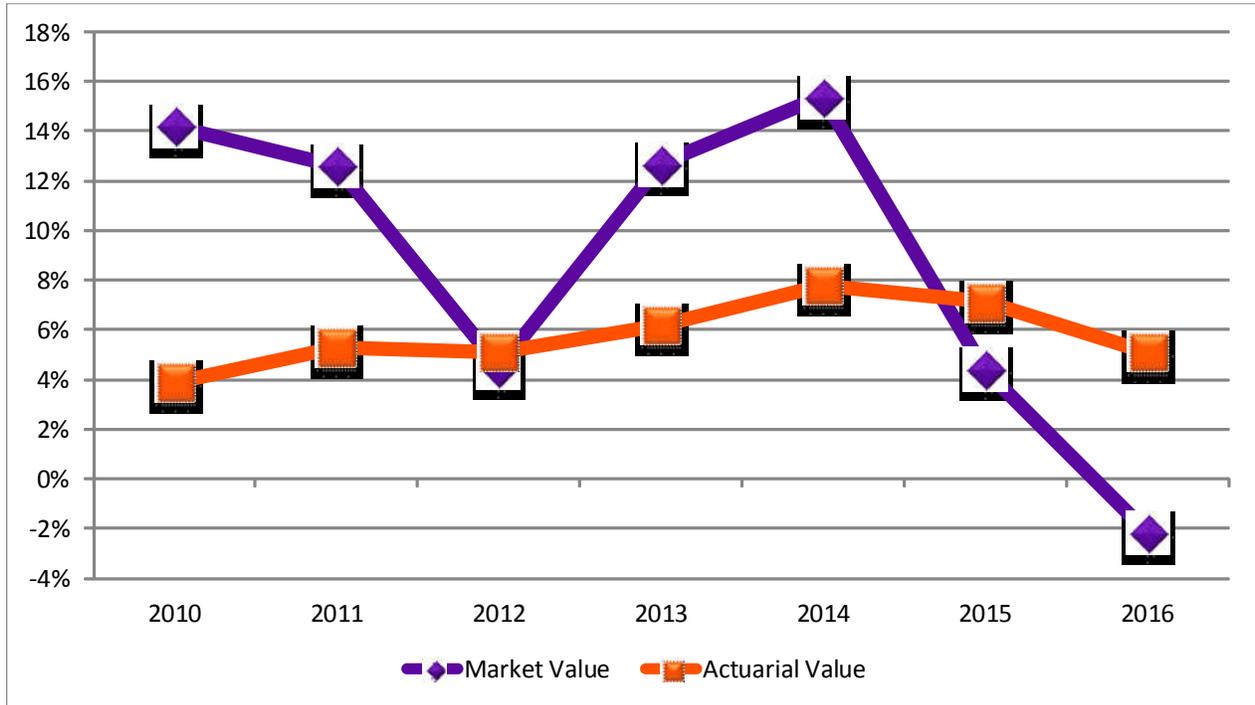
1. Actuarial value of assets July 1, 2015	\$ 200,353,566
2. City contributions during 2015-2016	7,158,000
3. Employee contributions during 2015-2016	1,479,977
4. Benefit payments and administrative expenses during 2015-2016	(13,040,433)
5. Expected return during 2015-2016	<u>15,137,688</u>
6. Expected actuarial value of assets July 1, 2016	211,088,798
7. Market value of assets July 1, 2016	186,944,990
8. Appreciation (depreciation) recognized: 20% x [(7) - (6)]	(4,828,762)
9. Preliminary actuarial value of assets July 1, 2016: (6) + (8)	206,260,036
10. Preliminary actuarial value of assets as a percentage of market value of assets	110.3%
11. Actuarial value of assets July 1, 2016	206,260,036
2015-2016 return on actuarial value of assets	5.1%

Rate of Return on Market Value of Assets					
Period Ending	Average Annual Effective Rate of Return				
	June 30	1 Year	3 Years	5 Years	10 Years
2007	N/A	N/A	N/A	N/A	N/A
2008	N/A	N/A	N/A	N/A	N/A
2009	N/A	N/A	N/A	N/A	N/A
2010	14.2%	N/A	N/A	N/A	N/A
2011	12.6%	N/A	N/A	N/A	N/A
2012	4.5%	10.4%	N/A	N/A	N/A
2013	12.7%	9.9%	N/A	N/A	N/A
2014	15.4%	10.8%	11.8%	N/A	N/A
2015	4.4%	10.7%	9.8%	N/A	N/A
2016	-2.1%	5.6%	6.8%	N/A	N/A

Rate of Return on Actuarial Value of Assets					
Period Ending	Average Annual Effective Rate of Return				
	June 30	1 Year	3 Years	5 Years	10 Years
2007	N/A	N/A	N/A	N/A	N/A
2008	N/A	N/A	N/A	N/A	N/A
2009	N/A	N/A	N/A	N/A	N/A
2010	3.9%	N/A	N/A	N/A	N/A
2011	5.3%	N/A	N/A	N/A	N/A
2012	5.1%	4.8%	N/A	N/A	N/A
2013	6.2%	5.5%	N/A	N/A	N/A
2014	7.8%	6.4%	5.7%	N/A	N/A
2015	7.1%	7.0%	6.3%	N/A	N/A
2016	5.1%	6.7%	6.3%	N/A	N/A



Actual Rate of Return on Assets





Target Allocation and Expected Rate of Return July 1, 2016

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*	Weighting
US Equity	25.00%	7.00%	1.75%
Non-US Equity	14.00%	7.25%	1.02%
US Fixed Income	20.00%	2.25%	0.45%
Alternatives	25.00%	4.00%	1.00%
Real Estate/REITs	14.00%	7.00%	0.98%
Cash	2.00%	0.00%	0.00%
	100.00%		5.20%
Long-Term Inflation Expectation			2.25%
Long-Term Expected Nominal Return			7.45%

**Long-Term Returns are provided by Clearbrook. 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 arithmetic means. The investment return assumption was selected using the long term asset allocation shown above. 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, 2016
2016 base	July 1, 2016	48,079,131	4,986,669	15	48,079,131



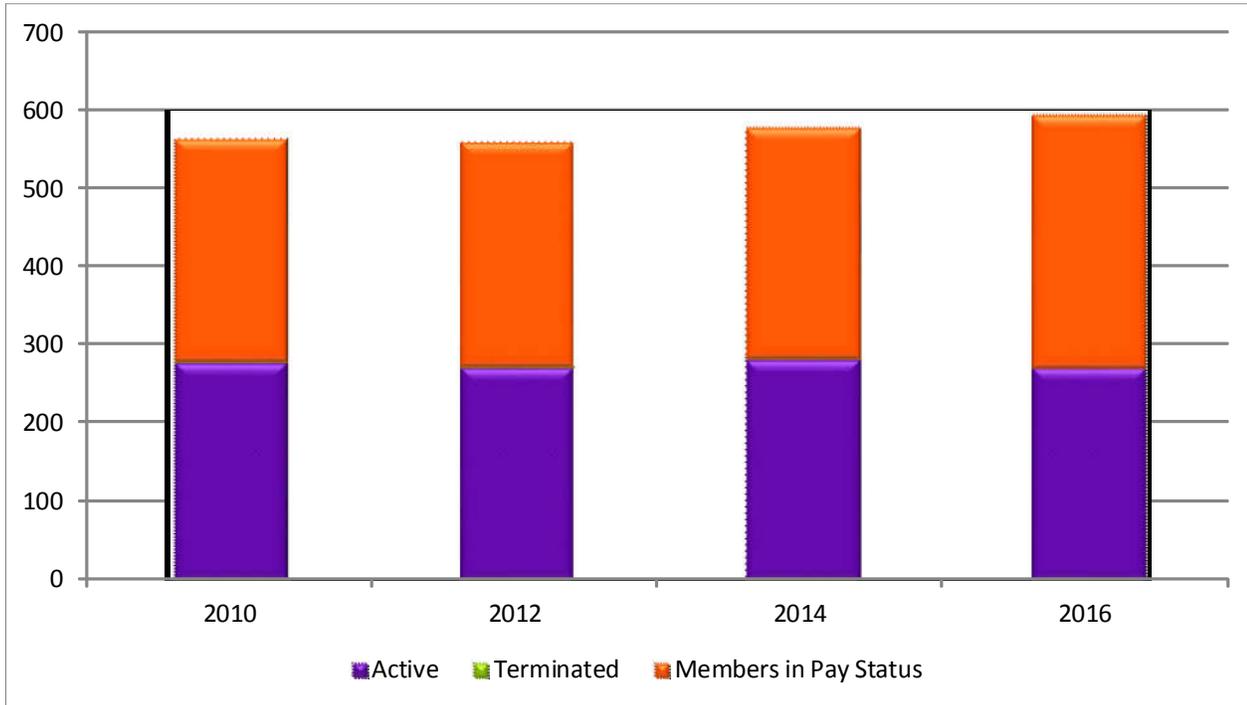
Member Data

The data reported by the Plan Sponsor for this valuation includes 272 active employees who met the Plan's minimum age and service requirements as of July 1, 2016.

Member Data					
	Active	Terminated vested	Employees in DROP	Members in pay status	Total
Total members July 1, 2014	282	2	0	296	580
Adjustments	0	0	0	+1	+1
Retirements	-9	-1	0	+10	0
Disabilities	-21	N/A	0	+21	0
Entered DROP	0	N/A	0	N/A	0
Terminations					
Vested	0	0	N/A	N/A	0
Lump sum payments	0	0		N/A	0
Due contributions only	-2	N/A	N/A	N/A	-2
Deaths					
With death benefit	0	0	0	-12	-12
Without death benefit	0	0	0	-5	-5
Transfers	0	0	N/A	N/A	0
Rehires	0	0	N/A	N/A	0
New beneficiaries	N/A	N/A	N/A	+12	+12
New entrants	+22	N/A	N/A	N/A	+22
Total members July 1, 2016	272	1	0	323	596



Member Counts by Status





Member Data					
	Active	Terminated vested	Employees in DROP	Members in pay status	Total
Average age					
July 1, 2014	45.8	46.5	0.0	68.5	
July 1, 2016	45.0	49.0	0.0	69.1	
Average service					
July 1, 2014	17.8	N/A	N/A	N/A	
July 1, 2016	17.3	N/A	N/A	N/A	
Covered employee payroll					
July 1, 2014	\$20,971,071	N/A	N/A	N/A	\$20,971,071
July 1, 2016	21,723,515	N/A	N/A	N/A	21,723,515
Total annual benefits					
July 1, 2014	N/A	\$73,287	\$0	\$11,398,134	\$11,471,421
July 1, 2016	N/A	34,054	0	13,525,216	13,559,270



Description of Actuarial Methods

Asset Valuation Method

The Actuarial Value of assets used in the development of plan contributions phases in differences between the 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.

This amount is amortized over 15 years on an open basis.

Full actuarial valuations are performed every other year. For interim year valuations, the actuarial accrued liability and the normal cost are estimated based on the results of the prior full valuation.



Description of Actuarial Assumptions

Changes in Actuarial Assumptions as of July 1, 2016

The valuation reflects changes in the actuarial assumptions listed below. (The assumptions used before and after these changes are more fully described in the next section.)

- Investment rate of return
- Rate of compensation increase
- Mortality and Mortality Improvement
- Retirement, termination and disability
- Sick and vacation bank election
- Inflation and related assumptions (payroll growth and Medicare Part B increase)

The assumptions indicated were changed to represent the Enrolled Actuary's current best estimate of anticipated experience of the plan.

In combination, the assumption changes increased liabilities by about 1.6%.

Investment rate of return (net of investment-related and administrative expenses)

7.20%. (Prior 7.50%)

Rate of compensation increase (including inflation)

Service	Rate
0	15.00%
1	15.00%
2-5	6.00%
6+	2.75%

Prior:

Age	Rate
20	6.50%
25	6.50%
30	5.85%
35	5.20%
40	4.55%
45	3.90%
50	3.25%
55+	3.00%

The actuarial assumption in regards to rate of compensation increases shown above is based on the results of an actuarial experience study for the period 2008-2014. The assumption was updated to better reflect actual experience. The change in assumption decreased liabilities.



Inflation

2.75%. (Prior: 3.00%)

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, separate tables for non-annuitants and annuitants, projected to the valuation date with Scale BB.

Prior: 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 AA.

Mortality Improvement

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

Prior: Projected to date of decrement using Scale AA (generational).

We have selected a mortality table commonly used by public pension systems. It is a recently published pension mortality study released by the Society of Actuaries. The plan does not have sufficiently credible data on which to perform a mortality experience study.

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

The mortality assumption was updated to a more recent improvement scale. The change in assumption increased liabilities.



Retirement age

Service	Rate
20	13%
21	11%
22	8%
23	7%
24	7%
25	7%
26	7%
27	8%
28	8%
29	8%
30	11%
31	13%
32	14%
33	13%
34	19%
35	20%
36	21%
37	17%
38	16%
39	18%
40	24%
41	24%
42	27%
43	21%
44	25%
45	22%
46	35%
47	50%

Additionally, 100% of participants are assumed to retire upon reaching age 65.

Prior: Sample rates of assumed annual rates of retirement after completion of 25 years are as follows:

Age	Retirement Rate
55	50%
56	50%
57	50%
58	50%
59	50%

An additional 50% is added upon attainment of 20 years of service and 100% of members remaining beyond the earlier of age 60 with 25 years of service or age 65 are assumed to retire.



Termination prior to retirement

The following sample annual rates of turnover are assumed:

Age	Rate
20	1.81%
25	1.63%
30	1.23%
35	0.78%
40	0.00%
45	0.00%
50	0.00%
55	0.00%
60	0.00%

Prior:

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%

Disability

The following sample annual rates of disability are assumed:

Age	Rate
20	0.30%
25	0.30%
30	0.30%
35	0.36%
40	0.54%
45	1.08%
50	2.40%
55	5.10%
60	10.44%



Disability (continued)

Prior:

Age	Probability
20	.05%
25	.05%
30	.05%
35	.06%
40	.09%
45	.18%
50	.40%
55	.85%
60	1.74%

The actuarial assumptions in regards to rates of decrement shown above are based on the results of an actuarial experience study for the period 2008-2014. The assumptions were updated to better reflect actual experience. The change in retirement rates decreased liabilities, while the change in termination and disability rates increased liabilities.

Administrative expenses

The estimate is based on the average of the actual expenses paid from the trust in the past 2 years.

Payroll growth

2.75% per year (Prior: 3.00%).

Percent of active employees married

80%.

Spouse's age

Husbands are assumed to be 4 years older than wives.

Sick Bank and Vacation Bank

34% of retirees are assumed to elect an annuity from the fund.

Prior: 50% of retirees are assumed to elect an annuity from the fund.

Post-Retirement Life Insurance

100% of active and retired employees are assumed to have a \$4,000 life insurance policy beginning at retirement.

Medicare Part B Reimbursement

2.75% increase assumption each year.

Prior: 3% increase assumption each year.



Summary of Plan Provisions

Pension Earnings

For those hired before April 11, 2016, Base Salary in Final Year of Employment plus 14 paid holidays.

For those hired after April 11, 2016, average of 3 highest base salaries (including 14 paid holidays).

Normal Retirement

Eligibility: 20 years of service

Benefit (for those hired before April 11, 2016):

Years of Service	% of Pension Earnings
20	50.00%
21	53.00%
22	56.00%
23	59.00%
24	62.00%
25	65.00%
26	67.33%
27	69.66%
28	71.99%
29	74.32%
30	76.65%

For those hired after April 11, 2016, 2.25% per year of service times pension earnings.

Limits on Annual Benefit

Maximum: 76.65% of pension earnings plus a possible 7.5% (from Sick Bank) for a total of 84.15% if hired before April 11, 2016. If hired after April 11, 2016, the maximum benefit is 100% of the average salary.

Minimum: None.

Early Retirement

Eligibility: None.

Minimum: See Termination Benefit.

Disability:

Service Requirement: None.

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

Pre-Retirement Death Benefit – Non Service Connected

Service Requirement: 10 years of service.

Benefit: 50% of salary.



Pre-Retirement Death Benefit – Service Connected

Service Requirement: None.

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

Post-Retirement Spouse's Benefit

For those hired before April 11, 2016, 100% of pension retiree was receiving.

For those hired after April 11, 2016, the retiree can elect an actuarially reduced joint & survivor annuity at retirement.

Post-Retirement Lump Sum at Death

Lump Sum equal to \$4,000.00.

Vesting in Accrued Benefit

Eligibility: 10 years of service.

For those hired before April 11, 2016, 50% of final salary times the ratio of service at termination to 20 years.

For those hired after April 11, 2016, 2.25% times years of service times pension earnings. Benefit is payable when the officer 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

7% of salary; no contributions for those with 30 or more years of service (35 or more years for those hired after April 11, 2016).

Additional Retirement Benefits

Employees can trade in 50% of sick leave for additional pension credit. If an officer's sick bank has less than 200 days, unused vacation time may be added, subject to a maximum of 200 sick and unused vacation days combined. Each 20 days grants an additional 1.5% of salary up to a maximum of 7.5%. Employees hired after April 11, 2016 are not eligible to exchange sick time for additional pension credit.

Medicare Part B Reimbursement

The Medicare Part B premium is reimbursed from the pension fund for participants hired before April 11, 2016.