THE FIREFIGHTERS' PENSION TRUST FUND OF THE CITY OF STAMFORD

Actuarial Valuation as of July 1, 2018
To Determine Funding For Fiscal Year 2019-20

Prepared by

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Certification

We have performed an actuarial valuation of the Plan as of July 1, 2018 to determine funding for fiscal year 2019-20. This report presents the results of our valuation.

The ultimate cost of a pension plan is the total amount needed to provide benefits for plan members and beneficiaries and to pay the expenses of administering the plan. Pension costs are met by contributions and by investment return on plan assets. The principal purpose of this report is to set forth an actuarial recommendation of the contribution, or range of contributions, which will properly fund the plan, in accordance with applicable government regulations. In addition, this report provides:

- A valuation of plan assets and liabilities to review the year-to-year progress of funding.
- Information needed to meet disclosure requirements.
- Review of plan experience for the previous year to ascertain whether the assumptions and methods employed for valuation purposes are reflective of actual events and remain appropriate for prospective application.
- Assessment of the relative funded position of the plan, i.e., through a comparison of plan assets and projected plan liabilities.
- Comments on any other matters which may be of assistance in the funding and operation of the plan.

This report may not be used for purposes other than those listed above without Milliman's prior written consent. If this report is distributed to other parties, it must be copied in its entirety, including this certification section.

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In preparing this report, we relied on employee census data and financial information as of the valuation date, furnished by the City. We performed a limited review of the data used directly in our analysis for reasonableness and consistency and have found them to be reasonably consistent and comparable with data used for other purposes. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete and our calculations may need to be revised. If there are material defects in the data, it is possible that they would be uncovered by a detailed, systematic review and comparison of the data to search for data values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Certification

The calculations reported herein have been made on a basis consistent with our understanding of ERISA and the related sections of the tax code. Additional determinations may be needed for purposes other than meeting funding requirements, such as judging benefit security at plan termination or meeting employer accounting requirements. On the basis of the foregoing, we hereby certify that, to the best of our knowledge, this report is complete and accurate and all costs and liabilities were determined in conformance with generally accepted actuarial principles and practices. Figures for periods prior to July 1, 2018 have been obtained from actuarial valuation reports prepared by Hooker & Holcombe and from the City's Comprehensive Annual Financial Reports.

We further certify that, in our opinion, each actuarial assumption, method and technique used is reasonable taking into account the experience of the Plan and reasonable expectations. 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 the actuarial assignment, we did not perform an analysis of the potential range of such future measurement.

The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Rebecca A. Sielman, FSA
Consulting Actuary

Section I - Executive Summary
Changes Since the Prior Valuation

Plan Changes

Medicare Part B reimbursement payments are no longer being paid from the Plan, so the corresponding liability has been removed from this plan and transferred to the OPEB plan. This change lowered the Accrued Liability by about $3.8 million.

Changes in Actuarial Methods and Assumptions

The interest rate assumption was lowered from 7.20% to 7.10% and the inflation assumption was reduced from 2.75% to 2.60%. These changes increased the Accrued Liability by about $2.5 million.

Other Significant Changes

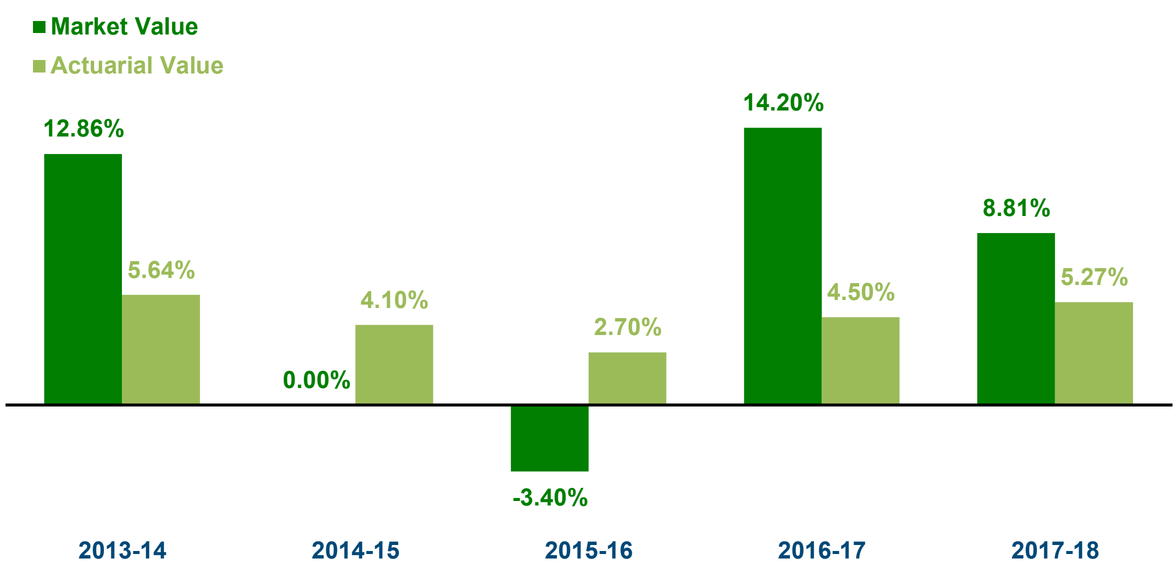
None.

Section I - Executive Summary
Assets

There are two different measures of the plan's assets that are used throughout this report. The Market Value is a snapshot of the plan's investments as of the valuation date. The Actuarial Value is a smoothed asset value designed to temper the volatile fluctuations in the market by recognizing investment gains or losses asymptotically over five years.

	Market	Actuarial
Value as of July 1, 2017	$129,663,624	$145,237,334
City and Member Contributions	8,299,247	8,299,247
Investment Income	11,320,351	7,655,041
Benefit Payments and Administrative Expenses	(10,577,568)	(10,577,568)
Value as of July 1, 2018	138,705,654	150,614,054

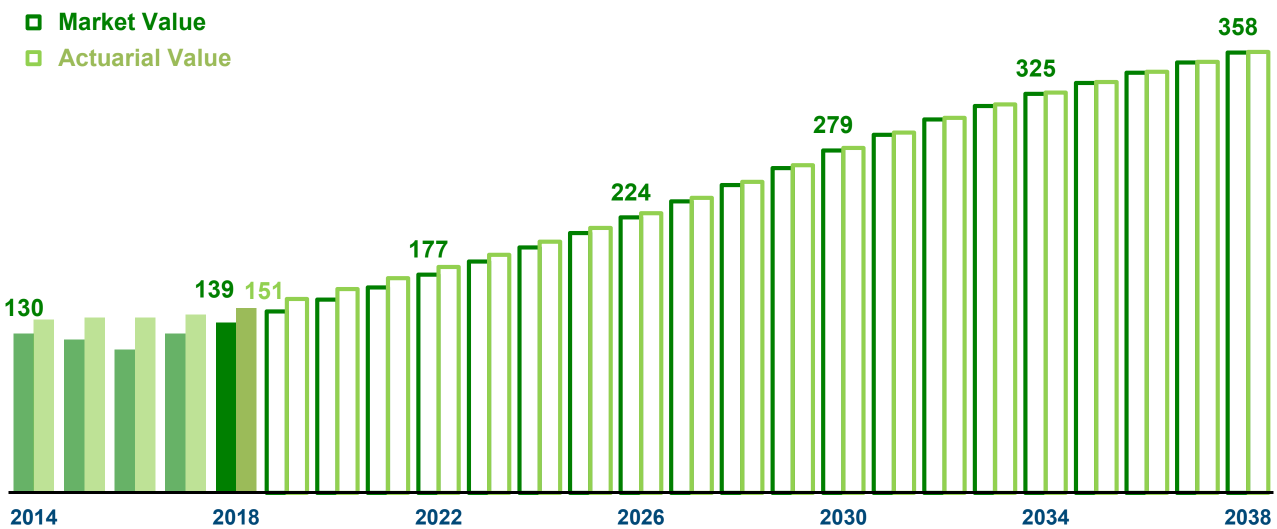
For fiscal year 2017-18, the plan's assets earned 8.81% on a Market Value basis and 5.27% on an Actuarial Value basis. The actuarial assumption for this period was 7.20%; the result is an asset gain of about $2.1 million on a Market Value basis and a loss of about $3.0 million on an Actuarial Value basis. Historical rates of return are shown in the graph below.



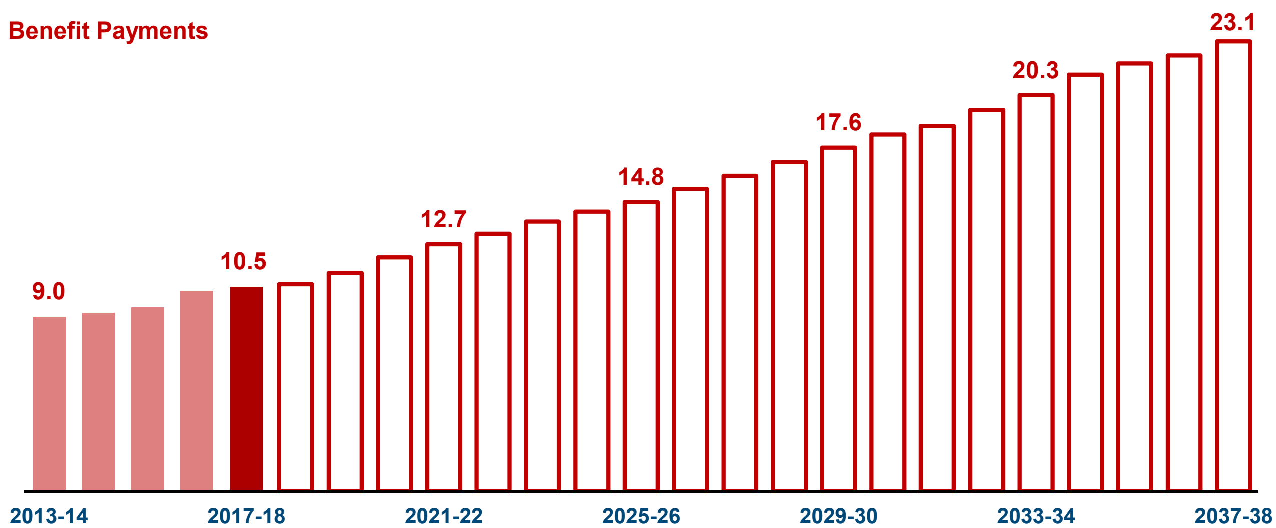
Please note that the Actuarial Value currently exceeds the Market Value by $11.9 million. This figure represents investment losses that will be gradually recognized in future years. This process will exert upward pressure on the City's contribution, unless there are offsetting market gains.

Section I - Executive Summary
Assets (continued)

The graph below shows how this year's asset values compare to where the plan's assets have been over the past several years and how they are projected to change over the next 20 years. For purposes of this projection, we have assumed that the City always contributes the Actuarially Determined Contribution and the investments always earn the assumed interest rate each year.

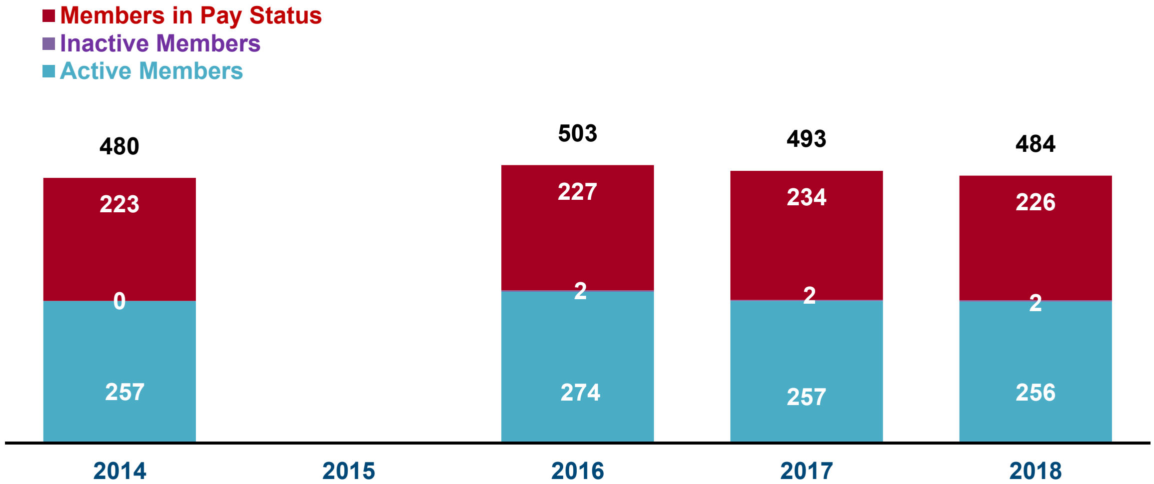


In 2017-18, the plan paid out $10.5 million in benefits to members. Over the next 20 years, the plan is projected to pay out a total of $335 million in benefits to members.



Section I - Executive Summary
Membership

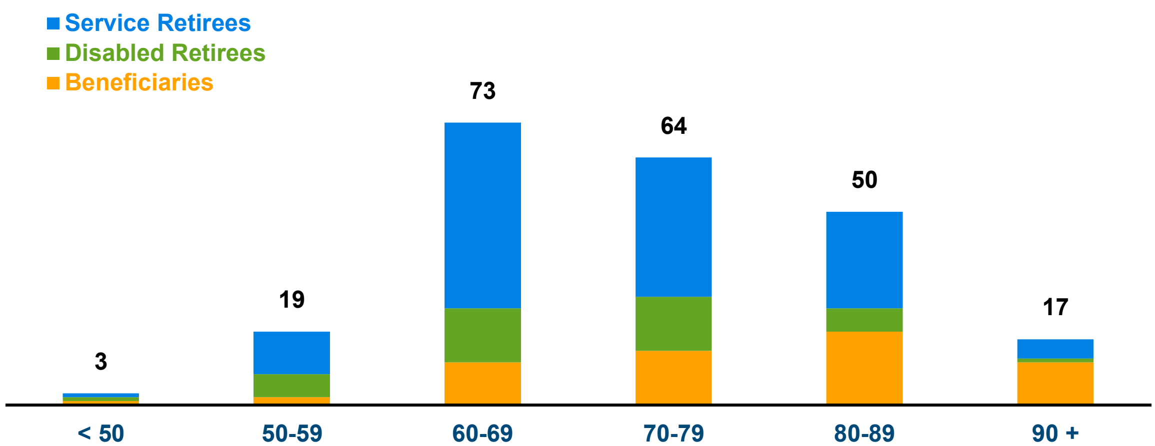
There are three basic categories of plan members included in the valuation: (1) members who are receiving monthly pension benefits, (2) former employees who have a vested right to benefits but have not yet started collecting, and (3) active employees who have met the eligibility requirements for membership. Prior to 2016, full valuations were only performed in even-numbered years, so membership information is not available for all past years.



Members in Pay Status on July 1, 2018

Service Retirees	126	Average Age	73.4
Disabled Retirees	42	Total Annual Benefit	$10,226,123
Beneficiaries	58	Average Annual Benefit	45,248
Total	226		

The members in pay status fall across a wide distribution of ages:



Section I - Executive Summary
Membership (continued)

Terminated Vested Members on July 1, 2018

Count	2
Average Age	43.2
Total Annual Benefit	$95,796
Average Annual Benefit	47,898

Nonvested Members Due Refunds on July 1, 2018

Count	0

Active Members on July 1, 2018

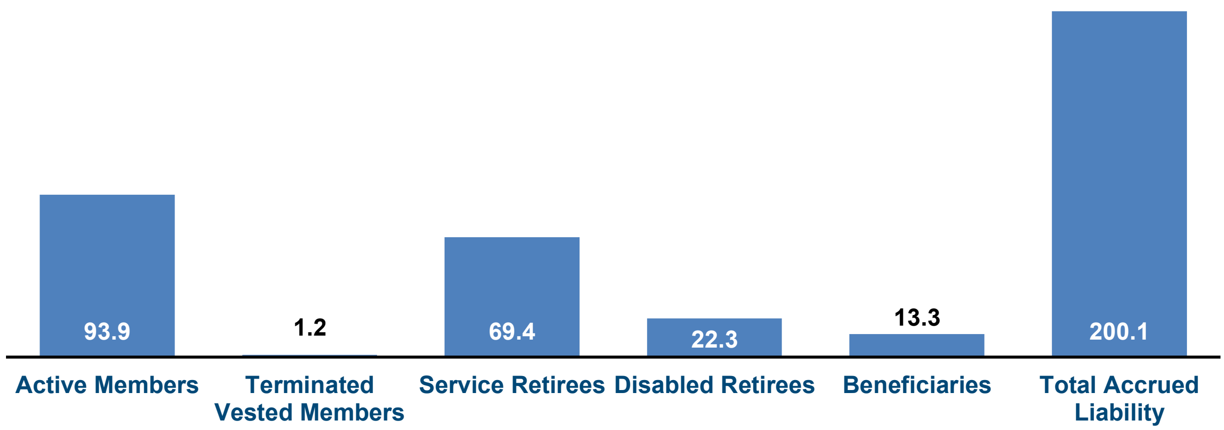
Count	256
Average Age	46.7
Average Service	18.0
Payroll	$24,035,714
Average Payroll	93,890

The table below illustrates the age and years of service of the active membership:

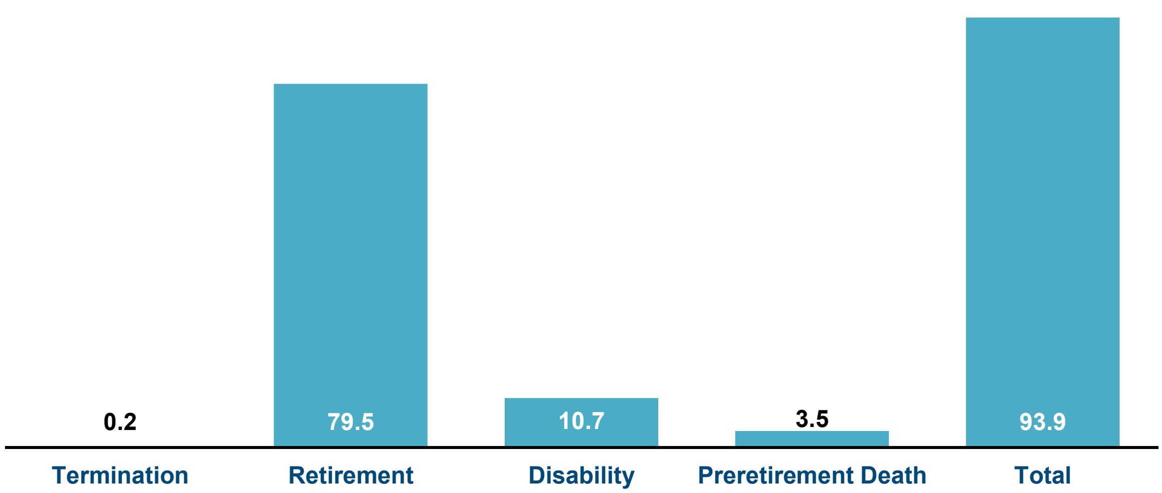
	Years of Service							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
< 25	3							3
25-29	8	4						12
30-34	9	5	6					20
35-39	4	8	16	2				30
40-44	4	4	14	14	1			37
45-49	2	2	10	21	12			47
50-54		1	6	13	13	10	11	54
55-59			2	5	8	6	17	38
60-64						1	13	14
65+							1	1
Total	30	24	54	55	34	17	42	256

Section I - Executive Summary
Accrued Liability

The Accrued Liability as of July 1, 2018 (in $ millions) consists of the following pieces:



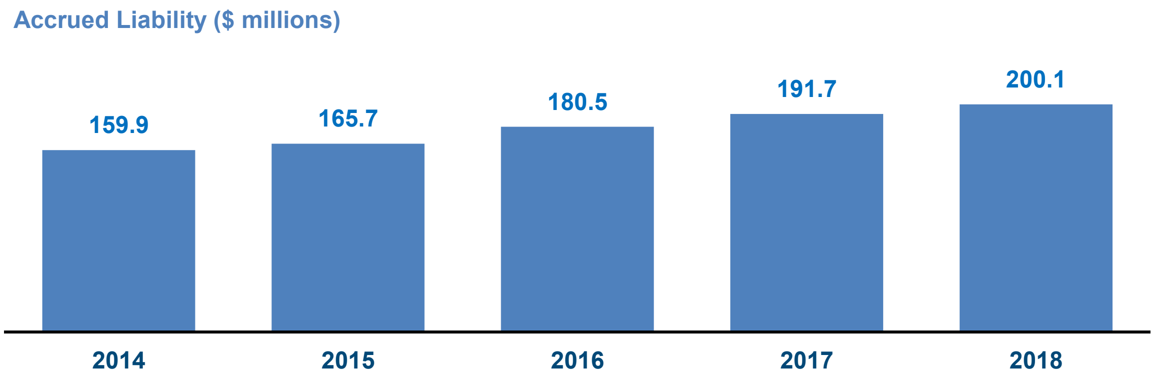
The Accrued Liability for active members can be broken down further by the different types of benefits provided by the plan:

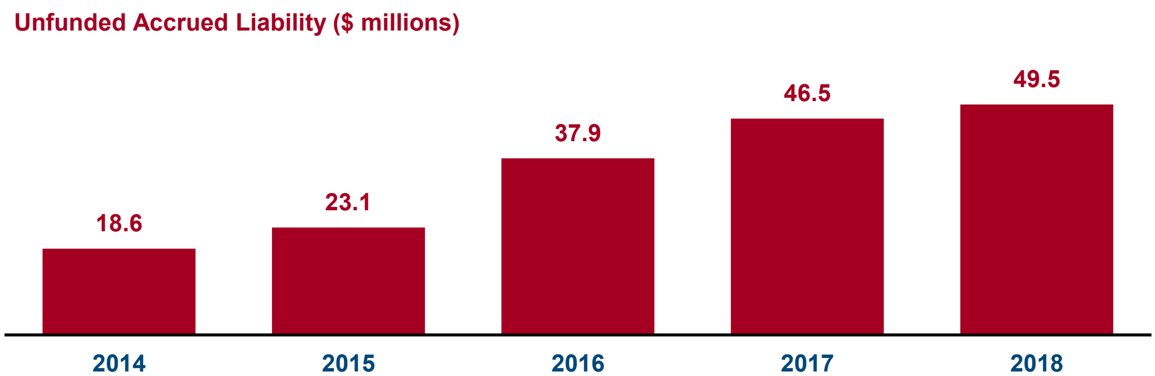


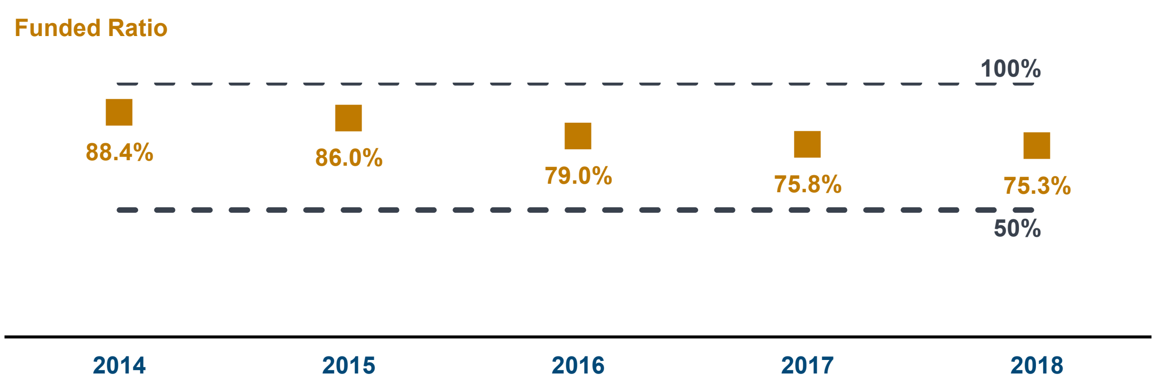
For purposes of determining the City's contribution, the Accrued Liability is measured using the Projected Unit Credit actuarial cost method. A different actuarial cost method, Entry Age Normal, is required to be used to measure liability for financial reporting purposes per GASB 67/68. As of July 1, 2018, the Entry Age Normal Accrued Liability is $205,628,835.

Section I - Executive Summary
Funded Status

The Accrued Liability grows over time as active members earn additional benefits, and goes down over time as members receive benefits; it may also change when there are changes to the plan provisions or changes in the actuarial assumptions. The Unfunded Accrued Liability is the dollar difference between the Accrued Liability and the Actuarial Value of Assets; the Funded Ratio is the ratio of the two.



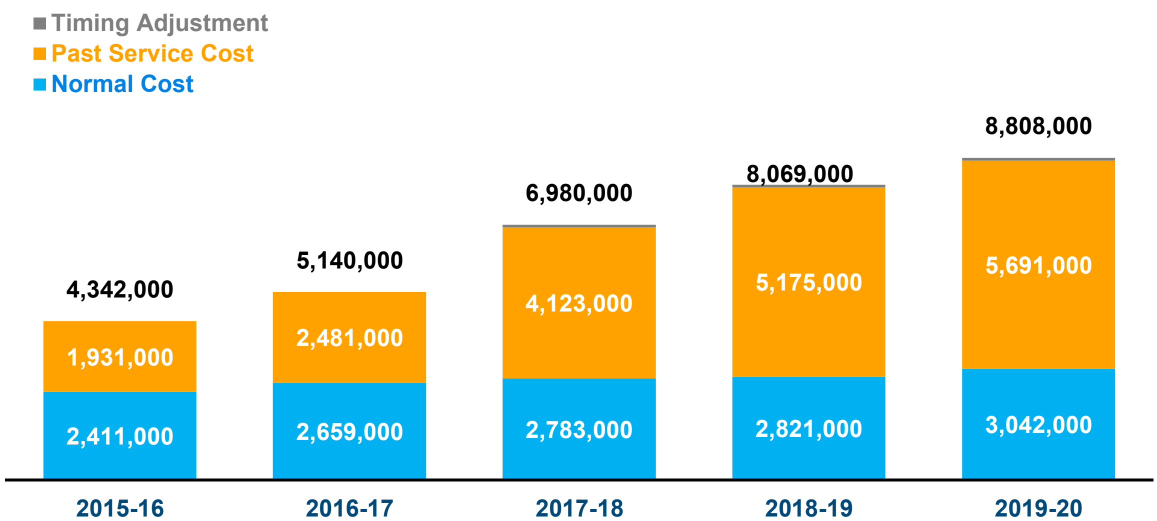




Section I - Executive Summary
Actuarially Determined Contribution

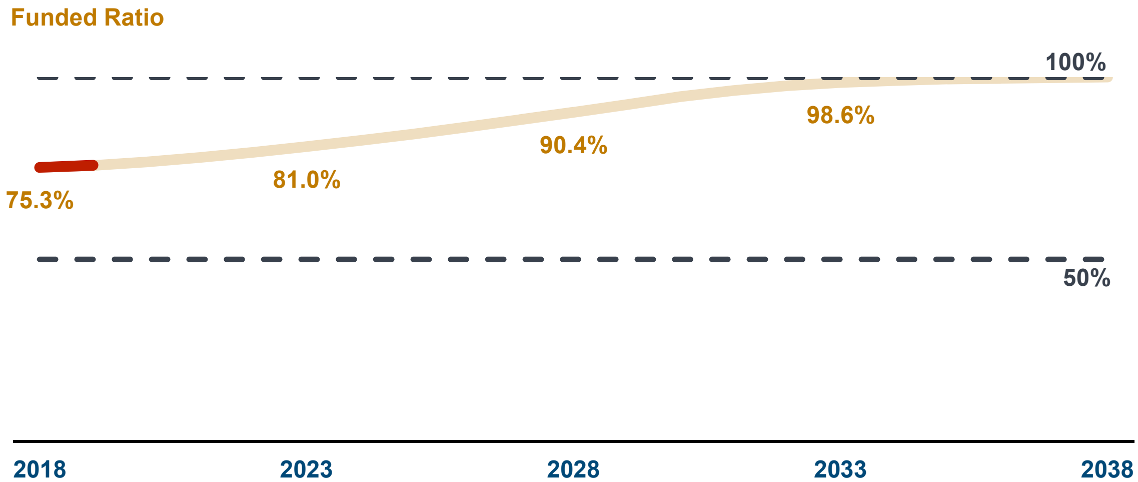
The Actuarially Determined Contribution consists of three pieces: a Normal Cost payment to fund the benefits earned each year, a Past Service Cost to gradually reduce any unfunded or surplus liability, and a Timing Adjustment to reflect the timing of the contribution relative to the valuation date.

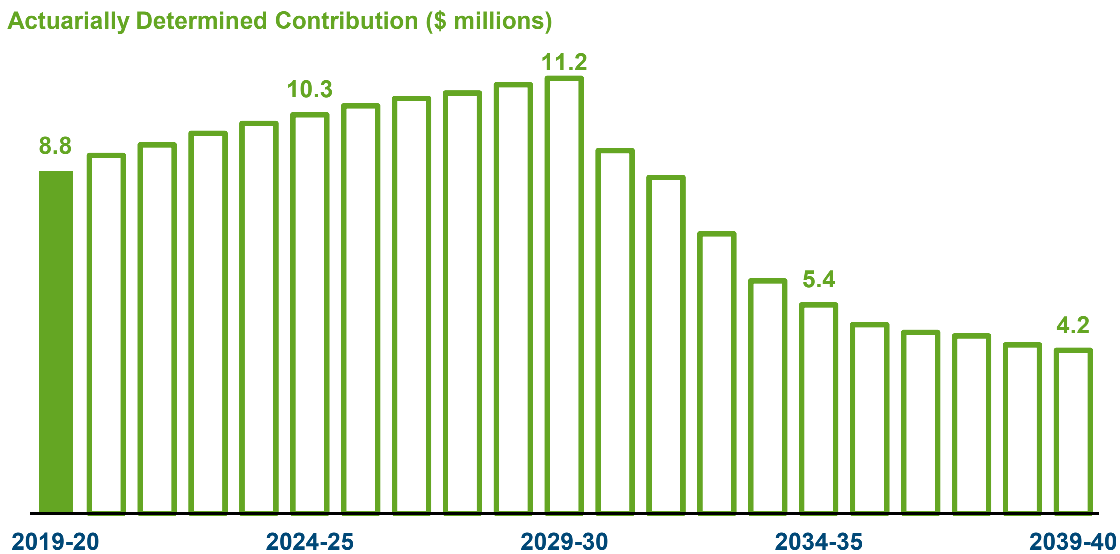
The Actuarially Determined Contribution for fiscal year 2019-20 is shown graphically below, along with the comparable figures for the preceding four fiscal years. Note that the Normal Cost is relatively consistent from year to year, whereas the Past Service Cost tends to be more volatile since it reflects the impact of asset performance.



Section I - Executive Summary
Long-Range Forecast

If the City pays the Actuarially Determined Contribution each year, the investments earn exactly the assumed interest rate each year, and there are no changes in the plan provisions or in the actuarial methods and assumptions, then we project the following changes in the plan's funded status and the long-range contribution levels:

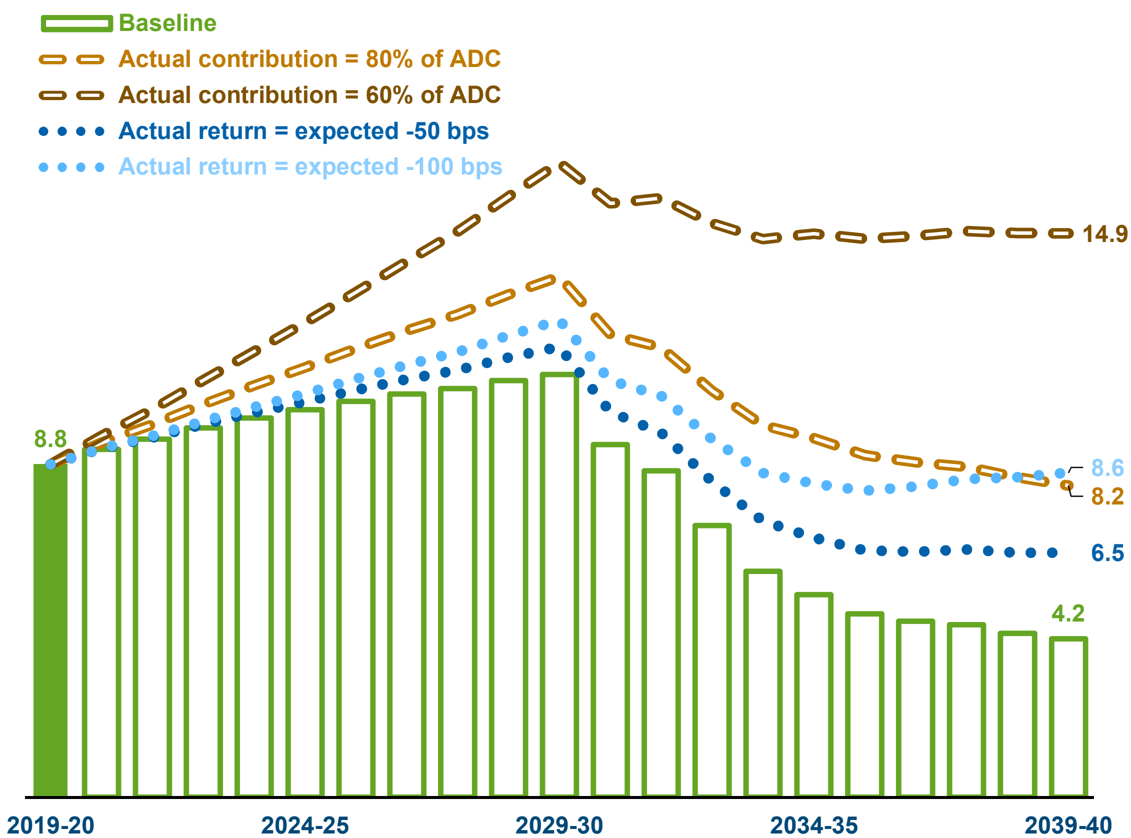




To the extent that there are future investment or liability gains or losses, changes in the actuarial assumptions or methods, or plan changes, the actual valuation results will differ from these forecasts. Please see Section III C for more details of the long range forecast.

Section I - Executive Summary
Long-Range Forecast (continued)

Pension benefits are paid for through a combination of contributions from the City and from employees, and from investment income. If the City pays less than the Actuarially Determined Contribution each year, or if the investments persistently earn less than the assumed interest rate, then the plan's funded status would suffer, and to compensate, the City's contribution levels would be pushed higher. The risks of underfunding and underearning are illustrated in the hypothetical scenarios below:



The scenarios illustrated above are based on deterministic projections that assume emerging plan experience always exactly matches the actuarial assumptions; in particular that actual asset returns will be constant in every year of the projection period. Variation in asset returns, contribution amounts, and many other factors may have a significant impact on the long-term financial health of the plan, the liquidity constraints on plan assets, and the City's future contribution levels. Stochastic projections could be prepared that would enable the City to understand the potential range of future results based on the expected variability in asset returns and other factors. Such analysis was beyond the scope of this engagement.

Section I - Executive Summary
Summary of Principal Results

Membership as of	July 1, 2018	July 1, 2017
Active Members	256	257
Inactive Members	2	2
Members in Pay Status	226	234
Total Count	484	493
Payroll	$24,035,714	$22,040,167

Assets and Liabilities as of	July 1, 2018	July 1, 2017
Market Value of Assets	$138,705,654	$129,663,624
Actuarial Value of Assets	150,614,054	145,237,334
Accrued Liabiilty for Active Members	93,948,424	82,121,914
Accrued Liabiilty for Inactive Members	1,213,370	1,115,497
Accrued Liabiilty for Members in Pay Status	104,975,364	108,494,058
Total Accrued Liability	200,137,158	191,731,469
Unfunded Accrued Liability	49,523,104	46,494,135
Funded Ratio	75.3%	75.8%

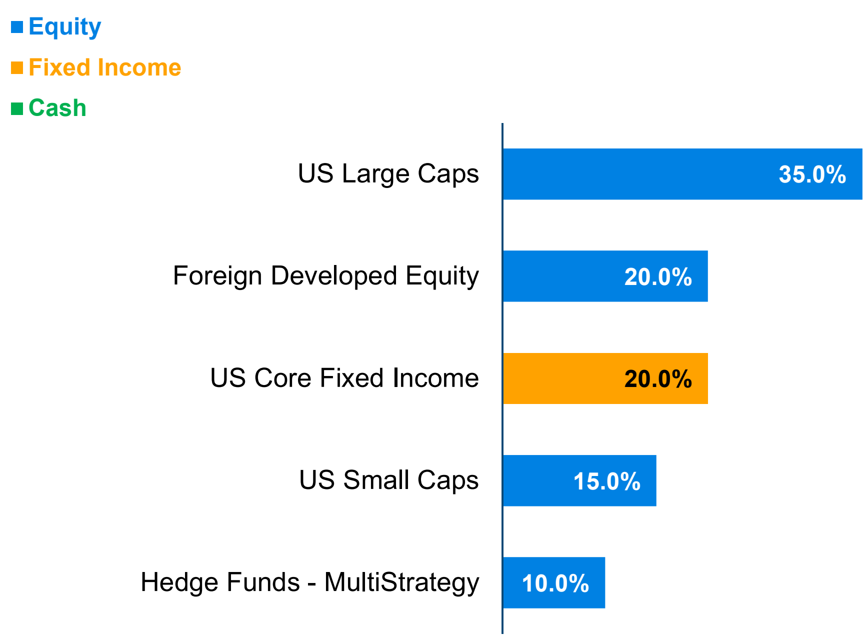
Actuarially Determined Contribution for Fiscal Year	2019-20	2018-19
Normal Cost	$3,042,000	$2,821,000
Past Service Cost	5,691,000	5,175,000
Timing Adjustment	75,000	73,000
Actuarially Determined Contribution	8,808,000	8,069,000

Section II - Plan Assets
A. Summary of Fund Transactions

Market Value as of July 1, 2017	$129,663,624
City Contributions	6,980,000
Member Contributions	1,319,247
Net Investment Income	11,320,351
Benefit Payments	(10,490,257)
Administrative Expenses	(87,311)
Market Value as of June 30, 2018	138,705,654
Expected Return on Market Value of Assets	9,251,592
Market Value (Gain)/Loss	(2,068,759)
Approximate Rate of Return *	8.81%

* The rate shown here is not the dollar or time weighted investment yield rate which measures investment performance. It is an approximate net return assuming all activity occurred on average midway through the fiscal year.

Target Asset Allocation as of June 30, 2018



Section II - Plan Assets
B. Development of Actuarial Value of Assets

In order to minimize the impact of market fluctuations on the contribution level, we use an Actuarial Value of Assets that recognizes gains and losses asymptotically over a five year period. The Actuarial Value of Assets as of July 1, 2018 is determined below.

1.	Expected Actuarial Value of Assets:	
	a. Actuarial Value of Assets as of July 1, 2017	$145,237,334
	b. City and Member Contributions	8,299,247
	c. Benefit Payments and Administrative Expenses	(10,577,568)
	d. Expected Earnings Based on 7.20% Interest	10,632,141
	e. Expected Actuarial Value of Assets as of July 1, 2018	153,591,154
2.	Market Value of Assets as of July 1, 2018	138,705,654
3.	Unrecognized Gains/(Losses): (2) - (1e)	(14,885,500)
4.	Amount Recognized as of July 1, 2018: 20% of (3)	(2,977,100)
5.	Preliminary Actuarial Value of Assets as of July 1, 2018: (1e) + (4)	150,614,054
6.	Preliminary Actuarial Value of Assets as a % of Market Value: (5) / (2)	108.6%
7.	Actuarial Value of Assets as of July 1, 2018: (5), within +/- 20% of (2)	150,614,054
8.	Actual Earnings on Actuarial Value of Assets: (7) - [(1a) + (1b) + (1c)]	7,655,041
9.	Approximate Rate of Return on Actuarial Value of Assets	5.27%
10.	Actuarial Value (Gain)/Loss: (1d) - (8)	2,977,100

Section III - Development of Contribution
A. Funded Status

		July 1, 2018	July 1, 2017
1.	Accrued Liability		
	Active Members	$93,948,424	$82,121,914
	Inactive Members	1,213,370	1,115,497
	Service Retirees	69,392,871	108,494,058
	Disabled Retirees*	22,322,989	0
	Beneficiaries*	13,259,504	0
	Total Accrued Liability	200,137,158	191,731,469
2.	Actuarial Value of Assets (see Section IIB)	150,614,054	145,237,334
3.	Unfunded Accrued Liability: (1) - (2)	49,523,104	46,494,135
4.	Funded Ratio: (2) / (1)	75.3%	75.8%

**July 1, 2017 report did not include breakdown; liabilities are included in Service Retirees.*

Section III - Development of Contribution
B. Past Service Cost

In determining the Past Service Cost, the Unfunded Accrued Liability is amortized as a level dollar amount over 15 years. Each year a new amortization base is established for the actuarial gains or losses that have emerged since the last valuation.

1. Amortization Bases Established in Prior Years

Date Established	Original Amount	(a) Outstanding Balance July 1, 2018	Years Remaining July 1, 2018	(b) Annual Amortization Payment
July 1, 2014	N/A	$15,371,548	11	$1,923,552
July 1, 2015	N/A	4,627,776	12	546,924
July 1, 2016	N/A	14,548,564	13	1,634,573
July 1, 2017	N/A	9,746,213	14	1,046,800
Total		44,294,101		5,151,849

2.	Unfunded Accrued Liability as of July 1, 2018 (see Section IIIA)	49,523,104
3.	New Amortization Base Established July 1, 2018: (2) - (1a Total)	5,229,003
4.	Amortization Period for New Amortization Base	15
5.	Amortization Growth Rate	0.00%
6.	Amortization Payment for July 1, 2018: (3) amortized over (4)	539,447
7.	Past Service Cost: (1b Total) + (6)	5,691,296

Section III - Development of Contribution
C. Actuarially Determined Contribution

		2019-20	2018-19
1.	Total Normal Cost	$4,263,881	$3,892,380
2.	Expected Member Contributions	1,375,119	1,211,840
3.	Expected Administrative Expenses	153,000	140,000
4.	Net Normal Cost: (1) - (2) + (3)	3,041,762	2,820,540
5.	Past Service Cost (see Section IIIB)	5,691,296	5,175,010
6.	Preliminary City Contribution: (4) + (5), rounded to $1,000	8,733,000	7,996,000
7.	Inflation Assumption	2.60%	2.75%
8.	Timing Adjustment: [(1) - (2)] x (7), rounded to $1,000	75,000	73,000
9.	Actuarially Determined Contribution: (6) + (8)	8,808,000	8,069,000

Section III - Development of Contribution
D. Long Range Forecast

This forecast is based on the results of the July 1, 2018 actuarial valuation and assumes that the City will pay the Actuarially Determined Contribution each year, the assets will return the assumed interest rate on a market value basis each year, and there are no future changes in the actuarial methods or assumptions or in the plan provisions. Actual results at each point in time will yield different values, reflecting the actual experience of the plan membership and assets.

	Values as of the Valuation Date					Cash Flows Projected to the Following Fiscal Year			
Valuation Date	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio	Fiscal Year	City Contributions	Member Contributions	Benefit Payments	Net Cash Flows
7/1/2018	$200,137,158	$150,614,054	$49,523,104	75.3%	2019-20	$8,808,000	$1,366,337	($11,194,691)	($1,020,354)
7/1/2019	208,014,000	157,740,000	50,274,000	75.8%	2020-21	9,205,000	1,423,000	(12,006,000)	(1,378,000)
7/1/2020	216,045,000	165,920,000	50,125,000	76.8%	2021-22	9,475,000	1,449,000	(12,667,000)	(1,743,000)
7/1/2021	223,822,000	174,635,000	49,187,000	78.0%	2022-23	9,777,000	1,538,000	(13,222,000)	(1,907,000)
7/1/2022	231,622,000	183,867,000	47,755,000	79.4%	2023-24	10,033,000	1,578,000	(13,845,000)	(2,234,000)
7/1/2023	239,415,000	193,822,000	45,593,000	81.0%	2024-25	10,253,000	1,655,000	(14,344,000)	(2,436,000)
7/1/2024	247,281,000	204,348,000	42,933,000	82.6%	2025-26	10,479,000	1,728,000	(14,847,000)	(2,640,000)
7/1/2025	255,273,000	215,586,000	39,687,000	84.5%	2026-27	10,672,000	1,787,000	(15,509,000)	(3,050,000)
7/1/2026	263,467,000	227,559,000	35,908,000	86.4%	2027-28	10,812,000	1,790,000	(16,188,000)	(3,586,000)
7/1/2027	271,714,000	240,085,000	31,629,000	88.4%	2028-29	11,029,000	1,815,000	(16,891,000)	(4,047,000)
7/1/2028	279,928,000	253,055,000	26,873,000	90.4%	2029-30	11,187,000	1,905,000	(17,631,000)	(4,539,000)
7/1/2029	288,104,000	266,562,000	21,542,000	92.5%	2030-31	9,331,000	1,982,000	(18,310,000)	(6,997,000)
7/1/2030	296,155,000	280,600,000	15,555,000	94.7%	2031-32	8,641,000	1,974,000	(18,749,000)	(8,134,000)
7/1/2031	304,160,000	293,086,000	11,074,000	96.4%	2032-33	7,190,000	2,030,000	(19,567,000)	(10,347,000)
7/1/2032	312,404,000	305,310,000	7,094,000	97.7%	2033-34	5,980,000	2,106,000	(20,319,000)	(12,233,000)
7/1/2033	320,514,000	316,105,000	4,409,000	98.6%	2034-35	5,364,000	2,195,000	(21,378,000)	(13,819,000)
7/1/2034	328,498,000	325,707,000	2,791,000	99.2%	2035-36	4,853,000	2,262,000	(21,944,000)	(14,829,000)
7/1/2035	335,943,000	334,361,000	1,582,000	99.5%	2036-37	4,658,000	2,314,000	(22,358,000)	(15,386,000)
7/1/2036	343,374,000	342,592,000	782,000	99.8%	2037-38	4,564,000	2,378,000	(23,086,000)	(16,144,000)
7/1/2037	351,074,000	350,844,000	230,000	99.9%	2038-39	4,339,000	2,484,000	(23,686,000)	(16,863,000)

Section III - Development of Contribution
E. History of Funded Status

Valuation Date	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
July 1, 2018	$150,614,054	$200,137,158	$49,523,104	75.3%
July 1, 2017	145,237,334	191,731,469	46,494,135	75.8%
July 1, 2016	142,545,253	180,482,066	37,936,813	79.0%
July 1, 2015	142,539,557	165,668,058	23,128,501	86.0%
July 1, 2014	141,313,028	159,884,000	18,570,972	88.4%
July 1, 2013	138,438,777	152,247,000	13,808,223	90.9%
July 1, 2012	137,082,000	147,783,000	10,701,000	92.8%
July 1, 2011	135,656,323	139,939,000	4,282,677	96.9%
July 1, 2010	130,795,712	133,421,000	2,625,288	98.0%

Section III - Development of Contribution
F. History of City Contributions

Fiscal Year	Actuarially Determined Contribution	Actual City Contribution	Payroll	Actual Contribution as a Percent of Payroll
2019-20	$8,808,000	TBD	$24,035,714	TBD
2018-19	8,069,000	TBD	22,040,167	TBD
2017-18	6,980,000	$6,980,000	22,756,531	30.7%
2016-17	5,140,000	5,140,000	20,118,733	25.5%
2015-16	4,342,000	4,342,000	20,118,733	21.6%
2014-15	3,575,000	3,515,000	21,702,858	16.2%
2013-14	3,119,000	3,119,000	20,850,430	15.0%
2012-13	2,340,000	2,340,000	21,662,924	10.8%

Section IV - Membership Data
A. Reconciliation of Membership from Prior Valuation

Details of the changes in the Plan membership since the last valuation are shown below. Additional details on the Plan membership are provided in the remainder of Section IV.

	Active Members	Terminated Vested Members	Nonvested Members Due Refunds	Service Retirees	Disabled Retirees	Beneficiaries	Total
Count July 1, 2017	257	2	0	131	41	62	493
Terminated							
- due refund	-	-	-	-	-	-	0
- paid refund	-	-	-	-	-	-	0
- vested benefits due	-	-	-	-	-	-	0
Retired	(2)	-	-	1	1	-	0
Died							
- with beneficiary	-	-	-	-	-	-	0
- no beneficiary	-	-	-	(6)	-	(6)	(12)
Benefits expired	-	-	-	-	-	-	0
New member	-	-	-	-	-	-	0
Rehired	1	-	-	-	-	-	1
New Alternate Payee	-	-	-	-	-	-	0
Correction	-	-	-	-	-	2	2
Count July 1, 2018	256	2	0	126	42	58	484

Section IV - Membership Data
B. Statistics of Active Membership

	As of July 1, 2018	As of July 1, 2017
Number of Active Members	256	257
Average Age	46.7	45.9
Average Service	18.0	16.9
Total Payroll	$24,035,714	$22,040,167
Average Payroll	93,890	85,759

Section IV - Membership Data
C. Statistics of Inactive Membership

	As of July 1, 2018	As of July 1, 2017
Terminated Vested Members		
Number	2	2
Total Annual Benefit	$95,796	$247,254
Average Annual Benefit	47,898	123,627
Average Age	43.2	53.1
Nonvested Members Due Refunds		
Number	0	0
Service Retirees		
Number	126	131
Total Annual Benefit*	$6,439,145	$10,613,602
Average Annual Benefit*	51,104	81,020
Average Age*	72.0	73.0
Disabled Retirees		
Number	42	41
Total Annual Benefit	$2,076,075	
Average Annual Benefit	49,430	
Average Age	70.4	
Beneficiaries		
Number	58	62
Total Annual Benefit	$1,710,903	
Average Annual Benefit	29,498	
Average Age	78.9	

**Individual breakdown not available for July 1, 2017- values shown are for all retirees/beneficiaries combined*

Section IV - Membership Data
D. Distribution of Inactive Members as of July 1, 2018

	Age	Number	Annual Benefits
Terminated Vested Members	< 50	2	$95,796
	50 - 59	0	0
	60 - 69	0	0
	70 - 79	0	0
	80 - 89	0	0
	90 +	0	0
	Total	2	95,796
Service Retirees	< 50	1	$38,271
	50 - 59	11	637,615
	60 - 69	48	2,938,885
	70 - 79	36	1,973,635
	80 - 89	25	702,134
	90 +	5	148,604
	Total	126	6,439,145
Disabled Retirees	< 50	1	$91,572
	50 - 59	6	355,670
	60 - 69	14	715,867
	70 - 79	14	615,628
	80 - 89	6	253,270
	90 +	1	44,068
	Total	42	2,076,075
Beneficiaries	< 50	1	$46,147
	50 - 59	2	50,232
	60 - 69	11	373,861
	70 - 79	14	$520,018
	80 - 89	19	511,140
	90 +	11	209,505
	Total	58	1,710,903

Appendix A - Actuarial Funding Method

The actuarial funding method used in the valuation of this Plan is known as the Projected Unit Credit Cost Method. The Actuarially Determined Contribution consists of three pieces: Normal Cost plus a Past Service Cost payment to gradually eliminate the Unfunded Accrued Liability plus a Timing Adjustment to reflect the timing of the contribution relative to the valuation date.

Under this cost method a projected retirement benefit at assumed retirement age is computed for each member. The Normal Cost for each member is computed as the present value of the pro-rata portion of the member's projected benefit which is accrued or earned during the plan year being valued. The normal cost of the plan is the total of the individually computed normal costs for all members. The Accrued Liability at any point in time for an active member is the present value of that portion of the projected benefit which has been accrued up to the valuation date. For members receiving benefits or entitled to a deferred benefit, the accrued liability is equal to the present value of their future benefit payments. The accrued liability for the plan is the total of individually computed accrued liability amounts for all members.

The funding cost of the Plan is derived by making certain specific assumptions as to rates of interest, mortality, turnover, etc. which are assumed to hold for many years into the future. Since actual experience may differ somewhat from the assumptions, the costs determined by the valuation must be regarded as estimates of the true costs of the Plan.

The Unfunded Accrued Liability is the excess of the Accrued Liability over the assets which have been accumulated for the plan. This Unfunded Accrued Liability is amortized as a level dollar amount over an open period of 15 years. Each year a new amortization base is established for the actuarial gains or losses that have emerged since the last valuation.

The Actuarial Value of Assets is determined by recognizing market gains and losses asymptotically over a five year period; the result is constrained to within +/- 30% of the market value of assets as of the valuation date.

The long-range forecasts included in this report have been developed by assuming that members will terminate, retire, become disabled, and die according to the actuarial assumptions with respect to these causes of decrement, and that pay increases, cost of living adjustments, and so forth will likewise occur according to the actuarial assumptions. For those unions whose new employees are eligible to participate in this plan, members who are projected to leave active employment are assumed to be replaced by new active members with the same age, service, gender, and pay characteristics as those hired in the past few years, as well as incorporating the characteristics of the current active employees as a whole.

Appendix B - Actuarial Assumptions

Each of the assumptions used in this valuation was set based on a formal study of the plan's experience as of July 1, 2013 which reflected industry standard published tables and data, the particular characteristics of the plan, relevant information from the plan sponsor or other sources about future expectations, and our professional judgment regarding future plan experience. We believe the assumptions are reasonable for the contingencies they are measuring, and are not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Interest Rate 7.10% (prior: 7.20%)

Inflation Rate 2.60% (prior: 2.75%)

Rate of Increase for Part B Reimbursements N/A (prior: 2.75%)

Expenses The average of the prior year two year's administrative expenses, rounded to the nearest $1,000.

Salary Scale

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

Turnover

Age	Rate
20	5.44%
25	4.89%
30	3.70%
35	2.35%
40+	0.00%

Retirement

Service	Rate	Service	Rate
25	4%	35	10%
26	0%	36	22%
27-31	4%	37	0%
32	18%	38	29%
33	11%	39	20%
34	38%	40	100%

Retirement rate at age 65 is 100%.

Appendix B - Actuarial Assumptions

Disability

Age	Rate
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%

Disability benefits are assumed to be service connected and equal to 75% of pay.

Mortality

RP-2000 Blue Collar Combined Table, with separate tables for males and females and generational projection per Scale BB. This assumption includes a margin for future improvements in longevity.

Pre-retirement deaths are assumed to be not service connected.

Marital Status

80% of active participants are assumed to be married. Female spouses are assumed to be 4 years younger than male spouses.

Vacation Bank

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

Appendix C - 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. All eligibility requirements and benefit amounts shall be determined in strict accordance with the plan document itself. To the extent that this summary does not accurately reflect the plan provisions, then the results of this valuation may not be accurate.

Pension Earnings	Base salary in the final year of employment excluding bonuses and overtime, and including differential amounts.
Normal Retirement Eligibility	Age 48 with 20 years of service if hired after January 1, 1981; 20 years of service if hired before January 1, 1981.
Normal Retirement Benefit	2.5% of Pension Earnings multiplied by years of service up to 20 plus an additional 2.0% of Pension Earnings for each additional year of service. For employees hired before July 1, 2016, the maximum benefit is 74% of Pension Earnings. 2.25% times years of service multiplied by a three-year average Pension Earnings for employees hired after July 1, 2016. The maximum benefit multiplier is 100% for these employees.
Non-Service Disability Eligibility	20 years of service.
Non-Service Disability Benefit	50% of salary, but not less than the accrued benefit.
Service Disability Eligibility	No service requirement.
Service Disability Benefit	100% or 75% of salary depending on the extent of the disability.
Non-Service Preretirement Death Eligibility	No service requirement.
Non-Service Preretirement Death Benefit	Return of contributions with interest for employees with less than 10 years of service. Greater of 100% of the Normal Retirement Benefit and 50% of salary for employees with more than 10 years of service.
Service Preretirement Death Eligibility	No service requirement.
Service Preretirement Death Benefit	Greater of 100% of the Normal Retirement Benefit and 50% of salary for employees with more than 10 years of service.

Appendix C - Summary of Plan Provisions

Postretirement Spouse's Benefit	100% of the benefit the retiree was receiving for employees hired before July 1, 2016. Employees may elect a reduced joint & survivor annuity at retirement if hired after July 1, 2016.
Postretirement Death Benefit	Lump sum equal to the excess, if any, of accumulated contributions over the total benefits paid to the member or survivors.
Vesting	100% after 15 years of service.
Termination Benefit	If the member is not vested, the member is paid a refund of their accumulated contributions.
Employee Contributions	Active members contribute a percentage of salary: 7.25% for employees hired after July 1, 2016. 6.25% for employees before after July 1, 2016. No member contributions are made by employees with 32+ years of service.
Vacation Exchange	Employees can trade in vacation leave time for additional pension credit. Each 20 days grants an additional 1.5% of salary up to a maxmimum of 7.5%. Those hired after July 1, 2016 are not eligible for this additional retirement benefit.

Appendix D - Glossary

Actuarial Cost Method - This is a procedure for determining the Actuarial Present Value of Benefits and allocating it to time periods to produce the Actuarial Accrued Liability and the Normal Cost.

Accrued Liability - This is the portion of the Actuarial Present Value of Benefits attributable to periods prior to the valuation date by the Actuarial Cost Method (i.e., that portion not provided by future Normal Costs).

Actuarial Assumptions - With any valuation of future benefits, assumptions of anticipated future events are required. If actual events differ from the assumptions made, the actual cost of the plan will vary as well. Some examples of key assumptions include the interest rate, salary scale, and rates of mortality, turnover and retirement.

Actuarial Present Value of Benefits - This is the present value, as of the valuation date, of future payments for benefits and expenses under the Plan, where each payment is: a) multiplied by the probability of the event occurring on which the payment is conditioned, such as the probability of survival, death, disability, termination of employment, etc.; and b) discounted at the assumed interest rate.

Actuarial Value of Assets - This is the value of cash, investments and other property belonging to the plan, typically adjusted to recognize investment gains or losses over a period of years to dampen the impact of market volatility on the Actuarially Determined Contribution.

Actuarially Determined Contribution ("ADC") - This is the employer's periodic contributions to a defined benefit plan, calculated in accordance with actuarial standards of practice.

Attribution Period - The period of an employee's service to which the expected benefit obligation for that employee is assigned. The beginning of the attribution period is the employee's date of hire and costs are spread across all employment.

Interest Rate - This is the long-term expected rate of return on any investments set aside to pay for the benefits. In a financial reporting context (e.g., GASB 68) this is termed the Discount Rate.

Normal Cost - This is the portion of the Actuarial Present Value of Benefits allocated to a valuation year by the Actuarial Cost Method.

Past Service Cost - This is a catch-up payment to fund the Unfunded Accrued Liability over time (generally 10 to 30 years). A closed amortization period is a specific number of years counted from one date and reducing to zero with the passage of time; an open amortization period is one that begins again or is recalculated at each valuation date. Also known as the Amortization Payment.

Return on Plan Assets - This is the actual investment return on plan assets during the fiscal year.

Unfunded Accrued Liability - This is the excess of the Accrued Liability over the Actuarial Value of Assets.