



TOWN OF GRANBY PENSION PLAN

**Actuarial Valuation as of July 1, 2019
To Determine Funding for Fiscal Year 2020-21**

Prepared by

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Certification

We have performed an actuarial valuation of the Plan as of July 1, 2019 to determine funding for fiscal year 2020-21. 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.

Milliman's work is prepared solely for the internal business use of the Town of Granby ("Town"). To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exceptions: (a) the Town may provide a copy of Milliman's work, in its entirety, to the Town's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the Town; and (b) the Town may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law. No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

In preparing this report, we relied on employee census data and financial information as of the valuation date, furnished by the Town. 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.

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

None.

Changes in Actuarial Methods and Assumptions

The interest rate assumption was lowered from 7.00% to 6.75%. This change increased the Unfunded Accrued Liability by about \$516,000 and increased the Actuarially Determined Contribution by approximately \$72,000.

Other Significant Changes

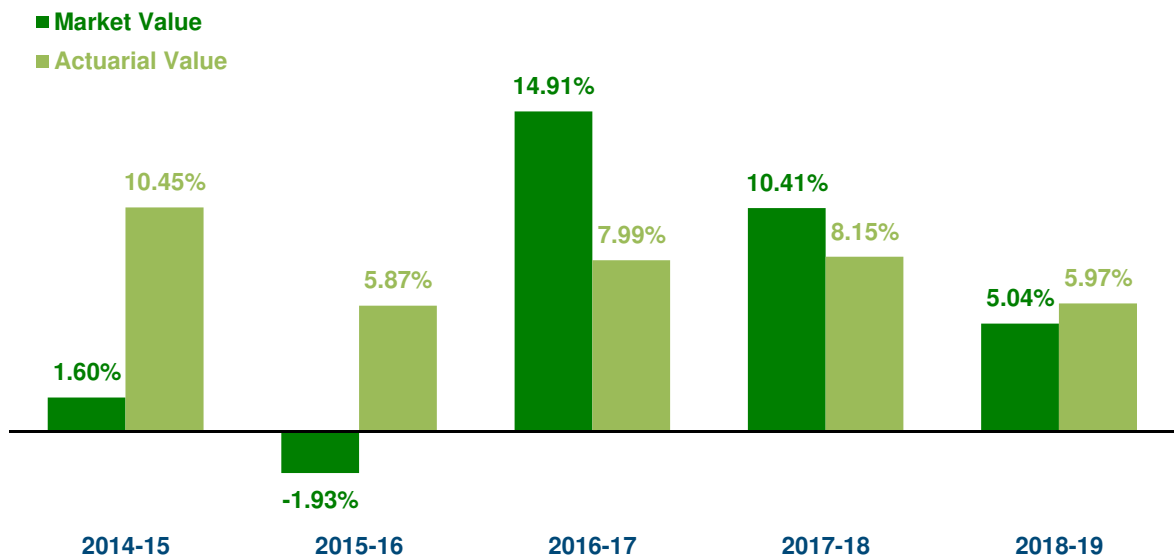
None.

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 non-asymptotically over five years.

	Market	Actuarial
Value as of July 1, 2018	\$17,917,742	\$17,563,945
Town and Member Contributions	716,478	716,478
Investment Income	890,366	1,033,024
Benefit Payments	(1,222,399)	(1,222,399)
Value as of July 1, 2019	18,302,187	18,091,048

For fiscal year 2018-19, the plan's assets earned 5.04% on a Market Value basis and 5.97% on an Actuarial Value basis. The actuarial assumption for this period was 7.00%; the result is an asset loss of about \$346,000 on a Market Value basis and a loss of about \$178,000 on an Actuarial Value basis. Historical rates of return are shown in the graph below.

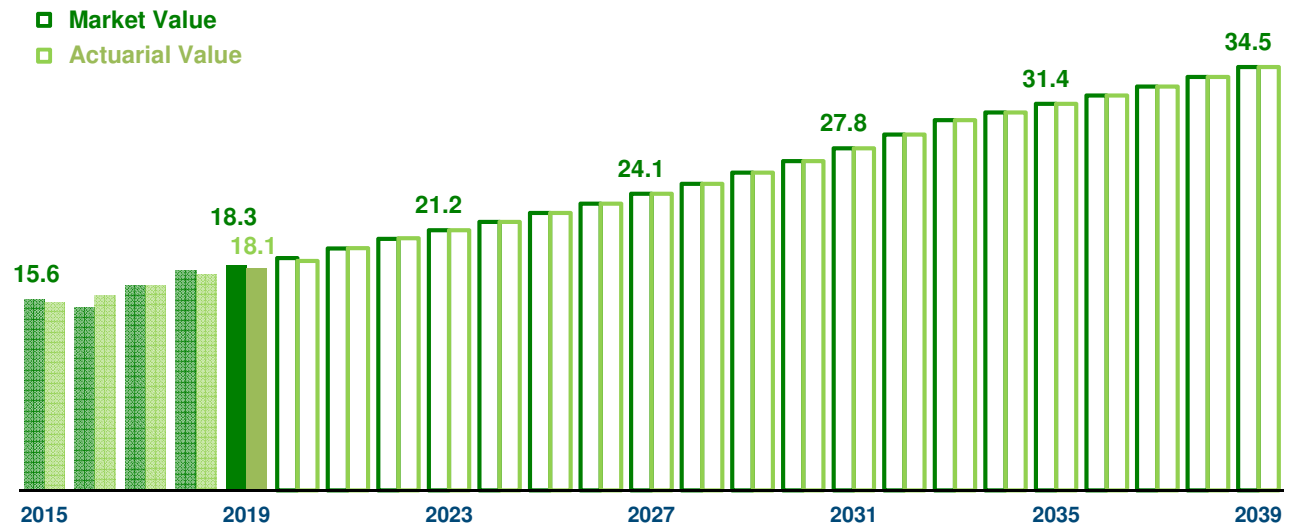


Please note that the Actuarial Value currently is less than the Market Value by \$0.2 million. This figure represents investment gains that will be gradually recognized in future years. This process will exert downward pressure on the Town's contribution, unless there are offsetting market losses.

Section I - Executive Summary

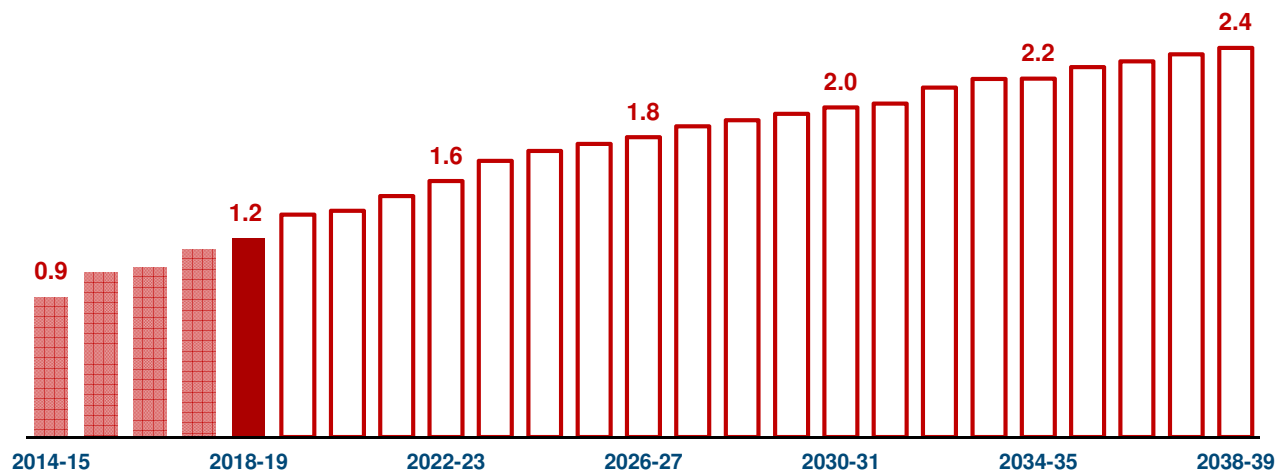
Assets (continued)

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 Town always contributes the Actuarially Determined Contribution and the investments always earn the assumed interest rate each year.



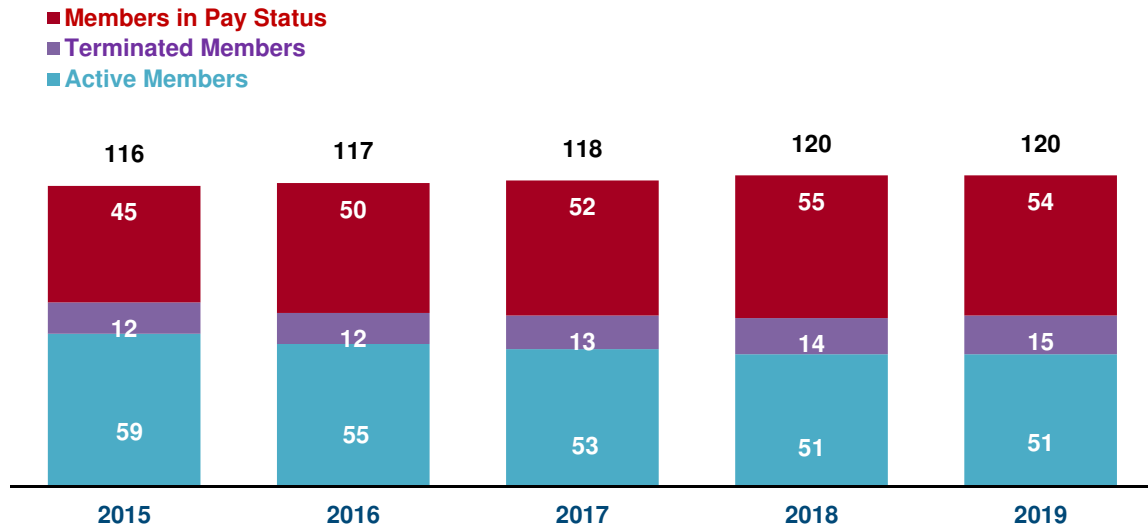
In 2018-19, the plan paid out \$1.2 million in benefits to members. Over the next 20 years, the plan is projected to pay out a total of \$39 million in benefits to members.

Benefit Payments



Section I - Executive Summary Membership

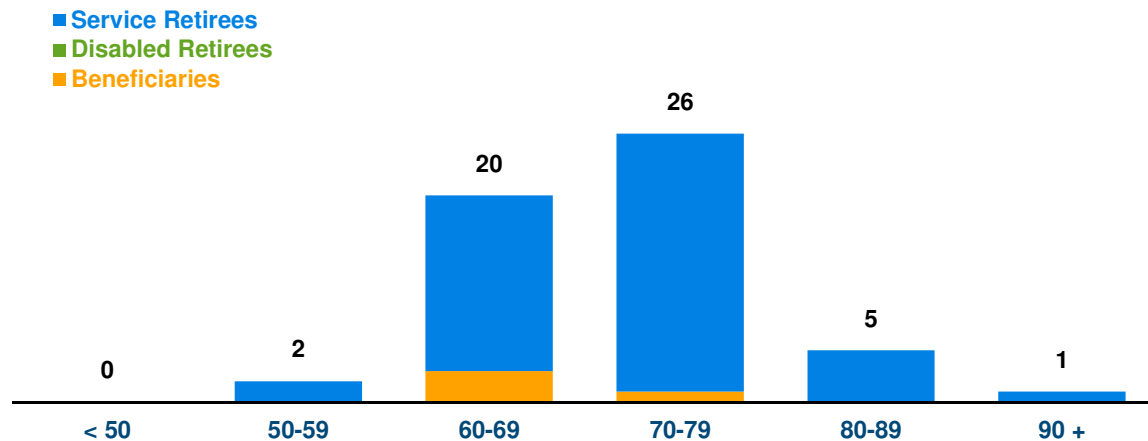
There are three basic categories of plan members included in the valuation: (1) members who are receiving monthly pension benefits, (2) former employees who have a vested right to benefits but have not yet started collecting, and (3) active employees who have met the eligibility requirements for membership.



Members in Pay Status on July 1, 2019

Service Retirees	50	Average Age	71.7
Disabled Retirees	0	Total Annual Benefit	\$1,240,415
Beneficiaries	4	Average Annual Benefit	22,971
Total	54		

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



Section I - Executive Summary

Membership (continued)

Terminated Vested Members on July 1, 2019

Count	6
Average Age	56.3
Total Annual Benefit	\$59,256
Average Annual Benefit	9,876

Nonvested Members Due Refunds on July 1, 2019

Count	9
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Active Members on July 1, 2019

	Town	Police	Board of Education	Total
Count	13	9	29	51
Average Age	54.3	47.2	53.7	52.7
Average Service	18.3	13.5	11.6	13.7
Payroll	\$1,050,566	\$927,423	\$1,900,174	\$3,878,163
Average Payroll	80,813	103,047	65,523	76,042

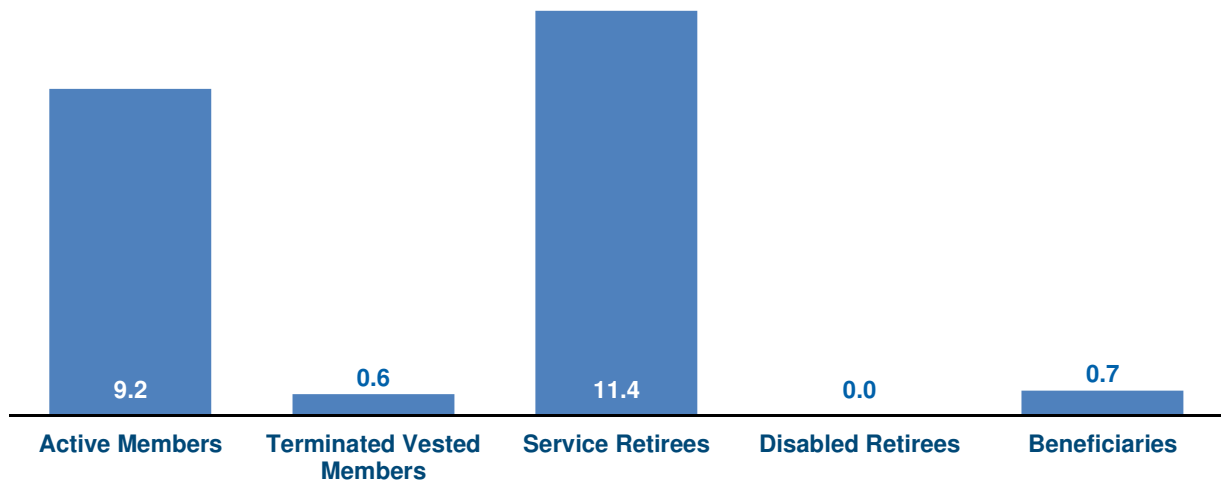
The table below illustrates the age and years of service of the active membership:

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29								0
30-34	1							1
35-39	3	3						6
40-44			4					4
45-49	3				1			4
50-54	1	2	4	1	3	1		12
55-59	1	3	2	2	1	1		10
60-64	3			2	4		2	11
65+					2		1	3
Total	12	8	10	5	11	2	3	51

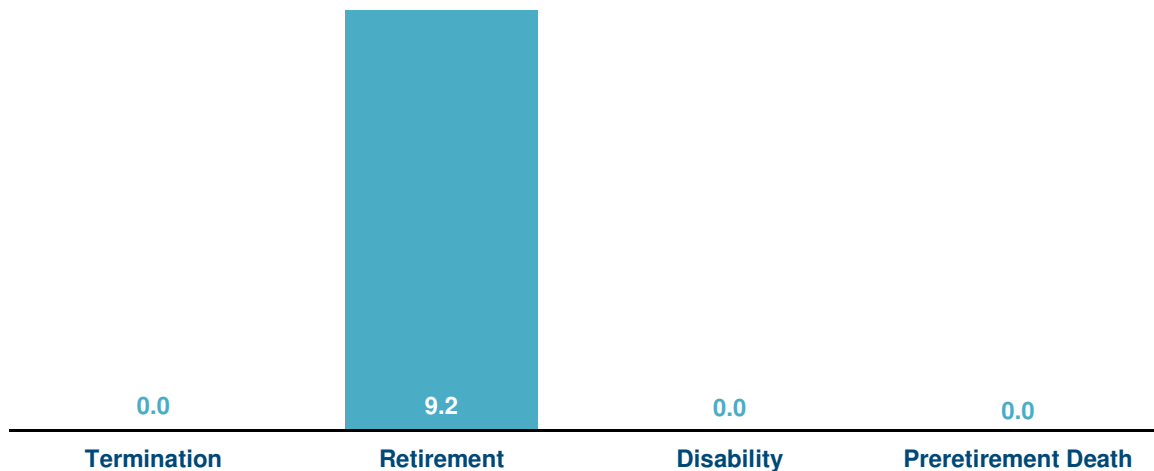
Section I - Executive Summary

Accrued Liability

The Accrued Liability as of July 1, 2019 is \$21.9 million, which consists of the following pieces (in \$ millions):



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

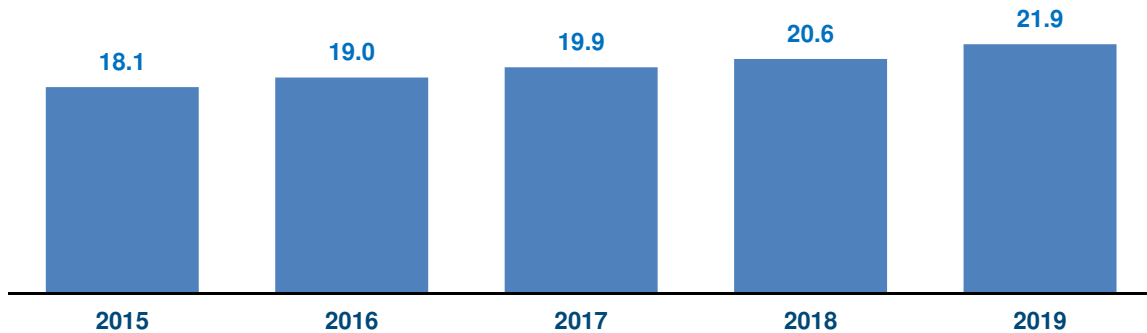


Section I - Executive Summary

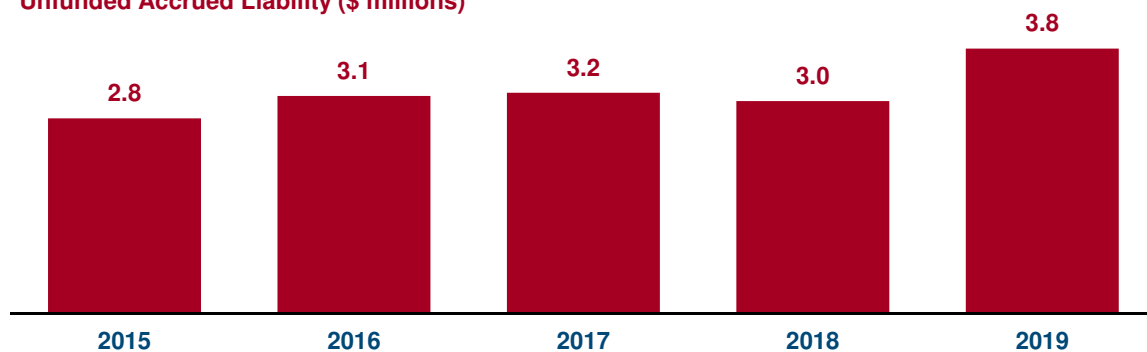
Funded Status

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.

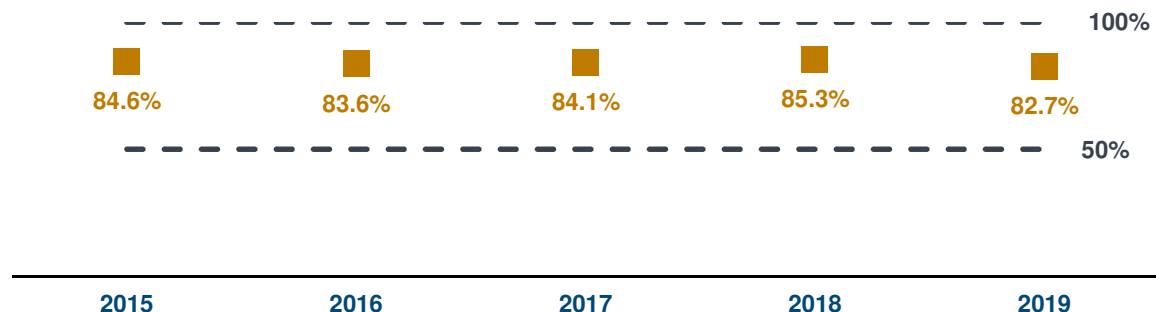
Accrued Liability (\$ millions)



Unfunded Accrued Liability (\$ millions)



Funded Ratio

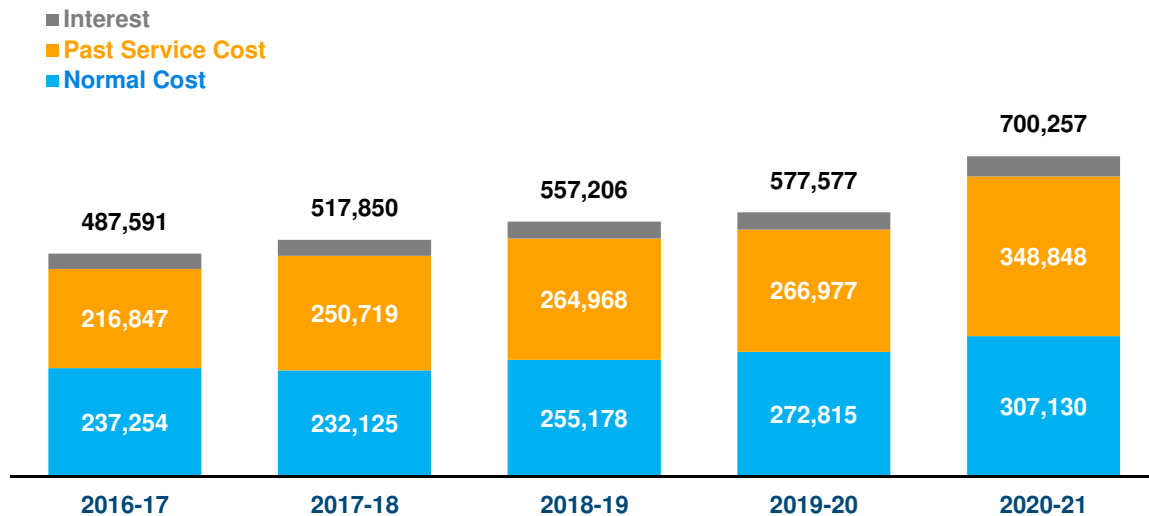


Section I - Executive Summary

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 Interest to reflect the timing of the contribution relative to the valuation date.

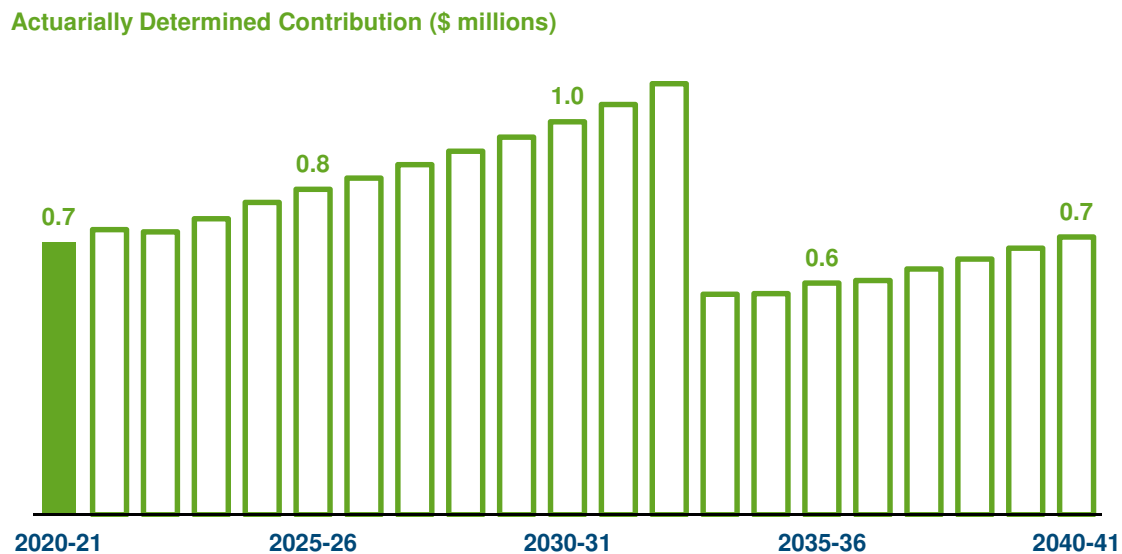
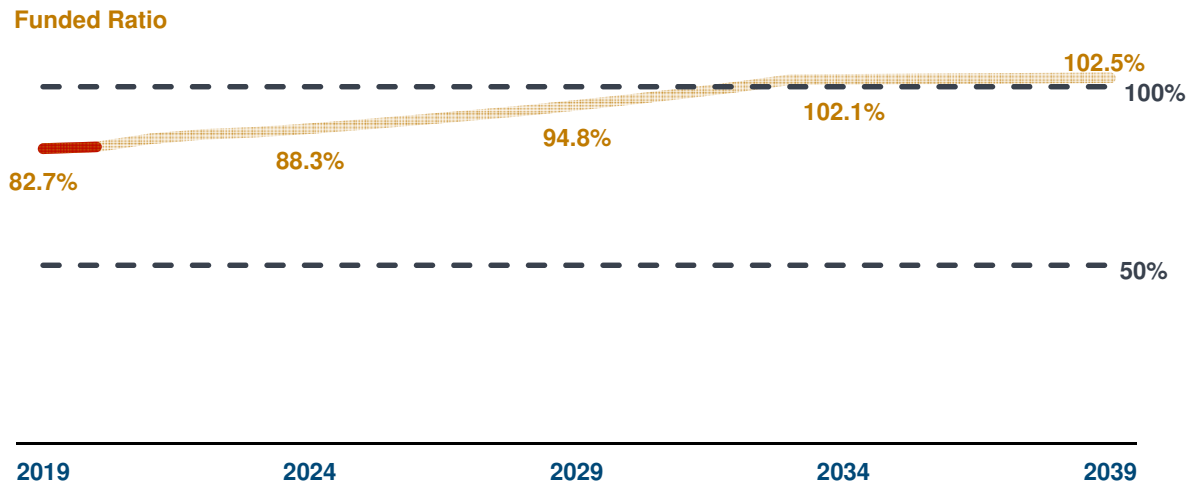
The Actuarially Determined Contribution for fiscal year 2020-21 is shown graphically below, along with the comparable figures for the preceding four fiscal years. Note that the Normal Cost is relatively consistent from year to year, whereas the Past Service Cost tends to be more volatile since it reflects the impact of asset performance.



Section I - Executive Summary

Long-Range Forecast

If the Town 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:

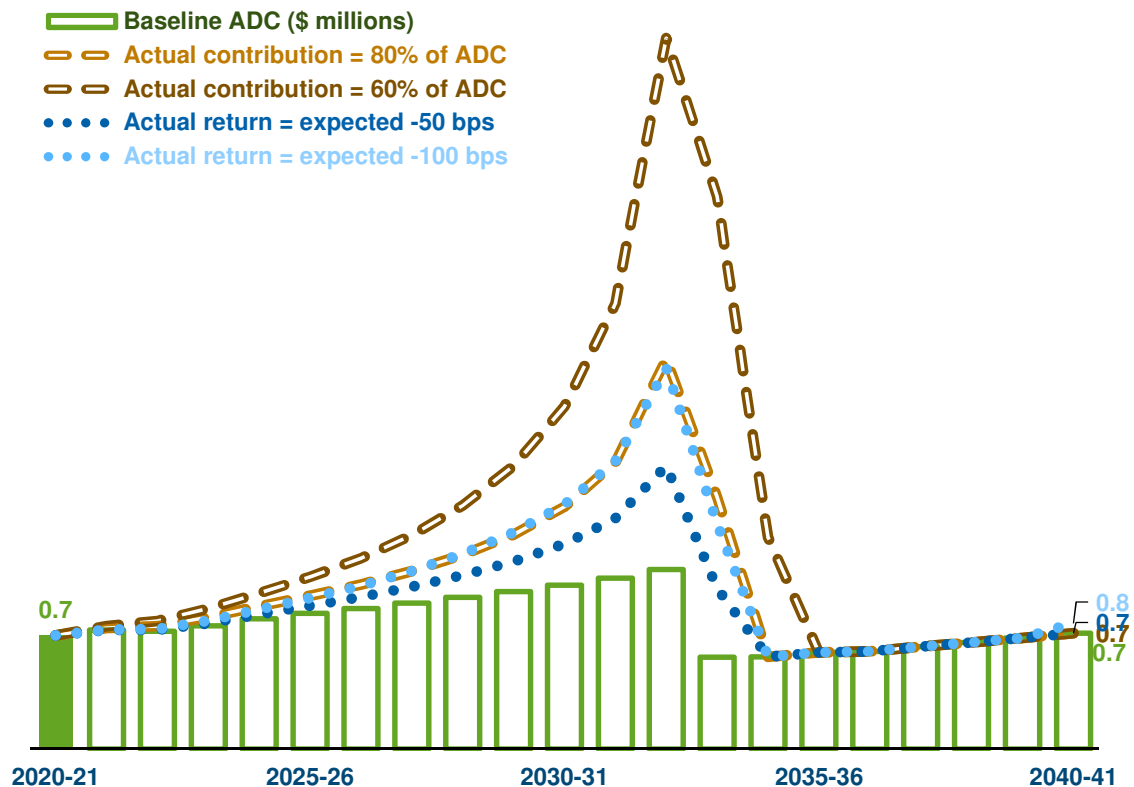


To the extent that there are future investment or liability gains or losses, changes in the actuarial assumptions or methods, or plan changes, the actual valuation results will differ from these forecasts. Please see Section III C for more details of the long range forecast.

Section I - Executive Summary

Long-Range Forecast (continued)

Pension benefits are paid for through a combination of contributions from the Town and from employees, and from investment income. If the Town 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 Town'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 Town's future contribution levels. Stochastic projections could be prepared that would enable the Town 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, 2019
Active Members	51	51
Terminated Members	14	15
Members in Pay Status	<u>55</u>	<u>54</u>
Total Count	120	120
Payroll	\$3,643,801	\$3,878,163
Assets and Liabilities as of	July 1, 2018	July 1, 2019
Market Value of Assets	\$17,917,742	\$18,302,187
Actuarial Value of Assets	17,563,945	18,091,048
Accrued Liability for Active Members	8,136,273	9,233,222
Accrued Liability for Terminated Members	526,805	569,952
Accrued Liability for Members in Pay Status	<u>11,939,065</u>	<u>12,080,300</u>
Total Accrued Liability	20,602,143	21,883,474
Unfunded Accrued Liability	3,038,198	3,792,426
Funded Ratio	85.3%	82.7%
Actuarially Determined Contribution for Fiscal Year	2019-20	2020-21
Normal Cost	\$272,815	\$307,130
Past Service Cost	266,977	348,848
Interest	<u>37,785</u>	<u>44,279</u>
Actuarially Determined Contribution	577,577	700,257
Allocation of Actuarially Determined Contribution*		
Town	\$177,403	\$189,695
Police	143,210	167,459
Board of Education	<u>256,964</u>	<u>343,103</u>
Total	577,577	700,257

* Allocated on the basis of payroll

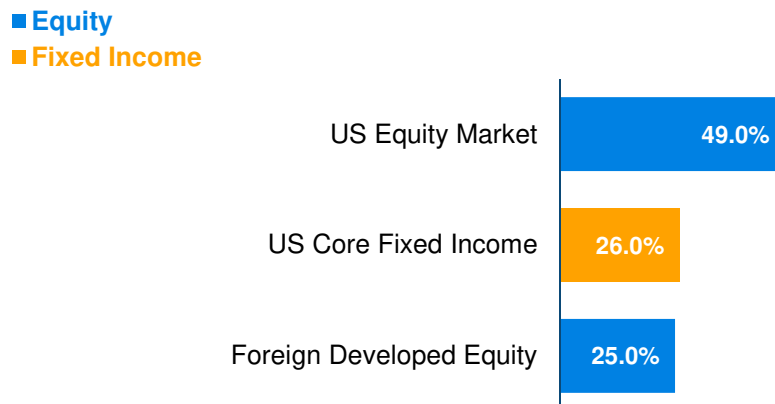
Section II - Plan Assets

A. Summary of Fund Transactions

Market Value as of July 1, 2018	\$17,917,742
Town Contributions	557,206
Member Contributions	159,272
Net Investment Income	890,366
Benefit Payments	(1,222,399)
 Market Value as of June 30, 2019	 18,302,187
Expected Return on Market Value of Assets	1,236,619
Market Value (Gain)/Loss	346,253
Approximate Rate of Return *	5.04%

* 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, 2019



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 in equal installments ('non-asymptotically') over a five year period. The Actuarial Value of Assets as of July 1, 2019 is determined below.

1.	Expected Market Value of Assets:	
a.	Market Value of Assets as of July 1, 2018	\$17,917,742
b.	Town and Member Contributions	716,478
c.	Benefit Payments	(1,222,399)
d.	Expected Earnings Based on 7.00% Interest	<u>1,236,619</u>
e.	Expected Market Value of Assets as of July 1, 2019	18,648,440
2.	Actual Market Value of Assets as of July 1, 2019	18,302,187
3.	Market Value (Gain)/Loss: (1e) - (2)	346,253
4.	Delayed Recognition of Market (Gains)/Losses	
	Plan Year End	(Gain)/Loss
	6/30/2019	\$346,253
	6/30/2018	(540,043)
	6/30/2017	(1,125,071)
	6/30/2016	1,429,563
	Percent Not Recognized	Amount Not Recognized
	80%	\$277,002
	60%	(324,026)
	40%	(450,028)
	20%	<u>285,913</u>
		(211,139)
5.	Actuarial Value of Assets as of July 1, 2019: (2) + (4)	18,091,048
6.	Approximate Rate of Return on Actuarial Value of Assets	5.97%
7.	Actuarial Value (Gain)/Loss	178,227

Section III - Development of Contribution

A. Past Service Cost

In determining the Past Service Cost, the Unfunded Accrued Liability is amortized as a level percent over a closed 22 year period starting on July 1, 2010.

	July 1, 2018	July 1, 2019
1. Accrued Liability		
Active Members	\$8,136,273	\$9,233,222
Terminated Members	526,805	569,952
Service Retirees	11,261,508	11,397,963
Disabled Retirees	0	0
Beneficiaries	<u>677,557</u>	<u>682,337</u>
Total Accrued Liability	20,602,143	21,883,474
2. Actuarial Value of Assets (see Section IIB)	17,563,945	18,091,048
3. Unfunded Accrued Liability: (1) - (2)	3,038,198	3,792,426
4. Funded Ratio: (2) / (1)	85.3%	82.7%
5. Amortization Period	14	13
6. Amortization Growth Rate	3.50%	3.50%
7. Past Service Cost: (3) amortized over (5)	266,977	348,848

Section III - Development of Contribution

B. Actuarially Determined Contribution

	2019-20	2020-21
1. Total Normal Cost	\$450,958	\$496,617
2. Expected Member Contributions	178,143	189,487
3. Expected Administrative Expenses	0	0
4. Net Normal Cost: (1) - (2) + (3)	272,815	307,130
5. Past Service Cost (see Section IIIA)	266,977	348,848
6. Interest on (4) + (5) to the start of the fiscal year	37,785	44,279
7. Actuarially Determined Contribution: (4) + (5) + (6)	577,577	700,257
8. Payroll		
Town	1,045,042	1,050,566
Police	843,623	927,423
Board of Education	<u>1,513,721</u>	<u>1,900,174</u>
Total	3,402,386	3,878,163
9. Allocation of (7) based on (8)		
Town	177,403	189,695
Police	143,210	167,459
Board of Education	<u>256,964</u>	<u>343,103</u>
Total	577,577	700,257

Section III - Development of Contribution

C. Long Range Forecast

This forecast is based on the results of the July 1, 2019 actuarial valuation and assumes that the Town 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. For purposes of this forecast the amortization period declines to 1 year to illustrate the progress of the plan towards becoming fully funded; in actual practice the amortization period will not be less than 10 years in order to shield the Town from contribution volatility. Actual results at each point in time will yield different values, reflecting the actual experience of the plan membership and assets.

Valuation Date	Values as of the Valuation Date				Fiscal Year	Cash Flows Projected to the Following Fiscal Year			
	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio		Town Contributions	Member Contributions	Benefit Payments	Net Cash Flows
7/1/2019	\$21,883,474	\$18,091,048	\$3,792,426	82.7%	2020-21	\$700,257	\$203,711	(\$1,393,251)	(\$489,283)
7/1/2020	22,470,000	18,682,000	3,788,000	83.1%	2021-22	733,000	207,000	(1,484,000)	(544,000)
7/1/2021	23,097,000	19,716,000	3,381,000	85.4%	2022-23	727,000	213,000	(1,576,000)	(636,000)
7/1/2022	23,686,000	20,523,000	3,163,000	86.6%	2023-24	761,000	216,000	(1,701,000)	(724,000)
7/1/2023	24,253,000	21,177,000	3,076,000	87.3%	2024-25	803,000	221,000	(1,761,000)	(737,000)
7/1/2024	24,750,000	21,858,000	2,892,000	88.3%	2025-26	837,000	226,000	(1,804,000)	(741,000)
7/1/2025	25,239,000	22,571,000	2,668,000	89.4%	2026-27	866,000	232,000	(1,845,000)	(747,000)
7/1/2026	25,734,000	23,329,000	2,405,000	90.7%	2027-28	900,000	238,000	(1,913,000)	(775,000)
7/1/2027	26,244,000	24,130,000	2,114,000	91.9%	2028-29	935,000	248,000	(1,949,000)	(766,000)
7/1/2028	26,742,000	24,957,000	1,785,000	93.3%	2029-30	971,000	255,000	(1,989,000)	(763,000)
7/1/2029	27,263,000	25,850,000	1,413,000	94.8%	2030-31	1,011,000	264,000	(2,029,000)	(754,000)
7/1/2030	27,806,000	26,806,000	1,000,000	96.4%	2031-32	1,055,000	273,000	(2,053,000)	(725,000)
7/1/2031	28,374,000	27,836,000	538,000	98.1%	2032-33	1,108,000	272,000	(2,150,000)	(770,000)
7/1/2032	28,985,000	28,964,000	21,000	99.9%	2033-34	567,000	285,000	(2,204,000)	(1,352,000)
7/1/2033	29,547,000	30,123,000	(576,000)	101.9%	2034-35	569,000	297,000	(2,207,000)	(1,341,000)
7/1/2034	30,130,000	30,759,000	(629,000)	102.1%	2035-36	595,000	300,000	(2,278,000)	(1,383,000)
7/1/2035	30,788,000	31,449,000	(661,000)	102.1%	2036-37	602,000	314,000	(2,313,000)	(1,397,000)
7/1/2036	31,426,000	32,142,000	(716,000)	102.3%	2037-38	632,000	324,000	(2,355,000)	(1,399,000)
7/1/2037	32,115,000	32,867,000	(752,000)	102.3%	2038-39	657,000	338,000	(2,396,000)	(1,401,000)
7/1/2038	32,844,000	33,639,000	(795,000)	102.4%	2039-40	685,000	348,000	(2,456,000)	(1,423,000)

Section III - Development of Contribution

D. History of Funded Status

Valuation Date	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
July 1, 2010	\$11,574,971	\$14,205,226	\$2,630,255	81.5%
July 1, 2011	12,140,206	15,118,477	2,978,271	80.3%
July 1, 2012	12,359,518	15,660,430	3,300,912	78.9%
July 1, 2013	12,780,404	16,255,832	3,475,428	78.6%
July 1, 2014	14,100,445	17,059,369	2,958,924	82.7%
July 1, 2015	15,323,428	18,115,444	2,792,016	84.6%
July 1, 2016	15,844,834	18,958,052	3,113,218	83.6%
July 1, 2017	16,699,864	19,857,952	3,158,088	84.1%
July 1, 2018	17,563,945	20,602,143	3,038,198	85.3%
July 1, 2019	18,091,048	21,883,474	3,792,426	82.7%

Section III - Development of Contribution

E. History of Town Contributions

Fiscal Year	Actuarially Determined Contribution	Actual Town Contribution	Payroll	Actual Contribution as a Percent of Payroll
2011-12	\$359,226	\$359,226	\$3,402,929	10.6%
2012-13	361,909	361,909	3,637,892	9.9%
2013-14	448,025	448,025	3,409,422	13.1%
2014-15	456,702	456,702	3,311,487	13.8%
2015-16	470,130	470,130	3,913,965	12.0%
2016-17	487,591	487,591	4,086,754	11.9%
2017-18	517,850	517,378	3,778,774	13.7%
2018-19	557,206	557,206	3,687,470	15.1%
2019-20	577,577	TBD	3,643,801	TBD
2020-21	700,257	TBD	3,878,163	TBD

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, 2018	51	9	5	50	0	5	120
Terminated							
- no benefits due	-	-	-	-	-	-	0
- paid refund	-	-	-	-	-	-	0
- vested benefits due	-	-	-	-	-	-	0
Retired	(2)	-	-	2	-	-	0
Died							
- with beneficiary	-	-	-	-	-	-	0
- no beneficiary	-	-	-	(2)	-	-	(2)
Benefits expired	-	-	-	-	-	-	0
New member	2	-	-	-	-	-	2
Rehired	-	-	-	-	-	-	0
New Alternate Payee	-	-	-	-	-	-	0
Correction	-	-	1	-	-	(1)	0
Count July 1, 2019	51	9	6	50	0	4	120
Breakdown July 1, 2019							
Town	13	0	3	16	0	2	34
Police	9	3	1	5	0	1	19
Board of Education	<u>29</u>	<u>6</u>	<u>2</u>	<u>29</u>	<u>0</u>	<u>1</u>	<u>67</u>
Total	51	9	6	50	0	4	120

Section IV - Membership Data

B. Statistics of Active Membership

	As of July 1, 2018	As of July 1, 2019
Town		
Number of Active Members	14	13
Average Age	54.3	54.3
Average Service	16.4	18.3
Total Payroll	\$1,081,619	\$1,050,566
Average Payroll	77,259	80,813
Police		
Number of Active Members	9	9
Average Age	46.2	47.2
Average Service	12.5	13.5
Total Payroll	\$890,257	\$927,423
Average Payroll	98,917	103,047
Board of Education		
Number of Active Members	28	29
Average Age	54.0	53.7
Average Service	11.4	11.6
Total Payroll	\$1,671,925	\$1,900,174
Average Payroll	59,712	65,523

Section IV - Membership Data

C. Distribution of Active Members as of July 1, 2019

Town

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29								0
30-34								0
35-39								0
40-44			3					3
45-49								0
50-54			2		2			4
55-59					1	1		2
60-64	1			1				2
65+					1		1	2
Total	1	0	5	1	4	1	1	13

Police

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29								0
30-34	1							1
35-39	1							1
40-44			1					1
45-49	1							1
50-54		1		1	1	1		4
55-59								0
60-64							1	1
65+								0
Total	3	1	1	1	1	1	1	9

Board of Education

Age	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
< 25								0
25-29								0
30-34								0
35-39	2	3						5
40-44								0
45-49	2				1			3
50-54	1	1	2					4
55-59	1	3	2	2				8
60-64	2			1	4		1	8
65+					1			1
Total	8	7	4	3	6	0	1	29

Section IV - Membership Data

D. Statistics of Inactive Membership

	As of July 1, 2018	As of July 1, 2019
Terminated Vested Members		
Number	5	6
Total Annual Benefit	\$42,009	\$59,256
Average Annual Benefit	8,402	9,876
Average Age	55.3	56.3
Nonvested Members Due Refunds		
Number	9	9
Service Retirees		
Number	50	50
Total Annual Benefit	\$1,167,372	\$1,181,026
Average Annual Benefit	23,347	23,621
Average Age	72.3	72.3
Disabled Retirees		
Number	0	0
Total Annual Benefit	\$0	\$0
Average Annual Benefit	0	0
Average Age	0.0	0.0
Beneficiaries		
Number	5	4
Total Annual Benefit	\$76,636	\$59,389
Average Annual Benefit	19,159	14,847
Average Age	63.9	64.9

Section IV - Membership Data

E. Distribution of Inactive Members as of July 1, 2019

	Age	Number	Annual Benefits
Terminated Vested Members	< 50	0	\$0
	50 - 59	2	20,414
	60 - 69	3	21,595
	70 - 79	1	17,247
	80 - 89	0	0
	90 +	<u>0</u>	<u>0</u>
	Total	6	59,256
Service Retirees	< 50	0	\$0
	50 - 59	2	84,670
	60 - 69	17	480,577
	70 - 79	25	551,058
	80 - 89	5	55,638
	90 +	<u>1</u>	<u>9,083</u>
	Total	50	1,181,026
Disabled Retirees	< 50	0	\$0
	50 - 59	0	0
	60 - 69	0	0
	70 - 79	0	0
	80 - 89	0	0
	90 +	<u>0</u>	<u>0</u>
	Total	0	0
Beneficiaries	< 50	0	\$0
	50 - 59	0	0
	60 - 69	3	56,074
	70 - 79	1	3,316
	80 - 89	0	0
	90 +	<u>0</u>	<u>0</u>
	Total	4	59,389

Section V - Analysis of Risk

A. Introduction

The results of this actuarial valuation are based on one set of reasonable assumptions. However, it is almost certain that future experience will not exactly match these assumptions. As an example, the plan's investments may perform better or worse than assumed in any single year and over any longer time horizon. It is therefore important to consider the potential impacts of these likely differences when making decisions that may affect the future financial health of the plan, or of the plan's members.

In addition, as plans mature they accumulate larger pools of assets and liabilities. The increase in size in turn increases the potential magnitude of adverse experience. As an example, the dollar impact of a 10% investment loss on a plan with \$1 billion in assets and liabilities is much greater than the dollar impact for a plan with \$1 million in assets and liabilities. Since pension plans make long-term promises and rely on long-term funding, it is important to consider how mature the plan is today, and how mature it may become in the future.

Actuarial Standard of Practice No. 51 (ASOP 51) directs actuaries to provide pension plan sponsors with information concerning the risks associated with the plan:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

This section of the report uses the framework of ASOP 51 to communicate important information about significant risks to the plan, the plan's maturity, and relevant historical plan data.

Please see Section III C for more information on the basis for the projected results shown on the following pages.

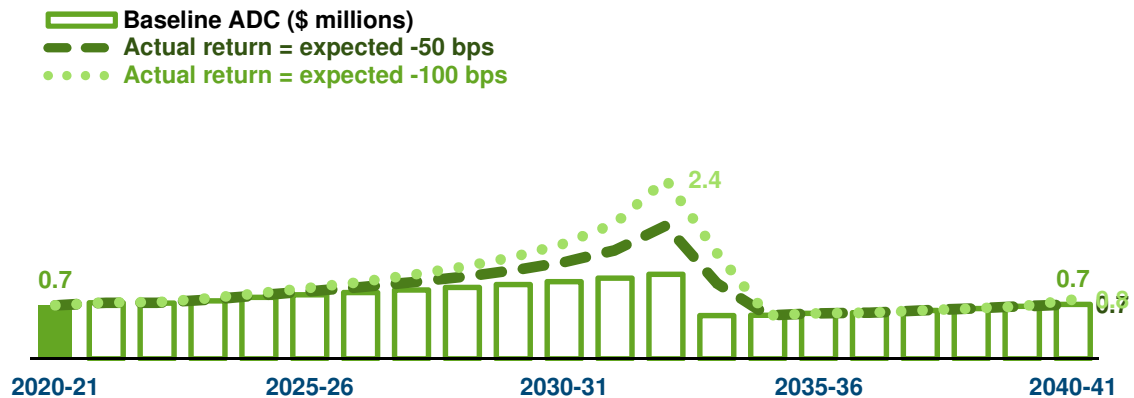
Section V - Analysis of Risk

B. Risk Identification and Assessment

Investment Risk

Definition: This is the potential that investment returns will be different than expected.

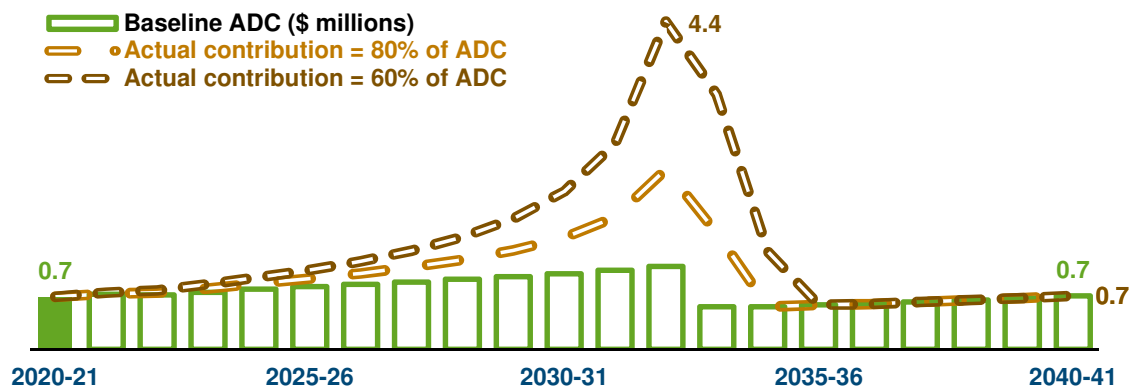
Identification: To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. The consequences of persistent underperformance on future Actuarially Determined Contribution levels are illustrated below:



Contribution Risk

Definition: This is the potential that actual future contributions will be less than the Actuarially Determined Contribution.

Identification: Over the past 8 years, actual contributions have been 100.0% of the Actuarially Determined Contribution in total. The consequences of persistent underfunding on future Actuarially Determined Contribution levels are illustrated below:



Section V - Analysis of Risk

B. Risk Identification and Assessment

Liquidity Risk

Definition: This is the potential that assets must be liquidated at a loss earlier than planned in order to pay for the plan's benefits and operating costs. This risk is heightened for plans with negative cash flows, in which contributions are not sufficient to cover benefit payments plus expenses.

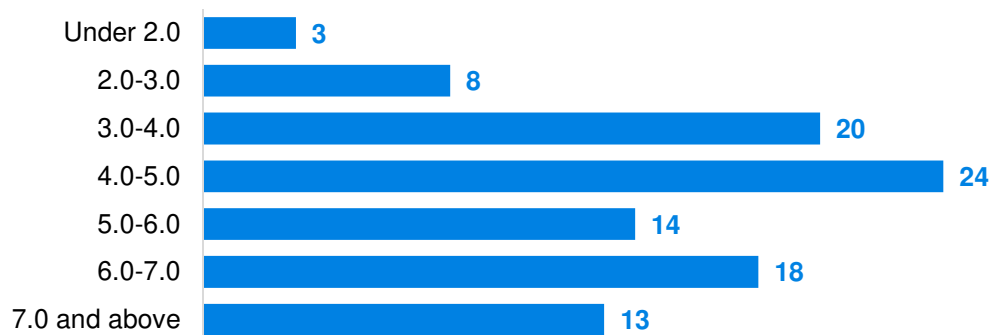
Identification: In 2018-19, the plan had negative cash flow, with town and member contributions to the plan of \$716,478 compared to \$1,222,399 of benefit payments paid out of the plan. We suggest that you consult with your investment advisors with respect to the liquidity characteristics of the plan's investment holdings.

Maturity Risk

Definition: This is the potential for total plan liabilities to become more heavily weighted toward inactive liabilities over time, and for plan assets and/or liabilities to become larger relative to the active member liability.

Identification: The plan is subject to maturity risk because as plan assets and liabilities continue to grow, the dollar impact of any gains or losses on the assets or liabilities also becomes larger.

Assessment: As of July 1, 2019, the plan's Asset Volatility Ratio (the ratio of the market value of plan assets to payroll) is 4.7. According to Milliman's 2018 Public Pension Funding Study, the 100 largest US public pension plans have the following range of Asset Volatility Ratios:



Inflation Risk

Definition: This is the potential for a pension to lose purchasing power over time due to inflation.

Identification: The members of pension plans without fully inflation-indexed benefits are subject to the risk that their purchasing power will be reduced over time due to inflation.

Assessment: This plan does not contain a mechanism to regularly increase benefits after retirement, so members bear all of the inflation risk.

Section V - Analysis of Risk

B. Risk Identification and Assessment

Insolvency Risk

Definition: This is the potential that a plan will become insolvent; that is, assets will be fully depleted.

Identification: If a plan becomes insolvent, contractually required benefits must be paid from the plan sponsor's other remaining assets.

Assessment: Under the GASB 68 depletion date methodology, the plan is not projected to become insolvent. Please see the GASB 68 report for more details on the underlying analysis.

Demographic Risks

Definition: This is the potential that mortality, turnover, retirement, or other demographic experience will be different than expected.

Identification: The pension liabilities reported herein have been calculated by assuming that members will follow patterns of demographic experience as described in Appendix B. If actual demographic experience or future demographic assumptions are different from what is assumed to occur in this valuation, future pension liabilities, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. Formal Experience Studies performed on a regular basis are helpful in ensuring that the demographic assumptions reflect emerging plan experience.

Retirement Risk

Definition: This is the potential for members to retire and receive subsidized benefits that are more valuable than expected.

Identification: This plan permits members to retire at relatively young ages. If members retire at earlier ages than are anticipated by the actuarial assumptions, this will put upward pressure on subsequent Actuarially Determined Contributions.

Pensionable Earnings Risk

Definition: This is the potential for active members to add items to their pensionable earnings and receive pension benefits that are higher than expected.

Identification: Benefits provided by this plan are calculated based on gross earnings which includes additional compensation such as overtime.

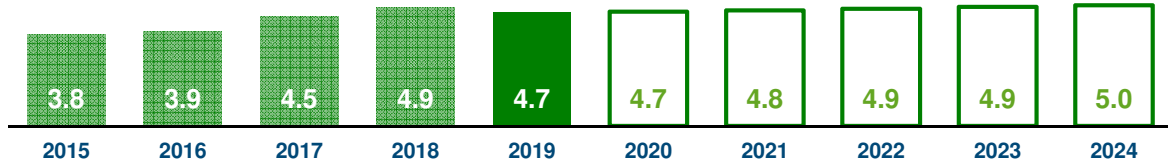
Assessment: To the extent that a member has unusually high levels of overtime or other forms of extra pay in the years just prior to retirement, this will put upward pressure on subsequent Actuarially Determined Contributions.

Section V - Analysis of Risk

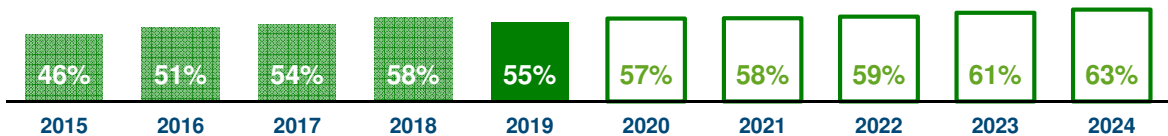
C. Maturity Measures

The metrics presented below are different ways of understanding the plan's maturity level, both in the past and as it is expected to change in the coming years.

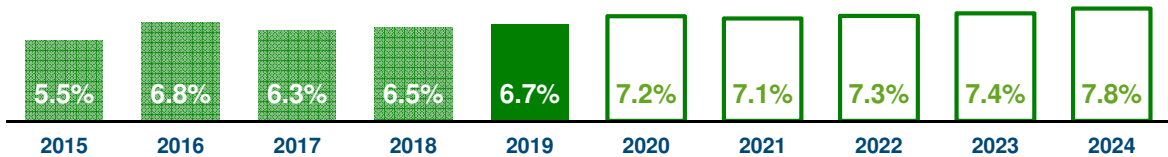
Asset Volatility Ratio: Market Value of Assets compared to Payroll



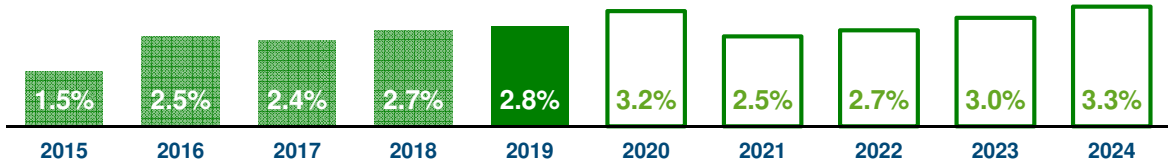
Accrued Liability for members in pay status compared to total Accrued Liability



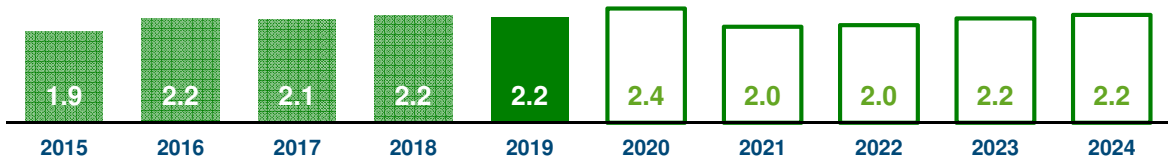
Benefit Payments compared to Market Value of Assets



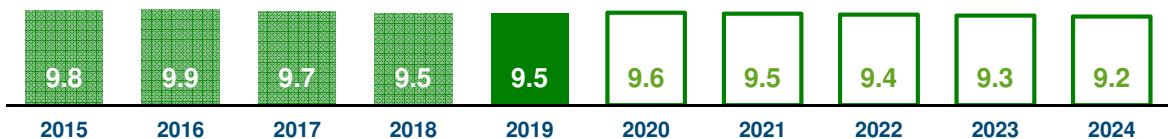
Net Cash Flows compared to Market Value of Assets



Benefit Payments compared to Town Contributions



Duration of Accrued Liability (based on GASB 68 sensitivity disclosures)



Appendix A - Actuarial Funding Method

The actuarial funding method used in the valuation of this Plan is known as the Entry Age Normal 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 Interest to reflect the timing of the contribution relative to the valuation date.

The Normal Cost is determined by calculating the present value of future benefits for present active Members that will become payable as the result of death, disability, retirement or termination. This cost is then spread as a level percentage of earnings from entry age to termination as an Active Member. If Normal Costs had been paid at this level for all prior years, a fund would have accumulated. Because this fund represents the portion of benefits that would have been funded to date, it is termed the Accrued Liability. In fact, it is calculated by adding the present value of benefits for Retired Members and Terminated Vested Members to the present value of benefits for Active Members and subtracting the present value of future Normal Cost contributions.

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 percent over a closed 22 year period starting on July 1, 2010. The amortization period will decrease each year until it reaches 10 years, after which point it will remain at 10 years.

The Actuarial Value of Assets is determined by recognizing market gains and losses non-asymptotically over a five year period.

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. 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.

Appendix B - Actuarial Assumptions

Each of the assumptions used in this valuation was set based on 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 Current: 6.75%

Prior: 7.00%

Salary Scale 3.50%

Amortization Growth Rate 3.50%

Healthy Mortality RP-2000 Mortality Tables for Employees and Healthy Annuitants, Male and Female, with generational projection of future mortality improvements per Scale AA. This assumption includes a margin for improvements in longevity beyond the valuation date.

Disabled Mortality RP-2000 Disabled Mortality Table, Male and Female. This assumption does not include a margin for improvements in longevity beyond the valuation date.

Turnover	Age	Male	Female
	20	6.00%	15.00%
	25	4.80%	15.00%
	30	3.60%	10.00%
	35	2.75%	7.50%
	40	2.05%	5.00%
	45	1.40%	2.50%
	50	0.75%	0.00%

Retirement Town

Age	Rate
55-59	2%
60-61	10%
62	50%
63-64	30%
65-69	40%
70	100%

Appendix B - Actuarial Assumptions

Retirement

Police

75% of members are assumed to retire at age 55 with 20 years of Credited Service.

At all other ages:

Age	Rate
56-64	20%
65	100%

Board of Education

Age	Rate
55-59	5%
60-61	15%
62	50%
63-64	30%
65-69	40%
70	100%

Marital Status

75% of participants are assumed to be married with husbands assumed to be 3 years older than their wives.

Cost of Living Adjustment

None.

Expenses

It is assumed that all expenses will be paid directly by the Town.

Form of Annuity

Life annuity with Modified Cash Refund.

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.

Eligibility

Non-bargaining unit members hired prior to age 25 may elect to participate on date of hire. Participation is mandatory at age 25.

Bargaining unit members may elect to participate after 1 year of Continuous Service. Participation is retroactive to date of hire. The Town will pay the Member Contributions for the first year of service.

Final Average Earnings

Certified Police Officers: Average of the 5 calendar years with the highest gross earnings. Gross earnings include overtime, educational incentive pay and longevity pay.

Others: Average of the 5 consecutive calendar years with the highest gross earnings. Gross earnings include overtime and any other form of additional compensation.

Continuous Service

Continuous employment with the Town.

Credited Service

All service counted in years and completed months from date of participation. Participation is retroactive to date of hire.

Member Contributions

Certified Police Officers: Effective July 1, 2000, 6% of earnings.

Others: Effective July 1, 2004, 5% of earnings.

Member contributions stop at Normal Retirement Date.

Interest is credited from January 1 following the date of the contribution to the date of the distribution as follows:

06/01/1966 to 12/31/1969	3.5%
01/01/1970 to 06/30/1986	4.5%
07/01/1986 and after	5.5%

Normal Form of Benefit

Life Annuity with Modified Cash Refund. Optional forms of benefit are available on an actuarially equivalent basis.

Normal Retirement Date

Certified Police Officers: The earlier of age 65 or age 55 with 20 years of Continuous Service.

Others: Earlier of age 65 or the date the member's age plus Continuous Service total 80.

Appendix C - Summary of Plan Provisions

Normal Retirement Benefit	<p>Certified Police Officers: 2.5% of Final Average Earnings multiplied by Credited Service up to 20 years plus 1.5% of Final Average Earnings multiplied by Credited Service in excess of 20 years; maximum benefit is 65% of Final Average Earnings.</p> <p>Others: 2.0% of Final Average Earnings multiplied by Credited Service.</p>
Early Retirement Date	<p>Certified Police Officers: None.</p> <p>Others: Age 55 with 15 years of Continuous Service.</p>
Early Retirement Benefit	Benefit calculated at Early Retirement Date reduced actuarially for commencement prior to Normal Retirement Date.
Late Retirement Date	Any date beyond Normal Retirement Date.
Late Retirement Benefit	Benefit calculated at Late Retirement Date.
Vesting	100% vested after 5 years of Continuous Service.
Termination Benefit	If Member is not vested as of date of termination, the Member shall receive a return of Member Contributions with interest. If a Member is vested as of termination, the Member shall be entitled to a Normal Retirement Benefit. The Member with a vested benefit can elect to receive Member contributions with interest. If the Member contributions are withdrawn, any employer provided benefit is forfeited.
Disability Retirement Date	Available at total and permanent disability after age 50 with 15 years of Continuous Service.
Disability Retirement Benefit	Benefit is the same as for Early Retirement.
Pre-Retirement Survivor Benefit	If the member has at least 5 years of Continuous Service and is married at time of death, the surviving spouse will receive an immediate benefit equal to 50% of the benefit that would have payable had the member terminated immediately before death, elected to retire at the member's earliest retirement eligibility date or date of death if later, and elected a 50% joint and survivor annuity. The surviving spouse's benefit is payable on the date that would have been the member's earliest retirement date.
Pre-Retirement Death Benefit	Return of Member Contributions with interest, in lieu of any Pre-Retirement Survivor Benefit if applicable.
Post-Retirement Death Benefit	Return of Member Contributions with interest, less any retirement benefits paid.

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.