



CITY OF NORWICH VOLUNTEER FIREFIGHTERS' PENSION PLAN

**Actuarial Valuation as of January 1, 2020
To Determine Funding for Fiscal Years 2020-21 and 2021-22**

Prepared by

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Certification

We have performed an actuarial valuation of the Plan as of January 1, 2020 to determine funding for fiscal years 2020-21 and 2021-22. 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 City of Norwich ("City"). 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 City may provide a copy of Milliman's work, in its entirety, to the City'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 City; and (b) the City 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 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.

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

This valuation reflects some changes to the methodology used to calculate the Actuarially Determined Contribution, including moving to fully layered amortization bases, switching from level dollar amortization to level percent amortization and modifying the interest adjustment to reflect the timing lag between the valuation date and the date on which the contribution is paid.

This valuation reflects the adoption of the PUB-2010 Public Safety mortality table with generational projection of future improvements in longevity per the MP Ultimate table. In addition, the interest rate assumption was lowered from 7.00% to 6.75%.

All of these changes combined increased the Unfunded Accrued Liability by \$381,000 and increased the Actuarially Determined Contribution by \$26,000.

Other Significant Changes

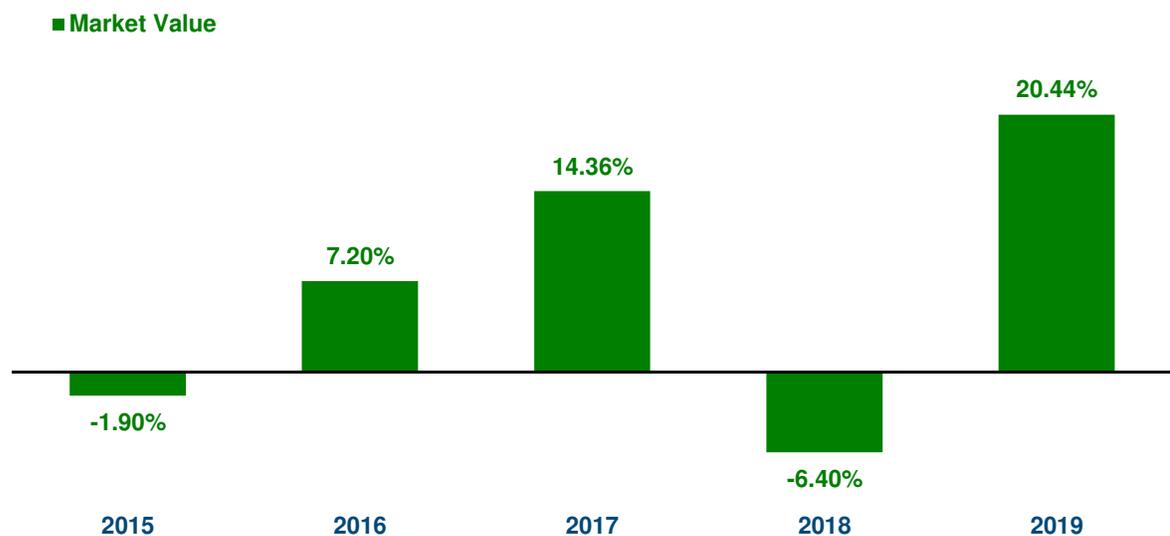
None.

Section I - Executive Summary Assets

Valuations for this plan are only prepared in even-numbered years. Over the past two years, the plan's assets changed as follows;

| | |
|--|-------------|
| Value as of January 1, 2018 | \$2,771,076 |
| City and Member Contributions | 383,124 |
| Investment Income | (178,559) |
| Benefit Payments and Administrative Expenses | (344,422) |
| Value as of January 1, 2019 | 2,631,219 |
| City and Member Contributions | 377,613 |
| Investment Income | 540,567 |
| Benefit Payments and Administrative Expenses | (350,001) |
| Value as of January 1, 2020 | 3,199,398 |

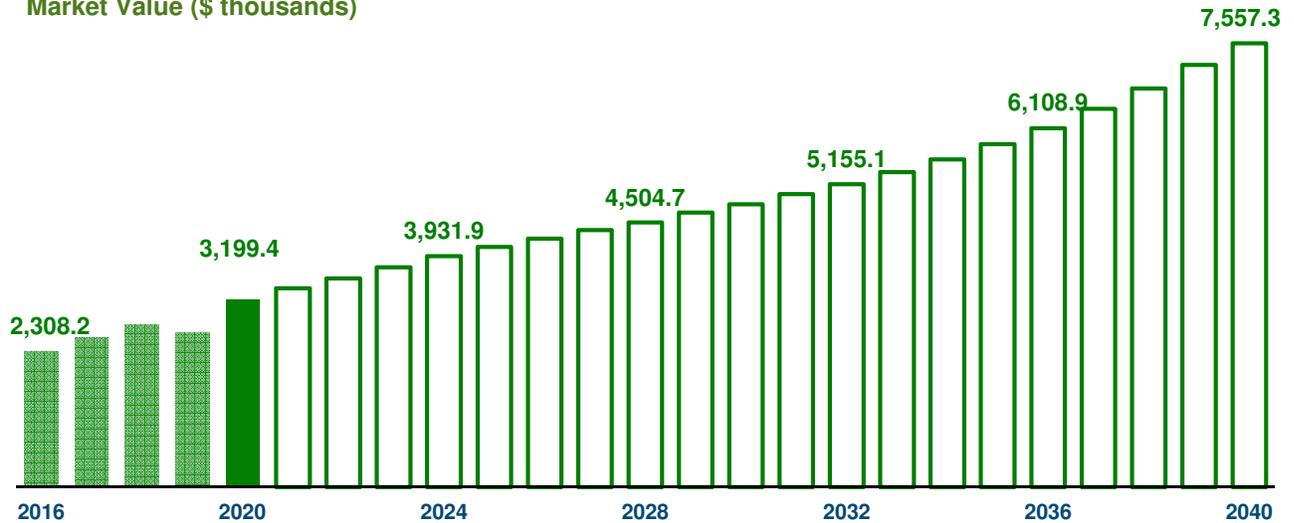
In 2018, the plan's assets earned -6.40% on a Market Value basis. The actuarial assumption for this period was 7.00%; the result is an asset loss of about \$373,900. In 2019, the plan's assets earned 20.44% on a Market Value basis. The actuarial assumption for this period was 7.00%; the result is an asset gain of about \$355,400. Historical rates of return are shown in the graph below.



Section I - Executive Summary Assets (continued)

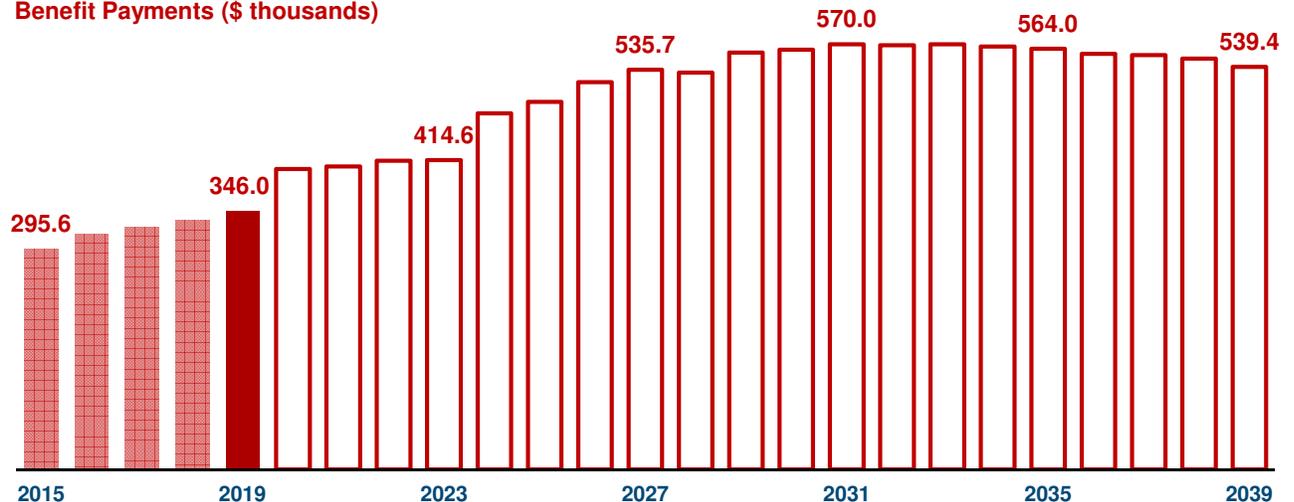
The graph below shows how this year's asset values compare to where the plan's assets have been over the past several years and how they are projected to change over the next 20 years. For purposes of this projection, we have assumed that the City always contributes the Actuarially Determined Contribution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

Market Value (\$ thousands)



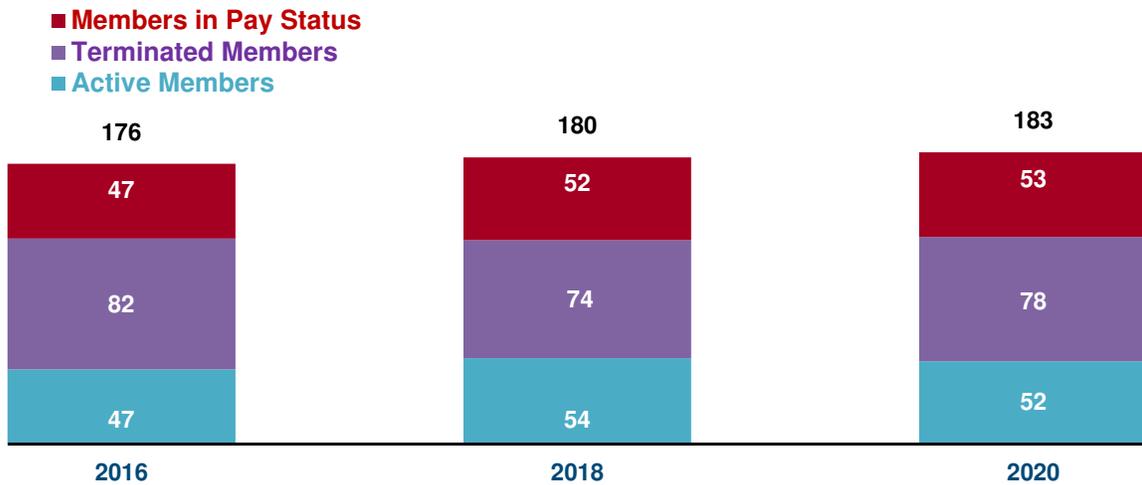
In 2019-20, the plan paid out \$346,000 in benefits to members. Over the next 20 years, the plan is projected to pay out a total of \$10,357,000 in benefits to members.

Benefit Payments (\$ thousands)



Section I - Executive Summary Membership

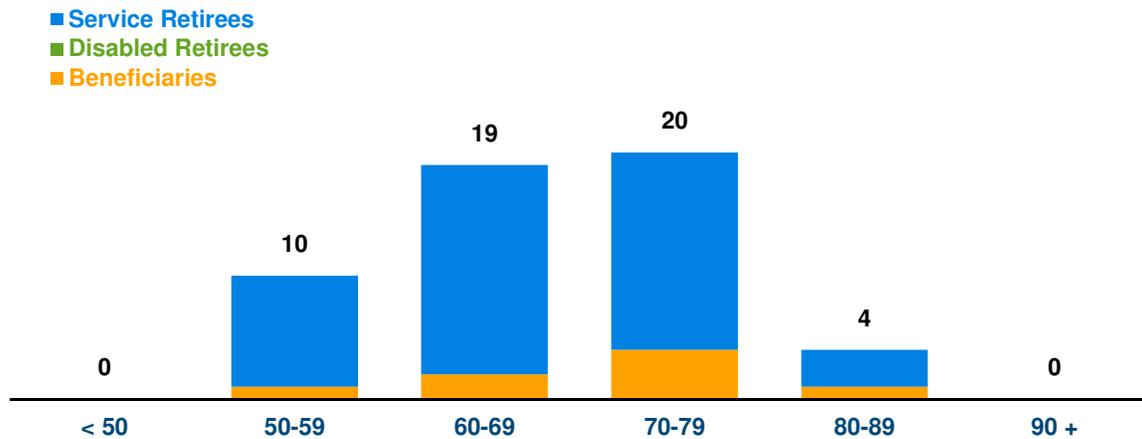
There are three basic categories of plan members included in the valuation: (1) members who are receiving monthly pension benefits, (2) former employees who have a vested right to benefits but have not yet started collecting, and (3) active employees who have met the eligibility requirements for membership.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



Members in Pay Status on January 1, 2020

| | | | |
|-------------------|-----------|------------------------|-----------|
| Service Retirees | 45 | Average Age | 68.2 |
| Disabled Retirees | 0 | Total Annual Benefit | \$353,091 |
| Beneficiaries | 8 | Average Annual Benefit | 6,662 |
| Total | 53 | | |

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



Section I - Executive Summary Membership (continued)

Terminated Vested Members on January 1, 2020

| | |
|------------------------|----------|
| Count | 4 |
| Average Age | 48.1 |
| Total Annual Benefit | \$23,232 |
| Average Annual Benefit | 5,808 |

Members Due Refunds

| | |
|-------|----|
| Count | 74 |
|-------|----|

Active Members on January 1, 2020

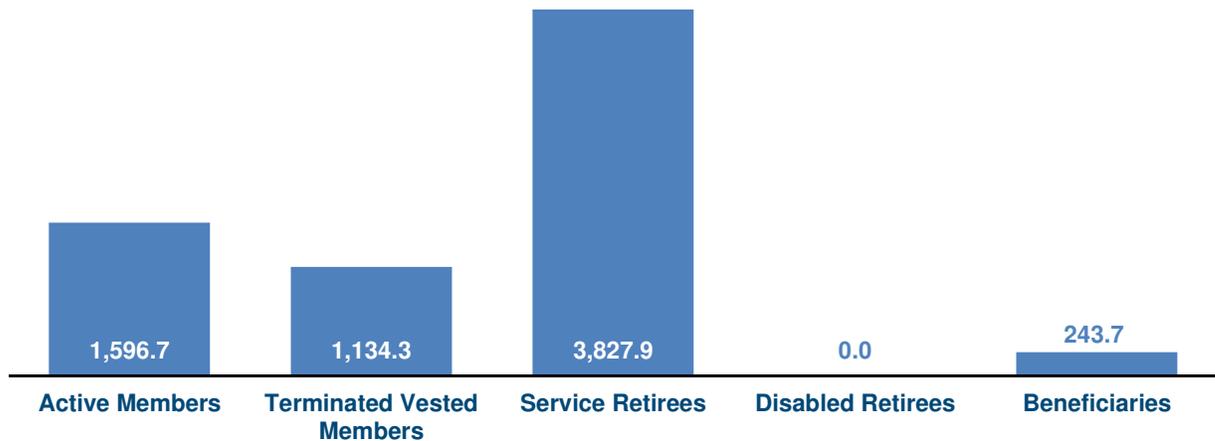
| | |
|-----------------|------|
| Count | 52 |
| Average Age | 40.5 |
| Average Service | 12.9 |

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

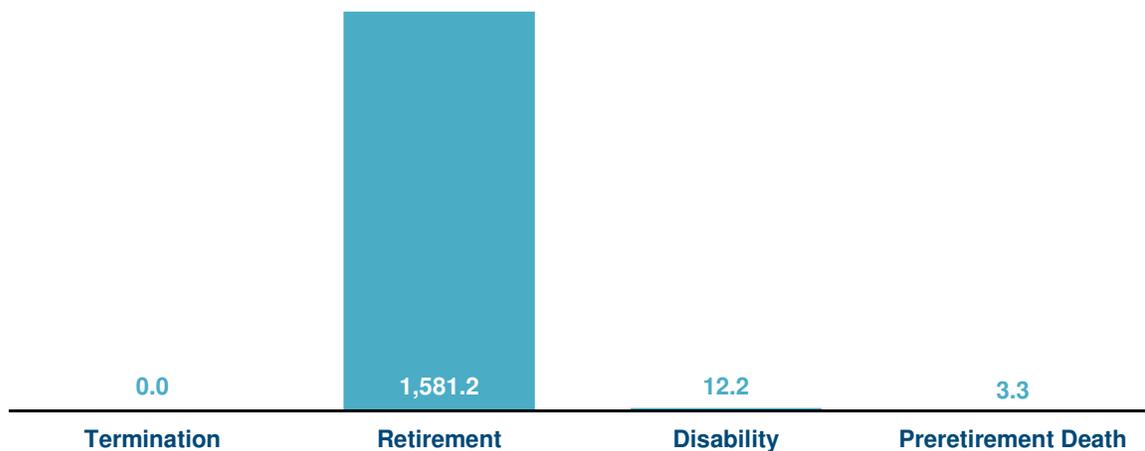
| Age | Years of Service | | | | | | | Total |
|--------------|------------------|-----|-------|-------|-------|-------|-----|-------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30+ | |
| < 25 | 8 | | | | | | | 8 |
| 25-29 | 5 | | 1 | | | | | 6 |
| 30-34 | 4 | 1 | 1 | | | | | 6 |
| 35-39 | 2 | 2 | | | | | | 4 |
| 40-44 | 2 | 1 | | | 2 | 1 | | 6 |
| 45-49 | 1 | 1 | | 1 | 3 | 1 | 1 | 8 |
| 50-54 | 1 | 1 | | 2 | 3 | | 2 | 9 |
| 55-59 | | | 2 | 1 | | | | 3 |
| 60-64 | | | | | | | | 0 |
| 65+ | | 1 | | 1 | | | | 2 |
| Total | 23 | 7 | 4 | 5 | 8 | 2 | 3 | 52 |

Section I - Executive Summary Accrued Liability

The Accrued Liability as of January 1, 2020 is \$6,802,589, which consists of the following pieces (in thousands \$):



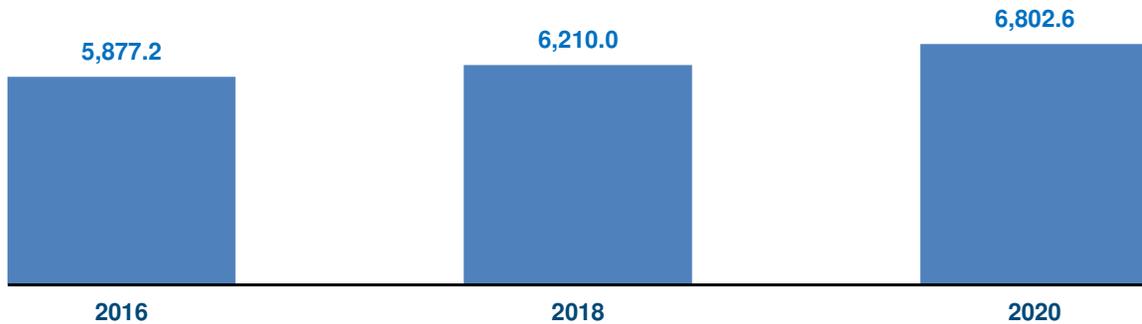
The Accrued Liability for active members can be broken down further by the different types of benefits provided by the plan:



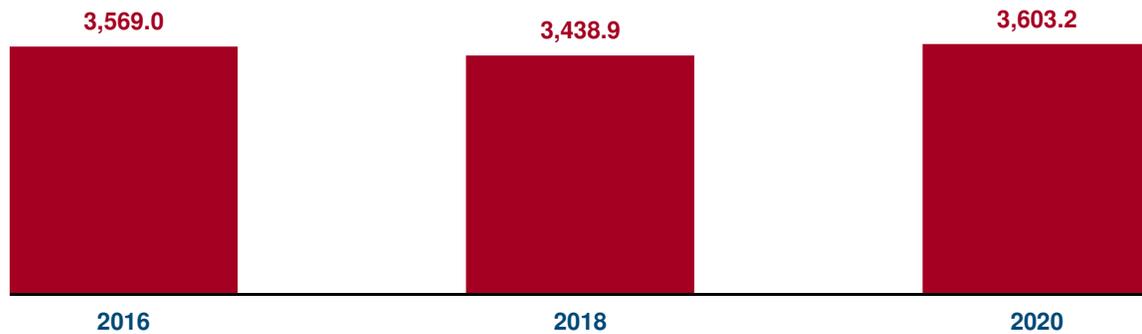
Section I - Executive Summary Funded Status

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.

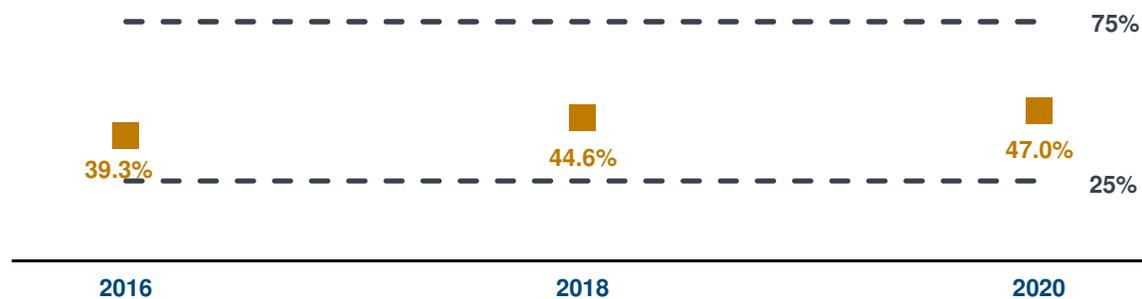
Accrued Liability (\$ thousands)



Unfunded Accrued Liability (\$ thousands)



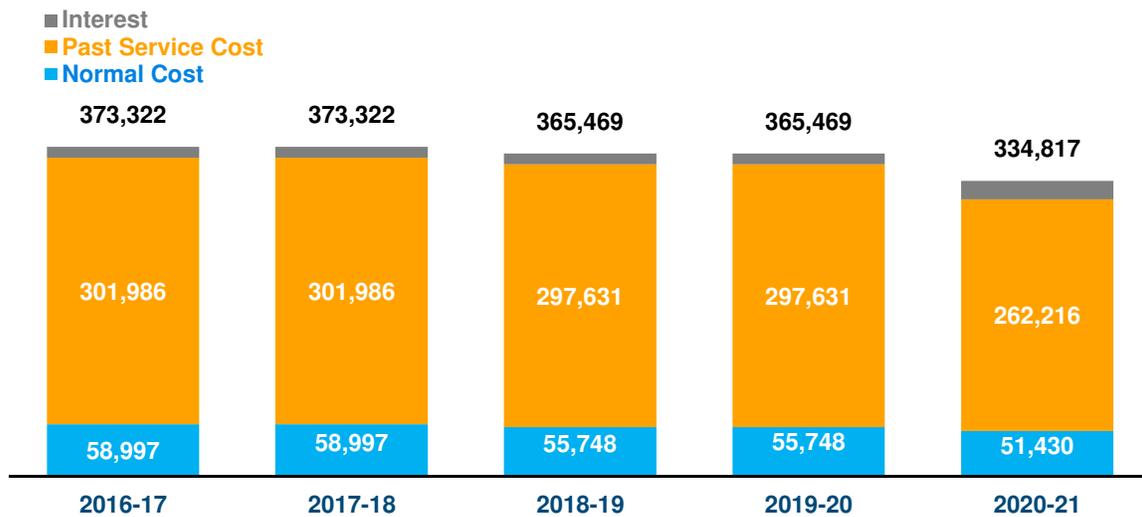
Funded Ratio



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.

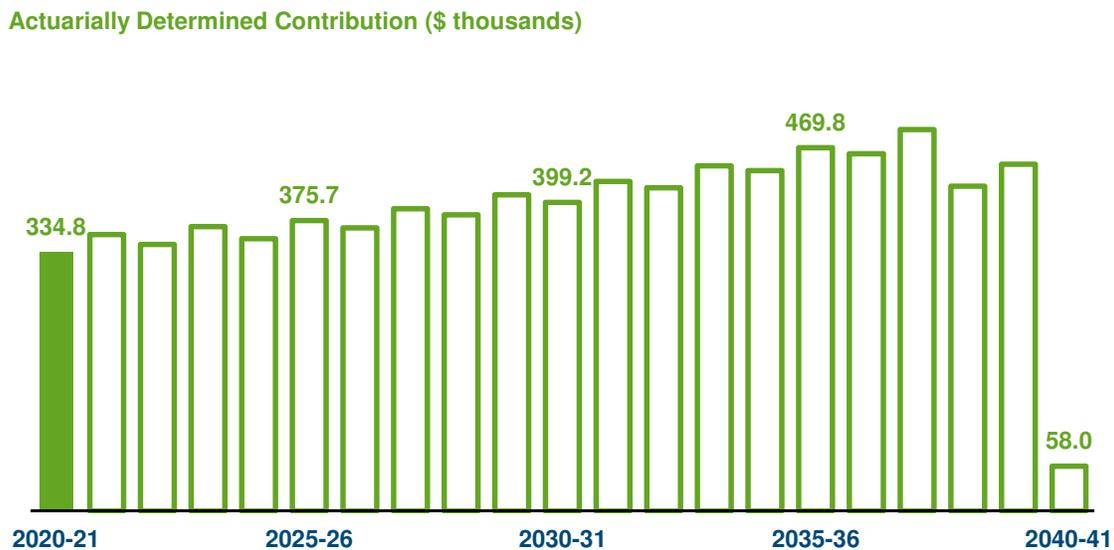
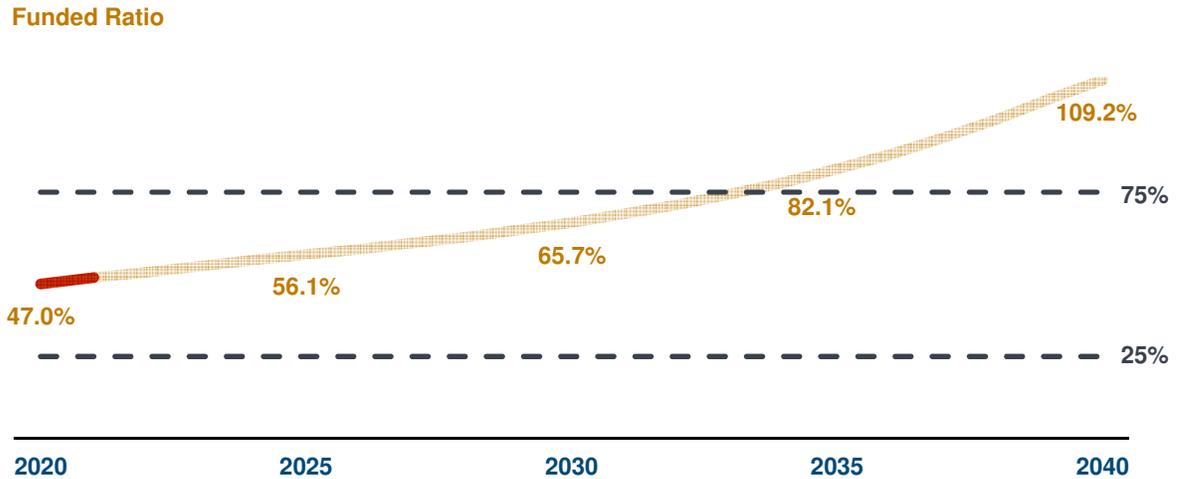
The Actuarially Determined Contribution for fiscal year 2020-21 is shown graphically below, along with the comparable figures for the preceding four fiscal years. Note that the Normal Cost is relatively consistent from year to year, whereas the Past Service Cost tends to be more volatile since it reflects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



Since valuations are only performed in even-numbered years, each valuation also produces the Actuarially Determined Contribution for the off year between valuations. Based on the January 1, 2020 valuation, the Actuarially Determined Contribution for fiscal year 2021-22 is \$357,417

Section I - Executive Summary Long-Range Forecast

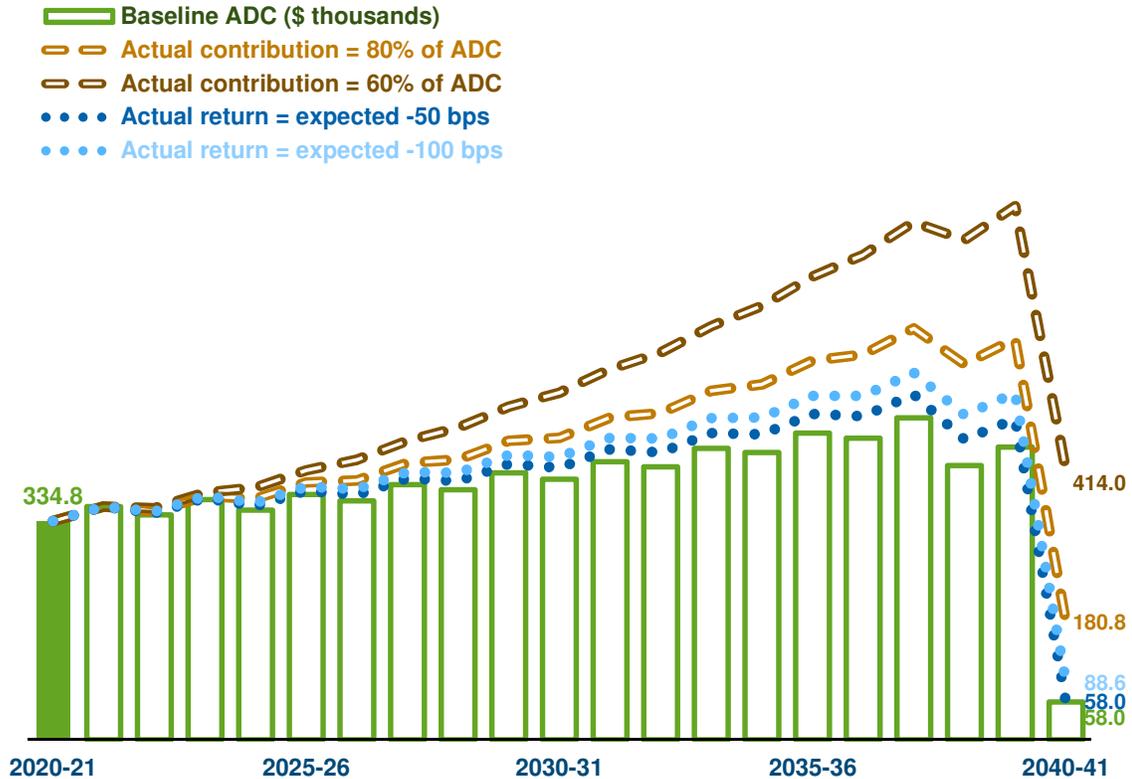
If the City pays the Actuarially Determined Contribution each year, the investments earn exactly the assumed interest rate each year, and there are no changes in the plan provisions or in the actuarial methods and assumptions, then we project the following changes in the plan's funded status and the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

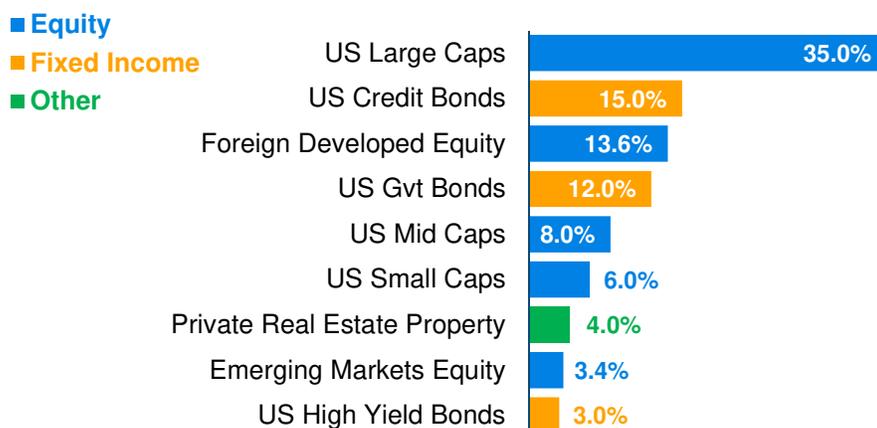
| Membership as of | January 1, 2018 | January 1, 2020 |
|--|------------------|------------------|
| Active Members | 54 | 52 |
| Terminated Members | 74 | 78 |
| Members in Pay Status | <u>52</u> | <u>53</u> |
| Total Count | 180 | 183 |
| | | |
| Assets and Liabilities as of | January 1, 2018 | January 1, 2020 |
| Market Value of Assets | \$2,771,076 | \$3,199,398 |
| Actuarial Value of Assets | 2,771,076 | 3,199,398 |
| Accrued Liability for Active Members | 1,770,319 | 1,596,729 |
| Accrued Liability for Terminated Members | 840,860 | 1,134,277 |
| Accrued Liability for Members in Pay Status | <u>3,598,844</u> | <u>4,071,583</u> |
| Total Accrued Liability | 6,210,023 | 6,802,589 |
| Unfunded Accrued Liability | 3,438,947 | 3,603,191 |
| Funded Ratio | 44.6% | 47.0% |
| | | |
| Actuarially Determined Contribution for Fiscal Year | 2018-19 | 2020-21 |
| Normal Cost | \$55,748 | \$51,430 |
| Past Service Cost | 297,631 | 262,216 |
| Interest Adjustment | <u>12,090</u> | <u>21,171</u> |
| Actuarially Determined Contribution | 365,469 | 334,817 |
| | | |
| Actuarially Determined Contribution for Second Fiscal Year | 2019-20 | 2021-22 |
| Interest Adjustment | \$0 | \$22,600 |
| Actuarially Determined Contribution | 365,469 | 357,417 |

Section II - Plan Assets Summary of Fund Transactions

| | |
|---|--------------------|
| Market Value as of January 1, 2018 | \$2,771,076 |
| City Contributions | 369,396 |
| Member Contributions | 13,728 |
| Net Investment Income | (178,559) |
| Benefit Payments | (333,422) |
| Administrative Expenses | <u>(11,000)</u> |
| Market Value as of December 31, 2018 | 2,631,219 |
| Expected Return on Market Value of Assets | 195,299 |
| Market Value (Gain)/Loss | 373,858 |
| Approximate Rate of Return * | -6.40% |
| | |
| Market Value as of January 1, 2019 | \$2,631,219 |
| City Contributions | 365,469 |
| Member Contributions | 12,144 |
| Net Investment Income | 540,567 |
| Benefit Payments | (346,001) |
| Administrative Expenses | <u>(4,000)</u> |
| Market Value as of December 31, 2019 | 3,199,398 |
| Expected Return on Market Value of Assets | 185,126 |
| Market Value (Gain)/Loss | (355,441) |
| Approximate Rate of Return * | 20.44% |

* 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 December 31, 2019



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 using layered 20-year bases.

| | January 1, 2020 |
|---|-----------------|
| 1. Accrued Liability | |
| Active Members | \$1,596,729 |
| Terminated Members | 1,134,277 |
| Service Retirees* | 3,827,867 |
| Disabled Retirees | 0 |
| Beneficiaries | <u>243,716</u> |
| Total Accrued Liability | 6,802,589 |
| 2. Actuarial Value of Assets | 3,199,398 |
| 3. Unfunded Accrued Liability: (1) - (2) | 3,603,191 |
| 4. Outstanding Balance of Amortization Bases Established in Prior Years (see Section IIIB) | 3,278,027 |
| 5. New Amortization Base Established January 1, 2020: (3) - (4) | 325,164 |
| 6. Amortization Growth Rate | 2.75% |
| 7. New Past Service Cost: (5) amortized over 20 years | 22,812 |
| 8. Past Service Cost for Bases Established in Prior Years (see Section IIIB) | 239,404 |
| 9. Total Past Service Cost: (7) + (8) | 262,216 |

Section III - Development of Contribution
B. Past Service Costs Established in Prior Years

The amortization base established with each valuation is gradually funded over time; the amortization payment is termed the Past Service Cost. The January 1, 2014 amortization base had a 25 year period. All subsequent bases have a 20 year period.

| Date Established | Original Amount | Outstanding Balance as of January 1, 2018 | Amortization Payment as of January 1, 2018 | Outstanding Balance as of January 1, 2020 | Years Remaining as of January 1, 2020 | Past Service Cost as of January 1, 2020 |
|-------------------------|------------------------|--|---|--|--|--|
| January 1, 2014 | \$2,921,763 | \$2,921,763 | \$252,006 | \$2,786,958 | 19 | \$202,391 |
| January 1, 2018 | 517,184 | 517,184 | 45,625 | 491,069 | 18 | 37,013 |
| Total | | 3,438,947 | 297,631 | 3,278,027 | | 239,404 |

Section III - Development of Contribution

C. Actuarially Determined Contribution

| | Fiscal Years 2018-19 and 2019-20 | Fiscal Years 2020-21 and 2021-22 |
|---|--|--|
| 1. Total Normal Cost | \$64,004 | \$57,394 |
| 2. Expected Member Contributions | 14,256 | 13,464 |
| 3. Expected Administrative Expenses | 6,000 | 7,500 |
| 4. Net Normal Cost: (1) - (2) + (3) | 49,748 | 43,930 |
| 5. Past Service Cost (see Section IIIA) | 297,631 | 262,216 |
| 6. Interest on (4) + (5) to beginning of first fiscal year* | 12,090 | 21,171 |
| 7. Actuarially Determined Contribution for first FY: (4) + (5) + (6) | 365,469 | 334,817 |
| 8. Interest on (7) to beginning of second fiscal year | 0 | 22,600 |
| 9. Actuarially Determined Contribution for second FY: (7) + (8) | 365,469 | 357,417 |

*Previously the timing adjustment added interest to the net normal cost based on the rate of inflation.

Section III - Development of Contribution

D. Long Range Forecast

This forecast is based on the results of the January 1, 2020 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. 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 City 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 | | City Contributions | Member Contributions | Benefit Payments | Net Cash Flows |
| 1/1/2020 | \$6,802,589 | \$3,199,398 | \$3,603,191 | 47.0% | 2021-22 | \$334,817 | \$13,728 | (\$406,014) | (\$57,469) |
| 1/1/2021 | 6,907,000 | 3,387,000 | 3,520,000 | 49.0% | 2022-23 | 357,000 | 13,000 | (414,000) | (44,000) |
| 1/1/2022 | 7,017,000 | 3,551,000 | 3,466,000 | 50.6% | 2023-24 | 345,000 | 14,000 | (415,000) | (56,000) |
| 1/1/2023 | 7,126,000 | 3,742,000 | 3,384,000 | 52.5% | 2024-25 | 368,000 | 12,000 | (477,000) | (97,000) |
| 1/1/2024 | 7,244,000 | 3,932,000 | 3,312,000 | 54.3% | 2025-26 | 352,000 | 13,000 | (493,000) | (128,000) |
| 1/1/2025 | 7,298,000 | 4,091,000 | 3,207,000 | 56.1% | 2026-27 | 376,000 | 13,000 | (519,000) | (130,000) |
| 1/1/2026 | 7,339,000 | 4,231,000 | 3,108,000 | 57.7% | 2027-28 | 366,000 | 13,000 | (536,000) | (157,000) |
| 1/1/2027 | 7,353,000 | 4,377,000 | 2,976,000 | 59.5% | 2028-29 | 391,000 | 14,000 | (532,000) | (127,000) |
| 1/1/2028 | 7,349,000 | 4,505,000 | 2,844,000 | 61.3% | 2029-30 | 383,000 | 13,000 | (559,000) | (163,000) |
| 1/1/2029 | 7,350,000 | 4,672,000 | 2,678,000 | 63.6% | 2030-31 | 409,000 | 13,000 | (563,000) | (141,000) |
| 1/1/2030 | 7,322,000 | 4,813,000 | 2,509,000 | 65.7% | 2031-32 | 399,000 | 13,000 | (570,000) | (158,000) |
| 1/1/2031 | 7,289,000 | 4,987,000 | 2,302,000 | 68.4% | 2032-33 | 426,000 | 13,000 | (569,000) | (130,000) |
| 1/1/2032 | 7,247,000 | 5,155,000 | 2,092,000 | 71.1% | 2033-34 | 418,000 | 13,000 | (570,000) | (139,000) |
| 1/1/2033 | 7,203,000 | 5,364,000 | 1,839,000 | 74.5% | 2034-35 | 446,000 | 14,000 | (567,000) | (107,000) |
| 1/1/2034 | 7,156,000 | 5,576,000 | 1,580,000 | 77.9% | 2035-36 | 440,000 | 13,000 | (564,000) | (111,000) |
| 1/1/2035 | 7,110,000 | 5,836,000 | 1,274,000 | 82.1% | 2036-37 | 470,000 | 14,000 | (557,000) | (73,000) |
| 1/1/2036 | 7,065,000 | 6,109,000 | 956,000 | 86.5% | 2037-38 | 462,000 | 13,000 | (555,000) | (80,000) |
| 1/1/2037 | 7,025,000 | 6,438,000 | 587,000 | 91.6% | 2038-39 | 493,000 | 14,000 | (551,000) | (44,000) |
| 1/1/2038 | 6,986,000 | 6,784,000 | 202,000 | 97.1% | 2039-40 | 420,000 | 14,000 | (539,000) | (105,000) |
| 1/1/2039 | 6,949,000 | 7,189,000 | (240,000) | 103.5% | 2040-41 | 448,000 | 14,000 | (528,000) | (66,000) |

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

| Valuation Date | Actuarial Value of Assets | Accrued Liability | Unfunded Accrued Liability | Funded Ratio |
|---------------------------|--|------------------------------|---|-------------------------|
| January 1, 2014 | \$2,139,179 | \$5,040,812 | \$2,901,633 | 42.4% |
| January 1, 2016 | 2,308,178 | 5,877,178 | 3,569,000 | 39.3% |
| January 1, 2018 | 2,771,076 | 6,210,023 | 3,438,947 | 44.6% |
| January 1, 2020 | 3,199,398 | 6,802,589 | 3,603,191 | 47.0% |

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 |
|-------------|-------------------------------------|--------------------------|---------|---|
| 2013-14 | \$308,987 | \$344,664 | N/A | N/A |
| 2014-15 | 303,861 | 365,969 | N/A | N/A |
| 2015-16 | 303,861 | 373,322 | N/A | N/A |
| 2016-17 | 373,322 | 186,661 | N/A | N/A |
| 2017-18 | 373,322 | 369,396 | N/A | N/A |
| 2018-19 | 365,469 | 365,469 | N/A | N/A |
| 2019-20 | 365,469 | TBD | N/A | N/A |
| 2020-21 | 334,817 | TBD | N/A | N/A |
| 2021-22 | 357,417 | TBD | N/A | N/A |

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 | Due Employee Contributions | Service Retirees | Disabled Retirees | Beneficiaries | Total |
|------------------------------|-------------------|---------------------------------|----------------------------------|---------------------|----------------------|---------------|-------|
| Count January 1, 2018 | 54 | 1 | 73 | 42 | 0 | 10 | 180 |
| Terminated | | | | | | | |
| - no benefits due | - | - | - | - | - | - | 0 |
| - paid refund | (4) | - | (3) | - | - | - | (7) |
| - contributions due | (8) | - | 8 | - | - | - | 0 |
| - vested benefits due | (2) | 2 | - | - | - | - | 0 |
| Retired | (4) | - | - | 4 | - | - | 0 |
| Died | | | | | | | |
| - with beneficiary | - | - | - | - | - | - | 0 |
| - no beneficiary | - | - | - | (2) | - | (1) | (3) |
| Benefits expired | - | - | - | - | - | - | 0 |
| New member | 13 | - | - | - | - | - | 13 |
| Rehired | 3 | - | (3) | - | - | - | 0 |
| New Alternate Payee | - | - | - | - | - | - | 0 |
| Correction | - | 1 | (1) | 1 | - | (1) | 0 |
| Count January 1, 2020 | 52 | 4 | 74 | 45 | 0 | 8 | 183 |

Section IV - Membership Data
B. Statistics of Active Membership

| | As of January 1, 2018 | As of January 1, 2020 |
|---------------------------------|--------------------------|--------------------------|
| Number of Active Members | 54 | 52 |
| Average Age | 42.3 | 40.5 |
| Average Service | 14.5 | 12.9 |

Section IV - Membership Data

C. Statistics of Inactive Membership

| | As of January 1, 2018 | As of January 1, 2020 |
|----------------------------------|--------------------------|--------------------------|
| Terminated Vested Members | | |
| Number | 1 | 4 |
| Total Annual Benefit | \$6,072 | \$23,232 |
| Average Annual Benefit | 6,072 | 5,808 |
| Average Age | 47.6 | 48.1 |
| Members Due Refunds | | |
| Number | 73 | 74 |
| Service Retirees | | |
| Number | 42 | 45 |
| Total Annual Benefit | \$298,272 | \$328,836 |
| Average Annual Benefit | 7,102 | 7,307 |
| Average Age | 67.4 | 68.0 |
| Disabled Retirees | | |
| Number | 0 | 0 |
| Total Annual Benefit | \$0 | \$0 |
| Average Annual Benefit | 0 | 0 |
| Average Age | 0.0 | 0.0 |
| Beneficiaries | | |
| Number | 10 | 8 |
| Total Annual Benefit | \$31,635 | \$24,255 |
| Average Annual Benefit | 3,164 | 3,032 |
| Average Age | 68.9 | 69.3 |

Section IV - Membership Data
D. Distribution of Inactive Members as of January 1, 2020

| | Age | Number | Annual Benefits |
|----------------------------------|---------|----------|-----------------|
| Terminated Vested Members | < 50 | 2 | \$11,352 |
| | 50 - 59 | 2 | 11,880 |
| | 60 - 69 | 0 | 0 |
| | 70 - 79 | 0 | 0 |
| | 80 - 89 | 0 | 0 |
| | 90 + | <u>0</u> | <u>0</u> |
| | Total | 4 | 23,232 |
| Service Retirees | < 50 | 0 | \$0 |
| | 50 - 59 | 9 | 75,456 |
| | 60 - 69 | 17 | 128,292 |
| | 70 - 79 | 16 | 105,576 |
| | 80 - 89 | 3 | 19,512 |
| | 90 + | <u>0</u> | <u>0</u> |
| | Total | 45 | 328,836 |
| 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 | 1 | 2,019 |
| | 60 - 69 | 2 | 9,576 |
| | 70 - 79 | 4 | 9,420 |
| | 80 - 89 | 1 | 3,240 |
| | 90 + | <u>0</u> | <u>0</u> |
| | Total | 8 | 24,255 |

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.

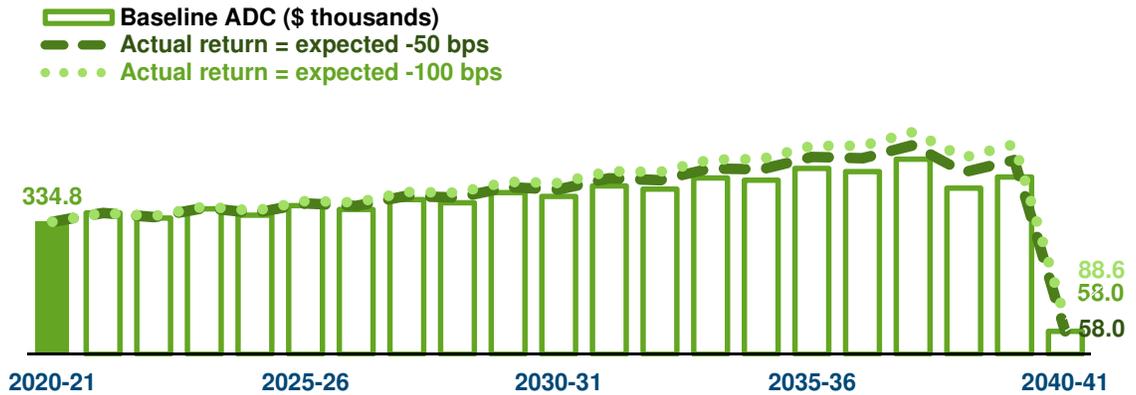
Section V - Analysis of Risk

B. Risk Identification and Assessment

Investment Risk

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

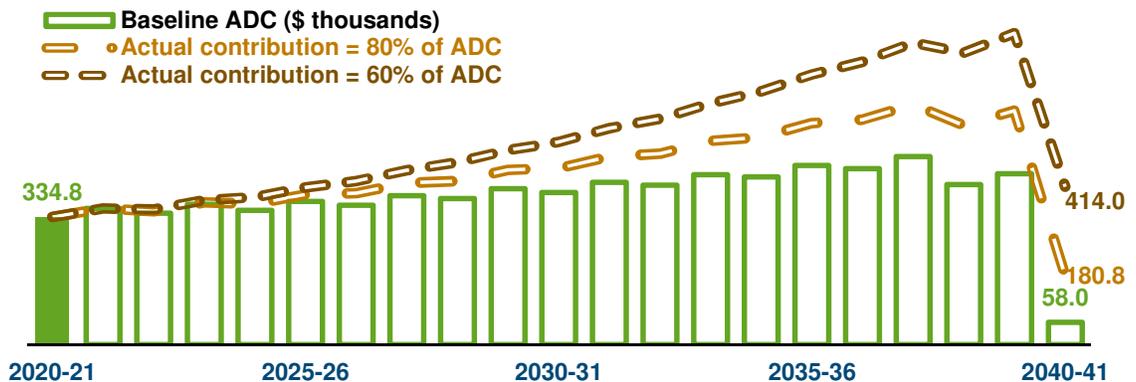
Identification: To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, Actuarially Determined Contributions, and funded status may differ significantly from those presented in this valuation. The consequences of persistent underperformance on 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 6 years, actual contributions have been 98.8% 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 2019, the plan had positive cash flow, with city and member contributions to the plan of \$377,613 compared to \$350,001 of benefit payments and administrative expenses 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.

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.

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.

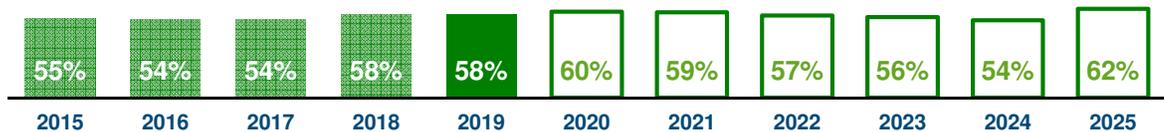
Identification: The pension liabilities reported herein have been calculated by assuming that members will follow patterns of demographic experience as described in Appendix B. If actual demographic experience or future demographic assumptions are different from what is assumed to occur in this valuation, 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.

Section V - Analysis of Risk

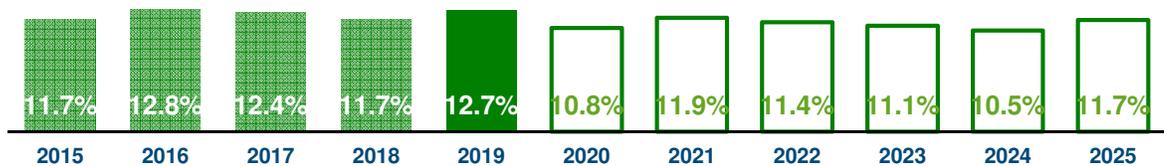
C. Maturity Measures

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.

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



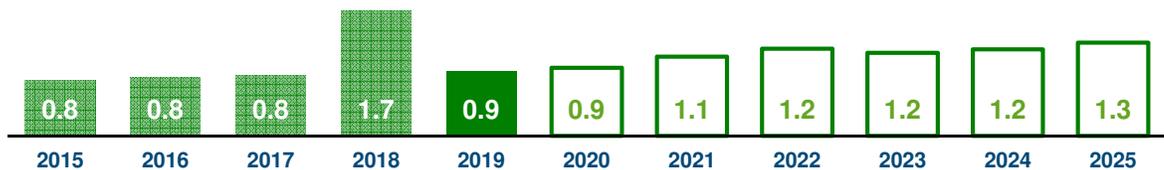
Benefit Payments compared to Market Value of Assets



Net Cash Flows compared to Market Value of Assets



Benefit Payments compared to City 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 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 using layered 20-year bases as a level percent.

Plan assets are valued at market value.

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 service 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 Rate | 6.75% (prior: 7.00%) | | |
| Inflation | 2.75% | | |
| Amortization Growth Rate | 2.75% (prior 0%) | | |
| Expenses | Average of prior 2 years' administrative expenses, increased by 3% and rounded to nearest \$100 | | |
| Mortality | Current: PubS-2010 Mortality Table with generational projection per the MP Ultimate Scale, with employee rates before benefit commencement and healthy or disabled annuitant rates after benefit commencement. This assumption includes a margin for future improvements in longevity beyond the valuation date. (Prior: RPH-2014 Adjusted to 2006 Blue Collar Mortality Table with generational projection per MP-2017) | | |
| Turnover | Age | Rate | |
| | 25 | 5.00% | |
| | 35 | 2.50% | |
| | 45 | 0.75% | |
| | 55 | 0.00% | |
| Retirement | 100% at Normal Retirement Date | | |
| Disability | Age | Male | Female |
| | 25 | 0.038% | 0.047% |
| | 35 | 0.069% | 0.136% |
| | 45 | 0.202% | 0.303% |
| | 55 | 0.722% | 0.952% |
| Marital Status | 80% of members are assumed to be married with female spouses 3 years younger than the male spouses. | | |

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 | Volunteers become eligible on the first of the year after completing 12 months of continuous service. |
| Member's Contributions | \$22 per month. Contributions cease after 30 years of service (40 years of service for employees hired before January 1, 2015). |
| Credited Service | <p>At the end of each plan year, a Volunteer earns a year of Credited Service if he or she completes the Emergency Call Requirement and Training Requirement for the department during the preceding calendar year and makes the required employee contribution.</p> <p>Emergency Call Requirement: The lesser of 20% of the department's emergency calls or 150 emergency calls.</p> <p>Training Requirement: The lesser of 20% of the department's training sessions and drills or 20 hours of training and drills.</p> |
| Normal Retirement Date | Age 55 with 20 years of Credited Service for Members hired prior to January 1, 2015. Age 55 with 25 years of Credited Service for Members hired after January 1, 2015. |
| Normal Retirement Benefit | \$22.00 per month multiplied by years of Credited Service. Credited Service is limited to 30 years for employees hired after January 1, 2015 and 40 years for employees hired prior to January 1, 2015. |
| Deferred Retirement | Members may commence receiving retirement benefits and remain an active Volunteer after Normal Retirement Date. Benefits are adjusted annually to reflect additional years of Credited Service earned after Normal Retirement benefits commence. |
| Normal Form of Annuity | 90% Joint and Survivor Annuity. |
| Disability Eligibility | Total and permanent disability in the line of duty. |
| Disability Benefit | \$22.00 per month multiplied by 30 years of Credited Service (40 years for employees hired prior to January 1, 2015). |
| Pre-Retirement Termination | Refund of employee contributions with interest at 3.0%. |
| Pre-Retirement Death Benefit | \$660 per month to the surviving spouse. A refund of employee contributions with interest is payable if there is no surviving spouse. |

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.