



February 15, 2022

Honorable Members of the City Council  
City of Worcester, Massachusetts

RE: OPEB Valuation June 30, 2021

Dear Councilors:

Enclosed for your review is the OPEB valuation as prepared by KMS Actuaries, LLC for the financial disclosure date of June 30, 2021. Local governments are required to recognize OPEB liabilities and report the required disclosures in accordance with Government Accounting Standards Board (GASB) Statement no. 75. The actuary has reviewed this report with the City's OPEB Board of Trustees.

Vested retirees receive health insurance coverage and basic life that is funded in part by the City. The City pays 75% of health insurance premiums and 50% of basic life. The GASB statement requires the recognition of the liability to be measured as the portion of the present value of projected benefit payments to be provided to current active and inactive employees qualifying for past periods of service. Offsetting the liability is the fiduciary net position held in the irrevocable trust, resulting in the net OPEB liability.

Membership in the City's OPEB plan includes members of the Worcester Retirement System and the Mass Teachers Retirement System. For the current valuation, the City's membership included 5,625 active plan members and 4,116 inactive plan members receiving current benefits during the year, a decrease in total membership of 4% from the prior valuation.

The net OPEB liability as of June 30, 2021 was \$1.5 billion an increase of \$366 million or 32% as a result of changes of assumptions. Changes in the method to determine per capita costs used to project future benefits added \$290 million to the liability. A decrease in the discount rate from 2.45% to 2.16% added \$78 million. In addition, the current valuation corrected an error in the previous actuarial report that omitted 1,285 spouses enrolled in Medicare and increased the beginning liability by \$116 million.

Per capita costs of retirees in higher age brackets in Non-Medicare plans are adjusted upward using actuarial standards and tables as individual costs are assumed to be higher for older aged members that are subsidized by lower aged members. The implied subsidy included in the valuation is estimated to add \$250 million to the total liability and \$9 million to the annual expected costs (service cost).

The City actively enrolls members in Medicare at age 65. Those enrolled in Medicare have a significantly less per capita cost than the Non-Medicare plans. As shown in Exhibit 7.2 on page 30 there are 273 members not eligible for Medicare enrolled in Non-Medicare plans. The costs for the actual premiums of Non-Medicare Plans are significantly higher and an implicit subsidy is added in. An excess liability attributable to those not eligible for Medicare and their spouses was estimated to add \$190 million to the liability which will phase out over time upon the passing of those members.

Medicare enrollment, discount rate, and the continued building of trust assets are key determinants affecting the liability. Medicare supplementary plans offered by the City at age 65 are significantly less expensive than traditional plans with approximately 80% of retirees enrolled. This has kept OPEB annual costs on a pay-as-you-go basis stable with a less than 2% annual growth over the past seven years and totaled \$23.5 million for fiscal 2021. The number of retirees and their spouses receiving benefits has also been stable averaging 3,900 and 1,500, respectively over the past five years.

The discount rate is one of the most important drivers of the liability. The higher the discount rate that is used to measure the present value of future expected benefits, the lower the liability. The discount rate is determined by GASB Statement No. 75. GASB allows the higher expected rate of return of trust assets (currently 6.8%) to the extent future cash flows cover future benefits. For any future period that is not deemed to be funded the discount rate is based on the yield of a 20-year tax exempt general obligation municipal bond (2.16% as of June 30, 2021). A single blended rate is then determined and used in the valuation.

As interest yields rise and plan assets grow the discount rate will rise which will decrease the liability. It is estimated that for every 1% increase in the discount rate the total liability would decrease 16%. A discount rate that is 400 basis points higher than the current 2.16% would result in a liability of \$750 million or half of the current valuation.

The increase in the liability did not result in any changes to the ratings from any of the three bond rating agencies as the view is there is flexibility in managing the benefit long-term and the actual pay-as-you-go costs were not impacted by the valuation changes.

Respectfully submitted,

A handwritten signature in black ink, reading "Robert V. Stearns". The signature is written in a cursive, flowing style.

Robert V. Stearns, CPA

City Auditor



# **CITY OF WORCESTER, MASSACHUSETTS**

**OTHER POSTEMPLOYMENT BENEFITS PROGRAM**

**FINANCIAL REPORTING AND DISCLOSURES  
Governmental Accounting Standards Board  
Statements 74 and 75**

**Disclosures as of  
June 30, 2021**

KMS Actuarial, LLC  
52 Hunt Road  
Kingston, NH 03848

December, 2021





December 15, 2021

OPEB Board  
Robert Stearns, Chair  
City of Worcester  
455 Main Street, Room 102  
Worcester, MA 01608

Dear Bob:

We are pleased to present the enclosed report of the July 1, 2020 actuarial valuation of the retiree health care benefits for the City of Worcester. The valuation was prepared in accordance with and for the purpose of financial reporting and disclosures as of June 30, 2021 under the following Governmental Accounting Standards Board (GASB) Statements:

- ◆ GASB Statement No. 74, Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (GASB 74)
- ◆ GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions (GASB 75)

The Principal Valuation Results, including assets, liabilities and the development of future contributions, are provided in Section 1. The Notes to the Financial Statements and the Required Supplementary Information are provided in Sections 2 and 3, respectively. Employer Reporting Amounts under GASB 75 are provided in Section 4. The Summary of Plan Provisions and Actuarial Assumptions and Methods are shown in Sections 5 and 6, respectively. Section 7 summarizes the demographic profile of active members and retired members, covered spouses and survivors. Finally, a Glossary of Terms is provided in Section 8.

Our calculations are based on member census data and other information provided by the City of Worcester as well as health plan rates provided by the City. Although we did not audit the data used in the valuation and disclosure calculations, we believe that the information is complete and reliable.

Liabilities presented in this report are based on a discount rate of 2.16%, the rate that reflects a tax-exempt, high quality municipal bond rate. The municipal bond rate of 2.16% is based on the Bond Buyer 20-Bond GO Index published on June 30, 2021.

This report was completed in accordance with generally accepted actuarial standards and procedures, and conforms to the Code of Professional Conduct of the American Academy of Actuaries. The actuarial assumptions other than those explicitly applicable to the postemployment benefit plans are consistent with those used by the Worcester and Massachusetts Teachers Retirement Systems' actuaries for the Retirement System pension valuations.

Future actuarial valuation results may differ significantly from the current results presented in this report. Examples of potential sources of volatility include plan experience differing from that anticipated by the economic or demographic assumptions, the effect of new entrants, changes in economic or demographic assumptions, the effect of law changes and the delayed effect of smoothing techniques.

Our valuation follows generally accepted actuarial methods and we perform such tests as we consider necessary to assure the accuracy of the results. The amounts presented in this report have been appropriately determined according to the actuarial assumptions and methods stated herein.

This report is intended for the sole use of the City of Worcester and is intended to provide information to comply with the stated purpose of the report. It may not be appropriate for other purposes.

The expected claims, cost trend rates, and analysis of regulatory changes have been developed based on the expertise of the undersigned health and welfare actuary, Christopher E. Bean, ASA, MAAA. The undersigned credentialed actuaries are Members of the American Academy of Actuaries and together meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinion contained herein. They are available to answer any questions with regard to this report.

Respectfully submitted,



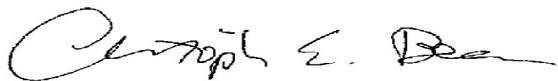
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Linda L. Bournival, FSA, EA  
Member, American Academy of Actuaries  
(603) 792-9494



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Amanda J. Makarevich, FSA  
Member, American Academy of Actuaries  
(603) 792-9494



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Christopher E. Bean, ASA  
Member, American Academy of Actuaries  
(508) 628-9022

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## EXECUTIVE SUMMARY

### Purpose of Report

This report presents the results of the actuarial valuation of the City of Worcester's retiree health care benefits as of July 1, 2020. The valuation was prepared in accordance with and for the purpose of financial reporting and disclosures as of June 30, 2021 under the following Governmental Accounting Standards Board (GASB) Statements:

- ◆ GASB Statement No. 74, Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (GASB 74)
- ◆ GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions (GASB 75)

The results as of the measurement date are based on a roll forward of the liabilities developed in the most recent actuarial valuation.

### GASB Accounting Standards

In June 2015, the GASB approved two related Statements that significantly changed the way other postemployment benefits (OPEB) plans and governments account and report OPEB liabilities. GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans*, replaced the requirements of Statement No. 43 and GASB Statement No. 75 (GASB 75), *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*, replaced the requirements of Statement No. 45.

The effective date for GASB 74 is for plan years beginning after June 15, 2016, which is the plan year ending June 30, 2017 for the City of Worcester. The effective date for GASB 75 is for fiscal years beginning after June 15, 2017, which is the fiscal year ending June 30, 2018 for the City of Worcester.

GASB 74 requires OPEB plans to present a statement of fiduciary net position (OPEB plan assets) and a statement of changes in fiduciary net position. Further, the statement requires that notes to financial statements include descriptive information such as the types of benefits provided, the classes of plan members covered and the authority under which benefit terms are established or may be amended. Finally, GASB 74 requires OPEB plans to present in required supplementary information the sources of the changes in the net OPEB liability and information about the actuarially determined contributions compared with the actual contributions made to the plan and related ratios.

GASB 74 and GASB 75 require projected benefit payments be discounted to their actuarial present value using the single rate that reflects (1) a long-term expected rate of return on OPEB plan investments to the extent that the OPEB plan's assets are sufficient to pay benefits and OPEB plan assets are expected to be invested using a strategy to achieve that return and (2) a tax-exempt, high-quality municipal bond rate to the extent that the conditions for use of the long-term expected rate of return are not met.

GASB 75 establishes standards for measuring and recognizing liabilities, deferred outflows of resources, deferred inflows of resources and OPEB expense by state and local governments.

## EXECUTIVE SUMMARY

### City of Worcester Other Postemployment Benefits Program

The City of Worcester administers the retiree health care benefits program - a single-employer defined benefit plan that is used to provide postemployment benefits other than pensions (OPEB) for all permanent full-time employees. The City provides health care benefits for retirees and their dependents. Benefits are provided through the City, and the full cost of benefits is shared between the City and retirees.

### Summary of Principal Results

A summary of principal results from the current and prior measurement dates follows:

Disclosure Date	June 30, 2021	June 30, 2020	% Change
Valuation Date	July 1, 2020	July 1, 2018	
<b>Membership Data</b>			
Active Plan Members	5,625	5,867	(4.1%)
Inactive Plan Members (excludes covered spouses)	4,116	4,281	(3.9%)
Total Plan Members	9,741	10,148	(4.0%)
Covered Spouses	1,523	Not Provided	
Covered Payroll	\$364,301,765	\$384,459,031	(5.2%)
<b>Net OPEB Liability</b>			
Discount Rate	2.16%	2.45%	
Total OPEB Liability (TOL) <sup>1</sup>	\$1,533,889,120	\$1,162,533,893	31.9%
Fiduciary Net Position (FNP)	\$25,774,748	\$20,505,624	25.7%
Net OPEB Liability	\$1,508,114,372	\$1,142,028,269	32.1%
FNP as % of TOL	1.7%	1.8%	
<b>OPEB Expense</b>			
OPEB Expense	\$158,667,243	\$102,091,996	55.4%
Deferred Outflows	\$388,981,280	\$116,929,264	
Deferred Inflows	\$27,663,557	\$407,999	
Recognition Period	7.52	5.54	

<sup>1</sup>Includes estimated adjustment of \$115,700,000 as of June 30, 2020 to account for covered spouses of retirees on Medicare plans that were not included in the prior valuation.

## EXECUTIVE SUMMARY

### Experience Gain and Loss

In developing the Total OPEB Liability, various assumptions are made regarding future premium rates, mortality, retirement, disability and turnover rates. A comparison of the results of the current and prior measurements is made to determine how closely actual experience relates to expected. For the current measurement period, the difference between expected and actual experience resulted in an actuarial gain of approximately \$31,076,000. The gain is primarily attributable to a decrease in the number of active employees. Further, premium rates for most plans were slightly lower than expected from the prior valuation.

### Changes of Assumptions

The discount rate changed from 2.45% as of June 30, 2020 to 2.16% as of June 30, 2021. In addition, many other assumptions were updated in this valuation, including decrements, the inflation rate, healthcare trend rates, mortality tables and mortality improvement rates, percent retiring with covered spouses, participation rates, and the claims curve development method. A summary of the impact on the Total OPEB Liability (TOL) of each assumption change is provided below:

◆ Decrease due to change in Decrement	(2,669,000)
◆ Increase due to change in Inflation Assumption	35,445,000
◆ Increase due to change in Trend Assumption	29,434,000
◆ Increase due to change in Mortality Tables and Mortality Improvement Rates	475,000
◆ Decrease due to change in Participation Rate	(80,159,000)
◆ Increase due to change in Discount Rate	78,278,000
◆ Increase due to change in Claims Curve Development Method	297,286,000
Total	\$ 359,707,000

The increase due to the change in claims curve development method is comprised of two components - the increase in liabilities attributable to retirees not eligible for Medicare who remain on the City's active plans and the medical aging factors used in the development of the claims curves. The liability increase attributable to retirees ineligible for Medicare is approximately \$190 million. Further, the liability increase attributable to the method change for development of the claims curve is approximately \$100 million. Further details on the development of the claims curves are presented in Section 6, Actuarial Assumptions and Methods.

All of the assumptions used in this valuation are shown in Section 6, Actuarial Assumptions and Methods.

### Changes of Benefit Terms

All benefit terms are the same as those used in the prior measurement. A Summary of the Principal Plan Provisions is provided in Section 5.

### Total OPEB Liability

The Total OPEB Liability as of the current measurement date, June 30, 2021, is \$1,533,889,120. The Total OPEB Liability as of the prior measurement date, June 30, 2020, was \$1,162,533,893, including the adjustment noted above. During the current measurement period ending June 30, 2021, the Total OPEB Liability increased by \$371,355,227, or 31.9%. The development of the Total OPEB Liability for the current measurement period is shown in Section 1, Exhibit 1.2.

## EXECUTIVE SUMMARY

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### Fiduciary Net Position

The Fiduciary Net Position is equal to the market value of assets and as of the current measurement date, June 30, 2021, is \$25,774,748. The Fiduciary Net Position as of the prior measurement date, June 30, 2020, was \$20,505,624. During the plan years ended June 30, 2021 and June 30, 2020, the actual rates of return were 6.63% and 4.74%, respectively. The expected long-term rate of return is 6.80%. The Fiduciary Net Position is shown in Section 1, Exhibit 1.1.

### Employer Future Period Contributions

The annual budgeted amounts for OPEB trust prefunding increase by 10% each year over the prior year, with Fiscal Year 2021 totaling \$732,050. In addition, there are ad hoc prefunded contributions from Free Cash, which is the amount of surplus funds available in the subsequent year available for current appropriations. The Policy states that 30% of Free Cash goes to OPEB, and the Fiscal Year 2021 contribution was \$3,076,241.

### Discount Rate

As of the June 30, 2021 measurement date, the OPEB plan's fiduciary net position was projected to be insufficient to make all projected benefit payments of current plan members. Therefore the 2.16% municipal bond rate was applied to all periods to determine the total OPEB liability. Projected benefit payments are discounted to their actuarial present value using a single discount rate of 2.16%.

### OPEB Expense

The OPEB Expense for the current measurement period ending June 30, 2021, is \$158,667,243. Benefit changes are recognized immediately and experience gains and losses and assumption changes developed in this valuation are recognized over 7.52 years. Investment gains and losses are recognized over 5 years. The OPEB Expense for the prior measurement period was \$102,091,996. The development of the OPEB expense for the current measurement period is shown in Section 4, Exhibit 4.2.

### Transition Valuation

The census data file submitted by the City to the prior actuaries, Lewis & Ellis, used for the disclosures as of June 30, 2020 does not appear to contain information for spouses covered under Medicare supplemental plans. The City's records for premiums paid in fiscal year 2020 were provided to KMS and indicate that between 1,200 and 1,300 spouses were omitted from the June 30, 2020 valuation. Based on the information provided for these spouses for the current valuation, the liability as of June 30, 2020 was understated by approximately \$115.7 million due to the omission of this group. This adjustment causes the total OPEB liability as of June 30, 2020 to increase from \$1,046,833,893 to \$1,162,533,893.

### COVID-19 Pandemic

The assumptions in this report do not reflect the potential impacts of the COVID-19 pandemic on the OPEB program. Especially in the short range, the pandemic is likely to materially affect the economic, demographic and healthcare-specific experience, in a way not anticipated by the assumptions on which the projections are based.

## SECTION 1 - PRINCIPAL VALUATION RESULTS

### Exhibit 1.1 - OPEB Trust Assets

The City has established an irrevocable trust pursuant to Section 20 of Chapter 32B of the Massachusetts General Laws for the purpose of accumulating assets to prefund the OPEB liabilities. Plan assets segregated and restricted in an OPEB trust must be dedicated to providing plan benefits to retirees and beneficiaries in accordance with the terms of the plan and must be legally protected from creditors of the employer. Further, employer contributions to the trust must be irrevocable. Asset information for the current and prior fiscal years was provided by the City and is presented below:

**Fiscal Year Ended June 30**

**2021**

**2020**

Trust Fund Composition at Fiscal Year-End		
Global Equity	\$11,002,059	\$0
Core Fixed Income	3,942,190	-
Value Added Fixed Income	1,777,851	-
Private Equity	3,736,063	-
Real Estate	2,138,574	-
Timberland	772,979	-
Portfolio Completion Strategies	2,138,574	-
Overlay	257,660	-
Cash and Due from Employer	8,798	(84,339)
Cash, Short-term	-	10,814,953
Other (MMDT ST Bond Portfolio)	-	9,775,010
Total Market Value of Assets	\$25,774,748	\$20,505,624
Asset Activity		
Market value, beginning of year	\$20,505,624	\$0
Employer Premiums	33,608,471	24,647,288
OPEB Trust Contributions	3,769,127	19,826,603
Benefit Payments	(33,608,471)	(24,647,288)
Administrative Expenses	-	-
Investment Return	1,499,997	679,021
Market value, end of year	\$25,774,748	\$20,505,624
<b>Money-Weighted Rate of Return</b>	<b>6.63%</b>	<b>4.74%</b>
(Gain) / Loss on OPEB Plan Investments		
Projected earnings	\$384,990	\$169,022
Actual earnings	1,499,997	679,021
(Gain) / Loss on OPEB plan investments	(\$1,115,007)	(\$509,999)

## SECTION 1 - PRINCIPAL VALUATION RESULTS

### Exhibit 1.2 - Total OPEB Liability

The Total OPEB Liability, developed using the Entry Age Normal funding method, is the portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service. The total OPEB liability as of the June 30, 2021 measurement date was developed from an actuarial valuation as of July 1, 2020 and rolled forward to the OPEB plan's fiscal year-end.

The Service Cost is the portion of the actuarial present value of projected benefit payments that is attributed to a valuation year. Only active employees who have not reached the age at which the probability of retirement is 100% incur a service cost.

Actuarial experience gains and losses arise from the difference between expected and actual experience, excluding amounts related to benefit changes and changes in assumptions or other inputs.

The development of the Total OPEB Liability from the beginning of the measurement period, June 30, 2020 to the end of the measurement period, June 30, 2021 is shown below:

Measurement Date	June 30, 2021
1. Total OPEB Liability, beginning of year <sup>1</sup> :	
a. Actives	Not Available
b. Retirees, Covered Spouses and Survivors	Not Available
c. Total OPEB Liability at 2.45% (a. + b.)	\$1,162,533,893
2. Service Cost <sup>2</sup>	\$47,108,000
3. Expected Benefit Payments	
a. Current retirees	(\$31,807,713)
b. Future retirees	(1,800,758)
c. Total (a. + b.)	(\$33,608,471)
4. Interest [2.45% x (1.c. + 2. + .5 x 3.c)]	\$29,224,523
5. Changes of benefit terms	\$0
6. Differences between expected and actual experience	(\$31,076,275)
7. Changes of assumptions or other inputs	\$359,707,450
8. Total OPEB Liability, end of year (1.c. + 2. + 3.c. + 4. + 5. + 6. + 7.)	
a. Actives	\$788,821,601
b. Retirees, Covered Spouses and Survivors	745,067,519
c. Total OPEB Liability at 2.16% (a. + b.)	\$1,533,889,120

<sup>1</sup>Includes adjustment for covered spouses of retirees on Medicare plans that were not included in the prior valuation.

<sup>2</sup>Estimated based on June 30, 2020 Total OPEB Liability and prior ratios of Service Cost to Total OPEB Liability.

## SECTION 1 - PRINCIPAL VALUATION RESULTS

### Exhibit 1.3 - Development of Actuarially Determined Employer Contributions

The annual budgeted amounts for OPEB trust prefunding increase by 10% each year over the prior year, with Fiscal Year 2021 totaling \$732,050. In addition, there are ad hoc prefunded contributions from Free Cash, which is the amount of surplus funds available in the subsequent year available for current appropriations. The Policy states that 30% of Free Cash goes to OPEB, and the Fiscal Year 2021 contribution was \$3,076,241.

The Actuarially Determined Employer Contribution (ADEC) equals the Normal Cost plus a provision for amortizing the Unfunded Actuarial Accrued Liability. We have assumed increasing dollar amortization over an amortization period of 30 years.

Fiscal Year Ending	June 30, 2021	June 30, 2022
<b>Discount Rate</b>	<b>2.45%</b>	<b>2.16%</b>
1. Normal Cost	\$47,108,000	\$68,397,517
2. Unfunded Actuarial Accrued Liability		
a. Actuarial Accrued Liability	\$1,162,533,893	\$1,533,889,120
b. Actuarial Value of Plan Assets	\$20,505,624	\$25,774,748
c. Unfunded Actuarial Accrued Liability (a. - b.)	\$1,142,028,269	\$1,508,114,372
3. Amortization of Unfunded Actuarial Accrued Liability		
a. Unfunded Actuarial Accrued Liability	\$1,142,028,269	\$1,508,114,372
b. Amortization Period in years	30	30
c. Payroll Growth Rate	3.5%	3.5%
d. Amortization Factor	34.92	36.47
e. Amortization Amount (3.a. / 3.d.)	\$32,704,131	\$41,352,190
4. Interest on 1. and 3.e.	\$1,955,397	\$2,370,594
5. Actuarially Determined Employer Contribution (1. + 3.e. + 4.)	\$81,767,528	\$112,120,301
6. Actual Employer Contribution to OPEB Trust	\$3,769,127	TBD
7. Expected Benefit Payments	\$33,608,471	
8. Total Contribution (6. + 7.)	\$37,377,598	

## SECTION 2 - NOTES TO THE FINANCIAL STATEMENTS

### Exhibit 2.1 - Plan Description

#### Plan Administration

The City of Worcester administers the retiree health care benefits program - a single-employer defined benefit plan that is used to provide postemployment benefits other than pensions (OPEB) for all permanent full-time employees.

#### Plan Membership

At June 30, 2021, OPEB plan membership consisted of the following:

Inactive plan members or beneficiaries currently receiving benefit payments <sup>1</sup>	4,116
Inactive plan members entitled to but not yet receiving benefit payments	0
Active plan members	5,625
	<u>9,741</u>

<sup>1</sup>Per paragraph 34a of GASB 74 and further clarified by Question 4.67 of the 2017-2 GASB 74 Implementation Guide, the total shown for inactive plan members or beneficiaries currently receiving benefit payments does not include covered spouses or other dependents.

#### Benefits Provided

The City provides health care benefits for retirees and their dependents. Benefits are provided through the City, and the full cost of benefits is shared between the City and retirees.

#### Employer Future Period Contributions

The annual budgeted amounts for OPEB trust prefunding increase by 10% each year over the prior year, with Fiscal Year 2021 totaling \$732,050. In addition, there are ad hoc prefunded contributions from Free Cash, which is the amount of surplus funds available in the subsequent year available for current appropriations. The Policy states that 30% of Free Cash goes to OPEB, and the Fiscal Year 2021 contribution was \$3,076,241.

## SECTION 2 - NOTES TO THE FINANCIAL STATEMENTS

### Exhibit 2.2 - Net OPEB Liability

The components of the net OPEB liability at June 30, 2021, were as follows:

Total OPEB liability	\$ 1,533,889,120
Fiduciary net position	(25,774,748)
Net OPEB liability	<u>\$ 1,508,114,372</u>

Fiduciary net position as a percentage of the total OPEB liability 1.68%

#### Actuarial Assumptions

The total OPEB liability was determined by an actuarial valuation as of July 1, 2020, rolled forward to the measurement date and using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.2% per year, based on current economic data, analyses from economists and other experts, and professional judgement.
Discount rate	2.16 percent, net of investment expenses, including inflation.
Healthcare cost trend rate	7 percent for 2020, decreasing 0.4 percent per year to 5.4 percent, then grading down to an ultimate trend rate of 4 percent, utilizing the Society of Actuaries Getzen Medical Trend Model. The ultimate medical inflation rate is reached in 2075.
Pre-Retirement Mortality Rates - General and Public Safety employees	RP-2014 Blue Collar Employee Mortality Table, projected with generational mortality improvement using scale MP-2017.
Healthy Retiree Mortality Rates - General and Public Safety employees	RP-2014 Blue Collar Healthy Annuitant Mortality Table, projected with generational mortality improvement using scale MP-2017.
Disabled Retiree Mortality Rates - General and Public Safety employees	RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year, projected with generational mortality improvement using scale MP-2017.
Pre-Retirement Mortality Rates - Teachers	PUB-2010 Teachers Headcount-Weighted Employee Mortality Table, base year 2010, projected with generational mortality using Scale MP-2020.
Healthy Retiree Mortality Rates - Teachers	PUB-2010 Teachers Headcount-Weighted Retiree Mortality Table, base year 2010, projected with generational mortality using Scale MP-2020.
Disabled Retiree Mortality Rates - Teachers	PUB-2010 Teachers Headcount-Weighted Disabled Mortality Table, base year 2010, projected with generational mortality using Scale MP-2020.

## SECTION 2 - NOTES TO THE FINANCIAL STATEMENTS

### Exhibit 2.2 - Net OPEB Liability

#### Long-Term Expected Rate of Return

The long-term expected rate of return on OPEB plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of OPEB plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage provided in the investment policy statement and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the target asset allocation as of June 30, 2021 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rates of Return <sup>1</sup>
Global Equity	39%	4.38%
Core Fixed Income	15%	0.05%
Value Added Fixed Income	8%	4.00%
Private Equity	13%	8.00%
Real Estate	10%	3.80%
Timberland	4%	4.40%
Portfolio Completion Strategies	11%	3.00%
Overlay	0%	0.00%
Total	100%	

<sup>1</sup> provided by the Pension Reserves Investment Management Board.

#### Discount Rate

The discount rate used to measure the total OPEB liability was 2.16%. The projection of cash flows used to determine the discount rate assumed that contributions from the City will be made in accordance with the plan's funding policy. Based on those assumptions, the OPEB plan's fiduciary net position was projected to be insufficient to make all projected benefit payments of current plan members. Therefore the 2.16% municipal bond rate was applied to all periods to determine the total OPEB liability.

## SECTION 2 - NOTES TO THE FINANCIAL STATEMENTS

### Exhibit 2.2 - Net OPEB Liability

#### Sensitivity of the Net OPEB Liability to Changes in the Discount Rate

The following presents the net OPEB liability calculated using the current discount rate of 2.16 percent, as well as what the net OPEB liability would be if it were calculated using a discount rate 1-percentage point lower (1.16 percent) or 1-percentage point higher (3.16 percent) than the current rate:

	<b>1% Decrease (1.16%)</b>	<b>Assumed Discount Rate (2.16%)</b>	<b>1% Increase (3.16%)</b>
Total OPEB Liability	\$ 1,854,635,815	\$1,533,889,120	\$ 1,286,720,418
Fiduciary Net Position	(25,774,748)	(25,774,748)	(25,774,748)
Net OPEB Liability	\$ 1,828,861,067	\$1,508,114,372	\$ 1,260,945,670

#### Sensitivity of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rates

The following presents the net OPEB liability calculated using the current healthcare cost trend rates as well as what the net OPEB liability would be if it were calculated using healthcare cost trend rates that are 1-percentage point lower (6% year 1 decreasing to 3%) or 1-percentage point higher (8% year 1 decreasing to 5%) than the current healthcare cost trend rates:

	<b>1% Decrease  6% Year 1 Decreasing to 3%</b>	<b>Assumed Healthcare Cost Trend Rates 7% Year 1 Decreasing to 4%</b>	<b>1% Increase  8% Year 1 Decreasing to 5%</b>
Total OPEB Liability	\$ 1,252,210,757	\$1,533,889,120	\$ 1,912,785,066
Fiduciary Net Position	(25,774,748)	(25,774,748)	(25,774,748)
Net OPEB Liability	\$ 1,226,436,009	\$1,508,114,372	\$ 1,887,010,318

## SECTION 3 - REQUIRED SUPPLEMENTARY INFORMATION

### Exhibit 3.1 - Changes in Net OPEB Liability and Related Ratios

Fiscal Year Ended June 30	2021	2020	2019	2018	2017
<b>Total OPEB Liability</b>					
Service cost	\$ 47,108,000	\$ 38,503,704	\$ 32,551,711	\$ 31,603,603	
Interest	29,224,523	29,572,938	25,793,294	28,218,425	
Changes of benefit terms	-	-	-	-	
Differences between expected and actual experience	(31,076,275)	78,078,974	8,668,944	6,664,810	
Changes of assumptions	359,707,450	6,683,323	71,307,434	-	
Benefit payments	(33,608,471)	(24,647,288)	(22,388,653)	(23,376,480)	
<b>Net change in total OPEB liability</b>	<b>\$ 371,355,227</b>	<b>\$ 128,191,651</b>	<b>\$115,932,730</b>	<b>\$ 43,110,358</b>	
<b>Total OPEB liability--beginning*</b>	<b>\$1,162,533,893</b>	<b>\$ 918,642,242</b>	<b>\$802,709,512</b>	<b>\$759,599,154</b>	
<b>Total OPEB liability--ending (a)</b>	<b>\$1,533,889,120</b>	<b>\$1,046,833,893</b>	<b>\$918,642,242</b>	<b>\$802,709,512</b>	
<b>Plan Fiduciary Net Position</b>					
Contributions--employer	\$ 37,377,598	\$ 44,473,891	\$ 22,388,653	\$ 23,376,480	
Net investment income	1,499,997	679,021	-	-	
Benefit payments	(33,608,471)	(24,647,288)	(22,388,653)	(23,376,480)	
Administrative expenses	-	-	-	-	
Other	-	-	-	-	
<b>Net change in plan fiduciary net position</b>	<b>\$ 5,269,124</b>	<b>\$ 20,505,624</b>	<b>\$ -</b>	<b>\$ -</b>	
<b>Plan fiduciary net position--beginning</b>	<b>\$ 20,505,624</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	
<b>Plan fiduciary net position--ending (b)</b>	<b>\$ 25,774,748</b>	<b>\$ 20,505,624</b>	<b>\$ -</b>	<b>\$ -</b>	
<b>Net OPEB liability--ending (a) -- (b)</b>	<b>\$1,508,114,372</b>	<b>\$1,026,328,269</b>	<b>\$918,642,242</b>	<b>\$802,709,512</b>	
Plan fiduciary net position as a percentage of the total OPEB liability	1.68%	1.96%	0.00%	0.00%	
Covered payroll	\$ 364,301,765	\$ 384,459,031	\$360,955,133	\$350,441,877	
Net OPEB liability as a percentage of covered payroll	413.97%	266.95%	254.50%	229.06%	
<b>Discount Rate</b>	<b>2.16%</b>	<b>2.45%</b>	<b>3.13%</b>	<b>3.62%</b>	

\*2021 beginning Total OPEB Liability includes an estimated adjustment of \$115,700,000 to account for covered spouses of retirees on Medicare plans that were not included in the prior valuation.

## SECTION 3 - REQUIRED SUPPLEMENTARY INFORMATION

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### Exhibit 3.1 - Changes in Net OPEB Liability and Related Ratios

#### Changes of Benefit Terms

All benefit terms are the same as those used in the prior measurement.

#### Changes of Assumptions

The discount rate changed from 2.45% as of June 30, 2020 to 2.16% as of June 30, 2021. In addition, many other assumptions were updated in this valuation, including decrements, the inflation rate, healthcare trend rates, mortality tables and mortality improvement rates, percent retiring with covered spouses, participation rates, and the claims curve development method.

## SECTION 3 - REQUIRED SUPPLEMENTARY INFORMATION

### Exhibit 3.2 - Investment Returns

Fiscal Year Ended June 30	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Annual money-weighted rate of return, net of investment expenses	6.63%	4.74%	N/A	N/A	N/A					

The money-weighted rate of return considers the changing amounts actually invested during a period and weights the amount of OPEB plan investments by the proportion of time they are available to earn a return during that period. The rate of return is then calculated by solving, through an iterative process, for the rate that equates the sum of the weighted external cash flows into and out of the OPEB plan investments to the ending fair value of OPEB plan investments.

Note: Only 5 years are presented here, beginning with the year of implementation; 10 years of information will be required.

## SECTION 3 - REQUIRED SUPPLEMENTARY INFORMATION

### Exhibit 3.2 - Investment Returns

#### Calculation of Money-Weighted Rate of Return

	Plan Investments/ Net External Cash Flows (a)	Periods Invested (b)	Period Weight (c)=(b)÷12	(d)=(a) x (1+r <sub>mw</sub> ) <sup>(c)</sup>
Beginning value - July 1, 2020	\$ 20,505,624	12	1.00	\$ 21,865,061
Monthly net external cash flows:				
July	-	11	0.92	-
August	732,050	10	0.83	772,275
September	-	9	0.75	-
October	-	8	0.67	-
November	-	7	0.58	-
December	3,076,241	6	0.50	3,176,576
January	-	5	0.42	-
February	-	4	0.33	-
March	-	3	0.25	-
April	-	2	0.17	-
May	-	1	0.08	-
June	(39,164)	0	0.00	(39,164)
Ending value - June 30, 2021				\$ 25,774,748
Money-weighted rate of return:				6.63%

## SECTION 3 - REQUIRED SUPPLEMENTARY INFORMATION

### Exhibit 3.3 - Schedule of Employer Contributions

Fiscal Year Ended June 30	2021	2020	2019	2018	2017
Actuarially determined contribution	\$ 81,767,528	Not Available	Not Available	Not Available	
Contributions in relation to the actuarially determined contribution	<u>37,377,598</u>	<u>44,473,891</u>	<u>22,388,653</u>	<u>23,376,480</u>	
Contribution deficiency (excess)	<u>\$ 44,389,930</u>	<u>Not Available</u>	<u>Not Available</u>	<u>Not Available</u>	
Covered payroll	\$ 364,301,765	\$ 384,459,031	\$ 360,955,133	\$ 350,441,877	
Contributions as a percentage of covered payroll	10.26%	11.57%	6.20%	6.67%	
Discount rate	2.45%	3.13%			
Inflation	2.20%	2.50%			

#### Notes to Schedule

#### Valuation Date

Actuarially determined contributions are determined as of July 1, one year prior to the end of the fiscal year in which contributions are reported.

#### Methods and Assumptions as of Current Measurement Date

Actuarial cost method	Entry Age Normal
Amortization method	Increasing at 3.5% over 30 years on an open amortization period for partial pre-funding.
Amortization period	30 years
Asset valuation method	Market value
Healthcare cost trend rates	7 percent for 2020, decreasing 0.4 percent per year to 5.4 percent, then grading down to an ultimate trend rate of 4 percent, utilizing the Society of Actuaries Getzen Medical Trend Model. The ultimate medical inflation rate is reached in 2075.

## SECTION 4 - EMPLOYER REPORTING AMOUNTS UNDER GASB 75

### Exhibit 4.1 - Deferred Outflows and Deferred Inflows of Resources

Deferred Outflows of Resources and Deferred Inflows of Resources arising from differences between expected and actual experience are recognized in OPEB Expense over the average expected remaining service life of all active and inactive participants.

					Balances at June 30, 2021
	Experience Losses	Experience Gains	Amounts Recognized in OPEB Expense through June 30, 2021	Deferred Outflows of Resources	Deferred Inflows of Resources
Year	(a)	(b)	(c)	(a) - (c)	(b) + (c)
2018	\$ 6,664,810	\$ -	\$ 4,845,478	\$ 1,819,332	\$ -
2019	8,668,944	-	5,776,882	2,892,062	-
2020	78,078,974	-	28,205,494	49,873,480	-
2021	-	31,076,275	(4,610,723)	-	26,465,552
Total				<u>\$ 54,584,874</u>	<u>\$ 26,465,552</u>

Deferred Outflows of Resources and Deferred Inflows of Resources arising from changes of assumptions are recognized in OPEB Expense over the average expected remaining service life of all active and inactive participants.

					Balances at June 30, 2021
	Increases in the Total OPEB Liability	Decreases in the Total OPEB Liability	Amounts Recognized in OPEB Expense through June 30, 2021	Deferred Outflows of Resources	Deferred Inflows of Resources
Year	(a)	(b)	(c)	(a) - (c)	(b) + (c)
2018	\$ -	\$ -	\$ -	\$ -	\$ -
2019	71,307,434	-	47,518,437	23,788,997	-
2020	6,683,323	-	2,414,306	4,269,017	-
2021	359,707,450	-	53,369,058	306,338,392	-
Total				<u>\$ 334,396,406</u>	<u>\$ -</u>

## SECTION 4 - EMPLOYER REPORTING AMOUNTS UNDER GASB 75

### Exhibit 4.1 - Deferred Outflows and Deferred Inflows of Resources

Deferred Outflows of Resources and Deferred Inflows of Resources arising from differences between projected and actual earnings on OPEB Plan investments are recognized in OPEB Expense over five years.

					Balances at June 30, 2021
	Investment Earnings Less Than Projected	Investment Earnings Greater Than Projected	Amounts Recognized in OPEB Expense through June 30, 2021	Deferred Outflows of Resources	Deferred Inflows of Resources
Year	(a)	(b)	(c)	(a) - (c)	(b) + (c)
2018	\$ -	\$ -	\$ -	\$ -	\$ -
2019	-	-	-	-	-
2020	-	509,999	(204,000)	-	305,999
2021	-	1,115,007	(223,001)	-	892,006
Subtotal				\$ -	\$ 1,198,005
Net				\$ -	\$ 1,198,005

Amounts reported as Deferred Outflows of Resources and Deferred Inflows of Resources will be recognized in OPEB expense as follows:

Year ended June 30		
2022	\$	82,719,710
2023	\$	73,267,147
2024	\$	63,743,233
2025	\$	56,748,133
2026	\$	48,758,335
Thereafter		36,081,165
Deferred Outflows	\$	388,981,280
Deferred Inflows	\$	27,663,557

## SECTION 4 - EMPLOYER REPORTING AMOUNTS UNDER GASB 75

### Exhibit 4.2 - OPEB Expense

The OPEB Expense and deferred outflows and inflows of resources primarily result from changes in the components of the net OPEB liability (NOL). Most changes in the NOL are included in the OPEB Expense in the period of the change, including service cost, interest on total OPEB liability, changes in benefit terms and projected earnings on the OPEB plan's investments. Other changes in the net OPEB liability are included in OPEB Expense over the current and future periods. These include the effects on the total OPEB liability of changes of economic and demographic assumptions and differences between expected and actual experience. In addition, the effect on the net OPEB liability of differences between the projected earnings on OPEB plan investments and actual experience with regard to those earnings are included in OPEB expense over the current and future periods. The OPEB Expense for the reporting period ending June 30, 2021 is presented below:

#### Fiscal Year Ended June 30, 2021

Measurement Date	6/30/2021
1. Service cost	\$ 47,108,000
2. Interest on the total OPEB liability	
a. Total OPEB liability, beginning of year	1,162,533,893
b. Service cost, beginning of year	47,108,000
c. Benefit payments	(33,608,471)
d. Interest on total OPEB liability = 2.45% times (a. + b. + .5 times c.)	29,224,523
3. Differences between expected and actual experience	12,629,022
4. Changes of benefit terms	-
5. Changes of assumptions	70,415,689
6. Projected earnings on OPEB plan investments	
a. Plan fiduciary net position, beginning of year	20,505,624
b. Contributions - Employer	37,377,598
c. Benefit payments	(33,608,471)
d. Administrative expenses and other	-
e. Total projected earnings	(384,990)
7. Differences between projected and actual earnings on OPEB plan investments	(325,001)
8. OPEB plan administrative expenses	-
9. Other changes in fiduciary net position	-
10. Total OPEB Expense	\$ 158,667,243

## SECTION 5 - SUMMARY OF PLAN PROVISIONS

**Eligibility for Postemployment Benefits** Employees of the City and their dependents are eligible for postemployment medical and life insurance based on the eligibility requirements under the Worcester and Massachusetts Teachers Retirement Systems.

**Retirement Eligibility** General employees hired before April 2, 2012: retire after attaining age 55 with 10 or more years of service or any age with 20 or more years of service

General employees hired after April 1, 2012: retire after attaining age 60 with 10 or more years of service

Public Safety employees hired before April 2, 2012: retire after attaining age 55 or any age with 20 or more years of service

Public Safety employees hired after April 1, 2012: retire after attaining age 55

**Ordinary Disability Eligibility** Any member who is unable to perform his or her duties due to a non-occupational disability and has ten or more years of creditable service.

**Accidental Disability Eligibility** Any member who is unable to perform his or her duties due to a job-related disability.

**Medical Premiums** The total monthly premiums by plan are shown below:

<b>Non-Medicare Plans - July 1, 2021</b>	<b>Individual</b>	<b>Family</b>
City of Worcester Direct	\$644.54	\$1,619.15
City of Worcester Advantage	\$796.01	\$1,976.32
BCBS Network Blue NE	\$955.77	\$2,471.00
BCBS Preferred Blue (Outside NE)	\$1,078.79	\$2,789.39
Fallon Advantage HDHP	\$577.27	\$1,433.25

<b>Medicare Plans - January 1, 2021</b>	
BCBS Medex II w/ PDP	\$332.00
THP Medicare Supplement w/ PDP	\$332.00
THP Medicare Preferred HMO	\$307.00
Fallon Medicare Plus	\$295.00
Fallon Medicare Plus Central	\$225.50

**Participant Contributions** Retired employees contribute 25% of the total medical premium.

## SECTION 5 - SUMMARY OF PLAN PROVISIONS

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<b>Continuation of Coverage to Spouse After Death of Retiree</b>	Surviving spouse may continue coverage for lifetime by paying the required medical premium.
<b>Medicare Penalty Reimbursement</b>	The City reimburses the Medicare late-enrollment penalty, if applicable, based on information provided in the retiree data. The City reimbursements totalled \$16,595 per month as of the valuation date.
<b>Dental Coverage</b>	Dental coverage is not offered to retirees.
<b>Life Insurance Coverage</b>	Retirees are eligible for a \$5,000 life insurance benefit. The total monthly cost is \$12.95. Retirees contribute \$6.48 towards the monthly premiums.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

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<b>Valuation Date</b>	July 1, 2020
<b>Disclosure Date</b>	June 30, 2021
<b>GASB 75 Reporting Date</b>	June 30, 2021
<b>Long-Term Expected Rate of Return</b>	<p>6.8%, compounded annually, net of fees.</p> <p>A long-term assumption based on capital market expectations by asset class, historical returns and professional judgment. A building block approach was used that considered the target asset allocation, expected returns by asset class and risk analysis to determine a long-term expected average annual rate of return.</p>
<b>Municipal Bond Rate</b>	2.16%, based on the Bond Buyer 20-Bond GO Index published on June 30, 2021.
<b>Discount Rate (GASB)</b>	<p>2.16%, compounded annually, for the measurement as of June 30, 2021.</p> <p>2.45%, compounded annually, for the measurement as of June 30, 2020.</p> <p>The single rate that reflects the long-term expected rate of return on OPEB plan investments to the extent that the OPEB plan's assets, which are expected to be invested using a strategy to achieve that return, are sufficient to pay benefits, and a tax-exempt, high-quality municipal bond rate to the extent that the conditions for use of the long-term expected rate of return are not met.</p>
<b>Discount Rate (ADEC)</b>	2.45%, compounded annually, for development of the Actuarially Determined Contribution (ADEC) as of June 30, 2021.
<b>Amortization Method</b>	Increasing at 3.5% over 30 years on an open amortization period for partial pre-funding.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

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### Medical Trend Rates

Year	Trend
1	7.00%
2	6.60%
3	6.20%
4	5.80%
5	5.40%
Ultimate	4.00%

Trend rates after year 5 grade down to the ultimate rate of 4 percent utilizing the Society of Actuaries Getzen Medical Trend Model. The ultimate trend rate is reached in 2075.

Health care trend assumptions begin at current levels and grade down over a period of years to a lower level equal to some real rate plus inflation. The principal components of health trend are medical inflation, deductible erosion, cost shifting, utilization, technology and catastrophic claims. The overall effect of these components are expected to decline year by year.

### Dental Trend Rates

Dental coverage is not offered to retirees.

### Inflation

2.2% per year, based on current economic data, analyses from economists and other experts, and professional judgment.

### Payroll Growth

3.5% per year.

### Participation Rates

Medical - 85% of eligible retired employees will elect to participate.

Dental - Not offered to retired employees.

Life - 50% of eligible retirees will elect to participate.

Medicare - all retired employees are assumed to enroll in Medicare at age 65.

### Dependent Status

Male spouses are assumed to be three years older and female spouses are assumed to be three years younger than the retired employee.

55% of employees are assumed to retire with a covered spouse.

For current retirees, the actual census information is used.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

### Medical Per Capita Costs

The following annual per capita costs are for the fiscal year beginning July 1, 2020 and are applicable to retirees, survivors and spouses. Annual costs for current and future retirees are based on the blended curves shown below, developed using the plan coverages elected by current retirees and survivors and premium rates currently in effect. Future years' costs are based on the first year cost adjusted with trend.

Age	Medicare-Eligible		Medicare-Ineligible	
	Male	Female	Male	Female
Under 20	\$3,793	\$4,453	\$3,793	\$4,453
20-24	2,989	4,741	2,989	4,741
25-29	3,110	6,994	3,110	6,994
30-34	3,907	8,838	3,907	8,838
35-39	4,901	9,103	4,901	9,103
40-44	6,107	9,323	6,107	9,323
45-49	7,707	10,233	7,707	10,233
50-54	10,158	12,039	10,158	12,039
55-59	13,200	13,920	13,200	13,920
60-64	16,939	16,568	16,939	16,568
65-69	2,971	2,893	21,135	19,860
70-74	3,560	3,413	25,322	23,418
75-79	4,204	3,960	29,912	27,196
80-84	4,832	4,542	34,380	31,178
85-89	5,383	5,077	39,348	35,593
90-94	5,860	5,418	39,348	35,593
95+	6,229	5,240	39,348	35,593

Age-adjusted costs were developed based on aging factors from the Society of Actuaries and Health Care Cost Institute study, "Health Care Costs-From Birth to Death," published in May 2013.

### Retiree Contributions

Annual per capita participant contributions for the fiscal year beginning July 1, 2020 are as follows:

Plan	Contribution
Non-Medicare	\$ 2,792
Medicare	953

### Actuarial Cost Method

Entry Age Normal. The costs of each employee's postemployment benefits are allocated as a level basis over the earnings of the employee between the employee's date of hire and the assumed exit ages.

### Employee Data

Employee and retiree data were compiled and submitted by the City as of June 30, 2021. We made reasonable adjustments for missing or invalid data.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

**Pre-Retirement Mortality Rates** Pre-retirement mortality rates for General and Public Safety employees are based on the RP-2014 Blue Collar Employee Mortality Table, projected with generational mortality improvement using scale MP-2017.

**Healthy Retiree Mortality Rates** Healthy retiree mortality rates for General and Public Safety employees are based on the RP-2014 Blue Collar Healthy Annuitant Mortality Table, projected with generational mortality improvement using scale MP-2017.

**Disabled Retiree Mortality Rates** Disabled retiree mortality rates for General and Public Safety employees are based on the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year, projected with generational mortality improvement using scale MP-2017.

**Turnover Rates** Turnover rates for General and Public Safety employees are as follows:

General Employees		Public Safety	
Age	Rate	Age	Rate
20	12.00%	20	2.10%
25	8.78%	25	1.88%
30	5.55%	30	1.65%
35	3.93%	35	1.11%
40	2.31%	40	0.56%
45	1.89%	45	0.28%
50	1.46%	50	0.00%
55	0.00%		

**Disability Rates** Disability rates for General and Public Safety employees are as follows:

General Employees		Public Safety	
Age	Rate	Age	Rate
25	0.03%	25	0.25%
30	0.04%	30	0.38%
35	0.07%	35	0.38%
40	0.13%	40	0.38%
45	0.18%	45	1.25%
50	0.24%	50	1.56%
55	0.30%	55	1.50%
60	0.35%	60	1.06%

55% of the General employee disabilities are job-related.

90% of the Public Safety employee disabilities are job-related.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

### Retirement Rates

Retirement rates for General and Public Safety employees are as follows:

General Employees		Public Safety	
Age	Rate	Age	Rate
50	3.00%	50	5.00%
51	1.00%	51	1.00%
52	1.00%	52	1.00%
53	1.00%	53	1.00%
54	1.00%	54	1.00%
55	2.00%	55	16.00%
56	2.00%	56	9.00%
57	3.00%	57	9.00%
58	3.00%	58	12.00%
59	3.00%	59	11.00%
60	8.00%	60	24.00%
61	7.00%	61	14.00%
62	15.00%	62	20.00%
63	11.00%	63	13.00%
64	10.00%	64	19.00%
65	36.00%	65	100.00%
66	22.00%		
67	22.00%		
68	22.00%		
69	25.00%		
70	100.00%		

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

**Pre-Retirement Mortality Rates** Pre-retirement mortality rates for Teachers are based on the PUB-2010 Teachers Headcount-Weighted Employee Mortality Table, base year 2010, projected with generational mortality using Scale MP-2020.

**Healthy Retiree Mortality Rates** Healthy retiree mortality rates for Teachers are based on the PUB-2010 Teachers Headcount-Weighted Retiree Mortality Table, base year 2010, projected with generational mortality using Scale MP-2020.

**Disabled Retiree Mortality Rates** Disabled retiree mortality rates for Teachers are based on the PUB-2010 Teachers Headcount-Weighted Disabled Mortality Table, base year 2010, projected with generational mortality using Scale MP-2020.

### Turnover Rates

Turnover rates for Teachers are as follows:

	Service					
	0		5		10+	
Age	Male	Female	Male	Female	Male	Female
20	13.0%	10.0%	5.5%	7.0%	1.5%	5.0%
30	15.0%	15.0%	5.4%	8.8%	1.5%	4.5%
40	13.3%	10.5%	5.2%	5.0%	1.7%	2.2%
50	16.2%	9.8%	7.0%	5.0%	2.3%	2.0%

### Disability Rates

Disability rates for Teachers are as follows:

Age	Rate
20	0.004%
30	0.006%
40	0.010%
50	0.050%
60	0.070%

35% of the disabilities are job-related.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

### Retirement Rates

Retirement rates for Teachers are as follows:

Age	Years of Service					
	Less than 20		20-29		30+	
	Male	Female	Male	Female	Male	Female
50	0.0%	0.0%	1.0%	1.0%	2.0%	1.5%
51	0.0%	0.0%	1.0%	1.0%	2.0%	1.5%
52	0.0%	0.0%	1.0%	1.0%	2.0%	1.5%
53	0.0%	0.0%	1.5%	1.0%	2.0%	1.5%
54	0.0%	0.0%	2.5%	1.0%	2.0%	2.0%
55	5.0%	3.0%	3.0%	3.0%	6.0%	5.0%
56	5.0%	3.0%	6.0%	5.0%	20.0%	15.0%
57	5.0%	4.0%	10.0%	8.0%	40.0%	35.0%
58	5.0%	8.0%	15.0%	10.0%	50.0%	35.0%
59	10.0%	8.0%	20.0%	15.0%	50.0%	35.0%
60	10.0%	10.0%	25.0%	20.0%	40.0%	35.0%
61	20.0%	12.0%	30.0%	25.0%	40.0%	35.0%
62	20.0%	12.0%	35.0%	30.0%	35.0%	35.0%
63	25.0%	15.0%	40.0%	30.0%	35.0%	35.0%
64	25.0%	20.0%	40.0%	30.0%	35.0%	35.0%
65	25.0%	25.0%	40.0%	40.0%	35.0%	35.0%
66	30.0%	25.0%	30.0%	30.0%	40.0%	35.0%
67	30.0%	30.0%	30.0%	30.0%	40.0%	30.0%
68	30.0%	30.0%	30.0%	30.0%	40.0%	30.0%
69	30.0%	30.0%	30.0%	30.0%	40.0%	30.0%
70	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## SECTION 7 - PLAN MEMBER INFORMATION

Exhibit 7.1 - Active Members by Age and Years of Service as of July 1, 2020

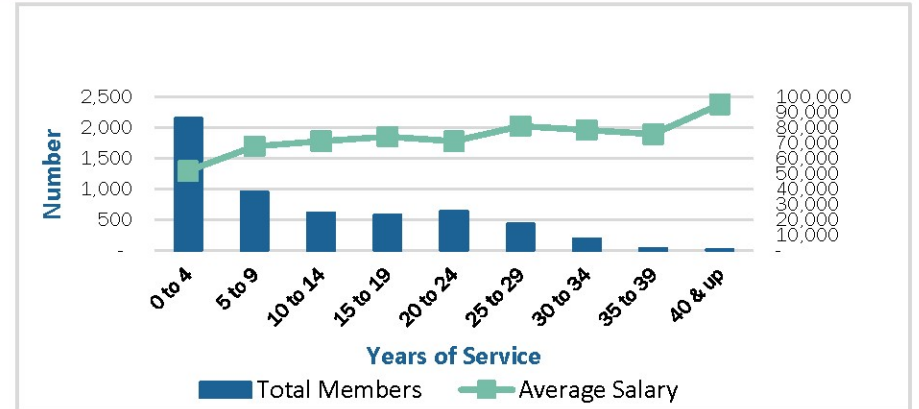
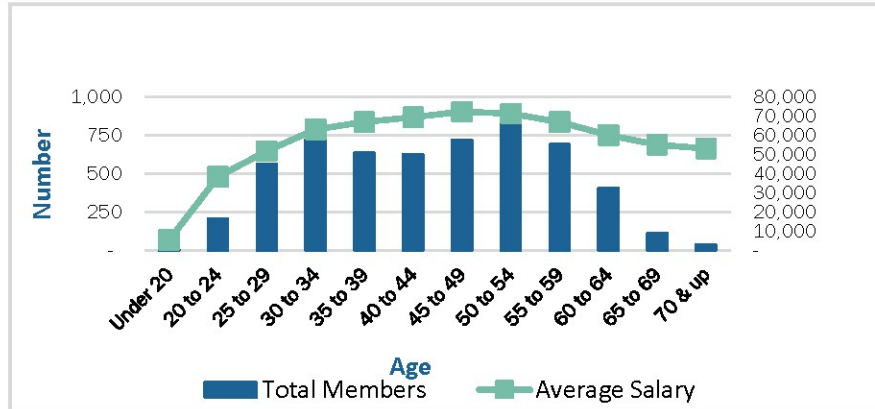
Age	Years of Service										Total	Total Salary	Average Salary
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up				
Under 20	4	-	-	-	-	-	-	-	-	4	22,499	5,625	
20 to 24	206	-	-	-	-	-	-	-	-	206	7,945,871	38,572	
25 to 29	499	65	1	-	-	-	-	-	-	565	29,281,476	51,826	
30 to 34	440	229	54	-	-	-	-	-	-	723	45,721,176	63,238	
35 to 39	262	189	146	37	2	-	-	-	-	636	42,597,296	66,977	
40 to 44	226	122	102	125	53	-	-	-	-	628	43,687,601	69,566	
45 to 49	163	125	74	128	167	62	-	-	-	719	52,081,052	72,435	
50 to 54	176	103	97	118	157	188	50	2	-	891	63,604,913	71,386	
55 to 59	111	69	80	84	132	104	99	14	-	693	46,453,327	67,032	
60 to 64	51	46	44	62	103	52	32	16	3	409	24,644,063	60,254	
65 to 69	12	6	13	21	25	20	6	2	7	112	6,190,676	55,274	
70 & up	1	6	3	3	8	6	5	1	6	39	2,071,814	53,123	
Total	2,151	960	614	578	647	432	192	35	16	5,625	364,301,765	64,765	
Total Salary	111,819,853	65,261,124	43,815,441	42,900,556	46,179,746	35,039,810	15,102,942	2,658,674	1,523,619				
Average Salary	51,985	67,980	71,361	74,222	71,375	81,111	78,661	75,962	95,226				

Average Age:

44.6

Average Service:

11.4



## SECTION 7 - PLAN MEMBER INFORMATION

Exhibit 7.2 - Retired Members, Covered Spouses and Survivors as of July 1, 2020

Age	Non-Medicare Plans					Medicare Plans					Total
	City of Worcester Direct	City of Worcester Advantage	BCBS Network Blue NE	BCBS Preferred Blue (Outside NE)	Fallon Advantage HDHP	BCBS Medex II w/ PDP	THP Medicare Supplement w/ PDP	THP Medicare Preferred HMO	Fallon Medicare Plus	Fallon Medicare Plus Central	
Under 40	0	1	0	0	0	0	0	0	0	0	1
40 to 44	1	2	0	0	0	0	0	0	0	0	3
45 to 49	0	13	2	3	1	1	0	0	0	0	20
50 to 54	5	22	8	4	0	0	0	0	0	0	39
55 to 59	17	93	43	14	2	3	1	0	0	0	173
60 to 64	32	193	101	18	4	56	26	2	6	1	439
65 to 69	5	38	25	3	0	483	152	17	24	11	758
70 to 74	6	32	46	8	0	627	124	42	5	6	896
75 to 79	1	28	24	2	0	411	139	64	7	3	679
80 to 84	3	16	7	2	0	248	96	54	7	1	434
85 to 89	1	6	8	6	0	180	57	46	2	1	307
90+	0	1	3	2	0	147	26	25	1	0	205
Total	71	445	267	62	7	2,156	621	250	52	23	3,954
Covered Spouses	33	205	121	32	3	771	258	73	21	6	1,523

Average Age: 73.6

In addition, there are 162 retirees that are not covered under any medical plan but are covered under a life insurance plan which the City contributes to.

## SECTION 8 - GLOSSARY OF TERMS

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**Actuarial Assumptions** – Assumptions as to the occurrence of future events affecting OPEB costs, such as mortality, withdrawal, disability and retirement; changes in compensation and OPEB benefits; rates of investment earnings and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; characteristics of future entrants for Open Group Actuarial Cost Methods; and other relevant items.

**Actuarial Cost Method (or Funding Method)** – A procedure for allocating the Actuarial Present Value of projected benefit payments to the current year (Service Cost) and the past (Total OPEB Liability).

**Actuarial Gain or Loss (or Experience Gain or Loss)** – A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions during the period between the valuation date and the most recent immediately preceding valuation date.

**Actuarial Present Value of Projected Benefit Payments** – The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

**Actuarially Determined Contribution** – A target or recommended contribution to a defined benefit OPEB plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

**Actuarial Valuation Date** – The date as of which an actuarial valuation is performed. This date may be up to 24 months prior to the measurement date and up to 30 months prior to the employer's reporting date.

**Deferred Inflow of Resources** – Acquisition of resources by a governmental entity that is applicable to future reporting periods. Under GASB 75, deferred inflows of resources are made up of experience gains, assumption changes reducing the Total OPEB Liability and investment gains that are recognized in future reporting periods.

**Deferred Outflow of Resources** – Consumption of resources by a governmental entity that is applicable to future reporting periods. Under GASB 75, deferred outflows of resources are made up of experience losses, assumption changes increasing the Total OPEB Liability and investment losses that are recognized in future reporting periods.

**Discount Rate** – Single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the sum of:

- (1) a long-term expected rate of return on OPEB plan investments *to the extent that the OPEB plan's assets are sufficient to pay benefits and OPEB plan assets are expected to be invested using a strategy to achieve that return* and
- (2) a tax-exempt, high-quality municipal bond rate *to the extent that the conditions for use of the long-term expected rate of return are not met*.

**Employer Future Period Contributions** – Contributions made by the employer, generally to an outside trust fund, to pay for future OPEB costs. These are costs in addition to the employer contributions made during the year to pay for ongoing premiums.

## SECTION 8 - GLOSSARY OF TERMS

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**Entry Age Normal Actuarial Cost Method** – A method under which the actuarial present value of the projected benefits of each individual in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age.

**Explicit Subsidy** – The difference between (a) the blended rates based on combined active and retired member experience and (b) actual cash contributions made by the employer.

**Fiduciary Net Position** – The fair market value of assets as of the measurement date.

**Funded Ratio** – The Actuarial Value of Assets expressed as a percentage of the Actuarial Accrued Liability.

**GASB** – Governmental Accounting Standards Board.

**Health Cost Trend Rate** – The rate of change in per capita health claims cost over time as a result of factors such as medical inflation, utilization of healthcare services, plan design, and technological developments.

**Implicit Subsidy** – In an experience-rated healthcare plan that includes both active employees and retirees with blended premium rates for all plan members, the difference between (a) the age-adjusted premiums approximating claim costs for retirees in the group and (b) the blended rates based on combined active and retired member experience.

**Long-Term Expected Rate of Return** – Long-term expected rate of return on OPEB plan investments expected to be used to finance the payment of benefits, net of investment expenses.

**Measurement Date** – The date as of which the Total OPEB Liability and Fiduciary Net Position are measured.

**Municipal Bond Rate** – Yield or index rate for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or higher.

**Net OPEB Liability** – The liability of the employer for benefits provided through an OPEB plan. It is calculated as the Total OPEB Liability less the Fiduciary Net Position.

**OPEB** – Other Postemployment Benefits including medical, dental, vision, hearing and life insurance benefits.

**Pay-As-You-Go** – A method of financing an OPEB plan under which the contributions to the plan are generally made at about the same time and in about the same amount as benefit payments and expenses becoming due.

**Present Value of Future Benefits** – The actuarial present value of the cost to finance benefits payable in the future, discounted to reflect the expected effects of the time value of money and the probabilities of payment.

**Reporting Date** – The last day of the Plan or employer's fiscal year.

## SECTION 8 - GLOSSARY OF TERMS

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**Service Cost** – The portion of the actuarial present value of projected benefit amounts that is attributed to a valuation year.

**Substantive Plan** – The terms of an OPEB plan as understood by the employer and plan members.

**Total OPEB Liability** – The portion of the actuarial present value of projected benefit amounts that is attributed to past periods of employee service.

**Unfunded Actuarial Accrued Liability** – The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.

## SECTION 9 - BREAKOUT OF RESULTS BY DEPARTMENT

Department	Airport	Parks	Fire	Police	Public Works	Water
<b>Summary of Member Data Used in Valuation</b>						
Active Members	0	50	402	506	155	89
Average Age	-	49.7	41.1	42.6	47.3	49.6
Average Service	-	12.9	12.8	15.3	12.3	14.1
Covered Payroll	-	2,895,040	36,449,640	41,876,037	8,639,144	4,932,370
Retired Members and Survivors	7	39	465	401	160	92
Average Age	71.8	72.5	71.2	72.1	73.2	72.5
Covered Spouses	2	14	222	171	55	37
Expected Benefit Payments	41,635	307,976	4,386,937	3,821,479	1,390,433	753,255
OPEB Trust contributions	3,598	32,699	474,797	518,388	108,343	68,940
Total Employer Contributions	45,233	340,675	4,861,734	4,339,867	1,498,776	822,195
<b>Beginning Net OPEB Liability - June 30, 2020</b>						
Total OPEB Liability	1,109,794	10,085,422	146,444,350	159,889,473	33,416,898	21,263,546
Fiduciary Net Position	19,575	177,894	2,583,093	2,820,248	589,431	375,062
Net OPEB Liability	1,090,219	9,907,528	143,861,257	157,069,225	32,827,467	20,888,484
Total OPEB Liability, beginning of year	1,109,794	10,085,422	146,444,350	159,889,473	33,416,898	21,263,546
Service cost	0	372,956	5,440,055	6,406,339	1,138,424	637,351
Interest	26,680	252,458	3,667,428	4,027,434	829,573	527,345
Changes of benefit terms	0	0	0	0	0	0
Differences between expected and actual experience	(267,224)	(845,465)	(10,021,954)	(17,885,001)	(1,718,052)	(2,253,261)
Changes of assumptions	228,249	4,877,829	36,594,807	47,643,274	20,850,178	6,460,229
Benefit payments	(41,635)	(307,976)	(4,386,937)	(3,821,479)	(1,390,433)	(753,255)
Net change in total OPEB liability	(53,930)	4,349,802	31,293,399	36,370,567	19,709,690	4,618,409
Total OPEB Liability, end of year	1,055,864	14,435,224	177,737,749	196,260,040	53,126,588	25,881,955
<b>Ending Net OPEB Liability - June 30, 2021</b>						
Total OPEB Liability	1,055,864	14,435,224	177,737,749	196,260,040	53,126,588	25,881,955
Fiduciary Net Position	24,605	223,606	3,246,844	3,544,939	740,891	471,438
Net OPEB Liability	1,031,259	14,211,618	174,490,905	192,715,101	52,385,697	25,410,517

## SECTION 9 - BREAKOUT OF RESULTS BY DEPARTMENT

Department	Airport	Parks	Fire	Police	Public Works	Water
<b>Total Deferred Outflows of Resources</b>						
Differences between Expected and Actual Experience	52,109	473,544	6,876,054	7,507,348	1,569,036	998,395
Changes in Assumptions	319,226	2,901,016	42,123,902	45,991,317	9,612,185	6,116,341
Differences between Expected and Actual Earnings on OPEB Plan Investments	0	0	0	0	0	0
<b>Total Deferred Outflows of Resources</b>	<b>371,335</b>	<b>3,374,560</b>	<b>48,999,957</b>	<b>53,498,665</b>	<b>11,181,220</b>	<b>7,114,736</b>
<b>Total Deferred Inflows of Resources</b>						
Differences between Expected and Actual Experience	25,265	229,599	3,333,865	3,639,948	760,749	484,073
Changes in Assumptions	0	0	0	0	0	0
Differences between Expected and Actual Earnings on OPEB Plan Investments	1,144	10,393	150,913	164,768	34,436	21,912
<b>Total Deferred Inflows of Resources</b>	<b>26,409</b>	<b>239,992</b>	<b>3,484,777</b>	<b>3,804,716</b>	<b>795,186</b>	<b>505,986</b>
<b>Total OPEB Expense (Income)</b>	<b>(177,576)</b>	<b>3,316,949</b>	<b>10,185,026</b>	<b>12,830,730</b>	<b>15,801,941</b>	<b>5,716,199</b>
<b>Sensitivity of the Net OPEB Liability to Changes in the Discount Rate</b>						
Current Discount Rate: 2.16%	1,031,259	14,211,618	174,490,905	192,715,101	52,385,697	25,410,517
1% Decrease in the Discount Rate: 1.16%	1,252,047	17,230,122	211,657,083	233,754,416	63,494,830	30,822,611
1% Increase in the Discount Rate: 3.16%	861,119	11,885,547	145,850,498	161,090,038	43,824,954	21,239,936
<b>Sensitivity of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rates</b>						
Current Trend Rates	1,031,259	14,211,618	174,490,905	192,715,101	52,385,697	25,410,517
1% Decrease in Trend Rates	837,364	11,560,781	141,851,728	156,674,551	42,629,705	20,657,640
1% Increase in Trend Rates	1,292,075	17,777,357	218,395,064	241,194,572	65,508,842	31,803,787
<b>Deferred Outflows of Resources and Deferred Inflows of Resources recognized in OPEB Expense</b>						
2022	78,967	717,625	10,420,199	11,376,882	2,377,768	1,513,000
2023	69,943	635,620	9,229,460	10,076,821	2,106,055	1,340,107
2024	60,851	552,997	8,029,733	8,766,946	1,832,292	1,165,908
2025	54,174	492,312	7,148,560	7,804,873	1,631,218	1,037,962
2026	46,546	422,997	6,142,086	6,705,993	1,401,553	891,824
Thereafter	34,444	313,018	4,545,143	4,962,435	1,037,149	659,949

## SECTION 9 - BREAKOUT OF RESULTS BY DEPARTMENT

Department	Sewer	Inspectional Services	School	Communications	Golf	Health
<b>Summary of Member Data Used in Valuation</b>						
Active Members	54	54	3,897	53	2	71
Average Age	50.6	48.9	44.8	37.8	53.0	44.8
Average Service	11.9	10.9	10.8	9.3	23.2	8.4
Covered Payroll	2,959,232	3,143,197	237,279,702	2,836,875	179,171	4,288,669
Retired Members and Survivors	41	33	2,432	19	0	71
Average Age	73.7	72.5	73.9	66.8	-	77.9
Covered Spouses	8	16	863	6	0	24
Expected Benefit Payments	239,582	248,436	19,440,942	190,769	271	463,140
OPEB Trust contributions	29,450	30,553	2,273,974	25,061	1,389	13,104
Total Employer Contributions	269,032	278,989	21,714,916	215,830	1,660	476,244
<b>Beginning Net OPEB Liability - June 30, 2020</b>						
Total OPEB Liability	9,083,530	9,423,753	701,374,569	7,729,797	428,557	4,041,874
Fiduciary Net Position	160,222	166,223	12,371,359	136,344	7,559	71,294
Net OPEB Liability	8,923,308	9,257,530	689,003,210	7,593,453	420,998	3,970,580
Total OPEB Liability, beginning of year	9,083,530	9,423,753	701,374,569	7,729,797	428,557	4,041,874
Service cost	428,963	420,282	29,147,659	354,283	11,679	544,411
Interest	230,121	238,136	17,659,642	195,723	10,782	106,691
Changes of benefit terms	0	0	0	0	0	0
Differences between expected and actual experience	(724,386)	(618,046)	6,100,722	(1,156,714)	(65,723)	6,297,882
Changes of assumptions	3,079,363	3,543,047	201,008,517	2,774,476	56,800	4,915,247
Benefit payments	(239,582)	(248,436)	(19,440,942)	(190,769)	(271)	(463,140)
Net change in total OPEB liability	2,774,479	3,334,983	234,475,598	1,976,999	13,267	11,401,091
Total OPEB Liability, end of year	11,858,009	12,758,736	935,850,167	9,706,796	441,824	15,442,965
<b>Ending Net OPEB Liability - June 30, 2021</b>						
Total OPEB Liability	11,858,009	12,758,736	935,850,167	9,706,796	441,824	15,442,965
Fiduciary Net Position	201,393	208,936	15,550,302	171,379	9,501	89,614
Net OPEB Liability	11,656,616	12,549,800	920,299,865	9,535,417	432,323	15,353,351

## SECTION 9 - BREAKOUT OF RESULTS BY DEPARTMENT

Department	Sewer	Inspectional Services	School	Communications	Golf	Health
<b>Total Deferred Outflows of Resources</b>						
Differences between Expected and Actual Experience	426,502	442,477	32,931,894	362,940	20,122	189,780
Changes in Assumptions	2,612,827	2,710,690	201,746,492	2,223,433	123,272	1,162,623
Differences between Expected and Actual Earnings on OPEB Plan Investments	0	0	0	0	0	0
<b>Total Deferred Outflows of Resources</b>	<b>3,039,329</b>	<b>3,153,167</b>	<b>234,678,386</b>	<b>2,586,373</b>	<b>143,394</b>	<b>1,352,402</b>
<b>Total Deferred Inflows of Resources</b>						
Differences between Expected and Actual Experience	206,790	214,536	15,967,074	175,972	9,756	92,015
Changes in Assumptions	0	0	0	0	0	0
Differences between Expected and Actual Earnings on OPEB Plan Investments	9,361	9,711	722,775	7,966	442	4,165
<b>Total Deferred Inflows of Resources</b>	<b>216,151</b>	<b>224,247</b>	<b>16,689,849</b>	<b>183,938</b>	<b>10,198</b>	<b>96,180</b>
	<b>1,493,529</b>	<b>2,204,489</b>	<b>79,494,428</b>	<b>1,428,538</b>	<b>(42,101)</b>	<b>10,890,628</b>
<b>Sensitivity of the Net OPEB Liability to Changes in the Discount Rate</b>						
Current Discount Rate: 2.16%	11,656,616	12,549,800	920,299,865	9,535,417	432,323	15,353,351
1% Decrease in the Discount Rate: 1.16%	14,136,207	15,217,739	1,115,992,529	11,565,174	524,711	18,582,580
1% Increase in the Discount Rate: 3.16%	9,745,833	10,493,876	769,498,306	7,971,278	361,128	12,864,894
<b>Sensitivity of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rates</b>						
Current Trend Rates	11,656,616	12,549,800	920,299,865	9,535,417	432,323	15,353,351
1% Decrease in Trend Rates	9,479,050	10,206,828	748,443,412	7,752,893	351,188	12,517,456
1% Increase in Trend Rates	14,585,740	15,701,419	1,151,470,313	11,933,156	541,461	19,168,018
<b>Deferred Outflows of Resources and Deferred Inflows of Resources recognized in OPEB Expense</b>						
2022	646,336	670,544	49,906,073	550,011	30,494	287,598
2023	572,477	593,919	44,203,197	487,160	27,009	254,734
2024	498,062	516,717	38,457,271	423,835	23,498	221,621
2025	443,405	460,013	34,237,020	377,324	20,920	197,301
2026	380,976	395,246	29,416,652	324,199	17,974	169,522
Thereafter	281,922	292,482	21,768,322	239,907	13,301	125,446

## SECTION 9 - BREAKOUT OF RESULTS BY DEPARTMENT

Department	Library	Other	Total
<b>Summary of Member Data Used in Valuation</b>			
Active Members	84	208	5,625
Average Age	46.3	46.2	44.6
Average Service	10.4	9.4	11.4
Covered Payroll	4,425,603	14,397,086	364,301,765
Retired Members and Survivors	66	290	4,116
Average Age	74.6	77.2	73.6
Covered Spouses	27	78	1,523
Expected Benefit Payments	549,894	1,773,722	33,608,471
OPEB Trust contributions	43,425	145,406	3,769,127
Total Employer Contributions	593,319	1,919,128	37,377,598
<b>Beginning Net OPEB Liability - June 30, 2020</b>			
Total OPEB Liability	13,393,965	44,848,365	1,162,533,893
Fiduciary Net Position	236,252	791,068	20,505,624
Net OPEB Liability	13,157,713	44,057,297	1,142,028,269
Total OPEB Liability, beginning of year	13,393,965	44,848,365	1,162,533,893
Service cost	619,030	1,586,568	47,108,000
Interest	336,582	1,115,928	29,224,523
Changes of benefit terms	0	0	0
Differences between expected and actual experience	(504,190)	(7,414,863)	(31,076,275)
Changes of assumptions	7,994,209	19,681,225	359,707,450
Benefit payments	(549,894)	(1,773,722)	(33,608,471)
Net change in total OPEB liability	7,895,737	13,195,136	371,355,227
Total OPEB Liability, end of year	21,289,702	58,043,501	1,533,889,120
<b>Ending Net OPEB Liability - June 30, 2021</b>			
Total OPEB Liability	21,289,702	58,043,501	1,533,889,120
Fiduciary Net Position	296,959	994,341	25,774,748
Net OPEB Liability	20,992,743	57,049,160	1,508,114,372

## SECTION 9 - BREAKOUT OF RESULTS BY DEPARTMENT

Department	Library	Other	Total
<b>Total Deferred Outflows of Resources</b>			
Differences between Expected and Actual Experience	628,892	2,105,781	54,584,874
Changes in Assumptions	3,852,700	12,900,383	334,396,406
Differences between Expected and Actual Earnings on OPEB Plan Investments	0	0	0
<b>Total Deferred Outflows of Resources</b>	<b>4,481,591</b>	<b>15,006,164</b>	<b>388,981,280</b>
<b>Total Deferred Inflows of Resources</b>			
Differences between Expected and Actual Experience	304,919	1,020,991	26,465,552
Changes in Assumptions	0	0	0
Differences between Expected and Actual Earnings on OPEB Plan Investments	13,803	46,217	1,198,005
<b>Total Deferred Inflows of Resources</b>	<b>318,722</b>	<b>1,067,208</b>	<b>27,663,557</b>
	<b>6,981,356</b>	<b>8,543,108</b>	<b>158,667,243</b>
<b>Sensitivity of the Net OPEB Liability to Changes in the Discount Rate</b>			
Current Discount Rate: 2.16%	20,992,743	57,049,160	1,508,114,372
1% Decrease in the Discount Rate: 1.16%	25,444,565	69,186,453	1,828,861,067
1% Increase in the Discount Rate: 3.16%	17,562,151	47,696,113	1,260,945,670
<b>Sensitivity of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rates</b>			
Current Trend Rates	20,992,743	57,049,160	1,508,114,372
1% Decrease in Trend Rates	17,083,172	46,390,242	1,226,436,009
1% Increase in Trend Rates	26,251,651	71,386,863	1,887,010,318
<b>Deferred Outflows of Resources and Deferred Inflows of Resources recognized in OPEB Expense</b>			
2022	953,043	3,191,170	82,719,710
2023	844,137	2,826,508	73,267,147
2024	734,408	2,459,094	63,743,233
2025	653,815	2,189,236	56,748,133
2026	561,762	1,881,005	48,758,335
Thereafter	415,704	1,391,943	36,081,165

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Under GASB 74 and GASB 75, a series of projections and calculations are used to determine the discount rate for the purpose of the measurement of the Total OPEB Liability. The discount rate is the single rate that reflects (1) the long-term expected rate of return on OPEB plan investments that are expected to be used to finance the payment of benefits, to the extent that the OPEB plan's fiduciary net position is projected to be sufficient to make projected benefit payments and OPEB plan assets are expected to be invested using a strategy to achieve that return, and (2) a yield or index rate for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or higher, to the extent that the conditions for use of the long-term expected rate of return are not met.

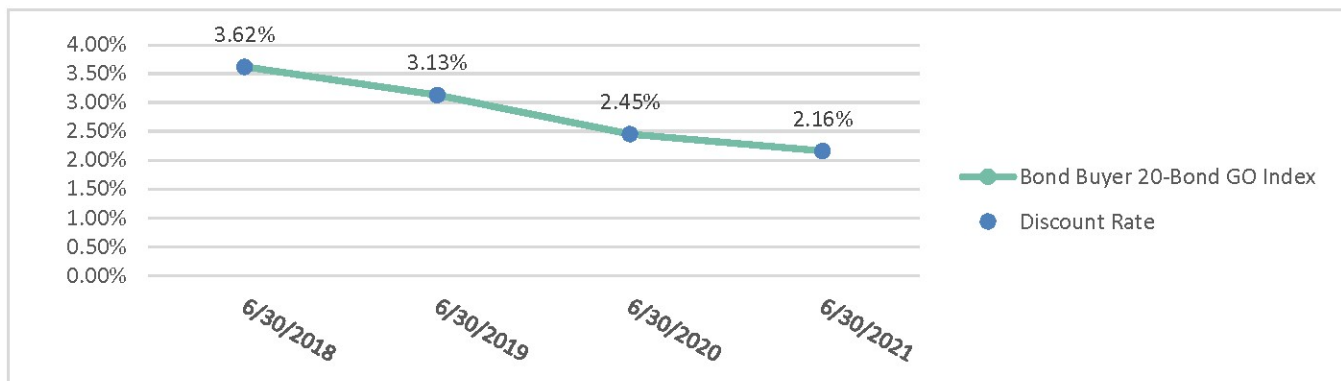
Projected cash flows into and out of the OPEB plan are assumed to be contributions to the OPEB plan, benefit payments, OPEB plan administrative expenses and OPEB plan investment earnings. These projected cash flows are used to project the OPEB plan's fiduciary net position at the beginning of each period. The OPEB plan's projected fiduciary net position at the beginning of each period is compared to the amount of benefit payments projected to occur in that period.

It is assumed that the OPEB plan's fiduciary net position is expected to always be invested using a strategy to achieve the long-term expected rate of return on OPEB plan investments.

The benefit payments that are projected to occur in a period are discounted using the long-term expected rate of return on OPEB plan investments if the amount of the OPEB plan's beginning fiduciary net position is projected to be sufficient to make the benefit payments in that period. In periods in which benefit payments are projected to be greater than the amount of the OPEB plan's fiduciary net position, they are discounted using a municipal bond rate as required by GASB 74.

For purposes of this valuation, liabilities are based on a discount rate of 2.16%, the rate that reflects a tax-exempt, high quality municipal bond rate. The municipal bond rate of 2.16% is based on the Bond Buyer 20-Bond GO Index published on June 30, 2021. The OPEB plan's fiduciary net position was projected to be insufficient to make all projected benefit payments of current plan members. Therefore the 2.16% municipal bond rate was applied to all periods to determine the total OPEB liability. Projected benefit payments are discounted to their actuarial present value using a single discount rate of 2.16%.

Below are the historical Bond Buyer 20-Bond GO Indices and the City's discount rate used in disclosures since the implementation of GASB 74 and GASB 75<sup>1</sup>:



<sup>1</sup>Bond rates prior to 2021 are based on the Fidelity GO AA 20 Year Index.

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 1: Projection of Contributions

Year	Projected Payroll			Projected Contributions			
	Payroll for Current Plan Members (a)	Payroll for Future Plan Members (b)	Total Payroll (c) = (a) + (b)	Employer Contributions (Benefit Payments) (d)	Employer Contributions (OPEB Trust) (e)	Employer Contributions Related to Payroll of Future Employees (f) = (b) * 18.49%	Portion of Employer Contributions for Current Plan Members (g) = (d) + (e) - (f)
2021	370,014,193	-	370,014,193	33,608,471	3,808,291	-	37,416,762
2022	354,368,181	28,596,509	382,964,690	35,596,712	3,881,496	5,286,095	34,192,113
2023	341,235,508	55,132,946	396,368,454	37,726,728	3,962,022	10,191,384	31,497,366
2024	328,626,263	81,615,087	410,241,350	40,305,690	4,050,600	15,086,636	29,269,654
2025	316,514,863	108,084,934	424,599,797	42,713,389	4,148,035	19,979,615	26,881,809
2026	304,995,381	134,465,409	439,460,790	45,038,064	4,255,215	24,856,074	24,437,205
2027	293,634,835	161,207,083	454,841,918	47,474,820	4,373,112	29,799,301	22,048,631
2028	281,611,667	189,149,718	470,761,385	50,235,068	4,502,799	34,964,526	19,773,341
2029	269,829,576	217,408,457	487,238,033	52,597,343	4,645,455	40,188,184	17,054,614
2030	257,915,647	246,375,717	504,291,364	55,705,728	4,802,377	45,542,813	14,965,292
2031	245,548,911	276,392,651	521,941,562	58,726,097	4,974,990	51,091,475	12,609,612
2032	232,425,516	307,784,001	540,209,517	61,282,792	5,164,865	56,894,200	9,553,457
2033	220,556,754	338,560,096	559,116,850	63,522,317	5,373,727	62,583,194	6,312,850
2034	208,799,980	369,885,960	578,685,940	65,925,224	5,603,476	68,373,813	3,154,887
2035	197,643,304	401,296,644	598,939,948	67,591,723	5,856,200	74,180,111	-
2036	186,818,738	433,084,108	619,902,846	68,833,420	6,134,196	80,056,058	-
2037	176,283,194	465,316,252	641,599,446	70,319,840	6,439,991	86,014,204	-
2038	166,246,408	497,809,019	664,055,427	71,889,381	6,776,366	92,020,526	-
2039	156,541,313	530,756,054	687,297,367	73,667,324	7,146,378	98,110,821	-
2040	147,119,501	564,233,274	711,352,775	75,323,898	7,553,392	104,299,121	-
2041	137,676,205	598,573,917	736,250,122	77,062,102	8,001,107	110,647,025	-
2042	128,395,964	633,622,912	762,018,876	78,976,353	8,493,594	117,125,869	-
2043	119,227,286	669,462,251	788,689,537	80,846,911	9,035,329	123,750,809	-
2044	110,535,697	705,757,974	816,293,671	82,746,803	9,631,238	130,460,112	-
2045	101,798,788	743,065,161	844,863,949	84,662,760	10,286,738	137,356,385	-
2046	93,335,248	781,098,939	874,434,187	86,376,648	11,007,787	144,386,969	-
2047	85,053,014	819,986,370	905,039,384	88,120,417	11,800,942	151,575,352	-
2048	77,259,935	859,455,827	936,715,762	90,045,277	12,673,412	158,871,323	-
2049	69,535,336	899,965,478	969,500,814	91,057,477	13,633,129	166,359,576	-
2050	62,193,426	941,239,916	1,003,433,342	92,471,872	14,688,818	173,989,199	-
2051	55,004,458	983,549,051	1,038,553,509	93,626,930	15,850,076	181,810,088	-
2052	47,855,480	1,027,047,402	1,074,902,882	94,529,417	17,127,459	189,850,804	-
2053	41,053,469	1,071,471,014	1,112,524,483	94,925,503	18,532,581	198,062,556	-
2054	34,395,269	1,117,067,571	1,151,462,840	95,337,742	20,078,215	206,491,128	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 1: Projection of Contributions

Year	Projected Payroll			Projected Contributions			
	Payroll for Current Plan Members (a)	Payroll for Future Plan Members (b)	Total Payroll (c) = (a) + (b)	Employer Contributions (Benefit Payments) (d)	Employer Contributions (OPEB Trust) (e)	Employer Contributions Related to Payroll of Future Employees (f) = (b) * 18.49%	Portion of Employer Contributions for Current Plan Members (g) = (d) + (e) - (f)
2055	28,489,696	1,163,274,343	1,191,764,039	94,519,430	21,778,413	215,032,499	-
2056	23,057,562	1,210,418,218	1,233,475,780	93,994,849	23,648,630	223,747,095	-
2057	18,177,393	1,258,470,039	1,276,647,432	93,118,499	25,705,869	232,629,525	-
2058	13,821,071	1,307,509,021	1,321,330,092	91,953,766	27,968,832	241,694,433	-
2059	10,365,697	1,357,210,948	1,367,576,645	90,962,944	30,458,091	250,881,887	-
2060	7,458,415	1,407,983,413	1,415,441,828	89,588,557	33,196,276	260,267,231	-
2061	5,199,091	1,459,783,201	1,464,982,292	88,347,678	36,208,279	269,842,477	-
2062	3,611,955	1,512,644,717	1,516,256,672	86,946,334	39,521,483	279,613,984	-
2063	2,362,338	1,566,963,318	1,569,325,656	85,566,637	43,166,007	289,654,835	-
2064	1,496,833	1,622,755,221	1,624,252,054	84,916,815	47,174,984	299,968,028	-
2065	997,335	1,680,103,541	1,681,100,876	84,410,796	51,584,858	310,568,926	-
2066	612,938	1,739,326,469	1,739,939,407	83,871,158	56,435,720	321,516,347	-
2067	321,376	1,800,515,910	1,800,837,286	83,489,311	61,771,667	332,827,280	-
2068	158,692	1,863,707,899	1,863,866,591	82,895,949	67,641,210	344,508,387	-
2069	63,824	1,929,038,098	1,929,101,922	81,979,251	74,097,707	356,584,743	-
2070	28,230	1,996,592,259	1,996,620,489	80,944,298	81,199,854	369,072,202	-
2071	14,251	2,066,487,955	2,066,502,206	79,643,084	89,012,215	381,992,496	-
2072	2,771	2,138,827,012	2,138,829,783	78,205,315	97,605,812	395,364,447	-
2073	457	2,213,688,368	2,213,688,825	76,578,014	107,058,769	409,202,649	-
2074	198	2,291,167,736	2,291,167,934	74,604,020	117,457,022	423,524,792	-
2075	-	2,371,358,812	2,371,358,812	72,565,196	128,895,100	438,348,198	-
2076	-	2,454,356,370	2,454,356,370	70,257,927	141,476,986	453,690,385	-
2077	-	2,540,258,843	2,540,258,843	67,721,318	155,317,061	469,569,548	-
2078	-	2,629,167,903	2,629,167,903	65,083,175	170,541,143	486,004,482	-
2079	-	2,721,188,780	2,721,188,780	62,125,167	187,287,633	503,014,639	-
2080	-	2,816,430,387	2,816,430,387	59,145,888	205,708,772	520,620,152	-
2081	-	2,915,005,451	2,915,005,451	55,983,693	225,972,025	538,841,857	-
2082	-	3,017,030,642	3,017,030,642	52,687,990	248,261,604	557,701,322	-
2083	-	3,122,626,714	3,122,626,714	49,322,079	272,780,140	577,220,868	-
2084	-	3,231,918,649	3,231,918,649	45,773,855	299,750,530	597,423,599	-
2085	-	3,345,035,802	3,345,035,802	42,194,720	329,417,959	618,333,425	-
2086	-	3,462,112,055	3,462,112,055	38,600,464	362,052,130	639,975,095	-
2087	-	3,583,285,977	3,583,285,977	35,020,301	397,949,719	662,374,223	-
2088	-	3,708,700,986	3,708,700,986	31,510,242	437,437,067	685,557,321	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 1: Projection of Contributions

Year	Projected Payroll			Projected Contributions			
	Payroll for Current Plan Members (a)	Payroll for Future Plan Members (b)	Total Payroll (c) = (a) + (b)	Employer Contributions (Benefit Payments) (d)	Employer Contributions (OPEB Trust) (e)	Employer Contributions Related to Payroll of Future Employees (f) = (b) * 18.49%	Portion of Employer Contributions for Current Plan Members (g) = (d) + (e) - (f)
						(f) = (b) * 18.49%	(g) = (d) + (e) - (f)
2089	-	3,838,505,521	3,838,505,521	28,056,452	480,873,150	709,551,827	-
2090	-	3,972,853,214	3,972,853,214	24,724,420	528,652,841	734,386,141	-
2091	-	4,111,903,076	4,111,903,076	21,560,743	581,210,501	760,089,656	-
2092	-	4,255,819,684	4,255,819,684	18,593,202	639,023,927	786,692,794	-
2093	-	4,404,773,373	4,404,773,373	15,856,307	702,618,695	814,227,041	-
2094	-	4,558,940,441	4,558,940,441	13,360,919	772,572,941	842,724,988	-
2095	-	4,718,503,356	4,718,503,356	11,122,014	849,522,611	872,220,362	-
2096	-	4,883,650,973	4,883,650,973	9,137,722	934,167,248	902,748,075	-
2097	-	5,054,578,757	5,054,578,757	7,407,407	1,027,276,348	934,344,258	-
2098	-	5,231,489,013	5,231,489,013	5,918,125	1,129,696,359	967,046,307	-
2099	-	5,414,591,128	5,414,591,128	4,655,634	1,242,358,371	1,000,892,927	-
2100	-	5,604,101,817	5,604,101,817	3,604,506	1,366,286,584	1,035,924,180	-
2101	-	5,800,245,381	5,800,245,381	2,743,689	1,502,607,618	1,072,181,526	-
2102	-	6,003,253,969	6,003,253,969	2,052,089	1,652,560,756	1,109,707,879	-
2103	-	6,213,367,858	6,213,367,858	1,506,782	1,817,509,207	1,148,547,655	-
2104	-	6,430,835,733	6,430,835,733	1,085,304	1,998,952,504	1,188,746,823	-
2105	-	6,655,914,984	6,655,914,984	766,296	2,198,540,130	1,230,352,962	-
2106	-	6,888,872,008	6,888,872,008	530,014	2,418,086,519	1,273,415,315	-
2107	-	7,129,982,528	7,129,982,528	358,770	2,659,587,547	1,317,984,851	-
2108	-	7,379,531,916	7,379,531,916	237,480	2,925,238,678	1,364,114,321	-
2109	-	7,637,815,533	7,637,815,533	153,672	3,217,454,921	1,411,858,322	-
2110	-	7,905,139,077	7,905,139,077	97,176	3,538,892,789	1,461,273,364	-
2111	-	8,181,818,945	8,181,818,945	59,989	3,892,474,444	1,512,417,931	-
2112	-	8,468,182,608	8,468,182,608	36,138	4,281,414,264	1,565,352,559	-
2113	-	8,764,568,999	8,764,568,999	21,242	4,709,248,067	1,620,139,899	-
2114	-	9,071,328,914	9,071,328,914	12,175	5,179,865,249	1,676,844,795	-
2115	-	9,388,825,426	9,388,825,426	6,808	5,697,544,150	1,735,534,363	-
2116	-	9,717,434,316	9,717,434,316	3,700	6,266,990,941	1,796,278,066	-
2117	-	10,057,544,517	10,057,544,517	1,950	6,893,382,411	1,859,147,798	-
2118	-	10,409,558,575	10,409,558,575	992	7,582,413,028	1,924,217,971	-
2119	-	10,773,893,125	10,773,893,125	483	8,340,346,707	1,991,565,600	-
2120	-	11,150,979,384	11,150,979,384	232	9,174,073,753	2,061,270,396	-
2121	-	11,541,263,662	11,541,263,662	102	10,091,173,504	2,133,414,859	-
2122	-	11,945,207,890	11,945,207,890	39	11,099,983,231	2,208,084,379	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 1: Projection of Contributions

Year	Projected Payroll			Projected Contributions			
	Payroll for Current Plan Members (a)	Payroll for Future Plan Members (b)	Total Payroll (c) = (a) + (b)	Employer Contributions (Benefit Payments) (d)	Employer Contributions (OPEB Trust) (e)	Employer Contributions Related to Payroll of Future Employees (f) = (b) * 18.49%	Portion of Employer Contributions for Current Plan Members (g) = (d) + (e) - (f)
2123	-	12,363,290,166	12,363,290,166	19	12,209,673,930	2,285,367,333	-
2124	-	12,796,005,322	12,796,005,322	7	13,430,333,699	2,365,355,189	-
2125	-	13,243,865,508	13,243,865,508	2	14,773,059,444	2,448,142,621	-
2126	-	13,707,400,801	13,707,400,801	1	16,250,057,765	2,533,827,613	-
2127	-	14,187,159,829	14,187,159,829	-	17,874,755,917	2,622,511,579	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 2: Projection of the OPEB Plan's Fiduciary Net Position

Year	Projected Beginning Fiduciary Net Position (a)	Employer Contributions for Current Plan Members (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) = (a) + (b) - (c) - (d) + (e)
2021	20,505,624	37,416,762	33,608,471	-	1,460,833	25,774,748
2022	25,774,748	34,192,113	35,596,712	-	1,704,926	26,075,075
2023	26,075,075	31,497,366	37,726,728	-	1,561,307	21,407,020
2024	21,407,020	29,269,654	40,305,690	-	1,080,452	11,451,435
2025	11,451,435	26,881,809	42,713,389	-	240,424	-
2026	-	24,437,205	45,038,064	-	-	-
2027	-	22,048,631	47,474,820	-	-	-
2028	-	19,773,341	50,235,068	-	-	-
2029	-	17,054,614	52,597,343	-	-	-
2030	-	14,965,292	55,705,728	-	-	-
2031	-	12,609,612	58,726,097	-	-	-
2032	-	9,553,457	61,282,792	-	-	-
2033	-	6,312,850	63,522,317	-	-	-
2034	-	3,154,887	65,925,224	-	-	-
2035	-	-	67,591,723	-	-	-
2036	-	-	68,833,420	-	-	-
2037	-	-	70,319,840	-	-	-
2038	-	-	71,889,381	-	-	-
2039	-	-	73,667,324	-	-	-
2040	-	-	75,323,898	-	-	-
2041	-	-	77,062,102	-	-	-
2042	-	-	78,976,353	-	-	-
2043	-	-	80,846,911	-	-	-
2044	-	-	82,746,803	-	-	-
2045	-	-	84,662,760	-	-	-
2046	-	-	86,376,648	-	-	-
2047	-	-	88,120,417	-	-	-
2048	-	-	90,045,277	-	-	-
2049	-	-	91,057,477	-	-	-
2050	-	-	92,471,872	-	-	-
2051	-	-	93,626,930	-	-	-
2052	-	-	94,529,417	-	-	-
2053	-	-	94,925,503	-	-	-
2054	-	-	95,337,742	-	-	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 2: Projection of the OPEB Plan's Fiduciary Net Position

Year	Projected Beginning Fiduciary Net Position (a)	Employer Contributions for Current Plan Members (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) = (a) + (b) - (c) - (d) + (e)
2055	-	-	94,519,430	-	-	-
2056	-	-	93,994,849	-	-	-
2057	-	-	93,118,499	-	-	-
2058	-	-	91,953,766	-	-	-
2059	-	-	90,962,944	-	-	-
2060	-	-	89,588,557	-	-	-
2061	-	-	88,347,678	-	-	-
2062	-	-	86,946,334	-	-	-
2063	-	-	85,566,637	-	-	-
2064	-	-	84,916,815	-	-	-
2065	-	-	84,410,796	-	-	-
2066	-	-	83,871,158	-	-	-
2067	-	-	83,489,311	-	-	-
2068	-	-	82,895,949	-	-	-
2069	-	-	81,979,251	-	-	-
2070	-	-	80,944,298	-	-	-
2071	-	-	79,643,084	-	-	-
2072	-	-	78,205,315	-	-	-
2073	-	-	76,578,014	-	-	-
2074	-	-	74,604,020	-	-	-
2075	-	-	72,565,196	-	-	-
2076	-	-	70,257,927	-	-	-
2077	-	-	67,721,318	-	-	-
2078	-	-	65,083,175	-	-	-
2079	-	-	62,125,167	-	-	-
2080	-	-	59,145,888	-	-	-
2081	-	-	55,983,693	-	-	-
2082	-	-	52,687,990	-	-	-
2083	-	-	49,322,079	-	-	-
2084	-	-	45,773,855	-	-	-
2085	-	-	42,194,720	-	-	-
2086	-	-	38,600,464	-	-	-
2087	-	-	35,020,301	-	-	-
2088	-	-	31,510,242	-	-	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 2: Projection of the OPEB Plan's Fiduciary Net Position

Year	Projected Beginning Fiduciary Net Position (a)	Employer Contributions for Current Plan Members (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) = (a) + (b) - (c) - (d) + (e)
2089	-	-	28,056,452	-	-	-
2090	-	-	24,724,420	-	-	-
2091	-	-	21,560,743	-	-	-
2092	-	-	18,593,202	-	-	-
2093	-	-	15,856,307	-	-	-
2094	-	-	13,360,919	-	-	-
2095	-	-	11,122,014	-	-	-
2096	-	-	9,137,722	-	-	-
2097	-	-	7,407,407	-	-	-
2098	-	-	5,918,125	-	-	-
2099	-	-	4,655,634	-	-	-
2100	-	-	3,604,506	-	-	-
2101	-	-	2,743,689	-	-	-
2102	-	-	2,052,089	-	-	-
2103	-	-	1,506,782	-	-	-
2104	-	-	1,085,304	-	-	-
2105	-	-	766,296	-	-	-
2106	-	-	530,014	-	-	-
2107	-	-	358,770	-	-	-
2108	-	-	237,480	-	-	-
2109	-	-	153,672	-	-	-
2110	-	-	97,176	-	-	-
2111	-	-	59,989	-	-	-
2112	-	-	36,138	-	-	-
2113	-	-	21,242	-	-	-
2114	-	-	12,175	-	-	-
2115	-	-	6,808	-	-	-
2116	-	-	3,700	-	-	-
2117	-	-	1,950	-	-	-
2118	-	-	992	-	-	-
2119	-	-	483	-	-	-
2120	-	-	232	-	-	-
2121	-	-	102	-	-	-
2122	-	-	39	-	-	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 2: Projection of the OPEB Plan's Fiduciary Net Position

Year	Projected Beginning Fiduciary Net Position (a)	Employer Contributions for Current Plan Members (b)	Projected Benefit Payments (c)	Projected Administrative Expenses (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) = (a) + (b) - (c) - (d) + (e)
2123	-	-	19	-	-	-
2124	-	-	7	-	-	-
2125	-	-	2	-	-	-
2126	-	-	1	-	-	-
2127	-	-	-	-	-	-

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

**Table 3: Actuarial Present Value of Projected Benefit Payments - End of Measurement Period**

Year	Projected Beginning Fiduciary Net Position (a)	Projected Benefit Payments (b)	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			"Funded" Portion of Benefit Payments (c)	"Unfunded" Portion of Benefit Payments (d)	Present Value of "Funded" Benefit Payments (e)	Present Value of "Unfunded" Benefit Payments (f)	Present Value of Benefit Payments Using the Single Discount Rate (g) = 2.16%
2022	25,774,748	35,596,712	-	35,596,712	-	35,218,385	35,218,385
2023	26,075,075	37,726,728	-	37,726,728	-	36,536,573	36,536,573
2024	21,407,020	40,305,690	-	40,305,690	-	38,208,866	38,208,866
2025	11,451,435	42,713,389	-	42,713,389	-	39,635,189	39,635,189
2026	-	45,038,064	-	45,038,064	-	40,908,705	40,908,705
2027	-	47,474,820	-	47,474,820	-	42,210,302	42,210,302
2028	-	50,235,068	-	50,235,068	-	43,720,110	43,720,110
2029	-	52,597,343	-	52,597,343	-	44,808,167	44,808,167
2030	-	55,705,728	-	55,705,728	-	46,452,847	46,452,847
2031	-	58,726,097	-	58,726,097	-	47,936,104	47,936,104
2032	-	61,282,792	-	61,282,792	-	48,965,395	48,965,395
2033	-	63,522,317	-	63,522,317	-	49,681,667	49,681,667
2034	-	65,925,224	-	65,925,224	-	50,470,843	50,470,843
2035	-	67,591,723	-	67,591,723	-	50,652,581	50,652,581
2036	-	68,833,420	-	68,833,420	-	50,492,460	50,492,460
2037	-	70,319,840	-	70,319,840	-	50,492,185	50,492,185
2038	-	71,889,381	-	71,889,381	-	50,527,773	50,527,773
2039	-	73,667,324	-	73,667,324	-	50,682,662	50,682,662
2040	-	75,323,898	-	75,323,898	-	50,726,679	50,726,679
2041	-	77,062,102	-	77,062,102	-	50,799,988	50,799,988
2042	-	78,976,353	-	78,976,353	-	50,961,118	50,961,118
2043	-	80,846,911	-	80,846,911	-	51,065,127	51,065,127
2044	-	82,746,803	-	82,746,803	-	51,160,093	51,160,093
2045	-	84,662,760	-	84,662,760	-	51,237,938	51,237,938
2046	-	86,376,648	-	86,376,648	-	51,169,913	51,169,913
2047	-	88,120,417	-	88,120,417	-	51,099,188	51,099,188
2048	-	90,045,277	-	90,045,277	-	51,111,368	51,111,368
2049	-	91,057,477	-	91,057,477	-	50,593,101	50,593,101
2050	-	92,471,872	-	92,471,872	-	50,292,642	50,292,642
2051	-	93,626,930	-	93,626,930	-	49,844,208	49,844,208
2052	-	94,529,417	-	94,529,417	-	49,260,635	49,260,635
2053	-	94,925,503	-	94,925,503	-	48,421,145	48,421,145
2054	-	95,337,742	-	95,337,742	-	47,603,197	47,603,197
2055	-	94,519,430	-	94,519,430	-	46,196,755	46,196,755

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

**Table 3: Actuarial Present Value of Projected Benefit Payments - End of Measurement Period**

Year	Projected Beginning Fiduciary Net Position (a)	Projected Benefit Payments (b)	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			"Funded" Portion of Benefit Payments (c)	"Unfunded" Portion of Benefit Payments (d)	Present Value of "Funded" Benefit Payments (e)	Present Value of "Unfunded" Benefit Payments (f)	Present Value of Benefit Payments Using the Single Discount Rate (g) = 2.16%
2056	-	93,994,849	-	93,994,849	-	44,969,033	44,969,033
2057	-	93,118,499	-	93,118,499	-	43,607,840	43,607,840
2058	-	91,953,766	-	91,953,766	-	42,151,909	42,151,909
2059	-	90,962,944	-	90,962,944	-	40,816,085	40,816,085
2060	-	89,588,557	-	89,588,557	-	39,349,435	39,349,435
2061	-	88,347,678	-	88,347,678	-	37,983,958	37,983,958
2062	-	86,946,334	-	86,946,334	-	36,591,100	36,591,100
2063	-	85,566,637	-	85,566,637	-	35,249,078	35,249,078
2064	-	84,916,815	-	84,916,815	-	34,241,763	34,241,763
2065	-	84,410,796	-	84,410,796	-	33,318,047	33,318,047
2066	-	83,871,158	-	83,871,158	-	32,405,094	32,405,094
2067	-	83,489,311	-	83,489,311	-	31,575,530	31,575,530
2068	-	82,895,949	-	82,895,949	-	30,688,255	30,688,255
2069	-	81,979,251	-	81,979,251	-	29,707,215	29,707,215
2070	-	80,944,298	-	80,944,298	-	28,711,995	28,711,995
2071	-	79,643,084	-	79,643,084	-	27,653,130	27,653,130
2072	-	78,205,315	-	78,205,315	-	26,579,794	26,579,794
2073	-	76,578,014	-	76,578,014	-	25,476,429	25,476,429
2074	-	74,604,020	-	74,604,020	-	24,294,939	24,294,939
2075	-	72,565,196	-	72,565,196	-	23,131,355	23,131,355
2076	-	70,257,927	-	70,257,927	-	21,922,352	21,922,352
2077	-	67,721,318	-	67,721,318	-	20,684,086	20,684,086
2078	-	65,083,175	-	65,083,175	-	19,458,026	19,458,026
2079	-	62,125,167	-	62,125,167	-	18,180,956	18,180,956
2080	-	59,145,888	-	59,145,888	-	16,943,098	16,943,098
2081	-	55,983,693	-	55,983,693	-	15,698,166	15,698,166
2082	-	52,687,990	-	52,687,990	-	14,461,660	14,461,660
2083	-	49,322,079	-	49,322,079	-	13,251,560	13,251,560
2084	-	45,773,855	-	45,773,855	-	12,038,219	12,038,219
2085	-	42,194,720	-	42,194,720	-	10,862,304	10,862,304
2086	-	38,600,464	-	38,600,464	-	9,726,923	9,726,923
2087	-	35,020,301	-	35,020,301	-	8,638,174	8,638,174
2088	-	31,510,242	-	31,510,242	-	7,608,043	7,608,043
2089	-	28,056,452	-	28,056,452	-	6,630,909	6,630,909

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

**Table 3: Actuarial Present Value of Projected Benefit Payments - End of Measurement Period**

Year	Projected Beginning Fiduciary Net Position (a)	Projected Benefit Payments (b)	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			"Funded" Portion of Benefit Payments (c)	"Unfunded" Portion of Benefit Payments (d)	Present Value of "Funded" Benefit Payments (e)	Present Value of "Unfunded" Benefit Payments (f)	Present Value of Benefit Payments Using the Single Discount Rate (g) = 2.16%
2090	-	24,724,420	-	24,724,420	-	5,719,862	5,719,862
2091	-	21,560,743	-	21,560,743	-	4,882,500	4,882,500
2092	-	18,593,202	-	18,593,202	-	4,121,467	4,121,467
2093	-	15,856,307	-	15,856,307	-	3,440,478	3,440,478
2094	-	13,360,919	-	13,360,919	-	2,837,738	2,837,738
2095	-	11,122,014	-	11,122,014	-	2,312,269	2,312,269
2096	-	9,137,722	-	9,137,722	-	1,859,568	1,859,568
2097	-	7,407,407	-	7,407,407	-	1,475,569	1,475,569
2098	-	5,918,125	-	5,918,125	-	1,153,975	1,153,975
2099	-	4,655,634	-	4,655,634	-	888,608	888,608
2100	-	3,604,506	-	3,604,506	-	673,436	673,436
2101	-	2,743,689	-	2,743,689	-	501,770	501,770
2102	-	2,052,089	-	2,052,089	-	367,354	367,354
2103	-	1,506,782	-	1,506,782	-	264,033	264,033
2104	-	1,085,304	-	1,085,304	-	186,157	186,157
2105	-	766,296	-	766,296	-	128,660	128,660
2106	-	530,014	-	530,014	-	87,107	87,107
2107	-	358,770	-	358,770	-	57,717	57,717
2108	-	237,480	-	237,480	-	37,396	37,396
2109	-	153,672	-	153,672	-	23,687	23,687
2110	-	97,176	-	97,176	-	14,662	14,662
2111	-	59,989	-	59,989	-	8,860	8,860
2112	-	36,138	-	36,138	-	5,224	5,224
2113	-	21,242	-	21,242	-	3,006	3,006
2114	-	12,175	-	12,175	-	1,687	1,687
2115	-	6,808	-	6,808	-	923	923
2116	-	3,700	-	3,700	-	491	491
2117	-	1,950	-	1,950	-	253	253
2118	-	992	-	992	-	126	126
2119	-	483	-	483	-	60	60
2120	-	232	-	232	-	28	28
2121	-	102	-	102	-	12	12
2122	-	39	-	39	-	5	5
2123	-	19	-	19	-	2	2

## APPENDIX A - CALCULATION OF SINGLE DISCOUNT RATE

Table 3: Actuarial Present Value of Projected Benefit Payments - End of Measurement Period

Year	Projected Beginning Fiduciary Net Position (a)	Projected Benefit Payments (b)	Projected Benefit Payments		Actuarial Present Value of Projected Benefit Payments		
			"Funded" Portion of Benefit Payments (c)	"Unfunded" Portion of Benefit Payments (d)	Present Value of "Funded" Benefit Payments (e)	Present Value of "Unfunded" Benefit Payments (f)	Present Value of Benefit Payments Using the Single Discount Rate (g) = 2.16%
2124	-	7	-	7	-	1	1
2125	-	2	-	2	-	-	-
2126	-	1	-	1	-	-	-
2127	-	-	-	-	-	-	-

## APPENDIX B - SCHEDULE OF DEFERRED OUTFLOWS OF RESOURCES AND DEFERRED INFLOWS OF RESOURCES

Year	Differences between Expected and Actual Experience	Recognition Period (Years)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2018	6,664,810	5.50	1,211,370	1,211,370	607,962	-	-	-	-	-	-	-
2019	8,668,944	4.50	1,925,628	1,925,628	966,434	-	-	-	-	-	-	-
2020	78,078,974	5.54	14,102,747	14,102,747	14,102,747	14,102,747	7,565,239	-	-	-	-	-
2021	(31,076,275)	6.74	(4,610,723)	(4,610,723)	(4,610,723)	(4,610,723)	(4,610,723)	(4,610,723)	(3,411,937)	-	-	-
Net Increase (Decrease) in OPEB Expense			12,629,022	12,629,022	11,066,420	9,492,024	2,954,516	(4,610,723)	(3,411,937)	-	-	-

Year	Changes of Assumptions	Recognition Period (Years)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2018	-	5.50	-	-	-	-	-	-	-	-	-	-
2019	71,307,434	4.50	15,839,479	15,839,479	7,949,518	-	-	-	-	-	-	-
2020	6,683,323	5.54	1,207,152	1,207,152	1,207,152	1,207,152	647,561	-	-	-	-	-
2021	359,707,450	6.74	53,369,058	53,369,058	53,369,058	53,369,058	53,369,058	53,369,058	39,493,102	-	-	-
Net Increase (Decrease) in OPEB Expense			70,415,689	70,415,689	62,525,728	54,576,210	54,016,619	53,369,058	39,493,102	-	-	-

Year	Differences between Projected and Actual Earnings on OPEB Plan Investments	Recognition Period (Years)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2018	-	5	-	-	-	-	-	-	-	-	-	-
2019	-	5	-	-	-	-	-	-	-	-	-	-
2020	(509,999)	5	(102,000)	(102,000)	(102,000)	(101,999)	-	-	-	-	-	-
2021	(1,115,007)	5	(223,001)	(223,001)	(223,001)	(223,002)	(223,002)	-	-	-	-	-
Net Increase (Decrease) in OPEB Expense			(325,001)	(325,001)	(325,001)	(325,001)	(223,002)	-	-	-	-	-