

# City of Troy Volunteer Firefighters' Incentive Plan

42nd Annual Actuarial Valuation

December 31, 2021



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May 17, 2022

Board of Trustees  
City of Troy Volunteer Firefighters' Incentive Plan  
500 West Big Beaver Road  
Troy, Michigan 48084

Dear Trustees:

The results of the December 31, 2021 Annual Actuarial Valuation of the City of Troy Volunteer Firefighters' Incentive Plan are presented in this report.

This report was prepared at the request of the Board and is intended for use by the Plan and those designated or approved by the Board. This report may be provided to parties other than the Plan only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the Plan's funding progress and to determine the employer contribution for the fiscal year ending June 30, 2024. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The contribution amount in this report is determined using the actuarial assumptions and methods disclosed in Section D of this report. This report includes risk metrics on page B-8 but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this Plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The findings in this report are based on data and other information through December 31, 2021. The valuation was based upon information furnished by the City, concerning Plan benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the City.

This report was prepared using assumptions adopted by the Board. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. Additional information about the actuarial assumptions is included in the section of this report entitled Valuation Methods and Assumptions.

This report was prepared using our proprietary valuation model and related software which, in our professional judgment, has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.


This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the City of Troy Volunteer Firefighters' Incentive Plan as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Brad Lee Armstrong, Jeffrey T. Tebeau, and Kevin T. Noelke are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this valuation and report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,  
Gabriel, Roeder, Smith & Company



Brad Lee Armstrong, ASA, EA, FCA, MAAA



Jeffrey T. Tebeau, FSA, EA, FCA, MAAA



Kevin T. Noelke, ASA, MAAA, FCA

BLA/JTT/KTN:rmn



## **SECTION A**

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### **EXECUTIVE SUMMARY**

# Executive Summary

## Funding Objective

The funding objective of the Plan is to establish and receive contributions that will remain approximately level from year-to-year and will not have to be increased for future generations of citizens.

## Contribution Amounts

The Plan is supported by City contributions and investment income from Plan assets.

Contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

- (1) Cover the actuarial present value of benefits allocated to the current year by the actuarial cost method described in Section D (the Normal Cost); and
- (2) Finance over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (Unfunded Actuarial Accrued Liability or UAAL).

The funding policy adopted by the Board is to determine the employer contribution as the employer normal cost plus the amortization of the Unfunded Actuarial Accrued Liability over a 25-year closed period (24 years remaining).

**Computed contributions** for the fiscal years ending June 30 are shown below:

	<u>2024</u>	<u>2023</u>
City's Contribution	\$ 1,689,984	\$ 1,652,713

For additional details, please see page B-1 of this report.

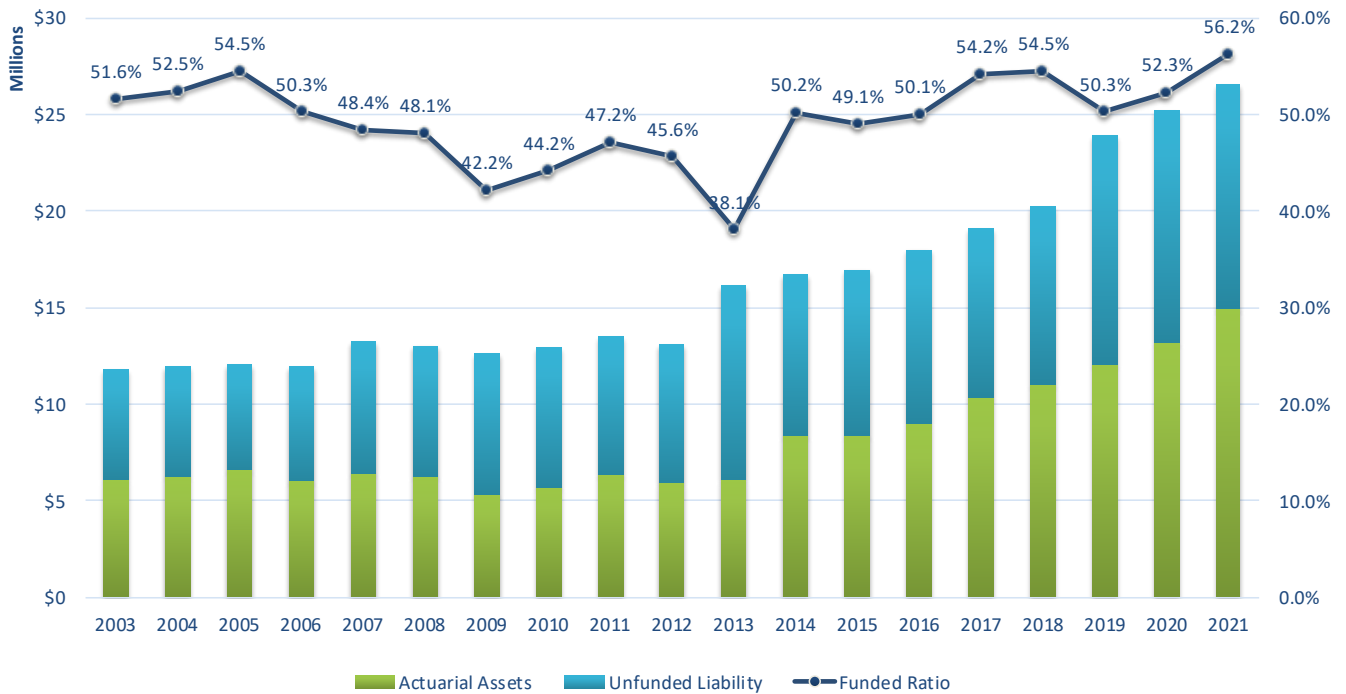
# Executive Summary

## Funding Status

Actuarial Accrued Liability and Funding Value of Assets as of the December 31 valuation dates are shown below:

	<u>2021</u>	<u>2020</u>
Actuarial Accrued Liabilities	\$ 26,604,079	\$ 25,189,584
Funding Value of Assets	<u>14,963,862</u>	<u>13,179,663</u>
Unfunded Actuarial Accrued Liabilities	11,640,217	12,009,921
Percent Funded (Assets/Liabilities)	56.2%	52.3%
<i>Rate of Return on Market Value of Assets</i>	13.5%	6.9%
<i>Rate of Return on Valuation Assets</i>	8.0%	6.9%

## Historical Funding Status



For additional details, please see Sections B and C of this report.

## **SECTION B**

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### **VALUATION RESULTS**



# City's Computed Contribution for the Fiscal Year Ending June 30, 2024

**Contribution for:**

**Normal Cost**

Age and service payments	\$ 691,123
Death-in-service payments	14,432
Total	705,555

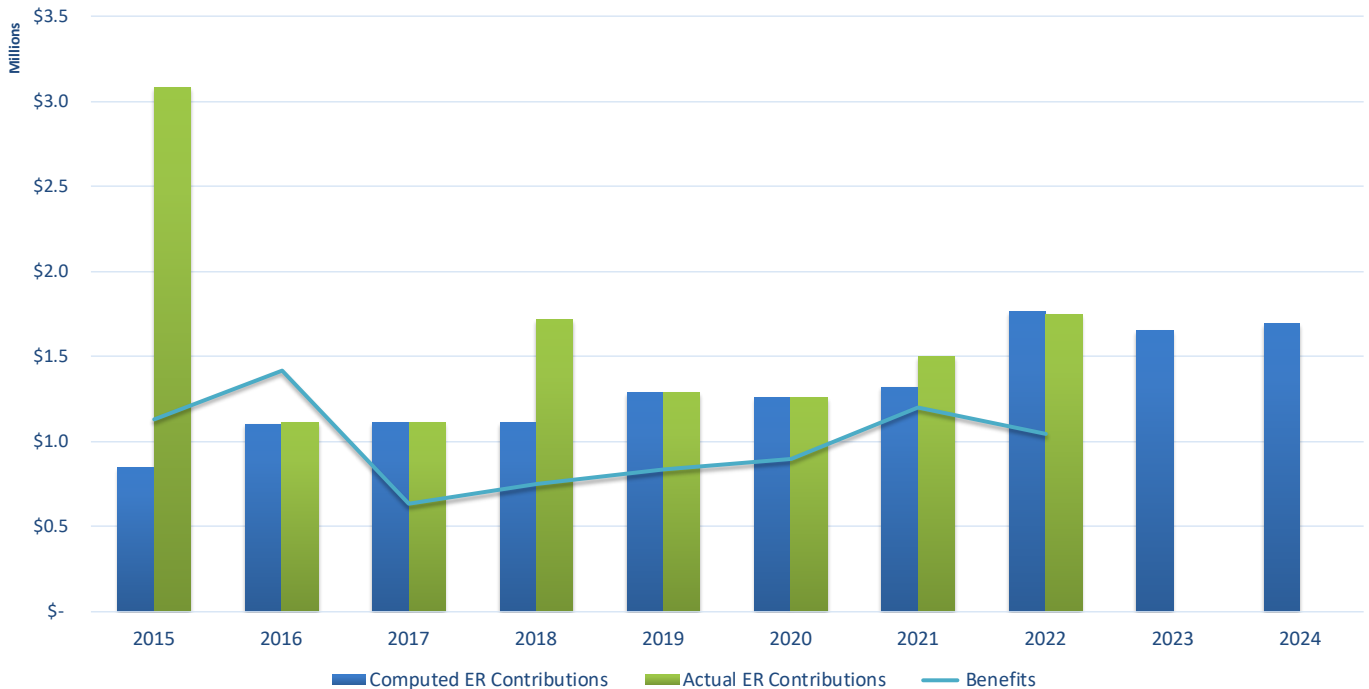
**Unfunded Accrued Liabilities**

Present recipients	0
Active participants and vested former participants*	984,429
Total	984,429

**City's Total Contribution FYE June 2024** **\$1,689,984**

\* *Financed over a closed period of 24 years. Accounts for expected contributions and the accrual of normal cost and interest between the valuation date and the beginning of the contribution period.*

### Historical Contributions and Benefits



## Development of Unfunded Actuarial Accrued Liabilities as of December 31, 2021

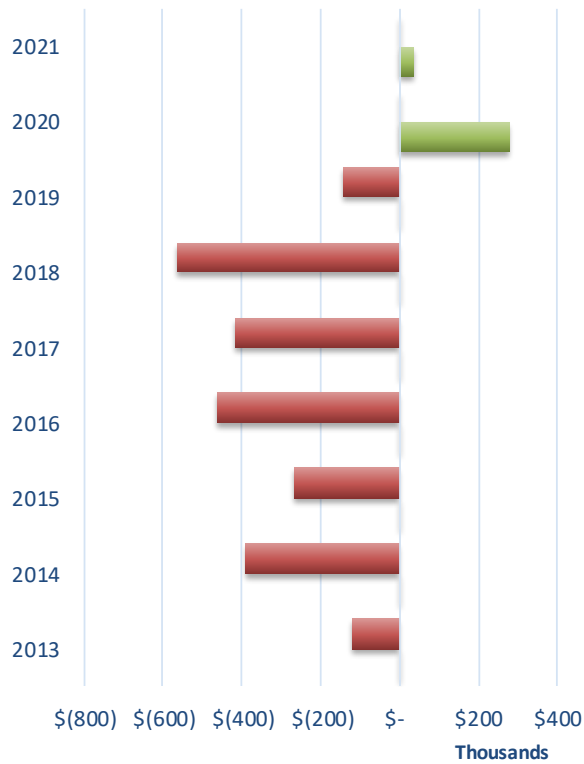
Actuarial Accrued Liabilities for:	
Active Participants*	\$13,142,350
Inactive Participants	
Currently receiving	12,431,260
Not currently receiving, but entitled to	<u>1,030,469</u>
Total Actuarial Accrued Liabilities	26,604,079
Funding Value of Assets	<u>14,963,862</u>
Unfunded Actuarial Accrued Liabilities	<b>\$11,640,217</b>
Percent Funded	56.2%

\* Includes participants on Leave of Absence.

## Derivation of Actuarial Gain/Loss Year Ended December 31, 2021

1) UAAL at start of year	\$ 12,009,921
2) Normal cost	666,454
3) Actual employer contributions	1,747,151
4) Interest accrual	745,522
5) Expected UAAL before changes	11,674,746
6) Change from benefit increases	0
7) Change from revised actuarial assumptions/methods	0
8) Expected UAAL after changes	11,674,746
9) Actual UAAL at end of year	11,640,217
10) Gain (Loss): (8) - (9)	34,529
11) Gain (Loss) as percent of actuarial accrued liabilities at start of year - \$25,189,584	0.1%

### Gain/Loss History



# Summary Statement of Plan Resources and Obligations

## Present Resources and Expected Future Resources

	<u>December 31, 2021</u>	<u>December 31, 2020</u>
A. Present valuation assets		
1. Net assets from Plan financial statements	\$ 15,969,926	\$ 13,409,300
2. Market value adjustment	<u>(1,006,064)</u>	<u>(229,637)</u>
3. Funding value of assets	14,963,862	13,179,663
B. Actuarial present value of expected future employer contributions		
1. For Normal Costs	5,993,938	5,804,722
2. For Unfunded Actuarial Accrued Liability	<u>11,640,217</u>	<u>12,009,921</u>
3. Total	17,634,155	17,814,643
C. Actuarial Present Value of Expected Future Member Contributions	0	0
D. Total present and expected future resources	<u><u>\$32,598,017</u></u>	<u><u>\$30,994,306</u></u>

## Actuarial Present Value of Expected Future Benefit Payments

A. To retirees and beneficiaries	\$ 12,431,260	\$ 11,900,183
B. To vested terminated members	1,030,469	1,253,641
C. To present active members		
1. Allocated to service rendered prior to valuation date - actuarial accrued liability	13,142,350	12,035,760
2. Allocated to service likely to be rendered after valuation date	<u>5,993,938</u>	<u>5,804,722</u>
3. Total	19,136,288	17,840,482
D. Total actuarial present value of expected future benefit payments	<u><u>\$32,598,017</u></u>	<u><u>\$30,994,306</u></u>



## Comparative Schedule

Valuation Date December 31,	Fiscal Year Ending June 30,	Vested Former Participants				Accrued Liability	Funding Value of Assets	Percent Funded	Unfunded Accrued Liability	Computed City's Contributions
		Current Payments		Deferred Payments						
		No.	Annual \$	No.	Annual \$					
2004 *	2006	64	\$ 263,767	26	\$ 82,834	\$ 11,936,051	\$ 6,261,188	52.5 %	\$ 5,674,863	\$ 774,795
2005 *	2007	67	302,477	27	92,676	12,052,272	6,571,524	54.5	5,480,748	762,121
2006 *	2008	70	346,539	25	79,601	11,931,905	6,006,600	50.3	5,925,305	788,742
2007 *	2009	73	372,705	23	75,828	13,239,695	6,412,626	48.4	6,827,069	885,365
2008 *	2010	74	403,828	24	89,238	13,037,843	6,272,677	48.1	6,765,166	864,167
2009 *	2011	79	477,636	27	110,008	12,625,243	5,325,404	42.2	7,299,839	873,691
2010	2012	77	491,385	27	110,008	12,925,065	5,709,574	44.2	7,215,491	873,354
2011	2013	79	507,267	26	105,942	13,476,184	6,356,765	47.2	7,119,419	868,074
2011	2014	79	507,267	26	105,942	13,476,184	6,356,765	47.2	7,119,419	858,472
2012	2015	80	535,321	25	102,542	13,115,192	5,983,106	45.6	7,132,086	843,872
2013 *#	2016	80	549,601	27	121,398	16,129,421	6,150,170	38.1	9,979,251	1,100,632
2014	2017	82	582,139	26	129,221	16,679,670	8,380,848	50.2	8,298,822	1,113,496
2015 #	2018	82	607,065	26	133,566	16,979,336	8,332,917	49.1	8,646,419	1,112,471
2016	2019	86	690,156	28	151,569	17,993,732	9,015,226	50.1	8,978,506	1,285,259
2017	2020	96	811,339	26	152,740	19,120,031	10,363,511	54.2	8,756,520	1,260,916
2018 #	2021	98	850,312	26	152,740	20,268,453	11,046,259	54.5	9,222,194	1,319,272
2019 *	2022	103	916,185	26	159,254	23,938,826	12,043,185	50.3	11,895,641	1,759,708
2020 #	2023	106	988,854	28	186,175	25,189,584	13,179,663	52.3	12,009,921	1,652,713
<b>2021</b>	<b>2024</b>	<b>114</b>	<b>1,036,875</b>	<b>23</b>	<b>174,871</b>	<b>26,604,079</b>	<b>14,963,862</b>	<b>56.2</b>	<b>11,640,217</b>	<b>1,689,984</b>

\* After changes in benefit provisions.

# After changes in actuarial assumptions.



## Comments

**Actuarial Experience:** Overall Plan experience was slightly more favorable than assumed during the year ending December 31, 2021 as shown in the gain/(loss) schedule on page B-3. The experience gain of approximately \$34 thousand is primarily attributable higher than expected investment returns on a Funding Value basis. The rate of return was 13.5% on a Market Value basis and 8.0% on a Funding Value basis (vs. 6.5% assumed). Due to the asset valuation method, investment gains and losses from each year are recognized over a four year period.

Gains were mostly offset by a larger increase in the per service benefit amount for those retiring in the future (see Comment C for details), lower retiree mortality than expected and more retirements and deferred vested separations than expected.

The funded percent is 56.2% using the Funding Value of Assets and 60.0% using the Market Value of Assets. Absent future losses, a higher funded percent on a Market Value basis will put downward pressure on future computed employer contributions and upward pressure on the funded ratio.

**Comment A:** There were no changes in benefit provisions for the Plan reflected in this valuation.

**Comment B:** There were no changes in actuarial assumptions or methods reflected in this valuation.

**Comment C:** This Plan has a history of increasing the fixed annual amount per year of incentive service at retirement for future retirees (not to be confused with post-retirement increases). The current provisions stipulate that the fixed benefit amount will increase annually based on the United States Consumer Price Index (CPI) for all urban consumers, but not to exceed 5% per year (the same inflation rate used by the State Tax Commission per MCL 211.34d).

The valuation assumes the fixed benefit amount will increase by 2.5% per year beginning with fiscal year 2023, consistent with the assumed rate of price inflation. To the extent that benefits do not increase by 2.5% per year, the Plan will experience liability gains. The converse is also true: benefit increases in excess of 2.5% will result in losses.

According to the Michigan Department of Treasury Bulletin 15 of 2021, the 2022 inflation rate is 3.3%. This valuation assumes the benefit amount for members retiring in the fiscal year beginning July 1, 2022, is \$857 per year of service (\$830 increased by 3.3%). Since the actual increase of 3.3% was more than the assumption of 2.5%, the Plan experienced a liability loss of approximately \$95 thousand.

**Comment D:** At the November 2020 Board meeting, the Board adopted to close the amortization period effective with the 2020 valuation. Therefore, future valuations will reflect decreasing amortization periods, which will accelerate the Plan's time to reach 100% funded, all else being equal. The full amortization of the unfunded liability is scheduled for June 30, 2047 (25 years beginning July 1, 2022).

**Comment E:** The necessary disclosures for Public Act 202 of 2017 under the Uniform Actuarial Assumptions will be included in our GASB Statement No. 67 and No. 68 report issued later this year.



## Other Observations

### General Implications of the Funding Policy on Future Expected Plan Contributions and Funded Status

Given the Plan's funding policy, if all actuarial assumptions are met (including the assumption of the Plan earning 6.50% on the actuarial value of assets), it is expected that:

- 1) The employer normal cost is sufficient to cover the cost of benefits accruing each year;
- 2) The Unfunded Actuarial Accrued Liabilities (UAAL) is expected to be fully amortized by June 30, 2047; and
- 3) The funded status of the Plan will increase gradually towards a 100% funded ratio.

The computed contribution shown on page A-1 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

### Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction;
- 2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit); and
- 3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

### Risks to Future Employer Contribution Requirements

There are ongoing risks to future employer contribution requirements to which the Plan is exposed, such as:

- Actual and Assumed Investment Rate of Return;
- Actual and Assumed Mortality Rates; and
- Amortization Policy.



## Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. **Investment Risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base. The continuing ability of the plan sponsor to make the contributions necessary to fund the plan is outside our scope of expertise and was not performed by GRS;
4. **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
5. **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.





## Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2021	2020	2019	2018	2017
Ratio of actives to retirees and beneficiaries	1.23	1.28	1.50	1.55	1.60
Ratio of retiree actuarial accrued liability to total liability	47%	47%	45%	49%	50%
Ratio of net cash flow to market value of assets	5%	2%	4%	4%	12%

### Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of actives to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

### Ratio of Retiree Actuarial Accrued Liability to Total Liability

The ratio of retiree liability to the total actuarial accrued liability gives an indication of the maturity of the plan. As the ratio increases, cash flow needs increase, and the liquidity needs of the portfolio change. A ratio on the order of 50% indicates a maturing system.

### Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

### Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

## **SECTION C**

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### **VALUATION DATA**

# Summary of Plan Provisions Valued (December 31, 2021)

## Normal Payment Conditions

**Eligibility** - Attainment of age 55 with 10 or more years of incentive service or 30 years of service regardless of age, or attainment of age 50 with 25 or more years of service.

**Annual Amount** -

Retiring	Fixed Annual Amount per Year of Incentive Service at Retirement
1/1/2005 - 12/31/2005	\$518.00
1/1/2006 - 12/31/2006	\$539.00
1/1/2007 - 12/31/2007	\$560.00
1/1/2008 - 12/31/2008	\$582.00
1/1/2009 - 6/30/2014	\$605.00
7/1/2014 - 6/30/2015	\$642.00
7/1/2015 - 6/30/2016	\$681.00
7/1/2016 - 6/30/2017	\$724.00
7/1/2017 - 6/30/2018	\$769.00
7/1/2018 - 6/30/2019	\$785.00
7/1/2019 - 6/30/2020	\$804.00
7/1/2020 - 6/30/2021	\$819.00
7/1/2021 - 6/30/2022	\$830.00
7/1/2022 - 6/30/2023	\$857.00
7/1/2023 - and after	*

\* The fixed benefit amount per service will increase annually beginning July 1, 2023 (during active employment only) based on the United States Consumer Price Index (CPI) for all urban consumers, but not to exceed 5% per year. The calculation of the increase in CPI will be the same as the calculation of the inflation rate used by the State Tax Commission as stated in MCL 211.34d.

## Vesting

**Eligibility** - 10 years of incentive service. Payments commence at age 60.

**Annual Amount** - See above.

## Payments in Event of Participant's Death

**Eligibility** - Death of an active participant after 10 years of incentive service.

**Annual Amount** – Surviving spouse receives the amount computed as above but reduced to reflect a 100% joint and survivor election.



## Summary of Plan Provisions Valued (December 31, 2021)

### Post-Retirement Payment Increases

Year	Ad-Hoc Increase
1986	10.0% increase in each current payment
1987	10.0% increase in each current payment
1988	7.5% increase in each current payment
1989	7.5% increase in each current payment
1989	Prorated increase based on difference between actual incentive service and the 25-year maximum which was provided for Ordinance No. 62
1990-1994	\$10 per month increase in each current payment
1995	\$ 5 per month increase in each current payment
1996	\$15 per month increase in each current payment
1997-2009	\$10 per month increase in each current payment
2010-2021	None

### Service Accrual

Firefighters serving as a Station Officer accrue 1.3 years of credited service for every year of service as a Station Officer.

## Active Participants - December 31, 2021 by Near Age and Years of Service

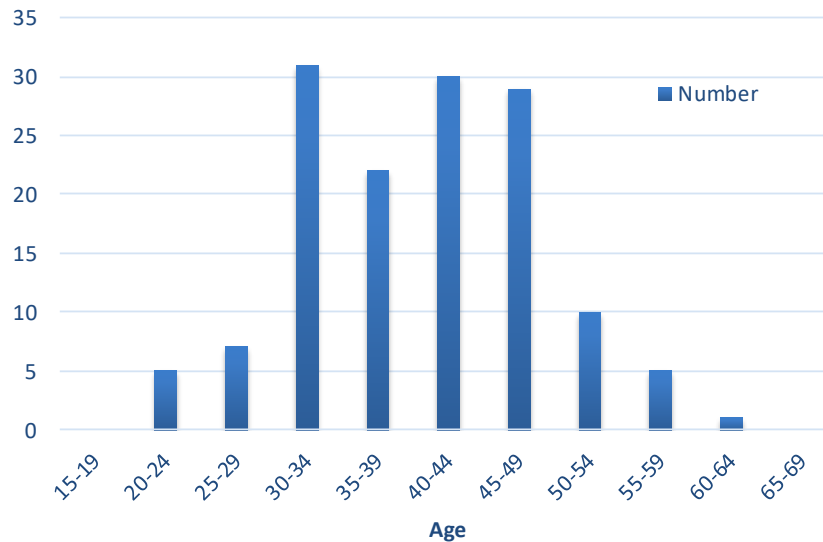
Near Age	Years of Accrued Service							Total No.
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
20-24	4	1						5
25-29	5	2						7
30-34	13	10	8					31
35-39	5	6	7	4				22
40-44	8	8	3	5	6			30
45-49	3	6	8	4	5	3		29
50-54	2	1	2	4	1			10
55-59	1	2		1	1			5
62		1						1
<b>Totals</b>	<b>41</b>	<b>37</b>	<b>28</b>	<b>18</b>	<b>13</b>	<b>3</b>	<b>0</b>	<b>140</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

### Group Averages:

Age: 40.2 years

Service: 9.8 years



# Leave of Absence Participants - December 31, 2021 by Near Age and Years of Service

Near Age	Years of Accrued Service							Total No.
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
35-39	2							2
45-49			1					1
<b>Totals</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

**Group Averages:**

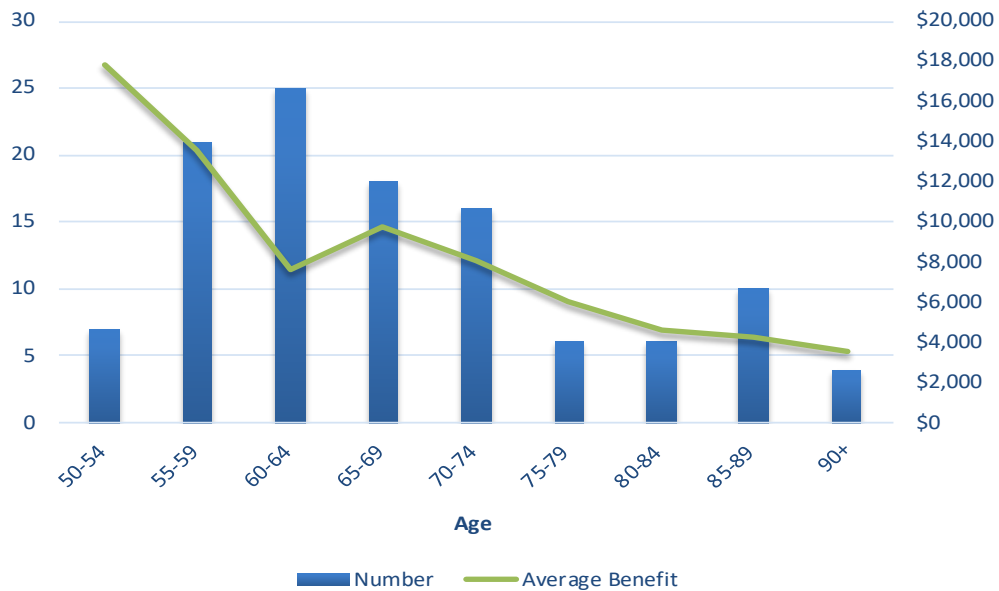
Age:            39.6 years  
Service:        6.2 years

## Inactive Participants - by Near Ages December 31, 2021

Near Age	Current Payments		Deferred Payments	
	No.	Annual Payments*	No.	Annual Payments*
30-34			2	\$ 17,472
35-39			3	24,185
40-44	1	\$ 10,178	4	37,591
45-49			4	34,877
50-54	7	124,744	4	23,391
55-59	21	285,074	4	26,088
60-64	25	190,914	2	11,267
65-69	18	176,479		
70-74	16	128,532		
75-79	6	36,165		
80-84	6	27,899		
85-89	10	42,573		
90-94	3	12,015		
95-99	1	2,302		
<b>Totals</b>	<b>114</b>	<b>\$1,036,875</b>	<b>23</b>	<b>\$174,871</b>

\* Totals may not add due to rounding.

### Average Annual Benefit Per Member



## Development of Funding Value of Assets

Year Ended December 31,	2020	2021	2022	2023	2024
A. Funding Value Beginning of Year	\$ 12,043,185	\$ 13,179,663			
B. Market Value End of Year	13,409,300	15,969,926			
C. Market Value Beginning of Year	12,254,902	13,409,300			
D. Non-Investment Net Cash Flow (ER cont.) - (Ret. Ben.+Refunds)	297,234	706,563			
E. Investment Income					
E1. Market Total: B - C - D	857,164	1,854,063			
E2. Assumed Rate	6.50%	6.50%			
E3. Amount for Immediate Recognition: (D/2 + A)*E2	792,467	879,641			
E4. Amount for Phased-In Recognition: E1 - E3	64,697	974,422			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 x E4	16,174	243,606			
F2. First Prior Year	242,899	16,174	\$ 243,606		
F3. Second Prior Year	(304,684)	242,899	16,174	\$ 243,606	
F4. Third Prior Year	92,388	(304,684)	242,899	16,175	\$ 243,604
F5. Total Recognized Investment Gain (Loss)	46,777	197,995	502,679	259,781	243,604
G. Funding Value: A + D + E3 + F5	13,179,663	14,963,862			
H. Difference Between Market & Funding Values	229,637	1,006,064			
I. Recognized Rate of Return	6.9%	8.0%			
J. Market Rate of Return	6.9%	13.5%			

The Funding Value of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed four-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. The Funding Value of Assets is **unbiased** with respect to Market Value. At any time, it may be either greater or less than Market Value. If actual and assumed rates of investment income are exactly equal for three consecutive years, the Funding Value will become equal to Market Value.





# Summary of Current Asset Information Furnished for Valuation

## Balance Sheet

Cash and Short-Term	\$ 958,536
U.S. Government/Agency Bonds	850,760
Corporate bonds	159,958
Bond mutual funds	2,491,239
Common Stocks	6,741,841
ETF - Equity	4,287,569
Real Estate	473,901
Accounts Payable/Receivable	<u>6,122</u>
Total Market Value of Plan Assets	\$ 15,969,926

## Revenues and Expenditures for Calendar Year 2021

Plan Assets at Beginning of Year	\$ 13,409,300
Plus Employer Contributions	1,747,151
Plus Investment Income	1,924,887
Less Monthly Retirement Benefits	1,040,588
Less Investment Expenses	49,813
Less Administrative Expenses	<u>21,011</u>
Plan Assets at End of Year	\$ 15,969,926

## SECTION D

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### VALUATION METHODS AND ASSUMPTIONS

## Actuarial Cost Method

**Normal cost and the allocation of benefit values** between service rendered before and after the valuation date was determined using the individual entry-age actuarial cost method having the following characteristics:

- (i) The annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and
- (ii) Each annual normal cost is a level-dollar amount.

**Financing of Unfunded Actuarial Accrued Liabilities.** Unfunded Actuarial Accrued Liabilities (the portion of total liabilities not covered by present assets or expected future normal cost contributions) were amortized by level dollar contributions over a closed period of 25 years beginning July 1, 2022 (24 years remaining). This UAAL payment reflects payments expected to be made between the valuation date and the date contributions determined by this report are scheduled to be made.

**Funding Value of Assets.** The valuation assets used for funding purposes is derived as follows: prior year valuation assets are increased by contributions and expected investment income and reduced by refunds, benefit payments and expenses. To this amount is added 25% of the difference between expected and actual investment income for each of the previous four years.

## Actuarial Assumptions Used for the Valuations

The contribution requirements and benefit values of the Plan are calculated by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost method described on the previous page.

The actuarial assumptions are adopted by the Board after consulting with the actuary. In general, non-economic actuarial assumptions were based on the experience of the plan as well as the City of Troy Employees Retirement System. The mortality tables also reflect national trends. The reasonableness of the economic assumptions was based on capital market expectations provided by various investment consultants and other sources such as the Social Security Trustees report.

The principal areas of financial risk which require assumptions about future experiences are:

- (i) Long-term rates of investment return to be generated by the assets of the Plan
- (ii) Rates of mortality among members, retirees and beneficiaries
- (iii) Rates of withdrawal of active members (without entitlement to a retirement benefit)
- (iv) Rates of disability among members
- (v) The age patterns of actual retirement

In a valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives - - - a period of time which can be as long as a century.

Actual experience of the Plan will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and considers all past differences between assumed and actual experience. The result is a continual series of adjustments to the computed contribution. From time to time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations).

## Valuation Assumptions

**The rate of investment return (net of administrative expenses)** used in making the valuation was 6.50% per annum, compounded annually. This rate was first used for the December 31, 1999 valuation.

**The rate of price inflation** was assumed to be 2.50% per year.

**The rate of increase in the benefit amount per year of service** is 2.50% per year beginning July 1, 2023. The increase for the fiscal year beginning July 1, 2022 is 3.3%, resulting in a benefit of \$857 per year of service for those retiring in fiscal year 2023.

**Mortality Tables** used for this valuation are detailed below. These tables were first used for the December 31, 2020 valuation. The margin for future mortality improvement is included in the MP-2020 mortality improvement scales.

- **Healthy Pre-Retirement:** The fully generational PubG-2010 Amount-weighted, General Employee, Male and Female tables, with a base year of 2010 and future mortality improvements projected using scale MP-2020. This assumption was used to measure the probabilities of members dying before retirement. All preretirement deaths were assumed to be non-duty related.
- **Healthy Post-Retirement:** The fully generational PubG-2010 Amount-Weighted, General Healthy Retiree, Male and Female tables, with a base year of 2010 and future mortality improvements projected using scale MP-2020. This assumption is used to measure the probabilities of each benefit payment being made after retirement.
- **Disability Retirement:** The fully generational PubG-2010 Amount-Weighted, General Disabled Retiree, Male and Female tables, with a base year of 2010 and future mortality improvements projected using scale MP-2020. This assumption was used to measure the probabilities of each benefit payment being made after disability retirements.

Sample healthy values are shown below:

Sample Ages in 2021	Healthy Inactives/Retirees			
	Value of		Future Life	
	\$1 Monthly for Life		Expectancy (Years)	
	Men	Women	Men	Women
55	154.28	160.34	30.41	33.22
60	144.02	151.28	25.70	28.37
65	131.58	139.75	21.22	23.67
70	116.53	125.37	16.99	19.15
75	99.02	108.17	13.08	14.92
80	80.03	89.01	9.63	11.13

## Valuation Assumptions

**Probabilities of retirement** for members eligible for immediate incentive payments were:

<b>Percent of Eligible Active Participants Separating within Next Year</b>			
<b>Age Based</b>		<b>Service Based</b>	
<b>Ages</b>	<b>Percent</b>	<b>Service</b>	<b>Percent</b>
48	20%	30	20%
49	20%	31	20%
50	20%	32	20%
51	20%	33	20%
52	20%	34	20%
53	20%	35	20%
54	20%	36	20%
55	20%	37	20%
56	20%	38	20%
57	20%	39	20%
58	20%	40	100%
59	15%		
60	15%		
61	15%		
62	25%		
63	100%		

**Rates of separation from active employment (before eligible for retirement)** used were:

<b>Sample Ages</b>	<b>Years of Service</b>	<b>% of Active Participants Separating within Next Year</b>
ALL	1	15.00 %
	2	10.00
	3	8.00
	4	7.00
	5	6.00
25	5 & Over	5.00
30		4.50
35		3.55
40		1.45
45		0.75
50		0.75

# Valuation Assumptions

## Pensions in an Inflationary Environment

### Value of \$1,000/Month Retirement Benefit to an Individual Who Retires at Age 55 in an Environment of 2.50% Inflation

<u>Age</u>	<u>Value</u>
55	\$1,000
56	976
57	952
58	929
59	906
60	884
65	780
70	689
75	609
80	539

The life expectancy of a 55-year-old male retiree is age 85. The life expectancy for a 55-year-old female retiree is age 88. Half of the people will outlive their life expectancy. The effects of even moderate amounts of inflation can be significant for those who live to an advanced age.

## Miscellaneous and Technical Assumptions

### December 31, 2021

**Marriage Assumption.** 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits.

**Pay Increase Timing.** Not applicable.

**Decrement Timing.** Decrements of all types are assumed to occur mid-year.

**Eligibility Testing.** Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

**Benefit Service.** Exact fractional service is used to determine the amount of benefit payable.

**Decrement Relativity.** Decrement rates are used without adjustment for multiple decrement table effects.

**Decrement Operation.** Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility.

**Normal Form of Benefit.** The assumed normal form of benefit is the straight life form.

**Optional Forms of Payment.** 6.50% interest, 100% unisex blend of the RP-2000 Mortality Table, projected to the year 2017 using Projection Scale BB, set back 0 years for men and 0 years for women. No margin for future mortality improvements is included in these tables.

**Incidence of Contributions.** Contributions are assumed to be received continuously throughout the year based upon the computed dollar amounts shown in this report. New entrant normal cost contributions are applied to the funding of new entrant benefits.

**Leave of Absence Members.** All members indicated as on leave of absence as of the valuation date are assumed to return to full employment one year after the valuation date.

**Station Officer Service.** Station Officers were assumed to earn approximately 13 years of credited service as a Station Officer at retirement, on average.

**Census Data.** The City supplied data for plan participants as of December 31, 2021. We did not audit this data, but we applied a number of validation tests to the data. No adjustments were made to the data that was provided by the City.



## SECTION E

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### **ADDITIONAL DISCLOSURE INFORMATION**

GASB Statements No. 67 and No. 68 are the accounting standards which replaced GASB Statements No. 25 and No. 27. GASB Statement No. 67 is first effective for fiscal year 2014 and GASB Statement No. 68 is first effective for fiscal year 2015. A separate GASB Statements No. 67 and No. 68 report has been issued outside of this report. This section contains historical GASB Statement No. 25 reporting information for prior fiscal years and illustrative information for fiscal year 2015 and after.

## Actuarial Accrued Liability

The Actuarial Accrued Liability is a measure intended to help users assess: (i) a pension fund's funded status on a going-concern basis; and (ii) progress being made toward accumulating the assets needed to pay benefits as due. Allocation of the actuarial present value of projected benefits between past and future service was based on service using the individual entry-age actuarial cost method. Assumptions were the same as used to determine the Plan's level dollar annual required contribution between entry-age and assumed exit age. Entry-age was established by subtracting credited service from current age on the valuation date.

The preceding actuarial cost method complies with the financial reporting standards established by the Governmental Accounting Standards Board.

The entry age Actuarial Accrued Liability was determined as part of an actuarial valuation of the Plan as of December 31, 2021. Significant actuarial assumptions used in determining the Actuarial Accrued Liability include (a) a rate of return on the investment of present and future assets of 6.50% per year compounded annually, and (b) the assumption that benefits will not increase after retirement.

Actuarial Accrued Liability	
Active members*	\$ 13,142,350
Retired members and beneficiaries currently receiving benefits	12,431,260
Vested terminated members not yet receiving benefits	<u>1,030,469</u>
Total Actuarial Accrued Liability	26,604,079
Actuarial Value of Assets (market value was \$15,969,926)	<u>14,963,862</u>
Unfunded Actuarial Accrued Liability	\$ 11,640,217

\* Including members on leave of absence.

During the year ended December 31, 2021, the Plan experienced a net change of \$1,414,495 in the Actuarial Accrued Liability. There were no changes in benefit provisions, actuarial assumptions or actuarial methods.

## Supplementary Information Schedule of Funding Progress (\$ Amounts in Thousands)

Actuarial Valuation Date December 31,	Actuarial Value of Assets# (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (b)-(a)	Funded Ratio (a)/(b)
2007 *	\$ 6,413	\$ 13,240	\$ 6,827	48.4 %
2008 *	6,273	13,038	6,765	48.1
2009 *	5,325	12,625	7,300	42.2
2010	5,710	12,925	7,215	44.2
2011	6,357	13,476	7,119	47.2
2012	5,983	13,115	7,132	45.6
2013 *&	6,150	16,129	9,979	38.1
2014	8,381	16,680	8,299	50.2
2015 &	8,333	16,979	8,646	49.1
2016	9,015	17,994	8,979	50.1
2017	10,364	19,120	8,757	54.2
2018 &	11,046	20,268	9,222	54.5
2019 *	12,043	23,939	11,896	50.3
2020 &	13,180	25,190	12,010	52.3
<b>2021</b>	<b>14,964</b>	<b>26,604</b>	<b>11,640</b>	<b>56.2</b>

# Prior to 1996, Book Value was used.

\* After changes in benefit provisions.

& After changes in actuarial assumptions.

Analysis of the dollar amounts of the actuarial value of assets, Actuarial Accrued Liability, or Actuarial Accrued Liability in isolation can be misleading. Expressing the actuarial value of assets as a percentage of the Actuarial Accrued Liability provides one indication of the plan's funded status on a going-concern basis. Analysis of this percentage over time indicates whether the plan is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan. The Unfunded Actuarial Accrued Liability and annual covered payroll are both affected by inflation.

## Supplementary Information Schedule of Employer Contributions

Fiscal Year Ending June 30,	Actuarial Valuation Date December 31,	Annual Required Contribution (In Thousands)	Percent Contributed
2008	2006	\$ 789	101 %
2009	2007	885	100
2010	2008	864	100
2011	2009	874	100
2012	2010	873	100
2013	2011	868	100
2014	2011	858	365
2015	2012	844	126
2016	2013	1,101	100
2017	2014	1,113	100
2018	2015	1,112	154
2019	2016	1,285	100
2020	2017	1,261	100
2021	2018	1,319	114
<b>2022</b>	<b>2019</b>	<b>1,760</b>	<b>99</b>

## Notes to Supplementary Information Summary of Actuarial Methods and Assumptions

Valuation Date	12/31/2021
Actuarial Cost Method	Individual Entry-Age
Amortization Method	Level dollar, closed
Remaining Amortization Period	24 years
Asset Valuation Method	4-year smoothed market
Actuarial Assumptions:	
Investment Rate of Return	6.50%
Projected Salary Increases	N/A