

## **City of Allentown Firemen's Pension Plan**

### **Actuarial Valuation Report as of January 1, 2021**

**Produced by Cheiron**

**September 2021**

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September 29, 2021

City of Allentown Pension Board  
Department of Finance, Room 227  
435 Hamilton Street  
Allentown, Pennsylvania 18101-1699

Dear Members of the Board:

At your request, we have conducted our annual actuarial valuation of the City of Allentown Firemen's Pension Plan as of January 1, 2021. The purpose of this report is to present the annual actuarial valuation of the City of Allentown Firemen's Pension Plan. This report is for the use of the City of Allentown's Pension Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements. The report does not include calculations under GASB Statements No. 67 and No. 68 which are provided in a separate report.

Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report. We also comment on the sources and reliability of both the data and the actuarial assumptions on which our findings are based. The results of this report are only applicable to the funded status of the Plan as of January 1, 2021 and will be used to determine the Plan's 2022 and 2023 Minimum Municipal Obligation (MMO). The final MMOs are dependent upon the payroll of the active population as provided by the City.

Future actuarial valuation results may differ significantly from the current actuarial valuation results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law. The results and projections provided in this report rely on future plan experience conforming to the underlying assumptions and methods outlined in this report. To the extent that the actual plan experience deviates from the underlying assumptions and methods, or there are any changes in plan provisions or applicable laws, the results would vary accordingly and projections may change materially.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared exclusively for the City of Allentown's Pension Board for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,  
Cheiron



Karen Zangara, FSA, EA, MAAA  
Principal Consulting Actuary



Brett Warren, FSA, EA, MAAA  
Consulting Actuary

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**FOREWORD**

Cheiron has performed the actuarial valuation of the City of Allentown Firemen's Pension Plan as of January 1, 2021. The purpose of this report is to:

- 1) **Measure and disclose**, as of the valuation date, the financial condition of the Plan, in compliance with Act 205;
- 2) **Indicate trends** in the financial progress of the Plan; and
- 3) **Determine an estimated Minimum Municipal Obligation (MMO)** for calendar year 2023 and to provide the actual MMOs for 2021 and 2022 in accordance with Act 44 and Act 205.

An actuarial valuation establishes and analyzes Plan assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the Plan's investment performance, as well as an analysis of actuarial liability gains and losses.

**Section I** presents a summary containing our findings and disclosing important trends experienced by the Plan in recent years as well as a risk assessment, which includes a review of potential risk and projected financial outlook associated with the plan.

**Section II** contains details on Plan assets, together with pertinent performance measurements.

**Section III** provides details on the Plan's liabilities.

**Section IV** provides the amortization requirements, the actual MMOs for 2021 and 2022, and the estimated MMO for 2023. The actual 2023 MMO amount will be finalized once the payroll for the 2023 year is provided by the City of Allentown. The 2022 and 2023 MMOs are based on the January 1, 2021 actuarial valuation results.

The appendices to this report contain supplemental information based upon assets excluding proceeds from pension obligation bonds, a summary of the Plan's membership at the valuation date, a summary of the major provisions of the Plan, and the actuarial methods and assumptions used in the valuation.

In preparing our report, we relied on information (some oral and some written) supplied by the City of Allentown ("City") and its auditors, Zelenkofske Axelrod LLC. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for the reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

The following table sets out the principal results of this year’s valuation and compares them to last year’s results.

<b>Table I-1 Summary of Principal Plan Results</b>			
<b>Valuation as of:</b>	<b>1/1/2020</b>	<b>1/1/2021</b>	<b>% Change</b>
<b><u>Participant Counts</u></b>			
Actives	121	128	5.8%
Terminated Vested and Inactive Members	1	1	0.0%
In Pay Status	196	192	-2.0%
<b>Total</b>	<b>318</b>	<b>321</b>	<b>0.9%</b>
Annual Salaries of Active Members (from prior year)*	\$ 10,187,331	\$ 10,919,071	7.2%
Average Annual Salary	84,193	85,305	1.3%
W-2 Wages for Active Members (from prior year)	11,684,319	12,011,495	2.8%
Annual Retirement Allowances for Retired Members and Beneficiaries	\$ 8,094,818	\$ 8,180,825	1.1%
Average Monthly Retirement Benefit	3,442	3,551	3.2%
<b><u>Financial Information</u></b>			
Market Value of Assets (MVA)	\$ 115,969,814	\$ 125,783,300	8.5%
Actuarial Value of Assets (AVA)	110,546,468	117,897,805	6.6%
Actuarial Liability	\$ 129,965,868	\$ 134,967,566	3.8%
Unfunded Actuarial Liability	19,419,400	17,069,761	-12.1%
Funding Ratio (MVA)	89.2%	93.2%	
Funding Ratio (AVA)	85.1%	87.4%	
<b><u>Contributions and Cash Flows</u></b>			
Contribution (actual/expected)	\$ 4,660,452	\$ 4,717,899	1.2%
Prior Year Benefit Payments	8,031,919	8,222,890	2.4%
Prior Year Administrative Expenses	78,130	77,182	-1.2%
Prior Year Total Investment Income	19,950,152	13,453,106	

\*\* Includes overtime pay up to 10% of base pay for members hired prior to January 1, 2012.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

**General Comments**

- For plans that are either not distressed or minimally distressed, the future gains and losses of the Plan are required to be amortized over the lesser of the maximum amortization periods, as outlined in Appendix D, or the average future service for the active participants in the Plan which is 10.38 years as of January 1, 2021 and, per Act 205, rounded up to 11 years. The City of Allentown was determined to be minimally distressed (86% funded on an aggregate basis for all plans) by the Pennsylvania Auditor General in 2020 and in accordance with Act 205 Section 502. Plan distress categories as outlined by Act 44 are provided below:

Funding Ratio	Distress Level
90% and above	None
70% to 89%	Minimal
50% to 69%	Moderate
Less than 50%	Severe

- The City adopted Ordinance 57 on September 16, 2015, as allowed under Section 202(b)(4) of Act 205, to change the plan’s amortization method. The amortization payments of the unfunded actuarial liability (UAL) will be the lesser of (1) the traditional amortization of individual bases or (2) the level dollar rolling amortization of the total UAL over 10 years, if the funding level of the Plan exceeds 70%. In this valuation, the lesser amount is the 10-year amortization of the UAL which is shown in Section IV of this report.
- The Board adopted a reduction in the discount rate from 7.50% to 7.40% which increased the liabilities by \$1,436,239.
- The Market Value of Assets returned 11.79% in 2020.
- The Actuarial Value of Asset (AVA) method smooths gains and losses over 5 years was applied. For the AVA, the Plan experienced a gain in 2020 of \$2.8 million, which yielded a return of 10.11% versus the prior assumed return rate of 7.50%. However, over the two-year period covering 2019 and 2020, there was an AVA gain of \$2.1 million.
- During calendar year 2020, the Firemen’s Pension Plan received \$4,660,452 in contributions and paid out \$8,300,072 in benefits and expenses. Comparing these two amounts results in a negative cash flow of \$3,639,620, which means the Plan’s benefits and expenses are not covered by contributions. Such a situation is expected for a mature plan.
- On the liability side, the Plan experienced a two-year gain totaling \$178,344 mainly due to mortality experience, active pay increases and COLA gains somewhat offset by new retirement losses.
- Overall, the Plan experienced a net gain (investment gain and liability gain) of \$2,261,882 during the two-year period covering 2019 and 2020. In addition, since the January 1, 2019 valuation there is a loss of \$282,264 over the two-year period from the timing of contributions, and the 10-year amortization of the UAL that was used to determine the MMO instead of the traditional amortization.

## SECTION I – BOARD SUMMARY

### Risk Assessment

Significant risks that may result in actual future measurements deviating from those expected by this valuation include investment risk, as well as longevity and other demographic risk. Investment risk is the potential that future investment returns will deviate from those that are expected. Longevity and other demographic risk is the potential that mortality or other demographic experience will deviate from that which is expected by the valuation assumptions.

The volatility of the measurements due to differences in the actual investment returns is examined later in this section with projections that assume rates of return other than the valuation assumption. We anticipate that for this plan the demographic assumption that presents the most risk to future actual measurements deviating from expected is the rate of salary increase, which impacts the Cost of Living Adjustment (COLA) growth for retirees, and potentially the mortality rate.

- If salary/rank pay growth is generally lower than anticipated, the plan's future financial status will be improved while if salary/rank pay is generally higher than anticipated, it will be degraded from that expected by this valuation. Salary/rank pay growth is especially a risk for the plan because of how this impacts not only liabilities for active participants, but for retirees as well because their COLA increase occurs when the pension allowance falls below half of the current salary for a police officer of the same rank based upon rank at retirement.
- If mortality rates are generally higher than anticipated, the plan's future financial status will be improved while if mortality rates are generally lower than anticipated, then it will decline from that expected by this valuation.

In the "Trends" part of this section, there are a number of historical measures shown that demonstrate the potential volatility of the Plan's actuarial measurements as a result of deviation of actual experience from assumptions has grown in recent years.

The remainder of this section analyzes past trends in the Plan's funding and presents projections under various economic outlooks.

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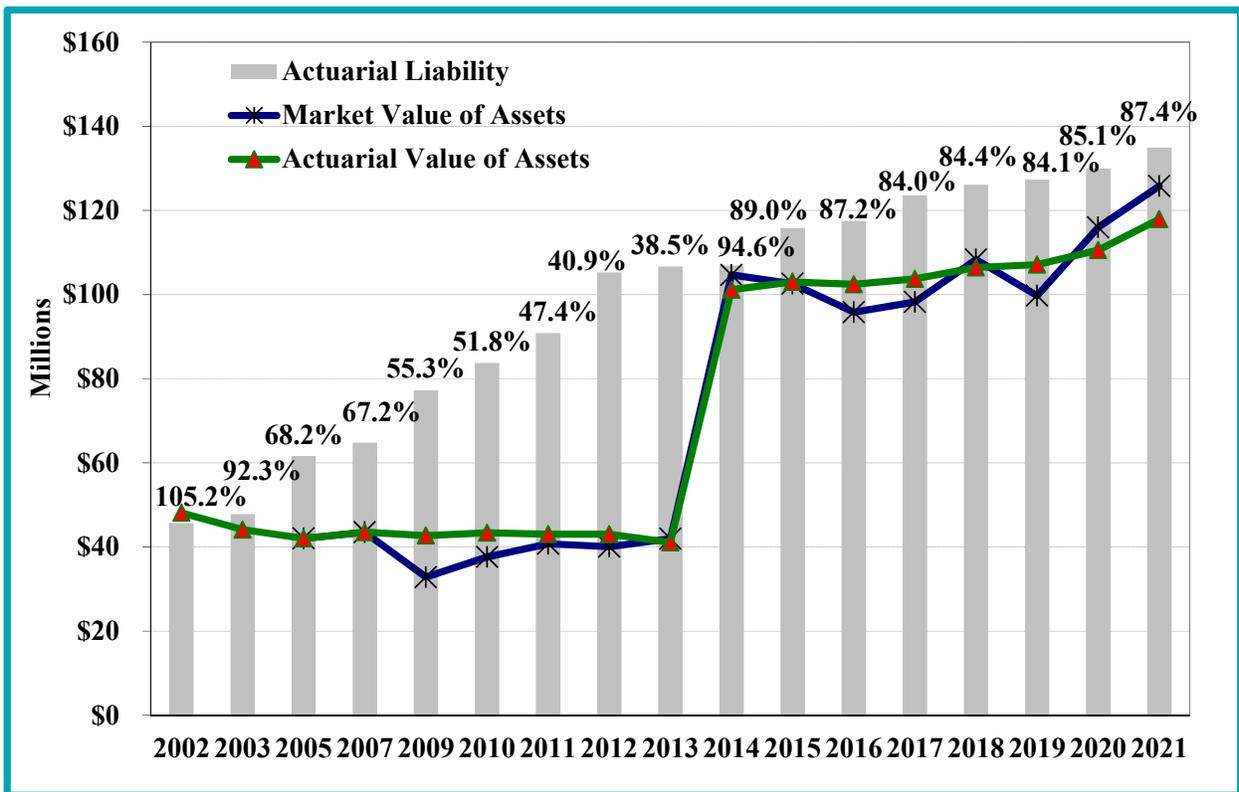
**SECTION I – BOARD SUMMARY**

**Trends**

It is important to take a step back from the latest results and view them in the context of the Plan’s recent history. Below we present a series of charts which display key factors in the valuations over the last several years.

Assets and Liabilities

The gray bars represent the Actuarial Liability mentioned in this report. The green and blue lines represent the asset values. Prior to 2007, the Actuarial Value of Assets equaled the Market Value of Assets. The funding ratios shown in the graph above each gray bar are equal to the Actuarial Value of Assets divided by the Actuarial Liability. The January 1, 2014 assets reflect the \$61.2 million Note contribution in 2013 and increased the funding ratio to 94.6%.



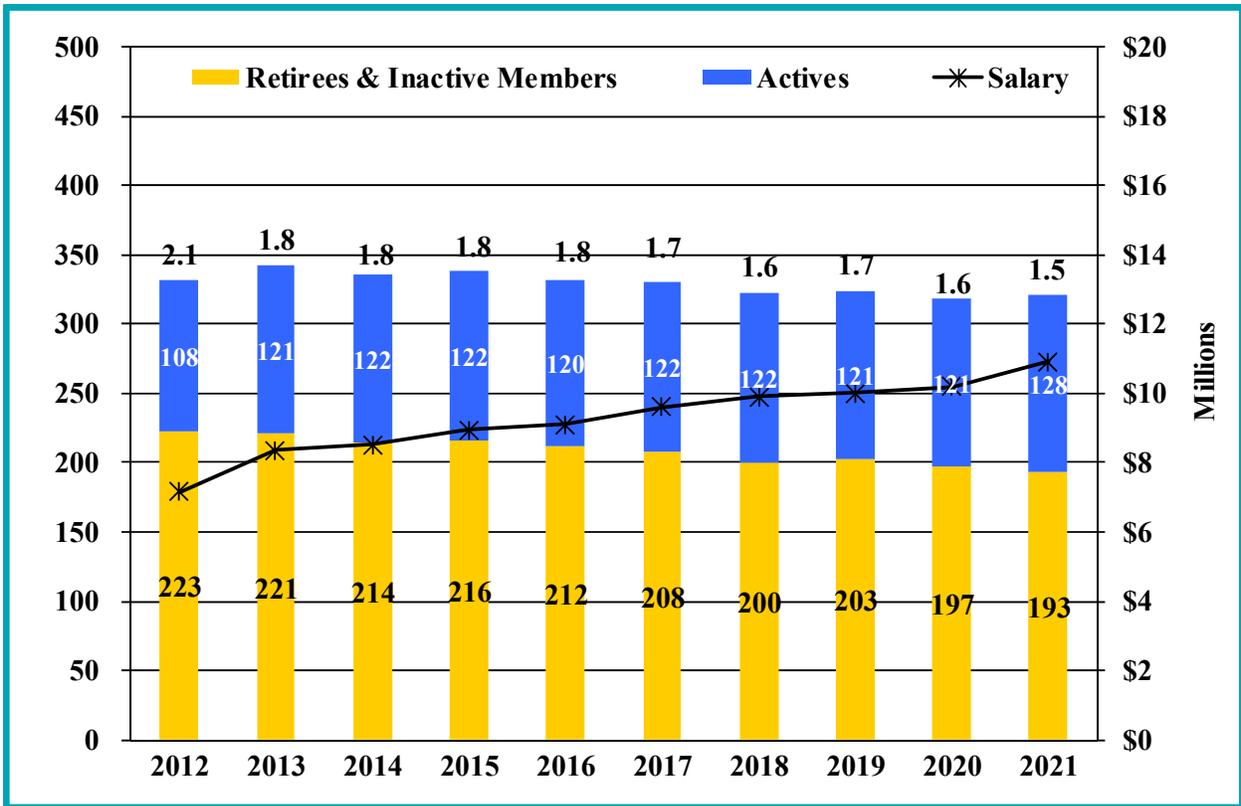
Results before 2010 are from the prior actuary. Valuations performed biennially from 2003 - 2009. The Actuarial Liability results for 2014 reflect the 2013 assumptions, in order that the 2015 results reflect all assumption changes since the prior Act 205 filing. This is required under Act 205.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

Participant Trends

Here we compare the membership counts (left-hand scale) and the total salary (right-hand scale). The ratio (at the top of each bar) is the number of inactive participants divided by the number of active participants. The amount shown is pensionable pay for the year (base pay plus overtime pay limited to 10% of the base pay). The ratio of inactive to active participants is a measure of the maturity of the plan. When this ratio is above one, the fund is more mature and potentially at a higher risk. This is because the assets backing the retiree benefits have become large relative to the contribution base, i.e. the active participant payroll. As assets grow relative to the pensionable payroll, any asset gain or loss can have a significant impact, resulting in volatile costs from year-to-year even with the application of asset smoothing methods.



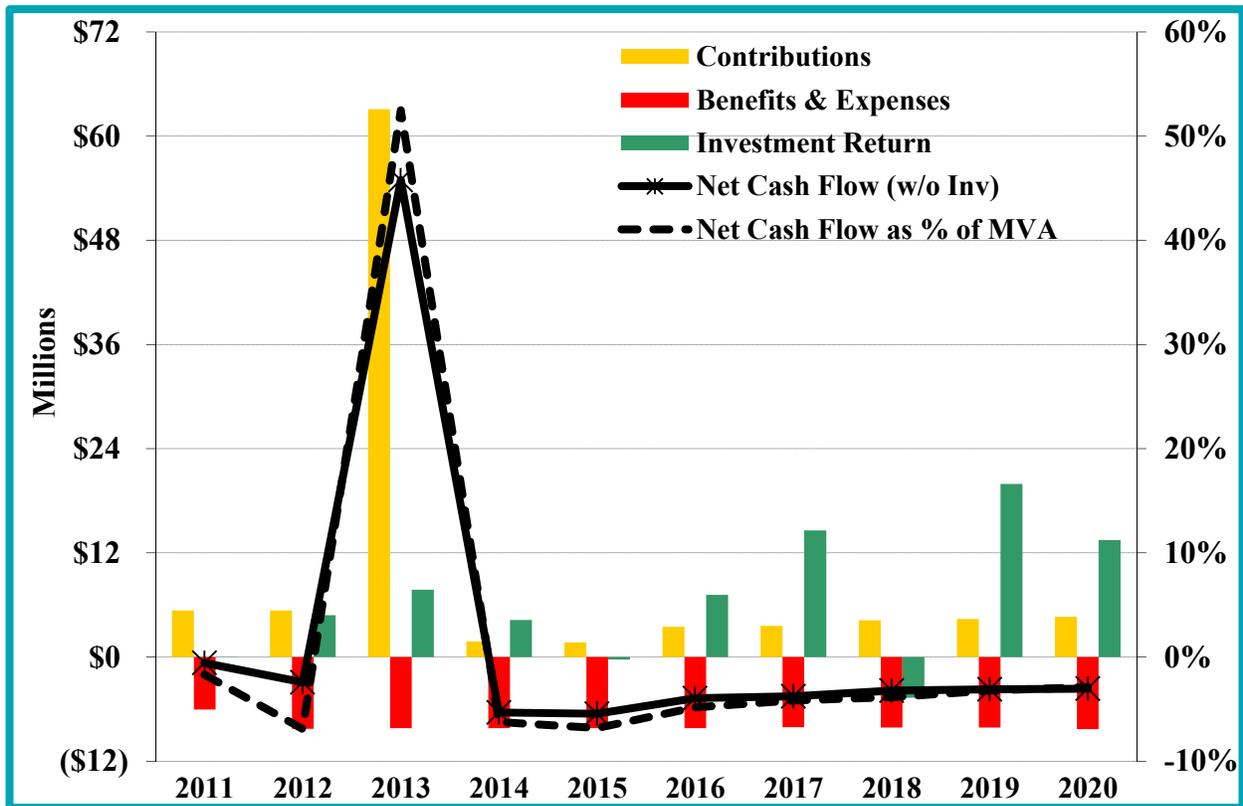
**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

Cash Flows

Plan cash flow is a critical measure, as it reflects the ability to make benefit payments without necessitating difficult investment decisions, especially during volatile markets. The laddered bond approach the Board has adopted for this plan helps to mitigate this risk. Cash flow is defined as contributions received less benefit payments and expenses.

The Plan's net cash flow (NCF) has been negative except for 2013. Due to the \$63.1 million contribution, which includes a \$61.2 million Note payment (under section 404(h) of Act 205) from the City's water and sewer lease proceeds, the plan had a substantial positive net cash flow in 2013. As anticipated, the plan experienced negative net cash flows from 2014-2020. The implication of a plan in a negative cash flow position is that return on investment must first cover the negative cash flow before the assets can increase. The NCF as a percentage of the Market Value of Assets (right vertical axis) was about 2.9% in 2020, so the net assets will not increase unless investment returns exceed 2.9%, if there are similar cash flows in 2021.



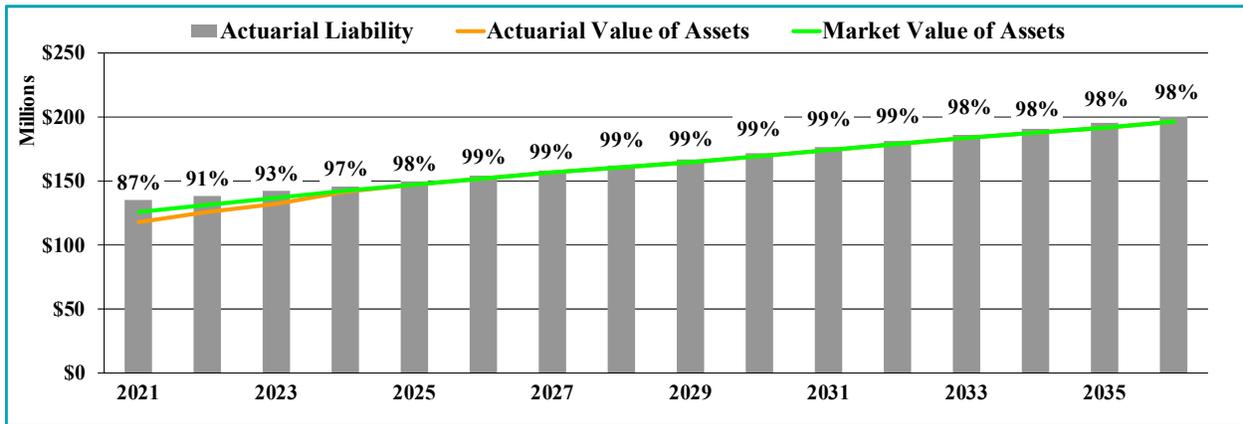
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**SECTION I – BOARD SUMMARY**

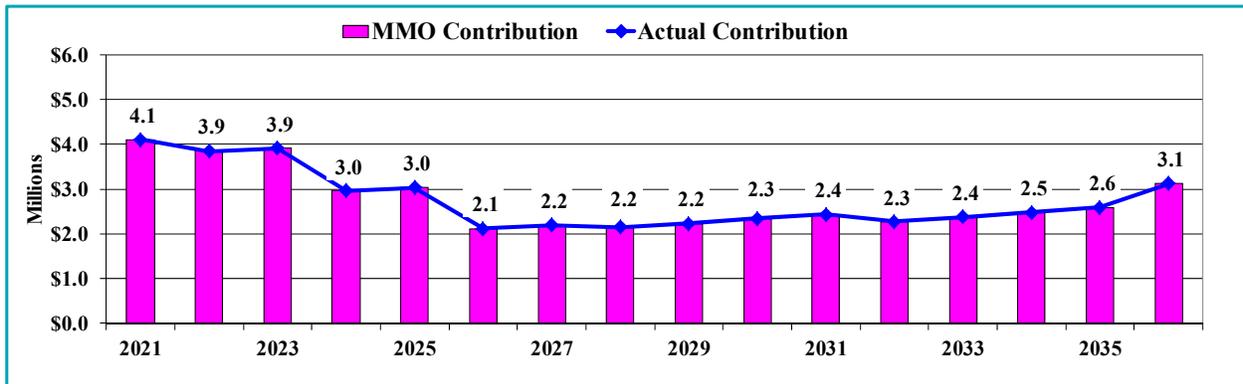
Baseline Projections - Asset Returns of 7.40% per year

We have included two charts projecting the funded ratio and Minimum Municipal Obligations for the next 15 years, assuming that the Plan’s assets earn 7.40%.

The gray bars represent the liabilities with the orange and green lines representing the asset values. The Actuarial Value of Assets and the Market Value of Assets are expected to converge over the next five years. This projection assumes all assumptions outlined in Appendix D are fully realized and that the MMO is paid in full each year. The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars increases to 98% at the end of the 15-year period. Due to the 10-year rolling amortization funding method, the funding ratio will not attain a 100% funded ratio but it will continue to approach the 100% level assuming all assumptions are met.



This next chart projects the MMO over the same period. On top of each bar is the projected MMO amount in millions of dollars. The 10-year rolling amortization is included in the calculation of the UAL amortization amount for the MMO. If all assumptions are met, the projected MMO after 15 years will be \$3.1 million. Under these projections, from 2032 – 2035 the MMO has no UAL amortization gain bases from the traditional approach produce a negative payment. Finally, there is an increase in the 2036 MMO as the amortization gain bases above are fully recognized and drop off by 2035.



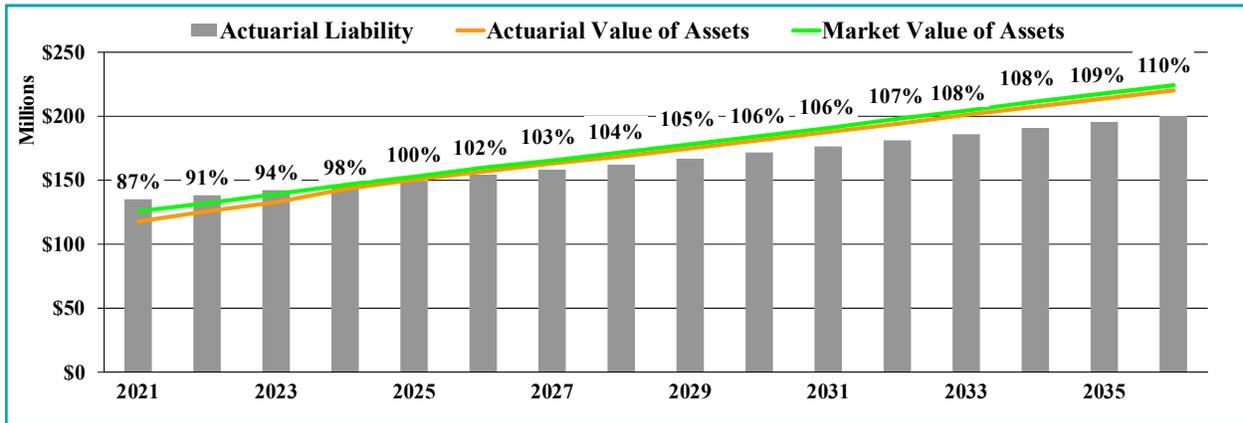
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**SECTION I – BOARD SUMMARY**

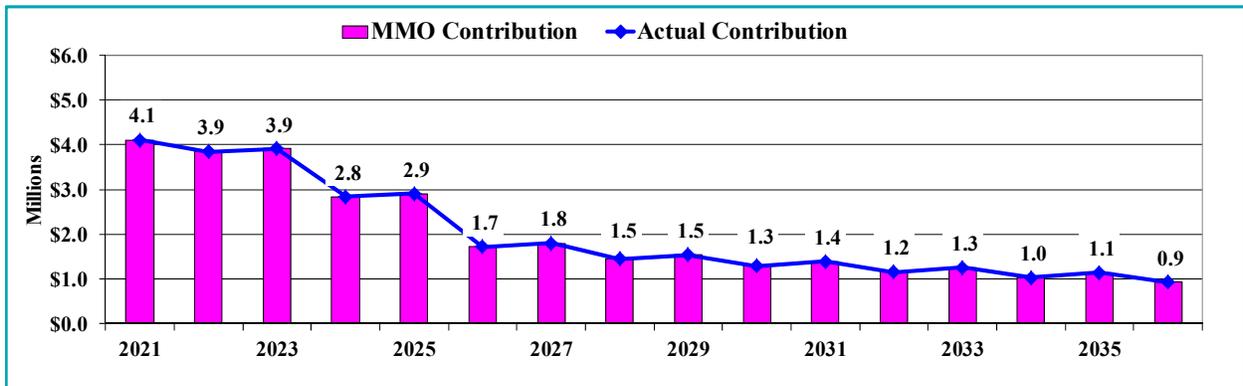
Optimistic Projections - Asset Returns of 8.40% per year

The charts below show the expected progress of the Plan over 15 years, assuming that the Plan’s assets earn 8.40%, 1.0% higher than the valuation assumption. All other assumptions are consistent with the Baseline projections.

The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars increases to 110% at the end of the 15-year period.



This next chart projects the MMO over the same period. On top of each bar is the projected MMO amount in millions of dollars. The 10-year rolling amortization is included in the calculation of the UAL amortization amount for the MMO. When the plan is projected to become over funded, 10% of the surplus assets above the liabilities are used to reduce MMO.



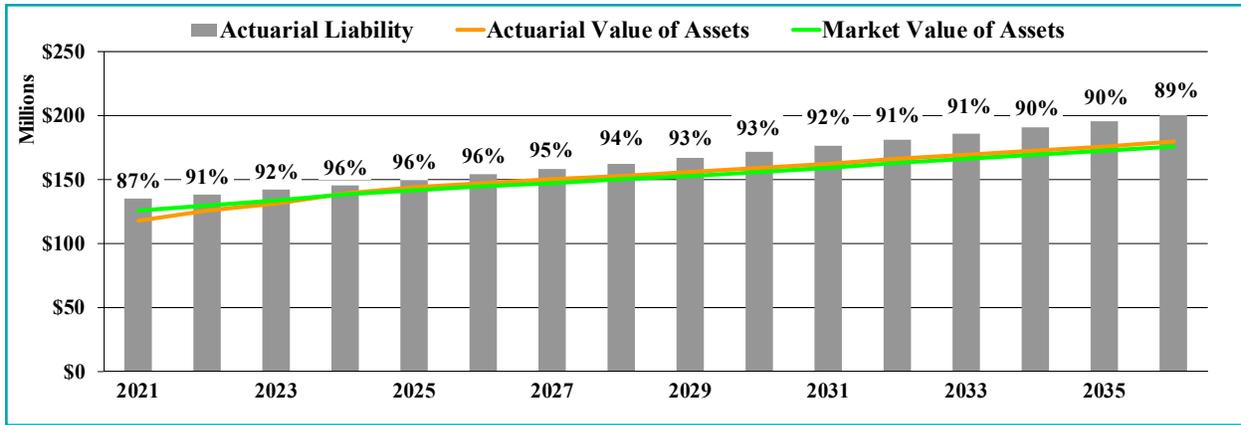
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**SECTION I – BOARD SUMMARY**

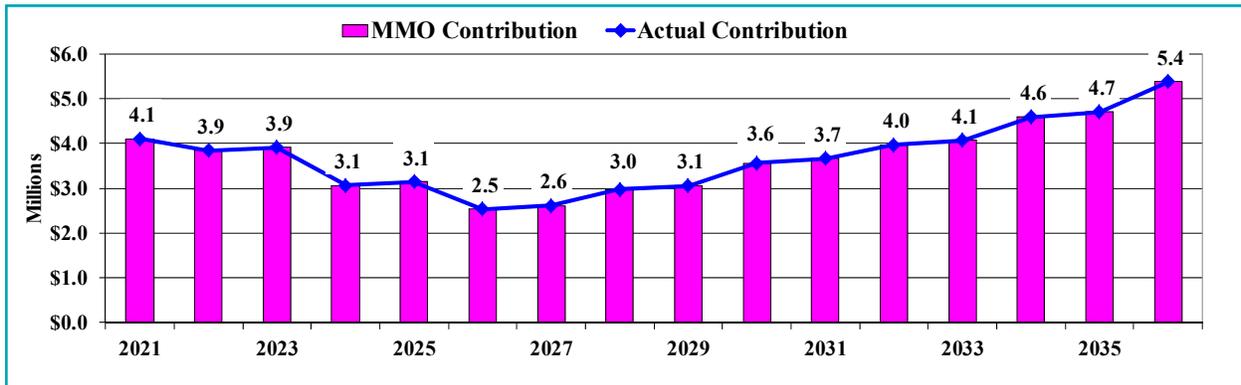
Pessimistic Projections - Asset Returns of 6.40% per year

The charts below show the expected progress of the Plan over 15 years, assuming that the Plan’s assets earn 6.40%, 1.0% lower than the valuation assumption. All other assumptions are consistent with the Baseline projections.

The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars initially increases to 96%, as deferred investment gains are recognized, and then decreases to 89% at the end of the 15-year period. This gradual decrease in the funding ratio is due to the 10-year rolling amortization being applied every year along with the annual underperformance of the asset returns. If in fact this scenario occurred, discussion with the pension board over the reduction in the discount rate assumption would likely occur.



This next chart projects the MMO over the same period. On top of each bar is the projected MMO amount in millions of dollars. The 10-year rolling amortization is included in the calculation of the UAL amortization amount for the MMO.



**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION I – BOARD SUMMARY**

The projections provided above are based on the January 1, 2021 valuation and the methods, assumptions, plan provisions and data as outlined in this report. To the extent that the actual plan experience deviates from the underlying assumptions and methods, (for example, if the asset returns are less than expected, the demographic data experience is different from the assumptions, or there are any changes in plan provisions or applicable laws) *the results will vary accordingly and possibly materially*, resulting in potentially larger MMOs than currently expected. Please note that these projections should be replaced once new data and valuations are completed in the future.

The MMO Pay used in the MMO calculation in the table below is provided by the City of Allentown and may differ from the valuation pay provided throughout this report which is based on actual participant data included in the actuarial valuation as of January 1 of each year.

<b>Table I-2</b>			
<b>Minimum Municipal Obligation (Actual and Estimated)</b>			
<b>Based Upon Valuation Report</b>	<b>1/1/2019</b>	<b>1/1/2021</b>	<b>1/1/2021</b>
<b>Calendar Year</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
(1) MMO Pay <i>(Estimated)</i>	\$ 12,204,882	\$ 12,923,111	\$ 13,505,000
(2) Normal Cost %	16.97%	16.27%	16.27%
(3) Total Normal Cost	2,071,168	2,102,590	2,197,264
(4) Amortization of UAL	2,566,731	2,304,917	2,304,917
(5) Total Administration Expense	80,000	80,000	80,000
(6) Total Financial Requirement	<u>\$ 4,717,899</u>	<u>\$ 4,487,507</u>	<u>\$ 4,582,181</u>
(7) Estimated Employee Contributions	610,244	646,156	675,250
(8) Minimum Municipal Obligation	<u>\$ 4,107,655</u>	<u>\$ 3,841,351</u>	<u>\$ 3,906,931</u>
[(6)-(7)]			

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION II – ASSETS**

Pension Plan assets play a key role in the financial operation of the Plan and in the decisions the Board may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely have an impact on benefit levels, contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on Plan assets including:

- **Disclosure** of Plan assets at January 1, 2020 and January 1, 2021;
- Statement of the **changes** in market values during the year;
- An assessment of **investment performance**; and
- Development of the **actuarial value of assets**.

**Disclosure**

The market value of assets represents the “snap-shot” or “cash-out” values which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace.

Table II-1 Disclosure of Plan Assets*		
	1/1/2020	1/1/2021
<b><u>Assets</u></b>		
Investments	\$ 116,238,697	\$ 125,751,972
Receivables	51,454	52,656
Due from City's General Fund	0	0
<b>Total Assets</b>	<b>\$ 116,290,151</b>	<b>\$ 125,804,628</b>
<b><u>Liabilities</u></b>		
Accounts Payable	\$ 7,736	\$ 21,328
Due to City's General Fund	312,601	0
<b>Total Liabilities</b>	<b>\$ 320,337</b>	<b>\$ 21,328</b>
<b>Net Assets Available for Benefits</b>	<b>\$ 115,969,814</b>	<b>\$ 125,783,300</b>

\* Assets are based on the Annual Comprehensive Financial Report (ACFR) for each year end.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION II – ASSETS**

**Changes in Market Value**

The components of asset change are:

- Contributions
- Benefit payments
- Expenses (administrative and investment consulting)
- Investment income (realized and unrealized)

The specific changes during the 2019 and 2020 plan years are presented below:

<b>Table II-2 Changes in Market Value</b>		
	<b>2019</b>	<b>2020</b>
<b>Beginning of Year Assets</b>	\$ 99,749,099	\$ 115,969,814
<b><u>Additions</u></b>		
Employer Contributions	\$ 3,779,843	\$ 4,063,701
Member Contributions	600,769	596,751
Interest and Dividends	2,437,847	2,325,341
Net Appreciation / (Depreciation)	17,512,305	11,127,765
<b>Total Additions</b>	<b>\$ 24,330,764</b>	<b>\$ 18,113,558</b>
<b><u>Deductions</u></b>		
Benefit Payments	\$ 8,031,919	\$ 8,222,890
Administrative expense	78,130	77,182
<b>Total Deductions</b>	<b>\$ 8,110,049</b>	<b>\$ 8,300,072</b>
<b>Net Change in Market Value of Assets</b>	<b>\$ 16,220,715</b>	<b>\$ 9,813,486</b>
<b>End of Year Assets</b>	<b>\$ 115,969,814</b>	<b>\$ 125,783,300</b>

The two-year average of the administrative expenses paid from the plan assets, rounded to the nearest \$10,000, is \$80,000, which includes the investment consultant fees as reported as a separate line item on the asset statements. This is the projected expense estimate for the 2022 and 2023 MMO determinations.

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**SECTION II – ASSETS**

**Investment Performance**

The following table calculates the investment related gain/loss for the most recent two calendar years on a market value basis. The market value gain/loss is an appropriate measure for comparing the actual asset performance to the long-term 7.50% assumption. Effective January 1, 2021, the long-term investment return assumption changed to 7.40%. Future investment gains and losses will be calculated relative to the new assumption.

<b>Table II-3</b>				
<b>Market Value of Assets Gain/(Loss)</b>				
<b>Item</b>	<b>2019</b>	<b>2020</b>	<b>Total Period</b>	
Beginning of Year Market Value	\$ 99,749,099	\$ 115,969,814	\$ 99,749,099	
Contributions	4,380,612	4,660,452	9,041,064	
Benefit Payments	(8,031,919)	(8,222,890)	(16,254,809)	
Administrative Expenses	(78,130)	(77,182)	(155,312)	
Expected Investment Earnings (7.50%)	7,343,857	8,563,718	14,962,102	
Expected Market Value on December 31	\$ 103,363,519	\$ 120,893,912	\$ 107,342,144	
Investment Gain / (Loss)	<u>12,606,295</u>	<u>4,889,388</u>	<u>18,441,156</u>	
End of Year Market Value	\$ 115,969,814	\$ 125,783,300	\$ 125,783,300	
Return	20.38%	11.79%	16.06%	

The Total Period reconciliation reflects total benefit payments, contributions and expenses during this two-year period. Investment earnings do not follow the additive property and instead are calculated based on the beginning and end of Total Period values.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
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**SECTION II – ASSETS**

**Assets at Actuarial Value**

The Actuarial Value of Asset (AVA) method smooths gains and losses over five years. The resulting value is then limited to be no greater than 120% and no less than 80% of the Market Value of Assets on the valuation date. Additional details regarding this actuarial methodology are included in Appendix D of the report.

The table below shows the development of the actuarial asset value applied to this valuation.

<b>Table II-4 Development of Actuarial Value of Assets 5-Year Smoothing Method</b>				
<b>Market Value of Assets as of January 1, 2021</b>				\$ 125,783,300
<b><u>Plan Year</u></b>	<b><u>Investment Gains / (Losses)</u></b>	<b><u>Percent Recognized</u></b>	<b><u>Percent Deferred</u></b>	<b><u>Amount Deferred</u></b>
2016	\$ (77,203)	100%	0%	\$ 0
2017	7,384,398	80%	20%	1,476,880
2018	(12,666,680)	60%	40%	(5,066,672)
2019	12,606,295	40%	60%	7,563,777
2020	4,889,388	20%	80%	3,911,510
				<u>\$ 7,885,495</u>
<b>Preliminary Actuarial Value as of January 1, 2021</b>				\$ 117,897,805
<b>Corridor for Actuarial Value</b>				
- Lower Limit			80%	\$ 100,626,640
- Upper Limit			120%	\$ 150,939,960
<b>Actuarial Value of Assets as of January 1, 2021</b>				\$ 117,897,805
- as a percent of Market Value of Assets				93.7%

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION II – ASSETS**

The following table calculates the investment related gain/loss for the most recent two calendar years on an actuarial value basis.

<b>Table II-5 Actuarial Value of Assets Gain/(Loss)</b>			
<b>Item</b>	<b>2019</b>	<b>2020</b>	<b>Total Period</b>
Beginning of Year Actuarial Value	\$ 107,080,303	\$ 110,546,468	\$ 107,080,303
Contributions	4,380,612	4,660,452	9,041,064
Benefit Payments	(8,031,919)	(8,222,890)	(16,254,809)
Administrative Expenses	(78,130)	(77,182)	(155,312)
Expected Investment Earnings (7.50%)	<u>7,893,697</u>	<u>8,156,967</u>	<u>16,103,021</u>
Expected Actuarial Value on December 31	\$ 111,244,563	\$ 115,063,815	\$ 115,814,267
Investment Gain / (Loss)	<u>(698,095)</u>	<u>2,833,990</u>	<u>2,083,538</u>
End of Year Actuarial Value	\$ 110,546,468	\$ 117,897,805	\$ 117,897,805
Return	6.84%	10.11%	8.43%

The Total Period reconciliation reflects total benefit payments, contributions and expenses during this two-year period. Investment earnings do not follow the additive property and instead are calculated based on the beginning and end of Total Period values.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION III – LIABILITIES**

In this section, we present detailed information on Plan liabilities including:

- **Disclosure** of Plan liabilities at January 1, 2020 and January 1, 2021;
- Statement of **changes** in these liabilities during the year; and
- Development of the actuarial gain / loss for the year ending December 31, 2020.

**Disclosure**

Two types of liabilities are calculated and presented in this report.

- **Present Value of Benefits:** Used for analyzing the financial outlook of the Plan, this represents the amount of money needed today to fully fund all future benefits and expenses of the Plan, assuming participants continue to accrue benefits.
- **Actuarial Liability:** Used for funding calculations, this liability is calculated by taking the Present Value of Benefits above and subtracting the present value of future Member Contributions and future Employer Normal Costs under an acceptable actuarial funding method. Employer Normal Costs are developed under the **Entry Age Normal** funding method, with normal cost as a percent of pay determined to be level at each active participant's entry age.

The following table discloses both of these liabilities for the current and prior valuations. The liability is also compared to the Plan's assets to determine the **net surplus** or **unfunded liability**. The net surplus or unfunded liability shown in this report is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Plan's benefit obligation in the event of a plan termination or other similar actions.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION III – LIABILITIES**

Table III-1		
Liabilities/Net (Surplus)/Unfunded		
	January 1, 2020	January 1, 2021
<b>Present Value of Future Benefits</b>		
(1) Active Participant Benefits		
Retirement Benefits	\$ 53,632,610	\$ 57,410,255
Disability Benefits	1,442,834	1,552,035
Survivor Benefits	1,295,891	1,384,336
Refund of Members Contribution with Interest	0	0
Other: Vested Benefits	<u>264,922</u>	<u>292,606</u>
Total Active Participant Benefits*	\$ 56,636,257	\$ 60,639,232
(2) Inactive Participant Benefits		
Retirement Benefits	\$ 78,766,868	\$ 81,267,225
Disability Benefits	\$ 2,491,488	\$ 2,829,009
Survivor Benefits	9,263,475	8,926,938
Terminated Vested and Inactive Members	<u>70,850</u>	<u>613</u>
Total Inactive Participant Benefits	\$ 90,592,681	\$ 93,023,785
(3) Present Value of Benefits (PVFB)	\$ 147,228,938	\$ 153,663,017
[(1)+(2)]		
Actuarial Value of Assets (AVA)	\$ 110,546,468	\$ 117,897,805
Present Value of Future Contributions	<u>36,682,470</u>	<u>35,765,212</u>
<b>Total Resources</b>	<b>\$ 147,228,938</b>	<b>\$ 153,663,017</b>
<b>Actuarial Liability</b>		
Present Value of Benefits (PVFB)	\$ 147,228,938	\$ 153,663,017
Present Value of Future Normal Costs (PVFNC)	<u>17,263,070</u>	<u>18,695,451</u>
<b>Actuarial Liability (AL = PVFB – PVFNC)</b>	<b>\$ 129,965,868</b>	<b>\$ 134,967,566</b>
Actuarial Value of Assets (AVA)	<u>110,546,468</u>	<u>117,897,805</u>
<b>Net (Surplus)/Unfunded (AL – AVA)</b>	<b>\$ 19,419,400</b>	<b>\$ 17,069,761</b>

\* The amount of the accumulated member contributions without accrued interest is \$6,744,452 for all active members as of January 1, 2021.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION III – LIABILITIES**

**Changes in Liabilities**

The Liabilities disclosed in the prior table are expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- Benefits accrued since the last valuation
- Plan amendments changing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above, and also due to changes in Plan assets resulting from:

- Contributions different than expected
- Investment earnings different than expected

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the Plan. In the following table we present key changes in liabilities since the valuation as of January 1, 2019. The accrual of benefits is the normal cost under the Entry Age Normal cost method.

Table III-2 Change in Actuarial Liability	
Liabilities on 01/01/2019	\$ 127,317,052
Liabilities on 01/01/2021	<u>134,967,566</u>
Liability Increase (Decrease)	\$ 7,650,514
Change Due to:	
Plan Amendment	\$ 0
Assumption Change	1,436,239
Method Change	0
Accrual of Benefits	3,613,451
Benefit Payments	(16,254,809)
Passage of Time	19,033,977
Liability (Gain)/Loss	<u>(178,344)</u>
Total	\$ 7,650,514

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION III – LIABILITIES**

The following table provides the Normal Cost, which is the cost for the additional benefit accrued during the year. The Normal Cost as a percent of payroll as of January 1, 2019 is used to calculate the 2021 MMO. The Normal Cost as a percent of payroll as of January 1, 2021 is used to calculate the 2022 and 2023 MMO.

<b>Table III-3</b>		
<b>Normal Cost and Normal Cost as Percentage of W-2 Payroll</b>		
	<b>2019</b>	<b>2021</b>
Normal Cost	\$ 1,800,136	\$ 1,953,892
W-2 Wages for active members from prior year	\$ 10,607,240	\$ 12,011,495
Normal Cost as a Percent of the Estimated Payroll	16.97%	16.27%

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION IV – MINIMUM MUNICIPAL OBLIGATION**

The actuarial funding method used to determine the normal cost and the unfunded actuarial liability is the **Entry Age Normal** (EAN) cost method. The normal cost is based on the normal cost rate determined by taking the value, as of entry age into the plan, of each member's projected future benefits. This value is then divided by the value, also at entry age, of each member's expected future salary producing a normal cost rate as a percent of salary that should remain relatively constant over a participant's career. The normal cost rate is multiplied by current salary to determine each member's normal cost. The total normal cost of the plan is the summation of each member's normal cost. Finally, the normal cost is reduced by the total member contributions to produce the employer normal cost.

The actuarial liability for active participants is the present value of all future benefits expected to be earned under the plan minus the present value of future normal costs. The actuarial liability for inactive participants is the present value of all future pension benefits to be paid from the plan to the retirees and vested terminated participants. The unfunded actuarial liability is the difference between the EAN actuarial liability and the actuarial value of assets.

The amortization requirement is the annual contribution to reduce the unfunded actuarial liability recognized over a certain time period, as outlined in Act 205 and revised by Act 44. The amortization time periods are provided in Appendix D of this report.

In the following charts, we show the actual MMOs for 2021 and 2022. The payroll amounts shown reflect the information provided by the City for those years.

The MMO for 2023 has been estimated based on the results of this valuation and the 2022 estimated payroll. The actual amount will vary based on actual payroll as provided by the City of Allentown.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION IV – MINIMUM MUNICIPAL OBLIGATION**

The MMO pay used in the MMO calculation in the table below is provided by the City of Allentown and may differ from the valuation pay provided throughout this report which is based on actual participant data included in the actuarial valuation as of January 1 of each year.

<b>Table IV-1</b>			
<b>Minimum Municipal Obligation (Actual and Estimated)</b>			
<b>Based on Valuation Report: Calendar Year:</b>	<b>1/1/2019 2021</b>	<b>1/1/2021 2022</b>	<b>1/1/2021 2023</b>
1. MMO pay (actual/ <i>estimated</i> ) (prior year W2 pay reported by the City)	\$ 12,204,882	\$ 12,923,111	\$ 13,505,000
2. Total Normal Cost Percentage	16.97%	16.27%	16.27%
3. Total Normal Cost [(1) x (2)]	\$ 2,071,168	\$ 2,102,590	\$ 2,197,264
4. Total Amortization Requirement	2,566,731	2,304,917	2,304,917
5. Total Administrative Expenses	<u>80,000</u>	<u>80,000</u>	<u>80,000</u>
<b>6. Total Financial Requirement</b> [(3) + (4) + (5)]	<b>\$ 4,717,899</b>	<b>\$ 4,487,507</b>	<b>\$ 4,582,181</b>
7. Estimated Member Contribution Rate	5.00%	5.00%	5.00%
8. Estimated Member Contributions [(1) x Member Contribution Rate]	<u>610,244</u>	<u>646,156</u>	<u>675,250</u>
9. Estimated Employer Portion of MMO [(6) - (8)]	\$ 4,107,655	\$ 3,841,351	\$ 3,906,931

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION IV – MINIMUM MUNICIPAL OBLIGATION**

The following table summarizes the development of the gains and losses from 2019 to 2021.

<b>Table IV-2</b>	
<b>Development of Actuarial Gain / (Loss)</b>	
Unfunded Liability as of 01/01/2019	\$ 20,236,749
Normal Cost	\$ 3,613,451
Contributions made	
a. Employee Contributions	\$ (1,197,520)
b. Local Portion	(7,843,544)
Actual Expenses	\$ 155,312
Interest on above	2,930,956
Plan Changes	\$ 0
Assumption Changes	1,436,239
Method Changes	0
Expected Unfunded Liability as of 01/01/2021	\$ 19,331,643
Actual Unfunded Liability as of 01/01/2021	<u>17,069,761</u>
Actuarial Gain / (Loss)	\$ 2,261,882
- Investment Gain / (Loss)	2,083,538
- Liability Gain / (Loss)	178,344

This table provides the gains/(losses) for the new amortization base.

<b>Table IV-3</b>	
<b>Total Gain/(Loss)</b>	
Investment Gain / (Loss)	\$ 2,083,538
Liability Gain / (Loss)	178,344
Timing and interest Gain / (Loss)	<u>(282,264)</u>
Total Gain/(Loss)	\$ 1,979,618

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION IV – MINIMUM MUNICIPAL OBLIGATION**

The following table provides the schedule of amortization bases as of January 1, 2021. The total \$1,979,618 actuarial gain reflects the explicit loss for the two-year period as provided above along with the timing and interest loss due to the delayed contribution method as followed under Act 205.

The assumption change base of \$1,436,239 accounts for the change in the assumption for the interest rate used to value liabilities which is detailed in Appendix D and in the Board Summary. The amortized payments prior to 2021 were re-determined based on the updated interest rate assumption.

<b>Table IV-4a</b>							
<b>Schedule of Amortization Bases Including Bond Proceeds for Minimum Contributions as of January 1, 2021</b>							
<b>Original Date</b>	<b>Type</b>	<b>Original Amount</b>	<b>Original Period</b>	<b>Remaining Period</b>	<b>Payment</b>	<b>Balance</b>	<b>Date Fully Amortized</b>
1/1/2003	Investment Loss	\$ 5,622,162	30	12	\$ 29,956	\$ 250,174	12/31/2032
1/1/2005	Plan Amendment	10,203,173	20	4	63,327	228,309	12/31/2024
1/1/2007	Assumption Change	(3,114,099)	20	6	(19,244)	(97,312)	12/31/2026
1/1/2007	Actuarial Loss	5,621,780	15	1	40,304	40,304	12/31/2021
1/1/2009	Assumption Change	(9,855,348)	20	8	(60,657)	(383,045)	12/31/2028
1/1/2009	Actuarial Loss	24,467,226	20	8	150,589	950,959	12/31/2028
1/1/2011	Actuarial Loss	15,494,705	20	10	95,003	703,570	12/31/2030
1/1/2013	Plan Amendment	(5,170,402)	10	2	(47,171)	(91,091)	12/31/2022
1/1/2013	Assumption Change	46,266	15	7	328	1,871	12/31/2027
1/1/2013	Actuarial Loss	27,694,316	20	12	169,197	1,413,053	12/31/2032
1/1/2015	Assumption Change	2,760,787	14	8	302,130	1,907,934	12/31/2028
1/1/2015	Actuarial Loss	1,436,184	14	8	157,171	992,524	12/31/2028
1/1/2017	Assumption Change	4,204,011	13	9	479,692	3,300,203	12/31/2029
1/1/2017	Actuarial Loss	7,896,896	13	9	901,063	6,199,164	12/31/2029
1/1/2019	Actuarial Loss	2,475,309	12	10	296,595	2,196,523	12/31/2030
1/1/2021	Assumption Change	1,436,239	12	12	171,973	1,436,239	12/31/2032
1/1/2021	Actuarial Gain	(1,979,618)	12	12	(237,037)	(1,979,618)	12/31/2032
					\$ 2,493,219	\$ 17,069,761	

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**SECTION IV – MINIMUM MUNICIPAL OBLIGATION**

In 2015, the City adopted Ordinance 57 changing the plan’s amortization method. The Unfunded Actuarial Liability Amortization is outlined in Appendix D and is the lesser of: the traditional amortization of individual bases, or the 10-year level dollar rolling amortization of the total Unfunded Actuarial Liability. The chart below shows the determination of the UAL payment for 2021.

<b>Table IV-4b UAL Amortization Payment</b>	
1. Traditional Amortization	\$ 2,493,219
2. 10-year Rolling Amortization	\$ 2,304,917
3. Minimum of (1) or (2)	\$ 2,304,917

By paying the 10-year rolling amortization amount when this amount is less than the traditional amortization amount, the plan will incur losses equal to the difference between these two amortization amounts. These losses will be recognized in future valuations. The City may choose to contribute more to the Plan in any given year.

For the 2021 actuarial valuation, the traditional amortization amount is greater than the 10-year rolling amortization amount.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS**

Allentown received the proceeds of a Pension Obligation Bond in 1996 and Note payment in 2013 which improved the financial status of the Plan. This section provides the development of the unfunded liability based upon assets without the bond proceeds and the Note payment and the amortization amount of this unfunded liability.

Under Act 205 section 404, municipalities that issue bonds (or notes) to fund the unfunded actuarial liabilities must complete Exhibit I of the Act 205 form reflecting the funded status and MMO determination of the plan as if the bond issuance (or notes) had not occurred. The contributions used for determining the assets excluding the bonds and the Note payment as of the valuation date are based upon “hypothetical amortization contributions that would have been made had bond issue proceeds not been deposited”, as described on the Act 205 form. In addition, investment earnings exclude earnings on bond issue proceeds (as instructed) by applying the rate of market returns for the year on the assets excluding the bonds.

The tables in this section consist of:

- Market Value of Assets without Bond Proceeds
- Actuarial Value of Assets without Bond Proceeds
- Unfunded Liability without Bond Proceeds
- Actuarial (Gain)/Loss without Bond Proceeds
- Schedule of Amortization bases without Bond Proceeds

<b>Table A-1</b>			
<b>Market Value of Assets with Gain/(Loss) without Bond</b>			
	<b>2019</b>	<b>2020</b>	<b>Total Period</b>
Beginning of Year Market Value	\$ 63,979,912	\$ 78,854,651	\$ 63,979,912
Contributions	9,782,305	9,783,454	19,565,759
Benefit Payments	(8,031,919)	(8,222,890)	(16,254,809)
Administrative Expenses	(78,130)	(77,182)	(155,312)
Investment Earnings*	13,202,483	9,378,363	22,580,846
Estimated Market Value on December 31	<b>\$ 78,854,651</b>	<b>\$ 89,716,396</b>	<b>\$ 89,716,396</b>
Expected Investment Earnings (7.50%)	4,860,069	5,968,720	10,203,108
Expected Market Value on December 31	\$ 70,512,237	\$ 86,306,753	\$ 77,338,658
Investment Gain / (Loss)	<b>8,342,414</b>	<b>3,409,643</b>	<b>12,377,738</b>
End of Year Market Value	\$ 78,854,651	\$ 89,716,396	\$ 89,716,396

\* Based upon market value with bond returns in Table II - 3

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS**

<b>Table A-2</b>				
<b>Development of Actuarial Value of Assets Without Bond</b>				
<b>5-Year Smoothing Method</b>				
Market Value of Assets as of January 1, 2021				\$ 89,716,396
<b><u>Plan</u></b>	<b><u>Investment</u></b>	<b><u>Percent</u></b>	<b><u>Percent</u></b>	<b><u>Amount</u></b>
<b><u>Year</u></b>	<b><u>Gains / (Losses)</u></b>	<b><u>Recognized</u></b>	<b><u>Deferred</u></b>	<b><u>Deferred</u></b>
2016	\$ (38,599)	100%	0%	\$ 0
2017	4,318,096	80%	20%	863,619
2018	(7,865,519)	60%	40%	(3,146,208)
2019	8,342,414	40%	60%	5,005,448
2020	3,409,643	20%	80%	2,727,714
				<u>\$ 5,450,573</u>
Preliminary Actuarial Value as of January 1, 2021				\$ 84,265,823
Corridor for Actuarial Value				
- Lower Limit			80%	\$ 71,773,117
- Upper Limit			120%	\$ 107,659,675
Actuarial Value of Assets as of January 1, 2021				\$ 84,265,823
- as a percent of Market Value of Assets				93.9%

<b>Table A-3</b>	
<b>Liabilities/Net (Surplus)/Unfunded Based upon Assets without Bond</b>	
	<b>January 1, 2021</b>
Actuarial Liability	\$ 134,967,566
Actuarial Value of Assets without Bond	<u>84,265,823</u>
Net (Surplus)/Unfunded without Bond (AL – AVA)	\$ 50,701,743

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS**

The following table provides the explicit gains/(losses) of the unfunded liability based upon the assets without the bond.

<b>Table A-4</b>	
<b>Development of Actuarial Gain/(Loss) without the Bond</b>	
Unfunded Liability without Bond as of 01/01/2019	\$ 58,876,210
Normal Cost	\$ 3,613,451
Contributions made	
a. Employee Contributions	\$ (1,197,520)
b. Local Portion	(18,368,239)
Actual Expense	\$ 155,312
Interest on above	8,109,409
Plan Changes	\$ 0
Assumption Changes	\$ 1,436,239
Method Changes	0
Expected Unfunded Liability as of 01/01/2021	\$ 52,624,862
Actual Unfunded Liability as of 01/01/2021	<u>50,701,743</u>
Actuarial Gain / (Loss)	\$ 1,923,119
- Investment Gain / (Loss)	1,744,775
- Liability Gain / (Loss)	178,344

<b>Table A-5</b>	
<b>Total Gain/(Loss) without Bond</b>	
Investment Gain / (Loss)	\$ 1,744,775
Liability Gain / (Loss)	178,344
Timing and interest Gain / (Loss)	<u>101,044</u>
Total Gain/(Loss)	\$ 2,024,163

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS**

The following tables provide the schedule of amortization bases as of January 1, 2021 without bond proceeds. Plan amendments and assumption changes prior to January 1, 2015 have not been adjusted by the 2013 Cancellation Ratio based on the 2013 Note contribution paid by the City, which triggered the application of Act 205 Section 404(h) to the Amortization Bases Including Bond Proceeds.

<b>Table A-6</b>							
<b>Schedule of Amortization Bases Excluding Bond for Minimum Contributions as of January 1, 2021</b>							
<b>Original Date</b>	<b>Type</b>	<b>Original Amount</b>	<b>Original Period</b>	<b>Remaining Period</b>	<b>Annual Payment</b>	<b>Remaining Balance</b>	<b>Date Fully Amortized</b>
1/1/2002	Investment Loss	440,914	30	11	35,137	277,425	12/31/2031
1/1/2003	Investment Loss	4,216,279	30	12	335,415	2,801,229	12/31/2032
1/1/2005	Plan Amendment	10,203,173	20	4	945,502	3,408,775	12/31/2024
1/1/2007	Assumption Change	(3,114,099)	20	6	(287,329)	(1,452,925)	12/31/2026
1/1/2007	Actuarial Loss	5,612,406	15	1	600,710	600,710	12/31/2021
1/1/2009	Assumption Change	(8,441,714)	20	8	(775,734)	(4,898,716)	12/31/2028
1/1/2009	Actuarial Loss	21,806,758	20	8	2,003,887	12,654,426	12/31/2028
1/1/2011	Actuarial Loss	15,362,399	20	10	1,406,318	10,414,912	12/31/2030
1/1/2013	Plan Amendment	(5,170,402)	10	2	(704,282)	(1,360,039)	12/31/2022
1/1/2013	Assumption Change	46,266	15	7	4,886	27,892	12/31/2027
1/1/2013	Actuarial Loss	28,941,356	20	12	2,639,949	22,047,588	12/31/2032
1/1/2015	Assumption Change	2,760,787	14	8	302,130	1,907,934	12/31/2028
1/1/2015	Actuarial Loss	797,999	14	8	87,330	551,484	12/31/2028
1/1/2017	Assumption Change	4,204,011	13	9	479,692	3,300,202	12/31/2029
1/1/2017	Actuarial Loss	1,371,433	13	9	156,485	1,076,593	12/31/2029
1/1/2019	Actuarial Gain	(76,432)	12	10	(9,158)	(67,823)	12/31/2030
1/1/2021	Assumption Change	1,436,239	12	12	171,973	1,436,239	12/31/2032
1/1/2021	Actuarial Gain	(2,024,163)	12	12	(242,371)	(2,024,163)	12/31/2032
					<b>\$ 7,150,540</b>	<b>\$ 50,701,743</b>	

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS**

The City adopted Ordinance 57 changing the plan’s amortization method. The Unfunded Actuarial Liability Amortization is outlined in Appendix D and is the lesser of: the traditional amortization of individual bases, or the 10-year level dollar rolling amortization of the total Unfunded Actuarial Liability. The chart below shows the determination of the UAL payment for 2021.

<b>Table A-7</b>	
<b>UAL Amortization Payment Excluding Bond</b>	
1. Traditional Amortization	\$ 7,150,540
2. 10-year Rolling Amortization	\$ 6,846,218
3. Minimum of (1) or (2)	\$ 6,846,218

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

The data for this valuation was provided by the City as of January 1, 2021. Cheiron did not audit any of the data; however, we performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

The following is a list of data charts contained in this section:

- Summary of Participant Data
- Age/Service Distribution for Active Participants, including counts and total salary
- Counts and Total Benefit Amount by Age for Retirees, Beneficiaries, and Disabled Participants
- Reconciliation of Active, Terminated Vested, and In-Pay Participants

<b>SUMMARY OF PARTICIPANT DATA</b>		
	<b>1/1/2020</b>	<b>1/1/2021</b>
<b>Active Participants</b>		
Count	121	128
New Entrants	4	11
Average Age	43.5	42.8
Average Benefit Service	14.0	13.4
Annual Payroll*	\$ 10,187,331	\$ 10,919,071
<b>Retirees and Beneficiaries Receiving Payments</b>		
Count	196	192
Average Age	69.9	69.9
Annual Benefits	\$ 8,094,818	\$ 8,180,825
Average Monthly Benefit	\$ 3,442	\$ 3,551
<b>Terminated Vested Participants and Inactive Members</b>		
Count	1	1
Accumulated Member		
Contributions w/o Interest	\$ 70,850	\$ 613
Annual Benefits	\$ 0	\$ 0
Average Monthly Benefit	\$ 0	\$ 0

The estimated benefit payments for the current plan year are \$8,481,252.

\*Includes overtime pay up to 10% of base pay for members hired prior to January 1, 2012.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

**Summary of Active Data with Pensionable Pay as of January 1, 2021**

Attained Age	YEARS OF CREDITED SERVICE																			
	Under 1		1 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	
	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.
Under 25	2	\$ 53,196	1	\$ 59,033	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0	0	\$ 0
25 to 29	6	52,734	3	59,580	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 to 34	1	53,196	4	69,179	5	78,968	2	86,943	0	0	0	0	0	0	0	0	0	0	0	0
35 to 39	2	53,173	0	0	9	81,839	6	91,806	1	94,355	0	0	0	0	0	0	0	0	0	0
40 to 44	0	0	0	0	8	83,167	14	89,754	8	90,549	1	101,505	0	0	0	0	0	0	0	0
45 to 49	0	0	0	0	4	86,845	7	88,372	9	94,250	7	94,589	1	96,108	0	0	0	0	0	0
50 to 54	0	0	0	0	2	83,019	1	95,015	3	100,143	7	93,880	5	101,981	0	0	0	0	0	0
55 to 59	0	0	0	0	1	78,722	1	87,189	0	0	4	92,901	1	101,638	1	88,513	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	95,302	0	0	
65 to 69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
70 & up	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

**Summary of Inactive Data as of January 1, 2021**

**AGE DISTRIBUTION OF INACTIVE PARTICIPANTS  
PENSIONERS AND BENEFICIARIES RECEIVING BENEFITS AS OF JANUARY 1, 2021**

Age	Disability Retirements		Normal, Early Deferred Vested Retirements		Surviving Spouses and Beneficiaries Receiving Benefits		Total	
	Number	Monthly Benefit	Number	Monthly Benefit	Number	Monthly Benefit	Number	Monthly Benefit
Under 55	1	\$ 3,243	19	\$ 98,331	5	\$ 10,764	25	\$ 112,338
55-59	1	5,681	27	140,777	1	1,200	29	147,658
60-64	0	0	19	97,065	4	7,402	23	104,467
65-69	2	4,017	17	73,539	4	15,700	23	93,256
70-74	1	2,615	16	59,970	5	13,396	22	75,981
75-79	1	1,121	17	50,360	1	1,686	19	53,167
80 & Over	3	4,754	20	43,373	28	46,742	51	94,869
<b>Total</b>	<b>9</b>	<b>\$ 21,431</b>	<b>135</b>	<b>\$ 563,415</b>	<b>48</b>	<b>\$ 96,890</b>	<b>192</b>	<b>\$ 681,736</b>

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

**Participant Reconciliation from January 1, 2020 To January 1, 2021**

	Actives	Inactive	Disabled	Retired	Beneficiary	Total
January 1, 2020 valuation	121	1	9	137	50	318
Additions / QDROs	11	1				12
Reductions						
a. Terminated - not vested, refund due		(1)				(1)
b. Deaths without beneficiary				(6)	(2)	(8)
<b>Total</b>	<b>11</b>			<b>(6)</b>	<b>(2)</b>	<b>(9)</b>
Changes in status						
a. Terminated - vested						
b. Retired	(4)			4		
c. Disabled						
d. Died with beneficiary						
e. Data corrections						
<b>Total</b>	<b>(4)</b>			<b>4</b>		
January 1, 2021 valuation	128	1	9	135	48	321

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

<b>Active Members</b>	<b>Count</b>	<b>Annual Pay</b>
As of last valuation date	121	\$ 10,187,331
<b>Separations from active service</b>		
Refund of contributions	0	\$ 0
Separation with deferred benefit	0	0
Separation due refund	0	0
Disability	0	0
Death	0	0
Retirement with service retirement benefit	4	354,337
<b>Total separations</b>	<b>4</b>	<b>\$ 354,337</b>
<b>As of current valuation date using prior pay</b>	<b>117</b>	<b>\$ 9,832,994</b>
<b>As of current valuation date using current pay</b>	<b>117</b>	<b>\$ 10,336,731</b>
New entrants	11	582,340
<b>As of current valuation date</b>	<b>128</b>	<b>\$ 10,919,071</b>

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

<b>Service retirement benefit recipients</b>	<b>Count</b>	<b>Annual Benefit</b>
As of last valuation date	137	\$ 6,643,021
New Benefit recipients	4	253,977
<b>Total</b>	<b>141</b>	<b>\$ 6,896,998</b>
Terminations	0	\$ 0
Deaths	6	141,321
Others	0	0
<b>Total terminations</b>	<b>6</b>	<b>\$ 141,321</b>
COLA increase		5,298
QDRO Decrease		0
<b>As of current valuation date</b>	<b>135</b>	<b>\$ 6,760,975</b>

<b>Disability benefit recipients</b>	<b>Count</b>	<b>Annual Benefit</b>
As of last valuation date	9	\$ 256,694
New Benefit recipients	0	0
<b>Total</b>	<b>9</b>	<b>\$ 256,694</b>
Terminations	0	\$ 0
Deaths	0	0
Others	0	0
<b>Total terminations</b>	<b>0</b>	<b>\$ 0</b>
COLA increase		480
<b>As of current valuation date</b>	<b>9</b>	<b>\$ 257,174</b>

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX B – MEMBERSHIP INFORMATION**

<b>Surviving Spouses</b>	<b>Count</b>	<b>Annual Benefit</b>
As of last valuation date	50	\$ 1,195,103
New Benefit recipients	0	0
<b>Total</b>	<b>50</b>	<b>\$ 1,195,103</b>
Terminations	0	\$ 0
Deaths	2	32,679
Others	0	0
<b>Total terminations</b>	<b>2</b>	<b>\$ 32,679</b>
COLA increase (QDRO)		252
<b>As of current valuation date</b>	<b>48</b>	<b>\$ 1,162,676</b>

<b>Inactive Refund Due</b>	<b>Count</b>	<b>Annual Benefit</b>
As of last valuation date	1	\$ 70,850
New recipients	1	613
<b>Total</b>	<b>2</b>	<b>\$ 71,463</b>
Others	1	70,850
<b>Total terminations</b>	<b>1</b>	<b>\$ 70,850</b>
<b>As of current valuation date</b>	<b>1</b>	<b>\$ 613</b>

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**1. Normal Retirement**

**Participants hired prior to January 1, 2012:**

Eligibility: 20 years of service.

Basic Benefit: The retirement benefit shall be determined by the rate of monthly pay of the employee at the time of retirement or the highest average annual salary during any five years of service. Salary will include base pay, longevity, holiday pay, festive pay, shift differential and overtime. Overtime shall be limited to 10% of base pay. The benefit will be a percent of pay in accordance with the following table:

Years of Service	Percent of Benefit
20	50.5%
21	54.0
22	58.0
23	62.0
24	66.0
25	70.0

The minimum benefit is \$10,400 per year.

**Participants hired on or after January 1, 2012:**

Eligibility: Age 50 with 20 years of service.

Basic Benefit: The retirement benefit shall be 50% of monthly pay at time of retirement or the highest average annual salary during any five years of service.

Service Increment: One-fortieth (1/40<sup>th</sup>) times the Basic Benefit for each year of service in excess of 20 years. The total Service Increment cannot exceed \$2,400 in total annual benefit increase (i.e. \$200 additional monthly benefit). Service after attaining age 65 is excluded.

Salary will include base pay plus longevity pay.

The minimum benefit is \$10,400 per year.

**2. Early Retirement**

None permitted.

**3. Termination Benefits**

For termination prior to eligibility for normal retirement: Refund of contributions (including any military buy-back contributions, if applicable) without interest.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**4. Preretirement Death Benefits**

Surviving spouse, dependent child(ren) or dependent parent(s): 100% of the pension benefit applicable to the member.

Other beneficiaries: Refund of contributions (including any military buy-back contributions, if applicable) without interest.

**5. Disability Benefits**

Less than 2 years of service: 10% of Salary

At least 2 years of service but less than 5 years: 20% of Salary

At least 5 years of service but less than 10 years: 30% of Salary

At least 10 years of service but less than 15 years: 40% of Salary

At least 15 years of service but less than 20 years: 50% of Salary

At least 20 years of service: Same as normal retirement

Salary is defined under normal retirement benefit.

**6. Postretirement Death Benefits**

Surviving spouse, dependent child(ren) or dependent parent(s): 100% of the pension benefit applicable to the member.

Other beneficiaries: None.

**7. Credit for Military Service**

Any member with military service prior to becoming a member in the Plan may purchase credited military service, not to exceed five (5) years of such service.

**8. Purchased Service**

Not applicable.

**9. Employee Contributions**

5% of salary per year. Salary will include base pay, longevity, holiday pay, festive pay, shift differential and overtime.

For new hires after 1/1/2012, additional contribution of \$24 per year for a service increment.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**10. Cost of Living Adjustment**

Participants retiring between January 1, 2005 and December 31, 2011 and their beneficiaries shall receive an annual COLA once each retiree is eligible for the COLA. Annual COLAs do not occur until the pension allowance is less than half of the current salary for a firefighter based upon rank at retirement. Such increases shall be in conformity with the uniform scale, which may be based on the cost of living, but the total of such allowances shall not at any time exceed  $\frac{1}{2}$  of the current salary benefit paid to the firefighter of the highest grade.

**11. Changes Since Last Valuation (i.e., since January 1, 2019 under Act 205)**

None.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS**

**A. Demographic and Economic Assumptions**

The demographic and economic assumptions are selected by the City of Allentown Pension Board. Some of these assumptions have been updated since Cheiron became the actuary to the Plan. For the updated assumptions, experience studies have been completed as requested by the Board and based on Cheiron's review of assumptions for reasonability.

**1. Mortality Rates**

Healthy Mortality: RP-2000 Blue Collar Combined Healthy Mortality Table projected generationally from base year 2000 using 50% of Scale AA.

Disabled Mortality: RP-2000 Disabled Mortality Table.

The mortality assumption was set by the City of Allentown Pension Board, which has control over the selection of the pension valuation assumptions, rather than the actuary. Based upon limited data, this mortality assumption was reviewed and appears to be reasonable in terms of reflecting projected mortality improvement in the future.

**2. Disability Rates**

100% of the 1955 United Auto Workers Table.

Age	Male	Female
30	0.04%	0.06%
35	0.05%	0.08%
40	0.07%	0.10%
45	0.10%	0.15%
50	0.18%	0.26%
55	0.36%	0.49%
60	0.90%	1.21%
>=65	0.00%	0.00%

**3. Termination Rates**

Plan specific rates based, in part, on the following table:

Age	Male	Female
25	5.00%	7.50%
30	3.75%	5.00%
35	2.50%	3.75%
40	1.50%	2.50%
45	0.75%	1.25%
>=50	0.00%	0.00%

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS**

**4. Retirement Rates for Active Employees**

Immediately upon attainment of age 62 with 20 years of service. If younger than age 62, a select and ultimate table with increasing rates.

The retirement assumption was set by the City of Allentown Pension Board, which has control over the selection of the pension valuation assumptions, rather than the actuary. Based upon our best professional judgment and with limited available data, we would be inclined to state that this retirement assumption may not represent the best estimate of future retirement experience under the Plan, although the new benefit tier might change retirement behavior to better match this assumption in the future.

Age	Years of Service					
	<=20	21	22	23	24	>=25
<=46	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
47	0.0%	0.0%	0.0%	0.0%	15.0%	15.0%
48	0.0%	0.0%	0.0%	0.0%	15.0%	15.0%
49	0.0%	0.0%	0.0%	0.0%	15.0%	15.0%
50	0.0%	0.0%	0.0%	10.0%	20.0%	20.0%
51	0.0%	0.0%	0.0%	10.0%	20.0%	20.0%
52	0.0%	0.0%	0.0%	10.0%	20.0%	20.0%
53	0.0%	0.0%	0.0%	10.0%	20.0%	20.0%
54	0.0%	0.0%	0.0%	10.0%	25.0%	25.0%
55	0.0%	5.0%	5.0%	15.0%	25.0%	25.0%
56	0.0%	10.0%	10.0%	15.0%	25.0%	25.0%
57	0.0%	10.0%	10.0%	15.0%	25.0%	25.0%
58	0.0%	10.0%	10.0%	15.0%	25.0%	25.0%
59	0.0%	10.0%	10.0%	15.0%	25.0%	25.0%
60	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%
61	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%
>=62	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**5. Percent Married**

80% of active members are assumed to be married.

**6. Age of Spouse**

Female spouse is assumed to be two years younger than male spouse.

**7. Investment Return**

7.40% per annum, net of investment management expenses.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS**

**8. Salary Increase**

Salary increases:

With Merit Increases:           4.5% compounded annually.  
Without Merit Increases:       3.5% compounded annually.

**9. Overtime**

Participants hired prior to January 1, 2012 are assumed to attain overtime pay equal to 10% of base pay at retirement.

**10. Credit for Military Service**

Military service purchased as of the valuation date, as provided by the City, is reflected in the valuation results. Future possible military service purchases are not assumed.

**11. Form of Annuity**

Married participants: 100% Joint and Survivor Annuity.

Single participants: Life Annuity.

**12. Cost of Living Adjustment**

2.4% per year upon eligibility to receive a COLA.

For participants eligible to receive a COLA, the pay of the same rank as the participant as of their retirement date is projected into the future to determine the date that future benefit increases are expected to begin.

**13. Expenses**

Expenses are assumed to equal the two-year average of paid administrative expenses from the most recent actuarial valuation, rounded to the nearest \$10,000. Expenses are assumed to increase based on without merit salary scale in the future for MMO projections.

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS**

**14. Rationale for Assumptions**

In accordance with Actuarial Standard of Practice No. 27, the rationale for the 7.40% discount rate is based on the Board's investment risk preference, the Plan's current asset allocation, and the investment manager's capital market outlook.

The rates of mortality were selected based on plan experience as reviewed by Cheiron with the Board. These rates are monitored for reasonability.

**15. Changes since last biennial valuation (i.e., since January 1, 2019 under Act 205)**

The investment return assumption was decreased from 7.50% to 7.40%.

**APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS**

**B. Actuarial Methods**

**1. Funding Method**

Under the entry age normal actuarial cost method, the individual entry age normal cost is determined for each participant by calculating the annual contribution rate as a level percent of pay required to fund that individual's expected benefits, based on the current plan provisions, over the participant's expected active working lifetime with the Plan at entry.

At the valuation date, the present value of future normal cost is calculated for each individual participant by multiplying the entry age normal cost by the present value of the participant's expected future salary with the Plan. The cost for each participant is then summed to yield the present value of future normal costs.

The excess of the present value of future benefits for all individuals at the valuation date over the present value of future normal costs is called the actuarial liability, or past service liability.

**2. Amortization Method**

Under Act 44 of 2009, the unfunded actuarial liability is amortized as a level dollar amount over the lesser of:

- (a) (i) 30 years, with respect to the initial liability as of 1/1/85 (or first valuation);
- (ii) 20 years, with respect to actuarial gains and losses;
- (iii) 15 years, with respect to changes due to actuarial assumptions;
- (iv) 10 years, with respect to changes in benefits not mandated by the state for active members;
- (v) 1 year, with respect to changes in benefits not mandated by the state for currently retired members;
- (vi) 20 years, with respect to state mandated benefit changes;

or

- (b) The average assumed working lifetime of active employees as of the date the liability was established, rounded to the next highest whole year.

If the Plan for the prior biennial valuation was determined to be moderately or severely distressed, then the amortization period is only determined by (a).

**CITY OF ALLENTOWN FIREMEN'S PENSION PLAN  
ACTUARIAL VALUATION AS OF JANUARY 1, 2021**

**APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS**

Due to the Ordinance 57 passed by City Council on September 16, 2015 if the Plan is greater than 70% funded, the amortization amount is the lesser of the traditional amortization of individual bases using the amortization periods described above or the 10-year level-dollar rolling amortization of the total unfunded actuarial liability. This comparison between the two amortization amounts occurs biennially for the odd-year actuarially valuation, and the amortization method employed by the subsequent MMO amounts based upon the biennial valuation cannot change. For example, amortization method for the two MMO determinations associated with the unfunded actuarial liability as of the odd-year valuation date must, over the two year period, both be based on either the 10-year rolling amortization method or the traditional layered amortization method.

This 10-year rolling amortization method is asymptotic in nature, where 100% full funding of the UAL is not projected to occur if all assumptions are met and the 10-year-rolling method applies, although the funding ratio is projected to improve.

**3. Actuarial Value of Assets**

The actuarial value of assets is determined in accordance with Section 3.16 of Revenue Procedure 2000-40, using a five-year smoothing period. The resulting actuarial value of assets is then limited to be no greater than 120% and no less than 80% of the market value of assets on the valuation date.

**4. Disclosure regarding Models Used**

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate liabilities and project benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

Projections in this report were developed using P-scan, our proprietary tool for the intended purpose of developing projections. The model is also used to stress test the impact of volatile asset returns over the projection period. While the assumptions individually are reasonable for the underlying report that supports the projections, specifically for projection purposes, they are also considered reasonable in the aggregate.

**5. Changes in Method Since Last Valuation**

None