CHEIRON

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City of Allentown Officers and Employees Pension Plan

Actuarial Valuation Report as of January 1, 2020

Produced by Cheiron

September 2020

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September 28, 2020

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 Pension Plan as of January 1, 2020. The purpose of this report is to present the annual actuarial valuation of the City of Allentown Officers and Employees 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.

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, 2020 and do not determine any past or future Minimum Municipal Obligation (MMO). The January 1, 2021 actuarial valuation results will be used to determine the Plan's 2022 and 2023 MMO. The final MMO for 2022 is also dependent upon the payroll of the active population as provided by the City. For budgetary purposes, we have provided estimated MMO for 2022 using the results from the January 1, 2020 valuation. The table below summarizes the MMOs provided in this report:

	2020 MMO	2021 MMO	2022 MMO
Based on:			
-Valuation Date	1/1/2019	1/1/2019	1/1/2021*
-Payroll	2019	2020	2021**
Actual or Estimated MMO	Actual	Actual	Estimated

**Estimated using 1/1/2020 valuation results*

***Estimated by projecting current payroll*

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.

Board of Trustees
City of Allentown
September 28, 2020

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

Anastasia Dopko

Karen Zangara

Karen Zangara, FSA, EA, MAAA
Principal Consulting Actuary

Anastasia Dopko, FSA, EA, MAAA
Associate Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the City of Allentown Pension Plan as of January 1, 2020. 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 2022, and to provide the actual MMOs for 2020 and 2021 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 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 and provides the actual MMO for 2020 and 2021 and the estimated MMO for 2022. The actual 2021 MMO is based on the January 1, 2019 valuation results and payroll provided by the City of Allentown. The actual 2022 MMO will be based on the January 1, 2021 valuation results and will require payroll provided by the City of Allentown.

The appendices to this report contain supplemental information: 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.

FOREWORD

In preparing our report, we relied on information (some oral and some written) supplied by the City of Allentown ("City") and 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.

The actuarial assumptions were adopted by the Board. The mortality table adopted by the Board reflects projected mortality improvements and was reviewed by Cheiron for reasonability based on prior experience. The salary scale assumption adopted by the Board was reviewed by the City for reasonability based upon expected future salary increases and prior increases. The results of this report are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the Plan could vary from our results.

Finally, in preparing this report, we have conformed to generally accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

SECTION I – BOARD SUMMARY

This Plan is closed to new members as of June 3, 1976, and predominately provides for the benefits of those members who have retired. As such, it is expected that the contributions are mostly to bring the Plan to full funding to pay benefits and that the liabilities will decline over time.

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

Table I-1
Summary of Principal Plan Results

Valuation as of:	1/1/2019	1/1/2020	% Change
Participant Counts			
Actives	1	1	0.0%
Terminated Vested and Inactive Members	0	0	N/A
In Pay Status	117	108	-7.7%
Total	118	109	-7.6%
Annual Salaries of Active Members (from prior year)	$ 76,590	$ 78,833	2.9%
Average Annual Salary	76,590	78,833	2.9%
W-2 Wages for Active Members (from prior year)	76,590	78,833	2.9%
Annual Retirement Allowances for			
Retired Members and Beneficiaries	$ 1,825,779	$ 1,746,159	-4.4%
Average Monthly Retirement Benefit	1,300	1,347	3.6%
Financial Information			
Market Value of Assets (MVA)	$ 10,887,569	$ 10,771,039	-1.1%
Actuarial Value of Assets (AVA)	11,728,438	10,554,983	-10.0%
Actuarial Liability	$ 12,913,821	$ 12,078,320	-6.5%
Unfunded Actuarial Liability	1,185,383	1,523,337	28.5%
Funding Ratio (MVA)	84.3%	89.2%	
Funding Ratio (AVA)	90.8%	87.4%	
Contributions and Cash Flows			
Contribution (actual/*expected)*	$ 207,737	*$ 234,682*	13.0%
Prior Year Benefit Payments	1,877,646	1,794,179	-4.4%
Prior Year Administrative Expenses	64,142	65,602	2.3%
Prior Year Total Investment Income	(264,012)	1,535,514	

SECTION I – BOARD SUMMARY

General Comments

- For plans that are 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 C, or the average future service for the active participants in the Plan which is 0.98 years as of January 1, 2020 and, per Act 205, rounded up to 1 year. 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

- In order to reduce the MMO volatility resulting from the short amortization period discussed above, 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%.
- The Market Value of Assets returned 15.26% in 2019.
- For this valuation, the Actuarial Value of Asset (AVA) method which smooths gains and losses over 5 years was applied. For the AVA, the Plan experienced a loss of $230,913 recognizing prior years' losses when coupled with this year's market value gain and which yielded a return of 4.39% versus the assumed return rate of 6.50%.
- During calendar year 2019, the Officers and Employees Pension Plan received $207,737 in contributions and paid out $1,859,781 in benefits and expenses. Comparing these two amounts results in a negative cash flow of $1,652,044, which means the Plan's benefits and expenses are not covered by contributions. In fact, because this is such a mature plan, the expected investment returns are not expected to cover this negative cash flow.
- On the liability side, the Plan experienced a loss totaling $166,473 due to fewer participant deaths than assumed.
- Overall, the Plan experienced a net loss (investment and liability gains) of $397,386 during 2019. Since the January 1, 2019 valuation there was a total loss of $801,569 due to the explicit gains/losses over the 2019 period from experience as described above and the timing of contributions. The loss due to the timing of contributions and the 10-year amortization of the UAL that was used to determine the MMO instead of the traditional amortization was $404,183.
- The total new loss base of $801,569 in 2020 will be amortized over 1 year. However, the rolling amortization produced the lower amount for the January 1, 2020 valuation.

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 mortality assumption presents the most risk to future actual measurements deviating from expected, as the majority of participants are in pay status and their primary experience is mortality. 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.

The City has alleviated the Plan's risk exposure to potential contribution volatility due by adopting Ordinance 57, which changed 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. If the 10-year level dollar amortization is the lesser amortization amount being paid in the MMO, then the plan will defer recognition of the Unfunded Actuarial Liability to future years.

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. For example, the proportion of the Plan's members that are in payment status has grown, which makes the volatility of mortality risk greater, which is expected for a mature plan.

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

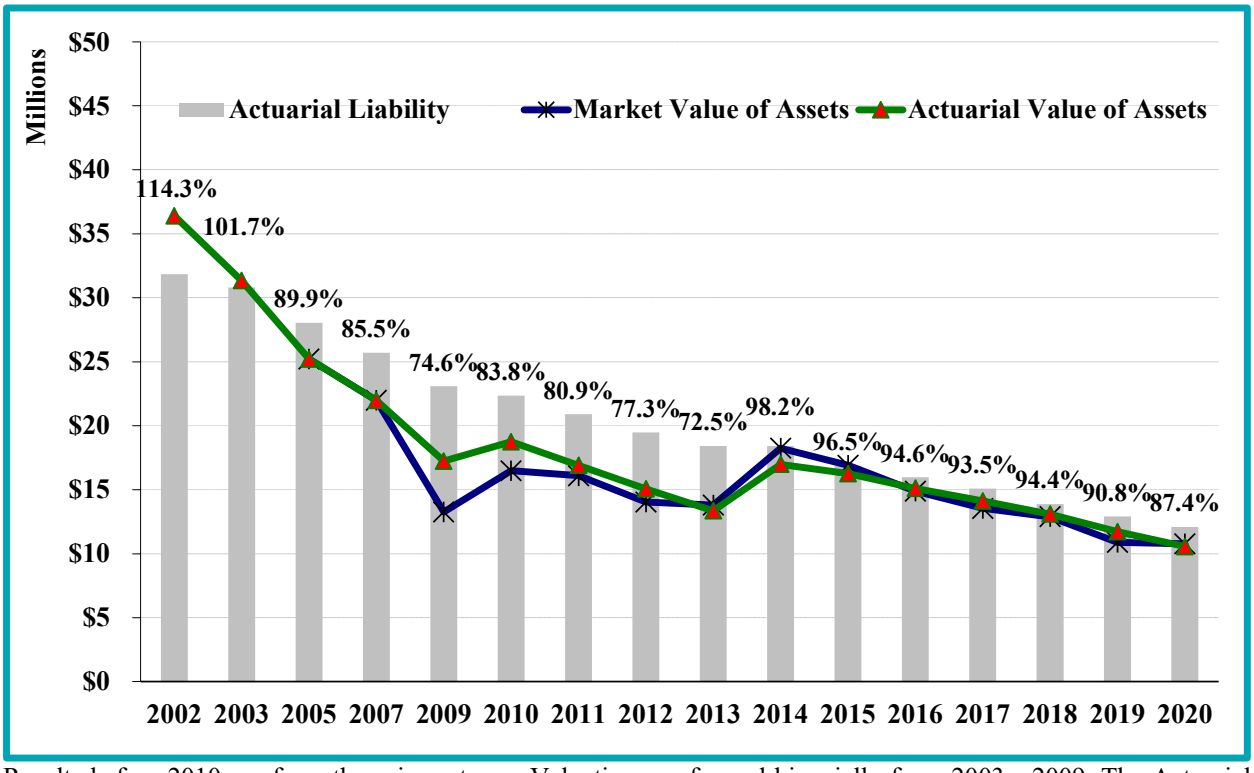
SECTION I – BOARD SUMMARY

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 assets values. Both Assets and Actuarial Liabilities will continue the general downward trend as retirees die. The Market Value of Assets was unavailable for 2002 and 2003, and in 2005 and 2007 the Actuarial Value of Assets equaled the Market Value of Assets. We compare the Actuarial Value of Assets to the Actuarial Liability in developing the funded percentages, which are shown in the graph labels above each grey bar. The January 1, 2014 assets reflect the $4.3 million contribution in 2013 proceeds from the pension obligation bonds and increased the funding ratio to 98.2%.

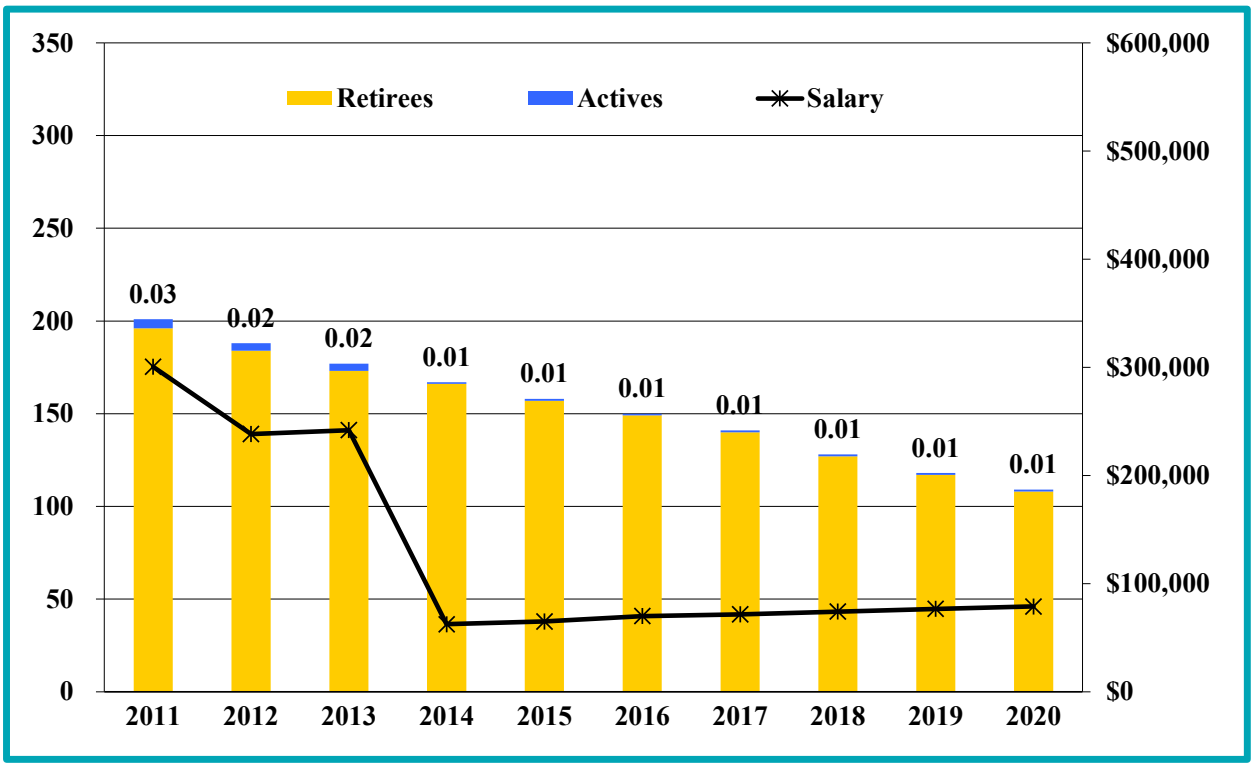


Results before 2010 are from the prior actuary. Valuations performed biennially from 2003 - 2009. The Actuarial Liability results for 2014 reflect the 2013 actuarial assumptions, reflecting all assumption changes since the prior Act 205 filing from 2015 forward, as required under Act 205.

SECTION I – BOARD SUMMARY

Participant Trends

Here we compare the membership counts (left-hand scale) and the total salary (right-hand scale). The counts between 2011 and 2020 have decreased due to deaths in the inactive population. The aggregate salary decreased sharply in 2014 because 3 active participants retired during 2013 and currently only one participant remains active. The ratio (at the top of each bar) is the number of active participants divided by the number of inactive participants. The ratio of active to inactive participants is a measure of maturity of the plan. When this ratio is below one, the fund is more mature. This creates an increased risk as most of the liabilities are attributable to inactive participants, and subsequently, require assets to pay their benefits. Any experience gain or loss can have a significant impact resulting in volatile costs from year to year even with the application of asset smoothing methods. As a closed plan made up mostly of retirees, costs as a percentage of active members is not an appropriate benchmark as most of the plan cost is to bring the plan to full-funding.

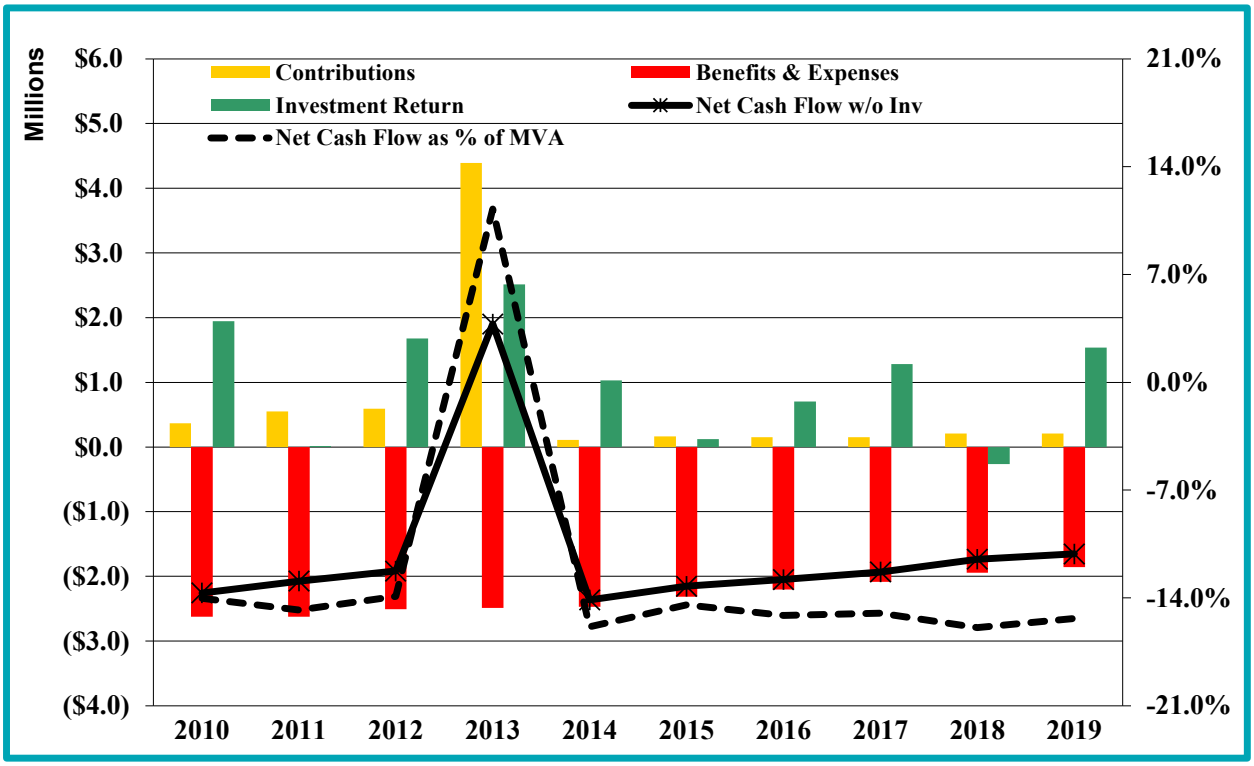


SECTION I – BOARD SUMMARY

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 of investing 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 a $4.4 million contribution, which includes $4.3 million in pension obligation bond proceeds, the plan had a substantial positive net cash flow in 2013. As anticipated, the plan experienced negative net cash flows from 2014-2019. The implication of a plan in a negative cash flow position is that return on investments must first cover the negative cash flow before the assets can increase. The negative cash flow is expected to continue as the plan is comprised almost entirely of retirees. The NCF as a percentage of the Market Value of Assets (right vertical axis) is about -12.3% on average over this ten year period.

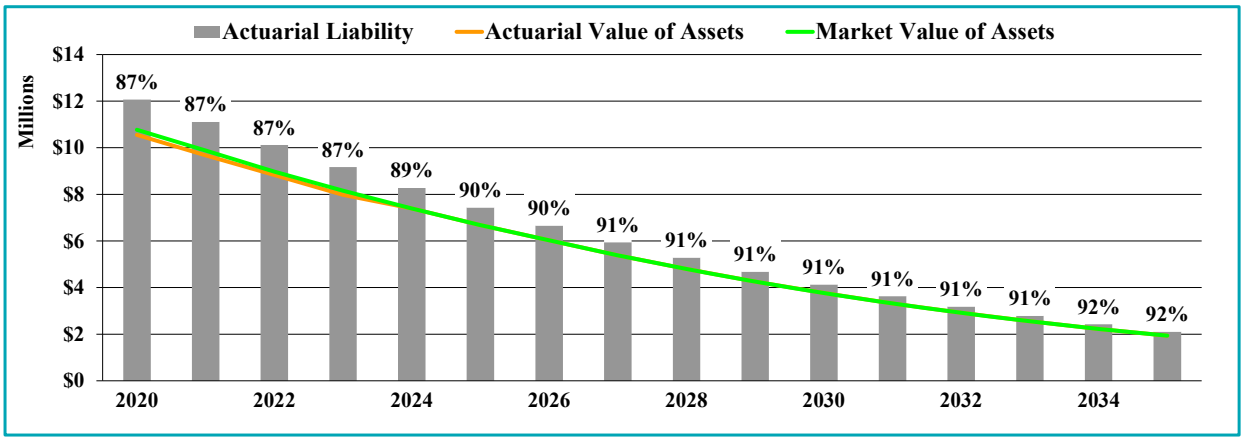


SECTION I – BOARD SUMMARY

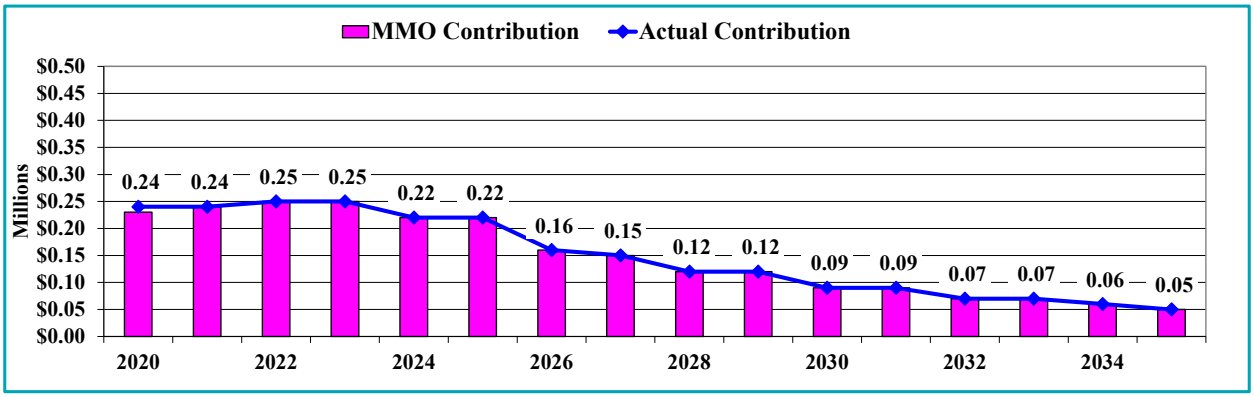
Baseline Projections

We have included two charts projecting the funded ratio and Minimal Municipal Obligations for the next 15 years, assuming that the Plan's assets earn 6.5%.

The grey 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 projected to converge over the next five years. This projection assumes all assumptions outlined in Appendix C are fully realized and there are no plan changes. The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars increases to 92% at the end of the 15-year period. Due to the 10-year rolling amortization of the unfunded liability, the funded ratio will not attain a 100% funding ratio but it will continue to approach the 100% level assuming all assumptions are met under the current amortization method. The UAL is projected to decrease on an absolute dollar basis, from $1,523,337 in 2020 to about $178,000 in 2035, as the assets and the liabilities are expected to decrease in tandem.



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 period is included in the calculation of the UAL amortization amount for the MMO.

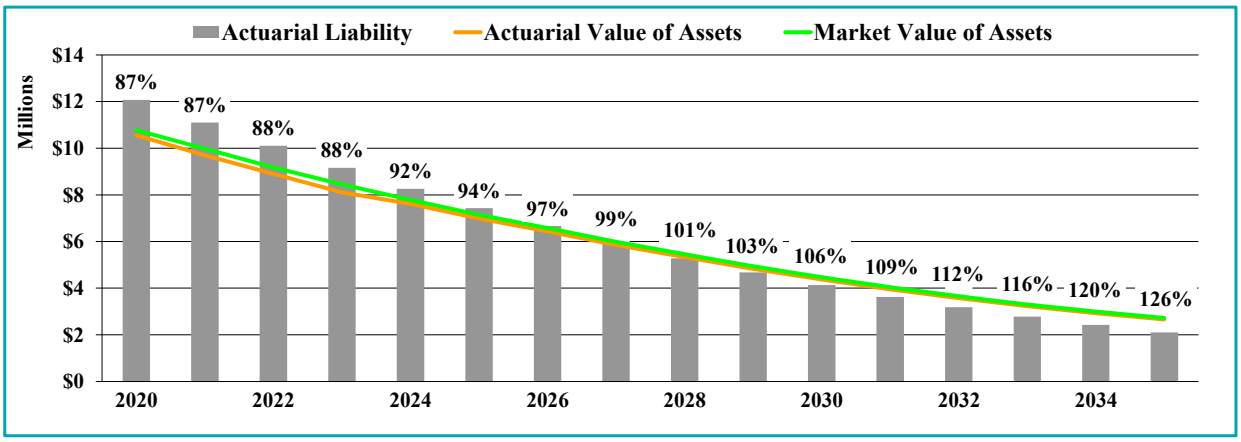


SECTION I – BOARD SUMMARY

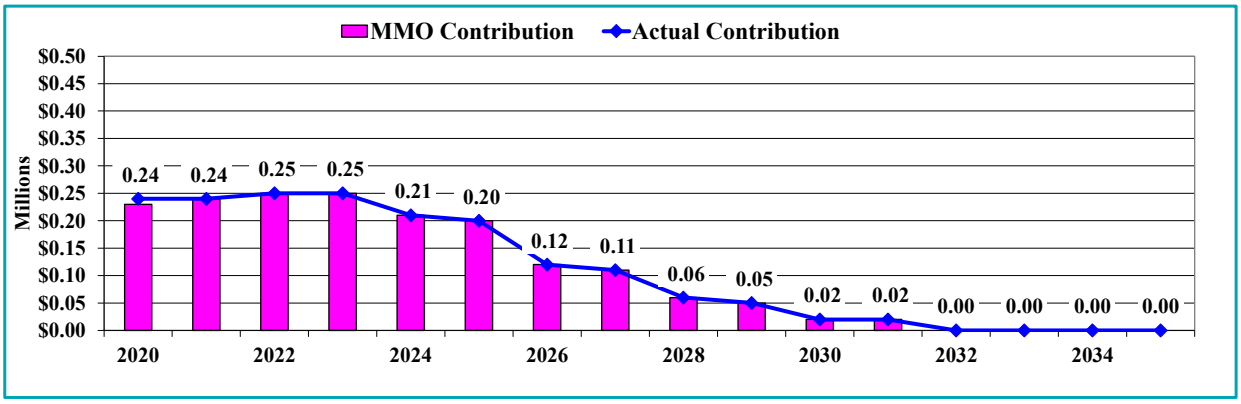
Projections with Asset Returns of 7.5%

The charts below show the expected progress of the Plan over 15 years, assuming that the Plan's assets earn 7.5%, 1.0% higher than the valuation assumption. All other assumptions are consistent with the Baseline projections.

The funded ratios (actuarial value of assets divided by liabilities) listed on top of each of the bars increase to 126% over 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 period is included in the calculation of the UAL amortization amount for the MMO.

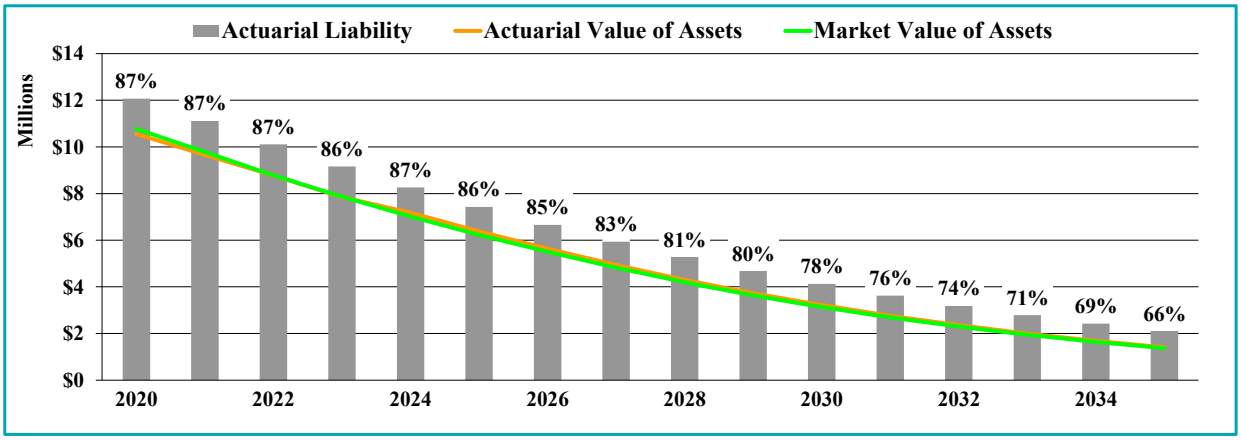


SECTION I – BOARD SUMMARY

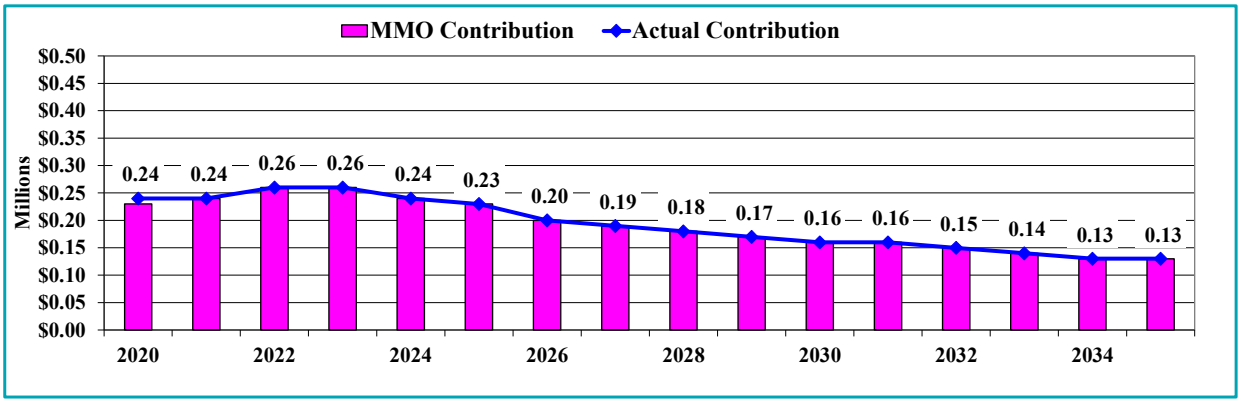
Projections with Asset Returns of 5.5%

The charts below show the expected progress of the Plan over 15 years, assuming that the Plan's assets earn 5.5%, 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 steadily decreases to 66%. 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 period is included in the calculation of the UAL amortization amount for the MMO. If the funding ratio is less than 70%, then the amortization payments will need to be based on the layered amortization. Under this example, this would occur in 2036 because the funded ratio is less than 70% in 2035, with the amortization period either 20 years if the Allentown pension plans are deemed moderately or severely distressed, or 1 year.



SECTION I – BOARD SUMMARY

These projections are based upon the January 1, 2020 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, or there are any changes in plan provisions or applicable laws) *the results would 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 and new projections are provided 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 upon actual participant data included in the actuarial valuation as of January 1 of each year.

Table I-2
Minimum Municipal Obligation (Actual and *Estimated)*

Based Upon Valuation Report	**1/1/2019**	**1/1/2019**	**1/1/2021**
Calendar Year	**2020**	**2021**	***2022***
(1) MMO Pay *(Estimated)*	$ 78,833	$ 84,696	*$ 89,000*
(2) Normal Cost %	12.50%	12.50%	*12.53%*
(3) Total Normal Cost	9,854	10,587	*11,152*
(4) Amortization of UAL	154,828	154,828	*190,000*
(5) Total Administration Expense	70,000	70,000	*60,000*
(6) Total Financial Requirement	$ 234,682	$ 235,415	*$ 261,152*
(7) Estimated Employee Contributions	4,336	4,658	*4,895*
(8) Minimum Municipal Obligation [(6)-(7)]	$ 230,346	$ 230,757	*$ 256,257*

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 upon 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, 2019 and January 1, 2020;
- 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*

	1/1/2019	1/1/2020
Assets		
Investments	$ 10,876,720	$ 10,830,190
Receivables	15,700	16,106
Due from City's General Fund	2,362	0
Total Assets	$ 10,894,782	$ 10,846,296
Liabilities		
Accounts Payable	$ 7,013	$ 4,930
Due to City's General Fund	200	70,327
Total Liabilities	$ 7,213	$ 75,257
Net Assets Available for Benefits	**$ 10,887,569**	**$ 10,771,039**

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

SECTION II – ASSETS

Changes in Market Value

The components of asset change are:

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

The specific changes during the 2018 and 2019 plan years are presented below:

Table II-2
Changes in Market Value

	2018	2019
Beginning of Year Assets	$ 12,885,730	$ 10,887,569
Additions		
Employer Contributions	$ 203,427	$ 203,401
Member Contributions	4,212	4,336
Interest and Dividends	211,305	213,465
Net Appreciation / (Depreciation)	(475,317)	1,322,049
Total Additions	$ (56,373)	$ 1,743,251
Deductions		
Benefit Payments	$ 1,877,646	$ 1,794,179
Administrative expense	64,142	65,602
Total Deductions	$ 1,941,788	$ 1,859,781
Net Change in Market Value of Assets	$ (1,998,161)	$ (116,530)
End of Year Assets	$ 10,887,569	$ 10,771,039

The two-year average of the administrative expenses paid from the plan assets, rounded to the nearest $10,000, is $60,000. This is the projected expense estimate for the 2022 MMO determination. The estimated benefit payments for the current plan year are $1,698,621.

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 6.50% assumption

Table II-3
Market Value of Assets Gain/(Loss)

Item	2018	2019	Total Period
Beginning of Year Market Value	$ 12,885,730	$ 10,887,569	$ 12,885,730
Contributions	207,639	207,737	415,376
Benefit Payments	(1,877,646)	(1,794,179)	(3,671,825)
Administrative Expenses	(64,142)	(65,602)	(129,744)
Expected Investment Earnings (6.50%)	782,100	654,846	1,504,943
Expected Market Value on December 31	$ 11,933,681	$ 9,890,371	$ 11,004,480
Investment Gain / (Loss)	(1,046,112)	880,668	(233,441)
End of Year Market Value	$ 10,887,569	$ 10,771,039	$ 10,771,039
Return	-2.20%	15.26%	5.52%

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.

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.

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

Table II-4
Development of Actuarial Value of Assets
5-Year Smoothing Method

Market Value of Assets as of January 1, 2020					$ 10,771,039
Plan Year	**Investment Gains / (Losses)**	**Percent Recognized**	**Percent Deferred**		**Amount Deferred**
2015	$ (948,345)	100%	0%		$ 0
2016	(230,953)	80%	20%		(46,191)
2017	463,451	60%	40%		185,380
2018	(1,046,112)	40%	60%		(627,667)
2019	880,668	20%	80%		704,534
					$ 216,056
Preliminary Actuarial Value as of January 1, 2020					$ 10,554,983
Corridor for Actuarial Value					
- Lower Limit				80%	$ 8,616,831
- Upper Limit				120%	$ 12,925,247
Actuarial Value of Assets as of January 1, 2020					$ 10,554,983
- as a percent of Market Value of Assets					98.0%

SECTION II – ASSETS

Table II-5
Actuarial Value of Assets Gain/(Loss)

Item	2018	2019	Total Period
Beginning of Year Actuarial Value	$ 13,100,702	$ 11,728,438	$ 13,100,702
Contributions	207,639	207,737	415,376
Benefit Payments	(1,877,646)	(1,794,179)	(3,671,825)
Administrative Expenses	(64,142)	(65,602)	(129,744)
Expected Investment Earnings (6.50%)	796,073	709,502	1,533,798
Expected Actuarial Value on December 31	$ 12,162,626	$ 10,785,896	$ 11,248,307
Investment Gain / (Loss)	(434,188)	(230,913)	(693,324)
End of Year Actuarial Value	$ 11,728,438	$ 10,554,983	$ 10,554,983
Return	2.96%	4.39%	3.62%

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.

SECTION III – LIABILITIES

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

- **Disclosure** of Plan liabilities at January 1, 2019 and January 1, 2020;
- Statement of **changes** in these liabilities during the year; and
- Development of the actuarial gain / loss for the year ending December 31, 2019

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 action.

SECTION III – LIABILITIES

Table III-1
Liabilities/Net (Surplus)/Unfunded

		January 1, 2019	January 1, 2020
Present Value of Future Benefits			
(1)	Active Participant Benefits		
	Retirement Benefits	$ 677,888	$ 723,929
	Disability Benefits	12,257	7,085
	Survivor Benefits	6,685	3,699
	Refund of Members Contribution with Interest	0	0
	Other: Vested Benefits	0	0
	Total Active Participant Benefits*	$ 696,830	$ 734,713
(2)	Inactive Participant Benefits		
	Retirement Benefits	$ 9,631,785	$ 9,045,213
	Disability Benefits	0	0
	Survivor Benefits	2,604,012	2,308,270
	Terminated Vested and Inactive Members	0	0
	Total Inactive Participant Benefits	$ 12,235,797	$ 11,353,483
(3)	**Present Value of Benefits (PVFB)** [(1) +(2)]	**$ 12,932,627**	**$ 12,088,196**
	Actuarial Value of Assets (AVA)	$ 11,728,438	$ 10,554,983
	Present Value of Future Contributions	1,204,189	1,533,213
	Total Resources	**$ 12,932,627**	**$ 12,088,196**
Actuarial Liability			
	Present Value of Benefits (PVFB)	$ 12,932,627	$ 12,088,196
	Present Value of Future Normal Costs (PVFNC)	18,806	9,876
	Actuarial Liability (AL = PVFB – PVFNC)	**$ 12,913,821**	**$ 12,078,320**
	Actuarial Value of Assets (AVA)	11,728,438	10,554,983
	Net (Surplus)/Unfunded (AL – AVA)	**$ 1,185,383**	**$ 1,523,337**

* The amount of the accumulated member contributions without accrued interest is $93,180 for all active members as of January 1, 2020.

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	$	12,913,821
Liabilities on 01/01/2020		12,078,320
Liability Increase (Decrease)	$	(835,501)
Change Due to:		
Plan Amendment	$	0
Assumption Change		0
Method Change		0
Accrual of Benefits		9,577
Benefit Payments		(1,794,179)
Passage of Time		782,628
Liability (Gain)/Loss		166,473
Total	$	(835,501)

SECTION III – LIABILITIES

Table III-3
Reconciliation of the Unfunded Actuarial Liability

	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability
Beginning of the Year Values as of 01/01/2019	**$ 12,913,821**	**$ (11,728,438)**	**$ 1,185,383**
Expected Normal Cost	9,577	N/A	9,577
Contributions (includes estimated expenses)	N/A	$ (207,737)	$ (207,737)
Benefit Payments	$ (1,794,179)	1,794,179	0
Actual Expenses	N/A	65,602	65,602
Plan Amendment	$ 0	$ 0	$ 0
Assumption Change	0	0	0
Expected Interest			
Interest on Initial Value	$ 839,398	$ (762,349)	$ 77,049
Interest on Normal Cost	623	0	623
Interest on Contributions	0	(6,645)	(6,645)
Interest on Benefit Payments	(57,393)	57,393	0
Interest on Expenses	0	2,099	2,099
Total Expected Interest	$ 782,628	$ (709,502)	$ 73,126
Expected End of Year Values as of 01/01/2020	**$ 11,911,847**	**$ (10,785,896)**	**$ 1,125,951**
(Gain)/Loss	166,473	230,913	397,386
Actual End of Year Values as of 01/01/2020	**$ 12,078,320**	**$ (10,554,983)**	**$ 1,523,337**

In addition to the explicit loss determined in the prior tables, there are additional losses due to the timing of amortization payments and the amount of amortization payment under the 10-year rolling amortization of the UAL, which was used for the 2019 MMO, being less than the traditional amortization.

The following table provides the Normal Cost, which is the cost of 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 2020 and 2021 MMOs.

Table III-4
Normal Cost and Normal Cost as Percentage of W-2 Payroll

	2018	2019	2020
Normal Cost	$ 9,983	$ 9,577	$ 9,877
W-2 Wages for active members from prior year	$ 74,062	$ 76,590	$ 78,833
Normal Cost as a Percent of the Estimated Payroll	13.48%	12.50%	12.53%

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 upon 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 C of this report.

In the following charts, we show the actual MMO for 2020 and 2021. The payroll amount shown reflects the information provided by the City for those years.

The MMO for 2022 has been estimated based on the results of the January 1, 2020 valuation and this valuation, respectively, as well as the estimated 2022 payrolls. Additionally, the amortization amount in the 2022 MMO calculation incorporates expected 2021 calendar year results, assuming all assumptions are realized as outlined in this report.

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 upon actual participant data included in the actuarial valuation as of January 1 of each year.

Table IV-1
Minimum Municipal Obligation (Actual and *Estimated*)

Based on Valuation Report:	**1/1/2019**	**1/1/2019**	***1/1/2021***
Calendar Year:	**2020**	**2021**	***2022***
1. MMO pay (actual/*estimated)* (prior year W2 pay reported by the City)	$ 78,833	$ 84,696	*$ 89,000*
2. Total Normal Cost Percentage	12.50%	12.50%	*12.53%*
3. Total Normal Cost [(1) x (2)]	$ 9,854	$ 10,587	*$ 11,152*
4. Total Amortization Requirement	154,828	154,828	*190,000*
5. Total Administrative Expenses	70,000	70,000	*60,000*
6. **Total Financial Requirement** [(3) + (4) + (5)]	**$ 234,682**	**$ 235,415**	***$ 261,152***
7. Estimated Member Contribution Rate	5.50%	5.50%	*5.50%*
8. Estimated Member Contributions [(1) x Member Contribution Rate]	4,336	4,658	*4,895*
9. Estimated Employer Portion of MMO [(6) - (8)]	$ 230,346	$ 230,757	*$ 256,257*

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

The following table summarizes the development of the gains and losses from 2019 to 2020.

Table IV-2 Development of Actuarial Gain / (Loss)		
Unfunded Liability as of 01/01/2019	$	1,185,383
Normal Cost	$	9,577
Contributions made		
a. Employee Contributions	$	(4,336)
b. Local Portion		(203,401)
Actual Expenses	$	65,602
Interest on above		73,126
Plan Changes	$	0
Assumption Changes		0
Method Changes		0
Expected Unfunded Liability as of 01/01/2020	$	1,125,951
Actual Unfunded Liability as of 01/01/2020		1,523,337
Actuarial Gain / (Loss)	$	(397,386)
- Investment Gain / (Loss)		(230,913)
- Liability Gain / (Loss)		(166,473)

This table provides a complete analysis of the gains/(losses) for the new amortization base.

Table IV-3 Total Gain/(Loss)		
Investment Gain / (Loss)	$	(230,913)
Liability Gain / (Loss)		(166,473)
Timing and interest Gain / (Loss)		(404,183)
Total Gain/(Loss)	$	(801,569)

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

The following table provides the schedule of amortization bases as of January 1, 2020. The total $801,569 actuarial loss reflects the explicit loss for 2019 as provided above in addition to the timing and interest loss due to the delayed contributions as followed under Act 205. The January 1, 2021 valuation will reflect the final amortization bases and the unfunded liability, and the current 2020 amortization base will be absorbed by the 2021 amortization base.

Table IV-4a

Schedule of Amortization Bases Including Bond Proceeds for Minimum Contributions as of January 1, 2020

Original Date	Type	Original Amount	Original Period	Remaining Period	Payment	Balance	Date Fully Amortized
1/1/2007	Actuarial Loss	1,127,419	15	2	17,779	34,472	12/31/2021
1/1/2009	Actuarial Loss	6,444,394	20	9	85,341	604,962	12/31/2028
1/1/2009	Assumption Change	(3,978,139)	20	9	(52,682)	(373,447)	12/31/2028
1/1/2011	Actuarial Gain	(1,356,897)	20	11	(17,800)	(145,765)	12/31/2030
1/1/2013	Assumption Change	(73,714)	15	8	(1,125)	(7,298)	12/31/2027
1/1/2013	Actuarial Loss	1,674,508	20	13	21,776	199,444	12/31/2032
1/1/2019	Assumption Change	(57,537)	2	1	(29,674)	(29,674)	12/31/2020
1/1/2019	Actuarial Loss	851,350	2	1	439,074	439,074	12/31/2020
1/1/2020	Actuarial Loss	801,569	1	1	801,569	801,569	12/31/2020
					$ 1,264,258	$ 1,523,337	

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

In 2015, the City adopted Ordinance 57 changing the plan's amortization method. The Unfunded Actuarial Liability Amortization as outlined in Appendix C 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 2020.

Table IV-4b
UAL Amortization Payment

1. Traditional Amortization	$	1,264,258
2. 10-year Rolling Amortization	$	198,970
3. Minimum of (1) or (2)	$	198,970

APPENDIX A – MEMBERSHIP INFORMATION

The data for this valuation was provided by the City as of January 1, 2020. 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
- Counts and Total Benefit Amount by Age for Retirees, Beneficiaries, and Disabled Participants
- Counts and Total Benefit Amount by Age for Terminated Vested Participants

SUMMARY OF PARTICIPANT DATA

	1/1/2019	1/1/2020
Active Participants		
Count	1	1
New Entrants	0	0
Average Age	N/A	N/A
Average Benefit Service	N/A	N/A
Annual Payroll	$ 76,590	$ 78,833
Retirees and Beneficiaries Receiving Payments		
Count	117	108
Average Age	83.7	84.3
Annual Benefits	$ 1,825,779	$ 1,746,159
Average Monthly Benefit	$ 1,300	$ 1,347
Terminated Vested Participants and Inactive Members		
Count	0	0
Accumulated Member Contributions w/o Interest	$ 0	$ 0
Annual Benefits	$ 0	$ 0
Average Monthly Benefit	$ 0	$ 0

APPENDIX A – MEMBERSHIP INFORMATION

Summary of Inactive Data as of January 1, 2020

AGE DISTRIBUTION OF INACTIVE PARTICIPANTS
PENSIONERS AND BENEFICIARIES RECEIVING BENEFITS AS OF JANUARY 1, 2020

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	0	$ 0	0	$ 0	0	$ 0	0	$ 0
55-59	0	0	0	0	0	0	0	0
60-64	0	0	2	6,103	0	0	2	6,103
65-69	0	0	1	2,880	0	0	1	2,880
70-74	0	0	6	15,072	5	3,823	11	18,895
75-79	0	0	7	15,325	1	1,153	8	16,478
80 & Over	0	0	40	71,125	46	30,032	86	101,157
Total	0	$ 0	56	$ 110,505	52	$ 35,008	**108**	**$ 145,513**

APPENDIX A – MEMBERSHIP INFORMATION

PARTICIPANT RECONCILIATION FROM JANUARY 1, 2019 TO JANUARY 1, 2020

	Actives	Term. Vested	Disabled	Retired	Beneficiary	Total
January 1, 2019 valuation	**1**		**0**	**59**	**58**	**118**
Additions						
Reductions						
a. Terminated - not vested						
b. Deaths without beneficiary				(3)	(6)	(9)
Total				**(3)**	**(6)**	**(9)**
Changes in status						
a. Terminated - vested						
b. Retired						
c. Disabled						
d. Died with beneficiary						
e. Data corrections						
Total						
January 1, 2020 valuation	**1**	**0**	**0**	**56**	**52**	**109**

Active Members	Count	Annual Pay
As of last valuation date	1	$ 76,590
Separations from active service		
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	0	0
Total separations	**0**	**$ 0**
As of current valuation date using prior pay	**1**	**$ 76,590**
As of current valuation date using current pay	**1**	**$ 78,833**
New entrants	0	0
As of current valuation date	**1**	**$ 78,833**

APPENDIX A – MEMBERSHIP INFORMATION

Service retirement benefit recipients	Count	Annual Benefit
As of last valuation date	59	$ 1,362,191
New Benefit recipients	0	0
Total	**59**	**$ 1,362,191**
Terminations	0	$ 0
Deaths	3	36,129
Others	0	0
Total terminations	**3**	**$ 36,129**
COLA increase		0
Benefit Decrease		0
As of current valuation date	**56**	**$ 1,326,062**

Surviving Spouses	Count	Annual Benefit
As of last valuation date	58	$ 463,588
New Benefit recipients	0	0
Total	**58**	**$ 463,588**
Terminations	0	$ 0
Deaths	6	43,491
Others	0	0
Total terminations	**6**	**$ 43,491**
As of current valuation date	**52**	**$ 420,097**

APPENDIX B – SUMMARY OF PLAN PROVISIONS

1. Last date plan was open to new employees

June 2, 1976.

2. Normal Retirement

Eligibility:	Age 55 and 20 years of service or age 60 with 12 years of service
Basic Benefit:	50% of the larger of the final annual salary or the highest average compensation of any 5 years of service, not less than $10,400 per year. If the member has less than twenty (20) years of service, then the basic benefit is prorated based upon credited service at retirement to twenty years. Payments are made bi-weekly.
Service Increment:	One-fortieth ($1/40^{th}$) of the basic benefit for each full year of service in excess of twenty (20). Service after age sixty-five shall not be counted. In order to be eligible for the service increment benefit, the employee must make additional contributions of one half of one-percent (1/2%) of the salary.

3. Early Retirement

None permitted.

4. Termination Benefits

Vesting: 100% after 12 years of service.

Vested Benefit: For involuntary terminations before age sixty (60) with more than twelve (12) years of service but less than twenty (20) years of service, the member will be eligible to retire at age 60 with the Basic Benefit prorated based upon credited service at the time of termination to twenty years.

Non-Vested Benefit: Refund of contributions (including any military buy-back contributions, if applicable) without interest.

5. Pre-Retirement and Post Retirement Survivor Benefits

Non-Vested Benefit: Refund of contributions (including any military buy-back contributions, if applicable) without interest.

Vested Benefit: 50% of the amount that the participant was receiving or was eligible to receive for life, not less than $5,200 per year.

APPENDIX B – SUMMARY OF PLAN PROVISIONS

6. Disability Benefits

Eligibility if not Retirement Eligible: Fifteen (15) years of service and less than age 60.

Benefit if not Retirement Eligible: 50% of the salary at date of disablement, prorated based upon the service at date of termination to twenty (20) years.

Benefit if Retirement Eligible: The normal retirement benefit.

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

- Three percent (3%) of compensation for members not covered by Social Security, else three and one-half percent (3 ½%) plus five percent (5%) in excess of that on which Social Security is payable (mandatory).
- One percent (1%) of compensation for survivor benefits (mandatory).
- One - half of one percent (½%) optional service contribution (not payable after age 65) (optional).
- Social Security Buy-Back Provision – one and one-half percent (1 ½%) of compensation up to the amount which Social Security is payable (optional).

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

None.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

A. Demographic and Economic Assumptions

It is our understanding that the demographic and economic assumptions are selected by the City of Allentown Pension Board. While some of these assumptions have been updated since Cheiron became the actuary to the Plan, an experience study has not been completed due to the size of the population and the associated lack of credible data.

1. Mortality Rates

Healthy Mortality: RP-2000 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

50% of the 1955 United Auto Workers Table.

Age	Male	Female
30	0.020%	0.030%
35	0.025%	0.040%
40	0.035%	0.050%
45	0.050%	0.075%
50	0.090%	0.130%
55	0.180%	0.245%
60	0.450%	0.605%
>=65	0.000%	0.000%

3. Termination Rates

None assumed.

4. Retirement Rates

The one remaining active participant is assumed to retire 100% in 2021.

5. Percent Married

All active members who are contributing for spouse's benefit are assumed to be married.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

6. Age of Spouse

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

7. Investment Return

6.50% per annum, net of investment management expenses.

8. Salary Increase

4.5% compounded annually

9. 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 not assumed to increase in the future.

10. Form of Annuity

50% Joint & Survivor for members contributing for spouse's benefit. Straight life basis for other members.

11. Rationale for Assumptions

In accordance with Actuarial Standard of Practice No. 27, the rationale for the 6.50% discount rate is based on the Board's risk preference, the Plan's current asset allocation, and the investment manager's capital market outlook.

For the demographic assumptions, the rate of retirement is based the Board's expectation. The rates of mortality were selected based on plan experienced. These rates are monitored annually for reasonability. Finally, we assume the one remaining active will not terminate due to his retirement eligibility.

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

None.

APPENDIX C – 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 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 salary based on the expected future active working lifetime 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).

APPENDIX C – 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 actuarial 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. The 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. Specifically, the actuarial value of assets as of January 1, 2008 is set equal to the market value of assets. For each subsequent plan year, the actuarial value shall be the market value minus a decreasing fraction (4/5, 3/5, 2/5, 1/5) of each gain or loss for each of the preceding four plan years. Gains or losses prior to January 1, 2008 are ignored. 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. Changes in Method Since Last Valuation

None.