



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

**City of Trenton Fire and Police
Retirement System
Actuarial Valuation Report**

Prepared as of June 30, 2022





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CONSULTING, LLC

The experience and dedication you deserve

November 14, 2022

Board of Trustees
City of Trenton Fire and Police Retirement System
Trenton, Michigan

RE: June 30, 2022 Actuarial Valuation Report

Dear Board:

In accordance with your request, we have completed an actuarial valuation of the City of Trenton Fire and Police Retirement System as of June 30, 2022 for the purpose of determining the contribution amount for the fiscal year ending June 30, 2024. The major findings of the valuation are contained in this report which reflects the benefit provisions in effect as of June 30, 2022. The benefit provisions and actuarial methods remain unchanged from the previous report. The actuarial assumptions were updated based on an experience study performed by Cavanaugh Macdonald and approved by the board on May 18, 2022.

In preparing this report, we relied, without audit, on information (some oral and some written) supplied by the City's staff. This information includes, but is not limited to, plan provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information in prior years. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different, and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the City have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the City and reasonable expectations) and which, in combination, offer our best estimate of anticipated experience affecting the City. Further, in our opinion, each actuarial assumption used is reasonably related to the experience of the Plan and to reasonable expectations which, in combination, represent our best estimate of anticipated experience under the Plan.



In order to prepare the results in this report, we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. Due the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The City has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix A.

Actuarial computations presented in this report are for purposes of determining the actuarial funding amounts for the City. The calculations in the enclosed report have been made on a basis consistent with our understanding of the City's funding policy and goals and the plan provisions described in Appendix B of this report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

This is to certify that the independent consulting actuaries are members of the American Academy of Actuaries and have experience in performing valuations for public retirement plans, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement Plan and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the Plan.

We respectfully submit the following report and look forward to discussing it with you.

A handwritten signature in blue ink, consisting of stylized, overlapping loops for the letters 'L' and 'L'.

Larry Langer, ASA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink, written in a cursive style that reads 'Wendy Ludbrook'.

Wendy Ludbrook, FSA, EA, FCA, MAAA
Consulting Actuary



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SUMMARY OF PRINCIPAL RESULTS

**ACTUARIAL VALUATION OF
CITY OF TRENTON FIRE AND POLICE
RETIREMENT SYSTEM AS OF JUNE 30, 2022**

VALUATION RESULTS

For convenience of reference, the principal results of the valuation and a comparison with the results of the previous valuation are summarized below:

Valuation Date	June 30, 2022	June 30, 2021	Change
Number of active members	58	59	(1.7%)
Active payroll	\$ 4,299,861	\$ 4,142,290	3.8%
Average annual compensation	74,136	70,208	5.6%
Number of retired members and beneficiaries	114	115	(0.9%)
Annual benefits	\$ 5,099,352	\$ 5,059,252	0.8%
Average annual benefit	44,731	43,993	1.7%
Assets:			
Actuarial value (AVA)	\$ 51,815,505	\$ 51,768,088	0.1%
Market value (MVA)	48,455,387	58,008,961	(16.5%)
AVA/MVA	106.9%	88.8%	20.4%
Actuarial Liability Actives	\$ 10,220,882	\$ 10,362,558	
Actuarial Liability Retirees and Beneficiaries	<u>58,358,071</u>	<u>57,114,385</u>	
Actuarial liability (AL)	\$ 68,578,953	\$ 67,476,943	1.6%
Unfunded actuarial liability (UAL)	16,763,448	15,708,855	6.7%
Funded ratio (AVA)	75.6%	76.7%	(1.5%)
Funded ratio (MVA)	70.7%	86.0%	(17.8%)
Amortization period	14 years	15 years	

Actuarial Contribution Rate for Fiscal Year Ending	June 30, 2024	June 30, 2023	Change
Normal cost	14.86%	16.34%	(9.1%)
Less Member Contribution Rate	<u>(6.00%)</u>	<u>(6.00%)</u>	0.0%
Net Employer Normal Cost	8.86%	10.34%	(14.3%)
Administrative Expenses	0.85%	0.00%	
Amortization of UAAL	<u>32.07%</u>	<u>33.83%</u>	(5.2%)
Actuarial Contribution Rate	41.78%	44.17%	(5.4%)
Actuarial Contribution Amount	\$ 2,006,294	\$ 1,884,590	6.5%

Note that the funded ratio does not indicate whether the Plan assets are sufficient to settle benefits earned to date. The funded ratio by itself also may not be indicative of future funding requirements.



SUMMARY OF PRINCIPAL RESULTS

OVERVIEW

This report presents the results of the June 30, 2022 actuarial valuation of the City of Trenton Fire and Police Retirement System (“the System”). The primary purposes of performing a valuation are to:

- Determine the actuarially determined employer contribution required to fund the System for the fiscal year ending two years from the valuation date
- Disclose asset and liability measures as of the valuation date
- Assess and disclose the key risks associated with funding the System
- Determine the experience of the System since the last valuation date, and
- Analyze and report on trends in contributions, assets, and liabilities over the past several years

This is the first actuarial valuation report prepared by Cavanaugh Macdonald Consulting, LLC (CMC). As part of our transition work, we replicated the June 30, 2021 actuarial valuation. Results were within acceptable limits, but as is typical in a takeover situation, there were some differences in the key valuation results. Based on our experience, these differences are neither unusual nor significant. A summary of the key actuarial measurements in the replication results is shown in the following table:

	June 30, 2021 Results		
	CMC	GRS	CMC/GRS
Present Value of Future Benefits	75,790,653	75,317,879	100.6%
Actuarial Accrued Liability	67,869,141	67,476,943	100.6%

The economic and demographic assumptions used in the valuation are based on the results of an experience review approved by the Board on May 18, 2022. The assumptions are first effective in the June 30, 2022 valuation. In our opinion the assumptions used in the valuation meet the parameters set by the Actuarial Standards of Practice. The impact of these changes in the actuarial assumptions resulted in an increase in liabilities of \$1,073,983. A summary of the actuarial assumptions and methods used in this actuarial valuation are shown in Appendix A of this report.

The valuation results provide a “snapshot” view of the System’s financial condition on June 30, 2022. The UAAL increased from \$15.7 million last year to \$16.8 million in this year’s valuation. The funded ratio (actuarial assets divided by actuarial accrued liability) declined from 76.7% in last year’s valuation to 75.6% in the current valuation. In addition, the Actuarial Determined Employer Contribution for FYE June 30, 2024 is \$2.00 million, an increase of \$0.12 million from the FYE 2023 contribution amount of \$1.88 million in last year’s valuation.

The Plan experienced a net actuarial loss for the year, which means the unfunded actuarial liability was higher than expected based on last year’s valuation. The rate of return on the actuarial value of assets was 6.1%. This return was below the assumed rate of 7.00%, resulting in a loss on the actuarial value of assets of \$437,737. The Plan’s liabilities experienced a loss of \$173,154 (actual liability lower than expected liability), which was primarily due to retirement and salary experience. The net result of all experience is an unfunded actuarial liability that is higher than expected by \$610,891.



SUMMARY OF PRINCIPAL RESULTS

ASSETS

As of the valuation date, the System had total assets of \$48.5 million, when measured on a market value basis. This represents a decrease of \$9.5 million from the June 30, 2021 amount of \$58.0 million. The market value of assets is not used directly in the actuarial valuation. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation (called the “actuarial value of assets”). Differences between the actual return on the market value of assets and the assumed return on the actuarial value of assets are recognized equally over a five-year period.

See Exhibit 2 for a detailed development of the actuarial value of assets. The components of the change in the market and actuarial value of assets for the System (in millions) are set forth in the following table.

	Market Value	Actuarial Value
Net Assets, June 30, 2021	\$ 58,008,961	\$ 51,768,088
- Employer and Member Contributions	2,410,444	2,410,444
- Benefit Payments and Expenses	(5,444,655)	(5,444,655)
- Investment Income	<u>(6,519,363)</u>	<u>3,081,628</u>
Net Assets, June 30, 2022	\$ 48,455,387	\$ 51,815,505
Estimated Rate of Return	-11.5%	6.1%

The annualized rate of return, measured on the actuarial value of assets, was about 6.1% and, measured on the market value of assets, was about -11.5%. The actuarial value of assets as of June 30, 2022 was \$51.8 million, which reflects an actuarial loss of \$437 thousand. Due to the asset smoothing method, the market value of assets is lower than the actuarial value of assets by \$3.3 million. This differential of \$3.3 million (net deferred investment gains) will flow through the asset smoothing method over the next five years.

LIABILITIES

The actuarial accrued liability is the portion of the present value of future benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and the asset value at the same date is referred to as the unfunded actuarial accrued liability, or surplus if the asset value exceeds the actuarial accrued liability. The unfunded actuarial accrued liability will be reduced if the employer’s contributions exceed the employer’s normal cost for the year, after allowing for interest earned on the previous balance of the unfunded actuarial accrued liability. Benefit improvements, experience gains and losses, and changes in actuarial assumptions and procedures will also impact the total actuarial accrued liability and the unfunded portion thereof.

The Unfunded Actuarial Accrued Liability for the System as of June 30, 2022 is:

Actuarial Accrued Liability	\$ 68,578,953
Actuarial Value of Assets	<u>51,815,505</u>
Unfunded Actuarial Accrued Liability	\$ 16,763,448



SUMMARY OF PRINCIPAL RESULTS

Analysis of the unfunded actuarial accrued liability strictly as a dollar amount can be misleading. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded status, the ratio of the actuarial value of assets to the actuarial accrued liability. This information for recent years is shown in the following table (in millions). Note that the funded ratio does not indicate whether or not the System has sufficient funds to settle all current obligations, nor is it necessarily indicative of the need for future funding.

	6/30/2022	6/30/2021	6/30/2020	6/30/2019	6/30/2018
Actuarial Value of Assets (\$M)	\$51.82	\$51.77	\$50.08	\$51.66	\$52.96
Actuarial Accrued Liability (\$M)	\$68.58	\$67.48	\$69.07	\$68.93	\$69.40
Funded Ratio (Actuarial Assets/AAL)	75.6%	76.7%	72.5%	74.9%	76.3%
Market Value of Assets (\$M)	\$48.46	\$58.01	\$47.33	\$50.58	\$51.69
Actuarial Accrued Liability (\$M)	\$68.58	\$67.48	\$69.07	\$68.93	\$69.40
Funded Ratio (MVA/AAL)	70.7%	86.0%	68.5%	73.4%	74.5%

As mentioned earlier in this report, due to the asset smoothing method there is a \$3.3 million difference between the market and actuarial value of assets. This deferred investment loss will flow through the asset smoothing method over the next five years, putting downward pressure on the actuarial value of assets and the System's funded ratio unless offset by future investment gains. The System's funded status will continue to be heavily dependent on future investment returns.

COMMENTS

The objective of the System's funding policy maintain stable contribution rates while maintaining adequate assets to fund all benefits expected to be paid to members and beneficiaries when due. The targeted funded ratio of the System is 100%. The System's funding policy is to be reviewed at least once every five years in conjunction with the required experience study performed by the Board's actuary.

In summary, we recommend the City contribute \$2,006,294 in fiscal year ending June 30, 2024 which is higher than the prior recommended contribution of \$1,884,590. The City's funding ratio is below 100%, a contribution at or exceeding the recommended amount can provide a buffer for adverse experience and offer the City more flexibility in funding the Plan in later years.

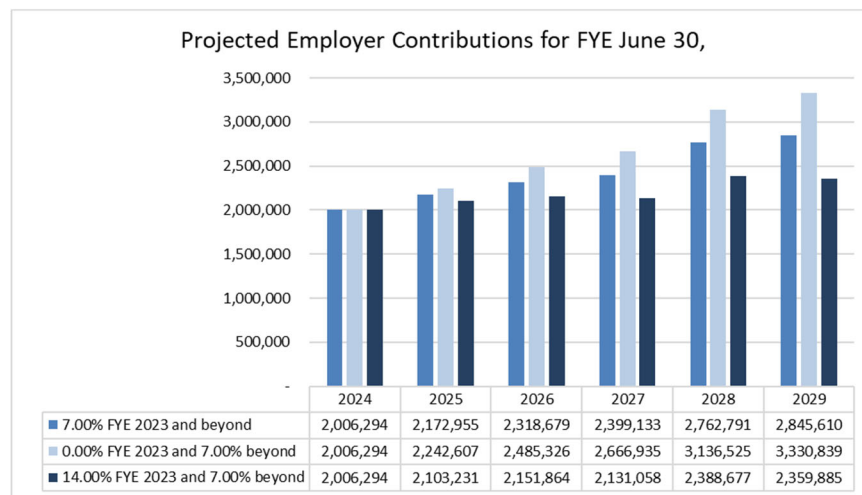
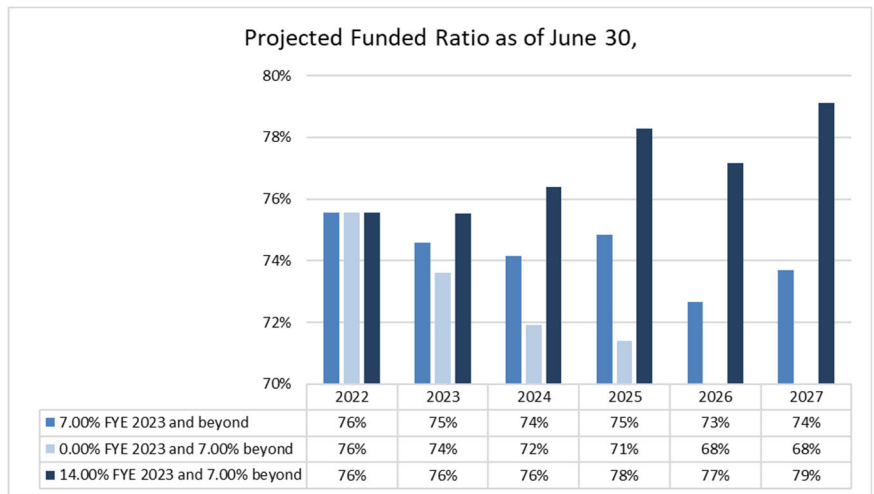


SUMMARY OF PRINCIPAL RESULTS

Projection of Future Results

Projecting the results from the valuation into the future provides valuable insight into the expected patterns of both employer contributions and funded ratio. The graphs below are based on the June 30, 2022 valuation and show the projected employer contributions and funded ratio if all actuarial assumptions are met. They also show two additional scenarios: if the asset return during FYE June 30, 2023 is 0% and if it is 14.50%. These scenarios are designed to show a range of outcomes related to investment return below the expected rate of return or double the expected rate of return and are for illustrative purposes only. Future results can vary due to factors outside of actual investment returns.

Consistent with other PERS across the country, returns during FYE June 30, 2022 were much less than the actuarial assumption. The shortfall will be phased in over the next five years. As a result, the funded ratio is expected to decrease. Over longer periods, following the funding policy is expected to result in the System achieving a funded ratio of 100%.



As the funded ratio declines, increased employer contributions are needed to achieve 100% funding. Achieving 100% will require higher contributions as shown below.



VALUATION RESULTS

EXHIBIT 1

RECONCILIATION OF MARKET VALUE OF ASSETS

As of June 30, 2022

		June 30, 2022
(1)	Market Value of Assets as of June 30, 2021	\$ 58,008,961
(2)	Expenditures	
	a. Benefit Payments	\$ (5,139,636)
	b. Refund of Contributions	(266,009)
	c. Administrative Expenses	(39,010)
	d. Total Expenditures	\$ (5,444,655)
(3)	Contributions	
	a. Employer Contributions	\$ 2,145,255
	b. Employee Contributions	265,189
	c. Total Contributions	\$ 2,410,444
(4)	Investment Income	\$ (6,519,363)
(5)	Market Value of Assets as of June 30, 2022 [(1) + (2d) + (3c) + (4)]	\$ 48,455,387
(8)	Investment Rate of Return, Net of Expenses	(11.5%)



VALUATION RESULTS

EXHIBIT 2

**DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS
As of June 30, 2022**

		June 30, 2022			
(1)	Market Value as of June 30, 2021	\$	58,008,961		
(2)	Total Expenditures	\$	(5,444,655)		
(3)	Total Contributions	\$	2,410,444		
(4)	Expected Return on Assets at 7.00%	\$	3,956,226		
(5)	Expected Market Value as of June 30, 2022 (1) + (2) + (3) + (4)	\$	58,930,976		
(6)	Actual Market Value as of June 30, 2022	\$	48,455,387		
(7)	Asset Gain/(Loss) 2022 (6) - (5)	\$	(10,475,589)		
Schedule of Asset Gains/(Losses)					
	Year	Original Amount	Recognized in Prior Years	Recognized in This Year	Recognized in Future Years
	2018	(426,156)	(340,925)	(85,231)	0
	2019	(1,250,099)	(750,059)	(250,020)	(250,020)
	2020	(3,015,299)	(1,206,120)	(603,060)	(1,206,119)
	2021	10,794,154	2,158,831	2,158,831	6,476,492
	2022	(10,475,589)	0	(2,095,118)	(8,380,471)
	Total	\$ (4,372,989)	\$ (138,273)	\$ (874,598)	\$ (3,360,118)
(8)	Asset Gain/(Loss) to be Recognized in the Future			\$	(3,360,118)
(9)	Actuarial Value as of June 30, 2022 (6) - (8)			\$	51,815,505
(10)	Estimated Rate of Return on the Actuarial Value of Assets				6.13%



VALUATION RESULTS

EXHIBIT 3

DEVELOPMENT OF THE UNFUNDED ACTUARIAL LIABILITY

As of June 30, 2022

		June 30, 2022
(1)	Present Value of Future Benefits	
	a. Active Members	\$ 18,501,390
	b. Retirees, Beneficiaries, and Inactive Vested Members	58,358,071
	c. Total	\$ 76,859,461
(2)	Present Value of Future Normal Costs	\$ 8,280,508
(3)	Actuarial Liability [(1c) - (2)]	\$ 68,578,953
(4)	Actuarial Value of Assets	\$ 51,815,505
(5)	Unfunded Actuarial Liability [(3) - (4)]	\$ 16,763,448



VALUATION RESULTS

EXHIBIT 4

ACTUARIAL CONTRIBUTION RATE

	Dollar Amount	% of Payroll
(1) FYE June 30, 2024 Employer Contribution:		
a. Normal Cost for FYE June 30, 2024:		
i Retirement	\$ 625,663	13.03%
ii Withdrawal	36,603	0.76%
iii Pre-Retirement Death	11,641	0.24%
iv Disability	39,699	0.83%
v Total	\$ 713,607	14.86%
b. Expected Member Contributions for FYE June 30, 2024	(288,064)	(6.00%)
c. Expected Administrative Expenses for FYE June 30, 2024	40,985	0.85%
d. UAAL Amortization Payment/(Credit) FYE June 30, 2024: 2e	1,539,766	32.07%
e. Total FYE June 30, 2024 Employer Contribution:	\$ 2,006,294	41.78%
(2) Development of UAAL Payment/Credit for FYE June 30, 2024:		
a. Expected Actuarial Accrued Liability (AAL) as of June 30, 2023:		
i AAL as of June 30, 2022	\$ 68,578,953	
ii Normal Cost for FYE June 30, 2023	696,378	
iii Expected Benefit Payments during FYE June 30, 2023	(5,150,180)	
iv Interest	4,647,280	
v Expected AAL as of June 30, 2023	\$ 68,772,431	
b. Expected Actuarial Value of Assets (AVA) as of June 30, 2023:		
i AVA as of June 30, 2022	\$ 51,815,506	
ii Contributions during FYE June 30, 2023	2,163,448	
iii Expected Benefit Payments during FYE June 30, 2023	(5,150,180)	
iv Administrative Expenses during FYE June 30, 2023	(39,985)	
v Interest	3,522,942	
vi Expected AVA as of June 30, 2023	\$ 52,311,731	
c. Expected UAAL as of June 30, 2023: 2av - 2bvi	16,460,700	
d. Amortization Factor over 14 years	10.6904	
e. Incremental 06/30/2023 UAAL Payment: (2c) ÷ (2d)	\$ 1,539,766	32.07%
(3) Projected Payroll for FYE June 30, 2024		\$ 4,801,062



VALUATION RESULTS

EXHIBIT 5
ACTUARIAL GAIN/(LOSS)

		June 30, 2022
(1)	Unfunded actuarial liability as of June 30, 2021	\$ 15,708,855
(2)	Normal cost for 2021 plan year	675,823
(3)	Interest on (1) and (2) to June 30, 2022	1,146,927
(4)	Contributions to the Plan for 2021 with interest to June 30, 2022	(2,493,383)
(5)	Administrative Expenses to the Plan for 2021 with interest to June 30, 2022	40,352
(6)	Benefit Provision Changes	0
(7)	Assumption Changes	1,073,983
(8)	Expected unfunded actuarial liability at June 30, 2022	\$ 16,152,557
(9)	Actual unfunded actuarial liability at June 30, 2022*	16,763,448
(10)	Actuarial Gain/(Loss) [(8) - (9)]	\$ (610,891)
(11)	Actuarial Value of Asset Gain/(Loss)	\$ (437,737)
(12)	Liability Gain/(Loss)	\$ (173,154)

*Determined using actuarial value of assets



EXHIBIT 6
VALUATION BALANCE SHEET
As of June 30, 2022

Assets	
Actuarial Value of Assets	\$ 51,815,505
Present Value of Future Contributions	
Normal Cost	\$ 8,280,508
Unfunded Actuarial Liability	<u>16,763,448</u>
Total	<u>25,043,956</u>
Total Assets	\$ 76,859,461
Liabilities	
Present Value of Future Benefits for Retirees, Beneficiaries, and Inactive Vested Members	\$ 58,358,071
Present Value of Future Benefits for Actives	<u>18,501,390</u>
Total Liabilities	\$ 76,859,461



VALUATION RESULTS

EXHIBIT 7

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Liability (AL) Entry Age (b)	Unfunded AL (UAL) (b) - (a)	Funded Ratio (a) / (b)	Valuation Covered Payroll (c)	UAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
6/30/2011	\$ 54,485,308	\$ 61,683,396	\$ 7,198,088	88.3%	\$ 2,881,249	249.8%
6/30/2012	53,891,504	63,797,993	9,906,489	84.5%	4,245,498	233.3%
6/30/2013	54,709,029	65,829,182	11,120,153	83.1%	4,376,244	254.1%
6/30/2014	54,501,943	66,314,563	11,812,620	82.2%	3,932,237	300.4%
6/30/2015	53,951,496	66,662,031	12,710,535	80.9%	3,876,578	327.9%
6/30/2016	53,030,880	66,906,300	13,875,420	79.3%	3,991,591	347.6%
6/30/2017	53,493,453	69,066,488	15,573,035	77.5%	3,974,464	391.8%
6/30/2018	52,960,484	69,401,011	16,440,527	76.3%	3,864,155	425.5%
6/30/2019	51,658,437	68,930,790	17,272,353	74.9%	4,009,427	430.8%
6/30/2020	50,079,470	69,068,730	18,989,260	72.5%	4,285,215	443.1%
6/30/2021	51,768,088	67,476,943	15,708,855	76.7%	4,142,290	379.2%
6/30/2022	51,815,505	68,578,953	16,763,448	75.6%	4,299,861	389.9%

All figures prior to 6/30/2019 were reported by the prior actuarial firm.



VALUATION RESULTS

EXHIBIT 8

SCHEDULE OF EMPLOYER CONTRIBUTIONS

The following table contains historical information about the City’s contributions:

Fiscal Year Ending	Actuarial Required Contribution (a)	Total Employer Contribution (b)	Percentage of ARC Contribution (b)/(a)
6/30/2010	\$485,174	\$485,174	100.00%
6/30/2011	801,120	801,113	100.00%
6/30/2012	1,116,778	1,116,778	100.00%
6/30/2013	1,050,331	1,050,327	100.00%
6/30/2014	1,329,444	1,329,445	100.00%
6/30/2015	\$1,411,401	\$1,411,401	100.00%
6/30/2016	1,424,943	1,424,943	100.00%
6/30/2017	1,479,258	1,479,258	100.00%
6/30/2018	1,579,481	1,579,481	100.00%
6/30/2019	1,734,037	1,734,037	100.00%
6/30/2020	\$1,788,696	\$1,788,696	100.00%
6/30/2021	1,912,113	1,912,113	100.00%
6/30/2022	2,145,255	2,145,255	100.00%
6/30/2023	1,884,590	TBD	TBD
6/30/2024	2,006,294	TBD	TBD

All figures prior to 6/30/2019 were reported by the prior actuarial firm.



RISK CONSIDERATIONS

RISK CONSIDERATIONS

Actuarial Standards of Practice are issued by the Actuarial Standards Board and are binding on credentialed actuaries practicing in the United States. These standards generally identify what the actuary should consider, document and disclose when performing an actuarial assignment. In September, 2017, Actuarial Standard of Practice Number 51, *Assessment and Disclosure of Risk in Measuring Pension Obligations*, (ASOP 51) was issued as final with application to measurement dates on or after November 1, 2018. This ASOP, which applies to funding valuations, actuarial projections, and actuarial cost studies of proposed plan changes, was first applicable for the June 30, 2019 actuarial valuation for the City of Trenton Fire and Police Retirement System (the System).

A typical retirement plan faces many different risks, but the greatest risk is the inability to make benefit payments when due. If plan assets are depleted, benefits may not be paid which could create legal risk or the plan could become “pay as you go”. The term “risk” is most commonly associated with an outcome with undesirable results. However, in the actuarial world, risk can be translated as uncertainty. The actuarial valuation process uses many actuarial assumptions to project how future contributions and investment returns will meet the cash flow needs for future benefit payments. Of course, we know that actual experience will not unfold exactly as anticipated by the assumptions and that uncertainty, whether favorable or unfavorable, creates risk. ASOP 51 defines risk as the potential of actual future measurements to deviate from expected results due to actual experience that is different than the actuarial assumptions.

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and price inflation;
- demographic risks such as mortality, payroll growth, aging population including the impact of baby boomers, and retirement ages;
- contribution risk, i.e., the potential for contribution rates to be too high for the plan sponsor/employer to pay; and
- external risks such as the regulatory and political environment.

There is a direct correlation between healthy, well-funded retirement plans and consistent contributions equal to the full actuarial contribution rate each year. The sources of funding for the Trenton Fire and Police Retirement System do not guarantee that the full contributions will be made, but because the System is currently well-funded, the amounts are currently sufficient. There is a risk if the funded status declines significantly that the contribution structure would not be able to return the System to being well-funded.

The other significant risk factor for the Trenton Fire and Police Retirement System is investment return because of the volatility of returns and the size of plan assets compared to payroll (see Exhibit 9). A perusal of historical returns reveals that the actual return each year is rarely close to the average return for the same period. This is to be expected, given the underlying capital market assumptions and the System’s asset allocation.

A key demographic risk for all retirement systems, including the Trenton Fire and Police Retirement System, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions anticipate some improvements in mortality experience over time and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a



RISK CONSIDERATIONS

significant medical breakthrough that could quickly increase liabilities. Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, which would also be significant, although more easily absorbed. While either of these events could happen, it represents a small probability and thus represents much less risk than the volatility associated with investment returns.

The following summarizes some historical information that helps indicate how certain key risk metrics have changed over time. Many are due to the maturing of the retirement system.



RISK CONSIDERATIONS

EXHIBIT 9

Historical Asset Volatility Ratios

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as the asset volatility ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility. In other words, it will be harder to recover from investment losses with increased contributions.

Actuarial Valuation Date	Market Value of Assets	Estimated Plan Year Payroll	Asset Volatility Ratio	Increase in ACR with a Return 10% Lower than Assumed*
6/30/2014	55,736,027	3,932,237	14.17	13.25%
6/30/2015	52,961,843	3,876,578	13.66	12.78%
6/30/2016	48,809,071	3,991,591	12.23	11.44%
6/30/2017	52,257,572	3,974,464	13.15	12.30%
6/30/2018	51,692,226	3,864,155	13.38	12.52%
6/30/2019	50,581,224	4,009,427	12.62	11.80%
6/30/2020	47,332,282	4,285,215	11.05	10.34%
6/30/2021	58,008,961	4,142,290	14.00	13.10%
6/30/2022	48,455,387	4,299,861	11.27	10.54%

Note: Results prior to 6/30/2019 were provided by the prior actuary.



RISK CONSIDERATIONS

EXHIBIT 10

Historical Cash Flows

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments. Note that negative cash flows are expected in mature retirement systems. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that may cause significant concerns. Although the Retirement System had a negative cash flow less than 5% in the past year, the average return over the past nine years is roughly 6.6%, so there is no concern for the foreseeable future.

Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments and Expenses	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/2014	\$ 55,736,027	\$ 1,589,058	\$ (5,095,136)	\$ (3,506,078)	(6.29%)
6/30/2015	52,961,843	1,652,501	(4,782,529)	(3,130,028)	(5.91%)
6/30/2016	48,809,071	1,666,985	(4,692,223)	(3,025,238)	(6.20%)
6/30/2017	52,257,572	1,728,176	(4,935,988)	(3,207,812)	(6.14%)
6/30/2018	51,692,226	1,822,061	(5,574,459)	(3,752,398)	(7.26%)
6/30/2019	50,581,224	1,983,795	(5,431,270)	(3,447,475)	(6.82%)
6/30/2020	47,332,282	2,047,508	(5,767,058)	(3,719,550)	(7.86%)
6/30/2021	58,008,961	2,167,068	(5,667,588)	(3,500,520)	(6.03%)
6/30/2022	48,455,387	2,410,444	(5,444,655)	(3,034,211)	(6.26%)

Note: Results prior to 6/30/2019 were provided by the prior actuary.



RISK CONSIDERATIONS

EXHIBIT 11

Comparison of Valuation Results under Alternate Investment Return Assumptions

The various risk factors for a given plan can have a significant impact – positive or negative – on the actuarial projection of liability and contribution rates. For example, if the expected return is decreased, it will result in an increase in the liability of the Plan as well as the actuarial contributions. Conversely, if we increase expected return, it will result in a decrease in the liability of the Plan as well as the actuarial contributions. The impact of an assumed rate of return one percent increase or decrease is shown in the table below:

	1% Decrease 6.00%	Current Interest Rate 7.00%	1% Increase 8.00%
Projected as of June 30, 2023:			
Actuarial Accrued Liability	\$ 76,468,840	\$ 68,772,431	\$ 62,332,061
Actuarial Value of Assets	<u>51,808,239</u>	<u>52,311,730</u>	<u>52,815,289</u>
Unfunded Actuarial Liability	\$ 24,660,601	\$ 16,763,448	\$ 9,516,772
Funded Ratio (Actuarial Assets)	67.8%	76.1%	84.7%
Contribution Rates FY 2023/2024			
Normal cost	19.31%	14.86%	11.52%
Member Contribution Rate	-6.00%	-6.00%	-6.00%
Administrative Expenses	0.85%	0.85%	0.85%
Amortization of UAAL	<u>45.22%</u>	<u>32.07%</u>	<u>19.66%</u>
Actuarial Contribution Rate*	59.38%	41.78%	26.04%

*Actuarial Contribution Rate cannot be less than 0.00%



EXHIBIT 12

EMPLOYER CONTRIBUTION UNDER UNIFORM ASSUMPTIONS
PER PUBLIC ACT 202

The exhibit below reports the funded status and nominal actuarially determined contribution reflecting the set of uniform assumptions established under Public Act 202 of 2017.

Line	Description	
1	Is this a primary unit?	Yes
2	Name of your retirement pension system	City of Trenton Fire and Police Retirement System
3 Financial Information - Most Recent Audit Report		
4	Retirement pension system's assets	48,455,387
5	Retirement pension system's liabilities	68,931,607
6	Funded ratio	70.3%
7	Actuarially determined contribution	2,006,294
8	Governmental fund revenues	to be provided by Trenton
9	All systems combined ADV/Gov. Revenues	to be provided by Trenton
10 Membership - Most Recent Actuarial Funding Valuation		
11	Number of active members	58
12	Number of inactive members	0
13	Number of retirees and beneficiaries	114
14 Investment Performance		
15	Actual rate of return - prior 1 year period	-11.5%
16	Actual rate of return - prior 5 year period	to be provided by Trenton
17	Actual rate of return - prior 10 year period	to be provided by Trenton
18 Actuarial Assumptions - Most Recent Actuarial Funding Valuation		
19	Investment return	7.00%
20	Amortization method	level dollar
21	Amortization period	14 years
22	Closed to new entrants?	No
23 Uniform Assumptions		
24	Actuarial value of assets	51,815,505
25	Actuarial accrued liabilities	69,555,427
26	Funded ratio	74.5%
27	Actuarially determined contribution	2,133,854
28	All systems combined ADV/Gov. Revenues	to be provided by Trenton
29 Pension Trigger Summary		
30	Does the system trigger "underfunded status"?	No



PUBLIC ACT 202 INFORMATION

EXHIBIT 13

PUBLIC ACT 202 ASSUMPTIONS

A comparison of the uniform assumptions and the valuation assumptions is shown below. All other assumptions and methods not included in this table were based on the same assumptions and methods that were used for the valuation.

Assumptions	Uniform Assumptions	Assumptions Used in the Calculations
Investment Return	Maximum of 6.85%	6.85%
Discount Rate	Maximum of 6.85% for periods which projected assets are sufficient to make projected benefit payments, Maximum of 2.16% in other years	6.85%
Salary Increase	minimum of 3.00%	table based on service, Minimum rate is 3.00%
Mortality Table	A version of the Pub-2010 mortality tables with future mortality improvements projected generationally using scale MP-2020	Pub-2010 mortality tables with future mortality improvements projected generationally using scale MP-2021
Amortization of Unfunded Actuarial Accrued Liability	Maximum closed period of 18 years	14 years



APPENDIX A – ACTUARIAL ASSUMPTIONS AND METHODS

ACTUARIAL COST METHOD

The actuarial method is the mathematical process which determines the contributions required to pay for the present value of benefits by allocating costs to the years of an employee's career. Some costs are allocated to future years in an employee's career (present value of future normal costs) and other costs are allocated to past years (accrued liability).

The portion of the accrued liability (or actuarial liability) which is not covered by the assets of the Plan is called the unfunded accrued liability. The value of the assets used in the actuarial process must take into account fair market value, but this may be done in a way which eliminates much of the short-term fluctuation of market value from one valuation to the next.

For the current year, the method produces a normal cost. Payment of the normal cost each year would eventually discharge the present value of future normal costs.

Valuations to determine contributions to the City of Trenton Fire and Police Retirement System use the Entry Age Normal cost method.

Under this actuarial method, an allocation to past service and future service is made by spreading the costs over an employee's career as a level percentage of pay. This is accomplished as follows:

- The expected pension benefit (based on past and future service) at the assumed retirement age is determined for each employee.
- The normal cost is computed for each employee as a level percentage of pay, assuming that such percentage of pay is paid from the employee's entry age into employment to normal retirement date. This normal cost is determined so that the accumulated value at normal retirement is sufficient to provide the expected pension benefits. (The sum of the normal costs for all employees determines the normal cost for the plan.)
- The present value of future payments of normal cost is determined for each employee based on the number of expected years with the company to the assumed retirement age.
- The sum of such values for all employees determines the present value of future normal costs.

The portion of the present value of benefits which is not covered by future normal costs is called the accrued liability. It is the amount to which past normal costs would have accumulated had they been paid each year in the employee's career and had all the assumptions been realized. The unfunded accrued liability is the amount by which the accrued liability exceeds the valuation assets.

The calculations for any disability, termination, or death benefits follow the above procedure taking into consideration that the entitlement to the benefits may begin at various future times. Each age prior to retirement has associated with it appropriate probabilities of disability, termination, and death.



APPENDIX A – ACTUARIAL ASSUMPTIONS AND METHODS

ASSET VALUATION METHOD

The investment gains or losses of each valuation period are recognized annually in level amounts over a period not to exceed 5 years. Investment gains or losses are calculated as the difference between actual and expected investment income. The actuarial value of assets is calculated by taking the actuarial value of assets at the beginning of the period, plus the net non-investment cash flows, plus the expected investment return, plus the total phased in recognition of investment income.

AMORTIZATION METHODS

Unfunded actuarial accrued liabilities (the portion of total liabilities not covered by present assets or expected future normal cost contributions) were projected forward one year and amortized by level (principal & interest combined) percent of payroll contributions over a closed period of 14 years. The closed period will decline every year until 10 years remain, at which time a 10-year multiple layered amortization schedule for unfunded liabilities arising during subsequent valuations will be implemented.



APPENDIX A – ACTUARIAL ASSUMPTIONS AND METHODS

STATEMENT OF ACTUARIAL ASSUMPTIONS

Long-term Expected Rate of Return: 7.00% per annum net of investment expenses, compounded annually

Inflation: 2.50%

Mortality Rates: Pub-2010 Public Retirement Plans Mortality Tables (Amount-Weighted) with fully generational projection of mortality improvements using SOA Scale MP-2021

Pre-retirement: Safety Employees table for males and females.

Healthy Post-Retirement: Public Safety Retirees table for males and females.

Disability Retirement: Disabled Retirees table for males and females.

Payroll Growth: 3.00%

Salary Increases:

<u>Service</u>	<u>Wage Growth</u>	<u>Merit & Longevity</u>	<u>Total</u>
1	3.0%	6.0%	9.0%
2	3.0	5.3	8.3
3	3.0	4.5	7.5
4	3.0	3.8	6.8
5	3.0	3.0	6.0
10	3.0	1.2	4.2
15	3.0	0.7	3.7
20	3.0	0.3	3.3
25+	3.0	0.2	3.2

Withdrawal Rates:

<u>Age</u>	<u>Years of Service</u>	<u>Rate of Withdrawal</u>
All	0	7.00%
	1	6.00
	2	5.00
	3	4.00
	4	3.00
35	5+	1.21
40+		0.44



APPENDIX A – ACTUARIAL ASSUMPTIONS AND METHODS

Retirement Rates:

Members hired before January 1, 1996:	<u>Years of Service</u>	<u>Rate of Retirement</u>
	25-31	33%
	32-41	55
	42+	100

Members hired on or after January 1, 1996:

<u>Age</u>	<u>Rate of Retirement</u>
55-59	30%
60+	100

Rates of Disability:

The following are assumed annual rates of disability for active members at sample ages. It is assumed all disabilities will be non-duty related.

<u>Sample Ages</u>	<u>Male Rate</u>	<u>Female Rate</u>
35	0.078%	0.102%
40	0.201	0.356
45	0.265	0.405
50	0.492	0.567
55	0.893	0.766
60	1.414	1.017
65+	1.657	1.232

Marriage Assumption:

100% of members are assumed to be married.

Spouse’s Age:

Males are assumed to be three years older than females.

Interest on Contributions:

2% per annum, compounded annually

Annuity Withdrawal Assumptions:

Retirement present values were loaded 3.5% for the subsidized annuity withdrawal option for members hired before January 1, 1996.

Lump Sum at Retirement Redemption Factor:

Retirement present values were loaded to account for the additional amount included in the AFC due to lump sums at retirement as follows:

Members hired before January 1, 1996: 6.00%

Members hired on or after January 1, 1996: 5.00%

Administrative Expenses:

0.5% of payroll included in Normal Cost



APPENDIX A – ACTUARIAL ASSUMPTIONS AND METHODS

Changes Since the Prior Measurement Date:: The following changes to assumptions were implemented since the prior measurement date:

- Mortality assumptions were changed to the Pub-2010 Public Retirement Plans Safety Mortality Tables with fully generational projection of mortality improvements using SOA Scale MP-2021
- The retirement and termination rates were updated



APPENDIX B – SUMMARY OF PLAN PROVISIONS

SUMMARY OF PLAN PROVISIONS

The following summary of plan provisions reflects the plan as in effect on the date of the valuation.

Plan Administration: The System is a single employer defined benefit pension plan administered by a Board of Trustees comprised of:

- a.) The treasurer of the City of Trenton;
- b.) A police member – elected by members of the Police Department
- c.) A fire member elected by members of the Fire Department; and
- d.) Two citizens of the City of Trenton – appointed by the Mayor

Final Average Compensation (FAC): Highest 3 consecutive years of last 10 years.

Covered Compensation For Retirement System purposes, compensation includes the following:

Police and Fire, hired on or before December 31, 1995:

AFC includes base wages, holiday pay, overtime pay, and unused vacation time.

Police and Fire, hired after January 1, 1996: AFC includes base wages and up to 240 hours of accrued leave time, which is payable at time of retirement. Effective July 1, 2014 for Fire, longevity and additional earned paid leave days are no longer included in AFC.

Regular Retirement

Eligibility: **For members hired before January 1, 1996:** 25 or more years of service regardless of age or age 60 regardless of years of service.

For members hired on or after January 1, 1996: eligibility is age 55 with 20 years of service.

Annual Benefit: **For members hired before January 1, 1996:** Straight life pension equals 2.5% of 3-year Average Final Compensation (AFC) times years of service up to a maximum of 80% of AFC.

For members hired on or after January 1, 1996: Straight life pension equals 2.0% of AFC times years of service up to a maximum of 80% of AFC.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Duty Disability Retirement

Eligibility:	Payable upon the total and permanent disability of a member in the line of duty.
Annual Benefit:	To age 55: 50% of AFC. At age 55: Same as Service Retirement Pension with service credit from date of disability to age 55.

Non-Duty Disability Retirement

Eligibility:	Payable upon the total and permanent disability of a member with 5 or more years of service
Annual Benefit:	To Age 55: 1.50% of AFC times years of service. At Age 55: Same as Service Retirement Pension.

Deferred Retirement

Eligibility:	10 or more years of service.
Annual Benefit:	Computed as Service Retirement but based upon service, AFC and benefit provisions in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.

Duty Death in Service Survivor's Pension

Eligibility:	Payable upon the expiration of a worker's compensation to the survivors of a member who died in the line of duty until spouse remarries and until children marry or reach age 18.
Annual Benefit:	Same amount that was paid by worker's compensation.

Non-Duty Death in Service Survivor's Pension

Eligibility:	Payable to a surviving spouse, if any, upon the death of a Fire Union and MAP Union member with 10 or more years of service. Command Officers (TILA Union) must have 15 years of service.
Annual Benefit:	Accrued straight life pension actuarially reduced in accordance with an Option I election.



APPENDIX B – SUMMARY OF PLAN PROVISIONS

Death After Retirement Survivor's Pension

Eligibility: Payable to a surviving spouse, if any, upon the death of a member who was receiving a straight life pension which was effective July 1, 1975 or later.

Annual Benefit: Spouse's pension equals 60% of the straight life pension the deceased retiree was receiving, or Option I or Option II as elected.

Member Contributions 6% of covered compensation.

Annuity Withdrawal Option If elected, member contribution account balance is paid in a lump sum at retirement. The regular retirement benefit is then reduced so that total benefits paid (lump sum plus monthly pension) are equivalent to the regular retirement benefit.

For members hired before January 1, 1996: the interest rate used to establish equivalency is 4.5%.

For members hired on or after January 1, 1996: the interest rate used to establish equivalency is 7.00%.

Post Retirement Cost-of-Living Adjustments For members hired before January 1, 1996: 10% after 5 years, 10% after 10 years and 5% after 15 years (each increase based on base pension).

For members hired on or after January 1, 1996: no cost-of-living adjustments.



APPENDIX C – MEMBERSHIP DATA

MEMBER STATUS RECONCILIATION

June 30, 2021 to June 30, 2022

	Active Participants	Inactive Vested	Retirees	Beneficiaries	Total
Total Participants as of June 30, 2021	59	0	115	0	174
New Participants	3	0	0	0	3
Terminations					
Refund	0	0	0	0	0
Inactive Vested	0	0	0	0	0
Non-Vested Termination	(2)	0	0	0	(2)
Retirements					
Annuity	(2)	0	2	0	0
Lump Sum	0	0	0	0	0
Deaths					
With Beneficiary	0	0	(4)	4	0
Without Beneficiary	0	0	(3)	0	(3)
Benefits Expired	0	0	0	0	0
Data Corrections	0	0	0	0	0
Net Change	(1)	0	(5)	4	(2)
Total Participants as of June 30, 2022	58	0	110	4	172



APPENDIX C – MEMBERSHIP DATA

TABLE 1
AGE – SERVICE TABLE

Distribution of Active Members as of June 30, 2022 by Age and Service Groups

Age	Completed Years of Service							Total
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Over	
Under 25								
Avg Pay								
25 to 29	5							5
Avg Pay	\$ 57,899							\$ 57,899
30 to 34	8	6						14
Avg Pay	\$ 63,240	\$ 75,087						\$ 68,317
35 to 39	5	3	3					11
Avg Pay	\$ 61,143	\$ 72,267	\$ 84,095					\$ 70,436
40 to 44	2	6	3	2	1			14
Avg Pay	\$ 61,542	\$ 76,135	\$ 77,448	\$ 82,561	\$ 77,278			\$ 75,331
45 to 49		1		5	2	1		9
Avg Pay		\$ 76,484		\$ 83,350	\$ 87,852	\$ 92,446		\$ 84,598
50 to 54		1				3		4
Avg Pay		\$ 80,680				\$ 98,643		\$ 94,152
55 to 59		1						1
Avg Pay		\$ 86,495						\$ 86,495
60 to 64								
Avg Pay								
65 & Over								
Avg Pay								
Total Count	20	18	6	7	3	4		58
Avg Pay	\$ 61,211	\$ 75,988	\$ 80,771	\$ 83,125	\$ 84,327	\$ 97,094		\$ 74,136

Average Age 38.5
Average Service 10.2



APPENDIX C – MEMBERSHIP DATA

TABLE 2
NUMBER OF RETIREMENTS AND BENEFICIARIES
AVERAGE BENEFITS BY AGE

Attained Age	Number of Members	Total Annual Benefits	Average Annual Benefit
60 and Under	27	\$ 1,295,770	\$ 47,991
61 – 65	18	937,559	52,087
66 – 70	19	949,920	49,996
71 – 75	14	803,676	57,405
76 – 80	8	299,196	37,400
81 – 85	11	383,762	34,887
86 – 90	12	351,554	29,296
Over 90	<u>5</u>	<u>77,915</u>	<u>15,583</u>
Total	114	\$ 5,099,352	\$ 44,731