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Indiana Public Retirement System

1977 Police Officers' and Firefighters' Retirement Fund

Actuarial Valuation as of
June 30, 2018

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The experience and dedication you deserve

November 1, 2018

Board of Trustees
Indiana Public Retirement System
1 North Capitol, Suite 001
Indianapolis, IN 46204

Dear Members of the Board:

At your request, we performed an actuarial valuation of the 1977 Police Officers' and Firefighters' Retirement Fund ('77 Fund) as of June 30, 2018, for the purpose of estimating the actuarial determined contribution rate for the calendar year 2020. The major findings of the valuation are contained in this report, which reflects the benefit and funding provisions in place on June 30, 2018. There was a change in the actuarial assumption from the prior year for the Cost-of-Living-Adjustment (COLA) to reflect future expectations after the passage of Senate Enrolled Act No. 373.

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, 2017 actuarial valuation. Results were well 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. In our replication, we matched the actuarial liability and the normal cost within 1%.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by Indiana Public Retirement System (INPRS) staff. This information includes, but is not limited to, statutory provisions, member data and financial information. We did review the data to ensure that it was reasonably consistent and comparable with data from 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.

We certify that all costs and liabilities for the '77 Fund have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the plan and reasonable expectations); and which, in combination, offer the best estimate of anticipated experience affecting the plan. Nevertheless, the emerging costs will vary from those presented in this report to the extent actual experience differs from that projected by the actuarial assumptions.

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While the assumptions were generally developed by the prior actuary, we believe that they are reasonable. The Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C. Specifically, we presented the assumptions for the 2018 valuations, to the Board on February 23, 2018, and the Board subsequently adopted their use. These assumptions are applicable to both the funding and Governmental Accounting Standards Board (GASB) Statement Number 67 valuation calculations, unless otherwise noted.

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 to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

Actuarial computations presented in this report are for purposes of determining the funding rates for the Plan. The calculations in the enclosed report have been made on a basis consistent with our understanding of the Plan's funding requirements and goals as adopted by the Board. Additionally, we have included actuarial computations for use in preparing certain reporting and disclosure requirements under Governmental Accounting Standards Board Statements Number 67 and Number 68. Determinations for purposes other than meeting these funding and disclosure requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

The Comprehensive Annual Financial Report (CAFR) for INPRS contains several exhibits that disclose the actuarial position of the System. This report provides data and tables for use in the following sections of the CAFR:

Financial Section:
- Note 1 - Tables of Plan Membership
- Note 7 - Net Pension Liability and Actuarial Information - Defined Benefit Plans
- Schedule of Changes in Net Pension Liability and Plan Fiduciary Net Position
- Schedule of Contributions
- Schedule of Notes to Required Supplementary Information

Actuarial Section:
- Summary of INPRS Funded Status (Included in the Executive Summary)
- Historical Summary of Actuarial Valuation Results by Retirement Plan
- Summary of Actuarial Assumptions, Methods and Plan Provisions
- Analysis of Financial Experience (Included in the Unfunded Actuarial Accrued Liability Reconciliation)
- Solvency Test
- Schedule of Active Member Valuation Data
- Schedule of Retirants and Beneficiaries

Statistical Section:
- Membership Data Summary
- Ratio of Active Members to Annuitants
- Schedule of Benefit Recipients by Type of Benefit Option
- Schedule of Average Benefit Payments

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald's advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

The calculations were completed in compliance with applicable law and the calculations for GASB disclosure, in our opinion, meet the requirements of GASB 67 and GASB 68. We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

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

Sincerely,

Brent A. Banister

Patrice Beckham

Brent A. Banister Ph.D., FSA, EA, MAAA, FCA
Chief Actuary

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

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This report presents the results of the June 30, 2018 actuarial valuation of the 1977 Police Officers' and Firefighters' Retirement Fund ('77 Fund). The primary purposes of performing this actuarial valuation are to:

- Determine the employer contribution rate for the calendar year ending December 31, 2020 that will be sufficient to meet the funding policy.
- Disclose asset and liability measurements as well as the current funded status of the plan on the valuation date.
- Compare actual and expected experience in the valuation during the plan year ending June 30, 2018.
- Analyze and report on trends in plan contributions, assets and liabilities over the past several years.

VALUATION RESULTS

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, 2017 actuarial valuation. For the most direct comparison of the replication, we compared measurements as of that valuation's census date of June 30, 2016. Note that while these measures were used in the roll forward to obtain June 30, 2017 valuation results, these specific measures are not shown in any valuation report. Results were well 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, 2016 Census Results		
	CMC	PwC	CMC/PwC
Present Value of Future Benefits	6,388,140,113	6,337,677,974	100.8%
Actuarial Accrued Liability	5,090,973,573	5,055,844,824	100.7%
Normal Cost	130,345,835	129,096,381	101.0%

It should be noted that while the key liability numbers were a very close match, some items reported in the valuation, such as the Unfunded Actuarial Accrued Liability (UAAL), are derived from calculations of these fundamental measures and may vary proportionately more than the underlying liability measures.

There were no changes to plan provisions, actuarial methods and assumptions, or funding policies between the June 30, 2017 and June 30, 2018 valuations.

The actuarial valuation results provide a "snapshot" view of the plan's financial condition on June 30, 2018. The plan's UAAL changed from a surplus of $201.8 million last year to a surplus of $114.3 million this year and the funded ratio decreased from 104% to 102%. Several factors contributed to this reduction in funded status. The change in actuarial firm was one source of this reduction, reducing the surplus by about $41 million. Continued recognition of past deferred asset losses helped contribute to the actuarial value of assets being $34.6 million less than expected. Finally, the demographic experience of the plan resulted in a loss of $81.4 million, primarily from retirement/DROP and salary experience. Partially offsetting these losses were contributions that exceeded the prior year's actuarially determined contributions.

A summary of the key results from the June 30, 2018 actuarial valuation compared to the June 30, 2017 valuation is shown in the following table. Further detail on the valuation results can be found in the following sections of this Executive Summary.

Valuation Results	June 30, 2017	June 30, 2018
Unfunded Actuarial Accrued Liability	$ (201,798,057)	$ (114,319,271)
Funded Ratio (Actuarial Assets)	103.75%	101.96%
Normal Cost	16.47%	17.41%
UAAL Amortization	(1.79%)	(0.97%)
Total Recommended Contribution	14.68%	16.44%
Estimated Member Contributions	(5.82%)	(5.92%)
Actuarially Determined Contribution Rate	8.86%	10.52%

Numerous components, which are examined in the following discussion, contributed to the change in the plan's assets, liabilities, and actuarial determined contribution rate between June 30, 2017 and June 30, 2018.

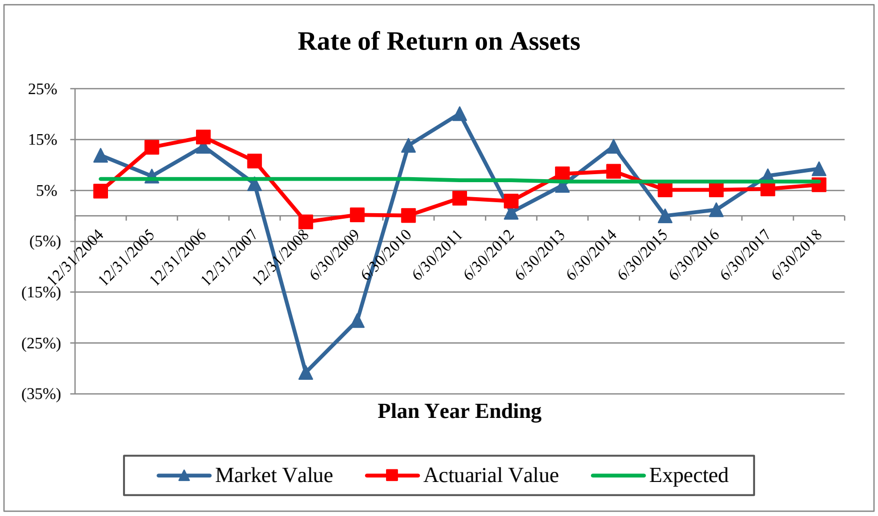
ASSETS

As of June 30, 2018, the plan had net assets of $5.93 billion, when measured on a market value basis. This was an increase of $526 million from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial accrued liability and the actuarial determined contribution rate. An asset valuation method, which smoothes the effect of market fluctuations, is applied to determine the value of assets used in the valuation. The resulting amount is called the actuarial value of assets. In this year's valuation, the actuarial value of assets is $5.95 billion, an increase of $366 million from the prior year. The components of change in the asset values are shown in the following table:

		Market Value		Actuarial Value
Net Assets, June 30, 2017	$	5,401,178,536	$	5,587,551,197
- Employer and Member Contributions	+	195,950,841	+	195,950,841
- Benefit Payments and Refunds	-	172,907,999	-	172,907,999
- Net Investment Income	+	503,348,811	+	343,384,265
Net Assets, June 30, 2018	$	5,927,570,189	$	5,953,978,304
Rate of Return, Net of Expenses		9.3%		6.1%

The rate of return on the actuarial value of assets was 6.1%, which was lower than the 6.75% investment return assumption applicable for the year ended June 30, 2018. As a result, there was an experience loss on assets of $34.6 million. The investment return on the market value of assets for FY 2018 of 9.3% resulted in a change in the deferred investment experience from a net deferred investment loss of $186 million in last year's valuation to a net deferred investment loss of $26 million in the current valuation. See Table 1 and Table 2 of this report for detailed information on the market and actuarial value of assets.



The rate of return on the actuarial value of assets has been less volatile than the market value return, illustrating the benefits of using an asset smoothing method.

LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that is allocated to past service. The remaining portion will be paid by future normal costs. The difference between this liability and the actuarial value of assets as of the valuation date is called the unfunded actuarial accrued liability (UAAL). The dollar amount of unfunded actuarial accrued liability is reduced if the contributions to the plan exceed the normal cost for the year plus interest on the prior year's UAAL.

The unfunded actuarial accrued liability is shown as of June 30, 2018 in the following table:

	Market Value		Actuarial Value	
Actuarial Accrued Liability	$	5,839,659,033	$	5,839,659,033
Value of Assets		5,927,570,189		5,953,978,304
Unfunded Actuarial Accrued Liability	$	(87,911,156)	$	(114,319,271)
Funded Ratio		101.51%		101.96%

See Table 3 of this report for the development of the unfunded actuarial accrued liability.

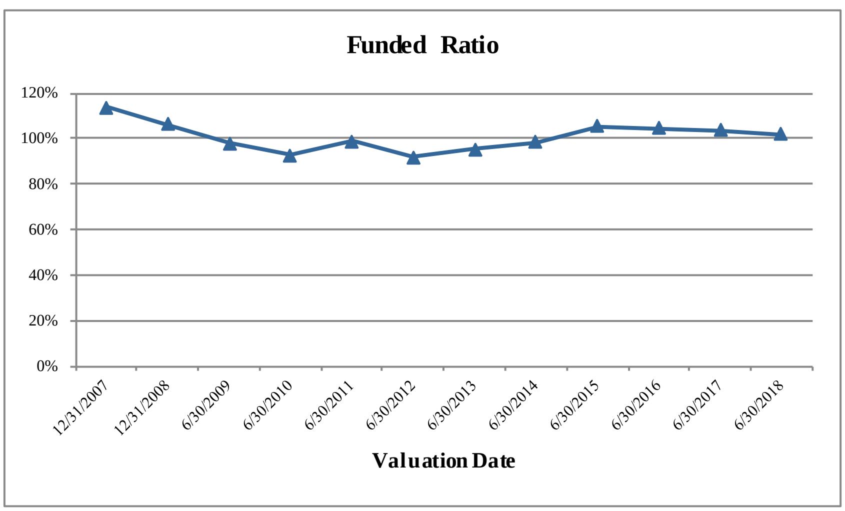
The net change in the UAAL from June 30, 2017 to June 30, 2018 was a decrease in surplus of $87.5 million. The most significant factors in this change was the actuarial loss on liabilities along with smaller losses arising from the return on assets and the change in actuarial firms. Contributions in excess of the actuarially determined contribution rate were a significant offset to these losses. This excess, along with other components of the change in the UAAL are quantified in Table 5 of this report. See Table 6 and Table 7 of this report for a breakdown of the components of experience gains/losses for greater detail.

An evaluation of the UAAL on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both large numbers) is reflected. Another way to evaluate the UAAL and the progress made in its funding is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial accrued liability. The funded status information, which is based on the actuarial value of assets, is shown below (in millions).

	6/30/2014	6/30/2015	6/30/2016	6/30/2017	6/30/2018
Funded Ratio	98.3%	105.5%	104.3%	103.8%	102.0%
UAAL (in millions)	$81.5	($258.6)	($215.4)	($201.8)	($114.3)

Note that the funded ratio does not indicate whether or not 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. In addition, if the funded ratios were shown using the market value of assets, the results would differ.

As the following graph of historical funded ratios shows, the '77 Fund has maintained a strong funded level for a number of years.



ACTUARIALLY DETERMINED CONTRIBUTION RATE

The Plan's actuarially determined contribution rate consists of two components:

- A "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to service of members during the year following the valuation date.
- An "unfunded actuarial accrued liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

The UAAL contribution rate is determined by calculating the amortization payment on the UAAL as a level dollar amount over 20 years for each amortization base. Whenever the Plan exceeds 100% funded, all prior layers are eliminated and the negative UAAL (or "surplus") is used to reduce the normal cost over a rolling 30-year period.

The employer actuarially determined contribution rate is the total actuarially determined contribution rate less the expected member contribution rate. Members with less than 32 years of service contribute 6% of pay into the plan, so the effective member contribution rate over all payroll (including the members with more than 32 years of service) is estimated to be 5.92% of pay.

See Table 10 of this report for the detailed development of the contribution rates which are summarized in the following table:

	June 30, 2017	June 30, 2018
Normal Cost	16.47%	17.41%
UAAL Amortization	(1.79%)	(0.97%)
Total Recommended Contribution	14.68%	16.44%
Estimated Member Contributions	(5.82%)	(5.92%)
Actuarially Determined Contribution Amount	8.86%	10.52%
Estimated Payroll	$ 829,736,440	$ 863,232,987
Actuarially Determined Contribution Amount	$ 73,514,649	$ 90,812,110

In keeping with Board policy, the Board has for a number of years approved an employer funding rate of 17.50% in order to provide a cushion against the potential need to increase rates in the future. This additional funding has helped improve the Plan's funded status. The Board policy will begin to reduce rates once the Plan reaches 105% funded, thus preventing accumulating unreasonable levels of surplus.

SUMMARY OF PRINCIPAL RESULTS

		June 30, 2016		June 30, 2017		June 30, 2018
MEMBERSHIP						
Active Members		13,506		13,587		13,171
Members in DROP		(incl. above)		(incl. above)		708
Retired Members and Beneficiaries		3,259		3,603		3,945
Disabled Members		745		771		806
Inactive Members		1,119		1,200		1,361
Total Members		18,629		19,161		19,991
Projected Annual Salaries in Following Year	$	791,508,489	$	829,736,440	$	863,232,987
Annual Retirement Payments for Retired Members, Disabled Members and Beneficiaries	$	105,218,382	$	118,471,604	$	132,206,622
ASSETS AND LIABILITIES						
Net Assets						
Market Value of Assets (MVA)	$	4,950,999,065	$	5,401,178,536	$	5,927,570,189
Actuarial Value of Assets (AVA)		5,255,255,442		5,587,551,197		5,953,978,304
Actuarial Accrued Liability (AAL)		5,039,835,987		5,385,753,140		5,839,659,033
Unfunded Actuarial Accrued Liability (UAAL): AAL - AVA	$	(215,419,455)	$	(201,798,057)	$	(114,319,271)
Funded Ratios						
AVA / AAL		104.27%		103.75%		101.96%
MVA / AAL		98.24%		100.29%		101.51%
CONTRIBUTIONS						
Normal Cost Rate		16.99%		16.47%		17.41%
UAAL Rate		(2.00%)		(1.79%)		(0.97%)
Total Recommended Contribution Rate		14.99%		14.68%		16.44%
Expected Employee Contribution Rate		(5.84%)		(5.82%)		(5.92%)
Actuarially Determined Contribution Rate		9.15%		8.86%		10.52%
Actuarially Determined Contribution Amount	$	72,423,027	$	73,514,649	$	90,812,110

This report presents the actuarial valuation results of the 1977 Police Officers' and Firefighters' Retirement Fund as of June 30, 2018. This valuation was prepared at the request of the Indiana Public Retirement System.

Please pay particular attention to our actuarial certification letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings which result from this valuation is presented in the previous section. Section 3 describes the assets and investment experience of the plan. Sections 4 and 5 describe how the obligations of the plan are to be met under the actuarial cost method in use. Section 6 provides information required by the Governmental Accounting Standards Board (GASB) for reporting and disclosure under GASB 67 and GASB 68.

This report includes several appendices:

- Appendix A — Schedules of valuation data classified by various categories of members.
- Appendix B — A summary of the current benefit structure, as determined by the provisions of governing law on June 30, 2018.
- Appendix C — A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D — A glossary of actuarial terms.

In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is June 30, 2018. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the plan, which are generally in excess of assets. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the plan assets and liabilities.

Market Value of Assets

The current market value represents the "snapshot" or "cash-out" value of plan assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time.

Table 1 summarizes the changes in the market value of assets for the last two years. Table 12 (in the GASB section) provides detail regarding the allocation of investments in the trust.

Actuarial Value of Assets

The market value of assets, representing a "cash-out" value of plan assets, may not be the best measure of the plan's ongoing ability to meet its obligations. To arrive at a suitable value of assets for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. Under the asset smoothing methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five-year period.

Table 2 shows the development of the actuarial value of assets (AVA) as of the valuation date.

TABLE 1

DEVELOPMENT OF MARKET VALUE OF ASSETS

	June 30, 2017	June 30, 2018
1. Market Value of Assets, Beginning of Year	$ 4,950,999,065	$ 5,401,178,536
2. Receipts		
a. Member (Includes Purchased Service)[1]	$ 51,520,565	$ 48,838,461
b. Employer (Includes Purchased Service)[2]	150,857,418	147,094,151
c. Miscellaneous	77,453	18,229
d. Total	$ 202,455,436	$ 195,950,841
3. Expenditures		
a. Benefit Payments	$ 145,591,101	$ 169,934,952
b. Refund of Contributions	3,273,904	2,973,047
c. Administrative Expense	1,607,057	1,642,550
d. Total	$ 150,472,062	$ 174,550,549
4. Investment Return		
a. Investment Income	$ 397,684,989	$ 504,226,389
b. Securities Lending Income	511,108	764,972
c. Total Investment Return	$ 398,196,097	$ 504,991,361
5. Market Value of Assets, End of Year: (1) + (2d) - (3d) + (4c)	$ 5,401,178,536	$ 5,927,570,189
6. Rate of Return, Net of Expenses[3]	7.97%	9.30%

[1] Includes $4,404,816 of member service purchases during fiscal year 2017 and $152,826 of member service purchases during fiscal year 2018.
[2] Includes $158,766 of employer service purchases during fiscal year 2017 and $19,824 of employer service purchases during fiscal year 2018.
[3] Based on individual fund experience. Assumes cash flows occur at mid-year.

TABLE 2

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

						For the Year Ending June 30, 2018
1. Market Value as of June 30, 2017					$	5,401,178,536
2. Receipts						195,950,841
3. Expenditures, Net of Administrative Expenses						(172,907,999)
4. Expected Return on Assets [1]						365,357,247
5. Expected Market Value as of June 30, 2018: (1) + (2) + (3) + (4)					$	5,789,578,625
6. Actual Market Value as of June 30, 2018					$	5,927,570,189
7. Year End 2018 Asset Gain/(Loss): (6) - (5)					$	137,991,564
8. Deferred Investment Gains and Losses						
		Year Ended June 30:	Gain/(Loss)	Factor		Deferred Amount
	a.	2015	$ (326,960,603)	20%	$	(65,392,121)
	b.	2016	(269,405,003)	40%		(107,762,001)
	c.	2017	60,587,926	60%		36,352,756
	d.	2018	137,991,564	80%		110,393,251
	e.	Total			$	(26,408,115)
9. Initial Actuarial Value as of June 30, 2018: (6) - (8e)					$	5,953,978,304
10. Constraining Values						
a. 80% of Market Value: (6) x 0.8					$	4,742,056,151
b. 120% of Market Value: (6) x 1.2					$	7,113,084,227
11. Actuarial Value as of June 30, 2018					$	5,953,978,304
12. Actuarial Rate of Return, Net of Expenses [2]						6.13%
13. Actuarial Value of Assets as a Percent of Market Value: (11) / (6)						100.4%

[1] Assumes cash flows occur at mid-year and an investment return of 6.75%.
[2] Assumes cash aflows occur at mid-year.

In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the 1977 Police Officers' and Firefighters' Retirement Fund as of the valuation date, June 30, 2018. In this section, the discussion will focus on the commitments (future benefit payments) of the plan, which are referred to as its liabilities.

The liability calculations for the June 30, 2018 valuation of the 1977 Police Officers' and Firefighters' Retirement Fund valuation are based on census data collected as of June 30, 2017. Standard actuarial techniques are used to adjust these results from June 30, 2017 to June 30, 2018. While these roll-forward techniques are based on the expectation that all actuarial assumptions are met during the intervening year, there will, of course, be many of the assumptions that are not met exactly. In general, this does not materially affect the resulting calculations or conclusions in this report. Should there be a year in which significant events that would affect the results occur, we would make adjustments in the roll-forward methods to reflect the events.

All liabilities reflect the benefit provisions and actuarial assumptions in place as of June 30, 2018.

Actuarial Accrued Liability

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to perform this allocation, it is necessary for the funding method to "breakdown" the present value of future benefits into two components:

(1) that which is attributable to the past and

(2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability." The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost."

Table 3 contains the calculation of actuarial accrued liability for the plan. The Entry Age Normal actuarial cost method is used to develop the actuarial accrued liability.

TABLE 3

ACTUARIAL ACCRUED LIABILITY

		As of June 30, 2018
1. Actuarial Accrued Liability		
a. Member Contribution Balances	$	866,551,444
b. Active & Inactive Members		3,062,953,713
c. In-pay Members		1,910,153,876
d. Total	$	5,839,659,033
2. Actuarial Value of Assets	$	5,953,978,304
3. Unfunded Actuarial Accrued Liability: (1d) – (2)	$	(114,319,271)
4. Funded Ratio: (2) ⁄ (1d)		101.96%

TABLE 4

SOLVENCY TEST

	Actuarial Accrued Liabilities (AAL)					Portion of AAL Covered by Assets			
Actuarial Valuation as of June 30	Active Member Contributions	Retirees and Beneficiaries	Active Member (Employer Financed Portion)	Total Actuarial Accrued Liabilities	Actuarial Value of Assets	Active Member Contributions	Retirees and Beneficiaries	Active Member (Employer Financed Portion)	Total Actuarial Accrued Liabilities
2018	$866,551	$1,910,154	$3,062,954	$5,839,659	$5,953,978	100.0%	100.0%	103.7%	102.0%
2017	857,426	1,715,503	2,812,824	5,385,753	5,587,551	100.0	100.0	107.2	103.7
2016	843,628	1,532,936	2,663,272	5,039,836	5,255,255	100.0	100.0	108.1	104.3
2015	832,760	1,362,021	2,485,913	4,680,694	4,939,330	100.0	100.0	110.4	105.5
2014	809,877	1,280,920	2,616,200	4,706,997	4,625,475	100.0	100.0	96.9	98.3
2013	782,124	1,288,457	2,322,366	4,392,947	4,180,704	100.0	100.0	90.9	95.2
2012	728,892	1,135,538	2,258,006	4,122,436	3,786,595	100.0	100.0	85.1	91.9
2011	679,849	970,676	1,988,431	3,638,956	3,593,787	100.0	100.0	97.7	98.8
2010	634,865	859,626	2,145,178	3,639,669	3,374,438	100.0	100.0	87.6	92.7
2009	571,534	793,167	1,967,985	3,332,686	3,265,598	100.0	100.0	96.6	98.0

Note: Dollar amounts are in thousands of dollars.

TABLE 5

RECONCILIATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

		For Year Ending June 30, 2018
1. Unfunded Actuarial Accrued Liability as of June 30, 2017	$	(201,798,057)
2. Normal Cost		136,640,454
3. Actuarially Determined Contribution		(121,787,332)
4. Interest		(12,618,783)
5. Expected Unfunded Actuarial Accrued Liability as of June 30, 2018	$	(199,563,718)
6. Actuarial Value of Asset Changes		
a. Investment Experience (Gain)/Loss	$	34,553,137
b. Contributions Above the Actuarially Determined Contribution	$	(72,203,302)
7. Actuarial Accrued Liability Changes		
a. Actuarial Accrued Liability Experience (Gain)/Loss	$	81,439,603
b. Additional Liability Due to Benefit Changes		0
c. Additional Liability Due to Assumption Changes		0
d. Additional Liability Due to Actuarial Firm Change		41,455,009
8. Total Experience (Gain)/Loss	$	85,244,447
9. June 30, 2018 Unfunded Actuarial Accrued Liability: (5) + (8)	$	(114,319,271)

TABLE 6

ACTUARIAL GAIN/(LOSS)

Liabilities		
1. Actuarial Accrued Liability as of June 30, 2017	$	5,385,753,140
2. Normal Cost for Plan Year Ending June 30, 2018		136,640,454
3. Benefit Payments During Plan Year[1]		(172,739,267)
4. Service Purchases (employee and employer)		172,650
5. Interest at 6.75%		366,937,444
6. Change Due to Benefit Changes		0
7. Change Due to Assumption Changes		0
8. Change Due to Actuarial Firm Change		41,455,009
9. Expected Actuarial Accrued Liability as of June 30, 2018	$	5,758,219,430
10. Actuarial Accrued Liability as of June 30, 2018	$	5,839,659,033

Assets		
11. Actuarial Value of Assets as of June 30, 2017	$	5,587,551,197
12. Receipts During Plan Year		195,950,841
13. Expenditures, Excluding Expenses, During Plan Year		(172,907,999)
14. Interest at 6.75%		377,937,402
15. Expected Actuarial Value of Assets as of June 30, 2018	$	5,988,531,441
16. Actuarial Value of Assets as of June 30, 2018	$	5,953,978,304

Experience Gain / (Loss)		
17. Liability Actuarial Experience Gain/(Loss): (9) - (10)	$	(81,439,603)
18. Asset Actuarial Experience Gain/(Loss): (16) - (15)	$	(34,553,137)
19. Total Actuarial Experience Gain/(Loss): (17) + (18)	$	(115,992,740)

[1] Does not include miscellaneous expenses or benefit overpayments.

TABLE 7

EXPERIENCE GAIN/(LOSS) ANALYSIS BY SOURCE

Liability Sources		Gain/(Loss)
Retirement/DROP	$	(31,273,000)
Termination		(8,413,000)
Disability		(441,000)
Mortality		3,231,000
Salary		(24,280,000)
New Entrants/Rehires		(18,247,000)
Miscellaneous/COLA		(2,017,000)
Total Liability Experience Gain/(Loss)	$	(81,440,000)
as a % of AAL		(1.4%)
Asset Experience Gain/(Loss)	$	(34,553,000)
Total Actuarial Experience Gain/(Loss)	$	(115,993,000)

TABLE 8

PROJECTED BENEFIT PAYMENTS

Plan Year Ending June 30	Benefit Amount
2019	$ 204,760,200
2020	237,414,746
2021	255,193,543
2022	256,051,488
2023	277,352,553
2024	299,759,430
2025	322,962,567
2026	346,702,599
2027	371,367,881
2028	397,375,082
2029	424,209,889
2030	451,641,479
2031	479,450,302
2032	507,447,241
2033	535,696,943
2034	563,370,451
2035	590,976,133
2036	618,305,813
2037	645,433,727
2038	672,404,642
2039	698,650,326
2040	724,159,032
2041	748,523,156
2042	771,130,740
2043	791,978,984
2044	810,632,505
2045	826,949,101
2046	840,827,328
2047	852,375,036
2048	861,829,771

Note: Payouts reflect nominal payouts for current members, assuming that all future assumptions are met.

The previous two sections were devoted to a discussion of the assets and liabilities of the plan. We now turn to considering how the benefits will be funded. The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost rate and (2) the unfunded actuarial accrued liability contribution rate.

The term "fully funded" is often applied to a plan in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, plans are not fully funded, either because of past benefit improvements that have not been completely funded or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated by the actuarial assumptions. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, as is the case for this plan, a surplus exists.

Description of Contribution Rate Components

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under that method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member's year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability/(surplus) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains and losses.

In general, contributions are computed in accordance with a level percent-of-payroll funding objective. The contribution rate based on the June 30, 2018 actuarial will be used to calculate the actuarially determined employer contribution rate to the 1977 Police Officers’ and Firefighters’ Retirement Fund for the 2020 calendar year. Based on the Board funding policy, the current employer funding rate of 17.5% will be retained. This rate exceeds the actuarially determined contribution rate, and allows for stability as well as more aggressive funding of the retirement system.

Contribution Rate Summary

In Table 9, the amortization payment related to the unfunded actuarial accrued liability/(surplus), as of June 30, 2018, is developed. Table 10 develops the actuarial determined contribution rate for the Plan. The contribution rates shown in this report are based on the actuarial assumptions and cost methods described in Appendix C. Additionally, in Table 11 the contribution rates under alternative discount rates are provided to illustrate the sensitivity of the contribution requirements to the selection of the investment return assumption.

TABLE 9

SCHEDULE OF AMORTIZATION BASES

Amortization Bases	Original Amount	June 30, 2018 Remaining Payments	Date of Last Payment	Outstanding Balance as of June 30, 2018	Annual Contribution
2018 UAAL Base	(114,319,271)	30	7/1/2038	(114,319,271)	(8,414,343)
Total				$ (114,319,271)	$ (8,414,343)

1. Total UAAL Amortization Payments	$ (8,414,343)
2. Projected Payroll for FY 2019	$ 863,232,987
3. UAAL Amortization Payment Rate	(0.97%)
4. Remaining Amortization Period in Years (Weighted)[1]	30.00

[1] The weighted average remaining UAAL amortization period is calculated by weighting the remaining amortization period of each base by the amortization amount of each base.

TABLE 10

ACTUARIAL DETERMINED CONTRIBUTION RATE

1. Projected Payroll for FY 2019	$	863,232,987
2. Normal Cost Rate		17.41%
3. Amortization of UAAL as of June 30, 2018		
a. Dollar Amount	$	(8,414,343)
b. Percent of Projected Pay		(0.97%)
4. Total Recommended Contribution Rate: (2) + (3b)		16.44%
5. Expected Employee Contribution Rate[1]		5.92%
6. Actuarially Determined Contribution Rate: (4) - (5)		10.52%
7. Estimated Actuarially Determined Contribution Amount: (1) x (6)	$	90,812,110
8. Actuarially Determined Contribution Rate for FY 2020		
a. July 1, 2019 to December 31, 2019		8.86%
b. January 1, 2020 to June 30, 2020		10.52%
c. Average		9.69%
9. Approved Funding Rate		17.50%
10. Expected Percentage of Actuarially Determined Contribution Contributed		180.60%

[1] Member contribution rate of 6% is made only on payroll of those with less than 32 years of service.

TABLE 11

INVESTMENT RETURN ASSUMPTION SENSITIVITY

	1.00% Decrease: (5.75%)	0.75% Decrease: (6.00%)	0.50% Decrease: (6.25%)	0.25% Decrease: (6.50%)	Current Assumption: (6.75%)
Funded Status					
Actuarial Accrued Liability	$6,762,809,434	$6,512,777,625	$6,276,139,076	$6,052,032,442	$5,839,659,033
Actuarial Value of Assets	5,953,978,304	5,953,978,304	5,953,978,304	5,953,978,304	5,953,978,304
Unfunded Actuarial Accrued Liability	$808,831,130	$558,799,321	$322,160,772	$98,054,138	($114,319,271)
Funded Ratio	88.0%	91.4%	94.9%	98.4%	102.0%
Actuarially Determined Contribution Amount					
Normal Cost Rate	22.79%	21.29%	19.89%	18.60%	17.41%
UAAL Amortization Rate	6.27%	4.44%	2.62%	0.82%	(0.97%)
Expected Member Contribution Rate	(5.92%)	(5.92%)	(5.92%)	(5.92%)	(5.92%)
Actuarially Determined Employer Contrib. Rate	23.14%	19.80%	16.59%	13.50%	10.52%

	0.25% Increase: (7.00%)	0.50% Increase: (7.25%)	0.75% Increase: (7.50%)	1.00% Increase: (7.75%)	1.25% Increase: (8.00%)
Funded Status					
Actuarial Accrued Liability	$5,638,277,819	$5,447,200,872	$5,265,789,187	$5,093,448,856	$4,929,627,569
Actuarial Value of Assets	5,953,978,304	5,953,978,304	5,953,978,304	5,953,978,304	5,953,978,304
Unfunded Actuarial Accrued Liability	($315,700,485)	($506,777,432)	($688,189,117)	($860,529,448)	($1,024,350,735)
Funded Ratio	105.6%	109.3%	113.1%	116.9%	120.8%
Actuarially Determined Contribution Amount					
Normal Cost Rate	16.31%	15.28%	14.33%	13.46%	12.64%
UAAL Amortization Rate	(2.75%)	(4.52%)	(6.28%)	(8.02%)	(9.76%)
Expected Member Contribution Rate	(5.92%)	(5.92%)	(5.92%)	(5.92%)	(5.92%)
Actuarially Determined Employer Contrib. Rate	7.63%	4.84%	2.14%	0.00%	0.00%

GASB NO. 67 AND GASB NO. 68

The Governmental Accounting Standards Board issued Statement No. 67 (GASB 67), "Financial Reporting for Pension Plans" and Statement No. 68 (GASB 68), "Accounting and Financial Reporting for Pensions" in June 2012. The effective date for reporting under GASB 67 for the INPRS Plans was the fiscal year ending June 30, 2014. GASB 68's effective date for employers is the first fiscal year beginning after June 15, 2014.

The sections that follow provide the results of the required actuarial calculations set out in GASB 67 and GASB 68 for note disclosure and Required Supplementary Information (RSI). Some of this information was provided by the INPRS for use in this report.

The discount rate used for these disclosures is the assumed return on assets of 6.75%. We have verified that the current assets in conjunction with future contributions made on behalf of current members (including all contributions to fund any past service liability) will be sufficient to make the anticipated benefit payments to be provided to the current members.

To the best of our knowledge, the information contained in this report is complete and accurate. The calculations were performed by qualified actuaries according to generally accepted actuarial principles and practices, as well as in conformity with Actuarial Standards of Practice issued by the Actuarial Standards Board. The calculations are based on the current provisions of the plan, and on actuarial assumptions that are internally consistent and individually reasonable based on the actual experience of the plan. In addition, the calculations were completed in compliance with applicable law and, in our opinion, meet the requirements of GASB 67 and GASB 68.

TABLE 12

STATEMENT OF FIDUCIARY NET POSITION

			June 30, 2018
1. Assets			
a. Cash		$	1,618,815
b. Receivables			
i.	Contributions and Miscellaneous Receivables	$	4,813,656
ii.	Investments Receivable		44,102,996
iii.	Foreign Exchange Contracts Receivable		1,719,470,327
iv.	Interest and Dividends		15,521,518
v.	Receivables Due From Other Funds		0
vi.	Total Receivables	$	1,783,908,497
c. Investments			
i.	Short-Term Investments	$	0
ii.	Pooled Repurchase Agreements		755,334
iii.	Pooled Short-Term Investments		264,788,659
iv.	Pooled Fixed Income		2,015,885,597
v.	Pooled Equity		1,330,295,159
vi.	Pooled Alternative Investments		2,405,664,673
vii.	Pooled Derivatives		4,778,652
viii.	Pooled Investments		0
ix.	Securities Lending Collateral		64,065,565
x.	Total Investments	$	6,086,233,639
d. Net Capital Assets			0
e. Other Assets			0
f. Total Assets: a + b(vi) + c(x) + d + e		$	7,871,760,951
2. Liabilities			
a. Administrative Payable		$	78,344
b. Retirement Benefits Payable			2,160,961
c. Investments Payable			99,384,361
d. Foreign Exchange Contracts Payable			1,715,640,105
e. Securities Lending Obligations			64,065,565
f. Securities Sold Under Agreement to Repurchase			62,139,861
g. Due To Other Funds			721,565
h. Due to Other Governments			0
i. Total Liabilities: a + b + c + d + e + f + g + h		$	1,944,190,762
3. Fiduciary Net Position Restricted for Pensions: (1)(f) - (2)(i)		**$**	**5,927,570,189**

TABLE 13

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

			For Fiscal Year Ending June 30, 2018
1. Fiduciary Net Position as of June 30, 2017		**$**	**5,401,178,536**
2. Additions			
a. Contributions			
i.	Member Contributions		48,685,635
ii.	Employer Contributions		147,074,327
iii.	Service Purchases (Employer and Member) [1]		172,650
iv.	Non-Employer Contributing Entity Contributions		0
v.	Total Contributions	$	195,932,612
b. Investment Income/(Loss)			
i.	Net Appreciation/(Depreciation)	$	461,726,283
ii.	Net Interest and Dividend Income		80,076,592
iii.	Securities Lending Income		933,744
iv.	Other Net Investment Income		315,608
v.	Investment Management Expenses		(36,451,865)
vi.	Direct Investment Expenses		(1,440,229)
vii.	Securities Lending Expenses		(168,772)
viii.	Total Investment Income/(Loss)	$	504,991,361
c. Other Additions			
i.	Member Reassignments		0
ii.	Miscellaneous Receipts		18,229
iii.	Total Other Additions	$	18,229
d. Total Revenue (Additions): a(v) + b(viii) + c(iii)		$	700,942,202
3. Deductions			
a. Pension, Survivor and Disability Benefits		$	169,050,952
b. Death and Funeral Benefits			884,000
c. Distributions of Contributions and Interest			2,973,047
d. Administrative Expenses			1,642,550
e. Member Reassignments			0
f. Miscellaneous Expenses			0
g. Total Expenses (Deductions)		$	174,550,549
4. Net Increase (Decrease) in Fiduciary Net Position: (2)(d) - (3)(g)		**$**	**526,391,653**
5. Fiduciary Net Position as of June 30, 2018: (1) + (4)		**$**	**5,927,570,189**

[1] Service purchases paid by employer of $19,824 and employee of $152,826.

TABLE 14

SCHEDULE OF CHANGES IN NET PENSION LIABILITY

	For Fiscal Year Ending June 30, 2018		
	Total Pension Liability (a)	**Plan Fiduciary Net Position (b)**	**Net Pension Liability (a) – (b)**
1. Balance at June 30, 2017	$ 5,385,753,140	$ 5,401,178,536	$ (15,425,396)
2. Changes for the Year:			
Service Cost (SC) [1]	136,640,454		136,640,454
Interest Cost	366,931,750		366,931,750
Experience (Gains)/Losses	123,069,038		123,069,038
Assumption Changes	0		0
Plan Amendments	0		0
Benefit Payments [2]	(172,907,999)	(172,907,999)	0
Service Purchases			
Employer Contributions	19,824	19,824	0
Employee Contributions	152,826	152,826	0
Member Reassignments	0	0	0
Employer Contributions		147,074,327	(147,074,327)
Non-employer Contributions		0	0
Employee Contributions		48,685,635	(48,685,635)
Net Investment Income		504,991,361	(504,991,361)
Administrative Expenses		(1,642,550)	1,642,550
Other		18,229	(18,229)
Net Changes	$ 453,905,893	$ 526,391,653	$ (72,485,760)
3. Balance at June 30, 2018	$ 5,839,659,033	$ 5,927,570,189	$ (87,911,156)

[1] Service cost provided as of beginning of year. Interest to end of year is included in the interest cost.
[2] Includes special death benefits of $884,000 and refund of member contributions of $2,973,047.

TABLE 15

DEFERRED OUTFLOWS OF RESOURCES

	June 30, 2017	Remaining Period	Recognition	June 30, 2018
1. Liability Experience				
June 30, 2018 Loss	$ 123,069,038	8.69	$ 14,162,145	$ 108,906,893
June 30, 2017 Loss	29,625,158	7.83	3,783,546	25,841,612
June 30, 2016 Loss	32,492,634	7.04	4,615,431	27,877,203
June 30, 2015 Loss	0	6.31	0	0
June 30, 2014 Loss	0	5.29	0	0
2. Assumption Changes				
June 30, 2018 Loss	$ 0	8.69	$ 0	$ 0
June 30, 2017 Loss	0	7.83	0	0
June 30, 2016 Loss	0	7.04	0	0
June 30, 2015 Loss	0	6.31	0	0
June 30, 2014 Loss	0	5.29	0	0
3. Investment Experience				
June 30, 2018 Loss	$ 0	5.00	$ 0	$ 0
June 30, 2017 Loss	0	4.00	0	0
June 30, 2016 Loss	160,563,341	3.00	53,521,114	107,042,227
June 30, 2015 Loss	144,156,894	2.00	72,078,447	72,078,447
June 30, 2014 Loss	0	1.00	0	0
Total Outflows: (1)+(2)+(3)	**$ 489,907,065**		**$ 148,160,683**	**$ 341,746,382**

Information was provided prospectively from June 30, 2013 for GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

In accordance with GASB, the original amortization period for liability experience and assumption changes are amortized over the expected future working lifetime of all members, whereas the investment experience is amortized over five years.

TABLE 16

DEFERRED INFLOWS OF RESOURCES

	June 30, 2017	Remaining Period	Recognition	June 30, 2018
1. Liability Experience				
June 30, 2018 Gain	$ 0	8.69	$ 0	$ 0
June 30, 2017 Gain	0	7.83	0	0
June 30, 2016 Gain	0	7.04	0	0
June 30, 2015 Gain	41,777,783	6.31	6,620,886	35,156,897
June 30, 2014 Gain	6,693,223	5.29	1,265,261	5,427,962
2. Assumption Changes				
June 30, 2018 Gain	$ 0	8.69	$ 0	$ 0
June 30, 2017 Gain	20,749,433	7.83	2,649,992	18,099,441
June 30, 2016 Gain	0	7.04	0	0
June 30, 2015 Gain	209,972,619	6.31	33,276,169	176,696,450
June 30, 2014 Gain	0	5.29	0	0
3. Investment Experience				
June 30, 2018 Gain	$ 139,689,550	5.00	$ 27,937,910	$ 111,751,640
June 30, 2017 Gain	49,820,040	4.00	12,455,010	37,365,030
June 30, 2016 Gain	0	3.00	0	0
June 30, 2015 Gain	0	2.00	0	0
June 30, 2014 Gain	51,238,062	1.00	51,238,062	0
Total Inflows: (1)+(2)+(3)	**$ 519,940,710**		**$ 135,443,290**	**$ 384,497,420**

Information was provided prospectively from June 30, 2013 for GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

In accordance with GASB, the original amortization period for liability experience and assumption changes are amortized over the expected future working lifetime of all members, whereas the investment experience is amortized over five years.

TABLE 17

DEFERRED INFLOWS / OUTFLOWS TO BE RECOGNIZED IN PENSION EXPENSE

Fiscal Year Ending June 30	Deferred Outflows	Deferred Inflows	Net Deferred Outflows/(Inflows)
Current Year:			
2018	$ 148,160,683	$ 135,443,290	$ 12,717,393
Future Years:			
2019	$ 148,160,683	$ 84,205,228	$ 63,955,455
2020	76,082,235	84,205,228	(8,122,993)
2021	22,561,122	84,205,228	(61,644,106)
2022	22,561,122	71,750,218	(49,189,096)
2023	22,561,122	42,913,965	(20,352,843)
Thereafter	49,820,098	17,217,553	32,602,545

TABLE 18

PENSION EXPENSE UNDER GASB NO. 68

		For Fiscal Year Ending June 30, 2018	
1. Service Cost, beginning of year		$	136,640,454
2. Interest Cost, including interest on service cost			366,931,750
3. Member Contributions [1]			(48,685,635)
4. Administrative Expenses			1,642,550
5. Expected Return on Assets [2]			(365,301,811)
6. Plan Amendments			0
7. Recognition of Deferred Inflows / Outflows of Resources Related to:			
a. Liability Experience (Gains) / Losses	14,674,975		
b. Assumption Change (Gains) / Losses	(35,926,161)		
c. Investment Experience (Gains) / Losses	33,968,579		
d. Total: (7a)+(7b)+(7c)			12,717,393
8. Miscellaneous (Income) / Expense			(18,229)
9. Total Collective Pension Expense: (1)+(2)+(3)+(4)+(5)+(6)+(7d)+(8)			103,926,472
10. Employer Service Purchases [3]			19,824
Pension Expense / (Income): (9) + (10)		**$**	**103,946,296**

[1] Excludes member paid service purchases of $152,826.
[2] Cash flows assumed to occur mid-year.
[3] To be expensed by the employers who purchased the service.

GASB NO. 67 and GASB NO. 68

NOTES TO THE FINANCIAL STATEMENTS

The material presented herein is a subset of the information requested as Notes to the Financial Statements. Required information not provided herein is to be supplied by the plan.

Actuarial Assumptions and Inputs

Significant actuarial assumptions and other inputs used to measure the total pension liability:

Type of Plan	The 1977 Police Officers' and Firefighters' Retirement Fund is a cost-sharing multiple-employer plan for GASB accounting purposes.
Measurement Date	June 30, 2018
Valuation Date	
Assets:	June 30, 2018
Liabilities:	June 30, 2017 – The TPL as of June 30, 2018 was determined based on an actuarial valuation prepared as of June 30, 2017 rolled forward one year to June 30, 2018, using the following key actuarial assumptions and other inputs, such as benefit accruals and actual benefit payments during that time period.
Inflation	2.25%
Future Salary Increases	2.50%
Cost-of-Living Increases	As of June 30, 2018: 2.0% compounded annually, beginning July 1, 2019. Actual COLA increases at July 1, 2017 (2.5%) and July 1, 2018 (2.2%) are reflected in the valuation.
	As of June 30, 2017: 2.0% compounded annually, beginning July 1, 2018. Actual COLA increases at July 1, 2016 (1.1%) and July 1, 2017 (2.5%) are reflected in the valuation.
Mortality Assumption (Healthy)	RP-2014 (with MP-2014 improvement removed) Blue Collar mortality tables, with future mortality improvement projected generationally using future mortality improvement inherent in the Social Security Administration's 2014 Trustee report.

Mortality Assumption (Disabled)	RP-2014 (with MP-2014 improvement removed) Disability mortality tables, with future mortality improvement projected generationally using future mortality improvement inherent in the Social Security Administration's 2014 Trustee report.
Experience Study	The most recent comprehensive experience study was completed in April 2015 and was based on member experience between June 30, 2010 and June 30, 2014. The demographic assumptions were updated as needed for the June 30, 2015 actuarial valuation based on the results of the study.
Discount Rate	6.75% The discount rate is equal to the expected long-term rate of return on plan investments, net of investment expense and including price inflation. There was no change in the discount rate from the prior measurement date. The INPRS Board of Trustees has established a funding policy of setting the employer contribution rate equal to the greater of 17.5% (the current contribution rate) or a rate equal to the actuarially determined contribution rate, which is based on the assumptions and methods selected by the Board for the annual actuarial valuations and projected covered member payroll. The June 30, 2018 actuarial valuation assumes a long-term rate of return on assets of 6.75%, a 30-year level dollar open method for amortizing the surplus of assets over the actuarial accrued liability (over 100% funded as of June 30, 2018), and a 5-year smoothing method for recognizing investment gains and losses in the actuarial value of assets.

Discount Rate Sensitivity

	1% Decrease 5.75%	Current Rate 6.75%	1% Increase 7.75%
Net Pension Liability	$835,239,245	($87,911,156)	($834,121,333)

Classes of Plan Members Covered

The June 30, 2018 valuation was performed using census data provided by INPRS as of June 30, 2017. Standard actuarial techniques were used to roll forward the total pension liability computed as of June 30, 2017 to the June 30, 2018 Measurement Date using actual benefit payments during that period of time.

Number as of June 30, 2017	
1. Currently Receiving Benefits:	
Retired Members, Disabled Members, and Beneficiaries	4,751
2. Inactive Members Entitled To But Not Yet Receiving Benefits	225
3. Inactive Non-vested Members Entitled to a Refund of Member Contributions	1,136
4. Active Members	13,879
Total Covered Plan Members: (1)+(2)+(3)+(4)	19,991

Money-Weighted Rate of Return

The money-weighted rate of return equals investment performance, net of pension plan investment expense, adjusted for the changing amounts actually invested. For the fiscal year ending June 30, 2018, the money-weighted return on the plan assets is 9.3%.

Components of Net Pension Liability

As of June 30, 2018		
Total Pension Liability	$	5,839,659,033
Fiduciary Net Position		5,927,570,189
Net Pension Liability	$	(87,911,156)
Ratio of Fiduciary Net Position to Total Pension Liability		101.51%

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF CHANGES IN THE TOTAL PENSION LIABILITY AND PLAN FIDUCIARY NET POSITION

Fiscal Year Ending June 30	2013	2014	2015	2016	2017	2018
Total Pension Liability						
Total Pension Liability - beginning	$4,122,436,112	$4,392,946,977	$4,706,997,462	$4,680,694,445	$5,039,835,987	$5,385,753,140
Service Cost (SC), beginning-of-year	130,912,451	133,074,656	138,204,281	129,369,091	134,489,476	136,640,454
Interest Cost, including interest on SC	283,732,680	301,824,523	323,129,528	320,218,564	344,396,796	366,931,750
Experience (Gains)/Losses	(39,592,111)	(11,754,267)	(61,640,441)	41,723,496	33,408,704	123,069,038
Assumption Changes	(4,810,241)	0	(309,801,126)	0	(23,399,425)	0
Plan Amendments	0	0	0	0	1,323,025	0
Actual Benefit Payments	(99,802,915)	(109,094,427)	(116,489,902)	(132,746,835)	(148,865,005)	(172,907,999)
Member Reassignments	71,001	0	0	(74,416)	0	0
Service Purchases	0	0	294,643	651,642	4,563,582	172,650
Net Change in Total Pension Liability	270,510,865	314,050,485	(26,303,017)	359,141,542	345,917,153	453,905,893
(a) Total Pension Liability - ending	$4,392,946,977	$4,706,997,462	$4,680,694,445	$5,039,835,987	$5,385,753,140	$5,839,659,033
Plan Fiduciary Net Position						
Plan Fiduciary Net Position – beginning	$3,817,013,634	$4,116,861,121	$4,757,977,785	$4,828,414,561	$4,950,999,065	$5,401,178,536
Contributions – employer	137,110,691	140,119,065	146,696,360	151,674,202	150,857,418	147,094,151
Contributions – non-employer	0	0	0	0	0	0
Contributions – member	40,786,098	41,791,345	43,523,241	44,918,203	51,520,565	48,838,461
Net investment income	223,527,670	570,088,526	(1,584,662)	60,464,690	398,273,550	504,991,361
Actual benefit payments	(99,802,915)	(109,094,427)	(116,489,902)	(132,746,835)	(148,865,005)	(172,907,999)
Net member reassignments	71,001	0	0	(74,416)	0	0
Administrative expense	(1,845,058)	(1,787,845)	(1,708,261)	(1,651,340)	(1,607,057)	(1,642,550)
Other	0	0	0	0	0	18,229
Net change in Plan Fiduciary Net Position	299,847,487	641,116,664	70,436,776	122,584,504	450,179,471	526,391,653
(b) Plan Fiduciary Net Position - ending	$4,116,861,121	$4,757,977,785	$4,828,414,561	$4,950,999,065	$5,401,178,536	$5,927,570,189
Net Pension Liability - ending, (a) - (b)	$276,085,856	($50,980,323)	($147,720,116)	$88,836,922	($15,425,396)	($87,911,156)

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF THE NET PENSION LIABILITY

Fiscal Year Ending June 30	2013	2014	2015	2016	2017	2018
Total Pension Liability	$4,392,946,977	$4,706,997,462	$4,680,694,445	$5,039,835,987	$5,385,753,140	$5,839,659,033
Plan Fiduciary Net Position	4,116,861,121	4,757,977,785	4,828,414,561	4,950,999,065	5,401,178,536	5,927,570,189
Net Pension Liability	$276,085,856	($50,980,323)	($147,720,116)	$88,836,922	($15,425,396)	($87,911,156)
Ratio of Plan Fiduciary Net Position to Total Pension Liability	93.72%	101.08%	103.16%	98.24%	100.29%	101.51%
Covered-employee payroll [1]	$695,000,000	$710,580,690	$745,336,167	$771,948,731	$809,382,060	$842,178,524
Net Pension Liability as a percentage of covered-employee payroll	39.72%	-7.17%	-19.82%	11.51%	-1.91%	-10.44%

[1] As provided by INPRS.

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year Ending June 30	2013	2014	2015	2016	2017	2018
Actuarially Determined Contribution [1]	$112,590,000	$103,425,019	$118,881,119	$113,437,866	$91,257,827	$74,490,690
Actual employer contributions [2]	$137,110,691	$140,119,065	$146,401,717	$151,299,454	$150,698,652	$147,074,327
Annual contribution (deficiency) / excess	$24,520,691	$36,694,046	$27,520,598	$37,861,588	$59,440,825	$72,583,637
Covered-employee payroll [3]	$695,000,000	$710,580,690	$745,336,167	$771,948,731	$809,382,060	$842,178,524
Actual contributions as a percentage of covered-employee payroll	19.73%	19.72%	19.64%	19.60%	18.62%	17.46%

[1] Actuarially determined contribution rate for July-December was developed in the actuarial funding valuation completed two years prior to the fiscal year. Actuarially determined contribution rate for January-June was developed in the actuarial funding valuation completed one year prior to the fiscal year. The average of these two rates was applied to the actual covered employee payroll for the fiscal year to determine the contribution amount.
[2] Excludes service purchases paid for by the employer of $19,824.
[3] As provided by INPRS.

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Results prior to 2018 were produced by the prior actuary.

GASB NO. 67 AND GASB NO. 68: REQUIRED SUPPLEMENTAL INFORMATION

SCHEDULE OF MONEY-WEIGHTED RETURNS

For Fiscal Year Ending June 30	Money-Weighted Return
2018	9.3%
2017	8.0%
2016	1.2%
2015	(0.1%)
2014	13.7%
2013	5.9%

Information was provided prospectively from June 30, 2013 for GASB No. 67 and GASB No. 68 purposes. Returns were provided by INPRS.

Appendix **Page**

MEMBER DATA RECONCILIATION
For June 30, 2017 Data used in the June 30, 2018 Valuation

	Active Members	Actives in DROP	Inactive Vested	Inactive Nonvested	Disabled	Retired	Beneficiary	Total
1. As of June 30, 2016	**13,029**	**553**	**195**	**1,005**	**771**	**2,862**	**741**	**19,156**
Reclassify Actives over Service Cap	3	0	(3)	0	0	0	0	0
Adjusted Counts	13,032	553	192	1,005	771	2,862	741	19,156
2. Data Adjustments								
New Units/Enlargements [1]	59	0	0	4	0	0	0	63
New Participants	778	0	0	0	0	0	0	778
Rehires	106	0	0	(106)	0	0	0	0
Terminations:								
Not Vested	(131)	0	0	131	0	0	0	0
Deferred Vested	(67)	(4)	71	0	0	0	0	0
DROP	(328)	329	(1)	0	0	0	0	0
Disability	(42)	(2)	0	(3)	47	0	0	0
Retirements	(163)	(166)	(41)	0	0	370	0	0
Refund / Benefits Ended	(65)	0	(1)	(75)	0	0	(1)	(142)
Deaths:								
With Beneficiary	(8)	0	(1)	0	(6)	(33)	48	0
Without Beneficiary	(1)	0	(1)	(1)	(5)	(20)	(26)	(54)
Entitled to Future Benefit	(2)	0	3	(1)	0	0	0	0
Data Corrections	3	(2)	4	182	(1)	3	1	190
Net Change	139	155	33	131	35	320	22	835
3. As of June 30, 2017 [2]	**13,171**	**708**	**225**	**1,136**	**806**	**3,182**	**763**	**19,991**

[1] New units joining '77 Fund during Fiscal Year 2017: Washington Township Avon Fire Department, Scottsburg Fire Department, and Cumberland Police Department.
[2] No change in counts due to new units, withdrawals, or transfers during Fiscal Year 2018.

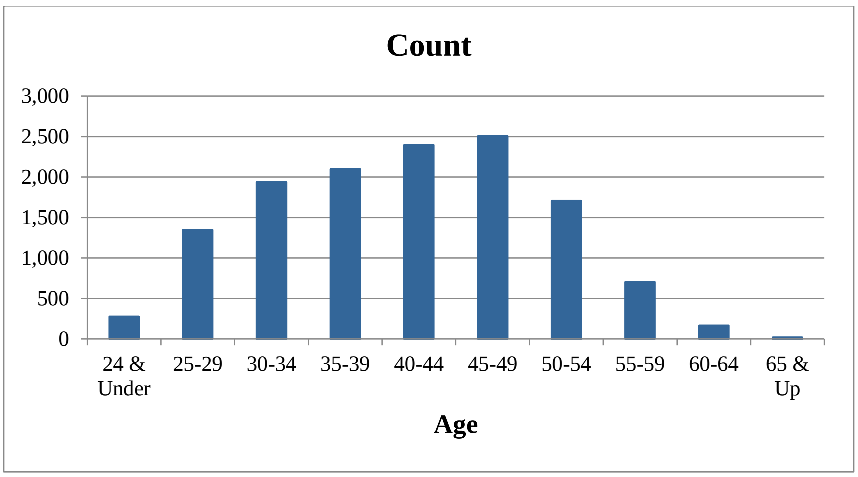
SUMMARY OF MEMBERSHIP DATA

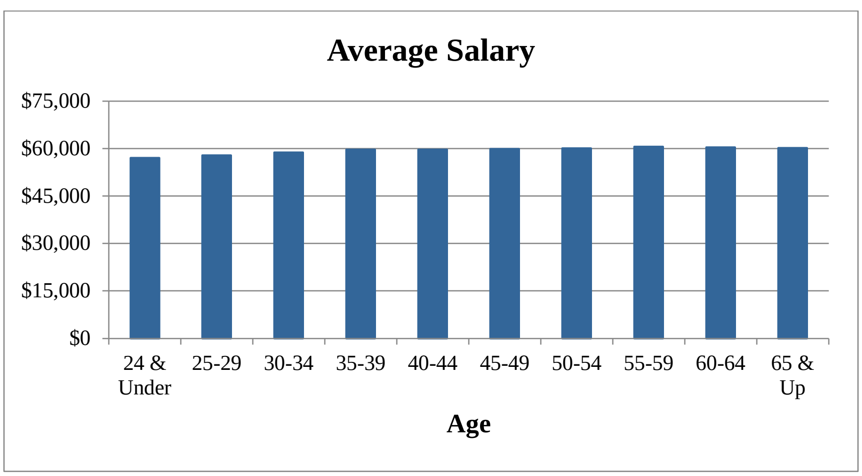
Valuation Date	June 30, 2017	June 30, 2018	% Change
Date of Membership Data [1]	June 30, 2016	June 30, 2017	
ACTIVE MEMBERS			
Number of Members			
Active	13,029	13,171	N/A
Active in DROP	553	708	N/A
Total	13,587	13,879	2.1%
Annual Membership Data Salary [2]	$ 784,278,130	$ 826,615,101	5.4%
Anticipated Payroll for Next Fiscal Year	$ 829,736,440	$ 863,232,987	4.0%
Active Member Averages			
Age	42.2	42.0	(65.9%)
Service	14.6	14.4	187.4%
Annual Membership Data Salary	$ 57,723	$ 59,559	3.2%
INACTIVE MEMBERS			
Number of Members			
Inactive Vested	195	225	15.4%
Inactive Non-Vested	1,005	1,136	13.0%
Total	1,200	1,361	13.4%
Inactive Vested Member Averages			
Age	49.6	49.3	(0.6%)
Service	22.6	21.9	(2.9%)
RETIREES, DISABLEDS, AND BENEFICIARIES			
Number of Members			
Retired	2,862	3,182	11.2%
Disabled	771	806	4.5%
Beneficiaries	741	763	3.0%
Total	4,374	4,751	8.6%
Annual Benefits			
Retired	$ N/A	$ 98,372,315	N/A
Disabled	N/A	21,103,737	N/A
Beneficiaries	N/A	12,730,570	N/A
Total	$ 118,471,604	$ 132,206,622	11.6%

[1] Valuation results were calculated using the prior year's census data, adjusted for certain activity during fiscal year.
[2] Annualized for actives with less than a year of service. Actives missing a salary are defaulted to the average salary.

ACTIVE MEMBERS
As of June 30, 2017 for the June 30, 2018 Valuation

	Count of Members			FY 2017 Annual Membership Data Salary		
Age	Male	Female	Total	Male	Female	Total
24 & Under	252	28	280	$ 14,470,399	$ 1,520,173	$ 15,990,572
25-29	1,254	96	1,350	72,122,837	5,939,387	78,062,224
30-34	1,833	103	1,936	107,309,088	6,402,735	113,711,823
35-39	1,977	122	2,099	117,727,871	7,665,730	125,393,601
40-44	2,256	139	2,395	134,384,497	8,564,777	142,949,274
45-49	2,395	112	2,507	143,441,567	6,830,985	150,272,552
50-54	1,616	93	1,709	96,735,548	5,945,809	102,681,357
55-59	681	25	706	41,237,893	1,576,584	42,814,477
60-64	162	7	169	9,772,216	442,691	10,214,907
65 & Up	20	0	20	1,203,705	0	1,203,705
Total	12,446	725	13,171	$ 738,405,621	$ 44,888,871	$ 783,294,492



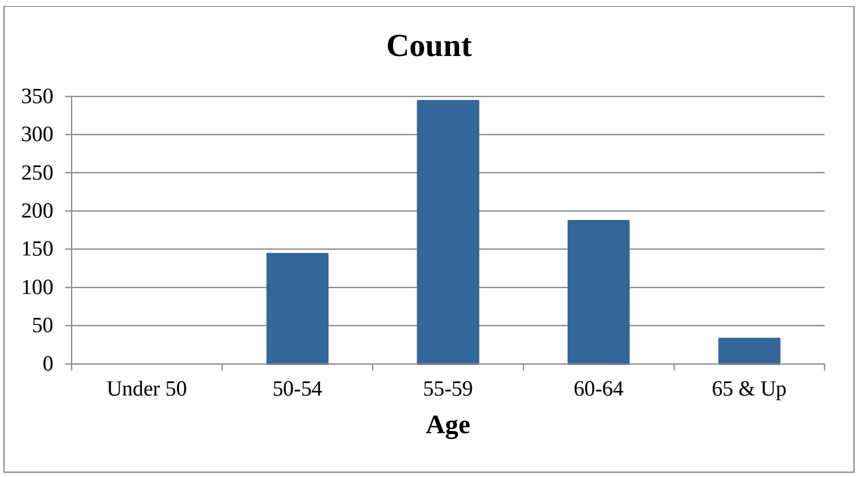


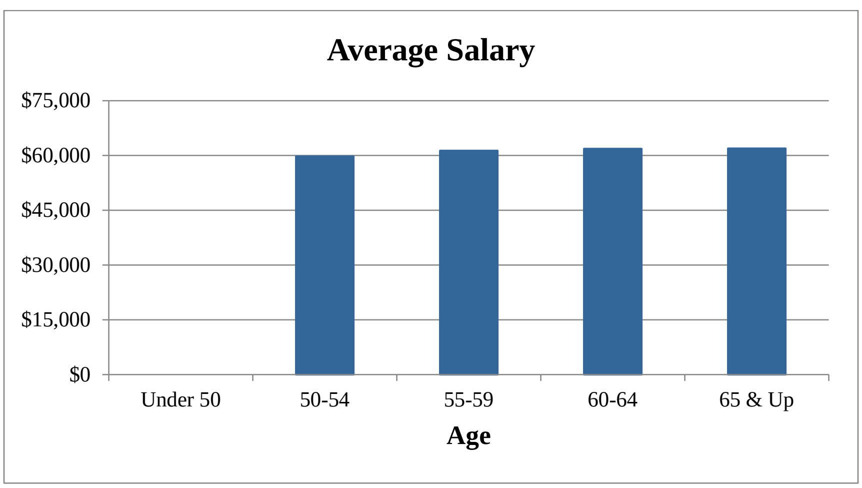
AGE AND SERVICE DISTRIBUTION
As of June 30, 2017 for the June 30, 2018 Valuation

Age		0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
24 & Under	Number	280	0	0	0	0	0	0	0	280
	Total Salary	$ 15,990,572	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 15,990,572
	Average Sal.	$ 57,109	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 57,109
25-29	Number	1,268	82	0	0	0	0	0	0	1,350
	Total Salary	$ 73,384,577	$ 4,677,646	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 78,062,224
	Average Sal.	$ 57,874	$ 57,044	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 57,824
30-34	Number	989	781	166	0	0	0	0	0	1,936
	Total Salary	$ 57,594,590	$ 46,220,672	$ 9,896,561	$ 0	$ 0	$ 0	$ 0	$ 0	$ 113,711,823
	Average Sal.	$ 58,235	$ 59,181	$ 59,618	$ 0	$ 0	$ 0	$ 0	$ 0	$ 58,735
35-39	Number	374	624	912	188	1	0	0	0	2,099
	Total Salary	$ 21,571,000	$ 37,141,750	$ 55,284,183	$ 11,340,602	$ 56,065	$ 0	$ 0	$ 0	$ 125,393,601
	Average Sal.	$ 57,676	$ 59,522	$ 60,619	$ 60,322	$ 56,065	$ 0	$ 0	$ 0	$ 59,740
40-44	Number	35	332	820	1,057	151	0	0	0	2,395
	Total Salary	$ 1,833,292	$ 19,329,238	$ 49,296,493	$ 63,720,644	$ 8,769,607	$ 0	$ 0	$ 0	$ 142,949,274
	Average Sal.	$ 52,380	$ 58,221	$ 60,118	$ 60,284	$ 58,077	$ 0	$ 0	$ 0	$ 59,687
45-49	Number	17	28	436	973	904	148	1	0	2,507
	Total Salary	$ 900,485	$ 1,689,376	$ 26,021,636	$ 58,421,379	$ 54,054,006	$ 9,112,410	$ 73,258	$ 0	$ 150,272,552
	Average Sal.	$ 52,970	$ 60,335	$ 59,683	$ 60,043	$ 59,794	$ 61,570	$ 73,258	$ 0	$ 59,941
50-54	Number	6	4	30	409	523	647	90	0	1,709
	Total Salary	$ 269,324	$ 205,277	$ 1,851,411	$ 23,955,723	$ 30,910,225	$ 39,698,722	$ 5,790,675	$ 0	$ 102,681,357
	Average Sal.	$ 44,887	$ 51,319	$ 61,714	$ 58,571	$ 59,102	$ 61,358	$ 64,341	$ 0	$ 60,083
55-59	Number	3	0	5	34	140	285	239	0	706
	Total Salary	$ 148,350	$ 0	$ 296,786	$ 2,007,541	$ 8,295,768	$ 17,230,158	$ 14,835,873	$ 0	$ 42,814,477
	Average Sal.	$ 49,450	$ 0	$ 59,357	$ 59,045	$ 59,255	$ 60,457	$ 62,075	$ 0	$ 60,644
60-64	Number	1	1	0	7	15	60	85	0	169
	Total Salary	$ 45,240	$ 49,945	$ 0	$ 451,117	$ 915,596	$ 3,480,523	$ 5,272,486	$ 0	$ 10,214,907
	Average Sal.	$ 45,240	$ 49,945	$ 0	$ 64,445	$ 61,040	$ 58,009	$ 62,029	$ 0	$ 60,443
65 & Up	Number	0	0	0	2	2	0	16	0	20
	Total Salary	$ 0	$ 0	$ 0	$ 123,907	$ 146,290	$ 0	$ 933,509	$ 0	$ 1,203,705
	Average Sal.	$ 0	$ 0	$ 0	$ 61,953	$ 73,145	$ 0	$ 58,344	$ 0	$ 60,185
Total	Number	2,973	1,852	2,369	2,670	1,736	1,140	431	0	13,171
	Total Salary	$ 171,737,430	$ 109,313,904	$ 142,647,070	$ 160,020,914	$ 103,147,558	$ 69,521,814	$ 26,905,801	$ 0	$ 783,294,491
	Average Sal.	$ 57,766	$ 59,025	$ 60,214	$ 59,933	$ 59,417	$ 60,984	$ 62,426	$ 0	$ 59,471

ACTIVE MEMBERS IN DROP
As of June 30, 2017 for the June 30, 2018 Valuation

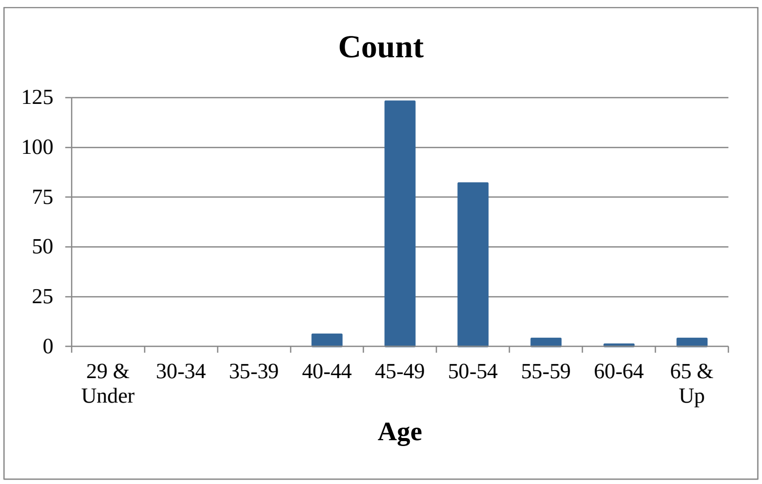
	Count of Members			FY 2017 Annual Membership Data Salary		
Age	Male	Female	Total	Male	Female	Total
Under 50	0	0	0	$ 0	$ 0	$ 0
50-54	138	6	144	8,213,805	391,516	8,605,321
55-59	319	25	344	19,362,859	1,737,558	21,100,417
60-64	178	9	187	10,957,543	614,076	11,571,619
65 & Up	28	5	33	1,710,347	332,905	2,043,252
Total	663	45	708	$ 40,244,554	$ 3,076,055	$ 43,320,609





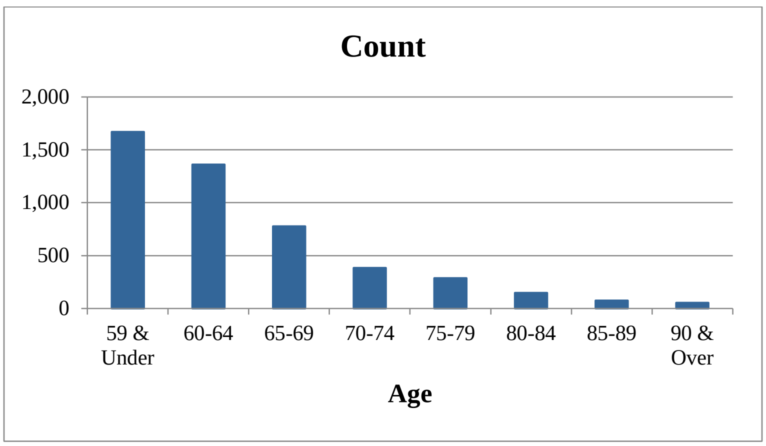
INACTIVE VESTED MEMBERS
As of June 30, 2017 for the June 30, 2018 Valuation

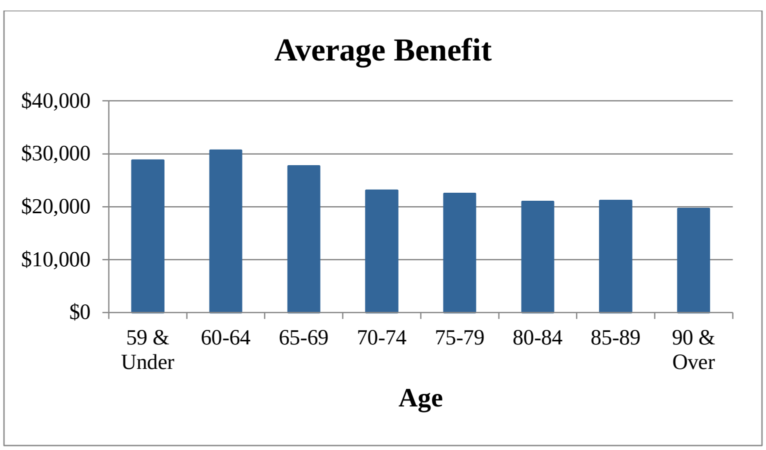
	Count of Members		
Age	Male	Female	Total
29 & Under	1	0	1
30-34	0	0	0
35-39	0	0	0
40-44	6	1	7
45-49	118	6	124
50-54	75	7	82
55-59	5	0	5
60-64	2	0	2
65 & Up	4	0	4
Total	211	14	225



MEMBERS AND BENEFICIARIES RECEIVING BENEFITS
As of June 30, 2017 for the June 30, 2018 Valuation

	Count of Members			Annual Benefits		
Age	Male	Female	Total	Male	Female	Total
59 & Under	1,336	333	1,669	$ 39,876,595	$ 8,153,212	$ 48,029,807
60-64	1,196	166	1,362	38,024,987	3,711,204	41,736,191
65-69	633	144	777	18,733,596	2,765,086	21,498,682
70-74	276	106	382	7,060,479	1,741,765	8,802,244
75-79	194	92	286	5,031,754	1,400,017	6,431,771
80-84	80	66	146	2,060,664	1,000,350	3,061,014
85-89	31	45	76	877,508	730,245	1,607,753
90 & Over	18	35	53	504,686	534,474	1,039,160
Total	3,764	987	4,751	$ 112,170,269	$ 20,036,353	$ 132,206,622





MEMBERS AND BENEFICIARIES RECEIVING BENEFITS
As of June 30, 2017 for the June 30, 2018 Valuation

Schedule of Average Benefit Payments [1]

	Years of Credited Service						
For the Year Ended June 30, 2018	< 10	10 - 14	15 - 19	20 - 24	25 - 29	30 +	Total
Average Monthly Defined Benefit	$1,924	$1,993	$1,938	$1,984	$2,589	$2,984	$2,319
Average Final Average Salary	$43,021	$50,113	$47,985	$46,569	$49,576	$52,614	$48,753
Number of Benefit Recipients [2]	239	241	286	1,843	1,330	812	4,751

Schedule of Benefit Recipients by Type of Benefit Option [1]

	Number of Recipients by Benefit Option			
Amount of Monthly Benefit (in dollars)	Joint with 60% Survivor Benefits	Survivors	Disability	Total Benefit Recipients
1 - 500	0	12	0	12
501 - 1,000	4	144	23	171
1,001 - 1,500	112	367	83	562
1,501 - 2,000	474	163	210	847
2,001 - 2,500	947	46	276	1,269
2,501 - 3,000	883	20	139	1,042
Over 3,000	762	11	75	848
Total	3,182	763	806	4,751

[1] Calculated using the prior year census data, adjusted for certain activity during the fiscal year.
[2] Members with less than 20 years of service are primarily members receiving a disability benefit.

MEMBERS AND BENEFICIARIES RECEIVING BENEFITS
As of June 30, 2017 for the June 30, 2018 Valuation

Schedule of Retirees and Beneficiaries

	Added to Rolls		Removed from Rolls		Rolls - End of Year				
	Number	Annual Benefits	Number	Annual Benefits	Number	Total Annual Benefits	Percent Change In Total Annual Benefits[1,2]	Average Annual Benefit	Percent Change In Average Annual Benefit
2018 [3]	429	$14,914	52	$1,002	4,751	132,207	11.6%	27,827	2.7%
2017 [3]	407	13,321	37	642	4,374	118,472	12.6	27,085	3.1
2016 [3]	312	10,074	44	834	4,004	105,218	9.2	26,278	1.9
2015 [3]	283	8,858	38	727	3,736	96,336	10.3	25,786	3.1
2014 [3]	0	0	0	0	3,491	87,301	0.0	25,008	0.0
2013	326	10,098	43	845	3,491	87,301	13.5	25,008	4.3
2012	281	7,900	39	814	3,208	76,917	12.8	23,977	4.3
2011	218	6,179	34	609	2,966	68,179	13.2	22,987	6.2
2010	208	4,918	34	641	2,782	60,220	8.4	21,646	1.6
2009	102	2,571	24	479	2,608	55,564	3.7	21,305	0.6

[1] Dollar amounts are in thousands except for the average annual benefit.
[2] End of year annual benefits are not equal to prior end of year annual benefits plus additions less removals due to beneficiary benefit changes, data changes, and COLA increases.
[3] The valuation results were calculated using the prior year census data, adjusted for certain activity during the fiscal year.

Definitions

Fiscal year	Twelve month period ending June 30.
Participation	All full-time, fully-paid police officers and firefighters who work for employers participating in the 1977 Fund and who are hired or rehired after April 30, 1977.
Member contributions	Members are assumed to contribute at the rate of 6% of salary until they have completed 32 years of service.

Eligibility for Benefits

Deferred vested	20 or more years of creditable service and no longer active.
Disability retirement	As determined by a disability medical panel.
Early retirement	Age 50 with 20 or more years of creditable service.
Normal retirement	Age 52 with 20 or more years of creditable service.
Pre-retirement death	Immediate.

Monthly Benefits Payable

Normal retirement	The retirement benefit valued was 50% of the base salary (first-class salary) of a First Class Police Officer and Firefighter with 20 years of service, plus an additional 1% for each completed 6 months of service over 20 years up to a maximum of 74% with 32 years of service.
Early retirement	Early retirement benefits are reduced by 7% per year for commencement between ages 50 and 52.
Deferred retirement	If a member ends employment other than by death or disability before completing 20 years of active service, the member shall be entitled to the member's contributions plus accumulated interest. This benefit is not available to converted members. If termination is after earning 20 years of service, the termination benefit is the accrued retirement benefit determined as of the termination date and payable commencing of the normal retirement date. The member may elect to receive a reduced early retirement benefit.

Disability

Hired before 1990

This disability benefit is only available to members hired prior to January 1, 1990 and who do not choose to be covered by the disability benefit for members hired after 1989. The disability benefit is equal to the benefit the member would have received if the member had retired. If the member does not have 20 years of service or is not at least age 52 on the date of disability, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of disability.

<u>House Enrolled Act Number 1617 Enhanced Disability:</u>
For catastrophic physical personal injuries that result in a degree of impairment of at least 67% and permanently prevents the member from performing any gainful work, the member will receive a disability benefit equal to 100% of base salary. Additionally, the benefit is increased by the increase in the base salary.

Hired after 1989

This disability benefit is for members hired after 1989, or hired prior to January 1, 1990, who have chosen to be covered by this disability benefit. The following describes the three different classes of impairments and the amount of base benefit for each class:

<u>Class 1 Impairment:</u>
A personal injury that occurs while on duty, while responding to an emergency, or due to an occupational disease. The disability benefit is equal to a base benefit of 45% of base salary, plus an additional amount between 10% and 45% of this salary based on degree of impairment. The benefit is payable for life, at which time the member is entitled to a retirement benefit based on the salary and service the member would have earned had the member remained in active service.

<u>Class 2 Impairment:</u>
A proven duty-related disease. The disability benefit is equal to a base benefit of 22% of base salary, plus an additional 0.5% of this salary for each year of service up to a maximum of 30 years of service, plus an additional amount between 10% and 45% of this salary based on degree of impairment. If the member's total benefit is less than 30% of this salary and the member has fewer than 4 years of service, then the benefit is payable for a period equal to the years of service of the member. Otherwise, the benefit is payable for life.

Class 3 Impairment:
All other impairments that are not Class 1 or Class 2. The disability benefit is equal to a base benefit of 1% of base salary for each year of service up to a maximum of 30 years of service, plus an additional amount between 10% and 45% of this salary based on degree of impairment. If the member's total benefit is less than 30% of this salary and the member has fewer than 4 years of service, then the benefit is payable for a period equal to the years of service of the member. Otherwise, the benefit is payable until age 52, at which time the member is entitled to a retirement benefit based on 20 years of service.

2017 House Enrolled Act No. 1617 Enhanced Disability:
For catastrophic physical personal injuries that result in a degree of impairment of at least 67% and permanently prevents the member from performing any gainful work, the member will receive a disability benefit equal to 100% of base salary. Additionally, the benefit is increased by the increase in the base salary.

Pre-retirement death

Surviving spouse

If a member dies other than in the line of duty, the spouse's benefit is equal to 60% of the monthly benefit the member was receiving or was entitled to receive on the date of death.

If a member dies in the line of duty, the spouse's benefit is equal to the monthly benefit the member was receiving or was entitled to receive on the date of death.

In either case, if the member does not have 20 years of service or is not at least age 52 on the date of death, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of death.

Children

A payment shall be made to each child of a deceased member equal to 20% of the member's benefit until the later of (a) the date the child becomes age 18, or (b) the date the child becomes age 23 if enrolled in a qualified school. If a child is at least 18 and is mentally or physically incapacitated, the child is entitled to an amount equal to the greater of 30% of the base salary, or 55% of the member's benefit payable for the duration of the incapacity. If the member does not have 20 years of service or is not at least age 52 on the date of death, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of death.

Dependent parents	If a deceased member leaves no surviving spouse and no qualified child but does leave a dependent parent or parents, an amount equal to 50% of the member's benefit shall be paid to the parent or parents jointly during their lifetime. If the member does not have 20 years of service or is not at least age 52 on the date of death, the benefit is computed as if the member does have 20 years of service and is age 52 on the date of death.
No spouse or dependent	If a deceased member leaves no surviving spouse, no qualified dependent child, nor a dependent parent, a refund of the member's contributions plus accumulated interest will be made to the member's estate.
Additional death benefits	A funeral death benefit is paid to the heirs or estate upon the member's death from any cause and is equal to at least $12,000. An additional death benefit of $150,000 is paid from the Pension Relief Fund to a surviving spouse, children, or parent(s) if death occurs in the line of duty.
Deferred retirement option plan (“DROP”)	The DROP is an optional form of benefit, which allows members who are eligible for an unreduced retirement benefit to continue to work and earn a salary while accumulating a DROP benefit payable in a lump sum or three annual installments. A member who elects to enter the DROP shall execute an irrevocable election to retire on the DROP retirement date. The member shall select a DROP retirement date not less than 12 months and not more than 36 months after the member’s DROP entry date. While in the DROP, the member shall continue to make applicable fund contributions. When a member enters the DROP, a “DROP frozen benefit” will be calculated. This is equal to the member's monthly retirement benefit based on accrued service and base salary as of the date member enters the DROP. Upon DROP retirement, the member is eligible to receive a lump sum equal to the amount of the DROP frozen benefit multiplied by the number of months in the DROP. You may elect to receive this amount in three annual installments instead of in a single lump sum. In addition, the member will receive a monthly retirement benefit equal to the DROP frozen benefit. The member will not continue to accrue service credit for the years in the DROP. Cost of living adjustments will not apply to the frozen monthly benefit while in the DROP. The cost of living adjustments will begin to be applied to the frozen monthly benefit, however, in the year after the year in which the member retires.

	If the member elected to participate in the DROP, the member may, upon retirement, elect to forego DROP benefits, and instead receive monthly retirement benefits calculated as if the member never elected to participate in the DROP. These benefits would be based on accrued service and base salary as of the date the member retires.
Cost-of-Living-Adjustments	Benefits for retired members are increased annually based on increases in the CPI-U index. The increase is subject to a 3% maximum and 0% minimum.
Forms of payment	
a. Single life annuity	Member will receive a monthly benefit for life, but there are no monthly payments to anyone after death.
b. Joint with 60% survivor benefits	Member will be paid a monthly benefit for life. After death, 60% of the benefit will be paid to the spouse or parent for their lifetime or the dependent until age 18.

Changes in Plan Provisions since the Prior Year

None.

ACTUARIAL METHODS

1. Actuarial Cost Method

The actuarial cost method is Entry Age Normal - Level Percent of Payroll.

The normal cost is calculated separately for each active member and is equal to the level percentage of payroll needed as an annual contribution from entry age to retirement age to fund projected benefits. The actuarial accrued liability on any valuation date is the accumulated value of such normal costs from entry age to the valuation date.

For funding, gains and losses occurring from census experience different than assumed, assumption changes, and benefit changes are amortized over a closed 20-year period with level payments each year. A new gain or loss base is established each year based on the additional gain or loss during that year and that base is amortized over a new 20-year period. However, when the plan is at or above 100% funded (based on Actuarial Value of Assets), the past amortization bases are considered fully amortized and a single amortization base equal to the surplus is amortized over an open 30-year period with level payments each year. The purpose of the method is to give a smooth progression of the costs from year to year and, at the same time, provide for an orderly funding of the unfunded liabilities.

For accounting, gains and losses occurring from census experience different than assumed and assumption changes are amortized into expense over the average expected future service of all plan participants. Gains and losses occurring from investment experience different from assumed are amortized into expense over a 5-year period. The effect of plan changes on the plan liability are fully recognized in expense in the year in which they occur.

Member census data as of June 30, 2017 was used in the valuation and adjusted, where appropriate, to reflect changes between June 30, 2017 and June 30, 2018. The valuation results from June 30, 2017 were rolled-forward to June 30, 2018 to reflect benefit accruals during the year less benefits paid.

2. Asset Valuation Method

The Actuarial Value of Assets smoothes the recognition of gains and losses on the Market Value of Assets over five years, subject to a 20% corridor.

3. Employer Contribution Rate

Based on the assumptions and methods previously described, an actuarially determined contribution rate is computed. The Board considers this information, but has ultimate authority in setting the employer contribution rate.

4. Anticipated Payroll

The anticipated payroll for the fiscal year following the valuation date is equal to the actual payroll during the year ending on the valuation date, increased with one year of salary scale.

Changes in Methods since the Prior Year – None

ACTUARIAL ASSUMPTIONS

Valuation Date — June 30, 2018

Economic Assumptions

1. Investment return — 6.75% per year, compounded annually (net of administrative and investment expenses)

2. Inflation — 2.25% per year

3. Salary increase — 2.50% per year

4. Interest on member balances — 3.50% per year

5. Cost-of-Living Adjustment (COLA) — 2.0% compounded annually, beginning July 1, 2019. Actual COLA increases at July 1, 2017 (2.5%) and July 1, 2018 (2.2%) are reflected in the valuation. For benefits paid under the 2017 House Enrolled Act No. 1617, the annual cost-of-living assumption is 2.5%, which is the same as the salary increase assumption for active members.

Demographic Assumptions

1. Mortality — The mortality assumption includes an appropriate level of conservatism that reflects expected future mortality improvement.

   a. Healthy mortality — RP-2014 (with MP-2014 improvement removed) Blue Collar mortality tables, with future mortality improvement projected generationally using future mortality improvement inherent in the Social Security Administration's 2014 Trustee report.

   b. Disabled mortality — RP-2014 (with MP-2014 improvement removed) Disability mortality tables, with future mortality improvement projected generationally using future mortality improvement inherent in the Social Security Administration's 2014 Trustee report.

2. Disability

Attained Age	Sample Rates
<=30	0.10%
35	0.16%
40	0.26%
45	0.36%
50	0.46%
55	0.56%
60	0.66%
62+	0.70%

3. Retirement

Attained Age	Service <32	Service>=32
50-57	10%	20%
58-61	15%	20%
62-64	20%	20%
65-69	50%	50%
70+	100%	100%

Inactive vested members are assumed to commence their retirement benefit at their earliest eligible retirement date (age 50, or current age if greater).

4. Termination

Years of Service	Rate
0	10.0%
1	5.0%
2	4.0%
3-4	3.5%
5	2.5%
6-8	2.0%
9-11	1.5%
12-19	1.0%
20+	2.0%

Other Assumptions

1. Form of payment

Members are assumed to elect either a single life annuity or a 60% joint survivor benefit based on the marriage assumptions below.

2. Marital status

a. Percent married

80% of male members and 50% of female members are assumed to be married or to have a dependent beneficiary.

b. Spouse's age

Male members are assumed to be three (3) years older than females and female members are assumed to be the same age as males.

3. Pay increase timing

Beginning of (fiscal) year. Payroll amounts stated in the valuation data are amounts projected to be paid during the current year.

4. Decrement timing

Decrements are assumed to occur at the beginning of the year.

5. Active members in DROP	Members who are participating in the DROP are assumed to receive an annuity benefit commencing at the end of their DROP period as well as a lump sum payment equal to the number of years they were in the DROP times their annual annuity benefit. The annuity benefit is estimated based on salary and service at the time the member entered the DROP.
6. Pre-retirement death	Of active member deaths, 10% are assumed to be in the line of duty and 90% are other than in the line of duty.
7. Disability retirement	For members hired after 1989 that become disabled, 1% are assumed to sustain a catastrophic disability and receive the enhanced disability benefit (100% of salary) added by 2017 House Enrolled Act No. 1617, 44% are assumed to sustain a Class 1 disability (at 65% of salary), 10% are assumed to sustain a Class 2 disability (at 50% of salary), and 45% are assumed to sustain a Class 3 disability (at 36% of salary). For members hired before 1989 that become disabled, 1% are assumed to sustain a catastrophic disability and receive the enhanced disability benefit (100% of salary) added by 2017 House Enrolled Act No. 1617 and 99% are assumed to sustain a non-catastrophic disability and receive their accrued retirement benefit.

Changes in Assumptions since the Prior Year

None.

Data Adjustments

Active and retired member data is reported as of June 30. Member census data as of June 30, 2017 was used in the valuation and adjusted. Standard actuarial roll-forward techniques were then used to project the liability computed as of June 30, 2017 to the June 30, 2018 valuation date. The normal cost rate is assumed to remain unchanged between June 30, 2017 and June 30, 2018.

The member total payroll and the asset information for this valuation were furnished as of June 30, 2018. Total payroll in FYE 2019 is assumed to increase by the salary growth assumption over the total payroll observed for FYE 2018. We did not audit the information provided, but we did review it thoroughly for reasonableness and compared it with the prior year's submission for consistency.

TECHNICAL VALUATION PROCEDURES

Other Valuation Procedures

Salary increases are assumed to apply to annual amounts.

Decrements are assumed to occur at the beginning of the year. Standard adjustments are made for multiple decrements.

No actuarial liability is included for participants who terminated without being vested prior to the valuation date, except those due a refund of contributions.

Accrued Service	Service credited under the plan that was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future experience with respect to demographic or economic events. Demographic assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement plan benefits between future normal cost and actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”
Actuarial Equivalent	A single amount or series of amounts of equal value to another single amount or series of amounts computed on the basis of a given set of actuarial assumptions.
Actuarial Accrued Liability	The difference between the actuarial present value of plan benefits and the actuarial value of future normal costs. Also referred to as “accrued liability” or “actuarial liability.”
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Normal Cost	The actuarial present value of retirement plan benefits allocated to the current year by the actuarial cost method.
Unfunded Actuarial Accrued Liability	The difference between actuarial liability and the actuarial value of assets. Sometimes referred to as “unfunded accrued liability” or “unfunded liability”. Most retirement plans have unfunded actuarial liability. They arise anytime new benefits are added and anytime an actuarial loss is realized.