Dallas Police and Fire Pension System

Actuarial Valuation and Review as of January 1, 2017

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July 10, 2017

Board of Trustees
Dallas Police and Fire Pension System
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Dallas, TX 75219-3207

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2017. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience and establishes the actuarially determined funding requirements for 2017; actual funding is determined by state law.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Pension System. The census information on which our calculations were based was prepared by the System's IT Department, under the supervision of John Holt, and the financial information was provided by the System's Finance Department, under the supervision of Summer Loveland. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. 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 smoothing of investment gains and losses); and changes in plan provisions or applicable law.

The actuarial calculations were directed under our supervision. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board of Trustees are reasonably related to the experience of and the expectations for the System, with the presumption that appropriate action is taken to address the System's funding issues.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: [redacted]

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Purpose

This report has been prepared by Segal Consulting to present a valuation of the Dallas Police and Fire Pension System as of January 1, 2017. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension System, as administered by the Board;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of December 31, 2016, provided by the System's IT Department;
- The unaudited assets of the System as of December 31, 2016, provided by the System's Finance Department;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding member terminations, retirement, death, etc.

  The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Experience Study Report for the five-year period ended December 31, 2014. Assumption changes were made in the January 1, 2017 valuation related to the salary scale and DROP interest. Additional assumption changes were made as part of the plan changes effective September 1, 2017. Changes from the prior year are listed at the end of this exhibit.

Significant Issues in Valuation Year

1. The January 1, 2016 actuarial valuation report presented the actuarially determined contribution for the System as a total rate (City and member combined), and reflected a 40-year amortization of the unfunded actuarial accrued liability. At the request of the Texas Pension Review Board, and in a subsequent communication to System staff, Segal Consulting provided the contribution rate using a 30-year amortization, with the rate split between the City and members. The 2016 results in this report have been revised to reflect the 30-year numbers, and the 2017 results are presented in the same manner.
2. The total actuarially determined contribution (City and member) declined from 79.03% of computation pay for 2016 to 56.95% of computation pay for 2017. The decline is due to significant plan changes approved by the Texas Legislature in May 2017 and effective September 1, 2017; these plan changes have been included in this valuation. The City's portion of the actuarially determined contribution rate decreased from 71.70% of computation pay for 2016 to 47.25% of computation pay for 2017.

3. On May 31, 2017, the Governor of Texas signed HB3158 into law. HB3158 amends Article 6243a-1 of the Texas Statues and provides changes to the pension benefits provided by the Dallas Police & Fire Pension System, as well as changes to the contributions required by both plan members and the City of Dallas. Both the plan and contribution changes, which are effective September 1, 2017, are reflected in the January 1, 2017 actuarial valuation. A complete listing of the plan changes effective September 1, 2017 can be found on the System's website, www.dpfp.org. A summary of the major changes is as follows:

   - Normal Retirement Age increased from either age 50 or 55 to age 58
   - Early Retirement Age increased from age 45 for members hired prior to March 1, 2011 to age 53 for all members
   - Benefit multiplier for all future service for members hired prior to March 1, 2011 lowered from 3.00% to 2.50%
   - Benefit multiplier retroactively increased to 2.50% for members hired on or after March 1, 2011
   - Benefit multipliers for 20 & Out benefit lowered and begin at later ages
   - Maximum benefit reduced from 96% of computation pay to 90% of computation pay for members hired prior to March 1, 2011
   - Average computation pay period changed from 36 months to 60 months for future service for members hired prior to March 1, 2011
   - COLA discontinued for all members. The Board may choose to provide a COLA if the funded ratio on a market value basis is at least 70% after the implementation of a COLA.
   - The supplemental benefit is eliminated prospectively; only those for whom the supplement was already granted as of September 1, 2017 will maintain the supplement
   - Active DROP participation is limited to 10 years
   - DROP interest for active DROP members will cease after September 1, 2017; only the balance as of September 1, 2017 will be eligible for interest once active DROP members retire
   - Retirees with DROP accounts as of September 1, 2017 will have their DROP account balances paid out over their expected lifetime based on their age as of September 1, 2017
   - Future retirees with DROP accounts will have their DROP account balances paid out over their expected lifetime as of the date of their retirement
   - Interest on retiree DROP accounts will be paid based on the length of the retiree's expected lifetime and will be based on U.S. Treasury rates which correlate to expected lifetime, as determined by the Board of Trustees; interest is only payable on the September 1, 2017 account balance
   - Member contributions for both DROP and non-DROP members increased to 13.5% effective September 1, 2017

- The City's contribution rate will increase to 34.5% of computation pay. Between September 1, 2017 and December 31, 2024, the City's contribution will be the greater of 34.5% and a biweekly contribution amount as stated in HB3158, plus $13 million per year.

4. The following assumption changes were proposed by the actuary and presented to the System as part of the plan design work that is incorporated in this valuation. These changes are reflected for the first time in this valuation.
   - The administrative expense assumption was changed from $10 million per year to the greater of $10 million per year or 1% of computation pay
   - The DROP utilization factor was changed from 100% to 0%
   - Current DROP members with at least eight years in the DROP as of January 1, 2017 are assumed to retire in 2018. Current DROP members with less than eight years in DROP as of January 1, 2017 are assumed to retire once they have been in the DROP for eight years.
   - Retirement rates were changed effective January 1, 2018
   - 100% retirement rate once the projected sum of age plus service equals 90
   - New terminated vested members are assumed to retire at age 58
   - Beginning September 1, 2017, DROP account balances for annuitants are assumed to earn 2.75% interest; DROP account balances as of September 1, 2017 for active members are assumed to earn 2.75% interest upon retirement; DROP account balances accrued after September 1, 2017 do not earn interest.
   - DROP payment period based on an 85%/15% male/female blend of the current healthy annuitant mortality tables
   - COLA assumed to be a 2.00% COLA beginning October 1, 2049 and payable every October 1 thereafter

5. Prior to the 2017 legislative session, the City and bargaining parties signed a new Meet and Confer Agreement. To reflect the expected impact of this agreement on member salaries, the assumed salary scale rates were revised through 2019. In addition, the assumed DROP interest was changed to 0% as of October 1, 2018 as a result of Section 6.14(c) of the plan document as amended and restated through April 16, 2015. These assumption changes are not related to the plan changes effective September 1, 2017.

6. The reconciliation of the City's actuarially determined employer contribution (ADEC), on a 30-year amortization basis, from the January 1, 2016 valuation to the January 1, 2017 valuation, is shown below.

➤ January 1, 2016 ADEC	**$261,589,079**, or **71.70%** of computation pay
➤ January 1, 2017 ADEC, prior to any assumption or plan changes	**$272,943,384**, or **77.75%** of computation pay
➤ January 1, 2017 ADEC, after assumption changes not related to plan changes	**$249,844,232**, or **69.90%** of computation pay
➤ January 1, 2017 ADEC, after plan changes	**$168,865,484**, or **47.25%** of computation pay

   Chart 14 on page 13 provides further details of the ADEC reconciliation.

7. In the January 1, 2016 actuarial valuation, the System was projected to become insolvent within 15 years. In the January 1, 2017 actuarial valuation, the System is projected to become 100% funded by January 1, 2061, based on the City's "hiring plan" payroll projections through 2037.

8. There were 284 retirements from the active population during 2016, almost double the number from the year before. The total number of active members declined almost 6%, from 5,415 to 5,104. The active member population is at its lowest level since the year ended December 31, 2007.

9. The projected year of full funding may vary on an annual basis due to demographic and economic experience other than assumed. Beginning in 2025, once the City is contributing based solely on computation pay, differences between actual payroll and the City's hiring plan payroll may also have an impact on when the System is projected to become fully funded. The City's hiring plan reflects significant growth in payroll over the next 20 years. If payroll growth is more modest, or if there is adverse experience in the System that leads to experience losses, the amortization of the $2.2 billion unfunded liability could take significantly longer. Progress toward 100% funding should be carefully monitored.

10. The market value of assets declined from $2.68 billion as of December 31, 2015 to $2.15 billion as of December 31, 2016, based on unaudited assets. Over the same timeframe, total DROP account balances declined from $1.50 billion to $1.05 billion.

11. The rate of return on the market value of assets was 6.82% for the year ended December 31, 2016; on an actuarial value basis, the rate of return was 7.16%. Compared to the return assumption of 7.25%, there was a minor loss ($2.0 million, or 0.04% of pre-plan change liability) due to asset performance. The net experience loss from sources other than investment experience was $53.6 million (0.9% of pre-plan change liability).
12. As stated in the January 1, 2016 actuarial valuation, the actuarial value of assets was written down to the market value of assets at that time, with five-year asset smoothing implemented in the 2017 valuation. Since the market value return in 2016 did not meet the 7.25% return assumption, there are asset losses that will be smoothed in over the next five years. As of December 31, 2016, there are $7,963,470 in unrecognized asset losses.
13. Financial information provided for the valuation, including the December 31, 2016 market value of assets and City and member contributions, is based on preliminary unaudited assets and may subsequently change once the audit is finalized. Audited assets are not expected to be materially different from those used in the valuation.
14. The funded ratio on an actuarial basis has increased from 45.07% as of January 1, 2016 to 49.41% as of January 1, 2017. On a market value basis, the funded ratio increased from 45.07% to 49.23%. The increases in funded ratio are as a result of the plan changes and assumptions related to the plan changes. As the System stabilizes over the next several years after the plan and investment portfolio changes, it is expected that the funding ratios will decline over the next decade before they once again start to rise.
15. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined employer contribution under the System's funding policy. Section 5 provides the accounting information for Governmental Accounting Standards Board Statement No. 67 disclosures as of December 31, 2016. The Net Pension Liability (NPL) is equal to the difference between the Total Pension Liability (TPL) and the Plan's fiduciary net position (equal to the market value of assets). The TPL is calculated based on a discount rate of 4.12%, which reflects a blending of the 7.25% funding rate and a 20-year municipal bond rate of 3.78%. The NPL as of December 31, 2016 is $6,300,444,636, a decline of $556,271,259 from the December 31, 2015 NPL of $6,856,715,895. (Plan changes effective September 1, 2017 are not included in the Net Pension Liability as of December 31, 2016. Had these plan changes been included, the December 31, 2016 Net Pension Liability would be approximately $4.1 billion.)
16. The actuarial valuation report as of January 1, 2017 is based on financial and demographic information as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the Plan. Since actuarial results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience may differ from expected experience.

Summary of Key Valuation Results

	2017, after plan changes	2017, prior to plan changes	2016
Contributions for plan year beginning January 1, adjusted for timing:			
Total actuarially determined contribution (City and member)	$203,533,370	$276,861,319	$288,633,291
Expected member contributions	34,667,886	27,017,087	26,774,212
City's actuarially determined employer contribution (ADEC)	168,865,484	249,844,232	261,859,079
City's ADEC as a percentage of computation pay	47.25%	69.90%	71.70%
Actual contributions (City and member)	--	--	$144,941,423
Amortization period for determination of ADEC	30 years	30 years	30 years
Funding elements for plan year beginning January 1:			
Employer normal cost, including administrative expenses	$34,947,056	$55,337,064	$63,413,557
Market value of assets	2,149,836,260	2,149,836,260	2,680,124,303
Actuarial value of assets	2,157,799,730	2,157,799,730	2,680,124,303
Actuarial accrued liability	4,367,180,454	5,364,055,235	5,947,173,998
Unfunded actuarial accrued liability (UAAL)	2,209,380,724	3,206,255,505	3,267,049,695
Funded ratio – Actuarial basis	49.41%	40.23%	45.07%
Funded ratio – Market basis	49.23%	40.08%	45.07%
Projected year of full funding	2061	N/A	N/A
Demographic data for plan year beginning January 1:			
Number of retired members and beneficiaries	4,456	4,456	4,230
Number of vested former members[1]	215	215	200
Number of active members	5,104	5,104	5,415
Total computation pay	$357,414,472	$357,414,472	$365,210,426
Average computation pay	70,026	70,026	67,444

[1] *Excludes terminated members due a refund of contributions*

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual benefits and expenses paid and the actual investment experience of the plan will determine the actual long-term cost of the plan.

In order to prepare a valuation, Segal Consulting ("Segal") relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Member data** An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on unaudited market value of assets as of the valuation date, as provided by the System. The System uses an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan members for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each member for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual benefits and expenses paid and the actual investment experience of the plan will determine the actual long-term cost of the plan.
- If the Board is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.
- The actuarial valuation assumes the Plan will be an ongoing, long-term entity.

As Segal Consulting has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

A. MEMBER DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, vested terminated members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A, B, and C.

A historical perspective of how the member population has changed over the past ten valuations is shown in this chart.

CHART 1

Member Population: 2007 – 2016

Year Ended December 31	Active Members	Vested Terminated Members*	Retired Members and Beneficiaries	Ratio of Non-Actives to Actives
2007	4,909	182	3,294	0.71
2008	5,235	151	3,375	0.67
2009	5,476	144	3,450	0.66
2010	5,482	135	3,535	0.67
2011	5,376	128	3,669	0.71
2012	5,400	96	3,783	0.72
2013	5,397	122	3,890	0.74
2014	5,487	157	4,069	0.77
2015	5,415	200	4,230	0.82
2016	5,104	215	4,456	0.92

**Excludes terminated members due a refund of member contributions*

Active Members

System costs are affected by the age, years of service and computation pay of active members. In this year's valuation, there were 5,104 active members with an average age of 41.4, average service of 14.3 years and average computation pay of $70,026. The 5,415 active members in the prior valuation had an average age of 41.4, average service of 14.3 years and average computation pay of $67,444.

The number of active Firefighters decreased from 1,932 to 1,849 as of December 31, 2016. The average age of this group is 41.7, the average years of service is 14.4, and the average computation pay is $70,703. Last year these averages were 41.8, 14.6 and $68,309, respectively.

The number of active Police Officers decreased from 3,483 to 3,255 as of December 31, 2016. The average age of this group remained unchanged at 41.2, and the average years of service remained unchanged at 14.1. The average computation pay increased from $66,965 to $69,642.

These graphs show a distribution of active members by age and by years of service.

CHART 2

Distribution of Active Members by Age as of December 31, 2016

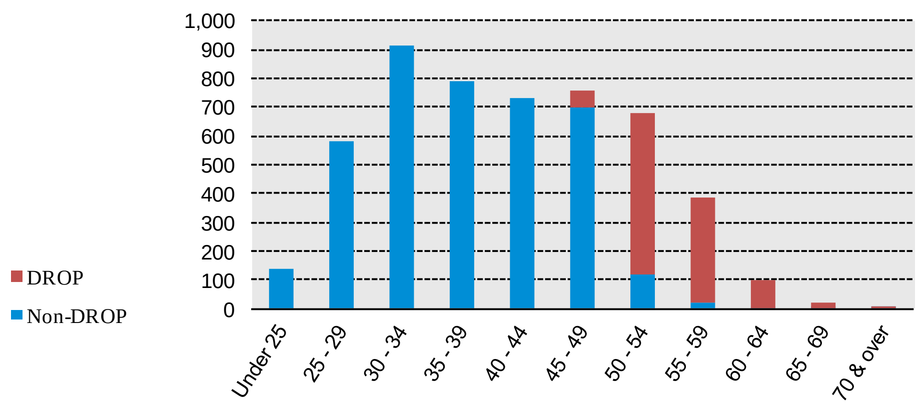
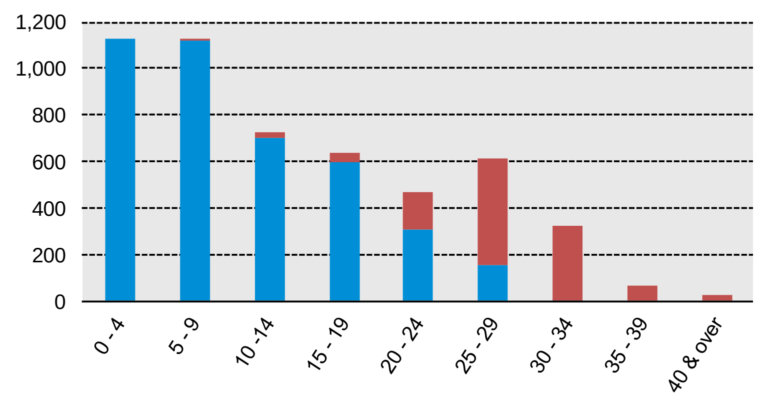


CHART 3

Distribution of Active Members by Years of Service as of December 31, 2016



Inactive Members

In this year's valuation, there were 215 members with a vested right to a deferred or immediate vested benefit. In addition, there were 295 members entitled to a return of their member contributions.

Retired Members and Beneficiaries

As of December 31, 2016, there were 3,338 retired members and 1,077 beneficiaries receiving total monthly benefits of $18,104,251. For comparison, in the previous valuation, there were 3,115 retired members and 1,067 beneficiaries receiving monthly benefits of $16,438,266.

There are also 41 beneficiaries with DROP balances only, and no monthly annuity. This number has decreased from 48 last year.

These graphs show a distribution of the current retired members and beneficiaries based on their monthly amount and age, by type of pension.

CHART 4

Distribution of Retired Members and Beneficiaries by Type and by Monthly Amount as of December 31, 2016

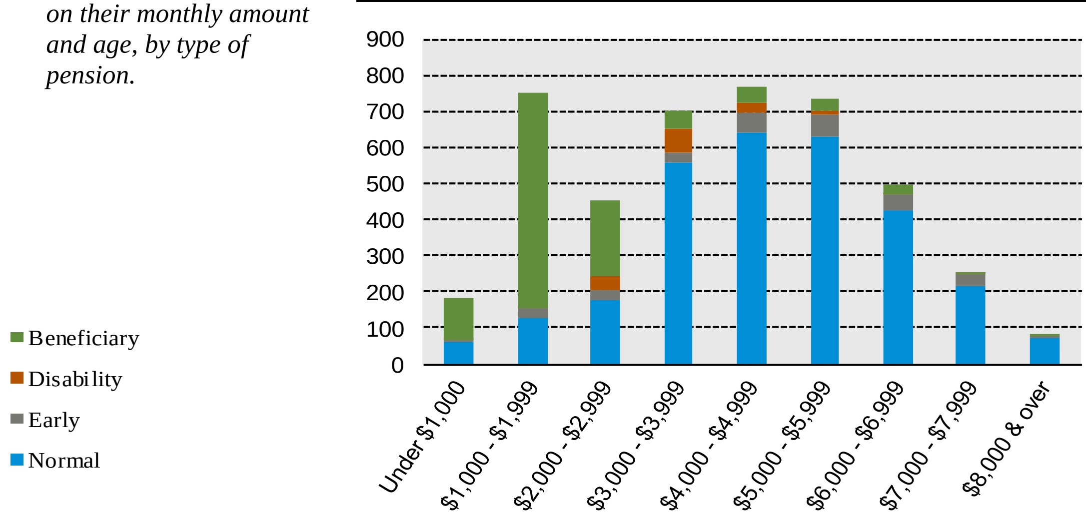
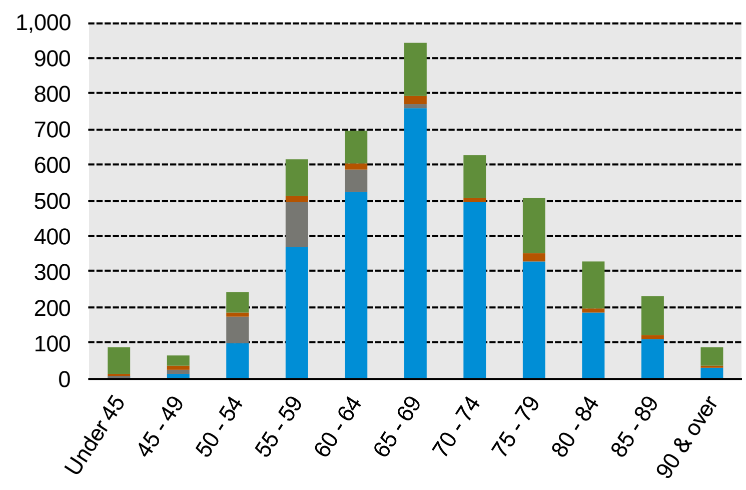


CHART 5

Distribution of Retired Members and Beneficiaries by Type and by Age as of December 31, 2016



B. FINANCIAL INFORMATION

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

Retirement plan assets change because of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits D, E and F.

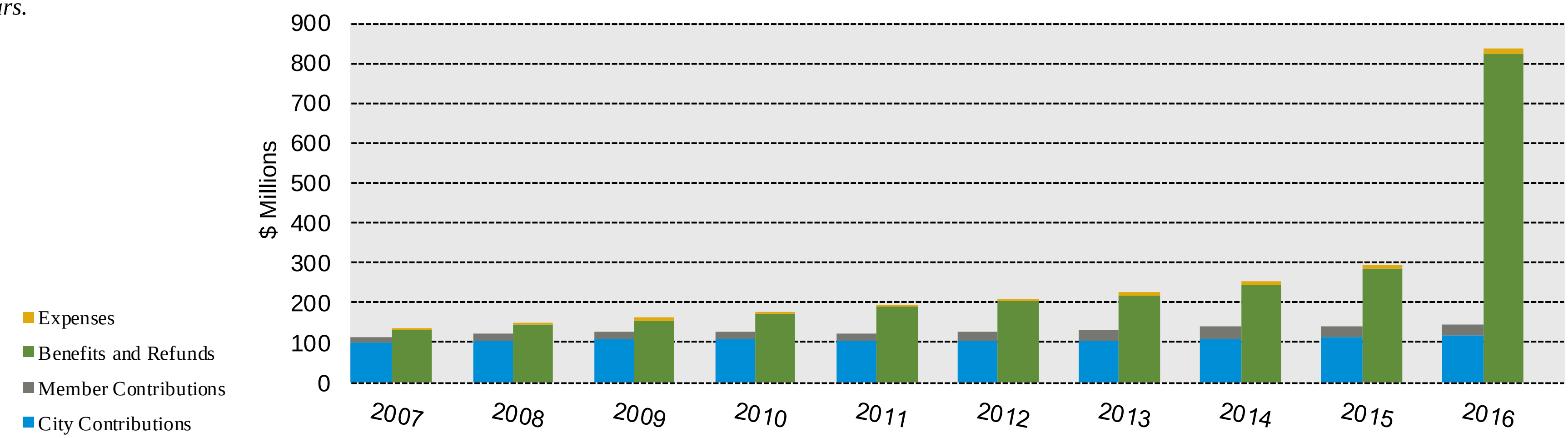
Total contributions were $144.9 million for the year ended December 31, 2016. Benefit payments and refunds totaled $825.1 million, of which $606.3 million were DROP lump sums. Benefit payments are projected to be $290 million in 2017. To the extent that future contributions are less than benefit payments, investment earnings or fund assets will be needed to cover the shortfall.

DROP balances declined from $1.50 billion as of December 31, 2015 to $1.05 billion as of December 31, 2016. Of the $1.05 billion balance, $689.52 million is for members who have left employment with Dallas.

This chart depicts the contributions made and the benefits and expenses paid over the last ten years.

CHART 6

Comparison of Contributions Made and Benefits and Expenses Paid for Years Ended December 31, 2007 – 2016



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative.

Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The actuarial value of assets was reset to the market value of assets as of December 31, 2015 with future gains and losses after that date amortized on a straight-line basis over five years.

The chart shows the determination of the actuarial value of assets as of the valuation date.

CHART 7

Determination of Actuarial Value of Assets for Year Ended December 31, 2016

	Original Amount[1]	Unrecognized Return[2]	
1. Market value of assets, December 31, 2016			$2,149,836,260
2. Calculation of unrecognized return			
(a) Year ended December 31, 2016	-$9,954,337	-$7,963,470	
(b) Total unrecognized return			-7,963,470
3. Preliminary actuarial value: (1) - (2b)			2,157,799,730
4. Adjustment to be within 20% corridor			0
5. Final actuarial value of assets as of December 31, 2016: (3) + (4)			$2,157,799,730
6. Actuarial value as a percentage of market value: (5) ÷ (1)			100.4%
7. Amount deferred for future recognition: (1) - (5)			-$7,963,470

[1]*Total return minus expected return on a market value basis*

[2]*Recognition at 20% per year over five years*

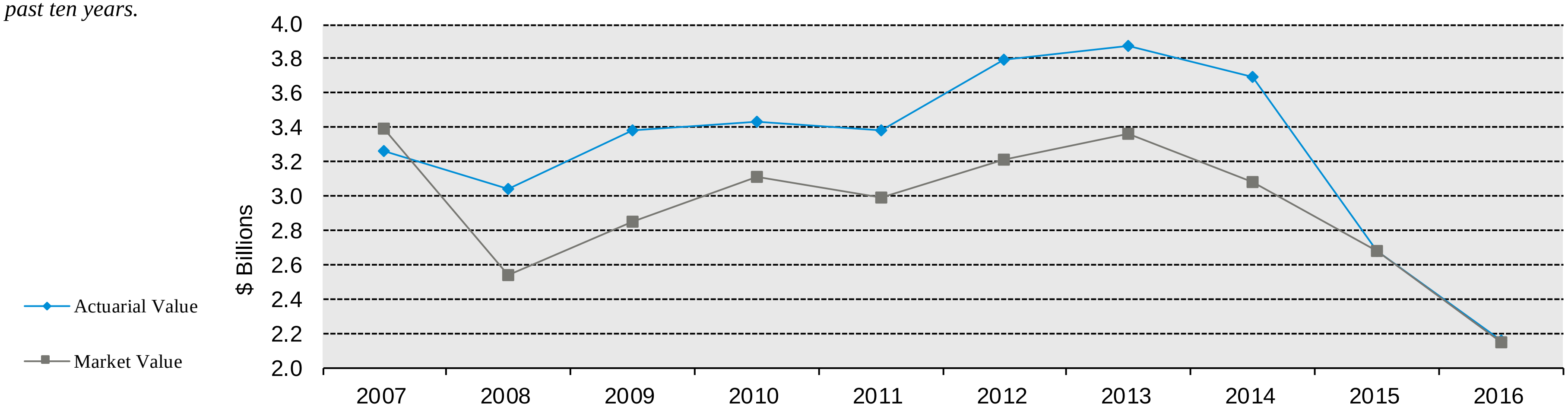
Both the actuarial value and market value of assets are representations of the System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

The decline in asset values from 2013 to 2015 was primarily the result of significant write-downs in the Plan's asset holdings. The decline from 2015 to 2016 reflects the unusually large number of DROP payments made in 2016.

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 8

Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2007 – 2016



C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss is $55,556,817, incluing a loss of $1,990,867 from investments and a loss of $53,565,950 from all other sources. The net experience variation from individual sources other than investments was 0.9% of the pre-plan change actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 9

Actuarial Experience for Year Ended December 31, 2016

1.	Net loss from investments*	-$1,990,867
2.	Net gain from administrative expenses	525,632
3.	Net loss from other experience	-54,091,582
4.	Net experience loss: (1) + (2) + (3)	-$55,556,817

** Details in Chart 10*

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.25%. The actual rate of return on an actuarial basis for the 2016 plan year was 7.16%.

Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended December 31, 2016 with regard to its investments.

This chart shows the loss due to investment experience.

CHART 10

Actuarial Value Investment Experience for Year Ended December 31, 2016

1.	Actual return	$167,318,581
2.	Average value of assets	2,335,302,726
3.	Actual rate of return: (1) ÷ (2)	7.16%
4.	Assumed rate of return	7.25%
5.	Expected return: (2) x (4)	$169,309,448
6.	Actuarial loss: (1) – (5)	-$1,990,867

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last ten years, including five-year and ten-year averages.

The Board has maintained the assumed rate of return of 7.25%. Market returns over the next couple of years may fall short of the target as the investment portfolio stabilizes after restructuring; however, based on the Board's target asset allocations, the assumption is not unreasonable over the long-term.

CHART 11

Investment Return – Actuarial Value vs. Market Value: 2007 - 2016

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount[1]	Percent[1]	Amount[2]	Percent[2]
2007	$312,669,979	10.58%	$276,240,781	8.85%
2008	-199,538,242	-6.14	-838,497,127	-24.80
2009	371,704,709	12.29	347,054,071	13.78
2010	90,332,398	2.69	303,461,949	10.72
2011	14,561,313	0.43	-54,844,275	-1.78
2012	493,841,725	14.79	292,719,981	9.92
2013	169,425,156	4.52	243,514,011	7.70
2014	-75,632,075	-1.98	-176,940,296	-5.35
2015	-870,708,449	-24.03	-254,829,470	-8.47
2016	167,318,581	7.16	159,355,111	6.82
Total	$473,975,095		$297,234,736	
	Five-year average return	-3.41%		1.79%
	Ten-year average return	-0.18%		1.00%

Note: Each year's yield is weighted by the average asset value in that year
[1]*Includes a change in asset method for plan years 2012 and 2015*
[2]*Returns for years 2014 and 2015 include significant write-downs of the Plan's assets*

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

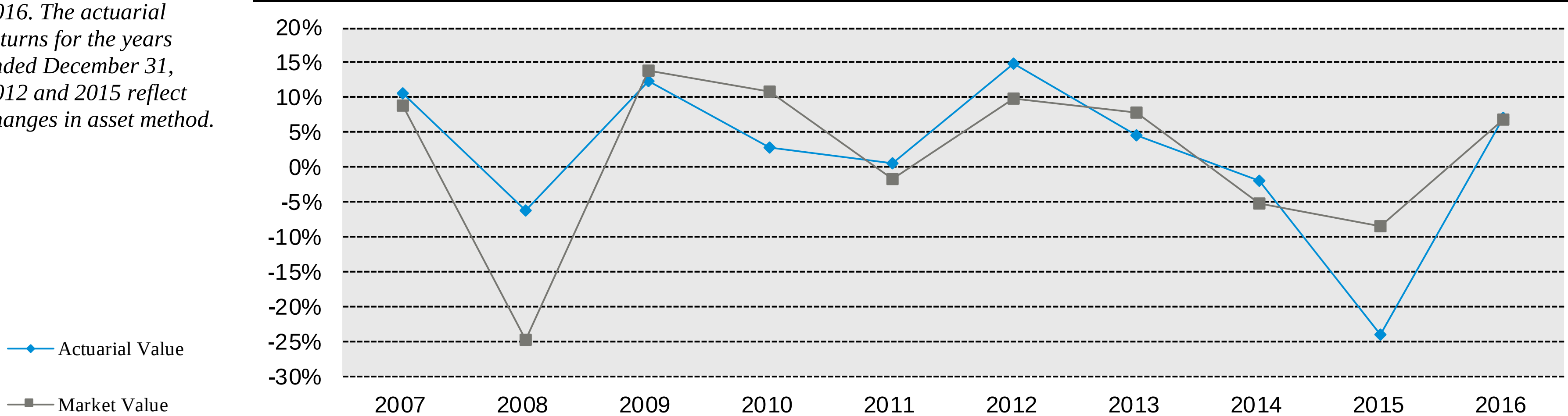
Administrative Expenses

Administrative expenses for the year ended December 31, 2016 totaled $9,492,445 compared to the assumption of $9,656,091, payable monthly. This resulted in a gain of $525,632 for the year. Because it is expected that these expenses will remain level, we have maintained the assumption of $9,656,091 for the current year.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2016. The actuarial returns for the years ended December 31, 2012 and 2015 reflect changes in asset method.

CHART 12

Market and Actuarial Rates of Return for Years Ended December 31, 2007 - 2016



Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the members,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net loss from this other experience for the year ended December 31, 2016 amounted to $54,091,582, which is 1.0% of the actuarial accrued liability. The loss is primarily due to a greater number of retirements than expected in 2016 and greater than expected DROP payments.

D. ACTUARIALLY DETERMINED CONTRIBUTION

The amount of annual contribution required to fund the System is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. This total amount is then divided by the total computation pay for active members to determine the City's actuarially determined funding rate of 47.25% of computation pay.

The actuarially determined contribution is based on a 30-year amortization of the unfunded actuarial accrued liability as a level percentage of payroll, with payroll expected to increase 2.75% annually.

Through August 2017, the City of Dallas is expected to contribute 27.50% of pay to the System, including overtime and other non-computation pay. Member contributions are 8.50% of computation pay for members who do not currently participate in the DROP, and 4.00% for DROP members.

Effective September 1, 2017, the City will contribute biweekly amounts mandated by HB3158 through 2024, but no less than 34.5% of computation pay, plus $13 million per year. Beginning January 1, 2025, the City will contribute 34.5% of computation pay. Member contributions will be 13.5% of computation pay for all members effective September 1, 2017.

The chart compares this valuation's actuarially determined contribution with the prior valuation.

CHART 13

Actuarially Determined Contribution

	Year Beginning January 1			
	2017		2016	
	Amount	% of Computation Pay	Amount	% of Computation Pay
1. Total normal cost	$58,766,591	16.44%	$79,610,889	21.80%
2. Administrative expenses	9,656,091	2.70%	9,656,091	2.64%
3. Expected member contributions	-33,475,626	-9.36%	-25,853,423	-7.08%
4. Employer normal cost: (1) + (2) + (3)	$34,947,056	9.78%	$63,413,557	17.36%
5. Actuarial accrued liability	4,367,180,454		5,947,173,998	
6. Actuarial value of assets	2,157,799,730		2,680,124,303	
7. Unfunded actuarial accrued liability: (5) - (6)	$2,209,380,724		$3,267,049,695	
8. Payment on unfunded actuarial accrued liability; 30-year amortization	128,110,992	35.84%	189,439,952	51.87%
9. Actuarially determined employer contribution: (4) + (8), adjusted for timing*	$168,865,484	47.25%	$261,859,079	71.70%
10. Total computation pay	$357,414,472		$365,210,426	

**Contributions are assumed to be paid at the middle of every year*

The contribution requirements as of January 1, 2017 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Actuarially Determined Employer Contribution

The chart below details the changes in the actuarially determined employer contribution from the prior valuation to the current year's valuation.

The chart reconciles the contribution from the prior valuation to the amount determined in this valuation.

CHART 14

Reconciliation of Actuarially Determined Employer Contribution from January 1, 2016 to January 1, 2017

Actuarially Determined Employer Contribution as of January 1, 2016	$261,859,079
Effect of plan changes and change in actuarial assumptions related to plan changes	-80,978,748
Effect of changes in actuarial assumptions not related to plan changes	-23,099,152
Effect of contributions less than actuarially determined contribution	9,086,220
Effect of expected change in amortization payment due to payroll decline	5,395,143
Effect of investment loss	121,586
Net effect of other gains and losses on accrued liability	3,271,373
Net effect of other changes	-6,790,017
Total change	-$92,993,595
Actuarially Determined Employer Contribution as of January 1, 2017	$168,865,484

EXHIBIT A
Table of Plan Coverage

Category	Year Ended December 31 2016	Year Ended December 31 2015	Change From Prior Year
Total active members in valuation:			
Number	5,104	5,415	-5.7%
Average age	41.4	41.4	N/A
Average years of service	14.3	14.3	N/A
Total computation pay	$357,414,472	$365,210,426	-2.1%
Average computation pay	70,026	67,444	3.8%
DROP account balances	356,421,938	474,296,247	-24.9%
Accumulated contribution balances	284,870,633	290,394,810	-1.9%
Total active vested members	3,978	4,235	-6.1%
Active members (excluding DROP):			
Number	4,002	4,077	-1.9%
Average age	37.6	37.0	N/A
Average years of service	10.3	9.8	N/A
Total computation pay	$262,030,358	$249,889,014	4.9%
Average computation pay	65,475	61,292	6.8%
Active members (DROP only):			
Number	1,102	1,338	-17.6%
Average age	55.1	54.8	N/A
Average years of service	28.3	28.1	N/A
Total computation pay	$95,384,114	$115,321,412	-17.3%
Average computation pay	86,555	86,189	0.3%
DROP account balances	356,078,264	474,296,247	-24.9%

EXHIBIT A (continued)

Table of Plan Coverage

Category	Year Ended December 31 2016	Year Ended December 31 2015	Change From Prior Year
Vested terminated members:			
Number	215	200	7.5%
Average age	39.4	38.9	N/A
Average monthly benefit	$1,125	$1,004	12.1%
Retired members:			
Number in pay status	3,189	2,964	7.6%
Average age	67.6	67.9	N/A
Average monthly benefit*	$4,672	$4,515	3.5%
DROP account balances	$662,398,699	$986,486,520	-32.9%
Disabled members:			
Number in pay status	149	151	-1.3%
Average age	67.2	66.6	N/A
Average monthly benefit*	$3,470	$3,407	1.8%
Beneficiaries in pay status:			
Number in pay status	1,077	1,067	0.9%
Average age	72.2	72.2	N/A
Average monthly benefit*	$2,065	$1,973	4.7%
DROP account balances	$27,124,372	$34,410,127	-21.2%
Beneficiaries with a DROP account only:			
Number	41	48	-14.6%
DROP account balances	$7,550,055	$9,579,082	-21.2%
Terminated members due a refund of contributions:			
Number	295	126	134.1%
Accumulated contribution balances	$1,170,846	$496,391	135.9%

** Excludes benefit supplement*

Note: DROP Account Balances reported for valuation purposes may differ slightly from the final balances stated in the System's year-end financial statements, due to subsequent adjustments. The difference is not material.

EXHIBIT B -1 (Total)

Members in Active Service as of December 31, 2016
By Age, Years of Service, and Average Computation Pay

		Years of Service								
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	138	138	- -	- -	- -	- -	- -	- -	- -	- -
	$50,304	$50,304	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	582	493	87	2	- -	- -	- -	- -	- -	- -
	53,986	52,948	$59,727	$60,115	- -	- -	- -	- -	- -	- -
30 - 34	916	306	533	77	- -	- -	- -	- -	- -	- -
	59,327	53,878	61,440	66,361	- -	- -	- -	- -	- -	- -
35 - 39	790	126	296	287	80	1	- -	- -	- -	- -
	63,522	52,747	60,585	68,630	$72,969	$69,077	- -	- -	- -	- -
40 - 44	731	29	134	202	313	53	- -	- -	- -	- -
	71,506	53,098	60,854	69,322	76,928	84,820	- -	- -	- -	- -
45 - 49	757	16	50	96	184	256	154	1	- -	- -
	79,817	59,375	60,471	69,152	77,558	85,914	$87,246	$108,875	- -	- -
50 - 54	679	2	18	42	46	123	316	132	- -	- -
	84,750	53,916	61,987	71,022	76,450	85,895	87,369	88,247	- -	- -
55 - 59	387	3	1	17	15	35	113	163	40	- -
	86,266	121,911	62,128	71,001	80,438	79,577	86,853	88,104	$89,569	- -
60 - 64	97	- -	6	2	1	4	24	28	24	8
	87,002	- -	72,375	70,089	85,271	82,105	87,189	88,084	90,329	$90,535
65 - 69	22	- -	1	- -	- -	3	2	2	4	10
	91,195	- -	60,480	- -	- -	90,806	94,270	81,546	98,177	92,905
70 & over	5	1	- -	- -	- -	- -	- -	- -	1	3
	91,526	53,916	- -	- -	- -	- -	- -	- -	75,396	109,439
Total	5,104	1,114	1,126	725	639	475	609	326	69	21
	$70,026	$53,138	$61,037	$68,826	$76,675	$85,283	$87,258	$88,184	$90,127	$94,364

EXHIBIT B-2 (Police)

Members in Active Service as of December 31, 2016
By Age, Years of Service, and Average Computation Pay

		Years of Service								
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	98	98	- -	- -	- -	- -	- -	- -	- -	- -
	$50,134	$50,134	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	387	337	48	2	- -	- -	- -	- -	- -	- -
	53,844	53,042	$59,208	$60,115	- -	- -	- -	- -	- -	- -
30 - 34	570	170	337	63	- -	- -	- -	- -	- -	- -
	59,783	53,739	61,534	66,728	- -	- -	- -	- -	- -	- -
35 - 39	475	57	165	202	50	1	- -	- -	- -	- -
	63,711	51,608	60,327	68,111	$70,794	$69,077	- -	- -	- -	- -
40 - 44	451	22	86	120	189	34	- -	- -	- -	- -
	70,505	52,450	60,792	69,003	75,485	84,368	- -	- -	- -	- -
45 - 49	546	12	48	68	114	168	136	- -	- -	- -
	78,825	59,946	60,465	69,786	75,816	84,781	$86,657	- -	- -	- -
50 - 54	454	- -	17	30	29	72	244	62	- -	- -
	84,081	- -	61,700	70,035	75,732	85,583	87,191	$86,939	- -	- -
55 - 59	219	1	1	10	15	21	76	74	21	- -
	85,825	84,545	62,128	73,466	80,438	79,098	86,899	88,264	$90,987	- -
60 - 64	44	- -	4	2	1	2	16	12	4	3
	86,266	- -	75,597	70,089	85,271	87,475	86,888	87,199	94,090	$93,326
65 - 69	10	- -	1	- -	- -	1	2	1	1	4
	88,277	- -	60,480	- -	- -	98,991	94,270	84,029	102,990	86,935
70 & over	1	- -	- -	- -	- -	- -	- -	- -	- -	1
	111,596	- -	- -	- -	- -	- -	- -	- -	- -	111,596
Total	3,255	697	707	497	398	299	474	149	26	8
	$69,642	$52,831	$61,014	$68,580	$75,220	$84,541	$87,011	$87,598	$91,926	$92,415

EXHIBIT B-3 (Fire)

Members in Active Service as of December 31, 2016
By Age, Years of Service, and Average Computation Pay

		Years of Service								
Age	**Total**	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**	**35 - 39**	**40 & over**
Under 25	40	40	- -	- -	- -	- -	- -	- -	- -	- -
	$50,721	$50,721	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	195	156	39	- -	- -	- -	- -	- -	- -	- -
	54,269	52,745	$60,366	- -	- -	- -	- -	- -	- -	- -
30 - 34	346	136	196	14	- -	- -	- -	- -	- -	- -
	58,577	54,051	61,279	$64,712	- -	- -	- -	- -	- -	- -
35 - 39	315	69	131	85	30	- -	- -	- -	- -	- -
	63,237	53,688	60,909	69,861	$76,594	- -	- -	- -	- -	- -
40 - 44	280	7	48	82	124	19	- -	- -	- -	- -
	73,120	55,136	60,964	69,789	79,127	$85,630	- -	- -	- -	- -
45 - 49	211	4	2	28	70	88	18	1	- -	- -
	82,383	57,664	60,620	67,614	80,396	88,077	$91,690	$108,875	- -	- -
50 - 54	225	2	1	12	17	51	72	70	- -	- -
	86,100	53,916	66,865	73,487	77,675	86,336	87,973	89,405	- -	- -
55 - 59	168	2	- -	7	- -	14	37	89	19	- -
	86,840	140,594	- -	67,480	- -	80,295	86,757	87,972	$88,002	- -
60 - 64	53	- -	2	- -	- -	2	8	16	20	5
	87,613	- -	65,930	- -	- -	76,736	87,792	88,749	89,577	$88,861
65 - 69	12	- -	- -	- -	- -	2	- -	1	3	6
	93,626	- -	- -	- -	- -	86,714	- -	79,063	96,573	96,884
70 & over	4	1	- -	- -	- -	- -	- -	- -	1	2
	86,509	53,916	- -	- -	- -	- -	- -	- -	75,396	108,361
Total	1,849	417	419	228	241	176	135	177	43	13
	$70,703	$53,650	$61,075	$69,361	$79,078	$86,545	$88,125	$88,676	$89,039	$95,564

EXHIBIT C

Reconciliation of Member Data

	Active Members	Vested Former Members[1]	Disableds	Retired Members	Beneficiaries[1]	Total
Number as of January 1, 2016	5,415	200	151	2,964	1,067	9,797
New members	183	N/A	N/A	N/A	N/A	183
Terminations – with vested rights	-52	52	0	0	0	0
Terminations – without vested rights	-48	N/A	N/A	N/A	N/A	-48
Retirements	-284	-6	N/A	290	N/A	0
New disabilities	-1	0	1	N/A	N/A	0
Return to work	6	-1	0	0	N/A	5
Deceased	-7	0	-3	-66	-46	-122
New beneficiaries	0	0	0	0	69	69
Lump sum payoffs[2]	-108	-29	0	0	0	-137
Certain period expired	N/A	N/A	0	0	-12	-12
Data adjustments	0	-1	0	1	-1	-1
Number as of January 1, 2017	5,104	215	149	3,189	1,077	9,734

[1] *Excludes terminated members due a refund of contributions and beneficiaries with a DROP account balance only*
[2] *Members who terminated and requested a refund of member contributions*

EXHIBIT D

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended December 31, 2016		Year Ended December 31, 2015	
Net assets at actuarial value at the beginning of the year		$2,680,124,303		$3,695,273,876
Contribution income:				
Employer contributions	$119,423,106		$114,885,723	
Member contributions	25,518,317		25,676,327	
Less administrative expenses*	-9,492,445		0	
Net contribution income		135,448,978		140,562,050
Investment income:				
Interest, dividends and other income	$54,956,120		$73,557,008	
Recognition of capital appreciation	128,577,874		-383,825,484	
Less interest expense	-4,532,196		-6,005,609	
Less investment fees*	-11,683,217		-18,409,504	
Net investment income		167,318,581		-334,683,589
Total income available for benefits		$302,767,559		-$194,121,539
Less benefit payments:				
Benefit payments	-$821,737,799		-$283,217,455	
Refunds	-3,354,333		-1,785,719	
Net benefit payments		-$825,092,132		-$285,003,174
Change in actuarial asset method		$0		-$536,024,860
Change in actuarial value of assets		-$522,324,573		-$1,015,149,573
Net assets at actuarial value at the end of the year		$2,157,799,730		$2,680,124,303

* *The 2015 valuation year did not include an explicit administrative expense assumption; administrative expenses were included with investment fees*

EXHIBIT E

Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended December 31, 2016		Year Ended December 31, 2015	
Net assets at market value at the beginning of the year[1]		$2,680,124,303		$3,079,394,897
Contribution income:				
Employer contributions	$119,423,106		$114,885,723	
Member contributions	25,518,317		25,676,327	
Less administrative expenses[2]	-9,492,445		0	
Net contribution income		135,448,978		140,562,050
Investment income:				
Interest, dividends and other income	$54,956,120		$73,557,008	
Recognition of capital appreciation	120,614,404		-303,971,365	
Less interest expense	-4,532,196		-6,005,609	
Less investment fees[2]	-11,683,217		-18,409,504	
Net investment income		159,355,111		-254,829,470
Total income available for benefits		$294,804,089		-$114,267,420
Less benefit payments:				
Benefit payments	-$821,737,799		-$283,217,455	
Refunds	-3,354,333		-1,785,719	
Net benefit payments		-$825,092,132		-$285,003,174
Change in market value of assets		-$530,288,043		-$399,270,594
Net assets at market value at the end of the year[1]		$2,149,836,260		$2,680,124,303

[1] *Based on preliminary unaudited assets*

[2] *The 2015 valuation year did not include an explicit administrative expense assumption; administrative expenses were included with investment fees*

EXHIBIT F

Summary Statement of Plan Assets

	Year Ended December 31, 2016		Year Ended December 31, 2015	
Cash equivalents and prepaid expenses		$324,575,667		$76,716,720
Invested securities lending collateral		21,494,665		93,566,804
Capital assets		11,943,266		12,103,670
Receivables		29,150,640		58,151,552
Investments:				
Real assets	$1,119,263,244		$1,127,163,418	
Fixed income securities	267,687,478		380,295,552	
Private equity	262,289,952		441,805,815	
Equity securities	153,397,855		436,644,700	
Alternative investments	133,798,219		392,177,664	
Other	6,811,004		29,384,494	
Total investments at market value		1,943,247,752		2,807,471,643
Total assets		$2,330,411,990		$3,048,010,389
Less liabilities		-$180,575,730		-$367,886,086
Net assets at market value*		$2,149,836,260		$2,680,124,303
Net assets at actuarial value		$2,157,799,730		$2,680,124,303

Note: DROP Account Balances reported for valuation purposes total $1,053,151,389, or 49.0% of the total assets of the System. This number may differ slightly from the final DROP balance stated in the System's year-end financial statements, due to subsequent adjustments. The difference is not material.

* *Based on preliminary unaudited assets*

EXHIBIT G

Development of the Fund Through December 31, 2016

Year Ended December 31	Employer Contributions	Member Contributions	Net Investment Return[1]	Administrative Expenses[2]	Benefit Payments[3]	Refunds	Actuarial Value of Assets at End of Year
2007	$97,440,007	$17,860,267	$312,669,979	$0	$130,995,067	$836,301	$3,258,627,218
2008	104,372,723	18,638,767	-199,538,242	0	142,075,673	357,628	3,039,667,165
2009	107,699,648	19,584,241	371,704,709	0	154,976,635	771,352	3,382,907,776
2010	108,060,956	19,790,189	90,332,398	0	169,458,531	813,965	3,430,818,823
2011	102,437,115	19,493,460	14,561,313	0	188,093,019	736,470	3,378,481,222
2012	103,310,264	22,490,884	493,841,725	0	203,099,511	N/A	3,795,024,584
2013	105,711,435	26,044,579	169,425,156	0	218,884,493	N/A	3,877,321,261
2014	109,791,512	28,969,429	-75,632,075	0	245,176,251	N/A	3,695,273,876
2015	114,885,723	25,676,327	-870,708,449	0	283,217,455	1,785,719	2,680,124,303
2016	119,423,106	25,518,317	167,318,581	9,492,445	821,737,799	3,354,333	2,157,799,730

[1] Net of investment fees and administrative expenses prior to 2016; net of investment fees only beginning in 2016. Returns for years ended 2007-2014 were estimated based on prior actuarial valuations. Returns include the effect of changes in asset method for years ending 2012 and 2015.

[2] A separate administrative expense assumption did not exist prior to the 2016 valuation

[3] Includes refunds; breakdown between benefit payments and refunds not provided in the 2012-2014 valuations

EXHIBIT H

Development of Unfunded Actuarial Accrued Liability for Year Ended December 31, 2016

1.	Unfunded actuarial accrued liability at beginning of year		$3,267,049,695
2.	Changes due to:		
	(a) Expected increase	33,686,755	
	(b) Actual contributions less than recommended	148,779,134	
	(c) Total		182,465,889
3.	Expected unfunded actuarial accrued liability		$3,449,515,584
4.	Net loss		55,556,817
5.	Unfunded actuarial accrued liability before changes		$3,505,072,401
6.	Changes due to:		
	(a) Assumption changes not related to plan changes	-$298,816,896	
	(b) Plan provisions changed in HB3158 and related assumption changes	-996,874,781	
	(c) Total		-1,295,691,677
7.	Unfunded actuarial accrued liability at end of year		$2,209,380,724
8.	Actuarial accrued liability at beginning of year		$5,947,173,998
9.	Loss as a percentage of actuarial accrued liability at beginning of year		0.93%

EXHIBIT I

Section 415 Limitations

Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active members could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of $160,000 indexed for inflation. That limit is $210,000 for 2017. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each member's circumstances, for such things as form of benefits chosen and after tax contributions. There is no retirement age adjustment for public safety.

Benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

EXHIBIT J

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Assumptions or Actuarial Assumptions: The estimates on which the cost of the Plan is calculated including:

(a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;

(b) Mortality rates — the death rates of members and pensioners; life expectancy is based on these rates;

(c) Retirement rates — the rate or probability of retirement at a given age;

(d) Withdrawal rates — the rates at which members of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Normal Cost: The amount of contributions required to fund the benefit allocated to the current year of service.

Actuarial Accrued Liability For Actives: The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.

Actuarial Accrued Liability For Pensioners: The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Unfunded Actuarial Accrued Liability: The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There is a wide range of approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

Amortization of the Unfunded Actuarial Accrued Liability: Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

Investment Return: The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1.	Retired members as of the valuation date (including 1,077 beneficiaries in pay status and 41 beneficiaries who have DROP account balances only)		4,456
2.	Members inactive during year ended December 31, 2016 with vested rights (excluding inactive members with a DROP account balance)		215
3.	Members active during the year ended December 31, 2016		5,104
	Fully vested	3,978	
	Not vested	1,126	
4.	Terminated members due a refund of contributions		295

The actuarial factors as of the valuation date are as follows:

1.	Normal cost, including administrative expenses		$68,422,682
2.	Present value of future benefits		4,859,187,039
3.	Present value of future normal costs		492,006,585
4.	Actuarial accrued liability		4,367,180,454
	Retired members and beneficiaries*	$2,712,706,702	
	Inactive members with vested rights	20,959,808	
	Active members	1,632,343,097	
	Terminated members due a refund or contributions	1,170,847	
5.	Actuarial value of assets ($2,149,836,260 at market value – unaudited)		2,157,799,730
6.	Unfunded actuarial accrued liability		$2,209,380,724

**Includes beneficiaries with DROP account balances only*

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

The determination of the actuarially determined employer contribution is as follows:

1.	Total normal cost	$58,766,591
2.	Administrative expenses	9,656,091
3.	Expected member contributions	-33,475,626
4.	Employer normal cost: (1) + (2) + (3)	$34,947,056
5.	Payment on unfunded actuarial accrued liability	128,110,992
6.	Actuarially determined employer contribution: (4) + (5), adjusted for timing	$168,865,484
7.	Total computation pay	$357,414,472
8.	Actuarially determined employer contribution as a percentage of total computation pay: (6) ÷ (7)	47.25%

EXHIBIT II

Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
01/01/2012	$3,378,481,222	$4,568,850,587	$1,190,369,365	73.95%	$349,494,994	340.60%
01/01/2013	3,795,024,584	4,858,205,631	1,063,181,047	78.12%	361,043,989	294.47%
01/01/2014	3,877,321,261	5,129,195,887	1,251,874,626	75.59%	377,943,454	331.23%
01/01/2015	3,695,273,876	5,792,216,025	2,096,942,149	63.80%	383,006,330	547.50%
01/01/2016	2,680,124,303	5,947,173,998	3,267,049,695	45.07%	365,210,426	894.57%
01/01/2017	2,157,799,730	4,367,180,454	2,209,380,724	49.41%	357,414,472	618.16%

EXHIBIT III

Funded Ratio

A critical piece of information regarding the System's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the System as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

The chart below depicts a history of the funded ratios for this plan on both an actuarial value (AVA) and a market value (MVA) basis.

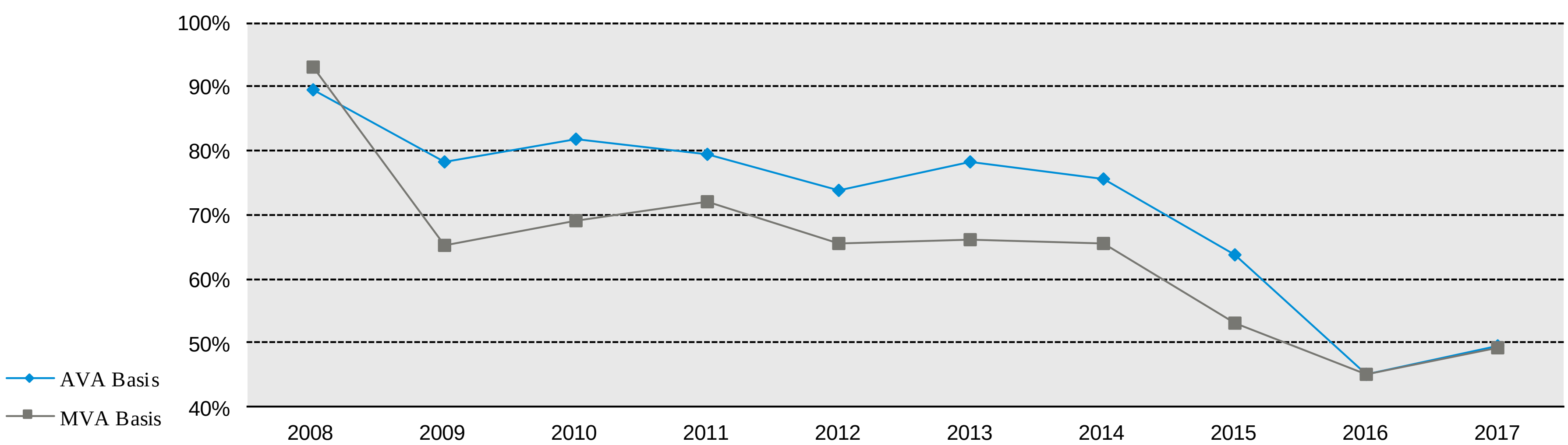


EXHIBIT IV

Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions:	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Experience Study Report for the five-year period ended December 31, 2014. Additional changes from the prior year related to the plan changes and modifications based on the Meet and Confer agreement are listed at the end of this exhibit.
Mortality Rates:	
Pre-retirement:	RP-2014 Employee Mortality Table, set back two years for males, projected generationally using Scale MP-2015
Healthy annuitants:	RP-2014 Blue Collar Healthy Annuitant Mortality Table, set forward two years for females, projected generationally using Scale MP-2015
Disabled annuitants:	RP-2014 Disabled Retiree Mortality Table, set back three years for males and females, projected generationally using Scale MP-2015
	The tables above, with adjustments as shown, reasonably reflect the mortality experience of the System as of the measurement date. The mortality tables were then generationally projected using Scale MP-2015 to anticipate future mortality improvement.

Mortality and Disability Rates before Retirement:

	Rate (%)			
	Mortality[1]		Disability[2]	
Age	Male	Female	Fire	Police
20	0.03	0.02	0.10	0.10
25	0.05	0.02	0.15	0.15
30	0.04	0.02	0.20	0.20
35	0.05	0.03	0.25	0.25
40	0.06	0.04	0.30	0.30
45	0.08	0.07	0.35	0.35
50	0.14	0.11	0.40	0.40
55	0.23	0.17	--	--
60	0.38	0.24	--	--
65	1.26	1.05	--	--
70	1.97	1.70	--	--
75	3.15	2.81	--	--
80	5.19	4.71	--	--

[1] *Rates shown do not include generational projection; rates beginning at age 65 are for healthy annuitants*
[2] *100% of disabilities are assumed to be service related*

Termination Rates Before Retirement:

Years of Service	Withdrawal Rate (%) Police	Withdrawal Rate (%) Fire
0	14.00	5.50
1	6.00	4.50
2	5.50	4.00
3	5.00	3.50
4	4.50	3.00
5	4.00	1.50
6	3.50	1.00
7	3.00	0.75
8	2.50	0.50
9	2.00	0.50
10-37	1.00	0.50
38 & over	0.00	0.00

Retirement Rates for 2017:

Police		Fire	
Age	Rate (%)	Age	Rate (%)
Under 50	1.00	Under 50	0.75
50-52	3.00	50-54	2.50
53-54	7.00	55-58	12.00
55	15.00	59-64	25.00
56-57	20.00	65-66	30.00
58-64	25.00	67	100.00
65-66	50.00		
67	100.00		

Retirement Rates beginning in 2018:

Current Active DROP Members

- If at least eight years in DROP as of January 1, 2017, 100% retirement rate in 2018
- If less than eight years in DROP as of January 1, 2017, 50% retirement rate in 2018

Non-DROP Active Members

Members hired prior to March 1, 2011 with less than 20 years of service as of September 1, 2017		Members hired prior to March 1, 2011 with at least 20 years of service as of September 1, 2017		Members hired on or after March 1, 2011	
Age	**Rate (%)**	**Age**	**Rate (%)**	**Age**	**Rate (%)**
Under 50	0	Under 50	1	Under 50	1
50	10	50	20	50	5
51	5	51	10	51	5
52	5	52	10	52	5
53	5	53	10	53	5
54	5	54	20	54	10
55	15	55	40	55	20
56	10	56	50	56	30
57	5	57	50	57	40
58	60	58	60	58	50
59	50	59	60	59	50
60	50	60	60	60	50
61	50	61	60	61	50
62 & over	100	62 & over	100	62 & over	100

100% retirement rate once the sum of age plus service equals 90
Current terminated vested members are assumed to retire at age 50
Future terminated vested members are assumed to retire at age 58

Interest on DROP Accounts:	6.00% per annum, until September 1, 2017 Beginning September 1, 2017: ➤ Annuitant account balances – 2.75% ➤ Active account balances as of September 1, 2017 – 2.75%, payable upon retirement ➤ Active account balances accrued after September 1, 2017 – 0.00%
Utilization of DROP:	0% of Police and Fire members are assumed to elect to enter the DROP
Period in DROP:	Current DROP members with at least eight years in the DROP as of January 1, 2017 are assumed to retire in 2018. Current DROP members with less than eight years in DROP as of January 1, 2017 are assumed to retire once they have been in DROP for eight years.
DROP Payment Period:	Based on expected lifetime as of the later of September 1, 2017 or retirement date. Expected lifetime determined based on an 85%/15% male/female blend of the current healthy annuitant mortality tables.
Unknown Data for Members:	Same age and service as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Percent Married:	75%
Age of Spouse/Children:	Females are assumed to be three years younger than males The youngest child is assumed to be ten years old
Retiree Form of Payment:	100% of married members are assumed to elect a Joint and Survivor annuity
Net Investment Return:	7.25% The net investment return assumption was chosen by the Pension System's Board of Trustees, with input from the actuary. This assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the System's target asset allocation.

Payroll Growth:	2.75%
Salary Scale for 2017 – 2019:	2017 – 10% if less than 10 years, 7% if 10 – 11 years, 2% if more than 11 years 2018 – 5% if less than 10 years, 2% if more than 10 years 2019 – 10% if less than 10 years, 7% if 10 – 11 years, 2% if more than 11 years

Salary Scale for 2020 and after:

	Rate (%)	
Years of Service	Police	Fire
1	5.20	5.20
2	5.00	5.05
3	4.80	4.90
4	4.60	4.75
5	4.40	4.60
6	4.20	4.45
7	4.00	4.30
8	3.80	4.15
9	3.60	4.00
10	3.40	3.85
11	3.20	3.70
12	3.00	3.55
13	3.00	3.40
14	3.00	3.25
15	3.00	3.10
16 & over	3.00	3.00

Includes allowance for inflation of 2.75% per year.

The salary scale assumption is based on the City's pay plan, along with analysis completed in conjunction with an Experience Study Report for the five-year period ended December 31, 2014. The salary scale for 2017 – 2019 is based on the Meet and Confer agreement.

Cost-of-living adjustment:	
Prior to October 1, 2049:	0.00%
Beginning October 1, 2049:	2.00%, on original benefit The assumption for the year the COLA begins will be updated on an annual basis and set equal to the year the System is projected to be 70% funded on a market value basis after the COLA is reflected.
Administrative Expenses:	$10,000,000 per year, payable monthly (equivalent to $9,656,091 at the beginning of the year) or 1% of computation pay, if greater
Actuarial Value of Assets:	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value.
Actuarial Cost Method:	Entry Age Normal Actuarial Cost Method. Entry Age is the age at the time the member commenced employment. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis, with Normal Cost determined as if the current benefit accrual rate had always been in effect. Actuarial Liability is allocated by salary.
Amortization Methodology:	The actuarially determined contribution is calculated using a 30-year amortization of unfunded actuarially accrued liability. The 2018 actuarial valuation will also use a 30-year amoritzation period, at which point the amortization period will be closed and reduced by one year with each subsequent valuation.
Change in Assumptions	The following assumption changes are not related to the plan changes: ➢ The salary scale was modified for valuation years 2017 - 2019 in accordance with the Meet and Confer Agreement ➢ DROP interest is assumed to decline from 6.00% to 5.00% effective October 1, 2017, and to 0.00% effective October 1, 2018, per Section 6.14(c) of the plan document as amended and restated through April 16, 2015

The following assumption changes were proposed by the actuary and presented to the Board as part of the plan design work that is incorporated in this valuation. These changes are reflected for the first time in this valuation.

- The administrative expense assumption was changed from $10 million per year to the greater of $10 million per year or 1% of computation pay
- The DROP utilization factor was changed from 100% to 0%
- Current DROP members with at least eight years in the DROP as of January 1, 2017 are assumed to retire in 2018. Current DROP members with less than eight years in the DROP as of January 1, 2017 are assumed to retire once they have been in DROP for eight years.
- Retirement rates were changed effective January 1, 2018
- 100% retirement rate once the sum of age plus service equals 90
- New terminated vested members are assumed to retire at age 58
- Beginning September 1, 2017, DROP account balances for annuitants are assumed to earn 2.75% interest; DROP account balances as of September 1, 2017 for active members are assumed to earn 2.75% interest upon retirement; DROP account balances accrued after September 1, 2017 do not earn interest.
- DROP payment period based on an 85%/15% male/female blend of the current healthy annuitant mortality tables
- COLA assumed to be a 2.00% COLA beginning October 1, 2049 and payable every October 1 thereafter

EXHIBIT V

Summary of Plan Provisions – Members Whose Participation Began Before March 1, 2011

This exhibit summarizes the major provisions of the Dallas Police and Fire Pension System included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions. This valuation includes many plan changes not effective until September 1, 2017; the new provisions are listed in this summary.

Plan Year:	January 1 through December 31
Plan Status:	Ongoing

Normal Retirement – Benefit Earned Prior to September 1, 2017:

Age Requirement	50
Service Requirement	5
Amount	The greater of 3% of Average Computation Pay times years of Pension Service (maximum 96.0%) and $2,200 per month. The $2,200 per month minimum benefit is prorated if the Member retires with less than 20 years of service. Average Computation Pay uses the 36 consecutive months that reflects the highest civil service rank held by a member plus Educational Incentive Pay plus Longevity Pay plus City Service Incentive Pay.

Normal Retirement – Benefit Earned Beginning September 1, 2017:

Age Requirement	58
Service Requirement	5
Amount	The greater of 2.5% of Average Computation Pay times years of Pension Service (maximum 90.0%) and $2,200 per month. The $2,200 per month minimum benefit is prorated if the Member retires with less than 20 years of service. Average Computation Pay uses the 60 consecutive months that reflects the highest civil service rank held by a member plus Educational Incentive Pay plus Longevity Pay plus City Service Incentive Pay.

20 and Out Reduced Retirement – If Eligible as of September 1, 2017:

Age Requirement	None
Service Requirement	20 years
Amount	20 & Out Multiplier times Average Computation Pay times years of Pension Service

Benefit Accrued by September 1, 2017
20 & Out Table 1

Age	20 & Out Multiplier
45 & under	2.00%
46	2.25%
47	2.50%
48	2.75%
49	2.75%
50 & above	3.00%

Benefit Accrued Beginning September 1, 2017
20 & Out Table 2

Age	20 & Out Multiplier
53 & under	2.00%
54	2.10%
55	2.20%
56	2.30%
57	2.40%
58 & above	2.50%

20 and Out Reduced Retirement – If Not Eligible as of September 1, 2017:

Age Requirement	None
Service Requirement	20 years
Amount	20 & Out Multiplier times 60-month Average Computation Pay times years of Pension Service

20 & Out Table 2

Age	20 & Out Multiplier
53 & under	2.00%
54	2.10%
55	2.20%
56	2.30%
57	2.40%
58 & above	2.50%

Early Retirement – If at least age 45 and less than age 50 as of September 1, 2017:

Age Requirement	45
Service Requirement	5
Amount	Normal pension accrued prior to September 1, 2017 plus the benefit accrued based on the 20 & Out Table 2 for service beginning September 1, 2017, reduced by 2/3 of 1% for each whole month by which the benefit commencement date precedes the normal retirement date.

Early Retirement – If reach age 53 after September 1, 2017:

Age Requirement	53
Service Requirement	5
Amount	Normal pension accrued prior to September 1, 2017 plus the benefit accrued based on the 20 & Out Table 2 for service beginning September 1, 2017. The benefit will be reduced by 2/3 of 1% per month from age 58 for the post-September 1, 2017 benefit.

Non-Service Connected Disability:

Eligibility	Injury or illness (lasting more than 90 days) not related to or incurred while in the performance of the member's job, preventing the member from performing their departmental duties.
Amount	3% of Average Computation Pay for service earned prior to September 1, 2017 and the applicable benefit multiplier from 20 & Out Table 2 times Average Computation Pay for service earned beginning September 1, 2017

Service-Connected Disability:

Eligibility	Injury or illness (lasting more than 90 days) obtained while on duty in the performance of the member's job.
Amount	3% of Average Computation Pay for service earned prior to September 1, 2017 and the applicable benefit multiplier from 20 & Out Table 2 times Average Computation Pay for service earned beginning September 1, 2017; if the member has less than 20 years of service, the benefit will be calculated as if they had 20 years at the time of disability.

Benefit Supplement:	
Age Requirement	55
Service Requirement	20 years, waived if member is receiving a service-connected disability
Amount	3% of the total monthly benefit (including any applicable COLA's) payable to the Member when the Member attains age 55. The benefit supplement shall not be less than $75 per month. Beginning September 1, 2017, only those annuitants already receiving the supplement will be eligible to maintain their current supplement, which will not change ongoing; future retirees will not be eligible for the supplement.
Termination Benefit:	
With less than five years of pension service	Upon request, the member's contributions will be returned without interest.
At least five years of pension service	The member may either withdraw contributions or leave contributions in the Plan and receive a monthly benefit to commence no earlier than the member's earliest eligibility for retirement benefits. Retirement benefit is equal to the accrued benefit as of the date of termination.
Pre-Retirement Death Benefit:	
While in active service	The greater of 50% of the Member's accrued benefit or a benefit based on 20 years of service. The benefit may not exceed 45% of Average Computation Pay.
After leaving active service, with fewer than five years	A lump sum benefit equal to the return of member contributions with interest.
After leaving active service, with at least five years	50% of the Member's accrued benefit, with no early retirement reduction
Post-Retirement Death Benefit:	50% of the pension the Member was receiving at the time of their death

Qualified Surviving Children Benefit:	50% of the pension the Member was receiving at the time of their death, divided equally among the children, paid until the youngest child is 19 years old or for life if the child becomes handicapped prior to age 23
Minimum Survivor Benefit:	$1,100 per month, not to exceed the actual amount the Member was receiving upon their death. If there are no Qualified Surviving Children, the minimum benefit to a spouse who is a Qualified Survivor shall be $1,200 per month. If the Member had less than 20 years of Pension Service, the minimum benefit will be prorated based on actual years of Pension Service.
Special Survivor Benefit:	
Eligibility	Upon leaving active service or joining DROP: a) the Member was at least 55 years old with at least 20 years of pension service, or b) the sum of the Member's age plus Pension Service was at least 78; **and** Has no Qualified Surviving Children or handicapped children currently eligible for survivor benefits; **and** Whose Qualified Surviving Spouse is at least 55 years old. The Qualified Surviving Spouse does not have to be 55 years old at the time of the Member's death.
Amount	Once all the eligibility conditions are met, the amount the Qualified Surviving Spouse will receive increases from 50% of the Member's pension benefit to a percentage of the Member's pension benefit based on 3% times the number of years of Pension Service the Member worked.
Survivor Benefit if No Qualified Surviving Spouse:	A lump sum that is the actuarial equivalent of 120 monthly payments of the greater of: 50% of the Member's pension benefit at the time of their death, or a benefit based on 20 years of the Member's service.

DROP:	
Eligibility	Members in active service who are retirement eligible may elect to enter the Deferred Retirement Option Plan (DROP).
Distribution	$3,000/month, if requested, for March 31, 2017 through the month prior to the start of lifetime annuitization. Once the Board has approved the life expectancy tables and interest rates, but no earlier than September 1, 2017, the DROP account balance will be paid over the expected future lifetime of annuitants as of September 1, 2017, and over the expected future lifetime based on the age at retirement of those who retire with a DROP account balance after September 1, 2017.
Interest	The benefit will be accumulated at a rate of 6.0% from October 1, 2016 to August 31, 2017. Beginning September 1, 2017, interest will be determined based on the expected lifetime of the member at retirement. The Board of Trustees will set the interest rates.
Cost-of-Living Adjustments:	The Board may grant an ad hoc COLA based on the actual market return over the prior five years less 5%, not to exceed 4% of the base benefit, if, after granting a COLA, the funded ratio on a market value of assets basis is no less than 70%.
Member Contributions:	<u>January 1, 2017 through August 31, 2017</u> 8.5% of computation pay if not participating in DROP 4.0% of computation pay if participating in DROP <u>Effective September 1, 2017</u> 13.5% of computation pay for all members
Changes in Plan Provisions:	The plan provisions listed in this section reflect the changes effective September 1, 2017 as summarized in Section 1.

EXHIBIT V

Summary of Plan Provisions – Members Whose Participation Began on or After March 1, 2011

Normal Retirement:

Age Requirement	55
Service Requirement	5
Amount	2.5% of Average Computation Pay for each year of Pension Service, maximum 90% The minimum monthly benefit is $110 times the number of years of Pension Service at retirement, but not greater than $2,200. Average Computation Pay uses the 60 consecutive months that reflects the highest civil service rank held by a member plus Educational Incentive Pay plus Longevity Pay plus City Service Incentive Pay.

Early Retirement:

Age Requirement	53
Service Requirement	5
Amount	Normal pension accrued, reduced by 2/3 of 1% for each whole month by which the benefit commencement date precedes the normal retirement date.

20 and Out Reduced Retirement:

Age Requirement	None
Service Requirement	20 years
Amount	20 & Out Multiplier times Average Computation Pay times years of Pension Service

20 & Out Table 2

Age	20 & Out Multiplier
53 & under	2.00%
54	2.10%
55	2.20%
56	2.30%
57	2.40%
58 & above	2.50%

Non-Service Connected Disability:	
Eligibility	Injury or illness (lasting more than 90 days) not related to or incurred while in the performance of the member's job, preventing the member from performing their departmental duties..
Amount	The Member's accrued benefit, but not less than a pro-rated minimum benefit.
Service-Connected Disability:	
Eligibility	Injury or illness (lasting more than 90 days) obtained while on duty in the performance of the member's job.
Amount	The greater of 50% of Average Computation Pay and the Member's accrued benefit.
Termination Benefit:	
With less than five years of service	Upon request, the member's contributions will be returned without interest.
After five years of service	The member may either withdraw contributions or leave contributions in the Plan and receive a monthly benefit to commence no earlier than the member's earliest eligibility for retirement benefits. Retirement benefit is equal to the accrued benefit as of the date of termination.
Pre-retirement Death Benefit:	
While in active service	The greater of 50% of the Member's accrued benefit or a benefit based on 20 years of service. The benefit may not exceed 45% of Average Computation Pay.
After leaving active service, with less than five years	A lump sum benefit equal to the return of member contributions with interest.
After leaving active service, with at least five years	50% of the Member's accrued benefit, with no early retirement reduction
Post-Retirement Death Benefit:	50% of the pension the Member was receiving at the time of their death

Qualified Surviving Children Benefit:	50% of the pension the Member was receiving at the time of their death, divided equally among the children, paid until the youngest child is 19 years old or for life if the child becomes handicapped prior to age 23.
Minimum Survivor Benefit:	$1,100 per month, not to exceed the actual amount the Member was receiving upon their death. If there are no Qualified Surviving Children, the minimum benefit to a spouse who is a Qualified Survivor shall be $1,200 per month. If the Member had less than 20 years of Pension Service, the minimum benefit will be prorated based on actual years of Pension Service.
Special Survivor Benefit:	
Eligibility	Upon leaving active service or joining DROP: a) the Member was at least 55 years old with at least 20 years of pension service, or b) the sum of the Member's age plus Pension Service was at least 78; **and** Has no Qualified Surviving Children or handicapped children currently eligible for survivor benefits; **and** Whose Qualified Surviving Spouse is at least 55 years old. The Qualified Surviving Spouse does not have to be 55 years old at the time of the Member's death.
Amount	Once all the eligibility conditions are met, the amount the Qualified Surviving Spouse will receive increases from 50% of the Member's pension benefit to a percentage of the Member's pension benefit based on 2.5% times the number of years of Pension Service the Member worked.
Survivor Benefit if No Qualified Surviving Spouse:	A lump sum that is the actuarial equivalent of 120 monthly payments of the greater of: 50% of the Member's pension benefit at the time of their death, or a benefit based on 20 years of the Member's service.

DROP:	
Eligibility	Members in active service who are retirement eligible may elect to enter the Deferred Retirement Option Plan (DROP).
Distribution	$3,000/month, if requested, for March 31, 2017 through the month prior to the start of lifetime annuitization. Once the Board has approved the life expectancy tables and interest rates, but no earlier than September 1, 2017, the DROP account balance will be paid over the expected future lifetime of annuitants as of September 1, 2017, and over the expected future lifetime based on the age at retirement of those who retire with a DROP account balance after September 1, 2017.
Interest	The benefit will be accumulated at a rate of 6.0% from October 1, 2016 to August 31, 2017. Beginning September 1, 2017, interest will be determined based on the expected lifetime of the member at retirement. The Board of Trustees will set the interest rates.
COLA:	The Board may grant an ad hoc COLA based on the actual market return over the prior five years less 5%, not to exceed 4% of the base benefit, if, after granting a COLA, the funded ratio on a market value of assets basis is no less than 70%.
Member Contributions:	January 1, 2017 through August 31, 2017 8.5% of computation pay if not participating in DROP 4.0% of computation pay if participating in DROP Effective September 1, 2017 13.5% of computation pay for all members
Changes in Plan Provisions:	The plan provisions listed in this section reflect the changes effective September 1, 2017 as summarized in Section 1.

EXHIBIT 1

Net Pension Liability

The components of the net pension liability of the Pension System at December 31, 2016 were as follows:

Total pension liability	$8,450,280,896
System fiduciary net position*	2,150,661,803
System's net pension liability	$6,299,619,093
System fiduciary net position as a percentage of the total pension liability	25.45%

**Assets differ from those used in the actuarial valuation*

Plan changes effective September 1, 2017 are not included in the net pension liability as of December 31, 2016. Had these plan changes been included, the December 31, 2016 Net Pension Liability would be approximately $4.1 billion.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of January 1, 2017, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75%
Real rate of return	4.50%
Investment rate of return	7.25%, net of investment expense, including inflation

The actuarial assumptions used in the January 1, 2017 valuation were based on the results of an experience study of the Pension System for the period January 1, 2010 to December 31, 2014, and based on assumption changes included in the January 1, 2017 valuation. The December 31, 2016 Total Pension Liability does not include assumption changes in the January 1, 2017 valuation that are related to the plan changes effective September 1, 2017. Assumptions are detailed in Exhibit V in Section 4 of this valuation report.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the System's target asset allocation are summarized in the table on the next page (net of inflation). This target allocation was approved by the Board of Trustees for the System on March 10, 2016.

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
Global Equity	20%	6.87%
Emerging Market Equity	5%	9.42%
Private Equity	5%	10.47%
Short-Term Core Bonds	2%	1.35%
Global Bonds	3%	1.38%
High Yield and Bank Loans	11%	4.09%
Structured Credit and Absolute Return	6%	5.67%
Emerging Markets Debt	6%	4.71%
Private Debt	5%	7.69%
Natural Resources	5%	7.63%
Infrastructure	5%	6.25%
Real Estate	12%	5.00%
Liquid Real Assets	3%	4.43%
Asset Allocation	10%	4.90%
Cash	2%	1.06%
Total	100%	

*As provided by Segal Marco Advisors, a member of The Segal Group

Discount rate: The discount rate used to measure the total pension liability was 4.12%. The projection of cash flows used to determine the discount rate assumed City and plan member contributions will be made at the current contribution rate: 27.50% of pay, including overtime and non-computation pay, from the City, 8.50% of computation pay from the members who have not elected DROP and 4.00% of computation pay from the members who have elected DROP. Total computation pay is projected to grow at 2.75% annually. The normal cost rate for future members is assumed to be 11.85% for all years. Based on those assumptions, the System's fiduciary net position was not projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to the first 12 periods of projected benefit payments and a 3.78% municipal bond rate was applied for all periods thereafter. The 3.78% municipal bond rate is based on an index of 20-year, tax-exempt general obligation bonds, published weekly by the

Federal Reserve. (The chosen rate is the Bond Buyer 20-Bond GO Index rate published closest to, but not later than, the measurement date of December 31, 2016.)

Actuarial cost method: In accordance with GASB 67, the Total Pension Liability for active members is valued as the total present value of benefits once they enter the DROP. For the funding valuation, the liability for these members accumulates from their entry age until they are assumed to leave active service.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the Dallas Police and Fire Pension System, calculated using the discount rate of 4.12%, as well as what the Dallas Police and Fire's net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (3.12%) or one-percentage-point higher (5.12%) than the current rate:

	1% Decrease (3.12%)	Current Discount (4.12%)	1% Increase (5.12%)
Dallas Police and Fire's net pension liability	$7,746,687,763	$6,299,619,093	$5,159,477,958

EXHIBIT 2
Schedules of Changes in Net Pension Liability – Last Two Fiscal Years

	2016	2015
Total pension liability		
Service cost	$167,432,312	$125,440,684
Interest	360,567,435	359,023,651
Changes of benefit terms	0	0
Differences between expected and actual experience	-77,462,935	379,460,954
Changes of assumptions	-712,003,982	908,988,241
Benefit payments, including refunds of member contributions	-825,092,132	-285,003,174
Net change in total pension liability	-$1,086,559,302	$1,487,910,356
Total pension liability – beginning	9,536,840,198	8,048,929,842
Total pension liability – ending (a)	$8,450,280,896	$9,536,840,198
Plan fiduciary net position		
Contributions – employer	$119,345,000*	$114,885,723
Contributions – member	25,518,317	25,676,327
Net investment and other income	164,790,956	-235,206,910
Benefit payments, including refunds of member contributions	-825,092,132	-285,003,174
Administrative expense	-9,492,445	-8,417,520
Interest expense	-4,532,196	-6,005,609
Net change in plan fiduciary net position	-$529,462,500	-$394,071,163
Plan fiduciary net position – beginning	2,680,124,303	3,074,195,466
Plan fiduciary net position – ending (b)	$2,150,661,803*	$2,680,124,303
System's net pension liability – ending (a) – (b)	$6,299,619,093	$6,856,715,895
Plan fiduciary net position as a percentage of the total pension liability	25.45%	28.10%
Covered employee payroll	$357,414,472	$365,210,426
System's net pension liability as percentage of covered employee payroll	1,762.55%	1,877.47%

Notes to Schedule:

** Assets and employer contributions differ from those used in the actuarial valuation*

Benefit changes: There have not been any changes in plan provisions reflected for the first time in this December 31, 2016 GASB 67 disclosure.

Change of Assumptions: The blended discount rate increased from 3.95% to 4.12%, with a liability impact of -$221,794,888. Section 4, Exhibit IV lists other assumption changes not related to plan changes effective September 1, 2017; these other assumption changes decreased liability by $490,209,094.

EXHIBIT 3

Schedule of City's Contributions – Last Two Fiscal Years

Year Ended December 31	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions[1]	Contribution Deficiency (Excess)	Covered-Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2015[2]	--	$114,885,723	--	$383,006,330	31.46%
2016	$261,859,079	119,345,000	$142,514,079	365,210,426	32.68

[1]*The City's contributions are based on statutory rates set by state law and not on Actuarially Determined Contributions*

[2]*The Actuarially Determined Contribution was not directly calculated as a dollar amount by the prior actuary for the year ended 2015*

EXHIBIT 4

Notes to Required Supplementary Information

Valuation date	Actuarially determined contributions are calculated as of January 1, 2016, the beginning of the year for which they are payable
Methods and used assumptions to determine contribution rates:	
Actuarial cost method	Entry age
Amortization method	30-year level percent of covered payroll, open
Remaining amortization period	Infinite as of January 1, 2016
Asset valuation method	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized over a five-year period.
Key actuarial assumptions for 2016 actuarially determined contribution*:	
Investment rate of return	7.25%, net of all expenses
Inflation rate	2.75%
Projected salary increases	Inflation plus merit increases, varying by gorup and service, ranging from 0.25% to 2.45%.
Cost of living adjustments	4.00%
Payroll growth rate	2.75% per annum used to amortize unfunded actuarial liabilities.
Retirement	Group-specific rates based on age
Mortality	*Pre-retirement*: Sex-distinct RP-2014 Employee Mortality Table, set back two years for males, projected generationally using Scale MP-2015 *Healthy annuitants*: Sex-distinct RP-2014 Healthy Annuitant Mortality Table, set forward two years for females, projected generationally using Scale MP-2015 *Disabled annuitants*: Sex-distinct RP-2014 Disabled Retiree Mortality Table, set back three years for males and females, projected generationally using Scale MP-2015
Annualized DROP account returns	7.0% at October 1, 2015 6.0% at October 1, 2016 5.0% at October 1, 2017 and thereafter
DROP entry	Age 50 with 5 years of service. Any active members who satisfy these criteria and have not entered DROP are assumed never to join DROP. Active members who retire with a DROP account are assumed to receive the balance of their account over a 10-year time period.

*Assumptions differ from those used in determination of the December 31, 2016 Total Pension Liability

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