

City of Plano, Texas Retirement Security Plan

Actuarial Valuation Report

For the Year Beginning December 31, 2017



July 11, 2018

Ms. Andrea Cockrell
Administrative Services Manager
City of Plano
1520 Ave. K, Ste 130
Plano, TX 75074

Re: Actuarial Valuation of the City of Plano, Texas Retirement Security Plan as of December 31, 2017

Dear Andrea:

We are pleased to present our report of the actuarial valuation of the City of Plano, Texas Retirement Security Plan (RSP or "Plan") as of December 31, 2017. We certify that the information contained in this report is accurate and fairly presents the actuarial position of the RSP as of the valuation date.

The primary purposes of the valuation report are to determine the recommended employer contribution, to describe the current financial condition of the Plan, and to analyze changes in the Plan's financial condition. A separate report is issued with regard to valuation results determined in accordance with Governmental Accounting Standards Board (GASB) Statements 67 and 68.

Results of this report should not be used for any other purpose without consultation with the undersigned. This report may be provided to parties other than the City of Plano only in its entirety and only with the permission from the City of Plano.

Funding Policy and Financing Objectives

In setting contribution rates, the Retirement Committee's principal objectives are:

- To set rates so that the unfunded actuarial accrued liability (UAAL) will be amortized over a reasonable period of time from the current valuation date
- To set rates so that they remain relatively level over time

To accomplish this, the Retirement Committee's funding policy requires the City of Plano to contribute a rate equal to the sum of the normal cost rate (which pays the current year's cost) and an amortization rate which result in the amortization of the UAAL over a 17-year period. The amortization period is closed, so 17 years remain at the current valuation date and 15 years will remain when the next actuarial valuation is performed on December 31, 2019. To provide stability in the contribution requirement in future years, new amortization bases will be established and separately maintained for each actuarial valuation on and after December 31, 2021 and amortized over 15 years. Also, since the City's financial risk of funding the RSP is not symmetric, if the net amortization cost is negative, or a credit, then the City's applicable contribution will not be less than the normal cost less the expected earnings on the surplus assets (determined as a percentage of covered payroll). This is intended to preserve the assets in excess of the actuarial accrued

liability to offset adverse experience that may occur in a future year. Under this policy, we expect the objective of maintaining a relatively level contribution rate over time will be achieved in normal conditions such as consistent financial markets.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. The funded ratio increased from 99.2% as of December 31, 2015 to 100.8% as of December 31, 2017. Since the last actuarial valuation, the Plan experienced gains due to liability and investment experience. These combined gains were partially offset by an actuarial loss due to the updated actuarial assumptions adopted by the Retirement Committee in 2017. If the market value had been used in the calculation instead of actuarial value, the fund ratio of the Plan as of December 31, 2017 would have been 103.9%.

Benefit provisions

There were no changes to the benefit provisions since the prior actuarial valuation. The benefit provisions are summarized in Section K of our report.

Assumptions and Methods

The actuarial assumptions and methods are set by the Retirement Committee, based upon recommendations made by the Plan's actuary. In preparing the actuarial valuation as of December 31, 2017 the following actuarial assumptions were modified:

- The investment return assumption was decreased from 7.50% to 7.00%.
- The price inflation assumption was decreased from 2.75% to 2.50%. This assumption is not directly used in the calculation of the actuarial accrued liability or contribution requirement, but does impact other economic assumptions.
- There were minor decreases in the step/promotional rates in the individual salary increase assumption for most participants. A productivity component above the 2.50% inflation assumption of 0.25% was added for all participants.
- The payroll growth rate assumption for amortizing the unfunded actuarial accrued liability was decreased from 3.25% to 2.75%.
- The assumed rate of future cost of living adjustments was decreased from 2.70% to 2.50%.
- An explicit load of 0.25% of payroll was added to the normal cost to account for administrative and miscellaneous expenses, and thus the assumed investment return is net of investment expenses only.
- The assumption for termination of employment was changed from being service-based to age-based. The overall impact of this change results in an increase in the expected number of participants who will leave employment prior to attaining retirement age.
- There were small adjustments in the overall retirement assumption used to model the pattern for Plan participants to retire and commence their RSP benefit.

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- There was a decrease in the probabilities that participants will become disabled and commence a disability retirement benefit.

Section J of our report provides a complete description of the assumptions and methods. We believe the assumptions are reasonable, internally consistent, comply with applicable Actuarial Standards of Practice, and, where applicable, are based on the actual experience of the RSP.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, and calculated contribution rates. The actuarial calculations presented in our report are intended to provide information for rational decision making.

Data

Member data for retired, active and inactive members was supplied as of December 31, 2017, by the City of Plano staff under the direction of the Plan Administrator. Asset and financial information as of December 31, 2017, was also supplied to us by the City of Plano staff. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data. GRS is not responsible for the accuracy or completeness of the information provided to us by the City of Plano.

Actuarial Certification

All of the tables contained in this actuarial valuation report were prepared by Gabriel, Roeder, Smith & Company. We certify that the information presented herein is accurate and fairly portrays the actuarial position of the RSP as of December 31, 2017.

All of our work conforms with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of state law, the Internal Revenue Code, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries and consultants. Mr. White and Mr. Siblik are Enrolled Actuaries and Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, the undersigned are experienced in performing actuarial valuations for public retirement systems.

Ms. Andrea Cockrell

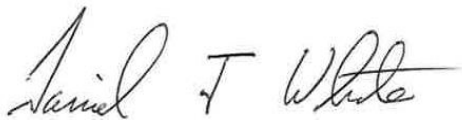
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We would like to thank you and your staff for your assistance in providing all necessary data to complete this valuation. Please let us know if you have any questions or need any additional information.

Respectfully submitted,

Gabriel, Roeder, Smith & Company



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SECTION A

EXECUTIVE SUMMARY

Executive Summary

The key results from the actuarial valuation of the City of Plano, Texas Retirement Security Plan (RSP) as of December 31, 2017 may be summarized as follows along with comparative amounts from the previous valuation:

	<u>December 31, 2017</u>	<u>December 31, 2015</u>
	(1)	(2)
1. Participants		
a. Actives	2,205	2,076
b. Retirees and beneficiaries	801	686
c. Disabled	17	18
d. Vested terminated	79	62
e. Members due cash-out	2	6
f. Total	<u>3,104</u>	<u>2,848</u>
2. Covered payroll	\$ 147,452,892	\$ 130,412,851
3. Normal cost	4,821,710	4,642,698
4. Actuarial accrued liability	142,908,846	122,992,163
5. Actuarial value of assets	144,040,464	122,044,321
6. Unfunded actuarial accrued liability (UAAL)	\$ (1,131,618)	\$ 947,842
7. Actuarial assets as % of actuarial accrued liability	100.8%	99.2%
8. Actuarial gains/(losses)		
a. Due to asset and liability experience	\$ 5,404,405	\$ 5,262,482
b. Due to change in method	0	0
c. Due to assumption change	<u>(2,989,199)</u>	<u>(7,094,524)</u>
d. Total	\$ 2,415,206	\$ (1,832,042)
9. Level percent of pay funding cost	\$ 4,747,983	\$ 4,720,945
a. As % of payroll	3.22%	3.62%
10. UAAL as % of payroll	-0.8%	0.7%
11. Funding period (years)	17	19
12. Principal assumptions		
a. Valuation interest rate	7.00%	7.50%
b. Payroll growth assumption	2.75%	3.25%

SECTION B

INTRODUCTION

Introduction

This December 31, 2017 actuarial valuation of the City of Plano, Texas Retirement Security Plan (RSP) has been prepared by Gabriel, Roeder, Smith & Company. The primary purpose of the valuation is to value the liabilities of the Plan as of December 31, 2017, determine the City's contribution rate for the calendar years beginning January 1, 2019, and January 1, 2020, and to provide certain required disclosure information. We are pleased to have the privilege of working on this actuarial valuation, and look forward to discussing the results with you at your convenience.

Section C of this report provides a summary of the valuation results. Assets are discussed in Section D. Section E contains an analysis of the actuarial gains and losses during the past two years.

Section F summarizes assumption changes in effect for the December 31, 2017 actuarial valuation. Section G discusses some of the historical comparisons and statistical summaries for the Plan while Section H summarizes our findings.

Various tables supporting the report are contained in Section I. Descriptions of the actuarial assumptions and methods can be found in Section J and a summary of benefit provisions used in the actuarial valuation can be found in Section K.

SECTION C

FINANCIAL STATUS OF THE PLAN

Financial Status of the Plan

The funded status of the Plan is shown in Table 1, Table 2, and Table 3. Table 1 summarizes the various cost items for the December 31, 2017 actuarial valuation, while Table 2 provides an allocation of the normal cost by its various components. Table 3 shows the components of the actuarial accrued liability.

Reviewing the composition of normal cost of the Plan, Table 2 indicates that the employer normal cost as of December 31, 2017 is 3.27% of payroll, which includes a cost to reflect anticipated administrative expenses paid with Plan assets.

Table 1 illustrates a number of the key actuarial items for the 2017 valuation. As mentioned above, the employer normal cost rate is 3.27% of pay and the actuarial accrued liability is \$142.9 million as shown in Item 5. The actuarial value of assets based on a five-year smoothed market value equals \$144.0 million, as shown in Item 6. As shown in Item 7, the valuation assets exceed the actuarial accrued liability by \$1.1 million as of December 31, 2017. As of the prior valuation, the actuarial accrued liability exceeded the valuation assets by \$0.9 million.

The contribution amount shown in Item 8 of Table 1 is a 17-year level percentage of payroll funding cost assuming a 2.75% annual payroll growth in City's payroll. This funding approach produces a contribution pattern that is intended to increase in amount from year to year but remain relatively constant when expressed as a percentage of covered payroll. For the December 31, 2017 valuation, this annual cost is 3.22% of covered payroll or \$4.7 million. These values compare to an annual contribution requirement of 3.62% of covered payroll or \$4.7 million determined in the December 31, 2015 actuarial valuation. The decrease in the contribution rate is due to updated actuarial assumptions and favorable liability and investment experience since the last actuarial valuation. On the other hand, the dollar amount of the contribution requirement is relatively unchanged because the covered payroll, which the City makes contributions on, has increased from \$130 million to \$147 million since the last actuarial valuation. This information is discussed in greater detail in Section F.

As mentioned above, the unfunded actuarial accrued liability for the Plan changed from being underfunded by \$0.9 million to having a \$1.1 million surplus of assets, on an actuarial of asset basis. Rather than an amortization of the unfunded actuarial accrued liability being added to the normal cost, the Plan is recognizing a credit equal to the expected investment earnings on those surplus assets, which amounts to 0.05% as a percentage of payroll. This explains why the recommended contribution requirement is less than the total normal cost. Although the aforementioned assumption changes decreased the normal cost component of the contribution requirement, they actually increased the actuarial accrued liability. The Plan benefited from both asset gains and liability experience gains, which combined, exceeded the increase in the liability due to the assumption changes. Further detail on the change in assets and liability gains or losses is given in the following sections of this report.

SECTION D

CHANGE IN ASSETS

Change in Assets

An analysis of the change in the Plan assets since the prior valuation and an estimate of the yield on assets for the Plan are included in Table 4. Table 4 shows both the market value and actuarial value of assets. The actuarial value is based upon the market value of assets with a five-year smoothing of actual investment return in excess of/(less than) expected investment income.

For the plan year ending December 31, 2016, plan assets earned 4.92% on a dollar-weighted basis, net of expenses. Similarly, for the plan year ending December 31, 2017, plan assets earned 16.88%. As shown in Item 10 in Table 5a, this experience resulted in \$3.1 million less in plan assets than expected for 2016 and \$11.9 million more in plan assets than expected for 2017.

The actuarial value of assets is based on a five year smoothing method, and as a result the average investment return over the two-year period was 8.54% on an actuarial value basis. This results in deferring \$4.4 million in net deferred investment gains as of the valuation date.

SECTION E

ACTUARIAL GAINS AND LOSSES

Actuarial Gains and Losses

An important part of the change in the Plan's unfunded actuarial accrued liability (UAAL) from year to year is due to the impact of actuarial gains and losses. We have summarized the combined asset and liability experience changes for the two-year period since December 31, 2015.

As can be seen in Item 6 of Table 6, the expected UAAL as of December 31, 2017 was \$1.3 million. This reflects an assumed investment return assumption of 7.50% at the beginning of 2016 and 2017 in combination with the actuarial accrued liability, normal cost, and actual contributions during calendar years 2016 and 2017.

Since the actual UAAL as of December 31, 2017 is (\$1.1) million the Plan had a \$2.4 million gain for the two-year period, as shown in Item 8 of Table 6. This gain was comprised of a \$2.8 million gain due to valuation asset experience (on an actuarial value of asset basis), and a \$2.6 million gain due to liability experience, and a \$3.0 million loss due to updated actuarial assumptions.

The largest single source of the experience gain was due to actual cost-of-living adjustments (COLA) provided to the retirees being less than assumed (approximately \$1.1 million of the \$2.6 million liability gain). The remaining liability gains resulted from fewer members retiring with an annuity than assumed as well as there being more participants than expected terminating employment with a vested benefit.

SECTION F

ASSUMPTION CHANGES

Assumption Changes

The following actuarial assumptions were modified for the December 31, 2017 actuarial valuation:

- The investment return assumption was decreased from 7.50% to 7.00%.
- The price inflation assumption was decreased from 2.75% to 2.50%. This assumption is not directly used in the calculation of the actuarial accrued liability or contribution requirement, but does impact other economic assumptions.
- There were minor decreases in the step/promotional rates in the individual salary increase assumption for most participants. A productivity component above the 2.50% inflation assumption of 0.25% was added for all participants.
- The payroll growth rate assumption for amortizing the unfunded actuarial accrued liability was decreased from 3.25% to 2.75%.
- The assumed rate of future cost of living adjustments was decreased from 2.70% to 2.50%.
- An explicit load of 0.25% of payroll was added to the normal cost to account for administrative and miscellaneous expenses, and thus the assumed investment return is net of investment expenses only.
- The assumption for termination of employment was changed from being service-based to age-based. The overall impact of this change results in an increase in the expected number of participants who will leave employment prior to attaining retirement age.
- There were small adjustments in the overall retirement assumption used to model the pattern for Plan participants to retire and commence their RSP benefit.
- There was decrease in the probabilities that participants will become disabled and commence a disability retirement benefit.

We believe the actuarial assumptions used in this actuarial valuation satisfy applicable Actuarial Standards of Practice (ASOP) requirements, including actuarial practice standards No. 27 and 35.

The actuarial accrued liability increased by \$3.0 million and the actuarially determined contribution rate based on the RSP's funding policy decreased by 0.19% of pay, due to the assumption changes.

SECTION G

HISTORICAL COMPARISONS AND STATISTICAL SUMMARIES

Historical Comparisons and Statistical Summaries

Various statistical data on the Plan is shown in Table 11. In addition, Tables 7 through 9 of Section I contain certain actuarial trend information which may be of interest.

Table 7 relates the size of the unfunded actuarial accrued liability (UAAL) to three different measurements. In Columns 3 and 4, the UAAL is related to the covered payroll of the Plan. Columns 5 and 6 relate the UAAL to the actuarial value of assets, while Columns 7 and 8 relate the UAAL to the total actuarial accrued liabilities of the Plan.

Table 8 provides the active membership, covered payroll, and average salary as of the valuation date. Table 9 shows the number of retired participants and the average monthly benefit.

SECTION H

SUMMARY AND CLOSING COMMENTS

Summary and Closing Comments

It is our opinion that the results of this valuation provide a reasonable reflection of the funded status of the Plan as of December 31, 2017.

The City of Plano's funding cost for the next two calendar years beginning January 1, 2019 (i.e. the funding cost for the years ending December 31, 2019 and 2020) is 3.22%. This funding cost consists of a 3.27% normal cost rate and a 0.05% credit in reflection of the Plan's expected earnings on surplus assets. Had the Plan experienced an unfunded actuarial accrued liability, there would have been an amortization cost calculated based on a 17-year funding period as a level percentage of pay with an assumed 2.75% growth in payroll.

SECTION I

ACTUARIAL TABLES

Actuarial Tables

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Table 1

SUMMARY OF COST ITEMS

	December 31, 2017		December 31, 2015	
	Cost Item	Cost as % of Pay	Cost Item	Cost as % of Pay
	(1)	(2)	(3)	(4)
1. Participants				
a. Active	2,205		2,076	
b. Retired participants and beneficiaries	801		686	
c. Disabled	17		18	
d. Terminated vested	79		62	
e. Members due cash-out	2		6	
f. Total	3,104		2,848	
2. Covered Payroll	\$ 147,452,892		\$ 130,412,851	
3. Averages for active participants				
a. Average age	43.6		44.2	
b. Average years of service	10.6		11.3	
c. Average pay	\$ 66,872		\$ 62,819	
4. Employer normal cost	\$ 4,821,710	3.27%	\$ 4,642,698	3.56%
5. Actuarial accrued liability				
a. Active participants	\$ 77,797,746		\$ 71,711,138	
b. Retired participants and beneficiaries	58,188,044		44,923,797	
c. Disabled participants	4,255,235		4,280,366	
d. Terminated vested participants	2,653,109		2,064,551	
e. Members due cash-out	14,712		12,311	
f. Total	\$ 142,908,846	96.92%	\$ 122,992,163	94.31%
6. Actuarial value of assets	\$ 144,040,464	97.69%	\$ 122,044,321	93.58%
7. Unfunded actuarial accrued liability (UAAL) (Item 5f - Item 6)	\$ (1,131,618)	(0.77%)	\$ 947,842	0.73%
8. Level percent of pay funding	\$ 4,747,983	3.22%	\$ 4,720,945	3.62%
9. Assets in excess of the actuarial accrued liability				
a. As percent of present assets	0.8%		(0.8%)	
b. As percent of covered payroll	0.8%		(0.7%)	
10. Principal Assumptions				
a. Valuation interest rate	7.00%		7.50%	
b. Payroll growth	2.75%		3.25%	

Table 2

ANALYSIS OF NORMAL COST BY COMPONENT

<u>Benefit Component</u> (1)	<u>Cost as % of Pay</u>	
	<u>December 31, 2017</u> (2)	<u>December 31, 2015</u> (3)
1. Retirement	2.09%	2.50%
2. Vested termination	0.56%	0.26%
3. Disability	0.37%	0.80%
4. Administrative expense	0.25%	N/A
5. Total normal cost	3.27%	3.56%

Table 3

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS AND CALCULATION OF ACTUARIAL ACCRUED LIABILITY

	December 31, 2017	December 31, 2015
	(1)	(2)
A. Present value of future benefits		
1. Active members		
a. Retirement benefits	\$ 96,336,159	\$ 93,587,021
b. Deferred termination benefits	8,447,687	2,849,275
c. Disability benefits	4,723,392	10,661,181
d. Total	\$ 109,507,238	\$ 107,097,477
2. Retired members		
a. Service retirees and beneficiaries	\$ 58,188,044	\$ 44,923,797
b. Disabled retirees	4,255,235	4,280,366
c. Total	\$ 62,443,279	\$ 49,204,163
3. Deferred vested members	\$ 2,653,109	\$ 2,064,551
4. Members due cash-out	\$ 14,712	\$ 12,311
5. Total actuarial present value of future benefits	\$ 174,618,338	\$ 158,378,502
B. Present value of future payroll	\$ 1,103,189,878	\$ 1,101,935,593
C. Present value of future normal costs	\$ 31,709,492	\$ 35,386,339
D. Actuarial accrued liability for active members		
1. Present value of future benefits (Item A1d)	\$ 109,507,238	\$ 107,097,477
2. Less present value of future normal costs	31,709,492	35,386,339
3. Actuarial accrued liability	\$ 77,797,746	\$ 71,711,138

Table 4

CHANGE IN ASSETS

	<u>Market Value</u>	<u>Actuarial Value</u>
1. Plan assets as of December 31, 2015	\$ 120,921,693	\$ 122,044,321
2. Employer contributions	9,292,924	9,292,924
3. Benefit payments made	9,057,679	9,057,679
4. Expenses paid from trust	699,187	699,187
5. Investment return	<u>28,058,556</u>	<u>22,460,085</u>
6. Plan assets as of December 31, 2017 (Item 1 + Item 2 - Item 3 - Item 4 + Item 5)	\$ 148,516,307	\$ 144,040,464
7. Approximate rate of return on average invested assets		
a. Average invested assets	\$ 121,039,316	\$ 122,161,944
b. Two-year rate of return ((Item 5 - Item 4) ÷ Item 7a)	22.60%	17.81%
c. Average annual rate of return	10.73%	8.54%

Table 5a

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS As of December 31, 2017

	Year Ending	
	<u>December 31, 2017</u>	<u>December 31, 2016</u>
A. Expected return on assets since last valuation		
1. Market value of assets at beginning of year	\$ 126,698,362	\$ 120,921,693
2. Actual contributions	\$ 5,159,461	\$ 4,133,463
3. Actual distributions	\$ (4,760,146)	\$ (4,297,533)
4. Expenses paid from trust	\$ (363,144)	\$ (336,043)
5. Market value of assets at end of year	\$ 148,516,307	\$ 126,698,362
6. Assets adjusted for mid-year weighting of actual contributions and distributions [Item 1 + .5 x (Item 2 + Item 3)]	\$ 126,898,020	\$ 120,839,658
7. Assumed rate of return on plan assets	7.50%	7.50%
8. Expected return (Item 6 x Item 7)	\$ 9,517,352	\$ 9,062,974
9. Actual return (Item 5 - Item 1 - Item 2 - Item 3)	\$ 21,418,630	\$ 5,940,739
10. Excess investment gain/(loss) (Item 9 - Item 8)	\$ 11,901,278	\$ (3,122,235)

Table 5b

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS (CONT.) As of December 31, 2017

B. Actuarial value of assets as of December 31, 2017

1. Market value of assets as of December 31, 2017 \$ 148,516,307

2. Deferred investment gains or losses

	Plan Year Ending (1)	Gain/(Loss) (2)	Percent Recognized (3)	Percent Deferred (4)	Deferred Amount (5)
a.	2017	\$ 11,901,278	20%	80%	\$ 9,521,022
b.	2016	(3,122,235)	40%	60%	(1,873,341)
c.	2015	(7,481,396)	60%	40%	(2,992,558)
d.	2014	(896,400)	80%	20%	(179,280)
e.	Total				\$ 4,475,843

3. Asset value adjusted for deferred gain/(losses) (Item 1 - Item 2e, Column 5) \$ 144,040,464

4. Corridor for actuarial value

a. 80% of market value (Item 1) \$ 118,813,046
 b. 120% of market value (Item 1) 178,219,568

5. Actuarial value of plan assets \$ 144,040,464
 (Item 3, but not less than Item 4a nor greater than Item 4b)

Table 6

ACTUARIAL GAIN OR LOSS AS OF DECEMBER 31, 2017

CALCULATION OF TOTAL ACTUARIAL GAIN OR LOSS

1. Unfunded actuarial accrued liability (UAAL) as of December 31, 2015	\$	947,842
2. Normal cost for year ending December 31, 2016		4,642,698
3. Projected normal cost for year ending December 31, 2017		4,793,586
4. Actual contributions during 2016 and 2017		(9,292,924)
5. Interest at previous year's rate of 7.50%		
a. On UAAL	\$	147,508
b. On normal cost		531,978
c. On projected normal cost		176,510
d. On contributions		(663,610)
e. Total	\$	192,386
6. Expected UAAL (Sum of Items 1 through 5)		1,283,588
7. Actual UAAL		(1,131,618)
8. Actuarial gain/(loss) for the period (Item 6 - Item 7)	\$	2,415,206

SOURCES OF GAINS AND (LOSSES)

9. Due to experience during the period		
a. Asset experience gain/(loss)	\$	2,771,696
b. Liability experience gain/(loss)		2,632,709
10. Due to change in method		0
11. Due to assumption change		(2,989,199)
12. Total gain/(loss) for the period	\$	2,415,206

Table 7

RELATIVE SIZE OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

Valuation as of December 31	Unfunded/ (Overfunded) Actuarial Accrued Liability	Relative to Covered Payroll		Relative to Actuarial Value of Assets		Relative to Total Actuarial Accrued Liability	
		Covered Payroll	Percent of Covered Payroll	Actuarial Value of Assets	Percent of Assets	Actuarial Accrued Liability	Percent of Actuarial Accrued Liability
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1987	\$ (274,779)	\$ 25,583,329	(1.1%)	\$ 4,461,376	(6.2%)	\$ 4,186,597	(6.6%)
1989	(674,848)	29,214,331	(2.3%)	7,125,704	(9.5%)	6,450,856	(10.5%)
1991	12,415	36,434,589	0.0%	10,276,088	0.1%	10,288,503	0.1%
1993	229,880	39,629,980	0.6%	13,239,853	1.7%	13,469,733	1.7%
1995	(880,438)	45,752,818	(1.9%)	18,658,846	(4.7%)	17,778,408	(5.0%)
1997	(5,404,671)	53,088,187	(10.2%)	27,598,932	(19.6%)	22,194,261	(24.4%)
1999	(9,489,259)	65,122,204	(14.6%)	36,482,176	(26.0%)	26,992,917	(35.2%)
2001	(6,297,866)	86,588,337	(7.3%)	43,901,297	(14.3%)	37,603,431	(16.7%)
2003	(4,778,767)	89,847,588	(5.3%)	48,894,642	(9.8%)	44,115,875	(10.8%)
2005	(592,856)	97,020,196	(0.6%)	56,579,886	(1.0%)	55,987,030	(1.1%)
2007	(564,423)	109,334,429	(0.5%)	69,211,789	(0.8%)	68,647,366	(0.8%)
2009	1,332,782	110,025,108	1.2%	75,217,522	1.8%	76,550,304	1.7%
2011	2,478,252	108,860,210	2.3%	84,500,525	2.9%	86,978,777	2.8%
2013	(271,930)	117,023,684	(0.2%)	100,876,901	(0.3%)	100,604,971	(0.3%)
2015	947,842	130,412,851	0.7%	122,044,321	0.8%	122,992,163	0.8%
2017	(1,131,618)	147,452,892	(0.8%)	144,040,464	(0.8%)	142,908,846	(0.8%)

Table 8

GROWTH OF COVERED PAYROLL AND ACTIVE PARTICIPANTS

Year Ending December 31	Active Participants		Covered Payroll		Average Salary	
	Number	Percent Increase	Amount	Percent Increase	Amount	Percent Increase
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1987	979	---	\$ 25,583,329	---	\$ 26,132	---
1989	1,109	13.3%	29,214,331	14.2%	26,343	0.8%
1991	1,231	11.0%	36,434,589	24.7%	29,598	12.4%
1993	1,239	0.6%	39,629,980	8.8%	31,985	8.1%
1995	1,315	6.1%	45,752,818	15.5%	34,793	8.8%
1997	1,483	12.8%	53,088,187	16.0%	35,798	2.9%
1999	1,693	14.2%	65,122,204	22.7%	38,466	7.5%
2001	1,905	12.5%	86,588,337	33.0%	45,453	18.2%
2003	1,908	0.2%	89,847,588	3.8%	47,090	3.6%
2005	1,952	2.3%	97,020,196	8.0%	49,703	5.5%
2007	2,064	5.7%	109,334,429	12.7%	52,972	6.6%
2009	2,010	-2.6%	110,025,108	0.6%	54,739	3.3%
2011	1,957	-2.6%	108,860,210	-1.1%	55,626	1.6%
2013	1,988	1.6%	117,023,684	7.5%	58,865	5.8%
2015	2,076	4.4%	130,412,851	11.4%	62,819	6.7%
2017	2,205	6.2%	147,452,892	13.1%	66,872	6.5%

Table 9

RETIRED PARTICIPANTS

Year Ending December 31	New Disabled Retirees		New Service Retirees		All New Retirees		All Disabled Retirees		All Service Retirees		All Retirees	
	Number	Average Monthly Benefit	Number	Average Monthly Benefit	Number	Average Monthly Benefit	Number	Average Monthly Benefit	Number	Average Monthly Benefit	Number	Average Monthly Benefit
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1991	2	\$ 853	3	\$ 211	5	\$ 468	7	\$ 788	28	\$ 222	35	\$ 335
1993	0	0	17	139	17	139	5	885	42	200	47	273
1995	2	1,075	12	204	14	329	6	987	54	209	60	287
1997	1	851	35	194	36	212	7	1,071	91	209	98	270
1999	1	966	25	213	26	242	8	1,086	108	214	116	274
2001	0	0	44	267	44	267	8	1,149	149	236	157	283
2003	4	1,264	49	261	53	337	12	1,310	191	237	203	301
2005	0	0	53	283	53	283	11	1,371	238	256	249	305
2007	2	1,232	95	384	97	401	13	1,429	326	300	339	343
2009	3	1,936	81	423	84	477	14	1,520	402	329	416	369
2011	1	1,274	102	470	103	478	15	1,576	493	369	508	405
2013	4	1,694	94	444	98	495	18	1,697	582	400	600	439
2015	1	1,376	113	496	114	504	18	1,741	686	422	704	456
2017	1	2,053	134	561	135	572	17	1,795	801	452	818	480

Table 10a

SCHEDULE OF FUNDING PROGRESS

<u>Year Ending December 31,</u> (1)	<u>Actuarial Value of Assets (AVA)</u> (2)	<u>Actuarial Accrued Liability (AAL)</u> (3)	<u>Unfunded Actuarial Accrued Liability (UAAL) (3) - (2)</u> (4)	<u>Funded Ratio (2)/(3)</u> (5)	<u>Annual Covered Payroll</u> (6)	<u>UAAL as % of Payroll (4)/(6)</u> (7)
1991	\$ 10,276,088	\$ 10,288,503	\$ 12,415	99.9%	\$ 36,434,589	0.0%
1993	13,239,853	13,469,733	229,880	98.3%	39,629,980	0.6%
1995	18,658,846	17,778,408	(880,438)	105.0%	45,752,818	(1.9%)
1997	27,598,932	22,194,261	(5,404,671)	124.4%	53,088,187	(10.2%)
1999	36,482,176	26,992,917	(9,489,259)	135.2%	65,122,204	(14.6%)
2001	43,901,297	37,603,431	(6,297,866)	116.7%	86,588,337	(7.3%)
2003	48,894,642	44,115,875	(4,778,767)	110.8%	89,847,588	(5.3%)
2005	56,579,886	55,987,030	(592,856)	101.1%	97,020,196	(0.6%)
2007	69,211,789	68,647,366	(564,423)	100.8%	109,334,429	(0.5%)
2009	75,217,522	76,550,304	1,332,782	98.3%	110,025,108	1.2%
2011	84,500,525	86,978,777	2,478,252	97.2%	108,860,210	2.3%
2013	100,876,901	100,604,971	(271,930)	100.3%	117,023,684	(0.2%)
2015	122,044,321	122,992,163	947,842	99.2%	130,412,851	0.7%
2017	144,040,464	142,908,846	(1,131,618)	100.8%	147,452,892	(0.8%)

Table 10b

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Calendar Year Beginning January 1,	Annual Required Contribution*	Percentage Contributed
(1)	(2)	(3)
1994	2.75%	100%
1995	2.88%	100%
1996	2.88%	100%
1997	2.76%	100%
1998	2.76%	100%
1999	2.28%	100%
2000	2.28%	100%
2001	2.03%	100%
2002	2.03%	100%
2003	2.52%	100%
2004	2.52%	100%
2005	2.70%	100%
2006	2.70%	100%
2007	3.13%	100%
2008	3.13%	100%
2009	3.12%	100%
2010	3.12%	100%
2011	3.23%	100%
2012	3.23%	100%
2013	3.28%	100%
2014	3.28%	100%
2015	3.12%	100%
2016	3.12%	100%
2017	3.62%	100%
2018	3.62%	100%
2019	3.22%	NA
2020	3.22%	NA

* As a percentage of payroll.

Table 10c

NOTES FOR REQUIRED SUPPLEMENTARY INFORMATION

The information disclosed in the required supplementary schedules was determined as part of the actuarial valuation at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation date	December 31, 2017
Actuarial cost method	Entry Age Normal
Amortization method	Level Percent of Pay
Payroll growth rate for amortization	2.75%
Remaining amortization period	17 years - closed
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.00%
Projected salary increases	8.00% to 2.75%
Includes inflation at	2.50%
Cost-of-living adjustments (COLA)	2.50% *

* Actual COLA of 2.13% effective April 1, 2018, 2.50% for all future years.

Table 11

Distribution of Active Members by Age, Service, and Current Rate of Pay As of December 31, 2017

Attained Age	Years of Credited Service											Total Count & Avg. Comp.	
	0 Count & Avg. Comp.	1 Count & Avg. Comp.	2 Count & Avg. Comp.	3 Count & Avg. Comp.	4 Count & Avg. Comp.	5-9 Count & Avg. Comp.	10-14 Count & Avg. Comp.	15-19 Count & Avg. Comp.	20-24 Count & Avg. Comp.	25-29 Count & Avg. Comp.	30 & Over Count & Avg. Comp.		
Under 25	35 \$ 45,969	12 \$ 47,933	7 \$ 35,806	7 \$ 42,265	3 \$ 62,740	2 \$ 38,904	- \$ -	- \$ -	- \$ -	- \$ -	- \$ -	- \$ -	66 \$ 45,404
25-29	70 \$ 48,020	48 \$ 50,775	34 \$ 56,633	26 \$ 57,166	19 \$ 59,269	23 \$ 52,144	- \$ -	- \$ -	- \$ -	- \$ -	- \$ -	- \$ -	220 \$ 52,436
30-34	59 \$ 53,588	44 \$ 56,127	35 \$ 54,793	42 \$ 57,484	22 \$ 75,319	68 \$ 64,259	34 \$ 68,980	- \$ -	- \$ -	- \$ -	- \$ -	- \$ -	304 \$ 60,314
35-39	32 \$ 54,199	23 \$ 57,970	23 \$ 49,574	25 \$ 68,306	16 \$ 56,356	56 \$ 67,281	72 \$ 77,724	20 \$ 74,908	- \$ -	- \$ -	- \$ -	- \$ -	267 \$ 66,214
40-44	20 \$ 57,228	13 \$ 65,967	13 \$ 60,872	18 \$ 66,891	8 \$ 51,910	46 \$ 71,057	63 \$ 72,365	83 \$ 82,172	11 \$ 75,241	- \$ -	- \$ -	- \$ -	275 \$ 72,321
45-49	17 \$ 49,833	14 \$ 76,049	6 \$ 64,884	18 \$ 55,308	16 \$ 57,569	34 \$ 56,012	56 \$ 70,752	101 \$ 82,935	57 \$ 92,764	4 \$ 65,911	1 \$ 131,127	1 \$ 74,516	324 \$ 74,516
50-54	14 \$ 62,708	17 \$ 63,184	13 \$ 58,468	13 \$ 62,627	6 \$ 56,627	37 \$ 60,961	32 \$ 65,733	63 \$ 69,180	63 \$ 82,145	38 \$ 87,013	17 \$ 93,186	17 \$ 72,362	313 \$ 72,362
55-59	5 \$ 42,065	10 \$ 61,258	6 \$ 69,031	6 \$ 58,197	7 \$ 52,859	24 \$ 59,406	43 \$ 56,276	42 \$ 65,171	48 \$ 76,896	29 \$ 85,783	26 \$ 88,178	26 \$ 69,148	246 \$ 69,148
60-64	2 \$ 51,071	3 \$ 58,575	3 \$ 74,603	5 \$ 53,642	7 \$ 66,686	18 \$ 65,791	22 \$ 58,848	27 \$ 60,572	11 \$ 66,150	15 \$ 81,923	17 \$ 106,340	17 \$ 70,118	130 \$ 70,118
65 & Over	2 \$ 68,648	1 \$ 58,881	1 \$ 51,933	3 \$ 79,913	1 \$ 95,051	2 \$ 44,030	16 \$ 54,026	17 \$ 63,798	9 \$ 81,233	4 \$ 119,981	4 \$ 67,114	4 \$ 68,324	60 \$ 68,324
Total	256 \$ 51,507	185 \$ 57,615	141 \$ 55,778	163 \$ 59,970	105 \$ 61,725	310 \$ 63,036	338 \$ 68,476	353 \$ 75,101	199 \$ 82,614	90 \$ 86,295	65 \$ 93,602	65 \$ 93,602	2,205 \$ 66,872

SECTION J

STATEMENT OF ACTUARIAL METHODS AND ASSUMPTIONS

Statement of Actuarial Methods and Assumptions of the Retirement Plan as of December 31, 2017

A. ACTUARIAL ASSUMPTIONS

1. Investment Return Rate

7.00% per annum, net of investment expenses.

2. Mortality

a. Pre-Retirement Mortality

Gender-distinct RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 54.5% and female rates multiplied by 51.5%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements.

b. Post-Retirement Mortality Nondisabled Retirees

Gender-distinct RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 109% and female rates multiplied by 103%. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements.

The following table provides the life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years				
Gender	Year of Retirement			
	2020	2025	2030	2035
Male	19.8	20.3	20.9	21.4
Female	22.6	23.1	23.5	24.0

c. Post-Retirement Mortality Disabled Retirees

Gender-distinct RP-2000 Combined Healthy Mortality Tables with Blue Collar Adjustment are used with male rates multiplied by 109% and female rates multiplied by 103% with a 3 year set-forward for both males and females. In addition, a 3% minimum mortality rate will be applied to reflect the impairment for younger members who become disabled. The rates are projected on a fully generational basis by scale BB to account for future mortality improvements subject to the 3% floor.

Note: All mortality assumptions used in this valuation are the same as those used by the Texas Municipal Retirement System (TMRS), which is statewide retirement system of which the City of Plano is a participating employer.

3. Retirement Rates

Rates as shown below:

<u>Age</u>	<u>Male</u>	<u>Female</u>
45-49	.05	.04
50-52	.05	.06
53	.08	.06
54	.08	.10
55-56	.12	.12
57	.12	.15
58-59	.14	.20
60	.16	.25
61	.20	.25
62-63	.25	.25
64-65	.30	.30
66	.25	.20
67-70	.20	.20
71	.20	.25
72	.20	.50
73	.50	.50
74+	1.00	1.00

4. Disability Rates

Sample rates are shown below:

<u>Age</u>	<u>Male & Female</u>
20	0.000004
25	0.000025
30	0.000099
35	0.000259
40	0.000494
45	0.000804
50	0.001188
55	0.001647
60	0.002180

5. Rates of Decrement Due to Withdrawal

Rates of termination are zero for participants eligible for service retirement.

Rates for participants not eligible for service retirement:

Age	Male	Female
20	0.3000	0.3500
21	0.2800	0.3300
22	0.2600	0.3100
23	0.2400	0.2900
24	0.2200	0.2700
25	0.2000	0.2500
26	0.1750	0.2400
27	0.1500	0.2300
28	0.1250	0.2200
29	0.1000	0.2100
30	0.0950	0.2000
31	0.0900	0.1900
32	0.0850	0.1800
33	0.0800	0.1700
34	0.0750	0.1600
35	0.0675	0.1500
36	0.0600	0.1400
37	0.0525	0.1300
38	0.0450	0.1200
39	0.0400	0.1100
40	0.0400	0.1000
41	0.0400	0.0900
42	0.0400	0.0800
43	0.0400	0.0700
44+	0.0400	0.0600

6. Rates of Salary Increase

Sample rates are shown below:

<u>Age</u>	<u>Promotional Rates of Increase</u>	<u>Total Annual Rate of Increase Including 2.75% General Increase Rate</u>
20	5.25%	8.00%
25	4.00%	6.75%
30	3.00%	5.75%
35	2.00%	4.75%
40	1.50%	4.25%
45	1.20%	3.95%
50	0.95%	3.70%
55	0.70%	3.45%
60	0.50%	3.25%
65	0.00%	2.75%

7. Payroll Growth Rate 2.75% per annum

8. Rate of Inflation 2.50% per annum

9. Future Cost of Living Adjustments 2.50% per annum. However, this valuation reflects the actual COLA of 2.13% provided on April 1, 2018, since it is determined on the average rate of increase in CPI for the 2017 calendar year.

10. Administrative Expenses 0.25% of payroll, added to the benefit normal cost.

B. ACTUARIAL VALUE OF ASSETS

The actuarial value of assets is based on the market value of assets with a five-year smoothing of actual investment return in excess of (less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). In no event will this amount exceed 120% of market value or be less than 80% of market value.

C. ACTUARIAL FUNDING METHOD

The funding period required to amortize the unfunded actuarial accrued liability (UAAL) is determined using the Entry Age Normal actuarial cost method. This method assigns the Plan's total actuarial present value of future benefits to various periods. The actuarial accrued liability is assigned to years prior to the valuation; the normal cost is assigned to the year following the valuation. The remaining costs are assigned to future years.

The normal cost is determined on an individual basis. The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

D. CHANGES IN ASSUMPTIONS SINCE LAST VALUATION

In preparing the actuarial valuation as of December 31, 2017 the following actuarial assumptions were modified:

- The investment return assumption was decreased from 7.50% to 7.00%.
- The price inflation assumption was decreased from 2.75% to 2.50%. This assumption is not directly used in the calculation of the actuarial accrued liability or contribution requirement, but does impact other economic assumptions.
- An explicit load of 0.25% of payroll was added to the normal cost to account for administrative and miscellaneous expenses, and thus the assumed investment return is net of investment expenses only.
- There were minor decreases in the step/promotional rates in the individual salary increase assumption for most participants. A productivity component above the 2.50% inflation assumption of 0.25% was added for all participants.
- The payroll growth rate assumption for amortizing the unfunded actuarial accrued liability was decreased from 3.25% to 2.75%.
- The assumed rate of future cost of living adjustments was decreased from 2.70% to 2.50%.
- The assumption for termination of employment was changed from being service-based to age-based. The overall impact of this change results in an increase in the expected number of participants who will leave employment prior to attaining retirement age.
- There were small adjustments in the overall retirement assumption used to model the pattern for Plan participants to retire and commence their RSP benefit.
- There was decrease in the probabilities that participants will become disabled and commence a disability retirement benefit.

SECTION K

SUMMARY OF BENEFIT PROVISIONS

Summary of Benefit Provisions of the Retirement Plan as of December 31, 2017

A. EFFECTIVE DATE

January 1, 1983.

B. ELIGIBILITY AND PARTICIPATION

All full-time employees, excluding elected employees, are eligible immediately.

C. SERVICE

1. Credited Service

The days, months, and years of employment less any period of severance. Service prior to the effective date is excluded from credited service in the computation of benefits.

2. Vesting Service

The days, months, and years of employment including any prior service with the Texas Municipal Retirement System (TMRS).

D. FINAL AVERAGE COMPENSATION

The average of the monthly compensation for the 36 consecutive calendar months of highest compensation during the last 120 months prior to termination.

E. RETIREMENT BENEFITS

1. Normal Retirement

- a. Eligibility: A participant may retire upon attaining age 65 with 5 years of Credited Service.
- b. Monthly Benefit: 0.70% of Final Average Compensation times years of Credited Service since January 1, 1983, not to exceed 25 years.
- c. Payment Form: Benefits are paid as a monthly life annuity to the participant, with a guarantee that should the participant die prior to receiving 60 monthly payments, the payments will continue to a beneficiary for the balance of the 60-month period.

2. Early Retirement

- a. Eligibility: A participant may retire early upon completion of 20 years of Credited Service OR upon attaining age 60 with 5 years of Credited Service. At least 5 years must be with the City of Plano.
- b. Monthly Benefit: 0.70% of Final Average Compensation times years of Credited Service since January 1, 1983, but not to exceed 25 years, multiplied by a reduction factor based on the number of years which the benefit start date precedes the Normal Retirement date. The benefit is reduced 1/15 for the first five years and 1/30 per year for the next five years. Below age 55 it is reduced on an actuarial equivalent basis.
- c. Payment Form: Same as for Normal Retirement above.

3. Optional Forms of Payment

- a. Joint and contingent annuity with either 100% or 50% of the reduced retirement income payable for the life of the contingent annuitant upon the death of the retiring participant,
- b. Period certain and life annuity with ten years of payments guaranteed,
- c. Life annuity, or
- d. Lump-sum.
 - Automatic if the present value is less than \$5,000
 - At participant's discretion if the present value is between \$5,000 and \$25,000
 - Not available if greater than \$25,000

F. DISABILITY RETIREMENT

1. Eligibility: If the participant is terminated by reason of a total and permanent disability which prevents the participant from engaging in any substantial gainful employment with the City of Plano, TX.
2. Benefit: The amount of monthly benefit payable to the participant is:
 - a. prior to Normal Retirement (age 65):

60% of the greater of the participant's base pay rate or final average compensation, minus any TMRS disability benefit.
 - b. upon attainment of Normal Retirement age (age 65):

determined as if the participant had continued employment until the first date he/she would have been eligible to receive a Normal Retirement benefit.

3. Form of Payment:

- a. The disability benefit prior to Normal Retirement is payable as a life only benefit.
- b. The disability benefit which begins upon attainment of normal retirement, is payable the same as Normal Retirement above.

G. VESTING OF BENEFITS

1. Vesting

A participant is vested according to the following schedule:

<u>Years of Vesting Service</u>	<u>Vested Percentage</u>
Less than 5	0%
5 or more	100%

2. Benefits Upon Vesting

A vested participant is entitled to the retirement benefit payable at Normal Retirement earned to the date of the participant's termination multiplied by his/her vested percentage.

H. DEATH IN SERVICE

No benefit is payable.

I. SPECIAL MINIMUM BENEFITS

For participants who are age 60 or older as of January 1, 1992, benefits will not be less than those available under the prior benefit formulas.

J. COST-OF-LIVING ADJUSTMENT (COLA)

On April 1st of each year, a cost-of-living increase is applied to monthly retirement benefits which have been in payment at least one (1) year. The cost-of-living increase percentage is based upon the U.S. Consumer Price Index, not to exceed 4%. Cost-of-living increases apply only during the participant's lifetime. Benefits payable to a spouse or beneficiary do not receive the cost-of-living increase.

SECTION L

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or Funding Method: A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the Actuarially Determined Contribution.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

- a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)
- b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and

c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations that provide the financial information of the plan, such as the funded ratio, unfunded actuarial accrued liability and the Actuarially Determined Contribution.

Actuarial Value of Assets or Valuation Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Actuarially Determined Contribution (ADC): The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and the Amortization Payment (or credit of expected investment earnings on surplus assets).

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Closed Amortization Period: A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: A retirement plan that is not a Defined Contribution Plan. Typically a defined benefit plan is one in which benefits are defined by a formula applied to the member's compensation and/or years of service.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA. For example, for accounting and financial reporting purposes, the funded ratio is determined on a MVA basis under GASB Statements No. 67 and 68.

Funding Period or Amortization Period: The term "Funding Period" is used two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: Governmental Accounting Standards Board.

Normal Cost: That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.