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# **Denton Firemen's Relief and Retirement Fund**

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## **Actuarial Valuation as of December 31, 2017**

**December 14, 2018**



**Rudd and Wisdom, Inc.**  
CONSULTING ACTUARIES

# Rudd and Wisdom, Inc.

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December 14, 2018

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Denton Firemen's Relief  
and Retirement Fund  
P.O. Box 2375  
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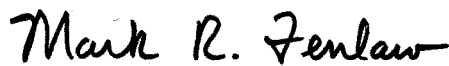
Members of the Board of Trustees:

At the request of the Board of Trustees of the Denton Firemen's Relief and Retirement Fund, we have prepared this report of the results of the actuarial valuation of the fund as of December 31, 2017. This valuation was prepared (1) to determine the city's contribution rate under its current funding policy, which is a modified actuarially determined contribution rate funding policy, (2) to recommend a city contribution rate for the next two years, and (3) to highlight the fund's actuarial condition.


In a separate report dated July 20, we provided the necessary disclosures for the fund's compliance with the Governmental Accounting Standards Board (GASB) Statement No. 67 for the plan year ending December 31, 2017. Similarly, we will provide a separate report later in December containing the pension expense, net pension liability, and disclosure information for the city's compliance with GASB 68 for the fiscal year ending September 30, 2018. GASB 68 prescribes the city's accounting for your fund, while this actuarial valuation report reflects the assumed continuation of the current funding policy, adopted in December 2017.

We certify that we are members of the American Academy of Actuaries who meet Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report.

Sincerely,



Mark R. Fenlaw, F.S.A.



Rebecca B. Morris, A.S.A.

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## Section I

### Valuation Summary

An actuarial valuation of the assets and liabilities of the Denton Firemen's Relief and Retirement Fund as of December 31, 2017 has been completed. The valuation was based on the Present Plan (plan effective January 1, 2011) and the provisions of the Texas Local Fire Fighters' Retirement Act (TLFFRA) which were in effect on December 31, 2017. Section II shows the summary of key results of the actuarial valuation as of December 31, 2017 and discusses the significant changes since the prior valuation that we prepared as of December 31, 2015.

The most significant change since the December 31, 2015 actuarial valuation is the city's new funding policy for the fund, which is now a modified actuarially determined contribution rate (ADCR) funding policy. Under that policy adopted in December 2017, the city's initial contribution rate was set at 18.5% and is to be re-evaluated following every actuarial valuation. While the funding policy has the intent of paying off the unfunded actuarial accrued liability (UAAL) over a closed 25-year period, the language implies that the rate should stay at 18.5% early in the amortization process, even if the ADCR is less than 18.5%, in order to pay down the UAAL. However, the language of the policy can also be interpreted to result in a minimum rate of 17.18% equal to the TMRS 2019 contribution rate. A key requirement of the language is also city approval of any change to the contribution level. **Based on input from the board at your December 11 meeting and from Mr. Bryan Langley, Deputy City Manager, we recommend to the city the continuation of the 18.5% contribution rate until the next biennial actuarial valuation.**

There are several reasons that support the city planning to keep its contribution rate at 18.5%:

- The 2018 plan year is the first year in which the city has contributed 18.5%.
- It is the budgeted rate currently, and rate stability over multiple budgets is desirable for budget planning.
- It would accelerate both the amortization of the UAAL and the expected increase in the funded ratio.
- It would hedge against potential future adverse experience, such as the investment experience in 2018 so far, or a change in assumption, such as a new mortality assumption that projects longer lifetimes, reducing the possibility of a rate increase in future years.

- It would better position the fund to provide an ad hoc increase in the monthly benefit for retirees at some future date, perhaps as soon as in two years, without a rate increase.

The city should be contributing more to the retirement plan for firefighters than to the retirement plan for other city employees (TMRS) for three additional reasons. First is that firefighters have much lower turnover than other city employees. So, a higher percent of newly hired firefighters will ultimately qualify for a retirement benefit than will newly hired other city employees. As a result, the cost of firefighter retirement benefits is higher than the cost of comparable retirement benefits for other city employees. A second reason for a higher contribution rate is that firefighters tend to retire at earlier ages than other city employees because of the physical demands of the job. This also increases the cost of firefighter retirement benefits compared to the cost for other city employees because of a longer period for benefits to be paid. The third reason is that retirees in TMRS have for years been getting annual automatic increases in their monthly benefit based on 70% of the CPI while the retired firefighters get only periodic ad hoc increases, with the most recent a 2% increase in 2008. The recommended 18.5% contribution rate exceeds the TMRS rate in recent years and in 2019 by only a little over 1% of payroll. The firefighters understand their higher cost and contribute 12.6% of their pay to the fund while the other city employees contribute only 7% to TMRS.

Because of the modified nature of the funding policy, we have actuarially determined the amortization period assuming the hypothetical continuation of the city contributing 18.5%. With the assumed continuous future 18.5% city contribution rate, the valuation reflects a total contribution rate of 31.1%, comprised of 12.6% by the firefighters and 18.5% by the city. The total contribution rate of 31.1% exceeds the normal cost rate of 21.77%, leaving 9.33% available to amortize the UAAL of \$18,435,302. Assuming that the total payroll increases at the rate of 3% per year in the future, the contributions in excess of the normal cost **will amortize the UAAL in 14.6 years.**

In order for a retirement plan to have an adequate contribution arrangement, contributions must be made that are sufficient to pay the plan's normal cost and to amortize the plan's UAAL over a reasonable period of time. Based on the current Texas Pension Review Board (PRB) pension funding guidelines, our professional judgment, and the actuarial assumptions and methods used in making this valuation, we consider periods of 10 years to 25 years to be preferable and 30 years to be the maximum acceptable period. Since the total assumed contributions are sufficient to pay the fund's normal cost and to amortize the fund's UAAL in less than 15 years, we are of the opinion that the fund, based on present levels of benefits and assumed contributions **has an adequate contribution arrangement. Section III presents considerations for future benefit improvements.**

## Projected Actuarial Valuation Results

In addition to completing this actuarial valuation, we estimated the amortization periods as of December 31, 2019 and as of December 31, 2021 by making projections from the December 31, 2017 actuarial valuation and assuming a fixed city contribution rate of 18.5% until the UAAL is amortized. These projections examine the effect on the amortization period in the next two actuarial valuations of the actuarial investment gains and losses that the fund experienced in the four years prior to the valuation date (losses in 2014 and 2015 and gains in 2016 and 2017) that have been only partially recognized as of December 31, 2017. As shown in Exhibit 6, a smoothing method is used to determine the actuarial value of assets (AVA) for this valuation. This method phases in over a five-year period any investment gains or losses (net actual investment return greater or less than the actuarially assumed investment return) that the fund has had. The AVA used in this current valuation is deferring recognition of various portions of the gains and losses in 2014-2017 that the fund experienced. The AVA used in this valuation is \$84,410,626. The market value of assets (MVA) is \$85,388,283. The \$977,657 difference between the MVA and the AVA is the net of the deferred gains and losses over the past four years that will be recognized in the next two actuarial valuations.

The theory behind the AVA method is to allow time for investment gains and losses to partially offset each other and thereby dampen the volatility associated with the progression of the MVA over time. In practice, the timing and amounts of investment gains and losses can result in irregular effects on the AVA in a given year. However, as intended, the pattern of the AVA is smoother over time than the pattern of the MVA, as seen in Exhibit 7.

For the purpose of projecting the amortization period through 2021 we used six scenarios of various assumed annual rates of investment return, net of investment-related expenses, over the 2018-2021 projection period. The projected amortization periods will not be the same as the actual amortization periods from completed future actuarial valuations but are the result of projected future actuarial valuation results based on the completed December 31, 2017 actuarial valuation. These projections show the expected effects over the next four years after the valuation date (1) of the recognition of the portions of the investment gains and losses over the past four years that are deferred as of December 31, 2017, and (2) of investment returns over the next four years different from the 6.75% assumption used in this valuation.

	Scenario					
	1	2	3	4	5	6
Assumed Investment Return for Calendar Year						
2018	6.75%	0.00%	0.00%	0.00%	-4.00%	-4.00%
2019	6.75	10.00	6.75	0.00	0.00	0.00
2020	6.75	10.00	6.75	10.00	10.00	4.00
2021	6.75	10.00	6.75	10.00	10.00	10.00
2022 and later	6.75	6.75	6.75	6.75	6.75	6.75
Amortization Period in Years as of December 31:						
2017 (actual)	14.6	14.6	14.6	14.6	14.6	14.6
2019 (projected)	13.4	15.5	16.1	17.3	19.1	19.1
2021 (projected)	9.6	10.9	14.6	16.9	20.6	23.5

The projected future December 31, 2019 valuation in Scenario 1 reveals that instead of decreasing by the expected two years from 14.6 years to 12.6 years, the amortization period is projected to decrease to only 13.4 years. The decrease two years after that is 3.8 years to 9.6 years. The pattern of these changes is due to the timing and magnitude of the significant loss from 2015 that will be recognized sooner than the good gains from 2016 and 2017.

One of the characteristics of a relatively well-funded plan like yours is that the amortization period is sensitive to investment gains and losses. For example, Scenario 3 is the same as Scenario 1 except for a projected rate of return of 0% for calendar year 2018. The one adverse year, without any investment gains or losses in the next three years, would result in a projected amortization period of 14.6 years as of December 31, 2021, which is 5.0 years greater than the projected amortization period of 9.6 years in Scenario 1.

We do not know what the investment experience will be for each of the next four calendar years. However, these scenarios show the sensitivity of the UAAL amortization period in the next two biennial actuarial valuations with an assumed continuation of the 18.5% contribution rate. Variations in experience from the underlying assumptions, other than investment return, will cause the actual amortization periods to be different from the periods shown above. In addition, the future investment experience in each of the next four years could be better or worse than the assumed rates shown. These scenarios present a range of plausible scenarios for the next two valuations assuming no changes in benefits.

### Participant and Asset Data

We have relied on and based our valuation on the active firefighter data, pensioner data, and asset data provided on behalf of the board of trustees by Gary Calmes, who provides

administrative services for the board of trustees. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the data provided for the December 31, 2015 actuarial valuation. Exhibit 1 is a distribution of the active firefighters by age and service. We included all the dispatchers that were participants as of December 31, 2017. The salaries used for projecting future contributions and benefits in the valuation were based on the actual pay for the 2017 calendar year, adjusted by 3% to reflect the net effect of the variable pay increases effective in April 2017 and April 2018. The total of these salaries is our assumed annualized covered payroll for the plan year beginning January 1, 2018 and is used in the valuation to determine the UAAL amortization period. The averages of the assumed salaries for the 2018 plan year are shown in Exhibit 1.

Exhibit 2 contains summary information on the pensioners. The monthly benefit payments are generally based on the amounts paid in December 2017. Exhibit 2A is a reconciliation of firefighters and pensioners from December 31, 2015 to December 31, 2017. Exhibit 3 shows a breakdown of the dollar amount of the monthly benefits for retirees and surviving spouses. Exhibit 4 shows a historical comparison of the actuarial accrued liability and the actuarial value of assets.

The summary of assets contained in Exhibit 5 is based on the December 31, 2017 market value of assets contained in the information received from the board. This exhibit also shows a comparison with the market values and actuarial values of assets as of December 31, 2015 and December 31, 2017. Exhibit 5A contains the statement of changes in assets for 2017 and 2016. Exhibit 6 shows the development of the actuarial value of assets. Exhibit 7 shows a historical comparison between the market value and actuarial value of assets. A comparison of the market value asset allocation by asset class as of December 31, 2015 and December 31, 2017 is shown in Exhibit 8.

## **Assumptions**

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate estimates of future experience for the fund for the long-term future. Their selection complies with the applicable actuarial standards of practice. Significant actuarial assumptions used in the valuation are:

1. 6.75% annual investment return net of investment-related expenses;
2. 3% annual general compensation increase plus promotion, step, and longevity increases which average 1.98% per year over a 30-year career;
3. Retirement rates which result in an average expected age at retirement of 57.0;
4. RP-2000 Combined Healthy Mortality Tables projected to 2024; and



Because the city contribution policy changed since the prior valuation, our assumption and methodology regarding the city contribution has changed. With the prior funding policy, the city contributed to this fund the same rate of payroll contributed for the city's other employees under the Texas Municipal Retirement System (TMRS). In the December 31, 2015 valuation, we assumed that the average of these future contributions would be 15.5%. In December 2017, the city adopted a modified actuarially determined contribution rate policy described more fully in the below section entitled "Actuarially Determined Contribution Rate for the City." For this actuarial valuation as of December 31, 2017, we assumed a stable future contribution rate of 18.5% to solve for a resulting amortization period.

The effect of this change in assumption to 18.5% on the UAAL amortization period is identified in Section II. A summary of all the assumptions and methods used in the valuation is shown in Exhibits 9 and 10. In our opinion, the assumptions used, both in the aggregate and individually, are reasonably related to the experience of the fund and to reasonable expectations. The assumptions represent a reasonable estimate of anticipated experience of the fund over the long-term future.

### **Other Supporting Exhibits**

Exhibit 11 contains definitions of terms used in this actuarial valuation report. Exhibit 12 summarizes the plan provisions of the Present Plan.

### **Actuarially Determined Contribution Rate for the City**

After negotiations among representatives from the city manager's office, the board of trustees, and the Denton Fire Fighters Association (the Association), an agreement was reached to amend the Meet and Confer agreement between the city and the Association. Final approval by the city council occurred in December 2017. The amendment changed the city's funding policy for the fund from matching its contribution rate to its plan in TMRS for the city's other employees to a modified actuarially determined contribution rate (ADCR) policy summarized below.

- The new funding policy is intended to fully pay off the UAAL over a closed 25-year amortization period.
- The city began contributing 18.5% of compensation in late December 2017.
- Each subsequent actuarial valuation for the board will include the modified ADCR for the city's review.
- If the actuarial valuation and modified ADCR are determined to be reasonable by the city, the city's contribution rate will be adjusted to the new modified ADCR beginning on the next October 1<sup>st</sup>.

- However, the contribution rate will not be lower than the initial 18.5% until the amortization period is 20 years or less.
- Two minimum constraints for the modified ADCR are that it will not be less than the city's TMRS rate or the minimum rate under TLFFRA.
- Any change to the contribution level is subject to final approval by the city.

### Variability in Future Actuarial Measurement

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 current economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements;
- Changes in economic or demographic assumptions; and
- Changes in plan provisions.

Analysis of the potential range of such future measurements resulting from the possible sources of measurement variability is typically outside the scope of an actuarial valuation for funding purposes. However, we provided projected amortization periods for the next two biennial actuarial valuations under six scenarios. Additional or other sensitivity analysis could be performed in a subsequent report if desired by the board of trustees.

Respectfully submitted,  
RUDD AND WISDOM, INC.

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Member, American Academy of Actuaries

*Rebecca B. Morris*

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## Section II

### Key Results of the Actuarial Valuation

	December 31, 2015 <sup>1</sup>	December 31, 2017
1. Actuarial present value of future benefits		
a. Those now receiving benefits or former firefighters entitled to receive benefits	\$ 39,149,449	\$ 39,792,196
b. Firefighters	<u>89,097,935</u>	<u>106,446,377</u>
c. Total	\$ 128,247,384	\$ 146,238,573
2. Actuarial present value of future normal cost contributions	\$ 38,304,699	\$ 43,392,645
3. Actuarial accrued liability (Item 1c – Item 2)	\$ 89,942,685	\$ 102,845,928
4. Actuarial value of assets	\$ 72,693,078	\$ 84,410,626
5. Unfunded actuarial accrued liability (UAAL) (Item 3 - Item 4)	\$ 17,249,607	\$ 18,435,302
6. Contributions (percent of pay)		
a. Firefighters	12.60%	12.60%
b. City of Denton <sup>2</sup>	<u>15.50%</u>	<u>18.50%</u>
c. Total	28.10%	31.10%
7. Normal cost (percent of payroll)	21.91%	21.77%
8. Percent of payroll available to amortize the UAAL (Item 6c - Item 7)	6.19%	9.33%
9. Annualized covered payroll	\$ 14,965,362	\$ 17,624,493
10. Present annual amount available to amortize the UAAL (Item 8 x Item 9)	\$ 926,356	\$ 1,644,365
11. Actuarially determined period to amortize the UAAL based on Item 6b	31.6 years	14.6 years
12. Funded ratio (Item 4 ÷ Item 3) <sup>3</sup>	80.8%	82.1%

<sup>1</sup> All items are from the December 31, 2015 actuarial valuation and reflect the Present Plan.

<sup>2</sup> For the December 31, 2015 valuation, the 15.5% city contribution rate was an assumed average of the future TMRS rate based on the city's prior funding policy. For the December 31, 2017 valuation, the 18.5% is the initial rate in the new funding policy, and was assumed to continue.

<sup>3</sup> The funded ratio is not appropriate for assessing either the need for or the amount of future contributions or the adequacy of the assumed contribution rates. Using the market value of assets instead of the actuarial value of assets for Item 13 would have resulted in funded ratios of 75.6% as of December 31, 2015 and 83.0% as of December 31, 2017.

## Change in the Actuarially Determined Amortization Period

The amortization period, based on the Present Plan provisions, was determined in the actuarial valuation as of December 31, 2015, to be 31.6 years. Since two years have passed since that valuation date, a 29.6-year amortization period would be expected if all actuarial assumptions had been exactly met, no changes had occurred (other than those expected) in the firefighter and pensioner data, and no changes in assumptions or methods or funding policy had been made. The amortization period is now 14.6 years based on the same plan provisions. The actual experience occurring between December 31, 2015 and December 31, 2017 differed from the expected experience, and in combination with the change in the assumed city contribution rate due to its new funding policy, the resulting amortization period is 14.6 years, which is 15.0 years less than the expected 29.6-year period for the following reasons:

1. The average annual rate of investment return, net of investment-related expenses, on the market value of assets during the two plan years 2016 and 2017 was 10.8%. However, the actuarial value of assets (AVA) used in the valuation and the determination of the amortization period is based on an adjusted market value. The average annual rate of return on the AVA, net of investment-related expenses, for plan years 2015 and 2016 was 6.6% compared to the assumed rate of return for those years of 6.75%. This caused an **increase** in the amortization period of 0.6 of a year.
2. The aggregate payroll increased at an average rate of 8.5% per year, compared to the assumed 3% per year rate, which caused the amortization period to **decrease** by 5.0 years.
3. The gain from city contributions above the assumed long-term average of 15.5% in 2016 (17.41%) and 2017 (17.52%) **decreased** the amortization period by 1.5 years.
4. The net result of all experience other than the investment experience, the aggregate payroll experience, and the city contribution rate experience had the combined effect of **increasing** the amortization period by 1.9 years. This was primarily the result of greater-than-expected pay increases in the last two years.
5. The change in the city contribution rate from an assumed average of 15.5% (based on the prior policy of matching the TMRS rate) to 18.5% (based on a hypothetical scenario with a stable 18.5% rate) had the effect of **decreasing** the amortization period by 11.0 years.

### Section III

#### Benefit Improvements

The 2017 amendment to the Meet and Confer agreement says that there will be no benefit enhancements until after September 30, 2019. There are probably a variety of opinions among the board members about what conditions should be met before there are any benefit enhancements. However, one consideration is that there has been no ad hoc increase for the retirees since a 2% increase in 2008. In contrast, the retirees in the TMRS plan have received an increase each January for many years based on 70% of the increase in the CPI.

The board would need to coordinate the development of a benefit enhancement policy through the Meet and Confer process since the city's funding policy has been put into the Meeting and Confer agreement. Currently the amended agreement with the city's current funding policy includes Section 4 which says the board agrees that it will not approve any benefit enhancements during the term of the agreement which expires on September 30, 2019. During that process, the board will keep in mind the requirements of Section 7 of TLFFRA, which requires the approval of the firefighters, the board, and the board's actuarial firm before any benefit changes can be implemented. Whenever that process is completed, the board should amend Section F(2) of the plan document to make it consistent with or at least not in conflict with the new benefit enhancement policy.

If the city decides to continue contributing at the rate of 18.5% or at some other rate that could reasonably be assumed to be stable, then we offer for your consideration a strategy for future benefit improvements. The idea is to coordinate periodic benefit improvements with favorable experience so that the recommended city contribution rate based on the city's funding policy would not be increased and so that the resulting actuarially determined UAAL amortization period would be acceptable to the board and to the city.



**Exhibit 2**  
**Summary of Pensioner Data**

Type of Benefit	Pensioner Data Used in December 31, 2017 Valuation	
	Number of Recipients	Total Monthly Benefit Payments
Service Retirement <sup>1</sup>	70	\$266,946
Disability Retirement	0	0
Vested Terminated (Deferred) <sup>2</sup>	3	5,615
Surviving Spouse	12	26,146
Surviving Child	11	<u>1,608</u>
	<u>3</u>	
Total	8	\$ 300,315
	87	

Type of Benefit	Comparison of Pensioner Count by Type as of The Prior and Current Actuarial Valuations			
	December 31, 2015	New	Ceased	December 31, 2017
Service Retirement <sup>1</sup>	68	+2	0	70
Disability Retirement	0	0	0	0
Vested Terminated (Deferred) <sup>2</sup>	2	+1	0	3
Surviving Spouse	12	0	(1)	11
Surviving Child	<u>4</u>	<u>0</u>	<u>(1)</u>	<u>3</u>
Total	86	+3	(2)	87

<sup>1</sup> Includes three alternate payees entitled to receive benefits according to the terms of a Qualified Domestic Relations Order.

<sup>2</sup> Monthly benefit payments are deferred to begin at terminated firefighter's future retirement date.

**Exhibit 2A**  
**Firefighter and Pensioner Reconciliation**

	Firefighters	Current Payment Status	Vested Terminated Firefighters	Total
1. As of December 31, 2015	176	84 <sup>1</sup>	2	262
2. Change of status				
a. retirement	(2)	2	0	0
b. disability	0	0	0	0
c. death	0	(1)	0	(1)
d. survivor payment begins	0	0	0	0
e. withdrawal	(3)	0	0	(3)
f. vested termination	(1)	0	1	0
g. completion of payment	0	(1)	0	(1)
h. QDRO alternate payee	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
i. net changes	(6)	0	1	(5)
3. New firefighters	<u>19</u>	<u>0</u>	<u>0</u>	<u>19</u>
4. As of December 31, 2017	189	84 <sup>1</sup>	3	276

<sup>1</sup> Includes three alternate payees entitled to receive benefits according to the terms of a Qualified Domestic Relations Order (QDRO).



**Exhibit 3**

**Breakdown of Pensioners by Monthly Benefit Amounts as of December 31, 2017**

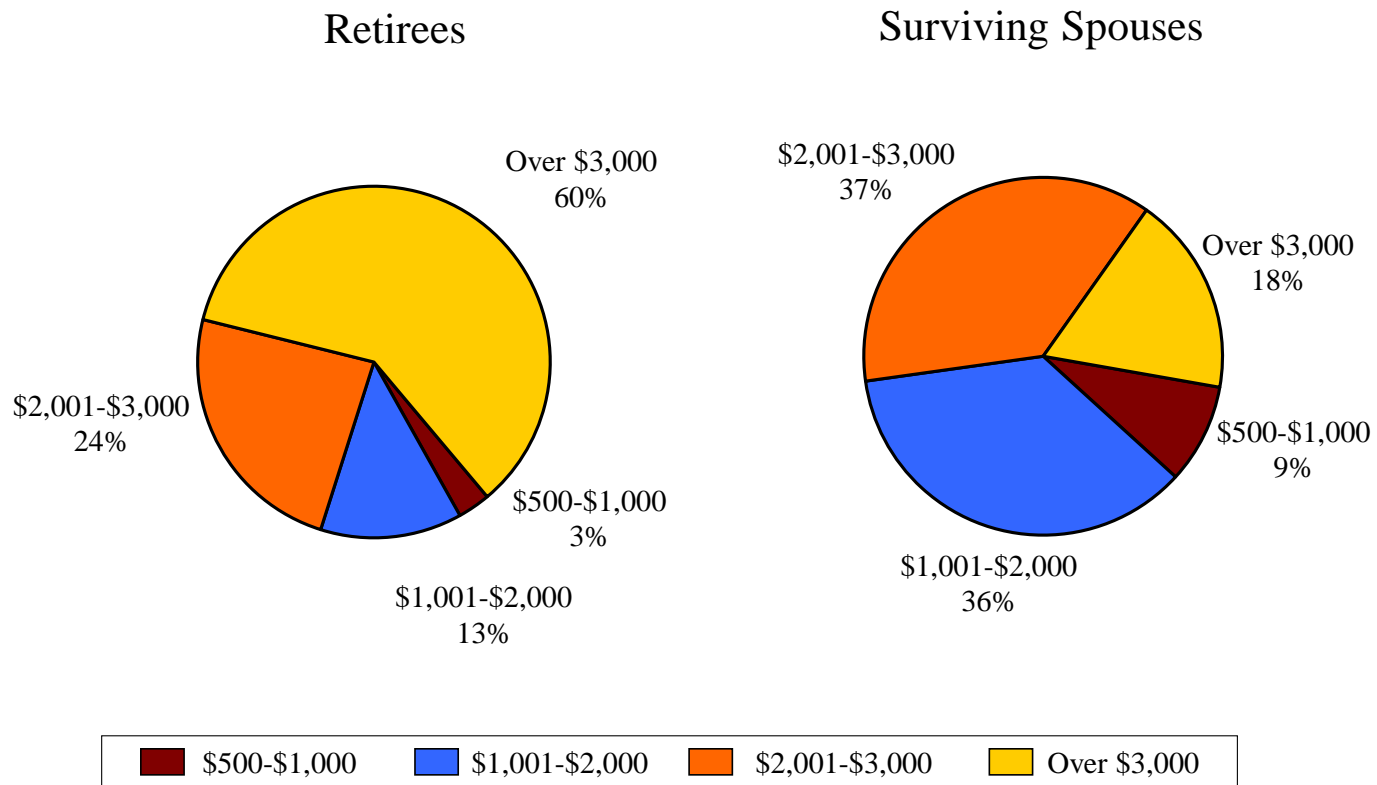
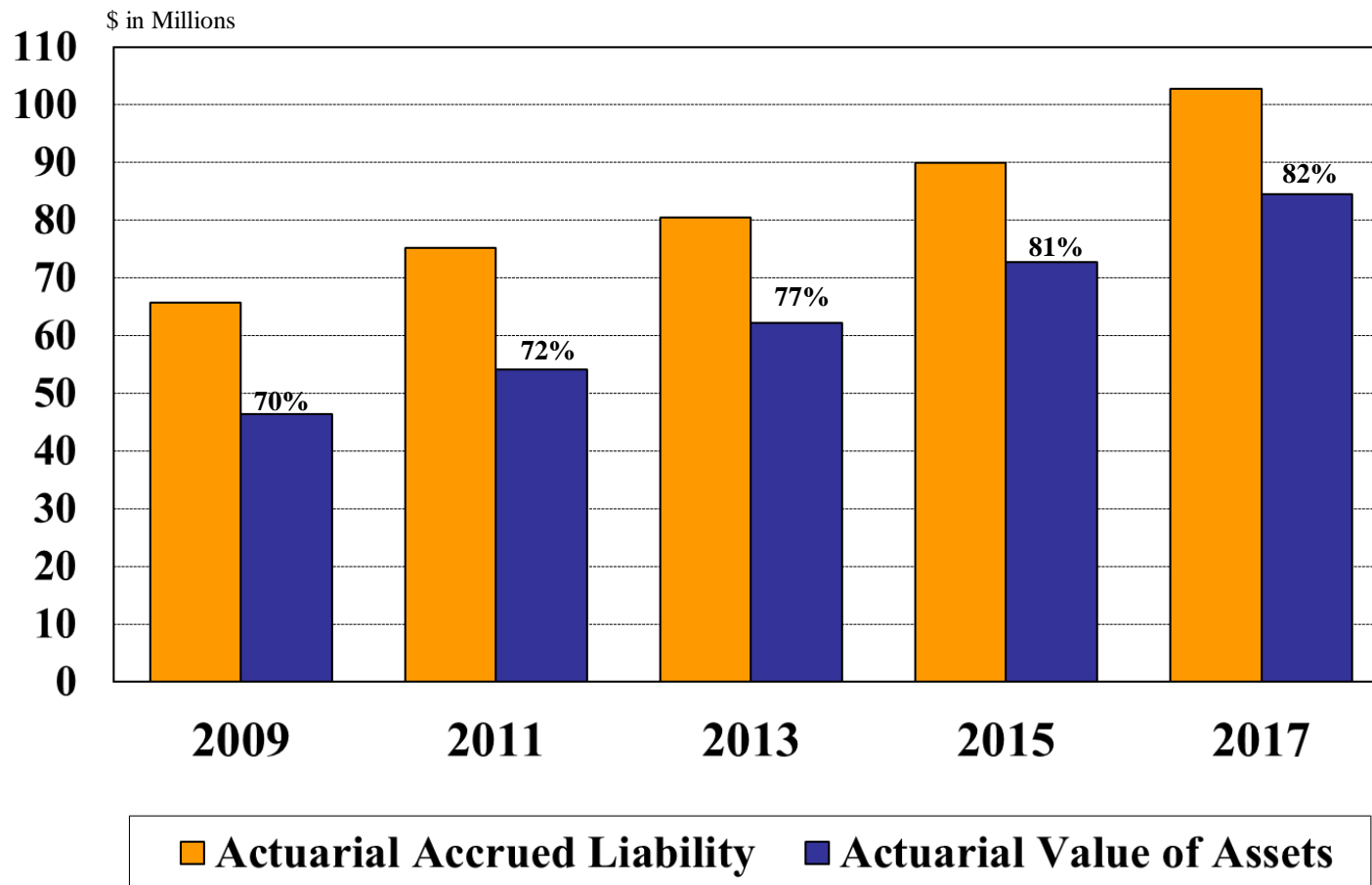


Exhibit 4

Historical Comparison of Actuarial Accrued Liability and Actuarial Value of Assets  
(Present Plan Valuations as of December 31)



**Exhibit 5**  
**Summary of Asset Data**

Asset Type	Market Value as of December 31, 2017	Allocation As a Percent of Grand Total
Equities		
U.S. Large Cap	\$29,788,424	34.9%
U.S. Small/Mid Cap	6,230,817	7.3
International	<u>6,145,463</u>	<u>7.2</u>
Total	42,164,704	49.4
Alternatives		
Real Estate	11,972,403	14.0
Master Limited Partnership	<u>5,628,510</u>	<u>6.6</u>
Total	17,600,913	20.6
Fixed Income		
Certificates of Deposit	4,672,411	5.5
Bond Funds	3,211,300	3.8
Corporate Bonds and Notes	<u>4,390,402</u>	<u>5.1</u>
Total	12,274,113	14.4
Cash Equivalents	<u>13,348,553</u>	<u>15.6</u>
Grand Total	\$85,388,283 <sup>1</sup>	100.0%

<sup>1</sup> The grand total is the audited amount. All of the invested amounts were determined from the coordination of the investment consultant's report and the audited financial report, both of which were provided by the plan administrator, Mr. Gary Calmes. The division of the equities was based on a summary of asset allocation percentages in the investment consultant's report. The cash equivalents amount is the cash equivalents net of the receivables and liabilities in the audited financial report.

Comparison of Asset Values as of the Prior and Current Actuarial Valuation Dates		
	<u>December 31, 2015</u>	<u>December 31, 2017</u>
Market Value	\$67,976,717	\$85,388,283
Actuarial Value	\$72,693,078	\$84,410,626
Actuarial Value as a Percent of Market Value	106.9%	98.9%

## Exhibit 5A

Statement of Changes in Audited Assets  
for the Years Ended December 31, 2017 and 2016

	<u>12/31/2017</u>	<u>12/31/2016</u>
<b>Additions</b>		
1. Contributions		
a. Employer	\$ 2,979,807	\$ 2,759,844
b. Employees	<u>2,142,990</u>	<u>1,997,155</u>
c. Total	\$ 5,122,797	\$ 4,756,999
2. Investment Income		
a. Interest and dividends	\$ 2,386,363	\$ 2,165,637
b. Net appreciation in fair value	<u>6,472,775</u>	<u>4,847,430</u>
c. Total	\$ 8,859,138	\$ 7,013,067
3. Other Additions	<u>7,996</u>	<u>2,329</u>
<b>Total Additions</b>	<b>\$13,989,931</b>	<b>\$11,772,395</b>
<b>Deductions</b>		
4. Benefit Payments		
a. Monthly benefits	\$ 3,578,956	\$ 3,529,183
b. Lump-sum benefits	<u>189,873</u>	<u>740,823</u>
c. Total	\$ 3,768,829	\$ 4,270,006
5. Expenses		
a. Investment-related	\$ 73,900	\$ 80,181
b. General administrative	<u>63,669</u>	<u>94,175</u>
c. Total	\$ 137,569	\$ 174,356
<b>Total Deductions</b>	<b>\$ 3,906,398</b>	<b>\$ 4,444,362</b>
<b>Net Increase in Assets</b>	<b>\$10,083,533</b>	<b>\$ 7,328,033</b>
Market Value of Assets (Fiduciary Net Position)		
Beginning of Year	\$75,304,750	\$67,976,717
End of Year	\$85,388,283	\$75,304,750
Rate of Return		
Net of All Expenses	11.49%	10.03%
Net of Investment-Related Expenses	11.58%	10.17%
Gross	11.68%	10.30%
Investment-Related Expenses	0.10%	0.13%

**Exhibit 6**

**Development of Actuarial Value of Assets**

Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Plan Years Ending December 31				
	2017	2016	2015	2014
1. Market Value of Assets as of Beginning of Year	\$75,304,750	\$67,976,717	\$71,018,518	\$66,412,172
2. Firefighter Contributions	2,142,990	1,997,155	1,803,064	1,745,419
3. City Contributions	2,979,807	2,759,844	2,567,219	2,566,875
4. Benefit Payments and Administrative Expenses <sup>1</sup>	(3,832,498)	(4,364,181)	(4,124,896)	(4,117,014)
5. Expected Investment Return <sup>2</sup>	<u>5,126,618</u>	<u>4,601,686</u>	<u>4,979,885</u>	<u>4,655,687</u>
6. Expected Market Value of Assets as of End of Year	81,721,667	72,971,221	76,243,790	71,263,139
7. Actual Market Value of Assets as of End of Year	<u>85,388,283</u>	<u>75,304,750</u>	<u>67,976,717</u>	<u>71,018,518</u>
8. Actuarial Investment Gain/(Loss)	3,666,616	2,333,529	(8,267,073)	(244,621)
9. Market Value Rate of Return Net of Expenses	11.58%	10.17%	(4.62)%	6.63%
10. Rate of Actuarial Investment Gain/(Loss)	4.83%	3.42%	(11.62)%	(0.37)%

<sup>1</sup> Administrative expenses are included because the investment return assumption was net of investment-related expenses for those years.

<sup>2</sup> Assuming uniform distribution of contributions and payments during the plan year; actuarially assumed investment return was 7.00% in 2014 and 2015 and 6.75% in 2016 and 2017.

Deferred Actuarial Investment Gains/Losses to be Recognized in Future Years			
Plan Year	Investment Gain/(Loss)	Deferral Percentage	Deferred Gain/(Loss) as of 12/31/2015
2017	\$3,666,616	80%	\$ 2,933,293
2016	2,333,529	60%	1,400,117
2015	(8,267,073)	40%	(3,306,829)
2014	(244,621)	20%	(48,924)
Total			<u>\$ 977,657</u>

Actuarial Value of Assets as of December 31, 2017	
11. Market Value of Assets as of December 31, 2017	\$ 85,388,283
12. Deferred Gain/(Loss) to be Recognized in Future	<u>977,657</u>
13. Preliminary Value (Item 12 – Item 13)	\$ 84,410,626
14. Corridor for Actuarial Value of Assets	
a. 90% of Market Value as of December 31, 2017 (minimum)	\$ 76,849,455
b. 110% of Market Value as of December 31, 2017 (maximum)	\$ 93,927,111
15. Actuarial Value as of December 31, 2017	\$ 84,410,626
16. Write Up/(Down) of Assets (Item 15 – Item 11)	<u>\$ (977,657)</u>

Exhibit 7

Historical Comparison of Market and Actuarial Value of Assets  
(Valuation as of December 31)

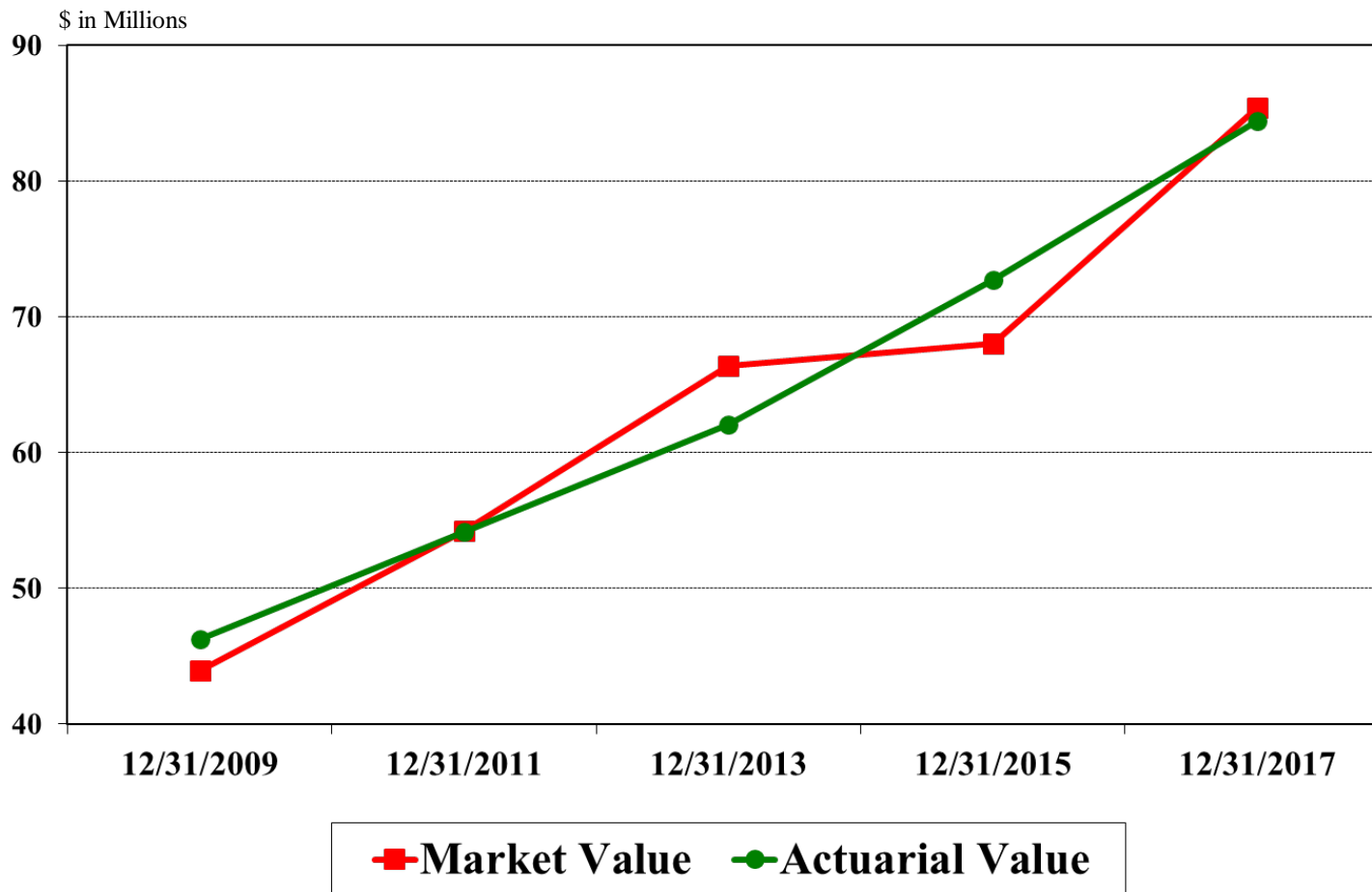
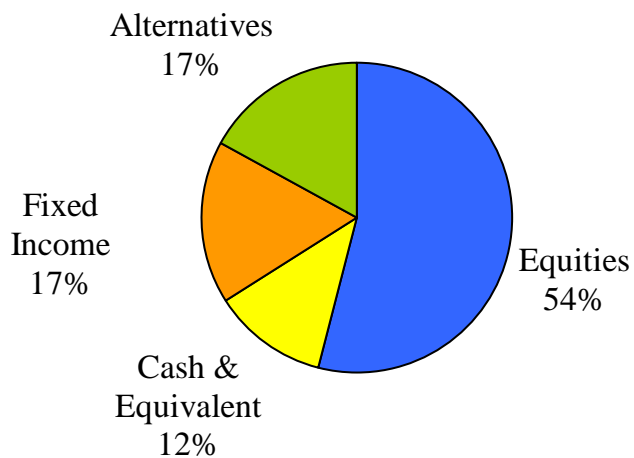


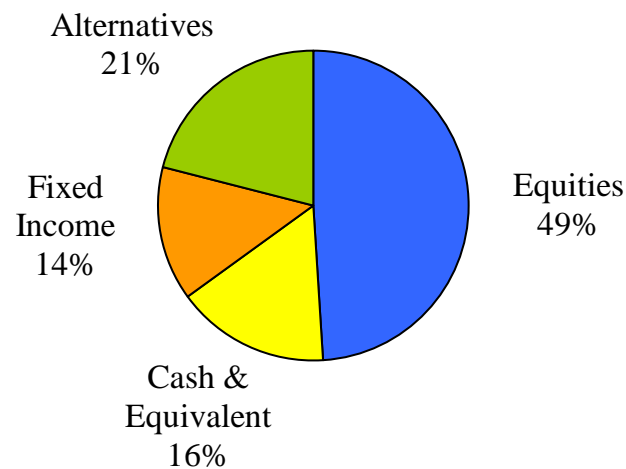
Exhibit 8

Comparison of Market Value Asset Allocation as of the Prior and Current  
Actuarial Valuation Dates

December 31, 2015



December 31, 2017



## Exhibit 9

### Actuarial Methods and Assumptions

#### A. Actuarial Methods

##### 1. Actuarial Cost Method

The Entry Age Actuarial Cost Method is an actuarial cost method in which the actuarial present value of projected benefits of each active firefighter included in the valuation is allocated as a level percentage of compensation between age at hire and assumed termination. Each active firefighter's normal cost is the current annual contribution in a series of annual contributions which, if made throughout the firefighter's total period of employment, would fund his expected benefits. Each firefighter's normal cost is calculated to be a constant percentage of his expected compensation in each year of employment. The normal cost for the fund is the sum of the normal costs for each active firefighter for the year following the valuation date. The normal cost as a percent of payroll reflects that contributions are made biweekly.

The fund's actuarial accrued liability is the excess of the actuarial present value of projected benefits over the actuarial present value of all future remaining normal cost contributions. The unfunded actuarial accrued liability (UAAL) is the amount by which the actuarial accrued liability exceeds the actuarial value of assets. The UAAL is recalculated each time a valuation is performed. Experience gains and losses, which represent deviations of the UAAL from its expected value based on the prior valuation, are determined at each valuation and are amortized as part of the newly calculated UAAL.

##### 2. Amortization Method

The UAAL is assumed to be amortized with level percentage of payroll contributions (total assumed contribution rate less normal cost contribution rate) based on assumed payroll growth of 3% per year. The actuarial determination of the amortization period reflects that contributions are made biweekly, as does the actuarially determined UAAL amortization contribution rate with the closed amortization period.

##### 3. Actuarial Value of Assets Method

All assets are valued at market value with an adjustment made to uniformly spread actuarial gains or losses (as measured by actual market value investment return vs. expected market value investment return) over a five-year period. The total adjustment amount shall be limited as necessary such that the actuarial value of assets shall not be less than 90% of market value nor greater than 110% of market value. See Exhibit 6.



## B. Actuarial Assumptions

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. The investment return assumption is reviewed using the building block approach that includes several asset allocations, assumed real rates of return for each asset class, an assumed rate of investment-related expenses, and an assumed rate of inflation, with all assumptions for the long-term future. Our economic assumptions are influenced both by long-term historical experience and by future expectations of investment consultants and economists, but we select the economic assumptions and discuss them with the board before completing the actuarial valuation. See our review of the economic assumptions in Appendix A.

We review the termination and retirement experience since the prior valuation and periodically look back more than two years. We also periodically review the average salaries by years of service to get insights into the promotion, step, and longevity compensation patterns for the purpose of reviewing our compensation increase assumption. For the mortality assumptions, we use an appropriate published mortality table with projections for improvement beyond the valuation date. We are guided in our review and selection of assumptions by the relevant actuarial standards of practice. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate for the fund for the long-term future.

### 1. Investment Return

6.75% per year net of investment-related expenses.

### 2. Inflation

2.5% per year included in compensation increases and investment return assumptions.

### 3. Mortality Rates

RP-2000 Combined Healthy Mortality Table projected to 2024 for males and for females (sex distinct) for all three types of mortality: pre-retirement, post-retirement, and post-disability.

### 4. Compensation Increases

General increases of 3% per year (2.5% inflation plus 0.5% productivity) in addition to promotion, step, and longevity increases that average 1.98% per year over a 30-year career. See Exhibit 10.

5. Retirement Rates

Age	Rate per Year for Firefighters Eligible to Retire
50-53	5%
54-58	15
59-61	30
62-64	50
65	100

The average expected retirement age for firefighters under age 50 based on these rates is 57.0.

6. RETRO DROP Election

- a. Percent of firefighters eligible electing RETRO DROP: 100% of service retirements eligible to elect at least a 12-month lump sum.
- b. Months assumed for lump sum: Maximum they are eligible for, up to 48 months.

7. Withdrawal Rates

See Exhibit 10.

8. Disability Rates

See Exhibit 10.

9. Reduction in Benefit after 2½ Years of Disability Retirement

45% weighted average reduction in benefit.

10. Percent Married

90% of the firefighters are assumed to be married at retirement, disability, or death while employed, with male firefighters having a spouse two years younger and female firefighters having a spouse two years older. We use actual spouse data once a monthly benefit is being paid.

11. Payment Form for Retirement Benefits Due to Service Retirement, Disability Retirement, or Vested Termination

- Joint and 2/3 to surviving spouse for the 90% assumed to be married
- Life annuity for the 10% assumed to be single

To the extent optional forms of payment are elected and the amounts are determined under an actuarial basis which differs from the basis used in the valuation, actuarial gains or losses will occur. These gains or losses are expected to be very small and will be recognized through the valuation process for those retiring since the prior valuation who made an optional election.

12. Surviving Child's Death Benefit

None are assumed as a result of future deaths.

13. Firefighters' Contribution Rate

12.60% of covered pay.

14. City's Assumed Contribution Rate

For the initial hypothetical scenario as described on page 1, 18.50% of covered payroll for as long as the actuarially determined period to amortize the UAAL.

15. Covered Payroll for First Year Following Valuation Date

Actual (or annualized) pay for 2017 with an adjustment of 3% for each firefighter to reflect the average effect of the variable general pay increases effective in April 2017 and April 2018.

16. General Administrative Expenses

The expenses paid by fund assets for other than investment-related expenses are assumed to be 0.55% of payroll. The normal cost rate as a percent of payroll is assumed to be 0.55% of payroll higher to reflect these expenses.

**Exhibit 10**

**Disability and Withdrawal Rates per 1,000 Active Members  
Compensation Increases by Years of Service**

Disability Rates		Withdrawal Rates		Compensation Increases	
Attained Age	Rate	Years of Service	Rate	Years of Service	Increase Percent
20	0.14	0	60	1	9.18%
21	0.15	1	54	2	9.18
22	0.16	2	48	3	9.18
23	0.17	3	42	4	9.18
24	0.18	4	37	5	9.18
25	0.19	5	32	6	6.09
26	0.21	6	27	7	6.09
27	0.23	7	24	8	6.09
28	0.25	8	21	9	6.09
29	0.28	9	19	10	6.09
30	0.31	10	17	11	6.09
31	0.35	11	14	12	6.09
32	0.40	12	12	13	6.09
33	0.45	13	11	14	6.09
34	0.49	14	10	15	6.09
35	0.52	15	9	16	3.00
36	0.54	16	9	17	3.00
37	0.57	17	8	18	3.00
38	0.62	18	8	19	3.00
39	0.73	19	8	20	3.00
40	0.92	20 & Over	0	21	3.00
41	1.14			22	3.00
42	1.32			23	3.00
43	1.48			24	3.00
44	1.73			25	3.00
45	2.09			26	3.00
46	2.55			27	3.00
47	2.98			28	3.00
48	3.34			29	3.00
49	3.62			30	3.00
50	3.79			31 & Over	3.00
51	3.92				
52	4.04				
53	4.24				
54	4.56				
55 & Over	0.00				

## Exhibit 11

### Definitions

1. Actuarial Accrued Liability That portion, as determined by the particular actuarial cost method used, of the Actuarial Present Value of future pension plan benefits as of the Valuation Date that is not provided for by the Actuarial Present Value of future Normal Costs.
2. Actuarial Assumptions Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, termination, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation; and other relevant items.
3. Actuarially Equivalent Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.
4. Actuarial Gain (Loss) A measure of the difference between actual experience and that expected based on the Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with the particular actuarial cost method used.
5. Actuarial Present Value The value of an amount or series of amounts payable or receivable at various times, determined as of a given date (the Valuation Date) by the application of the Actuarial Assumptions.
6. 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 pension plan.
7. Actuarial Value of Assets The value of cash, investments and other property belonging to a pension plan, as determined by a method and used by the actuary for the purpose of an Actuarial Valuation.

8. Entry Age Actuarial Cost Method  
An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in the Actuarial Valuation is allocated as a level percentage of earnings between entry age and assumed termination. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a Valuation Date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability. Under this method, Actuarial Gains (Losses), as they occur, reduce (increase) the Unfunded Actuarial Accrued Liability.
9. Plan Year  
A 12-month period beginning January 1 and ending December 31.
10. Normal Cost  
That portion of the Actuarial Present Value of pension plan benefits that is allocated to a valuation year by the actuarial cost method.
11. Projected Benefits  
Those pension plan benefit amounts that are expected to be paid at various future times according to the Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future qualified service.
12. Overfunded Actuarial Accrued Liability  
The excess, if any, of the Actuarial Value of Assets over the Actuarial Accrued Liability.
13. Unfunded Actuarial Accrued Liability  
The excess, if any, of the Actuarial Accrued Liability over the Actuarial Value of Assets.
14. Valuation Date  
The date upon which the Normal Cost, Actuarial Accrued Liability and Actuarial Value of Assets are determined. Generally, the Valuation Date will coincide with the end of a Plan Year.
15. Years to Amortize the Unfunded Actuarial Accrued Liability  
The period is determined in each Actuarial Valuation as the number of years, beginning with the Valuation Date, to amortize the Unfunded Actuarial Accrued Liability with a level percent of payroll that is the difference between the expected total contribution rate and the Normal Cost contribution rate.

**Exhibit 12**  
**Summary of Present Plan**

1. Normal Service Retirement Monthly Benefit as a Percent of Highest 36-Month Average Salary for Each Year of Service 2.59%
  
2. Normal Service Retirement Eligibility (Minimum) Age 50 and 20 Years
  
3. Retroactive Deferred Retirement Option Plan (RETRO DROP)
  - (a) Earliest RETRO DROP benefit calculation date Age 52 and 22 Years
  - (b) Maximum RETRO DROP benefit accumulation period 48 Months
  - (c) Earliest employment termination date with maximum RETRO DROP accumulation period Age 56 and 26 Years
  - (d) RETRO DROP lump sum includes
    - (i) Monthly benefits that would have been received between RETRO DROP benefit calculation date and end of month of termination of employment,
    - (ii) accumulated contributions made by the firefighter after the RETRO DROP benefit calculation date, and
    - (iii) no interest
  
4. Initial Disability Retirement Monthly Benefit as a Percentage of Highest 36-Month Average Salary
  - (a) Minimum percentage 51.80%
  - (b) Additional percentage for each year of service in excess of 20 years 2.59%
  
5. Disability Retirement Monthly Benefit for Firefighters Who Become Totally Disabled while Employed
  - (a) For initial 30-month period, is (i) plus (ii) if not able to perform job in fire department
    - (i) Minimum monthly amount based on 20 years
    - (ii) Additional monthly amount per year of service in excess of 20 years
  - (b) Following initial 30-month period, is the greater of (i) and (ii)
    - (i) Initial benefit reduced by the portion of the initial benefit equal to estimated annual residual earning capacity divided by annual base earnings
    - (ii) Initial benefit multiplied by percentage of disability
  - (c) Upon attaining eligibility for normal retirement, the member's vested retirement benefit becomes payable if the disability benefit has been reduced or terminated

6. Vested Terminated Benefit Eligibility  
(Benefit Deferred to Normal Retirement Age) 10 Years
7. Surviving Spouse's Monthly Death Benefit as a Percent of  
Highest 36-Month Average Salary for Each Year of Service  
for Death while an Active Firefighter
  - (a) Minimum percentage 34.53%
  - (b) Additional percentage for each year of service in excess of 20 years 1.73%
8. Surviving Spouse's Monthly Death Benefit as a Percent of  
Highest 36-Month Average Salary for Each Year of Service  
for Death while Eligible to Retire as an Active Firefighter 2.59% x 96%
9. Surviving Children's Monthly Benefit as a Percent of Surviving  
Spouse's Benefit
  - (a) When the spouse is receiving a benefit, for each child 20%
  - (b) When the spouse is not receiving a benefit or there is no spouse 100%
10. Contributions as a Percent of Payroll by:
  - (a) Firefighters 12.60%
  - (b) City of Denton New Funding Policy
11. The normal form of annuity payment at retirement is a Joint and Two-Thirds to  
Surviving Spouse, and payment is the first day of each month.
12. A Social Security Leveling Option optional form of payment is available to firefighters  
eligible for a service retirement benefit and to surviving spouses of firefighters who die  
while employed where the surviving spouse is between ages 45-60. A Joint and 100%  
to Surviving Spouse Optional form of payment and a Joint and 50% to Surviving  
Spouse are also available to firefighters eligible for a service retirement benefit.
13. Salary used to determine the Highest 36-Month Average Salary includes all elements  
of pay except for (a) lump sum distributions upon termination for unused sick leave or  
vacation and (b) overtime pay earned after June 13, 2007 for special deployments in  
excess of \$2,000 per biweekly pay period. The average is based on the highest  
consecutive 78 biweekly pay periods during active participation in the fund.
14. Refund of firefighters' accumulated contributions without interest will be made to  
firefighters who terminate employment and either are not eligible for any other benefit  
from the fund or request a refund from the fund.
15. A lump sum death benefit will be payable upon the death of a participating member of  
the fund in an amount equal to the current annual salary of the participating member.



## Appendix A

### Review of the Actuarial Economic Assumptions for the December 31, 2017 Actuarial Valuation

#### Section 1. Asset Allocation and Investment Return Assumption Development

<u>Asset Class</u>	<u>Gross Annual Real Rate of Investment Return (ROR)<sup>1</sup></u>	<u>12/31/2015</u>	<u>12/31/2017<sup>2</sup></u>	<u>Current Target</u>	<u>More Fixed Income</u>	<u>More Equities</u>
Equities						
Domestic						
Large Cap	6.5	38%	35%	40%	35%	44%
Small/Mid Cap	7.0	8	7	10	8	11
International	7.0	8	7	10	7	11
Fixed Income	1.5	17	14	10	20	10
MPLs	8.5	4	7	8	5	0
Real Estate	5.0	13	14	15	15	10
Cash	0.0	<u>12</u>	<u>16</u>	<u>7</u>	<u>10</u>	<u>14</u>
Total		100%	100%	100%	100%	100%
<b><u>Weighted Average Gross Real ROR Assumption</u></b>			4.76%	5.58%	4.80%	5.05%
<b><u>Weighted Average Net Real ROR Assumption<sup>3</sup></u></b>			4.26	5.08	4.30	4.55
<b>Possible Theoretical Annual Investment Return Assumption:</b>						
<b><u>Net Real ROR Plus Assumed Annual Rate of Inflation</u></b>						
Assumed 3.00% Inflation			7.26	8.08	7.30	7.55
Assumed 2.75% Inflation			7.01	7.83	7.05	7.30
Assumed 2.50% Inflation			6.76	7.58	6.80	7.05

<sup>1</sup> A gross **real** rate of return is an assumed total annual rate of investment return, before expenses, that is in excess of the assumed annual inflation rate. These are long-term assumptions made by Rudd and Wisdom, Inc.

<sup>2</sup> This allocation is from the investment consultant's 12/31/2017 report.

<sup>3</sup> A weighted average Net Real ROR is an annual rate equal to the weighted average Gross Real ROR reduced by investment-related expenses of an assumed annual rate of 0.5%. See Section 3.

Appendix A (continued)

Section 2. Price Inflation in the USA  
Average Annual Rates of Increase in the CPI-U

<u>Years</u> <u>(Dec. to Dec.)</u>	<u>Number</u> <u>of Years</u>	<u>Average</u> <u>Annual Increase</u>
1952 – 2017	65	3.48%
1957 – 2017	60	3.67
1962 – 2017	55	3.88
1967 – 2017	50	4.05
1972 – 2017	45	3.98
1977 – 2017	40	3.51
1982 – 2017	35	2.68
1987 – 2017	30	2.56
1992 – 2017	25	2.23
1997 – 2017	20	2.14

Most inflation forecasts are for 10 years or less. For example, the 10-year forecast in the June 2018 Livingston Survey published by the Federal Reserve Bank of Philadelphia was 2.28%. Similarly, the 2018 Wall Street Censuses Survey for the next decade included an average inflation forecast of 2.4%. However, 10 years is much too short a forecast period for a public employee defined benefit pension plan. In the 2018 annual report of the OASDI Trust Funds (Social Security), the ultimate inflation assumptions for their 75-year projections were 3.2%, 2.6%, and 2.0% for the low-cost, intermediate, and high-cost assumptions, respectively. Looking at the average annual increase in the CPI-U over historical periods of 30 to 65 years above and considering the Social Security forecasts, **we believe that reasonable assumed rates of inflation for the long-term future would range from 2.5% to 3.5%. Shorter term considerations make the bottom half of that range more desirable.**

Section 3. Retirement Plan's Expenses

<u>Plan</u> <u>Year</u>	<u>Market Value of Assets</u>		<u>Expenses</u>		<u>Expenses as a % of Assets</u>		
	<u>Beginning</u> <u>of Year</u>	<u>End</u> <u>of Year</u>	<u>General</u> <u>Admin.</u>	<u>Direct</u> <u>Investmt</u>	<u>GA</u> <u>(4) ÷ (2)</u>	<u>DI</u> <u>(5) ÷ (2)</u>	<u>Total</u> <u>(6) + (7)</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2017	\$75,304,750	\$85,388,283	\$63,669	\$73,900	0.08%	0.10%	0.18%
2016	67,976,717	75,304,750	94,175	80,181	0.14	0.12	0.26
2015	71,018,518	67,976,717	76,538	86,014	0.11	0.12	0.23
2014	66,412,172	71,018,518	81,005	19,874	0.12	0.03	0.15

Less than 4% of assets were in ETFs at the end of 2017, and all had relatively low expense ratios. The investment-related expenses have been atypically low for a fund this size but increased some beginning in 2015 due to investing in some real estate and using a second investment consultant for a portion of the assets. For the long-term future, we assume a higher, more typical rate of investment-related expenses of 0.50%.

Appendix A (continued)

Section 4. General Administrative Expenses

Plan Year Ending 12/31	General Administrative Expenses Paid by the Fund	Estimated Payroll	% of Payroll (2) ÷ (3)
(1)	(2)	(3)	(4)
2017	\$63,669	\$17,007,857	0.37%
2016	94,175	15,850,437	0.59
2015	76,538	14,310,032	0.53
2014	81,005	13,852,532	0.58
2014-2017	\$315,387	\$61,020,858	0.52%

The general administrative expenses are not reflected in the investment return assumption but are reflected as a percent of payroll that is added to the normal cost contribution rate. For the December 31, 2017 actuarial valuation, we recommend 0.55%, which is rounded up from the average developed above for the last four plan years. (The estimated payroll was determined as the firefighter contributions for the plan year divided by the firefighter contribution rate during the plan year.)

Section 5. Comparison of Actuarial Economic Assumptions

Actuarial Assumption <sup>1</sup>	12/31/2015 Actuarial Economic Assumptions	12/31/2017 Actuarial Economic Assumptions
Inflation (Price)	2.50%	2.50%
Net real rate of return <sup>2</sup>	<u>4.25</u>	<u>4.25</u>
Net total investment return	6.75%	6.75%
Firefighter pay increase <sup>3</sup>	4.98%	4.98%
Aggregate payroll increase	3.00%	3.00%
General administrative expenses <sup>4</sup>	0.55%	0.55%

<sup>1</sup> All assumptions are annual rates.

<sup>2</sup> Net of investment-related expenses.

<sup>3</sup> 3% annual general pay increase and 1.98% average annual promotion, step, and longevity pay increase over a 30-year career in both the 12/31/2015 assumptions and the 12/31/2017 assumptions.

<sup>4</sup> General administrative expenses are reflected as a percent of payroll that is added to the normal cost contribution rate.