Killeen Firefighter's Relief and Retirement Fund

Actuarial Valuation
as of September 30, 2016

June 9, 2017

Rudd and Wisdom, Inc.
CONSULTING ACTUARIES

Rudd and Wisdom, Inc.

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June 9, 2017

Board of Trustees
Killeen Firefighter's Relief and
Retirement Fund
c/o Ms. Jennifer Hanna, Administrator
Post Office Box 497
Conroe, Texas 77305

Members of the Board of Trustees:

At the request of the Board of Trustees of the Killeen Firefighter's Relief and Retirement Fund, we have prepared this report of the results of the actuarial valuation of the fund as of September 30, 2016. This valuation was prepared to determine whether the fund has an adequate contribution arrangement.

In a separate report dated May 31, 2017, 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 September 30, 2016. Similarly, we provided a separate report dated December 19, 2016 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, 2016. GASB 68 prescribes the city's accounting for your fund, while this actuarial valuation report reflects the assumed continuation of the current funding policy.

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

Mark R. Fenlaw, F.S.A.

Rebecca B. Morris

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Section I

Valuation Summary

An actuarial valuation of the assets and liabilities of the Killeen Firefighter's Relief and Retirement Fund as of September 30, 2016 has been completed. The valuation was based on the Present Plan (plan effective July 1, 2007) and the provisions of the Texas Local Fire Fighters' Retirement Act (TLFFRA) which were in effect on September 30, 2016. Section II shows the summary of key results of the actuarial valuation as of September 30, 2016 and discusses the significant changes since the prior valuation that we prepared as of September 30, 2014.

This valuation reflects an actuarially assumed total contribution rate of 24%, comprised of 11% by the firefighters and 13% by the city. The total contribution rate of 24% exceeds the normal cost rate of 16.0%, leaving 8.0% available to amortize the unfunded actuarial accrued liability (UAAL) of $16,234,675. Assuming that the total payroll increases at the rate of 3.25% per year in the future, the contributions in excess of the normal cost **will amortize the UAAL in 22.8 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 Texas Pension Review Board guidelines for pension funding, 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 40 years to be the current maximum acceptable period. The PRB guidelines will be changing to a maximum of 30 years allowing for phase in through 2025. Since the total contributions are sufficient to pay the fund's normal cost and to amortize the fund's UAAL within the maximum acceptable period, we are of the opinion that the fund, based on present levels of benefits and 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 September 30, 2018 and as of September 30, 2020 by making projections from the September 30, 2016 actuarial valuation. 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 2013, 2014, and 2015 and a gain in 2016) that have been only partially recognized as of September 30, 2016. 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 2013-2016 that the fund experienced. The AVA used in this valuation is $37,418,102. The market value of assets (MVA) is $35,342,830. The $2,075,272 difference between the MVA and the AVA is the net of the deferred gain and losses 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 market value of assets, as seen in Exhibit 7.

For the purpose of projecting the amortization period through 2020 we used several scenarios of various assumed annual rates of investment return, net of investment-related expenses, over the 2017-2020 projection period. The projected amortization periods will not be the same as the actual amortization periods from completed future actuarial valuations but are projected future actuarial valuation results based on the completed September 30, 2016 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 past investment gains and losses over the past four years that are deferred as of September 30, 2016, and (2) of investment returns over the next four years different from the 7.75% assumption used in this valuation.

	Scenario					
	1	2	3	4	5	6
Assumed Investment Return for Fiscal Year						
2016-2017	7.75%	12.00%	14.00%	0.00%	0.00%	4.00%
2017-2018	7.75	12.00	14.00	7.75	16.00	4.00
2018-2019	7.75	7.75	7.75	7.75	7.75	7.75
2019-2020	7.75	7.75	7.75	7.75	7.75	7.75
2020-2021 and later	7.75	7.75	7.75	7.75	7.75	7.75
Amortization Period in Years as of September 30:						
2016 (actual)	22.8	22.8	22.8	22.8	22.8	22.8
2018 (projected)	24.9	22.4	21.3	28.4	26.8	27.3
2020 (projected)	24.3	18.5	16.1	31.9	25.6	30.7

The projected future September 30, 2018 valuation in Scenario 1 reveals that instead of decreasing by the expected two years from 22.8 years to 20.8 years, the amortization period is projected to increase to 24.9 years, primarily due to the currently deferred losses that will be recognized as of September 30, 2018. The primary conclusion from Scenario 1 is that unless there are some significant gains in 2016-2017 and 2017-2018

from returns greater than 7.75%, (e.g., Scenario 2 or 3), the net deferred losses as of September 30, 2016 will cause the September 30, 2018 amortization period to increase. This is not surprising when you consider that if the AVA were set equal to the MVA, recognizing all of the past gains and losses in the September 30, 2016 actuarial valuation, the amortization period would have been 28.3 years instead of 22.8 years.

What market value rates of return in this year and next year would be high enough to lower the amortization period below 23 years? Scenarios 2 and 3 show the projected results of an annual assumed net investment return of 12% and 14%. Those rates of return in the next two years would get the amortization period under 23 years as of September 30, 2018.

Scenarios 4, 5 and 6 show three different examples of some adverse investment experience. In each scenario, the September 30, 2020 amortization period is projected to increase to over 25 years. These scenarios show the sensitivity of the amortization period to adverse investment experience, even with the smoothing method used.

We do not know what the investment experience will be for each of the next four plan years. 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 investment experience scenarios for the next two valuations assuming no changes in benefits or contribution rates. The key items that could have a positive effect, in addition to favorable investment experience, would be an increase in the number of firefighters and an increase in the total contribution rate.

The primary conclusion from the scenarios is that it is unlikely the amortization period in the next two actuarial valuations will be significantly below 23 years without some significant investment gains in the next two years or an increase in the number of firefighters or an increase in the contribution rate or some combination of those. The members should remember the long-term nature of the plan and should be patient in their expectations about future benefit improvements.

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 Ms. Jennifer Hanna, plan administrator for the board. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the data provided for the September 30, 2014 actuarial valuation. Exhibit 1 is a distribution of the active paid firefighters by age and service. The salaries used for projecting future contributions and benefits in the valuation were based on the actual pay for the 2016 plan year without an increase to reflect the absence of a general pay increase in October 2016. The total of these salaries is our assumed annual covered payroll for the plan year beginning October 1, 2016 and is

used in the valuation to determine the UAAL amortization period. The averages of the assumed salaries for the 2016-2017 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 October 31, 2016. Exhibit 2A is a reconciliation of firefighters and pensioners from September 30, 2014 to September 30, 2016. Exhibit 3 shows a breakdown of the dollar level 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 September 30, 2016 audited market value of assets shown in the fund's financial statements. This exhibit also shows a comparison of the market values and actuarial values of assets as of September 30, 2014 and September 30, 2016. Exhibit 5A contains the statement of changes in assets for fiscal years ending September 30, 2016 and September 30, 2015. 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 September 30, 2014 and September 30, 2016 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. 7.75% annual investment return net of investment-related expenses;
2. 3.25% annual general compensation increase plus an average of 1.73% per year for pay increases due to promotions and longevity over a 30-year career;
3. Retirement rates which result in an average expected age at retirement of 55.2; and
4. RP-2000 Combined Healthy Mortality Tables projected to 2024.

The following actuarial assumption changes have been made, and the new assumptions are compared to those used in the September 30, 2014 valuation:

1. We modified the components of the 7.75% investment return assumption, increasing the assumed net real rate of return from 4.25% to 4.50% and lowering the assumed inflation rate from 3.50% to 3.25%. The increase in the assumed net real rate of return is due to the full recognition of the new asset allocation which has been fully implemented since September 30, 2014. The implementation was in process at the time of the prior actuarial valuation.

2. We changed the general compensation increase from 3.50% per year to 3.25%, making it the same as the underlying price inflation assumption. As a result, we also changed the aggregate payroll increase assumption from 3.50% per year to 3.25%. Because of the somewhat slower growth anticipated in our economy for

the long-term future, we think that the 0.25% reduction in the long-term rate of inflation is appropriate.

3. We made a minor mortality assumption change, assuming that the spouse of a firefighter retiring in the future will be three years younger on average, a change from the prior assumption of two years younger. This change anticipates the somewhat greater average spread in ages of actual firefighter retirees and their spouses in other TLFFRA funds.

The effects of these changes in assumptions on the UAAL amortization period are 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, and their selection complies with the applicable actuarial standards of practice.

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 Contributions by the City

GASB 68 is all about accounting for pensions and did away with the concept of annually required contributions, referred to as the ARC. The GASB made a point of separating their new accounting standard for public employee defined benefit plans from the actual funding of those plans. In other words, the city's GASB 68 pension expense will usually be very different from its actual contributions. That is why separate reports are needed each year to provide the required GASB 68 actuarial information.

As a result of GASB getting out of the business of providing a funding standard, the PRB recommended in their report to the Texas Legislature at the end of 2014 that actuarial valuation reports for fixed contribution rate plans should disclose contribution levels required for a variety of appropriate amortization periods. Since the preferred range for the UAAL amortization period is 10 to 25 years in the PRB's pension funding guidelines, we have shown the city contribution rate that would have been required beginning October 1, 2016 for amortization periods of 15, 20, and 25 years based on this September 30, 2016 actuarial valuation. Because of the significant deferred net loss of $2.1 million in the AVA, we have used the MVA to determine the UAAL for these actuarially determined contribution rates.

UAAL Amortization Period	Actuarially Determined Contribution Rate by the City	Firefighter Contribution Rate	Total Contribution Rate
15 Years	16.86%	11.00%	27.86%
20 Years	14.76%	11.00%	25.76%
25 Years	13.55%	11.00%	24.55%

In 2015, the Legislature passed HB 3310 which amended Sections 801 and 802 of the Government Code. It included a new sentence in Section 802.101(a) which requires an actuarial valuation to include a recommended rate needed to have an amortization period for the UAAL that does not exceed 30 years. The city currently contributes 13% of pay and has for a number of years. Since our assumed continuation of this funding policy results in an actuarially determined amortization period of less than 30 years, we recommend the continuation of the city's current funding policy.

Variability in Future Actuarial Measurement

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: 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. 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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Section II

Key Results of the Actuarial Valuation

	September 30, 2014 [1]	September 30, 2016
1. Actuarial present value of future benefits		
a. Those now receiving benefits or former firefighters entitled to receive benefits	$ 19,514,301	$ 21,632,787
b. Firefighters	51,752,781	56,480,390
c. Total	$ 71,267,082	$ 78,113,177
2. Actuarial present value of future normal cost contributions	$ 22,210,568	$ 24,460,400
3. Actuarial accrued liability (Item 1c – Item 2)	$ 49,056,514	$ 53,652,777
4. Actuarial value of assets	$ 32,604,554	$ 37,418,102
5. Unfunded actuarial accrued liability (UAAL) (Item 3 - Item 4)	$ 16,451,960	$ 16,234,675
6. Contributions (percent of payroll)		
a. Firefighters	11.00%	11.00%
b. City of Killeen	13.00%	13.00%
c. Total	24.00%	24.00%
7. Normal cost (percent of payroll)	16.24%	16.00%
8. Percent of payroll available to amortize the UAAL (Item 6c - Item 7)	7.76%	8.00%
9. Annualized covered payroll	$ 12,457,025	$ 14,180,561
10. Present annual amount available to amortize the UAAL (Item 8 x Item 9)	$ 966,665	$ 1,134,445
11. Years to amortize the UAAL	29.5	22.8
12. Funded ratio (Item 4 ÷ Item 3)[2]	66.5%	69.7%

[1] All items are from the September 30, 2014 actuarial valuation and reflect the Present Plan.

[2] 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 12 would have resulted in funded ratios of 64.9% as of September 30, 2014 and 65.9% as of September 30, 2016.

Change in Amortization Period

The amortization period, based on the Present Plan provisions, was determined in the actuarial valuation as of September 30, 2014 to be 29.5 years. Since two years have passed since that valuation date, a 27.5-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 contribution rates had been made. The amortization period is now 22.8 years based on the same plan provisions. The actual experience occurring between September 30, 2014 and September 30, 2016 differed from the expected experience, and in combination with the changes in assumptions, the resulting amortization period was 22.8 years, which is 4.7 years less than the expected 27.5-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 fiscal years ending in 2015 and 2016 was 2.51%. 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 fiscal years 2015 and 2016 was 4.35%, below the assumed rate of return for those years of 7.75%. This resulted in an **increase** in the amortization period of 8.5 years.

2. The aggregate payroll increased at an average rate of 6.7% per year instead of the assumed 3.5% per year rate, which caused the amortization period to **decrease** by 4.4 years. The increase in payroll is from the growth in the size of the department.

3. The net result of all experience other than the investment experience and the aggregate payroll experience had the combined effect of **decreasing** the amortization period by 6.9 years. This was primarily the result of lower than assumed compensation increases and fewer than expected retirements in the last two years.

4. The result of the change by the city to discontinue using volunteer firefighters had the effect of **increasing** the amortization period by 0.2 of a year.

5. The change in the general compensation increase and aggregate payroll increase assumptions from 3.50% to 3.25% along with the change in the assumed age difference of future retirees and their spouses to from two years to three years younger for females had the combined net effect of **decreasing** the amortization period by 2.1 years.

Section III

Benefit Improvements

The results of this actuarial valuation as of September 30, 2016 reveal that the fund, based on the Present Plan of benefits, has an adequate contribution arrangement. As disclosed in both Sections I and II, the amortization period of the UAAL is 22.8 years. In order for benefit improvements to be made to the plan, they must be made in accordance with Section 7 of TLFFRA, which requires approval of the board, the board's actuarial firm, and the firefighters. However, because of the deferred net investment loss of over $2 million as of September 30, 2016 and the anticipated potential effects it will have over the next two biennial actuarial valuations shown in the six scenarios on page 2, we are not willing to approve any benefit improvements at this time.

The board should be cautious in considering benefit improvements in the future due to the sensitivity of the UAAL amortization period to investment losses as shown in the four-year projections in Section I. In our September 30, 2014 actuarial valuation report, we recommended a strategy for injecting caution in future benefit improvements. The idea is to coordinate periodic benefit improvements with a gradual lowering of the benefit improvement cap on the UAAL amortization period to a long-term goal such as 15 years, even though we had been using 25 years as the cap in the 10 years before 2015. We recommended this approach primarily for the following reasons:

1. The Texas Pension Review Board (PRB) pension funding guidelines, and
2. The increasing scrutiny of public employee pension plans.

One approach for implementing this strategy for injecting caution in future benefit improvements would be to wait until the amortization period is below 23 years and then to approve benefit improvements that would increase the amortization period up to as much as 23 years. In subsequent years, we would progressively lower the benefit improvement cap to 21 years, then 19 years, etc., coordinating periodic benefit improvements with the gradual lowering, until getting to a long-term goal such as 15 years. With this approach we would next approve benefit improvements based on a subsequent actuarial valuation when the amortization period is below 23 years.

This approach would both strengthen the actuarial condition of the fund and better prepare for the possibility of adverse experience to the fund in the future. The stronger actuarial condition of the fund would be demonstrated by the progressively lower UAAL amortization period until getting in to the bottom half of the preferred range in the PRB guidelines (10 to 25 years). The kinds of future adverse experience that the fund would be better prepared to withstand would be primarily adverse investment experience.

One of the challenges the board faces is balancing the goals of providing periodic benefit improvements and of managing all your responsibilities in a way that considers the long-term sustainability of the fund. There are a number of stakeholders with different points of view. Firefighters approaching retirement would like to see increases in the benefit

formula before they retire. Younger firefighters who hear about the very good benefits that new retirees are receiving may wonder if the fund will be able to pay benefits like that when they retire. Pensioners may wonder if they will get any kind of ad hoc increase in their monthly benefit. The city has a vested interest in providing benefits that are well funded, at a level that is attractive for hiring and retaining good firefighters, and also affordable for the long term. In the last four years, the Legislature has had a higher interest in public employee defined benefit plans than ever before. That's the reason for the PRB report to the Legislature at the end of 2014. There are more critics of public employee defined benefit plans than ever before.

Ten of the 42 TLFFRA funds in the most recent PRB report had amortization periods above 40 years and another 13 were over 30 years but under 40 years. These 23 funds are in that situation primarily because they didn't have much of a cushion for adverse investment experience in 2000-2002 and 2008. The TLFFRA funds that are currently in good shape actuarially are often there because of an increase in the city contribution rate or the firefighter contribution rate or both that have largely offset the adverse investment experience of 2000-2002 and 2008.

The board should not rely only on increases in contribution rates in the future. Part of our responsibility as your fund's actuarial firm is to be forward looking and to help the fund with the challenges of balancing the desire for more benefits with the goal of long-term sustainability. We strongly believe that strengthening the actuarial condition of your fund by gradually reducing the maximum amortization period for benefit improvements will facilitate both benefit improvements over the next few years and long-term sustainability. In addition, it will enhance the board's reputation as good fiduciaries and the fund's reputation as thoughtful and balanced. An enhanced reputation could help make the city more receptive to increasing their contribution rate.

Exhibit 1

Distribution of Firefighters by Age and Service on September 30, 2016 with Average Annual Salary

Years of Service	Age									Total	Average Salary
	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60 or Over		
0	15	13	10	1	0	0	0	0	0	39	$42,846
1	3	2	3	2	0	0	0	0	0	10	47,310
2	3	4	4	1	0	0	0	0	0	12	51,573
3	3	1	0	2	0	0	0	0	0	6	53,528
4	2	4	2	2	0	0	0	0	0	10	55,562
5	0	3	4	3	1	0	0	0	0	11	57,969
6	0	1	0	0	0	0	0	0	0	1	59,653
7	0	3	2	4	0	0	0	0	0	9	60,771
8	0	1	2	2	0	0	0	0	0	5	61,194
9	0	2	7	7	3	0	0	0	0	19	66,253
10	0	1	7	6	5	1	0	0	0	20	67,673
11	0	2	5	6	2	0	0	0	0	15	69,361
12	0	0	4	4	0	0	0	0	0	8	70,299
13	0	0	1	1	2	0	0	0	0	4	74,246
14	0	0	1	3	2	0	0	0	0	6	73,455
15	0	0	1	2	1	1	1	0	0	6	75,628
16	0	0	0	0	3	1	0	0	0	4	88,755
17	0	0	0	4	1	2	0	0	0	7	77,302
18	0	0	0	1	1	2	0	0	0	4	90,959
19	0	0	0	1	1	1	1	0	0	4	81,862
20-24	0	0	0	0	3	5	2	2	0	12	84,353
25-29	0	0	0	0	0	0	2	3	0	5	77,426
30-34	0	0	0	0	0	0	0	0	1	1	95,801
35+	0	0	0	0	0	0	0	4	2	6	83,574
Totals	26	37	53	52	25	13	6	9	3	224	$63,306

Average Salary	$46,048	$53,111	$61,289	$64,881	$74,745	$83,266
	$78,567	$77,604	$91,715	$63,306		

Average age	35.1
Average years of service	9.4
Average age at hire	25.7

Exhibit 1A

Killeen Firefighter's Relief and Retirement Fund
Firefighters with Both Paid and Volunteer Service
Estimated Service as of September 30, 2016

Name	Estimated Service		
	Paid Service	Volunteer Service	Total
Doug Emberton	18 yrs, 0 mos*	1 yrs, 0 mos	19 yrs, 0 mos*
Ethan Gingerich	20 yrs, 4 mos	0 yrs, 7 mos	20 yrs, 11mos

* Service shown does not include breaks in service.

Exhibit 2

Summary of Pensioner Data

Type of Benefit	Pensioner Data Used in September 30, 2016 Valuation	
	Number of Recipients	Total Monthly Benefit Payments
Paid Firefighter Pensioners		
Service Retirement	45	$ 140,037
Disability Retirement	1	2,274
Vested Terminated (Deferred)	8	15,016
Surviving Spouse	9	16,308
Surviving Child	0	0
Total	63	$173,635
Volunteer Firefighter Pensioners		
Service Retirement	2	$ 310
Disability Retirement	0	0
Vested Terminated (Deferred)	1	155
Surviving Spouse	4	428
Surviving Child	0	0
Total	7	$ 893
Total Pensioners	70	$ 174,528

Type of Benefit	Comparison of Pensioner Count by Type as of The Prior and Current Actuarial Valuations			
	September 30, 2014	New	Ceased	September 30, 2016
Paid Firefighter Pensioners				
Service Retirement	42 [1]	+6 [2]	-3	45 [3]
Disability Retirement	0	+1	0	1
Vested Terminated (Deferred)	9	+2	-3 [4]	8
Surviving Spouse	8	+1	0	9
Surviving Child	0	0	0	0
Total	59	+10	-6	63
Volunteer Firefighter Pensioners				
Service Retirement	2	0	0	2
Disability Retirement	0	0	0	0
Vested Terminated (Deferred)	0	+1	0	1
Surviving Spouse	5	0	-1	4
Surviving Child	0	0	0	0
Total	7	+1	-1	7
Total Pensioners	66	+11	-7	70

[1] Includes two alternate payees according to the terms of a QDRO for a retired member.
[2] Includes an alternate payee according to the terms of a QDRO for a retired member.
[3] Includes three alternate payees according to the terms of a QDRO for a retired member.
[4] Includes two who began payment as service retirements.

Exhibit 2A

Firefighter and Pensioner Reconciliation

	Firefighters	Volunteer Firefighters	Current Payment Status	Vested Terminated Firefighters	Total
1. As of September 30, 2014	189	13	57 [1]	9	268
2. Change of status					
a. retirement	(3)	0	6 [2]	(2)	1
b. disability	(1)	0	1	0	0
c. death	0	0	(4)	0	(4)
d. survivor payment begins	0	0	1	0	1
e. withdrawal	(13)	(12)	0	(1)	(26)
f. vested termination	(2)	(1)	0	3	0
g. volunteer to paid	0	0	0	0	0
h. new QDRO	0	0	0	0	0
i. net changes	(19)	(13)	4	0	(28)
3. New firefighters	54	0	0	0	54
4. As of September 30, 2016	224	0	61 [3]	9	294

[1] Includes two alternate payees according to the terms of a QDRO for a retired member.
[2] Includes an alternate payee according to the terms of a QDRO for a retired member.
[3] Includes three alternate payees according to the terms of a QDRO for a retired member.

Exhibit 3

Breakdown of Paid Firefighters Pensioners by Monthly Benefit Amounts as of September 30, 2016

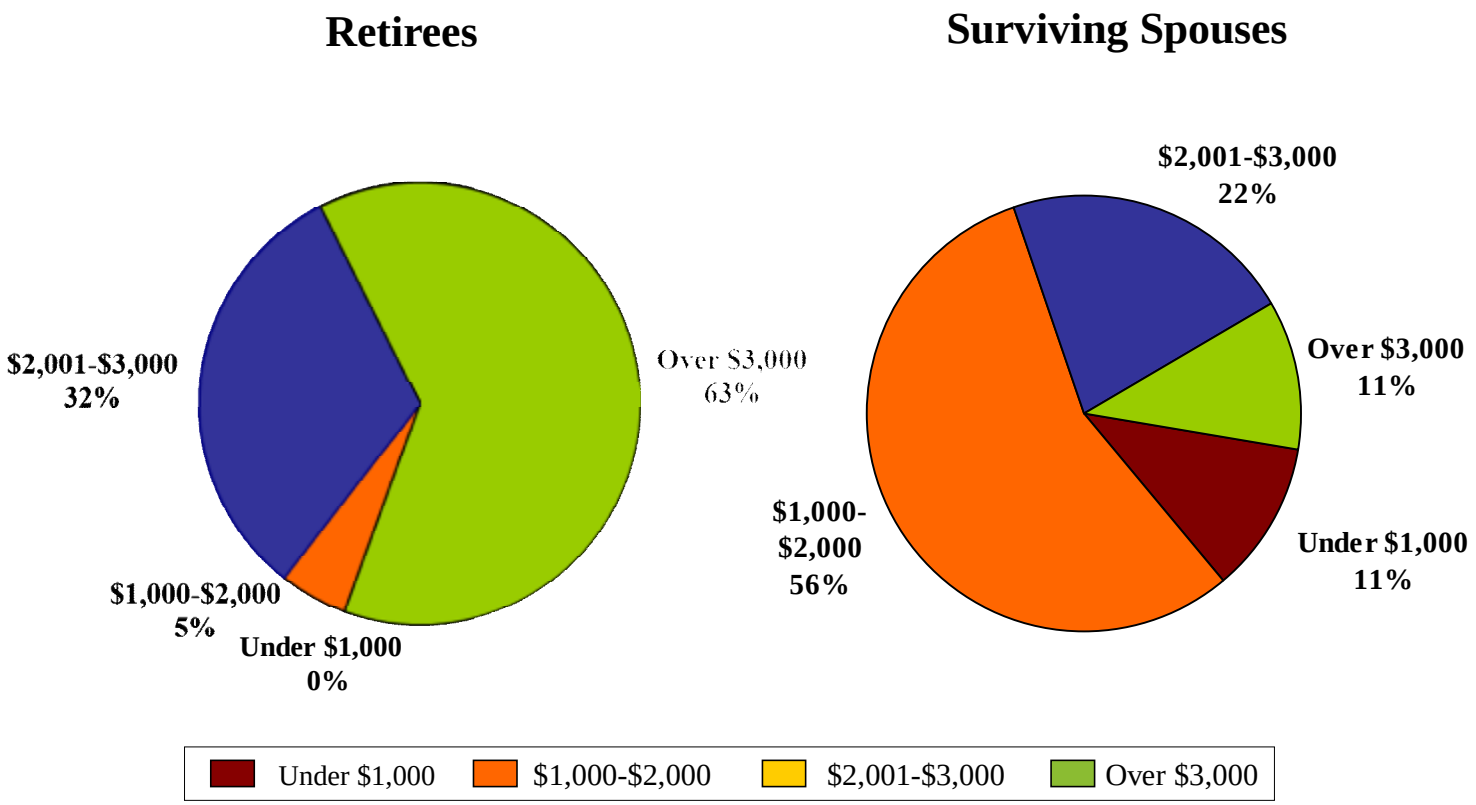


Exhibit 4

Historical Comparison of Actuarial Accrued Liability for Active Firefighters and Pensioners (Present Plan Valuations as of September 30)

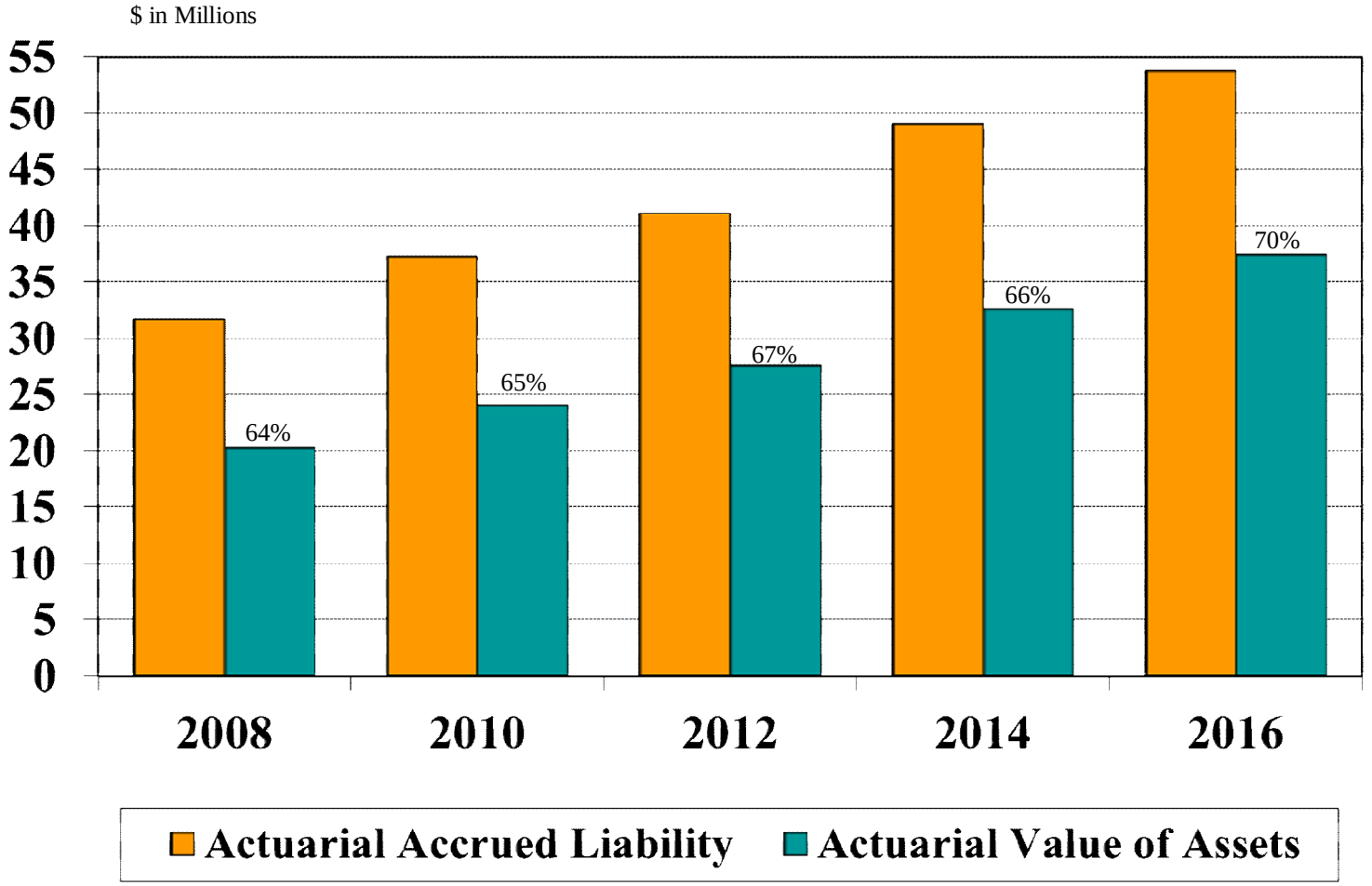


Exhibit 5

Summary of Asset Data

Asset Type	Market Value of Assets as of September 30, 2016	Allocation as a Percent of Grand Total
Domestic Equities		
Large Cap Blend	$ 7,077,050	20.02%
Large Cap Value	2,717,824	7.69
Large Cap Growth	2,763,874	7.82
Small/Mid Cap	2,066,691	5.85
Total	14,625,439	41.38
International Equities		
Developed Value	2,683,551	7.59
Developed Growth	2,689,184	7.61
Total	5,372,735	15.20
Fixed Income		
Core	6,796,189	19.23
Global	1,612,904	4.56
Direct Lending	1,395,062	3.95
Total	9,804,155	27.74
Alternatives		
Balanced Fund	$ 1,703,381	4.82%
Real Estate	1,613,152	4.56
Tactical	1,054,052	2.98
Private Equity	193,021	0.55
Total	4,563,605	12.91
Cash, Payables, Receivables	976,895	2.77
Grand Total	$ 35,342,830	100.00%

Comparison of Asset Values as of the Prior and Current Actuarial Valuation Dates		
	September 30, 2014	September 30, 2016
Market Value	$31,844,201	$35,342,830
Actuarial Value	$32,604,554	$37,418,102
Actuarial Value as a Percent of Market Value	102.4%	105.9%

Exhibit 5A

Statement of Changes in Audited Assets for the Years Ended September 30, 2016 and 2015

	9/30/2016	9/30/2015
Additions		
1. Contributions		
a. Employer	$ 1,770,872	$ 1,696,664
b. Employees	1,483,972	1,419,132
c. Total	$ 3,254,844	$ 3,115,796
2. Investment Income		
a. Interest and dividends	$ 995,687	$ 1,192,269
b. Net appreciation in fair value	2,165,546	(2,587,472)
c. Total	$ 3,161,233	$ (1,395,203)
3. Other Additions	0	0
Total Additions	**$ 6,416,077**	**$ 1,720,593**
Deductions		
4. Benefit Payments		
a. Monthly benefits	$ 1,831,264	$ 1,808,253
b. Contribution refunds	169,903	349,879
c. RETRO DROP lump sums	0	148,277
d. Total	$ 2,001,167	$ 2,306,409
5. Expenses		
a. Direct investment-related	$ 50,299	$ 49,774
b. General administrative	94,483	135,909
c. Total	$ 144,782	$ 185,683
Total Deductions	**$ 2,145,949**	**$ 2,492,092**
Net Increase in Assets	**$ 4,270,128**	**$ (771,499)**
Market Value of Assets (Plan Net Position)		
Beginning of Year	$ 31,072,702	$ 31,844,201
End of Year	$ 35,342,830	$ 31,072,702
Rate of Return		
Net of All Expenses	9.52%	-4.90%
Net of Investment-Related Expenses	9.83%	-4.49%
Gross	10.00%	-4.34%
Direct Investment-Related Expenses	0.17%	0.15%

Exhibit 6

Development of Actuarial Value of Assets

Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Plan Years Ending September 30				
	2016	2015	2014	2013
1. Market Value of Assets as of Beginning of Year	$ 31,072,702	$ 31,844,201	$ 29,281,329	$ 26,974,697
2. Firefighter Contributions	1,483,972	1,419,132	1,284,686	1,127,336
3. City Contributions	1,770,872	1,696,664	1,541,096	1,483,016
4. Benefit Payments and Administrative Expenses[1]	(2,095,650)	(2,442,318)	(2,235,502)	(1,871,188)
5. Expected Investment Return[2]	2,453,053	2,494,023	2,292,176	2,119,182
6. Expected Market Value of Assets as of End of Year	$ 34,684,949	35,011,702	$ 32,163,785	29,833,043
7. Actual Market Value of Assets as of End of Year	35,342,830	31,072,702	31,844,201	29,281,329
8. Actuarial Investment Gain/(Loss)	$ 657,881	$ (3,939,000)	$ (319,584)	$ (551,714)
9. Market Value Rate of Return Net of Expenses	9.83%	(4.49)%	6.67%	5.73%
10. Rate of Actuarial Investment Gain/(Loss)	2.08%	(12.24)%	(1.08)%	(2.02)%

[1] Administrative expenses are included because the investment return assumption was net of investment-related expenses for all four years.
[2] Assuming uniform distribution of contributions and payments during the plan years; actuarially assumed investment return of 7.75%.

Plan Year	Investment Gain/(Loss)	Deferral Percentage	Deferred Gain/(Loss) as of 9/30/2016
2016	$ 657,881	80%	$ 526,305
2015	(3,939,000)	60%	(2,363,400)
2014	(319,584)	40%	(127,834)
2013	(551,714)	20%	(110,343)
Total			$ (2,075,272)

Actuarial Value of Assets as of September 30, 2016	
11. Market Value of Assets as of September 30, 2016	$ 35,342,830
12. Deferred Gain/(Loss) to be Recognized in Future	(2,075,272)
13. Preliminary Value (Item 11 – Item 12)	$ 37,418,102
14. Corridor for Actuarial Value of Assets	
a. 80% of Market Value as of September 30, 2016 (minimum)	$ 28,274,264
b. 120% of Market Value as of September 30, 2016 (maximum)	$ 42,411,396
15. Actuarial Value as of September 30, 2016	$ 37,418,102
16. Write Up/(Down) of Assets (Item 15 – Item 11)	$ 2,075,272

Exhibit 7

Historical Comparison of Market and Actuarial Value of Assets (Valuation as of September 30)

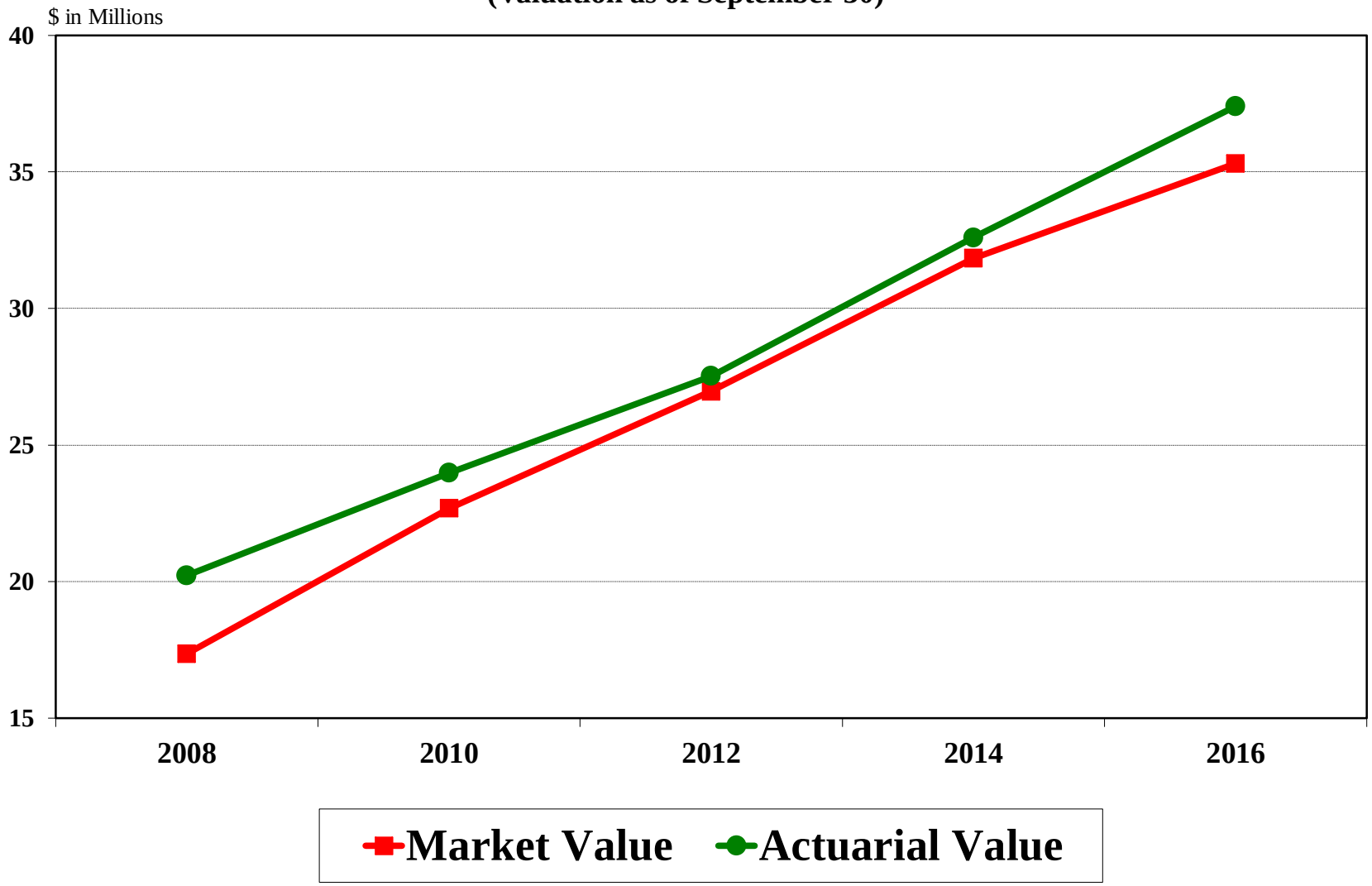
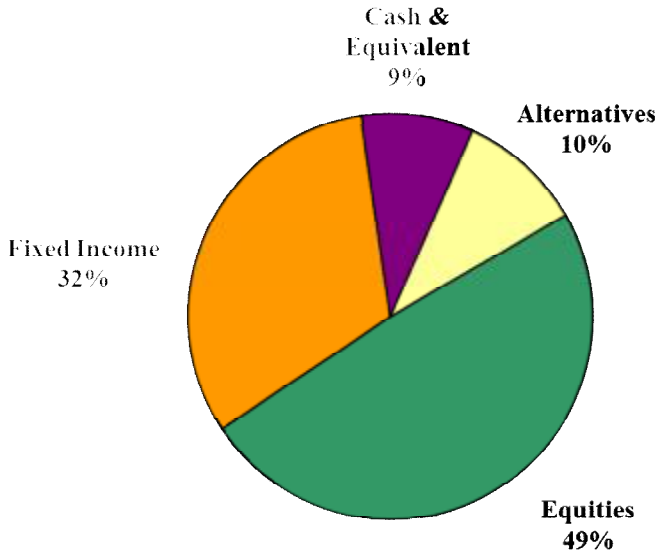


Exhibit 8

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

September 30, 2014



September 30, 2016

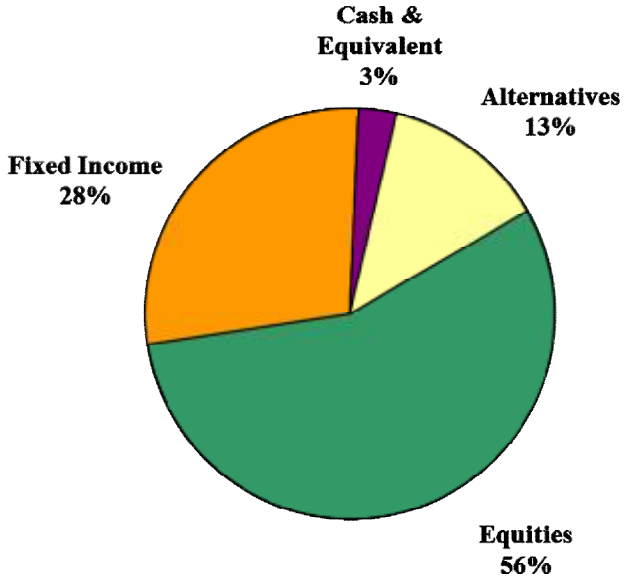


Exhibit 9

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 3.25% per year. The actuarial determination of the amortization period reflects that contributions are made biweekly.

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 80% of market value nor greater than 120% 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 one or more 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 usually discuss them with the board before completing the actuarial valuation.

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 estimates of future experience for the system for the long-term future.

1. Investment Return

   7.75% per year net of investment-related expenses.

2. Inflation

   3.25% per year included in compensation increases and investment return assumptions.

3. Mortality Rates

   RP-2000 Combined Healthy Mortality Table projected to 2024 by scale AA 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 3.25% per year in addition promotion, step, and longevity increases that average 1.73% per year over a 30-year career. See Exhibit 10.

5. Retirement Rates

Age	Rate per Year for Paid Firefighters Eligible to Retire
50-51	30%
52-55	15
56-69	25
70	100

The average expected retirement age for firefighters not yet eligible to retire based on these rates is 55.2.

6. RETRO DROP Election

a. Percent of firefighters eligible electing RETRO DROP: 75% 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 24 months.

7. Withdrawal Rates

See Exhibit 10.

8. Disability Rates

See Exhibit 10. The on-duty and off-duty rates are each 50% of the total rate at each age.

9. Reduction in Benefit after 2½ Years of Disability Retirement

15% weighted average reduction in benefit.

10. Percent Married

80% of the firefighters are assumed to be married at retirement, disability, or death while employed, with male firefighters having a spouse three years younger and female firefighters having a spouse three years older.

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

    - Joint and 2/3 to surviving spouse for the 80% assumed to be married
    - Life annuity for the 20% 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

    11% of covered pay.

14. City's Assumed Contributions

    13% of covered payroll for firefighters.

15. Covered Payroll for First Year Following Valuation Date

    Actual (or annualized) pay for 2016 with no adjustment for each firefighter to reflect no pay increase effective in October 2016.

16. General Administrative Expenses

    The expenses paid by fund assets for other than investment-related expenses are assumed to be 1% of payroll. The normal cost rate as a percent of payroll is assumed to be 1% of payroll higher to reflect these expenses.

17. Increase in Future Pay-Related Benefits Due to Definition of Average Salary

    - 0.50%

Exhibit 10
Disability, Mortality, and Withdrawal Rates per 1,000 Active Members
Compensation Increases by Years of Service

Attained Age	Disability and Mortality Rates			Withdrawal Rates		Compensation Increases	
		Mortality		Years of Service	Rate	Years of Service	Increase Percent
	Disability[1]	Male	Female				
20	0.14	0.218	0.130	0	89	1	9.45%
21	0.15	0.231	0.126	1	80	2	9.45
22	0.16	0.243	0.129	2	71	3	9.45
23	0.17	0.260	0.134	3	63	4	9.45
24	0.18	0.275	0.140	4	55	5	9.45
25	0.19	0.295	0.148	5	47	6	6.35
26	0.21	0.327	0.160	6	41	7	6.35
27	0.23	0.339	0.167	7	36	8	6.35
28	0.25	0.348	0.176	8	32	9	6.35
29	0.28	0.365	0.186	9	29	10	6.35
30	0.31	0.394	0.207	10	25	11	4.80
31	0.35	0.442	0.253	11	21	12	4.80
32	0.40	0.498	0.289	12	18	13	4.80
33	0.45	0.559	0.317	13	16	14	4.80
34	0.49	0.622	0.342	14	14	15	4.80
35	0.52	0.685	0.364	15	14	16	3.25
36	0.54	0.746	0.385	16	14	17	3.25
37	0.57	0.802	0.405	17	12	18	3.25
38	0.62	0.834	0.426	18	11	19	3.25
39	0.73	0.863	0.451	19	11	20	3.25
40	0.92	0.890	0.491	20 & Over	0	21	3.25
41	1.14	0.919	0.539			22	3.25
42	1.32	0.955	0.593			23	3.25
43	1.48	0.996	0.652			24	3.25
44	1.73	1.046	0.716			25	3.25
45	2.09	1.102	0.763			26	3.25
46	2.55	1.152	0.810			27	3.25
47	2.98	1.206	0.857			28	3.25
48	3.34	1.263	0.927			29	3.25
49	3.62	1.322	1.002			30	3.25
50	3.79	1.383	1.111			31	3.25
51	3.92	1.545	1.258			32	3.25
52	4.04	1.642	1.439			33	3.25
53	4.24	1.796	1.652			34	3.25
54	4.56	1.968	1.904			35	3.25
55	0.00	2.287	2.241			36	3.25
56	0.00	2.716	2.674			37	3.25
57	0.00	3.110	3.084			38	3.25
58	0.00	3.580	3.478			39	3.25
59	0.00	4.037	3.938			40	3.25
60		4.581	4.482				
61		5.341	5.155				
62		6.093	5.902				
63		7.138	6.781				
64		8.042	7.642				

[1] The on-duty and off-duty rates are each 50% of the total rate shown at each age.

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 October 1 and ending September 30.
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, but it does not have to coincide.
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.	Monthly Retirement Benefit for Firefighters as a Percentage of Highest 60-Month Average Salary	
	(a) For service and duty-related disability retirement benefit	58.40%
	(b) For duty-related death benefit to surviving spouse	38.93%
2.	Additional Monthly Retirement Benefit for Firefighters as a Percentage of Highest 60-Month Average Salary for Each Year of Service in Excess of 20 Years of Service	
	(a) For service and duty-related disability retirement benefit	2.275%
	(b) For duty-related death benefit to surviving spouse	1.517%
3.	Service Retirement Eligibility for Firefighters	Age 50 and 25 Years or Age 55 and 20 Years
4.	Retroactive Deferred Retirement Option Plan (RETRO DROP) provides a reduced monthly benefit and a lump sum	
	(a) Earliest RETRO DROP benefit calculation date	3.5 Years after Service Retirement Eligibility
	(b) Maximum RETRO DROP benefit accumulation period	24 Months
	(c) Earliest employment termination date with maximum RETRO DROP benefit accumulation period	Age 55.5 and 30.5 Years or Age 60.5 and 25.5 Years
	(d) RETRO DROP lump sum includes	
	(i) monthly benefits that would have been received between RETRO DROP benefit calculation date and termination of employment,	
	(ii) accumulated contributions made by the firefighter after the RETRO DROP benefit calculation date, and	
	(iii) no interest	
5.	Vested Termination Benefit	
	(a) Eligibility for firefighters	10 years
	(b) Percent vested with 10 years	50%
	(c) Additional percent vested for each year above 10 years	5%
	(d) Percent vested with 20 or more years	100%
	(e) Benefit is deferred to date person would have satisfied service retirement eligibility date	
	(f) Benefit is percent vested times service retirement benefit	
6.	Monthly Duty-Related Death Benefit for Children of Firefighters as a Percentage of Highest 60-Month Average Salary	
	(a) Where the spouse is receiving a benefit	7.79%
	(b) Where the spouse is not receiving a benefit or there is no spouse	38.93%

7.	Contributions As a Percentage of Pay by:	11.00%
	(a) Firefighters	13.00%
	(b) City of Killeen	
8.	Monthly Benefits for Volunteer Firefighters[1]	$155.00
	(a) Service retirement benefit	$155.00
	(b) Duty-related disability retirement benefit	$105.00
	(c) Duty-related spouse survivor benefit	
	(d) Duty-related child survivor benefit:	$37.20
	i. Where the spouse is receiving a benefit	$105.00
	ii. Where the spouse is not receiving a benefit	
9.	Service Retirement Eligibility for Volunteer Firefighters[1]	Age 55 and 20 Years
10.	Vested Terminated Benefit Eligibility for Volunteer Firefighters[1] (Benefit Deferred to Age 55)	20 Years

11. A prorated benefit is provided for firefighters with both paid and volunteer service.[1]

12. The normal form of annuity payment at retirement is a Joint and Two-Thirds to Surviving Spouse, and payment is the last day of each month. A Joint and 75% to Surviving Spouse Option and Joint and 100% to Surviving Spouse Option are available as optional forms of a service retirement benefit. A Social Security Leveling Option is also available.

13. Off-duty death benefits are provided for paid firefighters with more than 20 years of service with the same formula as for a duty-related death [Items 1(b) and 2(b)].

14 Salary used to determine the Highest 60-Month Average Salary for paid firefighters includes regular pay, longevity and overtime pay and excludes a lump sum distribution upon termination for unused sick leave or vacation. The average is based on the highest 130 biweekly pay periods during active participation in the fund or before the RETRO DROP benefit calculation date.

15. 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.

[1] The city discontinued using volunteers beginning in the second half of 2016; however there was one vested terminated volunteer as of September 30, 2016 with a benefit deferred to 55. In addition there were two paid firefighters with a small amount of volunteer service that will be recognized in their benefit calculations. The city discontinued contributions for volunteers in 2016.