
El Paso Firemen's Pension Fund

Actuarial Valuation as of January 1, 2020

August 28, 2020



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August 28, 2020

Board of Trustees
El Paso Firemen's Pension Fund
c/o Mr. Tyler Grossman, Executive Director and CIO
909 E. San Antonio Avenue
El Paso, TX 79901

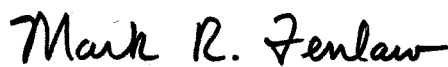
Members of the Board of Trustees:

At your request, we have prepared this report of the results of the actuarial valuation of the El Paso Firemen's Pension Fund (the Fund) as of January 1, 2020. This valuation was prepared to determine whether the Fund has an adequate contribution arrangement.

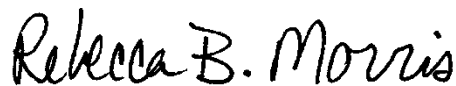
In a separate report dated April 24, we provided the necessary disclosures for the Fund's compliance with the Governmental Accounting Standards Board (GASB) Statement No. 67 for the plan year ending December 31, 2019. Similarly, we will provide a separate report later this year containing the pension expense, net pension liability, and disclosure information for the city's compliance with GASB 68 for the fiscal year ending August 31, 2020. GASB 68 prescribes the city's accounting for the 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, 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 El Paso Firemen's Pension Fund as of January 1, 2020 has been completed. The valuation was based on the Present Plan (plan effective December 31, 2017) and the provisions of Article 6243b, Vernon's Texas Civil Statutes. Section II shows the key results of the actuarial valuation as of January 1, 2020.

This valuation reflects an actuarially assumed total contribution rate of 36.5%, comprised of 18% by the firefighters and 18.5% by the city. The total contribution rate of 36.5% exceeds the normal cost rate of 19.25%, leaving 17.25% available initially to amortize the unfunded actuarial accrued liability (UAAL) of \$189,530,926. The 19.25% normal cost rate is the weighted average as of the valuation date of the normal cost rate of the base plan and the normal cost rate of the second-tier plan. Over time the weighted average normal cost rate will gradually decline to that of the second-tier plan. 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 26.6 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 Texas State 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.**

Changes in Plan Provisions

Since the January 1, 2018 actuarial valuation, there have been no changes in the plan provisions governing the Fund.

Projected Actuarial Valuation Results

In addition to completing this actuarial valuation, we estimated the amortization periods as of January 1, 2022 and as of January 1, 2024 by making projections from the January 1, 2020 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 2016 and 2018, and gains in 2017 and 2019) that have been only partially recognized as of January 1, 2020. As shown in Exhibit 8, 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 2016-2019 that the Fund experienced. The AVA used in this valuation is \$615.4 million. The market value of assets (MVA) is \$643.1 million. The \$27.7 million difference between the MVA and the AVA is the net deferred gain over the past four years that will be recognized in the next two biennial actuarial valuations. (In this report, the term “market value of assets” is a synonym for the accounting term “fiduciary net position.”)

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 9.

For the purpose of projecting the amortization period through 2023 we used six scenarios of various assumed annual rates of investment return, net of investment-related expenses, over the 2020-2023 projection period. 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 January 1, 2020 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 Calendar Year | | | | | | |
| 2020 | 7.75% | -4.00% | 0.00% | 0.00% | 0.00% | 5.00% |
| 2021 | 7.75 | 13.00 | 7.75 | 4.00 | 10.00 | 13.00 |
| 2022 | 7.75 | 7.75 | 7.75 | 4.00 | 7.75 | 9.00 |
| 2023 | 7.75 | 7.75 | 7.75 | 4.00 | 7.75 | 9.00 |
| 2024 and later | 7.75 | 7.75 | 7.75 | 7.75 | 7.75 | 7.75 |
| Amortization Period in Years as of January 1: | | | | | | |
| 2020 (actual) | 26.6 | 26.6 | 26.6 | 26.6 | 26.6 | 26.6 |
| 2022 (projected) | 20.6 | 26.6 | 25.3 | 26.3 | 24.7 | 20.9 |
| 2024 (projected) | 16.6 | 26.1 | 25.4 | 33.7 | 23.3 | 14.8 |

The projected January 1, 2024 valuation in Scenario 1 reveals that instead of decreasing by the expected four years, the amortization period is projected to decrease by ten years. This conclusion is not surprising when you consider that if we had fully recognized the \$27.7 million deferred net gain in this actuarial valuation by using the MVA instead of the AVA, the amortization period would have been 20.6 years (instead of 26.6 years).

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 to various gains or losses combined with the current deferred net gain. 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 both favorable and adverse scenarios for the next two valuations assuming no changes in benefits or contributions.

The primary conclusion from the scenarios is that the Fund's UAAL amortization period is sensitive to the investment experience, even with the AVA methodology that dampens market volatility. The board members should be cautious about their expectations and remember the long-term nature of the Fund.

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 the Fund's staff. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the data provided for the January 1, 2018 actuarial valuation. Exhibit 1 is a distribution of the active firefighters by age and service. The assumed compensation used for projecting future benefits for each active firefighter in the valuation was the annualized rate of pay in December 2019. For projecting contributions, the compensation used for projecting benefits was increased 4% to reflect the assumed overtime for the year. The total of these assumed compensation amounts for projecting contributions is our assumed covered payroll for the plan year beginning January 1, 2020 and is used in the valuation to determine the UAAL amortization period. The averages of the assumed compensation amounts for projecting contributions for the 2020 plan year are shown in Exhibit 1 for those who have not entered the Forward DROP as of the valuation date.

Exhibit 2 contains summary information on the pensioners. The monthly benefit payments are generally based on the amounts paid in January 2020. Exhibit 3 is a reconciliation of firefighters and pensioners from January 1, 2018 to January 1, 2020. Exhibit 4 shows a breakdown of the dollar amount of the monthly benefits for retirees and surviving spouses. Exhibit 5 shows a historical comparison of the actuarial accrued liability and the actuarial value of assets.

The summary of assets contained in Exhibit 6 is based on the December 31, 2019 report from the fund's investment consultant AndCo. This exhibit also shows a comparison with the market values and actuarial values of assets as of December 31, 2017 and December 31, 2019. Exhibit 7 contains the statement of changes in assets for 2019 and 2018. Exhibit 8 shows the development of the actuarial value of assets. Exhibit 9 shows a historical comparison between the market value and actuarial value of assets. A comparison of the market value asset allocation by major asset class as of December 31, 2017 and December 31, 2019 is shown in Exhibit 10.

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% general annual compensation increase plus promotion and longevity increases that vary by service and average 2.58% per year over a 25-year career; and
3. RP-2014 Mortality Tables with Blue Collar adjustment projected by Scale BB to 2030.

Our review of the actuarial assumptions resulted in one recommended change. We changed the assumed administrative expenses from 1.55% of payroll to 1.40% of payroll based on the average historical relationship in the last three years as shown in Appendix A. It is added to the normal cost.

A summary of all the assumptions and methods used in the valuation is shown in Exhibits 11 and 12. 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.

Supporting Exhibits

Exhibit 13 contains definitions of terms used in this actuarial valuation report. Exhibit 14 summarizes the plan provisions of the Present Plan.

Actuarially Determined Contributions by the City

The Texas Pension Review Board (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, and since the UAAL amortization period is under the eventual maximum acceptable period of 30 years, we have shown the city contribution rate that would have been required beginning January 1, 2020 for amortization periods of 25 and 22 years based on this January 1, 2020 actuarial valuation.

| UAAL Amortization Period | Actuarially Determined Contribution Rate by the City | Firefighter Contribution Rate | Total Contribution Rate |
|--------------------------|--|-------------------------------|-------------------------|
| 25 Years | 19.18% | 18% | 37.18% |
| 22 Years | 20.73% | 18% | 38.73% |

In 2015, the Legislature passed HB 3310 which amended Sections 801 and 802 of the Government Code. It includes a new sentence in Section 802.101(a) which requires an actuarial valuation to include a recommended contribution rate needed to have an amortization period that does not exceed 30 years. Since the current contribution policy results in an amortization period of less than 30 years, we recommend the continuation of that contribution 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 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 was provided on pages 2-3 in the projected amortization periods for the next two biennial actuarial valuations under six scenarios. These projections were designed to assess the risk of variance of potential future rates of return in the four years following the actuarial valuation date from the assumed 7.75% rate as indicated by the

potential effect on the amortization period. 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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Rebecca B. Morris

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Section II
Key Results of the Actuarial Valuation

| | <u>January 1, 2018</u> | <u>January 1, 2020</u> |
|---|------------------------|------------------------|
| 1. Actuarial present value of future benefits | | |
| a. Those now receiving benefits or former firefighters entitled to receive benefits | \$ 470,799,949 | \$ 504,289,279 |
| b. Firefighters who have entered Forward DROP ¹ | 69,254,885 | 100,402,916 |
| c. Firefighters not in Forward DROP | <u>314,296,454</u> | <u>298,412,221</u> |
| d. Total | \$ 854,351,288 | \$ 903,104,416 |
| 2. Actuarial present value of future normal cost contributions | \$ 106,785,206 | \$ 98,155,276 |
| 3. Actuarial accrued liability (Item 1d – Item 2) | \$ 747,566,082 | \$ 804,949,140 |
| 4. Actuarial value of assets | \$ 581,448,450 | \$ 615,418,214 |
| 5. Unfunded actuarial accrued liability (UAAL) (Item 3 - Item 4) | \$ 166,117,632 | \$ 189,530,926 |
| 6. Contributions (percent of pay) | | |
| a. Firefighters | 18.00% | 18.00% |
| b. City of El Paso | <u>18.50%</u> | <u>18.50%</u> |
| c. Total | 36.50% | 36.50% |
| 7. Normal cost (percent of payroll) | 22.17% | 19.25% |
| 8. Percent of payroll available to amortize the UAAL (Item 6c - Item 7) | 14.33% | 17.25% |
| 9. Annualized covered payroll | \$ 62,646,375 | \$ 67,407,294 |
| 10. Years to amortize the UAAL ² | 28.0 years | 26.6 years |
| 11. Funded ratio (Item 4 ÷ Item 3) ³ | 77.8% | 76.5% |

¹ The Forward DROP account balances are excluded from the Fund's net assets in the audited financial report; so they are also excluded from the actuarial present value of future benefits.

² The amortization period is actuarially determined using the normal cost of the Second-Tier Plan members for all members. (The normal cost in item 7 is the average normal cost for both the Base Plan and the Second Tier Plan members.) The determination also reflects the phasing into the ultimate firefighter contribution rate of 18%.

³ 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 11 would have resulted in funded ratios of 80.5% as of January 1, 2018 and 79.9% as of January 1, 2020. **The best indicator of the fund's health is Item 10.**

Change in Amortization Period

The amortization period, based on the Present Plan provisions was determined in the actuarial valuation as of January 1, 2018 to be 28.0 years. Since two years have passed since that valuation date, a 26.0-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 had been made. The amortization period is now 26.6 years based on the same plan provisions. The actual experience occurring between January 1, 2018 and January 1, 2020 differed from the expected experience, and in combination with the change in one assumption, the resulting amortization period is 26.6 years, which is 0.6 of a year more than the expected 26.0-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 2018 and 2019 was 6.43%. 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 2018 and 2019 was 6.04% compared to the assumed rate of return for those years of 7.75%. This caused an **increase** in the amortization period of 6.4 years.
2. The aggregate payroll increased at an average rate of 3.7% per year instead of increasing at the assumed 3% per year increase, which caused the amortization period to **decrease** by 1.0 year.
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 4.4 years. This was the net result of all other kinds of experience (retirement, entering Forward DROP, termination, mortality, salary increases) plus the reduction in the normal cost.
4. The result of the decrease in the administrative expenses assumption from 1.55% to 1.40% of aggregate payroll had the effect of **decreasing** the amortization period by 0.4 of a year.

Exhibit 2
Summary of Pensioner Data

| Type of Benefit | Pensioner Data Used in January 1, 2020 Valuation | |
|------------------------------|---|-----------------------------------|
| | Number of Recipients | Total Monthly Benefit Payments |
| Service Retirement | 631 ¹ | \$ 2,585,316 |
| Disability Retirement | 30 | 87,328 |
| Vested Terminated (Deferred) | 4 | 6,703 |
| Surviving Spouse | 116 | 369,907 |
| Surviving Child | <u>13</u> | <u>17,060</u> |
| Total | 794 | \$ 3,066,315 |

| Type of Benefit | Comparison of Pensioner Count by Type as of The Prior and Current Actuarial Valuations | | | |
|------------------------------|---|-----------|-----------|------------------|
| | January 1, 2018 | New | Ceased | January 1, 2020 |
| Service Retirement | 611 ³ | +41 | -21 | 631 ¹ |
| Disability Retirement | 33 | +1 | -4 | 30 |
| Vested Terminated (Deferred) | 6 ² | +0 | -2 | 4 |
| Surviving Spouse | 119 | +11 | -14 | 116 |
| Surviving Child | <u>12</u> | <u>+2</u> | <u>-1</u> | <u>13</u> |
| Total | 781 | +55 | -42 | 794 |

¹ Includes 50 alternate payees receiving benefits according to the terms of a Qualified Domestic Relations Order (QDRO).

² Includes one alternate payee entitled to receive benefits according to the terms of a QDRO.

³ Includes 51 alternate payees receiving benefits according to the terms of a QDRO.

Exhibit 3
Firefighter and Pensioner Reconciliation

| | Active Firefighters | Current Payment Status | Vested Terminated Firefighters | Total |
|----------------------------|------------------------|------------------------------|--------------------------------------|-----------|
| 1. As of January 1, 2018 | 900 ¹ | 775 ² | 6 ⁵ | 1,681 |
| 2. Change of status | | | | |
| a. retirement | (39) | 39 | 0 | 0 |
| b. disability | (1) | 1 | 0 | 0 |
| c. death | (2) | (39) | (1) | (42) |
| d. survivor payment begins | 0 | 13 | 0 | 13 |
| e. withdrawal | (13) | 0 | 0 | (13) |
| f. vested termination | 0 | 0 | 0 | 0 |
| g. QDRO alternate payee | 0 | 2 | (1) | 1 |
| h. completion of payments | 0 | (1) | 0 | (1) |
| i. correction | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> |
| j. net changes | (55) | 15 | (2) | (42) |
| 3. New firefighters | <u>53</u> | <u>0</u> | <u>0</u> | <u>53</u> |
| 4. As of January 1, 2020 | 898 ^{3,6} | 790 ⁴ | 4 | 1,692 |

¹ Includes 79 who have entered the Forward DROP.

² Includes 51 alternate payees receiving benefits according to the terms of a Qualified Domestic Relations Order (QDRO).

³ Includes 122 who have entered the Forward DROP.

⁴ Includes 50 alternate payees receiving benefits according to the terms of a QDRO.

⁵ Includes one alternate payee entitled to receive benefits according to the terms of a QDRO.

⁶ Includes 471 Base Plan members and 427 Tier 2 Plan members.

Exhibit 4

Breakdown of Monthly Benefit Payment Amounts as of January 1, 2020

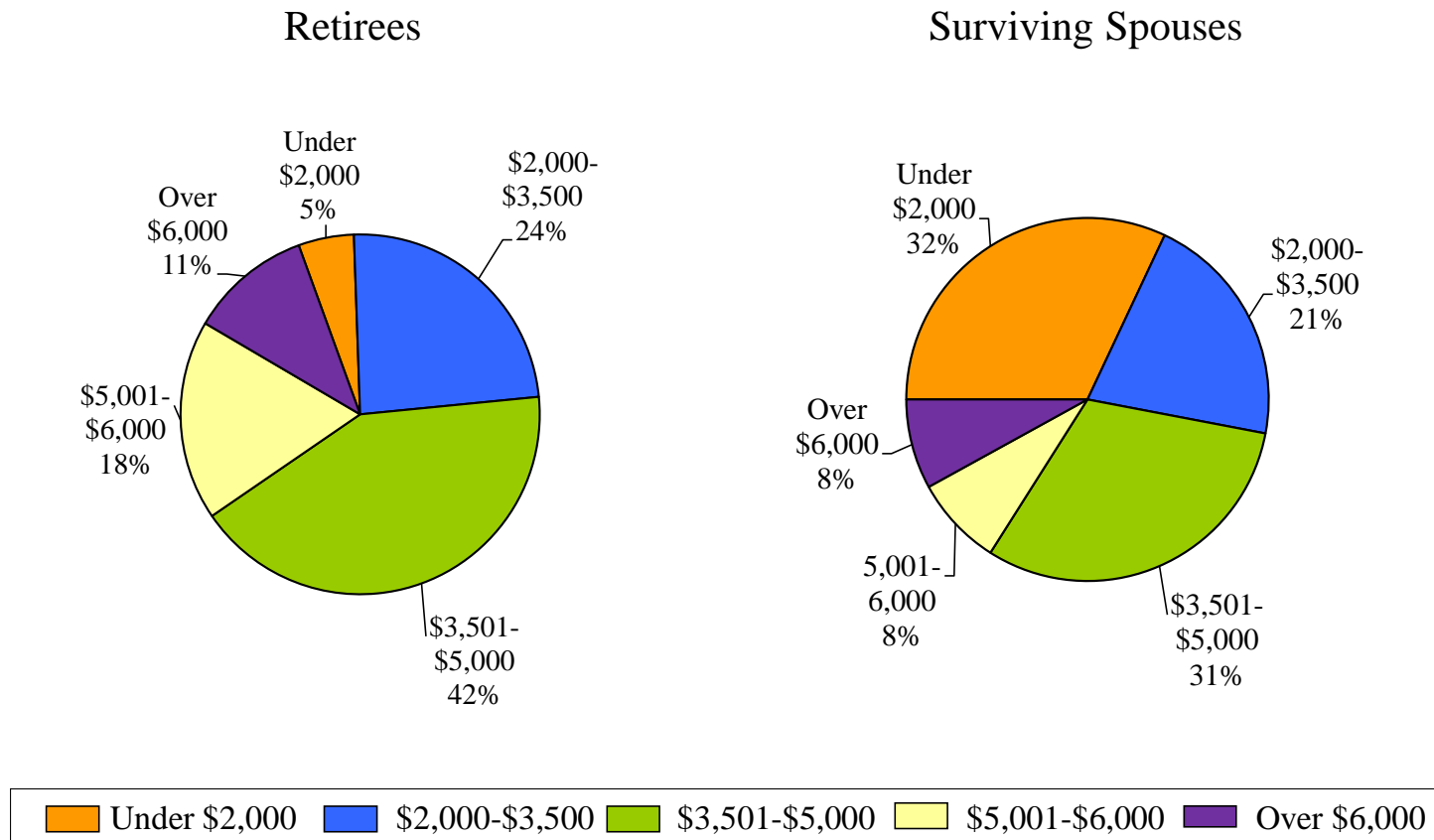


Exhibit 5

Historical Comparison of Actuarial Accrued Liability and Actuarial Value of Assets
(Present Plan Valuations as of January 1)

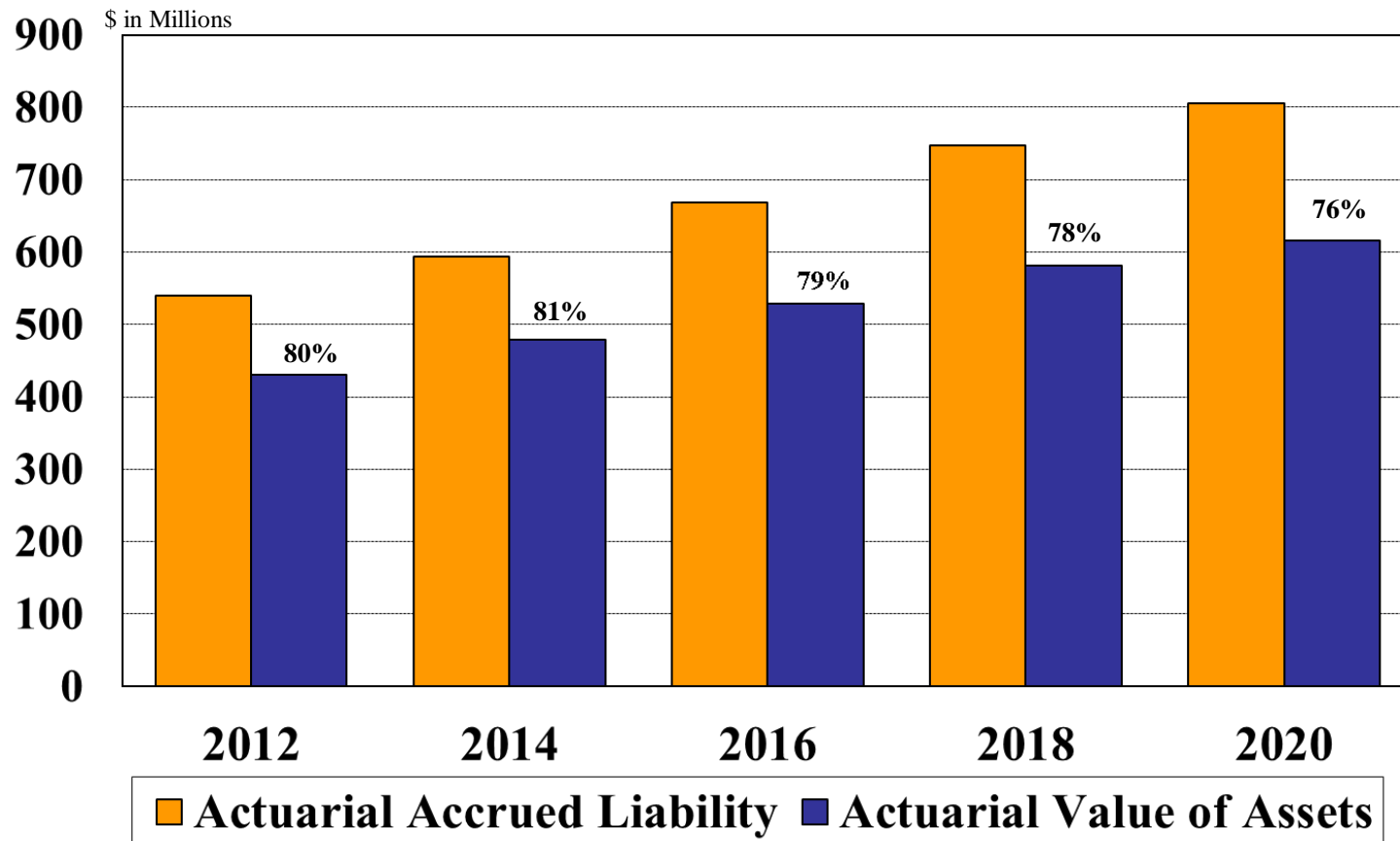


Exhibit 6
Summary of Asset Data

| Asset Type | Market Value Allocation as a Percent of Total Assets as of December 31, 2019 |
|-------------------------|--|
| Equities | |
| U.S. Large Cap | 22.5% |
| U.S. Small Cap | 8.6 |
| International Developed | 21.5 |
| Emerging Markets | <u>5.7</u> |
| Total | 58.3 |
| Alternatives | |
| Real Estate | 7.8 |
| Private Equity | <u>10.1</u> |
| Total | 17.9 |
| Fixed Income | |
| U.S. Core Plus - Active | 13.0 |
| U.S. Core - Passive | 6.9 |
| Bank Loans | <u>3.4</u> |
| Total | 23.3 |
| Cash Equivalents | <u>0.5</u> |
| Grand Total | 100.0% ¹ |

¹ This allocation is from the December 31, 2019 performance review and report from the investment consultant AndCo.

| Comparison of Asset Values as of the Prior and Current Actuarial Valuation Dates | | |
|---|--------------------------|--------------------------|
| | <u>December 31, 2017</u> | <u>December 31, 2019</u> |
| Market Value ² | \$ 601,790,721 | \$ 643,133,030 |
| Actuarial Value ³ | \$ 581,448,450 | \$ 615,418,214 |
| Actuarial Value as a Percent of Market Value | 96.6% | 95.7% |

² "Market value of assets" is a synonym for the accounting term "fiduciary net position."

³ The average annual rate of return on the actuarial value of assets for the two years 2018 and 2019 was 6.04%.

Exhibit 7
Statement of Changes in Assets
for the Years Ended December 31, 2019 and 2018

| | <u>12/31/2019¹</u> | <u>12/31/2018²</u> |
|--|-------------------------------|-------------------------------|
| Additions | | |
| 1. Contributions | | |
| a. Employer | \$ 12,789,438 | \$ 12,271,270 |
| b. Employees | <u>11,000,590</u> | <u>10,128,623</u> |
| c. Total | \$ 23,790,028 | \$ 22,399,893 |
| 2. Investment Income | | |
| a. Interest, dividends, other | \$ 14,065,302 | \$ 11,980,879 |
| b. Net appreciation in fair value | <u>99,523,961</u> | <u>(43,308,670)</u> |
| c. Total | \$ 113,589,263 | \$ (31,327,791) |
| 3. Other Additions | <u>0</u> | <u>0</u> |
| Total Additions | \$ 137,379,291 | \$ (8,927,898) |
| Deductions | | |
| 4. Benefit Payments | \$ 41,699,623 | \$ 38,877,155 |
| 5. Expenses | | |
| a. Investment-related | \$ 2,434,459 | \$ 2,346,244 |
| b. General administrative | <u>920,350</u> | <u>831,253</u> |
| c. Total | \$ 3,354,809 | \$ 3,177,497 |
| Total Deductions | \$ 45,054,432 | \$ 42,054,652 |
| Net Increase in Assets | \$ 92,324,859 | \$ (50,982,550) |
| Market Value of Assets (Fiduciary Net Position) ³ | | |
| Beginning of Year | \$ 550,808,171 | \$ 601,790,721 |
| End of Year | \$ 643,133,030 | \$ 550,808,171 |
| Rate of Return | | |
| Net of Investment-Related Expenses | 20.53% | (5.68)% |

¹ Preliminary² Audited³ The Forward DROP account balances are excluded from the Fund's net assets in the audited financial report. The amount was \$12,110,462 as of December 31, 2019.

Exhibit 8
Development of Actuarial Value of Assets

| Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Plan Years Ending December 31 | | | | |
|---|--------------------|--------------------|--------------------|--------------------|
| | 2019 | 2018 | 2017 | 2016 |
| 1. Market Value of Assets as of beginning of year | \$550,808,171 | \$601,790,721 | \$526,344,624 | \$505,209,625 |
| 2. Firefighter Contributions | 11,000,590 | 10,128,623 | 9,600,215 | 9,183,060 |
| 3. City Contributions | 12,789,438 | 12,271,270 | 11,796,406 | 11,295,350 |
| 4. Benefit Payments and Administrative Expenses ¹ | (42,619,973) | (39,708,408) | (38,387,524) | (34,075,964) |
| 5. Expected Investment Return ² | <u>41,957,973</u> | <u>45,968,076</u> | <u>40,133,311</u> | <u>38,626,841</u> |
| 6. Expected Market Value of Assets as of end of year | 573,936,199 | 630,450,282 | 549,487,032 | 530,238,912 |
| 7. Actual Market Value of Assets as of end of year ³ | <u>643,133,030</u> | <u>550,808,171</u> | <u>601,790,721</u> | <u>526,344,624</u> |
| 8. Actuarial Investment Gain/(Loss) | 69,196,831 | (79,642,111) | 52,303,689 | (3,894,288) |
| 9. Market Value Rate of Return Net of Expenses | 20.53% | (5.68)% | 17.85% | 6.97% |
| 10. Rate of Actuarial Investment Gain/(Loss) | 12.78% | (13.43)% | 10.10% | (0.78)% |

¹ Administrative expenses are included for all years to retroactively make the investment return assumption net of investment-related expenses.

² Assuming uniform distribution of contributions and payments during the plan year; investment return assumed to be 7.75% per year.

³ "Market value of assets" is a synonym for the accounting term "fiduciary net position."

| Plan Year | Investment Gain/(Loss) | Deferral Percentage | Deferred Gain/(Loss) as of 12/31/2019 |
|-----------|------------------------|---------------------|---------------------------------------|
| 2019 | \$ 69,196,831 | 80% | \$ 55,357,465 |
| 2018 | (79,642,111) | 60% | (47,785,267) |
| 2017 | 52,303,689 | 40% | 20,921,476 |
| 2016 | (3,894,288) | 20% | (778,858) |
| Total | | | <u>\$ 27,714,816</u> |

| Actuarial Value of Assets as of December 31, 2019 | |
|---|-------------------|
| 11. Market Value of Assets as of December 31, 2019 | \$ 643,133,030 |
| 12. Deferred Gain/(Loss) to be Recognized in Future | <u>27,714,816</u> |
| 13. Actuarial Value as of December 31, 2019 (Item 11 – Item 12) | \$ 615,418,214 |
| 14. Item 13 ÷ Item 11 | 95.7% |

Exhibit 9

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

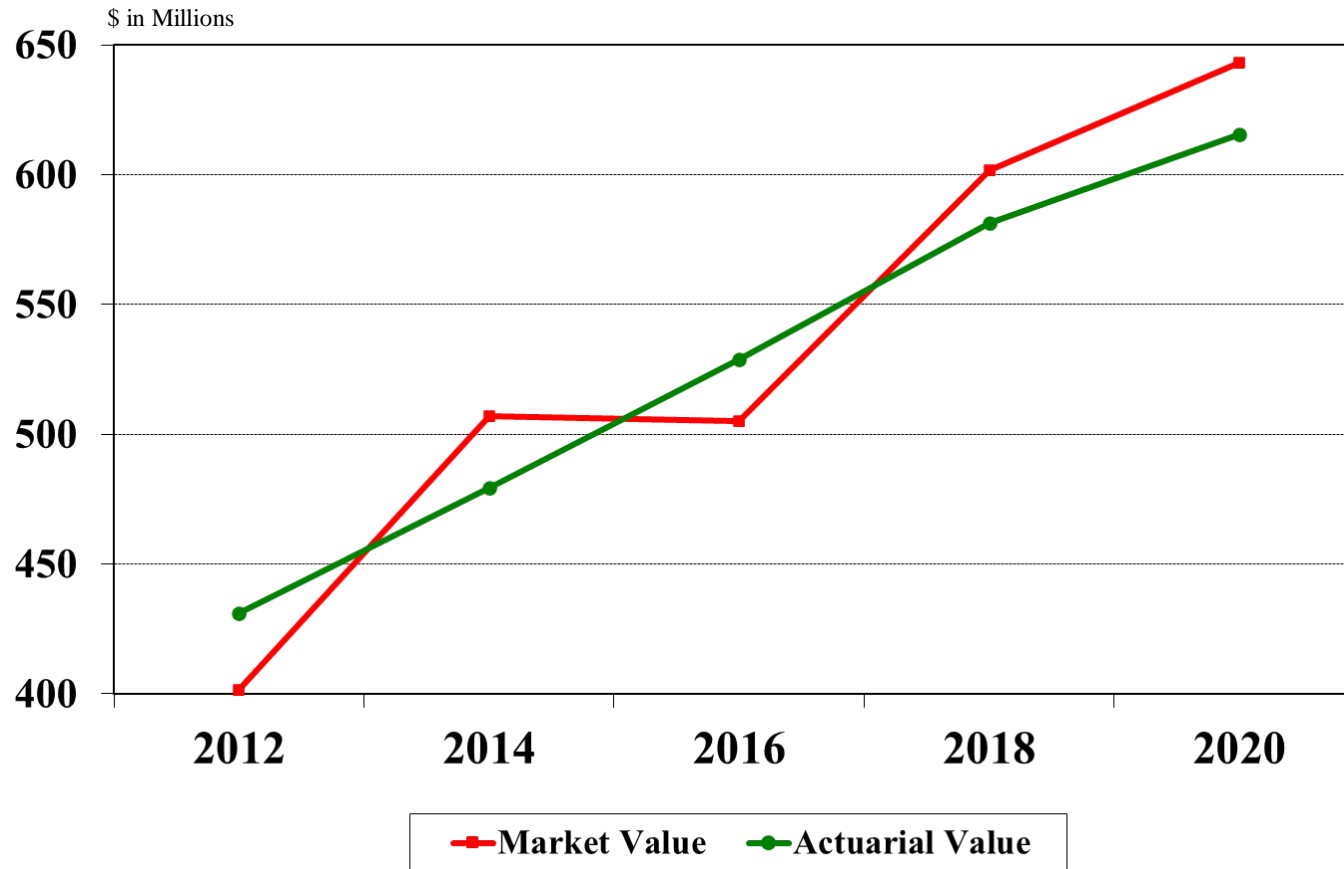
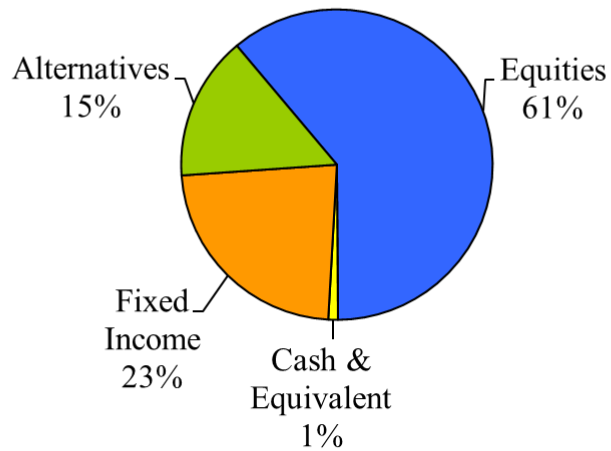


Exhibit 10

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

December 31, 2017



December 31, 2019

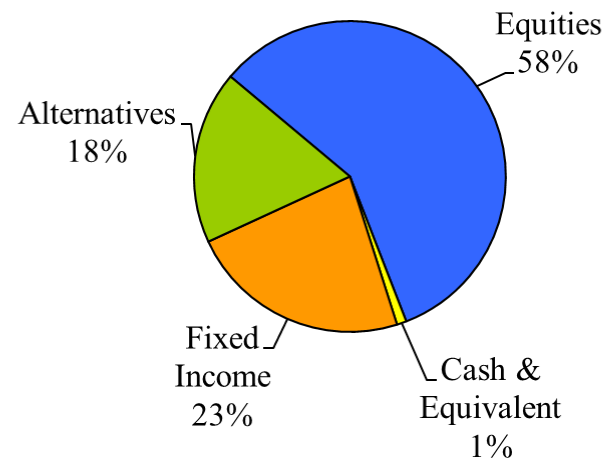


Exhibit 11

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, recognizing whether a member is covered by the base plan or the second-tier plan. 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 present value of projected benefits and of future normal cost contributions for each member reflect whether the member is covered by the base plan or the second-tier plan.) 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. In addition, the determination uses the normal cost contribution rate of the Second-Tier Plan members (those hired after June 30, 2007) for all firefighters and an adjusted UAAL based on the present value of future normal costs with the same normal cost contribution rate.

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 7.75% investment return assumption net of investment-related expenses used in this actuarial valuation was made retroactive for determining the actuarial gains or losses.

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 and recommend the economic assumptions as a part of each actuarial valuation. See our review of the economic assumptions in Appendix A.

We reviewed the demographic assumptions used in the prior actuarial valuation and recommended no changes. The only economic assumption change we recommended was a change in the administrative expenses assumption as explained in our separate letter to the board and also summarized in Appendix A. We were guided in our review of assumptions by the relevant actuarial standards of practice. As a result of our review, we have recommended actuarial assumptions we consider to be reasonable and appropriate estimates of future experience for the Fund for the long-term future.

1. Investment Return

7.75% per year net of investment-related expenses.

2. Inflation

3% per year included in compensation increases and investment return assumptions.

3. Mortality Rates

RP-2014 Mortality Tables with Blue Collar adjustment projected to 2030 by Scale BB for males and for females (sex distinct) for both pre-retirement and post-retirement mortality, except for disabled pensioners for which we use the RP-2014 Tables for Disabled Lives.

4. Compensation Increases

General increases of 3% per year plus promotion and longevity increases that vary by service and average 2.58% per year over a 25-year career. See Exhibit 12B.

5. Retirement Rates

See Exhibit 12A for the percentage of members eligible to retire assumed either to retire without Forward DROP or to enter the Forward DROP.

6. Forward DROP Election

See Exhibit 12A for the percentage of members assumed to retire who elect to enter the Forward DROP. The DROP period is assumed to average four years.

7. Withdrawal Rates

See Exhibit 12B.

8. Disability Rates

See Exhibit 12B.

9. Percent Married

100% of the active 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. Actual marital status and spouse date of birth are used for current retirees.

10. Surviving Child's Death Benefit

None are assumed as a result of future deaths.

11. Firefighters' Contribution Rate

18% of covered pay.

12. City's Contribution Rate

18.5% of covered pay for at least as long as the period required to amortize the UAAL.

13. Covered Payroll for First Year Following Valuation Date

The annualized rate of pay as of January 1, 2020 used for projecting benefits is increased 4% to reflect the assumed overtime for the year for projecting contributions.

14. Administrative Expenses

The expenses paid by Fund assets for other than investment-related expenses are assumed to be 1.40% of payroll. The normal cost rate as a percent of payroll is assumed to be 1.40% of payroll higher to reflect these expenses.

Exhibit 12A

**Rates of Retirement and Forward DROP Election
for Both the Base Plan and the Second-Tier Plan**

| Age | Assumed Rate of Retirement ¹ | Division of Those Assumed to Retire | |
|----------|---|-------------------------------------|---------------------------------|
| | | Election to Enter Forward DROP | Retirement without Forward DROP |
| Under 42 | 0% | 0% | 100% |
| 42 | 5 | 0 | 100 |
| 43 | 10 | 0 | 100 |
| 44 | 10 | 0 | 100 |
| 45 | 15 | 100 | 0 |
| 46 | 18 | 100 | 0 |
| 47 | 18 | 100 | 0 |
| 48 | 19 | 100 | 0 |
| 49 | 19 | 100 | 0 |
| 50 | 20 | 100 | 0 |
| 51 | 30 | 100 | 0 |
| 52 | 30 | 100 | 0 |
| 53 | 30 | 100 | 0 |
| 54 | 35 | 0 | 100 |
| 55 | 35 | 0 | 100 |
| 56 | 50 | 0 | 100 |
| 57 | 50 | 0 | 100 |
| 58 | 50 | 0 | 100 |
| 59 | 50 | 0 | 100 |
| 60 | 50 | 0 | 100 |
| 61 | 50 | 0 | 100 |
| 62 | 50 | 0 | 100 |
| 63 | 100 | 0 | 100 |
| 64 | 100 | 0 | 100 |
| 65 | 100 | 0 | 100 |
| 66 | 100 | 0 | 100 |
| 67 | 100 | 0 | 100 |
| 68 | 100 | 0 | 100 |
| 69 | 100 | 0 | 100 |
| 70 | 100 | 0 | 100 |

¹ Percentage of members eligible to retire assumed either to retire without Forward DROP or to enter the Forward DROP.

Exhibit 12B
Disability and Withdrawal Rates per 1,000 Active Members
Compensation Increases by Years of Service

| Attained Age | Disability and Withdrawal Rates | | Compensation Increases | |
|-----------------|---------------------------------|------------|------------------------|------------------|
| | Disability | Withdrawal | Years of Service | Increase Percent |
| 20 | 1.0 | 20 | 1 | 12.5% |
| 21 | 1.0 | 20 | 2 | 12.5 |
| 22 | 1.0 | 20 | 3 | 12.5 |
| 23 | 1.0 | 20 | 4 | 8.8 |
| 24 | 1.0 | 20 | 5 | 8.2 |
| 25 | 1.0 | 20 | 6 | 7.5 |
| 26 | 1.0 | 20 | 7 | 7.4 |
| 27 | 1.0 | 20 | 8 | 6.0 |
| 28 | 1.0 | 20 | 9 | 5.6 |
| 29 | 1.0 | 20 | 10 | 5.0 |
| 30 | 1.0 | 15 | 11 | 5.0 |
| 31 | 1.0 | 15 | 12 | 4.6 |
| 32 | 1.0 | 15 | 13 | 4.6 |
| 33 | 1.0 | 15 | 14 | 4.3 |
| 34 | 1.0 | 10 | 15 | 4.0 |
| 35 | 1.0 | 10 | 16 | 3.5 |
| 36 | 1.0 | 10 | 17 | 3.5 |
| 37 | 3.0 | 10 | 18 | 3.5 |
| 38 | 3.0 | 10 | 19 | 3.5 |
| 39 | 3.0 | 10 | 20 | 3.5 |
| 40 | 3.0 | 10 | 21 | 3.5 |
| 41 | 3.0 | 10 | 22 | 3.5 |
| 42 | 3.0 | 10 | 23 | 3.5 |
| 43 | 3.0 | 10 | 24 | 3.0 |
| 44 | 3.5 | 10 | 25 | 3.0 |
| 45 | 3.5 | 5 | 26 | 3.0 |
| 46 | 3.5 | 5 | 27 | 3.0 |
| 47 | 3.5 | 5 | 28 | 3.0 |
| 48 | 3.5 | 5 | 29 | 3.0 |
| 49 | 3.5 | 5 | 30 | 3.0 |
| 50 | 3.5 | 0 | 31 | 3.0 |
| 51 | 3.5 | | 32 | 3.0 |
| 52 | 3.5 | | 33 | 3.0 |
| 53 | 3.5 | | 34 | 3.0 |
| 54 | 3.5 | | 35 | 3.0 |
| 55 | 3.5 | | 36 | 3.0 |
| 56 | 3.5 | | 37 | 3.0 |
| 57 | 3.5 | | 38 | 3.0 |
| 58 | 3.5 | | 39 | 3.0 |
| 59 | 3.5 | | 40+ | 3.0 |
| 60 | 0.0 | | | |

Exhibit 13

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 14

Summary of Present Plan

Firefighters in the El Paso Fire Department are covered by the Fund which provides service retirement, death and disability benefits. Those hired prior to July 1, 2007 are in the Base Plan, while those hired on or after July 1, 2007 are in the Second-Tier Plan.

Retirement

Base Plan – Firefighters may retire with at least 20 years of service and the attainment of age 45 or more. The monthly benefit is equal to 2.75% of the final 36-month average wages, excluding overtime, for each year of service, not to exceed 28 years. If a firefighter terminates with at least 20 years of service before age 45, the member may elect an early retirement benefit which is actuarially reduced based on the years and months below age 45. If a firefighter terminates with at least 10 years of service but less than 20, the member is entitled to a retirement benefit commencing at age 50, or their age at termination if older. The normal form of the monthly benefit in all three of these types of retirement is joint and 100% to a surviving spouse paid at the end of each month. A 3% cost-of-living adjustment (COLA) is provided upon the earlier of the retiree having attained age 60 or the fifth anniversary of the pension commencement date and in each January thereafter.

A retiring member who is age 50 or more with more than 20½ years of service could elect until June 30, 2019, the Back Deferred Retirement Option Program (Back DROP) in which he receives a monthly benefit and a lump sum benefit. He would elect a benefit computation date a minimum of six months and a maximum of 36 months prior to his retirement date, as long as he has at least 20 years of service for his benefit computation. The Back DROP monthly benefit was based on the service, not to exceed 28 years minus the DROP period, and final 36-month average wages as of the benefit computation date. The lump sum was the monthly benefit multiplied by the number of months between the benefit computation date and the retirement date.

Effective July 1, 2016, a member who attains age 45 or more with at least 20 years of service is eligible to participate in the Forward DROP by an irrevocable written election. His benefit is calculated based on the service and final 36-month average wages as of the date participation in the Forward DROP begins. Upon retirement, he receives the lump sum of the total of the monthly retirement benefits between the benefit computation date and the retirement date as if they had commenced when the Forward DROP began, and he begins receiving the monthly benefit.

Second-Tier Plan – Firefighters may retire with at least 20 years of service and the attainment of age 45. The monthly benefit is equal to 2.5% of the final 36-month average wages, excluding overtime, for each year of service. If a firefighter terminates with at least 20 years of service before age 45, the member may elect an early retirement benefit

which is actuarially reduced based on the years and months below age 45. If a firefighter terminates with at least 10 years of service but less than 20, the member is entitled to a retirement benefit commencing at age 50, or their age at termination if older. The normal form of the monthly benefit is joint and 75% to a surviving spouse paid at the end of each month. COLAs are not provided.

A member who attains age 45 or more with at least 20 years of service is eligible to participate in the Forward DROP by an irrevocable written election. His benefit is calculated based on the service and final 36-month average wages as of the date participation in the Forward DROP begins. Upon retirement, he receives the lump sum of the total of the monthly retirement benefits between the benefit computation date and the retirement date as if they had commenced when the Forward DROP began, and he begins receiving the monthly benefit.

Death

Base Plan – Upon the death of a retiree with 20 or more years of service, the death benefit for a qualified spouse is 100% of the pension. If the deceased retiree has less than 20 years of service, the death benefit for a qualified spouse is two-thirds of the pension but not to exceed one-third of the retiree's final average wages.

Upon the death of a firefighter with 20 or more years of service, the death benefit for a qualified spouse is the greater of 50% of the firefighter's final average wages and 100% of the benefit calculated as if the firefighter had retired. If the deceased firefighter has less than 20 years of service, the death benefit for a qualified spouse is the greater of 50% of the member's final average wages or the benefit calculated as if the member were eligible for early retirement based on actual service and reduced for age.

Upon the death of a former member with at least 10 but less than 20 years of service, the death benefit for a qualified spouse is two-thirds of the deferred pension benefit, payable when the former member would have attained age 50, but not to exceed one-third of the member's final average wages.

Second-Tier Plan – Upon the death of a retiree with 20 or more years of service, the death benefit for a qualified spouse is 75% of the pension. If the deceased retiree has less than 20 years of service, the death benefit for a qualified spouse is two-thirds of the pension, but not to exceed one-third of the retiree's final average wages.

Upon the death of a firefighter with 20 or more years of service and age 45 or above, the death benefit for a qualified spouse is the greater of 50% of the member's final average wages and 75% of the amount calculated as if the member had retired. If the deceased firefighter has less than 20 years of service, the death benefit for a qualified spouse is the greater of 50% of the member's final average wages on the benefit

calculated as if the member were eligible for early retirement based on actual service and reduced for age.

Upon the death of a former member with at least 10 but less than 20 years of service, the death benefit for a qualified spouse is two-thirds of the deferred pension benefit, payable when the former member would have attained age 50, but not to exceed one-third of the member's final average wages.

Base Plan and Second-Tier Plan

Disability – If a member becomes permanently disabled, the benefit is the greater of 50% of the member's final average wages or the benefit calculated as if the member were eligible for an unreduced retirement benefit based on actual service.

Refund – A former member with less than five years of vesting service shall not be entitled to a pension or a refund of amounts contributed by the member or by the city. A former member with five or more years of vesting service may, if they request, be refunded the amount contributed by the member without interest and shall forfeit all years of credited service.

Member Contributions – Each firefighter shall contribute each pay period 15.28% of total wages through August 31, 2018; 15.824% of total wages from September 1, 2018 through August 31, 2019; 16.368% of total wages from September 1, 2019 through August 31, 2020; 16.912% of total wages from September 1, 2020 through August 31, 2021; 17.456% of total wages from September 1, 2021 through August 31, 2022; and 18% of total wages beginning September 1, 2022.

City Contributions – The city shall contribute 18% of total wages each pay period for all firefighters according to a city ordinance and an additional amount as a percentage of total wages of firefighters hired above age 29 according to another city ordinance.

Appendix A

El Paso Firemen & Policemen's Pension Fund
Review of the Actuarial Economic Assumptions
for the January 1, 2020 Actuarial Valuations

Asset Allocation and Investment Return Assumption Development

| | Gross Annual Real Rate of Investment Return (ROR) ^(A) | Estimated Investment Expenses ^(B) | Net Real ROR | Asset Allocation | | |
|--|---|--|--------------------|-----------------------------------|----------------------------------|--------------------|
| | | | | 12/31/19 Actual ^(C) | Current Target ^(C) | Modified Target |
| Equities | | | | | | |
| Domestic Large Cap | 6.5% | 0.69% | 5.81% | 22.5% | 19.25% | 20% |
| Domestic Small Cap | 7.0 | 1.00 | 6.00 | 8.6 | 8.25 | 10 |
| International Developed | 7.0 | 0.68 | 6.32 | 21.5 | 22.50 | 25 |
| Emerging Markets | 8.5 | 0.80 | 7.70 | <u>5.7</u> | <u>5.00</u> | <u>5</u> |
| | | | | 58.3 | 55.00 | 60 |
| Fixed Income | | | | | | |
| Domestic Core Plus - Active | 2.5 | 0.34 | 2.16 | 13.0 | 12.50 | 17 |
| Domestic Core - Passive | 2.0 | 0.08 | 1.92 | 6.9 | 7.50 | 10 |
| Bank Loans | 3.0 | 0.55 | 2.45 | <u>3.4</u> | <u>5.00</u> | <u>3</u> |
| | | | | 23.3 | 25.00 | 30 |
| Alternatives | | | | | | |
| Real Estate | 5.0 | 1.08 | 3.92 | 7.8 | 10.00 | 5 |
| Private Equity | 8.5 | 1.75 | 6.75 | <u>10.1</u> | <u>10.00</u> | <u>5</u> |
| | | | | 17.9 | 20.00 | 10 |
| Cash | | | | | | |
| | 0.5 | 0.15 | 0.35 | <u>0.5</u> | <u>0.00</u> | <u>0</u> |
| | | | | 100.0% | 100.00% | 100% |
| <u>Weighted Average Assumption</u> | | | | | | |
| Net Real ROR | | | | 5.11% | 5.02% | 4.89% |
| <u>Possible Theoretical Annual Investment Return Assumption</u> | | | | | | |
| <u>Net Real ROR Plus Assumed Annual Rate of Inflation</u> | | | | | | |
| Assumed 3.00% Inflation | | | | 8.11% | 8.02% | 7.89% |

(A) A gross annual real rate of investment return is the total annual rate of investment return, before any expenses, that is in excess of the assumed annual inflation rate. These are long-term assumptions made by Rudd and Wisdom, Inc.

(B) These assumed investment-related expenses are primarily based on information from AndCo's report as of December 31, 2019 for both direct and indirect investment manager expenses and on the 2019 investment expense report for the direct and indirect expenses on real estate and private equity. In addition, we have added 0.05% for other investment-related expenses (investment consultant fees, custodial fees, legal fees, and due diligence expenses) based on the actual fees in the years 2016-2019.

(C) This allocation is from the December 31, 2019 performance review and report by AndCo.

Appendix A (continued)

**Price Inflation in the USA
Average Annual Rates of Increase in the CPI-U**

| <u>Years (Dec. to Dec.)</u> | <u>Number of Years</u> | <u>Average Annual Increase</u> |
|---------------------------------|----------------------------|------------------------------------|
| 1954 – 2019 | 65 | 3.54% |
| 1959 – 2019 | 60 | 3.68 |
| 1964 – 2019 | 55 | 3.91 |
| 1969 – 2019 | 50 | 3.91 |
| 1974 – 2019 | 45 | 3.62 |
| 1979 – 2019 | 40 | 3.07 |
| 1984 – 2019 | 35 | 2.58 |
| 1989 – 2019 | 30 | 2.40 |
| 1994 – 2019 | 25 | 2.18 |
| 1999 – 2019 | 20 | 2.14 |

Most inflation forecasts are for 10 years or less. For example, the average 10-year forecast in the June 2020 Livingston Survey published by the Federal Reserve Bank of Philadelphia was 2.0%. Similarly, the 2020 Wall Street Consensus Survey for the next decade included an average inflation forecast of 2.1%. However, 10 years is much too short a forecast period for a public employee defined benefit pension plan. In the 2020 annual report of the OASDI Trust Funds (Social Security), the ultimate inflation assumptions for their 75-year projections are 3.0%, 2.4%, and 1.8% 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 2.25% to 3.25%. Shorter term considerations make the bottom half of that range more desirable.

**Investment-Related Expenses Other Than Brokerage Fees
(Investment Consultant, Legal, Custodian, and Due Diligence Expenses)**

| <u>Plan Year</u> | <u>Expenses Paid by the Fund</u> | <u>Assets at the Beginning of Year</u> | <u>Expenses ÷ Assets (2) ÷ (3)</u> |
|------------------|--------------------------------------|--|--|
| (1) | (2) | (3) | (4) |
| 2014 | \$ 743,643 | \$1,243,383,245 | 0.060% |
| 2015 | 649,484 | 1,270,861,916 | 0.051 |
| 2016 | 662,295 | 1,245,378,586 | 0.053 |
| 2017 | 643,329 | 1,295,716,967 | 0.050 |
| 2018 | 699,834 | 1,472,869,071 | 0.048 |
| 2019 | <u>671,498</u> | <u>1,349,957,443</u> | 0.050 |
| 2016-2019 | \$2,676,956 | \$5,363,922,067 | 0.050% |

Appendix A (continued)

Administrative Expenses

| <u>Group</u> | <u>Plan Year</u> | <u>Expenses</u> | <u>Payroll</u> | <u>Expenses ÷ Payroll</u> |
|--------------|------------------|-----------------|-------------------|-------------------------------|
| Fire | 2014 | \$ 657,040 | \$ 57,261,047 | 1.15% |
| | 2015 | 929,371 | 59,773,377 | 1.55 |
| | 2016 | 923,263 | 60,098,560 | 1.54 |
| | 2017 | 934,076 | 62,828,632 | 1.49 |
| | 2018 | 831,561 | 65,506,552 | 1.27 |
| | 2019 | <u>920,350</u> | <u>68,727,915</u> | 1.34 |
| | 2017-2019 | \$2,685,987 | \$197,063,099 | 1.36% |
| | Police | 2014 | \$ 957,359 | \$ 78,459,345 |
| 2015 | | 929,372 | 81,695,227 | 1.14 |
| 2016 | | 860,435 | 79,781,483 | 1.08 |
| 2017 | | 974,083 | 84,260,634 | 1.16 |
| 2018 | | 848,257 | 89,173,129 | 0.95 |
| 2019 | | <u>919,613</u> | <u>95,292,546</u> | 0.97 |
| 2017-2019 | | \$2,741,953 | \$268,726,309 | 1.02% |
| Staff | | 2015 | \$ 0 | \$352,220 |
| | 2016 | 249 | 630,471 | 0.04 |
| | 2017 | 70 | 702,236 | 0.01 |
| | 2018 | 16 | 734,360 | 0.00 |
| | 2019 | 0 | 796,080 | 0.00 |

The assumed future administrative expenses as a percent of payroll will again be added to the normal cost contribution rate just as they were for the January 1, 2018 actuarial valuations in order for the actuarial valuation assumptions to be consistent with the GASB 67/68 requirements for recognizing expenses. For the January 1, 2020 actuarial valuations, we recommend assuming 1.40% of payroll for the Firemen's Fund and 1.05% of payroll for the Policemen's Fund. These are based on the averages developed above for the last three plan years rounded up. The covered payroll was determined as the employee contributions for the plan year divided by their contribution rate. For the Staff Plan, we recommend assuming that administrative expenses will average 1% of payroll. This recommendation is not based on the experience above, but on the potential future allocation of actuarial, accounting, legal, and any other administrative expenses to the Staff Plan. We will review this assumption every two years and make adjustments to integrate emerging actual allocation of expenses.

Appendix A (continued)

Comparison of 1/1/2018 Actuarial Economic Assumptions
with 1/1/2020 Actuarial Economic Assumptions

| <u>Actuarial Assumption¹</u> | <u>1/1/2018 Actuarial Economic Assumptions</u> | <u>1/1/2020 Actuarial Economic Assumptions</u> |
|--|--|--|
| Inflation (Price) | 3.00% | 3.00% |
| Net real rate of return ² | <u>4.75</u> | <u>4.75</u> |
| Net total investment return ² | 7.75% | 7.75% |
| Employee general pay increase ³ | 3.00%/4.00% | 3.00%/4.00% |
| Aggregate payroll increase | 3.00% | 3.00% |
| Administrative expenses (% of payroll) | | |
| Fire | 1.55% | 1.40% |
| Police | 1.15% | 1.05% |
| Staff | 1.00% | 1.00% |

¹ All assumptions are annual rates.

² In order to be consistent with what is required for the accounting information, these assumptions are net of investment-related expenses.

³ For both actuarial valuation dates, the compensation increases consist of a 3% annual general pay increase for the Firemen's Fund and 4% for the Policemen's Fund plus promotion and longevity pay increases that vary by years of service for both the Firemen's Fund and the Policemen's Fund. For the Staff Plan, the compensation increases are 4% per year, consisting of a 3% annual general pay increase plus 1% per year for merit and longevity.