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City of Fresno Retirement Systems
2828 Fresno Street, Suite 201
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Re: City of Fresno Retirement Systems
Review of Cost Neutrality for Deferred Retirement Option Plan (DROP)

Dear Rob:

As requested by your office, we have reviewed the cost neutrality of the DROP based on data, assumptions, and methods from the most recent actuarial valuation as of June 30, 2019.

The primary purpose of this review is to determine the cost neutrality of the DROP for the Employees Plan and each Tier of the Fire & Police Plan, and to aid the Retirement Boards in setting the annual effective DROP interest rates in accordance with Sections 3-353(d), 3-424(d) and 3-566(d) of the Municipal Code.

There are three parts to our review:

1. In Part One, **for current active members who have not elected DROP** as of June 30, 2019, we analyzed **projected experience** (i.e., what we anticipate the costs to be for current active members expected to elect DROP in the future). This is necessary for determining whether the DROP would be expected to remain cost neutral for future DROP members based on the most current actuarial assumptions.
2. In Part Two, **for members who have already elected DROP** (including members who have already retired from the DROP as of June 30, 2019), we analyzed **historical experience** by comparing, in the aggregate, the actual and the theoretical amounts (i.e., what the amount would be if accumulated at the assumed interest rates) in their DROP accounts. This is necessary for determining whether the interest already credited to existing DROP accounts would be considered cost neutral.
3. In Part Three, for **current active members who have elected but not yet retired from the DROP** as of June 30, 2019, we analyzed **historical and projected experience** by comparing the total present value of benefits expected to be paid to those members (i.e., current and future accumulations in the DROP account plus future monthly benefits expected to be paid upon retirement from the DROP) to the total present value of benefits that would theoretically have been paid if they had never elected DROP. This is

necessary for determining whether the DROP would be considered cost neutral for the current group of DROP members. We note that this is the first time Part Three is included in the cost neutrality study.

In preparing this report, we have followed the practice of our 2017, 2014 and 2011 cost neutrality studies (as well as the study produced by the Systems' actuary in 2005) in including the analysis of the Employees Plan and the Fire and Police Tier 1 and Tier 2 Plan in a single report. This is because with the exception of the actual results that differ by Plan, the issues and discussions that follow apply equally to both the Employees and the Fire and Police Plans.

This letter provides the results as well as the methodology used in this study.

Summary of Conclusions

Part One - Cost neutrality of DROP for active members who have not elected DROP

We have continued the methodology used in our last cost neutrality study dated June 6, 2017. Under that method, the DROP is deemed cost neutral if the present value of benefits payable to the active members under the current Plans with the DROP provisions is within 2% of what the present value of benefits payable under the Plans would be without the DROP provisions. Furthermore, when determining the present value of benefits under the Plans without the DROP provisions, we included an analysis of the timing of when the members would have retired if the DROP were not in effect. We did that by assuming alternatively that the members would have retired either two years earlier than or at the same time[1] as what we assumed as the date of retirement for the current Plans with the DROP provisions. In our opinion, that method is a reasonable basis to evaluate the cost neutrality of the DROP provisions.

Based on that method, we concluded in the **last study** dated June 6, 2017 that as of June 30, 2016, with respect to the then-current active members who had not elected DROP as reported in the June 30, 2016 valuation, the DROP was cost neutral for both the Employees Plan and the Fire and Police Plan because the increase in the value of benefits under the DROP did not exceed 2%, assuming the members would have retired two years earlier without the DROP.

Based on that same method, we conclude in the **current study** as of June 30, 2019 that the DROP is cost neutral for the Employees Plan because the increase in the value of benefits under the DROP does not exceed 2% even without assuming members would have retired two years earlier without the DROP. However, we cannot conclude that the DROP is cost neutral for the Fire and Police Plan because the increase in the value of benefits under the DROP does

[1] As we discussed in the last and the current studies, the results calculated assuming the members would have retired at the same time without the DROP have been provided for reference only because we believe it is reasonable to expect that the DROP would still have some impact on influencing the retirement behavior of some members.

exceed 2%, even assuming the members would have retired two years earlier without the DROP.

Because of this, for the Fire and Police Plan we have: (a) identified the primary reason behind this result in the current study, (b) examined the impact of an alternative assumption that the DROP program shifts member retirement three years later instead of two years later when compared to if the DROP were not in effect and (c) analyzed the effect of exercising the Board's authority, as defined under the Municipal Code, to reduce the rate of interest credited to the members' DROP accounts so as to achieve cost neutrality under the methodology of this report, i.e., to bring the present value of benefits with the DROP to be within 2% of the present value of benefits without the DROP. We found that the DROP only becomes cost neutral if we reduce the interest crediting rate for the DROP account to 3 percent below the average net rate of return[2] (the maximum reduction allowed in the Municipal Code) together with the alternative assumption that the Fire and Police Plan members would have retired three years earlier without the DROP.

As discussed in the Methodology section below, the primary reason why the DROP is no longer cost neutral under this Part One (which includes only Tier 2 members) without both of these changes is the more robust assumptions for future DROP participation that were developed in the most recent experience study.

Part Two - Accumulated amounts in the DROP accounts for DROP participants

For members who had elected DROP (including members who have already retired from the DROP as of June 30, 2019), we have compared, in the aggregate, the actual and the theoretical amounts (i.e., what the amount would be if accumulated at the assumed investment return used in the actuarial valuations) in their DROP accounts.

In the 2017 study, the total actual balances accumulated in the DROP account for both the Employees and Fire and Police Plans were more than the theoretical balances due to the significant market recovery experienced by the Plans in the three-year period immediately preceding June 30, 2016. Therefore, we also considered the same results over the six-year period ending June 30, 2016. Based on the observation that the total actual balance was less than the theoretical balance in those accounts over that extended period, we concluded in the last study that the DROP did not increase the cost of the plans with respect to the interest credited to the DROP accounts.

In the current study as of June 30, 2019, the total actual balance accumulated in the DROP account for both the Employees and Fire and Police Plans were about 1% to 2% higher than the theoretical balance due to the continued market recovery experienced by the Plans in the three-year period immediately preceding June 30, 2019. However, if we include all the account

[2] The Municipal Code defines the "Average Net Rate of Return" as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans' long term net investment return assumption of 7%.

balance information (from 2005) that we have used since we prepared the 2011 DROP cost neutrality study, we observe that the DROP did not increase the cost of the plans with respect to the interest credited to the DROP accounts.

Part Three - Cost neutrality of DROP for active members who have elected but not yet retired from DROP

In this part of the study which is being performed for the first time, we recommend applying the same 2% threshold that we have been using for Part One of the study. Similarly, as with Part One of the Study we also recommended analyzing the impact of the DROP on member retirement by assuming alternatively that the members retire either two years later than or at the same time[3] as they would have retired if the DROP were not in effect.

Under that method, the DROP would be deemed cost neutral for the active members who elected but have not yet retired from DROP, if the total present value of benefits expected to be paid to those members (i.e., current and future accumulations in the DROP account plus future monthly benefits paid upon retirement from the DROP) is within 2% of the total present value of benefits that would theoretically have been paid if the DROP were not in effect.

After discussions with your office, we have introduced Part Three starting with this study to provide a more comprehensive review of DROP cost neutrality for members who have elected the DROP. This is in addition to our established practice to review the accumulation in these members' DROP accounts as provided in Part Two. Also, as we discussed, in future studies we will expand Part Three of the study by tracking comparable present values for members who retire from the DROP on or after July 1, 2019.

For the Employees Plan, we conclude in this Part Three of the current study as of June 30, 2019 that the DROP is cost neutral (specifically that there is a decrease in the present value of benefits with the DROP compared to the present value of benefits assuming the DROP were not in effect) after applying both of the following conditions: (1) members would have retired two years earlier without the DROP and (2) from the date they enrolled in the DROP to June 30, 2019 members would have received salary increases as assumed in the actuarial valuations as opposed to the lower salary increases they actually received during that period. We believe applying the extra condition of using projected salary increases from the date of DROP to June 30, 2019 is reasonable as actual salary increases granted during the last several years have been lower than our long term assumption.

For the Fire and Police Plan, the DROP is not cost neutral if we only assume members would have retired two years earlier without the DROP. For the Tier 2 members the increase in the value of benefits is within 2% only after we (1) reduce the interest crediting rate for the DROP account to 3 percent below the average net rate of return[4] (the maximum reduction allowed in

[3] This is provided for reference only based on the same reason outlined in footnote (1).

[4] The Municipal Code defines the "Average Net Rate of Return" as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans' long term net investment return assumption of 7%.

the Municipal Code), (2) apply the alternative assumption that the Tier 2 members would have retired three years earlier without the DROP and (3) assume members received salary increases as assumed in the actuarial valuations from the date they enrolled in the DROP to June 30, 2019. For the Tier 1 members, even under all three of these conditions there is still an increase in the present value of the DROP that exceeds 2%.

Background

In 2005, the Systems' prior actuary reviewed the cost neutrality of the DROP and concluded that the change in the present value of benefits for the then current active employees under the Plans with the DROP provisions came within 2% of the present value of benefits for the Plans without the DROP provisions.

In 2011, 2014 and 2017, we reviewed the cost neutrality of the DROP and concluded that the change in the present value of benefits for the then current active employees under the Plans with the DROP provisions came within 2% of the present value of benefits for the Plans without the DROP.[5]

In each cost neutrality study the present value of benefits for the Plans with the DROP provisions are calculated based on the same actuarial assumptions[6] used by the Boards in the most recent regular valuations to set the contribution rate requirements for the City and the active members. Those assumptions are set based on actual experience observed for the members who signed up for the DROP. In particular, in the most recent triennial experience study there was a significant increase in the number of members who elected the DROP in the Fire and Police Tier 2 Plan[7] which allowed us to develop a more robust set of assumptions to anticipate future DROP elections in that Tier. However, in determining what the present value of benefits would be for the Plans without the DROP provisions, additional hypothetical assumptions have to be made as to the age the active employees would have retired from the Plans and the levels of benefit that would have been earned in the absence of the DROP. The hypothetical aspect of the retirement age assumptions without the DROP provisions is discussed in more detail later in this report.

In addition to the above analysis for the active members, for all members who had ever enrolled in the DROP, we compare the interest actually credited to those members' DROP accounts (using a contingent rate calculated based on the Plans' actual average rate of return from investments over the last five years) since the date of the last cost neutrality study to the theoretical investment return assumption assumed by the Boards for the actuarial valuations during that same period.

[5] The studies in 2011 and 2014 actually showed for the Fire and Police Plan a reduction in the value of benefits under the DROP that exceeded 2%.

[6] These assumptions include: the ages active employees were anticipated to sign up for the DROP, the probability of signing up for the DROP at each of those ages, the number of years the active employee was expected to stay in the DROP before retirement from the City, etc.

[7] There were 38 Tier 2 members who elected the DROP during the period July 1, 2016 to June 30, 2019. Those were higher than the 21 and 11 Tier 2 members who elected DROP during the period July 1, 2013 to June 30, 2016 and July 1, 2010 to June, 30, 2013, respectively.

As discussed earlier in this letter, starting with this study, for actives who have elected but not yet retired from the DROP we included a comparison of (1) the actual plus future accumulations in the DROP account balance plus the value of the future retirement benefits earned by each DROP electing member at their date of retirement with (2) the value of the benefit the member would have earned based on their actual age, service and final average compensation at retirement in the absence of the DROP. We will track the comparable present values for members who retire from the DROP on or after July 1, 2019 so that they will be included in our future studies.

Consistent with the prior actuarial study of the DROP, our review is limited to the analysis of the cost of providing pension benefits with and without the DROP. We have not analyzed any possible impact of the DROP program on any other non-pension benefits or costs, such as the retaining of experienced employees relative to the training of new employees, or the relative cost or savings of providing health benefit to a member as an active employee (while participating in the DROP) relative to providing such benefits to a member as a retiree (in the absence of the DROP) should the City offer such benefits outside of the Retirement Plans.

Method used for measuring cost neutrality in Part One and Part Three of the study

A particular actuarial measure has to be chosen by the Retirement Boards as the basis for measuring the cost neutrality of the DROP program. A DROP program may provide an incentive for a member to remain in service longer for the City, depending on when a member signs up for the DROP and how long the member stays in the DROP. These decisions made by the member may change the total present value of benefits paid by the Plans, as well as the allocation of that present value of benefits between service already rendered by the member (i.e., actuarial accrued liability) and future service (i.e., future normal cost).

The method used in the last study was to compare the present value of the total pension benefit with the DROP (including the DROP account) to the present value of the pension benefit without the DROP. As employees are only required to make member contributions into the Plans before electing DROP[8], the two present values have to be adjusted to reflect the appropriate projected member contributions. In that earlier study, the DROP was deemed cost neutral if the difference between the two net present values was within 2%. We believe that this net present value measurement used in the prior study is still reasonable and we have continued to apply that method in this study.

Part One of this study is similar to prior studies in that it determines the actual impact of the DROP on the total present value of pension benefits for all current active members who have not signed up for the DROP. This study examines the impact of the DROP based on complete

[8] The Plans were amended so that any new active members entering DROP after around February 2011 would be required to continue making member contributions into the Plans. However, we have not taken that amendment into account since those member contributions would be deposited into the member's DROP account and therefore not available to defray the City's net present value of pension benefits as described above.

valuation results for the entire active plan membership as of the most recent valuation date, in this case June 30, 2019.

Note that these valuations in Part One of the study address the prospective cost impact of the DROP on current active members, excluding members currently in the DROP. Then in a new Part Three starting with this study, we include a retrospective analysis of the value of benefits for members who have already signed up for the DROP but have not retired after participating in the DROP. Similar to prior studies, the experience of members who elected DROP (especially those who have retired after participating in the DROP) is included in Part Two of the study which is our analysis of the actual interest credited to the DROP accounts versus the theoretical interest that would have been credited using the expected investment return assumption adopted by the Board for use by the Plans between 2016 and 2019.

The analysis provided in the rest of this report includes discussion of the net present value method, including the assumptions used in applying that method, and the results associated with measuring the net present value of the Plans with the DROP and without the DROP.

Method and assumptions used to measure the net present value with the DROP

In our July 1, 2015 to June 30, 2018 triennial experience studies for the Employees and the Fire and Police Plans, we provided our recommended actuarial assumptions for used in the pension valuations. Included in our recommendations were the time periods active employees were anticipated to sign up for the DROP once they become eligible for the program, the probability of signing up for the DROP at each of those time periods, and the number of years the active employee would be expected to stay in the DROP before retirement from the City. Those assumptions were then utilized in the June 30, 2019 valuations.

As discussed above, we have observed a significant increase in the number of members who elected the DROP in the Fire and Police Tier 2 Plan during the most recent triennial experience study. This allowed us to develop a more robust set of assumptions for anticipating members who would be expected to elect DROP in the future. For example, the new assumptions anticipate lower probabilities of electing DROP for eligible members with less than 15 years of service, and increasingly higher probabilities of electing DROP for members with between 15-19 and over 20 years of service, respectively. The old assumptions did not consider years of service directly, and were only a function of years since the members reached DROP eligibility. When reviewing the results under Part One of this report, we determined that <u>this change in the assumptions used to anticipate which members in Tier 2 would elect DROP is the primary reason why the DROP is no longer cost neutral for the Tier 2.</u>

Method and assumptions used to measure the net present value without the DROP in Part One and Part Three of the study

In order to determine what the net present value of pension benefits would have been without the DROP, we would have to know when the members would have retired if the DROP were not in effect. This is because, everything else being equal, if members would have retired earlier, then the cost of the Plans without the DROP would have been calculated using the age, service and final average compensation at such earlier date. This introduces two considerations: how would earlier retirements affect the cost of the plan and would members in fact retire earlier without the DROP.

The cost of a pension plan can be higher or lower at an earlier retirement age depending on whether the benefit accrual factor used for each year of service stays unchanged or decreases at the earlier retirement age. Other factors that influence the change in cost include the shorter service and lower final average compensation at the earlier retirement age and the additional post-retirement COLA paid upon such earlier retirement, among others. However, it is the different benefit accrual factors that can produce different cost neutrality results for different tiers of benefits.

For Fire and Police Tier 1 members, there is no reduction in the benefit accrual factor at an earlier retirement age because members can retire on or after age 50 with a benefit of 2.75% of final average compensation for each of the first 20 years of service plus 2.00% per year of service thereafter. (We note that all Fire and Police Tier 1 active members have either elected DROP or retired based on the data as of June 30, 2019.)

For Fire and Police Tier 2 members, those retiring at age 50 receive a benefit of 2.00% per year of service, and that benefit accrual factor increases to a maximum of 2.70% per year of service for retirements at and beyond age 55. Also, there is a benefit cap of 75% of final average compensation which a Tier 2 member retiring at 55 can attain with just below 28 years of service. This means that between ages 50 and 55 earlier retirements can reduce the benefit accrual if the member has less than 28 years of service.

For the Employees Plan, the benefit accrual factor continues to increase with age indefinitely, and is not subject to a cap. For example, the benefit accrual factor is 1.00% per year of service for retirements at age 55, 1.30% per year of service for retirements at age 65, 1.70% at age 75, 2.10% at age 85, so on and so forth. For an 85 year old retiring with 60 years of service, the benefit would be 126% of final average compensation. This means that earlier retirements can reduce the benefit accrual at all retirement ages.

As for whether members would retire earlier without the DROP, when comparing the present value of plan benefits “with and without the DROP” we know the value “with the DROP” from the annual valuations. We then need to determine the higher or lower “without the DROP” plan present value so we can compare it to the present value of the plan benefits with the DROP structure. Therefore, the question of “how much earlier would members have retired if it were not for the DROP” is crucial in determining whether the DROP is cost neutral.

In practice, it is impossible to really know when members would have retired without the DROP as the program has been in existence since 1998. This means that the question of whether the DROP is cost neutral will depend on a somewhat subjective assessment or estimate of when members would have retired without the DROP.

As in prior studies, in this study we have determined the net present value of benefits without the DROP by assuming that the DROP caused delays in retirement of two years. We did this by taking the current June 30, 2019 valuation results and shortening the length of DROP participation assumption by two years. In other words, if the DROP were not in effect, we assumed that members who were originally expected to elect DROP and remain in DROP for the assumed duration (6 years for members of the Employee Plan and 7 years for members of the Fire and Police Plan) would retire two years earlier than the originally assumed DROP exit date. The results prepared under this assumption are referred to as the Scenario 1 results.

Given that the DROP has been in existence since 1998, one could consider that the DROP may no longer have much influence in delaying a member's decision to retire from the Plans because the member may consider the DROP as part of his/her long-term retirement planning. We have also determined the net present value of benefits without the DROP if we assume that members who were originally expected to elect DROP would continue to work until the originally assumed DROP exit date. The results prepared under this assumption are referred to as the Scenario 2 results.

However, given that the results of the cost neutrality study are very sensitive to when members would have retired without the DROP especially for the Fire and Police Plan, we have also introduced a new Scenario 3 where we assume that members would have retired three years earlier than the originally assumed DROP exit date. Again, while we do not have any data from the City or the Retirement Systems to validate that assumption, a cursory comparison of the average age at retirement from the DROP for Tier 2 members in the City's Fire and Police Plan with the average age at retirement from just the law enforcement members from Fresno County does provide some evidence of earlier retirement from Fresno County that does not offer a DROP.[9] However, due to the difference in job assignment before retirement and level of pension benefit after retirement, it would be very difficult to draw any definitive conclusion by looking at just the average age at retirement from these two employers.

[9] The average age at retirement of the Tier 2 DROP members from the City's Fire and Police Plan, along with the adjustments under Scenarios 1 and 3, are as follows:

Average Age at DROP Entry	54.2
Average Age at Retirement from DROP	59.7
Average Age at Retirement from DROP Minus Two Years	57.7
Average Age at Retirement from DROP Minus Three Years	56.7

The average age at retirement of the law enforcement members from the Fresno County (and the level of benefit per year of service they receive), along with the adjustments under Scenarios 1 and 3, are as follows:

Average Age at Retirement for Safety Tier 1 (3.27% per year of service at 55)	54.5
Average Age at Retirement for Safety Tier 2 (3.00% per year of service at 55)	54.7
Average Age at Retirement for Safety Tier 4 (2.62% per year of service at 55)	56.9
Average Age at Retirement for Safety Tier 5 (2.70% per year of service at 57)	56.8

As we discussed above, while it is impossible to really know when members would have retired without the DROP because of the underlying plan designs we believe it reasonable to expect that the DROP would still have some impact on influencing the retirement behavior of some members. Therefore, we have labeled the results under Scenario 2 as being made available for reference only.

Part One - Cost neutrality results for active members who have never elected DROP

We can now compare the June 30, 2019 net present value of pension benefits with the DROP (as determined in the June 30, 2019 valuation) to the net present value without the DROP, under the alternative estimates of retirement behavior without the DROP just described.

As the DROP is no longer cost neutral for the Fire and Police Plan when we compare the Baseline results with those provided under Scenarios 1 and 2, we have also included the financial impact of the option available at the Board's discretion to reduce the annual interest crediting rate for the DROP account for up to 3.00% (i.e., from an annual rate of 7.00% assumed in our calculations to an annual rate of 4.00%).

Baseline — With the DROP
$ in Thousands

	Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
1. Present Value of Pension Benefits for Active Members	N/A	$810,200	$810,200	$523,895
2. Present Value of Member Contributions up to Date of DROP	N/A	$78,163	$78,163	$85,078
3. Net Present Value of Benefits	N/A	$732,037	$732,037	$438,817
4. Impact of Reducing Annual Interest Crediting Rate into DROP Account by 3 Percent[10]	N/A	$20,889	$20,889	Not Calculated
5. Item (3), less Item (4) if applicable	N/A	$711,148	$711,148	$438,817

[10] Includes the impact of reducing the annual interest crediting rate for monthly pension benefits ($18,151,000) and contributions to be deposited into the DROP Account ($2,738,000) in the future

Scenario 1 — For Use in Determining DROP Cost Neutrality Without the DROP, Assuming Retirements Occur 2 Years Earlier than Originally Assumed DROP Exit

$ in Thousands

	Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
1. Present Value of Pension Benefits for Active Members	N/A	$779,722	$779,722	$547,786
2. Present Value of Member Contributions up to Date of Retirement	N/A	$96,486	$96,486	$101,849
3. Net Present Value of Benefits	N/A	$683,236	$683,236	$445,937
4. Interest Crediting at the Average Net Rate of Return[11] - Baseline Item (3) / Item (3)	N/A	107%	107%	98%
5. Interest Crediting at 3 Percent Below the Average Net Rate of Return[11] - Baseline Item (5) / Item (3)	N/A	104%	104%	98%

Scenario 2 — For Reference Purposes Only Without the DROP, Assuming Retirements Occur on Originally Assumed DROP Exit

$ in Thousands

	Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
1. Present Value of Pension Benefits for Active Members	N/A	$747,244	$747,244	$552,084
2. Present Value of Member Contributions up to Date of Retirement	N/A	$99,052	$99,052	$109,427
3. Net Present Value of Benefits	N/A	$648,192	$648,192	$442,657
4. Interest Crediting at the Average Net Rate of Return[11] - Baseline Item (3) / Item (3)	N/A	113%	113%	99%
5. Interest Crediting at 3 Percent Below the Average Net Rate of Return[11] - Baseline Item (5) / Item (3)	N/A	110%	110%	99%

[11] The Municipal Code defines the “Average Net Rate of Return” as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans’ long term net investment return assumption of 7%.

Scenario 3 — For Use in Determining DROP Cost Neutrality Without the DROP, Assuming Retirements Occur 3 Years Earlier than Originally Assumed DROP Exit

$ in Thousands

	Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
1. Present Value of Pension Benefits for Active Members	N/A	$793,655	$793,655	Not Calculated
2. Present Value of Member Contributions up to Date of Retirement	N/A	$93,230	$93,230	Not Calculated
3. Net Present Value of Benefits	N/A	$700,425	$700,425	Not Calculated
4. Interest Crediting at the Average Net Rate of Return[12] - Baseline Item (3) / Item (3)	N/A	105%	105%	Not Calculated
5. Interest Crediting at 3 Percent Below the Average Net Return[12] - Baseline Item (5) / Item (3)	N/A	102%	102%	Not Calculated

The following are points of note about the results:

- For the Employees Plan, the net present value of benefits under the Baseline ($438.8 million) is lower than the present value of benefits under Scenario 1 ($445.9 million). There is a cost reduction of about 2% of the net present value of benefits for that Plan.
- For the Fire and Police Plan, all active Tier 1 members have elected the DROP as of June 30, 2019. With respect to the Tier 2 members, we conclude in this study that the DROP is not cost neutral as the present value of benefits under the DROP in the Baseline ($711.1 million) even after a reduction in the interest crediting rate for the DROP account is 4% higher compared to the present value of benefits under Scenario 1 ($683.2 million).

  If we assume the Tier 2 members would have retired three years earlier without the DROP, then the present value of benefits as provided under Scenario 3 ($700.4 million) is within 2% of the present value of benefits under the DROP in the Baseline ($711.1 million) but only after a reduction in the interest crediting rate for the DROP account.
- The results under Scenarios 1, 2 and 3 for both the Employees Plan and the Fire and Police Plan show how sensitive the results are to the hypothetical assumption of date of retirement without the DROP.

[12] The Municipal Code defines the “Average Net Rate of Return” as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans’ long term net investment return assumption of 7%.

Part Two - Interest Crediting to DROP Accounts

The Systems provided us with historical data for DROP balances, DROP deposits and withdrawals, and actual interest credited to the DROP accounts for the three-year period since the date of the last cost neutrality study (July 1, 2016) to June 30, 2019. We understand that the actual interest credited to the DROP accounts is based on a five-year trailing average of actual investment returns, net of investment expenses.

In the tables below, we have compared the ending balance of the DROP accounts as of June 30, 2019 to the theoretical ending balances assuming the interest credited were to be based on the investment return assumption of 7.25% assumed by the Boards for the actuarial valuations during that same period[13], consistent with the method used in our last study.

In addition to the assumed investment return rate, we have also included two alternative calculations based on the actual market value rate of return and the smoothed actuarial value rate of return that was used in the actuarial valuation to establish the City and the active member contribution rates in the historical actuarial valuations from July 1, 2016 to June 30, 2019.

Fire and Police DROP Account Ending Balance
$ in Thousands

As of June 30	Actual (5-Year Trailing Average Market Return)	Investment Return Assumption of 7.25%[14]	Actual Market Value Rate of Return[14]	Actual Actuarial Value Rate of Return[14]
2016	$130,484			
2017	$135,163	$134,725	$143,887	$136,286
2018	$139,944	$138,159	$149,971	$141,232
2019	$144,291	$141,412	$151,117	$143,549

Employees DROP Account Ending Balance
$ in Thousands

As of June 30	Actual (5-Year Trailing Average Market Return)	Investment Return Assumption of 7.25%[14]	Actual Market Value Rate of Return[14]	Actual Actuarial Value Rate of Return[14]
2016	$105,406			
2017	$114,835	$114,869	$122,468	$116,197
2018	$126,597	$125,288	$135,191	$127,955
2019	$136,301	$134,087	$141,967	$135,849

[13] Note that the investment return assumption for the June 30, 2019 valuations was reduced to 7.00%.

[14] Assuming DROP deposits and withdrawals are, on average, made at the middle of the year.

The following are points of note about the results:

- Our analysis shows that the actual ending balances of the DROP accounts as of June 30, 2019 are about 1%-2% higher than the ending balances would be if we instead apply the assumed investment return assumption of 7.25% over that three-year period.

  This is similar to the last study due to the significant market recovery experienced by the Plans in the three-year period immediately preceding June 30, 2016.

- If we include all the account balance information (from 2005) that we have used since we prepared the 2011 DROP cost neutrality study, we observe that the DROP did not increase the cost of the plans with respect to the interest credited to the DROP accounts.

Fire and Police DROP Account Ending Balance

$ in Thousands

As of June 30	Actual (5-Year Trailing Average Market Return)	Investment Return Assumption[15, 16]	Actual Market Value Rate of Return[16]	Actual Actuarial Value Rate of Return[16]
2005	$56,473			
2006	$64,160	$65,866	$67,886	$66,993
2007	$73,067	$75,379	$83,545	$80,330
2008	$85,529	$86,520	$82,706	$93,484
2009	$95,577	$96,104	$67,599	$97,575
2010	$99,704	$103,232	$76,544	$97,205
2011	$103,184	$108,928	$92,037	$97,513
2012	$106,889	$113,693	$87,735	$94,644
2013	$110,829	$119,959	$96,406	$99,451
2014	$115,802	$125,551	$109,348	$105,832
2015	$123,505	$131,497	$109,126	$112,112
2016	$130,484	$137,308	$105,703	$116,204
2017	$135,163	$142,043	$115,535	$120,797
2018	$139,944	$146,008	$119,164	$124,457
2019	$144,291	$149,829	$118,699	$125,698

[15] 8.25% for years ending June 30, 2005–2010. 8.0% for years ending June 30, 2010–2013. 7.5% for years ending June 30, 2013–2016. 7.25% for years ending June 30, 2016–2019.

[16] Assuming DROP deposits and withdrawals are, on average, made at the middle of the year.

Employees DROP Account Ending Balance
$ in Thousands

As of June 30	Actual (5-Year Trailing Average Market Return)	Investment Return Assumption[17,18]	Actual Market Value Rate of Return[18]	Actual Actuarial Value Rate of Return[18]
2005	$26,629			
2006	$30,952	$31,754	$32,710	$32,421
2007	$35,813	$36,920	$40,874	$39,419
2008	$44,812	$45,241	$43,118	$48,735
2009	$52,494	$52,638	$37,226	$53,168
2010	$57,178	$59,462	$45,195	$55,741
2011	$61,642	$65,732	$57,617	$58,755
2012	$67,524	$72,531	$58,753	$60,676
2013	$73,140	$80,222	$68,451	$67,449
2014	$81,027	$88,869	$82,914	$76,760
2015	$93,331	$99,279	$88,973	$87,629
2016	$105,406	$109,999	$92,527	$97,262
2017	$114,835	$119,795	$107,735	$107,361
2018	$126,597	$130,571	$119,181	$118,384
2019	$136,301	$139,754	$125,121	$125,666

Considering this, we conclude that the DROP is cost neutral with respect to the interest credited to the DROP accounts, relative to the assumed investment return assumption.

- The balance calculated using the same actual smoothed actuarial value rates of return that Segal uses for the actuarial valuation is different than that calculated using the five-year trailing average of actual investment returns developed by the Systems. Even though these numbers are both based on five years of actual returns, we believe that difference can be explained by the differences in the methods used in calculating the two returns. We are available to further review that difference if requested to do so by the Systems.

Part Three - Cost neutrality results for active members who have elected but not yet retired from DROP

Part Three of the study is similar to Part One except it is performed for active members enrolled in the DROP as of June 30, 2019. However in evaluating the present value of benefits without

[17] 8.25% for years ending June 30, 2005–2010. 8.0% for years ending June 30, 2010–2013. 7.5% for years ending June 30, 2013–2016. 7.25% for years ending June 30, 2016–2019.

[18] Assuming DROP deposits and withdrawals are, on average, made at the middle of the year.

the DROP, we have also evaluated the impact of an alternative condition assuming that the DROP members would have received salary increases from the date they enrolled in the DROP to June 30, 2019 consistent with the salary increases assumed in the valuation as opposed to the lower salary increases they actually received during that period. We believe evaluating the impact of that alternative condition is reasonable as actual salary increases granted during the last several years had been lower than our long term assumption. This is important because forgoing salary increases from the date of participation in the DROP through the date of retirement from DROP that would have been used to calculate retirement benefit without the DROP is one of the features to maintain DROP cost neutrality.

As in Part One we have included the impact of exercising the Board's authority to reduce the rate of interest credited to the members' DROP accounts so as to achieve cost neutrality.

Baseline — With the DROP
$ in Thousands

		Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
1.	Present Value of Benefits for Benefits paid after Valuation Date	$52,329	$62,568	$114,897	$156,309
2.	a Total DROP Account Balance	$24,533	$10,631	$35,164	$56,683
	b Member contributions deposited into DROP Account	$1,369	$1,394	$2,763	$7,828
	c Monthly pension benefits deposited into DROP Account	$23,164	$9,237	$32,401	$48,855
3.	Total Present Value of Benefits	$75,493	$71,805	$147,298	$205,164
4.	Impact of Reducing Annual Interest Crediting Rate for DROP Account by 3 Percent[19]	$180	$2,173	$2,353	Not Calculated
5.	Item (3), less Item (4)	$75,313	$69,632	$144,945	Not Calculated

[19] Includes the impact of reducing the annual interest crediting rate for monthly pension benefits and contributions already deposited into the DROP Account, as well as the impact of reducing the annual interest crediting rate for monthly pension benefits and contributions to be deposited into the DROP Account in the future

Scenario 1 — For Use in Determining DROP Cost Neutrality Without the DROP, Assuming Retirements Occur 2 Years Earlier than Originally Assumed DROP Exit[20]

$ in Thousands

		Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
Determined By Using Actual Salaries for DROP Members as of June 30, 2019 and Projecting Those Salaries to Assumed Date of Retirement					
1.	Present Value of Benefits for Benefits paid after Valuation Date	$60,193	$67,851	$128,044	$205,498
2.	a Member contributions deposited into DROP Account[21]	$1,369	$1,393	$2,762	$7,828
	b Present Value of Member Contributions up to Date of Retirement	$75	$1,397	$1,472	$1,895
3.	Net Present Value of Benefits	$58,749	$65,061	$123,810	$195,775
4.	Interest Crediting at the Average Net Rate of Return[22] - Baseline Item (3) / Item (3)	129%	110%	119%	105%
5.	Interest Crediting at 3 Percent Below the Average Net Rate of Return[22] - Baseline Item (5) / Item (3)	128%	107%	117%	Not Calculated
Determined By Using Actual Salaries for DROP Members as of Date of DROP Participation and Projecting Those Salaries to Assumed Date of Retirement					
6.	Present Value of Benefits for Benefits paid after Valuation Date	$65,574	$69,775	$135,349	$215,061
7.	a Member contributions deposited into DROP Account[21]	$1,369	$1,393	$2,762	$7,828
	b Present Value of Member Contributions up to Date of Retirement	$76	$1,401	$1,477	$1,887
8.	Net Present Value of Benefits	$64,129	$66,981	$131,110	$205,346
9.	Interest Crediting at the Average Net Rate of Return[22] - Baseline Item (3) / Item (3)	118%	107%	112%	100%
10.	Interest Crediting at 3 Percent Below the Average Net Rate of Return[22] - Baseline Item (5) / Item (3)	117%	104%	111%	Not Calculated

[20] 21 members in Fire and Police Tier 1 have been in the DROP for at least 6 years, and 7 members in Fire and Police Tier 2 have been in the DROP for at least 6 years. For those members, we have assumed they would have retired on June 30, 2019 if the 2 years earlier than originally assumed DROP exit date was prior to June 30, 2019.

[21] Includes interest, which was calculated using a proration of the monthly benefits paid into the DROP Account in relation to the amount of contributions deposited into the DROP Account

[22] The Municipal Code defines the “Average Net Rate of Return” as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans’ long term net investment return assumption of 7%.

Scenario 2 — For Reference Purposes Only Without the DROP, Assuming Retirements Occur on Originally Assumed DROP Exit

$ in Thousands

		Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
Determined By Using Actual Salaries for DROP Members as of June 30, 2019 and Projecting Those Salaries to Assumed Date of Retirement					
1.	Present Value of Benefits for Benefits paid after Valuation Date	$59,568	$64,528	$124,096	$206,988
2.	a Member contributions deposited into DROP Account[23]	$1,369	$1,393	$2,762	$7,828
	b Present Value of Member Contributions up to Date of Retirement	$286	$1,604	$1,891	$4,414
3.	Net Present Value of Benefits	$57,913	$61,531	$119,443	$194,746
4.	Interest Crediting at the Average Net Rate of Return[24] - Baseline Item (3) / Item (3)	130%	117%	123%	105%
5.	Interest Crediting at 3 Percent Below the Average Net Rate of Return[24] - Baseline Item (5) / Item (3)	130%	113%	121%	Not Calculated
Determined By Using Actual Salaries for DROP Members as of Date of DROP Participation and Projecting Those Salaries to Assumed Date of Retirement					
6.	Present Value of Benefits for Benefits paid after Valuation Date	$64,918	$66,409	$131,327	$216,507
7.	a Member contributions deposited into DROP Account[23]	$1,369	$1,393	$2,762	$7,828
	b Present Value of Member Contributions up to Date of Retirement	$297	$1,606	$1,903	$4,420
8.	Net Present Value of Benefits	$63,252	$63,410	$126,662	$204,259
9.	Interest Crediting at the Average Net Rate of Return[24] - Baseline Item (3) / Item (3)	119%	113%	116%	100%
10.	Interest Crediting at 3 Percent Below the Average Net Rate of Return[24] - Baseline Item (5) / Item (3)	119%	110%	114%	Not Calculated

[23] Includes interest, which was calculated using a proration of the monthly benefits paid into the DROP Account in relation to the amount of contributions deposited into the DROP Account

[24] The Municipal Code defines the “Average Net Rate of Return” as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans’ long term net investment return assumption of 7%.

Scenario 3 — For Use in Determining DROP Cost Neutrality Without the DROP, Assuming Retirements Occur 3 Years Earlier than Originally Assumed DROP Exit[25]

$ in Thousands

		Fire and Police Tier 1	Fire and Police Tier 2	Fire and Police Total	Employees
Determined By Using Actual Salaries for DROP Members as of June 30, 2019 and Projecting Those Salaries to Assumed Date of Retirement					
1.	Present Value of Benefits for Benefits paid after Valuation Date	$60,308	$68,843	$129,151	Not Calculated
2.	a Member contributions deposited into DROP Account[26]	$1,369	$1,393	$2,763	Not Calculated
	b Present Value of Member Contributions up to Date of Retirement	$35	$1,043	$1,078	Not Calculated
3.	Net Present Value of Benefits	$58,904	$66,407	$125,310	Not Calculated
4.	Interest Crediting at the Average Net Rate of Return[27] - Baseline Item (3) / Item (3)	128%	108%	118%	Not Calculated
5.	Interest Crediting at 3 Percent Below the Average Net Rate of Return[27] - Baseline Item (5) / Item (3)	128%	105%	116%	Not Calculated
Determined By Using Actual Salaries for DROP Members as of Date of DROP Participation and Projecting Those Salaries to Assumed Date of Retirement					
6.	Present Value of Benefits for Benefits paid after Valuation Date	$65,692	$70,762	$136,454	Not Calculated
7.	a Member contributions deposited into DROP Account[26]	$1,369	$1,393	$2,763	Not Calculated
	b Present Value of Member Contributions up to Date of Retirement	$35	$1,045	$1,080	Not Calculated
8.	Net Present Value of Benefits	$64,288	$68,324	$132,611	Not Calculated
9.	Interest Crediting at the Average Net Rate of Return[27] - Baseline Item (3) / Item (3)	117%	105%	111%	Not Calculated
10.	Interest Crediting at 3 Percent Below the Average Net Rate of Return[27] - Baseline Item (5) / Item (3)	117%	102%	109%	Not Calculated

[25] 29 members in Fire and Police Tier 1 have been in the DROP for at least 5 years, and 12 members in Fire and Police Tier 2 have been in the DROP for at least 5 years. For those members, we have assumed they would have retired on June 30, 2019 if the 3 years earlier than originally assumed DROP exit date was prior to June 30, 2019.

[26] Includes interest, which was calculated using a proration of the monthly benefits paid into the DROP Account in relation to the amount of contributions deposited into the DROP Account

[27] The Municipal Code defines the “Average Net Rate of Return” as the average of the net rates of return earned by the System's entire investment portfolio for each of the five prior fiscal years, including realized and unrealized gains and losses and as reduced by all investment expenses. For the purpose of this study, the Average Net Rate of Return is assumed to be the same as the Plans’ long term net investment return assumption of 7%.