

**CITY OF SAN JOSE POLICE AND FIRE
DEPARTMENT RETIREMENT PLAN**

Audit of June 30, 2016 Pension Actuarial Valuation



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February 22, 2017

Board of Administration
City of San Jose Police and Fire Department Retirement Plan
1737 North 1st Street, Suite 580
San Jose, CA 95112

Re: Audit of June 30, 2016 Pension Actuarial Valuation

Dear Members of the Board:

We are pleased to present the results of our audit of the June 30, 2016 Pension Actuarial Valuation for the City of San Jose Police and Fire Department Retirement Plan (“Plan”). The purpose of this audit was to verify the calculations completed by Cheiron and to offer comments on the methodology and the results of their actuarial valuation.

This review was conducted by Paul Angelo, a Fellow of the Society of Actuaries, Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA, and Andy Yeung, an Associate of the Society of Actuaries, Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. This review was conducted in accordance with the standards of practice prescribed by the Actuarial Standards Board.

The assistance of Cheiron and the Plan is gratefully acknowledged. We appreciate the opportunity to be of service to the Board of Administration, and we are available to answer any questions you may have on this report.

We are Members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Angelo".

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President & Actuary

A handwritten signature in black ink, appearing to read "Andy Yeung".

Andy Yeung, ASA, MAAA, FCA, EA
Vice President & Actuary

AB/bbf

cc: Tim Doyle
Bill Hallmark
Gene Kalwarski

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This report has been prepared by Segal Consulting (Segal) to present an audit of the June 30, 2016 Pension Actuarial Valuation performed by Cheiron for the Plan. As described in the Plan's contract for actuarial audit services, the scope of our audit is to review the liabilities and the contribution rates by Tier for each of Police and Fire that were included in the Plan's June 30, 2016 Pension Actuarial Valuation Report.

Summary of Results and Recommendations

This audit report includes an independent reproduction of the detailed valuation results that appear in the June 30, 2016 valuation report prepared by Cheiron. This audit was based on actuarial reports, employee data and supplemental information provided by both the Plan and Cheiron.

We have performed this actuarial audit of the Plan's June 30, 2016 Pension Actuarial Valuation to provide assurance to the Plan's Board of Administration that the actuarial calculations are reasonable and that the actuarial process was conducted according to generally accepted actuarial principles and practices. ***Our audit confirms that the results of the actuarial calculations as of June 30, 2016 are reasonable, and that those calculations are based on generally accepted actuarial principles and practices.*** We believe this is the case even though our review revealed an overestimate of the total Tier 1 City contribution rate in the 2016 valuation (by about 1.2% of payroll) as a result of overstating the liabilities for the deferred vested members and understating the (smoothed) actuarial value of assets used in the valuation. We would recommend that Cheiron address these issues when they prepare the contribution rates in the 2017 valuation. In the rest of this report, we have continued to use the deferred vested liabilities and the actuarial value of assets included in their 2016 valuation.

The following is a high-level summary of the results from our audit of the June 30, 2016 Pension Actuarial Valuation:

- The valuation results were prepared using the non-economic (demographic) actuarial assumptions approved by the Board based on the June 30, 2009 through June 30, 2015 experience study. Those non-economic assumptions were used in the June 30, 2015 valuation and have been carried over unchanged for the June 30, 2016 valuation. A review of those non-economic assumptions is not included in our contract for actuarial services and is therefore beyond the scope of this assignment.

- The economic (investment return, price inflation and wage inflation) actuarial assumptions previously used in the June 30, 2015 valuation were subsequently reviewed by the Board and the investment return assumption and inflation assumption were modified as part of the June 30, 2016 valuation. We have performed a high level review of those assumptions for reasonableness. We observed that a higher 3.25% price inflation assumption was used by NEPC (the investment consultant for the Plan) and incorporated by Cheiron in developing the long term (30-year) investment return assumption in Cheiron's stochastic model, while a lower 2.75% price inflation assumption was referenced by Cheiron in their pension valuation. With that exception, we concluded that Cheiron has recommended a set of economic assumptions that are generally consistent with each other, and are reasonable for use in the June 30, 2016 valuation for the Plan. This is the case even though those three assumptions appear to have been developed independently. Our review is included in Section III of this report.
- We understand that the Board has followed a practice of reviewing the economic assumptions (in particular, the investment return assumption) before each annual valuation. While the annual review of economic assumptions should allow the Plan to incorporate the most up-to-date capital market information in calculating the liabilities, that practice of performing an annual review is becoming less common practice among similar systems particularly when selecting long term economic assumptions (such as the investment return assumption).

When continuing with the current practice, we would recommend to the Board that they consider their deliberation of those economic assumptions for the upcoming valuation before (or just immediately after) the date of the valuation. Based on our prior experience working with other investment consulting firms, we understand that the long-term capital market assumptions provided by those firms are updated only periodically during the year, and that by starting the review of those economic assumptions earlier (e.g., earlier than the discussion that started in November 2016 as was the case during the review of the assumptions for the June 30, 2016 valuation), it should allow the Board more time to review, deliberate and adopt or modify the investment return assumption(s) recommended by Cheiron.

- The demographic data used in the 2016 valuation by Cheiron was primarily that supplied by the Plan. With the exception to modify the form of payment for about 10% of the retirees, it included only minimal changes made by Cheiron.

Specifically, 182 service and disabled retirees in the original 2016 data from the Plan were listed as having elected Joint and Survivor benefit; however, these retirees were included in Cheiron's final data as having elected single life annuity. We understand from Cheiron that the payment form was adjusted for these individual retirees each year based on the responses to the data questions for the current year and all prior years. These retirees were either not married at the time of retirement or their beneficiaries had died.

Segal would recommend that the Plan request Cheiron provide a list of these retirees to reconfirm their life annuity form of payment and then change the data in the Plan's records accordingly.

- In performing the actuarial valuation, there was a need to take the salary earned during 2015/2016 to project it forward to estimate the amount that would be earned during 2016/2017 and thereafter in their valuations for the Plan and the Federated Employees' Retirement System (System). While we are satisfied with the explanation provided by Cheiron for the two methods based on two different starting salaries used in their valuations for the Plan and the System, we note that it is not common for the same actuary to use two methods to project salaries for different employee groups who worked for the same employer.
- All active employees were assumed by Cheiron to earn one year of service between valuations. This means all part-time employees were assumed Cheiron to work full-time in the future; however, that assumption made by Cheiron was not disclosed in their report.
- We observed that, when computing the liabilities for current and future retirees, benefits were not limited to those that can be paid under the IRC Section 415 limitation. With that exception, all the other major benefits have been appropriately included by Cheiron in their valuation. It should be noted that based on the relatively small \$99,800 in annual benefits (out of a total of \$190.9 million) that were in excess of the Section 415 limitation (i.e., for only 7 out of 2,149 current retirees and beneficiaries), we would not expect the contribution rate impact from not reflecting such limitation in the valuation for current and future retirees to be material.
- Market value of assets has been maintained by the Plan separately by Tier for each of Police and Fire. Our review found an issue with respect to the calculation of the amount of expected return on contributions as a part of determining the (smoothed) actuarial value of assets

(AVA) used in the 2015 and 2016 valuations. That issue is described in detail later in this section.

Cheiron agreed with our observation of an inaccurate calculation of the expected income on City Tier 1 contributions for 2014/2015 and 2015/2016 but they assured us that the prior years' calculations were correct. The resulting understated deferred investment losses for those two fiscal years' contributions would lead to an understatement of the AVA in the 2016 valuation by about \$6.5 million which would correspond to an overstatement of the City contribution rate for Tier 1 by about 0.4% of payroll. Note that this change in AVA is not reflected in the comparisons of results later in this report.

- Segal's total (Tier 1 and Tier 2 for all of Police and Fire) present value of future benefits (PVB) is 101% of Cheiron's total present value of future benefits. This key result is the basis for all other liabilities and cost calculations in the valuation.
- The ratios of Segal's results to Cheiron's results, on a total present value of future benefits basis for the terminated vested members is 80% (ranging from 75% to 80% for Tier 1 and from 100% to 102% for Tier 2).

In order to assist Cheiron in explaining the difference in the calculations for terminated vested members, Segal provided Cheiron with the details behind the liability calculations for one deferred vested member test case. In their response, Cheiron stated that they were "overvaluing the surviving spouse death benefit for three reasons: (1) the percent married assumption was not being applied for the spousal death benefit, (2) the survivor benefit amount was being increased during the deferral period, and (3) the 37.5% [final average salary] was being applied as a minimum instead of a maximum". Cheiron provided the revised results reflecting those corrections for the two test cases and for all the Tier 1 inactive vested members. Their revision has the impact of reducing the PVB for current deferred vested members from Tier 1 from \$97,552,000 as shown in the 2016 actuarial valuation report to \$83,872,000. The overstatement of the PVB by Cheiron leads to an overstatement of the City UAAL contribution rate for Tier 1 by about 0.8% of payroll.

- Segal's total City contribution rate is 82.61% of payroll and Cheiron's total City contribution rate is 81.25% of payroll. The total City contribution rate calculated by Segal is about 102% of that calculated by Cheiron (excluding the effect of correcting the AVA). This level of difference can generally be explained by differences in procedures and methods used by

Segal and Cheiron in allocating the present value of future benefit between the past actuarial accrued liability and the future normal costs.

- Segal's total employee contribution rate is about 11.30% of payroll and Cheiron's total employee contribution rate is 11.16% of payroll. The total member rate calculated by Segal is about 101% of that calculated by Cheiron. Again, this level of difference can generally be explained by differences in procedures and methods used by Segal and Cheiron.
- A list of all action items we would recommend as part of the June 30, 2017 valuation is provided in Exhibit D. (Note that in preparing the list, we have included several items that are only addressed in Sections II and III of this report.)

Detailed Findings

Our detailed findings and recommendations are summarized as follows:

- With the exception of a higher 3.25% price inflation assumption used by NEPC (the investment consultant for the Plan) and carried over by Cheiron in developing the long term (30-year) investment return assumption in Cheiron's stochastic model but a lower 2.75% price inflation assumption used by Cheiron in their pension valuation, we concluded that Cheiron has recommended a set of economic assumptions that are generally consistent with each other, and are reasonable for use in the June 30, 2016 valuation for the Plan and in accordance with generally accepted actuarial practice. This is the case even though those three assumptions appear to have been developed independently. Our review is included in Section III of this report.
- Segal's *total present value of future benefits* as of June 30, 2016 is 101% of Cheiron's present value.
- A comparison of Segal's present value of future benefits (PVB) to Cheiron's present values by Tier for each of Police and Fire and in total indicates that the total liabilities of each plan are reasonable as shown in the following table.

Plan	Ratio of Segal's PVB to Cheiron's PVB
Fire Tier 1	101%
Police Tier 1	100%
Fire Tier 2	103%
Police Tier 2	98%
Total combined	101%

- > Segal's *total actuarial accrued liability* as of June 30, 2016 is 100% of Cheiron's liability.
- > The ratios of Segal's results to Cheiron's results, on a total present value of future benefits basis for the terminated vested members is 80% (range from 75% to 80% for Tier 1 and from 100% to 102% for Tier 2).

In order to assist Cheiron in explaining the difference in the calculations for terminated vested members, Segal provided Cheiron with the details behind the liability calculations for one deferred vested member test case. In their response, Cheiron stated that they were “overvaluing the surviving spouse death benefit for three reasons: (1) the percent married assumption was not being applied for the spousal death benefit, (2) the survivor benefit amount was being increased during the deferral period, and (3) the 37.5% [final average salary] was being applied as a minimum instead of a maximum”. Cheiron provided the revised results reflecting those corrections for the two test cases and for all the Tier 1 inactive vested members. Their revision has the impact of reducing the PVB for current deferred vested members from Tier 1 from \$97,552,000 as shown in the 2016 actuarial valuation report to \$83,872,000. In preparing Exhibit C, Segal has continued to show Cheiron's original PVB for the deferred vested members so as to match with their 2016 valuation report. The overstatement of the PVB by Cheiron leads to an overstatement of the City UAAL contribution rate for Tier 1 by about 0.8% of payroll.

For this audit, our first focus was on matching the core numbers on which the Police and Fire Tiers' ultimate costs depend: the present values of future benefits. The results of this analysis were shown in the previous table. We also focused on more detailed analyses of (i) the proper implementation of the demographic assumptions as determined by the 2015 experience study as well as the economic assumptions reviewed and approved as part of the 2016 valuation, (ii) the breakdown of the total normal cost contribution rate into the portions paid by the City and by the members, and (iii) the determination of the UAAL contribution rate paid by the City and by the members. Those detailed analyses produced the following findings and recommendations:

- Segal’s *total City contribution rate* is 82.61% of payroll and Cheiron’s total City contribution rate is 81.25% of payroll. The total City contribution rate calculated by Segal is about 102% of that calculated by Cheiron. This level of difference can generally be explained by differences in procedures and methods used by Segal and Cheiron in allocating the present value of future benefit between the past actuarial accrued liability and the future normal costs.
- Segal’s *total employee contribution rate* is about 11.30% of payroll and Cheiron’s total employee contribution rate is 11.16% of payroll. The total member rate calculated by Segal is about 101% of that calculated by Cheiron. Again, this level of difference can generally be explained by differences in procedures and methods used by Segal and Cheiron.
- While we were able to locate and opine on Cheiron’s calculations for the total City contribution rate of 81.25% as provided on page 1 of their report, we were not able to locate Cheiron’s breakdown of the total City contribution rate between the normal cost rate and the Unfunded Actuarial Accrued Liability (UAAL) contribution rate. The same is true for member rates.

As Cheiron did not include the breakdown of the total normal cost rate and UAAL rate for the City and for the members in their report, in the tables below we only show the ratios of the normal cost rate and the UAAL contribution rate for the City and the members by Tiers for each of Police and Fire separately, and not in the total.

RATIO OF SEGAL/CHEIRON	Fire Tier 1	Police Tier 1	Fire Tier 2	Police Tier 2	Total
Net City Normal Cost Rate	103%	100%	98%	100%	
City UAAL Rate	101%	101%	See note ⁽¹⁾	150% ⁽²⁾	
Total City Rate	102%	101%	99%	100%	102%

⁽¹⁾ While Segal’s City UAAL rate is 0.03%, Cheiron has calculated a rate of 0.00% of payroll. The ratio of Segal/Cheiron is undefined (when our rate is divided by 0.00%.)

⁽²⁾ The ratio of 150% for UAAL was relatively high because the Police Tier 2 Plan had relatively low UAAL contribution amounts as calculated by Cheiron.

RATIO OF SEGAL/CHEIRON	Fire Tier 1	Police Tier 1	Fire Tier 2	Police Tier 2	Total
Member Normal Cost Rate	103%	100%	98%	100%	
Member UAAL Rate	100%	100%	See note ⁽³⁾	150% ⁽⁴⁾	
Total Member Rate	103%	100%	99%	100%	101%

⁽³⁾ While Segal’s member UAAL rate is 0.03%, Cheiron has calculated a rate of 0.00% of payroll. The ratio of Segal/Cheiron is undefined (when our rate is divided by 0.00%.)

⁽⁴⁾ The ratio of 150% for UAAL was relatively high because the Police Tier 2 Plan had relatively low UAAL contribution amounts as calculated by Cheiron.

- For funding purposes, market value of assets has been maintained by the Plan separately by Tier for each of Police and Fire. We have reviewed and found an issue with respect to the calculation of the amount of expected return on contributions under the (smoothed) actuarial value of assets (AVA) used in the valuation.

We understand the City has been prepaying their contributions for Tier 1 members of the Plan as well as for Tier 1 members of the System. While we agreed with Cheiron's calculation of the expected return on those contributions for the System, we disagree with their calculation for the Plan. Consistent with actual practice, Cheiron applied a beginning of year (BOY) timing for the Tier 1 City contributions for the System which resulted in those contributions being available for a 12-month period to earn income at the assumed investment return rate. In contrast, for 2015/2016 Cheiron applied a middle of year (MOY) timing for the Tier 1 City contributions for the Plan which resulted in those contributions being available (on the average) for only a 6-month period to earn income at the assumed investment return rate. This practice for the Plan has the impact of understating the market value loss identified in the 2016 valuation by about \$4.7 million (before recognizing 20% of that loss in the 2016 valuation). This leads to understating the AVA during the 5-year period when the deferred losses are being recognized. We note that a MOY timing was also used in the 2015 valuation with respect to the Tier 1 City contributions for 2014/2015 which would result in understating the market value loss identified in the 2015 valuation by about \$4.6 million (before recognizing 20% of that loss in each of the 2015 and the 2016 valuations).

Cheiron agreed with our observation of an inaccurate calculation of the expected income on City Tier 1 contributions for 2014/2015 and 2015/2016 but they assured us that the prior years' calculations were correct. The resulting understated deferred investment losses for those two fiscal years' contributions would lead to an understatement of the AVA in the 2016 valuation by about \$6.5 million which would correspond to an overstatement of the City contribution rate for Tier 1 by about 0.4% of payroll.

- In determining the UAAL contribution rate, Cheiron uses a methodology that first projects the outstanding balances of the various UAAL layers to the next valuation date (i.e., one year in the future). Based on those projected outstanding balances and the remaining amortization periods as of that same future date, they determine the UAAL amortization payments for each of the UAAL layers. The total of those amortization payments is then converted to a percent by using the expected payroll for the fiscal year that begins one year after the date of

the current valuation. It is our understanding that the purpose of this methodology is to adjust for the one-year delay between the valuation date and the date that the contribution rates are implemented and to more accurately reflect the payroll for the fiscal year that begins one year after the valuation date. We believe that the methodology they are applying is reasonable for this purpose.

- Overall, we have verified that Cheiron's calculations of the normal cost, UAAL and the total City contribution rate as a percentage of payroll are reasonable. Similarly, we have verified that Cheiron's calculations of the normal cost, UAAL and the total member contribution rate as a percentage of payroll are reasonable.

PURPOSE AND SCOPE OF THE ACTUARIAL AUDIT

Purpose of the Audit

Segal Consulting has performed an actuarial audit of Cheiron's June 30, 2016 Pension Actuarial Valuation to provide assurance to the Plan's Board of Administration that the actuarial calculations are reasonable and that the actuarial process was conducted according to generally accepted actuarial principles and practices.

Scope of the Audit

The scope of the audit, as described in the Plan's Actuarial Audit Services Agreement with Segal, includes the following:

- Evaluation of the available data for the performance of such valuation, the degree to which such data is sufficient to support the conclusions of the valuation, and the use and appropriateness of any assumptions made regarding such data.
- Comparison of the major benefits summarized in Appendix C of Cheiron's 2016 valuation report against those that are included in the online Summary of Plan Description. For some benefits, we have also consulted the relevant provisions in the City Ordinance to confirm our understanding. We observed that, when computing the liabilities for current and future retirees, benefits were not limited to those that can be paid under the IRC Section 415 limitation. With that exception, all the other major benefits have been appropriately included by Cheiron in their valuation. It should be noted that based on the relatively small \$99,800 in annual benefits (out of a total of \$190.9 million) that were in excess of the Section 415 limitation (i.e., for only 7 out of 2,149 current retirees and beneficiaries), we would not expect the contribution rate impact from not reflecting such limitation in the valuation for current and future retirees to be material.
- Completion of a parallel valuation as of June 30, 2016 using the assumptions, methodologies and funding methods used by the Plan's consulting actuary in their performance of the June 30, 2016 valuation.

- Evaluation of the parallel valuation results that were included in the June 30, 2016 Actuarial Valuation Report by Tier for each of Police and Fire, and reconciliation of any discrepancies between the findings, assumptions, methodology, rates, and/or adjustments with the Plan's consulting actuary.

RESULTS OF THE VALUATION AUDIT

Several steps are involved in conducting an actuarial audit of a retirement benefits program. Outlined below are the primary steps we took to comply with the scope of the audit services. Following each step is a description of our observations.

Even though our analysis was performed concurrently with Cheiron's actuarial valuation, they were not able to answer our questions, address our observations and provide the backup we requested prior to completing the June 30, 2016 valuation. This might in part be explained by the tight timeline Cheiron had to follow to prepare multiple valuation results under different alternative economic actuarial assumptions and to present those results to the Board. However, with the exception of an overstatement of the liabilities for the deferred vested members and an understatement of the (smoothed) actuarial value of assets which combined to result in an overstatement of the total City Tier 1 contribution rate by about 1.2% of payroll, our audit results generally confirm and support the results of their final 2016 valuation.

Step 1: Compare the demographics of the 2016 data provided by the Plan with the valuation data used by Cheiron for the June 30, 2016 actuarial valuation.

Results

EXHIBIT-A provides a comparison, by membership type (i.e., Tiers 1 and 2), of the number of participants, their average ages, average salaries (active members), average service (active members) and average benefits (pensioners). This exhibit indicates that Cheiron had only made a few adjustments, estimations or corrections to the data received from the Plan. In general, the data received was "valuation ready" with the exception of the adjustment they have to make to about 10% of the retiree records to reflect more up-to-date information on surviving beneficiaries eligible for a continuance benefit.

Observations

- (1) In Cheiron's 2016 valuation report, they provided detailed summary of membership demographic information for each of Tier 1 and Tier 2. As liabilities and contribution rates are calculated separately for each of Police and Fire, Cheiron should consider providing further breakdown in their report for these two groups.
- (2) The payments awarded to ex-spouses under the combined account option (records indicated in the beneficiary data file with a code of "Q" for Qualified Domestic Relations Order or "QDRO") have been combined by Cheiron with the payments awarded to the corresponding members into a single record. No combining was necessary with respect to the annuity and pension portions of the benefit reported on the member record as the Plan has already included the ex-spouse's portions of those benefits in the member's record. Only the COLA portion of the benefit that has been paid to the ex-spouse needed to be combined with the COLA portion of the benefit for the retiree. We are only noting this detail for documentation purposes as the method used by Cheiron is consistent with how the data should be handled based on our discussion with Cheiron.
- (3) Cheiron did not limit the benefit amounts for the current and future retirees by the IRC Section 415 limitation. It should be noted that based on the relatively small \$99,800 in annual benefits (out of a total of \$190.9 million) that were in excess of the Section 415 limitation (i.e., for only 7 out of 2,149 current retirees and beneficiaries), we would not expect the contribution rate impact from not reflecting such limitation in the valuation for current and future retirees to be material.
- (4) There were 182 service and disabled retirees in the original 2016 data from the Plan listed as having elected Joint and Survivor benefit. However, these 182 retirees were included in Cheiron's final data as having elected single life annuity. We understand from Cheiron that the payment form was adjusted for these individual retirees each year based on the responses to the data questions for the current year and all prior years. These retirees were either not married at the time of retirement or their beneficiaries had died.

Segal would recommend that the Plan request Cheiron provide a list of the 182 retirees to confirm their single life annuity form of payment and then change the data in the Plan's records accordingly.

- (5) As a totally separate issue, we noted there were three minor beneficiaries currently collecting a survivor benefit from the Plan for whom the date of birth used by Cheiron was different from that provided by the Plan. (Two of three beneficiaries were from the same deceased retiree.) All three

beneficiaries had different dates of birth on the Plan's data file but were changed by Cheiron to 6/30/2001. We can assist in identifying those three beneficiaries so that their dates of birth may also be confirmed by Cheiron and the Plan.

- (6) Cheiron excluded from their 2016 valuation 19 records reported with a code "Leave of Absence" and non-zero benefit service in the original Plan's data file. However, Cheiron kept 10 similar records in the final data file for their 2016 valuation. We can assist in identifying these members so their correct valuation status may also be confirmed by Cheiron and the Plan.
- (7) Cheiron had to assign a salary for 23 Fire Tier 2 members (which was 1/3 of the Fire Tier 2 actives) who had less than 1 month of service and were without a salary in the data provided by the Plan.
- (8) In the Plan's original non-retiree data file, the total benefit service reported by the Plan exceeded the sum of the benefit service broken down between Tier 1 and Tier 2 for most active members by 0.08 years. Cheiron used the breakdown of the Tier 1 and Tier 2 service to calculate the benefit amounts for actives in their valuation. When Segal raised a question with respect to the discrepancies in service with Cheiron, Cheiron confirmed that that issue was discussed with the Plan's staff. The total benefit service reported by the Plan did include service earned in pay period fifteen ("PP15") that was accrued after the end of the June 30, 2016 valuation date but was excluded from the calculation when the Plan provided the breakdown of the service between Tier 1 and Tier 2 to Cheiron. Cheiron correctly used the breakdown of the Tier 1 and Tier 2 service to determine the benefit amount in the valuation. However, Cheiron did not update the total credited service (used for eligibility purposes in determining when a member would first be vested in a particular type of benefit) provided by the client to exclude the 0.08 years accrued in PP15. This could result in a small overstatement in Cheiron's calculations because a few members might have been assumed to be eligible for retirement before they accrued the minimum service to retire. We believe the impact of the overestimated credited service on the liability to be minimal.
- (9) The benefit amount for terminated vested members increased significantly between the Cheiron data provided to Segal and used in their 2016 and 2015 valuations. (For those 101 continuing terminated vested members with more than 10 years of service, the benefit amounts provided in 2016 approximately doubled.) As shown on page 35 of the Cheiron's 2016 valuation report, the average annual benefit for deferred vested members increased from \$12,110 in the 2015 valuation to \$19,999 in the 2016 valuation. It is our understanding that Cheiron calculated the

benefits internally for use in the 2015 valuation, while the Plan provided the benefits that Cheiron used in the 2016 valuation. We are only noting this detail for documentation purposes to echo a comment Cheiron made on page 20 of the 2016 valuation report when they disclosed an increase of \$26.4 million in the UAAL due to “vested terminated benefit changes”.

Step 2: Develop a valuation program based on the relevant provisions of the Plan as summarized in the Summary Plan Descriptions, using the actuarial methods and assumptions outlined in the most recent valuation report, and further defined by Cheiron.

Observations

- (1) In Cheiron’s valuation report, it states that the termination rates do not apply once a member is eligible for retirement which we interpret to mean both reduced retirement or unreduced retirement. Based on our discussion with Cheiron, termination rates should continue to apply until a member is eligible for an unreduced benefit. Segal would recommend to Cheiron that they document how termination rates are applied when they prepare their future valuation reports.
- (2) Cheiron’s valuation report does not state precisely how the reciprocity assumption is applied in their valuation program. Based on our discussion with Cheiron, all actives who have less than 10 years of service when they terminate employment are assumed to get a refund of contributions (100% refund of contributions). The reciprocity assumption is only applied to actives that have more than 10 years of service. Segal would recommend to Cheiron that they document how the reciprocity assumption is applied when they prepare their future valuation reports.
- (3) In Cheiron’s valuation report, it states that the mortality table for disabled females is calculated by taking 0.903 times the CalPERS 2009 Industrial Disability Mortality Table for Males. Cheiron confirmed for us that it should have been 0.903 times the CalPERS 2009 Industrial Disability Mortality Table for Females instead of Males. Segal would recommend to Cheiron that they correct that description when they prepare their future valuation reports.
- (4) In performing the actuarial valuation, there was a need to take the salary earned during 2015/2016 to project it forward to estimate the amount that would be earned during 2016/2017 and thereafter in their valuations for the Plan and the Federated Employees’ Retirement System (System). While we are satisfied with the explanation provided by Cheiron for the two methods based on two different starting salaries used in their valuations for the Plan and the System, we

note that it is not common for the same actuary to use two methods to project salaries for different employee groups who worked for the same employer.

- (5) Cheiron confirmed for us that in their valuation, they assumed service would increase by one year for all actives in between valuations (This means all part-time employees are assumed to work full time in the future.) Segal would recommend this assumption be disclosed in the assumption section in their future valuation reports.
- (6) As previously noted in Step 1, Cheiron did not limit the benefit amounts for current and future retirees by the IRC Section 415 limitation.

Step 3: Run the valuation program with specific individuals (test lives) who illustrate particular benefit provisions and compare results to Cheiron's results.

Results

EXHIBIT-B provides a comparison of Segal's and Cheiron's test life results for (i) the present value of future benefits, (ii) the present value of future normal costs, and (iii) the actuarial accrued liability.

- *Present Value of Future Benefits:* This measure represents the current value of the member's projected benefits, recognizing the time value of money (i.e., the investment return assumption), the salary increase assumption and the probabilities of retirement, death, disability and turnover. This value is the cornerstone for the entire valuation as it represents the amount expected to be needed to provide all future expected benefit payouts for current members, based on the valuation assumptions.

The ratio of Segal's results to Cheiron's results, on a *total present value of future benefits basis*, range from 99% to 104% for the active test lives. The ratio of Segal's results to Cheiron's results is about 101% for the terminated vested (after reflecting a correction discussed below) and retired test lives.

We believe our results are within an acceptable range of Cheiron's results to provide assurance that the significant plan liabilities are properly valued.

- *Present Value of Future Normal Costs and Actuarial Accrued Liability:* The funding method adopted by the Plan, the Entry Age Actuarial Cost Method, separates the present

value of future benefits for active members into two components, the actuarial accrued liability and the present value of future normal costs. Simply stated, the Entry Age Actuarial Cost Method determines a level cost as a percentage of pay for each year of service, called the normal cost. For active members, the actuarial accrued liability is the accumulated value of *past* normal costs (less any expected benefits, and assuming all actuarial assumptions were exactly realized), while the present value of future normal costs represents the current value of *future* normal costs required to fully fund the member's projected benefits before the member is expected to retire.

The method used to separate the present value of projected benefits into its two components can differ somewhat from valuation system to valuation system, even though the underlying funding method used in the systems is the same.

For the active test lives, the ratios of Segal's results to Cheiron's is about 99% (range from 97% to 105%) for the present value of future normal costs and about 105% (range from 99% to 106%) for the actuarial accrued liability [See pages 34A-34B].

Observations

- (1) Segal's valuation system generally assumed active members decrement (i.e., retirement, termination, etc.) at the beginning of each plan year (July 1). The Cheiron system, in contrast, assumes decrements occur in the middle of the year (January 1). As part of this audit for the Plan, we have changed our timing of the decrement to allow for the middle of the year timing for the decrements assumed by Cheiron. Either methodology is acceptable, with each actuarial firm establishing its own approach for the assumed timing of decrements.
- (2) COLA in the first year for Tier 2 retirees should be pro-rated based on the fraction of the year that the Tier 2 retirees would have been retired (e.g., one-quarter of a year assuming the retirement on January 1). Segal confirmed that Cheiron has not pro-rated the 1.5% COLA for Tier 2 members in their first partial year after retirement. Accordingly, Cheiron overestimated both the actuarial accrued liability and normal cost for Tier 2 by 1.125%. This overstatement should not have a significant impact on the contribution rates for the Plan as a whole because there was relatively low liability in Tier 2.

- (3) In the 2016 test case file, Cheiron provided the calculation for one Police active member with prior Tier 1 service that had since transferred to Tier 2. The initial cost calculations provided for that member in the 2016 test case were inconsistent with the calculation they provided for the 2015 test case.

In the 2015 test case file, the normal cost for Tier 1 for this member was \$0, and the actuarial accrued liability for Tier 1 of \$246,874 was equal to the present value of future benefits (PVB) for Tier 1 based on the service that was previously earned under Tier 1. In the 2016 test case, the normal cost for Tier 1 for this member was \$12,034, and the actuarial accrued liability for Tier 1 of \$267,849 was equal to the PVB.

Segal asked Cheiron for the reasons behind the change in the normal cost results for Tier 1. In their response, Cheiron agreed with our observation and requested that Segal overwrite the 2016 Cheiron results for this member in the test case file by zeroing out the normal cost for Tier 1. We understand from our discussions with Cheiron that after those changes, the results should match those in their final valuation.

- (4) In the 2016 test case file, Cheiron provided the calculation for two active members from Tier 1. The initial total normal costs in dollars when expressed as a percent of the payroll provided for those members in the 2016 test case were much lower than the total normal cost rates for Tier 1 shown for all actives in the 2015 valuation report.

Segal asked Cheiron for the reasons behind the lower total normal cost results for the two test cases provided for Tier 1. In their response, Cheiron agreed with our observation and said the reason behind those lower normal costs for those two actives in the 2016 test case file was that Cheiron included only the net City normal costs (i.e., the total normal costs reduced by the member contributions). Cheiron requested that Segal overwrite the 2016 Cheiron results for those two members in the test case file. Cheiron confirmed that the other two active members (from Tier 2) have the correct total normal costs on the test case file. Segal overwrote Cheiron's normal cost for the Fire Tier 1 active member which increased the normal cost from \$30,182 to \$50,567, and for the Police Tier 1 active member which increased the normal cost from \$22,356 to \$44,241. We understand from our discussions with Cheiron that after those changes, the results should match those in their final valuation.

(5) In the 2016 test case file, Cheiron provided the calculation for one deferred vested member and one reciprocal member from Tier 1. Segal's calculated liabilities for these two members were much lower than those provided by Cheiron.

In order to assist Cheiron in explaining the difference between the calculations, Segal provided Cheiron with the details behind our liability calculations for one deferred vested member test case. In their response, Cheiron stated that they were "overvaluing the surviving spouse death benefit for three reasons: (1) the percent married assumption was not being applied for the spousal death benefit, (2) the survivor benefit amount was being increased during the deferral period, and (3) the 37.5% [final average salary] was being applied as a minimum instead of a maximum". Cheiron made those corrections and revised the PVB for the two test cases and for all the Tier 1 inactive vested members. Cheiron requested that Segal overwrite the 2016 Cheiron's PVB for the deferred vested member from \$585,593 to \$540,021, and for the reciprocal member from \$555,384 to \$526,277. After Cheiron's changes, the ratio of Segal's PVB to Cheiron's PVB is 100%. Cheiron's PVB in Exhibit B reflect the changes Cheiron requested Segal to make.

Step 4: Run the valuation program with all participant data, compile results, and compare to Cheiron's results.

Results

EXHIBIT-C provides a comparison, by Tier for each of Police and Fire, of Segal's results and Cheiron's results for (i) the present value of future benefits, (ii) the present value of future normal costs, (iii) the UAAL, (iv) the total normal cost and UAAL contribution rates, (v) the City normal cost and UAAL contribution rates and (vi) the member normal cost and UAAL contribution rates.

- For funding purposes, market value of assets has been maintained by the Plan separately by Tier for each of Police and Fire. Our review found an issue with respect to the calculation of the amount of expected return on contributions as part of determining the (smoothed) actuarial value of assets (AVA) used in the valuation.

We understand the City has been prepaying their contributions for Tier 1 members of the Plan as well as for Tier 1 members of the System. While we agreed with Cheiron's calculation of the expected return on those contributions for the System, we disagree with their calculation for the

Plan. Consistent with actual practice, Cheiron applied a beginning of year (BOY) timing for the Tier 1 City contributions for the System which resulted in those contributions being available for a 12-month period to earn income at the assumed investment return rate. In contrast, for 2015/2016 Cheiron applied a middle of year (MOY) timing for the Tier 1 City contributions for the Plan which resulted in those contributions being available (on the average) for only a 6-month period to earn income at the assumed investment return rate. This practice for the Plan has the impact of understating the market value loss identified in the 2016 valuation by about \$4.7 million (before recognizing 20% of that loss in the 2016 valuation). This leads to understating the AVA during the 5-year period when the deferred losses are being recognized. We note that a MOY timing was also used in the 2015 valuation with respect to the Tier 1 City contributions for 2014/2015 which would result in understating the market value loss identified in the 2015 valuation by about \$4.6 million (before recognizing 20% of that loss in each of the 2015 and the 2016 valuations).

Cheiron agreed with our observation of an inaccurate calculation of the expected income on City Tier 1 contributions for 2014/2015 and 2015/2016 but they assured us that the prior years' calculations were correct. The resulting understated deferred investment losses for those two fiscal years' contributions would lead to an understatement of the AVA in the 2016 valuation by about \$6.5 million which would correspond to an overstatement of the City contribution rate for Tier 1 by about 0.4% of payroll.

- The ratios of Segal's results to Cheiron's results, on a *total present value of future benefits basis*, is 102% (ranging by Tier from 98% to 103%) for active members. For the retirees, the results are even closer as the ratio is 101%. For the terminated vested members, the ratio is 80% (ranging by Tier from 75% to 102%). In total, our present value of future benefits is 101% of Cheiron's present value as shown in the column labeled "TOTAL" on page 35-A.
- The ratios of Segal's results to Cheiron's results, on a total present value of future benefits basis for the terminated vested members is 80% due to an overstatement explained in Step 3, above.

Cheiron provided the revised results reflecting this correction. It had the impact of reducing the PVB for current deferred vested members from Tier 1 from \$97,552,000 as shown in the 2016 actuarial valuation report to \$83,872,000. In preparing Exhibit C, Segal has continued to show Cheiron's original PVB for the deferred vested members so as to match with their 2016 valuation

report. The overstatement of the PVB by Cheiron leads to an overstatement of the City UAAL contribution rate for Tier 1 by about 0.8% of payroll.

- The present value of future normal costs is allocated between member contributions and the City contributions. For Tier 1 for each of Police and Fire, members contribute 3/11 of the normal cost rate (excluding the cost for reciprocal benefits), the historical share of the administrative expenses; and the amortization payment on the February 4, 1996 benefit improvement. For Tier 1 Police members, there is an additional amortization payment for member contributions not made due to the 2006 rate increase delay. For Tier 1 for each of Police and Fire, the City pays the remainder of the total contribution rate, including the remaining UAAL payments. For Tier 2 for each of Police and Fire, the members and the City each pays one-half of the total contribution rate including both normal cost and UAAL payments.

Cheiron does not include a description of the fact that the cost for reciprocal benefits is excluded in calculating the member contributions for Tier 1 for each of Police and Fire in Appendix C (summary of plan provisions) in the 2016 valuation report. Segal would recommend that Cheiron add that description to the plan provisions section in their future valuation reports.

- The actuarial accrued liability depends in part on the valuation system's methodology for separating the present value of projected benefits into its two components – the actuarial accrued liability and the present value of future normal costs. The UAAL is then simply the difference between the actuarial accrued liability and the actuarial value of assets. Therefore, differences in the actuarial accrued liabilities due to the variations in the valuation systems impact the UAAL, and the related City and member normal cost contribution rates.
- Segal's *total City contribution rate* is 82.61% of payroll and Cheiron's total City contribution rate is 81.25% of payroll. The total City contribution rate calculated by Segal is about 102% of that calculated by Cheiron. This level of difference can generally be explained by differences in procedures and methods used by Segal and Cheiron in allocating the present value of future benefit between the past actuarial accrued liability and the future normal costs.
- Segal's *total employee contribution rate* is about 11.30% of payroll and Cheiron's total employee contribution rate is 11.16% of payroll. The total member rate calculated by Segal is

about 101% of that calculated by Cheiron. Again, this level of difference can generally be explained by differences in procedures and methods used by Segal and Cheiron.

- While we were able to locate and opine on Cheiron’s calculations for the total City contribution rate of 81.25% as provided on page 1 of their report, we were not able to locate Cheiron’s breakdown of the total City contribution rate between the normal cost rate and the Unfunded Actuarial Accrued Liability (UAAL) contribution rate. The same is true for the member rates.

As Cheiron did not include the breakdown of the total normal cost rate and UAAL rate for the City and for the members in their report, in the tables below we only show the ratios of the normal cost rate and the UAAL contribution rate for the City and the members by Tiers for each of Police and Fire separately, and not in the total.

RATIO OF SEGAL/CHEIRON	Fire Tier 1	Police Tier 1	Fire Tier 2	Police Tier 2	Total
Net City Normal Cost Rate	103%	100%	98%	100%	
City UAAL Rate	101%	101%	See note ⁽¹⁾	150% ⁽²⁾	
Total City Rate	102%	101%	99%	100%	102%

⁽¹⁾ While Segal’s City UAAL rate is 0.03%, Cheiron has calculated a rate of 0.00% of payroll. The ratio of Segal/Cheiron is undefined (when our rate is divided by 0.00%.)

⁽²⁾ The ratio of 150% for UAAL was relatively high because the Police Tier 2 Plan had relatively low UAAL contribution amounts as calculated by Cheiron.

RATIO OF SEGAL/CHEIRON	Fire Tier 1	Police Tier 1	Fire Tier 2	Police Tier 2	Total
Member Normal Cost Rate	103%	100%	98%	100%	
Member UAAL Rate	100%	100%	See note ⁽³⁾	150% ⁽⁴⁾	
Total Member Rate	103%	100%	99%	100%	101%

⁽³⁾ While Segal’s member UAAL rate is 0.03%, Cheiron has calculated a rate of 0.00% of payroll. The ratio of Segal/Cheiron is undefined (when our rate is divided by 0.00%.)

⁽⁴⁾ The ratio of 150% for UAAL was relatively high because the Police Tier 2 Plan had relatively low UAAL contribution amounts as calculated by Cheiron.

- In determining the UAAL contribution rate, Cheiron uses a methodology that first projects the outstanding balances of the various UAAL layers to the next valuation date (i.e., one year in the future). Based on those projected outstanding balances and the remaining amortization periods as of that same future date, they determine the UAAL amortization payments for each of the UAAL layers. The total of those amortization payments is then converted to a percent by using the expected payroll for the fiscal year that begins one year after the date of the current valuation. It is our understanding that the purpose of this methodology is to adjust

for the one-year delay between the valuation date and the date that the contribution rates are implemented and to more accurately reflect the payroll for the fiscal year that begins one year after the valuation date. We believe that the methodology they are applying is reasonable for this purpose.

- Overall, we have verified that Cheiron's calculations of the normal cost, UAAL and the total City contribution rate as a percentage of payroll are reasonable. Similarly, we have verified that Cheiron's calculations of the normal cost, UAAL and the total member contribution rate as a percentage of payroll are reasonable.

Step 5: Evaluate the valuation results and methodology as presented in the Cheiron actuarial valuation report.

Observations

- (1) As we were not provided with a draft of Cheiron's actuarial valuation report (as originally anticipated in our contract for audit services), we reviewed Cheiron's final actuarial report in detail after it had already been presented to the Board. With the exception of the overstatement of the liabilities for deferred vested members and the understatement AVA which together result in an overstatement of the total City Tier 1 contribution rate by about 1.2% of payroll, most of our comments (already discussed in the previous steps) based on that final report are relatively minor and deal primarily with providing additional disclosures for documentation purposes.

REVIEW OF ECONOMIC ASSUMPTIONS

The economic assumptions reviewed by Cheiron during the 2016 actuarial valuation are the investment rate of return, price inflation and wage growth (price inflation and real wage increases). Actuarial Standard of Practice No. 27 (ASOP 27) provides the actuary guidance in developing these assumptions. Among these guidelines is the need for consistency among the economic assumptions selected by the actuary.

Results

We observed that a higher 3.25% price inflation assumption was used by NEPC (the investment consultant for the Plan) and incorporated by Cheiron in developing the long term (30-year) investment return assumption in Cheiron's stochastic model, while a lower 2.75% price inflation assumption was referenced by Cheiron in their pension valuation. With that exception, we concluded that Cheiron has recommended a set of economic assumptions that are generally consistent with each other, and are reasonable for use in the June 30, 2016 valuation for the Plan. This is the case even though those three assumptions appear to have been developed independently.

We understand that the Board has followed a practice of reviewing the economic assumptions (in particular, the investment return assumption) before each annual valuation. While the annual review of economic assumptions should allow the Plan to incorporate the most up-to-date capital market information in calculating the liabilities, that practice of performing an annual review is becoming a less common practice particularly when selecting long term economic assumptions (such as the investment return assumption).

When continuing with the current practice, we would recommend to the Board that they consider their deliberation of those economic assumptions for the upcoming valuation before (or just immediately after) the date of the valuation. Based on our prior experience working with other investment consulting firms, we understand that the long-term capital market assumptions provided by those firms are updated only periodically during the year, and that by starting the review of those

economic assumptions earlier (e.g., earlier than the discussion that started in November 2016 as was the case during the review of the assumptions for the June 30, 2016 valuation), it should allow the Board more time to review, deliberate and adopt or modify the investment return assumption(s) recommended by Cheiron.

Details of Review

In order to demonstrate the interconnection and the consistency among the investment return, price inflation and wage inflation assumptions, Segal utilized a “building block” approach in developing and documenting our review of these three assumptions. Under this approach, the investment rate of return assumption is the combination of the inflation component and the real rate of return component (used by the investment consultants), less an expense component. Similarly, the wage growth assumption is the combination of the inflation component and the real wage increase component. (It should be noted that the salary increase assumption is developed using the wage growth assumption and the merit increase assumption.) In our experience, this is generally the preferred approach for documenting and developing these assumptions.

Inflation Assumption for Use in Projecting Benefit Obligations

The first “building block” to consider is the price inflation component assumption. This assumption underlies all other economic assumptions, including both the investment return and the projection of benefit liabilities (i.e., salary increase for actives and COLAs for retirees in Tier 2). For the inflation assumption, based on alternatives presented by Cheiron, the Board chose to reduce the current assumption of 3.00% used in the June 30, 2015 valuation to 2.75% used in the June 30, 2016 valuation. In their analysis, as part of the 2015 experience study, Cheiron cited the inflation expectations from the Federal Reserve Survey of Professional Economic Forecasters and those inflation assumptions used by different California public retirement plans in their valuations. They also included the inflation expectation of NEPC, the investment consultant for the Plan.

There was a wide disparity between the 50th percentile assumptions of 2.15% from the economic forecasters and 3.25% from the retirement plan valuations. While we would find the 3.00% and

2.75% assumptions used by Cheiron in the 2015 and 2016 valuations, respectively, to be within the reasonable range for this assumption, it is important to acknowledge the different time horizons used by the economic forecasters (10 years as provided in the Cheiron experience study) and the much longer time period used by the California public retirement plans in their valuations. For example, the benefits for some members currently in their 30's and 40's will not commence until they retire at 60's and 70's and then be paid for 20 to 30 years after their retirement. Due to the difference in the time horizon, the inflation assumption adopted by Segal's California public retirement system clients (that have recently reviewed these assumptions) have been in the range of 2.75% to 3.00%.

It should also be noted that while the long term (30-year) inflation assumption used by NEPC had remained unchanged at 3.25% between the 2015 experience study and the 2016 valuation, Cheiron quoted a medium term (5 to 7 years) inflation assumption of 3.00% from NEPC when Cheiron developed the alternative inflation assumptions for the 2016 valuation. Even though we did not see a reference to that effect, the Board should be aware that Cheiron had previously provided a 2.50% recommended inflation assumption to the City's Federated City Employees' Retirement System ("System") in their June 30, 2015 and 2016 valuations. It has been the trend within the industry to lower the inflation assumption for use in a pension valuation. If that trend were to continue and given that Cheiron had previously recommended a 2.50% inflation to the City's other pension plan at the System, we believe it would be reasonable to anticipate that Cheiron may recommend a 2.50% inflation to the Board in a future valuation.

Administrative and Investment Expenses Paid from the Plan and the Deduction of some of those Expenses in Development of Investment Return Assumption

Administrative Expenses

In their 2015 experience study, Cheiron analyzed the administrative expenses as a percentage of payroll for each plan year since 2010. The administrative expense ratio had ranged from a low of 1.16% to a high of 2.23%. The average over the six-year period from fiscal year 2010 to 2015 was 1.72%, while the average over the most recent three-year period from fiscal year 2013 to 2015 was 2.01%.

Rather than to offset the administrative expenses with actual investment income, which would lower the investment return assumption, Cheiron included an additional contribution rate in their valuation to defray those expenses. That assumption was increased from 1.8% of payroll to 1.9% of payroll to partially recognize: (1) the increase in actual amount of the administrative expenses (about \$4.2 million for fiscal year 2014/2015) and (2) a payroll base (about \$188.2 million for fiscal year 2014/2015) that had decreased by about \$70 million since fiscal year 2010 (about \$255.2 million for fiscal year 2009/2010).

We agree with Cheiron that the collection of 1.9% of payroll to defray administrative expenses may be subject to increase in future valuations and that the investment return assumption does not have to be adjusted to anticipate the payment of such expenses.

Investment Expenses

The actual amount of investment expenses paid out of the plan during fiscal year 2015 was \$16.2 million. (Of that amount, about 88% was paid out as investment managers fees and the remaining 12% was paid out for investment consulting, custodian banking, and other expenses.)

Because Cheiron made no provision to collect those investment expenses as an additional contribution rate, these investment expenses came out of investment return. Because Cheiron did not make an explicit reduction for these, there was an implicit 0.00% investment expense assumption used by Cheiron in their development of the investment return assumption. While we have not audited the capital market assumptions, it has been our experience working with the investment consultants retained by our California public retirement system clients that their capital market assumptions are generally gross of (i.e. not reduced for) investment expenses.

It should be noted that individual actuarial firms use different models with different criteria and parameters to develop the investment return assumption, and the model used by Segal is different from that used by Cheiron. Segal would generally subtract some portion of the investment expenses (total investment expenses were about 50 basis points or bps) from the indexed (or passively managed) returns in developing the investment return assumption, which would lower the expected

investment return assumption¹. Furthermore, in the case of the Plan, it appears based on information provided in the comparison of asset performance section of the Fiscal Year 2015 CAFR that the average market return net of manager fees was lower than the policy benchmark by about 40 bps during a 10-year period. While this may be a coincidence (40 bps versus 50 bps), this observation could be used to support some reduction in the investment return assumption for payment of those expenses.

We also note that about 12% of the total investment expense paid in Fiscal Year 2015 was for investment consulting, custodian banking, and other expenses that either were not directly in pursuit of “alpha” returns or were expenses that had not been netted out of the capital market assumptions. For all these reasons, we recommend that Cheiron review their methodology in conjunction with the ASOP 27 to consider making some provisions for payment of future investment expenses when they review the investment return assumption before the June 30, 2017 valuation.

Development of Investment Rate of Return Assumption

For the investment rate of return assumption, based on alternatives presented by Cheiron, the Board chose to reduce the current assumption of 7.00% used in the June 30, 2015 valuation to 6.875% used in the June 30, 2016 valuation. Cheiron derived the 7.00% investment return assumption by applying the Plan’s target asset allocation in a stochastic model developed using the capital market assumptions provided by NEPC, the Plan’s investment consultants, in preparing their investment return assumption recommended for the June 30, 2015 valuation. While the reduction to the 6.875% investment return assumption for the June 30, 2016 valuation is consistent with the trend in the industry to adopt more conservative investment return assumptions, we would nonetheless recommend to Cheiron that they include a more detailed analysis behind their recommendation in a more formal report. This should supplement the high

¹ Our practice may be considered by some to be more conservative than that required under the Actuarial Standard of Practice (ASOP) No. 27, which states in part in Section 3.8.3.d, “Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (pessimistic). The actuary should not assume that superior or inferior returns will be achieved, **net of investment expenses**, from an active investment management strategy compared to a passive investment management strategy unless the actuary believe, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the measurement period.” (emphasis added). We believe this means that assuming only enough superior return to cover related investment expenses would not require the relevant supporting data referenced in ASOP No. 27.

level analysis provided in their Power Point presentation made to the Board at the December 2016 meeting.

We have the following observations with respect to the development of the 7.00% investment return assumption that Cheiron provided in their June 30, 2015 experience study report.

- To estimate the expected return from each category class, Cheiron used the specific capital market assumptions from only one investment consultant (i.e. NEPC). On the one hand, that would allow more consistency between the investment return expectation that might have been utilized by the investment consultant when they assist the Board in selecting the Plan's particular asset allocation and that was used in the actuarial valuation by Cheiron. On the other hand, it suffers from the undesired outcome (and possibly significant variability) of having the expected investment returns dependent on which investment consultant is employed by a retirement plan.
- In the 2015 experience study, Cheiron discussed that the 30-year long term median return from their stochastic modeling (without adjusting for the investment expense assumption) was 7.70%. In the 2015 review, Cheiron used the specific capital market assumptions prepared by NEPC which included an implicit inflation assumption of 3.25%. However, in 2015 Cheiron's recommended inflation assumption component for projecting the benefit obligations (i.e., salary increase for all actives and COLA for retirees in Tier 2) was 3.0%. It should be noted that this difference of 0.25% was increased to 0.50% in 2016 when Cheiron lowered their inflation expectation from 3.0% used in their 2015 experience study to 2.75% used under one of the alternatives in their 2016 analysis. We believe that the Plan's valuation report and experience study report should document which inflation assumption(s) is used to develop the investment return assumption and the price inflation and wage inflation for calculating the liabilities. To the extent they are different, an explanation should be provided accordingly, because otherwise, the economic assumptions would be arguably inconsistent.
- As an independent check, Segal has applied the model that we use for other California public retirement systems to review the adopted 6.875% investment return assumption. While, especially when first applied, our model does not necessarily produce an absolute investment return recommendation, it is very useful for comparing the level of risk inherent in the

investment return assumptions adopted by a given retirement system at different points in time or with other retirement systems that have previously been analyzed using that model.

Based on the application of our model, we believe that the level of risk implicit in the 6.875% investment return assumption, along with a 2.75% price inflation assumption, is somewhat lower than the comparable risk measure used by other California public retirement systems that have been analyzed using that model. The main reason is that those other California public retirement systems have adopted a higher investment return assumption (either 7.25% or 7.50%) in their valuations.

- Another test of the recommended investment return assumption is to compare it against those used by other public retirement systems, both in California and nationwide. We note that an investment return assumption of 6.875% is the lowest value for this assumption among the California public sector retirement systems. The most common range, with a few exceptions, is from 7.00% to 7.50%.

Taking into account the above discussion and based on our own independent analysis, we believe that the 6.875% investment return assumption that has been recommended by Cheiron to the Board is reasonable. However, we believe that they should consider making adjustment in their model to address the issues related to investment expenses and inflation as discussed above.

Wage Increase Assumption

Cheiron used a somewhat different approach in developing their wage inflation assumption. Under that approach, they observed that “over [a] 20-year period, average wage growth (3.37 percent) was 66 basis points greater than San Jose inflation (2.71 percent).” This information, together with the “the median wage inflation in [their] survey of California systems [of] 3.75 percent” were all considered in coming up with their 3.25% wage increase assumption. Again, our preference is to utilize a “building block” approach in developing the recommended wage inflation assumption, so as to maintain and demonstrate consistency with the price inflation assumption. Under that approach, the wage income assumption is the combination of the price inflation component and the productivity or real wage increase component. Even though we would find the 3.25% assumption recommended by Cheiron to be within the reasonable range for this assumption for both the June 30, 2015 and 2016 valuations, our process would likely

have led to a somewhat higher wage increase assumption of 0.50% above price inflation for the 2015 valuation. However, the need to possibly consider a higher wage increase assumption was mitigated when Cheiron reduced the inflation assumption from 3.0% to 2.75% in their 2016 valuation, while keeping the wage inflation assumption unchanged at 3.25%. We have included below a narrative showing how we would develop such a 3.25% wage increase assumption.

Inflation Component

The price inflation component was discussed earlier where we concluded that Cheiron's recommendation of 2.75% was reasonable.

Productivity or Real Wage Increase Component

Real "Across the Board" Pay Increases – These increases are sometimes termed productivity increases since they are considered to be derived from the ability of an organization or an economy to produce goods and services in a more efficient manner. As that occurs, at least some portion of the value of these improvements can provide a source for pay increases. These increases are typically assumed to extend to all employees "across the board." The State and Local Government Workers Employment Cost Index produced by the Department of Labor provides evidence that real "across the board" pay increases have averaged about 0.6% - 0.9% annually during the last ten to twenty years.

We also referred to the annual report on the financial status of the Social Security program published in July 2015. In that report, real "across the board" pay increases are forecast to be 1.2% per year under the intermediate assumptions. (Note that this should be comparable to the increase in national average wages reported by Social Security Administration in the June 30, 2015 experience study report.)

The real pay increase assumption is generally considered a more "macroeconomic" assumption, that is not necessarily based on individual plan experience. However, recent salary experience with public systems in California as well as anecdotal discussions with plans and plan sponsors indicate lower future real wage growth expectations for public sector employees. For these reasons, we would generally recommend an across the board pay increase assumption of 0.50%.

When combined with Cheiron's price inflation component of 2.75%, this results in a wage inflation assumption of 3.25% for the 2016 valuation.

EXHIBIT – A
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
ANALYSIS OF PARTICIPANT DATA

Active Member Data						
	Tier 1		Tier 2		Total	
	Plan	Cheiron	Plan	Cheiron	Plan	Cheiron
Number	1,391	1,393	189	189	1,580 ⁽¹⁾	1,582
Average Age	43.93	43.95	30.58	30.58	42.33	42.35
Average Eligibility Service	16.0	16.0	1.8	1.8	14.3	14.3
TOTAL						
Compensation rate as of 6/30/2016 ⁽²⁾	\$6,503,157	Not Available	\$524,121	Not Available	\$7,027,278	Not Available
Pensionable compensation for 7/1/2015-6/30/2016 ⁽²⁾	\$166,573,107	Not Available	\$10,687,480	Not Available	\$177,260,587	Not Available
Expected salary for 7/1/2016-6/30/2017 before assigning a salary for 23 active members with \$0 salary from Plan ⁽²⁾⁽³⁾	\$177,344,994	Not Available	\$14,647,774	Not Available	\$191,992,768	Not Available
Expected salary for 7/1/2016-6/30/2017 ⁽⁴⁾	\$177,344,994	\$177,611,521	\$16,404,008	\$16,460,571	\$193,749,002	\$194,072,092
AVERAGE						
Expected salary for 7/1/2016-6/30/2017 ⁽⁴⁾	\$127,495	\$127,503	\$86,794	\$87,093	\$122,626	\$122,675
% DIFFERENCE						
Number		0.1%		0.0%		0.1%
Average Age		0.0%		0.0%		0.0%
Average Eligibility Service		0.0%		0.0%		0.0%
TOTAL						
Expected salary for 7/1/2016-6/30/2017 ⁽⁴⁾		0.2%		0.3%		0.2%
AVERAGE						
Expected salary for 7/1/2016-6/30/2017 ⁽⁴⁾		0.0%		0.3%		0.0%

⁽¹⁾ 3 records in the Plan's original data reported as actives were reclassified as deferred vested members based on the response to a data question raised by Cheiron.

⁽²⁾ 26 actives (including 2 Tier 1 and 24 Tier 2) did not have a compensation rate in the data provided by the Plan. 32 actives (including 4 Tier 1 and 28 Tier 2) did not have a pensionable compensation in the data provided by the Plan. Only 23 actives (all from Fire Tier 2) were missing both the compensation rate and the pensionable compensation. In the final Cheiron data file provided to Segal, Cheiron did not include the compensation rate nor the pensionable compensation.

⁽³⁾ The expected salary for 2016/2017 has been calculated using a method consistent with that used by Cheiron and it is as follows:
Step One - An annualized salary was calculated by multiplying Compensation Rate (comp2) times 26 and increased with one year of wage inflation and one-half year of merit.
Step Two - Pensionable compensation was increased with one year of wage inflation and one year of merit.
Step Three - Expected Salary for 2016/2017 was calculated as the greater of the salaries calculated in Step One and Step Two.

⁽⁴⁾ Cheiron assigned a salary of \$76,358 for 23 Fire Tier 2 actives missing both the compensation rate and the pensionable compensation. Segal made the same assignment for those 23 actives.

EXHIBIT – A (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
ANALYSIS OF PARTICIPANT DATA

Retired & Disabled Member Data						
	Tier 1		Tier 2		Total	
	Plan	Cheiron	Plan	Cheiron	Plan	Cheiron
Number					1,854	1,854
Average Age	A breakdown between Tier 1 and Tier 2 was not provided in the Cheiron valuation report ⁽¹⁾ .				65.8	65.8
Total Annual Benefit ⁽²⁾					\$178,931,693	\$178,929,360
Average Annual Benefit					\$96,511	\$96,510
% DIFFERENCE						
Number						0.0%
Average Age						0.0%
Total Annual Benefit						0.0%
Average Annual Benefit						0.0%

⁽¹⁾ As of June 30, 2016, there were no retired and disabled members in Tier 2.

⁽²⁾ Cheiron did not reduce the benefit amount for 7 retirees whose benefit were in excess of 415 limit. The total of those benefits in excess of 415 limit was \$99,800.

EXHIBIT – A (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
ANALYSIS OF PARTICIPANT DATA

BENEFICIARIES						
	Tier 1		Tier 2		Total	
	Plan	Cheiron	Plan	Cheiron	Plan	Cheiron
Number					295 ⁽²⁾	295
Average Age	A breakdown between Tier 1 and Tier 2 was not provided in the Cheiron valuation report ⁽¹⁾ .				66.7 ⁽³⁾	66.9
Total Annual Benefit					\$11,967,590	\$11,967,590
Average Annual Benefit					\$40,568	\$40,568
% DIFFERENCE						
Number						0.0%
Average Age						0.3% ⁽³⁾
Total Annual Benefit						0.0%
Average Annual Benefit						0.0%

⁽¹⁾ As of June 30, 2016, there were no beneficiaries in Tier 2.

⁽²⁾ Did not include 108 records indicated in the beneficiary file with the indicator of “Q” for *Qualified Domestic Relations Order* or “*QDRO*”.

⁽³⁾ There were three minor beneficiaries currently collecting a survivor benefit from the Plan for whom the date of birth used by Cheiron was different from that provided by the Plan. (Two of three beneficiaries were from the same deceased retiree.) All three beneficiaries had different dates of birth on the Plan’s data file but were changed by Cheiron to 6/30/2001.

EXHIBIT – A (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
ANALYSIS OF PARTICIPANT DATA

Inactive Member Data						
	Tier 1		Tier 2		Total	
	Plan	Cheiron	Plan	Cheiron	Plan	Cheiron
Number	A breakdown between Tier 1 and Tier 2 was not provided in the Cheiron valuation report ⁽³⁾ .				336 ⁽¹⁾	317 ⁽²⁾
Average Age					41.4	41.0
% DIFFERENCE						
Number						-5.7%
Average Age						-1.0%

⁽¹⁾ 3 records in the Plan's original data reported as actives were reclassified as deferred vested members based on the response to a data question raised by Cheiron.

⁽²⁾ Cheiron showed 317 deferred vested members on page 2 of the 2016 valuation report and 314 deferred vested members on page 35 of the 2016 valuation report. Cheiron excluded from their 2016 valuation 19 records reported with a code "Leave of Absence" and non-zero benefit service in the original Plan's data file. However, Cheiron kept in their 2016 valuation 10 similar records in the final data file.

⁽³⁾ As of June 30, 2016, there were 279 Tier 1 and 38 Tier 2 inactive members, reported by Cheiron in the final data file.

EXHIBIT – B
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
TEST LIFE COMPARISON

ACTIVES	Testlife #1		Testlife #2		Testlife #3		Testlives #4&5		Testlives #1-5	
	Fire Tier 1		Police Tier 1		Fire Tier 2		Police Tier 1 & 2		Total Actives	
	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal
Total PVB	\$1,121,359	\$1,138,650	\$969,561	\$981,760	\$292,307	\$288,238	\$512,785	\$531,782	\$2,896,012	\$2,940,430
PV - Future Normal Costs	\$527,735	\$516,390	\$530,712	\$515,979	\$265,060	\$261,280	\$183,713	\$193,784	\$1,507,220	\$1,487,433
Actuarial Accrued Liability	\$593,624	\$622,260	\$438,849	\$465,781	\$27,247	\$26,958	\$329,072	\$337,998	\$1,388,792	\$1,452,997
RATIO OF SEGAL/CHEIRON										
Total PVB	102%		101%		99%		104%		102%	
PV - Future Normal Costs	98%		97%		99%		105%		99%	
Actuarial Accrued Liability	105%		106%		99%		103%		105%	

EXHIBIT – B (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
TEST LIFE COMPARISON

INACTIVES	Testlife #6		Testlife #7		Testlife #8		Testlife #9		Testlife #10		Testlife #11	
	Retired Fire Tier 1		Retired Police Tier 1		Disability Fire Tier 1		Disability Police Tier 1		Beneficiary Fire Tier 1		Beneficiary Police Tier 1	
	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal
Total PVB	\$2,635,736	\$2,654,822	\$2,646,586	\$2,664,825	\$2,249,613	\$2,253,367	\$789,670	\$795,325	\$144,574	\$145,373	\$736,562	\$742,622
RATIO OF SEGAL/CHEIRON												
	101%		101%		100%		101%		101%		101%	

INACTIVES	Testlife #12		Testlife #13		Testlives #6-13	
	Deferred Police Tier 1		Reciprocal Police Tier 1		Total Inactives	
	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal
Total PVB - before changes	\$585,593	\$538,188	\$555,384	\$525,912	\$10,343,718	\$10,320,433
Total PVB - after changes	\$540,021	\$538,188	\$526,277	\$525,912	\$10,269,039	\$10,320,433
RATIO OF SEGAL/CHEIRON						
Before changes	92%		95%		100%	
After changes	100%		100%		101%	

EXHIBIT – C
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
COMPARISON OF RESULTS
(All Dollar Amounts are in Thousands)

PRESENT VALUE OF FUTURE BENEFITS (PVB)	Fire Tier 1		Police Tier 1		Fire Tier 2		Police Tier 2		Total	
	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal
Actives	\$814,718	\$826,716	\$1,045,722	\$1,063,823	\$16,225	\$16,754	\$30,917	\$30,187	\$1,907,582	\$1,937,480
Retirees	1,082,089	1,090,759	1,819,891	1,833,672	0	0	0	0	2,901,980	2,924,431
Inactive Vesteds	11,140 ⁽¹⁾	8,376	86,412 ⁽¹⁾	69,157	10	10	231	235	97,793	77,778
Total PVB	\$1,907,947	\$1,925,851	\$2,952,025	\$2,966,652	\$16,235	\$16,764	\$31,148	\$30,422	\$4,907,355	\$4,939,689
RATIO OF SEGAL/CHEIRON										
Actives		101%		102%		103%		98%		102%
Retirees		101%		101%		N/A		N/A		101%
Inactive Vesteds		75% ⁽¹⁾		80% ⁽¹⁾		100%		102%		80% ⁽¹⁾
Total PVB		101%		100%		103%		98%		101%

⁽¹⁾ The present value of future benefits for current inactive vested members was overstated by Cheiron. The Cheiron numbers are the same as those shown in the 2016 valuation which do not reflect necessary corrections. Cheiron's revised PVB for Fire Tier 1 inactive vested members was \$8,803 resulting in a 95% ratio. Cheiron's revised PVB for Police Tier 1 inactive vested members was \$75,069 resulting in a 92% ratio.

EXHIBIT – C (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
COMPARISON OF RESULTS

CONTRIBUTION RATES	Fire Tier 1		Police Tier 1		Fire Tier 2		Police Tier 2		Total	
	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron ⁽¹⁾	Segal
1. Normal Cost Rate (incl. admin. exp.)	42.36%	43.70%	40.92%	40.90%	23.54%	23.18%	22.66%	22.60%		
2. Member Normal Cost Rate	<u>11.25%</u>	<u>11.64%</u>	<u>10.72%</u>	<u>10.71%</u>	<u>11.77%</u>	<u>11.59%</u>	<u>11.33%</u>	<u>11.30%</u>		
3. Net City Normal Cost Rate (1. - 2.)	31.11%	32.06%	30.20%	30.19%	11.77%	11.59%	11.33%	11.30%		
4. Total UAAL Rate	65.08%	66.05%	65.27%	66.21%	0.00%	0.06%	-0.04%	-0.06%		
5. Member UAAL Rate	<u>0.13%</u>	<u>0.13%</u>	<u>0.16%</u>	<u>0.16%</u>	<u>0.00%</u>	<u>0.03%</u>	<u>-0.02%</u>	<u>-0.03%</u>		
6. City UAAL Rate (4. - 5.)	64.95%	65.92%	65.11%	66.05%	0.00%	0.03%	-0.02%	-0.03%		
7. Total Member Rate (2. + 5.)	11.38%	11.77%	10.88%	10.87%	11.77%	11.62%	11.31%	11.27%	11.16%	11.30%
8. Total City Rate (3. + 6.)	96.06%	97.98%	95.31%	96.24%	11.77%	11.62%	11.31%	11.27%	81.25%	82.61%
RATIO OF SEGAL/CHEIRON										
1. Normal Cost Rate (incl. admin. exp.)		103%		100%		98%		100%		
2. Member Normal Cost Rate		103%		100%		98%		100%		
3. Net City Normal Cost Rate (1. - 2.)		103%		100%		98%		100%		
4. Total UAAL Rate		101%		101%		See note ⁽²⁾		150% ⁽³⁾		
5. Member UAAL Rate		100%		100%		See note ⁽²⁾		150% ⁽³⁾		
6. City UAAL Rate (4. - 5.)		101%		101%		See note ⁽²⁾		150% ⁽³⁾		
7. Total Member Rate (2. + 5.)		103%		100%		99%		100%		101%
8. Total City Rate (3. + 6.)		102%		101%		99%		100%		102%

⁽¹⁾ While we were able to locate and opine on Cheiron’s calculations for the total City contribution rate of 81.25% as provided on page 1 of their report, we were not able to locate Cheiron’s breakdown of the total City contribution rate between the normal cost rate and the UAAL contribution rate.

As Cheiron did not include the breakdown of the total normal cost rate and UAAL rate for each of the City and the member in their report, in the table above we only show the ratios of the normal cost rate and the UAAL contribution rate for the City and the members for Tier 1 and Tier 2 for each of Police and Fire separately, and not in the total.

⁽²⁾ While Segal’s member and City UAAL rates are 0.03%, Cheiron has calculated rates of 0.00% of payroll. The ratio of Segal/Cheiron is undefined (when our rate is divided by 0.00%).

⁽³⁾ The ratio of Segal/Cheiron for UAAL was relatively high because the Police Tier 2 Plan had relatively low UAAL contribution amounts as calculated by Cheiron.

EXHIBIT – C (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
COMPARISON OF RESULTS
(All Dollar Amounts are in Thousands)

UNFUNDED ACTUARIAL LIABILITY	Fire Tier 1		Police Tier 1		Fire Tier 2		Police Tier 2		Total	
	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal	Cheiron	Segal
Present Value of Future Benefits	\$1,907,947	\$1,925,851	\$2,952,025	\$2,966,652	\$16,235	\$16,764	\$31,148	\$30,422	\$4,907,355	\$4,939,689
PV Future NC Contributions	263,147	273,151	245,091	246,706	15,602	16,075	27,525	26,840	551,365	562,772
Actuarial Accrued Liability	1,644,800	1,652,700	2,706,934	2,719,946	633	689	3,623	3,582	4,355,990	4,376,917
Current Assets at Actuarial Value	See note ⁽¹⁾	See note ⁽¹⁾	See note ⁽¹⁾	See note ⁽¹⁾	623	623	3,706	3,706	3,297,068	3,297,068
UAAL	See note ⁽¹⁾	See note ⁽¹⁾	See note ⁽¹⁾	See note ⁽¹⁾	10	66	-83	-124	1,058,922	1,079,849
Total UAAL Rate	65.08%	66.05%	65.27%	66.21%	0.00%	0.06%	-0.04%	-0.06%	54.03% ⁽²⁾	55.00%
RATIO OF SEGAL/CHEIRON										
Present Value of Future Benefits		101%		100%		103%		98%		101%
PV Future NC Contributions		104%		101%		103%		98%		102%
Actuarial Accrued Liability		100%		100%		109%		99%		100%
Current Assets at Actuarial Value		100%		100%		100%		100%		100%
UAAL		102%		102%		660% ⁽³⁾		149% ⁽³⁾		102%
Total UAAL Rate		101%		101%		See note ⁽⁴⁾		150% ⁽³⁾		102%

EXHIBIT – C (CONTINUED)
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
JUNE 30, 2016 VALUATION
COMPARISON OF RESULTS

(1) The combined AVA and UAAL for Tier 1 Police and Fire are as follows:

Tier 1	Cheiron	Segal
Current Assets at Actuarial Value	\$3,292,739	\$3,292,739
UAAL	1,058,995	1,079,907

(2) Calculated by Segal.

(3) The ratio of Segal/Cheiron for UAAL was relatively high because the Fire Tier 2 and Police Tier 2 Plans had relatively low UAAL contribution amounts as calculated by Cheiron.

(4) While Segal's total UAAL rate is 0.06%, Cheiron has calculated a rate of 0.00% of payroll. The ratio of Segal/Cheiron is undefined (when our rate is divided by 0.00%).

EXHIBIT – D
CITY OF SAN JOSE POLICE AND FIRE DEPARTMENT RETIREMENT PLAN
RECOMMENDED ACTION ITEMS BEFORE JUNE 30, 2017 VALUATION

- In developing the economic assumptions for the 2017 valuation, Cheiron should consider documenting the interrelationship between the price inflation, wage inflation and investment return assumption. Cheiron should consider some provisions for payment of future investment expenses when they review the investment return assumption.
- The Board might want to consider their deliberation of the economic assumptions before (or just immediately) after the date of the valuation.
- Cheiron should correct the calculations of the (smoothed) actuarial value of assets (AVA) in the 2017 valuation.
- Cheiron should correct the calculations of the actuarial accrued liability for current inactive vested members in the 2017 valuation.
- The Plan should request a list of retirees for whom Cheiron has changed their form of payment to a single life annuity in their 2016 valuation.
- The Plan should request a list of beneficiaries for whom Cheiron has changed their dates of birth in their 2016 valuation.
- The Plan should request a list of terminated vested with a code “Leave of absence” that Cheiron did not include in their 2016 valuation.
- Cheiron should document the assumption that all employees are assumed to earn 1 year of service between valuations.
- Cheiron should clarify how the termination rates are applied in the 2017 valuation.
- Cheiron should correct the description of the mortality table for disabled females in the 2017 valuation.
- Cheiron should clarify the application of the reciprocity assumption in the 2017 valuation.
- Cheiron should prorate the COLA for Tier 2 members in the 2017 valuation.
- Cheiron should take the IRC Section 415 limitation into account in the 2017 valuation.
- Cheiron should show the demographic data in the valuation report not only for Tier 1 and Tier 2 but also for each of Police and Fire.
- Cheiron should describe that the cost for reciprocal benefits is excluded when they calculate the member contributions for Tier 1 for each of Police and Fire in Appendix C (summary of plan provisions section) in the 2017 valuation.