

**City of Fresno Fire and Police
Retirement System**

ACTUARIAL EXPERIENCE STUDY

**Analysis of Actuarial Experience
During the Period
July 1, 2012 through June 30, 2015**



100 Montgomery Street, Suite 500
San Francisco, CA 94104

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100 Montgomery Street Suite 500 San Francisco, CA 94104-4308
T 415.263.8200 www.segalco.com

May 17, 2016

Board of Retirement
City of Fresno Fire and Police Retirement System
2828 Fresno Street, Suite 201
Fresno, CA 93721-1327

**Re: Review of Non-Economic Actuarial Assumptions for the June 30, 2016
Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience of the City of Fresno Fire and Police Retirement System. This study utilizes the census data from the last three actuarial valuations ending June 30, 2015. The study includes the proposed actuarial assumptions to be used effective with the June 30, 2016 valuation.

The review of the economic assumptions for use in the June 30, 2016 valuation is provided in a separate 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.

We look forward to reviewing this report with you and answering any questions you may have.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Angelo", written over a horizontal line.

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

A handwritten signature in black ink, appearing to read "Andy Yeung", written over a horizontal line.

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

TJH/hy

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I. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To project the cost and liabilities of the Pension Fund, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the assumptions, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are changed, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Taking into account one year's gains or losses without making a change in the assumptions means that that year's experience was temporary and that, over the long run, experience will return to what was originally assumed. Changing assumptions reflects a basic change in thinking about the future, and it has a much greater effect on the current contribution requirements than recognizing gains or losses as they occur.

The use of realistic actuarial assumptions is important in maintaining adequate funding, while paying adequate benefit amounts to participants already retired and to those near retirement. The actuarial assumptions used do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three-year experience period from July 1, 2012 through June 30, 2015. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 35, "Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations" and, as appropriate, ASOP No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations." These Standards of Practice put forth guidelines for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected near-term experience, we recommend various changes in the current actuarial assumptions.

We are recommending changes in the Tier 2 retirement rates, percent of deferred vested members proceeding to work at a reciprocal system, spouse age difference, pre-retirement mortality, healthy life

post-retirement mortality, disabled life post-retirement mortality, Tier 2 termination, Tier 2 DROP election and salary increases.

Our recommendations for the major actuarial assumption categories are as follows:

Retirement Rates - The probability of retirement at each age at which participants are eligible to retire.

Recommendation: We recommend maintaining the current assumptions for Tier 1 members and recommend minor decreases for Tier 2 members to anticipate slightly later retirement. The assumptions are developed in Section III (B). We also recommend maintaining the current marriage/domestic partnership assumption. We recommend adjusting the assumed age difference between members and their spouses.

Mortality Rates - The probability of dying at each age. Mortality rates are used to project life expectancies.

Recommendation: We used experience for a six-year period including both the current and the prior experience study periods to study this assumption. In addition, we included a somewhat larger margin under the current “static” approach for anticipating future mortality improvements to partially reflect the anticipated effect of any future recommendation to use a “generational” approach for anticipating future mortality improvement.

For non-disabled members and all beneficiaries, we adjust post-retirement mortality rates as developed in Section III (C) to anticipate slightly shorter assumed life expectancy for males, and slightly longer assumed life expectancy for females. For disabled retirees, we adjust mortality rates as developed in Section III (D) to anticipate slightly shorter assumed life expectancy.

We recommend adjusting the rates for the pre-retirement mortality assumptions as developed in Section III (C). In addition, we recommend that all pre-retirement deaths be continued to be assumed as duty related deaths.

Termination Rates - The probability of leaving employment at each age and receiving either a refund of contributions or a deferred vested retirement benefit.

Recommendation: We recommend maintaining the current assumptions for Tier 1 members and recommend minor increases for Tier 2 members as developed in Section III(E) to reflect somewhat higher incidence of termination.

Disability Incidence Rates - The probability of becoming disabled at each age.

Recommendation: We recommend maintaining the current disability rates for both Tier 1 and Tier 2 members.

DROP Assumptions - The probability that a participant elects DROP and the duration of DROP participation.

Recommendation: We recommend maintaining the current DROP participation probability for Tier 1 members, and restructuring the assumed DROP participation probability for Tier 2 members to reflect different patterns of participation before and after age 55, as developed in Section III (G) based on emerging experience. We recommend maintaining the current assumption for the length of time members are assumed to remain in DROP.

Individual Salary Increases - Increases in the salary of a member between the date of the valuation to the date of separation from active service.

Recommendation: We recommend restructuring from an age-and-service-based assumption to a service-only-based assumption, and adjusting the merit and promotion rates to those developed in Section III (H) to reflect past experience.

Leave Conversions and Cash-outs - Additional pay elements that are expected to be received on both an ongoing basis and during the member's final average earnings period.

Recommendation: We recommend maintaining the leave conversion and cash-out assumptions as shown in Section III (G).

Section II provides some background on basic principles and the methodology used for the experience study and for the review of the demographic actuarial assumptions. A detailed discussion of the experience and reasons for the proposed changes is found in Section III.

Section IV shows the estimated cost impact of the recommended assumptions (including the economic assumptions as recommended in our separate report) for the June 30, 2016 valuation.

II. BACKGROUND AND METHODOLOGY

In this report, we analyzed the “demographic” or “non-economic” assumptions only. Our analysis of the “economic” assumptions for the June 30, 2015 valuation is provided in a separate report. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as “decrements,” e.g., withdrawal from service, disability retirement, service retirement, DROP election, and death after retirement. We also review the individual salary increases net of inflation (i.e., the merit and promotion assumptions) in this report.

Demographic Assumptions

In order to determine the probability of an event occurring, we examine the “decrements” and “exposures” of that event. For example, taking withdrawal from service, we compare the number of employees who actually withdraw in a certain age and/or service category (i.e., the number of “decrements”) with those who could have withdrawn (i.e., the number of “exposures”). For example, if there were 500 active employees in the 20-24 age group at the beginning of the year and 50 of them left during the year, we would say the probability of withdrawal in that age group is $50 \div 500$ or 10%.

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much credence to the probability of withdrawal developed for that age category, especially if it is out of line with the pattern shown for the other age groups. Similarly, if we are considering the death decrement, there may be a large number of exposures in, say, the age 20-24 category, but very few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability developed for that category.

One reason we use several years of experience for such a study is to have more exposures and decrements, and therefore more statistical reliability. Another reason for using several years of data is to smooth out fluctuations that may occur from one year to the next. However, we also calculate the rates on a year-to-year basis to check for any trend that may be developing in the later years.

III. ACTUARIAL ASSUMPTIONS

A. ECONOMIC ASSUMPTIONS

The economic assumptions are reviewed in a separate report titled “Review of Economic Actuarial Assumptions for the June 30, 2016 Actuarial Valuation.”

B. RETIREMENT RATES

The age at which a member retires from service (i.e., who did not retire on a disability pension) will affect both the amount of the benefits that will be paid to that member as well as the period over which funding must take place.

The tables on the following page show the observed service retirement rates based on the actual experience over the past three years. The observed service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service, with “N/A” denoting no eligible active members. This same methodology is followed throughout this report and was described in Section II. Also shown are the current rates assumed and the rates we propose.

Please note that the actual retirement experience was only a reflection of those members who never elected to participate in the DROP. Based on the data collected, no Tier 1 members and only seven Tier 2 members have retired during the past three years who never elected the DROP. We are not recommending any changes in the Tier 1 rates and we are recommending some minor decreases in the Tier 2 rates between 60 and 62.

As most Tier 1 and Tier 2 members are expected to elect DROP, the application of the service retirement rates are not expected to have a material impact in projecting the cost for the plan.

Tier 1

Age	Current and Proposed Rate of Retirement	Actual Rate of Retirement
50	12.72%	0.00%
51	7.63	N/A*
52	7.63	N/A
53	5.09	N/A
54	5.09	N/A
55	10.60	N/A
56	13.77	N/A
57	14.03	N/A
58	16.66	N/A
59	29.67	N/A
60	100.00	N/A

* "N/A" denotes those brackets with no exposures (e.g. there were no Tier 1 retirement eligible actives between 51 and 60 years old in the last three years)

Tier 2

Age	Current Rate of Retirement	Actual Rate of Retirement	Proposed Rate of Retirement
50	5.31%	0.00%	5.31%
51	4.12	2.63	4.12
52	4.64	2.78	4.64
53	5.09	7.14	5.09
54	5.09	0.00	5.09
55	19.46	0.00	19.46
56	11.72	20.00	11.72
57	7.82	0.00	7.82
58	9.69	0.00	9.69
59	9.17	25.00	9.17
60	75.00	0.00	60.00
61	75.00	0.00	60.00
62	75.00	0.00	60.00
63	75.00	100.00	75.00
64	75.00	N/A	75.00
65	100.00	N/A	100.00

Chart 1 compares actual experience with the assumed and the proposed rates of retirement for Tier 1 members. Chart 2 has similar data for Tier 2 members.

In prior valuations, deferred vested Tier 1 members were assumed to retire at age 50 and Tier 2 members were assumed to retire at age 52. Over the last three years one Tier 1 member retired from deferred vested status at age 50, and one Tier 2 member retired from deferred vested status at age 59 ½. In the last study, there were 3 Tier 1 retirements from deferred vested status with an average age of 50, and 3 Tier 2 retirements from deferred vested status with an average age of 52.5. Based on this, we recommend maintaining the assumed retirement at age 50 for deferred vested Tier 1 members and at age 52 for deferred vested Tier 2 members.

In prior valuations, it was assumed that 85% of all active members would be married or have an eligible domestic partner when they retired. According to experience of members who retired from active employment or started their participation in the DROP during the last three years, about 89% of all members were married or had a domestic partner at retirement. We recommend maintaining the marriage assumption at 85%.

In prior valuations, it was assumed that when active members retire, the spouses of male members are three years younger, and the spouses of female members are three years older. Based on observed experience from members who retired during the last three years that showed a difference between the average male member and female spouse of -1.76 years, and between the average female member and male spouse of 1.64 years, we recommend changing the spousal age assumption for male members from three years younger to two years younger, and changing the spousal age assumption for female members from three years older to two years older. All spouses will be assumed to be of the opposite sex to the member until we have more actual experience concerning domestic partners.

Reciprocity Assumption

Based on the actual experience that 43% of all deferred vested members went on to be covered by a reciprocal retirement system, we recommend an assumption that 50% of all future deferred vested members will continue to work for a reciprocal employer, as compared to the current assumption of 60%. Currently we assume a 4.15% annual salary increase to anticipate salary increases from termination to the expected date of retirement from the reciprocal employer. We propose decreasing this annual salary increase assumption to 4.00%, consistent with the salary increase assumption for active members. This includes general salary increases of 3.50% plus 0.50% merit and promotion increases.

Chart 1
Retirement Rates - Tier 1 Members

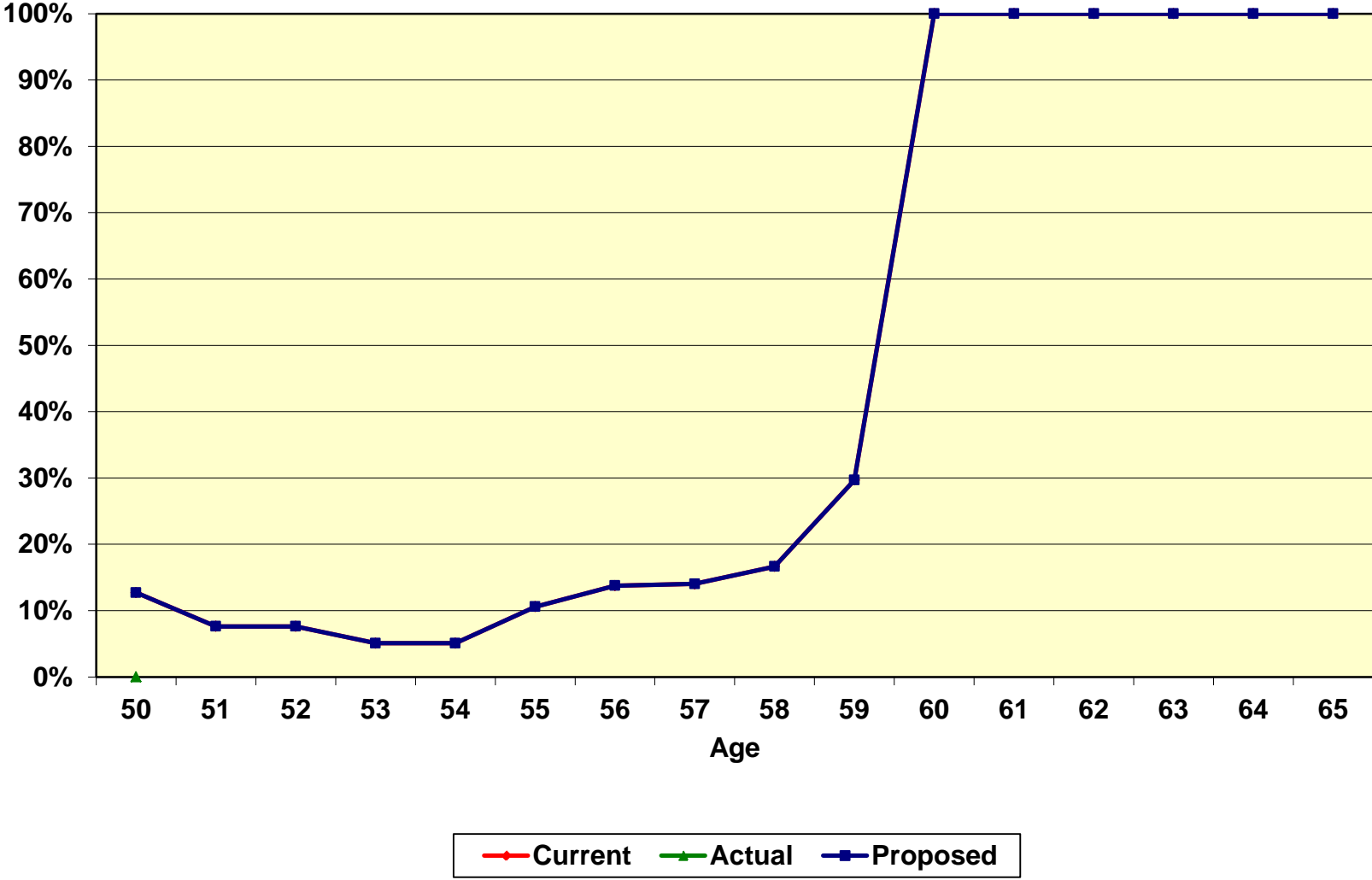
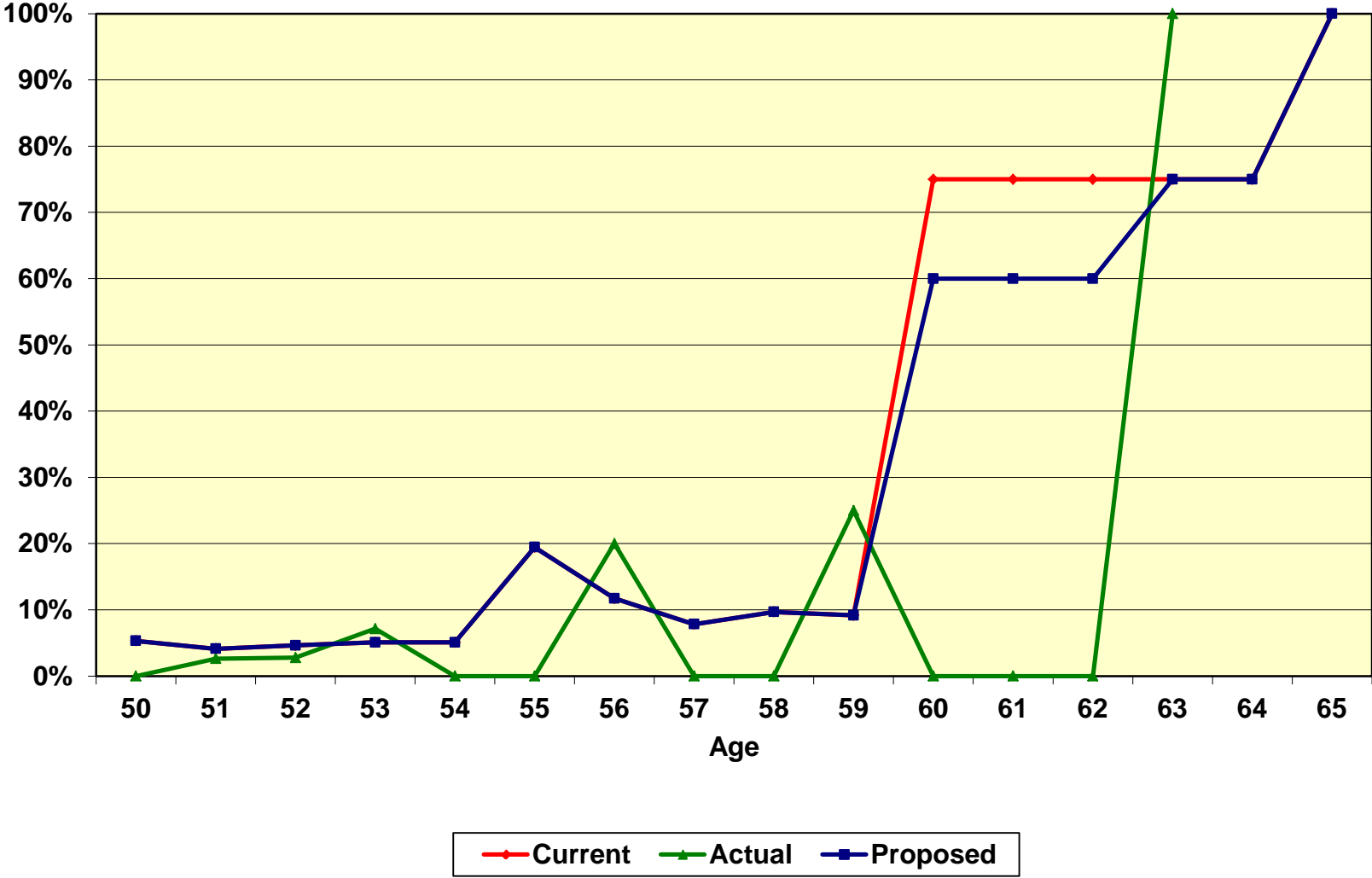


Chart 2
Retirement Rates - Tier 2 Members



C. MORTALITY RATES - HEALTHY

The “healthy” mortality rates project the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). Also, the “healthy” pre-retirement mortality rates project what proportion of members will die before retirement. The table currently being used for post-service retirement mortality rates is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females), projected with scale AA to 2021, set back three years for males and set forward one year for females.

The Society of Actuaries (SOA) has recently published the RP-2014 family of mortality tables and associated life expectancy improvement scales. Within that family of mortality tables, there are mortality rates developed for annuitants on a “headcount” weighted basis that weight all retirees at the same age the same way without regard to the level of benefits those annuitants are receiving from a retirement plan. Mortality rates are also developed for annuitants on a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits. The headcount-weighted basis is the more common practice and is the approach used by Segal in the past for its California public system clients (including the City of Fresno) and by other public sector actuaries in California.

As for the life expectancy improvement scales, they can be applied in one of two ways. Currently, the more common application is to use a “static” approach to anticipate a fixed level of mortality improvement for all annuitants receiving benefits from a retirement plan. This is in contrast to a “generational” approach where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. The static approach is used by Segal for its California public system clients (including the City of Fresno) and is still most commonly used by other public sector actuaries in California and nationwide.

The SOA is in the process of collecting data from public sector plans so that they can develop mortality tables based on public sector experience comparable to the RP-2014 mortality tables developed using data collected from private and multi-employer plans. Furthermore, after publishing the two-dimensional MP-2014 life improvement expectancy scale, the SOA has replaced it with the two-dimensional MP-2015 life improvement expectancy scale to remove some of the conservatism built into the MP-2014 scale and to better reflect the most recent data of mortality improvement from the Social Security Administration. Segal believes that given the trend in the retirement industry to move towards generational mortality, it would be prudent for the Board to adopt the Headcount-Weighted RP-2014 mortality table, adjusted for City of Fresno experience. However, given that there is a large difference between the generational MP-2014 and MP-2015,

Segal recommends that the City continue to use a static mortality improvement but with adjustments that would nearly double the 10% margin we have recommended in the past to anticipate the move towards a “generational” approach in a future experience study.

Once the SOA has included data from public sector plans in developing the new tables, we will also include a discussion with the Board on whether to consider the benefit weighted mortality rates in the experience study. Finally, note that in order to use more actual City of Fresno experience in our analysis, we have used experience for a six-year period from both the current and the last experience study periods to study this assumption.

In the table below, we have provided the approximate increase in the total employer and Tier 1 member contribution rates based on the different approaches to build in margin for future mortality improvements.

	Employer and Member Normal Cost Impact Combined	Impact on Actuarial Accrued Liability (Estimated Dollar Amounts in Thousands)
Headcount Weighted RP-2014 – Static approach with increased margin	-0.34% of payroll*	\$18,141*
Benefit Weighted RP-2014 – Static approach without increased margin	-0.41% of payroll*	\$4,388*
Headcount Weighted RP-2014 – Generational approach	0.30% of payroll	\$30,886

* *The newly published RP-2014 Healthy Annuitant Tables (both headcount and benefit weighted) have relatively higher mortality rates for both males and females under the age of 65 versus those over the age of 65, when compared to the corresponding mortality rates (those under 65 versus those over 65) provided in the previously used RP-2000 Combined Healthy Tables. This results in a net reduction in the normal cost rate for active members but an overall increase in the actuarial accrued liability among retired members and beneficiaries in pay status. Current actives will face somewhat higher assumed rates of mortality during their initial years of retirement, which results in a reduction in their expected future benefits and the annual costs to fund them.*

Pre-Retirement Mortality

In prior experience studies, the pre-retirement mortality rates for active and deferred vested members were set equal to the post-retirement mortality rates for retirees since the actual number of deaths among this group was generally not large enough to provide a statistically creditable

analysis. However, this approach is not compatible with our current proposal because the post-retirement RP-2014 Healthy Annuitant table does not include rates for ages below 50.

From the RP-2014 family of tables, we recommend that pre-retirement mortality follow the Headcount-Weighted RP-2014 Employee Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, times 75%, all to account for the lower observed incidences of pre-retirement death. In addition, consistent with the prior experience study, we recommend that all pre-retirement deaths are assumed to be duty related.

Post-Retirement Mortality (Service Retirements)

Among service retired member and beneficiaries, the actual deaths compared to the expected deaths under the current and the proposed assumptions for the last six years are as follows:

	Healthy Retirees and All Beneficiaries		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	56	74	63
Female	<u>56</u>	<u>53</u>	<u>43</u>
Total	112	127	106
Actual / Expected	113%		120%

The ratio of actual to expected deaths under the current assumption was 113%. We recommend changing to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, with no setback for males and set forward one year for females. This will bring the actual to expected ratio for the most recent six year period to 120% for this group.

Chart 2 compares actual to expected deaths under the current and the proposed assumptions over the last six years. Experience shows that there were more deaths than predicted by the current table.

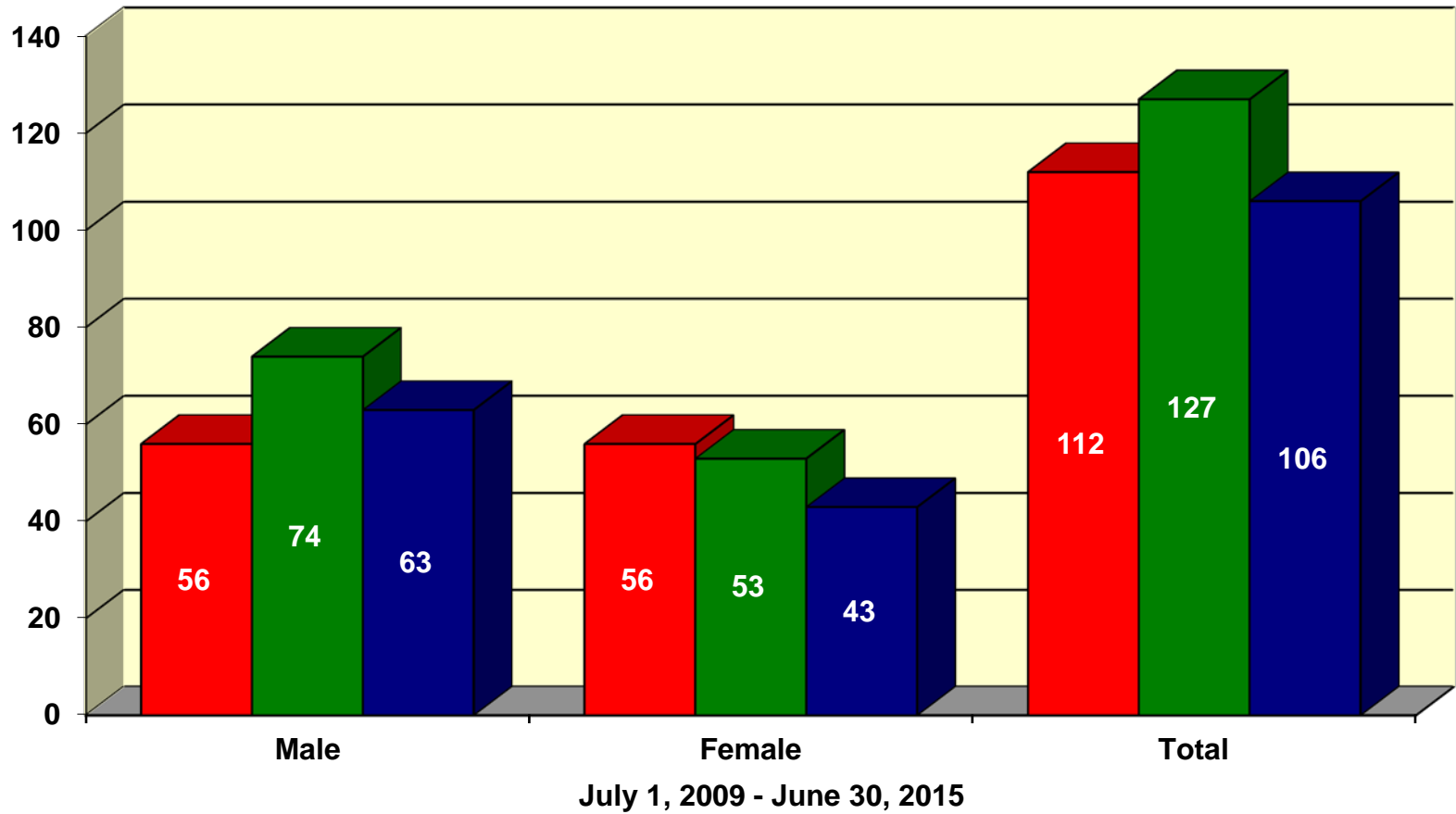
Chart 3 shows the life expectancies under the current and the proposed tables.

Mortality Table for Tier 1 Member Contributions and Tier 1 and Tier 2 Optional Benefits

We recommend the mortality table used for determining contributions be changed from the RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021, set back three years for males and set forward one year for females, weighted 90% male and 10% female to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, with no setback for males and set

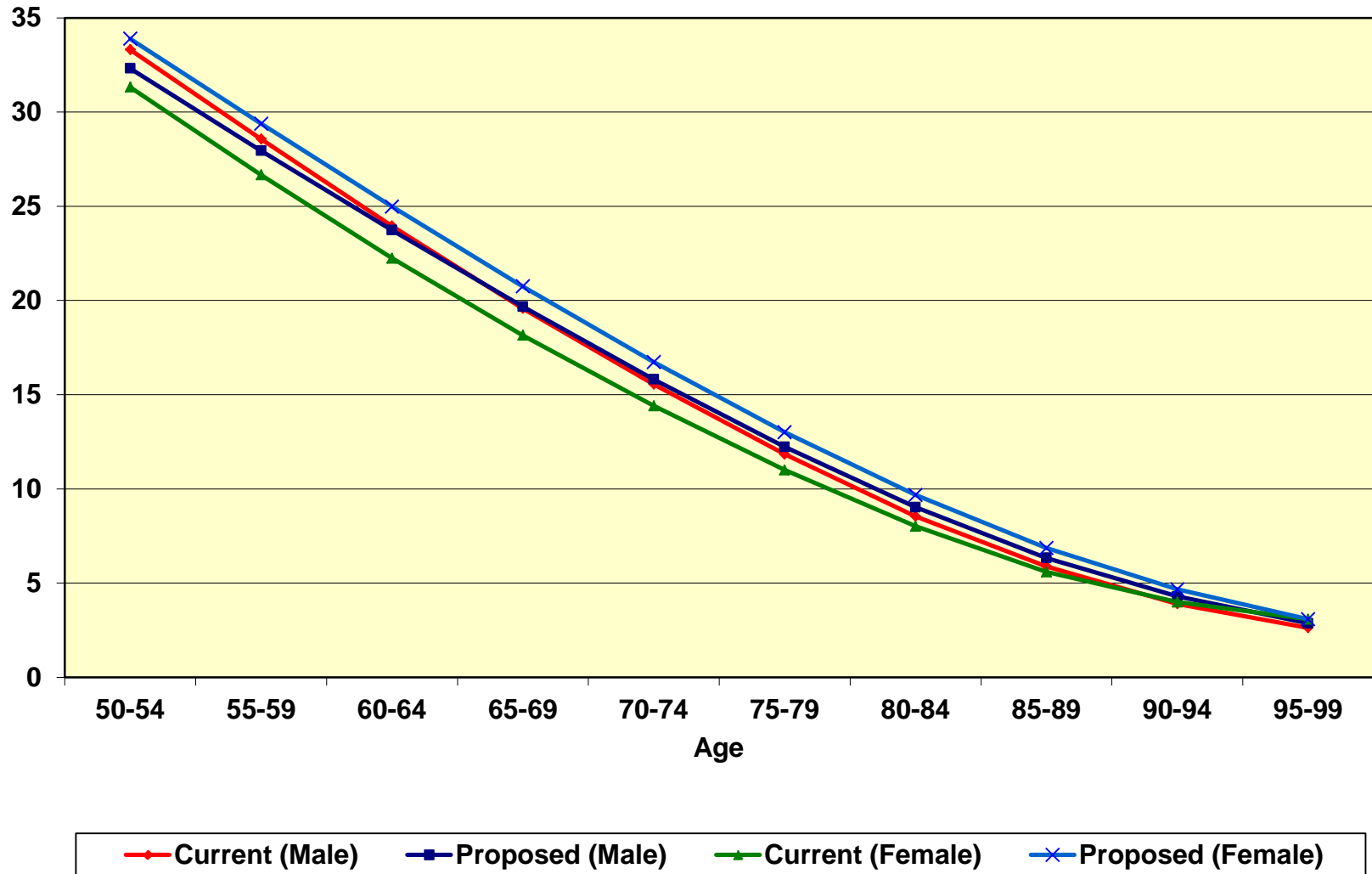
forward one year for females, weighted 80% male and 20% female. This is based on the proposed post-retirement mortality table and the actual gender distribution for current members.

Chart 3
Post-Retirement Deaths
Non-Disabled Members and All Beneficiaries



Expected - Current Actual Expected - Proposed

Chart 4
Life Expectancies
Non-Disabled Members and All Beneficiaries



D. MORTALITY RATES - DISABLED

Since death rates for disabled members can differ from those of healthy members, a different mortality assumption is often used. The table currently being used is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females), projected with scale AA to 2021, set forward two years.

The number of actual deaths compared to the number expected under the current and the proposed assumptions for the last six years has been as follows:

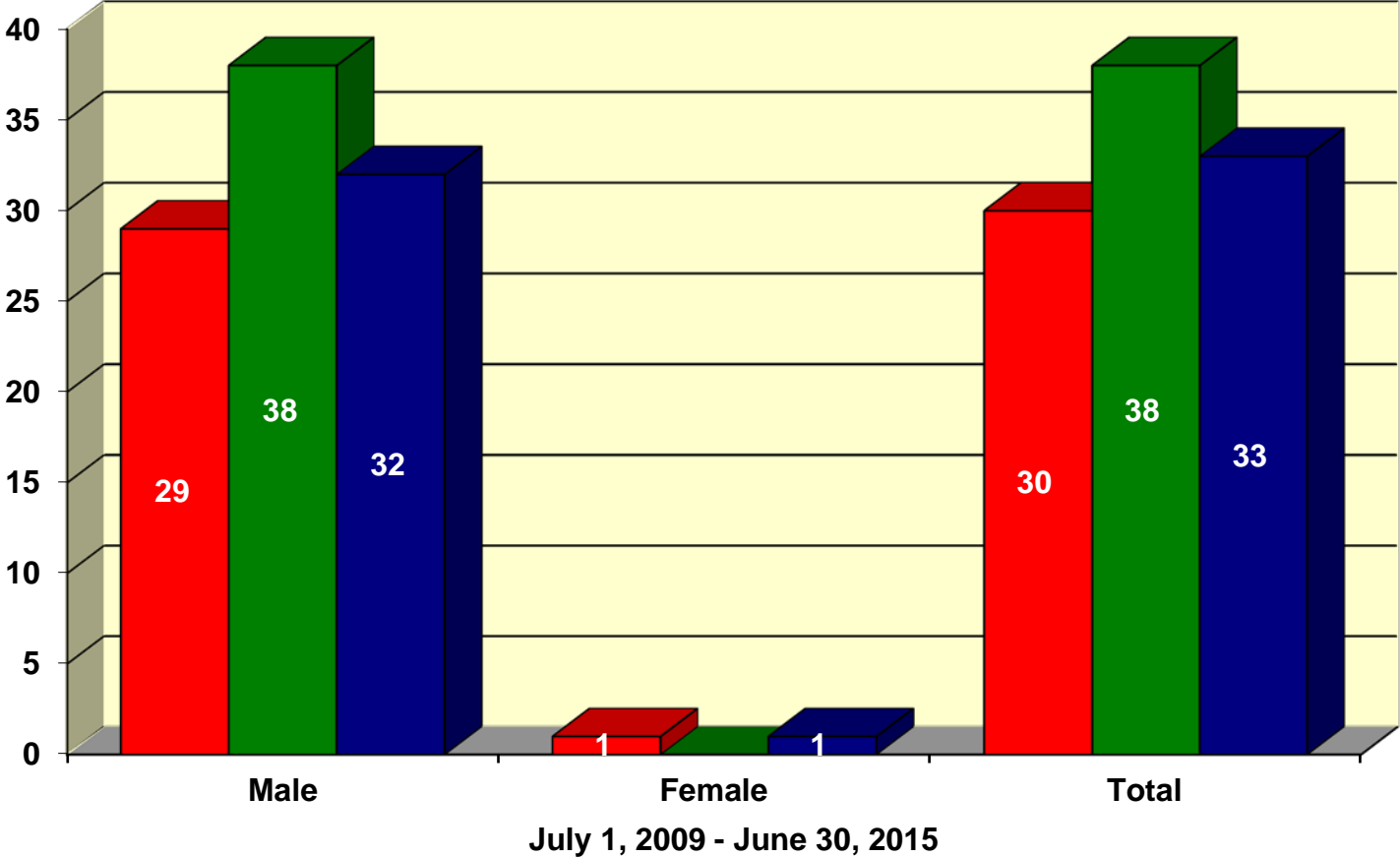
	Disabled		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	29	38	32
Female	<u>1</u>	<u>0</u>	<u>1</u>
Total	30	38	33
Actual / Expected	127%		115%

Based on the actual experience, we recommend changing the mortality to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional scale MP-2015, set forward four years. This will bring the actual to expected ratio for the most recent six year period to 115% for this group.

Chart 5 compares actual to expected deaths under the current and the proposed assumptions over the last six years. Experience shows that there 27% more actual deaths than predicted by the current table.

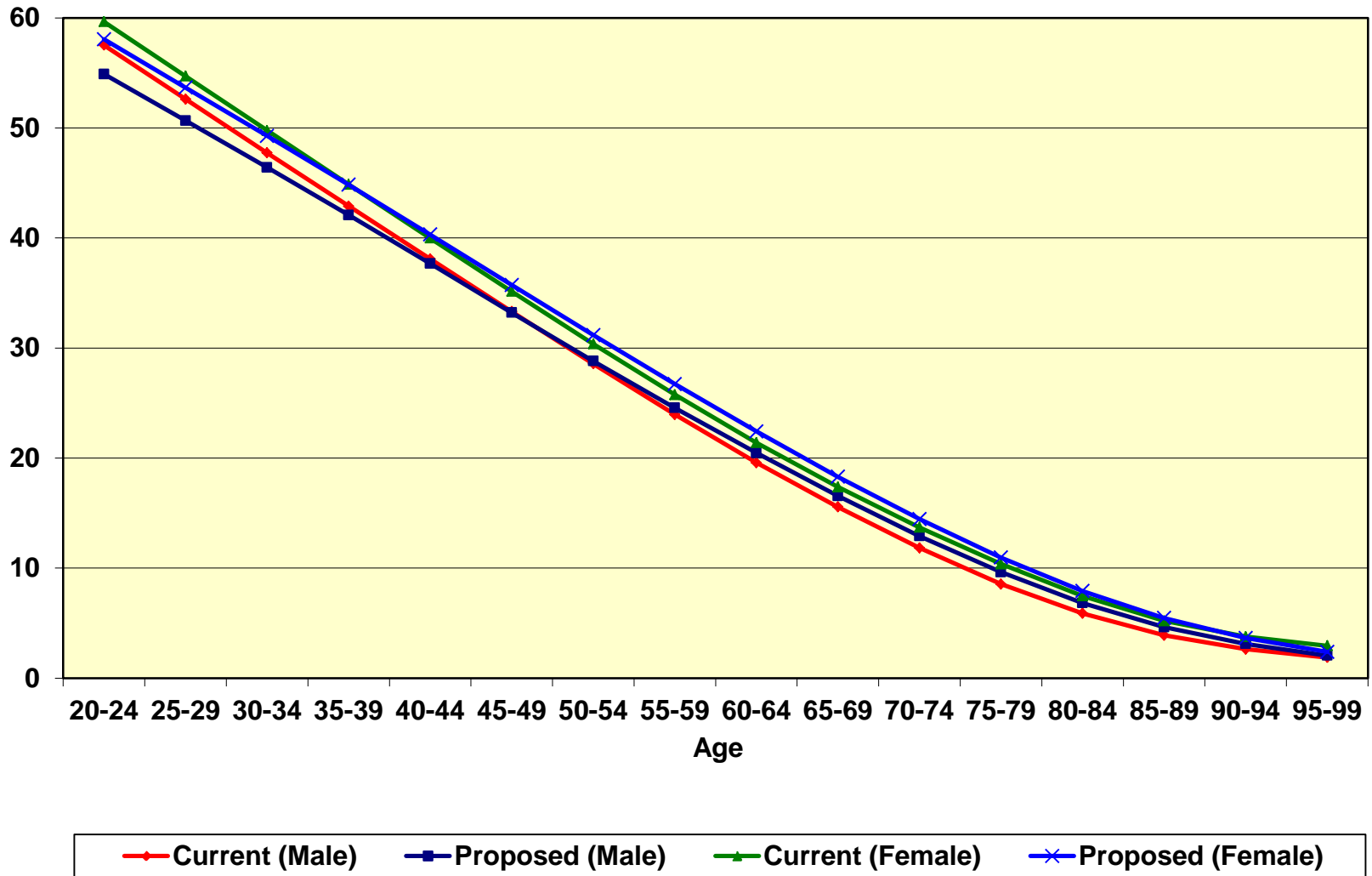
Chart 6 shows the life expectancies under the current and the proposed tables.

Chart 5
Post - Retirement Deaths
Disabled Members



Expected - Current Actual Expected - Proposed

Chart 6
Life Expectancies
Disabled Members



E. TERMINATION RATES

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions, there is an overall assumed incidence of total termination combined with a separate assumption for the percent of members who would elect to withdraw their contributions (ordinary withdrawal) versus a deferred retirement benefit (vested termination).

The termination experience over the last three years for Tier 1 and Tier 2 members is shown on the next two pages. An observed rate of “N/A” indicates no relevant experience. For Tier 1, there were no active members with less than 5 years of service, and no active members under the age of 45. Accordingly, we are not recommending any changes to the Tier 1 termination rates. For Tier 2 members, we are recommending increases in the total termination rates.

Rates of Termination (Tier 1)
(Less than Five Years of Service)

<u>Years of Service</u>	<u>Current and Proposed Rates</u>	<u>Observed Rates</u>
0 – 1	4.47%	N/A
1 – 2	4.47	N/A
2 – 3	4.47	N/A
3 – 4	4.47	N/A
4 – 5	4.47	N/A

Rates of Termination (Tier 1)
(Five or More Years of Service)

<u>Age</u>	<u>Current and Proposed Rates</u>		<u>Observed Rates</u>	
	<u>5 - 10 Years</u>	<u>10+ Years</u>	<u>5 - 10 Years</u>	<u>10+ Years</u>
20 – 24	2.87%	3.57%	N/A	N/A
25 – 29	2.87	3.57	N/A	N/A
30 – 34	1.22	2.00	N/A	N/A
35 – 39	0.64	1.06	N/A	N/A
40 – 44	0.30	0.82	N/A	N/A
45 – 49	0.12	0.50	N/A	0.00%
50+	Not calculated*	Not calculated*	Not calculated*	Not calculated*

* *Not calculated since these members are assumed to either retire or continue working.*

For members with less than ten years of service, we recommend the continuation of the 100% assumption for the election of a withdrawal of contributions. No members will be assumed to elect a deferred vested benefit. This is because members with less than ten years of service are not entitled to a deferred vested benefit.

For members with ten or more years of service, we recommend the continuation of the 0% assumption for the election of a withdrawal of contributions, so that they will all be assumed to elect a deferred vested benefit. This is consistent with experience over the last several studies, where no members with ten or more years of service were observed to terminate and withdraw their contributions.

Rates of Termination (Tier 2)
(Less than Five Years of Service)

<u>Years of Service</u>	<u>Current Rates</u>	<u>Observed Rates</u>	<u>Proposed Rates</u>
0 – 1	9.00%	17.39%	12.00%
1 – 2	3.00	25.00	8.00
2 – 3	2.00	0.00	2.00
3 – 4	1.50	0.00	1.50
4 – 5	1.00	2.63	1.00

Rates of Termination (Tier 2)
(Five or More Years of Service)

<u>Age</u>	<u>Current Rates</u>	<u>Observed Rates</u>	<u>Proposed Rates</u>
20 – 24	3.00%	N/A	3.00%
25 – 29	2.75	3.75%	2.75
30 – 34	1.70	2.42	2.10
35 – 39	1.30	1.65	1.50
40 – 44	0.80	1.57	1.20
45 – 49	0.40	1.19	0.80
50+	Not calculated*	Not calculated*	Not calculated*

* *Not calculated since these members are assumed to either retire or continue working.*

For members with less than five years of service, we recommend the continuation of the current 100% assumption for the election of a withdrawal of contributions. No members will be assumed to elect a deferred vested benefit. This is because members with less than five years of service are not entitled to a deferred vested benefit.

We recommend the continuation of the current 50% assumption for the election of a withdrawal of contributions. The remaining 50% of members will be assumed to elect a deferred vested benefit. Note that the actual experience from the current study indicated that 31% of all members that terminated with five or more years of service elected a withdrawal of contributions, while the percentage was 80% from the last experience study. We will monitor this experience to determine if a change in this assumption to assume fewer withdrawals may be warranted.

Chart 7 compares actual to expected terminations (both withdrawal and vested terminations) over the past three years for both the current and proposed assumptions for Tier 1 members.

Chart 8 graphs the same information as Chart 7, but for Tier 2 members.

Chart 9 shows the current and the proposed termination rates for Tier 1 members with less than five years of service.

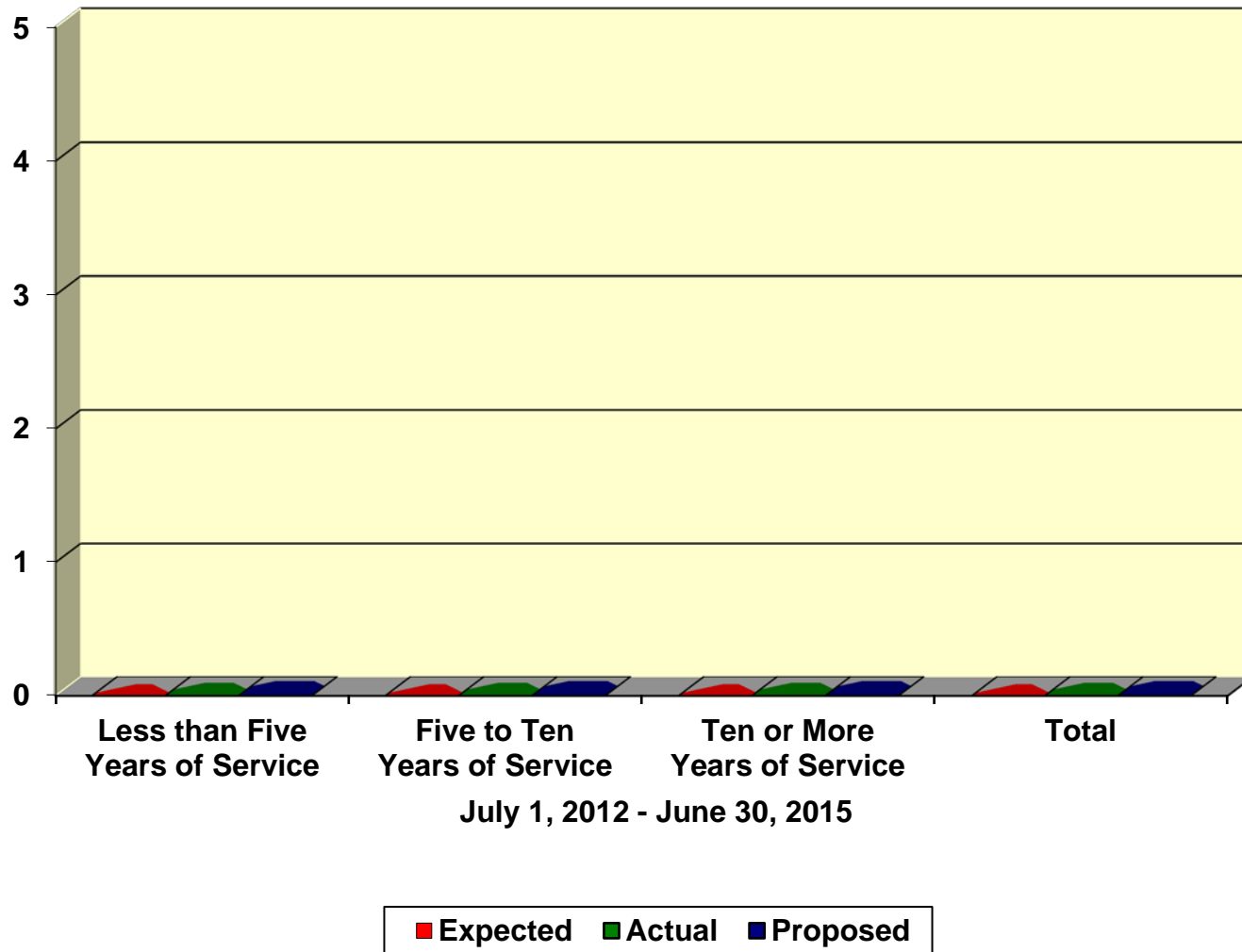
Chart 10 shows the current and the proposed termination rates for Tier 1 members with five or more years of service.

Charts 11 and 12 show the same information as Charts 9 and 10, but for Tier 2 members.

We continue to propose that termination rates be set at 0% at any age where members are assumed to retire. In other words, at those ages, members will either retire (and commence receiving a benefit) or continue working.

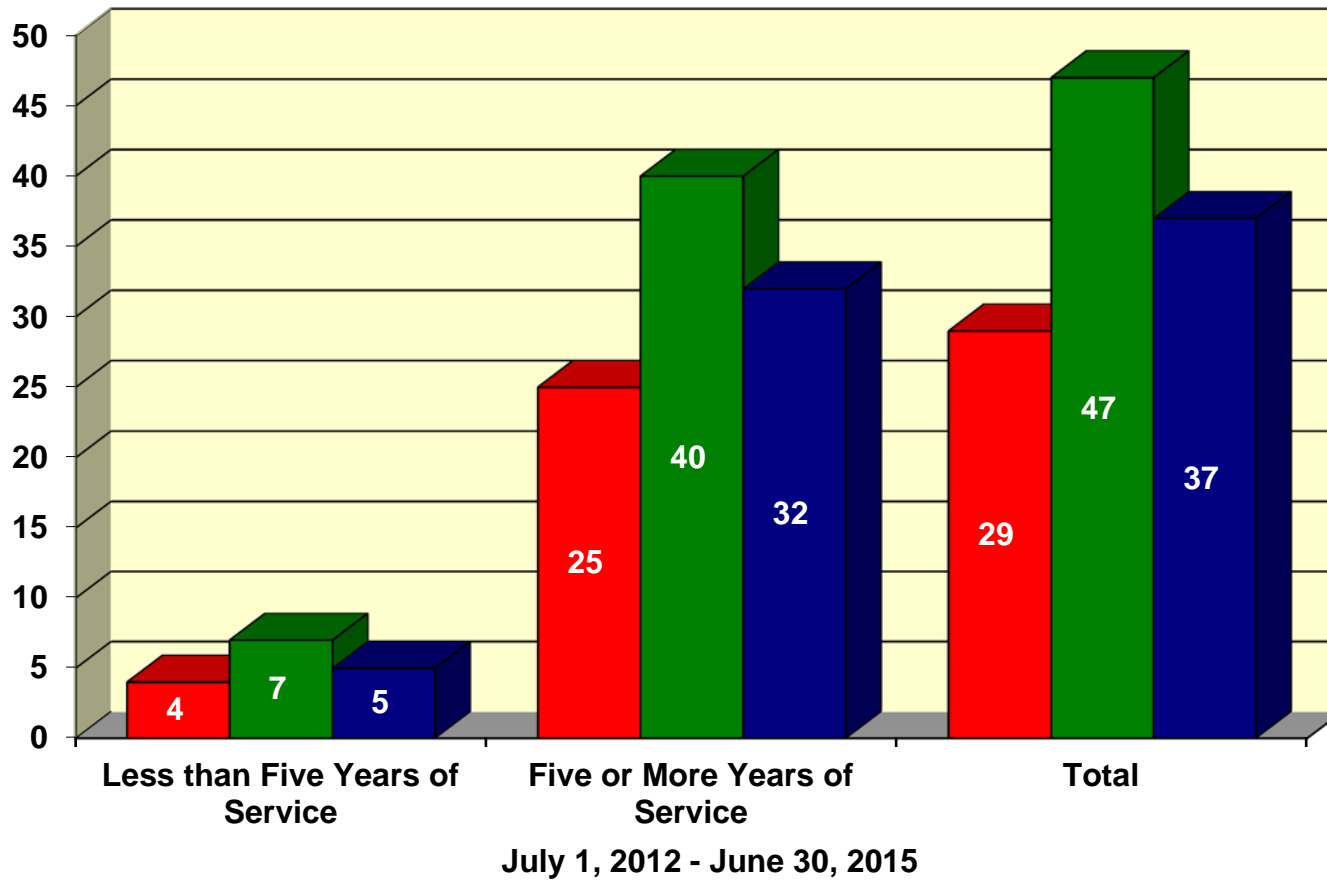
As shown in Chart 7, there were no actual or expected Tier 1 terminations over the last three years. Accordingly, we are not recommending any changes to the Tier 1 termination rates. Based upon the recent experience as captured in Chart 8, we recommend modifying the current termination assumptions for Tier 2.

**Chart 7
Actual Number of Terminations Compared to Expected
(Tier 1)**



Note: There were no actual or expected Tier 1 terminations in the last three years.

Chart 8
Actual Number of Terminations Compared to Expected
(Tier 2)



■ Expected ■ Actual ■ Proposed

Chart 9
Termination Rates - Tier 1 Members
(Less than Five Years of Service)

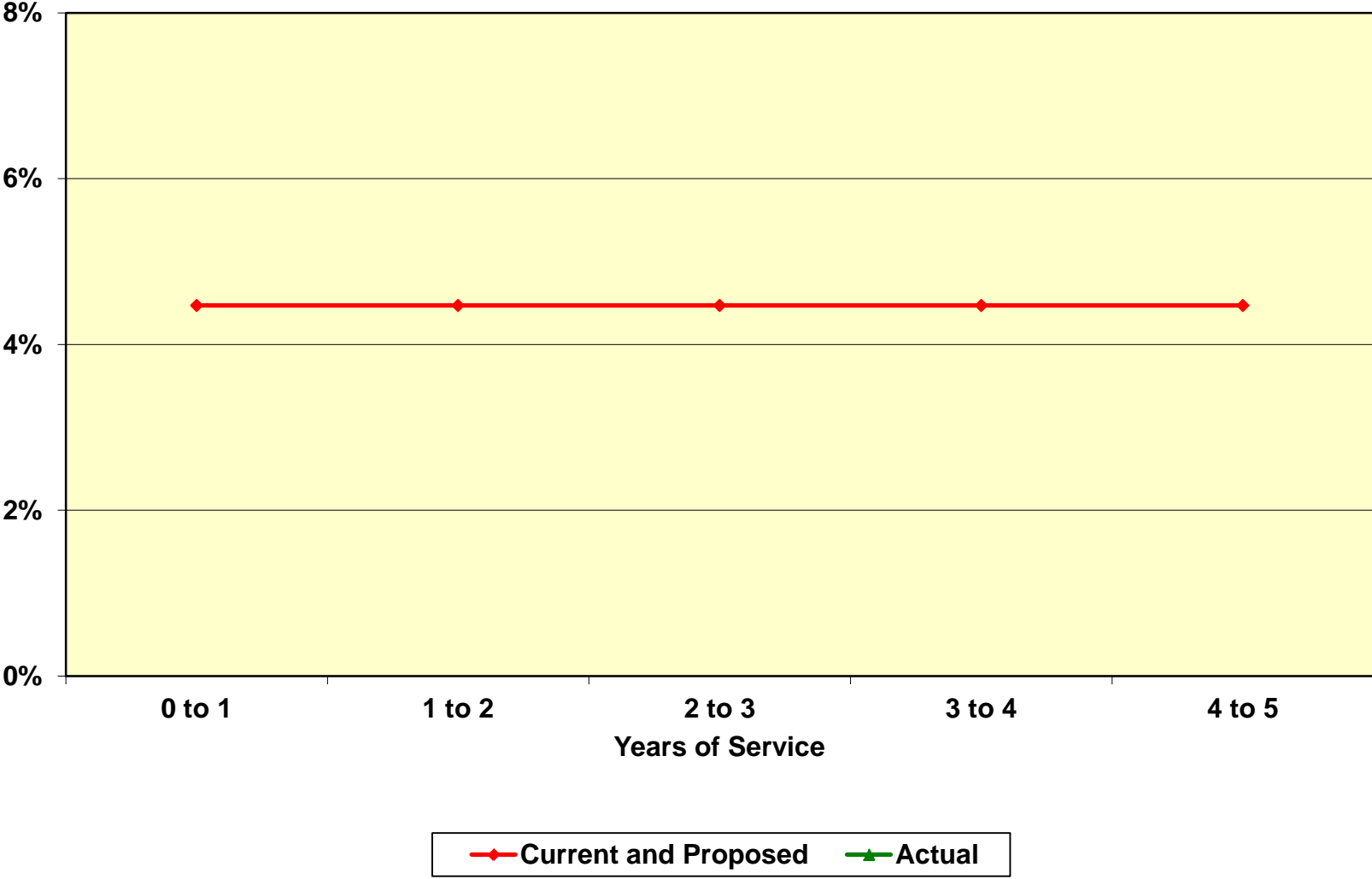
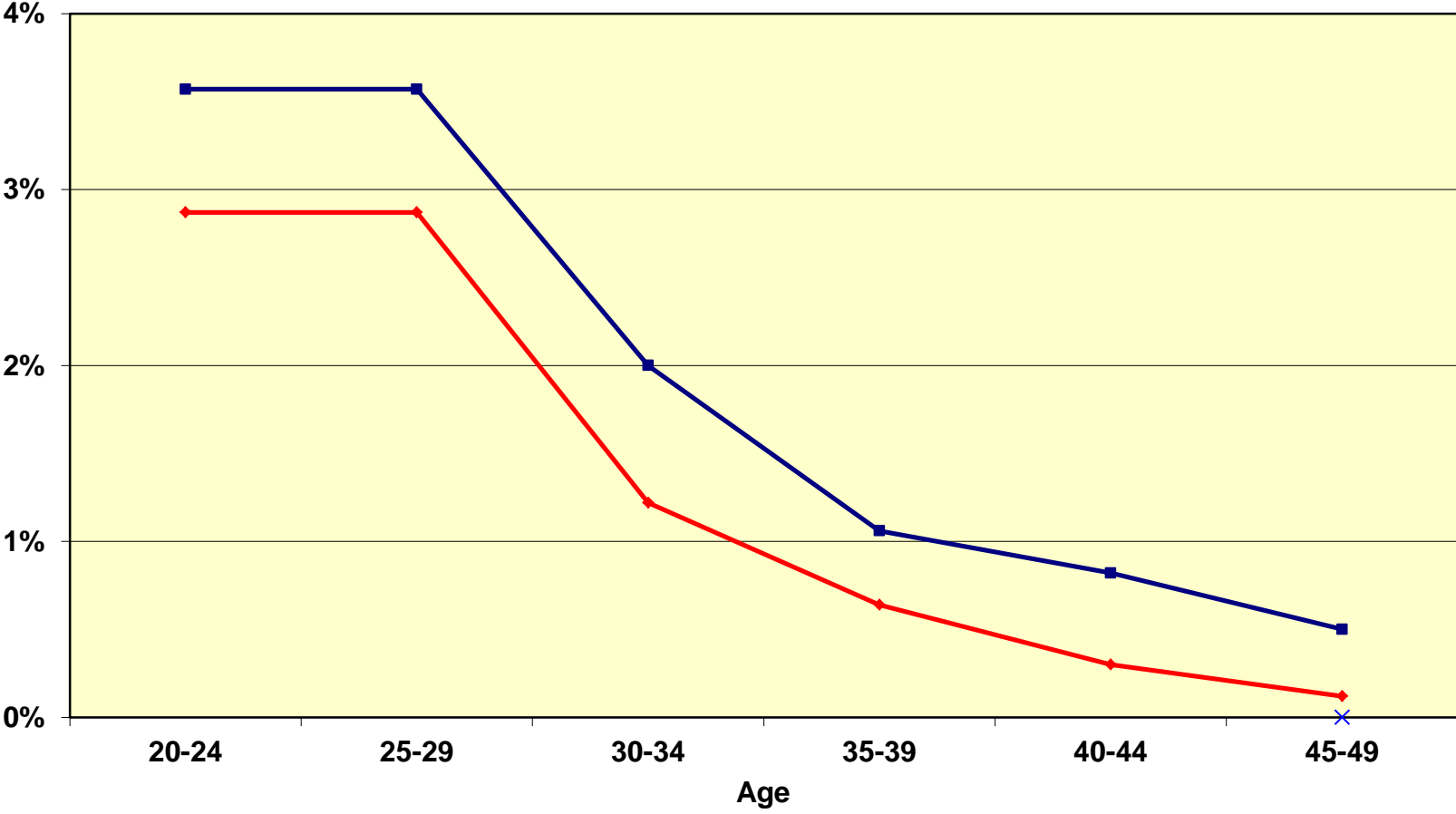


Chart 10
Termination Rates - Tier 1 Members
(Five or More Years of Service)



◆ Current and Proposed (5 - 10)
 ◆ Actual (5 - 10)
 ■ Current and Proposed (10+)
 × Actual (10+)

Chart 11
Termination Rates - Tier 2 Members
(Less than Five Years of Service)

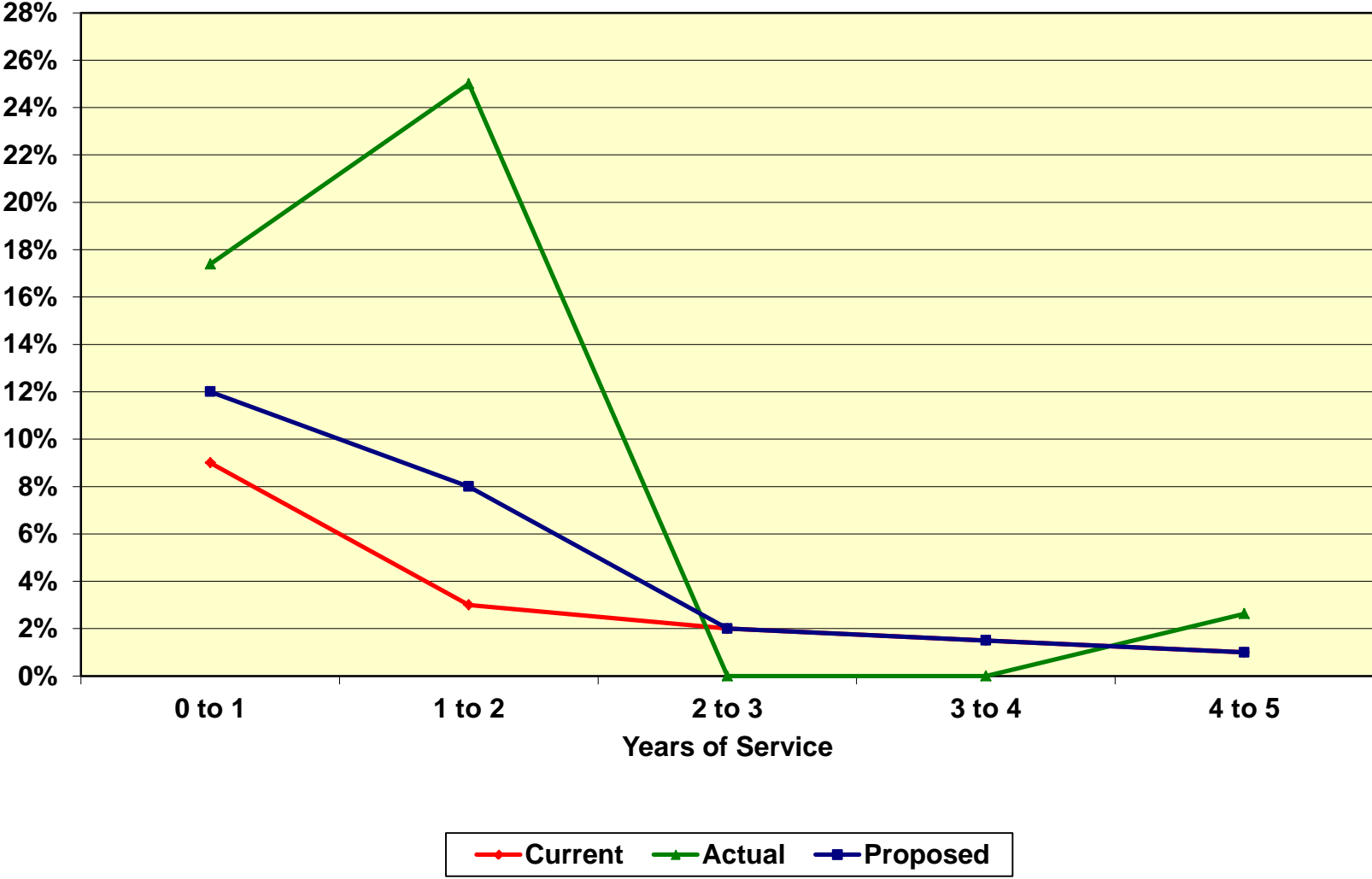
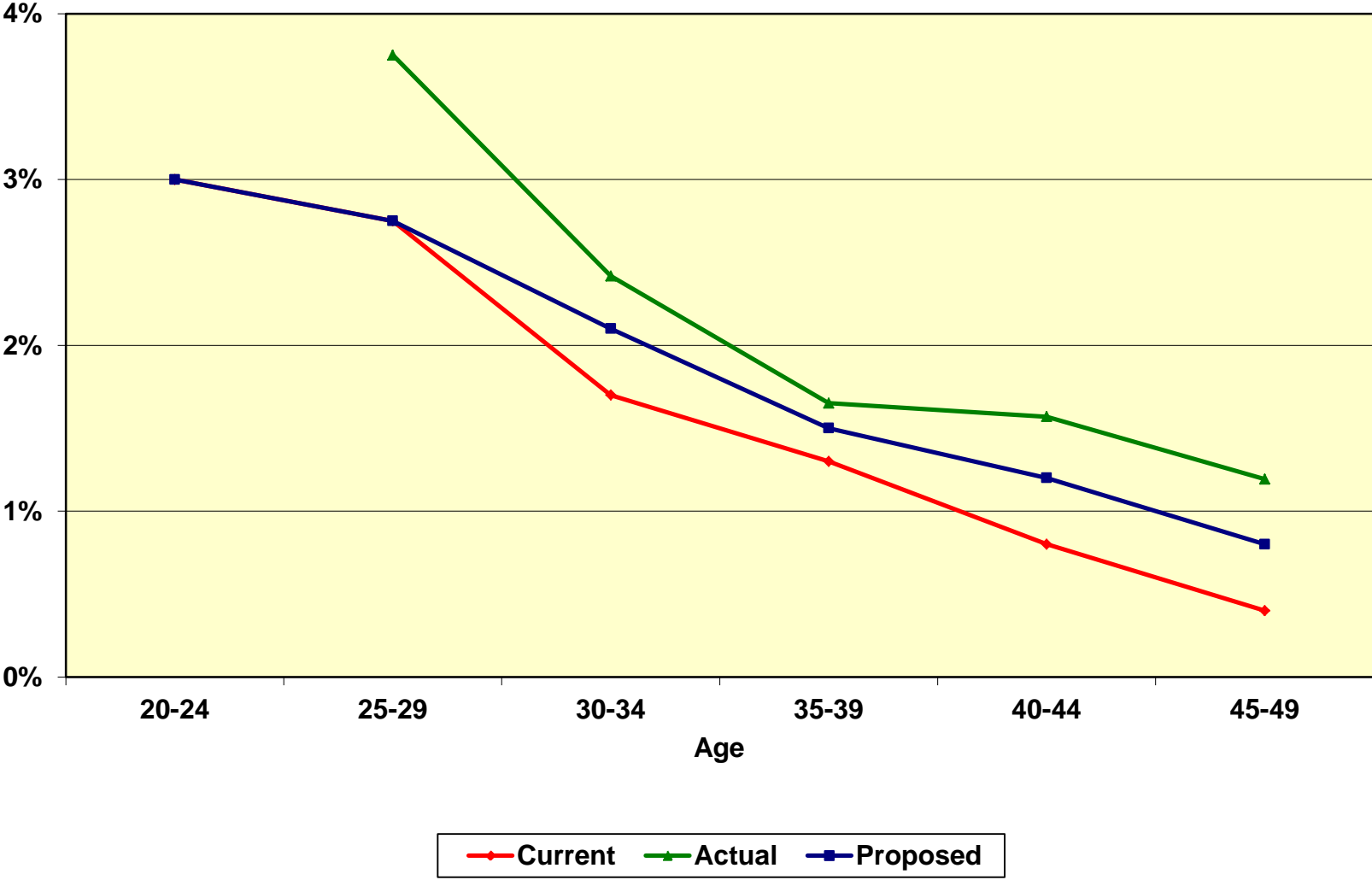


Chart 12
Termination Rates - Tier 2 Members
(Five or More Years of Service)



F. DISABILITY INCIDENCE RATES

When a member becomes disabled, he or she may be entitled to at least a 55% of Final Average Salary (FAS) pension for Tier 1 and 50% of FAS pension for Tier 2 (duty disability), or a pension that may depend upon the member's years of service (ordinary disability) if it is greater than 36.67% or 33.00% of FAS for Tier 1 and Tier 2, respectively. The following summarizes the actual incidence of duty and ordinary disabilities over the past three years (with "N/A" denoting no relevant experience) compared to the current and proposed assumptions for both duty and ordinary disability incidence:

Rates of Duty Disability Incidence (Tier 1)

<u>Age</u>	<u>Current and Proposed Rates</u>	<u>Observed Rates</u>
20 – 24	0.05%	N/A
25 – 29	0.20	N/A
30 – 34	0.30	N/A
35 – 39	0.45	N/A
40 – 44	0.70	N/A
45 – 49	1.00	0.00%
50 – 54	4.00	0.00
55 – 59	11.00	N/A
60 – 64	0.00	N/A

Rates of Duty Disability Incidence (Tier 2)

<u>Age</u>	<u>Current and Proposed Rates</u>	<u>Observed Rates</u>
20 – 24	0.20%	0.00%
25 – 29	0.35	0.00
30 – 34	0.60	0.61
35 – 39	0.80	0.71
40 – 44	1.10	1.13
45 – 49	1.30	1.58
50 – 54	1.60	0.58
55 – 59	1.90	0.00
60 – 64	0.00	0.00

The above observed rates do not include 18 DROP members (16 from Tier 1 and 2 from Tier 2) who were granted a duty disability retirement after entering the DROP. This is because, based on past discussions with the Retirement System, it is our understanding that there are no changes in the benefits payable for these members as a result of their reclassifications. However, members that are granted a disability retirement after entering the DROP would be expected to have shorter life expectancies similar to those of other disabled retirees. Based on the actual percentage of members who left DROP during the past three

years and were subsequently granted a disability retirement during that period, we recommend continuing the practice of using a blended mortality table for current and future DROP members before their retirement from the City equal to 80% of the proposed mortality tables for service retirement and 20% of the proposed mortality table for disabled retirement.

Rates of Ordinary Disability Incidence (Tier 1)

<u>Age</u>	<u>Current and Proposed Rates</u>	<u>Observed Rates</u>
20 – 24	0.00%	N/A
25 – 29	0.01	N/A
30 – 34	0.01	N/A
35 – 39	0.05	N/A
40 – 44	0.20	N/A
45 – 49	0.25	0.00%
50 – 54	0.10	0.00
55 – 59	0.00	N/A
60 – 64	0.00	N/A

Rates of Ordinary Disability Incidence (Tier 2)

<u>Age</u>	<u>Current and Proposed Rates</u>	<u>Observed Rates</u>
20 – 24	0.00%	0.00%
25 – 29	0.01	0.00
30 – 34	0.01	0.00
35 – 39	0.05	0.00
40 – 44	0.20	0.14
45 – 49	0.25	0.00
50 – 54	0.10	0.00
55 – 59	0.00	0.00
60 – 64	0.00	0.00

The above observed rates do not include one Tier 1 DROP member who was granted an ordinary disability retirement after entering the DROP.

Chart 13 compares the actual number of duty and ordinary disabilities over the past three years for Tiers 1 and 2 combined to that expected under both the current and proposed assumptions.

Chart 14 shows actual duty disablement rates, compared to the assumed and the proposed rates for Tier 1 members.

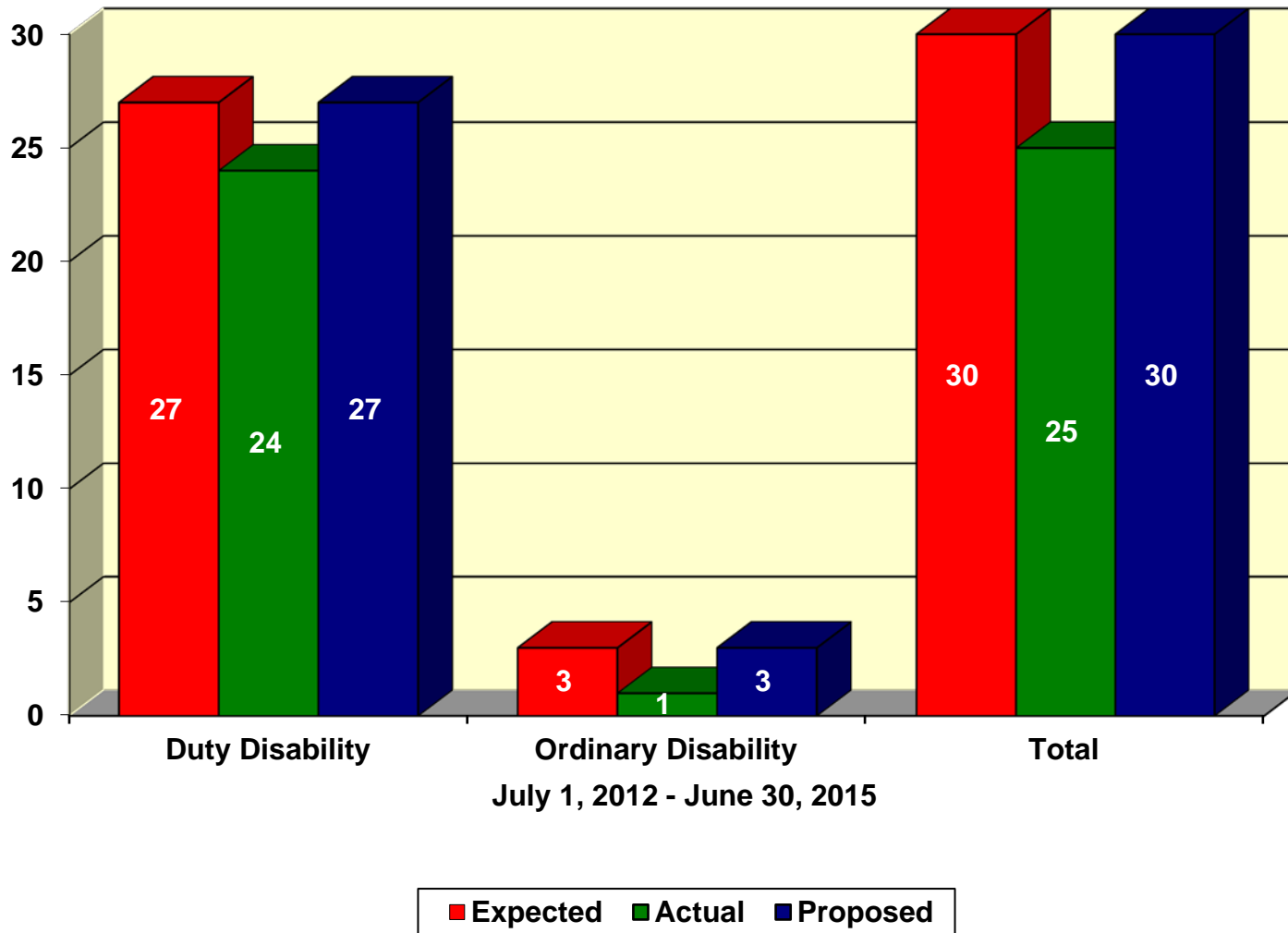
Chart 15 graphs the same information as Chart 14 but for Tier 2 members.

Chart 16 shows actual ordinary disablement rates, compared to the assumed and the proposed rates for Tier 1 members.

Chart 17 graphs the same information as Chart 16, but for Tier 2 members.

We recommend maintaining the current duty and ordinary disability assumptions for both Tiers, as well as the current practice of using a blended healthy and disabled mortality table for current and future DROP members.

Chart 13
Actual Number of Disabilities Compared to Expected



Note: Out of the 25 actual disabilities, all were from Tier 2. The current and proposed assumptions would have predicted 1 Tier 1 duty disability and no Tier 1 ordinary disabilities.

Chart 14
Duty Disablement Rates for Tier 1 Members

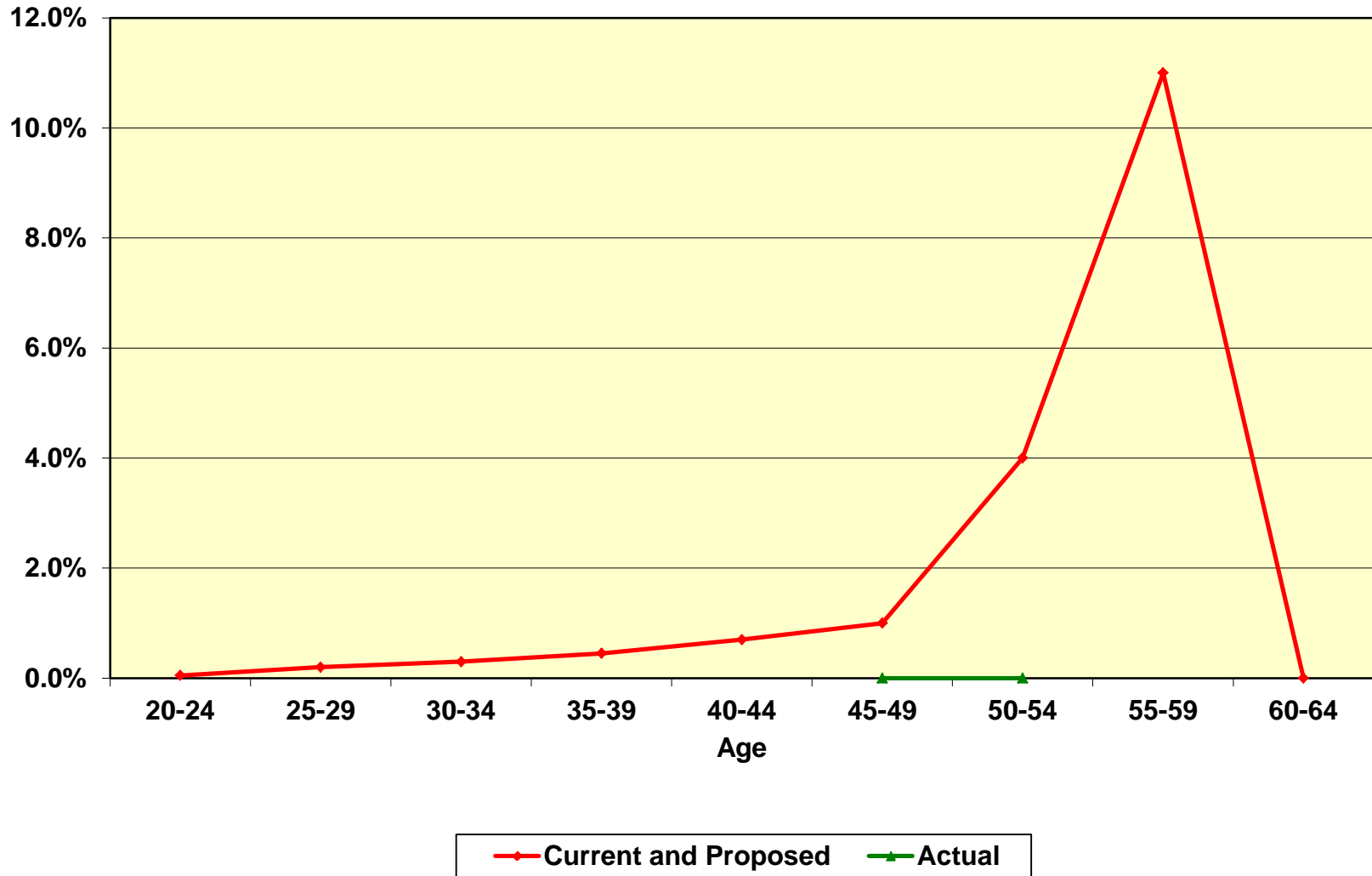


Chart 15
Duty Disablement Rates for Tier 2 Members

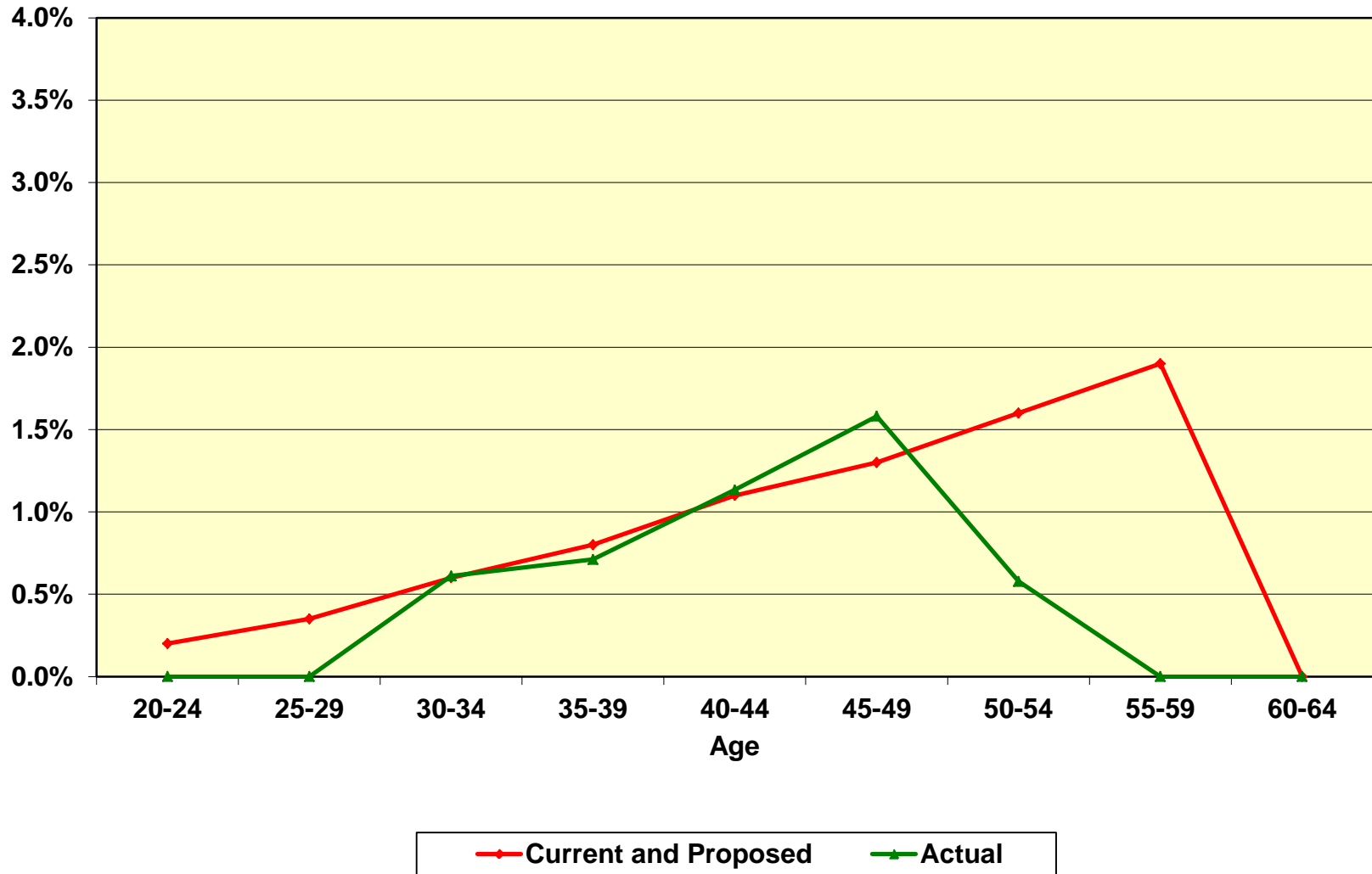


Chart 16
Ordinary Disablement Rates for Tier 1 Members

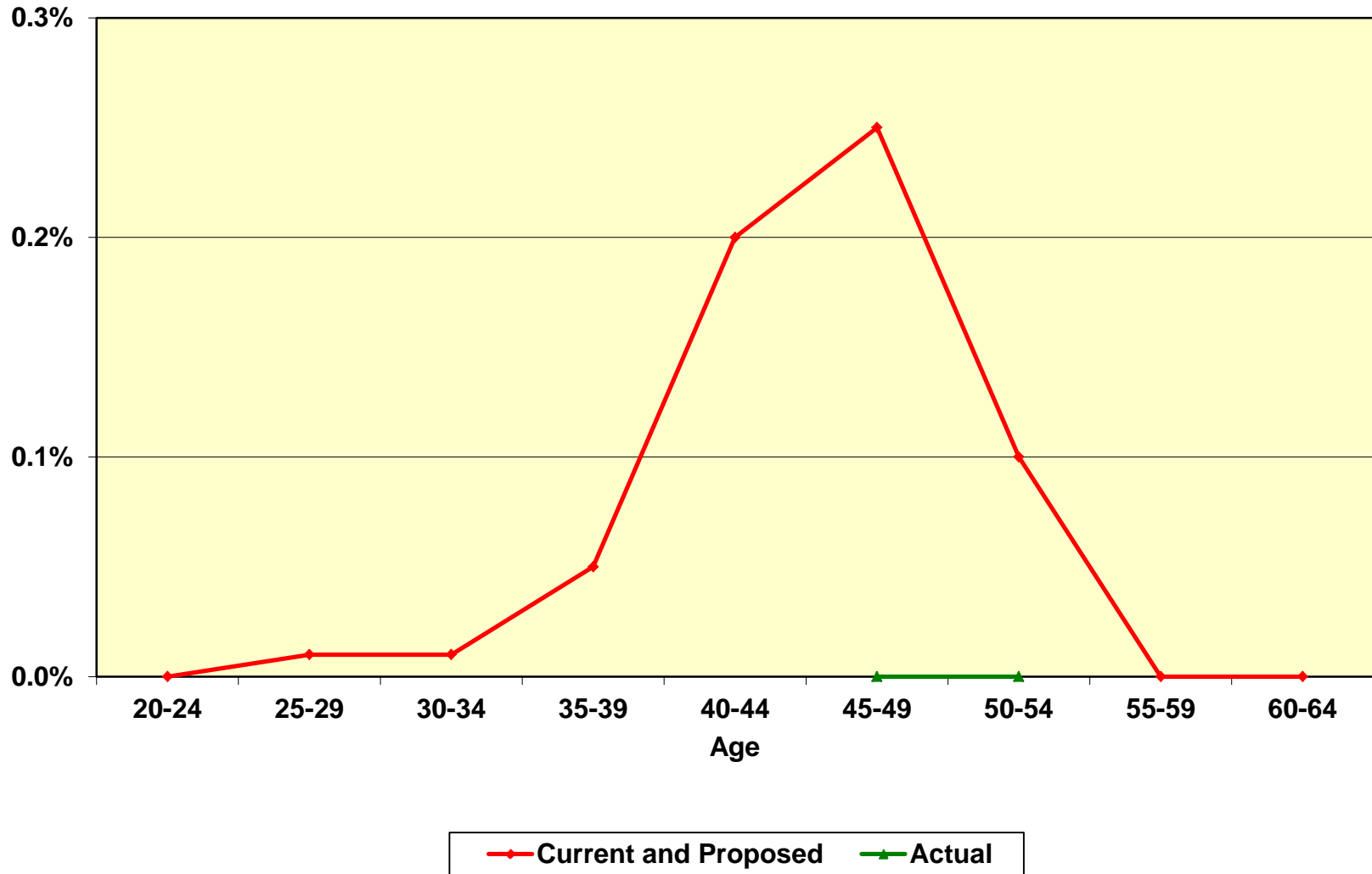
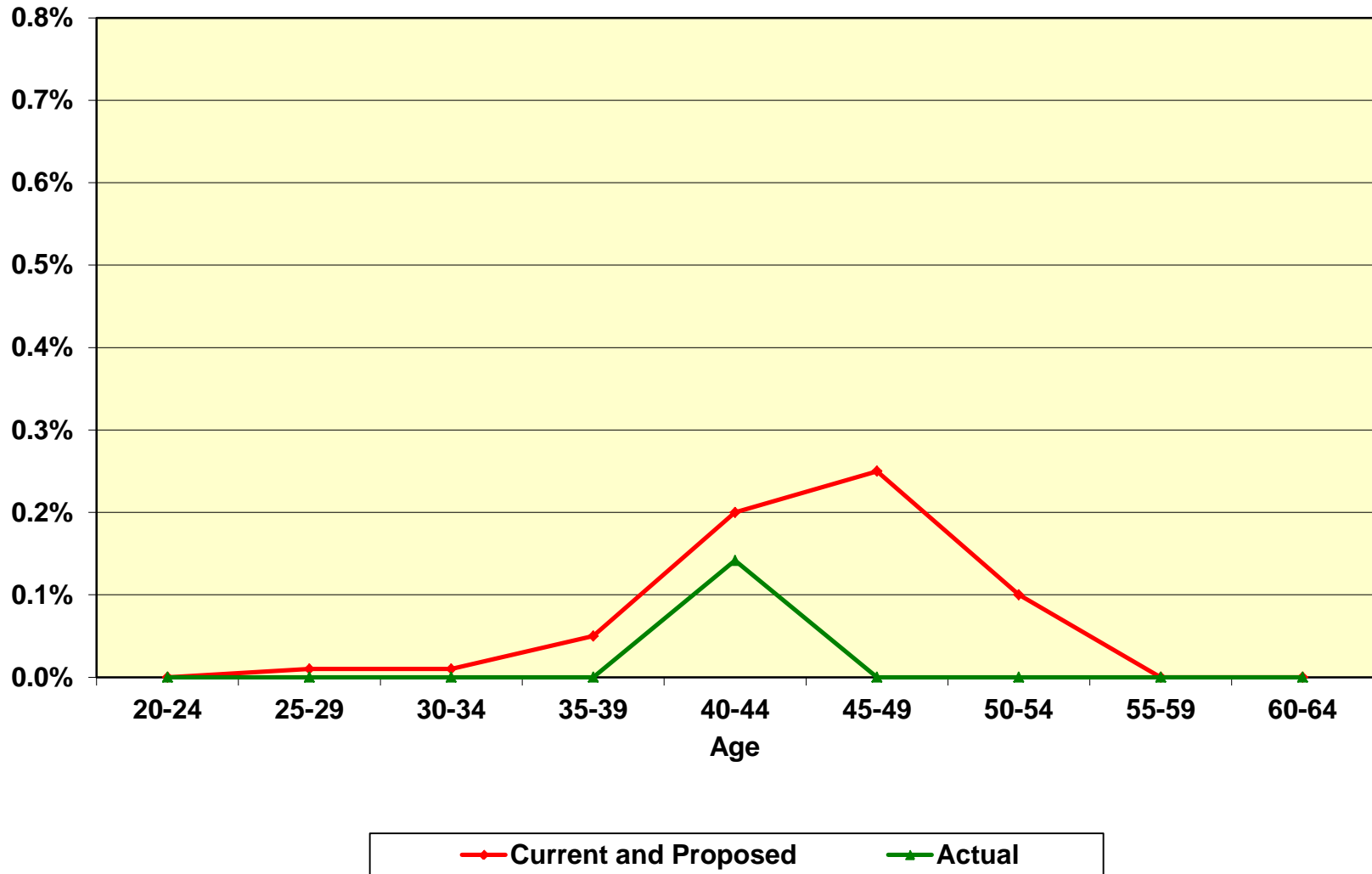


Chart 17
Ordinary Disablement Rates for Tier 2 Members



G. DROP ELECTION RATES

The DROP election experience over the last three years for Tier 1 and Tier 2 members is shown below:

Rates of DROP Election (Tier 1)

<u>Year Eligible</u>	<u>Current and Proposed Rates</u>	<u>Observed Rate</u>
1st	100%	100%
2nd	0	N/A
3rd	0	N/A
Thereafter	0	N/A

Rates of DROP Election (Tier 2) – Current Assumption Structure

<u>Year Eligible</u>	<u>Current Rate</u>	<u>Observed Rate</u>
1st	40%	2%
2nd	20	2
3rd	10	11
Thereafter	0	22

Please note that the Tier 1 DROP observed election rates were based on a total of 20 actual Tier 1 DROP elections, which were all made during the first year of eligibility. Also note that the Tier 2 DROP observed election rates were based on a total of 22⁽¹⁾ actual Tier 2 DROP elections, including 16 (or about 22% of the 74 members who were eligible) who elected to enter DROP beyond their third year eligible, and so beyond the final assumed rate.

It is assumed that members remain in DROP for 7 years. Based on the experience of members who retired from the DROP during the past three years, the average number of years of participation in the DROP was 7.7. We recommend maintaining the current DROP participation period at 7 years for both Tier 1 and Tier 2 members while maintaining the current DROP election rates for Tier 1 members.

For Tier 2 members, emerging experience over the last three years has shown DROP election rates that are not entirely consistent with the current assumption structure, which mirrored the “years since eligible” approach borrowed from Tier 1. In particular, different rates were observed for members who were under the age of 55 and those who were at least 55 years of age. Accordingly, we are recommending a new set of DROP election rates that are applicable to those eligible members who are under the age of 55, and those who are at least 55 years of age.

(1) In the prior experience study there were only 7 actual Tier 1 DROP elections.

As shown in the observed rates below, once members first became eligible for DROP, there was a modest number of elections until the age of 55, at which point close to 50% of those eligible elected to enter DROP. After their initial year of eligibility once attaining age 55, there was again a modest number of elections.

For the Employees' System, we have historically observed a lot fewer DROP elections prior to the age of 55, which is why for those members we assume no DROP election prior to age 55 and include those who elected DROP before attaining age 55 in the service retirement experience. However, unlike the Employees' System, where only about 11% of all new DROP members over the last three years were under 55, for The Fire and Police System close to 65% of all new Tier 2 DROP members over the last three years were under 55. Because of this, we recommend a two-tiered rate structure that applies a modest 10% election rate for those members who are eligible but still under 55, and another set of rates that are applied once a member is eligible and at least age 55.

Rates of DROP Election (Tier 2) – Proposed Assumption Structure

	<u>Current Rate*</u>	<u>Observed Rate</u>	<u>Proposed Rate</u>
Eligible but Under Age 55	18%	7%	10%
 <u>Year Since Attaining Age 55 and 5</u>			
<u>Years of Service</u>			
1st	9%	47%	40%
2nd	11	0	10
3rd	8	0	5
Thereafter	0	22	0

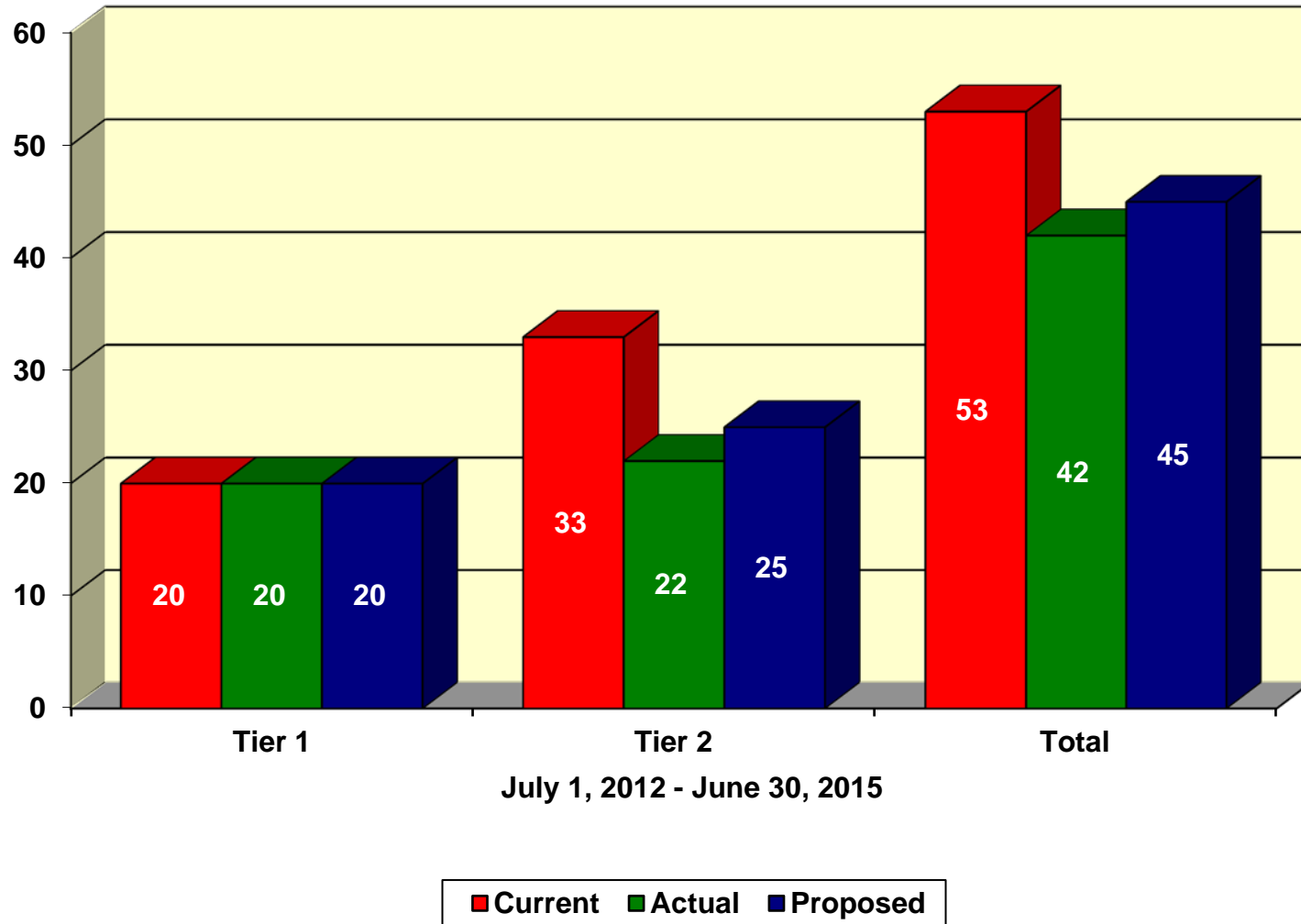
* *Calculated by dividing the total number of DROP elections assumed under the old assumption structure by the total number of eligible members within each of the categories above.*

Please note that while the percentage of those members electing DROP beyond the final assumed rate remains at 22%, the actual number of DROP elections in this range dropped from 16 under the old assumption structure to 2 (or about 22% of the 9 members who were eligible) under this new structure.

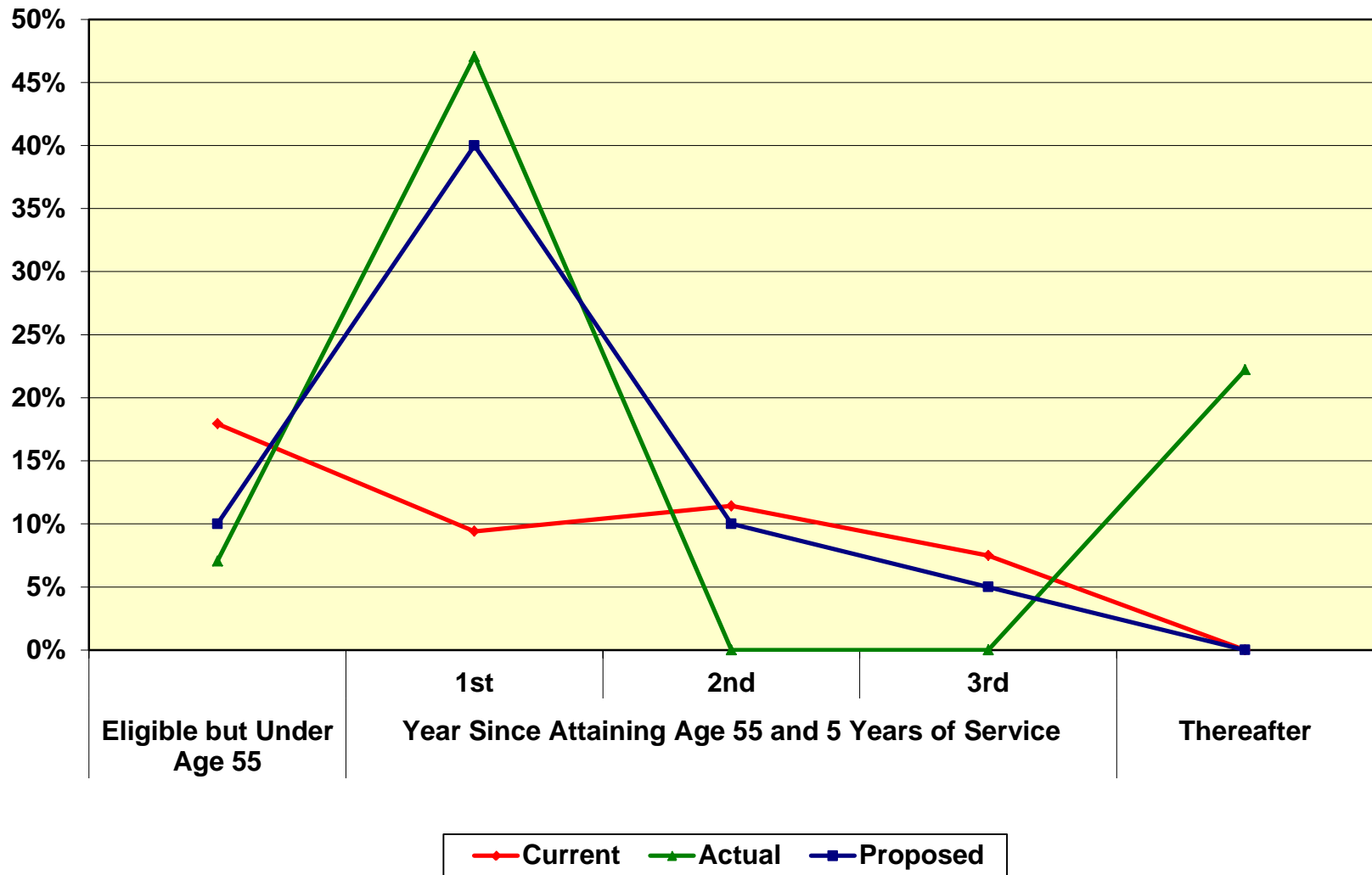
Chart 18 compares actual to expected DROP elections over the past three years for both the current and proposed assumptions.

Chart 19 shows the current and the proposed DROP election rates for Tier 2 members based on the new assumption structure.

Chart 18
Actual Number of DROP Elections Compared to Expected



**Chart 19
DROP Election Rates - Tier 2 Members
(New Assumption Structure)**



H. MERIT AND PROMOTION SALARY INCREASES

The System's retirement benefits are determined in large part by a member's compensation just prior to retirement or election to participate in the DROP. For that reason, it is important to anticipate salary increases that employees will receive over their careers. These salary increases are made up of three components:

- Inflationary increases;
- Real "across the board" increases; and
- Merit and promotion increases.

The inflationary increases are assumed to follow the general annual inflation assumption of 3.00% discussed in our separate economic assumption report. We also discussed in that report our recommended assumption of an annual 0.50% "across the board" pay increase. Therefore, the total annual inflation and real "across the board" increase of 3.50% is used as the assumed annual rate of payroll growth at which payments to the UAAL or Prefunded Actuarial Accrued Liability are assumed to increase.

The annual merit and promotion increases are determined by measuring the actual increases received by members over the experience period, net of the inflationary and real "across the board" pay increases. Increases are measured in combination for Tier 1 and Tier 2 members. This is accomplished by:

- Measuring each member's actual salary increase over each year of the experience period;
- Categorizing these increases into service groups;
- Removing the general salary increases (including inflation and "across the board" components) from these increases. These general increases are assumed to be equal to the increase in the members' average salary during the year;
- Averaging the remaining individual annual increases over the three-year experience period; and
- Modifying current assumptions to reflect some portion of these measured increases reflective of their "credibility."

Note that based on our recent experience both with the Fire & Police System and with similar public retirement systems, merit and promotional increases are generally correlated more closely with service than with age. For this reason, we have restructured the merit and promotional increases from a service-and-age-based assumption to a service-only-based assumption. Consistent with that restructuring, we are recommending some adjustments in the merit and promotion assumptions for members.

The following table shows the average annual increases over the three-year experience period (July 1, 2012 through June 30, 2015) before removing the general increases (inflationary and “across the board” components):

<u>Years of Service</u>	<u>Increase</u>
0 - 1	10.40%
1 - 2	15.19
2 - 3	7.99
3 - 4	6.95
4 - 5	6.31
5 - 6	7.12
6 - 7	1.81
7 - 8	1.21
8 - 9	1.26
9+	1.04

The annual increase in average salary over this three-year period was about 1.5%. After removing these general increases, the following table shows the average annual merit and promotion increases for the three-year period. For reference purposes, we have also included the similar schedule with experience observed from the last study, restructured into the new service-only-based-assumption.

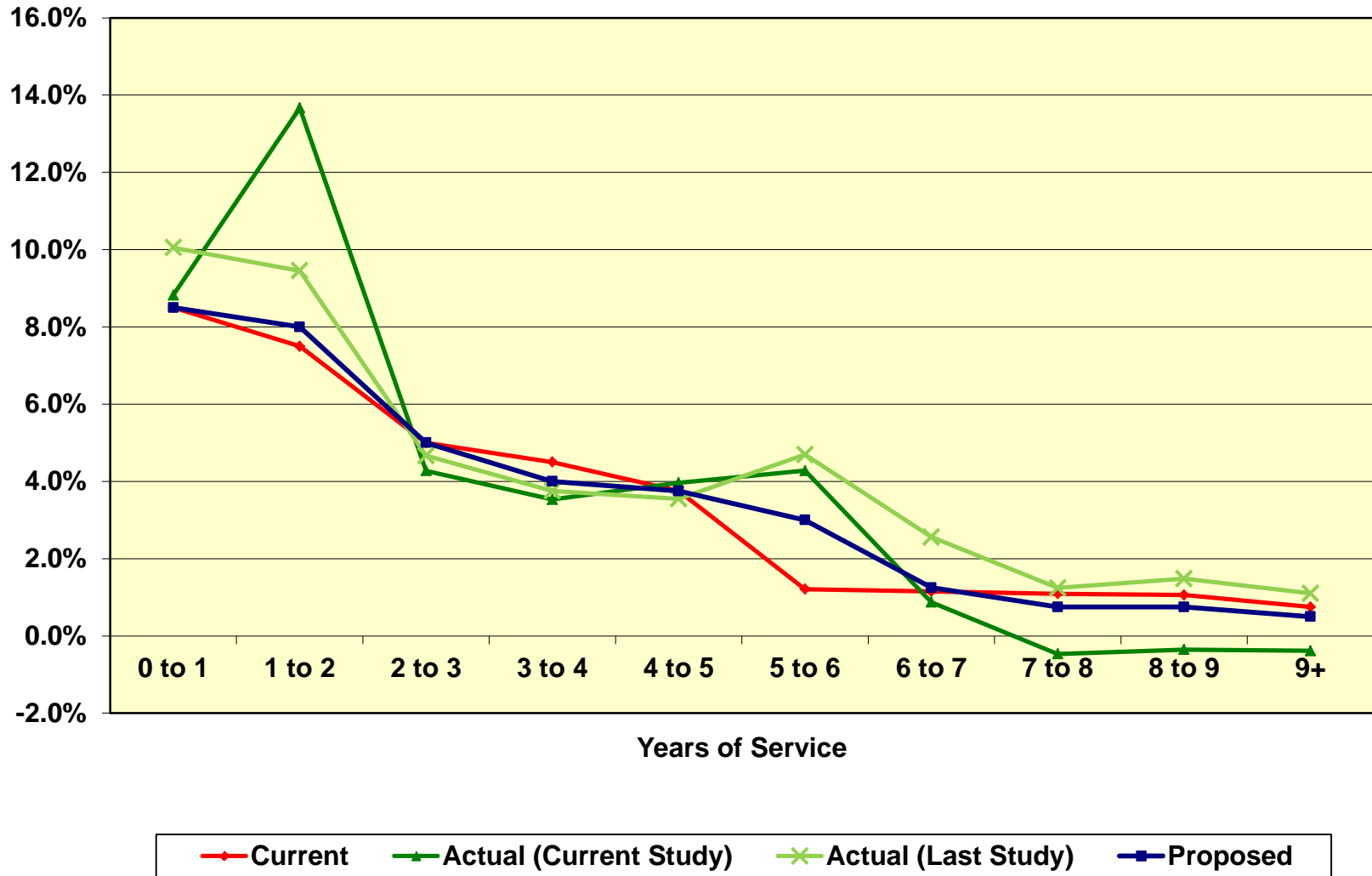
<u>Years of Service</u>	<u>Increase (Current Study)</u>	<u>Increase (Last Study)</u>
0 - 1	8.82%	10.05%
1 - 2	13.67	9.45
2 - 3	4.28	4.67
3 - 4	3.53	3.75
4 - 5	3.97	3.55
5 - 6	4.28	4.69
6 - 7	0.87	2.56
7 - 8	-0.47	1.24
8 - 9	-0.35	1.48
9+	-0.39	1.10

The following table shows the current and recommended annual merit and promotion assumptions based on this recent experience:

<u>Years of Service</u>	<u>Current</u>	<u>Recommended</u>
0 - 1	8.50%	8.50%
1 - 2	7.50	8.00
2 - 3	5.00	5.00
3 - 4	4.50	4.00
4 - 5	3.75	3.75
5 - 6	1.21	3.00
6 - 7	1.15	1.25
7 - 8	1.09	0.75
8 - 9	1.06	0.75
9+	0.75	0.50

Chart 20 provides a graphical comparison of the current, actual experience and recommended merit and promotion increases.

Chart 20
Merit and Promotion Salary Increase Rates



I. LEAVE CONVERSIONS AND CASH-OUTS

Besides the salaries that are routinely reported by the Retirement System for the annual actuarial valuation, there are several additional pay elements should be included as compensation earnable for pension purposes. These additional pay elements fall into two categories:

- Ongoing Pay Elements – Those that are expected to be received relatively uniformly over a member’s employment years; and
- Cash-out Elements – Those that are expected to be received only during the member’s final average earnings pay period.

Ongoing Pay Elements

For Police members, Ongoing Holiday Leave Cash-out is recognized in the actuarial calculations by virtue of all accruals being included in the salary that is reported for active Police members for the annual valuation. However, for all Fire members, an assumption is currently applied to approximate the Ongoing Holiday Leave Cash-out as that salary is only included in the salary that is reported for active Fire members for the annual valuation at the time of the cash-out. Since not all accruals are cashed-out on an annual basis, we continue to recommend that an assumption be applied to anticipate the maximum cash-out that is allowed. As the maximum Ongoing Holiday Leave that can be cashed-out on an annual basis is 312 hours for Tier 1 management, Tier 1 non-management and Tier 2 management, we recommend maintaining the current assumption of 3.6%². As the maximum for Tier 2 non-management is 156 hours, we recommend maintaining the current assumption of 1.8%.

Cash-out Elements

In order to anticipate these cash-outs, in this study we have collected data for members who retired or enrolled in the DROP during the last three years. The cash-outs for these members, expressed as a percentage of final average pay, are summarized in the following table:

² 3.6% is equal to $312/(56*52*3)$ where 56 is the number of hours worked per week based on a full-time schedule, 52 is the number of weeks in a year and 3 is the number of years included in the final averaging period.

<u>Cash-out Type</u>	<u>Current Rate</u>	<u>Observed Rate</u>	<u>Proposed Rate</u>
A. Average Leave Time Cash-out			
1) Management employees	1.00%	1.20%	1.00%
2) Non-Management employees*	0.25%*	0.00%	0.25%**
B. Sick Leave	7.00%	5.60%	7.00%
C. Additional Holiday Leave			
1) Tier 2 Police management	Actual bank or 1.50%**	N/A	Actual bank or 1.50%**
2) Tier 2 Police non-management	Actual bank or 1.50%**	4.90%	Actual bank or 1.50%**

* *Since non-management employees may become management employees in the future, we recommend a 0.25% assumption based on the fact that in the last three years, 15% of all employees retired as management employees and those management employees had an average salary that was about 1.5 times greater than non-management employees (i.e., $1.00\% \times 15\% \times 1.5 = 0.225\%$ which we have rounded to 0.25%).*

** *For employees that have over 96 hours as reported in the data for the annual actuarial valuation, we will use the actual hours in the employee's holiday balance. For employees that have less than 96 hours, we will assume that they will accrue 96 hours by the time they enter DROP or retire. Therefore we recommend a 1.50% assumption which is approximately equal to $96 / (40 \times 52 \times 3)$ where 40 is the number of hours worked per week based on a full-time schedule, 52 is the number of weeks in a year and 3 is the number of years included in the final averaging period.*

For item B, the current assumption, the observed rate and the proposed assumption have all been calculated and applied to members retiring with both service and disability retirements. However, the current assumptions for items A and C above are only calculated and applied to members retiring with service retirement. As members retiring with disability retirement are also reported with these cash-outs, both the observed rate and the proposed assumptions for these two items are now calculated and applicable to members retiring with both service and disability retirements.

It is our understanding that the Absence with Substitution (AWS) program for Tier 2 Police members allows a member to work additional hours for another member in the years immediately preceding retirement thereby increasing their final average salary. As we are only starting to observe more Tier 2 retirements, after discussions with the Retirement System we recommend that the impact of this program on final average salary be reviewed at the next triennial experience study once more data is available.

IV. COST IMPACT OF ASSUMPTION CHANGES

The table below shows the changes in the employer and member contribution rates and actuarial accrued liability due to the recommended assumption changes as if they were applied in the June 30, 2015 actuarial valuation, broken down by source.

Source	Employer Normal Cost Contribution Rate Impact (% of Payroll) ¹	Average Member Contribution Rate Impact (% of Payroll) ²	Actuarial Accrued Liability (Estimated Dollar Amounts in Thousands)
Mortality	-0.34%	0.00%	\$18,141
Economic	1.61	0.00	17,133
Tier 2 DROP Rates	1.34	0.00	17,995
All Other ³	<u>-1.40</u>	<u>0.00</u>	<u>-5,063</u>
Total	1.22%	0.00% ⁴	\$48,206 ⁵

¹ Based on projected fiscal year 2015-2016 annual payroll for active non-DROP and DROP members of \$95,262,000.

² Based on projected fiscal year 2015-2016 annual payroll for active non-DROP members of \$82,821,000.

³ Primarily due to the reduction in assumed salary increases for continuing active and reciprocal members.

⁴ Reflects a change in average member contribution rates for Tier 1 non-DROP actives of -0.16%. For Tier 2 members, the 9% contribution rate remains unchanged.

⁵ If the plan had an unfunded actuarial accrued liability, the increase of \$48,206,000 in accrued liability would be amortized over a 15-year period at the new assumed interest rate of 7.25%, with annual payments increasing at the new assumed annual payroll increase of 3.50% (i.e. 3.00 inflation plus 0.50% real across-the-board salary increase). This would result in a 4.46% increase in UAAL contributions (as a percent of payroll) for the next fifteen years.

The table below shows the changes in employer normal cost contribution rates from above, broken down by tier.

Source	Employer Normal Cost Contribution Rate Impact (% of Payroll)	
	Tier 1	Tier 2
Mortality	-0.36%	-0.33%
Economic	0.69	1.72
Tier 2 DROP Rates	N/A	1.50
All Other	<u>-1.44</u>	<u>-1.39</u>
Total	-1.11%	1.50%

APPENDIX A

CURRENT ACTUARIAL ASSUMPTIONS

Mortality Rates

Healthy: RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with scale AA to 2021 set back three years for males and set forward one year for females.

Disabled: RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with scale AA to 2021 set forward two years.

Employee Contribution Rates and Optional Benefits:

For healthy members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021 set back three years for males and set forward one year for females weighted 90% male and 10% female.

For beneficiaries: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021 set back three years for males and set forward one year for females weighted 10% male and 90% female.

For disabled members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2021 set forward two years weighted 90% male and 10% female.

Termination Rates Before Retirement:

Rate (%)		
Mortality		
Tier 1 & Tier 2		
Age	Male	Female
25	0.03	0.02
30	0.03	0.03
35	0.05	0.04
40	0.08	0.06
45	0.10	0.09
50	0.13	0.13
55	0.17	0.27
60	0.33	0.52
65	0.64	0.99

All pre-retirement deaths are assumed to be duty.

Termination Rates Before Retirement (continued):

Rate (%)				
Disability				
Age	Tier 1		Tier 2	
	Duty	Non-Duty	Duty	Non-Duty
20	0.02	0.00	0.14	0.00
25	0.14	0.01	0.29	0.01
30	0.26	0.01	0.50	0.01
35	0.39	0.03	0.72	0.03
40	0.60	0.12	0.98	0.12
45	0.88	0.25	1.22	0.25
50	2.80	0.20	1.48	0.20
55	8.20	0.00	1.78	0.00
60	0.00	0.00	0.00	0.00

Rate (%)		
Total Termination (Less than 5 years of service)		
Service	Tier 1	Tier 2
0 - 1	4.47	9.00
1 - 2	4.47	3.00
2 - 3	4.47	2.00
3 - 4	4.47	1.50
4 - 5	4.47	1.00

100% of members are assumed to elect a withdrawal of contributions. No termination is assumed after a member is assumed to retire.

Termination Rates Before Retirement (continued):

Rate (%)			
Total Termination (5 or more years of service)			
Age	Tier 1		Tier 2
	5 - 10 Years	10+ Years	
20	2.87	3.57	3.10
25	2.87	3.57	2.85
30	1.88	2.63	2.12
35	0.87	1.44	1.46
40	0.44	0.92	1.00
45	0.19	0.63	0.56
50	0.00	0.00	0.00

100% of Tier 1 members with 5 - 10 years of service, 0% of Tier 1 members with 10+ years of service and 50% of Tier 2 members with 5+ years of service are assumed to elect a withdrawal of contributions. The remaining members are assumed to elect a deferred vested benefit. No termination is assumed after a member is assumed to retire.

Retirement Rates:

Rate (%)		
Age	Tier 1	Tier 2
50	12.72	5.31
51	7.63	4.12
52	7.63	4.64
53	5.09	5.09
54	5.09	5.09
55	10.60	19.46
56	13.77	11.72
57	14.03	7.82
58	16.66	9.69
59	29.67	9.17
60	100.00	75.00
61	100.00	75.00
62	100.00	75.00
63	100.00	75.00
64	100.00	75.00
65	100.00	100.00

Drop Assumptions:

	Tier 1	Tier 2
First Year Eligible	100%	40%
Second Year Eligible	0%	20%
Third Year Eligible	0%	10%
Thereafter	0%	0%

Members are assumed to remain in DROP for 7 years.

Retirement Age and Benefit for Deferred Vested Members:

For current deferred vested members, retirement assumptions are as follows:

Tier 1: Age 50
Tier 2: Age 52

It is assumed that 60% of future deferred vested members will continue to work for a reciprocal employer. For those that continue to work for a reciprocal employer, a 4.15% compensation increase per annum is assumed.

Future Benefit Accruals:

1.0 year of service per year.

Unknown Data for Members:

Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

Inclusion of Deferred Vested Members:

All deferred vested members are included in the valuation.

Percent Married:

85%

Age of Spouse:

Wives are 3 years younger than their husbands.

Net Investment Return:

7.50%, net of administration and investment expenses.

Employee Contribution Crediting Rate:

7.50%, assumed in the valuation.

Consumer Price Index:

Increase of 3.75% per year; Retiree COLA increases due to CPI are limited to maximum at 3.75% per year for Tier 1 and 3.00% for Tier 2.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.25% per year;
plus 0.50% real across-the-board salary increase;
plus the following Merit and Promotion increases based on
completed years of service and age.

Less than 5 years of service:

Service	Annual Increase
0 - 1	8.50%
1 - 2	7.50
2 - 3	5.00
3 - 4	4.50
4 - 5	3.75

5 or more years of service:

Age	Annual Increase
25-29	1.70%
30-34	1.30
35-39	1.10
40-44	0.70
45-49	0.60
50-54	0.40
55+	0.00

Ongoing Pay Elements

To reflect the cash-out of holiday leave to increase salary on an ongoing basis for Fire employees, we have increased the salary for all active Tier 1 employees and Tier 2 management employees by 3.6% and we have increased the salary for all active Tier 2 non-management employees by 1.8%.

Since the salary data provided by the System already reflects the ongoing cash-out of holiday leave for Police employees, no assumption for Police employees is necessary.

Cash-out Elements

There is an additional 1.00% increase for Fire and Police management employees and an additional 0.25% increase for Fire and Police non-management employees to reflect the average leave time cash-outs for management employees to increase final average salary at retirement.

There is an additional 7.00% increase for all Fire and Police employees to reflect the conversion of sick leave to increase final average salary at retirement.

To reflect the cash-out of additional holiday leave balance to increase final average salary at retirement for Tier 2 Police employees, there is an additional increase equal to the actual hours reported in an employee's holiday balance if that balance is greater than 96 hours and for those with a balance less than 96 hours the additional increase is equal to 1.5%.

APPENDIX B

PROPOSED ACTUARIAL ASSUMPTIONS

Post-Retirement Mortality Rates

- Healthy:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP-2015, with no setback for males and set forward one year for females.
- Disabled:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP-2015, set forward four years.

Pre-Retirement Mortality Rates:

Headcount-Weighted RP-2014 Employee Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP-2015 times 75%. All pre-retirement deaths are assumed to be non-service connected deaths.

Employee Contribution Rates and Optional Benefits:

For healthy members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, with no setback for males and set forward one year for females, weighted 80% male and 20% female.

For beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, with no setback for males and set forward one year for females, weighted 20% male and 80% female.

For disabled members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP-2015, set forward four years, weighted 80% male and 20% female.

Termination Rates Before Retirement:

Rate (%)		
Mortality		
Tier 1 & Tier 2		
Age	Male	Female
25	0.03	0.01
30	0.03	0.02
35	0.04	0.02
40	0.04	0.03
45	0.07	0.05
50	0.11	0.08
55	0.20	0.13
60	0.35	0.19
65	0.60	0.26

All pre-retirement deaths are assumed to be duty.

Rate (%)				
Disability				
Age	Tier 1		Tier 2	
	Duty	Non-Duty	Duty	Non-Duty
20	0.02	0.00	0.14	0.00
25	0.14	0.01	0.29	0.01
30	0.26	0.01	0.50	0.01
35	0.39	0.03	0.72	0.03
40	0.60	0.12	0.98	0.12
45	0.88	0.25	1.22	0.25
50	2.80	0.20	1.48	0.20
55	8.20	0.00	1.78	0.00
60	0.00	0.00	0.00	0.00

Termination Rates Before Retirement (continued):

Rate (%)		
Total Termination (Less than 5 years of service)		
Service	Tier 1	Tier 2
0 - 1	4.47	12.00
1 - 2	4.47	8.00
2 - 3	4.47	2.00
3 - 4	4.47	1.50
4 - 5	4.47	1.00

100% of members are assumed to elect a withdrawal of contributions. No termination is assumed after a member is assumed to retire.

Rate (%)			
Total Termination (5 or more years of service)			
Age	Tier 1		Tier 2
	5 - 10 Years	10+ Years	
20	2.87	3.57	3.10
25	2.87	3.57	2.85
30	1.88	2.63	2.36
35	0.87	1.44	1.74
40	0.44	0.92	1.32
45	0.19	0.63	0.96
50	0.00	0.00	0.00

100% of Tier 1 members with 5 - 10 years of service, 0% of Tier 1 members with 10+ years of service and 50% of Tier 2 members with 5+ years of service are assumed to elect a withdrawal of contributions. The remaining members are assumed to elect a deferred vested benefit. No termination is assumed after a member is assumed to retire.

Termination Rates Before Retirement (continued):

Retirement Rates:

Age	Rate (%)	
	Tier 1	Tier 2
50	12.72	5.31
51	7.63	4.12
52	7.63	4.64
53	5.09	5.09
54	5.09	5.09
55	10.60	19.46
56	13.77	11.72
57	14.03	7.82
58	16.66	9.69
59	29.67	9.17
60	100.00	60.00
61	100.00	60.00
62	100.00	60.00
63	100.00	75.00
64	100.00	75.00
65	100.00	100.00

Drop Assumptions:

	Tier 1
First Year Eligible	100%
Second Year Eligible	0%
Third Year Eligible	0%
Thereafter	0%
	Tier 2
Eligible but Under Age 55	10%
<u>Year Since Attaining Age 55 and 5 Years of Service</u>	
First Year	40%
Second Year	10%
Third Year	5%
Thereafter	0%

Members are assumed to remain in DROP for 7 years.

**Retirement Age and Benefit for
Deferred Vested Members:**

For current deferred vested members, retirement assumptions are as follows:

Tier 1: Age 50
Tier 2: Age 52

It is assumed that 50% of future deferred vested members will continue to work for a reciprocal employer. For those that continue to work for a reciprocal employer, a 4.0% compensation increase per annum is assumed.

Future Benefit Accruals:	1.0 year of service per year.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Inclusion of Deferred Vested Members:	All deferred vested members are included in the valuation.
Percent Married:	85%
Age of Spouse:	Wives are 2 years younger than their husbands.
Net Investment Return:	7.25%, net of administration and investment expenses.

Employee Contribution Crediting Rate:

7.25%, assumed in the valuation.

Consumer Price Index:

Increase of 3.50% per year; Retiree COLA increases due to CPI are limited to maximum at 3.50% per year for Tier 1 and 3.00% for Tier 2.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.00% per year;
plus 0.50% real across-the-board salary increase;
plus the following Merit and Promotion increases based on completed years of service and age.

Years of Service	Annual Increase (%)
0	8.50
1	8.00
2	5.00
3	4.00
4	3.75
5	3.00
6	1.25
7	0.75
8	0.75
9+	0.50

Ongoing Pay Elements

To reflect the cash-out of holiday leave to increase salary on an ongoing basis for Fire employees, we have increased the salary for all active Tier 1 employees and Tier 2 management employees by 3.6% and we have increased the salary for all active Tier 2 non-management employees by 1.8%.

Since the salary data provided by the System already reflects the ongoing cash-out of holiday leave for Police employees, no assumption for Police employees is necessary.

Cash-out Elements

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There is an additional 7.00% increase for all Fire and Police employees to reflect the conversion of sick leave to increase final average salary at retirement.

To reflect the cash-out of additional holiday leave balance to increase final average salary at retirement for Tier 2 Police employees, there is an additional increase equal to the actual hours reported in an employee's holiday balance if that balance is greater than 96 hours and for those with a balance less than 96 hours the additional increase is equal to 1.5%.

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