Orange County Employees Retirement System

ACTUARIAL EXPERIENCE STUDY

Analysis of Actuarial Experience During the Period January 1, 2011 through December 31, 2013

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JULY 2014

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July 10, 2014

Board of Retirement
Orange County Employees Retirement System
2223 Wellington Avenue
Santa Ana, CA 92701

Re: Review of Non-economic Actuarial Assumptions for the December 31, 2014 Actuarial Valuation

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience of the Orange County Employees Retirement System. This study utilizes the census data of the last three actuarial valuations and includes the proposed actuarial assumptions to be used in future actuarial valuations starting with the December 31, 2014 valuation.

Please note that we have also reviewed the economic assumptions. The economic actuarial assumption recommendations for the December 31, 2014 valuation are 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,

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

Andy Yeung, ASA, MAAA, FCA, EA
Vice President and Associate Actuary

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I. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To project the cost and liabilities of the pension plan, 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 modified, 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 promised 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, 2010 through June 30, 2013. 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 are recommending various changes in the current actuarial assumptions.

The economic assumptions are currently reviewed every three years at the same time as the non-economic assumptions. See the "Review of Economic Actuarial Assumptions for the December 31, 2014 Actuarial Valuation" that is provided in a separate report.

In this report we are recommending changes to most of the demographic assumptions, including the assumptions for retirement from active employment, deferred vested retirement age, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, percent married at retirement, percent of pre-retirement deaths that are assumed to be non-service connected, pre-retirement mortality, healthy life mortality, disabled life mortality, turnover, disability (non-service connected, service connected), merit and promotional salary increases and additional cashout assumptions.

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

Ref: Pg. 5 **Retirement Rates –** The probability of retirement at each age at which participants are eligible to retire.

Recommendation: Adjust the current retirement rates to those developed in Section III(B). Both General and Safety members are assumed to retire at slightly later ages overall.

Ref: Pg. 21
Pg. 29 **Mortality Rates –** The probability of dying at each age. Mortality rates are used to project life expectancies.

Recommendation: Increase pre- and post-retirement mortality rates (to anticipate shorter life expectancy) for non-disabled General and decrease mortality rates (to anticipate longer life expectancy) for non-disabled Safety members as developed in Section III(C). Decrease mortality rates for disabled General and Safety members as developed in Section III(D).

Ref: Pg. 34 **Termination Rates –** The probability of leaving employment at each age and receiving either a refund of contributions or a deferred vested retirement benefit.

Recommendation: Change the termination rates for both General and Safety members to those developed in Section III(E). Included in our recommendation is a change in the structure of the termination rates so that the new assumptions are entirely service based instead of a combination of age based and service based under the old assumptions. Overall, the termination rates have been decreased except for General OCTA members.

Ref: Pg. 44 **Disability Incidence Rates –** The probability of becoming disabled at each age.

Recommendation: Decrease the current disability rates at some ages for General and Safety members to those developed in Section III(F).

Ref: Pg. 52 **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: Change the merit and promotional increases to those developed in Section III(G). Future promotional and merit salary increases are decreased for General members and increased for Safety members under the new assumption.

Ref: Pg. 58 ***Additional Cashouts –*** Additional pay elements that are expected to be received during the member's final average earnings period.

Recommendation: The annual cashout assumptions have been decreased for the Tier 1 plans but increased for the Tier 2 plans to reflect recent years' experience as developed in Section III(H).

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 each assumption and reasons for the proposed changes is found in Section III.

II. BACKGROUND AND METHODOLOGY

In this report, we analyzed the "demographic" or "non-economic" assumptions only. Our analysis of the "economic" assumptions for the December 31, 2014 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., termination from service, disability retirement, service retirement, and death after retirement. We also review the individual salary increases net of inflation (i.e., the merit and promotional 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 termination from service, we compare the number of employees who actually terminate in a certain age and/or service category (i.e., the number of "decrements") with those who could have terminated (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 terminate during the year, we would say the probability of termination in that age group is 50 ÷ 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 credibility to the probability of termination 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 currently reviewed every three years at the same time as the non-economic assumptions. Our review is provided in a separate report titled "Review of Economic Actuarial Assumptions for the December 31, 2014 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 and duration of the benefits that will be paid to that member as well as the period over which funding must take place.

The System's current retirement rates for the non-CalPEPRA Plans[1] are separated into:

(1) General Enhanced
(2) General Non-Enhanced[2]
(3) General SJC (2.0% @ 57 under §31676.12)
(4) Safety Law Enforcement (3.0% @ 50 under §31664.1)
(5) Safety Law Enforcement (3.0% @ 55 under §31664.2)
(6) Safety Fire (3.0% @ 50 under §31664.1)
(7) Safety Fire (3.0% @ 55 under §31664.2)
(8) Safety Probation

For members who are covered under the CalPEPRA Plans, the retirement rates are separated into:

(1) CalPEPRA General
(2) CalPEPRA Safety Probation
(3) CalPEPRA Safety Law Enforcement
(4) CalPEPRA Safety Fire

The tables on the following pages shows the observed service retirement rates for each of the above non-CalPEPRA categories 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. 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:

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1 CalPEPRA or California Public Employees' Pension Reform Act of 2013 imposed lower benefit tiers for General and Safety members together with other changes.

2 These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (§31676.01).

Retirement Rates (%)

	General – Enhanced			General – Non-Enhanced[1]		
Age	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
Under 50	0.00	21.43	0.00	0.00	33.33	0.00
50	3.00	1.81	2.50	2.00	3.70	2.50
51	2.00	2.04	2.00	2.00	1.68	2.50
52	2.00	1.14	2.00	2.00	2.94	2.50
53	2.00	3.64	2.00	2.00	2.44	2.50
54	5.00	5.24	5.00	2.00	2.84	2.50
55	15.00	14.88	15.00	3.00	2.79	3.00
56	9.00	10.96	10.00	4.00	2.63	3.50
57	9.00	10.49	10.00	6.00	4.09	5.00
58	9.00	11.47	10.00	8.00	1.67	5.00
59	9.00	12.21	11.00	8.00	6.21	7.00
60	12.00	12.32	12.00	8.00	11.25	9.00
61	12.00	12.48	12.00	8.00	12.77	10.00
62	17.00	13.06	15.00	16.00	16.92	16.00
63	15.00	16.59	16.00	16.00	16.22	16.00
64	18.00	14.06	16.00	16.00	19.42	18.00
65	20.00	22.47	21.00	20.00	22.50	21.00
66	25.00	20.00	22.00	25.00	26.67	26.00
67	21.00	26.02	23.00	21.00	26.32	21.00
68	21.00	25.00	23.00	21.00	16.13	21.00
69	21.00	21.49	23.00	21.00	20.00	21.00
70	60.00	20.63	40.00	40.00	18.18	30.00
71	60.00	15.79	40.00	40.00	10.00	30.00
72	60.00	20.00	40.00	40.00	5.56	30.00
73	60.00	15.38	40.00	40.00	37.50	30.00
74	60.00	19.15	40.00	40.00	33.33	30.00
75 & Over	100.00	16.67	100.00	100.00	28.57	100.00

[1] These assumptions are also used for the CalPEPRA 1.62% at 65 formula (§31676.01).

As shown above, we are recommending decreases overall in the retirement rates for General Enhanced members and General Non-Enhanced members.

Chart 1 that follows later in this section compares actual experience with the current and proposed rates of retirement for General Enhanced members and Chart 2 has the same data for General Non-Enhanced members.

Retirement Rates (%)

	Safety – Law (31664.1)[1]			Safety – Fire (31664.1)[1]		
Age	Current Rate	Actual Rate	Proposed Rate	Current Rate	Actual Rate	Proposed Rate
49	10.00	9.64	10.00	0.00	2.82	0.00
50	14.00	16.96	16.00	7.00	5.49	6.00
51	14.00	17.14	16.00	9.00	6.31	8.00
52	14.00	18.32	16.00	11.00	5.94	9.00
53	14.00	19.39	16.00	12.00	8.42	10.00
54	20.00	28.17	22.00	16.00	15.91	16.00
55	20.00	25.49	22.00	20.00	17.11	19.00
56	20.00	18.42	20.00	20.00	19.64	20.00
57	20.00	21.88	20.00	25.00	20.93	23.00
58	20.00	18.18	20.00	25.00	33.33	30.00
59	25.00	26.92	26.00	30.00	21.74	30.00
60	60.00	36.84	45.00	60.00	20.00	45.00
61	60.00	28.57	45.00	60.00	18.18	45.00
62	60.00	0.00	45.00	60.00	33.33	45.00
63	60.00	30.77	45.00	60.00	33.33	45.00
64	60.00	0.00	45.00	60.00	14.29	45.00
65 & Over	100.00	53.33	100.00	100.00	23.00	100.00

[1] Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

As shown above, we are recommending slight increases in the retirement rates at early ages and decreases in the retirement rates at later ages for Safety – Law (3.0% @ 50 under §31664.1) members and decreases overall in the retirement rates for Safety – Fire (3.0% @ 50 under §31664.1) members.

Chart 3 that follows later in this section compares actual experience with the current and proposed rates of retirement for Safety – Law (3.0% @ 50 under §31664.1) members and Chart 4 has the same data for Safety – Law (3.0% @ 50 under §31664.1) members.

Retirement Rates (%)

Safety – Probation[(1)]

Age	Current Rate	Actual Rate	Proposed Rate
49	0.00	3.70	0.00
50	4.00	0.00	3.00
51	4.00	2.38	3.00
52	4.00	4.44	4.00
53	4.00	2.56	4.00
54	8.00	2.70	6.00
55	12.00	11.11	11.00
56	12.00	9.09	11.00
57	16.00	18.18	17.00
58	25.00	13.04	20.00
59	25.00	11.11	20.00
60	25.00	18.75	20.00
61	25.00	12.50	20.00
62	25.00	25.00	25.00
63	50.00	46.15	50.00
64	100.00	12.50	50.00
65 & Over	100.00	45.45	100.00

(1) Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

As shown above, we are recommending decreases overall in the retirement rates for Safety – Probation members.

Chart 5 that follows later in this section compares actual experience with the current and proposed rates of retirement for Safety – Probation members.

For General SJC under (2.0% @ 57 under §31676.12), Safety Law Enforcement (3.0% @ 55 under §31664.2) and Safety Fire (3.0% @ 55 under §31664.2), we are not recommending a change in the retirement assumptions because there is not sufficient experience available.

Note that effective January 1, 2013, new CalPEPRA formulas were implemented for new General and Safety tiers. For these new formulas we do not have any actual retirement experience from the past three years to propose new rates. However, we have lowered our recommended rates for CalPEPRA General and Safety formulas at some ages so that those rates will remain comparable to the proposed retirement rates we are recommending for the non-CalPEPRA General and Safety formulas.

Retirement Rates (%)

	CalPEPRA – General		CalPEPRA – Safety Probation[1]		CalPEPRA – Safety Law[1]		CalPEPRA – Safety Fire[1]	
Age	Current Rate	Proposed Rate	Current Rate	Proposed Rate	Current Rate	Proposed Rate	Current Rate	Proposed Rate
50	0.00	0.00	3.00	2.50	10.00	11.00	7.00	6.50
51	0.00	0.00	3.00	2.50	10.50	11.50	8.50	8.00
52	4.00	4.00	3.00	3.00	11.00	12.00	9.50	9.00
53	1.50	1.50	3.00	3.00	15.50	16.00	10.50	10.00
54	1.50	1.50	7.00	5.50	16.50	17.00	12.00	12.00
55	2.50	2.50	10.50	10.00	27.00	28.00	21.00	21.00
56	3.50	3.50	10.50	10.00	17.50	18.00	20.00	20.00
57	5.50	5.50	14.00	15.00	18.00	17.50	23.50	22.00
58	7.50	7.50	22.00	20.00	22.00	22.00	23.50	25.00
59	7.50	7.50	22.00	20.00	26.00	26.00	31.50	31.50
60	7.50	7.50	100.00	100.00	100.00	100.00	100.00	100.00
61	7.50	7.50	100.00	100.00	100.00	100.00	100.00	100.00
62	15.00	14.00	100.00	100.00	100.00	100.00	100.00	100.00
63	15.00	14.00	100.00	100.00	100.00	100.00	100.00	100.00
64	15.00	14.00	100.00	100.00	100.00	100.00	100.00	100.00
65	19.00	18.00	100.00	100.00	100.00	100.00	100.00	100.00
66	25.00	22.00	100.00	100.00	100.00	100.00	100.00	100.00
67	21.00	23.00	100.00	100.00	100.00	100.00	100.00	100.00
68	21.00	23.00	100.00	100.00	100.00	100.00	100.00	100.00
69	21.00	23.00	100.00	100.00	100.00	100.00	100.00	100.00
70	40.00	30.00	100.00	100.00	100.00	100.00	100.00	100.00
71	40.00	30.00	100.00	100.00	100.00	100.00	100.00	100.00
72	40.00	30.00	100.00	100.00	100.00	100.00	100.00	100.00
73	40.00	30.00	100.00	100.00	100.00	100.00	100.00	100.00
74	40.00	30.00	100.00	100.00	100.00	100.00	100.00	100.00
75 & Over	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

[1] Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Chart 6 compares the current rates with the proposed rates of retirement for CalPEPRA General members. Chart 7 has the same data for CalPEPRA Safety Probation members. Chart 8 has the same data for CalPEPRA Safety Law members. Chart 9 has the same data for CalPEPRA Safety Fire members.

Deferred Vested Members

In prior valuations, deferred vested General and Safety members were assumed to retire at age 57 and 53, respectively. The average age at retirement over the prior three years was 59 for General and 53 for Safety. We recommend increasing the assumption for General members from age 57 to age 58 and maintaining the current assumption for Safety members at age 53.

Please note that for members who terminate with less than five years of service after January 1, 2003 and are not vested, we assume they would retire at age 70 for both General and Safety if they decide to leave their contributions on deposit as permitted by §31629.5.

Reciprocity

It was also assumed that 25% of future General and 30% of future Safety deferred vested members would go on to work for a reciprocal system and receive 4.75% compensation increases per annum from termination until their date of retirement. Based on the actual experience that 18% of General and 26% of Safety members went on to work for a reciprocal system during the last three years, we recommend decreasing the reciprocity assumption for General members from 25% to 20% and we recommend maintaining the reciprocity assumption for Safety members at 30%. Based on our ultimate recommended merit and promotional salary increase assumption of 0.75% for General and 1.50% for Safety (and our recommended economic assumptions), we propose that a 4.50% (i.e., 3.25% inflation plus 0.50% “across the board” plus 0.75% merit and promotional) for General and 5.25% (i.e., 3.25% inflation plus 0.50% “across the board” plus 1.50% merit and promotional) salary increase assumption be utilized to anticipate salary increases (under the reciprocal system) from termination from OCERS to the expected date of retirement.

Survivor Continuance Under Unmodified Option

In prior valuations, it was assumed that 80% of all active male members and 50% of all active female members would be married or have an eligible domestic partner when they retired. According to the experience of members who retired during the last three years, about 74% of all male members and 49% of all female members were married or had a domestic partner at retirement. We recommend decreasing the marriage assumption from 80% to 75% for male members and maintain the current 50% marriage assumption for female members.

Since the value of the survivor's continuance benefit is dependent on the survivor's age and sex, we must also have assumptions for the age and sex of the survivor. Based on the experience during the three-year period, we believe that it is reasonable to continue to assume a three-year age difference for the survivors age as compared to the member's age.

Since the majority of survivors are expected to be of the opposite sex, even with the inclusion of domestic partners, we will continue to assume that the survivor's sex is the opposite of the member.

The proposed assumption for the age of the survivor and recommended assumption are shown below. These assumptions will continue to be monitored in future experience studies.

Survivor Ages – Current Assumptions

	Survivor's Age as Compared to Member's Age		
Beneficiary Sex	Current Assumption	Actual Age Difference	Recommended Assumption
Male	3 years older	3.3 years older	No change
Female	3 years younger	1.8 years younger	No change

Chart 1
Retirement Rates - General Enhanced Members

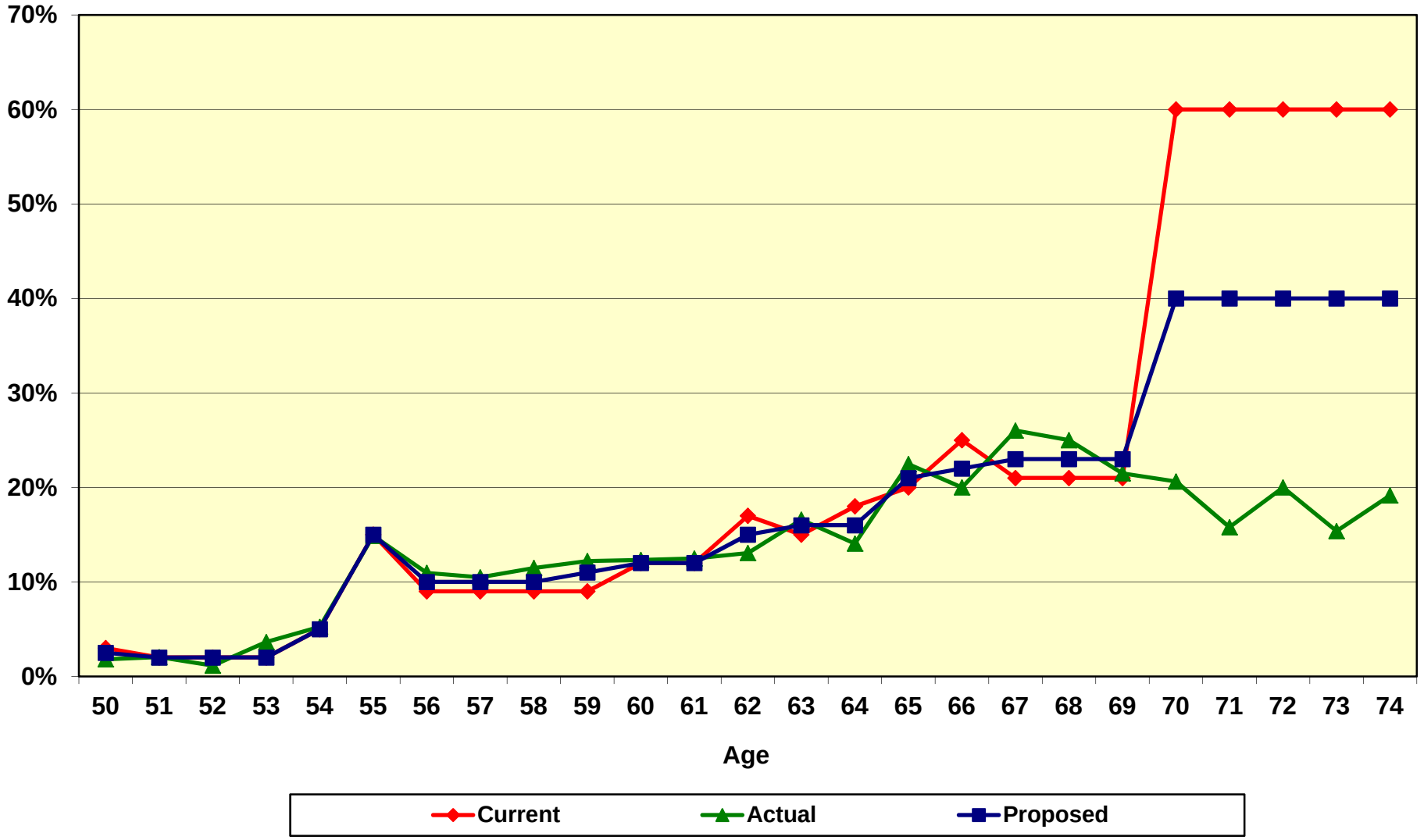


Chart 2
Retirement Rates - General Non-Enhanced Members

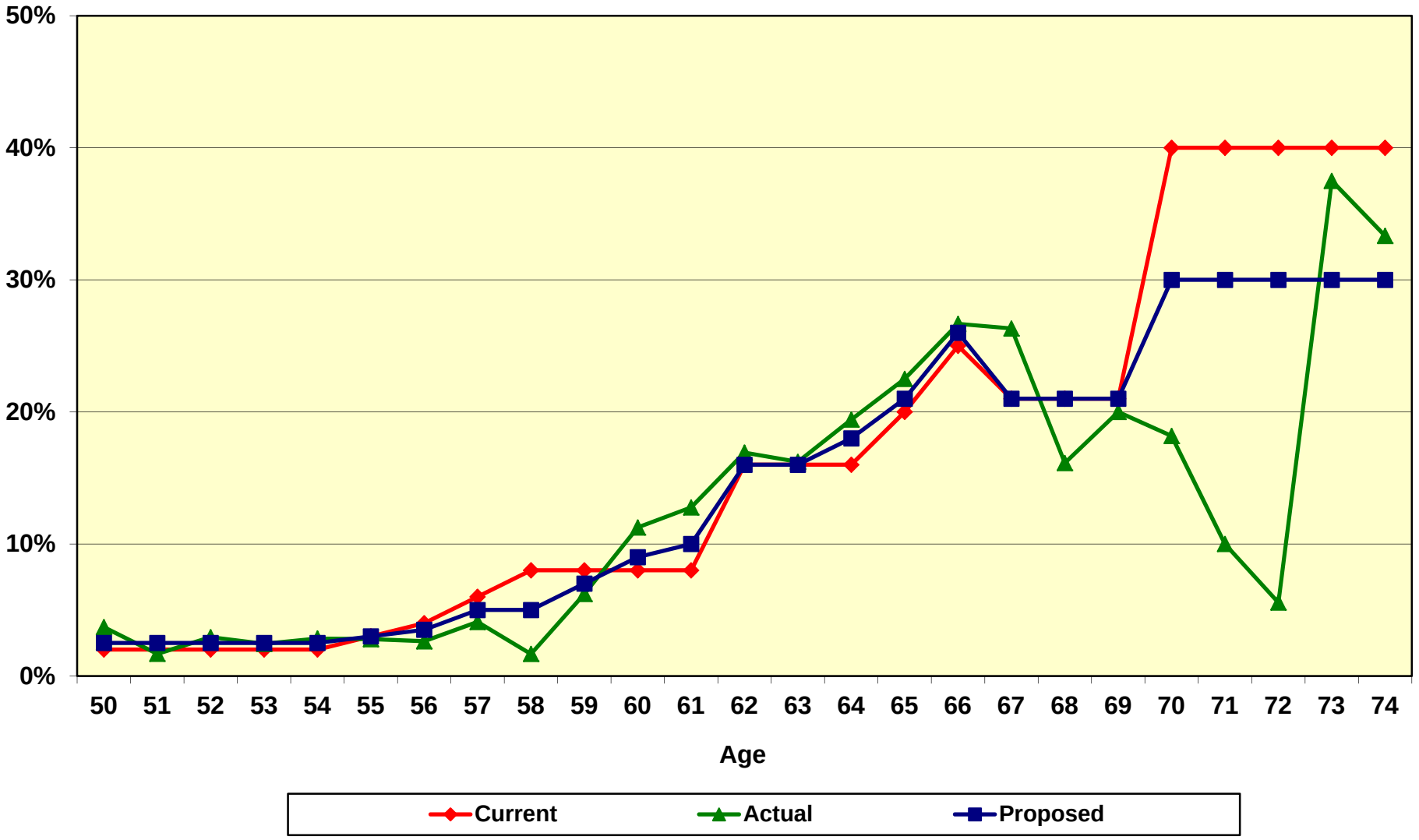


Chart 3
Retirement Rates - Safety Law Enforcement Members (31664.1)

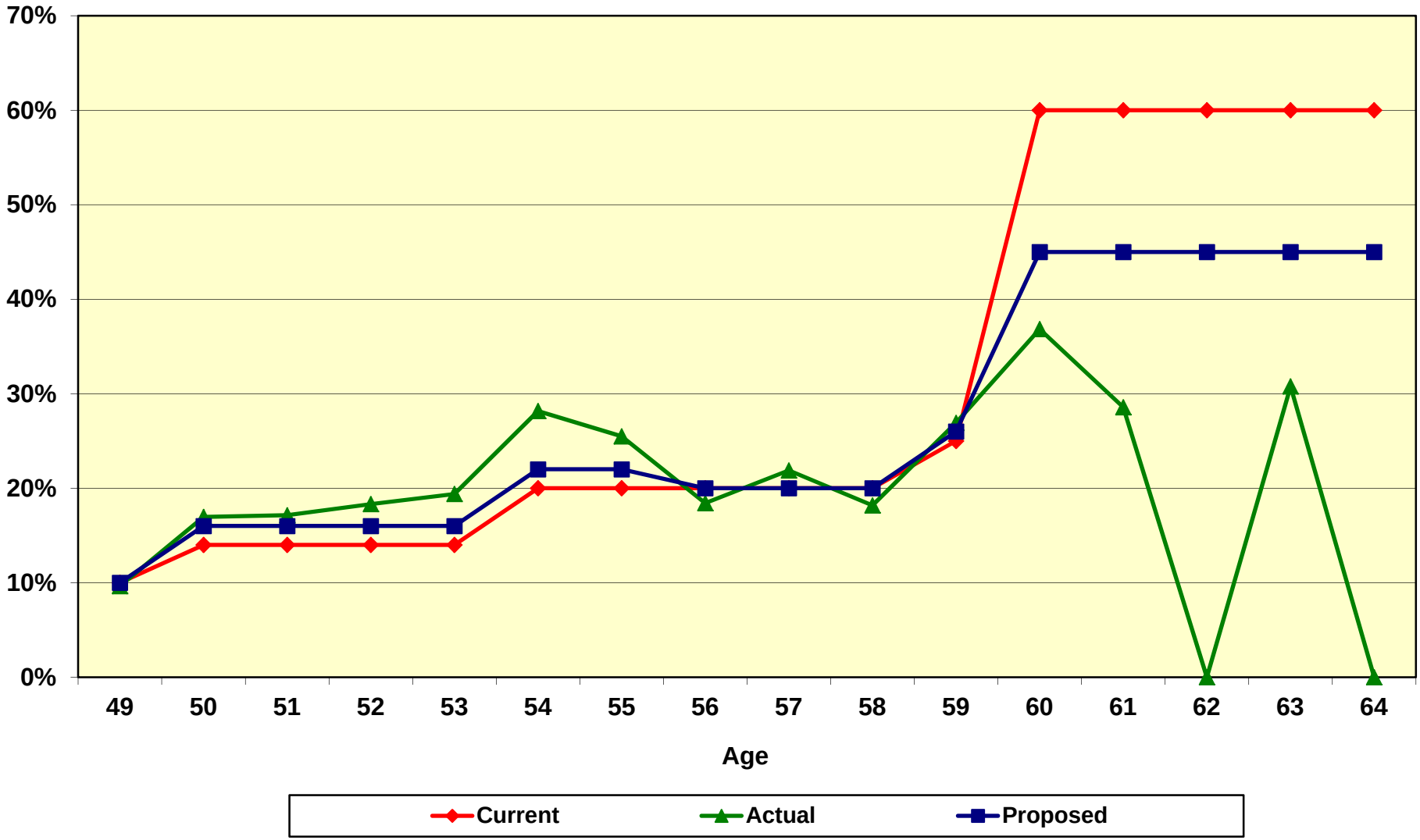


Chart 4
Retirement Rates - Safety Fire Authority Members (31664.1)

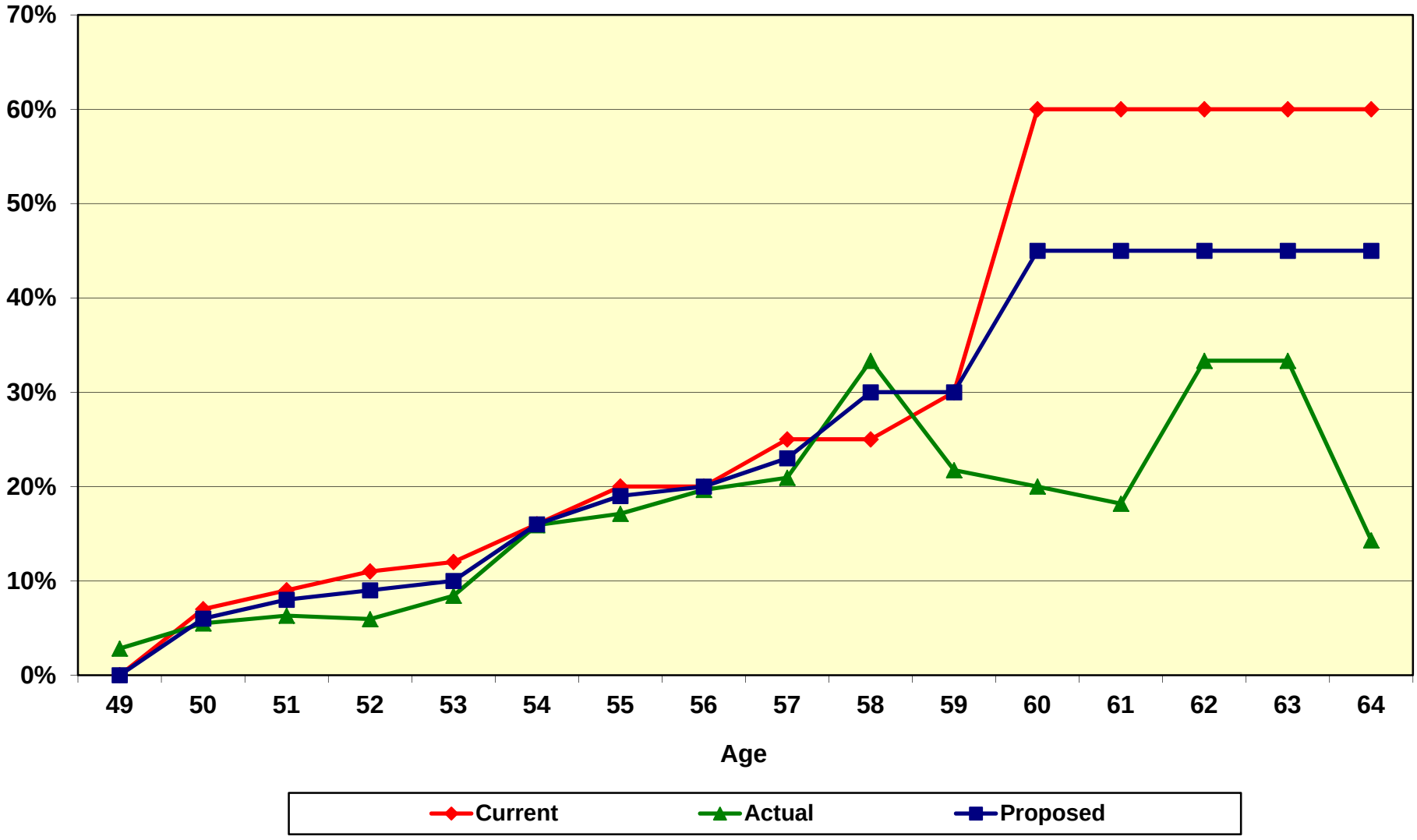


Chart 5
Retirement Rates - Safety Probation Members (31664.1)

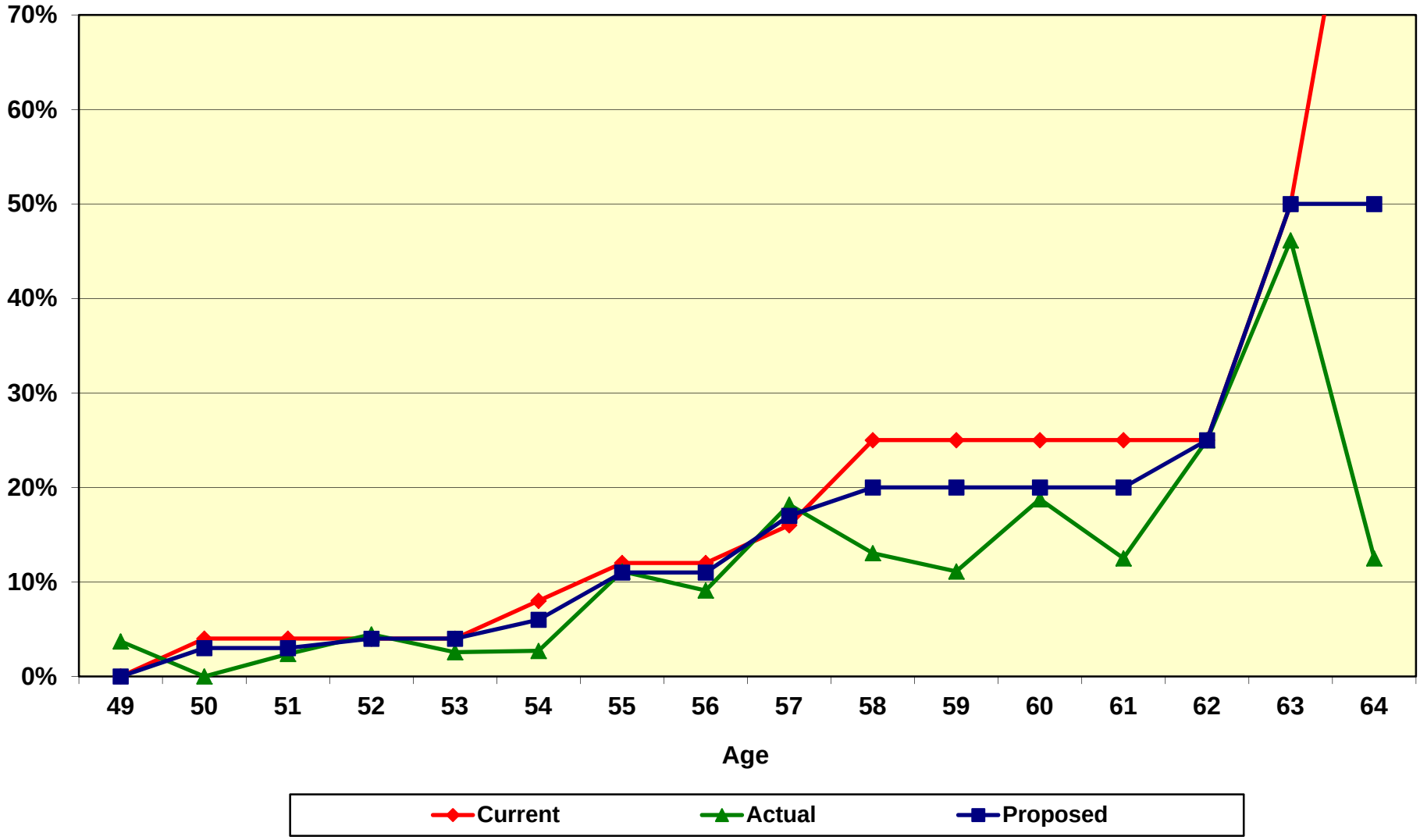


Chart 6
Retirement Rates - CalPEPRA General Members

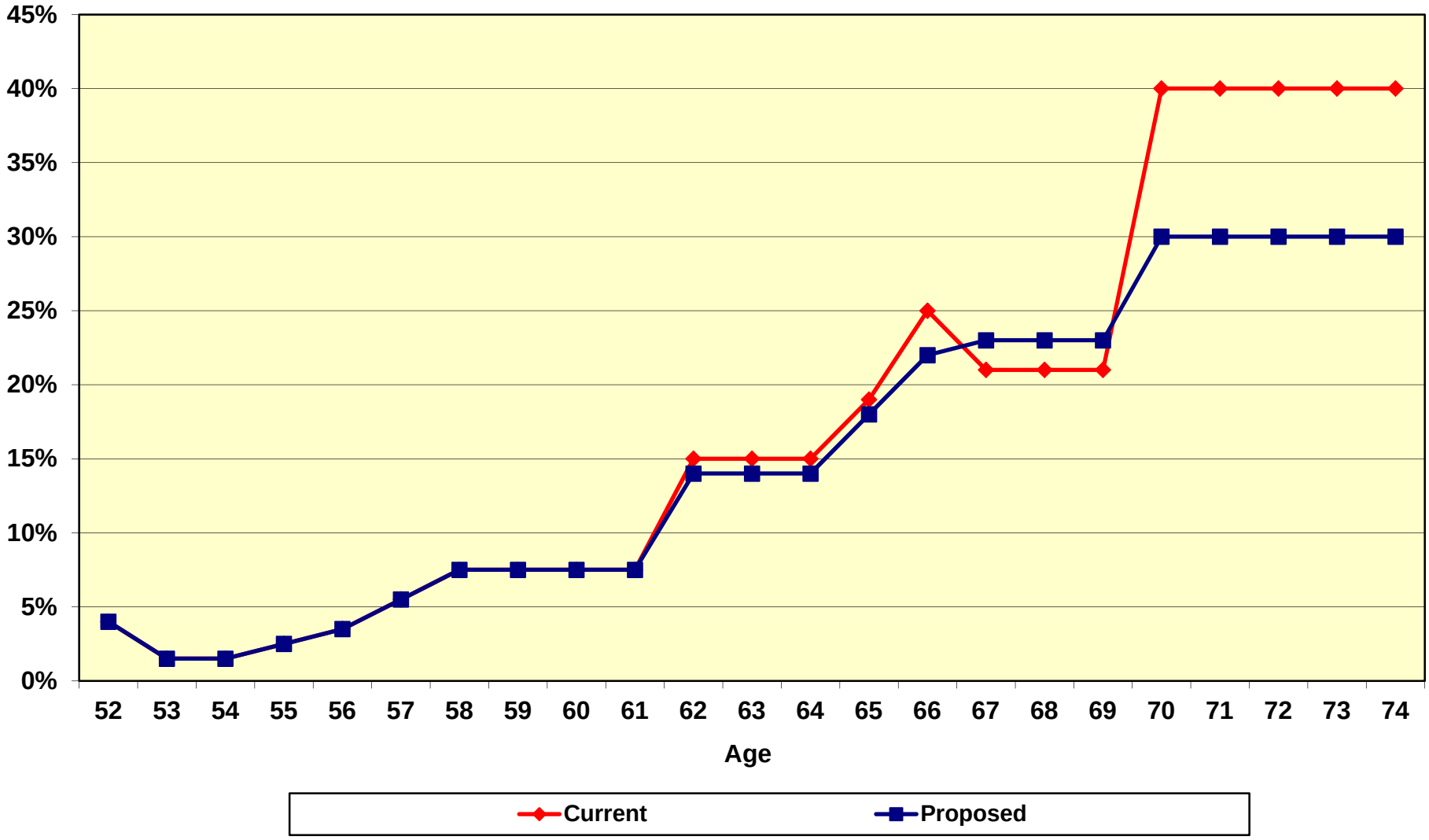


Chart 7
Retirement Rates - CalPEPRA Safety Probation Members

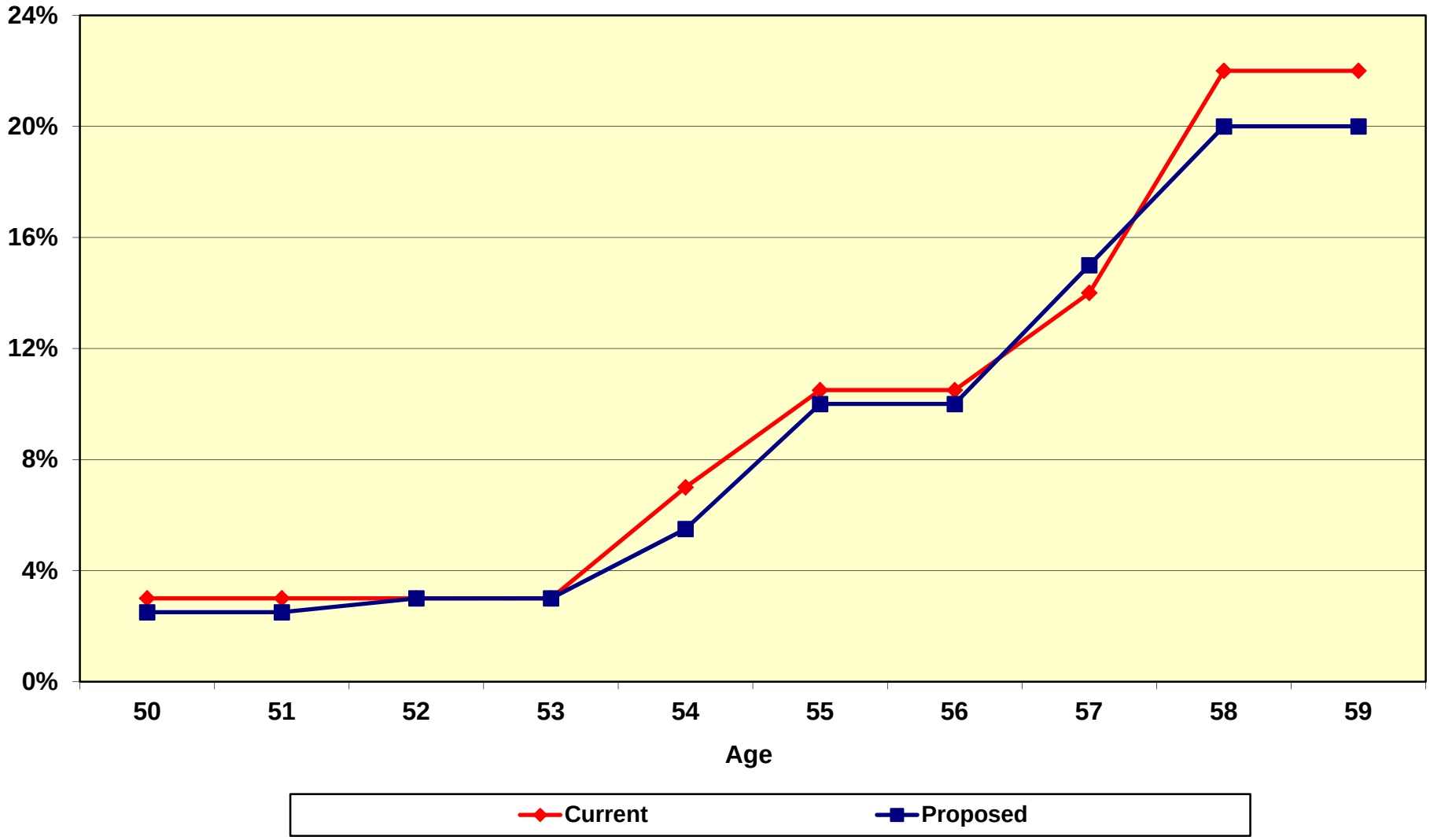


Chart 8
Retirement Rates - CalPEPRA Safety Law Enforcement Members

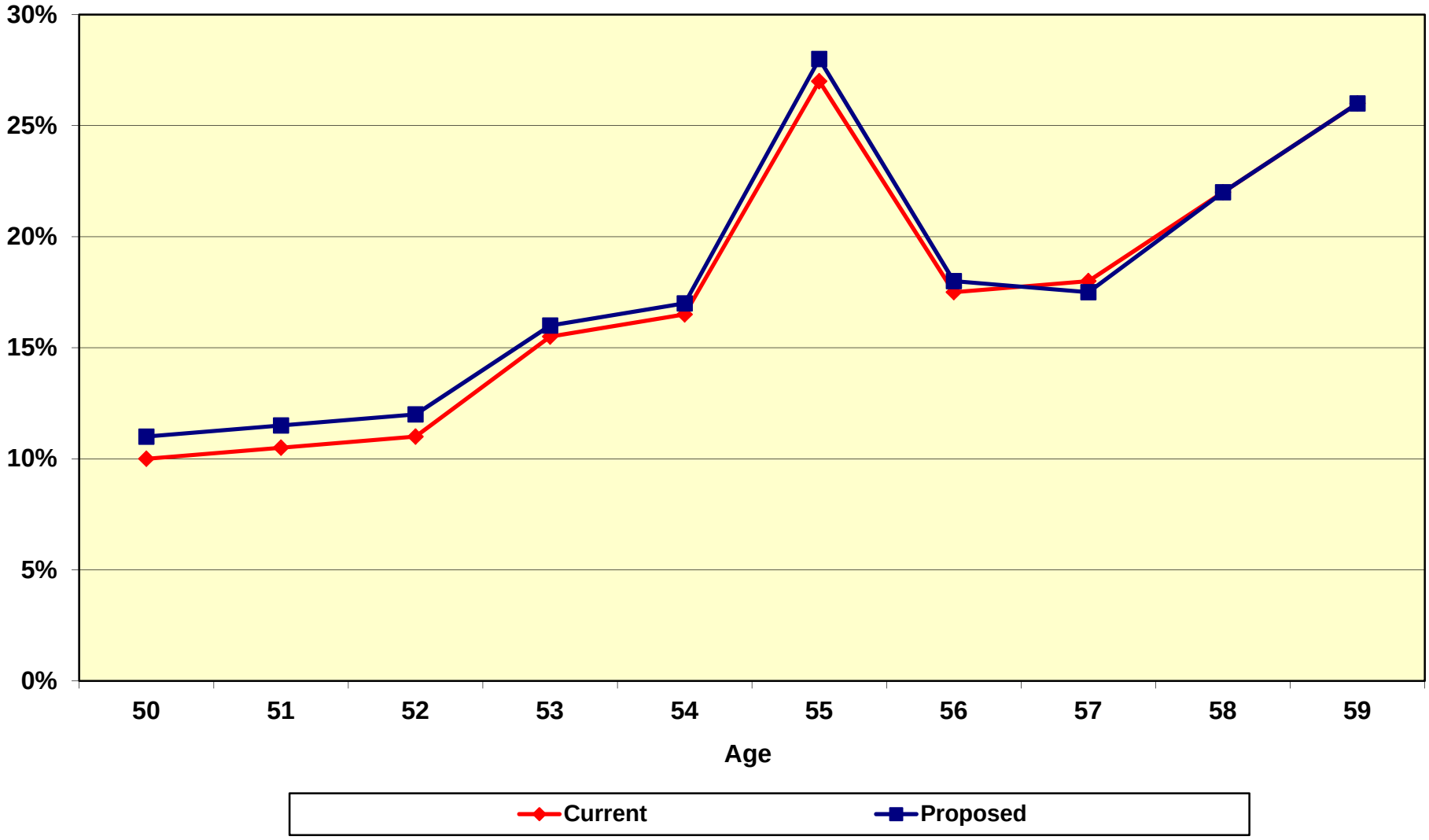
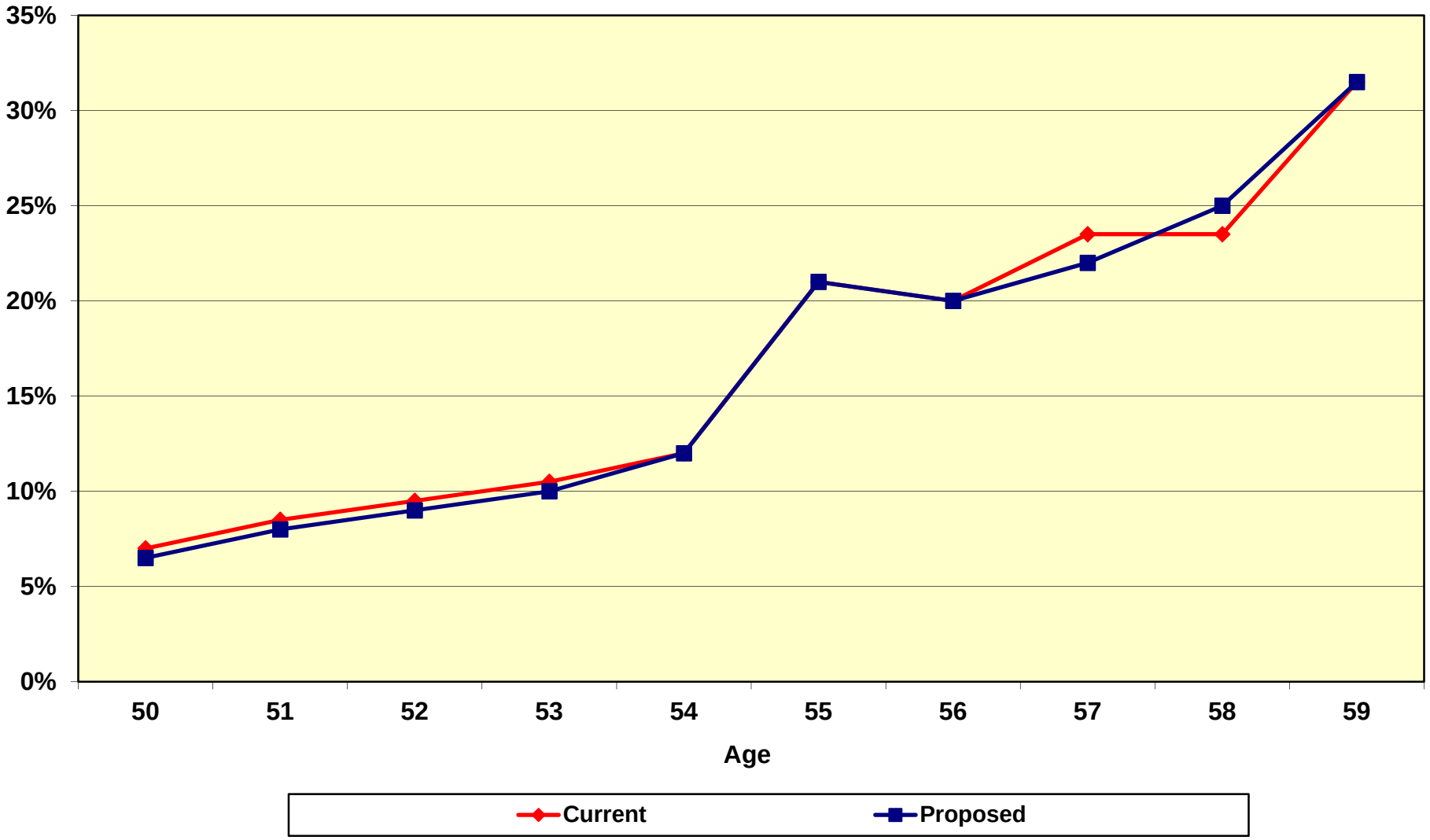


Chart 9
Retirement Rates - CalPEPRA Safety Fire Authority Members



C. MORTALITY RATES - HEALTHY

The "healthy" mortality rates project what proportion of members will die before retirement as well as the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). 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) with ages set back three years for General members and all beneficiaries and the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) with ages set back two years for Safety members.

Recent changes to ASOP 35 have increased the actuary's responsibility to reflect and to disclose any allowance for future mortality improvement in this assumption. Ways to reflect anticipated future mortality improvement include:

- Mortality of a longer-lived group – The table in use, without projection, forecasts fewer deaths than the current experience level, thus implicitly allowing for future mortality improvement.
- Projection to a future year – The same mortality table is used for all members, but that table is intended to be reflective of mortality at a future date, not as of today.
- Generational mortality – Each year of birth has its own mortality table that reflects the forecasted improvements. Thus, younger participants have more future mortality improvement built in than older participants do.

Historically, we have used the approach described in the first bullet when setting mortality assumptions for OCERS. Generally, we have set the mortality assumption so that actual deaths will be at least 10% greater than those assumed.

Pre-Retirement Mortality

The number of deaths among active members is not large enough to provide statistics credible enough to develop a unique table. Therefore, it is assumed that pre-retirement mortality and post-retirement mortality will follow the same tables.

The current assumption is that all pre-retirement deaths are assumed to be ordinary (non-service connected). Based on actual experience during the last three years (with 99% non-service connected deaths for General and 83% non-service connected deaths for Safety), we recommended maintaining the current assumption for General and assuming that 90% of pre-retirement deaths are non-service connected for Safety. The remaining 10% of Safety deaths are assumed to be service connected.

Post-Retirement Mortality (Service Retirements)

Our analysis starts with a table that shows among all service retired members and beneficiaries, the actual deaths compared to the expected deaths under the current assumptions for the last three years. We also show the deaths under the proposed assumptions based on using a methodology generally consistent with prior years. As noted above, in prior years we have generally set the mortality assumption so that actual deaths will be at least 10% greater than those assumed. We are recommending continuation of that methodology in this experience study. However, as discussed later in this section, the Board should be aware that a future recommendation may include the use of a generational mortality table.

	General Members – Healthy			**Safety Members – Healthy**		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	287	343	302	47	38	37
Female	313	370	340	4	5	3
Total	600	713	642	51	43	40
Actual / Expected	119%		111%	84%		108%

	All Beneficiaries – Healthy		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	41	63	43
Female	136	163	148
Total	177	226	191
Actual / Expected	128%		118%

	General Members and All Beneficiaries – Healthy			**Safety Members – Healthy**		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	328	406	345	47	38	37
Female	449	533	488	4	5	3
Total	777	939	833	51	43	40
Actual / Expected	121%		113%	84%		108%

Chart 10 compares actual to expected deaths for General members and all beneficiaries under the current and proposed assumptions over the last three years. Experience shows that there were more deaths than predicted by the current table.

Chart 11 has the same comparison for Safety members. Experience shows that there were fewer deaths than predicted by the current table.

For General service retirees and all beneficiaries the ratio of actual to expected deaths was 121%. We recommend changing the current table to the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with Scale BB to 2020 with no age adjustments. This will bring the actual to expected ratio to 113%. This is consistent with ASOP 35 as we are continuing to include about a 10% margin in the rates to anticipate expected future improvement in life expectancy.

For Safety service retirees the ratio of actual to expected deaths was 84%. We recommend changing the current table to the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with Scale BB to 2020 with ages set back two years. This will bring the actual to expected ratio to 108%.

Chart 12 shows the life expectancies (i.e. expected future lifetime) under the current and the proposed tables for General members and all beneficiaries.

Chart 13 shows the same information for Safety members.

As mentioned earlier, we want to make the Board aware that a future recommendation might be for the use of a generational mortality table. While the use of generational mortality tables is under considerable discussion as an emerging practice within the actuarial profession, to date it is still uncommon for public sector retirement plans to actually use a generational mortality table. However, we anticipate that actuarial practice will continue to move in this direction, for reasons we will now discuss.

A generational mortality table provides dynamic projections of mortality experience for each cohort of retirees. For example, the mortality rate for someone who is 65 next year will be slightly less than for someone who is 65 this year. In general, using generational mortality anticipates increases in the cost of the Plan over time as participants' life expectancies are projected to increase. This is in contrast to updating a static mortality assumption with each experience study as we have proposed in this and prior experience studies.

Using generational mortality rather than static mortality incorporates a more explicit assumption for future mortality improvement. Accordingly, the goal is to start with a mortality table that closely matches the current experience (without a margin for future mortality improvement), and then reflect mortality improvement by projecting lower mortality rates in future years. That is why, for an illustrative generational mortality table that we developed for the Plan (for the members only), the current actual to expected ratio shown in the tables below is only around 100%. In future years these ratios would remain

around 100%, as long as actual mortality improved at the same rates as anticipated in the generational mortality tables.

	General Members – Healthy			Safety Members – Healthy		
	Expected Deaths	Actual Deaths	Proposed Expected Deaths*	Expected Deaths	Actual Deaths	Proposed Expected Deaths**
Male	287	343	336	47	38	40
Female	313	370	372	4	5	4
Total	600	713	708	51	43	44
Actual / Expected	119%		101%	84%		98%

* *For illustration purposes only and shown for the RP-2000 Combined Healthy Mortality Table projected to 2012 (middle year of the experience study period) with Scale BB, with no age set back for males and females.*

** *For illustration purposes only and shown for the RP-2000 Combined Healthy Mortality Table projected to 2012 (middle year of the experience study period) with Scale BB, with ages set back two years for males and females.*

Note that using generational mortality increases current liabilities and costs more than using static mortality but should result in fewer changes (and cost increases) in later years. For example, the generational mortality table developed above would increase the total (employer and member) contribution rate by about 3.0% of compensation more than the updated static table that we are recommending.[3]

Note that there are currently unresolved issues regarding how generational mortality tables would be used in determining member contribution rates, optional forms of payments and reserve values. These issues would need to be addressed for OCERS before using a generational mortality table.

Mortality Table for Member Contributions

We recommend that the mortality table used for determining contributions for General members be updated from the RP-2000 Combined Healthy Mortality Table set back three years weighted 40% male and 60% female to the RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with no age adjustments weighted 40% male and 60% female. This is based on the proposed valuation mortality table for General members and the actual sex distribution of General members.

For Safety members, we recommend the mortality table be changed from the RP-2000 Combined Healthy Mortality Table set back two years weighted 80% male and 20% female to the RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 set back two years weighted 80% male and 20% female. This is based on the proposed valuation mortality table for Safety members and the actual sex distribution of Safety members.

3 These cost increases reflect the hypothetical adoption of generational mortality for both healthy and disabled retirees.

Chart 10
Post - Retirement Deaths
Non - Disabled General Members and All Beneficiaries

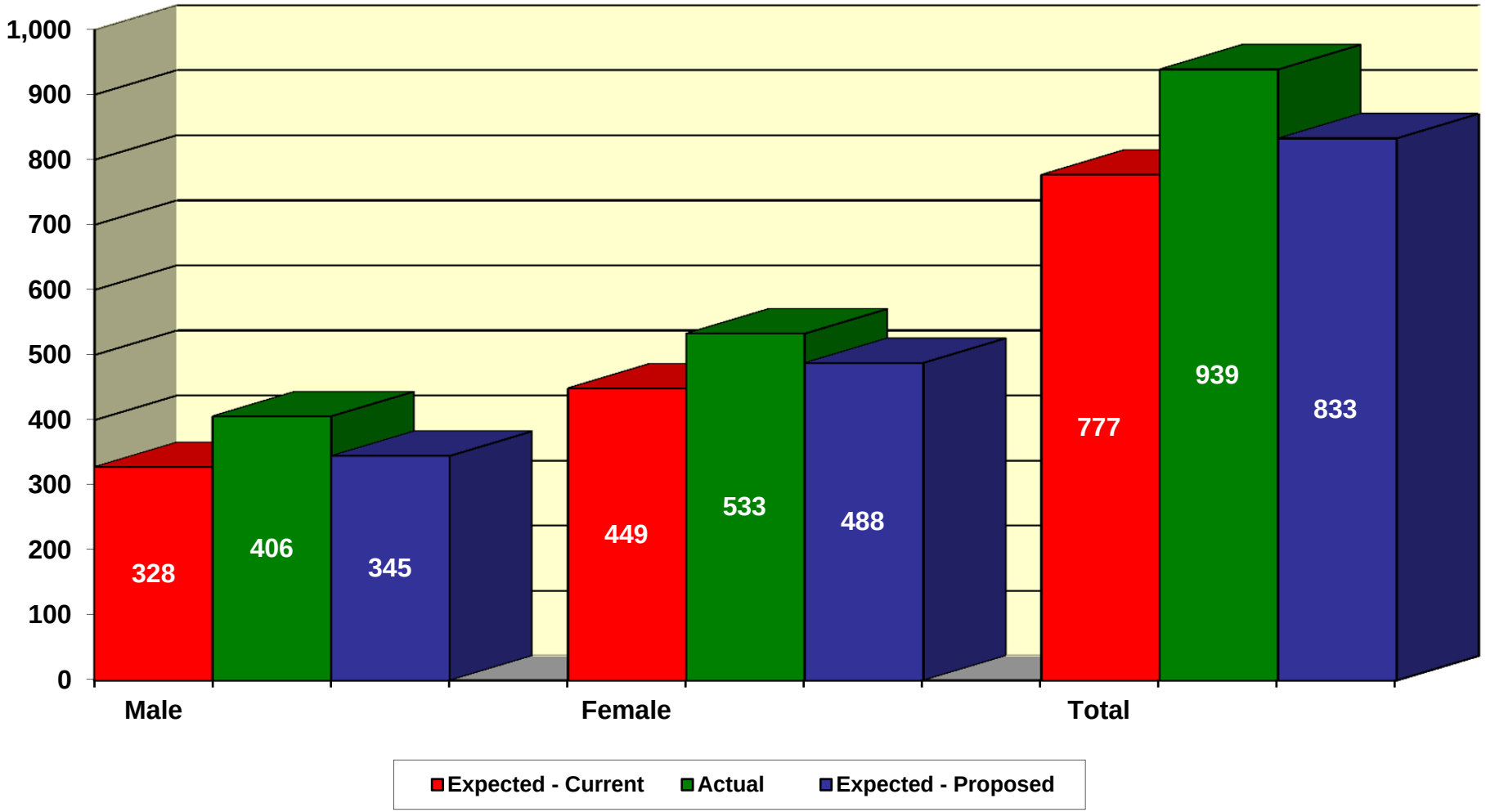


Chart 11
Post - Retirement Deaths
Non - Disabled Safety Members

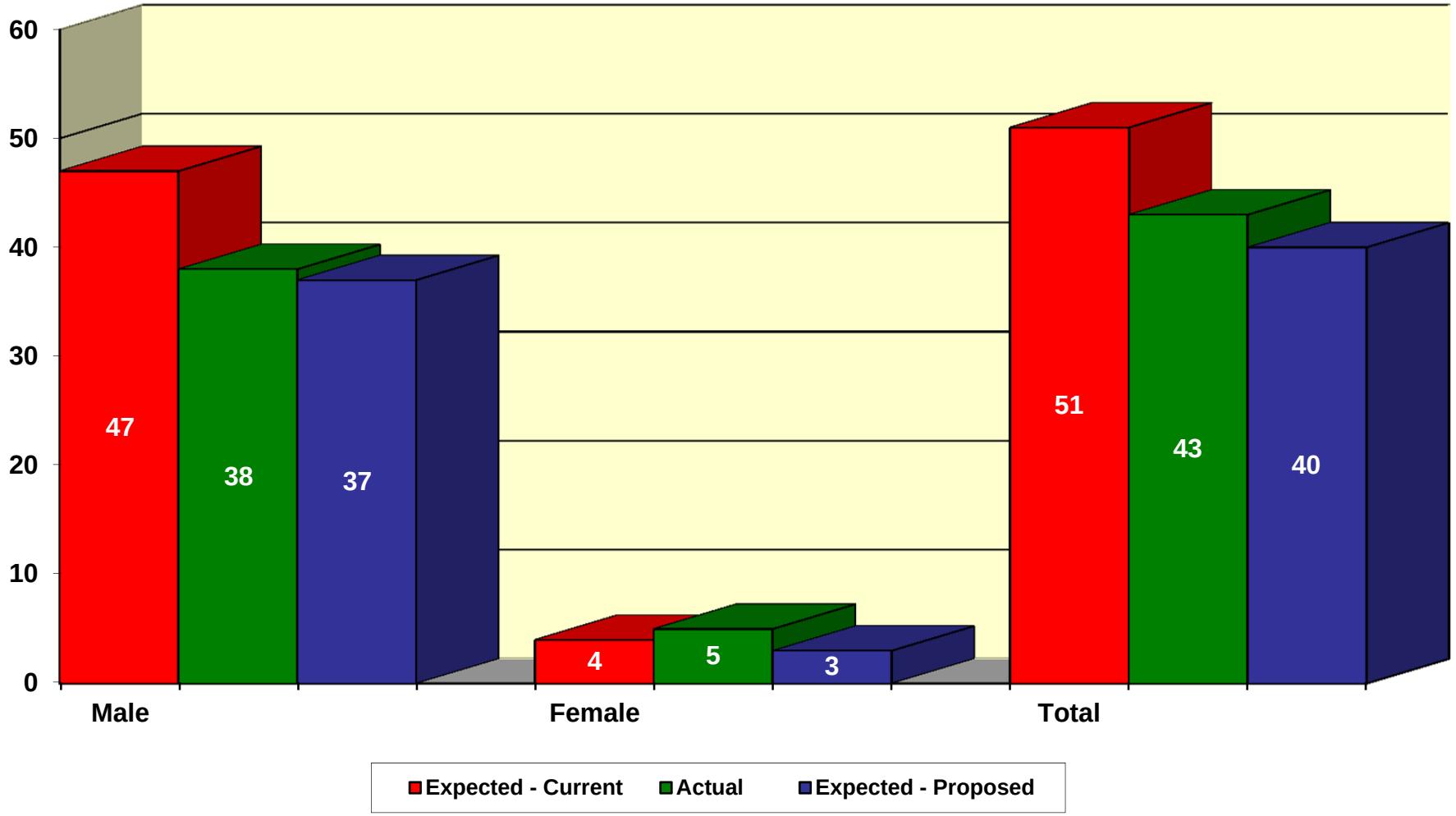


Chart 12
Life Expectancies
Non - Disabled General Members and All Beneficiaries

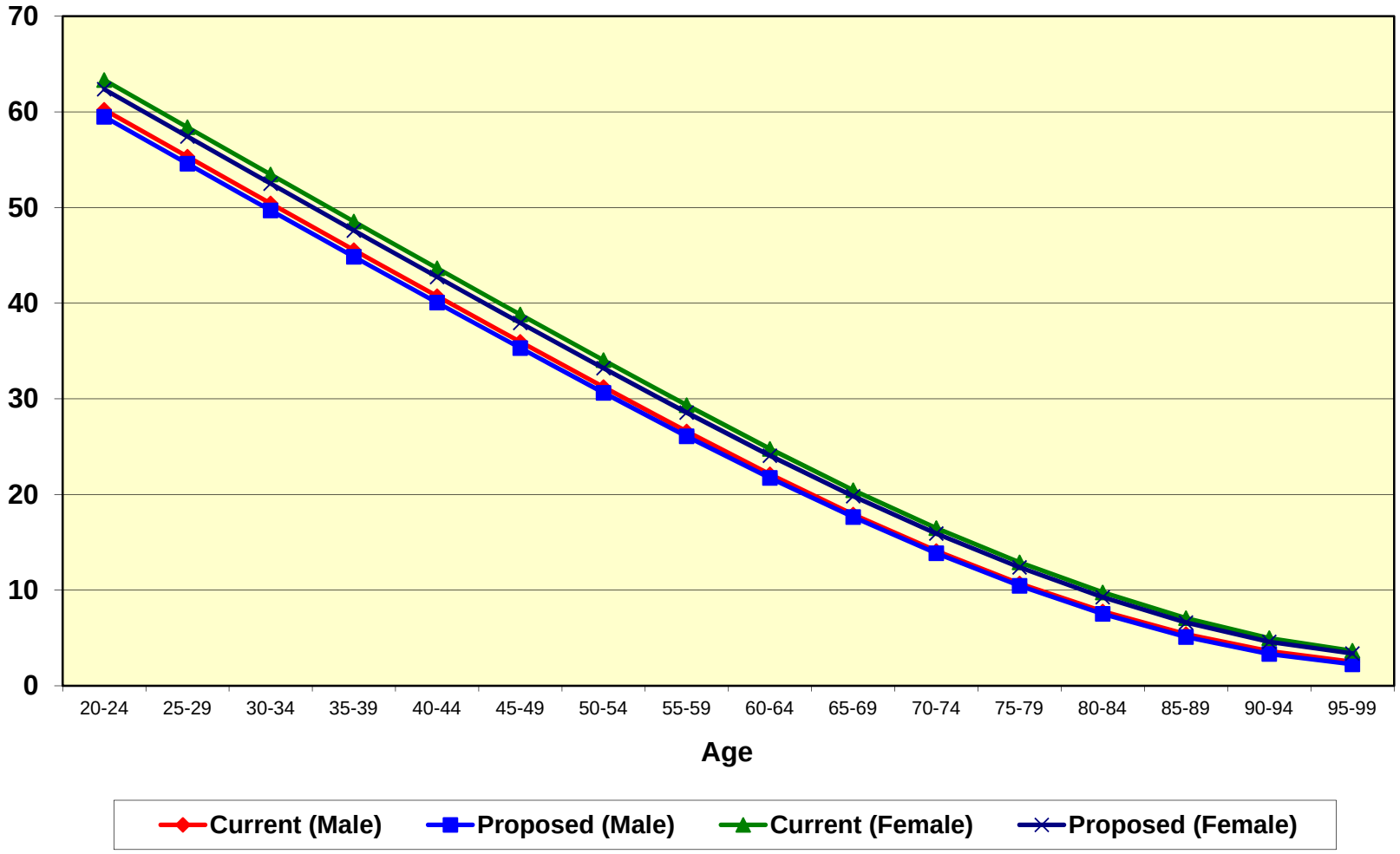
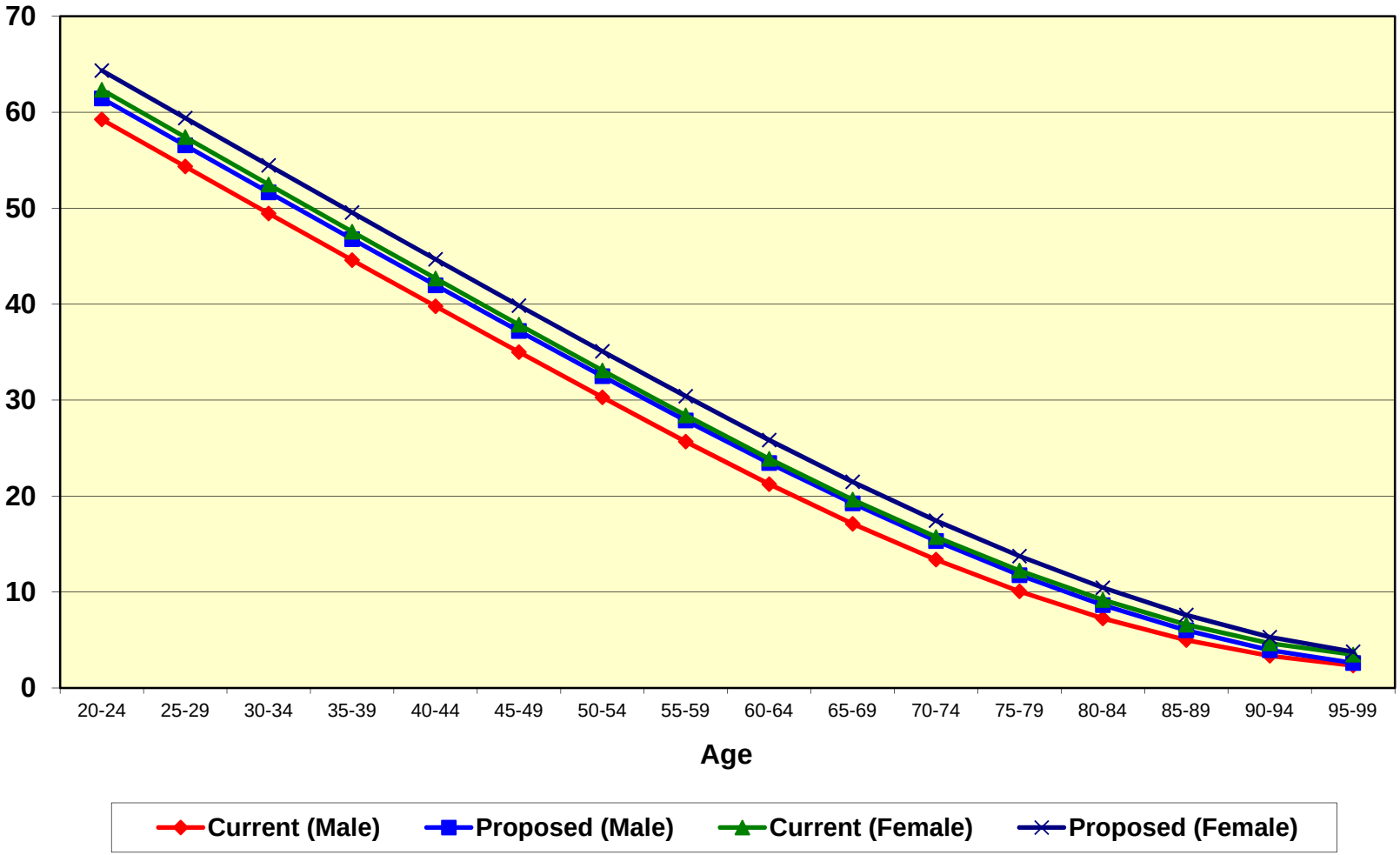


Chart 13
Life Expectancies
Non - Disabled Safety Members



D. MORTALITY RATES - DISABLED

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used. For General members, the table currently being used is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) with ages set forward three years. For Safety members, the table currently being used is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) with ages set forward two years.

The number of actual deaths compared to the number expected for the last three years has been as follows:

	General – Disabled			Safety – Disabled		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	38	42	40	19	14	12
Female	31	28	25	2	0	1
Total	69	70	65	21	14	13
Actual / Expected	101%		108%	67%		108%

Based on this experience, we recommend that the mortality table for General members be changed to the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with Scale BB to 2020 with ages set forward six years for males and set forward three years for females. We recommend that the mortality table for Safety members be changed to the RP-2000 Combined Table (separate tables for males and females) projected with Scale BB to 2020 with no age adjustments.

Chart 14 compares actual to expected deaths under both the current and proposed assumptions for disabled General members over the last three years.

Chart 15 has the same comparison for Safety members. Experience shows that there were fewer deaths than predicted by the current table.

Chart 16 shows the life expectancies under both the current and proposed tables for General members.

Chart 17 shows the same information for Safety members.

Chart 14
Post - Retirement Deaths
Disabled General Members

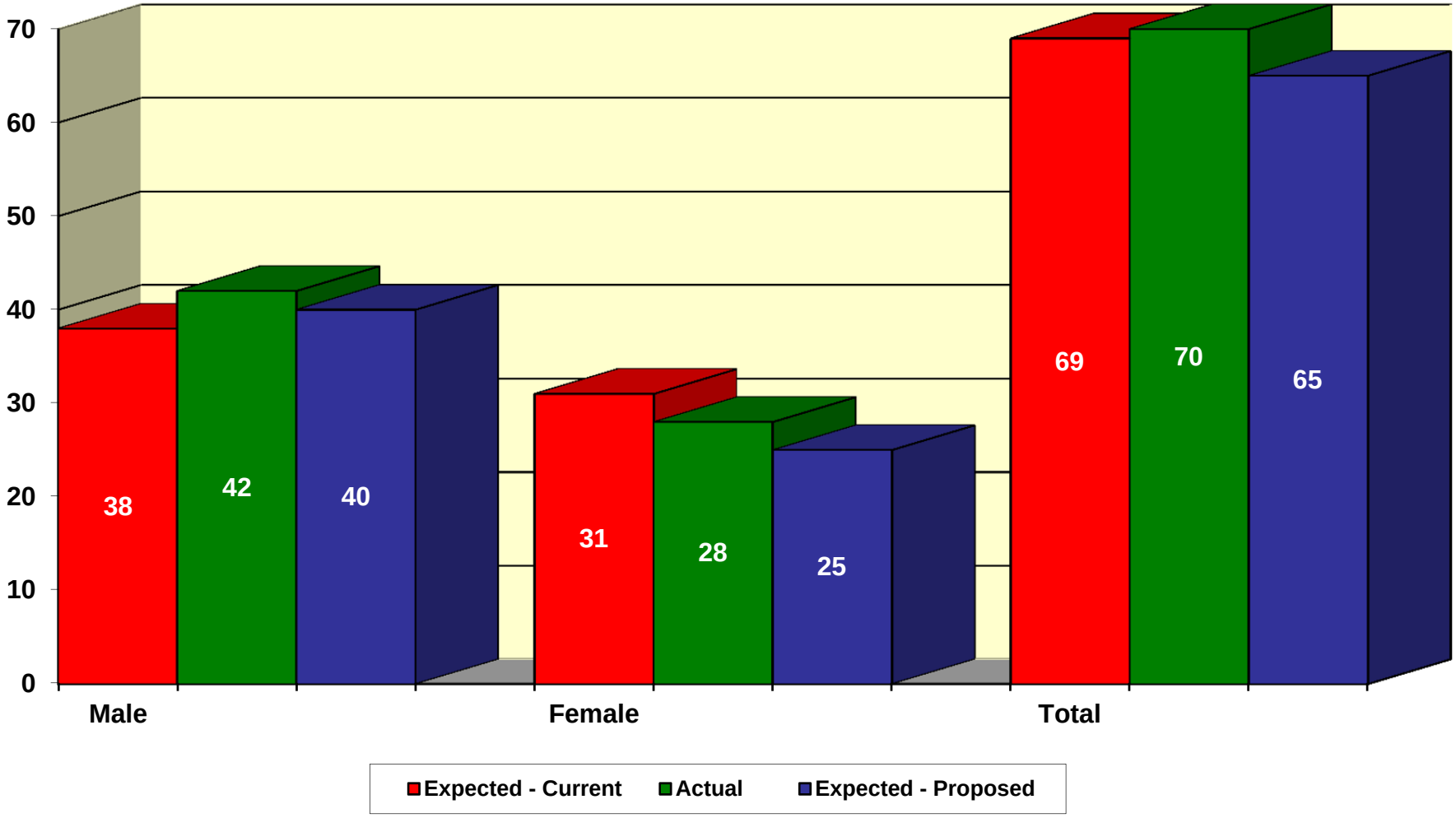


Chart 15
Post - Retirement Deaths
Disabled Safety Members

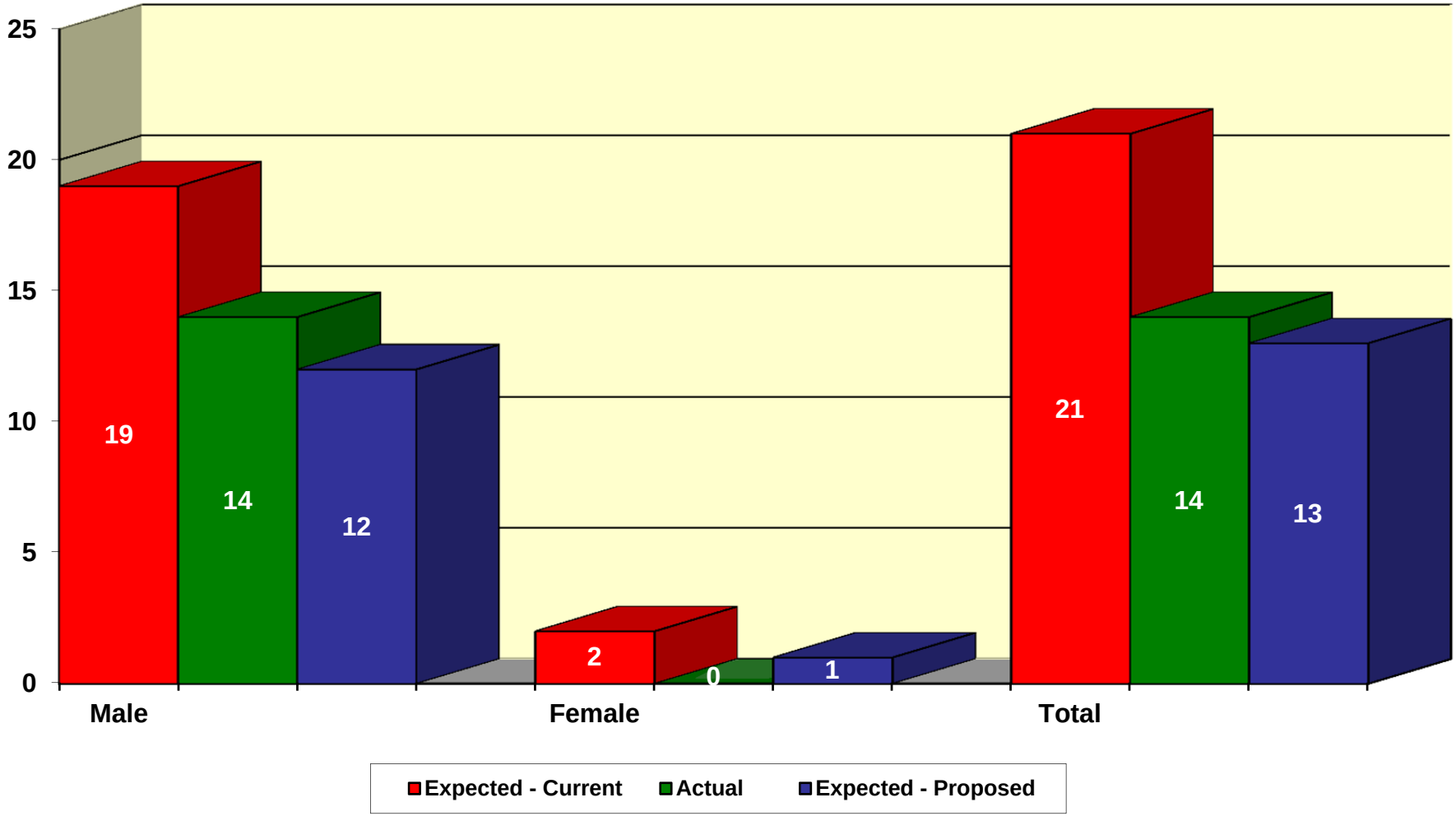


Chart 16
Life Expectancies
Disabled General Members

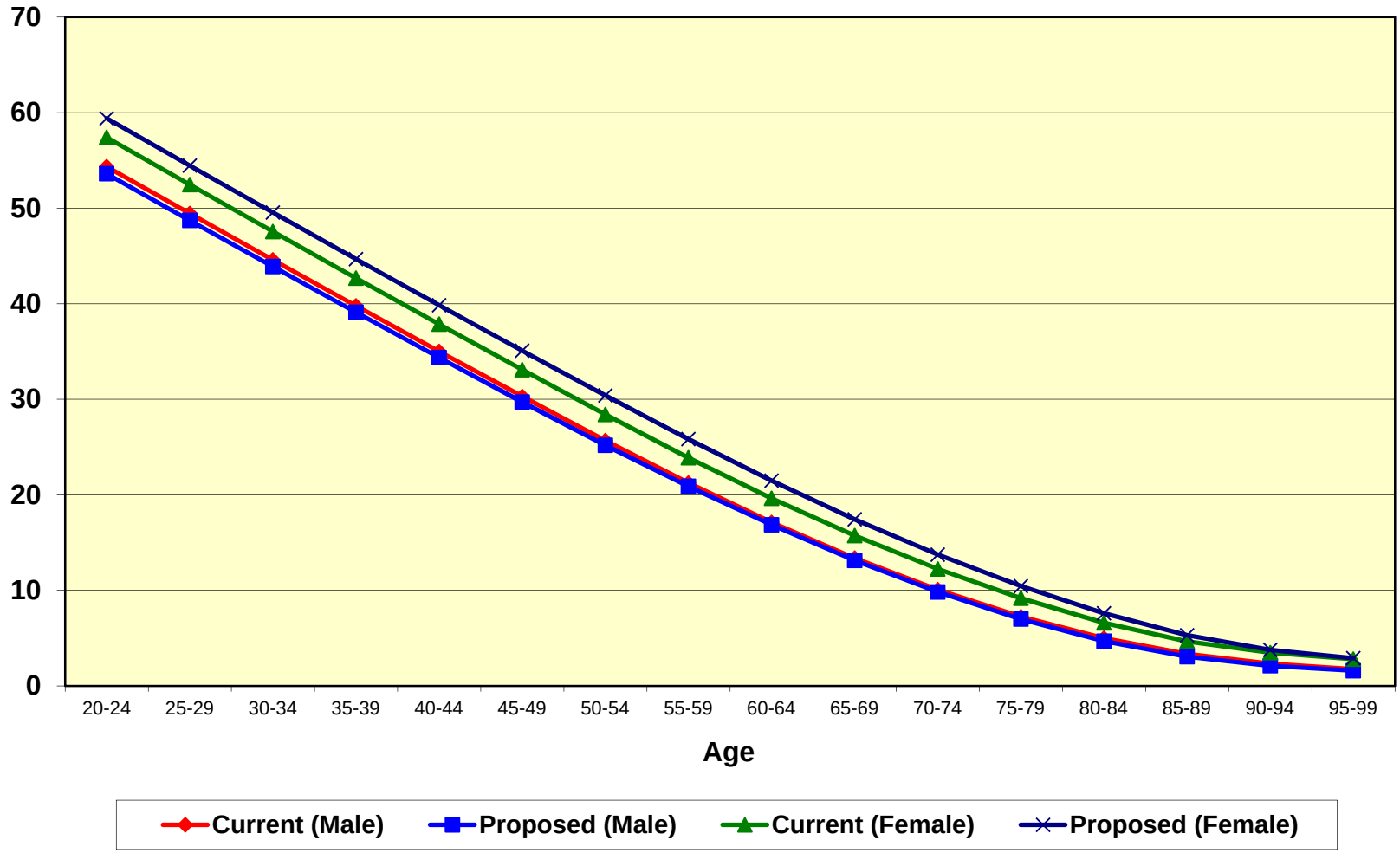
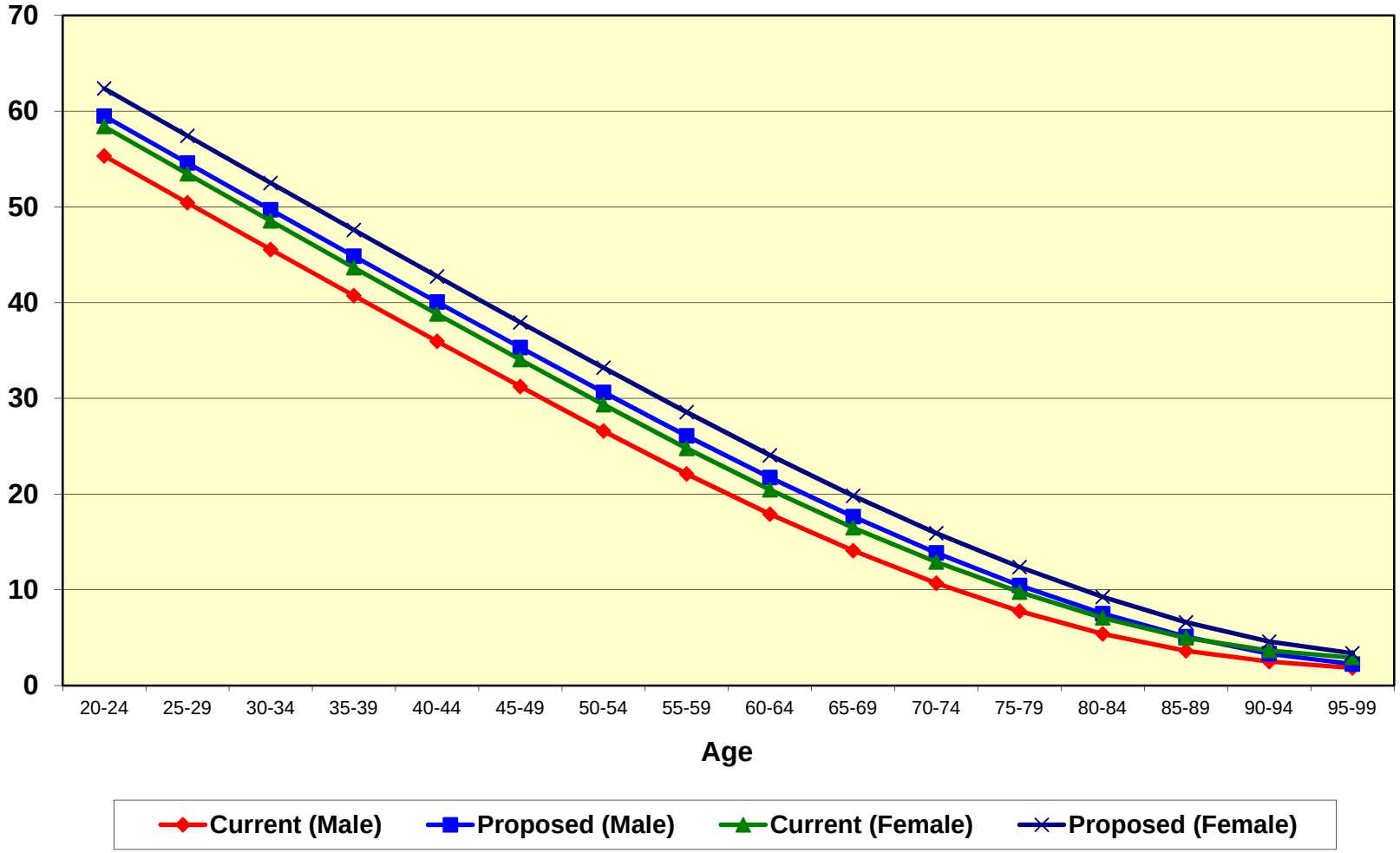


Chart 17
Life Expectancies
Disabled Safety Members



E. TERMINATION RATES

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there is a separate set of service based assumptions for members with less than five years of service and members with five or more years of service. There is also another set of assumptions to anticipate the percentage of members who will withdraw their contributions and members who will leave their contributions on deposit and receive a deferred vested benefit.

Currently, the assumed termination rates are a function of a member's age (or age based) for members with five or more years of service. Our experience review analyzed terminations both as a function of age and as a function of years of service. Our review found that while termination rates correlate with both years of service and age, we believe there is a stronger correlation with years of service. This is consistent with our experience from other systems. As a result of this review, we recommend that the termination rate assumption be structured solely as a function of years of service.

We have developed rates for the following four groups: (1) General All Other, (2) General OCTA, (3) Safety Law Enforcement and Fire and (4) Safety Probation. The termination experience over the last three years for General and Safety members is shown by years of service in the following tables. We also show the current and proposed assumptions.

Termination Rates (%)

	General All Other			General OCTA		
Years of Service	Current Rate*	Observed Rate	Proposed Rate	Current Rate*	Observed Rate	Proposed Rate
Less than 1	13.00	10.18	11.00	20.00	14.62	17.50
1	8.00	8.40	8.00	16.00	10.61	13.50
2	7.00	7.03	7.00	12.00	8.96	10.50
3	6.00	4.93	5.00	9.00	11.21	10.00
4	5.00	3.84	4.00	7.00	11.00	9.00
5	3.20	3.58	3.75	3.34	9.05	7.00
6	3.12	2.62	3.50	3.21	6.83	5.00
7	3.00	2.95	3.00	3.11	6.93	5.00
8	2.95	2.04	2.75	3.04	4.68	4.00
9	2.88	1.64	2.50	3.02	3.61	3.50
10	2.81	1.81	2.25	3.07	3.75	3.50
11	2.74	1.18	2.00	3.08	3.72	3.50
12	2.68	1.30	2.00	3.01	1.82	3.00
13	2.63	0.93	1.75	2.93	2.94	3.00
14	2.60	1.01	1.75	2.85	3.73	3.00
15	2.56	0.93	1.75	2.82	0.00	3.00
16	2.52	0.47	1.50	2.91	2.99	3.00
17	2.50	0.95	1.50	2.75	0.00	2.75
18	2.47	0.53	1.50	2.68	3.39	2.75
19	2.43	0.65	1.50	2.70	0.00	2.75
20 or more	2.37	0.40	1.25	2.83	0.69	1.75

* *The rate shown for five or more years of service is an average rate developed from the current age based assumption for members in that service category.*

Termination Rates (%)

	Safety Law and Fire			Safety Probation		
Years of Service	Current Rate*	Observed Rate	Proposed Rate	Current Rate*	Observed Rate	Proposed Rate
Less than 1	4.00	3.53	4.00	20.00	10.81	16.00
1	3.00	1.71	3.00	15.00	0.00	13.00
2	2.00	3.07	2.00	10.00	11.11	10.00
3	2.00	0.70	1.00	5.00	6.90	6.00
4	1.00	0.80	1.00	4.00	3.45	4.00
5	0.88	1.19	1.00	3.16	3.37	3.50
6	0.83	1.28	0.95	2.99	3.21	3.00
7	0.79	0.42	0.90	2.84	0.88	2.50
8	0.75	0.46	0.85	2.79	1.64	2.25
9	0.74	0.44	0.80	2.70	1.03	2.00
10	0.70	1.44	0.75	2.61	0.97	1.75
11	0.68	0.00	0.65	2.50	1.62	1.75
12	0.65	1.25	0.60	2.46	0.60	1.50
13	0.62	0.29	0.50	2.41	0.56	1.25
14	0.58	0.00	0.50	2.26	1.28	1.00
15	0.54	0.00	0.50	2.11	0.00	1.00
16	0.51	0.79	0.50	2.06	1.15	1.00
17	0.49	0.00	0.50	2.05	0.00	0.50
18	0.46	0.00	0.50	1.95	0.00	0.50
19	0.43	0.48	0.50	1.82	0.00	0.50
20 or more	0.24	0.10	0.25	1.54	0.00	0.50

* *The rate shown for five or more years of service is an average rate developed from the current age based assumption for members in that service category.*

It is important to note that not every service category has enough exposures and/or decrements such that the results in that category are statistically credible. This is mainly the case at the highest service categories since most members in those categories are eligible to retire and so have been excluded from our review of this experience. It is also the case in the tables that follow due to the even more limited experience regarding actual terminations.

Chart 18 compares actual to expected terminations over the past three years for both the current and proposed assumptions for General and Safety members.

Chart 19 shows the actual termination rates over the past three years compared to the current and proposed assumptions for General All Other members.

Chart 20-22 shows the same information as Chart 19, but for General OCTA, Safety Law and Fire and Safety Probation members.

Based upon the recent experience, the termination rates have been increased for those at around 5 to 9 years of service and decreased for all other years of service categories. Overall, for both General All Other and Safety members, the proposed termination rates are slightly lower than those under the current assumptions. For General OCTA, the proposed termination rates are slightly higher than those under the current assumptions.

The following table shows the currently assumed, observed and proposed assumed percentages for members who withdraw their contributions. For the observed experience, we have included the experience from the current and the last triennial experience study periods. The assumed percentages for members who leave their contributions on deposit and receive a deferred vested benefit is equal to one minus the percentage of those assumed to withdraw.

	Members with Fewer than Five Years of Service			
Group	Current Assumed Withdrawal	January 1, 2008 Through December 31, 2010 Observed Withdrawal	January 1, 2011 Through December 31, 2013 Observed Withdrawal	Proposed Withdrawal
General All Other	50%	41%	29%	40%
General OCTA	50%	61%	43%	45%
Safety Law and Fire	40%	15%	8%	20%
Safety Probation	40%	40%	36%	40%

	Members with Five or More Years of Service			
Group	Current Assumed Withdrawal	January 1, 2008 Through December 31, 2010 Observed Withdrawal	January 1, 2011 Through December 31, 2013 Observed Withdrawal	Proposed Withdrawal
General All Other	30%	29%	25%	25%
General OCTA	30%	38%	37%	35%
Safety Law and Fire	30%	32%	7%	20%
Safety Probation	30%	21%	27%	30%

Chart 18
Actual Number of Terminations Compared to Expected

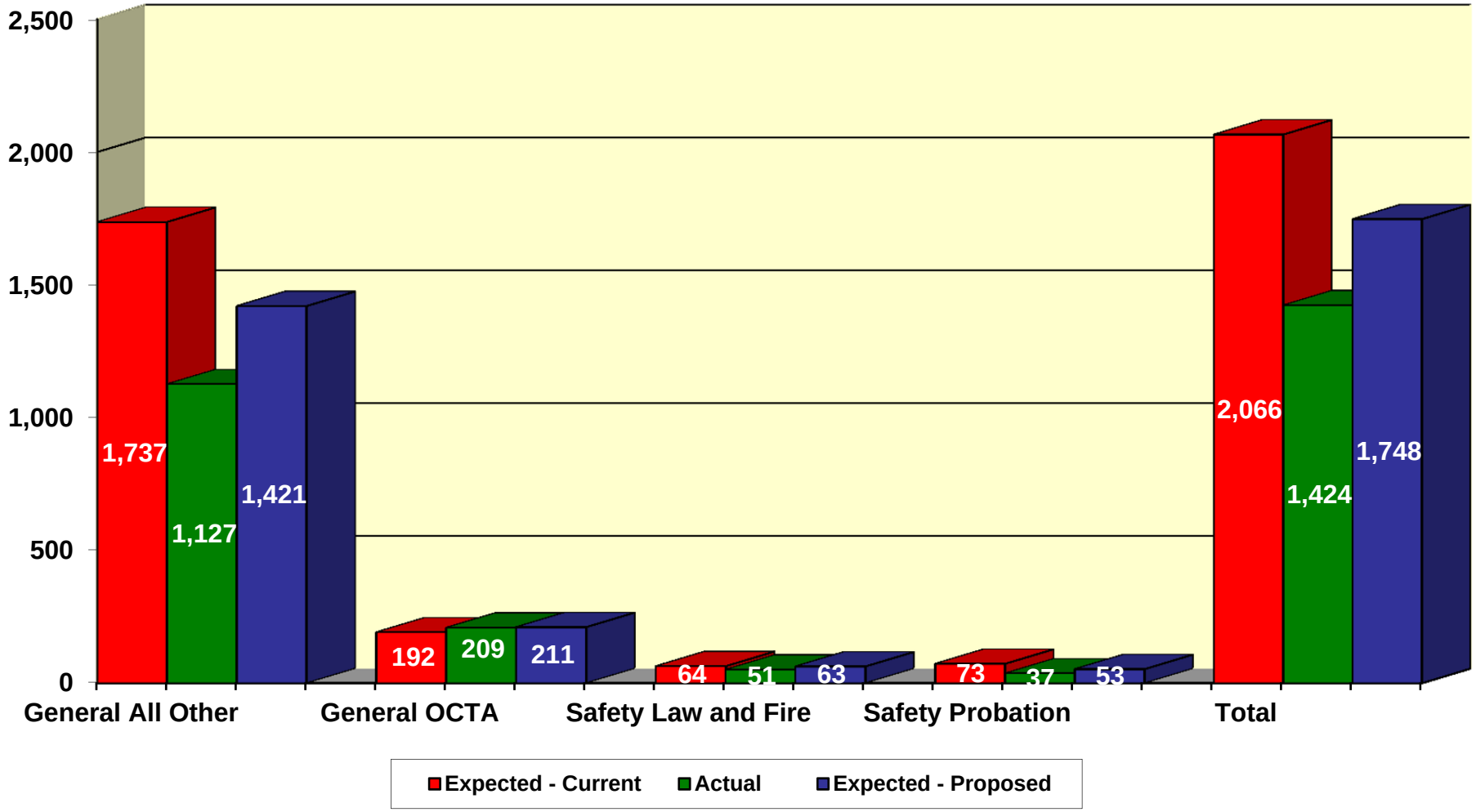


Chart 19
Termination Rates - General All Other Members

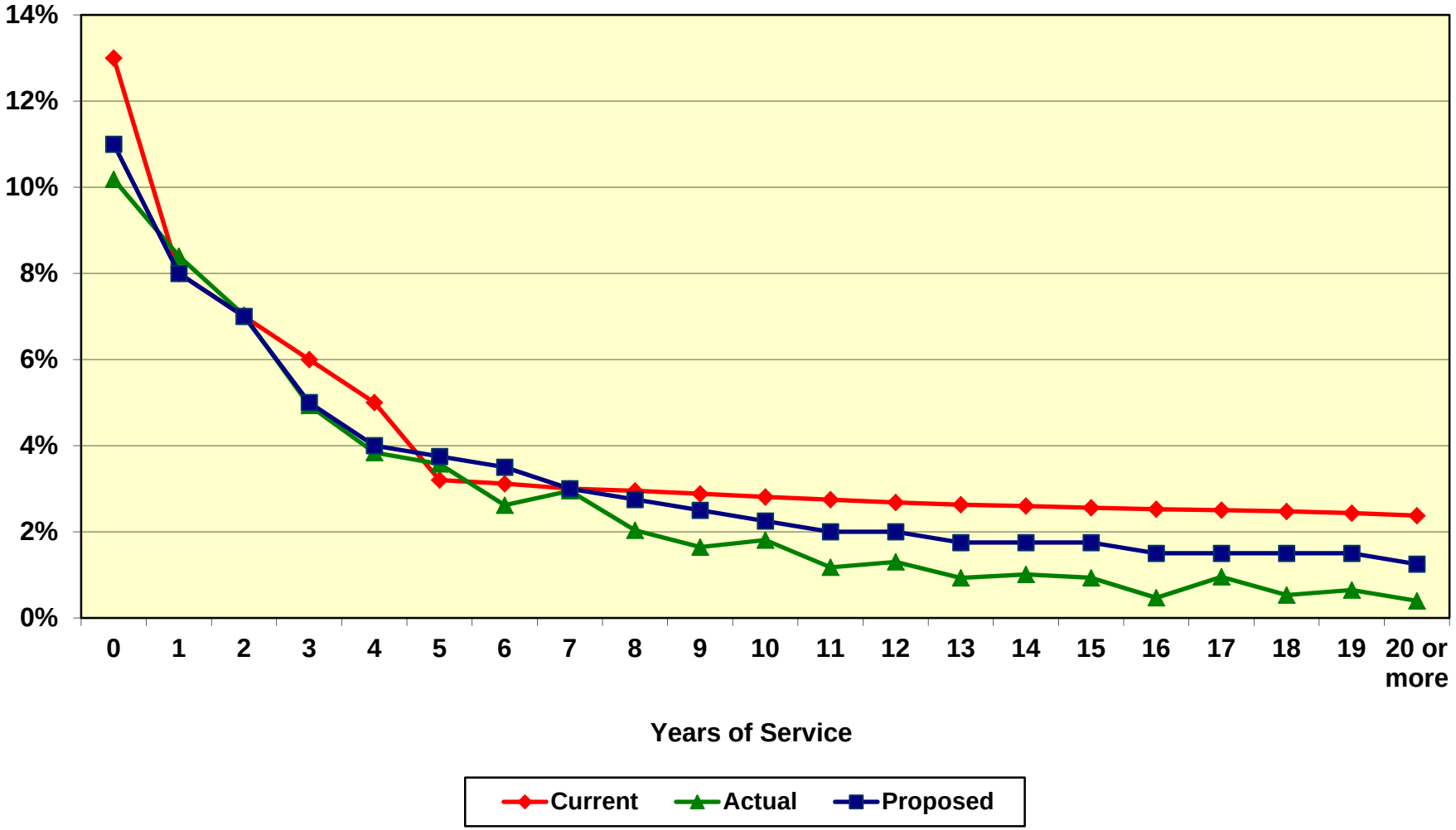


Chart 20
Termination Rates - General OCTA Members

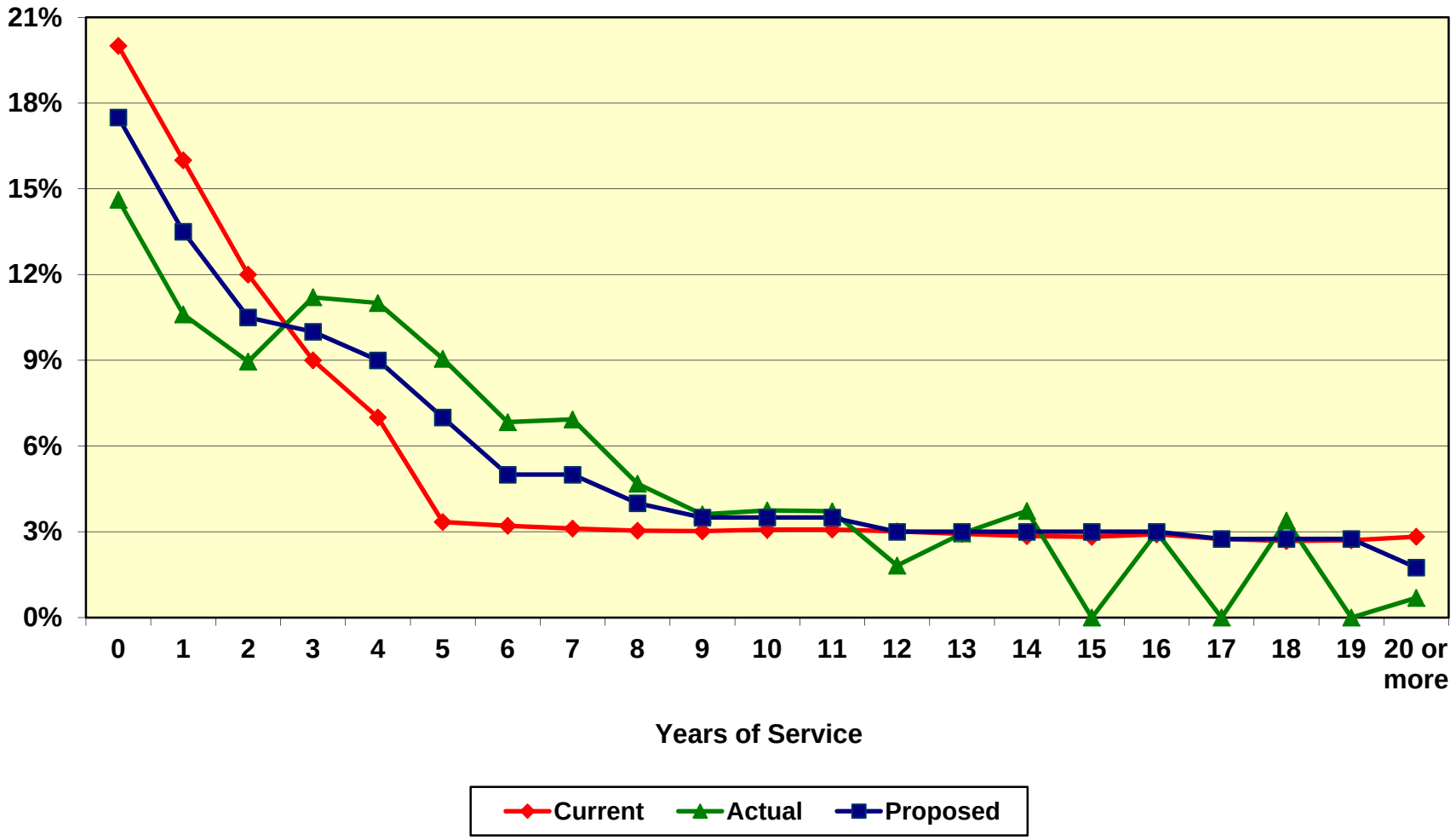


Chart 21
Termination Rates - Safety Law and Fire Members

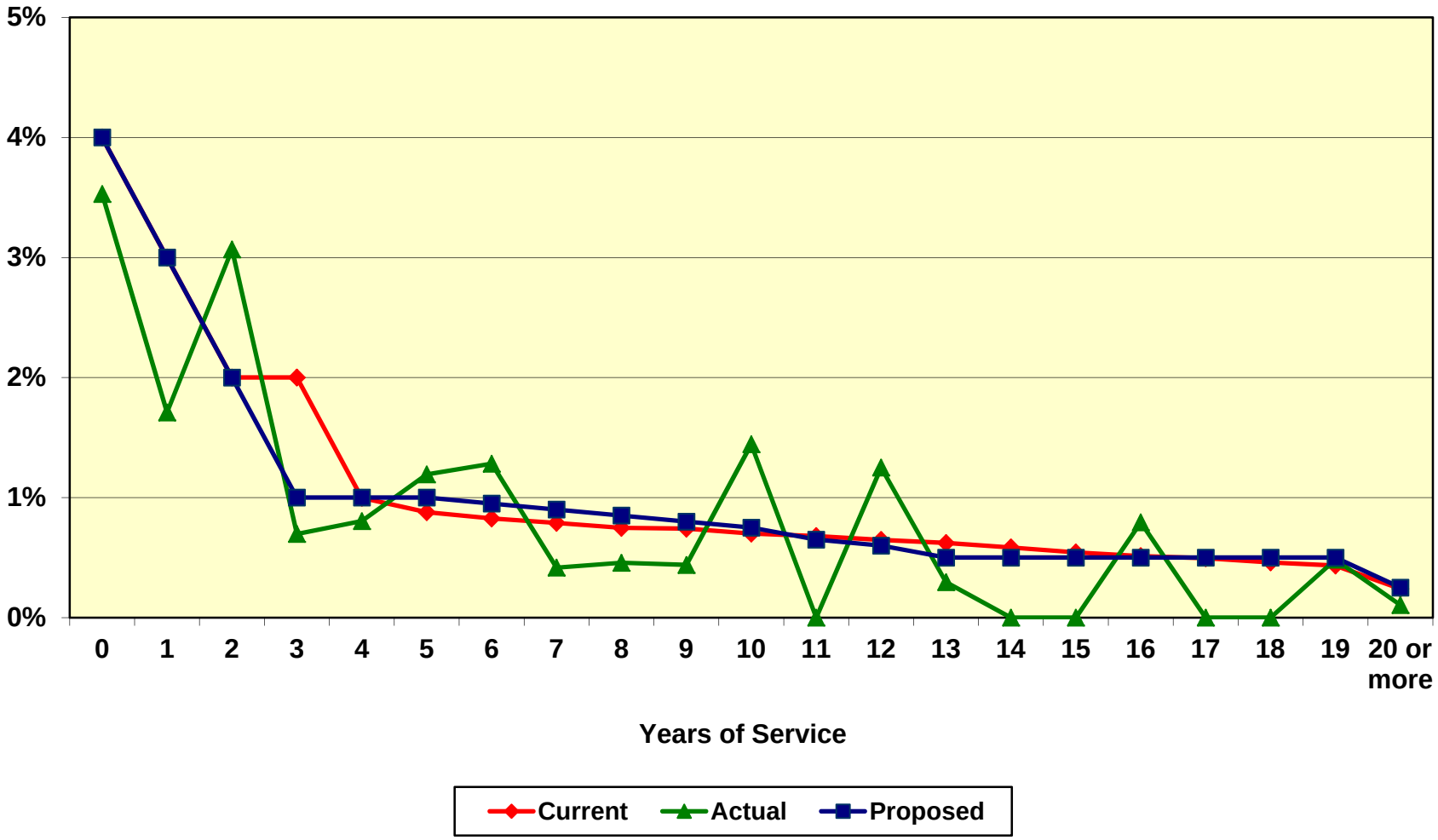
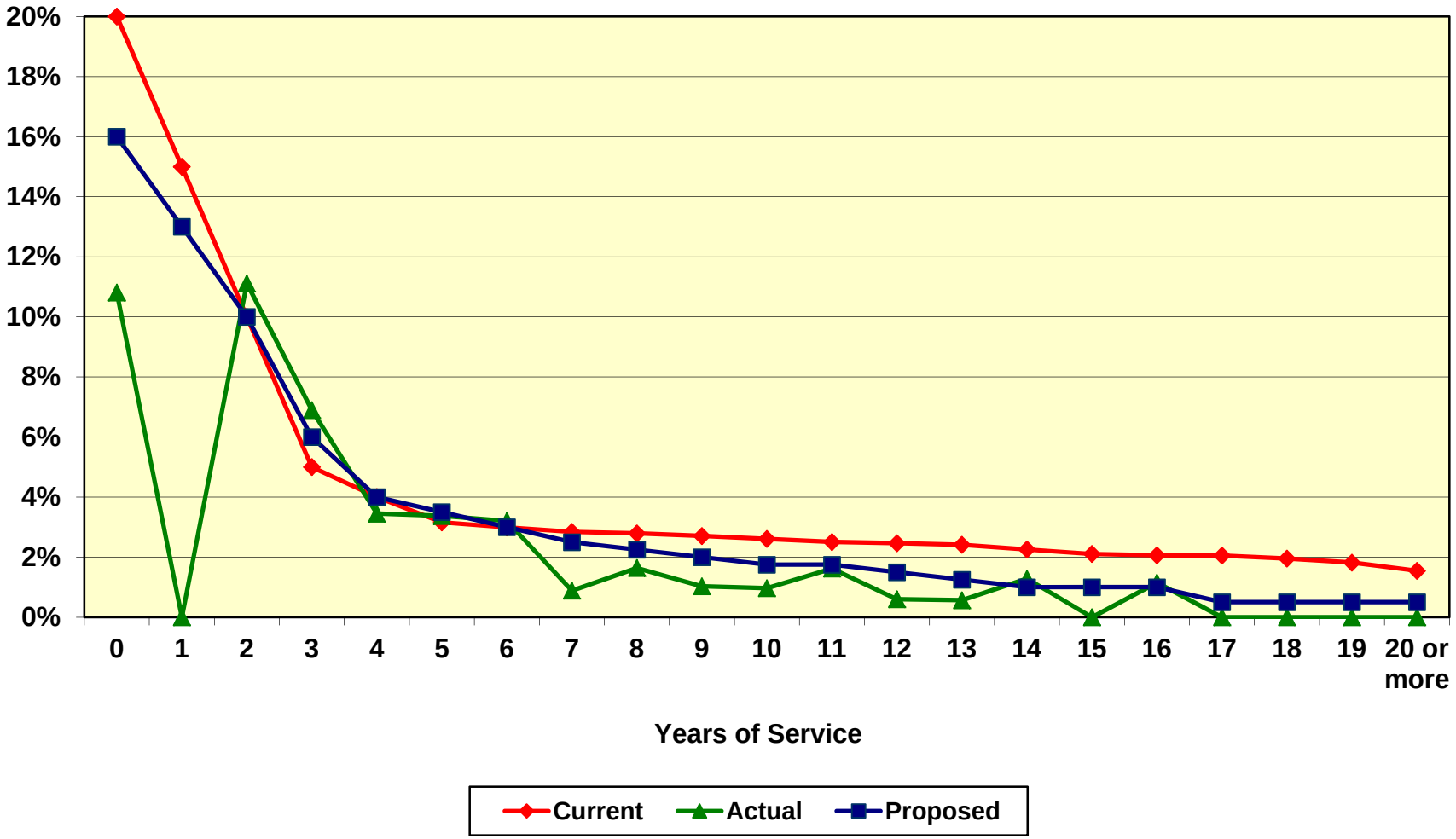


Chart 22
Termination Rates - Safety Probation Members



F. DISABILITY INCIDENCE RATES

When a member becomes disabled, he or she may be entitled to at least a 50% pension (service connected disability), or a pension that depends upon the member's years of service (non-service connected disability). The following summarizes the actual incidence of combined service and non-service connected disabilities over the past three years compared to the current and proposed assumptions for both service connected and non-service connected disability incidence:

Rates of Disability Incidence (General All Other)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.00%	0.00%	0.00%
25 – 29	0.00	0.00	0.00
30 – 34	0.03	0.00	0.01
35 – 39	0.08	0.02	0.05
40 – 44	0.13	0.10	0.10
45 – 49	0.15	0.08	0.12
50 – 54	0.15	0.10	0.15
55 – 59	0.20	0.21	0.20
60 – 64	0.40	0.28	0.35
65 – 69	0.40	0.27	0.35

Rates of Disability Incidence (General OCTA)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.00%	0.00%	0.00%
25 – 29	0.00	0.00	0.00
30 – 34	0.05	0.00	0.05
35 – 39	0.10	0.73	0.30
40 – 44	0.40	0.53	0.40
45 – 49	0.50	0.41	0.45
50 – 54	0.60	0.33	0.50
55 – 59	1.00	0.47	0.90
60 – 64	1.50	1.79	1.75
65 – 69	1.50	1.73	1.75

Rates of Disability Incidence (Safety Law and Fire)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.02%	0.00%	0.00%
25 – 29	0.05	0.00	0.02
30 – 34	0.10	0.00	0.05
35 – 39	0.30	0.08	0.20
40 – 44	0.40	0.00	0.30
45 – 49	0.60	0.46	0.50
50 – 54	1.20	1.14	1.20
55 – 59	2.00	2.75	2.50
60 – 64	5.00	9.72	7.00

Rates of Disability Incidence (Safety Probation)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.00%	0.00%	0.00%
25 – 29	0.10	0.00	0.05
30 – 34	0.20	0.00	0.10
35 – 39	0.20	0.00	0.10
40 – 44	0.20	0.00	0.10
45 – 49	0.20	0.30	0.20
50 – 54	0.20	0.00	0.20
55 – 59	0.20	0.65	0.25
60 – 64	0.00	0.00	0.00

Chart 23 compares the actual number of non-service connected and service connected disabilities over the past three years to that expected under both the current and proposed assumptions. The proposed disability rates were adjusted to reflect the past three years experience.

Chart 24 shows actual disablement rates, compared to the assumed and proposed rates for General All Other members. Charts 25-27 graph the same information as Chart 24, but for General OCTA, Safety Law and Fire and Safety Probation members.

The following table shows the currently assumed, observed and proposed assumed percentages for service versus non-service connected disability for the groups.

Group	Currently assumed percentage for disablements receiving service connected disability	Observed percentage receiving service connected disability	Proposed percentage for disablements receiving service connected disability	Proposed percentage for disablements receiving non-service connected disability
General All Other	50%	59%	55%	45%
General OCTA	70%	57%	65%	35%
Safety Law and Fire	100%	89%	100%	0%
Safety Probation	100%	50%	100%	0%

Chart 23
Actual Number of Disabilities Compared to Expected

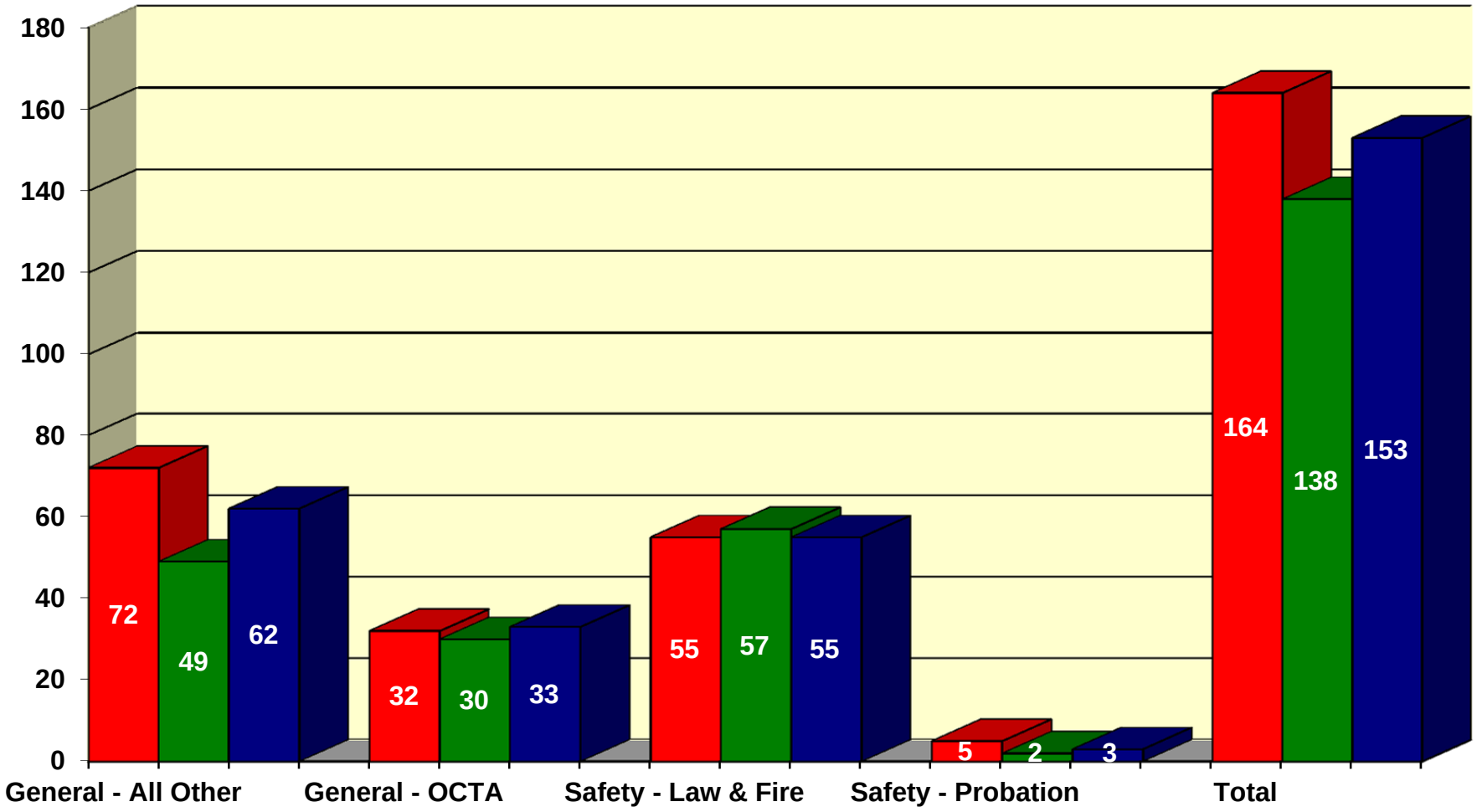


Chart 24
Disability Incidence Rates for General All Other Members

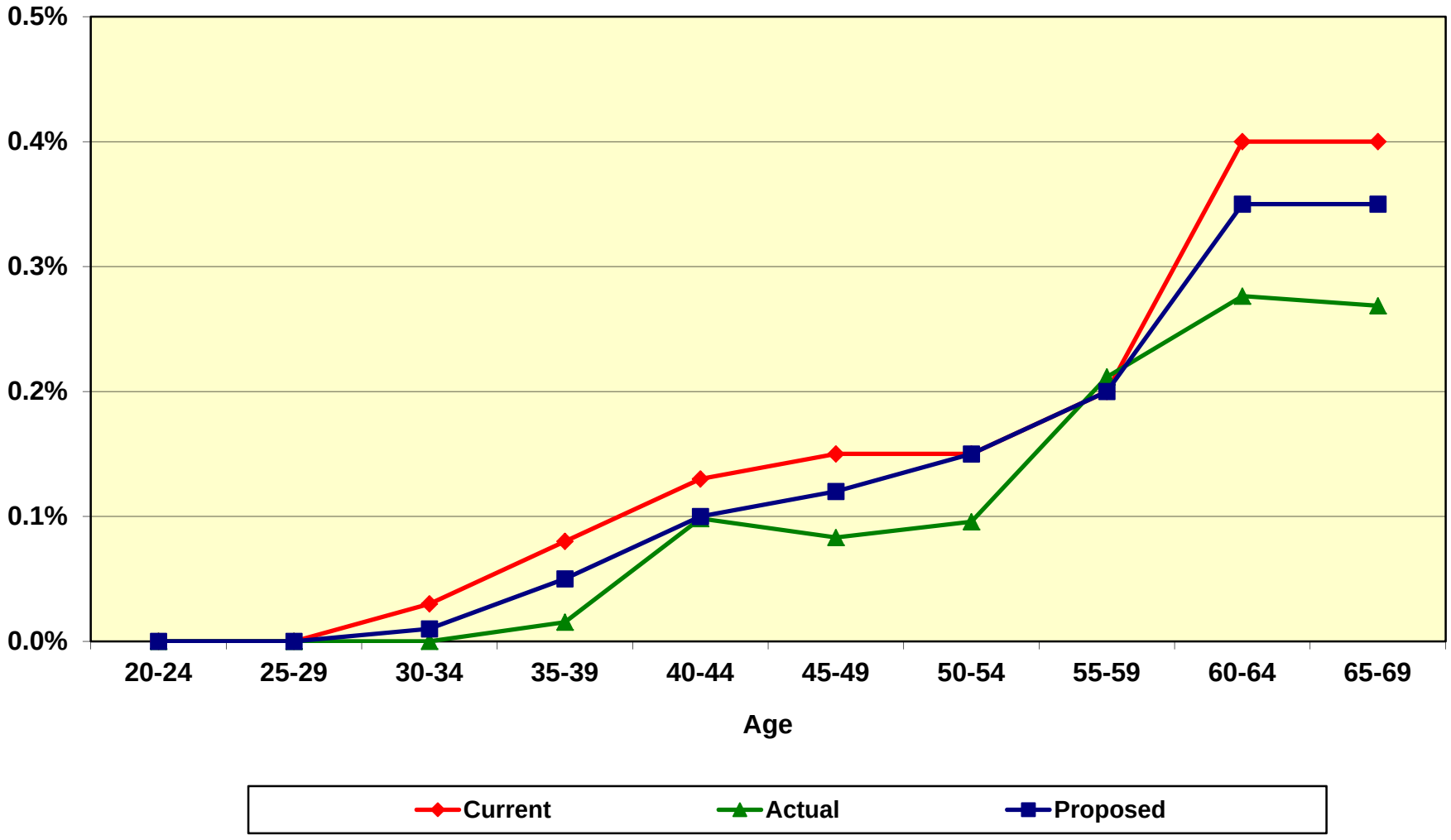


Chart 25
Disability Incidence Rates for General OCTA Members

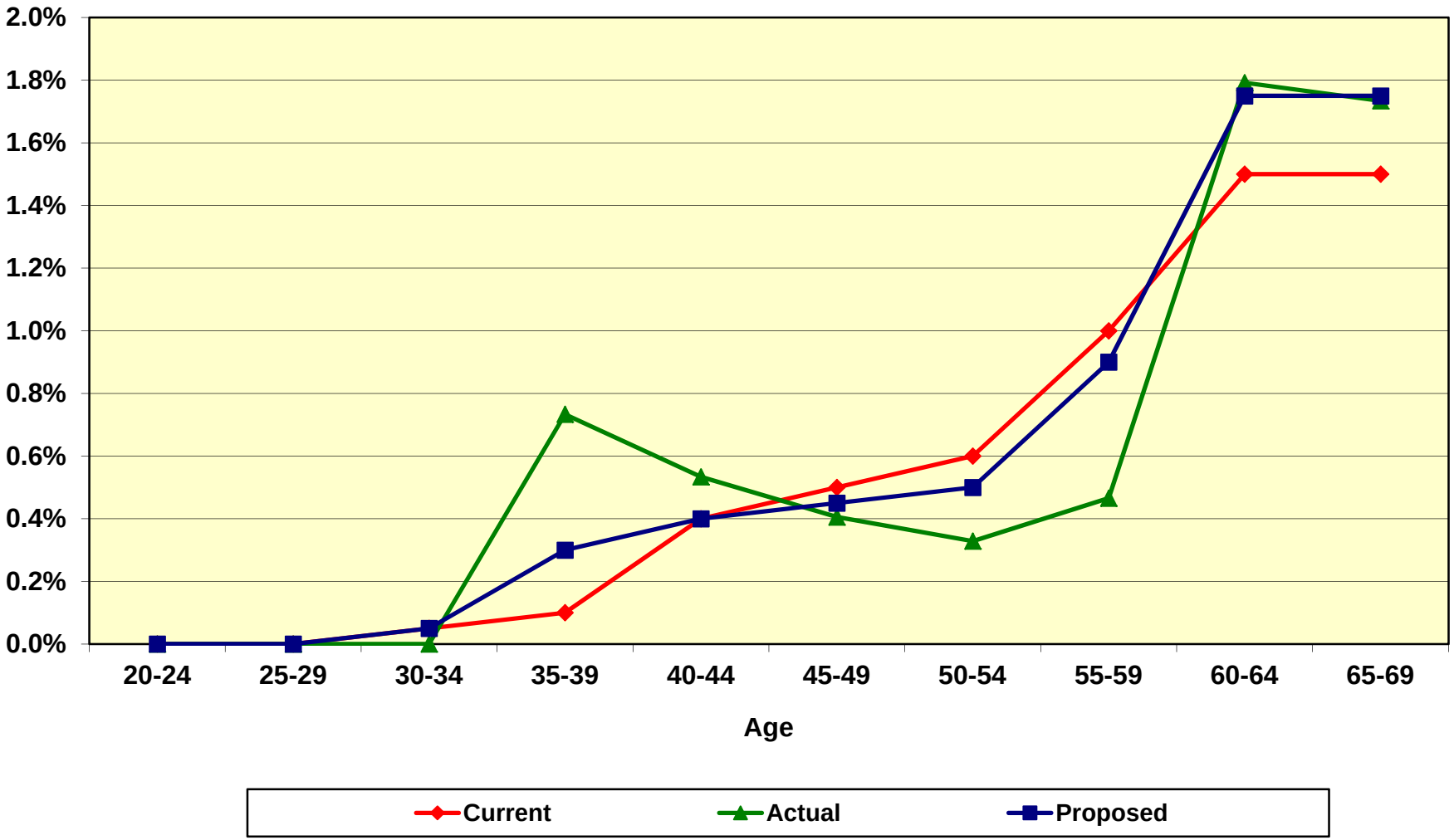


Chart 26
Disability Incidence Rates for Safety Law and Fire Members

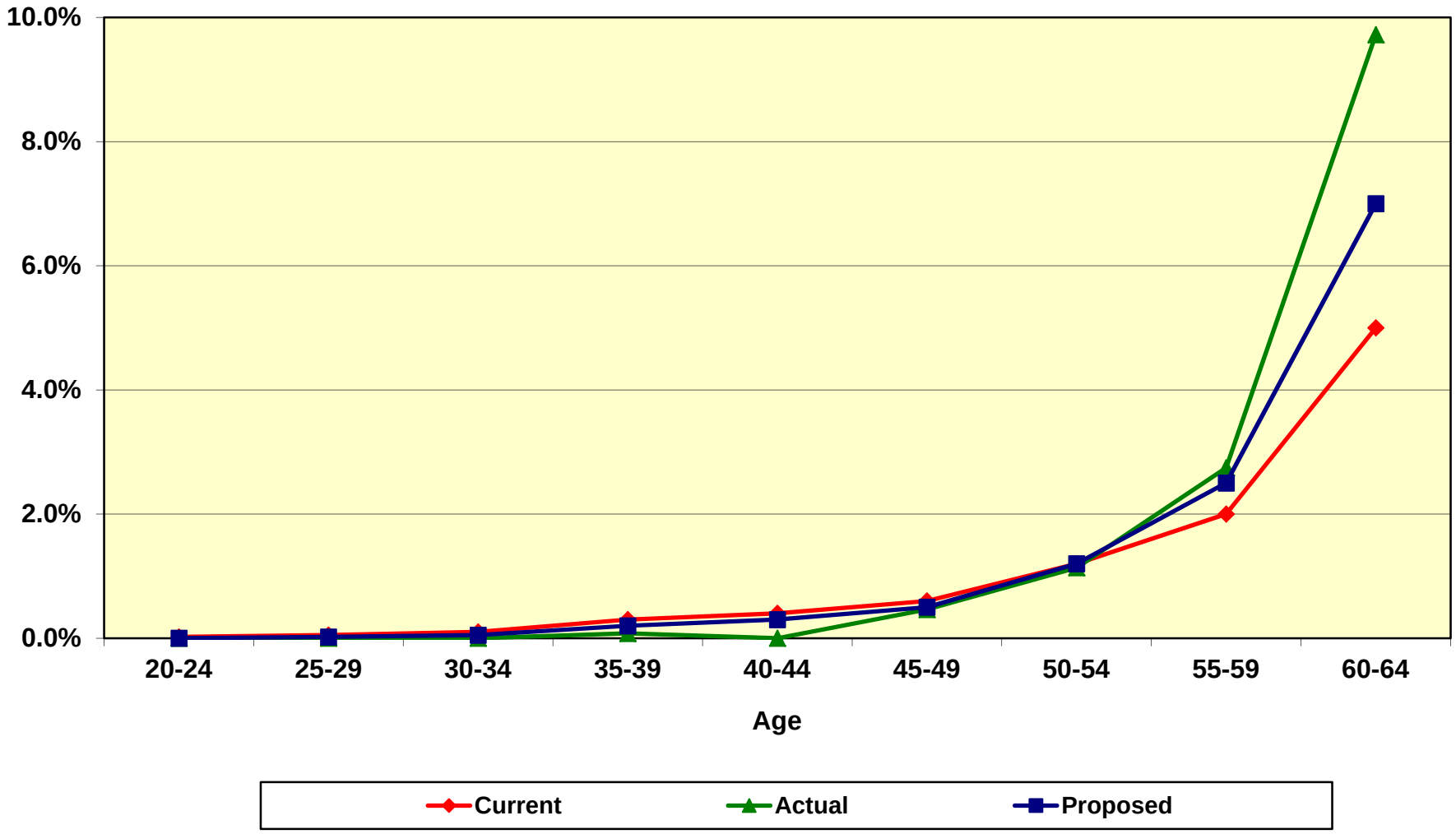
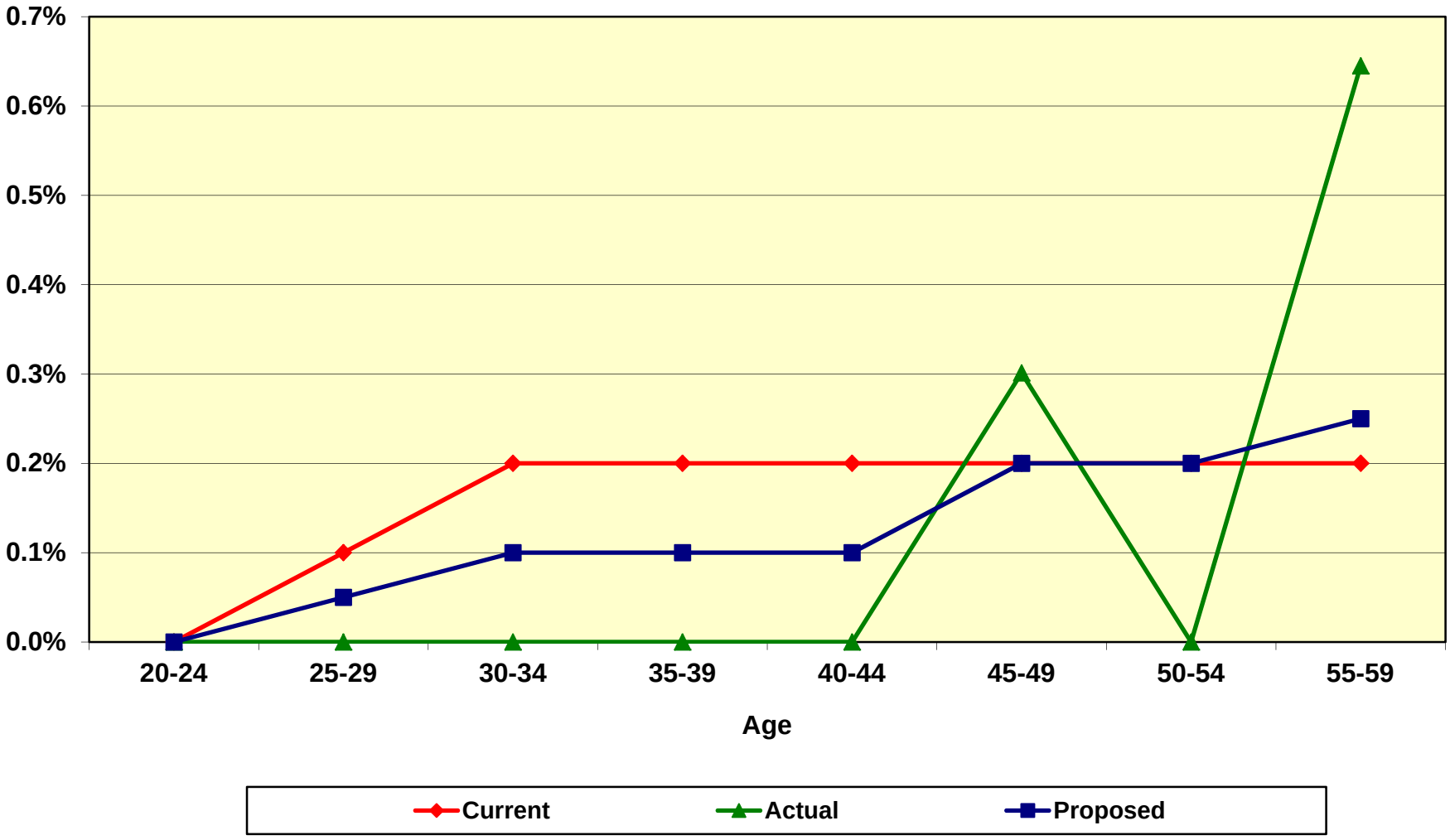


Chart 27
Disability Incidence Rates for Safety Probation Members



G. PROMOTIONAL AND MERIT SALARY INCREASES

The System's retirement benefits are determined in large part by a member's compensation just prior to retirement. 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 promotional increases.

The inflationary increases are assumed to follow the general annual inflation assumption discussed in our separate economic assumptions report where we recommended maintaining the current inflation assumption at 3.25%. We also discussed in that report maintaining the annual "across the board" pay increases at 0.50%. Therefore, the total assumed inflation and real "across the board" pay increase (i.e., wage inflation) remain unchanged at 3.75%. Unless the current method is changed, this is also the annual rate of payroll growth at which payments to amortize the Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase.

The annual merit and promotional 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 separately for General and Safety members. This is accomplished by:

- Measuring each continuing member's actual salary increase over each year of the experience period;
- Excluding any members with large increases (in the case of OCERS, we have excluded increases greater than 50%) or any decreases during any particular year;
- Categorizing these increases according to member demographics;
- Removing the wage inflation component from these increases (assumed to be equal to the increase in the members' average salary during the year);
- Averaging these 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, to be consistent with the other economic assumptions, these merit and promotional assumptions should be used in combination with the 3.75% assumed inflation and real "across the board" increases.

The following table shows the General members' actual average merit and promotional increases by years of service over the three-year period from January 1, 2011 through December 31, 2013 along with the actual average increases based on combining the current three-year period with the three years from the prior experience study. The current and proposed assumptions are also shown. The actual average total salary increases for the most recent three-year period were reduced by the actual average inflation plus "across the board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year over the current three-year experience period (1.0% on average).

General				
Years of Service	**Current Assumptions**	**January 1, 2011 Through December 31, 2013 Average Merit and Promotional Increases**	**Average Increases Combining Current (2011 – 2013) and Prior (2008 - 2010) Studies**	**Proposed Assumptions**
Less than 1	10.00%	9.08%	10.09%	10.00%
1	7.00	8.19	7.68	7.25
2	6.00	5.49	5.69	6.00
3	5.00	4.04	4.45	4.75
4	4.00	3.64	4.00	4.00
5	3.00	3.26	3.33	3.25
6	2.00	2.81	2.38	2.25
7	1.75	2.47	2.13	2.00
8	1.50	1.82	1.47	1.50
9	1.25	1.39	1.19	1.25
10	1.25	1.33	0.94	1.25
11	1.25	1.07	0.89	1.25
12	1.25	1.03	0.90	1.25
13	1.25	1.09	0.87	1.25
14	1.25	1.51	0.97	1.25
15	1.25	1.35	0.68	1.25
16	1.00	0.77	0.51	0.75
17	1.00	0.67	0.28	0.75
18	1.00	0.70	0.48	0.75
19	1.00	0.35	0.22	0.75
20 or more	1.00	0.81	0.46	0.75

The following table provides the same information for Safety members. The actual average merit and promotional increases were determined by reducing the actual average total salary increases by the actual average inflation plus real "across the board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year over the three-year period (0.3% on average).

Safety

Years of Service	Current Assumptions	January 1, 2011 Through December 31, 2013 Average Merit and Promotional Increases	Average Increases Combining Current (2011 – 2013) and Prior (2008 - 2010) Studies	Proposed Assumptions
Less than 1	14.00%	13.94%	15.85%	14.00%
1	9.00	15.10	11.99	10.00
2	8.00	8.60	8.81	8.50
3	7.00	5.57	6.43	6.75
4	5.00	5.51	5.85	5.25
5	4.00	5.50	5.09	4.50
6	3.00	4.58	4.18	3.50
7	3.00	3.93	3.56	3.25
8	2.00	2.60	2.60	2.25
9	2.00	2.60	2.54	2.25
10	1.50	2.66	2.20	1.75
11	1.50	1.82	1.98	1.75
12	1.50	1.95	2.39	1.75
13	1.50	1.68	1.98	1.75
14	1.50	1.98	2.66	1.75
15	1.50	2.86	2.57	1.75
16	1.00	1.77	2.05	1.50
17	1.00	2.26	2.24	1.50
18	1.00	2.29	3.19	1.50
19	1.00	1.81	2.68	1.50
20 or more	1.00	2.27	2.77	1.50

Charts 28 and 29 provide a graphical comparison of the actual promotional and merit increases, compared to the proposed and current assumptions. The charts also show the actual promotional and merit increases based on an average of both the current and previous three-year experience periods. This is discussed above. Chart 28 shows this information for General members and Chart 29 for Safety members.

Based on this experience, we are proposing slight decreases overall in the merit and promotional salary increases for General and slight increases overall in the merit and promotional increases for Safety members.

Chart 28
Merit and Promotional Salary Increase Rates - General Members

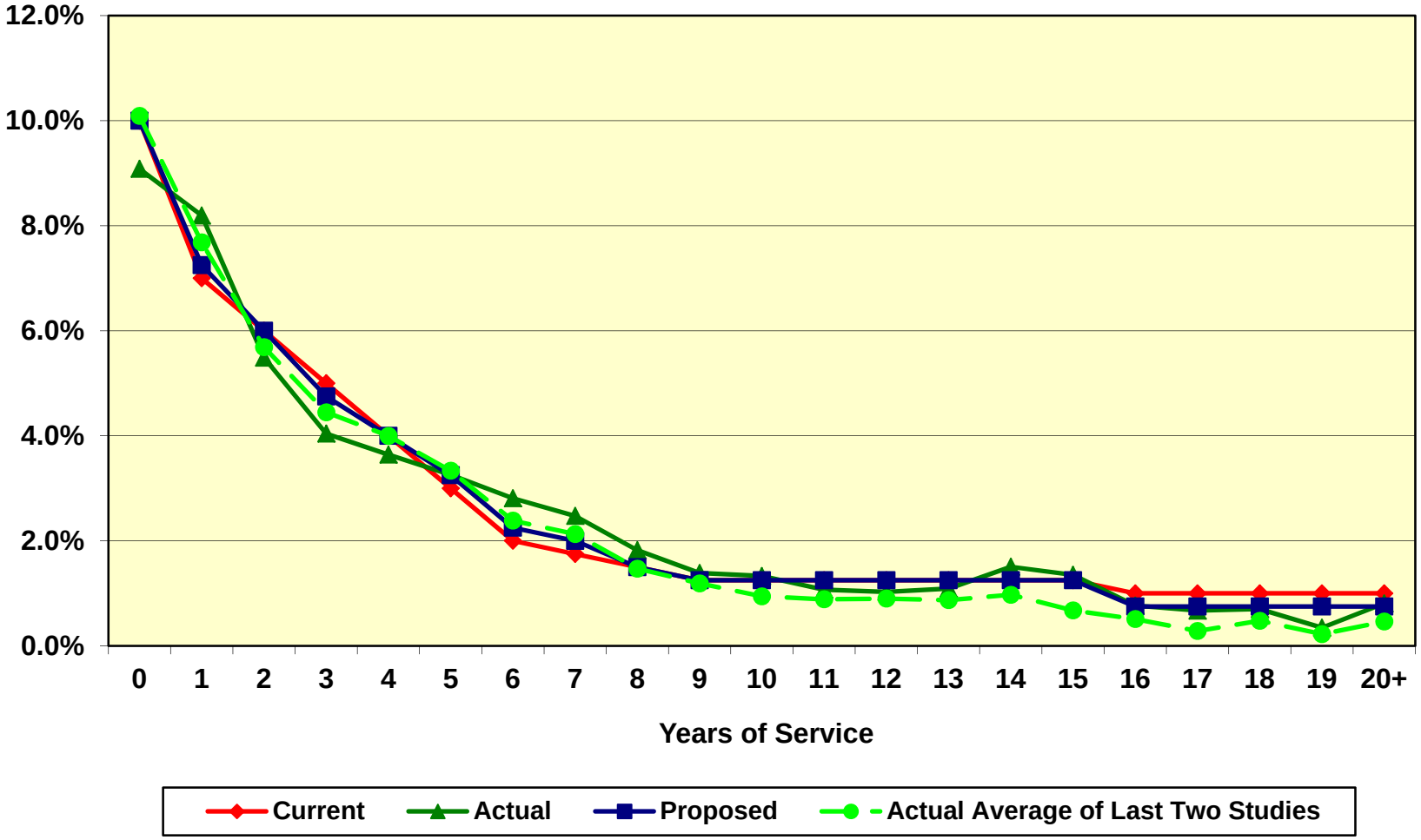
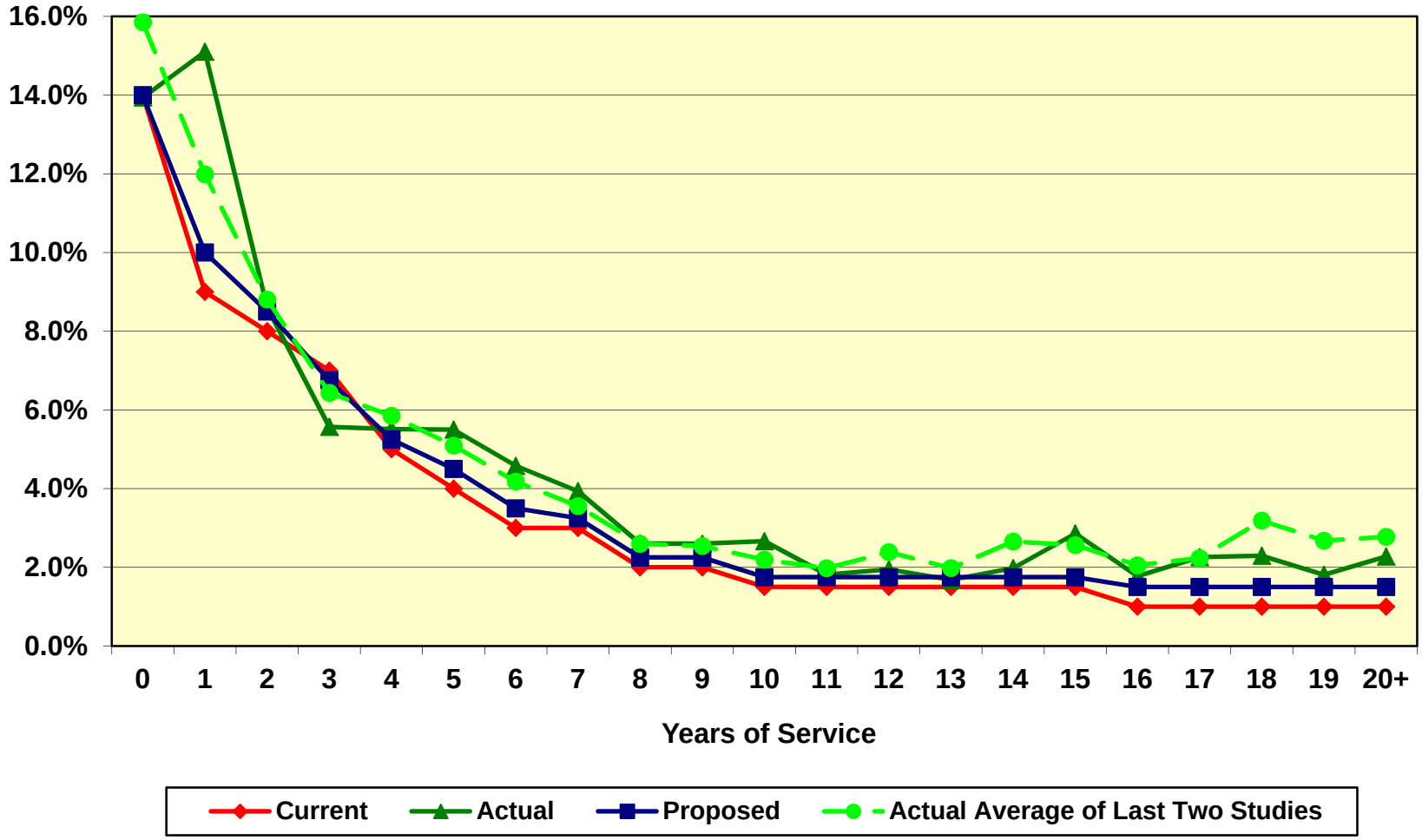


Chart 29
Merit and Promotional Salary Increase Rates - Safety Members



H. ADDITIONAL CASHOUTS

In response to the California Supreme Court ruling in the Ventura cases, employers agreed to include several additional pay elements as Earnable Compensation. There are two categories within which these additional pay elements fall:

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

The first category is recognized in the actuarial calculations by virtue of being included in the current pay of active members. The second category requires an actuarial assumption to anticipate its impact on a member's retirement benefit.

In this study, we have been provided with final average salaries determined by OCERS before ("FAS – Base") as well as after ("FAS – Final") including the terminal pay elements for members who retired during the last three years. We have studied the impact of including these pay elements by taking the ratio of "FAS – Final" to "FAS – Base". Members covered under CalPEPRA plans are not eligible to receive leave cashouts.

The current and recommended additional cashout assumptions are provided in the following table:

	Final One Year Salary			Final Three Year Salary		
	Currently Assumed	**Actual**	**Proposed**	**Currently Assumed**	**Actual**	**Proposed**
General Members	4.00%	3.48%	3.50%	2.70%	2.81%	2.80%
Safety - Probation	5.20%	3.78%	3.80%	2.70%	2.78%	2.80%
Safety - Law	6.60%	5.18%	5.20%	4.50%	4.70%	4.70%
Safety - Fire	4.00%	1.75%	2.00%	2.00%	1.95%	2.00%

APPENDIX A

CURRENT ACTUARIAL ASSUMPTIONS

Mortality Rates

Healthy: For General Members: RP-2000 Combined Healthy Mortality Table set back three years.

For Safety Members: RP-2000 Combined Healthy Mortality Table set back two years.

Disabled: For General Members: RP-2000 Combined Healthy Mortality Table set forward three years.

For Safety Members: RP-2000 Combined Healthy Mortality Table set forward two years.

Beneficiaries: Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

Member Contribution Rates: For General Members: RP-2000 Combined Healthy Mortality Table set back three years weighted 40% male and 60% female.

For Safety Members: RP-2000 Combined Healthy Mortality Table set back two years weighted 80% male and 20% female.

Termination Rates Before Retirement:

	Rate (%) Mortality			
	General		Safety	
Age	Male	Female	Male	Female
25	0.04	0.02	0.04	0.02
30	0.04	0.02	0.04	0.02
35	0.06	0.04	0.06	0.04
40	0.09	0.06	0.10	0.06
45	0.12	0.09	0.13	0.09
50	0.17	0.13	0.19	0.14
55	0.27	0.20	0.29	0.22
60	0.47	0.35	0.53	0.39
65	0.88	0.67	1.00	0.76

All pre-retirement deaths are assumed to be non-service connected.

Termination Rates Before Retirement (continued):

	Rate (%) Disability			
Age	General All Other[1]	General OCTA[2]	Safety - Law & Fire[3]	Safety - Probation[3]
20	0.00	0.00	0.01	0.00
25	0.00	0.00	0.04	0.06
30	0.02	0.03	0.08	0.16
35	0.06	0.08	0.22	0.20
40	0.11	0.28	0.36	0.20
45	0.14	0.46	0.52	0.20
50	0.15	0.56	0.96	0.20
55	0.18	0.84	1.68	0.20
60	0.32	1.30	3.80	0.08

(1) *50% of General All Other disabilities are assumed to be service connected disabilities. The other 50% are assumed to be non-service connected.*

(2) *70% of General - OCTA disabilities are assumed to be service connected disabilities. The other 30% are assumed to be non-service connected.*

(3) *100% of Safety – Law Enforcement, Fire and Probation disabilities are assumed to be service connected disabilities.*

Termination Rates Before Retirement (continued):

	Rate (%) Termination (< 5 Years of Service)			
Years of Service	General All Other[1]	General OCTA[1]	Safety – Law & Fire[2]	Safety - Probation[2]
0	13.0	20.0	4.0	20.0
1	8.0	16.0	3.0	15.0
2	7.0	12.0	2.0	10.0
3	6.0	9.0	2.0	5.0
4	5.0	7.0	1.0	4.0

	Termination (5+ Years of Service)			
Age	General All Other[3]	General OCTA[3]	Safety – Law & Fire[3]	Safety – Probation[3]
20	5.0	4.0	1.0	4.0
25	4.4	4.0	1.0	4.0
30	4.0	4.0	1.0	3.4
35	3.4	4.0	0.9	3.0
40	3.0	3.4	0.6	2.4
45	2.4	3.0	0.5	2.0
50	2.3	3.0	0.2	2.0
55	2.5	3.0	0.0	1.4
60	2.5	3.0	0.0	0.4

(1) *50% of all terminated members will choose a refund of contributions and 50% will choose a deferred vested benefit.*

(2) *40% of all terminated members will choose a refund of contributions and 60% will choose a deferred vested benefit.*

(3) *30% of terminated members will choose a refund of contributions and 70% will choose a deferred vested benefit.*

Retirement Rates:

	Rate (%)							
Age	General - Enhanced	General - Non-Enhanced[1]	General - SJC (31676.12)	Safety - Law (31664.1)[2]	Safety - Law (31664.2)[2]	Safety - Fire (31664.1)[2]	Safety - Fire (31664.2)[2]	Safety - Probation[2]
49	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0
50	3.0	2.0	3.0	14.0	11.5	7.0	8.0	4.0
51	2.0	2.0	3.0	14.0	12.0	9.0	10.0	4.0
52	2.0	2.0	3.0	14.0	12.7	11.0	11.0	4.0
53	2.0	2.0	3.0	14.0	17.9	12.0	12.0	4.0
54	5.0	2.0	3.0	20.0	18.8	16.0	14.0	8.0
55	15.0	3.0	4.0	20.0	30.7	20.0	24.0	12.0
56	9.0	4.0	5.0	20.0	20.0	20.0	23.0	12.0
57	9.0	6.0	6.0	20.0	20.0	25.0	27.0	16.0
58	9.0	8.0	7.0	20.0	25.0	25.0	27.0	25.0
59	9.0	8.0	9.0	25.0	30.0	30.0	36.0	25.0
60	12.0	8.0	11.0	60.0	100.0	60.0	100.0	25.0
61	12.0	8.0	13.0	60.0	100.0	60.0	100.0	25.0
62	17.0	16.0	15.0	60.0	100.0	60.0	100.0	25.0
63	15.0	16.0	15.0	60.0	100.0	60.0	100.0	50.0
64	18.0	16.0	20.0	60.0	100.0	60.0	100.0	100.0
65	20.0	20.0	20.0	100.0	100.0	100.0	100.0	100.0
66	25.0	25.0	24.0	100.0	100.0	100.0	100.0	100.0
67	21.0	21.0	24.0	100.0	100.0	100.0	100.0	100.0
68	21.0	21.0	24.0	100.0	100.0	100.0	100.0	100.0
69	21.0	21.0	24.0	100.0	100.0	100.0	100.0	100.0
70	60.0	40.0	100.0	100.0	100.0	100.0	100.0	100.0
71	60.0	40.0	100.0	100.0	100.0	100.0	100.0	100.0
72	60.0	40.0	100.0	100.0	100.0	100.0	100.0	100.0
73	60.0	40.0	100.0	100.0	100.0	100.0	100.0	100.0
74	60.0	40.0	100.0	100.0	100.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] *These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T).*

[2] *Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.*

Retirement Rates (Continued):

	Rate (%)			
Age	CalPEPRA 2.5% @ 67 General Formula	CalPEPRA Safety - Probation Formula[1]	CalPEPRA Safety - Law Formula[1]	CalPEPRA Safety - Fire Formula[1]
50	0.0	3.0	10.0	7.0
51	0.0	3.0	10.5	8.5
52	4.0	3.0	11.0	9.5
53	1.5	3.0	15.5	10.5
54	1.5	7.0	16.5	12.0
55	2.5	10.5	27.0	21.0
56	3.5	10.5	17.5	20.0
57	5.5	14.0	18.0	23.5
58	7.5	22.0	22.0	23.5
59	7.5	22.0	26.0	31.5
60	7.5	100.0	100.0	100.0
61	7.5	100.0	100.0	100.0
62	15.0	100.0	100.0	100.0
63	15.0	100.0	100.0	100.0
64	15.0	100.0	100.0	100.0
65	19.0	100.0	100.0	100.0
66	25.0	100.0	100.0	100.0
67	21.0	100.0	100.0	100.0
68	21.0	100.0	100.0	100.0
69	21.0	100.0	100.0	100.0
70	40.0	100.0	100.0	100.0
71	40.0	100.0	100.0	100.0
72	40.0	100.0	100.0	100.0
73	40.0	100.0	100.0	100.0
74	40.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0

[1] *Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.*

Retirement Age and Benefit for Deferred Vested Members:	For deferred vested members, we make the following retirement assumption: General Age: 57 Safety Age: 53 We assume that 25% of future General and 30% of future Safety deferred vested members are reciprocal. For reciprocals, we assume 4.75% compensation increases per annum.
Liability Calculation for Current Deferred Vested Members:	Liability for a current deferred vested member is calculated based on salary, service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.
Future Benefit Accruals:	1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Percent Married:	80% of male members and 50% of female members are assumed to be married at retirement or time of pre-retirement death.
Age of Spouse:	Female (or male) three years younger (or older) than spouse.
Net Investment Return:	7.25%, net of investment and administration expenses.
Employee Contribution Crediting Rate:	5.00%, compounded semi-annually.
Consumer Price Index:	Increase of 3.25% per year; retiree COLA increases due to CPI are limited to maximum of 3.00% per year.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.25% per year; plus "across the board" salary increases of 0.50% per year; plus the following merit and promotional increases:

Years of Service	General	Safety
Less than 1	10.00%	14.00%
1	7.00	9.00
2	6.00	8.00
3	5.00	7.00
4	4.00	5.00
5	3.00	4.00
6	2.00	3.00
7	1.75	3.00
8	1.50	2.00
9	1.25	2.00
10	1.25	1.50
11	1.25	1.50
12	1.25	1.50
13	1.25	1.50
14	1.25	1.50
15	1.25	1.50
16	1.00	1.00
17	1.00	1.00
18	1.00	1.00
19	1.00	1.00
20 and Over	1.00	1.00

Additional Cashout Assumptions:

Non-CalPEPRA Formulas

Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

	Final One Year Salary	**Final Three Year Salary**
General Members	4.00%	2.70%
Safety - Probation	5.20%	2.70%
Safety - Law	6.60%	4.50%
Safety - Fire	4.00%	2.00%

The additional cashout assumptions are the same for service and disability retirements.

CalPEPRA Formulas

None

APPENDIX B

PROPOSED ACTUARIAL ASSUMPTIONS

Mortality Rates

Healthy: For General Members: RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set back two years.

Disabled: For General Members: RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set forward six years for males and set forward three years for females.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020.

Beneficiaries: Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

Member Contribution Rates: For General Members: RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 weighted 40% male and 60% female.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set back two years weighted 80% male and 20% female.

Termination Rates Before Retirement:

	Rate (%) Mortality			
	General		Safety	
Age	Male	Female	Male	Female
25	0.04	0.02	0.04	0.02
30	0.04	0.02	0.04	0.02
35	0.07	0.04	0.06	0.04
40	0.10	0.07	0.09	0.06
45	0.14	0.11	0.12	0.09
50	0.20	0.16	0.18	0.14
55	0.34	0.25	0.27	0.21
60	0.59	0.41	0.48	0.33
65	1.00	0.76	0.82	0.60

All General pre-retirement deaths are assumed to be non-service connected. For Safety, 90% of pre-retirement deaths are assumed to be non-service connected. The other 10% are assumed to be service connected

Termination Rates Before Retirement (continued):

	Rate (%) Disability			
Age	General All Other[1]	General OCTA[2]	Safety - Law & Fire[3]	Safety - Probation[3]
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.01	0.03
30	0.01	0.03	0.04	0.08
35	0.03	0.20	0.14	0.10
40	0.08	0.36	0.26	0.10
45	0.11	0.43	0.42	0.16
50	0.14	0.48	0.92	0.20
55	0.18	0.74	1.98	0.23
60	0.29	1.41	5.20	0.10

(1) *55% of General All Other disabilities are assumed to be service connected disabilities. The other 45% are assumed to be non-service connected.*

(2) *65% of General - OCTA disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected.*

(3) *100% of Safety – Law Enforcement, Fire and Probation disabilities are assumed to be service connected disabilities.*

Termination Rates Before Retirement (continued):

Years of Service	Rate (%) Termination			
	General All Other[1]	General OCTA[2]	Safety – Law & Fire[3]	Safety - Probation[4]
0	11.00	17.50	4.00	16.00
1	8.00	13.50	3.00	13.00
2	7.00	10.50	2.00	10.00
3	5.00	10.00	1.00	6.00
4	4.00	9.00	1.00	4.00
5	3.75	7.00	1.00	3.50
6	3.50	5.00	0.95	3.00
7	3.00	5.00	0.90	2.50
8	2.75	4.00	0.85	2.25
9	2.50	3.50	0.80	2.00
10	2.25	3.50	0.75	1.75
11	2.00	3.50	0.65	1.75
12	2.00	3.00	0.60	1.50
13	1.75	3.00	0.50	1.25
14	1.75	3.00	0.50	1.00
15	1.75	3.00	0.50	1.00
16	1.50	3.00	0.50	1.00
17	1.50	2.75	0.50	0.50
18	1.50	2.75	0.50	0.50
19	1.50	2.75	0.50	0.50
20 +	1.25	1.75	0.25	0.50

(1) *40% of all terminated members with less than 5 years of service and 25% of all terminated members with 5 or more years of service will choose a refund of contributions.*

(2) *45% of all terminated members with less than 5 years of service and 35% of all terminated members with 5 or more years of service will choose a refund of contributions.*

(3) *20% of all terminated members with less than 5 years of service and 20% of all terminated members with 5 or more years of service will choose a refund of contributions.*

(4) *40% of all terminated members with less than 5 years of service and 30% of all terminated members with 5 or more years of service will choose a refund of contributions.*

Retirement Rates:

	Rate (%)							
Age	General - Enhanced	General - Non-Enhanced[1]	General - SJC (31676.12)	Safety - Law (31664.1)[2]	Safety - Law (31664.2)[2]	Safety - Fire (31664.1)[2]	Safety - Fire (31664.2)[2]	Safety - Probation[2]
49	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0
50	2.5	2.5	3.0	16.0	11.5	6.0	8.0	3.0
51	2.0	2.5	3.0	16.0	12.0	8.0	10.0	3.0
52	2.0	2.5	3.0	16.0	12.7	9.0	11.0	4.0
53	2.0	2.5	3.0	16.0	17.9	10.0	12.0	4.0
54	5.0	2.5	3.0	22.0	18.8	16.0	14.0	6.0
55	15.0	3.0	4.0	22.0	30.7	19.0	24.0	11.0
56	10.0	3.5	5.0	20.0	20.0	20.0	23.0	11.0
57	10.0	5.0	6.0	20.0	20.0	23.0	27.0	17.0
58	10.0	5.0	7.0	20.0	25.0	30.0	27.0	20.0
59	11.0	7.0	9.0	26.0	30.0	30.0	36.0	20.0
60	12.0	9.0	11.0	45.0	100.0	45.0	100.0	20.0
61	12.0	10.0	13.0	45.0	100.0	45.0	100.0	20.0
62	15.0	16.0	15.0	45.0	100.0	45.0	100.0	25.0
63	16.0	16.0	15.0	45.0	100.0	45.0	100.0	50.0
64	16.0	18.0	20.0	45.0	100.0	45.0	100.0	50.0
65	21.0	21.0	20.0	100.0	100.0	100.0	100.0	100.0
66	22.0	26.0	24.0	100.0	100.0	100.0	100.0	100.0
67	23.0	21.0	24.0	100.0	100.0	100.0	100.0	100.0
68	23.0	21.0	24.0	100.0	100.0	100.0	100.0	100.0
69	23.0	21.0	24.0	100.0	100.0	100.0	100.0	100.0
70	40.0	30.0	100.0	100.0	100.0	100.0	100.0	100.0
71	40.0	30.0	100.0	100.0	100.0	100.0	100.0	100.0
72	40.0	30.0	100.0	100.0	100.0	100.0	100.0	100.0
73	40.0	30.0	100.0	100.0	100.0	100.0	100.0	100.0
74	40.0	30.0	100.0	100.0	100.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] *These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T).*

[2] *Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.*

Retirement Rates (Continued):

	Rate (%)			
Age	CalPEPRA 2.5% @ 67 General Formula	CalPEPRA Safety - Probation Formula[1]	CalPEPRA Safety - Law Formula[1]	CalPEPRA Safety - Fire Formula[1]
50	0.0	2.5	11.0	6.5
51	0.0	2.5	11.5	8.0
52	4.0	3.0	12.0	9.0
53	1.5	3.0	16.0	10.0
54	1.5	5.5	17.0	12.0
55	2.5	10.0	28.0	21.0
56	3.5	10.0	18.0	20.0
57	5.5	15.0	17.5	22.0
58	7.5	20.0	22.0	25.0
59	7.5	20.0	26.0	31.5
60	7.5	100.0	100.0	100.0
61	7.5	100.0	100.0	100.0
62	14.0	100.0	100.0	100.0
63	14.0	100.0	100.0	100.0
64	14.0	100.0	100.0	100.0
65	18.0	100.0	100.0	100.0
66	22.0	100.0	100.0	100.0
67	23.0	100.0	100.0	100.0
68	23.0	100.0	100.0	100.0
69	23.0	100.0	100.0	100.0
70	30.0	100.0	100.0	100.0
71	30.0	100.0	100.0	100.0
72	30.0	100.0	100.0	100.0
73	30.0	100.0	100.0	100.0
74	30.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0

[1] *Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.*

Retirement Age and Benefit for Deferred Vested Members:

For deferred vested members, we make the following retirement assumption:

General Age:	58
Safety Age:	53

We assume that 20% of future General and 30% of future Safety deferred vested members are reciprocal. For reciprocals, we assume 4.50% compensation increases for General and 5.25% for Safety per annum.

Liability Calculation for Current Deferred Vested Members:

Liability for a current deferred vested member is calculated based on salary, service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.

Future Benefit Accruals:

1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.

Unknown Data for Members:

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

Percent Married:

75% of male members and 50% of female members are assumed to be married at retirement or time of pre-retirement death.

Age of Spouse:

Female (or male) three years younger (or older) than spouse.

Net Investment Return:

7.50% or 7.25%, net of investment expenses but gross (not reduced) for administration expenses.

Employee Contribution Crediting Rate:

5.00%, compounded semi-annually.

Consumer Price Index:

Increase of 3.25% per year; retiree COLA increases due to CPI are limited to maximum of 3.00% per year.

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.25% per year; plus "across the board" salary increases of 0.50% per year; plus the following merit and promotional increases:

Years of Service	General	Safety
Less than 1	10.00%	14.00%
1	7.25	10.00
2	6.00	8.50
3	4.75	6.75
4	4.00	5.25
5	3.25	4.50
6	2.25	3.50
7	2.00	3.25
8	1.50	2.25
9	1.25	2.25
10	1.25	1.75
11	1.25	1.75
12	1.25	1.75
13	1.25	1.75
14	1.25	1.75
15	1.25	1.75
16	0.75	1.50
17	0.75	1.50
18	0.75	1.50
19	0.75	1.50
20 and Over	0.75	1.50

Additional Cashout Assumptions:

Non-CalPEPRA Formulas

Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

	Final One Year Salary	**Final Three Year Salary**
General Members	3.50%	2.80%
Safety - Probation	3.80%	2.80%
Safety - Law	5.20%	4.70%
Safety - Fire	2.00%	2.00%

The additional cashout assumptions are the same for service and disability retirements.

CalPEPRA Formulas

None